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	zie tabblad 'Uitleg' voor uitleg per kolom

Lijnen algemeen
Mastmodellen en mastberekeningen
Funderingsconstructies
Aarding
Lijnarmaturen en kettingen

Documentnummer / Meridiankenmerk	Documenttitel	RFA	Documentnummer opdrachtnemer	Documentnaam	Bestandsextensie
1669074	Resultaten onderzoek (toetsingen)	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Resultaten onderzoek (toetsingen)	PDF
~~1668886~~	~~Bijlage 1 Balkrooster 4xBeton32x32 mast 146~~	~~1669141~~	~~KIJ_BKK_DIM380-000-32-1001~~	~~KIJ_BKK_DIM380-000-32-1001-Bijlage 1 Balkrooster 4xBeton32x32 mast 146~~	PDF
~~1668887~~	~~Bijlage 2 Balkrooster 4xBeton32x32 mast 147~~	~~1669141~~	~~KIJ_BKK_DIM380-000-32-1001~~	~~KIJ_BKK_DIM380-000-32-1001-Bijlage 2 Balkrooster 4xBeton32x32 mast 147~~	PDF
1668888	Bijlage 3 Balkrooster 4xBeton40x40 mast 157	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 3 Balkrooster 4xBeton40x40 mast 157	PDF
1668889	Bijlage 4 Balkrooster 4xBeton40x40 mast 158	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 4 Balkrooster 4xBeton40x40 mast 158	PDF
1668890	Bijlage 5 Blokpoer 1xLD1+2xTubex	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 5 Blokpoer 1xLD1+2xTubex	PDF
1668892	Bijlage 6 Balkrooster 4xBeton40x40 mast 159	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 6 Balkrooster 4xBeton40x40 mast 159	PDF
1668893	Bijlage 7 Balkrooster 4xBeton40x40 mast 17	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 7 Balkrooster 4xBeton40x40 mast 17	PDF
1668894	Bijlage 8 Balkrooster 4xBeton40x40 mast 37	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 8 Balkrooster 4xBeton40x40 mast 37	PDF
1668895	Bijlage 9 Balkrooster 4xBeton40x40 mast 60	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 9 Balkrooster 4xBeton40x40 mast 60	PDF
1668896	Bijlage 10 Balkrooster 4xBeton40x40 mast 68	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 10 Balkrooster 4xBeton40x40 mast 68	PDF
1668902	Bijlage 11 Balkrooster 4xBeton40x40 mast 108	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 11 Balkrooster 4xBeton40x40 mast 108	PDF
1668909	Bijlage 12 Balkrooster 4xBeton40x40	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 12 Balkrooster 4xBeton40x40	PDF
~~1668919~~	~~Bijlage 13_Blokpoer 2xLD1~~	~~1669141~~	~~KIJ_BKK_DIM380-000-32-1001~~	~~KIJ_BKK_DIM380-000-32-1001-Bijlage 13_Blokpoer 2xLD1~~	~~PDF~~
~~1668932~~	~~Bijlage 14_Koppelframe 1xLD1~~	~~1669141~~	~~KIJ_BKK_DIM380-000-32-1001~~	~~KIJ_BKK_DIM380-000-32-1001-Bijlage 14_Koppelframe 1xLD1~~	~~PDF~~
1668941	Bijlage 15_Blokpoer 3xBeton40x40 Mast S+0_II	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 15_Blokpoer 3xBeton40x40 Mast S+0_II	PDF
1668960	Bijlage 16_Blokpoer 3xBeton40x40 Mast S+0_III	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 16_Blokpoer 3xBeton40x40 Mast S+0_III	PDF
1668961	Bijlage 17_Blokpoer 3xBeton40x40 Mast S+3 36	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 17_Blokpoer 3xBeton40x40 Mast S+3 36	PDF
1668963	Bijlage 18_Blokpoer 3xBeton40x40 Mast S+3	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 18_Blokpoer 3xBeton40x40 Mast S+3	PDF
1668964	Bijlage 19_Blokpoer 3xBeton40x40 Mast S+6	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 19_Blokpoer 3xBeton40x40 Mast S+6	PDF
1668965	Bijlage 20_Blokpoer 3xBeton40x40 Mast S+9	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 20_Blokpoer 3xBeton40x40 Mast S+9	PDF
1668966	Bijlage 21_Cilinderpoer 2xMV+1xLD1+2xTubex Mast HB	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 21_Cilinderpoer 2xMV+1xLD1+2xTubex Mast HB	PDF
1668967	Bijlage 22_Cilinderpoer 2xMV+1xLD1 Mast HA	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 22_Cilinderpoer 2xMV+1xLD1 Mast HA	PDF
1668968	Bijlage 23_Cilinderpoer 2xMV+1xLD1 Mast HA+3	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 23_Cilinderpoer 2xMV+1xLD1 Mast HA+3	PDF
1668970	Bijlage 24_Cilinderpoer 4xTubex406	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 24_Cilinderpoer 4xTubex406	PDF
1668971	Bijlage 25_Anker type A	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 25_Anker type A	PDF
1668972	Bijlage 26_Anker type B	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 26_Anker type B	PDF
1668973	Bijlage 27_Anker type C	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 27_Anker type C	PDF
1668975	Bijlage 28_Anker type D	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 28_Anker type D	PDF
1668976	Bijlage 29_Type C5_L	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 29_Type C5_L	PDF
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1668979	Bijlage 31_Type C7_M	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 31_Type C7_M	PDF
1668981	Bijlage 32_Type C8_L	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 32_Type C8_L	PDF
~~1668982~~	~~Bijlage 33_Type C9~~	~~1669141~~	~~KIJ_BKK_DIM380-000-32-1001~~	~~KIJ_BKK_DIM380-000-32-1001-Bijlage 33_Type C9~~	~~PDF~~
1668983	Bijlage 34_Type F_J	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 34_Type F_J	PDF
1668984	Bijlage 35_Type G_M	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 35_Type G_M	PDF
1668985	Bijlage 36_Type G_N	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 36_Type G_N	PDF
1668986	Bijlage 37_Type H_N	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 37_Type H_N	PDF
1668988	Bijlage 38_Type H_Q	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 38_Type H_Q	PDF
1668989	Bijlage 39_Type betonkop 400_350_320	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 39_Type betonkop 400_350_320	PDF
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1668993	Bijlage 42_Doorsnede Blokpoer 220	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 42_Doorsnede Blokpoer 220	PDF
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1668996	Bijlage 44_Doorsnede Blokpoer 700	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 44_Doorsnede Blokpoer 700	PDF
1668998	Bijlage 45_Doorsnede Cilinderpoer 200	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 45_Doorsnede Cilinderpoer 200	PDF
1668999	Bijlage 46_Doorsnede Cilinderpoer 225	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 46_Doorsnede Cilinderpoer 225	PDF
1669000	Bijlage 47_Samenvatting toets masten	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 47_Samenvatting toets masten	PDF
1669002	Bijlage 48_Schetsen versterkingen funderingen	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 48_Schetsen versterkingen funderingen	PDF
1669003	Bijlage 49_Overzichtslijst mastfundaties	1669141	KIJ_BKK_DIM380-000-32-1001	KIJ_BKK_DIM380-000-32-1001-Bijlage 49_Overzichtslijst mastfundaties	PDF
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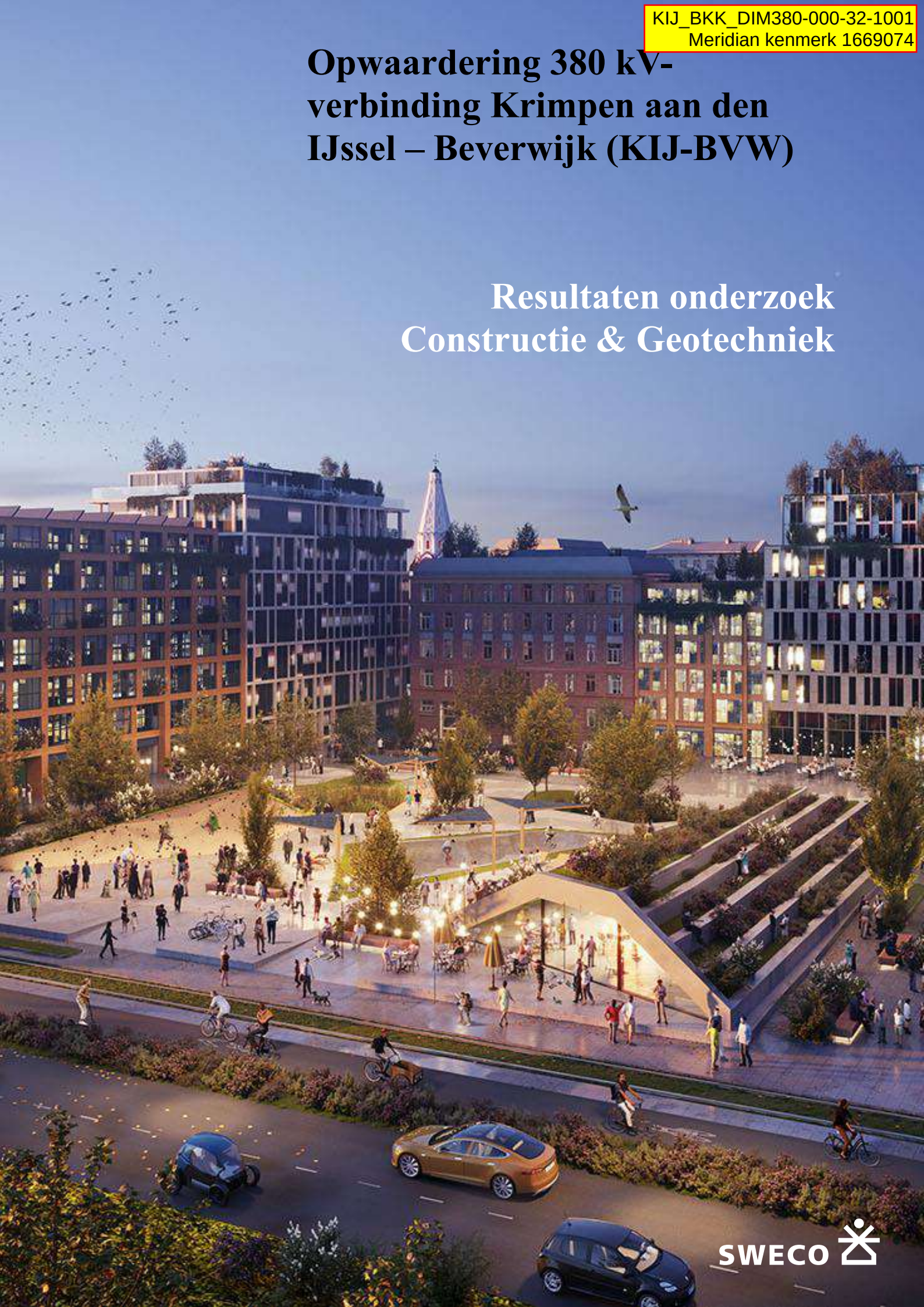
TenneT C2 - Internal Information

KIJ_BKK_DIM380-000-32-1001
Meridian kenmerk 1669074

Opwaardering 380 kV-verbinding Krimpen aan den IJssel – Beverwijk (KIJ-BVW)

Resultaten onderzoek Constructie & Geotechniek



SWECO

Lijst met aanpassingen

Versie	Datum	Beschrijving van de wijziging	Herzien	Vrijgegeven door
D01	02-06-2025	1e uitgave	[redacted]	[redacted]
D02	08-09-2025	2e uitgave, verwerking review TenneT	[redacted]	[redacted]
D03	15-04-2026	3e uitgave, masten ‘De Ronde Venen’ aangepast	[redacted]	[redacted]
D04	28-05-2026	4e uitgave, verwerking afwijking in LD1 palen	[redacted]	[redacted]

Sweco Nederland B.V. Handelsregister 30129769
Onderwerp Opwaardering KIJ-BVW
Projectnummer 51021552
Klant TenneT TSO B.V.
Auteur [redacted]
Gecontroleerd door [redacted]
Vrijgegeven door [redacted]
Datum 28-05-2026
Versie D04
Documentreferentie KIJ_BKK380_DIM380-000-32-1001-Resultaten onderzoek

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1 Inleiding

1.1 Achtergrond

Om in de toekomst een grotere elektriciteitstransportcapaciteit te waarborgen, is het noodzakelijk om naast de nieuwbouw van hoogspanningsverbindingen ook bestaande verbindingen te upgraden. TenneT heeft het voornemen om de landelijke 380 kV ring, de 'ruggengraad' van het hoogspanningsnet in Nederland, op te waarderen. Dit project omvat onder andere het deelproject ‘Opwaardering 380 kV-verbinding Krimpen aan den IJssel – Beverwijk (KIJ-BVW)’. De werkzaamheden binnen dit project vallen onder de Rijkscoördinatieregeling.

1.2 Werkzaamheden

De opwaardering van de bestaande 380 kV-verbinding KIJ-BVW omvat diverse activiteiten. Centraal staat de vervanging van de huidige geleiders door nieuwe geleiders met een hogere capaciteit. Deze nieuwe geleiders zijn in staat meer stroom te transporteren doordat ze hogere temperaturen kunnen weerstaan zonder te ver door te hangen. Aangezien de huidige hoogspanningsverbinding inmiddels 50 jaar oud is, zullen ook andere componenten, zoals isolatorkettingen en bliksemdraden, worden vervangen om de levensduur te verlengen. Daarnaast worden de hoogspanningsmasten en de mastfunderingen opnieuw constructief beoordeeld, dit als onderdeel van de niet-omgevings vergunningplichtige werkzaamheden.

1.3 Scope

De scope van dit document behelst het onderzoek en rapporteren van de restcapaciteit van de constructieve onderdelen van de funderingen van de volgende lijn:

- Lijn KIJ – BKK – DIM380

Voor de onderdelen waarvan de capaciteit niet voldoet zal in dit document (hoofdstuk 8) een schetsmatige versterking worden uitgewerkt.

Voor dit project worden de volgende onderdelen constructief getoetst:

- Fundering (team constructies):
  - Balken en poeren (SCIA en Technosoft)
  - Verbindingen (Excel en Idea)
- Palen (team geotechniek):
  - Capaciteit palen (D-foundations)

1.4 Toelichting bij versie D02

De door TenneT uitgevoerde review is de aanleiding geweest voor versie D02 van deze rapportage. Vanuit deze review zijn diverse tekstuele aanpassingen in de tekst doorgevoerd en zijn tevens diverse bijlagen nagelopen naar aanleiding van het reviewcommentaar.

Daarnaast zijn ook vanuit Sweco een tweetal wijzigingen geïnitieerd. Dat betreft het alsnog goedkeuren van de masten 84 en 127. De oorspronkelijke toetsing is in deze rapportage herzien/gecorrigeerd.

1.5 Toelichting bij versie D03

In versie D03 zijn aanpassingen in de rapportage verwerkt als gevolg van de hertoetsing op nieuwbouwniveau van alle masten in “De Ronde Venen”. Dit betreft de masten 128 t/m 148. De nieuwbouwtoets van deze masten is apart beschreven in de rapportages:

- KIJ_BKK380_DIM380-000-32-1006-Uitgangspuntennotitie De Ronde Venen
- KIJ_BKK380_DIM380-000-32-1008-Resultaten onderzoek (toetsingen) De Ronde Venen
- KIJ_BKK380_DIM380-000-32-1009-Uitwerking versterking De Ronde Venen

Als gevolg daarvan zijn de onderstaande berekeningsrapportages van het oorspronkelijke lijndeel 1 herzien.

- KIJ_BKK380_DIM380-000-32-1001-Resultaten onderzoek (toetsingen)
- KIJ_BKK380_DIM380-000-32-1004-Uitwerking versterking

In deze rapportages zijn alle teksten en toetsingen in het hoofdrapport met betrekking tot de masten 128 t/m 148 doorgehaald. Ook zijn de bijlagen die volledig zijn vervallen gemarkeerd in de lijst met bijlagen.

1.6 Toelichting bij versie D04

In versie D04 zijn een aantal aanpassingen doorgevoerd:

- De in SCIA opgenomen modellering van de LD1 palen is aangepast. Als gevolg daarvan zijn de bijlagen 5, 21, 22, 23 en 49 herzien. De resultaten van deze herziening zijn in de rapportage verwerkt.
- Het eigen gewicht van de LD1 palen is voor de situaties die niet met SCIA zijn berekend in overeenstemming gebracht met de modellering die in SCIA is aangehouden. Het netto-effect is dat er een hoger eigen gewicht is meegenomen. Als gevolg hiervan is bijlage 49 aangepast en zijn de resultaten in de rapportage verwerkt.
- In enkele SCIA-modellen is gebleken dat vanuit de masten de belastingcombinaties met een hoog eigen gewicht bepalend zijn voor zowel de maatgevende druk als trekbelasting. In deze gevallen hebben wij deze bewuste belastingcombinaties nu ook met 0,9xEG gecombineerd. De bijlagen 7, 8, 9, 10, 11, 12 en 49 zijn op basis daarvan herzien.

- In enkele gevallen was in de toetsing van het geotechnische draagvermogen abusievelijk de optredende waarde in het aansluitvlak fundering-paal getoetst in plaats van de waarde op de punt van de paal. Dit heeft als gevolg dat wij besloten hebben om mast 68 niet te versterken. Hier was een versterking met ballast opgenomen.
  In bijlage 49 hebben wij nu in de lijst een duidelijk onderscheidt opgenomen tussen de waarde in het aansluitvlak van de fundering op de paal en de waarde in de punt van de paal.
- Het geotechnische draagvermogen van mast 104 is gecorrigeerd in bijlage 49. Voor deze mast geldt dat het draagvermogen van de bestaande fundering voldoende is om de optredende belastingen op te nemen. Deze wijziging was al doorgevoerd in KIJ_BKK380_DIM380-000-32-1004-Uitwerking versterking
- In deze rapportage is een verwijzing opgenomen naar de aanvullende notitie die is geschreven met betrekking tot mast 76. Op basis van bevindingen uit een locatiebezoek is de toetsing van deze mast aangepast, zie KIJ_BKK380_DIM380-000-32-1010-Resultaten hertoetsing mast 76. De conclusie dat deze mast voldoet blijft daarin van toepassing.
- Het geotechnisch draagvermogen van de palen bij mast 127, 132, 137 en 149 is in bijlage 49 gecorrigeerd – de opgenomen waarden weken af van het geotechnisch advies – dit heeft verder geen gevolgen.
- Bij mast 149 – HE+6 mast – is een nieuwe opgave van de belastingen vanuit de mast opgenomen. Deze belastingen liggen iets lager dan de belastingen die aangehouden waren in eerdere versie van deze rapportage. Dit heeft invloed op het SCIA-model in bijlage 23.
- Naar aanleiding van RFA’s uitgevoerd op de toetsingen van OZN-DIM en BVW-OZN heeft een herziening plaatsgevonden van de excel-blad waarmee de diverse knaggen en deuvels zijn berekend. De herziene excelbladen zijn opgenomen in bijlage 29 t/m 38 en 49 en de resultaten zijn in de rapportage verwerkt, in deze bijlagen is conform het restlevensduuronderzoek tevens een hogere betonkwaliteit meegenomen.

In lijn met de aanpassingen van versie D03 zijn wederom de waarden van de masten 128 t/m 148 doorgehaald en bijbehorende bijlagen gemarkeerd als vervallen. Wel zijn wijzigingen die invloed hadden op rekenresultaten van zowel het hoofdproject als het lijndeel De Ronde Venen ook bij De Ronde Venen doorgevoerd.

2 Aanpak

Het overall plan van aanpak voor dit project bestaat uit drie fasen:

- **Fase 1a:** Toetsing
- **Fase 1b:** Schetsontwerp versterkingen
- **Fase 2:** Uitwerking versterkingen

In dit document worden fase 1a en 1b behandeld, waarbij de capaciteiten van verbindingen, betonconstructies en palen worden berekend en vergeleken met de krachten die erop werken om te bepalen of de constructie voldoet aan de eisen. De werkwijze die hierbij wordt gehanteerd, wordt in het betreffende hoofdstuk nader toegelicht. De resultaten worden per onderdeel behandeld en daarnaast overzichtelijk in tabelvorm weergegeven en opgenomen in de bijlage. Onderdelen die niet voldoen, worden globaal omschreven, waarbij maatgevende situaties worden onderzocht om efficiënt met tijd en capaciteit om te gaan. Vervolgens worden de onderdelen met onvoldoende capaciteit nader beschouwd. Er wordt nauw samengewerkt met de afdelingen hoogspanning en geotechniek om de onderdelen te toetsen.

3 Uitgangspunten

Voor de uitgangspunten wordt naar de uitgangspuntennotitie met naam *KIJ_BKK380_DIM380-000-32-1000-Uitgangspuntennotitie* verwezen.

Voor de uitwerking van de versterkingen wordt verwezen naar *KIJ_BKK380_DIM380-000-32-1004-Uitwerking versterking*

Voor de leesbaarheid van dit document zijn enkele uitgangspunten overgenomen uit de uitgangspunten notitie.

Aanvullende uitgangspunten die tijdens de berekeningen (toetsingen) zijn ontdekt/bepaald worden hier weergegeven:

- Voor de versterkingen wordt uitgegaan van onderstaande uitgangspunten:
    - Versterkingen in de vorm van ballast worden bepaald op basis van het tekort aan draagvermogen onder NEN8700, CC2, afkeurniveau en 30 jaar referentieperiode
    - Versterkingen in de vorm van extra aan te brengen funderingspalen worden bepaald op basis van het tekort aan draagvermogen onder NEN8700, CC2, verbouwniveau en 50 jaar referentieperiode.
- Voor het eigen gewicht van de funderingspalen onder het grondwater is het soortelijk gewicht verlaagd van de toegepaste materialen verlaagd met 10 kN/m^3. Voor beton resulteert dit bijvoorbeeld in 0,9 x (25-10) = 13,5 kN/m^3 effectief. Dit is aangehouden over de gehele lengte van de bestaande funderingspalen.
- Voor de betonkwaliteit van bestaande constructies is in tegenstelling tot de uitgangspuntennotitie C13/16 aangehouden in plaats van C12/15. Daarnaast is voor lokale toetsingen een verhoging van de drukcapaciteit in rekening gebracht.

- Voor de toetsing van enkele masten zijn aanvullende werkafspraken gemaakt:
    - Mast 156 wordt getoetst op basis van een bestaande fundament met 2xMV palen + 1x LD1 paal + 2x Tubex paal. Het oudste deel van dit fundament wordt uitgerekend met 2x MV en 1xLD1 palen. Dit is het meest waarschijnlijke scenario, maar wijkt wel af van de versterkingstekeningen van IOB/Movares. De toegepaste fundering wordt in het werk geverifieerd.
    - Mast 120 wordt getoetst op basis LD1 palen. Dit is op basis van de assetdata waarschijnlijk, echter er zijn geen bestaande tekeningen beschikbaar die dit bevestigen. De toegepaste fundering wordt in het werk geverifieerd.
    - Mast 76 wordt getoetst als blokpoer 220 met 3x betonpaal. Uit drone inspectie blijkt dat dit fundament niet als blokpoer is uitgevoerd, maar als balkrooster. Om die reden wordt het eigen gewicht van het balkrooster handmatig als extra drukbelasting op de funderingspalen gecontroleerd. Mogelijk zijn er bij dit fundament ook 2xLD1 palen toegepast, daar zijn echter geen tekeningen van beschikbaar. De toegepaste fundering wordt in het werk geverifieerd.
      Naar aanleiding van een uitgevoerd locatiebezoek is een hertoetsing van mast 76 uitgevoerd welke is beschreven in *KIJ_BKK380_DIM380-000-32-1010-Resultaten hertoetsing mast 76*
    - ~~Mast 146/147 wordt getoetst met 5xbetonpaal per hoekpunt (optie 1) en met 1xLD1 paal per hoekpunt (optie 2). Mede op basis van drone-inspectie lijkt optie 1 het meest waarschijnlijk. Op basis hiervan is het uitgangspunt dat het fundament versterkt moet worden. De toegepaste fundering wordt in het werk geverifieerd.~~

3.1 Toegepaste materialen

- Bestaand (uit assetdata)
  - Beton
    - K225 vergelijkbaar met C13/16 (voor de verankeringen is in de bijlagen 29 t/m 38 gerekend met een hogere betonkwaliteit op basis van restlevensduuronderzoek, zie paragraaf 3.2)
    - Dekking onder 4cm
    - Dekking overigens 3cm
  - Wapening
    - Buig/trek QR40 vergelijkbaar met Feb400
    - Beugels QR24 vergelijkbaar met Feb220
  - Staal
    - Kwaliteit S235 (aangenomen)
  - Bouten
    - Kwaliteit 5.6 / 5Din
  - Ankers
    - Kwaliteit 4.6
- Nieuw
  - Beton
    - C30/37
    - Dekking rondom 45 mm
    - Milieuklasse XC4/XS1/XF3/XD3/XA3
  - Wapening
    - B500b
  - Staal
    - S235
  - Bouten
    - Klasse 8.8
  - Ankers
    - Klasse 8.8 met volgplaat

3.2 Restlevensduur

Vanuit perceel 3 is een onderzoek naar de restlevensduur van de constructie uitgevoerd. Dit onderzoek is reeds in een eerder stadium van dit project uitgevoerd.

Het onderzoek – uitgevoerd door Bejan – is gerapporteerd in: 250071A-001 380kV KIJ-DIM v1.1 van d.d. 2 juli 2025. Het betreffende onderzoek is uitgevoerd op basis van de notitie KIJ_BKK380_DIM380-000-32-1002-Uitvraag restlevensduuronderzoek.

Het doel van betreffende onderzoek is geweest inzicht te verkrijgen in de staat van de poerfundaties van de hoogspanningsmasten van de lijnverbinding KIJ-BKK-DIM.

In het onderzoek zijn de volgende werkzaamheden uitgevoerd

- Visuele inspectie, 78 masten
  - Visuele inspectie / inventariseren schadebeelden
  - Inspectie conform CUR aanbeveling 72, klasse 1.2
  - Vastlegging conform NEN2767
  - Inmeten en intekenen schades
  - Afkloppen betonnen onderdelen.
- Nadere onderzoeken, 16 masten
  - Bepalen carbonatatie op 4 locaties per mast (alle poeren)
  - Monsters ter bepaling chloride gehalte op 1 locatie per mast in twee zones (0-20 mm en 20-40 mm)
  - Betondekking
  - Boren van kernen ter bepaling van de betondruksterkte op 2 locaties per mast

Conform paragraaf 3.4.3. uit de rapportage van Bejan zijn 32 metingen van de druksterkte verricht over het lijndeel KIJ-BKK-DIM. Van dit totaal zijn 8 metingen verricht in het deel binnen de gemeente “De Ronde Venen”, namelijk bij mast 132, 135, 137 en 146.

De gemiddelde druksterkte van de 32 metingen bedraagt.

De gemiddelde druksterkte bedraagt 59,9 N/mm^2, terwijl de 5% onderschrijdingswaarde van deze dataset gelijk is aan 44,4 N/mm^2.

Op basis van deze druksterkte is het veilig om te rekenen met een hogere waarde van de druksterkte dan is aangehouden in paragraaf 3.1. Vooral voor de toetsingen van de verankeringen wordt hier rekening mee gehouden.

Een veilige aanname op basis van bovenstaande is C30/37 als betonkwaliteit.

3.3 Toets criteria

- NEN8700:

Het onderzoek naar de capaciteit van de funderings-constructie word op afkeur niveau van de NEN8700 uitgevoerd voor gevolgklasse CC2 met een referentieperiode van 30 jaar.

- De partiële factoren hierbij van toepassing:

Partiële factoren bij afkeuren				
Belastings-combinatie	Blijvende belastingen		Overheersende veranderlijke belasting anders dan wind [a]	Wind maatgevende belasting [a]
	Ongunstig	Gunstig		
(Vgl. 6.10a)	$\gamma_{Gj,sup}$	$\gamma_{Gj,inf}$	$\gamma_{Q,1}$	$\gamma_{Q,1}$
Gevolgklasse CC2	1,20	0,90	1,15	1,30
(Vgl. 6.10b)	$\xi \cdot \gamma_{Gj,sup}$	$\gamma_{Gj,inf}$	$\gamma_{Q,1}$	$\gamma_{Q,1}$
Gevolgklasse CC2	1,10	0,90	1,15	1,30

Versterking die nodig zijn ten gevolge van onvoldoende capaciteit van de bestaande fundering constructie zal verder worden uitgewerkt volgens de verbouwniveau van de NEN8700 voor gevolgklasse CC2 met een referentieperiode van 50 jaar.

- De partiële factoren hierbij van toepassing:

Partiële factoren bij verbouw				
Belastings-combinatie	Blijvende belastingen		Overheersende veranderlijke belasting anders dan wind [a]	Wind maatgevende belasting [a b]
	Ongunstig	Gunstig		
(Vgl. 6.10a)	$\gamma_{Gj,sup}$	$\gamma_{Gj,inf}$	$\gamma_{Q,1}$	$\gamma_{Q,1}$
Gevolgklasse CC2	1,30 (1,20)	0,90	1,30	1,40
(Vgl. 6.10b)	$\xi \cdot \gamma_{Gj,sup}$	$\gamma_{Gj,inf}$	$\gamma_{Q,1}$	$\gamma_{Q,1}$
Gevolgklasse CC2	1,15	0,90	1,30	1,40

Deze partiële factoren gelden echter niet voor versterkingen uitgevoerd door middel van ballast. In afwijking van het bovenstaande wordt bij dergelijke versterkingen uitgegaan van het tekort aan capaciteit bepaald onder afkeurniveau van de NEN8700

voor gevolgklasse CC2 met een referentieperiode van 30 jaar. (zie ook aanvullende uitgangspunten onder hoofdstuk 3)

Het effect van de grondwaterstand op de fundering wordt mee genomen in beschouwing van de krachten die kunnen ontstaan in de fundering.

4 Berekeningen

In deze paragraaf worden de controleberekeningen van verschillende onderdelen van de constructie besproken. De berekeningen van de verbindingen, zoals knaggen en ankers, worden uitgevoerd met behulp van Excel en IDEA. Voor een gedetailleerde toelichting op deze berekeningen, zie hoofdstuk 5. De funderingen van meerpaalsconstructies, waaronder poeren en balken, worden geanalyseerd met SCIA-Engineer. Meer informatie hierover is te vinden in hoofdstuk 6.1. Ten slotte worden de capaciteiten van funderingspalen, zowel beton als staal, door het team geotechniek bepaald en in hoofdstuk 6.2 getoetst.

Voor de belastingen vanuit de masten wordt verwezen naar de betreffende rapportages van de masten in PLS-Tower. In elk van deze rapportages zijn zowel de belastingen onder afkeurniveau als onder verbouwniveau weergegeven. In bijlage 49 is in een aparte kolom een overzicht opgenomen van de beschikbare en gehanteerde rapportages vanuit hoogspanning.

Voor de geotechnische uitgangspunten wordt verwezen naar de rapportage van geotechniek. Dit betreft de rapportage NL25-6488000269-137201 Geotechnisch rappport – Lijndeel KIJ-DIM van d.d. 12-06-2025 en de notitie NL25-6488000269-137182 Lateraal belaste paal van d.d. 12-06-2025 – mast 105 tot 159.

5 Verbindingen

Een gedetailleerd en nauwkeurig beeld van de krachten en capaciteiten van de verschillende verbindingen en funderingen binnen een constructie is essentieel voor de veiligheid en duurzaamheid. Dit hoofdstuk bespreekt de methodieken en resultaten van de controleberekeningen voor de verbindingen en funderingen van de constructie. Deze berekeningen zijn cruciaal om te waarborgen dat de constructie voldoet aan de gestelde eisen en normen, en om eventuele tekortkomingen tijdig te identificeren en aan te pakken.

5.1 Berekening methodiek

In deze paragraaf wordt de methodiek voor het bepalen van de capaciteit van de verbindingen in de fundatie behandeld. Omdat er meerdere type fundaties zijn over de lijn, wordt de aanpak tweemaal gesplitst om voor elk soort verbinding een gepaste rekenstrategie toe te kennen.

De eerste splitsing in aanpak is de aard van de verbinding. Hierbij wordt een onderscheid gemaakt tussen twee verbindingen:

- Verbindingen die de mastpoot verankerd aan de fundatie
- Verbinding die de fundatie verankeren aan de fundatiepaal

Boven genoemde situaties komen scherper naar voren bij meerpaals-poeren of balkroosters. Bij enkelpaals-fundaties zit deze verbindingen op dezelfde plek.

De tweede onderscheiding betreft het soort verankering van de mastpoot. Lijndeel KIJ-BKK-DIM kent twee soorten verankeringen tussen de mastpoot en de fundering: ankerstaven en blokdeuvels (knaggen).

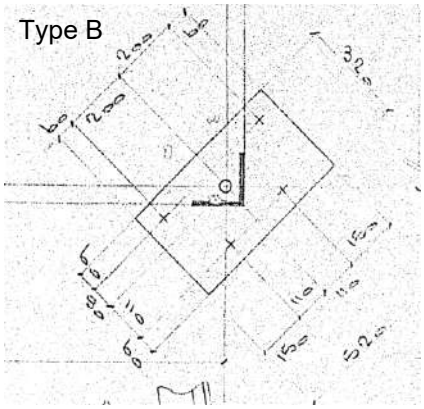
Naast de toetsing van de verankeringen worden ook de betondoorsnedes getoetst.

5.1.1 Verankering mastpoot aan fundering met voetplaat en ankerstaven

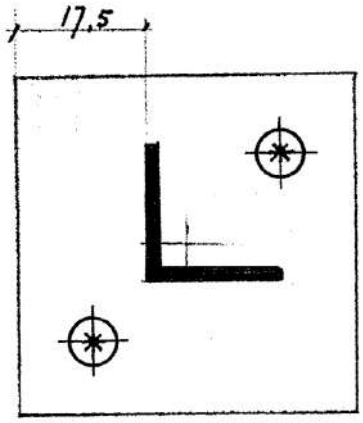
Bij 123 masten over lijndeel KIJ-BKK-DIM is de mastvoet verankerd middels voetplaat en ankerstaven. In totaal zijn en vier verschillende ankerstaaf types, zie figuur 5.1.
In bijlage 49 is een overzicht welk type anker is toegekend aan masten over het lijndeel.

Type A

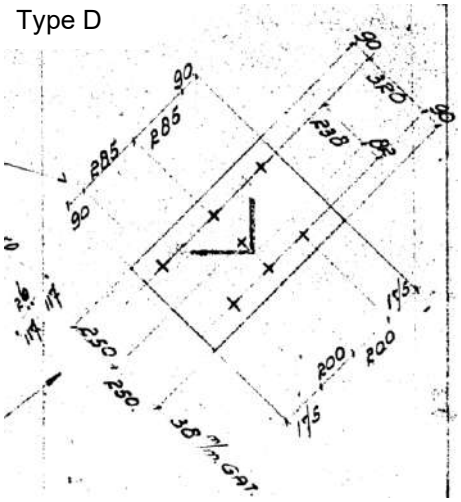
Type B



Type C



Type D



Figuur 5.1 Bovenaanzicht van de vier type voetplaten met ankerstaven

Verbindingen mastpoot - fundering		**Aangenomen gegevens**		
Type verankering	**Profiel mastpoot**	**Verankering**	**Voetplaat**	**Materiaal**
Rechte anker A	L250x24	6 x Ø65	800mm*550mm*75mm, 70mm stelruimte	S235, 4.6, C13/16
Rechte anker B	L150x12	4 x Ø38	520mm*320mm*38mm, 50mm stelruimte	S235, 4.6, C13/16
Rechte anker C	L180x16	2 x Ø65	450mm*450mm*45mm, 70mm stelruimte	S235, 4.6, C13/16
Rechte anker D	L250x18	6 x Ø51	750mm*500mm*65mm, 70mm stelruimte	S235, 4.6, C13/16

Bij het benaderen van de capaciteit van deze verbindingen zijn de volgende toetsingen beschouwd:

- Staaltoets van de voetplaat, mastpoot en lassen
- Ankertoetsen: trekweerstand, uitbarstweerstand, afschuifweerstand, trek en afschuif combinatie en detaillering.
- Toetsing betonspanning
- Toetsing van wapening rond verankering

Bovenstaande onderdelen worden getoetst of de maximaal toelaatbare normaalkracht in de mastpoot voor zowel druk als trek. In de staaltoetsen van de voetplaat, mastpoot en lassen is vermoeiing niet beschouwd, in het project zijn hier geen eisen aan gesteld.

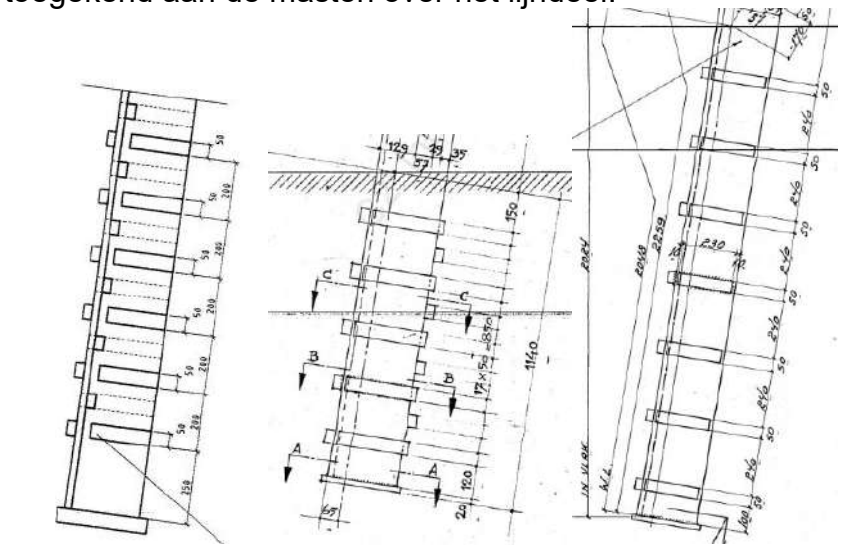
Om een samenhangende rekenmethodiek aan te houden wordt IDEA Statica toegepast. Met de Verbinding en Detail module kunnen bovenstaande toetsingen op een omhullende manier uitgevoerd worden.

De modellen zijn zoveel mogelijk op basis van assetdata ingevoerd. Er zijn een aantal systematische wijzigingen in de modellen. Zo zijn ankers met een recht einde gemodelleerd in plaats van een haak einde. Hiervoor is gekozen omdat de omvang van de haak niet meer voldoet aan de huidige normen. Daarnaast zijn door beperkingen van de software betonvormen als doosvormig beschouwd in plaats van taps toelopend. Hierbij is een veilige ondergrens benadering aangehouden. De wapening is wel overeenkomstig assetdata gemodelleerd.

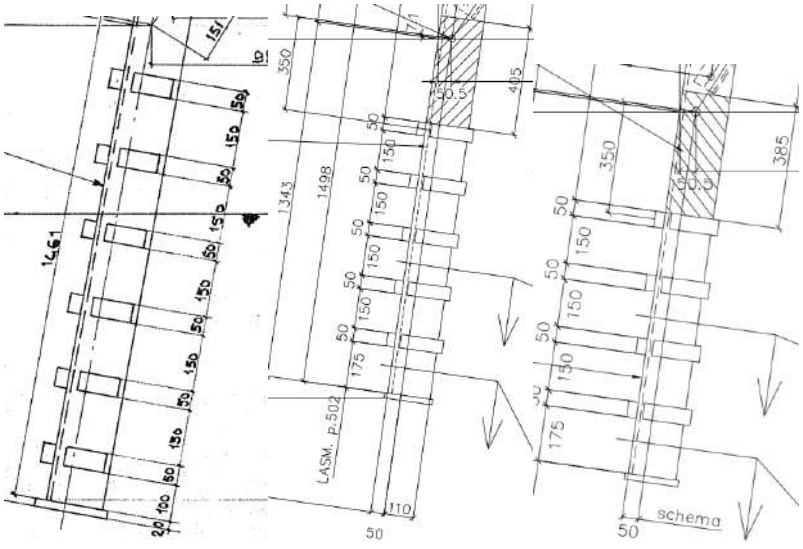
In de modellen is rekening gehouden met een fictieve verticale bedding van 150MN/paal en een horizontale bedding van 15MN/paal. In modellen waarbij enkel de betonopstort is beschouwd, zijn de beddingen teruggerekend naar het totale contactoppervlak met de resterende fundering. Resultaten zijn niet gevoelig voor afwijkingen van de aangenomen bedding. De IDEA software heeft een bedding nodig om te kunnen rekenen, binnen de marge van vermenigvuldigd of gedeeld door $\sqrt{2}$ zien wij geen gevoeligheid voor de ingevoerde bedding.

5.1.2 Verankering mastpoot aan fundering met ingestorte mastpoot met deuvels

Bij 35 masten over lijndeel KIJ-BKK-DIM is de mastvoet verankerd door middel van ingestorte mastpoten. De ingestorte delen zijn voorzien van blokdeuvels (knaggen) en een ankerplaat. In totaal zijn en zes verschillende type knaggen configuraties over het lijndeel, zie figuur 5.2
In bijlage 49 is een overzicht opgenomen welk type verankering is toegekend aan de masten over het lijndeel.



Type J Type K Type L



Type M Type N Type Q

Figuur 5.2 Zijaanzicht van de zes type ingestorte mastpoten

Verbindingen mastpoot - fundering		Aangenomen gegevens	
Type verankering	**Profiel mastpoot**	**Verankering**	**Materiaal**
Mastpoot knag J	L250x25	24 x 250*30*50 + 24 x 200*30*50 + ankerplaat	S235, C28/35
Mastpoot knag K	L250x18	10 x 260*30*50 + 4 x 370*30*50 + ankerplaat	S235, C30/37
Mastpoot knag L	L250x18 en L250x20	14 x 230*30*50 + ankerplaat	S235, C30/37
Mastpoot knag M	L150x14	12 x 100*30*50 + ankerplaat	S235, C30/37
Mastpoot knag N	L160x15 en L180x16	10 x 160*30*50 + ankerplaat	S235, C28/35
Mastpoot knag Q	L150x12	8 x 150*30*50 + ankerplaat	S235, C28/35

Bij het benaderen van de capaciteit van de verbinding zijn de volgende toetsingen beschouwd:

- Staaltoets van de knaggen, ankerplaat en lassen
- Toetsing betonspanning

De horizontale krachten vanuit de mastpoot worden via contactoppervlak tussen het ingestorte profiel en het omliggende beton overgebracht, de knaggen spelen daarbij geen rol. Om die reden is in de berekening van de knaggen geen horizontale kracht getoetst.

Bovenstaande onderdelen worden getoetst op de maximaal toelaatbare normaalkracht in de mastpoot voor zowel druk als trek. De toetsingen zijn gemaakt met Excel rekensheets.

De modellen zijn ingevoerd op basis van assetdata. Bij het bepalen van de capaciteit van de verbindingen zijn een aantal aannames gedaan:

- De betondruksterkte wordt verhoogd op basis van het afschuifprojectievlak zoals beschreven in NEN-EN1994-2 F1.1
- Indien de keeldoorsnede voor lassen onduidelijk is wordt er uitgegaan van 4,0mm.
- Indien het aantal lassen per knag onbekend is wordt uitgegaan van de lassen die toegepast zijn bij een vergelijkbare situatie waarbij de lassen wel bekend zijn, daarbij worden conservatieve waarden aangehouden.

- De oppervlakte van ankerplaten wordt gereduceerd op basis van de effectieve breedte bepaald met NEN-EN1993-1-8 p. 4.10.

5.1.3 Verankering fundering aan fundatiepaal met stekken

Bij 121 masten over lijndeel KIJ-BKK-DIM bestaat de fundering uit meerpaals-poeren met betonnen fundatiepalen. De fundatiepalen zijn middels stekken met de poeren verbonden. In de assetdata is beschreven dat de palen een wapeningspercentage hebben van 1,50%. Op basis van dit wapeningspercentage is een aanname gedaan welke staven er redelijkerwijs in de fundatiepaal zitten. Er zijn geen tekeningen beschikbaar waarop de toegepaste wapening is aangeduid.

In bijlage (39) is een overzicht welk wapeningstype is aangehouden per mast.

Bij het benaderen van de capaciteit van de verbinding zijn de volgende toetsingen beschouwd:

- Betontoetsing op trek, druk en moment.

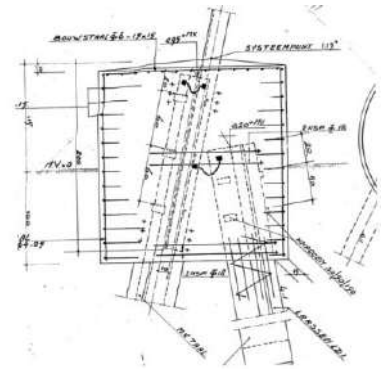
Bovenstaande onderdelen worden getoetst of de maximaal toelaatbare normaalkracht in de mastpoot voor zowel druk als trek. De toetsingen zijn gemaakt met Excel rekensheets. De input voor de berekening is ontleend aan de assetdata.

Door het ontbreken van nauwkeurige gegevens van de palen hebben wij geen directe toets uitgevoerd op dwarskracht. De M_{Ed} en N_{Ed} hebben wij op basis van de 1,5% wapening (op basis van assetdata) in de paal ‘getoetst’ maar van de dwarskrachtwapening is helemaal niets bekend en dat maakt ‘toetsen’ lastig. Op basis van een ongewapende doorsnede is de schuifspanning ca. 0,60 N/mm^2. Dit is een relatief lage waarde.

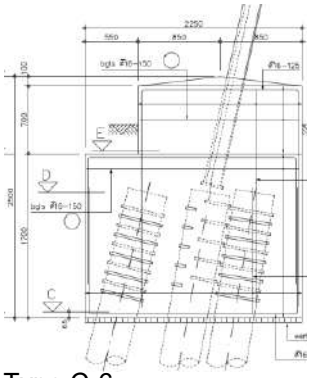
5.1.4 Verankering fundering aan fundatiepaal met deuvels

Bij 36 masten over lijndeel KIJ-BKK-DIM bestaat de fundering uit enkel- of meerpaals-poeren met damwand- of buispalen. De ingestorte delen van de fundatiepaal zijn voorzien van blokdeuvels (knaggen). In totaal zijn er zeven verschillende type knaggen funderingen over het lijndeel, zie figuur 5.3. Alle overige masten zijn gefundeerd op prefab betonpalen.

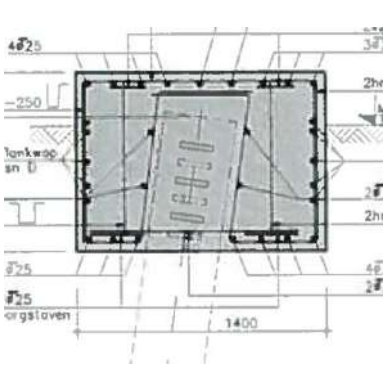
In bijlage 49 is een overzicht welk type knaggen is toegekend aan masten over het lijndeel.



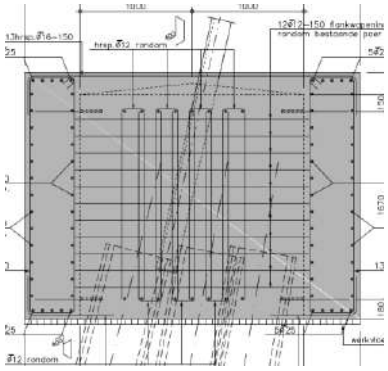
Type C-5



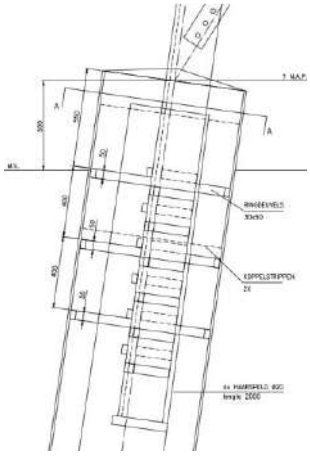
Type C-6



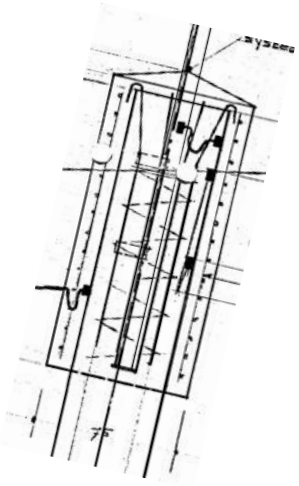
Type C-7



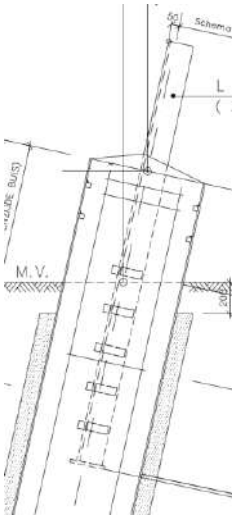
Type C-8



Type F



Type G



Type H

Figuur 5.3 Zijaanzicht van de zeven type funderingen met knaggen aan de paalwand

Verbindingen mastpoot - fundering		Aangenomen gegevens	
Type verankering	**Profiel fundatiepaal**	**Verankering**	**Materiaal**
Knaggen C-5 (LD1)	LD1	6 x 150*30*50	S235, C30/37
Knaggen C-5 (MV)	MV	6 x L80*8*300	S235, C30/37
Knaggen C-6	Tubex Ø406,4	10 x 315*25*25	S235, C30/37
Aangelaste strippen C-7 (oud)	LP2S	2 x 600*40*150	S235
Knaggen C-7 (verzwaring)	Ø406,4	LP2S: 6 x 315*25*25, Tubex: 6 x 180*30*50	S235, C30/37
Knaggen C-8 (oud)	LP2S of LD1		
Knaggen C-8 (verzwaring)	Tubex Ø406,4		
Knaggen F	Tubex Ø813,0	3 x ring*30*50	S235, C28/35
Knaggen G + korf	LD1	3 x 180*30*30 + korf 7 x Ø19	S235, C30/37, FeB400
Knaggen H	Tubex Ø610	2 x ring*30*30	S235, C28/35

Bij het benaderen van de capaciteit van de verbinding zijn de volgende toetsingen beschouwd:

- Staaltoets van de knaggen en lassen
- Toetsing betonspanning
- Indien van toepassing: Toetsing meewerkende wapening

De horizontale kracht vanuit de constructie wordt overgedragen via contactoppervlak tussen de paal en het beton van het specifieke fundament. Deze horizontale kracht wordt daarom niet beschouwd in de toetsing van de knaggen aan de funderingspaal.

Bovenstaande onderdelen worden getoetst of de maximaal toelaatbare normaalkracht in de mastpoot voor zowel druk als trek. De toetsingen zijn gemaakt met Excel rekensheets.

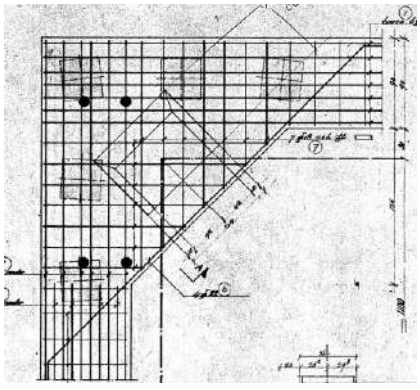
De modellen zijn ingevoerd op basis van de assetdata. Bij het bepalen van de capaciteit van de verbindingen zijn een aantal aannames gedaan:

- De betondruksterkte wordt verhoogd op basis van het afschuifprojectievlak zoals beschreven in NEN-EN1994-2 F1.1
- Indien de keeldoorsnede voor lassen onduidelijk is wordt er uitgegaan van 4,0mm.
- Indien het aantal lassen per knag onbekend is wordt uitgegaan van de lassen die toegepast zijn bij een vergelijkbare situatie waarbij de lassen wel bekend zijn, daarbij worden conservatieve waarden aangehouden.

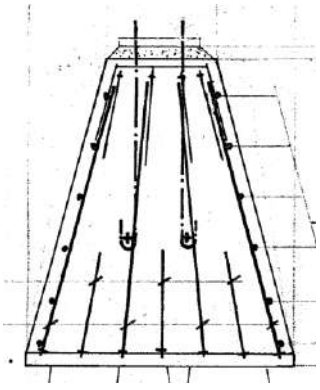
- Splijten en buiging worden niet beschouwd bij het toetsen van de fundatiepaal doorsnede. In een deel van de situaties zorgt de omhullende funderingspoer voor omsluiting van de funderingspalen met knaggen aan de buitenzijde van de palen. In een ander deel van de situaties zitten de knaggen aan de binnenzijde van de paal en zorgt de paal zelf voor omsluiting van de verankering.
- De wanddikte van fundatiepalen wordt met 4,0mm gereduceerd om eventuele roestvorming in beschouwing te nemen.
- De oppervlakte van aangelaste L-profielen wordt gereduceerd op basis van de effectieve breedte bepaald met NEN-EN1993-1-8 p. 4.10. Het betreft hier aan de MV palen gelaste hoeklijnen.
- Bij fundatiepalen waar de knaggen aan de binnenzijde van de paalwand zijn gesitueerd wordt de wapening ook meegenomen bij het toetsen van de trekcapaciteit van de verbinding.

5.1.5 Betondoorsneden

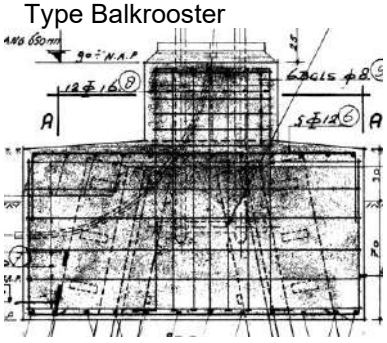
Alle masten met meerdere palen per mastpoot zijn voorzien van een poer of balkrooster. Het beton en de wapening hiervan dient ook getoetst te worden aan de maximaal optredende krachten. In totaal zijn en zeven type doorsnedes over het lijndeel, zie figuur 5.4.



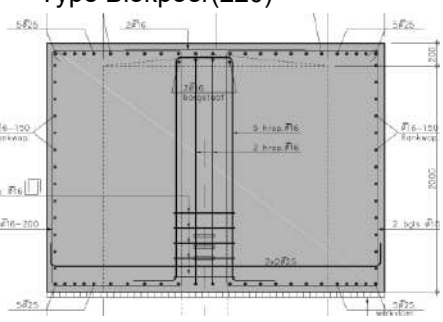
Type Balkrooster



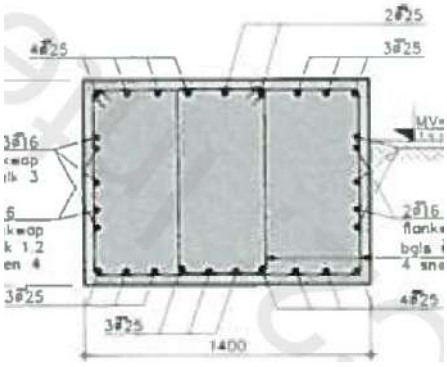
Type Blokpoer(220)



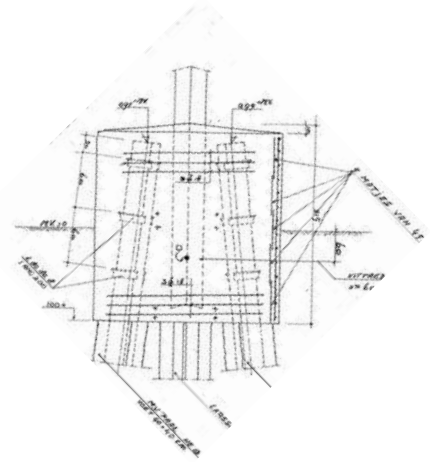
Type Blokpoer(200)



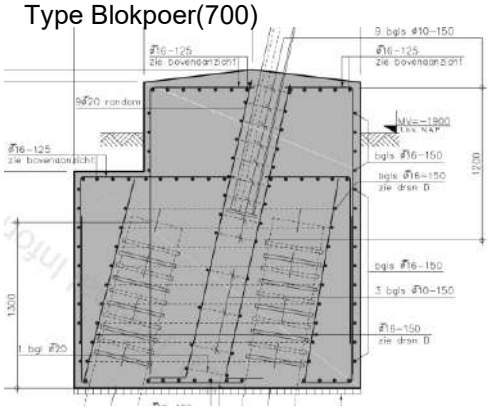
Type Blokpoer(553)



Type Blokpoer(700)



Type Cilinderpoer(200)



Type Cilinderpoer(225)

Figuur 5.4 Overzicht van de zeven typen betondoorsneden

Doorsnede	**Aangenomen gegevens**		
Type doorsnede	**Vorm beton bxh/dxh [mm]**	**Materiaal**	**Type berekening**
Balkrooster	1000x750	C12/15*, FeB400	Buiging
Blokpoer (200)	900x1000	C12/15*, FeB400	Staafwerk
Blokpoer (220)	1060x1200	C12/15*, FeB400	FEM
Blokpoer (553)	3000x2200	C30/37, B500	Buiging
Blokpoer (700)	1400x1000	C35/45, B500	Buiging
Cilinderpoer (200)	2000x2150	C12/15*, FeB400	Staafwerk
Cilinderpoer (225)	2250x1700	C12/15*, FeB400	Staafwerk

* In de gebruikte programmatuur (QEC/ Idea Statica) wordt gebruik gemaakt van standaard betonkwaliteiten, daarom worden in deze toetsingen C12/15 toegepast in plaats van C13/16 (K225).

Afhankelijk van de lengte en paalconfiguratie van de balk/poer kan door de gedrongen aard een staafwerk analogie toegepast worden in plaats van een standaard doorsnede toetst. In bovenstaande tabel wordt aangeduid welke type betonpoeren/balken op welke wijze wordt brekend. Omdat het type blokpoer (220) in zijn geheel is gemodelleerd in Idea is hiervan geen apart staafwerkmodel opgesteld.

Bij het benaderen van de capaciteit van de verbinding zijn de volgende toetsingen beschouwd:

- Toetsing wapening
- Toetsing drukspanning (inden staafwerk berekening)
- Toetsing trekband (indien staafwerk berekening)
- Toetsing opneembaar moment (indien buig berekening)

Bovenstaande onderdelen worden getoetst op de maximaal optredende krachten. De toetsingen zijn gemaakt met QEC-rekensheets en Idea Statica.

De modellen zijn ingevoerd op basis van de assetdata. Bij het bepalen van de capaciteit van de verbindingen zijn een aantal aannames gedaan:

- Een betonkwaliteit van C12/15 wordt gehanteerd in plaats van C13/16 door beperkingen in toegepaste programmatuur.
- Staafwerkmodellen zijn versimpeld tot tweepaals-poeren model, ook als de poer meer dan twee fundatiepalen heeft. Dit is gedaan zodat gewerkt kan worden met een eenvoudige conservatieve benadering.

De doorsnedetoetsingen zijn opgenomen in de bijlagen 40 t/m 46, de resultaten hiervan zijn gerapporteerd in paragraaf 5.4

In bijlage 49 is een overzicht welk type fundatie is toegekend aan masten over het lijndeel.

5.2 Verbinding Mast/Fundering

In dit onderdeel wordt de overdracht van krachten van de mast naar de funderingsconstructie getoetst. Het onderzoek omvat de volgende onderdelen:

- Knaggen (Excel)
- Ankers (Idea)

De krachten uit de berekening van de masten worden getoetst aan de hand van de capaciteiten van de verbindingen. De resultaten worden in Tabel 5.1 weergegeven. De berekeningen en modelinvoer is te vinden in bijlage 25 t/m 38.

Tabel 5.1 Resultaten toetsingen verankeringen van mastpoot

Resultaten toetsingen verankeringen van mastpoot								
Mast	Mast type	Type verbinding	$F_{Rd,druk}$ [kN]	$F_{Rd,trek}$ [kN]	$F_{Ed,druk}$ [kN]	$F_{Ed,trek}$ [kN]	UC druk	UC trek
1	EA+0	A	2100	1250	1425	1092	0,68	0,87
2	n.v.t.	n.v.t.	n.v.t.	n.v.t.	n.v.t.	n.v.t.	n.v.t.	n.v.t.
3	S+0	B	800	594	749	588	0,94	0,99
4	S+0	B	800	594	749	588	0,94	0,99
5	S+0	B	800	594	749	588	0,94	0,99
6	S+0	B	800	594	749	588	0,94	0,99
7	S+0	B	800	594	749	588	0,94	0,99
8	S+0	B	800	594	749	588	0,94	0,99
9	S+0	B	800	594	749	588	0,94	0,99
10	S+0	B	800	594	749	588	0,94	0,99
11	S+0	B	800	594	749	588	0,94	0,99
12	HA+0	A	2100	1250	1211	997	0,58	0,80
13	S+0	B	800	594	749	588	0,94	0,99
14	S+0	B	800	594	749	588	0,94	0,99
15	S+0	B	800	594	749	588	0,94	0,99
16	S+0	B	800	594	749	588	0,94	0,99
17	HA+0	A	2100	1250	1270	1040	0,60	0,82
18	S+0	B	800	594	749	588	0,94	0,99
19	S+0	B	800	594	749	588	0,94	0,99
20	S+0	B	800	594	749	588	0,94	0,99
21	S+0	B	800	594	749	588	0,94	0,99
22	S+0	B	800	594	749	588	0,94	0,99
23	S+0	B	800	594	749	588	0,94	0,99
24	S+0	B	800	594	749	588	0,94	0,99
25	HA+0	A	2100	1250	1252	1024	0,60	0,82
26	S+0	B	800	594	749	588	0,94	0,99
27	S+0	B	800	594	749	588	0,94	0,99
28	S+0	B	800	594	749	588	0,94	0,99
29	S+0	B	800	594	749	588	0,94	0,99
30	S+0	B	800	594	749	588	0,94	0,99
31	S+0	B	800	594	749	588	0,94	0,99

32	S+0	B	800	594	749	588	0,94	0,99
33	S+0	B	800	594	749	588	0,94	0,99
34	S+0	B	800	594	749	588	0,94	0,99
35	S+0	B	800	594	749	588	0,94	0,99
36	S+3	B	800	594	749	586	0,94	0,99
37	HA+0	A	2100	1250	1353	1120	0,64	0,90
38	S+0	B	800	594	749	588	0,94	0,99
39	S+0	B	800	594	749	588	0,94	0,99
40	S+0	B	800	594	749	588	0,94	0,99
41	S+0	B	800	594	749	588	0,94	0,99
42	S+0	B	800	594	749	588	0,94	0,99
43	S+0	B	800	594	749	588	0,94	0,99
44	S+0	B	800	594	749	588	0,94	0,99
45	S+0	B	800	594	749	588	0,94	0,99
46	S+0	B	800	594	749	588	0,94	0,99
47	HA+0	A	2100	1250	1172	948	0,56	0,76
48	S+0	B	800	594	634	468	0,80	0,79
49	S+0	B	800	594	634	468	0,80	0,79
50	S+0	B	800	594	634	468	0,80	0,79
51	S+0	B	800	594	634	468	0,80	0,79
52	S+6	B	800	570	719	536	0,90	0,94
53	S+6	B	800	570	710	515	0,89	0,90
54	S+0	B	800	594	634	468	0,80	0,79
55	S+0	B	800	594	634	468	0,80	0,79
56	S+0	B	800	594	634	468	0,80	0,79
57	S+0	B	800	594	634	468	0,80	0,79
58	S+0	B	800	594	634	468	0,80	0,79
59	S+0	B	800	594	634	468	0,80	0,79
60	WA	A	2100	1250	1215	982	0,58	0,79
61	S+0	B	800	594	634	468	0,80	0,79
62	S+0	B	800	594	634	468	0,80	0,79
63	S+0	B	800	594	634	468	0,80	0,79
64	S+0	B	800	594	634	468	0,80	0,79
65	S+0	B	800	594	634	468	0,80	0,79
66	S+0	B	800	594	634	468	0,80	0,79
67	S+0	B	800	594	634	468	0,80	0,79
68	HA+0	A	2100	1250	1255	1030	0,60	0,82
69	S+6	B	800	594	710	515	0,89	0,87
70	S+9	C	950	708	879	685	0,93	0,97
71	S+9	C	950	708	879	685	0,93	0,97
72	S+6	B	800	594	710	515	0,89	0,87
73	S+0	B	800	594	634	468	0,80	0,79
74	S+0	B	800	594	634	468	0,80	0,79
75	HB+0	A	2100	1250	1329	1097	0,63	0,88
76	S+6	B	800	594	710	515	0,89	0,87
77	S+0	B	800	594	634	468	0,80	0,79
78	S+0	B	800	594	634	468	0,80	0,79
79	S+0	B	800	594	634	468	0,80	0,79
80	S+0	B	800	594	634	468	0,80	0,79
81	S+3	B	800	594	637	453	0,80	0,76
82	S+3	B	800	594	637	453	0,80	0,76
83	S+0	B	800	594	634	468	0,80	0,79
84	HA+0	A	2100	1250	1163	932	0,55	0,75

85	S+3	M	1205	1205	637	453	0,53	0,38
86	S+0	M	1205	1205	634	468	0,53	0,39
87	S+0	B	800	594	634	468	0,80	0,79
88	S+0	B	800	594	634	468	0,80	0,79
89	S+0	B	800	594	634	468	0,80	0,79
90	S+0	B	800	594	634	468	0,80	0,79
91	S+0	B	800	594	634	468	0,80	0,79
92	S+0	B	800	594	634	468	0,80	0,79
93	S+0	B	800	594	634	468	0,80	0,79
94	HA+0	A	2100	1250	1163	922	0,55	0,74
95	S+0	B	800	594	634	468	0,80	0,79
96	S+0	B	800	594	634	468	0,80	0,79
97	S+0	B	800	594	634	468	0,80	0,79
98	S+0	B	800	594	634	468	0,80	0,79
99	S+6	B	800	594	710	515	0,89	0,87
100	S+0	B	800	594	634	468	0,80	0,79
101	S+0	B	800	594	634	468	0,80	0,79
102	S+0	B	800	594	634	468	0,80	0,79
103	S+0	B	800	594	634	468	0,80	0,79
104	EA+3/K	J	4945	4945	1299	982	0,26	0,19
105	HB+0	A	2100	1250	1344	1087	0,64	0,87
106	SHV+6	N	1749	1749	849	664	0,49	0,38
107	S+0/V	Q	1382	1382	634	468	0,46	0,35
108	WA	A	2100	1250	1198	974	0,57	0,78
109	S+3	Q	1382	1382	637	453	0,46	0,33
110	S+0	B	800	594	634	468	0,80	0,79
111	S+0	B	800	594	634	468	0,80	0,79
112	S+0	B	800	594	634	468	0,80	0,79
113	S+6	Q	1382	1382	709	515	0,51	0,37
114	S+0	B	800	594	634	468	0,80	0,79
115	S+0	B	800	594	634	468	0,80	0,79
116	S+0	B	800	594	634	468	0,80	0,79
117	S+0	B	800	594	634	468	0,80	0,79
118	S+0	B	800	594	634	468	0,80	0,79
119	HB+0	A	2100	1250	1353	1122	0,64	0,90
120	HA+3	A	2100	1250	1259	1016	0,60	0,81
121	S+6	M	1205	1205	710	515	0,59	0,43
122	S+6	B	800	594	710	515	0,89	0,87
123	S+6	B	800	594	710	515	0,89	0,87
124	S+0	B	800	594	634	468	0,80	0,79
125	S+6	B	800	594	710	515	0,89	0,87
126	S+6	M	655	605	710	515	0,59	0,43
127	HA+0	L	2164	2164	1267	1050	0,59	0,49
~~128~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~636~~	~~468~~	~~0,53~~	~~0,39~~
~~129~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~636~~	~~468~~	~~0,53~~	~~0,39~~
~~130~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~636~~	~~468~~	~~0,53~~	~~0,39~~
~~131~~	~~S+6~~	~~M~~	~~1205~~	~~1205~~	~~710~~	~~515~~	~~0,59~~	~~0,43~~
~~132~~	~~HA+0~~	~~L~~	~~2164~~	~~2164~~	~~1176~~	~~951~~	~~0,54~~	~~0,44~~
~~133~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~634~~	~~468~~	~~0,53~~	~~0,39~~
~~134~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~634~~	~~468~~	~~0,53~~	~~0,39~~
~~135~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~634~~	~~468~~	~~0,53~~	~~0,39~~
~~136~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~634~~	~~468~~	~~0,53~~	~~0,39~~
~~137~~	~~HA+0~~	~~L~~	~~2164~~	~~2164~~	~~1169~~	~~938~~	~~0,54~~	~~0,58~~

~~138~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~634~~	~~468~~	~~0,53~~	~~0,39~~
~~139~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~634~~	~~468~~	~~0,53~~	~~0,39~~
~~140~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~634~~	~~468~~	~~0,53~~	~~0,39~~
~~141~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~634~~	~~468~~	~~0,53~~	~~0,39~~
~~142~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~634~~	~~468~~	~~0,53~~	~~0,39~~
~~143~~	~~S+0~~	~~M~~	~~1205~~	~~1205~~	~~634~~	~~468~~	~~0,53~~	~~0,39~~
~~144~~	~~S+6~~	~~M~~	~~1205~~	~~1205~~	~~710~~	~~515~~	~~0,59~~	~~0,43~~
~~145~~	~~S+6~~	~~M~~	~~1205~~	~~1205~~	~~710~~	~~515~~	~~0,59~~	~~0,43~~
~~146~~	~~S+9~~	~~C~~	~~1000~~	~~708~~	~~879~~	~~685~~	~~0,88~~	~~0,97~~
~~147~~	~~S+9~~	~~C~~	~~1000~~	~~708~~	~~879~~	~~685~~	~~0,88~~	~~0,97~~
~~148~~	~~S+12~~	~~C~~	~~1000~~	~~708~~	~~799~~	~~598~~	~~0,80~~	~~0,84~~
149	HA+6	L	2164	2164	1490	1254	0,69	0,58
150	S+9	N	1504	1504	834	647	0,55	0,43
151	S+9	N	1504	1504	848	656	0,56	0,44
152	S+0	M	1205	1205	749	588	0,62	0,49
153	S+0	M	1205	1205	749	588	0,62	0,49
154	S+0	M	1990	1990	749	588	0,38	0,30
155	HA+12	K	4154	3936	1593	1235	0,38	0,31
156	HB+0	L	2164	2164	1453	1238	0,65	0,56
157	S+24	D	2000	1250	1519	1218	0,76	0,97
158	S+24	D	2000	1250	1491	1194	0,75	0,96
159	EA+0	A	2100	1250	1465	1172	0,70	0,94

Conclusie

Zoals tabel 5.1 beschrijft voldoen alle verbindingen aan de uiterste optredende trek- en drukkrachten. Dit geldt voor zowel de verbindingen met ankers (A t/m D) als de verbindingen met deuvels (alle overige typen) waarbij de capaciteiten gebaseerd zijn op de berekeningen conform de in paragraaf 5.1 beschreven methodiek

Ten opzichte van de vorige versie van deze rapportage is nu bij de verbindingen met deuvels rekening gehouden met een hogere betonkwaliteit overeenkomstig het uitgevoerde restlevensduuronderzoek.

5.3 Verbinding Fundering/Paal

In deze paragraaf wordt de overdracht van krachten van de fundering naar de palen geanalyseerd, inclusief:

- Beton/beton verbindingen (Excel),
- Beton/staal verbindingen (Excel).

De maximale reactiekrachten per fundatiepaal worden getoetst op de capaciteiten van de verbindingen. De reactiekrachten per paal volgen uit de SCIA-berekeningen, bijlage 1 t/m 24. De resultaten zijn in tabel 5.3 weergegeven. De berekeningen en modelinvoer van de capaciteit van de verbindingen zijn te vinden bijlage 25 t/m 38 & 39.

Tabel 5.3 Resultaten toetsingen verankeringen van fundering aan fundatiepaal/palen

Mast	Mast type	Type verbinding	$F_{Rd,druk}$ [kN]	$F_{Rd,trek}$ [kN]	$F_{Ed,druk,max}$ [kN]	$F_{Ed,trek,max}$ [kN]	UC druk	UC trek
1	EA+0	B400x400	2080	370	358	256	0,17	0,68
2	n.v.t.	n.v.t.	n.v.t.	n.v.t.	n.v.t.	n.v.t.	n.v.t	n.v.t.
3	S+0	B400x400	2080	370	504	308	0,24	0,83
4	S+0	B400x400	2080	370	504	308	0,24	0,83
5	S+0	B400x400	2080	370	504	308	0,24	0,83
6	S+0	B400x400	2080	370	504	308	0,24	0,83
7	S+0	B400x400	2080	370	504	308	0,24	0,83
8	S+0	B400x400	2080	370	504	308	0,24	0,83
9	S+0	B400x400	2080	370	504	308	0,24	0,83
10	S+0	B400x400	2080	370	504	308	0,24	0,83
11	S+0	B400x400	2080	370	504	308	0,24	0,83
12	HA+0	B400x400	2080	370	358	256	0,17	0,69
13	S+0	B400x400	2080	370	504	308	0,24	0,83
14	S+0	B400x400	2080	370	504	308	0,24	0,83
15	S+0	B400x400	2080	370	504	308	0,24	0,83
16	S+0	B400x400	2080	370	504	308	0,24	0,83
17	HA+0	B400x400	2080	370	345	236	0,17	0,64
18	S+0	B400x400	2080	370	504	308	0,24	0,83
19	S+0	B400x400	2080	370	504	308	0,24	0,83
20	S+0	B400x400	2080	370	504	308	0,24	0,83
21	S+0	B400x400	2080	370	504	308	0,24	0,83
22	S+0	B400x400	2080	370	504	308	0,24	0,83
23	S+0	B400x400	2080	370	504	308	0,24	0,83
24	S+0	B400x400	2080	370	504	308	0,24	0,83
25	HA+0	B400x400	2080	370	358	256	0,17	0,69
26	S+0	B400x400	2080	370	504	308	0,24	0,83
27	S+0	B400x400	2080	370	504	308	0,24	0,83
28	S+0	B400x400	2080	370	504	308	0,24	0,83
29	S+0	B400x400	2080	370	504	308	0,24	0,83
30	S+0	B400x400	2080	370	504	308	0,24	0,83

31	S+0	B400x400	2080	370	504	308	0,24	0,83
32	S+0	B400x400	2080	370	504	308	0,24	0,83
33	S+0	B400x400	2080	370	504	308	0,24	0,83
34	S+0	B400x400	2080	370	504	308	0,24	0,83
35	S+0	B400x400	2080	370	504	308	0,24	0,83
36	S+3	B400x400	2080	370	590	332	0,28	0,90
37	HA+0	B400x400	2080	370	351	188	0,17	0,51
38	S+0	B400x400	2080	370	504	308	0,24	0,83
39	S+0	B400x400	2080	370	504	308	0,24	0,83
40	S+0	B400x400	2080	370	504	308	0,24	0,83
41	S+0	B400x400	2080	370	504	308	0,24	0,83
42	S+0	B400x400	2080	370	504	308	0,24	0,83
43	S+0	B400x400	2080	370	504	308	0,24	0,83
44	S+0	B400x400	2080	370	504	308	0,24	0,83
45	S+0	B400x400	2080	370	504	308	0,24	0,83
46	S+0	B400x400	2080	370	504	308	0,24	0,83
47	HA+0	B400x400	2080	370	358	256	0,17	0,69
48	S+0	B400x400	2080	370	457	295	0,22	0,80
49	S+0	B400x400	2080	370	457	295	0,22	0,80
50	S+0	B400x400	2080	370	457	295	0,22	0,80
51	S+0	B400x400	2080	370	457	295	0,22	0,80
52	S+6	B400x400	2080	370	398	300	0,19	0,81
53	S+6	B400x400	2080	370	398	300	0,19	0,81
54	S+0	B400x400	2080	370	457	295	0,22	0,80
55	S+0	B400x400	2080	370	457	295	0,22	0,80
56	S+0	B400x400	2080	370	457	295	0,22	0,80
57	S+0	B400x400	2080	370	457	295	0,22	0,80
58	S+0	B400x400	2080	370	457	295	0,22	0,80
59	S+0	B400x400	2080	370	457	295	0,22	0,80
60	WA	B400x400	2080	370	331	221	0,16	0,60
61	S+0	B400x400	2080	370	457	295	0,22	0,80
62	S+0	B400x400	2080	370	457	295	0,22	0,80
63	S+0	B400x400	2080	370	457	295	0,22	0,80
64	S+0	B400x400	2080	370	457	295	0,22	0,80
65	S+0	B400x400	2080	370	457	295	0,22	0,80
66	S+0	B400x400	2080	370	457	295	0,22	0,80
67	S+0	B400x400	2080	370	457	295	0,22	0,80
68	HA+0	B400x400	2080	370	343	202	0,16	0,55
69	S+6	B400x400	2080	370	398	300	0,19	0,81
70	S+9	B400x400	2080	370	635	307	0,31	0,83
71	S+9	B400x400	2080	370	635	307	0,31	0,83
72	S+6	B400x400	2080	370	398	300	0,19	0,81
73	S+0	B400x400	2080	370	457	295	0,22	0,80
74	S+0	B400x400	2080	370	457	295	0,22	0,80
75	HB+0	B400x400	2080	370	358	256	0,17	0,69
76	S+6	B400x400*	2080	370	398	300	0,19	0,81
77	S+0	B400x400	2080	370	457	295	0,22	0,80
78	S+0	B400x400	2080	370	457	295	0,22	0,80
79	S+0	B400x400	2080	370	457	295	0,22	0,80
80	S+0	B400x400	2080	370	457	295	0,22	0,80
81	S+3	B400x400	2080	370	478	307	0,23	0,83
82	S+3	B400x400	2080	370	478	307	0,23	0,83
83	S+0	B400x400	2080	370	457	295	0,22	0,80

84	HA+0	B350x350	1592	247	338	214	0,21	0,87
85	S+3	G + korf	916	916	637	453	0,70	0,49
86	S+0	G + korf	916	916	634	468	0,69	0,51
87	S+0	B400x400	2080	370	457	295	0,22	0,80
88	S+0	B400x400	2080	370	457	295	0,22	0,80
89	S+0	B400x400	2080	370	457	295	0,22	0,80
90	S+0	B400x400	2080	370	457	295	0,22	0,80
91	S+0	B400x400	2080	370	457	295	0,22	0,80
92	S+0	B400x400	2080	370	457	295	0,22	0,80
93	S+0	B400x400	2080	370	457	295	0,22	0,80
94	HA+0	B400x400	2080	370	358	256	0,17	0,69
95	S+0	B400x400	2080	370	457	295	0,22	0,80
96	S+0	B400x400	2080	370	457	295	0,22	0,80
97	S+0	B400x400	2080	370	457	295	0,22	0,80
98	S+0	B400x400	2080	370	457	295	0,22	0,80
99	S+6	B400x400	2080	370	398	300	0,19	0,81
100	S+0	B400x400	2080	370	457	295	0,22	0,80
101	S+0	B400x400	2080	370	457	295	0,22	0,80
102	S+0	B400x400	2080	370	457	295	0,22	0,80
103	S+0	B400x400	2080	370	457	295	0,22	0,80
104	EA+3/K	F	3939	3939	1265	955	0,32	0,24
105	HB+0	B400x400	2080	370	358	256	0,17	0,69
106	SHV+6	H	1754	1754	849	664	0,48	0,38
107	S+0/V	H	1754	1754	636	481	0,36	0,27
108	WA	B400x400	2080	370	329	191	0,16	0,52
109	S+3	H	1754	1754	637	453	0,36	0,26
110	S+0	B400x400	2080	370	457	295	0,22	0,80
111	S+0	B400x400	2080	370	457	295	0,22	0,80
112	S+0	B400x400	2080	370	457	295	0,22	0,80
113	S+6	H	1754	1754	709	515	0,40	0,29
114	S+0	B400x400	2080	370	457	295	0,22	0,80
115	S+0	B400x400	2080	370	457	295	0,22	0,80
116	S+0	B400x400	2080	370	457	295	0,22	0,80
117	S+0	B400x400	2080	370	457	295	0,22	0,80
118	S+0	B400x400	2080	370	457	295	0,22	0,80
119	HB+0	B400x400	2080	370	358	256	0,17	0,69
120	HA+3	B400x400**	2080	370	358	256	0,17	0,69
121	S+6	G + korf	916	916	710	515	0,78	0,56
122	S+6	B400x400	2080	370	398	300	0,19	0,81
123	S+6	B400x400	2080	370	398	300	0,19	0,81
124	S+0	B400x400	2080	370	457	295	0,22	0,80
125	S+6	B400x400	2080	370	398	300	0,19	0,81
126	S+6	G + korf	916	916	710	515	0,78	0,56
127	HA+0	C5 – LD1	953	953	104	0	0,11	0,00
127	HA+0	C5 – MV	1505	1505	690	465	0,46	0,31
~~128~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~
~~129~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~
~~130~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~
~~131~~	~~S+6~~	~~G + korf~~	~~916~~	~~916~~	~~710~~	~~515~~	~~0,78~~	~~0,56~~
~~132~~	~~HA+0~~	~~C5 – LD1~~	~~953~~	~~953~~	~~119~~	~~0~~	~~0,12~~	~~0,00~~
~~132~~	~~HA+0~~	~~C5 – MV~~	~~1505~~	~~1505~~	~~684~~	~~467~~	~~0,45~~	~~0,31~~
~~133~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~
~~134~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~

~~135~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~
~~136~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~
~~137~~	~~HA+0~~	~~C5 – LD1~~	~~953~~	~~953~~	~~119~~	~~0~~	~~0,12~~	~~0,00~~
~~137~~	~~HA+0~~	~~C5 – MV~~	~~1505~~	~~1505~~	~~684~~	~~467~~	~~0,45~~	~~0,31~~
~~138~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~
~~139~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~
~~140~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~
~~141~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~
~~142~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~
~~143~~	~~S+0~~	~~G + korf~~	~~916~~	~~916~~	~~634~~	~~468~~	~~0,69~~	~~0,51~~
~~144~~	~~S+6~~	~~G + koppel~~	~~916~~	~~916~~	~~779~~	~~445~~	~~0,85~~	~~0,49~~
~~145~~	~~S+6~~	~~G + korf~~	~~916~~	~~916~~	~~710~~	~~515~~	~~0,78~~	~~0,56~~
~~146a~~	~~S+9~~	~~B320x320***~~	~~1331~~	~~91~~	~~-~~	~~-~~	~~n.t.b.~~	~~n.t.b.~~
~~146b~~	~~S+9~~	~~LD1***~~	~~953~~	~~953~~	~~879~~	~~685~~	~~0,92~~	~~0,72~~
~~147a~~	~~S+9~~	~~B320x320***~~	~~1331~~	~~91~~	~~284~~	~~126~~	~~0,21~~	~~1,39~~
~~147b~~	~~S+9~~	~~LD1***~~	~~953~~	~~953~~	~~879~~	~~685~~	~~0,92~~	~~0,72~~
~~148~~	~~S+12~~	~~C9~~	~~1363~~	~~1363~~	~~798~~	~~399~~	~~0,59~~	~~0,29~~
149	HA+0	C5 – LD1	953	953	193	12	0,20	0,01
149	HA+0	C5 – MV	1505	1505	743	505	0,49	0,34
150	S+9	G + korf	916	916	834	647	0,91	0,71
151	S+9	G + korf	916	655	848	656	0,93	0,72
152	S+0	G + korf	916	916	749	588	0,82	0,64
153	S+0	G + korf	916	916	749	588	0,82	0,64
154	S+0	C7 – LP2S	1990	1990	603	194	0,30	0,10
154	S+0	C7 – Tubex	1329	1329	267	118	0,20	0,09
155	HA+12	C6	1550	1550	501	514	0,32	0,33
156	HB+0	C8 – MV	1505	1505	562	301	0,37	0,20
156	HB+0***	C8 – LD1	953	953	279	52	0,29	0,05
156	HB+0***	C8 – Tubex	1031	1031	612	139	0,59	0,13
157	S+24	B400x400	2080	370	542	362	0,26	0,98
158	S+24	B400x400	2080	370	536	362	0,26	0,98
159	EA+0	B400x400	2080	370	359	263	0,17	0,71

*Bij mast 76 is het fundament in de assetdata aangeduide met 3 betonpalen en 2 LD1 palen. Uit drone inspectie blijkt dat dit fundament als balkrooster is uitgevoerd. In de assetdata is echter geen informatie aanwezig waarin deze combinatie voorkomt. Voor de toetsing is gerekend met een blokpoer (220 (3*B) waarbij het fundament voldoet. Naar aanleiding van een uitgevoerd locatiebezoek is een hertoetsing van mast 76 uitgevoerd welke is beschreven in KIJ_BKK380_DIM380-000-32-1010-Resultaten hertoetsing mast 76

**Bij mast 120 is de beschikbare assetdata niet compleet. Het fundament is aangeduid met 5 LP palen, daarin is dit fundament uniek. Naar verwachting is er sprake van een balkrooster

vergelijkbaar met de varianten met 4 of 5 betonpalen. Uit nader onderzoek moet blijken welke palen er in de fundering zijn toegepast.

~~***Bij mast 146 en 147 is tegenstrijdige assetdata gevonden. Hierbij zijn per mast twee varianten getoetst: De toetsingen 146a en 147a gaan uit van de toepassing van vijf betonpalen 320x320 mm per mastpoot. De toetsingen 146b en 147b gaan uit van de toepassing van één LD1 paal per mastpoot. We weten niet met zekerheid wat werkelijk is toegepast. Dit zal daarom nader onderzocht worden. Wel is vanuit een inspectie met een drone bekend dat mast 147 op een balkrooster staat. Bij mast 146 is mogelijk ook sprake van een balkrooster (maar deze zou zich dan onder maaiveld bevinden, hetgeen goed mogelijk is) Bij mast 146 is voor de variant met betonpalen (146a) een verwaarloosbare bedding en paalstijfheid berekend door geotechniek. (146a heeft een berekende capaciteit op trek van 1 kN per paal, 147a heeft een berekende capaciteit op trek van 45 kN per paal) Hierdoor kunnen er bij 146a geen reactiekrachten bepaald kunnen worden en kan de aansluiting niet getoetst worden.~~

****Bij mast 156 is de toetsing uitgevoerd op basis van een bestaande poer met 2xMV paal en 1xLD paal. Deze bestaande poer is versterkt met 2xTubex paal. De assetdata geven een tegenstrijdig beeld over de palen onder de bestaande poer. Als werkhypothese hebben wij de originele tekeningen van de poer aangehouden, welke afwijkt van de versterkingstekening. Deze aanpak zal moeten worden geverifieerd door onderzoek op locatie.

De bovenstaande opmerkingen zijn ook van belang met betrekking tot de toetsing van de fundering in hoofdstuk 6.

Conclusie

Zoals tabel 5.3 beschrijft voldoen de fundatie verbindingen van masten ~~146 en 147~~ niet aan de uiterste optredende trek- of drukkracht. Bij deze funderingen voldoet de verbinding van de betonpaal 320x320 aan het fundament niet. De capaciteit daarvan wordt bepaald door de in rekening gebrachte wapening. Deze verbindingen dienen versterkt te worden of de krachten op deze palen moeten lager worden door het aanbrengen van extra funderingspalen.

5.4 Betondoorsneden

In deze paragraaf worden de maatgevende betondoorsneden, beschreven in paragraaf 5.1.5, getoetst aan de maatgevende krachten.

Voor doorsnedes die worden getoetst op buiging worden de maatgevende de buigmomenten uit de SCIA uitvoer beschouwd, bijlage 1 t/m 24. Voor doorsnedes die getoetst worden met een staafwerkmodel of FEM model wordt de uiterste kracht vanuit de randstijl beschouwd. De resultaten worden in tabelvorm weergegeven. De berekeningen en modelinvoer is te vinden in bijlage 40 t/m 46.

Tabel 5.5 Resultaten toetsingen betondoorsneden (betontoets)

Type verbinding	M_{Rd} [kNm]	V_{Rd} [kN]	T_{Rd} [kNm]	M_{Ed} [kNm]	V_{Ed} [kN]	T_{Ed} [kNm]	UC buiging	UC Dwarskracht+wi nging	UC beugels s_a/s_b
Balkrooster	499	1599	412	145	594	40	0,29	0,47	0,61
Blokpoer(553)	3600	1823*	24814	869	499	47	0,24	0,28*	n.v.t.*
Blokpoer(700)	1200	476*	2757	767	229	67	0,64	0,58*	n.v.t.*

*Waarde als ongewapend of toetsing voldoet ook zonder dwarskrachtwapening

Tabel 5.6 Resultaten toetsingen betondoorsneden (staafwerktoets)

Type verbinding	F_{Rd} [kN]	F_{Ed} [kN]	UC Staafwerk
~~Blokpoer(200)~~	~~975~~	~~879~~	~~0,90~~
Cilinderpoer(200)	1260	1490	1,19
Cilinderpoer(225)	1650	1593	0,97

Tabel 5.7 Resultaten toetsingen betondoorsneden (FEM-toets)

Type verbinding	F_{Rd} [kN]	F_{Ed} [kN]	UC FEM
Blokpoer(220)	950	749	0,79

Conclusie

Zoals Tabel 5.5 beschrijft voldoet de capaciteit van Cilinderpoer(200) niet aan de maximaal optredende kracht. Bij deze toetsing wordt de betondrukspanning overschreden. Een uitgangspunt bij de toetsingen is het hanteren van betonkwaliteit C12/15 (in verband met beperking in de software is hier niet gerekend met C13/16). Uit restlevensduuronderzoek moet blijken of in praktijk een hogere betonkwaliteit aanwezig is. Tabel 5.6 beschrijft de situatie van kritieke masten als de betonkwaliteit C16/20 blijkt te zijn. Hieruit blijkt dat alle kritieke aansluitingen zullen voldoen als een hogere betonkwaliteit aangetoond kan worden. Indien er geen hogere betonkwaliteit kan worden aangetoond dienen kritieke fundaties versterkt te worden.

Tabel 5.6 Resultaten toetsing cilinderpoer(200) indien een betonkwaliteit van C16/20 aangetoond kan worden.

Type verbinding	Type berekening	F_{Rd} [kN]	M_{Rd} [kNm]	F_{Ed} [kN]	M_{Ed} [kNm]	UC Staafwerk	UC Buiging
Cilinderpoer(200)	Staafwerk	1650	-	1490	-	0,90	

6 Fundering

Het waarborgen van de veiligheid en duurzaamheid van funderingsconstructies vereist een gedetailleerde en nauwkeurige toetsing van de palen, poeren en balken. Dit hoofdstuk behandelt de methodieken en resultaten van deze toetsingen, die essentieel zijn om te voldoen aan de gestelde eisen en normen.

6.1 SCIA-modellen

Om de krachtswerking vanuit de hoogspanningsmasten naar de funderingen correct te beschouwen is van alle mastfunderingen met meer dan één paal per poer een SCIA-model gemaakt. Van ieder gemodelleerd funderingstype is een SCIA Engineering Report beschikbaar in de bijlagen waar gedetailleerde informatie te vinden is. De algemene uitgangspunten voor de SCIA-modellen staan hieronder beschreven, gevolgd door een aantal aspecten die alleen voor de modellen van specifieke funderingstypes gelden. De resultaten van de SCIA-modellen worden gebruikt om de krachten in de funderingspalen, poeren en, waar aanwezig, balken getoetst.

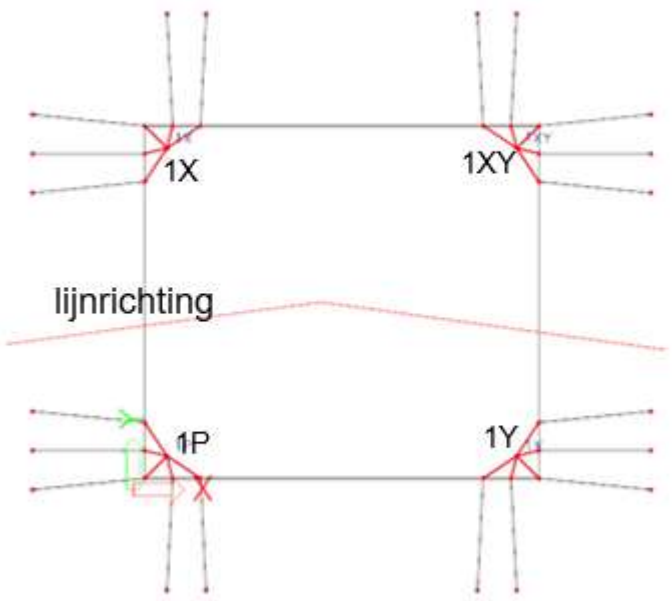
Bij de masten 76, 120, 146/147 en 156 spelen enkele issues met betrekking tot de assetdata, zie hiervoor de toelichting onderaan de tabel in paragraaf 5.3

6.1.1 Algemene uitgangspunten SCIA-modellen

Geometrie
De SCIA-modellen zijn opgebouwd aan de hand van de oorspronkelijke archieftekeningen of, waar relevant, op basis van recentere tekeningen van reeds versterkte of aangepaste locaties (assetdata). Van een aantal fundering-types zijn meerdere soortgelijke modellen gemaakt, die slechts verschillen in zaken als

pootspreiding of paalconfiguratie. De afmetingen van de prefab betonpalen zijn rechtstreeks overgenomen in de modellen. Sommige staalprofielen, zoals de LD1 palen, zijn niet exact gespecificeerd op de funderingstekeningen of kunnen in staat van corrosie zijn, waartoe een conservatieve aanname van de doorsnede is gekozen (destijds kleinst mogelijke doorsnede en plaatdikte).

Voor de naamgeving van de knopen waar de belasting aangrijpt op de poeren, is de volgende systematiek aangehouden: Op locatie x=0, y=0 bevindt zich knoop 1P. Vervolgens in x-richting, wat in de lijnrichting is, zit knoop 1Y. De ogenschijnlijk onlogische keuze om de knoopnaam los te koppelen van de x- en y-oriëntatie van SCIA heeft te maken met het direct kunnen gebruiken van PLS-Tower output in SCIA, programma's die andere uitgangspunten hanteren met betrekking tot assenstelsels. Haaks op de lijnrichting bevindt zich knoop 1X. Diagonaal tegenover knoop 1P, is knoop 1XY te vinden.



Figuur 6-1 Verduidelijking van tekenconventie.

Materialen

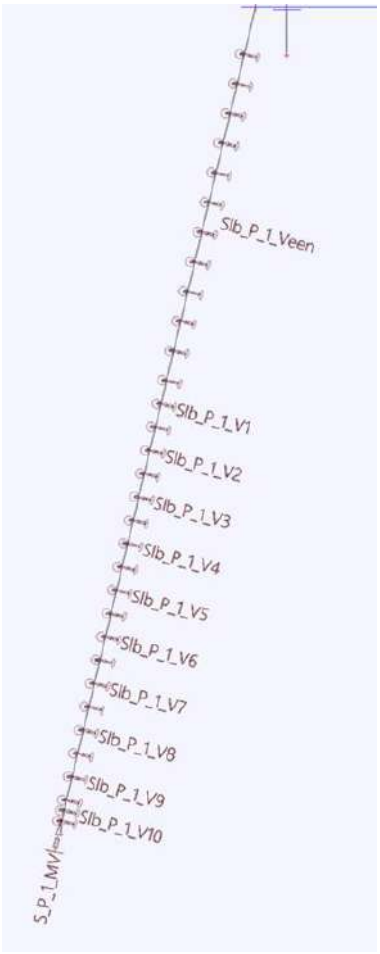
De toegepaste materialen in de SCIA-modellen zijn in overeenstemming met de materialen beschreven in paragraaf 3.1 *Toegepaste materialen* van dit document.

De enige afwijking op paragraaf 3.1 is het eigen gewicht van de funderingspalen. Deze is verlaagd met 10 kN/m^3 omdat de palen zich voor het overgrote deel onder het grondwaterpeil bevinden. Dit is verdisconteerd door middel van een eigen gewicht van het beton in de palen van 1500 kg/m^3.

Geotechnisch

De horizontale beddingen zijn in SCIA beschouwd op de funderingspalen per meter diepte en de PY-curves worden benaderd middels niet-lineaire functies. De reden om de beddingen op deze wijze vrij exact te beschouwen, is dat er onder maaiveld op een groot deel van de mastlocaties een veenlaag aanwezig is, die ervoor zorgt dat de horizontale krachten vanuit de masten pas op diepte in de palen opgenomen worden. Dit zorgt voor een momentwerking in meerpaals-poeren die het krachtenspel in de palen beïnvloed, in bepaalde situaties resulterende in zowel palen op trek als onder druk, onder één poer.

De axiale stijfheid van de funderingspalen is op de paalpunten gemodelleerd, rekening houdend met de schoorstand van de paal indien aanwezig. Per funderingstype is een combinatie gemaakt van de zwakste paalstijfheden in trek en druk, welke in SCIA gerepresenteerd worden door bi-lineaire veren.
Een soortgelijk uitgangspunt is gehanteerd voor de horizontale stijfheid door middel van twee verschillende PY-curves voor de beddingen, genaamd PY-curves 1 en 2. PY-curve 2 is iets stijver dan PY-curve 1. De funderingstypes die zowel in PY-curve 1 als 2 gebied voorkomen, zijn beschouwd als gelegen in PY-curve 1 gebied.



Figuur 6-2 Horizontale bedding per meter diepte gemodelleerd op de funderingspaal

Belastingen en combinaties
Vanwege de grote hoeveelheid mogelijke belastinggevallen op de funderingen vanuit de masten en soms veel voorkomende masttypes (voornamelijk de S+0 masten), is per masttype een selectie gemaakt met maatgevende, representatieve belastingen. Dit houdt in dat in basis één dezelfde belasting voor alle mastlocaties met een bepaald type mast aangehouden wordt.

De belastingcombinaties zijn telkens als volgt opgebouwd per windrichting:

Ongunstig werkende belasting (mast drukt op een poer):

- EG_ongunstig + HS_high loadcase
    - EG_ongunstig = 1,2 * EG (EG = Eigen Gewicht fundering)
    - HS_high = maatgevende krachten uit de hoogspanningsmast met ongunstig (hoog) beschouwd eigen gewicht

Gunstig werkende belasting (mast trekt aan een poer):

- EG_gunstig + HS_low loadcase
    - EG_gunstig = 0,9 * EG
    - HS_low = maatgevende krachten uit de hoogspanningsmast met gunstig (laag) beschouwd eigen gewicht
- In sommige gevallen is gebleken dat het belastinggeval HS_high ook de maatgevende trekbelasting op de fundering genereerd. In die gevallen is HS_high zowel met 1,2 * EG als 0,9 * EG gecombineerd.

De conservatieve geotechnische aannames per funderingstype worden getoetst aan maatgevende mastkrachten per masttype. Dit kan een hypothetische combinatie van lage capaciteit en hoge belasting zijn. Als de hypothetische combinatie voldoet, voldoen gelijk alle corresponderende funderingstype-masttype combinaties. Indien de maatgevende combinatie niet voldoet, zijn er, waar nodig en effectief, optimalisaties gemaakt in het beschouwen van meer locatie-specifieke en dus lagere belastingen. Wel zijn alle funderingspalen getoetst aan de paaldraagvermogens die op de specifieke mastlocaties gelden, voor de aanwezige paaltypes.

Aan de hand van deze belastingcombinaties wordt per paal, poer of balk de omhullende kracht bepaalt middels resultaatklassen, waarin gunstig of ongunstig werkend eigengewicht verdisconteerd

zit van zowel de hoogspanningsmasten als van de funderingsconstructie.

6.1.2 Funderingstype specifieke uitgangspunten SCIA-modellen

Balkroosters

De fundering in het SCIA-model bestaat uit verschillende gewapende betonnen palen met rechthoekige doorsnedes, ontworpen om structurele belastingen te verdelen naar de ondergrond.

- ~~Variant met 5 palen van 32x32cm, deze komt voor bij 146 en 147. Bij deze fundamenten is ook een optie met 1xLD1 paal beschouwd.~~
- Variant met 4 palen van 40x40cm.
- Variant met 5 palen van 40x40cm.
- Variant met 5 palen van 35x35cm niet gemodelleerd, gebaseerd op variant met 5 palen van 40x40 cm.

Blokpoeren

Voor de S+0, S+3 en S+6 mastlocaties met blokpoeren met drie betonpalen is de trekcapaciteit daadwerkelijk begrensd in de SCIA-modellen. Reden hiertoe is dat het begrenzen van de paalcapaciteiten leidt tot een meer realistische en gunstige verdeling van krachten over de funderingspalen, waardoor fors meer funderingslocatie niet versterkt hoeven te worden. De trekcapaciteit is begrensd op 275 kN en geldt enkel voor de mastfunderingen waar dit leidt tot een conservatieve aanname. De capaciteit van 275 kN is de geotechnische begrenzing, en staat gemodelleerd op de paalpunt. De uiteindelijke trekkracht in de funderingspalen zelf loopt over de hoogte van de palen op, gezien het eigengewicht van de paal over de paalhoogte toeneemt en de trekkracht tegenwerkt.

- Taps versmallende poer als kolom gemodelleerd met variërende doorsnede. Om de starre verbinding met de ingestorte palen te beschouwen op de juiste locaties, zijn de paalkoppen met "rigid-links" in SCIA gekoppeld aan de onderzijde van de poer, op de locatie waar ze in werkelijkheid uit de poer steken.
- De blokpoer fundering met drie betonpalen komt voor met vier verschillende pootspreidingen, behorend tot S+0 (windgebied II & III), S+3, S+6 en S+9 masttypes.

- Variant met 1 LD1 paal en 2 Tubex palen
- ~~Variant met 2 LD1 palen~~

Cilinderpoeren

De fundering in het SCIA-model bestaat uit diverse stalen palen van verschillende doorsneden. Dit ontwerp zorgt ervoor dat structurele belastingen effectief worden afgevoerd naar de ondergrond.

- Variant met -2xMV palen-1xLD1 paal-HA
- Variant met -2xMV palen-1xLD1 paal- HAplus3
- Variant met -2xMV palen-1xLD1 paal- 2xTubex palen-HB. De Tubex-palen zijn verbonden met een betonnen balk.
- Variant met -4xTubex406-560 palen

~~Koppelframe (variant op cilinderpoer)~~

- ~~Koppelframe met 1xLD1 paal~~

6.2 Capaciteit palen

De krachten uit de berekening van de fundering worden getoetst aan de hand van de capaciteiten van de palen. De resultaten worden in tabelvorm weergegeven.

De berekeningen en modelinvoer zijn te vinden in de bijlagen 1 t/m 24, daarnaast wordt verwezen naar bijlage 49.

Tabel 6-1 Resultaten toetsingen paaldraagvermogens

Resultaten toetsingen paaldraagvermogens								
Mast	Paaltype	$F_{Rd,druk}$ [kN]	$F_{Rd,trek}$ [kN]	$F_{Ed,druk}$ [kN]	$F_{Ed,trek}$ [kN]	UC druk	UC trek	Bijlage ##
1	40*40 cm bet.	1918	306	388,6	232,8	0,20	0,76	12
2	n.v.t.	n.v.t.	n.v.t.	n.v.t.	n.v.t.	n.v.t.	n.v.t.	nvt.
3	40*40 cm bet.	948	290	537,3	275,0	0,57	0,95	15
4	40*40 cm bet.	965	214	537,3	275,0	0,56	1,29	15
5	40*40 cm bet.	1075	181	537,3	275,0	0,50	1,52	15
6	40*40 cm bet.	1340	242	537,3	275,0	0,40	1,14	15
7	40*40 cm bet.	1400	263	537,3	275,0	0,38	1,05	15
8	40*40 cm bet.	1409	310	537,3	275,0	0,38	0,89	15
9	40*40 cm bet.	1577	266	537,3	275,0	0,34	1,03	15
10	40*40 cm bet.	960	175	537,3	275,0	0,56	1,57	15
11	40*40 cm bet.	1767	325	537,3	275,0	0,30	0,85	15
12	40*40 cm bet.	1324	266	388,6	232,8	0,29	0,88	12
13	40*40 cm bet.	1011	224	537,3	275,0	0,53	1,23	15
14	40*40 cm bet.	1289	268	537,3	275,0	0,42	1,03	15
15	40*40 cm bet.	1433	290	537,3	275,0	0,37	0,95	15
16	40*40 cm bet.	1138	189	537,3	275,0	0,47	1,46	15
17	40*40 cm bet.	824	239	395,3	199,1	0,48	0,83	7
18	40*40 cm bet.	1169	250	537,3	275,0	0,46	1,10	15
19	40*40 cm bet.	979	234	537,3	275,0	0,55	1,18	15
20	40*40 cm bet.	1284	276	537,3	275,0	0,42	1,00	15

21	40*40 cm bet.	1068	204	537,3	275,0	0,50	1,35	15
22	40*40 cm bet.	1270	237	537,3	275,0	0,42	1,16	15
23	40*40 cm bet.	700	90	537,3	275,0	0,77	3,06	15
24	40*40 cm bet.	721	204	537,3	275,0	0,75	1,35	15
25	40*40 cm bet.	1237	352	388,6	232,8	0,31	0,66	12
26	40*40 cm bet.	849	205	537,3	275,0	0,63	1,34	15
27	40*40 cm bet.	905	180	537,3	275,0	0,59	1,53	15
28	40*40 cm bet.	1199	246	537,3	275,0	0,45	1,12	15
29	40*40 cm bet.	655	204	537,3	275,0	0,82	1,35	15
30	40*40 cm bet.	802	333	537,3	275,0	0,67	0,83	15
31	40*40 cm bet.	1548	393	537,3	275,0	0,35	0,70	15
32	40*40 cm bet.	1324	308	537,3	275,0	0,41	0,89	15
33	40*40 cm bet.	787	185	537,3	275,0	0,68	1,49	15
34	40*40 cm bet.	661	215	537,3	275,0	0,81	1,28	15
35	40*40 cm bet.	1250	291	537,3	275,0	0,43	0,95	15
36	40*40 cm bet.	1230	292	646,3	275,0	0,53	0,94	17
37	40*40 cm bet.	915	138	400,8	138,0	0,44	1,01	8
38	40*40 cm bet.	1553	330	537,3	275,0	0,35	0,83	15
39	40*40 cm bet.	1314	297	537,3	275,0	0,41	0,93	15
40	40*40 cm bet.	1604	347	537,3	275,0	0,33	0,79	15
41	40*40 cm bet.	1231	335	537,3	275,0	0,44	0,82	15
42	40*40 cm bet.	1317	296	537,3	275,0	0,41	0,93	15
43	40*40 cm bet.	1877	341	537,3	275,0	0,29	0,81	15
44	40*40 cm bet.	1728	282	537,3	275,0	0,31	0,98	15
45	40*40 cm bet.	1780	310	537,3	275,0	0,30	0,89	15
46	40*40 cm bet.	1048	341	537,3	275,0	0,51	0,81	15
47	40*40 cm bet.	1260	300	388,6	232,8	0,31	0,78	12

48	40*40 cm bet.	1709	337	491,9	269,2	0,29	0,80	16
49	40*40 cm bet.	1533	276	491,9	269,2	0,32	0,98	16
50	40*40 cm bet.	1020	203	491,9	269,2	0,48	1,33	16
51	40*40 cm bet.	1063	228	491,9	269,2	0,46	1,18	16
52	40*40 cm bet.	1478	269	423,0	275,0	0,29	1,02	19
53	40*40 cm bet.	1481	228	423,0	275,0	0,29	1,21	19
54	40*40 cm bet.	1233	240	491,9	269,2	0,40	1,12	16
55	40*40 cm bet.	1401	228	491,9	269,2	0,35	1,18	16
56	40*40 cm bet.	1580	256	491,9	269,2	0,31	1,05	16
57	40*40 cm bet.	1699	271	491,9	269,2	0,29	1,01	16
58	40*40 cm bet.	1630	186	491,9	269,2	0,30	1,45	16
59	40*40 cm bet.	1150	197	491,9	269,2	0,43	1,37	16
60	40*40 cm bet.	1425	223	368,4	192,7	0,26	0,86	9
61	40*40 cm bet.	1474	341	491,9	269,2	0,33	0,79	16
62	40*40 cm bet.	1487	281	491,9	269,2	0,33	0,96	16
63	40*40 cm bet.	1941	351	491,9	269,2	0,25	0,77	16
64	40*40 cm bet.	1239	226	491,9	269,2	0,40	1,19	16
65	40*40 cm bet.	1526	260	491,9	269,2	0,32	1,04	16
66	40*40 cm bet.	1319	270	491,9	269,2	0,37	1,02	16
67	40*40 cm bet.	1485	288	491,9	269,2	0,33	0,93	16
68	40*40 cm bet.	1463	176	377,1	176,0	0,26	1,00	10
69	40*40 cm bet.	423	172	423,0	275,0	1,00	1,60	19
70	40*40 cm bet.	1281	377	666,6	275,0	0,52	0,73	20
71	40*40 cm bet.	1153	214	666,6	275,0	0,58	1,29	20
72	40*40 cm bet.	2064	414	423,0	275,0	0,20	0,66	19
73	40*40 cm bet.	1569	250	491,9	269,2	0,31	1,08	16
74	40*40 cm bet.	1620	319	491,9	269,2	0,30	0,84	16

75	40*40 cm bet.	2222	427	388,6	232,8	0,17	0,55	12
76	40*40 cm bet.	1744	391	423,0	275,0	0,24	0,70	19
77	40*40 cm bet.	1642	374	491,9	269,2	0,30	0,72	16
78	40*40 cm bet.	1297	322	491,9	269,2	0,38	0,84	16
79	40*40 cm bet.	1677	359	491,9	269,2	0,29	0,75	16
80	40*40 cm bet.	1345	278	491,9	269,2	0,37	0,97	16
81	40*40 cm bet.	1705	331	520,2	275,0	0,31	0,83	18
82	40*40 cm bet.	1382	299	520,2	275,0	0,38	0,92	18
83	40*40 cm bet.	1401	346	491,9	269,2	0,35	0,78	16
84	35*35 cm bet.	2155	353	368,3	183,7	0,17	0,52	50
85	LD1+p	1686	461	712,0	397,0	0,42	0,86	49
86	LD1+p	1252	255	711,0	410,0	0,57	1,61	49
87	40*40 cm bet.	994	285	491,9	269,2	0,49	0,94	16
88	40*40 cm bet.	1009	282	491,9	269,2	0,49	0,95	16
89	40*40 cm bet.	1680	453	491,9	269,2	0,29	0,59	16
90	40*40 cm bet.	1324	263	491,9	269,2	0,37	1,02	16
91	40*40 cm bet.	1723	303	491,9	269,2	0,29	0,89	16
92	40*40 cm bet.	1561	306	491,9	269,2	0,32	0,88	16
93	40*40 cm bet.	1516	314	491,9	269,2	0,32	0,86	16
94	40*40 cm bet.	1675	323	388,6	232,8	0,23	0,72	12
95	40*40 cm bet.	2302	401	491,9	269,2	0,21	0,67	16
96	40*40 cm bet.	1417	320	491,9	269,2	0,35	0,84	16
97	40*40 cm bet.	1694	343	491,9	269,2	0,29	0,78	16
98	40*40 cm bet.	1617	331	491,9	269,2	0,30	0,81	16
99	40*40 cm bet.	1302	311	423,0	275,0	0,32	0,88	19
100	40*40 cm bet.	1326	341	491,9	269,2	0,37	0,79	16
101	40*40 cm bet.	1353	285	491,9	269,2	0,36	0,94	16
102	40*40 cm bet.	1508	316	491,9	269,2	0,33	0,85	16

103	40*40 cm bet.	1591	342	491,9	269,2	0,31	0,79	16
104	Ø813	2107	553	1455,0	813,0	0,25	0,61	49
105	40*40 cm bet.	1820	321	388,6	232,8	0,21	0,73	12
106	Ø609/670	3284	785	937,0	598,0	0,29	0,76	49
107	Ø609/630	2938	802	714,0	422,0	0,24	0,53	49
108	40*40 cm bet.	1044	181	390,9	144,0	0,37	0,80	11
109	Ø609/630	3244	558	691,0	412,0	0,21	0,74	49
110	40*40 cm bet.	1516	300	491,9	269,2	0,32	0,90	16
111	40*40 cm bet.	1376	257	491,9	269,2	0,36	1,05	16
112	40*40 cm bet.	1187	279	491,9	269,2	0,41	0,96	16
113	Ø609/630	2838	617	769,0	470,0	0,27	0,76	49
114	40*40 cm bet.	1262	302	491,9	269,2	0,39	0,89	16
115	40*40 cm bet.	1328	280	491,9	269,2	0,37	0,96	16
116	40*40 cm bet.	1411	370	491,9	269,2	0,35	0,73	16
117	40*40 cm bet.	1221	302	491,9	269,2	0,40	0,89	16
118	40*40 cm bet.	1288	236	491,9	269,2	0,38	1,14	16
119	40*40 cm bet.	1328	275	388,6	232,8	0,29	0,85	12
120	LD1+p	1262	283	388,6	232,8	0,31	0,82	12
121	LD1+p	1627	387	799,0	449,0	0,49	1,16	49
122	40*40 cm bet.	1820	371	423,0	275,0	0,23	0,74	19
123	40*40 cm bet.	1180	222	423,0	275,0	0,36	1,24	19
124	40*40 cm bet.	1192	188	491,9	269,2	0,41	1,43	16
125	40*40 cm bet.	1456	290	423,0	275,0	0,29	0,95	19
126	LD1+p	1250	345	794,0	452,0	0,64	1,31	49
127 deel 1	LD1	370	59	143,3	0,0	0,39	0,00	22
127 deel 2	2*MV	1391	471	702,9	455,6	0,51	0,97	22
~~128~~	~~LD1+p~~	~~1319~~	~~322~~	~~711,0~~	~~410,0~~	~~0,54~~	~~1,27~~	~~49~~
~~129~~	~~LD1+p~~	~~1576~~	~~445~~	~~718,0~~	~~405,0~~	~~0,46~~	~~0,91~~	~~49~~
~~130~~	~~LD1+p~~	~~1454~~	~~348~~	~~709,0~~	~~412,0~~	~~0,49~~	~~1,18~~	~~49~~
~~131~~	~~LD1+p~~	~~1245~~	~~409~~	~~789,0~~	~~455,0~~	~~0,63~~	~~1,11~~	~~49~~
~~132 deel 1~~	~~LD1~~	~~840~~	~~142~~	~~143,3~~	~~0,0~~	~~0,17~~	~~0,00~~	~~22~~
~~132 deel 2~~	~~2*MV~~	~~2180~~	~~693~~	~~702,9~~	~~455,6~~	~~0,32~~	~~0,66~~	~~22~~
~~133~~	~~LD1+p~~	~~1223~~	~~413~~	~~713,0~~	~~408,0~~	~~0,58~~	~~0,99~~	~~49~~
~~134~~	~~LD1+p~~	~~1505~~	~~428~~	~~709,0~~	~~412,0~~	~~0,47~~	~~0,96~~	~~49~~

~~135~~	~~LD1+p~~	~~1457~~	~~317~~	~~711,0~~	~~410,0~~	~~0,49~~	~~1,29~~	~~49~~
~~136~~	~~LD1+p~~	~~1271~~	~~319~~	~~704,0~~	~~415,0~~	~~0,55~~	~~1,30~~	~~49~~
~~137 deel 1~~	~~LD1~~	~~771~~	~~116~~	~~143,3~~	~~0,0~~	~~0,19~~	~~0,00~~	~~22~~
~~137 deel 2~~	~~2*MV~~	~~1559~~	~~536~~	~~702,9~~	~~455,6~~	~~0,45~~	~~0,85~~	~~22~~
~~138~~	~~LD1+p~~	~~2379~~	~~473~~	~~723,0~~	~~402,0~~	~~0,30~~	~~0,85~~	~~49~~
~~139~~	~~LD1+p~~	~~1447~~	~~507~~	~~713,0~~	~~408,0~~	~~0,49~~	~~0,81~~	~~49~~
~~140~~	~~LD1+p~~	~~2180~~	~~488~~	~~713,0~~	~~408,0~~	~~0,33~~	~~0,84~~	~~49~~
~~141~~	~~LD1+p~~	~~1253~~	~~249~~	~~707,0~~	~~414,0~~	~~0,56~~	~~1,66~~	~~49~~
~~142~~	~~LD1+p~~	~~1119~~	~~256~~	~~711,0~~	~~410,0~~	~~0,64~~	~~1,60~~	~~49~~
~~143~~	~~LD1+p~~	~~1349~~	~~289~~	~~713,0~~	~~408,0~~	~~0,53~~	~~1,41~~	~~49~~
~~144~~	~~LD1+p~~	~~1159~~	~~302~~	~~967,0~~	~~303,7~~	~~0,83~~	~~1,08~~	~~14~~
~~145~~	~~LD1+p~~	~~1900~~	~~414~~	~~789,0~~	~~455,0~~	~~0,42~~	~~1,10~~	~~49~~
~~146 optie 2~~	~~LD1+p~~	~~821~~	~~308~~	~~1234,0~~	~~419,0~~	~~1,50~~	~~1,36~~	~~49~~
~~146 optie 1~~	~~32*32 cm bet.~~	~~135~~	~~1~~	~~n.t.b.~~	~~n.t.b.~~	~~n.t.b.~~	~~n.t.b.~~	~~1~~
~~147 optie 2~~	~~LD1+p~~	~~901~~	~~274~~	~~1231,0~~	~~421,0~~	~~1,37~~	~~1,54~~	~~49~~
~~147 optie 1~~	~~32*32 cm bet.~~	~~561~~	~~45~~	~~300,0~~	~~113,6~~	~~0,53~~	~~2,52~~	~~2~~
~~148~~	~~2 LD1+p~~	~~1174~~	~~237~~	~~960,5~~	~~237,0~~	~~0,82~~	~~1,00~~	~~13~~
149 deel 1	LD1	920	167	240,6	0,0	0,26	0,00	23
149 deel 2	2*MV	2593	519	752,4	496,3	0,29	0,96	23
150	LD1+p	1998	390	923,0	581,0	0,46	1,49	49
151	LD1+p	1278	327	932,0	593,0	0,73	1,81	49
152	LD1+p	1572	436	847,0	515,0	0,54	1,18	49
153	LD1+p	1115	316	838,0	522,0	0,75	1,65	49
154 best.	LD1+p	992	231	674,9	140,0	0,68	0,61	5
154 aanvul	Ø406/560	737	149	305,5	88,6	0,41	0,59	5
155	Ø406/560	2558	750	536,1	479,0	0,21	0,64	24
156 best	2*MV	2278	383	571,0	292,6	0,25	0,76	21
156 best	LD1	399	135	331,8	0	0,83	0,00	21
156 aanvul	Ø406/560	3091	588	655,0	106,2	0,21	0,18	21
157	40*40 cm bet.	656	248	585,3	330,1	0,89	1,33	3
158	40*40 cm bet.	1040	293	593,7	319,6	0,57	1,09	4
159	40*40 cm bet.	1656	482	408,7	226,1	0,25	0,47	6

De Unity Check (UC) voor druk- en trekbelastingen laat zien hoe dicht de daadwerkelijke belasting (F_{Ed}) bij de draagcapaciteit (F_{Rd}) ligt. Bij een UC > 1 moet er aandacht besteed worden aan de veiligheid, omdat de paal dan onvoldoende capaciteit heeft om de maatgevende belastingen op te nemen.

Conclusie

Op basis van Tabel 6-1 voldoen de funderingspalen bij ca. 40% van de fundering niet. Voor elk van deze situaties dienen versterkingsmaatregelen uitgewerkt te worden. Deze versterkingsmaatregelen zijn beschouwd in hoofdstuk 8.

7 Resultaten

In de voorgaande hoofdstukken 5 en 6 zijn de toetsingen uitgevoerd op de verbindingen, betondoorsneden en paaldraagvermogens. De resultaten zijn toegevoegd aan de Excel-bestand waarin alle assetdata is verzameld dat als volgt is opgebouwd:

- Mastkenmerken,
  - Nummer,
  - Type,
  - Hoogte,
- Fundering gegevens,
  - Palen,
    - Type,
    - Aantal,
    - Lengte,
    - Paalpunt,
    - Schoor,
  - Poeren,
    - Afmetingen,
  - Balken,
    - Afmetingen,
- Verankering gegevens,
  - Mastpoot aan fundering,
  - Fundering aan paal,
- Resultaten berekeningen,
  - Modellen,
  - Uitgangspunten,
  - Trek/druk krachten in palen,
- Input belastingen vanuit Hoogspanning,
  - Afkeur,
  - Verbouw,
- Toetsing,
  - Verankeringen,
  - Paalcapaciteiten,
- Versterkingen
  - Categorie F1 t/m F5

Een samenvatting van de toetsingen zijn hieronder in tabel 7.1 weergegeven:

Tabel 7-1 Aantal versterkingen

Afgekeurd:	52	38%
Goedgekeurd:	85	62%

In de volgende tabel 7.2 is een uittreksel van het totaaloverzicht opgenomen van de uitgevoerde toetsingen:

Tabel 7-2 Overall U.C. per mast

Mast	Mast type	Paaltype	Maatgevende U.C.
1	EA+0	40*40 cm bet.	**0,87**
2	n.v.t.	n.v.t.	**n.v.t.**
3	S+0	40*40 cm bet.	**0,99**
4	S+0	40*40 cm bet.	**1,29**
5	S+0	40*40 cm bet.	**1,52**
6	S+0	40*40 cm bet.	**1,14**
7	S+0	40*40 cm bet.	**1,05**
8	S+0	40*40 cm bet.	**0,99**
9	S+0	40*40 cm bet.	**1,03**
10	S+0	40*40 cm bet.	**1,57**
11	S+0	40*40 cm bet.	**0,99**
12	HA+0	40*40 cm bet.	**0,88**
13	S+0	40*40 cm bet.	**1,23**
14	S+0	40*40 cm bet.	**1,03**
15	S+0	40*40 cm bet.	**0,99**
16	S+0	40*40 cm bet.	**1,46**
17	HA+0	40*40 cm bet.	**0,83**
18	S+0	40*40 cm bet.	**1,10**
19	S+0	40*40 cm bet.	**1,18**
20	S+0	40*40 cm bet.	**1,00**
21	S+0	40*40 cm bet.	**1,35**
22	S+0	40*40 cm bet.	**1,16**
23	S+0	40*40 cm bet.	**3,06**
24	S+0	40*40 cm bet.	**1,35**
25	HA+0	40*40 cm bet.	**0,82**
26	S+0	40*40 cm bet.	**1,34**
27	S+0	40*40 cm bet.	**1,53**
28	S+0	40*40 cm bet.	**1,12**
29	S+0	40*40 cm bet.	**1,35**

30	S+0	40*40 cm bet.	**0,99**
31	S+0	40*40 cm bet.	**0,99**
32	S+0	40*40 cm bet.	**0,99**
33	S+0	40*40 cm bet.	**1,49**
34	S+0	40*40 cm bet.	**1,28**
35	S+0	40*40 cm bet.	**0,99**
36	S+3	40*40 cm bet.	**0,99**
37	HA+0	40*40 cm bet.	**1,01**
38	S+0	40*40 cm bet.	**0,99**
39	S+0	40*40 cm bet.	**0,99**
40	S+0	40*40 cm bet.	**0,99**
41	S+0	40*40 cm bet.	**0,99**
42	S+0	40*40 cm bet.	**0,99**
43	S+0	40*40 cm bet.	**0,99**
44	S+0	40*40 cm bet.	**0,99**
45	S+0	40*40 cm bet.	**0,99**
46	S+0	40*40 cm bet.	**0,99**
47	HA+0	40*40 cm bet.	**0,78**
48	S+0	40*40 cm bet.	**0,80**
49	S+0	40*40 cm bet.	**0,98**
50	S+0	40*40 cm bet.	**1,33**
51	S+0	40*40 cm bet.	**1,18**
52	S+6	40*40 cm bet.	**1,02**
53	S+6	40*40 cm bet.	**1,21**
54	S+0	40*40 cm bet.	**1,12**
55	S+0	40*40 cm bet.	**1,18**
56	S+0	40*40 cm bet.	**1,05**
57	S+0	40*40 cm bet.	**1,01**
58	S+0	40*40 cm bet.	**1,45**
59	S+0	40*40 cm bet.	**1,37**
60	WA	40*40 cm bet.	**0,86**
61	S+0	40*40 cm bet.	**0,80**
62	S+0	40*40 cm bet.	**0,96**
63	S+0	40*40 cm bet.	**0,80**
64	S+0	40*40 cm bet.	**1,19**
65	S+0	40*40 cm bet.	**1,04**
66	S+0	40*40 cm bet.	**1,02**
67	S+0	40*40 cm bet.	**0,93**
68	HA+0	40*40 cm bet.	**1,00**
69	S+6	40*40 cm bet.	**1,60**
70	S+9	40*40 cm bet.	**0,97**
71	S+9	40*40 cm bet.	**1,29**
72	S+6	40*40 cm bet.	**0,89**
73	S+0	40*40 cm bet.	**1,08**
74	S+0	40*40 cm bet.	**0,84**

75	HB+0	40*40 cm bet.	**0,88**
76	S+6	40*40 cm bet.	**0,89**
77	S+0	40*40 cm bet.	**0,80**
78	S+0	40*40 cm bet.	**0,84**
79	S+0	40*40 cm bet.	**0,80**
80	S+0	40*40 cm bet.	**0,97**
81	S+3	40*40 cm bet.	**0,83**
82	S+3	40*40 cm bet.	**0,92**
83	S+0	40*40 cm bet.	**0,80**
84	HA+0	35*35 cm bet.	**0,93**
85	S+3	LD1+p	**0,86**
86	S+0	LD1+p	**1,61**
87	S+0	40*40 cm bet.	**0,94**
88	S+0	40*40 cm bet.	**0,95**
89	S+0	40*40 cm bet.	**0,80**
90	S+0	40*40 cm bet.	**1,02**
91	S+0	40*40 cm bet.	**0,89**
92	S+0	40*40 cm bet.	**0,88**
93	S+0	40*40 cm bet.	**0,86**
94	HA+0	40*40 cm bet.	**0,74**
95	S+0	40*40 cm bet.	**0,80**
96	S+0	40*40 cm bet.	**0,84**
97	S+0	40*40 cm bet.	**0,80**
98	S+0	40*40 cm bet.	**0,81**
99	S+6	40*40 cm bet.	**0,89**
100	S+0	40*40 cm bet.	**0,80**
101	S+0	40*40 cm bet.	**0,94**
102	S+0	40*40 cm bet.	**0,85**
103	S+0	40*40 cm bet.	**0,80**
104	EA+3/K	Ø813	**0,61**
105	HB+0	40*40 cm bet.	**0,87**
106	SHV+6	Ø609/670	**0,76**
107	S+0/V	Ø609/630	**0,53**
108	WA	40*40 cm bet.	**0,80**
109	S+3	Ø609/630	**0,74**
110	S+0	40*40 cm bet.	**0,90**
111	S+0	40*40 cm bet.	**1,05**
112	S+0	40*40 cm bet.	**0,96**
113	S+6	Ø609/630	**0,76**
114	S+0	40*40 cm bet.	**0,89**
115	S+0	40*40 cm bet.	**0,96**
116	S+0	40*40 cm bet.	**0,80**
117	S+0	40*40 cm bet.	**0,89**
118	S+0	40*40 cm bet.	**1,14**
119	HB+0	40*40 cm bet.	**0,90**

120	HA+3	LD1+p	**0,82**
121	S+6	LD1+p	**1,16**
122	S+6	40*40 cm bet.	**0,89**
123	S+6	40*40 cm bet.	**1,24**
124	S+0	40*40 cm bet.	**1,43**
125	S+6	40*40 cm bet.	**0,95**
126	S+6	LD1+p	**1,31**
127 deel 1	HA+0	LD1	**0,59**
127 deel 2	HA+0	2*MV	**0,97**
~~**128**~~	~~S+0~~	~~LD1+p~~	~~**1,27**~~
~~**129**~~	~~S+0~~	~~LD1+p~~	~~**0,91**~~
~~**130**~~	~~S+0~~	~~LD1+p~~	~~**1,18**~~
~~**131**~~	~~S+6~~	~~LD1+p~~	~~**1,11**~~
~~**132 deel 1**~~	~~HA+0~~	~~LD1~~	~~**0,54**~~
~~**132 deel 2**~~	~~HA+0~~	~~2*MV~~	~~**0,66**~~
~~**133**~~	~~S+0~~	~~LD1+p~~	~~**0,99**~~
~~**134**~~	~~S+0~~	~~LD1+p~~	~~**0,96**~~
~~**135**~~	~~S+0~~	~~LD1+p~~	~~**1,29**~~
~~**136**~~	~~S+0~~	~~LD1+p~~	~~**1,30**~~
~~**137 deel 1**~~	~~HA+0~~	~~LD1~~	~~**0,58**~~
~~**137 deel 2**~~	~~HA+0~~	~~2*MV~~	~~**0,85**~~
~~**138**~~	~~S+0~~	~~LD1+p~~	~~**0,85**~~
~~**139**~~	~~S+0~~	~~LD1+p~~	~~**0,81**~~
~~**140**~~	~~S+0~~	~~LD1+p~~	~~**0,84**~~
~~**141**~~	~~S+0~~	~~LD1+p~~	~~**1,66**~~
~~**142**~~	~~S+0~~	~~LD1+p~~	~~**1,60**~~
~~**143**~~	~~S+0~~	~~LD1+p~~	~~**1,41**~~
~~**144**~~	~~S+6~~	~~LD1+p~~	~~**1,01**~~
~~**145**~~	~~S+6~~	~~LD1+p~~	~~**1,10**~~
~~**146 optie 2**~~	~~S+9~~	~~32*32 cm bet.~~	~~**0,97**~~
~~**146 optie 1**~~	~~S+9~~	~~LD1+p~~	~~**1,50**~~
~~**147 optie 2**~~	~~S+9~~	~~32*32 cm bet.~~	~~**2,52**~~
~~**147 optie 1**~~	~~S+9~~	~~LD1+p~~	~~**1,54**~~
~~**148**~~	~~S+12~~	~~2 LD1+p~~	~~**1,00**~~
149 deel 1	HE+6	LD1	**0,69**
149 deel 2	HE+6	2*MV	**0,96**
150	S+9	LD1+p	**1,49**

151	S+9	LD1+p	**1,81**
152	S+0	LD1+p	**1,18**
153	S+0	LD1+p	**1,65**
154 best.	S+0	LD1+p	**0,68**
154 aanvul	S+0	Ø406/560	**0,59**
155	HA+12	Ø406/560	**0,64**
156 best deel 2	HB+0	2 MV	**0,76**
156 best deel 1	HB+0	LD1	**0,83**
156 aanvul	HB+0	Ø406/560	**0,59**
157	S+24	40*40 cm bet.	**1,33**
158	S+24	40*40 cm bet.	**1,09**
159	EA+0	40*40 cm bet.	**0,94**

Dit is een samenvatting met daarin de overall U.C. per mast. Het complete overzicht is opgenomen in bijlage 49.

De versterkingen als gevolg van deze toetsingen worden in hoofdstuk 8 verder behandeld.

8 Versterkingen

In hoofdstuk 7 zijn de uitkomsten van de toetsingen van de bestaande masten en funderingen weergegeven. De toetsing van de constructies is uitgevoerd volgens de NEN8700-normen. Waar nodig worden versterkingen ontworpen om te voldoen aan de vereisten van deze norm. Hoofdstuk 8 richt zich specifiek op fase 1a en 1b, waarin globale berekeningen en schetsen van de versterkingen worden gepresenteerd. Hierbij is aandacht besteed aan de maakbaarheid, de verbinding tussen mast en fundering, de fundering zelf en de verbinding tussen fundering en paal.

De totale engineering en het tekenwerk zullen pas in fase 2 verder worden uitgewerkt. In fase 1a en 1b worden de versterkingen globaal bepaald, en de verdere uitwerking van deze versterkingen op DO-niveau zal in fase 2 worden gerapporteerd. Hierbij wordt rekening gehouden met operationele uitdagingen, zoals het in dienst houden van de stroomvoorziening. Waar mogelijk worden de versterkingen gebaseerd op de standaard versterkingen gehanteerd door TenneT, gecategoriseerd van F1 tot en met F5.

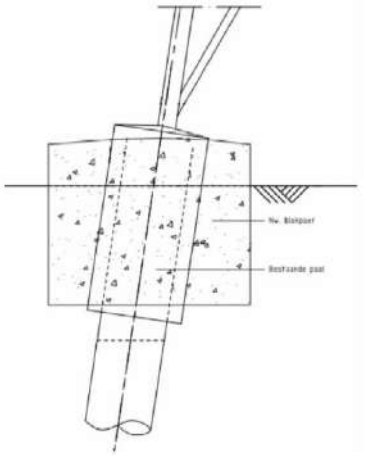
De versterkingen zijn onder te verdelen in de volgende typen:

- Versterking met ballast (F1 en F2),
    - Blokpoer (220) (3*B) + Ballast licht
        - S+0 mast 7 / 9 / 14 / 56 / 57 / 65 / 66 / 90 / 111
        - S+6 mast 52
    - Blokpoer (220) (3*B) + Ballast zwaar
        - S+0 mast 6 / 18 / 28 / 73
    - Blokpoer (220) (3*B) + Ballast + Koppelbalk
        - S+0 mast 13 / 19 / 22 / 51 / 54 / 64 / 118
        - S+6 mast 53 / 123
    - Cilinderpoer (75) (1*LD1) + Ballast
        - S+0 mast 152
        - S+6 mast 121
- Versterking met extra palen (F3, F4 en F5),
    - Blokpoer (220) (3*B) + 2 extra palen

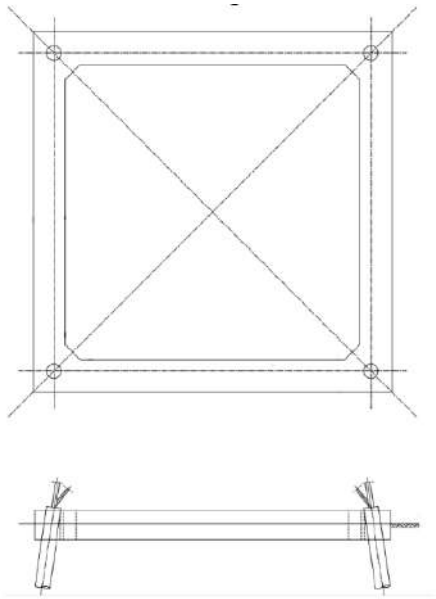
        - S+0 mast 4 / 5 / 10 / 16 / 21 /23 / 24 / 26 / 27 / 29 / 33 / 34 / 50 / 58 / 59 / 124
        - S+6 mast 69
        - S+9 mast 71
    - Balkrooster (5*B) + 2 extra palen
        - HA+0 mast 37
    - Cilinderpoer (75) (1*LD1) + 2 extra palen
        - S+0 mast 86
        - S+0 mast 153 (schoorpalen)
        - S+6 mast 126
        - S+9 mast 150/151 (schoorpalen)
    - Balkrooster (4*B) + 2/3 extra palen
        - S+24 mast 157 3 extra palen
        - S+24 mast 158 2 extra palen

Standaardversterkingen TenneT

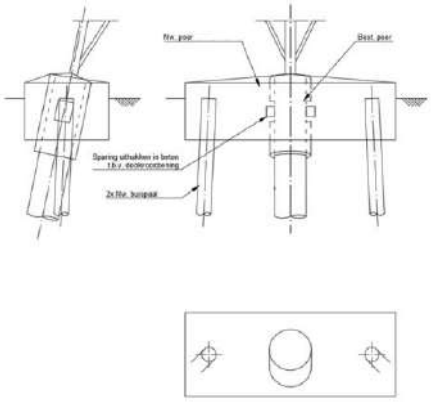
- F1 => Ballastblok aan poer enkele paal,



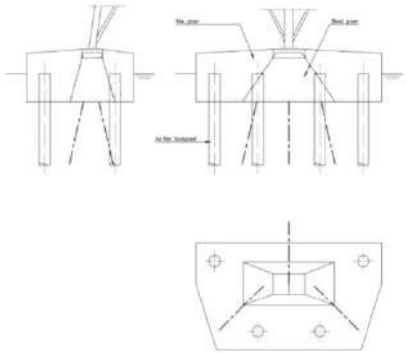
- F2 => Ballast balken aan ringbalk/balkrooster,



- F3 => Lijnpoer met 2 extra palen naast bestaande enkele paal,



- F4 => Blokpoer met 4 extra palen om bestaande blokpoer,



- F5 => Specials die niet in F1 t/m F4 in te delen zijn.

Voor het berekenen van de F3, F4 en F5 specials zal gebruik gemaakt worden van SCIA, gezien de complexe aard van deze oplossing. SCIA biedt de benodigde geavanceerde rekenmogelijkheden om de specifieke eisen en uitdagingen van de F5 specials nauwkeurig te modelleren en te analyseren. Dit zorgt ervoor dat de berekeningen betrouwbaar en gedetailleerd zijn, wat essentieel is voor de veiligheid en stabiliteit van de constructie.

Van de versterkingen F1 t/m F5 zullen geen gedetailleerde berekeningen in dit rapport worden opgenomen, aangezien deze gebaseerd zijn op enkele globale berekeningen. Voor de capaciteit van de palen wordt uitgegaan van de capaciteiten van de bestaande palen ter plaatse van de te versterken onderdelen. De daadwerkelijke constructieve en geotechnische berekeningen zullen in fase 2 worden uitgewerkt en gerapporteerd, waarbij alle relevante details en specificaties grondig worden geanalyseerd en gedocumenteerd.

Hieronder is een tabel met een samenvatting van de versterkingen per mast weergegeven:

Tabel 8-1 Versterkingen per mast

Mast	Paaltype	Poertype	Maatgevende U.C.	Versterking	Categorie (F1 t/m F5)
1	40*40 cm bet.	Balkrooster (5*B)	**0,87**	-	-
2	n.v.t.	n.v.t.	**n.v.t**	n.v.t	n.v.t
3	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
4	40*40 cm bet.	Blokpoer(220) (3*B)	**1,29**	Lijnpoer met 2 extra palen	F4
5	40*40 cm bet.	Blokpoer(220) (3*B)	**1,52**	Lijnpoer met 2 extra palen	F4
6	40*40 cm bet.	Blokpoer(220) (3*B)	**1,14**	Ballast zwaar	F1
7	40*40 cm bet.	Blokpoer(220) (3*B)	**1,05**	Ballast licht	F1
8	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
9	40*40 cm bet.	Blokpoer(220) (3*B)	**1,03**	Ballast licht	F1
10	40*40 cm bet.	Blokpoer(220) (3*B)	**1,57**	Lijnpoer met 2 extra palen	F4
11	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
12	40*40 cm bet.	Balkrooster (5*B)	**0,88**	-	-
13	40*40 cm bet.	Blokpoer(220) (3*B)	**1,23**	Ballast+Koppelbalk	F2
14	40*40 cm bet.	Blokpoer(220) (3*B)	**1,03**	Ballast licht	F1
15	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
16	40*40 cm bet.	Blokpoer(220) (3*B)	**1,46**	Lijnpoer met 2 extra palen	F4
17	40*40 cm bet.	Balkrooster (5*B)	**0,83**	-	-
18	40*40 cm bet.	Blokpoer(220) (3*B)	**1,10**	Ballast zwaar	F1
19	40*40 cm bet.	Blokpoer(220) (3*B)	**1,18**	Ballast+Koppelbalk	F2
20	40*40 cm bet.	Blokpoer(220) (3*B)	**1,00**	-	-
21	40*40 cm bet.	Blokpoer(220) (3*B)	**1,35**	Lijnpoer met 2 extra palen	F4
22	40*40 cm bet.	Blokpoer(220) (3*B)	**1,16**	Ballast+Koppelbalk	F2
23	40*40 cm bet.	Blokpoer(220) (3*B)	**3,06**	Lijnpoer met 2 extra palen	F4
24	40*40 cm bet.	Blokpoer(220) (3*B)	**1,35**	Lijnpoer met 2 extra palen	F4
25	40*40 cm bet.	Balkrooster (5*B)	**0,82**	-	-
26	40*40 cm bet.	Blokpoer(220) (3*B)	**1,34**	Lijnpoer met 2 extra palen	F4
27	40*40 cm bet.	Blokpoer(220) (3*B)	**1,53**	Lijnpoer met 2 extra palen	F4
28	40*40 cm bet.	Blokpoer(220) (3*B)	**1,12**	Ballast zwaar	F1
29	40*40 cm bet.	Blokpoer(220) (3*B)	**1,35**	Lijnpoer met 2 extra palen	F4
30	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
31	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
32	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
33	40*40 cm bet.	Blokpoer(220) (3*B)	**1,49**	Lijnpoer met 2 extra palen	F4
34	40*40 cm bet.	Blokpoer(220) (3*B)	**1,28**	Lijnpoer met 2 extra palen	F4
35	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
36	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
37	40*40 cm bet.	Balkrooster (5*B)	**1,01**	Aanstorting met 2 palen	F5
38	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
39	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
40	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
41	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
42	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
43	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
44	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
45	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-
46	40*40 cm bet.	Blokpoer(220) (3*B)	**0,99**	-	-

47	40*40 cm bet.	Balkrooster (5*B)	**0,78**	-	-
48	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**	-	-
49	40*40 cm bet.	Blokpoer(220) (3*B)	**0,98**	-	-
50	40*40 cm bet.	Blokpoer(220) (3*B)	**1,33**	Lijnpoer met 2 extra palen	F4
51	40*40 cm bet.	Blokpoer(220) (3*B)	**1,18**	Ballast+Koppelbalk	F2
52	40*40 cm bet.	Blokpoer(220) (3*B)	**1,02**	Ballast licht	F1
53	40*40 cm bet.	Blokpoer(220) (3*B)	**1,21**	Ballast+Koppelbalk	F2
54	40*40 cm bet.	Blokpoer(220) (3*B)	**1,12**	Ballast+Koppelbalk	F2
55	40*40 cm bet.	Blokpoer(220) (3*B)	**1,18**	Ballast+Koppelbalk	F2
56	40*40 cm bet.	Blokpoer(220) (3*B)	**1,05**	Ballast licht	F1
57	40*40 cm bet.	Blokpoer(220) (3*B)	**1,01**	Ballast licht	F1
58	40*40 cm bet.	Blokpoer(220) (3*B)	**1,45**	Lijnpoer met 2 extra palen	F4
59	40*40 cm bet.	Blokpoer(220) (3*B)	**1,37**	Lijnpoer met 2 extra palen	F4
60	40*40 cm bet.	Balkrooster (5*B)	**0,86**	-	-
61	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**	-	-
62	40*40 cm bet.	Blokpoer(220) (3*B)	**0,96**	-	-
63	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**	-	-
64	40*40 cm bet.	Blokpoer(220) (3*B)	**1,19**	Ballast+Koppelbalk	F2
65	40*40 cm bet.	Blokpoer(220) (3*B)	**1,04**	Ballast licht	F1
66	40*40 cm bet.	Blokpoer(220) (3*B)	**1,02**	Ballast licht	F1
67	40*40 cm bet.	Blokpoer(220) (3*B)	**0,93**	-	-
68	40*40 cm bet.	Balkrooster (5*B)	**1,00**	-	-
69	40*40 cm bet.	Blokpoer(220) (3*B)	**1,60**	Lijnpoer met 2 extra palen	F4
70	40*40 cm bet.	Blokpoer(220) (3*B)	**0,97**	-	-
71	40*40 cm bet.	Blokpoer(220) (3*B)	**1,29**	Lijnpoer met 2 extra palen	F4
72	40*40 cm bet.	Blokpoer(220) (3*B)	**0,89**	-	-
73	40*40 cm bet.	Blokpoer(220) (3*B)	**1,08**	Ballast zwaar	F1
74	40*40 cm bet.	Blokpoer(220) (3*B)	**0,84**	-	-
75	40*40 cm bet.	Balkrooster (5*B)	**0,88**	-	-
76	40*40 cm bet.	Blokpoer(220) (3*B)+2LD1?	**0,89**	-	-
77	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**	-	-
78	40*40 cm bet.	Blokpoer(220) (3*B)	**0,84**	-	-
79	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**	-	-
80	40*40 cm bet.	Blokpoer(220) (3*B)	**0,97**	-	-
81	40*40 cm bet.	Blokpoer(220) (3*B)	**0,83**	-	-
82	40*40 cm bet.	Blokpoer(220) (3*B)	**0,92**	-	-
83	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**	-	-
84	35*35 cm bet.	Balkrooster (5*B)	**0,93**	-	-
85	LD1+p	Cilinderpoer(75) (1*LD1)	**0,97**	-	-
86	LD1+p	Cilinderpoer(75) (1*LD1)	**1,61**	Extra palen (2 stuks)	F3
87	40*40 cm bet.	Blokpoer(220) (3*B)	**0,94**	-	-
88	40*40 cm bet.	Blokpoer(220) (3*B)	**0,95**	-	-
89	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**	-	-
90	40*40 cm bet.	Blokpoer(220) (3*B)	**1,02**	Ballast licht	F1
91	40*40 cm bet.	Blokpoer(220) (3*B)	**0,89**	-	-
92	40*40 cm bet.	Blokpoer(220) (3*B)	**0,88**	-	-
93	40*40 cm bet.	Blokpoer(220) (3*B)	**0,86**	-	-
94	40*40 cm bet.	Balkrooster (5*B)	**0,74**	-	-
95	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**	-	-
96	40*40 cm bet.	Blokpoer(220) (3*B)	**0,84**	-	-

97	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**	-	-
98	40*40 cm bet.	Blokpoer(220) (3*B)	**0,81**	-	-
99	40*40 cm bet.	Blokpoer(220) (3*B)	**0,89**	-	-
100	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**	-	-
101	40*40 cm bet.	Blokpoer(220) (3*B)	**0,94**	-	-
102	40*40 cm bet.	Blokpoer(220) (3*B)	**0,85**	-	-
103	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**	-	-
104	Ø813	1xSI	**0,61**	-	-
105	40*40 cm bet.	Balkrooster (5*B)	**0,87**	-	-
106	Ø609/670	1xSI	**0,76**	-	-
107	Ø609/630	1xSI	**0,67**	-	-
108	40*40 cm bet.	Balkrooster (5*B)	**0,80**	-	-
109	Ø609/630	1xSI	**0,74**	-	-
110	40*40 cm bet.	Blokpoer(220) (3*B)	**0,90**	-	-
111	40*40 cm bet.	Blokpoer(220) (3*B)	**1,05**	Ballast licht	F1
112	40*40 cm bet.	Blokpoer(220) (3*B)	**0,96**	-	-
113	Ø609/630	1xSI	**0,76**	-	-
114	40*40 cm bet.	Blokpoer(220) (3*B)	**0,89**	-	-
115	40*40 cm bet.	Blokpoer(220) (3*B)	**0,96**	-	-
116	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**	-	-
117	40*40 cm bet.	Blokpoer(220) (3*B)	**0,89**	-	-
118	40*40 cm bet.	Blokpoer(220) (3*B)	**1,14**	Ballast+Koppelbalk	F2
119	40*40 cm bet.	Balkrooster (5*B)	**0,90**	-	-
120	LD1+p	Balkrooster (5LP)	**0,82**	-	-
121	LD1+p	Cilinderpoer(75) (1*LD1)	**1,16**	Ballast	F1
122	40*40 cm bet.	Blokpoer(220) (3*B)	**0,89**	-	-
123	40*40 cm bet.	Blokpoer(220) (3*B)	**1,24**	Ballast+Koppelbalk	F2
124	40*40 cm bet.	Blokpoer(220) (3*B)	**1,43**	Lijnpoer met 2 extra palen	F4
125	40*40 cm bet.	Blokpoer(220) (3*B)	**0,95**	-	-
126	LD1+p	Cilinderpoer(75) (1*LD1)	**1,31**	Extra palen (2 stuks)	F3
127 deel 1	LD1	Cilinderpoer(200) (2*MV+1*LD1)	**0,73**	-	-
127 deel 2	2*MV	Cilinderpoer(200) (2*MV+1*LD1)	**0,97**	-	-
~~**128**~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~**1,27**~~	~~Ballast~~	~~F1~~
~~**129**~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~**0,97**~~	-	-
~~**130**~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~**1,18**~~	~~Ballast~~	~~F1~~
~~**131**~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~**1,11**~~	~~Ballast~~	~~F1~~
~~**132 deel 1**~~	~~LD1~~	~~Cilinderpoer(200) (2*MV+1*LD1)~~	~~**0,67**~~	-	-
~~**132 deel 2**~~	~~2*MV~~	~~Cilinderpoer(200) (2*MV+1*LD1)~~	~~**0,66**~~	-	-
~~**133**~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~**0,99**~~	-	-
~~**134**~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~**0,97**~~	-	-
~~**135**~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~**1,29**~~	~~Ballast~~	~~F1~~

~~136~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~1,30~~	~~Ballast~~	~~F1~~
~~137 deel 1~~	~~LD1~~	~~Cilinderpoer(200) (2*MV+1*LD1)~~	~~0,67~~	-	-
~~137 deel 2~~	~~2*MV~~	~~Cilinderpoer(200) (2*MV+1*LD1)~~	~~0,85~~	-	-
~~138~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~0,97~~	-	-
~~139~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~0,97~~	-	-
~~140~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~0,97~~	-	-
~~141~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~1,66~~	~~Extra palen (2 stuks)~~	~~F3~~
~~142~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~1,60~~	~~Extra palen (2 stuks)~~	~~F3~~
~~143~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~1,41~~	~~Extra palen (2 stuks)~~	~~F3~~
~~144~~	~~LD1+p~~	~~Koppelframe (Cilinderpoer 1*LD1)~~	~~1,08~~	~~Extra palen (2 stuks) lijnpoer~~	~~F3~~
~~145~~	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~1,10~~	~~Ballast~~	~~F1~~
~~146 optie 2~~	~~32*32 cm bet.~~	~~Balkrooster (5*B)~~	~~0,97~~	~~Aanstorting met 3 palen~~	~~F5~~
~~146 optie 1~~	~~LD1+p~~	~~Balkrooster (5*B)~~	~~2,63~~	~~Aanstorting met 3 palen~~	~~F5~~
~~147 optie 2~~	~~32*32 cm bet.~~	~~Balkrooster (5*B)~~	~~2,52~~	~~Aanstorting met 3 palen~~	~~F5~~
~~147 optie 1~~	~~LD1+p~~	~~Balkrooster (5*B)~~	~~2,63~~	~~Aanstorting met 3 palen~~	~~F5~~
~~148~~	~~2 LD1+p~~	~~Blokpoer(200) (2*LD1)~~	~~1,00~~	~~Blokpoer met 2 extra palen~~	~~F5~~
149 deel 1	LD1	Cilinderpoer(200) (2*MV+1*LD1)	**0,85**	-	-
149 deel 2	2*MV	Cilinderpoer(200) (2*MV+1*LD1)	**1,04**	-	-
150	LD1+p	Cilinderpoer(75) (1*LD1)	**1,49**	Extra palen (2 stuks)	F3
151	LD1+p	Cilinderpoer(75) (1*LD1)	**1,81**	Extra palen (2 stuks)	F3
152	LD1+p	Cilinderpoer(75) (1*LD1)	**1,18**	Ballast	F1
153	LD1+p	Cilinderpoer(75) (1*LD1)	**1,65**	Extra palen (2 stuks)	F3
154 best.	LD1+p	Cilinderpoer(75) (1*LD1)	**0,68**		
154 aanvul	Ø406/560	Blokpoer(700)	**0,59**		
155	Ø406/560	Cilinderpoer(225) (4*Ø406/560)	**0,64**		
156 best deel 2	2 MV	Cilinderpoer(200) (2*MV+1*LD1)	**0,76**		

156 best deel 1	LD1	Cilinderpoer(200) (2*MV+1*LD1)	**0,83**		
156 aanvul	Ø406/560	Cilinderpoer(200) (2*MV+1*LD1)	**0,49**		
157	40*40 cm bet.	Balkrooster (4*B)	**1,33**	Aanstorting met 3 palen	F5
158	40*40 cm bet.	Balkrooster (4*B)	**1,09**	Aanstorting met 2 palen	F5
159	40*40 cm bet.	Balkrooster (4*B)	**0,94**		

Een overzichtslijst van de versterkingen is weergegeven in bijlage 47

Voor een schetsmatige uitwerking van de versterkingen zie bijlage 48

Bijlagen

~~Bijlage 1 uitvoer SCIA - Balkrooster 5xBeton32x32 mast 146 (29 bladzijden)~~

~~Bijlage 2 uitvoer SCIA - Balkrooster 5xBeton32x32 mast 147 (42 bladzijden)~~

Bijlage 3 uitvoer SCIA -Balkrooster 4xBeton40x40 mast 157 (44 bladzijden)

Bijlage 4 uitvoer SCIA - Balkrooster 4xBeton40x40 mast 158 (47 bladzijden)

Bijlage 5 uitvoer SCIA -Blokpoer-1xLD1-2xTubex (48 bladzijden)

Bijlage 6 uitvoer SCIA -Balkrooster 7xBeton40x40 mast 159 (49 bladzijden)

Bijlage 7 uitvoer SCIA - Balkrooster 5xBeton40x40 mast 17 (42 bladzijden)

Bijlage 8 uitvoer SCIA - Balkrooster 5xBeton40x40 mast 37 (43 bladzijden)

Bijlage 9 uitvoer SCIA - Balkrooster 5xBeton40x40 mast 60 (42 bladzijden)

Bijlage 10 uitvoer SCIA - Balkrooster 5xBeton40x40 mast 68 (40 bladzijden)

Bijlage 11 uitvoer SCIA - Balkrooster 5xBeton40x40 mast 108 (41 bladzijden)

Bijlage 12 uitvoer SCIA - Balkrooster 5xBeton40x40 (38 bladzijden)

~~Bijlage 13 uitvoer SCIA - Blokpoer-2xLD1 (42 bladzijden)~~

~~Bijlage 14 uitvoer SCIA - Koppelframe-1xLD1 (42 bladzijden)~~

Bijlage 15 uitvoer SCIA - Blokpoer-3xBeton40x40-MAST-S+0 _II (36 bladzijden)

Bijlage 16 uitvoer SCIA - Blokpoer-3xBeton40x40-MAST-S+0 _III (37 bladzijden)

Bijlage 17 uitvoer SCIA - Blokpoer-3xBeton40x40-MAST-Splus3 -mast 36 (41 bladzijden)

Bijlage 18 uitvoer SCIA - Blokpoer-3xBeton40x40-MAST-Splus3 (41 bladzijden)

Bijlage 19 uitvoer SCIA - Blokpoer-3xBeton40x40-MAST-Splus6 (39 bladzijden)

Bijlage 20 uitvoer SCIA - Blokpoer-3xBeton40x40-MAST-Splus9 (39 bladzijden)

Bijlage 21 uitvoer SCIA - Cilinderpoer-2xMV-1xLD1- 2xTubex-HB (45 bladzijden)

Bijlage 22 uitvoer SCIA - Cilinderpoer-2xMV-1xLD1-HA (35 bladzijden)

Bijlage 23 uitvoer SCIA - Cilinderpoer-2xMV-1xLD1-HAplus3 (33 bladzijden)

Bijlage 24 uitvoer SCIA - Cilinderpoer-4xTubex406-560 (30 bladzijden)

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Bijlage 26 uitvoer berekening inleiding krachten in fundatie – Anker type B

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Bijlage 28 uitvoer berekening inleiding krachten in fundatie – Anker type D

Bijlage 29 uitvoer berekening inleiding krachten in fundatie – Knag type C5-L

Bijlage 30 uitvoer berekening inleiding krachten in fundatie – Knag type C6-L

Bijlage 31 uitvoer berekening inleiding krachten in fundatie – Knag type C7-M

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Bijlage 44 uitvoer doorsnedetoets – Type Blokpoer (700)

Bijlage 45 uitvoer doorsnedetoets – Type Cilinderpoer (200)

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Together with our clients and the collective knowledge of our 22,000 architects, engineers and other specialists, we co-create solutions that address urbanisation, capture the power of digitalisation, and make our societies more sustainable.

Sweco – Transforming society together

SWECO

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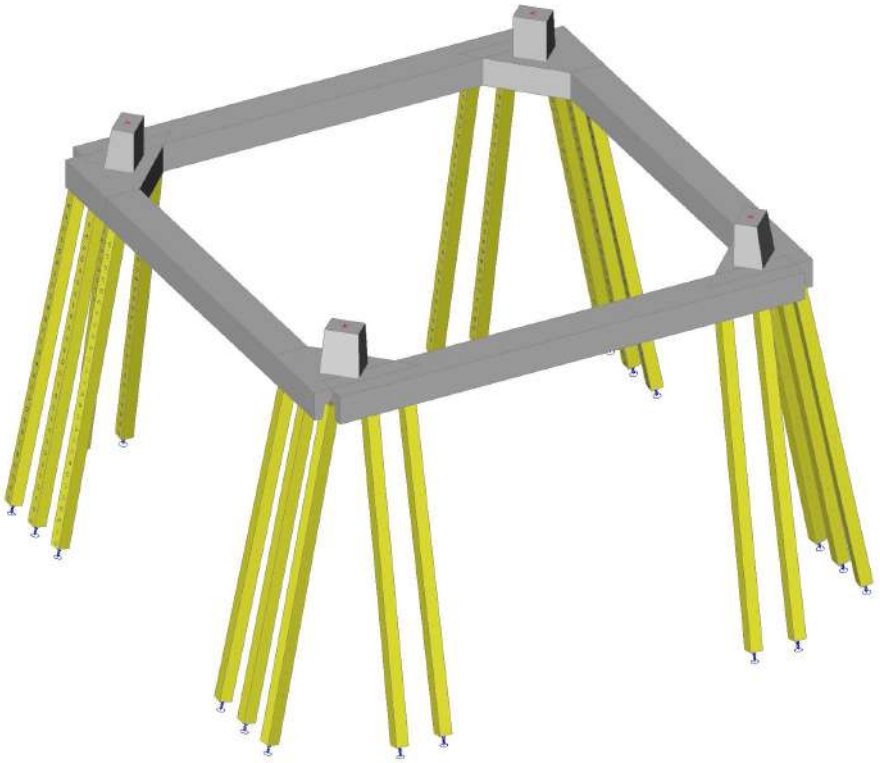
2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-DIM 380kV
Part	Balkrooster 5xBeton32x32 mast 146
Author	[redacted]
Date	6-05-2025
Structure	General XYZ
No. of nodes :	52
No. of beams :	28
No. of slabs :	0
No. of solids :	0
No. of used profiles :	3
No. of load cases :	9
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,810
National code	EC - EN

3. Analyse model



4. Modeleigenschappen

4.1. Materials

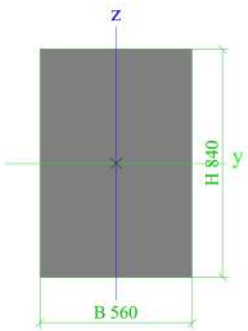
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C20/25 Ongescheurd	Concrete	1500,0	2600,0	2,4000e+04	0.2	0,00	20,00	
C20/25 Gescheurd	Concrete	2500,0	2600,0	8,0000e+03	0.2	0,00	20,00	

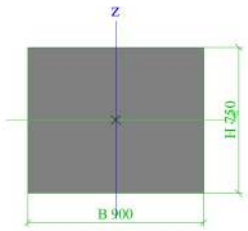
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

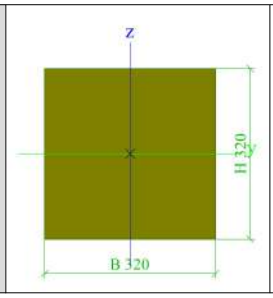
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 500B	Reinforcement steel	7850,0	2,0000e+05	8,3333e+04	0,00	500,0

4.2. Cross-sections

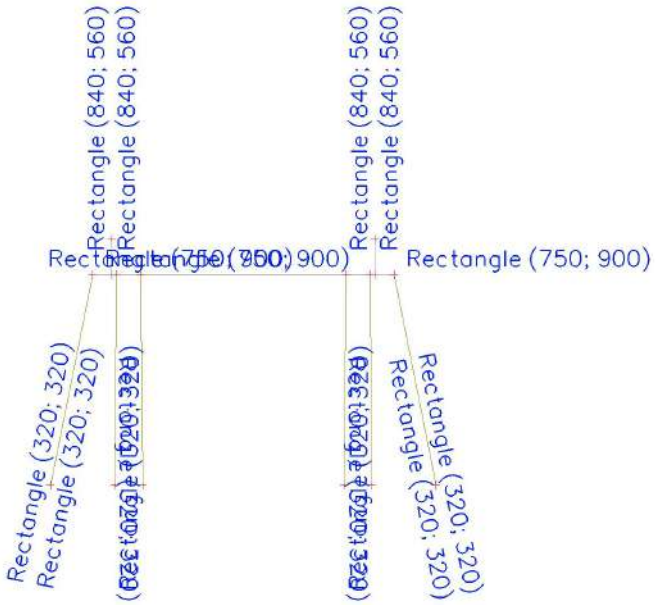
Poer.Opstort		
Type	Rectangle	
Detailed	840; 560	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	4,7040e-01	
A_y [m²], A_z [m²]	3,9200e-01	3,9200e-01
A_L [m²/m], A_D [m²/m]	2,8000e+00	2,8000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	280	420
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,7660e-02	1,2293e-02
i_y [mm], i_z [mm]	242	162
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	6,5856e-02	4,3904e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	2,8888e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

Balk		
Type	Rectangle	
Detailed	750; 900	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	6,7500e-01	
A_y [m²], A_z [m²]	5,6250e-01	5,6250e-01
A_L [m²/m], A_D [m²/m]	3,3000e+00	3,3000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450	375
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	3,1641e-02	4,5563e-02
i_y [mm], i_z [mm]	217	260
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	8,4375e-02	1,0125e-01
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	6,3112e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

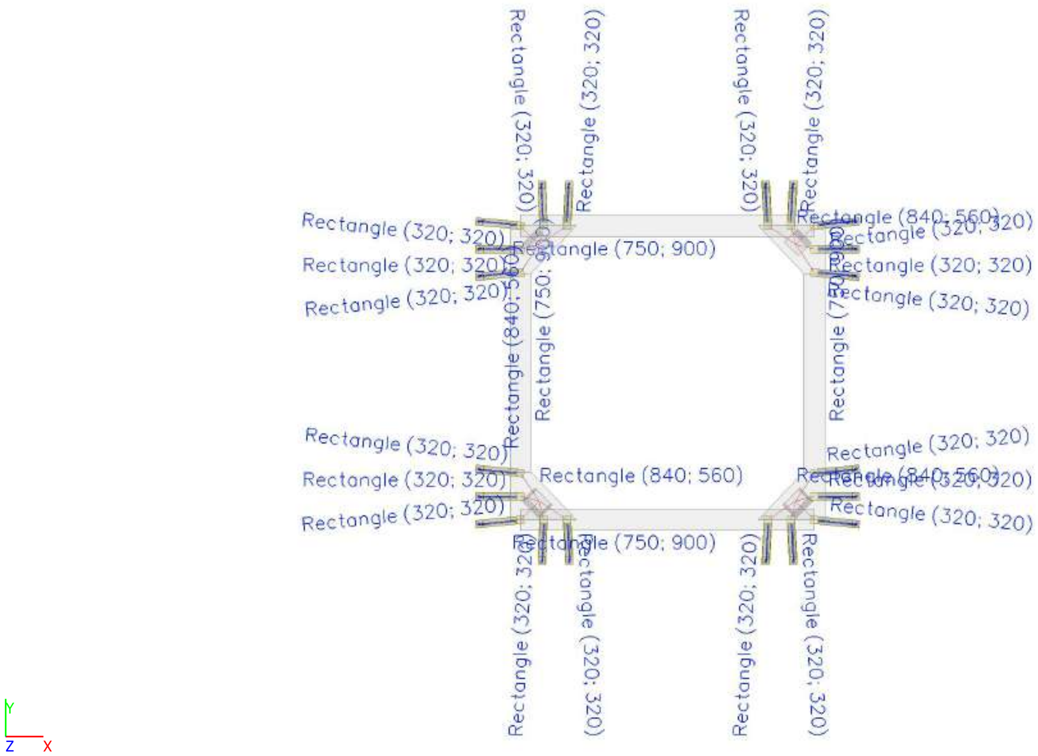
Funderingspaal		
Type	Rectangle	
Detailed	320; 320	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [m²]	1,0240e-01	
A_y [m²], A_z [m²]	8,5333e-02	8,5333e-02
A_L [m²/m], A_D [m²/m]	1,2800e+00	1,2800e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	160	160
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	8,7381e-04	8,7381e-04
i_y [mm], i_z [mm]	92	92
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	5,4613e-03	5,4613e-03
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	1,4757e-03	0,0000e+00
β_y [mm], β_z [mm]	0	0

Picture		
		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	NetInstelling1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	5
Average size of 2D mesh element [m]	0,250
Average size of 1D mesh element on curved 1D members [m]	0,250
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N5	13,000	1,400	0,000
N6	13,000	2,400	0,000
N7	12,000	0,400	0,000
N1	11,000	0,400	0,000
N17	0,400	0,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N21	0,400	13,000	0,000
1Y	12,200	1,200	1,475
N22	12,200	1,200	0,000
N23	12,200	12,200	0,000
1XY	12,200	12,200	1,475

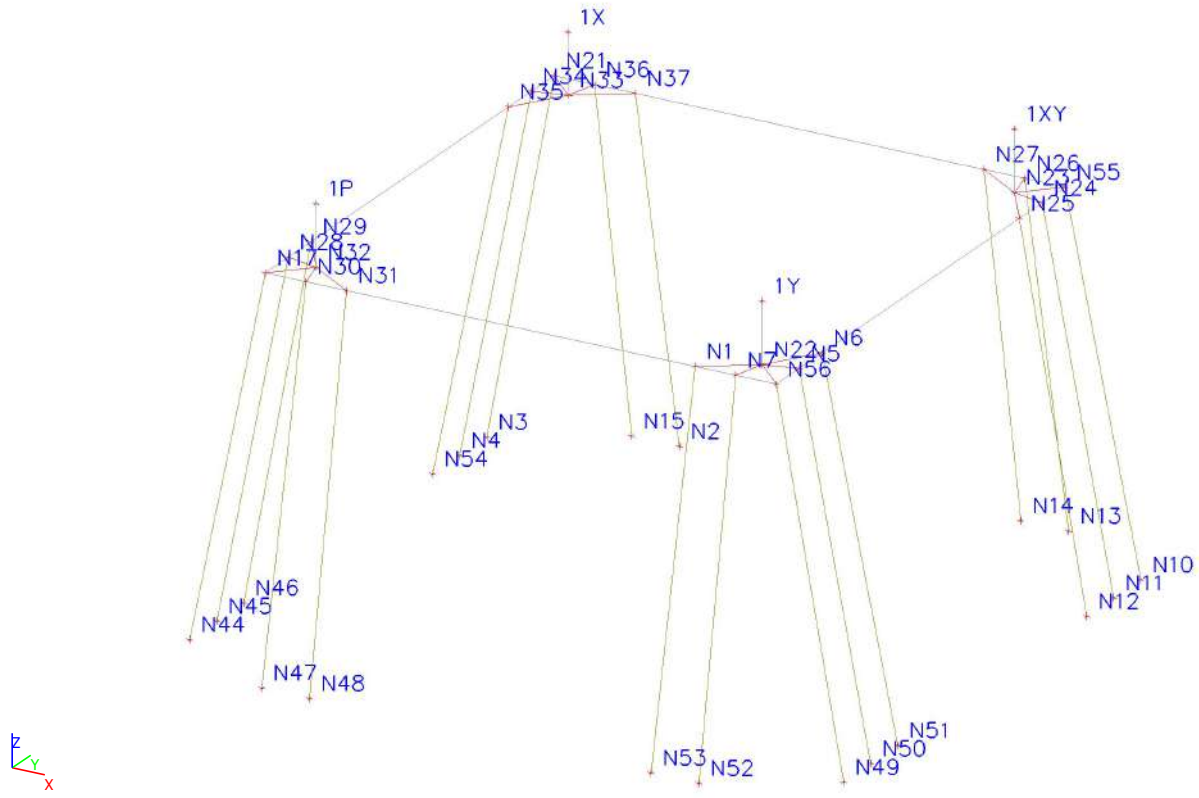
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N24	13,000	12,000	0,000
N25	13,000	11,000	0,000
N26	12,000	13,000	0,000
N27	11,000	13,000	0,000
N28	0,400	1,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N29	0,400	2,400	0,000
N30	1,400	0,400	0,000
N31	2,400	0,400	0,000
1P	1,200	1,200	1,475
N32	1,200	1,200	0,000
N33	1,200	12,200	0,000
1X	1,200	12,187	1,475
N34	0,400	12,000	0,000
N35	0,400	11,000	0,000
N36	1,400	13,000	0,000
N37	2,400	13,000	0,000
N38	12,200	1,200	0,000
N39	1,200	1,200	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N40	12,200	12,200	0,000
N41	1,200	12,200	0,000
N44	-1,365	0,224	-8,824
N45	-1,364	1,400	-8,821
N46	-1,365	2,576	-8,824
N47	1,312	-1,364	-8,822
N48	2,488	-1,364	-8,822
N49	14,765	0,224	-8,824
N50	14,764	1,400	-8,821
N51	14,765	2,576	-8,824
N52	12,088	-1,364	-8,822
N53	10,912	-1,364	-8,822
N10	14,765	13,176	-8,824

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N11	14,764	12,000	-8,821
N12	14,765	10,824	-8,824
N13	12,088	14,764	-8,822
N14	10,912	14,764	-8,822
N15	1,312	14,764	-8,822
N2	2,488	14,764	-8,822
N3	-1,365	13,176	-8,824
N4	-1,364	12,000	-8,821
N54	-1,365	10,824	-8,824
N55	13,000	13,000	0,000
N56	13,000	0,400	0,000

5.2. Analyse model met knopen

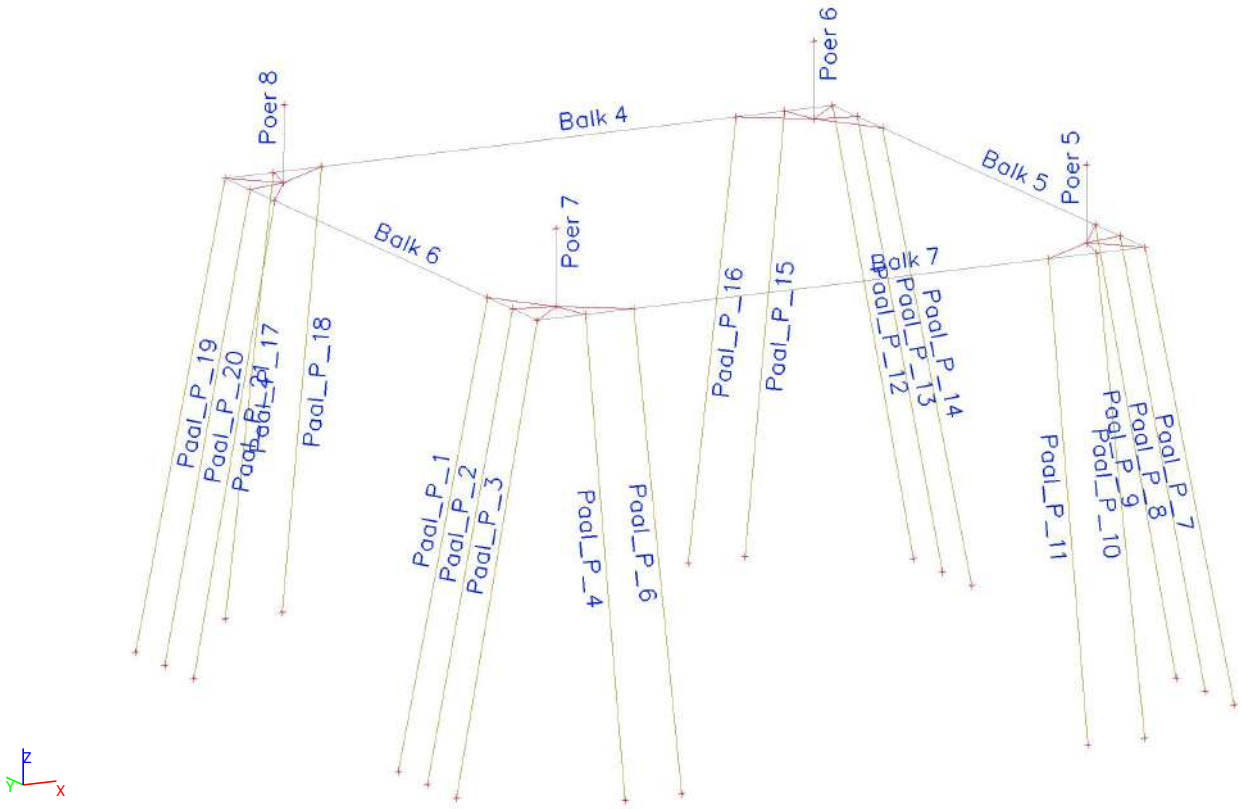


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Balk 4	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N55	N21	beam (80)
Balk 5	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N55	beam (80)
Balk 6	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N17	N21	beam (80)
Balk 7	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N17	beam (80)
Poer 5	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N22	1Y	column (100)
Poer 6	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N23	1XY	column (100)
Poer 7	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N32	1P	column (100)
Poer 8	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N33	1X	column (100)
Paal_P_1	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N29	N46	column (100)
Paal_P_2	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,996	N28	N45	column (100)
Paal_P_3	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N17	N44	column (100)
Paal_P_4	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N30	N47	column (100)
Paal_P_6	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N31	N48	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_7	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N56	N49	column (100)
Paal_P_8	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,996	N5	N50	column (100)
Paal_P_9	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N6	N51	column (100)
Paal_P_10	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N7	N52	column (100)
Paal_P_11	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N1	N53	column (100)
Paal_P_12	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N55	N10	column (100)
Paal_P_13	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,996	N24	N11	column (100)
Paal_P_14	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N25	N12	column (100)
Paal_P_15	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N26	N13	column (100)
Paal_P_16	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N27	N14	column (100)
Paal_P_17	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N36	N15	column (100)
Paal_P_18	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N37	N2	column (100)
Paal_P_19	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N21	N3	column (100)
Paal_P_20	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,996	N34	N4	column (100)
Paal_P_21	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N35	N54	column (100)

5.4. Analyse model met Staven

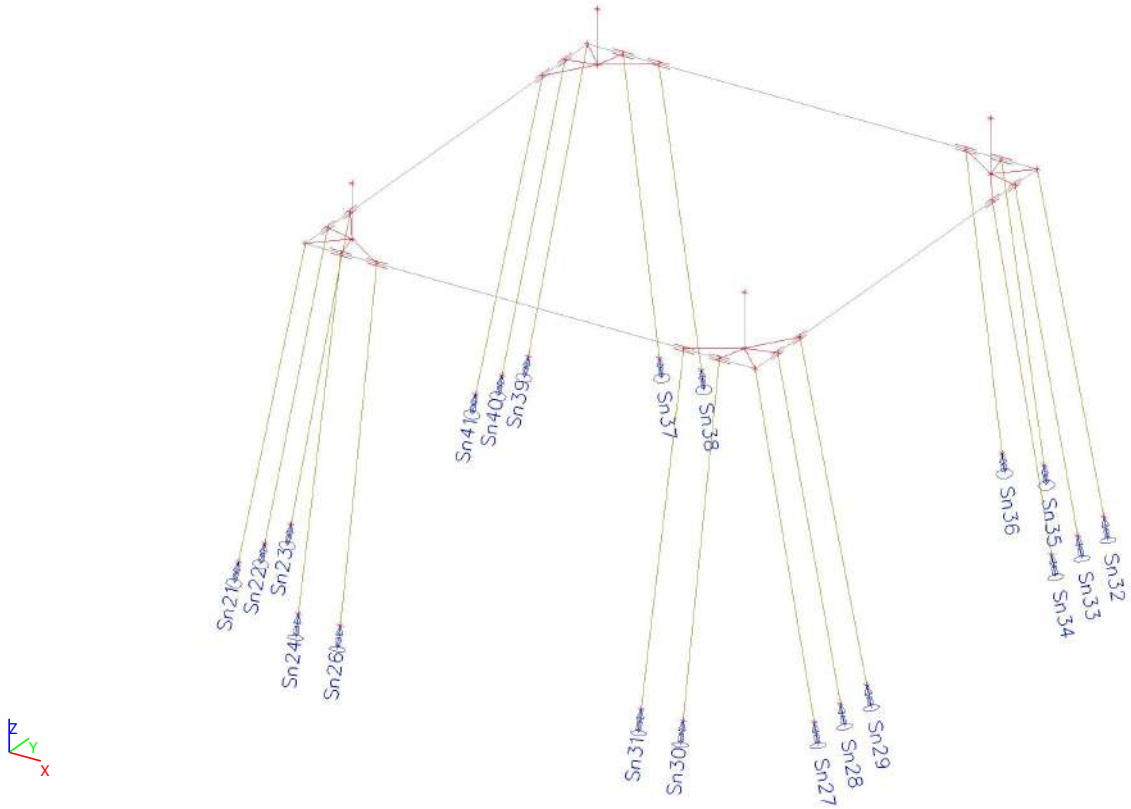


5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn21	N44	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31
Sn22	N45	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn23	N46	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn24	N47	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn26	N48	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn27	N49	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn28	N50	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31
Sn29	N51	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn30	N52	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn31	N53	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn32	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn33	N11	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn34	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn35	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn36	N14	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn37	N15	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn38	N2	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn39	N3	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31
Sn40	N4	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn41	N54	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31

5.6. Analyse model met Knoopondersteuningen

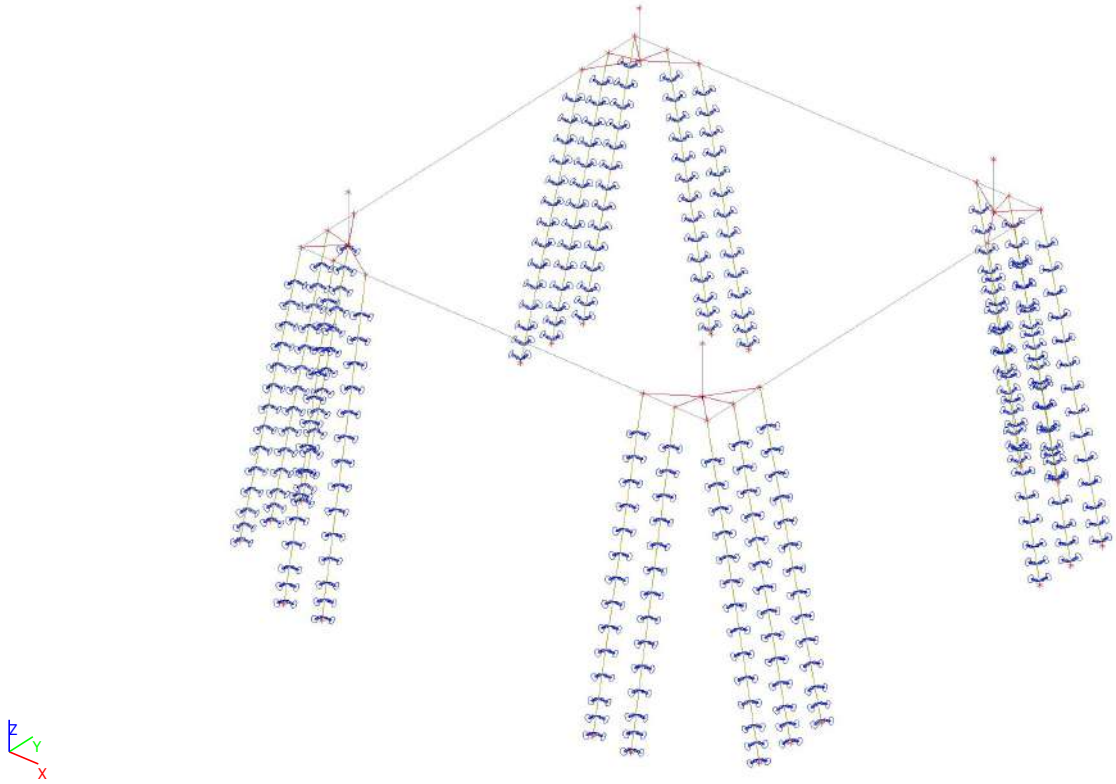


5.7. Line supports on member

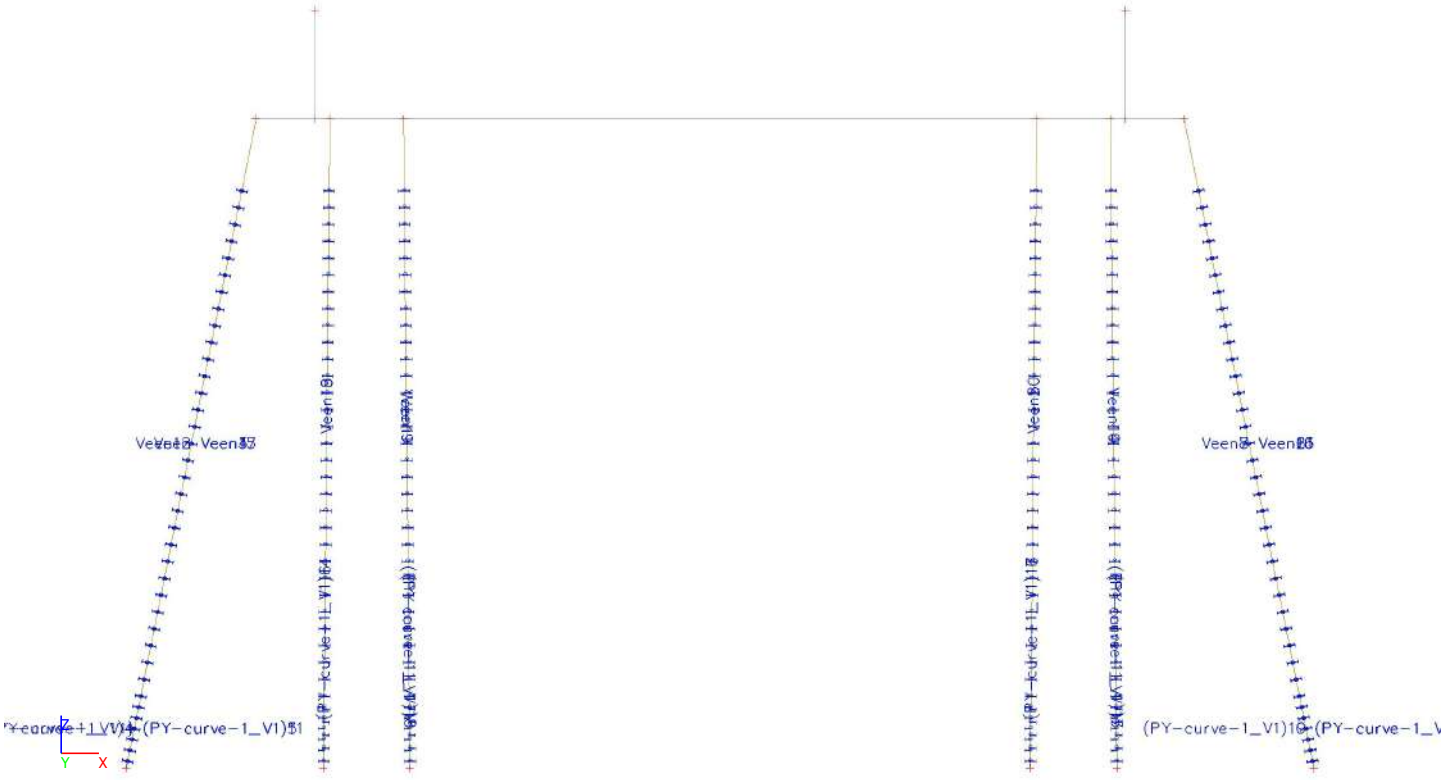
Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
Veen	Line	Paal_P_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Veen3	Line	Paal_P_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Veen4	Line	Paal_P_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)1	Line	Paal_P_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
(PY-curve-1_V1)3	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
(PY-curve-1_V1)4	Line	Paal_P_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen18	Line	Paal_P_4	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)14	Line	Paal_P_4	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen9	Line	Paal_P_6	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
(PY-curve-1_V1)18	Line	Paal_P_6	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen8	Line	Paal_P_7	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)19	Line	Paal_P_7	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen16	Line	Paal_P_8	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)8	Line	Paal_P_8	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen13	Line	Paal_P_9	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)2	Line	Paal_P_9	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen10	Line	Paal_P_10	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)15	Line	Paal_P_10	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen5	Line	Paal_P_11	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)16	Line	Paal_P_11	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen7	Line	Paal_P_12	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)10	Line	Paal_P_12	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen21	Line	Paal_P_13	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)12	Line	Paal_P_13	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen6	Line	Paal_P_14	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)13	Line	Paal_P_14	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen14	Line	Paal_P_15	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)7	Line	Paal_P_15	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen20	Line	Paal_P_16	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)17	Line	Paal_P_16	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen19	Line	Paal_P_17	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)6	Line	Paal_P_17	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen11	Line	Paal_P_18	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)9	Line	Paal_P_18	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen17	Line	Paal_P_19	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)11	Line	Paal_P_19	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen15	Line	Paal_P_20	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)5	Line	Paal_P_20	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						
Veen12	Line	Paal_P_21	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)	Line	Paal_P_21	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,900	From start						

5.8. Analyse model met Lijnondersteuningen



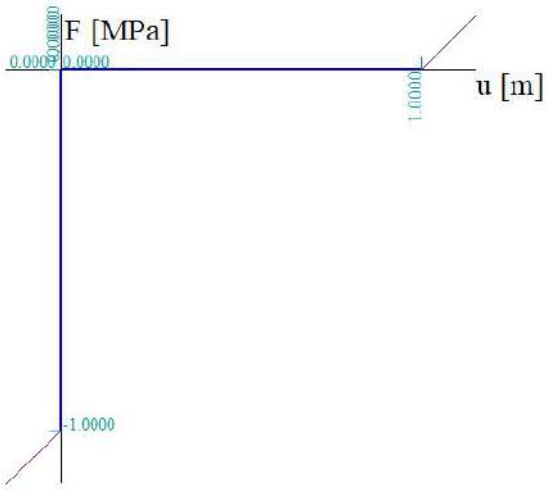
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

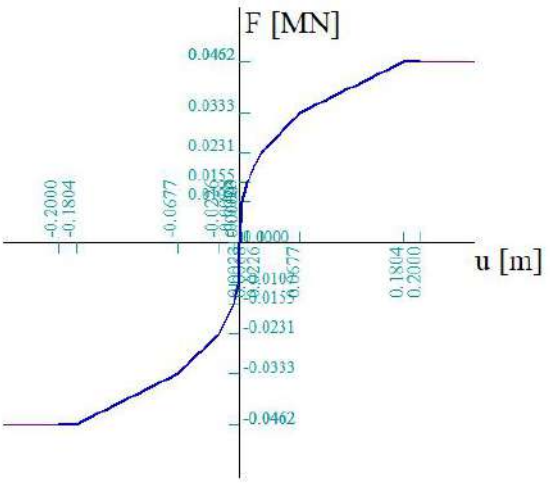
Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-2,0000e-01[m] / -4,6204e-02[MN]	Free	Free
		-1,8040e-01[m] / -4,6204e-02[MN]		
		-6,7650e-02[m] / -3,3319e-02[MN]		
		-2,2550e-02[m] / -2,3102e-02[MN]		
		-6,7650e-03[m] / -1,5465e-02[MN]		
		-2,2550e-03[m] / -1,0723e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 1,0723e-02[MN]		
		6,7650e-03[m] / 1,5465e-02[MN]		
		2,2550e-02[m] / 2,3102e-02[MN]		
		6,7650e-02[m] / 3,3319e-02[MN]		
		1,8040e-01[m] / 4,6204e-02[MN]		
		2,0000e-01[m] / 4,6204e-02[MN]		

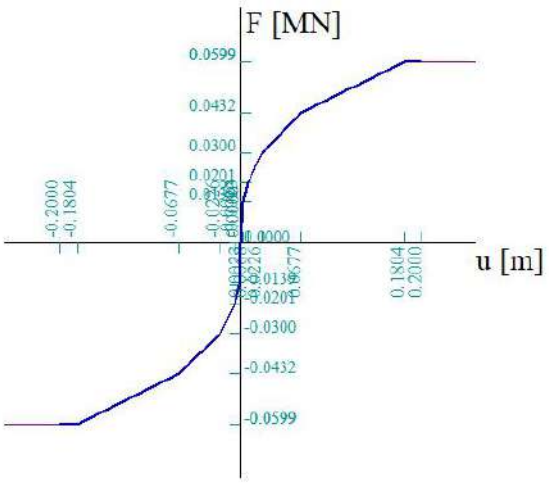
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-2,0000e-01[m] / -5,9936e-02[MN]	Free	Free
		-1,8040e-01[m] / -5,9936e-02[MN]		
		-6,7650e-02[m] / -4,3221e-02[MN]		
		-2,2550e-02[m] / -2,9968e-02[MN]		

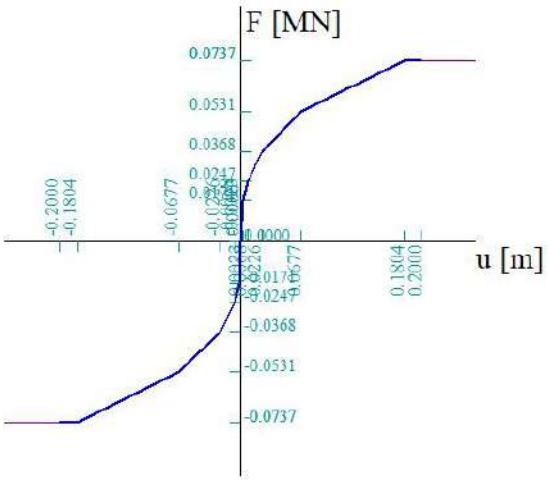
Name	Type	u / F	Positive end	Negative end
		-6,7650e-03[m] / -2,0061e-02[MN]		
		-2,2550e-03[m] / -1,3910e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 1,3910e-02[MN]		
		6,7650e-03[m] / 2,0061e-02[MN]		
		2,2550e-02[m] / 2,9968e-02[MN]		
		6,7650e-02[m] / 4,3221e-02[MN]		
		1,8040e-01[m] / 5,9936e-02[MN]		
		2,0000e-01[m] / 5,9936e-02[MN]		

Drawing



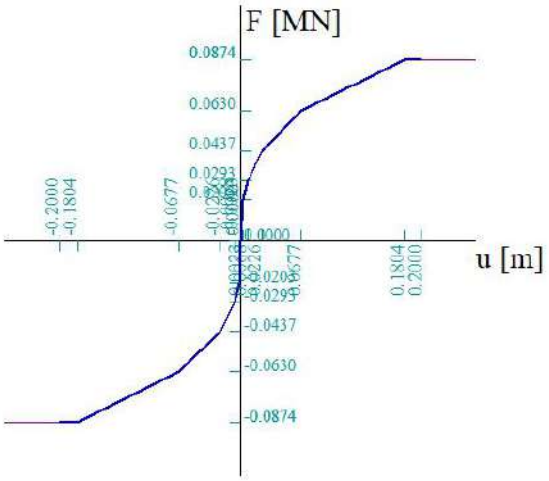
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-2,0000e-01[m] / -7,3668e-02[MN]	Free	Free
		-1,8040e-01[m] / -7,3668e-02[MN]		
		-6,7650e-02[m] / -5,3123e-02[MN]		
		-2,2550e-02[m] / -3,6834e-02[MN]		
		-6,7650e-03[m] / -2,4658e-02[MN]		
		-2,2550e-03[m] / -1,7097e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 1,7097e-02[MN]		
		6,7650e-03[m] / 2,4658e-02[MN]		
		2,2550e-02[m] / 3,6834e-02[MN]		
		6,7650e-02[m] / 5,3123e-02[MN]		
		1,8040e-01[m] / 7,3668e-02[MN]		
		2,0000e-01[m] / 7,3668e-02[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-2,0000e-01[m] / -8,7399e-02[MN]	Free	Free
		-1,8040e-01[m] / -8,7399e-02[MN]		
		-6,7650e-02[m] / -6,3026e-02[MN]		
		-2,2550e-02[m] / -4,3700e-02[MN]		
		-6,7650e-03[m] / -2,9254e-02[MN]		
		-2,2550e-03[m] / -2,0284e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 2,0284e-02[MN]		
		6,7650e-03[m] / 2,9254e-02[MN]		
		2,2550e-02[m] / 4,3700e-02[MN]		
		6,7650e-02[m] / 6,3026e-02[MN]		
		1,8040e-01[m] / 8,7399e-02[MN]		
		2,0000e-01[m] / 8,7399e-02[MN]		

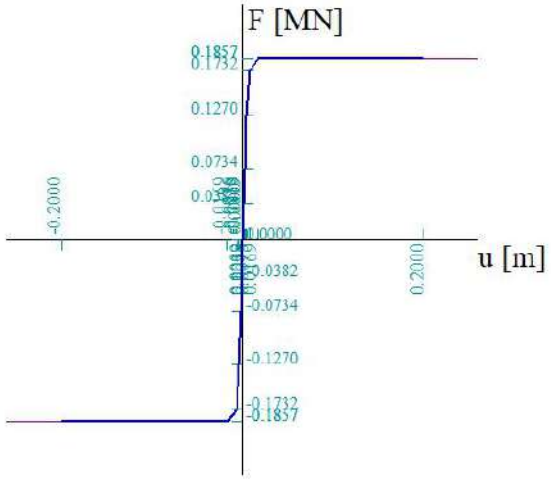
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-2,0000e-01[m] / -1,8575e-01[MN]	Free	Free
		-1,6913e-02[m] / -1,8575e-01[MN]		
		-7,5167e-03[m] / -1,7319e-01[MN]		
		-3,7583e-03[m] / -1,2697e-01[MN]		
		-1,8792e-03[m] / -7,3365e-02[MN]		
		-9,3958e-04[m] / -3,8233e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 3,8233e-02[MN]		
		1,8792e-03[m] / 7,3365e-02[MN]		
		3,7583e-03[m] / 1,2697e-01[MN]		

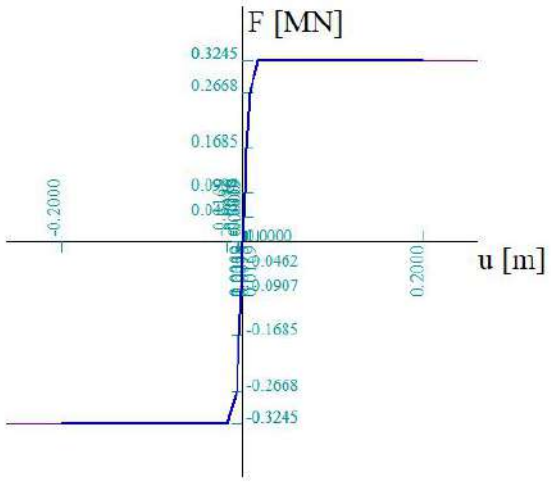
Name	Type	u / F	Positive end	Negative end
		7,5167e-03[m] / 1,7319e-01[MN]		
		1,6913e-02[m] / 1,8575e-01[MN]		
		2,0000e-01[m] / 1,8575e-01[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-2,0000e-01[m] / -3,2450e-01[MN]	Free	Free
		-1,6913e-02[m] / -3,2450e-01[MN]		
		-7,5167e-03[m] / -2,6680e-01[MN]		
		-3,7583e-03[m] / -1,6850e-01[MN]		
		-1,8792e-03[m] / -9,0672e-02[MN]		
		-9,3958e-04[m] / -4,6234e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 4,6234e-02[MN]		
		1,8792e-03[m] / 9,0672e-02[MN]		
		3,7583e-03[m] / 1,6850e-01[MN]		
		7,5167e-03[m] / 2,6680e-01[MN]		
		1,6913e-02[m] / 3,2450e-01[MN]		
		2,0000e-01[m] / 3,2450e-01[MN]		

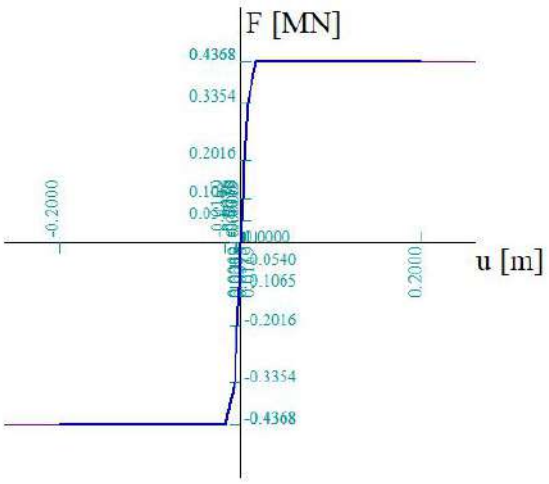
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-2,0000e-01[m] / -4,3677e-01[MN]	Free	Free
		-1,6913e-02[m] / -4,3677e-01[MN]		
		-7,5167e-03[m] / -3,3536e-01[MN]		
		-3,7583e-03[m] / -2,0165e-01[MN]		

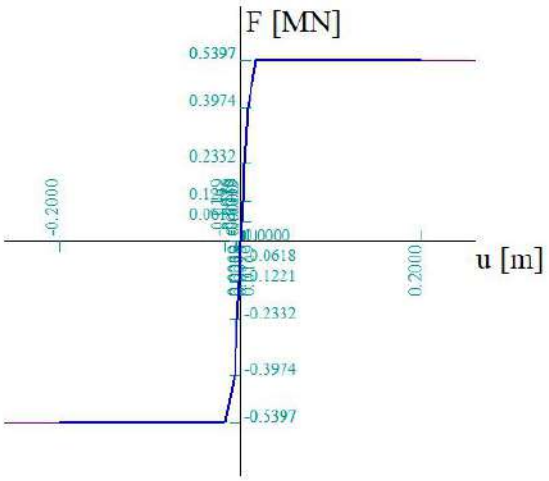
Name	Type	u / F	Positive end	Negative end
		-1,8792e-03[m] / -1,0652e-01[MN]		
		-9,3958e-04[m] / -5,4036e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 5,4036e-02[MN]		
		1,8792e-03[m] / 1,0652e-01[MN]		
		3,7583e-03[m] / 2,0165e-01[MN]		
		7,5167e-03[m] / 3,3536e-01[MN]		
		1,6913e-02[m] / 4,3677e-01[MN]		
		2,0000e-01[m] / 4,3677e-01[MN]		

Drawing



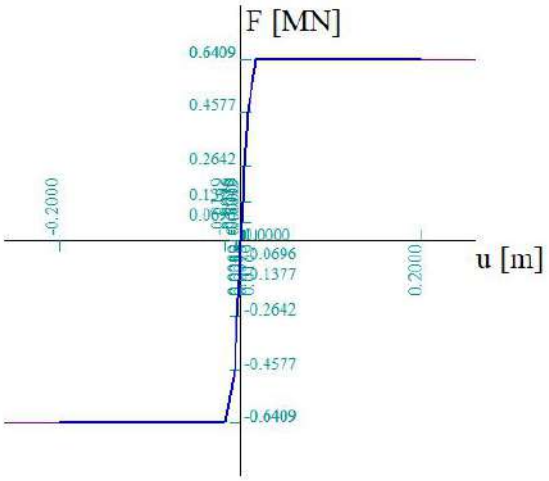
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-2,0000e-01[m] / -5,3968e-01[MN]	Free	Free
		-1,6913e-02[m] / -5,3968e-01[MN]		
		-7,5167e-03[m] / -3,9743e-01[MN]		
		-3,7583e-03[m] / -2,3316e-01[MN]		
		-1,8792e-03[m] / -1,2212e-01[MN]		
		-9,3958e-04[m] / -6,1805e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 6,1805e-02[MN]		
		1,8792e-03[m] / 1,2212e-01[MN]		
		3,7583e-03[m] / 2,3316e-01[MN]		
		7,5167e-03[m] / 3,9743e-01[MN]		
		1,6913e-02[m] / 5,3968e-01[MN]		
		2,0000e-01[m] / 5,3968e-01[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-2,0000e-01[m] / -6,4086e-01[MN]	Free	Free
		-1,6913e-02[m] / -6,4086e-01[MN]		
		-7,5167e-03[m] / -4,5770e-01[MN]		
		-3,7583e-03[m] / -2,6422e-01[MN]		
		-1,8792e-03[m] / -1,3765e-01[MN]		
		-9,3958e-04[m] / -6,9565e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 6,9565e-02[MN]		
		1,8792e-03[m] / 1,3765e-01[MN]		
		3,7583e-03[m] / 2,6422e-01[MN]		
		7,5167e-03[m] / 4,5770e-01[MN]		
		1,6913e-02[m] / 6,4086e-01[MN]		
		2,0000e-01[m] / 6,4086e-01[MN]		

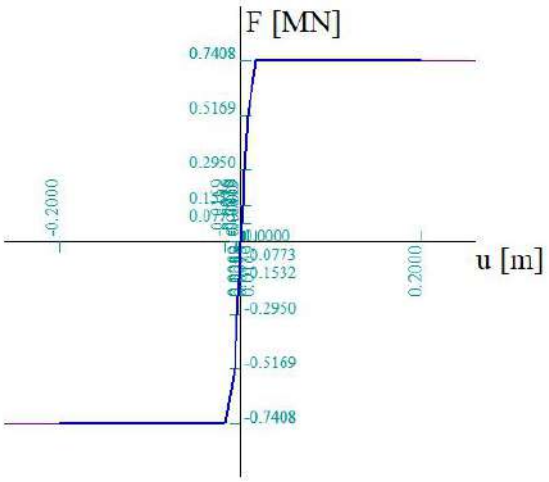
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-2,0000e-01[m] / -7,4077e-01[MN]	Free	Free
		-1,6913e-02[m] / -7,4077e-01[MN]		
		-7,5167e-03[m] / -5,1689e-01[MN]		
		-3,7583e-03[m] / -2,9504e-01[MN]		
		-1,8792e-03[m] / -1,5315e-01[MN]		
		-9,3958e-04[m] / -7,7320e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 7,7320e-02[MN]		
		1,8792e-03[m] / 1,5315e-01[MN]		
		3,7583e-03[m] / 2,9504e-01[MN]		

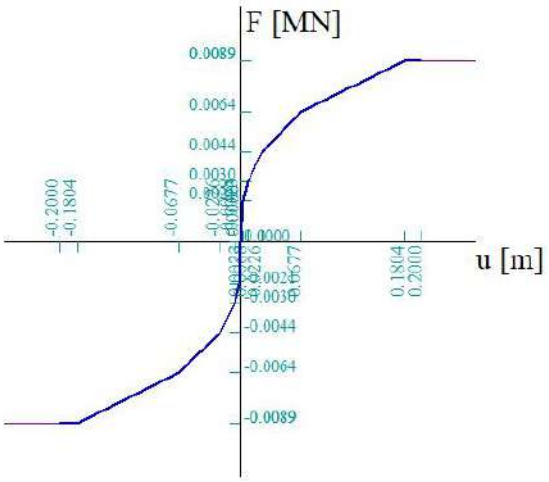
Name	Type	u / F	Positive end	Negative end
		7,5167e-03[m] / 5,1689e-01[MN]		
		1,6913e-02[m] / 7,4077e-01[MN]		
		2,0000e-01[m] / 7,4077e-01[MN]		

Drawing



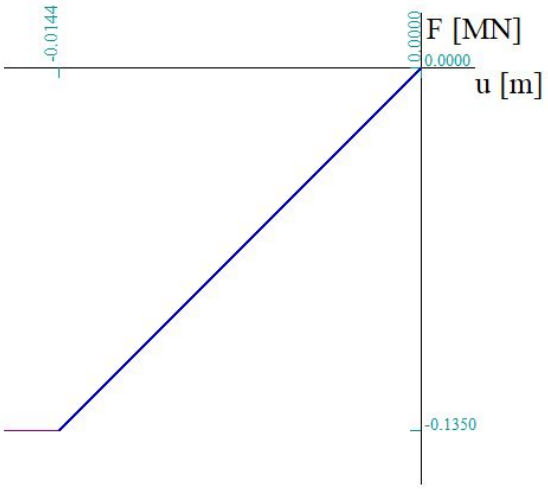
Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-2,0000e-01[m] / -8,8944e-03[MN]	Free	Free
		-1,8040e-01[m] / -8,8944e-03[MN]		
		-6,7650e-02[m] / -6,4138e-03[MN]		
		-2,2550e-02[m] / -4,4477e-03[MN]		
		-6,7650e-03[m] / -2,9770e-03[MN]		
		-2,2550e-03[m] / -2,0640e-03[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 2,0640e-03[MN]		
		6,7650e-03[m] / 2,9770e-03[MN]		
		2,2550e-02[m] / 4,4477e-03[MN]		
		6,7650e-02[m] / 6,4138e-03[MN]		
		1,8040e-01[m] / 8,8944e-03[MN]		
		2,0000e-01[m] / 8,8944e-03[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
Trek-druk-S+paalpunt	Translation	-1,4370e-02[m] / -1,3500e-01[MN]	Free	Free
		0,0000e+00[m] / 0,0000e+00[MN]		

Drawing

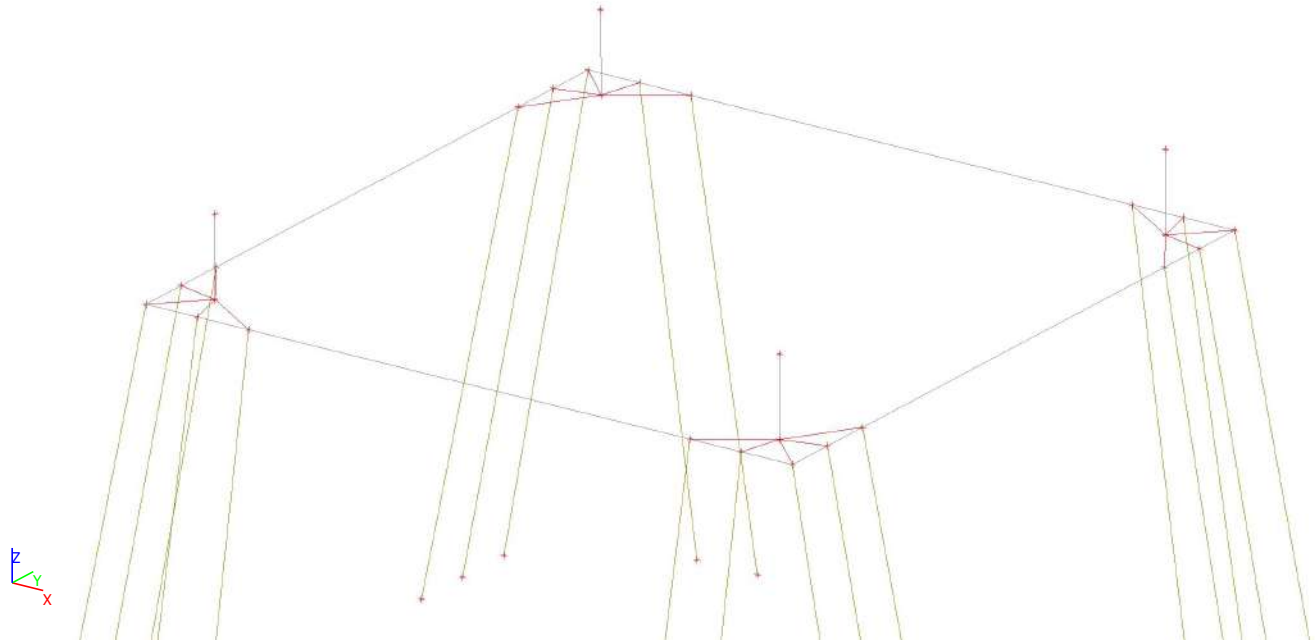


6. Belastingen

6.1. Load cases

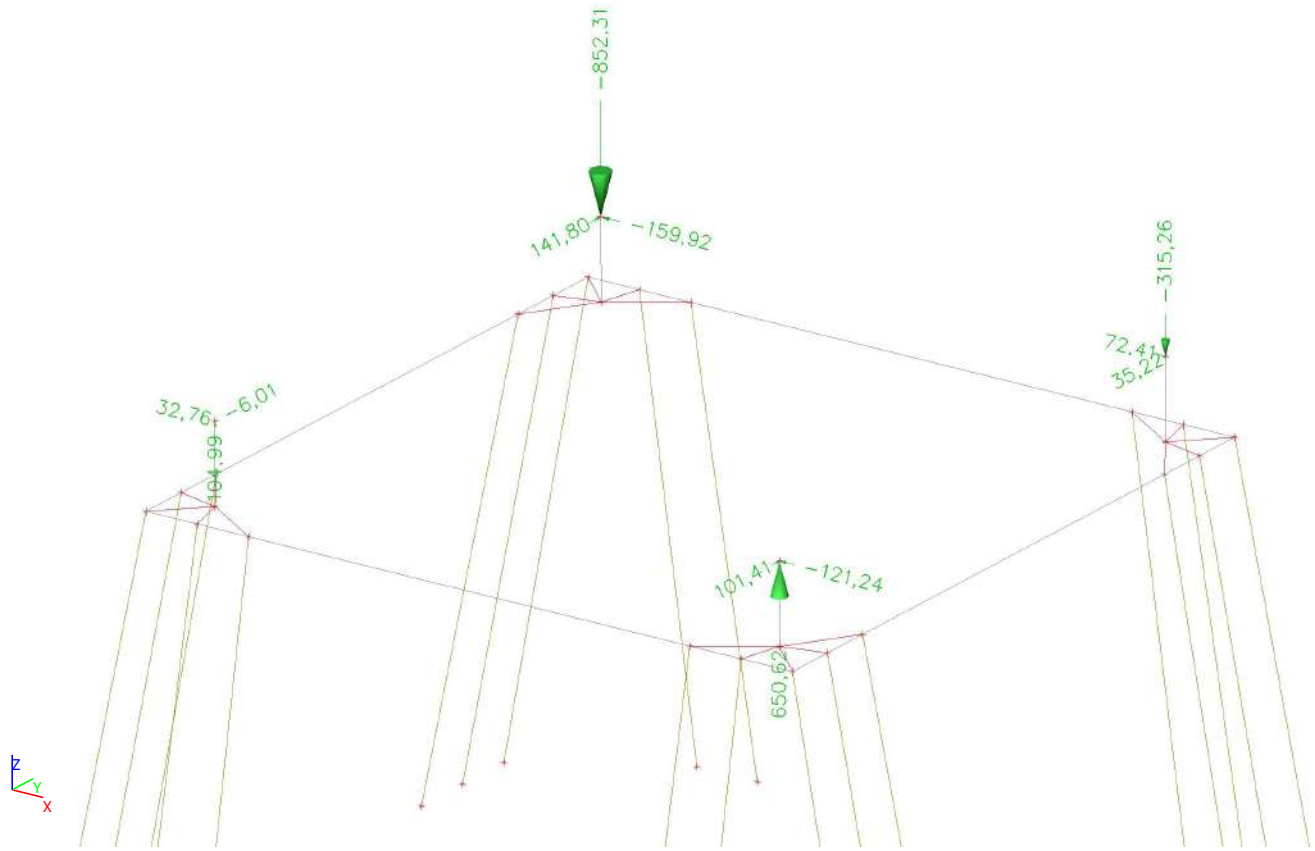
6.1.1. Load cases - E.G.

Name	Description	Action type	Load group	Direction
	Spec	Load type		
E.G.		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - high max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			

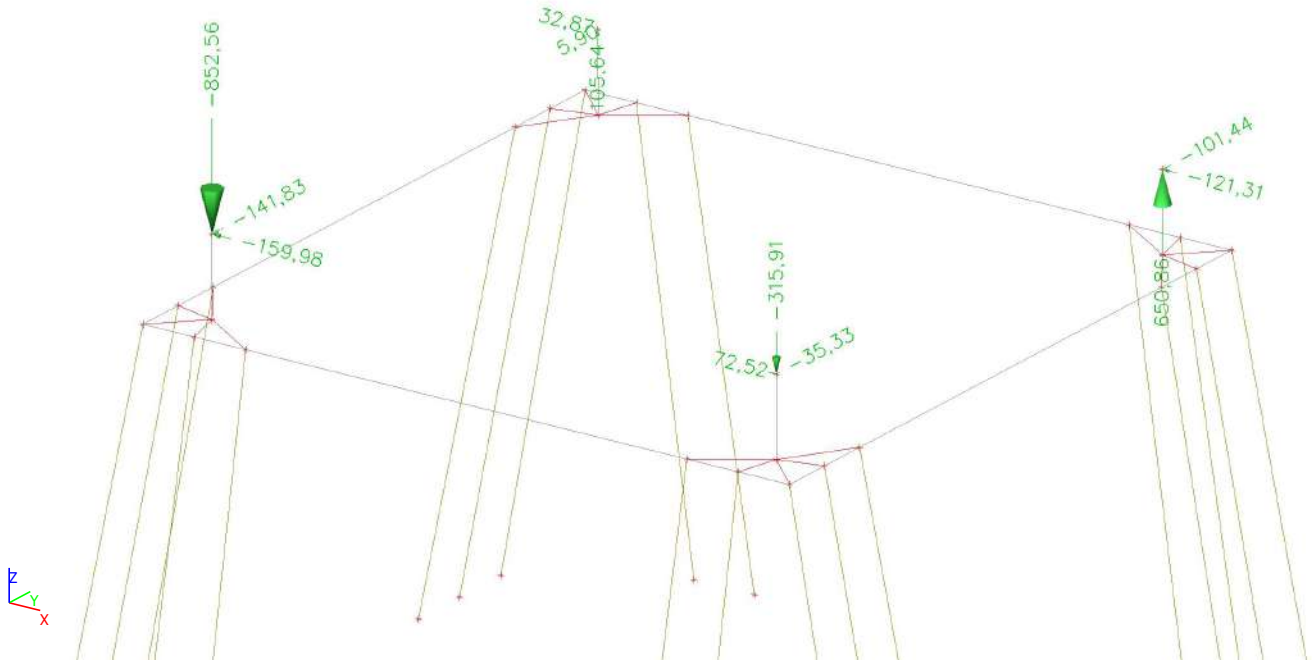


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Force	32,76
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Force	-6,01
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Force	104,99
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Force	-159,92
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Force	141,80
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Force	-852,31
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Force	72,41
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Force	35,22
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Force	-315,26
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Force	-121,24
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Force	101,41
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Force	650,62

6.1.3. Load cases - high max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



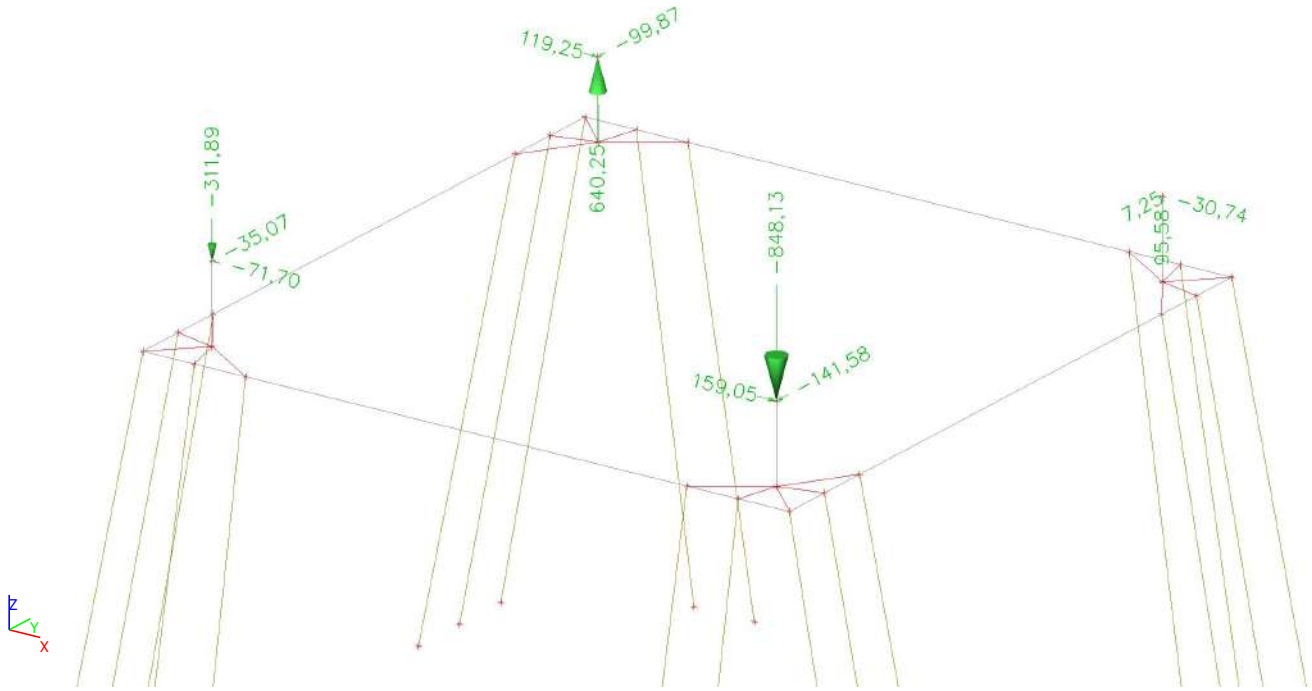
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Force	-159,98
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Force	-141,83
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Force	-852,56
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Force	32,87
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Force	5,90
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Force	105,64
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Force	-121,31
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Force	-101,44
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Force	650,86
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Force	72,52
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Force	-35,33

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Force	-315,91

6.1.4. Load cases - high max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



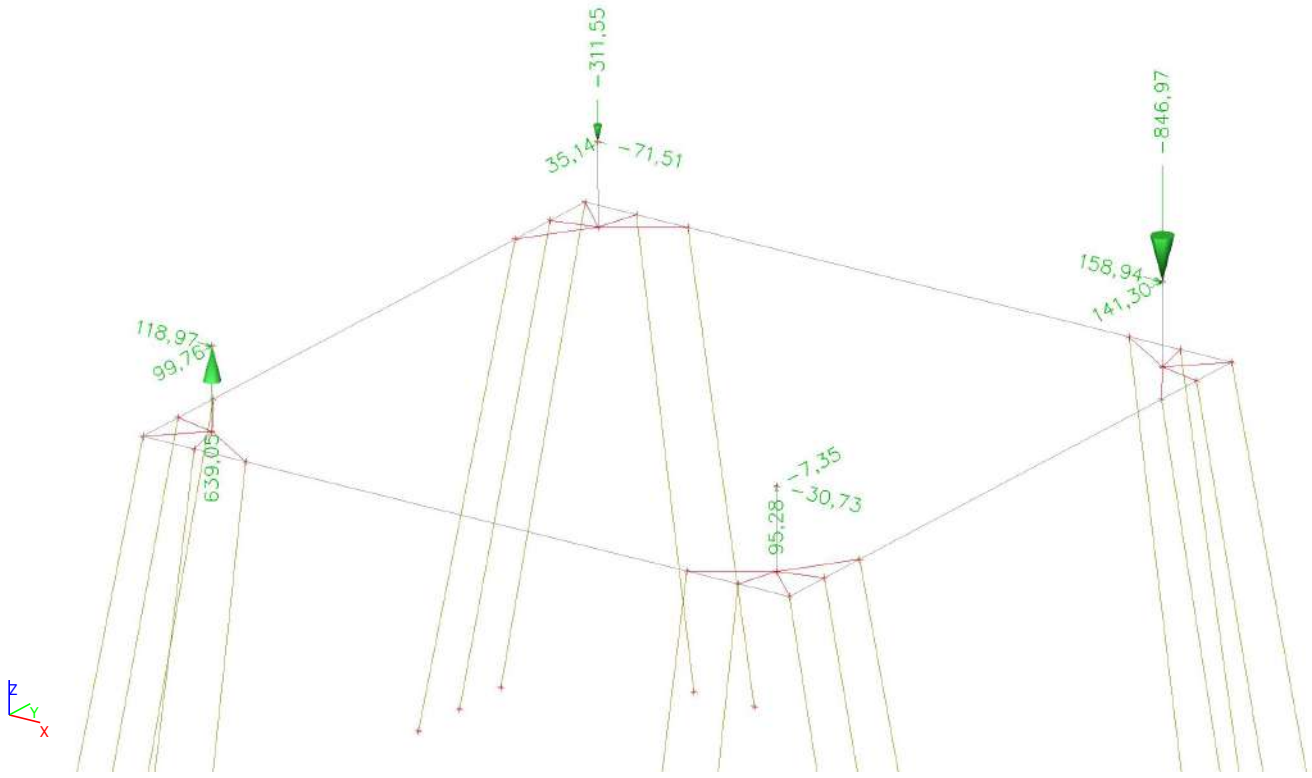
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Force	-71,70
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Force	-35,07
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Force	-311,89
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Force	119,25
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Force	-99,87
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Force	640,25
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Force	-30,74
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Force	7,25

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Force	95,58
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Force	159,05
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Force	-141,58
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Force	-848,13

6.1.5. Load cases - high max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



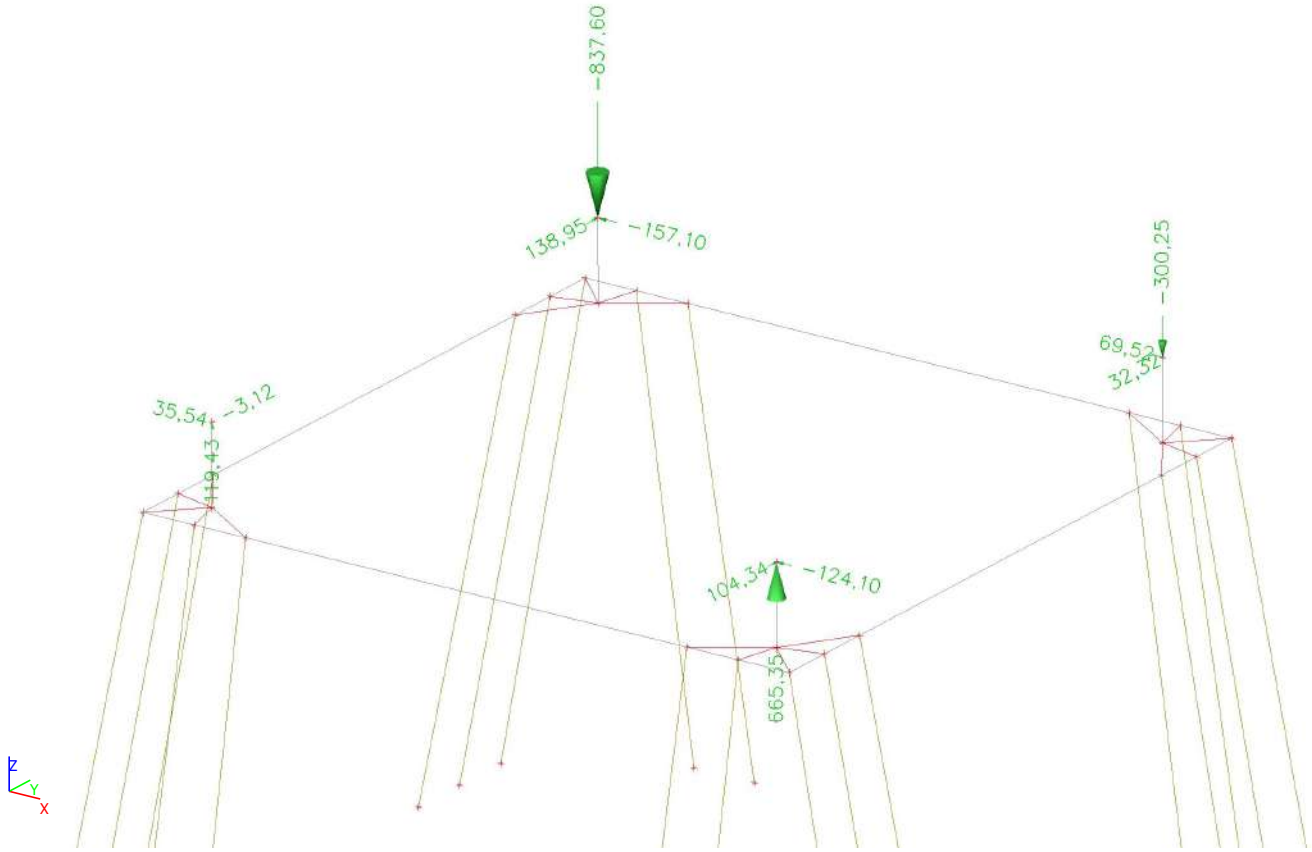
6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Force	118,97
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Force	99,76
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Force	639,05
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Force	-71,51
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Force	35,14

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Force	-311,55
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Force	158,94
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Force	141,30
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Force	-846,97
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Force	-30,73
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Force	-7,35
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Force	95,28

6.1.6. Load cases - low max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			

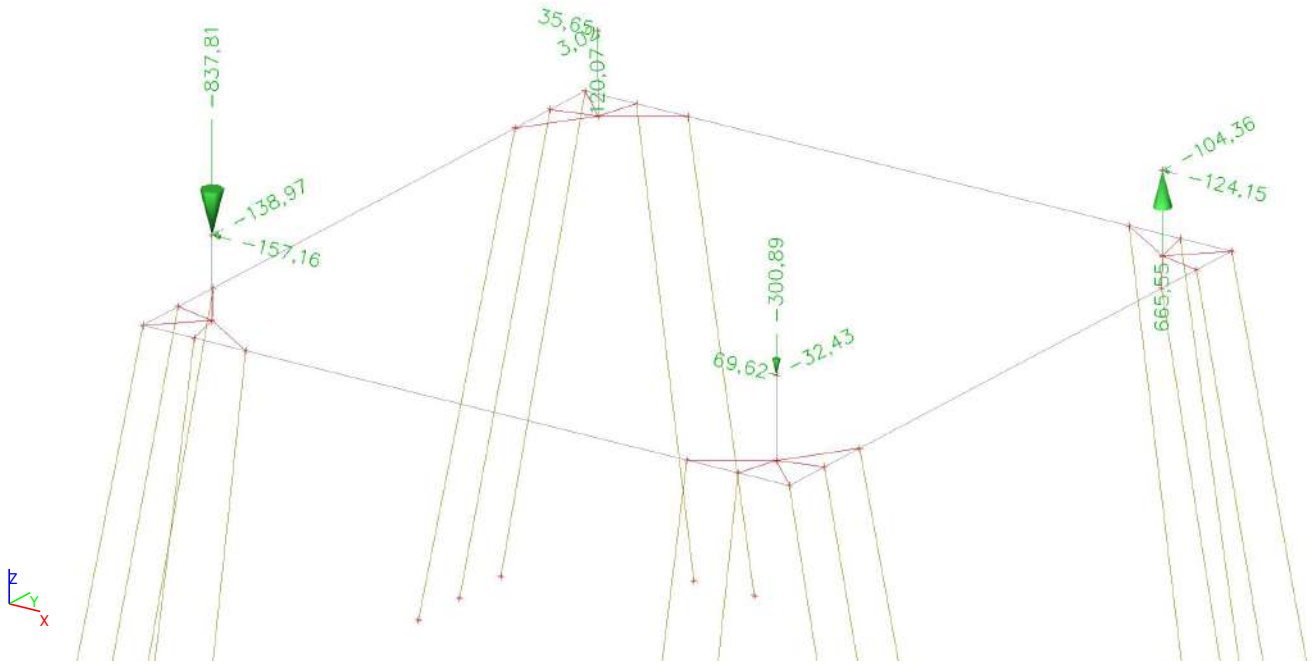


6.1.6.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Force	35,54
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Force	-3,12
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Force	119,43
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Force	-157,10
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Force	138,95
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Force	-837,60
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Force	69,52
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Force	32,32
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Force	-300,25
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Force	-124,10
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Force	104,34
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Force	665,35

6.1.7. Load cases - low max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			

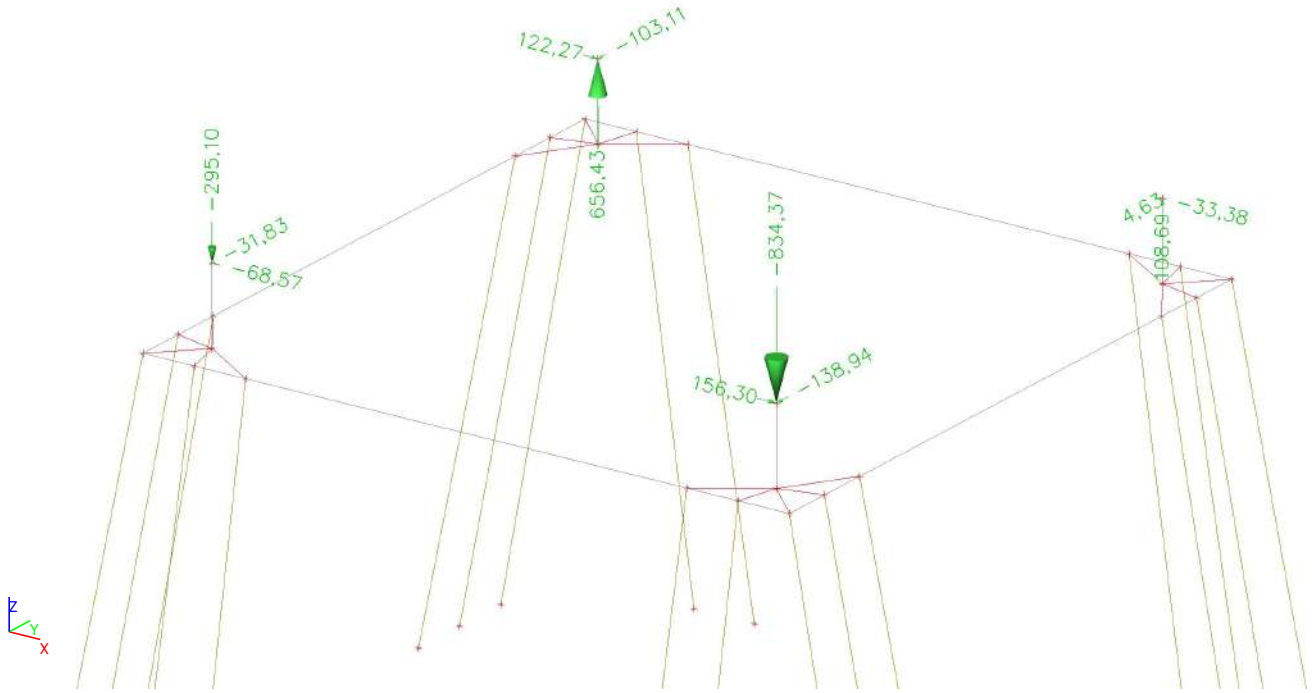


6.1.7.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Force	-157,16
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Force	-138,97
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Force	-837,81
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Force	35,65
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Force	3,02
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Force	120,07
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Force	-124,15
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Force	-104,36
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Force	665,55
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Force	69,62
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Force	-32,43
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Force	-300,89

6.1.8. Load cases - low max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



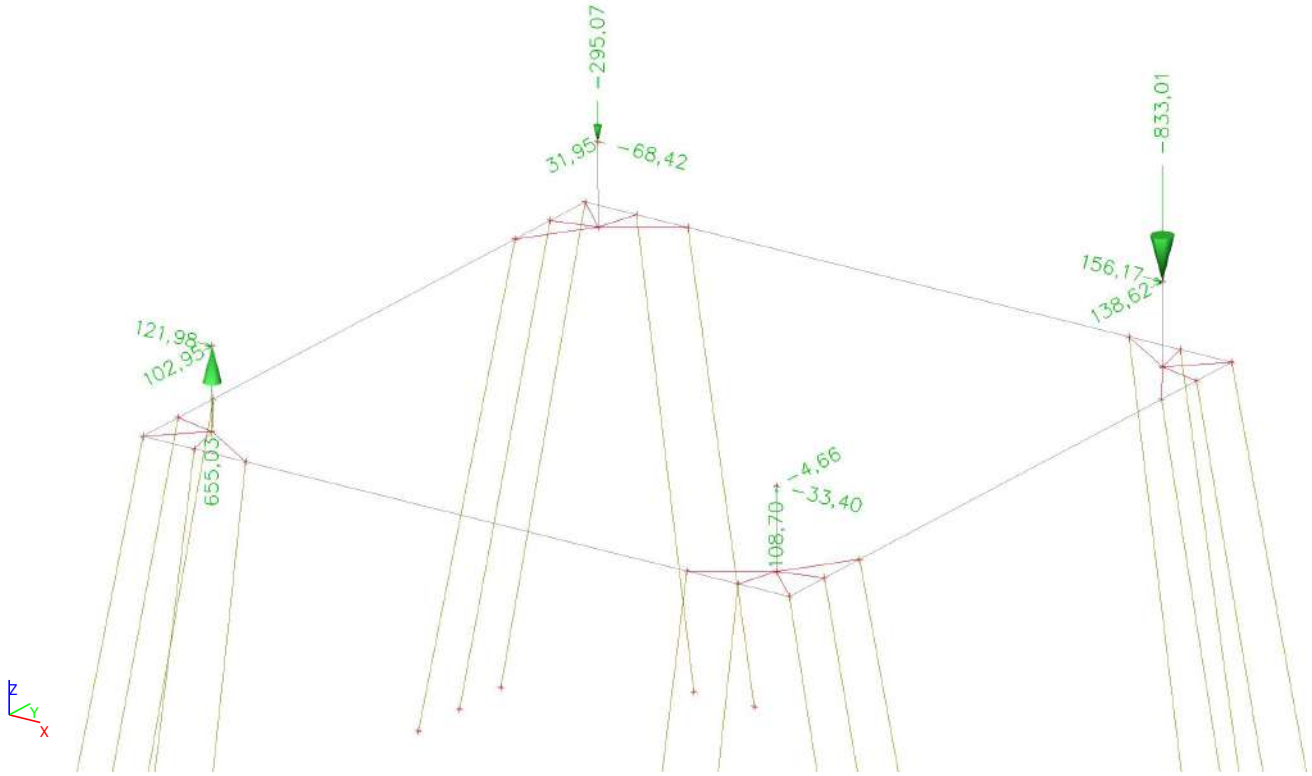
6.1.8.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Force	-68,57
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Force	-31,83
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Force	-295,10
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Force	122,27
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Force	-103,11
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Force	656,43
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Force	-33,38
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Force	4,63
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Force	108,69
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Force	156,30
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Force	-138,94

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Force	-834,37

6.1.9. Load cases - low max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



6.1.9.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Force	121,98
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Force	102,95
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Force	655,03
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Force	-68,42
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Force	31,95
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Force	-295,07
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Force	156,17
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Force	138,62

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Force	-833,01
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Force	-33,40
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Force	-4,66
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Force	108,70

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
high max Wnd ;225°	Ultimate	E.G.	1,20
		high max Wnd ;225°	1,00
high max Wnd ;135°	Ultimate	E.G.	1,20
		high max Wnd ;135°	1,00
high max Wnd ;45°	Ultimate	E.G.	1,20
		high max Wnd ;45°	1,00
high max Wnd ;315°	Ultimate	E.G.	1,20
		high max Wnd ;315°	1,00
low max Wnd ;45°	Ultimate	E.G.	0,90
		low max Wnd ;45°	1,00
low max Wnd ;135°	Ultimate	E.G.	0,90
		low max Wnd ;135°	1,00
low max Wnd ;315°	Ultimate	E.G.	0,90
		low max Wnd ;315°	1,00
low max Wnd ;225°	Ultimate	E.G.	0,90
		low max Wnd ;225°	1,00

6.3. Result classes

Name	List
All non-linear	high max Wnd ;225°
	high max Wnd ;135°
	high max Wnd ;45°
	high max Wnd ;315°
	low max Wnd ;45°
	low max Wnd ;135°
	low max Wnd ;315°
	low max Wnd ;225°

Dit model is niet stabiel vanwege de lage bedding en trekcapaciteit van de palen, waardoor het niet mogelijk is om hier resultaten te genereren.

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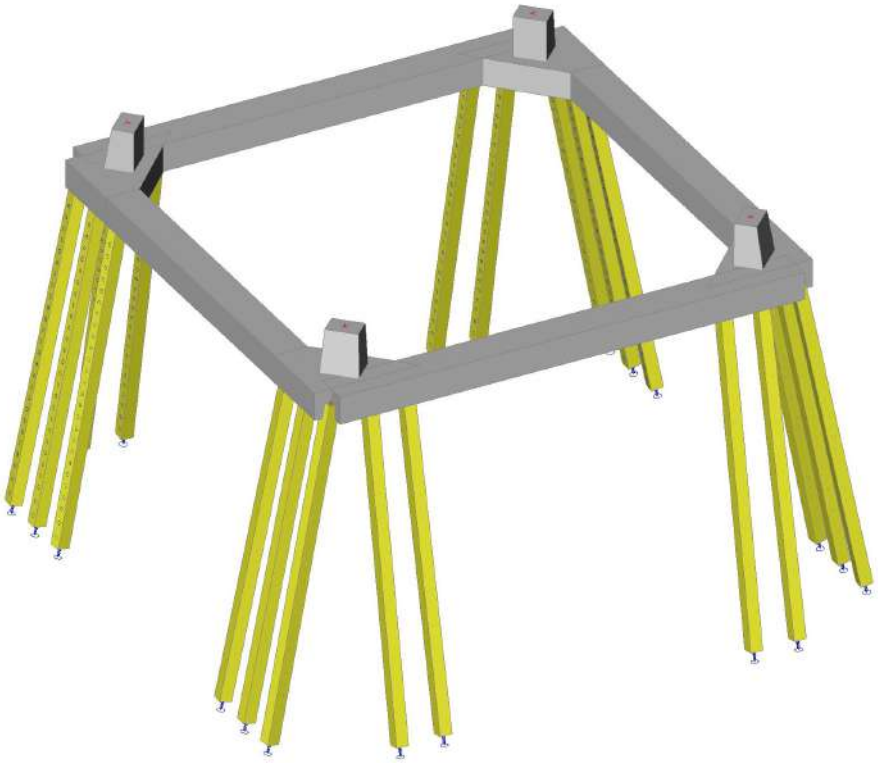
2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-DIM 380kV
Part	Balkrooster 5xBeton32x32 mast 147
Author	[redacted]
Date	6-05-2025
Structure	General XYZ
No. of nodes :	52
No. of beams :	28
No. of slabs :	0
No. of solids :	0
No. of used profiles :	3
No. of load cases :	9
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,810
National code	EC - EN

3. Analyse model



4. Modeleigenschappen

4.1. Materials

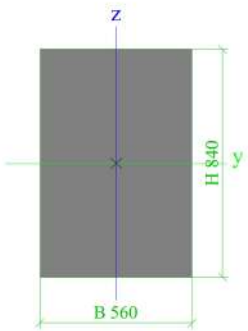
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C20/25 Ongescheurd	Concrete	1500,0	2600,0	2,4000e+04	0.2	0,00	20,00	
C20/25 Gescheurd	Concrete	2500,0	2600,0	8,0000e+03	0.2	0,00	20,00	

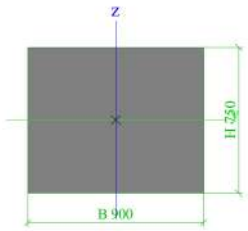
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

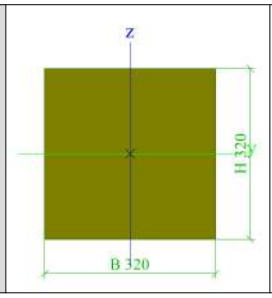
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 500B	Reinforcement steel	7850,0	2,0000e+05	8,3333e+04	0,00	500,0

4.2. Cross-sections

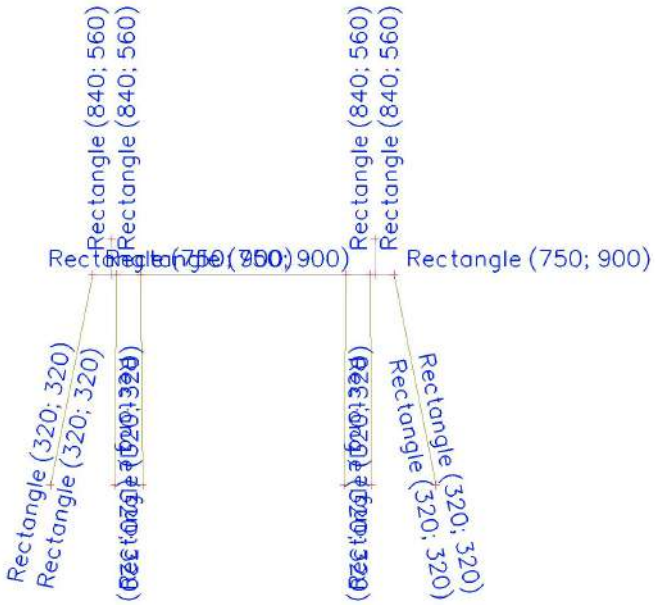
Poer.Opstort		
Type	Rectangle	
Detailed	840; 560	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	4,7040e-01	
A_y [m²], A_z [m²]	3,9200e-01	3,9200e-01
A_L [m²/m], A_D [m²/m]	2,8000e+00	2,8000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	280	420
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,7660e-02	1,2293e-02
i_y [mm], i_z [mm]	242	162
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	6,5856e-02	4,3904e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	2,8888e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

Balk		
Type	Rectangle	
Detailed	750; 900	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	6,7500e-01	
A_y [m²], A_z [m²]	5,6250e-01	5,6250e-01
A_L [m²/m], A_D [m²/m]	3,3000e+00	3,3000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450	375
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	3,1641e-02	4,5563e-02
i_y [mm], i_z [mm]	217	260
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	8,4375e-02	1,0125e-01
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	6,3112e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

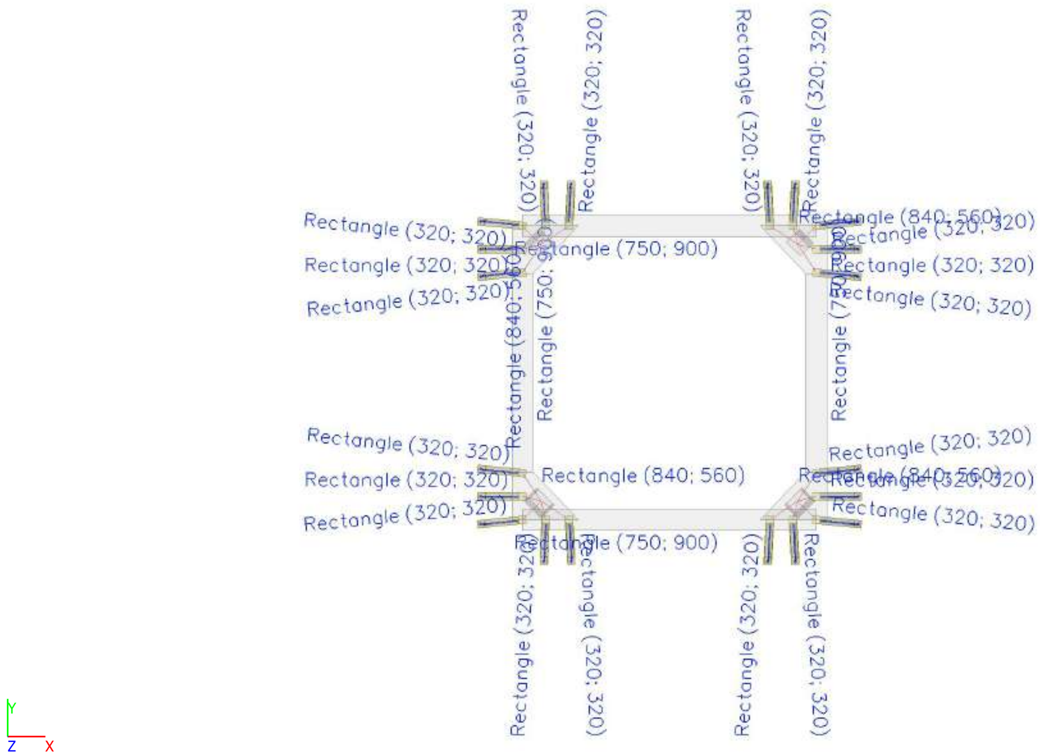
Funderingspaal		
Type	Rectangle	
Detailed	320; 320	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [m²]	1,0240e-01	
A_y [m²], A_z [m²]	8,5333e-02	8,5333e-02
A_L [m²/m], A_D [m²/m]	1,2800e+00	1,2800e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	160	160
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	8,7381e-04	8,7381e-04
i_y [mm], i_z [mm]	92	92
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	5,4613e-03	5,4613e-03
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	1,4757e-03	0,0000e+00
β_y [mm], β_z [mm]	0	0

Picture		
		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	NetInstelling1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	5
Average size of 2D mesh element [m]	0,250
Average size of 1D mesh element on curved 1D members [m]	0,200
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N5	13,000	1,400	0,000
N6	13,000	2,400	0,000
N7	12,000	0,400	0,000
N1	11,000	0,400	0,000
N17	0,400	0,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N21	0,400	13,000	0,000
1Y	12,200	1,200	1,475
N22	12,200	1,200	0,000
N23	12,200	12,200	0,000
1XY	12,200	12,200	1,475

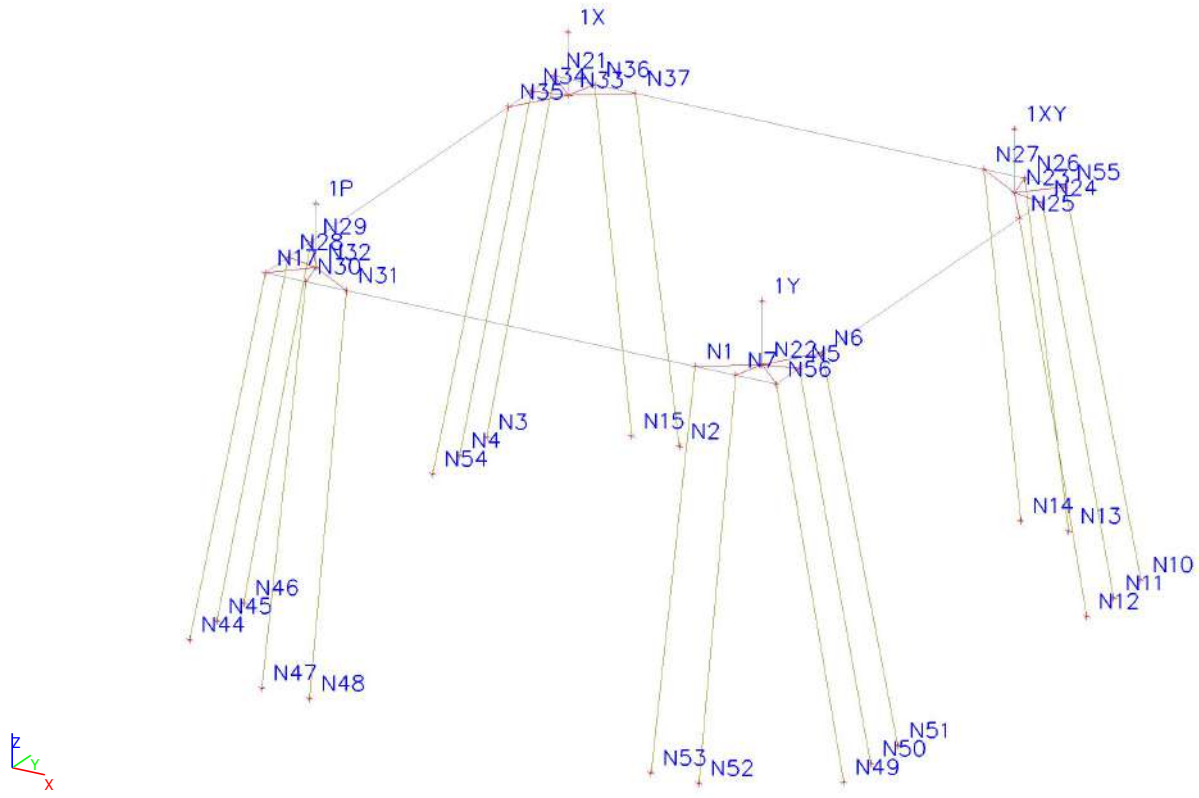
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N24	13,000	12,000	0,000
N25	13,000	11,000	0,000
N26	12,000	13,000	0,000
N27	11,000	13,000	0,000
N28	0,400	1,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N29	0,400	2,400	0,000
N30	1,400	0,400	0,000
N31	2,400	0,400	0,000
1P	1,200	1,200	1,475
N32	1,200	1,200	0,000
N33	1,200	12,200	0,000
1X	1,200	12,187	1,475
N34	0,400	12,000	0,000
N35	0,400	11,000	0,000
N36	1,400	13,000	0,000
N37	2,400	13,000	0,000
N38	12,200	1,200	0,000
N39	1,200	1,200	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N40	12,200	12,200	0,000
N41	1,200	12,200	0,000
N44	-1,365	0,224	-8,824
N45	-1,364	1,400	-8,821
N46	-1,365	2,576	-8,824
N47	1,312	-1,364	-8,822
N48	2,488	-1,364	-8,822
N49	14,765	0,224	-8,824
N50	14,764	1,400	-8,821
N51	14,765	2,576	-8,824
N52	12,088	-1,364	-8,822
N53	10,912	-1,364	-8,822
N10	14,765	13,176	-8,824

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N11	14,764	12,000	-8,821
N12	14,765	10,824	-8,824
N13	12,088	14,764	-8,822
N14	10,912	14,764	-8,822
N15	1,312	14,764	-8,822
N2	2,488	14,764	-8,822
N3	-1,365	13,176	-8,824
N4	-1,364	12,000	-8,821
N54	-1,365	10,824	-8,824
N55	13,000	13,000	0,000
N56	13,000	0,400	0,000

5.2. Analyse model met knopen

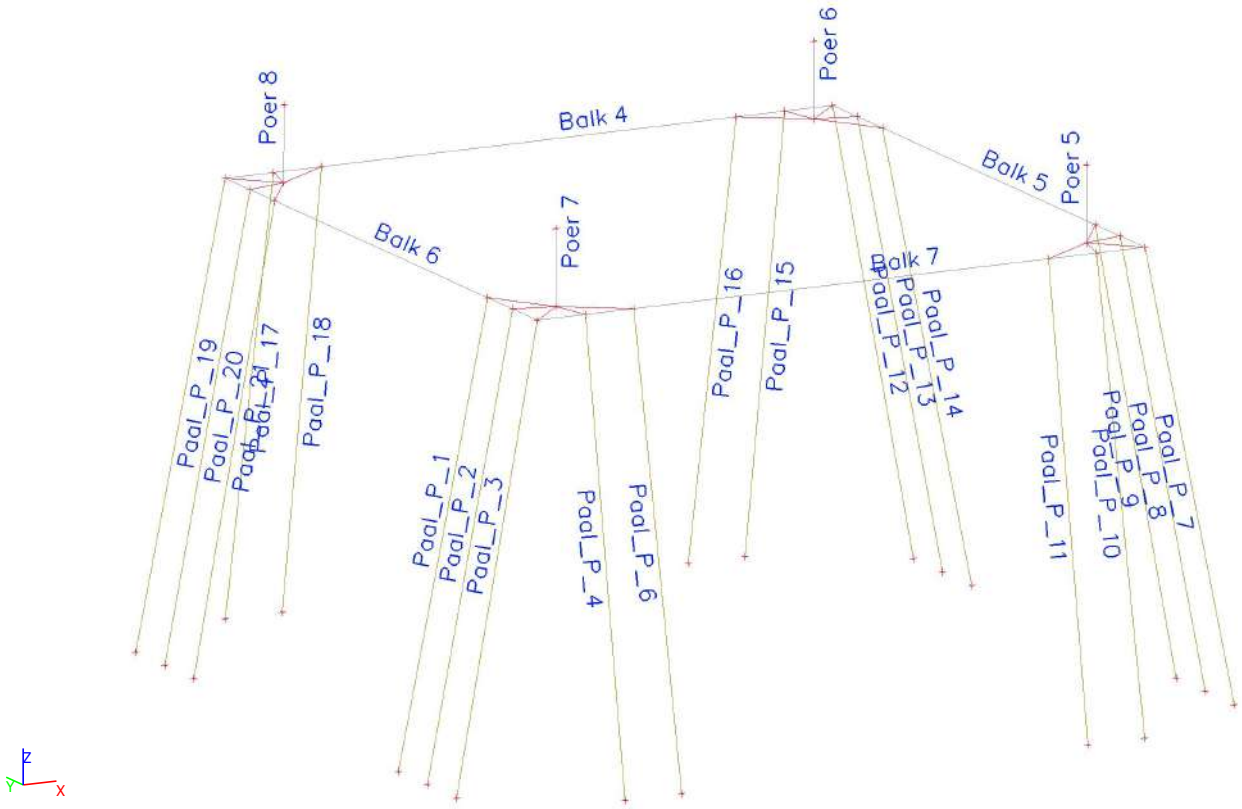


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Balk 4	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N55	N21	beam (80)
Balk 5	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N55	beam (80)
Balk 6	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N17	N21	beam (80)
Balk 7	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N17	beam (80)
Poer 5	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N22	1Y	column (100)
Poer 6	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N23	1XY	column (100)
Poer 7	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N32	1P	column (100)
Poer 8	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N33	1X	column (100)
Paal_P_1	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N29	N46	column (100)
Paal_P_2	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,996	N28	N45	column (100)
Paal_P_3	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N17	N44	column (100)
Paal_P_4	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N30	N47	column (100)
Paal_P_6	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N31	N48	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_7	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N56	N49	column (100)
Paal_P_8	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,996	N5	N50	column (100)
Paal_P_9	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N6	N51	column (100)
Paal_P_10	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N7	N52	column (100)
Paal_P_11	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N1	N53	column (100)
Paal_P_12	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N55	N10	column (100)
Paal_P_13	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,996	N24	N11	column (100)
Paal_P_14	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N25	N12	column (100)
Paal_P_15	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N26	N13	column (100)
Paal_P_16	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N27	N14	column (100)
Paal_P_17	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N36	N15	column (100)
Paal_P_18	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,997	N37	N2	column (100)
Paal_P_19	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N21	N3	column (100)
Paal_P_20	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	8,996	N34	N4	column (100)
Paal_P_21	Funderingspaal - Rectangle (320; 320)	C20/25 Ongescheurd	9,000	N35	N54	column (100)

5.4. Analyse model met Staven

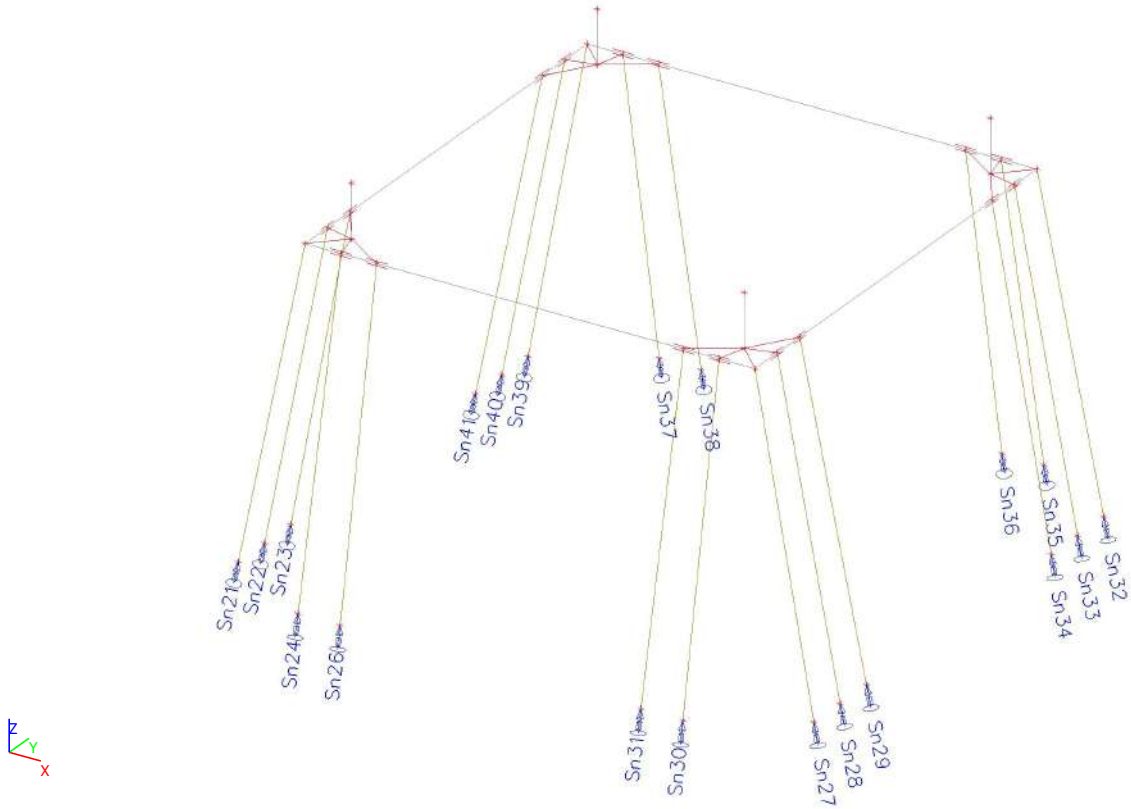


5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn21	N44	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31
Sn22	N45	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn23	N46	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn24	N47	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn26	N48	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn27	N49	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn28	N50	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31
Sn29	N51	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn30	N52	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn31	N53	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn32	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn33	N11	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn34	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn35	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn36	N14	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn37	N15	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn38	N2	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn39	N3	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn40	N4	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn41	N54	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31

5.6. Analyse model met Knoopondersteuningen

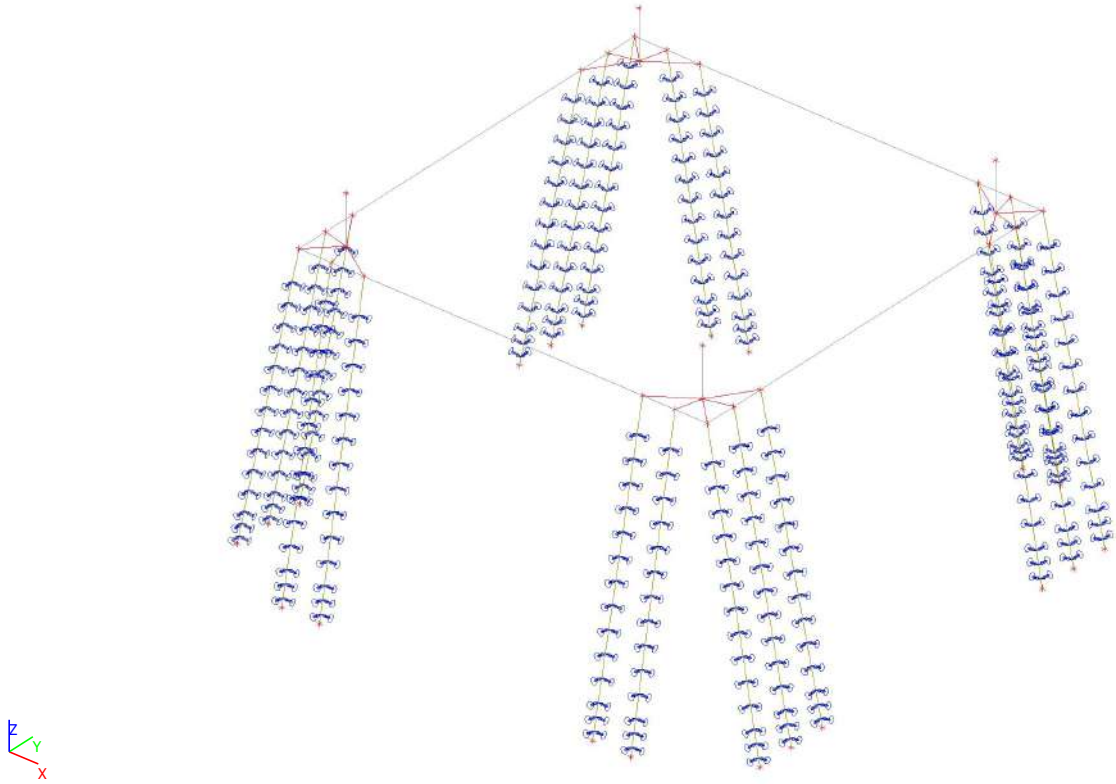


5.7. Line supports on member

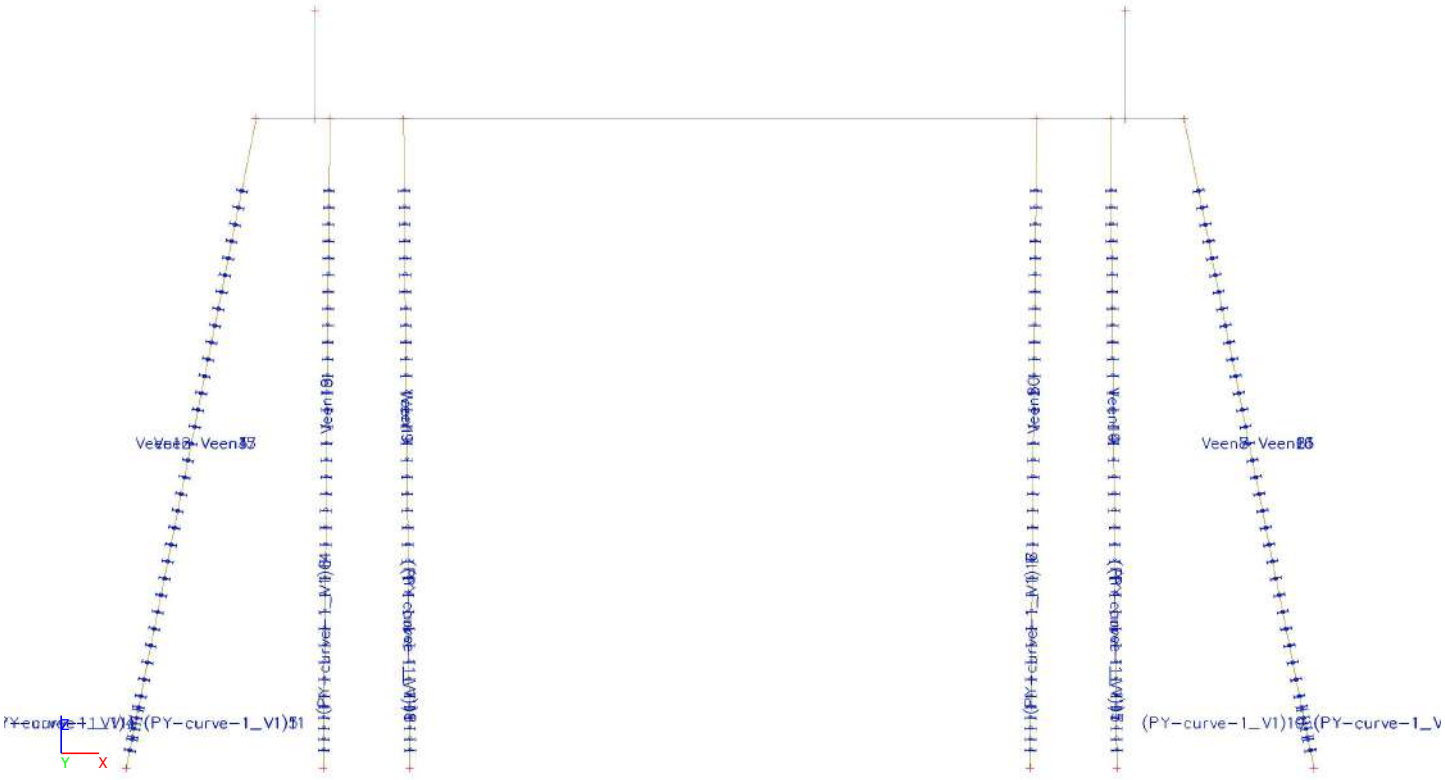
Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
Veen	Line	Paal_P_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Veen3	Line	Paal_P_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Veen4	Line	Paal_P_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)1	Line	Paal_P_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
(PY-curve-1_V1)3	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
(PY-curve-1_V1)4	Line	Paal_P_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen18	Line	Paal_P_4	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)14	Line	Paal_P_4	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen9	Line	Paal_P_6	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
(PY-curve-1_V1)18	Line	Paal_P_6	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen8	Line	Paal_P_7	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)19	Line	Paal_P_7	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen16	Line	Paal_P_8	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)8	Line	Paal_P_8	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen13	Line	Paal_P_9	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)2	Line	Paal_P_9	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen10	Line	Paal_P_10	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)15	Line	Paal_P_10	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen5	Line	Paal_P_11	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)16	Line	Paal_P_11	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen7	Line	Paal_P_12	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)10	Line	Paal_P_12	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen21	Line	Paal_P_13	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)12	Line	Paal_P_13	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen6	Line	Paal_P_14	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)13	Line	Paal_P_14	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen14	Line	Paal_P_15	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)7	Line	Paal_P_15	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen20	Line	Paal_P_16	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)17	Line	Paal_P_16	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen19	Line	Paal_P_17	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)6	Line	Paal_P_17	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen11	Line	Paal_P_18	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)9	Line	Paal_P_18	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen17	Line	Paal_P_19	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)11	Line	Paal_P_19	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen15	Line	Paal_P_20	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)5	Line	Paal_P_20	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						
Veen12	Line	Paal_P_21	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)	Line	Paal_P_21	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,750	From start						

5.8. Analyse model met Lijnondersteuningen



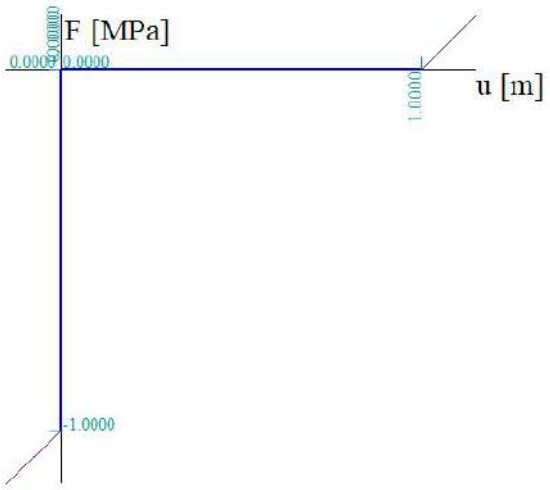
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

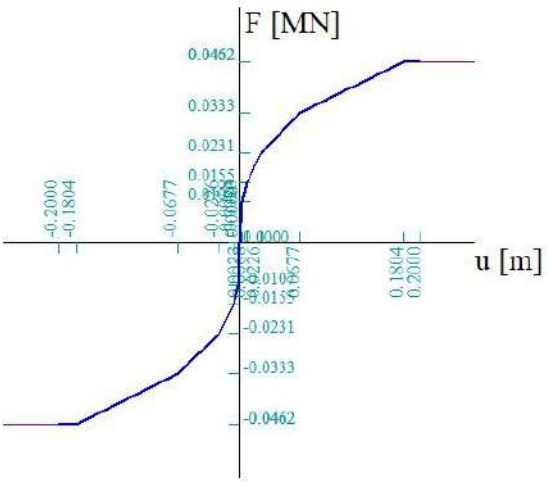
Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -46203.840000	Free	Free
		-0.180400 / -46203.840000		
		-0.067650 / -33318.734193		
		-0.022550 / -23101.920000		
		-0.006765 / -15465.186458		
		-0.002255 / -10722.961391		
		0.000000 / 0.000000		
		0.002255 / 10722.961391		
		0.006765 / 15465.186458		
		0.022550 / 23101.920000		
		0.067650 / 33318.734193		
		0.180400 / 46203.840000		
		0.200000 / 46203.840000		

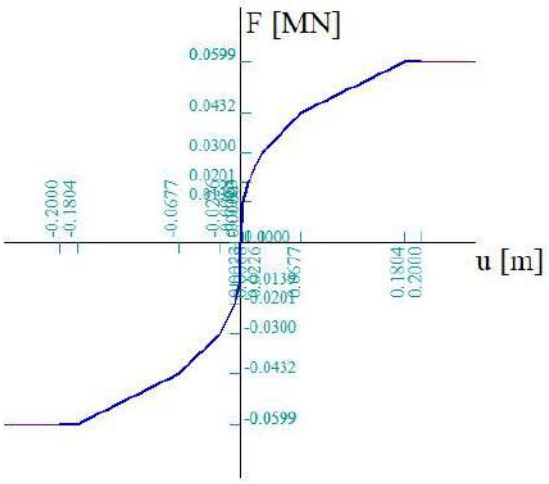
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -59935.680000	Free	Free
		-0.180400 / -59935.680000		
		-0.067650 / -43221.104363		
		-0.022550 / -29967.840000		

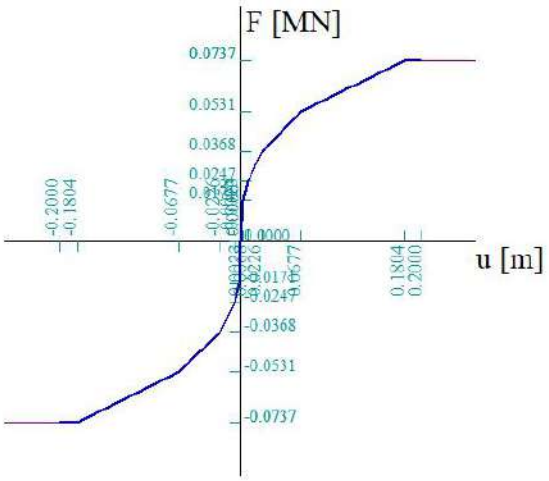
Name	Type	u / F	Positive end	Negative end
		-0.006765 / -20061.459539		
		-0.002255 / -13909.839151		
		0.000000 / 0.000000		
		0.002255 / 13909.839151		
		0.006765 / 20061.459539		
		0.022550 / 29967.840000		
		0.067650 / 43221.104363		
		0.180400 / 59935.680000		
		0.200000 / 59935.680000		

Drawing



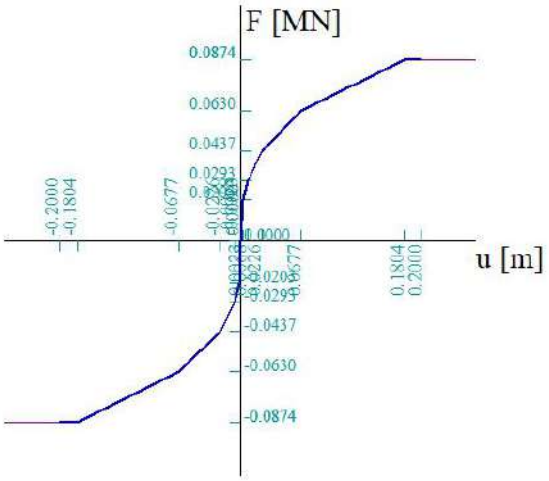
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -73667.520000	Free	Free
		-0.180400 / -73667.520000		
		-0.067650 / -53123.474533		
		-0.022550 / -36833.760000		
		-0.006765 / -24657.732619		
		-0.002255 / -17096.716912		
		0.000000 / 0.000000		
		0.002255 / 17096.716912		
		0.006765 / 24657.732619		
		0.022550 / 36833.760000		
		0.067650 / 53123.474533		
		0.180400 / 73667.520000		
		0.200000 / 73667.520000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -87399.360000	Free	Free
		-0.180400 / -87399.360000		
		-0.067650 / -63025.844703		
		-0.022550 / -43699.680000		
		-0.006765 / -29254.005700		
		-0.002255 / -20283.594672		
		0.000000 / 0.000000		
		0.002255 / 20283.594672		
		0.006765 / 29254.005700		
		0.022550 / 43699.680000		
		0.067650 / 63025.844703		
		0.180400 / 87399.360000		
		0.200000 / 87399.360000		

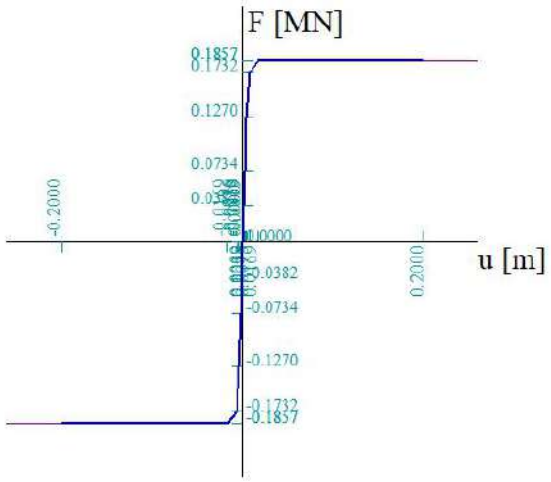
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -185749.581577	Free	Free
		-0.016913 / -185749.581577		
		-0.007517 / -173191.521652		
		-0.003758 / -126966.550767		
		-0.001879 / -73364.887728		
		-0.000940 / -38233.153457		
		0.000000 / 0.000000		
		0.000940 / 38233.153457		
		0.001879 / 73364.887728		
		0.003758 / 126966.550767		

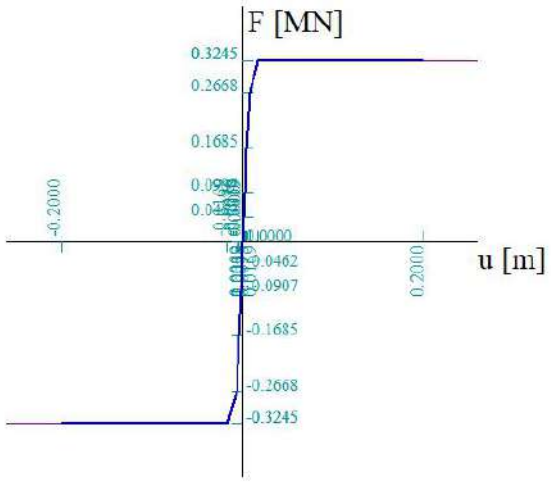
Name	Type	u / F	Positive end	Negative end
		0.007517 / 173191.521652		
		0.016913 / 185749.581577		
		0.200000 / 185749.581577		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -324503.959510	Free	Free
		-0.016913 / -324503.959510		
		-0.007517 / -266801.170128		
		-0.003758 / -168504.997582		
		-0.001879 / -90672.108471		
		-0.000940 / -46234.204284		
		0.000000 / 0.000000		
		0.000940 / 46234.204284		
		0.001879 / 90672.108471		
		0.003758 / 168504.997582		
		0.007517 / 266801.170128		
		0.016913 / 324503.959510		
		0.200000 / 324503.959510		

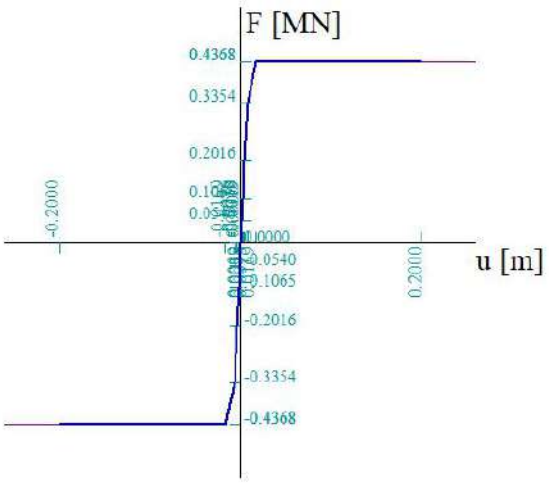
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -436765.819801	Free	Free
		-0.016913 / -436765.819801		
		-0.007517 / -335362.730832		
		-0.003758 / -201646.948699		

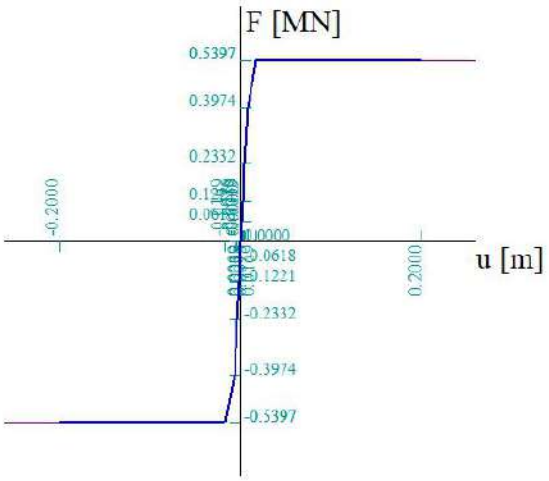
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -106522.716227		
		-0.000940 / -54036.089272		
		0.000000 / 0.000000		
		0.000940 / 54036.089272		
		0.001879 / 106522.716227		
		0.003758 / 201646.948699		
		0.007517 / 335362.730832		
		0.016913 / 436765.819801		
		0.200000 / 436765.819801		

Drawing



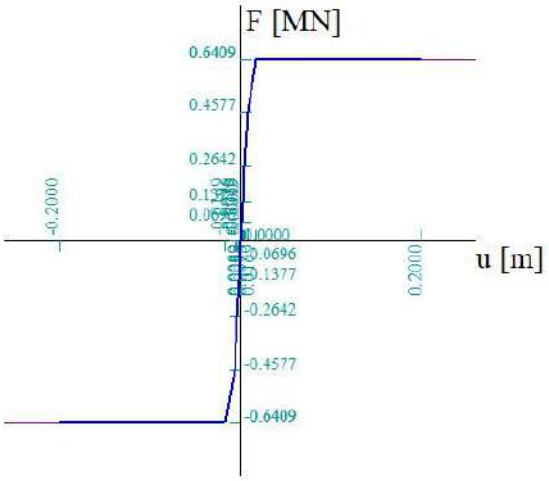
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -539683.678038	Free	Free
		-0.016913 / -539683.678038		
		-0.007517 / -397433.011814		
		-0.003758 / -233158.398644		
		-0.001879 / -122122.429030		
		-0.000940 / -61804.852432		
		0.000000 / 0.000000		
		0.000940 / 61804.852432		
		0.001879 / 122122.429030		
		0.003758 / 233158.398644		
		0.007517 / 397433.011814		
		0.016913 / 539683.678038		
		0.200000 / 539683.678038		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -640861.931437	Free	Free
		-0.016913 / -640861.931437		
		-0.007517 / -457700.088592		
		-0.003758 / -264224.038576		
		-0.001879 / -137654.602914		
		-0.000940 / -69564.742931		
		0.000000 / 0.000000		
		0.000940 / 69564.742931		
		0.001879 / 137654.602914		
		0.003758 / 264224.038576		
		0.007517 / 457700.088592		
		0.016913 / 640861.931437		
		0.200000 / 640861.931437		

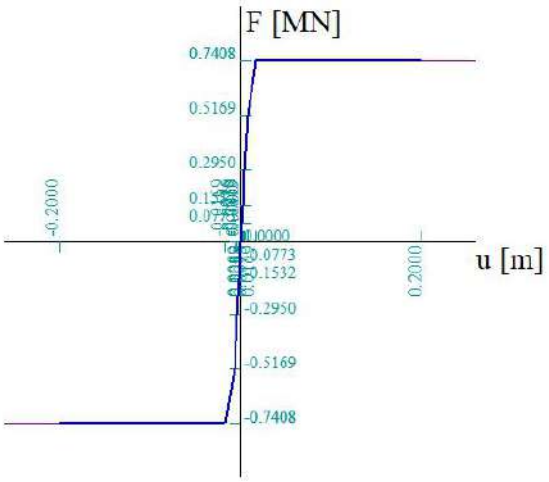
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -740774.043969	Free	Free
		-0.016913 / -740774.043969		
		-0.007517 / -516894.797403		
		-0.003758 / -295043.983610		
		-0.001879 / -153150.432455		
		-0.000940 / -77319.889121		
		0.000000 / 0.000000		
		0.000940 / 77319.889121		
		0.001879 / 153150.432455		
		0.003758 / 295043.983610		

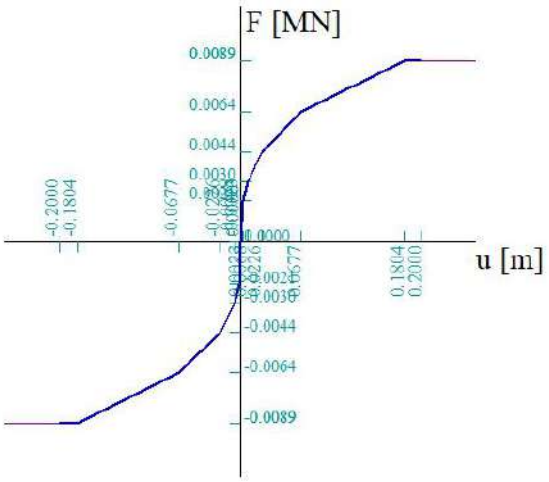
Name	Type	u / F	Positive end	Negative end
		0.007517 / 516894.797403		
		0.016913 / 740774.043969		
		0.200000 / 740774.043969		

Drawing



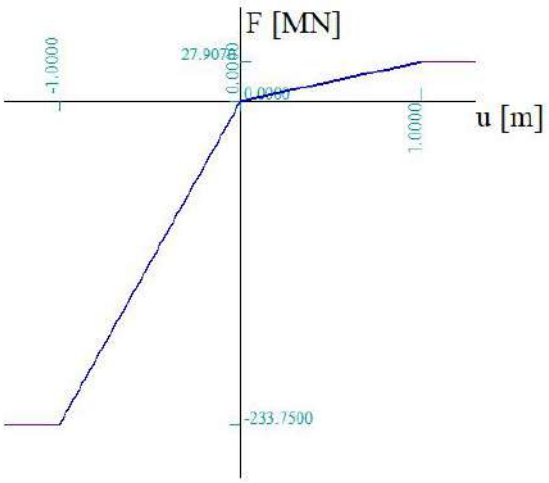
Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -8894.400000	Free	Free
		-0.180400 / -8894.400000		
		-0.067650 / -6413.760000		
		-0.022550 / -4447.680000		
		-0.006765 / -2976.960000		
		-0.002255 / -2064.000000		
		0.000000 / 0.000000		
		0.002255 / 2064.000000		
		0.006765 / 2976.960000		
		0.022550 / 4447.680000		
		0.067650 / 6413.760000		
		0.180400 / 8894.400000		
		0.200000 / 8894.400000		

Drawing



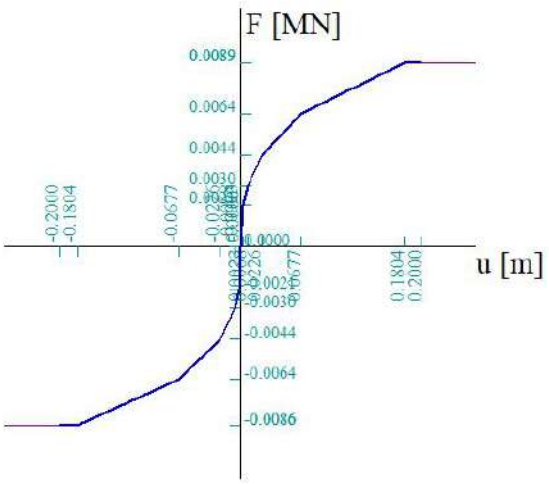
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+paalpunt	Translation	-1.000000 / -233750000.000000	Free	Free
		0.000000 / 0.000000		
		1.000000 / 27907000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen reduced	Translation	-0.200000 / -8640.000000	Free	Free
		-0.180400 / -8640.000000		
		-0.067650 / -6432.000000		
		-0.022550 / -4444.800000		
		-0.006765 / -2976.000000		
		-0.002255 / -2064.000000		
		0.000000 / 0.000000		
		0.002255 / 2064.000000		
		0.006765 / 2976.000000		
		0.022550 / 4444.800000		
		0.067650 / 6432.000000		
		0.180400 / 8899.200000		
		0.200000 / 8899.200000		

Drawing

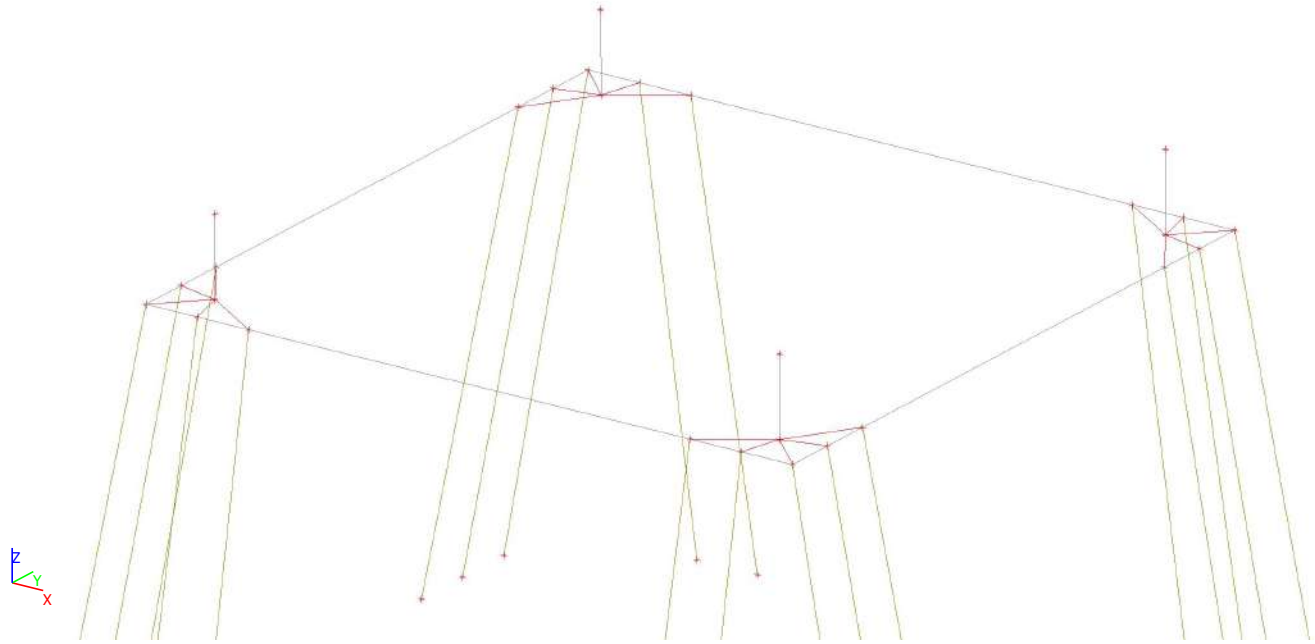


6. Belastingen

6.1. Load cases

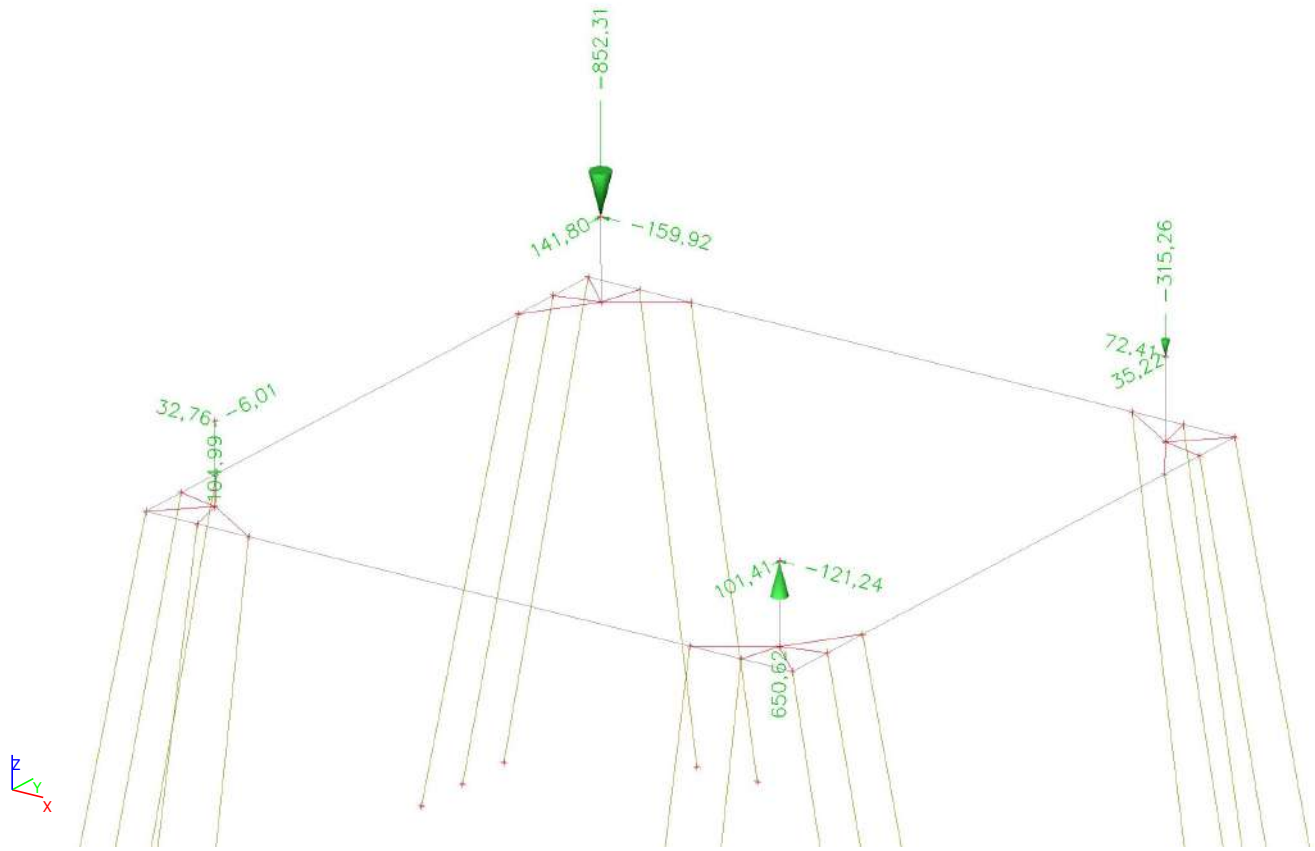
6.1.1. Load cases - E.G.

Name	Description	Action type	Load group	Direction
	Spec	Load type		
E.G.		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - high max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			

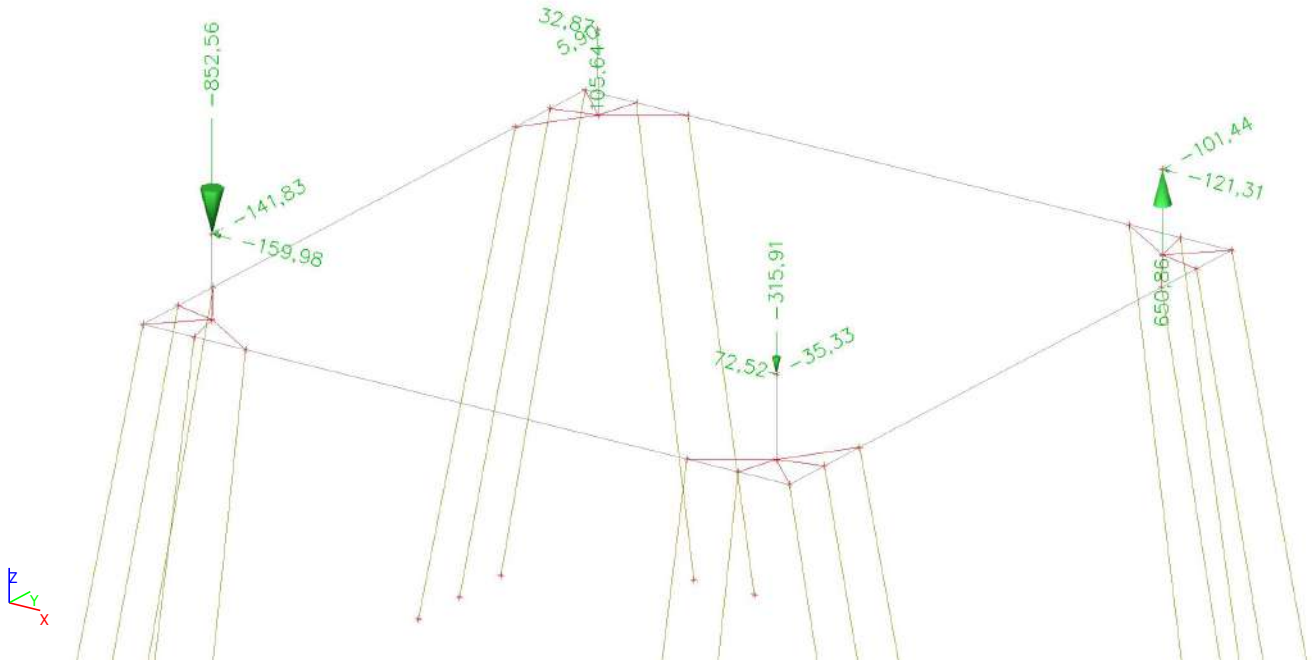


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Force	32,76
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Force	-6,01
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Force	104,99
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Force	-159,92
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Force	141,80
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Force	-852,31
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Force	72,41
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Force	35,22
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Force	-315,26
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Force	-121,24
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Force	101,41
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Force	650,62

6.1.3. Load cases - high max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



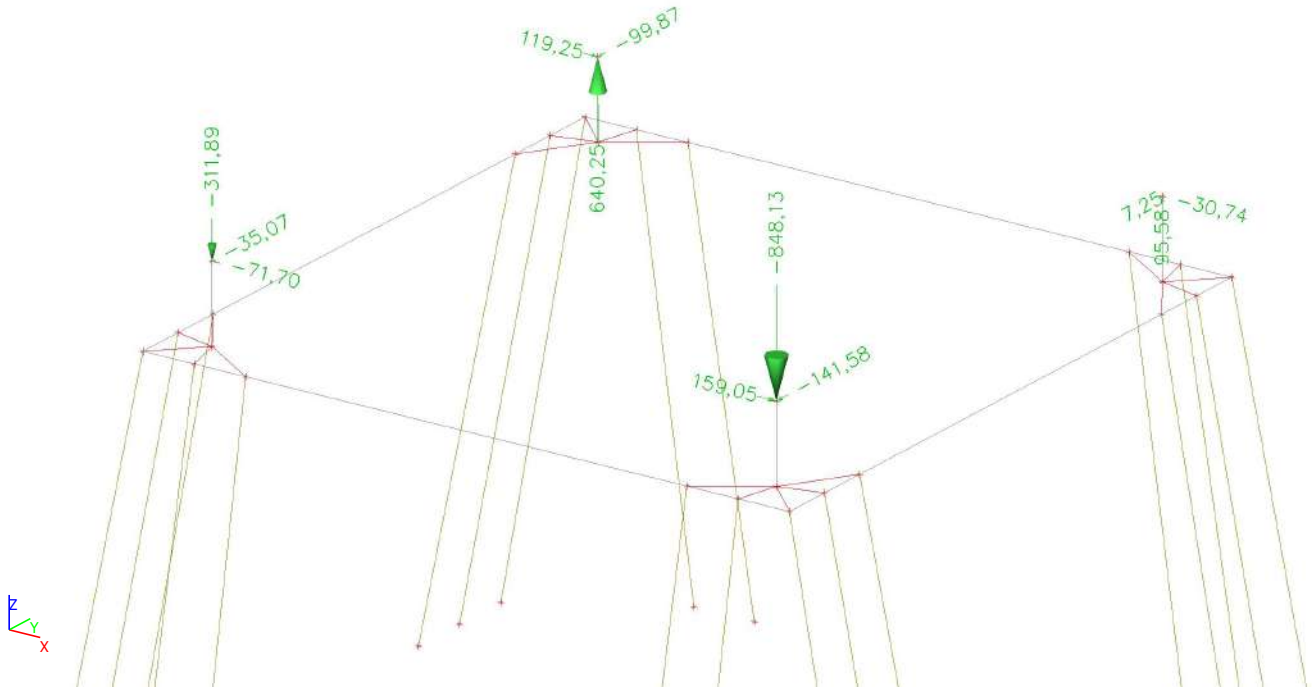
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Force	-159,98
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Force	-141,83
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Force	-852,56
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Force	32,87
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Force	5,90
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Force	105,64
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Force	-121,31
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Force	-101,44
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Force	650,86
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Force	72,52
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Force	-35,33

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Force	-315,91

6.1.4. Load cases - high max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



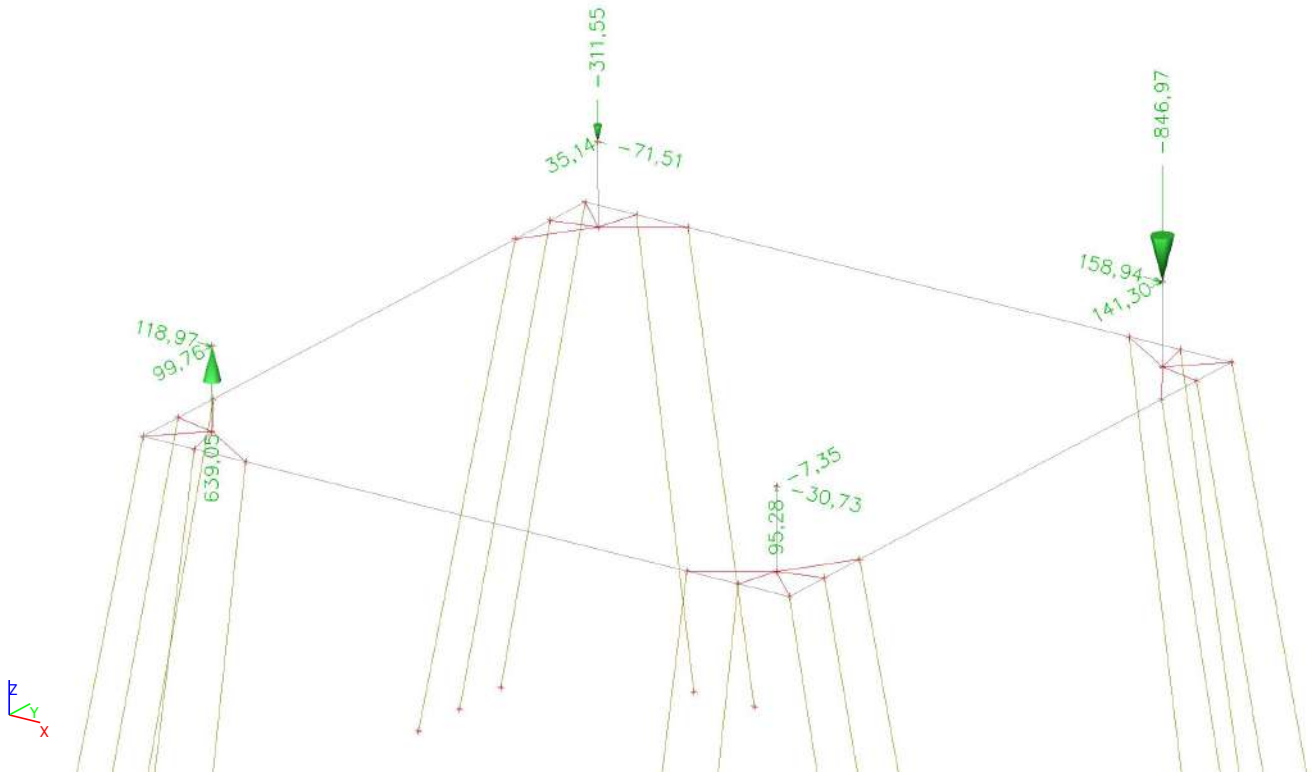
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Force	-71,70
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Force	-35,07
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Force	-311,89
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Force	119,25
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Force	-99,87
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Force	640,25
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Force	-30,74
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Force	7,25

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Force	95,58
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Force	159,05
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Force	-141,58
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Force	-848,13

6.1.5. Load cases - high max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



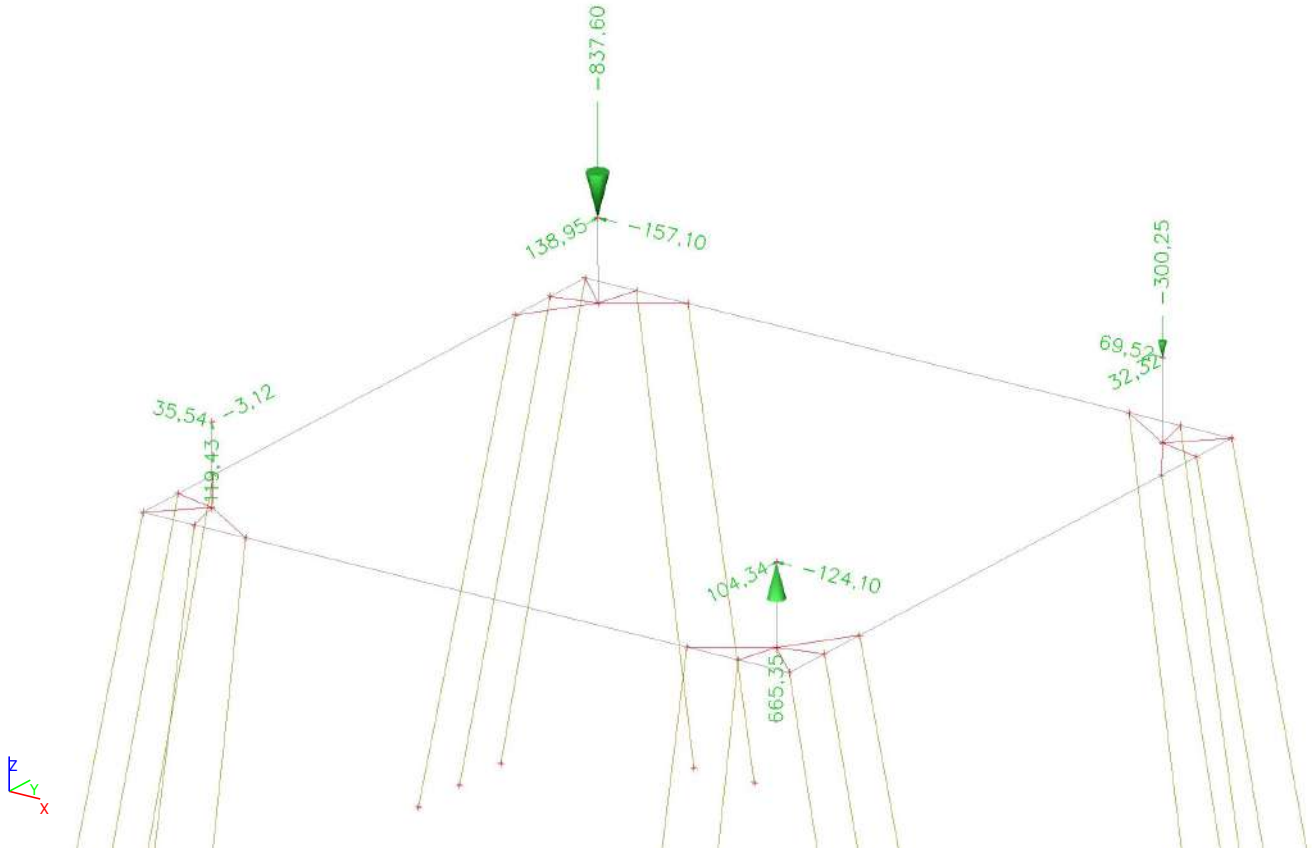
6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Force	118,97
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Force	99,76
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Force	639,05
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Force	-71,51
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Force	35,14

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Force	-311,55
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Force	158,94
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Force	141,30
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Force	-846,97
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Force	-30,73
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Force	-7,35
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Force	95,28

6.1.6. Load cases - low max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			

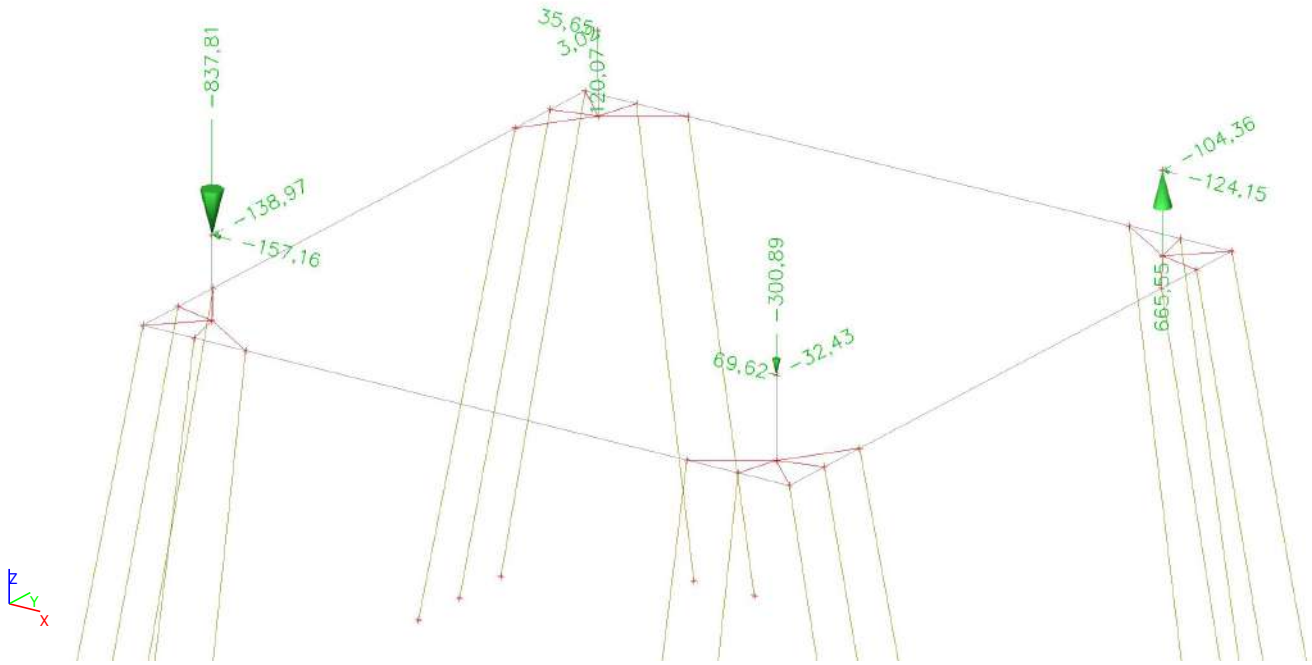


6.1.6.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Force	35,54
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Force	-3,12
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Force	119,43
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Force	-157,10
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Force	138,95
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Force	-837,60
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Force	69,52
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Force	32,32
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Force	-300,25
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Force	-124,10
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Force	104,34
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Force	665,35

6.1.7. Load cases - low max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			

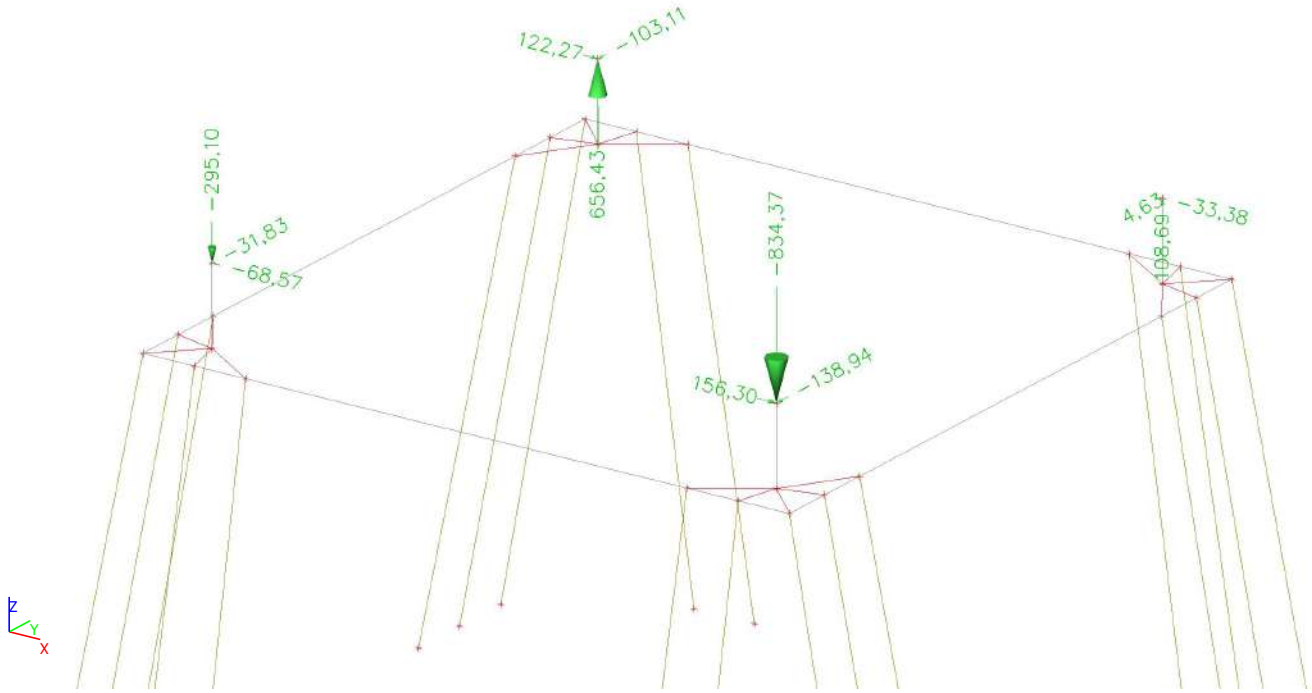


6.1.7.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Force	-157,16
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Force	-138,97
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Force	-837,81
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Force	35,65
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Force	3,02
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Force	120,07
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Force	-124,15
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Force	-104,36
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Force	665,55
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Force	69,62
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Force	-32,43
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Force	-300,89

6.1.8. Load cases - low max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



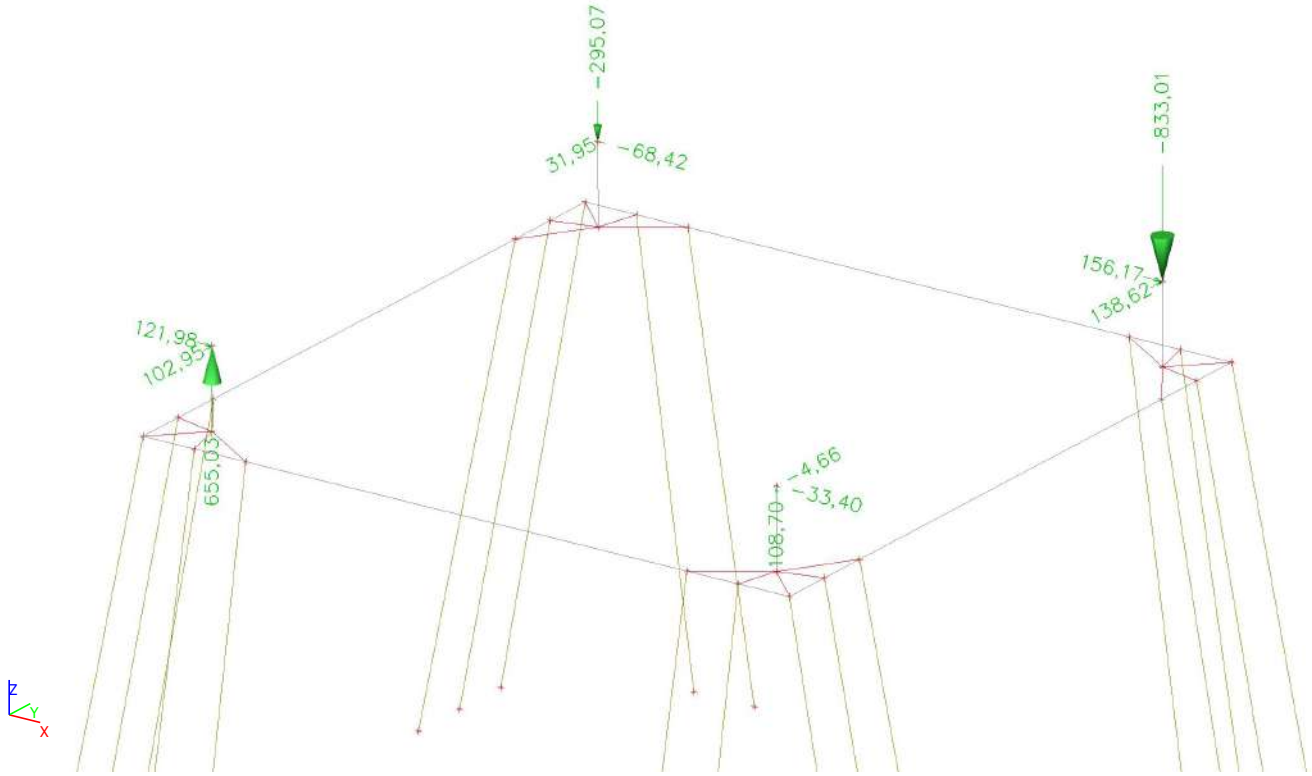
6.1.8.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Force	-68,57
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Force	-31,83
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Force	-295,10
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Force	122,27
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Force	-103,11
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Force	656,43
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Force	-33,38
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Force	4,63
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Force	108,69
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Force	156,30
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Force	-138,94

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Force	-834,37

6.1.9. Load cases - low max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



6.1.9.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Force	121,98
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Force	102,95
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Force	655,03
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Force	-68,42
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Force	31,95
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Force	-295,07
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Force	156,17
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Force	138,62

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Force	-833,01
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Force	-33,40
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Force	-4,66
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Force	108,70

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
high max Wnd ;225°	Ultimate	E.G.	1,20
		high max Wnd ;225°	1,00
high max Wnd ;135°	Ultimate	E.G.	1,20
		high max Wnd ;135°	1,00
high max Wnd ;45°	Ultimate	E.G.	1,20
		high max Wnd ;45°	1,00
high max Wnd ;315°	Ultimate	E.G.	1,20
		high max Wnd ;315°	1,00
low max Wnd ;45°	Ultimate	E.G.	0,90
		low max Wnd ;45°	1,00
low max Wnd ;135°	Ultimate	E.G.	0,90
		low max Wnd ;135°	1,00
low max Wnd ;315°	Ultimate	E.G.	0,90
		low max Wnd ;315°	1,00
low max Wnd ;225°	Ultimate	E.G.	0,90
		low max Wnd ;225°	1,00

6.3. Result classes

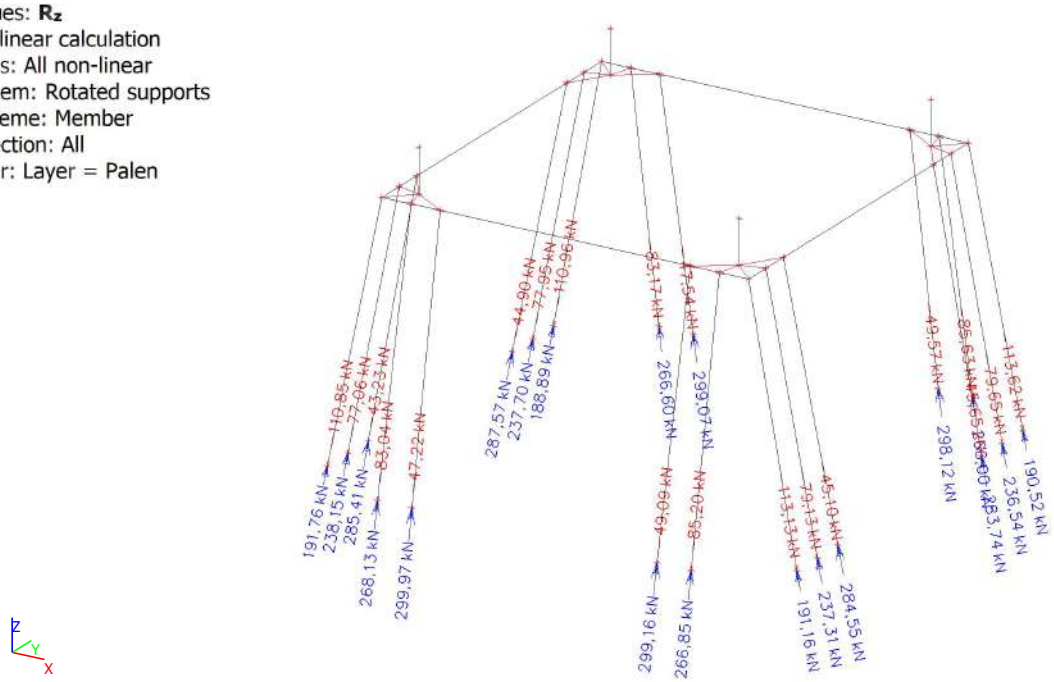
Name	List
All non-linear	high max Wnd ;225°
	high max Wnd ;135°
	high max Wnd ;45°
	high max Wnd ;315°
	low max Wnd ;45°
	low max Wnd ;135°
	low max Wnd ;315°
	low max Wnd ;225°

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn27/N49	high max Wnd ;45°	**0,00**	0,00	189,89	0,00	0,00	0,00	0,0	0,0
Sn23/N46	high max Wnd ;135°	**0,00**	0,00	285,41	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn35/N13	low max Wnd ;315°	0,00	**0,00**	246,87	0,00	0,00	0,00	0,0	0,0
Sn24/N47	high max Wnd ;135°	0,00	**0,00**	268,13	0,00	0,00	0,00	0,0	0,0
Sn32/N10	low max Wnd ;135°	0,00	0,00	**-113,62**	0,00	0,00	0,00	0,0	0,0
Sn26/N48	high max Wnd ;135°	0,00	0,00	**299,97**	0,00	0,00	0,00	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn21/N44	high max Wnd ;315°	0,00	**0,00**	-94,51	0,00	0,00	0,00	0,0	0,0
Sn21/N44	high max Wnd ;135°	0,00	**0,00**	190,71	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn21/N44	low max Wnd ;315°	**0,00**	0,00	**-110,85**	0,00	0,00	0,00	0,0	0,0
Sn21/N44	low max Wnd ;135°	**0,00**	0,00	**191,76**	0,00	0,00	**0,00**	0,0	0,0
Sn22/N45	low max Wnd ;315°	0,00	0,00	**-77,06**	0,00	0,00	0,00	0,0	0,0
Sn22/N45	high max Wnd ;135°	**0,00**	**0,00**	**238,15**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn22/N45	low max Wnd ;135°	**0,00**	0,00	218,91	0,00	0,00	**0,00**	0,0	0,0
Sn23/N46	high max Wnd ;135°	**0,00**	**0,00**	**285,41**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn23/N46	low max Wnd ;315°	**0,00**	**0,00**	**-43,23**	0,00	0,00	**0,00**	0,0	0,0
Sn24/N47	low max Wnd ;45°	0,00	**0,00**	154,82	0,00	0,00	0,00	0,0	0,0
Sn24/N47	high max Wnd ;135°	**0,00**	**0,00**	**268,13**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn24/N47	low max Wnd ;315°	**0,00**	0,00	**-83,04**	0,00	0,00	**0,00**	0,0	0,0
Sn26/N48	high max Wnd ;45°	0,00	**0,00**	222,31	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn26/N48	low max Wnd ;315°	**0,00**	0,00	**-47,22**	0,00	0,00	0,00	0,0	0,0
Sn26/N48	high max Wnd ;135°	**0,00**	**0,00**	**299,97**	0,00	0,00	**0,00**	0,0	0,0
Sn27/N49	high max Wnd ;315°	**0,00**	0,00	-7,52	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn27/N49	low max Wnd ;225°	0,00	**0,00**	**-113,13**	0,00	0,00	0,00	0,0	0,0
Sn27/N49	low max Wnd ;45°	0,00	0,00	**191,16**	0,00	0,00	0,00	0,0	0,0
Sn27/N49	high max Wnd ;45°	**0,00**	**0,00**	189,89	0,00	0,00	**0,00**	0,0	0,0
Sn28/N50	low max Wnd ;225°	**0,00**	0,00	**-79,13**	0,00	0,00	0,00	0,0	0,0
Sn28/N50	high max Wnd ;45°	0,00	**0,00**	**237,31**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn28/N50	high max Wnd ;135°	**0,00**	0,00	114,45	0,00	0,00	**0,00**	0,0	0,0
Sn29/N51	high max Wnd ;315°	**0,00**	0,00	148,16	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn29/N51	high max Wnd ;45°	0,00	**0,00**	**284,55**	0,00	0,00	0,00	0,0	0,0
Sn29/N51	low max Wnd ;225°	0,00	**0,00**	**-45,10**	0,00	0,00	0,00	0,0	0,0
Sn29/N51	low max Wnd ;45°	**0,00**	0,00	245,20	0,00	0,00	**0,00**	0,0	0,0
Sn30/N52	high max Wnd ;45°	0,00	**0,00**	**266,85**	0,00	0,00	0,00	0,0	0,0
Sn30/N52	high max Wnd ;135°	0,00	**0,00**	174,47	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn30/N52	low max Wnd ;225°	**0,00**	0,00	**-85,20**	0,00	0,00	0,00	0,0	0,0
Sn30/N52	low max Wnd ;45°	**0,00**	0,00	247,66	0,00	0,00	**0,00**	0,0	0,0
Sn31/N53	low max Wnd ;135°	0,00	**0,00**	182,37	0,00	0,00	0,00	0,0	0,0
Sn31/N53	low max Wnd ;45°	**0,00**	**0,00**	258,43	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn31/N53	high max Wnd ;45°	0,00	0,00	**299,16**	0,00	0,00	0,00	0,0	0,0

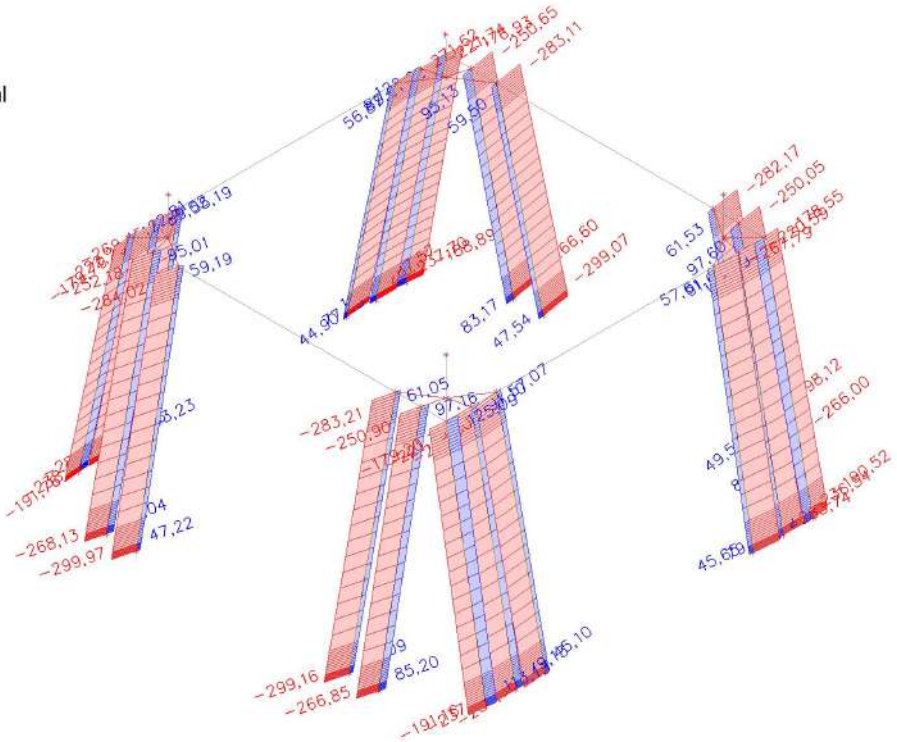
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn31/N53	low max Wnd ;225°	**0,00**	0,00	**-49,09**	0,00	0,00	**0,00**	0,0	0,0
Sn32/N10	low max Wnd ;315°	0,00	**0,00**	**190,52**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn32/N10	low max Wnd ;135°	**0,00**	**0,00**	**-113,62**	0,00	0,00	0,00	0,0	0,0
Sn32/N10	high max Wnd ;135°	**0,00**	0,00	-97,72	0,00	0,00	**0,00**	0,0	0,0
Sn33/N11	low max Wnd ;135°	**0,00**	0,00	**-79,65**	0,00	0,00	0,00	0,0	0,0
Sn33/N11	high max Wnd ;315°	0,00	**0,00**	**236,54**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn33/N11	low max Wnd ;315°	**0,00**	0,00	217,62	0,00	0,00	**0,00**	0,0	0,0
Sn34/N12	high max Wnd ;45°	**0,00**	0,00	147,10	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn34/N12	low max Wnd ;135°	0,00	**0,00**	**-45,65**	0,00	0,00	0,00	0,0	0,0
Sn34/N12	high max Wnd ;315°	**0,00**	**0,00**	**283,74**	0,00	0,00	**0,00**	0,0	0,0
Sn35/N13	high max Wnd ;135°	0,00	**0,00**	-64,04	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn35/N13	low max Wnd ;135°	**0,00**	0,00	**-85,63**	0,00	0,00	0,00	0,0	0,0
Sn35/N13	high max Wnd ;315°	0,00	0,00	**266,00**	0,00	0,00	0,00	0,0	0,0
Sn35/N13	low max Wnd ;315°	**0,00**	**0,00**	246,87	0,00	0,00	**0,00**	0,0	0,0
Sn36/N14	high max Wnd ;315°	**0,00**	**0,00**	**298,12**	0,00	0,00	0,00	0,0	0,0
Sn36/N14	low max Wnd ;315°	0,00	**0,00**	257,54	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn36/N14	low max Wnd ;135°	**0,00**	0,00	**-49,57**	0,00	0,00	**0,00**	0,0	0,0
Sn37/N15	low max Wnd ;225°	**0,00**	0,00	247,31	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	low max Wnd ;315°	0,00	**0,00**	154,19	0,00	0,00	0,00	0,0	0,0
Sn37/N15	high max Wnd ;315°	0,00	**0,00**	172,33	0,00	0,00	0,00	0,0	0,0
Sn37/N15	high max Wnd ;225°	0,00	0,00	**266,60**	0,00	0,00	0,00	0,0	0,0
Sn37/N15	low max Wnd ;45°	**0,00**	0,00	**-83,17**	0,00	0,00	**0,00**	0,0	0,0
Sn38/N2	low max Wnd ;315°	0,00	**0,00**	180,69	0,00	0,00	0,00	0,0	0,0
Sn38/N2	low max Wnd ;135°	0,00	**0,00**	65,04	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn38/N2	low max Wnd ;45°	**0,00**	0,00	**-47,54**	0,00	0,00	0,00	0,0	0,0
Sn38/N2	high max Wnd ;225°	**0,00**	0,00	**299,07**	0,00	0,00	**0,00**	0,0	0,0
Sn39/N3	high max Wnd ;225°	0,00	**0,00**	187,63	0,00	0,00	0,00	0,0	0,0
Sn39/N3	low max Wnd ;225°	**0,00**	0,00	**188,89**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn39/N3	low max Wnd ;45°	**0,00**	**0,00**	**-110,96**	0,00	0,00	**0,00**	0,0	0,0
Sn40/N4	low max Wnd ;45°	0,00	0,00	**-77,95**	0,00	0,00	0,00	0,0	0,0
Sn40/N4	high max Wnd ;225°	**0,00**	**0,00**	**237,70**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn40/N4	high max Wnd ;45°	**0,00**	0,00	-56,87	0,00	0,00	**0,00**	0,0	0,0
Sn41/N54	low max Wnd ;315°	**0,00**	0,00	148,25	**0,00**	**0,00**	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn41/N54	low max Wnd ;45°	0,00	**0,00**	**-44,90**	0,00	0,00	0,00	0,0	0,0
Sn41/N54	high max Wnd ;225°	**0,00**	**0,00**	**287,57**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

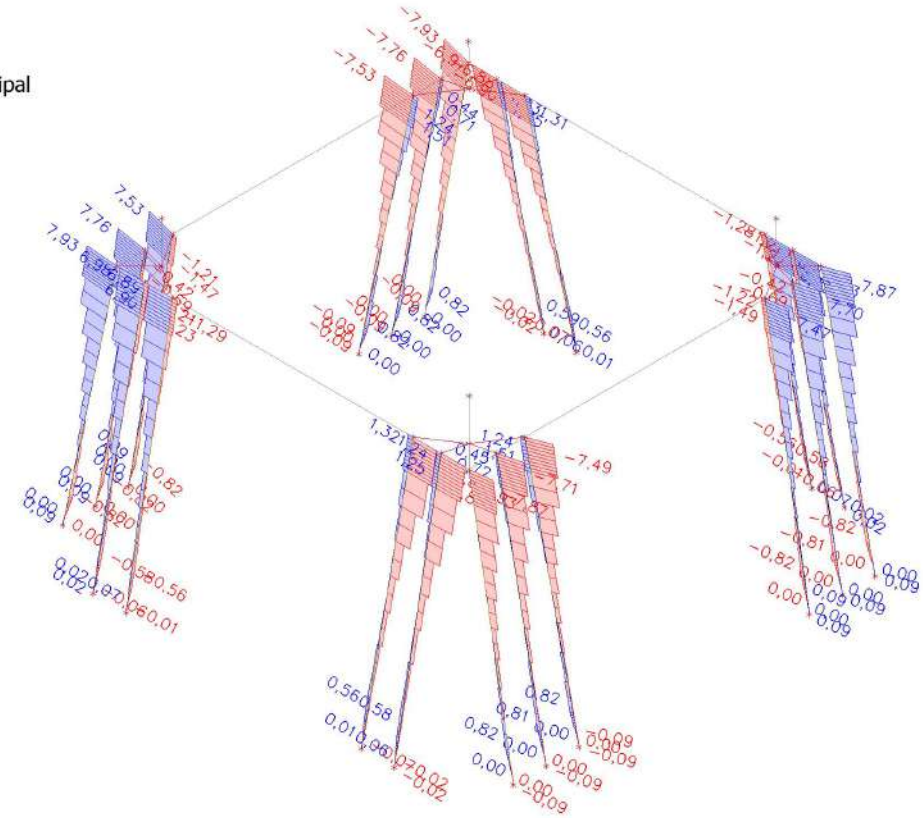
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



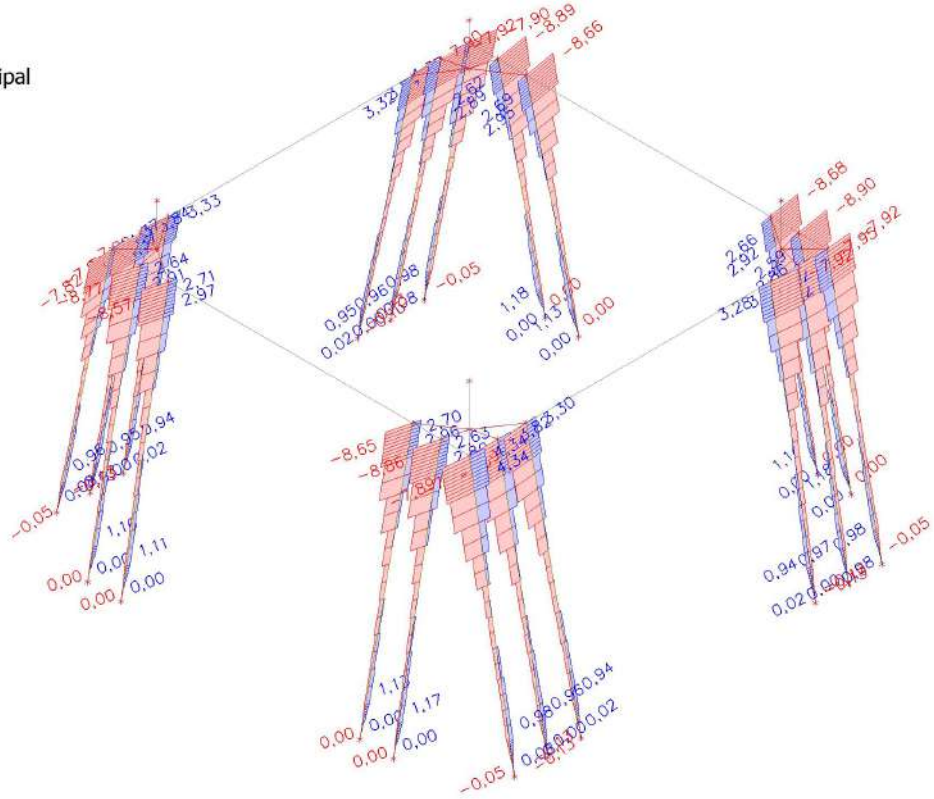
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



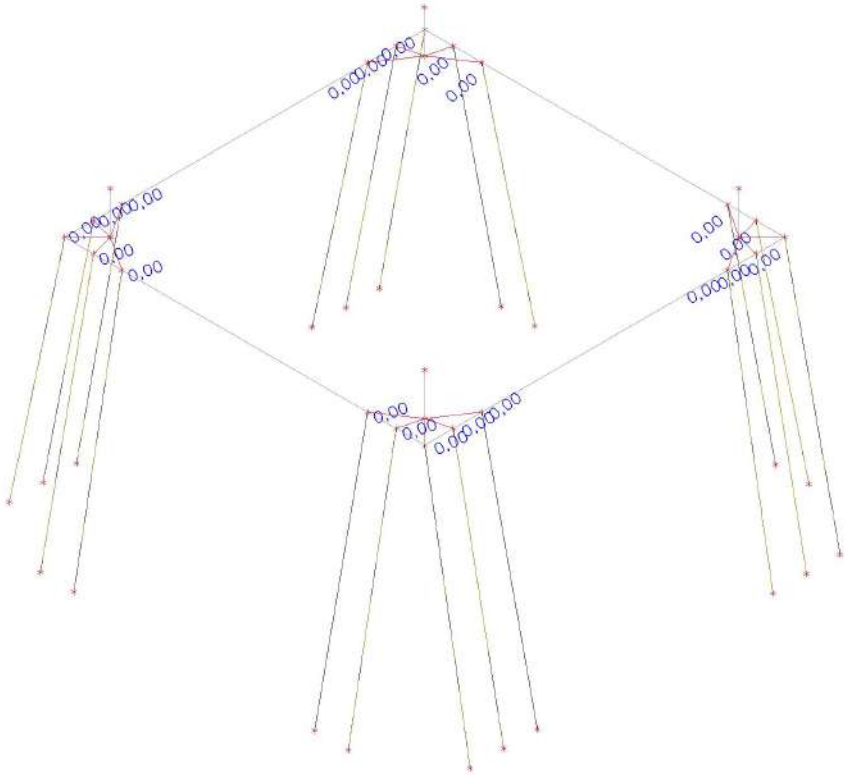
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



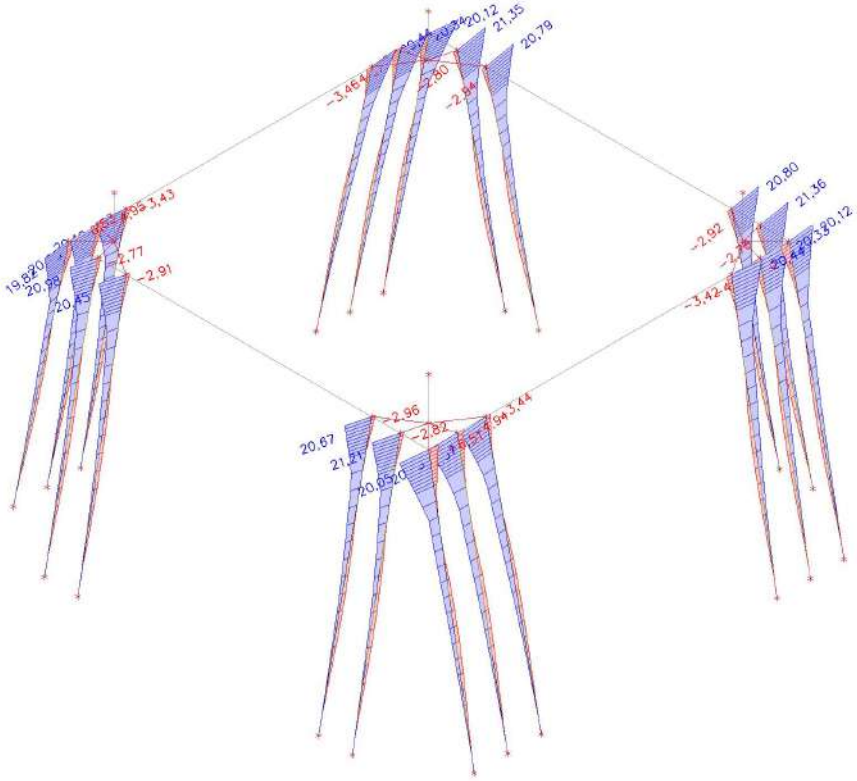
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



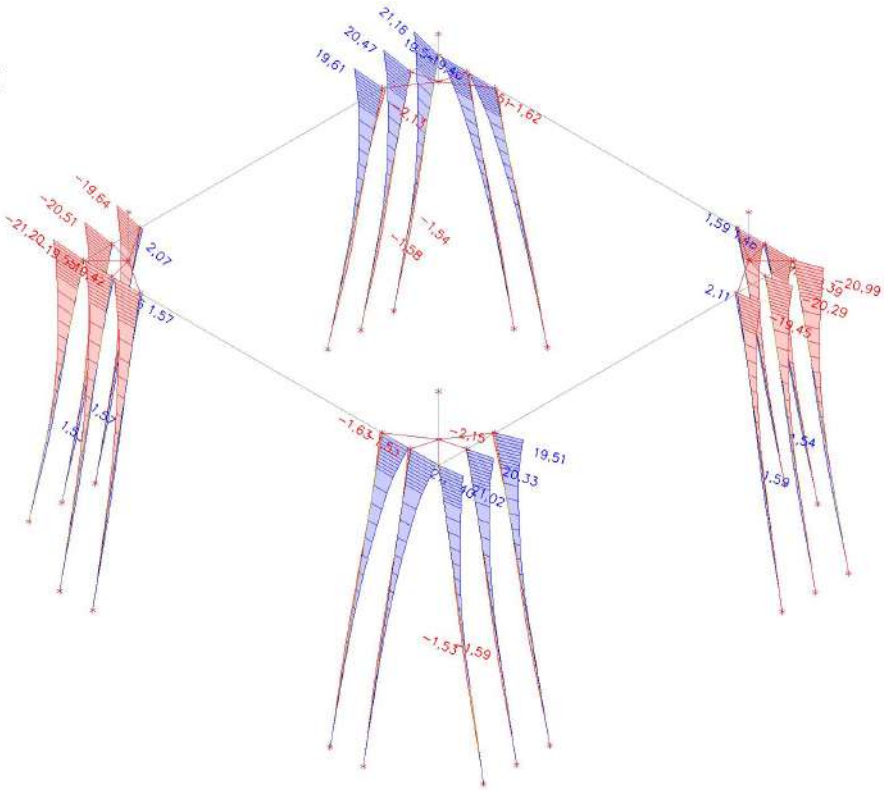
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_P_6	8,997	high max Wnd ;135°	**-299,97**	0,07	0,00	0,00	0,00	0,00
Paal_P_12	0,000	low max Wnd ;135°	**125,59**	4,97	1,59	**0,00**	2,75	-17,57
Paal_P_19	0,000	high max Wnd ;135°	24,53	**-7,93**	3,87	0,00	-4,84	**21,16**
Paal_P_15	0,000	high max Wnd ;225°	-157,82	-0,56	**-8,90**	0,00	**21,36**	-0,76
Paal_P_3	0,800-	low max Wnd ;225°	19,93	6,53	**4,37**	0,00	-3,03	-12,49
Paal_P_19	0,000	low max Wnd ;135°	20,94	-6,74	4,37	0,00	**-6,55**	17,76
Paal_P_3	0,000	high max Wnd ;225°	24,53	**7,93**	3,89	0,00	-4,86	**-21,20**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

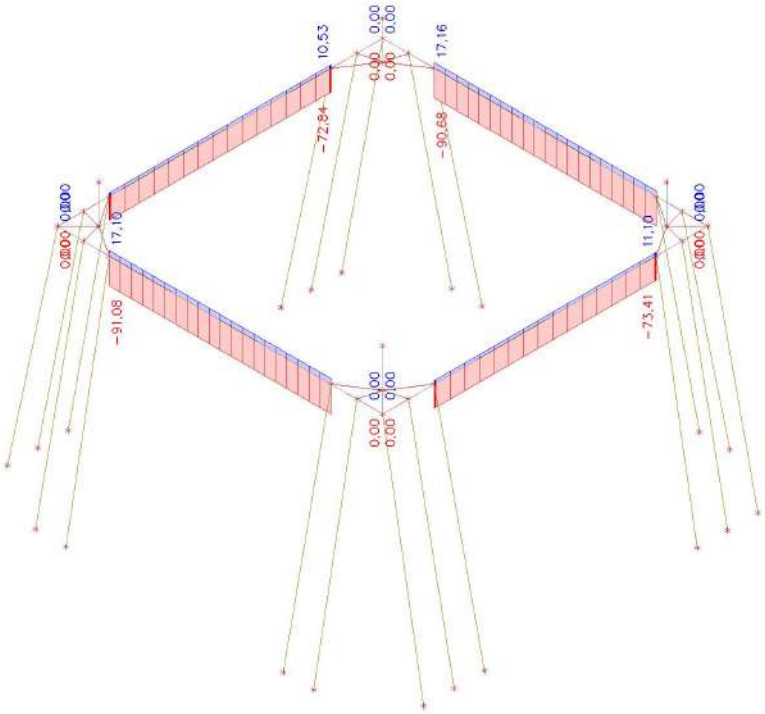
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer 6	1,475	low max Wnd ;135°	**665,55**	-161,58	13,99	0,17	0,00	-7,99
Poer 7	0,000	high max Wnd ;135°	**-880,47**	**-213,41**	12,83	-1,39	-18,93	**221,52**
Poer 8	0,000	high max Wnd ;315°	-336,64	-73,32	**-27,82**	**2,99**	**40,91**	73,48
Poer 8	1,475	low max Wnd ;135°	120,04	22,32	**28,09**	-0,34	0,00	1,44
Poer 8	0,000	low max Wnd ;135°	101,44	22,44	27,98	**-3,03**	**-41,36**	-20,88
Poer 5	0,000	high max Wnd ;45°	-876,04	**212,58**	12,35	1,33	-18,22	**-220,76**

7.4. Krachten van de Funderingsbalken

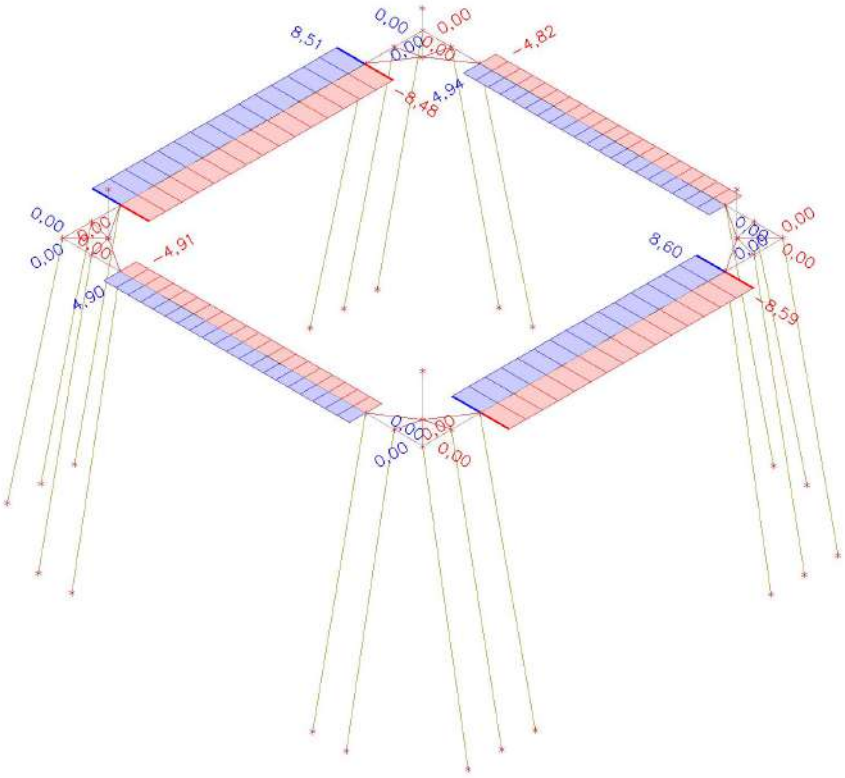
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



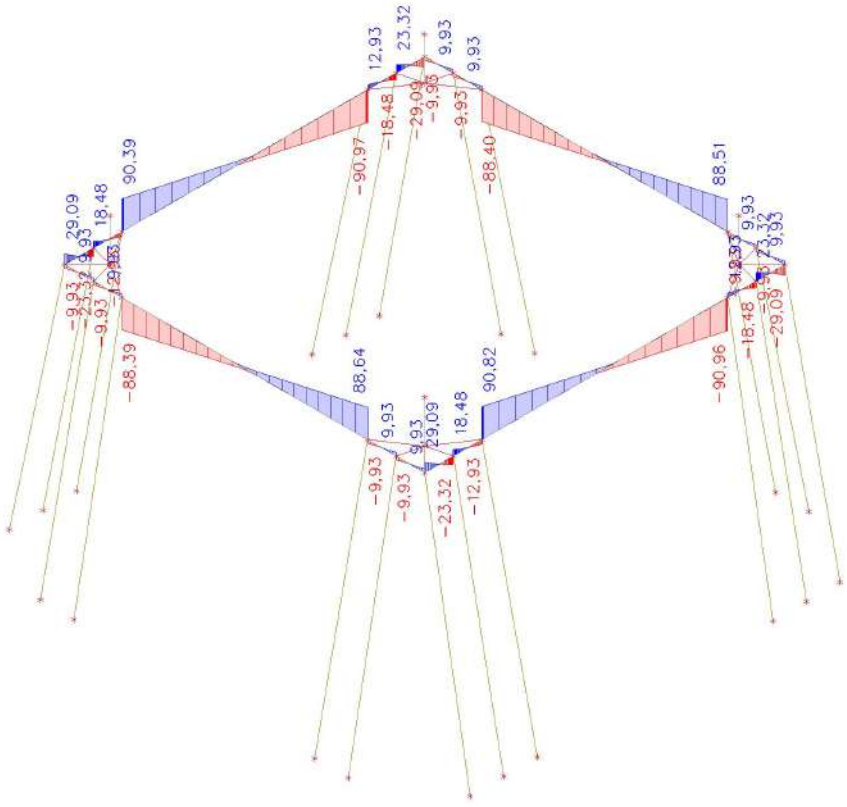
7.4.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



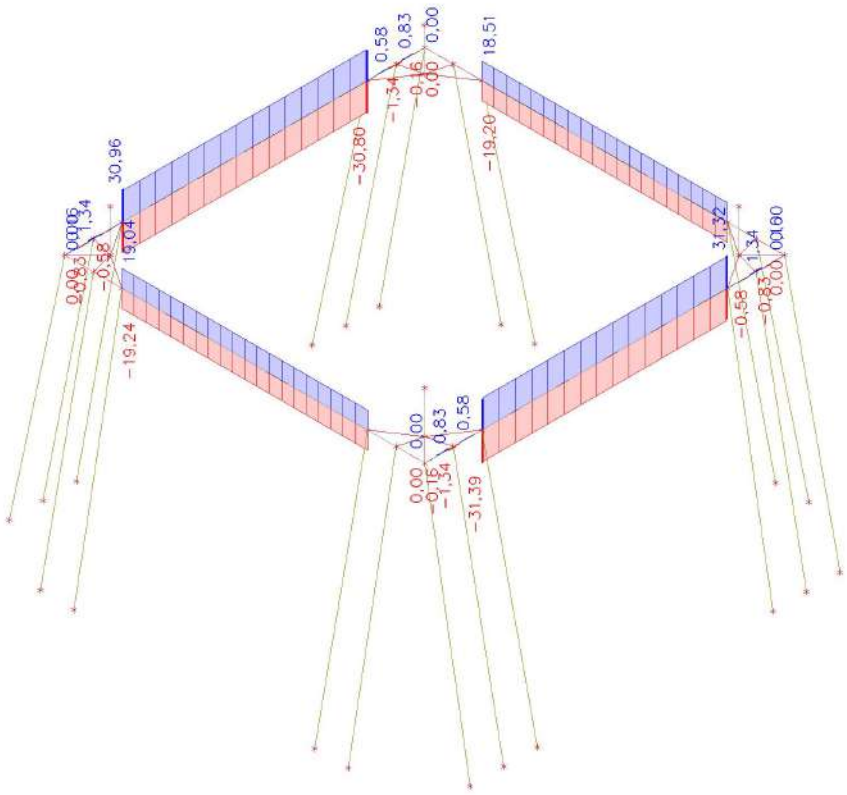
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



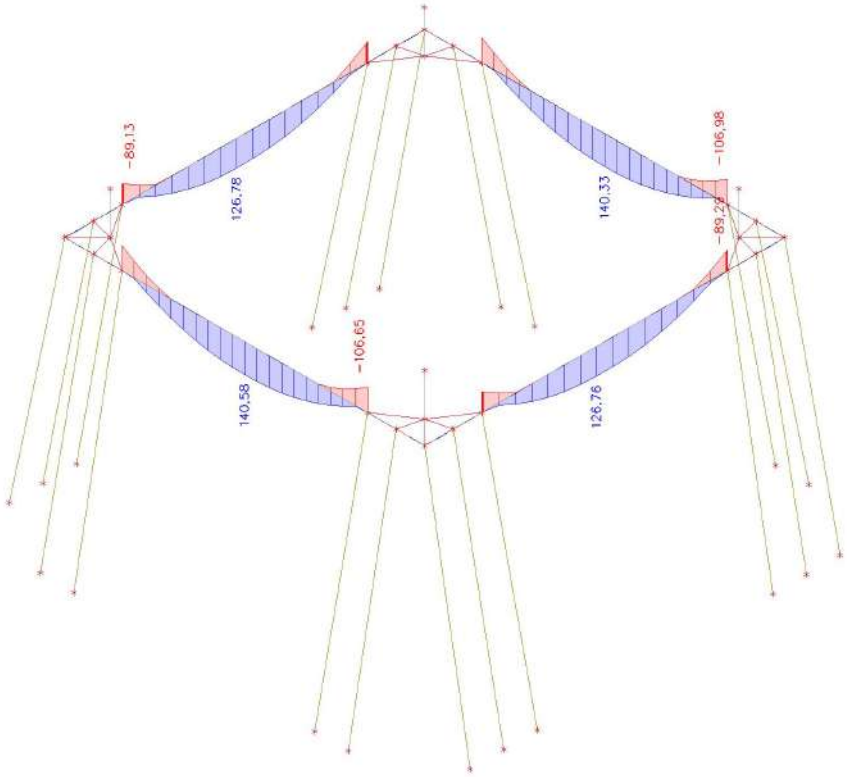
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



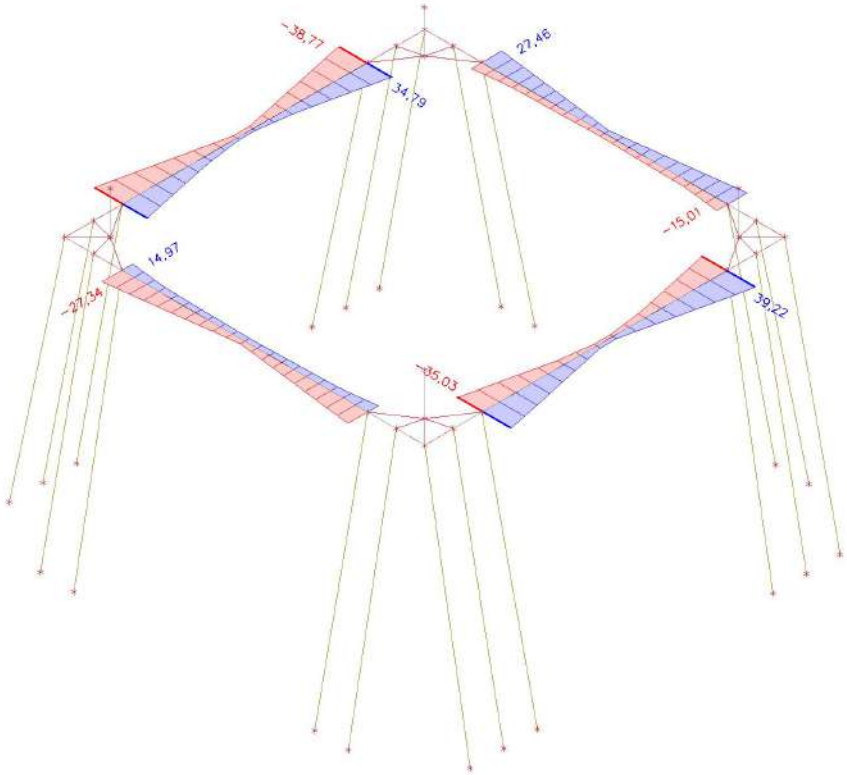
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: Named selection - FunderingsBalken
Filter: Layer = Balken

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Balk 4	2,000+	low max Wnd ;225°	**17,16**	0,82	65,36	-4,88	-87,66	-10,13
Balk 5	2,000+	low max Wnd ;135°	-64,21	**-8,59**	66,50	28,80	-49,28	38,85
Balk 6	10,600-	high max Wnd ;315°	-72,84	-8,14	**-90,97**	28,95	-81,41	-36,57
Balk 5	2,000+	high max Wnd ;135°	-73,41	-8,25	**90,82**	29,31	-80,81	37,02
Balk 5	2,000+	high max Wnd ;225°	-73,40	8,26	79,93	**-31,39**	-33,96	-33,95
Balk 5	10,550+	high max Wnd ;135°	-73,41	-8,25	-79,06	**31,32**	-30,66	-33,54
Balk 4	2,000+	high max Wnd ;225°	7,05	0,82	86,53	-5,85	**-106,98**	-9,80
Balk 7	6,300	high max Wnd ;225°	**-91,08**	-4,64	-2,97	19,04	**140,58**	-6,19
Balk 6	10,550-	low max Wnd ;315°	-63,81	-8,48	-65,85	29,22	-46,38	**-38,77**
Balk 5	10,550-	low max Wnd ;225°	-64,22	**8,60**	-65,84	-29,63	-46,38	**39,22**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Balkrooster 4xBeton40x40 mast 157
Author	[redacted]
Date	27-08-2025
Structure	General XYZ
No. of nodes :	40
No. of beams :	24
No. of slabs :	0
No. of solids :	0
No. of used profiles :	3
No. of load cases :	9
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materials

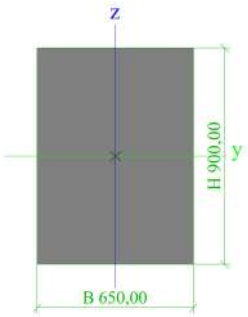
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C12/15 Gescheurd	Concrete	2500,00	2600,00	7,0000e+03	0.2	0,01e-003	12,00	
C20/25 Ongescheurd	Concrete	1500,00	2600,00	2,4000e+04	0.2	0,01e-003	20,00	

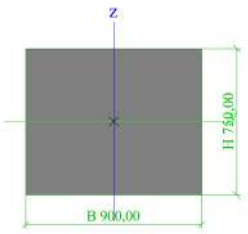
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

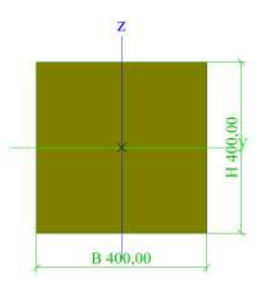
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Reinforcement steel	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

4.2. Cross-sections

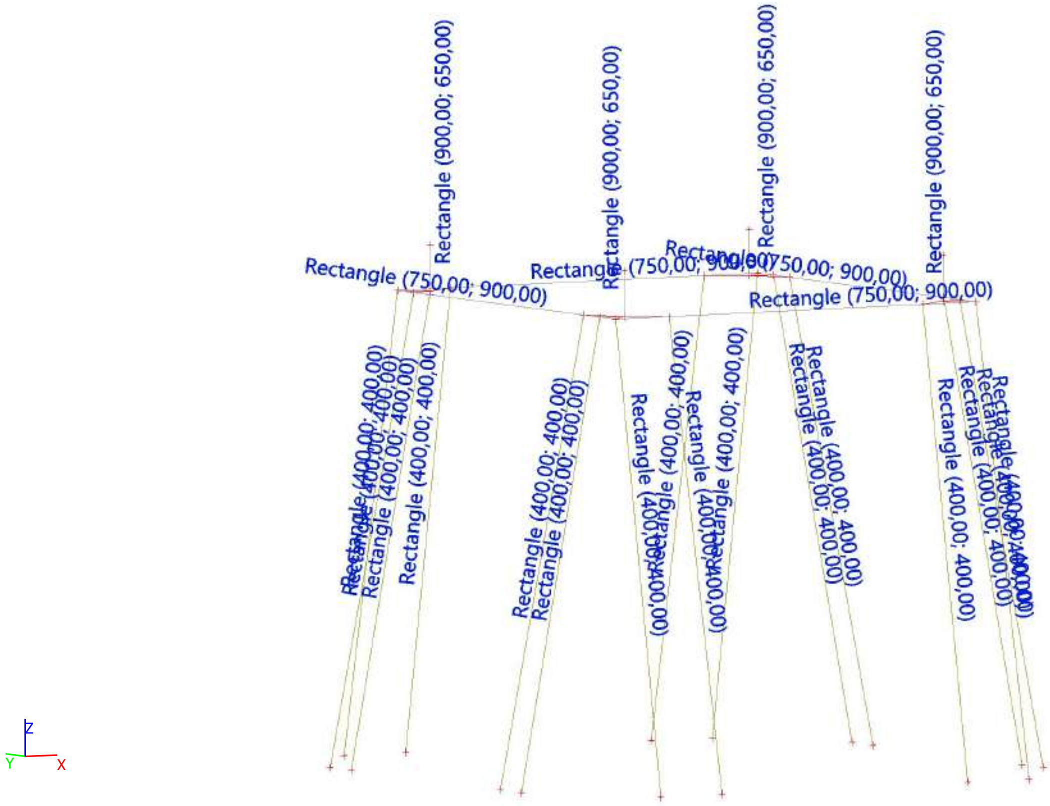
Poer.Opstort		
Type	Rectangle	
Detailed	900,00; 650,00	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	concrete	
Colour		
A [mm²]	5,8500e+05	
A_y [mm²], A_z [mm²]	4,8750e+05	4,8750e+05
A_L [m²/m], A_D [m²/m]	3,1000e+00	3,1000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	325,00	450,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	3,9487e+10	2,0597e+10
i_y [mm], i_z [mm]	259,81	187,64
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	8,7750e+07	6,3375e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	4,5857e+10	0,0000e+00
$β_y$ [mm], $β_z$ [mm]	0,00	0,00
Picture		

Balk		
Type	Rectangle	
Detailed	750,00; 900,00	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	concrete	
Colour		
A [mm²]	6,7500e+05	
A_y [mm²], A_z [mm²]	5,6250e+05	5,6250e+05
A_L [m²/m], A_D [m²/m]	3,3000e+00	3,3000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450,00	375,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	3,1641e+10	4,5563e+10
i_y [mm], i_z [mm]	216,51	259,81
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	8,4375e+07	1,0125e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	6,3112e+10	0,0000e+00
$β_y$ [mm], $β_z$ [mm]	0,00	0,00
Picture		

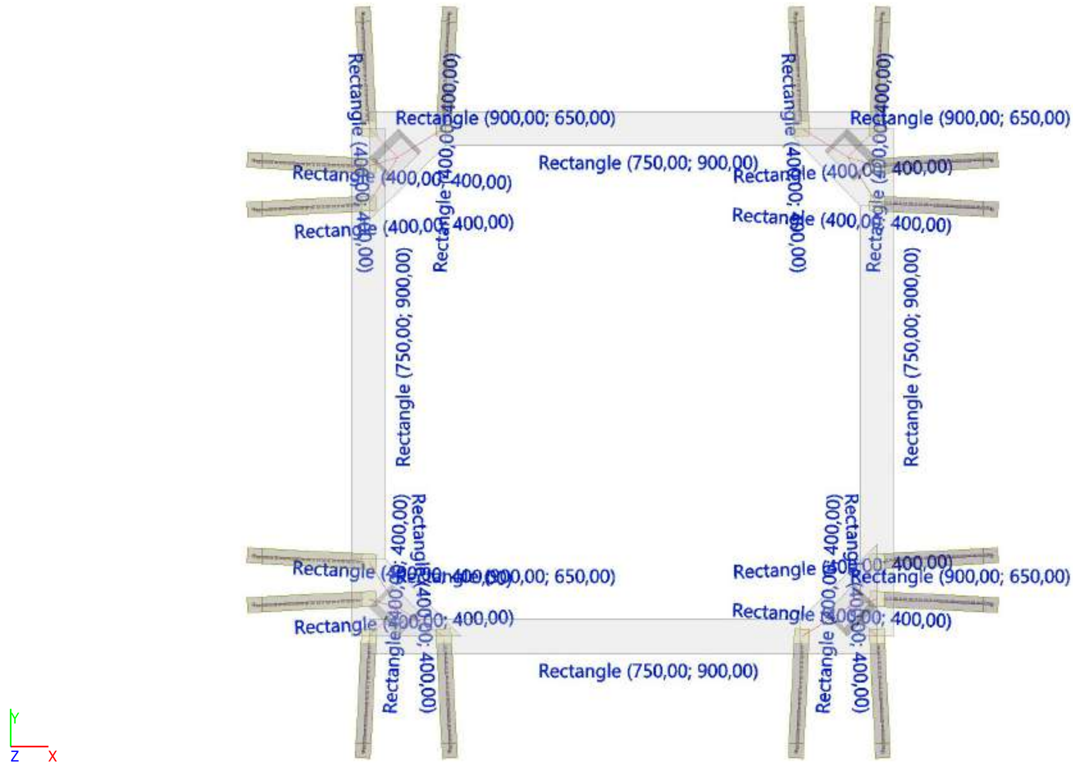
Funderingspaal		
Type	Rectangle	
Detailed	400,00; 400,00	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [mm²]	1,6000e+05	
A_y [mm²], A_z [mm²]	1,3333e+05	1,3333e+05
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200,00	200,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	2,1333e+09	2,1333e+09
i_y [mm], i_z [mm]	115,47	115,47
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,0667e+07	1,0667e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	3,6027e+09	0,0000e+00
$β_y$ [mm], $β_z$ [mm]	0,00	0,00

Picture		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Subsoils

Empty table

4.6. Mesh setup

Name	MeshSetup1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	1
Average size of 2D mesh element [m]	0,500
Average size of 1D mesh element on curved 1D members [m]	0,200
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N81	1,169	1,169	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N83	13,169	1,169	0,000

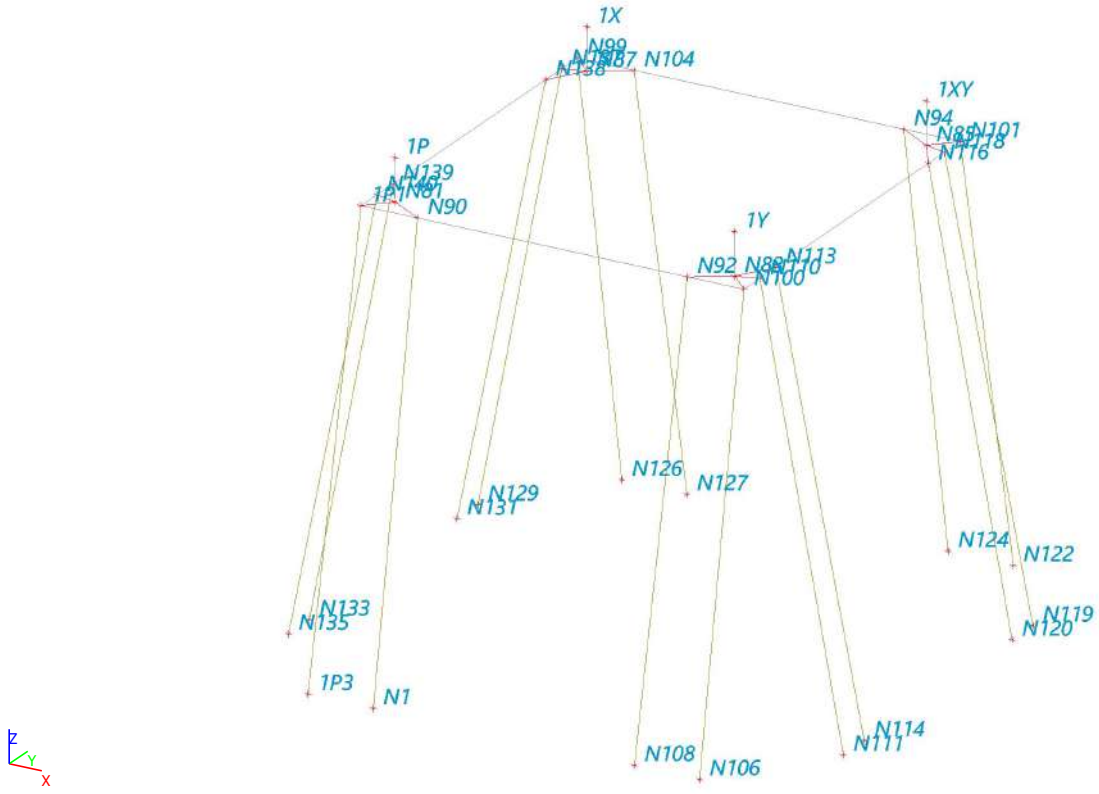
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N85	13,169	13,169	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N87	1,169	13,169	0,000
1P	1,169	1,169	1,475
1P1	0,400	0,400	0,000
1P3	0,248	-2,639	-15,195
N1	2,552	-2,639	-15,195
N90	2,400	0,400	0,000
N92	11,938	0,400	0,000
N104	2,400	13,938	0,000
N94	11,938	13,938	0,000
N99	0,400	13,938	0,000
N100	13,938	0,400	0,000
N101	13,938	13,938	0,000
1Y	13,169	1,169	1,475

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
1XY	13,169	13,169	1,475
1X	1,169	13,169	1,475
N106	14,090	-2,639	-15,195
N108	11,786	-2,639	-15,195
N110	13,938	1,400	0,000
N111	16,977	1,248	-15,195
N113	13,938	2,400	0,000
N114	16,977	2,552	-15,195
N116	13,938	11,938	0,000
N118	13,938	12,938	0,000
N119	16,977	13,090	-15,195
N120	16,977	11,786	-15,195
N122	14,090	16,977	-15,195

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N124	11,786	16,977	-15,195
N126	0,248	16,977	-15,195
N127	2,552	16,977	-15,195
N129	-2,639	13,090	-15,195
N131	-2,639	11,786	-15,195
N133	-2,639	2,552	-15,195
N135	-2,639	1,248	-15,195
N137	0,400	12,938	0,000
N138	0,400	11,938	0,000
N139	0,400	2,400	0,000
N140	0,400	1,400	0,000

5.2. Analyse model met knopen

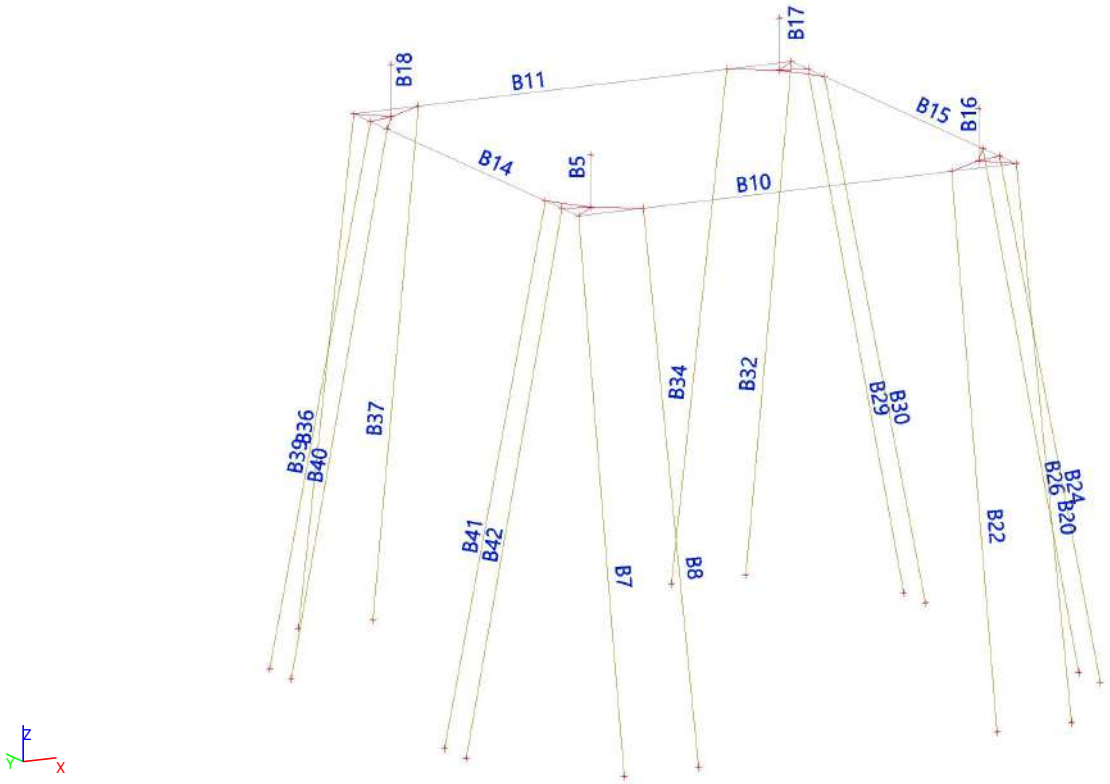


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
B10	Balk - Rectangle (750,00; 900,00)	C12/15 Gescheurd	13,538	1P1	N100	beam (80)
B11	Balk - Rectangle (750,00; 900,00)	C12/15 Gescheurd	13,538	N99	N101	beam (80)
B14	Balk - Rectangle (750,00; 900,00)	C12/15 Gescheurd	13,538	1P1	N99	beam (80)
B15	Balk - Rectangle (750,00; 900,00)	C12/15 Gescheurd	13,538	N100	N101	beam (80)
B5	Poer.Opstort - Rectangle (900,00; 650,00)	C12/15 Gescheurd	1,475	N81	1P	column (100)
B7	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	1P3	1P1	column (100)
B8	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N1	N90	column (100)
B16	Poer.Opstort - Rectangle (900,00; 650,00)	C12/15 Gescheurd	1,475	N83	1Y	column (100)
B17	Poer.Opstort - Rectangle (900,00; 650,00)	C12/15 Gescheurd	1,475	N85	1XY	column (100)
B18	Poer.Opstort - Rectangle (900,00; 650,00)	C12/15 Gescheurd	1,475	N87	1X	column (100)
B20	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N106	N100	column (100)
B22	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N108	N92	column (100)
B24	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N111	N110	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
B26	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N114	N113	column (100)
B29	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N119	N118	column (100)
B30	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N120	N116	column (100)
B32	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N122	N101	column (100)
B34	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N124	N94	column (100)
B36	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N126	N99	column (100)
B37	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N127	N104	column (100)
B39	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N129	N137	column (100)
B40	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N131	N138	column (100)
B41	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N133	N139	column (100)
B42	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	15,497	N135	N140	column (100)

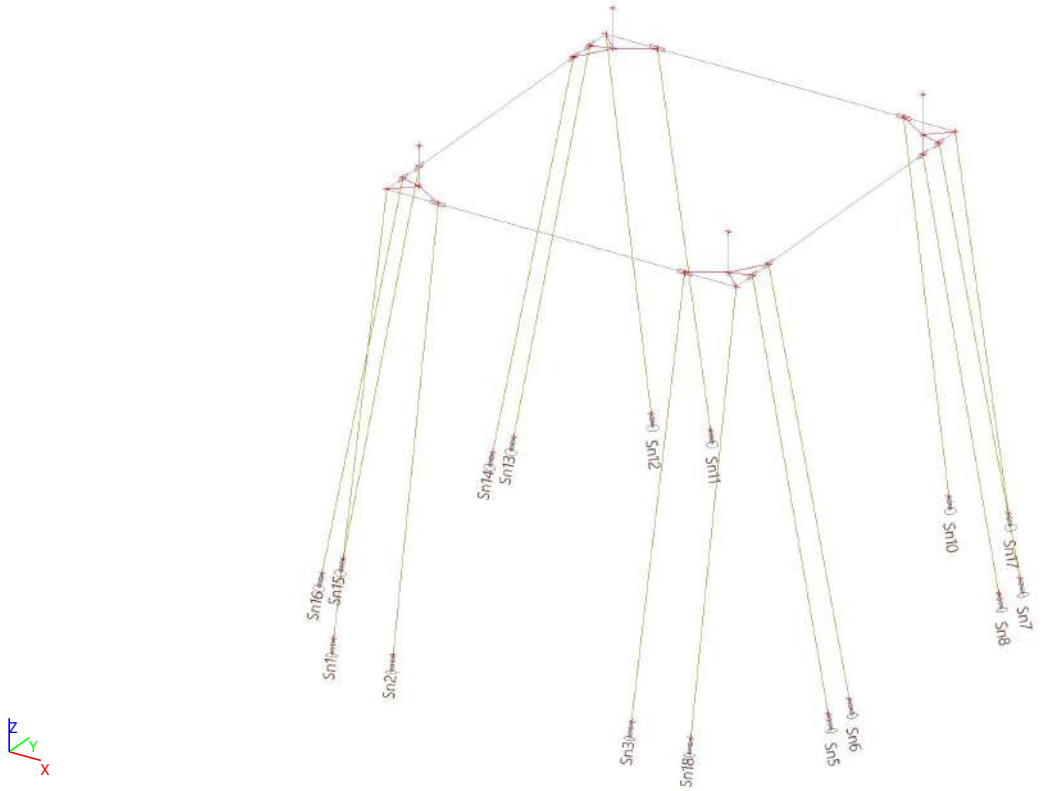
5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn1	1P3	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-11,31;Ry0,56
Sn2	N1	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-11,31;Ry-0,56
Sn3	N108	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-11,31;Ry0,56
Sn5	N111	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-0,56;Ry-11,31
Sn6	N114	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx0,56;Ry-11,31
Sn7	N119	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx0,56;Ry-11,31
Sn8	N120	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-0,56;Ry-11,31
Sn10	N124	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx11,31;Ry0,56
Sn11	N127	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx11,31;Ry-0,56
Sn12	N126	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx11,31;Ry0,56
Sn13	N129	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx0,56;Ry11,31
Sn14	N131	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-0,56;Ry11,31
Sn15	N133	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx0,56;Ry11,31
Sn16	N135	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-0,56;Ry11,31
Sn17	N122	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx11,31;Ry-0,56
Sn18	N106	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-11,31;Ry-0,56

5.6. Analyse model met Knoopondersteuningen



5.7. Line supports on member

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Veen	Line	B7 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen1	Line	B8 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen2	Line	B20 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen3	Line	B22 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen4	Line	B24 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen5	Line	B26 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen6	Line	B29 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen7	Line	B30 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen8	Line	B32 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen9	Line	B34 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen10	Line	B36 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen11	Line	B37 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen12	Line	B39 LCS	1,000 8,000	Abso From end	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen13	Line	B40	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From end						
Veen14	Line	B41	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From end						
Veen15	Line	B42	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From end						
(PY-curve-1_V1)	Line	B7	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)1	Line	B8	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)2	Line	B20	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)3	Line	B22	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)4	Line	B24	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)5	Line	B26	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)6	Line	B29	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)7	Line	B30	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)8	Line	B32	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)9	Line	B34	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)10	Line	B36	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)11	Line	B37	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)12	Line	B39	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)13	Line	B40	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)14	Line	B41	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V1)15	Line	B42	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From end						
(PY-curve-1_V2)16	Line	B7	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)17	Line	B8	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)18	Line	B20	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)19	Line	B22	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)20	Line	B24	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)21	Line	B26	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)22	Line	B29	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)23	Line	B30	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)24	Line	B32	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)25	Line	B34	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)26	Line	B36	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)27	Line	B37	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)28	Line	B39	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)29	Line	B40	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

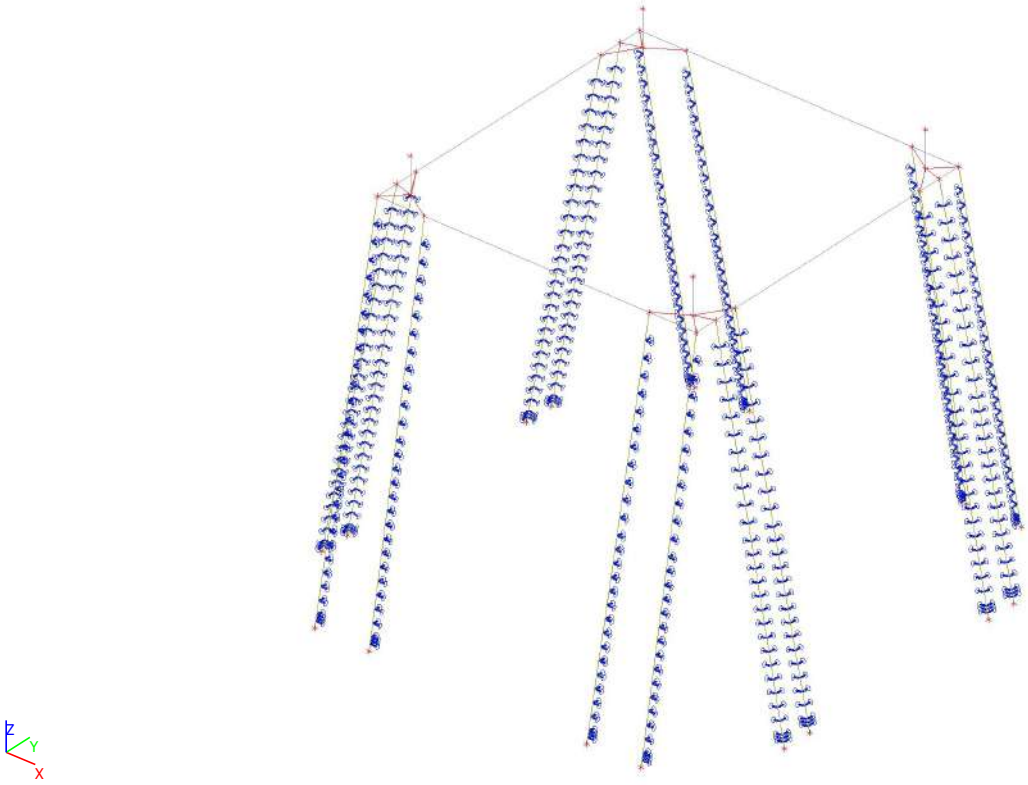
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	10,000	From end						
(PY-curve-1_V2)30	Line	B41	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V2)31	Line	B42	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From end						
(PY-curve-1_V3)	Line	B7	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)1	Line	B8	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)2	Line	B20	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)3	Line	B22	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)4	Line	B24	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)5	Line	B26	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)6	Line	B29	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)7	Line	B30	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)8	Line	B32	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)9	Line	B34	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)10	Line	B36	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)11	Line	B37	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)12	Line	B39	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)13	Line	B40	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)14	Line	B41	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V3)15	Line	B42	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From end						
(PY-curve-1_V4)	Line	B7	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)1	Line	B8	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)2	Line	B20	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)3	Line	B22	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)4	Line	B24	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)5	Line	B26	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)6	Line	B29	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)7	Line	B30	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)8	Line	B32	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)9	Line	B34	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)10	Line	B36	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)11	Line	B37	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)12	Line	B39	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)13	Line	B40	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	12,000	From end						
(PY-curve-1_V4)14	Line	B41	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V4)15	Line	B42	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From end						
(PY-curve-1_V5)	Line	B7	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)1	Line	B8	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)2	Line	B20	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)3	Line	B22	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)4	Line	B24	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)5	Line	B26	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)6	Line	B29	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)7	Line	B30	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)8	Line	B32	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)9	Line	B34	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)10	Line	B36	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)11	Line	B37	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)12	Line	B39	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)13	Line	B40	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)14	Line	B41	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V5)15	Line	B42	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From end						
(PY-curve-1_V6)	Line	B7	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)1	Line	B8	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)2	Line	B20	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)3	Line	B22	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)4	Line	B24	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)5	Line	B26	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)6	Line	B29	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)7	Line	B30	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)8	Line	B32	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)9	Line	B34	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)10	Line	B36	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)11	Line	B37	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)12	Line	B39	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)13	Line	B40	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

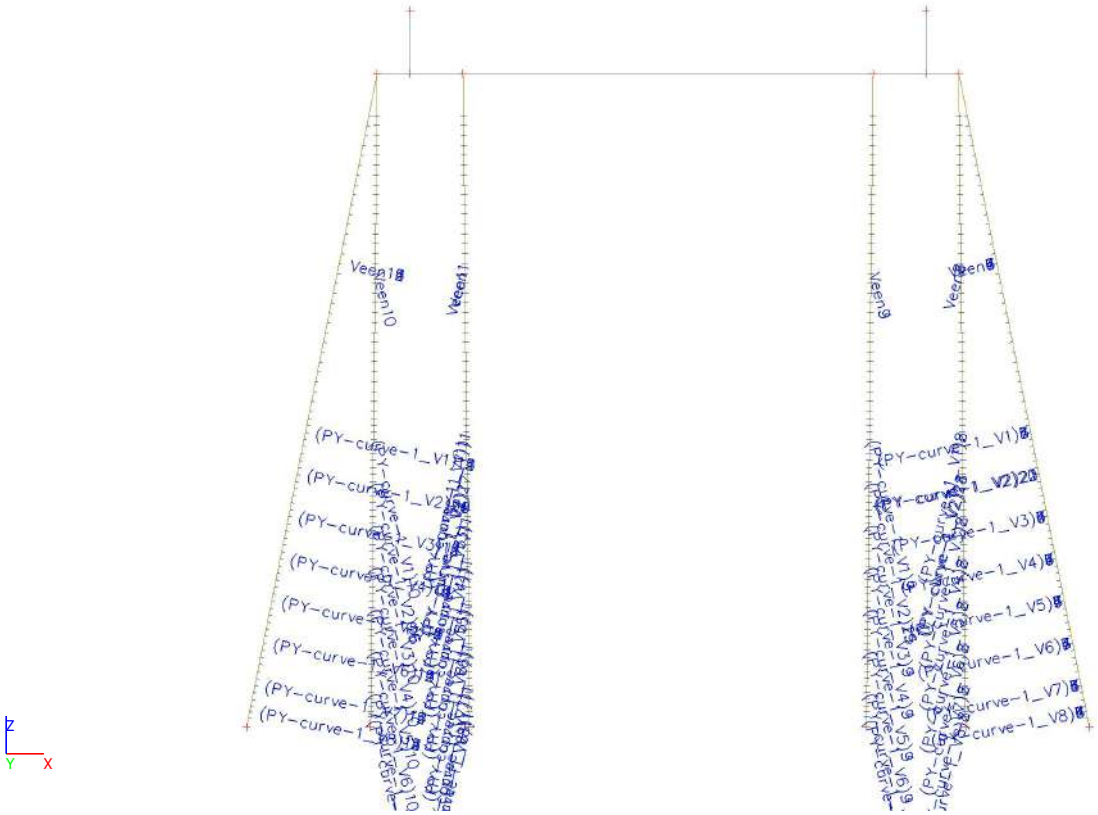
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	14,000	From end						
(PY-curve-1_V6)14	Line	B41	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V6)15	Line	B42	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From end						
(PY-curve-1_V7)	Line	B7	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)1	Line	B8	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)2	Line	B20	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)3	Line	B22	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)4	Line	B24	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)5	Line	B26	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)6	Line	B29	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)7	Line	B30	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)8	Line	B32	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)9	Line	B34	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)10	Line	B36	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)11	Line	B37	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)12	Line	B39	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)13	Line	B40	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)14	Line	B41	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V7)15	Line	B42	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From end						
(PY-curve-1_V8)	Line	B7	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)1	Line	B8	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)2	Line	B20	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)3	Line	B22	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)4	Line	B24	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)5	Line	B26	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)6	Line	B29	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)7	Line	B30	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)8	Line	B32	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)9	Line	B34	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)10	Line	B36	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)11	Line	B37	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)12	Line	B39	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)13	Line	B40	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	15,250	From end						
(PY-curve-1_V8)14	Line	B41	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						
(PY-curve-1_V8)15	Line	B42	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,250	From end						

5.8. Analyse model met Lijnondersteuningen



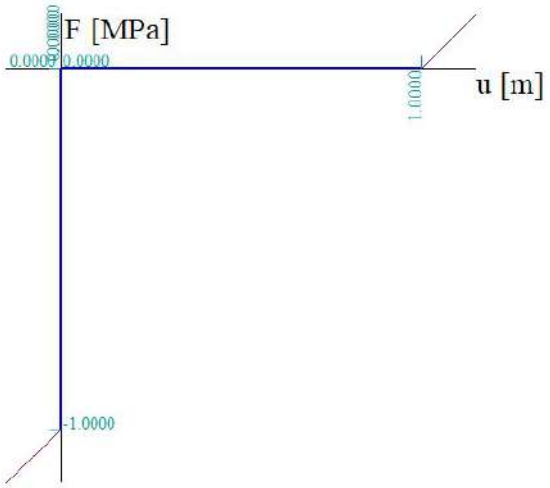
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

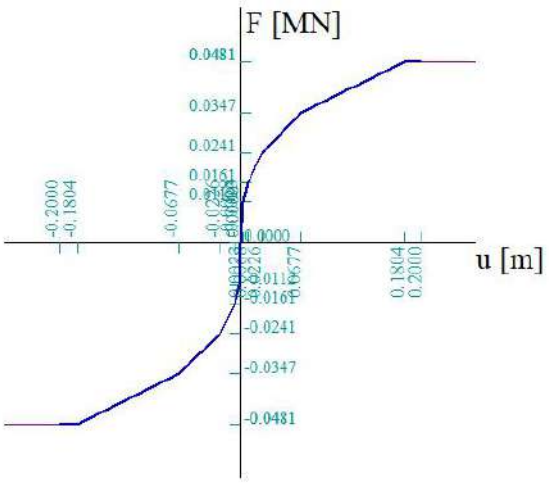
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -48130.000000	Free	Free
		-0.180400 / -48130.000000		
		-0.067650 / -34710.000000		
		-0.022550 / -24064.500000		
		-0.006765 / -16109.569000		

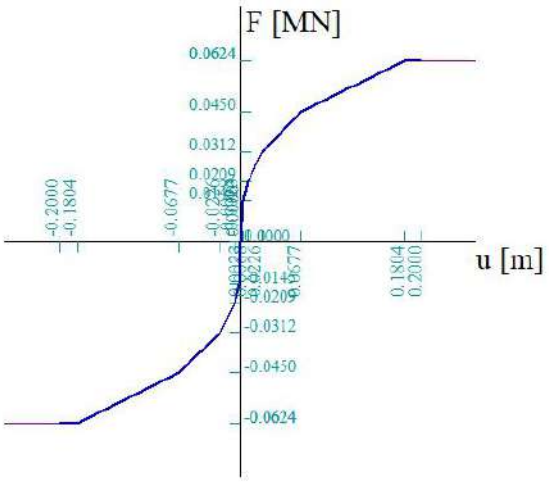
Name	Type	u / F	Positive end	Negative end
		-0.002255 / -11169.751000		
		0.000000 / 0.000000		
		0.002255 / 11169.751000		
		0.006765 / 16109.569000		
		0.022550 / 24064.500000		
		0.067650 / 34707.015000		
		0.180400 / 48129.000000		
		0.200000 / 48129.000000		

Drawing



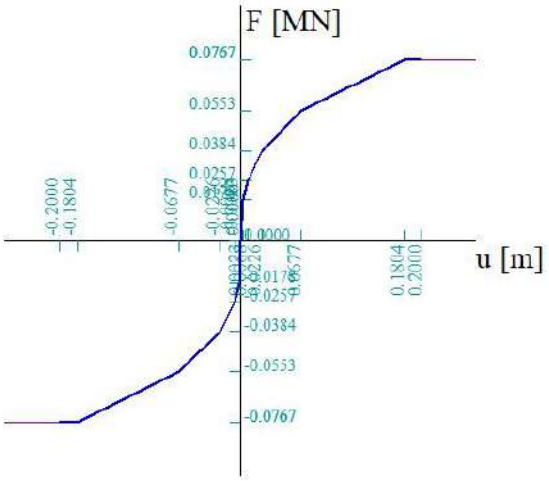
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -62400.000000	Free	Free
		-0.180400 / -62400.000000		
		-0.067650 / -45000.000000		
		-0.022550 / -31200.000000		
		-0.006765 / -20900.000000		
		-0.002255 / -14500.000000		
		0.000000 / 0.000000		
		0.002255 / 14490.000000		
		0.006765 / 20900.000000		
		0.022550 / 31220.000000		
		0.067650 / 45020.000000		
		0.180400 / 62430.000000		
		0.200000 / 62430.000000		

Drawing



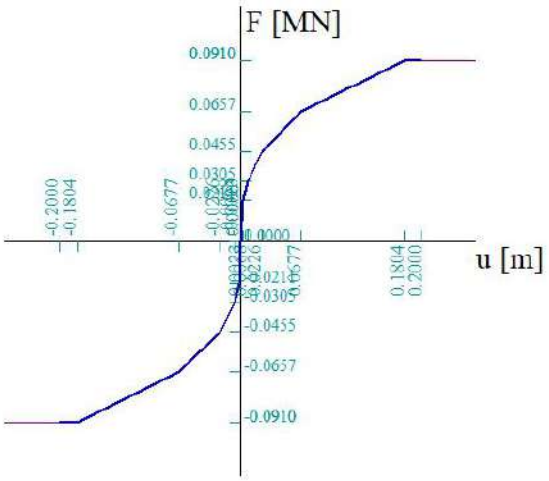
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -76737.000000	Free	Free
		-0.180400 / -76737.000000		
		-0.067650 / -55336.953000		
		-0.022550 / -38368.500000		
		-0.006765 / -25685.138000		
		-0.002255 / -17809.080000		
		0.000000 / 0.000000		
		0.002255 / 17809.080000		
		0.006765 / 25685.138000		
		0.022550 / 38368.500000		
		0.067650 / 55336.953000		
		0.180400 / 76737.000000		
		0.200000 / 76737.000000		

Drawing



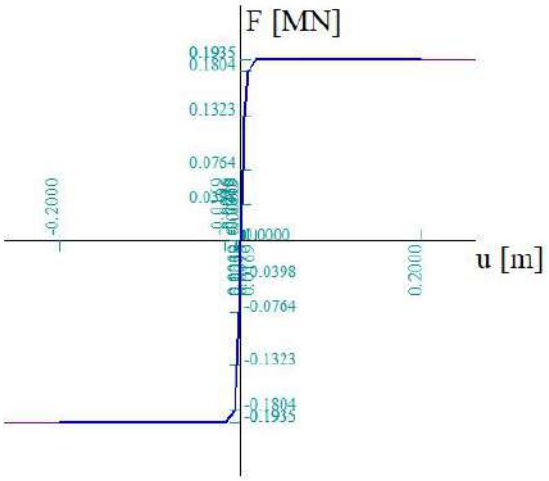
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -91041.000000	Free	Free
		-0.180400 / -91041.000000		
		-0.067650 / -65651.922000		
		-0.022550 / -45520.500000		
		-0.006765 / -30472.923000		
		-0.002255 / -21128.744000		
		0.000000 / 0.000000		
		0.002255 / 21128.744000		
		0.006765 / 30472.923000		
		0.022550 / 45520.500000		
		0.067650 / 65651.922000		
		0.180400 / 91041.000000		
		0.200000 / 91041.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -193489.147000	Free	Free
		-0.016913 / -193489.147000		
		-0.007517 / -180407.835000		
		-0.003758 / -132256.824000		
		-0.001879 / -76421.758000		
		-0.000940 / -39826.202000		
		0.000000 / 0.000000		
		0.000940 / 39826.202000		
		0.001879 / 76421.758000		
		0.003758 / 132256.824000		
		0.007517 / 180407.835000		
		0.016913 / 193489.147000		
		0.200000 / 193489.147000		

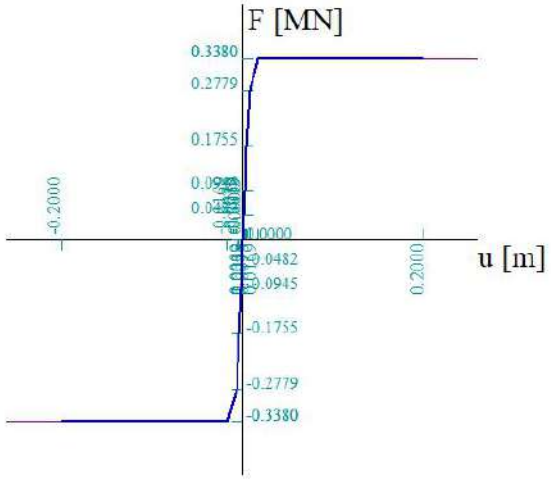
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -338024.958000	Free	Free
		-0.016913 / -338024.958000		
		-0.007517 / -277917.886000		
		-0.003758 / -175526.039000		
		-0.001879 / -94450.113000		
		-0.000940 / -48160.629000		
		0.000000 / 0.000000		
		0.000940 / 48160.629000		
		0.001879 / 94450.113000		
		0.003758 / 175526.039000		

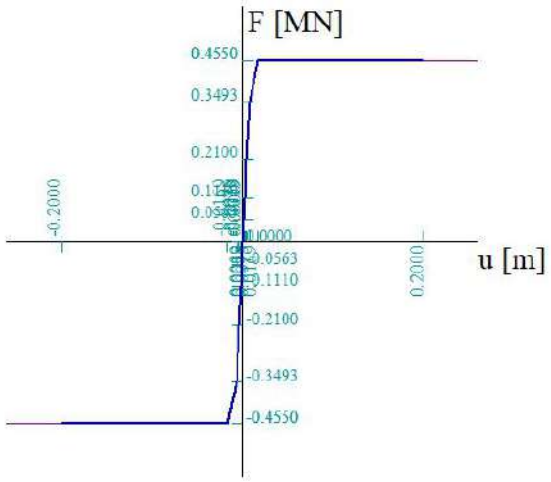
Name	Type	u / F	Positive end	Negative end
		0.007517 / 277917.886000		
		0.016913 / 338024.958000		
		0.200000 / 338024.958000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -454964.396000	Free	Free
		-0.016913 / -454964.396000		
		-0.007517 / -349336.178000		
		-0.003758 / -210048.905000		
		-0.001879 / -110961.163000		
		-0.000940 / -56287.593000		
		0.000000 / 0.000000		
		0.000940 / 56287.593000		
		0.001879 / 110961.163000		
		0.003758 / 210048.905000		
		0.007517 / 349336.178000		
		0.016913 / 454964.396000		
		0.200000 / 454964.396000		

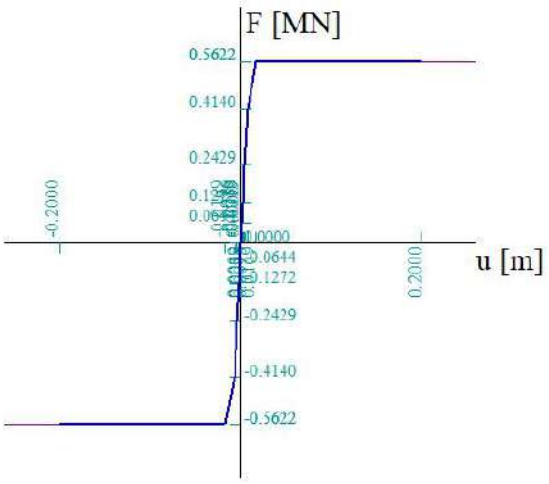
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -562170.498000	Free	Free
		-0.016913 / -562170.498000		
		-0.007517 / -413992.721000		
		-0.003758 / -242873.332000		

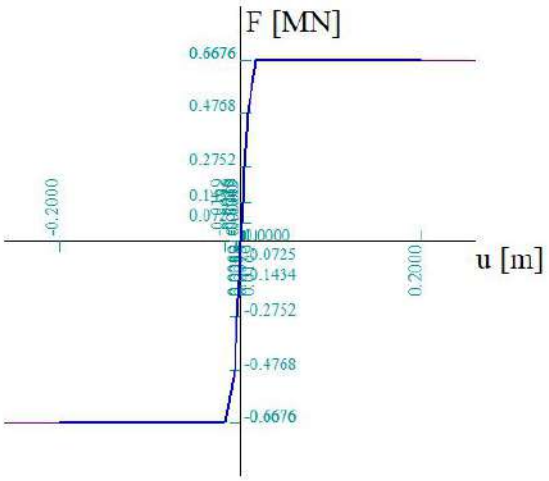
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -127210.864000		
		-0.000940 / -64380.055000		
		0.000000 / 0.000000		
		0.000940 / 64380.055000		
		0.001879 / 127210.864000		
		0.003758 / 242873.332000		
		0.007517 / 413992.721000		
		0.016913 / 562170.498000		
		0.200000 / 562170.498000		

Drawing



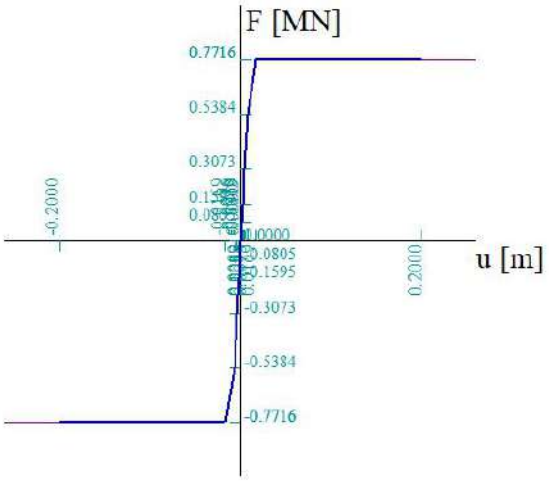
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -667564.512000	Free	Free
		-0.016913 / -667564.512000		
		-0.007517 / -476770.926000		
		-0.003758 / -275233.374000		
		-0.001879 / -143390.211000		
		-0.000940 / -72463.274000		
		0.000000 / 0.000000		
		0.000940 / 72463.274000		
		0.001879 / 143390.211000		
		0.003758 / 275233.374000		
		0.007517 / 476770.926000		
		0.016913 / 667564.512000		
		0.200000 / 667564.512000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -771639.629000	Free	Free
		-0.016913 / -771639.629000		
		-0.007517 / -538432.081000		
		-0.003758 / -307337.483000		
		-0.001879 / -159531.700000		
		-0.000940 / -80541.551000		
		0.000000 / 0.000000		
		0.000940 / 80541.551000		
		0.001879 / 159531.700000		
		0.003758 / 307337.483000		
		0.007517 / 538432.081000		
		0.016913 / 771639.629000		
		0.200000 / 771639.629000		

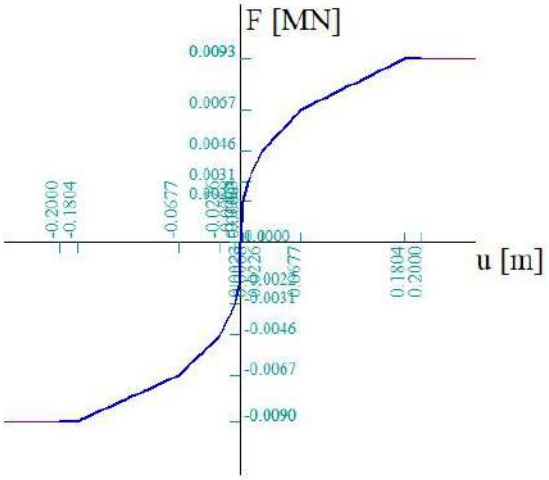
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -9000.000000	Free	Free
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		
		-0.006765 / -3100.000000		
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		

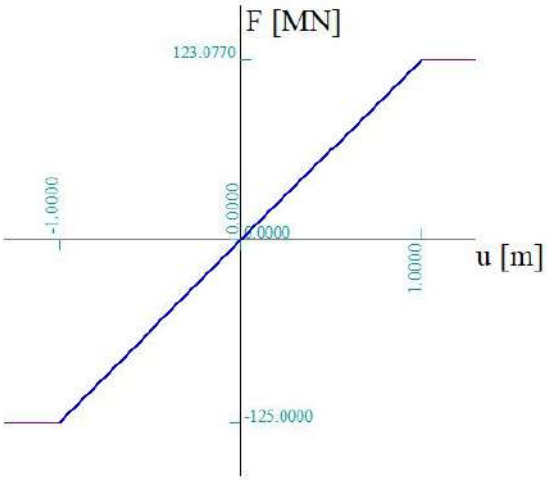
Name	Type	u / F	Positive end	Negative end
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
Trek-druk-S+paalpunt	Translation	-1.000000 / -125000000.000000	Free	Free
		0.000000 / 0.000000		
		1.000000 / 123077000.000000		

Drawing

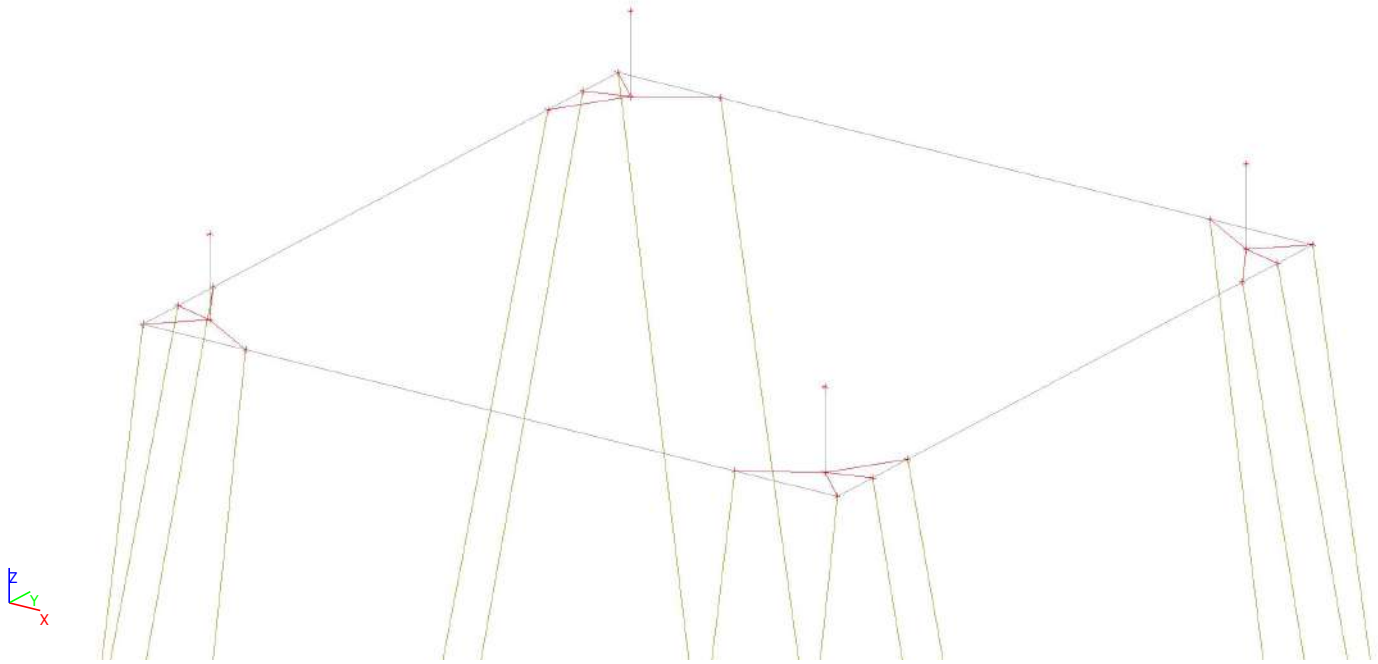


6. Belastingen

6.1. Load cases

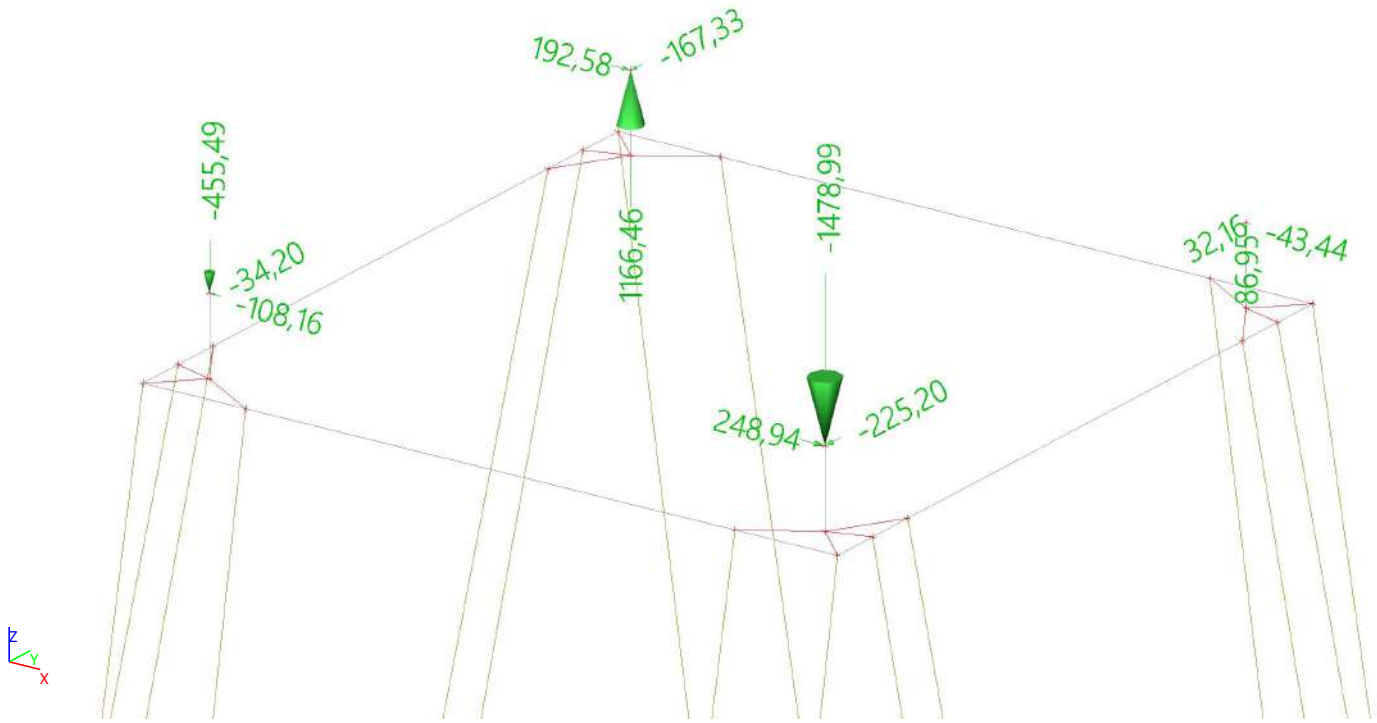
6.1.1. Load cases - E.G.

Name	Description	Action type	Load group	Direction
	Spec	Load type		
E.G.		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - high max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			

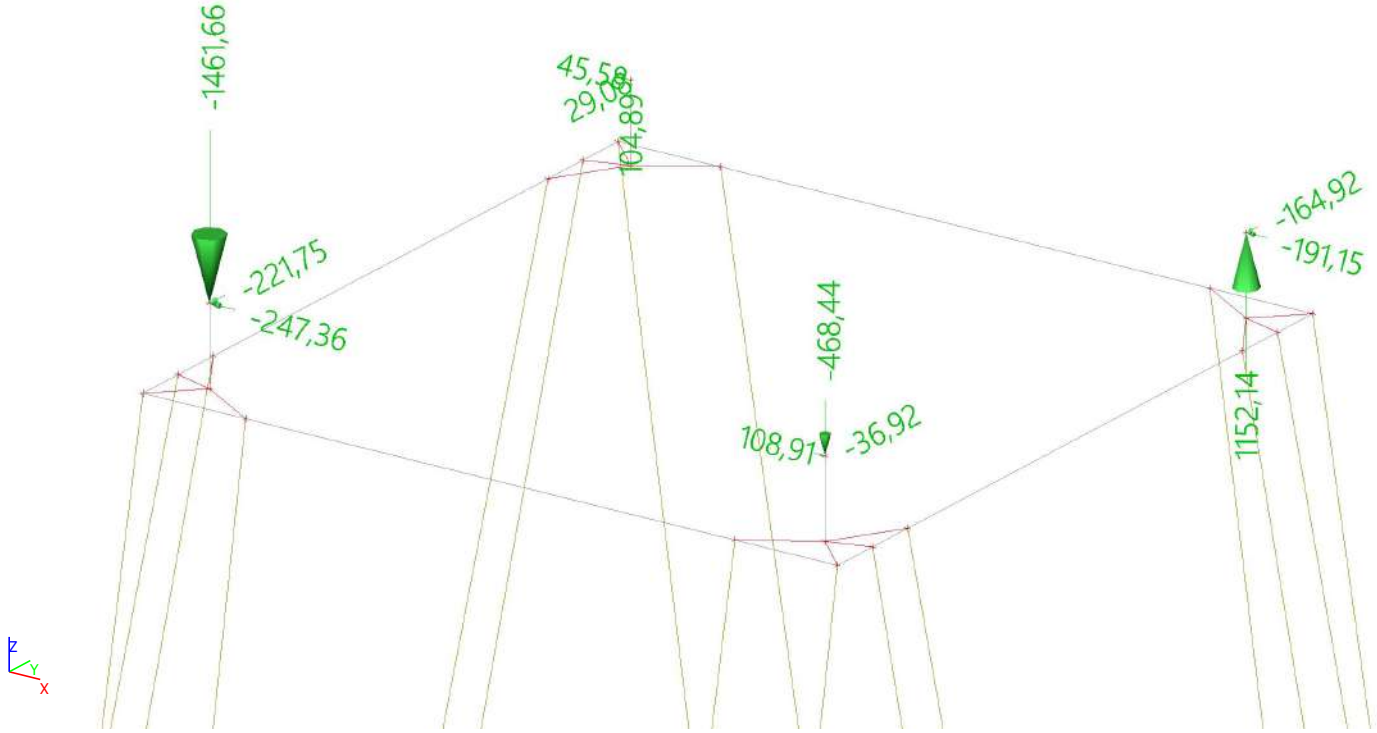


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Force	248,94
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Force	-225,20
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Force	-1478,99
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Force	-108,16
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Force	-34,20
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Force	-455,49
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Force	192,58
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Force	-167,33
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Force	1166,46
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Force	-43,44
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Force	32,16
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Force	86,95

6.1.3. Load cases - high max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



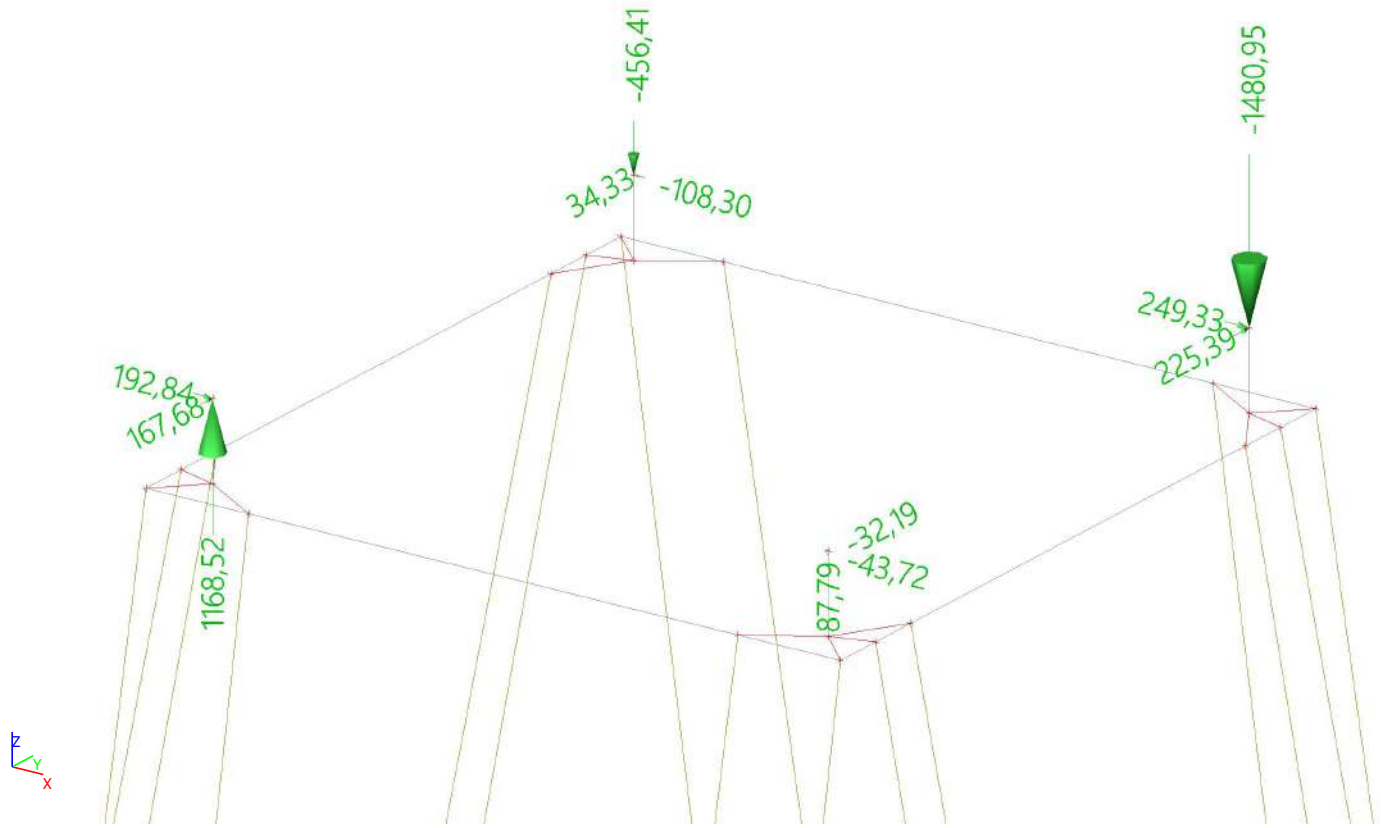
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Force	-247,36
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Force	-221,75
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Force	-1461,66
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Force	45,58
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Force	29,08
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Force	104,89
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Force	-191,15
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Force	-164,92
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Force	1152,14
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Force	108,91
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Force	-36,92

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Force	-468,44

6.1.4. Load cases - high max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



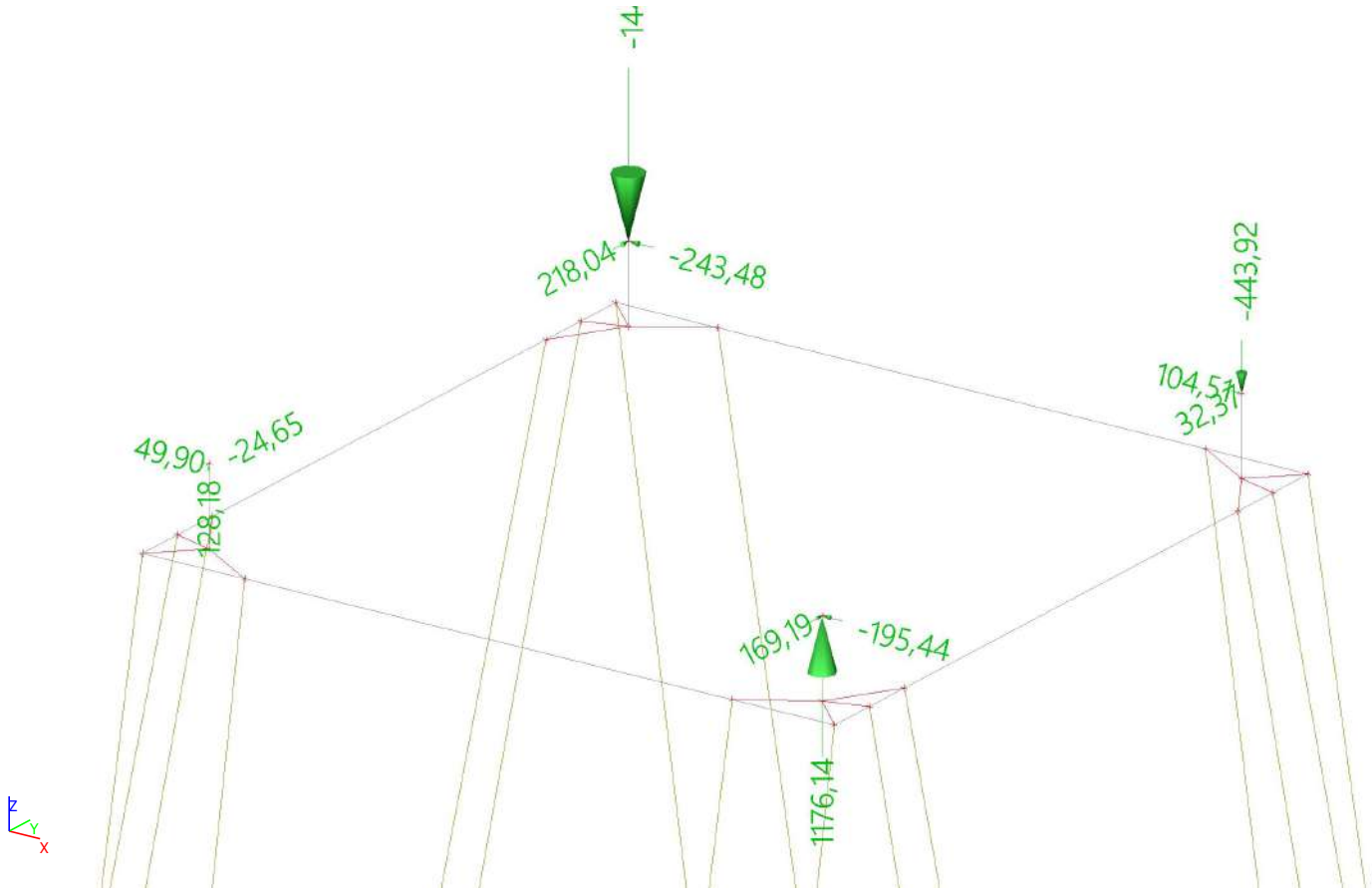
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Force	249,33
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Force	225,39
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Force	-1480,95
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Force	192,84
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Force	167,68
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Force	1168,52
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Force	-108,30
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Force	34,33

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Force	-456,41
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Force	-43,72
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Force	-32,19
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Force	87,79

6.1.5. Load cases - low max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



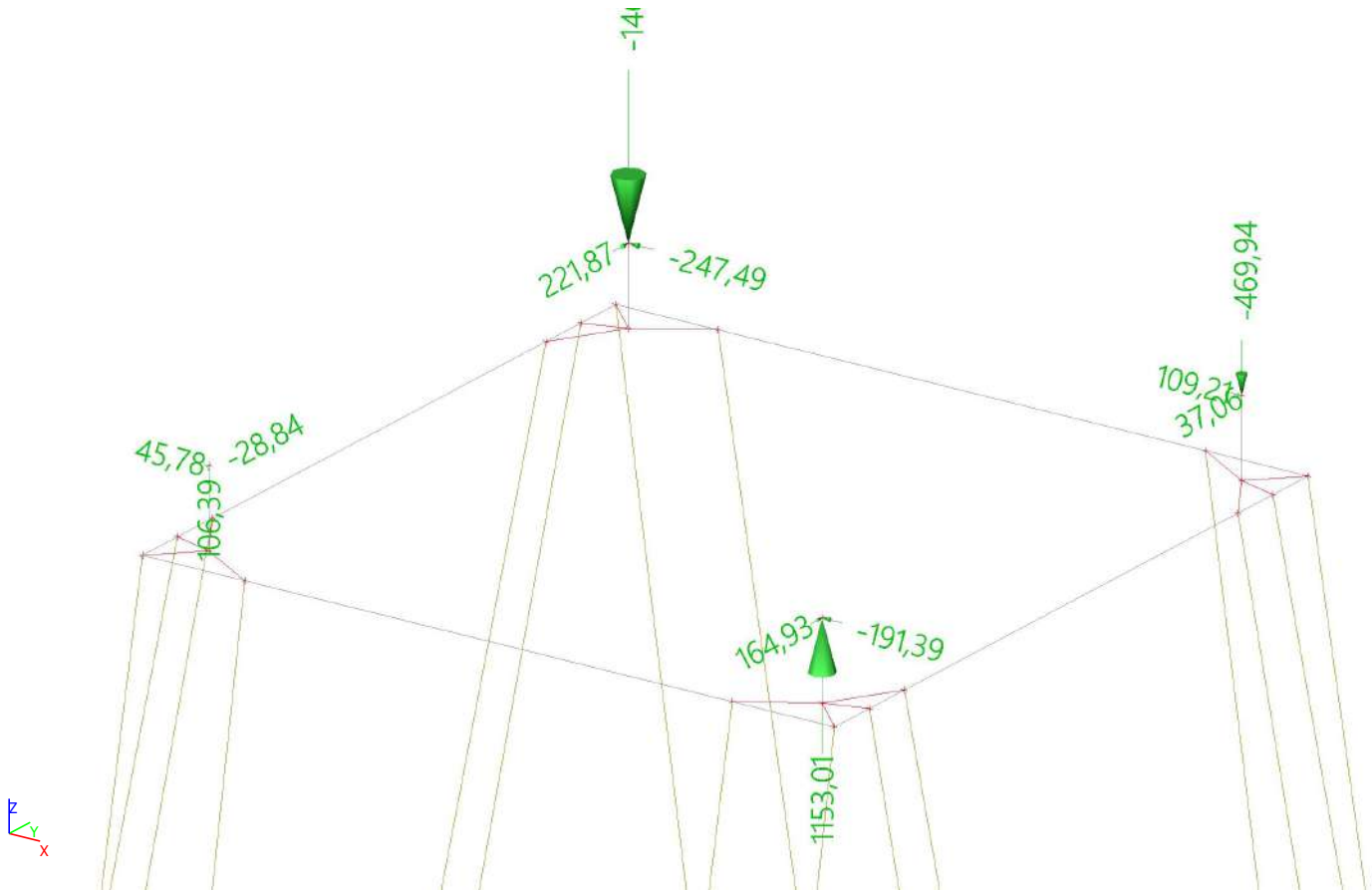
6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Force	-195,44
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Force	169,19
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Force	1176,14
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Force	49,90
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Force	-24,65

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Force	128,18
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Force	-243,48
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Force	218,04
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Force	-1440,00
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Force	104,51
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Force	32,37
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Force	-443,92

6.1.6. Load cases - high max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			

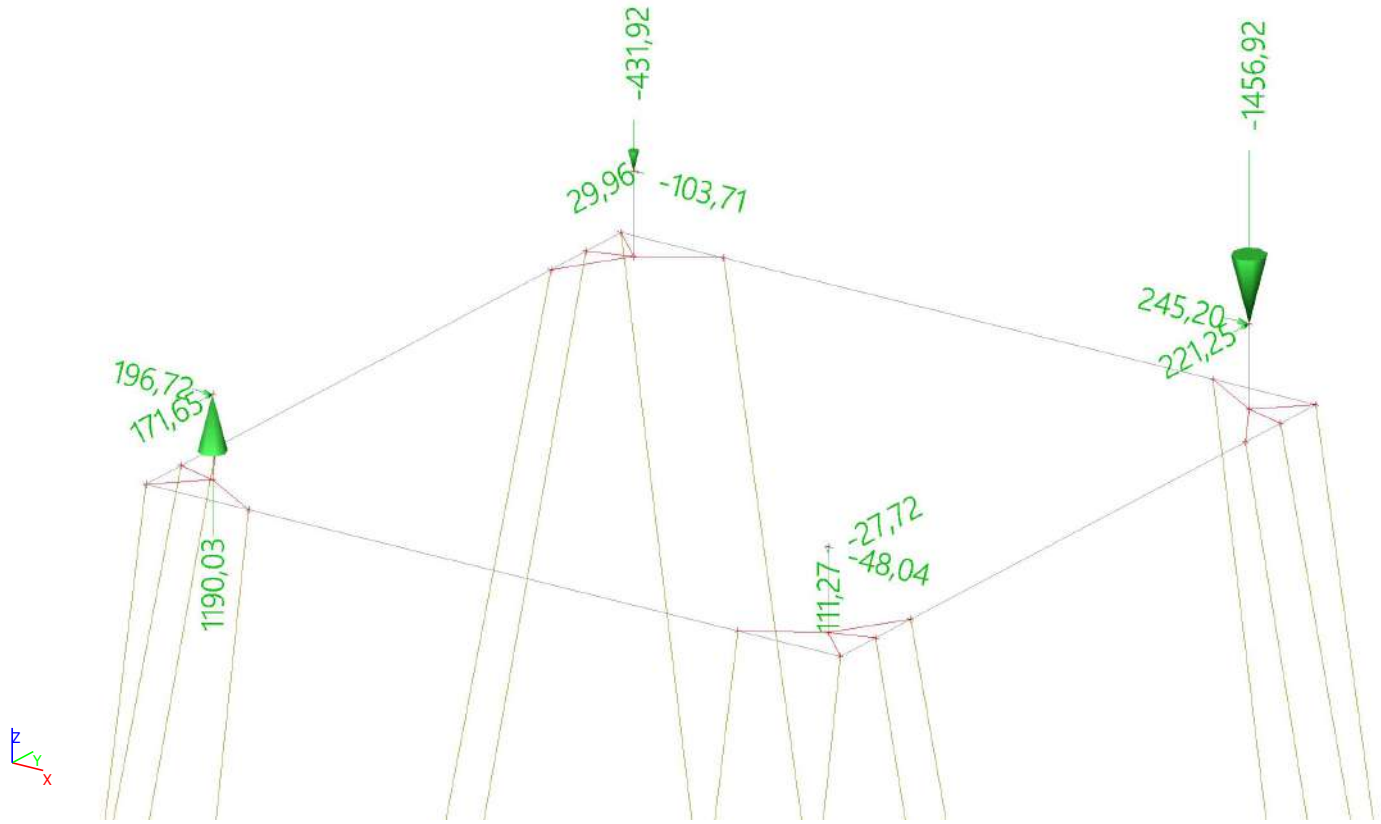


6.1.6.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Force	-247,49
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Force	221,87
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Force	-1462,50
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Force	45,78
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Force	-28,84
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Force	106,39
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Force	109,21
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Force	37,06
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Force	-469,94
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Force	-191,39
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Force	164,93
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Force	1153,01

6.1.7. Load cases - low max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			

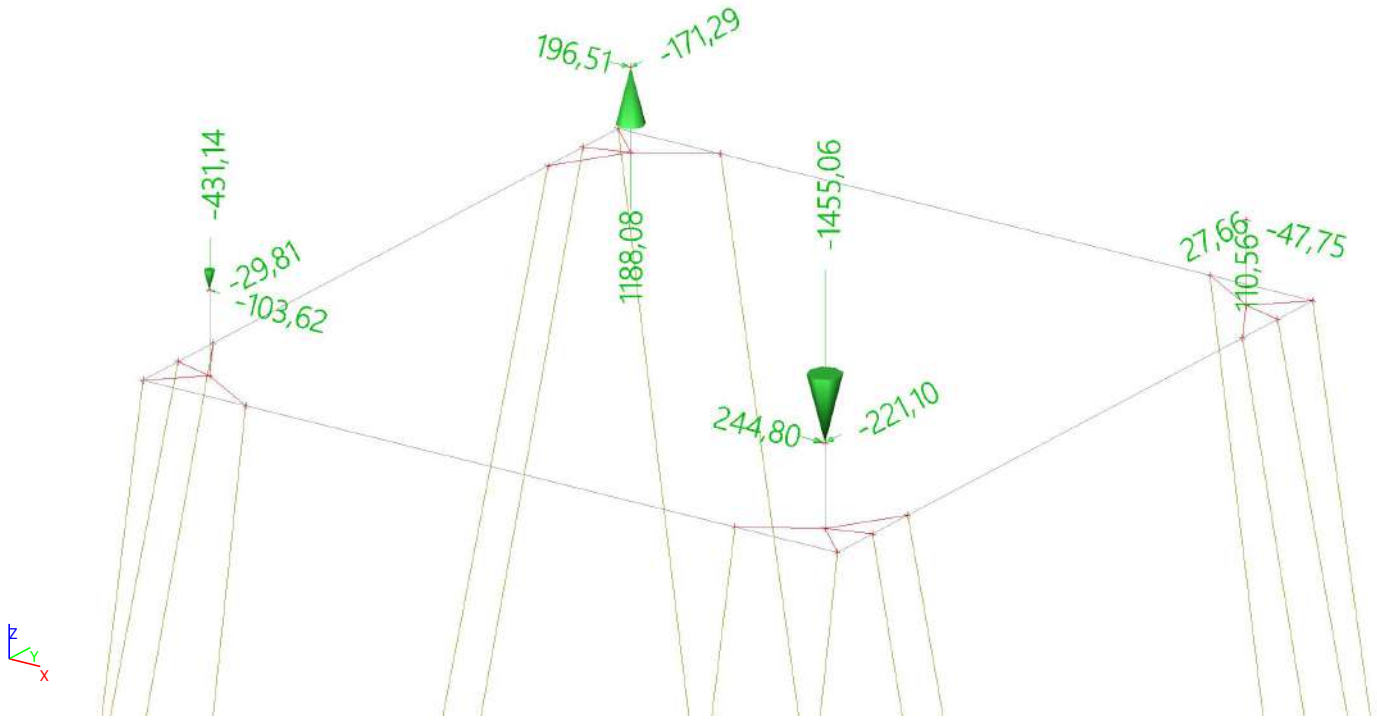


6.1.7.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Force	196,72
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Force	171,65
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Force	1190,03
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Force	-103,71
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Force	29,96
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Force	-431,92
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Force	245,20
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Force	221,25
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Force	-1456,92
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Force	-48,04
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Force	-27,72
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Force	111,27

6.1.8. Load cases - low max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



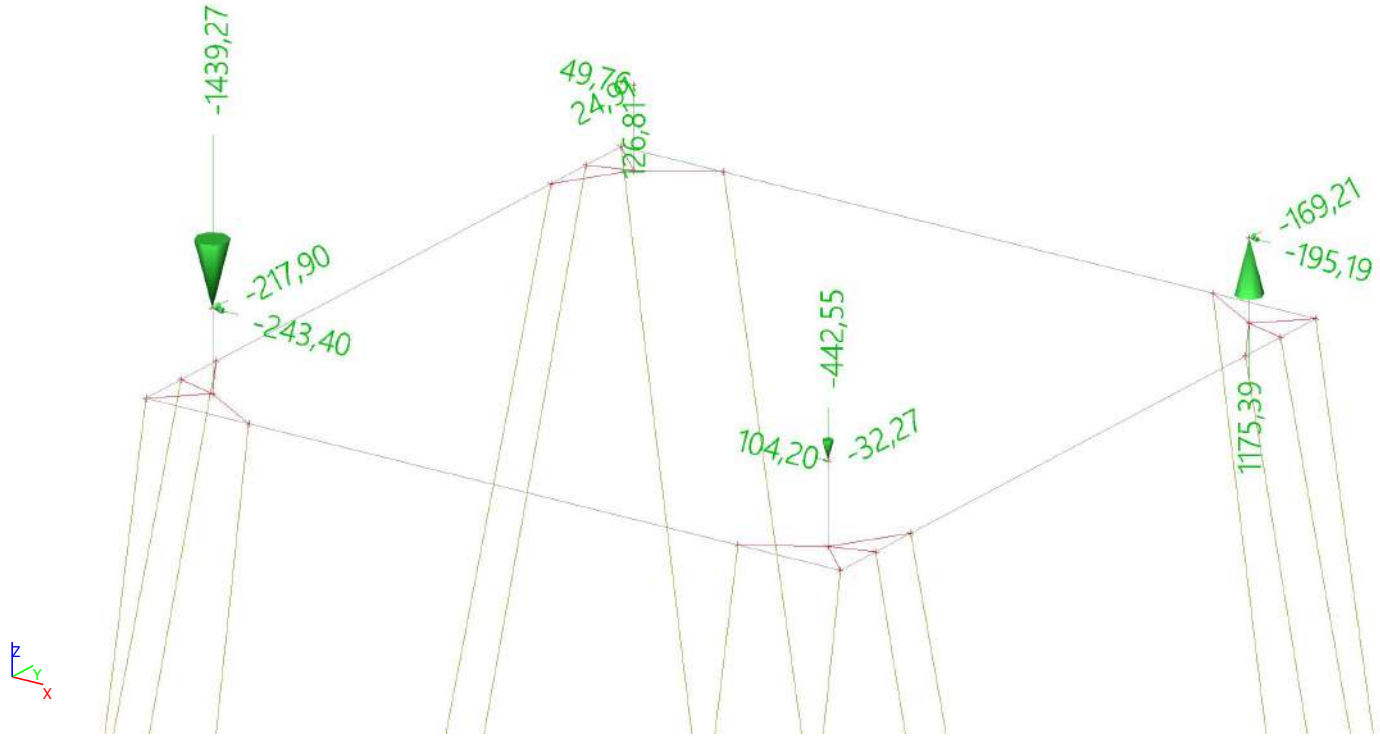
6.1.8.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Force	196,51
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Force	-171,29
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Force	1188,08
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Force	-103,62
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Force	-29,81
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Force	-431,14
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Force	-47,75
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Force	27,66
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Force	110,56
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Force	244,80
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Force	-221,10

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Force	-1455,06

6.1.9. Load cases - low max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



6.1.9.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Force	-195,19
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Force	-169,21
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Force	1175,39
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Force	-243,40
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Force	-217,90
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Force	-1439,27
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Force	49,76
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Force	24,91

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Force	126,81
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Force	104,20
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Force	-32,27
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Force	-442,55

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
low max Wnd ;45°	Ultimate	E.G.	0,900
		low max Wnd ;45°	1,000
high max Wnd ;225°	Ultimate	E.G.	1,200
		high max Wnd ;225°	1,000
high max Wnd ;315°	Ultimate	E.G.	1,200
		high max Wnd ;315°	1,000
high max Wnd ;135°	Ultimate	E.G.	1,200
		high max Wnd ;135°	1,000
high max Wnd ;45°	Ultimate	E.G.	1,200
		high max Wnd ;45°	1,000
low max Wnd ;135°	Ultimate	E.G.	0,900
		low max Wnd ;135°	1,000
low max Wnd ;225°	Ultimate	E.G.	0,900
		low max Wnd ;225°	1,000
low max Wnd ;315°	Ultimate	E.G.	0,900
		low max Wnd ;315°	1,000

6.3. Result classes

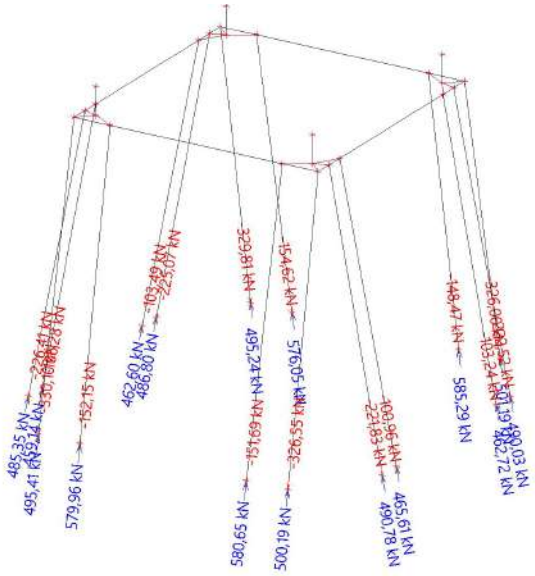
Name	List
All non-linear	low max Wnd ;45°
	high max Wnd ;225°
	high max Wnd ;315°
	high max Wnd ;135°
	high max Wnd ;45°
	low max Wnd ;135°
	low max Wnd ;225°
	low max Wnd ;315°

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn8/N120	high max Wnd ;135°	**0,00**	0,00	462,72	0,00	0,00	0,00	0,0	0,0
Sn14/N131	high max Wnd ;45°	**0,00**	0,00	462,60	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn11/N127	low max Wnd ;45°	0,00	**0,00**	520,56	0,00	0,00	0,00	0,0	0,0
Sn3/N108	low max Wnd ;225°	0,00	**0,00**	524,78	0,00	0,00	0,00	0,0	0,0
Sn10/N124	high max Wnd ;135°	0,00	0,00	**585,29**	0,00	0,00	0,00	0,0	0,0
Sn1/1P3	low max Wnd ;135°	0,00	0,00	**-330,10**	0,00	0,00	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen
Nodal reactions

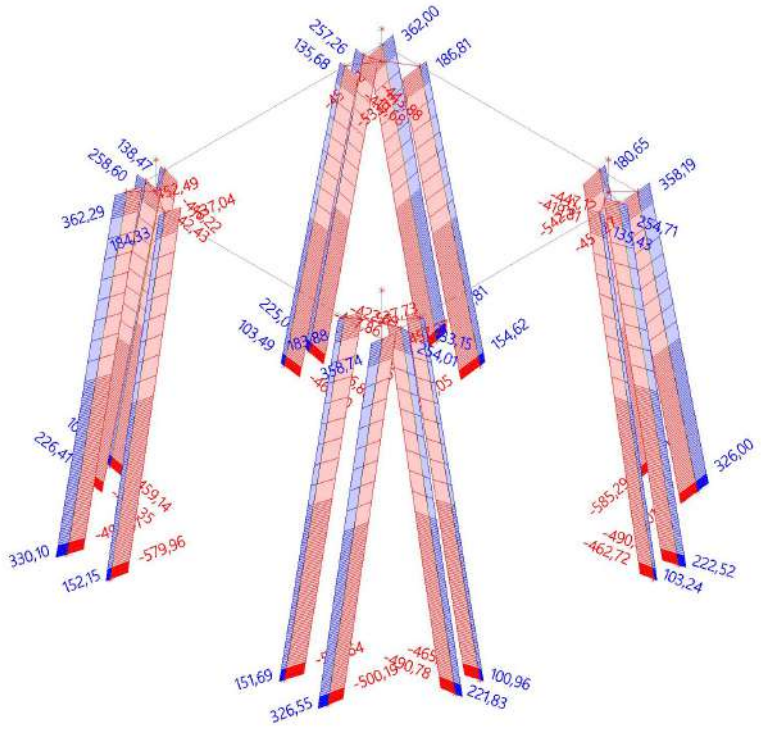
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn1/1P3	low max Wnd ;315°	0,00	**0,00**	477,14	0,00	0,00	0,00	0,0	0,0
Sn1/1P3	high max Wnd ;315°	**0,00**	0,00	**495,41**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn1/1P3	low max Wnd ;135°	**0,00**	**0,00**	**-330,10**	0,00	0,00	**0,00**	0,0	0,0
Sn2/N1	low max Wnd ;315°	0,00	**0,00**	523,42	0,00	0,00	0,00	0,0	0,0
Sn2/N1	high max Wnd ;135°	0,00	**0,00**	-95,65	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn2/N1	low max Wnd ;135°	**0,00**	0,00	**-152,15**	0,00	0,00	0,00	0,0	0,0
Sn2/N1	high max Wnd ;315°	**0,00**	0,00	**579,96**	0,00	0,00	**0,00**	0,0	0,0
Sn18/N106	high max Wnd ;225°	0,00	**0,00**	**500,19**	0,00	0,00	0,00	0,0	0,0
Sn18/N106	high max Wnd ;45°	0,00	**0,00**	-307,71	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn18/N106	low max Wnd ;45°	**0,00**	0,00	**-326,55**	0,00	0,00	0,00	0,0	0,0
Sn18/N106	low max Wnd ;225°	**0,00**	0,00	481,61	0,00	0,00	**0,00**	0,0	0,0
Sn3/N108	high max Wnd ;135°	0,00	**0,00**	146,95	0,00	0,00	0,00	0,0	0,0
Sn3/N108	low max Wnd ;225°	**0,00**	**0,00**	524,78	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn3/N108	high max Wnd ;225°	0,00	0,00	**580,65**	0,00	0,00	0,00	0,0	0,0
Sn3/N108	low max Wnd ;45°	**0,00**	0,00	**-151,69**	0,00	0,00	**0,00**	0,0	0,0
Sn5/N111	low max Wnd ;45°	**0,00**	**0,00**	**-221,83**	0,00	0,00	0,00	0,0	0,0
Sn5/N111	high max Wnd ;225°	0,00	**0,00**	**490,78**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn5/N111	low max Wnd ;225°	**0,00**	0,00	456,99	0,00	0,00	**0,00**	0,0	0,0
Sn6/N114	high max Wnd ;315°	**0,00**	0,00	256,37	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn6/N114	high max Wnd ;225°	0,00	**0,00**	**465,61**	0,00	0,00	0,00	0,0	0,0
Sn6/N114	low max Wnd ;45°	0,00	**0,00**	**-100,96**	0,00	0,00	0,00	0,0	0,0
Sn6/N114	low max Wnd ;225°	**0,00**	0,00	416,90	0,00	0,00	**0,00**	0,0	0,0
Sn7/N119	high max Wnd ;135°	0,00	**0,00**	**490,03**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn7/N119	low max Wnd ;315°	**0,00**	**0,00**	**-222,52**	0,00	0,00	0,00	0,0	0,0
Sn7/N119	low max Wnd ;135°	**0,00**	0,00	456,57	0,00	0,00	**0,00**	0,0	0,0
Sn8/N120	low max Wnd ;45°	**0,00**	0,00	205,18	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn8/N120	low max Wnd ;315°	0,00	**0,00**	**-103,24**	0,00	0,00	0,00	0,0	0,0
Sn8/N120	high max Wnd ;135°	**0,00**	**0,00**	**462,72**	0,00	0,00	**0,00**	0,0	0,0
Sn17/N122	high max Wnd ;315°	0,00	**0,00**	-307,00	0,00	0,00	0,00	0,0	0,0
Sn17/N122	low max Wnd ;45°	0,00	**0,00**	186,20	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn17/N122	low max Wnd ;315°	**0,00**	0,00	**-326,00**	0,00	0,00	0,00	0,0	0,0
Sn17/N122	high max Wnd ;135°	**0,00**	0,00	**501,19**	0,00	0,00	**0,00**	0,0	0,0
Sn10/N124	low max Wnd ;135°	0,00	**0,00**	528,31	0,00	0,00	0,00	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn10/N124	high max Wnd ;135°	**0,00**	**0,00**	**585,29**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn10/N124	low max Wnd ;315°	**0,00**	0,00	**-148,47**	0,00	0,00	**0,00**	0,0	0,0
Sn12/N126	low max Wnd ;45°	**0,00**	0,00	477,07	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn12/N126	low max Wnd ;315°	0,00	**0,00**	-19,32	0,00	0,00	0,00	0,0	0,0
Sn12/N126	low max Wnd ;225°	0,00	0,00	**-329,81**	0,00	0,00	0,00	0,0	0,0
Sn12/N126	high max Wnd ;45°	0,00	**0,00**	**495,24**	0,00	0,00	0,00	0,0	0,0
Sn12/N126	high max Wnd ;225°	**0,00**	0,00	-311,41	0,00	0,00	**0,00**	0,0	0,0
Sn11/N127	high max Wnd ;315°	0,00	**0,00**	142,58	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn11/N127	low max Wnd ;225°	**0,00**	0,00	**-154,62**	0,00	0,00	0,00	0,0	0,0
Sn11/N127	high max Wnd ;45°	0,00	0,00	**576,05**	0,00	0,00	0,00	0,0	0,0
Sn11/N127	low max Wnd ;45°	**0,00**	**0,00**	520,56	0,00	0,00	**0,00**	0,0	0,0
Sn13/N129	high max Wnd ;135°	**0,00**	0,00	195,14	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn13/N129	high max Wnd ;45°	0,00	**0,00**	**486,80**	0,00	0,00	0,00	0,0	0,0
Sn13/N129	high max Wnd ;225°	0,00	**0,00**	-192,31	0,00	0,00	0,00	0,0	0,0
Sn13/N129	low max Wnd ;225°	**0,00**	0,00	**-225,07**	0,00	0,00	**0,00**	0,0	0,0
Sn14/N131	low max Wnd ;225°	0,00	**0,00**	**-103,49**	0,00	0,00	0,00	0,0	0,0
Sn14/N131	high max Wnd ;45°	**0,00**	**0,00**	**462,60**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn14/N131	high max Wnd ;135°	**0,00**	0,00	254,21	0,00	0,00	**0,00**	0,0	0,0
Sn15/N133	low max Wnd ;315°	**0,00**	0,00	411,60	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn15/N133	high max Wnd ;315°	0,00	**0,00**	**459,14**	0,00	0,00	0,00	0,0	0,0
Sn15/N133	low max Wnd ;135°	0,00	**0,00**	**-106,28**	0,00	0,00	0,00	0,0	0,0
Sn15/N133	high max Wnd ;225°	**0,00**	0,00	250,75	0,00	0,00	**0,00**	0,0	0,0
Sn16/N135	low max Wnd ;135°	0,00	**0,00**	**-226,41**	0,00	0,00	0,00	0,0	0,0
Sn16/N135	high max Wnd ;315°	**0,00**	**0,00**	**485,35**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn16/N135	high max Wnd ;225°	**0,00**	0,00	193,71	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

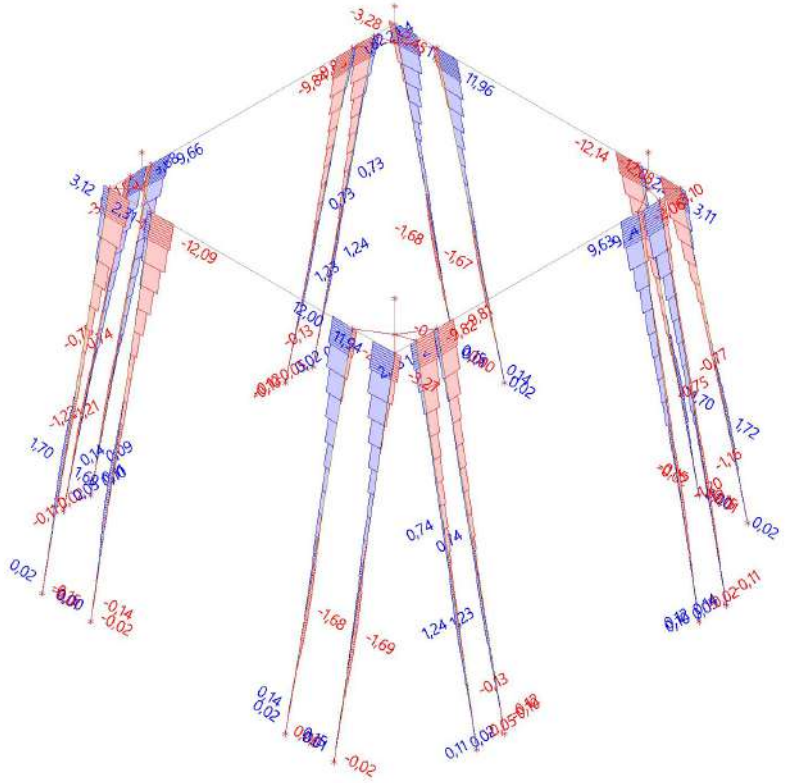
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



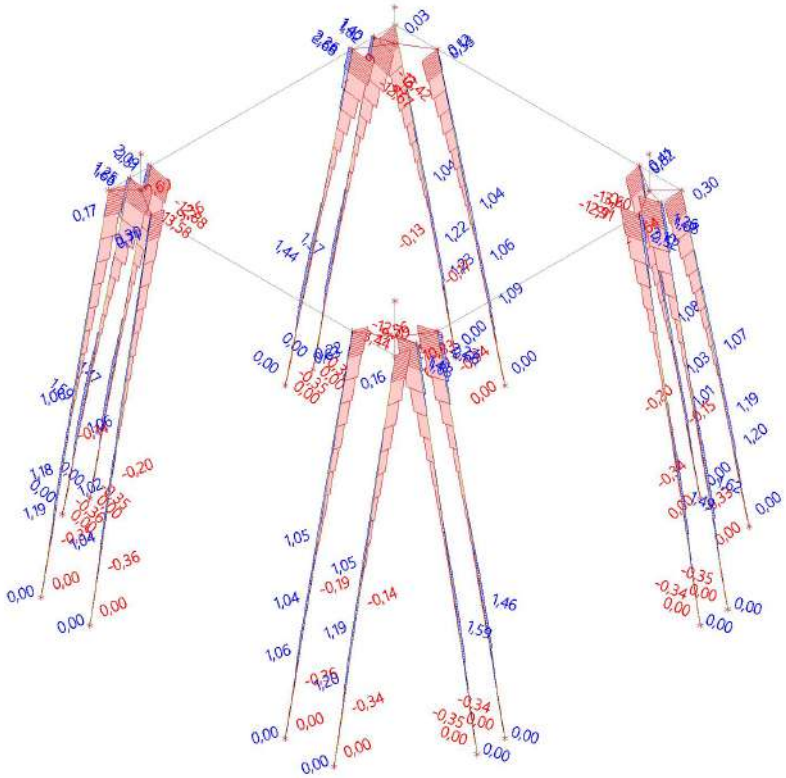
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



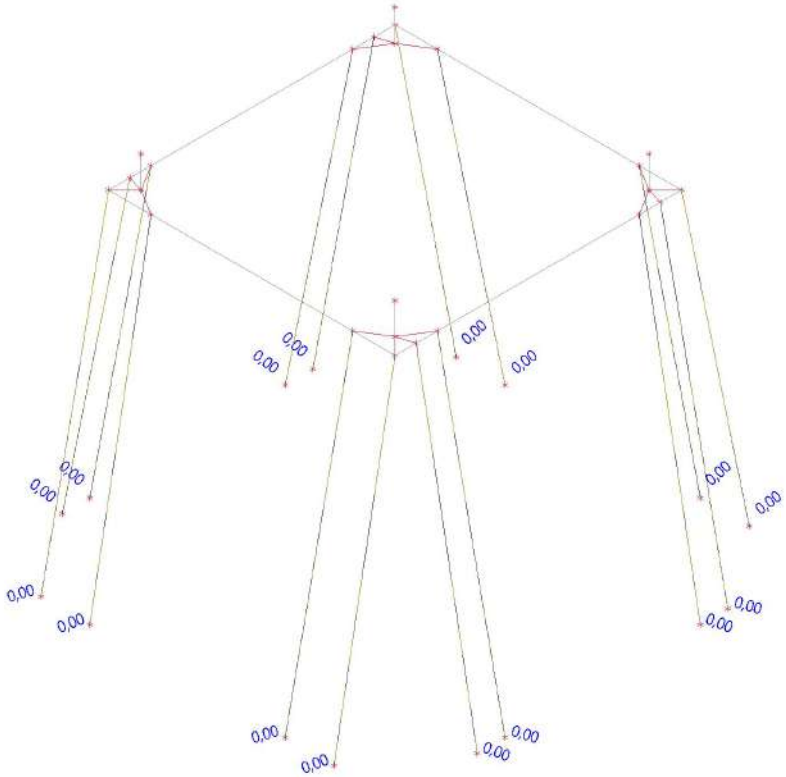
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



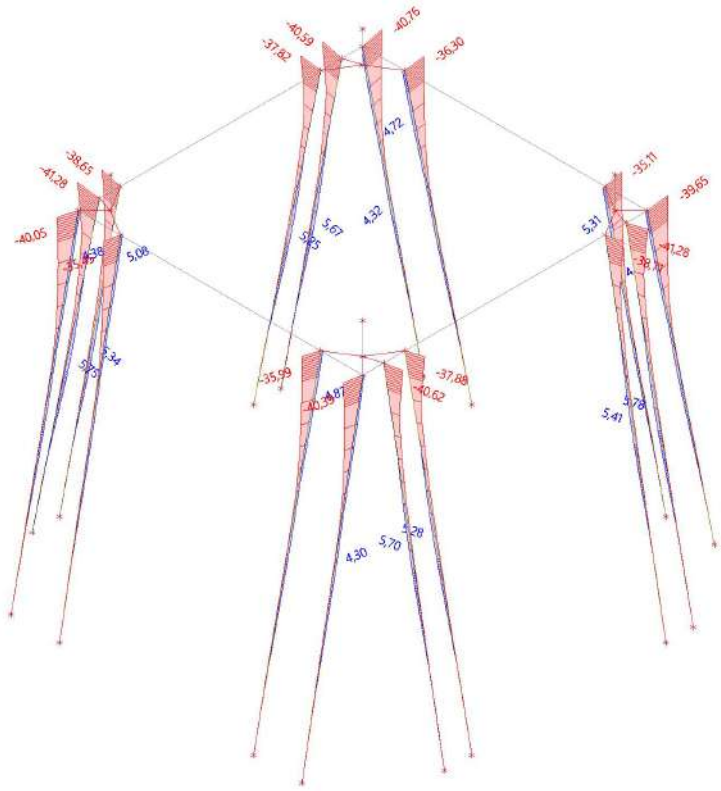
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



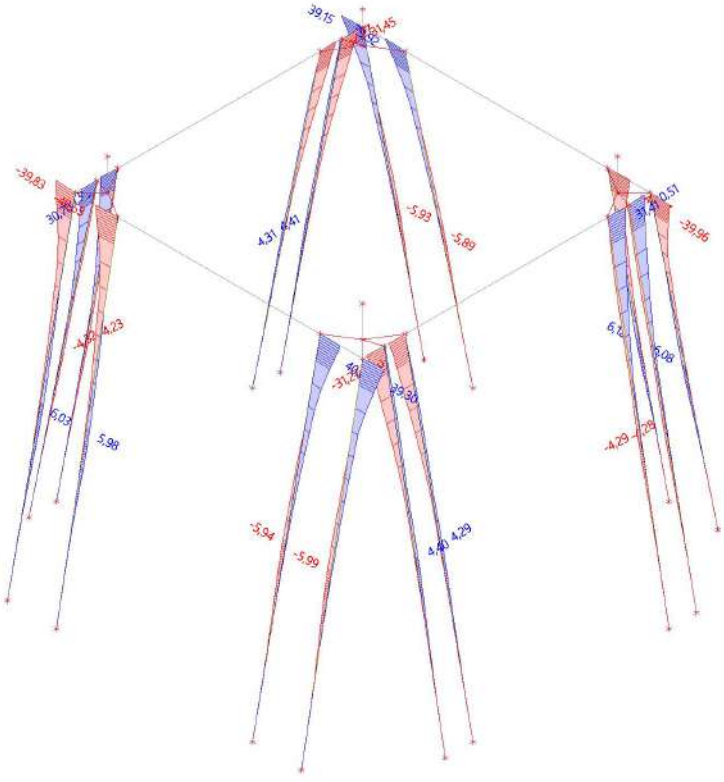
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B34	0,000	high max Wnd ;135°	**-585,29**	-0,02	0,00	0,00	0,00	0,00
B7	15,497	low max Wnd ;135°	**362,29**	1,08	-7,91	**0,00**	-34,26	-8,25
B26	14,497+	low max Wnd ;315°	-177,23	-8,59	**2,68**	0,00	-2,82	-18,48
B29	15,497	high max Wnd ;225°	-74,79	-2,06	**-13,60**	0,00	**-41,28**	0,47
B29	8,372-	high max Wnd ;225°	-95,74	0,79	0,14	0,00	**5,78**	1,96
B34	15,497	high max Wnd ;225°	-108,39	**-12,14**	-1,00	0,00	-6,80	**-40,67**
B22	15,497	high max Wnd ;135°	-104,03	**12,00**	-1,24	0,00	-7,69	**40,04**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

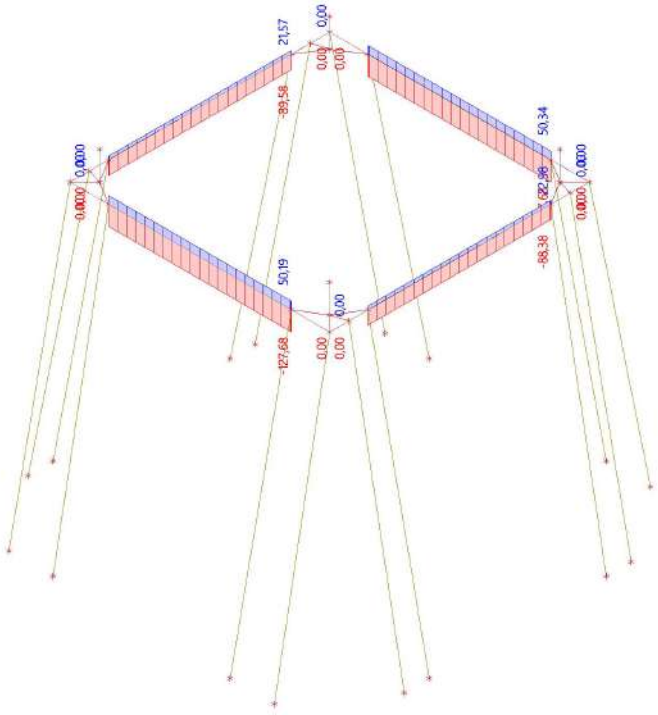
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B5	1,475	low max Wnd ;135°	**1190,03**	-260,48	17,73	0,18	0,00	-11,90
B5	0,000	low max Wnd ;135°	1165,52	**-260,48**	17,73	1,60	-26,15	**277,99**
B16	0,000	high max Wnd ;135°	55,10	-8,15	**-53,68**	**-4,83**	**79,17**	5,31
B17	0,000	high max Wnd ;225°	54,26	-7,98	**53,46**	**4,81**	**-78,85**	5,13
B17	0,000	high max Wnd ;135°	**-1513,64**	**335,68**	-16,93	-1,52	24,97	**-360,65**

7.4. Krachten van de Funderingsbalken

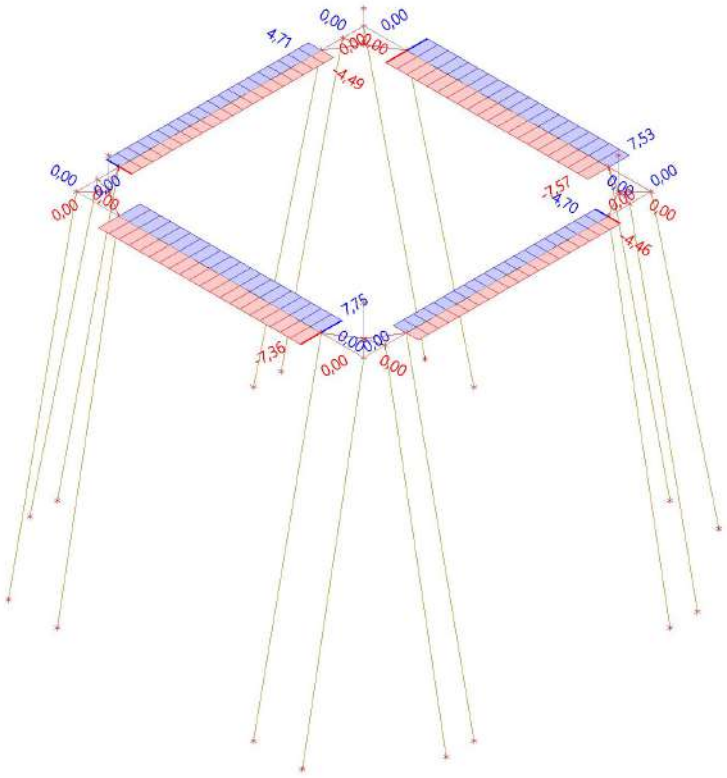
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



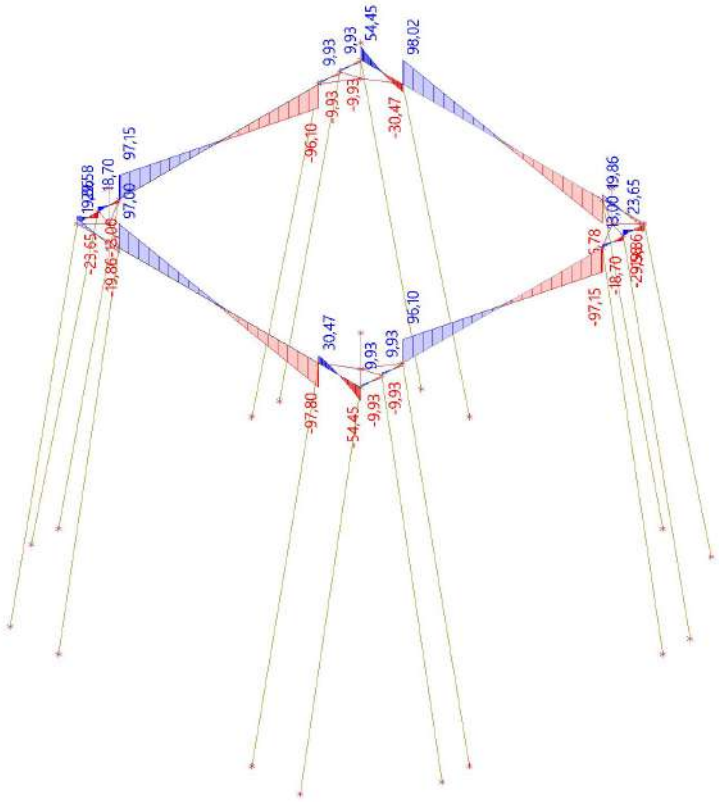
7.4.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



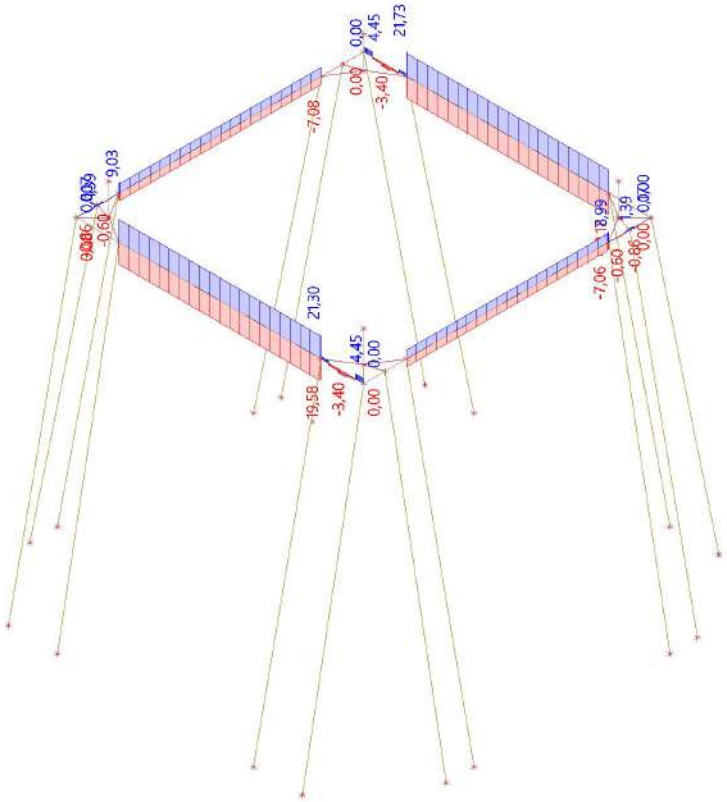
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



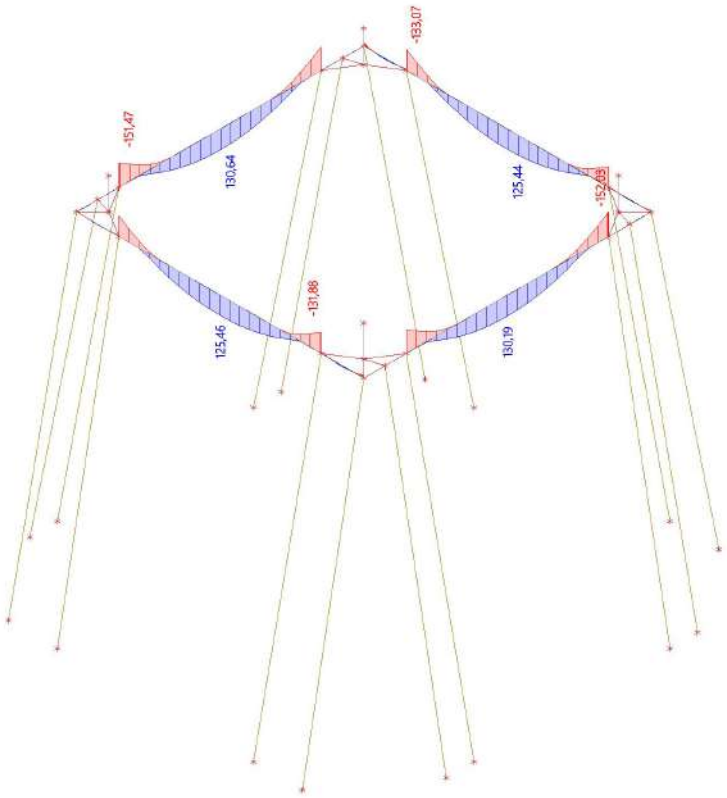
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



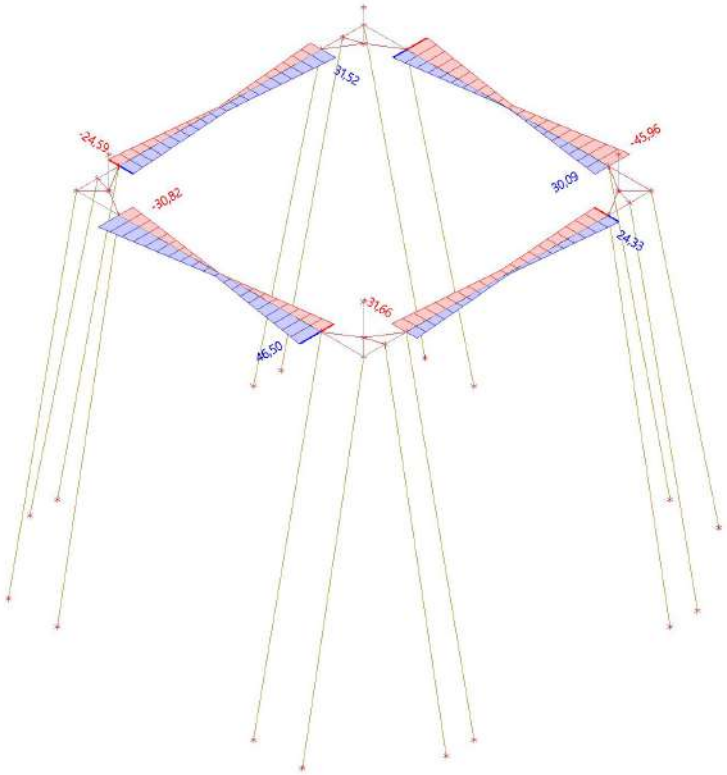
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Balken

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B11	2,000+	low max Wnd ;135°	**50,34**	-6,49	74,08	20,36	-105,20	29,66
B11	2,000+	high max Wnd ;225°	-127,30	**-7,57**	**98,02**	**21,73**	-116,11	27,76
B10	11,538-	high max Wnd ;45°	**-127,68**	-7,36	**-97,80**	21,30	-115,08	-26,76
B15	11,538-	high max Wnd ;135°	11,59	3,79	-96,76	-5,38	**-152,03**	4,62
B14	6,794+	high max Wnd ;225°	-89,56	4,71	1,92	-7,02	**130,64**	-1,55
B11	11,538-	high max Wnd ;225°	-127,30	-7,57	-91,43	20,55	-84,82	**-45,96**
B10	11,488-	high max Wnd ;135°	-127,55	**7,75**	-91,43	**-19,58**	-84,96	**46,50**

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2. Project

Gebruiker van licentie	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Onderdeel	Balkrooster 4xBeton40x40 mast 158
Auteur	[redacted]
Datum	27-08-2025
Constructie	Algemeen XYZ
Aantal knopen :	44
Aantal staven :	24
Aantal platen :	0
Aantal vaste lichamen :	0
Aantal gebruikte doorsneden :	3
Aantal belastingsgevallen :	9
Aantal gebruikte materialen :	3
Gravitatieversnelling [m/s^2]	9,807
Nationale norm	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materialen

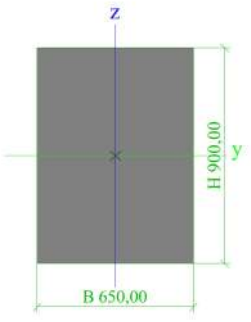
Naam	Type	ρ [kg/m³]	Dichtheid in natte toestand [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Kleur
C12/15 Gescheurd	Beton	2500,00	2600,00	7,0000e+03	0.2	0,01e-003	12,00	
C20/25 Ongescheurd	Beton	1500,00	2600,00	2,4000e+04	0.2	0,01e-003	20,00	

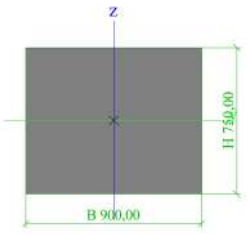
Verklaring van symbolen	
Dichtheid in natte toestand	De waarde van de dichtheid van het kenmerk nieuwe toestand wordt alleen gebruikt als een samengesteld dek wordt ingevoerd en rekening wordt gehouden met de belasting van het eigengewicht.

Reinforcement EC2

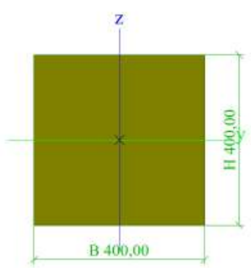
Naam	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Betonstaal	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

4.2. Doorsneden

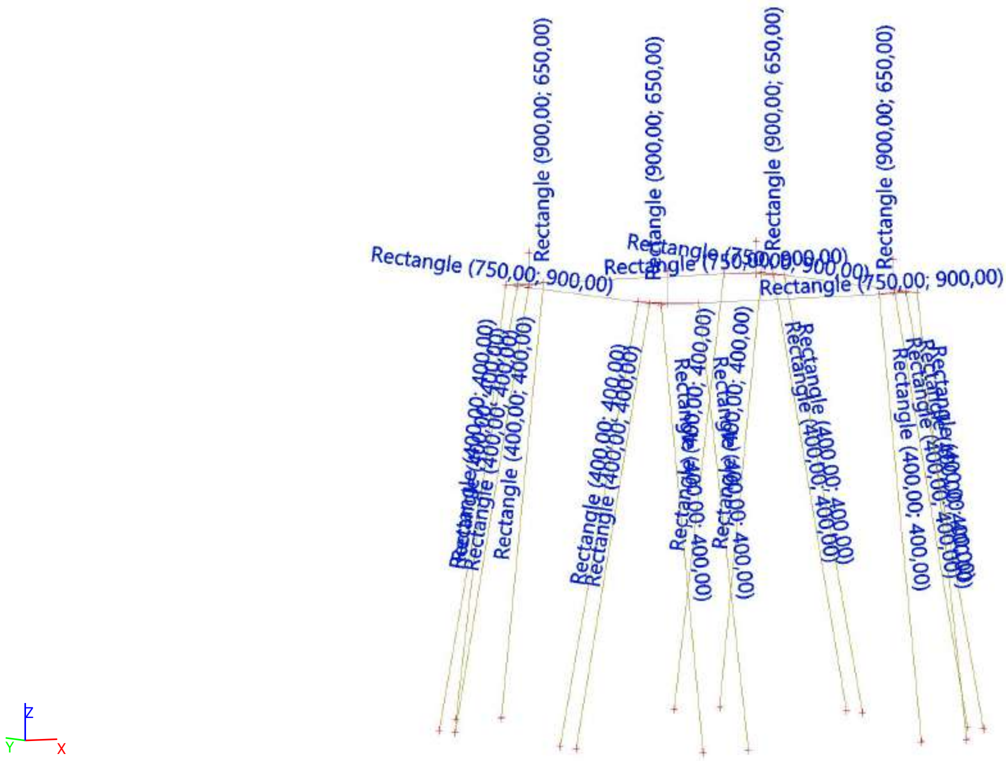
Poer.Opstort		
Type	Rectangle	
Gedetailleerd	900,00; 650,00	
Vorm type	Dikke wanden	
Onderdeelmateriaal	C12/15 Gescheurd	
Bouwwijze	beton	
Kleur		
A [mm²]	5,8500e+05	
A_y [mm²], A_z [mm²]	4,8750e+05	4,8750e+05
A_L [m²/m], A_D [m²/m]	3,1000e+00	3,1000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	325,00	450,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	3,9487e+10	2,0597e+10
i_y [mm], i_z [mm]	259,81	187,64
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	8,7750e+07	6,3375e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	4,5857e+10	0,0000e+00
$β_y$ [mm], $β_z$ [mm]	0,00	0,00
Afbeelding		

Balk		
Type	Rectangle	
Gedetailleerd	750,00; 900,00	
Vorm type	Dikke wanden	
Onderdeelmateriaal	C12/15 Gescheurd	
Bouwwijze	beton	
Kleur		
A [mm²]	6,7500e+05	
A_y [mm²], A_z [mm²]	5,6250e+05	5,6250e+05
A_L [m²/m], A_D [m²/m]	3,3000e+00	3,3000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450,00	375,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	3,1641e+10	4,5563e+10
i_y [mm], i_z [mm]	216,51	259,81
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	8,4375e+07	1,0125e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	6,3112e+10	0,0000e+00
$β_y$ [mm], $β_z$ [mm]	0,00	0,00
Afbeelding		

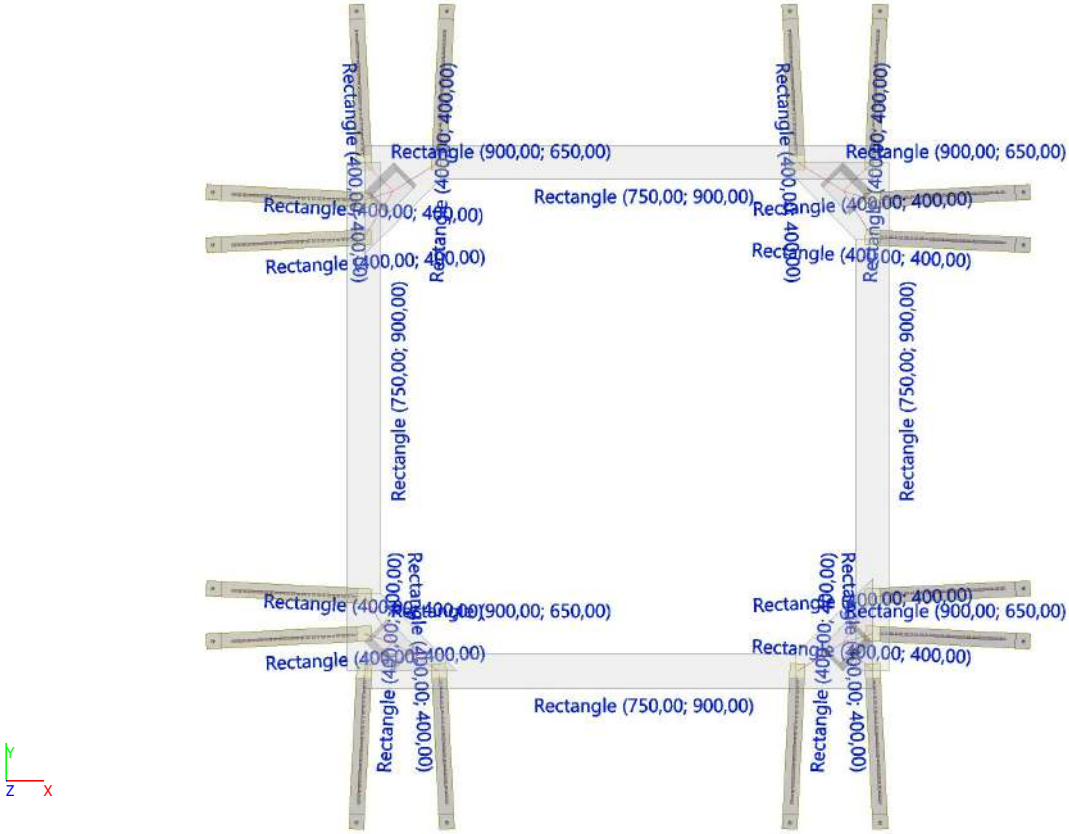
Funderingspaal		
Type	Rectangle	
Gedetailleerd	400,00; 400,00	
Vorm type	Dikke wanden	
Onderdeelmateriaal	C20/25 Ongescheurd	
Bouwwijze	beton	
Kleur		
A [mm²]	1,6000e+05	
A_y [mm²], A_z [mm²]	1,3333e+05	1,3333e+05
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200,00	200,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	2,1333e+09	2,1333e+09
i_y [mm], i_z [mm]	115,47	115,47
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,0667e+07	1,0667e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00

I_t [mm^4], I_w [mm^6]	3,6027e+09	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Afbeelding		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Instellingen net

Naam	MeshSetup1
Generatie van variabele excentriciteiten op elementen in plaats van constante excentriciteiten	×
Generatie van knopen op staven	×
Elastisch net	✓
Pas automatische netverfijning toe	×
Constructie-entiteiten verbinden	✓
Verdeling op consoles en variabele staven	5
Verdeling voor integratiestrook en 2D-1D upgrade	50
Gemiddeld aantal 1D-netelementen op rechte 1D-elementen	1
Gemiddelde grootte van 2D-netelement [m]	0,500
Gemiddelde grootte van 1D-element op gebogen 1D-elementen [m]	0,200
Minimum lengte van staafelement [m]	0,100
Maximum lengte van staafelement [m]	1000,000
Gemiddelde grootte van voorspankabels, elementen op elastische bedding, niet-lineaire grondveer [m]	1,000
Maximale hoek uit het vlak van vierhoekig element [mrad]	30,0
Minimale afstand tussen definitiepunt en -lijn [m]	0,001
Gemiddelde afmeting van paneelelement [m]	1,000
Netverfijning volgens het liggertype	Geen
Definitie van netelementen afmetingen voor panelen	Handmatig

5. Geometrie

5.1. Knopen

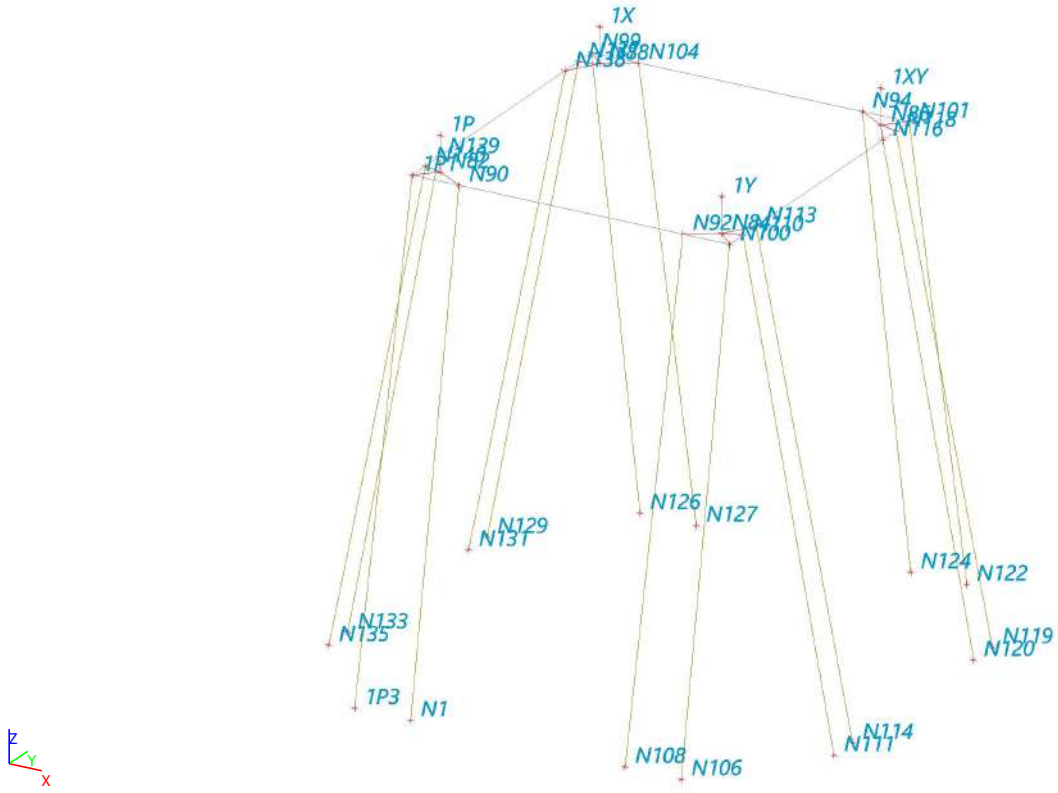
Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N81	1,169	1,169	0,000
N82	1,169	1,169	0,000
N83	13,169	1,169	0,000
N84	13,169	1,169	0,000
N85	13,169	13,169	0,000

Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N86	13,169	13,169	0,000
N87	1,169	13,169	0,000
N88	1,169	13,169	0,000
1P	1,169	1,169	1,475
1P1	0,400	0,400	0,000

Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
1P3	0,200	-3,600	-20,000
N1	2,600	-3,600	-20,000
N90	2,400	0,400	0,000
N92	11,938	0,400	0,000
N104	2,400	13,938	0,000
N94	11,938	13,938	0,000
N99	0,400	13,938	0,000
N100	13,938	0,400	0,000
N101	13,938	13,938	0,000
1Y	13,169	1,169	1,475
1XY	13,169	13,169	1,475
1X	1,169	13,169	1,475
N106	14,138	-3,600	-20,000
N108	11,738	-3,600	-20,000
N110	13,938	1,400	0,000
N111	17,938	1,200	-20,000
N113	13,938	2,400	0,000

Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N114	17,938	2,600	-20,000
N116	13,938	11,938	0,000
N118	13,938	12,938	0,000
N119	17,938	13,138	-20,000
N120	17,938	11,738	-20,000
N122	14,138	17,938	-20,000
N124	11,738	17,938	-20,000
N126	0,200	17,938	-20,000
N127	2,600	17,938	-20,000
N129	-3,600	13,138	-20,000
N131	-3,600	11,738	-20,000
N133	-3,600	2,600	-20,000
N135	-3,600	1,200	-20,000
N137	0,400	12,938	0,000
N138	0,400	11,938	0,000
N139	0,400	2,400	0,000
N140	0,400	1,400	0,000

5.2. Analyse model met knopen

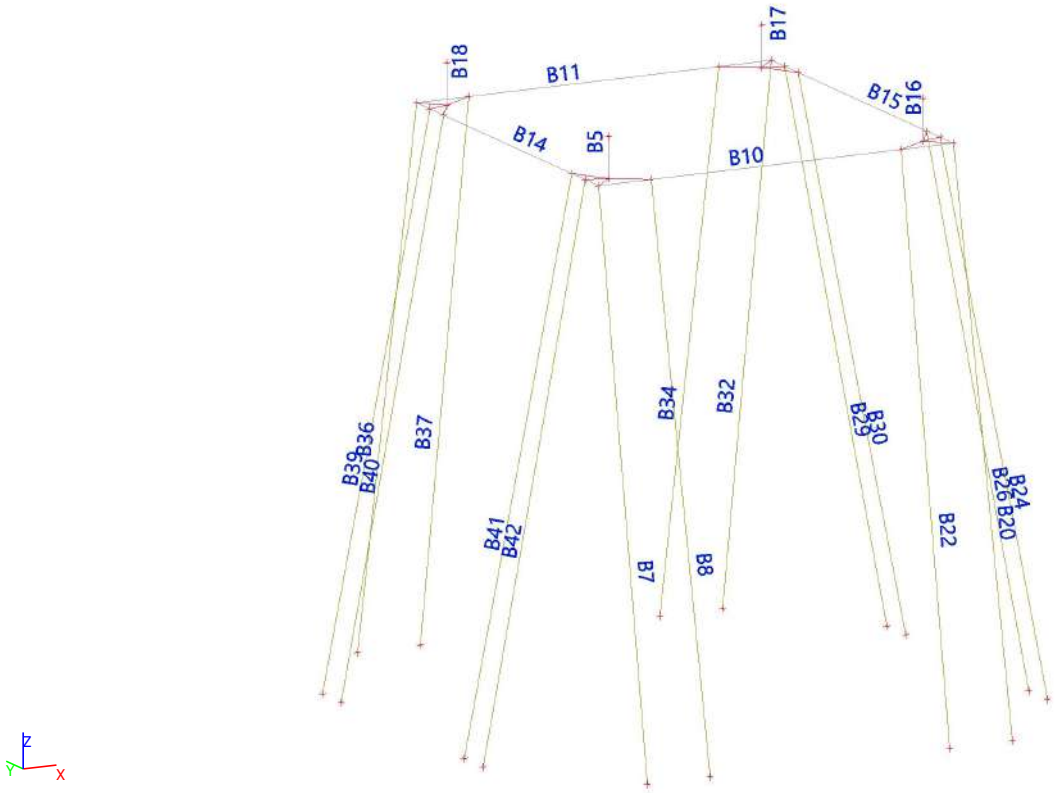


5.3. Staven

Naam	Doorsnede	Materiaal	Lengte [m]	Beginknoop	Eindknoop	Type
B10	Balk - Rectangle (750,00; 900,00)	C12/15 Gescheurd	13,538	1P1	N100	Balk (80)
B11	Balk - Rectangle (750,00; 900,00)	C12/15 Gescheurd	13,538	N99	N101	Balk (80)
B14	Balk - Rectangle (750,00; 900,00)	C12/15 Gescheurd	13,538	1P1	N99	Balk (80)
B15	Balk - Rectangle (750,00; 900,00)	C12/15 Gescheurd	13,538	N100	N101	Balk (80)
B5	Poer.Opstort - Rectangle (900,00; 650,00)	C12/15 Gescheurd	1,475	N82	1P	Kolom (100)
B7	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	1P3	1P1	Kolom (100)
B8	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N1	N90	Kolom (100)
B16	Poer.Opstort - Rectangle (900,00; 650,00)	C12/15 Gescheurd	1,475	N84	1Y	Kolom (100)
B17	Poer.Opstort - Rectangle (900,00; 650,00)	C12/15 Gescheurd	1,475	N86	1XY	Kolom (100)

Naam	Doorsnede	Materiaal	Lengte [m]	Beginknoop	Eindknoop	Type
B18	Poer.Opstort - Rectangle (900,00; 650,00)	C12/15 Gescheurd	1,475	N88	1X	Kolom (100)
B20	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N106	N100	Kolom (100)
B22	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N108	N92	Kolom (100)
B24	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N111	N110	Kolom (100)
B26	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N114	N113	Kolom (100)
B29	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N119	N118	Kolom (100)
B30	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N120	N116	Kolom (100)
B32	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N122	N101	Kolom (100)
B34	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N124	N94	Kolom (100)
B36	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N126	N99	Kolom (100)
B37	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N127	N104	Kolom (100)
B39	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N129	N137	Kolom (100)
B40	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N131	N138	Kolom (100)
B41	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N133	N139	Kolom (100)
B42	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,397	N135	N140	Kolom (100)

5.4. Analyse model met Staven

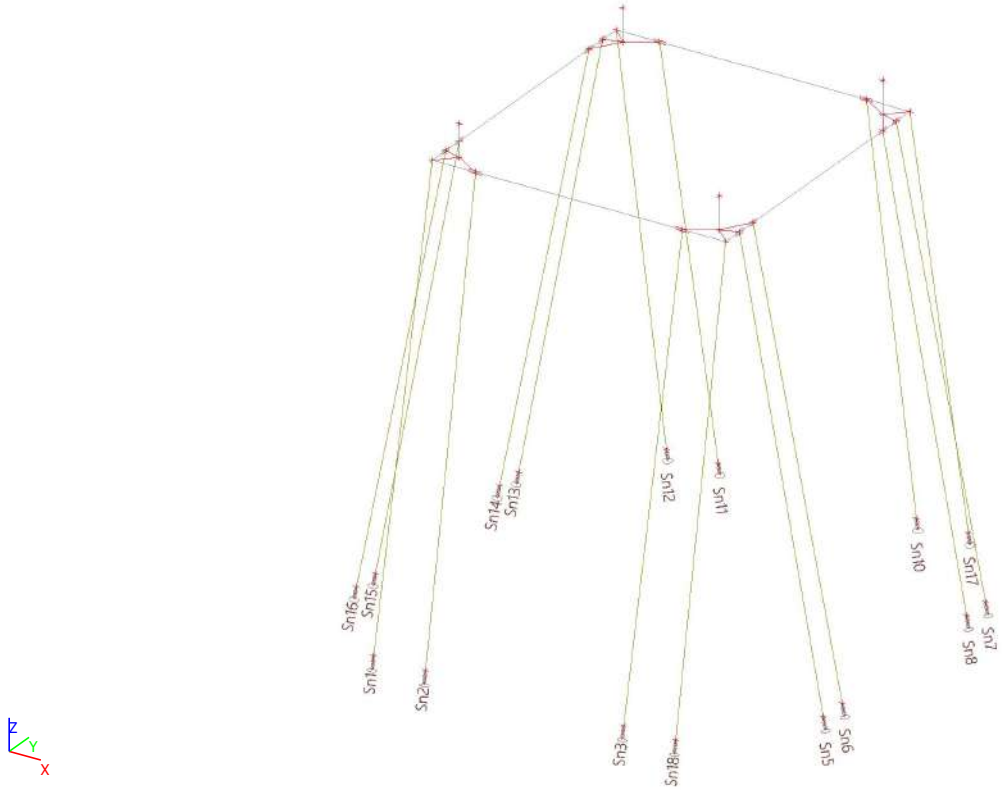


5.5. Knoopsteunpunten

Naam	Knoop	Systeem	Type	X	Y	Z	Rx	Ry	Rz	Hoek [deg]
Sn1	1P3	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-11,31;Ry0,56
Sn2	N1	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-11,31;Ry-0,56
Sn3	N108	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-11,31;Ry0,56
Sn5	N111	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-0,57;Ry-11,31
Sn6	N114	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx0,57;Ry-11,31
Sn7	N119	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx0,57;Ry-11,31
Sn8	N120	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-0,57;Ry-11,31
Sn10	N124	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx11,31;Ry0,56
Sn11	N127	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx11,31;Ry-0,56
Sn12	N126	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx11,31;Ry0,56
Sn13	N129	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx0,57;Ry11,31
Sn14	N131	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-0,57;Ry11,31

Naam	Knoop	Systeem	Type	X	Y	Z	Rx	Ry	Rz	Hoek [deg]
Sn15	N133	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx0,57;Ry11,31
Sn16	N135	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-0,57;Ry11,31
Sn17	N122	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx11,31;Ry-0,56
Sn18	N106	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-11,31;Ry-0,51

5.6. Analyse model met Knoopondersteuningen



5.7. Lijnsteunpunten op staven

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
Veen	Lijn	B7	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen1	Lijn	B8	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen2	Lijn	B20	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen3	Lijn	B22	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen4	Lijn	B24	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen5	Lijn	B26	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen6	Lijn	B29	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen7	Lijn	B30	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen8	Lijn	B32	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen9	Lijn	B34	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen10	Lijn	B36	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	8,000	Vanaf einde						
Veen11	Lijn	B37	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen12	Lijn	B39	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen13	Lijn	B40	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen14	Lijn	B41	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen15	Lijn	B42	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)	Lijn	B7	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)1	Lijn	B8	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)2	Lijn	B20	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)3	Lijn	B22	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)4	Lijn	B24	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)5	Lijn	B26	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)6	Lijn	B29	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)7	Lijn	B30	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)8	Lijn	B32	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)9	Lijn	B34	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)10	Lijn	B36	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)11	Lijn	B37	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)12	Lijn	B39	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)13	Lijn	B40	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)14	Lijn	B41	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)15	Lijn	B42	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)16	Lijn	B7	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)17	Lijn	B8	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)18	Lijn	B20	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)19	Lijn	B22	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)20	Lijn	B24	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)21	Lijn	B26	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)22	Lijn	B29	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)23	Lijn	B30	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)24	Lijn	B32	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)25	Lijn	B34	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)26	Lijn	B36	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf Systeem	Pos x_1 [m] Pos x_2 [m]	Coör Oors	X	Y	Z	Rx	Ry	Rz
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)27	Lijn	B37	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)28	Lijn	B39	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)29	Lijn	B40	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)30	Lijn	B41	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)31	Lijn	B42	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)	Lijn	B7	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)1	Lijn	B8	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)2	Lijn	B20	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)3	Lijn	B22	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)4	Lijn	B24	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)5	Lijn	B26	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)6	Lijn	B29	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)7	Lijn	B30	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)8	Lijn	B32	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)9	Lijn	B34	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)10	Lijn	B36	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)11	Lijn	B37	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)12	Lijn	B39	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)13	Lijn	B40	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)14	Lijn	B41	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)15	Lijn	B42	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)	Lijn	B7	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)1	Lijn	B8	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)2	Lijn	B20	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)3	Lijn	B22	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)4	Lijn	B24	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)5	Lijn	B26	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)6	Lijn	B29	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)7	Lijn	B30	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)8	Lijn	B32	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)9	Lijn	B34	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)10	Lijn	B36	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

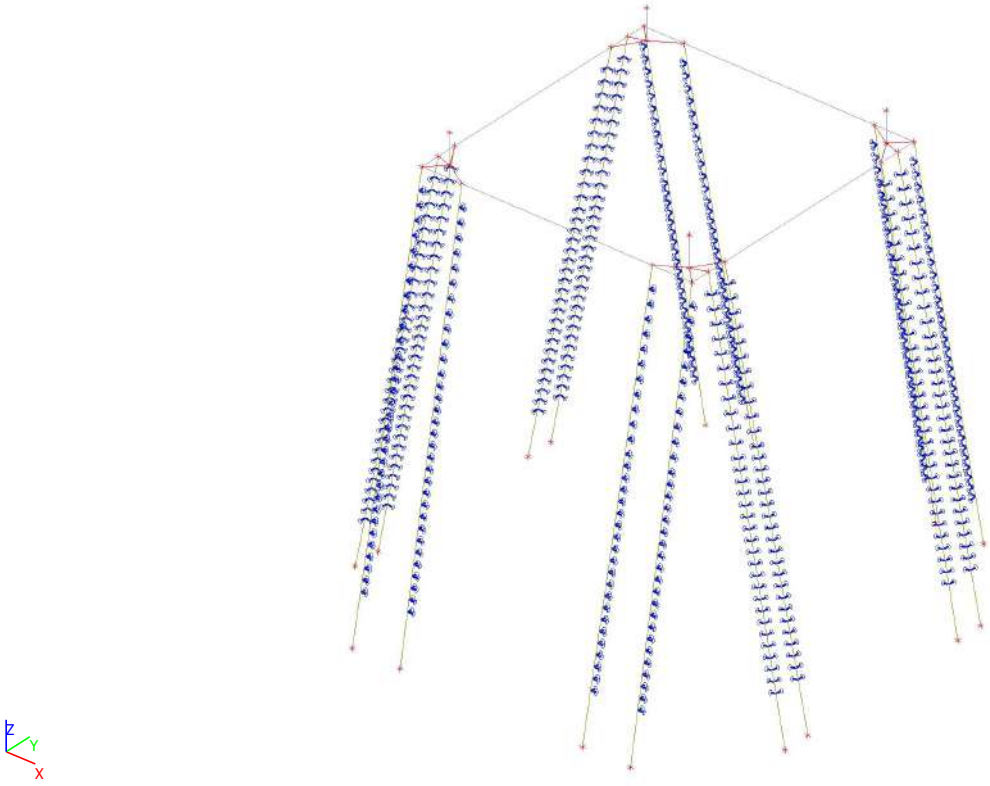
Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)11	Lijn	B37	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)12	Lijn	B39	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)13	Lijn	B40	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)14	Lijn	B41	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)15	Lijn	B42	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)	Lijn	B7	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)1	Lijn	B8	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)2	Lijn	B20	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)3	Lijn	B22	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)4	Lijn	B24	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)5	Lijn	B26	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)6	Lijn	B29	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)7	Lijn	B30	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)8	Lijn	B32	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)9	Lijn	B34	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)10	Lijn	B36	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)11	Lijn	B37	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)12	Lijn	B39	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)13	Lijn	B40	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)14	Lijn	B41	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)15	Lijn	B42	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)	Lijn	B7	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)1	Lijn	B8	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)2	Lijn	B20	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)3	Lijn	B22	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)4	Lijn	B24	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)5	Lijn	B26	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)6	Lijn	B29	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)7	Lijn	B30	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)8	Lijn	B32	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)9	Lijn	B34	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)10	Lijn	B36	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)11	Lijn	B37	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)12	Lijn	B39	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)13	Lijn	B40	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)14	Lijn	B41	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)15	Lijn	B42	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)	Lijn	B7	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)1	Lijn	B8	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)2	Lijn	B20	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)3	Lijn	B22	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)4	Lijn	B24	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)5	Lijn	B26	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)6	Lijn	B29	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)7	Lijn	B30	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)8	Lijn	B32	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)9	Lijn	B34	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)10	Lijn	B36	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)11	Lijn	B37	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)12	Lijn	B39	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)13	Lijn	B40	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)14	Lijn	B41	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)15	Lijn	B42	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)	Lijn	B7	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)1	Lijn	B8	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)2	Lijn	B20	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)3	Lijn	B22	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)4	Lijn	B24	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)5	Lijn	B26	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)6	Lijn	B29	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)7	Lijn	B30	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)8	Lijn	B32	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)9	Lijn	B34	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)10	Lijn	B36	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

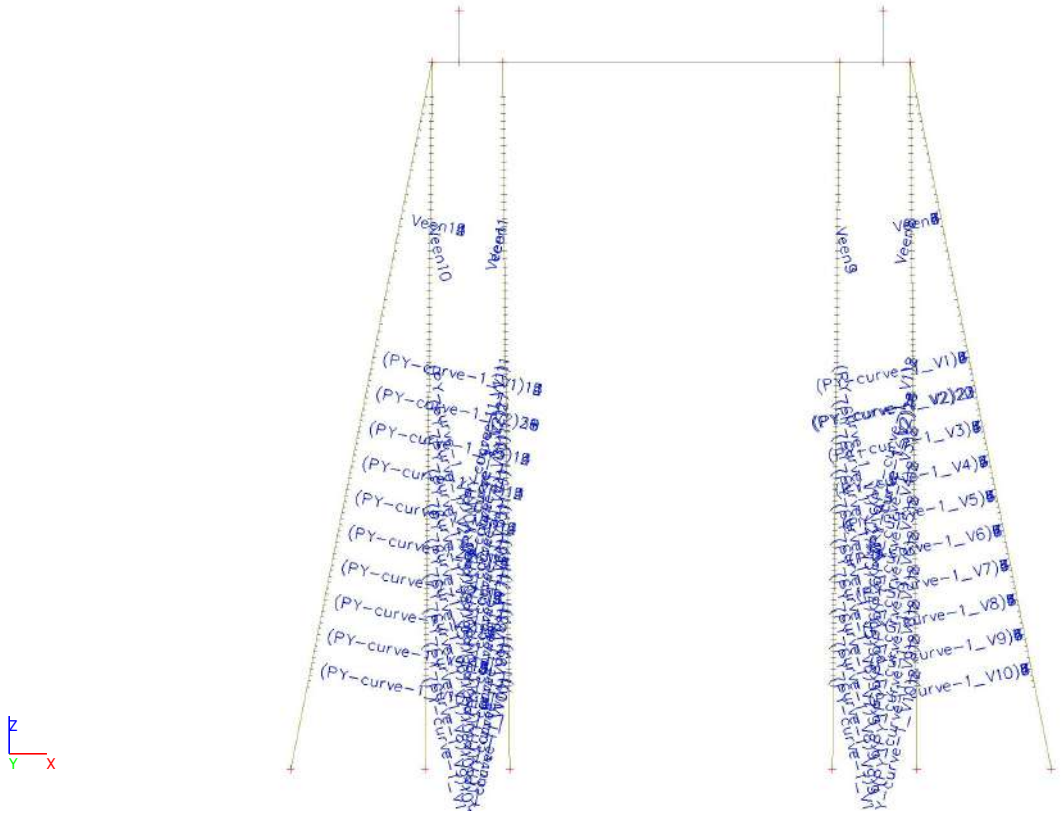
Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)11	Lijn	B37	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)12	Lijn	B39	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)13	Lijn	B40	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)14	Lijn	B41	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)15	Lijn	B42	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)	Lijn	B7	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)1	Lijn	B8	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)2	Lijn	B20	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)3	Lijn	B22	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)4	Lijn	B24	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)5	Lijn	B26	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)6	Lijn	B29	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)7	Lijn	B30	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)8	Lijn	B32	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)9	Lijn	B34	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)10	Lijn	B36	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)11	Lijn	B37	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)12	Lijn	B39	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)13	Lijn	B40	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)14	Lijn	B41	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)15	Lijn	B42	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)	Lijn	B7	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)1	Lijn	B8	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)2	Lijn	B20	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)3	Lijn	B22	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)4	Lijn	B24	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)5	Lijn	B26	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)6	Lijn	B29	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)7	Lijn	B30	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)8	Lijn	B32	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)9	Lijn	B34	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)10	Lijn	B36	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)11	Lijn	B37	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)12	Lijn	B39	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)13	Lijn	B40	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)14	Lijn	B41	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						
(PY-curve-1_V10)15	Lijn	B42	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	18,000	Vanaf einde						

5.8. Analyse model met Lijnondersteuningen



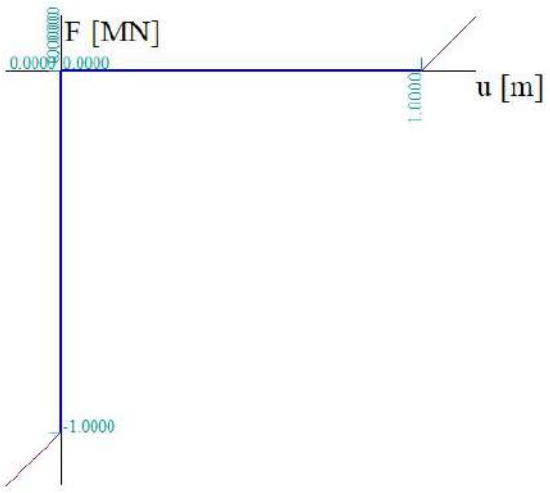
5.9. Analyse model met Lijnondersteuningen



5.10. Niet-lineaire functies

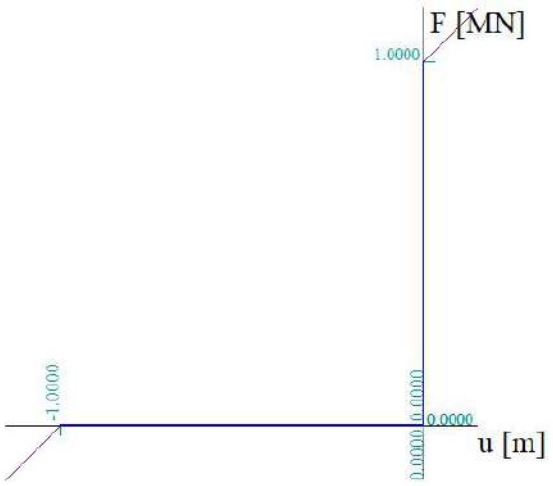
Naam	Type	u / F	Positief einde	Negatief einde
press only	Verplaatsing	-0.000001 / -1000000.000000	Verend	Verend
		0.000000 / 0.000000		
		1.000000 / 0.000000		

Tekenen



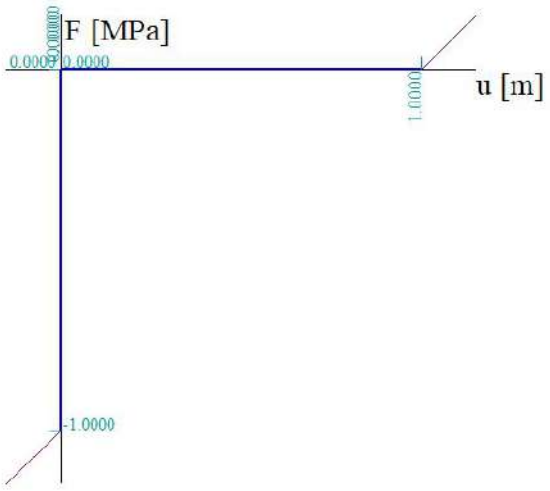
Naam	Type	u / F	Positief einde	Negatief einde
tension only	Verplaatsing	-1.000000 / 0.000000	Verend	Verend
		0.000000 / 0.000000		
		0.000001 / 1000000.000000		

Tekenen



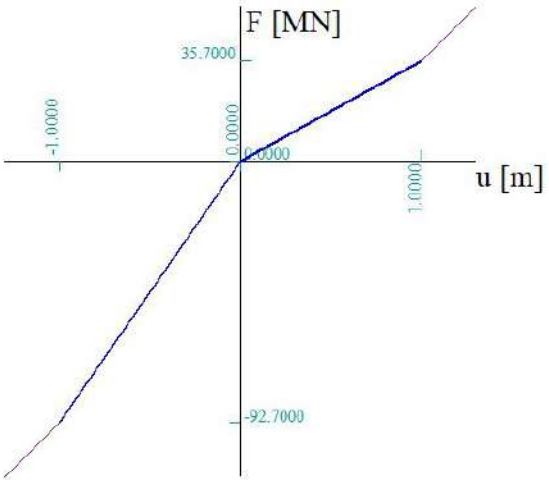
Naam	Type	u / F	Positief einde	Negatief einde
soil press only	Niet-lineair bedding		Verend	Verend

Tekenen



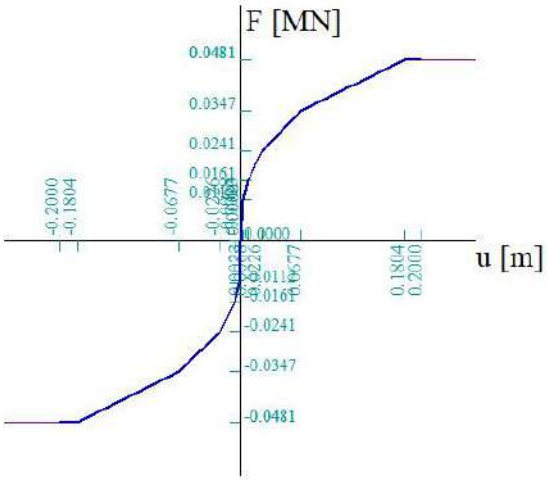
Naam	Type	u / F	Positief einde	Negatief einde
S+0 lower bound	Verplaatsing	-1.000000 / -92700000.000000	Verend	Verend
		0.000000 / 0.000000		
		1.000000 / 35700000.000000		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V1	Verplaatsing	-0.200000 / -48130.000000	Vrij	Vrij
		-0.180400 / -48130.000000		
		-0.067650 / -34710.000000		
		-0.022550 / -24064.500000		
		-0.006765 / -16109.569000		
		-0.002255 / -11169.751000		
		0.000000 / 0.000000		
		0.002255 / 11169.751000		
		0.006765 / 16109.569000		
		0.022550 / 24064.500000		
		0.067650 / 34707.015000		
		0.180400 / 48129.000000		
		0.200000 / 48129.000000		

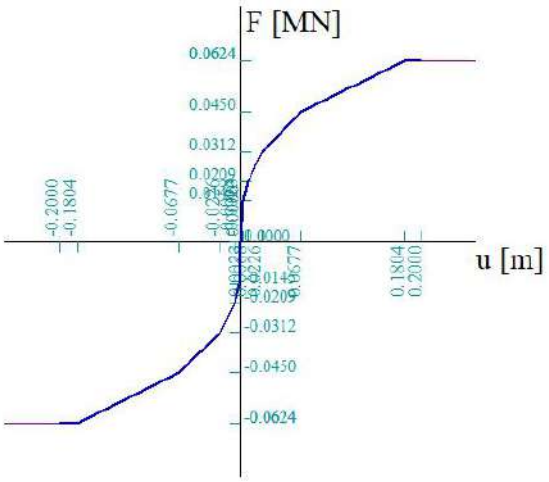
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V2	Verplaatsing	-0.200000 / -62400.000000	Vrij	Vrij
		-0.180400 / -62400.000000		
		-0.067650 / -45000.000000		
		-0.022550 / -31200.000000		
		-0.006765 / -20900.000000		
		-0.002255 / -14500.000000		
		0.000000 / 0.000000		
		0.002255 / 14490.000000		
		0.006765 / 20900.000000		
		0.022550 / 31220.000000		

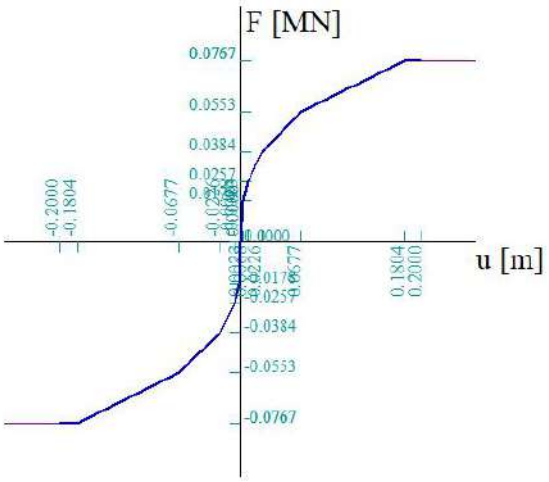
Naam	Type	u / F	Positief einde	Negatief einde
		0.067650 / 45020.000000		
		0.180400 / 62430.000000		
		0.200000 / 62430.000000		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V3	Verplaatsing	-0.200000 / -76737.000000	Vrij	Vrij
		-0.180400 / -76737.000000		
		-0.067650 / -55336.953000		
		-0.022550 / -38368.500000		
		-0.006765 / -25685.138000		
		-0.002255 / -17809.080000		
		0.000000 / 0.000000		
		0.002255 / 17809.080000		
		0.006765 / 25685.138000		
		0.022550 / 38368.500000		
		0.067650 / 55336.953000		
		0.180400 / 76737.000000		
		0.200000 / 76737.000000		

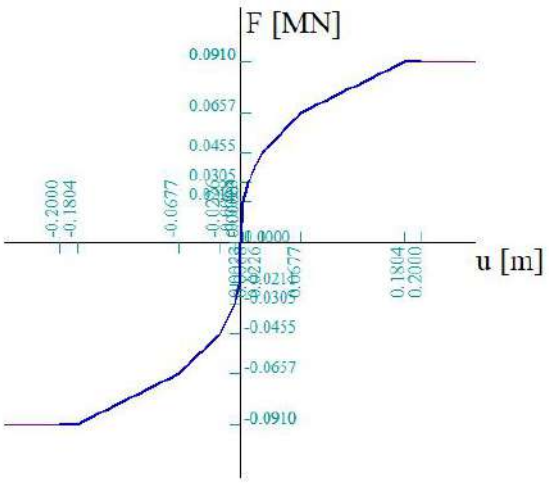
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V4	Verplaatsing	-0.200000 / -91041.000000	Vrij	Vrij
		-0.180400 / -91041.000000		
		-0.067650 / -65651.922000		
		-0.022550 / -45520.500000		

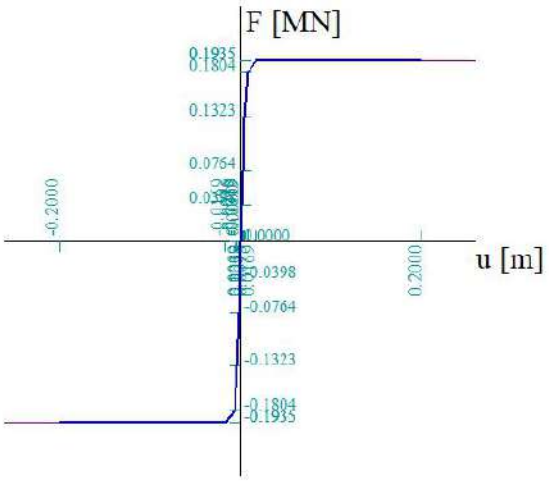
Naam	Type	u / F	Positief einde	Negatief einde
		-0.006765 / -30472.923000		
		-0.002255 / -21128.744000		
		0.000000 / 0.000000		
		0.002255 / 21128.744000		
		0.006765 / 30472.923000		
		0.022550 / 45520.500000		
		0.067650 / 65651.922000		
		0.180400 / 91041.000000		
		0.200000 / 91041.000000		

Tekenen



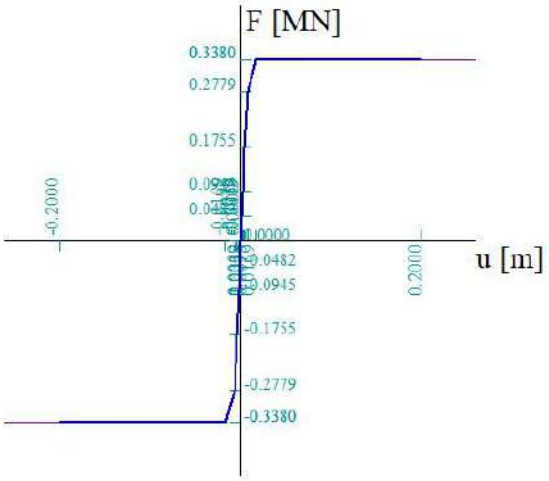
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V5	Verplaatsing	-0.200000 / -193489.147000	Vrij	Vrij
		-0.016913 / -193489.147000		
		-0.007517 / -180407.835000		
		-0.003758 / -132256.824000		
		-0.001879 / -76421.758000		
		-0.000940 / -39826.202000		
		0.000000 / 0.000000		
		0.000940 / 39826.202000		
		0.001879 / 76421.758000		
		0.003758 / 132256.824000		
		0.007517 / 180407.835000		
		0.016913 / 193489.147000		
		0.200000 / 193489.147000		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V6	Verplaatsing	-0.200000 / -338024.958000	Vrij	Vrij
		-0.016913 / -338024.958000		
		-0.007517 / -277917.886000		
		-0.003758 / -175526.039000		
		-0.001879 / -94450.113000		
		-0.000940 / -48160.629000		
		0.000000 / 0.000000		
		0.000940 / 48160.629000		
		0.001879 / 94450.113000		
		0.003758 / 175526.039000		
		0.007517 / 277917.886000		
		0.016913 / 338024.958000		
		0.200000 / 338024.958000		

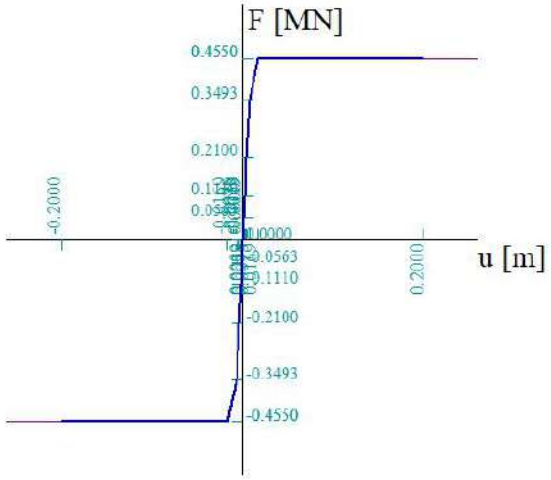
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V7	Verplaatsing	-0.200000 / -454964.396000	Vrij	Vrij
		-0.016913 / -454964.396000		
		-0.007517 / -349336.178000		
		-0.003758 / -210048.905000		
		-0.001879 / -110961.163000		
		-0.000940 / -56287.593000		
		0.000000 / 0.000000		
		0.000940 / 56287.593000		
		0.001879 / 110961.163000		
		0.003758 / 210048.905000		

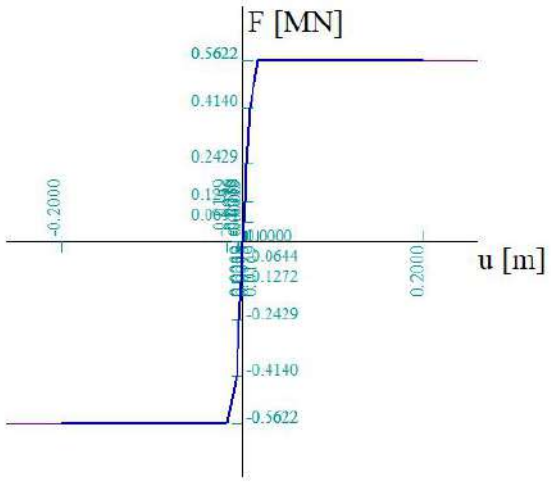
Naam	Type	u / F	Positief einde	Negatief einde
		0.007517 / 349336.178000		
		0.016913 / 454964.396000		
		0.200000 / 454964.396000		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V8	Verplaatsing	-0.200000 / -562170.498000	Vrij	Vrij
		-0.016913 / -562170.498000		
		-0.007517 / -413992.721000		
		-0.003758 / -242873.332000		
		-0.001879 / -127210.864000		
		-0.000940 / -64380.055000		
		0.000000 / 0.000000		
		0.000940 / 64380.055000		
		0.001879 / 127210.864000		
		0.003758 / 242873.332000		
		0.007517 / 413992.721000		
		0.016913 / 562170.498000		
		0.200000 / 562170.498000		

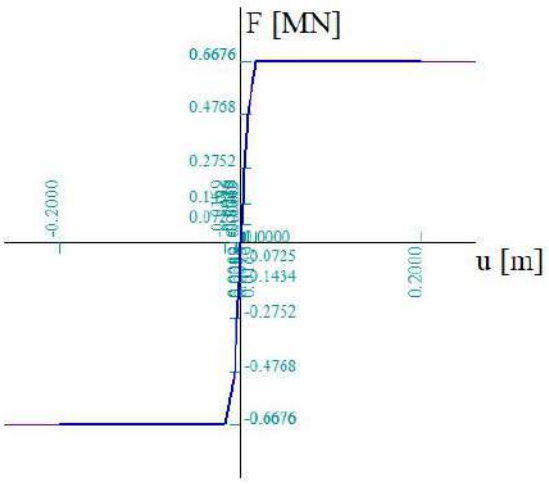
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V9	Verplaatsing	-0.200000 / -667564.512000	Vrij	Vrij
		-0.016913 / -667564.512000		
		-0.007517 / -476770.926000		
		-0.003758 / -275233.374000		

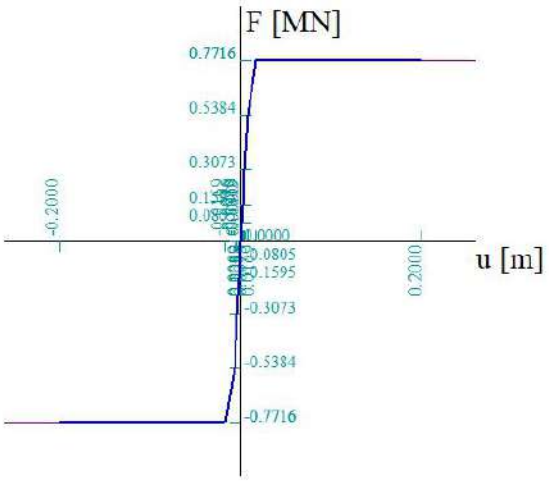
Naam	Type	u / F	Positief einde	Negatief einde
		-0.001879 / -143390.211000		
		-0.000940 / -72463.274000		
		0.000000 / 0.000000		
		0.000940 / 72463.274000		
		0.001879 / 143390.211000		
		0.003758 / 275233.374000		
		0.007517 / 476770.926000		
		0.016913 / 667564.512000		
		0.200000 / 667564.512000		

Tekenen



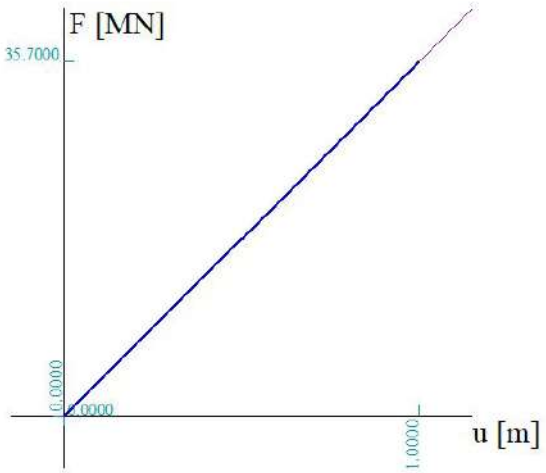
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V10	Verplaatsing	-0.200000 / -771639.629000	Vrij	Vrij
		-0.016913 / -771639.629000		
		-0.007517 / -538432.081000		
		-0.003758 / -307337.483000		
		-0.001879 / -159531.700000		
		-0.000940 / -80541.551000		
		0.000000 / 0.000000		
		0.000940 / 80541.551000		
		0.001879 / 159531.700000		
		0.003758 / 307337.483000		
		0.007517 / 538432.081000		
		0.016913 / 771639.629000		
		0.200000 / 771639.629000		

Tekenen



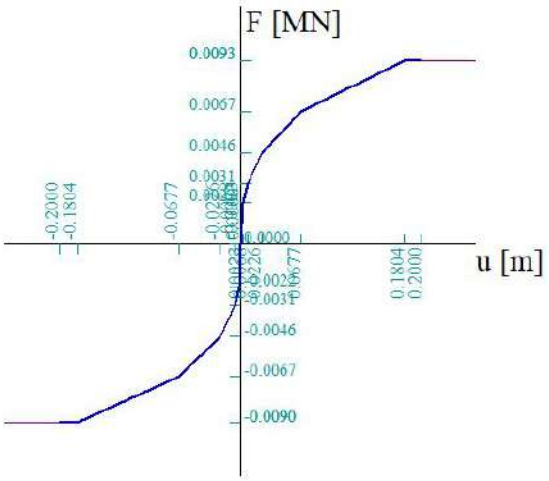
Naam	Type	u / F	Positief einde	Negatief einde
S+0 lower bound Trek	Verplaatsing	0.000000 / 0.000000	Verend	Vrij
		1.000000 / 35700000.000000		

Tekenen



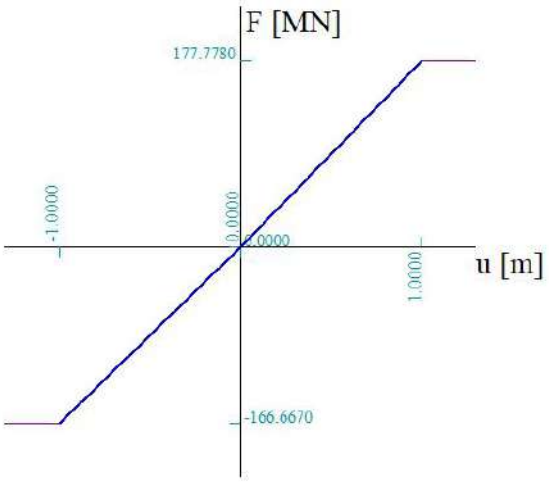
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_Veen	Verplaatsing	-0.200000 / -9000.000000	Vrij	Vrij
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		
		-0.006765 / -3100.000000		
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
Trek-druk-S+paalpunt	Verplaatsing	-1.000000 / -166667000.000000	Vrij	Vrij
		0.000000 / 0.000000		
		1.000000 / 177778000.000000		

Tekenen

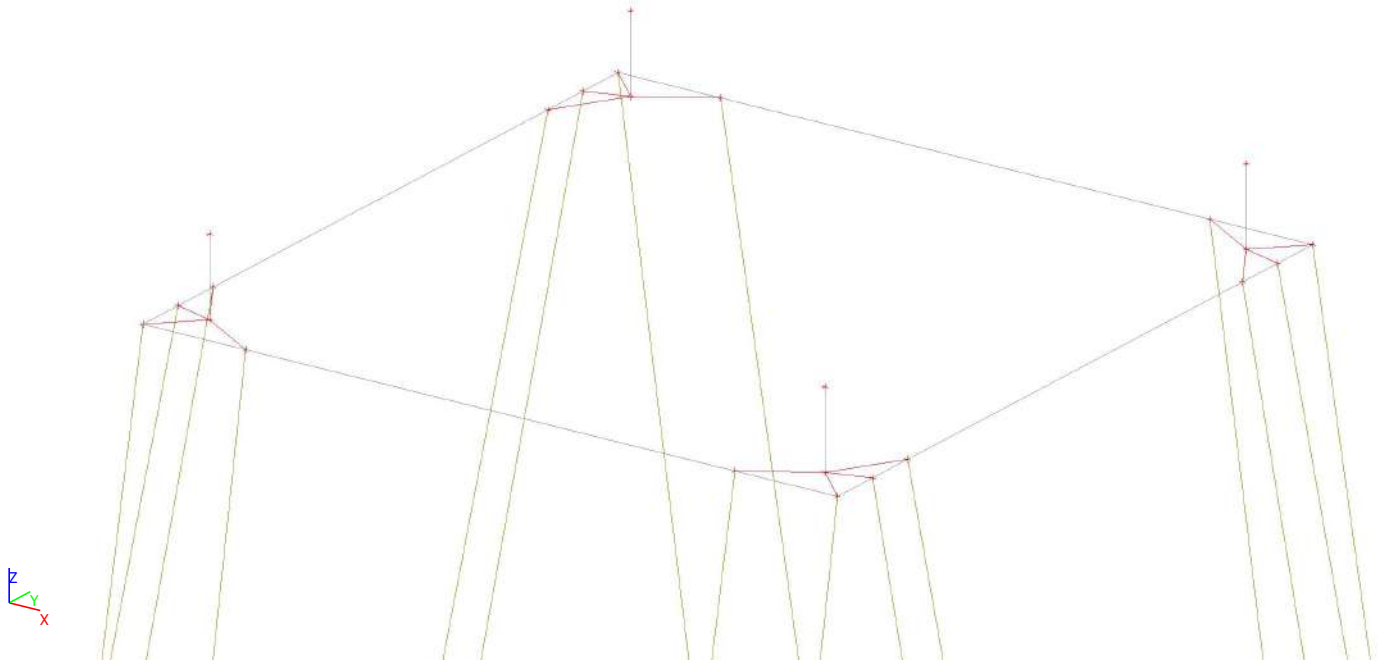


6. Belastingen

6.1. Belastingsgevallen

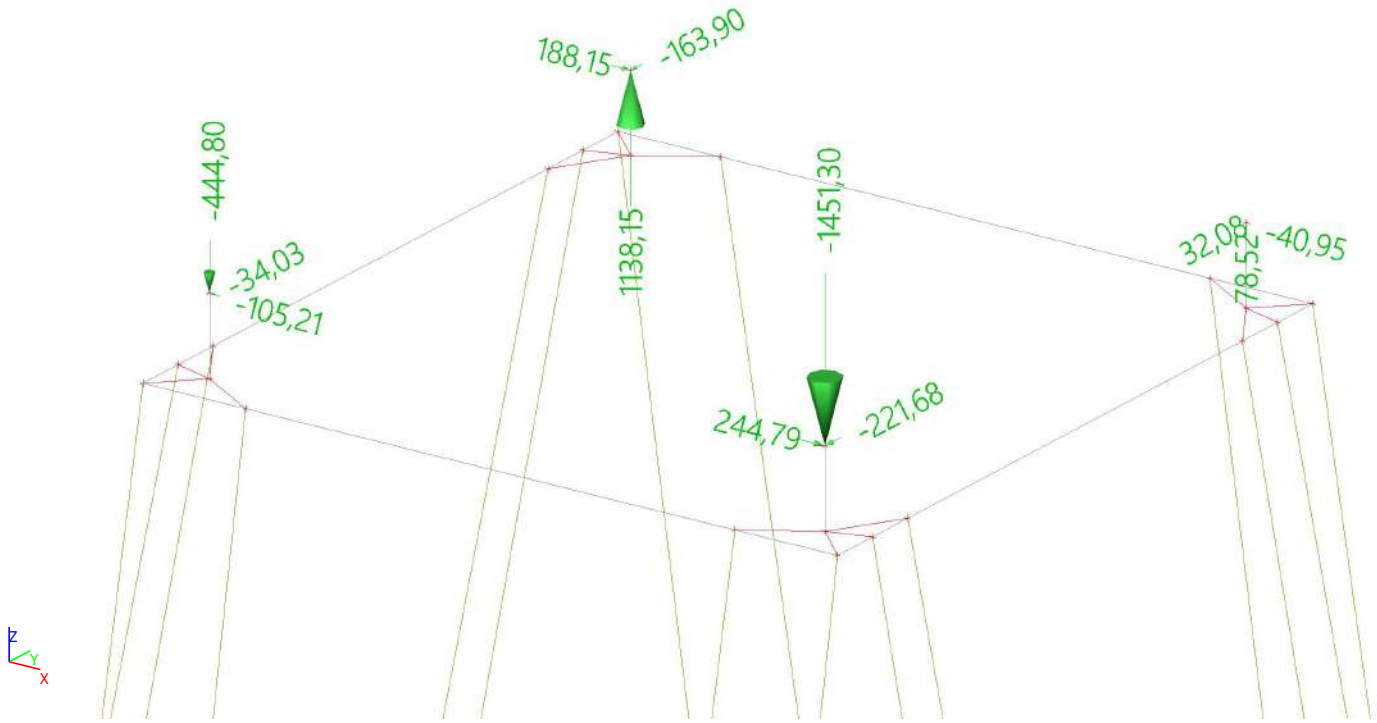
6.1.1. Belastingsgevallen - E.G.

Naam	Omschrijving	Actie type	Lastgroep	Richting
	Spec	Belastingtype		
E.G.		Permanent	LG1	-Z
		Eigen gewicht		



6.1.2. Belastingsgevallen - high max Wnd ;225°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
high max Wnd ;225°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			

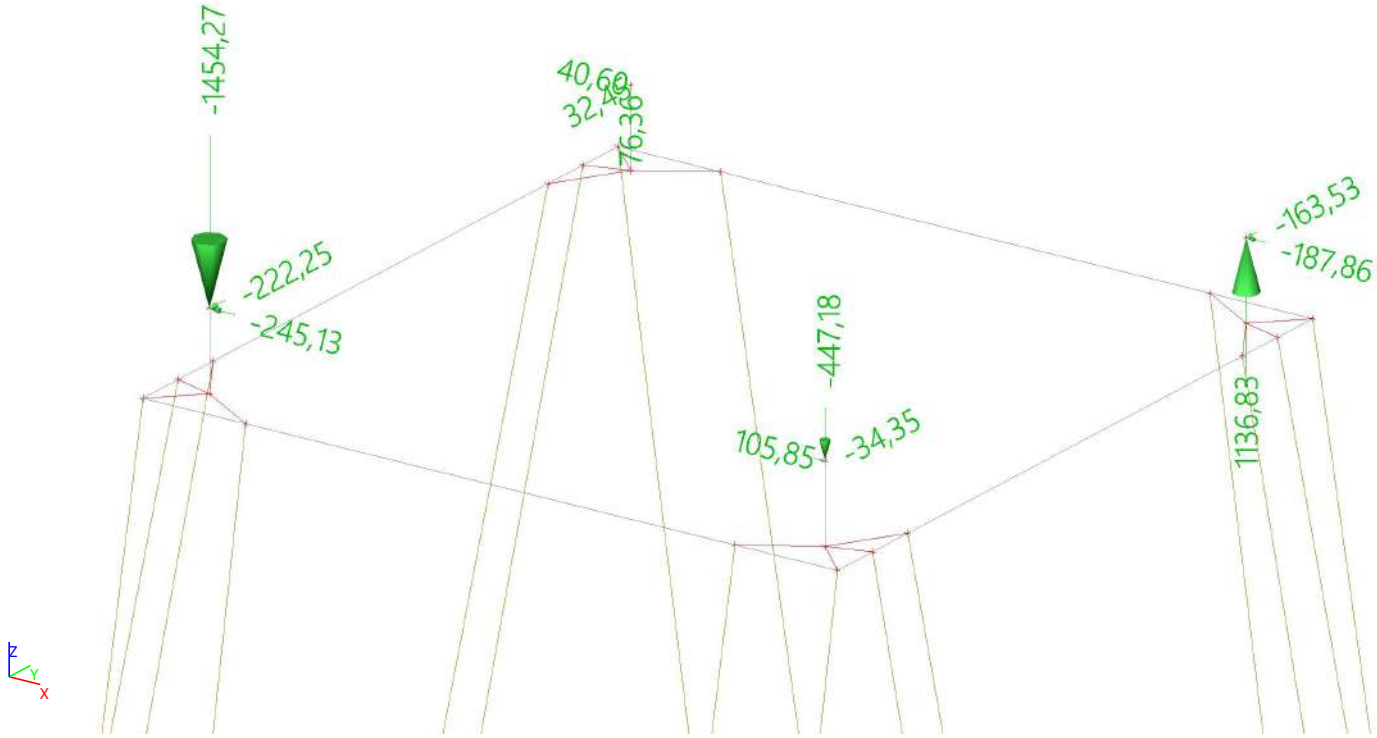


6.1.2.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Kracht	-105,21
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Kracht	-34,03
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Kracht	-444,80
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Kracht	188,15
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Kracht	-163,90
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Kracht	1138,15
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Kracht	-40,95
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Kracht	32,08
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Kracht	78,52
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Kracht	244,79
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Kracht	-221,68
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Kracht	-1451,30

6.1.3. Belastingsgevallen - high max Wnd ;315°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
high max Wnd ;315°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



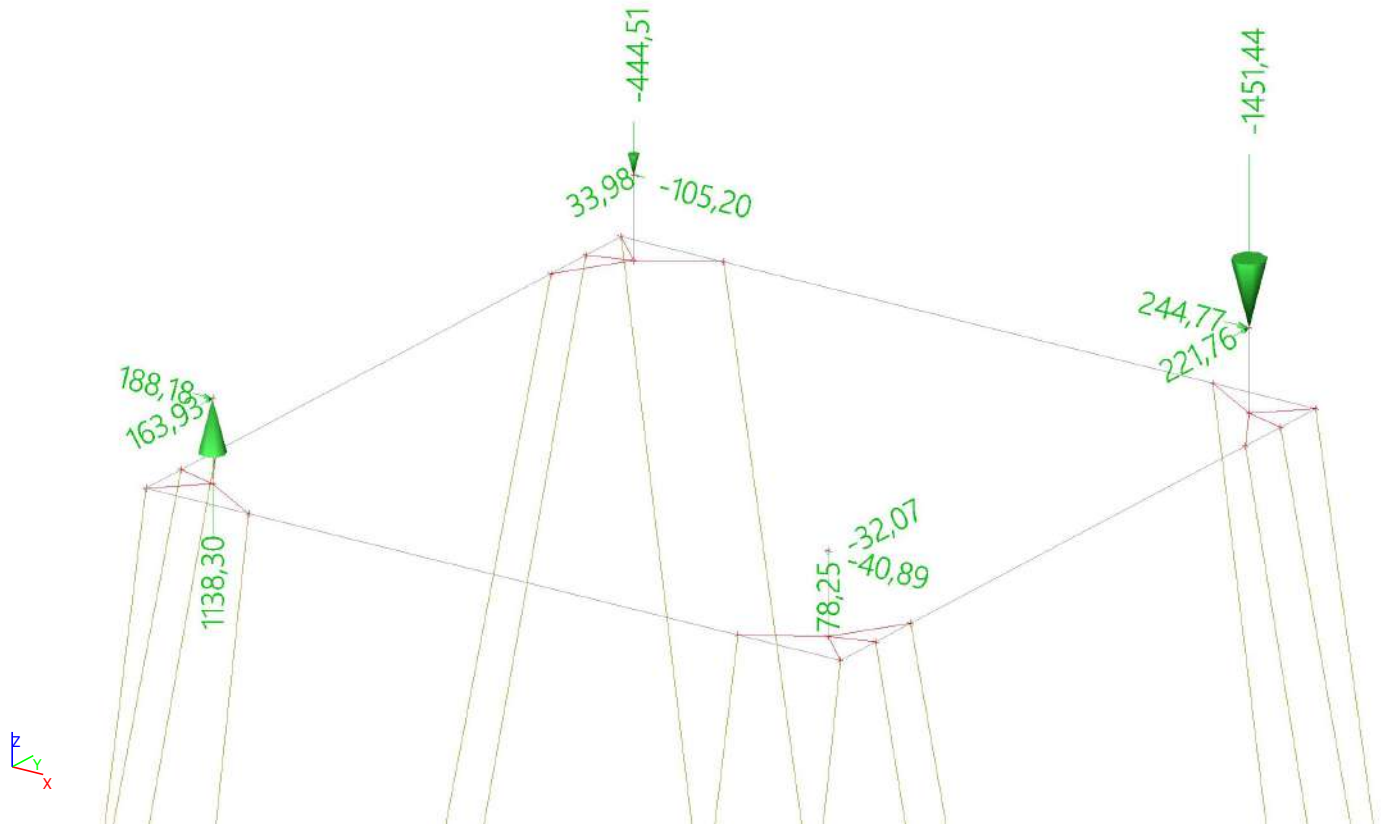
6.1.3.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Kracht	-245,13
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Kracht	-222,25
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Kracht	-1454,27
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Kracht	40,60
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Kracht	32,45
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Kracht	76,36
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Kracht	-187,86
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Kracht	-163,53
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Kracht	1136,83
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Kracht	105,85
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Kracht	-34,35

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Kracht	-447,18

6.1.4. Belastingsgevallen - high max Wnd ;135°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
high max Wnd ;135°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



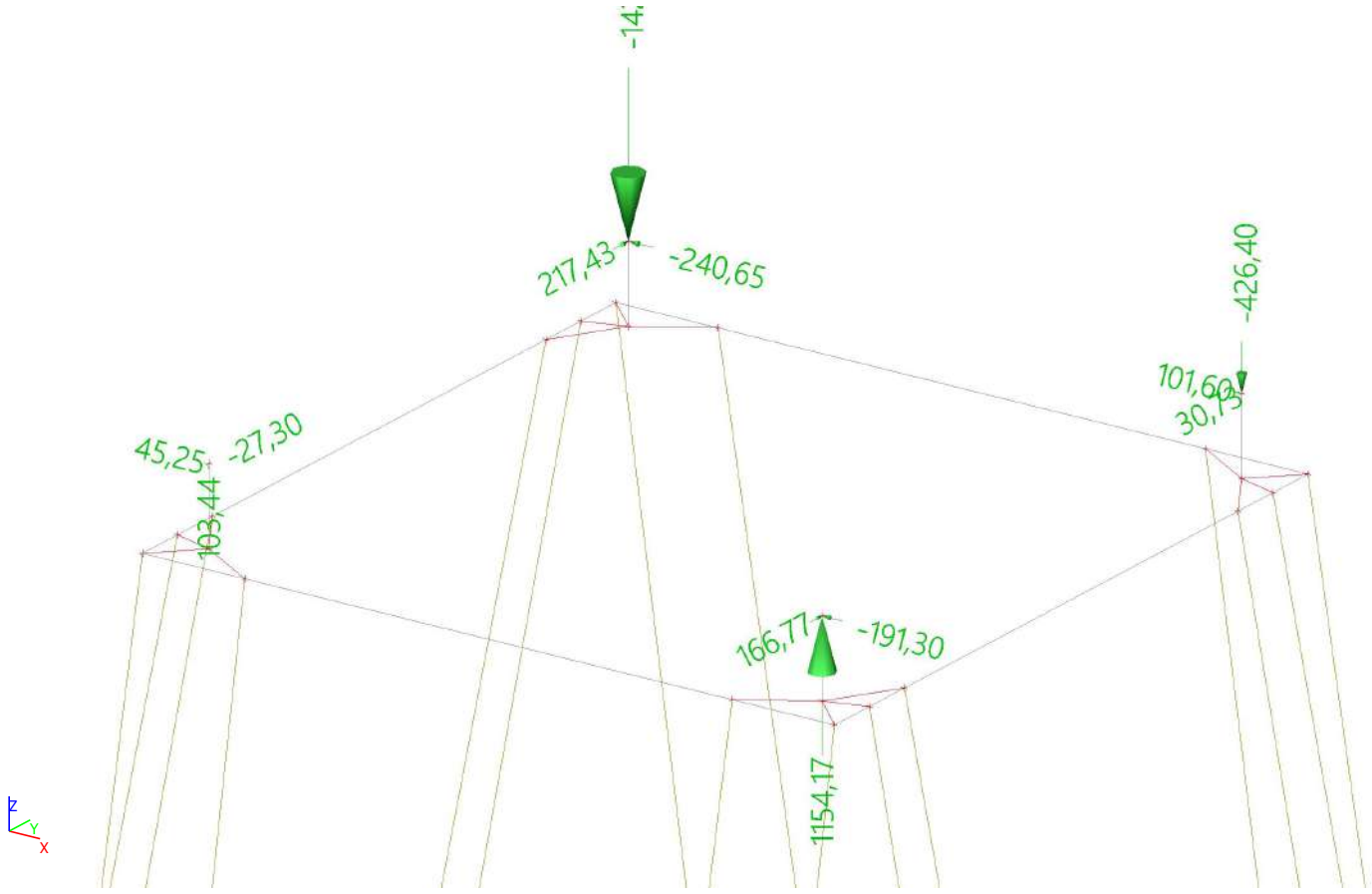
6.1.4.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Kracht	188,18
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Kracht	163,93
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Kracht	1138,30
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Kracht	-105,20
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Kracht	33,98
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Kracht	-444,51
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Kracht	244,77
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Kracht	221,76

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Kracht	-1451,44
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Kracht	-40,89
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Kracht	-32,07
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Kracht	78,25

6.1.5. Belastingsgevallen - low max Wnd ;45°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
low max Wnd ;45°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



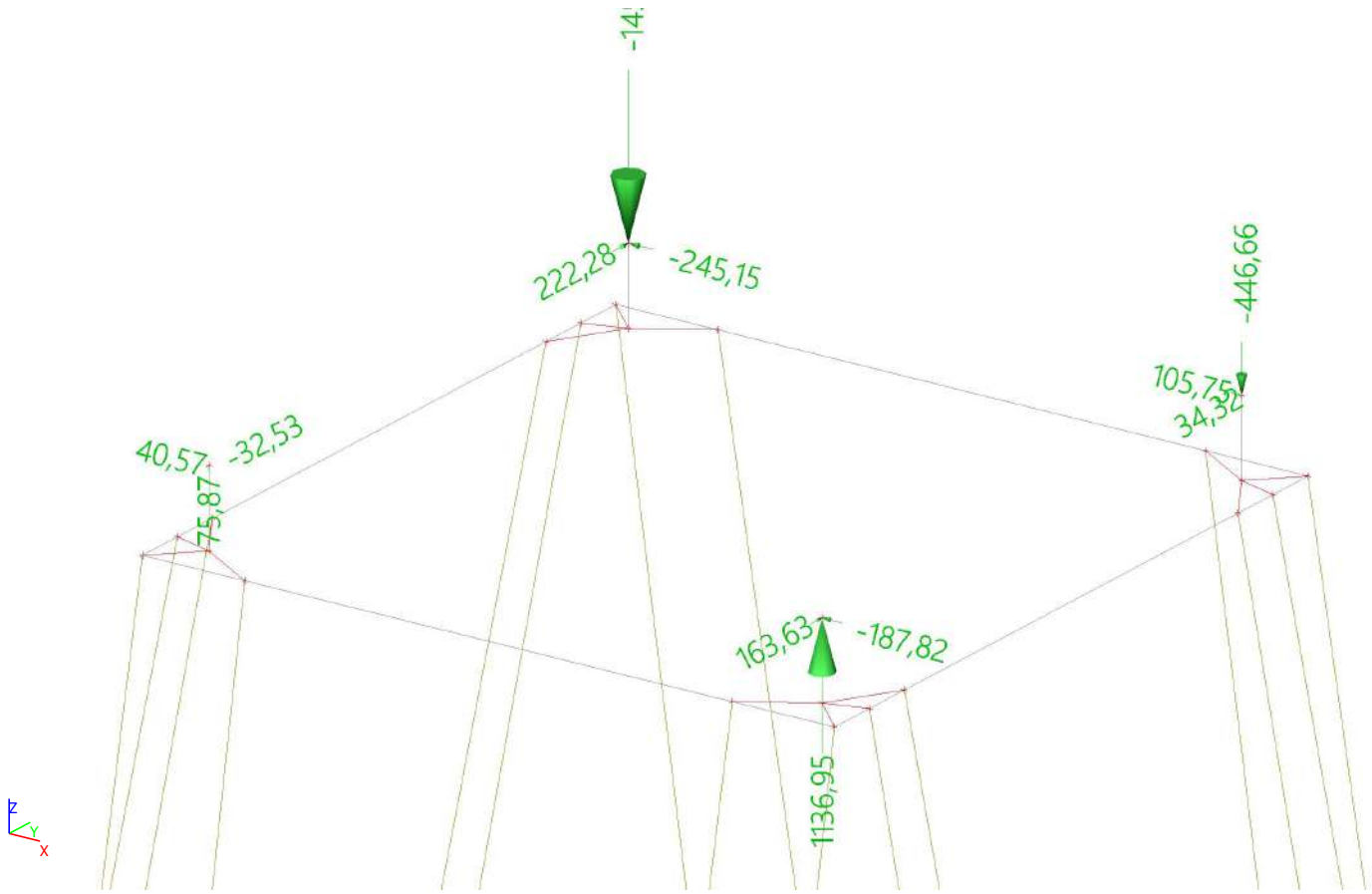
6.1.5.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Kracht	45,25
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Kracht	-27,30
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Kracht	103,44
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Kracht	-240,65
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Kracht	217,43

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Kracht	-1426,53
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Kracht	101,60
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Kracht	30,73
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Kracht	-426,40
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Kracht	-191,30
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Kracht	166,77
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Kracht	1154,17

6.1.6. Belastingsgevallen - high max Wnd ;45°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
high max Wnd ;45°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			

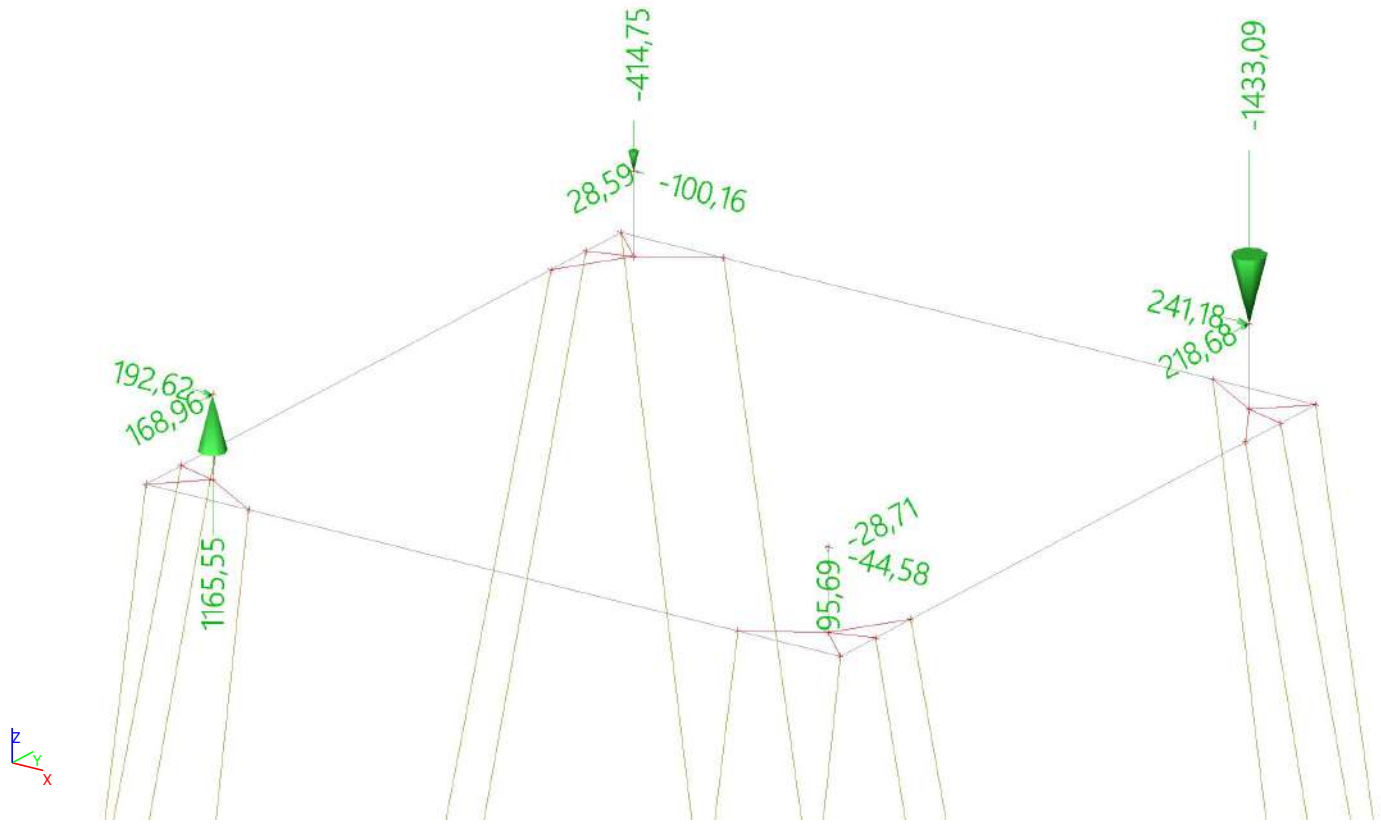


6.1.6.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Kracht	40,57
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Kracht	-32,53
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Kracht	75,87
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Kracht	-245,15
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Kracht	222,28
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Kracht	-1454,36
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Kracht	105,75
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Kracht	34,32
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Kracht	-446,66
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Kracht	-187,82
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Kracht	163,63
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Kracht	1136,95

6.1.7. Belastingsgevallen - low max Wnd ;135°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
low max Wnd ;135°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			

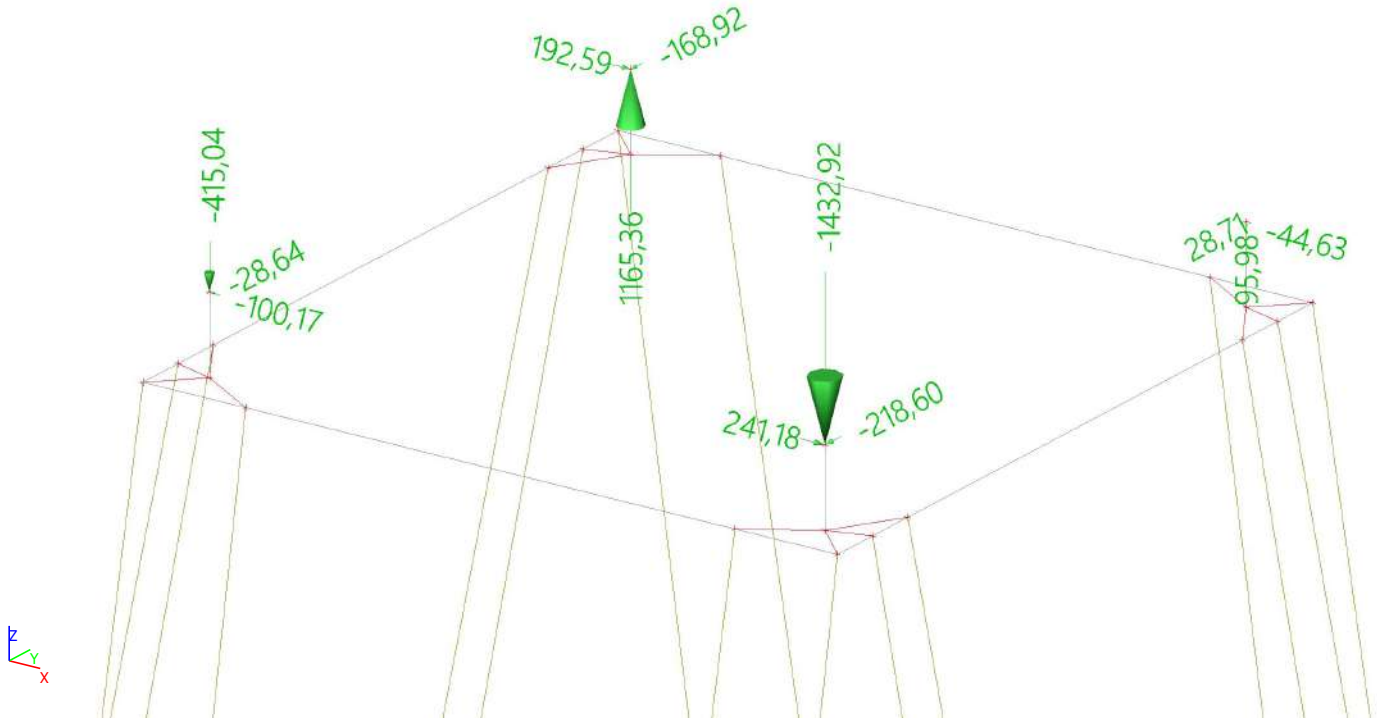


6.1.7.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Kracht	192,62
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Kracht	168,96
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Kracht	1165,55
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Kracht	-100,16
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Kracht	28,59
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Kracht	-414,75
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Kracht	241,18
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Kracht	218,68
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Kracht	-1433,09
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Kracht	-44,58
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Kracht	-28,71
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Kracht	95,69

6.1.8. Belastingsgevallen - low max Wnd ;225°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
low max Wnd ;225°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



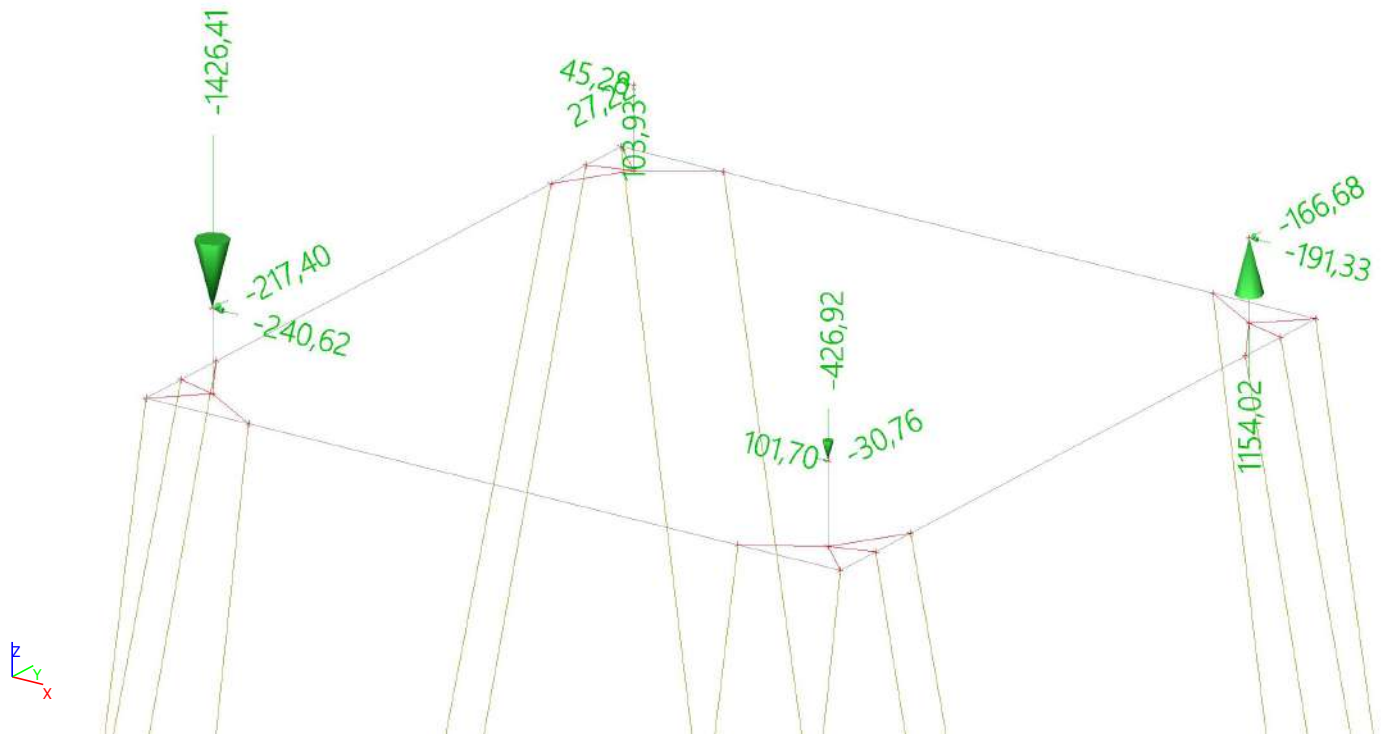
6.1.8.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Kracht	-100,17
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Kracht	-28,64
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Kracht	-415,04
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Kracht	192,59
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Kracht	-168,92
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Kracht	1165,36
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Kracht	-44,63
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Kracht	28,71
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Kracht	95,98
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Kracht	241,18
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Kracht	-218,60

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Kracht	-1432,92

6.1.9. Belastingsgevallen - low max Wnd ;315°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
low max Wnd ;315°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



6.1.9.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Kracht	-240,62
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Kracht	-217,40
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Kracht	-1426,41
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Kracht	45,28
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Kracht	27,22
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Kracht	103,93
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Kracht	-191,33
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Kracht	-166,68

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Kracht	1154,02
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Kracht	101,70
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Kracht	-30,76
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Kracht	-426,92

6.2. Niet-lineaire combinaties

Naam	Type	Belastingsgevallen	Coëff. [-]
low max Wnd ;45°	Uiterste Grenstoestand	E.G.	0,900
		low max Wnd ;45°	1,000
high max Wnd ;225°	Uiterste Grenstoestand	E.G.	1,200
		high max Wnd ;225°	1,000
high max Wnd ;315°	Uiterste Grenstoestand	E.G.	1,200
		high max Wnd ;315°	1,000
high max Wnd ;135°	Uiterste Grenstoestand	E.G.	1,200
		high max Wnd ;135°	1,000
high max Wnd ;45°	Uiterste Grenstoestand	E.G.	1,200
		high max Wnd ;45°	1,000
low max Wnd ;135°	Uiterste Grenstoestand	E.G.	0,900
		low max Wnd ;135°	1,000
low max Wnd ;225°	Uiterste Grenstoestand	E.G.	0,900
		low max Wnd ;225°	1,000
low max Wnd ;315°	Uiterste Grenstoestand	E.G.	0,900
		low max Wnd ;315°	1,000

6.3. Resultaatklasses

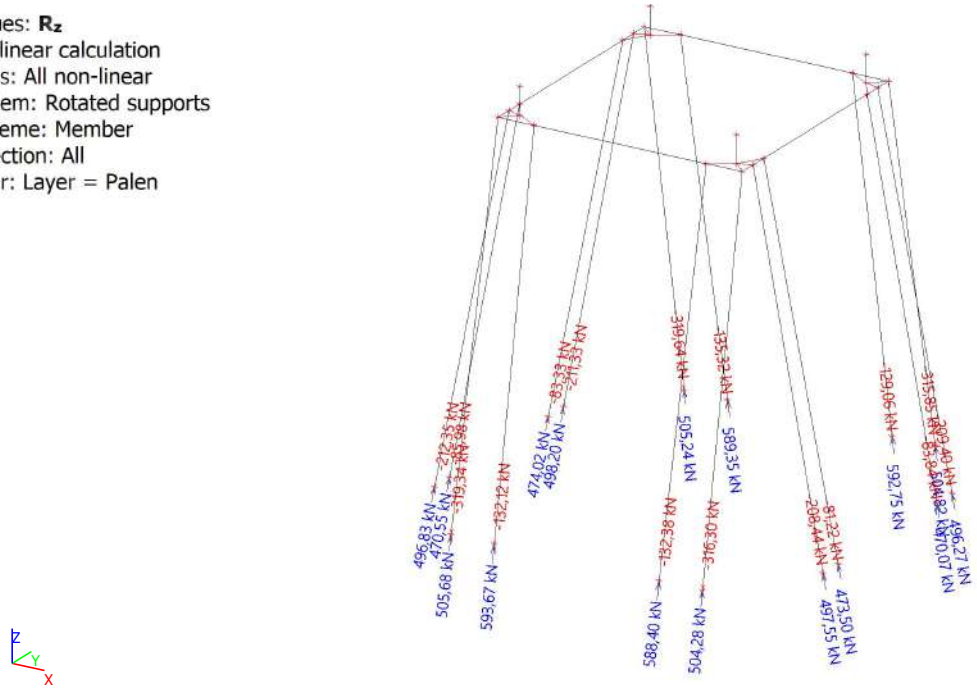
Naam	Lijst
All non-linear	low max Wnd ;45°
	high max Wnd ;225°
	high max Wnd ;315°
	high max Wnd ;135°
	high max Wnd ;45°
	low max Wnd ;135°
	low max Wnd ;225°
	low max Wnd ;315°

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reacties

Niet-lineaire berekening
Klasse: All non-linear
Systeem: Schuine steunpunten
Extreem: Globaal
Selectie: Alle
Filter: Laag = Palen
Knoopreacties

Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn18/N106	high max Wnd ;225°	**0,00**	0,00	504,28	0,00	0,00	0,00	0,0	0,0
Sn16/N135	low max Wnd ;315°	**0,00**	0,00	459,18	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn3/N108	low max Wnd ;225°	0,00	**0,00**	530,14	0,00	0,00	0,00	0,0	0,0
Sn11/N127	low max Wnd ;45°	0,00	**0,00**	528,56	0,00	0,00	0,00	0,0	0,0
Sn12/N126	low max Wnd ;225°	0,00	0,00	**-319,64**	0,00	0,00	0,00	0,0	0,0
Sn2/N1	high max Wnd ;315°	0,00	0,00	**593,67**	0,00	0,00	0,00	0,0	0,0

7.1.3. Reacties

Niet-lineaire berekening
Klasse: All non-linear
Systeem: Schuine steunpunten
Extreem: Element
Selectie: Alle
Filter: Laag = Palen
Knoopreacties

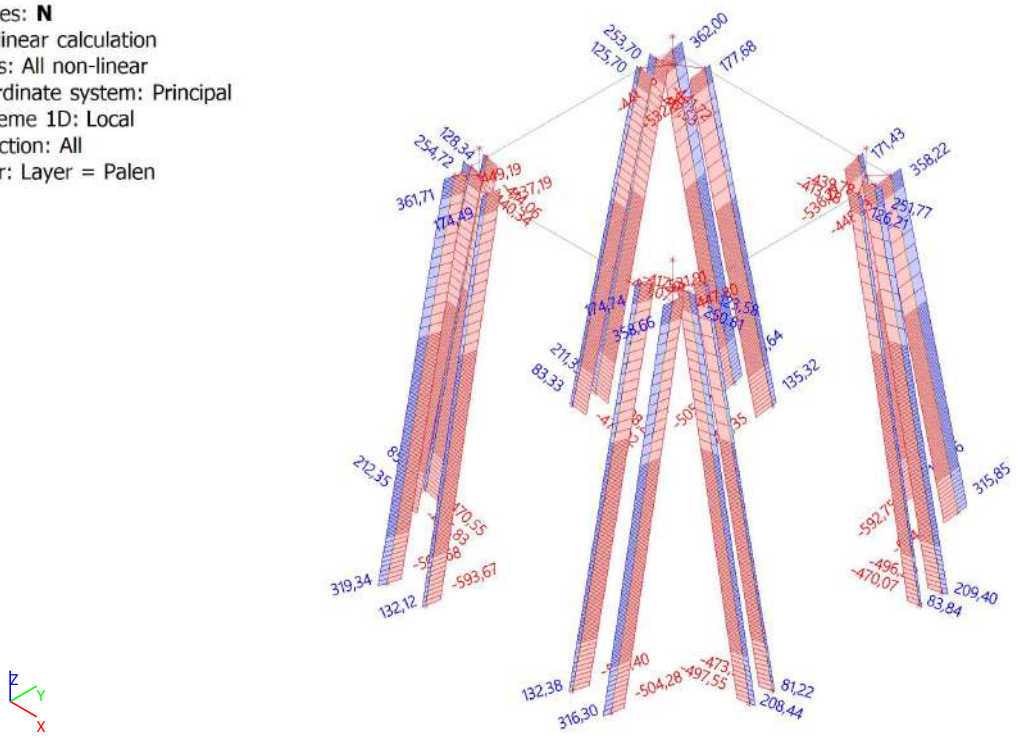
Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn1/1P3	low max Wnd ;315°	0,00	**0,00**	483,16	0,00	0,00	0,00	0,0	0,0
Sn1/1P3	high max Wnd ;135°	0,00	**0,00**	-297,15	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn1/1P3	high max Wnd ;315°	**0,00**	0,00	**505,68**	0,00	0,00	0,00	0,0	0,0
Sn1/1P3	low max Wnd ;135°	**0,00**	0,00	**-319,34**	0,00	0,00	**0,00**	0,0	0,0
Sn2/N1	low max Wnd ;315°	0,00	**0,00**	531,80	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn2/N1	low max Wnd ;135°	**0,00**	0,00	**-132,12**	0,00	0,00	0,00	0,0	0,0
Sn2/N1	high max Wnd ;315°	**0,00**	**0,00**	**593,67**	0,00	0,00	**0,00**	0,0	0,0
Sn18/N106	low max Wnd ;315°	0,00	**0,00**	188,92	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn18/N106	low max Wnd ;45°	**0,00**	0,00	**-316,30**	0,00	0,00	0,00	0,0	0,0
Sn18/N106	high max Wnd ;225°	**0,00**	**0,00**	**504,28**	0,00	0,00	**0,00**	0,0	0,0
Sn3/N108	low max Wnd ;225°	0,00	**0,00**	530,14	0,00	0,00	0,00	0,0	0,0
Sn3/N108	high max Wnd ;225°	**0,00**	**0,00**	**588,40**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn3/N108	low max Wnd ;45°	**0,00**	0,00	**-132,38**	0,00	0,00	**0,00**	0,0	0,0
Sn5/N111	high max Wnd ;225°	**0,00**	**0,00**	**497,55**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn5/N111	low max Wnd ;45°	0,00	**0,00**	**-208,44**	0,00	0,00	0,00	0,0	0,0
Sn5/N111	low max Wnd ;315°	**0,00**	0,00	169,58	0,00	0,00	**0,00**	0,0	0,0
Sn6/N114	low max Wnd ;315°	**0,00**	0,00	216,66	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn6/N114	low max Wnd ;45°	0,00	**0,00**	**-81,22**	0,00	0,00	0,00	0,0	0,0
Sn6/N114	high max Wnd ;225°	0,00	**0,00**	**473,50**	0,00	0,00	0,00	0,0	0,0
Sn6/N114	low max Wnd ;135°	**0,00**	0,00	133,17	0,00	0,00	**0,00**	0,0	0,0
Sn7/N119	high max Wnd ;225°	**0,00**	0,00	133,19	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn7/N119	low max Wnd ;135°	0,00	**0,00**	461,03	0,00	0,00	0,00	0,0	0,0
Sn7/N119	low max Wnd ;315°	0,00	**0,00**	**-209,40**	0,00	0,00	0,00	0,0	0,0
Sn7/N119	high max Wnd ;135°	**0,00**	0,00	**496,27**	0,00	0,00	**0,00**	0,0	0,0
Sn8/N120	low max Wnd ;135°	**0,00**	0,00	419,50	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn8/N120	high max Wnd ;135°	0,00	**0,00**	**470,07**	0,00	0,00	0,00	0,0	0,0
Sn8/N120	low max Wnd ;315°	0,00	**0,00**	**-83,84**	0,00	0,00	0,00	0,0	0,0
Sn8/N120	high max Wnd ;45°	**0,00**	0,00	264,70	0,00	0,00	**0,00**	0,0	0,0
Sn17/N122	low max Wnd ;315°	**0,00**	**0,00**	**-315,85**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn17/N122	high max Wnd ;135°	**0,00**	**0,00**	**504,82**	0,00	0,00	**0,00**	0,0	0,0
Sn10/N124	high max Wnd ;135°	**0,00**	**0,00**	**592,75**	0,00	0,00	0,00	0,0	0,0
Sn10/N124	low max Wnd ;45°	0,00	**0,00**	304,88	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn10/N124	low max Wnd ;315°	**0,00**	0,00	**-129,06**	0,00	0,00	**0,00**	0,0	0,0

Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn12/N126	low max Wnd ;45°	0,00	**0,00**	482,85	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn12/N126	low max Wnd ;225°	0,00	0,00	**-319,64**	0,00	0,00	0,00	0,0	0,0
Sn12/N126	high max Wnd ;45°	**0,00**	0,00	**505,24**	0,00	0,00	0,00	0,0	0,0
Sn12/N126	high max Wnd ;225°	**0,00**	**0,00**	-297,56	0,00	0,00	**0,00**	0,0	0,0
Sn11/N127	low max Wnd ;45°	0,00	**0,00**	528,56	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn11/N127	low max Wnd ;225°	**0,00**	**0,00**	**-135,32**	0,00	0,00	0,00	0,0	0,0
Sn11/N127	high max Wnd ;45°	**0,00**	0,00	**589,35**	0,00	0,00	**0,00**	0,0	0,0
Sn13/N129	high max Wnd ;225°	**0,00**	0,00	-174,06	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn13/N129	high max Wnd ;45°	0,00	**0,00**	**498,20**	0,00	0,00	0,00	0,0	0,0
Sn13/N129	low max Wnd ;225°	**0,00**	**0,00**	**-211,33**	0,00	0,00	**0,00**	0,0	0,0
Sn14/N131	low max Wnd ;225°	0,00	**0,00**	**-83,33**	0,00	0,00	0,00	0,0	0,0
Sn14/N131	high max Wnd ;45°	**0,00**	0,00	**474,02**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn14/N131	low max Wnd ;45°	**0,00**	**0,00**	420,77	0,00	0,00	**0,00**	0,0	0,0
Sn15/N133	low max Wnd ;315°	**0,00**	0,00	418,16	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn15/N133	high max Wnd ;315°	0,00	**0,00**	**470,55**	0,00	0,00	0,00	0,0	0,0
Sn15/N133	low max Wnd ;135°	**0,00**	**0,00**	**-85,98**	0,00	0,00	**0,00**	0,0	0,0
Sn16/N135	low max Wnd ;315°	**0,00**	0,00	459,18	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn16/N135	high max Wnd ;315°	0,00	**0,00**	**496,83**	0,00	0,00	0,00	0,0	0,0
Sn16/N135	low max Wnd ;135°	**0,00**	**0,00**	**-212,35**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

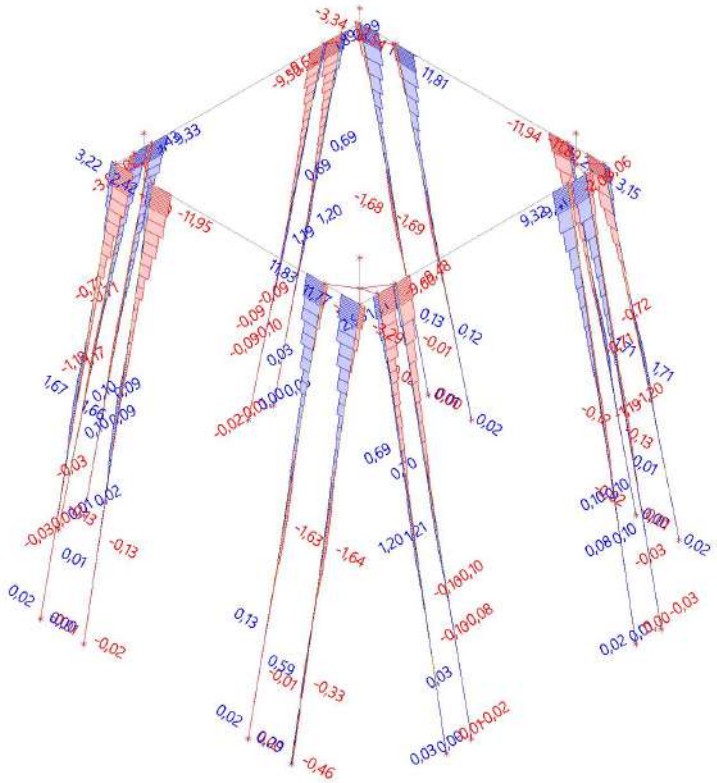
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



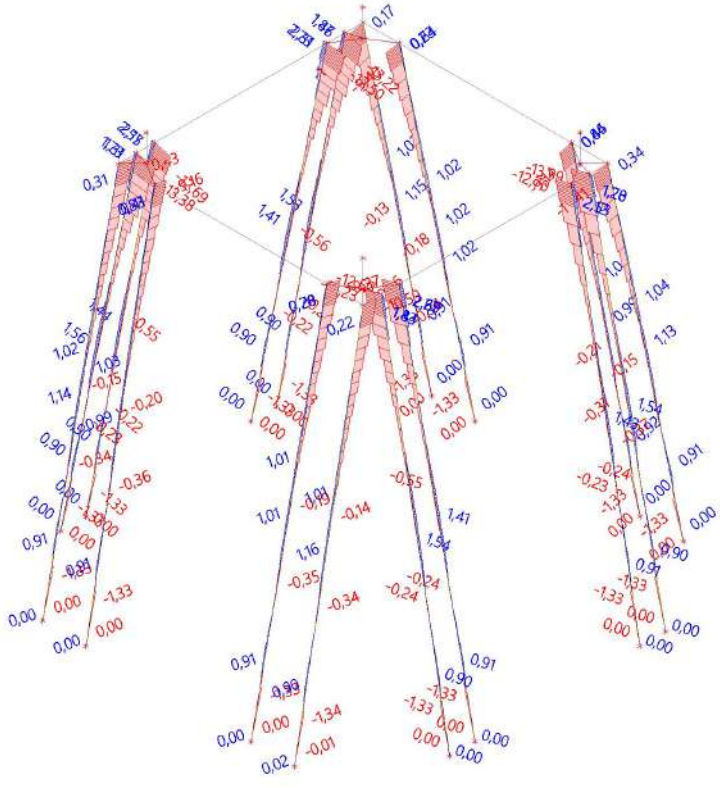
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



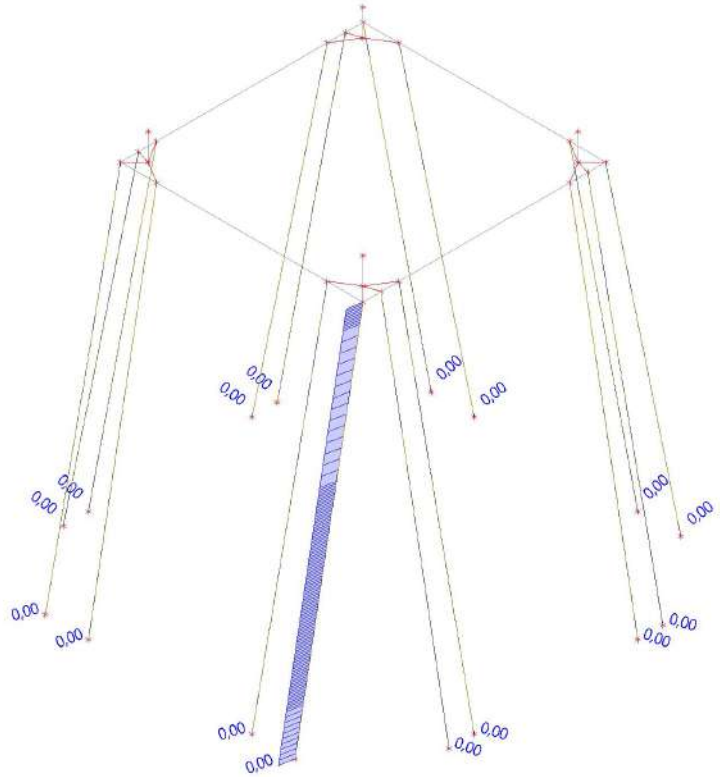
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



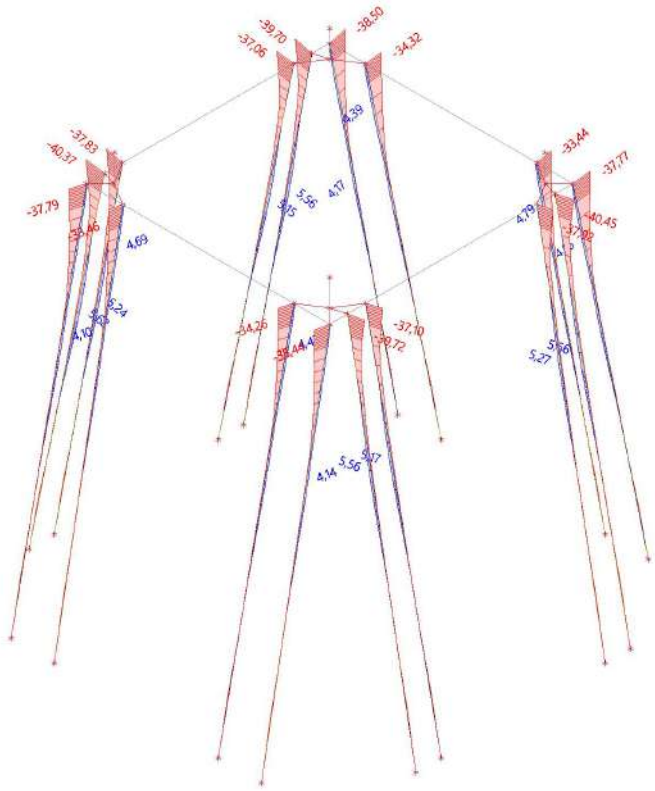
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



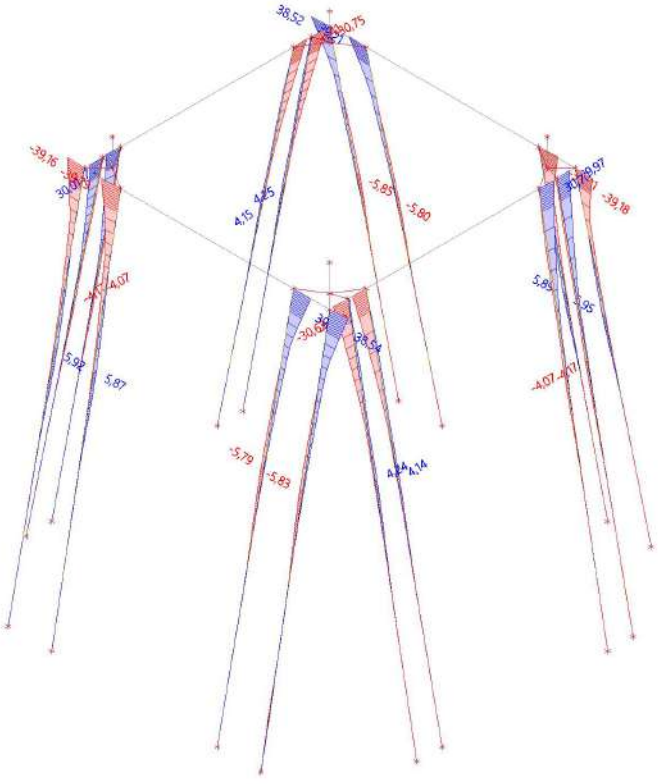
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. Interne 1D-krachten

Niet-lineaire berekening
Klasse: All non-linear
Coördinatenstelsel: Hoofd
Extreme 1D: Globaal
Selectie: Alle
Filter: Laag = Palen

Naam	dx [m]	Belasting	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B8	0,000	high max Wnd ;315°	**-593,67**	-0,02	0,00	0,00	0,00	0,00
B36	20,397	low max Wnd ;225°	**362,00**	-1,47	-7,59	**0,00**	-32,80	6,52
B8	19,397+	high max Wnd ;45°	-116,95	**-11,95**	-0,40	0,00	-5,69	-27,84
B40	19,397+	low max Wnd ;135°	-173,95	-8,35	**2,73**	0,00	-2,55	-18,29
B20	0,000	high max Wnd ;225°	-504,28	-0,46	0,02	**0,00**	0,00	0,00
B29	20,397	high max Wnd ;225°	-76,70	-2,01	**-13,39**	0,00	**-40,45**	0,27
B29	13,272-	high max Wnd ;225°	-97,65	0,75	0,16	0,00	**5,66**	1,89
B34	20,397	high max Wnd ;225°	-113,40	-11,94	-0,97	0,00	-6,40	**-39,81**
B22	20,397	high max Wnd ;135°	-109,13	**11,83**	-1,19	0,00	-7,25	**39,23**

7.3. Krachten van de Poeren

7.3.1. Interne 1D-krachten

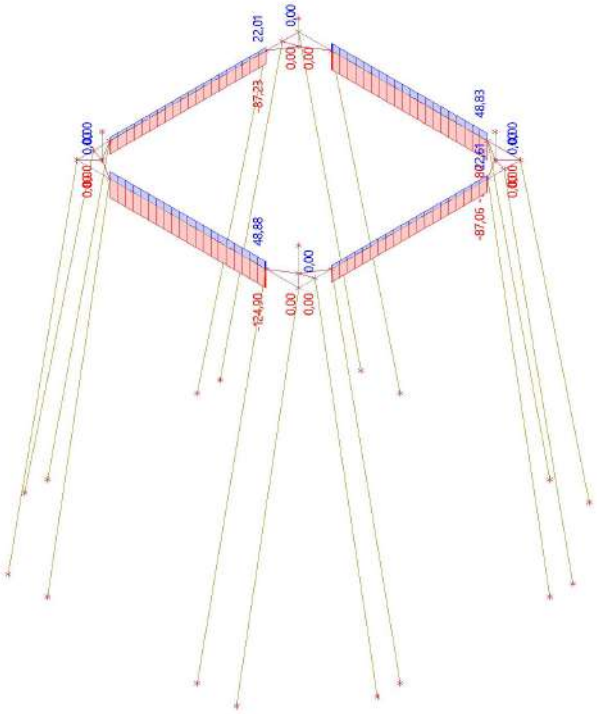
Niet-lineaire berekening
Klasse: All non-linear
Coördinatenstelsel: Hoofd
Extreme 1D: Globaal
Selectie: Alle
Filter: Laag = Poeren

Naam	dx [m]	Belasting	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B5	1,475	low max Wnd ;135°	**1165,55**	-255,68	16,73	0,17	0,00	-11,66
B5	0,000	low max Wnd ;135°	1141,04	**-255,68**	16,73	1,51	-24,68	**273,11**
B16	0,000	low max Wnd ;135°	71,18	-11,22	**-51,82**	**-4,66**	**76,44**	8,83
B17	0,000	low max Wnd ;225°	71,47	-11,26	**51,86**	**4,67**	**-76,49**	8,86
B18	0,000	high max Wnd ;45°	**-1487,05**	**330,52**	16,17	1,46	-23,85	**-355,44**

7.4. Krachten van de Funderingsbalken

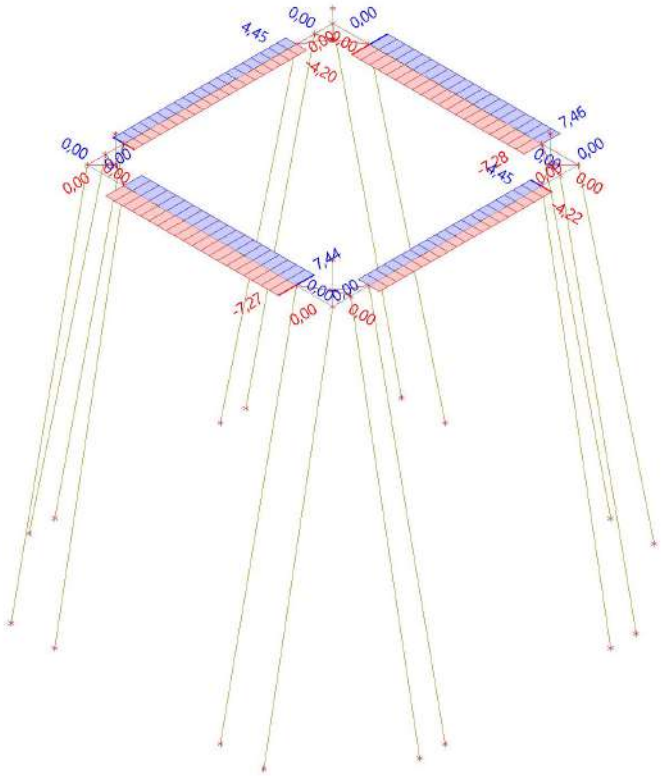
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



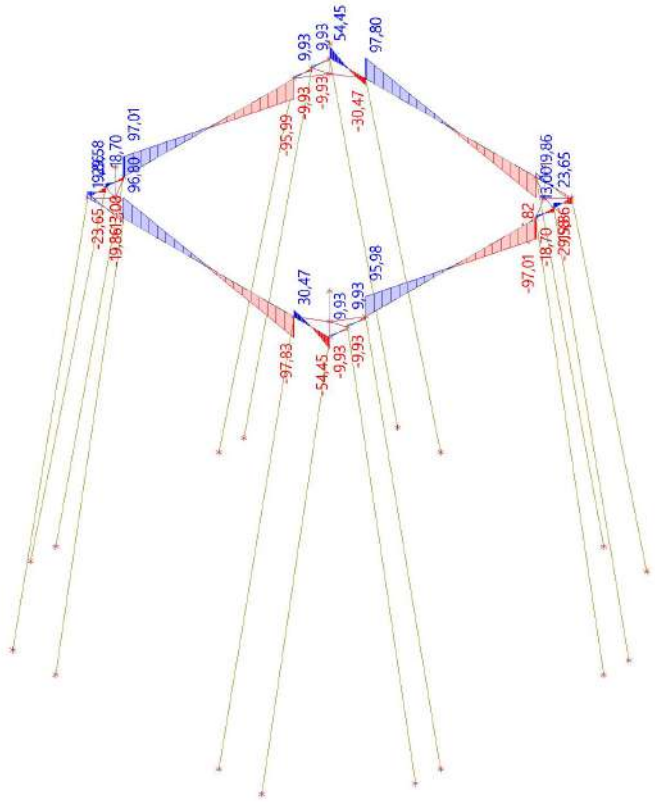
7.4.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



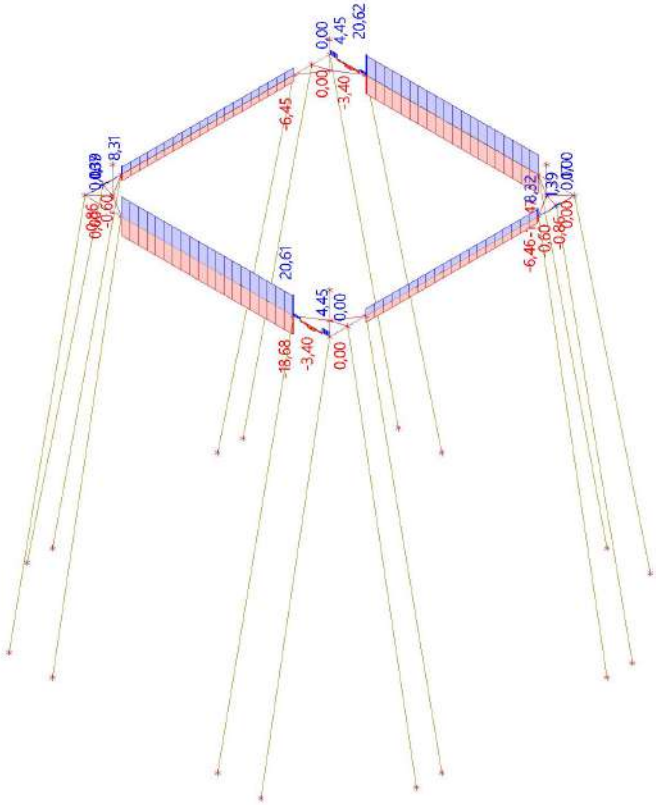
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



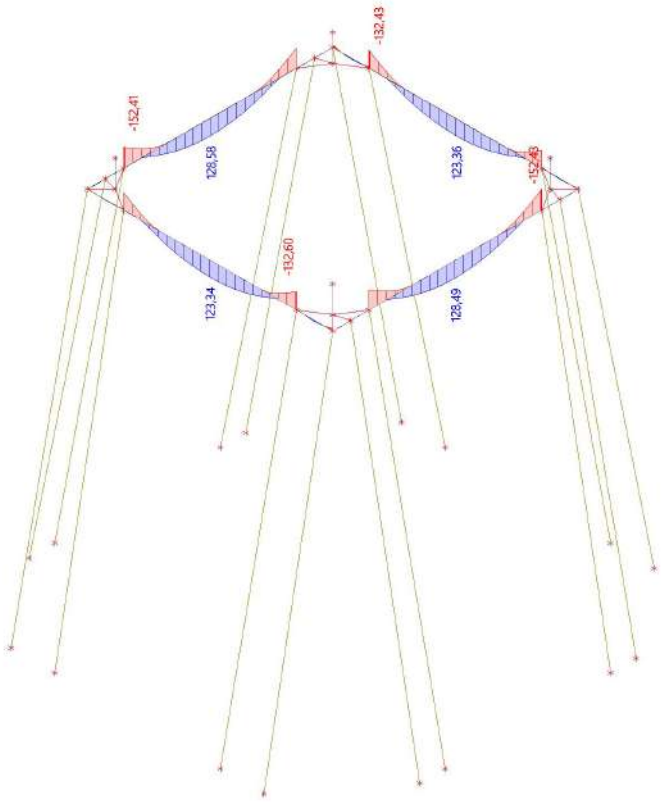
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



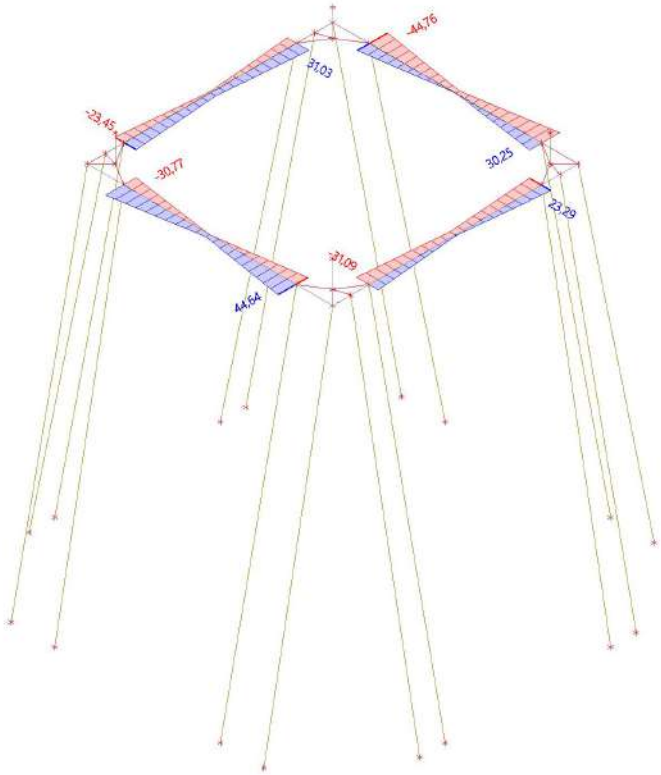
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. Interne 1D-krachten

Niet-lineaire berekening
Klasse: All non-linear
Coördinatenstelsel: Hoofd
Extreme 1D: Globaal
Selectie: Alle
Filter: Laag = Balken

Naam	dx [m]	Belasting	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B10	2,000+	low max Wnd ;315°	**48,88**	-6,35	68,35	18,79	-78,58	30,99
B11	2,000+	high max Wnd ;225°	-124,80	**-7,28**	**97,80**	**20,62**	-117,16	26,73
B10	11,538-	high max Wnd ;45°	-124,63	-7,27	**-97,83**	20,61	-117,31	-26,66
B10	6,744-	low max Wnd ;135°	-112,06	7,35	2,61	**-18,68**	94,23	8,08
B15	11,538-	high max Wnd ;135°	10,89	3,76	-96,83	-5,12	**-152,43**	4,91
B14	6,794-	high max Wnd ;225°	-87,23	4,45	1,78	-6,34	**128,58**	-1,59
B11	2,050+	high max Wnd ;315°	-124,73	**7,46**	91,61	-18,47	-87,93	**-44,76**
B10	11,488-	high max Wnd ;135°	**-124,90**	7,44	-91,62	-18,48	-87,97	**44,64**

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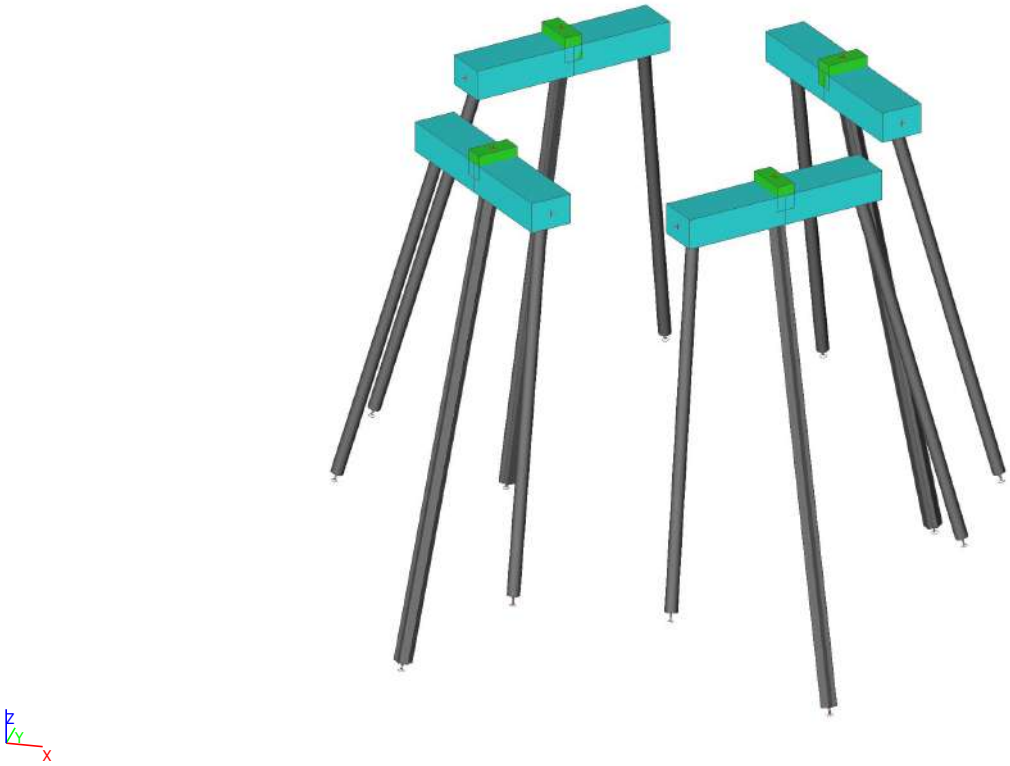
2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Blokpoer 1xLD1 2xTubex
Author	[redacted]
Date	7-05-2026
Structure	General XYZ
No. of nodes :	36
No. of beams :	24
No. of slabs :	0
No. of solids :	0
No. of used profiles :	4
No. of load cases :	9
No. of used materials :	6
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analysis model



4. Modeleigenschappen

4.1. Materials

Steel EC3

Name	ρ [kg/m³]	E_{mod} [MPa]	μ [-]	Lower limit [mm]	Upper limit [mm]	F_y [MPa]	F_u [MPa]	Colour
		G_{mod} [MPa]	α [m/mK]					
S 235	6850,00	2,1000e+05	0,30	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	
S 235	6850,00	2,1000e+05	0,30	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	

Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ [-]	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C35/45 Gescheurd	Concrete	2500,00	2600,00	1,1333e+04	0,20	0,01e-003	35,00	
C12/15 Ongescheurd	Concrete	1500,00	2600,00	2,7000e+04	0,20	0,01e-003	12,00	
C12/15 Gescheurd	Concrete	1500,00	2600,00	7,0000e+03	0,20	0,01e-003	12,00	

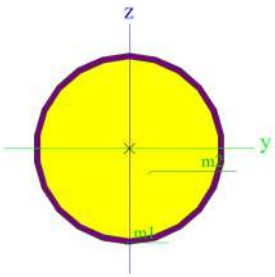
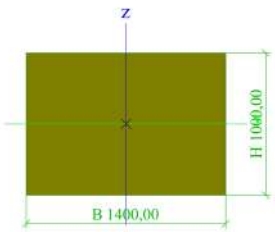
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

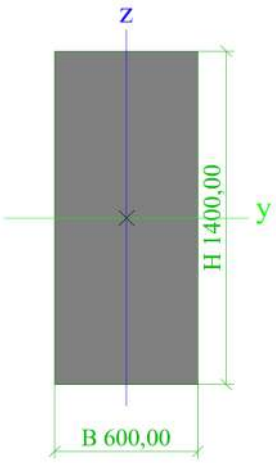
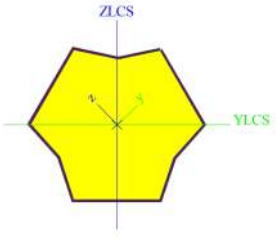
Reinforcement EC2

Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Reinforcement steel	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

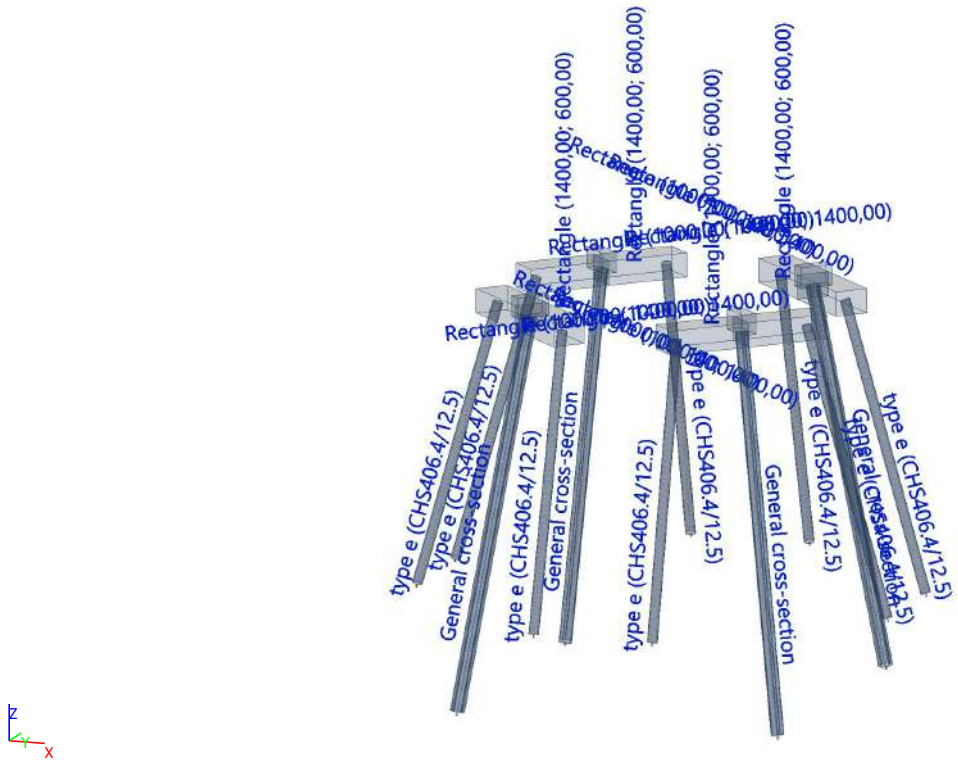
4.2. Cross-sections

TubexPaal		
Type	type e	
Detailed	CHS406.4/12.5	
Shape type	Thick-walled	
Item material	S 235	
	C12/15 Ongescheurd	
Fabrication	concrete	
Flexural buckling y-y, Flexural buckling z-z	a	a
A [mm²]	3,0151e+04	
A_y [mm²], A_z [mm²]	2,3655e+04	2,3655e+04
A_L [m²/m], A_D [m²/m]	1,2767e+00	1,2767e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	203,20	203,20
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	4,3368e+08	4,3368e+08
i_y [mm], i_z [mm]	119,93	119,93
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	2,1342e+06	2,1342e+06
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	2,1144e+06	2,1144e+06
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	496889449,79	496889449,79
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	496889449,79	496889449,79
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	8,8937e+08	5,0557e+03
β_y [mm], β_z [mm]	0,00	0,00

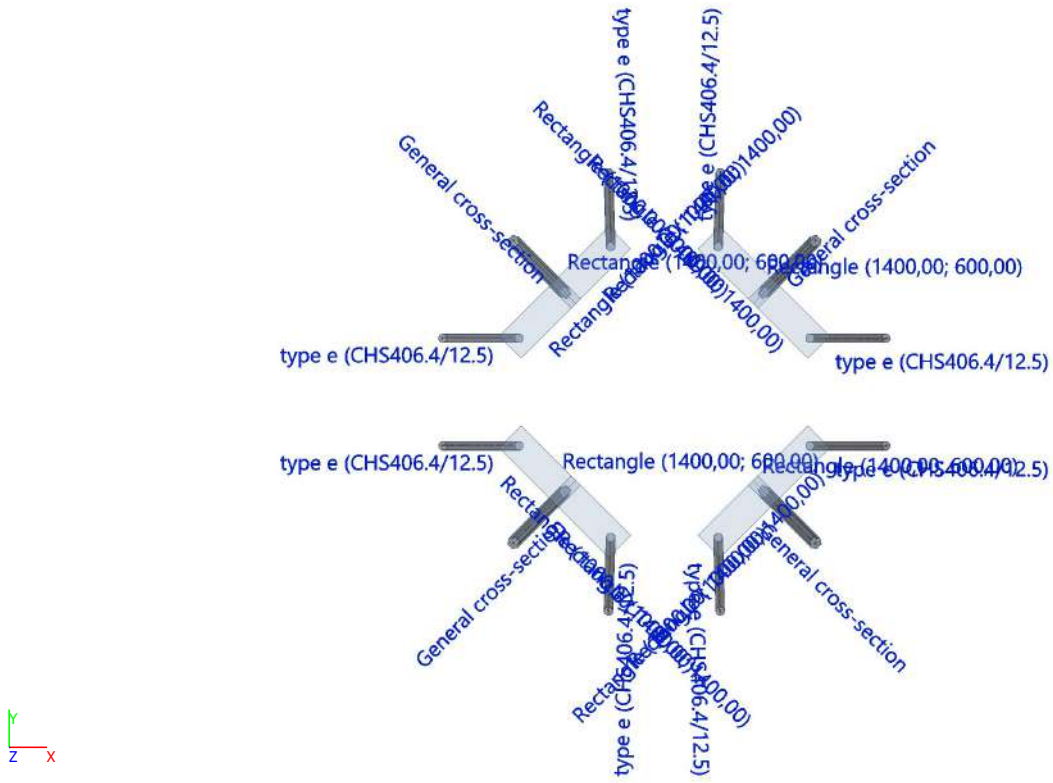
Picture		
Balk		
Type	Rectangle	
Detailed	1000,00; 1400,00	
Shape type	Thick-walled	
Item material	C35/45 Gescheurd	
Fabrication	concrete	
Colour		
A [mm²]	1,4000e+06	
A_y [mm²], A_z [mm²]	1,1670e+06	1,1673e+06
A_L [m²/m], A_D [m²/m]	4,8000e+00	4,8000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	700,00	500,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	1,1667e+11	2,2867e+11
i_y [mm], i_z [mm]	288,68	404,15
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	2,3333e+08	3,2667e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	2,6176e+11	2,2997e+15
β_y [mm], β_z [mm]	0,00	0,00
Picture		
Poer		
Type	Rectangle	
Detailed	1400,00; 600,00	
Shape type	Thick-walled	
Item material	C35/45 Gescheurd	
Fabrication	concrete	
Colour		
A [mm²]	8,4000e+05	
A_y [mm²], A_z [mm²]	7,0065e+05	7,0012e+05
A_L [m²/m], A_D [m²/m]	4,0000e+00	4,0000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	300,00	700,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	1,3720e+11	2,5200e+10
i_y [mm], i_z [mm]	404,15	173,21
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,9600e+08	8,4000e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	7,3634e+10	1,9653e+15
β_y [mm], β_z [mm]	0,00	0,00

Picture		
LD1(31-plank)		
Type	General cross-section	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
	S 235	
Fabrication	concrete	
Flexural buckling y-y, Flexural buckling z-z	d	d
A [mm²]	6,0572e+05	
A_y [mm²], A_z [mm²]	3,6248e+05	3,6314e+05
A_L [m²/m], A_D [m²/m]	1,7651e+00	3,4664e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	553,25	9,99
$I_{Y.LCS}$ [mm⁴], $I_{Z.LCS}$ [mm⁴]	1,6274e+10	1,6264e+10
$I_{YZ.LCS}$ [mm⁴]	-1,0231e+08	
α [deg]	43,55	
I_y [mm⁴], I_z [mm⁴]	1,6372e+10	1,6167e+10
i_y [mm], i_z [mm]	164,40	163,37
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	5,7898e+07	5,8163e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	4,9594e+07	4,9245e+07
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	601215312,58	595125922,92
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	597037111,16	590937542,96
d_y [mm], d_z [mm]	0,12	0,03
I_t [mm⁴], I_w [mm⁶]	2,6243e+10	1,7700e+12
β_y [mm], β_z [mm]	0,09	0,21
Picture		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	MeshSetup1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	1
Average size of 2D mesh element [m]	0,200
Average size of 1D mesh element on curved 1D members [m]	0,100
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

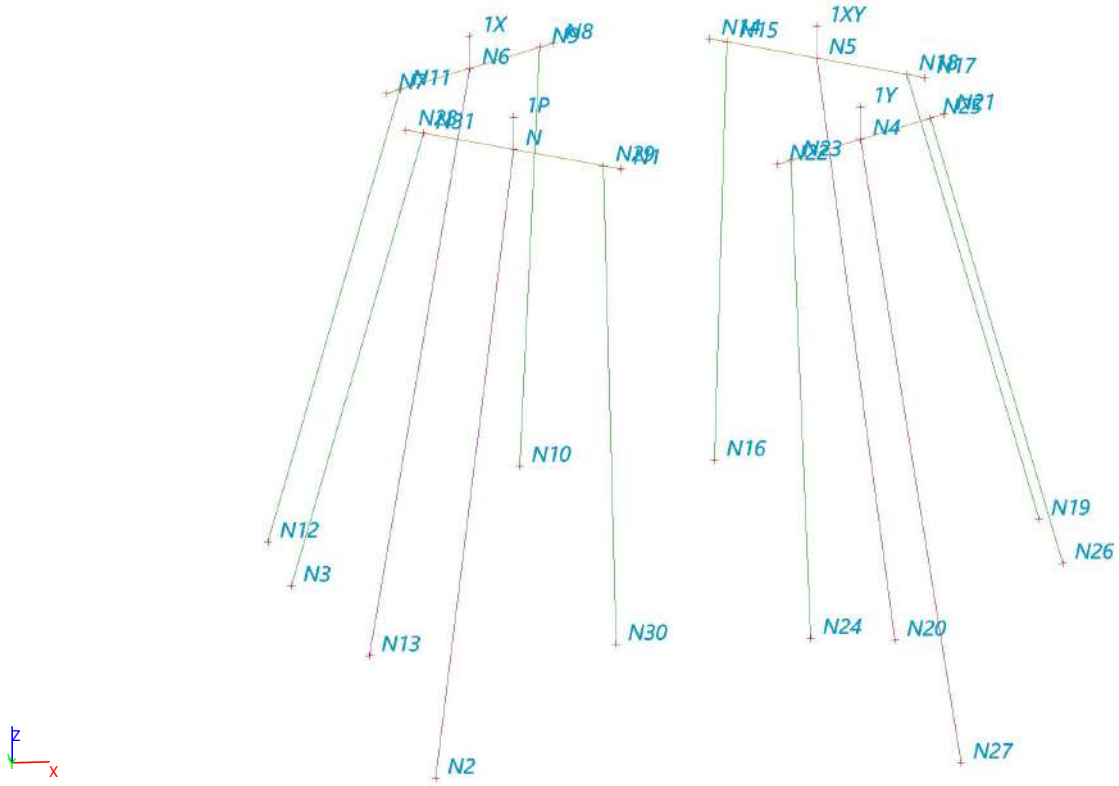
5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N	0,000	0,000	0,000
N2	-2,312	-2,312	-16,000
N3	-5,500	2,072	-11,859
N31	-2,072	2,072	0,000
N30	1,975	-5,401	-11,851
N29	2,072	-2,072	0,000
N1	2,475	-2,475	0,000
N28	-2,475	2,475	0,000
1P	0,000	0,000	0,850
N4	9,000	0,000	0,000
N27	11,312	-2,312	-16,000
N26	14,500	2,072	-11,859

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N25	11,072	2,072	0,000
N24	7,025	-5,401	-11,851
N23	6,928	-2,072	0,000
N22	6,525	-2,475	0,000
N21	11,475	2,475	0,000
1Y	9,000	0,000	0,850
N20	11,312	11,312	-16,000
N19	14,500	6,928	-11,859
N18	11,072	6,928	0,000
N17	11,475	6,525	0,000
N5	9,000	9,000	0,000
N16	7,025	14,401	-11,851

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N15	6,928	11,072	0,000
N14	6,525	11,475	0,000
1XY	9,000	9,000	0,850
N6	0,000	9,000	0,000
N13	-2,312	11,312	-16,000
N12	-5,500	6,928	-11,859
N11	-2,072	6,928	0,000
N10	1,975	14,401	-11,851
N9	2,072	11,072	0,000
N8	2,475	11,475	0,000
N7	-2,475	6,525	0,000
1X	0,000	9,000	0,850

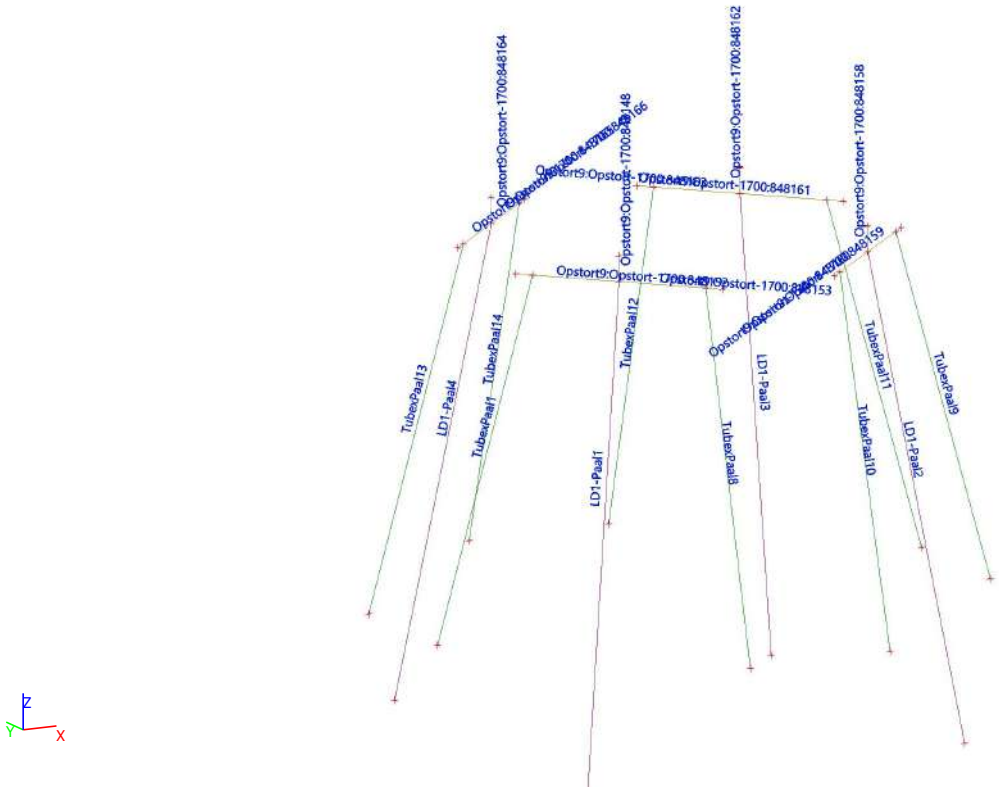
5.2. Analyse model met knopen



5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Opstort9:Opstort-1700:848152	Balk - Rectangle (1000,00; 1400,00)	C35/45 Gescheurd	3,500	N28	N	beam (80)
Opstort9:Opstort-1700:848153	Balk - Rectangle (1000,00; 1400,00)	C35/45 Gescheurd	3,500	N	N1	beam (80)
Opstort9:Opstort-1700:848159	Balk - Rectangle (1000,00; 1400,00)	C35/45 Gescheurd	3,500	N21	N4	beam (80)
Opstort9:Opstort-1700:848160	Balk - Rectangle (1000,00; 1400,00)	C35/45 Gescheurd	3,500	N4	N22	beam (80)
Opstort9:Opstort-1700:848161	Balk - Rectangle (1000,00; 1400,00)	C35/45 Gescheurd	3,500	N17	N5	beam (80)
Opstort9:Opstort-1700:848163	Balk - Rectangle (1000,00; 1400,00)	C35/45 Gescheurd	3,500	N5	N14	beam (80)
Opstort9:Opstort-1700:848165	Balk - Rectangle (1000,00; 1400,00)	C35/45 Gescheurd	3,500	N7	N6	beam (80)
Opstort9:Opstort-1700:848166	Balk - Rectangle (1000,00; 1400,00)	C35/45 Gescheurd	3,500	N6	N8	beam (80)
LD1-Paal1	LD1(31-plank) - General cross-section	C12/15 Gescheurd	16,331	N	N2	column (100)
LD1-Paal2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	16,331	N4	N27	column (100)
LD1-Paal3	LD1(31-plank) - General cross-section	C12/15 Gescheurd	16,331	N5	N20	column (100)
LD1-Paal4	LD1(31-plank) - General cross-section	C12/15 Gescheurd	16,331	N6	N13	column (100)
Opstort9:Opstort-1700:848148	Poer - Rectangle (1400,00; 600,00)	C35/45 Gescheurd	0,850	N	1P	column (100)
Opstort9:Opstort-1700:848158	Poer - Rectangle (1400,00; 600,00)	C35/45 Gescheurd	0,850	N4	1Y	column (100)
Opstort9:Opstort-1700:848162	Poer - Rectangle (1400,00; 600,00)	C35/45 Gescheurd	0,850	N5	1XY	column (100)
Opstort9:Opstort-1700:848164	Poer - Rectangle (1400,00; 600,00)	C35/45 Gescheurd	0,850	N6	1X	column (100)
TubexPaal1	TubexPaal - type e (CHS406.4/12.5)	S 235	12,345	N31	N3	column (100)
TubexPaal8	TubexPaal - type e (CHS406.4/12.5)	S 235	12,310	N29	N30	column (100)
TubexPaal9	TubexPaal - type e (CHS406.4/12.5)	S 235	12,345	N25	N26	column (100)
TubexPaal10	TubexPaal - type e (CHS406.4/12.5)	S 235	12,310	N23	N24	column (100)
TubexPaal11	TubexPaal - type e (CHS406.4/12.5)	S 235	12,345	N18	N19	column (100)
TubexPaal12	TubexPaal - type e (CHS406.4/12.5)	S 235	12,310	N15	N16	column (100)
TubexPaal13	TubexPaal - type e (CHS406.4/12.5)	S 235	12,345	N11	N12	column (100)
TubexPaal14	TubexPaal - type e (CHS406.4/12.5)	S 235	12,310	N9	N10	column (100)

5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn1	N3	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry16,12
Sn2	N2	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-8,14;Ry8,14
Sn3	N30	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-15,69
Sn4	N27	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-8,14;Ry-8,14
Sn5	N26	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-16,12
Sn6	N24	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-15,69
Sn7	N20	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx8,14;Ry-8,14
Sn8	N19	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-16,12
Sn9	N16	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx15,69
Sn10	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx8,14;Ry8,14
Sn11	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry16,12
Sn12	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx15,69

5.6. Analyse model met Knoopondersteuningen

5.7. Line supports on member

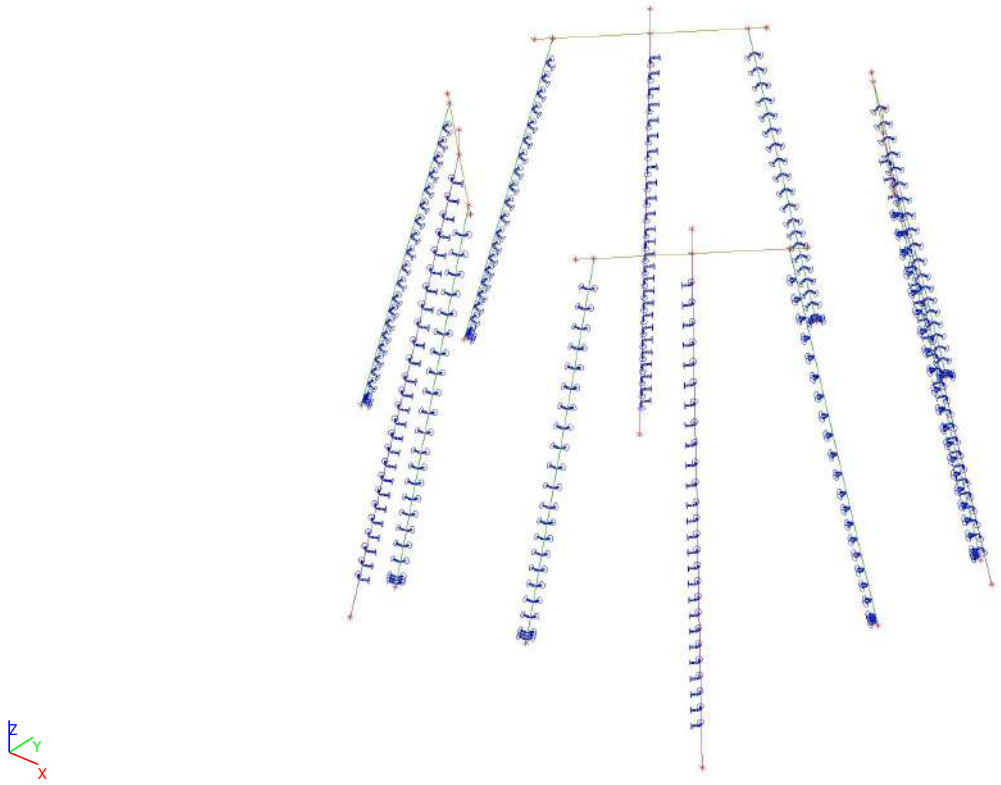
Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
Slb2	Line	LD1-Paal1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb3	Line	TubexPaal1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb4	Line	TubexPaal8	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb5	Line	LD1-Paal2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb6	Line	TubexPaal9	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb7	Line	TubexPaal10	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb8	Line	LD1-Paal3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb9	Line	TubexPaal11	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb10	Line	TubexPaal12	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb11	Line	LD1-Paal4	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb12	Line	TubexPaal13	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb13	Line	TubexPaal14	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb1	Line	LD1-Paal2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb14	Line	TubexPaal9	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	9,000	From start						
Slb15	Line	LD1-Paal3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb16	Line	TubexPaal11	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb17	Line	LD1-Paal1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb18	Line	TubexPaal1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb19	Line	TubexPaal8	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb20	Line	TubexPaal10	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb21	Line	TubexPaal12	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb22	Line	LD1-Paal4	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb23	Line	TubexPaal13	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb24	Line	TubexPaal14	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb25	Line	TubexPaal9	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb26	Line	TubexPaal11	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb27	Line	LD1-Paal1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb28	Line	TubexPaal1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb29	Line	TubexPaal8	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb30	Line	LD1-Paal2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb31	Line	TubexPaal10	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb32	Line	LD1-Paal3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb33	Line	TubexPaal12	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb34	Line	LD1-Paal4	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb35	Line	TubexPaal13	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb36	Line	TubexPaal14	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb37	Line	TubexPaal1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb38	Line	TubexPaal13	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb39	Line	LD1-Paal1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb40	Line	TubexPaal8	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb41	Line	LD1-Paal2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb42	Line	TubexPaal9	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb43	Line	TubexPaal10	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb44	Line	LD1-Paal3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb45	Line	TubexPaal11	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb46	Line	TubexPaal12	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

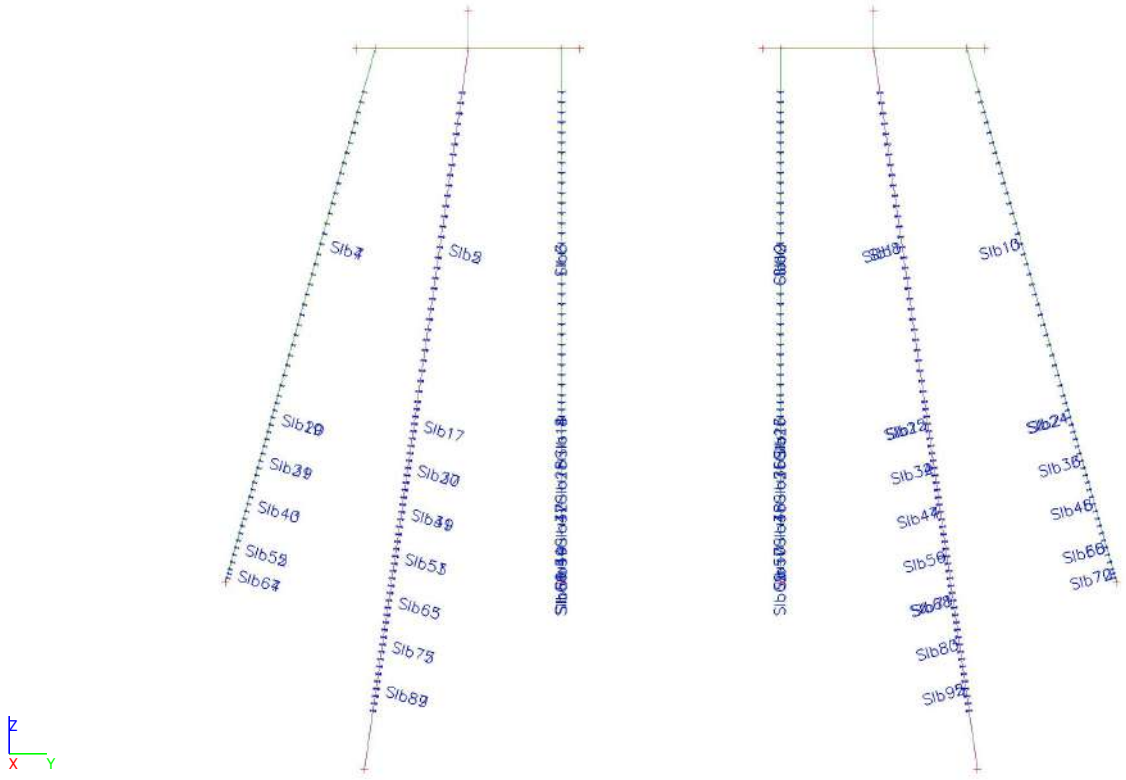
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	11,000 11,000	From start						
Slb47	Line	LD1-Paal4 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb48	Line	TubexPaal14 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb49	Line	TubexPaal1 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb50	Line	TubexPaal13 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb51	Line	LD1-Paal1 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb52	Line	TubexPaal8 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb53	Line	LD1-Paal2 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb54	Line	TubexPaal9 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb55	Line	TubexPaal10 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb56	Line	LD1-Paal3 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb57	Line	TubexPaal11 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb58	Line	TubexPaal12 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb59	Line	LD1-Paal4 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb60	Line	TubexPaal14 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb61	Line	TubexPaal1 LCS	12,000 12,200	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb62	Line	TubexPaal13 LCS	12,000 12,200	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb63	Line	LD1-Paal1 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb64	Line	TubexPaal8 LCS	12,000 12,200	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb65	Line	LD1-Paal2 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb66	Line	TubexPaal9 LCS	12,000 12,200	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb67	Line	TubexPaal10 LCS	12,000 12,200	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb68	Line	LD1-Paal3 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb69	Line	TubexPaal11 LCS	12,000 12,200	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb70	Line	TubexPaal12 LCS	12,000 12,200	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb71	Line	LD1-Paal4 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb72	Line	TubexPaal14 LCS	12,000 12,200	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb75	Line	LD1-Paal1 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb77	Line	LD1-Paal2 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb80	Line	LD1-Paal3 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb83	Line	LD1-Paal4 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb87	Line	LD1-Paal1 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb89	Line	LD1-Paal2	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	15,000	From start						
Slb92	Line	LD1-Paal3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb95	Line	LD1-Paal4	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						

5.8. Analyse model met Lijnondersteuningen



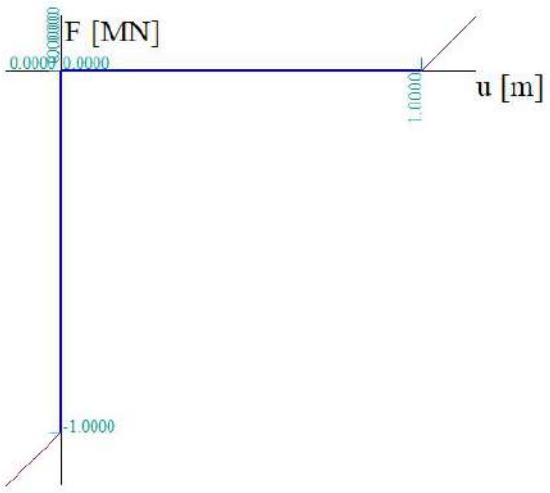
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

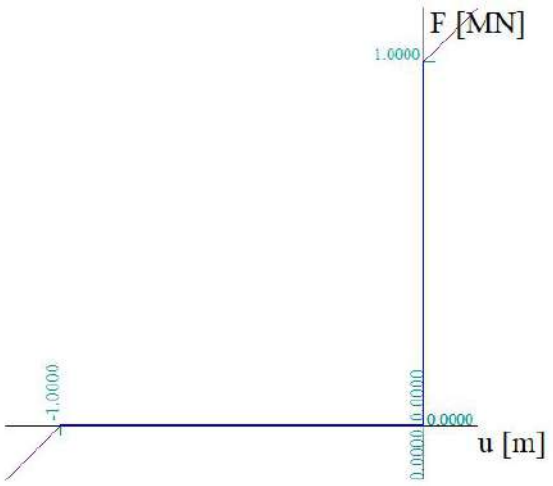
Name	Type	u / F	Positive end	Negative end
press only	Translation	-0.000001 / -1000000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 0.000000		

Drawing



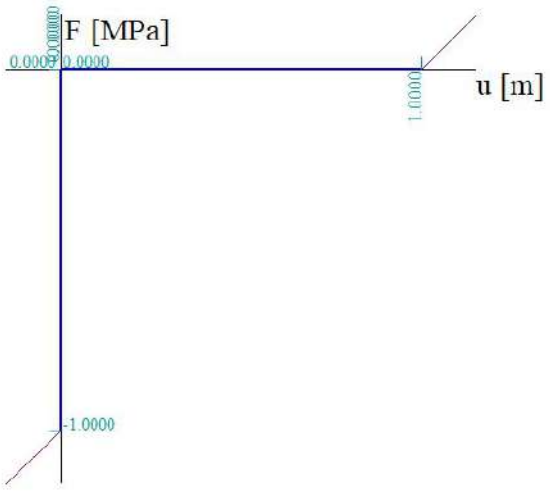
Name	Type	u / F	Positive end	Negative end
tension only	Translation	-1.000000 / 0.000000	Flexible	Flexible
		0.000000 / 0.000000		
		0.000001 / 1000000.000000		

Drawing



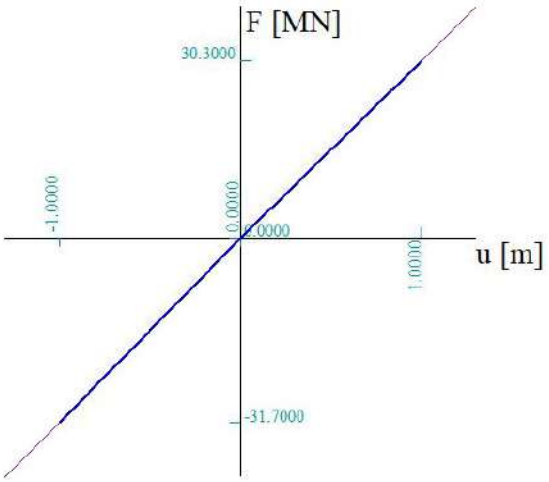
Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing



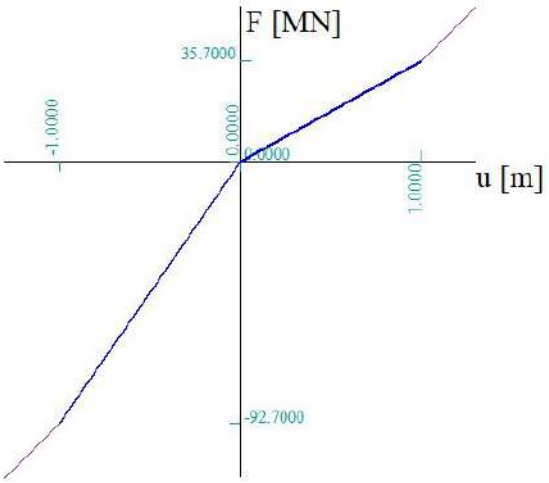
Name	Type	u / F	Positive end	Negative end
Trek-druk stijfheden	Translation	-1.000000 / -31700000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 30300000.000000		

Drawing



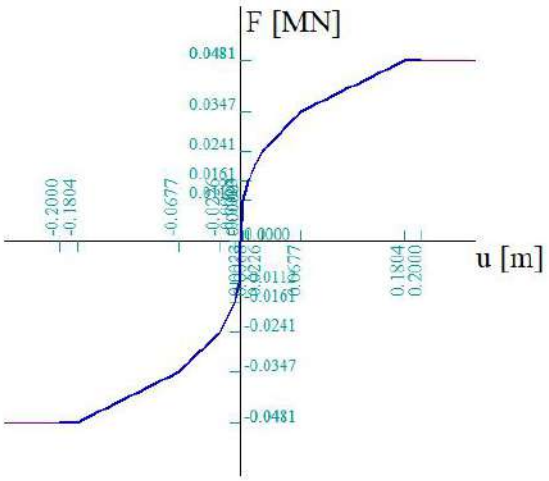
Name	Type	u / F	Positive end	Negative end
S+0 lower bound	Translation	-1.000000 / -92700000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 35700000.000000		

Drawing



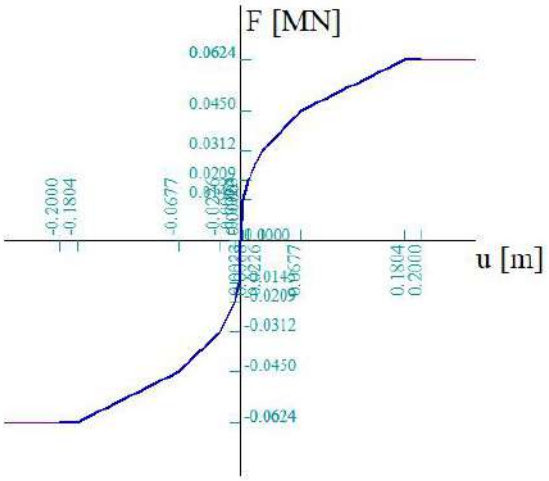
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -48130.000000	Free	Free
		-0.180400 / -48130.000000		
		-0.067650 / -34710.000000		
		-0.022550 / -24064.500000		
		-0.006765 / -16109.569000		
		-0.002255 / -11169.751000		
		0.000000 / 0.000000		
		0.002255 / 11169.751000		
		0.006765 / 16109.569000		
		0.022550 / 24064.500000		
		0.067650 / 34707.015000		
		0.180400 / 48129.000000		
		0.200000 / 48129.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -62400.000000	Free	Free
		-0.180400 / -62400.000000		
		-0.067650 / -45000.000000		
		-0.022550 / -31200.000000		
		-0.006765 / -20900.000000		
		-0.002255 / -14500.000000		
		0.000000 / 0.000000		
		0.002255 / 14490.000000		
		0.006765 / 20900.000000		
		0.022550 / 31220.000000		
		0.067650 / 45020.000000		
		0.180400 / 62430.000000		
		0.200000 / 62430.000000		

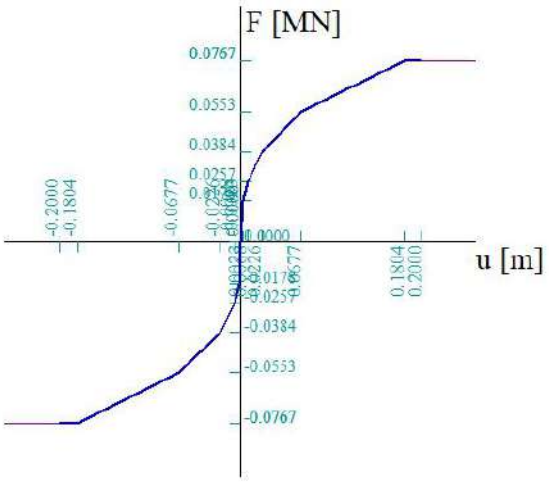
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -76737.000000	Free	Free
		-0.180400 / -76737.000000		
		-0.067650 / -55336.953000		
		-0.022550 / -38368.500000		
		-0.006765 / -25685.138000		
		-0.002255 / -17809.080000		
		0.000000 / 0.000000		
		0.002255 / 17809.080000		
		0.006765 / 25685.138000		
		0.022550 / 38368.500000		

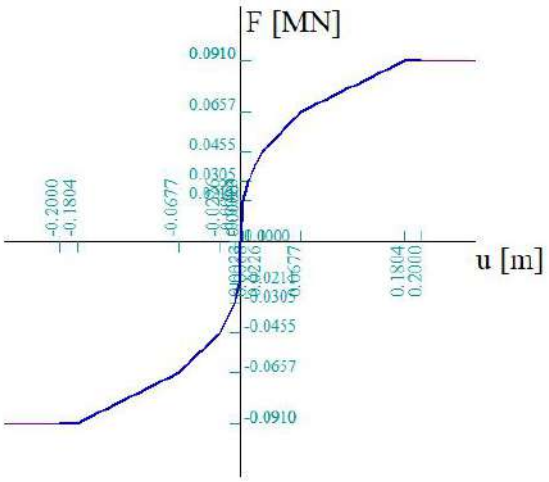
Name	Type	u / F	Positive end	Negative end
		0.067650 / 55336.953000		
		0.180400 / 76737.000000		
		0.200000 / 76737.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -91041.000000	Free	Free
		-0.180400 / -91041.000000		
		-0.067650 / -65651.922000		
		-0.022550 / -45520.500000		
		-0.006765 / -30472.923000		
		-0.002255 / -21128.744000		
		0.000000 / 0.000000		
		0.002255 / 21128.744000		
		0.006765 / 30472.923000		
		0.022550 / 45520.500000		
		0.067650 / 65651.922000		
		0.180400 / 91041.000000		
		0.200000 / 91041.000000		

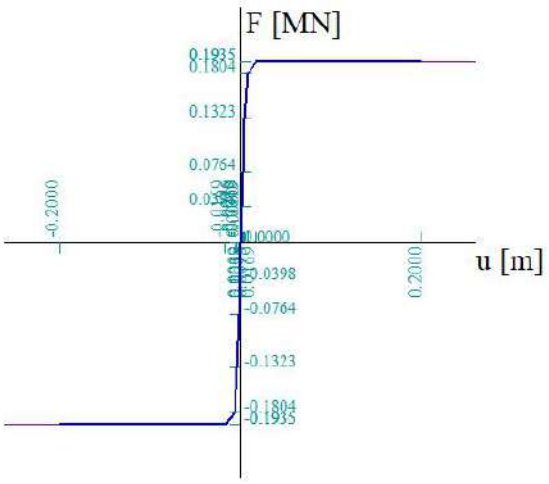
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -193489.147000	Free	Free
		-0.016913 / -193489.147000		
		-0.007517 / -180407.835000		
		-0.003758 / -132256.824000		

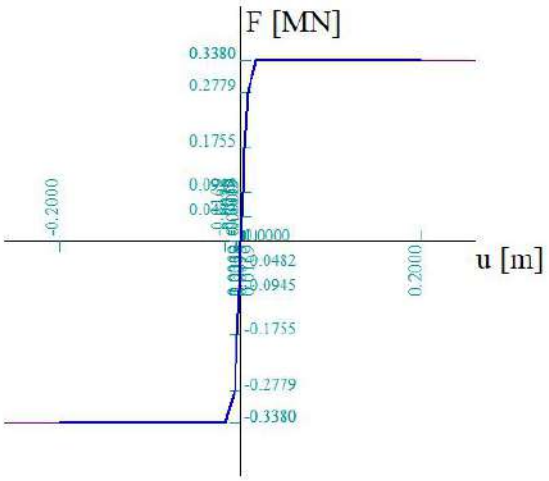
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -76421.758000		
		-0.000940 / -39826.202000		
		0.000000 / 0.000000		
		0.000940 / 39826.202000		
		0.001879 / 76421.758000		
		0.003758 / 132256.824000		
		0.007517 / 180407.835000		
		0.016913 / 193489.147000		
		0.200000 / 193489.147000		

Drawing



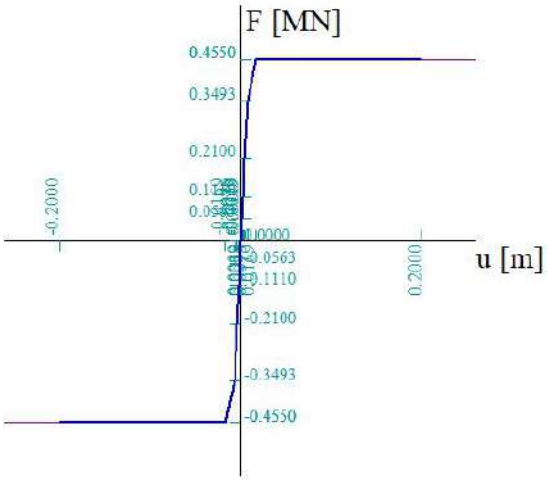
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -338024.958000	Free	Free
		-0.016913 / -338024.958000		
		-0.007517 / -277917.886000		
		-0.003758 / -175526.039000		
		-0.001879 / -94450.113000		
		-0.000940 / -48160.629000		
		0.000000 / 0.000000		
		0.000940 / 48160.629000		
		0.001879 / 94450.113000		
		0.003758 / 175526.039000		
		0.007517 / 277917.886000		
		0.016913 / 338024.958000		
		0.200000 / 338024.958000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -454964.396000	Free	Free
		-0.016913 / -454964.396000		
		-0.007517 / -349336.178000		
		-0.003758 / -210048.905000		
		-0.001879 / -110961.163000		
		-0.000940 / -56287.593000		
		0.000000 / 0.000000		
		0.000940 / 56287.593000		
		0.001879 / 110961.163000		
		0.003758 / 210048.905000		
		0.007517 / 349336.178000		
		0.016913 / 454964.396000		
		0.200000 / 454964.396000		

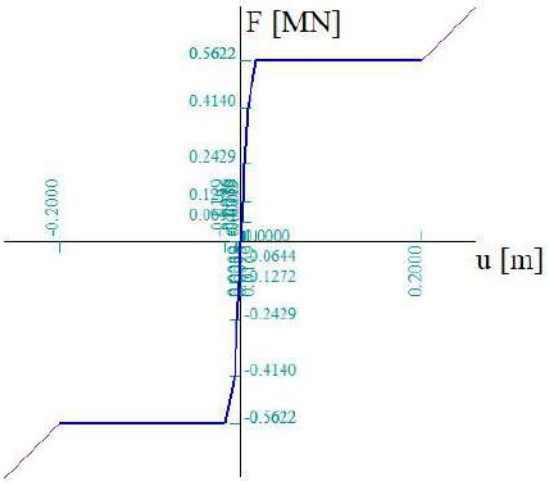
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -562170.498000	Flexible	Flexible
		-0.016913 / -562170.498000		
		-0.007517 / -413992.721000		
		-0.003758 / -242873.332000		
		-0.001879 / -127210.864000		
		-0.000940 / -64380.055000		
		0.000000 / 0.000000		
		0.000940 / 64380.055000		
		0.001879 / 127210.864000		
		0.003758 / 242873.332000		

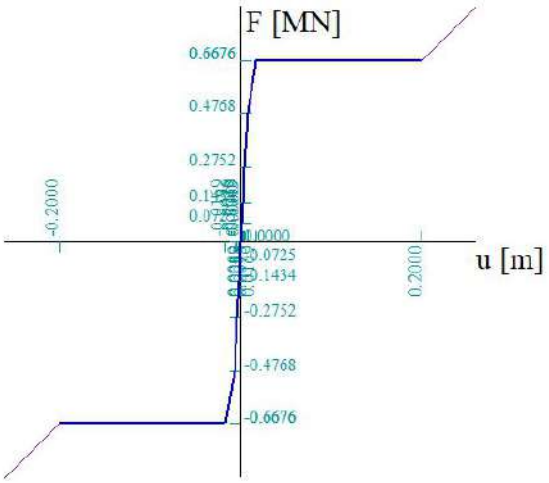
Name	Type	u / F	Positive end	Negative end
		0.007517 / 413992.721000		
		0.016913 / 562170.498000		
		0.200000 / 562170.498000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -667564.512000	Flexible	Flexible
		-0.016913 / -667564.512000		
		-0.007517 / -476770.926000		
		-0.003758 / -275233.374000		
		-0.001879 / -143390.211000		
		-0.000940 / -72463.274000		
		0.000000 / 0.000000		
		0.000940 / 72463.274000		
		0.001879 / 143390.211000		
		0.003758 / 275233.374000		
		0.007517 / 476770.926000		
		0.016913 / 667564.512000		
		0.200000 / 667564.512000		

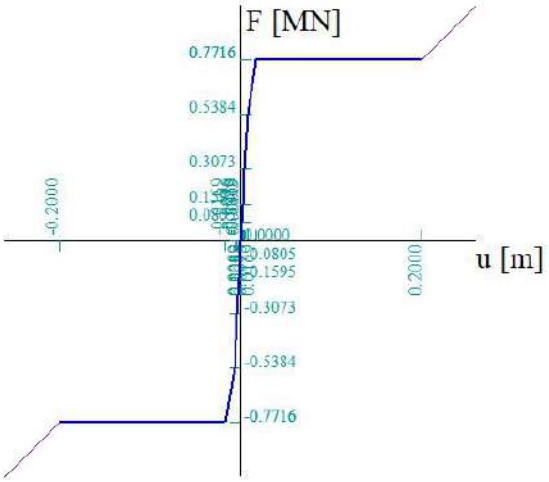
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -771639.629000	Flexible	Flexible
		-0.016913 / -771639.629000		
		-0.007517 / -538432.081000		
		-0.003758 / -307337.483000		

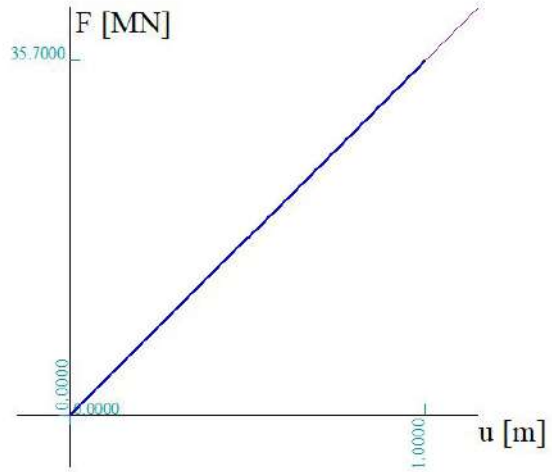
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -159531.700000		
		-0.000940 / -80541.551000		
		0.000000 / 0.000000		
		0.000940 / 80541.551000		
		0.001879 / 159531.700000		
		0.003758 / 307337.483000		
		0.007517 / 538432.081000		
		0.016913 / 771639.629000		
		0.200000 / 771639.629000		

Drawing



Name	Type	u / F	Positive end	Negative end
S+0 lower bound Trek	Translation	0.000000 / 0.000000	Flexible	Free
		1.000000 / 35700000.000000		

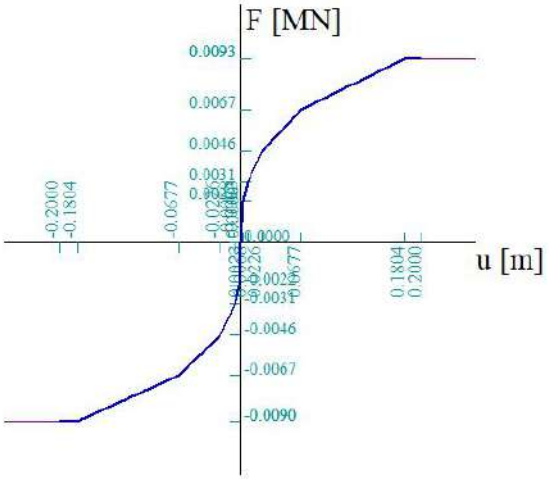
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -9000.000000	Free	Free
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		
		-0.006765 / -3100.000000		
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		

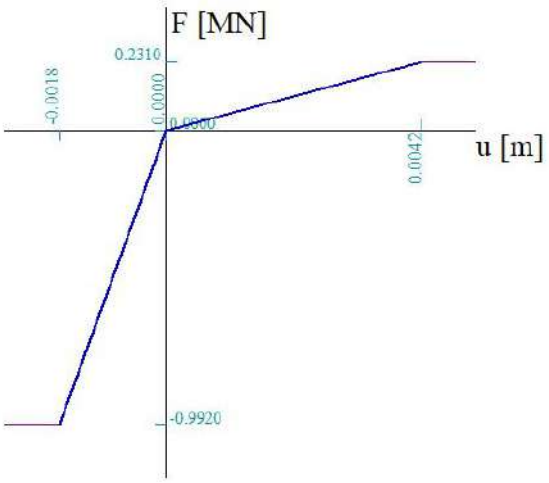
Name	Type	u / F	Positive end	Negative end
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing



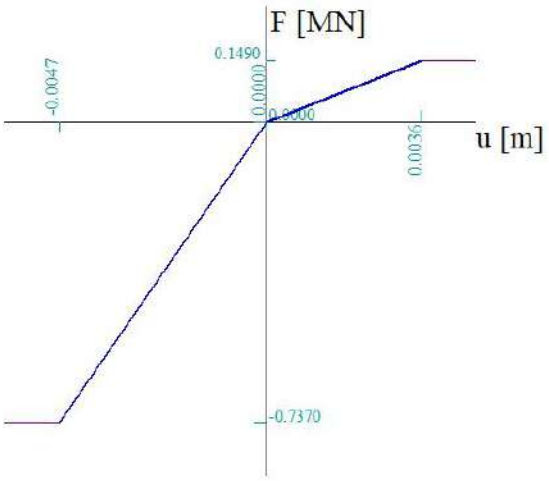
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+paalpunt.LD1	Translation	-0.001760 / -992000.000000	Free	Free
		0.000000 / 0.000000		
		0.004210 / 231000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
Trek-druk-S+paalpunt.rond	Translation	-0.004750 / -737000.000000	Free	Free
		0.000000 / 0.000000		
		0.003600 / 149000.000000		

Drawing

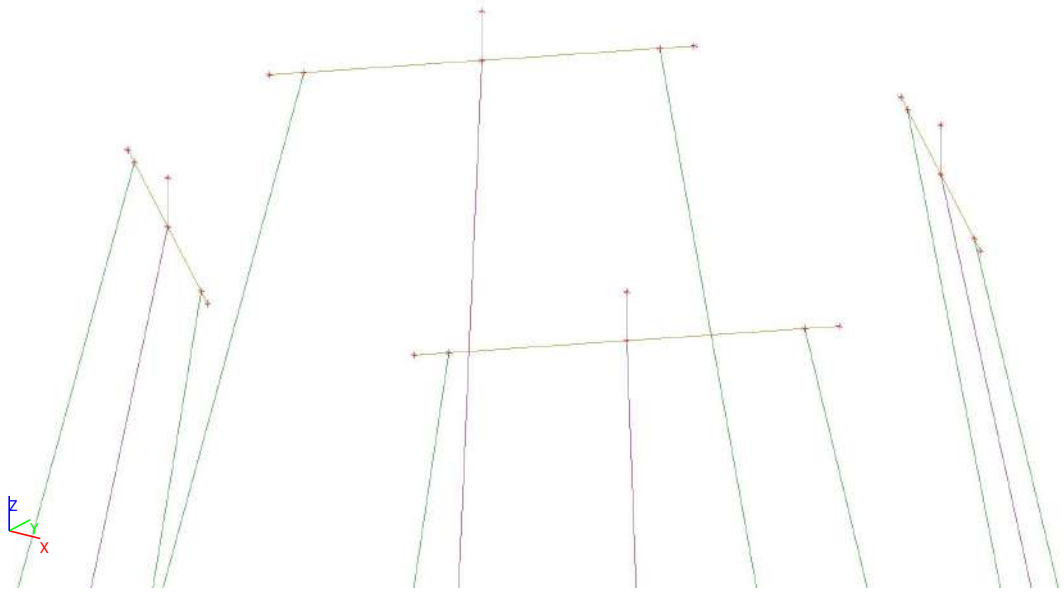

F [MN]
0.1490
-0.0047
0.0000
0.0000
0.0036
u [m]
-0.7370

6. Belastingen

6.1. Load cases

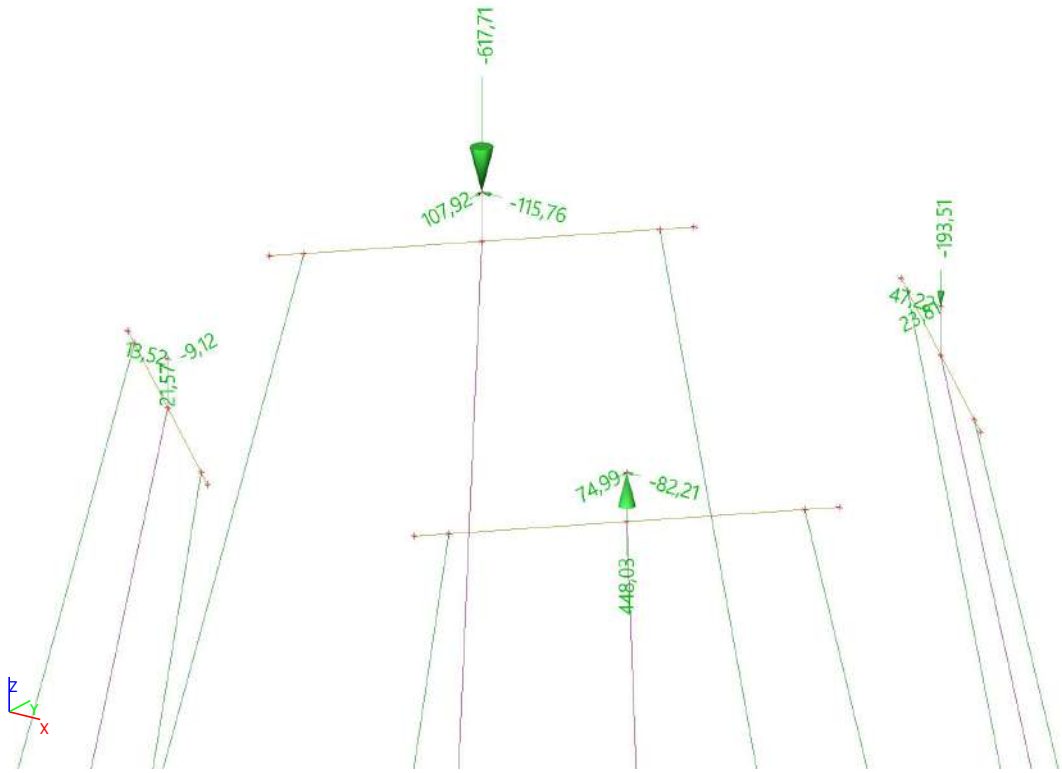
6.1.1. Load cases - E.G.

Name	Description	Action type	Load group	Direction
	Spec	Load type		
E.G.		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - high max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			

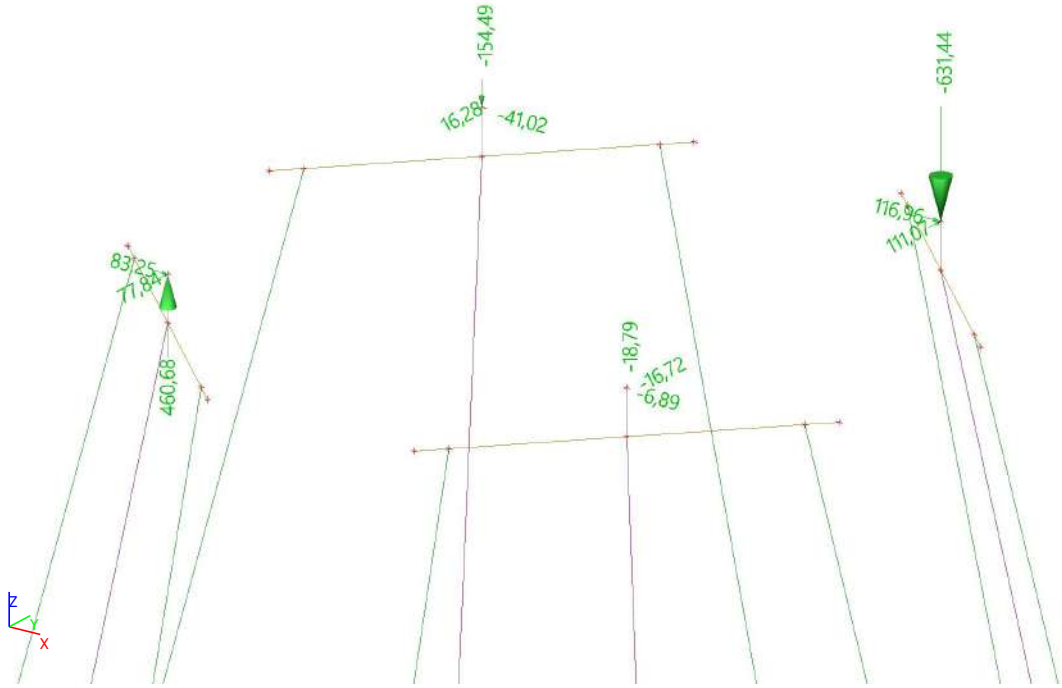


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Force	13,52
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Force	-9,12
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Force	21,57
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Force	-115,76
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Force	107,92
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Force	-617,71
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Force	47,22
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Force	23,81
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Force	-193,51
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Force	-82,21
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Force	74,99
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Force	448,03

6.1.3. Load cases - high max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



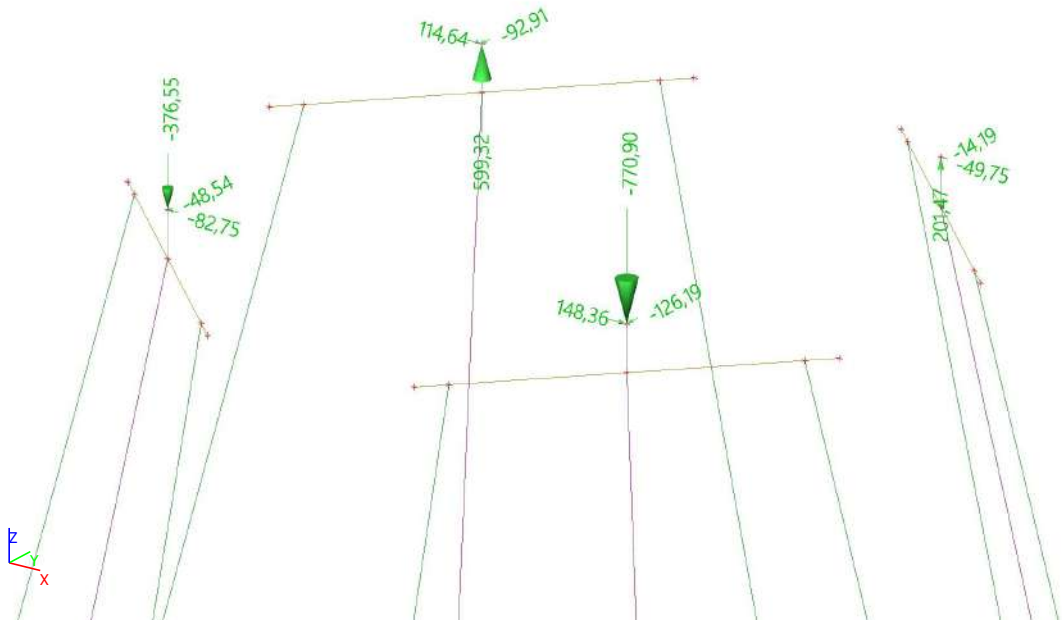
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Force	83,25
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Force	77,84
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Force	460,68
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Force	-41,02
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Force	16,28
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Force	-154,49
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Force	116,96
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Force	111,07
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Force	-631,44
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Force	-6,89
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Force	-16,72

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Force	-18,79

6.1.4. Load cases - high max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



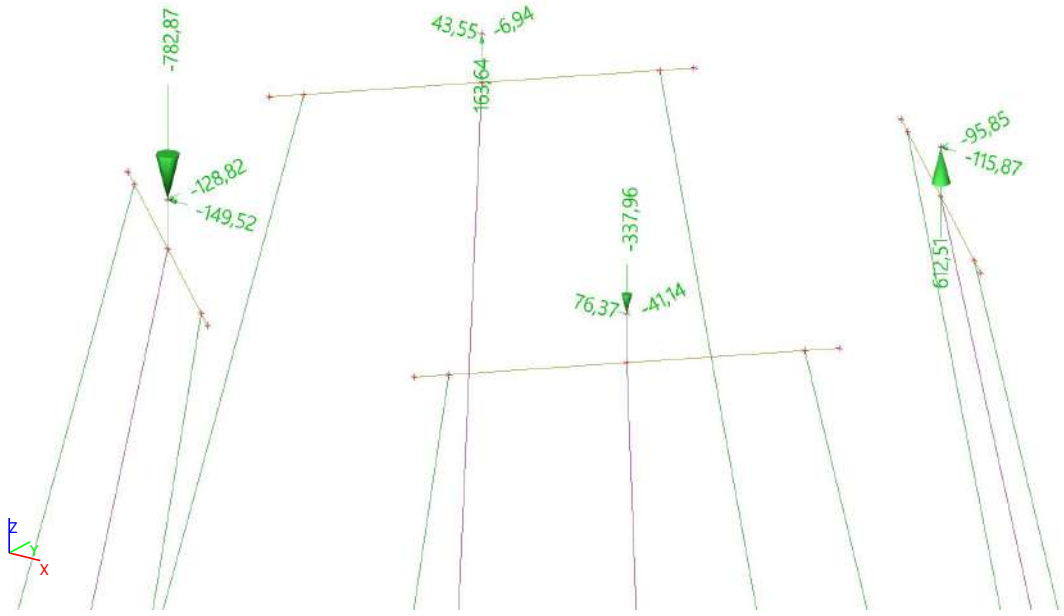
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Force	-82,75
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Force	-48,54
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Force	-376,55
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Force	114,64
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Force	-92,91
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Force	599,32
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Force	-49,75
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Force	-14,19

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Force	201,47
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Force	148,36
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Force	-126,19
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Force	-770,90

6.1.5. Load cases - high max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



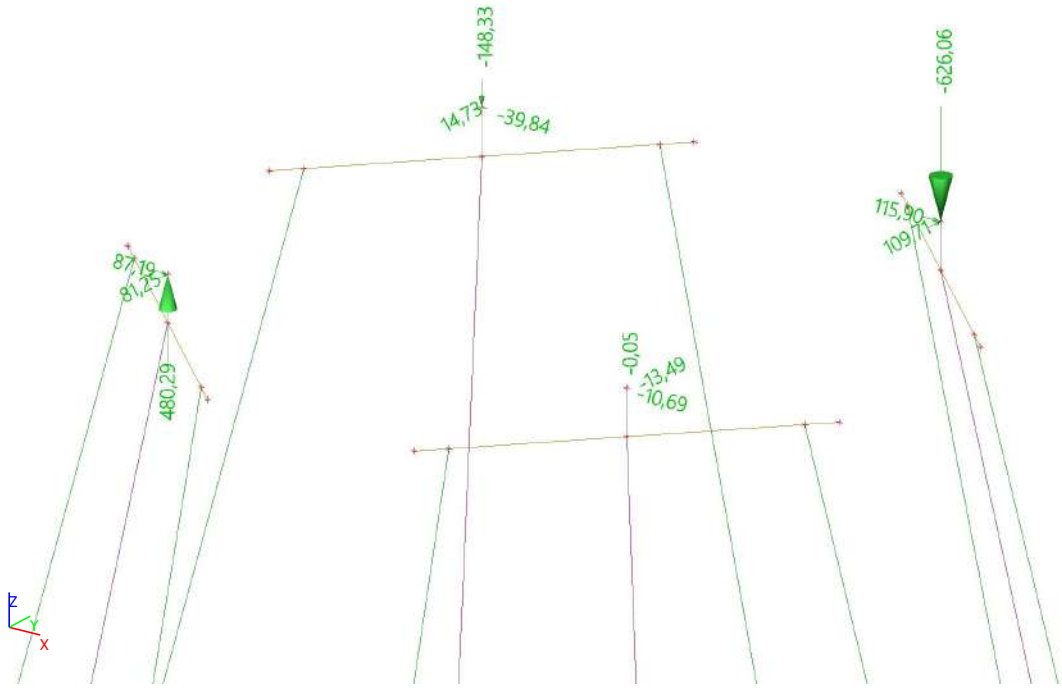
6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Force	-149,52
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Force	-128,82
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Force	-782,87
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Force	43,55
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Force	-6,94

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Force	163,64
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Force	-115,87
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Force	-95,85
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Force	612,51
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Force	76,37
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Force	-41,14
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Force	-337,96

6.1.6. Load cases - low max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			

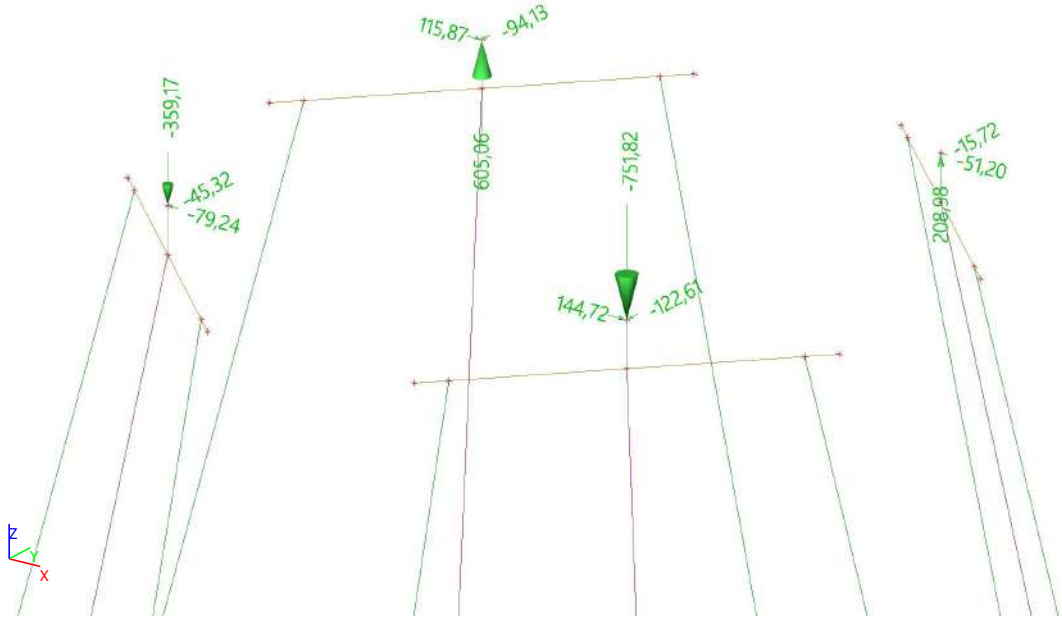


6.1.6.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Force	87,19
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Force	81,25
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Force	480,29
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Force	-39,84
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Force	14,73
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Force	-148,33
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Force	115,90
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Force	109,71
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Force	-626,06
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Force	-10,69
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Force	-13,49
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Force	-0,05

6.1.7. Load cases - low max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			

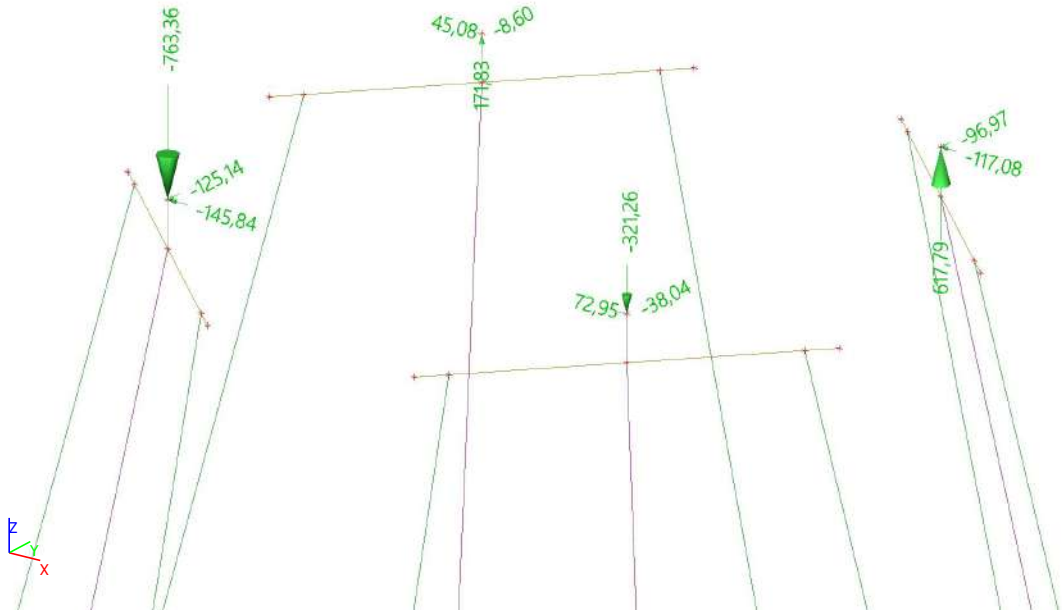


6.1.7.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Force	-79,24
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Force	-45,32
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Force	-359,17
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Force	115,87
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Force	-94,13
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Force	605,06
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Force	-51,20
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Force	-15,72
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Force	208,98
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Force	144,72
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Force	-122,61
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Force	-751,82

6.1.8. Load cases - low max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



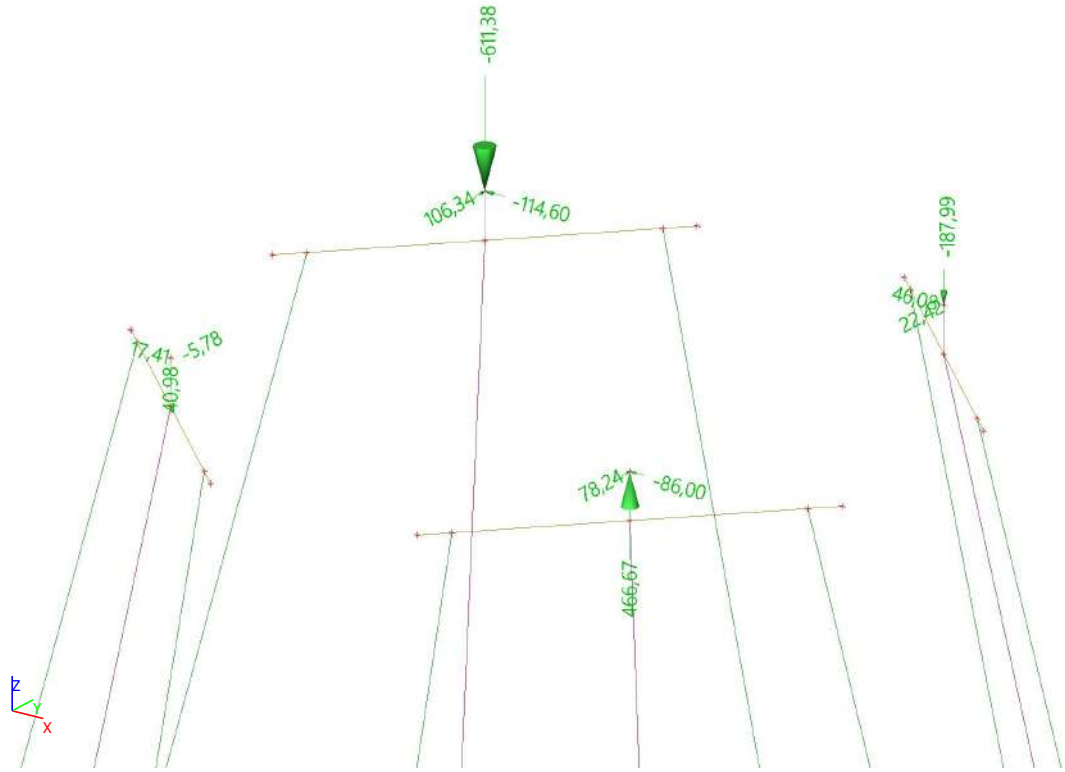
6.1.8.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Force	-145,84
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Force	-125,14
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Force	-763,36
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Force	45,08
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Force	-8,60
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Force	171,83
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Force	-117,08
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Force	-96,97
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Force	617,79
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Force	72,95
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Force	-38,04

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Force	-321,26

6.1.9. Load cases - low max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



6.1.9.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Force	17,41
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Force	-5,78
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Force	40,98
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Force	-114,60
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Force	106,34
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Force	-611,38
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Force	46,08
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Force	22,42

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Force	-187,99
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Force	-86,00
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Force	78,24
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Force	466,67

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
high max Wnd ;45°	Ultimate	E.G.	1,200
		high max Wnd ;45°	1,000
high max Wnd ;135°	Ultimate	E.G.	1,200
		high max Wnd ;135°	1,000
high max Wnd ;225°	Ultimate	E.G.	1,200
		high max Wnd ;225°	1,000
high max Wnd ;315°	Ultimate	E.G.	1,200
		high max Wnd ;315°	1,000
low max Wnd ;135°	Ultimate	E.G.	0,900
		low max Wnd ;135°	1,000
low max Wnd ;225°	Ultimate	E.G.	0,900
		low max Wnd ;225°	1,000
low max Wnd ;315°	Ultimate	E.G.	0,900
		low max Wnd ;315°	1,000
low max Wnd ;45°	Ultimate	E.G.	0,900
		low max Wnd ;45°	1,000

6.3. Result classes

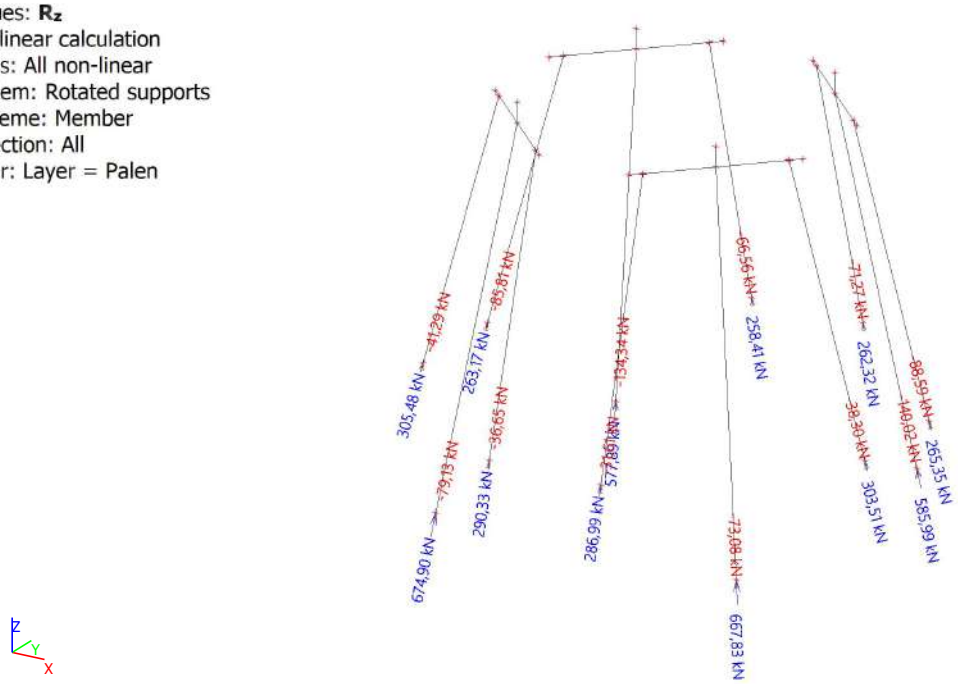
Name	List
All non-linear	high max Wnd ;45°
	high max Wnd ;135°
	high max Wnd ;225°
	high max Wnd ;315°
	low max Wnd ;135°
	low max Wnd ;225°
	low max Wnd ;315°
	low max Wnd ;45°

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Cross-section = LD1(31-plank) - General cross-section
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn7/N20	low max Wnd ;315°	0,00	0,00	**-140,01**	0,00	0,00	0,00	0,0	0,0
Sn2/N2	high max Wnd ;315°	**0,00**	**0,00**	**674,90**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Cross-section = TubexPaal - type e (CHS406.4/12.5)
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn8/N19	low max Wnd ;315°	0,00	0,00	**-88,59**	0,00	0,00	0,00	0,0	0,0
Sn1/N3	high max Wnd ;315°	**0,00**	**0,00**	**305,48**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.4. Reactions

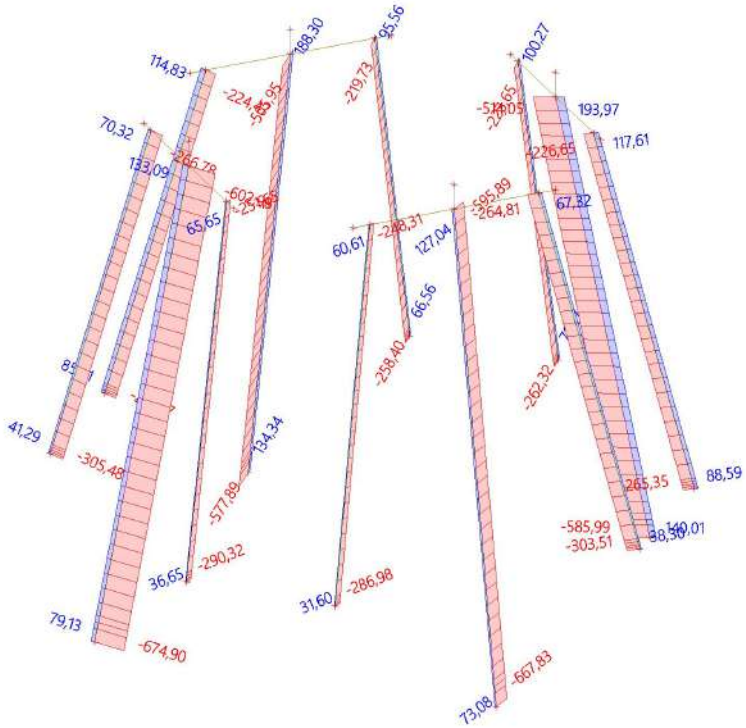
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn2/N2	low max Wnd ;135°	0,00	0,00	**-79,13**	0,00	0,00	0,00	0,0	0,0
Sn2/N2	high max Wnd ;315°	**0,00**	**0,00**	**674,90**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn1/N3	low max Wnd ;135°	0,00	0,00	**-41,29**	0,00	0,00	0,00	0,0	0,0
Sn1/N3	high max Wnd ;315°	**0,00**	**0,00**	**305,48**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn3/N30	low max Wnd ;135°	0,00	0,00	**-36,65**	0,00	0,00	0,00	0,0	0,0
Sn3/N30	high max Wnd ;315°	**0,00**	**0,00**	**290,33**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn4/N27	low max Wnd ;45°	0,00	0,00	**-73,08**	0,00	0,00	0,00	0,0	0,0
Sn4/N27	high max Wnd ;225°	**0,00**	**0,00**	**667,83**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn5/N26	low max Wnd ;45°	0,00	0,00	**-38,30**	0,00	0,00	0,00	0,0	0,0
Sn5/N26	high max Wnd ;225°	**0,00**	**0,00**	**303,51**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn6/N24	low max Wnd ;45°	0,00	0,00	**-31,61**	0,00	0,00	0,00	0,0	0,0
Sn6/N24	high max Wnd ;225°	**0,00**	**0,00**	**286,99**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn7/N20	low max Wnd ;315°	0,00	0,00	**-140,01**	0,00	0,00	0,00	0,0	0,0
Sn7/N20	high max Wnd ;135°	**0,00**	**0,00**	**585,99**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn8/N19	low max Wnd ;315°	0,00	0,00	**-88,59**	0,00	0,00	0,00	0,0	0,0
Sn8/N19	high max Wnd ;135°	**0,00**	**0,00**	**265,35**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn9/N16	low max Wnd ;315°	0,00	0,00	**-71,27**	0,00	0,00	0,00	0,0	0,0
Sn9/N16	high max Wnd ;135°	**0,00**	**0,00**	**262,32**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn10/N13	low max Wnd ;225°	**0,00**	**0,00**	**-134,34**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn10/N13	high max Wnd ;45°	0,00	0,00	**577,89**	0,00	0,00	**0,00**	0,0	0,0
Sn11/N12	low max Wnd ;225°	**0,00**	**0,00**	**-85,81**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn11/N12	high max Wnd ;45°	0,00	0,00	**263,17**	0,00	0,00	**0,00**	0,0	0,0
Sn12/N10	low max Wnd ;225°	**0,00**	**0,00**	**-66,56**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn12/N10	high max Wnd ;45°	0,00	0,00	**258,41**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

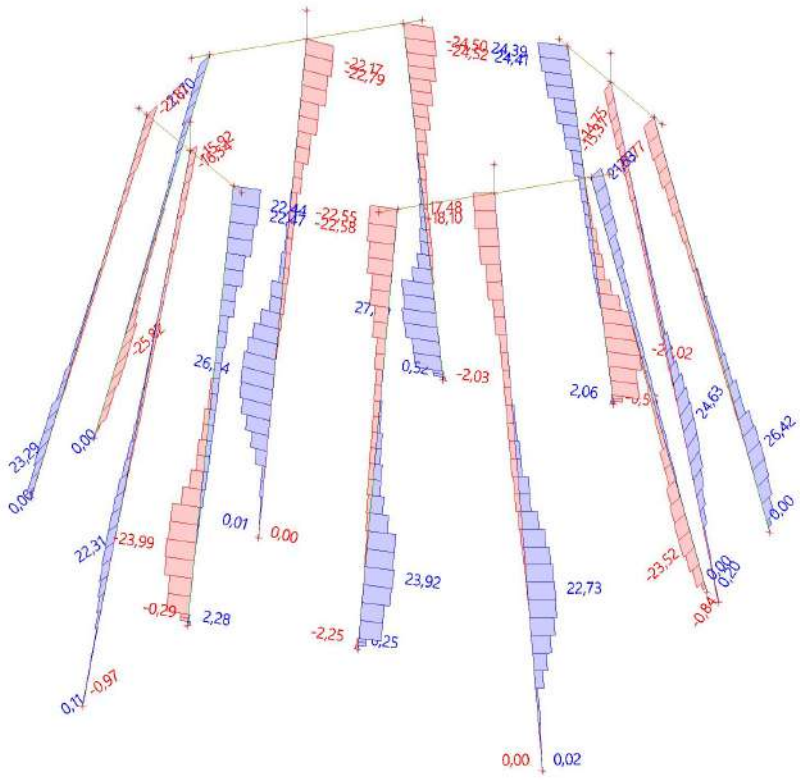
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



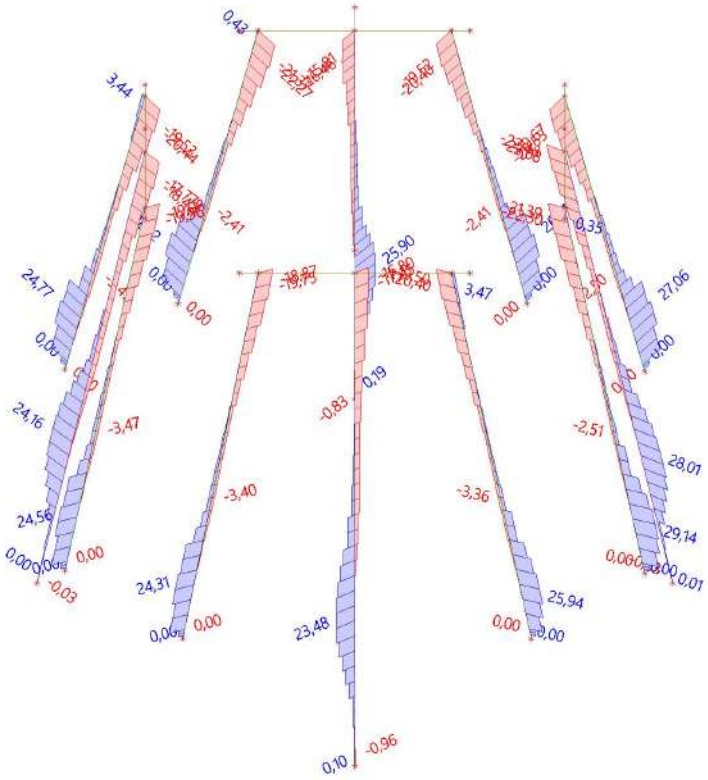
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



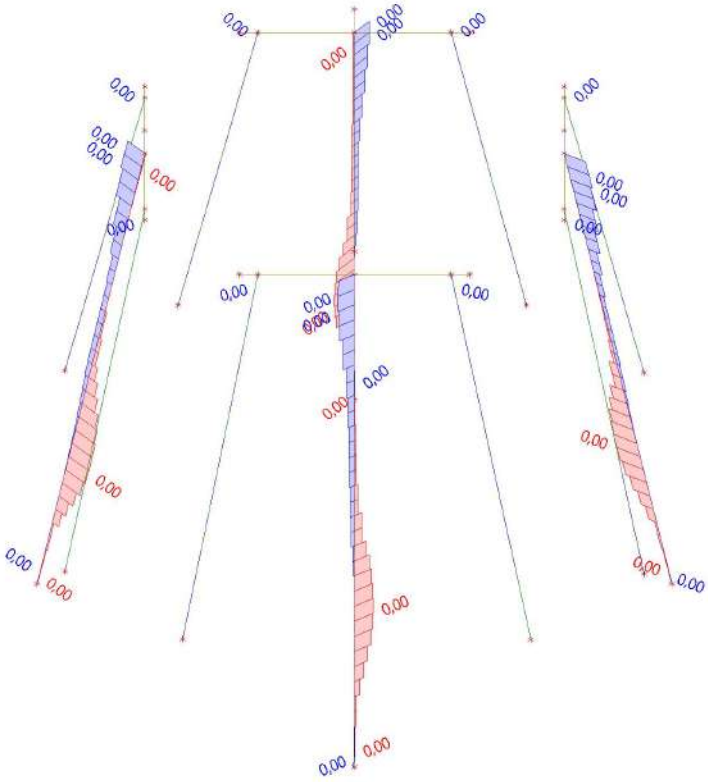
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



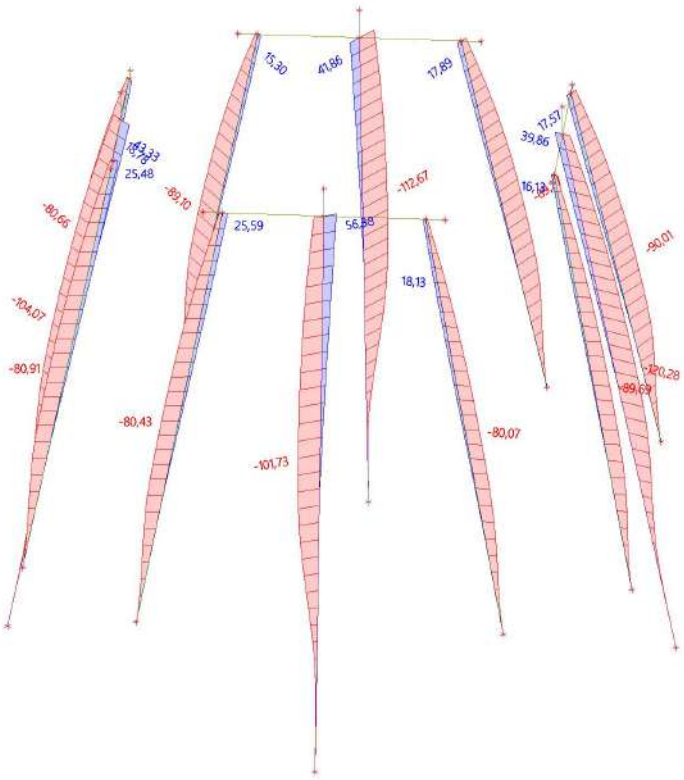
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



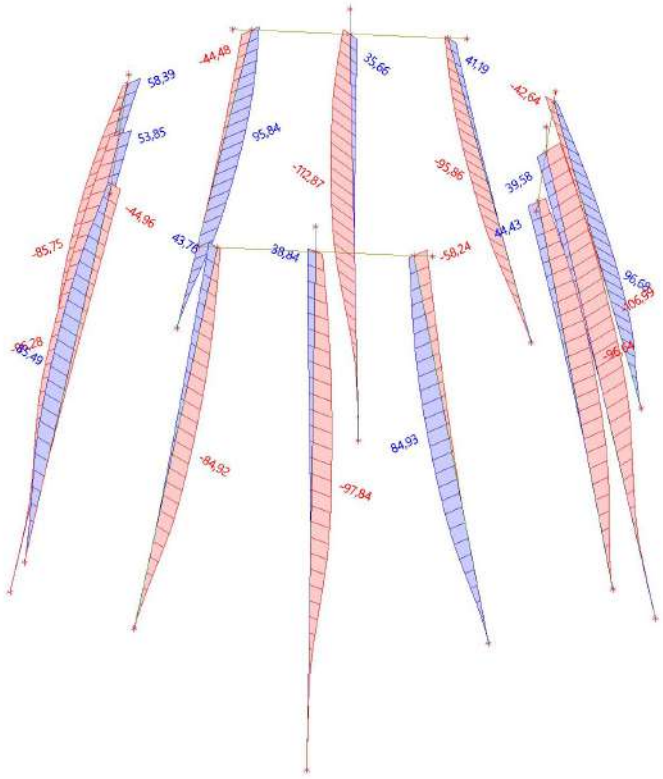
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Nothing in selection to display.

7.2.8. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Cross-section = TubexPaal - type e (CHS406.4/12.5)

Name	dx [m]	Case	Cross-section	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
TubexPaal1	12,345	high max Wnd ;315°	TubexPaal - type e (CHS406.4/12.5)	**-305,48**	0,00	0,00	0,00	0,00	0,00
TubexPaal11	0,000	low max Wnd ;315°	TubexPaal - type e (CHS406.4/12.5)	**117,61**	-17,49	-18,69	**0,00**	-11,13	-32,85
TubexPaal12	10,000+	high max Wnd ;315°	TubexPaal - type e (CHS406.4/12.5)	41,24	**-28,02**	27,06	0,00	-50,95	51,49
TubexPaal14	10,000+	high max Wnd ;225°	TubexPaal - type e (CHS406.4/12.5)	36,30	**27,89**	26,81	0,00	-50,34	-51,26
TubexPaal11	1,000-	high max Wnd ;315°	TubexPaal - type e (CHS406.4/12.5)	87,86	-21,77	**-22,30**	0,00	-33,74	-51,45
TubexPaal11	10,500+	high max Wnd ;315°	TubexPaal - type e (CHS406.4/12.5)	57,29	25,34	**29,14**	0,00	-39,58	-33,50
TubexPaal12	6,250-	high max Wnd ;315°	TubexPaal - type e (CHS406.4/12.5)	55,18	0,74	-0,90	0,00	**-90,01**	**96,68**
TubexPaal10	0,000	high max Wnd ;225°	TubexPaal - type e (CHS406.4/12.5)	-248,31	-7,25	-3,59	0,00	**25,59**	43,76
TubexPaal11	5,375-	high max Wnd ;315°	TubexPaal - type e (CHS406.4/12.5)	75,51	-2,02	-5,17	0,00	-87,71	**-96,64**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

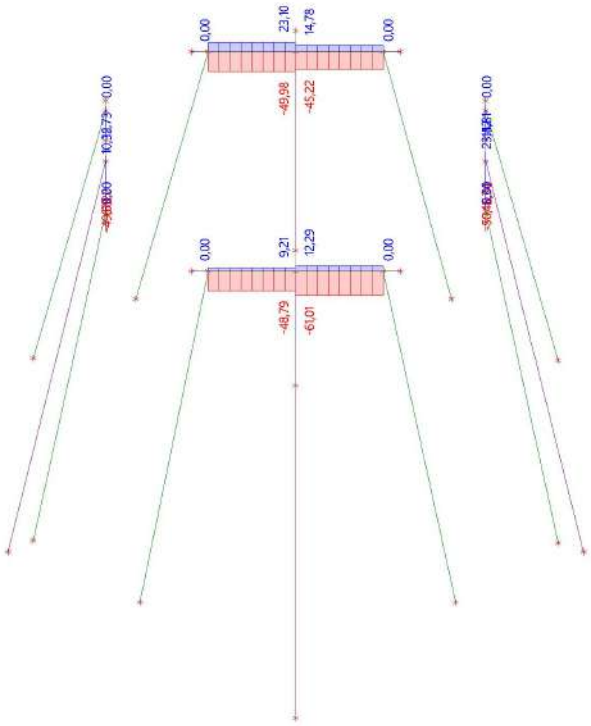
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Opstort9:Opstort-1700:848162	0,850	low max Wnd ;315°	**617,79**	-14,22	-151,36	**0,00**	0,00	0,00
Opstort9:Opstort-1700:848162	0,000	high max Wnd ;225°	180,46	**-25,14**	-45,21	0,00	38,43	**21,37**
Opstort9:Opstort-1700:848162	0,000	low max Wnd ;315°	602,04	-14,22	**-151,36**	0,00	**128,65**	12,09
Opstort9:Opstort-1700:848148	0,000	high max Wnd ;315°	**-803,88**	14,64	**196,82**	0,00	**-167,29**	-12,44
Opstort9:Opstort-1700:848164	0,000	high max Wnd ;315°	142,63	**25,89**	-35,70	0,00	30,35	**-22,00**

7.4. Krachten van de Funderingsbalken

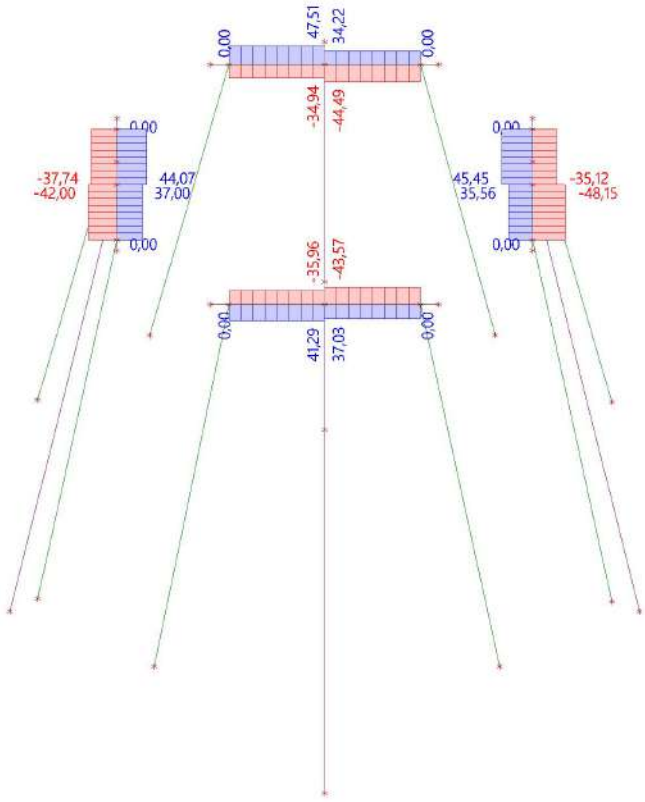
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



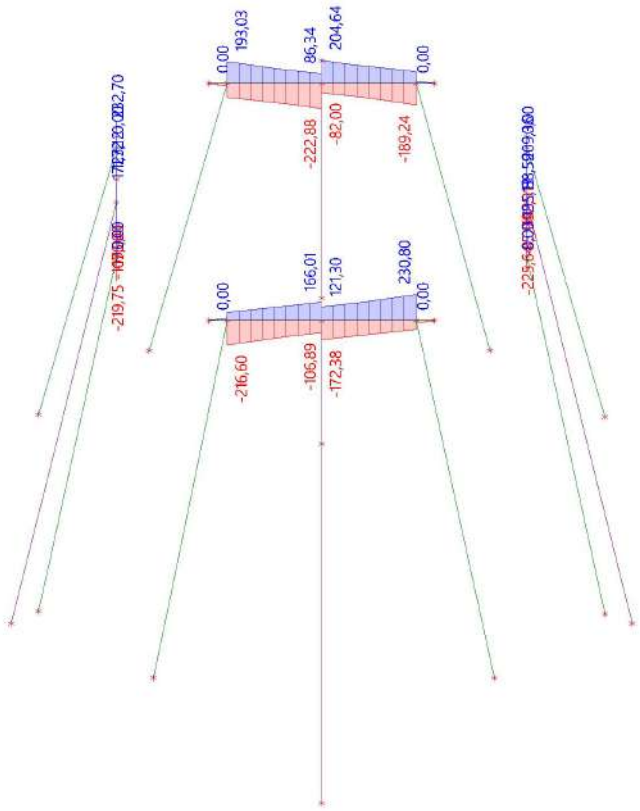
7.4.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



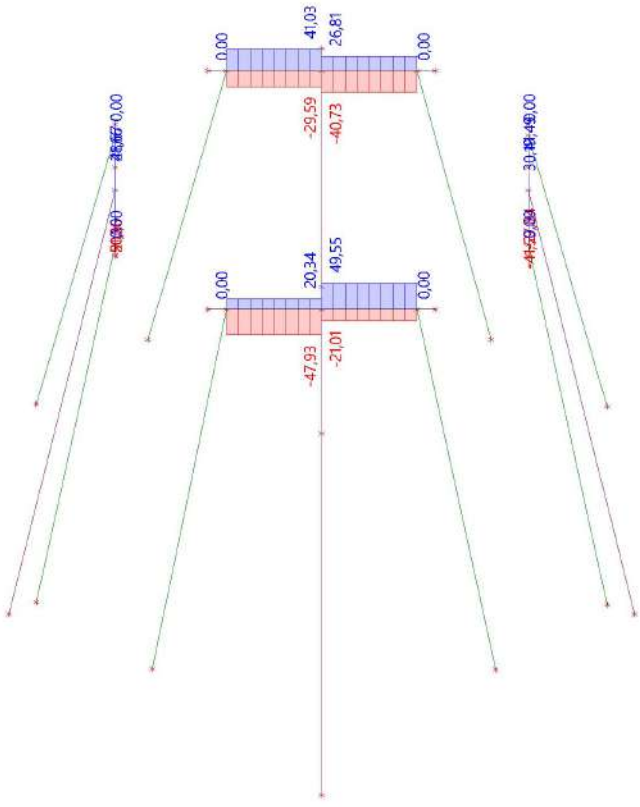
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



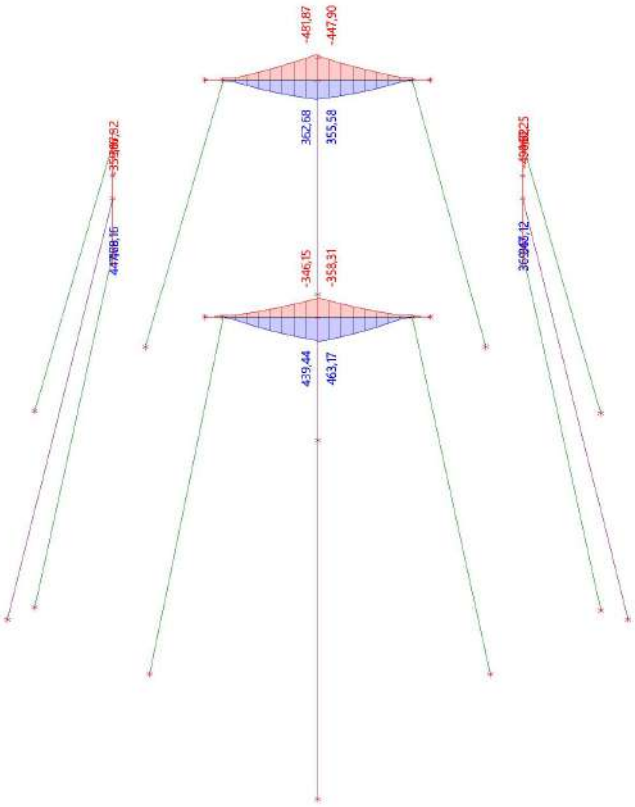
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



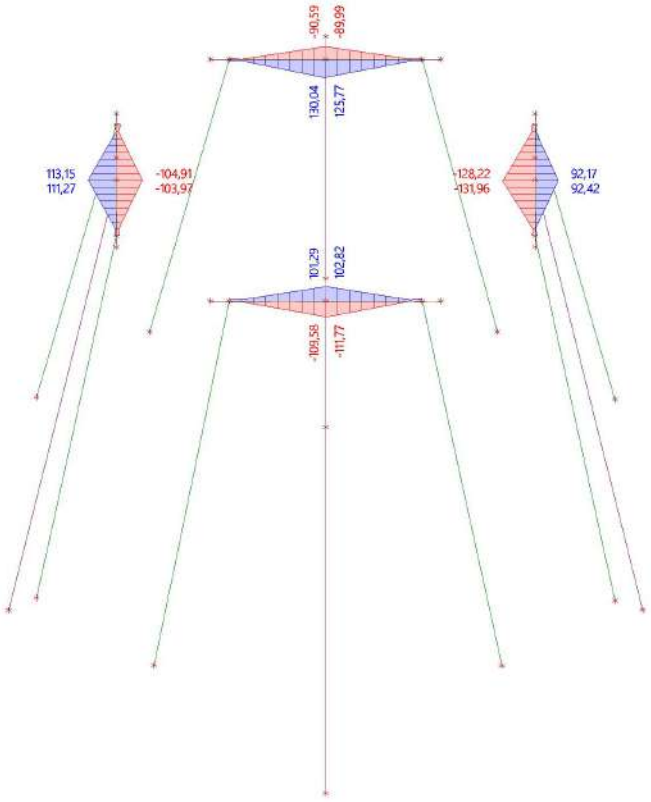
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Balken

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Opstort9:Opstort-1700:848161	3,500	high max Wnd ;315°	17,00	-47,79	**-225,64**	28,57	-479,26	-131,80
Opstort9:Opstort-1700:848152	0,570+	high max Wnd ;315°	-61,22	44,07	**232,70**	**-50,16**	-35,85	-16,21
Opstort9:Opstort-1700:848159	0,570+	high max Wnd ;225°	-61,01	-43,57	230,80	**49,55**	-36,27	16,17
Opstort9:Opstort-1700:848152	3,500	high max Wnd ;315°	**-61,22**	44,07	112,02	-50,16	**469,16**	112,91
Opstort9:Opstort-1700:848161	3,500	low max Wnd ;315°	**23,42**	**-48,15**	-215,92	30,19	**-490,62**	**-131,96**
Opstort9:Opstort-1700:848165	3,500	low max Wnd ;225°	23,10	**47,51**	-213,22	-29,59	-481,87	**130,04**

1. Inhoudsopgave

1. Inhoudsopgave 1
2. Project 2
3. Analyse model 2
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2. Project

Gebruiker van licentie	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Onderdeel	Balkrooster 7xBeton40x40 mast 159
Auteur	[redacted]
Datum	27-08-2025
Constructie	Algemeen XYZ
Aantal knopen :	64
Aantal staven :	36
Aantal platen :	0
Aantal vaste lichamen :	0
Aantal gebruikte doorsneden :	3
Aantal belastingsgevallen :	7
Aantal gebruikte materialen :	3
Gravitatieversnelling [m/s^2]	9,807
Nationale norm	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materialen

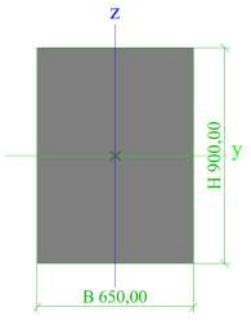
Naam	Type	ρ [kg/m³]	Dichtheid in natte toestand [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Kleur
C20/25 Ongescheurd	Beton	1500,00	2600,00	2,4000e+04	0.2	0,01e-003	20,00	
C20/25 Gescheurd	Beton	2500,00	2600,00	8,0000e+03	0.2	0,01e-003	20,00	

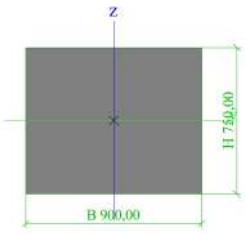
Verklaring van symbolen	
Dichtheid in natte toestand	De waarde van de dichtheid van het kenmerk nieuwe toestand wordt alleen gebruikt als een samengesteld dek wordt ingevoerd en rekening wordt gehouden met de belasting van het eigengewicht.

Wapening EC2

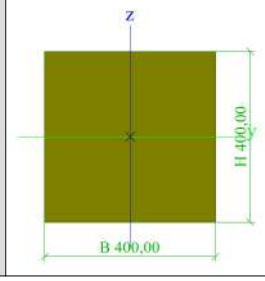
Naam	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Betonstaal	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

4.2. Doorsneden

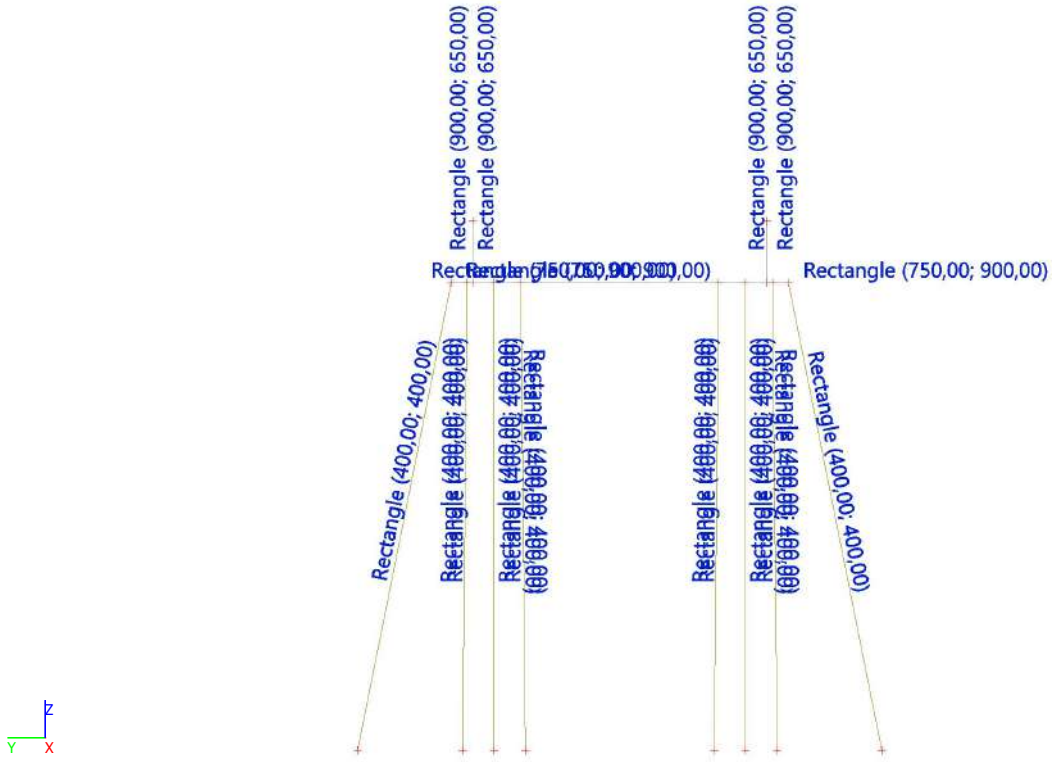
Poer.Opstort		
Type	Rectangle	
Gedetailleerd	900,00; 650,00	
Vorm type	Dikke wanden	
Onderdeelmateriaal	C20/25 Gescheurd	
Bouwwijze	beton	
Kleur		
A [mm²]	5,8500e+05	
A_y [mm²], A_z [mm²]	4,8750e+05	4,8750e+05
A_L [m²/m], A_D [m²/m]	3,1000e+00	3,1000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	325,00	450,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	3,9487e+10	2,0597e+10
i_y [mm], i_z [mm]	259,81	187,64
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	8,7750e+07	6,3375e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	4,5857e+10	0,0000e+00
$β_y$ [mm], $β_z$ [mm]	0,00	0,00
Afbeelding		

Balk		
Type	Rectangle	
Gedetailleerd	750,00; 900,00	
Vorm type	Dikke wanden	
Onderdeelmateriaal	C20/25 Gescheurd	
Bouwwijze	beton	
Kleur		
A [mm²]	6,7500e+05	
A_y [mm²], A_z [mm²]	5,6250e+05	5,6250e+05
A_L [m²/m], A_D [m²/m]	3,3000e+00	3,3000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450,00	375,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	3,1641e+10	4,5563e+10
i_y [mm], i_z [mm]	216,51	259,81
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	8,4375e+07	1,0125e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	6,3112e+10	0,0000e+00
$β_y$ [mm], $β_z$ [mm]	0,00	0,00
Afbeelding		

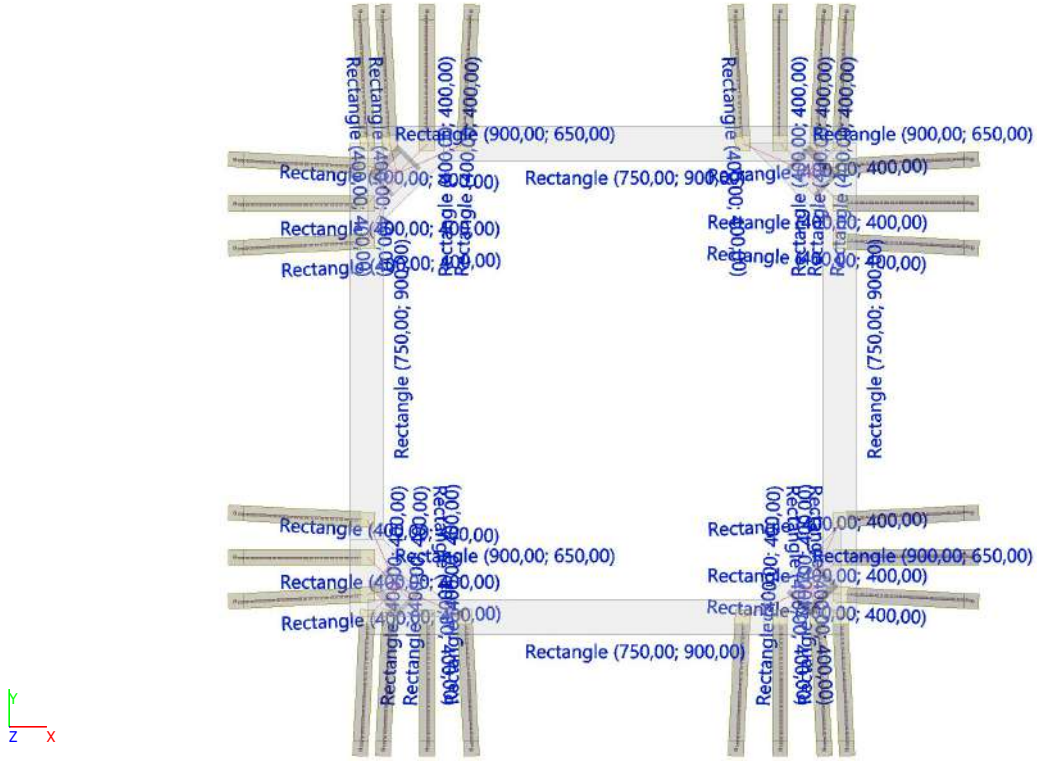
Funderingspaal		
Type	Rectangle	
Gedetailleerd	400,00; 400,00	
Vorm type	Dikke wanden	
Onderdeelmateriaal	C20/25 Ongescheurd	
Bouwwijze	beton	
Kleur		
A [mm²]	1,6000e+05	
A_y [mm²], A_z [mm²]	1,3333e+05	1,3333e+05
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200,00	200,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	2,1333e+09	2,1333e+09
i_y [mm], i_z [mm]	115,47	115,47
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,0667e+07	1,0667e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00

I_t [mm⁴], I_w [mm⁶]	3,6027e+09	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Afbeelding		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Instellingen net

Naam	MeshSetup1
Generatie van variabele excentriciteiten op elementen in plaats van constante excentriciteiten	×
Generatie van knopen op staven	×
Elastisch net	✓
Pas automatische netverfijning toe	×
Constructie-entiteiten verbinden	✓
Verdeling op consoles en variabele staven	5
Verdeling voor integratiestrook en 2D-1D upgrade	50
Gemiddeld aantal 1D-netelementen op rechte 1D-elementen	1
Gemiddelde grootte van 2D-netelement [m]	0,500
Gemiddelde grootte van 1D-element op gebogen 1D-elementen [m]	0,200
Minimum lengte van staafelement [m]	0,100
Maximum lengte van staafelement [m]	1000,000
Gemiddelde grootte van voorspankabels, elementen op elastische bedding, niet-lineaire grondveer [m]	1,000
Maximale hoek uit het vlak van vierhoekig element [mrad]	30,0
Minimale afstand tussen definitiepunt en -lijn [m]	0,001
Gemiddelde afmeting van paneelelement [m]	1,000
Netverfijning volgens het liggertype	Geen
Definitie van netelementen afmetingen voor panelen	Handmatig

5. Geometrie

5.1. Knopen

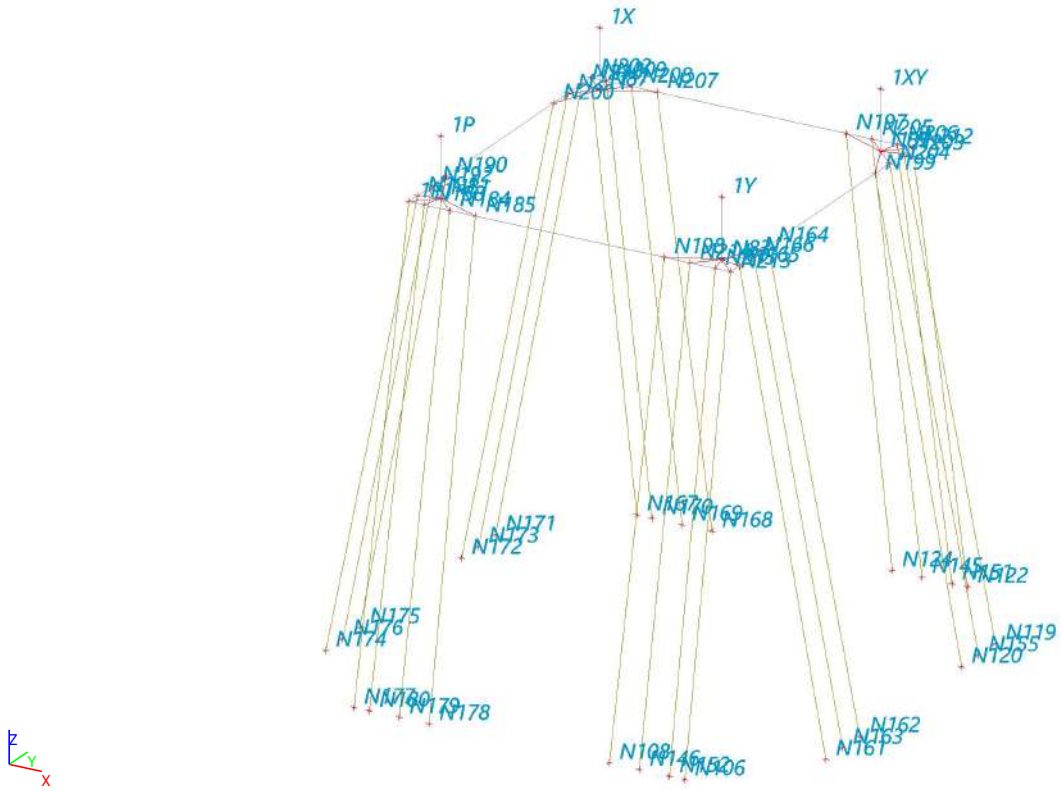
Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N81	1,200	1,200	0,000
N83	12,200	1,200	0,000
N85	12,200	12,200	0,000
N87	1,200	12,200	0,000
1P	1,200	1,200	2,300

Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
1P1	0,400	0,400	0,000
1Y	12,200	1,200	2,300
1XY	12,200	12,200	2,300
1X	1,200	12,200	2,300
N106	13,175	-3,090	-17,451

Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N108	10,225	-3,090	-17,451
N119	16,490	12,575	-17,451
N120	16,490	10,225	-17,451
N122	13,175	16,490	-17,451
N124	10,225	16,490	-17,451
N145	11,400	16,490	-17,450
N146	11,400	-3,090	-17,450
N151	12,575	16,490	-17,451
N152	12,575	-3,090	-17,451
N155	16,490	11,400	-17,450
N161	16,490	0,825	-17,451
N162	16,490	3,175	-17,451
N163	16,490	2,000	-17,450
N164	13,000	3,000	0,000
N165	13,000	1,000	0,000
N166	13,000	2,000	0,000
N167	0,225	16,490	-17,451
N168	3,175	16,490	-17,451
N169	2,000	16,490	-17,450
N170	0,825	16,490	-17,451
N171	-3,090	12,575	-17,451
N172	-3,090	10,225	-17,451
N173	-3,090	11,400	-17,450
N174	-3,090	0,825	-17,451
N175	-3,090	3,175	-17,451
N176	-3,090	2,000	-17,450
N177	0,225	-3,090	-17,451

Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N178	3,175	-3,090	-17,451
N179	2,000	-3,090	-17,450
N180	0,825	-3,090	-17,451
N184	2,000	0,400	0,000
N185	3,000	0,400	0,000
N188	1,000	0,400	0,000
N190	0,400	3,000	0,000
N191	0,400	1,000	0,000
N192	0,400	2,000	0,000
N197	10,400	13,000	0,000
N198	10,400	0,400	0,000
N199	13,000	10,400	0,000
N200	0,400	10,400	0,000
N202	0,400	13,000	0,000
N203	13,000	12,400	0,000
N204	13,000	11,400	0,000
N205	11,400	13,000	0,000
N206	12,400	13,000	0,000
N207	3,000	13,000	0,000
N208	2,000	13,000	0,000
N209	1,000	13,000	0,000
N210	0,400	12,400	0,000
N211	0,400	11,400	0,000
N212	13,000	13,000	0,000
N213	13,000	0,400	0,000
N214	11,400	0,400	0,000
N215	12,400	0,400	0,000

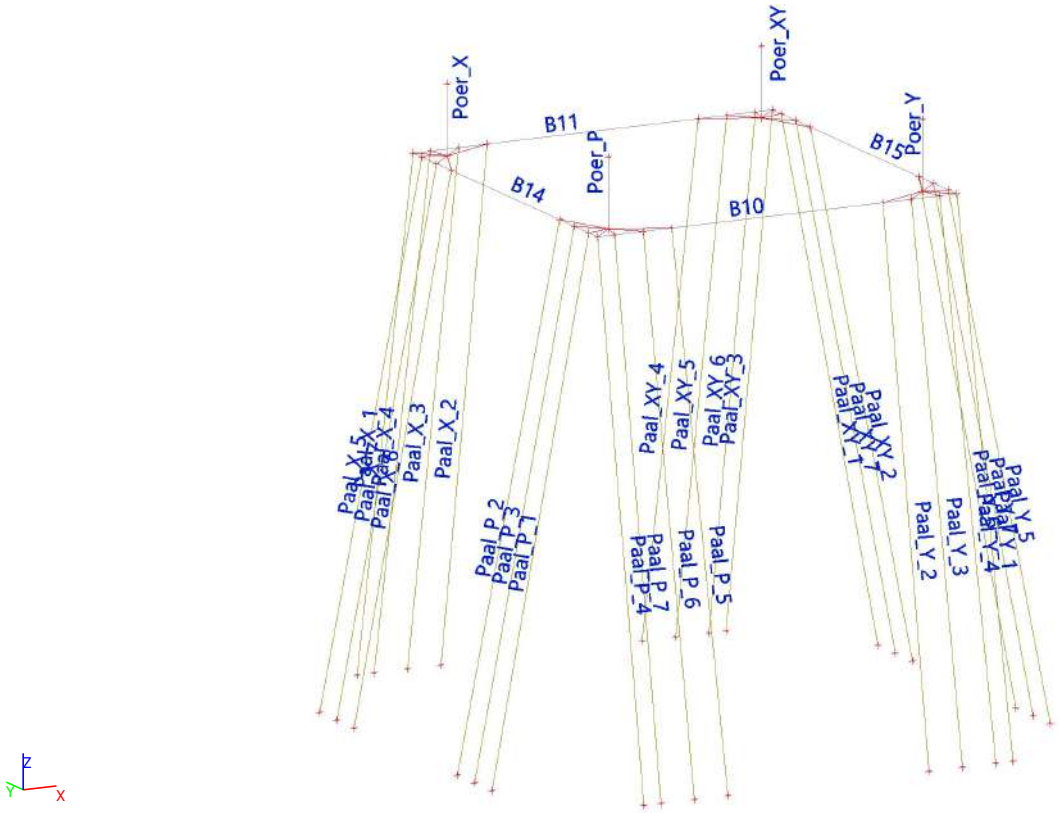
5.2. Analyse model met knopen



5.3. Staven

Naam	Doorsnede	Materiaal	Lengte [m]	Beginknoop	Eindknoop	Type
B10	Balk - Rectangle (750,00; 900,00)	C20/25 Gescheurd	12,600	1P1	N213	Balk (80)
B11	Balk - Rectangle (750,00; 900,00)	C20/25 Gescheurd	12,600	N202	N212	Balk (80)
B14	Balk - Rectangle (750,00; 900,00)	C20/25 Gescheurd	12,600	1P1	N202	Balk (80)
B15	Balk - Rectangle (750,00; 900,00)	C20/25 Gescheurd	12,600	N213	N212	Balk (80)
Paal_P_1	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N174	N191	Kolom (100)
Paal_P_2	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N175	N190	Kolom (100)
Paal_P_3	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,796	N176	N192	Kolom (100)
Paal_P_4	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N177	1P1	Kolom (100)
Paal_P_5	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N178	N185	Kolom (100)
Paal_P_6	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,796	N179	N184	Kolom (100)
Paal_P_7	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N180	N188	Kolom (100)
Paal_XY_1	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N119	N203	Kolom (100)
Paal_XY_2	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N120	N199	Kolom (100)
Paal_XY_3	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N122	N212	Kolom (100)
Paal_XY_4	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N124	N197	Kolom (100)
Paal_XY_5	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,796	N145	N205	Kolom (100)
Paal_XY_6	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N151	N206	Kolom (100)
Paal_XY_7	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,796	N155	N204	Kolom (100)
Paal_X_1	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N167	N202	Kolom (100)
Paal_X_2	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N168	N207	Kolom (100)
Paal_X_3	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,796	N169	N208	Kolom (100)
Paal_X_4	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N170	N209	Kolom (100)
Paal_X_5	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N171	N210	Kolom (100)
Paal_X_6	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N172	N200	Kolom (100)
Paal_X_7	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,796	N173	N211	Kolom (100)
Paal_Y_1	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N106	N213	Kolom (100)
Paal_Y_2	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N108	N198	Kolom (100)
Paal_Y_3	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,796	N146	N214	Kolom (100)
Paal_Y_4	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N152	N215	Kolom (100)
Paal_Y_5	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N161	N165	Kolom (100)
Paal_Y_6	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,797	N162	N164	Kolom (100)
Paal_Y_7	Funderingspaal - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	17,796	N163	N166	Kolom (100)
Poer_P	Poer.Opstort - Rectangle (900,00; 650,00)	C20/25 Gescheurd	2,300	N81	1P	Kolom (100)
Poer_X	Poer.Opstort - Rectangle (900,00; 650,00)	C20/25 Gescheurd	2,300	N87	1X	Kolom (100)
Poer_XY	Poer.Opstort - Rectangle (900,00; 650,00)	C20/25 Gescheurd	2,300	N85	1XY	Kolom (100)
Poer_Y	Poer.Opstort - Rectangle (900,00; 650,00)	C20/25 Gescheurd	2,300	N83	1Y	Kolom (100)

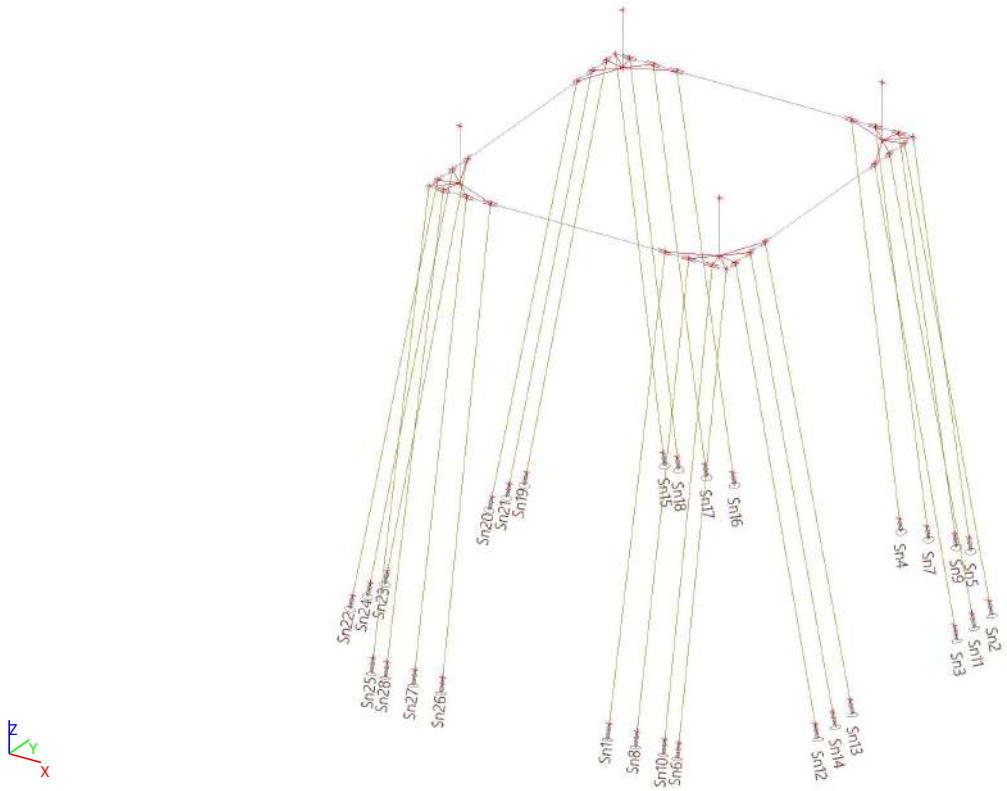
5.4. Analyse model met Staven



5.5. Knoopsteunpunten

Naam	Knoop	Systeem	Type	X	Y	Z	Rx	Ry	Rz	Hoek [deg]
Sn1	N108	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-11,31;Ry0,56
Sn2	N119	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx0,57;Ry-11,31
Sn3	N120	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-0,57;Ry-11,31
Sn4	N124	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx11,31;Ry0,56
Sn5	N122	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx11,31;Ry-0,56
Sn6	N106	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-11,31;Ry-0,51
Sn7	N145	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx11,31
Sn8	N146	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-11,31
Sn9	N151	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx11,31;Ry-0,56
Sn10	N152	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-11,31;Ry-0,51
Sn11	N155	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry-11,31
Sn12	N161	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-0,57;Ry-11,31
Sn13	N162	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx0,57;Ry-11,31
Sn14	N163	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry-11,31
Sn15	N167	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx11,31;Ry0,56
Sn16	N168	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx11,31;Ry-0,56
Sn17	N169	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx11,31
Sn18	N170	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx11,31;Ry0,56
Sn19	N171	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx0,57;Ry11,31
Sn20	N172	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-0,57;Ry11,31
Sn21	N173	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry11,31
Sn22	N174	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-0,57;Ry11,31
Sn23	N175	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx0,57;Ry11,31
Sn24	N176	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry11,31
Sn25	N177	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-11,31;Ry0,51
Sn26	N178	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-11,31;Ry-0,56
Sn27	N179	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-11,31
Sn28	N180	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-11,31;Ry0,51

5.6. Analyse model met Knoopondersteuningen



5.7. Lijnsteunpunten op staven

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
Veen1	Lijn	Paal_Y_1	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen2	Lijn	Paal_Y_2	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen3	Lijn	Paal_XY_1	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen4	Lijn	Paal_XY_2	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen5	Lijn	Paal_XY_3	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
Veen6	Lijn	Paal_XY_4	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)4	Lijn	Paal_Y_1	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)1	Lijn	Paal_Y_2	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)5	Lijn	Paal_XY_1	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)7	Lijn	Paal_XY_2	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)13	Lijn	Paal_XY_3	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V1)14	Lijn	Paal_XY_4	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)1	Lijn	Paal_Y_1	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)2	Lijn	Paal_Y_2	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)3	Lijn	Paal_XY_1	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)4	Lijn	Paal_XY_2	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)5	Lijn	Paal_XY_3	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V2)7	Lijn	Paal_XY_4	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)28	Lijn	Paal_Y_1	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)26	Lijn	Paal_Y_2	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)21	Lijn	Paal_XY_1	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)25	Lijn	Paal_XY_2	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)23	Lijn	Paal_XY_3	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V3)18	Lijn	Paal_XY_4	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)9	Lijn	Paal_Y_1	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)5	Lijn	Paal_Y_2	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)27	Lijn	Paal_XY_1	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)24	Lijn	Paal_XY_2	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)22	Lijn	Paal_XY_3	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V4)20	Lijn	Paal_XY_4	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)27	Lijn	Paal_Y_1	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)1	Lijn	Paal_Y_2	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)2	Lijn	Paal_XY_1	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)3	Lijn	Paal_XY_2	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)4	Lijn	Paal_XY_3	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V5)5	Lijn	Paal_XY_4	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)27	Lijn	Paal_Y_1	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)24	Lijn	Paal_Y_2	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)10	Lijn	Paal_XY_1	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)21	Lijn	Paal_XY_2	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)17	Lijn	Paal_XY_3	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V6)11	Lijn	Paal_XY_4	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)20	Lijn	Paal_Y_1	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)19	Lijn	Paal_Y_2	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)18	Lijn	Paal_XY_1	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)17	Lijn	Paal_XY_2	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)21	Lijn	Paal_XY_3	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V7)27	Lijn	Paal_XY_4	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)18	Lijn	Paal_Y_1	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)7	Lijn	Paal_Y_2	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)6	Lijn	Paal_XY_1	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)23	Lijn	Paal_XY_2	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)25	Lijn	Paal_XY_3	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V8)3	Lijn	Paal_XY_4	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)23	Lijn	Paal_Y_1	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)22	Lijn	Paal_Y_2	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)18	Lijn	Paal_XY_1	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)17	Lijn	Paal_XY_2	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)16	Lijn	Paal_XY_3	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V9)15	Lijn	Paal_XY_4	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)24	Lijn	Paal_Y_1	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
(PY-curve-1_V10)8	Lijn	Paal_Y_2	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
(PY-curve-1_V10)3	Lijn	Paal_XY_1	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
(PY-curve-1_V10)2	Lijn	Paal_XY_2	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
(PY-curve-1_V10)27	Lijn	Paal_XY_3	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
(PY-curve-1_V10)26	Lijn	Paal_XY_4	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen8	Lijn	Paal_XY_5	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)18	Lijn	Paal_XY_5	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)14	Lijn	Paal_XY_5	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)13	Lijn	Paal_XY_5	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)7	Lijn	Paal_XY_5	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)7	Lijn	Paal_XY_5	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)6	Lijn	Paal_XY_5	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)5	Lijn	Paal_XY_5	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)10	Lijn	Paal_XY_5	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)10	Lijn	Paal_XY_5	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)20	Lijn	Paal_XY_5	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen18	Lijn	Paal_Y_3	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)16	Lijn	Paal_Y_3	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)17	Lijn	Paal_Y_3	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)19	Lijn	Paal_Y_3	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)19	Lijn	Paal_Y_3	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)8	Lijn	Paal_Y_3	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)2	Lijn	Paal_Y_3	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)14	Lijn	Paal_Y_3	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)26	Lijn	Paal_Y_3	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)11	Lijn	Paal_Y_3	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)11	Lijn	Paal_Y_3	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen26	Lijn	Paal_XY_6	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)24	Lijn	Paal_XY_6	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)19	Lijn	Paal_XY_6	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)8	Lijn	Paal_XY_6	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)12	Lijn	Paal_XY_6	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)9	Lijn	Paal_XY_6	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)22	Lijn	Paal_XY_6	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)13	Lijn	Paal_XY_6	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)12	Lijn	Paal_XY_6	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)6	Lijn	Paal_XY_6	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)4	Lijn	Paal_XY_6	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen21	Lijn	Paal_Y_4	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)9	Lijn	Paal_Y_4	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)21	Lijn	Paal_Y_4	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)9	Lijn	Paal_Y_4	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)16	Lijn	Paal_Y_4	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)10	Lijn	Paal_Y_4	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)1	Lijn	Paal_Y_4	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)10	Lijn	Paal_Y_4	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)24	Lijn	Paal_Y_4	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)3	Lijn	Paal_Y_4	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)7	Lijn	Paal_Y_4	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	17,500	Vanaf einde						
Veen16	Lijn	Paal_XY_7	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)28	Lijn	Paal_XY_7	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)23	Lijn	Paal_XY_7	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)16	Lijn	Paal_XY_7	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)3	Lijn	Paal_XY_7	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)11	Lijn	Paal_XY_7	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)25	Lijn	Paal_XY_7	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)11	Lijn	Paal_XY_7	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)27	Lijn	Paal_XY_7	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)1	Lijn	Paal_XY_7	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)13	Lijn	Paal_XY_7	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen15	Lijn	Paal_Y_5	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)3	Lijn	Paal_Y_5	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)25	Lijn	Paal_Y_5	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)20	Lijn	Paal_Y_5	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)21	Lijn	Paal_Y_5	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)12	Lijn	Paal_Y_5	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)20	Lijn	Paal_Y_5	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)6	Lijn	Paal_Y_5	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)15	Lijn	Paal_Y_5	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)27	Lijn	Paal_Y_5	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)15	Lijn	Paal_Y_5	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen12	Lijn	Paal_Y_6	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)25	Lijn	Paal_Y_6	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)27	Lijn	Paal_Y_6	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)27	Lijn	Paal_Y_6	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)25	Lijn	Paal_Y_6	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)13	Lijn	Paal_Y_6	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)9	Lijn	Paal_Y_6	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)1	Lijn	Paal_Y_6	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)22	Lijn	Paal_Y_6	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)24	Lijn	Paal_Y_6	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)22	Lijn	Paal_Y_6	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen9	Lijn	Paal_Y_7	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)8	Lijn	Paal_Y_7	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)9	Lijn	Paal_Y_7	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)7	Lijn	Paal_Y_7	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)23	Lijn	Paal_Y_7	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)14	Lijn	Paal_Y_7	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)13	Lijn	Paal_Y_7	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)3	Lijn	Paal_Y_7	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)17	Lijn	Paal_Y_7	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)25	Lijn	Paal_Y_7	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)19	Lijn	Paal_Y_7	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen11	Lijn	Paal_X_1	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)20	Lijn	Paal_X_1	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)28	Lijn	Paal_X_1	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)22	Lijn	Paal_X_1	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)4	Lijn	Paal_X_1	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)16	Lijn	Paal_X_1	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)7	Lijn	Paal_X_1	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)15	Lijn	Paal_X_1	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)2	Lijn	Paal_X_1	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)20	Lijn	Paal_X_1	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)1	Lijn	Paal_X_1	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen17	Lijn	Paal_X_2	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)6	Lijn	Paal_X_2	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)6	Lijn	Paal_X_2	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)14	Lijn	Paal_X_2	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)1	Lijn	Paal_X_2	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)17	Lijn	Paal_X_2	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)4	Lijn	Paal_X_2	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)2	Lijn	Paal_X_2	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)14	Lijn	Paal_X_2	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)26	Lijn	Paal_X_2	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)16	Lijn	Paal_X_2	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen10	Lijn	Paal_X_3	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)21	Lijn	Paal_X_3	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)26	Lijn	Paal_X_3	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)24	Lijn	Paal_X_3	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)17	Lijn	Paal_X_3	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)18	Lijn	Paal_X_3	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)15	Lijn	Paal_X_3	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)8	Lijn	Paal_X_3	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)19	Lijn	Paal_X_3	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)4	Lijn	Paal_X_3	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)14	Lijn	Paal_X_3	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen14	Lijn	Paal_X_4	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)26	Lijn	Paal_X_4	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)24	Lijn	Paal_X_4	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)17	Lijn	Paal_X_4	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)6	Lijn	Paal_X_4	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)6	Lijn	Paal_X_4	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)26	Lijn	Paal_X_4	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)12	Lijn	Paal_X_4	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)1	Lijn	Paal_X_4	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)2	Lijn	Paal_X_4	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)12	Lijn	Paal_X_4	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen13	Lijn	Paal_X_5	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)2	Lijn	Paal_X_5	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)22	Lijn	Paal_X_5	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)11	Lijn	Paal_X_5	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)11	Lijn	Paal_X_5	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)19	Lijn	Paal_X_5	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)12	Lijn	Paal_X_5	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)7	Lijn	Paal_X_5	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

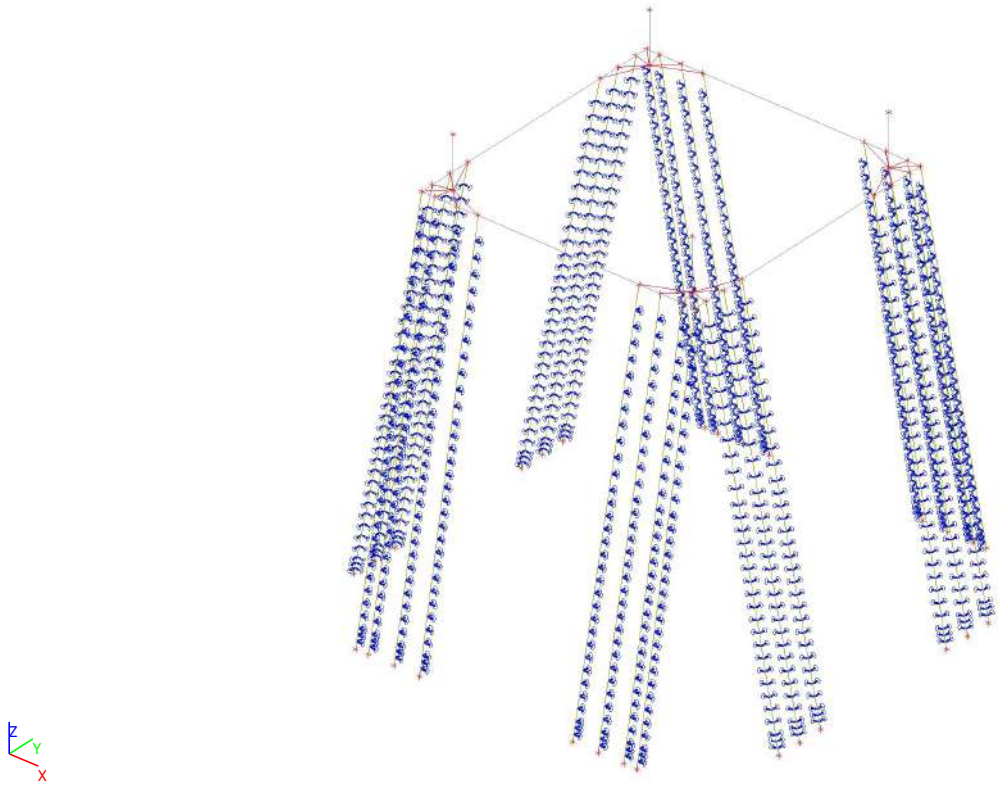
Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)9	Lijn	Paal_X_5	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)5	Lijn	Paal_X_5	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)5	Lijn	Paal_X_5	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen22	Lijn	Paal_X_6	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)19	Lijn	Paal_X_6	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)20	Lijn	Paal_X_6	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)12	Lijn	Paal_X_6	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)13	Lijn	Paal_X_6	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)20	Lijn	Paal_X_6	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)5	Lijn	Paal_X_6	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)23	Lijn	Paal_X_6	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)20	Lijn	Paal_X_6	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)7	Lijn	Paal_X_6	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)18	Lijn	Paal_X_6	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen27	Lijn	Paal_X_7	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)15	Lijn	Paal_X_7	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)18	Lijn	Paal_X_7	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)1	Lijn	Paal_X_7	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)26	Lijn	Paal_X_7	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)21	Lijn	Paal_X_7	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)3	Lijn	Paal_X_7	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)4	Lijn	Paal_X_7	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)11	Lijn	Paal_X_7	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)8	Lijn	Paal_X_7	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)10	Lijn	Paal_X_7	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen19	Lijn	Paal_P_1	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)10	Lijn	Paal_P_1	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)16	Lijn	Paal_P_1	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)2	Lijn	Paal_P_1	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)8	Lijn	Paal_P_1	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)22	Lijn	Paal_P_1	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)23	Lijn	Paal_P_1	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)26	Lijn	Paal_P_1	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)8	Lijn	Paal_P_1	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)12	Lijn	Paal_P_1	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)25	Lijn	Paal_P_1	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen23	Lijn	Paal_P_2	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)11	Lijn	Paal_P_2	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)13	Lijn	Paal_P_2	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)6	Lijn	Paal_P_2	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)18	Lijn	Paal_P_2	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)23	Lijn	Paal_P_2	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)19	Lijn	Paal_P_2	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)25	Lijn	Paal_P_2	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)16	Lijn	Paal_P_2	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)13	Lijn	Paal_P_2	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)23	Lijn	Paal_P_2	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen7	Lijn	Paal_P_3	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)23	Lijn	Paal_P_3	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)12	Lijn	Paal_P_3	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)3	Lijn	Paal_P_3	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)2	Lijn	Paal_P_3	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)24	Lijn	Paal_P_3	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)18	Lijn	Paal_P_3	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)9	Lijn	Paal_P_3	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)5	Lijn	Paal_P_3	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)21	Lijn	Paal_P_3	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)9	Lijn	Paal_P_3	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen28	Lijn	Paal_P_4	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)27	Lijn	Paal_P_4	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)15	Lijn	Paal_P_4	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)5	Lijn	Paal_P_4	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)10	Lijn	Paal_P_4	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)15	Lijn	Paal_P_4	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

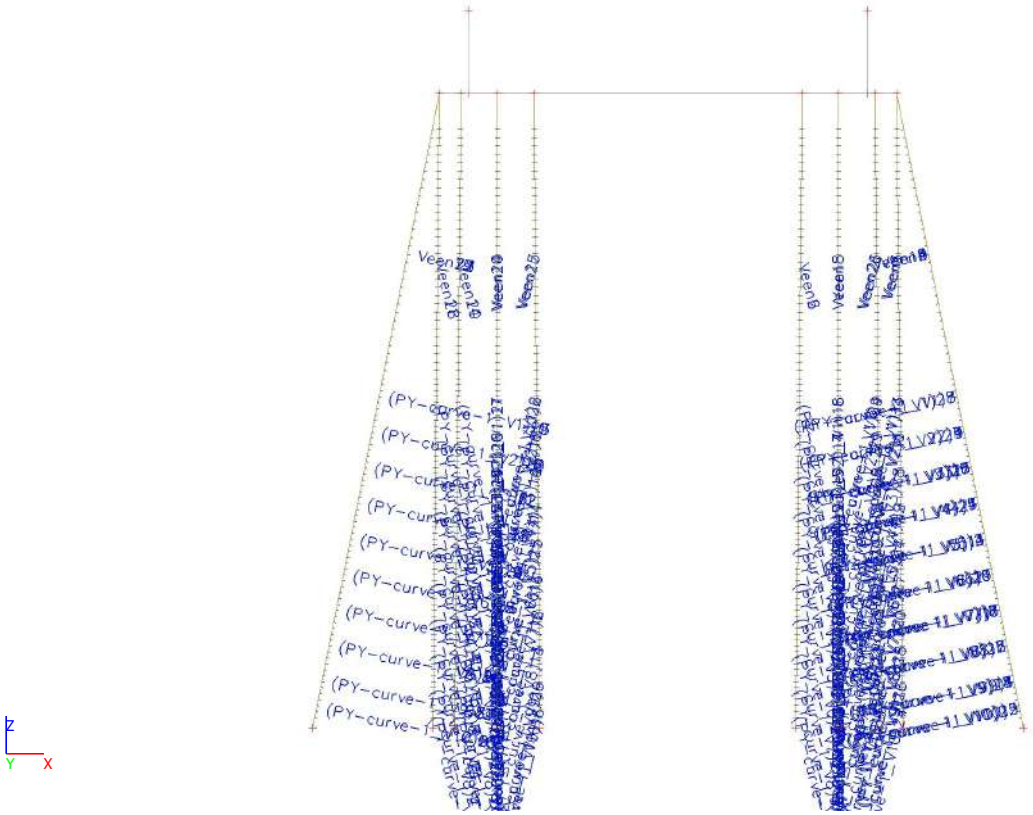
Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)8	Lijn	Paal_P_4	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)24	Lijn	Paal_P_4	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)4	Lijn	Paal_P_4	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)14	Lijn	Paal_P_4	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)21	Lijn	Paal_P_4	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen25	Lijn	Paal_P_5	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)22	Lijn	Paal_P_5	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)11	Lijn	Paal_P_5	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)10	Lijn	Paal_P_5	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)14	Lijn	Paal_P_5	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)25	Lijn	Paal_P_5	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)16	Lijn	Paal_P_5	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)16	Lijn	Paal_P_5	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)13	Lijn	Paal_P_5	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)9	Lijn	Paal_P_5	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)6	Lijn	Paal_P_5	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen24	Lijn	Paal_P_6	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)17	Lijn	Paal_P_6	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)10	Lijn	Paal_P_6	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)15	Lijn	Paal_P_6	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)15	Lijn	Paal_P_6	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)26	Lijn	Paal_P_6	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)14	Lijn	Paal_P_6	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)22	Lijn	Paal_P_6	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)21	Lijn	Paal_P_6	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)19	Lijn	Paal_P_6	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)17	Lijn	Paal_P_6	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						
Veen20	Lijn	Paal_P_7	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf einde						
(PY-curve-1_V1)12	Lijn	Paal_P_7	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf einde						
(PY-curve-1_V2)8	Lijn	Paal_P_7	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf einde						
(PY-curve-1_V3)4	Lijn	Paal_P_7	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf einde						
(PY-curve-1_V4)28	Lijn	Paal_P_7	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	12,000	Vanaf einde						
(PY-curve-1_V5)28	Lijn	Paal_P_7	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf einde						
(PY-curve-1_V6)28	Lijn	Paal_P_7	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf einde						
(PY-curve-1_V7)28	Lijn	Paal_P_7	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf einde						
(PY-curve-1_V8)28	Lijn	Paal_P_7	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf einde						
(PY-curve-1_V9)28	Lijn	Paal_P_7	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf einde						
(PY-curve-1_V10)28	Lijn	Paal_P_7	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,500	Vanaf einde						

5.8. Analyse model met Lijnondersteuningen



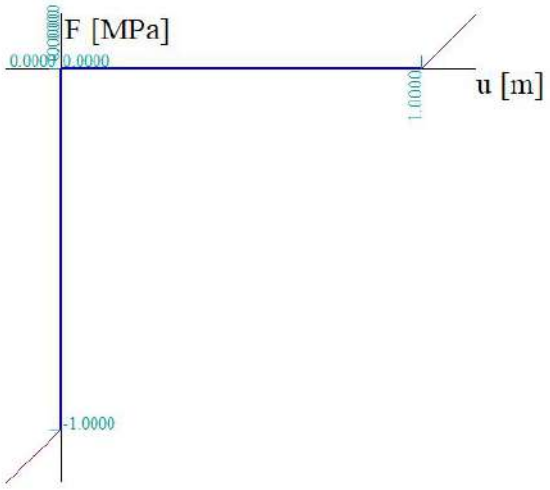
5.9. Analyse model met Lijnondersteuningen



5.10. Niet-lineaire functies

Naam	Type	u / F	Positief einde	Negatief einde
soil press only	Niet-lineair bedding		Verend	Verend

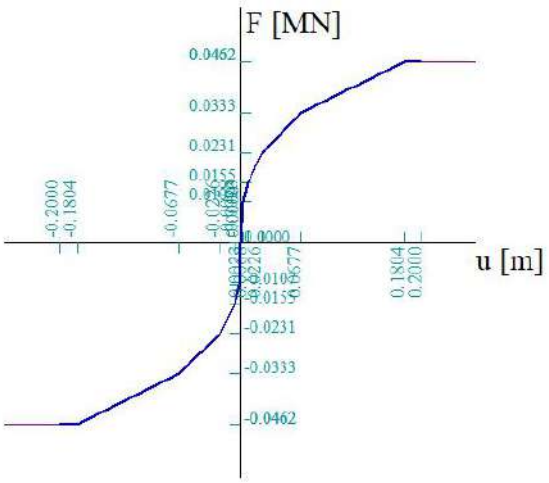
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V1	Verplaatsing	-0.200000 / -46203.840000	Vrij	Vrij
		-0.180400 / -46203.840000		
		-0.067650 / -33318.734193		
		-0.022550 / -23101.920000		
		-0.006765 / -15465.186458		

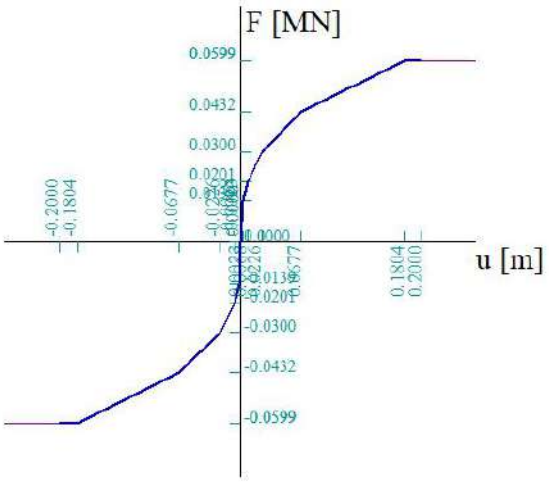
Naam	Type	u / F	Positief einde	Negatief einde
		-0.002255 / -10722.961391		
		0.000000 / 0.000000		
		0.002255 / 10722.961391		
		0.006765 / 15465.186458		
		0.022550 / 23101.920000		
		0.067650 / 33318.734193		
		0.180400 / 46203.840000		
		0.200000 / 46203.840000		

Tekenen



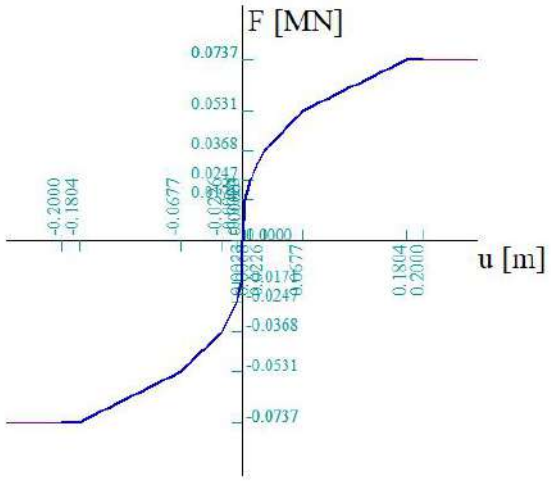
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V2	Verplaatsing	-0.200000 / -59935.680000	Vrij	Vrij
		-0.180400 / -59935.680000		
		-0.067650 / -43221.104363		
		-0.022550 / -29967.840000		
		-0.006765 / -20061.459539		
		-0.002255 / -13909.839151		
		0.000000 / 0.000000		
		0.002255 / 13909.839151		
		0.006765 / 20061.459539		
		0.022550 / 29967.840000		
		0.067650 / 43221.104363		
		0.180400 / 59935.680000		
		0.200000 / 59935.680000		

Tekenen



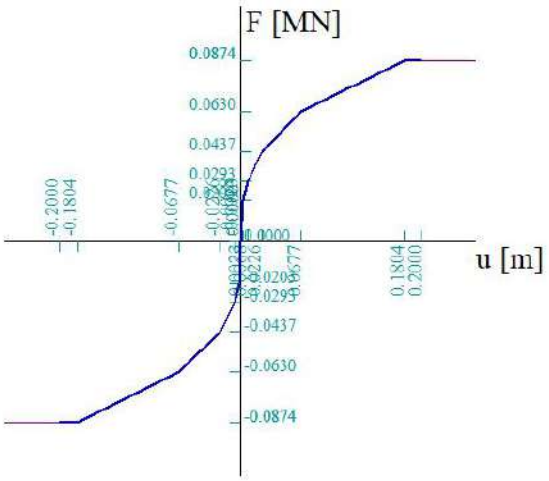
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V3	Verplaatsing	-0.200000 / -73667.520000	Vrij	Vrij
		-0.180400 / -73667.520000		
		-0.067650 / -53123.474533		
		-0.022550 / -36833.760000		
		-0.006765 / -24657.732619		
		-0.002255 / -17096.716912		
		0.000000 / 0.000000		
		0.002255 / 17096.716912		
		0.006765 / 24657.732619		
		0.022550 / 36833.760000		
		0.067650 / 53123.474533		
		0.180400 / 73667.520000		
		0.200000 / 73667.520000		

Tekenen



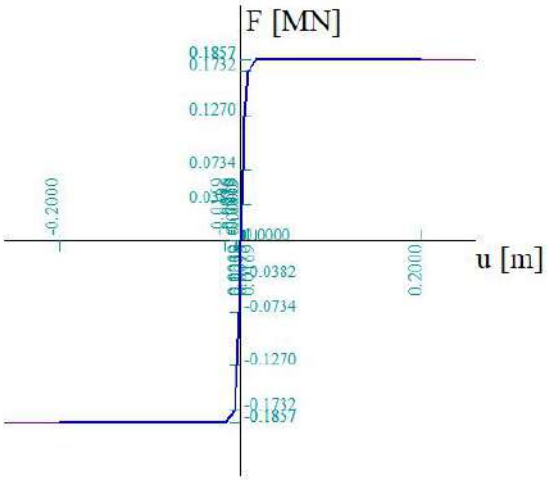
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V4	Verplaatsing	-0.200000 / -87399.360000	Vrij	Vrij
		-0.180400 / -87399.360000		
		-0.067650 / -63025.844703		
		-0.022550 / -43699.680000		
		-0.006765 / -29254.005700		
		-0.002255 / -20283.594672		
		0.000000 / 0.000000		
		0.002255 / 20283.594672		
		0.006765 / 29254.005700		
		0.022550 / 43699.680000		
		0.067650 / 63025.844703		
		0.180400 / 87399.360000		
		0.200000 / 87399.360000		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V5	Verplaatsing	-0.200000 / -185749.581577	Vrij	Vrij
		-0.016913 / -185749.581577		
		-0.007517 / -173191.521652		
		-0.003758 / -126966.550767		
		-0.001879 / -73364.887728		
		-0.000940 / -38233.153457		
		0.000000 / 0.000000		
		0.000940 / 38233.153457		
		0.001879 / 73364.887728		
		0.003758 / 126966.550767		
		0.007517 / 173191.521652		
		0.016913 / 185749.581577		
		0.200000 / 185749.581577		

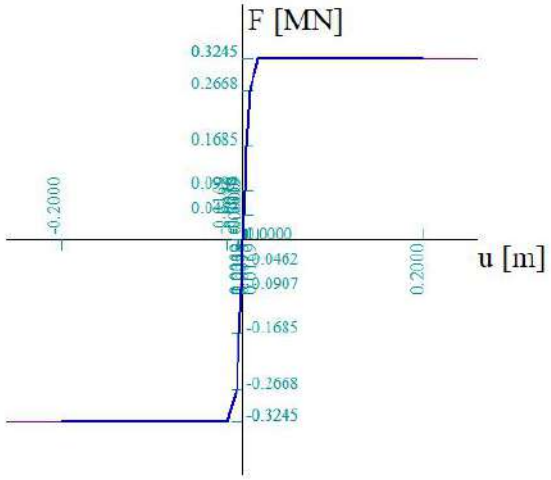
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V6	Verplaatsing	-0.200000 / -324503.959510	Vrij	Vrij
		-0.016913 / -324503.959510		
		-0.007517 / -266801.170128		
		-0.003758 / -168504.997582		
		-0.001879 / -90672.108471		
		-0.000940 / -46234.204284		
		0.000000 / 0.000000		
		0.000940 / 46234.204284		
		0.001879 / 90672.108471		
		0.003758 / 168504.997582		

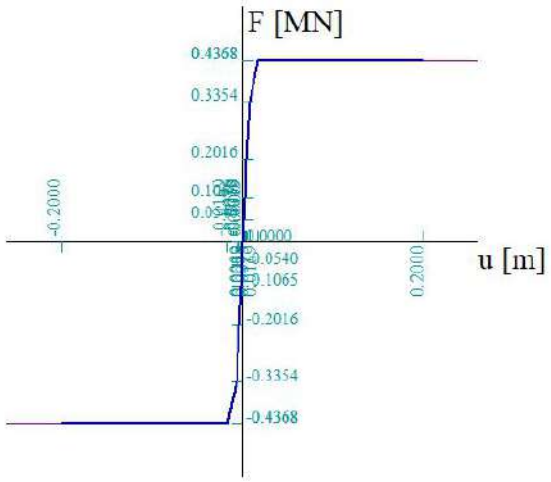
Naam	Type	u / F	Positief einde	Negatief einde
		0.007517 / 266801.170128		
		0.016913 / 324503.959510		
		0.200000 / 324503.959510		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V7	Verplaatsing	-0.200000 / -436765.819801	Vrij	Vrij
		-0.016913 / -436765.819801		
		-0.007517 / -335362.730832		
		-0.003758 / -201646.948699		
		-0.001879 / -106522.716227		
		-0.000940 / -54036.089272		
		0.000000 / 0.000000		
		0.000940 / 54036.089272		
		0.001879 / 106522.716227		
		0.003758 / 201646.948699		
		0.007517 / 335362.730832		
		0.016913 / 436765.819801		
		0.200000 / 436765.819801		

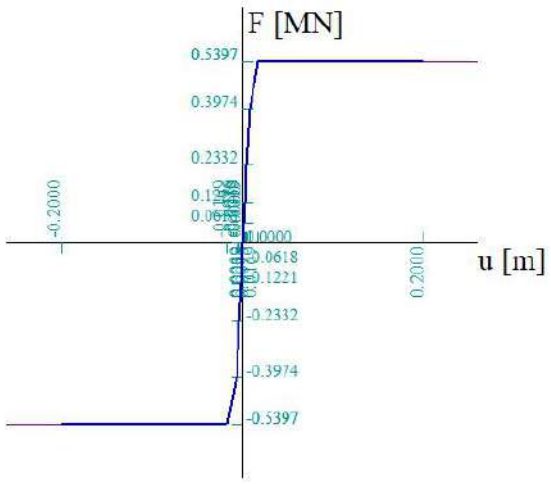
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V8	Verplaatsing	-0.200000 / -539683.678038	Vrij	Vrij
		-0.016913 / -539683.678038		
		-0.007517 / -397433.011814		
		-0.003758 / -233158.398644		

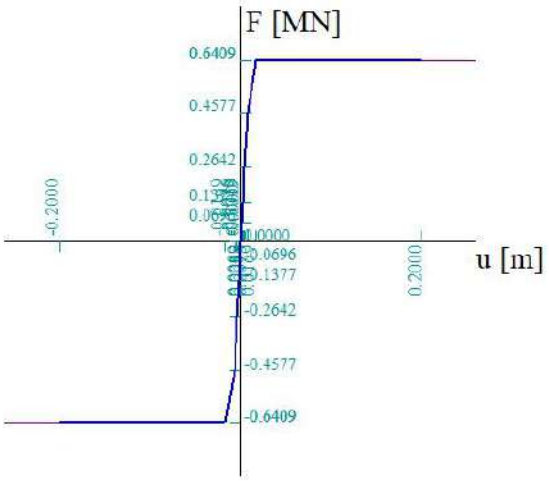
Naam	Type	u / F	Positief einde	Negatief einde
		-0.001879 / -122122.429030		
		-0.000940 / -61804.852432		
		0.000000 / 0.000000		
		0.000940 / 61804.852432		
		0.001879 / 122122.429030		
		0.003758 / 233158.398644		
		0.007517 / 397433.011814		
		0.016913 / 539683.678038		
		0.200000 / 539683.678038		

Tekenen



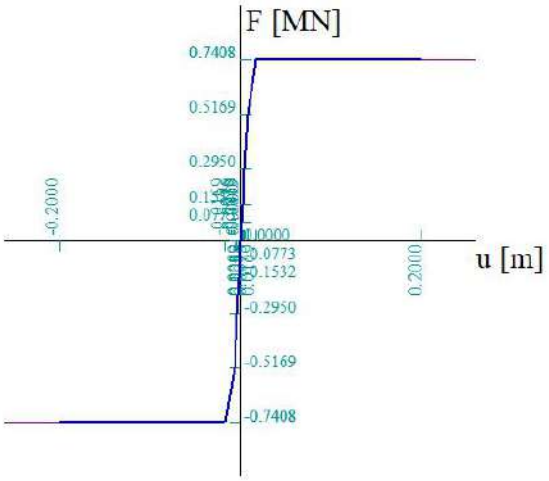
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V9	Verplaatsing	-0.200000 / -640861.931437	Vrij	Vrij
		-0.016913 / -640861.931437		
		-0.007517 / -457700.088592		
		-0.003758 / -264224.038576		
		-0.001879 / -137654.602914		
		-0.000940 / -69564.742931		
		0.000000 / 0.000000		
		0.000940 / 69564.742931		
		0.001879 / 137654.602914		
		0.003758 / 264224.038576		
		0.007517 / 457700.088592		
		0.016913 / 640861.931437		
		0.200000 / 640861.931437		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V10	Verplaatsing	-0.200000 / -740774.043969	Vrij	Vrij
		-0.016913 / -740774.043969		
		-0.007517 / -516894.797403		
		-0.003758 / -295043.983610		
		-0.001879 / -153150.432455		
		-0.000940 / -77319.889121		
		0.000000 / 0.000000		
		0.000940 / 77319.889121		
		0.001879 / 153150.432455		
		0.003758 / 295043.983610		
		0.007517 / 516894.797403		
		0.016913 / 740774.043969		
		0.200000 / 740774.043969		

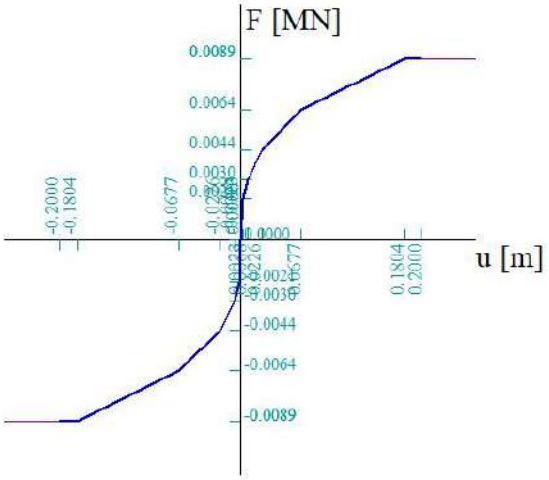
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_Veen	Verplaatsing	-0.200000 / -8894.400000	Vrij	Vrij
		-0.180400 / -8894.400000		
		-0.067650 / -6413.760000		
		-0.022550 / -4447.680000		
		-0.006765 / -2976.960000		
		-0.002255 / -2064.000000		
		0.000000 / 0.000000		
		0.002255 / 2064.000000		
		0.006765 / 2976.960000		
		0.022550 / 4447.680000		

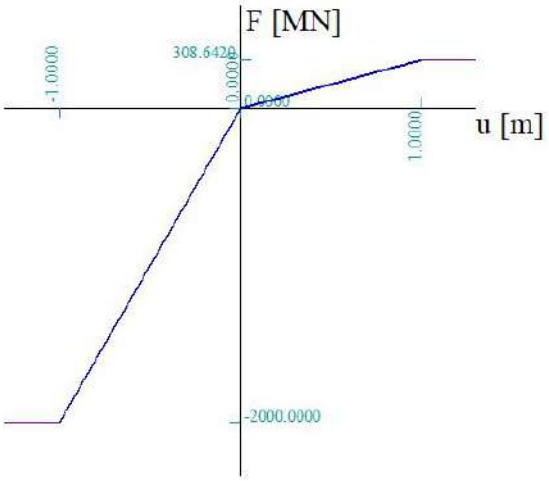
Naam	Type	u / F	Positief einde	Negatief einde
		0.067650 / 6413.760000		
		0.180400 / 8894.400000		
		0.200000 / 8894.400000		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
Trek-druk-S+paalpunt	Verplaatsing	-1.000000 / -2000000000.000000	Vrij	Vrij
		0.000000 / 0.000000		
		1.000000 / 308642000.000000		

Tekenen

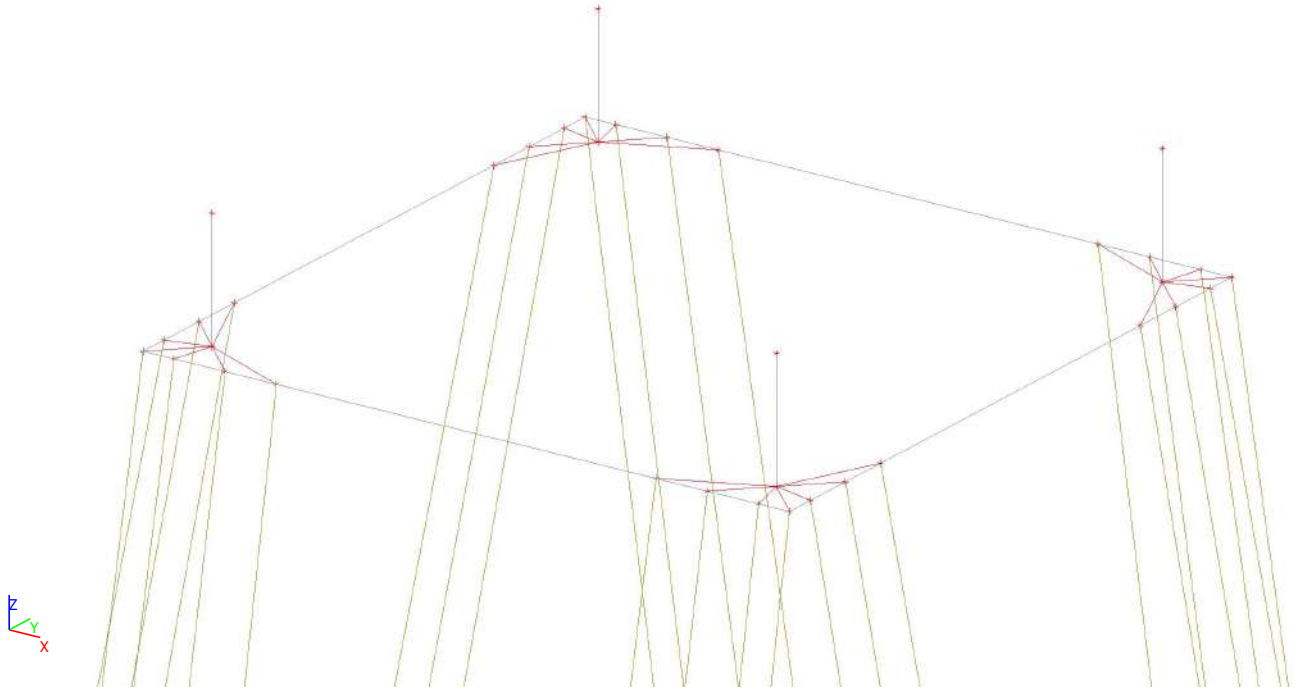


6. Belastingen

6.1. Belastingsgevallen

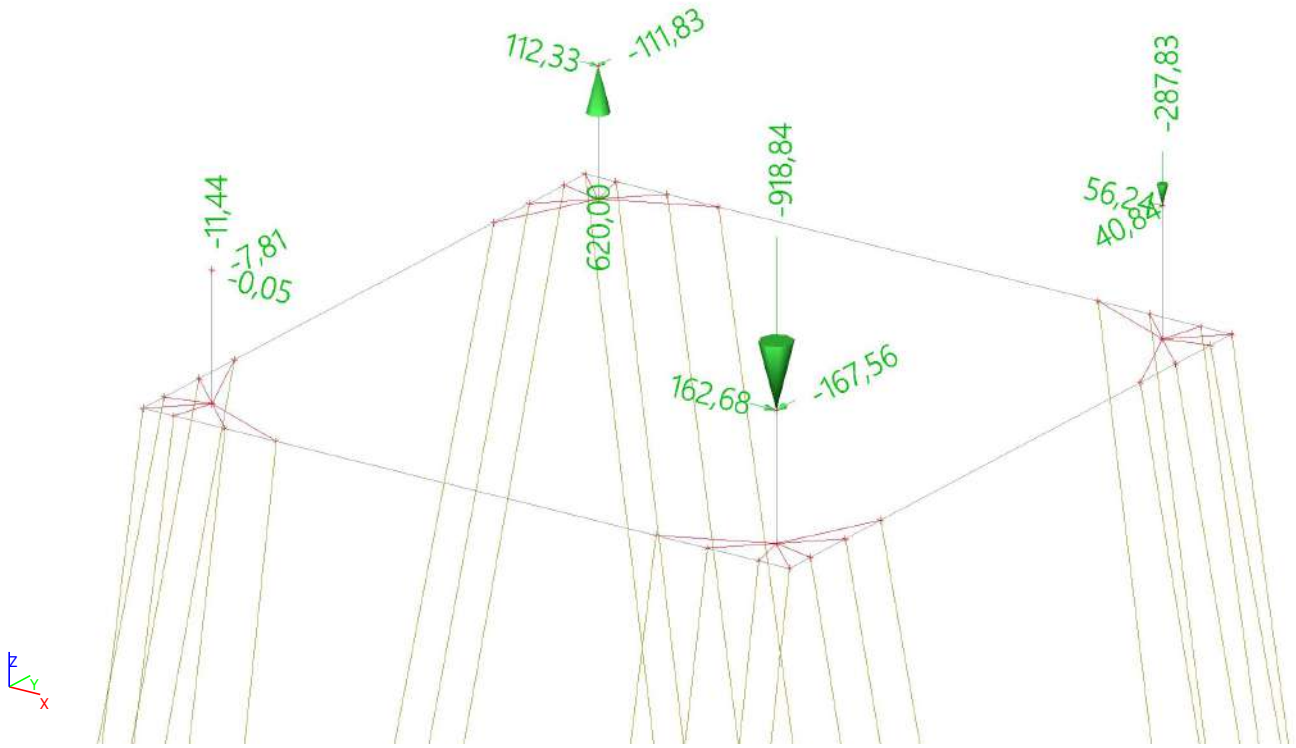
6.1.1. Belastingsgevallen - E.G.

Naam	Omschrijving	Actie type	Lastgroep	Richting
	Spec	Belastingtype		
E.G.		Permanent	LG1	-Z
		Eigen gewicht		



6.1.2. Belastingsgevallen - hL Bck + Wnd ;225°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
hL Bck + Wnd ;225°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			

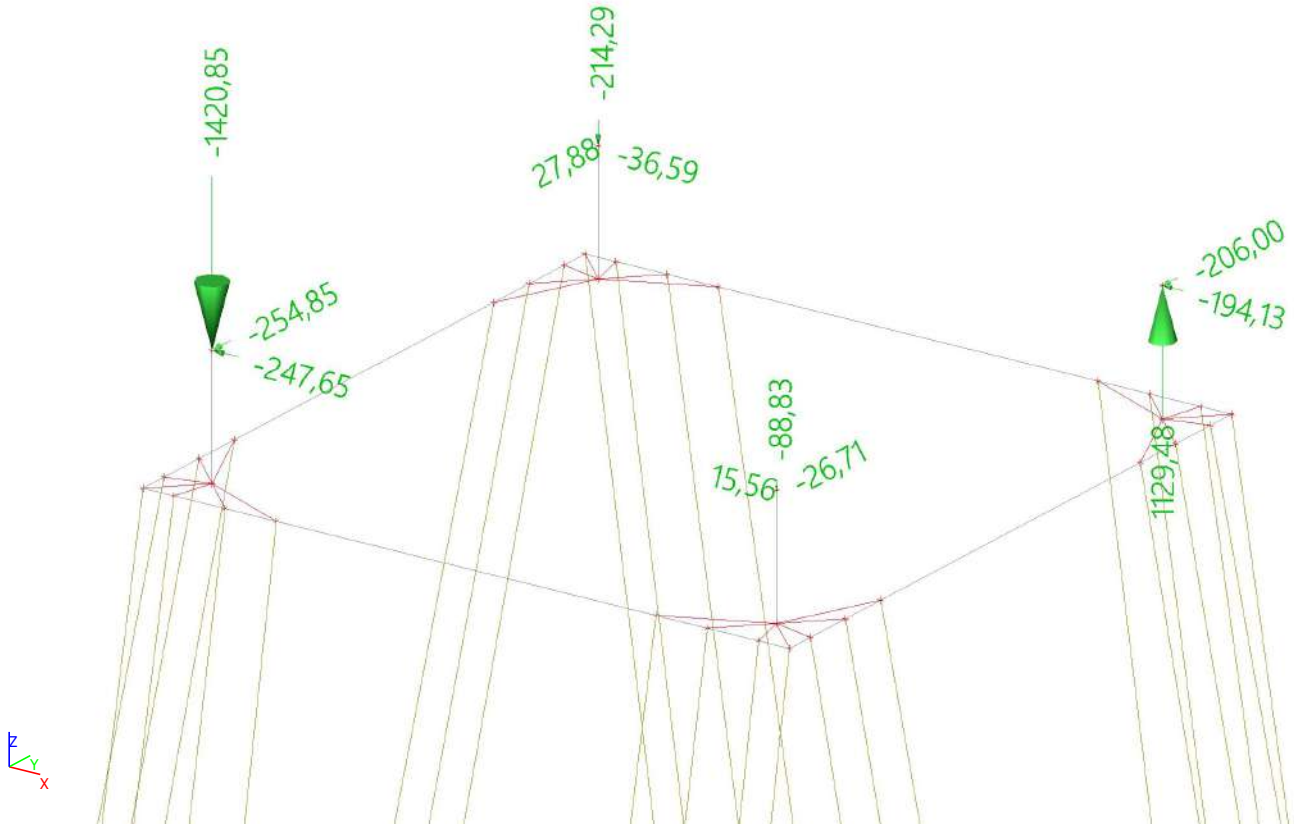


6.1.2.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
hL Bck + Wnd ;225°_1P_X	1P	hL Bck + Wnd ;225°	GCS	X	Kracht	-0,05
hL Bck + Wnd ;225°_1P_Y	1P	hL Bck + Wnd ;225°	GCS	Y	Kracht	-7,81
hL Bck + Wnd ;225°_1P_Z	1P	hL Bck + Wnd ;225°	GCS	Z	Kracht	-11,44
hL Bck + Wnd ;225°_1X_X	1X	hL Bck + Wnd ;225°	GCS	X	Kracht	112,33
hL Bck + Wnd ;225°_1X_Y	1X	hL Bck + Wnd ;225°	GCS	Y	Kracht	-111,83
hL Bck + Wnd ;225°_1X_Z	1X	hL Bck + Wnd ;225°	GCS	Z	Kracht	620,00
hL Bck + Wnd ;225°_1XY_X	1XY	hL Bck + Wnd ;225°	GCS	X	Kracht	56,24
hL Bck + Wnd ;225°_1XY_Y	1XY	hL Bck + Wnd ;225°	GCS	Y	Kracht	40,84
hL Bck + Wnd ;225°_1XY_Z	1XY	hL Bck + Wnd ;225°	GCS	Z	Kracht	-287,83
hL Bck + Wnd ;225°_1Y_X	1Y	hL Bck + Wnd ;225°	GCS	X	Kracht	162,68
hL Bck + Wnd ;225°_1Y_Y	1Y	hL Bck + Wnd ;225°	GCS	Y	Kracht	-167,56
hL Bck + Wnd ;225°_1Y_Z	1Y	hL Bck + Wnd ;225°	GCS	Z	Kracht	-918,84

6.1.3. Belastingsgevallen - high max Wnd ;270°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
high max Wnd ;270°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



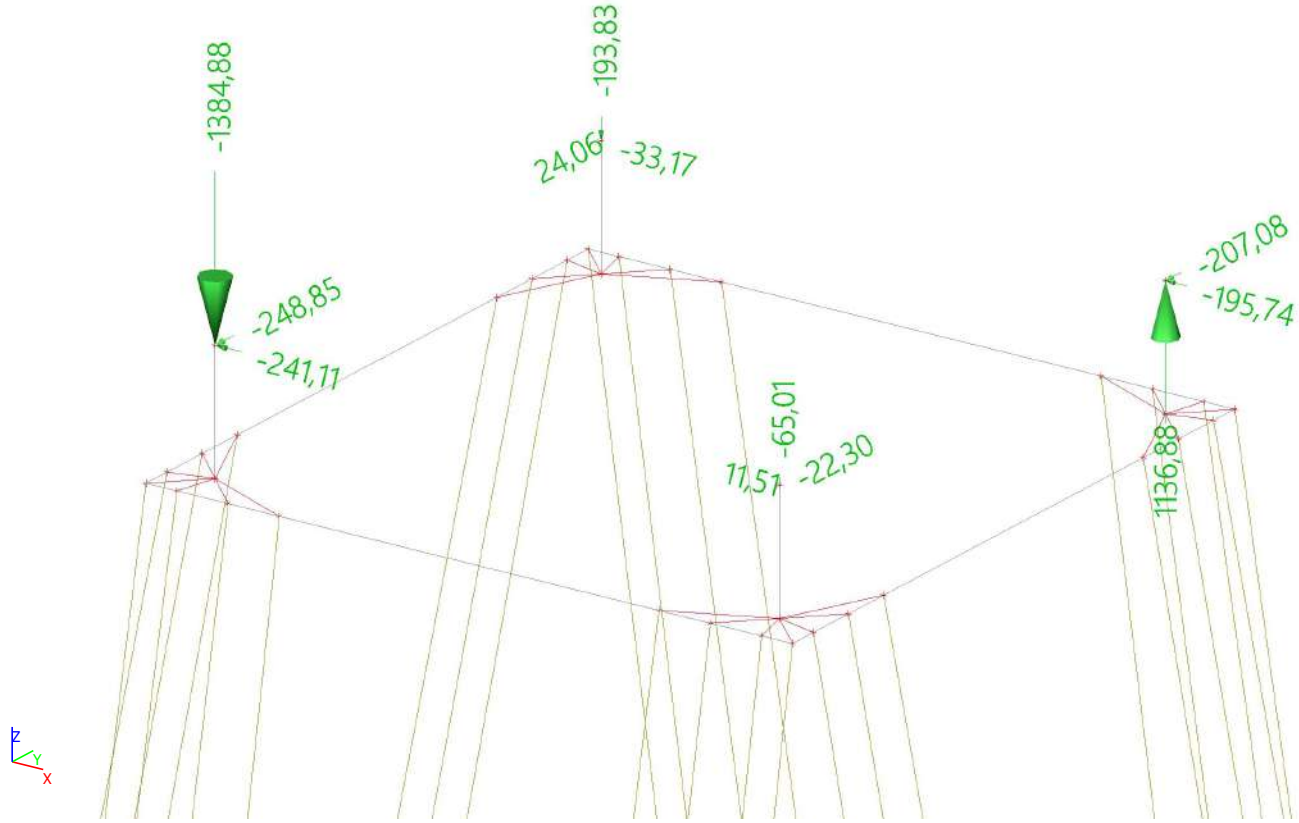
6.1.3.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;270°_1P_X	1P	high max Wnd ;270°	GCS	X	Kracht	-247,65
high max Wnd ;270°_1P_Y	1P	high max Wnd ;270°	GCS	Y	Kracht	-254,85
high max Wnd ;270°_1P_Z	1P	high max Wnd ;270°	GCS	Z	Kracht	-1420,85
high max Wnd ;270°_1X_X	1X	high max Wnd ;270°	GCS	X	Kracht	-36,59
high max Wnd ;270°_1X_Y	1X	high max Wnd ;270°	GCS	Y	Kracht	27,88
high max Wnd ;270°_1X_Z	1X	high max Wnd ;270°	GCS	Z	Kracht	-214,29
high max Wnd ;270°_1XY_X	1XY	high max Wnd ;270°	GCS	X	Kracht	-194,13
high max Wnd ;270°_1XY_Y	1XY	high max Wnd ;270°	GCS	Y	Kracht	-206,00
high max Wnd ;270°_1XY_Z	1XY	high max Wnd ;270°	GCS	Z	Kracht	1129,48
high max Wnd ;270°_1Y_X	1Y	high max Wnd ;270°	GCS	X	Kracht	15,56
high max Wnd ;270°_1Y_Y	1Y	high max Wnd ;270°	GCS	Y	Kracht	-26,71

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;270°_1Y_Z	1Y	high max Wnd ;270°	GCS	Z	Kracht	-88,83

6.1.4. Belastingsgevallen - low max Wnd ;270°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
low max Wnd ;270°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



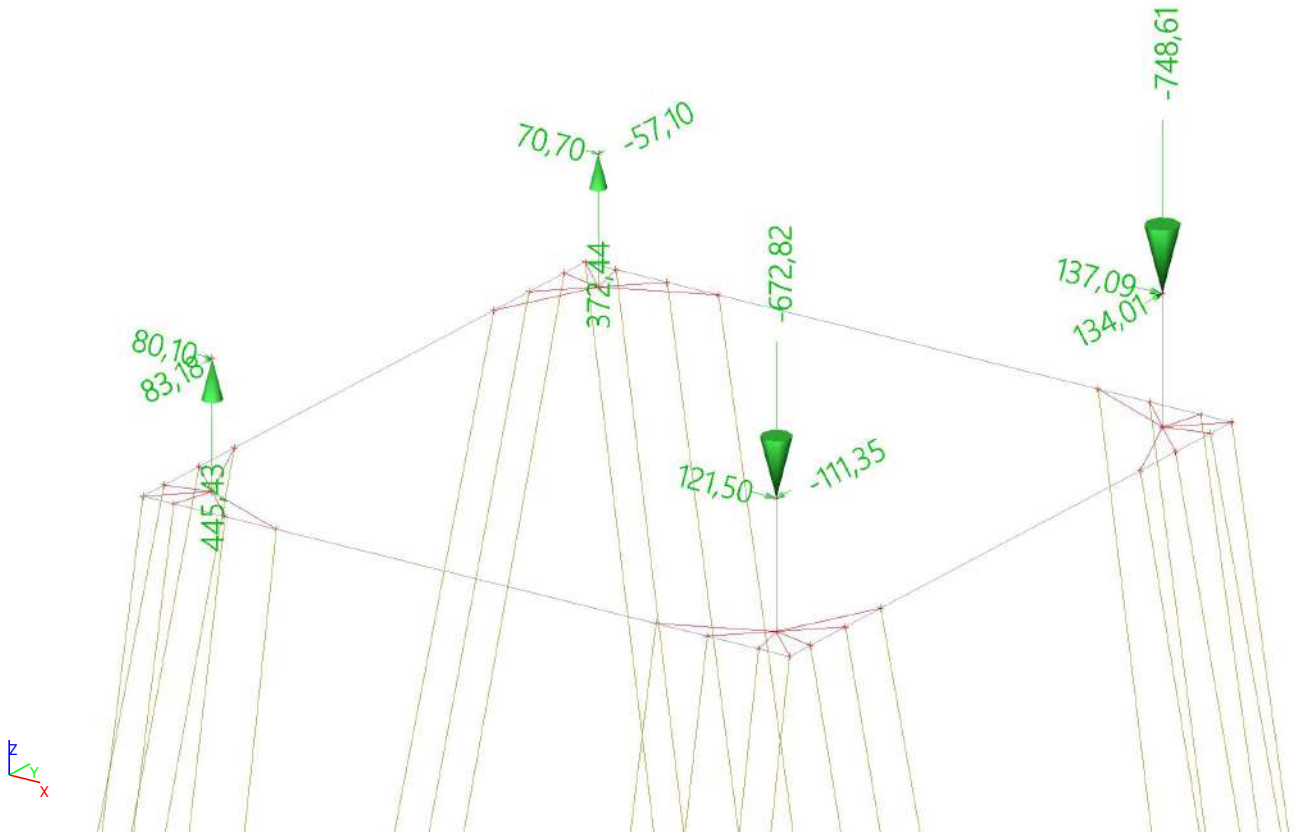
6.1.4.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;270°_1P_X	1P	low max Wnd ;270°	GCS	X	Kracht	-241,11
low max Wnd ;270°_1P_Y	1P	low max Wnd ;270°	GCS	Y	Kracht	-248,85
low max Wnd ;270°_1P_Z	1P	low max Wnd ;270°	GCS	Z	Kracht	-1384,88
low max Wnd ;270°_1X_X	1X	low max Wnd ;270°	GCS	X	Kracht	-33,17
low max Wnd ;270°_1X_Y	1X	low max Wnd ;270°	GCS	Y	Kracht	24,06
low max Wnd ;270°_1X_Z	1X	low max Wnd ;270°	GCS	Z	Kracht	-193,83
low max Wnd ;270°_1XY_X	1XY	low max Wnd ;270°	GCS	X	Kracht	-195,74
low max Wnd ;270°_1XY_Y	1XY	low max Wnd ;270°	GCS	Y	Kracht	-207,08

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;270°_1XY_Z	1XY	low max Wnd ;270°	GCS	Z	Kracht	1136,88
low max Wnd ;270°_1Y_X	1Y	low max Wnd ;270°	GCS	X	Kracht	11,51
low max Wnd ;270°_1Y_Y	1Y	low max Wnd ;270°	GCS	Y	Kracht	-22,30
low max Wnd ;270°_1Y_Z	1Y	low max Wnd ;270°	GCS	Z	Kracht	-65,01

6.1.5. Belastingsgevallen - hL Bck + Wnd ;135°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
hL Bck + Wnd ;135°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



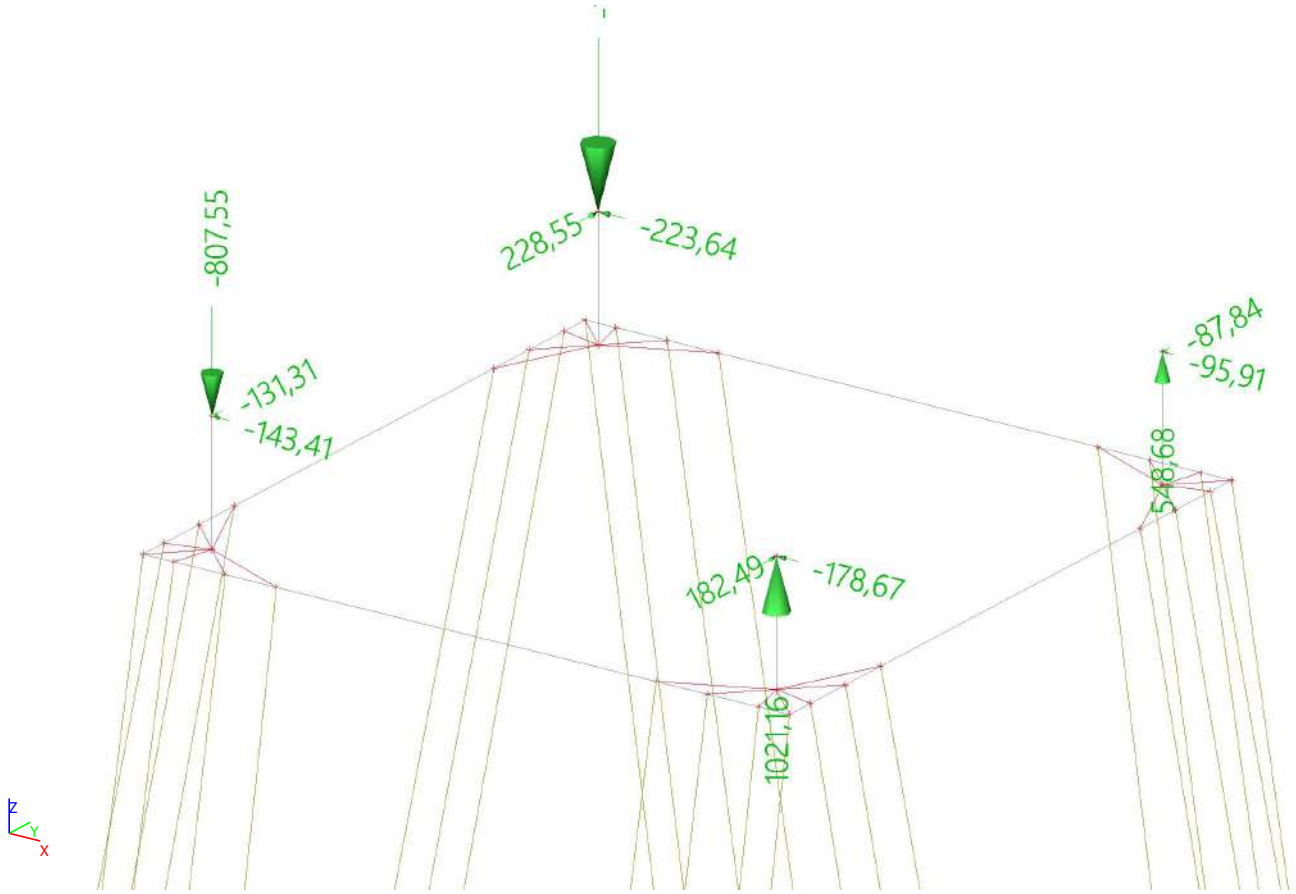
6.1.5.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
hL Bck + Wnd ;135°_1P_X	1P	hL Bck + Wnd ;135°	GCS	X	Kracht	80,10
hL Bck + Wnd ;135°_1P_Y	1P	hL Bck + Wnd ;135°	GCS	Y	Kracht	83,18
hL Bck + Wnd ;135°_1P_Z	1P	hL Bck + Wnd ;135°	GCS	Z	Kracht	445,43
hL Bck + Wnd ;135°_1X_X	1X	hL Bck + Wnd ;135°	GCS	X	Kracht	70,70
hL Bck + Wnd ;135°_1X_Y	1X	hL Bck + Wnd ;135°	GCS	Y	Kracht	-57,10

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
hL Bck + Wnd ;135°_1X_Z	1X	hL Bck + Wnd ;135°	GCS	Z	Kracht	372,44
hL Bck + Wnd ;135°_1XY_X	1XY	hL Bck + Wnd ;135°	GCS	X	Kracht	137,09
hL Bck + Wnd ;135°_1XY_Y	1XY	hL Bck + Wnd ;135°	GCS	Y	Kracht	134,01
hL Bck + Wnd ;135°_1XY_Z	1XY	hL Bck + Wnd ;135°	GCS	Z	Kracht	-748,61
hL Bck + Wnd ;135°_1Y_X	1Y	hL Bck + Wnd ;135°	GCS	X	Kracht	121,50
hL Bck + Wnd ;135°_1Y_Y	1Y	hL Bck + Wnd ;135°	GCS	Y	Kracht	-111,35
hL Bck + Wnd ;135°_1Y_Z	1Y	hL Bck + Wnd ;135°	GCS	Z	Kracht	-672,82

6.1.6. Belastingsgevallen - hL Ahd + Wnd ;45°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
hL Ahd + Wnd ;45°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			

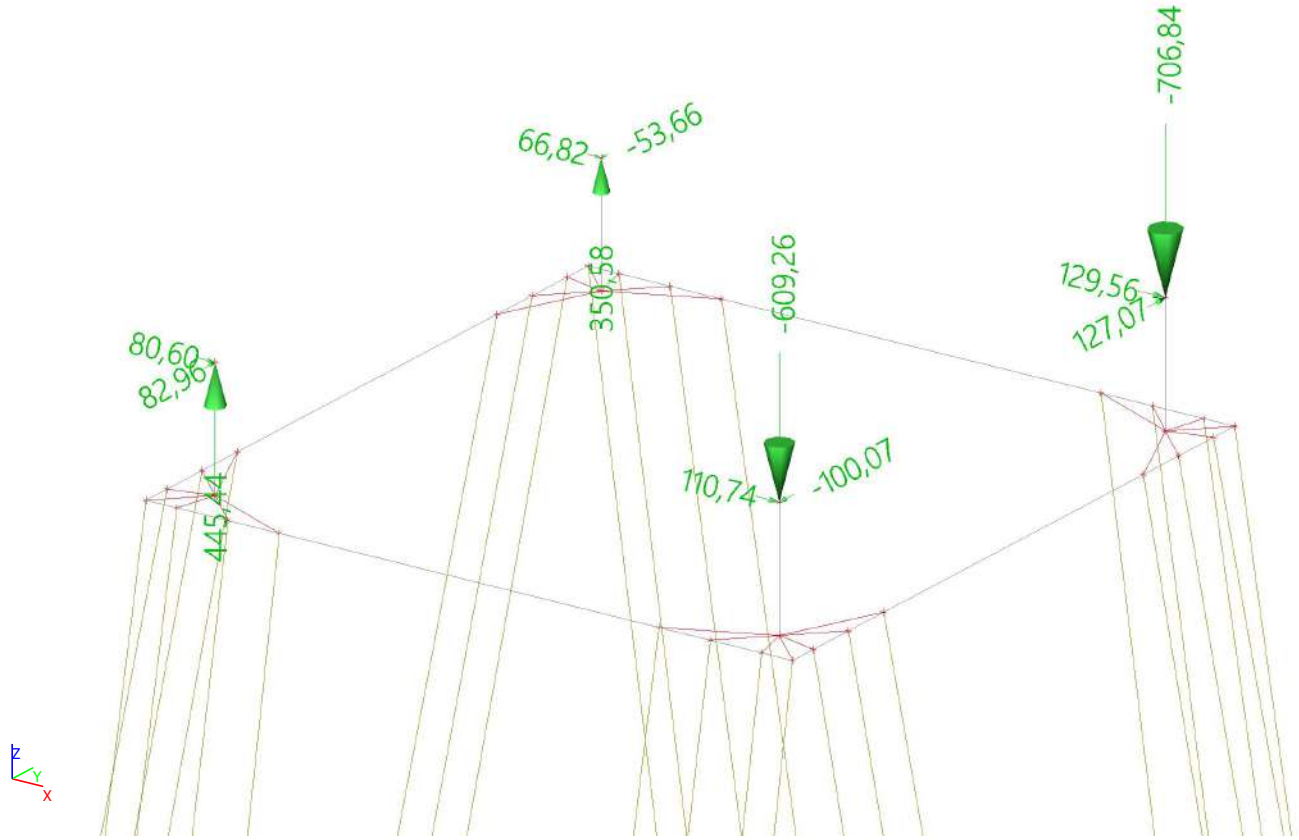


6.1.6.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
hL Ahd + Wnd ;45°_1P_X	1P	hL Ahd + Wnd ;45°	GCS	X	Kracht	-143,41
hL Ahd + Wnd ;45°_1P_Y	1P	hL Ahd + Wnd ;45°	GCS	Y	Kracht	-131,31
hL Ahd + Wnd ;45°_1P_Z	1P	hL Ahd + Wnd ;45°	GCS	Z	Kracht	-807,55
hL Ahd + Wnd ;45°_1X_X	1X	hL Ahd + Wnd ;45°	GCS	X	Kracht	-223,64
hL Ahd + Wnd ;45°_1X_Y	1X	hL Ahd + Wnd ;45°	GCS	Y	Kracht	228,55
hL Ahd + Wnd ;45°_1X_Z	1X	hL Ahd + Wnd ;45°	GCS	Z	Kracht	-1277,18
hL Ahd + Wnd ;45°_1XY_X	1XY	hL Ahd + Wnd ;45°	GCS	X	Kracht	-95,91
hL Ahd + Wnd ;45°_1XY_Y	1XY	hL Ahd + Wnd ;45°	GCS	Y	Kracht	-87,84
hL Ahd + Wnd ;45°_1XY_Z	1XY	hL Ahd + Wnd ;45°	GCS	Z	Kracht	548,68
hL Ahd + Wnd ;45°_1Y_X	1Y	hL Ahd + Wnd ;45°	GCS	X	Kracht	-178,67
hL Ahd + Wnd ;45°_1Y_Y	1Y	hL Ahd + Wnd ;45°	GCS	Y	Kracht	182,49
hL Ahd + Wnd ;45°_1Y_Z	1Y	hL Ahd + Wnd ;45°	GCS	Z	Kracht	1021,16

6.1.7. Belastingsgevallen - lL Bck + Wnd ;135°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
lL Bck + Wnd ;135°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



6.1.7.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
IL Bck + Wnd ;135°_1P_X	1P	IL Bck + Wnd ;135°	GCS	X	Kracht	80,60
IL Bck + Wnd ;135°_1P_Y	1P	IL Bck + Wnd ;135°	GCS	Y	Kracht	82,96
IL Bck + Wnd ;135°_1P_Z	1P	IL Bck + Wnd ;135°	GCS	Z	Kracht	445,44
IL Bck + Wnd ;135°_1X_X	1X	IL Bck + Wnd ;135°	GCS	X	Kracht	66,82
IL Bck + Wnd ;135°_1X_Y	1X	IL Bck + Wnd ;135°	GCS	Y	Kracht	-53,66
IL Bck + Wnd ;135°_1X_Z	1X	IL Bck + Wnd ;135°	GCS	Z	Kracht	350,58
IL Bck + Wnd ;135°_1XY_X	1XY	IL Bck + Wnd ;135°	GCS	X	Kracht	129,56
IL Bck + Wnd ;135°_1XY_Y	1XY	IL Bck + Wnd ;135°	GCS	Y	Kracht	127,07
IL Bck + Wnd ;135°_1XY_Z	1XY	IL Bck + Wnd ;135°	GCS	Z	Kracht	-706,84
IL Bck + Wnd ;135°_1Y_X	1Y	IL Bck + Wnd ;135°	GCS	X	Kracht	110,74
IL Bck + Wnd ;135°_1Y_Y	1Y	IL Bck + Wnd ;135°	GCS	Y	Kracht	-100,07
IL Bck + Wnd ;135°_1Y_Z	1Y	IL Bck + Wnd ;135°	GCS	Z	Kracht	-609,26

6.2. Niet-lineaire combinaties

Naam	Type	Belastingsgevallen	Coëff. [-]
low max Wnd ;270°	Uiterste Grenstoestand	E.G.	0,900
		low max Wnd ;270°	1,000
hL Bck + Wnd ;225°	Uiterste Grenstoestand	E.G.	1,200
		hL Bck + Wnd ;225°	1,000
high max Wnd ;270°	Uiterste Grenstoestand	E.G.	1,200
		high max Wnd ;270°	1,000
hL Bck + Wnd ;135°	Uiterste Grenstoestand	E.G.	1,200
		hL Bck + Wnd ;135°	1,000
hL Ahd + Wnd ;45°	Uiterste Grenstoestand	E.G.	1,200
		hL Ahd + Wnd ;45°	1,000
lL Bck Wnd ;135°	Uiterste Grenstoestand	E.G.	0,900
		lL Bck + Wnd ;135°	1,000

6.3. Resultaatklasses

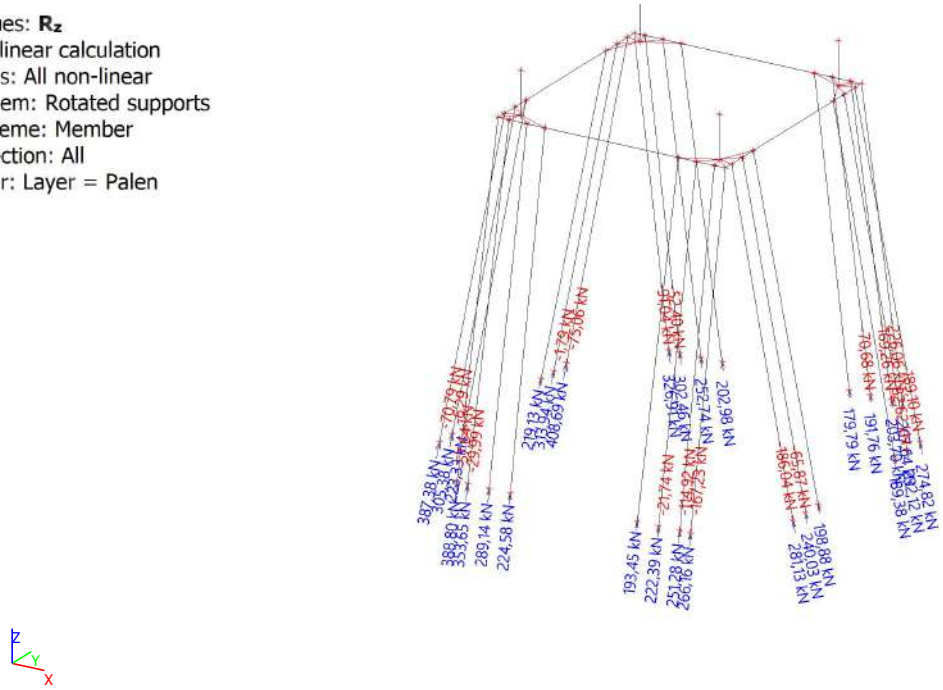
Naam	Lijst
All non-linear	low max Wnd ;270°
	hL Bck + Wnd ;225°
	high max Wnd ;270°
	hL Bck + Wnd ;135°
	hL Ahd + Wnd ;45°
	lL Bck Wnd ;135°

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reacties

Niet-lineaire berekening
Klasse: All non-linear
Systeem: Schuine steunpunten
Extreem: Globaal
Selectie: Alle
Filter: Laag = Palen
Knoopreacties

Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn12/N161	hL Bck + Wnd ;225°	**0,00**	0,00	281,13	0,00	0,00	0,00	0,0	0,0
Sn25/N177	high max Wnd ;270°	**0,00**	0,00	388,80	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn25/N177	low max Wnd ;270°	0,00	**0,00**	369,46	0,00	0,00	0,00	0,0	0,0
Sn8/N146	high max Wnd ;270°	0,00	**0,00**	153,46	0,00	0,00	0,00	0,0	0,0
Sn5/N122	low max Wnd ;270°	0,00	0,00	**-226,06**	0,00	0,00	0,00	0,0	0,0
Sn19/N171	hL Ahd + Wnd ;45°	0,00	0,00	**408,69**	0,00	0,00	0,00	0,0	0,0

7.1.3. Reacties

Niet-lineaire berekening
Klasse: All non-linear
Systeem: Schuine steunpunten
Extreem: Element
Selectie: Alle
Filter: Laag = Palen
Knoopreacties

Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn6/N106	low max Wnd ;270°	0,00	**0,00**	101,12	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn6/N106	hL Ahd + Wnd ;45°	**0,00**	0,00	**-167,23**	0,00	0,00	0,00	0,0	0,0
Sn6/N106	hL Bck + Wnd ;225°	**0,00**	**0,00**	**266,16**	0,00	0,00	**0,00**	0,0	0,0
Sn1/N108	high max Wnd ;270°	**0,00**	0,00	176,56	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn1/N108	hL Bck + Wnd ;135°	0,00	**0,00**	174,73	0,00	0,00	0,00	0,0	0,0
Sn1/N108	hL Bck + Wnd ;225°	0,00	**0,00**	**193,45**	0,00	0,00	0,00	0,0	0,0
Sn1/N108	hL Ahd + Wnd ;45°	**0,00**	0,00	**109,57**	0,00	0,00	**0,00**	0,0	0,0
Sn2/N119	lL Bck Wnd ;135°	0,00	**0,00**	245,78	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn2/N119	low max Wnd ;270°	**0,00**	0,00	**-189,10**	0,00	0,00	0,00	0,0	0,0
Sn2/N119	hL Bck + Wnd ;135°	0,00	0,00	**274,82**	0,00	0,00	0,00	0,0	0,0
Sn2/N119	high max Wnd ;270°	**0,00**	**0,00**	-171,14	0,00	0,00	**0,00**	0,0	0,0
Sn3/N120	hL Bck + Wnd ;135°	**0,00**	**0,00**	**189,38**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn3/N120	low max Wnd ;270°	0,00	**0,00**	**36,60**	0,00	0,00	0,00	0,0	0,0
Sn3/N120	hL Bck + Wnd ;225°	**0,00**	0,00	174,99	0,00	0,00	**0,00**	0,0	0,0
Sn5/N122	lL Bck Wnd ;135°	0,00	**0,00**	188,63	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn5/N122	low max Wnd ;270°	**0,00**	0,00	**-226,06**	0,00	0,00	0,00	0,0	0,0
Sn5/N122	hL Bck + Wnd ;135°	**0,00**	**0,00**	**207,64**	0,00	0,00	**0,00**	0,0	0,0
Sn4/N124	hL Bck + Wnd ;225°	**0,00**	0,00	156,04	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn4/N124	hL Bck + Wnd ;135°	0,00	**0,00**	**179,79**	0,00	0,00	0,00	0,0	0,0
Sn4/N124	high max Wnd ;270°	0,00	**0,00**	86,31	0,00	0,00	0,00	0,0	0,0
Sn4/N124	low max Wnd ;270°	**0,00**	0,00	**42,80**	0,00	0,00	**0,00**	0,0	0,0
Sn7/N145	hL Bck + Wnd ;225°	0,00	**0,00**	126,11	0,00	0,00	0,00	0,0	0,0
Sn7/N145	hL Bck + Wnd ;135°	**0,00**	0,00	**191,76**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn7/N145	low max Wnd ;270°	0,00	**0,00**	**-70,68**	0,00	0,00	**0,00**	0,0	0,0
Sn8/N146	hL Bck + Wnd ;135°	0,00	**0,00**	177,05	0,00	0,00	0,00	0,0	0,0
Sn8/N146	high max Wnd ;270°	**0,00**	**0,00**	153,46	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn8/N146	hL Ahd + Wnd ;45°	0,00	0,00	**-21,74**	0,00	0,00	0,00	0,0	0,0
Sn8/N146	hL Bck + Wnd ;225°	0,00	0,00	**222,39**	0,00	0,00	0,00	0,0	0,0
Sn9/N151	low max Wnd ;270°	**0,00**	0,00	**-169,26**	0,00	0,00	0,00	0,0	0,0
Sn9/N151	hL Bck + Wnd ;135°	0,00	**0,00**	**203,70**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn9/N151	lL Bck Wnd ;135°	**0,00**	**0,00**	179,75	0,00	0,00	**0,00**	0,0	0,0
Sn10/N152	lL Bck Wnd ;135°	0,00	**0,00**	150,10	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn10/N152	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**-114,92**	0,00	0,00	0,00	0,0	0,0

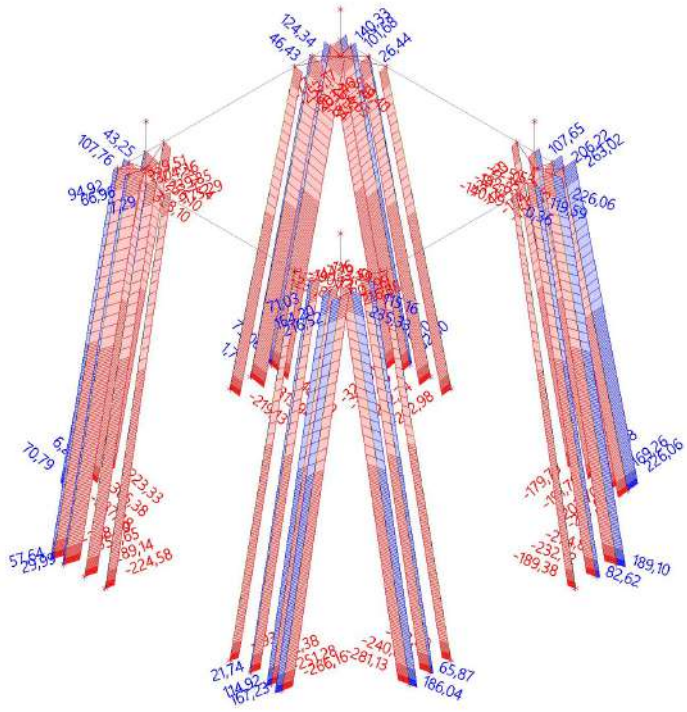
Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn10/N152	hL Bck + Wnd ;225°	**0,00**	0,00	**251,28**	0,00	0,00	**0,00**	0,0	0,0
Sn11/N155	low max Wnd ;270°	**0,00**	0,00	**-82,62**	0,00	0,00	0,00	0,0	0,0
Sn11/N155	hL Bck + Wnd ;135°	0,00	**0,00**	**232,12**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn11/N155	lL Bck Wnd ;135°	**0,00**	0,00	197,51	0,00	0,00	**0,00**	0,0	0,0
Sn12/N161	hL Bck + Wnd ;135°	0,00	**0,00**	263,79	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn12/N161	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**-186,04**	0,00	0,00	0,00	0,0	0,0
Sn12/N161	hL Bck + Wnd ;225°	**0,00**	0,00	**281,13**	0,00	0,00	**0,00**	0,0	0,0
Sn13/N162	lL Bck Wnd ;135°	**0,00**	0,00	154,54	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn13/N162	hL Ahd + Wnd ;45°	0,00	**0,00**	**83,29**	0,00	0,00	0,00	0,0	0,0
Sn13/N162	hL Bck + Wnd ;225°	0,00	**0,00**	**198,88**	0,00	0,00	0,00	0,0	0,0
Sn13/N162	low max Wnd ;270°	**0,00**	0,00	110,19	0,00	0,00	**0,00**	0,0	0,0
Sn14/N163	lL Bck Wnd ;135°	**0,00**	**0,00**	193,30	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn14/N163	hL Ahd + Wnd ;45°	0,00	0,00	**-65,87**	0,00	0,00	0,00	0,0	0,0
Sn14/N163	hL Bck + Wnd ;225°	0,00	0,00	**240,03**	0,00	0,00	0,00	0,0	0,0
Sn14/N163	hL Bck + Wnd ;135°	**0,00**	0,00	230,06	0,00	0,00	**0,00**	0,0	0,0
Sn15/N167	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**326,91**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn15/N167	hL Bck + Wnd ;225°	**0,00**	**0,00**	**-91,04**	0,00	0,00	**0,00**	0,0	0,0
Sn16/N168	lL Bck Wnd ;135°	**0,00**	0,00	111,19	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn16/N168	low max Wnd ;270°	0,00	**0,00**	**109,89**	0,00	0,00	0,00	0,0	0,0
Sn16/N168	hL Ahd + Wnd ;45°	0,00	**0,00**	**202,98**	0,00	0,00	0,00	0,0	0,0
Sn16/N168	hL Bck + Wnd ;135°	**0,00**	0,00	148,29	0,00	0,00	**0,00**	0,0	0,0
Sn17/N169	high max Wnd ;270°	0,00	**0,00**	107,10	0,00	0,00	0,00	0,0	0,0
Sn17/N169	hL Bck + Wnd ;135°	**0,00**	**0,00**	78,98	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn17/N169	hL Bck + Wnd ;225°	0,00	0,00	**22,85**	0,00	0,00	0,00	0,0	0,0
Sn17/N169	hL Ahd + Wnd ;45°	0,00	0,00	**252,74**	0,00	0,00	0,00	0,0	0,0
Sn18/N170	lL Bck Wnd ;135°	0,00	**0,00**	-3,92	0,00	0,00	0,00	0,0	0,0
Sn18/N170	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**302,46**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn18/N170	hL Bck + Wnd ;225°	**0,00**	0,00	**-52,40**	0,00	0,00	**0,00**	0,0	0,0
Sn19/N171	hL Bck + Wnd ;225°	0,00	**0,00**	**-75,06**	0,00	0,00	0,00	0,0	0,0
Sn19/N171	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**408,69**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn19/N171	high max Wnd ;270°	**0,00**	0,00	202,71	0,00	0,00	**0,00**	0,0	0,0
Sn20/N172	hL Bck + Wnd ;135°	**0,00**	0,00	125,22	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn20/N172	hL Ahd + Wnd ;45°	0,00	**0,00**	**219,13**	0,00	0,00	0,00	0,0	0,0

Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn20/N172	lL Bck Wnd ;135°	0,00	**0,00**	**87,75**	0,00	0,00	0,00	0,0	0,0
Sn20/N172	low max Wnd ;270°	**0,00**	0,00	137,30	0,00	0,00	**0,00**	0,0	0,0
Sn21/N173	hL Bck + Wnd ;135°	**0,00**	**0,00**	22,18	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn21/N173	lL Bck Wnd ;135°	0,00	0,00	**-1,79**	0,00	0,00	0,00	0,0	0,0
Sn21/N173	hL Ahd + Wnd ;45°	**0,00**	0,00	**313,94**	0,00	0,00	**0,00**	0,0	0,0
Sn22/N174	low max Wnd ;270°	**0,00**	0,00	363,10	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn22/N174	high max Wnd ;270°	0,00	**0,00**	**387,38**	0,00	0,00	0,00	0,0	0,0
Sn22/N174	lL Bck Wnd ;135°	0,00	**0,00**	**-70,79**	0,00	0,00	0,00	0,0	0,0
Sn22/N174	hL Ahd + Wnd ;45°	**0,00**	0,00	340,58	0,00	0,00	**0,00**	0,0	0,0
Sn23/N175	low max Wnd ;270°	**0,00**	0,00	183,53	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn23/N175	lL Bck Wnd ;135°	0,00	**0,00**	**89,30**	0,00	0,00	0,00	0,0	0,0
Sn23/N175	high max Wnd ;270°	0,00	**0,00**	**223,33**	0,00	0,00	0,00	0,0	0,0
Sn23/N175	hL Bck + Wnd ;135°	**0,00**	0,00	128,45	0,00	0,00	**0,00**	0,0	0,0
Sn24/N176	low max Wnd ;270°	**0,00**	**0,00**	273,34	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn24/N176	lL Bck Wnd ;135°	0,00	0,00	**-6,29**	0,00	0,00	0,00	0,0	0,0
Sn24/N176	high max Wnd ;270°	0,00	0,00	**305,38**	0,00	0,00	0,00	0,0	0,0
Sn24/N176	hL Bck + Wnd ;225°	**0,00**	0,00	77,87	0,00	0,00	**0,00**	0,0	0,0
Sn25/N177	low max Wnd ;270°	0,00	**0,00**	369,46	0,00	0,00	0,00	0,0	0,0
Sn25/N177	high max Wnd ;270°	**0,00**	0,00	**388,80**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn25/N177	lL Bck Wnd ;135°	**0,00**	**0,00**	**-57,64**	0,00	0,00	**0,00**	0,0	0,0
Sn26/N178	hL Ahd + Wnd ;45°	**0,00**	0,00	179,08	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn26/N178	high max Wnd ;270°	0,00	**0,00**	**224,58**	0,00	0,00	0,00	0,0	0,0
Sn26/N178	lL Bck Wnd ;135°	0,00	**0,00**	**105,35**	0,00	0,00	0,00	0,0	0,0
Sn26/N178	low max Wnd ;270°	**0,00**	0,00	184,17	0,00	0,00	**0,00**	0,0	0,0
Sn27/N179	lL Bck Wnd ;135°	0,00	0,00	**29,68**	0,00	0,00	0,00	0,0	0,0
Sn27/N179	high max Wnd ;270°	**0,00**	**0,00**	**289,14**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn27/N179	low max Wnd ;270°	0,00	**0,00**	256,83	0,00	0,00	**0,00**	0,0	0,0
Sn28/N180	high max Wnd ;270°	**0,00**	**0,00**	**353,65**	0,00	0,00	0,00	0,0	0,0
Sn28/N180	hL Bck + Wnd ;135°	0,00	**0,00**	-14,87	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn28/N180	lL Bck Wnd ;135°	**0,00**	0,00	**-29,99**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

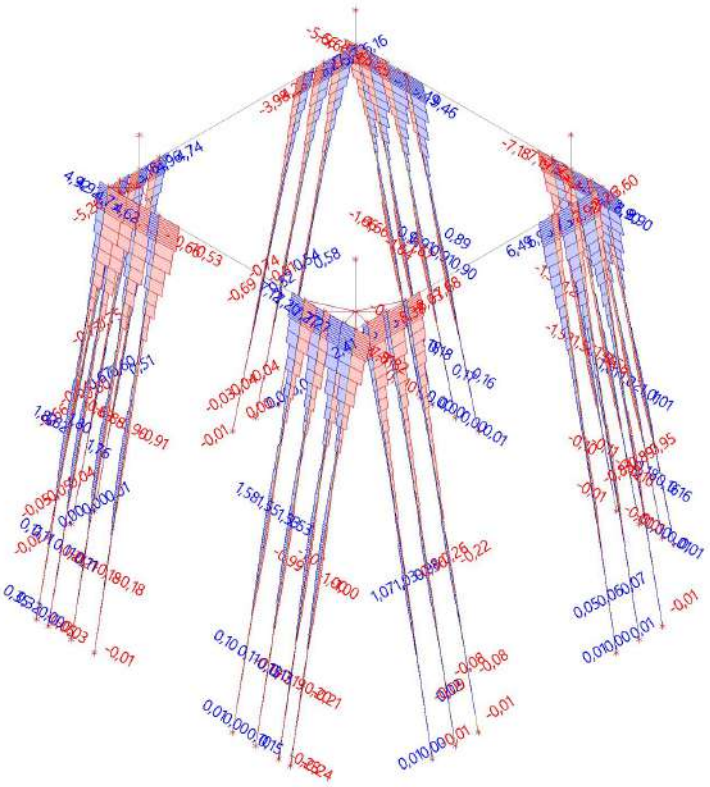
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



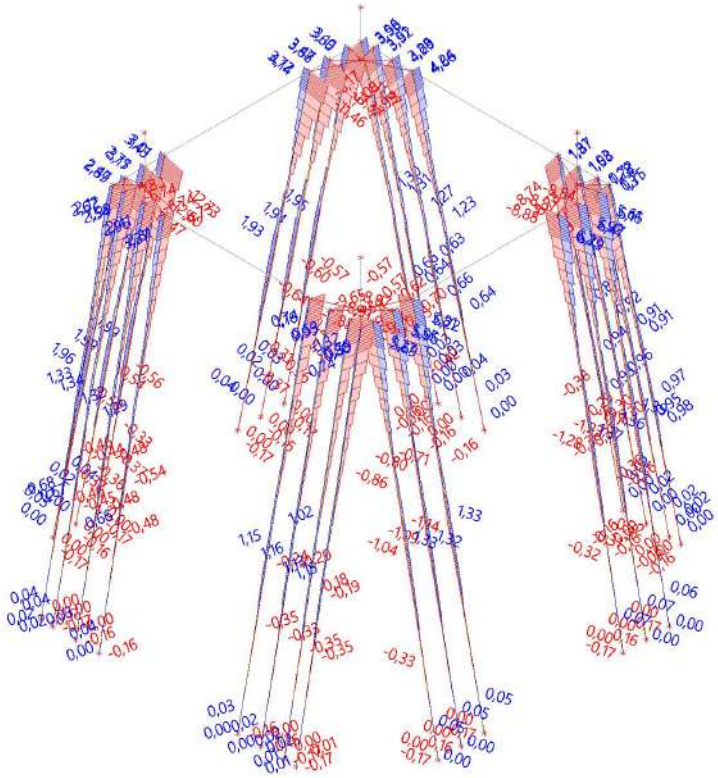
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



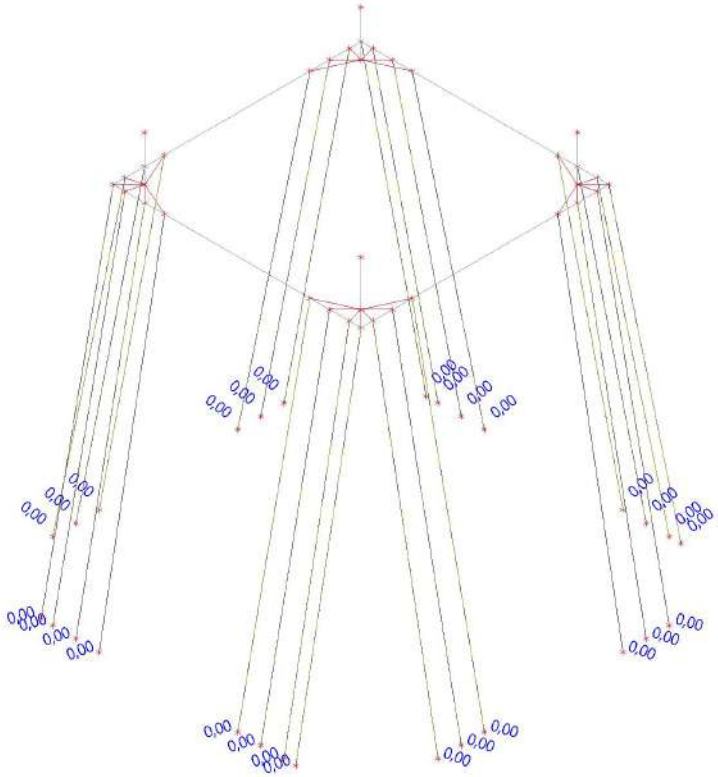
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



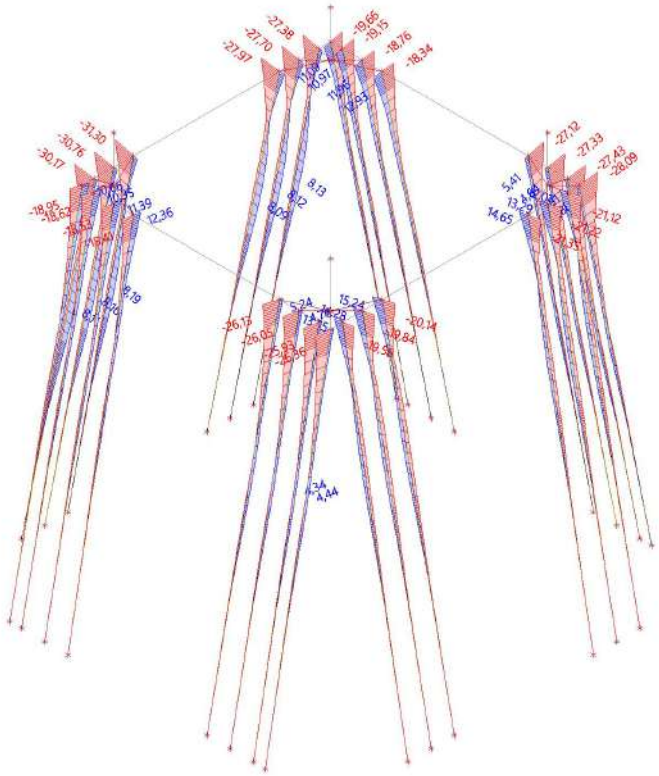
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



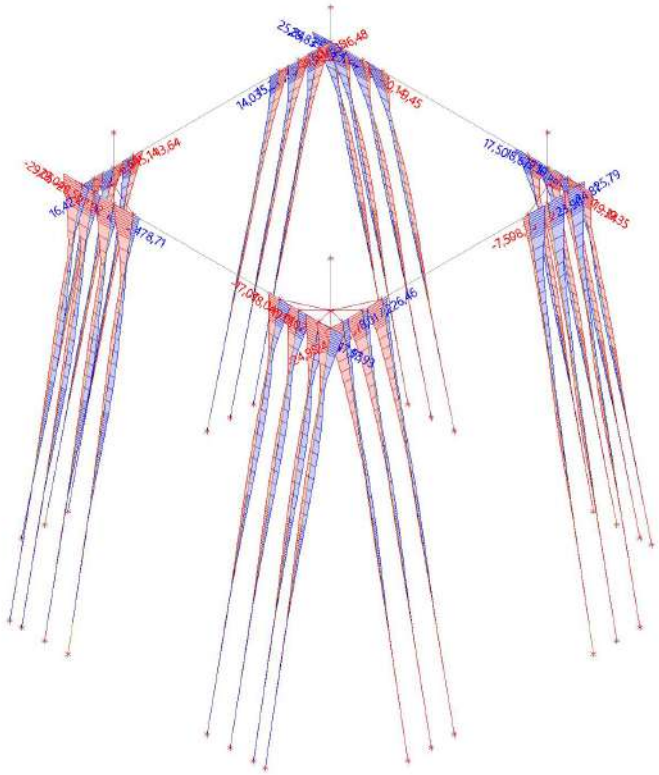
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. Interne 1D-krachten

Niet-lineaire berekening
Klasse: All non-linear
Coördinatenstelsel: Hoofd
Extreme 1D: Globaal
Selectie: Alle
Filter: Laag = Palen

Naam	dx [m]	Belasting	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_X_5	0,000	hL Ahd + Wnd ;45°	**-408,69**	0,02	0,00	0,00	0,00	0,00
Paal_XY_3	17,797	low max Wnd ;270°	**263,02**	3,57	-2,22	**0,00**	-13,59	0,90
Paal_X_1	16,797+	hL Ahd + Wnd ;45°	-280,39	**9,54**	-0,88	0,00	4,74	13,49
Paal_XY_2	16,797+	hL Ahd + Wnd ;45°	-58,89	6,49	**6,79**	0,00	8,14	17,42
Paal_P_2	17,797	hL Ahd + Wnd ;45°	-154,17	-4,02	**-12,73**	0,00	**-31,30**	-13,64
Paal_Y_6	17,797	low max Wnd ;270°	-73,22	-7,38	5,81	0,00	**15,24**	-22,12
Paal_P_4	17,797	hL Ahd + Wnd ;45°	-131,07	**-10,78**	2,12	0,00	10,66	**-29,05**
Paal_X_1	17,797	high max Wnd ;270°	12,31	9,24	2,75	0,00	9,03	**25,84**

7.3. Krachten van de Poeren

7.3.1. Interne 1D-krachten

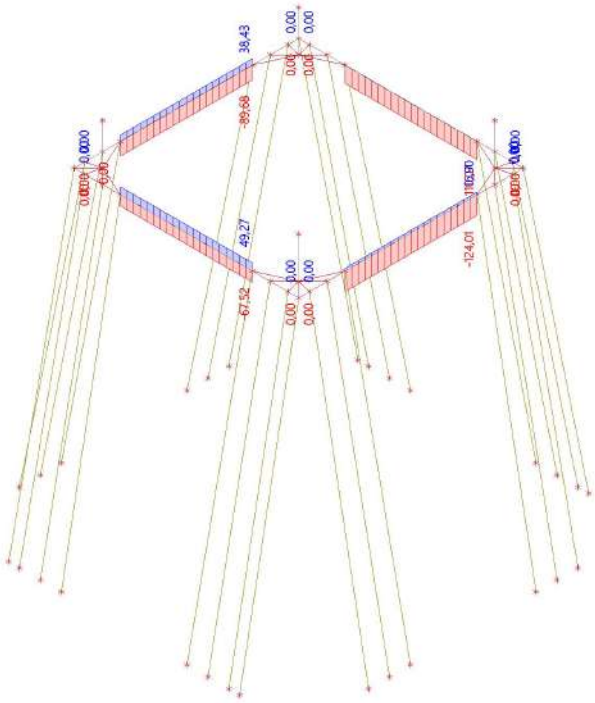
Niet-lineaire berekening
Klasse: All non-linear
Coördinatenstelsel: Hoofd
Extreme 1D: Globaal
Selectie: Alle
Filter: Laag = Poeren

Naam	dx [m]	Belasting	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer_XY	2,300	low max Wnd ;270°	**1136,88**	-284,84	-8,02	-0,08	0,00	-11,37
Poer_XY	0,000	low max Wnd ;270°	1098,65	**-284,84**	-8,02	-0,72	18,44	**554,19**
Poer_XY	0,000	hL Bck + Wnd ;225°	-338,80	68,65	**-10,89**	**-0,98**	**25,05**	-130,13
Poer_Y	0,000	lL Bck Wnd ;135°	-647,49	149,07	**7,54**	**0,68**	**-17,35**	-286,63
Poer_P	0,000	high max Wnd ;270°	**-1471,82**	**355,32**	5,09	0,46	-11,71	**-687,51**

7.4. Krachten van de Funderingsbalken

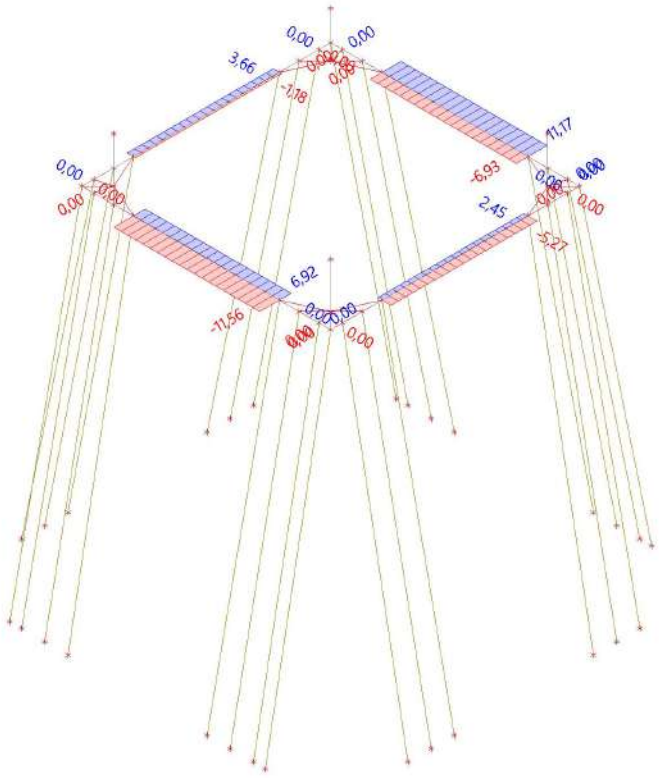
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



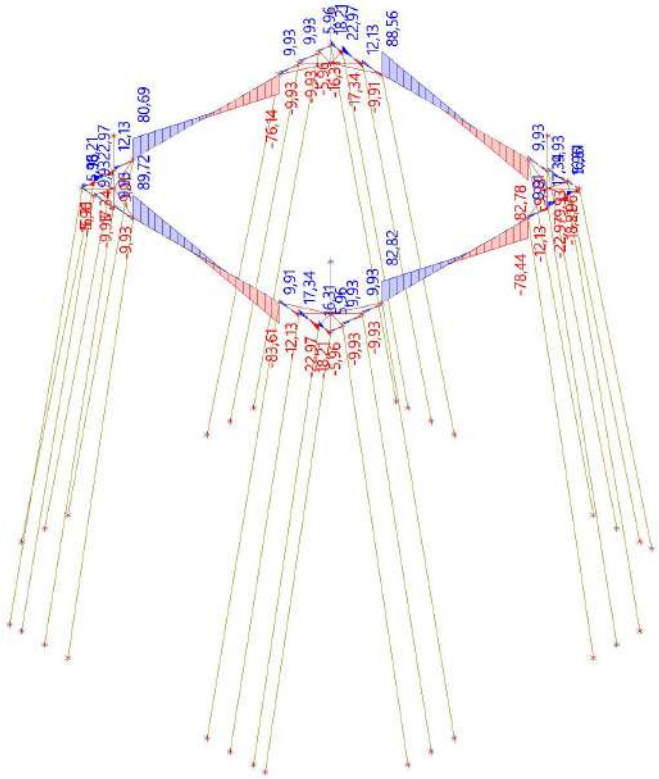
7.4.2. Interne 1D- krachten; V_y

Values: V_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



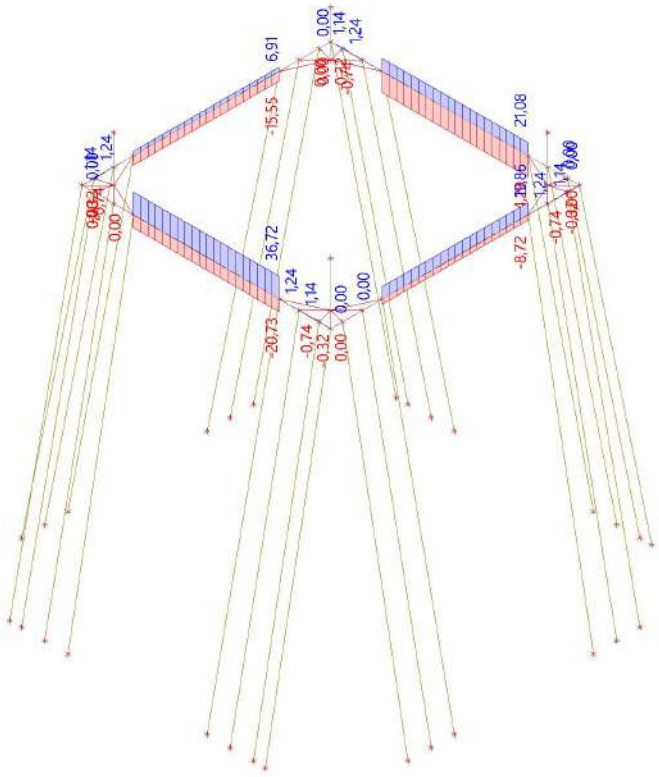
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



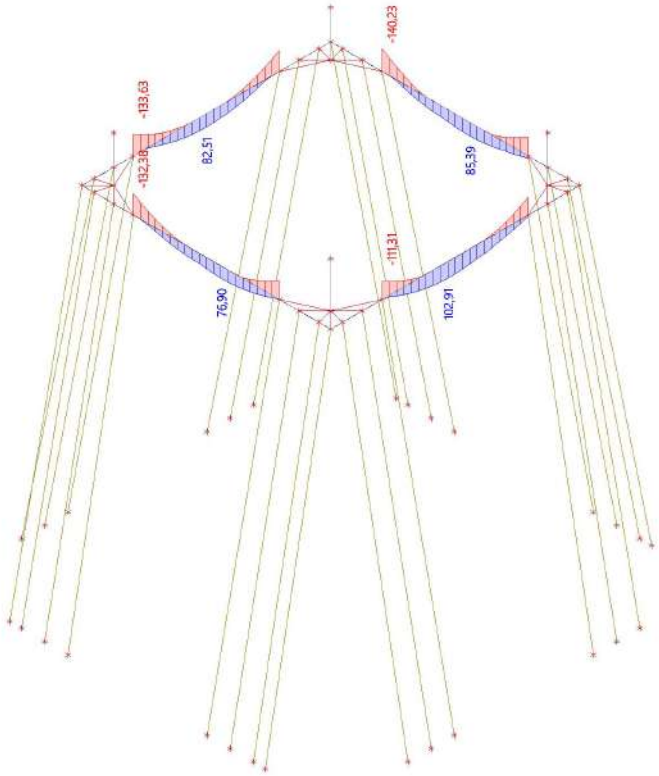
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



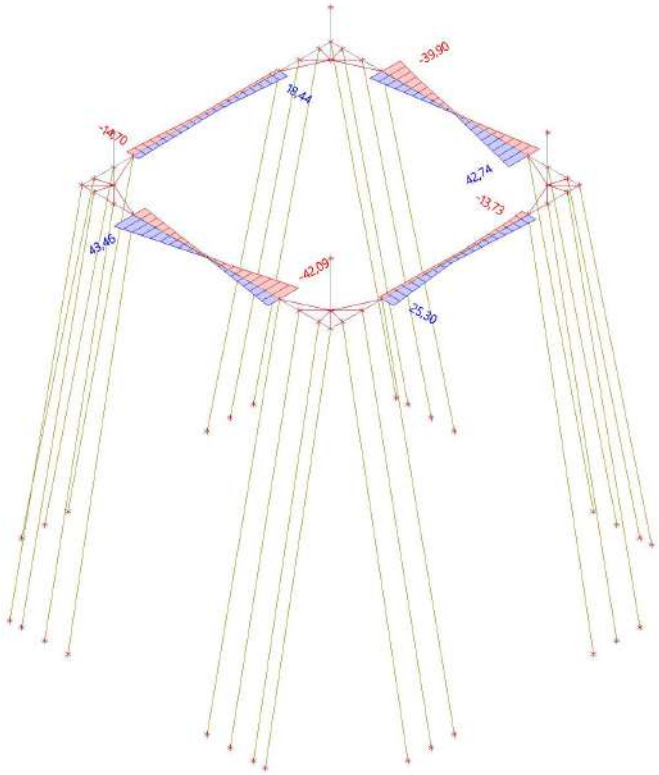
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. Interne 1D-krachten

Niet-lineaire berekening
Klasse: All non-linear
Coördinatenstelsel: Hoofd
Extreme 1D: Globaal
Selectie: Alle
Filter: Laag = Balken

Naam	dx [m]	Belasting	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B10	2,600+	low max Wnd ;270°	**49,27**	-6,96	64,62	23,44	-112,99	22,82
B10	2,600+	hL Ahd + Wnd ;45°	-67,52	**-11,56**	**89,72**	**36,72**	-125,69	**43,46**
B10	10,000-	hL Bck + Wnd ;135°	-40,46	6,92	**-83,61**	-20,73	-113,51	25,45
B11	2,600+	hL Ahd + Wnd ;45°	-8,48	**11,17**	88,56	**-34,20**	**-140,23**	-39,90
B15	5,930	hL Ahd + Wnd ;45°	**-124,01**	2,45	2,39	-8,72	**102,91**	7,17
B10	10,000-	hL Ahd + Wnd ;45°	-67,52	-11,56	-57,24	36,72	-5,54	**-42,09**

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2. Project

Gebruiker van licentie	[redacted]
Project	Opwaardering KIJ-DIM 380kV
Onderdeel	Balkrooster 5xBeton40x40 mast 17
Auteur	[redacted]
Datum	4-05-2026
Constructie	Algemeen XYZ
Aantal knopen :	52
Aantal staven :	28
Aantal platen :	0
Aantal vaste lichamen :	0
Aantal gebruikte doorsneden :	3
Aantal belastingsgevallen :	5
Aantal gebruikte materialen :	3
Gravitatieversnelling [m/s^2]	9,810
Nationale norm	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materialen

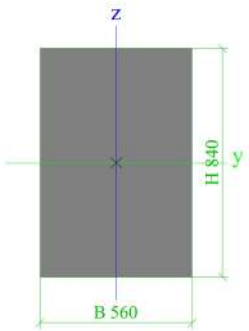
Naam	Type	ρ [kg/m³]	Dichtheid in natte toestand [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Kleur
C20/25 Ongescheurd	Beton	1500,0	2600,0	2,4000e+04	0.2	0,00	20,00	
C20/25 Gescheurd	Beton	2500,0	2600,0	8,0000e+03	0.2	0,00	20,00	

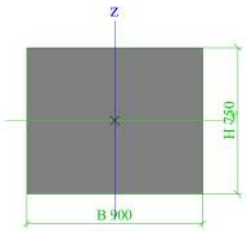
Verklaring van symbolen	
Dichtheid in natte toestand	De waarde van de dichtheid van het kenmerk nieuwe toestand wordt alleen gebruikt als een samengesteld dek wordt ingevoerd en rekening wordt gehouden met de belasting van het eigengewicht.

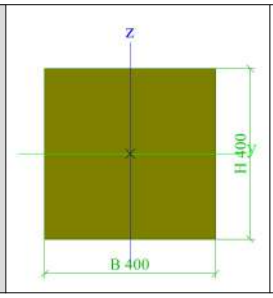
Wapening EC2

Naam	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 500B	Betonstaal	7850,0	2,0000e+05	8,3333e+04	0,00	500,0

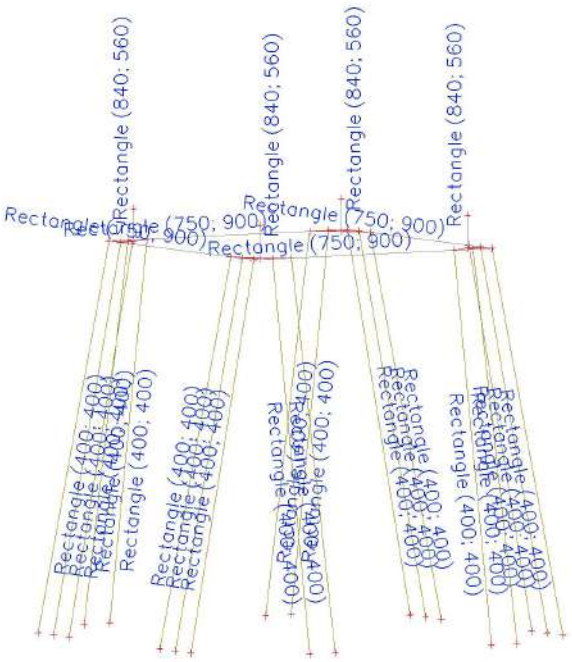
4.2. Doorsneden

Poer.Opstort		
Type	Rectangle	
Gedetailleerd	840; 560	
Vorm type	Dikke wanden	
Onderdeelmateriaal	C20/25 Gescheurd	
Bouwwijze	beton	
Kleur		
A [m²]	4,7040e-01	
A_y [m²], A_z [m²]	3,9200e-01	3,9200e-01
A_L [m²/m], A_D [m²/m]	2,8000e+00	2,8000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	280	420
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,7660e-02	1,2293e-02
i_y [mm], i_z [mm]	242	162
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	6,5856e-02	4,3904e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	2,8888e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Afbeelding		
Balk		
Type	Rectangle	
Gedetailleerd	750; 900	
Vorm type	Dikke wanden	
Onderdeelmateriaal	C20/25 Gescheurd	
Bouwwijze	beton	
Kleur		
A [m²]	6,7500e-01	
A_y [m²], A_z [m²]	5,6250e-01	5,6250e-01
A_L [m²/m], A_D [m²/m]	3,3000e+00	3,3000e+00

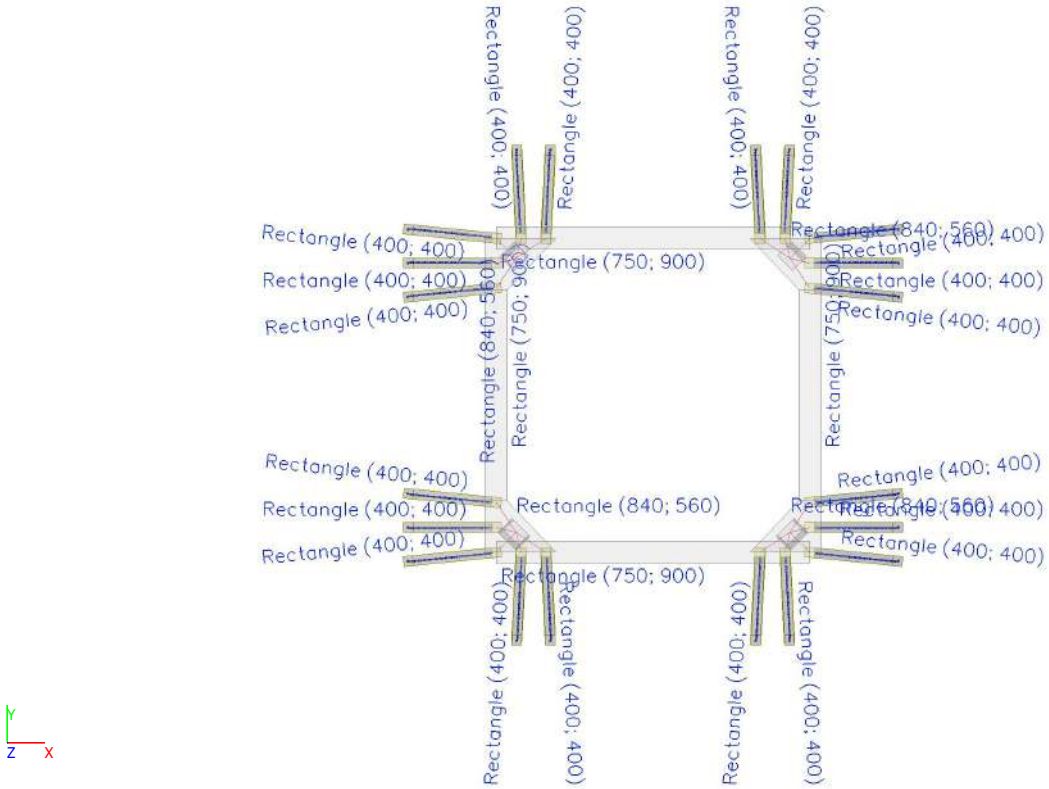
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450	375
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	3,1641e-02	4,5563e-02
i_y [mm], i_z [mm]	217	260
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	8,4375e-02	1,0125e-01
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	6,3112e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Afbeelding		
Funderingspaal		
Type	Rectangle	
Gedetailleerd	400; 400	
Vorm type	Dikke wanden	
Onderdeelmateriaal	C20/25 Ongescheurd	
Bouwwijze	beton	
Kleur		
A [m²]	1,6000e-01	
A_y [m²], A_z [m²]	1,3333e-01	1,3333e-01
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200	200
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,1333e-03	2,1333e-03
i_y [mm], i_z [mm]	115	115
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	1,0667e-02	1,0667e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	3,6027e-03	0,0000e+00
β_y [mm], β_z [mm]	0	0

Afbeelding		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Instellingen net

Naam	NetInstelling1
Generatie van variabele excentriciteiten op elementen in plaats van constante excentriciteiten	×
Generatie van knopen op staven	×
Elastisch net	✓
Pas automatische netverfijning toe	×
Constructie-entiteiten verbinden	✓
Verdeling op consoles en variabele staven	5
Verdeling voor integratiestrook en 2D-1D upgrade	50
Gemiddeld aantal 1D-netelementen op rechte 1D-elementen	5
Gemiddelde grootte van 2D-netelement [m]	0,250
Gemiddelde grootte van 1D-element op gebogen 1D-elementen [m]	0,200
Minimum lengte van staafelement [m]	0,100
Maximum lengte van staafelement [m]	1000,000
Gemiddelde grootte van voorspankabels, elementen op elastische bedding, niet-lineaire grondveer [m]	1,000
Maximale hoek uit het vlak van vierhoekig element [mrad]	30,0
Minimale afstand tussen definitiepunt en -lijn [m]	0,001
Gemiddelde afmeting van paneelelement [m]	1,000
Netverfijning volgens het liggertype	Geen
Definitie van netelementen afmetingen voor panelen	Handmatig

5. Geometrie

5.1. Knopen

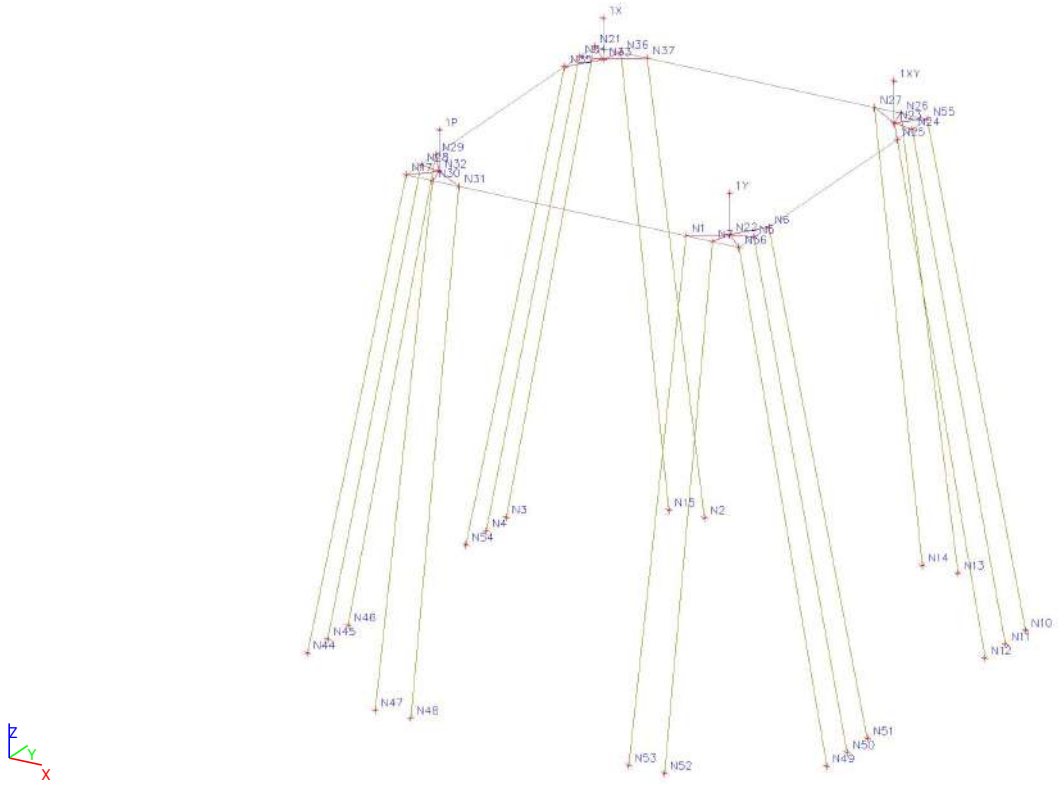
Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N5	13,000	1,400	0,000
N6	13,000	2,400	0,000
N7	12,000	0,400	0,000
N1	11,000	0,400	0,000
N17	0,400	0,400	0,000

Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N21	0,400	13,000	0,000
1Y	12,200	1,200	1,475
N22	12,200	1,200	0,000
N23	12,200	12,200	0,000
1XY	12,200	12,200	1,475

Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N24	13,000	12,000	0,000
N25	13,000	11,000	0,000
N26	12,000	13,000	0,000
N27	11,000	13,000	0,000
N28	0,400	1,400	0,000
N29	0,400	2,400	0,000
N30	1,400	0,400	0,000
N31	2,400	0,400	0,000
1P	1,200	1,200	1,475
N32	1,200	1,200	0,000
N33	1,200	12,200	0,000
1X	1,200	12,187	1,475
N34	0,400	12,000	0,000
N35	0,400	11,000	0,000
N36	1,400	13,000	0,000
N37	2,400	13,000	0,000
N38	12,200	1,200	0,000
N39	1,200	1,200	0,000
N40	12,200	12,200	0,000
N41	1,200	12,200	0,000
N44	-3,129	0,047	-17,647

Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N45	-3,129	1,400	-17,647
N46	-3,129	2,753	-17,647
N47	1,224	-3,129	-17,647
N48	2,576	-3,129	-17,647
N49	16,529	0,047	-17,647
N50	16,529	1,400	-17,647
N51	16,529	2,753	-17,647
N52	12,176	-3,129	-17,647
N53	10,824	-3,129	-17,647
N10	16,529	13,353	-17,647
N11	16,529	12,000	-17,647
N12	16,529	10,647	-17,647
N13	12,176	16,529	-17,647
N14	10,824	16,529	-17,647
N15	1,224	16,529	-17,647
N2	2,576	16,529	-17,647
N3	-3,129	13,353	-17,647
N4	-3,129	12,000	-17,647
N54	-3,129	10,647	-17,647
N55	13,000	13,000	0,000
N56	13,000	0,400	0,000

5.2. Analyse model met knopen

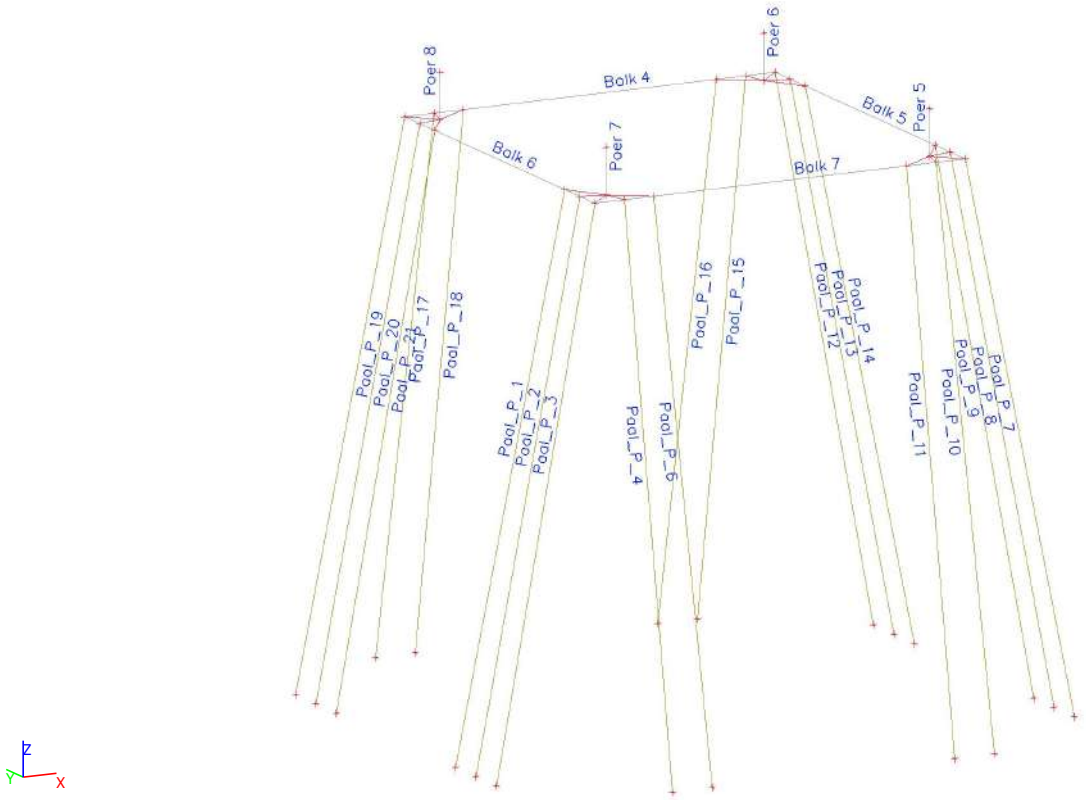


5.3. Staven

Naam	Doorsnede	Materiaal	Lengte [m]	Beginknoop	Eindknoop	Type
Balk 4	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N55	N21	Balk (80)
Balk 5	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N55	Balk (80)
Balk 6	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N17	N21	Balk (80)
Balk 7	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N17	Balk (80)
Poer 5	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N22	1Y	Kolom (100)

Naam	Doorsnede	Materiaal	Lengte [m]	Beginknoop	Eindknoop	Type
Poer 6	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N23	1XY	Kolom (100)
Poer 7	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N32	1P	Kolom (100)
Poer 8	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N33	1X	Kolom (100)
Paal_P_1	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N29	N46	Kolom (100)
Paal_P_2	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,996	N28	N45	Kolom (100)
Paal_P_3	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N17	N44	Kolom (100)
Paal_P_4	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N30	N47	Kolom (100)
Paal_P_6	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N31	N48	Kolom (100)
Paal_P_7	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N56	N49	Kolom (100)
Paal_P_8	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,996	N5	N50	Kolom (100)
Paal_P_9	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N6	N51	Kolom (100)
Paal_P_10	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N7	N52	Kolom (100)
Paal_P_11	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N1	N53	Kolom (100)
Paal_P_12	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N55	N10	Kolom (100)
Paal_P_13	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,996	N24	N11	Kolom (100)
Paal_P_14	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N25	N12	Kolom (100)
Paal_P_15	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N26	N13	Kolom (100)
Paal_P_16	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N27	N14	Kolom (100)
Paal_P_17	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N36	N15	Kolom (100)
Paal_P_18	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N37	N2	Kolom (100)
Paal_P_19	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N21	N3	Kolom (100)
Paal_P_20	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,996	N34	N4	Kolom (100)
Paal_P_21	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N35	N54	Kolom (100)

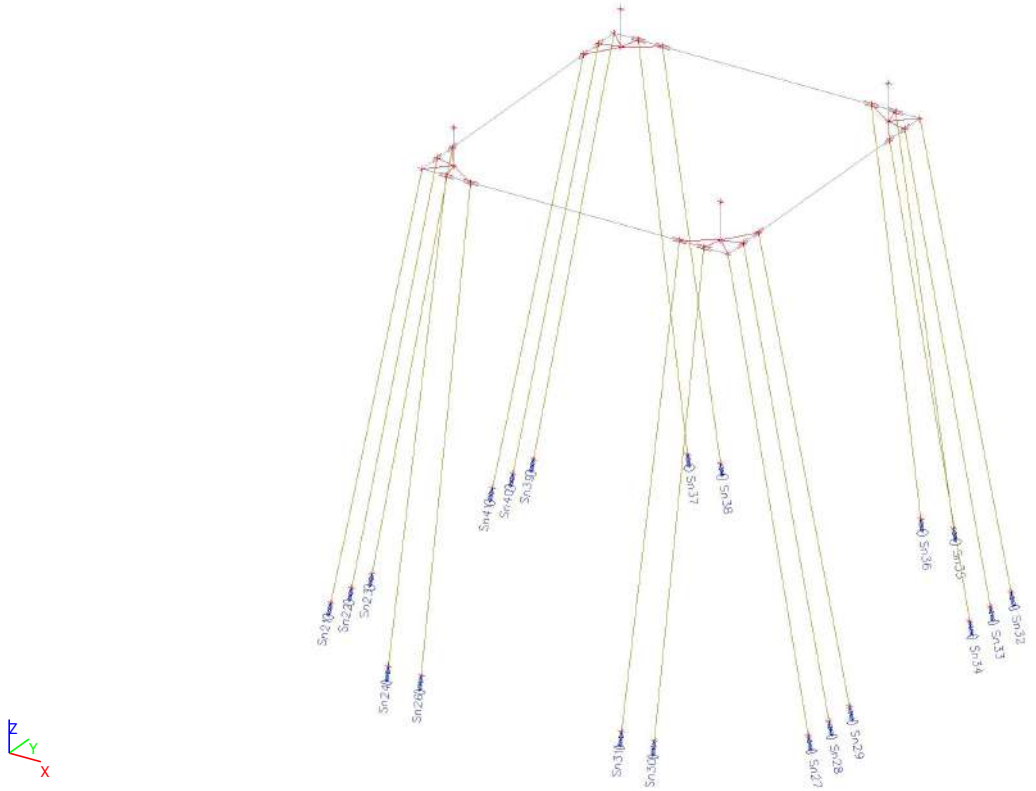
5.4. Analyse model met Staven



5.5. Knoopsteunpunten

Naam	Knoop	Systeem	Type	X	Y	Z	Rx	Ry	Rz	Hoek [deg]
Sn21	N44	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-1,12;Ry11,31
Sn22	N45	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry11,31
Sn23	N46	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx1,12;Ry11,31
Sn24	N47	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry0,56;Rx-11,31
Sn26	N48	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry-0,56;Rx-11,31
Sn27	N49	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-1,12;Ry-11,31
Sn28	N50	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry-11,31
Sn29	N51	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx1,12;Ry-11,31
Sn30	N52	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry-0,56;Rx-11,31
Sn31	N53	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry0,56;Rx-11,31
Sn32	N10	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx1,12;Ry-11,31
Sn33	N11	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry-11,31
Sn34	N12	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-1,12;Ry-11,31
Sn35	N13	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry-0,56;Rx11,31
Sn36	N14	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry0,56;Rx11,31
Sn37	N15	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry0,56;Rx11,31
Sn38	N2	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry-0,56;Rx11,31
Sn39	N3	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-1,12;Ry11,31
Sn40	N4	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry11,31
Sn41	N54	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Rx-1,12;Ry11,31

5.6. Analyse model met Knoopondersteuningen



5.7. Lijnsteunpunten op staven

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
Veen	Lijn	Paal_P_1	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
Veen3	Lijn	Paal_P_2	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
Veen4	Lijn	Paal_P_3	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
(PY-curve-1_V1)1	Lijn	Paal_P_3	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
(PY-curve-1_V1)3	Lijn	Paal_P_2	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
(PY-curve-1_V1)4	Lijn	Paal_P_1	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
(PY-curve-1_V2)	Lijn	Paal_P_3	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
(PY-curve-1_V2)1	Lijn	Paal_P_2	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
(PY-curve-1_V2)2	Lijn	Paal_P_1	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
(PY-curve-1_V3)	Lijn	Paal_P_3	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
(PY-curve-1_V3)19	Lijn	Paal_P_2	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
(PY-curve-1_V3)12	Lijn	Paal_P_1	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
(PY-curve-1_V4)8	Lijn	Paal_P_3	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
(PY-curve-1_V4)17	Lijn	Paal_P_2	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
(PY-curve-1_V4)16	Lijn	Paal_P_1	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
(PY-curve-1_V5)18	Lijn	Paal_P_3	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						
(PY-curve-1_V5)	Lijn	Paal_P_2	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						
(PY-curve-1_V5)1	Lijn	Paal_P_1	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						
(PY-curve-1_V6)6	Lijn	Paal_P_3	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf begin						
(PY-curve-1_V6)9	Lijn	Paal_P_2	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf begin						
(PY-curve-1_V6)11	Lijn	Paal_P_1	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf begin						
(PY-curve-1_V7)14	Lijn	Paal_P_3	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf begin						
(PY-curve-1_V7)16	Lijn	Paal_P_2	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf begin						
(PY-curve-1_V7)15	Lijn	Paal_P_1	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf begin						
(PY-curve-1_V8)12	Lijn	Paal_P_3	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf begin						
(PY-curve-1_V8)4	Lijn	Paal_P_2	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf begin						
(PY-curve-1_V8)3	Lijn	Paal_P_1	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf begin						
(PY-curve-1_V9)14	Lijn	Paal_P_3	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf begin						
(PY-curve-1_V9)13	Lijn	Paal_P_2	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf begin						
(PY-curve-1_V9)12	Lijn	Paal_P_1	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf begin						
(PY-curve-1_V10)7	Lijn	Paal_P_3	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,750	Vanaf begin						

Naam	Type	Staaf Systeem	Pos x_1 [m] Pos x_2 [m]	Coör Oors	X	Y	Z	Rx	Ry	Rz
(PY-curve-1_V10)6	Lijn	Paal_P_2 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)5	Lijn	Paal_P_1 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen18	Lijn	Paal_P_4 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)14	Lijn	Paal_P_4 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)7	Lijn	Paal_P_4 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)5	Lijn	Paal_P_4 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)3	Lijn	Paal_P_4 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)3	Lijn	Paal_P_4 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)10	Lijn	Paal_P_4 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)8	Lijn	Paal_P_4 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)1	Lijn	Paal_P_4 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)10	Lijn	Paal_P_4 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)11	Lijn	Paal_P_4 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen9	Lijn	Paal_P_6 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)18	Lijn	Paal_P_6 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)9	Lijn	Paal_P_6 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)8	Lijn	Paal_P_6 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)2	Lijn	Paal_P_6 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)4	Lijn	Paal_P_6 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)13	Lijn	Paal_P_6 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)3	Lijn	Paal_P_6 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)6	Lijn	Paal_P_6 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)6	Lijn	Paal_P_6 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)9	Lijn	Paal_P_6 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen8	Lijn	Paal_P_7 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)19	Lijn	Paal_P_7 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)12	Lijn	Paal_P_7 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)10	Lijn	Paal_P_7 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)13	Lijn	Paal_P_7 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)5	Lijn	Paal_P_7 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)14	Lijn	Paal_P_7 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)11	Lijn	Paal_P_7 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf Systeem	Pos x_1 [m] Pos x_2 [m]	Coör Oors	X	Y	Z	Rx	Ry	Rz
(PY-curve-1_V8)7	Lijn	Paal_P_7 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)4	Lijn	Paal_P_7 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)3	Lijn	Paal_P_7 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen16	Lijn	Paal_P_8 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)8	Lijn	Paal_P_8 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)14	Lijn	Paal_P_8 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)9	Lijn	Paal_P_8 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)5	Lijn	Paal_P_8 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)6	Lijn	Paal_P_8 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)19	Lijn	Paal_P_8 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)9	Lijn	Paal_P_8 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)10	Lijn	Paal_P_8 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)7	Lijn	Paal_P_8 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)17	Lijn	Paal_P_8 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen13	Lijn	Paal_P_9 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)2	Lijn	Paal_P_9 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)16	Lijn	Paal_P_9 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)1	Lijn	Paal_P_9 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)18	Lijn	Paal_P_9 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)7	Lijn	Paal_P_9 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)17	Lijn	Paal_P_9 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)6	Lijn	Paal_P_9 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)9	Lijn	Paal_P_9 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)1	Lijn	Paal_P_9 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)1	Lijn	Paal_P_9 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen10	Lijn	Paal_P_10 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)15	Lijn	Paal_P_10 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)18	Lijn	Paal_P_10 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)11	Lijn	Paal_P_10 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)12	Lijn	Paal_P_10 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)8	Lijn	Paal_P_10 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)	Lijn	Paal_P_10 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

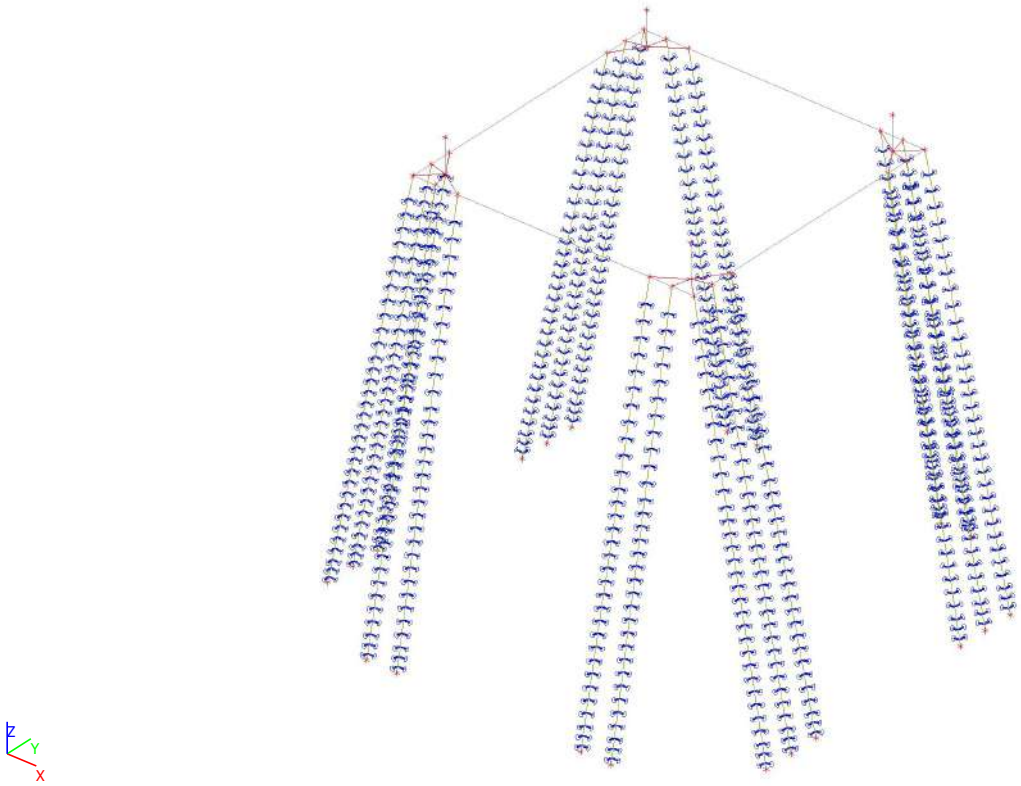
Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
(PY-curve-1_V7)1	Lijn	Paal_P_10	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf begin						
(PY-curve-1_V8)17	Lijn	Paal_P_10	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf begin						
(PY-curve-1_V9)16	Lijn	Paal_P_10	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf begin						
(PY-curve-1_V10)12	Lijn	Paal_P_10	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,750	Vanaf begin						
Veen5	Lijn	Paal_P_11	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
(PY-curve-1_V1)16	Lijn	Paal_P_11	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
(PY-curve-1_V2)4	Lijn	Paal_P_11	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
(PY-curve-1_V3)15	Lijn	Paal_P_11	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
(PY-curve-1_V4)14	Lijn	Paal_P_11	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
(PY-curve-1_V5)9	Lijn	Paal_P_11	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						
(PY-curve-1_V6)1	Lijn	Paal_P_11	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf begin						
(PY-curve-1_V7)12	Lijn	Paal_P_11	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf begin						
(PY-curve-1_V8)18	Lijn	Paal_P_11	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf begin						
(PY-curve-1_V9)17	Lijn	Paal_P_11	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf begin						
(PY-curve-1_V10)	Lijn	Paal_P_11	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,750	Vanaf begin						
Veen7	Lijn	Paal_P_12	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
(PY-curve-1_V1)10	Lijn	Paal_P_12	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
(PY-curve-1_V2)19	Lijn	Paal_P_12	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
(PY-curve-1_V3)2	Lijn	Paal_P_12	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
(PY-curve-1_V4)6	Lijn	Paal_P_12	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
(PY-curve-1_V5)11	Lijn	Paal_P_12	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						
(PY-curve-1_V6)8	Lijn	Paal_P_12	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf begin						
(PY-curve-1_V7)17	Lijn	Paal_P_12	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	15,000	Vanaf begin						
(PY-curve-1_V8)16	Lijn	Paal_P_12	15,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	16,000	Vanaf begin						
(PY-curve-1_V9)15	Lijn	Paal_P_12	16,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,000	Vanaf begin						
(PY-curve-1_V10)15	Lijn	Paal_P_12	17,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	17,750	Vanaf begin						
Veen21	Lijn	Paal_P_13	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
(PY-curve-1_V1)12	Lijn	Paal_P_13	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
(PY-curve-1_V2)3	Lijn	Paal_P_13	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
(PY-curve-1_V3)16	Lijn	Paal_P_13	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
(PY-curve-1_V4)15	Lijn	Paal_P_13	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
(PY-curve-1_V5)12	Lijn	Paal_P_13	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						

Naam	Type	Staaf Systeem	Pos x_1 [m] Pos x_2 [m]	Coör Oors	X	Y	Z	Rx	Ry	Rz
(PY-curve-1_V6)7	Lijn	Paal_P_13 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)2	Lijn	Paal_P_13 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)14	Lijn	Paal_P_13 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)	Lijn	Paal_P_13 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)2	Lijn	Paal_P_13 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen6	Lijn	Paal_P_14 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)13	Lijn	Paal_P_14 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)17	Lijn	Paal_P_14 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)4	Lijn	Paal_P_14 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)11	Lijn	Paal_P_14 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)2	Lijn	Paal_P_14 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)18	Lijn	Paal_P_14 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)7	Lijn	Paal_P_14 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)	Lijn	Paal_P_14 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)2	Lijn	Paal_P_14 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)18	Lijn	Paal_P_14 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen14	Lijn	Paal_P_15 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)7	Lijn	Paal_P_15 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)15	Lijn	Paal_P_15 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)13	Lijn	Paal_P_15 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)7	Lijn	Paal_P_15 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)13	Lijn	Paal_P_15 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)16	Lijn	Paal_P_15 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)10	Lijn	Paal_P_15 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)8	Lijn	Paal_P_15 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)3	Lijn	Paal_P_15 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)14	Lijn	Paal_P_15 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen20	Lijn	Paal_P_16 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)17	Lijn	Paal_P_16 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)13	Lijn	Paal_P_16 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)18	Lijn	Paal_P_16 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)	Lijn	Paal_P_16 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

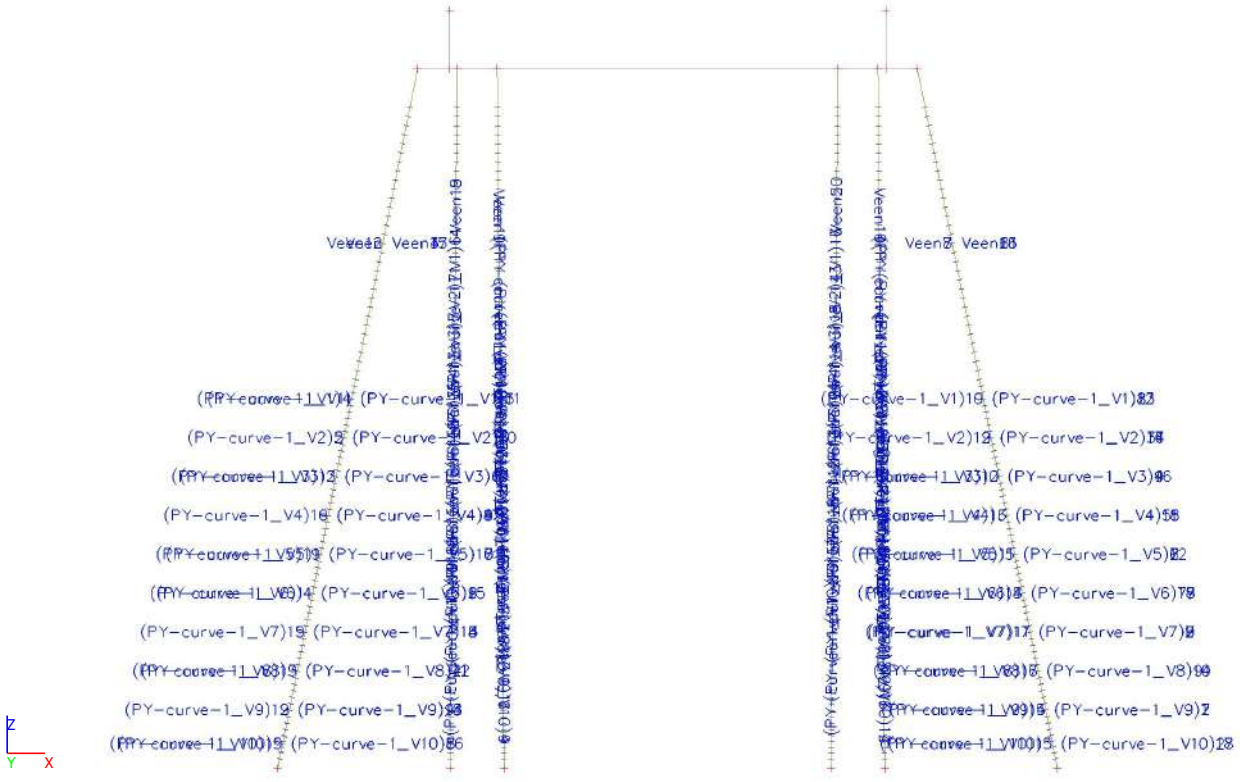
Naam	Type	Staaf Systeem	Pos x_1 [m] Pos x_2 [m]	Coör Oors	X	Y	Z	Rx	Ry	Rz
(PY-curve-1_V5)14	Lijn	Paal_P_16 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)3	Lijn	Paal_P_16 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)	Lijn	Paal_P_16 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)15	Lijn	Paal_P_16 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)5	Lijn	Paal_P_16 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)13	Lijn	Paal_P_16 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen19	Lijn	Paal_P_17 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)6	Lijn	Paal_P_17 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)11	Lijn	Paal_P_17 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)7	Lijn	Paal_P_17 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)1	Lijn	Paal_P_17 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)15	Lijn	Paal_P_17 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)5	Lijn	Paal_P_17 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)5	Lijn	Paal_P_17 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)5	Lijn	Paal_P_17 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)8	Lijn	Paal_P_17 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)10	Lijn	Paal_P_17 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen11	Lijn	Paal_P_18 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)9	Lijn	Paal_P_18 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)8	Lijn	Paal_P_18 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)14	Lijn	Paal_P_18 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)10	Lijn	Paal_P_18 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)16	Lijn	Paal_P_18 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)12	Lijn	Paal_P_18 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)4	Lijn	Paal_P_18 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)13	Lijn	Paal_P_18 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)11	Lijn	Paal_P_18 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)4	Lijn	Paal_P_18 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen17	Lijn	Paal_P_19 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)11	Lijn	Paal_P_19 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)6	Lijn	Paal_P_19 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)6	Lijn	Paal_P_19 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf Systeem	Pos x_1 [m] Pos x_2 [m]	Coör Oors	X	Y	Z	Rx	Ry	Rz
(PY-curve-1_V4)4	Lijn	Paal_P_19 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)10	Lijn	Paal_P_19 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)2	Lijn	Paal_P_19 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)13	Lijn	Paal_P_19 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)2	Lijn	Paal_P_19 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)18	Lijn	Paal_P_19 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)16	Lijn	Paal_P_19 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen15	Lijn	Paal_P_20 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)5	Lijn	Paal_P_20 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)10	Lijn	Paal_P_20 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)17	Lijn	Paal_P_20 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)9	Lijn	Paal_P_20 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)17	Lijn	Paal_P_20 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)15	Lijn	Paal_P_20 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)18	Lijn	Paal_P_20 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)11	Lijn	Paal_P_20 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)9	Lijn	Paal_P_20 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)8	Lijn	Paal_P_20 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
Veen12	Lijn	Paal_P_21 LCS	1,000 8,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V1)	Lijn	Paal_P_21 LCS	8,000 9,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V2)5	Lijn	Paal_P_21 LCS	9,000 10,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V3)3	Lijn	Paal_P_21 LCS	10,000 11,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V4)19	Lijn	Paal_P_21 LCS	11,000 12,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V5)19	Lijn	Paal_P_21 LCS	12,000 13,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V6)4	Lijn	Paal_P_21 LCS	13,000 14,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V7)19	Lijn	Paal_P_21 LCS	14,000 15,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V8)19	Lijn	Paal_P_21 LCS	15,000 16,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V9)19	Lijn	Paal_P_21 LCS	16,000 17,000	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
(PY-curve-1_V10)19	Lijn	Paal_P_21 LCS	17,000 17,750	Abso Vanaf begin	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

5.8. Analyse model met Lijnondersteuningen



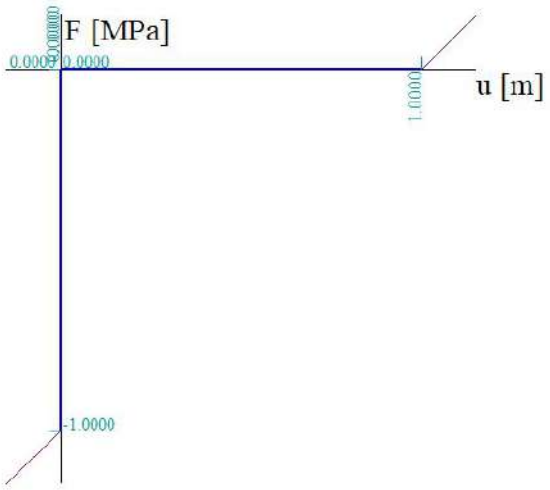
5.9. Analyse model met Lijnondersteuningen



5.10. Niet-lineaire functies

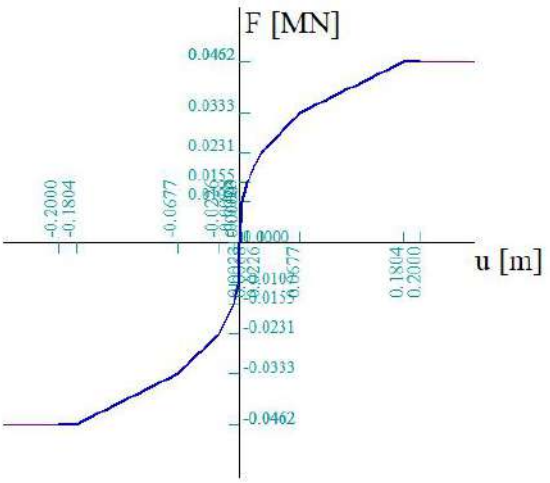
Naam	Type	u / F	Positief einde	Negatief einde
soil press only	Niet-lineair bedding		Verend	Verend

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V1	Verplaatsing	-0.200000 / -46203.840000	Vrij	Vrij
		-0.180400 / -46203.840000		
		-0.067650 / -33318.734193		
		-0.022550 / -23101.920000		
		-0.006765 / -15465.186458		
		-0.002255 / -10722.961391		
		0.000000 / 0.000000		
		0.002255 / 10722.961391		
		0.006765 / 15465.186458		
		0.022550 / 23101.920000		
		0.067650 / 33318.734193		
		0.180400 / 46203.840000		
		0.200000 / 46203.840000		

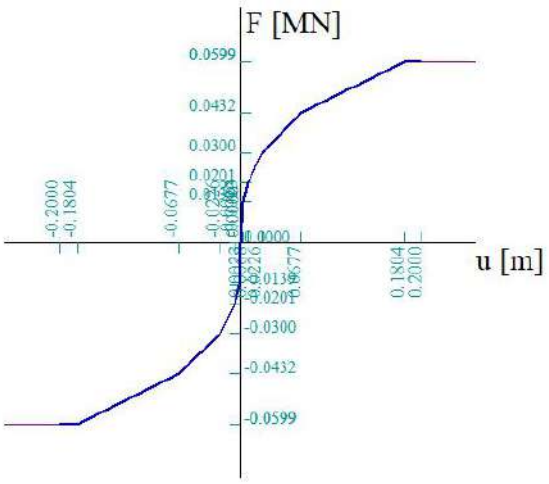
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V2	Verplaatsing	-0.200000 / -59935.680000	Vrij	Vrij
		-0.180400 / -59935.680000		
		-0.067650 / -43221.104363		
		-0.022550 / -29967.840000		

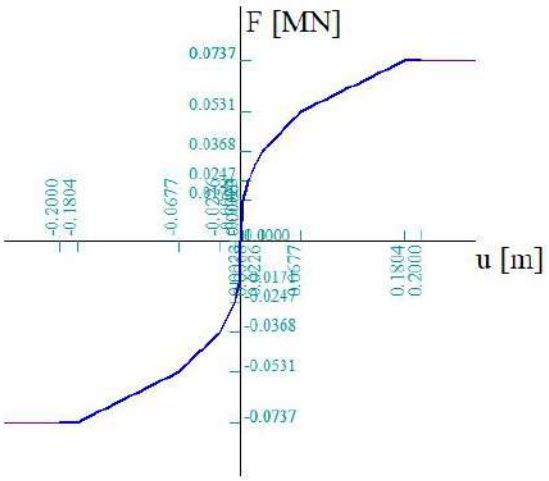
Naam	Type	u / F	Positief einde	Negatief einde
		-0.006765 / -20061.459539		
		-0.002255 / -13909.839151		
		0.000000 / 0.000000		
		0.002255 / 13909.839151		
		0.006765 / 20061.459539		
		0.022550 / 29967.840000		
		0.067650 / 43221.104363		
		0.180400 / 59935.680000		
		0.200000 / 59935.680000		

Tekenen



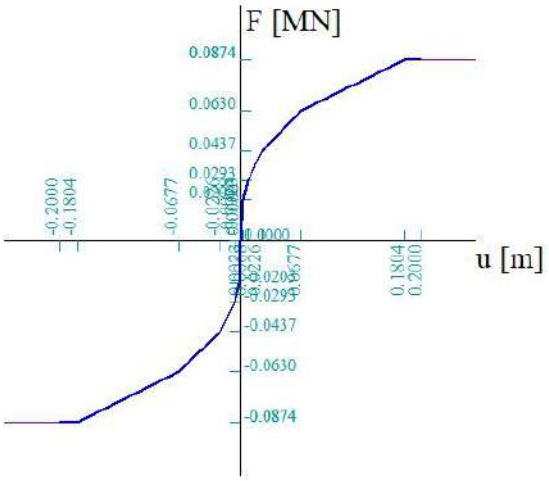
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V3	Verplaatsing	-0.200000 / -73667.520000	Vrij	Vrij
		-0.180400 / -73667.520000		
		-0.067650 / -53123.474533		
		-0.022550 / -36833.760000		
		-0.006765 / -24657.732619		
		-0.002255 / -17096.716912		
		0.000000 / 0.000000		
		0.002255 / 17096.716912		
		0.006765 / 24657.732619		
		0.022550 / 36833.760000		
		0.067650 / 53123.474533		
		0.180400 / 73667.520000		
		0.200000 / 73667.520000		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V4	Verplaatsing	-0.200000 / -87399.360000	Vrij	Vrij
		-0.180400 / -87399.360000		
		-0.067650 / -63025.844703		
		-0.022550 / -43699.680000		
		-0.006765 / -29254.005700		
		-0.002255 / -20283.594672		
		0.000000 / 0.000000		
		0.002255 / 20283.594672		
		0.006765 / 29254.005700		
		0.022550 / 43699.680000		
		0.067650 / 63025.844703		
		0.180400 / 87399.360000		
		0.200000 / 87399.360000		

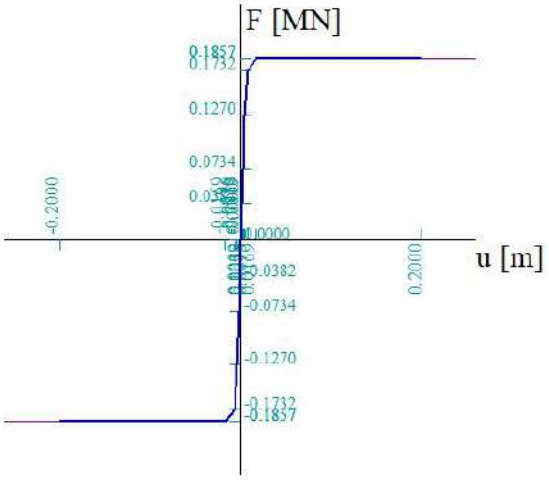
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V5	Verplaatsing	-0.200000 / -185749.581577	Vrij	Vrij
		-0.016913 / -185749.581577		
		-0.007517 / -173191.521652		
		-0.003758 / -126966.550767		
		-0.001879 / -73364.887728		
		-0.000940 / -38233.153457		
		0.000000 / 0.000000		
		0.000940 / 38233.153457		
		0.001879 / 73364.887728		
		0.003758 / 126966.550767		

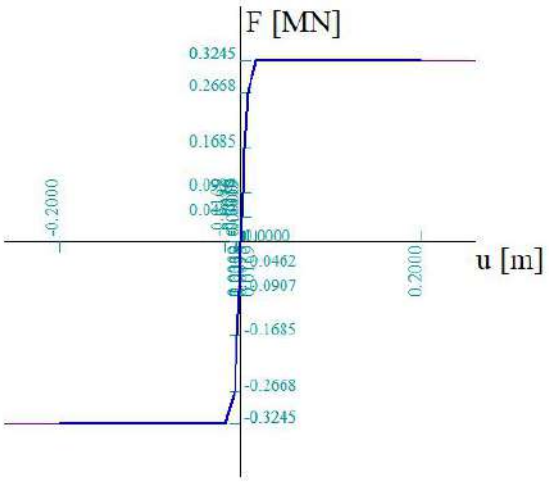
Naam	Type	u / F	Positief einde	Negatief einde
		0.007517 / 173191.521652		
		0.016913 / 185749.581577		
		0.200000 / 185749.581577		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V6	Verplaatsing	-0.200000 / -324503.959510	Vrij	Vrij
		-0.016913 / -324503.959510		
		-0.007517 / -266801.170128		
		-0.003758 / -168504.997582		
		-0.001879 / -90672.108471		
		-0.000940 / -46234.204284		
		0.000000 / 0.000000		
		0.000940 / 46234.204284		
		0.001879 / 90672.108471		
		0.003758 / 168504.997582		
		0.007517 / 266801.170128		
		0.016913 / 324503.959510		
		0.200000 / 324503.959510		

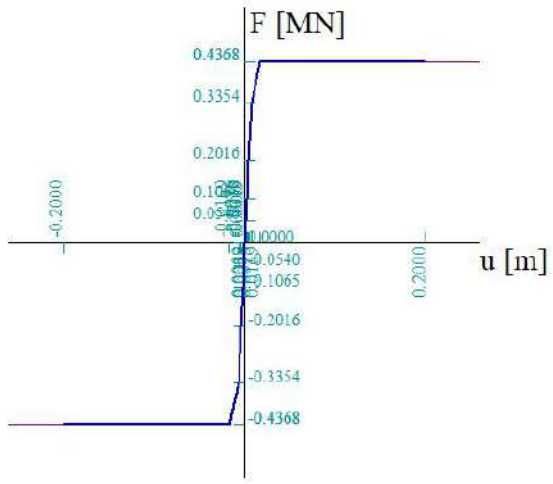
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V7	Verplaatsing	-0.200000 / -436765.819801	Vrij	Vrij
		-0.016913 / -436765.819801		
		-0.007517 / -335362.730832		
		-0.003758 / -201646.948699		

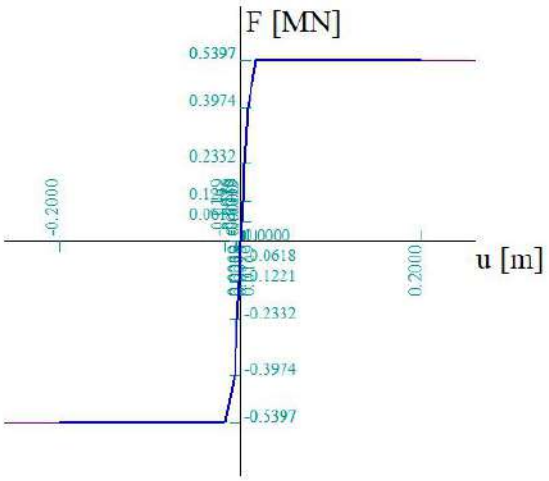
Naam	Type	u / F	Positief einde	Negatief einde
		-0.001879 / -106522.716227		
		-0.000940 / -54036.089272		
		0.000000 / 0.000000		
		0.000940 / 54036.089272		
		0.001879 / 106522.716227		
		0.003758 / 201646.948699		
		0.007517 / 335362.730832		
		0.016913 / 436765.819801		
		0.200000 / 436765.819801		

Tekenen



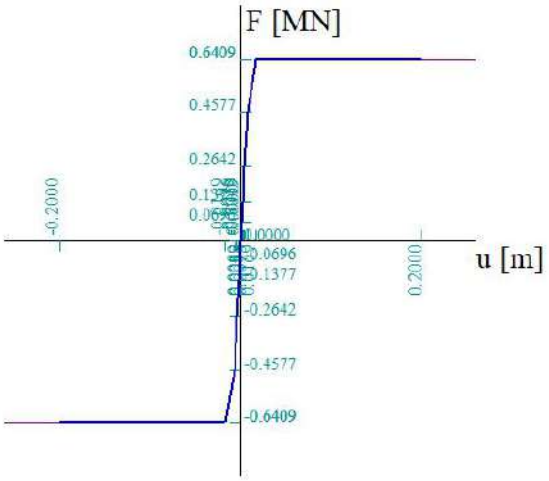
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V8	Verplaatsing	-0.200000 / -539683.678038	Vrij	Vrij
		-0.016913 / -539683.678038		
		-0.007517 / -397433.011814		
		-0.003758 / -233158.398644		
		-0.001879 / -122122.429030		
		-0.000940 / -61804.852432		
		0.000000 / 0.000000		
		0.000940 / 61804.852432		
		0.001879 / 122122.429030		
		0.003758 / 233158.398644		
		0.007517 / 397433.011814		
		0.016913 / 539683.678038		
		0.200000 / 539683.678038		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V9	Verplaatsing	-0.200000 / -640861.931437	Vrij	Vrij
		-0.016913 / -640861.931437		
		-0.007517 / -457700.088592		
		-0.003758 / -264224.038576		
		-0.001879 / -137654.602914		
		-0.000940 / -69564.742931		
		0.000000 / 0.000000		
		0.000940 / 69564.742931		
		0.001879 / 137654.602914		
		0.003758 / 264224.038576		
		0.007517 / 457700.088592		
		0.016913 / 640861.931437		
		0.200000 / 640861.931437		

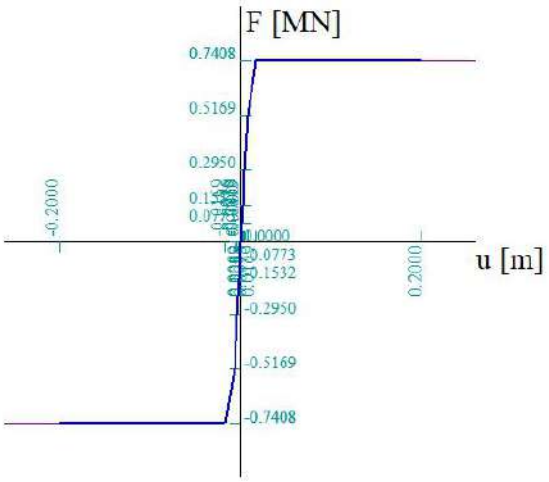
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V10	Verplaatsing	-0.200000 / -740774.043969	Vrij	Vrij
		-0.016913 / -740774.043969		
		-0.007517 / -516894.797403		
		-0.003758 / -295043.983610		
		-0.001879 / -153150.432455		
		-0.000940 / -77319.889121		
		0.000000 / 0.000000		
		0.000940 / 77319.889121		
		0.001879 / 153150.432455		
		0.003758 / 295043.983610		

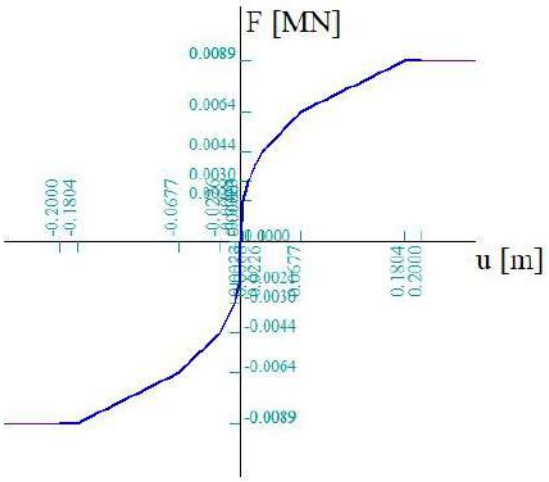
Naam	Type	u / F	Positief einde	Negatief einde
		0.007517 / 516894.797403		
		0.016913 / 740774.043969		
		0.200000 / 740774.043969		

Tekenen



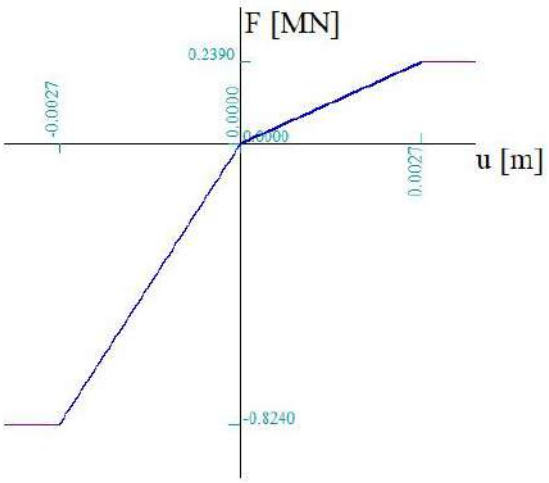
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_Veen	Verplaatsing	-0.200000 / -8894.400000	Vrij	Vrij
		-0.180400 / -8894.400000		
		-0.067650 / -6413.760000		
		-0.022550 / -4447.680000		
		-0.006765 / -2976.960000		
		-0.002255 / -2064.000000		
		0.000000 / 0.000000		
		0.002255 / 2064.000000		
		0.006765 / 2976.960000		
		0.022550 / 4447.680000		
		0.067650 / 6413.760000		
		0.180400 / 8894.400000		
		0.200000 / 8894.400000		

Tekenen



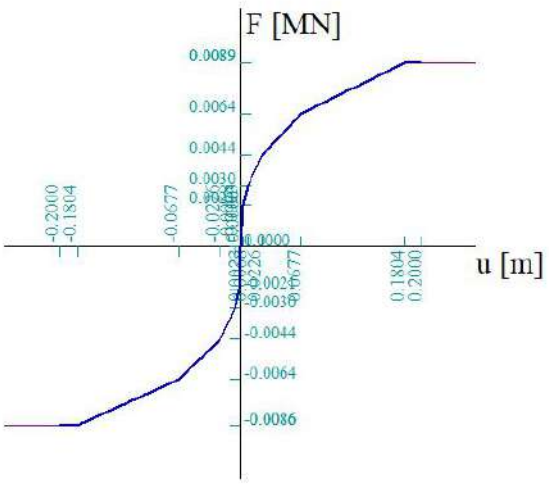
Naam	Type	u / F	Positief einde	Negatief einde
Trek-druk-S+paalpunt	Verplaatsing	-0.002680 / -824000.000000	Vrij	Vrij
		0.000000 / 0.000000		
		0.002710 / 239000.000000		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_Veen reduced	Verplaatsing	-0.200000 / -8640.000000	Vrij	Vrij
		-0.180400 / -8640.000000		
		-0.067650 / -6432.000000		
		-0.022550 / -4444.800000		
		-0.006765 / -2976.000000		
		-0.002255 / -2064.000000		
		0.000000 / 0.000000		
		0.002255 / 2064.000000		
		0.006765 / 2976.000000		
		0.022550 / 4444.800000		
		0.067650 / 6432.000000		
		0.180400 / 8899.200000		
		0.200000 / 8899.200000		

Tekenen

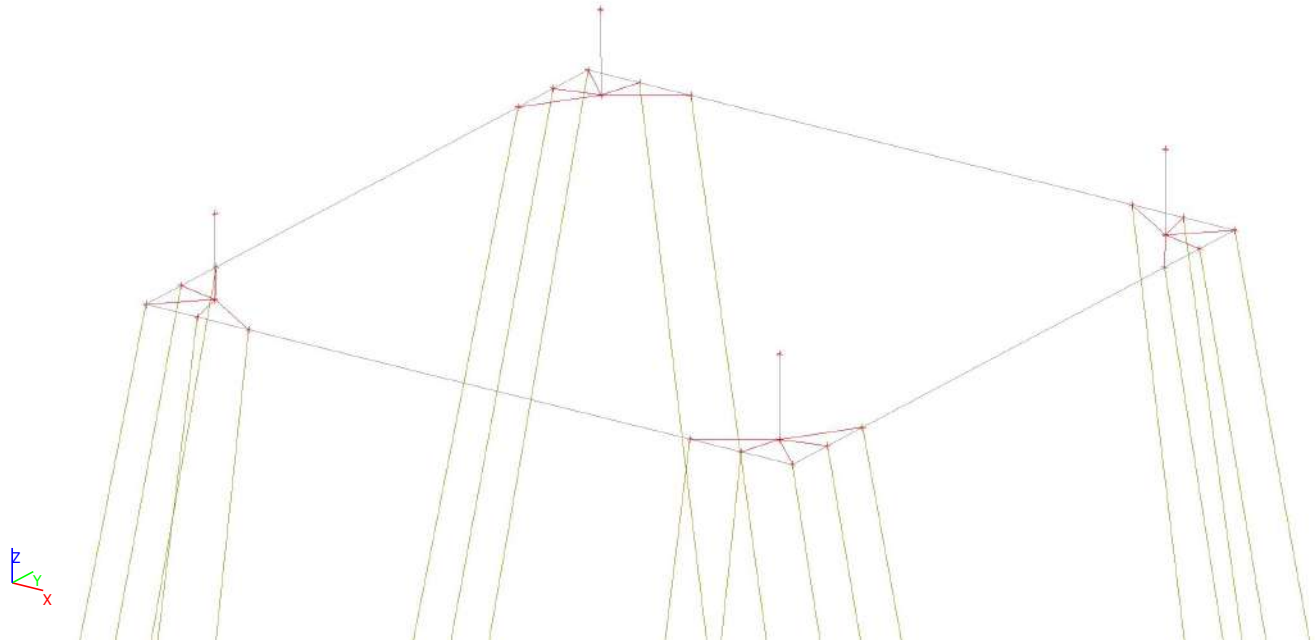


6. Belastingen

6.1. Belastingsgevallen

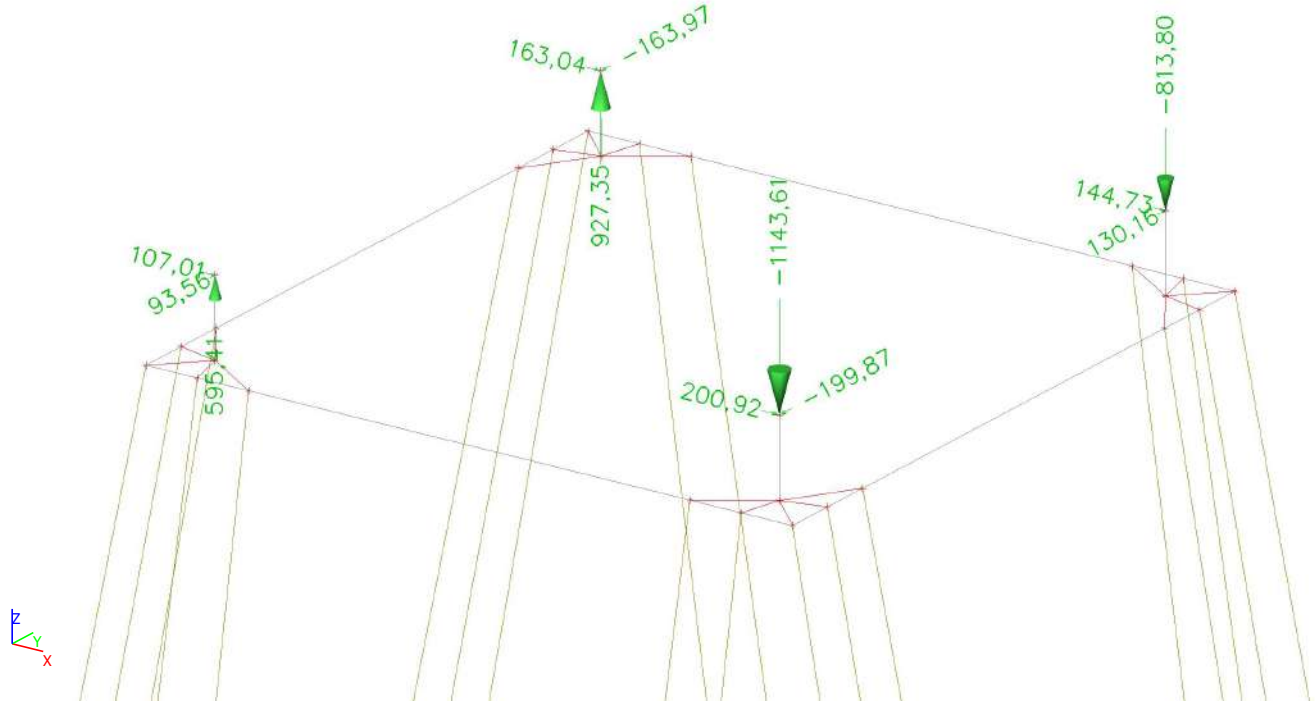
6.1.1. Belastingsgevallen - E.G.

Naam	Omschrijving	Actie type	Lastgroep	Richting
	Spec	Type last		
E.G.		Permanent	LG1	-Z
		Eigen gewicht		



6.1.2. Belastingsgevallen - hL Bck + Wnd ;225°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Type last			
hL Bck + Wnd ;225°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			

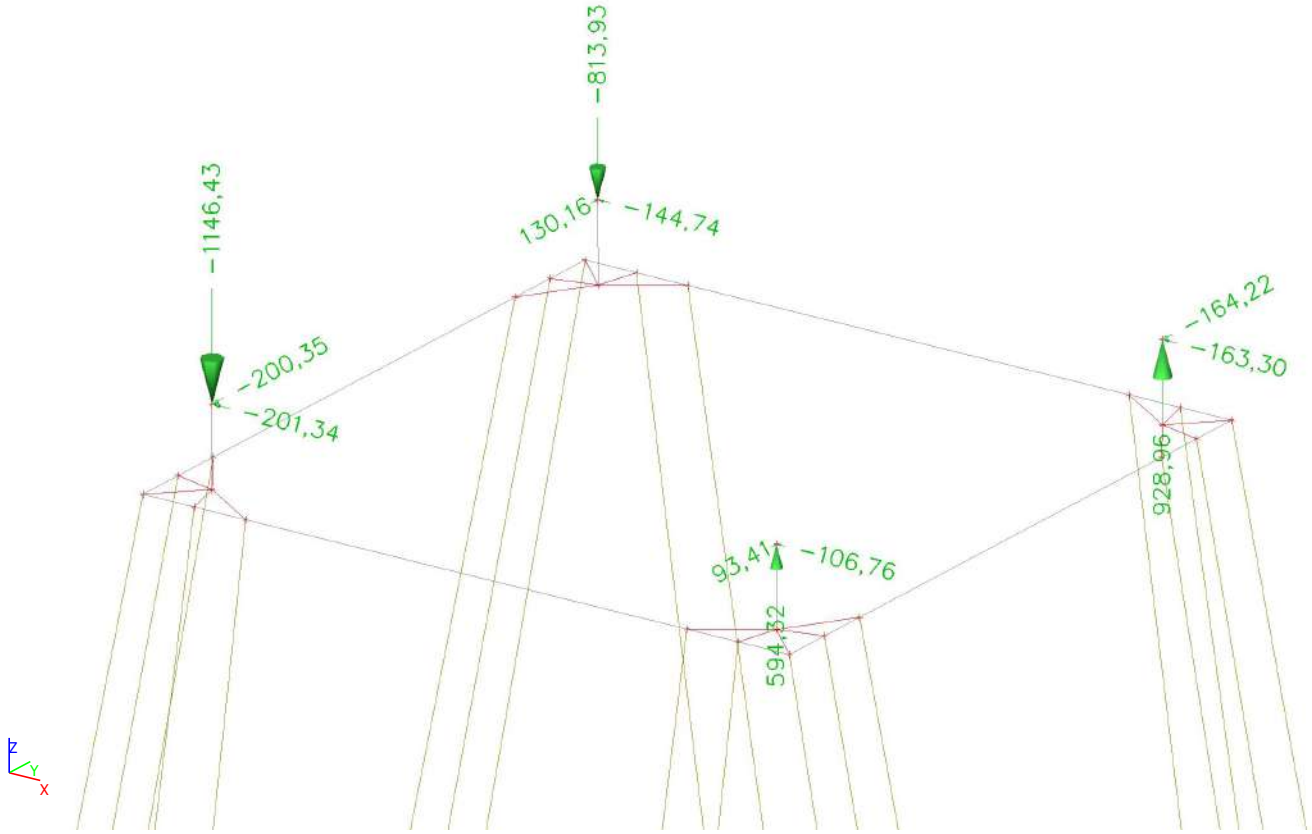


6.1.2.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
hL Bck + Wnd ;225°_1P_X	1P	hL Bck + Wnd ;225°	GCS	X	Kracht	107,01
hL Bck + Wnd ;225°_1P_Y	1P	hL Bck + Wnd ;225°	GCS	Y	Kracht	93,56
hL Bck + Wnd ;225°_1P_Z	1P	hL Bck + Wnd ;225°	GCS	Z	Kracht	595,41
hL Bck + Wnd ;225°_1X_X	1X	hL Bck + Wnd ;225°	GCS	X	Kracht	163,04
hL Bck + Wnd ;225°_1X_Y	1X	hL Bck + Wnd ;225°	GCS	Y	Kracht	-163,97
hL Bck + Wnd ;225°_1X_Z	1X	hL Bck + Wnd ;225°	GCS	Z	Kracht	927,35
hL Bck + Wnd ;225°_1XY_X	1XY	hL Bck + Wnd ;225°	GCS	X	Kracht	144,73
hL Bck + Wnd ;225°_1XY_Y	1XY	hL Bck + Wnd ;225°	GCS	Y	Kracht	130,16
hL Bck + Wnd ;225°_1XY_Z	1XY	hL Bck + Wnd ;225°	GCS	Z	Kracht	-813,80
hL Bck + Wnd ;225°_1Y_X	1Y	hL Bck + Wnd ;225°	GCS	X	Kracht	200,92
hL Bck + Wnd ;225°_1Y_Y	1Y	hL Bck + Wnd ;225°	GCS	Y	Kracht	-199,87
hL Bck + Wnd ;225°_1Y_Z	1Y	hL Bck + Wnd ;225°	GCS	Z	Kracht	-1143,61

6.1.3. Belastingsgevallen - hL Ahd + Wnd;315°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Type last			
hL Ahd + Wnd;315°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



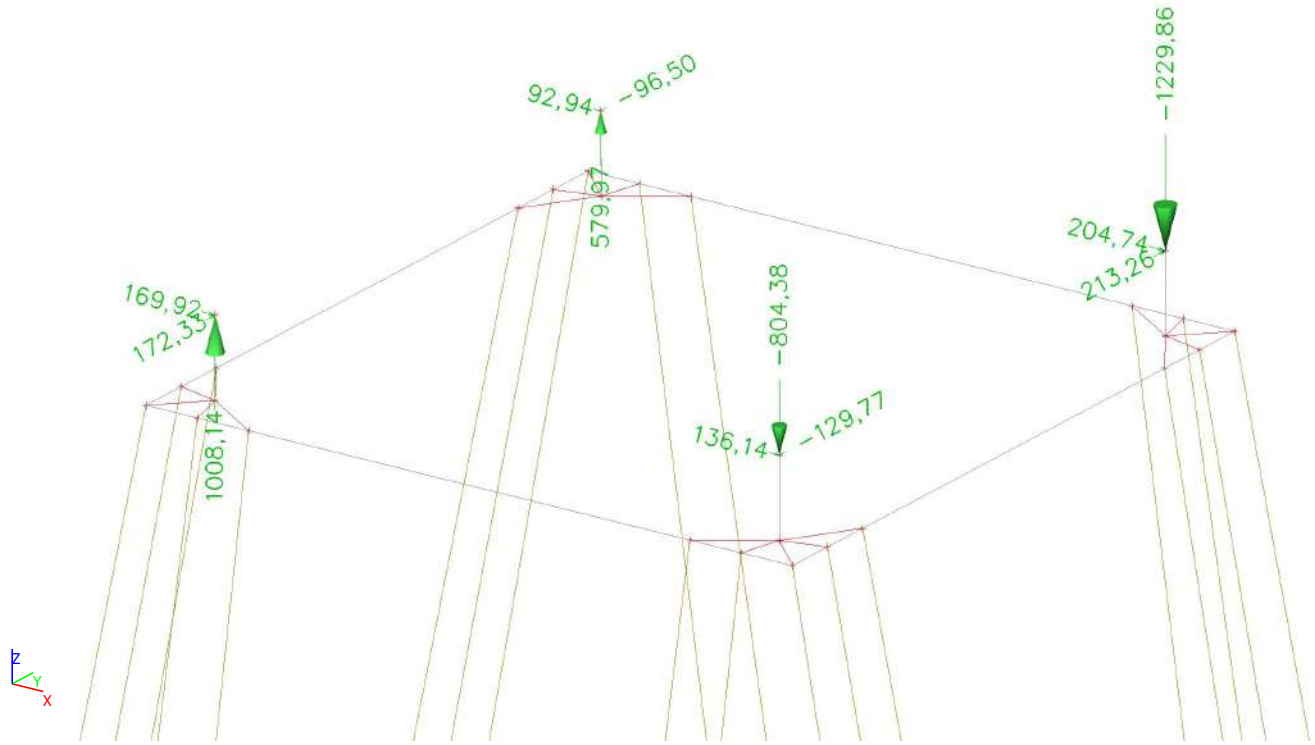
6.1.3.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
hL Ahd + Wnd;315°_1P_X	1P	hL Ahd + Wnd;315°	GCS	X	Kracht	-201,34
hL Ahd + Wnd;315°_1P_Y	1P	hL Ahd + Wnd;315°	GCS	Y	Kracht	-200,35
hL Ahd + Wnd;315°_1P_Z	1P	hL Ahd + Wnd;315°	GCS	Z	Kracht	-1146,43
hL Ahd + Wnd;315°_1X_X	1X	hL Ahd + Wnd;315°	GCS	X	Kracht	-144,74
hL Ahd + Wnd;315°_1X_Y	1X	hL Ahd + Wnd;315°	GCS	Y	Kracht	130,16
hL Ahd + Wnd;315°_1X_Z	1X	hL Ahd + Wnd;315°	GCS	Z	Kracht	-813,93
hL Ahd + Wnd;315°_1XY_X	1XY	hL Ahd + Wnd;315°	GCS	X	Kracht	-163,30
hL Ahd + Wnd;315°_1XY_Y	1XY	hL Ahd + Wnd;315°	GCS	Y	Kracht	-164,22
hL Ahd + Wnd;315°_1XY_Z	1XY	hL Ahd + Wnd;315°	GCS	Z	Kracht	928,96
hL Ahd + Wnd;315°_1Y_X	1Y	hL Ahd + Wnd;315°	GCS	X	Kracht	-106,76
hL Ahd + Wnd;315°_1Y_Y	1Y	hL Ahd + Wnd;315°	GCS	Y	Kracht	93,41

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
hL Ahd + Wnd;315°_1Y_Z	1Y	hL Ahd + Wnd;315°	GCS	Z	Kracht	594,32

6.1.4. Belastingsgevallen - hL Bck + Wnd ;90°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Type last			
hL Bck + Wnd ;90°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



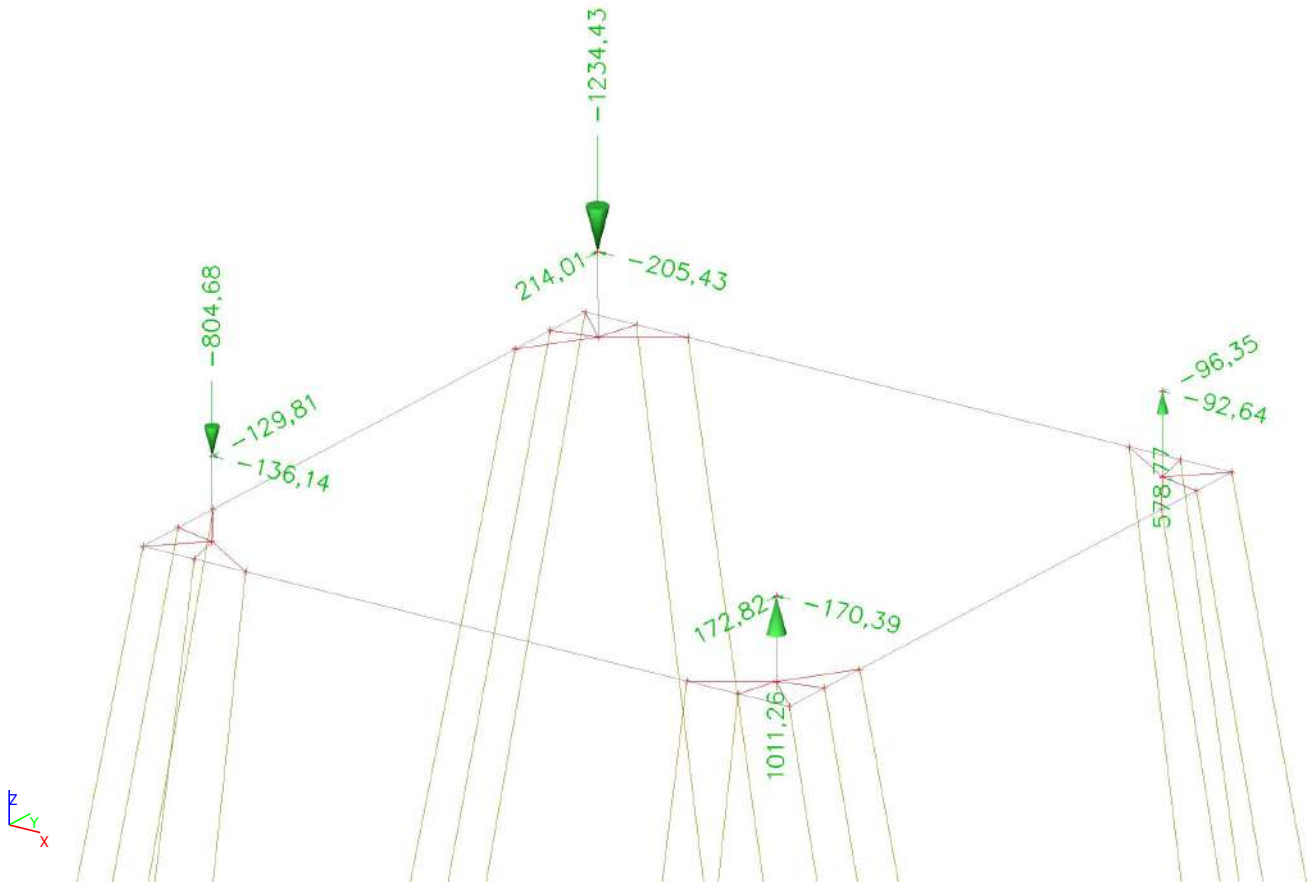
6.1.4.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
hL Bck + Wnd ;90°_1P_X	1P	hL Bck + Wnd ;90°	GCS	X	Kracht	169,92
hL Bck + Wnd ;90°_1P_Y	1P	hL Bck + Wnd ;90°	GCS	Y	Kracht	172,33
hL Bck + Wnd ;90°_1P_Z	1P	hL Bck + Wnd ;90°	GCS	Z	Kracht	1008,14
hL Bck + Wnd ;90°_1X_X	1X	hL Bck + Wnd ;90°	GCS	X	Kracht	92,94
hL Bck + Wnd ;90°_1X_Y	1X	hL Bck + Wnd ;90°	GCS	Y	Kracht	-96,50
hL Bck + Wnd ;90°_1X_Z	1X	hL Bck + Wnd ;90°	GCS	Z	Kracht	579,97
hL Bck + Wnd ;90°_1XY_X	1XY	hL Bck + Wnd ;90°	GCS	X	Kracht	204,74
hL Bck + Wnd ;90°_1XY_Y	1XY	hL Bck + Wnd ;90°	GCS	Y	Kracht	213,26

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
hL Bck + Wnd ;90°_1XY_Z	1XY	hL Bck + Wnd ;90°	GCS	Z	Kracht	-1229,86
hL Bck + Wnd ;90°_1Y_X	1Y	hL Bck + Wnd ;90°	GCS	X	Kracht	136,14
hL Bck + Wnd ;90°_1Y_Y	1Y	hL Bck + Wnd ;90°	GCS	Y	Kracht	-129,77
hL Bck + Wnd ;90°_1Y_Z	1Y	hL Bck + Wnd ;90°	GCS	Z	Kracht	-804,38

6.1.5. Belastingsgevallen - hL Ahd + Wnd ;90°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Type last			
hL Ahd + Wnd ;90°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



6.1.5.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
hL Ahd + Wnd ;90°_1P_X	1P	hL Ahd + Wnd ;90°	GCS	X	Kracht	-136,14
hL Ahd + Wnd ;90°_1P_Y	1P	hL Ahd + Wnd ;90°	GCS	Y	Kracht	-129,81
hL Ahd + Wnd ;90°_1P_Z	1P	hL Ahd + Wnd ;90°	GCS	Z	Kracht	-804,68
hL Ahd + Wnd ;90°_1X_X	1X	hL Ahd + Wnd ;90°	GCS	X	Kracht	-205,43
hL Ahd + Wnd ;90°_1X_Y	1X	hL Ahd + Wnd ;90°	GCS	Y	Kracht	214,01

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
hL Ahd + Wnd ;90°_1X_Z	1X	hL Ahd + Wnd ;90°	GCS	Z	Kracht	-1234,43
hL Ahd + Wnd ;90°_1XY_X	1XY	hL Ahd + Wnd ;90°	GCS	X	Kracht	-92,64
hL Ahd + Wnd ;90°_1XY_Y	1XY	hL Ahd + Wnd ;90°	GCS	Y	Kracht	-96,35
hL Ahd + Wnd ;90°_1XY_Z	1XY	hL Ahd + Wnd ;90°	GCS	Z	Kracht	578,77
hL Ahd + Wnd ;90°_1Y_X	1Y	hL Ahd + Wnd ;90°	GCS	X	Kracht	-170,39
hL Ahd + Wnd ;90°_1Y_Y	1Y	hL Ahd + Wnd ;90°	GCS	Y	Kracht	172,82
hL Ahd + Wnd ;90°_1Y_Z	1Y	hL Ahd + Wnd ;90°	GCS	Z	Kracht	1011,26

6.2. Niet-lineaire combinaties

Naam	Type	Belastingsgevallen	Coëff. [-]
hL Ahd + Wnd ;90°	Uiterste Grenstoestand	E.G.	1,20
		hL Ahd + Wnd ;90°	1,00
hL Bck + Wnd ;225°	Uiterste Grenstoestand	E.G.	1,20
		hL Bck + Wnd ;225°	1,00
hL Ahd + Wnd;315°	Uiterste Grenstoestand	E.G.	1,20
		hL Ahd + Wnd;315°	1,00
hL Bck + Wnd ;90°	Uiterste Grenstoestand	E.G.	1,20
		hL Bck + Wnd ;90°	1,00
lL Ahd + Wnd ;90°	Uiterste Grenstoestand	E.G.	0,90
		hL Ahd + Wnd ;90°	1,00
lL Bck + Wnd ;225°	Uiterste Grenstoestand	E.G.	0,90
		hL Bck + Wnd ;225°	1,00
lL Ahd + Wnd;315°	Uiterste Grenstoestand	E.G.	0,90
		hL Ahd + Wnd;315°	1,00
lL Bck + Wnd ;90°	Uiterste Grenstoestand	E.G.	0,90
		hL Bck + Wnd ;90°	1,00

6.3. Resultaatklasses

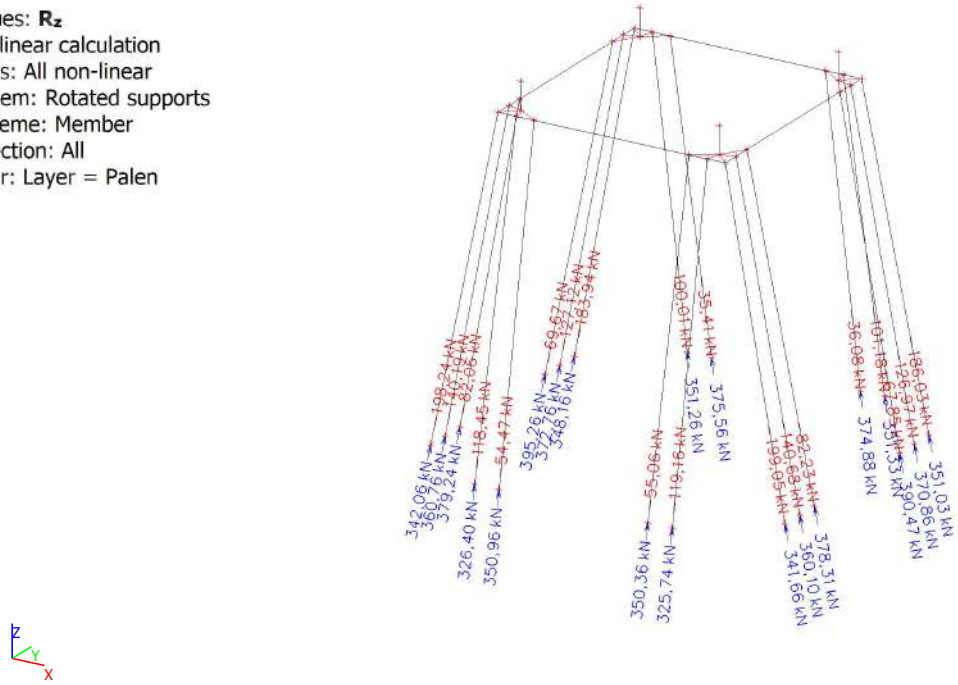
Naam	Lijst
All non-linear	hL Ahd + Wnd ;90°
	hL Bck + Wnd ;225°
	hL Ahd + Wnd;315°
	hL Bck + Wnd ;90°
	lL Ahd + Wnd ;90°
	lL Bck + Wnd ;225°
	lL Ahd + Wnd;315°
	lL Bck + Wnd ;90°

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reacties

Niet-lineaire berekening
Klasse: All non-linear
Systeem: Schuine steunpunten
Extreme: Globaal
Selectie: Alle
Filter: Laag = Palen
Knoopreacties

Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn27/N49	lL Ahd + Wnd ;90°	0,00	0,00	**-199,05**	0,00	0,00	0,00	0,0	0,0
Sn41/N54	hL Ahd + Wnd ;90°	**0,00**	**0,00**	**395,26**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.3. Reacties

Niet-lineaire berekening
Klasse: All non-linear
Systeem: Schuine steunpunten
Extreme: Element
Selectie: Alle
Filter: Laag = Palen
Knoopreacties

Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn21/N44	lL Bck + Wnd ;90°	0,00	0,00	**-198,24**	0,00	0,00	0,00	0,0	0,0
Sn21/N44	hL Ahd + Wnd;315°	**0,00**	**0,00**	**342,06**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn22/N45	lL Bck + Wnd ;90°	0,00	0,00	**-140,19**	0,00	0,00	0,00	0,0	0,0
Sn22/N45	hL Ahd +	**0,00**	**0,00**	**360,76**	**0,00**	**0,00**	**0,00**	0,0	0,0

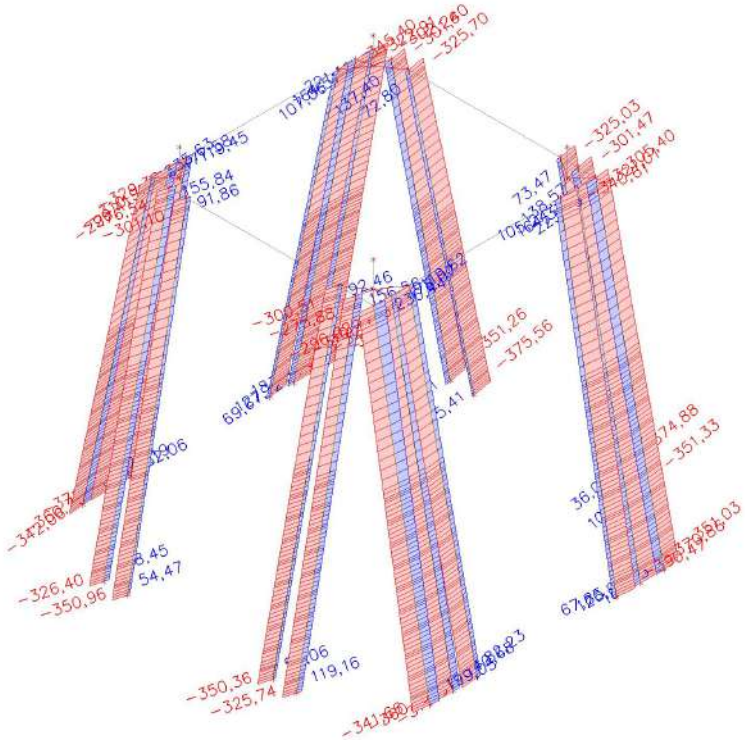
Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd;315°								
Sn23/N46	lL Bck + Wnd ;90°	0,00	0,00	**-82,06**	0,00	0,00	0,00	0,0	0,0
Sn23/N46	hL Ahd + Wnd;315°	**0,00**	**0,00**	**379,24**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn24/N47	lL Bck + Wnd ;90°	0,00	0,00	**-118,45**	0,00	0,00	0,00	0,0	0,0
Sn24/N47	hL Ahd + Wnd;315°	**0,00**	**0,00**	**326,40**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn26/N48	lL Bck + Wnd ;90°	0,00	0,00	**-54,47**	0,00	0,00	0,00	0,0	0,0
Sn26/N48	hL Ahd + Wnd;315°	**0,00**	**0,00**	**350,96**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn27/N49	lL Ahd + Wnd ;90°	0,00	0,00	**-199,05**	0,00	0,00	0,00	0,0	0,0
Sn27/N49	hL Bck + Wnd ;225°	**0,00**	**0,00**	**341,66**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn28/N50	lL Ahd + Wnd ;90°	0,00	0,00	**-140,68**	0,00	0,00	0,00	0,0	0,0
Sn28/N50	hL Bck + Wnd ;225°	**0,00**	**0,00**	**360,10**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn29/N51	lL Ahd + Wnd ;90°	0,00	0,00	**-82,23**	0,00	0,00	0,00	0,0	0,0
Sn29/N51	hL Bck + Wnd ;225°	**0,00**	**0,00**	**378,31**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn30/N52	lL Ahd + Wnd ;90°	0,00	0,00	**-119,16**	0,00	0,00	0,00	0,0	0,0
Sn30/N52	hL Bck + Wnd ;225°	**0,00**	**0,00**	**325,74**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn31/N53	lL Ahd + Wnd ;90°	0,00	0,00	**-55,06**	0,00	0,00	0,00	0,0	0,0
Sn31/N53	hL Bck + Wnd ;225°	**0,00**	**0,00**	**350,36**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn32/N10	lL Ahd + Wnd;315°	0,00	0,00	**-186,03**	0,00	0,00	0,00	0,0	0,0
Sn32/N10	hL Bck + Wnd ;90°	**0,00**	**0,00**	**351,03**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn33/N11	lL Ahd + Wnd;315°	0,00	0,00	**-126,97**	0,00	0,00	0,00	0,0	0,0
Sn33/N11	hL Bck + Wnd ;90°	**0,00**	**0,00**	**370,86**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn34/N12	lL Ahd + Wnd;315°	0,00	0,00	**-67,85**	0,00	0,00	0,00	0,0	0,0
Sn34/N12	hL Bck + Wnd ;90°	**0,00**	**0,00**	**390,47**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn35/N13	lL Ahd + Wnd;315°	0,00	0,00	**-101,18**	0,00	0,00	0,00	0,0	0,0
Sn35/N13	hL Bck + Wnd ;90°	**0,00**	**0,00**	**351,33**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn36/N14	lL Ahd + Wnd;315°	0,00	0,00	**-36,08**	0,00	0,00	0,00	0,0	0,0
Sn36/N14	hL Bck + Wnd ;90°	**0,00**	**0,00**	**374,88**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	lL Bck + Wnd ;225°	**0,00**	**0,00**	**-100,01**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	hL Ahd + Wnd ;90°	0,00	0,00	**351,26**	0,00	0,00	**0,00**	0,0	0,0
Sn38/N2	lL Bck + Wnd ;225°	**0,00**	**0,00**	**-35,41**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn38/N2	hL Ahd + Wnd ;90°	0,00	0,00	**375,56**	0,00	0,00	**0,00**	0,0	0,0
Sn39/N3	lL Bck + Wnd ;225°	**0,00**	**0,00**	**-183,94**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn39/N3	hL Ahd + Wnd ;90°	0,00	0,00	**348,16**	0,00	0,00	**0,00**	0,0	0,0
Sn40/N4	lL Bck +	**0,00**	**0,00**	**-127,12**	**0,00**	**0,00**	**0,00**	0,0	0,0

Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;225°								
Sn40/N4	hL Ahd + Wnd ;90°	0,00	0,00	**372,76**	0,00	0,00	**0,00**	0,0	0,0
Sn41/N54	lL Bck + Wnd ;225°	**0,00**	**0,00**	**-69,67**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn41/N54	hL Ahd + Wnd ;90°	0,00	0,00	**395,26**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

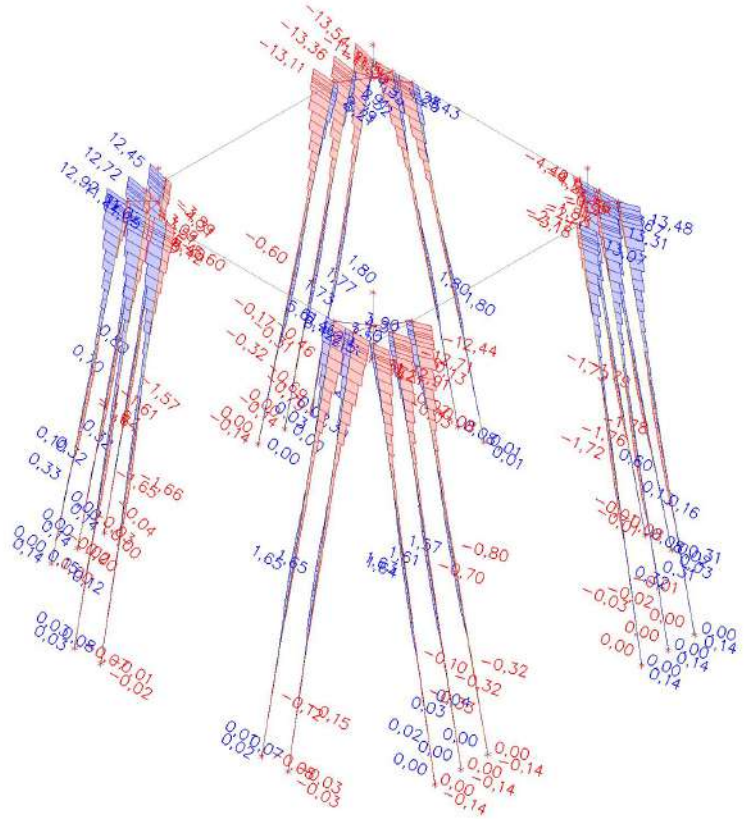
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



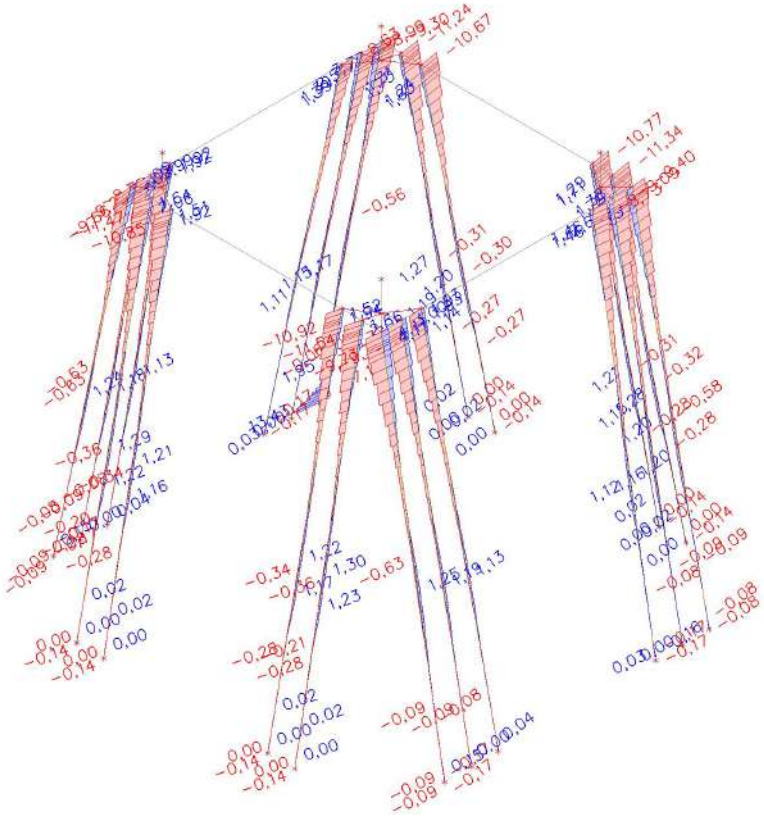
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



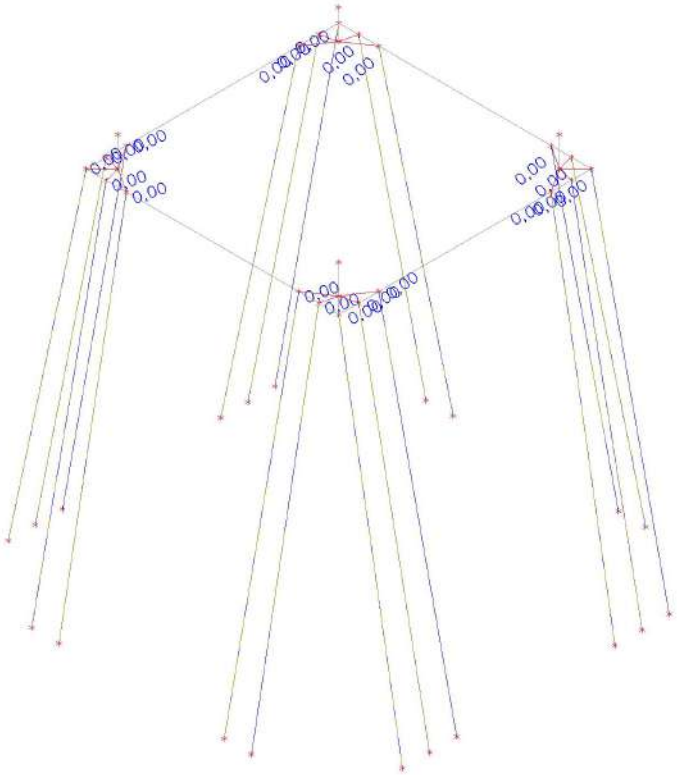
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



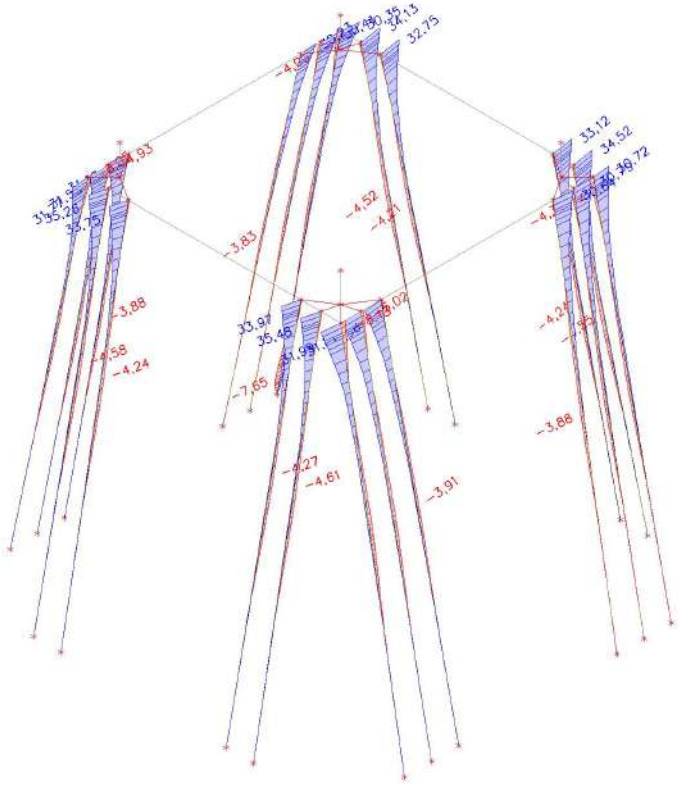
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



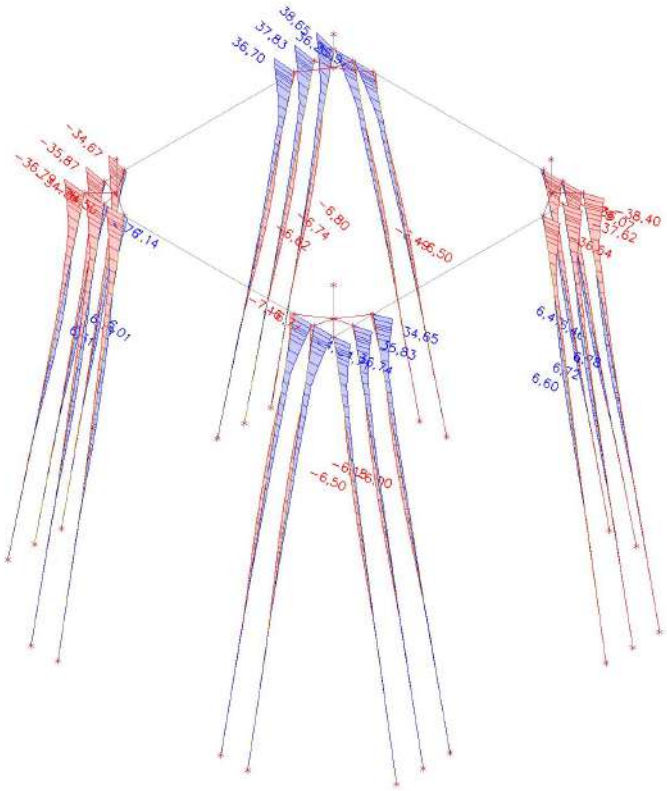
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. Interne 1D-krachten

Niet-lineaire berekening
Klasse: All non-linear
Coördinatenstelsel: Hoofd
Extreme 1D: Globaal
Selectie: Alle
Filter: Laag = Palen

Naam	dx [m]	Belasting	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_P_21	18,000	hL Ahd + Wnd ;90°	**-395,26**	0,00	-0,17	0,00	0,00	0,00
Paal_P_7	0,000	lL Ahd + Wnd ;90°	**236,44**	-0,90	-1,51	**0,00**	12,43	12,62
Paal_P_19	0,000	hL Ahd + Wnd;315°	-211,01	**-13,54**	3,08	0,00	-4,45	**38,65**
Paal_P_10	0,000	hL Ahd + Wnd;315°	42,04	4,70	**-11,54**	0,00	**35,48**	-3,84
Paal_P_19	17,750+	hL Ahd + Wnd ;90°	-347,21	1,16	**13,43**	0,00	-3,36	-0,31
Paal_P_7	0,000	lL Bck + Wnd ;90°	-211,01	-11,38	4,11	0,00	**-8,13**	31,39
Paal_P_12	0,000	hL Bck + Wnd ;225°	-213,85	**13,48**	3,14	0,00	-4,75	**-38,40**

7.3. Krachten van de Poeren

7.3.1. Interne 1D-krachten

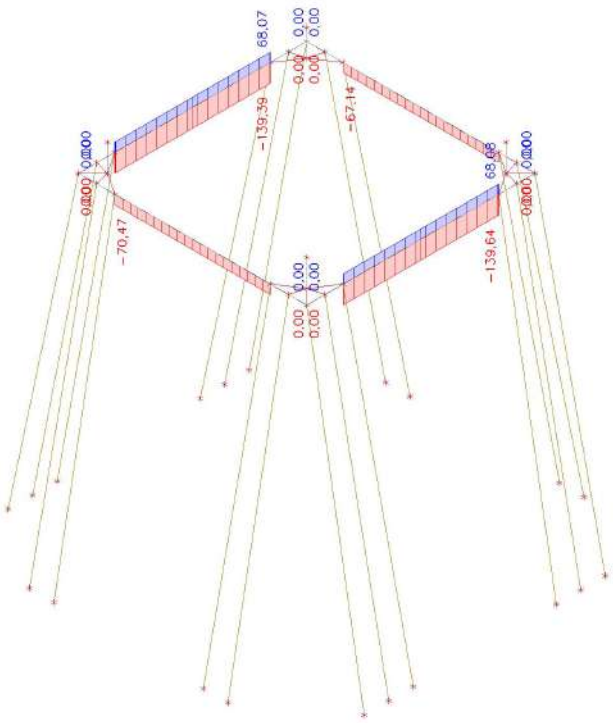
Niet-lineaire berekening
Klasse: All non-linear
Coördinatenstelsel: Hoofd
Extreme 1D: Globaal
Selectie: Alle
Filter: Laag = Poeren

Naam	dx [m]	Belasting	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer 8	0,000	hL Ahd + Wnd ;90°	**-1261,06**	-288,74	-1,79	0,18	2,52	291,40
Poer 5	1,475	hL Ahd + Wnd ;90°	**1011,26**	-242,69	1,72	0,02	0,00	-12,14
Poer 8	1,475	hL Ahd + Wnd ;90°	-1236,27	**-288,89**	-1,64	0,02	0,00	-14,84
Poer 8	0,000	hL Ahd + Wnd;315°	-839,84	-189,15	**-15,54**	**1,67**	**22,81**	190,00
Poer 6	0,000	hL Bck + Wnd ;225°	-838,60	194,38	-10,30	**-1,11**	15,20	-197,71
Poer 6	0,000	lL Bck + Wnd ;90°	-1248,46	**295,57**	**6,02**	0,65	**-8,89**	**-302,31**
Poer 7	0,000	lL Ahd + Wnd;315°	-1167,37	-284,04	0,70	-0,08	-1,03	**294,25**

7.4. Krachten van de Funderingsbalken

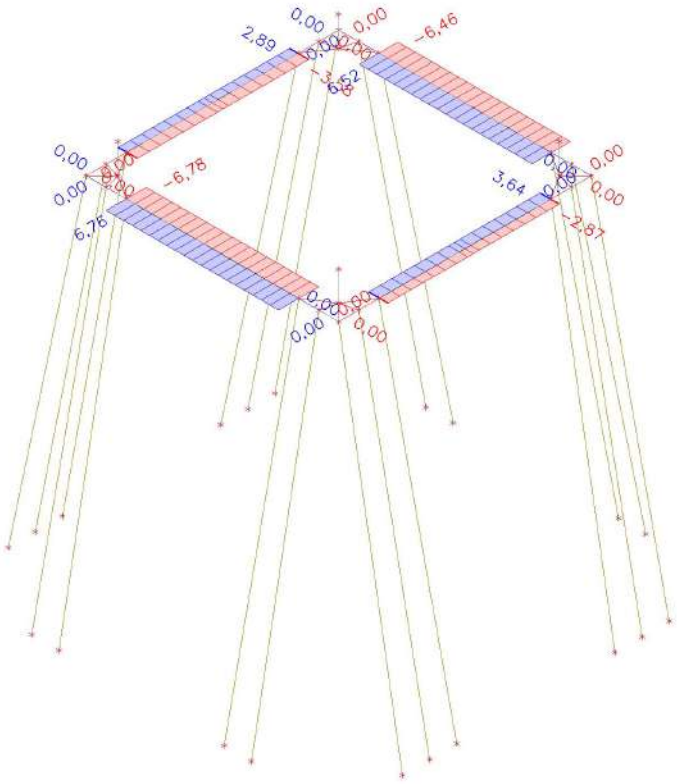
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



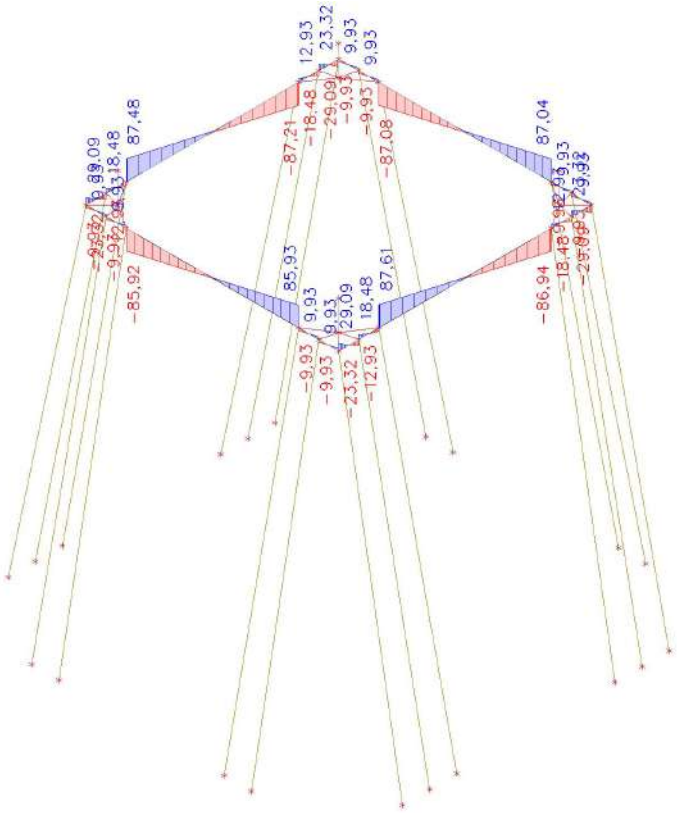
7.4.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



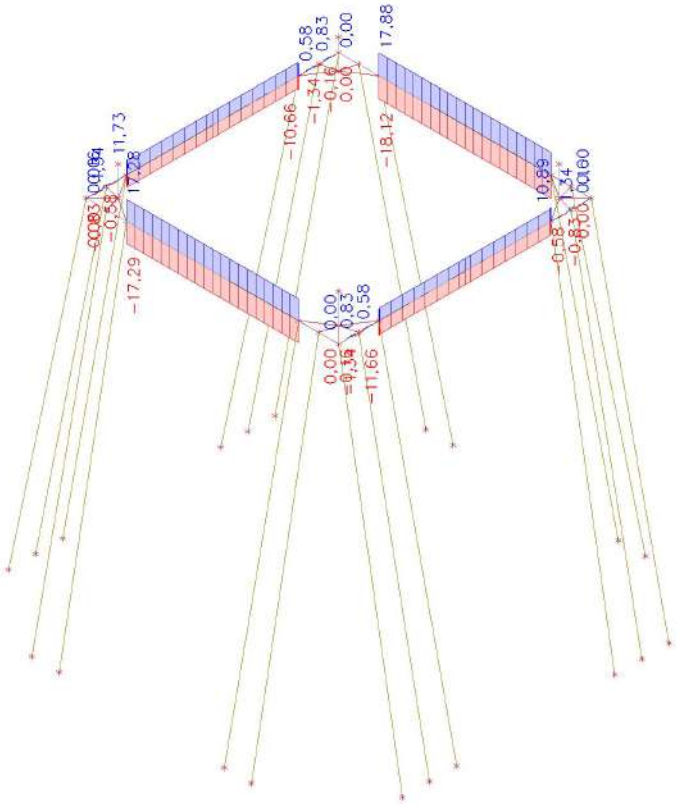
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



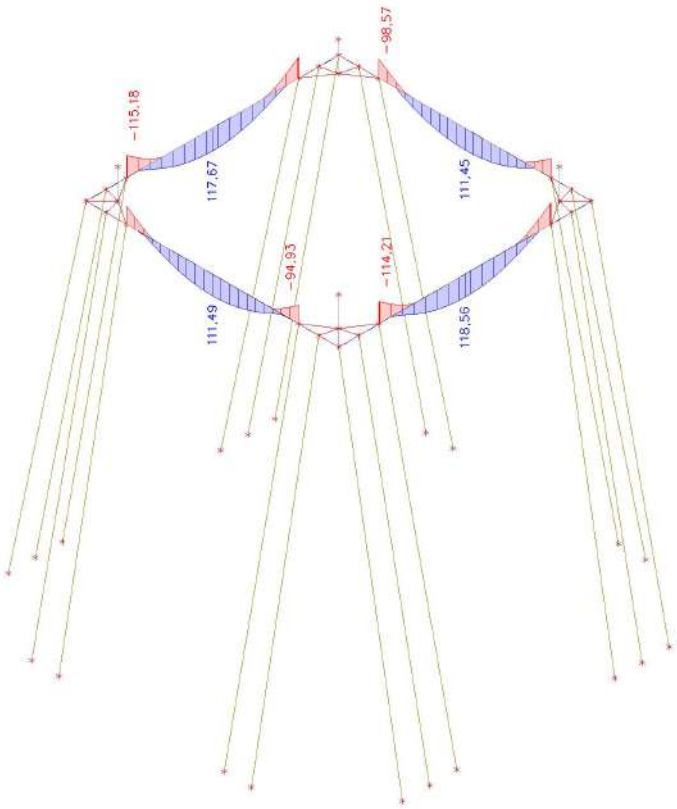
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



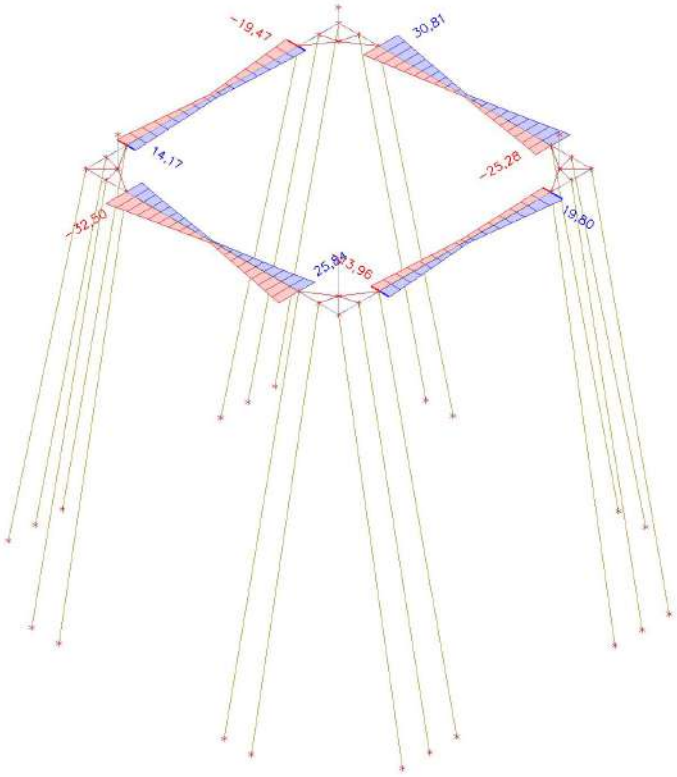
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. Interne 1D-krachten

Niet-lineaire berekening
Klasse: All non-linear
Coördinatenstelsel: Hoofd
Extreme 1D: Globaal
Selectie: Benoemde selectie - FunderingsBalken
Filter: Laag = Balken

Naam	dx [m]	Belasting	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Balk 5	2,000+	hL Ahd + Wnd ;90°	**-139,64**	3,64	83,95	-11,66	-60,36	-13,02
Balk 5	2,000+	lL Bck + Wnd ;90°	**68,08**	1,85	62,66	-7,97	-77,06	-13,24
Balk 7	2,000+	hL Bck + Wnd ;90°	-70,30	**6,76**	85,35	-17,29	-71,96	-32,39
Balk 6	10,600-	hL Bck + Wnd ;90°	-139,39	-3,58	**-87,21**	9,72	-74,87	-18,00
Balk 5	2,000+	hL Ahd + Wnd;315°	-138,96	-2,87	**87,61**	8,88	-74,40	14,91
Balk 4	2,000+	hL Bck + Wnd ;225°	-66,69	-6,46	87,04	**17,88**	-79,68	30,70
Balk 6	2,000+	hL Ahd + Wnd;315°	53,89	1,42	87,48	-6,14	**-115,18**	-0,99
Balk 5	6,300	hL Ahd + Wnd;315°	-138,96	-2,87	2,16	9,91	**118,56**	4,22
Balk 7	10,600-	hL Ahd + Wnd ;90°	-70,47	**-6,78**	-85,31	17,28	-71,69	**-32,50**
Balk 4	10,600-	hL Ahd + Wnd;315°	-67,14	6,52	-87,08	**-18,12**	-79,34	**30,81**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-DIM 380kV
Part	Balkrooster 5xBeton40x40 mast 37
Author	[redacted]
Date	6-05-2026
Structure	General XYZ
No. of nodes :	52
No. of beams :	28
No. of slabs :	0
No. of solids :	0
No. of used profiles :	3
No. of load cases :	5
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,810
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materials

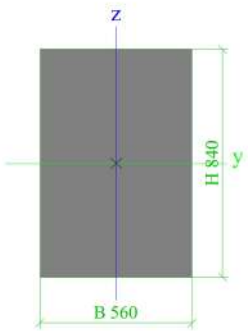
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C20/25 Ongescheurd	Concrete	1500,0	2600,0	2,4000e+04	0.2	0,00	20,00	
C20/25 Gescheurd	Concrete	2500,0	2600,0	8,0000e+03	0.2	0,00	20,00	

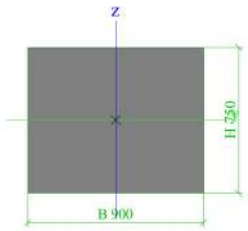
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

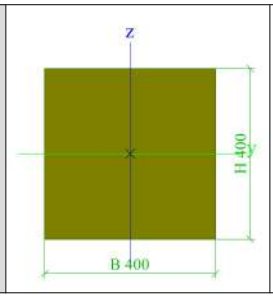
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 500B	Reinforcement steel	7850,0	2,0000e+05	8,3333e+04	0,00	500,0

4.2. Cross-sections

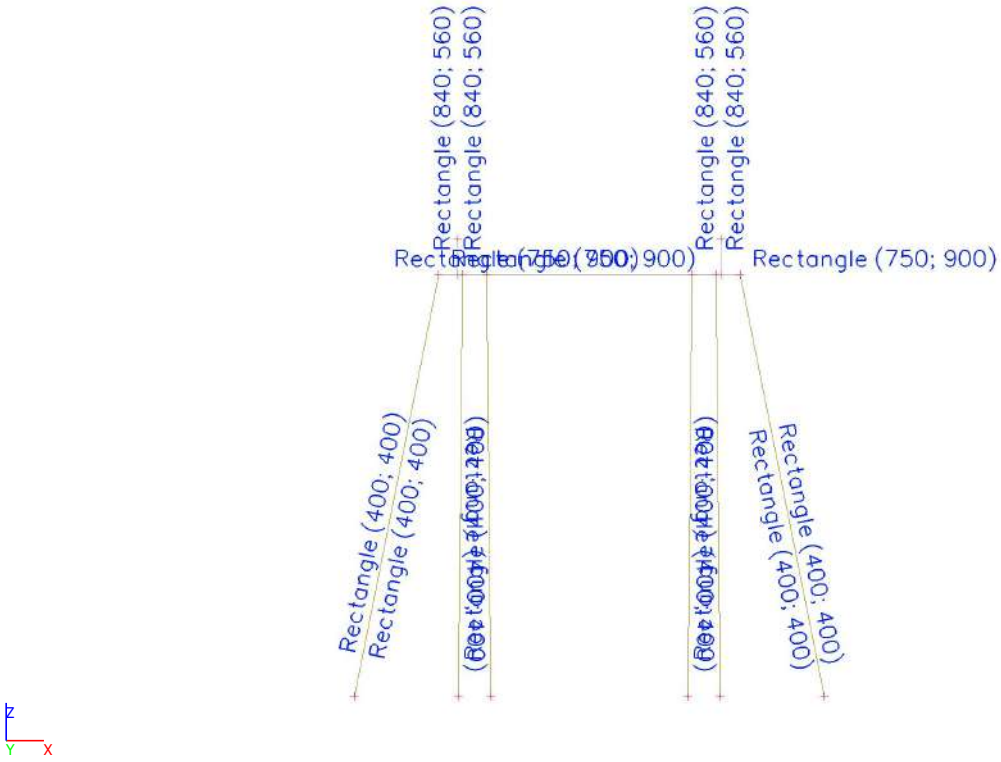
Poer.Opstort		
Type	Rectangle	
Detailed	840; 560	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	4,7040e-01	
A_y [m²], A_z [m²]	3,9200e-01	3,9200e-01
A_L [m²/m], A_D [m²/m]	2,8000e+00	2,8000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	280	420
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,7660e-02	1,2293e-02
i_y [mm], i_z [mm]	242	162
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	6,5856e-02	4,3904e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	2,8888e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

Balk		
Type	Rectangle	
Detailed	750; 900	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	6,7500e-01	
A_y [m²], A_z [m²]	5,6250e-01	5,6250e-01
A_L [m²/m], A_D [m²/m]	3,3000e+00	3,3000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450	375
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	3,1641e-02	4,5563e-02
i_y [mm], i_z [mm]	217	260
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	8,4375e-02	1,0125e-01
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	6,3112e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

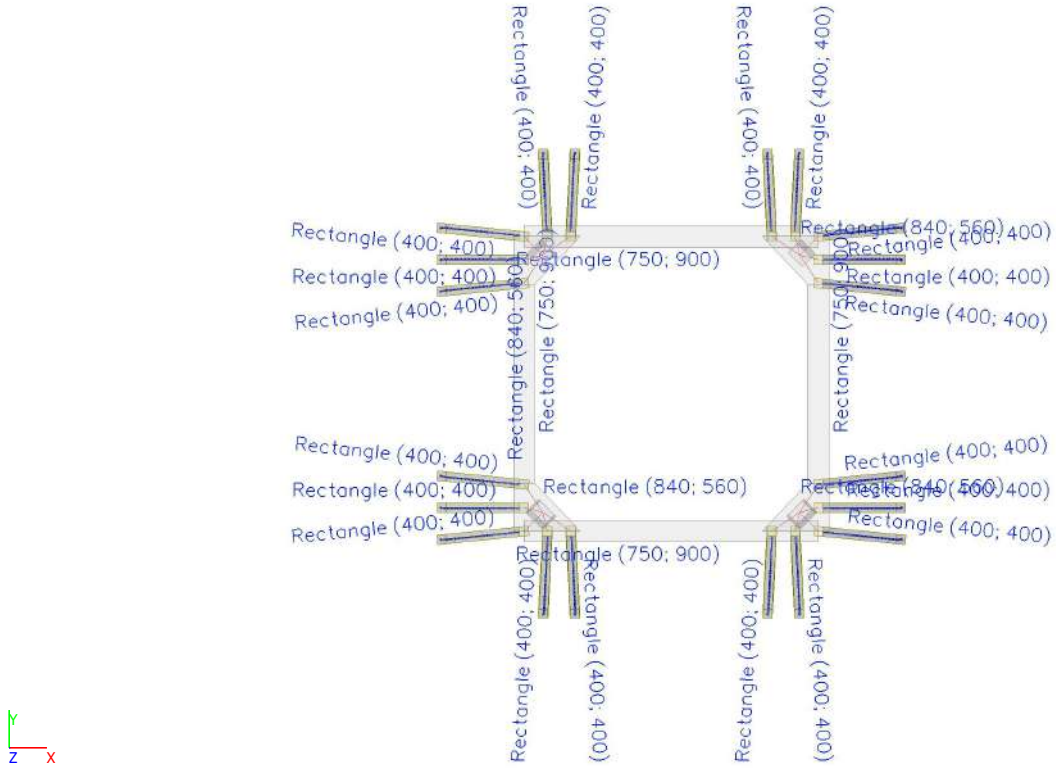
Funderingspaal		
Type	Rectangle	
Detailed	400; 400	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [m²]	1,6000e-01	
A_y [m²], A_z [m²]	1,3333e-01	1,3333e-01
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200	200
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,1333e-03	2,1333e-03
i_y [mm], i_z [mm]	115	115
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	1,0667e-02	1,0667e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	3,6027e-03	0,0000e+00
β_y [mm], β_z [mm]	0	0

Picture		
		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	NetInstelling1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	5
Average size of 2D mesh element [m]	0,250
Average size of 1D mesh element on curved 1D members [m]	0,250
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N5	13,000	1,400	0,000
N6	13,000	2,400	0,000
N7	12,000	0,400	0,000
N1	11,000	0,400	0,000
N17	0,400	0,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N21	0,400	13,000	0,000
1Y	12,200	1,200	1,475
N22	12,200	1,200	0,000
N23	12,200	12,200	0,000
1XY	12,200	12,200	1,475

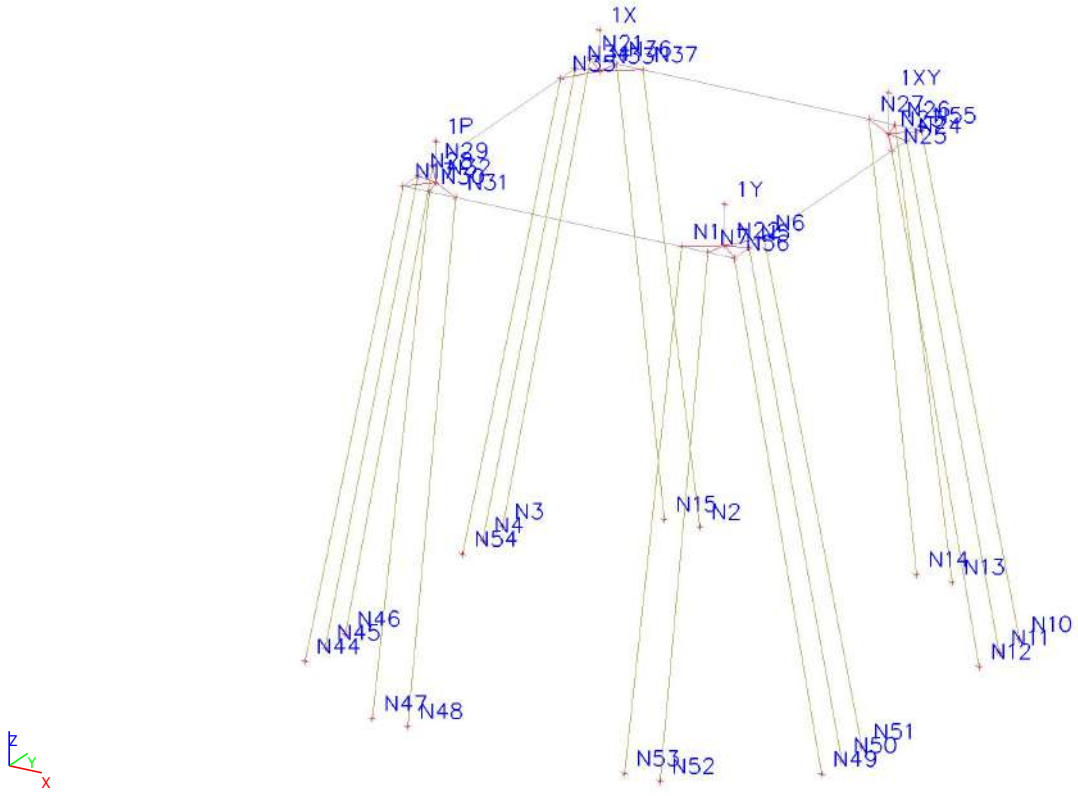
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N24	13,000	12,000	0,000
N25	13,000	11,000	0,000
N26	12,000	13,000	0,000
N27	11,000	13,000	0,000
N28	0,400	1,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N29	0,400	2,400	0,000
N30	1,400	0,400	0,000
N31	2,400	0,400	0,000
1P	1,200	1,200	1,475
N32	1,200	1,200	0,000
N33	1,200	12,200	0,000
1X	1,200	12,187	1,475
N34	0,400	12,000	0,000
N35	0,400	11,000	0,000
N36	1,400	13,000	0,000
N37	2,400	13,000	0,000
N38	12,200	1,200	0,000
N39	1,200	1,200	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N40	12,200	12,200	0,000
N41	1,200	12,200	0,000
N44	-3,129	0,047	-17,647
N45	-3,129	1,400	-17,647
N46	-3,129	2,753	-17,647
N47	1,224	-3,129	-17,647
N48	2,576	-3,129	-17,647
N49	16,529	0,047	-17,647
N50	16,529	1,400	-17,647
N51	16,529	2,753	-17,647
N52	12,176	-3,129	-17,647
N53	10,824	-3,129	-17,647
N10	16,529	13,353	-17,647

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N11	16,529	12,000	-17,647
N12	16,529	10,647	-17,647
N13	12,176	16,529	-17,647
N14	10,824	16,529	-17,647
N15	1,224	16,529	-17,647
N2	2,576	16,529	-17,647
N3	-3,129	13,353	-17,647
N4	-3,129	12,000	-17,647
N54	-3,129	10,647	-17,647
N55	13,000	13,000	0,000
N56	13,000	0,400	0,000

5.2. Analyse model met knopen

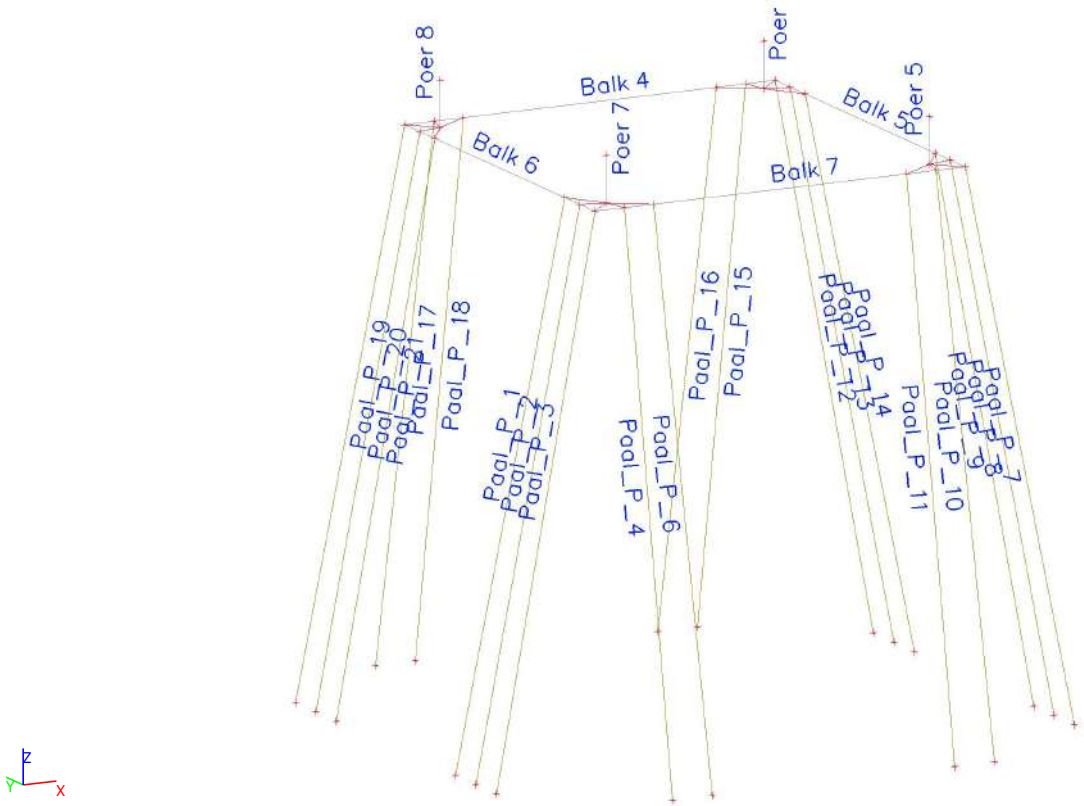


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Balk 4	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N55	N21	beam (80)
Balk 5	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N55	beam (80)
Balk 6	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N17	N21	beam (80)
Balk 7	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N17	beam (80)
Poer 5	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N22	1Y	column (100)
Poer 6	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N23	1XY	column (100)
Poer 7	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N32	1P	column (100)
Poer 8	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N33	1X	column (100)
Paal_P_1	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N29	N46	column (100)
Paal_P_2	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,996	N28	N45	column (100)
Paal_P_3	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N17	N44	column (100)
Paal_P_4	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N30	N47	column (100)
Paal_P_6	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N31	N48	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_7	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N56	N49	column (100)
Paal_P_8	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,996	N5	N50	column (100)
Paal_P_9	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N6	N51	column (100)
Paal_P_10	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N7	N52	column (100)
Paal_P_11	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N1	N53	column (100)
Paal_P_12	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N55	N10	column (100)
Paal_P_13	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,996	N24	N11	column (100)
Paal_P_14	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N25	N12	column (100)
Paal_P_15	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N26	N13	column (100)
Paal_P_16	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N27	N14	column (100)
Paal_P_17	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N36	N15	column (100)
Paal_P_18	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,997	N37	N2	column (100)
Paal_P_19	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N21	N3	column (100)
Paal_P_20	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	17,996	N34	N4	column (100)
Paal_P_21	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	18,000	N35	N54	column (100)

5.4. Analyse model met Staven

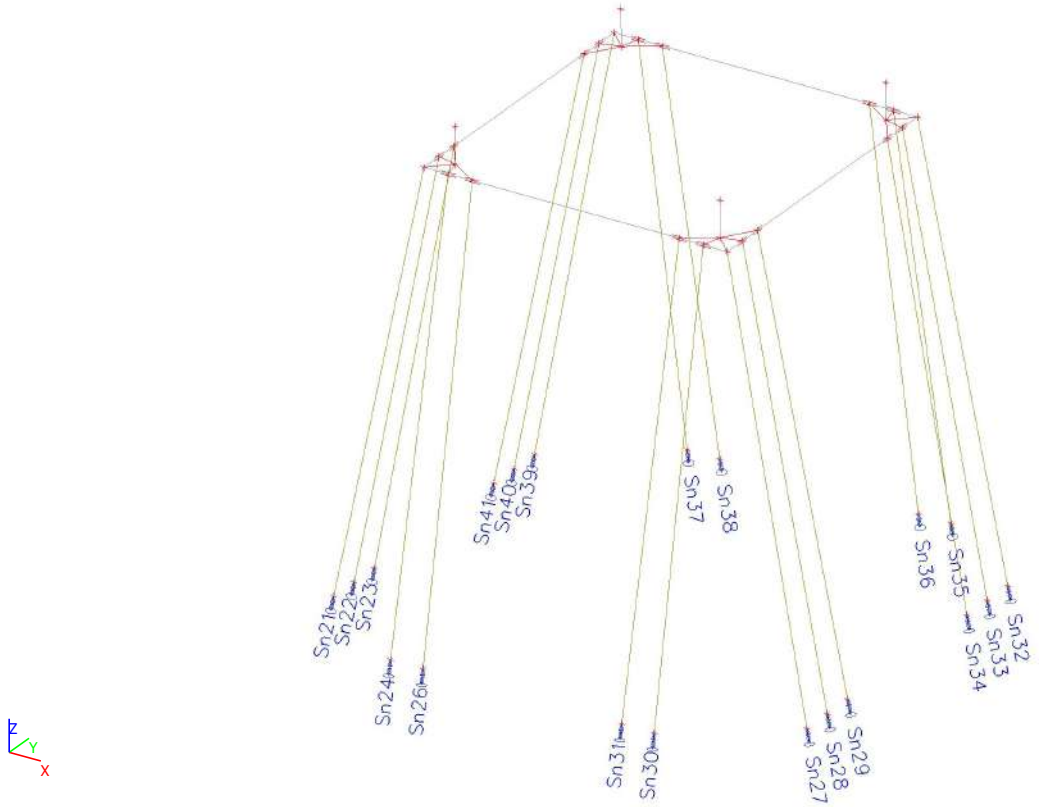


5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn21	N44	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31
Sn22	N45	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn23	N46	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn24	N47	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn26	N48	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn27	N49	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn28	N50	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31
Sn29	N51	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn30	N52	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn31	N53	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn32	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn33	N11	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn34	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn35	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn36	N14	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn37	N15	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn38	N2	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn39	N3	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn40	N4	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn41	N54	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31

5.6. Analyse model met Knoopondersteuningen



5.7. Line supports on member

Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
Veen	Line	Paal_P_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Veen3	Line	Paal_P_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Veen4	Line	Paal_P_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)1	Line	Paal_P_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V1)3	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V1)4	Line	Paal_P_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)	Line	Paal_P_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V2)1	Line	Paal_P_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V2)2	Line	Paal_P_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	10,000	From start						
(PY-curve-1_V3)	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V3)19	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V3)12	Line	Paal_P_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)8	Line	Paal_P_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V4)17	Line	Paal_P_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V4)16	Line	Paal_P_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)18	Line	Paal_P_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V5)	Line	Paal_P_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V5)1	Line	Paal_P_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)6	Line	Paal_P_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V6)9	Line	Paal_P_2	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V6)11	Line	Paal_P_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)14	Line	Paal_P_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V7)16	Line	Paal_P_2	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V7)15	Line	Paal_P_1	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)12	Line	Paal_P_3	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V8)4	Line	Paal_P_2	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V8)3	Line	Paal_P_1	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)14	Line	Paal_P_3	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V9)13	Line	Paal_P_2	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V9)12	Line	Paal_P_1	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)7	Line	Paal_P_3	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
(PY-curve-1_V10)6	Line	Paal_P_2	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
(PY-curve-1_V10)5	Line	Paal_P_1	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen18	Line	Paal_P_4	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)14	Line	Paal_P_4	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)7	Line	Paal_P_4	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)5	Line	Paal_P_4	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)3	Line	Paal_P_4	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)3	Line	Paal_P_4	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)10	Line	Paal_P_4	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)8	Line	Paal_P_4	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	15,000	From start						
(PY-curve-1_V8)1	Line	Paal_P_4	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)10	Line	Paal_P_4	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)11	Line	Paal_P_4	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen9	Line	Paal_P_6	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)18	Line	Paal_P_6	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)9	Line	Paal_P_6	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)8	Line	Paal_P_6	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)2	Line	Paal_P_6	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)4	Line	Paal_P_6	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)13	Line	Paal_P_6	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)3	Line	Paal_P_6	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)6	Line	Paal_P_6	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)6	Line	Paal_P_6	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)9	Line	Paal_P_6	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen8	Line	Paal_P_7	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)19	Line	Paal_P_7	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)12	Line	Paal_P_7	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)10	Line	Paal_P_7	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)13	Line	Paal_P_7	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)5	Line	Paal_P_7	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)14	Line	Paal_P_7	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)11	Line	Paal_P_7	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)7	Line	Paal_P_7	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)4	Line	Paal_P_7	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)3	Line	Paal_P_7	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen16	Line	Paal_P_8	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)8	Line	Paal_P_8	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)14	Line	Paal_P_8	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)9	Line	Paal_P_8	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)5	Line	Paal_P_8	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)6	Line	Paal_P_8	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)19	Line	Paal_P_8	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	14,000	From start						
(PY-curve-1_V7)9	Line	Paal_P_8	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)10	Line	Paal_P_8	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)7	Line	Paal_P_8	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)17	Line	Paal_P_8	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen13	Line	Paal_P_9	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)2	Line	Paal_P_9	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)16	Line	Paal_P_9	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)1	Line	Paal_P_9	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)18	Line	Paal_P_9	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)7	Line	Paal_P_9	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)17	Line	Paal_P_9	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)6	Line	Paal_P_9	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)9	Line	Paal_P_9	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)1	Line	Paal_P_9	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)1	Line	Paal_P_9	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen10	Line	Paal_P_10	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)15	Line	Paal_P_10	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)18	Line	Paal_P_10	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)11	Line	Paal_P_10	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)12	Line	Paal_P_10	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)8	Line	Paal_P_10	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)	Line	Paal_P_10	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)1	Line	Paal_P_10	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)17	Line	Paal_P_10	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)16	Line	Paal_P_10	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)12	Line	Paal_P_10	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen5	Line	Paal_P_11	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)16	Line	Paal_P_11	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)4	Line	Paal_P_11	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)15	Line	Paal_P_11	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)14	Line	Paal_P_11	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)9	Line	Paal_P_11	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

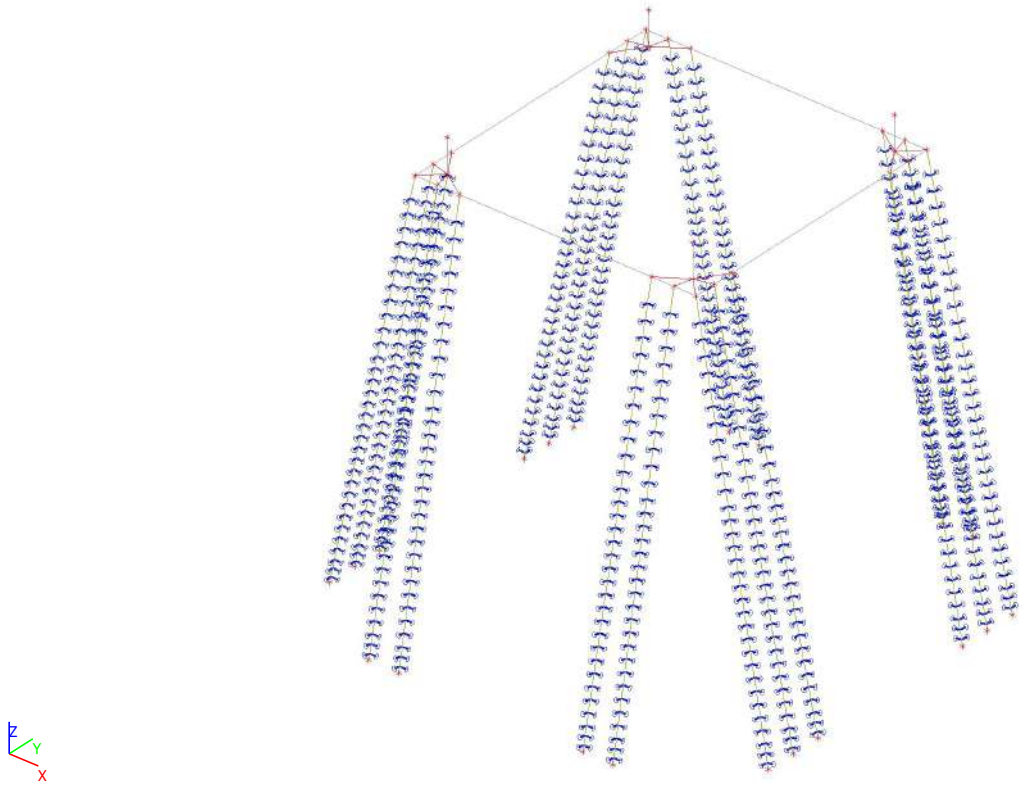
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	13,000	From start						
(PY-curve-1_V6)1	Line	Paal_P_11	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)12	Line	Paal_P_11	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)18	Line	Paal_P_11	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)17	Line	Paal_P_11	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)	Line	Paal_P_11	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen7	Line	Paal_P_12	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)10	Line	Paal_P_12	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)19	Line	Paal_P_12	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)2	Line	Paal_P_12	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)6	Line	Paal_P_12	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)11	Line	Paal_P_12	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)8	Line	Paal_P_12	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)17	Line	Paal_P_12	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)16	Line	Paal_P_12	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)15	Line	Paal_P_12	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)15	Line	Paal_P_12	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen21	Line	Paal_P_13	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)12	Line	Paal_P_13	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)3	Line	Paal_P_13	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)16	Line	Paal_P_13	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)15	Line	Paal_P_13	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)12	Line	Paal_P_13	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)7	Line	Paal_P_13	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)2	Line	Paal_P_13	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)14	Line	Paal_P_13	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)	Line	Paal_P_13	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)2	Line	Paal_P_13	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen6	Line	Paal_P_14	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)13	Line	Paal_P_14	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)17	Line	Paal_P_14	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)4	Line	Paal_P_14	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)11	Line	Paal_P_14	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	12,000	From start						
(PY-curve-1_V5)2	Line	Paal_P_14	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)18	Line	Paal_P_14	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)7	Line	Paal_P_14	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)	Line	Paal_P_14	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)2	Line	Paal_P_14	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)18	Line	Paal_P_14	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen14	Line	Paal_P_15	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)7	Line	Paal_P_15	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)15	Line	Paal_P_15	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)13	Line	Paal_P_15	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)7	Line	Paal_P_15	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)13	Line	Paal_P_15	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)16	Line	Paal_P_15	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)10	Line	Paal_P_15	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)8	Line	Paal_P_15	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)3	Line	Paal_P_15	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)14	Line	Paal_P_15	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen20	Line	Paal_P_16	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)17	Line	Paal_P_16	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)13	Line	Paal_P_16	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)18	Line	Paal_P_16	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)	Line	Paal_P_16	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)14	Line	Paal_P_16	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)3	Line	Paal_P_16	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)	Line	Paal_P_16	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)15	Line	Paal_P_16	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)5	Line	Paal_P_16	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)13	Line	Paal_P_16	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen19	Line	Paal_P_17	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)6	Line	Paal_P_17	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)11	Line	Paal_P_17	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)7	Line	Paal_P_17	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

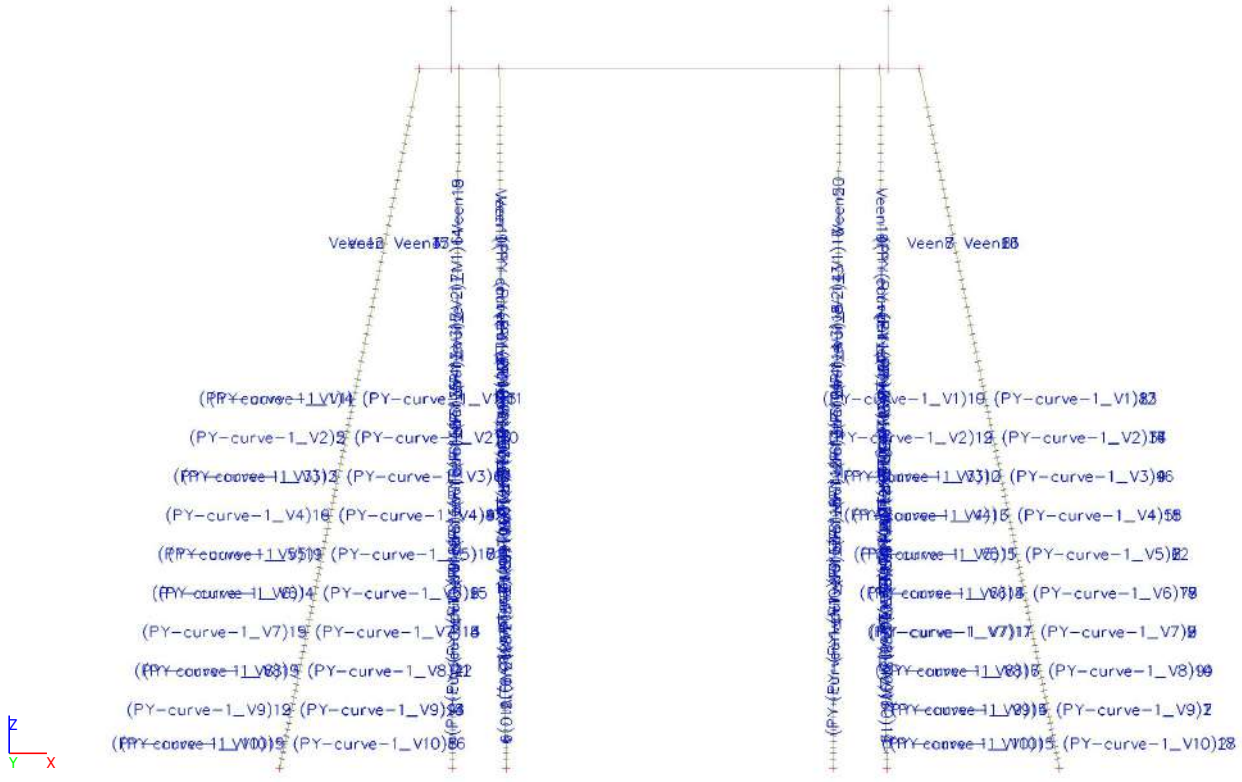
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	11,000	From start						
(PY-curve-1_V4)1	Line	Paal_P_17	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)15	Line	Paal_P_17	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)5	Line	Paal_P_17	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)5	Line	Paal_P_17	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)5	Line	Paal_P_17	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)8	Line	Paal_P_17	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)10	Line	Paal_P_17	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen11	Line	Paal_P_18	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)9	Line	Paal_P_18	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)8	Line	Paal_P_18	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)14	Line	Paal_P_18	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)10	Line	Paal_P_18	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)16	Line	Paal_P_18	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)12	Line	Paal_P_18	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)4	Line	Paal_P_18	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)13	Line	Paal_P_18	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)11	Line	Paal_P_18	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)4	Line	Paal_P_18	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen17	Line	Paal_P_19	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)11	Line	Paal_P_19	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)6	Line	Paal_P_19	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)6	Line	Paal_P_19	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)4	Line	Paal_P_19	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)10	Line	Paal_P_19	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)2	Line	Paal_P_19	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)13	Line	Paal_P_19	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)2	Line	Paal_P_19	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)18	Line	Paal_P_19	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)16	Line	Paal_P_19	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen15	Line	Paal_P_20	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)5	Line	Paal_P_20	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)10	Line	Paal_P_20	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	10,000	From start						
(PY-curve-1_V3)17	Line	Paal_P_20	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)9	Line	Paal_P_20	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)17	Line	Paal_P_20	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)15	Line	Paal_P_20	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)18	Line	Paal_P_20	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)11	Line	Paal_P_20	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)9	Line	Paal_P_20	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)8	Line	Paal_P_20	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						
Veen12	Line	Paal_P_21	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)	Line	Paal_P_21	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)5	Line	Paal_P_21	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)3	Line	Paal_P_21	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)19	Line	Paal_P_21	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)19	Line	Paal_P_21	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)4	Line	Paal_P_21	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
(PY-curve-1_V7)19	Line	Paal_P_21	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
(PY-curve-1_V8)19	Line	Paal_P_21	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
(PY-curve-1_V9)19	Line	Paal_P_21	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
(PY-curve-1_V10)19	Line	Paal_P_21	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,750	From start						

5.8. Analyse model met Lijnondersteuningen



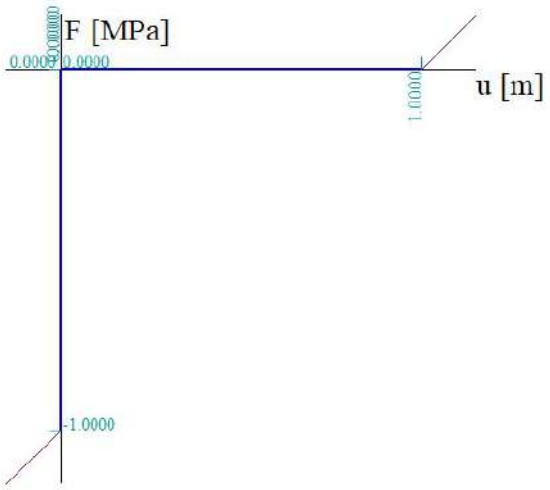
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

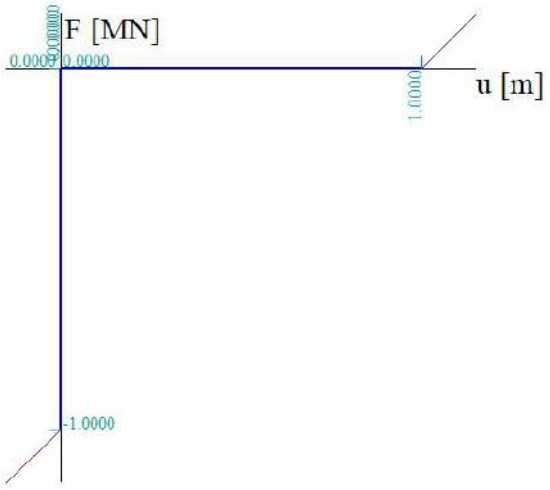
Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing



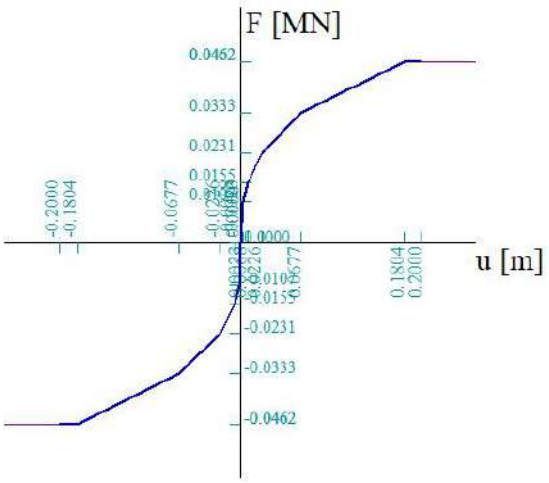
Name	Type	u / F	Positive end	Negative end
press only	Translation	-0.000001 / -1000000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 0.000000		

Drawing



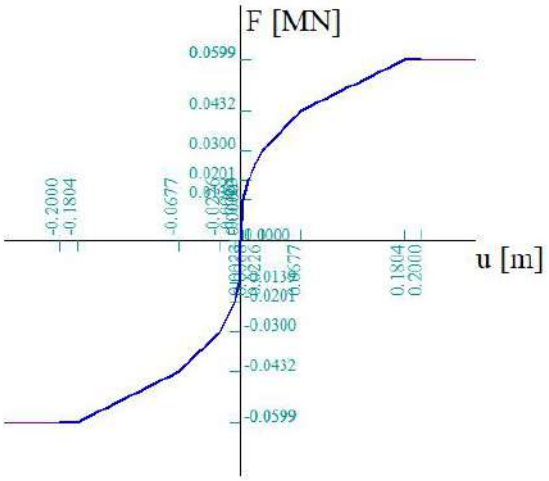
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -46203.840000	Free	Free
		-0.180400 / -46203.840000		
		-0.067650 / -33318.734193		
		-0.022550 / -23101.920000		
		-0.006765 / -15465.186458		
		-0.002255 / -10722.961391		
		0.000000 / 0.000000		
		0.002255 / 10722.961391		
		0.006765 / 15465.186458		
		0.022550 / 23101.920000		
		0.067650 / 33318.734193		
		0.180400 / 46203.840000		
		0.200000 / 46203.840000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -59935.680000	Free	Free
		-0.180400 / -59935.680000		
		-0.067650 / -43221.104363		
		-0.022550 / -29967.840000		
		-0.006765 / -20061.459539		
		-0.002255 / -13909.839151		
		0.000000 / 0.000000		
		0.002255 / 13909.839151		
		0.006765 / 20061.459539		
		0.022550 / 29967.840000		
		0.067650 / 43221.104363		
		0.180400 / 59935.680000		
		0.200000 / 59935.680000		

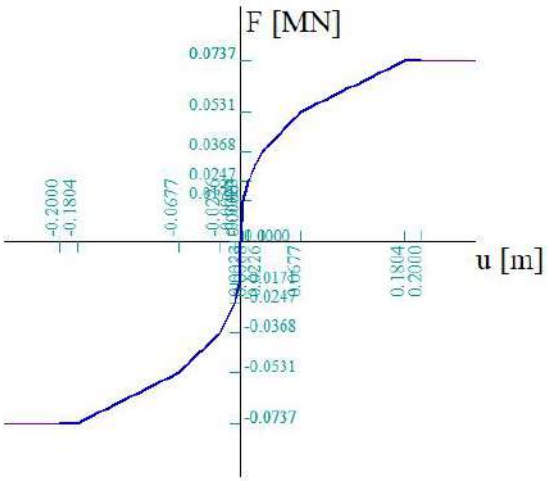
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -73667.520000	Free	Free
		-0.180400 / -73667.520000		
		-0.067650 / -53123.474533		
		-0.022550 / -36833.760000		
		-0.006765 / -24657.732619		
		-0.002255 / -17096.716912		
		0.000000 / 0.000000		
		0.002255 / 17096.716912		

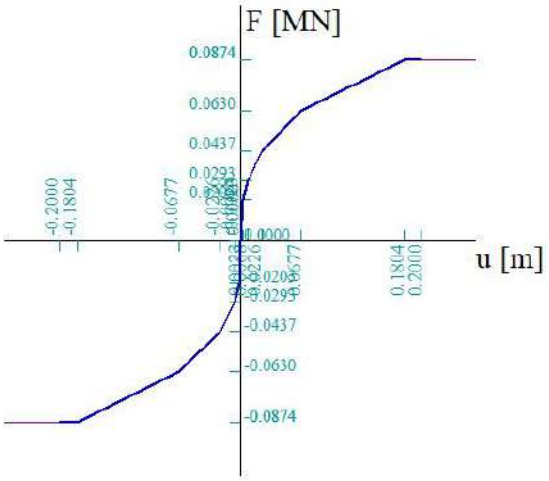
Name	Type	u / F	Positive end	Negative end
		0.006765 / 24657.732619		
		0.022550 / 36833.760000		
		0.067650 / 53123.474533		
		0.180400 / 73667.520000		
		0.200000 / 73667.520000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -87399.360000	Free	Free
		-0.180400 / -87399.360000		
		-0.067650 / -63025.844703		
		-0.022550 / -43699.680000		
		-0.006765 / -29254.005700		
		-0.002255 / -20283.594672		
		0.000000 / 0.000000		
		0.002255 / 20283.594672		
		0.006765 / 29254.005700		
		0.022550 / 43699.680000		
		0.067650 / 63025.844703		
		0.180400 / 87399.360000		
		0.200000 / 87399.360000		

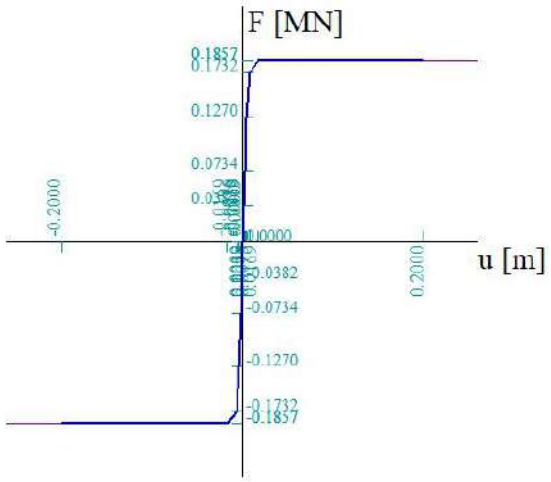
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -185749.581577	Free	Free
		-0.016913 / -185749.581577		

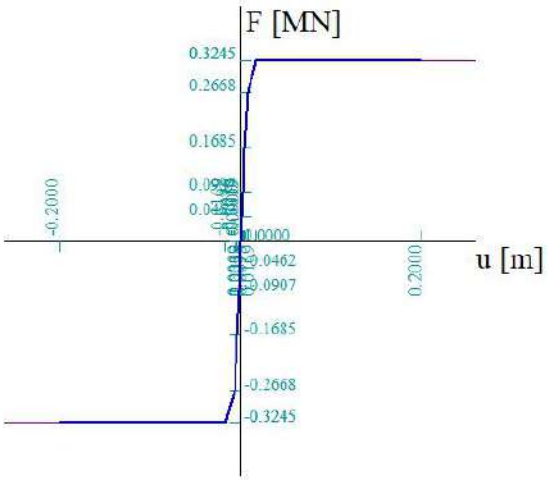
Name	Type	u / F	Positive end	Negative end
		-0.007517 / -173191.521652		
		-0.003758 / -126966.550767		
		-0.001879 / -73364.887728		
		-0.000940 / -38233.153457		
		0.000000 / 0.000000		
		0.000940 / 38233.153457		
		0.001879 / 73364.887728		
		0.003758 / 126966.550767		
		0.007517 / 173191.521652		
		0.016913 / 185749.581577		
		0.200000 / 185749.581577		

Drawing



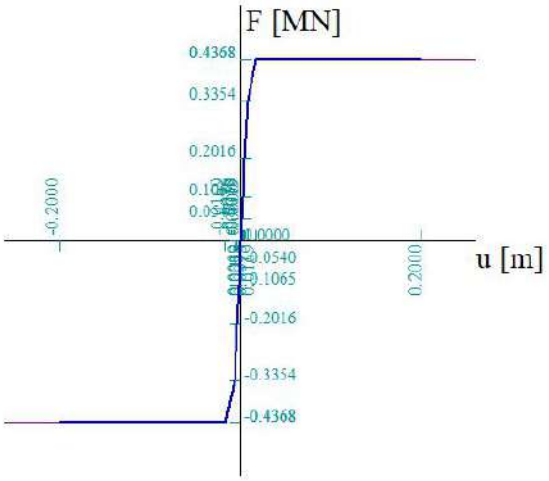
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -324503.959510	Free	Free
		-0.016913 / -324503.959510		
		-0.007517 / -266801.170128		
		-0.003758 / -168504.997582		
		-0.001879 / -90672.108471		
		-0.000940 / -46234.204284		
		0.000000 / 0.000000		
		0.000940 / 46234.204284		
		0.001879 / 90672.108471		
		0.003758 / 168504.997582		
		0.007517 / 266801.170128		
		0.016913 / 324503.959510		
		0.200000 / 324503.959510		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -436765.819801	Free	Free
		-0.016913 / -436765.819801		
		-0.007517 / -335362.730832		
		-0.003758 / -201646.948699		
		-0.001879 / -106522.716227		
		-0.000940 / -54036.089272		
		0.000000 / 0.000000		
		0.000940 / 54036.089272		
		0.001879 / 106522.716227		
		0.003758 / 201646.948699		
		0.007517 / 335362.730832		
		0.016913 / 436765.819801		
		0.200000 / 436765.819801		

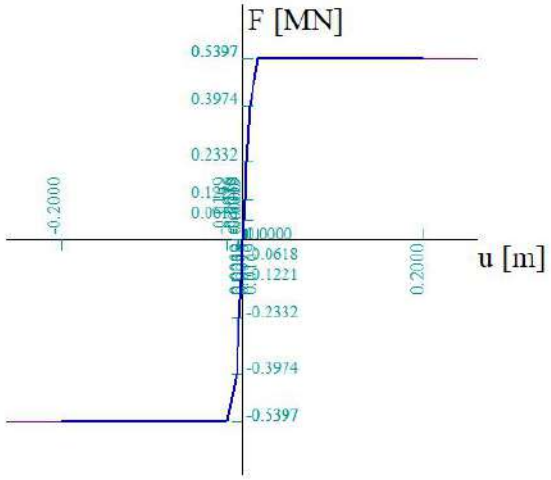
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -539683.678038	Free	Free
		-0.016913 / -539683.678038		
		-0.007517 / -397433.011814		
		-0.003758 / -233158.398644		
		-0.001879 / -122122.429030		
		-0.000940 / -61804.852432		
		0.000000 / 0.000000		
		0.000940 / 61804.852432		
		0.001879 / 122122.429030		
		0.003758 / 233158.398644		

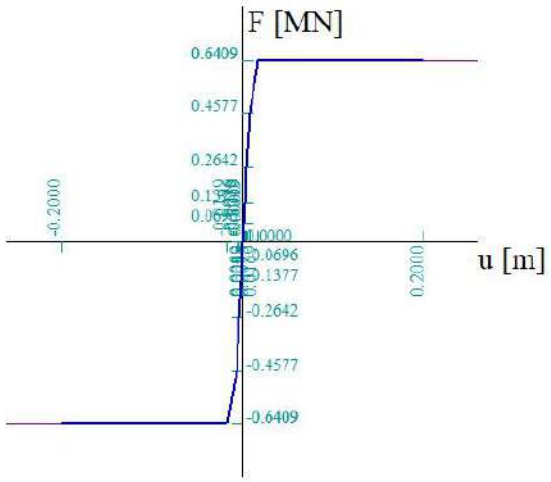
Name	Type	u / F	Positive end	Negative end
		0.007517 / 397433.011814		
		0.016913 / 539683.678038		
		0.200000 / 539683.678038		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -640861.931437	Free	Free
		-0.016913 / -640861.931437		
		-0.007517 / -457700.088592		
		-0.003758 / -264224.038576		
		-0.001879 / -137654.602914		
		-0.000940 / -69564.742931		
		0.000000 / 0.000000		
		0.000940 / 69564.742931		
		0.001879 / 137654.602914		
		0.003758 / 264224.038576		
		0.007517 / 457700.088592		
		0.016913 / 640861.931437		
		0.200000 / 640861.931437		

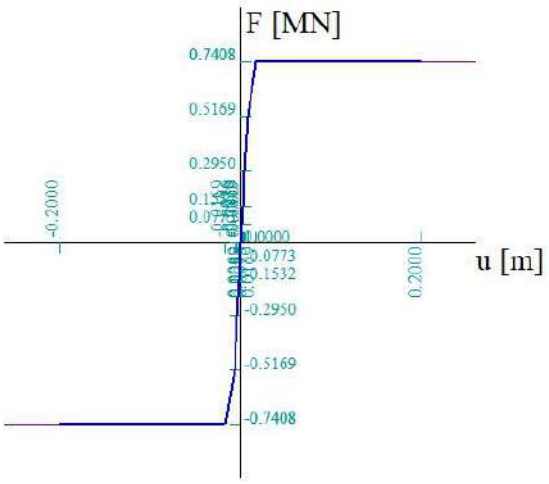
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -740774.043969	Free	Free
		-0.016913 / -740774.043969		
		-0.007517 / -516894.797403		
		-0.003758 / -295043.983610		

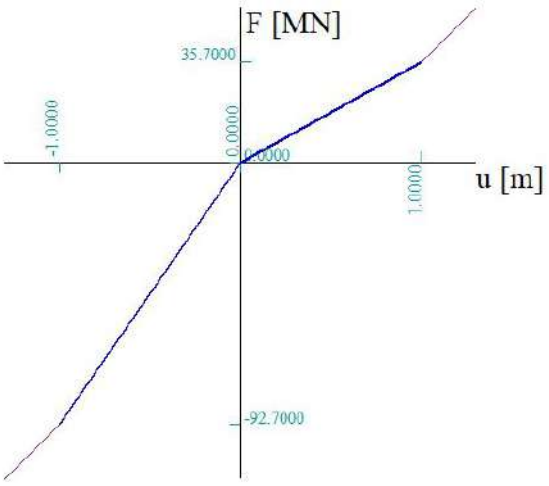
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -153150.432455		
		-0.000940 / -77319.889121		
		0.000000 / 0.000000		
		0.000940 / 77319.889121		
		0.001879 / 153150.432455		
		0.003758 / 295043.983610		
		0.007517 / 516894.797403		
		0.016913 / 740774.043969		
		0.200000 / 740774.043969		

Drawing



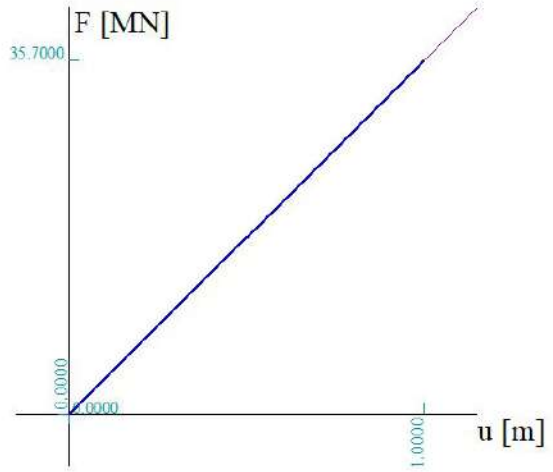
Name	Type	u / F	Positive end	Negative end
S+0 lower bound	Translation	-1.000000 / -92700000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 35700000.000000		

Drawing



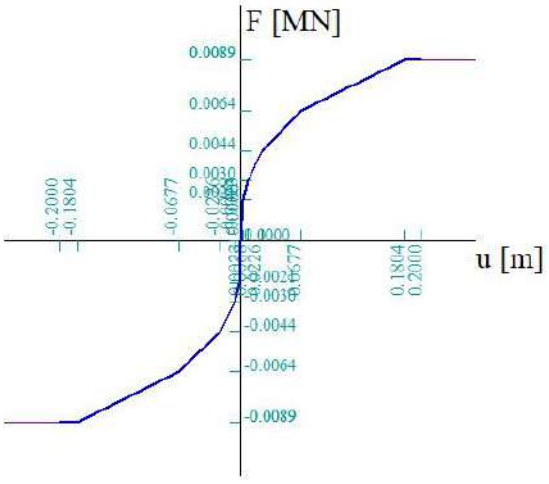
Name	Type	u / F	Positive end	Negative end
S+0 lower bound Trek	Translation	0.000000 / 0.000000	Flexible	Free
		1.000000 / 35700000.000000		

Drawing



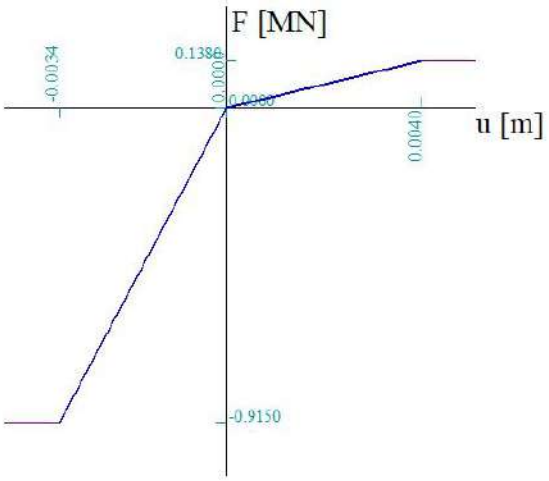
Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -8894.400000	Free	Free
		-0.180400 / -8894.400000		
		-0.067650 / -6413.760000		
		-0.022550 / -4447.680000		
		-0.006765 / -2976.960000		
		-0.002255 / -2064.000000		
		0.000000 / 0.000000		
		0.002255 / 2064.000000		
		0.006765 / 2976.960000		
		0.022550 / 4447.680000		
		0.067650 / 6413.760000		
		0.180400 / 8894.400000		
		0.200000 / 8894.400000		

Drawing



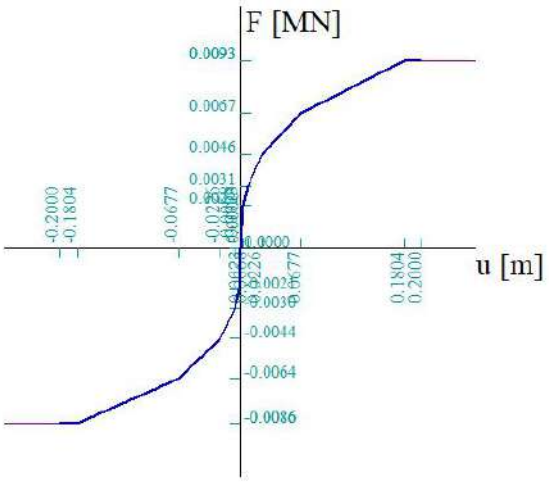
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+paalpunt	Translation	-0.003430 / -915000.000000	Free	Free
		0.000000 / 0.000000		
		0.004020 / 138000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen1 reduced	Translation	-0.200000 / -8640.000000	Free	Free
		-0.180400 / -8640.000000		
		-0.067650 / -6432.000000		
		-0.022550 / -4444.800000		
		-0.006765 / -2976.000000		
		-0.002255 / -2064.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing

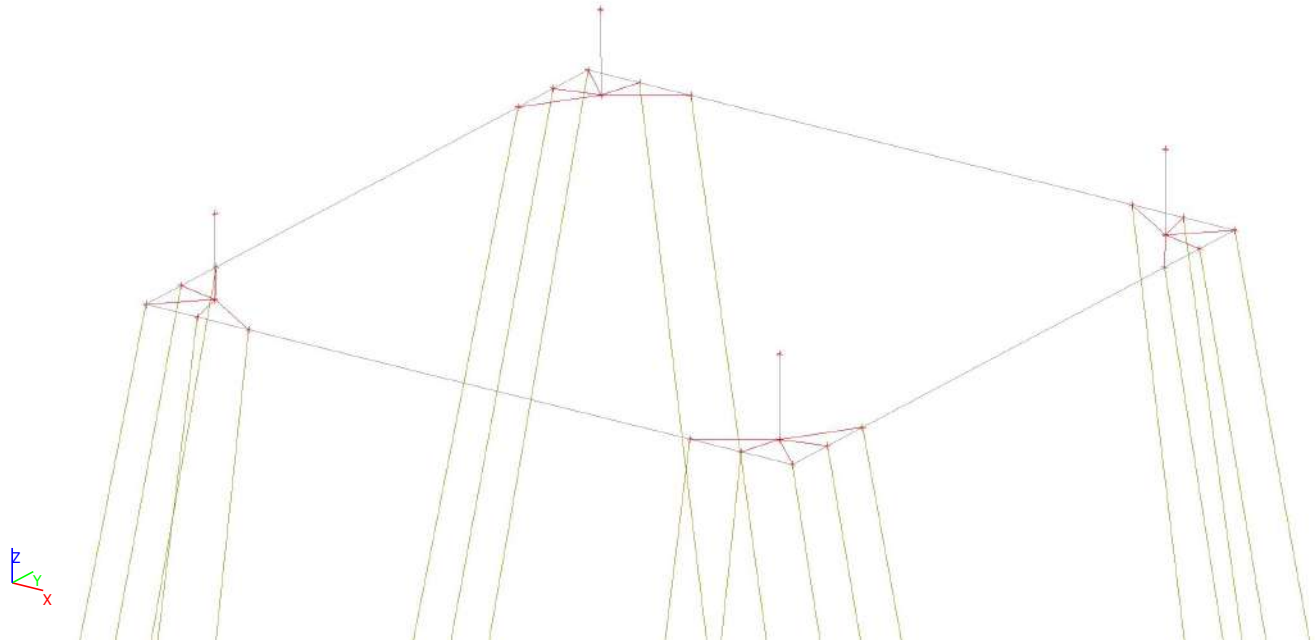


6. Belastingen

6.1. Load cases

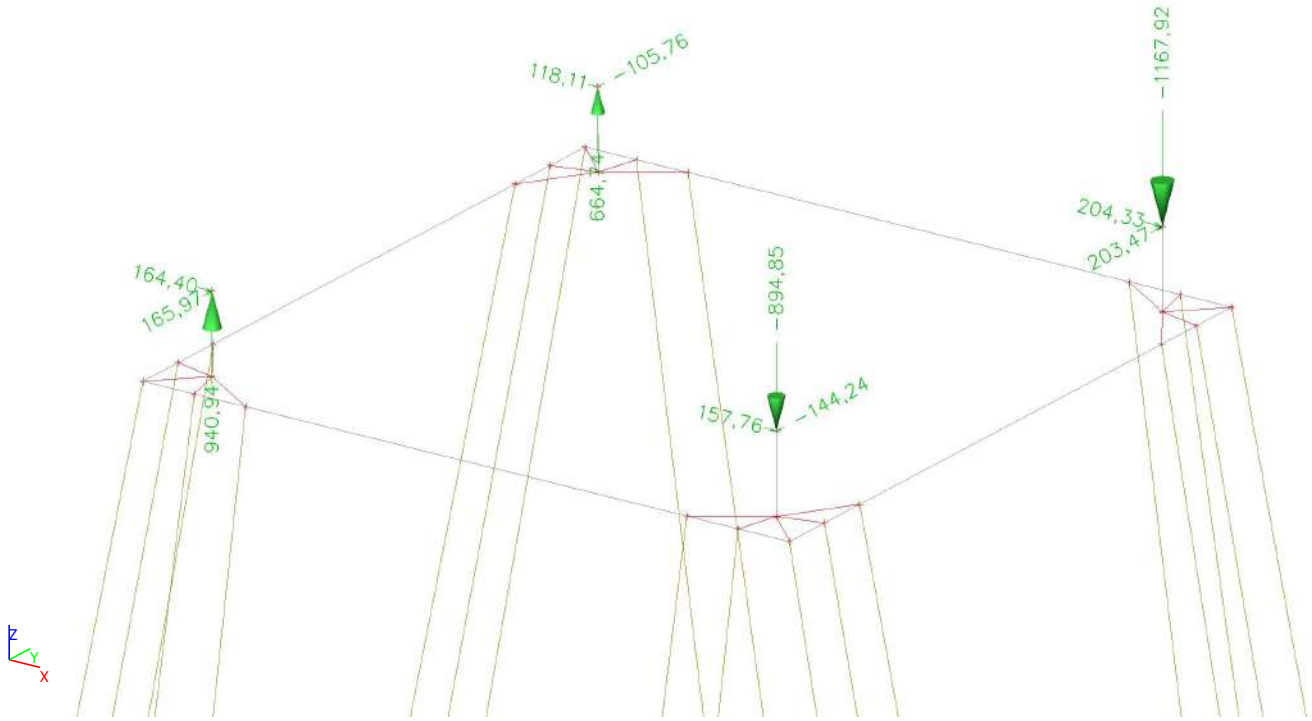
6.1.1. Load cases - E.G.

Name	Description	Action type	Load group	Direction
	Spec	Load type		
E.G.		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - hL Bck + Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			

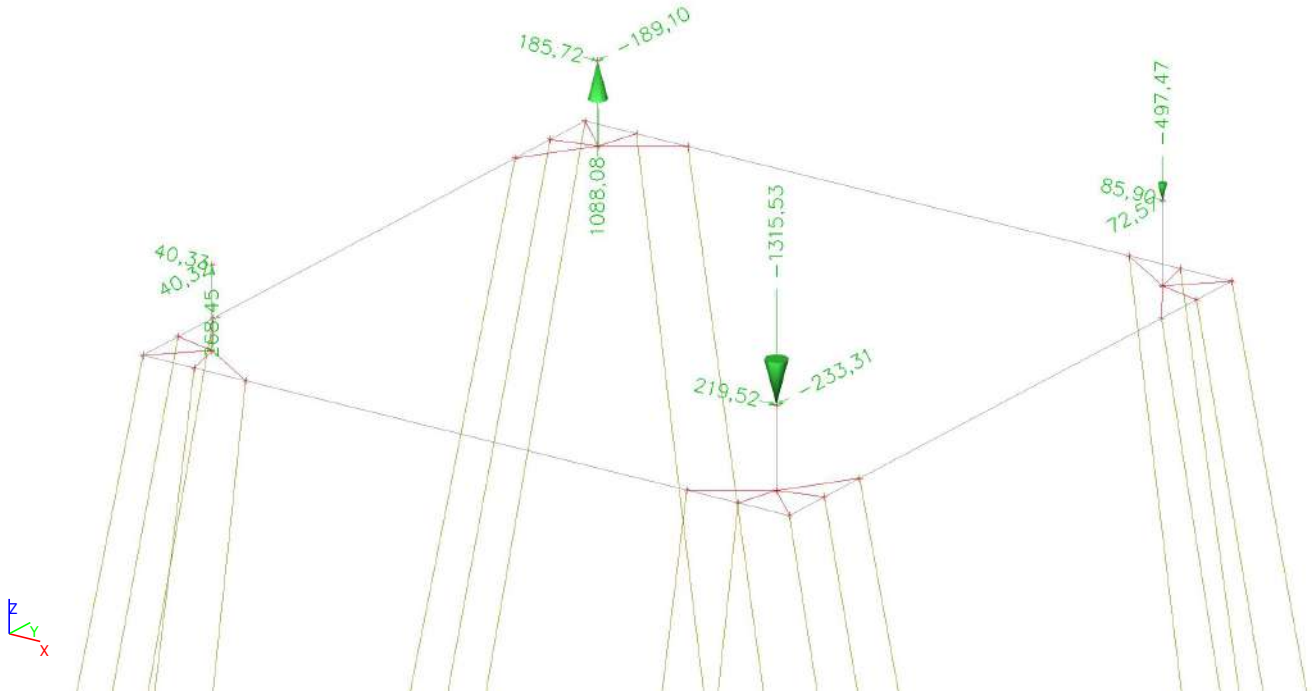


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;135°_1P_X	1P	hL Bck + Wnd ;135°	GCS	X	Force	164,40
hL Bck + Wnd ;135°_1P_Y	1P	hL Bck + Wnd ;135°	GCS	Y	Force	165,97
hL Bck + Wnd ;135°_1P_Z	1P	hL Bck + Wnd ;135°	GCS	Z	Force	940,94
hL Bck + Wnd ;135°_1X_X	1X	hL Bck + Wnd ;135°	GCS	X	Force	118,11
hL Bck + Wnd ;135°_1X_Y	1X	hL Bck + Wnd ;135°	GCS	Y	Force	-105,76
hL Bck + Wnd ;135°_1X_Z	1X	hL Bck + Wnd ;135°	GCS	Z	Force	664,74
hL Bck + Wnd ;135°_1XY_X	1XY	hL Bck + Wnd ;135°	GCS	X	Force	204,33
hL Bck + Wnd ;135°_1XY_Y	1XY	hL Bck + Wnd ;135°	GCS	Y	Force	203,47
hL Bck + Wnd ;135°_1XY_Z	1XY	hL Bck + Wnd ;135°	GCS	Z	Force	-1167,92
hL Bck + Wnd ;135°_1Y_X	1Y	hL Bck + Wnd ;135°	GCS	X	Force	157,76
hL Bck + Wnd ;135°_1Y_Y	1Y	hL Bck + Wnd ;135°	GCS	Y	Force	-144,24
hL Bck + Wnd ;135°_1Y_Z	1Y	hL Bck + Wnd ;135°	GCS	Z	Force	-894,85

6.1.3. Load cases - hL Bck + Wnd ;270°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;270°		Variable	LG4	Short	None
	Standard	Static			



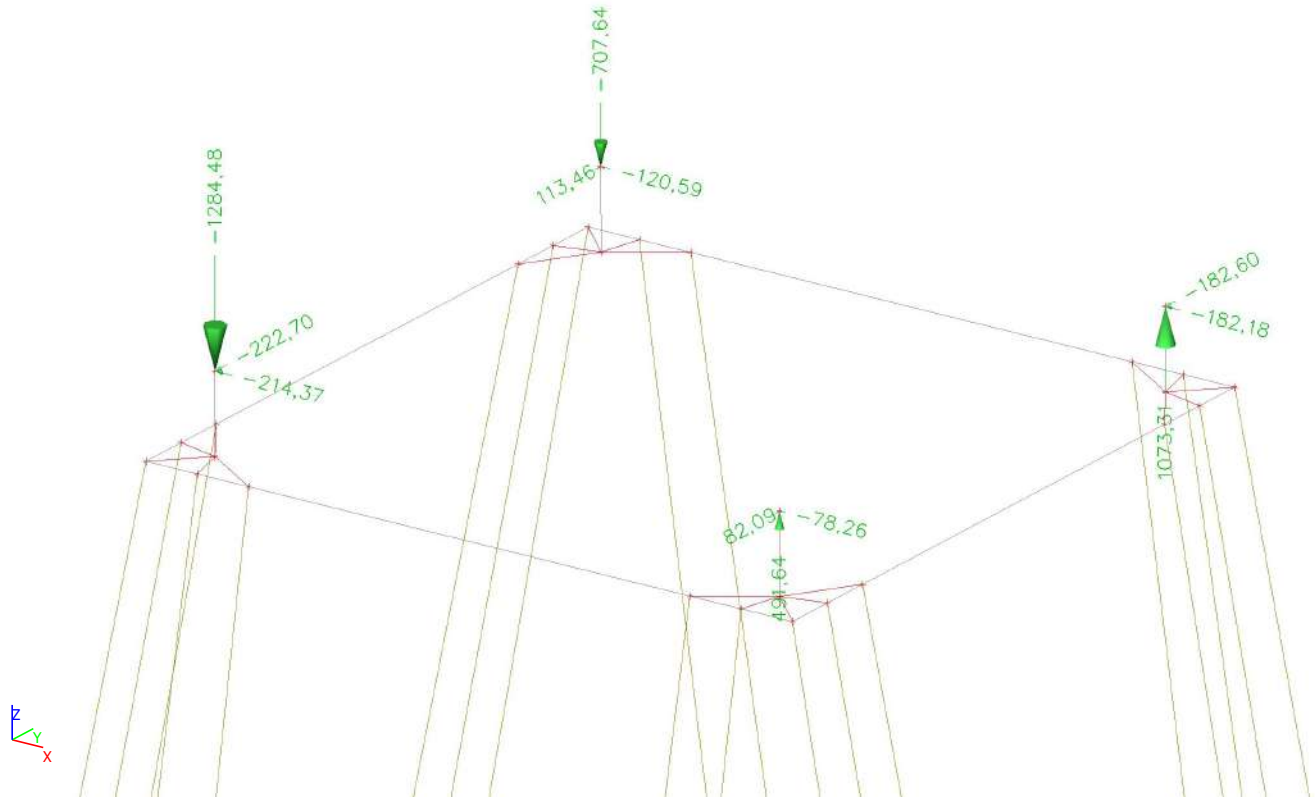
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;270°_1P_X	1P	hL Bck + Wnd ;270°	GCS	X	Force	40,33
hL Bck + Wnd ;270°_1P_Y	1P	hL Bck + Wnd ;270°	GCS	Y	Force	40,32
hL Bck + Wnd ;270°_1P_Z	1P	hL Bck + Wnd ;270°	GCS	Z	Force	268,45
hL Bck + Wnd ;270°_1X_X	1X	hL Bck + Wnd ;270°	GCS	X	Force	185,72
hL Bck + Wnd ;270°_1X_Y	1X	hL Bck + Wnd ;270°	GCS	Y	Force	-189,10
hL Bck + Wnd ;270°_1X_Z	1X	hL Bck + Wnd ;270°	GCS	Z	Force	1088,08
hL Bck + Wnd ;270°_1XY_X	1XY	hL Bck + Wnd ;270°	GCS	X	Force	85,90
hL Bck + Wnd ;270°_1XY_Y	1XY	hL Bck + Wnd ;270°	GCS	Y	Force	72,57
hL Bck + Wnd ;270°_1XY_Z	1XY	hL Bck + Wnd ;270°	GCS	Z	Force	-497,47
hL Bck + Wnd ;270°_1Y_X	1Y	hL Bck + Wnd ;270°	GCS	X	Force	219,52
hL Bck + Wnd ;270°_1Y_Y	1Y	hL Bck + Wnd ;270°	GCS	Y	Force	-233,31

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;270°_1Y_Z	1Y	hL Bck + Wnd ;270°	GCS	Z	Force	-1315,53

6.1.4. Load cases - hL Ahd + Wnd ;270°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;270°		Variable	LG4	Short	None
	Standard	Static			



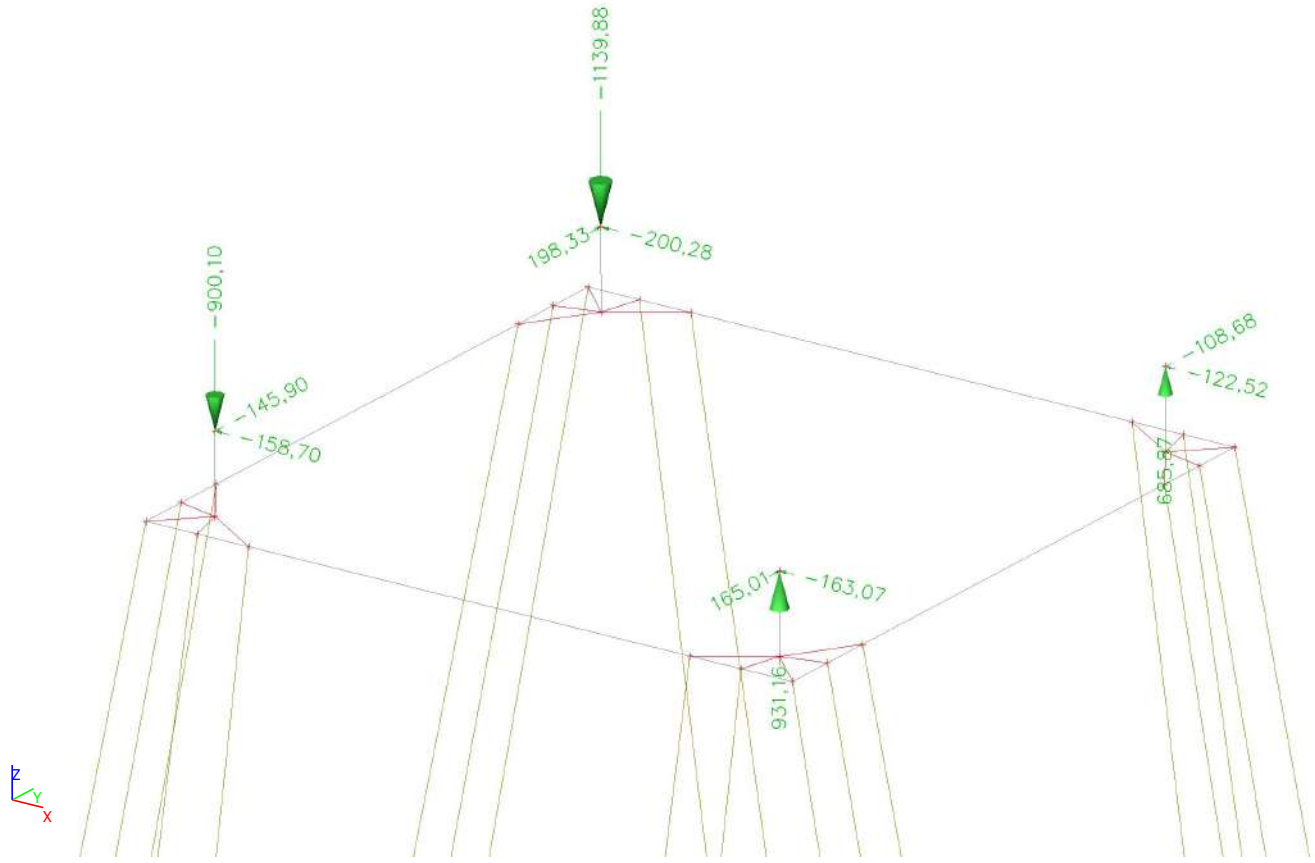
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;270°_1P_X	1P	hL Ahd + Wnd ;270°	GCS	X	Force	-214,37
hL Ahd + Wnd ;270°_1P_Y	1P	hL Ahd + Wnd ;270°	GCS	Y	Force	-222,70
hL Ahd + Wnd ;270°_1P_Z	1P	hL Ahd + Wnd ;270°	GCS	Z	Force	-1284,48
hL Ahd + Wnd ;270°_1X_X	1X	hL Ahd + Wnd ;270°	GCS	X	Force	-120,59
hL Ahd + Wnd ;270°_1X_Y	1X	hL Ahd + Wnd ;270°	GCS	Y	Force	113,46
hL Ahd + Wnd ;270°_1X_Z	1X	hL Ahd + Wnd ;270°	GCS	Z	Force	-707,64
hL Ahd + Wnd ;270°_1XY_X	1XY	hL Ahd + Wnd ;270°	GCS	X	Force	-182,18
hL Ahd + Wnd ;270°_1XY_Y	1XY	hL Ahd + Wnd ;270°	GCS	Y	Force	-182,60

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;270°_1XY_Z	1XY	hL Ahd + Wnd ;270°	GCS	Z	Force	1073,31
hL Ahd + Wnd ;270°_1Y_X	1Y	hL Ahd + Wnd ;270°	GCS	X	Force	-78,26
hL Ahd + Wnd ;270°_1Y_Y	1Y	hL Ahd + Wnd ;270°	GCS	Y	Force	82,09
hL Ahd + Wnd ;270°_1Y_Z	1Y	hL Ahd + Wnd ;270°	GCS	Z	Force	491,64

6.1.5. Load cases - hL Ahd + Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;45°_1P_X	1P	hL Ahd + Wnd ;45°	GCS	X	Force	-158,70
hL Ahd + Wnd ;45°_1P_Y	1P	hL Ahd + Wnd ;45°	GCS	Y	Force	-145,90
hL Ahd + Wnd ;45°_1P_Z	1P	hL Ahd + Wnd ;45°	GCS	Z	Force	-900,10
hL Ahd + Wnd ;45°_1X_X	1X	hL Ahd + Wnd ;45°	GCS	X	Force	-200,28
hL Ahd + Wnd ;45°_1X_Y	1X	hL Ahd + Wnd ;45°	GCS	Y	Force	198,33

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;45°_1X_Z	1X	hL Ahd + Wnd ;45°	GCS	Z	Force	-1139,88
hL Ahd + Wnd ;45°_1XY_X	1XY	hL Ahd + Wnd ;45°	GCS	X	Force	-122,52
hL Ahd + Wnd ;45°_1XY_Y	1XY	hL Ahd + Wnd ;45°	GCS	Y	Force	-108,68
hL Ahd + Wnd ;45°_1XY_Z	1XY	hL Ahd + Wnd ;45°	GCS	Z	Force	685,87
hL Ahd + Wnd ;45°_1Y_X	1Y	hL Ahd + Wnd ;45°	GCS	X	Force	-163,07
hL Ahd + Wnd ;45°_1Y_Y	1Y	hL Ahd + Wnd ;45°	GCS	Y	Force	165,01
hL Ahd + Wnd ;45°_1Y_Z	1Y	hL Ahd + Wnd ;45°	GCS	Z	Force	931,16

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
hL Ahd + Wnd ;45°	Ultimate	E.G.	1,20
		hL Ahd + Wnd ;45°	1,00
hL Bck + Wnd ;135°	Ultimate	E.G.	1,20
		hL Bck + Wnd ;135°	1,00
hL Bck + Wnd ;270°	Ultimate	E.G.	1,20
		hL Bck + Wnd ;270°	1,00
hL Ahd + Wnd ;270°	Ultimate	E.G.	1,20
		hL Ahd + Wnd ;270°	1,00
lL Ahd + Wnd ;45°	Ultimate	E.G.	0,90
		hL Ahd + Wnd ;45°	1,00
lL Bck + Wnd ;135°	Ultimate	E.G.	0,90
		hL Bck + Wnd ;135°	1,00
lL Bck + Wnd ;270°	Ultimate	E.G.	0,90
		hL Bck + Wnd ;270°	1,00
lL Ahd + Wnd ;270°	Ultimate	E.G.	0,90
		hL Ahd + Wnd ;270°	1,00

6.3. Result classes

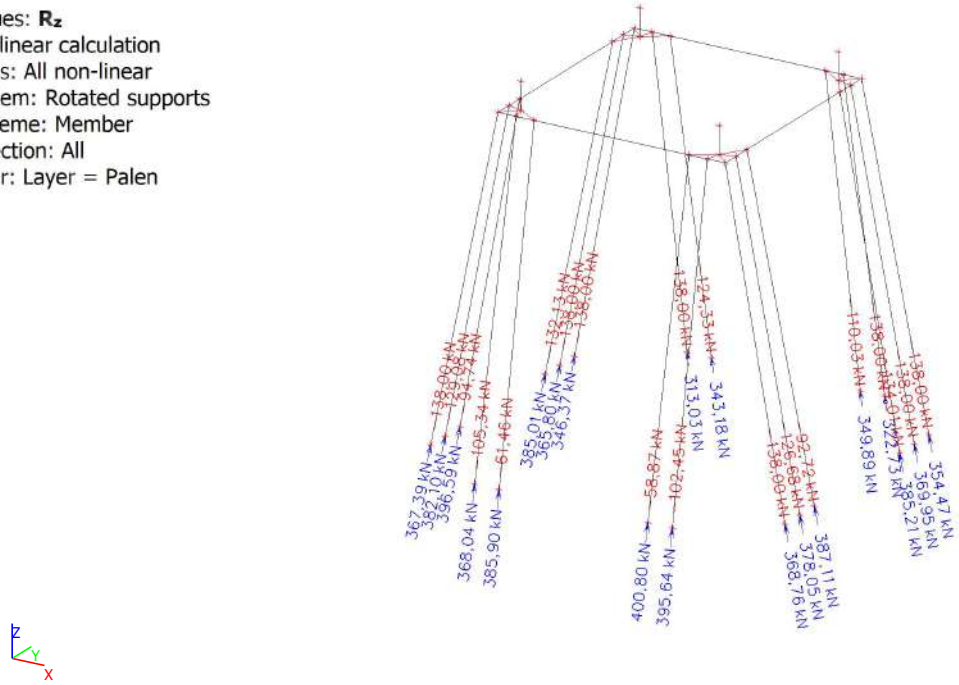
Name	List
All non-linear	hL Ahd + Wnd ;45°
	hL Bck + Wnd ;135°
	hL Bck + Wnd ;270°
	hL Ahd + Wnd ;270°
	lL Ahd + Wnd ;45°
	lL Bck + Wnd ;135°
	lL Bck + Wnd ;270°
	lL Ahd + Wnd ;270°

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn21/N44	lL Bck + Wnd ;135°	0,00	0,00	**-138,00**	0,00	0,00	0,00	0,0	0,0
Sn31/N53	hL Bck + Wnd ;270°	**0,00**	**0,00**	**400,80**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn21/N44	lL Bck + Wnd ;135°	0,00	0,00	**-138,00**	0,00	0,00	0,00	0,0	0,0
Sn21/N44	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**367,39**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn22/N45	lL Bck + Wnd ;135°	0,00	0,00	**-129,08**	0,00	0,00	0,00	0,0	0,0
Sn22/N45	hL Ahd +	**0,00**	**0,00**	**382,10**	**0,00**	**0,00**	**0,00**	0,0	0,0

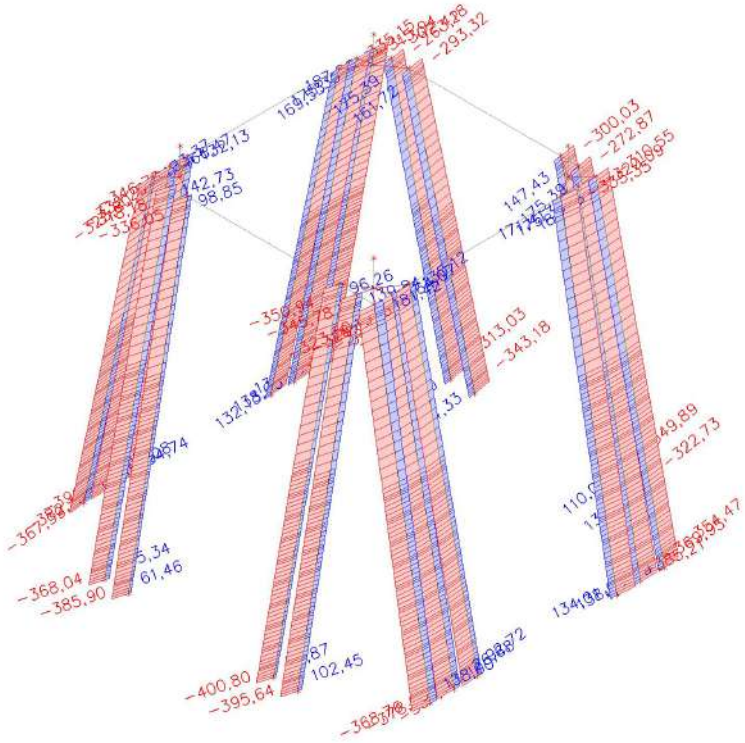
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;270°								
Sn23/N46	lL Bck + Wnd ;135°	0,00	0,00	**-94,74**	0,00	0,00	0,00	0,0	0,0
Sn23/N46	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**396,59**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn24/N47	lL Bck + Wnd ;135°	0,00	0,00	**-105,34**	0,00	0,00	0,00	0,0	0,0
Sn24/N47	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**368,04**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn26/N48	lL Bck + Wnd ;135°	0,00	0,00	**-61,46**	0,00	0,00	0,00	0,0	0,0
Sn26/N48	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**385,90**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn27/N49	lL Ahd + Wnd ;45°	0,00	0,00	**-138,00**	0,00	0,00	0,00	0,0	0,0
Sn27/N49	hL Bck + Wnd ;270°	**0,00**	**0,00**	**368,76**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn28/N50	lL Ahd + Wnd ;45°	0,00	0,00	**-126,68**	0,00	0,00	0,00	0,0	0,0
Sn28/N50	hL Bck + Wnd ;270°	**0,00**	**0,00**	**378,05**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn29/N51	lL Ahd + Wnd ;45°	0,00	0,00	**-92,72**	0,00	0,00	0,00	0,0	0,0
Sn29/N51	hL Bck + Wnd ;270°	**0,00**	**0,00**	**387,11**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn30/N52	lL Ahd + Wnd ;45°	0,00	0,00	**-102,45**	0,00	0,00	0,00	0,0	0,0
Sn30/N52	hL Bck + Wnd ;270°	**0,00**	**0,00**	**395,64**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn31/N53	lL Ahd + Wnd ;45°	0,00	0,00	**-58,87**	0,00	0,00	0,00	0,0	0,0
Sn31/N53	hL Bck + Wnd ;270°	**0,00**	**0,00**	**400,80**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn32/N10	hL Ahd + Wnd ;270°	0,00	0,00	**-138,00**	0,00	0,00	0,00	0,0	0,0
Sn32/N10	hL Bck + Wnd ;135°	**0,00**	**0,00**	**354,47**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn33/N11	lL Ahd + Wnd ;270°	0,00	0,00	**-138,00**	0,00	0,00	0,00	0,0	0,0
Sn33/N11	hL Bck + Wnd ;135°	**0,00**	**0,00**	**369,95**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn34/N12	lL Ahd + Wnd ;270°	0,00	0,00	**-134,01**	0,00	0,00	0,00	0,0	0,0
Sn34/N12	hL Bck + Wnd ;135°	**0,00**	**0,00**	**385,21**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn35/N13	lL Ahd + Wnd ;270°	0,00	0,00	**-138,00**	0,00	0,00	0,00	0,0	0,0
Sn35/N13	hL Bck + Wnd ;135°	**0,00**	**0,00**	**322,73**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn36/N14	lL Ahd + Wnd ;270°	0,00	0,00	**-110,03**	0,00	0,00	0,00	0,0	0,0
Sn36/N14	hL Bck + Wnd ;135°	**0,00**	**0,00**	**349,89**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	lL Bck + Wnd ;270°	**0,00**	**0,00**	**-138,00**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	hL Ahd + Wnd ;45°	0,00	0,00	**313,03**	0,00	0,00	**0,00**	0,0	0,0
Sn38/N2	lL Bck + Wnd ;270°	**0,00**	**0,00**	**-124,33**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn38/N2	hL Ahd + Wnd ;45°	0,00	0,00	**343,18**	0,00	0,00	**0,00**	0,0	0,0
Sn39/N3	hL Bck + Wnd ;270°	**0,00**	**0,00**	**-138,00**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn39/N3	hL Ahd + Wnd ;45°	0,00	0,00	**346,37**	0,00	0,00	**0,00**	0,0	0,0
Sn40/N4	lL Bck +	**0,00**	**0,00**	**-138,00**	**0,00**	**0,00**	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;270°								
Sn40/N4	hL Ahd + Wnd ;45°	0,00	0,00	**365,80**	0,00	0,00	**0,00**	0,0	0,0
Sn41/N54	lL Bck + Wnd ;270°	**0,00**	**0,00**	**-132,13**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn41/N54	hL Ahd + Wnd ;45°	0,00	0,00	**385,01**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

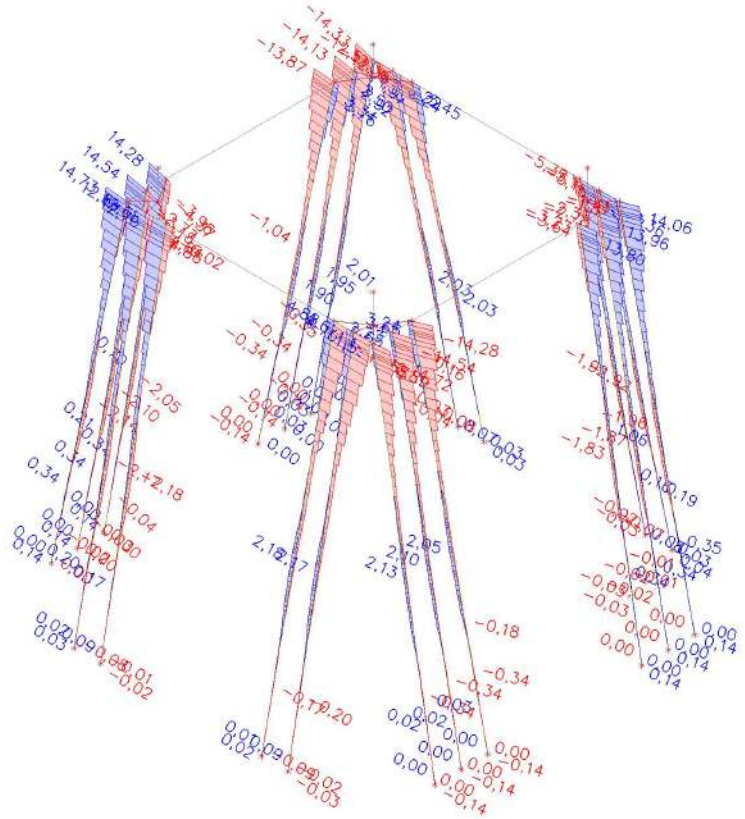
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



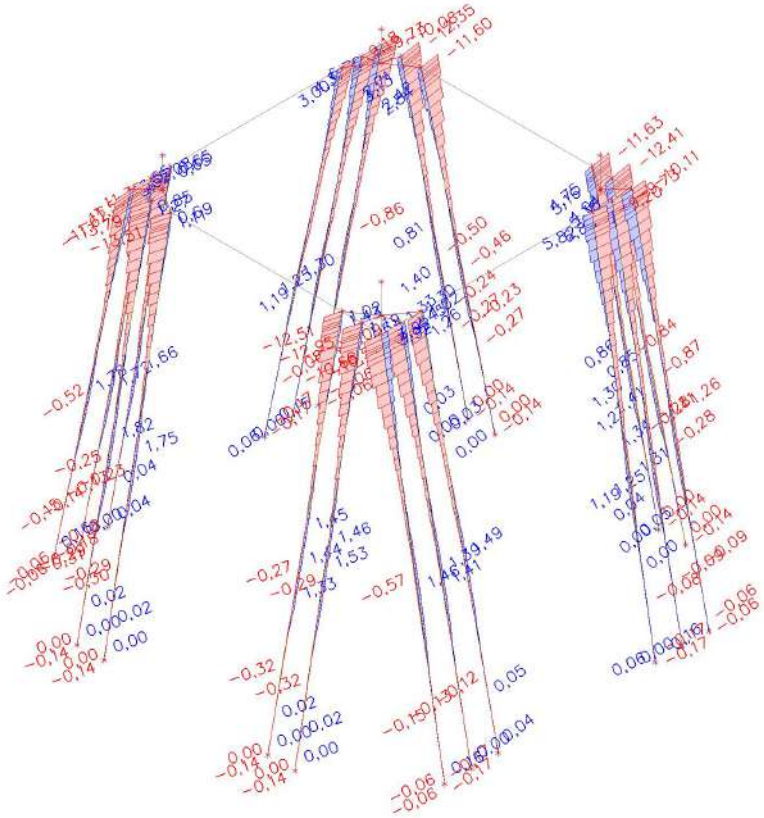
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



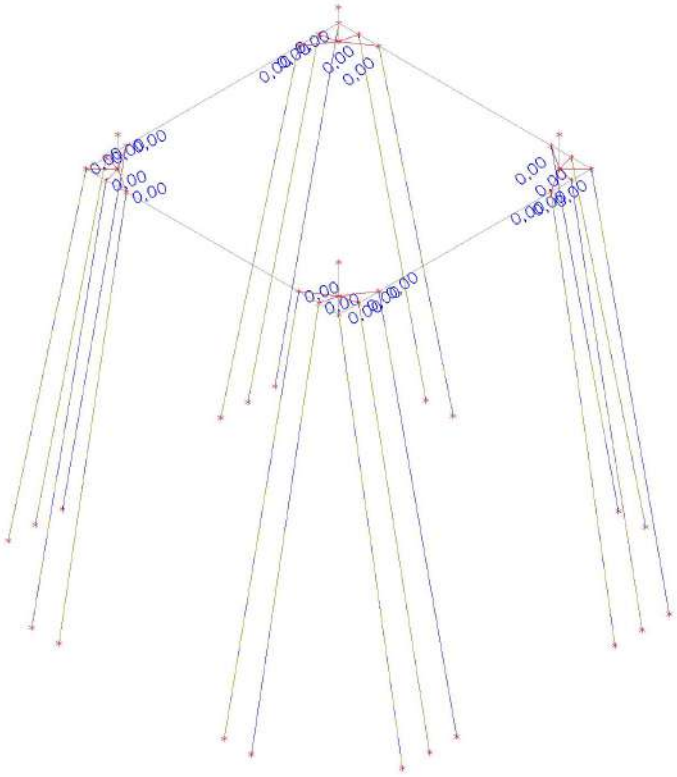
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



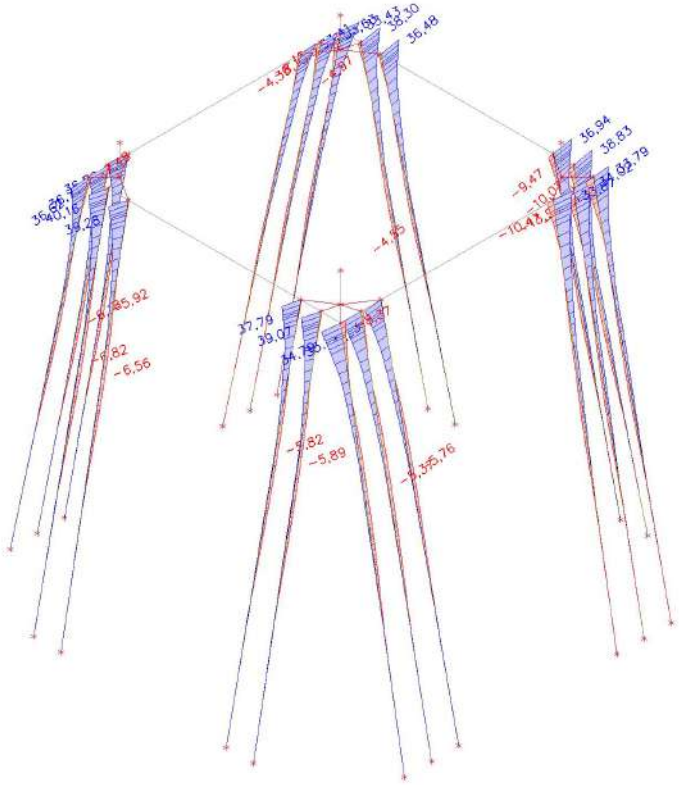
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



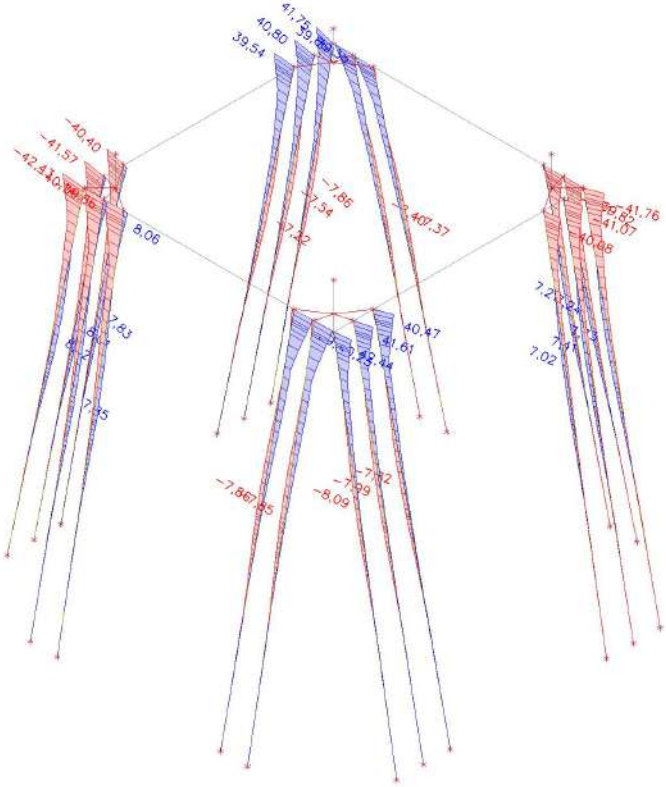
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_P_11	17,997	hL Bck + Wnd ;270°	**-400,80**	-0,09	0,00	0,00	0,00	0,00
Paal_P_12	0,000	hL Ahd + Wnd ;270°	**187,86**	4,58	-3,25	**0,00**	21,77	-28,44
Paal_P_7	0,000	hL Bck + Wnd ;135°	-241,83	**-14,72**	3,13	0,00	-5,02	**42,44**
Paal_P_4	0,000	hL Bck + Wnd ;270°	-53,93	-3,83	**-13,79**	0,00	**40,16**	4,11
Paal_P_12	1,000-	lL Bck + Wnd ;270°	-151,71	12,54	**7,87**	0,00	-9,44	-24,80
Paal_P_12	0,000	lL Bck + Wnd ;270°	-149,63	12,96	7,87	0,00	**-17,31**	-37,55
Paal_P_3	0,000	hL Ahd + Wnd ;45°	-242,90	**14,73**	2,76	0,00	-4,16	**-42,43**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

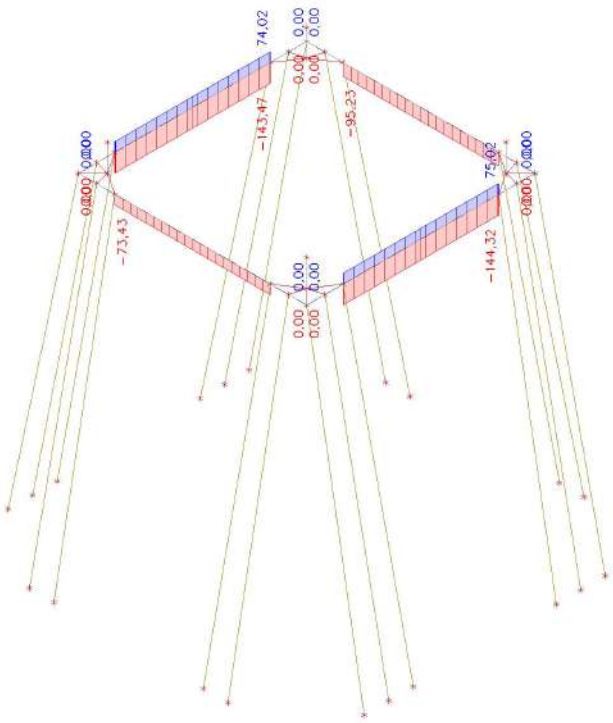
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer 8	1,475	hL Bck + Wnd ;270°	**1089,70**	258,25	4,40	-0,05	0,00	13,08
Poer 5	0,000	hL Bck + Wnd ;270°	**-1343,44**	**320,20**	**-9,75**	-1,05	**14,38**	-329,03
Poer 8	1,475	hL Bck + Wnd ;135°	665,65	154,15	**12,88**	-0,15	0,00	7,99
Poer 6	0,000	hL Ahd + Wnd ;45°	661,07	-163,48	9,79	**1,06**	-14,43	168,17
Poer 8	0,000	lL Bck + Wnd ;135°	647,05	154,27	12,77	**-1,39**	**-18,92**	-156,41
Poer 5	0,000	lL Bck + Wnd ;270°	-1336,46	320,20	-9,75	-1,05	14,38	**-329,32**
Poer 7	0,000	lL Ahd + Wnd ;270°	-1305,41	**-309,06**	-5,89	0,64	8,69	**316,24**

7.4. Krachten van de Funderingsbalken

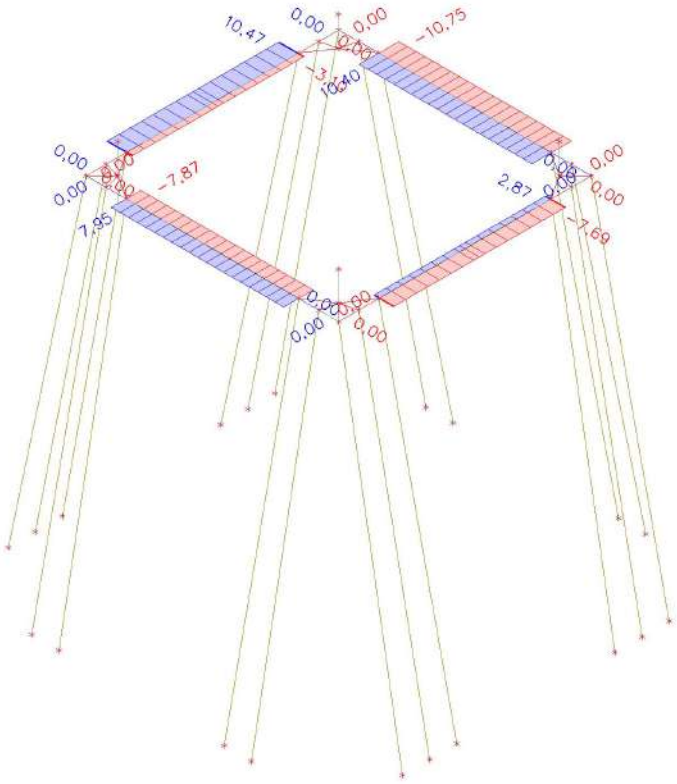
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



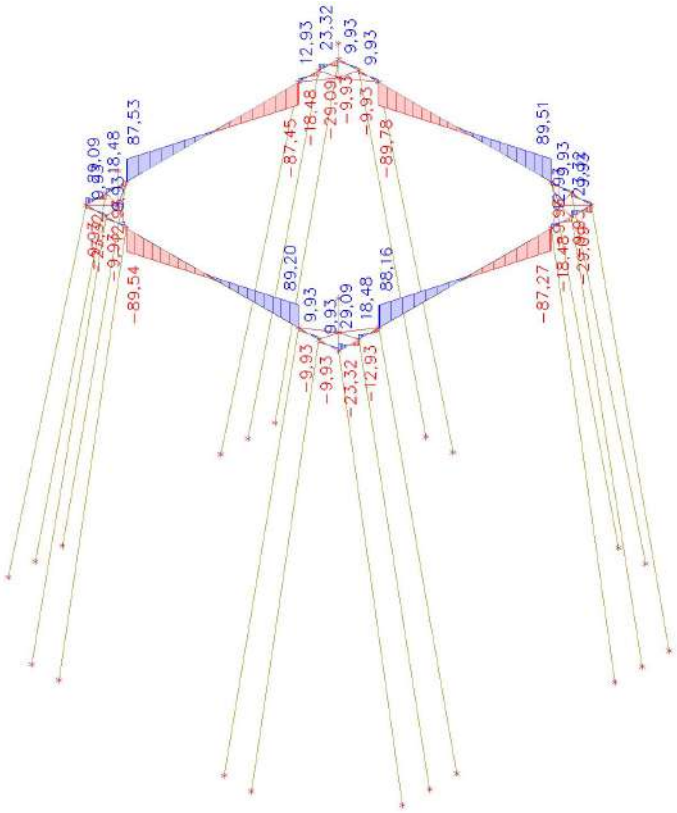
7.4.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



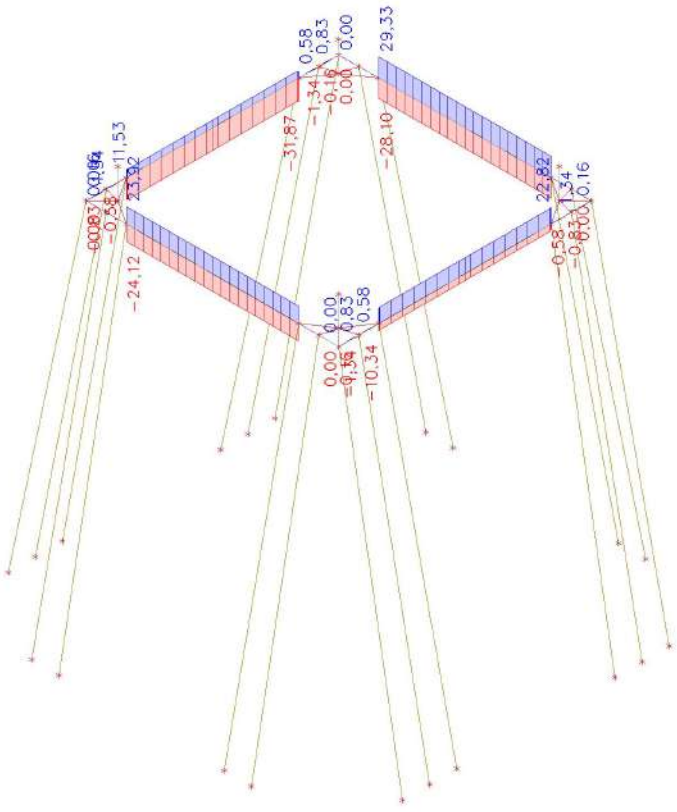
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



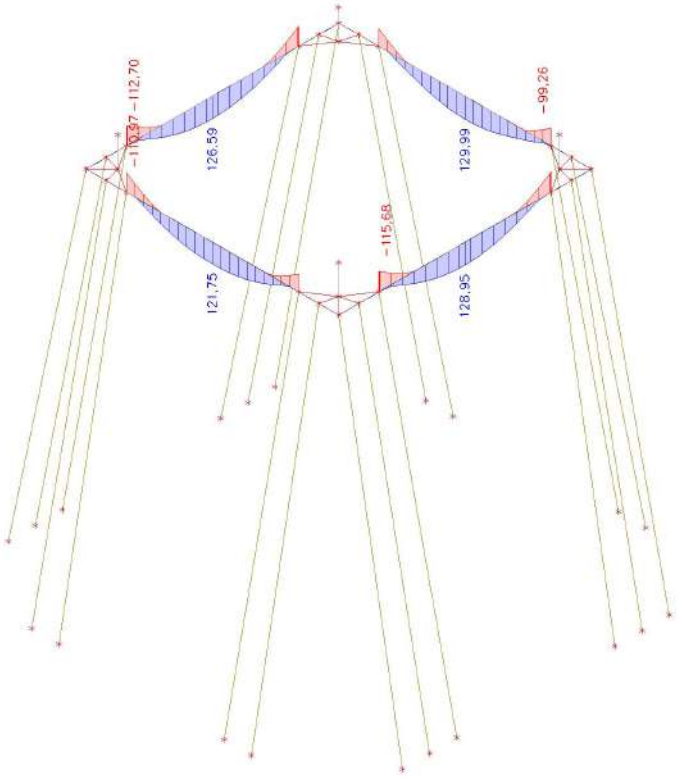
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



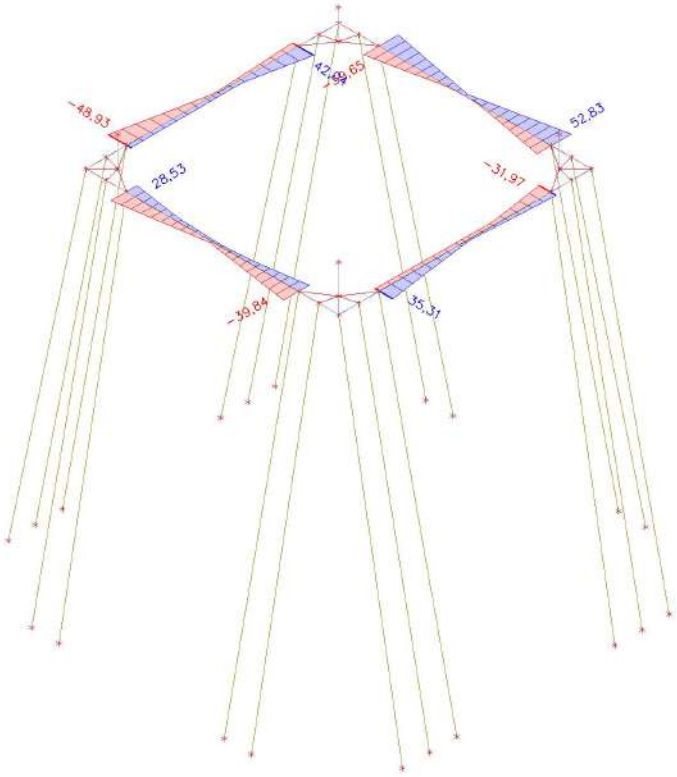
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: Named selection - FunderingsBalken
Filter: Layer = Balken

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Balk 5	2,000+	hL Ahd + Wnd ;45°	**-144,32**	2,87	83,62	-10,34	-48,30	-11,69
Balk 5	2,000+	lL Bck + Wnd ;135°	**75,02**	0,43	62,34	-5,78	-78,69	-10,40
Balk 4	2,000+	lL Bck + Wnd ;270°	-86,97	**-10,75**	60,84	**29,33**	-13,36	**52,83**
Balk 4	10,600-	hL Ahd + Wnd ;45°	-48,78	5,14	**-89,78**	-18,65	-98,35	23,49
Balk 4	2,000+	hL Bck + Wnd ;135°	-46,12	-5,17	**89,51**	18,59	-99,26	23,41
Balk 6	10,550+	lL Bck + Wnd ;270°	-120,46	**10,47**	-63,55	**-31,87**	-29,45	41,52
Balk 5	2,000+	hL Bck + Wnd ;270°	45,47	-2,35	88,16	13,73	**-115,68**	4,82
Balk 4	6,300	hL Bck + Wnd ;270°	-95,23	-9,18	-1,03	24,85	**129,99**	6,06
Balk 6	2,050+	lL Bck + Wnd ;270°	-120,46	10,47	63,09	-31,12	-27,51	**-48,93**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-DIM 380kV
Part	Balkrooster 5xBeton40x40 mast 60
Author	[redacted]
Date	6-05-2026
Structure	General XYZ
No. of nodes :	52
No. of beams :	28
No. of slabs :	0
No. of solids :	0
No. of used profiles :	3
No. of load cases :	5
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,810
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materials

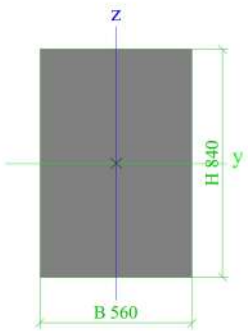
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C20/25 Ongescheurd	Concrete	1500,0	2600,0	2,4000e+04	0.2	0,00	20,00	
C20/25 Gescheurd	Concrete	2500,0	2600,0	8,0000e+03	0.2	0,00	20,00	

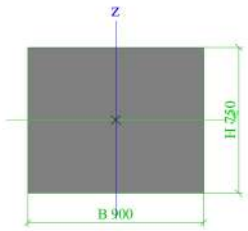
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

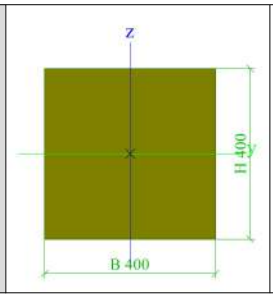
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 500B	Reinforcement steel	7850,0	2,0000e+05	8,3333e+04	0,00	500,0

4.2. Cross-sections

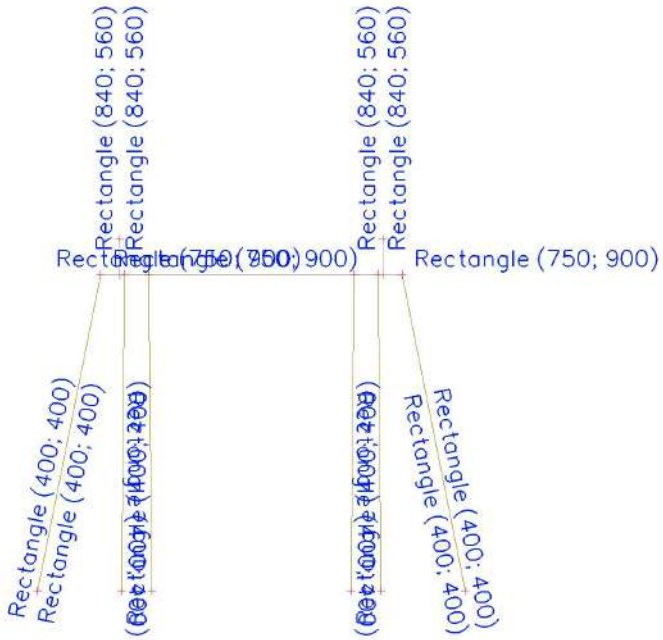
Poer.Opstort		
Type	Rectangle	
Detailed	840; 560	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	4,7040e-01	
A_y [m²], A_z [m²]	3,9200e-01	3,9200e-01
A_L [m²/m], A_D [m²/m]	2,8000e+00	2,8000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	280	420
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,7660e-02	1,2293e-02
i_y [mm], i_z [mm]	242	162
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	6,5856e-02	4,3904e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	2,8888e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

Balk		
Type	Rectangle	
Detailed	750; 900	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	6,7500e-01	
A_y [m²], A_z [m²]	5,6250e-01	5,6250e-01
A_L [m²/m], A_D [m²/m]	3,3000e+00	3,3000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450	375
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	3,1641e-02	4,5563e-02
i_y [mm], i_z [mm]	217	260
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	8,4375e-02	1,0125e-01
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	6,3112e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

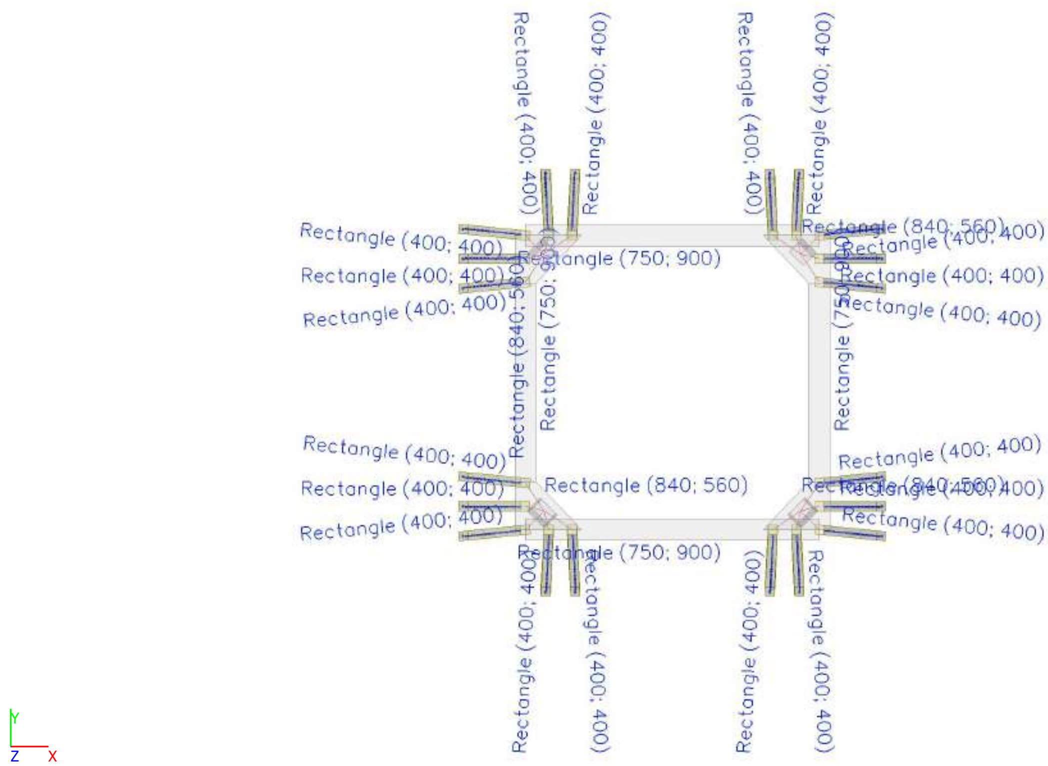
Funderingspaal		
Type	Rectangle	
Detailed	400; 400	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [m²]	1,6000e-01	
A_y [m²], A_z [m²]	1,3333e-01	1,3333e-01
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200	200
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,1333e-03	2,1333e-03
i_y [mm], i_z [mm]	115	115
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	1,0667e-02	1,0667e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	3,6027e-03	0,0000e+00
β_y [mm], β_z [mm]	0	0

Picture		
		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	NetInstelling1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	5
Average size of 2D mesh element [m]	0,250
Average size of 1D mesh element on curved 1D members [m]	0,200
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N5	13,000	1,400	0,000
N6	13,000	2,400	0,000
N7	12,000	0,400	0,000
N1	11,000	0,400	0,000
N17	0,400	0,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N21	0,400	13,000	0,000
1Y	12,200	1,200	1,475
N22	12,200	1,200	0,000
N23	12,200	12,200	0,000
1XY	12,200	12,200	1,475

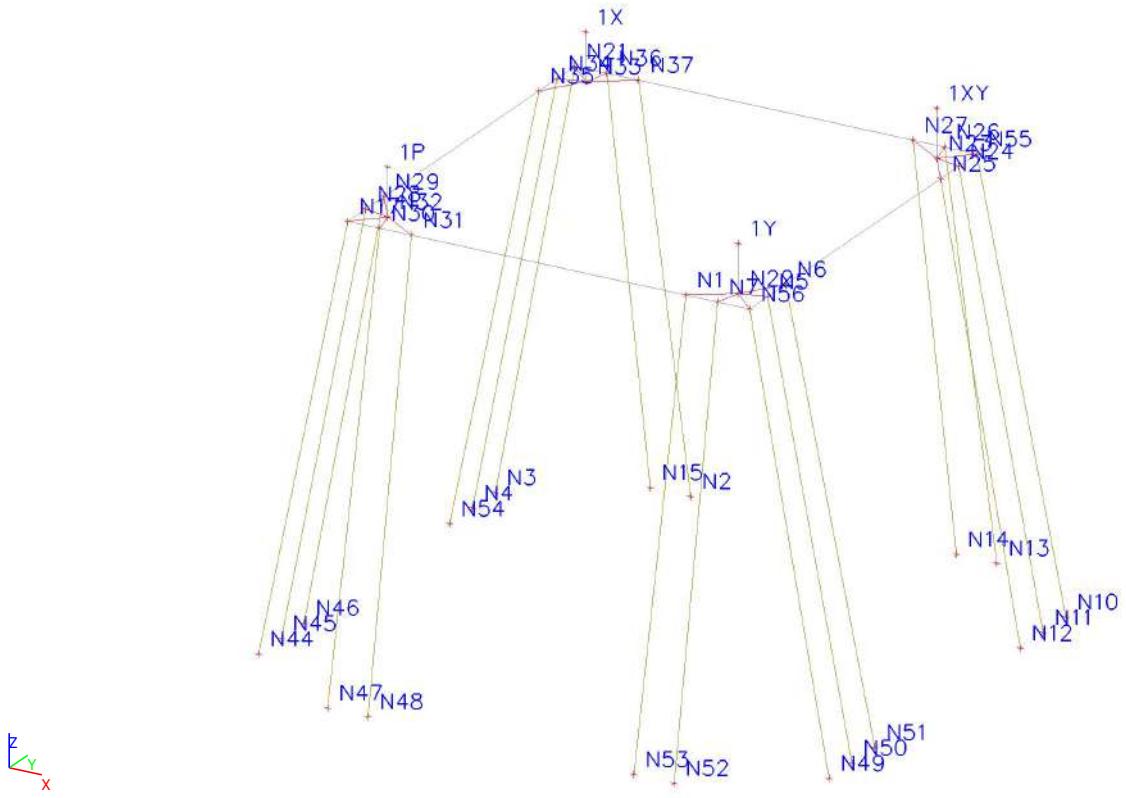
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N24	13,000	12,000	0,000
N25	13,000	11,000	0,000
N26	12,000	13,000	0,000
N27	11,000	13,000	0,000
N28	0,400	1,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N29	0,400	2,400	0,000
N30	1,400	0,400	0,000
N31	2,400	0,400	0,000
1P	1,200	1,200	1,475
N32	1,200	1,200	0,000
N33	1,200	12,200	0,000
1X	1,200	12,187	1,475
N34	0,400	12,000	0,000
N35	0,400	11,000	0,000
N36	1,400	13,000	0,000
N37	2,400	13,000	0,000
N38	12,200	1,200	0,000
N39	1,200	1,200	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N40	12,200	12,200	0,000
N41	1,200	12,200	0,000
N44	-2,247	0,135	-13,235
N45	-2,247	1,400	-13,234
N46	-2,247	2,665	-13,235
N47	1,268	-2,247	-13,234
N48	2,532	-2,247	-13,234
N49	15,647	0,135	-13,235
N50	15,647	1,400	-13,234
N51	15,647	2,665	-13,235
N52	12,132	-2,247	-13,234
N53	10,868	-2,247	-13,234
N10	15,647	13,265	-13,235

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N11	15,647	12,000	-13,234
N12	15,647	10,735	-13,235
N13	12,132	15,647	-13,234
N14	10,868	15,647	-13,234
N15	1,268	15,647	-13,234
N2	2,532	15,647	-13,234
N3	-2,247	13,265	-13,235
N4	-2,247	12,000	-13,234
N54	-2,247	10,735	-13,235
N55	13,000	13,000	0,000
N56	13,000	0,400	0,000

5.2. Analyse model met knopen

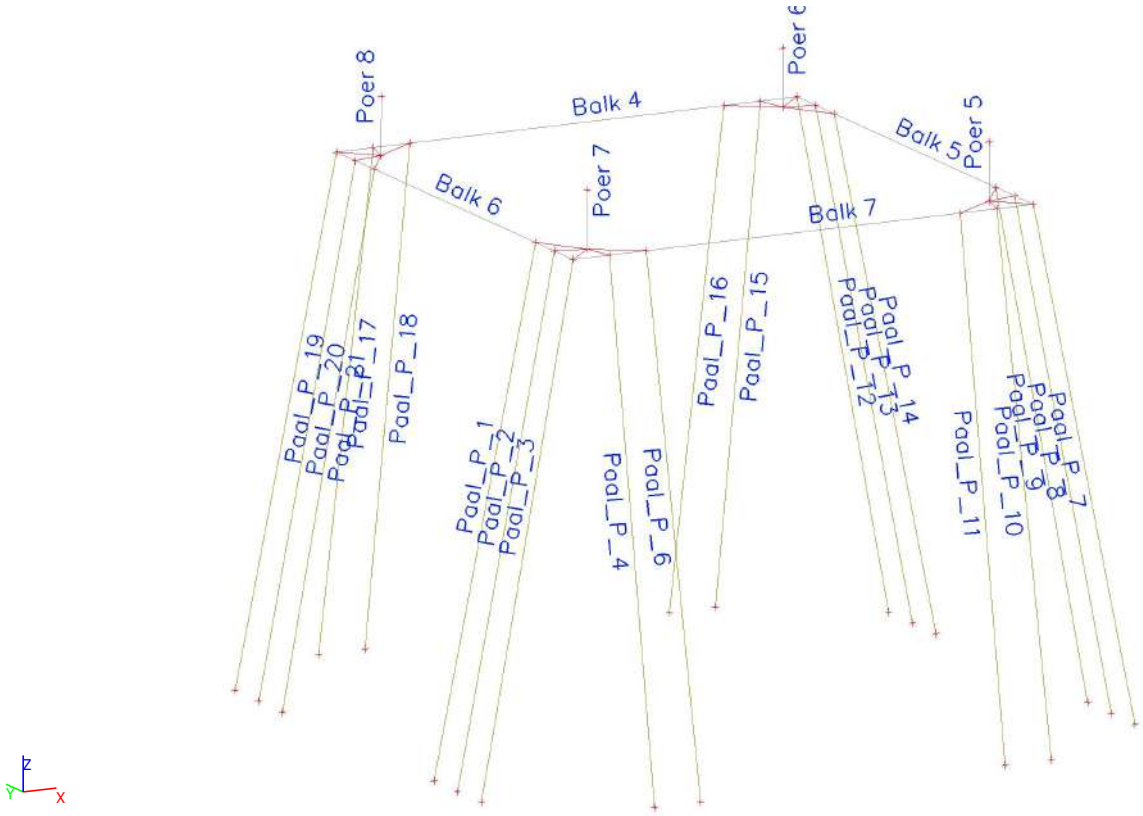


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Balk 4	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N55	N21	beam (80)
Balk 5	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N55	beam (80)
Balk 6	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N17	N21	beam (80)
Balk 7	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N17	beam (80)
Poer 5	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N22	1Y	column (100)
Poer 6	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N23	1XY	column (100)
Poer 7	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N32	1P	column (100)
Poer 8	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N33	1X	column (100)
Paal_P_1	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N29	N46	column (100)
Paal_P_2	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,496	N28	N45	column (100)
Paal_P_3	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N17	N44	column (100)
Paal_P_4	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N30	N47	column (100)
Paal_P_6	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N31	N48	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_7	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N56	N49	column (100)
Paal_P_8	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,496	N5	N50	column (100)
Paal_P_9	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N6	N51	column (100)
Paal_P_10	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N7	N52	column (100)
Paal_P_11	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N1	N53	column (100)
Paal_P_12	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N55	N10	column (100)
Paal_P_13	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,496	N24	N11	column (100)
Paal_P_14	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N25	N12	column (100)
Paal_P_15	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N26	N13	column (100)
Paal_P_16	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N27	N14	column (100)
Paal_P_17	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N36	N15	column (100)
Paal_P_18	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N37	N2	column (100)
Paal_P_19	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N21	N3	column (100)
Paal_P_20	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,496	N34	N4	column (100)
Paal_P_21	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N35	N54	column (100)

5.4. Analyse model met Staven

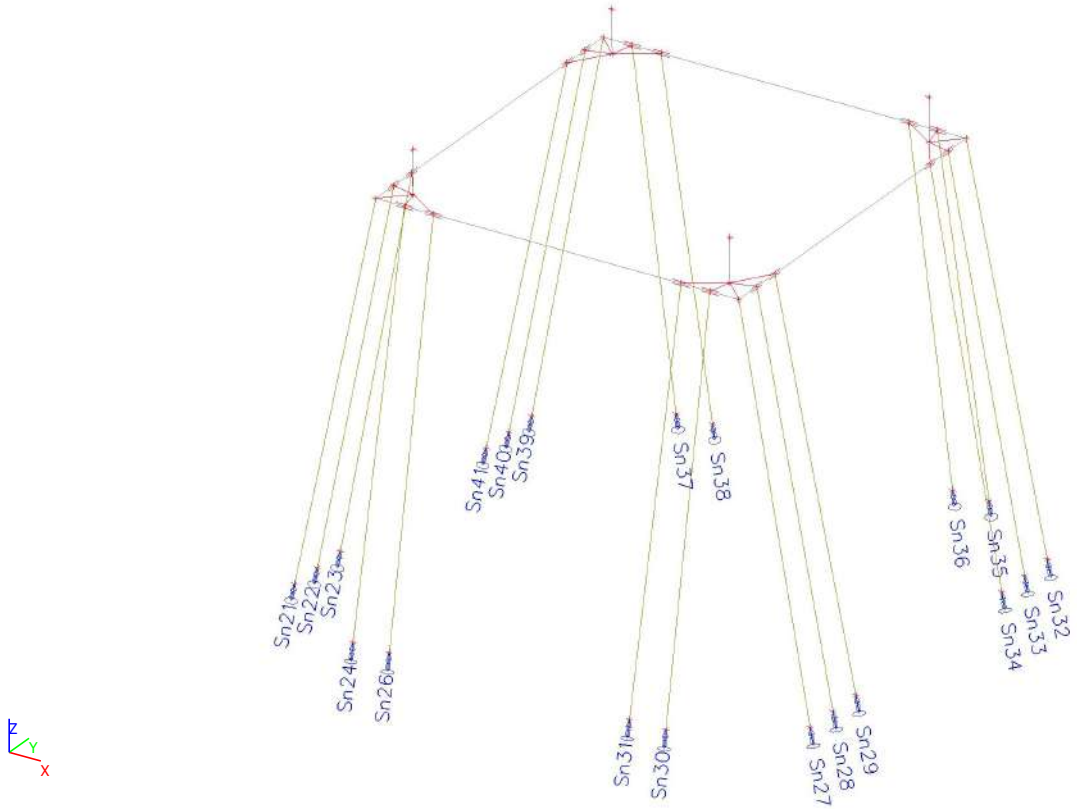


5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn21	N44	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31
Sn22	N45	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn23	N46	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn24	N47	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn26	N48	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn27	N49	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn28	N50	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31
Sn29	N51	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn30	N52	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn31	N53	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn32	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn33	N11	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn34	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn35	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn36	N14	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn37	N15	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn38	N2	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn39	N3	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn40	N4	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn41	N54	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31

5.6. Analyse model met Knoopondersteuningen



5.7. Line supports on member

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Veen	Line	Paal_P_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen3	Line	Paal_P_2 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen4	Line	Paal_P_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)1	Line	Paal_P_3 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)3	Line	Paal_P_2 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)4	Line	Paal_P_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)	Line	Paal_P_3 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)1	Line	Paal_P_2 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)2	Line	Paal_P_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	10,000	From start						
(PY-curve-1_V3)	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V3)19	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V3)12	Line	Paal_P_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)8	Line	Paal_P_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V4)17	Line	Paal_P_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V4)16	Line	Paal_P_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)18	Line	Paal_P_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V5)	Line	Paal_P_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V5)1	Line	Paal_P_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)6	Line	Paal_P_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
(PY-curve-1_V6)9	Line	Paal_P_2	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
(PY-curve-1_V6)11	Line	Paal_P_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen18	Line	Paal_P_4	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)14	Line	Paal_P_4	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)7	Line	Paal_P_4	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)5	Line	Paal_P_4	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)3	Line	Paal_P_4	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)3	Line	Paal_P_4	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)10	Line	Paal_P_4	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen9	Line	Paal_P_6	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)18	Line	Paal_P_6	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)9	Line	Paal_P_6	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)8	Line	Paal_P_6	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)2	Line	Paal_P_6	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)4	Line	Paal_P_6	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)13	Line	Paal_P_6	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen8	Line	Paal_P_7	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)19	Line	Paal_P_7	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)12	Line	Paal_P_7	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)10	Line	Paal_P_7	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)13	Line	Paal_P_7	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)5	Line	Paal_P_7	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

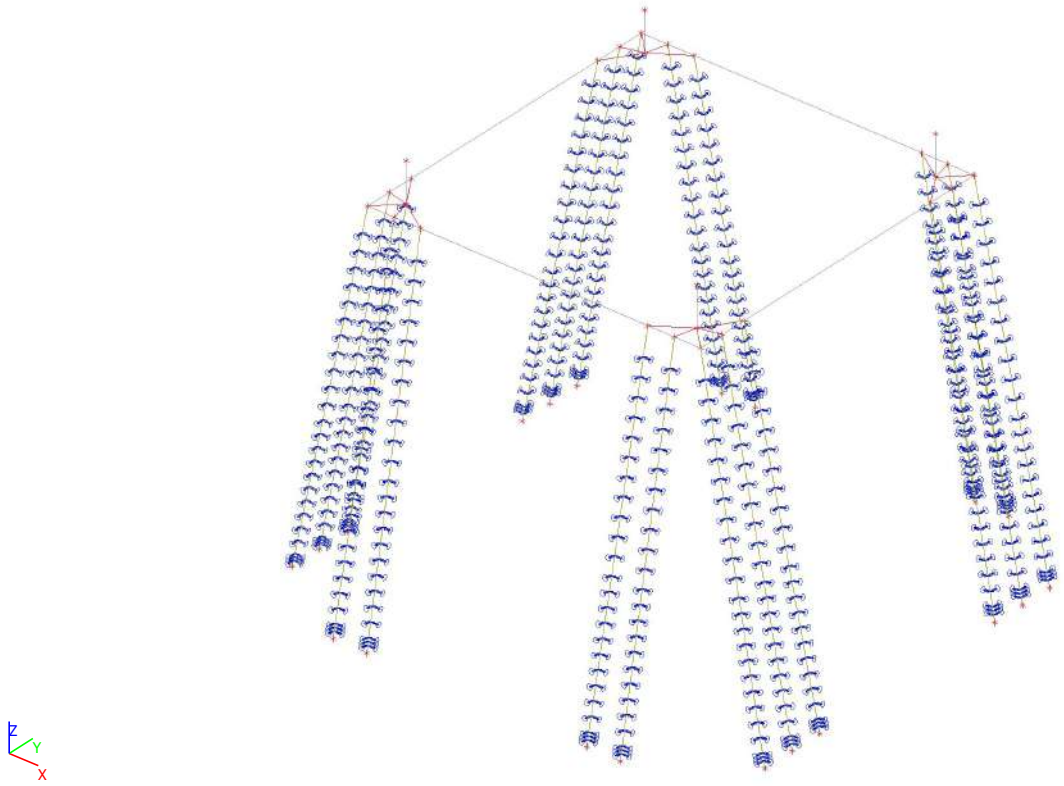
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	13,000	From start						
(PY-curve-1_V6)14	Line	Paal_P_7	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen16	Line	Paal_P_8	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)8	Line	Paal_P_8	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)14	Line	Paal_P_8	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)9	Line	Paal_P_8	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)5	Line	Paal_P_8	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)6	Line	Paal_P_8	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)19	Line	Paal_P_8	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen13	Line	Paal_P_9	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)2	Line	Paal_P_9	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)16	Line	Paal_P_9	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)1	Line	Paal_P_9	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)18	Line	Paal_P_9	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)7	Line	Paal_P_9	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)17	Line	Paal_P_9	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen10	Line	Paal_P_10	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)15	Line	Paal_P_10	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)18	Line	Paal_P_10	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)11	Line	Paal_P_10	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)12	Line	Paal_P_10	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)8	Line	Paal_P_10	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)	Line	Paal_P_10	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen5	Line	Paal_P_11	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)16	Line	Paal_P_11	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)4	Line	Paal_P_11	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)15	Line	Paal_P_11	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)14	Line	Paal_P_11	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)9	Line	Paal_P_11	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)1	Line	Paal_P_11	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen7	Line	Paal_P_12	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)10	Line	Paal_P_12	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)19	Line	Paal_P_12	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
		LCS	10,000	From start						
(PY-curve-1_V3)2	Line	Paal_P_12	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)6	Line	Paal_P_12	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)11	Line	Paal_P_12	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)8	Line	Paal_P_12	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen21	Line	Paal_P_13	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)12	Line	Paal_P_13	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)3	Line	Paal_P_13	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)16	Line	Paal_P_13	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)15	Line	Paal_P_13	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)12	Line	Paal_P_13	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)7	Line	Paal_P_13	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen6	Line	Paal_P_14	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)13	Line	Paal_P_14	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)17	Line	Paal_P_14	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)4	Line	Paal_P_14	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)11	Line	Paal_P_14	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)2	Line	Paal_P_14	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)18	Line	Paal_P_14	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen14	Line	Paal_P_15	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)7	Line	Paal_P_15	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)15	Line	Paal_P_15	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)13	Line	Paal_P_15	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)7	Line	Paal_P_15	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)13	Line	Paal_P_15	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)16	Line	Paal_P_15	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen20	Line	Paal_P_16	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)17	Line	Paal_P_16	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)13	Line	Paal_P_16	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)18	Line	Paal_P_16	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)	Line	Paal_P_16	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)14	Line	Paal_P_16	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)3	Line	Paal_P_16	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

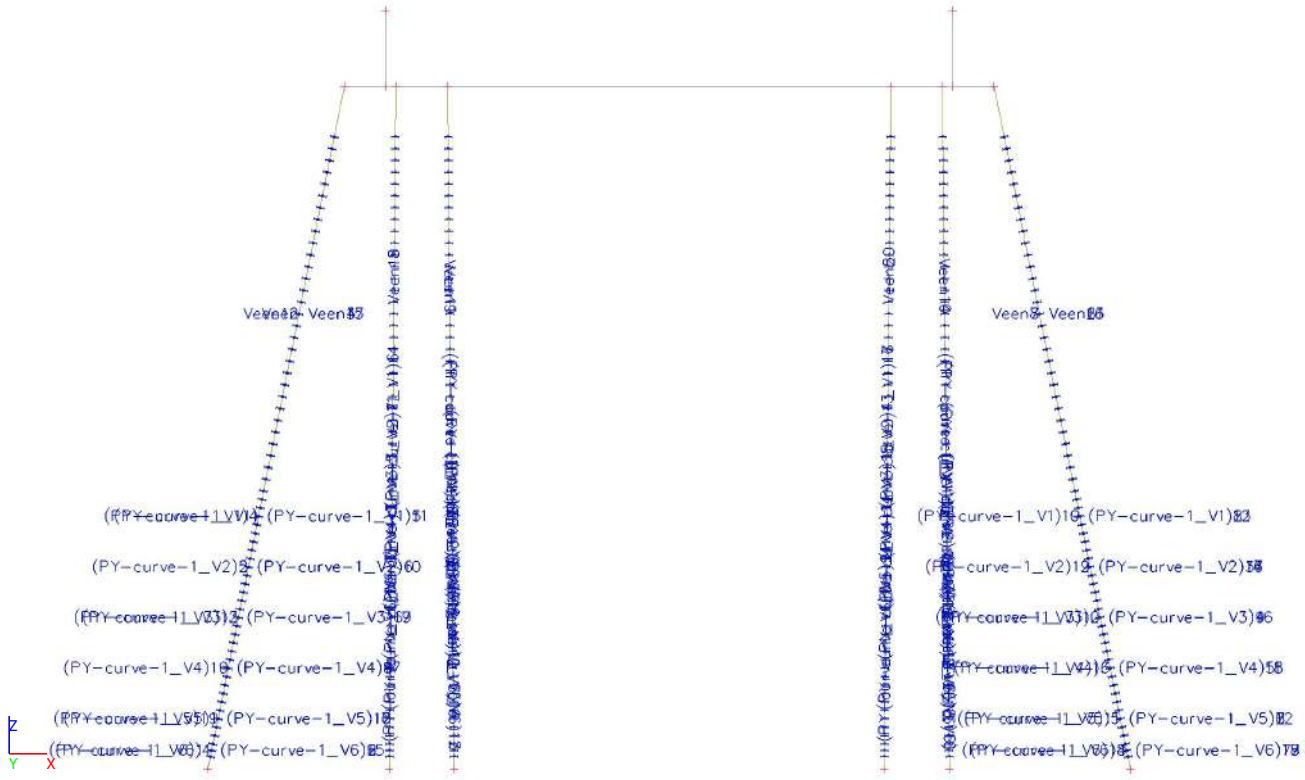
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	13,250	From start						
Veen19	Line	Paal_P_17	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)6	Line	Paal_P_17	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)11	Line	Paal_P_17	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)7	Line	Paal_P_17	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)1	Line	Paal_P_17	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)15	Line	Paal_P_17	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)5	Line	Paal_P_17	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen11	Line	Paal_P_18	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)9	Line	Paal_P_18	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)8	Line	Paal_P_18	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)14	Line	Paal_P_18	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)10	Line	Paal_P_18	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)16	Line	Paal_P_18	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)12	Line	Paal_P_18	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen17	Line	Paal_P_19	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)11	Line	Paal_P_19	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)6	Line	Paal_P_19	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)6	Line	Paal_P_19	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)4	Line	Paal_P_19	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)10	Line	Paal_P_19	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)2	Line	Paal_P_19	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen15	Line	Paal_P_20	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)5	Line	Paal_P_20	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)10	Line	Paal_P_20	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)17	Line	Paal_P_20	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)9	Line	Paal_P_20	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)17	Line	Paal_P_20	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)15	Line	Paal_P_20	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						
Veen12	Line	Paal_P_21	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)	Line	Paal_P_21	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)5	Line	Paal_P_21	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)3	Line	Paal_P_21	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	11,000	From start						
(PY-curve-1_V4)19	Line	Paal_P_21	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)19	Line	Paal_P_21	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
(PY-curve-1_V6)4	Line	Paal_P_21	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,250	From start						

5.8. Analyse model met Lijnondersteuningen



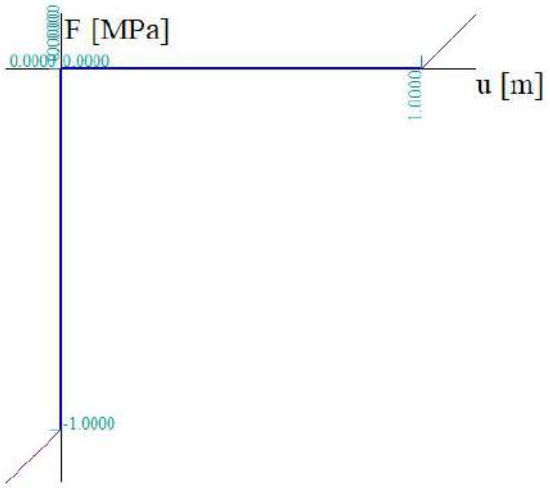
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

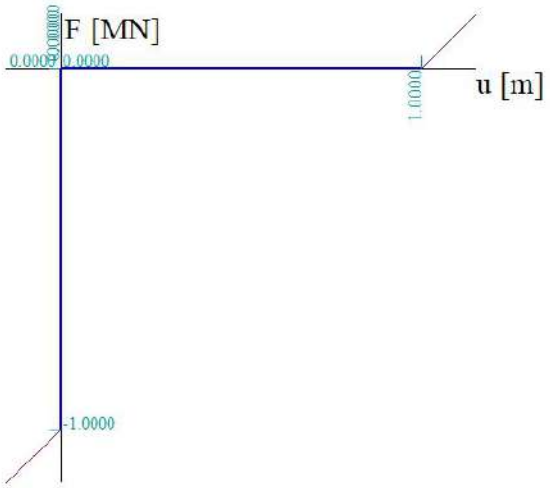
Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing



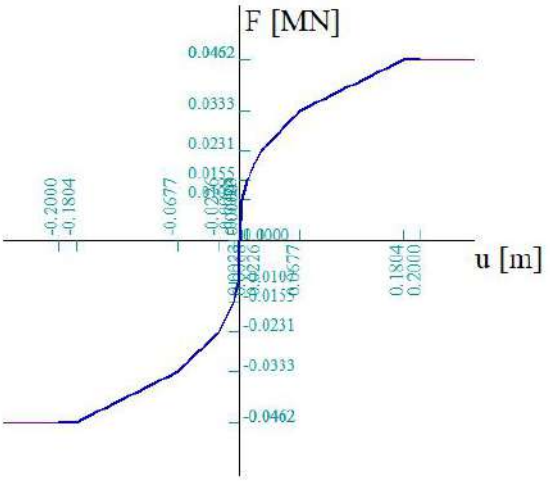
Name	Type	u / F	Positive end	Negative end
press only	Translation	-0.000001 / -1000000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 0.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -46203.840000	Free	Free
		-0.180400 / -46203.840000		
		-0.067650 / -33318.734193		
		-0.022550 / -23101.920000		
		-0.006765 / -15465.186458		
		-0.002255 / -10722.961391		
		0.000000 / 0.000000		
		0.002255 / 10722.961391		
		0.006765 / 15465.186458		
		0.022550 / 23101.920000		
		0.067650 / 33318.734193		
		0.180400 / 46203.840000		
		0.200000 / 46203.840000		

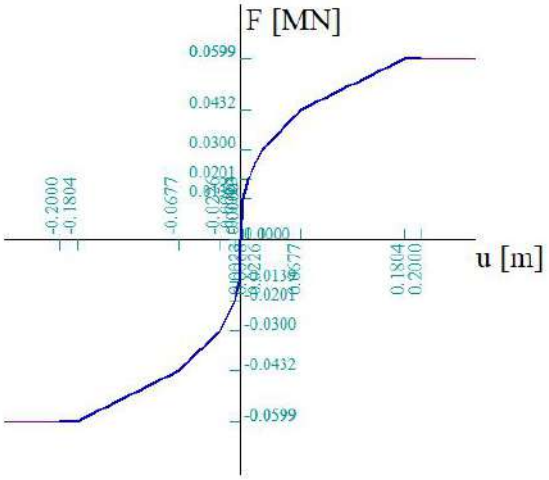
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -59935.680000	Free	Free
		-0.180400 / -59935.680000		
		-0.067650 / -43221.104363		
		-0.022550 / -29967.840000		
		-0.006765 / -20061.459539		
		-0.002255 / -13909.839151		
		0.000000 / 0.000000		
		0.002255 / 13909.839151		
		0.006765 / 20061.459539		

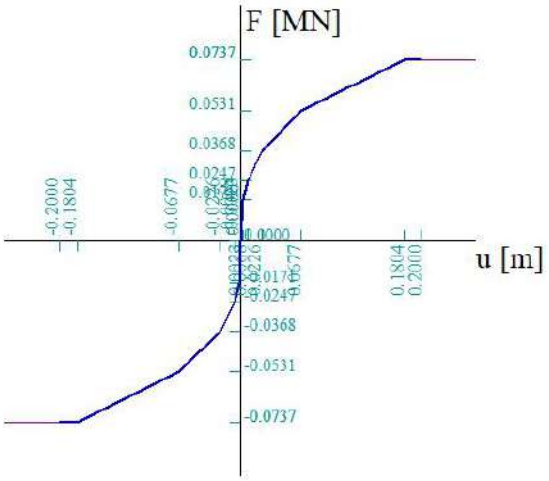
Name	Type	u / F	Positive end	Negative end
		0.022550 / 29967.840000		
		0.067650 / 43221.104363		
		0.180400 / 59935.680000		
		0.200000 / 59935.680000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -73667.520000	Free	Free
		-0.180400 / -73667.520000		
		-0.067650 / -53123.474533		
		-0.022550 / -36833.760000		
		-0.006765 / -24657.732619		
		-0.002255 / -17096.716912		
		0.000000 / 0.000000		
		0.002255 / 17096.716912		
		0.006765 / 24657.732619		
		0.022550 / 36833.760000		
		0.067650 / 53123.474533		
		0.180400 / 73667.520000		
		0.200000 / 73667.520000		

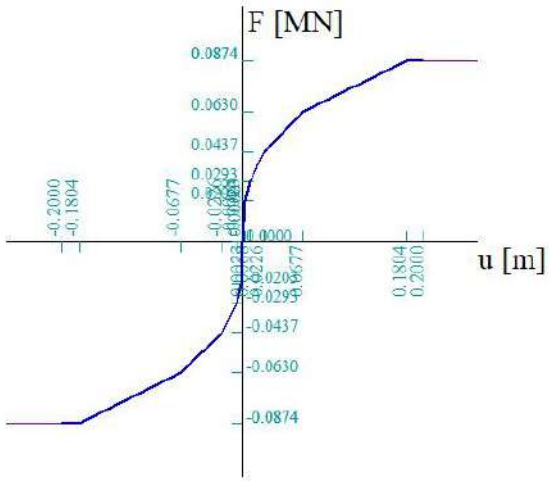
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -87399.360000	Free	Free
		-0.180400 / -87399.360000		
		-0.067650 / -63025.844703		

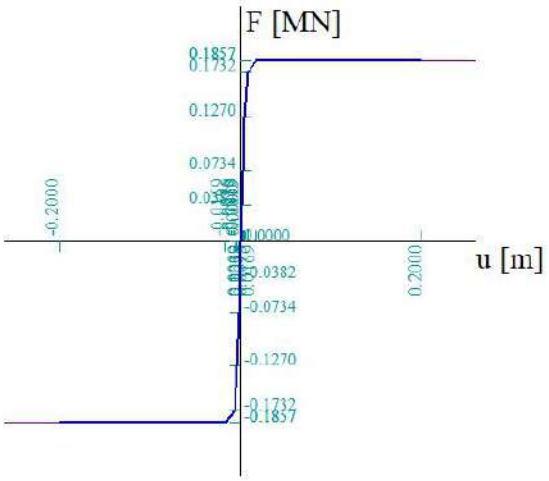
Name	Type	u / F	Positive end	Negative end
		-0.022550 / -43699.680000		
		-0.006765 / -29254.005700		
		-0.002255 / -20283.594672		
		0.000000 / 0.000000		
		0.002255 / 20283.594672		
		0.006765 / 29254.005700		
		0.022550 / 43699.680000		
		0.067650 / 63025.844703		
		0.180400 / 87399.360000		
		0.200000 / 87399.360000		

Drawing



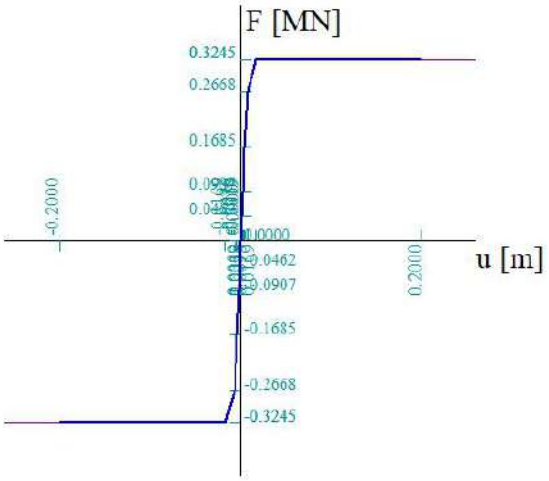
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -185749.581577	Free	Free
		-0.016913 / -185749.581577		
		-0.007517 / -173191.521652		
		-0.003758 / -126966.550767		
		-0.001879 / -73364.887728		
		-0.000940 / -38233.153457		
		0.000000 / 0.000000		
		0.000940 / 38233.153457		
		0.001879 / 73364.887728		
		0.003758 / 126966.550767		
		0.007517 / 173191.521652		
		0.016913 / 185749.581577		
		0.200000 / 185749.581577		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -324503.959510	Free	Free
		-0.016913 / -324503.959510		
		-0.007517 / -266801.170128		
		-0.003758 / -168504.997582		
		-0.001879 / -90672.108471		
		-0.000940 / -46234.204284		
		0.000000 / 0.000000		
		0.000940 / 46234.204284		
		0.001879 / 90672.108471		
		0.003758 / 168504.997582		
		0.007517 / 266801.170128		
		0.016913 / 324503.959510		
		0.200000 / 324503.959510		

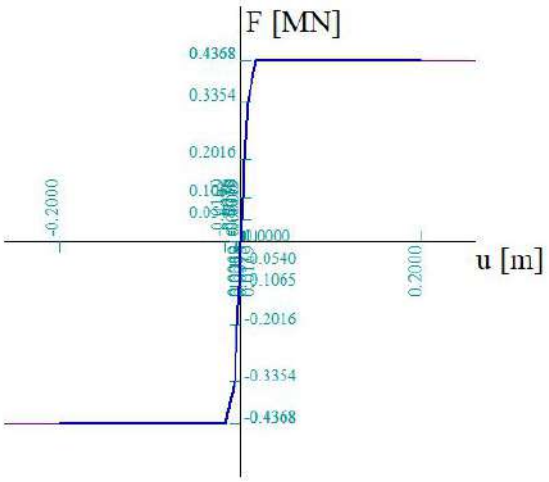
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -436765.819801	Free	Free
		-0.016913 / -436765.819801		
		-0.007517 / -335362.730832		
		-0.003758 / -201646.948699		
		-0.001879 / -106522.716227		
		-0.000940 / -54036.089272		
		0.000000 / 0.000000		
		0.000940 / 54036.089272		
		0.001879 / 106522.716227		
		0.003758 / 201646.948699		

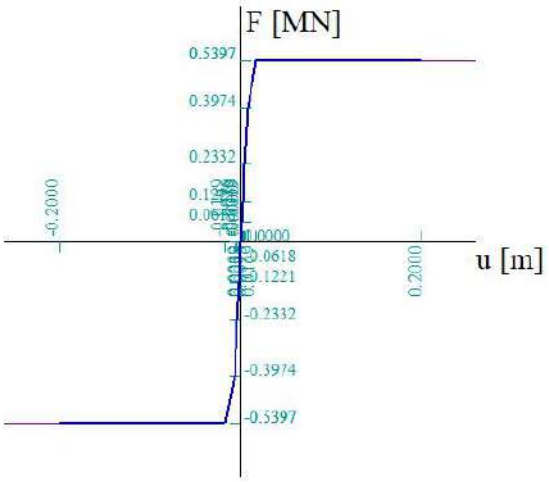
Name	Type	u / F	Positive end	Negative end
		0.007517 / 335362.730832		
		0.016913 / 436765.819801		
		0.200000 / 436765.819801		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -539683.678038	Free	Free
		-0.016913 / -539683.678038		
		-0.007517 / -397433.011814		
		-0.003758 / -233158.398644		
		-0.001879 / -122122.429030		
		-0.000940 / -61804.852432		
		0.000000 / 0.000000		
		0.000940 / 61804.852432		
		0.001879 / 122122.429030		
		0.003758 / 233158.398644		
		0.007517 / 397433.011814		
		0.016913 / 539683.678038		
		0.200000 / 539683.678038		

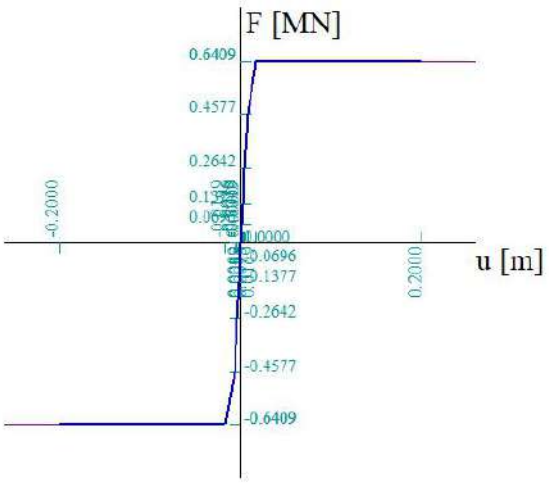
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -640861.931437	Free	Free
		-0.016913 / -640861.931437		
		-0.007517 / -457700.088592		
		-0.003758 / -264224.038576		

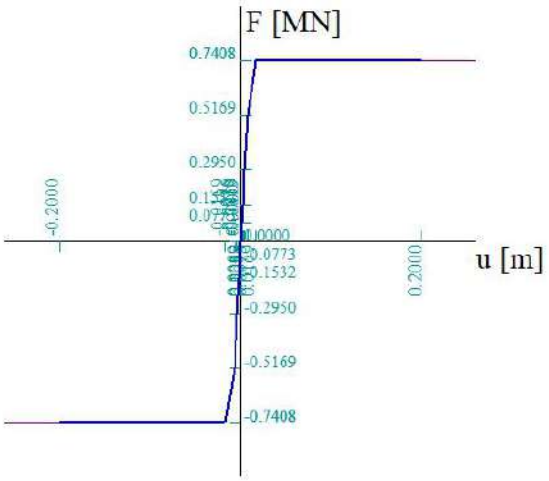
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -137654.602914		
		-0.000940 / -69564.742931		
		0.000000 / 0.000000		
		0.000940 / 69564.742931		
		0.001879 / 137654.602914		
		0.003758 / 264224.038576		
		0.007517 / 457700.088592		
		0.016913 / 640861.931437		
		0.200000 / 640861.931437		

Drawing



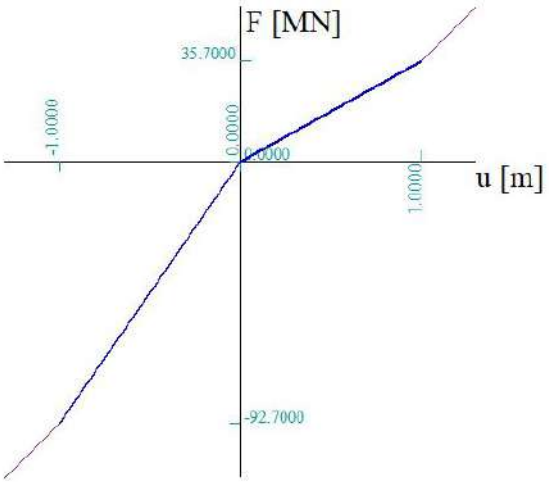
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -740774.043969	Free	Free
		-0.016913 / -740774.043969		
		-0.007517 / -516894.797403		
		-0.003758 / -295043.983610		
		-0.001879 / -153150.432455		
		-0.000940 / -77319.889121		
		0.000000 / 0.000000		
		0.000940 / 77319.889121		
		0.001879 / 153150.432455		
		0.003758 / 295043.983610		
		0.007517 / 516894.797403		
		0.016913 / 740774.043969		
		0.200000 / 740774.043969		

Drawing



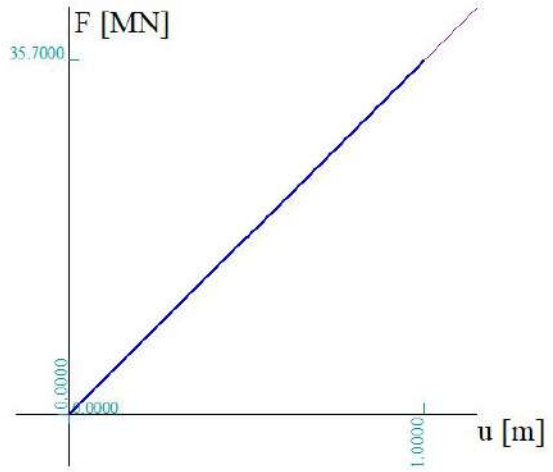
Name	Type	u / F	Positive end	Negative end
S+0 lower bound	Translation	-1.000000 / -92700000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 35700000.000000		

Drawing



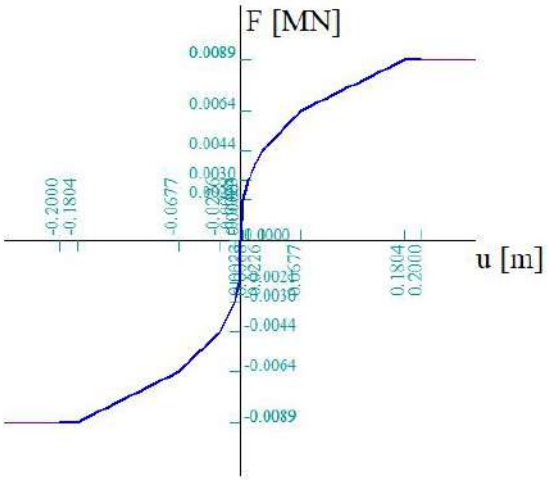
Name	Type	u / F	Positive end	Negative end
S+0 lower bound Trek	Translation	0.000000 / 0.000000	Flexible	Free
		1.000000 / 35700000.000000		

Drawing



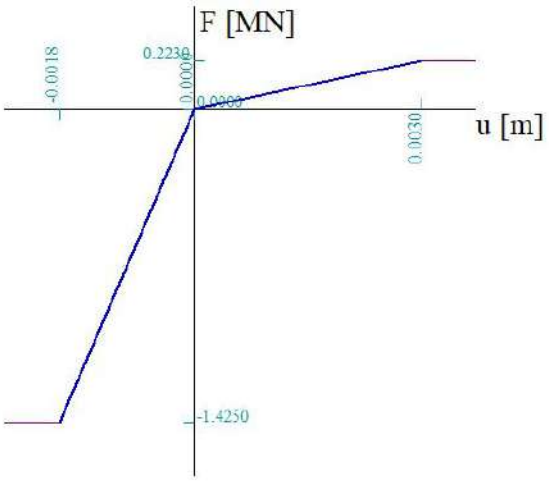
Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -8894.400000	Free	Free
		-0.180400 / -8894.400000		
		-0.067650 / -6413.760000		
		-0.022550 / -4447.680000		
		-0.006765 / -2976.960000		
		-0.002255 / -2064.000000		
		0.000000 / 0.000000		
		0.002255 / 2064.000000		
		0.006765 / 2976.960000		
		0.022550 / 4447.680000		
		0.067650 / 6413.760000		
		0.180400 / 8894.400000		
		0.200000 / 8894.400000		

Drawing



Name	Type	u / F	Positive end	Negative end
Trek-druk-S+paalpunt	Translation	-0.001780 / -1425000.000000	Free	Free
		0.000000 / 0.000000		
		0.003000 / 223000.000000		

Drawing

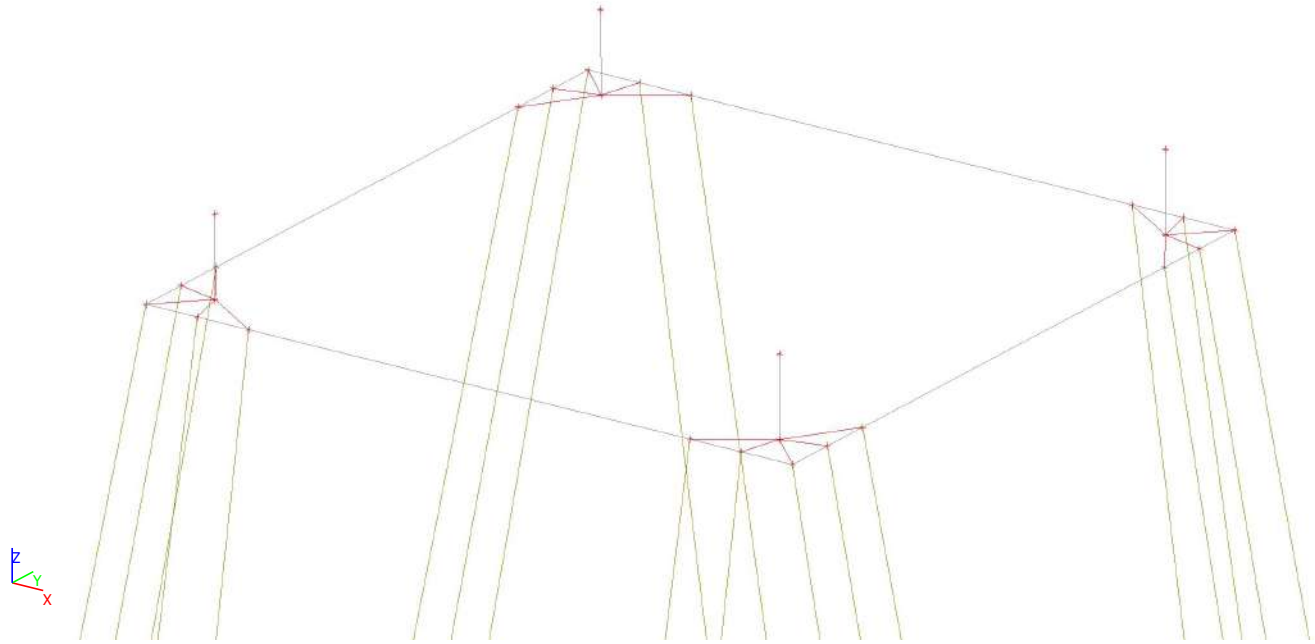

F [MN]
u [m]
-0.0018
0.2230
0.0000
0.0000
0.0030
-1.4250

6. Belastingen

6.1. Load cases

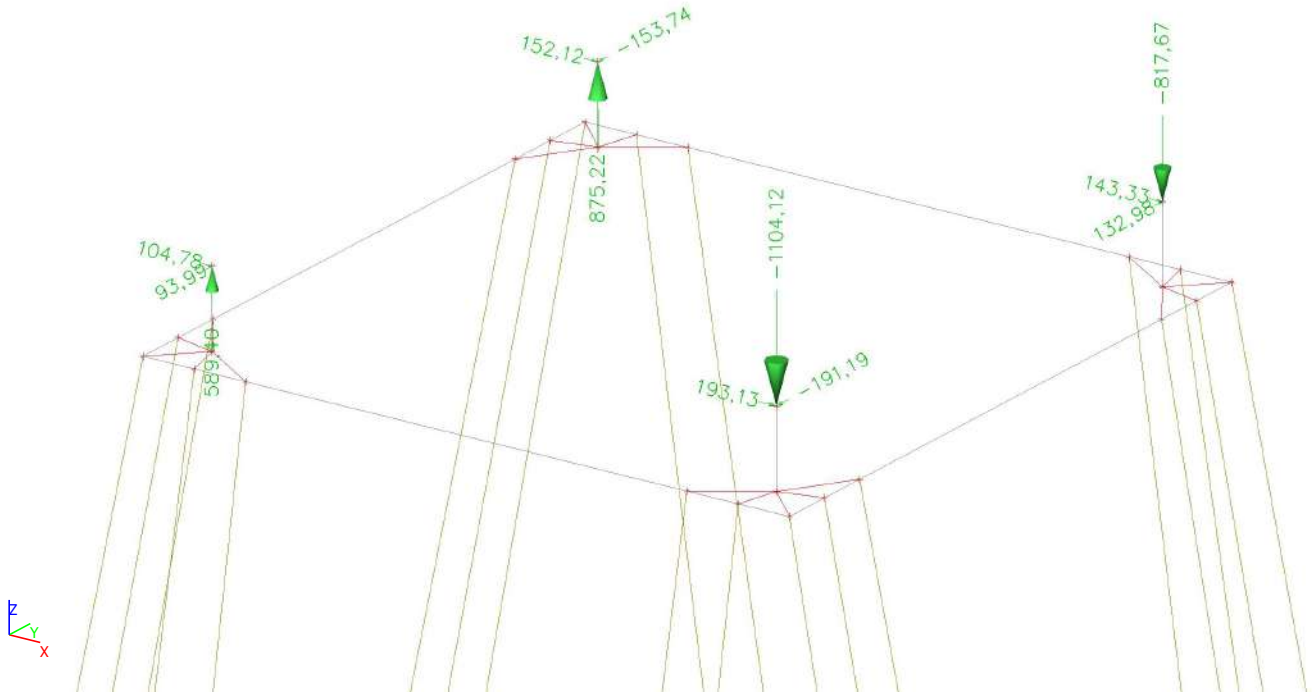
6.1.1. Load cases - E.G.

Name	Description	Action type	Load group	Direction
	Spec	Load type		
E.G.		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - hL Bck + Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			

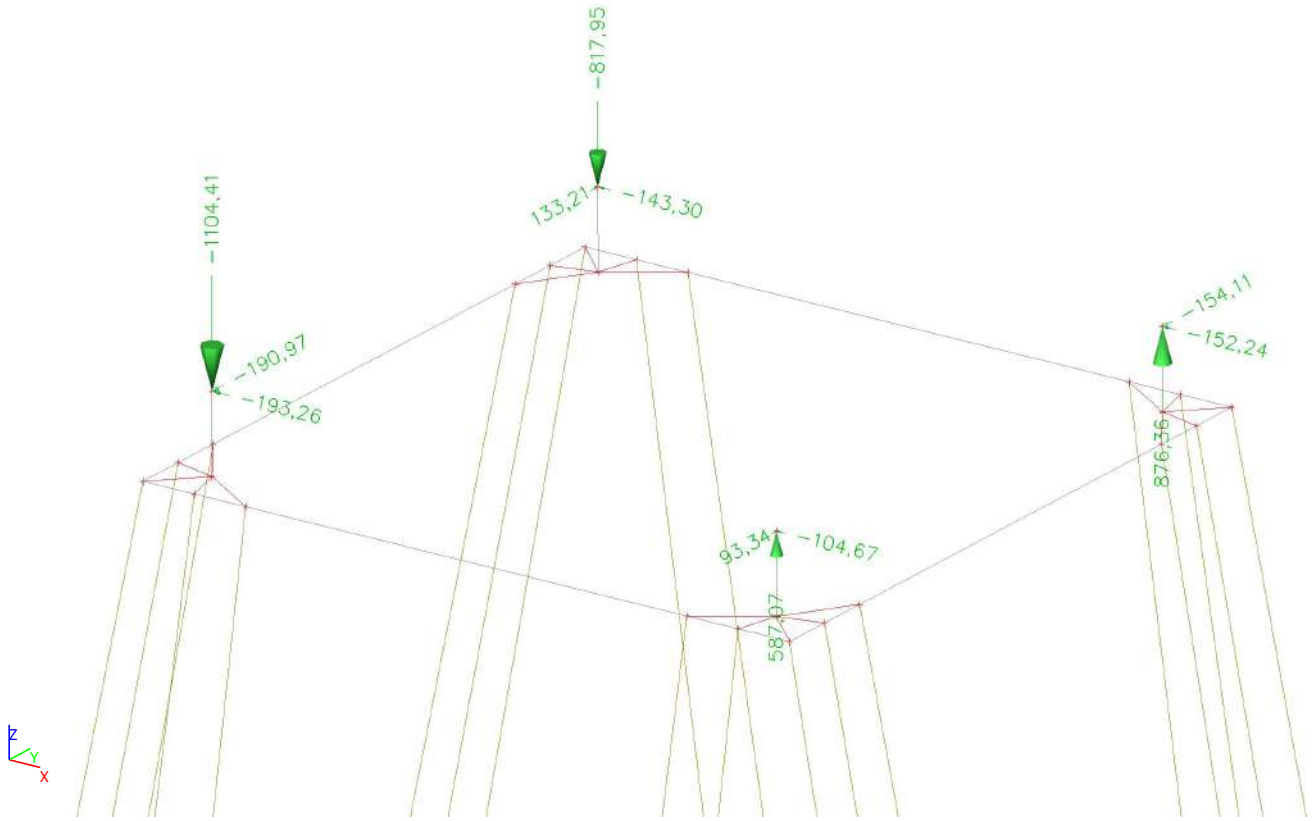


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;225°_1P_Long. Forc	1P	hL Bck + Wnd ;225°	GCS	X	Force	104,78
hL Bck + Wnd ;225°_1X_Long. Forc	1X	hL Bck + Wnd ;225°	GCS	X	Force	152,12
hL Bck + Wnd ;225°_1XY_Long. For	1XY	hL Bck + Wnd ;225°	GCS	X	Force	143,33
hL Bck + Wnd ;225°_1Y_Long. Forc	1Y	hL Bck + Wnd ;225°	GCS	X	Force	193,13
hL Bck + Wnd ;225°_1P_Tran. Forc	1P	hL Bck + Wnd ;225°	GCS	Y	Force	93,99
hL Bck + Wnd ;225°_1X_Tran. Forc	1X	hL Bck + Wnd ;225°	GCS	Y	Force	-153,74
hL Bck + Wnd ;225°_1XY_Tran. For	1XY	hL Bck + Wnd ;225°	GCS	Y	Force	132,98
hL Bck + Wnd ;225°_1Y_Tran. Forc	1Y	hL Bck + Wnd ;225°	GCS	Y	Force	-191,19
hL Bck + Wnd ;225°_1P_Vert. Forc	1P	hL Bck + Wnd ;225°	GCS	Z	Force	589,40
hL Bck + Wnd ;225°_1X_Vert. Forc	1X	hL Bck + Wnd ;225°	GCS	Z	Force	875,22
hL Bck + Wnd ;225°_1XY_Vert. For	1XY	hL Bck + Wnd ;225°	GCS	Z	Force	-817,67
hL Bck + Wnd ;225°_1Y_Vert. Forc	1Y	hL Bck + Wnd ;225°	GCS	Z	Force	-1104,12

6.1.3. Load cases - hL Ahd + Wnd;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd;315°		Variable	LG4	Short	None
	Standard	Static			



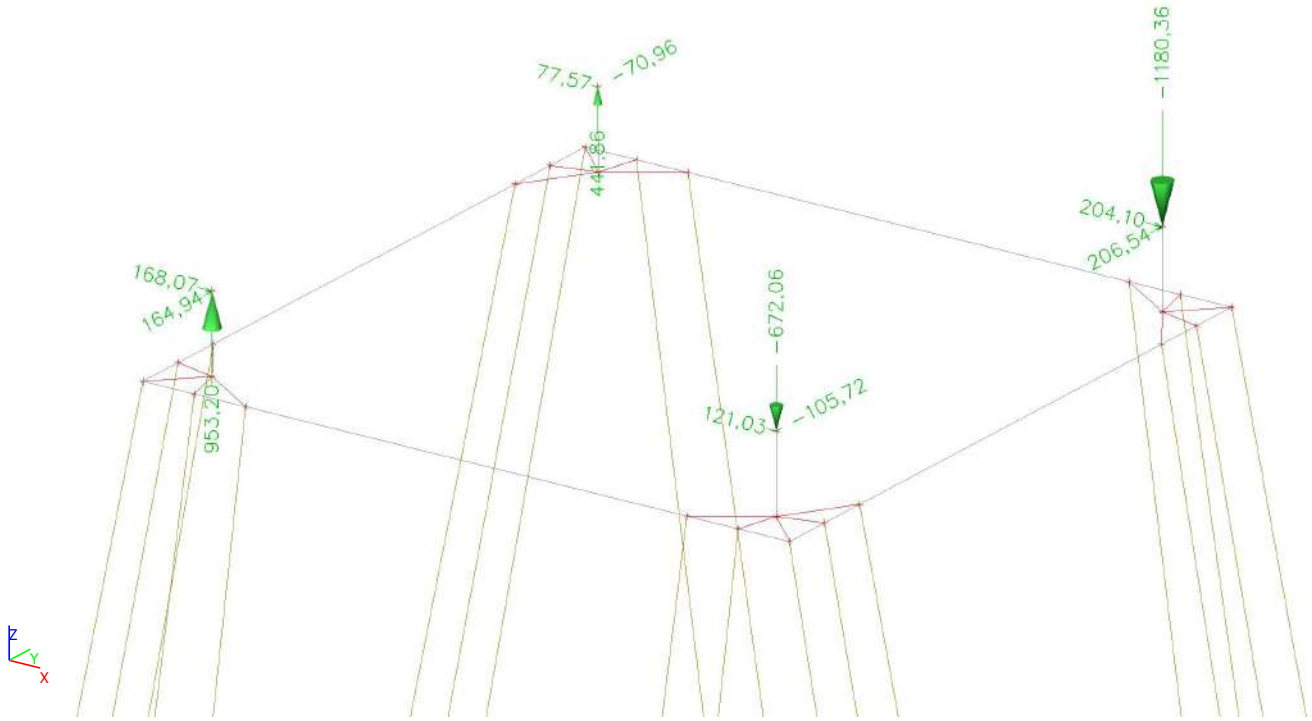
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd;315°_1P_Long. Force	1P	hL Ahd + Wnd;315°	GCS	X	Force	-193,26
hL Ahd + Wnd;315°_1X_Long. Force	1X	hL Ahd + Wnd;315°	GCS	X	Force	-143,30
hL Ahd + Wnd;315°_1XY_Long. Forc	1XY	hL Ahd + Wnd;315°	GCS	X	Force	-152,24
hL Ahd + Wnd;315°_1Y_Long. Force	1Y	hL Ahd + Wnd;315°	GCS	X	Force	-104,67
hL Ahd + Wnd;315°_1P_Tran. Force	1P	hL Ahd + Wnd;315°	GCS	Y	Force	-190,97
hL Ahd + Wnd;315°_1X_Tran. Force	1X	hL Ahd + Wnd;315°	GCS	Y	Force	133,21
hL Ahd + Wnd;315°_1XY_Tran. Forc	1XY	hL Ahd + Wnd;315°	GCS	Y	Force	-154,11
hL Ahd +	1Y	hL Ahd + Wnd;315°	GCS	Y	Force	93,34

Name	Node	Load case	System	Dir	Type	Value - F [kN]
Wnd;315°_1Y_Tran. Force						
hL Ahd + Wnd;315°_1P_Vert. Force	1P	hL Ahd + Wnd;315°	GCS	Z	Force	-1104,41
hL Ahd + Wnd;315°_1X_Vert. Force	1X	hL Ahd + Wnd;315°	GCS	Z	Force	-817,95
hL Ahd + Wnd;315°_1XY_Vert. Forc	1XY	hL Ahd + Wnd;315°	GCS	Z	Force	876,36
hL Ahd + Wnd;315°_1Y_Vert. Force	1Y	hL Ahd + Wnd;315°	GCS	Z	Force	587,07

6.1.4. Load cases - hL Bck + Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			

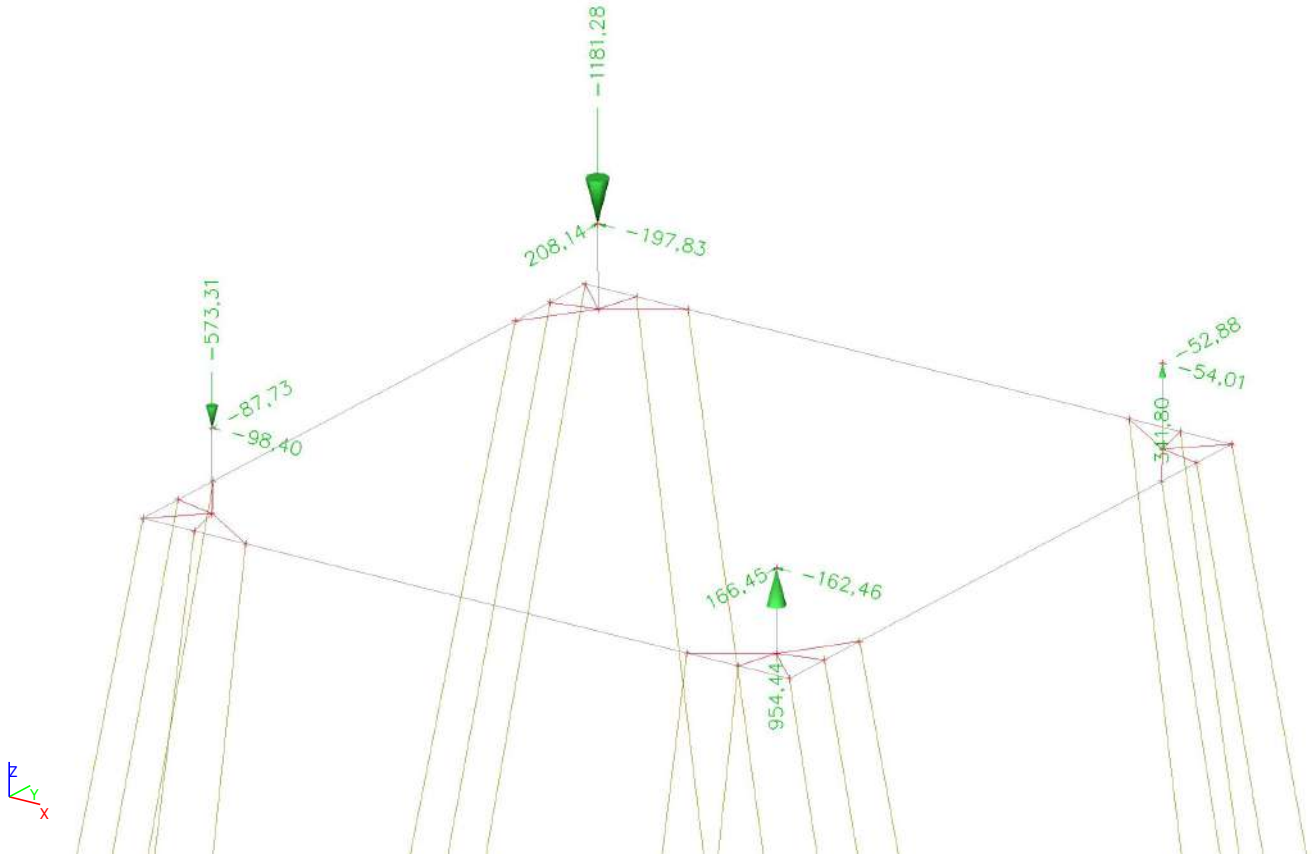


6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;135°_1P_Long. Forc	1P	hL Bck + Wnd ;135°	GCS	X	Force	168,07
hL Bck + Wnd ;135°_1X_Long. Forc	1X	hL Bck + Wnd ;135°	GCS	X	Force	77,57
hL Bck + Wnd ;135°_1XY_Long. For	1XY	hL Bck + Wnd ;135°	GCS	X	Force	204,10
hL Bck + Wnd ;135°_1Y_Long. Forc	1Y	hL Bck + Wnd ;135°	GCS	X	Force	121,03
hL Bck + Wnd ;135°_1P_Tran. Forc	1P	hL Bck + Wnd ;135°	GCS	Y	Force	164,94
hL Bck + Wnd ;135°_1X_Tran. Forc	1X	hL Bck + Wnd ;135°	GCS	Y	Force	-70,96
hL Bck + Wnd ;135°_1XY_Tran. For	1XY	hL Bck + Wnd ;135°	GCS	Y	Force	206,54
hL Bck + Wnd ;135°_1Y_Tran. Forc	1Y	hL Bck + Wnd ;135°	GCS	Y	Force	-105,72
hL Bck + Wnd ;135°_1P_Vert. Forc	1P	hL Bck + Wnd ;135°	GCS	Z	Force	953,20
hL Bck + Wnd ;135°_1X_Vert. Forc	1X	hL Bck + Wnd ;135°	GCS	Z	Force	441,86
hL Bck + Wnd ;135°_1XY_Vert. For	1XY	hL Bck + Wnd ;135°	GCS	Z	Force	-1180,36
hL Bck + Wnd ;135°_1Y_Vert. Forc	1Y	hL Bck + Wnd ;135°	GCS	Z	Force	-672,06

6.1.5. Load cases - hL Ahd + Wnd ;90°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;90°		Variable	LG4	Short	None
	Standard	Static			



6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd;90°_1P_Long. Force	1P	hL Ahd + Wnd ;90°	GCS	X	Force	-98,40
hL Ahd + Wnd;90°_1X_Long. Force	1X	hL Ahd + Wnd ;90°	GCS	X	Force	-197,83
hL Ahd + Wnd;90°_1XY_Long. Force	1XY	hL Ahd + Wnd ;90°	GCS	X	Force	-54,01
hL Ahd + Wnd;90°_1Y_Long. Force	1Y	hL Ahd + Wnd ;90°	GCS	X	Force	-162,46
hL Ahd + Wnd;90°_1P_Tran. Force	1P	hL Ahd + Wnd ;90°	GCS	Y	Force	-87,73
hL Ahd + Wnd;90°_1X_Tran. Force	1X	hL Ahd + Wnd ;90°	GCS	Y	Force	208,14
hL Ahd + Wnd;90°_1XY_Tran. Force	1XY	hL Ahd + Wnd ;90°	GCS	Y	Force	-52,88
hL Ahd + Wnd;90°_1Y_Tran. Force	1Y	hL Ahd + Wnd ;90°	GCS	Y	Force	166,45
hL Ahd + Wnd;90°_1P_Vert. Force	1P	hL Ahd + Wnd ;90°	GCS	Z	Force	-573,31
hL Ahd + Wnd;90°_1X_Vert.	1X	hL Ahd + Wnd ;90°	GCS	Z	Force	-1181,28

Name	Node	Load case	System	Dir	Type	Value - F [kN]
Force						
hL Ahd + Wnd;90°_1XY_Vert. Force	1XY	hL Ahd + Wnd ;90°	GCS	Z	Force	341,80
hL Ahd + Wnd;90°_1Y_Vert. Force	1Y	hL Ahd + Wnd ;90°	GCS	Z	Force	954,44

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
hL Ahd + Wnd;90°	Ultimate	E.G.	1,20
		hL Ahd + Wnd ;90°	1,00
hL Bck + Wnd ;225°	Ultimate	E.G.	1,20
		hL Bck + Wnd ;225°	1,00
hL Ahd + Wnd;315°	Ultimate	E.G.	1,20
		hL Ahd + Wnd;315°	1,00
hL Bck + Wnd ;135°	Ultimate	E.G.	1,20
		hL Bck + Wnd ;135°	1,00
lL Ahd + Wnd;90°	Ultimate	E.G.	0,90
		hL Ahd + Wnd ;90°	1,00
lL Bck + Wnd ;225°	Ultimate	E.G.	0,90
		hL Bck + Wnd ;225°	1,00
lL Ahd + Wnd;315°	Ultimate	E.G.	0,90
		hL Ahd + Wnd;315°	1,00
lL Bck + Wnd ;135°	Ultimate	E.G.	0,90
		hL Bck + Wnd ;135°	1,00

6.3. Result classes

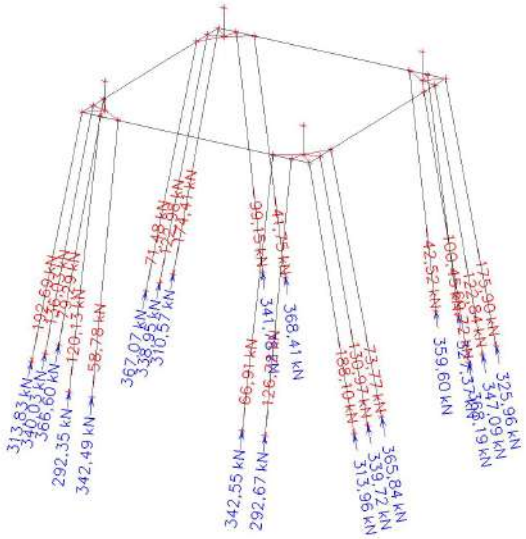
Name	List
All non-linear	hL Ahd + Wnd;90°
	hL Bck + Wnd ;225°
	hL Ahd + Wnd;315°
	hL Bck + Wnd ;135°
	lL Ahd + Wnd;90°
	lL Bck + Wnd ;225°
	lL Ahd + Wnd;315°
	lL Bck + Wnd ;135°

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn21/N44	lL Bck + Wnd ;135°	0,00	0,00	**-192,69**	0,00	0,00	0,00	0,0	0,0
Sn38/N2	hL Ahd + Wnd;90°	**0,00**	**0,00**	**368,41**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn21/N44	lL Bck + Wnd ;135°	0,00	0,00	**-192,69**	0,00	0,00	0,00	0,0	0,0
Sn21/N44	lL Ahd + Wnd;315°	**0,00**	**0,00**	**313,83**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn22/N45	lL Bck + Wnd ;135°	0,00	0,00	**-136,03**	0,00	0,00	0,00	0,0	0,0
Sn22/N45	hL Ahd +	**0,00**	**0,00**	**340,03**	**0,00**	**0,00**	**0,00**	0,0	0,0

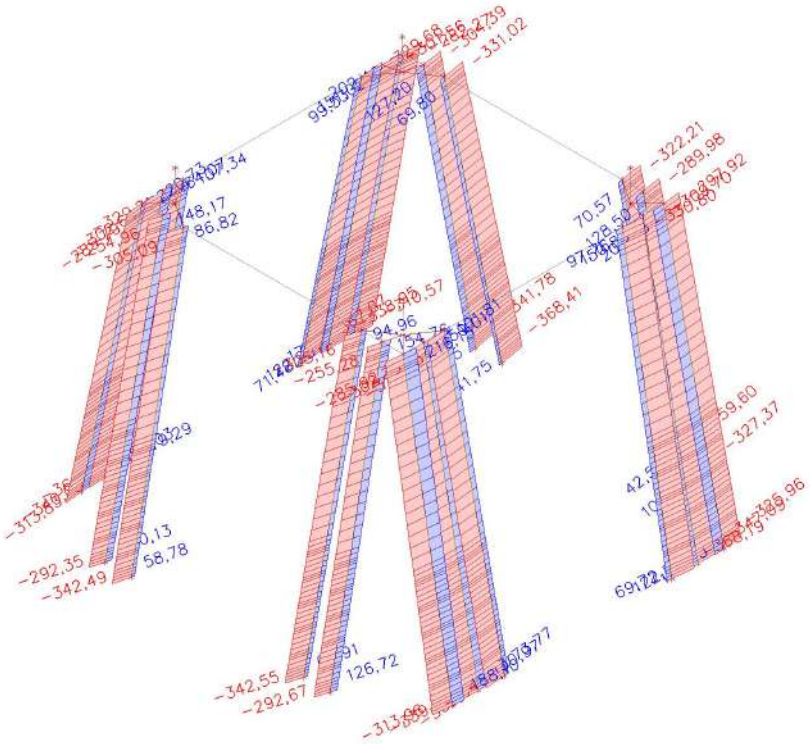
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd;315°								
Sn23/N46	lL Bck + Wnd ;135°	0,00	0,00	**-79,29**	0,00	0,00	0,00	0,0	0,0
Sn23/N46	hL Ahd + Wnd;315°	**0,00**	**0,00**	**366,60**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn24/N47	lL Bck + Wnd ;135°	0,00	0,00	**-120,13**	0,00	0,00	0,00	0,0	0,0
Sn24/N47	hL Ahd + Wnd;315°	**0,00**	**0,00**	**292,35**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn26/N48	lL Bck + Wnd ;135°	0,00	0,00	**-58,78**	0,00	0,00	0,00	0,0	0,0
Sn26/N48	hL Ahd + Wnd;315°	**0,00**	**0,00**	**342,49**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn27/N49	lL Ahd + Wnd;90°	0,00	0,00	**-188,10**	0,00	0,00	0,00	0,0	0,0
Sn27/N49	lL Bck + Wnd ;225°	**0,00**	**0,00**	**313,96**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn28/N50	lL Ahd + Wnd;90°	0,00	0,00	**-130,97**	0,00	0,00	0,00	0,0	0,0
Sn28/N50	hL Bck + Wnd ;225°	**0,00**	**0,00**	**339,72**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn29/N51	lL Ahd + Wnd;90°	0,00	0,00	**-73,77**	0,00	0,00	0,00	0,0	0,0
Sn29/N51	hL Bck + Wnd ;225°	**0,00**	**0,00**	**365,84**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn30/N52	lL Ahd + Wnd;90°	0,00	0,00	**-126,72**	0,00	0,00	0,00	0,0	0,0
Sn30/N52	hL Bck + Wnd ;225°	**0,00**	**0,00**	**292,67**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn31/N53	lL Ahd + Wnd;90°	0,00	0,00	**-66,91**	0,00	0,00	0,00	0,0	0,0
Sn31/N53	hL Bck + Wnd ;225°	**0,00**	**0,00**	**342,55**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn32/N10	lL Ahd + Wnd;315°	0,00	0,00	**-175,90**	0,00	0,00	0,00	0,0	0,0
Sn32/N10	lL Bck + Wnd ;135°	**0,00**	**0,00**	**325,96**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn33/N11	lL Ahd + Wnd;315°	0,00	0,00	**-122,84**	0,00	0,00	0,00	0,0	0,0
Sn33/N11	hL Bck + Wnd ;135°	**0,00**	**0,00**	**347,09**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn34/N12	lL Ahd + Wnd;315°	0,00	0,00	**-69,72**	0,00	0,00	0,00	0,0	0,0
Sn34/N12	hL Bck + Wnd ;135°	**0,00**	**0,00**	**368,19**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn35/N13	lL Ahd + Wnd;315°	0,00	0,00	**-100,45**	0,00	0,00	0,00	0,0	0,0
Sn35/N13	hL Bck + Wnd ;135°	**0,00**	**0,00**	**327,37**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn36/N14	lL Ahd + Wnd;315°	0,00	0,00	**-42,52**	0,00	0,00	0,00	0,0	0,0
Sn36/N14	hL Bck + Wnd ;135°	**0,00**	**0,00**	**359,60**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	lL Bck + Wnd ;225°	**0,00**	**0,00**	**-99,15**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	hL Ahd + Wnd;90°	0,00	0,00	**341,78**	0,00	0,00	**0,00**	0,0	0,0
Sn38/N2	lL Bck + Wnd ;225°	**0,00**	**0,00**	**-41,75**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn38/N2	hL Ahd + Wnd;90°	0,00	0,00	**368,41**	0,00	0,00	**0,00**	0,0	0,0
Sn39/N3	lL Bck + Wnd ;225°	**0,00**	**0,00**	**-174,41**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn39/N3	hL Ahd + Wnd;90°	0,00	0,00	**310,57**	0,00	0,00	**0,00**	0,0	0,0
Sn40/N4	lL Bck +	**0,00**	**0,00**	**-122,98**	**0,00**	**0,00**	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;225°								
Sn40/N4	hL Ahd + Wnd;90°	0,00	0,00	**338,95**	0,00	0,00	**0,00**	0,0	0,0
Sn41/N54	lL Bck + Wnd ;225°	**0,00**	**0,00**	**-71,48**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn41/N54	hL Ahd + Wnd;90°	0,00	0,00	**367,07**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

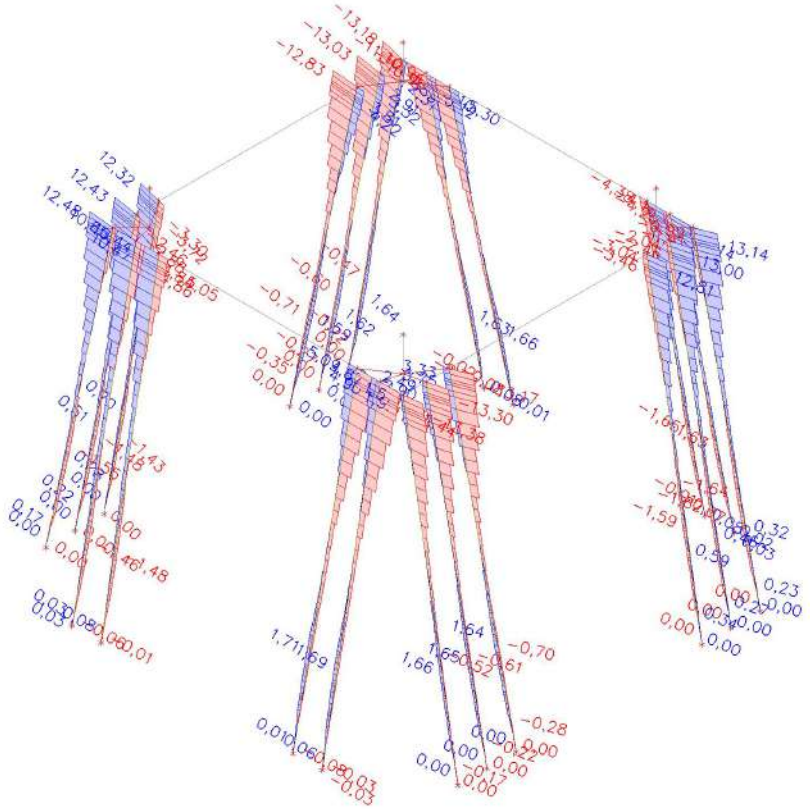
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



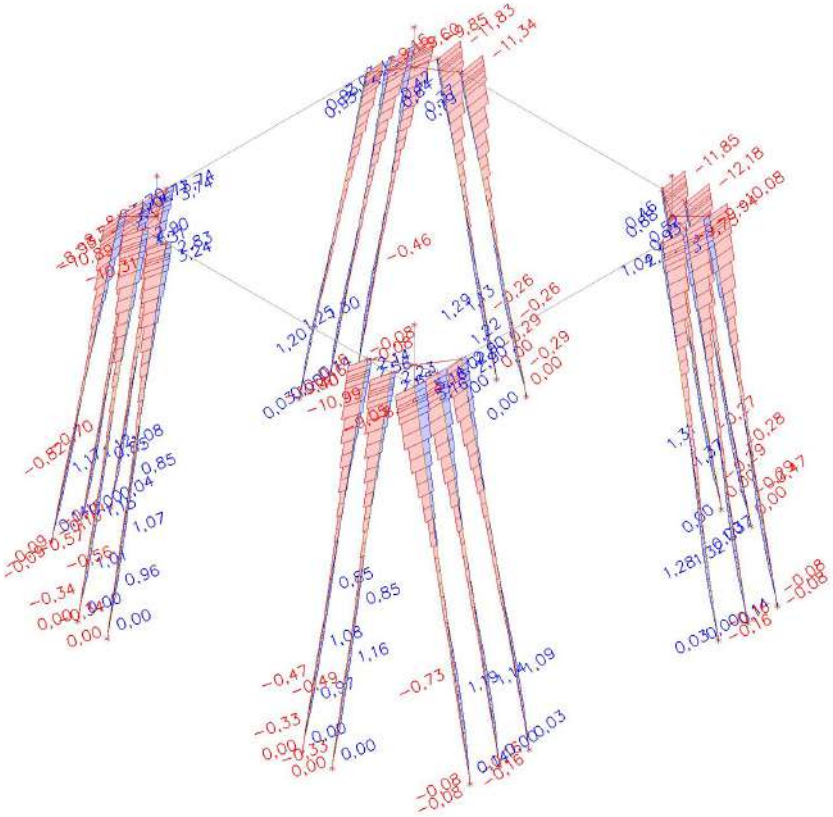
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



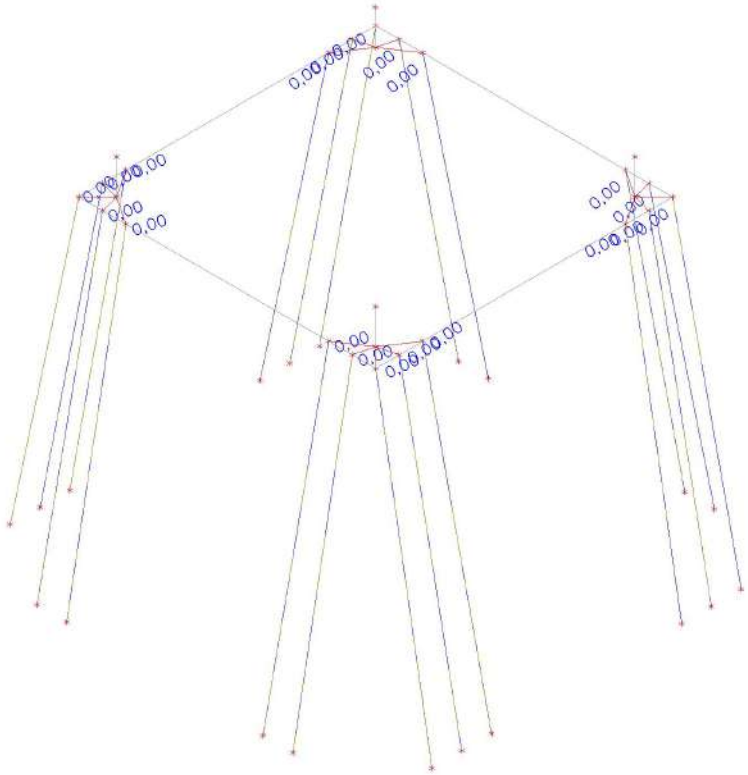
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



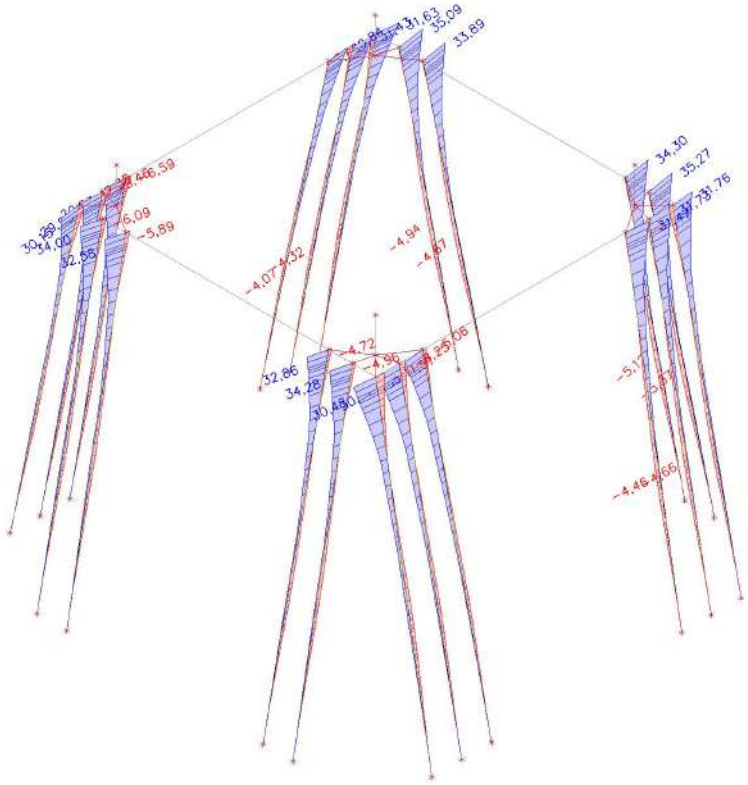
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



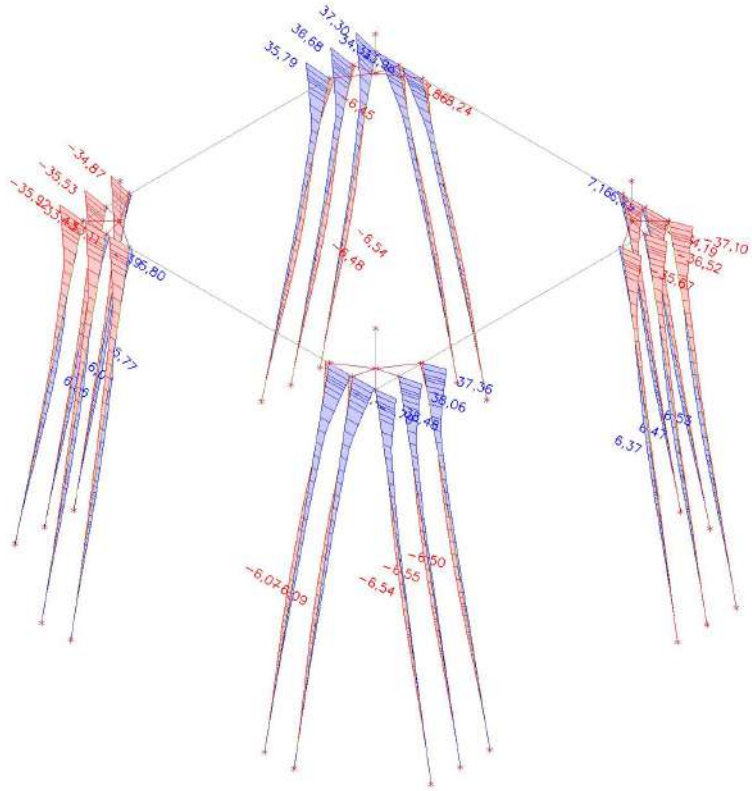
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_P_18	13,497	hL Ahd + Wnd;90°	**-368,41**	-0,08	0,00	0,00	0,00	0,00
Paal_P_3	0,000	lL Bck + Wnd ;135°	**220,73**	0,94	-0,71	**0,00**	10,67	-12,85
Paal_P_7	0,000	hL Bck + Wnd ;135°	-175,61	**-13,38**	4,70	0,00	-9,42	**38,48**
Paal_P_15	0,000	hL Ahd + Wnd;90°	-12,61	-3,54	**-12,18**	0,00	**35,27**	4,25
Paal_P_3	1,000-	lL Ahd + Wnd;90°	-153,06	10,58	**5,70**	0,00	-6,68	-20,31
Paal_P_3	0,000	lL Ahd + Wnd;90°	-150,98	10,99	5,70	0,00	**-12,39**	-31,09
Paal_P_12	0,000	hL Bck + Wnd ;225°	-208,03	**13,14**	2,74	0,00	-4,90	**-37,10**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

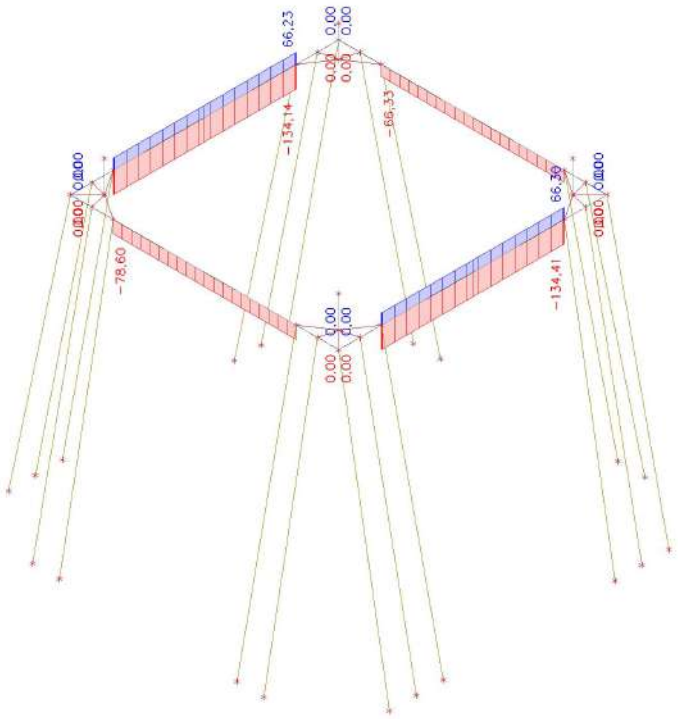
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer 8	0,000	hL Ahd + Wnd;90°	**-1207,86**	-279,54	-0,24	0,02	0,23	283,58
Poer 5	1,475	hL Ahd + Wnd;90°	**954,44**	-232,57	2,82	0,03	0,00	-11,45
Poer 8	1,475	hL Ahd + Wnd;90°	-1183,07	**-279,70**	-0,08	0,00	0,00	-14,20
Poer 8	0,000	hL Ahd + Wnd;315°	-843,89	-190,27	**-12,39**	**1,33**	**18,16**	191,21
Poer 5	0,000	hL Ahd + Wnd;315°	559,16	-140,01	-8,01	**-0,87**	11,82	144,31
Poer 5	0,000	hL Bck + Wnd ;135°	-699,97	160,34	**10,83**	1,17	**-15,97**	-162,72
Poer 6	0,000	lL Bck + Wnd ;135°	-1198,96	**290,37**	1,73	0,19	-2,54	**-299,98**
Poer 8	0,000	lL Ahd + Wnd;90°	-1201,66	-279,58	-0,20	0,01	0,20	**283,89**

7.4. Krachten van de Funderingsbalken

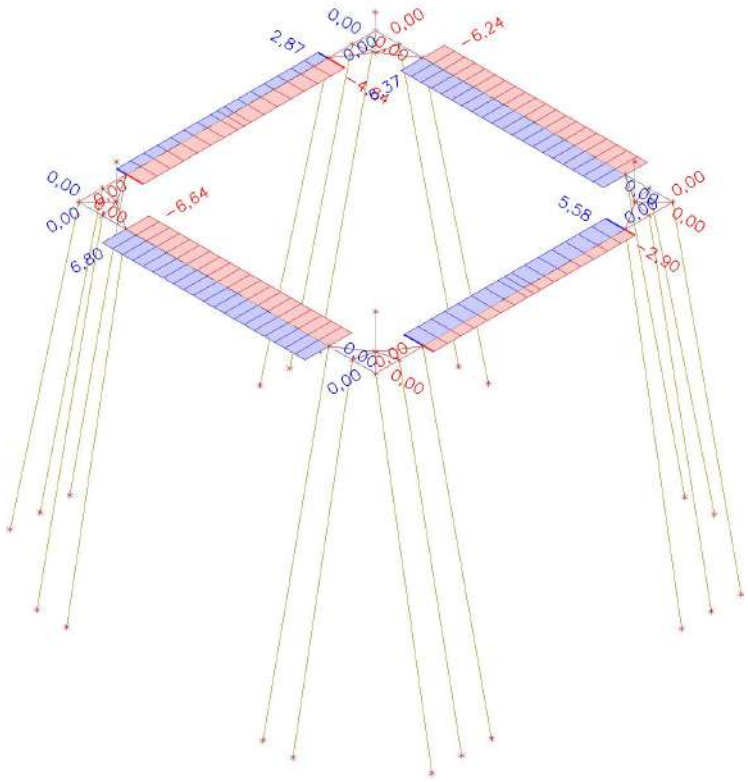
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



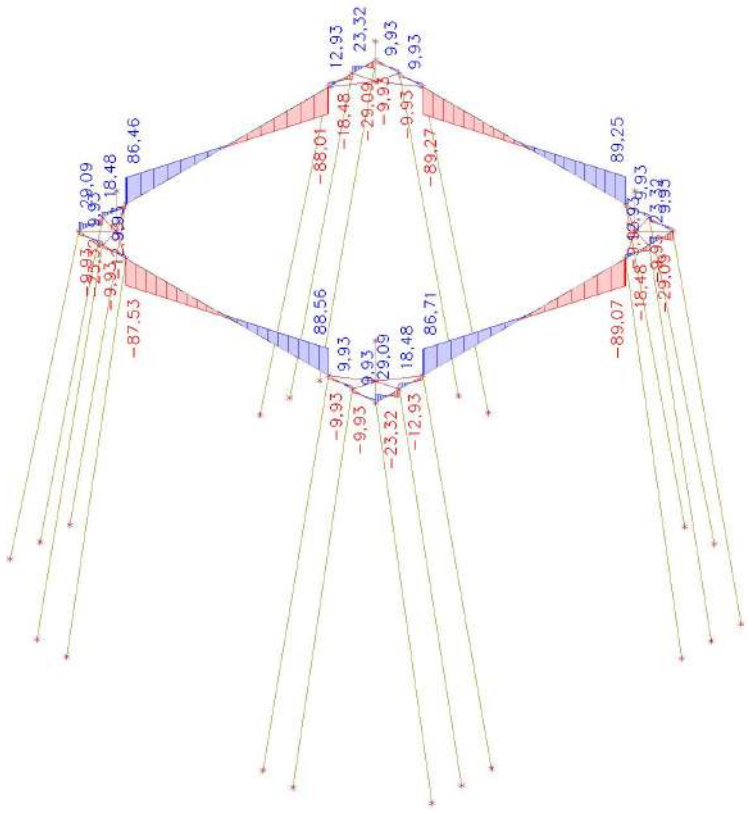
7.4.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



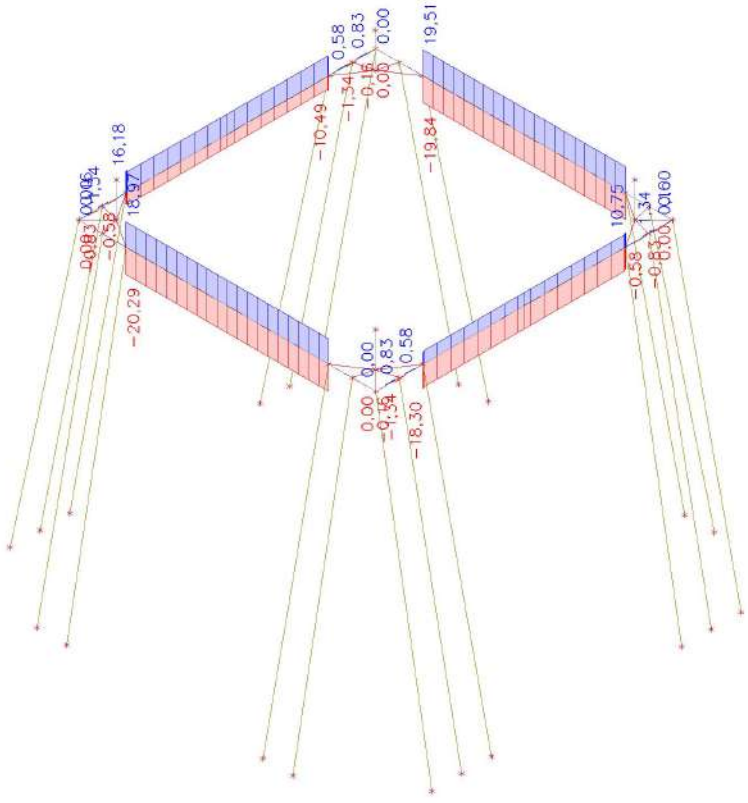
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



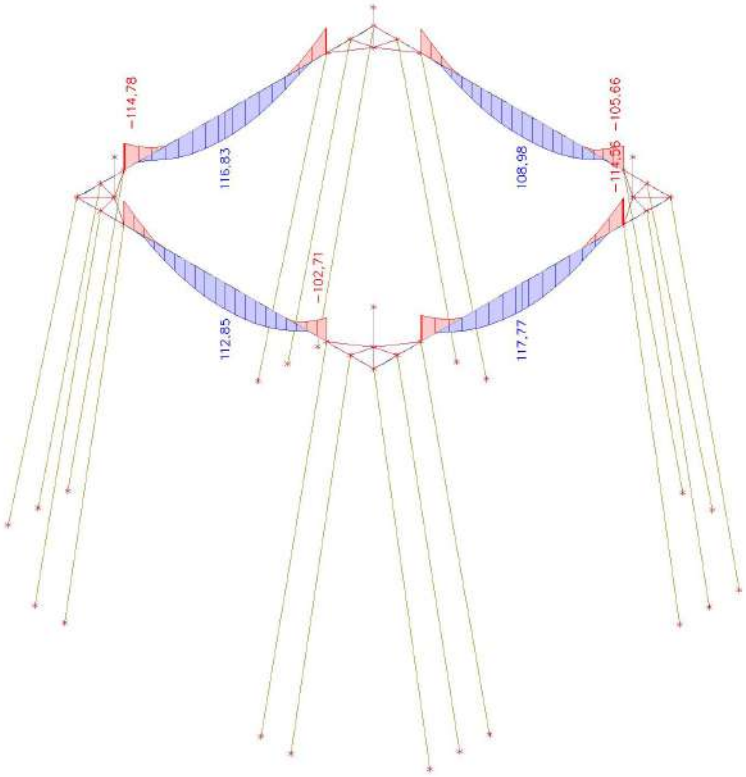
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



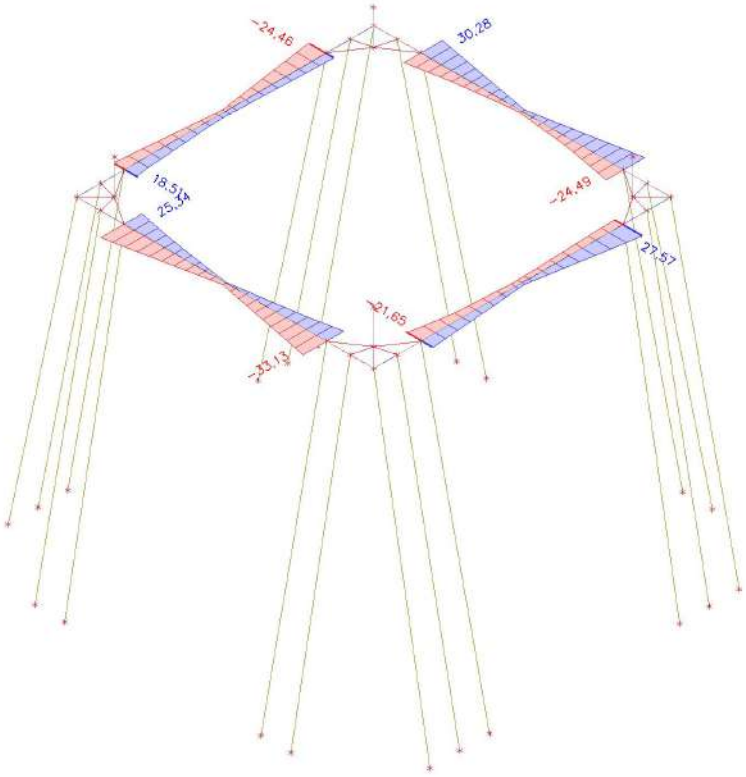
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: Named selection - FunderingsBalken
Filter: Layer = Balken

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Balk 5	2,000+	lL Bck + Wnd ;225°	**66,30**	-1,27	64,85	4,42	-89,70	-0,16
Balk 7	2,000+	hL Ahd + Wnd;90°	-78,60	**-6,64**	83,38	18,97	-62,02	24,39
Balk 4	10,600-	hL Ahd + Wnd;315°	-66,33	6,37	**-89,27**	-19,84	-91,21	**30,28**
Balk 4	2,000+	hL Bck + Wnd ;225°	-65,85	-6,24	**89,25**	**19,51**	-91,59	29,88
Balk 6	2,000+	hL Ahd + Wnd;315°	53,35	1,11	86,46	-4,82	**-114,78**	0,36
Balk 5	6,300	hL Ahd + Wnd;315°	**-134,41**	-2,90	1,26	9,76	**117,77**	3,74
Balk 7	2,000+	hL Bck + Wnd ;135°	-74,68	**6,80**	88,56	**-20,29**	-84,51	**-33,13**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-DIM 380kV
Part	Balkrooster 5xBeton40x40 mast 68
Author	[redacted]
Date	6-05-2026
Structure	General XYZ
No. of nodes :	52
No. of beams :	28
No. of slabs :	0
No. of solids :	0
No. of used profiles :	3
No. of load cases :	5
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,810
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materials

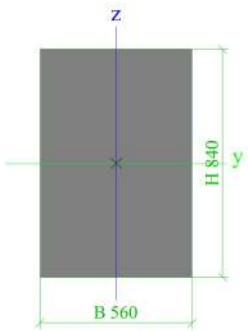
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C20/25 Ongescheurd	Concrete	1500,0	2600,0	2,4000e+04	0.2	0,00	20,00	
C20/25 Gescheurd	Concrete	2500,0	2600,0	8,0000e+03	0.2	0,00	20,00	

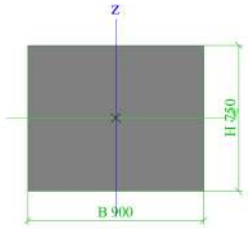
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

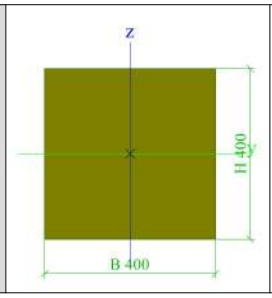
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 500B	Reinforcement steel	7850,0	2,0000e+05	8,3333e+04	0,00	500,0

4.2. Cross-sections

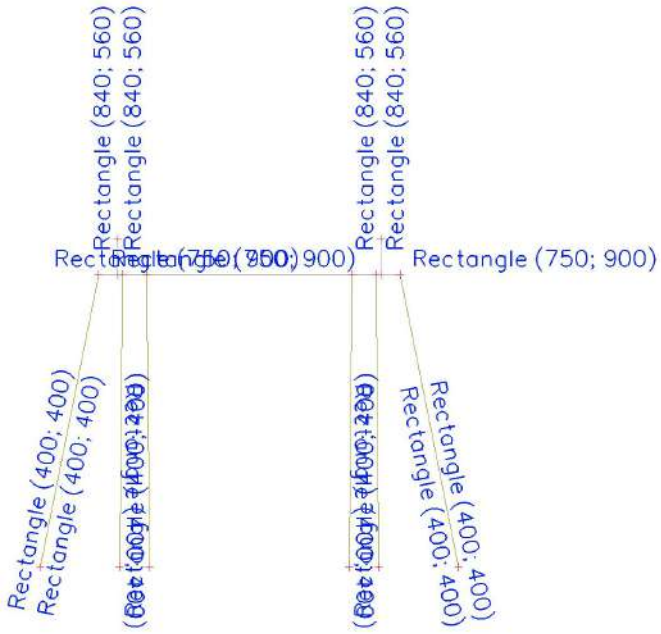
Poer.Opstort		
Type	Rectangle	
Detailed	840; 560	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	4,7040e-01	
A_y [m²], A_z [m²]	3,9200e-01	3,9200e-01
A_L [m²/m], A_D [m²/m]	2,8000e+00	2,8000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	280	420
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,7660e-02	1,2293e-02
i_y [mm], i_z [mm]	242	162
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	6,5856e-02	4,3904e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	2,8888e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

Balk		
Type	Rectangle	
Detailed	750; 900	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	6,7500e-01	
A_y [m²], A_z [m²]	5,6250e-01	5,6250e-01
A_L [m²/m], A_D [m²/m]	3,3000e+00	3,3000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450	375
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	3,1641e-02	4,5563e-02
i_y [mm], i_z [mm]	217	260
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	8,4375e-02	1,0125e-01
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	6,3112e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

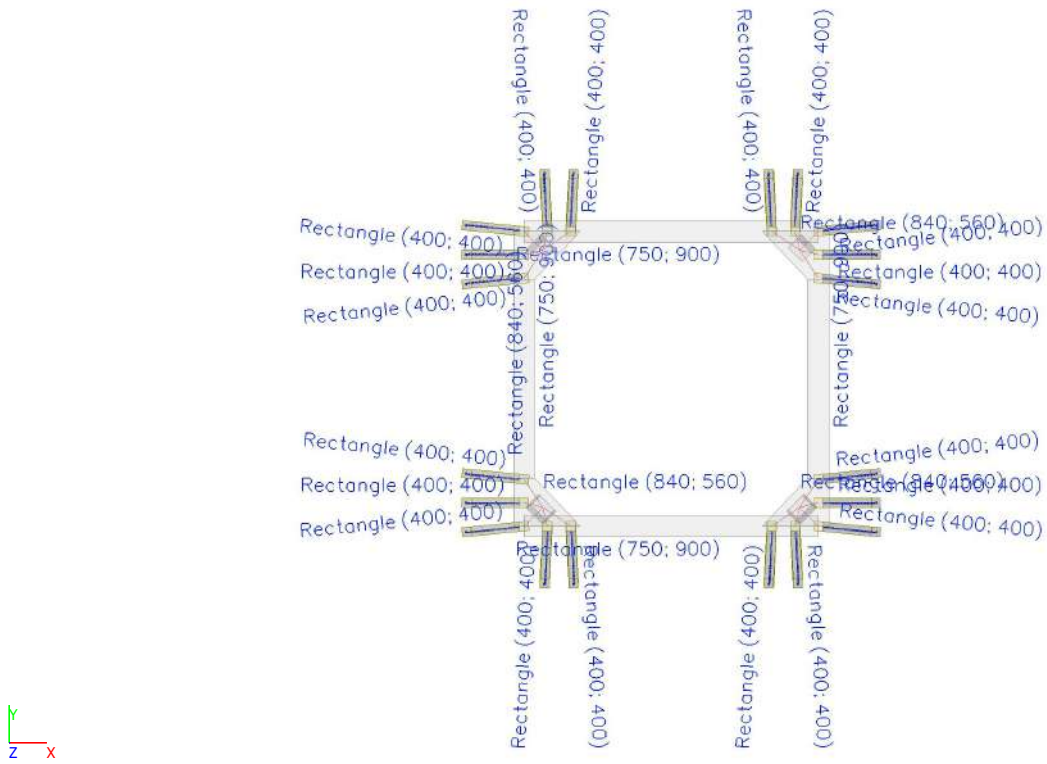
Funderingspaal		
Type	Rectangle	
Detailed	400; 400	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [m²]	1,6000e-01	
A_y [m²], A_z [m²]	1,3333e-01	1,3333e-01
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200	200
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,1333e-03	2,1333e-03
i_y [mm], i_z [mm]	115	115
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	1,0667e-02	1,0667e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	3,6027e-03	0,0000e+00
β_y [mm], β_z [mm]	0	0

Picture		
		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	NetInstelling1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	5
Average size of 2D mesh element [m]	0,250
Average size of 1D mesh element on curved 1D members [m]	0,200
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N5	13,000	1,400	0,000
N6	13,000	2,400	0,000
N7	12,000	0,400	0,000
N1	11,000	0,400	0,000
N17	0,400	0,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N21	0,400	13,000	0,000
1Y	12,200	1,200	1,475
N22	12,200	1,200	0,000
N23	12,200	12,200	0,000
1XY	12,200	12,200	1,475

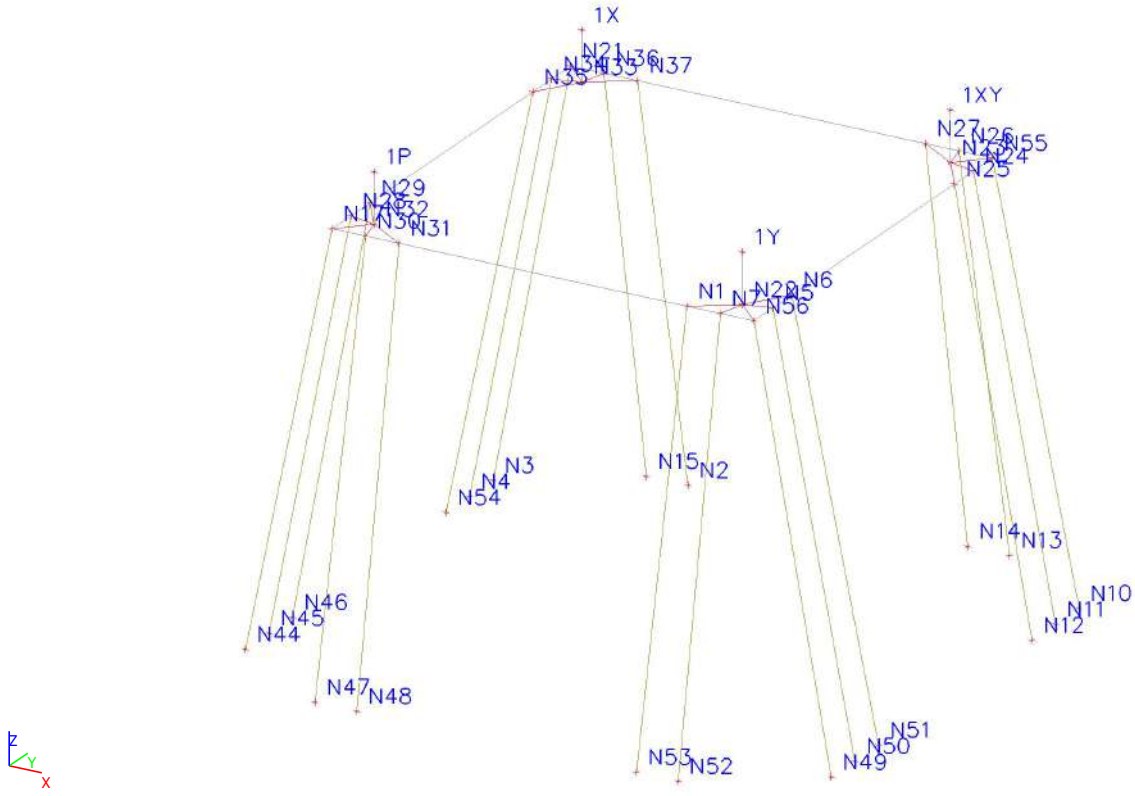
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N24	13,000	12,000	0,000
N25	13,000	11,000	0,000
N26	12,000	13,000	0,000
N27	11,000	13,000	0,000
N28	0,400	1,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N29	0,400	2,400	0,000
N30	1,400	0,400	0,000
N31	2,400	0,400	0,000
1P	1,200	1,200	1,475
N32	1,200	1,200	0,000
N33	1,200	12,200	0,000
1X	1,200	12,187	1,475
N34	0,400	12,000	0,000
N35	0,400	11,000	0,000
N36	1,400	13,000	0,000
N37	2,400	13,000	0,000
N38	12,200	1,200	0,000
N39	1,200	1,200	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N40	12,200	12,200	0,000
N41	1,200	12,200	0,000
N44	-2,051	0,155	-12,255
N45	-2,051	1,400	-12,253
N46	-2,051	2,645	-12,255
N47	1,277	-2,051	-12,254
N48	2,523	-2,051	-12,254
N49	15,451	0,155	-12,255
N50	15,451	1,400	-12,253
N51	15,451	2,645	-12,255
N52	12,123	-2,051	-12,254
N53	10,877	-2,051	-12,254
N10	15,451	13,245	-12,255

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N11	15,451	12,000	-12,253
N12	15,451	10,755	-12,255
N13	12,123	15,451	-12,254
N14	10,877	15,451	-12,254
N15	1,277	15,451	-12,254
N2	2,523	15,451	-12,254
N3	-2,051	13,245	-12,255
N4	-2,051	12,000	-12,253
N54	-2,051	10,755	-12,255
N55	13,000	13,000	0,000
N56	13,000	0,400	0,000

5.2. Analyse model met knopen

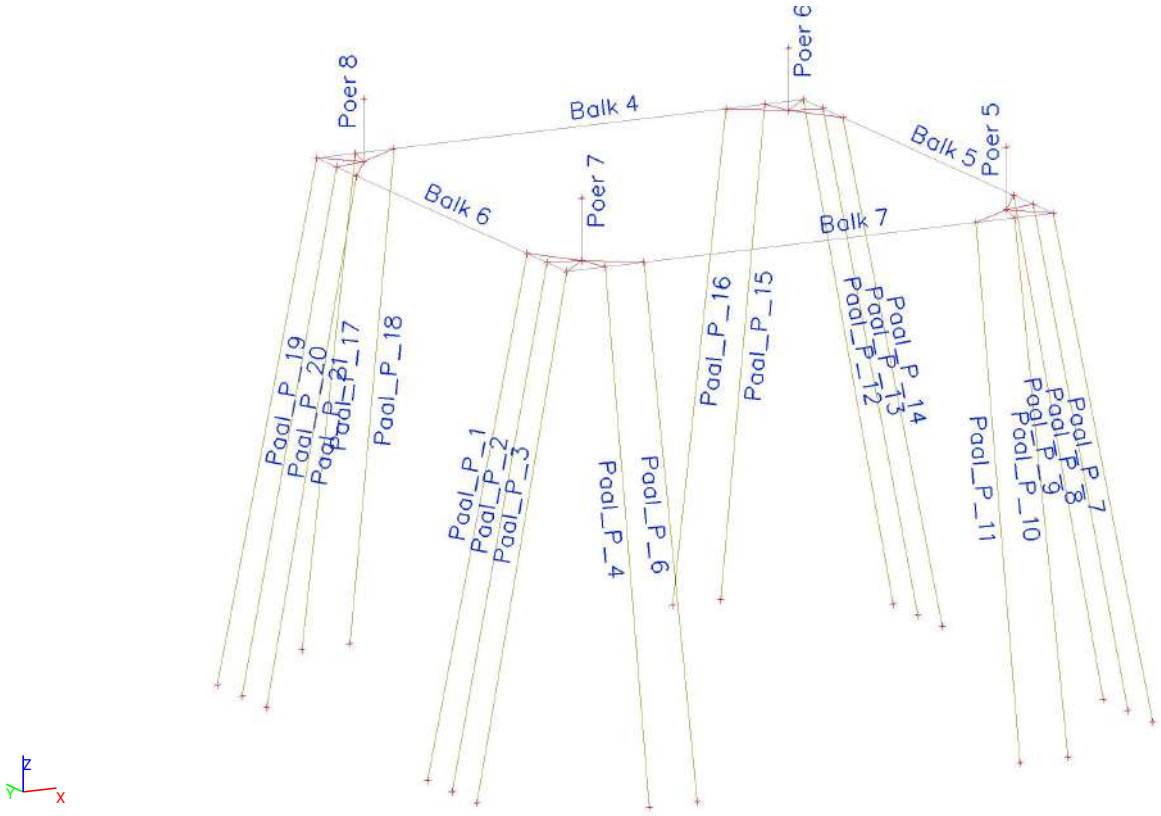


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Balk 4	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N55	N21	beam (80)
Balk 5	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N55	beam (80)
Balk 6	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N17	N21	beam (80)
Balk 7	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N17	beam (80)
Poer 5	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N22	1Y	column (100)
Poer 6	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N23	1XY	column (100)
Poer 7	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N32	1P	column (100)
Poer 8	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N33	1X	column (100)
Paal_P_1	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,500	N29	N46	column (100)
Paal_P_2	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,496	N28	N45	column (100)
Paal_P_3	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,500	N17	N44	column (100)
Paal_P_4	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,497	N30	N47	column (100)
Paal_P_6	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,497	N31	N48	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_7	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,500	N56	N49	column (100)
Paal_P_8	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,496	N5	N50	column (100)
Paal_P_9	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,500	N6	N51	column (100)
Paal_P_10	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,497	N7	N52	column (100)
Paal_P_11	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,497	N1	N53	column (100)
Paal_P_12	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,500	N55	N10	column (100)
Paal_P_13	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,496	N24	N11	column (100)
Paal_P_14	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,500	N25	N12	column (100)
Paal_P_15	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,497	N26	N13	column (100)
Paal_P_16	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,497	N27	N14	column (100)
Paal_P_17	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,497	N36	N15	column (100)
Paal_P_18	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,497	N37	N2	column (100)
Paal_P_19	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,500	N21	N3	column (100)
Paal_P_20	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,496	N34	N4	column (100)
Paal_P_21	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	12,500	N35	N54	column (100)

5.4. Analyse model met Staven

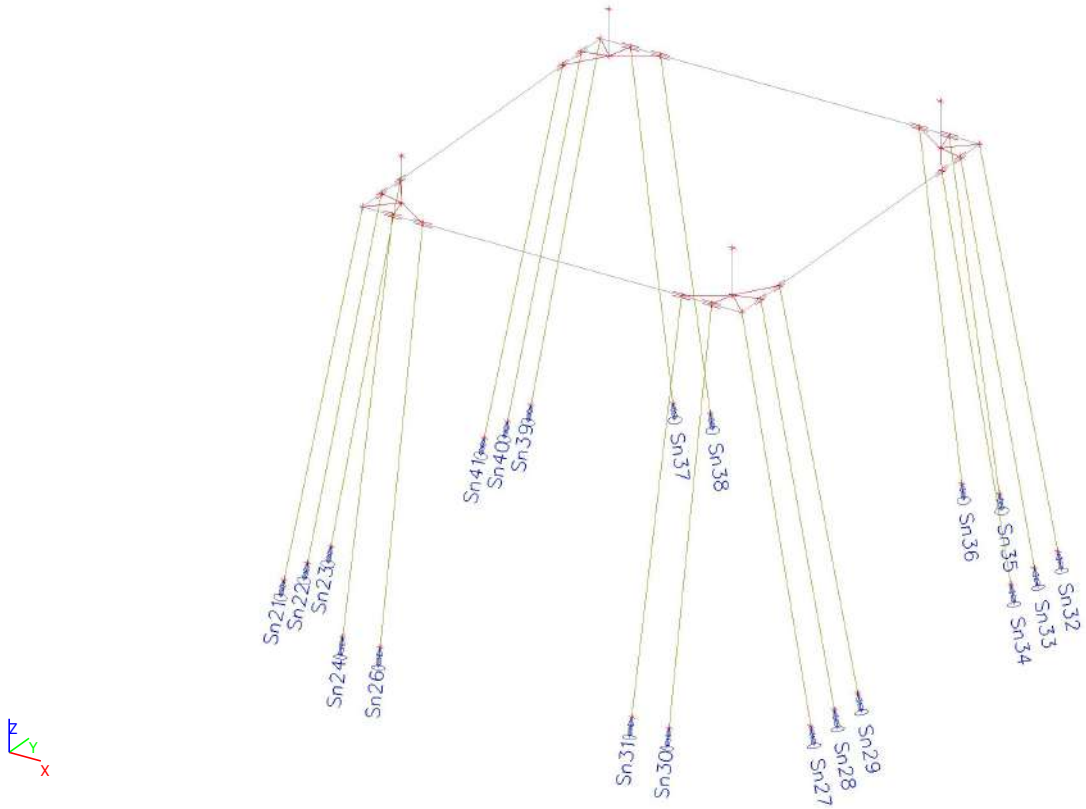


5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn21	N44	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31
Sn22	N45	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn23	N46	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn24	N47	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn26	N48	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn27	N49	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn28	N50	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31
Sn29	N51	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn30	N52	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn31	N53	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn32	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn33	N11	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn34	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn35	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn36	N14	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn37	N15	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn38	N2	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn39	N3	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn40	N4	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn41	N54	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31

5.6. Analyse model met Knoopondersteuningen



5.7. Line supports on member

Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
Veen	Line	Paal_P_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Veen3	Line	Paal_P_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Veen4	Line	Paal_P_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)1	Line	Paal_P_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V1)3	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V1)4	Line	Paal_P_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)	Line	Paal_P_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V2)1	Line	Paal_P_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V2)2	Line	Paal_P_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

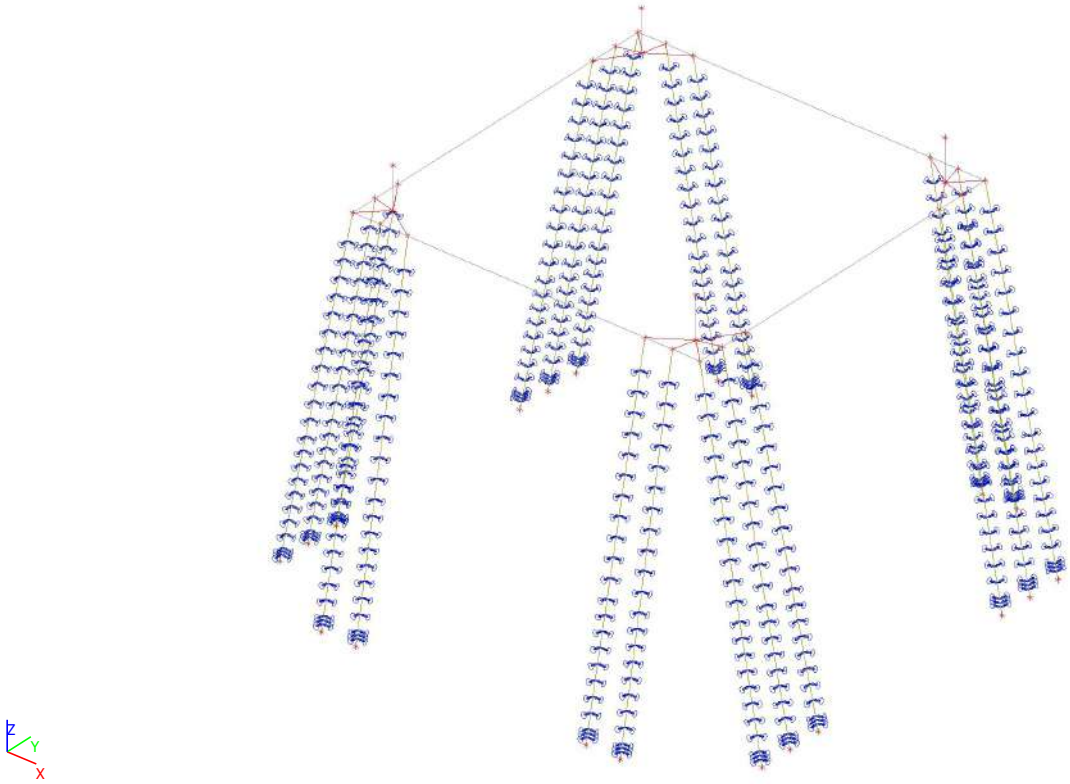
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	10,000	From start						
(PY-curve-1_V3)	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V3)19	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V3)12	Line	Paal_P_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)8	Line	Paal_P_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V4)17	Line	Paal_P_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V4)16	Line	Paal_P_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)18	Line	Paal_P_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
(PY-curve-1_V5)	Line	Paal_P_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
(PY-curve-1_V5)1	Line	Paal_P_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen18	Line	Paal_P_4	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)14	Line	Paal_P_4	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)7	Line	Paal_P_4	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)5	Line	Paal_P_4	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)3	Line	Paal_P_4	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)3	Line	Paal_P_4	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen9	Line	Paal_P_6	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)18	Line	Paal_P_6	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)9	Line	Paal_P_6	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)8	Line	Paal_P_6	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)2	Line	Paal_P_6	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)4	Line	Paal_P_6	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen8	Line	Paal_P_7	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)19	Line	Paal_P_7	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)12	Line	Paal_P_7	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)10	Line	Paal_P_7	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)13	Line	Paal_P_7	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)5	Line	Paal_P_7	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen16	Line	Paal_P_8	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)8	Line	Paal_P_8	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)14	Line	Paal_P_8	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)9	Line	Paal_P_8	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)5	Line	Paal_P_8	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
		LCS	12,000	From start						
(PY-curve-1_V5)6	Line	Paal_P_8	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen13	Line	Paal_P_9	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)2	Line	Paal_P_9	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)16	Line	Paal_P_9	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)1	Line	Paal_P_9	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)18	Line	Paal_P_9	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)7	Line	Paal_P_9	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen10	Line	Paal_P_10	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)15	Line	Paal_P_10	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)18	Line	Paal_P_10	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)11	Line	Paal_P_10	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)12	Line	Paal_P_10	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)8	Line	Paal_P_10	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen5	Line	Paal_P_11	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)16	Line	Paal_P_11	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)4	Line	Paal_P_11	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)15	Line	Paal_P_11	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)14	Line	Paal_P_11	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)9	Line	Paal_P_11	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen7	Line	Paal_P_12	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)10	Line	Paal_P_12	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)19	Line	Paal_P_12	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)2	Line	Paal_P_12	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)6	Line	Paal_P_12	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)11	Line	Paal_P_12	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen21	Line	Paal_P_13	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)12	Line	Paal_P_13	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)3	Line	Paal_P_13	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)16	Line	Paal_P_13	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)15	Line	Paal_P_13	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)12	Line	Paal_P_13	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen6	Line	Paal_P_14	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

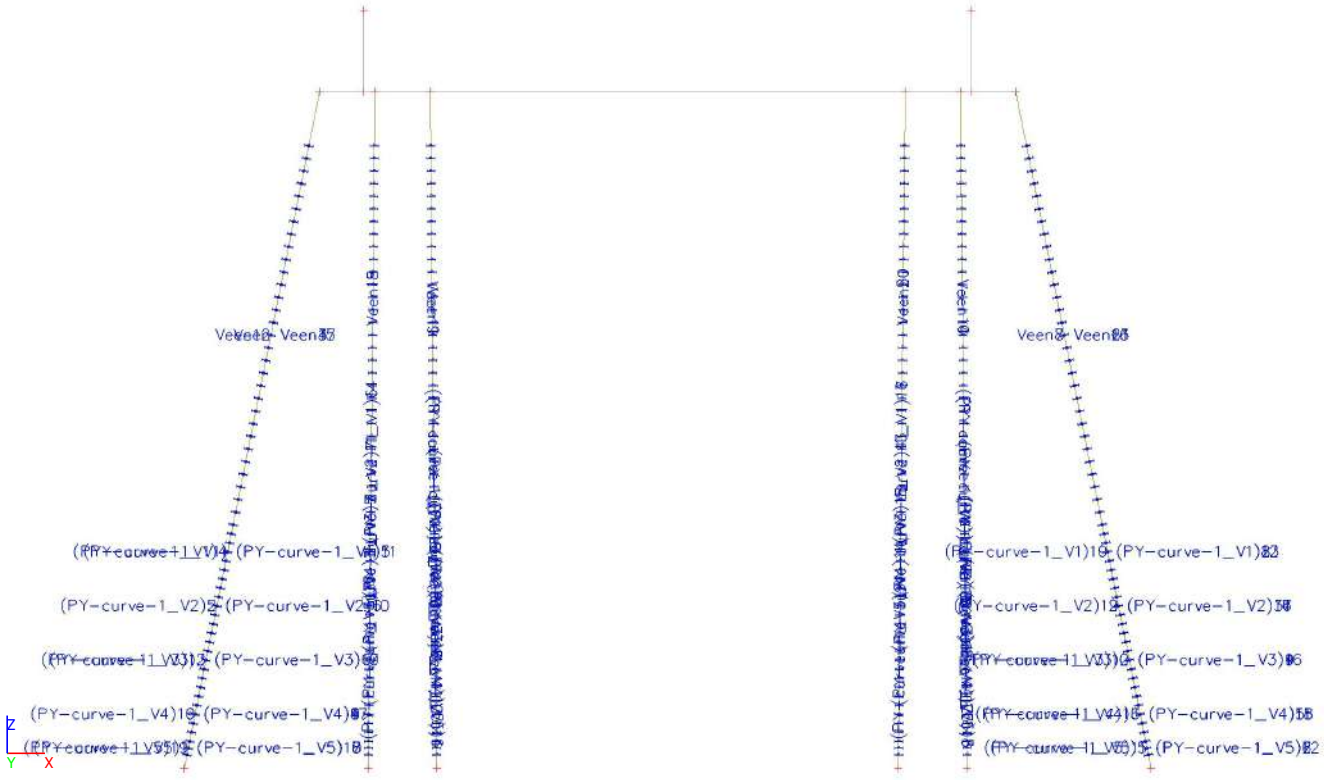
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
(PY-curve-1_V1)13	Line	Paal_P_14	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)17	Line	Paal_P_14	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)4	Line	Paal_P_14	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)11	Line	Paal_P_14	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)2	Line	Paal_P_14	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen14	Line	Paal_P_15	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)7	Line	Paal_P_15	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)15	Line	Paal_P_15	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)13	Line	Paal_P_15	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)7	Line	Paal_P_15	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)13	Line	Paal_P_15	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen20	Line	Paal_P_16	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)17	Line	Paal_P_16	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)13	Line	Paal_P_16	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)18	Line	Paal_P_16	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)	Line	Paal_P_16	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)14	Line	Paal_P_16	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen19	Line	Paal_P_17	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)6	Line	Paal_P_17	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)11	Line	Paal_P_17	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)7	Line	Paal_P_17	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)1	Line	Paal_P_17	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)15	Line	Paal_P_17	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen11	Line	Paal_P_18	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)9	Line	Paal_P_18	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)8	Line	Paal_P_18	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)14	Line	Paal_P_18	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
(PY-curve-1_V4)10	Line	Paal_P_18	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
(PY-curve-1_V5)16	Line	Paal_P_18	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Veen17	Line	Paal_P_19	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)11	Line	Paal_P_19	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)6	Line	Paal_P_19	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	10,000 11,000	From start Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)6	Line	Paal_P_19 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)4	Line	Paal_P_19 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)10	Line	Paal_P_19 LCS	12,000 12,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen15	Line	Paal_P_20 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)5	Line	Paal_P_20 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)10	Line	Paal_P_20 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)17	Line	Paal_P_20 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)9	Line	Paal_P_20 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)17	Line	Paal_P_20 LCS	12,000 12,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen12	Line	Paal_P_21 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)	Line	Paal_P_21 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)5	Line	Paal_P_21 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)3	Line	Paal_P_21 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)19	Line	Paal_P_21 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)19	Line	Paal_P_21 LCS	12,000 12,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

5.8. Analyse model met Lijnondersteuningen



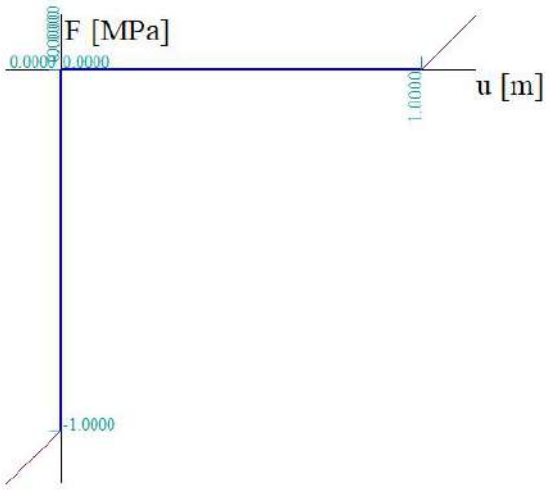
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

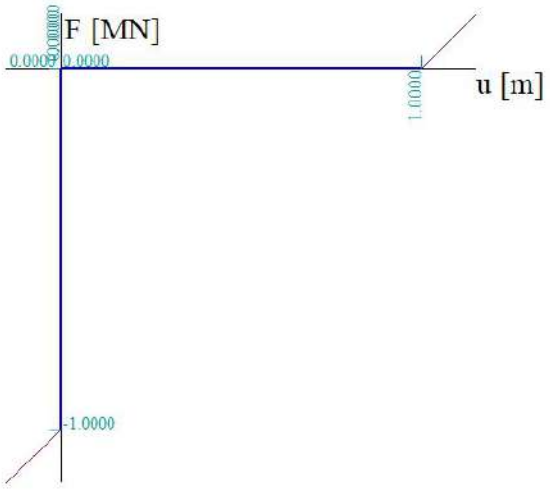
Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing



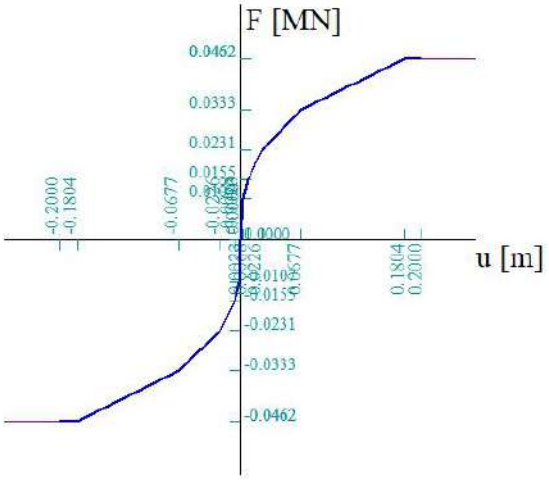
Name	Type	u / F	Positive end	Negative end
press only	Translation	-0.000001 / -1000000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 0.000000		

Drawing



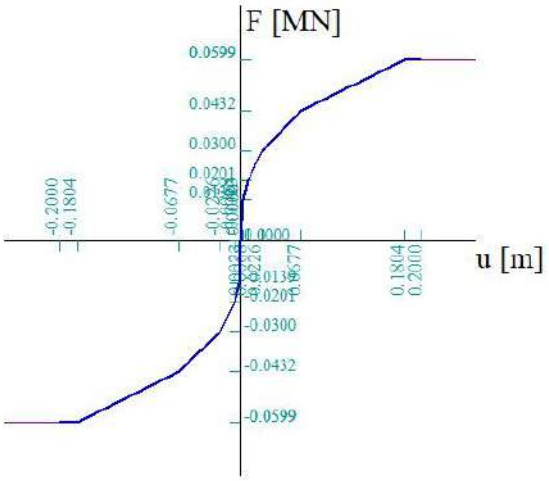
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -46203.840000	Free	Free
		-0.180400 / -46203.840000		
		-0.067650 / -33318.734193		
		-0.022550 / -23101.920000		
		-0.006765 / -15465.186458		
		-0.002255 / -10722.961391		
		0.000000 / 0.000000		
		0.002255 / 10722.961391		
		0.006765 / 15465.186458		
		0.022550 / 23101.920000		
		0.067650 / 33318.734193		
		0.180400 / 46203.840000		
		0.200000 / 46203.840000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -59935.680000	Free	Free
		-0.180400 / -59935.680000		
		-0.067650 / -43221.104363		
		-0.022550 / -29967.840000		
		-0.006765 / -20061.459539		
		-0.002255 / -13909.839151		
		0.000000 / 0.000000		
		0.002255 / 13909.839151		
		0.006765 / 20061.459539		
		0.022550 / 29967.840000		
		0.067650 / 43221.104363		
		0.180400 / 59935.680000		
		0.200000 / 59935.680000		

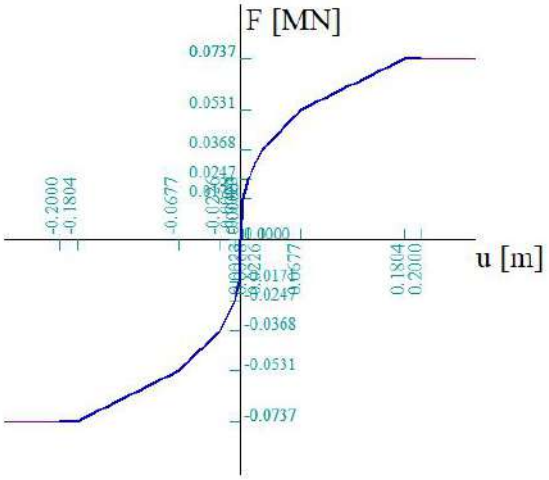
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -73667.520000	Free	Free
		-0.180400 / -73667.520000		
		-0.067650 / -53123.474533		
		-0.022550 / -36833.760000		
		-0.006765 / -24657.732619		
		-0.002255 / -17096.716912		
		0.000000 / 0.000000		
		0.002255 / 17096.716912		

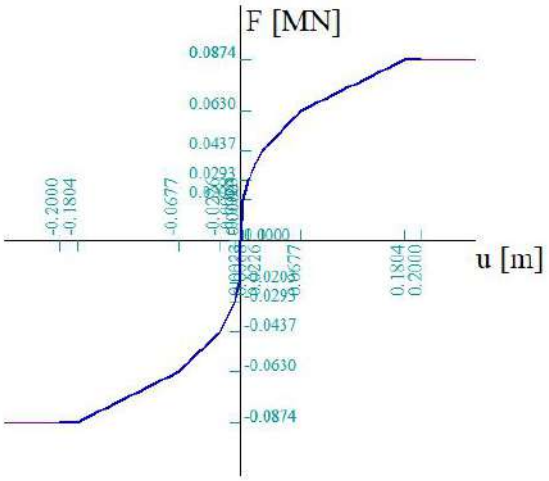
Name	Type	u / F	Positive end	Negative end
		0.006765 / 24657.732619		
		0.022550 / 36833.760000		
		0.067650 / 53123.474533		
		0.180400 / 73667.520000		
		0.200000 / 73667.520000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -87399.360000	Free	Free
		-0.180400 / -87399.360000		
		-0.067650 / -63025.844703		
		-0.022550 / -43699.680000		
		-0.006765 / -29254.005700		
		-0.002255 / -20283.594672		
		0.000000 / 0.000000		
		0.002255 / 20283.594672		
		0.006765 / 29254.005700		
		0.022550 / 43699.680000		
		0.067650 / 63025.844703		
		0.180400 / 87399.360000		
		0.200000 / 87399.360000		

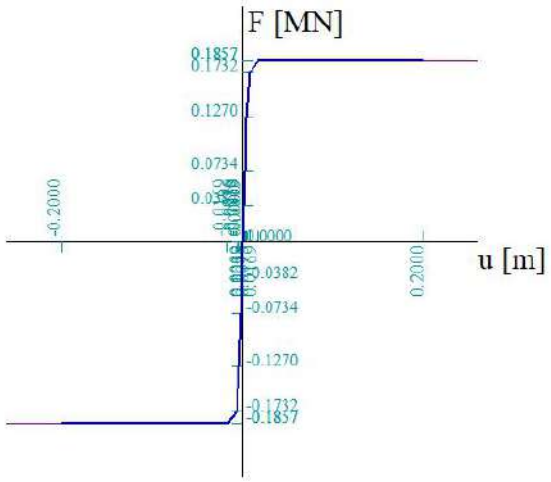
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -185749.581577	Free	Free
		-0.016913 / -185749.581577		

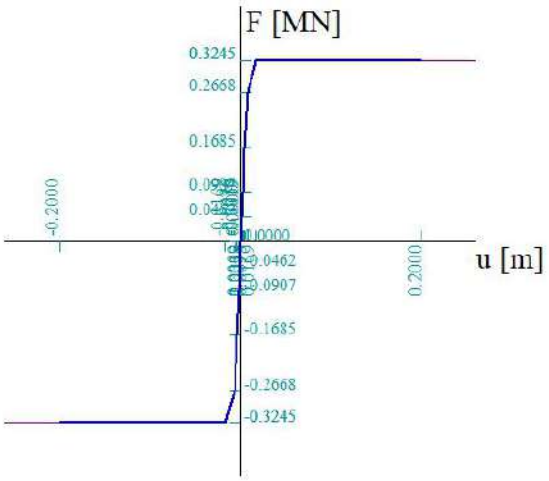
Name	Type	u / F	Positive end	Negative end
		-0.007517 / -173191.521652		
		-0.003758 / -126966.550767		
		-0.001879 / -73364.887728		
		-0.000940 / -38233.153457		
		0.000000 / 0.000000		
		0.000940 / 38233.153457		
		0.001879 / 73364.887728		
		0.003758 / 126966.550767		
		0.007517 / 173191.521652		
		0.016913 / 185749.581577		
		0.200000 / 185749.581577		

Drawing



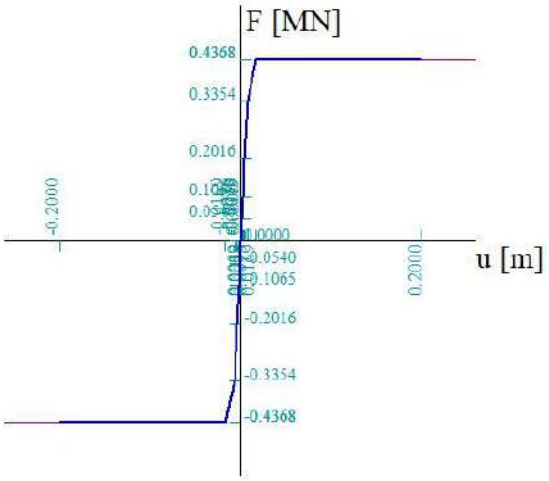
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -324503.959510	Free	Free
		-0.016913 / -324503.959510		
		-0.007517 / -266801.170128		
		-0.003758 / -168504.997582		
		-0.001879 / -90672.108471		
		-0.000940 / -46234.204284		
		0.000000 / 0.000000		
		0.000940 / 46234.204284		
		0.001879 / 90672.108471		
		0.003758 / 168504.997582		
		0.007517 / 266801.170128		
		0.016913 / 324503.959510		
		0.200000 / 324503.959510		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -436765.819801	Free	Free
		-0.016913 / -436765.819801		
		-0.007517 / -335362.730832		
		-0.003758 / -201646.948699		
		-0.001879 / -106522.716227		
		-0.000940 / -54036.089272		
		0.000000 / 0.000000		
		0.000940 / 54036.089272		
		0.001879 / 106522.716227		
		0.003758 / 201646.948699		
		0.007517 / 335362.730832		
		0.016913 / 436765.819801		
		0.200000 / 436765.819801		

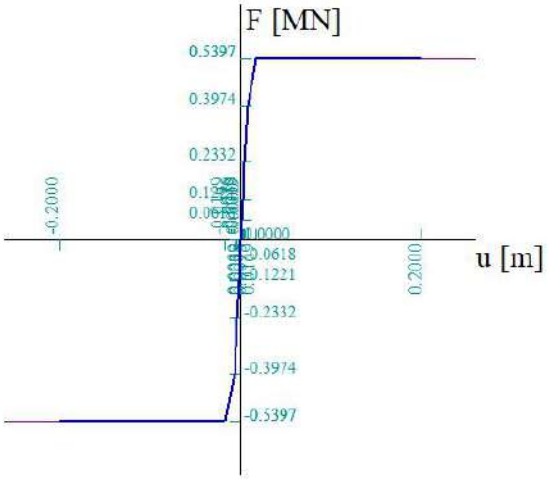
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -539683.678038	Free	Free
		-0.016913 / -539683.678038		
		-0.007517 / -397433.011814		
		-0.003758 / -233158.398644		
		-0.001879 / -122122.429030		
		-0.000940 / -61804.852432		
		0.000000 / 0.000000		
		0.000940 / 61804.852432		
		0.001879 / 122122.429030		
		0.003758 / 233158.398644		

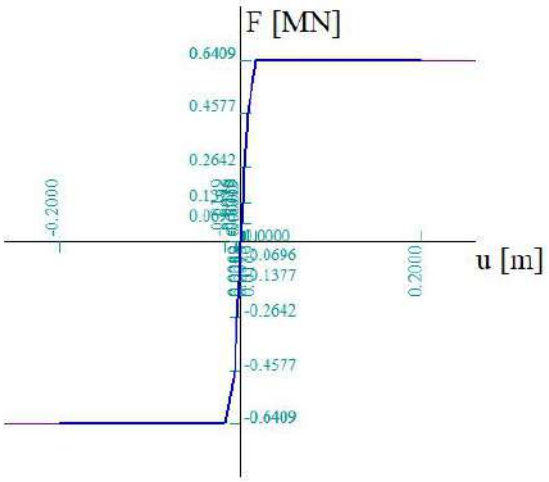
Name	Type	u / F	Positive end	Negative end
		0.007517 / 397433.011814		
		0.016913 / 539683.678038		
		0.200000 / 539683.678038		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -640861.931437	Free	Free
		-0.016913 / -640861.931437		
		-0.007517 / -457700.088592		
		-0.003758 / -264224.038576		
		-0.001879 / -137654.602914		
		-0.000940 / -69564.742931		
		0.000000 / 0.000000		
		0.000940 / 69564.742931		
		0.001879 / 137654.602914		
		0.003758 / 264224.038576		
		0.007517 / 457700.088592		
		0.016913 / 640861.931437		
		0.200000 / 640861.931437		

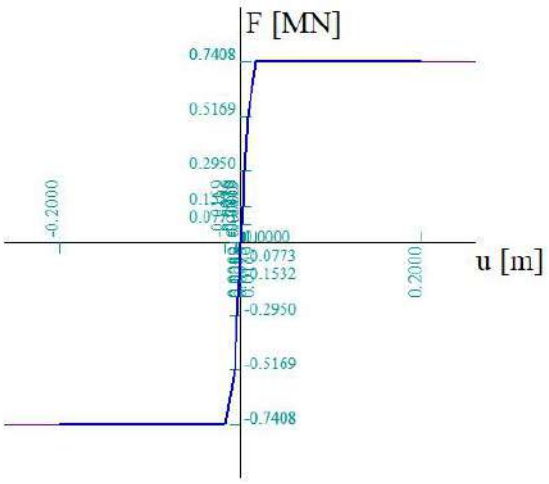
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -740774.043969	Free	Free
		-0.016913 / -740774.043969		
		-0.007517 / -516894.797403		
		-0.003758 / -295043.983610		

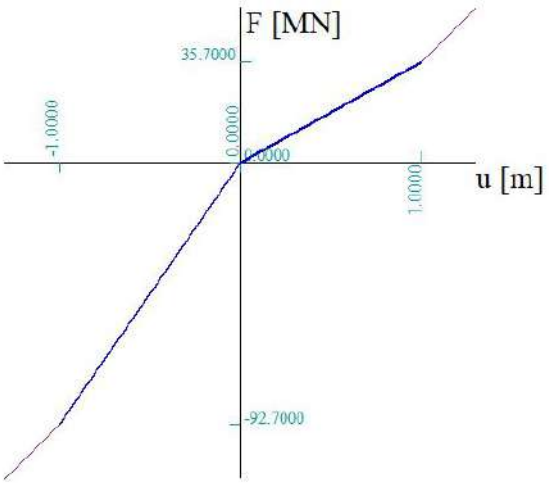
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -153150.432455		
		-0.000940 / -77319.889121		
		0.000000 / 0.000000		
		0.000940 / 77319.889121		
		0.001879 / 153150.432455		
		0.003758 / 295043.983610		
		0.007517 / 516894.797403		
		0.016913 / 740774.043969		
		0.200000 / 740774.043969		

Drawing



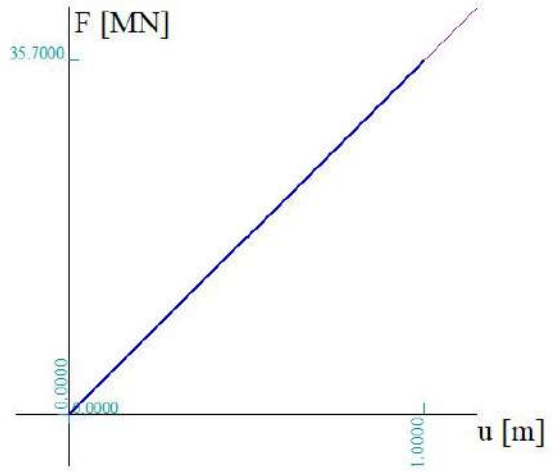
Name	Type	u / F	Positive end	Negative end
S+0 lower bound	Translation	-1.000000 / -92700000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 35700000.000000		

Drawing



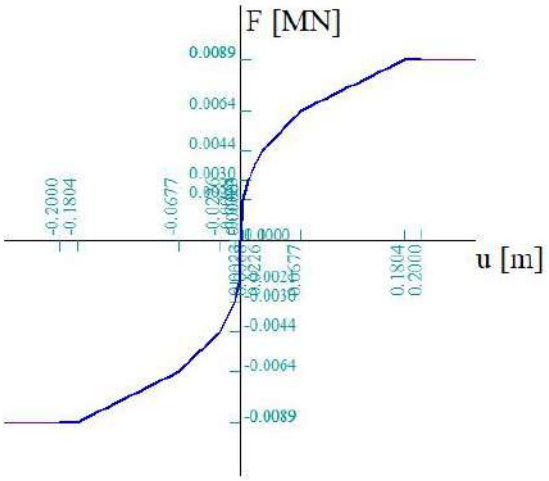
Name	Type	u / F	Positive end	Negative end
S+0 lower bound Trek	Translation	0.000000 / 0.000000	Flexible	Free
		1.000000 / 35700000.000000		

Drawing



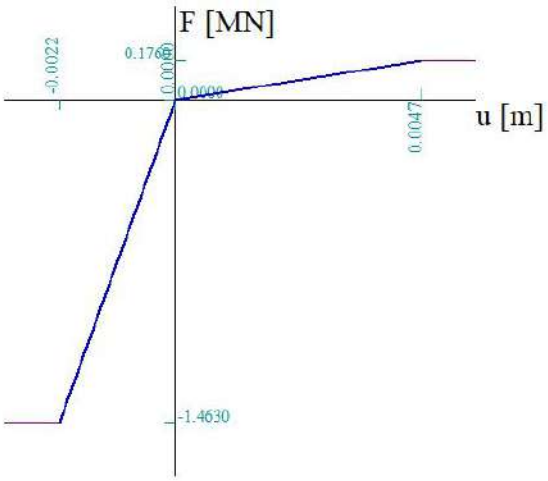
Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -8894.400000	Free	Free
		-0.180400 / -8894.400000		
		-0.067650 / -6413.760000		
		-0.022550 / -4447.680000		
		-0.006765 / -2976.960000		
		-0.002255 / -2064.000000		
		0.000000 / 0.000000		
		0.002255 / 2064.000000		
		0.006765 / 2976.960000		
		0.022550 / 4447.680000		
		0.067650 / 6413.760000		
		0.180400 / 8894.400000		
		0.200000 / 8894.400000		

Drawing



Name	Type	u / F	Positive end	Negative end
Trek-druk-S+paalpunt	Translation	-0.002190 / -1463000.000000	Free	Free
		0.000000 / 0.000000		
		0.004660 / 176000.000000		

Drawing

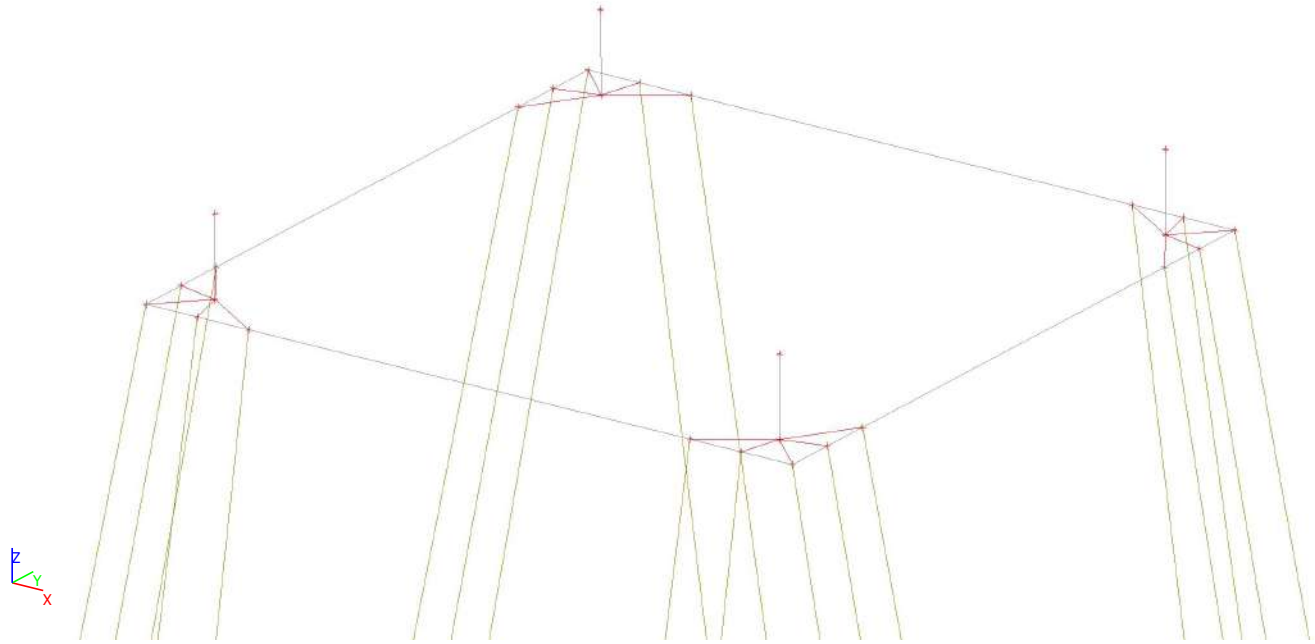

F [MN]
u [m]
-0.0022
0.1768
0.0000
0.0047
-1.4630

6. Belastingen

6.1. Load cases

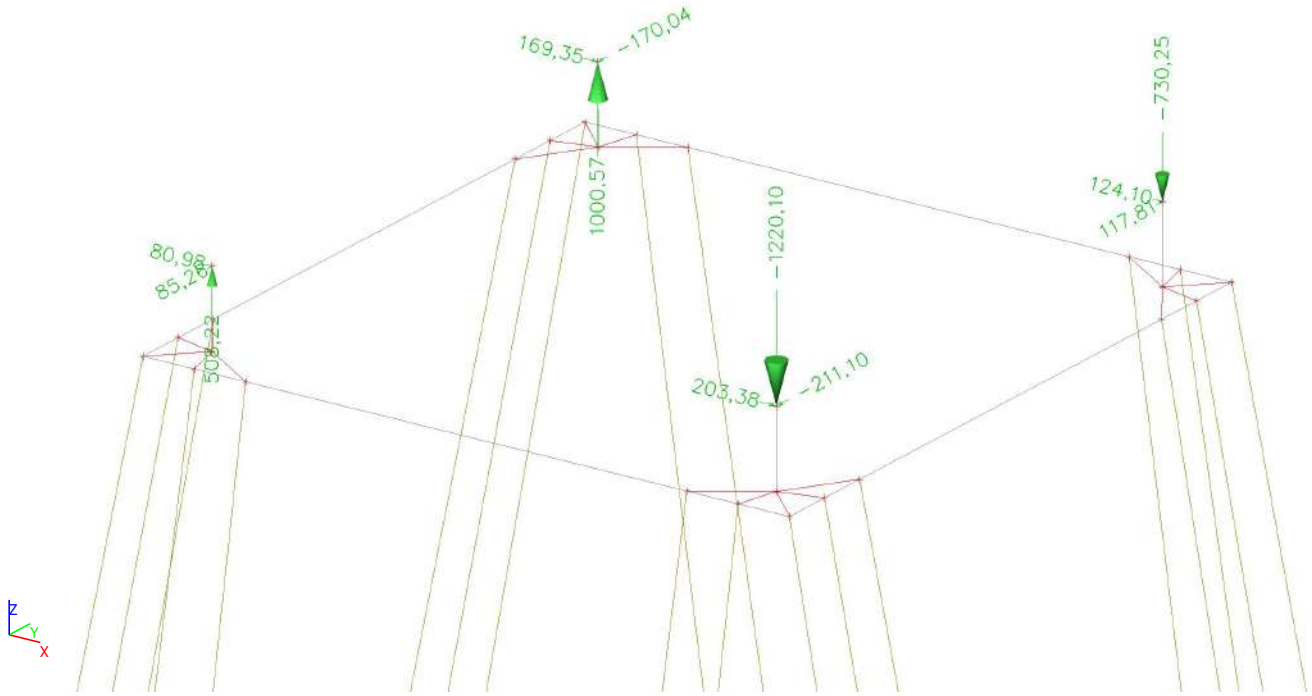
6.1.1. Load cases - E.G.

Name	Description	Action type	Load group	Direction
	Spec	Load type		
E.G.		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - hL Bck + Wnd ;270°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;270°		Variable	LG4	Short	None
	Standard	Static			

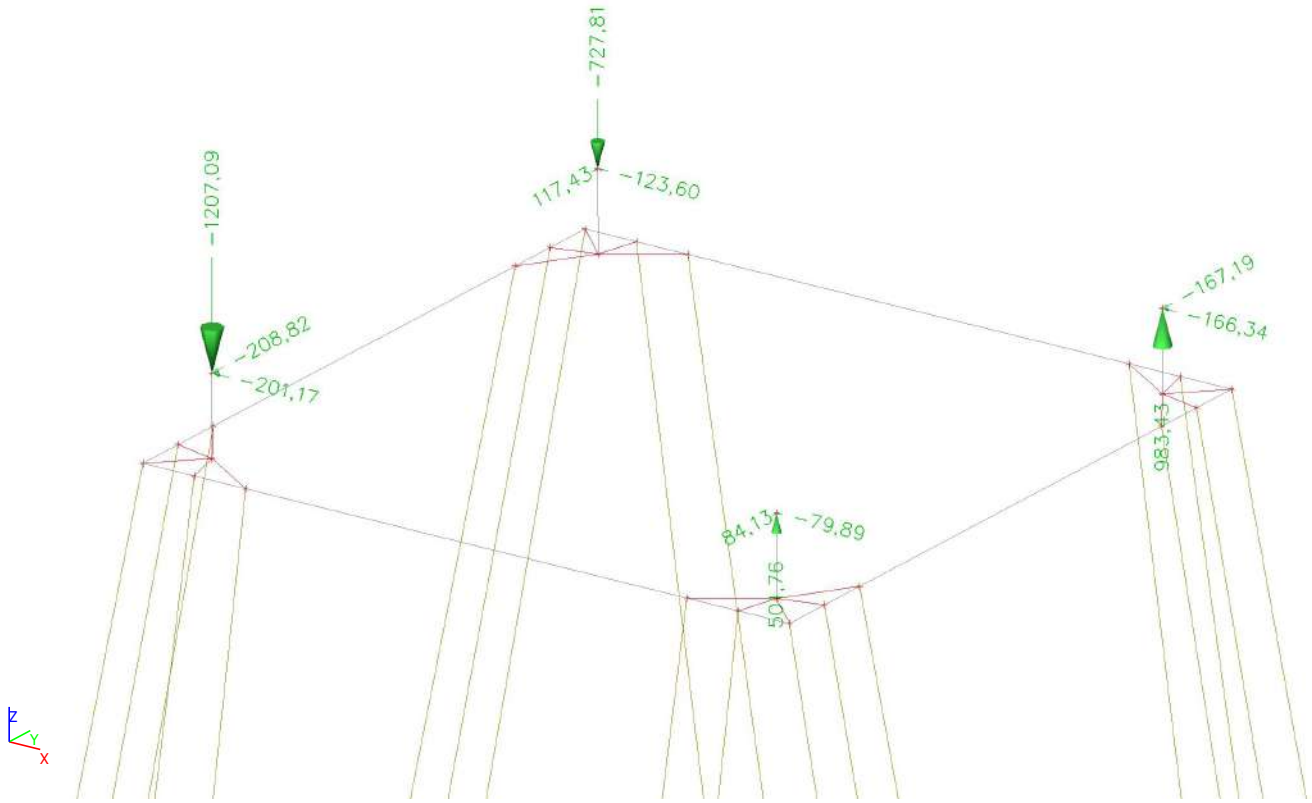


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;270°_1X_X	1X	hL Bck + Wnd ;270°	GCS	X	Force	169,35
hL Bck + Wnd ;270°_1X_Y	1X	hL Bck + Wnd ;270°	GCS	Y	Force	-170,04
hL Bck + Wnd ;270°_1X_Z	1X	hL Bck + Wnd ;270°	GCS	Z	Force	1000,57
hL Bck + Wnd ;270°_1Y_X	1Y	hL Bck + Wnd ;270°	GCS	X	Force	203,38
hL Bck + Wnd ;270°_1Y_Y	1Y	hL Bck + Wnd ;270°	GCS	Y	Force	-211,10
hL Bck + Wnd ;270°_1Y_Z	1Y	hL Bck + Wnd ;270°	GCS	Z	Force	-1220,10
hL Bck + Wnd ;270°_1P_X	1P	hL Bck + Wnd ;270°	GCS	X	Force	80,98
hL Bck + Wnd ;270°_1P_Y	1P	hL Bck + Wnd ;270°	GCS	Y	Force	85,26
hL Bck + Wnd ;270°_1P_Z	1P	hL Bck + Wnd ;270°	GCS	Z	Force	508,22
hL Bck + Wnd ;270°_1XY_X	1XY	hL Bck + Wnd ;270°	GCS	X	Force	124,10
hL Bck + Wnd ;270°_1XY_Y	1XY	hL Bck + Wnd ;270°	GCS	Y	Force	117,81
hL Bck + Wnd ;270°_1XY_Z	1XY	hL Bck + Wnd ;270°	GCS	Z	Force	-730,25

6.1.3. Load cases - hL Ahd + Wnd ;270°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;270°		Variable	LG4	Short	None
	Standard	Static			



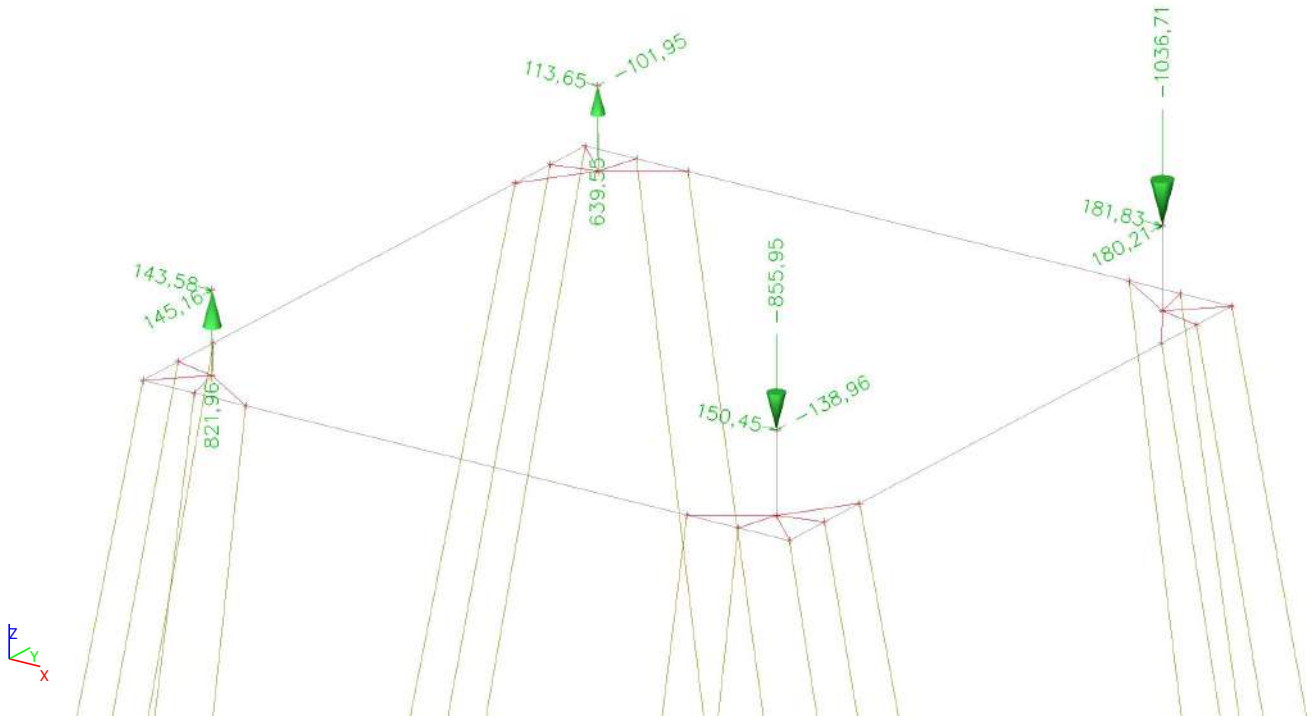
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;270°_1P_X	1P	hL Ahd + Wnd ;270°	GCS	X	Force	-201,17
hL Ahd + Wnd ;270°_1P_Y	1P	hL Ahd + Wnd ;270°	GCS	Y	Force	-208,82
hL Ahd + Wnd ;270°_1P_Z	1P	hL Ahd + Wnd ;270°	GCS	Z	Force	-1207,09
hL Ahd + Wnd ;270°_1XY_X	1XY	hL Ahd + Wnd ;270°	GCS	X	Force	-166,34
hL Ahd + Wnd ;270°_1XY_Y	1XY	hL Ahd + Wnd ;270°	GCS	Y	Force	-167,19
hL Ahd + Wnd ;270°_1XY_Z	1XY	hL Ahd + Wnd ;270°	GCS	Z	Force	983,43
hL Ahd + Wnd ;270°_1X_X	1X	hL Ahd + Wnd ;270°	GCS	X	Force	-123,60
hL Ahd + Wnd ;270°_1X_Y	1X	hL Ahd + Wnd ;270°	GCS	Y	Force	117,43
hL Ahd + Wnd ;270°_1X_Z	1X	hL Ahd + Wnd ;270°	GCS	Z	Force	-727,81
hL Ahd + Wnd ;270°_1Y_X	1Y	hL Ahd + Wnd ;270°	GCS	X	Force	-79,89
hL Ahd + Wnd ;270°_1Y_Y	1Y	hL Ahd + Wnd ;270°	GCS	Y	Force	84,13

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;270°_1Y_Z	1Y	hL Ahd + Wnd ;270°	GCS	Z	Force	501,76

6.1.4. Load cases - hL Bck + Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



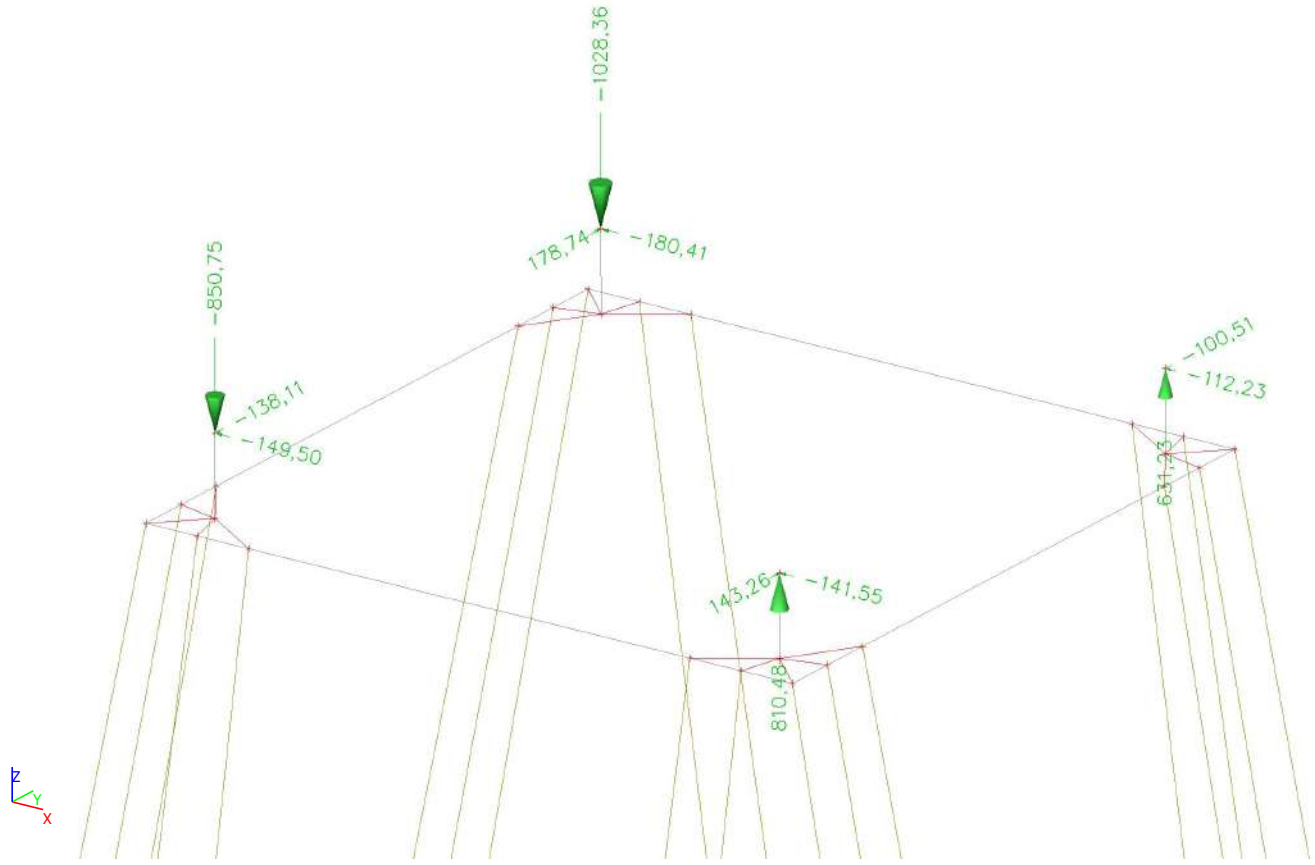
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;135°_1P_X	1P	hL Bck + Wnd ;135°	GCS	X	Force	143,58
hL Bck + Wnd ;135°_1P_Y	1P	hL Bck + Wnd ;135°	GCS	Y	Force	145,16
hL Bck + Wnd ;135°_1P_Z	1P	hL Bck + Wnd ;135°	GCS	Z	Force	821,96
hL Bck + Wnd ;135°_1XY_X	1XY	hL Bck + Wnd ;135°	GCS	X	Force	181,83
hL Bck + Wnd ;135°_1XY_Y	1XY	hL Bck + Wnd ;135°	GCS	Y	Force	180,21
hL Bck + Wnd ;135°_1XY_Z	1XY	hL Bck + Wnd ;135°	GCS	Z	Force	-1036,71
hL Bck + Wnd ;135°_1X_X	1X	hL Bck + Wnd ;135°	GCS	X	Force	113,65
hL Bck + Wnd ;135°_1X_Y	1X	hL Bck + Wnd ;135°	GCS	Y	Force	-101,95

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;135°_1X_Z	1X	hL Bck + Wnd ;135°	GCS	Z	Force	639,55
hL Bck + Wnd ;135°_1Y_X	1Y	hL Bck + Wnd ;135°	GCS	X	Force	150,45
hL Bck + Wnd ;135°_1Y_Y	1Y	hL Bck + Wnd ;135°	GCS	Y	Force	-138,96
hL Bck + Wnd ;135°_1Y_Z	1Y	hL Bck + Wnd ;135°	GCS	Z	Force	-855,95

6.1.5. Load cases - hL Ahd + Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;45°_1X_X	1X	hL Ahd + Wnd ;45°	GCS	X	Force	-180,41
hL Ahd + Wnd ;45°_1X_Y	1X	hL Ahd + Wnd ;45°	GCS	Y	Force	178,74
hL Ahd + Wnd ;45°_1X_Z	1X	hL Ahd + Wnd ;45°	GCS	Z	Force	-1028,36
hL Ahd + Wnd ;45°_1Y_X	1Y	hL Ahd + Wnd ;45°	GCS	X	Force	-141,55
hL Ahd + Wnd ;45°_1Y_Y	1Y	hL Ahd + Wnd ;45°	GCS	Y	Force	143,26

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;45°_1Y_Z	1Y	hL Ahd + Wnd ;45°	GCS	Z	Force	810,48
hL Ahd + Wnd ;45°_1P_X	1P	hL Ahd + Wnd ;45°	GCS	X	Force	-149,50
hL Ahd + Wnd ;45°_1P_Y	1P	hL Ahd + Wnd ;45°	GCS	Y	Force	-138,11
hL Ahd + Wnd ;45°_1P_Z	1P	hL Ahd + Wnd ;45°	GCS	Z	Force	-850,75
hL Ahd + Wnd ;45°_1XY_X	1XY	hL Ahd + Wnd ;45°	GCS	X	Force	-112,23
hL Ahd + Wnd ;45°_1XY_Y	1XY	hL Ahd + Wnd ;45°	GCS	Y	Force	-100,51
hL Ahd + Wnd ;45°_1XY_Z	1XY	hL Ahd + Wnd ;45°	GCS	Z	Force	631,23

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
hL Ahd + Wnd ;45°	Ultimate	E.G.	1,20
		hL Ahd + Wnd ;45°	1,00
hL Bck + Wnd ;270°	Ultimate	E.G.	1,20
		hL Bck + Wnd ;270°	1,00
hL Ahd + Wnd ;270°	Ultimate	E.G.	1,20
		hL Ahd + Wnd ;270°	1,00
hL Bck + Wnd ;135°	Ultimate	E.G.	1,20
		hL Bck + Wnd ;135°	1,00
lL Ahd + Wnd ;45°	Ultimate	E.G.	0,90
		hL Ahd + Wnd ;45°	1,00
lL Bck + Wnd ;270°	Ultimate	E.G.	0,90
		hL Bck + Wnd ;270°	1,00
lL Ahd + Wnd ;270°	Ultimate	E.G.	0,90
		hL Ahd + Wnd ;270°	1,00
lL Bck + Wnd ;135°	Ultimate	E.G.	0,90
		hL Bck + Wnd ;135°	1,00

6.3. Result classes

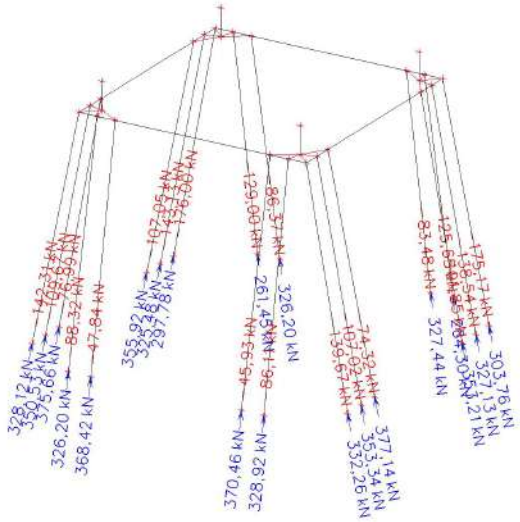
Name	List
All non-linear	hL Ahd + Wnd ;45°
	hL Bck + Wnd ;270°
	hL Ahd + Wnd ;270°
	hL Bck + Wnd ;135°
	lL Ahd + Wnd ;45°
	lL Bck + Wnd ;270°
	lL Ahd + Wnd ;270°
	lL Bck + Wnd ;135°

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn39/N3	lL Bck + Wnd ;270°	0,00	0,00	**-176,00**	0,00	0,00	0,00	0,0	0,0
Sn29/N51	hL Bck + Wnd ;270°	**0,00**	**0,00**	**377,14**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn21/N44	lL Bck + Wnd ;135°	0,00	0,00	**-142,31**	0,00	0,00	0,00	0,0	0,0
Sn21/N44	lL Ahd + Wnd ;270°	**0,00**	**0,00**	**328,12**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn22/N45	lL Bck + Wnd ;135°	0,00	0,00	**-109,67**	0,00	0,00	0,00	0,0	0,0
Sn22/N45	hL Ahd +	**0,00**	**0,00**	**350,53**	**0,00**	**0,00**	**0,00**	0,0	0,0

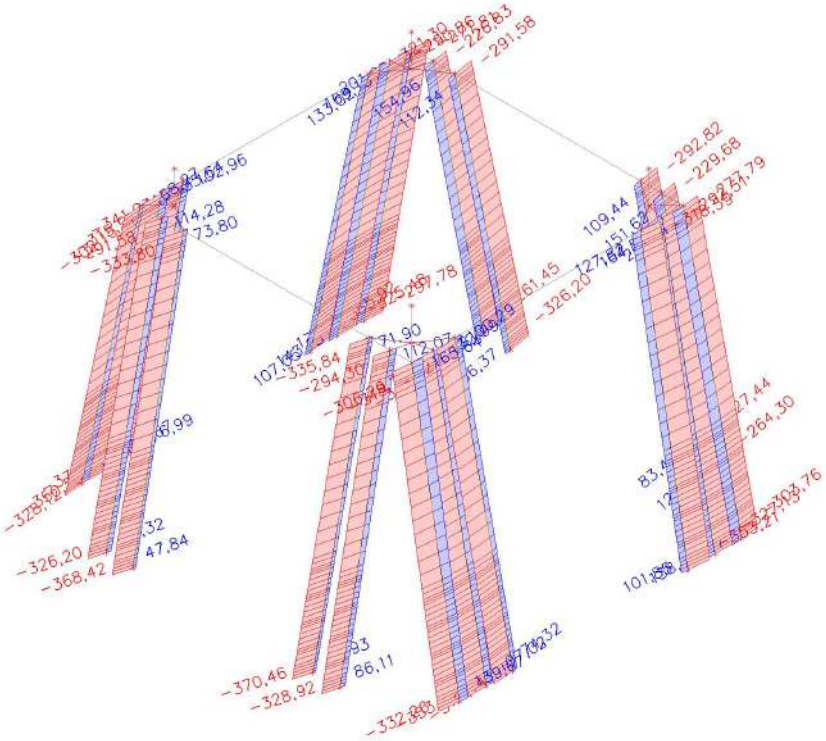
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;270°								
Sn23/N46	lL Bck + Wnd ;135°	0,00	0,00	**-76,99**	0,00	0,00	0,00	0,0	0,0
Sn23/N46	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**375,66**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn24/N47	lL Bck + Wnd ;135°	0,00	0,00	**-88,32**	0,00	0,00	0,00	0,0	0,0
Sn24/N47	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**326,20**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn26/N48	lL Bck + Wnd ;135°	0,00	0,00	**-47,84**	0,00	0,00	0,00	0,0	0,0
Sn26/N48	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**368,42**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn27/N49	lL Ahd + Wnd ;45°	0,00	0,00	**-139,67**	0,00	0,00	0,00	0,0	0,0
Sn27/N49	lL Bck + Wnd ;270°	**0,00**	**0,00**	**332,26**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn28/N50	lL Ahd + Wnd ;45°	0,00	0,00	**-107,02**	0,00	0,00	0,00	0,0	0,0
Sn28/N50	hL Bck + Wnd ;270°	**0,00**	**0,00**	**353,34**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn29/N51	lL Ahd + Wnd ;45°	0,00	0,00	**-74,32**	0,00	0,00	0,00	0,0	0,0
Sn29/N51	hL Bck + Wnd ;270°	**0,00**	**0,00**	**377,14**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn30/N52	lL Ahd + Wnd ;45°	0,00	0,00	**-86,11**	0,00	0,00	0,00	0,0	0,0
Sn30/N52	hL Bck + Wnd ;270°	**0,00**	**0,00**	**328,92**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn31/N53	lL Ahd + Wnd ;45°	0,00	0,00	**-45,93**	0,00	0,00	0,00	0,0	0,0
Sn31/N53	hL Bck + Wnd ;270°	**0,00**	**0,00**	**370,46**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn32/N10	lL Ahd + Wnd ;270°	0,00	0,00	**-175,17**	0,00	0,00	0,00	0,0	0,0
Sn32/N10	lL Bck + Wnd ;135°	**0,00**	**0,00**	**303,76**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn33/N11	lL Ahd + Wnd ;270°	0,00	0,00	**-138,54**	0,00	0,00	0,00	0,0	0,0
Sn33/N11	hL Bck + Wnd ;135°	**0,00**	**0,00**	**327,13**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn34/N12	lL Ahd + Wnd ;270°	0,00	0,00	**-101,85**	0,00	0,00	0,00	0,0	0,0
Sn34/N12	hL Bck + Wnd ;135°	**0,00**	**0,00**	**353,21**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn35/N13	lL Ahd + Wnd ;270°	0,00	0,00	**-125,65**	0,00	0,00	0,00	0,0	0,0
Sn35/N13	hL Bck + Wnd ;135°	**0,00**	**0,00**	**264,30**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn36/N14	lL Ahd + Wnd ;270°	0,00	0,00	**-83,48**	0,00	0,00	0,00	0,0	0,0
Sn36/N14	hL Bck + Wnd ;135°	**0,00**	**0,00**	**327,44**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	lL Bck + Wnd ;270°	**0,00**	**0,00**	**-129,00**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	hL Ahd + Wnd ;45°	0,00	0,00	**261,45**	0,00	0,00	**0,00**	0,0	0,0
Sn38/N2	lL Bck + Wnd ;270°	**0,00**	**0,00**	**-86,37**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn38/N2	hL Ahd + Wnd ;45°	0,00	0,00	**326,20**	0,00	0,00	**0,00**	0,0	0,0
Sn39/N3	lL Bck + Wnd ;270°	0,00	0,00	**-176,00**	0,00	0,00	0,00	0,0	0,0
Sn39/N3	lL Ahd + Wnd ;45°	**0,00**	**0,00**	**297,78**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn40/N4	lL Bck +	**0,00**	**0,00**	**-143,13**	**0,00**	**0,00**	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;270°								
Sn40/N4	hL Ahd + Wnd ;45°	0,00	0,00	**325,48**	0,00	0,00	**0,00**	0,0	0,0
Sn41/N54	lL Bck + Wnd ;270°	**0,00**	**0,00**	**-107,05**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn41/N54	hL Ahd + Wnd ;45°	0,00	0,00	**355,92**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

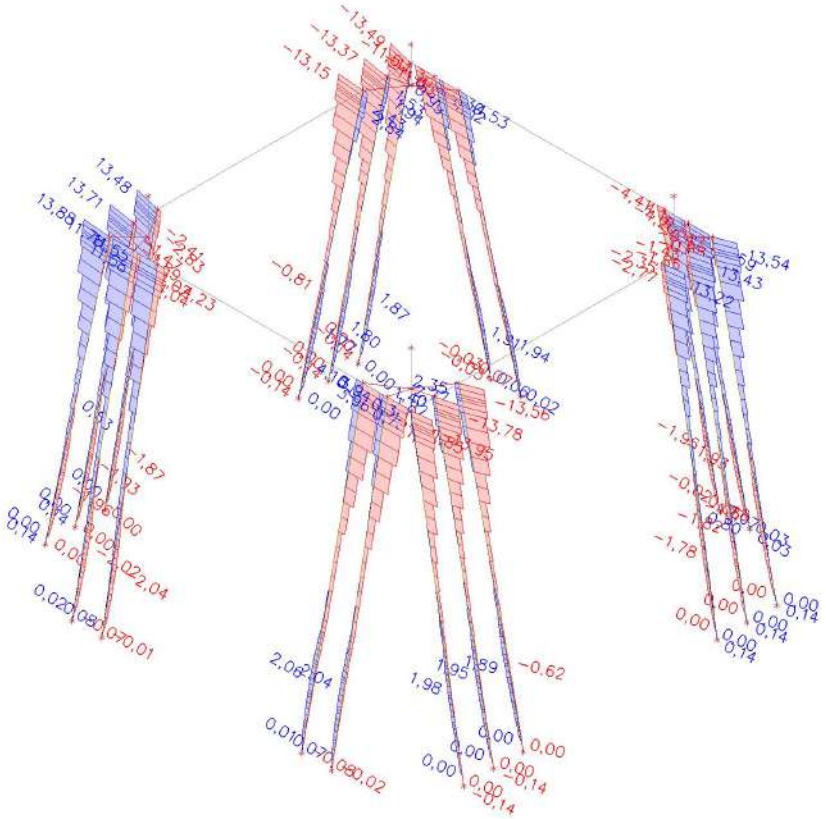
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



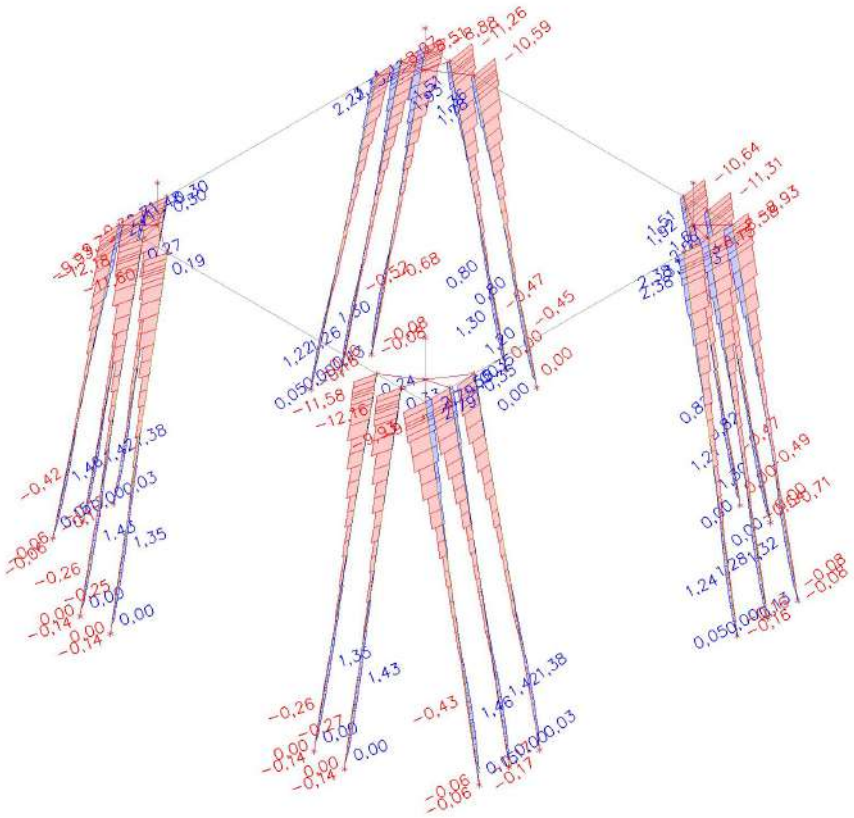
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



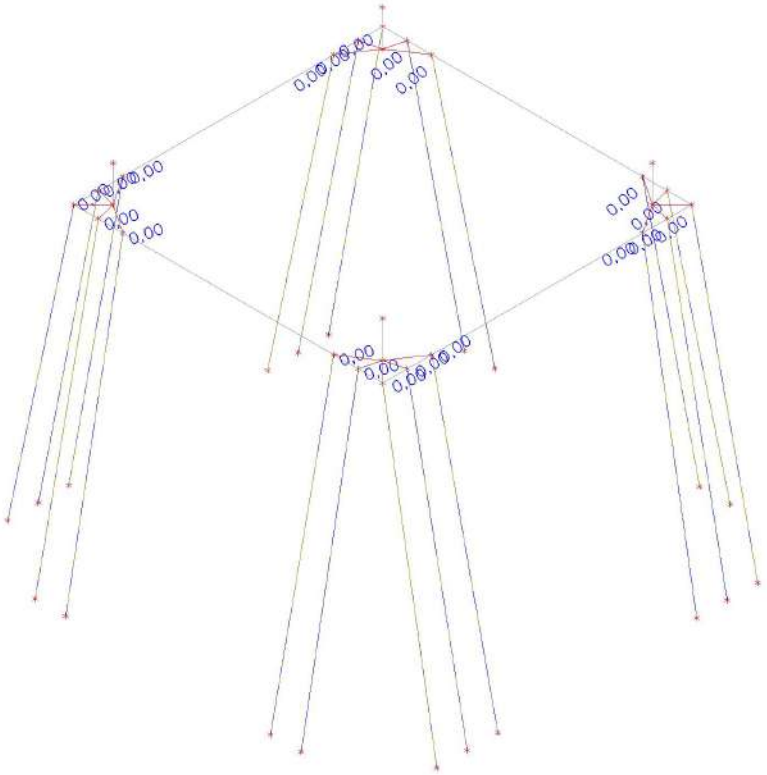
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



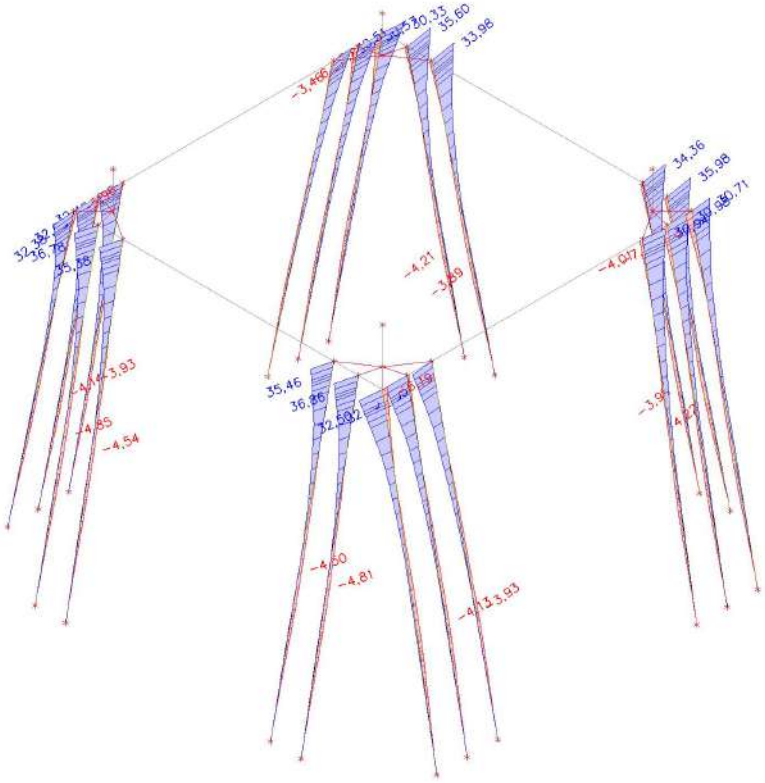
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



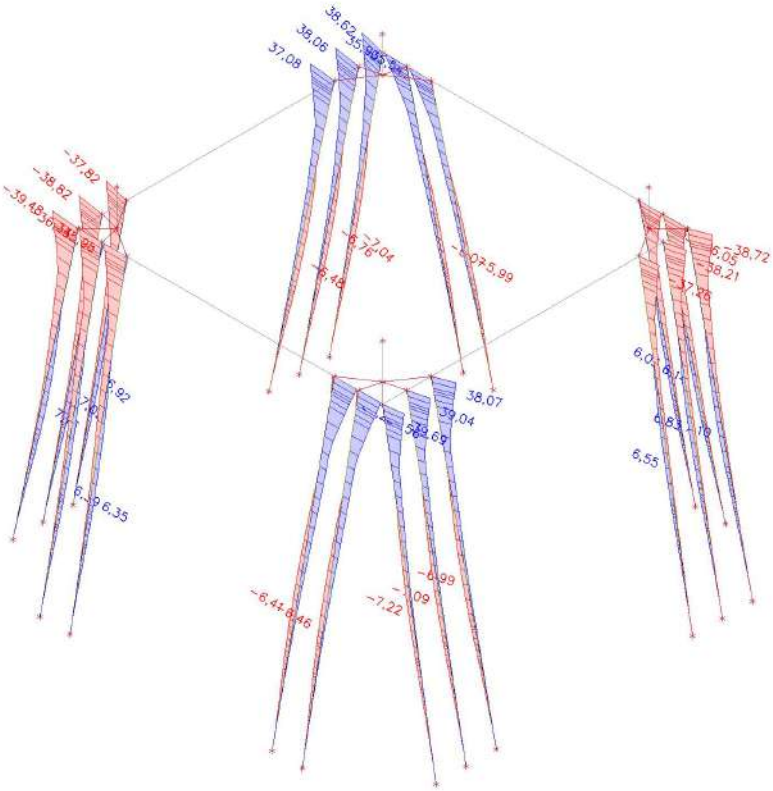
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_P_9	12,500	hL Bck + Wnd ;270°	**-377,14**	0,00	-0,17	0,00	0,00	0,00
Paal_P_19	0,000	lL Bck + Wnd ;270°	**201,97**	-2,95	-1,31	**0,00**	13,09	20,28
Paal_P_7	0,000	hL Bck + Wnd ;135°	-223,27	**-13,95**	2,32	0,00	-4,04	**39,69**
Paal_P_4	0,000	hL Bck + Wnd ;270°	44,22	-3,58	**-12,18**	0,00	36,78	1,18
Paal_P_12	0,800-	lL Bck + Wnd ;270°	-204,21	11,75	**4,68**	0,00	-6,74	-24,24
Paal_P_12	0,000	lL Bck + Wnd ;270°	-202,55	12,08	4,68	0,00	**-10,48**	-33,77
Paal_P_10	0,000	hL Ahd + Wnd ;270°	43,67	3,50	-12,16	0,00	**36,86**	-1,06
Paal_P_3	0,000	hL Ahd + Wnd ;45°	-220,82	**13,88**	2,24	0,00	-3,81	**-39,48**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

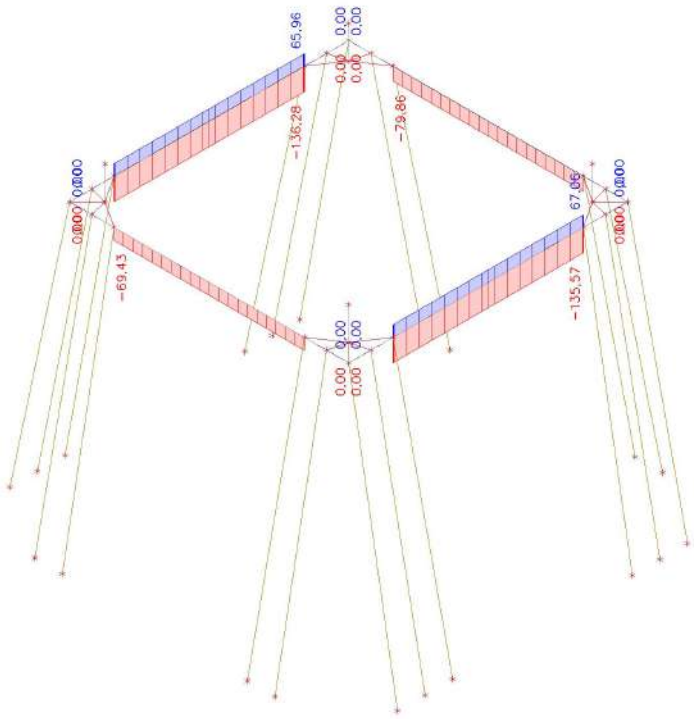
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer 5	0,000	hL Bck + Wnd ;270°	**-1248,01**	**293,08**	-5,46	-0,59	8,05	-299,34
Poer 8	1,475	hL Bck + Wnd ;270°	**1002,03**	233,74	5,76	-0,07	0,00	12,02
Poer 8	0,000	hL Ahd + Wnd ;270°	-753,61	-165,74	**-9,06**	**0,97**	**13,24**	164,78
Poer 8	1,475	hL Bck + Wnd ;135°	640,42	148,46	**12,26**	-0,15	0,00	7,69
Poer 8	0,000	lL Bck + Wnd ;135°	621,83	148,58	12,15	**-1,32**	**-18,01**	-150,74
Poer 5	0,000	lL Bck + Wnd ;270°	-1241,04	293,08	-5,46	-0,59	8,05	**-299,63**
Poer 7	0,000	lL Ahd + Wnd ;270°	-1228,03	**-289,91**	-5,41	0,58	7,98	**296,35**

7.4. Krachten van de Funderingsbalken

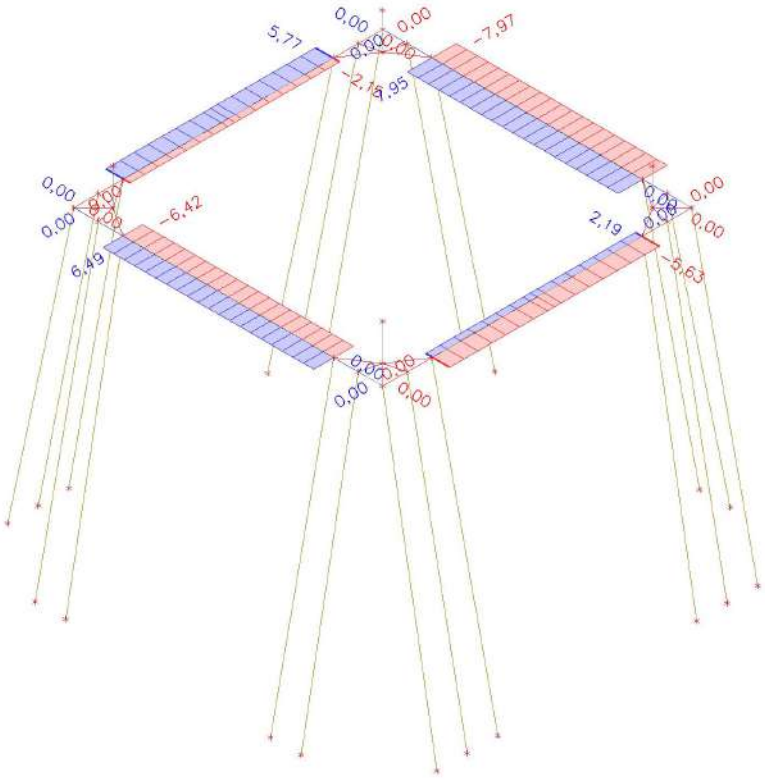
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



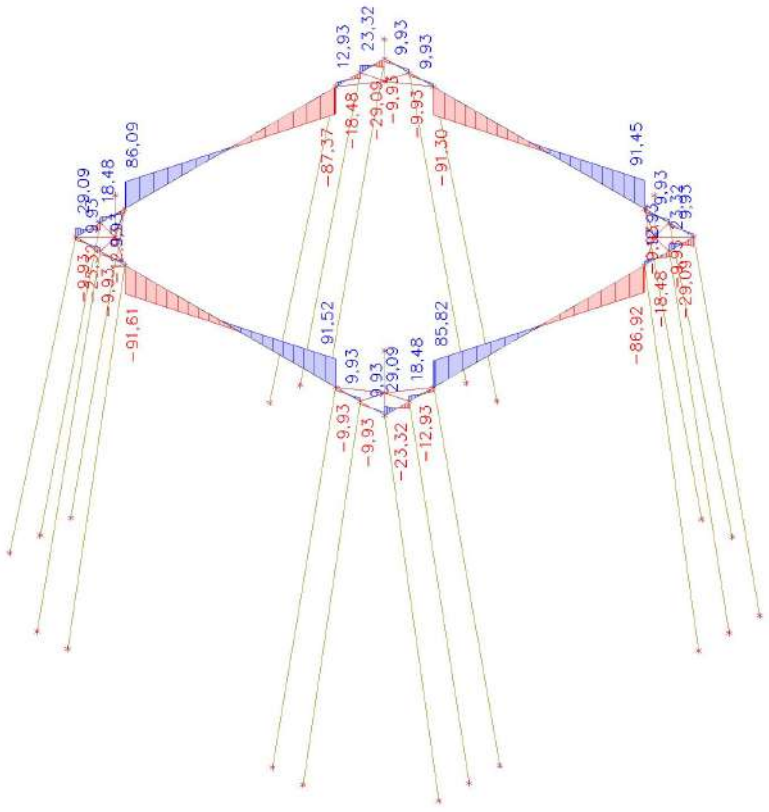
7.4.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



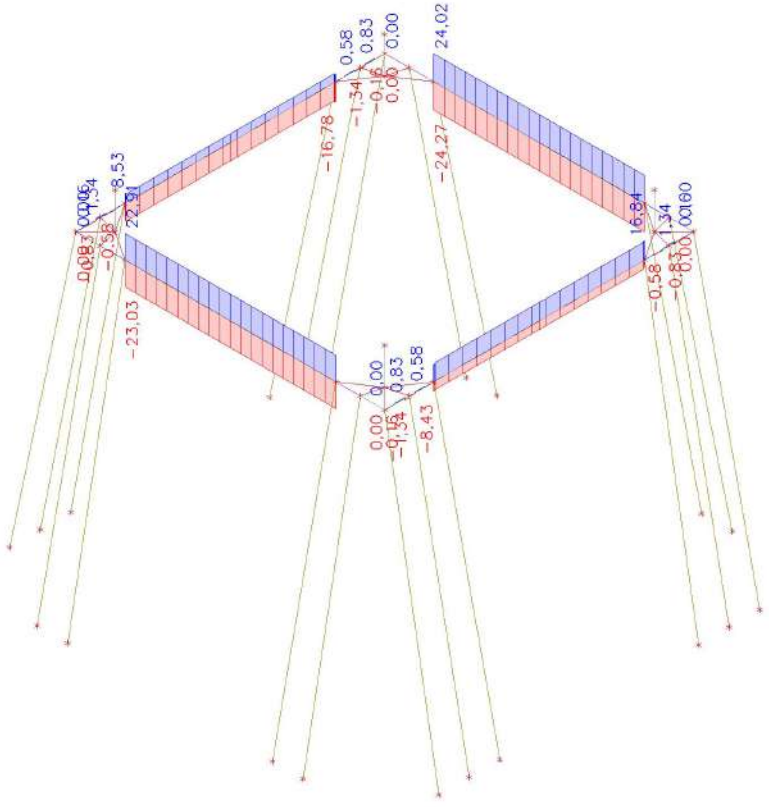
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



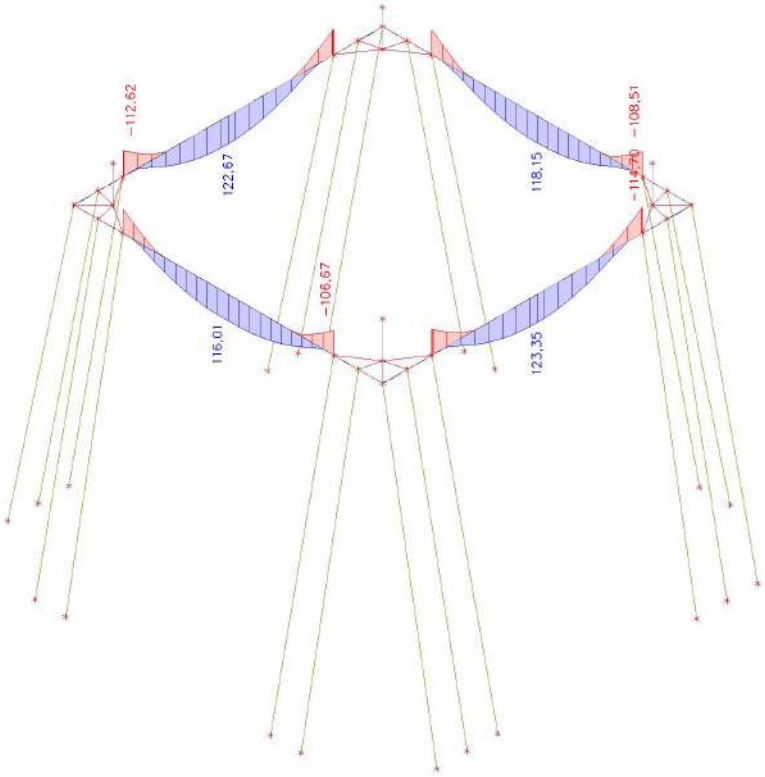
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



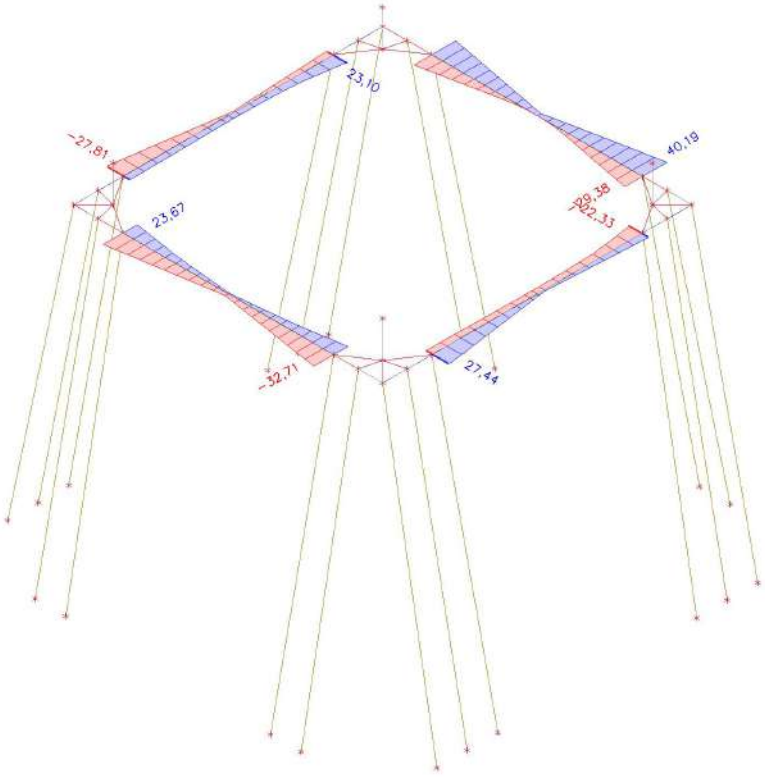
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: Named selection - FunderingsBalken
Filter: Layer = Balken

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Balk 6	2,000+	hL Bck + Wnd ;270°	**-136,28**	5,77	84,03	-14,77	-55,40	-26,48
Balk 5	2,000+	lL Bck + Wnd ;270°	**67,06**	-1,25	64,52	6,21	-88,03	-1,82
Balk 4	2,000+	hL Bck + Wnd ;270°	-79,86	**-7,97**	87,28	**24,02**	-73,50	39,39
Balk 7	10,600-	hL Ahd + Wnd ;45°	-69,14	-6,42	**-91,61**	22,91	-95,31	-31,69
Balk 7	2,000+	hL Bck + Wnd ;135°	-69,43	6,49	**91,52**	-23,03	-94,64	-32,10
Balk 4	2,000+	hL Ahd + Wnd ;270°	-79,62	**7,95**	83,39	**-24,27**	-56,77	-29,38
Balk 5	10,600-	hL Bck + Wnd ;135°	53,45	0,48	-86,23	-3,21	**-114,70**	-4,93
Balk 5	6,300	hL Ahd + Wnd ;45°	-133,32	2,19	-1,47	-7,44	**123,35**	1,82
Balk 7	2,000+	lL Bck + Wnd ;135°	-57,26	6,41	67,03	-21,09	-59,07	**-32,71**
Balk 4	2,000+	lL Bck + Wnd ;270°	-68,07	-7,91	62,94	22,32	-38,12	**40,19**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-DIM 380kV
Part	Balkrooster 5xBeton40x40 mast 108
Author	[redacted]
Date	6-05-2026
Structure	General XYZ
No. of nodes :	52
No. of beams :	28
No. of slabs :	0
No. of solids :	0
No. of used profiles :	3
No. of load cases :	5
No. of used materials :	4
Acceleration of gravity [m/s^2]	9,810
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materials

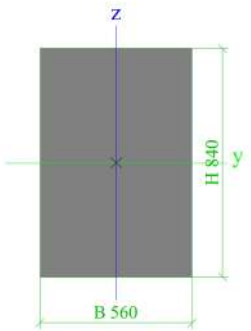
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
Geen Gewicht	Concrete	0,0	2600,0	2,1000e+11	0.2	0,00	35,00	
C12/15 Gescheurd	Concrete	2500,0	2600,0	7,0000e+03	0.2	0,00	12,00	
C20/25 Ongescheurd	Concrete	2500,0	2600,0	2,4000e+04	0.2	0,00	20,00	

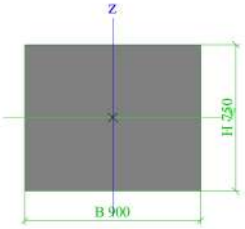
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

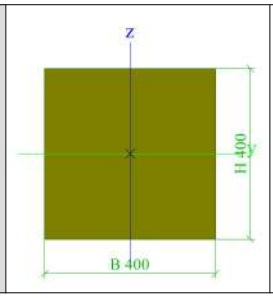
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 500B	Reinforcement steel	7850,0	2,0000e+05	8,3333e+04	0,00	500,0

4.2. Cross-sections

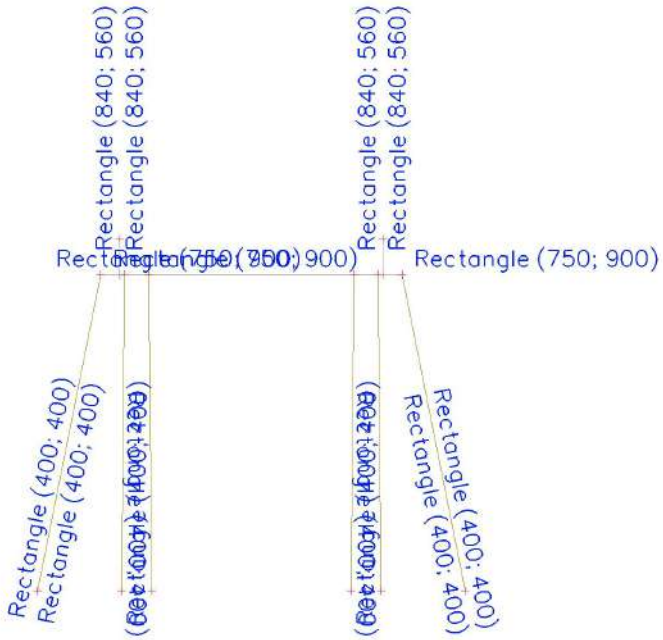
Poer.Opstort		
Type	Rectangle	
Detailed	840; 560	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	4,7040e-01	
A_y [m²], A_z [m²]	3,9200e-01	3,9200e-01
A_L [m²/m], A_D [m²/m]	2,8000e+00	2,8000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	280	420
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,7660e-02	1,2293e-02
i_y [mm], i_z [mm]	242	162
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	6,5856e-02	4,3904e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	2,8888e-02	0,0000e+00
$β_y$ [mm], $β_z$ [mm]	0	0
Picture		

Balk		
Type	Rectangle	
Detailed	750; 900	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	6,7500e-01	
A_y [m²], A_z [m²]	5,6250e-01	5,6250e-01
A_L [m²/m], A_D [m²/m]	3,3000e+00	3,3000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450	375
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	3,1641e-02	4,5563e-02
i_y [mm], i_z [mm]	217	260
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	8,4375e-02	1,0125e-01
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	6,3112e-02	0,0000e+00
$β_y$ [mm], $β_z$ [mm]	0	0
Picture		

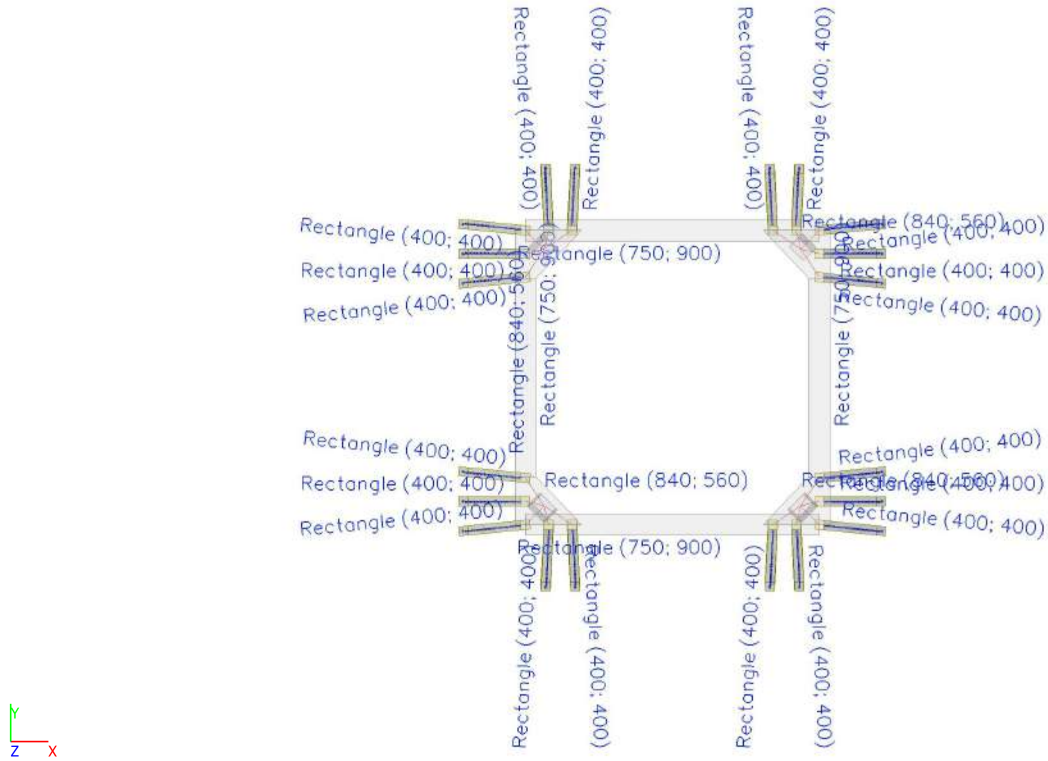
Funderingspaal		
Type	Rectangle	
Detailed	400; 400	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [m²]	1,6000e-01	
A_y [m²], A_z [m²]	1,3333e-01	1,3333e-01
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200	200
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,1333e-03	2,1333e-03
i_y [mm], i_z [mm]	115	115
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	1,0667e-02	1,0667e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	3,6027e-03	0,0000e+00
$β_y$ [mm], $β_z$ [mm]	0	0

Picture		
		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Subsoils

Name	C1x [MN/m³]	C1z	C1y [MN/m³]	Stiffness [MN/m³]	C2x [MN/m]	C2y [MN/m]
Bedding1	1,5000e+00	Flexible	1,5000e+00	1,5000e+01	0,0000e+00	0,0000e+00

4.6. Mesh setup

Name	NetInstelling1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	5
Average size of 2D mesh element [m]	0,250
Average size of 1D mesh element on curved 1D members [m]	0,200
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

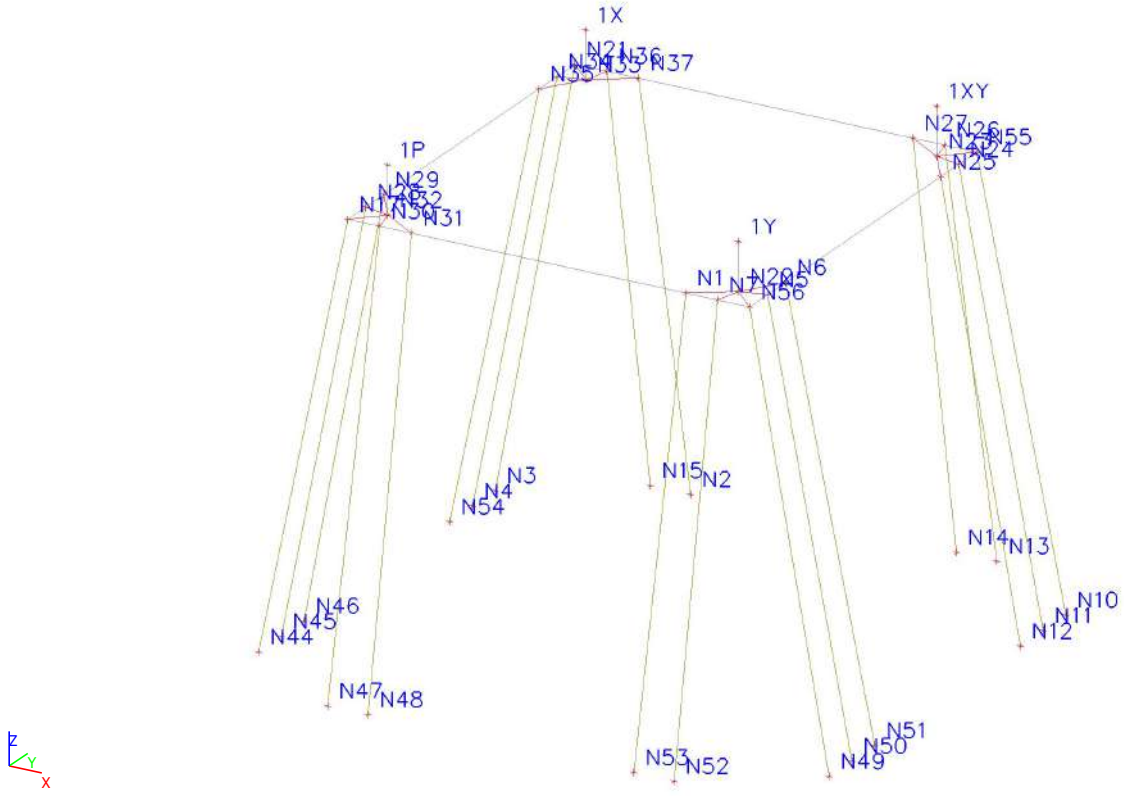
5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N5	13,000	1,400	0,000
N6	13,000	2,400	0,000
N7	12,000	0,400	0,000
N1	11,000	0,400	0,000
N17	0,400	0,400	0,000
N21	0,400	13,000	0,000
1Y	12,200	1,200	1,475
N22	12,200	1,200	0,000
N23	12,200	12,200	0,000
1XY	12,200	12,200	1,475
N24	13,000	12,000	0,000
N25	13,000	11,000	0,000
N26	12,000	13,000	0,000
N27	11,000	13,000	0,000
N28	0,400	1,400	0,000
N29	0,400	2,400	0,000
N30	1,400	0,400	0,000
N31	2,400	0,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
1P	1,200	1,200	1,475
N32	1,200	1,200	0,000
N33	1,200	12,200	0,000
1X	1,200	12,187	1,475
N34	0,400	12,000	0,000
N35	0,400	11,000	0,000
N36	1,400	13,000	0,000
N37	2,400	13,000	0,000
N38	12,200	1,200	0,000
N39	1,200	1,200	0,000
N40	12,200	12,200	0,000
N41	1,200	12,200	0,000
N44	-2,247	0,135	-13,235
N45	-2,247	1,400	-13,234
N46	-2,247	2,665	-13,235
N47	1,268	-2,247	-13,234
N48	2,532	-2,247	-13,234
N49	15,647	0,135	-13,235

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N50	15,647	1,400	-13,234
N51	15,647	2,665	-13,235
N52	12,132	-2,247	-13,234
N53	10,868	-2,247	-13,234
N10	15,647	13,265	-13,235
N11	15,647	12,000	-13,234
N12	15,647	10,735	-13,235
N13	12,132	15,647	-13,234
N14	10,868	15,647	-13,234
N15	1,268	15,647	-13,234
N2	2,532	15,647	-13,234
N3	-2,247	13,265	-13,235
N4	-2,247	12,000	-13,234
N54	-2,247	10,735	-13,235
N55	13,000	13,000	0,000
N56	13,000	0,400	0,000

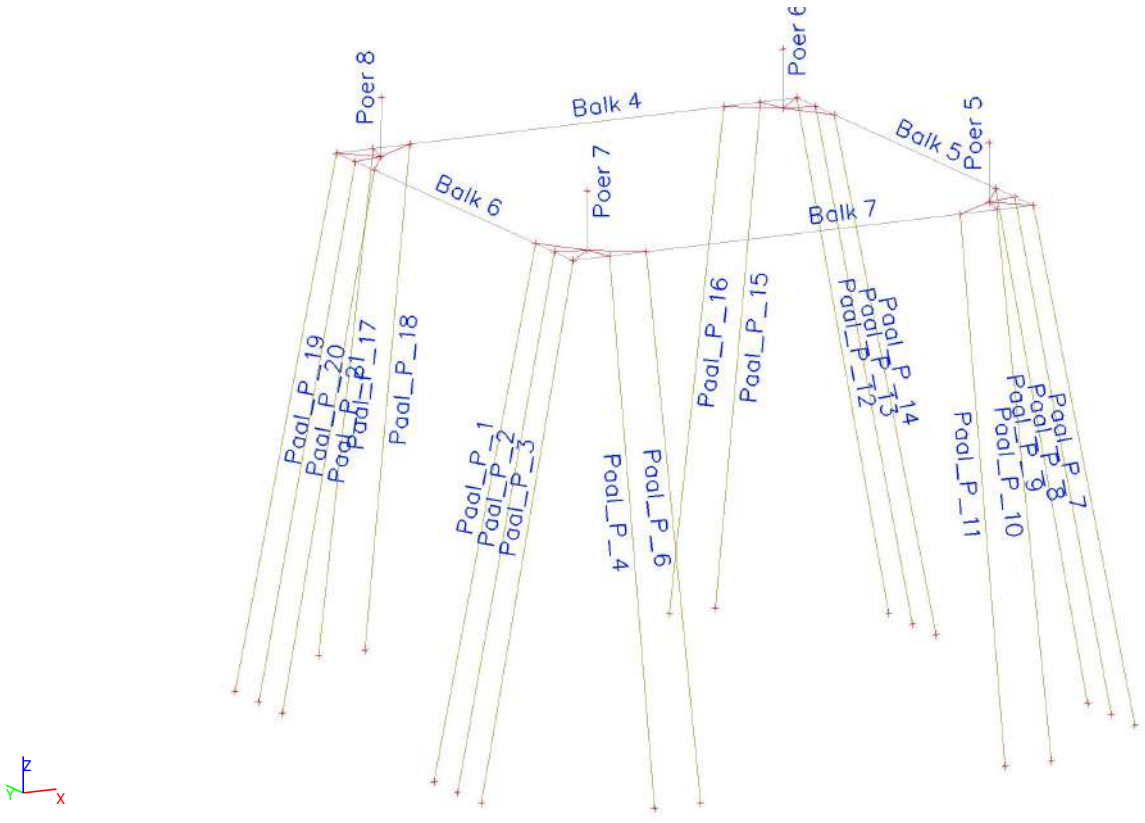
5.2. Analyse model met knopen



5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Balk 4	Balk - Rectangle (750; 900)	C12/15 Gescheurd	12,600	N55	N21	beam (80)
Balk 5	Balk - Rectangle (750; 900)	C12/15 Gescheurd	12,600	N56	N55	beam (80)
Balk 6	Balk - Rectangle (750; 900)	C12/15 Gescheurd	12,600	N17	N21	beam (80)
Balk 7	Balk - Rectangle (750; 900)	C12/15 Gescheurd	12,600	N56	N17	beam (80)
Poer 5	Poer.Opstort - Rectangle (840; 560)	C12/15 Gescheurd	1,475	N22	1Y	column (100)
Poer 6	Poer.Opstort - Rectangle (840; 560)	C12/15 Gescheurd	1,475	N23	1XY	column (100)
Poer 7	Poer.Opstort - Rectangle (840; 560)	C12/15 Gescheurd	1,475	N32	1P	column (100)
Poer 8	Poer.Opstort - Rectangle (840; 560)	C12/15 Gescheurd	1,475	N33	1X	column (100)
Paal_P_1	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N29	N46	column (100)
Paal_P_2	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,496	N28	N45	column (100)
Paal_P_3	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N17	N44	column (100)
Paal_P_4	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N30	N47	column (100)
Paal_P_6	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N31	N48	column (100)
Paal_P_7	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N56	N49	column (100)
Paal_P_8	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,496	N5	N50	column (100)
Paal_P_9	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N6	N51	column (100)
Paal_P_10	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N7	N52	column (100)
Paal_P_11	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N1	N53	column (100)
Paal_P_12	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N55	N10	column (100)
Paal_P_13	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,496	N24	N11	column (100)
Paal_P_14	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N25	N12	column (100)
Paal_P_15	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N26	N13	column (100)
Paal_P_16	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N27	N14	column (100)
Paal_P_17	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N36	N15	column (100)
Paal_P_18	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,497	N37	N2	column (100)
Paal_P_19	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N21	N3	column (100)
Paal_P_20	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,496	N34	N4	column (100)
Paal_P_21	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	13,500	N35	N54	column (100)

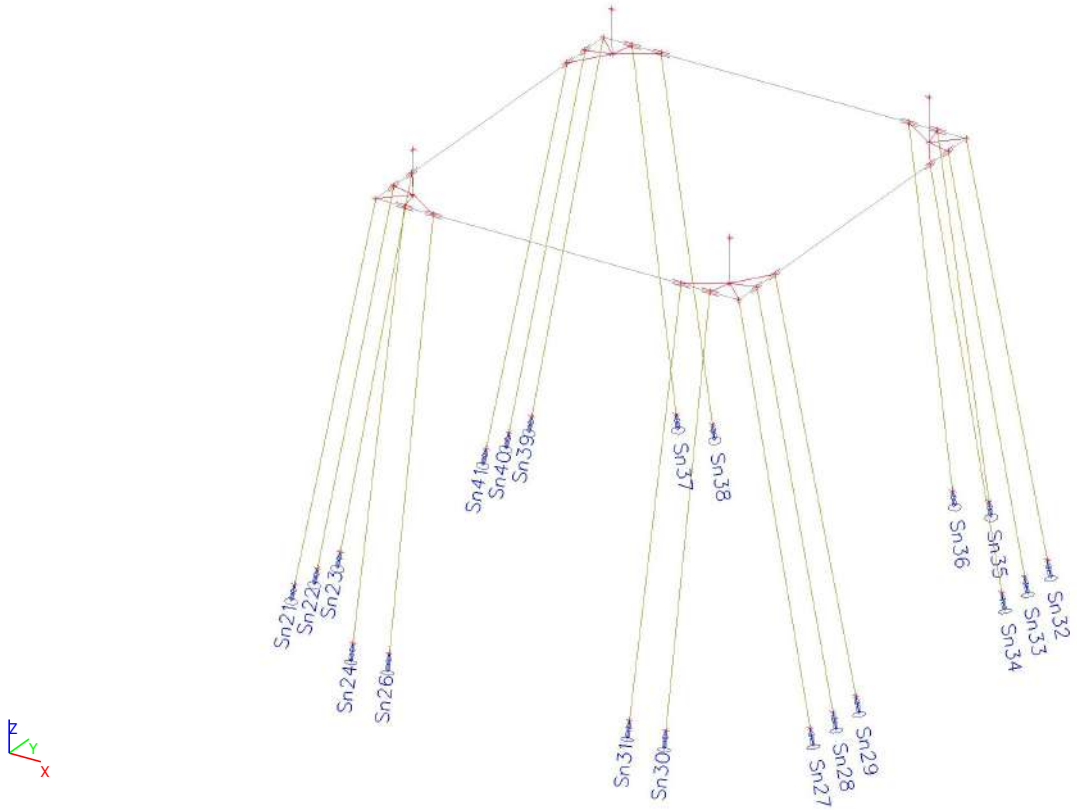
5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn21	N44	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31
Sn22	N45	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn23	N46	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn24	N47	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn26	N48	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn27	N49	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn28	N50	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31
Sn29	N51	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn30	N52	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn31	N53	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn32	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn33	N11	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31
Sn34	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn35	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn36	N14	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn37	N15	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn38	N2	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn39	N3	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn40	N4	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn41	N54	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31

5.6. Analyse model met Knoopondersteuningen



5.7. Line supports on member

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Veen	Line	Paal_P_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen3	Line	Paal_P_2 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen4	Line	Paal_P_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)1	Line	Paal_P_3 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)3	Line	Paal_P_2 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)4	Line	Paal_P_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)	Line	Paal_P_3 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)1	Line	Paal_P_2 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)2	Line	Paal_P_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)	Line	Paal_P_3 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)19	Line	Paal_P_2 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)12	Line	Paal_P_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)8	Line	Paal_P_3 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)17	Line	Paal_P_2 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)16	Line	Paal_P_1 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)18	Line	Paal_P_3 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)	Line	Paal_P_2 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)1	Line	Paal_P_1 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)6	Line	Paal_P_3 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)9	Line	Paal_P_2 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)11	Line	Paal_P_1 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen18	Line	Paal_P_4 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)14	Line	Paal_P_4 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)7	Line	Paal_P_4 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)5	Line	Paal_P_4 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)3	Line	Paal_P_4 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)3	Line	Paal_P_4 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)10	Line	Paal_P_4 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen9	Line	Paal_P_6 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)18	Line	Paal_P_6 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)9	Line	Paal_P_6 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

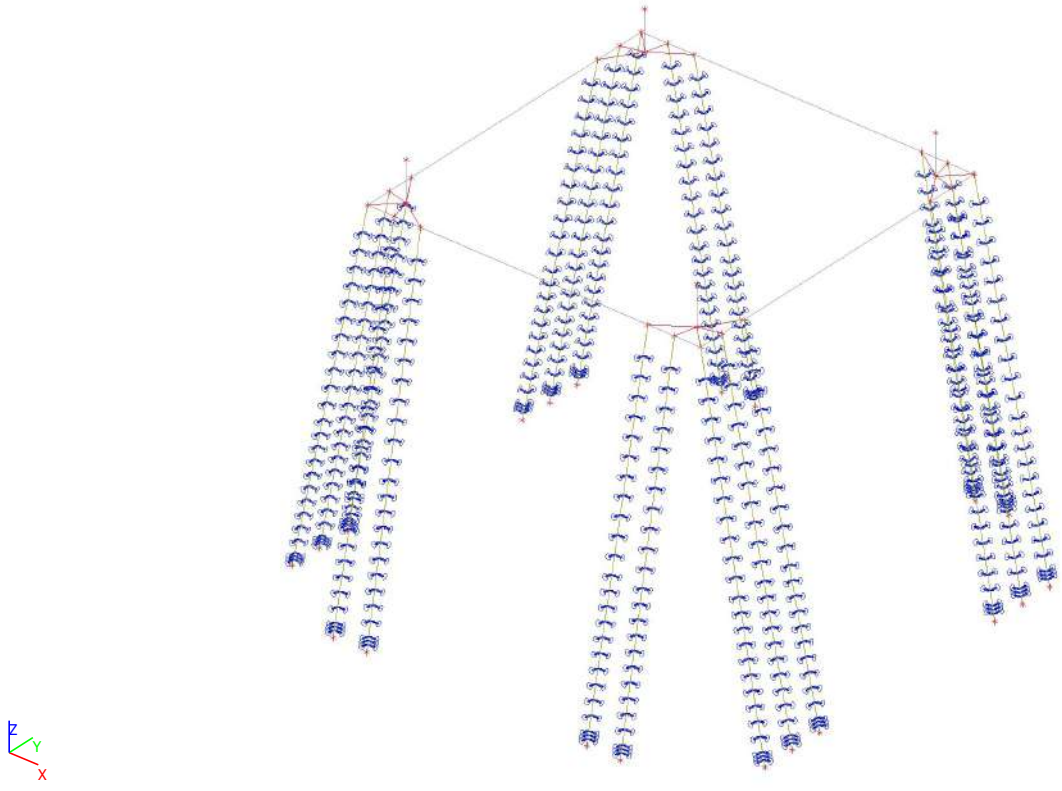
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
(PY-curve-1_V3)8	Line	Paal_P_6 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)2	Line	Paal_P_6 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)4	Line	Paal_P_6 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)13	Line	Paal_P_6 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen8	Line	Paal_P_7 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)19	Line	Paal_P_7 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)12	Line	Paal_P_7 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)10	Line	Paal_P_7 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)13	Line	Paal_P_7 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)5	Line	Paal_P_7 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)14	Line	Paal_P_7 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen16	Line	Paal_P_8 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)8	Line	Paal_P_8 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)14	Line	Paal_P_8 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)9	Line	Paal_P_8 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)5	Line	Paal_P_8 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)6	Line	Paal_P_8 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)19	Line	Paal_P_8 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen13	Line	Paal_P_9 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)2	Line	Paal_P_9 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)16	Line	Paal_P_9 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)1	Line	Paal_P_9 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)18	Line	Paal_P_9 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)7	Line	Paal_P_9 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)17	Line	Paal_P_9 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen10	Line	Paal_P_10 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)15	Line	Paal_P_10 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)18	Line	Paal_P_10 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)11	Line	Paal_P_10 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)12	Line	Paal_P_10 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)8	Line	Paal_P_10 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)	Line	Paal_P_10 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Veen5	Line	Paal_P_11 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)16	Line	Paal_P_11 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)4	Line	Paal_P_11 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)15	Line	Paal_P_11 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)14	Line	Paal_P_11 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)9	Line	Paal_P_11 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)1	Line	Paal_P_11 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen7	Line	Paal_P_12 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)10	Line	Paal_P_12 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)19	Line	Paal_P_12 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)2	Line	Paal_P_12 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)6	Line	Paal_P_12 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)11	Line	Paal_P_12 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)8	Line	Paal_P_12 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen21	Line	Paal_P_13 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)12	Line	Paal_P_13 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)3	Line	Paal_P_13 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)16	Line	Paal_P_13 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)15	Line	Paal_P_13 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)12	Line	Paal_P_13 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)7	Line	Paal_P_13 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen6	Line	Paal_P_14 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)13	Line	Paal_P_14 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)17	Line	Paal_P_14 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)4	Line	Paal_P_14 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)11	Line	Paal_P_14 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)2	Line	Paal_P_14 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)18	Line	Paal_P_14 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen14	Line	Paal_P_15 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)7	Line	Paal_P_15 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)15	Line	Paal_P_15 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)13	Line	Paal_P_15 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

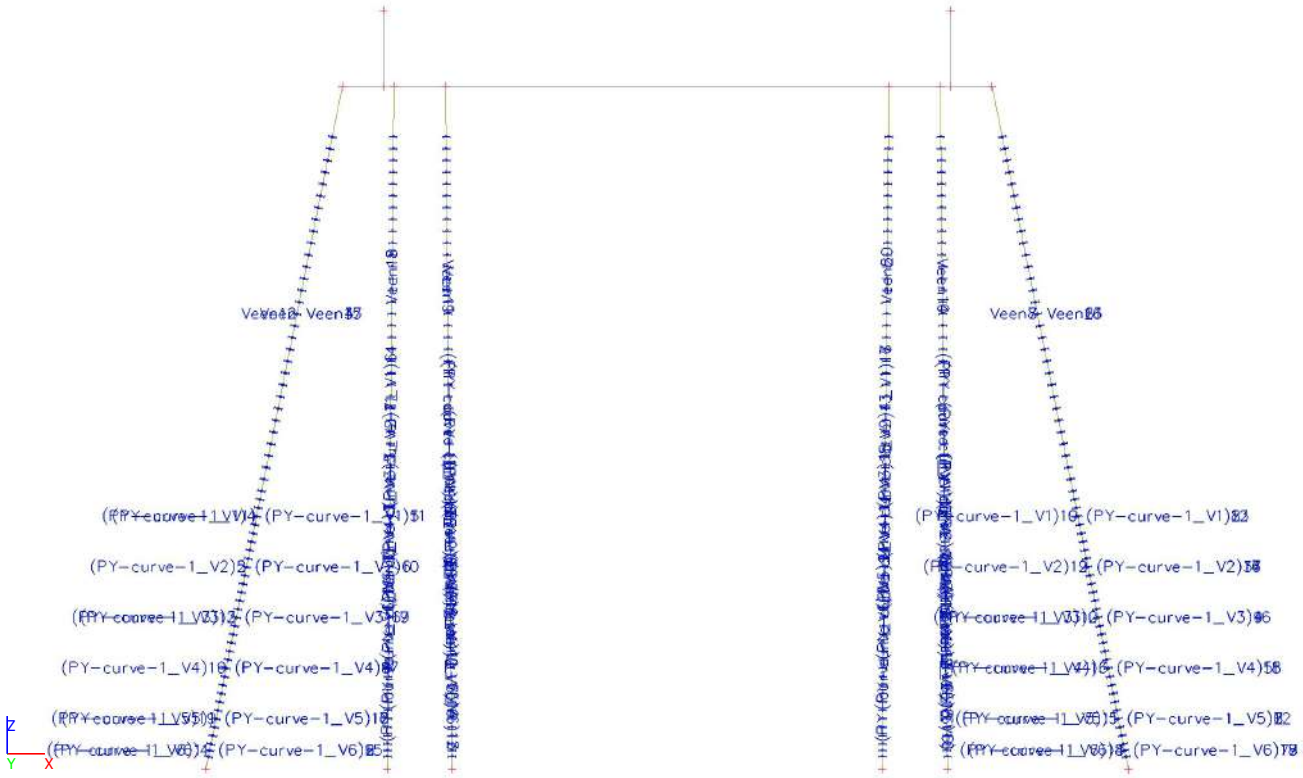
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
(PY-curve-1_V4)7	Line	Paal_P_15 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)13	Line	Paal_P_15 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)16	Line	Paal_P_15 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen20	Line	Paal_P_16 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)17	Line	Paal_P_16 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)13	Line	Paal_P_16 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)18	Line	Paal_P_16 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)	Line	Paal_P_16 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)14	Line	Paal_P_16 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)3	Line	Paal_P_16 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen19	Line	Paal_P_17 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)6	Line	Paal_P_17 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)11	Line	Paal_P_17 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)7	Line	Paal_P_17 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)1	Line	Paal_P_17 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)15	Line	Paal_P_17 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)5	Line	Paal_P_17 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen11	Line	Paal_P_18 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)9	Line	Paal_P_18 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)8	Line	Paal_P_18 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)14	Line	Paal_P_18 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)10	Line	Paal_P_18 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)16	Line	Paal_P_18 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)12	Line	Paal_P_18 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen17	Line	Paal_P_19 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)11	Line	Paal_P_19 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)6	Line	Paal_P_19 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)6	Line	Paal_P_19 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)4	Line	Paal_P_19 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)10	Line	Paal_P_19 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)2	Line	Paal_P_19 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen15	Line	Paal_P_20 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
(PY-curve-1_V1)5	Line	Paal_P_20 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)10	Line	Paal_P_20 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)17	Line	Paal_P_20 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)9	Line	Paal_P_20 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)17	Line	Paal_P_20 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)15	Line	Paal_P_20 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen12	Line	Paal_P_21 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)	Line	Paal_P_21 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)5	Line	Paal_P_21 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V3)3	Line	Paal_P_21 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V4)19	Line	Paal_P_21 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V5)19	Line	Paal_P_21 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V6)4	Line	Paal_P_21 LCS	13,000 13,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

5.8. Analyse model met Lijnondersteuningen



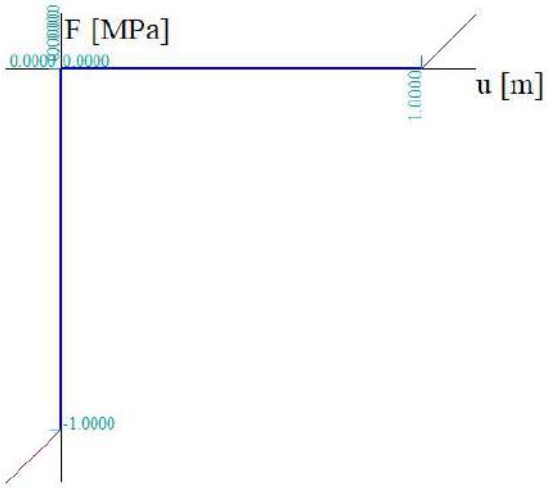
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

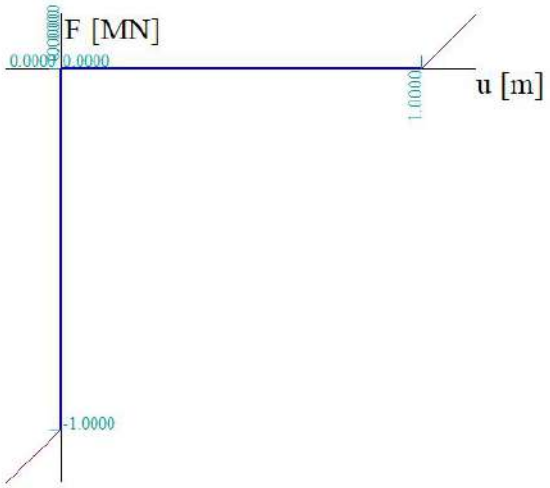
Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing



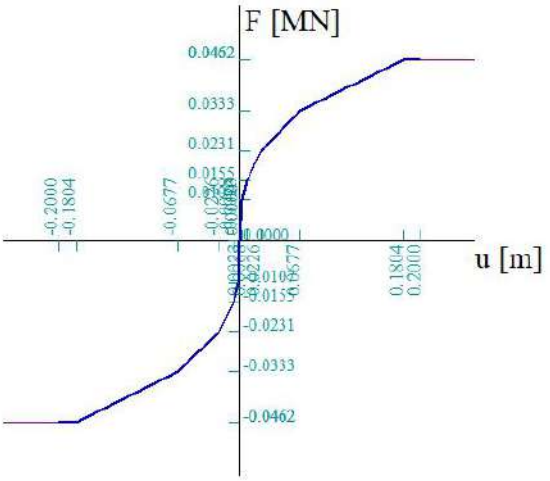
Name	Type	u / F	Positive end	Negative end
press only	Translation	-0.000001 / -1000000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 0.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -46203.840000	Free	Free
		-0.180400 / -46203.840000		
		-0.067650 / -33318.734193		
		-0.022550 / -23101.920000		
		-0.006765 / -15465.186458		
		-0.002255 / -10722.961391		
		0.000000 / 0.000000		
		0.002255 / 10722.961391		
		0.006765 / 15465.186458		
		0.022550 / 23101.920000		
		0.067650 / 33318.734193		
		0.180400 / 46203.840000		
		0.200000 / 46203.840000		

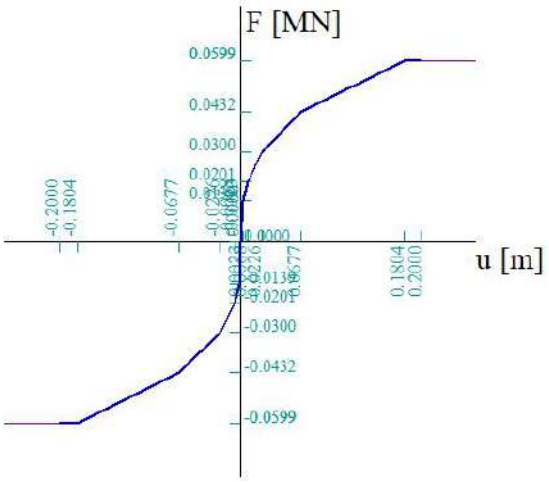
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -59935.680000	Free	Free
		-0.180400 / -59935.680000		
		-0.067650 / -43221.104363		
		-0.022550 / -29967.840000		
		-0.006765 / -20061.459539		
		-0.002255 / -13909.839151		
		0.000000 / 0.000000		
		0.002255 / 13909.839151		
		0.006765 / 20061.459539		

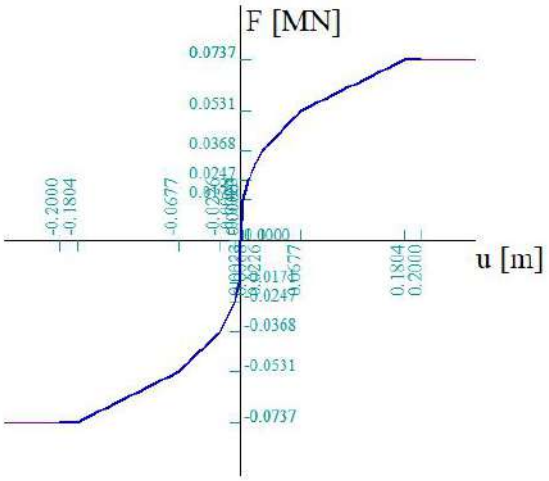
Name	Type	u / F	Positive end	Negative end
		0.022550 / 29967.840000		
		0.067650 / 43221.104363		
		0.180400 / 59935.680000		
		0.200000 / 59935.680000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -73667.520000	Free	Free
		-0.180400 / -73667.520000		
		-0.067650 / -53123.474533		
		-0.022550 / -36833.760000		
		-0.006765 / -24657.732619		
		-0.002255 / -17096.716912		
		0.000000 / 0.000000		
		0.002255 / 17096.716912		
		0.006765 / 24657.732619		
		0.022550 / 36833.760000		
		0.067650 / 53123.474533		
		0.180400 / 73667.520000		
		0.200000 / 73667.520000		

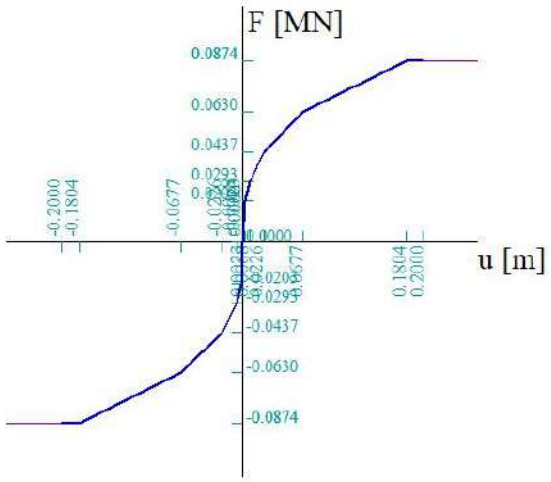
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -87399.360000	Free	Free
		-0.180400 / -87399.360000		
		-0.067650 / -63025.844703		

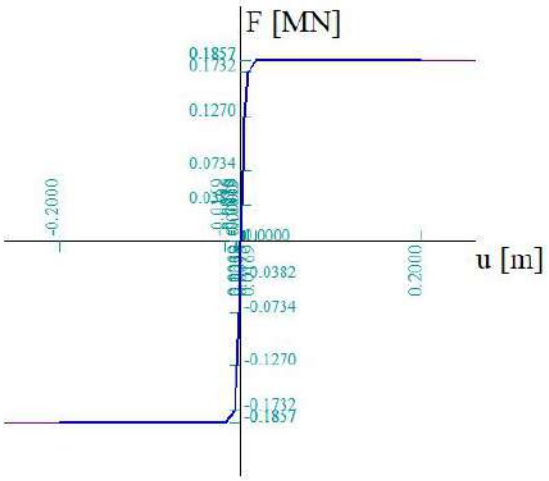
Name	Type	u / F	Positive end	Negative end
		-0.022550 / -43699.680000		
		-0.006765 / -29254.005700		
		-0.002255 / -20283.594672		
		0.000000 / 0.000000		
		0.002255 / 20283.594672		
		0.006765 / 29254.005700		
		0.022550 / 43699.680000		
		0.067650 / 63025.844703		
		0.180400 / 87399.360000		
		0.200000 / 87399.360000		

Drawing



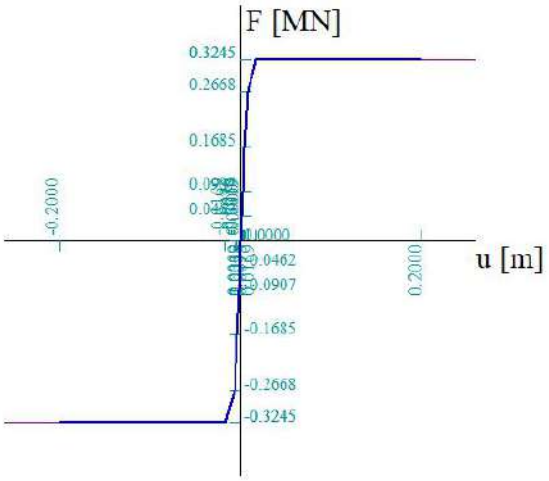
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -185749.581577	Free	Free
		-0.016913 / -185749.581577		
		-0.007517 / -173191.521652		
		-0.003758 / -126966.550767		
		-0.001879 / -73364.887728		
		-0.000940 / -38233.153457		
		0.000000 / 0.000000		
		0.000940 / 38233.153457		
		0.001879 / 73364.887728		
		0.003758 / 126966.550767		
		0.007517 / 173191.521652		
		0.016913 / 185749.581577		
		0.200000 / 185749.581577		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -324503.959510	Free	Free
		-0.016913 / -324503.959510		
		-0.007517 / -266801.170128		
		-0.003758 / -168504.997582		
		-0.001879 / -90672.108471		
		-0.000940 / -46234.204284		
		0.000000 / 0.000000		
		0.000940 / 46234.204284		
		0.001879 / 90672.108471		
		0.003758 / 168504.997582		
		0.007517 / 266801.170128		
		0.016913 / 324503.959510		
		0.200000 / 324503.959510		

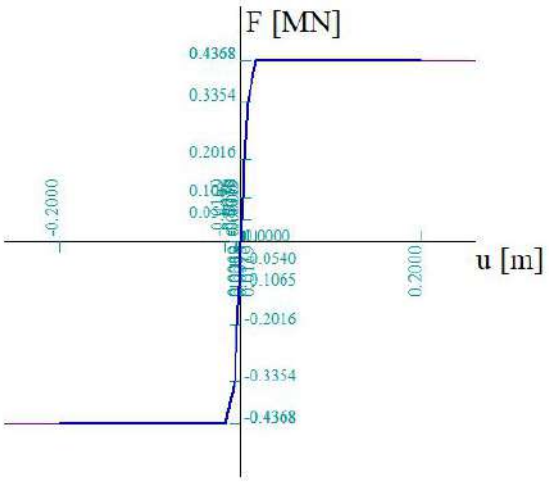
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -436765.819801	Free	Free
		-0.016913 / -436765.819801		
		-0.007517 / -335362.730832		
		-0.003758 / -201646.948699		
		-0.001879 / -106522.716227		
		-0.000940 / -54036.089272		
		0.000000 / 0.000000		
		0.000940 / 54036.089272		
		0.001879 / 106522.716227		
		0.003758 / 201646.948699		

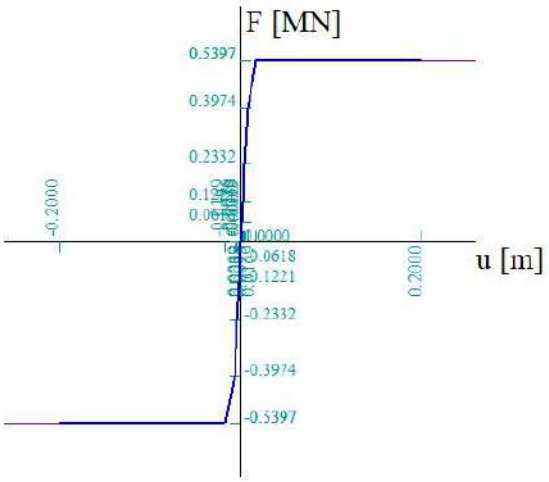
Name	Type	u / F	Positive end	Negative end
		0.007517 / 335362.730832		
		0.016913 / 436765.819801		
		0.200000 / 436765.819801		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -539683.678038	Free	Free
		-0.016913 / -539683.678038		
		-0.007517 / -397433.011814		
		-0.003758 / -233158.398644		
		-0.001879 / -122122.429030		
		-0.000940 / -61804.852432		
		0.000000 / 0.000000		
		0.000940 / 61804.852432		
		0.001879 / 122122.429030		
		0.003758 / 233158.398644		
		0.007517 / 397433.011814		
		0.016913 / 539683.678038		
		0.200000 / 539683.678038		

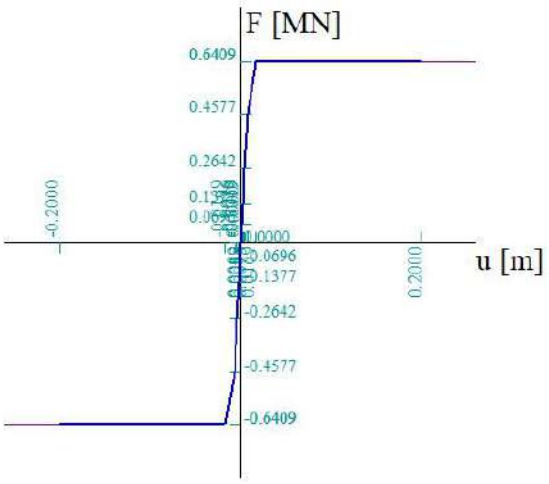
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -640861.931437	Free	Free
		-0.016913 / -640861.931437		
		-0.007517 / -457700.088592		
		-0.003758 / -264224.038576		

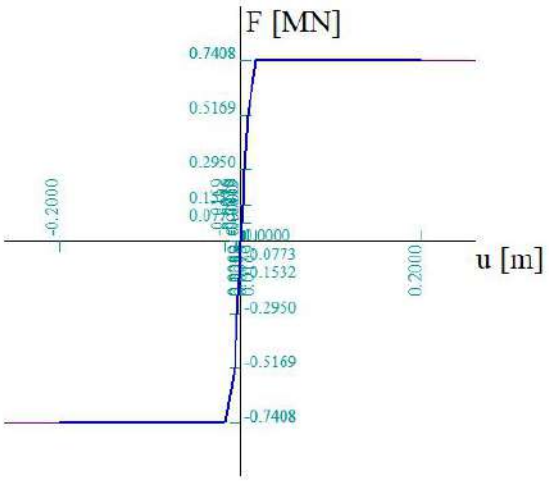
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -137654.602914		
		-0.000940 / -69564.742931		
		0.000000 / 0.000000		
		0.000940 / 69564.742931		
		0.001879 / 137654.602914		
		0.003758 / 264224.038576		
		0.007517 / 457700.088592		
		0.016913 / 640861.931437		
		0.200000 / 640861.931437		

Drawing



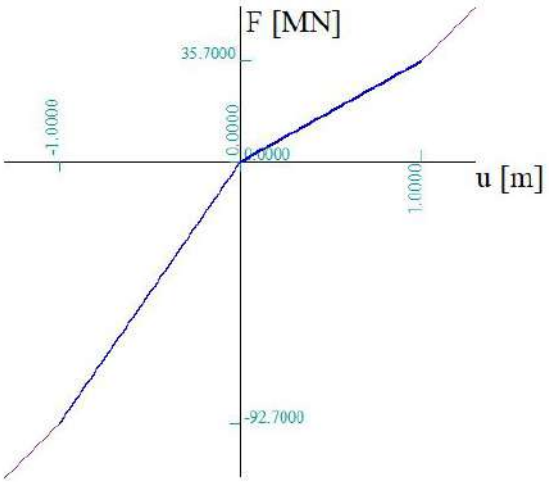
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -740774.043969	Free	Free
		-0.016913 / -740774.043969		
		-0.007517 / -516894.797403		
		-0.003758 / -295043.983610		
		-0.001879 / -153150.432455		
		-0.000940 / -77319.889121		
		0.000000 / 0.000000		
		0.000940 / 77319.889121		
		0.001879 / 153150.432455		
		0.003758 / 295043.983610		
		0.007517 / 516894.797403		
		0.016913 / 740774.043969		
		0.200000 / 740774.043969		

Drawing



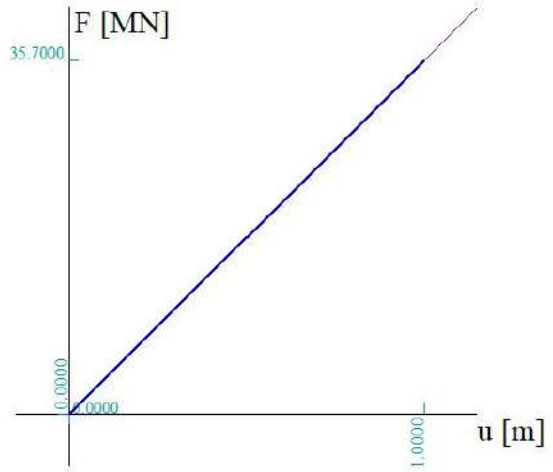
Name	Type	u / F	Positive end	Negative end
S+0 lower bound	Translation	-1.000000 / -92700000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 35700000.000000		

Drawing



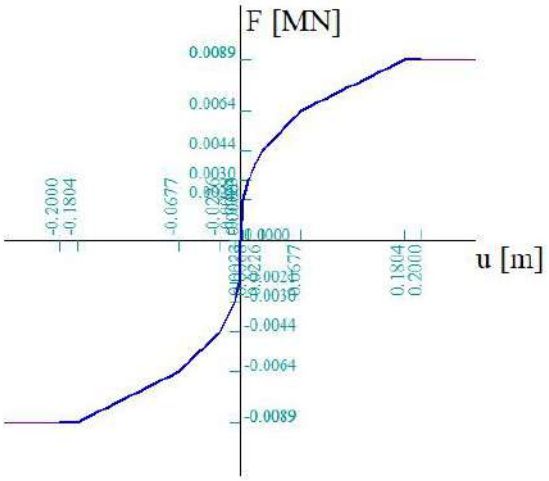
Name	Type	u / F	Positive end	Negative end
S+0 lower bound Trek	Translation	0.000000 / 0.000000	Flexible	Free
		1.000000 / 35700000.000000		

Drawing



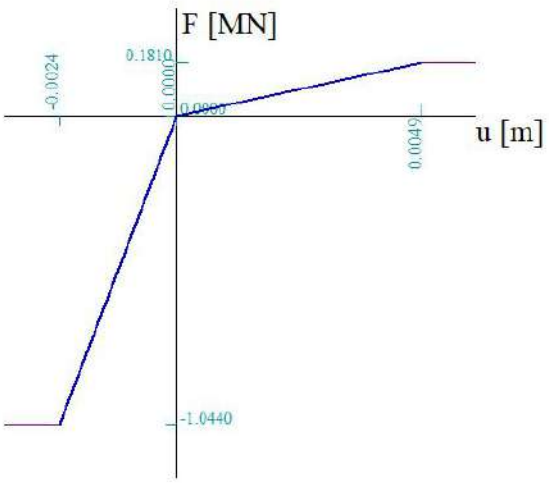
Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -8894.400000	Free	Free
		-0.180400 / -8894.400000		
		-0.067650 / -6413.760000		
		-0.022550 / -4447.680000		
		-0.006765 / -2976.960000		
		-0.002255 / -2064.000000		
		0.000000 / 0.000000		
		0.002255 / 2064.000000		
		0.006765 / 2976.960000		
		0.022550 / 4447.680000		
		0.067650 / 6413.760000		
		0.180400 / 8894.400000		
		0.200000 / 8894.400000		

Drawing



Name	Type	u / F	Positive end	Negative end
Trek-druk-S+paalpunt	Translation	-0.002350 / -1044000.000000	Free	Free
		0.000000 / 0.000000		
		0.004890 / 181000.000000		

Drawing

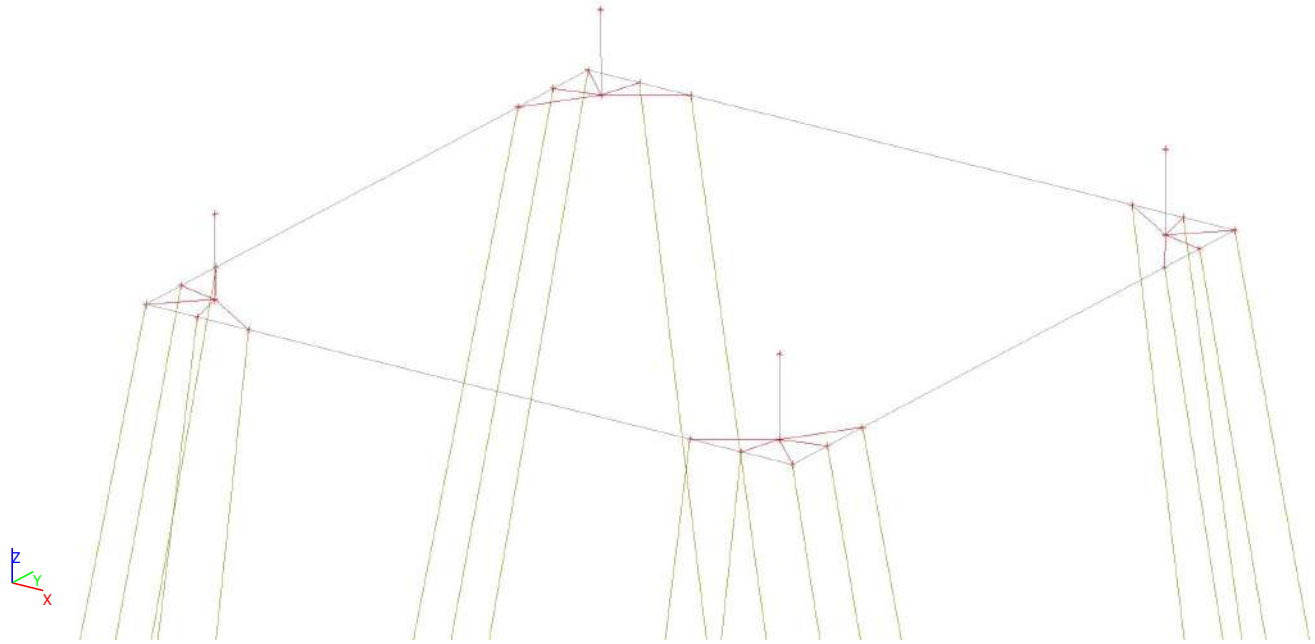

F [MN]
u [m]
0.1810
-0.0024
0.0000
0.0000
0.0049
-1.0440

6. Belastingen

6.1. Load cases

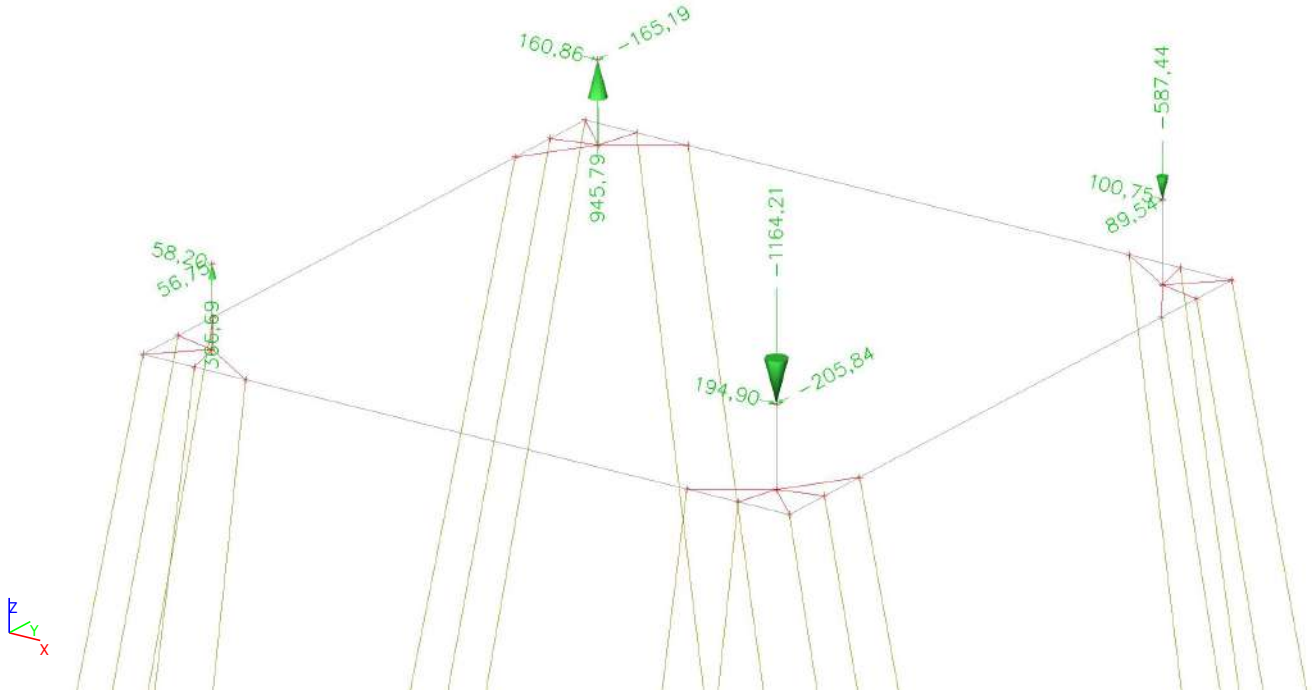
6.1.1. Load cases - E.G.

Name	Description	Action type	Load group	Direction
	Spec	Load type		
E.G.		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - hL Bck + Wnd ;270°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;270°		Variable	LG4	Short	None
	Standard	Static			

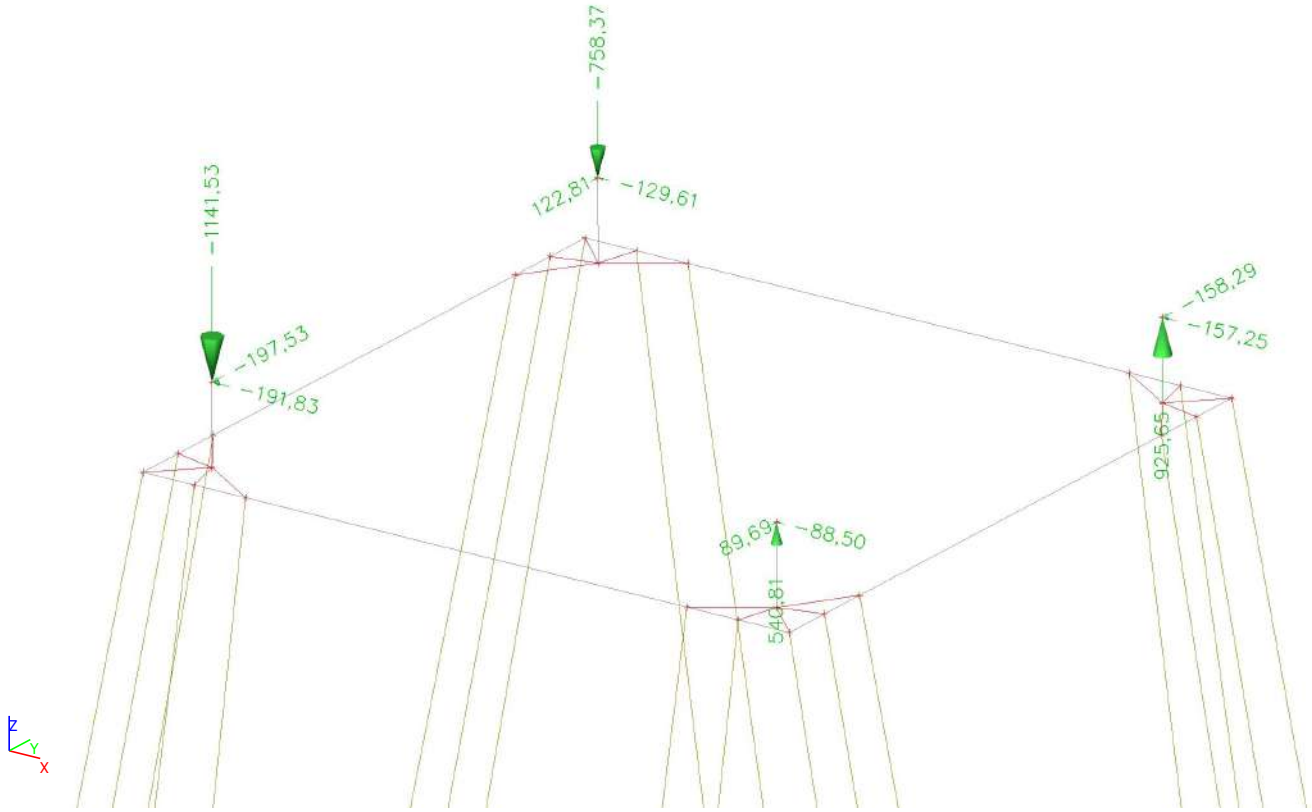


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;270°_1X_X	1X	hL Bck + Wnd ;270°	GCS	X	Force	160,86
hL Bck + Wnd ;270°_1X_Y	1X	hL Bck + Wnd ;270°	GCS	Y	Force	-165,19
hL Bck + Wnd ;270°_1X_Z	1X	hL Bck + Wnd ;270°	GCS	Z	Force	945,79
hL Bck + Wnd ;270°_1Y_X	1Y	hL Bck + Wnd ;270°	GCS	X	Force	194,90
hL Bck + Wnd ;270°_1Y_Y	1Y	hL Bck + Wnd ;270°	GCS	Y	Force	-205,84
hL Bck + Wnd ;270°_1Y_Z	1Y	hL Bck + Wnd ;270°	GCS	Z	Force	-1164,21
hL Bck + Wnd ;270°_1P_X	1P	hL Bck + Wnd ;270°	GCS	X	Force	58,20
hL Bck + Wnd ;270°_1P_Y	1P	hL Bck + Wnd ;270°	GCS	Y	Force	56,75
hL Bck + Wnd ;270°_1P_Z	1P	hL Bck + Wnd ;270°	GCS	Z	Force	366,69
hL Bck + Wnd ;270°_1XY_X	1XY	hL Bck + Wnd ;270°	GCS	X	Force	100,75
hL Bck + Wnd ;270°_1XY_Y	1XY	hL Bck + Wnd ;270°	GCS	Y	Force	89,54
hL Bck + Wnd ;270°_1XY_Z	1XY	hL Bck + Wnd ;270°	GCS	Z	Force	-587,44

6.1.3. Load cases - hL Ahd + Wnd ;270°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;270°		Variable	LG4	Short	None
	Standard	Static			



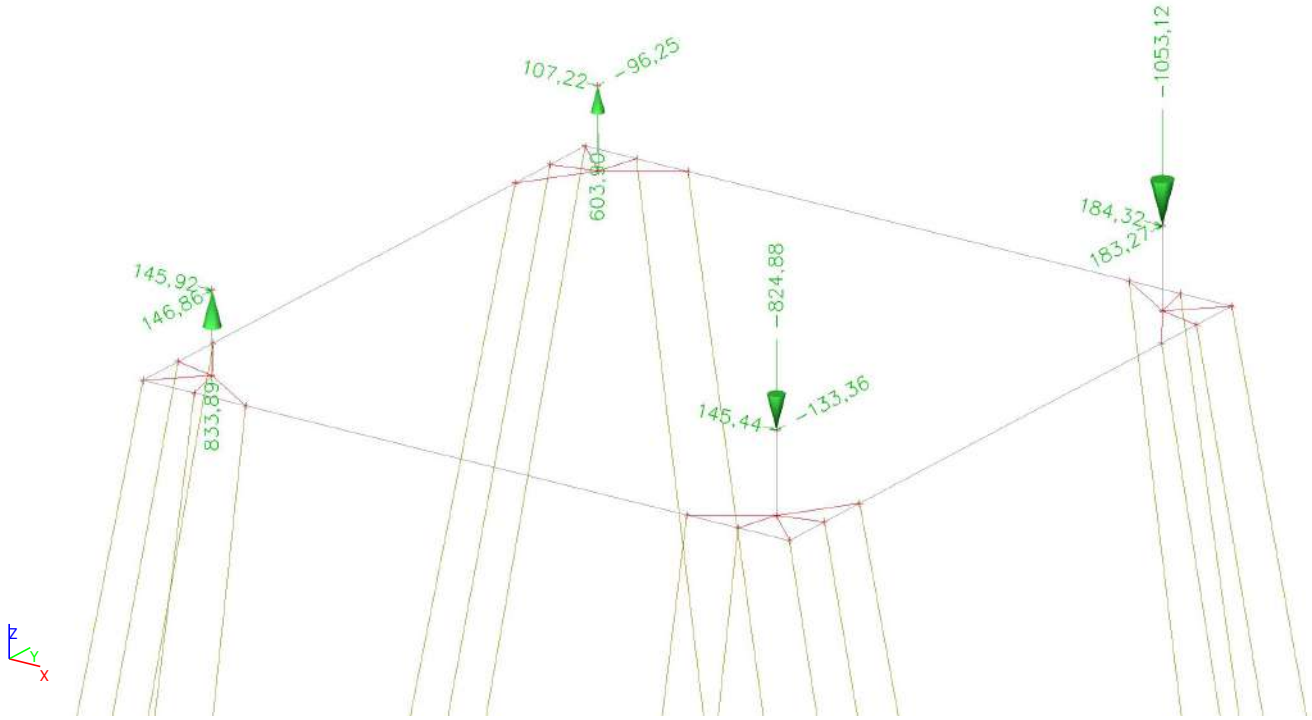
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;270°_1XY_X	1XY	hL Ahd + Wnd ;270°	GCS	X	Force	-157,25
hL Ahd + Wnd ;270°_1XY_Y	1XY	hL Ahd + Wnd ;270°	GCS	Y	Force	-158,29
hL Ahd + Wnd ;270°_1XY_Z	1XY	hL Ahd + Wnd ;270°	GCS	Z	Force	925,65
hL Ahd + Wnd ;270°_1P_X	1P	hL Ahd + Wnd ;270°	GCS	X	Force	-191,83
hL Ahd + Wnd ;270°_1P_Y	1P	hL Ahd + Wnd ;270°	GCS	Y	Force	-197,53
hL Ahd + Wnd ;270°_1P_Z	1P	hL Ahd + Wnd ;270°	GCS	Z	Force	-1141,53
hL Ahd + Wnd ;270°_1X_X	1X	hL Ahd + Wnd ;270°	GCS	X	Force	-129,61
hL Ahd + Wnd ;270°_1X_Y	1X	hL Ahd + Wnd ;270°	GCS	Y	Force	122,81
hL Ahd + Wnd ;270°_1X_Z	1X	hL Ahd + Wnd ;270°	GCS	Z	Force	-758,37
hL Ahd + Wnd ;270°_1Y_X	1Y	hL Ahd + Wnd ;270°	GCS	X	Force	-88,50
hL Ahd + Wnd ;270°_1Y_Y	1Y	hL Ahd + Wnd ;270°	GCS	Y	Force	89,69

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;270°_1Y_Z	1Y	hL Ahd + Wnd ;270°	GCS	Z	Force	540,81

6.1.4. Load cases - hL Bck + Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



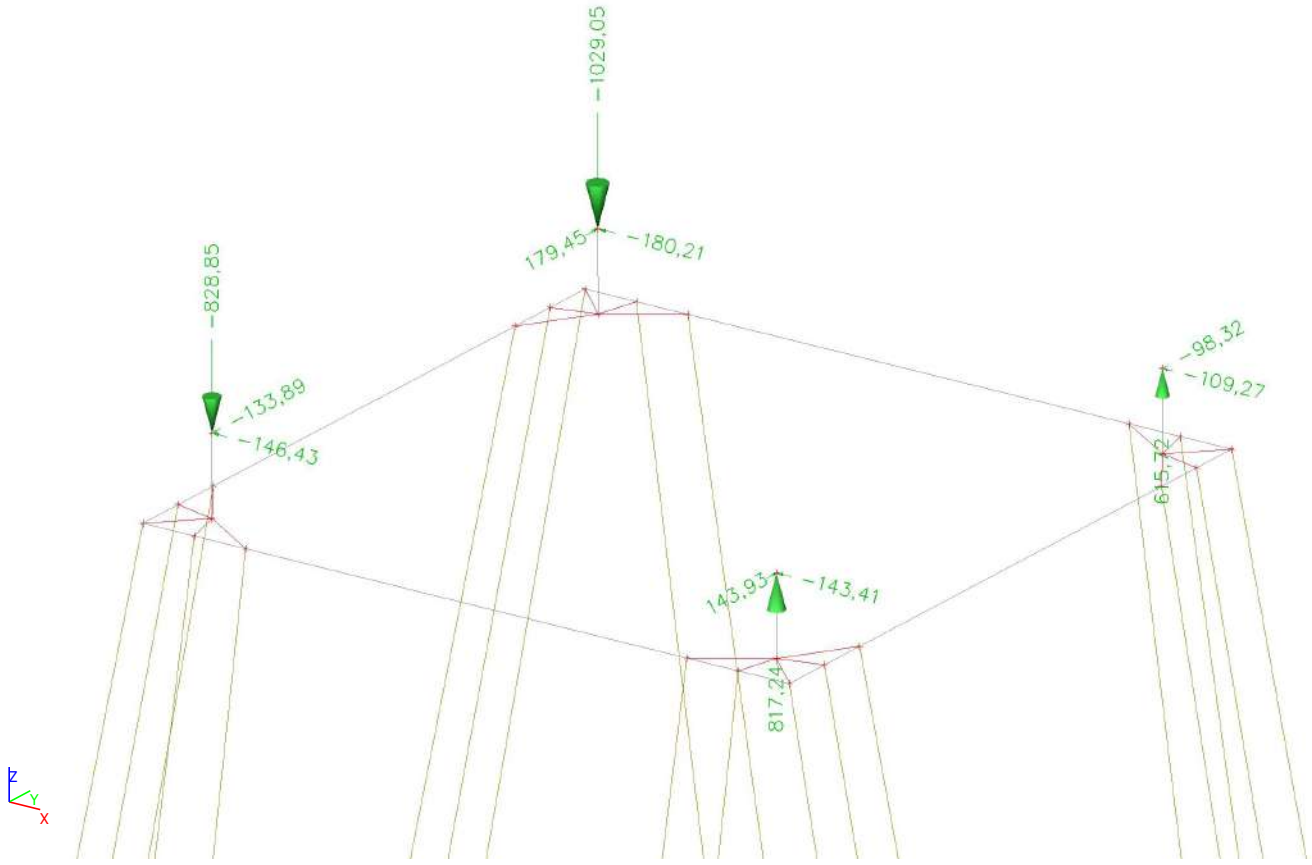
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;135°_1P_X	1P	hL Bck + Wnd ;135°	GCS	X	Force	145,92
hL Bck + Wnd ;135°_1P_Y	1P	hL Bck + Wnd ;135°	GCS	Y	Force	146,86
hL Bck + Wnd ;135°_1P_Z	1P	hL Bck + Wnd ;135°	GCS	Z	Force	833,89
hL Bck + Wnd ;135°_1XY_X	1XY	hL Bck + Wnd ;135°	GCS	X	Force	184,32
hL Bck + Wnd ;135°_1XY_Y	1XY	hL Bck + Wnd ;135°	GCS	Y	Force	183,27
hL Bck + Wnd ;135°_1XY_Z	1XY	hL Bck + Wnd ;135°	GCS	Z	Force	-1053,12
hL Bck + Wnd ;135°_1X_X	1X	hL Bck + Wnd ;135°	GCS	X	Force	107,22
hL Bck + Wnd ;135°_1X_Y	1X	hL Bck + Wnd ;135°	GCS	Y	Force	-96,25

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;135°_1X_Z	1X	hL Bck + Wnd ;135°	GCS	Z	Force	603,90
hL Bck + Wnd ;135°_1Y_X	1Y	hL Bck + Wnd ;135°	GCS	X	Force	145,44
hL Bck + Wnd ;135°_1Y_Y	1Y	hL Bck + Wnd ;135°	GCS	Y	Force	-133,36
hL Bck + Wnd ;135°_1Y_Z	1Y	hL Bck + Wnd ;135°	GCS	Z	Force	-824,88

6.1.5. Load cases - hL Ahd + Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;45°_1Y_X	1Y	hL Ahd + Wnd ;45°	GCS	X	Force	-143,41
hL Ahd + Wnd ;45°_1Y_Y	1Y	hL Ahd + Wnd ;45°	GCS	Y	Force	143,93
hL Ahd + Wnd ;45°_1Y_Z	1Y	hL Ahd + Wnd ;45°	GCS	Z	Force	817,24
hL Ahd + Wnd ;45°_1X_X	1X	hL Ahd + Wnd ;45°	GCS	X	Force	-180,21
hL Ahd + Wnd ;45°_1X_Y	1X	hL Ahd + Wnd ;45°	GCS	Y	Force	179,45

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;45°_1X_Z	1X	hL Ahd + Wnd ;45°	GCS	Z	Force	-1029,05
hL Ahd + Wnd ;45°_1P_X	1P	hL Ahd + Wnd ;45°	GCS	X	Force	-146,43
hL Ahd + Wnd ;45°_1P_Y	1P	hL Ahd + Wnd ;45°	GCS	Y	Force	-133,89
hL Ahd + Wnd ;45°_1P_Z	1P	hL Ahd + Wnd ;45°	GCS	Z	Force	-828,85
hL Ahd + Wnd ;45°_1XY_X	1XY	hL Ahd + Wnd ;45°	GCS	X	Force	-109,27
hL Ahd + Wnd ;45°_1XY_Y	1XY	hL Ahd + Wnd ;45°	GCS	Y	Force	-98,32
hL Ahd + Wnd ;45°_1XY_Z	1XY	hL Ahd + Wnd ;45°	GCS	Z	Force	615,72

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
hL Ahd + Wnd ;45°	Ultimate	E.G.	1,20
		hL Ahd + Wnd ;45°	1,00
hL Bck + Wnd ;270°	Ultimate	E.G.	1,20
		hL Bck + Wnd ;270°	1,00
hL Ahd + Wnd ;270°	Ultimate	E.G.	1,20
		hL Ahd + Wnd ;270°	1,00
hL Bck + Wnd ;135°	Ultimate	E.G.	1,20
		hL Bck + Wnd ;135°	1,00
lL Ahd + Wnd ;45°	Ultimate	E.G.	0,90
		hL Ahd + Wnd ;45°	1,00
lL Bck + Wnd ;270°	Ultimate	E.G.	0,90
		hL Bck + Wnd ;270°	1,00
lL Ahd + Wnd ;270°	Ultimate	E.G.	0,90
		hL Ahd + Wnd ;270°	1,00
lL Bck + Wnd ;135°	Ultimate	E.G.	0,90
		hL Bck + Wnd ;135°	1,00

6.3. Result classes

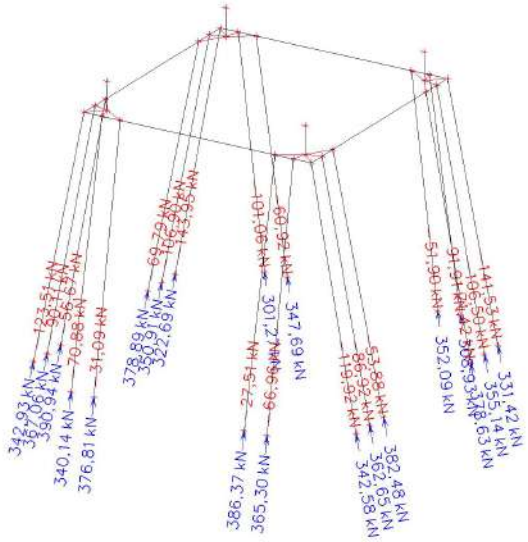
Name	List
All non-linear	hL Ahd + Wnd ;45°
	hL Bck + Wnd ;270°
	hL Ahd + Wnd ;270°
	hL Bck + Wnd ;135°
	lL Ahd + Wnd ;45°
	lL Bck + Wnd ;270°
	lL Ahd + Wnd ;270°
	lL Bck + Wnd ;135°

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn39/N3	lL Bck + Wnd ;270°	0,00	0,00	**-143,95**	0,00	0,00	0,00	0,0	0,0
Sn23/N46	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**390,94**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn21/N44	lL Bck + Wnd ;135°	0,00	0,00	**-123,51**	0,00	0,00	0,00	0,0	0,0
Sn21/N44	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**342,93**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn22/N45	lL Bck + Wnd ;135°	0,00	0,00	**-90,11**	0,00	0,00	0,00	0,0	0,0
Sn22/N45	hL Ahd +	**0,00**	**0,00**	**367,06**	**0,00**	**0,00**	**0,00**	0,0	0,0

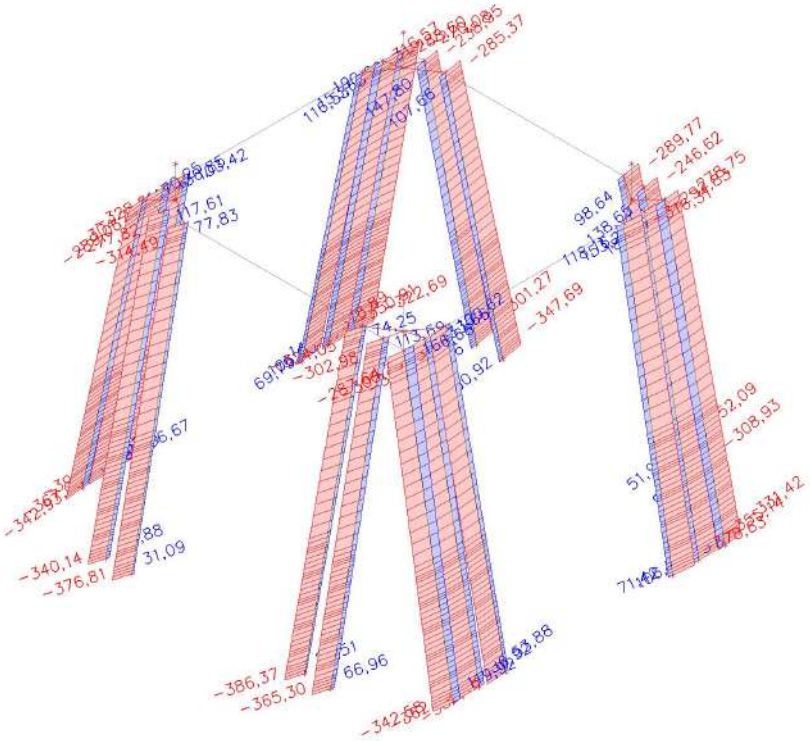
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;270°								
Sn23/N46	lL Bck + Wnd ;135°	0,00	0,00	**-56,67**	0,00	0,00	0,00	0,0	0,0
Sn23/N46	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**390,94**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn24/N47	lL Bck + Wnd ;135°	0,00	0,00	**-70,88**	0,00	0,00	0,00	0,0	0,0
Sn24/N47	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**340,14**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn26/N48	lL Bck + Wnd ;135°	0,00	0,00	**-31,09**	0,00	0,00	0,00	0,0	0,0
Sn26/N48	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**376,81**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn27/N49	lL Ahd + Wnd ;45°	0,00	0,00	**-119,92**	0,00	0,00	0,00	0,0	0,0
Sn27/N49	hL Bck + Wnd ;270°	**0,00**	**0,00**	**342,58**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn28/N50	lL Ahd + Wnd ;45°	0,00	0,00	**-86,92**	0,00	0,00	0,00	0,0	0,0
Sn28/N50	hL Bck + Wnd ;270°	**0,00**	**0,00**	**362,65**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn29/N51	lL Ahd + Wnd ;45°	0,00	0,00	**-53,88**	0,00	0,00	0,00	0,0	0,0
Sn29/N51	hL Bck + Wnd ;270°	**0,00**	**0,00**	**382,48**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn30/N52	lL Ahd + Wnd ;45°	0,00	0,00	**-66,96**	0,00	0,00	0,00	0,0	0,0
Sn30/N52	hL Bck + Wnd ;270°	**0,00**	**0,00**	**365,30**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn31/N53	lL Ahd + Wnd ;45°	0,00	0,00	**-27,51**	0,00	0,00	0,00	0,0	0,0
Sn31/N53	hL Bck + Wnd ;270°	**0,00**	**0,00**	**386,37**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn32/N10	lL Ahd + Wnd ;270°	0,00	0,00	**-141,53**	0,00	0,00	0,00	0,0	0,0
Sn32/N10	hL Bck + Wnd ;135°	**0,00**	**0,00**	**331,42**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn33/N11	lL Ahd + Wnd ;270°	0,00	0,00	**-106,50**	0,00	0,00	0,00	0,0	0,0
Sn33/N11	hL Bck + Wnd ;135°	**0,00**	**0,00**	**355,14**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn34/N12	lL Ahd + Wnd ;270°	0,00	0,00	**-71,42**	0,00	0,00	0,00	0,0	0,0
Sn34/N12	hL Bck + Wnd ;135°	**0,00**	**0,00**	**378,63**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn35/N13	lL Ahd + Wnd ;270°	0,00	0,00	**-91,91**	0,00	0,00	0,00	0,0	0,0
Sn35/N13	hL Bck + Wnd ;135°	**0,00**	**0,00**	**308,93**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn36/N14	lL Ahd + Wnd ;270°	0,00	0,00	**-51,90**	0,00	0,00	0,00	0,0	0,0
Sn36/N14	hL Bck + Wnd ;135°	**0,00**	**0,00**	**352,09**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	lL Bck + Wnd ;270°	**0,00**	**0,00**	**-101,06**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	hL Ahd + Wnd ;45°	0,00	0,00	**301,27**	0,00	0,00	**0,00**	0,0	0,0
Sn38/N2	lL Bck + Wnd ;270°	**0,00**	**0,00**	**-60,92**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn38/N2	hL Ahd + Wnd ;45°	0,00	0,00	**347,69**	0,00	0,00	**0,00**	0,0	0,0
Sn39/N3	lL Bck + Wnd ;270°	**0,00**	**0,00**	**-143,95**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn39/N3	hL Ahd + Wnd ;45°	0,00	0,00	**322,69**	0,00	0,00	**0,00**	0,0	0,0
Sn40/N4	lL Bck +	**0,00**	**0,00**	**-106,90**	**0,00**	**0,00**	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;270°								
Sn40/N4	hL Ahd + Wnd ;45°	0,00	0,00	**350,91**	0,00	0,00	**0,00**	0,0	0,0
Sn41/N54	lL Bck + Wnd ;270°	**0,00**	**0,00**	**-69,79**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn41/N54	hL Ahd + Wnd ;45°	0,00	0,00	**378,89**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

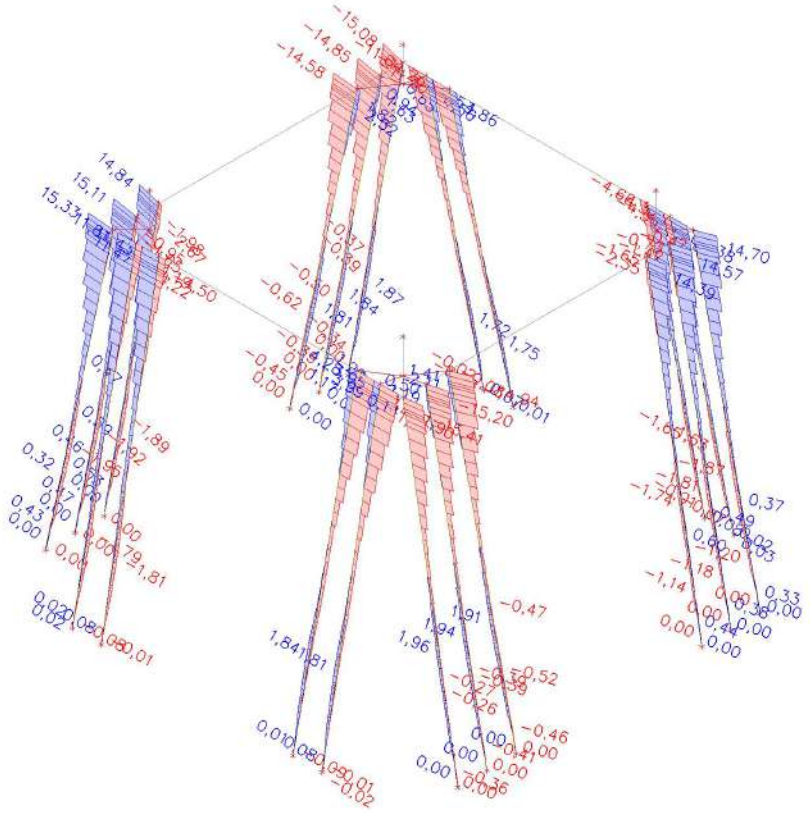
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



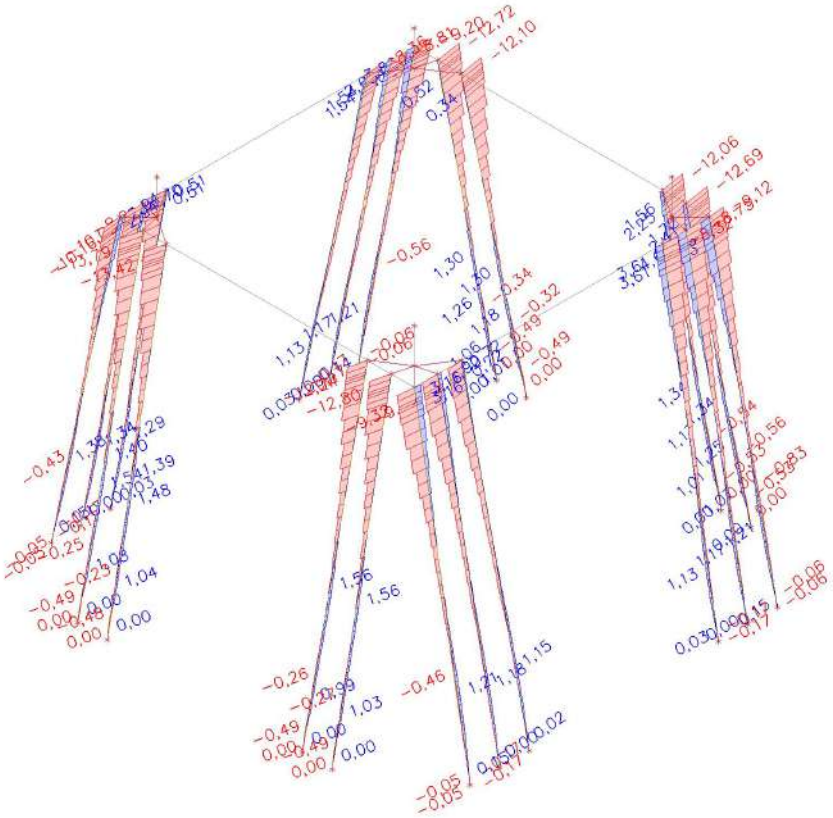
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



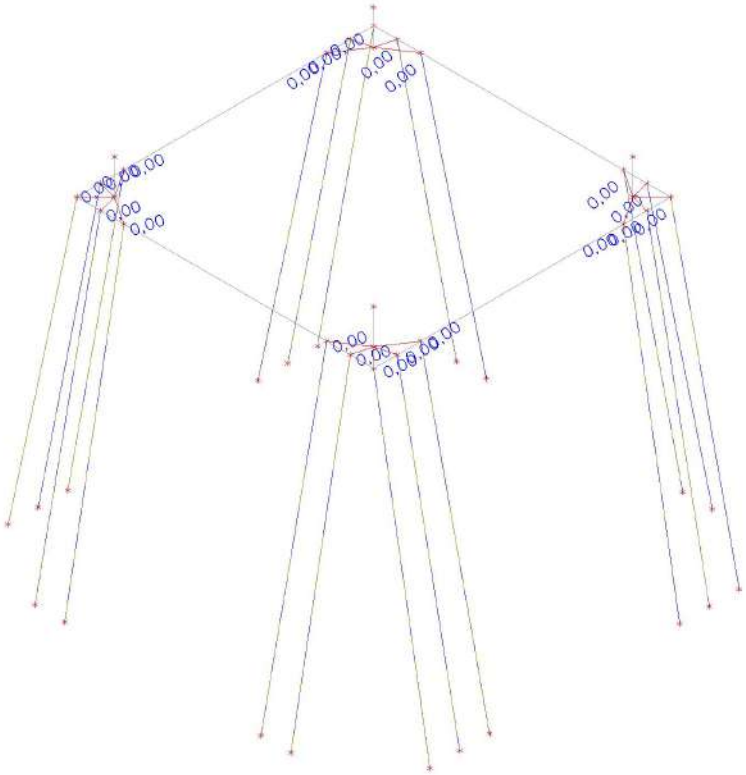
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



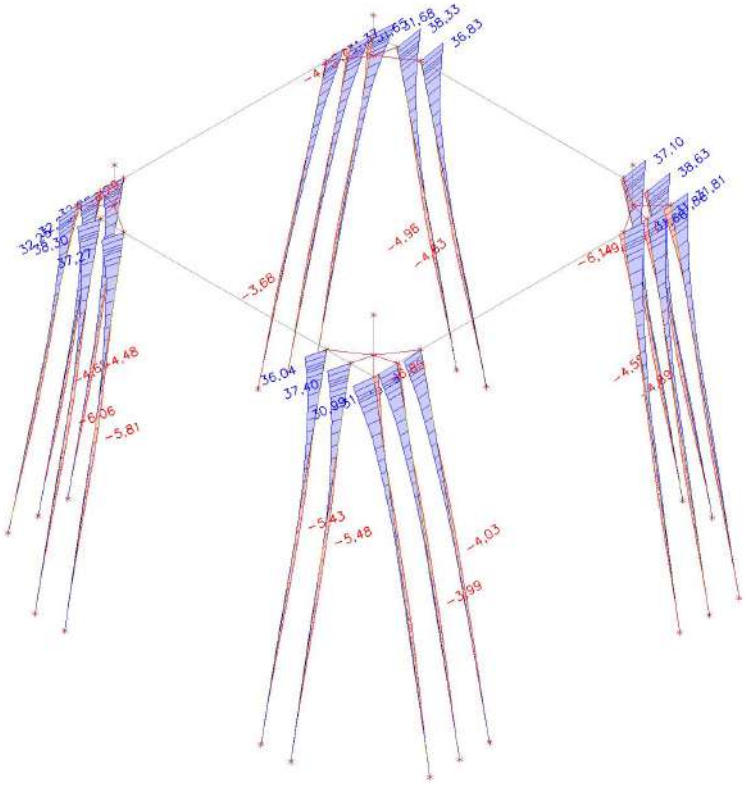
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



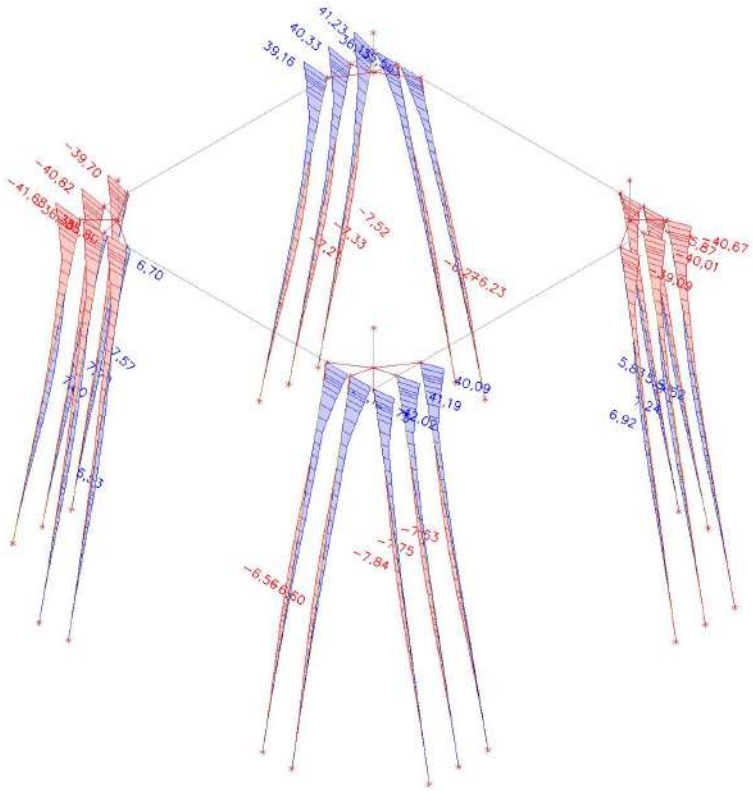
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_P_1	13,500	hL Ahd + Wnd ;270°	**-390,94**	0,00	-0,17	0,00	0,00	0,00
Paal_P_19	0,000	lL Bck + Wnd ;270°	**190,69**	-4,40	-0,43	**0,00**	11,55	22,63
Paal_P_7	0,000	hL Bck + Wnd ;135°	-215,95	**-15,41**	2,60	0,00	-4,34	**42,02**
Paal_P_4	0,000	hL Bck + Wnd ;270°	-10,66	-3,47	**-13,79**	0,00	38,30	3,55
Paal_P_12	1,000-	lL Bck + Wnd ;270°	-163,92	12,10	**5,76**	0,00	-6,61	-22,36
Paal_P_12	0,000	lL Bck + Wnd ;270°	-160,46	12,79	5,76	0,00	**-12,37**	-34,80
Paal_P_15	0,000	hL Ahd + Wnd ;45°	70,92	-3,89	-12,69	0,00	**38,63**	0,91
Paal_P_3	0,000	hL Ahd + Wnd ;45°	-216,25	**15,33**	2,36	0,00	-3,72	**-41,68**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

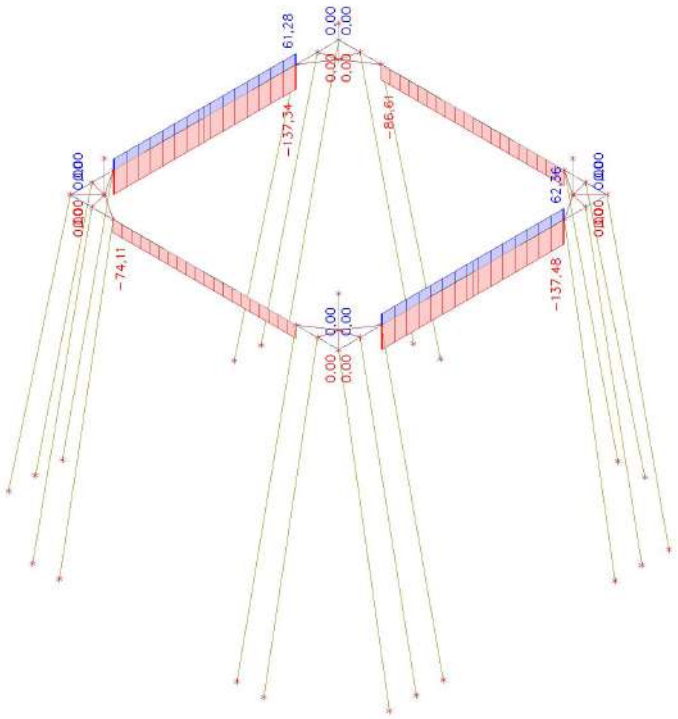
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer 5	0,000	hL Bck + Wnd ;270°	**-1192,12**	**283,37**	-7,74	-0,84	11,41	-291,04
Poer 8	1,475	hL Bck + Wnd ;270°	**947,21**	224,65	2,84	-0,03	0,00	11,37
Poer 8	0,000	hL Ahd + Wnd ;270°	-784,22	-173,60	**-9,70**	**1,04**	**14,18**	173,07
Poer 8	1,475	hL Bck + Wnd ;135°	604,72	140,11	**11,53**	-0,14	0,00	7,26
Poer 8	0,000	lL Bck + Wnd ;135°	586,13	140,22	11,41	**-1,24**	**-16,92**	-142,27
Poer 5	0,000	lL Bck + Wnd ;270°	-1185,14	283,37	-7,74	-0,84	11,41	**-291,34**
Poer 7	0,000	lL Ahd + Wnd ;270°	-1162,46	**-275,32**	-4,03	0,44	5,95	**281,92**

7.4. Krachten van de Funderingsbalken

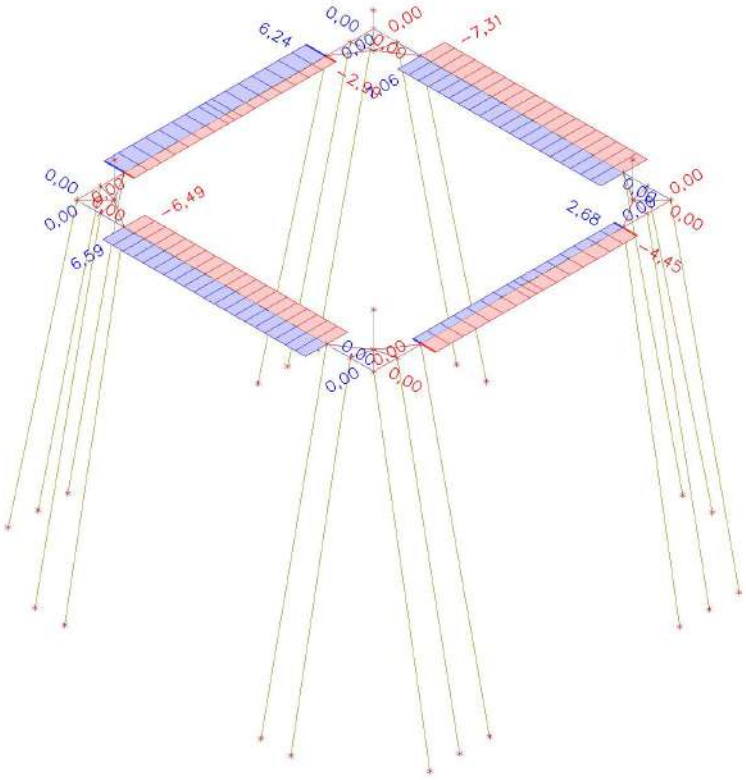
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



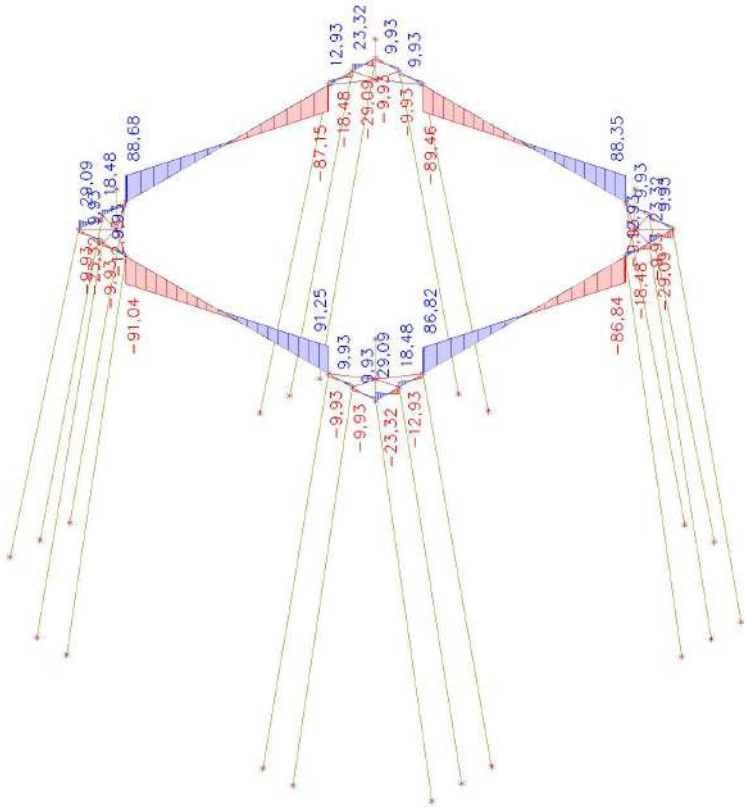
7.4.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



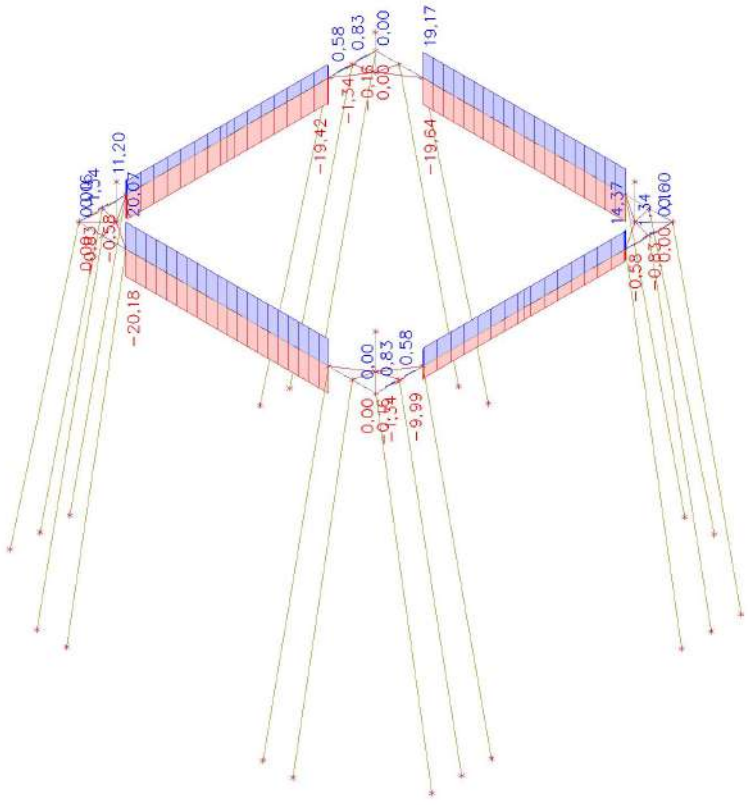
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



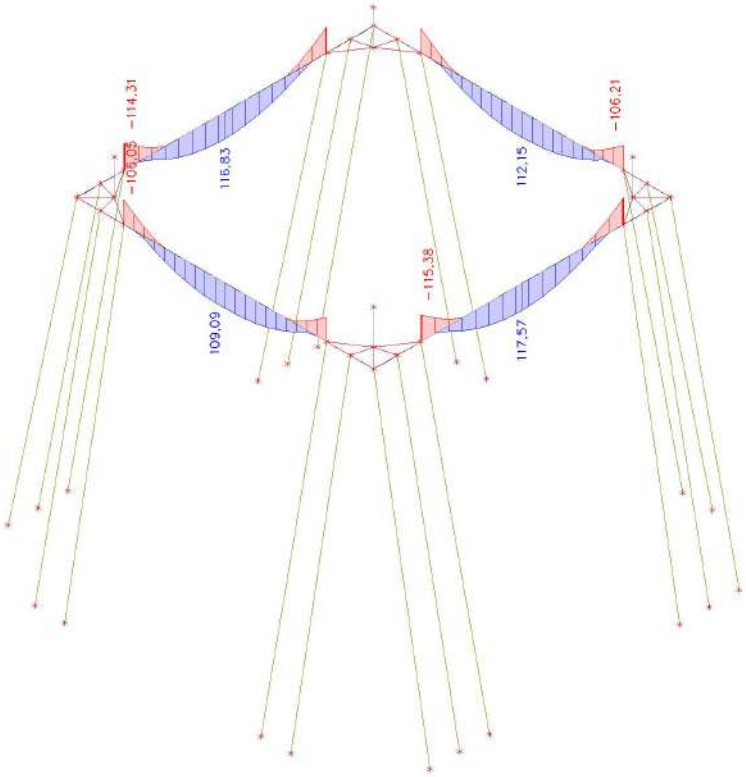
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



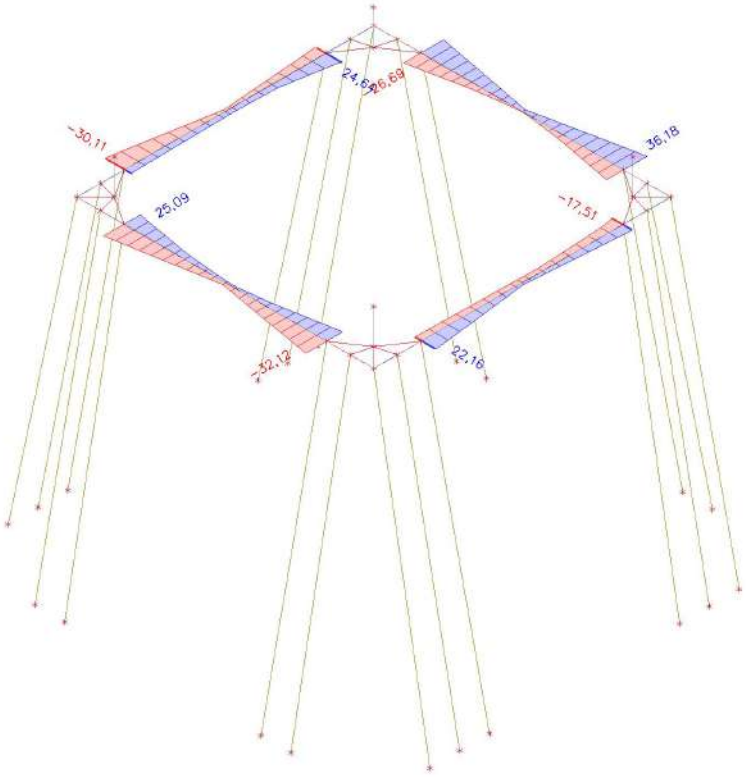
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: Named selection - FunderingsBalken
Filter: Layer = Balken

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Balk 5	2,000+	lL Bck + Wnd ;135°	**62,36**	0,64	63,12	-5,04	-82,76	-9,49
Balk 4	2,000+	lL Bck + Wnd ;270°	-73,18	**-7,31**	63,80	18,85	-47,41	**36,18**
Balk 4	2,000+	hL Ahd + Wnd ;270°	-79,74	**7,06**	81,38	-19,64	-56,17	-26,29
Balk 7	10,600-	hL Ahd + Wnd ;45°	-72,93	-6,49	**-91,04**	**20,07**	-100,36	-30,86
Balk 7	2,000+	hL Bck + Wnd ;135°	-74,11	6,59	**91,25**	**-20,18**	-100,31	-31,59
Balk 5	2,000+	hL Bck + Wnd ;270°	38,90	-1,87	86,82	8,97	**-115,38**	3,29
Balk 5	6,300	hL Ahd + Wnd ;45°	**-137,48**	2,68	-1,40	-9,00	**117,57**	3,32
Balk 7	2,000+	lL Bck + Wnd ;135°	-61,10	6,44	67,48	-18,75	-66,13	**-32,12**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-DIM 380kV
Part	Balkrooster 5xBeton40x40
Author	[redacted]
Date	4-05-2026
Structure	General XYZ
No. of nodes :	52
No. of beams :	28
No. of slabs :	0
No. of solids :	0
No. of used profiles :	3
No. of load cases :	5
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,810
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materials

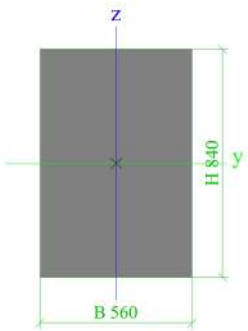
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C20/25 Ongescheurd	Concrete	1500,0	2600,0	2,4000e+04	0.2	0,00	20,00	
C20/25 Gescheurd	Concrete	2500,0	2600,0	8,0000e+03	0.2	0,00	20,00	

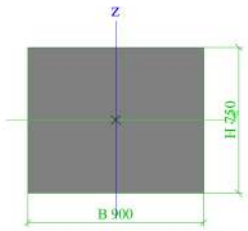
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

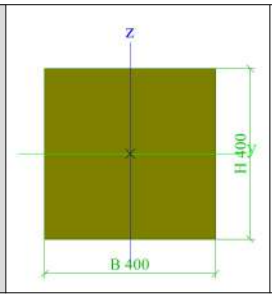
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 500B	Reinforcement steel	6850,0	2,0000e+05	8,3333e+04	0,00	500,0

4.2. Cross-sections

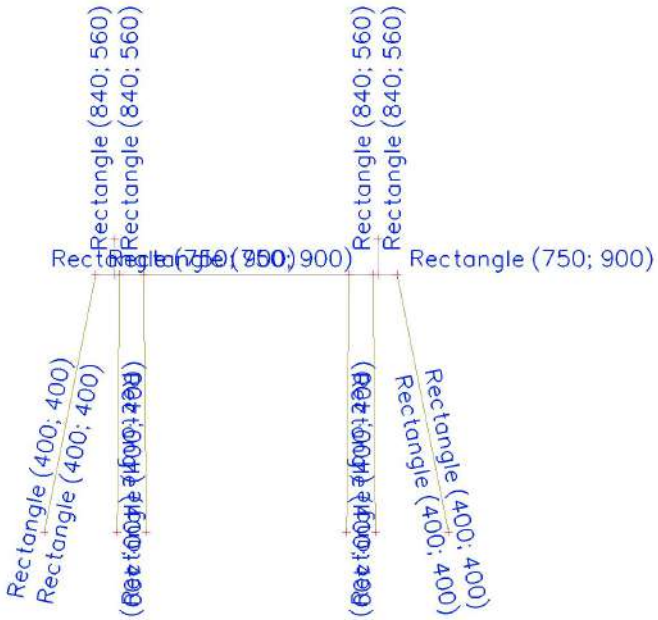
Poer.Opstort		
Type	Rectangle	
Detailed	840; 560	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	4,7040e-01	
A_y [m²], A_z [m²]	3,9200e-01	3,9200e-01
A_L [m²/m], A_D [m²/m]	2,8000e+00	2,8000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	280	420
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,7660e-02	1,2293e-02
i_y [mm], i_z [mm]	242	162
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	6,5856e-02	4,3904e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	2,8888e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

Balk		
Type	Rectangle	
Detailed	750; 900	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	6,7500e-01	
A_y [m²], A_z [m²]	5,6250e-01	5,6250e-01
A_L [m²/m], A_D [m²/m]	3,3000e+00	3,3000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450	375
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	3,1641e-02	4,5563e-02
i_y [mm], i_z [mm]	217	260
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	8,4375e-02	1,0125e-01
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	6,3112e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

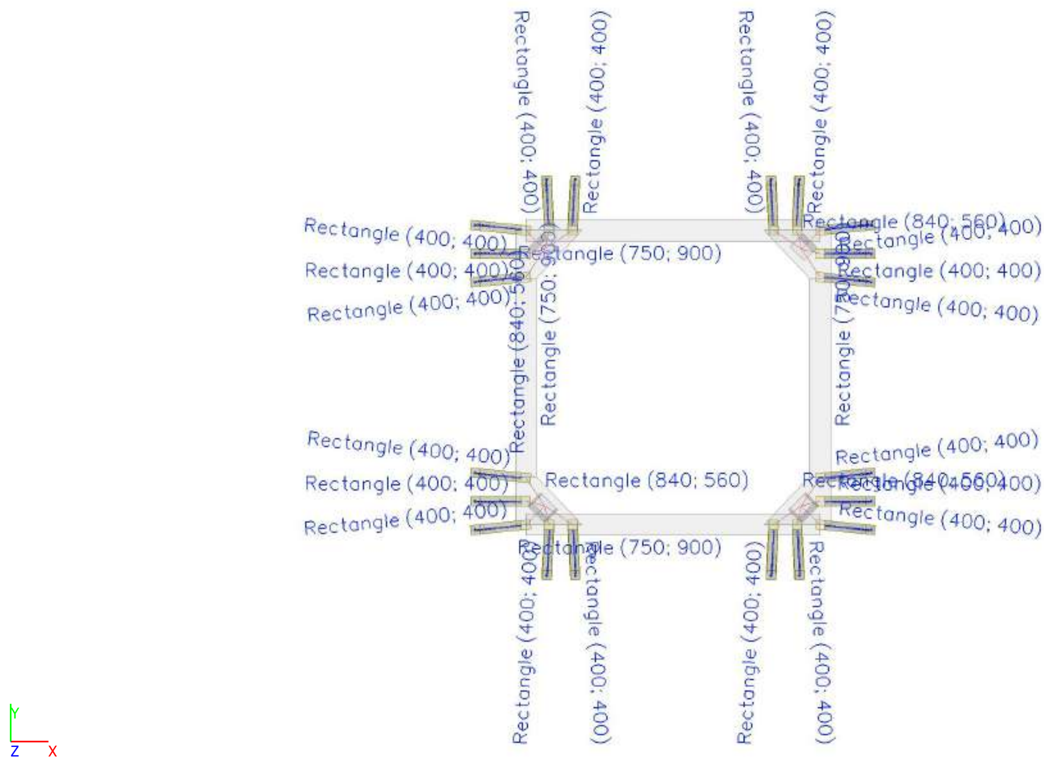
Funderingspaal		
Type	Rectangle	
Detailed	400; 400	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [m²]	1,6000e-01	
A_y [m²], A_z [m²]	1,3333e-01	1,3333e-01
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200	200
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,1333e-03	2,1333e-03
i_y [mm], i_z [mm]	115	115
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	1,0667e-02	1,0667e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	3,6027e-03	0,0000e+00
β_y [mm], β_z [mm]	0	0

Picture		
		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	NetInstelling1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	5
Average size of 2D mesh element [m]	0,250
Average size of 1D mesh element on curved 1D members [m]	0,200
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N5	13,000	1,400	0,000
N6	13,000	2,400	0,000
N7	12,000	0,400	0,000
N1	11,000	0,400	0,000
N17	0,400	0,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N21	0,400	13,000	0,000
1Y	12,200	1,200	1,475
N22	12,200	1,200	0,000
N23	12,200	12,200	0,000
1XY	12,200	12,200	1,475

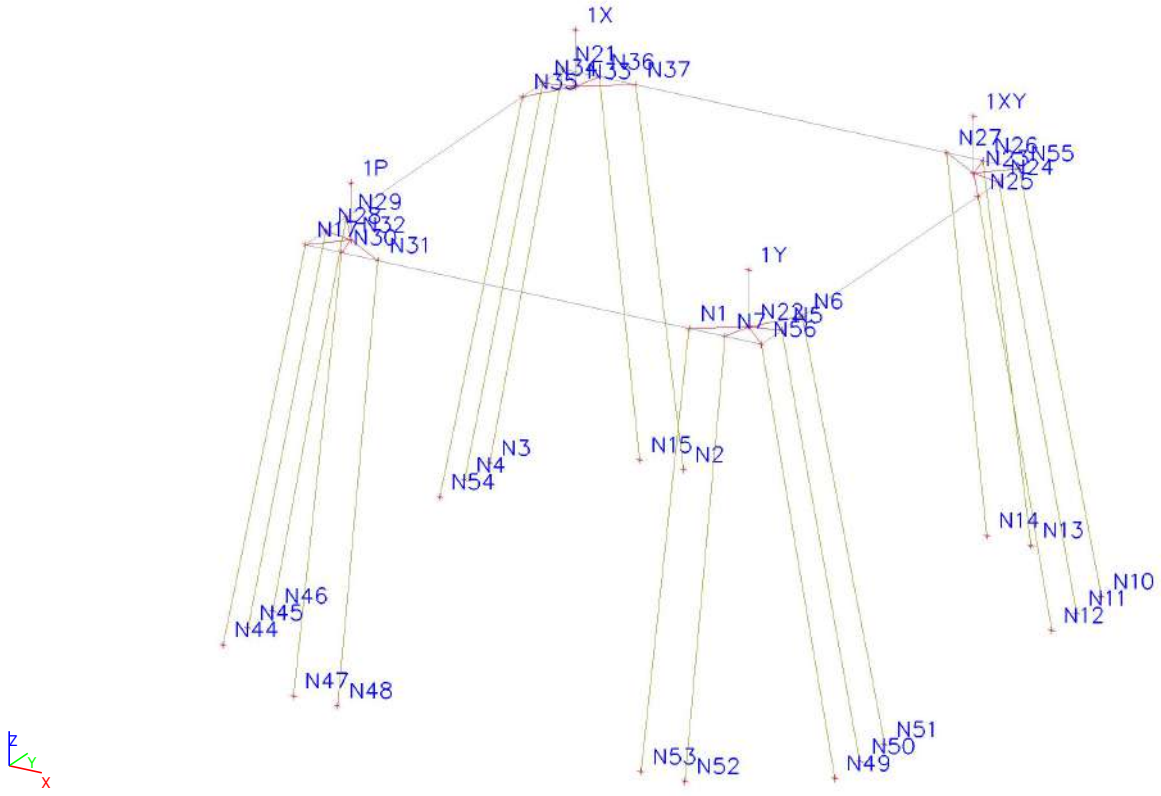
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N24	13,000	12,000	0,000
N25	13,000	11,000	0,000
N26	12,000	13,000	0,000
N27	11,000	13,000	0,000
N28	0,400	1,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N29	0,400	2,400	0,000
N30	1,400	0,400	0,000
N31	2,400	0,400	0,000
1P	1,200	1,200	1,475
N32	1,200	1,200	0,000
N33	1,200	12,200	0,000
1X	1,200	12,187	1,475
N34	0,400	12,000	0,000
N35	0,400	11,000	0,000
N36	1,400	13,000	0,000
N37	2,400	13,000	0,000
N38	12,200	1,200	0,000
N39	1,200	1,200	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N40	12,200	12,200	0,000
N41	1,200	12,200	0,000
N44	-1,757	0,184	-10,784
N45	-1,757	1,400	-10,783
N46	-1,757	2,616	-10,784
N47	1,292	-1,757	-10,783
N48	2,508	-1,757	-10,783
N49	15,157	0,184	-10,784
N50	15,157	1,400	-10,783
N51	15,157	2,616	-10,784
N52	12,108	-1,757	-10,783
N53	10,892	-1,757	-10,783
N10	15,157	13,216	-10,784

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N11	15,157	12,000	-10,783
N12	15,157	10,784	-10,784
N13	12,108	15,157	-10,783
N14	10,892	15,157	-10,783
N15	1,292	15,157	-10,783
N2	2,508	15,157	-10,783
N3	-1,757	13,216	-10,784
N4	-1,757	12,000	-10,783
N54	-1,757	10,784	-10,784
N55	13,000	13,000	0,000
N56	13,000	0,400	0,000

5.2. Analyse model met knopen

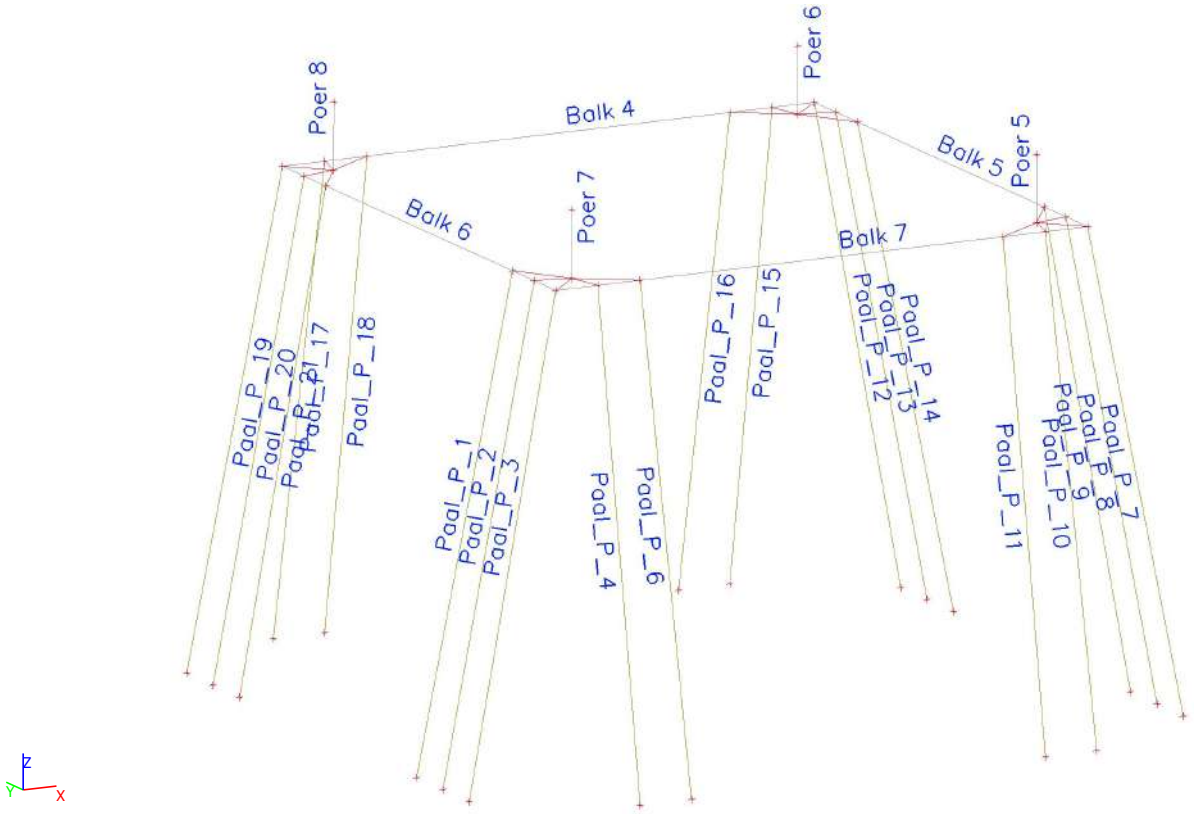


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Balk 4	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N55	N21	beam (80)
Balk 5	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N55	beam (80)
Balk 6	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N17	N21	beam (80)
Balk 7	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N17	beam (80)
Poer 5	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N22	1Y	column (100)
Poer 6	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N23	1XY	column (100)
Poer 7	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N32	1P	column (100)
Poer 8	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N33	1X	column (100)
Paal_P_1	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N29	N46	column (100)
Paal_P_2	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,996	N28	N45	column (100)
Paal_P_3	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N17	N44	column (100)
Paal_P_4	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N30	N47	column (100)
Paal_P_6	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N31	N48	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_7	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N56	N49	column (100)
Paal_P_8	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,996	N5	N50	column (100)
Paal_P_9	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N6	N51	column (100)
Paal_P_10	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N7	N52	column (100)
Paal_P_11	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N1	N53	column (100)
Paal_P_12	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N55	N10	column (100)
Paal_P_13	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,996	N24	N11	column (100)
Paal_P_14	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N25	N12	column (100)
Paal_P_15	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N26	N13	column (100)
Paal_P_16	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N27	N14	column (100)
Paal_P_17	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N36	N15	column (100)
Paal_P_18	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N37	N2	column (100)
Paal_P_19	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N21	N3	column (100)
Paal_P_20	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,996	N34	N4	column (100)
Paal_P_21	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N35	N54	column (100)

5.4. Analyse model met Staven

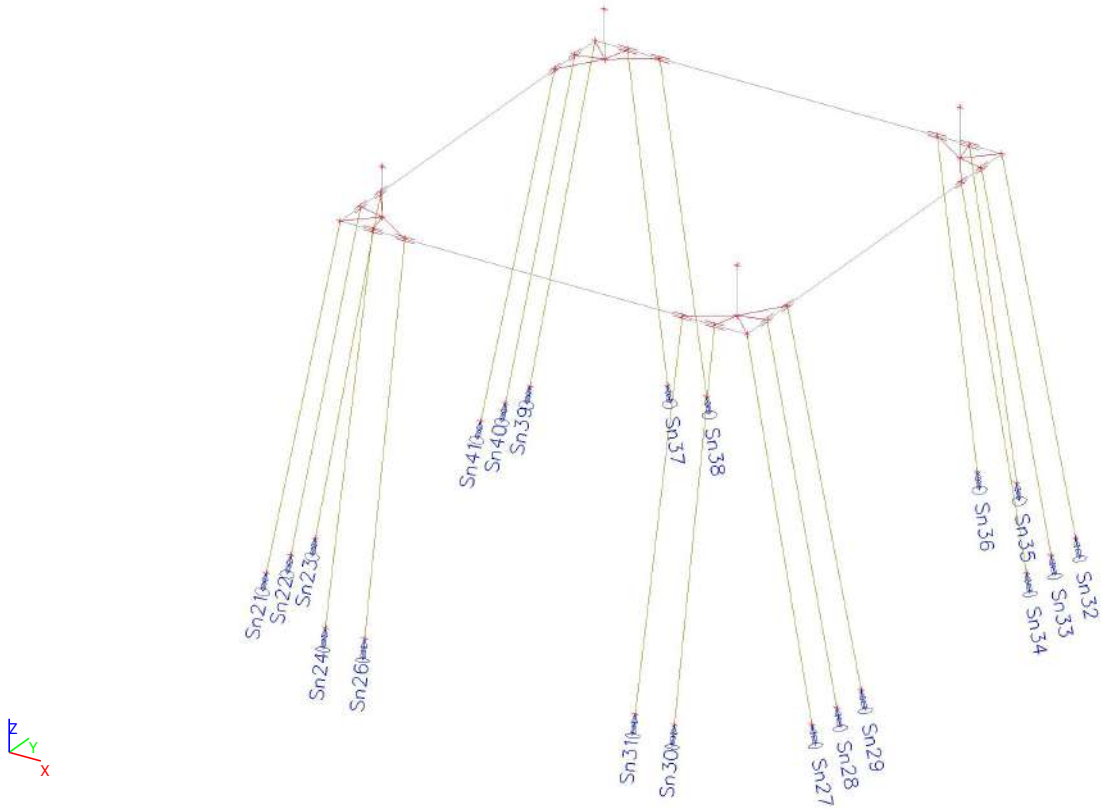


5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn21	N44	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31
Sn22	N45	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn23	N46	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn24	N47	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn26	N48	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn27	N49	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn28	N50	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31
Sn29	N51	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn30	N52	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn31	N53	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn32	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn33	N11	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn34	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn35	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn36	N14	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn37	N15	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn38	N2	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn39	N3	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn40	N4	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn41	N54	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31

5.6. Analyse model met Knoopondersteuningen



5.7. Line supports on member

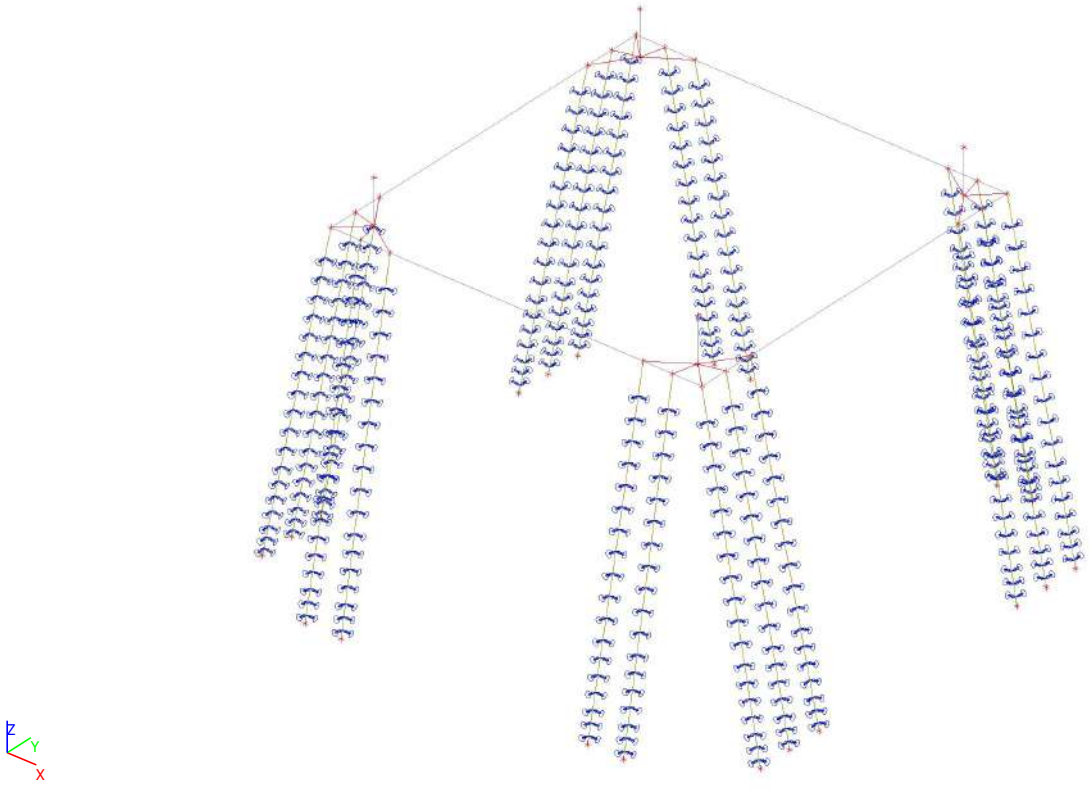
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Veen	Line	Paal_P_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen3	Line	Paal_P_2 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Veen4	Line	Paal_P_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)1	Line	Paal_P_3 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)3	Line	Paal_P_2 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V1)4	Line	Paal_P_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)	Line	Paal_P_3 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)1	Line	Paal_P_2 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
(PY-curve-1_V2)2	Line	Paal_P_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
		LCS	10,000	From start						
(PY-curve-1_V3)	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
(PY-curve-1_V3)19	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
(PY-curve-1_V3)12	Line	Paal_P_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen18	Line	Paal_P_4	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)14	Line	Paal_P_4	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)7	Line	Paal_P_4	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)5	Line	Paal_P_4	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen9	Line	Paal_P_6	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)18	Line	Paal_P_6	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)9	Line	Paal_P_6	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)8	Line	Paal_P_6	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen8	Line	Paal_P_7	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)19	Line	Paal_P_7	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)12	Line	Paal_P_7	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)10	Line	Paal_P_7	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen16	Line	Paal_P_8	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)8	Line	Paal_P_8	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)14	Line	Paal_P_8	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)9	Line	Paal_P_8	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen13	Line	Paal_P_9	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)2	Line	Paal_P_9	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)16	Line	Paal_P_9	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)1	Line	Paal_P_9	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen10	Line	Paal_P_10	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)15	Line	Paal_P_10	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)18	Line	Paal_P_10	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)11	Line	Paal_P_10	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen5	Line	Paal_P_11	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)16	Line	Paal_P_11	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)4	Line	Paal_P_11	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)15	Line	Paal_P_11	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen7	Line	Paal_P_12	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

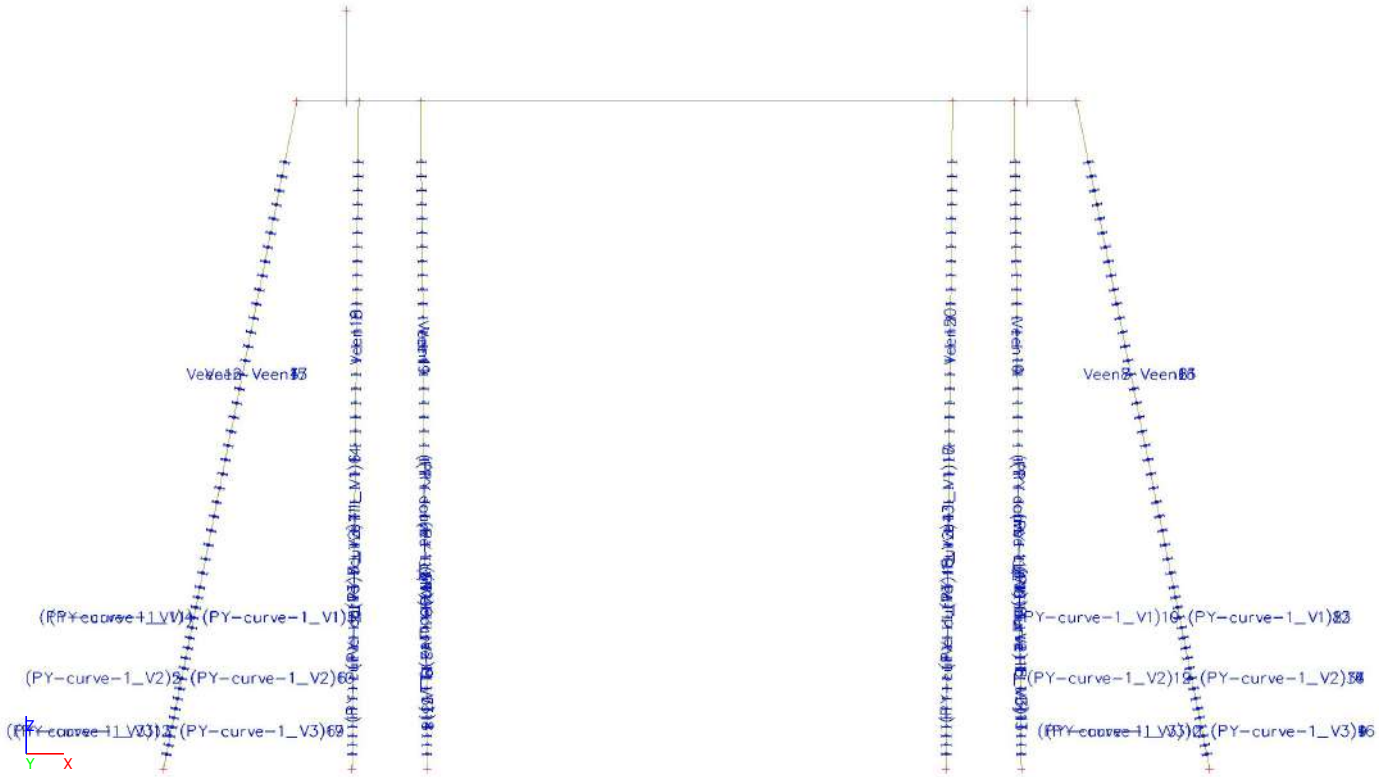
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
(PY-curve-1_V1)10	Line	Paal_P_12	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)19	Line	Paal_P_12	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)2	Line	Paal_P_12	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen21	Line	Paal_P_13	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)12	Line	Paal_P_13	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)3	Line	Paal_P_13	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)16	Line	Paal_P_13	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen6	Line	Paal_P_14	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)13	Line	Paal_P_14	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)17	Line	Paal_P_14	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)4	Line	Paal_P_14	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen14	Line	Paal_P_15	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)7	Line	Paal_P_15	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)15	Line	Paal_P_15	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)13	Line	Paal_P_15	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen20	Line	Paal_P_16	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)17	Line	Paal_P_16	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)13	Line	Paal_P_16	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)18	Line	Paal_P_16	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen19	Line	Paal_P_17	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)6	Line	Paal_P_17	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)11	Line	Paal_P_17	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)7	Line	Paal_P_17	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen11	Line	Paal_P_18	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)9	Line	Paal_P_18	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)8	Line	Paal_P_18	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)14	Line	Paal_P_18	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen17	Line	Paal_P_19	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)11	Line	Paal_P_19	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)6	Line	Paal_P_19	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)6	Line	Paal_P_19	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen15	Line	Paal_P_20	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
(PY-curve-1_V1)5	Line	Paal_P_20	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)10	Line	Paal_P_20	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)17	Line	Paal_P_20	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen12	Line	Paal_P_21	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)	Line	Paal_P_21	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)5	Line	Paal_P_21	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)3	Line	Paal_P_21	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						

5.8. Analyse model met Lijnondersteuningen



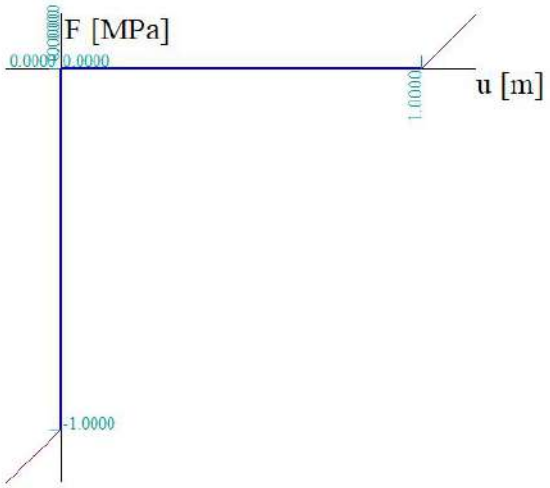
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

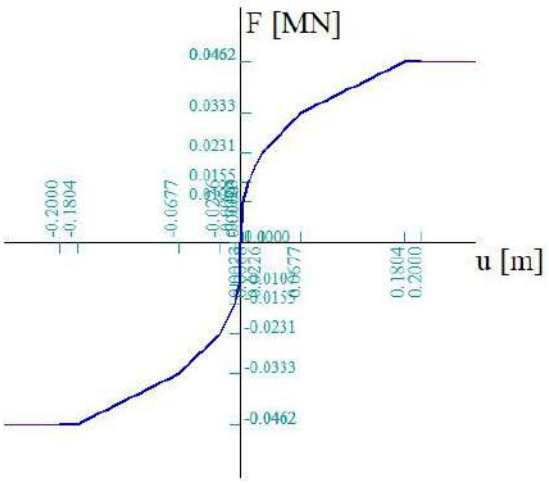
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -46203.840000	Free	Free
		-0.180400 / -46203.840000		
		-0.067650 / -33318.734193		
		-0.022550 / -23101.920000		
		-0.006765 / -15465.186458		

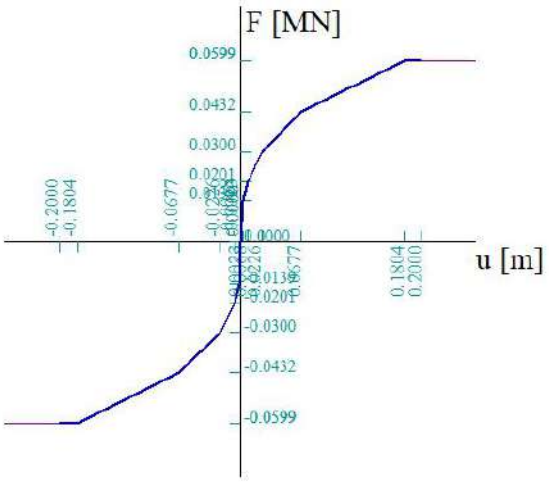
Name	Type	u / F	Positive end	Negative end
		-0.002255 / -10722.961391		
		0.000000 / 0.000000		
		0.002255 / 10722.961391		
		0.006765 / 15465.186458		
		0.022550 / 23101.920000		
		0.067650 / 33318.734193		
		0.180400 / 46203.840000		
		0.200000 / 46203.840000		

Drawing



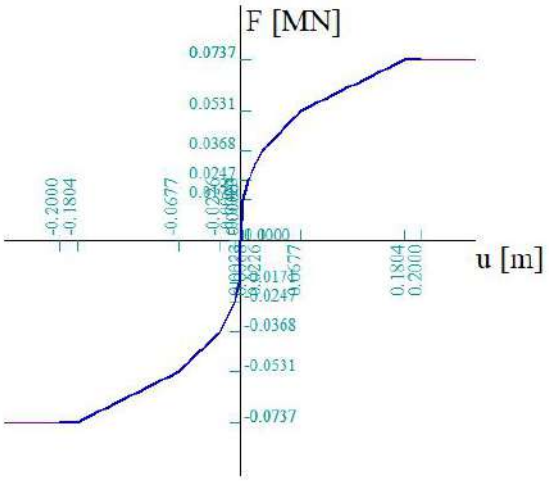
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -59935.680000	Free	Free
		-0.180400 / -59935.680000		
		-0.067650 / -43221.104363		
		-0.022550 / -29967.840000		
		-0.006765 / -20061.459539		
		-0.002255 / -13909.839151		
		0.000000 / 0.000000		
		0.002255 / 13909.839151		
		0.006765 / 20061.459539		
		0.022550 / 29967.840000		
		0.067650 / 43221.104363		
		0.180400 / 59935.680000		
		0.200000 / 59935.680000		

Drawing



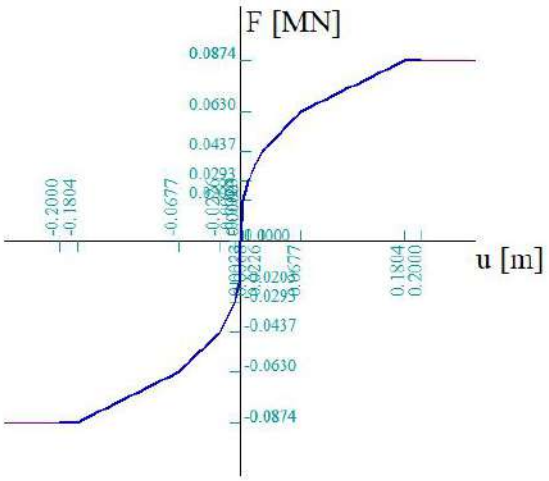
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -73667.520000	Free	Free
		-0.180400 / -73667.520000		
		-0.067650 / -53123.474533		
		-0.022550 / -36833.760000		
		-0.006765 / -24657.732619		
		-0.002255 / -17096.716912		
		0.000000 / 0.000000		
		0.002255 / 17096.716912		
		0.006765 / 24657.732619		
		0.022550 / 36833.760000		
		0.067650 / 53123.474533		
		0.180400 / 73667.520000		
		0.200000 / 73667.520000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -87399.360000	Free	Free
		-0.180400 / -87399.360000		
		-0.067650 / -63025.844703		
		-0.022550 / -43699.680000		
		-0.006765 / -29254.005700		
		-0.002255 / -20283.594672		
		0.000000 / 0.000000		
		0.002255 / 20283.594672		
		0.006765 / 29254.005700		
		0.022550 / 43699.680000		
		0.067650 / 63025.844703		
		0.180400 / 87399.360000		
		0.200000 / 87399.360000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -185749.581577	Free	Free
		-0.016913 / -185749.581577		
		-0.007517 / -173191.521652		
		-0.003758 / -126966.550767		
		-0.001879 / -73364.887728		
		-0.000940 / -38233.153457		
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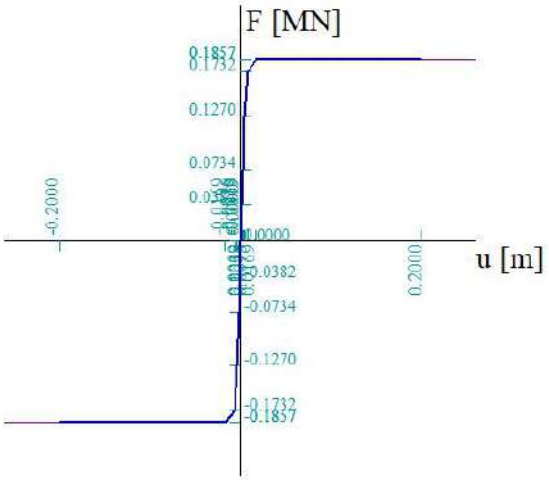
		0.000940 / 38233.153457		
		0.001879 / 73364.887728		
		0.003758 / 126966.550767		
		0.007517 / 173191.521652		
		0.016913 / 185749.581577		
		0.200000 / 185749.581577		

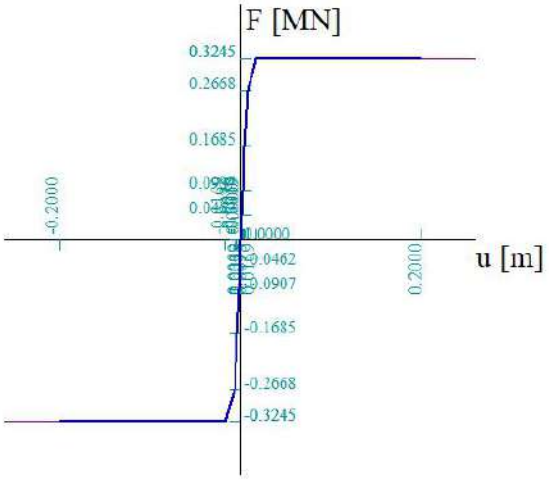
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -324503.959510	Free	Free
		-0.016913 / -324503.959510		
		-0.007517 / -266801.170128		
		-0.003758 / -168504.997582		
		-0.001879 / -90672.108471		
		-0.000940 / -46234.204284		
		0.000000 / 0.000000		
		0.000940 / 46234.204284		
		0.001879 / 90672.108471		
		0.003758 / 168504.997582		

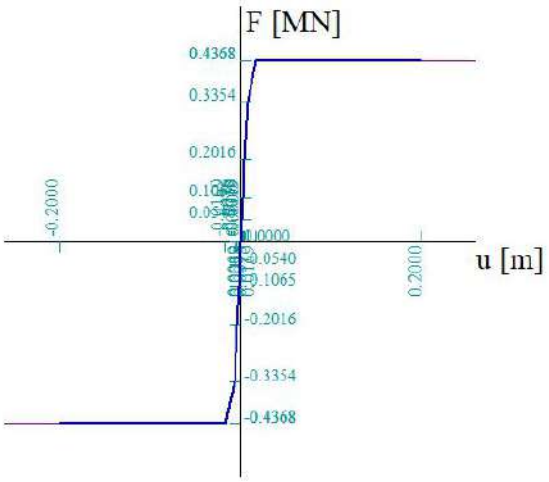
Name	Type	u / F	Positive end	Negative end
		0.007517 / 266801.170128		
		0.016913 / 324503.959510		
		0.200000 / 324503.959510		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -436765.819801	Free	Free
		-0.016913 / -436765.819801		
		-0.007517 / -335362.730832		
		-0.003758 / -201646.948699		
		-0.001879 / -106522.716227		
		-0.000940 / -54036.089272		
		0.000000 / 0.000000		
		0.000940 / 54036.089272		
		0.001879 / 106522.716227		
		0.003758 / 201646.948699		
		0.007517 / 335362.730832		
		0.016913 / 436765.819801		
		0.200000 / 436765.819801		

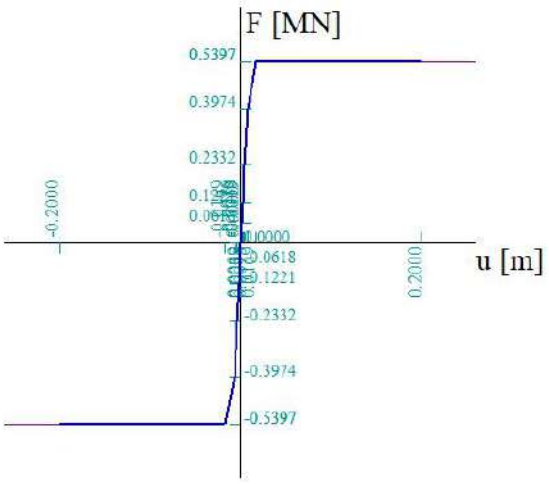
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -539683.678038	Free	Free
		-0.016913 / -539683.678038		
		-0.007517 / -397433.011814		
		-0.003758 / -233158.398644		

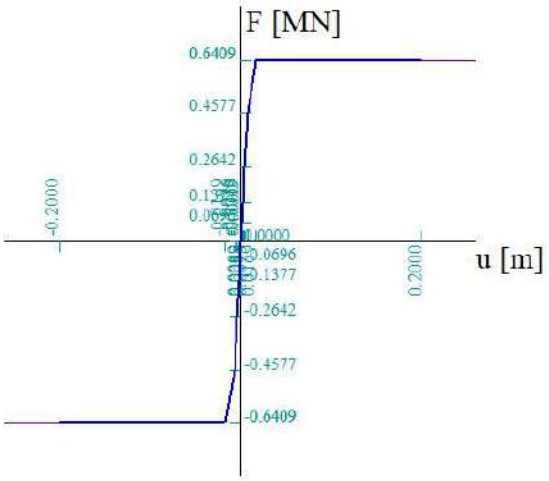
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -122122.429030		
		-0.000940 / -61804.852432		
		0.000000 / 0.000000		
		0.000940 / 61804.852432		
		0.001879 / 122122.429030		
		0.003758 / 233158.398644		
		0.007517 / 397433.011814		
		0.016913 / 539683.678038		
		0.200000 / 539683.678038		

Drawing



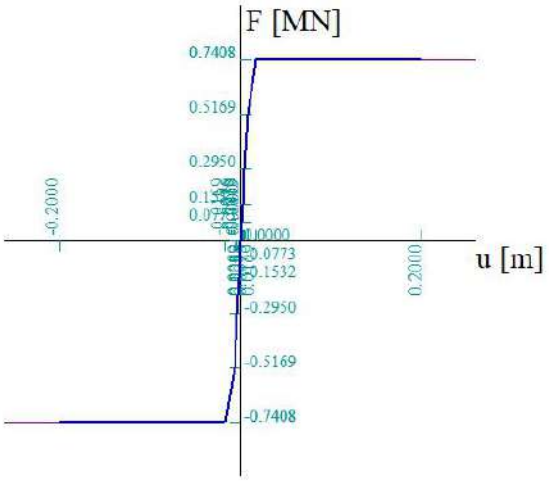
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -640861.931437	Free	Free
		-0.016913 / -640861.931437		
		-0.007517 / -457700.088592		
		-0.003758 / -264224.038576		
		-0.001879 / -137654.602914		
		-0.000940 / -69564.742931		
		0.000000 / 0.000000		
		0.000940 / 69564.742931		
		0.001879 / 137654.602914		
		0.003758 / 264224.038576		
		0.007517 / 457700.088592		
		0.016913 / 640861.931437		
		0.200000 / 640861.931437		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -740774.043969	Free	Free
		-0.016913 / -740774.043969		
		-0.007517 / -516894.797403		
		-0.003758 / -295043.983610		
		-0.001879 / -153150.432455		
		-0.000940 / -77319.889121		
		0.000000 / 0.000000		
		0.000940 / 77319.889121		
		0.001879 / 153150.432455		
		0.003758 / 295043.983610		
		0.007517 / 516894.797403		
		0.016913 / 740774.043969		
		0.200000 / 740774.043969		

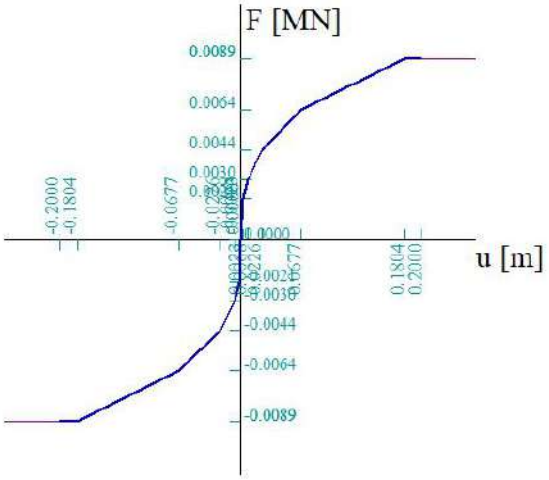
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -8894.400000	Free	Free
		-0.180400 / -8894.400000		
		-0.067650 / -6413.760000		
		-0.022550 / -4447.680000		
		-0.006765 / -2976.960000		
		-0.002255 / -2064.000000		
		0.000000 / 0.000000		
		0.002255 / 2064.000000		
		0.006765 / 2976.960000		
		0.022550 / 4447.680000		

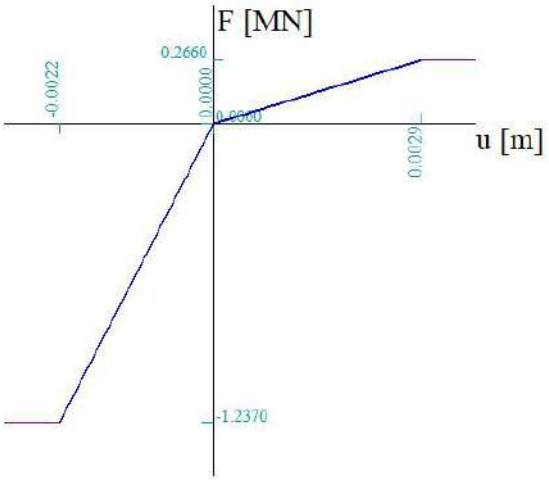
Name	Type	u / F	Positive end	Negative end
		0.067650 / 6413.760000		
		0.180400 / 8894.400000		
		0.200000 / 8894.400000		

Drawing



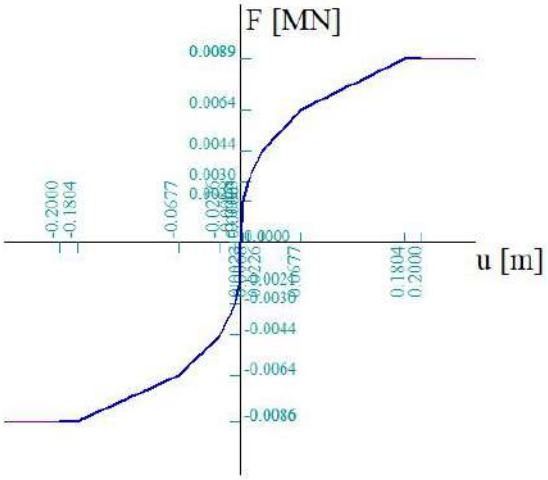
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+paalpunt	Translation	-0.002160 / -1237000.000000	Free	Free
		0.000000 / 0.000000		
		0.002950 / 266000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen reduced	Translation	-0.200000 / -8640.000000	Free	Free
		-0.180400 / -8640.000000		
		-0.067650 / -6432.000000		
		-0.022550 / -4444.800000		
		-0.006765 / -2976.000000		
		-0.002255 / -2064.000000		
		0.000000 / 0.000000		
		0.002255 / 2064.000000		
		0.006765 / 2976.000000		
		0.022550 / 4444.800000		
		0.067650 / 6432.000000		
		0.180400 / 8899.200000		
		0.200000 / 8899.200000		

Drawing


F [MN]
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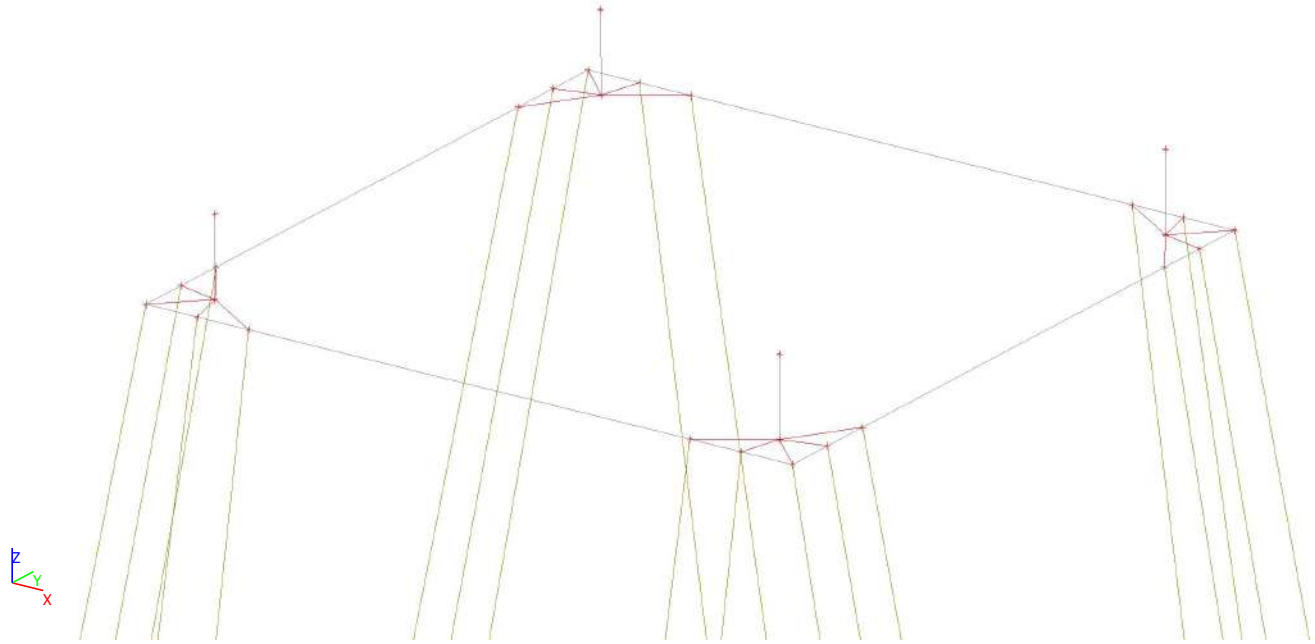
0.0064
0.0044
0.0030
-0.2000
-0.1804
-0.0677
0.0000
0.1804
0.2000
u [m]
-0.0030
-0.0044
-0.0064
-0.0086

6. Belastingen

6.1. Load cases

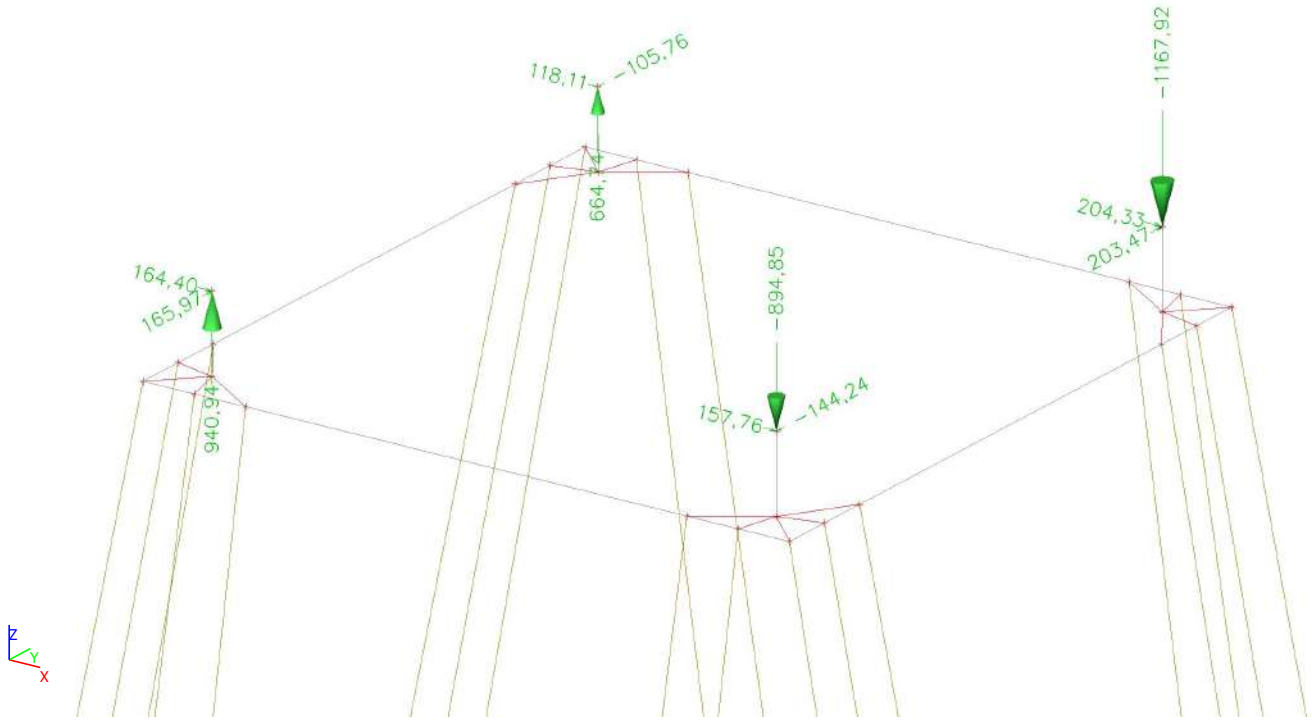
6.1.1. Load cases - E.G.

Name	Description	Action type	Load group	Direction
	Spec	Load type		
E.G.		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - hL Bck + Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			

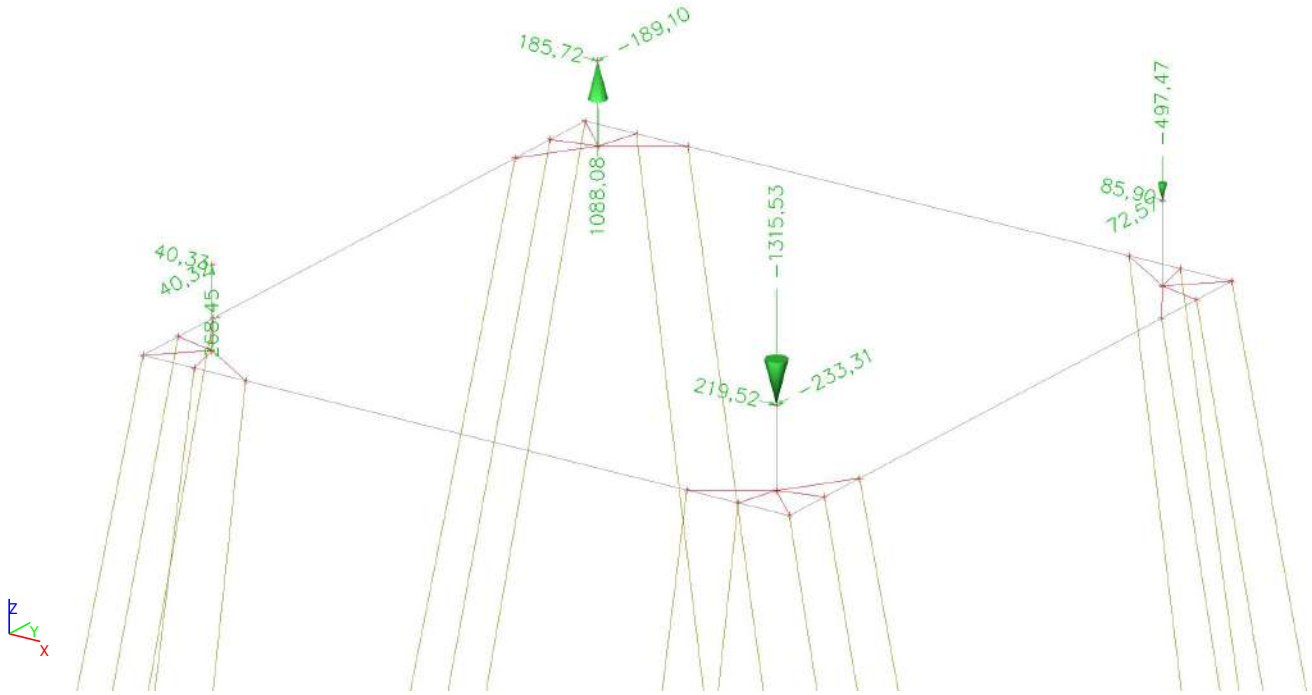


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;135°_1P_X	1P	hL Bck + Wnd ;135°	GCS	X	Force	164,40
hL Bck + Wnd ;135°_1P_Y	1P	hL Bck + Wnd ;135°	GCS	Y	Force	165,97
hL Bck + Wnd ;135°_1P_Z	1P	hL Bck + Wnd ;135°	GCS	Z	Force	940,94
hL Bck + Wnd ;135°_1X_X	1X	hL Bck + Wnd ;135°	GCS	X	Force	118,11
hL Bck + Wnd ;135°_1X_Y	1X	hL Bck + Wnd ;135°	GCS	Y	Force	-105,76
hL Bck + Wnd ;135°_1X_Z	1X	hL Bck + Wnd ;135°	GCS	Z	Force	664,74
hL Bck + Wnd ;135°_1XY_X	1XY	hL Bck + Wnd ;135°	GCS	X	Force	204,33
hL Bck + Wnd ;135°_1XY_Y	1XY	hL Bck + Wnd ;135°	GCS	Y	Force	203,47
hL Bck + Wnd ;135°_1XY_Z	1XY	hL Bck + Wnd ;135°	GCS	Z	Force	-1167,92
hL Bck + Wnd ;135°_1Y_X	1Y	hL Bck + Wnd ;135°	GCS	X	Force	157,76
hL Bck + Wnd ;135°_1Y_Y	1Y	hL Bck + Wnd ;135°	GCS	Y	Force	-144,24
hL Bck + Wnd ;135°_1Y_Z	1Y	hL Bck + Wnd ;135°	GCS	Z	Force	-894,85

6.1.3. Load cases - hL Bck + Wnd ;270°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;270°		Variable	LG4	Short	None
	Standard	Static			



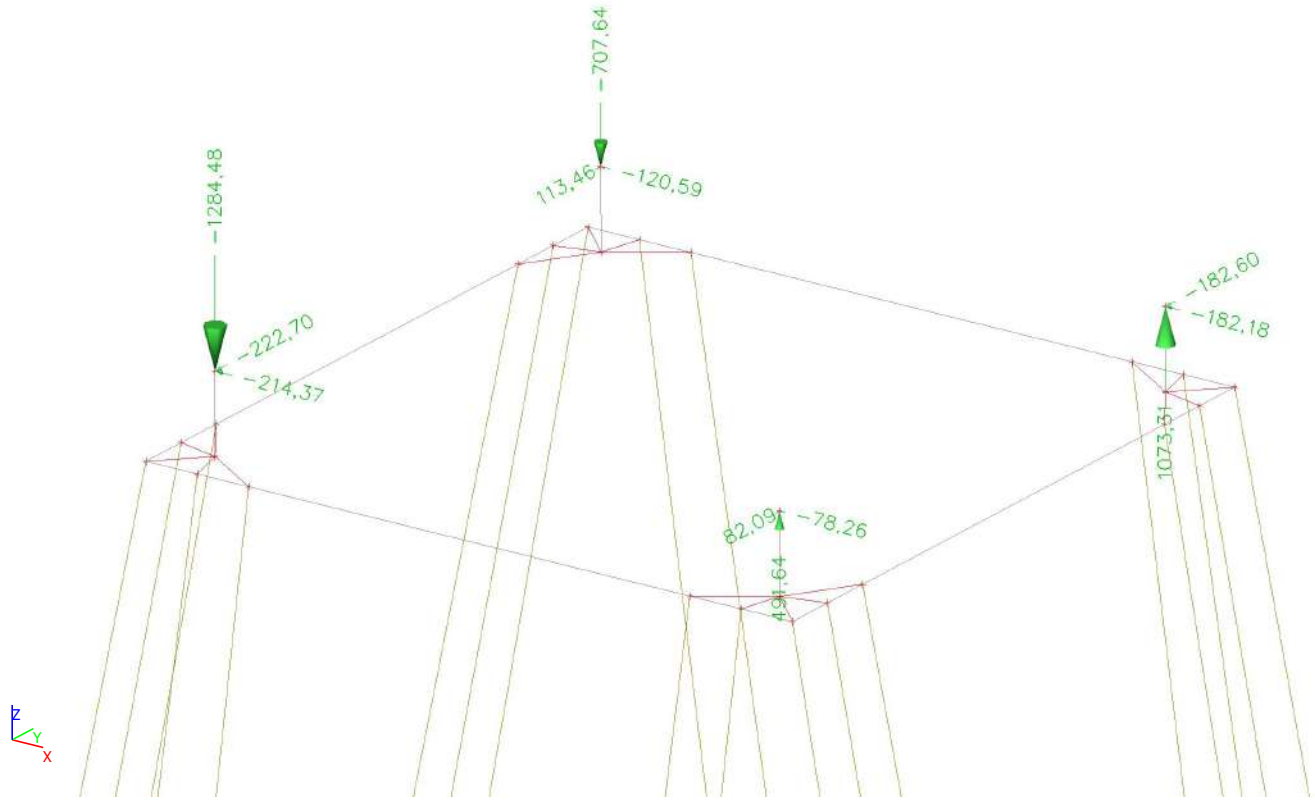
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;270°_1P_X	1P	hL Bck + Wnd ;270°	GCS	X	Force	40,33
hL Bck + Wnd ;270°_1P_Y	1P	hL Bck + Wnd ;270°	GCS	Y	Force	40,32
hL Bck + Wnd ;270°_1P_Z	1P	hL Bck + Wnd ;270°	GCS	Z	Force	268,45
hL Bck + Wnd ;270°_1X_X	1X	hL Bck + Wnd ;270°	GCS	X	Force	185,72
hL Bck + Wnd ;270°_1X_Y	1X	hL Bck + Wnd ;270°	GCS	Y	Force	-189,10
hL Bck + Wnd ;270°_1X_Z	1X	hL Bck + Wnd ;270°	GCS	Z	Force	1088,08
hL Bck + Wnd ;270°_1XY_X	1XY	hL Bck + Wnd ;270°	GCS	X	Force	85,90
hL Bck + Wnd ;270°_1XY_Y	1XY	hL Bck + Wnd ;270°	GCS	Y	Force	72,57
hL Bck + Wnd ;270°_1XY_Z	1XY	hL Bck + Wnd ;270°	GCS	Z	Force	-497,47
hL Bck + Wnd ;270°_1Y_X	1Y	hL Bck + Wnd ;270°	GCS	X	Force	219,52
hL Bck + Wnd ;270°_1Y_Y	1Y	hL Bck + Wnd ;270°	GCS	Y	Force	-233,31

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;270°_1Y_Z	1Y	hL Bck + Wnd ;270°	GCS	Z	Force	-1315,53

6.1.4. Load cases - hL Ahd + Wnd ;270°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;270°		Variable	LG4	Short	None
	Standard	Static			



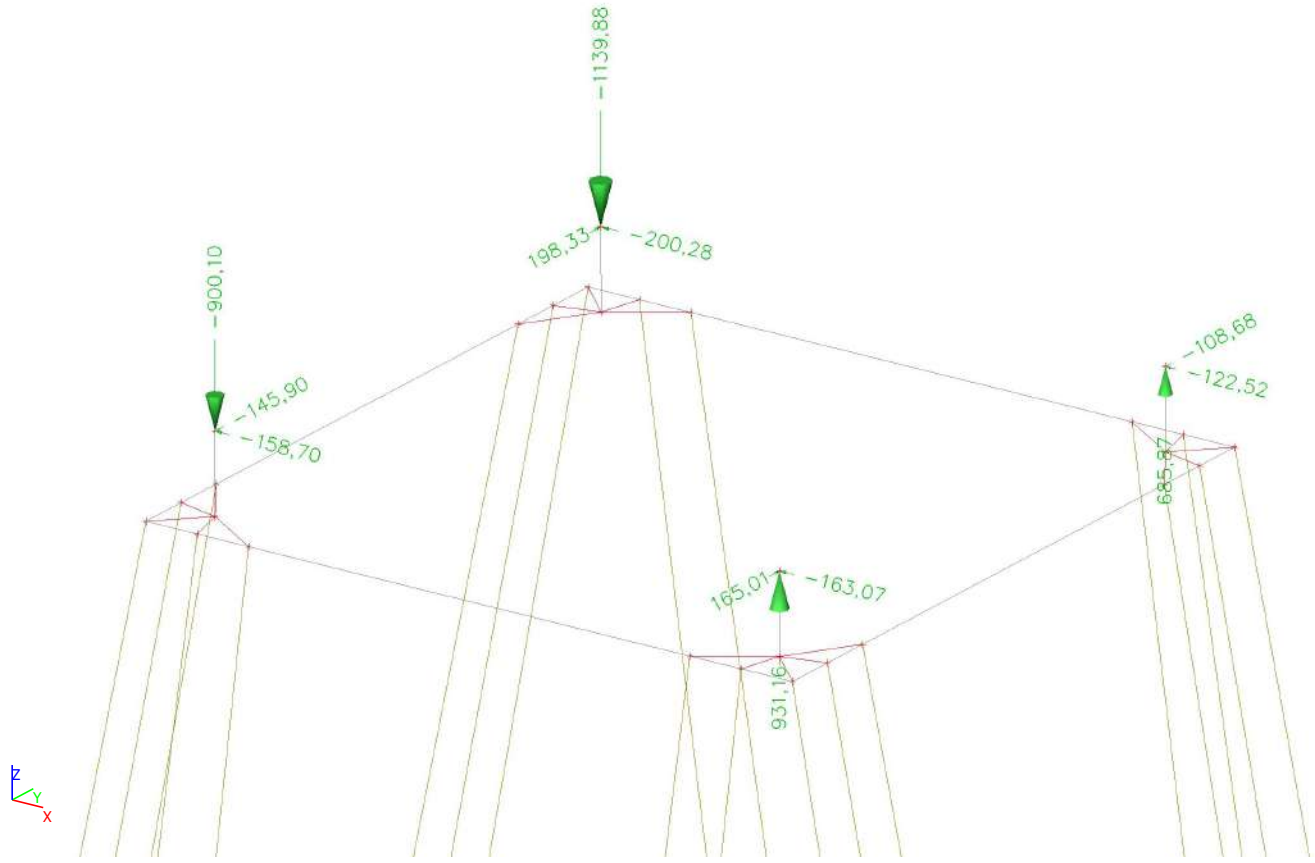
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;270°_1P_X	1P	hL Ahd + Wnd ;270°	GCS	X	Force	-214,37
hL Ahd + Wnd ;270°_1P_Y	1P	hL Ahd + Wnd ;270°	GCS	Y	Force	-222,70
hL Ahd + Wnd ;270°_1P_Z	1P	hL Ahd + Wnd ;270°	GCS	Z	Force	-1284,48
hL Ahd + Wnd ;270°_1X_X	1X	hL Ahd + Wnd ;270°	GCS	X	Force	-120,59
hL Ahd + Wnd ;270°_1X_Y	1X	hL Ahd + Wnd ;270°	GCS	Y	Force	113,46
hL Ahd + Wnd ;270°_1X_Z	1X	hL Ahd + Wnd ;270°	GCS	Z	Force	-707,64
hL Ahd + Wnd ;270°_1XY_X	1XY	hL Ahd + Wnd ;270°	GCS	X	Force	-182,18
hL Ahd + Wnd ;270°_1XY_Y	1XY	hL Ahd + Wnd ;270°	GCS	Y	Force	-182,60

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;270°_1XY_Z	1XY	hL Ahd + Wnd ;270°	GCS	Z	Force	1073,31
hL Ahd + Wnd ;270°_1Y_X	1Y	hL Ahd + Wnd ;270°	GCS	X	Force	-78,26
hL Ahd + Wnd ;270°_1Y_Y	1Y	hL Ahd + Wnd ;270°	GCS	Y	Force	82,09
hL Ahd + Wnd ;270°_1Y_Z	1Y	hL Ahd + Wnd ;270°	GCS	Z	Force	491,64

6.1.5. Load cases - hL Ahd + Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;45°_1P_X	1P	hL Ahd + Wnd ;45°	GCS	X	Force	-158,70
hL Ahd + Wnd ;45°_1P_Y	1P	hL Ahd + Wnd ;45°	GCS	Y	Force	-145,90
hL Ahd + Wnd ;45°_1P_Z	1P	hL Ahd + Wnd ;45°	GCS	Z	Force	-900,10
hL Ahd + Wnd ;45°_1X_X	1X	hL Ahd + Wnd ;45°	GCS	X	Force	-200,28
hL Ahd + Wnd ;45°_1X_Y	1X	hL Ahd + Wnd ;45°	GCS	Y	Force	198,33

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;45°_1X_Z	1X	hL Ahd + Wnd ;45°	GCS	Z	Force	-1139,88
hL Ahd + Wnd ;45°_1XY_X	1XY	hL Ahd + Wnd ;45°	GCS	X	Force	-122,52
hL Ahd + Wnd ;45°_1XY_Y	1XY	hL Ahd + Wnd ;45°	GCS	Y	Force	-108,68
hL Ahd + Wnd ;45°_1XY_Z	1XY	hL Ahd + Wnd ;45°	GCS	Z	Force	685,87
hL Ahd + Wnd ;45°_1Y_X	1Y	hL Ahd + Wnd ;45°	GCS	X	Force	-163,07
hL Ahd + Wnd ;45°_1Y_Y	1Y	hL Ahd + Wnd ;45°	GCS	Y	Force	165,01
hL Ahd + Wnd ;45°_1Y_Z	1Y	hL Ahd + Wnd ;45°	GCS	Z	Force	931,16

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
hL Bck + Wnd ;135°	Ultimate	E.G.	1,20
		hL Bck + Wnd ;135°	1,00
hL Bck + Wnd ;270°	Ultimate	E.G.	1,20
		hL Bck + Wnd ;270°	1,00
hL Ahd + Wnd ;270°	Ultimate	E.G.	1,20
		hL Ahd + Wnd ;270°	1,00
hL Ahd + Wnd ;45°	Ultimate	E.G.	1,20
		hL Ahd + Wnd ;45°	1,00
lL Bck + Wnd ;135°	Ultimate	E.G.	0,90
		hL Bck + Wnd ;135°	1,00
lL Bck + Wnd ;270°	Ultimate	E.G.	0,90
		hL Bck + Wnd ;270°	1,00
lL Ahd + Wnd ;270°	Ultimate	E.G.	0,90
		hL Ahd + Wnd ;270°	1,00
lL Ahd + Wnd ;45°	Ultimate	E.G.	0,90
		hL Ahd + Wnd ;45°	1,00

6.3. Result classes

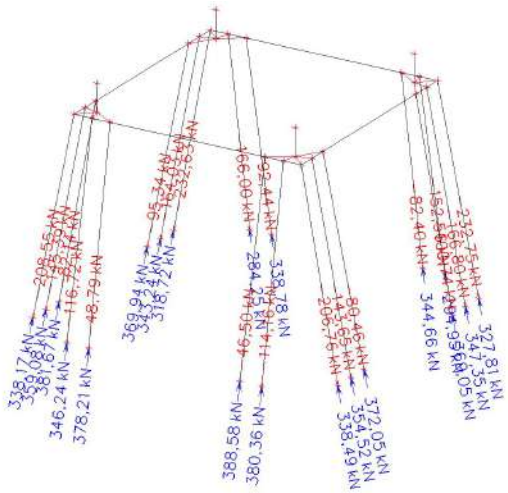
Name	List
All non-linear	hL Bck + Wnd ;135°
	hL Bck + Wnd ;270°
	hL Ahd + Wnd ;270°
	hL Ahd + Wnd ;45°
	lL Bck + Wnd ;135°
	lL Bck + Wnd ;270°
	lL Ahd + Wnd ;270°
	lL Ahd + Wnd ;45°

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn32/N10	lL Ahd + Wnd ;270°	0,00	0,00	**-232,75**	0,00	0,00	0,00	0,0	0,0
Sn31/N53	hL Bck + Wnd ;270°	**0,00**	**0,00**	**388,58**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn21/N44	lL Bck + Wnd ;135°	0,00	0,00	**-208,55**	0,00	0,00	0,00	0,0	0,0
Sn21/N44	lL Ahd + Wnd ;270°	**0,00**	**0,00**	**338,17**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn22/N45	lL Bck + Wnd ;135°	0,00	0,00	**-145,39**	0,00	0,00	0,00	0,0	0,0
Sn22/N45	hL Ahd +	**0,00**	**0,00**	**359,08**	**0,00**	**0,00**	**0,00**	0,0	0,0

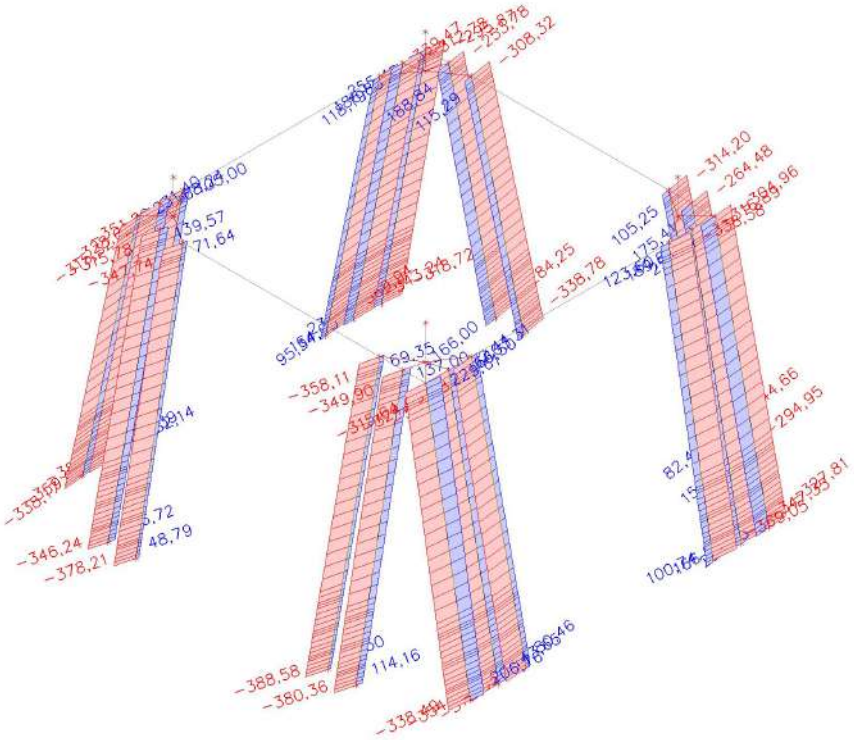
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;270°								
Sn23/N46	lL Bck + Wnd ;135°	0,00	0,00	**-82,14**	0,00	0,00	0,00	0,0	0,0
Sn23/N46	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**381,67**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn24/N47	lL Bck + Wnd ;135°	0,00	0,00	**-116,72**	0,00	0,00	0,00	0,0	0,0
Sn24/N47	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**346,24**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn26/N48	lL Bck + Wnd ;135°	0,00	0,00	**-48,79**	0,00	0,00	0,00	0,0	0,0
Sn26/N48	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**378,21**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn27/N49	lL Ahd + Wnd ;45°	0,00	0,00	**-206,76**	0,00	0,00	0,00	0,0	0,0
Sn27/N49	lL Bck + Wnd ;270°	**0,00**	**0,00**	**338,49**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn28/N50	lL Ahd + Wnd ;45°	0,00	0,00	**-143,65**	0,00	0,00	0,00	0,0	0,0
Sn28/N50	hL Bck + Wnd ;270°	**0,00**	**0,00**	**354,52**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn29/N51	lL Ahd + Wnd ;45°	0,00	0,00	**-80,46**	0,00	0,00	0,00	0,0	0,0
Sn29/N51	hL Bck + Wnd ;270°	**0,00**	**0,00**	**372,05**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn30/N52	lL Ahd + Wnd ;45°	0,00	0,00	**-114,16**	0,00	0,00	0,00	0,0	0,0
Sn30/N52	hL Bck + Wnd ;270°	**0,00**	**0,00**	**380,36**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn31/N53	lL Ahd + Wnd ;45°	0,00	0,00	**-46,50**	0,00	0,00	0,00	0,0	0,0
Sn31/N53	hL Bck + Wnd ;270°	**0,00**	**0,00**	**388,58**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn32/N10	lL Ahd + Wnd ;270°	0,00	0,00	**-232,75**	0,00	0,00	0,00	0,0	0,0
Sn32/N10	lL Bck + Wnd ;135°	**0,00**	**0,00**	**327,81**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn33/N11	lL Ahd + Wnd ;270°	**0,00**	**0,00**	**-166,80**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn33/N11	hL Bck + Wnd ;135°	0,00	0,00	**347,35**	0,00	0,00	**0,00**	0,0	0,0
Sn34/N12	lL Ahd + Wnd ;270°	**0,00**	**0,00**	**-100,74**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn34/N12	hL Bck + Wnd ;135°	0,00	0,00	**369,05**	0,00	0,00	**0,00**	0,0	0,0
Sn35/N13	lL Ahd + Wnd ;270°	**0,00**	**0,00**	**-152,56**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn35/N13	hL Bck + Wnd ;135°	0,00	0,00	**294,95**	0,00	0,00	**0,00**	0,0	0,0
Sn36/N14	lL Ahd + Wnd ;270°	**0,00**	**0,00**	**-82,40**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn36/N14	hL Bck + Wnd ;135°	0,00	0,00	**344,66**	0,00	0,00	**0,00**	0,0	0,0
Sn37/N15	lL Bck + Wnd ;270°	0,00	0,00	**-166,00**	0,00	0,00	0,00	0,0	0,0
Sn37/N15	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**284,25**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn38/N2	lL Bck + Wnd ;270°	0,00	0,00	**-92,44**	0,00	0,00	0,00	0,0	0,0
Sn38/N2	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**338,78**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn39/N3	lL Bck + Wnd ;270°	0,00	0,00	**-232,63**	0,00	0,00	0,00	0,0	0,0
Sn39/N3	lL Ahd + Wnd ;45°	**0,00**	**0,00**	**318,72**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn40/N4	lL Bck +	0,00	0,00	**-164,03**	0,00	0,00	0,00	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;270°								
Sn40/N4	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**343,24**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn41/N54	lL Bck + Wnd ;270°	0,00	0,00	**-95,34**	0,00	0,00	0,00	0,0	0,0
Sn41/N54	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**369,94**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

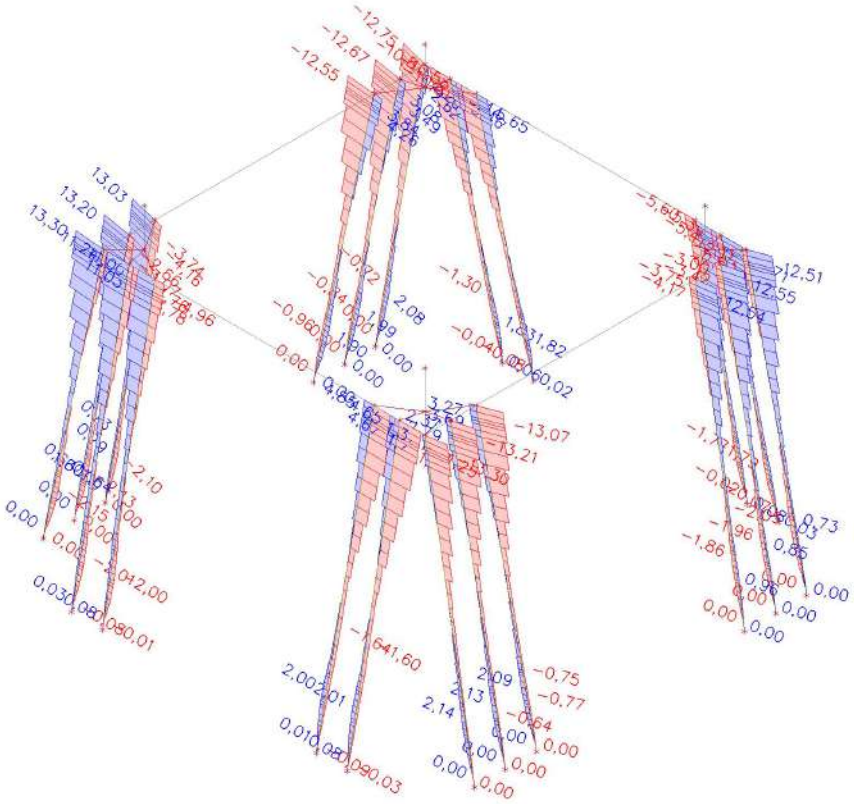
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



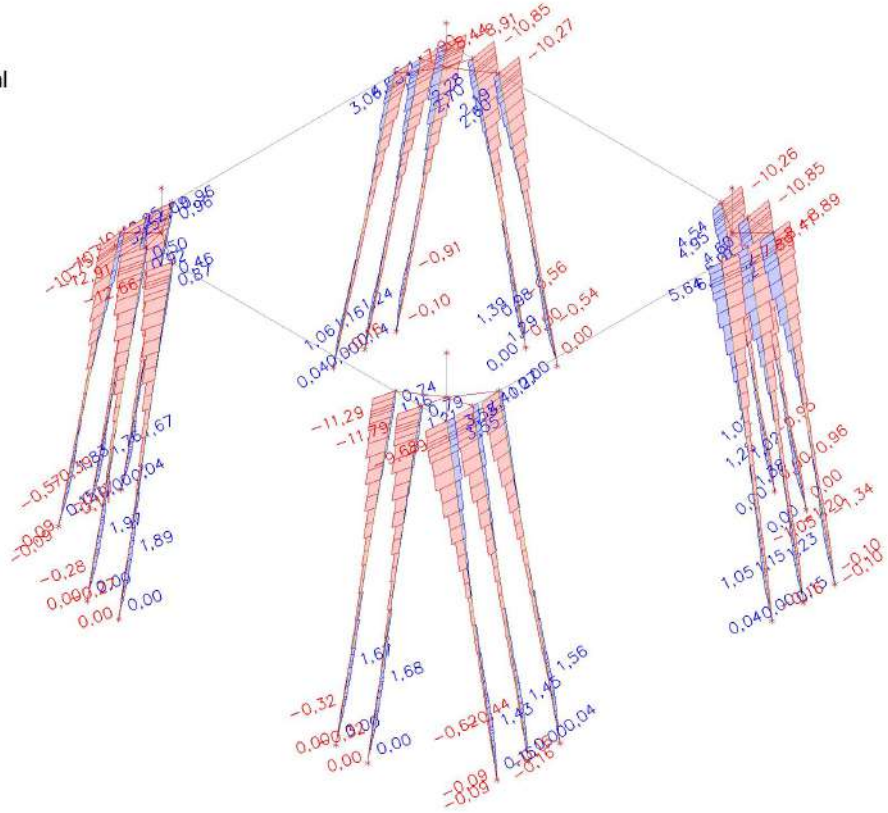
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



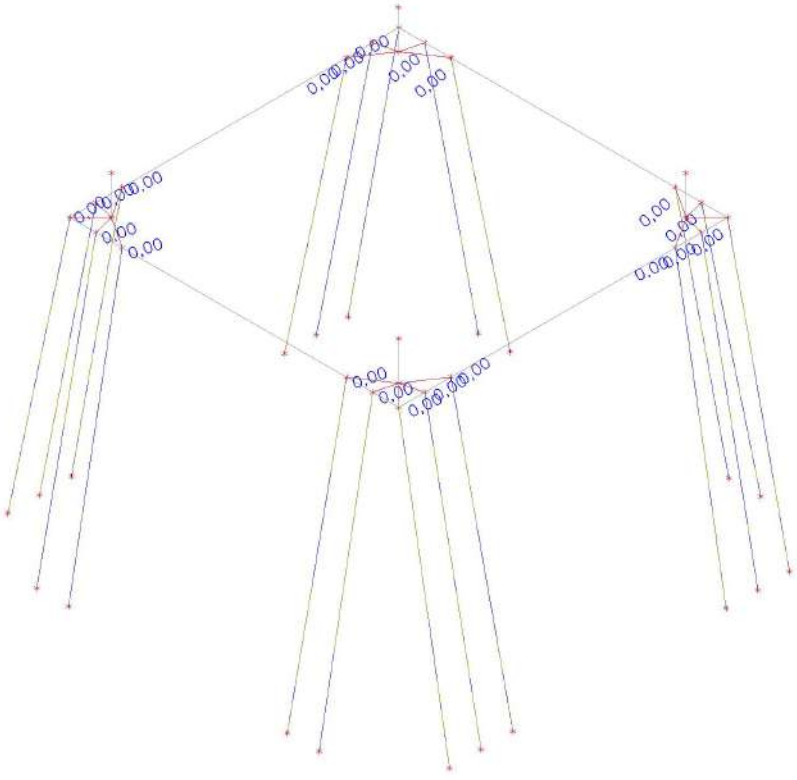
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



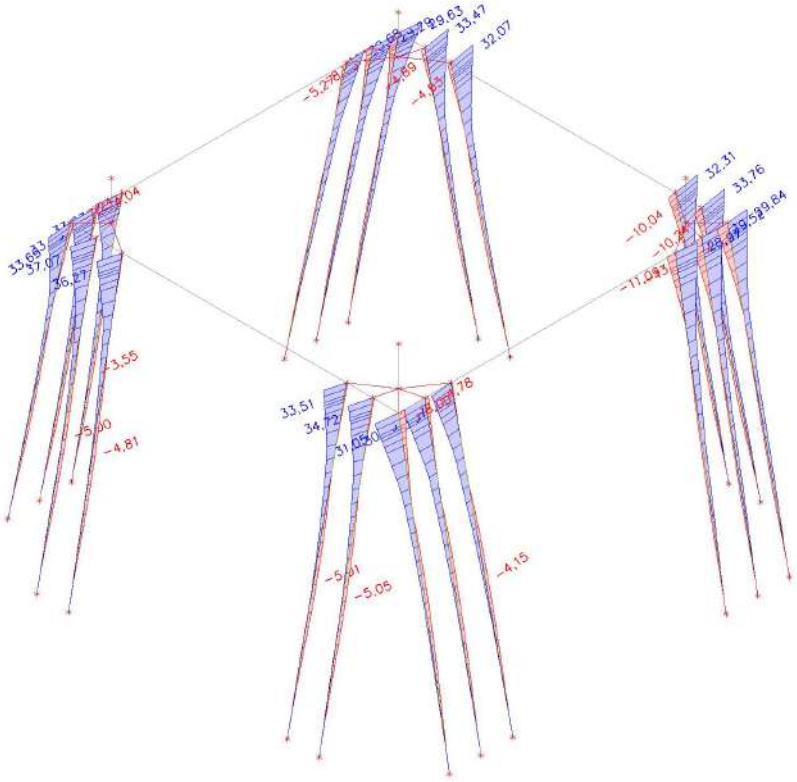
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



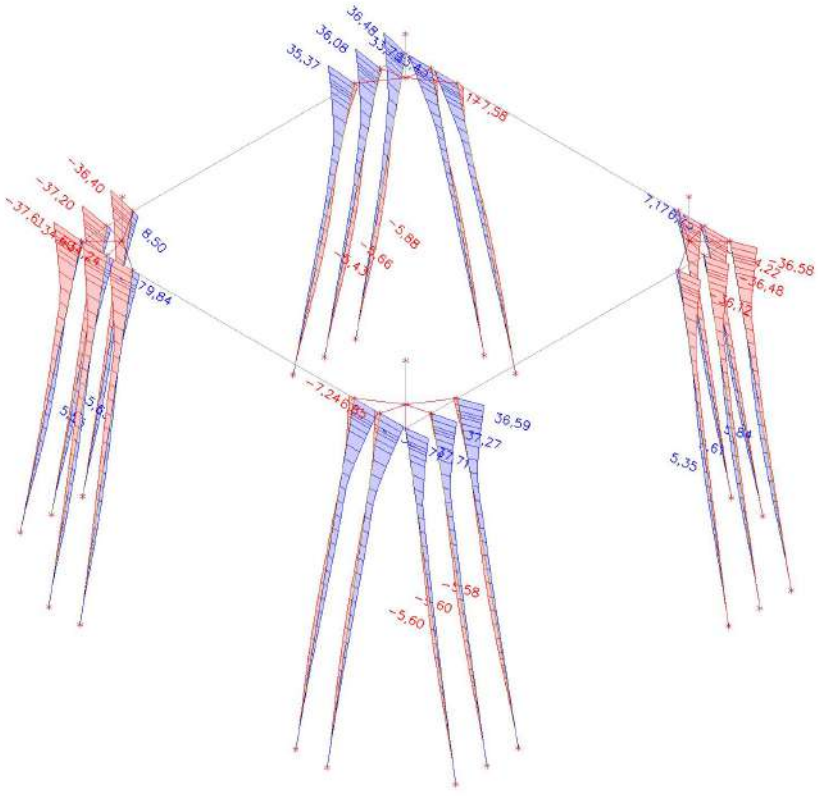
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_P_11	10,997	hL Bck + Wnd ;270°	**-388,58**	-0,09	0,00	0,00	0,00	0,00
Paal_P_12	0,000	lL Ahd + Wnd ;270°	**255,61**	1,12	-0,21	**0,00**	9,05	-12,60
Paal_P_7	0,000	hL Bck + Wnd ;135°	-230,46	**-13,30**	3,10	0,00	-5,95	**37,71**
Paal_P_4	0,000	hL Bck + Wnd ;270°	-50,87	-4,15	**-12,91**	0,00	**37,07**	6,96
Paal_P_12	0,800-	lL Bck + Wnd ;270°	-136,55	10,76	**7,32**	0,00	-10,87	-23,19
Paal_P_12	0,000	lL Bck + Wnd ;270°	-134,89	11,09	7,32	0,00	**-16,72**	-31,93
Paal_P_3	0,000	hL Ahd + Wnd ;45°	-231,49	**13,30**	2,79	0,00	-5,19	**-37,61**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

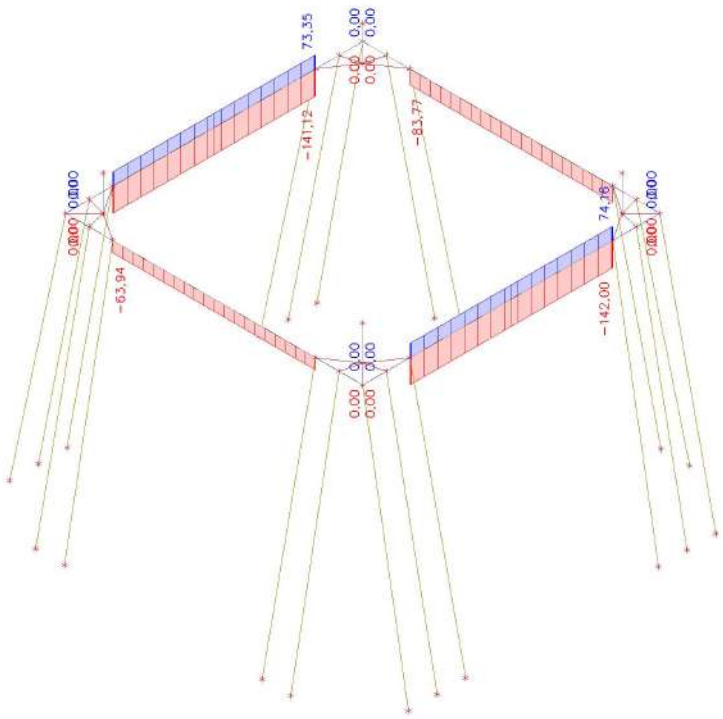
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer 8	1,475	hL Bck + Wnd ;270°	**1089,70**	258,25	4,40	-0,05	0,00	13,08
Poer 5	0,000	hL Bck + Wnd ;270°	**-1343,44**	**320,20**	**-9,75**	-1,05	**14,38**	-329,03
Poer 8	1,475	hL Bck + Wnd ;135°	665,65	154,15	**12,88**	-0,15	0,00	7,99
Poer 6	0,000	hL Ahd + Wnd ;45°	661,07	-163,48	9,79	**1,06**	-14,43	168,17
Poer 8	0,000	lL Bck + Wnd ;135°	647,05	154,27	12,77	**-1,39**	**-18,92**	-156,41
Poer 5	0,000	lL Bck + Wnd ;270°	-1336,46	320,20	-9,75	-1,05	14,38	**-329,32**
Poer 7	0,000	lL Ahd + Wnd ;270°	-1305,41	**-309,06**	-5,89	0,64	8,69	**316,24**

7.4. Krachten van de Funderingsbalken

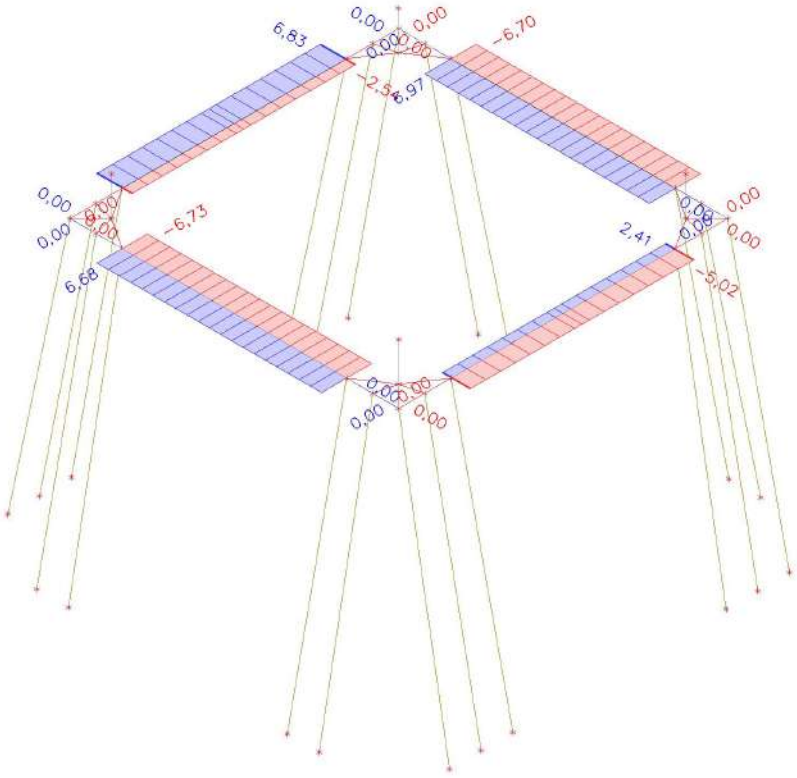
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



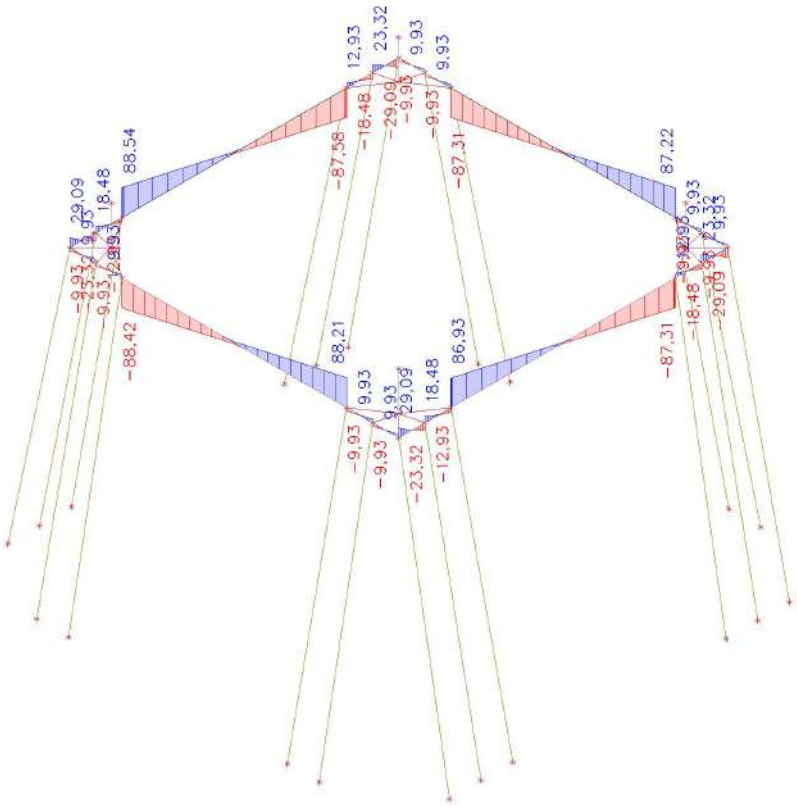
7.4.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



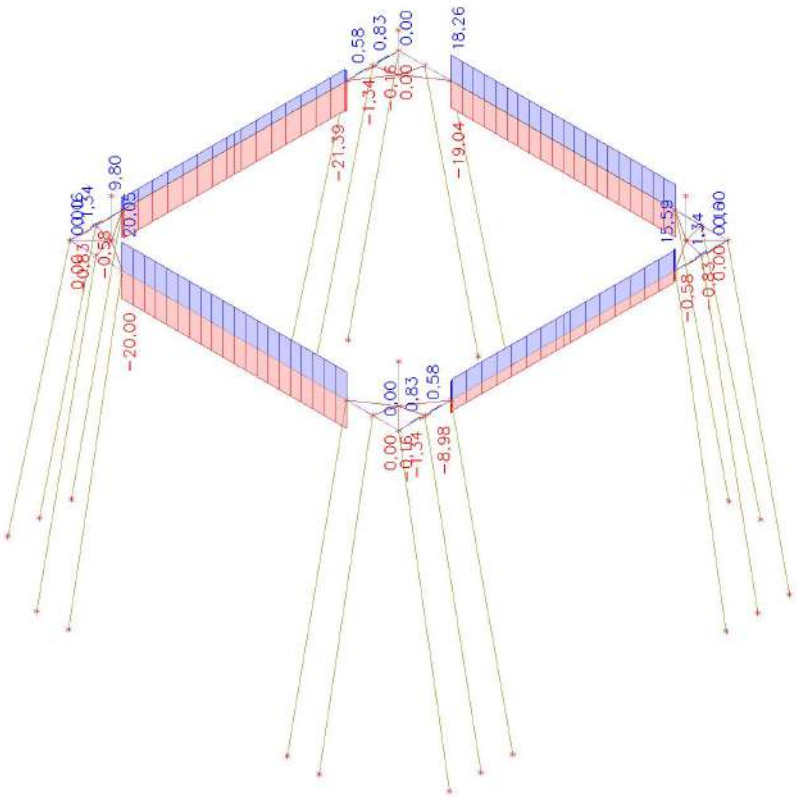
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



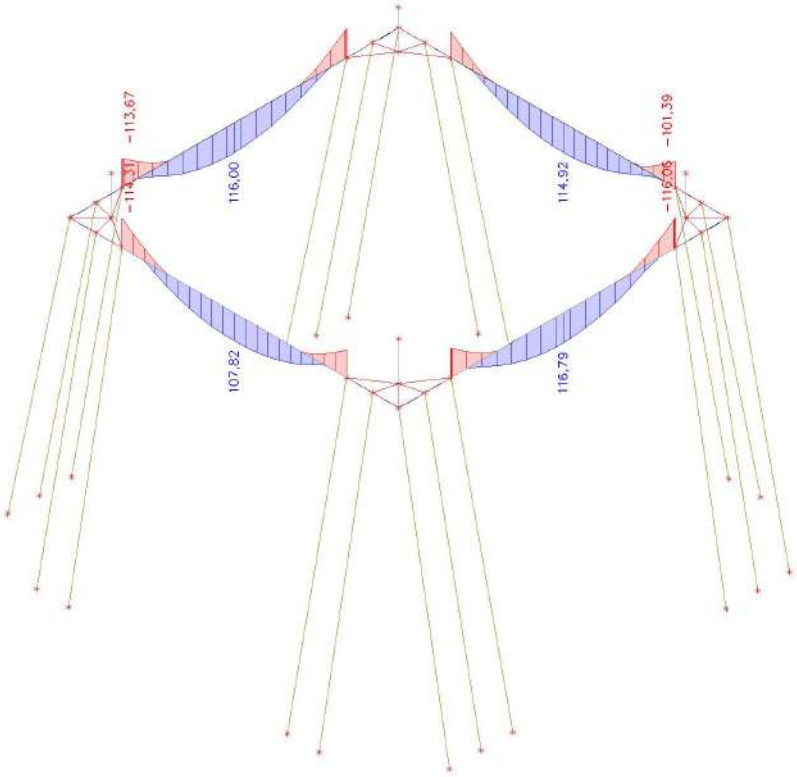
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



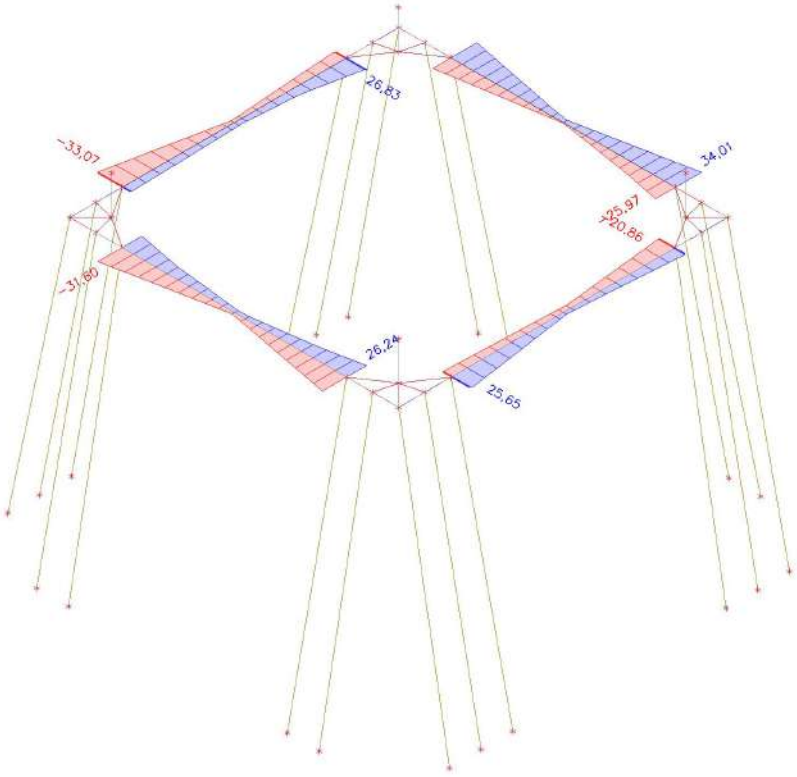
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: Named selection - FunderingsBalken
Filter: Layer = Balken

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Balk 5	2,000+	lL Bck + Wnd ;135°	**74,16**	1,20	63,17	-6,30	-83,59	-10,76
Balk 4	2,000+	hL Ahd + Wnd ;270°	-74,59	**6,97**	84,50	-19,04	-68,93	-25,97
Balk 7	10,600-	hL Ahd + Wnd ;45°	-63,43	**-6,73**	**-88,42**	**20,05**	-89,07	-31,60
Balk 6	2,000+	hL Bck + Wnd ;270°	-125,05	6,83	**88,54**	-19,38	-86,25	-31,92
Balk 6	10,550+	hL Bck + Wnd ;270°	-125,05	6,83	-81,34	**-21,39**	-55,60	26,49
Balk 5	10,600-	hL Bck + Wnd ;135°	61,51	1,15	-86,35	-4,98	**-116,06**	-0,39
Balk 5	6,300	hL Ahd + Wnd ;45°	**-142,00**	2,41	-1,86	-8,00	**116,79**	3,91
Balk 6	2,050+	hL Bck + Wnd ;270°	-125,05	6,83	87,52	-20,42	-81,85	**-33,07**
Balk 4	2,000+	hL Bck + Wnd ;270°	-83,77	-6,70	85,80	18,26	-70,38	**34,01**

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2. Project

Gebruiker van licentie	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Onderdeel	Blokpoer 2xLD1
Auteur	[redacted]
Datum	01-09-2025
Constructie	Algemeen XYZ
Aantal knopen :	36
Aantal staven :	20
Aantal platen :	0
Aantal vaste lichamen :	0
Aantal gebruikte doorsneden :	3
Aantal belastingsgevallen :	9
Aantal gebruikte materialen :	4
Gravitatieversnelling [m/s^2]	9,807
Nationale norm	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materialen

Steel EC3

Naam	ρ [kg/m³]	E_{mod} [MPa]	μ	Lower limit [mm]	Upper limit [mm]	F_y [MPa]	F_u [MPa]	Colour
		G_{mod} [MPa]	α [m/mK]					
S 235	6850,00	2,1000e+05	0.3	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	

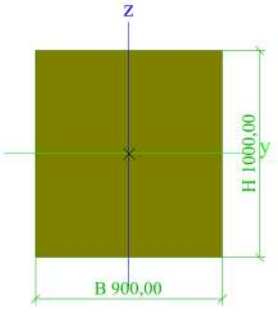
Naam	Type	ρ [kg/m³]	Dichtheid in natte toestand [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Kleur
C12/15 Gescheurd	Beton	2500,00	2600,00	7,0000e+03	0.2	0,01e-003	12,00	
C12/15 en zand	Beton	1034,00	2600,00	2,7100e+04	0.2	0,01e-003	12,00	

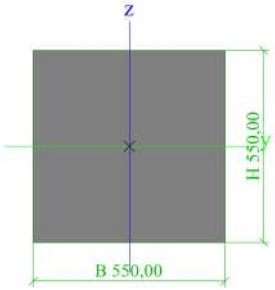
Verklaring van symbolen	
Dichtheid in natte toestand	De waarde van de dichtheid van het kenmerk nieuwe toestand wordt alleen gebruikt als een samengesteld dek wordt ingevoerd en rekening wordt gehouden met de belasting van het eigengewicht.

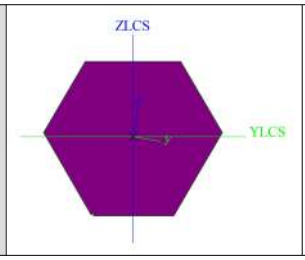
Wapening EC2

Naam	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Betonstaal	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

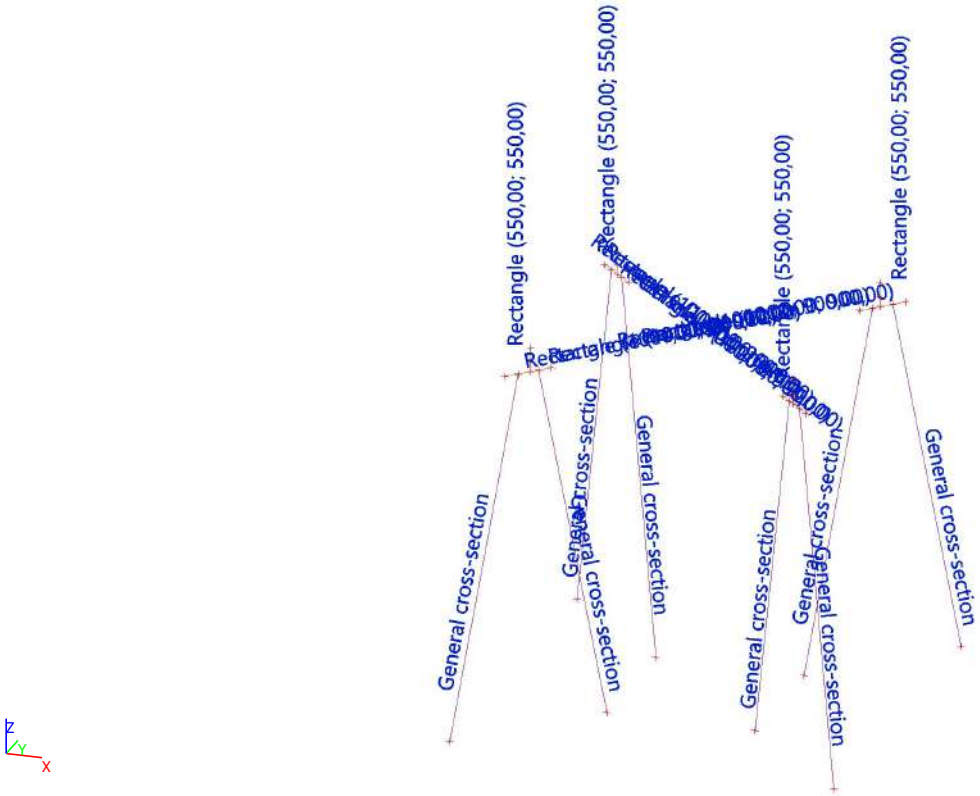
4.2. Doorsneden

Balk		
Type	Rectangle	
Gedetailleerd	1000,00; 900,00	
Vorm type	Dikke wanden	
Onderdeelmateriaal	C12/15 Gescheurd	
Bouwwijze	beton	
Kleur		
A [mm²]	9,0000e+05	
A_y [mm²], A_z [mm²]	7,5031e+05	7,5025e+05
A_L [m²/m], A_D [m²/m]	3,8000e+00	3,8000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450,00	500,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	7,5000e+10	6,0750e+10
i_y [mm], i_z [mm]	288,68	259,81
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,5000e+08	1,3500e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	1,1333e+11	1,5185e+14
β_y [mm], β_z [mm]	0,00	0,00
Afbeelding		
Poer		

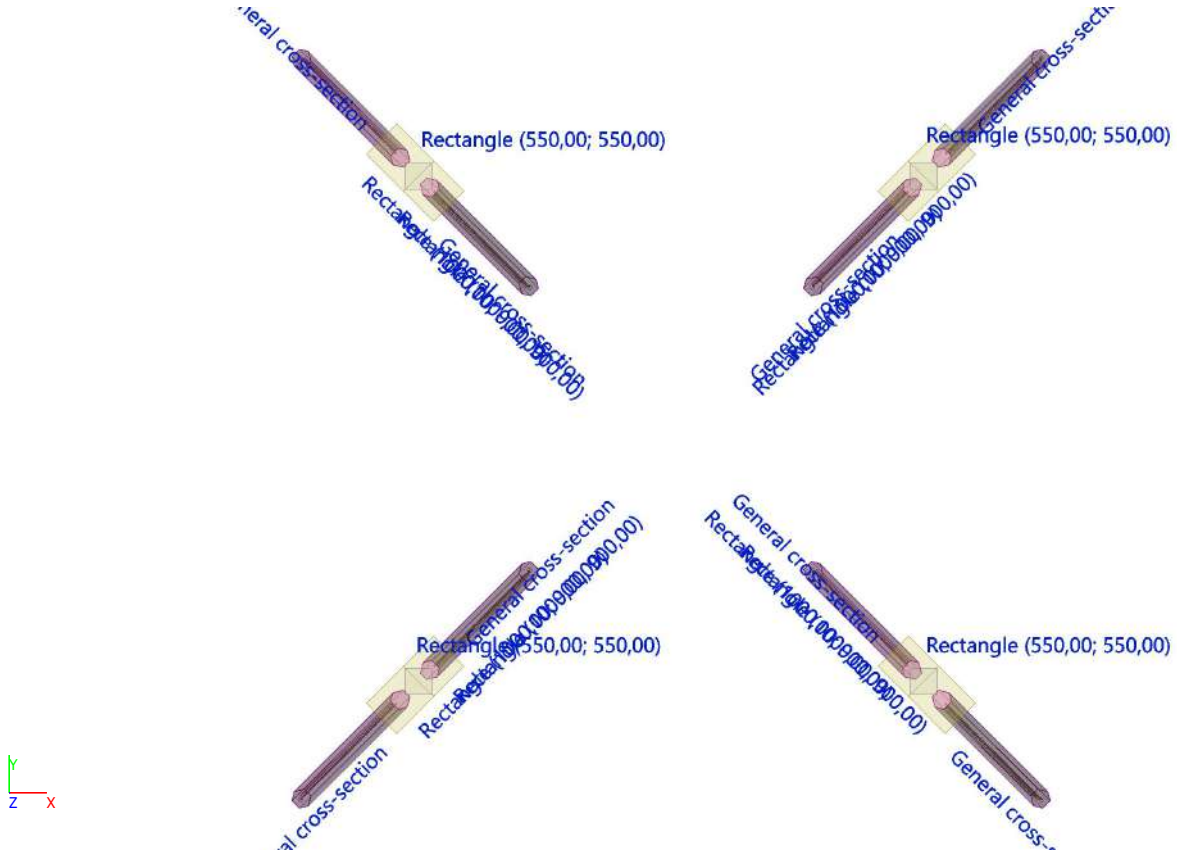
Type	Rectangle	
Gedetailleerd	550,00; 550,00	
Vorm type	Dikke wanden	
Onderdeelmateriaal	C12/15 Gescheurd	
Bouwwijze	beton	
Kleur		
A [mm²]	3,0250e+05	
A_y [mm²], A_z [mm²]	2,5218e+05	2,5218e+05
A_L [m²/m], A_D [m²/m]	2,2000e+00	2,2000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	275,00	275,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	7,6255e+09	7,6255e+09
i_y [mm], i_z [mm]	158,77	158,77
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	2,7729e+07	2,7729e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	1,2869e+10	3,7254e+12
β_y [mm], β_z [mm]	0,00	0,00
Afbeelding		
LD1		
Type	General cross-section	
Vorm type	Dikke wanden	
Onderdeelmateriaal	C12/15 en zand	
	S 235	
Bouwwijze	Algemeen	
Kleur		
Knik y-y, Knik z-z	d	d
A [mm²]	1,0430e+06	
A_y [mm²], A_z [mm²]	8,2498e+05	8,2508e+05
A_L [m²/m], A_D [m²/m]	1,2942e+00	1,2942e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	0,02	4,66
$I_{Y.LCS}$ [mm⁴], $I_{Z.LCS}$ [mm⁴]	9,9469e+09	9,9650e+09
$I_{YZ.LCS}$ [mm⁴]	-2,9817e+06	
α [deg]	-9,09	
I_y [mm⁴], I_z [mm⁴]	9,9464e+09	9,9655e+09
i_y [mm], i_z [mm]	97,66	97,75
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	4,8892e+07	4,6629e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	1,9850e+08	1,9985e+08
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	2381949559,25	2384214612,89
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	2398154842,11	2399175725,55
d_y [mm], d_z [mm]	-0,01	-0,03
I_t [mm⁴], I_w [mm⁶]	1,7672e+10	4,7076e+11
β_y [mm], β_z [mm]	0,05	0,02

Afbeelding		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Instellingen net

Naam	MeshSetup1
Generatie van variabele excentriciteiten op elementen in plaats van constante excentriciteiten	×
Generatie van knopen op staven	×
Elastisch net	✓
Pas automatische netverfijning toe	×
Constructie-entiteiten verbinden	✓
Verdeling op consoles en variabele staven	5
Verdeling voor integratiestrook en 2D-1D upgrade	50
Gemiddeld aantal 1D-netelementen op rechte 1D-elementen	1
Gemiddelde grootte van 2D-netelement [m]	0,200
Gemiddelde grootte van 1D-element op gebogen 1D-elementen [m]	0,100
Minimum lengte van staafelement [m]	0,100
Maximum lengte van staafelement [m]	1000,000
Gemiddelde grootte van voorspankabels, elementen op elastische bedding, niet-lineaire grondveer [m]	1,000
Maximale hoek uit het vlak van vierhoekig element [mrad]	30,0
Minimale afstand tussen definitiepunt en -lijn [m]	0,001
Gemiddelde afmeting van paneelelement [m]	1,000
Netverfijning volgens het liggertype	Geen
Definitie van netelementen afmetingen voor panelen	Handmatig

5. Geometrie

5.1. Knopen

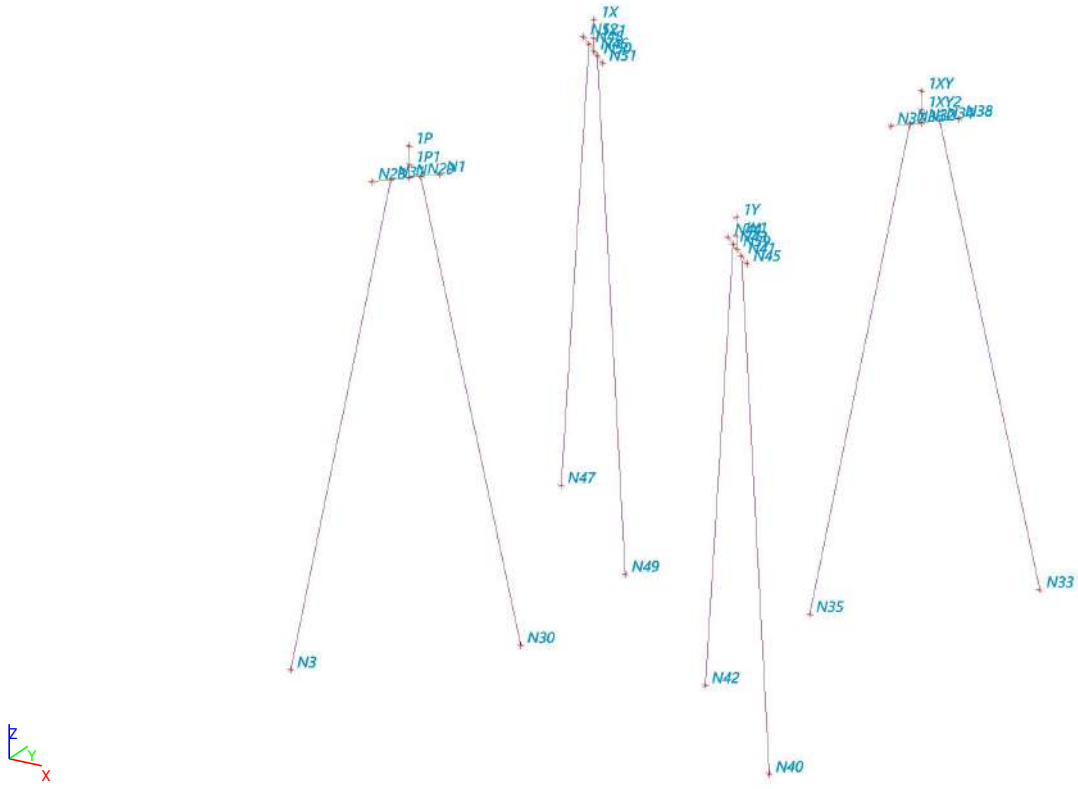
Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N	0,000	0,000	0,000
N3	-2,462	-2,462	-14,706
N31	-0,382	-0,382	0,000
N30	2,320	2,320	-14,706
N29	0,240	0,240	0,000

Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N1	0,636	0,636	0,000
N28	-0,778	-0,778	0,000
1P	0,000	0,000	0,970
1P1	0,000	0,000	0,400
N32	10,646	10,646	0,000

Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N33	13,108	13,108	-14,706
N34	11,028	11,028	0,000
N35	8,326	8,326	-14,706
N36	10,406	10,406	0,000
N37	10,010	10,010	0,000
N38	11,424	11,424	0,000
1XY	10,646	10,646	0,970
1XY2	10,646	10,646	0,400
N39	10,646	0,000	0,000
N40	13,108	-2,462	-14,706
N41	11,028	-0,382	0,000
N42	8,326	2,320	-14,706
N43	10,406	0,240	0,000

Naam	Coördinaat X [m]	Coördinaat Y [m]	Coördinaat Z [m]
N44	10,010	0,636	0,000
N45	11,424	-0,778	0,000
1Y	10,646	0,000	0,970
1Y1	10,646	0,000	0,400
N46	0,000	10,646	0,000
N47	-2,462	13,108	-14,706
N48	-0,382	11,028	0,000
N49	2,320	8,326	-14,706
N50	0,240	10,406	0,000
N51	0,636	10,010	0,000
N52	-0,778	11,424	0,000
1X	0,000	10,646	0,970
1X1	0,000	10,646	0,400

5.2. Analyse model met knopen

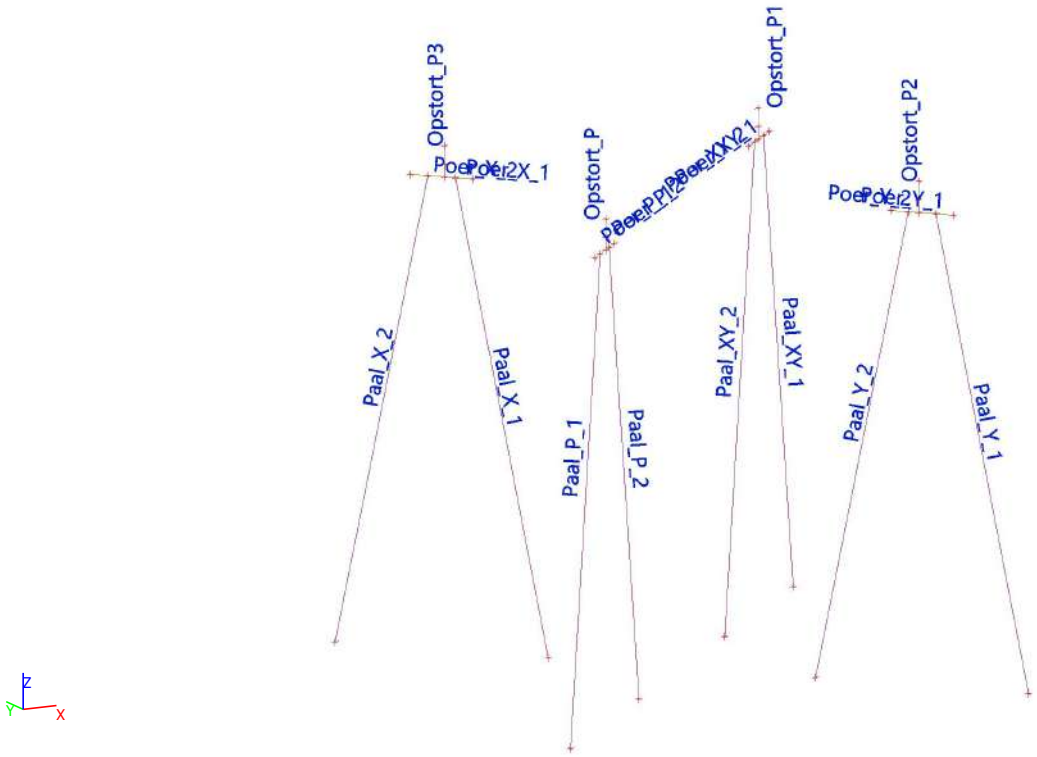


5.3. Staven

Naam	Doorsnede	Materiaal	Lengte [m]	Beginknoop	Eindknoop	Type
Poer_P_1	Balk - Rectangle (1000,00; 900,00)	C12/15 Gescheurd	1,100	N28	N	Balk (80)
Poer_P_2	Balk - Rectangle (1000,00; 900,00)	C12/15 Gescheurd	0,900	N	N1	Balk (80)
Poer_XY_1	Balk - Rectangle (1000,00; 900,00)	C12/15 Gescheurd	1,100	N38	N32	Balk (80)
Poer_XY_2	Balk - Rectangle (1000,00; 900,00)	C12/15 Gescheurd	0,900	N32	N37	Balk (80)
Poer_X_1	Balk - Rectangle (1000,00; 900,00)	C12/15 Gescheurd	0,900	N46	N51	Balk (80)
Poer_X_2	Balk - Rectangle (1000,00; 900,00)	C12/15 Gescheurd	1,100	N52	N46	Balk (80)
Poer_Y_1	Balk - Rectangle (1000,00; 900,00)	C12/15 Gescheurd	1,100	N45	N39	Balk (80)
Poer_Y_2	Balk - Rectangle (1000,00; 900,00)	C12/15 Gescheurd	0,900	N39	N44	Balk (80)
Opstort_P	Poer - Rectangle (550,00; 550,00)	C12/15 Gescheurd	0,570	1P1	1P	Kolom (100)
Opstort_P1	Poer - Rectangle (550,00; 550,00)	C12/15 Gescheurd	0,570	1XY2	1XY	Kolom (100)
Opstort_P2	Poer - Rectangle (550,00; 550,00)	C12/15 Gescheurd	0,570	1Y1	1Y	Kolom (100)
Opstort_P3	Poer - Rectangle (550,00; 550,00)	C12/15 Gescheurd	0,570	1X1	1X	Kolom (100)
Paal_P_1	LD1 - General cross-section	C12/15 en zand	14,997	N31	N3	Kolom (100)

Naam	Doorsnede	Materiaal	Lengte [m]	Beginknoop	Eindknoop	Type
Paal_P_2	LD1 - General cross-section	C12/15 en zand	14,997	N29	N30	Kolom (100)
Paal_XY_1	LD1 - General cross-section	C12/15 en zand	14,997	N34	N33	Kolom (100)
Paal_XY_2	LD1 - General cross-section	C12/15 en zand	14,997	N36	N35	Kolom (100)
Paal_X_1	LD1 - General cross-section	C12/15 en zand	14,997	N50	N49	Kolom (100)
Paal_X_2	LD1 - General cross-section	C12/15 en zand	14,997	N48	N47	Kolom (100)
Paal_Y_1	LD1 - General cross-section	C12/15 en zand	14,997	N41	N40	Kolom (100)
Paal_Y_2	LD1 - General cross-section	C12/15 en zand	14,997	N43	N42	Kolom (100)

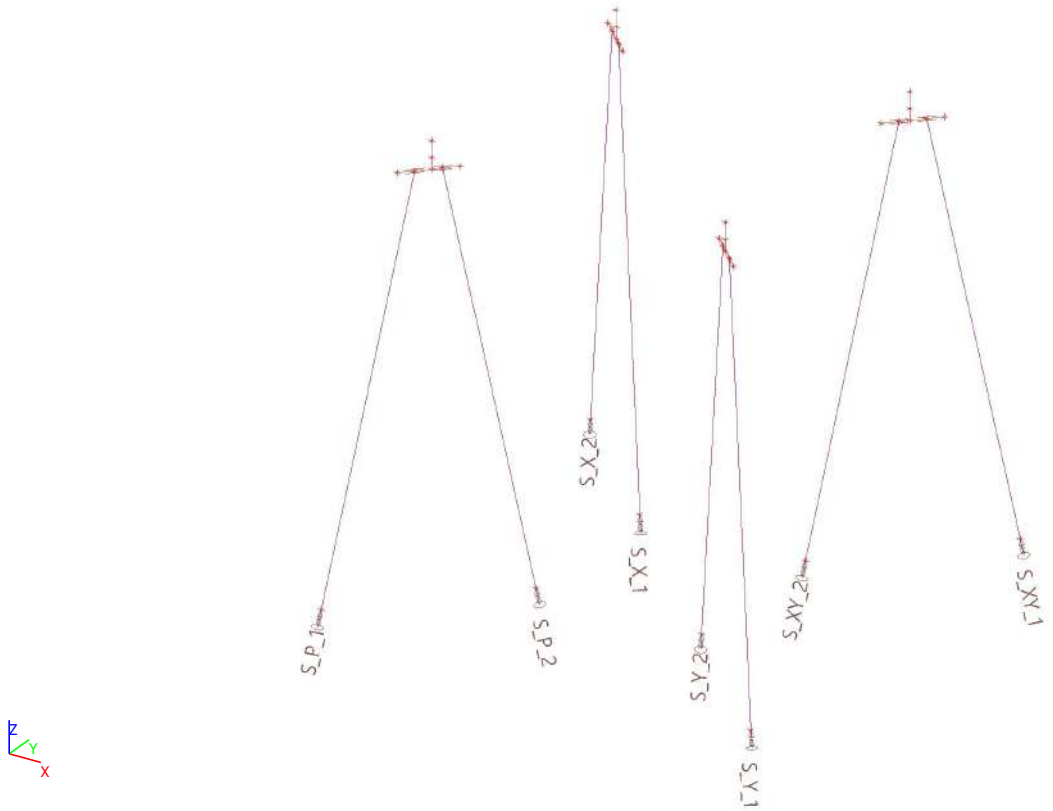
5.4. Analyse model met Staven



5.5. Knoopsteunpunten

Naam	Knoop	Systeem	Type	X	Y	Z	Rx	Ry	Rz	Hoek [deg]
S_P_1	N3	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry8,00;Rx-8,00
S_P_2	N30	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry-8,00;Rx8,00
S_XY_1	N33	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry-8,00;Rx8,00
S_XY_2	N35	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry8,00;Rx-8,00
S_Y_1	N40	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry-8,00;Rx-8,00
S_Y_2	N42	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry8,00;Rx8,00
S_X_2	N47	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry8,00;Rx8,00
S_X_1	N49	LCS van knoop	Standaard	Vrij	Vrij	Niet-lineair	Vrij	Vrij	Vrij	Ry-8,00;Rx-8,00

5.6. Analyse model met Knoopondersteuningen



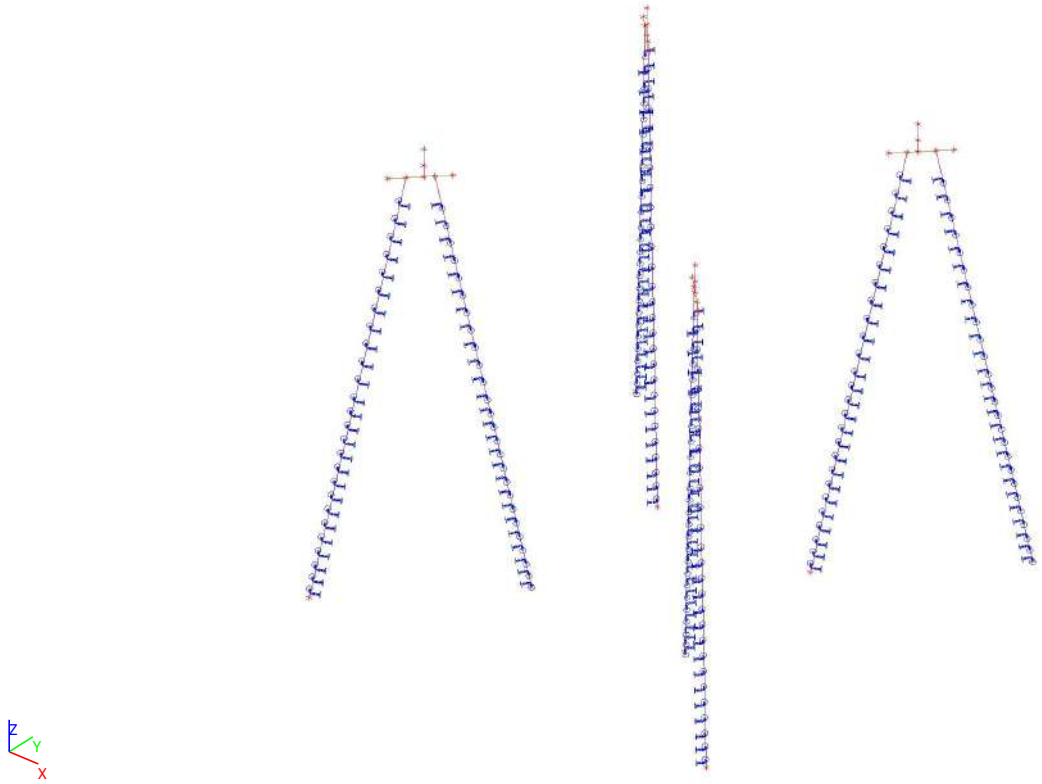
5.7. Lijnsteunpunten op staven

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
Slb_P_1_Veen	Lijn	Paal_P_1	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
Slb_P_2_Veen	Lijn	Paal_P_2	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
Slb_P_1_V9	Lijn	Paal_P_1	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
Slb_P_2_V9	Lijn	Paal_P_2	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
Slb_P_1_V10	Lijn	Paal_P_1	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
Slb_P_2_V10	Lijn	Paal_P_2	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
Slb_P_1_V11	Lijn	Paal_P_1	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
Slb_P_2_V11	Lijn	Paal_P_2	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
Slb_P_1_V12	Lijn	Paal_P_1	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
Slb_P_2_V12	Lijn	Paal_P_2	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
Slb_P_1_V13	Lijn	Paal_P_1	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						
Slb_P_2_V13	Lijn	Paal_P_2	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						
Slb_P_1_V14	Lijn	Paal_P_1	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf begin						
Slb_P_2_V14	Lijn	Paal_P_2	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

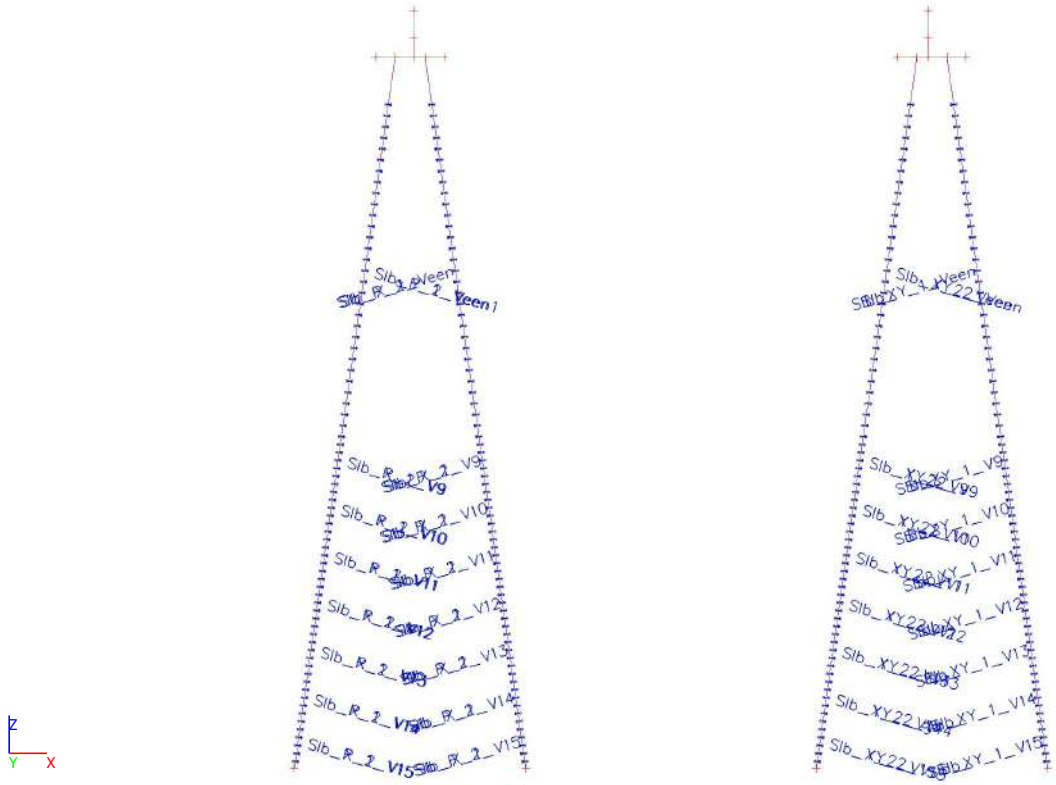
Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	14,000	Vanaf begin						
Slb_P_1_V15	Lijn	Paal_P_1	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,850	Vanaf begin						
Slb_P_2_V15	Lijn	Paal_P_2	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,850	Vanaf begin						
Slb_XY_1_Veen	Lijn	Paal_XY_1	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
Slb_XY_1_V9	Lijn	Paal_XY_1	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
Slb_XY_1_V10	Lijn	Paal_XY_1	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
Slb_XY_1_V11	Lijn	Paal_XY_1	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
Slb_XY_1_V12	Lijn	Paal_XY_1	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
Slb_XY_1_V13	Lijn	Paal_XY_1	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						
Slb_XY_1_V14	Lijn	Paal_XY_1	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf begin						
Slb_XY_1_V15	Lijn	Paal_XY_1	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,850	Vanaf begin						
Slb_XY_2_Veen	Lijn	Paal_XY_2	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
Slb_XY_2_V9	Lijn	Paal_XY_2	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
Slb_XY_2_V10	Lijn	Paal_XY_2	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
Slb_XY_2_V11	Lijn	Paal_XY_2	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
Slb_XY_2_V12	Lijn	Paal_XY_2	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
Slb_XY_2_V13	Lijn	Paal_XY_2	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						
Slb_XY_2_V14	Lijn	Paal_XY_2	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf begin						
Slb_XY_2_V15	Lijn	Paal_XY_2	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,850	Vanaf begin						
Slb_Y_1_Veen	Lijn	Paal_Y_1	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
Slb_Y_1_V9	Lijn	Paal_Y_1	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
Slb_Y_1_V10	Lijn	Paal_Y_1	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
Slb_Y_1_V11	Lijn	Paal_Y_1	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
Slb_Y_1_V12	Lijn	Paal_Y_1	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
Slb_Y_1_V13	Lijn	Paal_Y_1	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						
Slb_Y_1_V14	Lijn	Paal_Y_1	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf begin						
Slb_Y_1_V15	Lijn	Paal_Y_1	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,850	Vanaf begin						
Slb_Y_2_Veen	Lijn	Paal_Y_2	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
Slb_Y_2_V9	Lijn	Paal_Y_2	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
Slb_Y_2_V10	Lijn	Paal_Y_2	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
Slb_Y_2_V11	Lijn	Paal_Y_2	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
Slb_Y_2_V12	Lijn	Paal_Y_2	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
Slb_Y_2_V13	Lijn	Paal_Y_2	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij

Naam	Type	Staaf	Pos x_1 [m]	Coör	X	Y	Z	Rx	Ry	Rz
		Systeem	Pos x_2 [m]	Oors						
		LCS	13,000	Vanaf begin						
Slb_Y_2_V14	Lijn	Paal_Y_2	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf begin						
Slb_Y_2_V15	Lijn	Paal_Y_2	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,850	Vanaf begin						
Slb_Y_2_Veen1	Lijn	Paal_X_2	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
Slb_X_2_V9	Lijn	Paal_X_2	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
Slb_X_2_V10	Lijn	Paal_X_2	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
Slb_X_2_V11	Lijn	Paal_X_2	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
Slb_X_2_V12	Lijn	Paal_X_2	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
Slb_X_2_V13	Lijn	Paal_X_2	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						
Slb_X_2_V14	Lijn	Paal_X_2	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf begin						
Slb_X_2_V15	Lijn	Paal_X_2	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,850	Vanaf begin						
Slb_X_1_Veen	Lijn	Paal_X_1	1,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	8,000	Vanaf begin						
Slb_X_1_V9	Lijn	Paal_X_1	8,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	9,000	Vanaf begin						
Slb_X_1_V10	Lijn	Paal_X_1	9,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	10,000	Vanaf begin						
Slb_X_1_V11	Lijn	Paal_X_1	10,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	11,000	Vanaf begin						
Slb_X_1_V12	Lijn	Paal_X_1	11,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	12,000	Vanaf begin						
Slb_X_1_V13	Lijn	Paal_X_1	12,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	13,000	Vanaf begin						
Slb_X_1_V14	Lijn	Paal_X_1	13,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,000	Vanaf begin						
Slb_X_1_V15	Lijn	Paal_X_1	14,000	Abso	Vrij	Niet-lineair	Niet-lineair	Vrij	Vrij	Vrij
		LCS	14,850	Vanaf begin						

5.8. Analyse model met Lijnondersteuningen



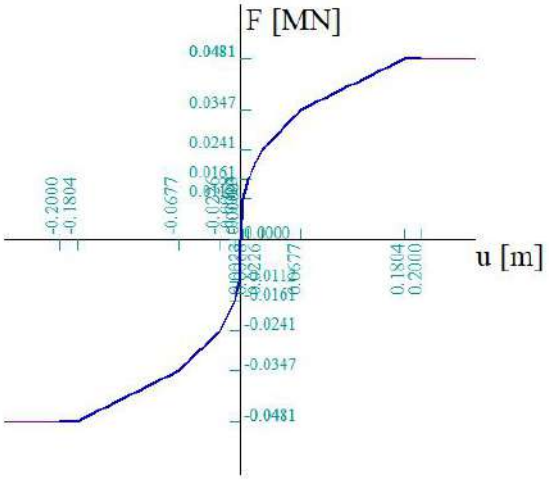
5.9. Analyse model met Lijnondersteuningen



5.10. Niet-lineaire functies

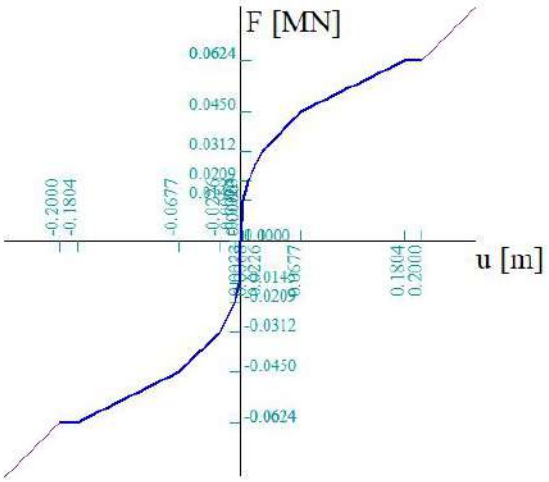
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V1	Verplaatsing	-0.200000 / -48130.000000	Vrij	Vrij
		-0.180400 / -48130.000000		
		-0.067650 / -34710.000000		
		-0.022550 / -24064.500000		
		-0.006765 / -16109.569000		
		-0.002255 / -11169.751000		
		0.000000 / 0.000000		
		0.002255 / 11169.751000		
		0.006765 / 16109.569000		
		0.022550 / 24064.500000		
		0.067650 / 34707.015000		
		0.180400 / 48129.000000		
		0.200000 / 48129.000000		

Tekenen



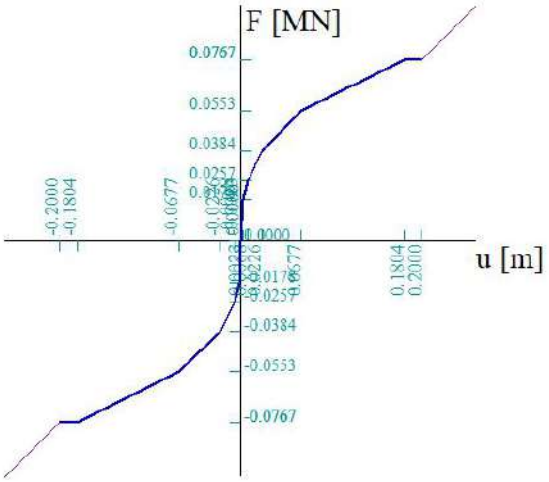
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V2	Verplaatsing	-0.200000 / -62400.000000	Verend	Verend
		-0.180400 / -62400.000000		
		-0.067650 / -45000.000000		
		-0.022550 / -31200.000000		
		-0.006765 / -20900.000000		
		-0.002255 / -14500.000000		
		0.000000 / 0.000000		
		0.002255 / 14490.000000		
		0.006765 / 20900.000000		
		0.022550 / 31220.000000		
		0.067650 / 45020.000000		
		0.180400 / 62430.000000		
		0.200000 / 62430.000000		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V3	Verplaatsing	-0.200000 / -76737.000000	Verend	Verend
		-0.180400 / -76737.000000		
		-0.067650 / -55336.953000		
		-0.022550 / -38368.500000		
		-0.006765 / -25685.138000		
		-0.002255 / -17809.080000		
		0.000000 / 0.000000		
		0.002255 / 17809.080000		
		0.006765 / 25685.138000		
		0.022550 / 38368.500000		
		0.067650 / 55336.953000		
		0.180400 / 76737.000000		
		0.200000 / 76737.000000		

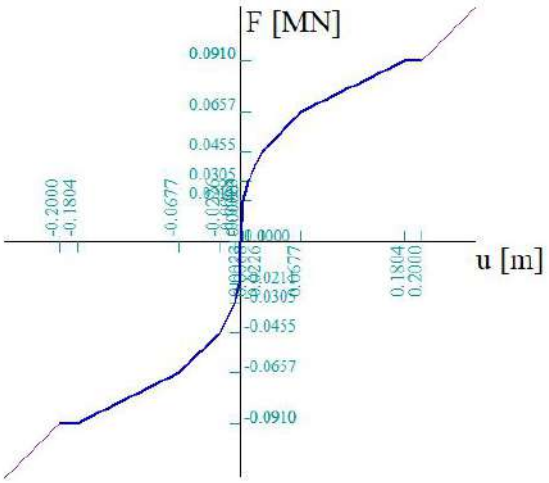
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V4	Verplaatsing	-0.200000 / -91041.000000	Verend	Verend
		-0.180400 / -91041.000000		
		-0.067650 / -65651.922000		
		-0.022550 / -45520.500000		
		-0.006765 / -30472.923000		
		-0.002255 / -21128.744000		
		0.000000 / 0.000000		
		0.002255 / 21128.744000		
		0.006765 / 30472.923000		
		0.022550 / 45520.500000		

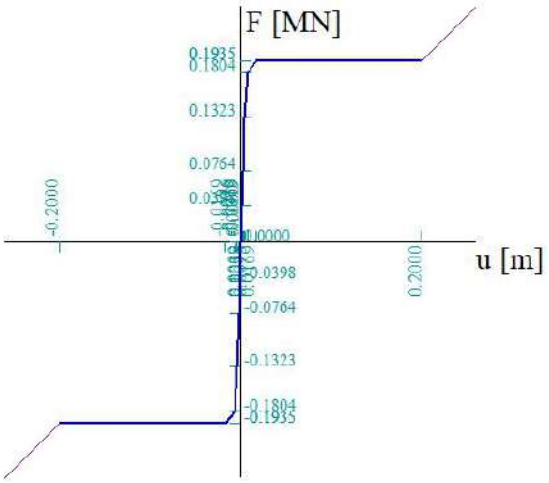
Naam	Type	u / F	Positief einde	Negatief einde
		0.067650 / 65651.922000		
		0.180400 / 91041.000000		
		0.200000 / 91041.000000		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V5	Verplaatsing	-0.200000 / -193489.147000	Verend	Verend
		-0.016913 / -193489.147000		
		-0.007517 / -180407.835000		
		-0.003758 / -132256.824000		
		-0.001879 / -76421.758000		
		-0.000940 / -39826.202000		
		0.000000 / 0.000000		
		0.000940 / 39826.202000		
		0.001879 / 76421.758000		
		0.003758 / 132256.824000		
		0.007517 / 180407.835000		
		0.016913 / 193489.147000		
		0.200000 / 193489.147000		

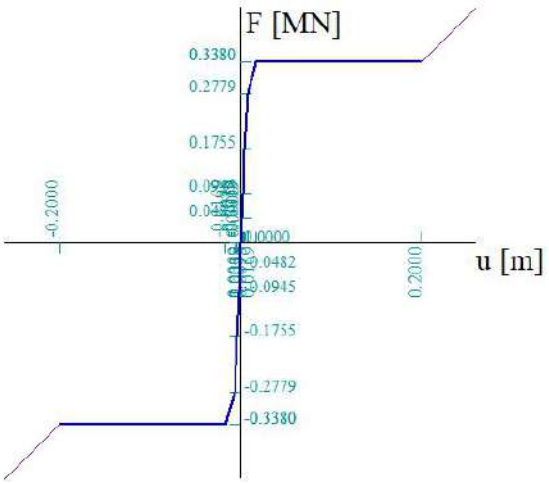
Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V6	Verplaatsing	-0.200000 / -338024.958000	Verend	Verend
		-0.016913 / -338024.958000		
		-0.007517 / -277917.886000		
		-0.003758 / -175526.039000		

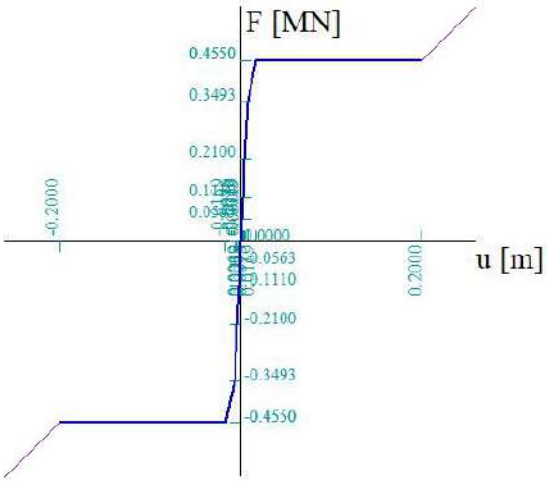
Naam	Type	u / F	Positief einde	Negatief einde
		-0.001879 / -94450.113000		
		-0.000940 / -48160.629000		
		0.000000 / 0.000000		
		0.000940 / 48160.629000		
		0.001879 / 94450.113000		
		0.003758 / 175526.039000		
		0.007517 / 277917.886000		
		0.016913 / 338024.958000		
		0.200000 / 338024.958000		

Tekenen



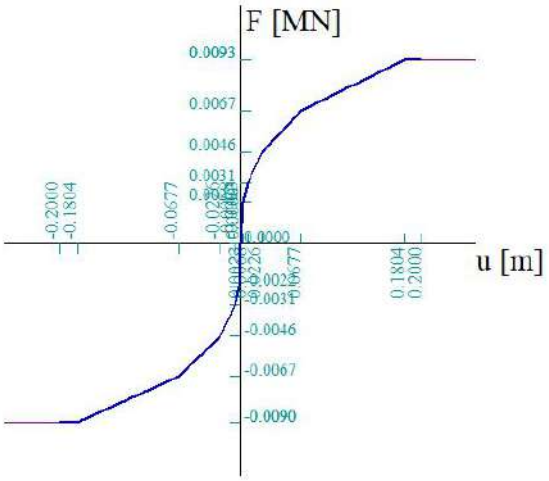
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_V7	Verplaatsing	-0.200000 / -454964.396000	Verend	Verend
		-0.016913 / -454964.396000		
		-0.007517 / -349336.178000		
		-0.003758 / -210048.905000		
		-0.001879 / -110961.163000		
		-0.000940 / -56287.593000		
		0.000000 / 0.000000		
		0.000940 / 56287.593000		
		0.001879 / 110961.163000		
		0.003758 / 210048.905000		
		0.007517 / 349336.178000		
		0.016913 / 454964.396000		
		0.200000 / 454964.396000		

Tekenen



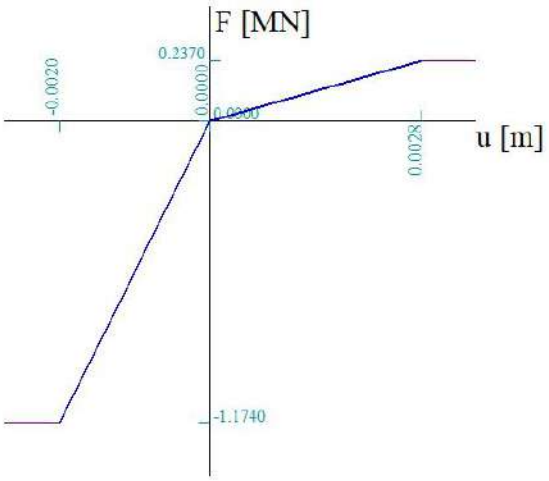
Naam	Type	u / F	Positief einde	Negatief einde
PY-curve-1_Veen	Verplaatsing	-0.200000 / -9000.000000	Vrij	Vrij
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		
		-0.006765 / -3100.000000		
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Tekenen



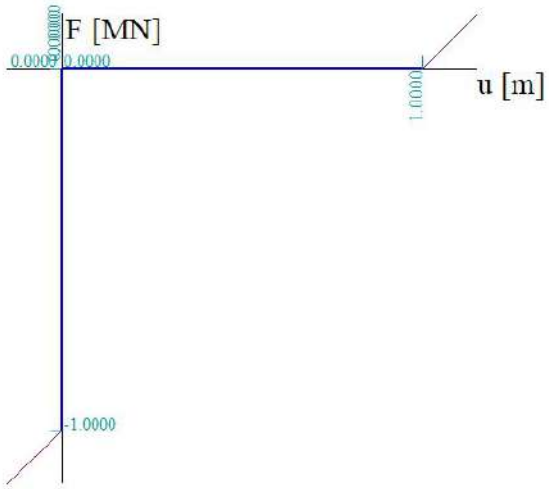
Naam	Type	u / F	Positief einde	Negatief einde
Trek-druk-paalpunt-Mastnr148	Verplaatsing	-0.001960 / -1174000.000000	Vrij	Vrij
		0.000000 / 0.000000		
		0.002760 / 237000.000000		

Tekenen



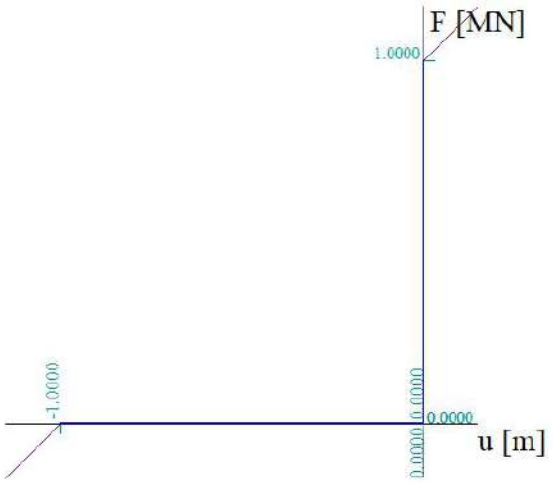
Naam	Type	u / F	Positief einde	Negatief einde
press only	Verplaatsing	-0.000001 / -1000000.000000	Verend	Verend
		0.000000 / 0.000000		
		1.000000 / 0.000000		

Tekenen



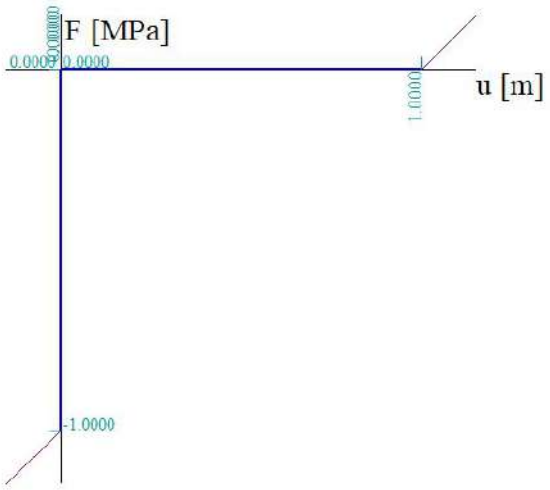
Naam	Type	u / F	Positief einde	Negatief einde
tension only	Verplaatsing	-1.000000 / 0.000000	Verend	Verend
		0.000000 / 0.000000		
		0.000001 / 1000000.000000		

Tekenen



Naam	Type	u / F	Positief einde	Negatief einde
soil press only	Niet-lineair bedding		Verend	Verend

Tekenen

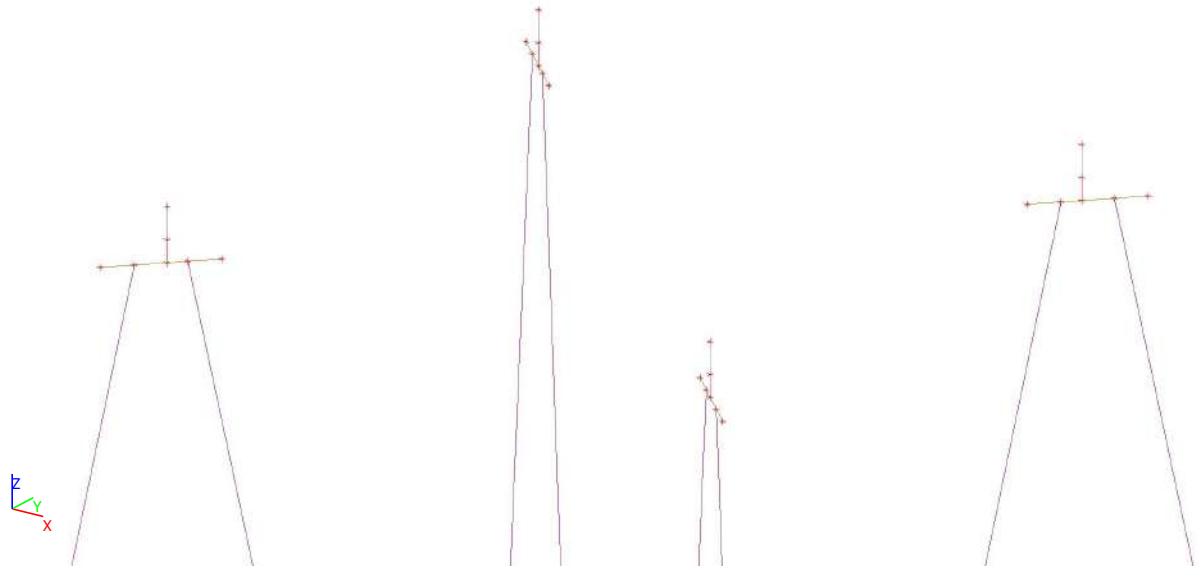


6. Belastingen

6.1. Belastingsgevallen

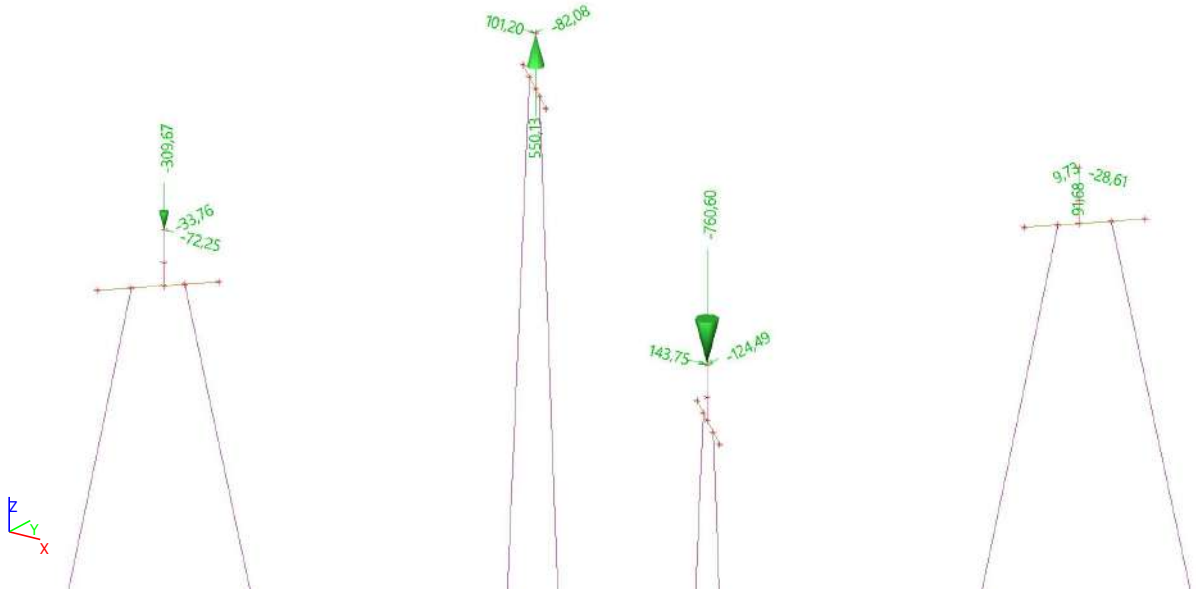
6.1.1. Belastingsgevallen - E.G.

Naam	Omschrijving	Actie type	Lastgroep	Richting
	Spec	Belastingtype		
E.G.		Permanent	LG1	-Z
		Eigen gewicht		



6.1.2. Belastingsgevallen - high max Wnd ;45°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
high max Wnd ;45°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			

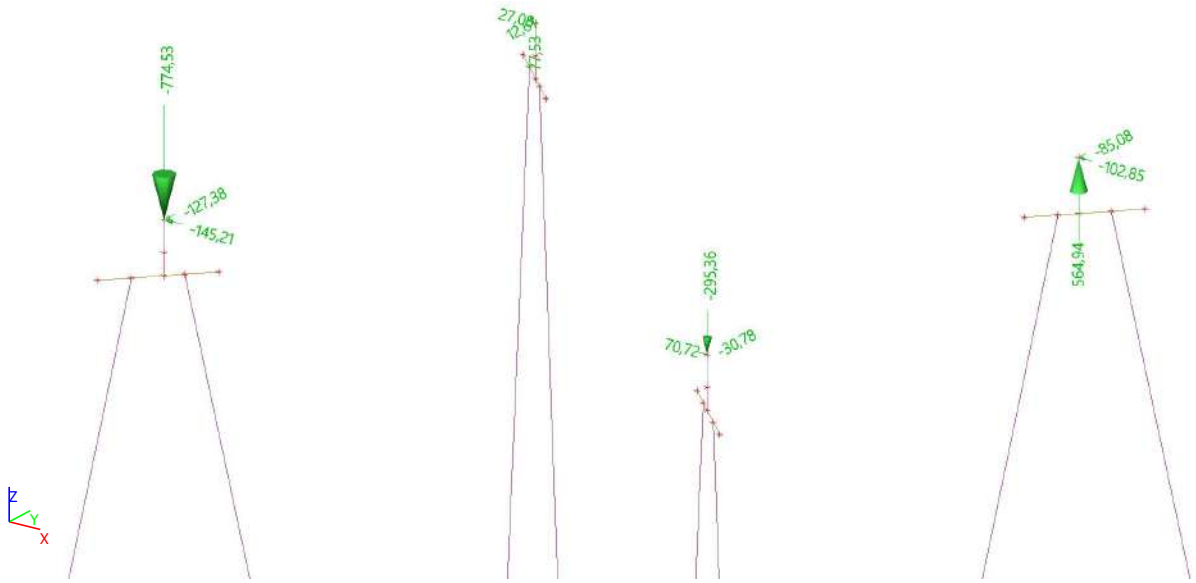


6.1.2.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Kracht	-72,25
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Kracht	-33,76
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Kracht	-309,67
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Kracht	101,20
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Kracht	-82,08
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Kracht	550,13
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Kracht	-28,61
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Kracht	9,73
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Kracht	91,68
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Kracht	143,75
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Kracht	-124,49
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Kracht	-760,60

6.1.3. Belastingsgevallen - high max Wnd ;135°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
high max Wnd ;135°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



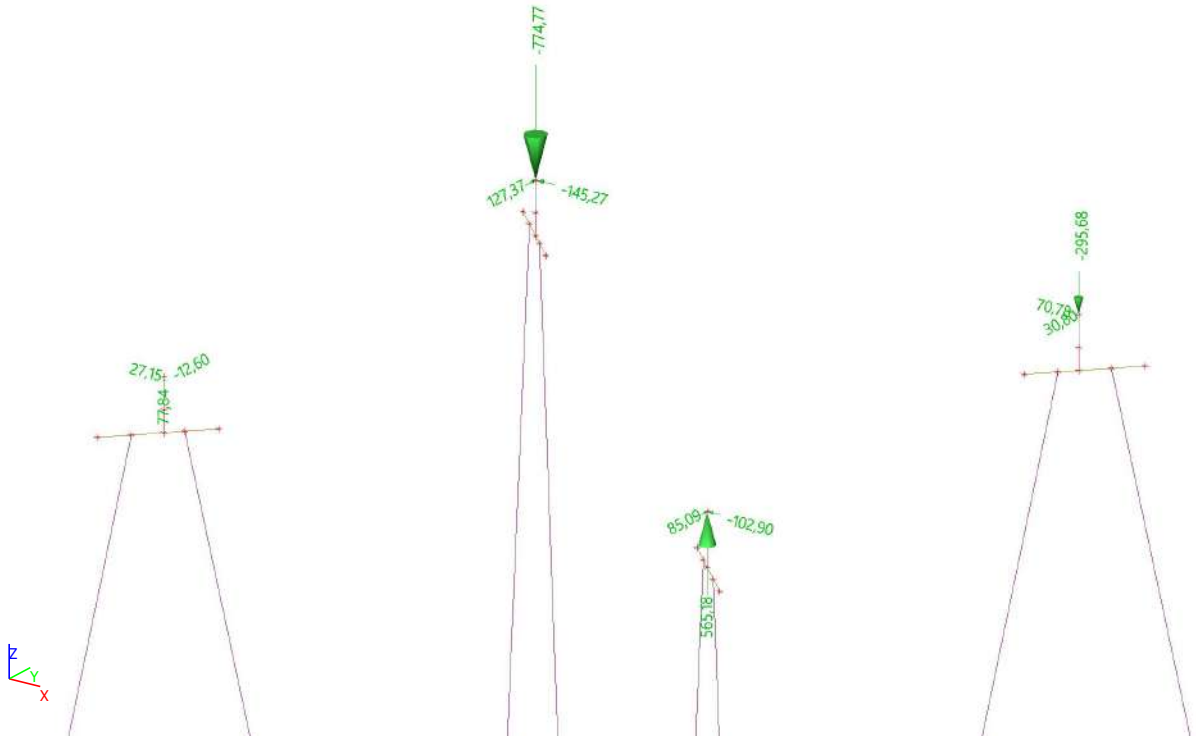
6.1.3.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Kracht	-145,21
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Kracht	-127,38
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Kracht	-774,53
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Kracht	27,08
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Kracht	12,61
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Kracht	77,53
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Kracht	-102,85
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Kracht	-85,08
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Kracht	564,94
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Kracht	70,72
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Kracht	-30,78

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Kracht	-295,36

6.1.4. Belastingsgevallen - high max Wnd ;225°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
high max Wnd ;225°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



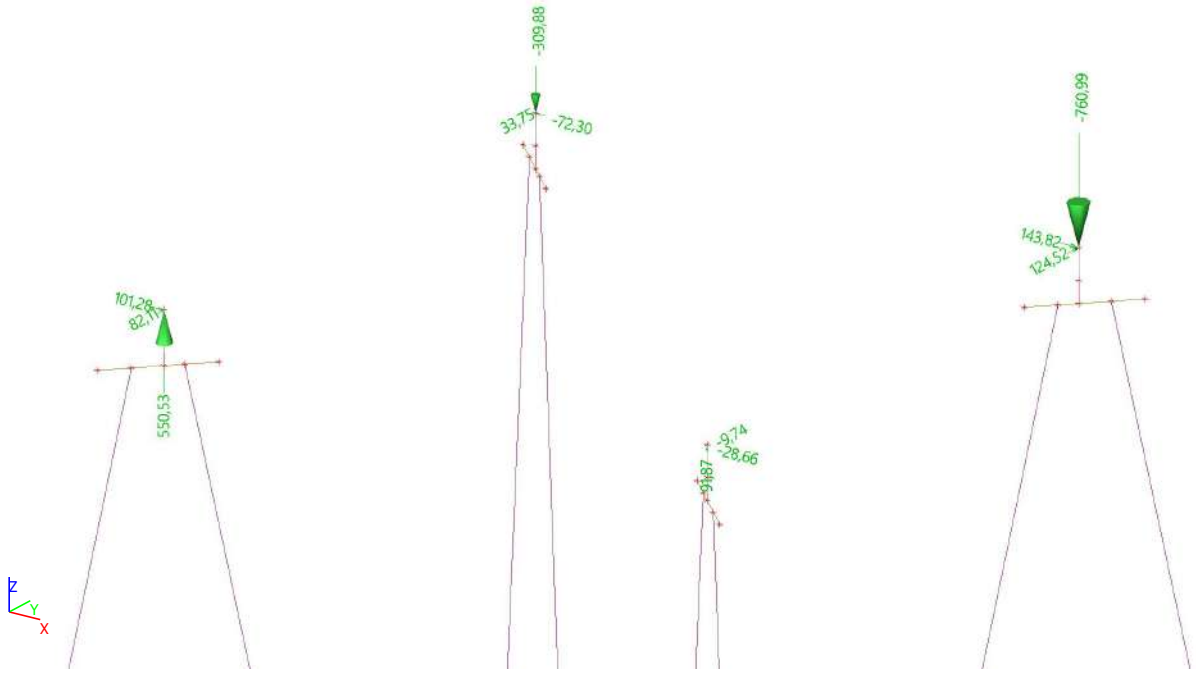
6.1.4.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Kracht	27,15
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Kracht	-12,60
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Kracht	77,84
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Kracht	-145,27
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Kracht	127,37
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Kracht	-774,77
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Kracht	70,78
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Kracht	30,80

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Kracht	-295,68
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Kracht	-102,90
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Kracht	85,09
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Kracht	565,18

6.1.5. Belastingsgevallen - high max Wnd ;315°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
high max Wnd ;315°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



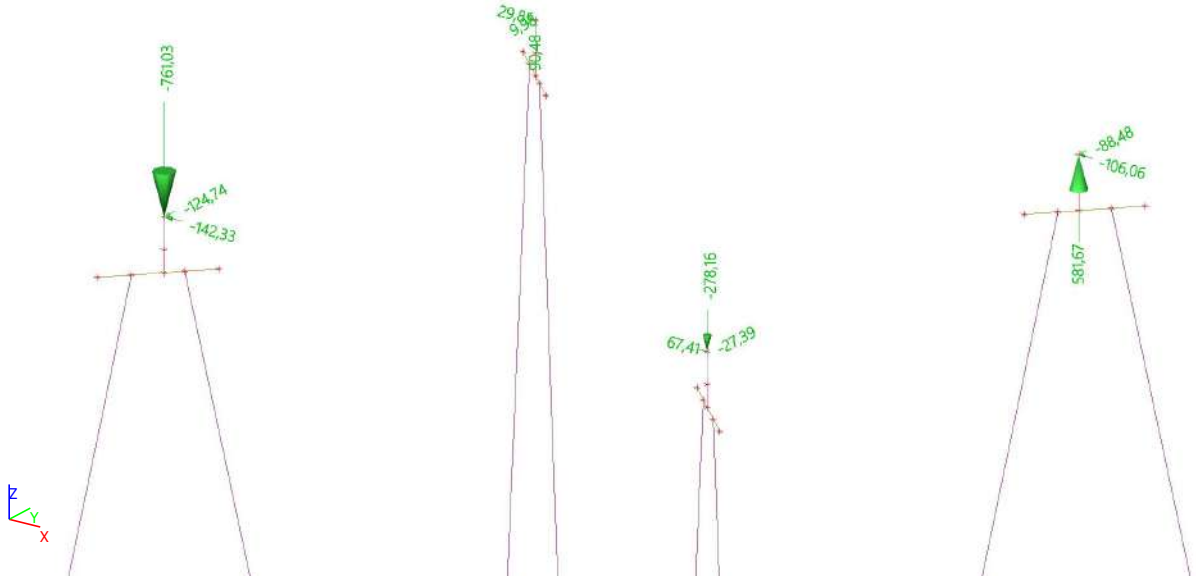
6.1.5.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Kracht	101,28
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Kracht	82,11
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Kracht	550,53
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Kracht	-72,30
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Kracht	33,75

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Kracht	-309,88
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Kracht	143,82
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Kracht	124,52
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Kracht	-760,99
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Kracht	-28,66
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Kracht	-9,74
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Kracht	91,87

6.1.6. Belastingsgevallen - low max Wnd ;135°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
low max Wnd ;135°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			

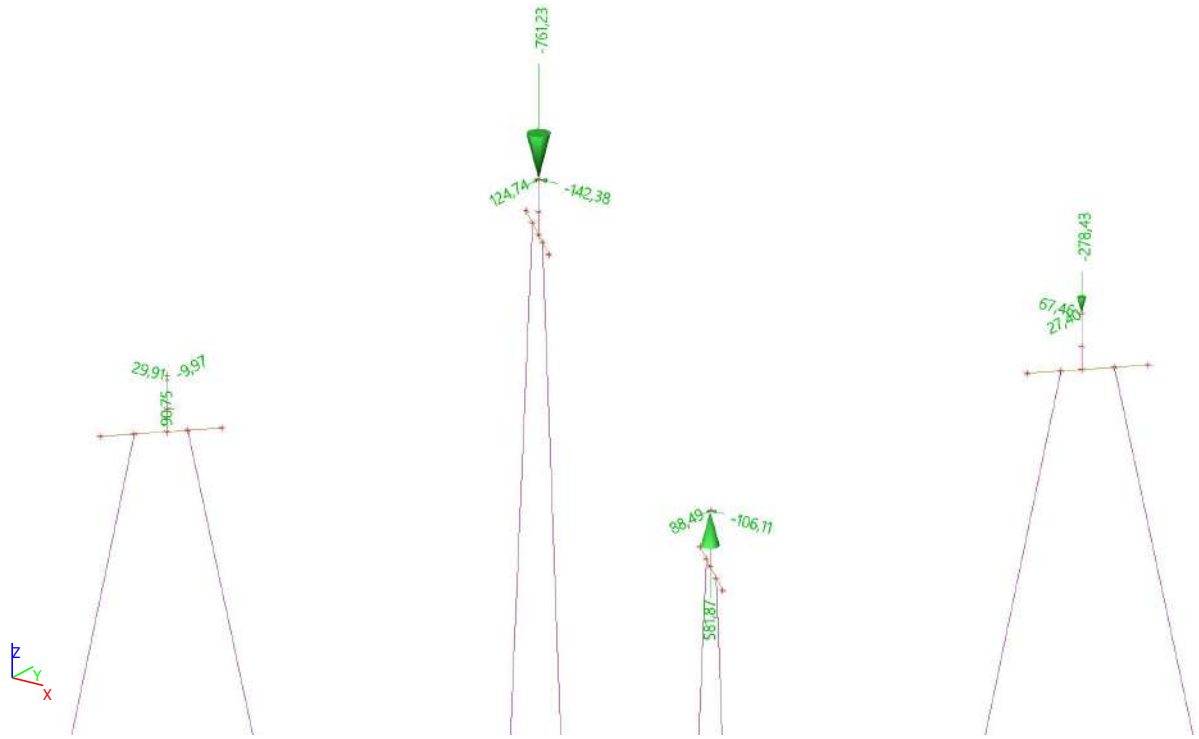


6.1.6.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Kracht	-142,33
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Kracht	-124,74
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Kracht	-761,03
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Kracht	29,85
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Kracht	9,98
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Kracht	90,48
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Kracht	-106,06
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Kracht	-88,48
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Kracht	581,67
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Kracht	67,41
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Kracht	-27,39
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Kracht	-278,16

6.1.7. Belastingsgevallen - low max Wnd ;225°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
low max Wnd ;225°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			

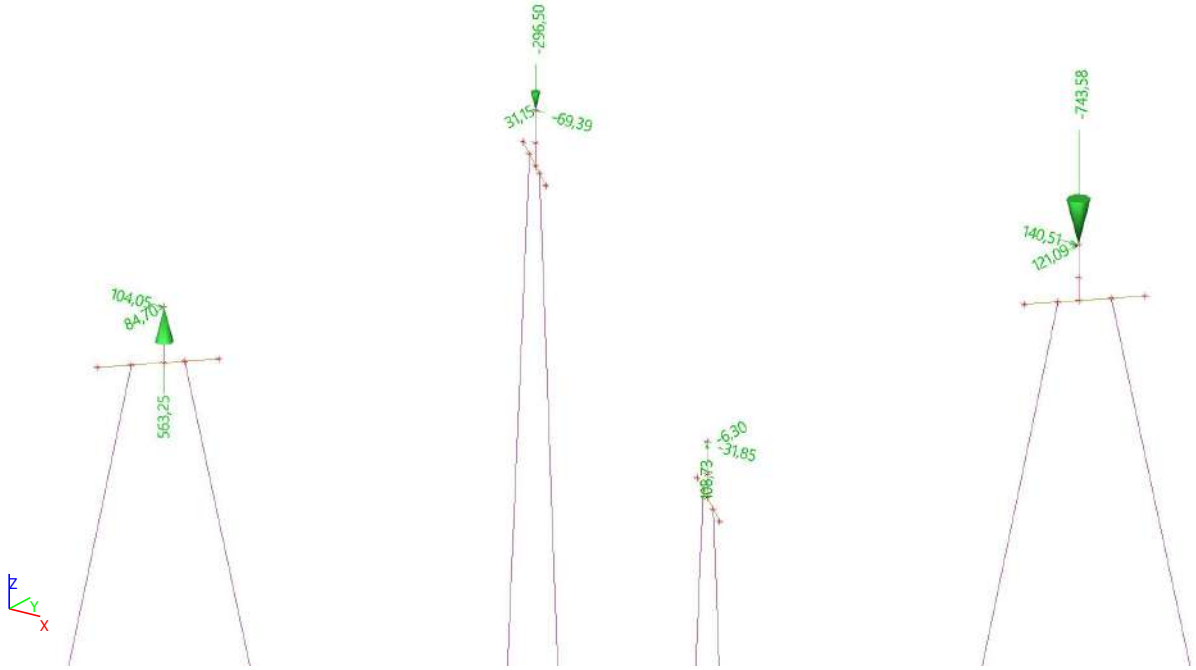


6.1.7.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Kracht	29,91
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Kracht	-9,97
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Kracht	90,75
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Kracht	-142,38
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Kracht	124,74
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Kracht	-761,23
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Kracht	67,46
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Kracht	27,40
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Kracht	-278,43
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Kracht	-106,11
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Kracht	88,49
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Kracht	581,87

6.1.8. Belastingsgevallen - low max Wnd ;315°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
low max Wnd ;315°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



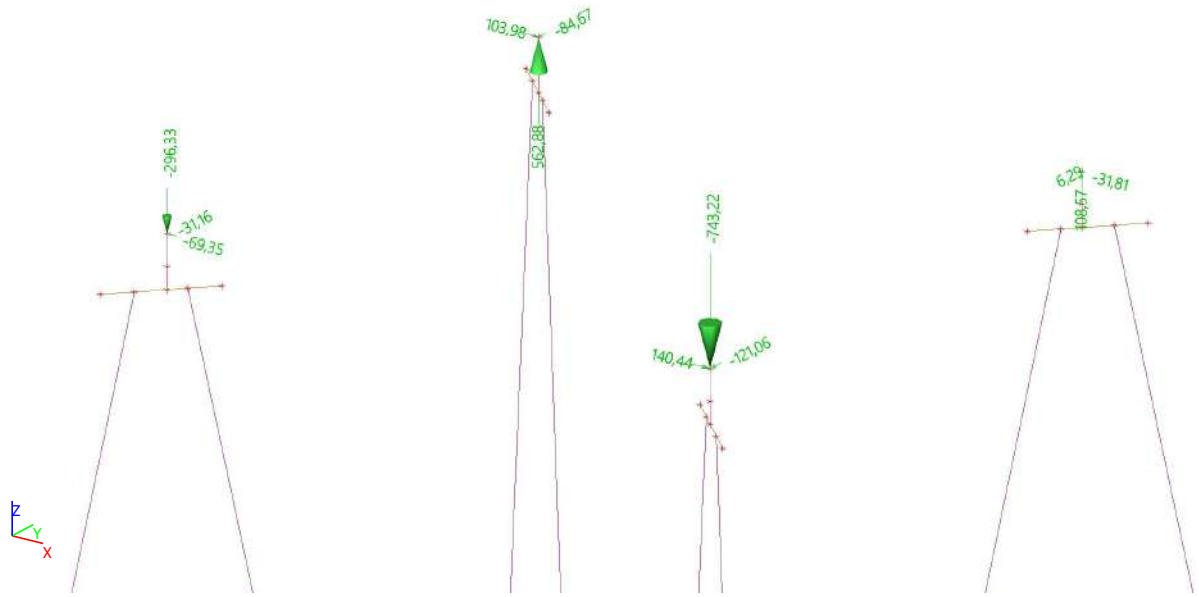
6.1.8.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Kracht	104,05
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Kracht	84,70
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Kracht	563,25
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Kracht	-69,39
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Kracht	31,15
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Kracht	-296,50
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Kracht	140,51
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Kracht	121,09
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Kracht	-743,58
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Kracht	-31,85
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Kracht	-6,30

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Kracht	108,73

6.1.9. Belastingsgevallen - low max Wnd ;45°

Naam	Omschrijving	Actie type	Lastgroep	Duur	'Master' belastingsgeval
	Spec	Belastingtype			
low max Wnd ;45°		Variabel	LG4	Kort	Geen
	Standaard	Statisch			



6.1.9.1. Puntlast op knoop

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Kracht	-69,35
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Kracht	-31,16
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Kracht	-296,33
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Kracht	103,98
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Kracht	-84,67
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Kracht	562,88
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Kracht	-31,81
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Kracht	6,29

Naam	Knoop	Belastingsgeval	Systeem	Rich	Type	Waarde - F [kN]
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Kracht	108,57
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Kracht	140,44
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Kracht	-121,06
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Kracht	-743,22

6.2. Niet-lineaire combinaties

Naam	Type	Belastingsgevallen	Coëff. [-]
high max Wnd ;45° + EG_Ongunstig	Uiterste Grenstoestand	E.G.	1,200
		high max Wnd ;45°	1,000
high max Wnd ;135° + EG_Ongunstig	Uiterste Grenstoestand	E.G.	1,200
		high max Wnd ;135°	1,000
high max Wnd ;315° + EG_Ongunstig	Uiterste Grenstoestand	E.G.	1,200
		high max Wnd ;315°	1,000
high max Wnd ;225° + EG_Ongunstig	Uiterste Grenstoestand	E.G.	1,200
		high max Wnd ;225°	1,000
low max Wnd ;45° + EG_Gunstig	Uiterste Grenstoestand	E.G.	0,900
		low max Wnd ;45°	1,000
low max Wnd ;135° + EG_Gunstig	Uiterste Grenstoestand	E.G.	0,900
		low max Wnd ;135°	1,000
low max Wnd ;315° + EG_Gunstig	Uiterste Grenstoestand	E.G.	0,900
		low max Wnd ;315°	1,000
low max Wnd ;225° + EG_Gunstig	Uiterste Grenstoestand	E.G.	0,900
		low max Wnd ;225°	1,000

6.3. Resultaatklasses

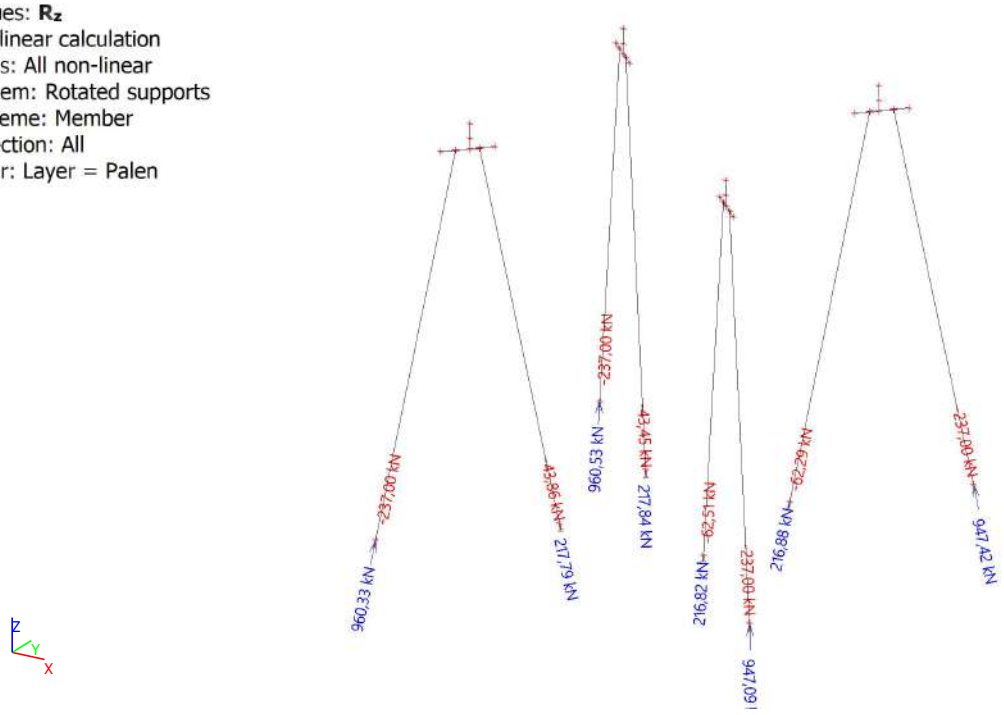
Naam	Lijst
All non-linear	high max Wnd ;45° + EG_Ongunstig
	high max Wnd ;135° + EG_Ongunstig
	high max Wnd ;315° + EG_Ongunstig
	high max Wnd ;225° + EG_Ongunstig
	low max Wnd ;45° + EG_Gunstig
	low max Wnd ;135° + EG_Gunstig
	low max Wnd ;315° + EG_Gunstig
	low max Wnd ;225° + EG_Gunstig

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reacties

Niet-lineaire berekening
Klasse: All non-linear
Systeem: Schuine steunpunten
Extreem: Globaal
Selectie: Alle
Filter: Laag = Palen

Knoopreacties

Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_XY_1/N33	high max Wnd ;315° + EG_Ongunstig	**0,00**	0,00	947,42	0,00	0,00	0,00	0,0	0,0
S_XY_1/N33	low max Wnd ;315° + EG_Gunstig	0,00	**0,00**	880,38	0,00	0,00	0,00	0,0	0,0
S_P_1/N3	low max Wnd ;135° + EG_Gunstig	**0,00**	**0,00**	897,01	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_1/N3	high max Wnd ;315° + EG_Ongunstig	0,00	0,00	**-237,00**	0,00	0,00	0,00	0,0	0,0
S_X_2/N47	high max Wnd ;225° + EG_Ongunstig	0,00	0,00	**960,53**	0,00	0,00	0,00	0,0	0,0

7.1.3. Reacties

Niet-lineaire berekening
Klasse: All non-linear
Systeem: Schuine steunpunten
Extreem: Element
Selectie: Alle

Filter: Laag = Palen

Knoopreacties

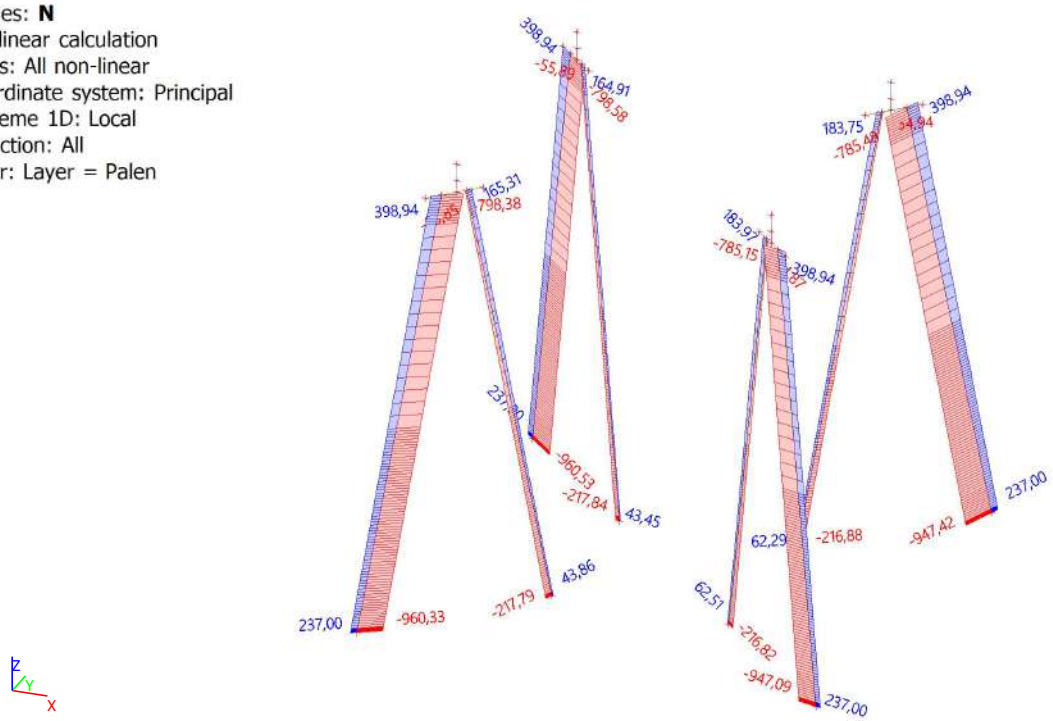
Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_1/N3	low max Wnd ;135° + EG_Gunstig	**0,00**	**0,00**	897,01	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_1/N3	high max Wnd ;315° + EG_Ongunstig	0,00	0,00	**-237,00**	0,00	0,00	0,00	0,0	0,0
S_P_1/N3	high max Wnd ;135° + EG_Ongunstig	**0,00**	**0,00**	**960,33**	0,00	0,00	**0,00**	0,0	0,0
S_P_2/N30	low max Wnd ;225° + EG_Gunstig	**0,00**	0,00	124,35	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_2/N30	high max Wnd ;45° + EG_Ongunstig	0,00	**0,00**	212,30	0,00	0,00	0,00	0,0	0,0
S_P_2/N30	low max Wnd ;315° + EG_Gunstig	0,00	0,00	**-43,86**	0,00	0,00	0,00	0,0	0,0
S_P_2/N30	high max Wnd ;135° + EG_Ongunstig	0,00	0,00	**217,79**	0,00	0,00	0,00	0,0	0,0
S_P_2/N30	low max Wnd ;45° + EG_Gunstig	**0,00**	**0,00**	164,34	0,00	0,00	**0,00**	0,0	0,0
S_XY_1/N33	low max Wnd ;315° + EG_Gunstig	0,00	**0,00**	880,38	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_1/N33	high max Wnd ;135° + EG_Ongunstig	**0,00**	0,00	**-237,00**	0,00	0,00	0,00	0,0	0,0
S_XY_1/N33	high max Wnd ;315° + EG_Ongunstig	**0,00**	**0,00**	**947,42**	0,00	0,00	**0,00**	0,0	0,0
S_XY_2/N35	low max Wnd ;45° + EG_Gunstig	0,00	**0,00**	122,55	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_2/N35	high max Wnd ;315° + EG_Ongunstig	**0,00**	0,00	**216,88**	0,00	0,00	0,00	0,0	0,0
S_XY_2/N35	low max Wnd ;135° + EG_Gunstig	**0,00**	**0,00**	**-62,29**	0,00	0,00	**0,00**	0,0	0,0
S_Y_1/N40	high max Wnd ;135° + EG_Ongunstig	0,00	**0,00**	478,00	0,00	0,00	0,00	0,0	0,0
S_Y_1/N40	high max Wnd ;225° + EG_Ongunstig	0,00	0,00	**-237,00**	0,00	0,00	0,00	0,0	0,0
S_Y_1/N40	high max Wnd ;45° + EG_Ongunstig	**0,00**	0,00	**947,09**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_1/N40	low max Wnd ;45° + EG_Gunstig	**0,00**	**0,00**	880,08	0,00	0,00	**0,00**	0,0	0,0
S_Y_2/N42	high max Wnd ;135° + EG_Ongunstig	**0,00**	0,00	210,89	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_2/N42	low max Wnd ;45° + EG_Gunstig	0,00	**0,00**	169,09	0,00	0,00	0,00	0,0	0,0
S_Y_2/N42	low max Wnd ;135° + EG_Gunstig	0,00	**0,00**	162,53	0,00	0,00	0,00	0,0	0,0

Naam	Belasting	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_Y_2/N42	high max Wnd ;45° + EG_Ongunstig	0,00	0,00	**216,82**	0,00	0,00	0,00	0,0	0,0
S_Y_2/N42	low max Wnd ;225° + EG_Gunstig	**0,00**	0,00	**-62,51**	0,00	0,00	**0,00**	0,0	0,0
S_X_2/N47	low max Wnd ;225° + EG_Gunstig	**0,00**	0,00	897,18	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_2/N47	high max Wnd ;315° + EG_Ongunstig	0,00	**0,00**	491,36	0,00	0,00	0,00	0,0	0,0
S_X_2/N47	high max Wnd ;225° + EG_Ongunstig	0,00	**0,00**	**960,53**	0,00	0,00	0,00	0,0	0,0
S_X_2/N47	high max Wnd ;45° + EG_Ongunstig	**0,00**	0,00	**-237,00**	0,00	0,00	**0,00**	0,0	0,0
S_X_1/N49	high max Wnd ;225° + EG_Ongunstig	**0,00**	**0,00**	**217,84**	0,00	0,00	0,00	0,0	0,0
S_X_1/N49	low max Wnd ;315° + EG_Gunstig	0,00	**0,00**	164,38	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_1/N49	low max Wnd ;45° + EG_Gunstig	0,00	0,00	**-43,45**	0,00	0,00	0,00	0,0	0,0
S_X_1/N49	high max Wnd ;135° + EG_Ongunstig	**0,00**	0,00	172,29	0,00	0,00	**0,00**	0,0	0,0

8. Krachten van de Funderingspalen

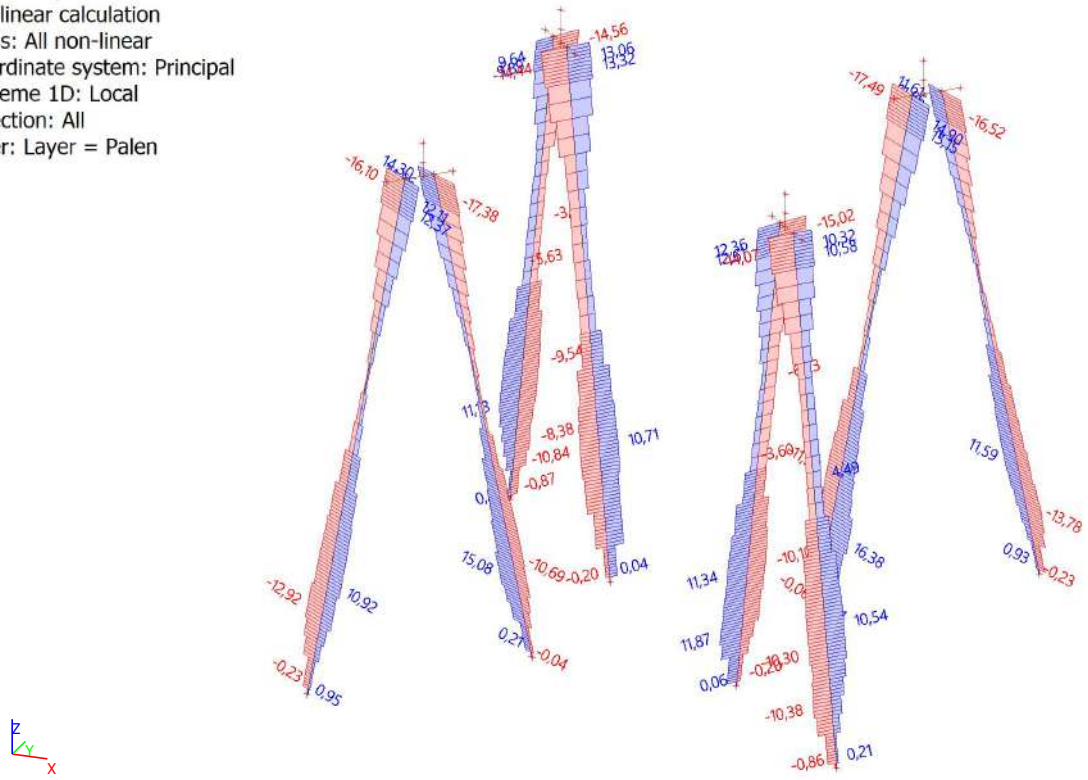
8.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



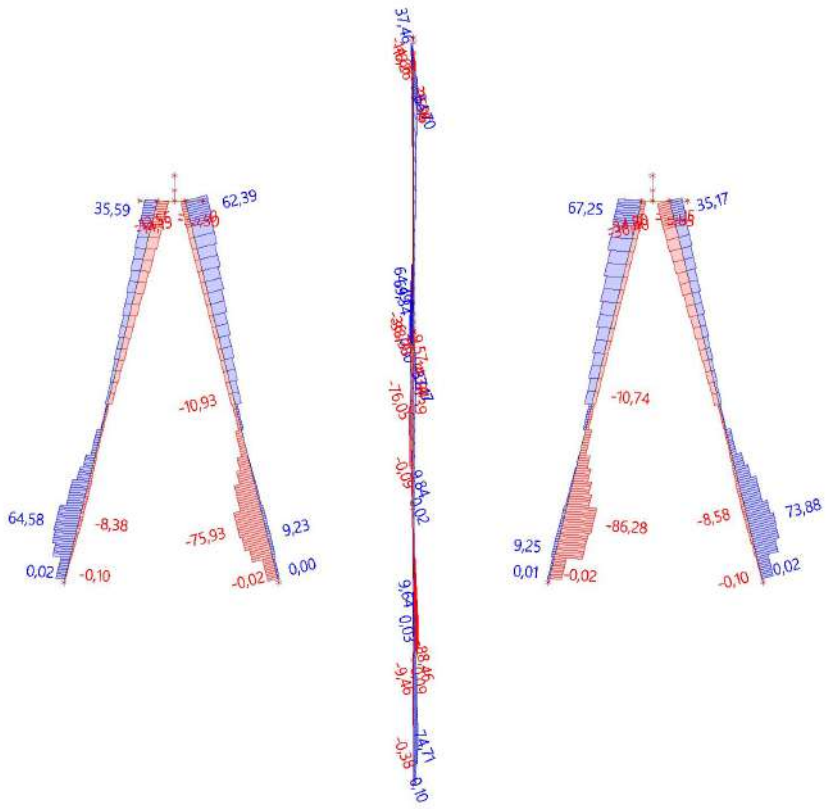
8.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



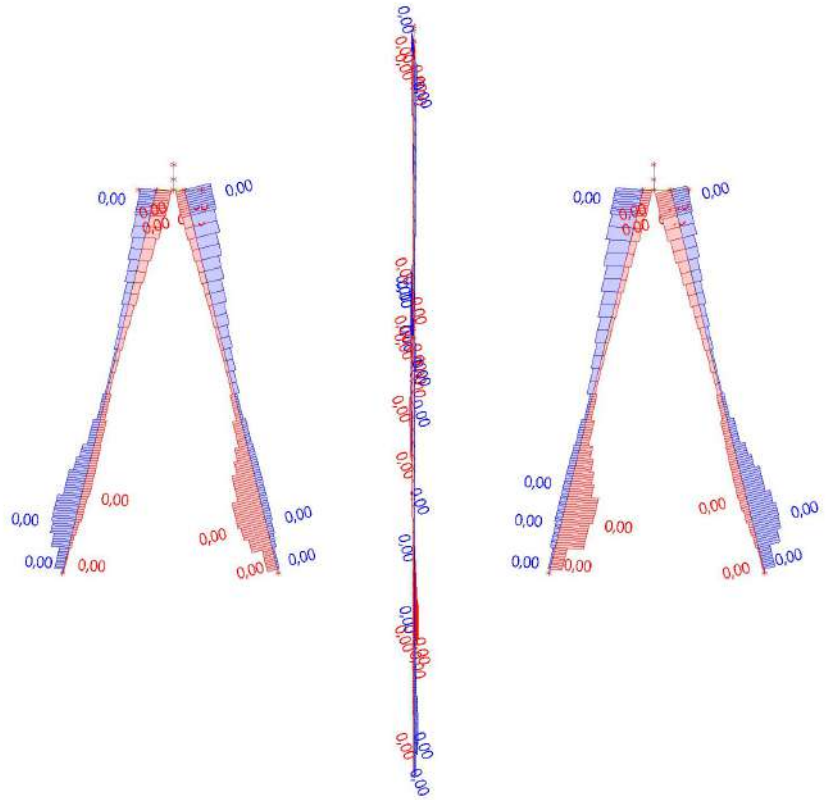
8.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



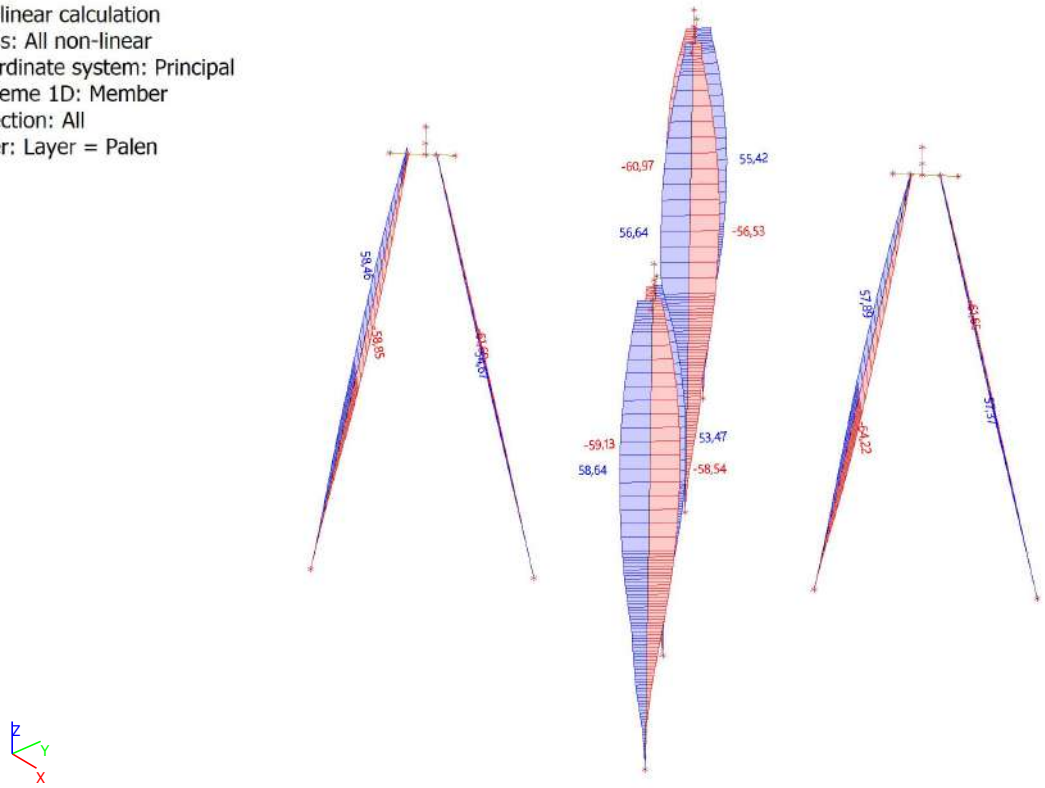
8.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



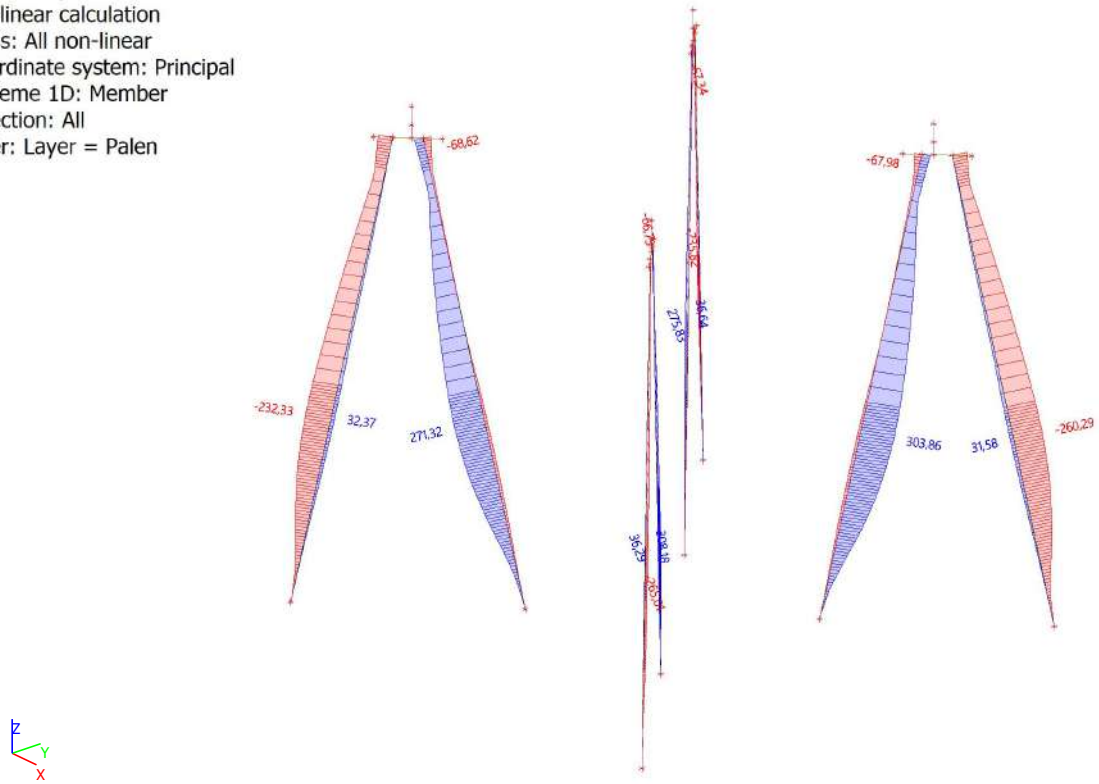
8.5. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



8.6. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



8.7. Interne 1D-krachten

Niet-lineaire berekening
Klasse: All non-linear
Coördinatenstelsel: Hoofd
Extreme 1D: Globaal
Selectie: Alle
Filter: Laag = Palen

Naam	dx [m]	Belasting	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_X_2	14,997	high max Wnd ;225° + EG_Ongunstig	**-960,53**	-0,87	-0,39	0,00	0,00	0,00
Paal_P_1	0,000	high max Wnd ;315° + EG_Ongunstig	**398,94**	9,33	-18,27	0,00	-14,22	11,53
Paal_XY_2	0,000	low max Wnd ;135° + EG_Gunstig	183,75	**-17,49**	67,25	**0,00**	-51,68	4,28
Paal_Y_2	12,000+	low max Wnd ;225° + EG_Gunstig	82,74	11,62	**-88,46**	0,00	196,22	-27,38
Paal_Y_1	12,500+	low max Wnd ;225° + EG_Gunstig	255,20	-10,02	**74,71**	0,00	-132,29	18,88
Paal_XY_2	12,000+	low max Wnd ;135° + EG_Gunstig	82,51	**16,38**	-86,28	**0,00**	195,85	-35,42
Paal_Y_1	9,000-	low max Wnd ;225° + EG_Gunstig	289,62	3,42	-3,20	0,00	**-265,01**	29,09
Paal_Y_2	9,000-	low max Wnd ;225° + EG_Gunstig	115,13	-3,72	6,39	0,00	**308,18**	-35,27
Paal_XY_2	8,000-	low max Wnd ;135° + EG_Gunstig	123,01	-1,34	20,65	0,00	296,54	**-64,22**
Paal_Y_1	5,375-	low max Wnd ;135° + EG_Gunstig	-330,45	0,51	5,79	0,00	18,01	**58,64**

9. Krachten van de Poeren

9.1. Interne 1D-krachten

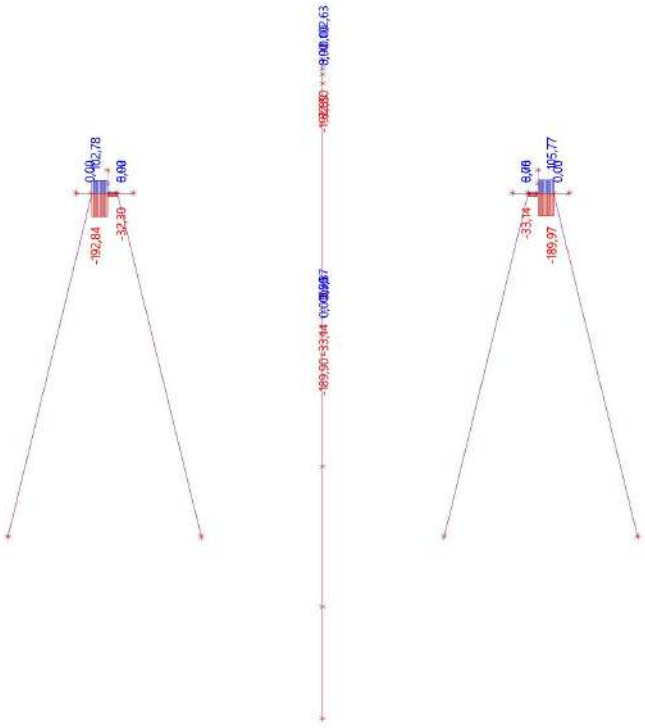
Niet-lineaire berekening
Klasse: All non-linear
Coördinatenstelsel: Hoofd
Extreme 1D: Globaal
Selectie: Alle
Filter: Laag = Poeren

Naam	dx [m]	Belasting	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Opstort_P2	0,570	low max Wnd ;225° + EG_Gunstig	**581,87**	-106,11	88,49	**0,00**	0,00	0,00
Opstort_P	0,000	high max Wnd ;135° + EG_Ongunstig	-779,60	127,38	**-145,21**	**0,00**	**82,77**	-72,61
Opstort_P3	0,000	high max Wnd ;225° + EG_Ongunstig	**-779,84**	**-145,27**	**127,37**	0,00	**-72,60**	**82,80**
Opstort_P2	0,000	high max Wnd ;45° + EG_Ongunstig	-765,67	**143,75**	-124,49	0,00	70,96	**-81,94**

10. Krachten van de Funderingsbalken

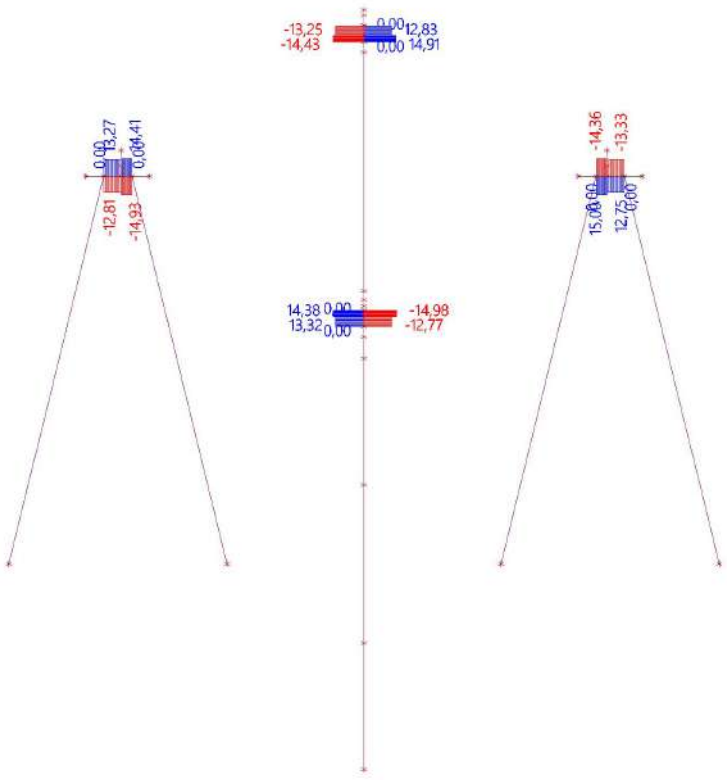
10.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



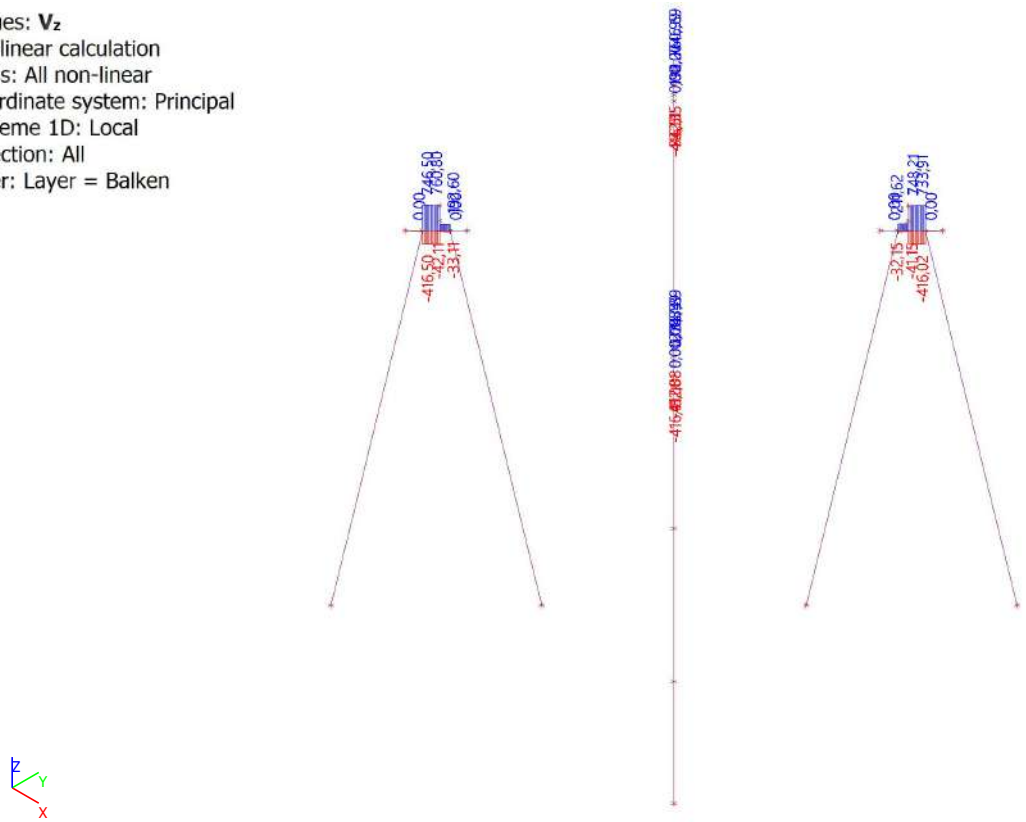
10.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



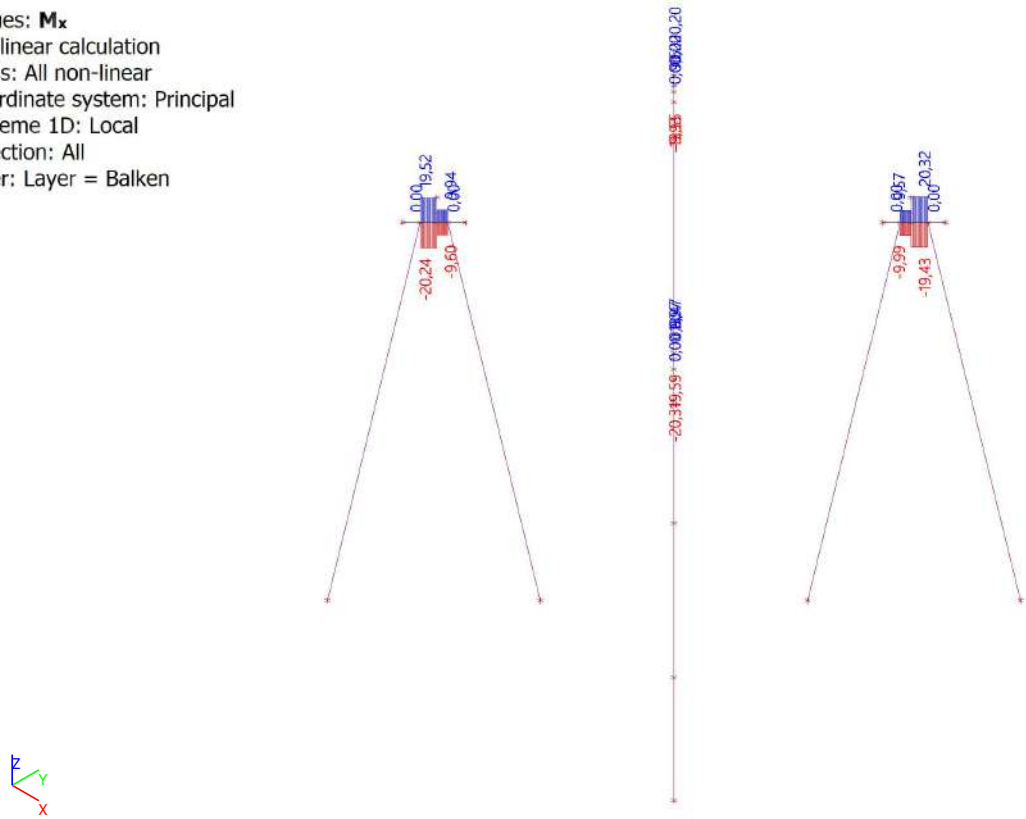
10.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



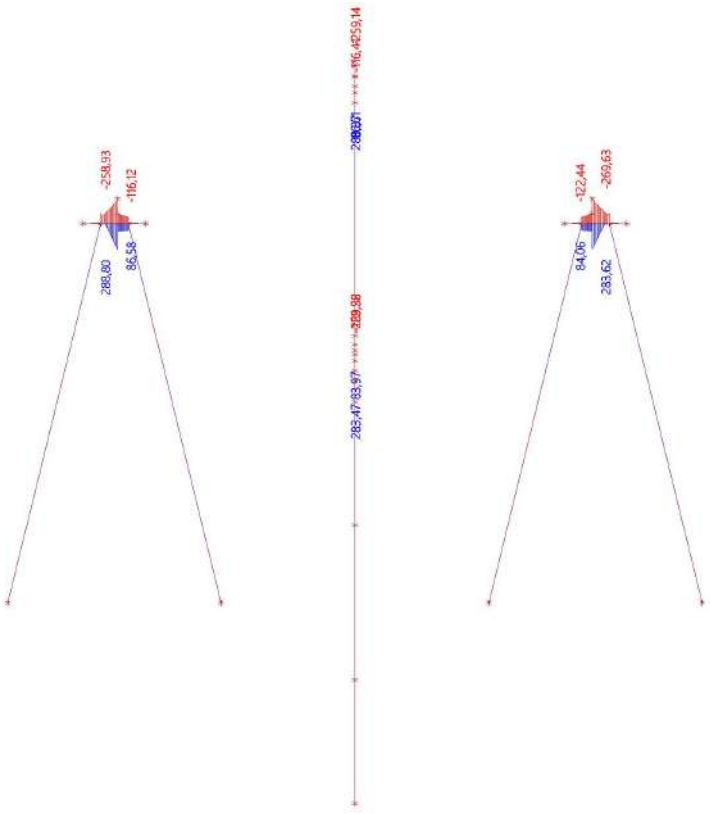
10.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



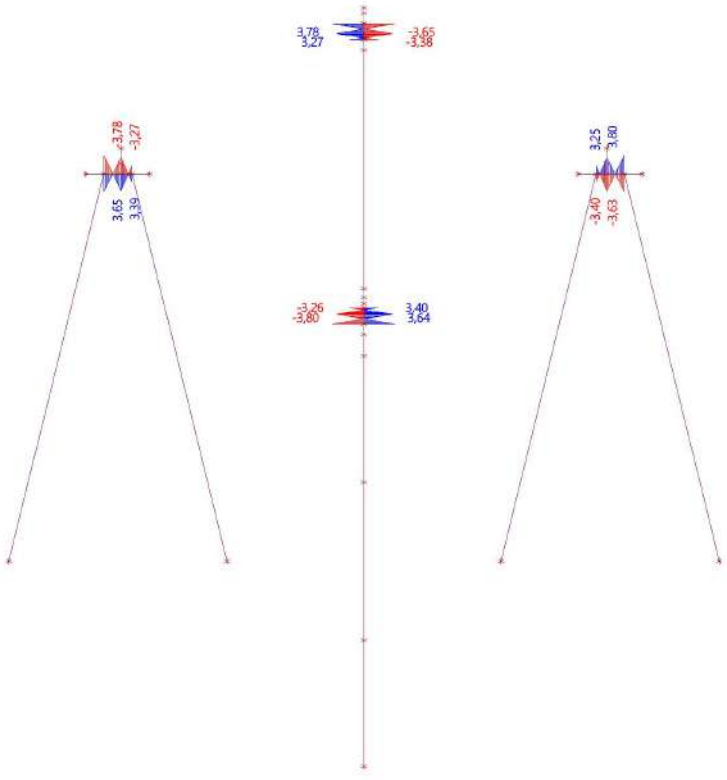
10.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



10.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



10.7. Interne 1D-krachten

Niet-lineaire berekening
Klasse: All non-linear
Coördinatenstelsel: Hoofd
Extreme 1D: Globaal
Selectie: Alle
Filter: Laag = Balken

Naam	dx [m]	Belasting	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer_X_2	0,560+	high max Wnd ;225° + EG_Ongunstig	**-192,89**	5,90	**760,99**	-8,94	-118,21	-1,67
Poer_Y_1	0,560+	low max Wnd ;225° + EG_Gunstig	**105,87**	-5,81	-355,50	8,80	-74,65	1,64
Poer_Y_2	0,000	low max Wnd ;135° + EG_Gunstig	-7,51	**-14,98**	-22,51	9,97	22,75	3,40
Poer_XY_2	0,000	low max Wnd ;225° + EG_Gunstig	-7,51	**15,00**	-22,59	-9,99	22,81	-3,40
Poer_X_2	1,100	high max Wnd ;45° + EG_Ongunstig	97,29	-6,30	**-416,51**	9,56	-250,65	-1,62
Poer_XY_1	1,100	low max Wnd ;135° + EG_Gunstig	105,77	5,79	-366,25	-8,78	**-269,63**	1,49
Poer_X_2	1,100	high max Wnd ;225° + EG_Ongunstig	-192,89	5,90	746,69	-8,94	**288,87**	1,51
Poer_Y_1	0,560+	low max Wnd ;135° + EG_Gunstig	-74,54	13,32	270,18	**-20,31**	-48,52	**-3,80**
Poer_XY_1	0,560+	low max Wnd ;225° + EG_Gunstig	-74,59	-13,33	270,37	**20,32**	-48,52	**3,80**

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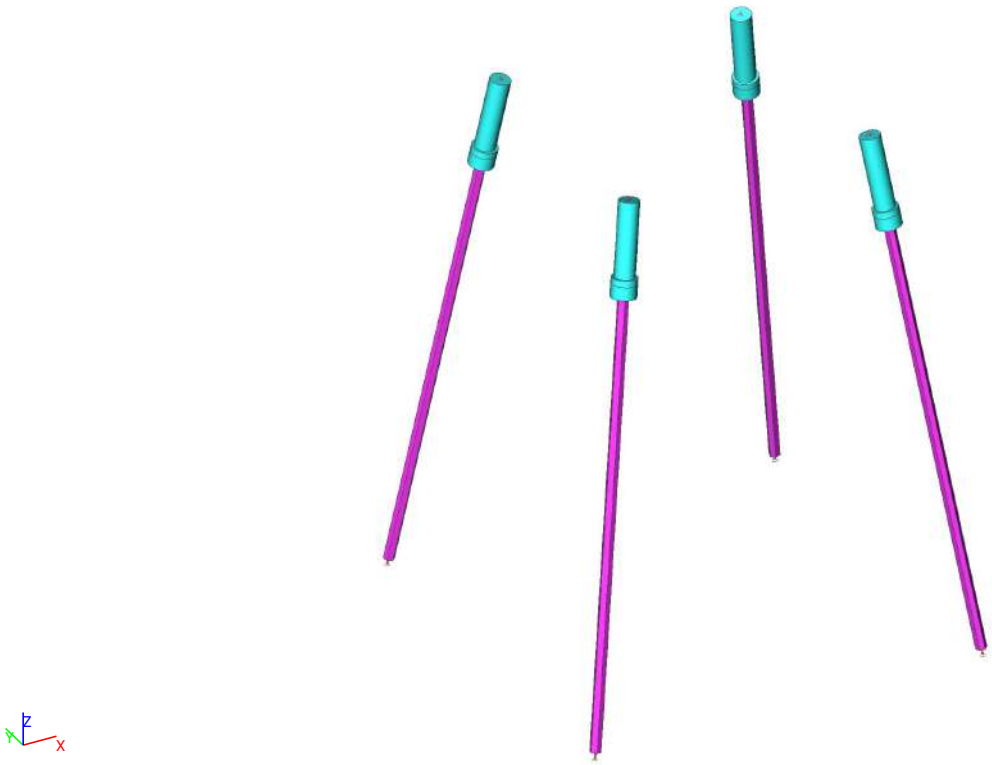
2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Koppelframe 1xLD1
Author	[redacted]
Date	1-09-2025
Structure	General XYZ
No. of nodes :	20
No. of beams :	20
No. of slabs :	0
No. of solids :	0
No. of used profiles :	4
No. of load cases :	9
No. of used materials :	5
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analyse model



4. Modeleigenschappen

4.1. Materials

Steel EC3

Name	ρ [kg/m³]	E_{mod} [MPa]	μ	Lower limit [mm]	Upper limit [mm]	F_y [MPa]	F_u [MPa]	Colour
		G_{mod} [MPa]	α [m/mK]					
S 235 balk	7850,00	2,1000e+05	0.3	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	
S 235	6850,00	2,1000e+05	0.3	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	

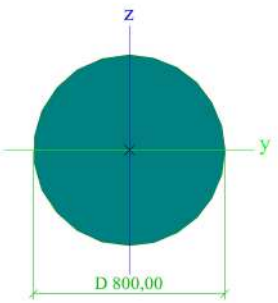
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C12/15 Gescheurd	Concrete	2500,00	2600,00	9,0000e+03	0.23	0,01e-003	12,00	
C12/15 en zand	Concrete	1000,00	2600,00	9,0000e+03	0.23	0,01e-003	12,00	

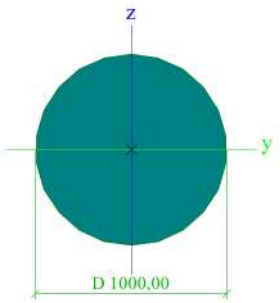
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

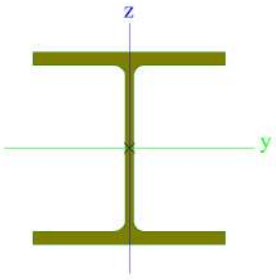
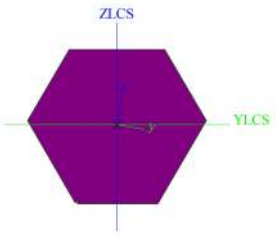
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Reinforcement steel	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

4.2. Cross-sections

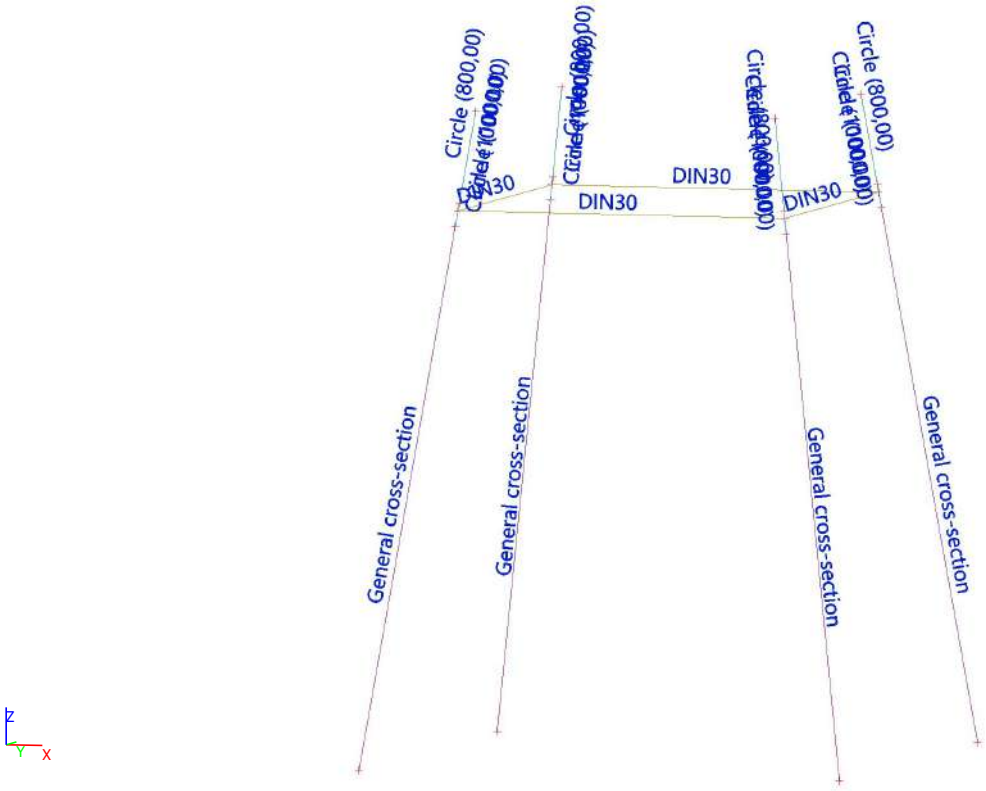
Poer800		
Type	Circle	
Detailed	800,00	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	general	
Colour		
A [mm²]	5,0265e+05	
A_y [mm²], A_z [mm²]	4,5239e+05	4,5239e+05
A_L [m²/m], A_D [m²/m]	2,5131e+00	2,5131e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	400,00	400,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	2,0106e+10	2,0106e+10
i_y [mm], i_z [mm]	199,98	199,98
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	5,0265e+07	5,0265e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	8,5333e+07	8,5333e+07
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	4,0212e+10	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		

Putring1000		
Type	Circle	
Detailed	1000,00	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	general	
Colour		
A [mm²]	7,8540e+05	
A_y [mm²], A_z [mm²]	7,0686e+05	7,0686e+05
A_L [m²/m], A_D [m²/m]	3,1414e+00	3,1414e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	500,00	500,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	4,9087e+10	4,9087e+10
i_y [mm], i_z [mm]	249,97	249,97
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	9,8175e+07	9,8175e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	1,6667e+08	1,6667e+08
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	9,8175e+10	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		

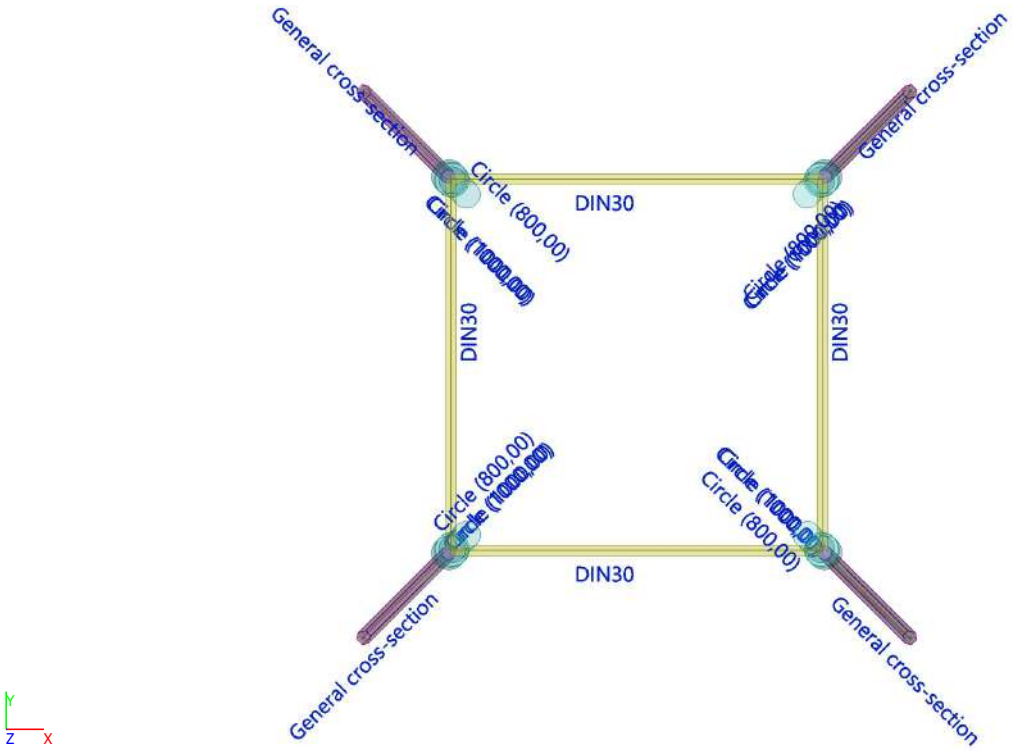
CS2		
Type	DIN30	
Shape type	Thick-walled	
Item material	S 235 balk	
Fabrication	general	
Colour		
Flexural buckling y-y, Flexural buckling z-z	d	d
A [mm²]	1,5403e+04	
A_y [mm²], A_z [mm²]	1,1168e+04	3,7446e+03
A_L [m²/m], A_D [m²/m]	1,7450e+00	1,7450e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	0,00	0,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	2,5767e+08	9,0070e+07
i_y [mm], i_z [mm]	129,34	76,47
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,7178e+06	6,0046e+05
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	1,9185e+06	9,1221e+05
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	450841591,20	450841591,20
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	214369759,94	214369759,94
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	5,1558e+06	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00

Picture		
LD1.		
Type	General cross-section	
Shape type	Thick-walled	
Item material	C12/15 en zand	
	S 235	
Fabrication	general	
Colour		
Flexural buckling y-y, Flexural buckling z-z	d	d
A [mm²]	2,9047e+06	
A_y [mm²], A_z [mm²]	2,3425e+06	2,3428e+06
A_L [m²/m], A_D [m²/m]	1,2942e+00	1,2942e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	0,02	4,66
$I_{Y.LCS}$ [mm⁴], $I_{Z.LCS}$ [mm⁴]	2,7824e+10	2,7875e+10
$I_{YZ.LCS}$ [mm⁴]	-8,9452e+06	
α [deg]	-9,57	
I_y [mm⁴], I_z [mm⁴]	2,7822e+10	2,7877e+10
i_y [mm], i_z [mm]	97,87	97,96
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,3640e+08	1,3057e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	1,9854e+08	1,9981e+08
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	2382532275,12	2384748629,23
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	2397717601,24	2398789409,67
d_y [mm], d_z [mm]	-0,01	-0,03
I_t [mm⁴], I_w [mm⁶]	5,0345e+10	1,3197e+12
β_y [mm], β_z [mm]	0,06	0,02
Picture		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	MeshSetup1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	1
Average size of 2D mesh element [m]	0,200
Average size of 1D mesh element on curved 1D members [m]	0,100
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

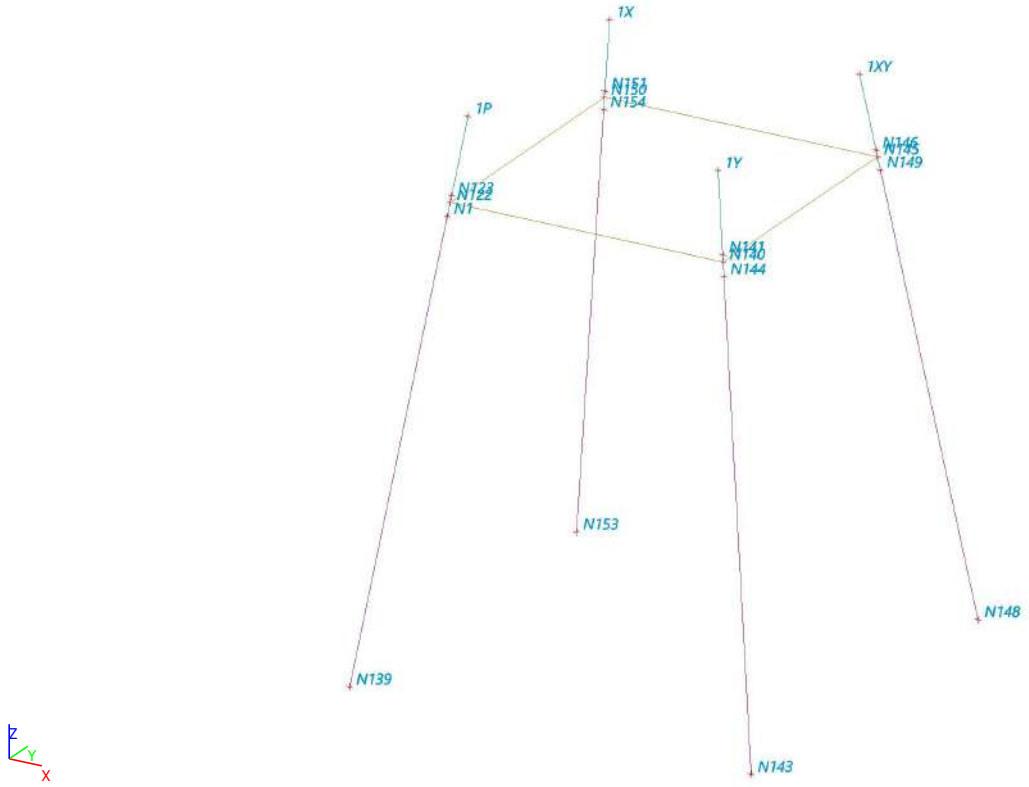
5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N122	-0,466	-0,466	-0,500
N123	-0,430	-0,430	-0,250
1P	-0,014	-0,014	2,650
N139	-3,009	-3,009	-18,148
N1	-0,540	-0,540	-1,000
N140	10,326	-0,466	-0,500
N141	10,290	-0,430	-0,250

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
1Y	9,874	-0,014	2,650
N143	12,869	-3,009	-18,148
N144	10,400	-0,540	-1,000
N145	10,326	10,326	-0,500
N146	10,290	10,290	-0,250
1XY	9,874	9,874	2,650
N148	12,869	12,869	-18,148

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N149	10,400	10,400	-1,000
N150	-0,466	10,326	-0,500
N151	-0,430	10,290	-0,250
1X	-0,014	9,874	2,650
N153	-3,009	12,869	-18,148
N154	-0,540	10,400	-1,000

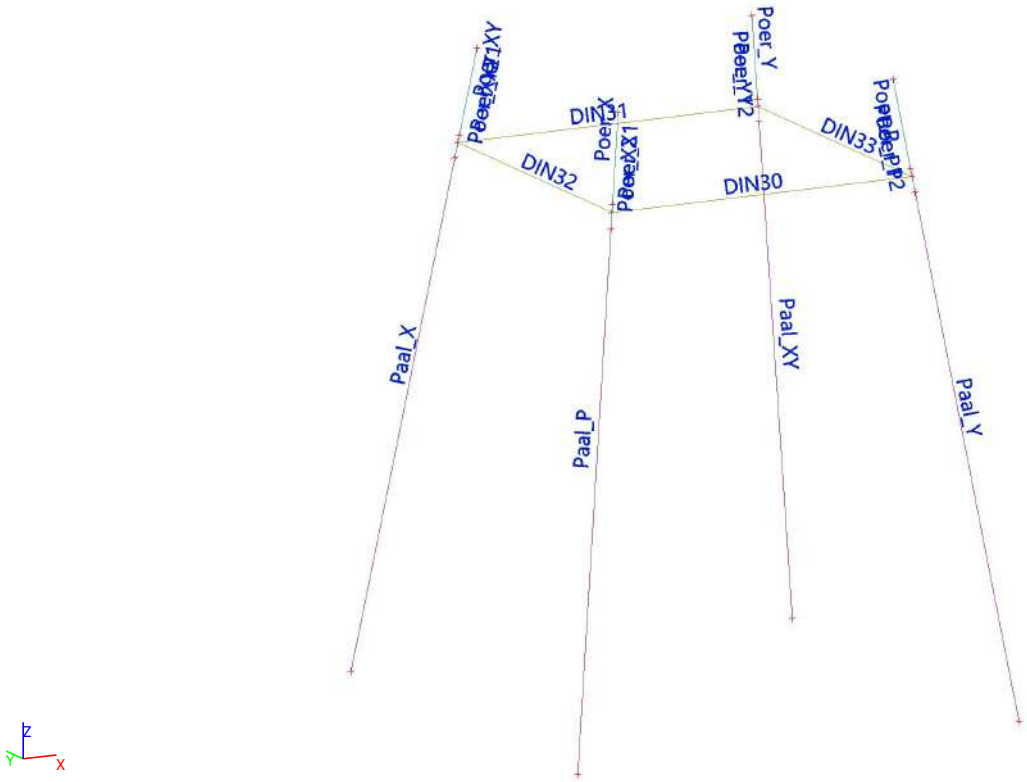
5.2. Analyse model met knopen



5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
DIN30	CS2 - DIN30	S 235 balk	10,792	N122	N140	beam (80)
DIN31	CS2 - DIN30	S 235 balk	10,792	N150	N145	beam (80)
DIN32	CS2 - DIN30	S 235 balk	10,792	N150	N122	beam (80)
DIN33	CS2 - DIN30	S 235 balk	10,792	N145	N140	beam (80)
Paal_P	LD1. - General cross-section	C12/15 en zand	17,500	N1	N139	column (100)
Paal_X	LD1. - General cross-section	C12/15 en zand	17,500	N154	N153	column (100)
Paal_XY	LD1. - General cross-section	C12/15 en zand	17,500	N149	N148	column (100)
Paal_Y	LD1. - General cross-section	C12/15 en zand	17,500	N144	N143	column (100)
Poer_P	Poer800 - Circle (800,00)	C12/15 Gescheurd	2,959	N141	1Y	column (100)
Poer_P1	Putring1000 - Circle (1000,00)	C12/15 Gescheurd	0,255	N140	N141	column (100)
Poer_P2	Putring1000 - Circle (1000,00)	C12/15 Gescheurd	0,511	N144	N140	column (100)
Poer_X	Poer800 - Circle (800,00)	C12/15 Gescheurd	2,959	N123	1P	column (100)
Poer_X1	Putring1000 - Circle (1000,00)	C12/15 Gescheurd	0,255	N122	N123	column (100)
Poer_X2	Putring1000 - Circle (1000,00)	C12/15 Gescheurd	0,511	N1	N122	column (100)
Poer_XY	Poer800 - Circle (800,00)	C12/15 Gescheurd	2,959	N151	1X	column (100)
Poer_XY1	Putring1000 - Circle (1000,00)	C12/15 Gescheurd	0,255	N150	N151	column (100)
Poer_XY2	Putring1000 - Circle (1000,00)	C12/15 Gescheurd	0,511	N154	N150	column (100)
Poer_Y	Poer800 - Circle (800,00)	C12/15 Gescheurd	2,959	N146	1XY	column (100)
Poer_Y1	Putring1000 - Circle (1000,00)	C12/15 Gescheurd	0,255	N145	N146	column (100)
Poer_Y2	Putring1000 - Circle (1000,00)	C12/15 Gescheurd	0,511	N149	N145	column (100)

5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
S_P	N139	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-8,11;Ry8,11
S_Y	N143	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-8,11;Ry-8,11
S_XY	N148	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx8,12;Ry-8,12
S_X	N153	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx8,11;Ry8,11

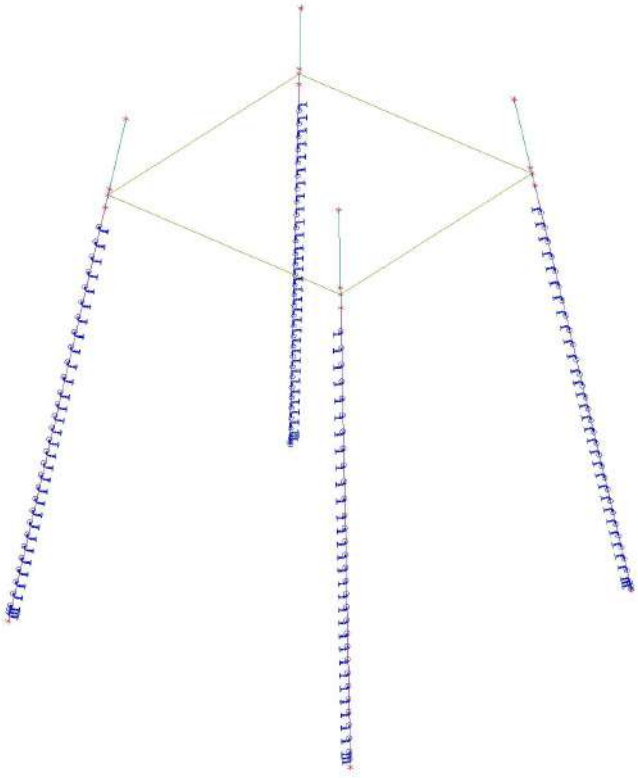
5.6. Analyse model met Knoopondersteuningen

5.7. Line supports on member

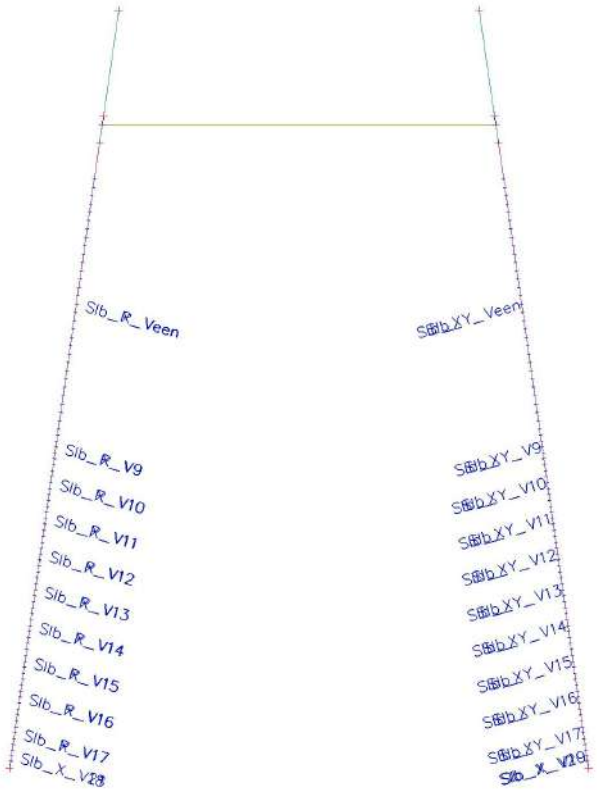
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Slb_P_Veen	Line	Paal_P LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_Veen	Line	Paal_Y LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_Veen	Line	Paal_XY LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_Veen	Line	Paal_X LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_V9	Line	Paal_P LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_V9	Line	Paal_Y LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_V9	Line	Paal_XY LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_V9	Line	Paal_X LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_V10	Line	Paal_P LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_V11	Line	Paal_P LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_V12	Line	Paal_P LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_V13	Line	Paal_P LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_V14	Line	Paal_P LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_V15	Line	Paal_P	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	15,000	From start						
Slb_P_V16	Line	Paal_P	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
Slb_P_V17	Line	Paal_P	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
Slb_Y_V10	Line	Paal_Y	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_V11	Line	Paal_Y	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_V12	Line	Paal_Y	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_V13	Line	Paal_Y	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_V14	Line	Paal_Y	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_V15	Line	Paal_Y	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_Y_V16	Line	Paal_Y	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
Slb_Y_V17	Line	Paal_Y	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
Slb_XY_V10	Line	Paal_XY	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_V11	Line	Paal_XY	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_V12	Line	Paal_XY	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_XY_V13	Line	Paal_XY	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_XY_V14	Line	Paal_XY	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_XY_V15	Line	Paal_XY	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_XY_V16	Line	Paal_XY	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
Slb_XY_V17	Line	Paal_XY	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
Slb_X_V10	Line	Paal_X	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_V11	Line	Paal_X	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_X_V12	Line	Paal_X	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_X_V13	Line	Paal_X	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_X_V14	Line	Paal_X	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_X_V15	Line	Paal_X	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_X_V16	Line	Paal_X	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
Slb_X_V17	Line	Paal_X	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
Slb_X_V18	Line	Paal_P	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,300	From start						
Slb_X_V19	Line	Paal_Y	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,300	From start						
Slb_X_V20	Line	Paal_XY	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,300	From start						
Slb_X_V21	Line	Paal_X	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,300	From start						

5.8. Analyse model met Lijnondersteuningen



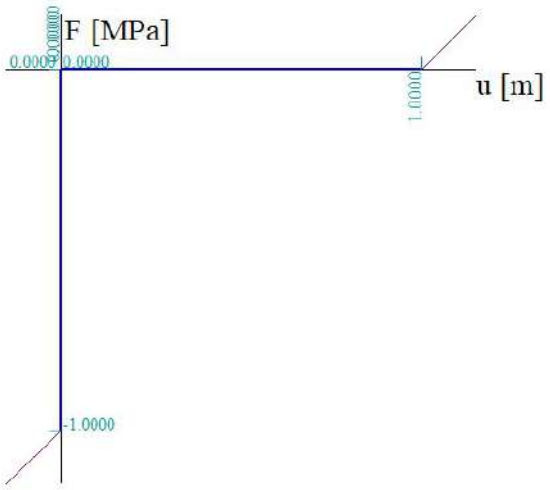
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

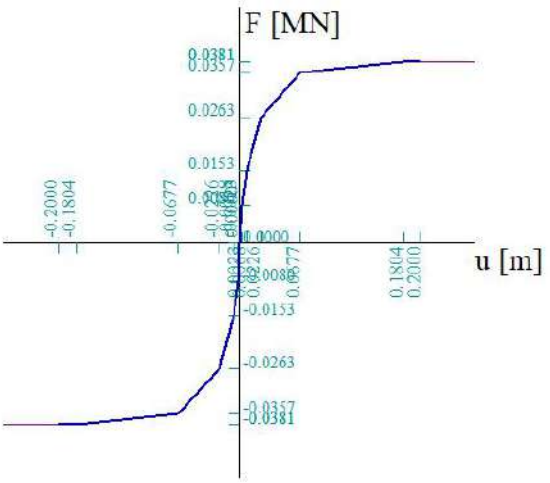
Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V9	Translation	-0.200000 / -38100.000000	Free	Free
		-0.180400 / -38100.000000		
		-0.067650 / -35700.000000		
		-0.022550 / -26300.000000		
		-0.006765 / -15300.000000		
		-0.002255 / -8000.000000		
		0.000000 / 0.000000		
		0.002255 / 8000.000000		
		0.006765 / 15300.000000		
		0.022550 / 26300.000000		
		0.067650 / 35700.000000		
		0.180400 / 38100.000000		
		0.200000 / 38100.000000		

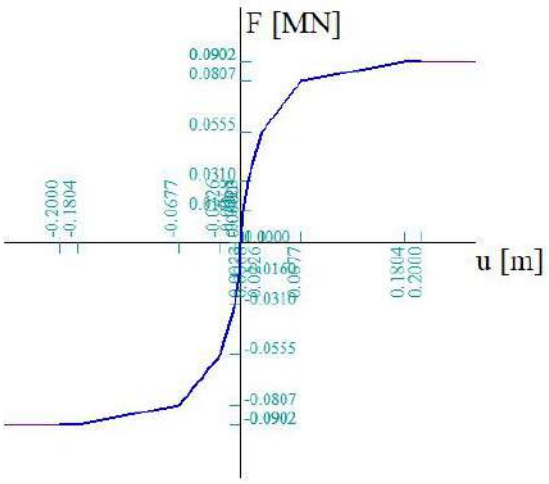
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V10	Translation	-0.200000 / -90200.000000	Free	Free
		-0.180400 / -90200.000000		
		-0.067650 / -80700.000000		
		-0.022550 / -55500.000000		

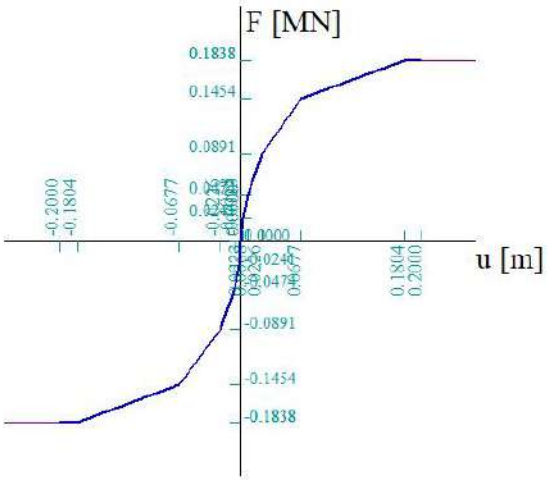
Name	Type	u / F	Positive end	Negative end
		-0.006765 / -31000.000000		
		-0.002255 / -16000.000000		
		0.000000 / 0.000000		
		0.002255 / 16000.000000		
		0.006765 / 31000.000000		
		0.022550 / 55500.000000		
		0.067650 / 80700.000000		
		0.180400 / 90200.000000		
		0.200000 / 90200.000000		

Drawing



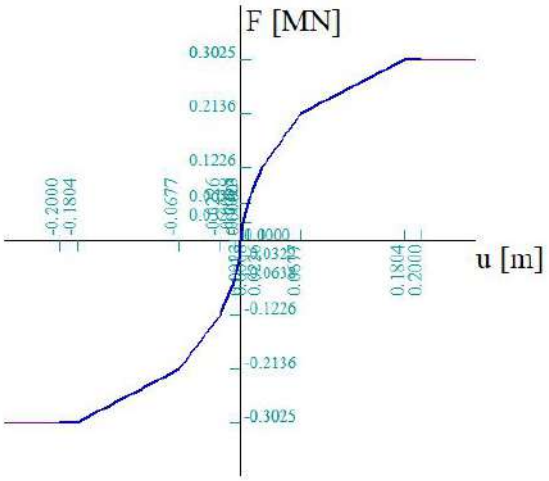
Name	Type	u / F	Positive end	Negative end
PY-curve-2_V11	Translation	-0.200000 / -183800.000000	Free	Free
		-0.180400 / -183800.000000		
		-0.067650 / -145400.000000		
		-0.022550 / -89100.000000		
		-0.006765 / -47400.000000		
		-0.002255 / -24100.000000		
		0.000000 / 0.000000		
		0.002255 / 24100.000000		
		0.006765 / 47400.000000		
		0.022550 / 89100.000000		
		0.067650 / 145400.000000		
		0.180400 / 183800.000000		
		0.200000 / 183800.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V12	Translation	-0.200000 / -302500.000000	Free	Free
		-0.180400 / -302500.000000		
		-0.067650 / -213600.000000		
		-0.022550 / -122600.000000		
		-0.006765 / -63800.000000		
		-0.002255 / -32200.000000		
		0.000000 / 0.000000		
		0.002255 / 32200.000000		
		0.006765 / 63800.000000		
		0.022550 / 122600.000000		
		0.067650 / 213600.000000		
		0.180400 / 302500.000000		
		0.200000 / 302500.000000		

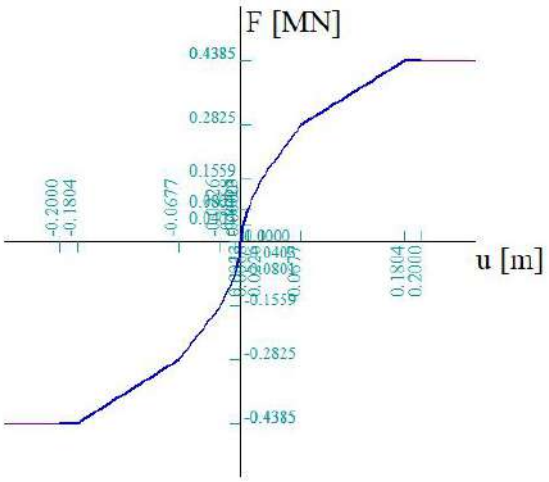
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V13	Translation	-0.200000 / -438500.000000	Free	Free
		-0.180400 / -438500.000000		
		-0.067650 / -282500.000000		
		-0.022550 / -155900.000000		
		-0.006765 / -80100.000000		
		-0.002255 / -40300.000000		
		0.000000 / 0.000000		
		0.002255 / 40300.000000		
		0.006765 / 80100.000000		
		0.022550 / 155900.000000		

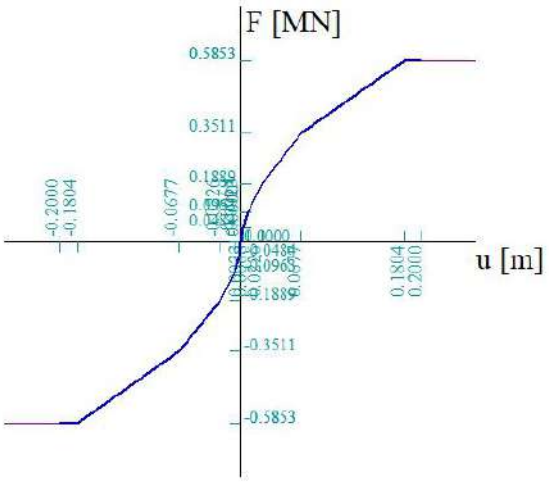
Name	Type	u / F	Positive end	Negative end
		0.067650 / 282500.000000		
		0.180400 / 438500.000000		
		0.200000 / 438500.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V14	Translation	-0.200000 / -585300.000000	Free	Free
		-0.180400 / -585300.000000		
		-0.067650 / -351100.000000		
		-0.022550 / -188900.000000		
		-0.006765 / -96300.000000		
		-0.002255 / -48400.000000		
		0.000000 / 0.000000		
		0.002255 / 48400.000000		
		0.006765 / 96300.000000		
		0.022550 / 188900.000000		
		0.067650 / 351100.000000		
		0.180400 / 585300.000000		
		0.200000 / 585300.000000		

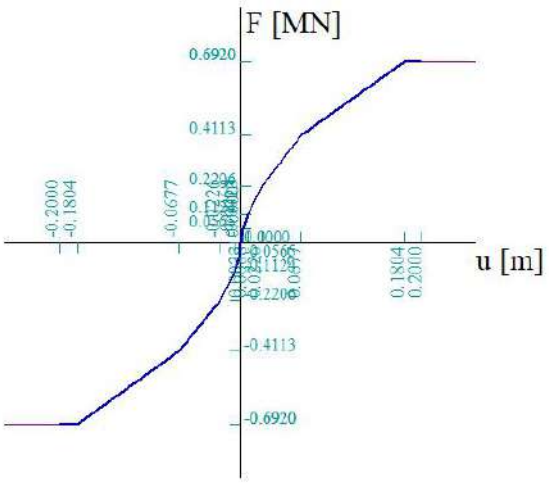
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V15	Translation	-0.200000 / -692000.000000	Free	Free
		-0.180400 / -692000.000000		
		-0.067650 / -411300.000000		
		-0.022550 / -220600.000000		

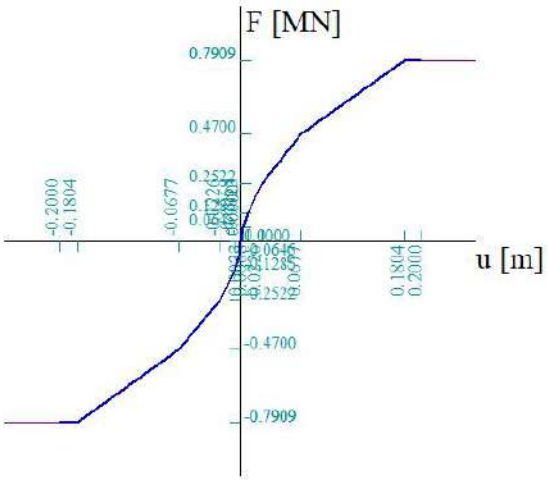
Name	Type	u / F	Positive end	Negative end
		-0.006765 / -112400.000000		
		-0.002255 / -56500.000000		
		0.000000 / 0.000000		
		0.002255 / 56500.000000		
		0.006765 / 112400.000000		
		0.022550 / 220600.000000		
		0.067650 / 411300.000000		
		0.180400 / 692000.000000		
		0.200000 / 692000.000000		

Drawing



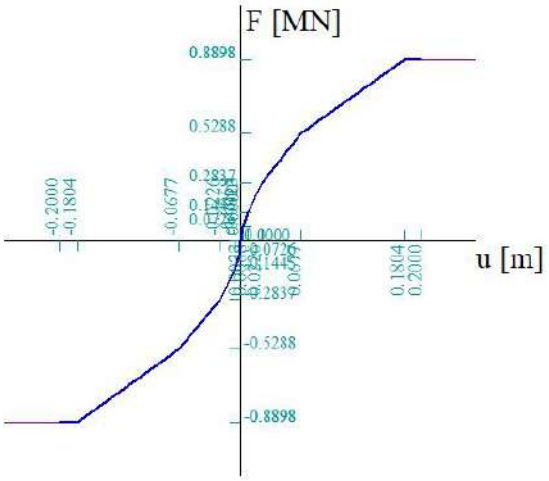
Name	Type	u / F	Positive end	Negative end
PY-curve-2_V16	Translation	-0.200000 / -790900.000000	Free	Free
		-0.180400 / -790900.000000		
		-0.067650 / -470000.000000		
		-0.022550 / -252200.000000		
		-0.006765 / -128500.000000		
		-0.002255 / -64500.000000		
		0.000000 / 0.000000		
		0.002255 / 64500.000000		
		0.006765 / 128500.000000		
		0.022550 / 252200.000000		
		0.067650 / 470000.000000		
		0.180400 / 790900.000000		
		0.200000 / 790900.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V17	Translation	-0.200000 / -889800.000000	Free	Free
		-0.180400 / -889800.000000		
		-0.067650 / -528800.000000		
		-0.022550 / -283700.000000		
		-0.006765 / -144500.000000		
		-0.002255 / -72600.000000		
		0.000000 / 0.000000		
		0.002255 / 72600.000000		
		0.006765 / 144500.000000		
		0.022550 / 283700.000000		
		0.067650 / 528800.000000		
		0.180400 / 889800.000000		
		0.200000 / 889800.000000		

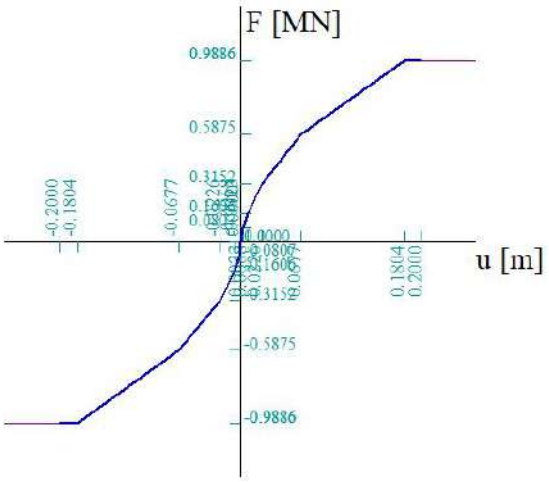
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V18	Translation	-0.200000 / -988600.000000	Free	Free
		-0.180400 / -988600.000000		
		-0.067650 / -587500.000000		
		-0.022550 / -315200.000000		
		-0.006765 / -160600.000000		
		-0.002255 / -80700.000000		
		0.000000 / 0.000000		
		0.002255 / 80700.000000		
		0.006765 / 160600.000000		
		0.022550 / 315200.000000		

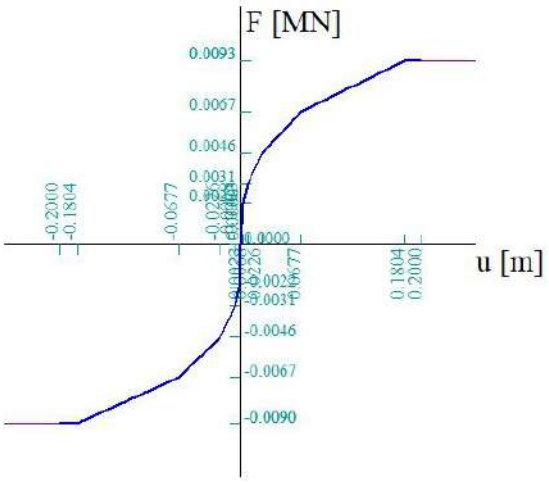
Name	Type	u / F	Positive end	Negative end
		0.067650 / 587500.000000		
		0.180400 / 988600.000000		
		0.200000 / 988600.000000		

Drawing



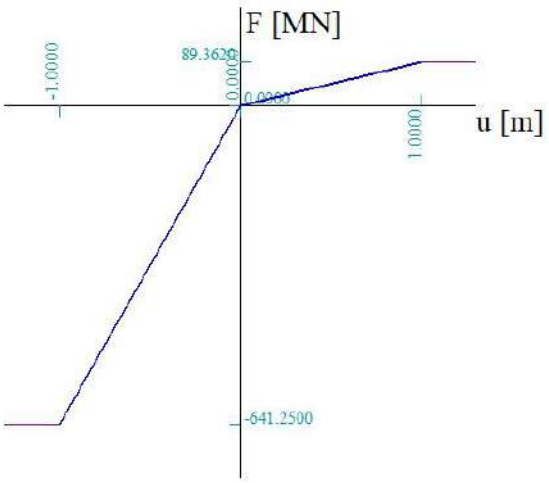
Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -9000.000000	Free	Free
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		
		-0.006765 / -3100.000000		
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
Trek-druk-paalpunt_mast_144	Translation	-1.000000 / -641250000.000000	Free	Free
		0.000000 / 0.000000		
		1.000000 / 89362000.000000		

Drawing

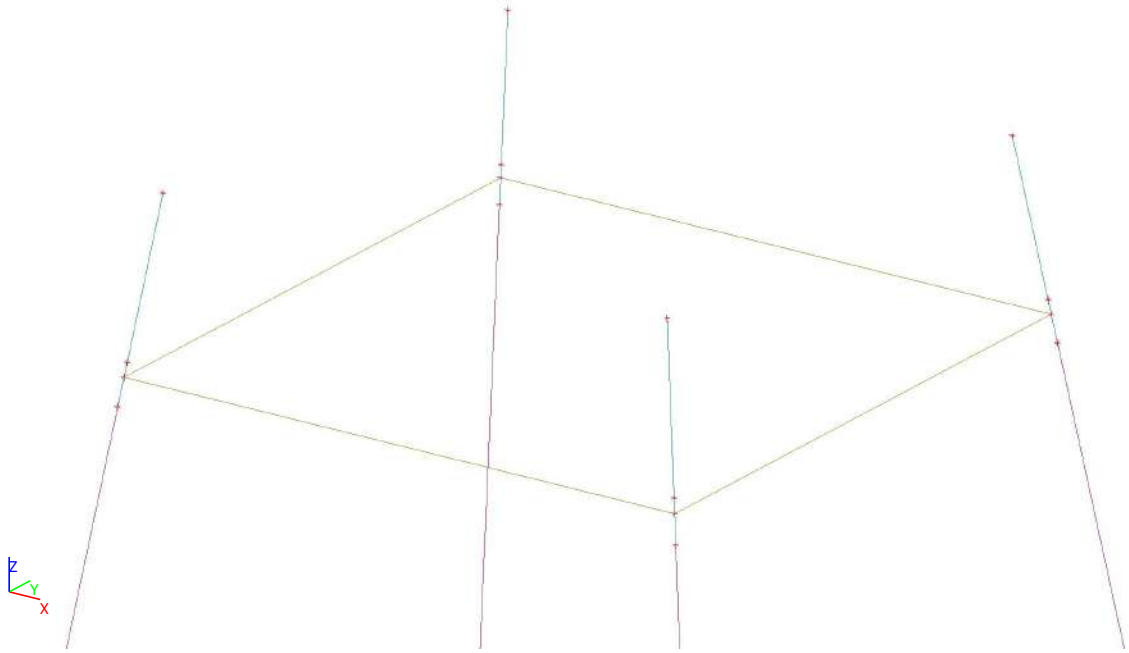


6. Belastingen

6.1. Load cases

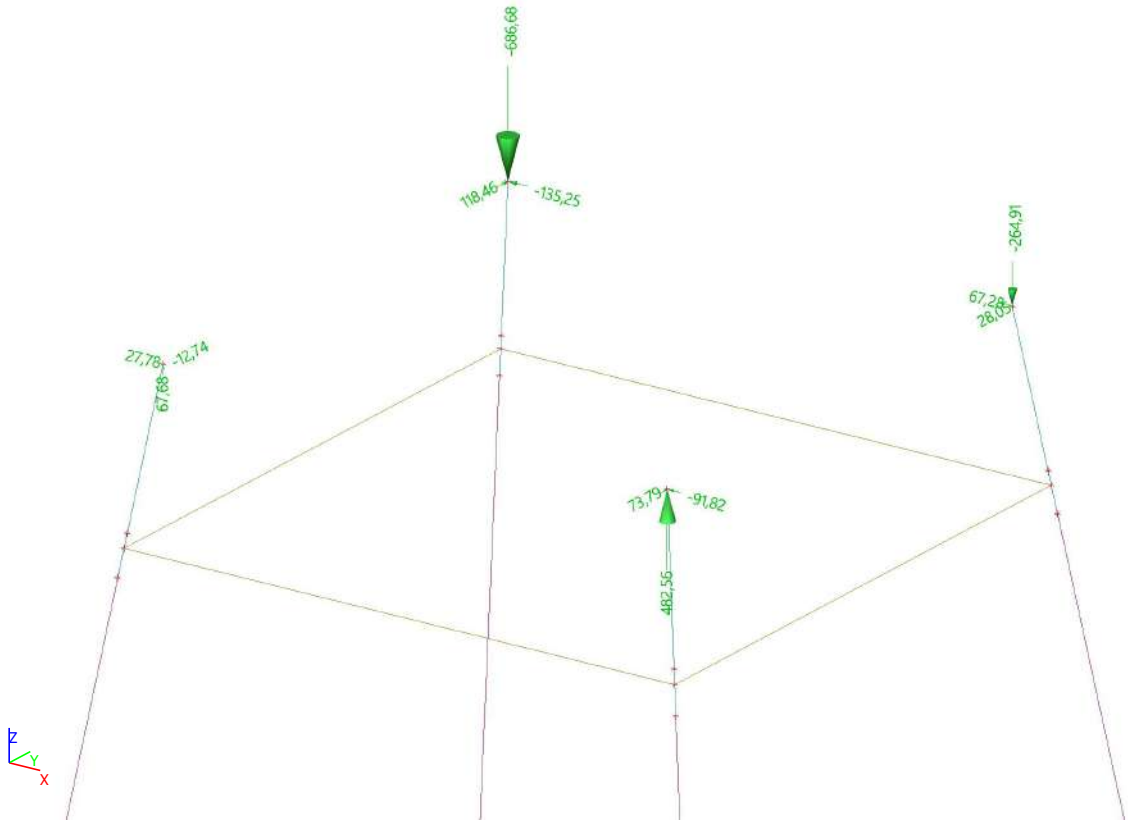
6.1.1. Load cases - EG_Fundering

Name	Description	Action type	Load group	Direction
	Spec	Load type		
EG_Fundering		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - high max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			

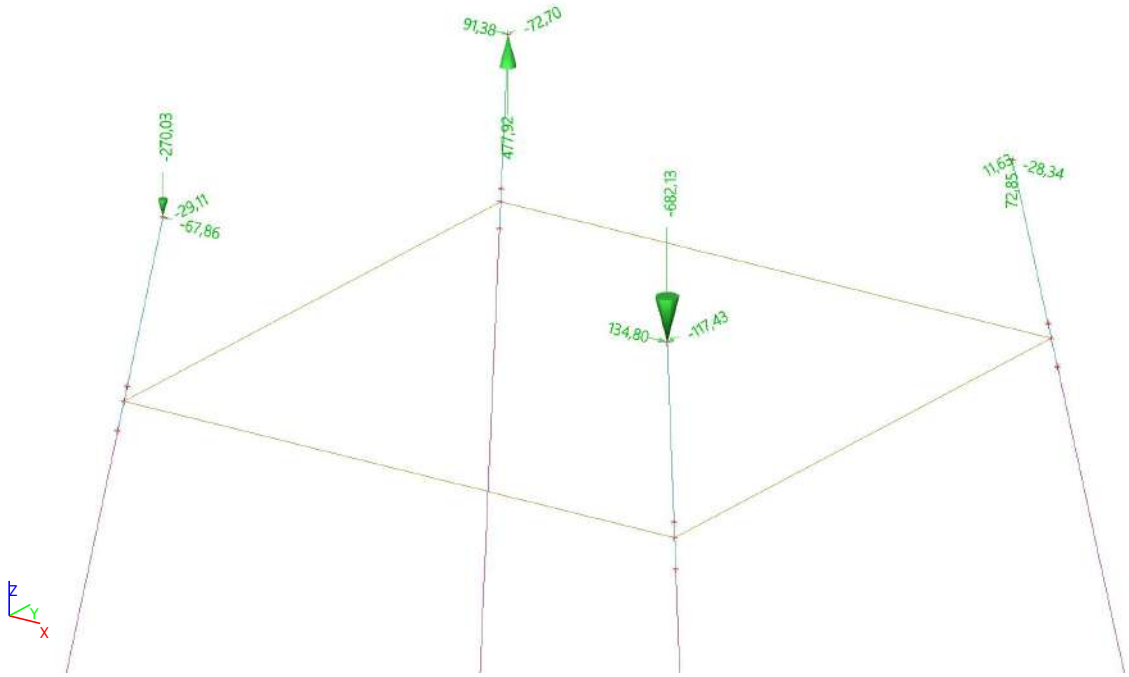


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Force	27,78
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Force	-12,74
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Force	67,68
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Force	-135,25
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Force	118,46
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Force	-686,68
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Force	67,28
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Force	28,05
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Force	-264,91
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Force	-91,82
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Force	73,79
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Force	482,56

6.1.3. Load cases - high max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



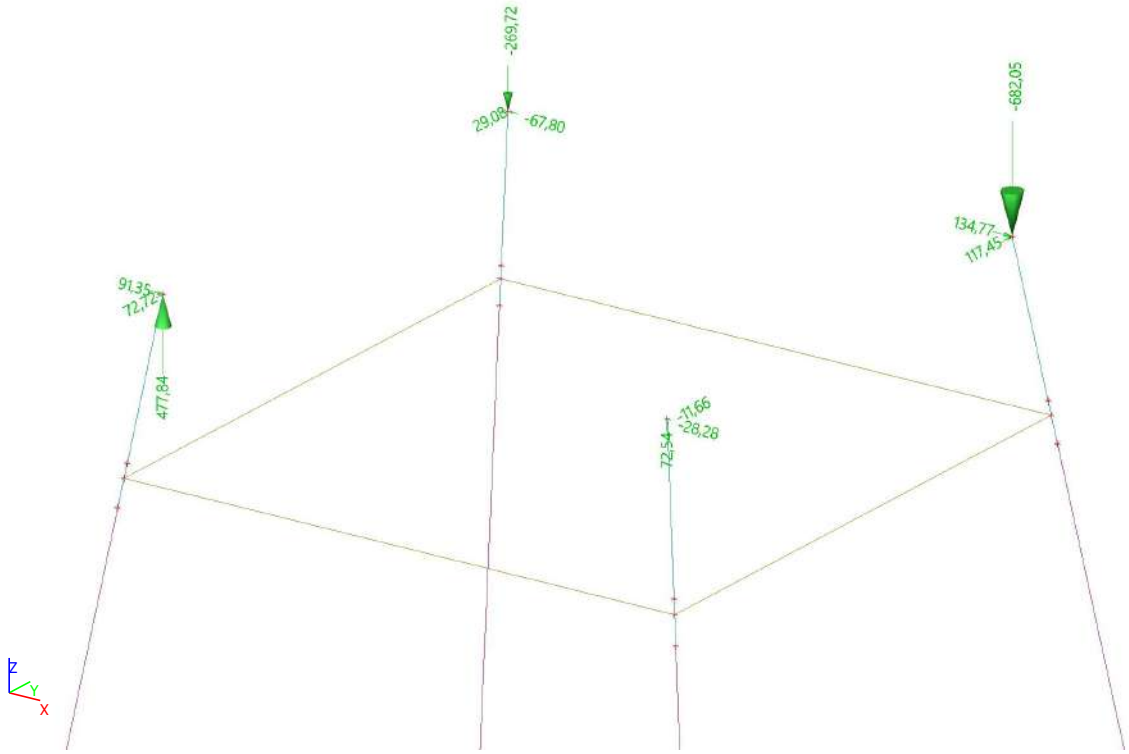
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Force	-67,86
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Force	-29,11
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Force	-270,03
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Force	91,38
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Force	-72,70
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Force	477,92
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Force	-28,34
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Force	11,63
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Force	72,85
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Force	134,80
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Force	-117,43

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Force	-682,13

6.1.4. Load cases - high max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



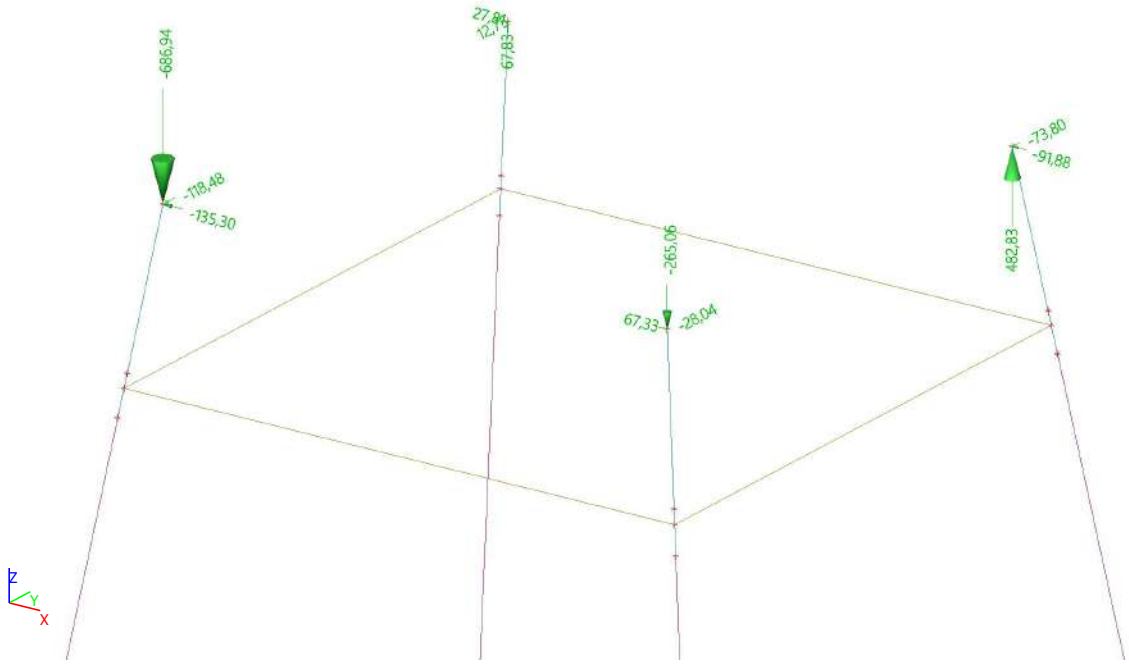
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Force	91,35
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Force	72,72
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Force	477,84
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Force	-67,80
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Force	29,08
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Force	-269,72
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Force	134,77
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Force	117,45

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Force	-682,05
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Force	-28,28
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Force	-11,66
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Force	72,54

6.1.5. Load cases - high max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



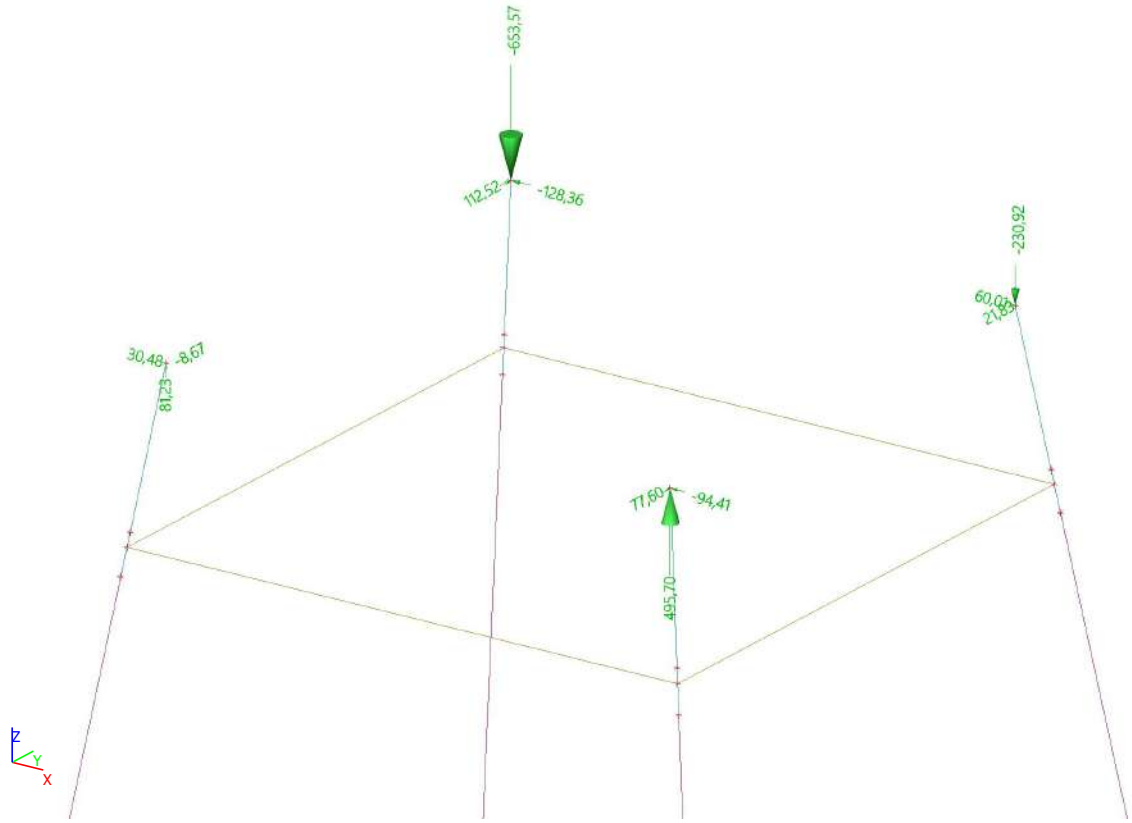
6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Force	-135,30
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Force	-118,48
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Force	-686,94
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Force	27,81
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Force	12,75

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Force	67,83
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Force	-91,88
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Force	-73,80
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Force	482,83
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Force	67,33
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Force	-28,04
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Force	-265,06

6.1.6. Load cases - low max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			

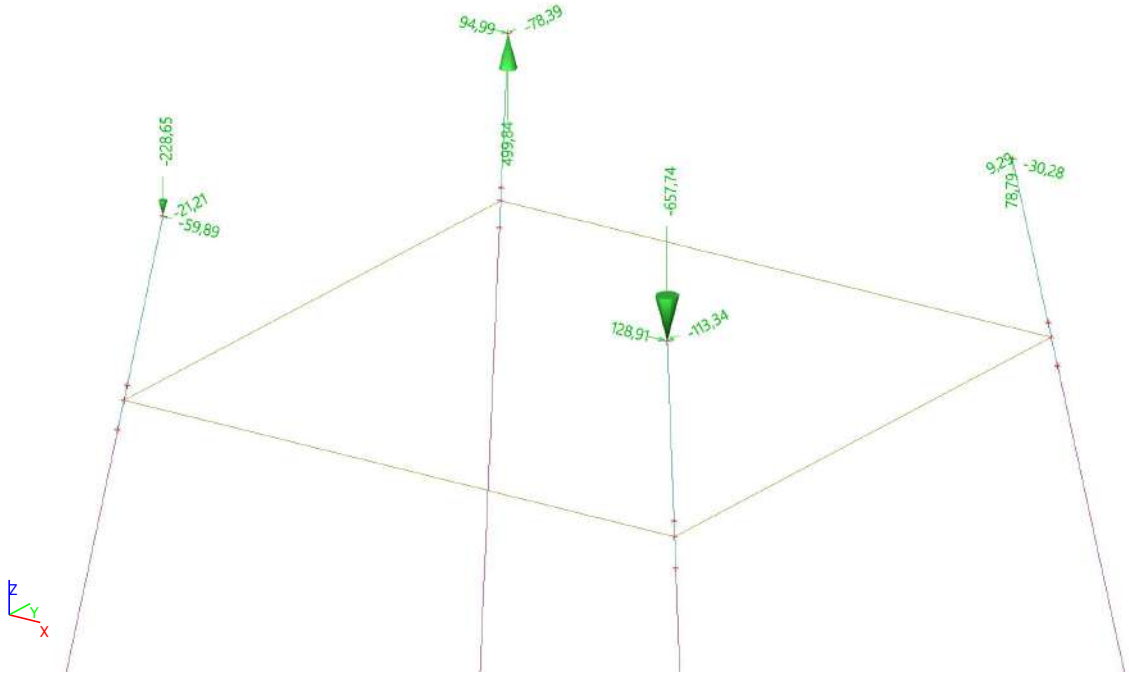


6.1.6.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Force	30,48
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Force	-8,67
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Force	81,23
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Force	-128,36
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Force	112,52
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Force	-653,57
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Force	60,01
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Force	21,83
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Force	-230,92
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Force	-94,41
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Force	77,60
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Force	495,70

6.1.7. Load cases - low max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			

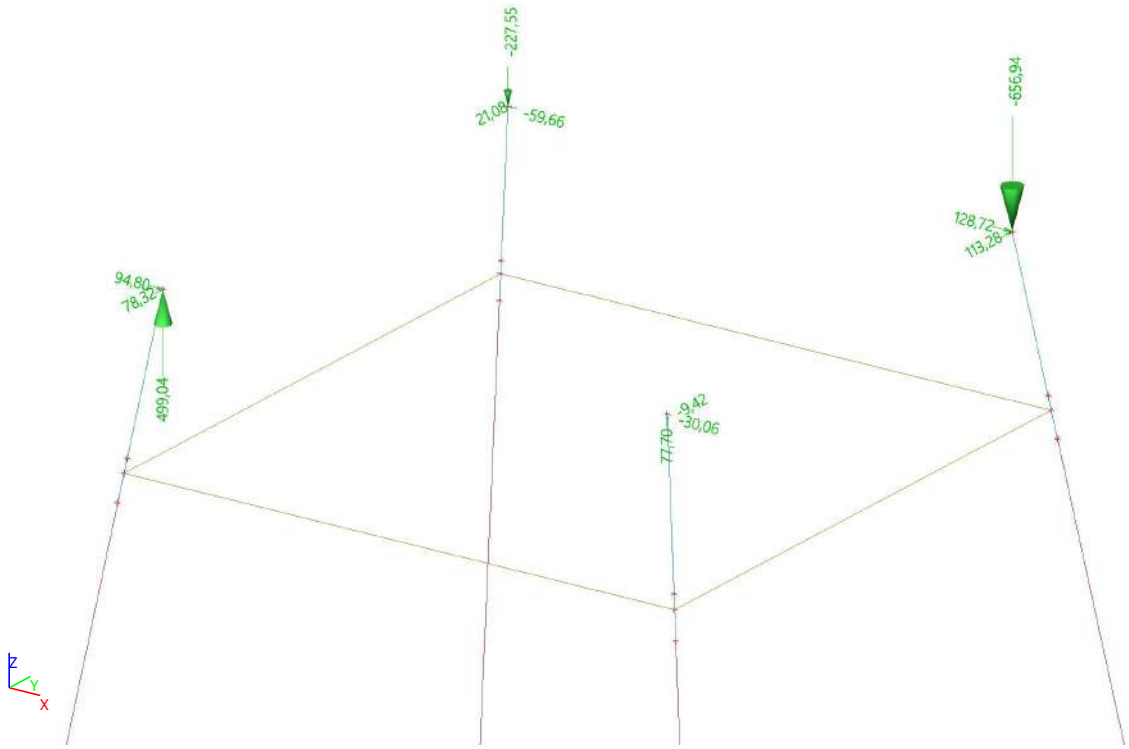


6.1.7.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Force	-59,89
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Force	-21,21
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Force	-228,65
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Force	94,99
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Force	-78,39
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Force	499,84
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Force	-30,28
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Force	9,29
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Force	78,79
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Force	128,91
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Force	-113,34
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Force	-657,74

6.1.8. Load cases - low max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



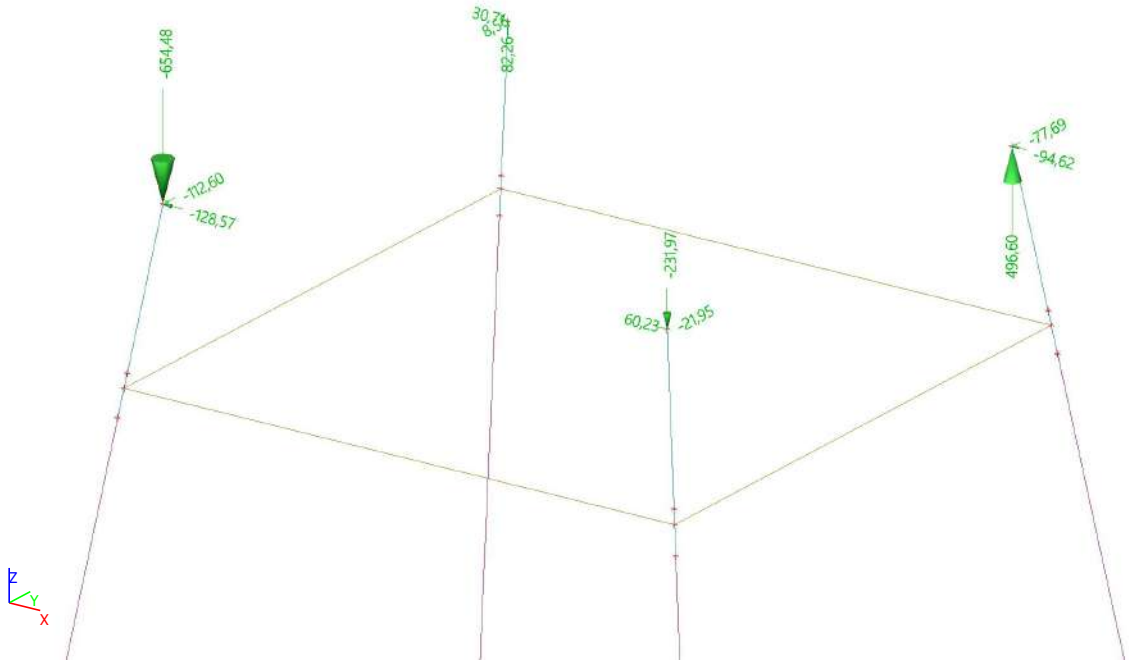
6.1.8.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Force	94,80
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Force	78,32
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Force	499,04
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Force	-59,66
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Force	21,08
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Force	-227,55
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Force	128,72
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Force	113,28
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Force	-656,94
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Force	-30,06
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Force	-9,42

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Force	77,70

6.1.9. Load cases - low max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



6.1.9.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Force	-128,57
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Force	-112,60
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Force	-654,48
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Force	30,71
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Force	8,56
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Force	82,26
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Force	-94,62
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Force	-77,69

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Force	496,60
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Force	60,23
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Force	-21,95
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Force	-231,97

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
low max Wnd ;45° - EG_Gunstig	Ultimate	EG_Fundering	0,900
		low max Wnd ;45°	1,000
low max Wnd ;225° - EG_Gunstig	Ultimate	EG_Fundering	0,900
		low max Wnd ;225°	1,000
low max Wnd ;135° - EG_Gunstig	Ultimate	EG_Fundering	0,900
		low max Wnd ;135°	1,000
low max Wnd ;315° - EG_Gunstig	Ultimate	EG_Fundering	0,900
		low max Wnd ;315°	1,000
high max Wnd ;45° - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		high max Wnd ;45°	1,000
high max Wnd ;225° - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		high max Wnd ;225°	1,000
high max Wnd ;135° - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		high max Wnd ;135°	1,000
high max Wnd ;315° - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		high max Wnd ;315°	1,000

6.3. Result classes

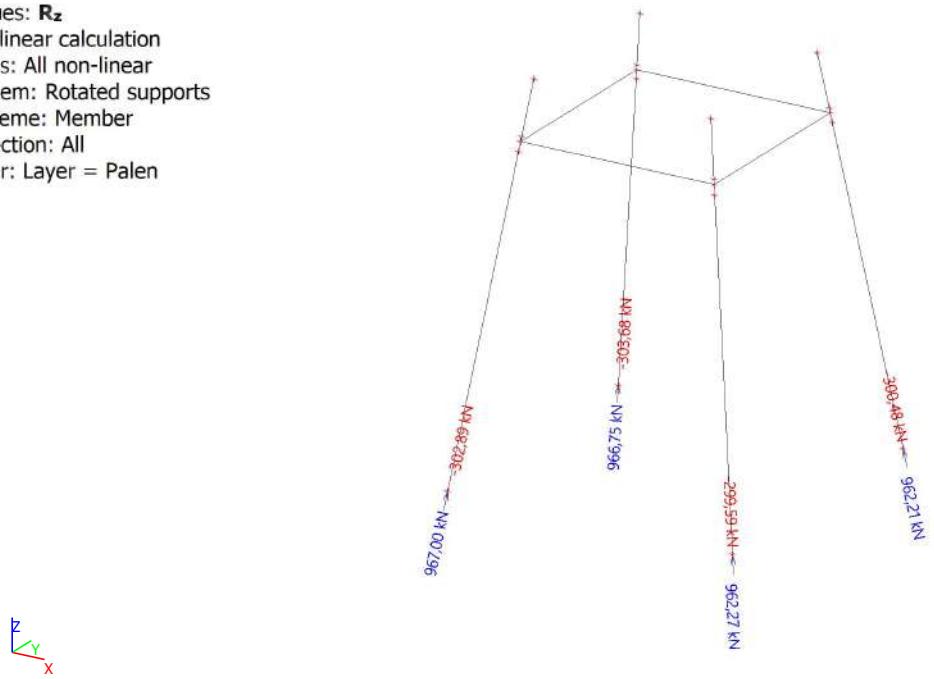
Name	List
All non-linear	low max Wnd ;45° - EG_Gunstig
	low max Wnd ;225° - EG_Gunstig
	low max Wnd ;135° - EG_Gunstig
	low max Wnd ;315° - EG_Gunstig
	high max Wnd ;45° - EG_Ongunstig
	high max Wnd ;225° - EG_Ongunstig
	high max Wnd ;135° - EG_Ongunstig
	high max Wnd ;315° - EG_Ongunstig

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen

Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_X/N153	low max Wnd ;45° - EG_Gunstig	**0,00**	0,00	866,43	0,00	0,00	0,00	0,0	0,0
S_Y/N143	low max Wnd ;225° - EG_Gunstig	**0,00**	**0,00**	870,55	0,00	0,00	0,00	0,0	0,0
S_XY/N148	low max Wnd ;135° - EG_Gunstig	0,00	**0,00**	869,76	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X/N153	low max Wnd ;225° - EG_Gunstig	0,00	0,00	**-303,68**	0,00	0,00	0,00	0,0	0,0
S_P/N139	high max Wnd ;315° - EG_Ongunstig	0,00	0,00	**967,00**	0,00	0,00	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All

Filter: Layer = Palen

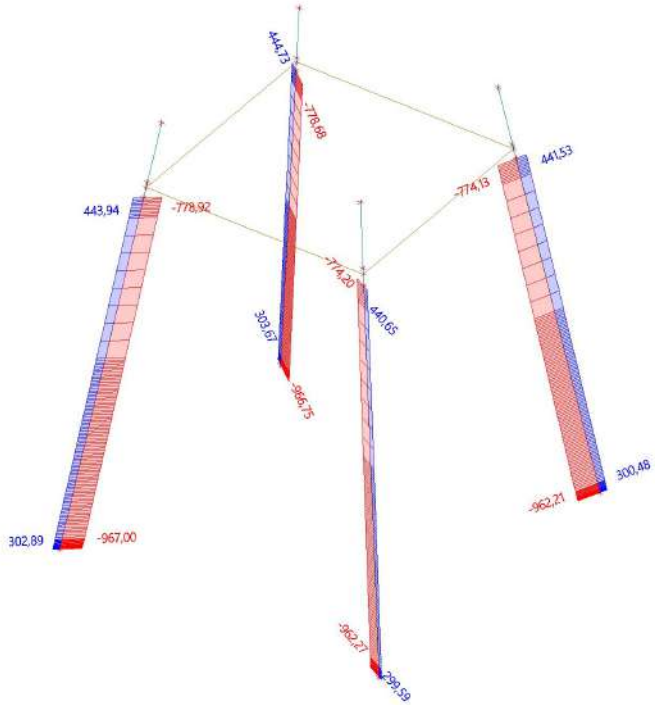
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P/N139	low max Wnd ;315° - EG_Gunstig	**0,00**	**0,00**	867,32	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P/N139	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-302,89**	0,00	0,00	0,00	0,0	0,0
S_P/N139	high max Wnd ;315° - EG_Ongunstig	**0,00**	**0,00**	**967,00**	0,00	0,00	**0,00**	0,0	0,0
S_Y/N143	low max Wnd ;225° - EG_Gunstig	**0,00**	**0,00**	870,55	0,00	0,00	0,00	0,0	0,0
S_Y/N143	high max Wnd ;45° - EG_Ongunstig	0,00	**0,00**	-219,32	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y/N143	low max Wnd ;45° - EG_Gunstig	0,00	0,00	**-299,59**	0,00	0,00	0,00	0,0	0,0
S_Y/N143	high max Wnd ;225° - EG_Ongunstig	**0,00**	0,00	**962,27**	0,00	0,00	**0,00**	0,0	0,0
S_XY/N148	low max Wnd ;135° - EG_Gunstig	**0,00**	**0,00**	869,76	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY/N148	low max Wnd ;315° - EG_Gunstig	0,00	**0,00**	**-300,48**	0,00	0,00	0,00	0,0	0,0
S_XY/N148	high max Wnd ;135° - EG_Ongunstig	0,00	0,00	**962,21**	0,00	0,00	0,00	0,0	0,0
S_XY/N148	high max Wnd ;225° - EG_Ongunstig	**0,00**	0,00	197,10	0,00	0,00	**0,00**	0,0	0,0
S_X/N153	low max Wnd ;225° - EG_Gunstig	**0,00**	**0,00**	**-303,68**	0,00	0,00	0,00	0,0	0,0
S_X/N153	high max Wnd ;45° - EG_Ongunstig	0,00	0,00	**966,75**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X/N153	low max Wnd ;45° - EG_Gunstig	**0,00**	**0,00**	866,43	0,00	0,00	**0,00**	0,0	0,0

8. Krachten van de Funderingspalen

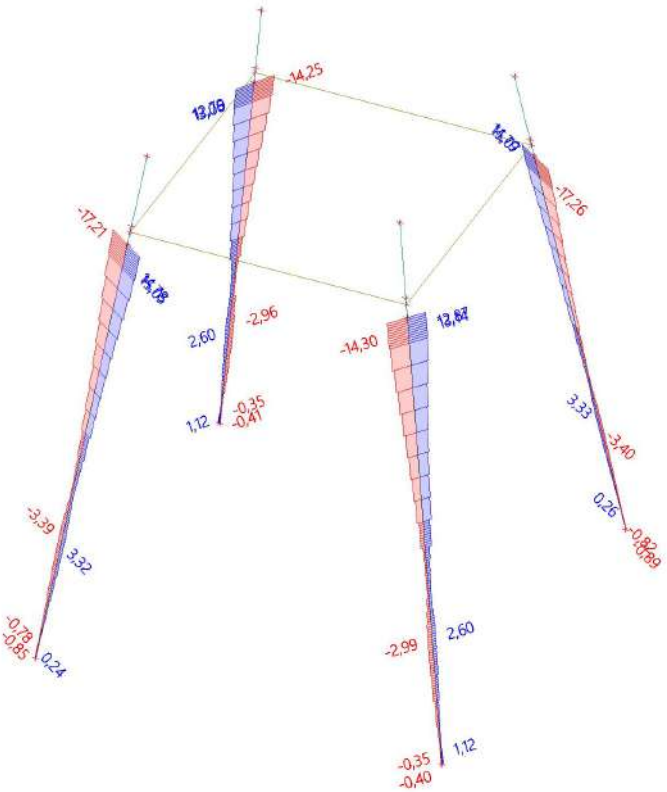
8.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



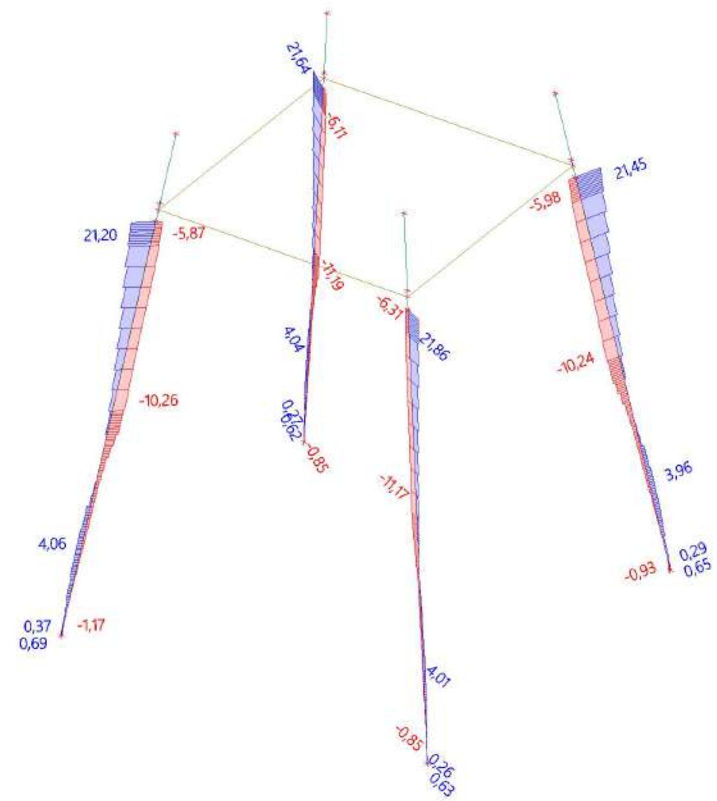
8.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



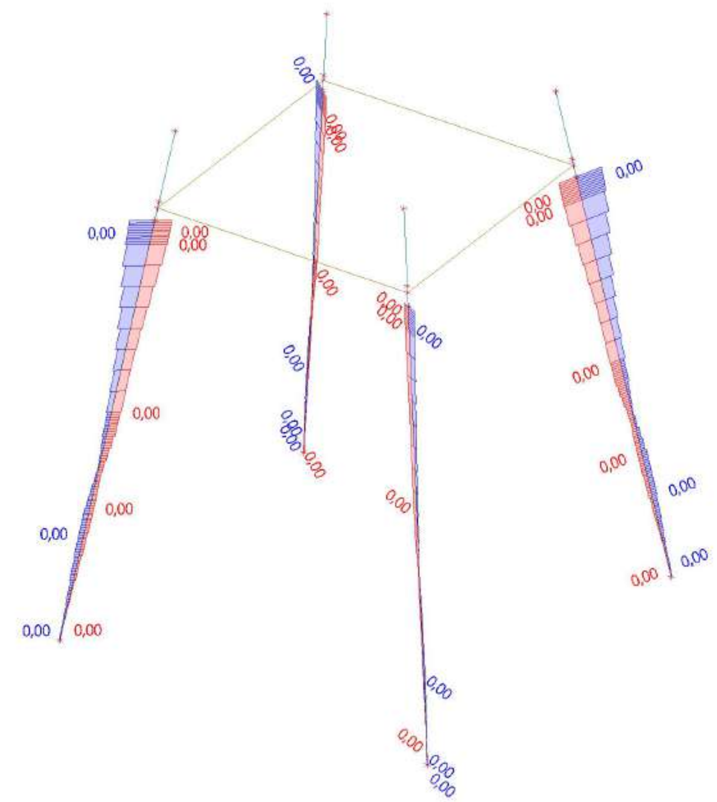
8.3. Interne 1D- krachten; V_z

Values: **V_z**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



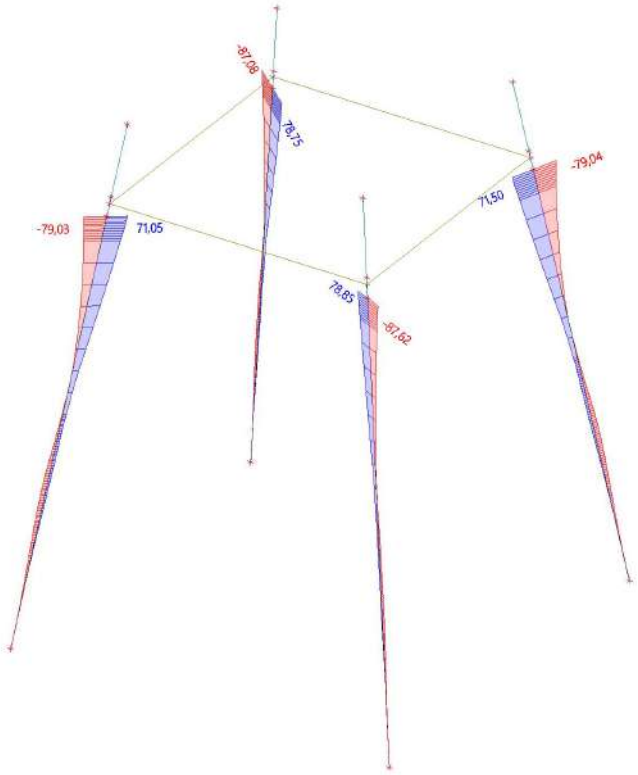
8.4. Interne 1D- krachten; M_x

Values: **M_x**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



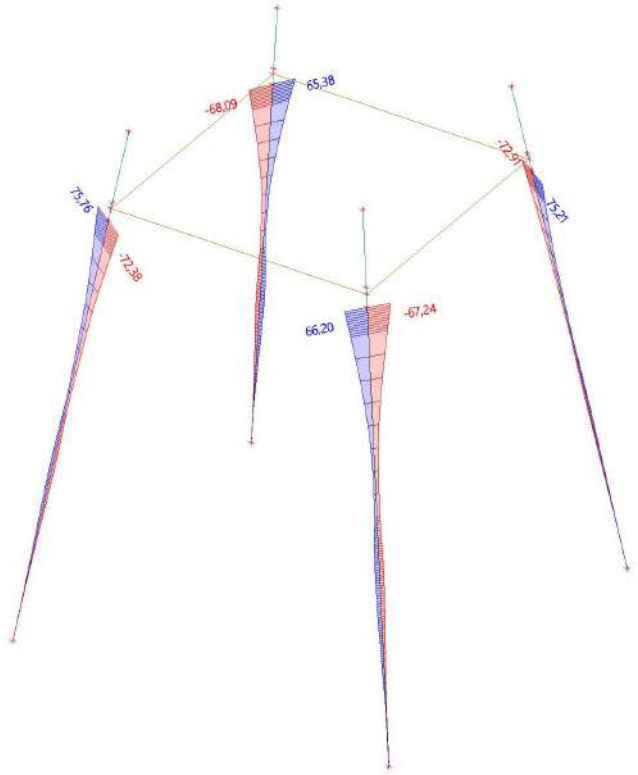
8.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



8.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



8.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_P	17,500	high max Wnd ;315° - EG_Ongunstig	**-967,00**	-0,78	-1,17	0,00	0,00	0,00
Paal_X	0,000	low max Wnd ;225° - EG_Gunstig	**444,73**	-2,15	19,73	0,00	-87,02	-9,44
Paal_XY	0,000	high max Wnd ;225° - EG_Ongunstig	-9,03	**-17,26**	12,25	**0,00**	-11,60	75,21
Paal_X	7,125+	high max Wnd ;45° - EG_Ongunstig	-859,95	-0,87	**-11,19**	0,00	15,39	5,54
Paal_XY	1,000-	low max Wnd ;45° - EG_Gunstig	-297,60	**15,07**	-0,91	**0,00**	8,91	-56,01
Paal_Y	0,000	high max Wnd ;45° - EG_Ongunstig	407,39	-2,37	**21,86**	0,00	**-87,62**	-11,48
Paal_Y	0,000	low max Wnd ;225° - EG_Gunstig	-729,49	0,18	-6,31	0,00	**78,85**	8,94
Paal_XY	0,000	high max Wnd ;45° - EG_Ongunstig	-344,22	14,40	2,21	0,00	8,32	**-72,91**
Paal_P	0,000	high max Wnd ;45° - EG_Ongunstig	-14,11	-17,21	11,98	0,00	-10,78	**75,76**

9. Krachten van de Poeren

9.1. 1D internal forces

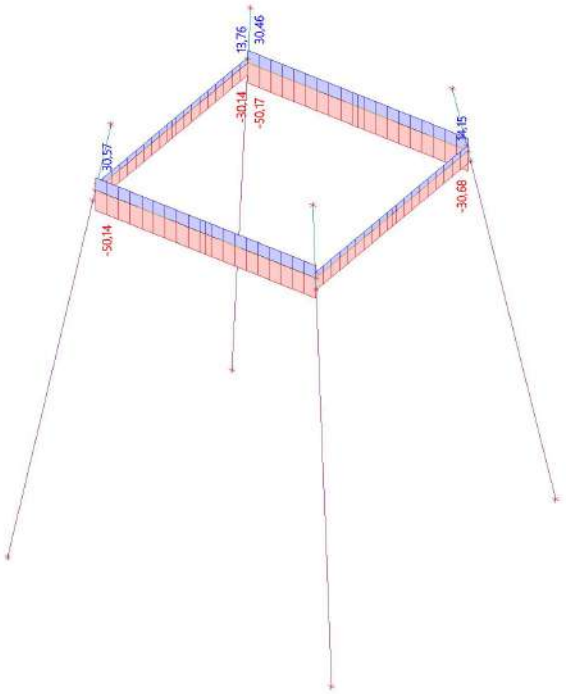
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer_X2	0,000	high max Wnd ;315° - EG_Ongunstig	**-778,89**	-0,84	-8,95	0,13	-75,94	-23,54
Poer_XY	2,959	low max Wnd ;225° - EG_Gunstig	**514,24**	-20,77	-11,74	0,00	0,00	0,00
Poer_X1	0,000	high max Wnd ;45° - EG_Ongunstig	19,78	**-28,65**	-6,82	-0,06	5,49	**92,09**
Poer_XY	2,959	high max Wnd ;45° - EG_Ongunstig	-708,64	**39,30**	11,87	0,00	0,00	0,00
Poer_XY	0,000	high max Wnd ;315° - EG_Ongunstig	25,71	-5,65	**-28,68**	0,00	84,87	3,85
Poer_P1	0,255	low max Wnd ;225° - EG_Gunstig	-710,85	-11,01	**30,05**	-0,02	-100,15	32,58
Poer_X2	0,000	high max Wnd ;45° - EG_Ongunstig	-14,19	14,98	14,60	**-0,40**	23,22	72,91
Poer_XY2	0,000	high max Wnd ;315° - EG_Ongunstig	-14,05	-14,97	14,62	**0,40**	23,21	-72,96
Poer_XY1	0,000	high max Wnd ;45° - EG_Ongunstig	-757,33	-11,87	28,86	-0,03	**-110,92**	38,16
Poer_Y2	0,511	high max Wnd ;315° - EG_Ongunstig	419,07	1,27	26,60	-0,14	**97,50**	26,58
Poer_XY	0,000	high max Wnd ;45° - EG_Ongunstig	-751,53	30,59	11,87	0,00	-35,13	**-103,41**

10. Krachten van de Funderingsbalken

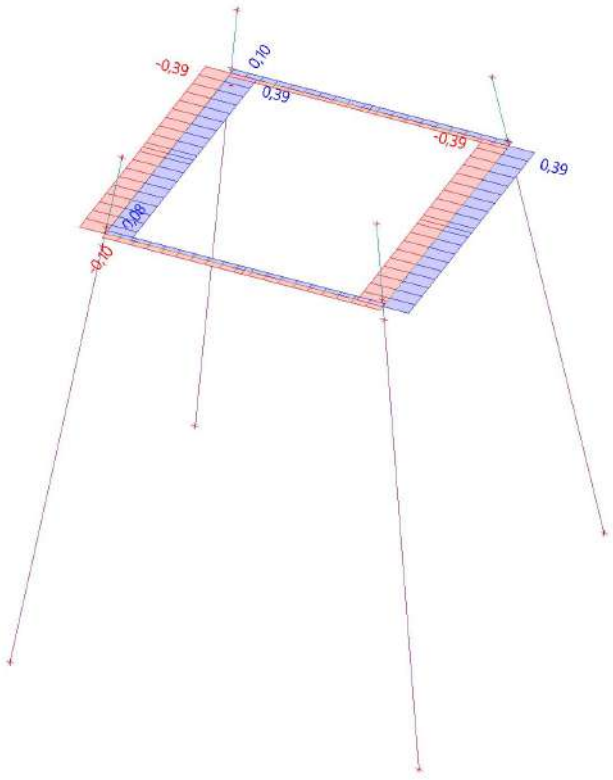
10.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



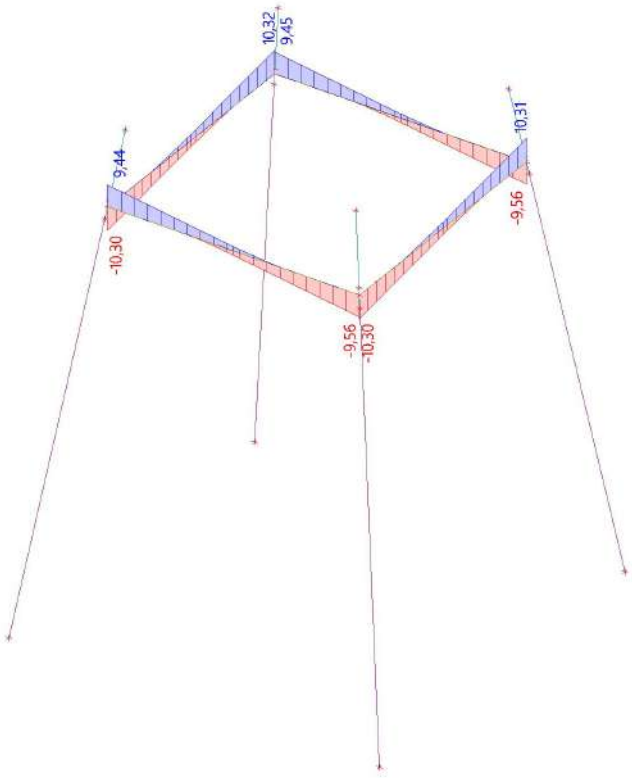
10.2. Interne 1D- krachten; V_y

Values: V_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



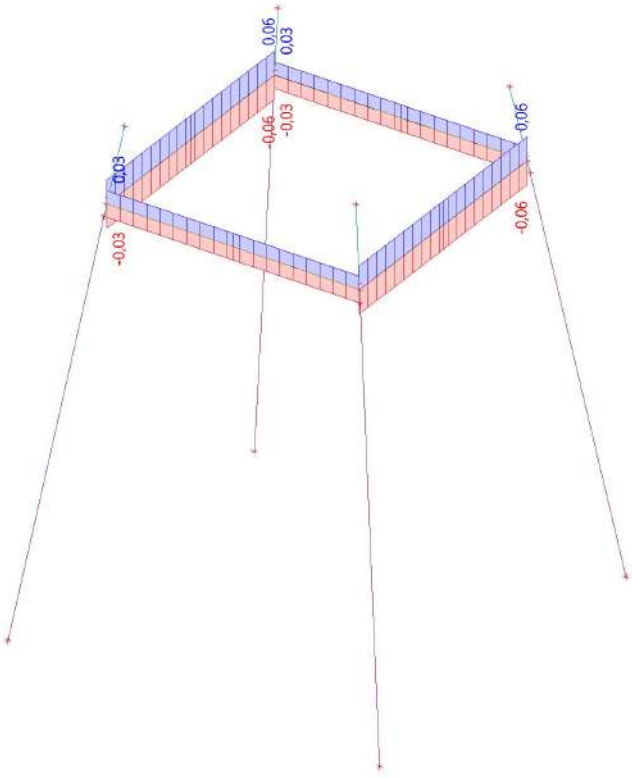
10.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



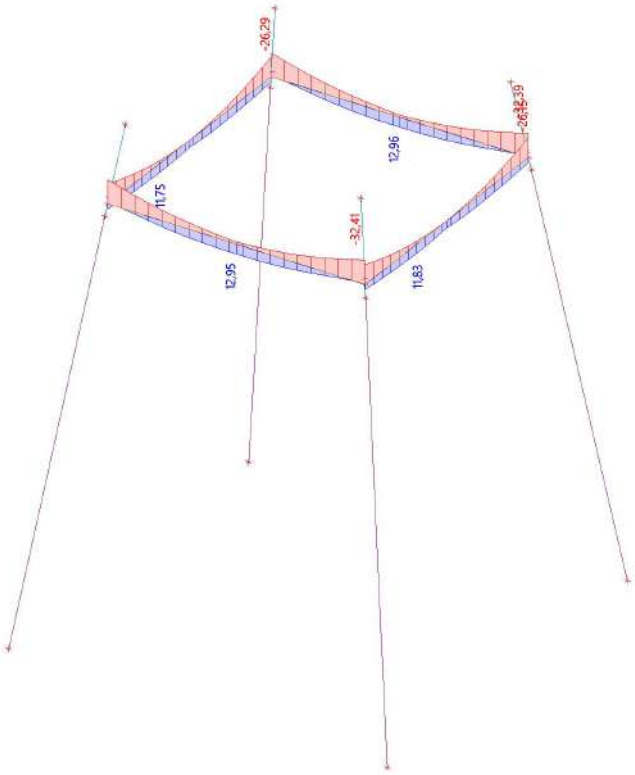
10.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



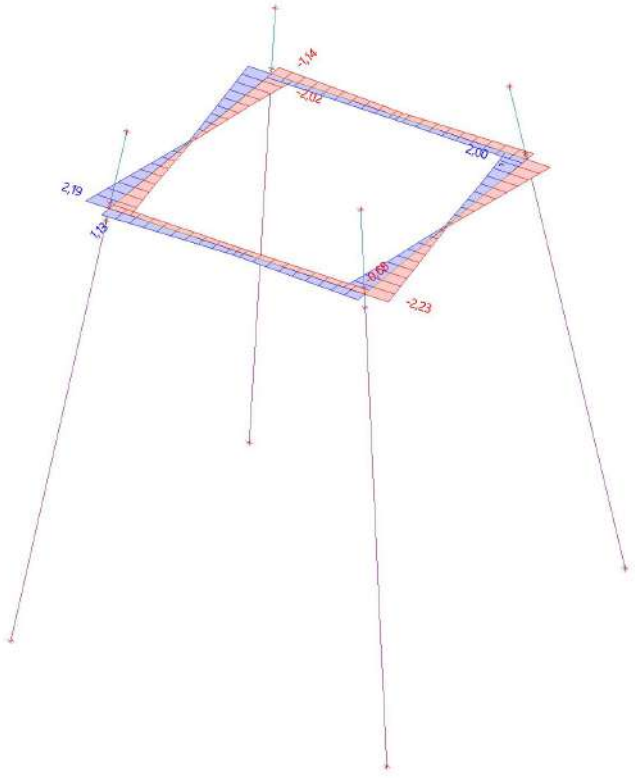
10.5. Interne 1D- krachten; M_y

Values: **M_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



10.6. Interne 1D- krachten; M_z

Values: **M_z**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



10.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Balken

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
DIN30	0,000	low max Wnd ;225° - EG_Gunstig	**30,57**	-0,01	4,00	-0,03	-8,82	-0,50
DIN32	10,792	high max Wnd ;135° - EG_Ongunstig	-30,14	-0,32	**-10,30**	0,05	-25,58	-1,84
DIN32	0,000	high max Wnd ;225° - EG_Ongunstig	-30,13	0,32	**10,32**	-0,05	-25,66	-1,85
DIN33	0,000	high max Wnd ;135° - EG_Ongunstig	10,70	**0,39**	6,38	**-0,06**	-12,04	-2,22
DIN30	10,792	high max Wnd ;225° - EG_Ongunstig	28,85	-0,02	-9,56	-0,03	**-32,41**	-0,68
DIN31	5,112	high max Wnd ;225° - EG_Ongunstig	**-50,17**	0,10	-0,18	0,03	**12,96**	-0,64
DIN33	10,792	high max Wnd ;225° - EG_Ongunstig	10,69	**-0,39**	-6,36	**0,06**	-11,97	**-2,23**
DIN32	10,792	high max Wnd ;315° - EG_Ongunstig	11,26	0,39	-6,36	-0,06	-12,01	**2,19**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Blokpoer 3xBeton40x40 Mast-S+0 Wnd_II
Author	[redacted]
Date	01-09-2025
Structure	General XYZ
No. of nodes :	32
No. of beams :	16
No. of slabs :	0
No. of solids :	0
No. of used profiles :	2
No. of load cases :	9
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

5. Geometrie

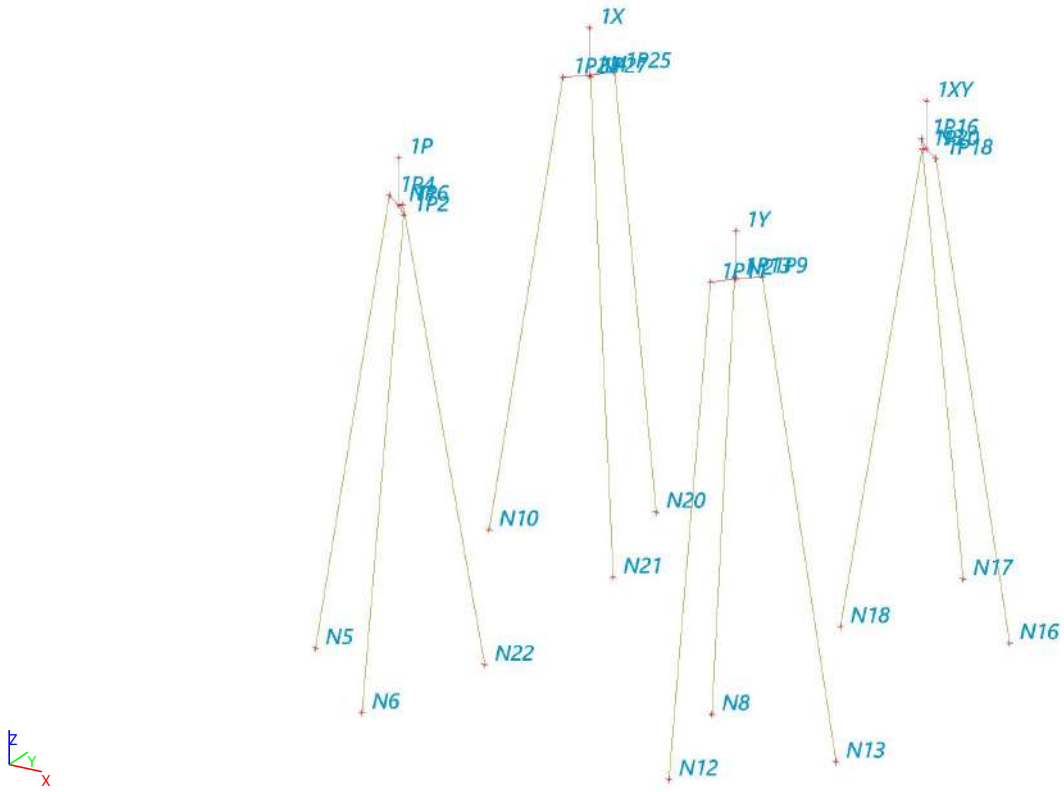
5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N1	0,000	0,000	0,000
1P	0,000	0,000	1,200
1P2	0,400	-0,480	0,000
1P4	-0,480	0,400	0,000
1P6	0,070	0,070	0,000
N2	9,000	0,000	0,000
1Y	9,000	0,000	1,200
1P9	9,480	0,400	0,000
1P11	8,600	-0,480	0,000
1P13	8,930	0,070	0,000
N3	9,000	9,000	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
1XY	9,000	9,000	1,200
1P16	8,600	9,480	0,000
1P18	9,480	8,600	0,000
1P20	8,930	8,930	0,000
N4	0,000	9,000	0,000
1X	0,000	9,000	1,200
1P23	-0,480	8,600	0,000
1P25	0,400	9,480	0,000
1P27	0,070	8,930	0,000
N5	-2,453	0,400	-11,813
N6	0,400	-2,453	-11,813

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N8	7,536	1,464	-11,813
N10	-2,453	8,600	-11,813
N12	8,600	-2,453	-11,813
N13	11,453	0,400	-11,813
N16	11,453	8,600	-11,813
N17	8,600	11,453	-11,813
N18	7,536	7,536	-11,813
N20	0,400	11,453	-11,813
N21	1,464	7,536	-11,813
N22	1,464	1,464	-11,813

5.2. Analyse model met knopen

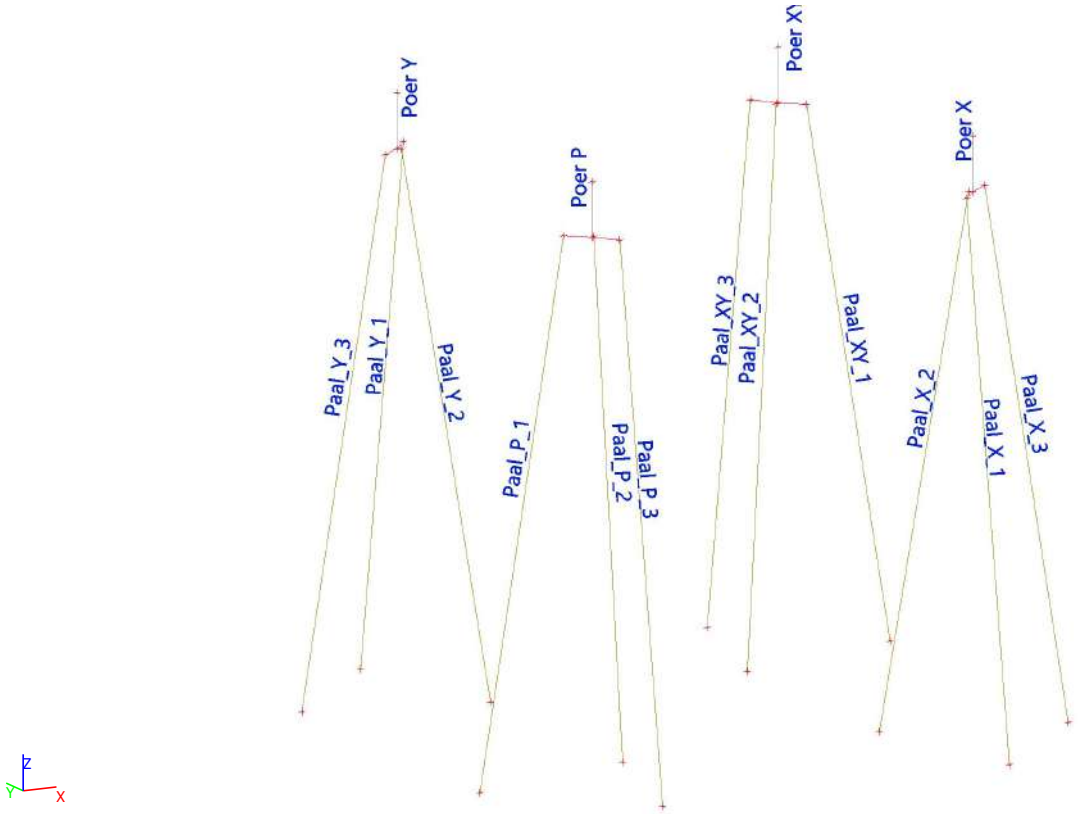


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P4	N5	column (100)
Poer P	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N1	1P	column (100)
Poer X	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N2	1Y	column (100)
Poer XY	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N3	1XY	column (100)
Poer Y	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N4	1X	column (100)
Paal_P_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P6	N22	column (100)
Paal_P_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P2	N6	column (100)
Paal_XY_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P18	N16	column (100)
Paal_XY_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P20	N18	column (100)
Paal_XY_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P16	N17	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_X_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P11	N12	column (100)
Paal_X_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P13	N8	column (100)
Paal_X_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P9	N13	column (100)
Paal_Y_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P25	N20	column (100)
Paal_Y_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P27	N21	column (100)
Paal_Y_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P23	N10	column (100)

5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
S_P_1	N5	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,50
S_P_2	N22	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,72;Ry-6,72
S_P_3	N6	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,50
S_X_1	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,50
S_X_2	N8	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,72;Ry6,72
S_X_3	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,50
S_XY_1	N16	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,50
S_XY_2	N18	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,72;Ry6,72
S_XY_3	N17	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,50
S_Y_1	N20	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,50
S_Y_2	N21	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,72;Ry-6,72
S_Y_3	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,50

5.6. Analyse model met Knoopondersteuningen

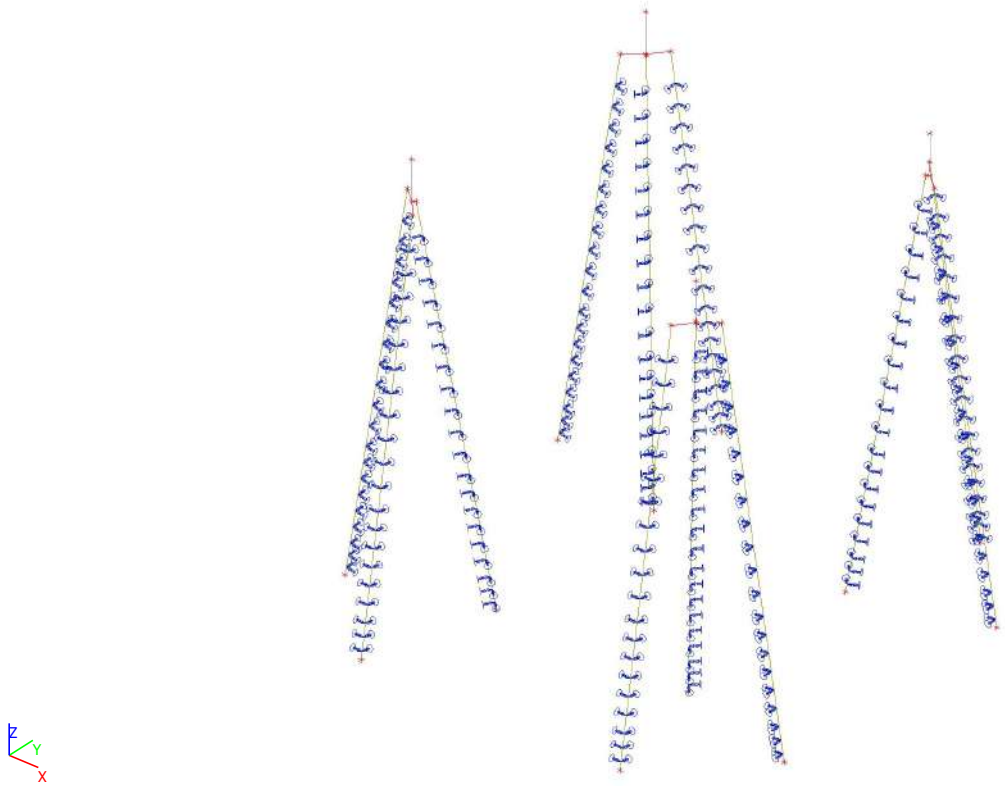
5.7. Line supports on member

Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
Slb_P_1_07	Line	Paal_P_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_1_08	Line	Paal_P_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_1_09	Line	Paal_P_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_P_1_10	Line	Paal_P_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_P_3_07	Line	Paal_P_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_3_08	Line	Paal_P_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_3_09	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_P_3_10	Line	Paal_P_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_X_1_07	Line	Paal_X_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_1_08	Line	Paal_X_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_1_09	Line	Paal_X_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_X_1_10	Line	Paal_X_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_X_3_07	Line	Paal_X_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_3_08	Line	Paal_X_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

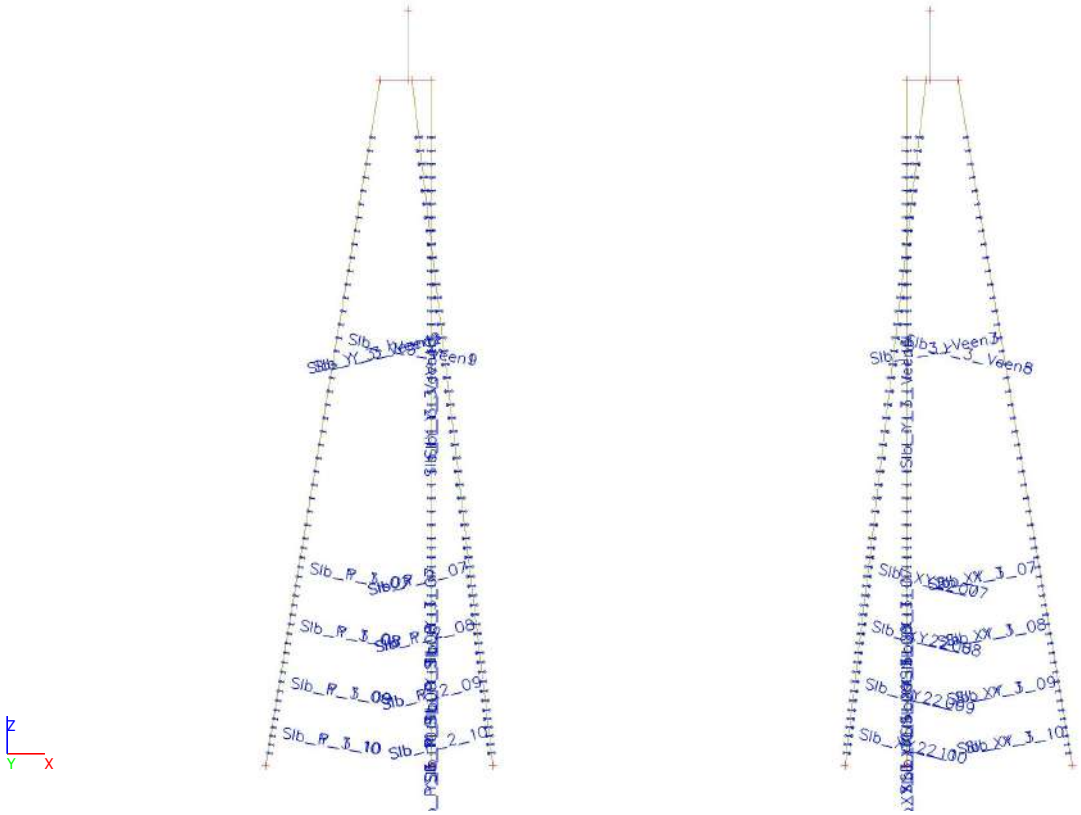
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	10,000	From start						
Slb_X_3_09	Line	Paal_X_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_X_3_10	Line	Paal_X_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_XY_1_07	Line	Paal_XY_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_1_08	Line	Paal_XY_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_1_09	Line	Paal_XY_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_1_10	Line	Paal_XY_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_XY_3_07	Line	Paal_XY_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_3_08	Line	Paal_XY_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_3_09	Line	Paal_XY_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_3_10	Line	Paal_XY_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_Y_1_07	Line	Paal_Y_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_1_08	Line	Paal_Y_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_1_09	Line	Paal_Y_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_1_10	Line	Paal_Y_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_Y_3_07	Line	Paal_Y_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_08	Line	Paal_Y_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_09	Line	Paal_Y_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_10	Line	Paal_Y_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_P_2_07	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_2_08	Line	Paal_P_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_2_09	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_P_2_10	Line	Paal_P_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_X_2_07	Line	Paal_X_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_2_08	Line	Paal_X_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_2_09	Line	Paal_X_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_X_2_10	Line	Paal_X_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_XY_2_07	Line	Paal_XY_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_2_08	Line	Paal_XY_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_2_09	Line	Paal_XY_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_2_10	Line	Paal_XY_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_Y_2_07	Line	Paal_Y_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_2_08	Line	Paal_Y_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	10,000	From start						
Slb_Y_2_09	Line	Paal_Y_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_2_10	Line	Paal_Y_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_Y_3_Veen	Line	Paal_P_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen1	Line	Paal_P_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen2	Line	Paal_P_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen3	Line	Paal_X_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen4	Line	Paal_X_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen5	Line	Paal_X_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen6	Line	Paal_XY_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen7	Line	Paal_XY_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen8	Line	Paal_XY_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen9	Line	Paal_Y_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen10	Line	Paal_Y_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen11	Line	Paal_Y_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						

5.8. Analyse model met Lijnondersteuningen



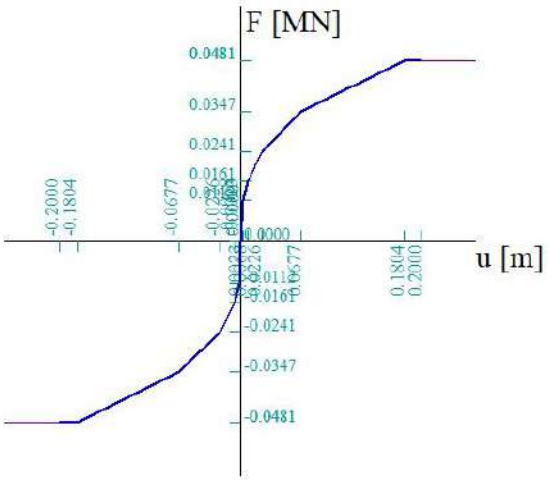
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

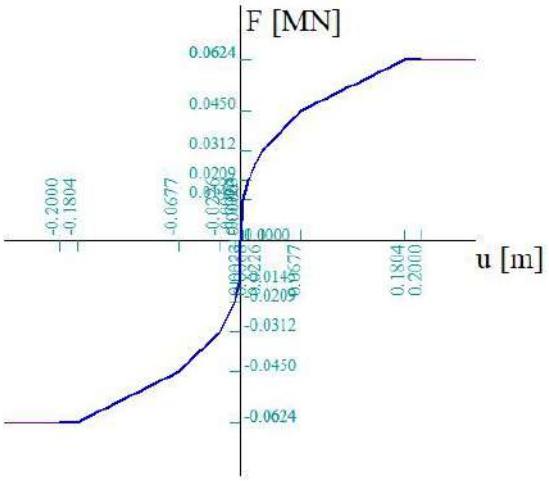
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -48130.000000	Free	Free
		-0.180400 / -48130.000000		
		-0.067650 / -34710.000000		
		-0.022550 / -24064.500000		
		-0.006765 / -16109.569000		
		-0.002255 / -11169.751000		
		0.000000 / 0.000000		
		0.002255 / 11169.751000		
		0.006765 / 16109.569000		
		0.022550 / 24064.500000		
		0.067650 / 34707.015000		
		0.180400 / 48129.000000		
		0.200000 / 48129.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -62400.000000	Free	Free
		-0.180400 / -62400.000000		
		-0.067650 / -45000.000000		
		-0.022550 / -31200.000000		
		-0.006765 / -20900.000000		
		-0.002255 / -14500.000000		
		0.000000 / 0.000000		
		0.002255 / 14490.000000		
		0.006765 / 20900.000000		
		0.022550 / 31220.000000		
		0.067650 / 45020.000000		
		0.180400 / 62430.000000		
		0.200000 / 62430.000000		

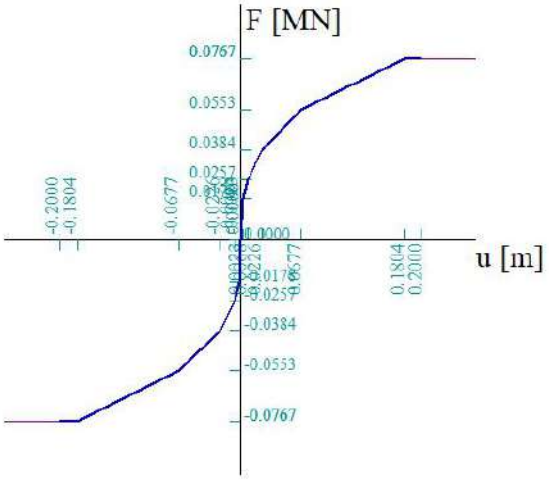
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -76737.000000	Free	Free
		-0.180400 / -76737.000000		
		-0.067650 / -55336.953000		
		-0.022550 / -38368.500000		
		-0.006765 / -25685.138000		
		-0.002255 / -17809.080000		
		0.000000 / 0.000000		
		0.002255 / 17809.080000		
		0.006765 / 25685.138000		
		0.022550 / 38368.500000		

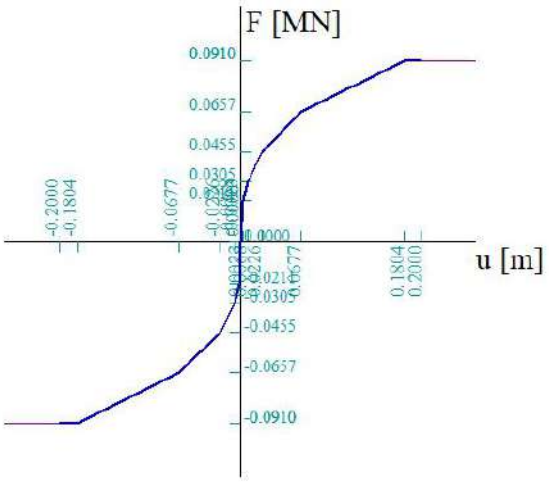
Name	Type	u / F	Positive end	Negative end
		0.067650 / 55336.953000		
		0.180400 / 76737.000000		
		0.200000 / 76737.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -91041.000000	Free	Free
		-0.180400 / -91041.000000		
		-0.067650 / -65651.922000		
		-0.022550 / -45520.500000		
		-0.006765 / -30472.923000		
		-0.002255 / -21128.744000		
		0.000000 / 0.000000		
		0.002255 / 21128.744000		
		0.006765 / 30472.923000		
		0.022550 / 45520.500000		
		0.067650 / 65651.922000		
		0.180400 / 91041.000000		
		0.200000 / 91041.000000		

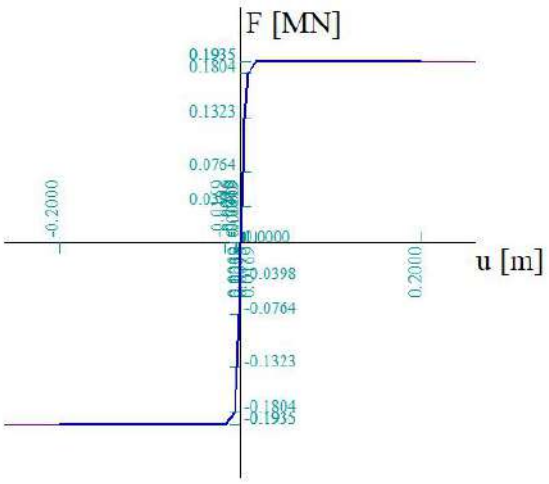
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -193489.147000	Free	Free
		-0.016913 / -193489.147000		
		-0.007517 / -180407.835000		
		-0.003758 / -132256.824000		

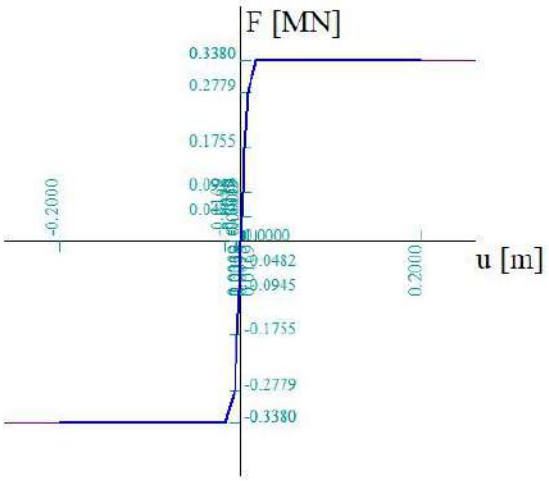
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -76421.758000		
		-0.000940 / -39826.202000		
		0.000000 / 0.000000		
		0.000940 / 39826.202000		
		0.001879 / 76421.758000		
		0.003758 / 132256.824000		
		0.007517 / 180407.835000		
		0.016913 / 193489.147000		
		0.200000 / 193489.147000		

Drawing



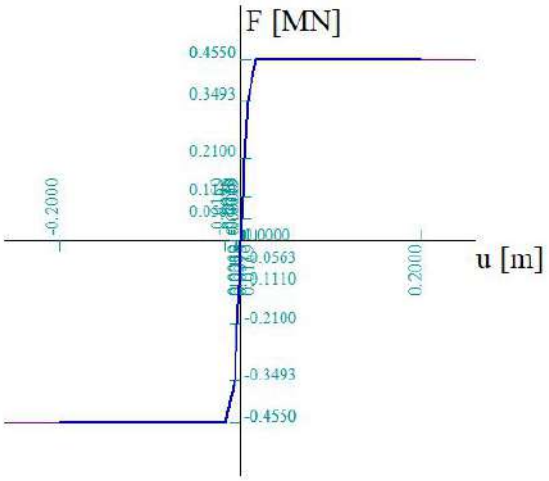
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -338024.958000	Free	Free
		-0.016913 / -338024.958000		
		-0.007517 / -277917.886000		
		-0.003758 / -175526.039000		
		-0.001879 / -94450.113000		
		-0.000940 / -48160.629000		
		0.000000 / 0.000000		
		0.000940 / 48160.629000		
		0.001879 / 94450.113000		
		0.003758 / 175526.039000		
		0.007517 / 277917.886000		
		0.016913 / 338024.958000		
		0.200000 / 338024.958000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -454964.396000	Free	Free
		-0.016913 / -454964.396000		
		-0.007517 / -349336.178000		
		-0.003758 / -210048.905000		
		-0.001879 / -110961.163000		
		-0.000940 / -56287.593000		
		0.000000 / 0.000000		
		0.000940 / 56287.593000		
		0.001879 / 110961.163000		
		0.003758 / 210048.905000		
		0.007517 / 349336.178000		
		0.016913 / 454964.396000		
		0.200000 / 454964.396000		

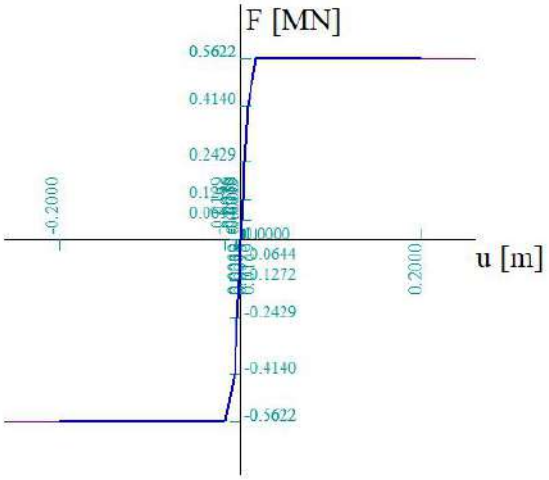
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -562170.498000	Free	Free
		-0.016913 / -562170.498000		
		-0.007517 / -413992.721000		
		-0.003758 / -242873.332000		
		-0.001879 / -127210.864000		
		-0.000940 / -64380.055000		
		0.000000 / 0.000000		
		0.000940 / 64380.055000		
		0.001879 / 127210.864000		
		0.003758 / 242873.332000		

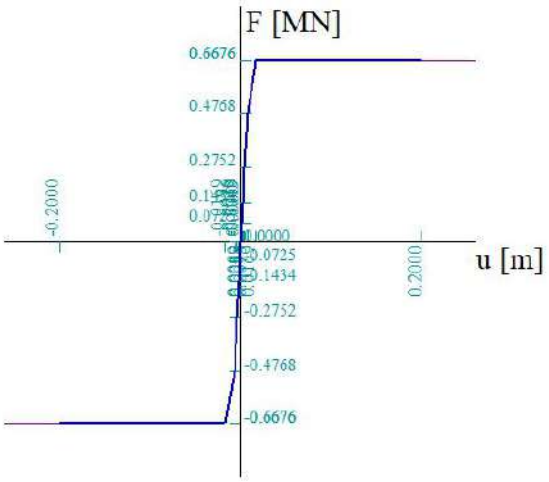
Name	Type	u / F	Positive end	Negative end
		0.007517 / 413992.721000		
		0.016913 / 562170.498000		
		0.200000 / 562170.498000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -667564.512000	Free	Free
		-0.016913 / -667564.512000		
		-0.007517 / -476770.926000		
		-0.003758 / -275233.374000		
		-0.001879 / -143390.211000		
		-0.000940 / -72463.274000		
		0.000000 / 0.000000		
		0.000940 / 72463.274000		
		0.001879 / 143390.211000		
		0.003758 / 275233.374000		
		0.007517 / 476770.926000		
		0.016913 / 667564.512000		
		0.200000 / 667564.512000		

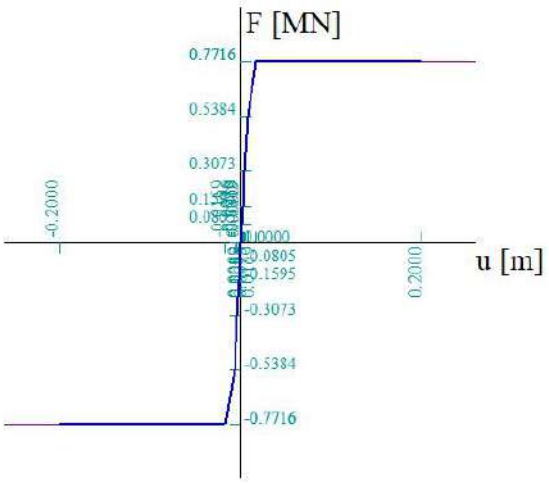
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -771639.629000	Free	Free
		-0.016913 / -771639.629000		
		-0.007517 / -538432.081000		
		-0.003758 / -307337.483000		

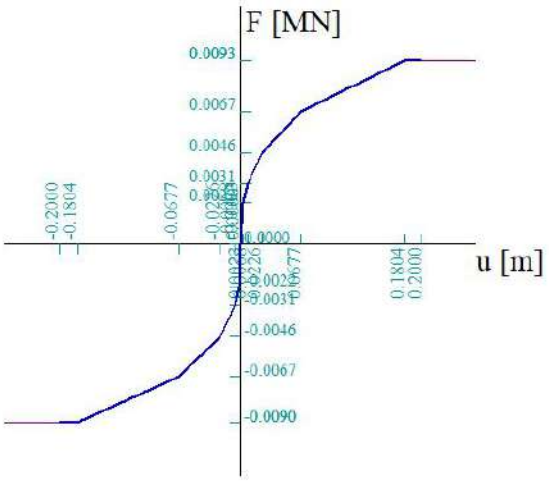
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -159531.700000		
		-0.000940 / -80541.551000		
		0.000000 / 0.000000		
		0.000940 / 80541.551000		
		0.001879 / 159531.700000		
		0.003758 / 307337.483000		
		0.007517 / 538432.081000		
		0.016913 / 771639.629000		
		0.200000 / 771639.629000		

Drawing



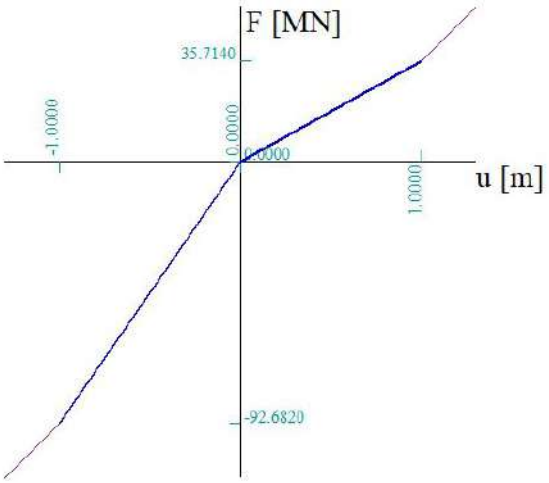
Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -9000.000000	Free	Free
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		
		-0.006765 / -3100.000000		
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing



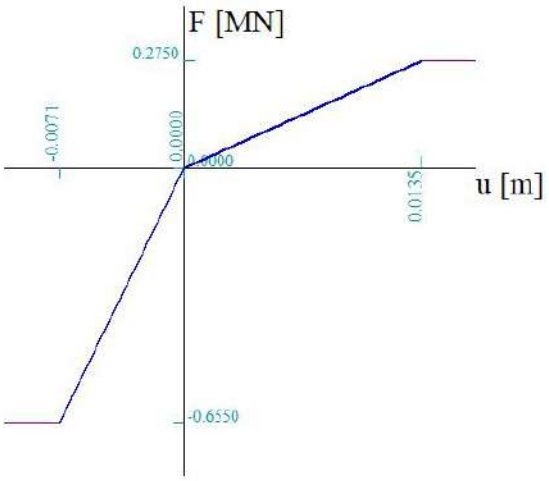
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+0-paalpunt	Translation	-1.000000 / -92682000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 35714000.000000		

Drawing



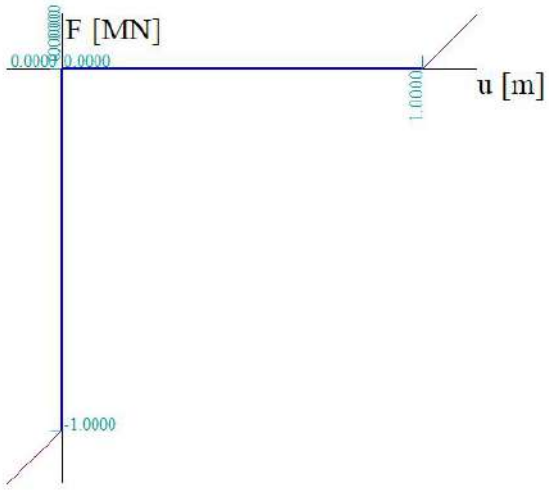
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+0-paalpunt_cap275kN	Translation	-0.007070 / -655000.000000	Free	Free
		0.000000 / 0.000000		
		0.013500 / 275000.000000		

Drawing



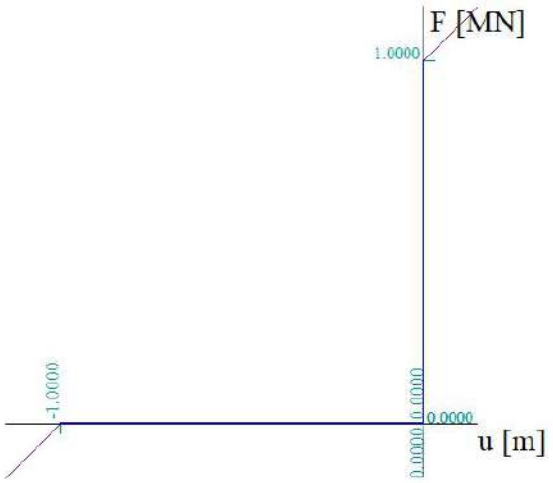
Name	Type	u / F	Positive end	Negative end
press only	Translation	-0.000001 / -1000000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 0.000000		

Drawing



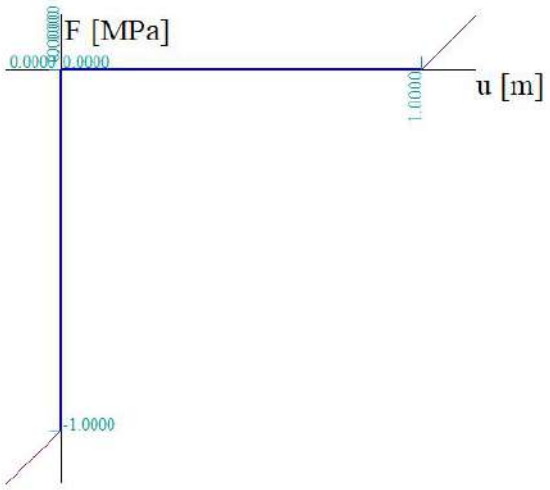
Name	Type	u / F	Positive end	Negative end
tension only	Translation	-1.000000 / 0.000000	Flexible	Flexible
		0.000000 / 0.000000		
		0.000001 / 1000000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing

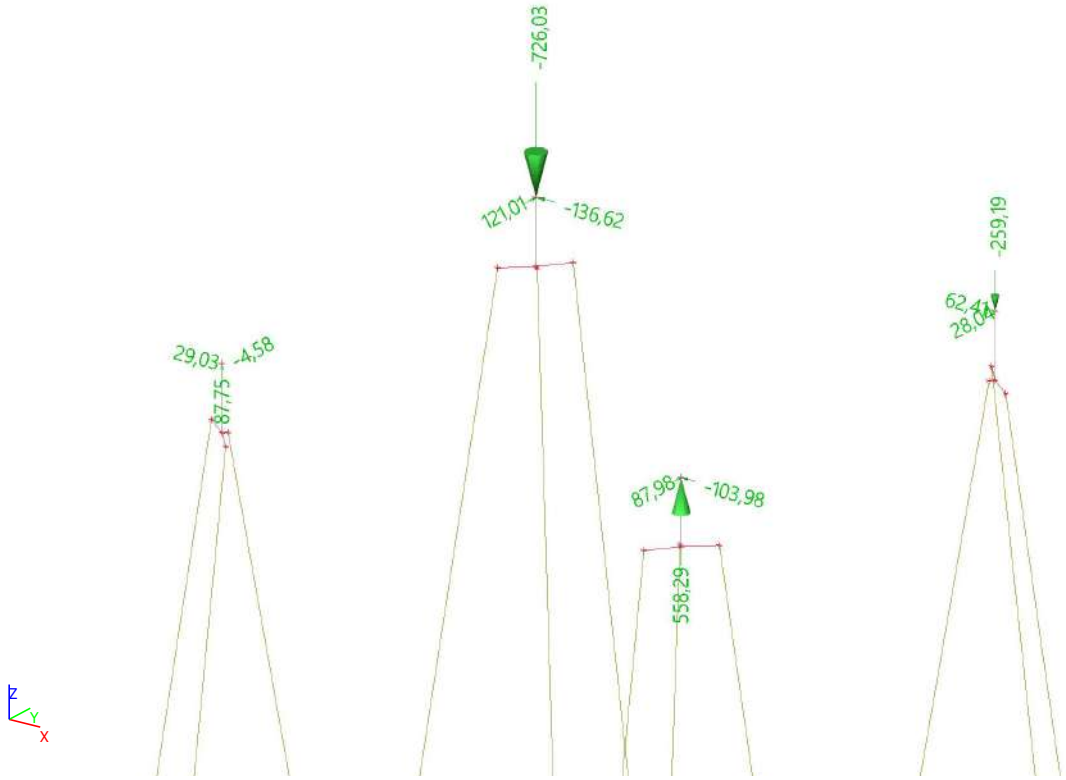


6. Belastingen

6.1. Load cases

6.1.1. Load cases - high max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



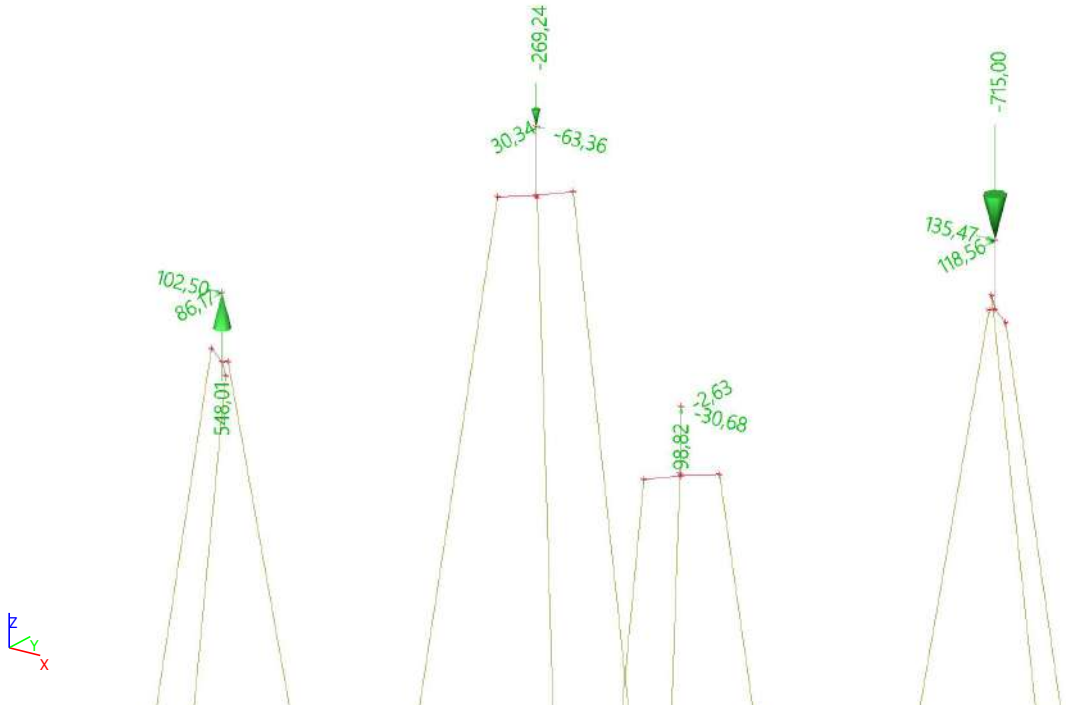
6.1.1.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Force	29,03
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Force	-4,58
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Force	87,75
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Force	-136,62
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Force	121,01
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Force	-726,03
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Force	62,41
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Force	28,04
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Force	-259,19

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Force	-103,98
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Force	87,98
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Force	558,29

6.1.2. Load cases - high max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



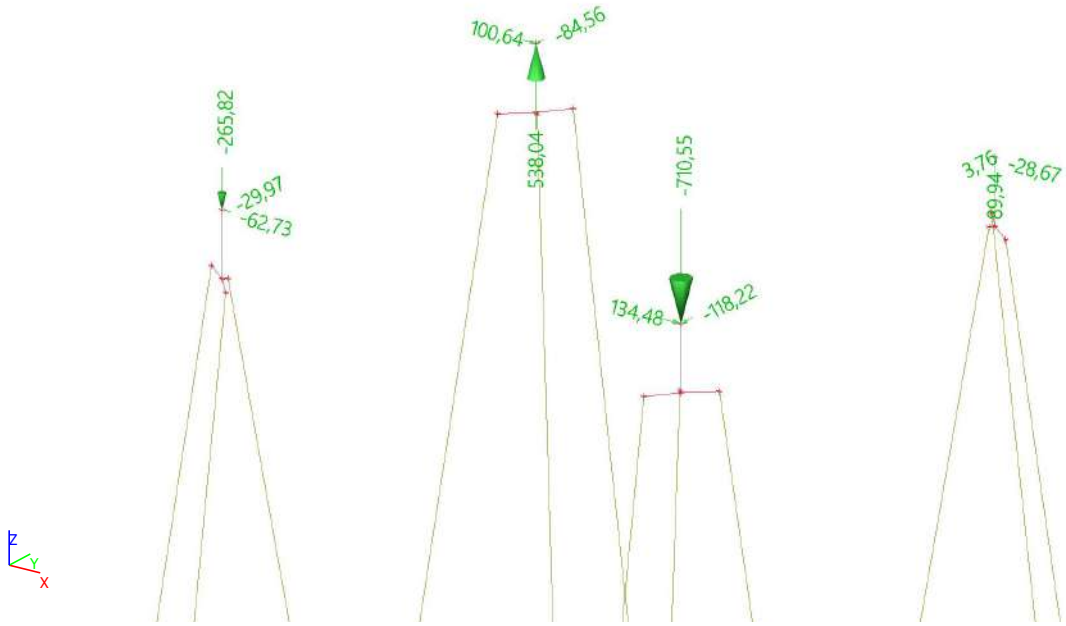
6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Force	102,50
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Force	86,17
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Force	548,01
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Force	-63,36
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Force	30,34
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Force	-269,24

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Force	135,47
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Force	118,56
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Force	-715,00
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Force	-30,68
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Force	-2,63
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Force	98,82

6.1.3. Load cases - high max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



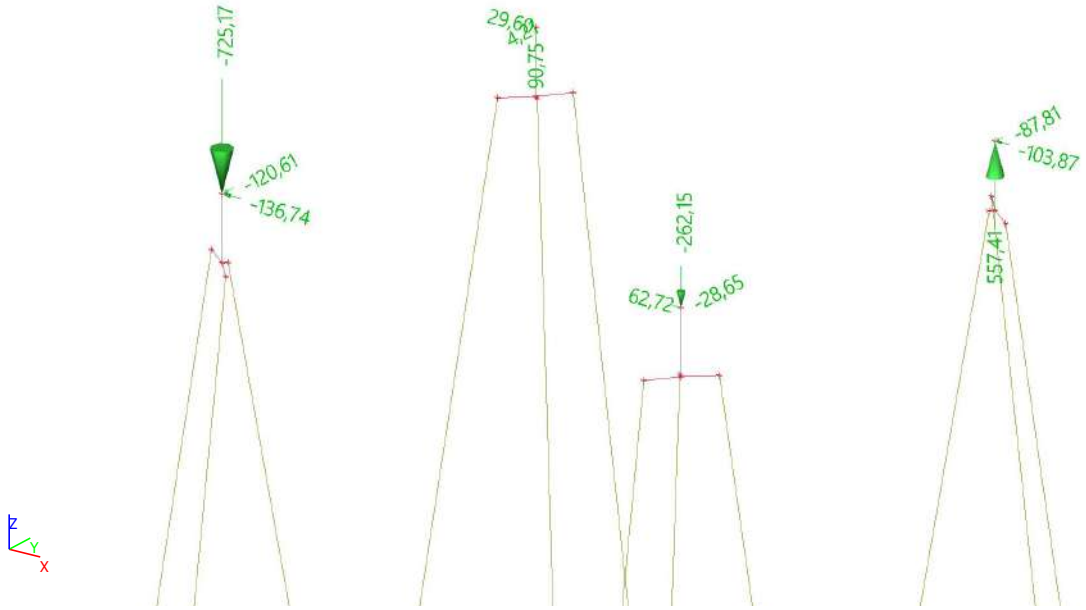
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Force	-62,73
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Force	-29,97
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Force	-265,82

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Force	100,64
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Force	-84,56
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Force	538,04
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Force	-28,67
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Force	3,76
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Force	89,94
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Force	134,48
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Force	-118,22
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Force	-710,55

6.1.4. Load cases - high max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			

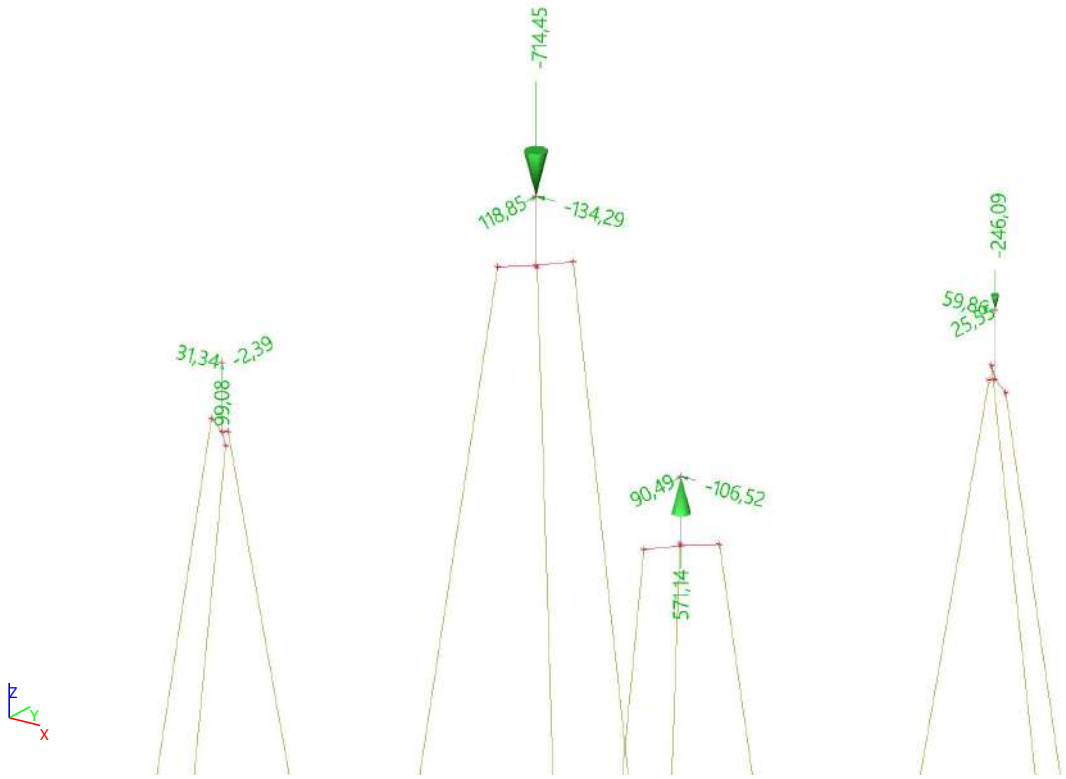


6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Force	-136,74
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Force	-120,61
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Force	-725,17
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Force	29,60
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Force	4,21
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Force	90,75
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Force	-103,87
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Force	-87,81
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Force	557,41
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Force	62,72
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Force	-28,65
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Force	-262,15

6.1.5. Load cases - low max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			

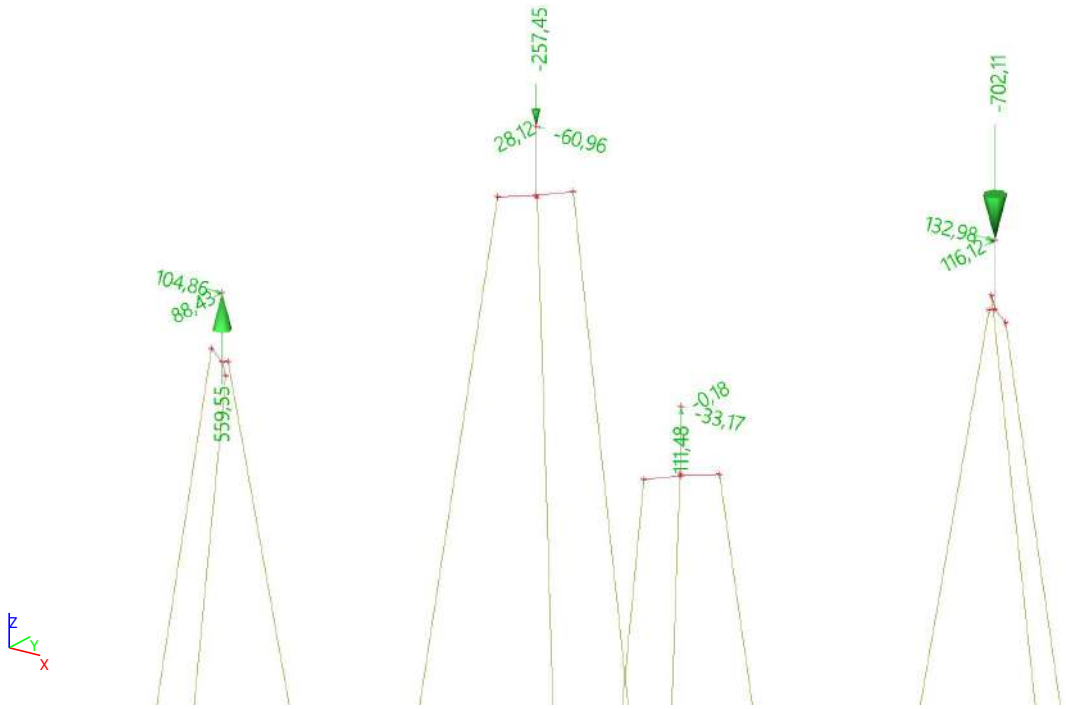


6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Force	31,34
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Force	-2,39
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Force	99,08
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Force	-134,29
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Force	118,85
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Force	-714,45
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Force	59,86
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Force	25,55
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Force	-246,09
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Force	-106,52
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Force	90,49
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Force	571,14

6.1.6. Load cases - low max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



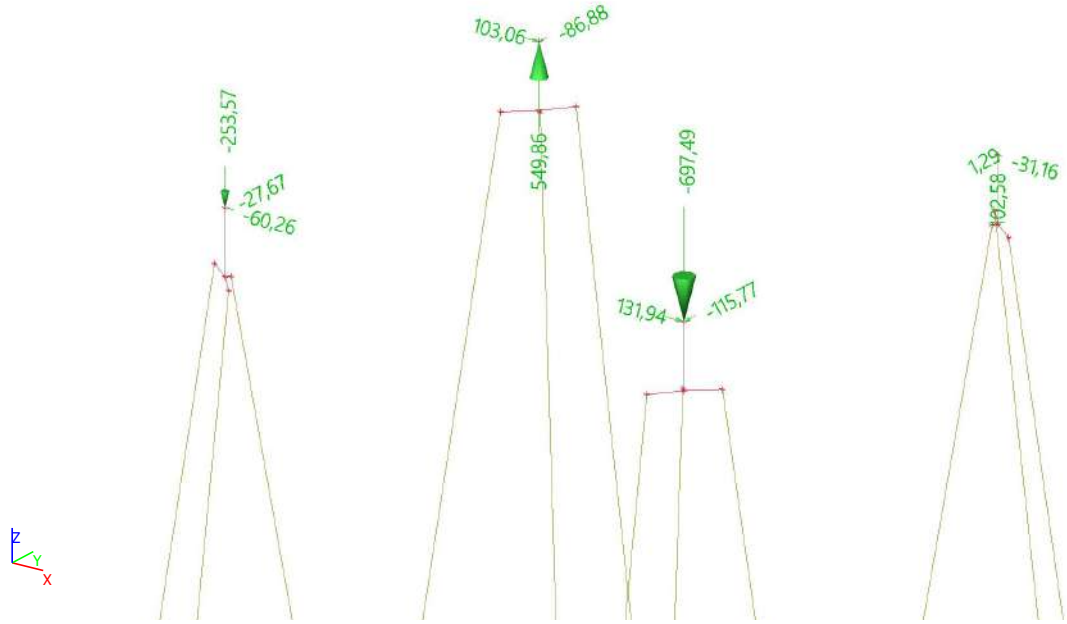
6.1.6.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Force	104,86
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Force	88,43
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Force	559,55
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Force	-60,96
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Force	28,12
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Force	-257,45
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Force	132,98
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Force	116,12
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Force	-702,11
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Force	-33,17
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Force	-0,18

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Force	111,48

6.1.7. Load cases - low max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



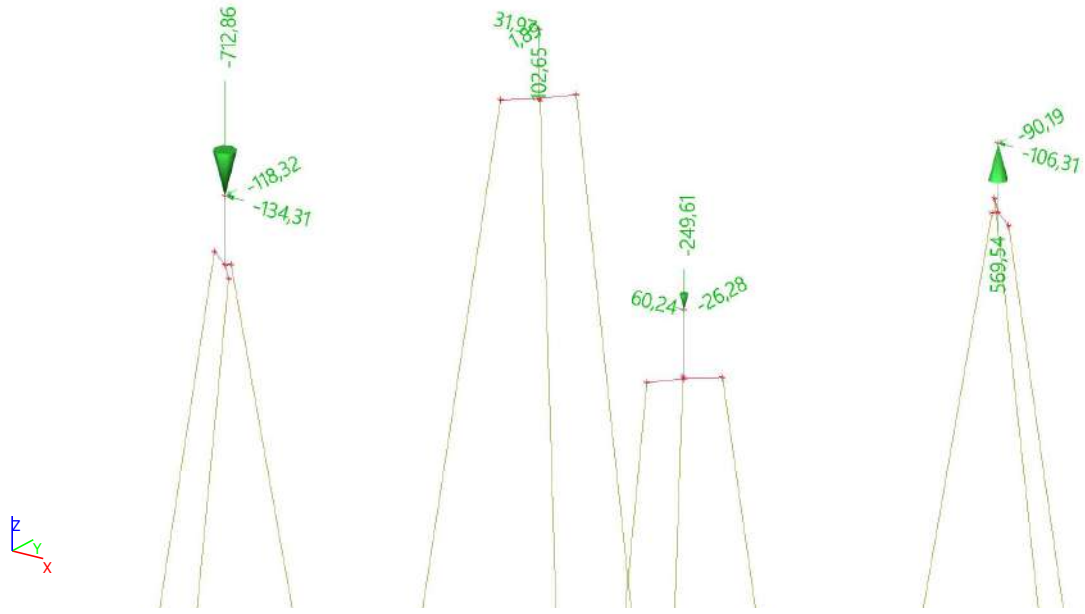
6.1.7.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Force	-60,26
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Force	-27,67
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Force	-253,57
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Force	103,06
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Force	-86,88
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Force	549,86
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Force	-31,16
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Force	1,29

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Force	102,58
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Force	131,94
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Force	-115,77
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Force	-697,49

6.1.8. Load cases - low max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



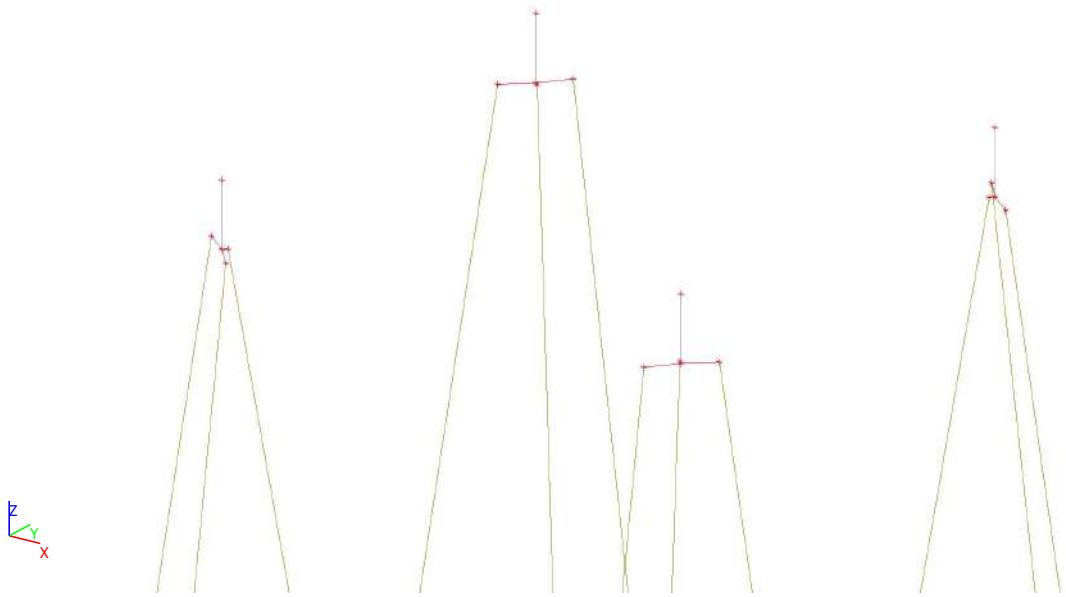
6.1.8.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Force	-134,31
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Force	-118,32
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Force	-712,86
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Force	31,97
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Force	1,89

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Force	102,65
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Force	-106,31
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Force	-90,19
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Force	569,54
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Force	60,24
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Force	-26,28
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Force	-249,61

6.1.9. Load cases - EG_fundering

Name	Description	Action type	Load group	Direction
	Spec	Load type		
EG_fundering		Permanent	LG1	-Z
		Self weight		



6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
low max Wnd ;45° - EG_gunstig	Ultimate	low max Wnd ;45°	1,000
		EG_fundering	0,900
low max Wnd ;135° - EG_gunstig	Ultimate	low max Wnd ;135°	1,000
		EG_fundering	0,900
low max Wnd ;225° - EG_gunstig	Ultimate	low max Wnd ;225°	1,000
		EG_fundering	0,900
low max Wnd ;315° - EG_gunstig	Ultimate	low max Wnd ;315°	1,000
		EG_fundering	0,900
high max Wnd ;45° - EG_ongunstig	Ultimate	high max Wnd ;45°	1,000
		EG_fundering	1,200
high max Wnd ;135° - EG_ongunstig	Ultimate	high max Wnd ;135°	1,000
		EG_fundering	1,200
high max Wnd ;225° - EG_ongunstig	Ultimate	high max Wnd ;225°	1,000
		EG_fundering	1,200
high max Wnd ;315° - EG_ongunstig	Ultimate	high max Wnd ;315°	1,000
		EG_fundering	1,200

6.3. Result classes

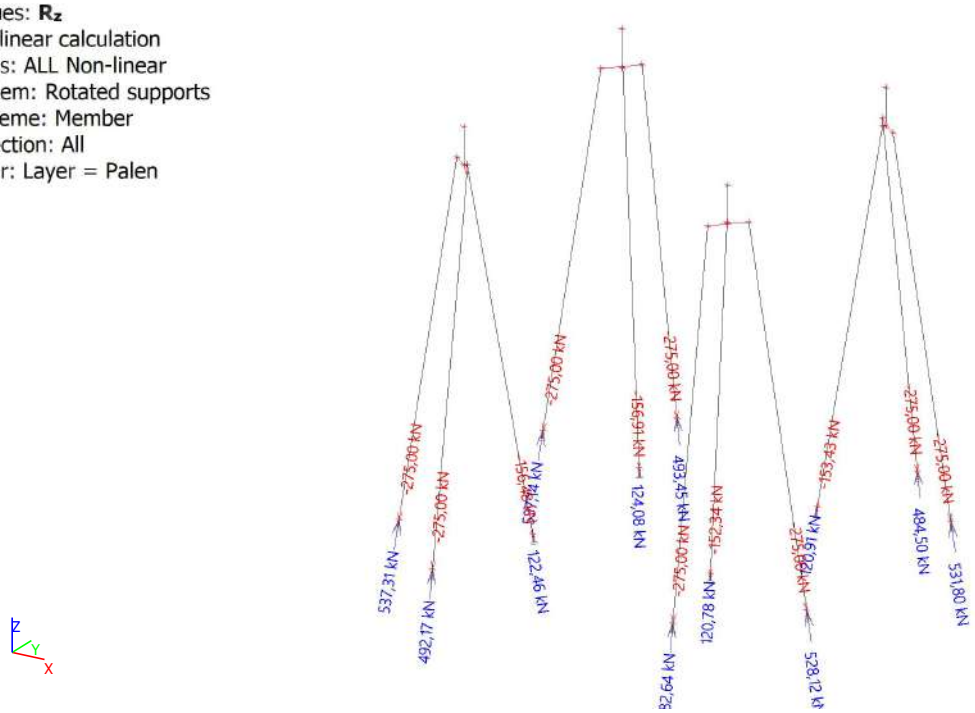
Name	List
ALL Non-linear	low max Wnd ;45° - EG_gunstig
	low max Wnd ;135° - EG_gunstig
	low max Wnd ;225° - EG_gunstig
	low max Wnd ;315° - EG_gunstig
	high max Wnd ;45° - EG_ongunstig
	high max Wnd ;135° - EG_ongunstig
	high max Wnd ;225° - EG_ongunstig
	high max Wnd ;315° - EG_ongunstig

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen

Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_Y_3/N10	low max Wnd ;135° - EG_gunstig	**0,00**	0,00	236,15	0,00	0,00	0,00	0,0	0,0
S_XY_1/N16	high max Wnd ;135° - EG_ongunstig	**0,00**	0,00	531,80	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_3/N6	high max Wnd ;315° - EG_ongunstig	0,00	**0,00**	492,17	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	low max Wnd ;45° - EG_gunstig	0,00	**0,00**	472,87	0,00	0,00	0,00	0,0	0,0
S_P_3/N6	low max Wnd ;135° - EG_gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	high max Wnd ;315° - EG_ongunstig	0,00	0,00	**537,31**	0,00	0,00	0,00	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: ALL Non-linear

System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen

Nodal reactions

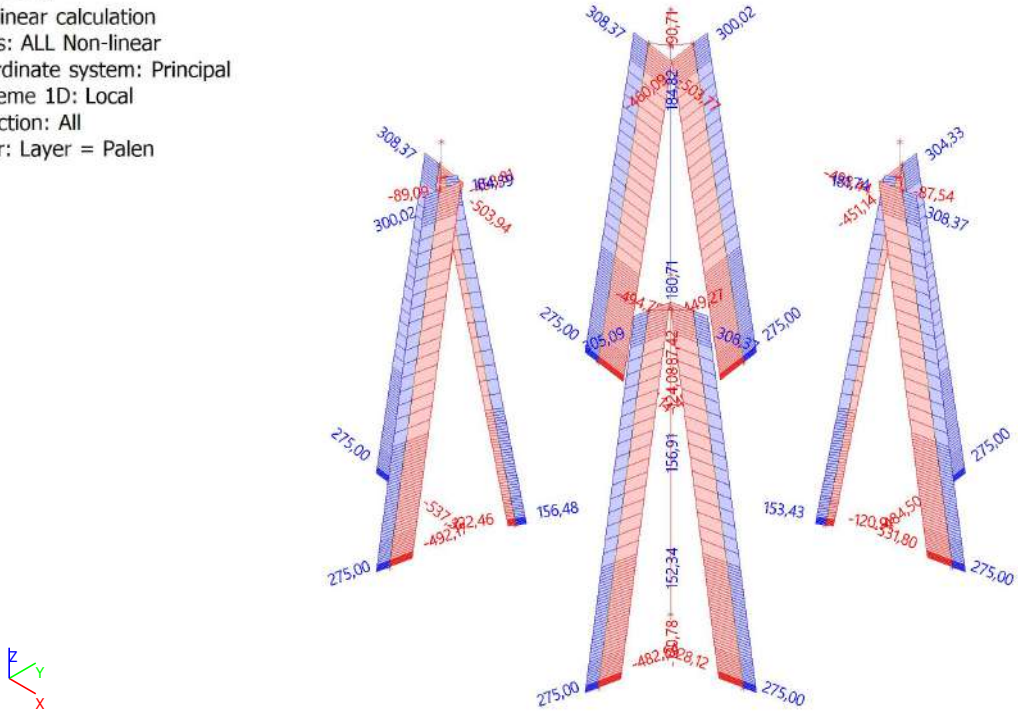
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_3/N6	high max Wnd ;315° - EG_ongunstig	0,00	**0,00**	**492,17**	0,00	0,00	0,00	0,0	0,0
S_P_3/N6	high max Wnd ;225° - EG_ongunstig	**0,00**	**0,00**	169,73	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_3/N6	low max Wnd ;135° - EG_gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	low max Wnd ;315° - EG_gunstig	**0,00**	**0,00**	515,84	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_1/N5	high max Wnd ;315° - EG_ongunstig	0,00	0,00	**537,31**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	low max Wnd ;135° - EG_gunstig	**0,00**	0,00	**-275,00**	0,00	0,00	**0,00**	0,0	0,0
S_P_2/N22	low max Wnd ;135° - EG_gunstig	**0,00**	0,00	87,30	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_2/N22	low max Wnd ;315° - EG_gunstig	0,00	**0,00**	**-156,48**	0,00	0,00	0,00	0,0	0,0
S_P_2/N22	high max Wnd ;135° - EG_ongunstig	0,00	0,00	**122,46**	0,00	0,00	0,00	0,0	0,0
S_P_2/N22	high max Wnd ;315° - EG_ongunstig	**0,00**	**0,00**	-151,22	0,00	0,00	**0,00**	0,0	0,0
S_X_3/N13	low max Wnd ;315° - EG_gunstig	**0,00**	**0,00**	232,84	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_3/N13	low max Wnd ;45° - EG_gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	high max Wnd ;225° - EG_ongunstig	0,00	0,00	**528,12**	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	high max Wnd ;315° - EG_ongunstig	**0,00**	0,00	254,49	0,00	0,00	**0,00**	0,0	0,0
S_X_1/N12	high max Wnd ;225° - EG_ongunstig	0,00	**0,00**	**482,64**	0,00	0,00	0,00	0,0	0,0
S_X_1/N12	high max Wnd ;315° - EG_ongunstig	**0,00**	**0,00**	165,82	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_1/N12	low max Wnd ;45° - EG_gunstig	0,00	0,00	**-275,00**	0,00	0,00	**0,00**	0,0	0,0
S_X_2/N8	low max Wnd ;225° - EG_gunstig	**0,00**	**0,00**	**-152,34**	0,00	0,00	0,00	0,0	0,0
S_X_2/N8	high max Wnd ;45° - EG_ongunstig	0,00	0,00	**120,78**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_2/N8	high max Wnd ;225° - EG_ongunstig	**0,00**	**0,00**	-147,34	0,00	0,00	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_XY_3/N17	high max Wnd ;135° - EG_ongunstig	**0,00**	**0,00**	**484,50**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_3/N17	low max Wnd ;315° - EG_gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_XY_3/N17	low max Wnd ;45° - EG_gunstig	0,00	**0,00**	141,97	0,00	0,00	**0,00**	0,0	0,0
S_XY_1/N16	low max Wnd ;315° - EG_gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_XY_1/N16	high max Wnd ;135° - EG_ongunstig	**0,00**	**0,00**	**531,80**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_1/N16	low max Wnd ;225° - EG_gunstig	**0,00**	0,00	-46,38	0,00	0,00	**0,00**	0,0	0,0
S_XY_2/N18	high max Wnd ;315° - EG_ongunstig	0,00	**0,00**	**120,91**	0,00	0,00	0,00	0,0	0,0
S_XY_2/N18	high max Wnd ;135° - EG_ongunstig	**0,00**	**0,00**	-148,38	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_2/N18	low max Wnd ;135° - EG_gunstig	**0,00**	0,00	**-153,43**	0,00	0,00	**0,00**	0,0	0,0
S_Y_3/N10	high max Wnd ;135° - EG_ongunstig	**0,00**	**0,00**	257,44	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_3/N10	low max Wnd ;225° - EG_gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_Y_3/N10	high max Wnd ;45° - EG_ongunstig	0,00	0,00	**537,14**	0,00	0,00	0,00	0,0	0,0
S_Y_3/N10	low max Wnd ;135° - EG_gunstig	**0,00**	0,00	236,15	0,00	0,00	**0,00**	0,0	0,0
S_Y_1/N20	high max Wnd ;225° - EG_ongunstig	0,00	**0,00**	-254,43	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	low max Wnd ;225° - EG_gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	high max Wnd ;45° - EG_ongunstig	**0,00**	0,00	**493,45**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_1/N20	low max Wnd ;45° - EG_gunstig	0,00	**0,00**	472,87	0,00	0,00	**0,00**	0,0	0,0
S_Y_2/N21	high max Wnd ;45° - EG_ongunstig	**0,00**	**0,00**	-151,46	0,00	0,00	0,00	0,0	0,0
S_Y_2/N21	high max Wnd ;225° - EG_ongunstig	0,00	0,00	**124,08**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_2/N21	low max Wnd ;45° - EG_gunstig	**0,00**	**0,00**	**-156,91**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

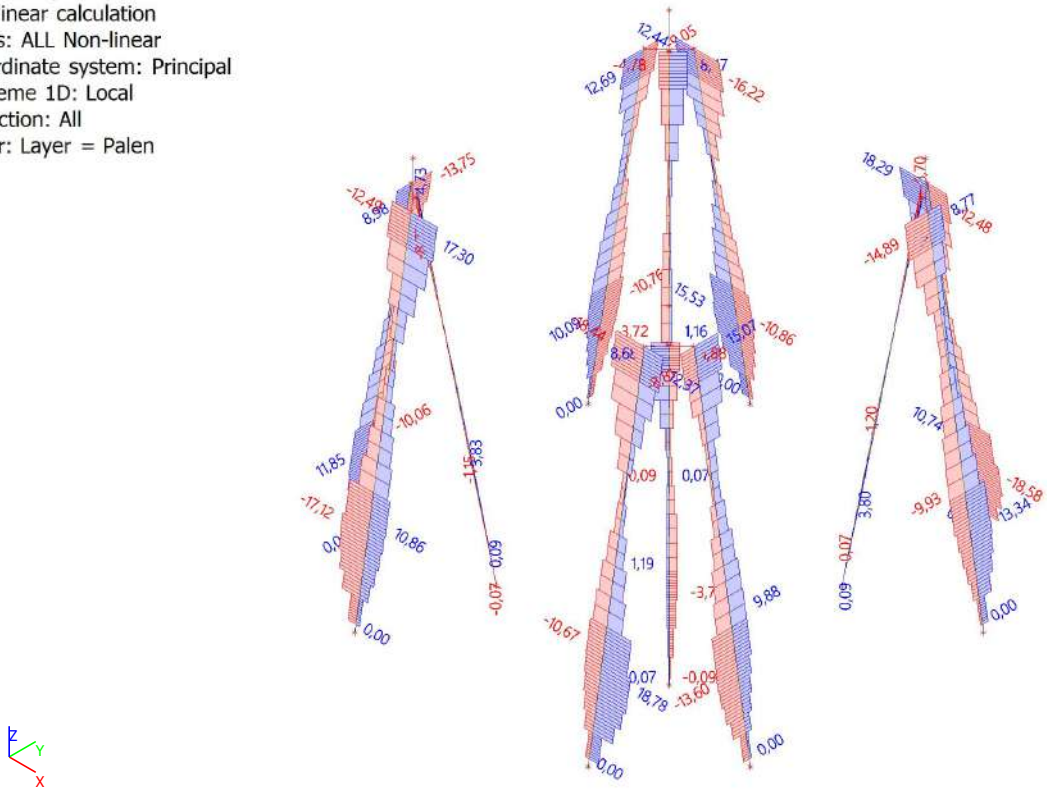
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



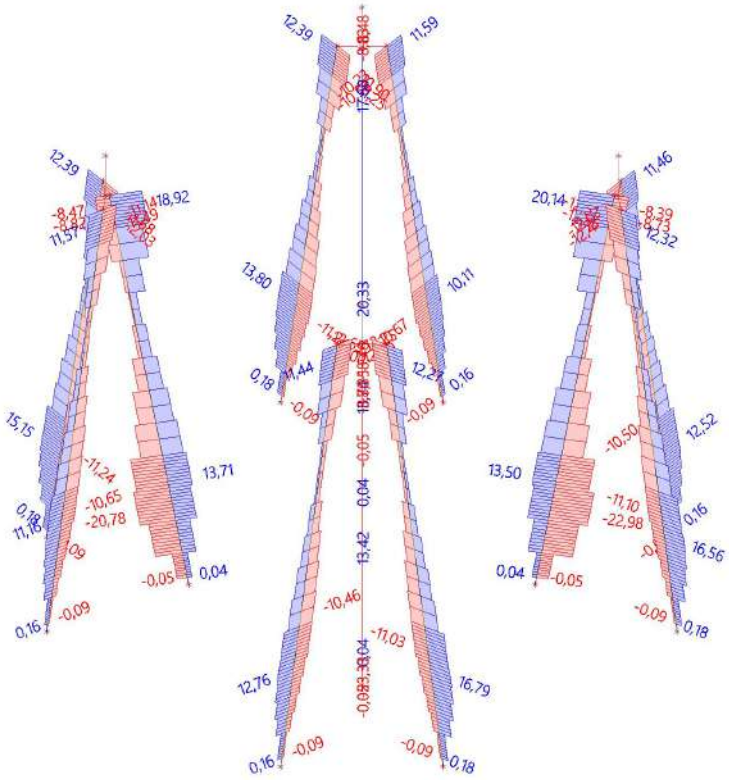
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



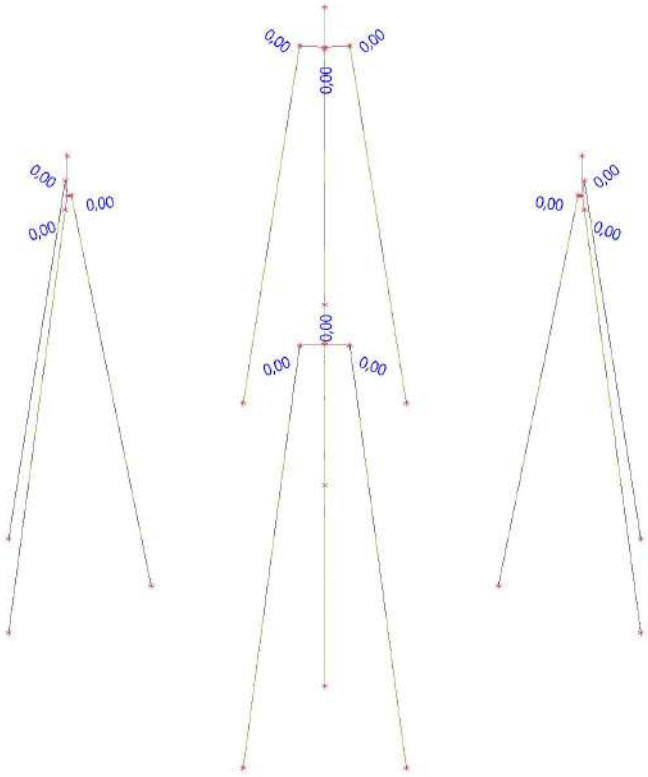
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



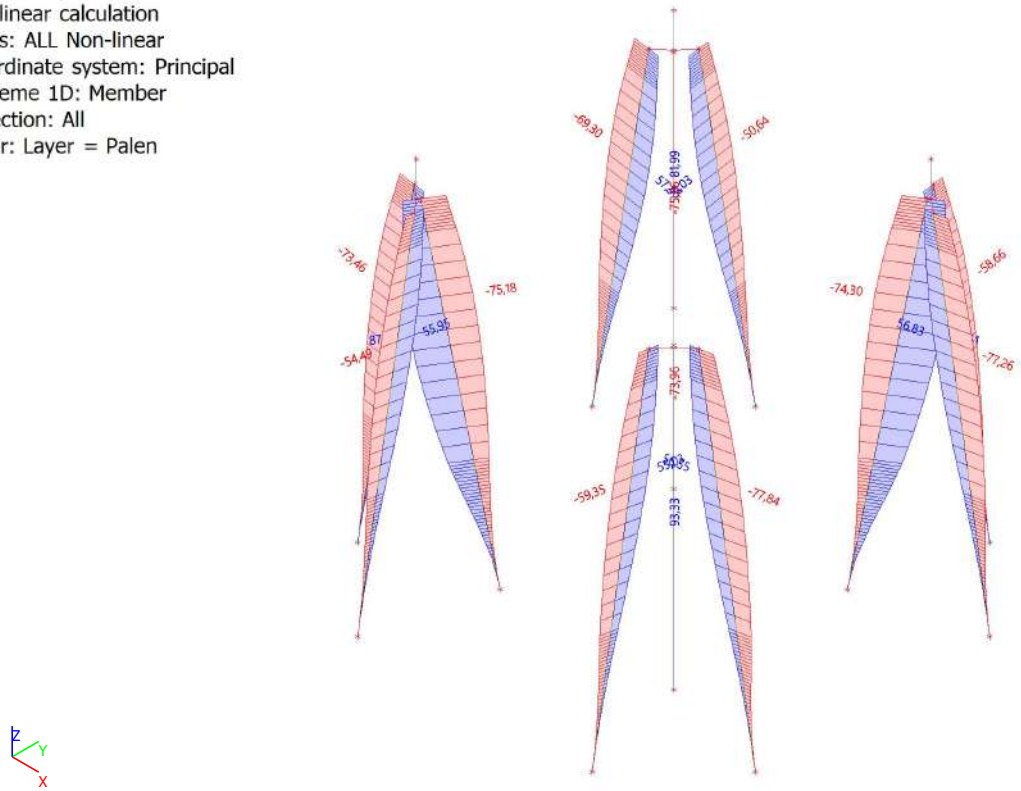
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



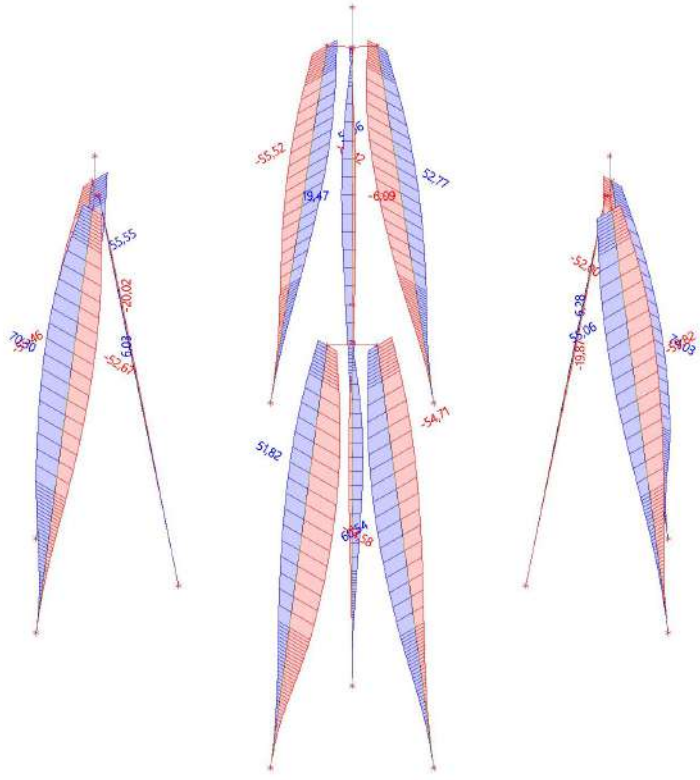
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_P_1	11,977	high max Wnd ;315° - EG_ongunstig	**-537,31**	0,00	0,18	0,00	0,00	0,00
Paal_P_1	0,000	high max Wnd ;135° - EG_ongunstig	**308,37**	-11,64	-9,42	**0,00**	-41,99	-23,25
Paal_XY_3	9,000+	low max Wnd ;315° - EG_gunstig	280,70	**-18,58**	12,52	0,00	-23,50	37,64
Paal_X_1	9,000+	low max Wnd ;45° - EG_gunstig	280,70	**18,78**	12,76	0,00	-24,05	-38,20
Paal_X_2	9,000+	low max Wnd ;45° - EG_gunstig	-70,27	-3,00	**-23,33**	0,00	47,15	5,12
Paal_X_2	0,000	low max Wnd ;45° - EG_gunstig	-50,42	8,68	**20,33**	0,00	41,49	-1,21
Paal_X_3	3,625-	low max Wnd ;45° - EG_gunstig	293,36	4,39	-2,32	0,00	**-77,84**	59,84
Paal_X_2	4,000-	low max Wnd ;45° - EG_gunstig	-57,73	1,33	4,73	0,00	**93,33**	19,80
Paal_X_1	4,500-	low max Wnd ;45° - EG_gunstig	291,54	-2,41	0,35	0,00	-59,05	**-74,58**
Paal_XY_3	4,500-	low max Wnd ;315° - EG_gunstig	291,54	2,34	0,40	0,00	-58,31	**74,03**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer X	1,200	low max Wnd ;45° - EG_gunstig	**571,14**	-139,31	-11,33	**0,00**	0,00	0,00
Poer X	0,000	low max Wnd ;45° - EG_gunstig	541,37	**-139,31**	-11,33	0,00	13,60	**167,17**
Poer XY	0,000	high max Wnd ;45° - EG_ongunstig	-298,88	63,96	**-24,30**	0,00	**29,16**	-76,75
Poer X	0,000	high max Wnd ;315° - EG_ongunstig	-301,84	64,61	**24,09**	0,00	**-28,91**	-77,53
Poer Y	0,000	high max Wnd ;45° - EG_ongunstig	**-765,72**	**182,17**	11,04	0,00	-13,25	**-218,61**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Blokpoer 3xBeton40x40 Mast-S+0 Wnd_III
Author	[redacted]
Date	01-09-2025
Structure	General XYZ
No. of nodes :	32
No. of beams :	16
No. of slabs :	0
No. of solids :	0
No. of used profiles :	2
No. of load cases :	9
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

5. Geometrie

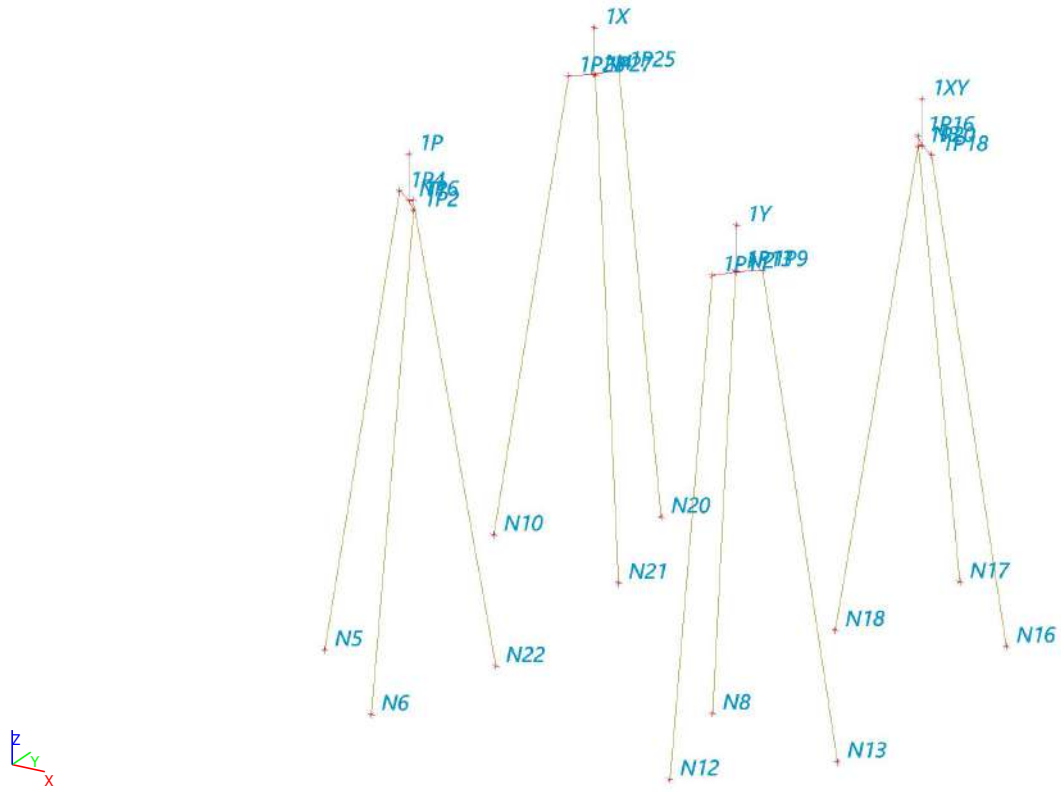
5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N1	0,000	0,000	0,000
1P	0,000	0,000	1,200
1P2	0,400	-0,480	0,000
1P4	-0,480	0,400	0,000
1P6	0,070	0,070	0,000
N2	9,000	0,000	0,000
1Y	9,000	0,000	1,200
1P9	9,480	0,400	0,000
1P11	8,600	-0,480	0,000
1P13	8,930	0,070	0,000
N3	9,000	9,000	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
1XY	9,000	9,000	1,200
1P16	8,600	9,480	0,000
1P18	9,480	8,600	0,000
1P20	8,930	8,930	0,000
N4	0,000	9,000	0,000
1X	0,000	9,000	1,200
1P23	-0,480	8,600	0,000
1P25	0,400	9,480	0,000
1P27	0,070	8,930	0,000
N5	-2,535	0,400	-12,307
N6	0,400	-2,535	-12,307

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N8	7,478	1,522	-12,306
N10	-2,535	8,600	-12,307
N12	8,600	-2,535	-12,307
N13	11,535	0,400	-12,307
N16	11,535	8,600	-12,307
N17	8,600	11,535	-12,307
N18	7,478	7,478	-12,306
N20	0,400	11,535	-12,307
N21	1,522	7,478	-12,306
N22	1,522	1,522	-12,306

5.2. Analyse model met knopen

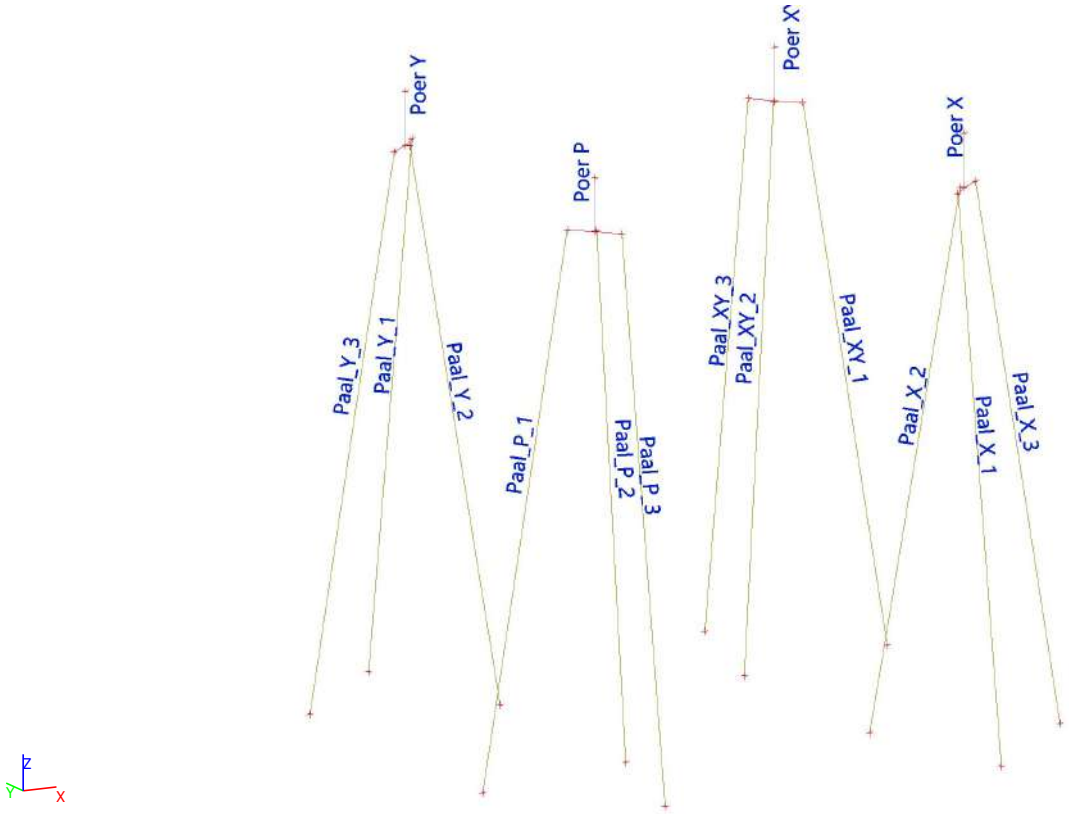


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	12,477	1P4	N5	column (100)
Poer P	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N1	1P	column (100)
Poer X	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N2	1Y	column (100)
Poer XY	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N3	1XY	column (100)
Poer Y	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N4	1X	column (100)
Paal_P_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	12,477	1P6	N22	column (100)
Paal_P_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	12,477	1P2	N6	column (100)
Paal_XY_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	12,477	1P18	N16	column (100)
Paal_XY_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	12,477	1P20	N18	column (100)
Paal_XY_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	12,477	1P16	N17	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_X_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	12,477	1P11	N12	column (100)
Paal_X_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	12,477	1P13	N8	column (100)
Paal_X_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	12,477	1P9	N13	column (100)
Paal_Y_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	12,477	1P25	N20	column (100)
Paal_Y_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	12,477	1P27	N21	column (100)
Paal_Y_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	12,477	1P23	N10	column (100)

5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
S_P_1	N5	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,50
S_P_2	N22	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,72;Ry-6,72
S_P_3	N6	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,50
S_X_1	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,50
S_X_2	N8	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,72;Ry6,72
S_X_3	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,50
S_XY_1	N16	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,50
S_XY_2	N18	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,72;Ry6,72
S_XY_3	N17	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,50
S_Y_1	N20	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,50
S_Y_2	N21	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,72;Ry-6,72
S_Y_3	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,50

5.6. Analyse model met Knoopondersteuningen

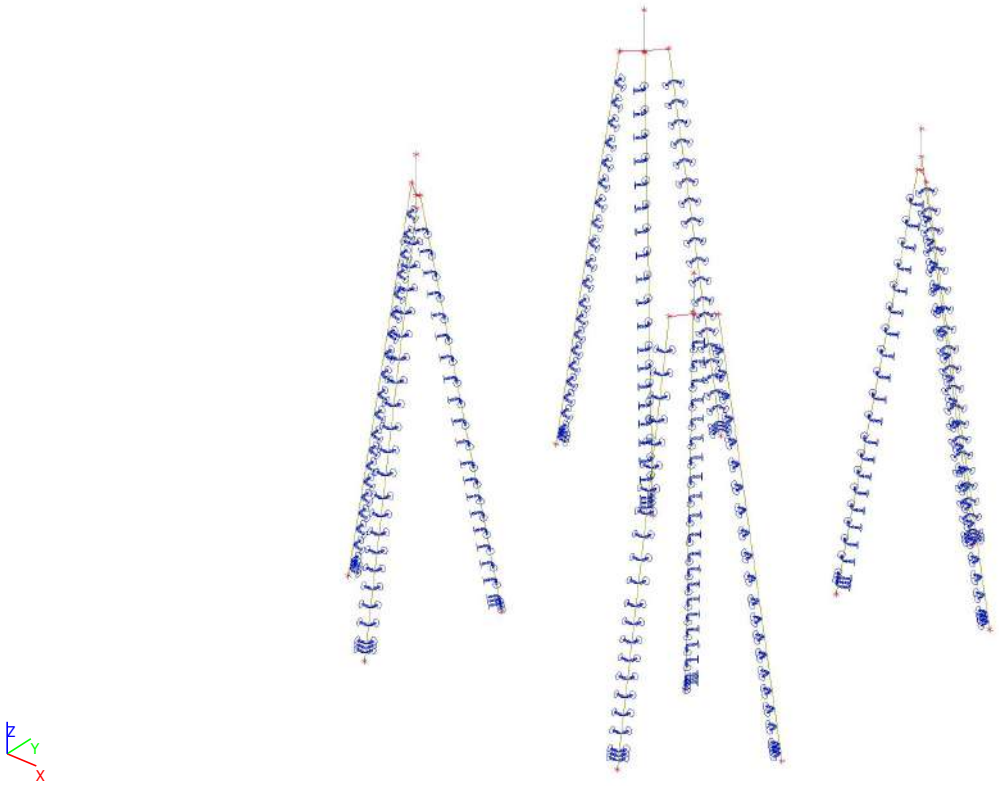
5.7. Line supports on member

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Slb_P_1_06	Line	Paal_P_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_07	Line	Paal_P_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_08	Line	Paal_P_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_09	Line	Paal_P_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_06	Line	Paal_P_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_07	Line	Paal_P_3 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_08	Line	Paal_P_3 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_09	Line	Paal_P_3 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_06	Line	Paal_X_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_07	Line	Paal_X_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_08	Line	Paal_X_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_09	Line	Paal_X_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_06	Line	Paal_X_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_07	Line	Paal_X_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

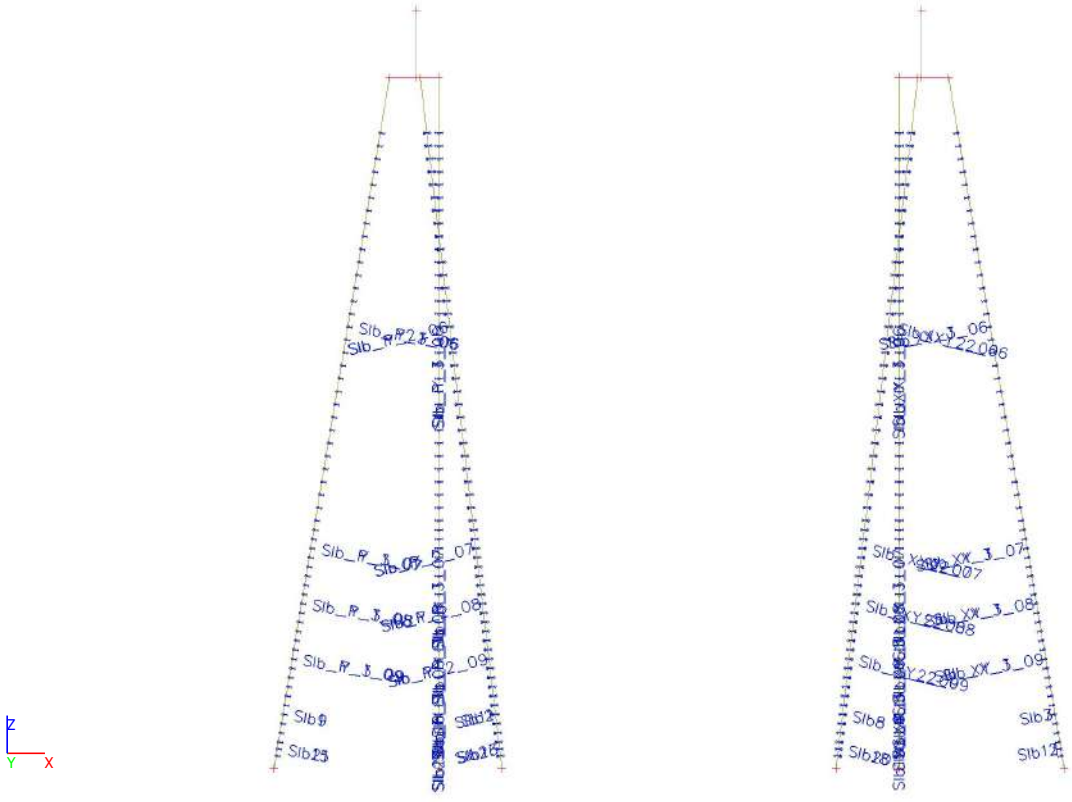
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	9,000	From start						
Slb_X_3_08	Line	Paal_X_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_3_09	Line	Paal_X_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_1_06	Line	Paal_XY_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_1_07	Line	Paal_XY_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_1_08	Line	Paal_XY_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_1_09	Line	Paal_XY_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_3_06	Line	Paal_XY_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_3_07	Line	Paal_XY_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_3_08	Line	Paal_XY_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_3_09	Line	Paal_XY_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_1_06	Line	Paal_Y_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_1_07	Line	Paal_Y_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_1_08	Line	Paal_Y_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_1_09	Line	Paal_Y_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_06	Line	Paal_Y_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_07	Line	Paal_Y_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_08	Line	Paal_Y_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_09	Line	Paal_Y_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_P_2_06	Line	Paal_P_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_P_2_07	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_2_08	Line	Paal_P_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_2_09	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_X_2_06	Line	Paal_X_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_X_2_07	Line	Paal_X_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_2_08	Line	Paal_X_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_2_09	Line	Paal_X_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_2_06	Line	Paal_XY_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_2_07	Line	Paal_XY_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_2_08	Line	Paal_XY_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_2_09	Line	Paal_XY_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_2_06	Line	Paal_Y_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_2_07	Line	Paal_Y_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	9,000	From start						
Slb_Y_2_08	Line	Paal_Y_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_2_09	Line	Paal_Y_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb	Line	Paal_P_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb1	Line	Paal_P_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb2	Line	Paal_P_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb3	Line	Paal_X_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb4	Line	Paal_X_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb5	Line	Paal_X_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb6	Line	Paal_XY_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb7	Line	Paal_XY_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb8	Line	Paal_XY_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb9	Line	Paal_Y_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb10	Line	Paal_Y_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb11	Line	Paal_Y_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb12	Line	Paal_X_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Slb13	Line	Paal_XY_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Slb14	Line	Paal_P_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Slb15	Line	Paal_P_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Slb16	Line	Paal_P_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Slb17	Line	Paal_X_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Slb18	Line	Paal_X_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Slb19	Line	Paal_XY_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Slb20	Line	Paal_XY_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Slb21	Line	Paal_Y_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Slb22	Line	Paal_Y_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						
Slb23	Line	Paal_Y_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,250	From start						

5.8. Analyse model met Lijnondersteuningen



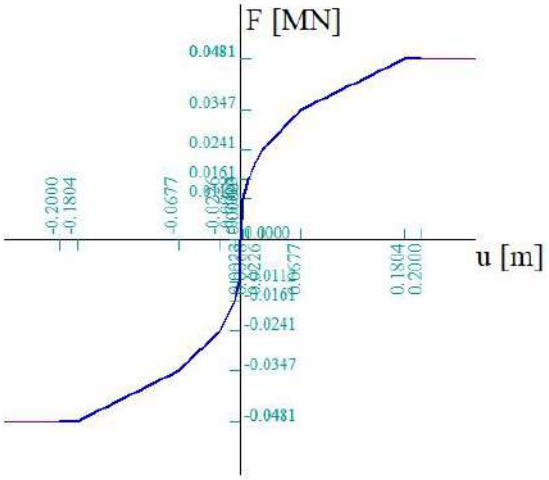
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

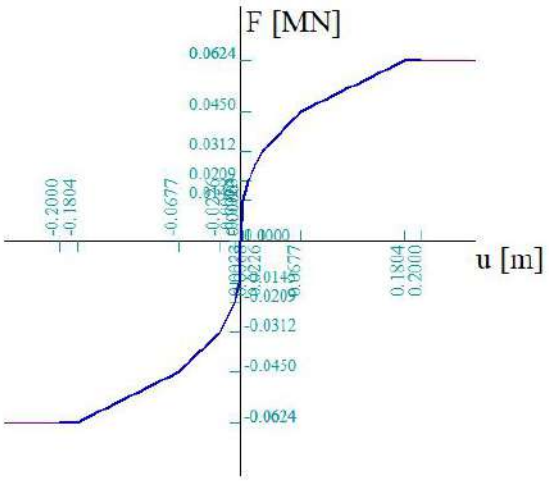
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -48130.000000	Free	Free
		-0.180400 / -48130.000000		
		-0.067650 / -34710.000000		
		-0.022550 / -24064.500000		
		-0.006765 / -16109.569000		
		-0.002255 / -11169.751000		
		0.000000 / 0.000000		
		0.002255 / 11169.751000		
		0.006765 / 16109.569000		
		0.022550 / 24064.500000		
		0.067650 / 34707.015000		
		0.180400 / 48129.000000		
		0.200000 / 48129.000000		

Drawing



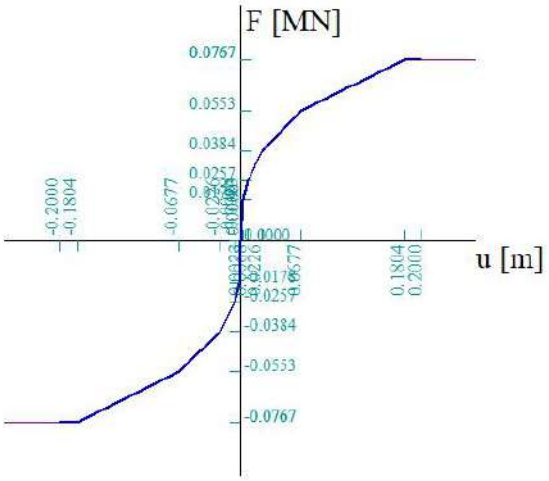
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -62400.000000	Free	Free
		-0.180400 / -62400.000000		
		-0.067650 / -45000.000000		
		-0.022550 / -31200.000000		
		-0.006765 / -20900.000000		
		-0.002255 / -14500.000000		
		0.000000 / 0.000000		
		0.002255 / 14490.000000		
		0.006765 / 20900.000000		
		0.022550 / 31220.000000		
		0.067650 / 45020.000000		
		0.180400 / 62430.000000		
		0.200000 / 62430.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -76737.000000	Free	Free
		-0.180400 / -76737.000000		
		-0.067650 / -55336.953000		
		-0.022550 / -38368.500000		
		-0.006765 / -25685.138000		
		-0.002255 / -17809.080000		
		0.000000 / 0.000000		
		0.002255 / 17809.080000		
		0.006765 / 25685.138000		
		0.022550 / 38368.500000		
		0.067650 / 55336.953000		
		0.180400 / 76737.000000		
		0.200000 / 76737.000000		

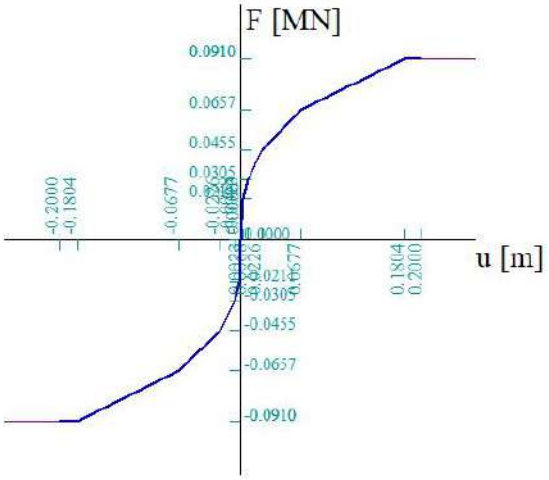
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -91041.000000	Free	Free
		-0.180400 / -91041.000000		
		-0.067650 / -65651.922000		
		-0.022550 / -45520.500000		
		-0.006765 / -30472.923000		
		-0.002255 / -21128.744000		
		0.000000 / 0.000000		
		0.002255 / 21128.744000		
		0.006765 / 30472.923000		
		0.022550 / 45520.500000		

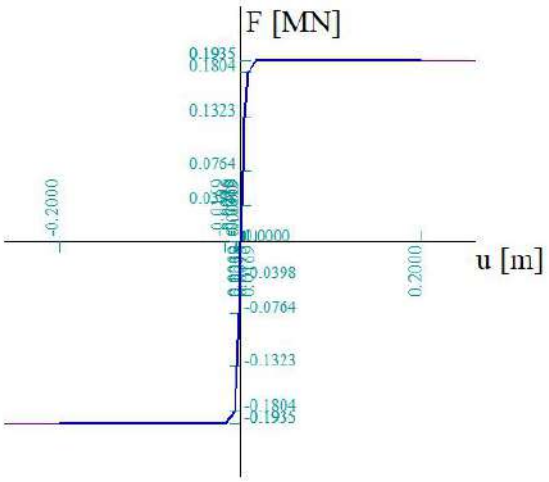
Name	Type	u / F	Positive end	Negative end
		0.067650 / 65651.922000		
		0.180400 / 91041.000000		
		0.200000 / 91041.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -193489.147000	Free	Free
		-0.016913 / -193489.147000		
		-0.007517 / -180407.835000		
		-0.003758 / -132256.824000		
		-0.001879 / -76421.758000		
		-0.000940 / -39826.202000		
		0.000000 / 0.000000		
		0.000940 / 39826.202000		
		0.001879 / 76421.758000		
		0.003758 / 132256.824000		
		0.007517 / 180407.835000		
		0.016913 / 193489.147000		
		0.200000 / 193489.147000		

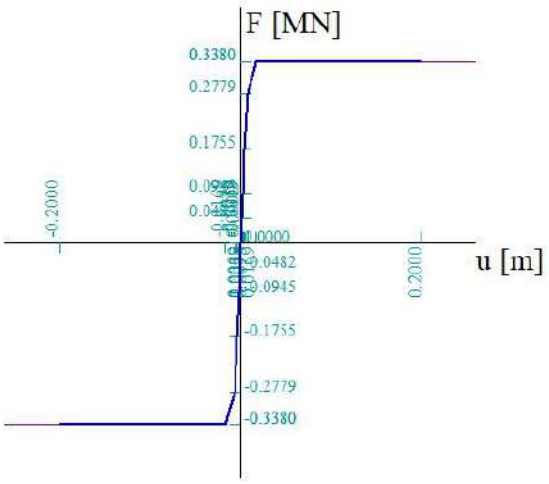
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -338024.958000	Free	Free
		-0.016913 / -338024.958000		
		-0.007517 / -277917.886000		
		-0.003758 / -175526.039000		

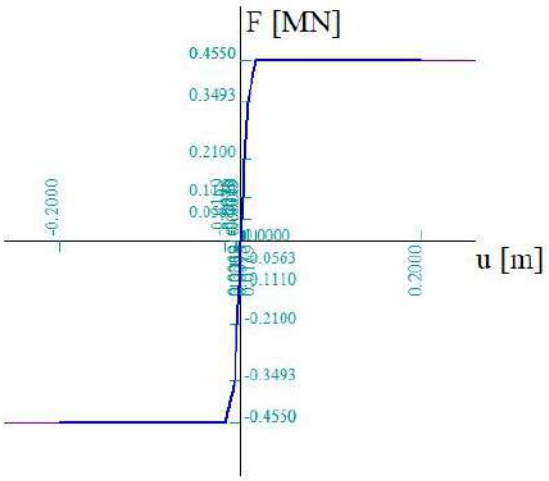
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -94450.113000		
		-0.000940 / -48160.629000		
		0.000000 / 0.000000		
		0.000940 / 48160.629000		
		0.001879 / 94450.113000		
		0.003758 / 175526.039000		
		0.007517 / 277917.886000		
		0.016913 / 338024.958000		
		0.200000 / 338024.958000		

Drawing



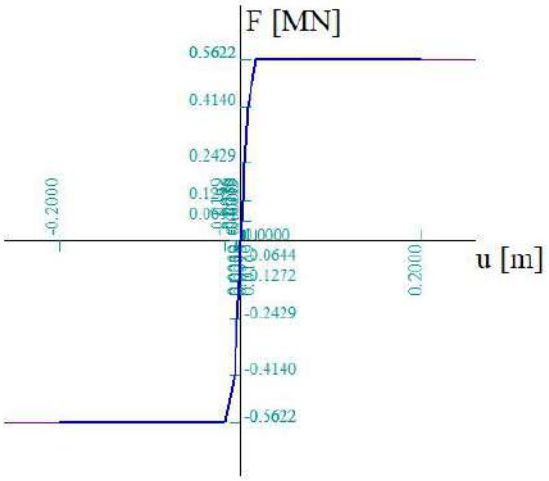
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -454964.396000	Free	Free
		-0.016913 / -454964.396000		
		-0.007517 / -349336.178000		
		-0.003758 / -210048.905000		
		-0.001879 / -110961.163000		
		-0.000940 / -56287.593000		
		0.000000 / 0.000000		
		0.000940 / 56287.593000		
		0.001879 / 110961.163000		
		0.003758 / 210048.905000		
		0.007517 / 349336.178000		
		0.016913 / 454964.396000		
		0.200000 / 454964.396000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -562170.498000	Free	Free
		-0.016913 / -562170.498000		
		-0.007517 / -413992.721000		
		-0.003758 / -242873.332000		
		-0.001879 / -127210.864000		
		-0.000940 / -64380.055000		
		0.000000 / 0.000000		
		0.000940 / 64380.055000		
		0.001879 / 127210.864000		
		0.003758 / 242873.332000		
		0.007517 / 413992.721000		
		0.016913 / 562170.498000		
		0.200000 / 562170.498000		

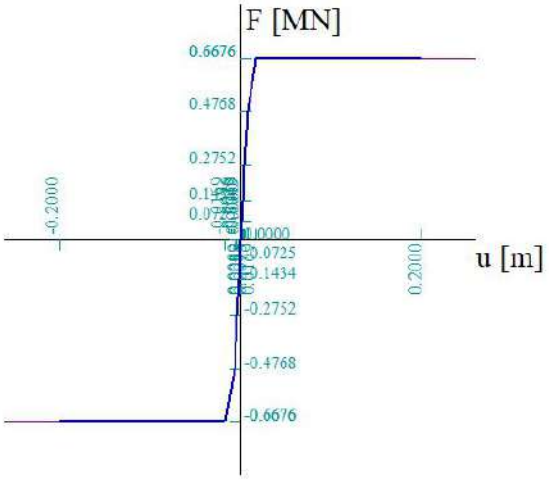
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -667564.512000	Free	Free
		-0.016913 / -667564.512000		
		-0.007517 / -476770.926000		
		-0.003758 / -275233.374000		
		-0.001879 / -143390.211000		
		-0.000940 / -72463.274000		
		0.000000 / 0.000000		
		0.000940 / 72463.274000		
		0.001879 / 143390.211000		
		0.003758 / 275233.374000		

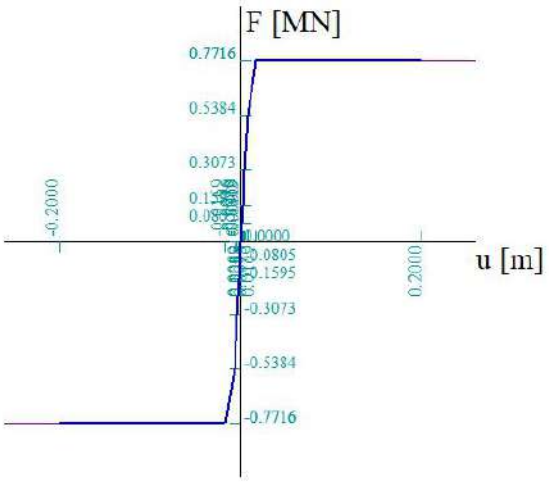
Name	Type	u / F	Positive end	Negative end
		0.007517 / 476770.926000		
		0.016913 / 667564.512000		
		0.200000 / 667564.512000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -771639.629000	Free	Free
		-0.016913 / -771639.629000		
		-0.007517 / -538432.081000		
		-0.003758 / -307337.483000		
		-0.001879 / -159531.700000		
		-0.000940 / -80541.551000		
		0.000000 / 0.000000		
		0.000940 / 80541.551000		
		0.001879 / 159531.700000		
		0.003758 / 307337.483000		
		0.007517 / 538432.081000		
		0.016913 / 771639.629000		
		0.200000 / 771639.629000		

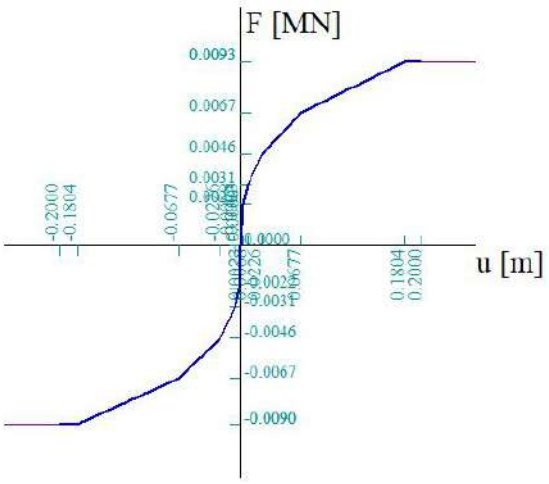
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -9000.000000	Free	Free
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		

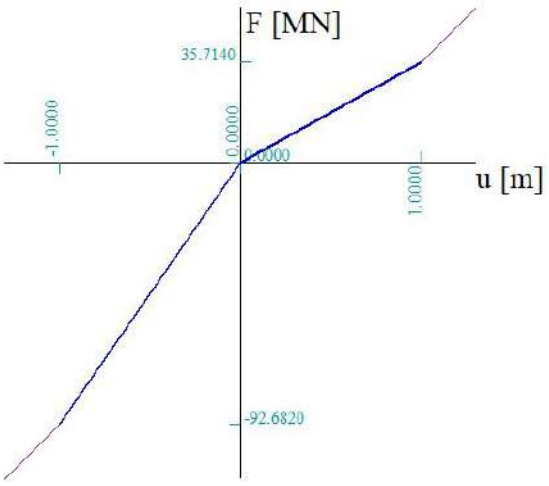
Name	Type	u / F	Positive end	Negative end
		-0.006765 / -3100.000000		
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing



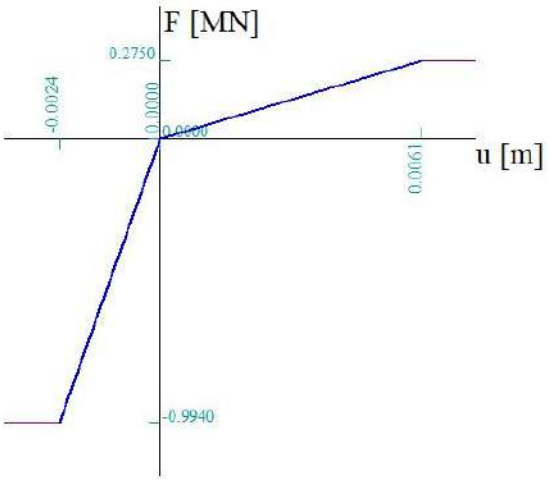
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+0-paalpunt	Translation	-1.000000 / -92682000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 35714000.000000		

Drawing



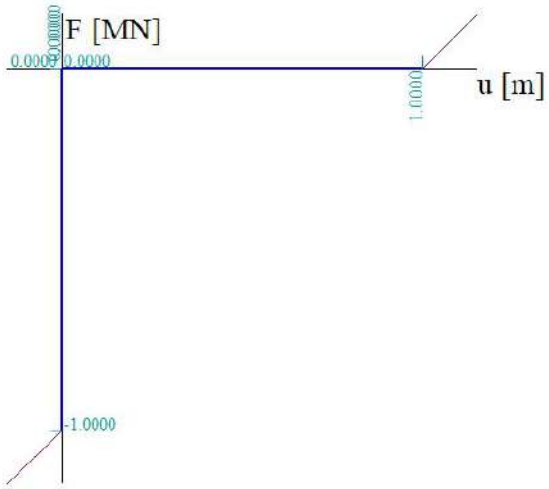
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+0-paalpunt_cap275kN	Translation	-0.002350 / -994000.000000	Free	Free
		0.000000 / 0.000000		
		0.006120 / 275000.000000		

Drawing



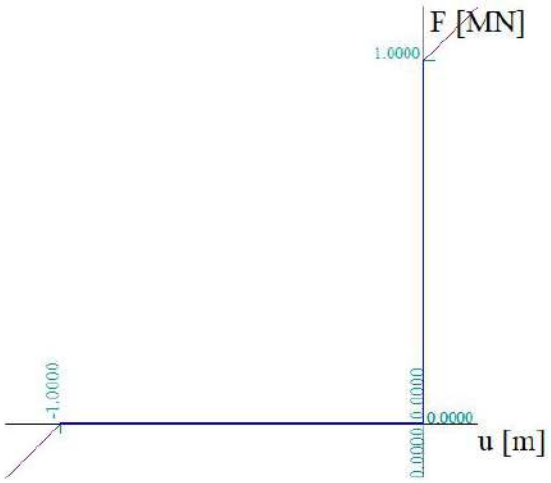
Name	Type	u / F	Positive end	Negative end
press only	Translation	-0.000001 / -1000000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 0.000000		

Drawing



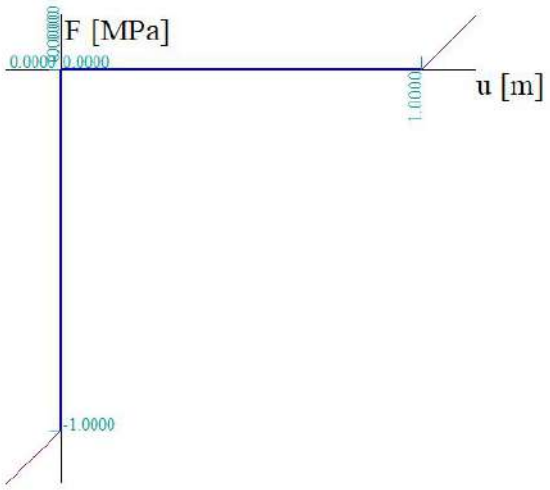
Name	Type	u / F	Positive end	Negative end
tension only	Translation	-1.000000 / 0.000000	Flexible	Flexible
		0.000000 / 0.000000		
		0.000001 / 1000000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing

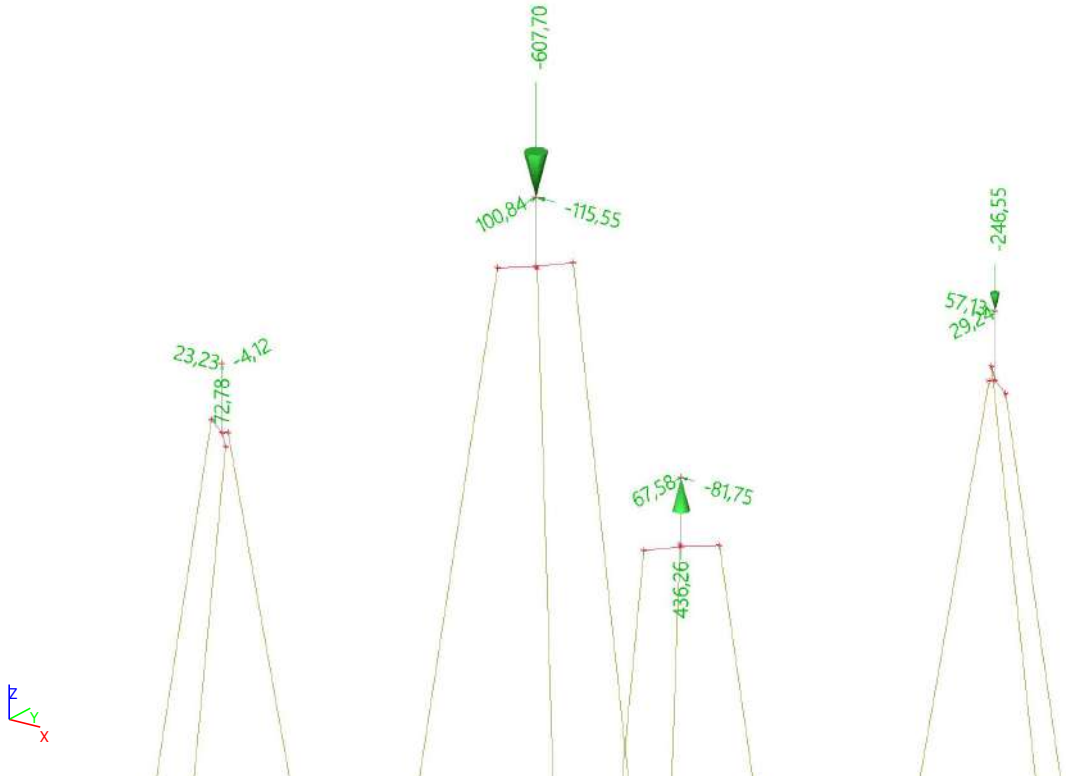


6. Belastingen

6.1. Load cases

6.1.1. Load cases - high max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



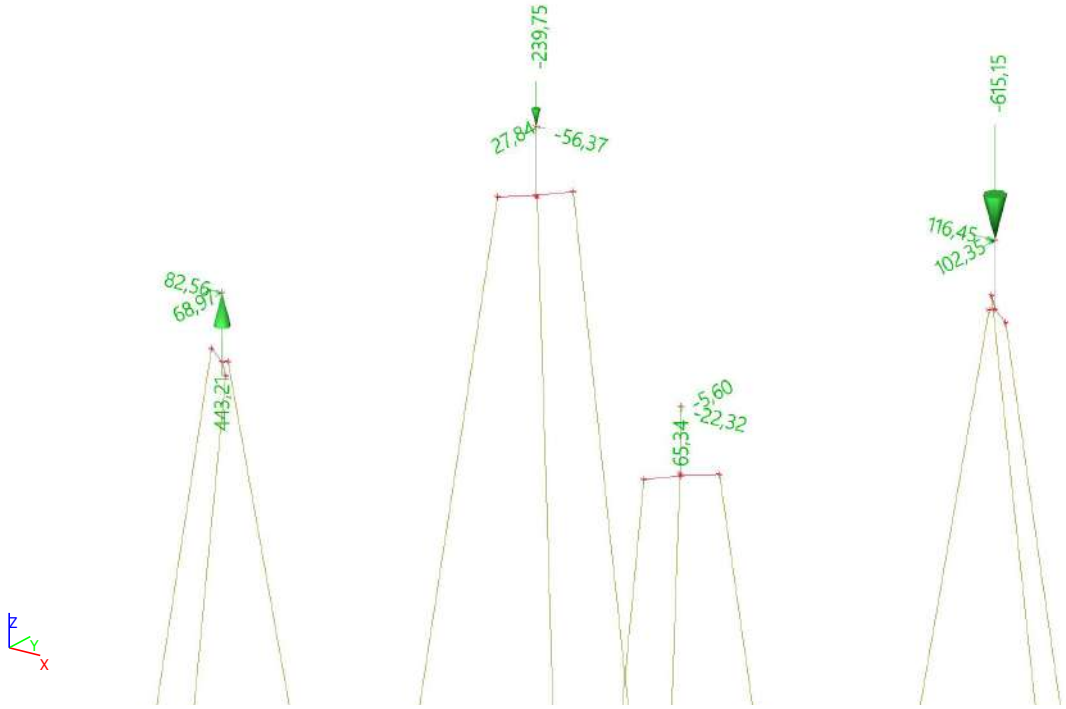
6.1.1.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Force	23,23
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Force	-4,12
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Force	72,78
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Force	-115,55
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Force	100,84
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Force	-607,70
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Force	57,13
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Force	29,24
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Force	-246,55

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Force	-81,75
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Force	67,58
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Force	436,26

6.1.2. Load cases - high max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



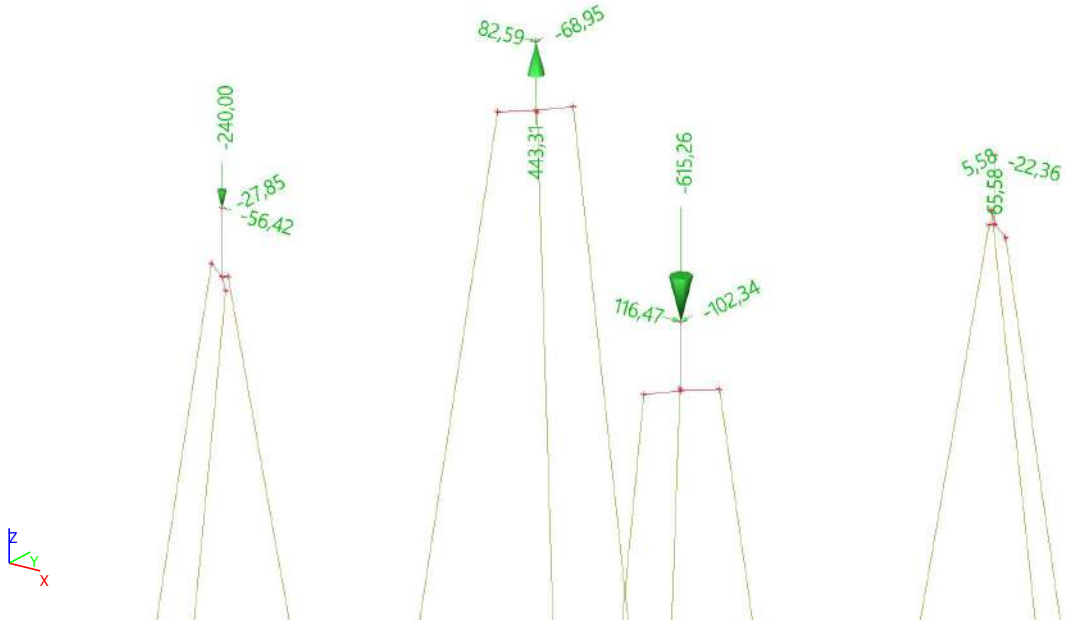
6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Force	82,56
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Force	68,97
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Force	443,21
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Force	-56,37
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Force	27,84
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Force	-239,75

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Force	116,45
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Force	102,35
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Force	-615,15
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Force	-22,32
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Force	-5,60
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Force	65,34

6.1.3. Load cases - high max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



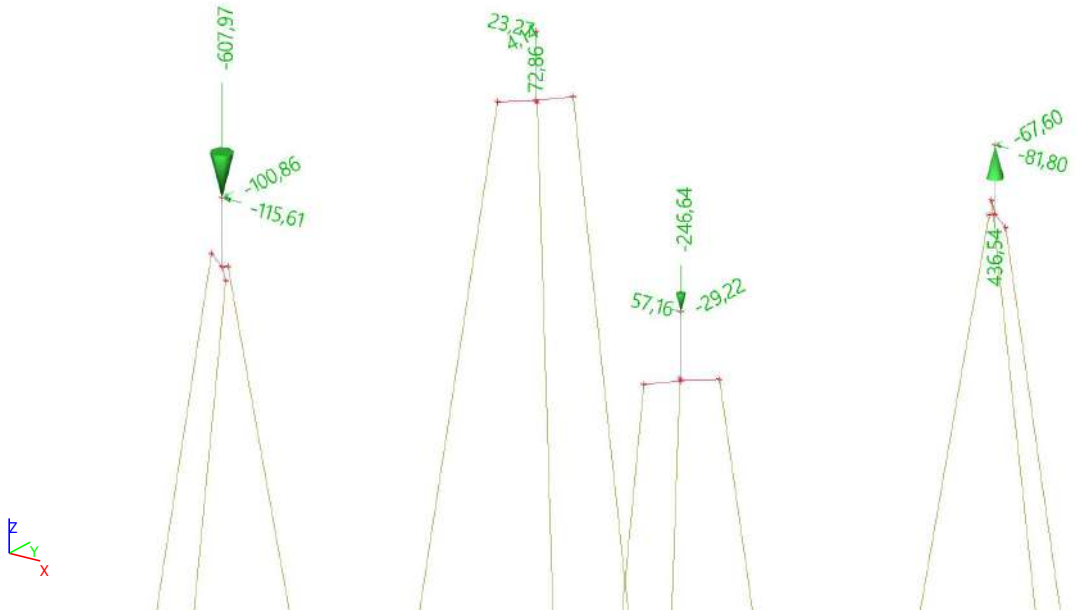
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Force	-56,42
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Force	-27,85
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Force	-240,00

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Force	82,59
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Force	-68,95
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Force	443,31
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Force	-22,36
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Force	5,58
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Force	65,58
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Force	116,47
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Force	-102,34
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Force	-615,26

6.1.4. Load cases - high max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			

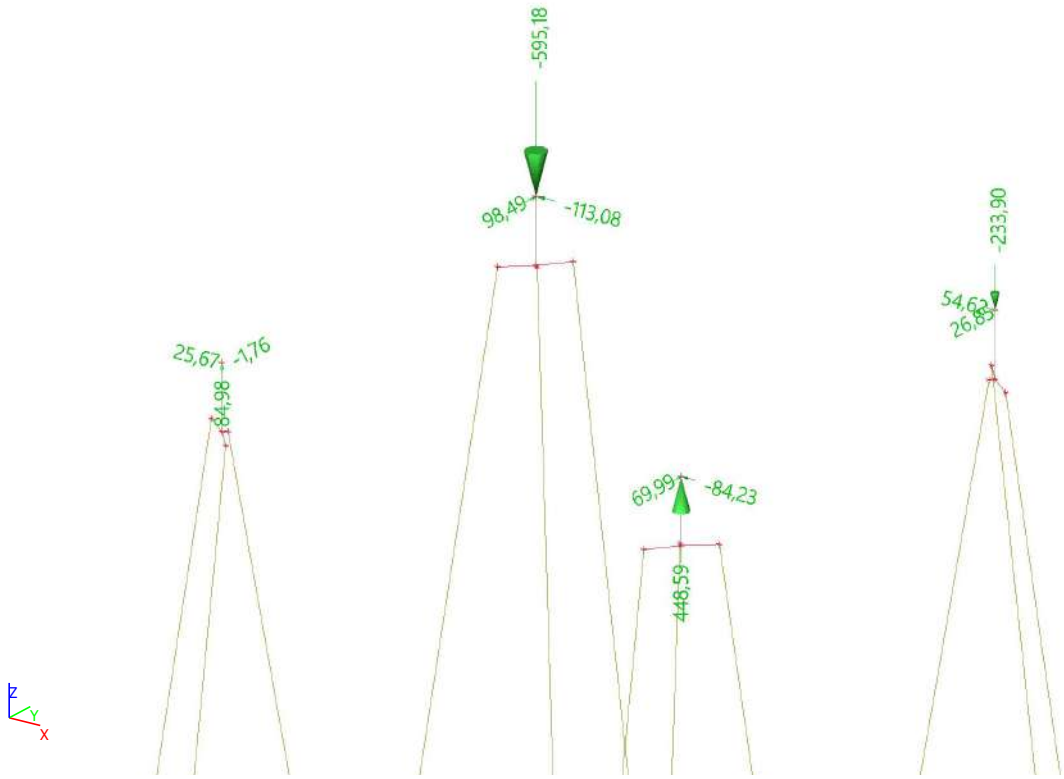


6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Force	-115,61
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Force	-100,86
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Force	-607,97
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Force	23,27
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Force	4,14
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Force	72,86
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Force	-81,80
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Force	-67,60
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Force	436,54
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Force	57,16
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Force	-29,22
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Force	-246,64

6.1.5. Load cases - low max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			

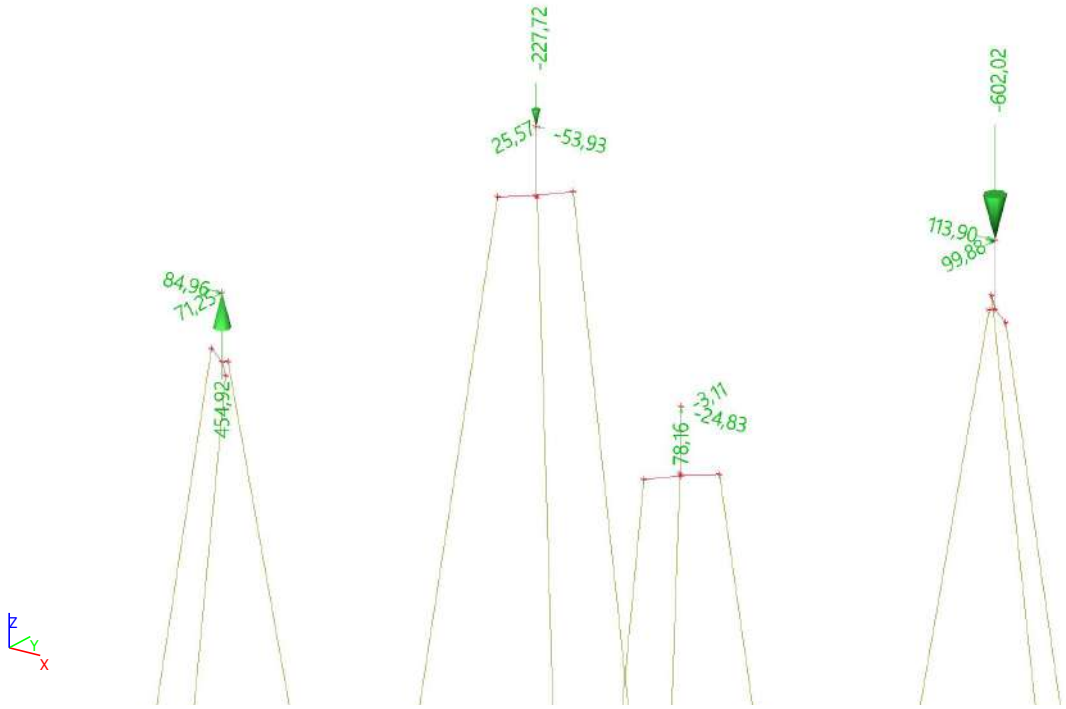


6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Force	25,67
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Force	-1,76
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Force	84,98
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Force	-113,08
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Force	98,49
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Force	-595,18
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Force	54,62
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Force	26,85
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Force	-233,90
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Force	-84,23
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Force	69,99
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Force	448,59

6.1.6. Load cases - low max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



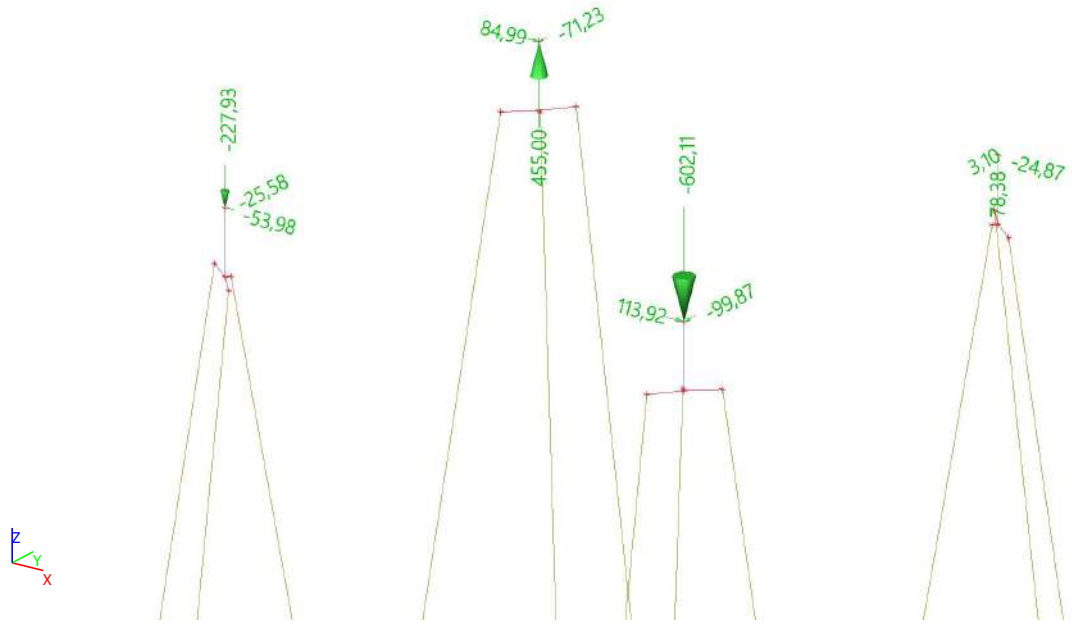
6.1.6.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Force	84,96
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Force	71,25
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Force	454,92
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Force	-53,93
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Force	25,57
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Force	-227,72
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Force	113,90
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Force	99,88
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Force	-602,02
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Force	-24,83
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Force	-3,11

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Force	78,16

6.1.7. Load cases - low max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



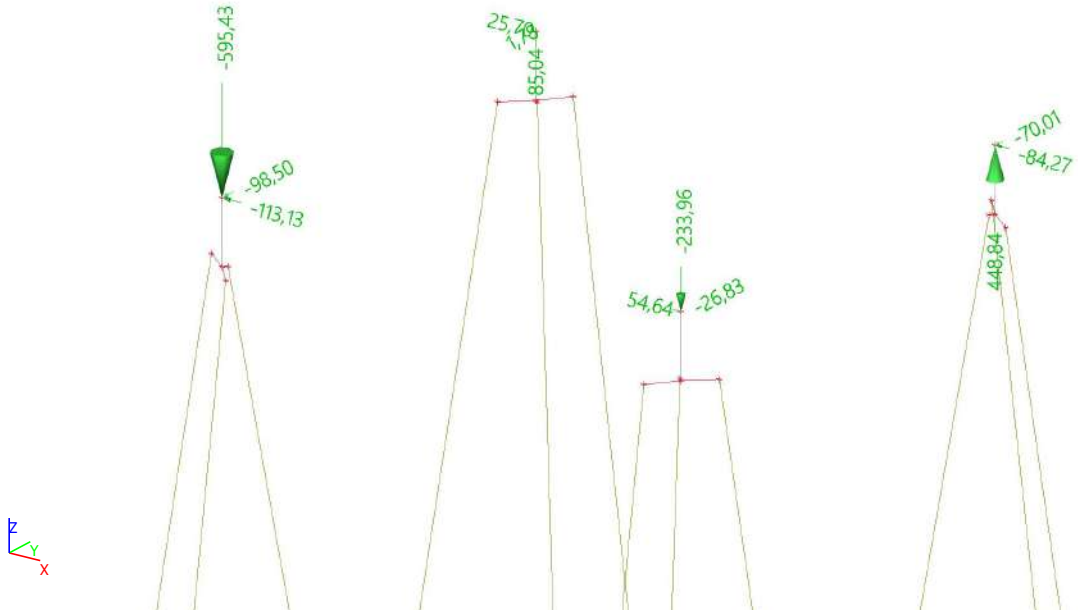
6.1.7.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Force	-53,98
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Force	-25,58
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Force	-227,93
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Force	84,99
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Force	-71,23
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Force	455,00
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Force	-24,87
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Force	3,10

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Force	78,38
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Force	113,92
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Force	-99,87
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Force	-602,11

6.1.8. Load cases - low max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



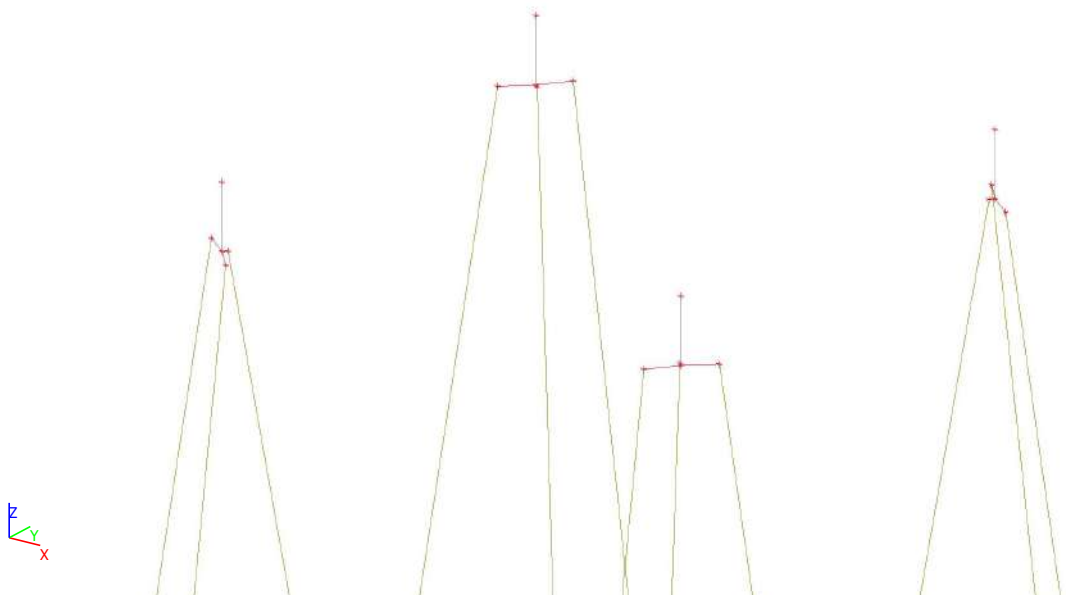
6.1.8.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Force	-113,13
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Force	-98,50
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Force	-595,43
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Force	25,70
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Force	1,78

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Force	85,04
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Force	-84,27
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Force	-70,01
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Force	448,84
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Force	54,64
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Force	-26,83
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Force	-233,96

6.1.9. Load cases - EG_fundering

Name	Description	Action type	Load group	Direction
	Spec	Load type		
EG_fundering		Permanent	LG1	-Z
		Self weight		



6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
low max Wnd ;45° - EG_gunstig	Ultimate	low max Wnd ;45°	1,000
		EG_fundering	0,900
low max Wnd ;135° - EG_gunstig	Ultimate	low max Wnd ;135°	1,000
		EG_fundering	0,900
low max Wnd ;225° - EG_gunstig	Ultimate	low max Wnd ;225°	1,000
		EG_fundering	0,900
low max Wnd ;315° - EG_gunstig	Ultimate	low max Wnd ;315°	1,000
		EG_fundering	0,900
high max Wnd ;45° - EG_ongunstig	Ultimate	high max Wnd ;45°	1,000
		EG_fundering	1,200
high max Wnd ;135° - EG_ongunstig	Ultimate	high max Wnd ;135°	1,000
		EG_fundering	1,200
high max Wnd ;225° - EG_ongunstig	Ultimate	high max Wnd ;225°	1,000
		EG_fundering	1,200
high max Wnd ;315° - EG_ongunstig	Ultimate	high max Wnd ;315°	1,000
		EG_fundering	1,200

6.3. Result classes

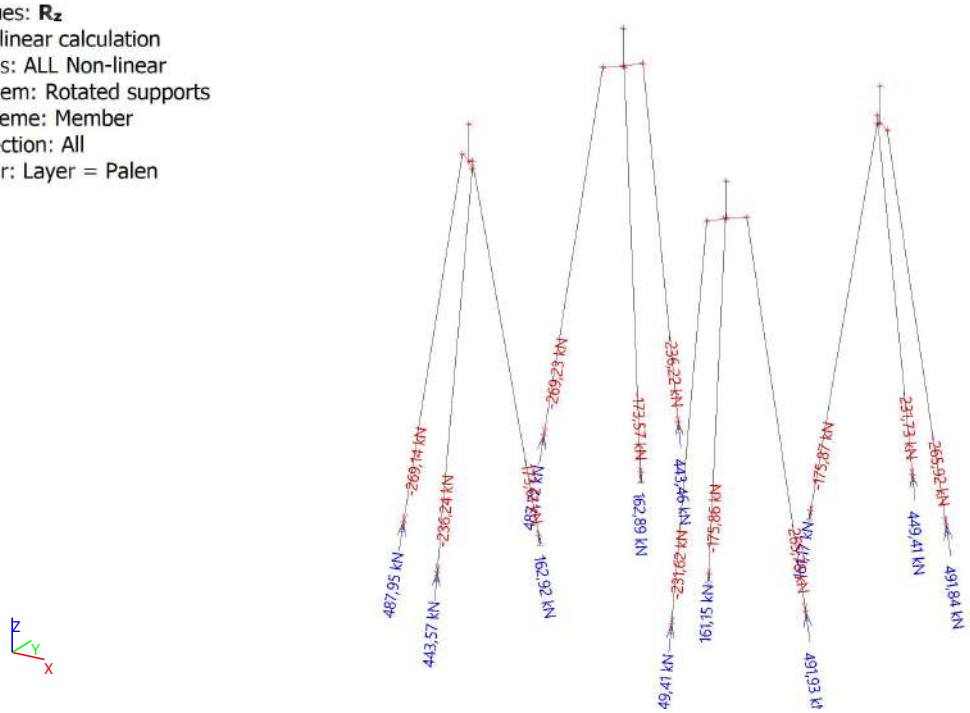
Name	List
ALL Non-linear	low max Wnd ;45° - EG_gunstig
	low max Wnd ;135° - EG_gunstig
	low max Wnd ;225° - EG_gunstig
	low max Wnd ;315° - EG_gunstig
	high max Wnd ;45° - EG_ongunstig
	high max Wnd ;135° - EG_ongunstig
	high max Wnd ;225° - EG_ongunstig
	high max Wnd ;315° - EG_ongunstig

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen

Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_Y_3/N10	high max Wnd ;135° - EG_ongunstig	**0,00**	0,00	250,19	0,00	0,00	0,00	0,0	0,0
S_XY_1/N16	low max Wnd ;45° - EG_gunstig	**0,00**	0,00	231,27	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_2/N8	low max Wnd ;45° - EG_gunstig	0,00	**0,00**	151,06	0,00	0,00	0,00	0,0	0,0
S_XY_3/N17	high max Wnd ;135° - EG_ongunstig	0,00	**0,00**	449,41	0,00	0,00	0,00	0,0	0,0
S_Y_3/N10	low max Wnd ;225° - EG_gunstig	0,00	0,00	**-269,23**	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	high max Wnd ;225° - EG_ongunstig	0,00	0,00	**491,93**	0,00	0,00	0,00	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: ALL Non-linear

System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen

Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_3/N6	high max Wnd ;315° - EG_ongunstig	0,00	**0,00**	**443,57**	0,00	0,00	0,00	0,0	0,0
S_P_3/N6	high max Wnd ;135° - EG_ongunstig	**0,00**	**0,00**	-217,43	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_3/N6	low max Wnd ;135° - EG_gunstig	0,00	0,00	**-236,24**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	high max Wnd ;135° - EG_ongunstig	**0,00**	**0,00**	-249,95	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_1/N5	low max Wnd ;135° - EG_gunstig	0,00	0,00	**-269,14**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	high max Wnd ;315° - EG_ongunstig	0,00	0,00	**487,95**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	low max Wnd ;225° - EG_gunstig	**0,00**	0,00	228,28	0,00	0,00	**0,00**	0,0	0,0
S_P_2/N22	low max Wnd ;135° - EG_gunstig	**0,00**	0,00	152,64	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_2/N22	low max Wnd ;315° - EG_gunstig	0,00	0,00	**-173,61**	0,00	0,00	0,00	0,0	0,0
S_P_2/N22	high max Wnd ;135° - EG_ongunstig	0,00	**0,00**	**162,92**	0,00	0,00	0,00	0,0	0,0
S_P_2/N22	high max Wnd ;315° - EG_ongunstig	**0,00**	**0,00**	-168,69	0,00	0,00	**0,00**	0,0	0,0
S_X_3/N13	low max Wnd ;315° - EG_gunstig	**0,00**	**0,00**	231,34	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_3/N13	low max Wnd ;45° - EG_gunstig	0,00	0,00	**-265,76**	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	high max Wnd ;225° - EG_ongunstig	**0,00**	0,00	**491,93**	0,00	0,00	**0,00**	0,0	0,0
S_X_1/N12	low max Wnd ;225° - EG_gunstig	0,00	**0,00**	427,05	0,00	0,00	0,00	0,0	0,0
S_X_1/N12	high max Wnd ;225° - EG_ongunstig	**0,00**	**0,00**	**449,41**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_1/N12	low max Wnd ;45° - EG_gunstig	0,00	0,00	**-231,62**	0,00	0,00	**0,00**	0,0	0,0
S_X_2/N8	high max Wnd ;225° - EG_ongunstig	**0,00**	0,00	-171,11	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_2/N8	low max Wnd ;45° - EG_gunstig	0,00	**0,00**	151,06	0,00	0,00	0,00	0,0	0,0
S_X_2/N8	low max Wnd ;225° - EG_gunstig	0,00	**0,00**	**-175,86**	0,00	0,00	0,00	0,0	0,0

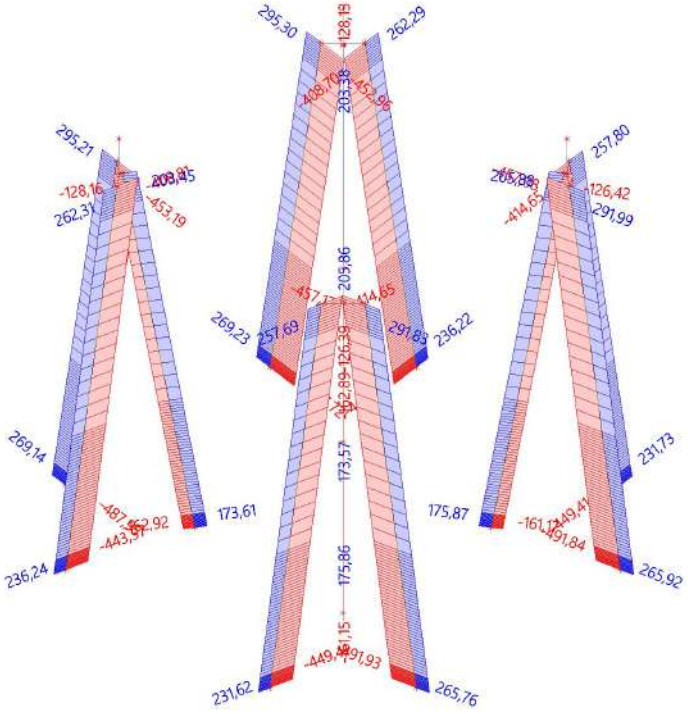
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_X_2/N8	high max Wnd ;45° - EG_ongunstig	0,00	0,00	**161,15**	0,00	0,00	0,00	0,0	0,0
S_X_2/N8	high max Wnd ;315° - EG_ongunstig	**0,00**	0,00	-33,70	0,00	0,00	**0,00**	0,0	0,0
S_XY_3/N17	low max Wnd ;135° - EG_gunstig	0,00	**0,00**	427,06	0,00	0,00	0,00	0,0	0,0
S_XY_3/N17	low max Wnd ;315° - EG_gunstig	0,00	0,00	**-231,73**	0,00	0,00	0,00	0,0	0,0
S_XY_3/N17	high max Wnd ;135° - EG_ongunstig	**0,00**	**0,00**	**449,41**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_1/N16	low max Wnd ;45° - EG_gunstig	**0,00**	**0,00**	231,27	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_1/N16	high max Wnd ;135° - EG_ongunstig	0,00	0,00	**491,84**	0,00	0,00	0,00	0,0	0,0
S_XY_1/N16	low max Wnd ;315° - EG_gunstig	**0,00**	0,00	**-265,92**	0,00	0,00	**0,00**	0,0	0,0
S_XY_2/N18	high max Wnd ;135° - EG_ongunstig	**0,00**	0,00	-171,13	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_2/N18	high max Wnd ;45° - EG_ongunstig	0,00	**0,00**	-33,70	0,00	0,00	0,00	0,0	0,0
S_XY_2/N18	low max Wnd ;315° - EG_gunstig	0,00	**0,00**	151,08	0,00	0,00	0,00	0,0	0,0
S_XY_2/N18	low max Wnd ;135° - EG_gunstig	0,00	0,00	**-175,87**	0,00	0,00	0,00	0,0	0,0
S_XY_2/N18	high max Wnd ;315° - EG_ongunstig	**0,00**	0,00	**161,17**	0,00	0,00	**0,00**	0,0	0,0
S_Y_3/N10	high max Wnd ;225° - EG_ongunstig	**0,00**	**0,00**	-250,04	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_3/N10	low max Wnd ;225° - EG_gunstig	0,00	0,00	**-269,23**	0,00	0,00	0,00	0,0	0,0
S_Y_3/N10	high max Wnd ;45° - EG_ongunstig	0,00	0,00	**487,72**	0,00	0,00	0,00	0,0	0,0
S_Y_3/N10	high max Wnd ;135° - EG_ongunstig	**0,00**	0,00	250,19	0,00	0,00	**0,00**	0,0	0,0
S_Y_1/N20	low max Wnd ;135° - EG_gunstig	0,00	**0,00**	148,85	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	low max Wnd ;225° - EG_gunstig	0,00	0,00	**-236,22**	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	high max Wnd ;45° - EG_ongunstig	**0,00**	**0,00**	**443,46**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_2/N21	high max Wnd ;225° - EG_ongunstig	**0,00**	**0,00**	**162,89**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_2/N21	low max Wnd ;45° - EG_gunstig	0,00	**0,00**	**-173,57**	0,00	0,00	0,00	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_Y_2/N21	high max Wnd ;45° - EG_ongunstig	**0,00**	0,00	-168,62	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

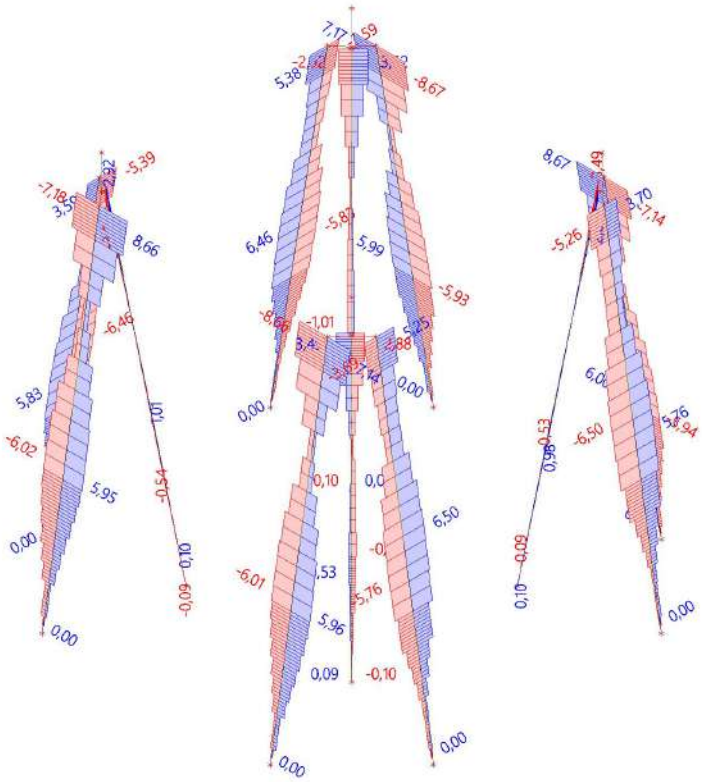
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



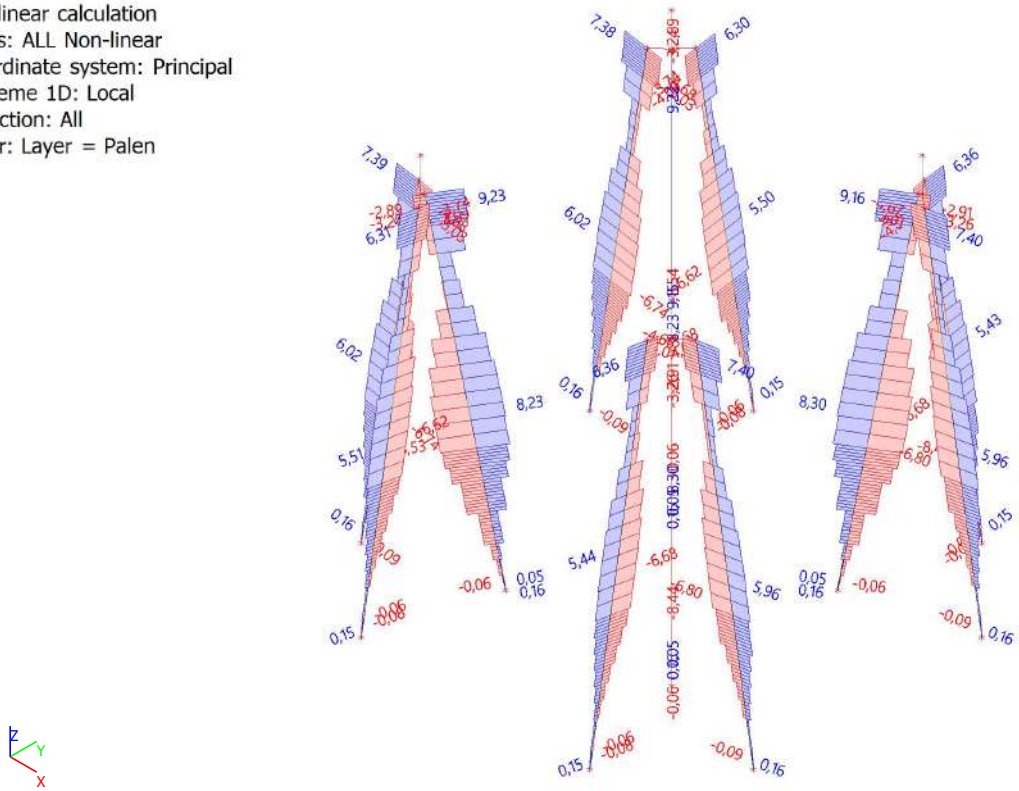
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



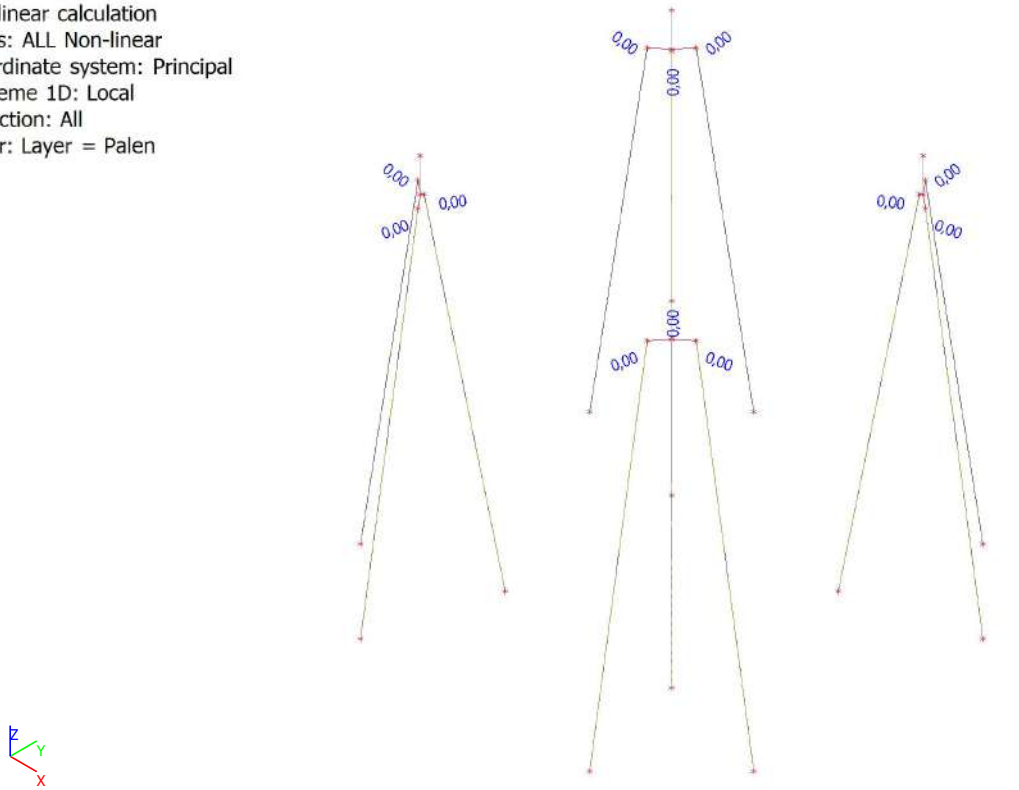
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



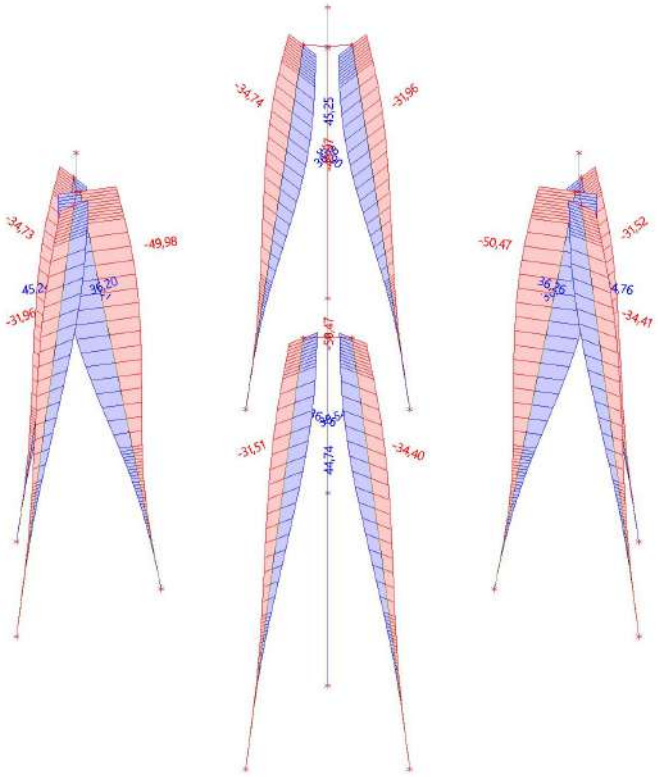
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



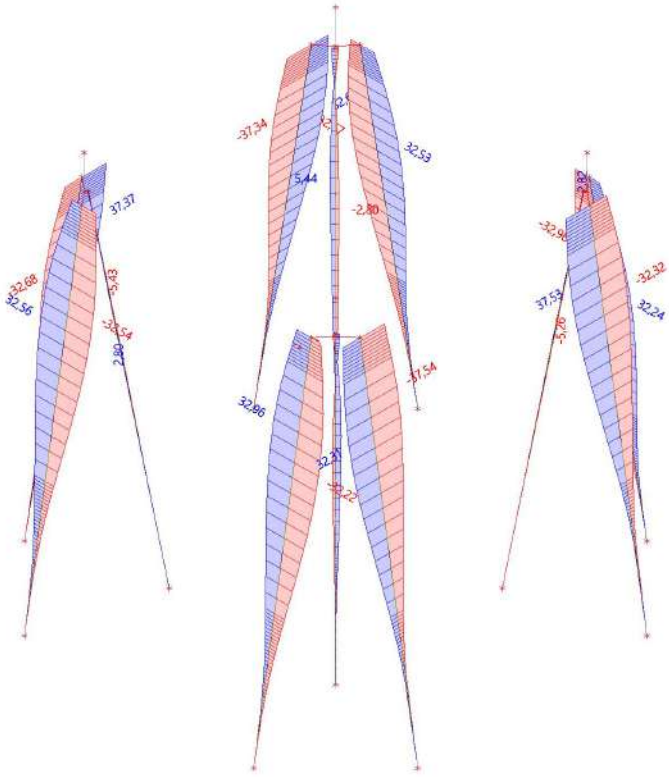
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_X_3	12,477	high max Wnd ;225° - EG_ongunstig	**-491,93**	0,00	0,16	0,00	0,00	0,00
Paal_Y_3	0,000	low max Wnd ;225° - EG_gunstig	**295,30**	5,38	-4,68	**0,00**	-25,87	22,96
Paal_Y_1	0,000	low max Wnd ;225° - EG_gunstig	262,29	**-8,67**	-3,74	0,00	-25,41	-13,25
Paal_XY_3	0,000	low max Wnd ;315° - EG_gunstig	257,80	**8,67**	-3,68	0,00	-25,12	12,88
Paal_Y_2	7,125+	low max Wnd ;225° - EG_gunstig	-142,36	-0,77	**-8,54**	0,00	24,29	2,32
Paal_P_2	0,000	high max Wnd ;135° - EG_ongunstig	-128,16	-2,84	**9,23**	0,00	25,81	2,01
Paal_XY_2	1,875-	high max Wnd ;135° - EG_ongunstig	201,88	1,49	-1,18	0,00	**-50,47**	0,47
Paal_Y_2	2,750-	low max Wnd ;225° - EG_gunstig	-131,39	1,15	3,16	0,00	**45,25**	3,78
Paal_X_3	1,875-	high max Wnd ;225° - EG_ongunstig	-461,17	-2,07	5,18	0,00	34,56	**-37,54**
Paal_XY_1	1,875-	high max Wnd ;135° - EG_ongunstig	-461,08	2,08	5,18	0,00	34,57	**37,53**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer Y	1,200	low max Wnd ;225° - EG_gunstig	**455,00**	-110,46	-9,73	**0,00**	0,00	0,00
Poer Y	0,000	low max Wnd ;225° - EG_gunstig	425,23	**-110,46**	-9,73	0,00	11,68	**132,56**
Poer P	0,000	high max Wnd ;225° - EG_ongunstig	-279,69	59,59	**-20,20**	0,00	**24,24**	-71,51
Poer Y	0,000	high max Wnd ;135° - EG_ongunstig	-279,44	59,55	**20,17**	0,00	**-24,21**	-71,45
Poer X	0,000	high max Wnd ;225° - EG_ongunstig	**-654,95**	**154,72**	9,99	0,00	-11,99	**-185,67**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Blokpoer 3xBeton40x40 Mast 36
Author	[redacted]
Date	07-05-2025
Structure	General XYZ
No. of nodes :	32
No. of beams :	16
No. of slabs :	0
No. of solids :	0
No. of used profiles :	2
No. of load cases :	9
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materials

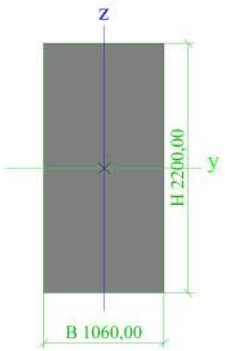
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C12/15 Gescheurd	Concrete	2500,00	2600,00	7,0000e+03	0.2	0,01e-003	12,00	
C20/25 Ongescheurd	Concrete	1500,00	2600,00	2,4000e+04	0.2	0,01e-003	20,00	

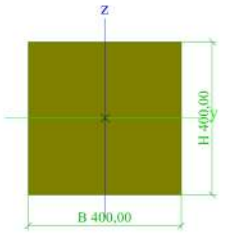
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Reinforcement steel	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

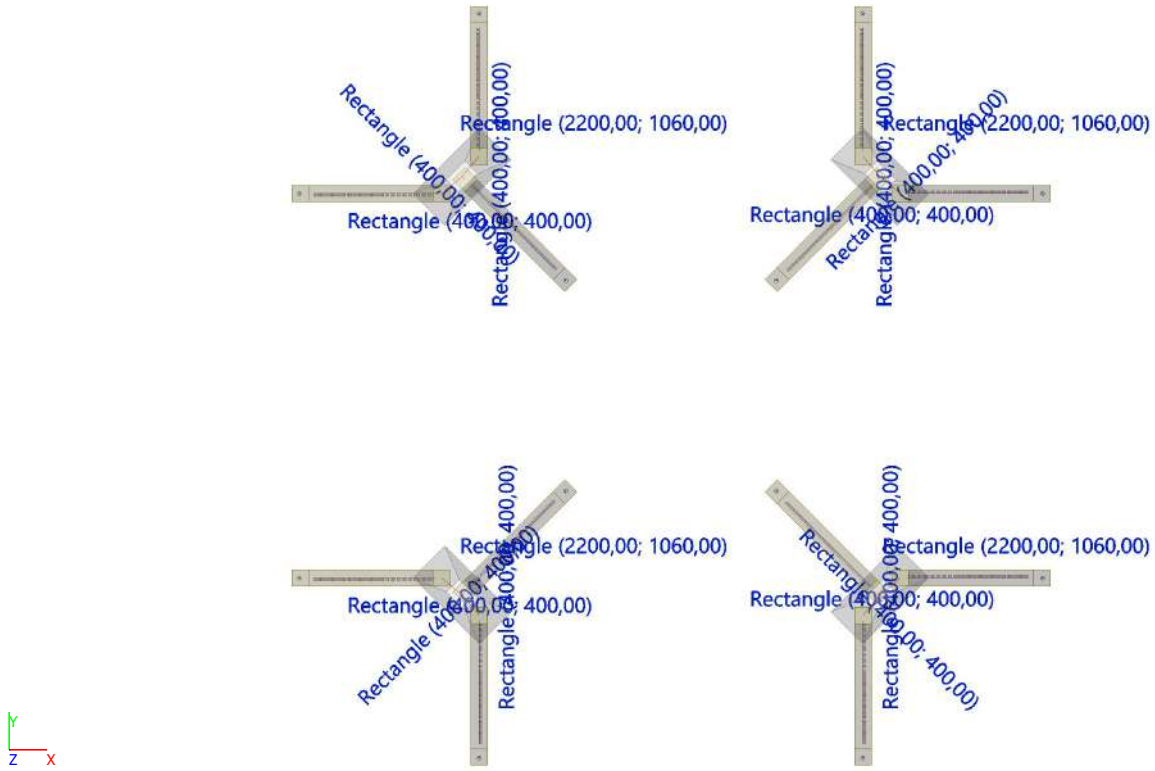
4.2. Cross-sections

Poer		
Type	Rectangle	
Detailed	2200,00; 1060,00	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	concrete	
Colour		
A [mm²]	2,3320e+06	
A_y [mm²], A_z [mm²]	1,9433e+06	1,9433e+06
A_L [m²/m], A_D [m²/m]	6,5200e+00	6,5200e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	530,00	1100,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	9,4057e+11	2,1835e+11
i_y [mm], i_z [mm]	635,09	306,00
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	8,5507e+08	4,1199e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	6,0907e+11	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		
Paal 40x40		
Type	Rectangle	
Detailed	400,00; 400,00	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [mm²]	1,6000e+05	

A_y [mm²], A_z [mm²]	1,3333e+05	1,3333e+05
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200,00	200,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	2,1333e+09	2,1333e+09
i_y [mm], i_z [mm]	115,47	115,47
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,0667e+07	1,0667e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	3,6027e+09	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		

4.3. Analyse model met doorsneden

4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	MeshSetup1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	1
Average size of 2D mesh element [m]	0,500
Average size of 1D mesh element on curved 1D members [m]	0,200
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N1	0,000	0,000	0,000
1P	0,000	0,000	1,200
1P2	0,400	-0,480	0,000
1P4	-0,480	0,400	0,000
1P6	0,070	0,070	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N2	9,860	0,000	0,000
1Y	9,860	0,000	1,200
1P9	10,340	0,400	0,000
1P11	9,460	-0,480	0,000
1P13	9,790	0,070	0,000

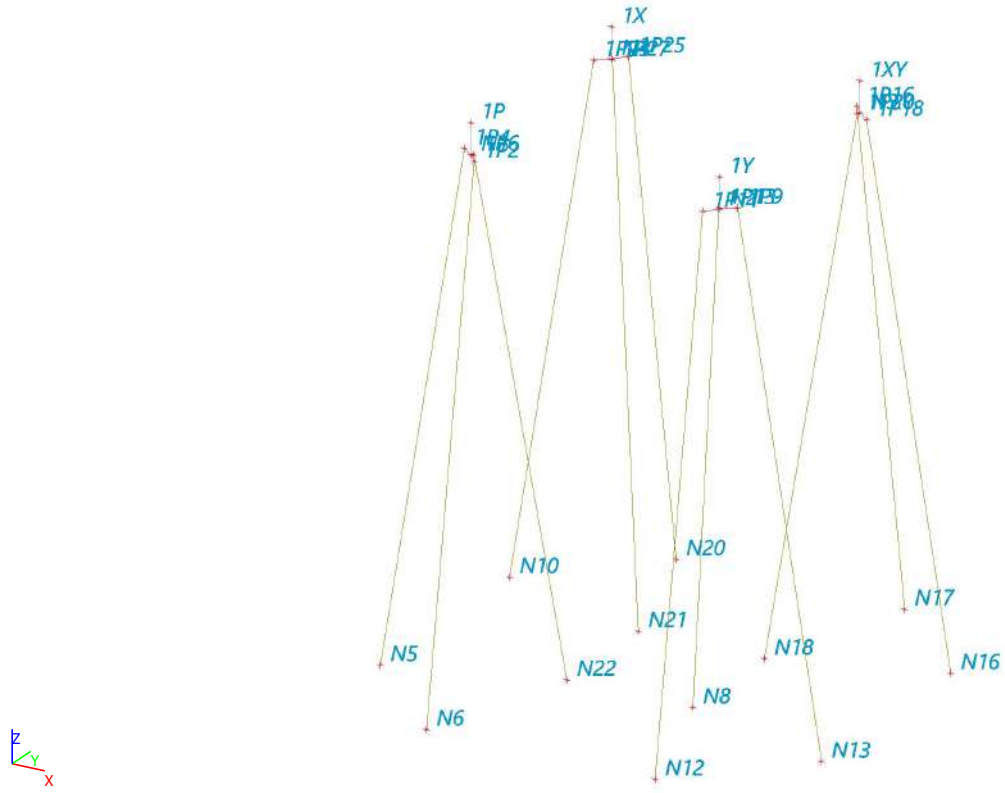
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N3	9,860	9,860	0,000
1XY	9,860	9,860	1,200
1P16	9,460	10,340	0,000
1P18	10,340	9,460	0,000
1P20	9,790	9,790	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N4	0,000	9,860	0,000
1X	0,000	9,860	1,200
1P23	-0,480	9,460	0,000
1P25	0,400	10,340	0,000
1P27	0,070	9,790	0,000
N5	-3,820	0,400	-20,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N6	0,400	-3,820	-20,000
N8	7,430	2,430	-20,000
N10	-3,820	9,460	-20,000
N12	9,460	-3,820	-20,000
N13	13,680	0,400	-20,000
N16	13,680	9,460	-20,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N17	9,460	13,680	-20,000
N18	7,430	7,430	-20,000
N20	0,400	13,680	-20,000
N21	2,430	7,430	-20,000
N22	2,430	2,430	-20,000

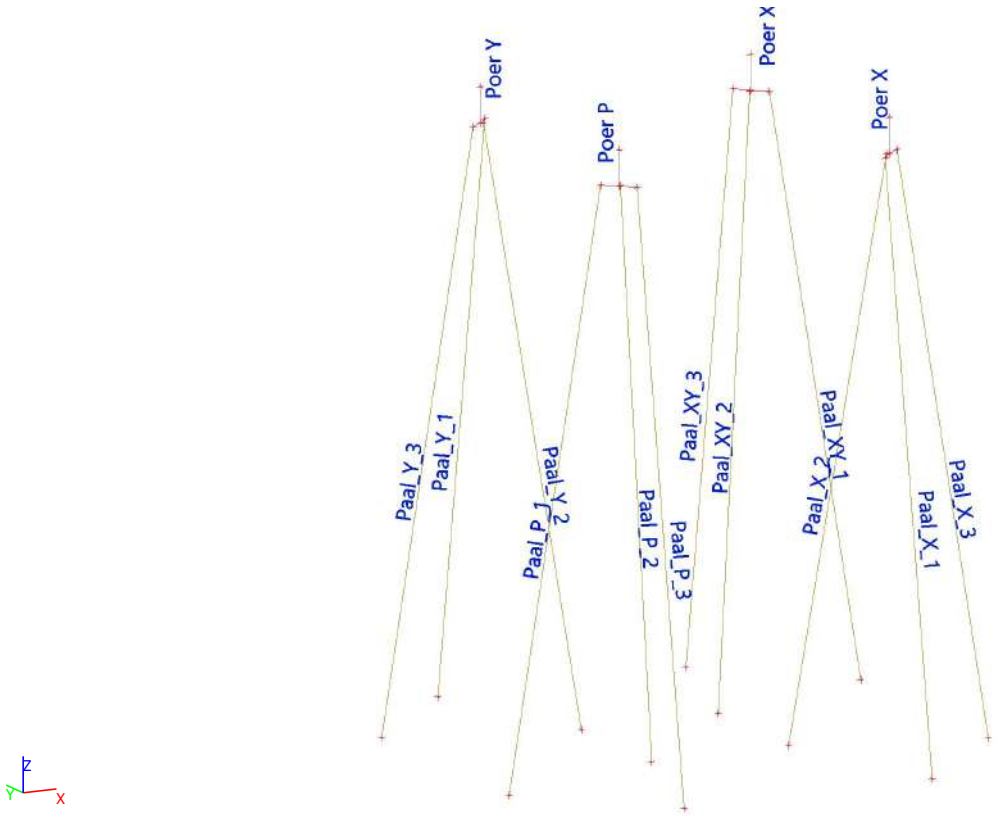
5.2. Analyse model met knopen



5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,277	N5	1P4	column (100)
Poer P	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N1	1P	column (100)
Poer X	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N2	1Y	column (100)
Poer XY	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N3	1XY	column (100)
Poer Y	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N4	1X	column (100)
Paal_P_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,277	N22	1P6	column (100)
Paal_P_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,277	N6	1P2	column (100)
Paal_XY_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,277	N16	1P18	column (100)
Paal_XY_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,277	N18	1P20	column (100)
Paal_XY_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,277	N17	1P16	column (100)
Paal_X_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,277	N12	1P11	column (100)
Paal_X_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,277	N8	1P13	column (100)
Paal_X_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,277	N13	1P9	column (100)
Paal_Y_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,277	N20	1P25	column (100)
Paal_Y_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,277	N21	1P27	column (100)
Paal_Y_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	20,277	N10	1P23	column (100)

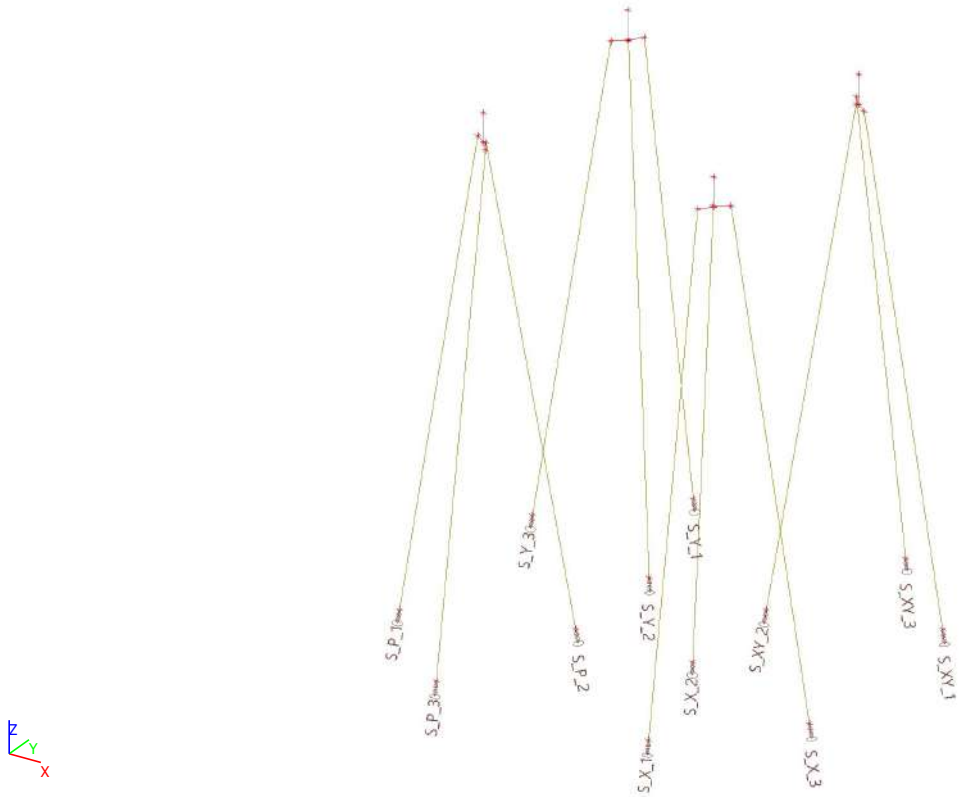
5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
S_P_1	N5	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,50
S_P_2	N22	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,72;Ry-6,72
S_P_3	N6	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,50
S_X_1	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,50
S_X_2	N8	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,72;Ry6,72
S_X_3	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,50
S_XY_1	N16	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,50
S_XY_2	N18	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,72;Ry6,72
S_XY_3	N17	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,50
S_Y_1	N20	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,50
S_Y_2	N21	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,72;Ry-6,72
S_Y_3	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,50

5.6. Analyse model met Knoopondersteuningen



5.7. Line supports on member

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Slb_P_1_01	Line	Paal_P_1 LCS	2,000 3,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_02	Line	Paal_P_1 LCS	3,000 4,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_03	Line	Paal_P_1 LCS	4,000 5,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_04	Line	Paal_P_1 LCS	5,000 6,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_05	Line	Paal_P_1 LCS	6,000 7,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_06	Line	Paal_P_1 LCS	7,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_07	Line	Paal_P_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_08	Line	Paal_P_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_09	Line	Paal_P_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_10	Line	Paal_P_1 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_01	Line	Paal_P_3 LCS	2,000 3,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_02	Line	Paal_P_3 LCS	3,000 4,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_03	Line	Paal_P_3 LCS	4,000 5,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_04	Line	Paal_P_3	5,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

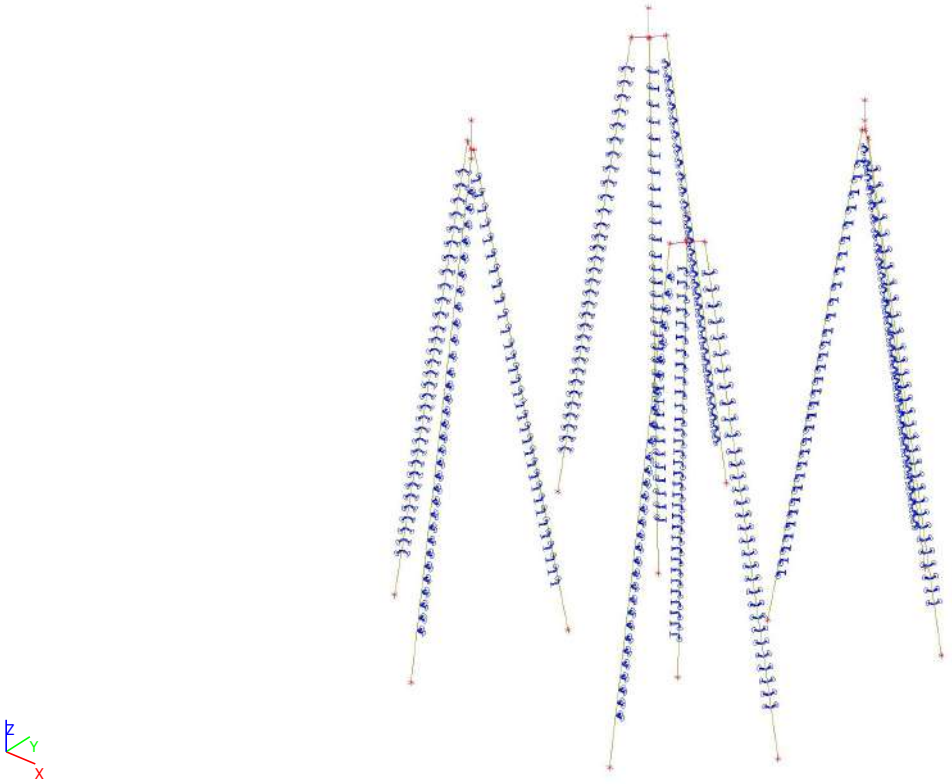
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	6,000	From start						
Slb_P_3_05	Line	Paal_P_3	6,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	7,000	From start						
Slb_P_3_06	Line	Paal_P_3	7,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_P_3_07	Line	Paal_P_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_3_08	Line	Paal_P_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_3_09	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_P_3_10	Line	Paal_P_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_X_1_01	Line	Paal_X_1	2,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	3,000	From start						
Slb_X_1_02	Line	Paal_X_1	3,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	4,000	From start						
Slb_X_1_03	Line	Paal_X_1	4,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	5,000	From start						
Slb_X_1_04	Line	Paal_X_1	5,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	6,000	From start						
Slb_X_1_05	Line	Paal_X_1	6,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	7,000	From start						
Slb_X_1_06	Line	Paal_X_1	7,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_X_1_07	Line	Paal_X_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_1_08	Line	Paal_X_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_1_09	Line	Paal_X_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_X_1_10	Line	Paal_X_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_X_3_01	Line	Paal_X_3	2,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	3,000	From start						
Slb_X_3_02	Line	Paal_X_3	3,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	4,000	From start						
Slb_X_3_03	Line	Paal_X_3	4,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	5,000	From start						
Slb_X_3_04	Line	Paal_X_3	5,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	6,000	From start						
Slb_X_3_05	Line	Paal_X_3	6,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	7,000	From start						
Slb_X_3_06	Line	Paal_X_3	7,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_X_3_07	Line	Paal_X_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_3_08	Line	Paal_X_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_3_09	Line	Paal_X_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_X_3_10	Line	Paal_X_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_XY_1_01	Line	Paal_XY_1	2,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	3,000	From start						
Slb_XY_1_02	Line	Paal_XY_1	3,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	4,000	From start						
Slb_XY_1_03	Line	Paal_XY_1	4,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	5,000	From start						
Slb_XY_1_04	Line	Paal_XY_1	5,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	6,000	From start						
Slb_XY_1_05	Line	Paal_XY_1	6,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	7,000	From start						
Slb_XY_1_06	Line	Paal_XY_1	7,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
Slb_XY_1_07	Line	Paal_XY_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_1_08	Line	Paal_XY_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_1_09	Line	Paal_XY_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_1_10	Line	Paal_XY_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_XY_3_01	Line	Paal_XY_3	2,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	3,000	From start						
Slb_XY_3_02	Line	Paal_XY_3	3,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	4,000	From start						
Slb_XY_3_03	Line	Paal_XY_3	4,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	5,000	From start						
Slb_XY_3_04	Line	Paal_XY_3	5,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	6,000	From start						
Slb_XY_3_05	Line	Paal_XY_3	6,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	7,000	From start						
Slb_XY_3_06	Line	Paal_XY_3	7,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_3_07	Line	Paal_XY_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_3_08	Line	Paal_XY_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_3_09	Line	Paal_XY_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_3_10	Line	Paal_XY_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_1_01	Line	Paal_Y_1	2,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	3,000	From start						
Slb_Y_1_02	Line	Paal_Y_1	3,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	4,000	From start						
Slb_Y_1_03	Line	Paal_Y_1	4,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	5,000	From start						
Slb_Y_1_04	Line	Paal_Y_1	5,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	6,000	From start						
Slb_Y_1_05	Line	Paal_Y_1	6,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	7,000	From start						
Slb_Y_1_06	Line	Paal_Y_1	7,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_1_07	Line	Paal_Y_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_1_08	Line	Paal_Y_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_1_09	Line	Paal_Y_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_1_10	Line	Paal_Y_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_01	Line	Paal_Y_3	2,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	3,000	From start						
Slb_Y_3_02	Line	Paal_Y_3	3,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	4,000	From start						
Slb_Y_3_03	Line	Paal_Y_3	4,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	5,000	From start						
Slb_Y_3_04	Line	Paal_Y_3	5,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	6,000	From start						
Slb_Y_3_05	Line	Paal_Y_3	6,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	7,000	From start						
Slb_Y_3_06	Line	Paal_Y_3	7,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_07	Line	Paal_Y_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_08	Line	Paal_Y_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

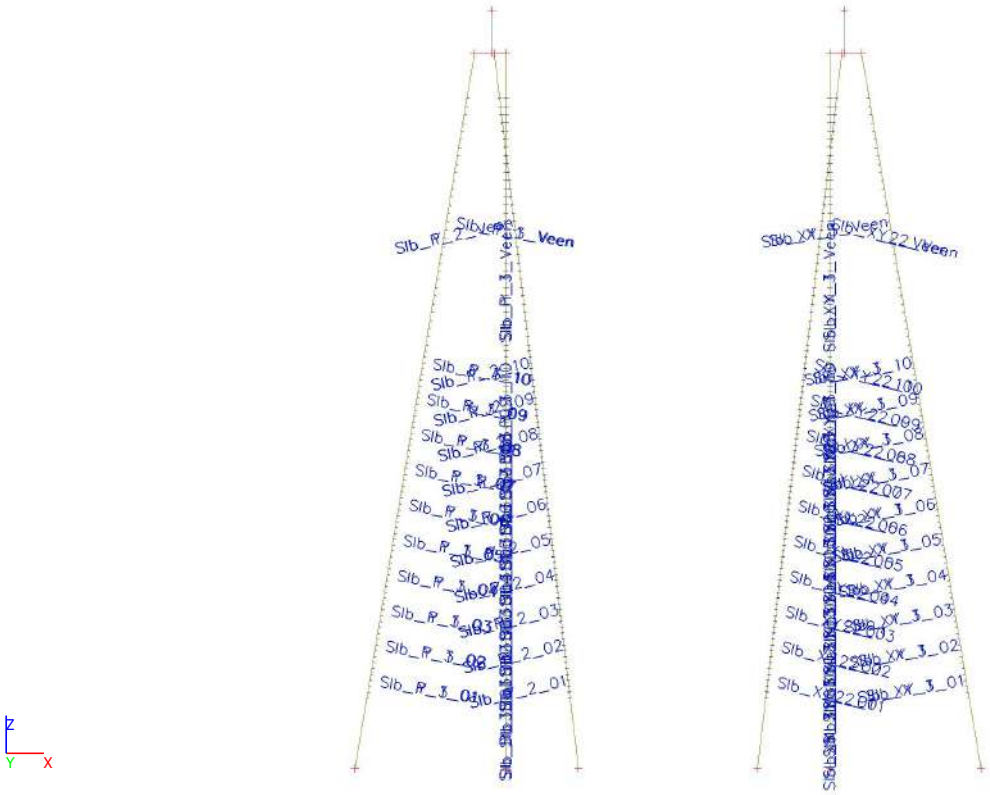
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	10,000	From start						
Slb_Y_3_09	Line	Paal_Y_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_10	Line	Paal_Y_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_P_2_01	Line	Paal_P_2	2,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	3,000	From start						
Slb_P_2_02	Line	Paal_P_2	3,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	4,000	From start						
Slb_P_2_03	Line	Paal_P_2	4,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	5,000	From start						
Slb_P_2_04	Line	Paal_P_2	5,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	6,000	From start						
Slb_P_2_05	Line	Paal_P_2	6,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	7,000	From start						
Slb_P_2_06	Line	Paal_P_2	7,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_P_2_07	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_2_08	Line	Paal_P_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_2_09	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_P_2_10	Line	Paal_P_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_X_2_01	Line	Paal_X_2	2,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	3,000	From start						
Slb_X_2_02	Line	Paal_X_2	3,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	4,000	From start						
Slb_X_2_03	Line	Paal_X_2	4,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	5,000	From start						
Slb_X_2_04	Line	Paal_X_2	5,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	6,000	From start						
Slb_X_2_05	Line	Paal_X_2	6,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	7,000	From start						
Slb_X_2_06	Line	Paal_X_2	7,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_X_2_07	Line	Paal_X_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_2_08	Line	Paal_X_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_2_09	Line	Paal_X_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_X_2_10	Line	Paal_X_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_XY_2_01	Line	Paal_XY_2	2,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	3,000	From start						
Slb_XY_2_02	Line	Paal_XY_2	3,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	4,000	From start						
Slb_XY_2_03	Line	Paal_XY_2	4,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	5,000	From start						
Slb_XY_2_04	Line	Paal_XY_2	5,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	6,000	From start						
Slb_XY_2_05	Line	Paal_XY_2	6,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	7,000	From start						
Slb_XY_2_06	Line	Paal_XY_2	7,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_2_07	Line	Paal_XY_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_2_08	Line	Paal_XY_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_2_09	Line	Paal_XY_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_2_10	Line	Paal_XY_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	12,000	From start						
Slb_Y_2_01	Line	Paal_Y_2	2,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	3,000	From start						
Slb_Y_2_02	Line	Paal_Y_2	3,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	4,000	From start						
Slb_Y_2_03	Line	Paal_Y_2	4,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	5,000	From start						
Slb_Y_2_04	Line	Paal_Y_2	5,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	6,000	From start						
Slb_Y_2_05	Line	Paal_Y_2	6,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	7,000	From start						
Slb_Y_2_06	Line	Paal_Y_2	7,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_2_07	Line	Paal_Y_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_2_08	Line	Paal_Y_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_2_09	Line	Paal_Y_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_2_10	Line	Paal_Y_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_P_1_Veen	Line	Paal_P_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	19,000	From start						
Slb_P_2_Veen	Line	Paal_P_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	19,000	From start						
Slb_P_3_Veen	Line	Paal_P_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	19,000	From start						
Slb_X_1_Veen	Line	Paal_X_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	19,000	From start						
Slb_X_2_Veen	Line	Paal_X_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	19,000	From start						
Slb_X_3_Veen	Line	Paal_X_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	19,000	From start						
Slb_XY_1_Veen	Line	Paal_XY_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	19,000	From start						
Slb_XY_2_Veen	Line	Paal_XY_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	19,000	From start						
Slb_XY_3_Veen	Line	Paal_XY_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	19,000	From start						
Slb_Y_1_Veen	Line	Paal_Y_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	19,000	From start						
Slb_Y_2_Veen	Line	Paal_Y_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	19,000	From start						
Slb_Y_3_Veen	Line	Paal_Y_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	19,000	From start						

5.8. Analyse model met Lijnondersteuningen



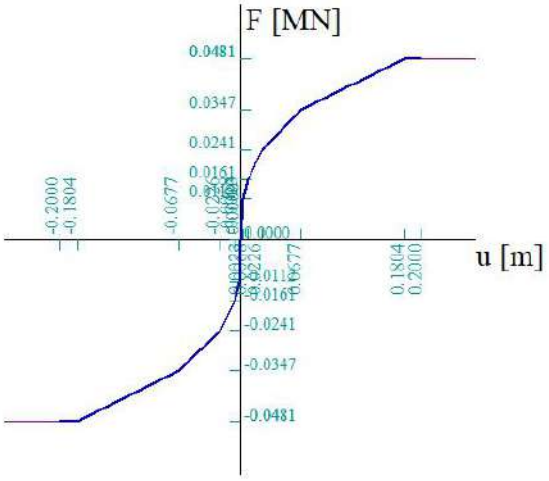
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

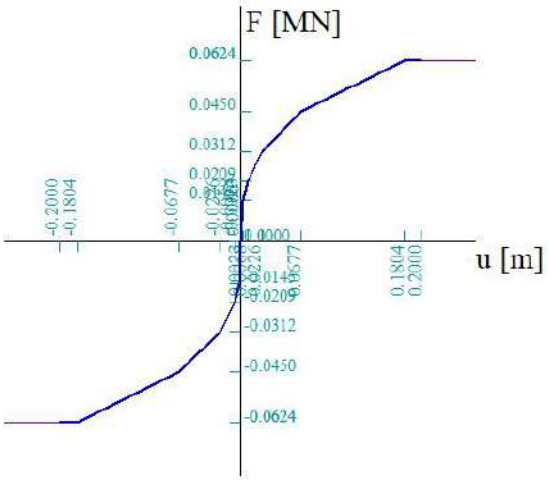
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-2,0000e-01[m] / -4,8130e-02[MN]	Free	Free
		-1,8040e-01[m] / -4,8130e-02[MN]		
		-6,7650e-02[m] / -3,4710e-02[MN]		
		-2,2550e-02[m] / -2,4064e-02[MN]		
		-6,7650e-03[m] / -1,6110e-02[MN]		
		-2,2550e-03[m] / -1,1170e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 1,1170e-02[MN]		
		6,7650e-03[m] / 1,6110e-02[MN]		
		2,2550e-02[m] / 2,4064e-02[MN]		
		6,7650e-02[m] / 3,4707e-02[MN]		
		1,8040e-01[m] / 4,8129e-02[MN]		
		2,0000e-01[m] / 4,8129e-02[MN]		

Drawing



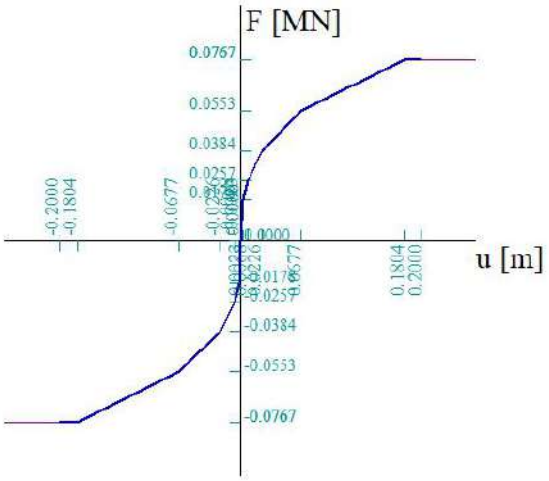
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-2,0000e-01[m] / -6,2400e-02[MN]	Free	Free
		-1,8040e-01[m] / -6,2400e-02[MN]		
		-6,7650e-02[m] / -4,5000e-02[MN]		
		-2,2550e-02[m] / -3,1200e-02[MN]		
		-6,7650e-03[m] / -2,0900e-02[MN]		
		-2,2550e-03[m] / -1,4500e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 1,4490e-02[MN]		
		6,7650e-03[m] / 2,0900e-02[MN]		
		2,2550e-02[m] / 3,1220e-02[MN]		
		6,7650e-02[m] / 4,5020e-02[MN]		
		1,8040e-01[m] / 6,2430e-02[MN]		
		2,0000e-01[m] / 6,2430e-02[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-2,0000e-01[m] / -7,6737e-02[MN]	Free	Free
		-1,8040e-01[m] / -7,6737e-02[MN]		
		-6,7650e-02[m] / -5,5337e-02[MN]		
		-2,2550e-02[m] / -3,8368e-02[MN]		
		-6,7650e-03[m] / -2,5685e-02[MN]		
		-2,2550e-03[m] / -1,7809e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 1,7809e-02[MN]		
		6,7650e-03[m] / 2,5685e-02[MN]		
		2,2550e-02[m] / 3,8368e-02[MN]		
		6,7650e-02[m] / 5,5337e-02[MN]		
		1,8040e-01[m] / 7,6737e-02[MN]		
		2,0000e-01[m] / 7,6737e-02[MN]		

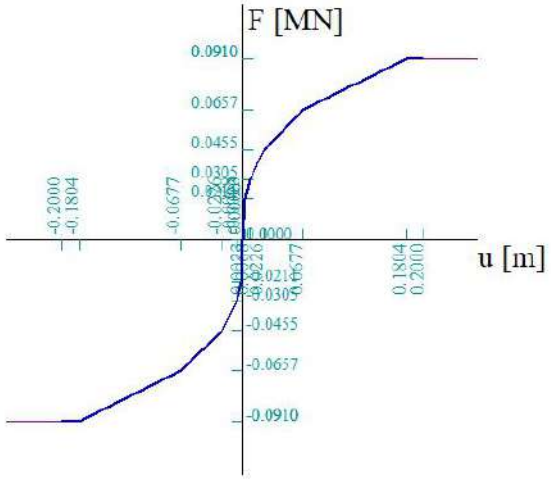
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-2,0000e-01[m] / -9,1041e-02[MN]	Free	Free
		-1,8040e-01[m] / -9,1041e-02[MN]		
		-6,7650e-02[m] / -6,5652e-02[MN]		
		-2,2550e-02[m] / -4,5520e-02[MN]		
		-6,7650e-03[m] / -3,0473e-02[MN]		
		-2,2550e-03[m] / -2,1129e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 2,1129e-02[MN]		
		6,7650e-03[m] / 3,0473e-02[MN]		
		2,2550e-02[m] / 4,5520e-02[MN]		

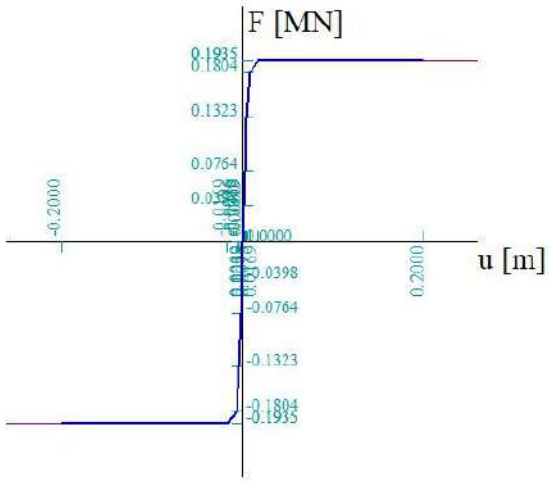
Name	Type	u / F	Positive end	Negative end
		6,7650e-02[m] / 6,5652e-02[MN]		
		1,8040e-01[m] / 9,1041e-02[MN]		
		2,0000e-01[m] / 9,1041e-02[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-2,0000e-01[m] / -1,9349e-01[MN]	Free	Free
		-1,6913e-02[m] / -1,9349e-01[MN]		
		-7,5167e-03[m] / -1,8041e-01[MN]		
		-3,7583e-03[m] / -1,3226e-01[MN]		
		-1,8792e-03[m] / -7,6422e-02[MN]		
		-9,3958e-04[m] / -3,9826e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 3,9826e-02[MN]		
		1,8792e-03[m] / 7,6422e-02[MN]		
		3,7583e-03[m] / 1,3226e-01[MN]		
		7,5167e-03[m] / 1,8041e-01[MN]		
		1,6913e-02[m] / 1,9349e-01[MN]		
		2,0000e-01[m] / 1,9349e-01[MN]		

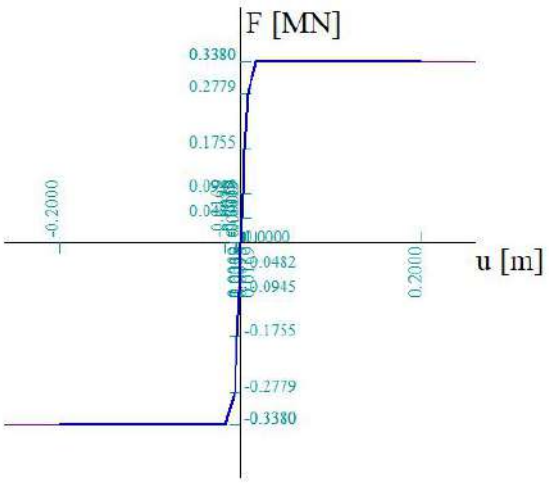
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-2,0000e-01[m] / -3,3802e-01[MN]	Free	Free
		-1,6913e-02[m] / -3,3802e-01[MN]		
		-7,5167e-03[m] / -2,7792e-01[MN]		
		-3,7583e-03[m] / -1,7553e-01[MN]		

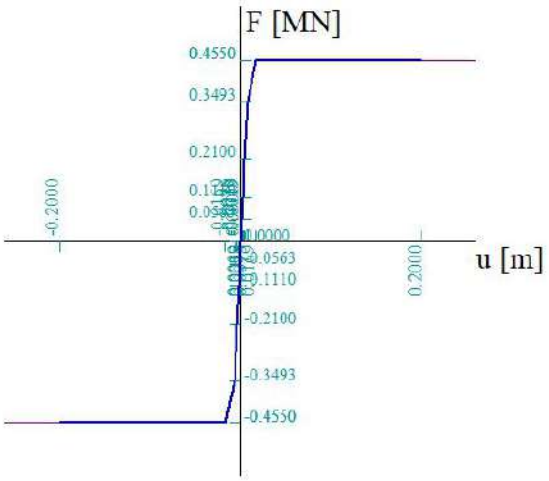
Name	Type	u / F	Positive end	Negative end
		-1,8792e-03[m] / -9,4450e-02[MN]		
		-9,3958e-04[m] / -4,8161e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 4,8161e-02[MN]		
		1,8792e-03[m] / 9,4450e-02[MN]		
		3,7583e-03[m] / 1,7553e-01[MN]		
		7,5167e-03[m] / 2,7792e-01[MN]		
		1,6913e-02[m] / 3,3802e-01[MN]		
		2,0000e-01[m] / 3,3802e-01[MN]		

Drawing



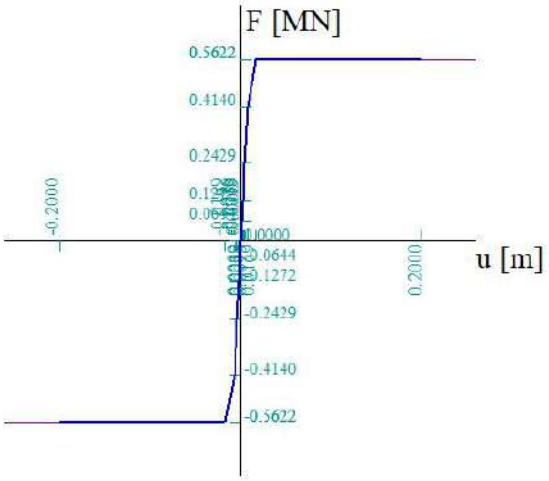
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-2,0000e-01[m] / -4,5496e-01[MN]	Free	Free
		-1,6913e-02[m] / -4,5496e-01[MN]		
		-7,5167e-03[m] / -3,4934e-01[MN]		
		-3,7583e-03[m] / -2,1005e-01[MN]		
		-1,8792e-03[m] / -1,1096e-01[MN]		
		-9,3958e-04[m] / -5,6288e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 5,6288e-02[MN]		
		1,8792e-03[m] / 1,1096e-01[MN]		
		3,7583e-03[m] / 2,1005e-01[MN]		
		7,5167e-03[m] / 3,4934e-01[MN]		
		1,6913e-02[m] / 4,5496e-01[MN]		
		2,0000e-01[m] / 4,5496e-01[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-2,0000e-01[m] / -5,6217e-01[MN]	Free	Free
		-1,6913e-02[m] / -5,6217e-01[MN]		
		-7,5167e-03[m] / -4,1399e-01[MN]		
		-3,7583e-03[m] / -2,4287e-01[MN]		
		-1,8792e-03[m] / -1,2721e-01[MN]		
		-9,3958e-04[m] / -6,4380e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 6,4380e-02[MN]		
		1,8792e-03[m] / 1,2721e-01[MN]		
		3,7583e-03[m] / 2,4287e-01[MN]		
		7,5167e-03[m] / 4,1399e-01[MN]		
		1,6913e-02[m] / 5,6217e-01[MN]		
		2,0000e-01[m] / 5,6217e-01[MN]		

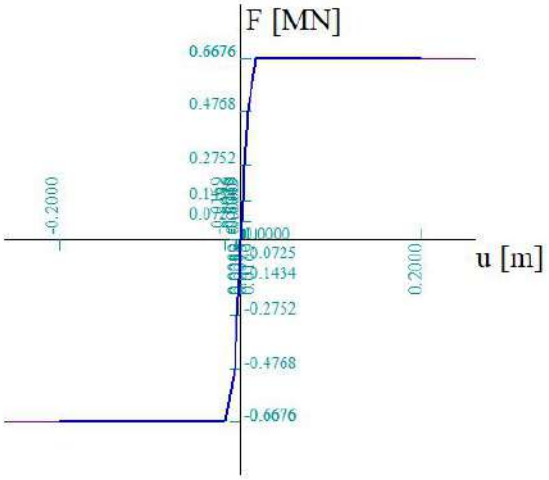
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-2,0000e-01[m] / -6,6756e-01[MN]	Free	Free
		-1,6913e-02[m] / -6,6756e-01[MN]		
		-7,5167e-03[m] / -4,7677e-01[MN]		
		-3,7583e-03[m] / -2,7523e-01[MN]		
		-1,8792e-03[m] / -1,4339e-01[MN]		
		-9,3958e-04[m] / -7,2463e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 7,2463e-02[MN]		
		1,8792e-03[m] / 1,4339e-01[MN]		
		3,7583e-03[m] / 2,7523e-01[MN]		

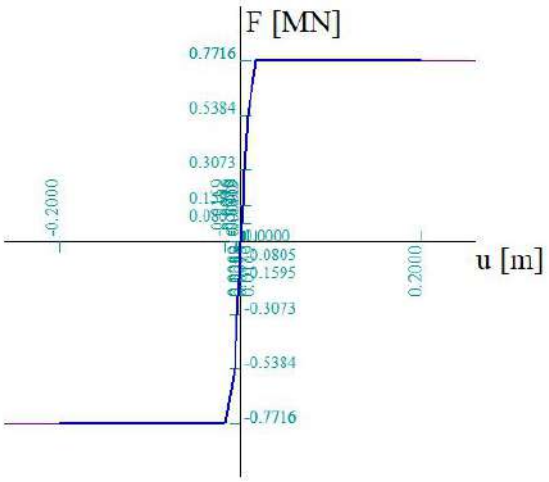
Name	Type	u / F	Positive end	Negative end
		7,5167e-03[m] / 4,7677e-01[MN]		
		1,6913e-02[m] / 6,6756e-01[MN]		
		2,0000e-01[m] / 6,6756e-01[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-2,0000e-01[m] / -7,7164e-01[MN]	Free	Free
		-1,6913e-02[m] / -7,7164e-01[MN]		
		-7,5167e-03[m] / -5,3843e-01[MN]		
		-3,7583e-03[m] / -3,0734e-01[MN]		
		-1,8792e-03[m] / -1,5953e-01[MN]		
		-9,3958e-04[m] / -8,0542e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 8,0542e-02[MN]		
		1,8792e-03[m] / 1,5953e-01[MN]		
		3,7583e-03[m] / 3,0734e-01[MN]		
		7,5167e-03[m] / 5,3843e-01[MN]		
		1,6913e-02[m] / 7,7164e-01[MN]		
		2,0000e-01[m] / 7,7164e-01[MN]		

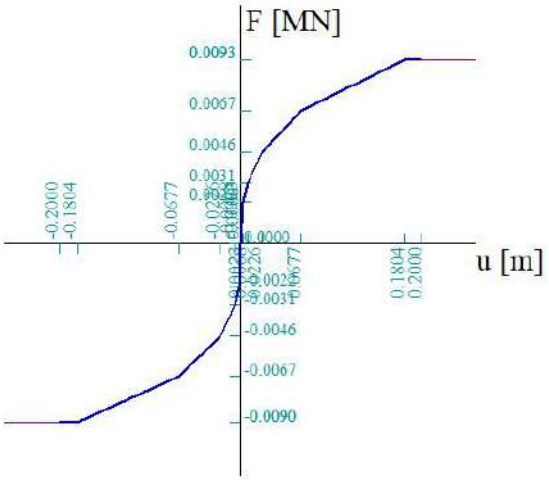
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-2,0000e-01[m] / -9,0000e-03[MN]	Free	Free
		-1,8040e-01[m] / -9,0000e-03[MN]		
		-6,7650e-02[m] / -6,7000e-03[MN]		
		-2,2550e-02[m] / -4,6300e-03[MN]		

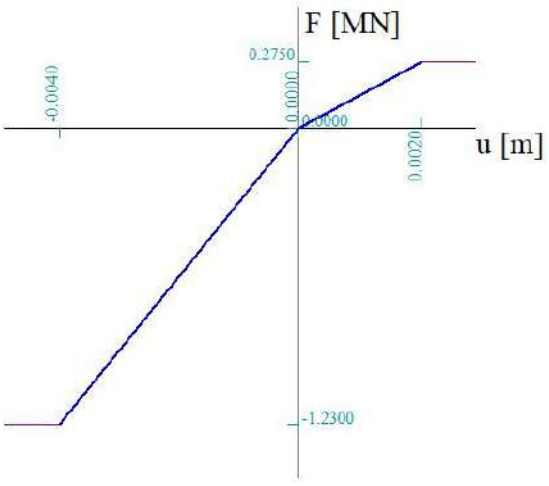
Name	Type	u / F	Positive end	Negative end
		-6,7650e-03[m] / -3,1000e-03[MN]		
		-2,2550e-03[m] / -2,1500e-03[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 2,1500e-03[MN]		
		6,7650e-03[m] / 3,1000e-03[MN]		
		2,2550e-02[m] / 4,6300e-03[MN]		
		6,7650e-02[m] / 6,7000e-03[MN]		
		1,8040e-01[m] / 9,2700e-03[MN]		
		2,0000e-01[m] / 9,2700e-03[MN]		

Drawing



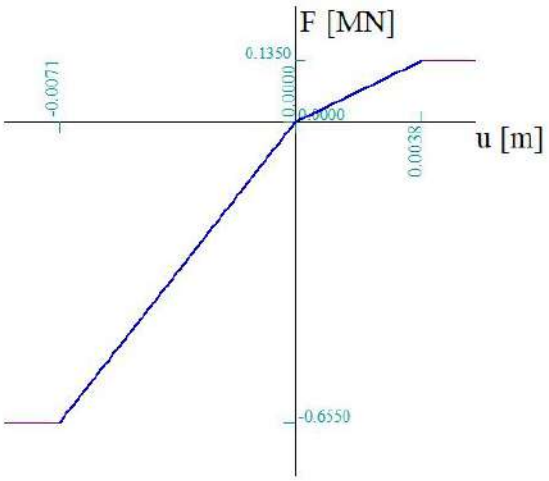
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+3-paalpunt	Translation	-4,0000e-03[m] / -1,2300e+00[MN]	Free	Free
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,0400e-03[m] / 2,7500e-01[MN]		

Drawing



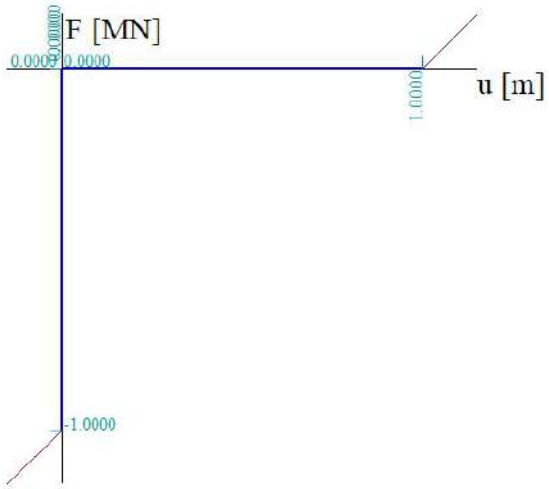
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+0-paalpunt_cap	Translation	-7,1000e-03[m] / -6,5500e-01[MN]	Free	Free
		0,0000e+00[m] / 0,0000e+00[MN]		
		3,8000e-03[m] / 1,3500e-01[MN]		

Drawing



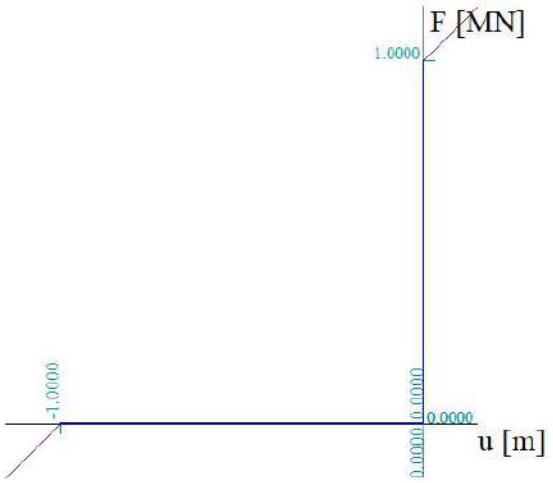
Name	Type	u / F	Positive end	Negative end
press only	Translation	-1,0000e-06[m] / -1,0000e+00[MN]	Flexible	Flexible
		0,0000e+00[m] / 0,0000e+00[MN]		
		1,0000e+00[m] / 0,0000e+00[MN]		

Drawing



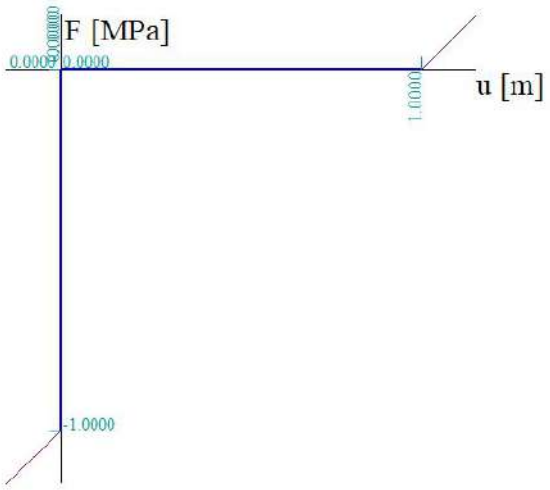
Name	Type	u / F	Positive end	Negative end
tension only	Translation	-1,0000e+00[m] / 0,0000e+00[MN]	Flexible	Flexible
		0,0000e+00[m] / 0,0000e+00[MN]		
		1,0000e-06[m] / 1,0000e+00[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing

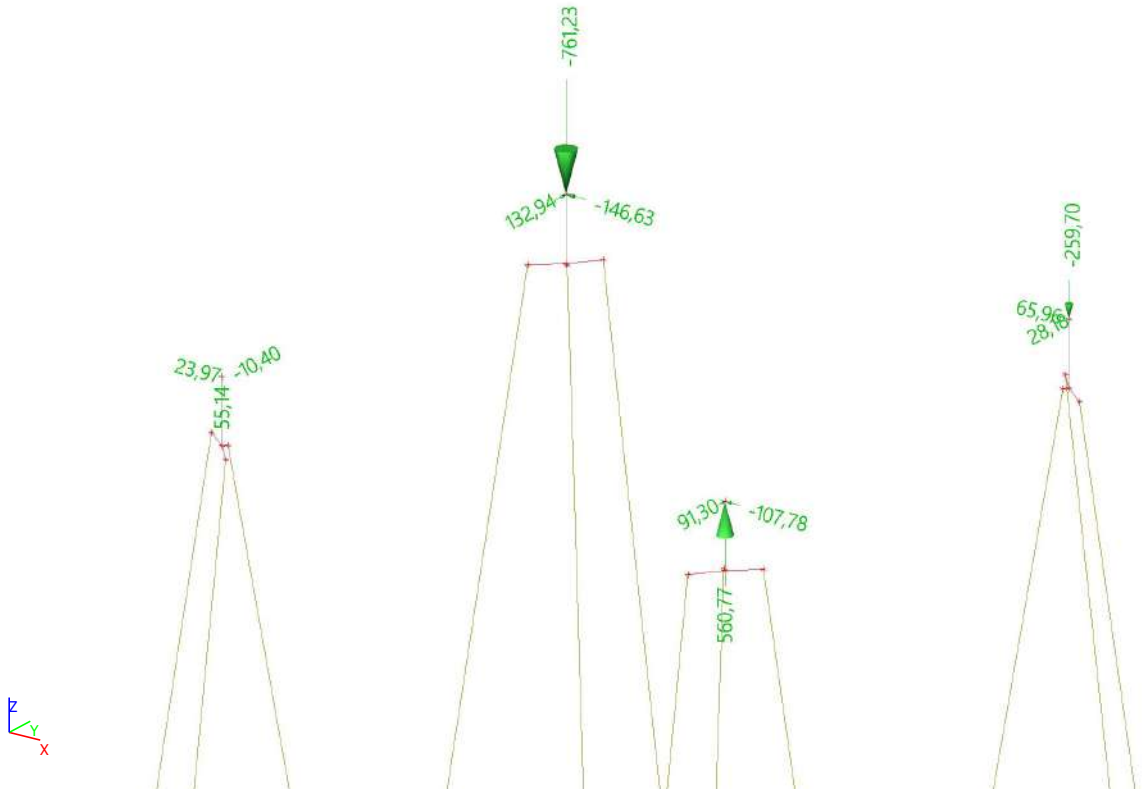


6. Belastingen

6.1. Load cases

6.1.1. Load cases - high max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



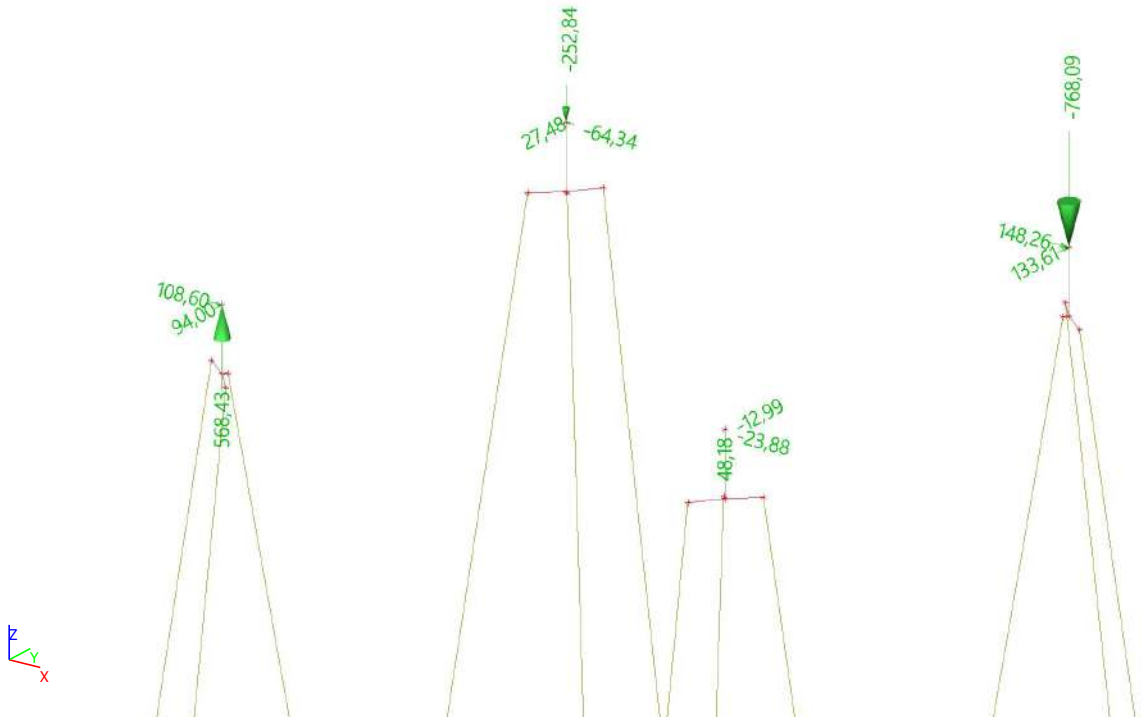
6.1.1.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Force	23,97
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Force	-10,40
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Force	55,14
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Force	-146,63
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Force	132,94
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Force	-761,23
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Force	65,96
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Force	28,18
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Force	-259,70

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Force	-107,78
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Force	91,30
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Force	560,77

6.1.2. Load cases - high max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



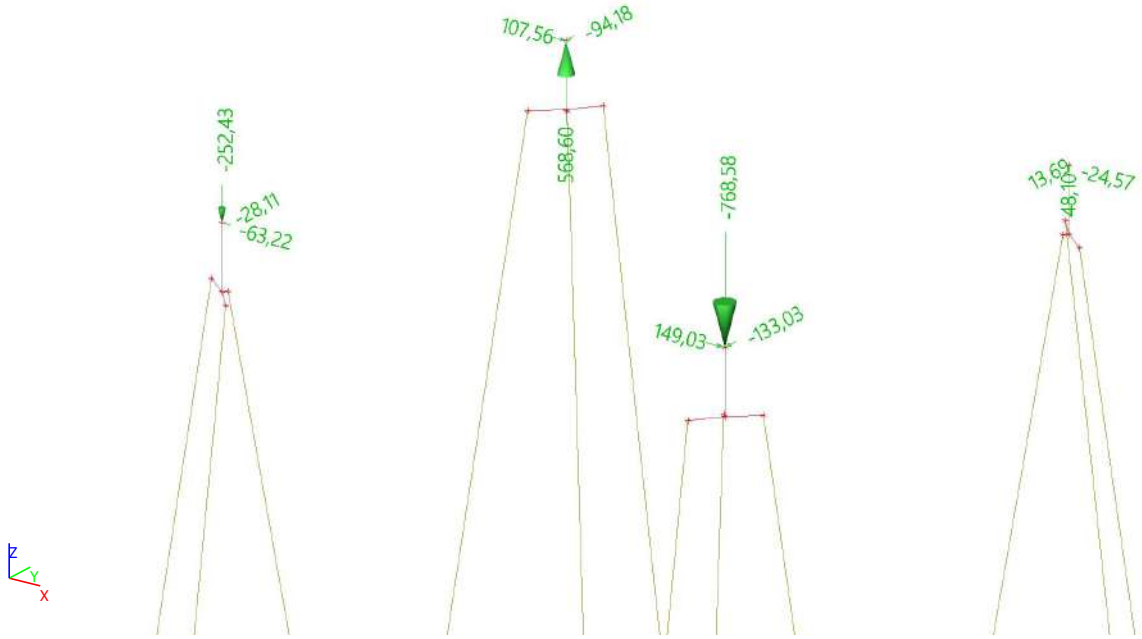
6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Force	108,60
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Force	94,00
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Force	568,43
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Force	-64,34
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Force	27,48
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Force	-252,84

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Force	148,26
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Force	133,61
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Force	-768,09
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Force	-23,88
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Force	-12,99
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Force	48,18

6.1.3. Load cases - high max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



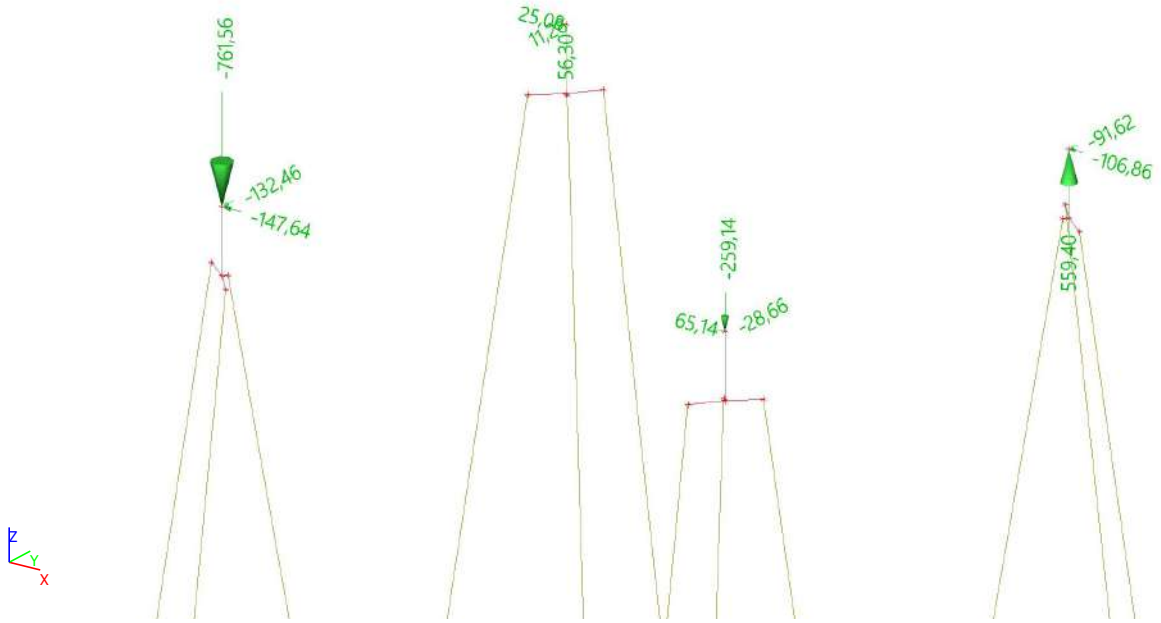
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Force	-63,22
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Force	-28,11
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Force	-252,43

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Force	107,56
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Force	-94,18
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Force	568,60
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Force	-24,57
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Force	13,69
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Force	48,10
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Force	149,03
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Force	-133,03
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Force	-768,58

6.1.4. Load cases - high max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			

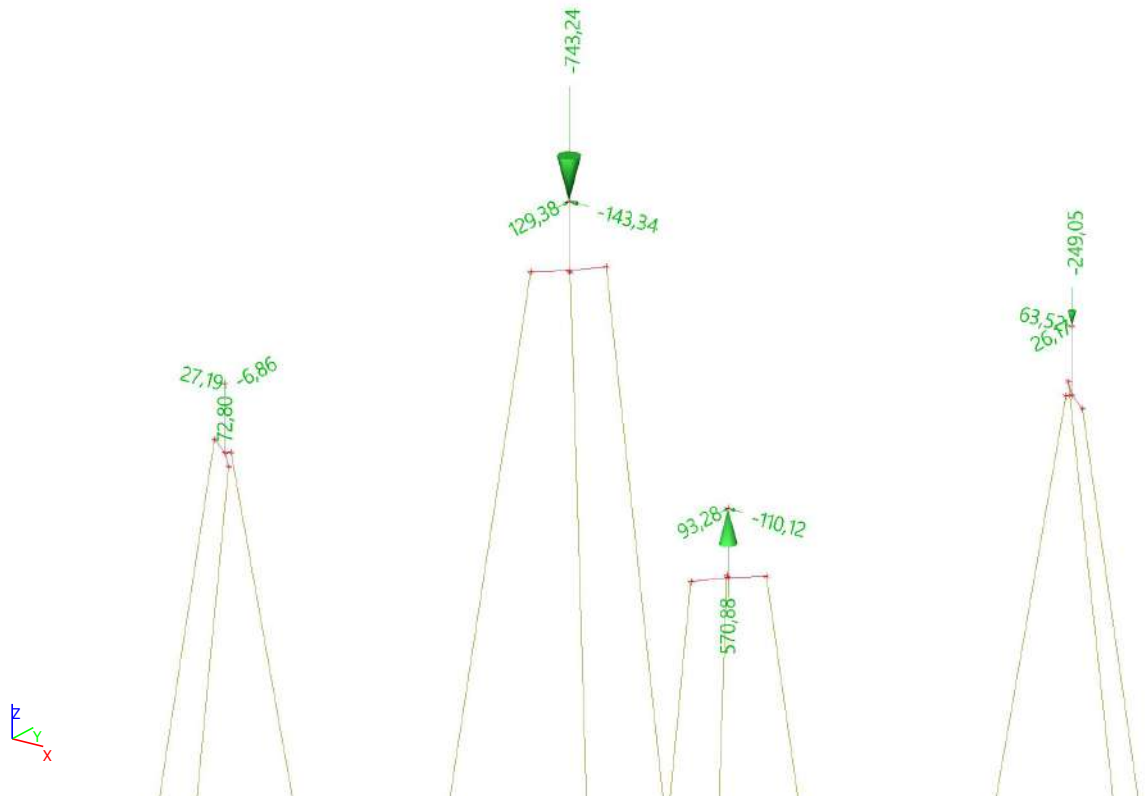


6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Force	-147,64
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Force	-132,46
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Force	-761,56
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Force	25,08
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Force	11,28
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Force	56,30
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Force	-106,86
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Force	-91,62
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Force	559,40
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Force	65,14
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Force	-28,66
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Force	-259,14

6.1.5. Load cases - low max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			

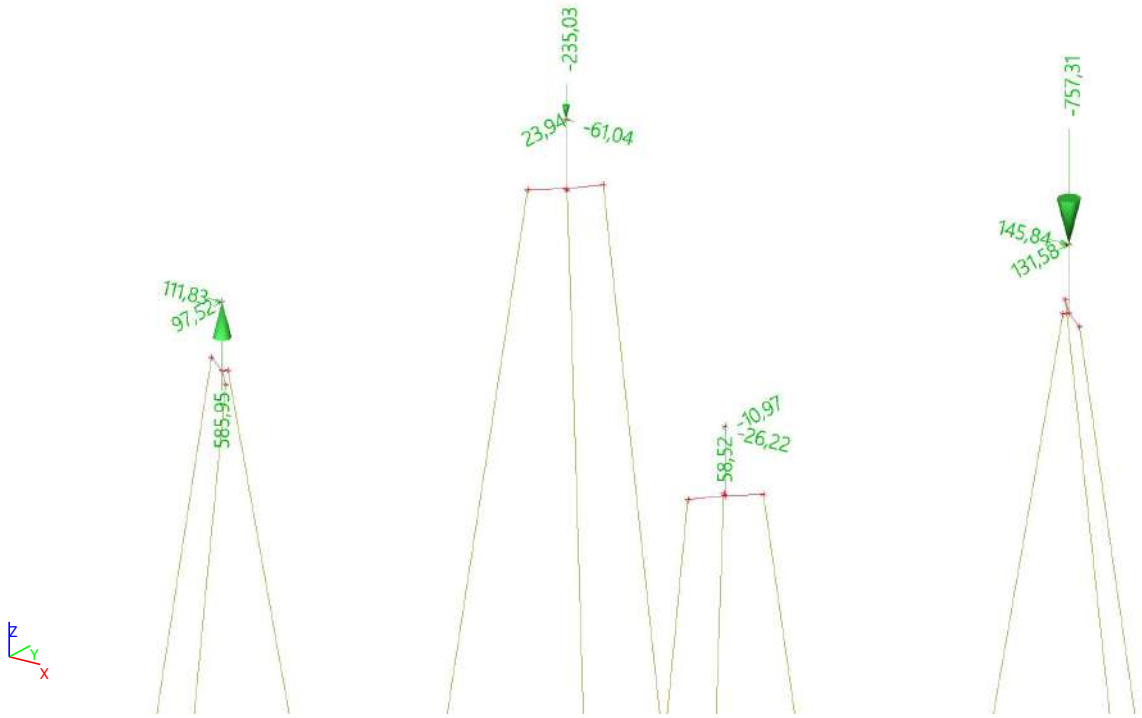


6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Force	27,19
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Force	-6,86
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Force	72,80
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Force	-143,34
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Force	129,38
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Force	-743,24
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Force	63,52
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Force	26,17
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Force	-249,05
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Force	-110,12
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Force	93,28
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Force	570,88

6.1.6. Load cases - low max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



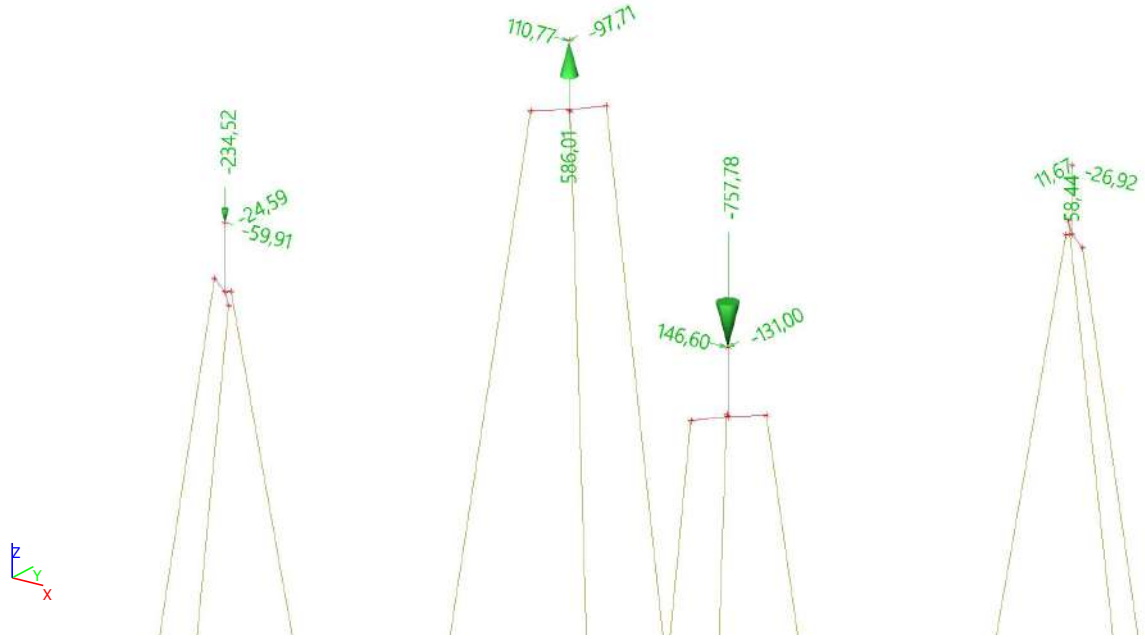
6.1.6.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Force	111,83
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Force	97,52
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Force	585,95
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Force	-61,04
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Force	23,94
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Force	-235,03
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Force	145,84
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Force	131,58
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Force	-757,31
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Force	-26,22
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Force	-10,97

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Force	58,52

6.1.7. Load cases - low max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



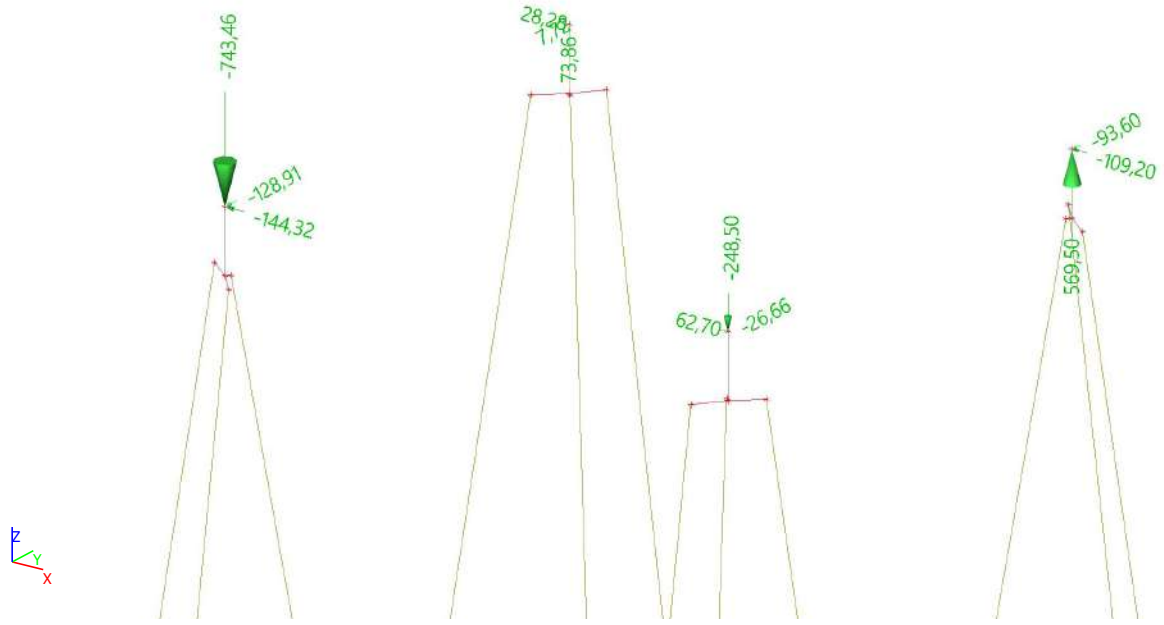
6.1.7.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Force	-59,91
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Force	-24,59
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Force	-234,52
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Force	110,77
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Force	-97,71
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Force	586,01
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Force	-26,92
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Force	11,67

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Force	58,44
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Force	146,60
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Force	-131,00
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Force	-757,78

6.1.8. Load cases - low max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



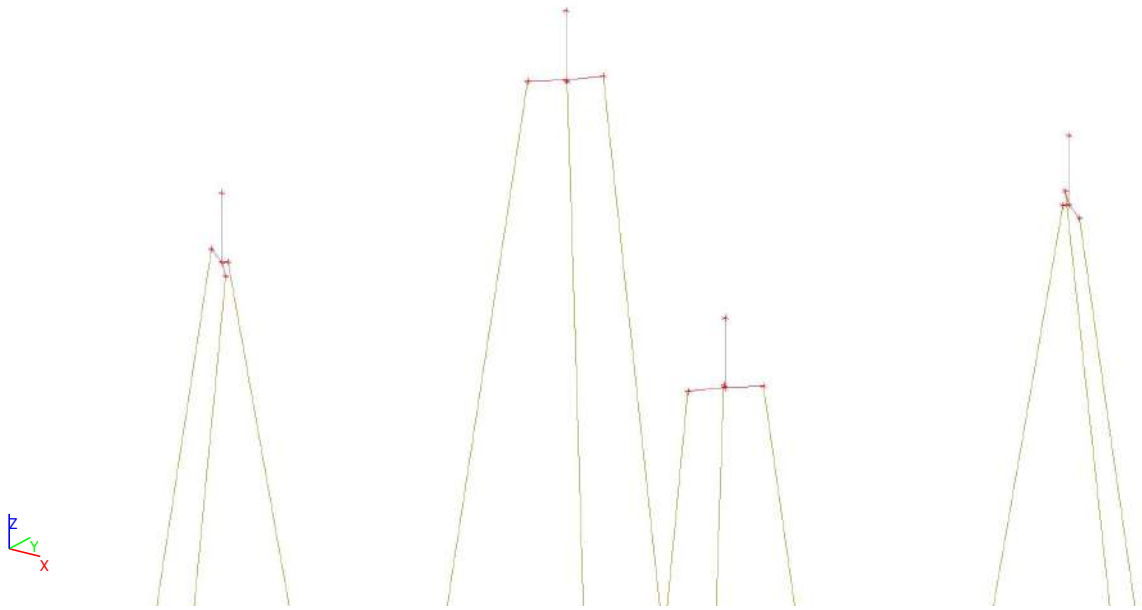
6.1.8.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Force	-144,32
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Force	-128,91
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Force	-743,46
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Force	28,28
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Force	7,72

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Force	73,86
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Force	-109,20
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Force	-93,60
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Force	569,50
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Force	62,70
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Force	-26,66
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Force	-248,50

6.1.9. Load cases - EG_Fundering

Name	Description	Action type	Load group	Direction
	Spec	Load type		
EG_Fundering		Permanent	LG1	-Z
		Self weight		



6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
low max Wnd ;45° - EG_Gunstig	Ultimate	low max Wnd ;45°	1,000
		EG_Fundering	0,900
low max Wnd ;135° - EG_Gunstig	Ultimate	low max Wnd ;135°	1,000
		EG_Fundering	0,900
low max Wnd ;225° - EG_Gunstig	Ultimate	low max Wnd ;225°	1,000
		EG_Fundering	0,900
low max Wnd ;315° - EG_Gunstig	Ultimate	low max Wnd ;315°	1,000
		EG_Fundering	0,900
high max Wnd ;45° - EG_Ongunstig	Ultimate	high max Wnd ;45°	1,000
		EG_Fundering	1,200
high max Wnd ;135° - EG_Ongunstig	Ultimate	high max Wnd ;135°	1,000
		EG_Fundering	1,200
high max Wnd ;225° - EG_Ongunstig	Ultimate	high max Wnd ;225°	1,000
		EG_Fundering	1,200
high max Wnd ;315° - EG_Ongunstig	Ultimate	high max Wnd ;315°	1,000
		EG_Fundering	1,200

6.3. Result classes

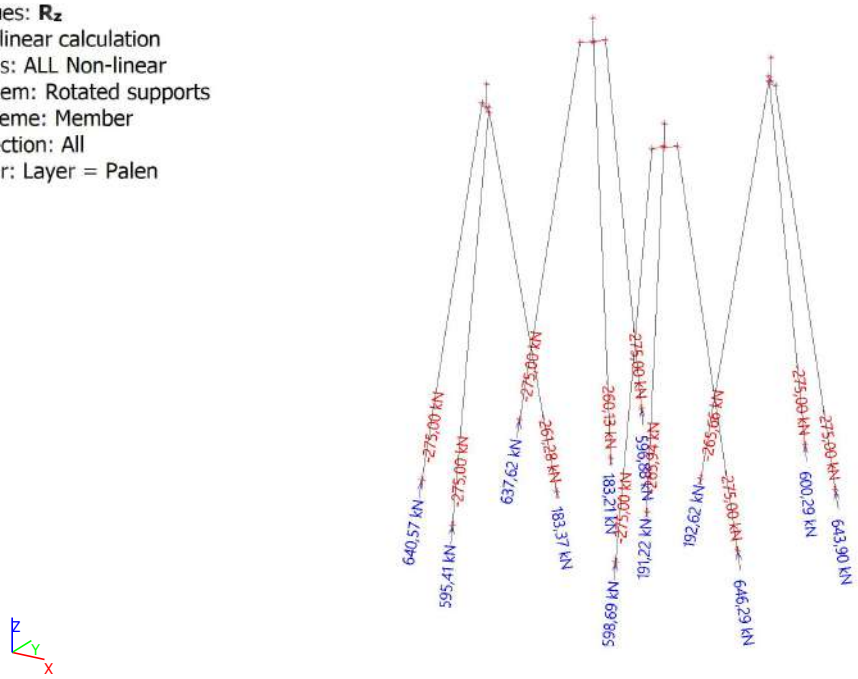
Name	List
ALL Non-linear	low max Wnd ;45° - EG_Gunstig
	low max Wnd ;135° - EG_Gunstig
	low max Wnd ;225° - EG_Gunstig
	low max Wnd ;315° - EG_Gunstig
	high max Wnd ;45° - EG_Ongunstig
	high max Wnd ;135° - EG_Ongunstig
	high max Wnd ;225° - EG_Ongunstig
	high max Wnd ;315° - EG_Ongunstig

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen

Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_XY_1/N16	low max Wnd ;135° - EG_Gunstig	**0,00**	0,00	617,34	0,00	0,00	0,00	0,0	0,0
S_XY_1/N16	high max Wnd ;135° - EG_Ongunstig	**0,00**	0,00	643,90	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_1/N12	low max Wnd ;225° - EG_Gunstig	0,00	**0,00**	573,26	0,00	0,00	0,00	0,0	0,0
S_X_2/N8	low max Wnd ;225° - EG_Gunstig	0,00	**0,00**	-265,94	0,00	0,00	0,00	0,0	0,0
S_P_3/N6	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	high max Wnd ;225° - EG_Ongunstig	0,00	0,00	**646,29**	0,00	0,00	0,00	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: ALL Non-linear

System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen

Nodal reactions

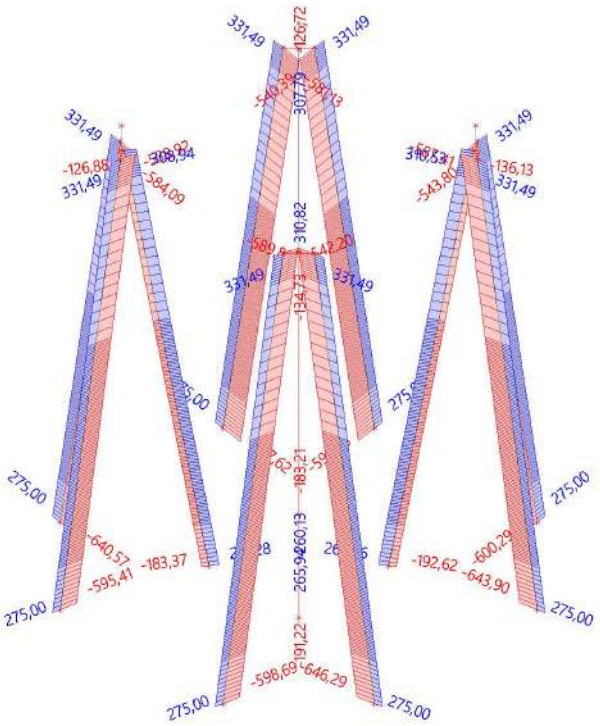
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_3/N6	low max Wnd ;315° - EG_Gunstig	0,00	**0,00**	563,97	0,00	0,00	0,00	0,0	0,0
S_P_3/N6	low max Wnd ;225° - EG_Gunstig	**0,00**	**0,00**	165,90	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_3/N6	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_P_3/N6	high max Wnd ;315° - EG_Ongunstig	0,00	0,00	**595,41**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	high max Wnd ;315° - EG_Ongunstig	**0,00**	**0,00**	**640,57**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_1/N5	low max Wnd ;225° - EG_Gunstig	**0,00**	0,00	262,99	0,00	0,00	**0,00**	0,0	0,0
S_P_2/N22	high max Wnd ;135° - EG_Ongunstig	**0,00**	**0,00**	**183,37**	0,00	0,00	0,00	0,0	0,0
S_P_2/N22	high max Wnd ;315° - EG_Ongunstig	0,00	**0,00**	-252,45	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_2/N22	low max Wnd ;315° - EG_Gunstig	**0,00**	0,00	**-261,28**	0,00	0,00	**0,00**	0,0	0,0
S_X_3/N13	low max Wnd ;225° - EG_Gunstig	**0,00**	**0,00**	619,70	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_3/N13	low max Wnd ;45° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	high max Wnd ;225° - EG_Ongunstig	0,00	0,00	**646,29**	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	low max Wnd ;315° - EG_Gunstig	**0,00**	0,00	273,81	0,00	0,00	**0,00**	0,0	0,0
S_X_1/N12	low max Wnd ;225° - EG_Gunstig	0,00	**0,00**	573,26	0,00	0,00	0,00	0,0	0,0
S_X_1/N12	low max Wnd ;315° - EG_Gunstig	**0,00**	**0,00**	174,37	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_1/N12	high max Wnd ;225° - EG_Ongunstig	0,00	0,00	**598,69**	0,00	0,00	0,00	0,0	0,0
S_X_1/N12	low max Wnd ;45° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	**0,00**	0,0	0,0
S_X_2/N8	low max Wnd ;225° - EG_Gunstig	0,00	**0,00**	**-265,94**	0,00	0,00	0,00	0,0	0,0
S_X_2/N8	high max Wnd ;45° - EG_Ongunstig	**0,00**	0,00	**191,22**	**0,00**	**0,00**	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_X_2/N8	low max Wnd ;45° - EG_Gunstig	**0,00**	**0,00**	127,99	0,00	0,00	**0,00**	0,0	0,0
S_XY_3/N17	high max Wnd ;45° - EG_Ongunstig	0,00	**0,00**	198,32	0,00	0,00	0,00	0,0	0,0
S_XY_3/N17	low max Wnd ;315° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_XY_3/N17	high max Wnd ;135° - EG_Ongunstig	**0,00**	**0,00**	**600,29**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_1/N16	low max Wnd ;315° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_XY_1/N16	high max Wnd ;135° - EG_Ongunstig	**0,00**	**0,00**	**643,90**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_1/N16	low max Wnd ;135° - EG_Gunstig	**0,00**	0,00	617,34	0,00	0,00	**0,00**	0,0	0,0
S_XY_2/N18	low max Wnd ;315° - EG_Gunstig	**0,00**	**0,00**	129,39	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_2/N18	low max Wnd ;135° - EG_Gunstig	0,00	**0,00**	**-265,66**	0,00	0,00	0,00	0,0	0,0
S_XY_2/N18	high max Wnd ;315° - EG_Ongunstig	**0,00**	0,00	**192,62**	0,00	0,00	**0,00**	0,0	0,0
S_Y_3/N10	low max Wnd ;45° - EG_Gunstig	**0,00**	**0,00**	606,97	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_3/N10	low max Wnd ;225° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_Y_3/N10	high max Wnd ;45° - EG_Ongunstig	**0,00**	0,00	**637,62**	0,00	0,00	**0,00**	0,0	0,0
S_Y_1/N20	high max Wnd ;45° - EG_Ongunstig	0,00	**0,00**	**596,88**	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	high max Wnd ;135° - EG_Ongunstig	**0,00**	**0,00**	194,99	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_1/N20	low max Wnd ;225° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_Y_2/N21	low max Wnd ;225° - EG_Gunstig	**0,00**	0,00	112,56	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_2/N21	low max Wnd ;45° - EG_Gunstig	0,00	**0,00**	**-260,13**	0,00	0,00	0,00	0,0	0,0
S_Y_2/N21	high max Wnd ;225° - EG_Ongunstig	0,00	**0,00**	**183,21**	0,00	0,00	0,00	0,0	0,0
S_Y_2/N21	high max Wnd ;45° - EG_Ongunstig	**0,00**	0,00	-251,30	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

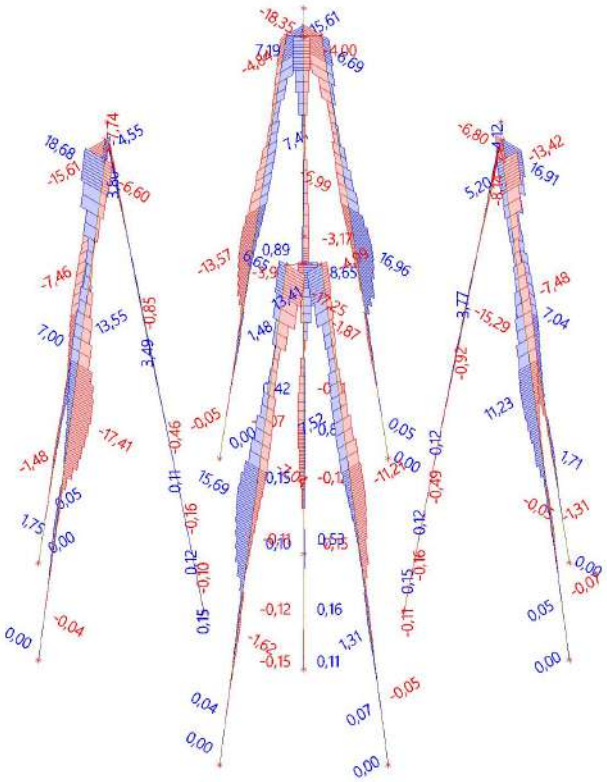
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



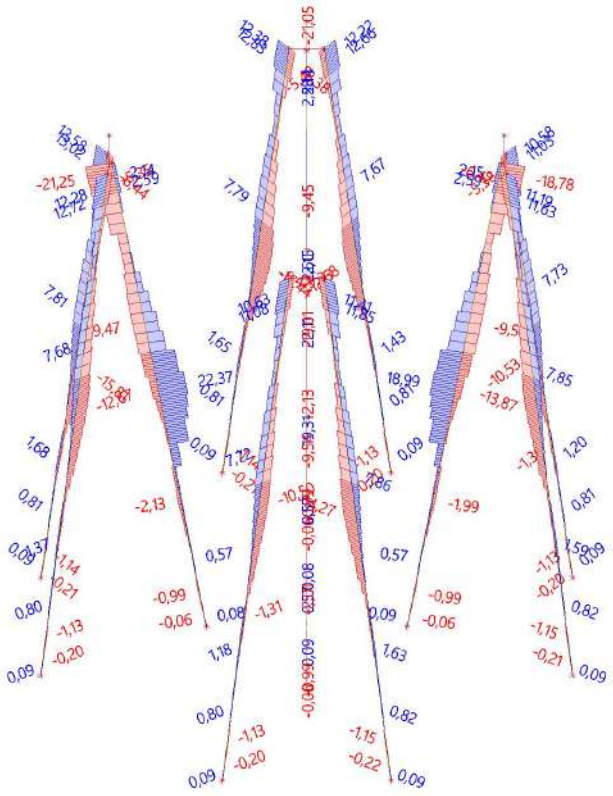
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



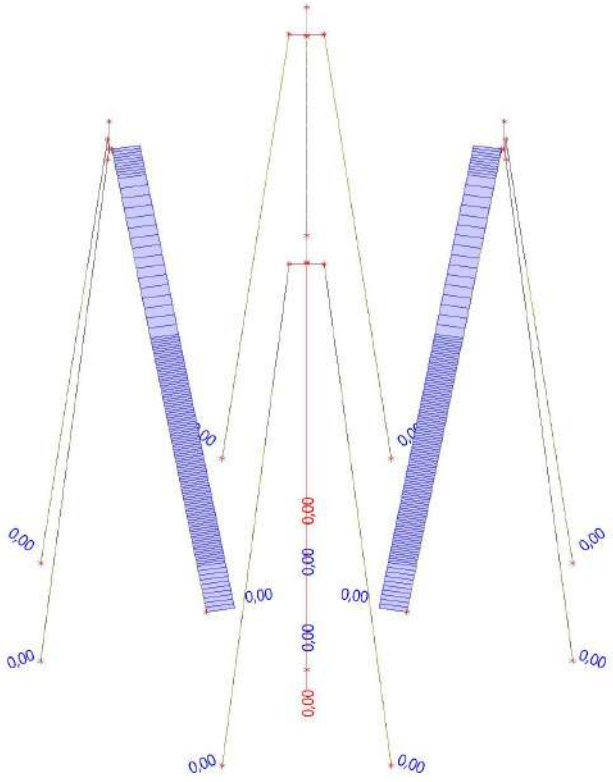
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



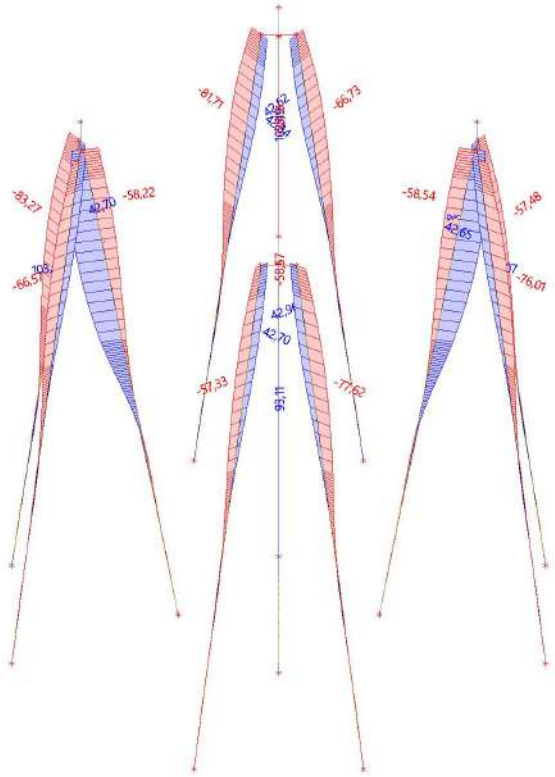
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



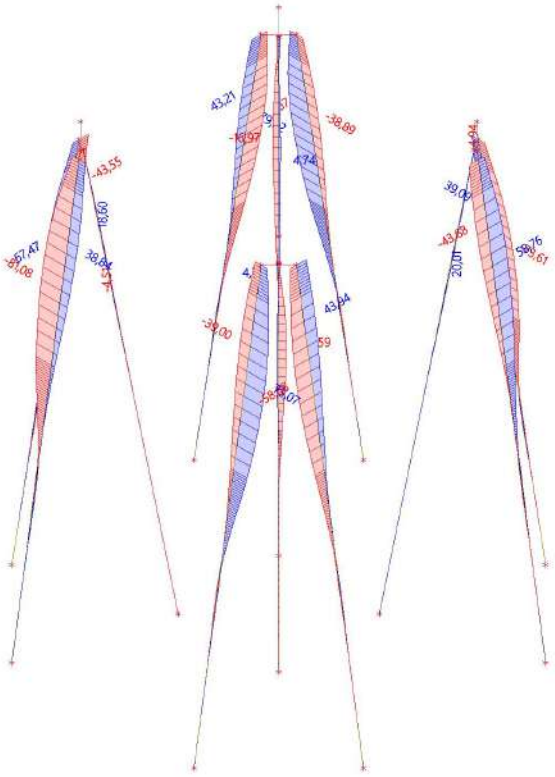
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_X_3	0,000	high max Wnd ;225° - EG_Ongunstig	**-646,29**	0,00	-0,22	0,00	0,00	0,00
Paal_P_3	20,277	high max Wnd ;135° - EG_Ongunstig	**331,49**	14,26	7,81	0,00	-29,02	-24,79
Paal_Y_1	19,000+	low max Wnd ;225° - EG_Gunstig	314,70	**-18,35**	12,66	0,00	-49,57	48,92
Paal_P_3	19,000+	low max Wnd ;135° - EG_Gunstig	314,70	**18,68**	12,72	0,00	-49,24	-49,56
Paal_P_2	20,277	low max Wnd ;135° - EG_Gunstig	-70,24	-7,74	**-21,25**	0,00	42,39	-1,47
Paal_P_2	10,000+	low max Wnd ;135° - EG_Gunstig	-90,67	2,62	**22,37**	0,00	36,59	1,82
Paal_X_2	0,000	high max Wnd ;45° - EG_Ongunstig	-191,22	0,11	-0,06	**0,00**	0,00	0,00
Paal_P_2	0,000	high max Wnd ;135° - EG_Ongunstig	-183,37	-0,10	-0,06	**0,00**	0,00	0,00
Paal_P_1	16,000-	low max Wnd ;135° - EG_Gunstig	307,39	0,78	-3,08	0,00	**-83,27**	67,47
Paal_P_2	15,500-	low max Wnd ;135° - EG_Gunstig	-81,14	2,05	2,11	0,00	**103,45**	18,17
Paal_P_3	15,000-	low max Wnd ;135° - EG_Gunstig	305,30	-3,35	-5,11	0,00	-64,50	**-81,08**
Paal_Y_1	15,000-	low max Wnd ;225° - EG_Gunstig	305,30	3,45	-5,16	0,00	-64,60	**79,52**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer Y	1,200	low max Wnd ;225° - EG_Gunstig	**586,01**	-147,42	-9,23	**0,00**	0,00	0,00
Poer P	0,000	low max Wnd ;135° - EG_Gunstig	556,18	**-148,03**	10,12	0,00	-12,14	**177,64**
Poer XY	0,000	high max Wnd ;45° - EG_Ongunstig	-299,39	66,57	**-26,71**	0,00	**32,06**	-79,88
Poer XY	0,000	low max Wnd ;225° - EG_Gunstig	28,67	-10,78	**27,29**	0,00	**-32,74**	12,94
Poer X	0,000	high max Wnd ;225° - EG_Ongunstig	**-808,27**	**199,45**	11,31	0,00	-13,58	**-239,34**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Blokpoer 3xBeton40x40 Mast-S+3
Author	[redacted]
Date	01-09-2025
Structure	General XYZ
No. of nodes :	32
No. of beams :	16
No. of slabs :	0
No. of solids :	0
No. of used profiles :	2
No. of load cases :	9
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materials

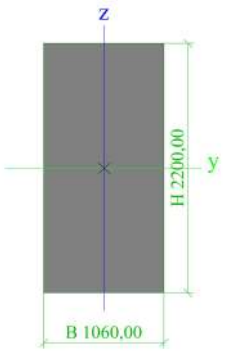
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C12/15 Gescheurd	Concrete	2500,00	2600,00	7,0000e+03	0.2	0,01e-003	12,00	
C20/25 Ongescheurd	Concrete	1500,00	2600,00	2,4000e+04	0.2	0,01e-003	20,00	

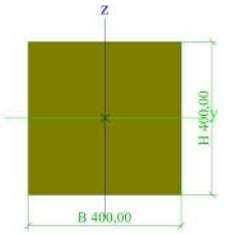
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

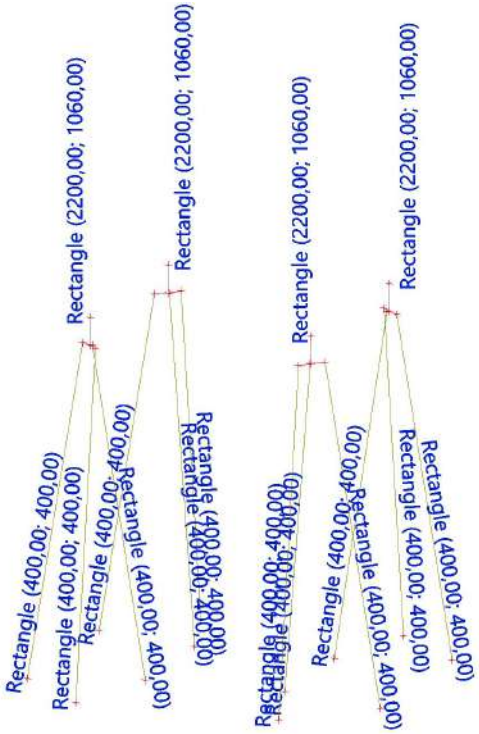
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Reinforcement steel	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

4.2. Cross-sections

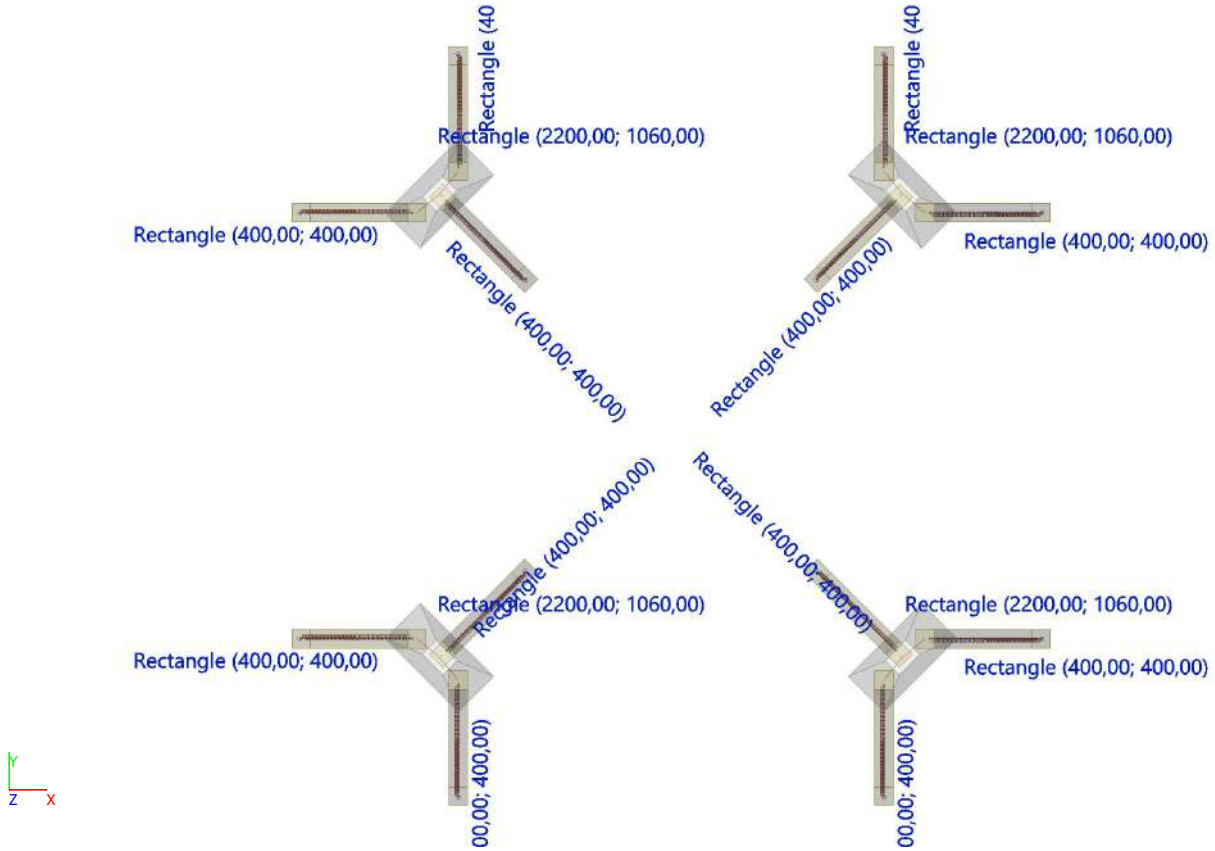
Poer		
Type	Rectangle	
Detailed	2200,00; 1060,00	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	concrete	
Colour		
A [mm²]	2,3320e+06	
A_y [mm²], A_z [mm²]	1,9433e+06	1,9433e+06
A_L [m²/m], A_D [m²/m]	6,5200e+00	6,5200e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	530,00	1100,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	9,4057e+11	2,1835e+11
i_y [mm], i_z [mm]	635,09	306,00
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	8,5507e+08	4,1199e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	6,0907e+11	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		
Paal 40x40		
Type	Rectangle	
Detailed	400,00; 400,00	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [mm²]	1,6000e+05	

A_y [mm²], A_z [mm²]	1,3333e+05	1,3333e+05
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200,00	200,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	2,1333e+09	2,1333e+09
i_y [mm], i_z [mm]	115,47	115,47
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,0667e+07	1,0667e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	3,6027e+09	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	MeshSetup1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	1
Average size of 2D mesh element [m]	0,500
Average size of 1D mesh element on curved 1D members [m]	0,200
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N1	0,000	0,000	0,000
1P	0,000	0,000	1,200
1P2	0,400	-0,480	0,000
1P4	-0,480	0,400	0,000
1P6	0,070	0,070	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N2	9,860	0,000	0,000
1Y	9,860	0,000	1,200
1P9	10,340	0,400	0,000
1P11	9,460	-0,480	0,000
1P13	9,790	0,070	0,000

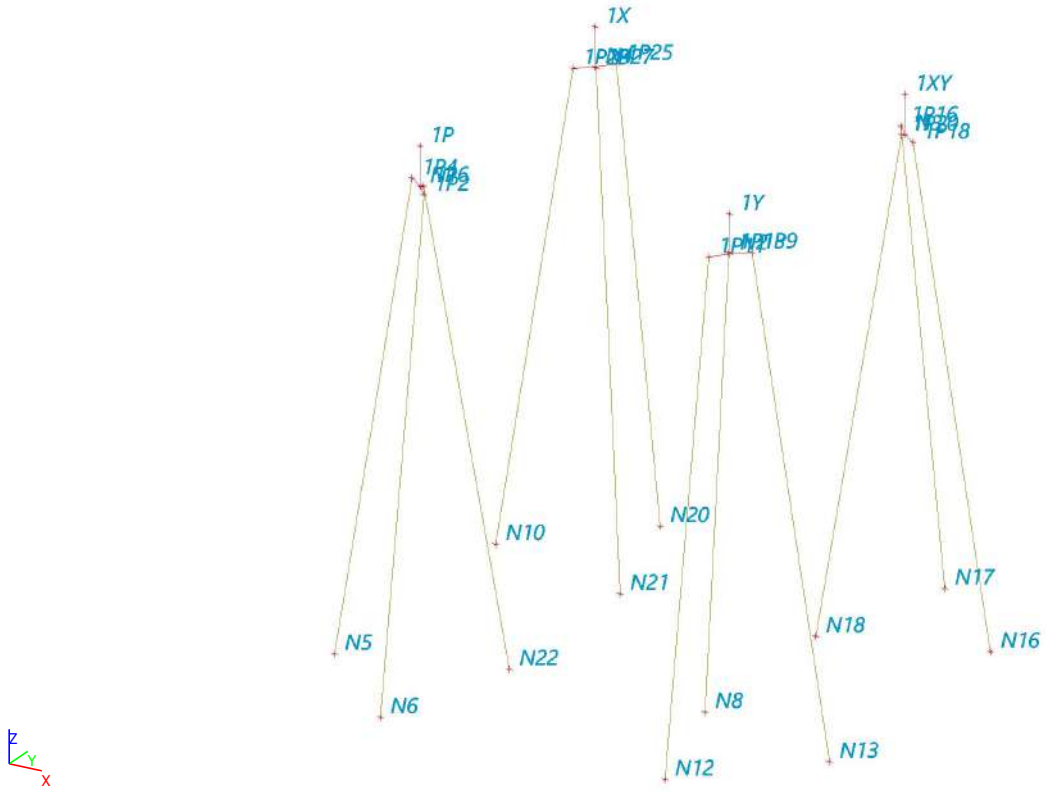
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N3	9,860	9,860	0,000
1XY	9,860	9,860	1,200
1P16	9,460	10,340	0,000
1P18	10,340	9,460	0,000
1P20	9,790	9,790	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N4	0,000	9,860	0,000
1X	0,000	9,860	1,200
1P23	-0,480	9,460	0,000
1P25	0,400	10,340	0,000
1P27	0,070	9,790	0,000
N5	-2,947	0,400	-14,772

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N6	0,400	-2,947	-14,772
N8	8,047	1,813	-14,772
N10	-2,947	9,460	-14,772
N12	9,460	-2,947	-14,772
N13	12,807	0,400	-14,772
N16	12,807	9,460	-14,772

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N17	9,460	12,807	-14,772
N18	8,047	8,047	-14,772
N20	0,400	12,807	-14,772
N21	1,813	8,047	-14,772
N22	1,813	1,813	-14,772

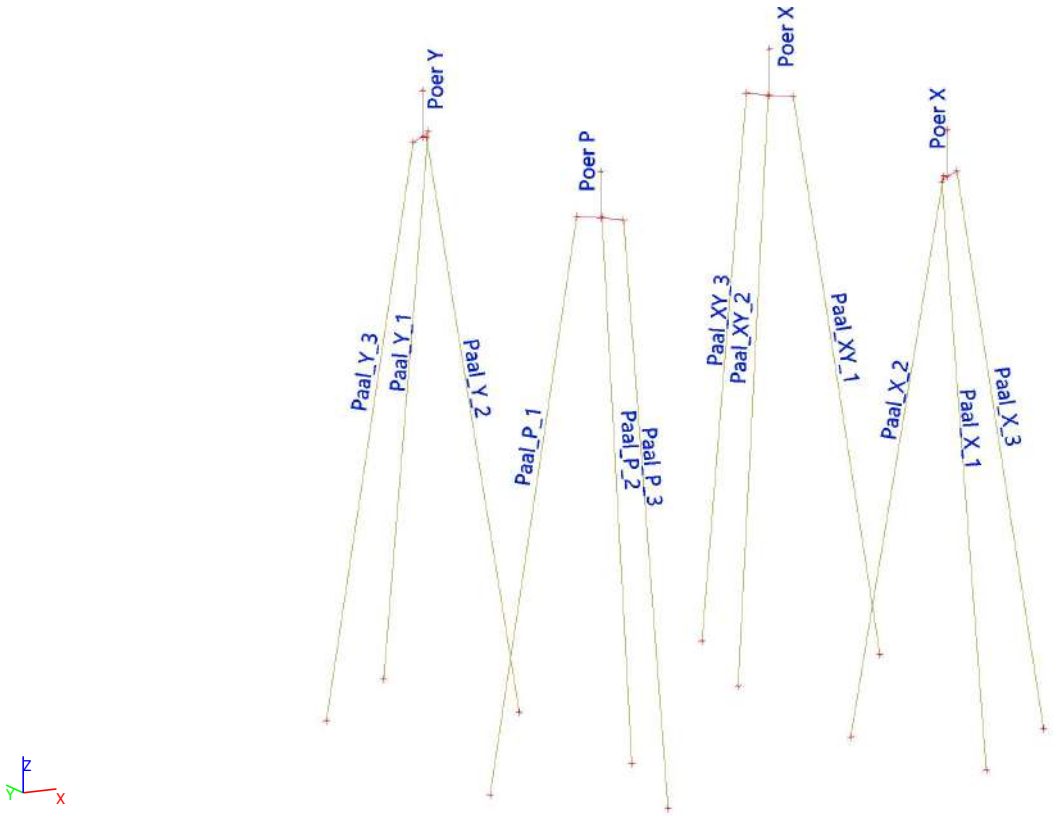
5.2. Analyse model met knopen



5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	14,977	1P4	N5	column (100)
Poer P	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N1	1P	column (100)
Poer X	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N2	1Y	column (100)
Poer XY	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N3	1XY	column (100)
Poer Y	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N4	1X	column (100)
Paal_P_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	14,977	1P6	N22	column (100)
Paal_P_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	14,977	1P2	N6	column (100)
Paal_XY_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	14,977	1P18	N16	column (100)
Paal_XY_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	14,977	1P20	N18	column (100)
Paal_XY_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	14,977	1P16	N17	column (100)
Paal_X_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	14,977	1P11	N12	column (100)
Paal_X_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	14,977	1P13	N8	column (100)
Paal_X_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	14,977	1P9	N13	column (100)
Paal_Y_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	14,977	1P25	N20	column (100)
Paal_Y_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	14,977	1P27	N21	column (100)
Paal_Y_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	14,977	1P23	N10	column (100)

5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
S_P_1	N5	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,50
S_P_2	N22	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,72;Ry-6,72
S_P_3	N6	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,50
S_X_1	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,50
S_X_2	N8	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,72;Ry6,72
S_X_3	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,50
S_XY_1	N16	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,50
S_XY_2	N18	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,72;Ry6,72
S_XY_3	N17	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,50
S_Y_1	N20	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,50
S_Y_2	N21	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,72;Ry-6,72
S_Y_3	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,50

5.6. Analyse model met Knoopondersteuningen

5.7. Line supports on member

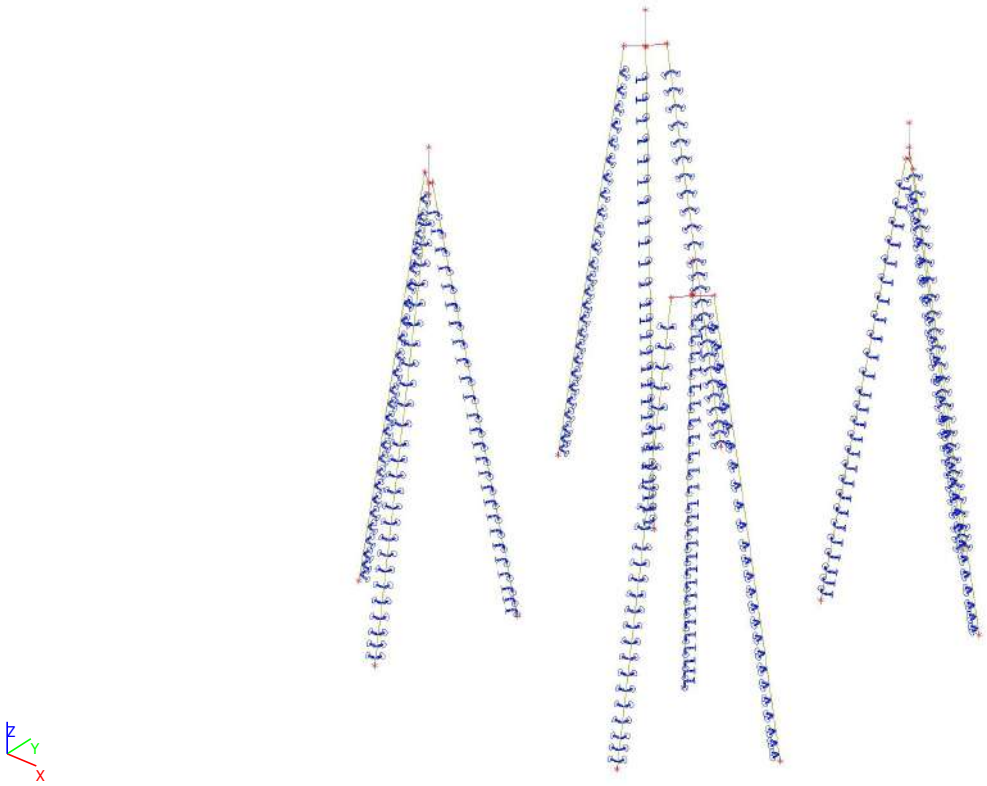
Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
Slb_P_1_02	Line	Paal_P_1	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,750	From start						
Slb_P_3_02	Line	Paal_P_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,750	From start						
Slb_X_1_02	Line	Paal_X_1	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,750	From start						
Slb_X_3_02	Line	Paal_X_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,750	From start						
Slb_XY_1_02	Line	Paal_XY_1	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,750	From start						
Slb_XY_3_02	Line	Paal_XY_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,750	From start						
Slb_Y_1_02	Line	Paal_Y_1	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,750	From start						
Slb_Y_3_02	Line	Paal_Y_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,750	From start						
Slb_P_2_02	Line	Paal_P_2	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,750	From start						
Slb_X_2_02	Line	Paal_X_2	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,750	From start						
Slb_XY_2_02	Line	Paal_XY_2	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,750	From start						
Slb_Y_2_02	Line	Paal_Y_2	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,750	From start						
Slb_Y_3_Veen	Line	Paal_P_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen1	Line	Paal_P_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
Slb_Y_3_Veen2	Line	Paal_P_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen3	Line	Paal_X_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen4	Line	Paal_X_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen5	Line	Paal_X_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen6	Line	Paal_XY_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen7	Line	Paal_XY_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen8	Line	Paal_XY_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen9	Line	Paal_Y_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen10	Line	Paal_Y_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen11	Line	Paal_Y_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen12	Line	Paal_P_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen13	Line	Paal_P_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen14	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen15	Line	Paal_X_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen16	Line	Paal_X_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen17	Line	Paal_X_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen18	Line	Paal_XY_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen19	Line	Paal_XY_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen20	Line	Paal_XY_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen21	Line	Paal_Y_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen22	Line	Paal_Y_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen23	Line	Paal_Y_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen24	Line	Paal_P_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen25	Line	Paal_P_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen26	Line	Paal_P_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen27	Line	Paal_X_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen28	Line	Paal_X_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen29	Line	Paal_X_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen30	Line	Paal_XY_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen31	Line	Paal_XY_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen32	Line	Paal_XY_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen33	Line	Paal_Y_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

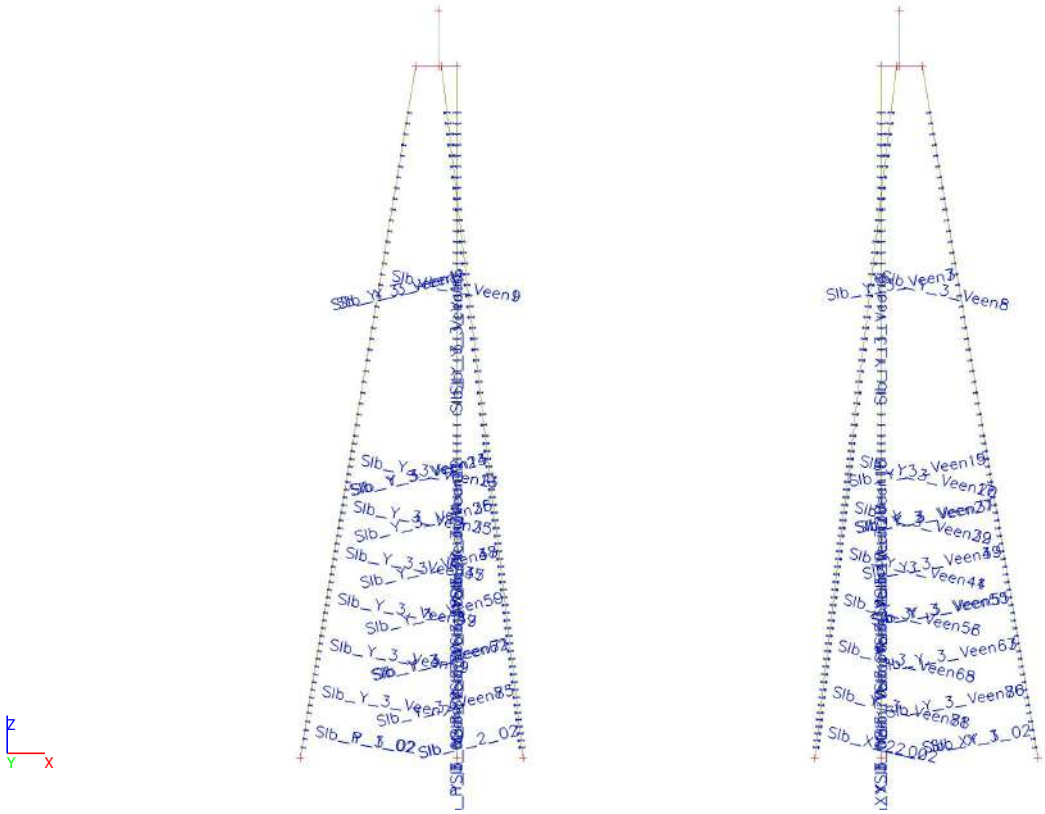
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	10,000	From start						
Slb_Y_3_Veen34	Line	Paal_Y_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen35	Line	Paal_Y_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen36	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen37	Line	Paal_P_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen38	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen39	Line	Paal_X_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen40	Line	Paal_X_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen41	Line	Paal_X_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen42	Line	Paal_XY_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen43	Line	Paal_XY_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen44	Line	Paal_XY_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen45	Line	Paal_Y_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen46	Line	Paal_Y_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen47	Line	Paal_Y_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen48	Line	Paal_P_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_Veen49	Line	Paal_P_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_Veen50	Line	Paal_P_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_Veen51	Line	Paal_X_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_Veen52	Line	Paal_X_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_Veen53	Line	Paal_X_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_Veen54	Line	Paal_XY_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_Veen55	Line	Paal_XY_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_Veen56	Line	Paal_XY_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_Veen57	Line	Paal_Y_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_Veen58	Line	Paal_Y_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_Veen59	Line	Paal_Y_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_Veen60	Line	Paal_P_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_Veen61	Line	Paal_P_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_Veen62	Line	Paal_P_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_Veen63	Line	Paal_X_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_Veen64	Line	Paal_X_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_Veen65	Line	Paal_X_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
		LCS	13,000	From start						
Slb_Y_3_Veen66	Line	Paal_XY_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_Veen67	Line	Paal_XY_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_Veen68	Line	Paal_XY_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_Veen69	Line	Paal_Y_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_Veen70	Line	Paal_Y_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_Veen71	Line	Paal_Y_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_Veen72	Line	Paal_P_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_Veen73	Line	Paal_Y_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_Veen74	Line	Paal_P_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_Veen75	Line	Paal_P_2	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_Veen76	Line	Paal_X_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_Veen77	Line	Paal_X_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_Veen78	Line	Paal_X_2	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_Veen79	Line	Paal_XY_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_Veen80	Line	Paal_XY_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_Veen81	Line	Paal_XY_2	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_Veen82	Line	Paal_Y_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_Veen83	Line	Paal_Y_2	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						

5.8. Analyse model met Lijnondersteuningen



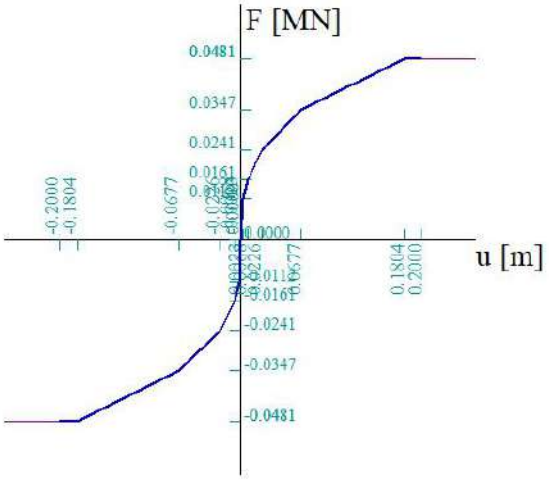
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

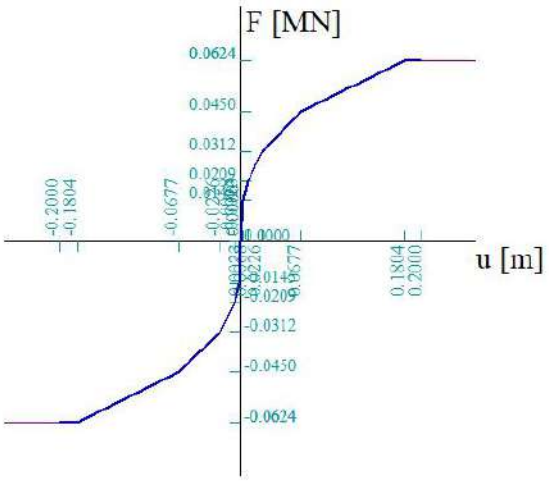
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -48130.000000	Free	Free
		-0.180400 / -48130.000000		
		-0.067650 / -34710.000000		
		-0.022550 / -24064.500000		
		-0.006765 / -16109.569000		
		-0.002255 / -11169.751000		
		0.000000 / 0.000000		
		0.002255 / 11169.751000		
		0.006765 / 16109.569000		
		0.022550 / 24064.500000		
		0.067650 / 34707.015000		
		0.180400 / 48129.000000		
		0.200000 / 48129.000000		

Drawing



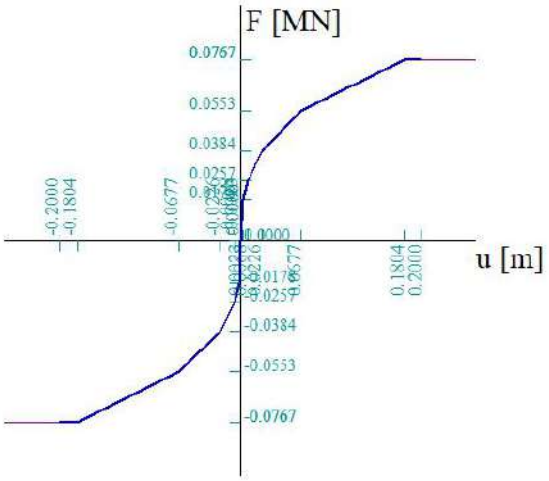
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -62400.000000	Free	Free
		-0.180400 / -62400.000000		
		-0.067650 / -45000.000000		
		-0.022550 / -31200.000000		
		-0.006765 / -20900.000000		
		-0.002255 / -14500.000000		
		0.000000 / 0.000000		
		0.002255 / 14490.000000		
		0.006765 / 20900.000000		
		0.022550 / 31220.000000		
		0.067650 / 45020.000000		
		0.180400 / 62430.000000		
		0.200000 / 62430.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -76737.000000	Free	Free
		-0.180400 / -76737.000000		
		-0.067650 / -55336.953000		
		-0.022550 / -38368.500000		
		-0.006765 / -25685.138000		
		-0.002255 / -17809.080000		
		0.000000 / 0.000000		
		0.002255 / 17809.080000		
		0.006765 / 25685.138000		
		0.022550 / 38368.500000		
		0.067650 / 55336.953000		
		0.180400 / 76737.000000		
		0.200000 / 76737.000000		

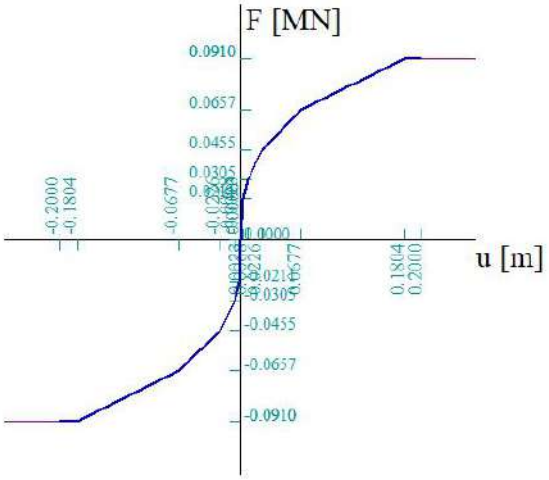
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -91041.000000	Free	Free
		-0.180400 / -91041.000000		
		-0.067650 / -65651.922000		
		-0.022550 / -45520.500000		
		-0.006765 / -30472.923000		
		-0.002255 / -21128.744000		
		0.000000 / 0.000000		
		0.002255 / 21128.744000		
		0.006765 / 30472.923000		
		0.022550 / 45520.500000		

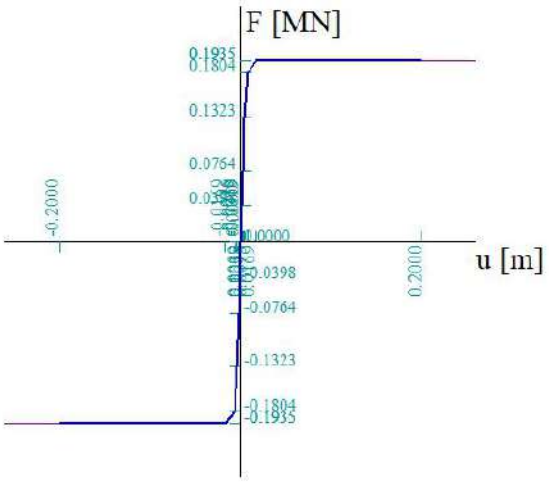
Name	Type	u / F	Positive end	Negative end
		0.067650 / 65651.922000		
		0.180400 / 91041.000000		
		0.200000 / 91041.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -193489.147000	Free	Free
		-0.016913 / -193489.147000		
		-0.007517 / -180407.835000		
		-0.003758 / -132256.824000		
		-0.001879 / -76421.758000		
		-0.000940 / -39826.202000		
		0.000000 / 0.000000		
		0.000940 / 39826.202000		
		0.001879 / 76421.758000		
		0.003758 / 132256.824000		
		0.007517 / 180407.835000		
		0.016913 / 193489.147000		
		0.200000 / 193489.147000		

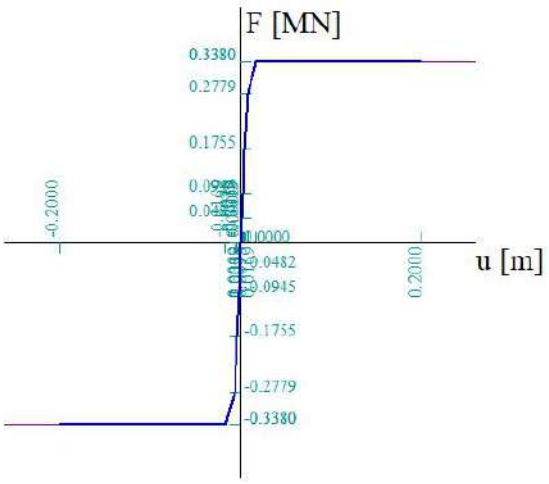
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -338024.958000	Free	Free
		-0.016913 / -338024.958000		
		-0.007517 / -277917.886000		
		-0.003758 / -175526.039000		

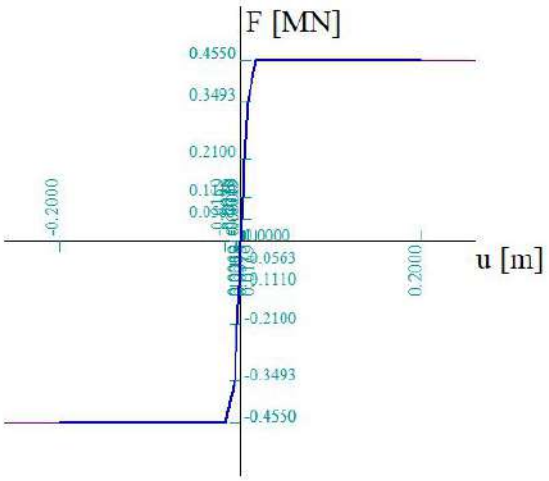
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -94450.113000		
		-0.000940 / -48160.629000		
		0.000000 / 0.000000		
		0.000940 / 48160.629000		
		0.001879 / 94450.113000		
		0.003758 / 175526.039000		
		0.007517 / 277917.886000		
		0.016913 / 338024.958000		
		0.200000 / 338024.958000		

Drawing



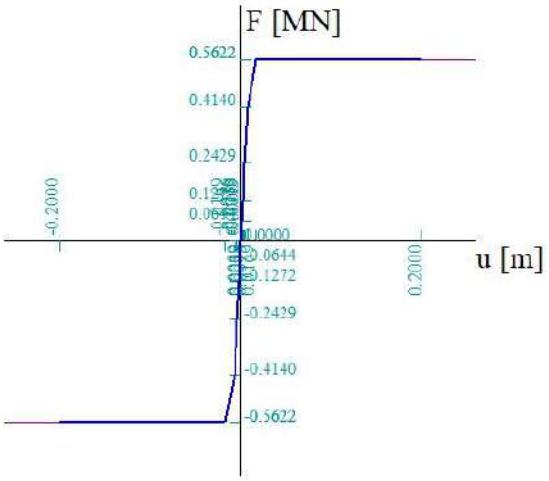
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -454964.396000	Free	Free
		-0.016913 / -454964.396000		
		-0.007517 / -349336.178000		
		-0.003758 / -210048.905000		
		-0.001879 / -110961.163000		
		-0.000940 / -56287.593000		
		0.000000 / 0.000000		
		0.000940 / 56287.593000		
		0.001879 / 110961.163000		
		0.003758 / 210048.905000		
		0.007517 / 349336.178000		
		0.016913 / 454964.396000		
		0.200000 / 454964.396000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -562170.498000	Free	Free
		-0.016913 / -562170.498000		
		-0.007517 / -413992.721000		
		-0.003758 / -242873.332000		
		-0.001879 / -127210.864000		
		-0.000940 / -64380.055000		
		0.000000 / 0.000000		
		0.000940 / 64380.055000		
		0.001879 / 127210.864000		
		0.003758 / 242873.332000		
		0.007517 / 413992.721000		
		0.016913 / 562170.498000		
		0.200000 / 562170.498000		

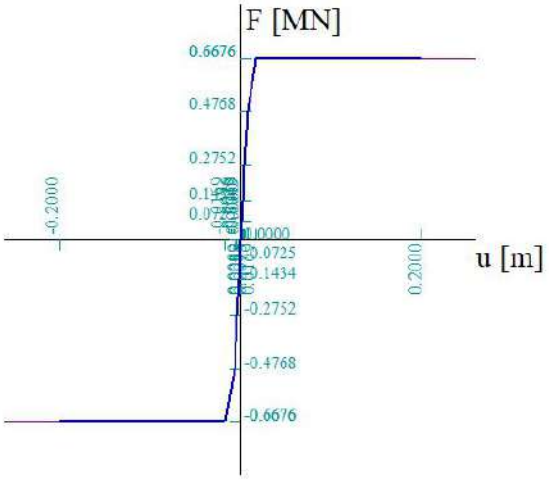
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -667564.512000	Free	Free
		-0.016913 / -667564.512000		
		-0.007517 / -476770.926000		
		-0.003758 / -275233.374000		
		-0.001879 / -143390.211000		
		-0.000940 / -72463.274000		
		0.000000 / 0.000000		
		0.000940 / 72463.274000		
		0.001879 / 143390.211000		
		0.003758 / 275233.374000		

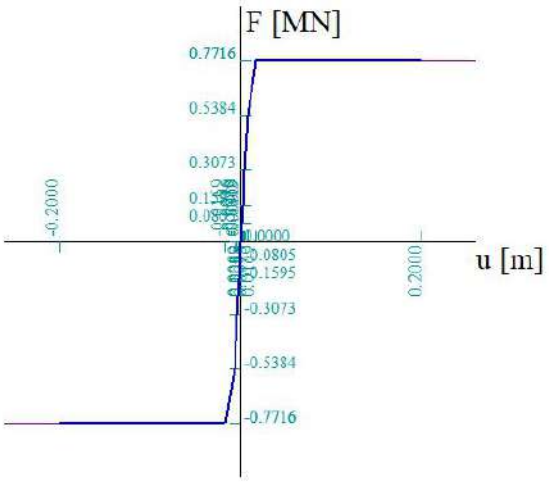
Name	Type	u / F	Positive end	Negative end
		0.007517 / 476770.926000		
		0.016913 / 667564.512000		
		0.200000 / 667564.512000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -771639.629000	Free	Free
		-0.016913 / -771639.629000		
		-0.007517 / -538432.081000		
		-0.003758 / -307337.483000		
		-0.001879 / -159531.700000		
		-0.000940 / -80541.551000		
		0.000000 / 0.000000		
		0.000940 / 80541.551000		
		0.001879 / 159531.700000		
		0.003758 / 307337.483000		
		0.007517 / 538432.081000		
		0.016913 / 771639.629000		
		0.200000 / 771639.629000		

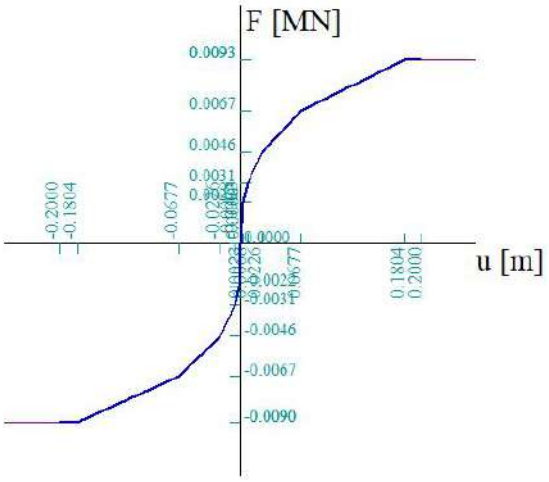
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -9000.000000	Free	Free
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		

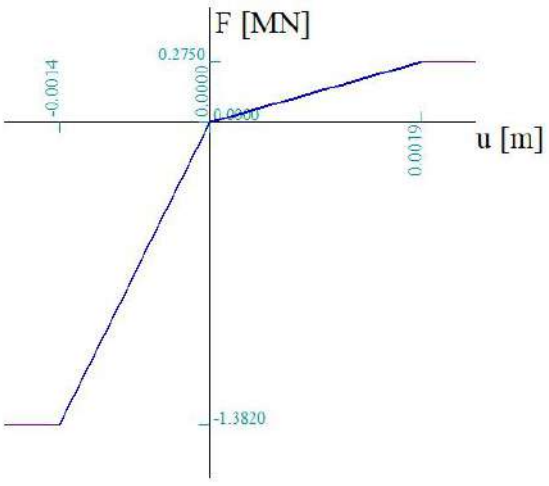
Name	Type	u / F	Positive end	Negative end
		-0.006765 / -3100.000000		
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing



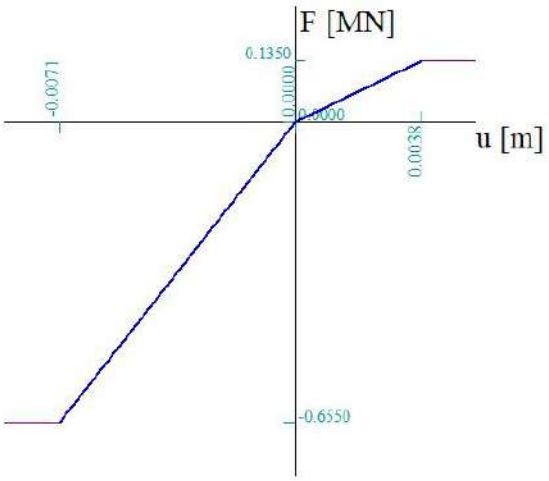
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+3-paalpunt	Translation	-0.001380 / -1382000.000000	Free	Free
		0.000000 / 0.000000		
		0.001940 / 275000.000000		

Drawing



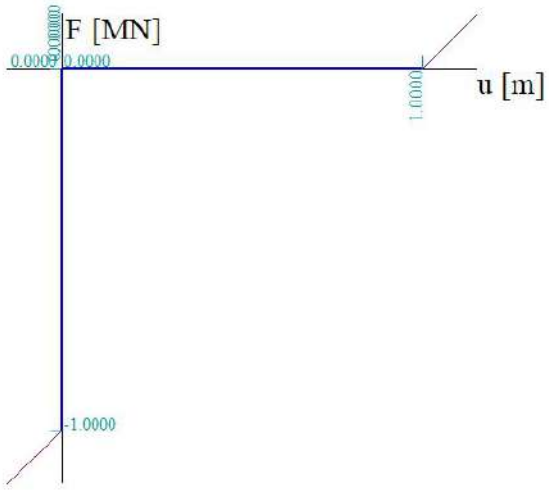
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+0-paalpunt_cap	Translation	-0.007100 / -655000.000000	Free	Free
		0.000000 / 0.000000		
		0.003800 / 135000.000000		

Drawing



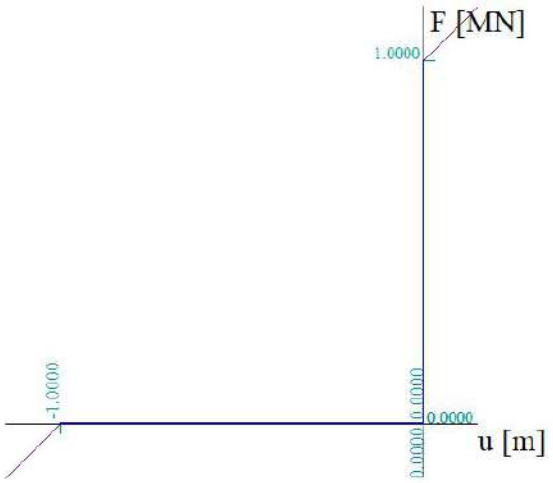
Name	Type	u / F	Positive end	Negative end
press only	Translation	-0.000001 / -1000000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 0.000000		

Drawing



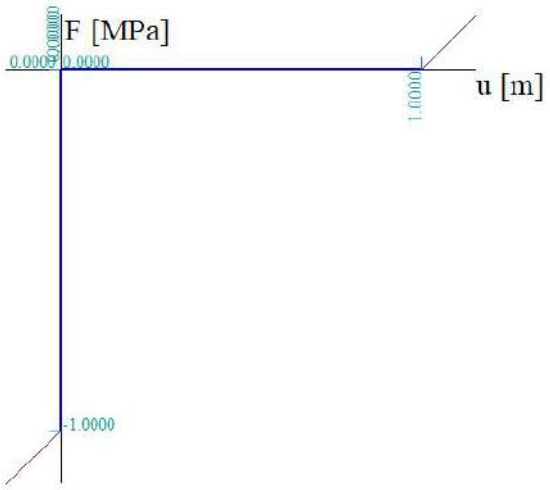
Name	Type	u / F	Positive end	Negative end
tension only	Translation	-1.000000 / 0.000000	Flexible	Flexible
		0.000000 / 0.000000		
		0.000001 / 1000000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing

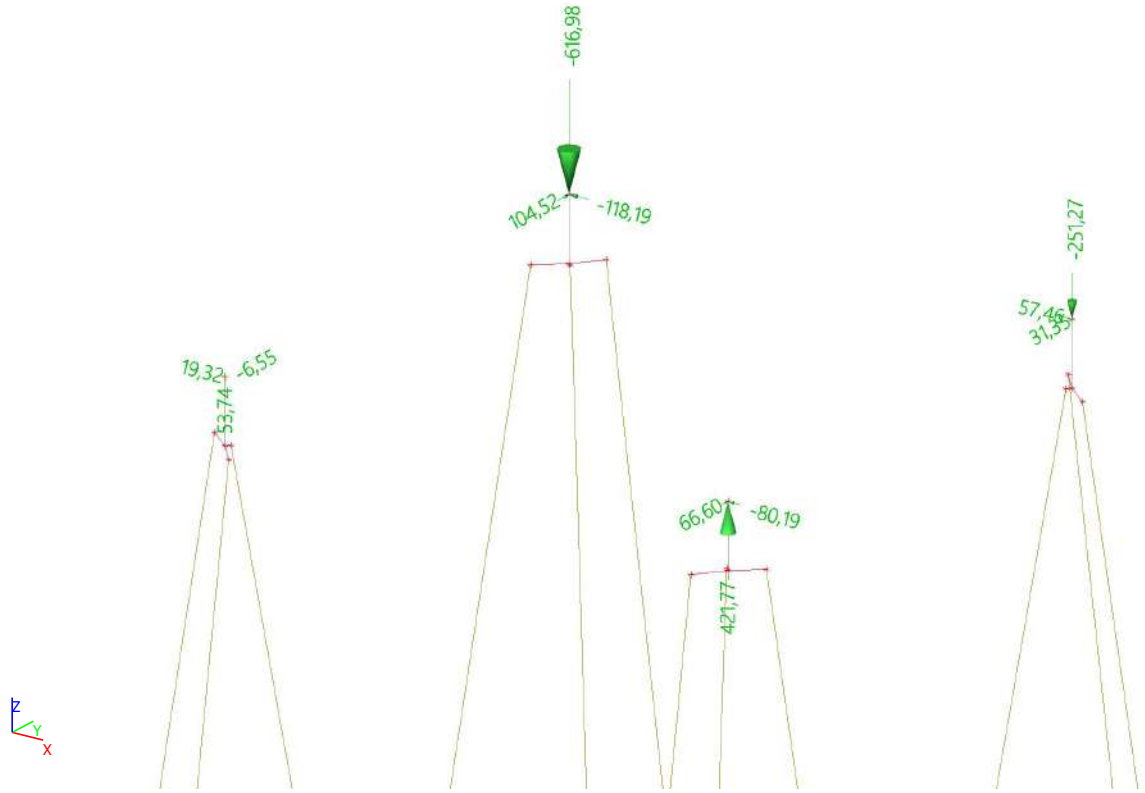


6. Belastingen

6.1. Load cases

6.1.1. Load cases - high max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



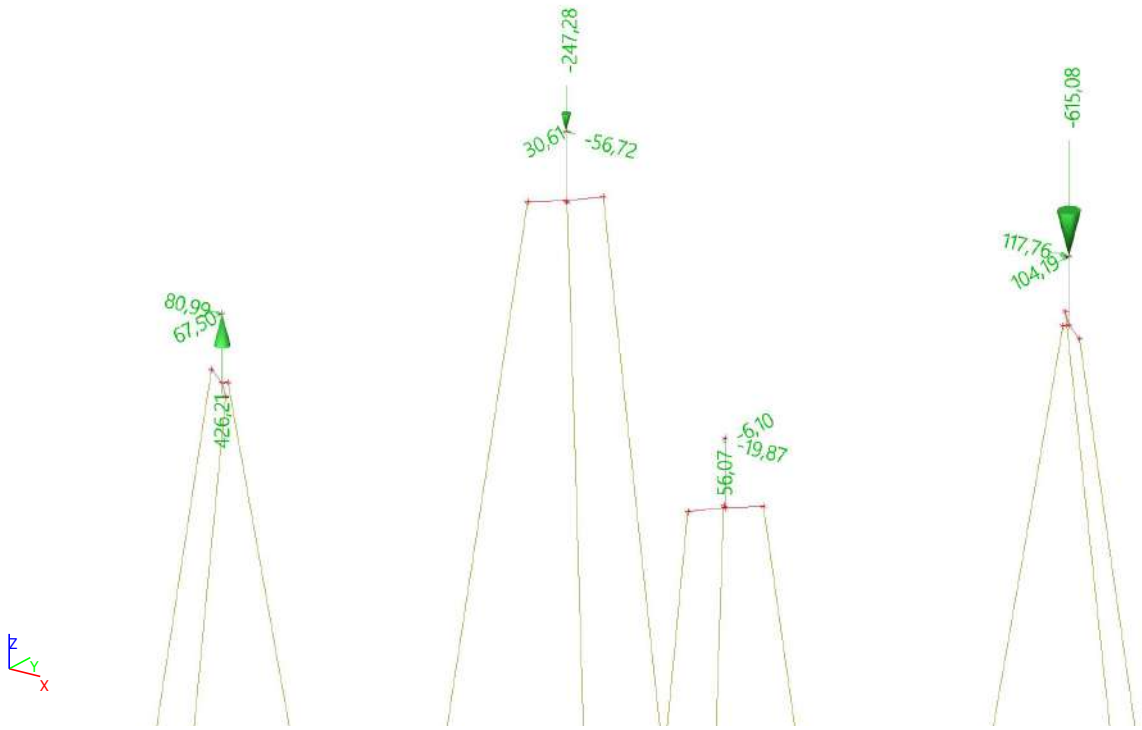
6.1.1.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Force	19,32
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Force	-6,55
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Force	53,74
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Force	-118,19
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Force	104,52
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Force	-616,98
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Force	57,46
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Force	31,35
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Force	-251,27

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Force	-80,19
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Force	66,60
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Force	421,77

6.1.2. Load cases - high max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



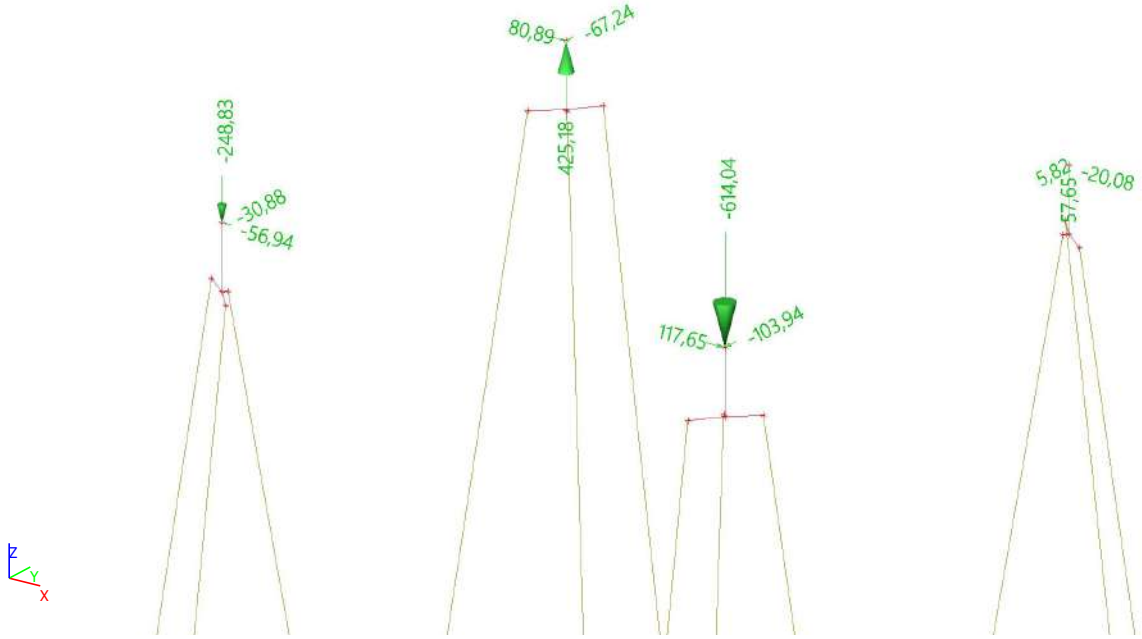
6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Force	80,99
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Force	67,50
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Force	426,21
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Force	-56,72
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Force	30,61
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Force	-247,28

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Force	117,76
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Force	104,19
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Force	-615,08
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Force	-19,87
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Force	-6,10
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Force	56,07

6.1.3. Load cases - high max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



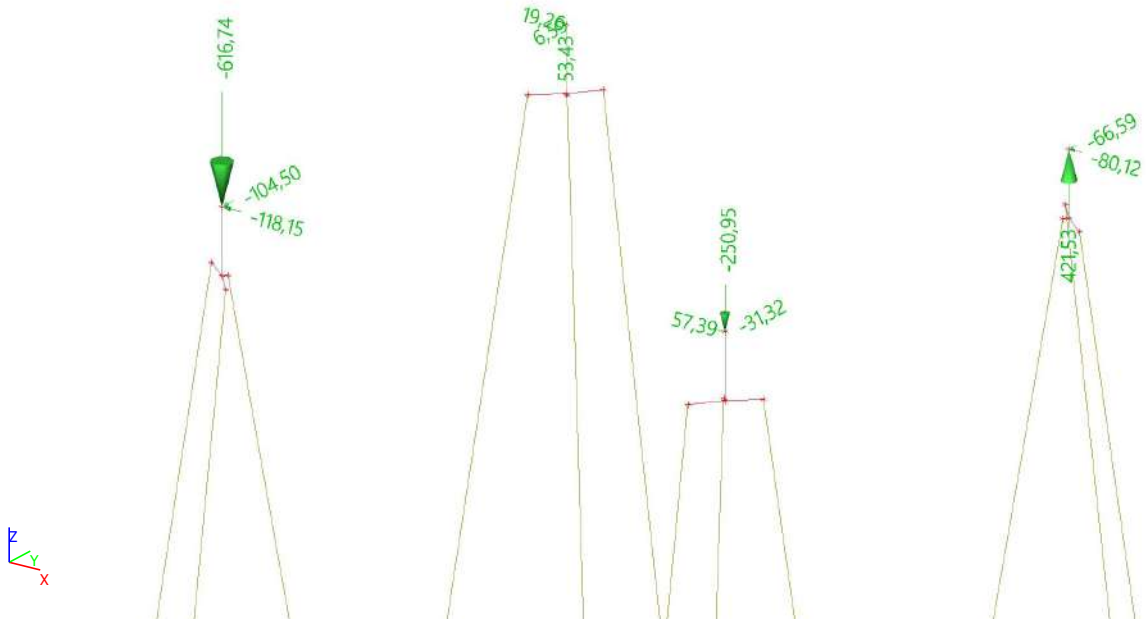
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Force	-56,94
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Force	-30,88
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Force	-248,83

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Force	80,89
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Force	-67,24
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Force	425,18
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Force	-20,08
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Force	5,82
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Force	57,65
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Force	117,65
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Force	-103,94
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Force	-614,04

6.1.4. Load cases - high max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			

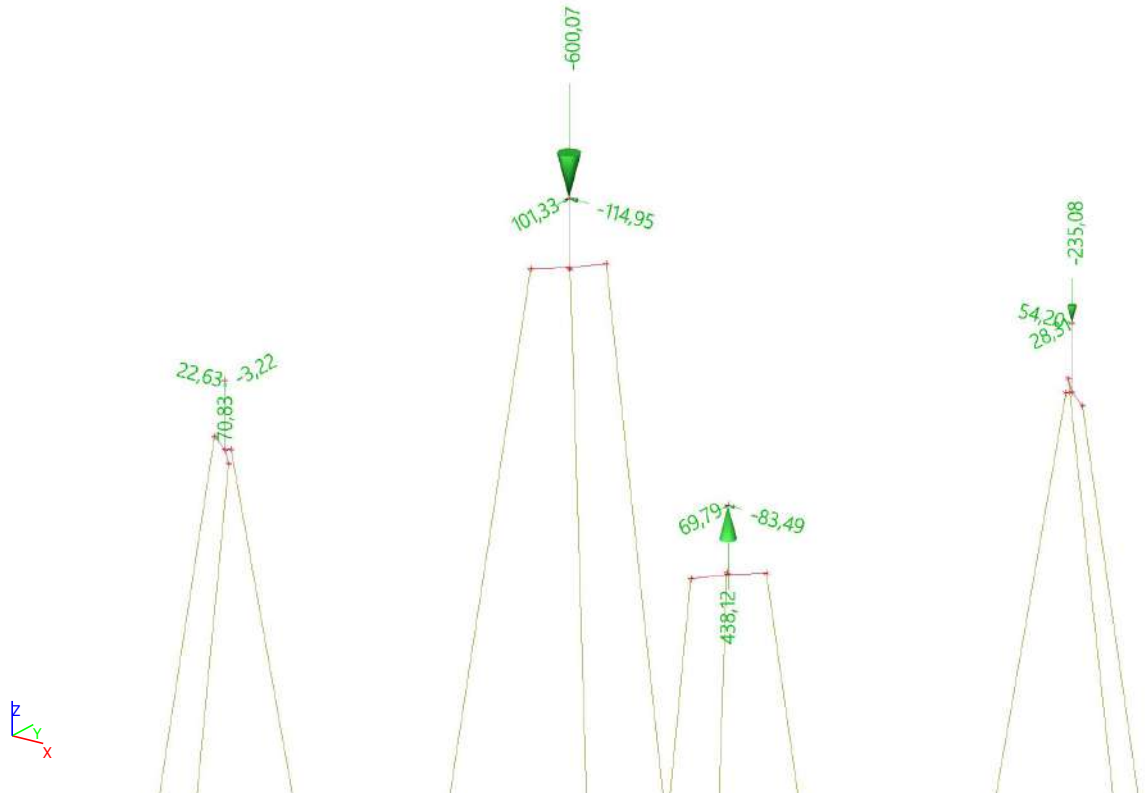


6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Force	-118,15
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Force	-104,50
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Force	-616,74
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Force	19,26
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Force	6,59
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Force	53,43
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Force	-80,12
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Force	-66,59
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Force	421,53
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Force	57,39
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Force	-31,32
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Force	-250,95

6.1.5. Load cases - low max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			

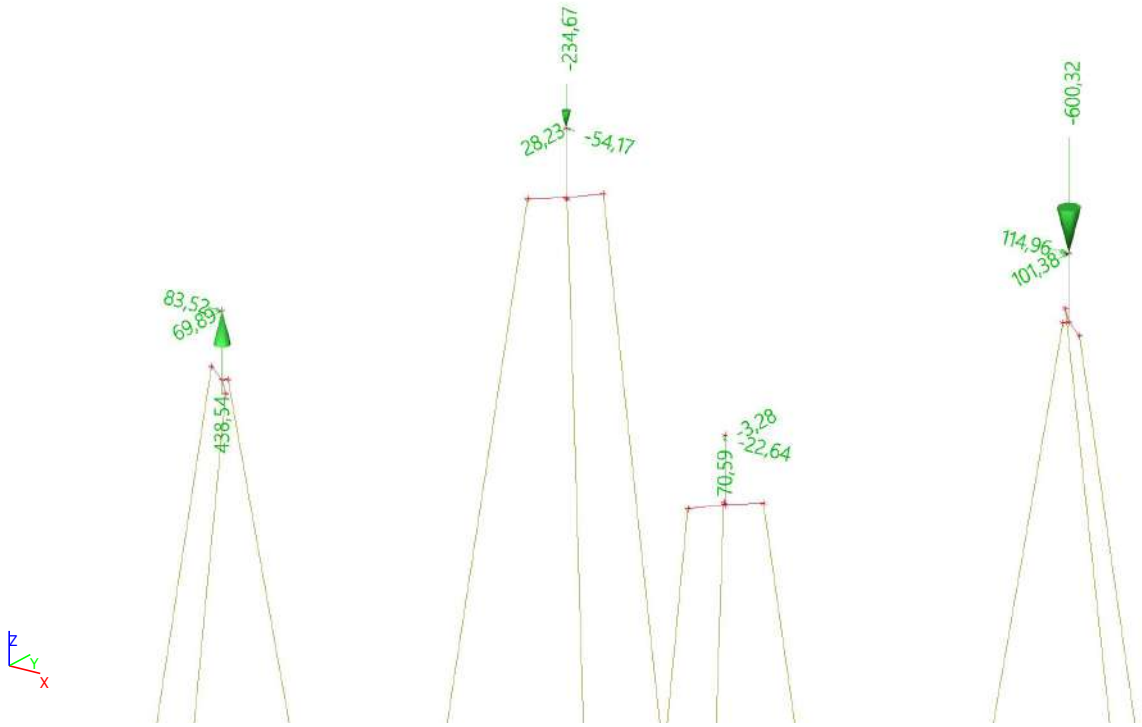


6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Force	22,63
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Force	-3,22
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Force	70,83
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Force	-114,95
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Force	101,33
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Force	-600,07
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Force	54,20
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Force	28,31
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Force	-235,08
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Force	-83,49
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Force	69,79
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Force	438,12

6.1.6. Load cases - low max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



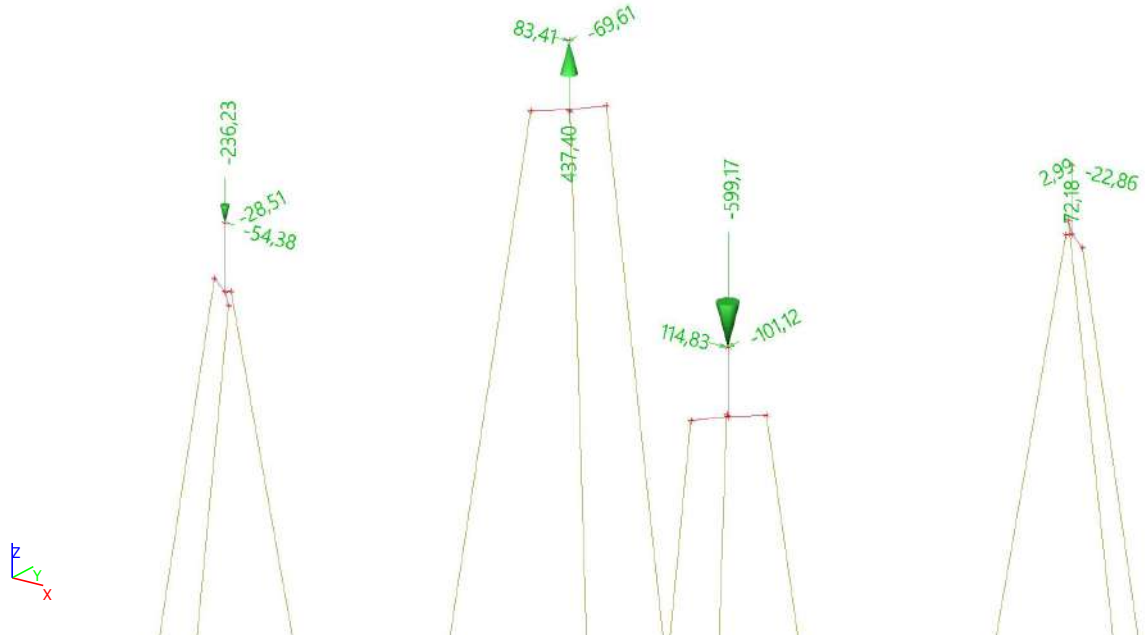
6.1.6.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Force	83,52
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Force	69,89
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Force	438,54
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Force	-54,17
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Force	28,23
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Force	-234,67
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Force	114,96
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Force	101,38
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Force	-600,32
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Force	-22,64
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Force	-3,28

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Force	70,59

6.1.7. Load cases - low max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



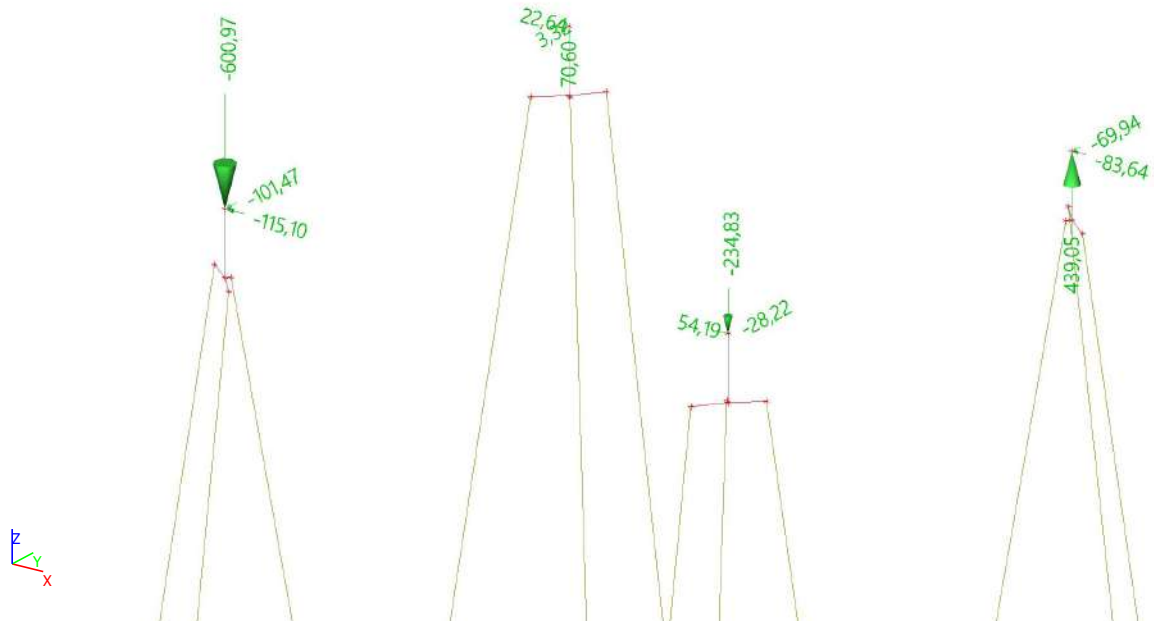
6.1.7.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Force	-54,38
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Force	-28,51
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Force	-236,23
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Force	83,41
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Force	-69,61
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Force	437,40
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Force	-22,86
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Force	2,99

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Force	72,18
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Force	114,83
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Force	-101,12
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Force	-599,17

6.1.8. Load cases - low max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



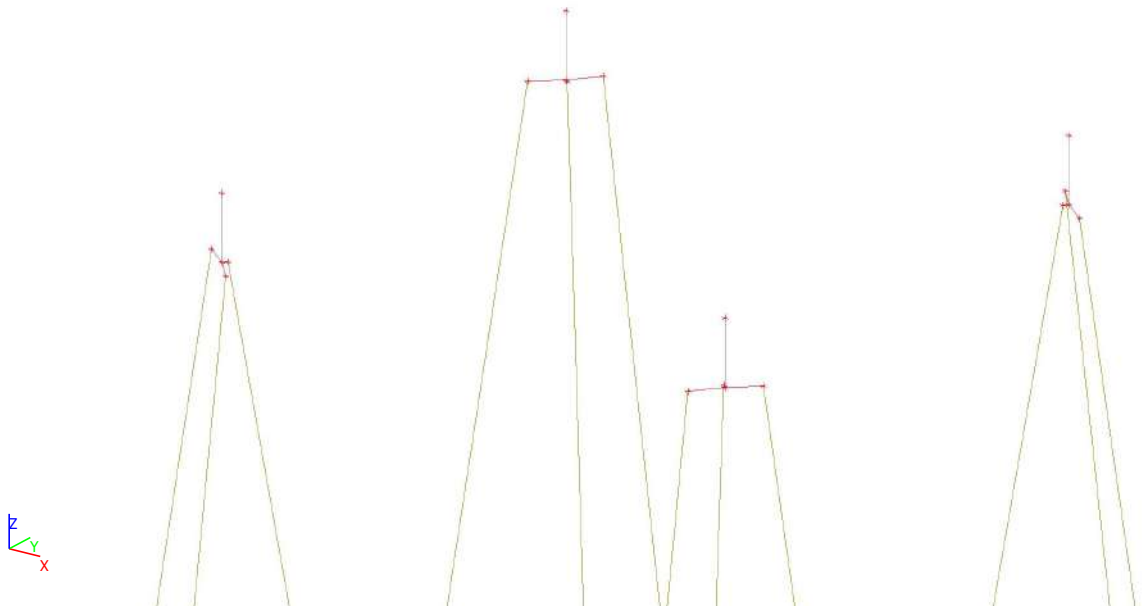
6.1.8.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Force	-115,10
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Force	-101,47
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Force	-600,97
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Force	22,64
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Force	3,32

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Force	70,60
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Force	-83,64
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Force	-69,94
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Force	439,05
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Force	54,19
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Force	-28,22
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Force	-234,83

6.1.9. Load cases - EG_Fundering

Name	Description	Action type	Load group	Direction
	Spec	Load type		
EG_Fundering		Permanent	LG1	-Z
		Self weight		



6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
low max Wnd ;45° - EG_Gunstig	Ultimate	low max Wnd ;45°	1,000
		EG_Fundering	0,900
low max Wnd ;135° - EG_Gunstig	Ultimate	low max Wnd ;135°	1,000
		EG_Fundering	0,900
low max Wnd ;225° - EG_Gunstig	Ultimate	low max Wnd ;225°	1,000
		EG_Fundering	0,900
low max Wnd ;315° - EG_Gunstig	Ultimate	low max Wnd ;315°	1,000
		EG_Fundering	0,900
high max Wnd ;45° - EG_Ongunstig	Ultimate	high max Wnd ;45°	1,000
		EG_Fundering	1,200
high max Wnd ;135° - EG_Ongunstig	Ultimate	high max Wnd ;135°	1,000
		EG_Fundering	1,200
high max Wnd ;225° - EG_Ongunstig	Ultimate	high max Wnd ;225°	1,000
		EG_Fundering	1,200
high max Wnd ;315° - EG_Ongunstig	Ultimate	high max Wnd ;315°	1,000
		EG_Fundering	1,200

6.3. Result classes

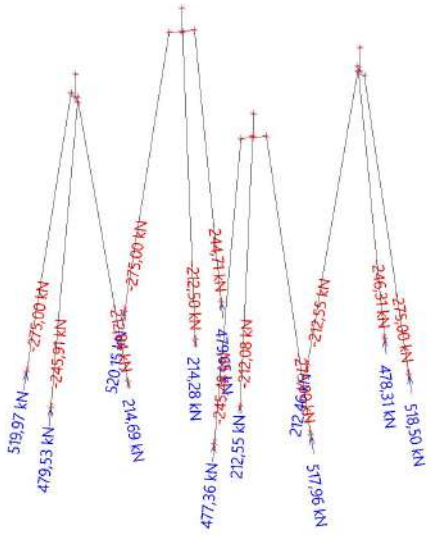
Name	List
ALL Non-linear	low max Wnd ;45° - EG_Gunstig
	low max Wnd ;135° - EG_Gunstig
	low max Wnd ;225° - EG_Gunstig
	low max Wnd ;315° - EG_Gunstig
	high max Wnd ;45° - EG_Ongunstig
	high max Wnd ;135° - EG_Ongunstig
	high max Wnd ;225° - EG_Ongunstig
	high max Wnd ;315° - EG_Ongunstig

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen

Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_Y_3/N10	low max Wnd ;45° - EG_Gunstig	**0,00**	0,00	493,24	0,00	0,00	0,00	0,0	0,0
S_XY_1/N16	high max Wnd ;135° - EG_Ongunstig	**0,00**	0,00	518,50	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_3/N6	high max Wnd ;315° - EG_Ongunstig	0,00	**0,00**	479,53	0,00	0,00	0,00	0,0	0,0
S_X_2/N8	low max Wnd ;225° - EG_Gunstig	0,00	**0,00**	-212,08	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_Y_3/N10	high max Wnd ;45° - EG_Ongunstig	0,00	0,00	**520,15**	0,00	0,00	0,00	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: ALL Non-linear

System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen

Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_3/N6	high max Wnd ;315° - EG_Ongunstig	0,00	**0,00**	**479,53**	0,00	0,00	0,00	0,0	0,0
S_P_3/N6	high max Wnd ;135° - EG_Ongunstig	**0,00**	**0,00**	-222,17	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_3/N6	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-245,91**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	low max Wnd ;45° - EG_Gunstig	**0,00**	**0,00**	-36,43	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_1/N5	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	high max Wnd ;315° - EG_Ongunstig	0,00	0,00	**519,97**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	high max Wnd ;225° - EG_Ongunstig	**0,00**	0,00	266,57	0,00	0,00	**0,00**	0,0	0,0
S_P_2/N22	high max Wnd ;315° - EG_Ongunstig	**0,00**	0,00	-207,38	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_2/N22	high max Wnd ;135° - EG_Ongunstig	0,00	**0,00**	**214,69**	0,00	0,00	0,00	0,0	0,0
S_P_2/N22	low max Wnd ;315° - EG_Gunstig	0,00	**0,00**	**-212,84**	0,00	0,00	0,00	0,0	0,0
S_P_2/N22	low max Wnd ;135° - EG_Gunstig	**0,00**	0,00	200,77	0,00	0,00	**0,00**	0,0	0,0
S_X_3/N13	high max Wnd ;315° - EG_Ongunstig	**0,00**	**0,00**	268,24	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_3/N13	low max Wnd ;45° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	high max Wnd ;225° - EG_Ongunstig	0,00	0,00	**517,96**	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	low max Wnd ;315° - EG_Gunstig	**0,00**	0,00	241,79	0,00	0,00	**0,00**	0,0	0,0
S_X_1/N12	low max Wnd ;315° - EG_Gunstig	**0,00**	**0,00**	169,51	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_1/N12	high max Wnd ;225° - EG_Ongunstig	0,00	0,00	**477,36**	0,00	0,00	0,00	0,0	0,0
S_X_1/N12	low max Wnd ;45° - EG_Gunstig	0,00	**0,00**	**-245,48**	0,00	0,00	**0,00**	0,0	0,0
S_X_2/N8	high max Wnd ;225° - EG_Ongunstig	**0,00**	0,00	-205,94	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_2/N8	high max Wnd ;45° - EG_Ongunstig	0,00	**0,00**	**212,55**	0,00	0,00	0,00	0,0	0,0

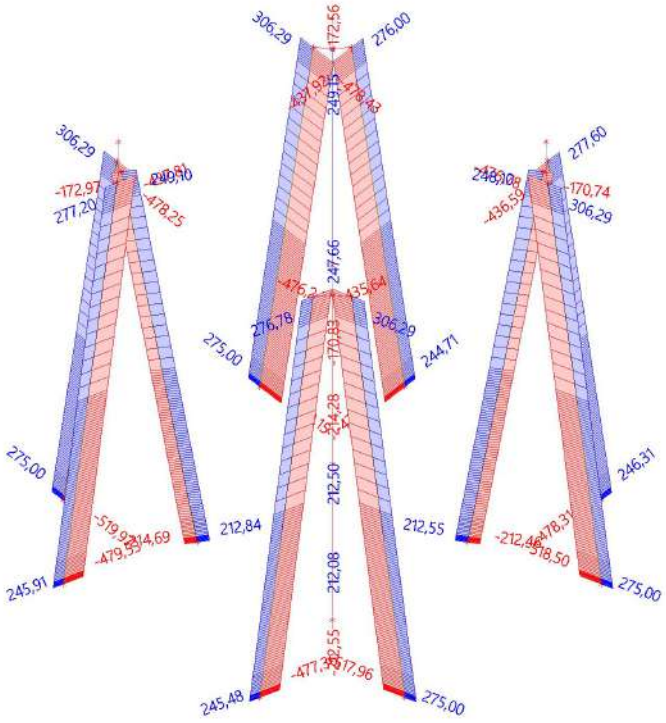
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_X_2/N8	low max Wnd ;225° - EG_Gunstig	0,00	**0,00**	**-212,08**	0,00	0,00	0,00	0,0	0,0
S_X_2/N8	low max Wnd ;45° - EG_Gunstig	**0,00**	0,00	200,77	0,00	0,00	**0,00**	0,0	0,0
S_XY_3/N17	high max Wnd ;45° - EG_Ongunstig	**0,00**	**0,00**	195,74	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_3/N17	low max Wnd ;315° - EG_Gunstig	0,00	**0,00**	**-246,31**	0,00	0,00	0,00	0,0	0,0
S_XY_3/N17	high max Wnd ;135° - EG_Ongunstig	0,00	0,00	**478,31**	0,00	0,00	0,00	0,0	0,0
S_XY_1/N16	low max Wnd ;315° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_XY_1/N16	high max Wnd ;135° - EG_Ongunstig	**0,00**	**0,00**	**518,50**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_1/N16	high max Wnd ;45° - EG_Ongunstig	**0,00**	0,00	268,51	0,00	0,00	**0,00**	0,0	0,0
S_XY_2/N18	high max Wnd ;135° - EG_Ongunstig	**0,00**	0,00	-206,37	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_2/N18	low max Wnd ;135° - EG_Gunstig	0,00	**0,00**	**-212,55**	0,00	0,00	0,00	0,0	0,0
S_XY_2/N18	high max Wnd ;315° - EG_Ongunstig	0,00	**0,00**	**212,46**	0,00	0,00	0,00	0,0	0,0
S_XY_2/N18	low max Wnd ;315° - EG_Gunstig	**0,00**	0,00	200,65	0,00	0,00	**0,00**	0,0	0,0
S_Y_3/N10	low max Wnd ;135° - EG_Gunstig	**0,00**	**0,00**	241,68	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_3/N10	low max Wnd ;225° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_Y_3/N10	high max Wnd ;45° - EG_Ongunstig	0,00	0,00	**520,15**	0,00	0,00	0,00	0,0	0,0
S_Y_3/N10	low max Wnd ;45° - EG_Gunstig	**0,00**	0,00	493,24	0,00	0,00	**0,00**	0,0	0,0
S_Y_1/N20	low max Wnd ;135° - EG_Gunstig	**0,00**	**0,00**	169,49	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_1/N20	low max Wnd ;225° - EG_Gunstig	0,00	0,00	**-244,71**	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	high max Wnd ;45° - EG_Ongunstig	0,00	0,00	**479,65**	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	low max Wnd ;45° - EG_Gunstig	0,00	**0,00**	452,90	0,00	0,00	**0,00**	0,0	0,0
S_Y_2/N21	low max Wnd ;45° - EG_Gunstig	**0,00**	**0,00**	**-212,50**	0,00	0,00	0,00	0,0	0,0
S_Y_2/N21	high max Wnd ;225° - EG_Ongunstig	0,00	**0,00**	**214,28**	**0,00**	**0,00**	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_Y_2/N21	low max Wnd ;225° - EG_Gunstig	**0,00**	0,00	200,73	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

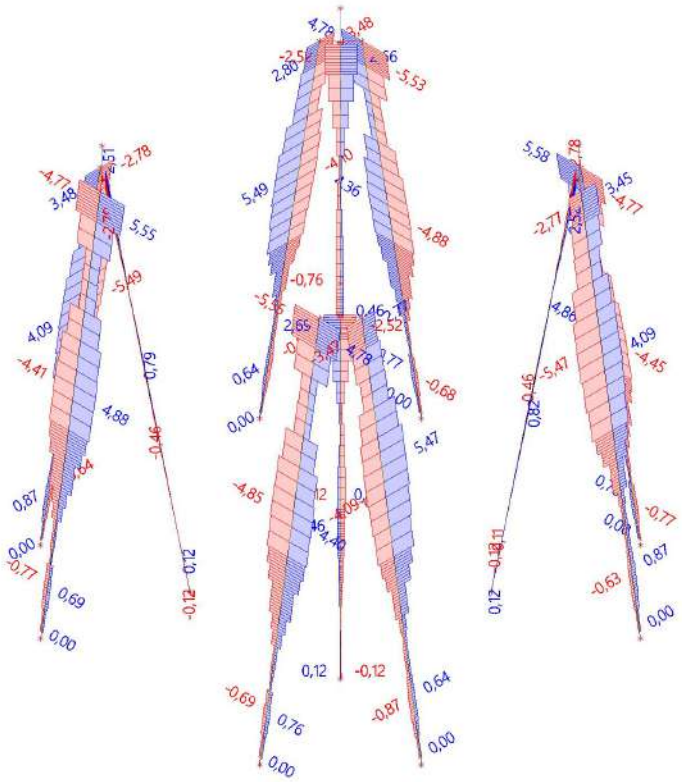
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



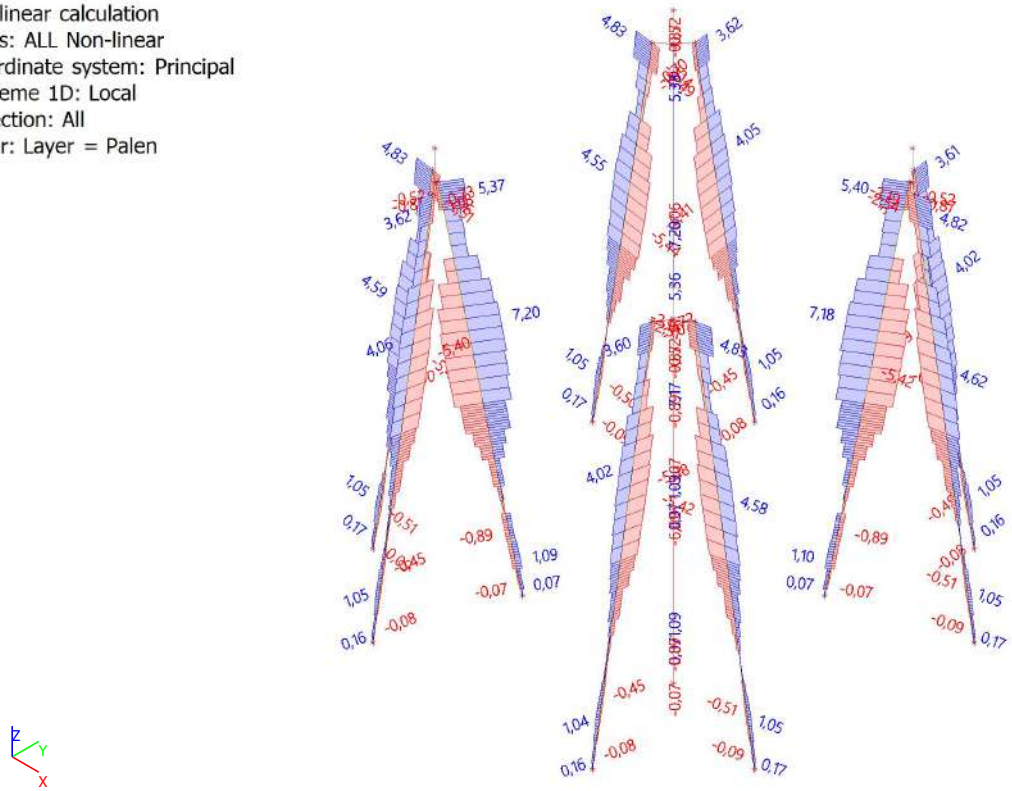
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



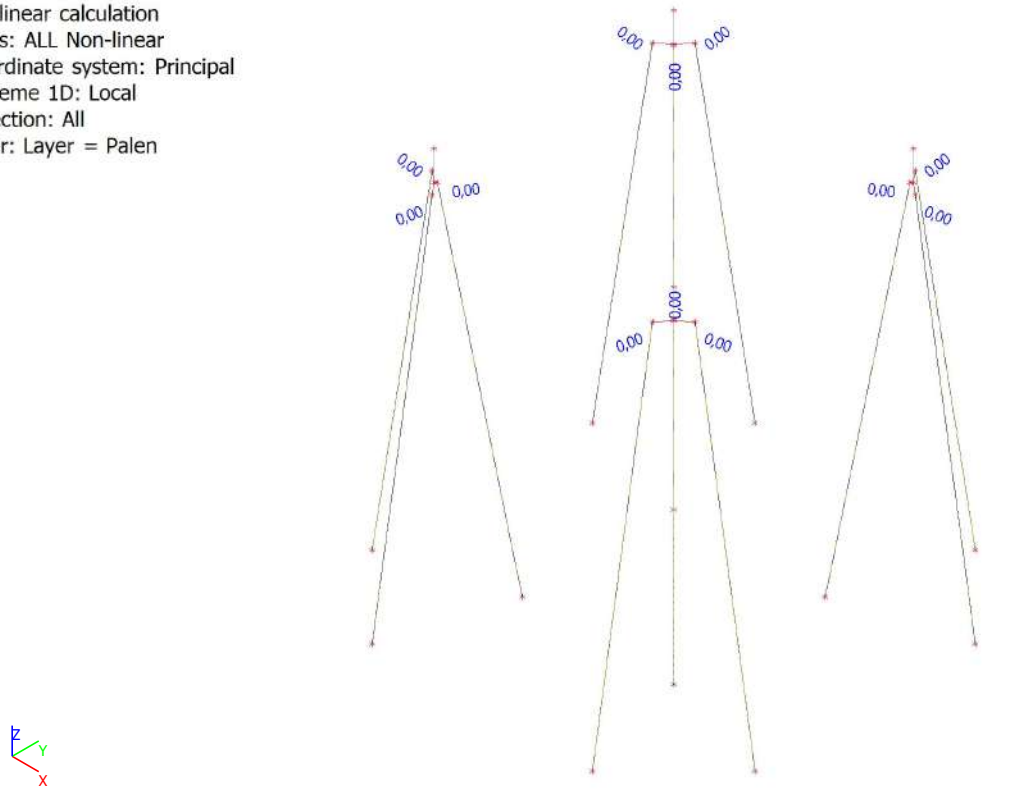
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



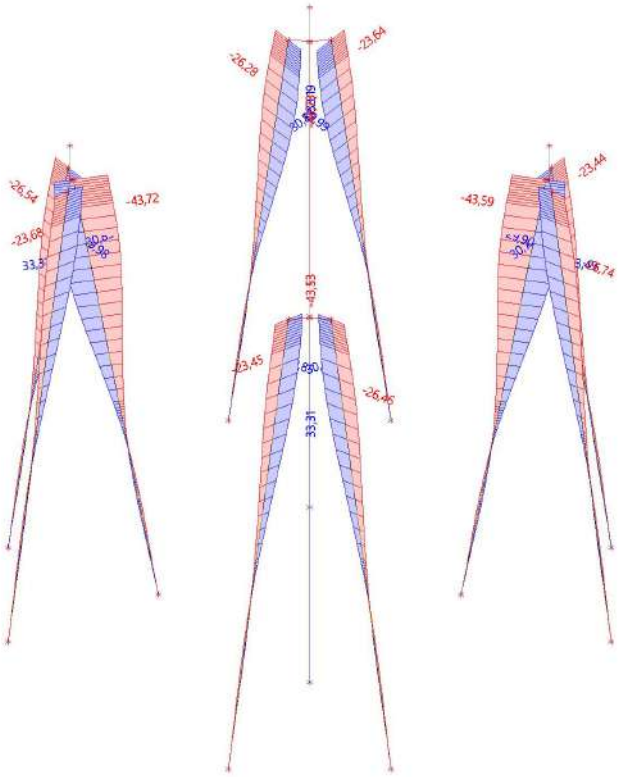
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



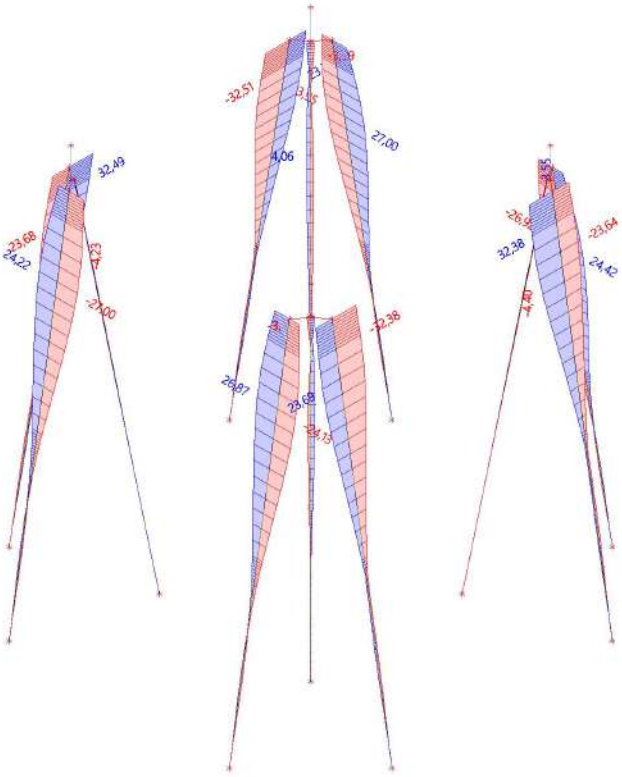
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_Y_3	14,977	high max Wnd ;45° - EG_Ongunstig	**-520,15**	0,00	0,17	0,00	0,00	0,00
Paal_P_1	0,000	low max Wnd ;135° - EG_Gunstig	**306,29**	-1,94	-2,16	**0,00**	-23,08	-21,14
Paal_X_1	0,000	low max Wnd ;45° - EG_Gunstig	276,78	**-5,55**	-0,72	0,00	-22,47	-13,52
Paal_XY_3	0,000	low max Wnd ;315° - EG_Gunstig	277,60	**5,58**	-0,75	0,00	-22,39	13,72
Paal_XY_2	6,250+	low max Wnd ;315° - EG_Gunstig	-183,33	0,81	**-6,12**	0,00	17,98	-3,05
Paal_Y_2	4,500+	high max Wnd ;45° - EG_Ongunstig	235,39	0,05	**7,20**	0,00	-29,93	-1,47
Paal_Y_2	1,000-	high max Wnd ;45° - EG_Ongunstig	246,36	-1,59	-0,37	0,00	**-43,73**	0,83
Paal_XY_2	2,750-	low max Wnd ;315° - EG_Gunstig	-174,19	-1,02	0,51	0,00	**33,49**	-4,18
Paal_Y_3	1,000-	high max Wnd ;45° - EG_Ongunstig	-481,21	-1,02	4,37	0,00	27,42	**-32,51**
Paal_P_1	1,000-	high max Wnd ;315° - EG_Ongunstig	-481,03	1,02	4,37	0,00	27,42	**32,49**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer XY	1,200	low max Wnd ;315° - EG_Gunstig	**439,05**	-108,60	9,69	**0,00**	0,00	0,00
Poer XY	0,000	low max Wnd ;315° - EG_Gunstig	409,28	**-108,60**	9,69	0,00	-11,62	**130,32**
Poer XY	0,000	high max Wnd ;45° - EG_Ongunstig	-290,96	62,80	**-18,46**	0,00	**22,16**	-75,36
Poer Y	0,000	high max Wnd ;135° - EG_Ongunstig	-286,97	61,75	**18,46**	0,00	**-22,16**	-74,10
Poer Y	0,000	high max Wnd ;45° - EG_Ongunstig	**-656,67**	**157,48**	9,67	0,00	-11,60	**-188,98**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Blokpoer 3xBeton40x40 Mast-S+6
Author	[redacted]
Date	01-09-2025
Structure	General XYZ
No. of nodes :	32
No. of beams :	16
No. of slabs :	0
No. of solids :	0
No. of used profiles :	2
No. of load cases :	9
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materials

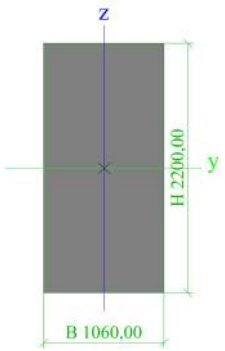
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C12/15 Gescheurd	Concrete	2500,00	2600,00	8,0000e+03	0.2	0,01e-003	12,00	
C20/25 Ongescheurd	Concrete	1500,00	2600,00	2,4000e+04	0.2	0,01e-003	20,00	

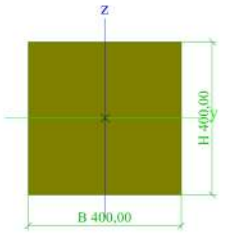
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

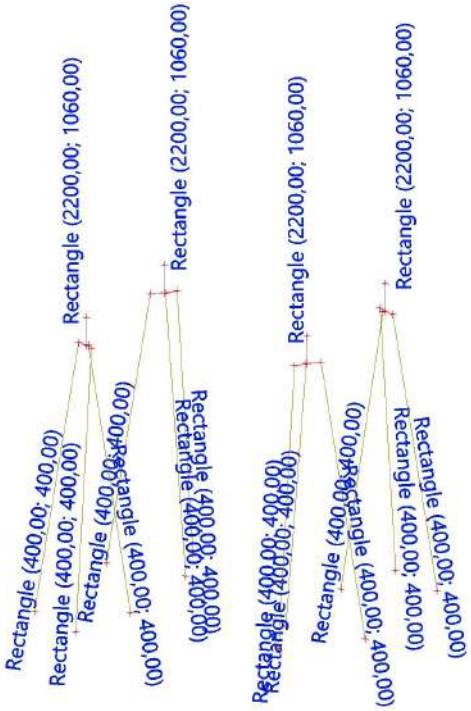
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Reinforcement steel	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

4.2. Cross-sections

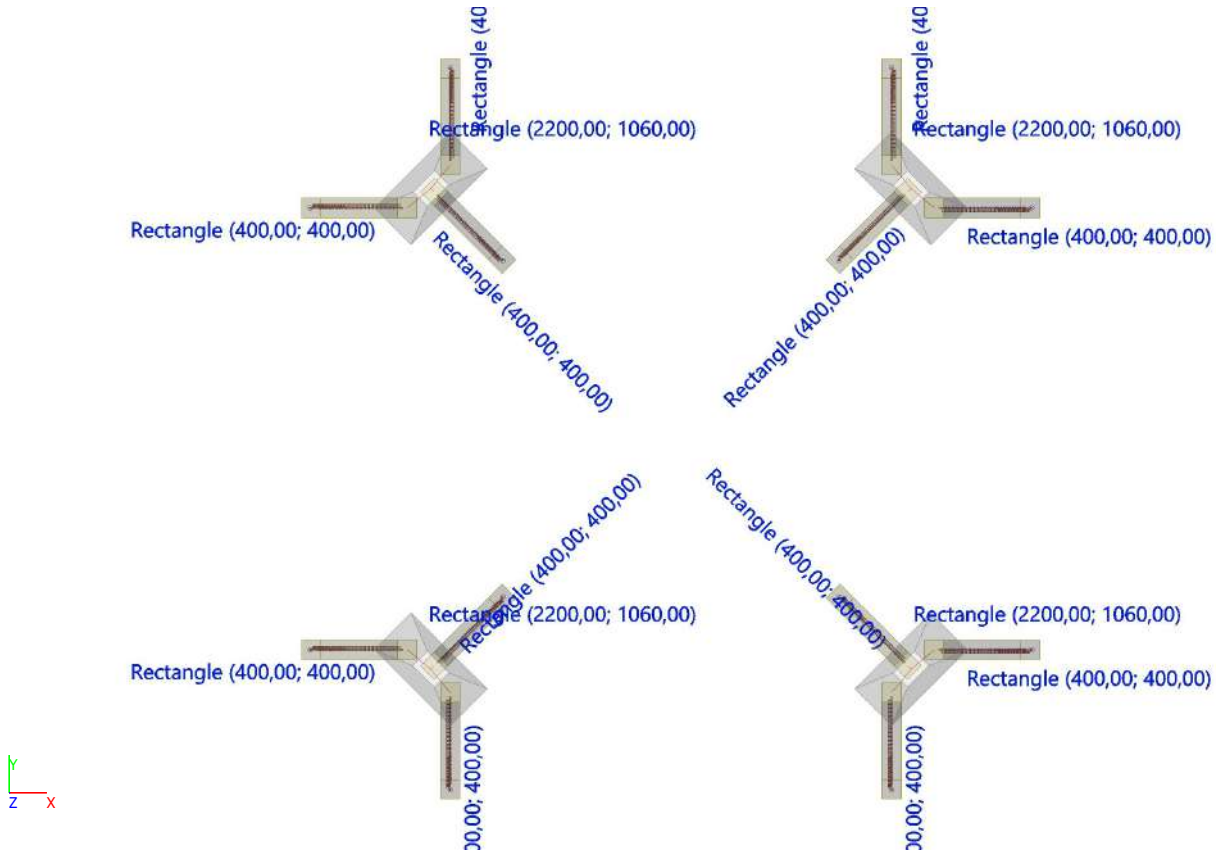
Poer		
Type	Rectangle	
Detailed	2200,00; 1060,00	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	concrete	
Colour		
A [mm²]	2,3320e+06	
A_y [mm²], A_z [mm²]	1,9433e+06	1,9433e+06
A_L [m²/m], A_D [m²/m]	6,5200e+00	6,5200e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	530,00	1100,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	9,4057e+11	2,1835e+11
i_y [mm], i_z [mm]	635,09	306,00
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	8,5507e+08	4,1199e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	6,0907e+11	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		
Paal 40x40		
Type	Rectangle	
Detailed	400,00; 400,00	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [mm²]	1,6000e+05	

A_y [mm²], A_z [mm²]	1,3333e+05	1,3333e+05
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200,00	200,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	2,1333e+09	2,1333e+09
i_y [mm], i_z [mm]	115,47	115,47
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,0667e+07	1,0667e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	3,6027e+09	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	MeshSetup1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	1
Average size of 2D mesh element [m]	0,500
Average size of 1D mesh element on curved 1D members [m]	0,200
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N1	0,000	0,000	0,000
1P	0,000	0,000	1,200
1P2	0,400	-0,480	0,000
1P4	-0,480	0,400	0,000
1P6	0,070	0,070	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N2	9,860	0,000	0,000
1Y	9,860	0,000	1,200
1P9	10,340	0,400	0,000
1P11	9,460	-0,480	0,000
1P13	9,790	0,070	0,000

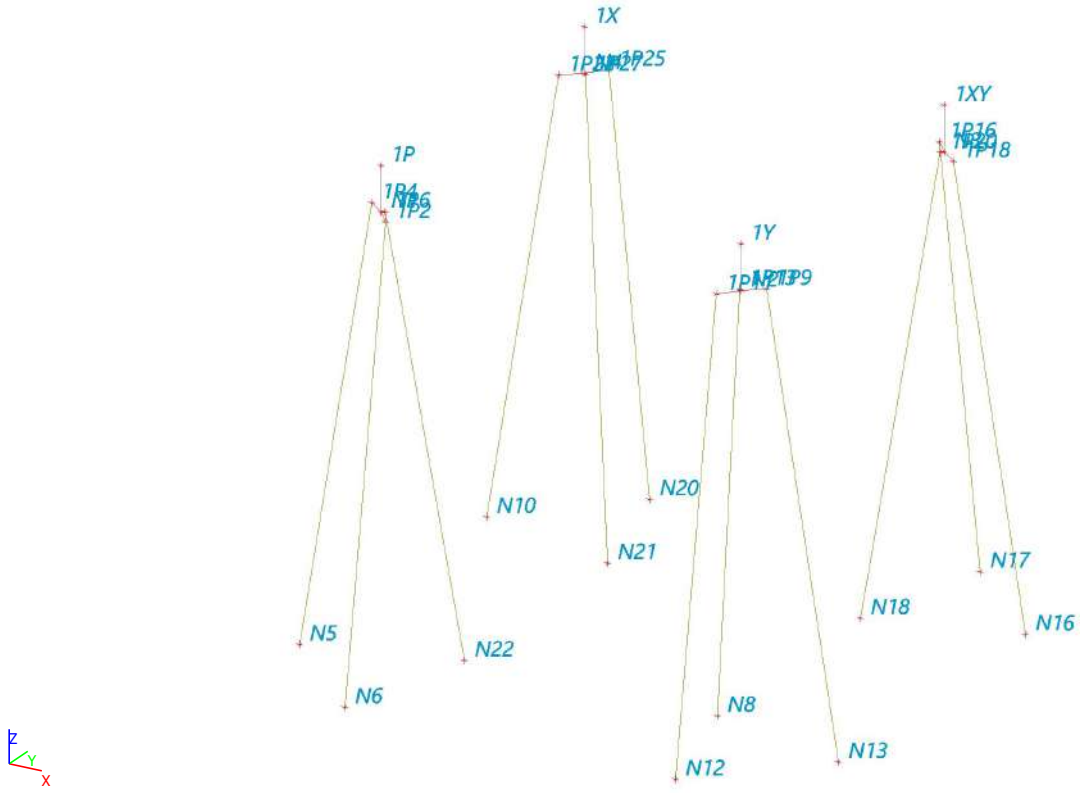
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N3	9,860	9,860	0,000
1XY	9,860	9,860	1,200
1P16	9,460	10,340	0,000
1P18	10,340	9,460	0,000
1P20	9,790	9,790	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N4	0,000	9,860	0,000
1X	0,000	9,860	1,200
1P23	-0,480	9,460	0,000
1P25	0,400	10,340	0,000
1P27	0,070	9,790	0,000
N5	-2,453	0,400	-11,813

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N6	0,400	-2,453	-11,813
N8	8,396	1,464	-11,813
N10	-2,453	9,460	-11,813
N12	9,460	-2,453	-11,813
N13	12,313	0,400	-11,813
N16	12,313	9,460	-11,813

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N17	9,460	12,313	-11,813
N18	8,396	8,396	-11,813
N20	0,400	12,313	-11,813
N21	1,464	8,396	-11,813
N22	1,464	1,464	-11,813

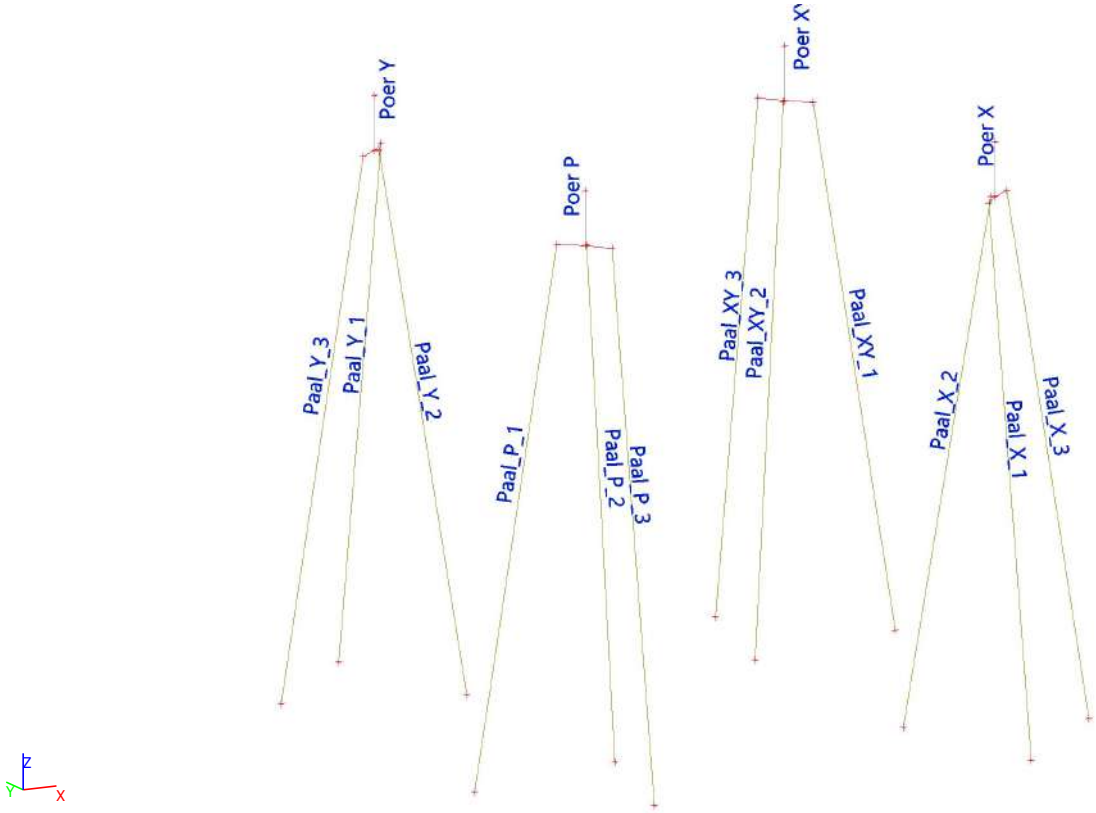
5.2. Analyse model met knopen



5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P4	N5	column (100)
Poer P	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N1	1P	column (100)
Poer X	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N2	1Y	column (100)
Poer XY	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N3	1XY	column (100)
Poer Y	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N4	1X	column (100)
Paal_P_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P6	N22	column (100)
Paal_P_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P2	N6	column (100)
Paal_XY_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P18	N16	column (100)
Paal_XY_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P20	N18	column (100)
Paal_XY_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P16	N17	column (100)
Paal_X_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P11	N12	column (100)
Paal_X_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P13	N8	column (100)
Paal_X_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P9	N13	column (100)
Paal_Y_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P25	N20	column (100)
Paal_Y_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P27	N21	column (100)
Paal_Y_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,977	1P23	N10	column (100)

5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
S_P_1	N5	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,50
S_P_2	N22	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,72;Ry-6,72
S_P_3	N6	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,50
S_X_1	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,50
S_X_2	N8	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,72;Ry6,72
S_X_3	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,50
S_XY_1	N16	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,50
S_XY_2	N18	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,72;Ry6,72
S_XY_3	N17	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,50
S_Y_1	N20	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,50
S_Y_2	N21	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,72;Ry-6,72
S_Y_3	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,50

5.6. Analyse model met Knoopondersteuningen

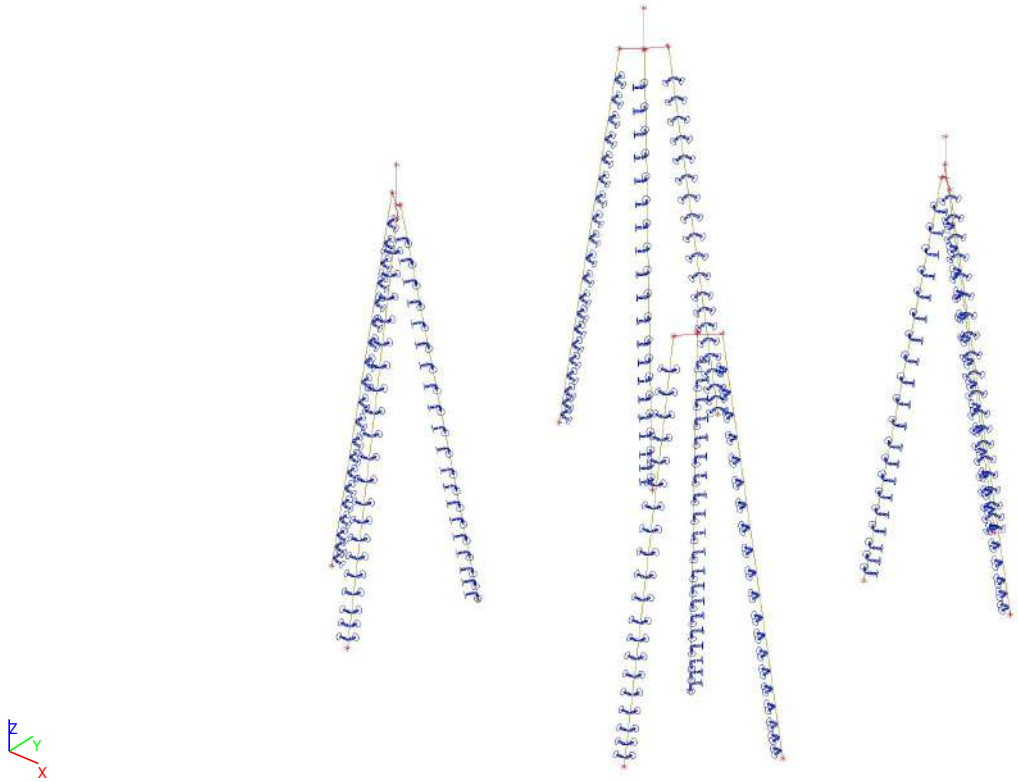
5.7. Line supports on member

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Slb_P_1_07	Line	Paal_P_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_08	Line	Paal_P_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_09	Line	Paal_P_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_10	Line	Paal_P_1 LCS	11,000 11,750	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_07	Line	Paal_P_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_08	Line	Paal_P_3 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_09	Line	Paal_P_3 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_10	Line	Paal_P_3 LCS	11,000 11,750	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_07	Line	Paal_X_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_08	Line	Paal_X_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_09	Line	Paal_X_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_10	Line	Paal_X_1 LCS	11,000 11,750	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_07	Line	Paal_X_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_08	Line	Paal_X_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

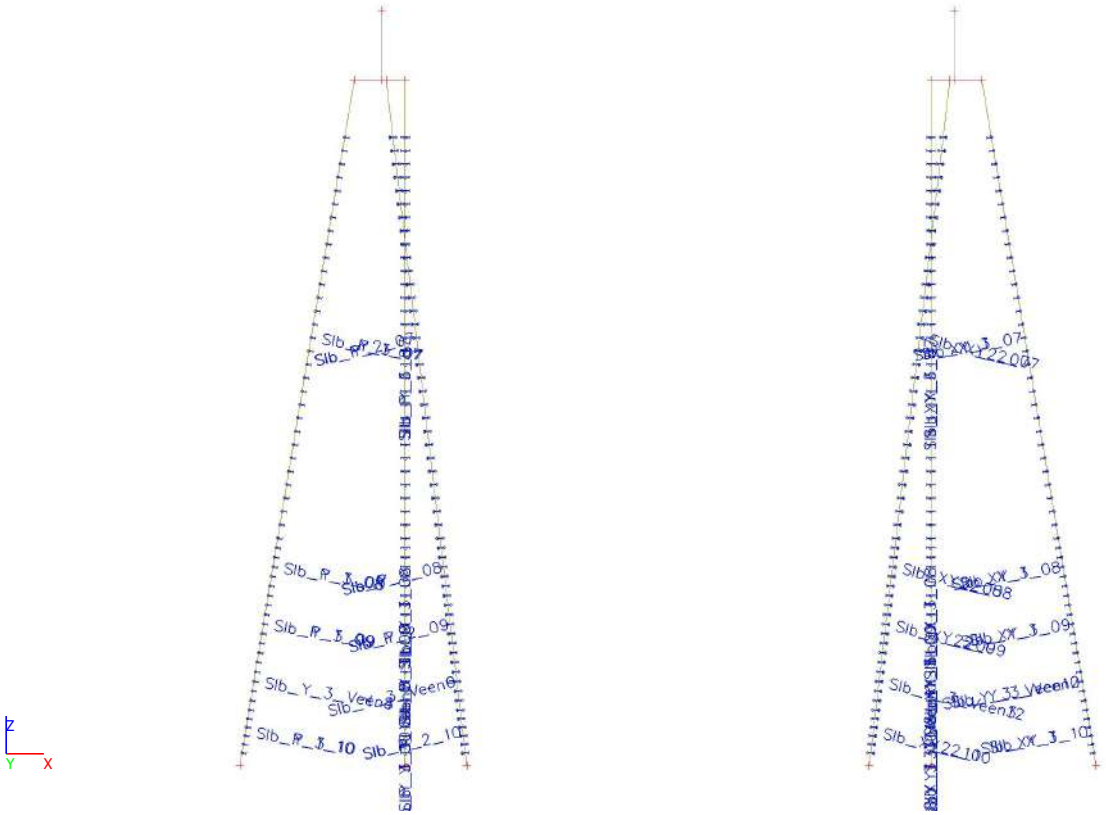
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	9,000	From start						
Slb_X_3_09	Line	Paal_X_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_3_10	Line	Paal_X_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_XY_1_07	Line	Paal_XY_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_1_08	Line	Paal_XY_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_1_09	Line	Paal_XY_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_1_10	Line	Paal_XY_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_XY_3_07	Line	Paal_XY_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_3_08	Line	Paal_XY_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_3_09	Line	Paal_XY_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_3_10	Line	Paal_XY_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_Y_1_07	Line	Paal_Y_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_1_08	Line	Paal_Y_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_1_09	Line	Paal_Y_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_1_10	Line	Paal_Y_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_Y_3_07	Line	Paal_Y_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_08	Line	Paal_Y_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_09	Line	Paal_Y_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_10	Line	Paal_Y_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_P_2_07	Line	Paal_P_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_P_2_08	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_2_09	Line	Paal_P_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_2_10	Line	Paal_P_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_X_2_07	Line	Paal_X_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_X_2_08	Line	Paal_X_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_2_09	Line	Paal_X_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_2_10	Line	Paal_X_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_XY_2_07	Line	Paal_XY_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_2_08	Line	Paal_XY_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_2_09	Line	Paal_XY_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_2_10	Line	Paal_XY_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_Y_2_07	Line	Paal_Y_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_2_08	Line	Paal_Y_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	9,000	From start						
Slb_Y_2_09	Line	Paal_Y_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_2_10	Line	Paal_Y_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,750	From start						
Slb_Y_3_Veen1	Line	Paal_XY_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen2	Line	Paal_XY_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen3	Line	Paal_XY_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen4	Line	Paal_Y_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen5	Line	Paal_Y_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen6	Line	Paal_Y_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen7	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen8	Line	Paal_P_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen9	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen10	Line	Paal_X_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen11	Line	Paal_X_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen12	Line	Paal_X_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						

5.8. Analyse model met Lijnondersteuningen



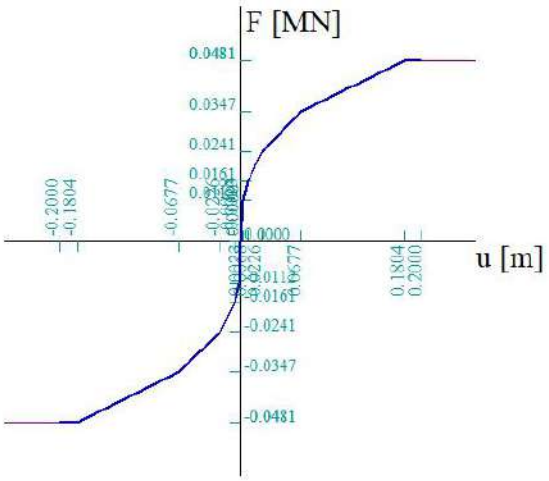
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

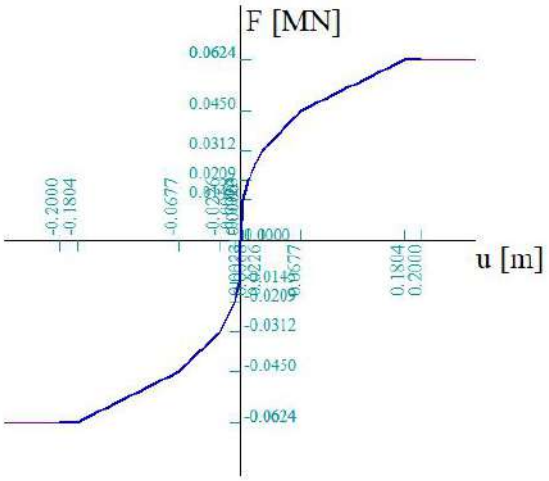
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -48130.000000	Free	Free
		-0.180400 / -48130.000000		
		-0.067650 / -34710.000000		
		-0.022550 / -24064.500000		
		-0.006765 / -16109.569000		
		-0.002255 / -11169.751000		
		0.000000 / 0.000000		
		0.002255 / 11169.751000		
		0.006765 / 16109.569000		
		0.022550 / 24064.500000		
		0.067650 / 34707.015000		
		0.180400 / 48129.000000		
		0.200000 / 48129.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -62400.000000	Free	Free
		-0.180400 / -62400.000000		
		-0.067650 / -45000.000000		
		-0.022550 / -31200.000000		
		-0.006765 / -20900.000000		
		-0.002255 / -14500.000000		
		0.000000 / 0.000000		
		0.002255 / 14490.000000		
		0.006765 / 20900.000000		
		0.022550 / 31220.000000		
		0.067650 / 45020.000000		
		0.180400 / 62430.000000		
		0.200000 / 62430.000000		

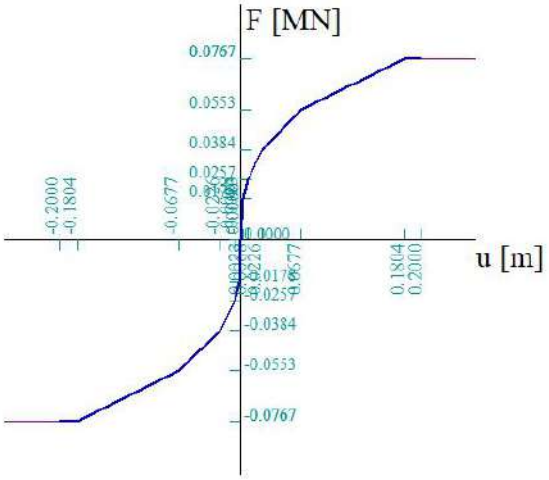
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -76737.000000	Free	Free
		-0.180400 / -76737.000000		
		-0.067650 / -55336.953000		
		-0.022550 / -38368.500000		
		-0.006765 / -25685.138000		
		-0.002255 / -17809.080000		
		0.000000 / 0.000000		
		0.002255 / 17809.080000		
		0.006765 / 25685.138000		
		0.022550 / 38368.500000		

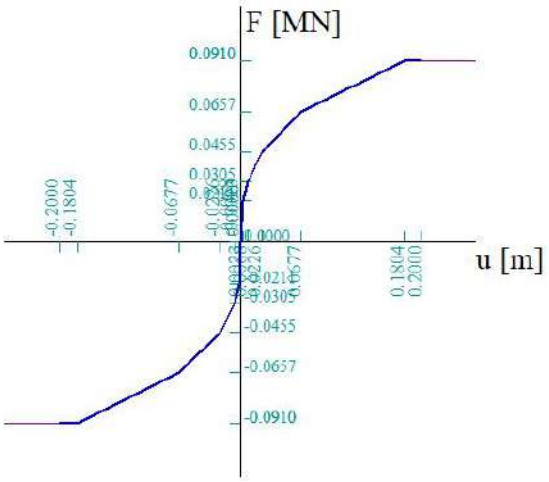
Name	Type	u / F	Positive end	Negative end
		0.067650 / 55336.953000		
		0.180400 / 76737.000000		
		0.200000 / 76737.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -91041.000000	Free	Free
		-0.180400 / -91041.000000		
		-0.067650 / -65651.922000		
		-0.022550 / -45520.500000		
		-0.006765 / -30472.923000		
		-0.002255 / -21128.744000		
		0.000000 / 0.000000		
		0.002255 / 21128.744000		
		0.006765 / 30472.923000		
		0.022550 / 45520.500000		
		0.067650 / 65651.922000		
		0.180400 / 91041.000000		
		0.200000 / 91041.000000		

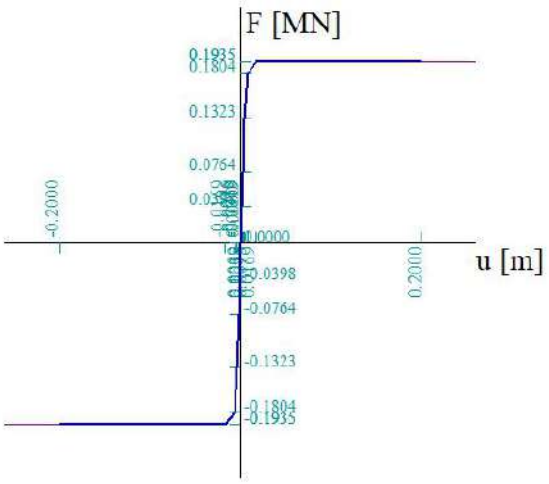
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -193489.147000	Free	Free
		-0.016913 / -193489.147000		
		-0.007517 / -180407.835000		
		-0.003758 / -132256.824000		

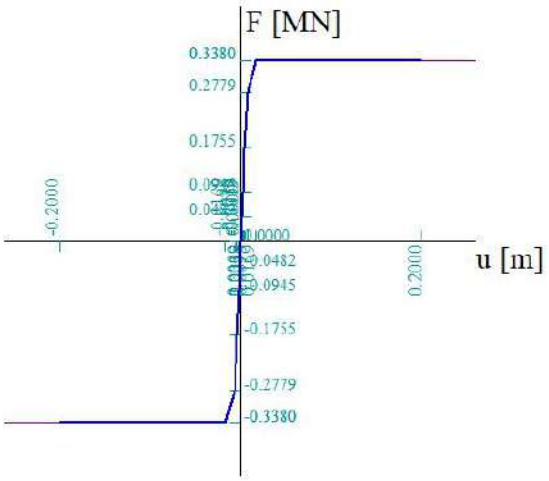
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -76421.758000		
		-0.000940 / -39826.202000		
		0.000000 / 0.000000		
		0.000940 / 39826.202000		
		0.001879 / 76421.758000		
		0.003758 / 132256.824000		
		0.007517 / 180407.835000		
		0.016913 / 193489.147000		
		0.200000 / 193489.147000		

Drawing



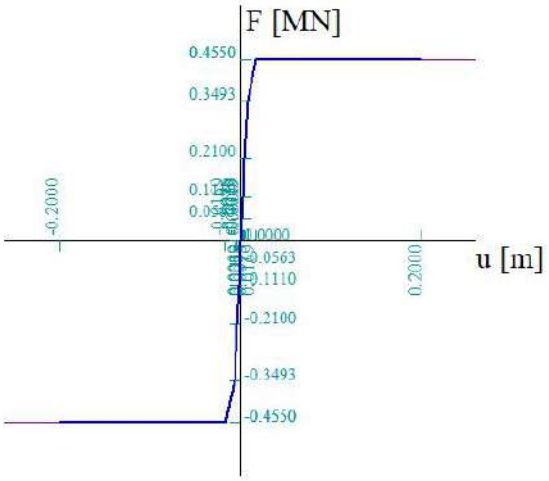
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -338024.958000	Free	Free
		-0.016913 / -338024.958000		
		-0.007517 / -277917.886000		
		-0.003758 / -175526.039000		
		-0.001879 / -94450.113000		
		-0.000940 / -48160.629000		
		0.000000 / 0.000000		
		0.000940 / 48160.629000		
		0.001879 / 94450.113000		
		0.003758 / 175526.039000		
		0.007517 / 277917.886000		
		0.016913 / 338024.958000		
		0.200000 / 338024.958000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -454964.396000	Free	Free
		-0.016913 / -454964.396000		
		-0.007517 / -349336.178000		
		-0.003758 / -210048.905000		
		-0.001879 / -110961.163000		
		-0.000940 / -56287.593000		
		0.000000 / 0.000000		
		0.000940 / 56287.593000		
		0.001879 / 110961.163000		
		0.003758 / 210048.905000		
		0.007517 / 349336.178000		
		0.016913 / 454964.396000		
		0.200000 / 454964.396000		

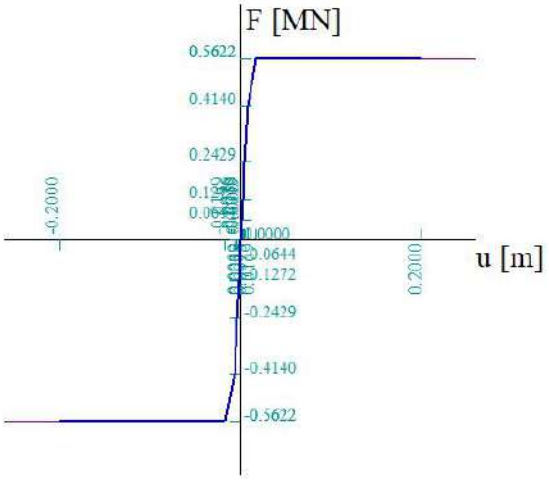
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -562170.498000	Free	Free
		-0.016913 / -562170.498000		
		-0.007517 / -413992.721000		
		-0.003758 / -242873.332000		
		-0.001879 / -127210.864000		
		-0.000940 / -64380.055000		
		0.000000 / 0.000000		
		0.000940 / 64380.055000		
		0.001879 / 127210.864000		
		0.003758 / 242873.332000		

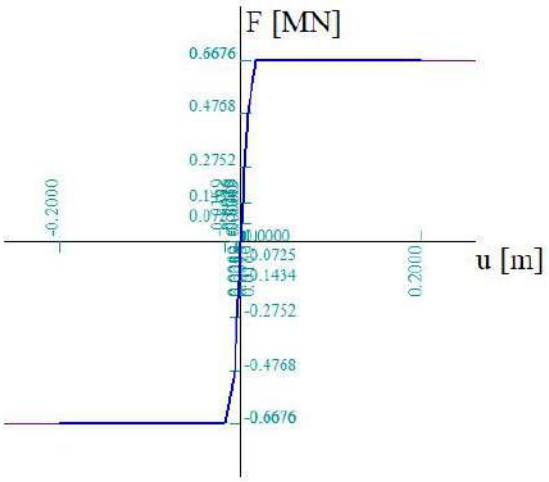
Name	Type	u / F	Positive end	Negative end
		0.007517 / 413992.721000		
		0.016913 / 562170.498000		
		0.200000 / 562170.498000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -667564.512000	Free	Free
		-0.016913 / -667564.512000		
		-0.007517 / -476770.926000		
		-0.003758 / -275233.374000		
		-0.001879 / -143390.211000		
		-0.000940 / -72463.274000		
		0.000000 / 0.000000		
		0.000940 / 72463.274000		
		0.001879 / 143390.211000		
		0.003758 / 275233.374000		
		0.007517 / 476770.926000		
		0.016913 / 667564.512000		
		0.200000 / 667564.512000		

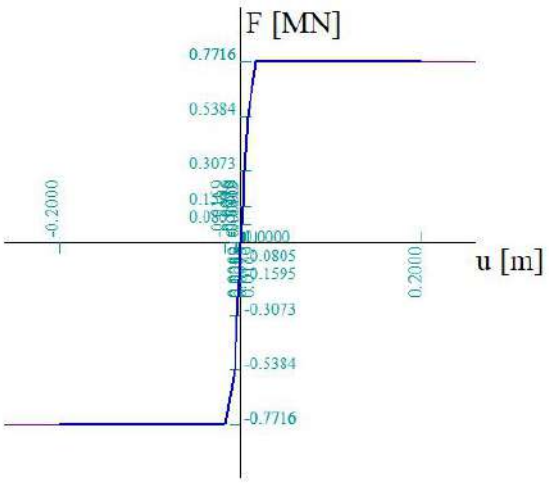
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -771639.629000	Free	Free
		-0.016913 / -771639.629000		
		-0.007517 / -538432.081000		
		-0.003758 / -307337.483000		

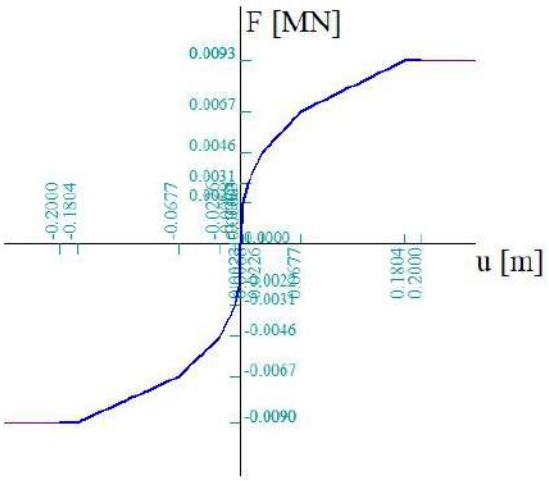
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -159531.700000		
		-0.000940 / -80541.551000		
		0.000000 / 0.000000		
		0.000940 / 80541.551000		
		0.001879 / 159531.700000		
		0.003758 / 307337.483000		
		0.007517 / 538432.081000		
		0.016913 / 771639.629000		
		0.200000 / 771639.629000		

Drawing



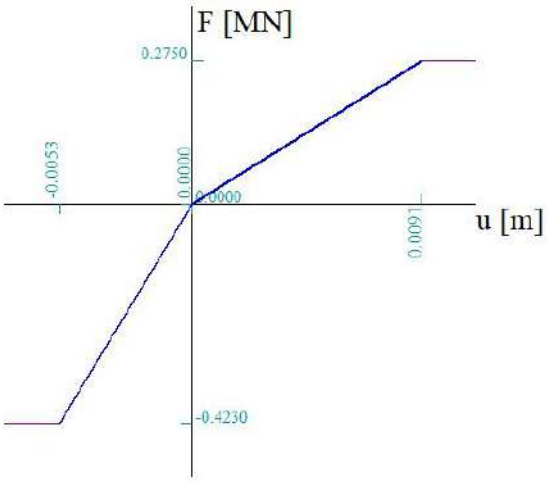
Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -9000.000000	Free	Free
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		
		-0.006765 / -3100.000000		
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing



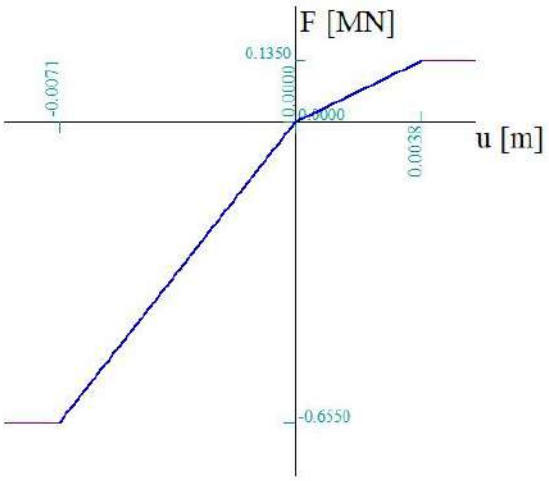
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+6-paalpunt	Translation	-0.005270 / -423000.000000	Free	Free
		0.000000 / 0.000000		
		0.009090 / 275000.000000		

Drawing



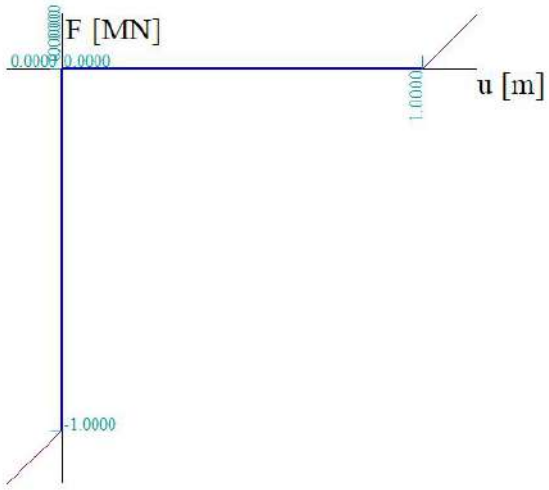
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+0-paalpunt_cap	Translation	-0.007100 / -655000.000000	Free	Free
		0.000000 / 0.000000		
		0.003800 / 135000.000000		

Drawing



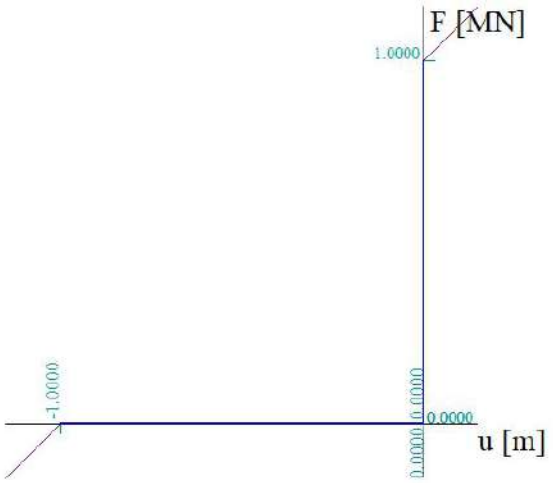
Name	Type	u / F	Positive end	Negative end
press only	Translation	-0.000001 / -1000000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 0.000000		

Drawing



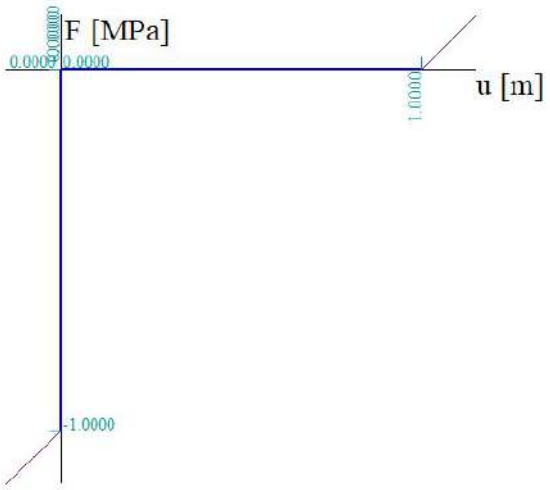
Name	Type	u / F	Positive end	Negative end
tension only	Translation	-1.000000 / 0.000000	Flexible	Flexible
		0.000000 / 0.000000		
		0.000001 / 1000000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing

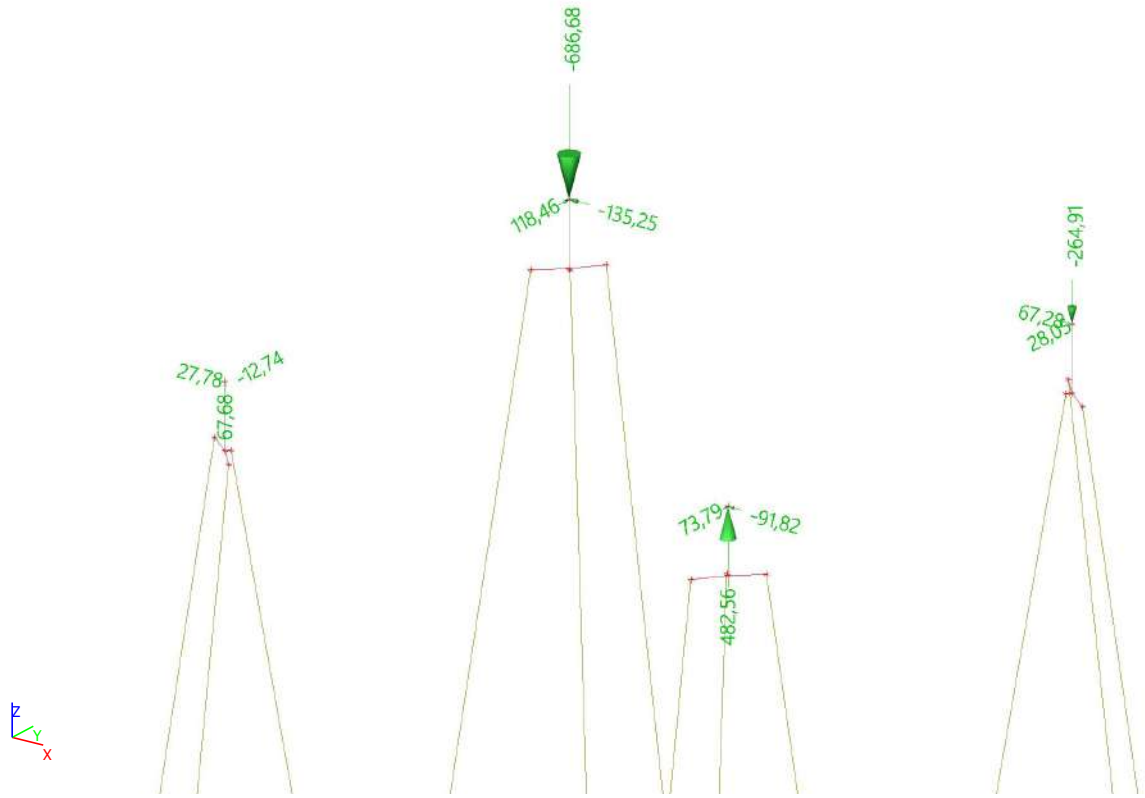


6. Belastingen

6.1. Load cases

6.1.1. Load cases - high max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



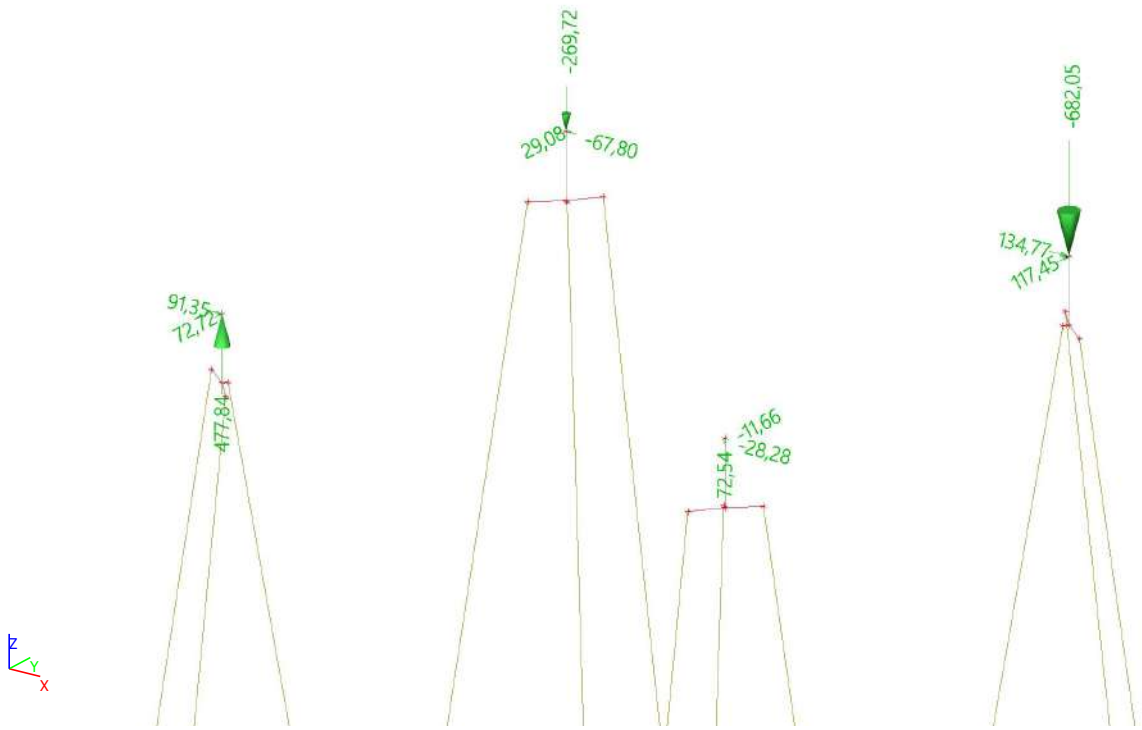
6.1.1.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Force	27,78
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Force	-12,74
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Force	67,68
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Force	-135,25
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Force	118,46
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Force	-686,68
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Force	67,28
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Force	28,05
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Force	-264,91

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Force	-91,82
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Force	73,79
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Force	482,56

6.1.2. Load cases - high max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



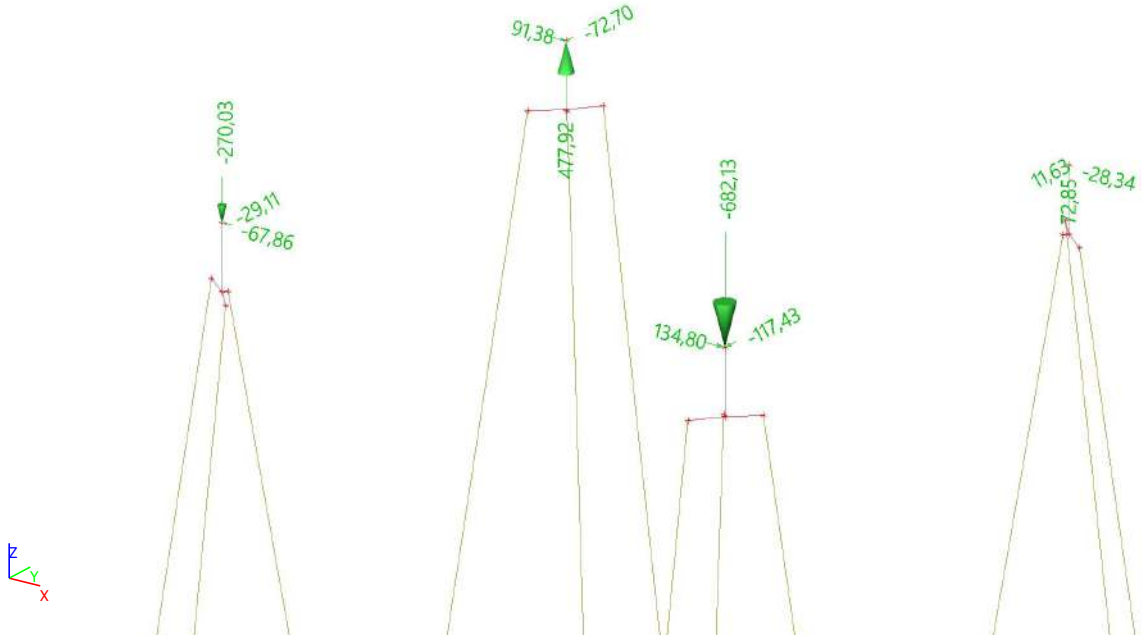
6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Force	91,35
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Force	72,72
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Force	477,84
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Force	-67,80
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Force	29,08
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Force	-269,72

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Force	134,77
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Force	117,45
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Force	-682,05
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Force	-28,28
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Force	-11,66
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Force	72,54

6.1.3. Load cases - high max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



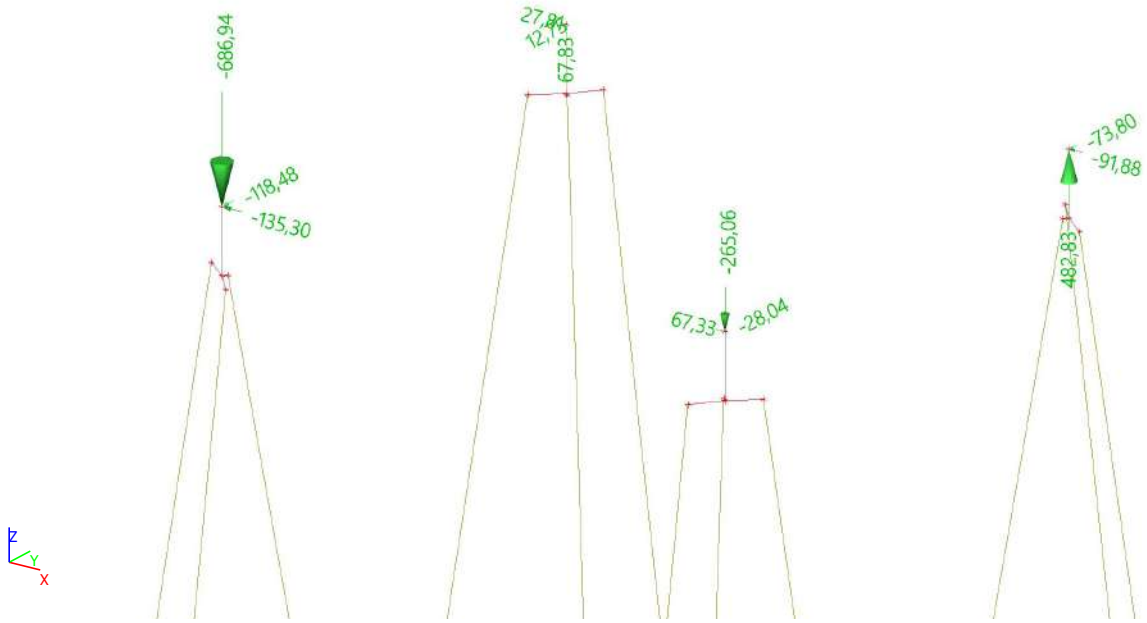
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Force	-67,86
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Force	-29,11
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Force	-270,03

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Force	91,38
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Force	-72,70
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Force	477,92
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Force	-28,34
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Force	11,63
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Force	72,85
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Force	134,80
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Force	-117,43
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Force	-682,13

6.1.4. Load cases - high max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			

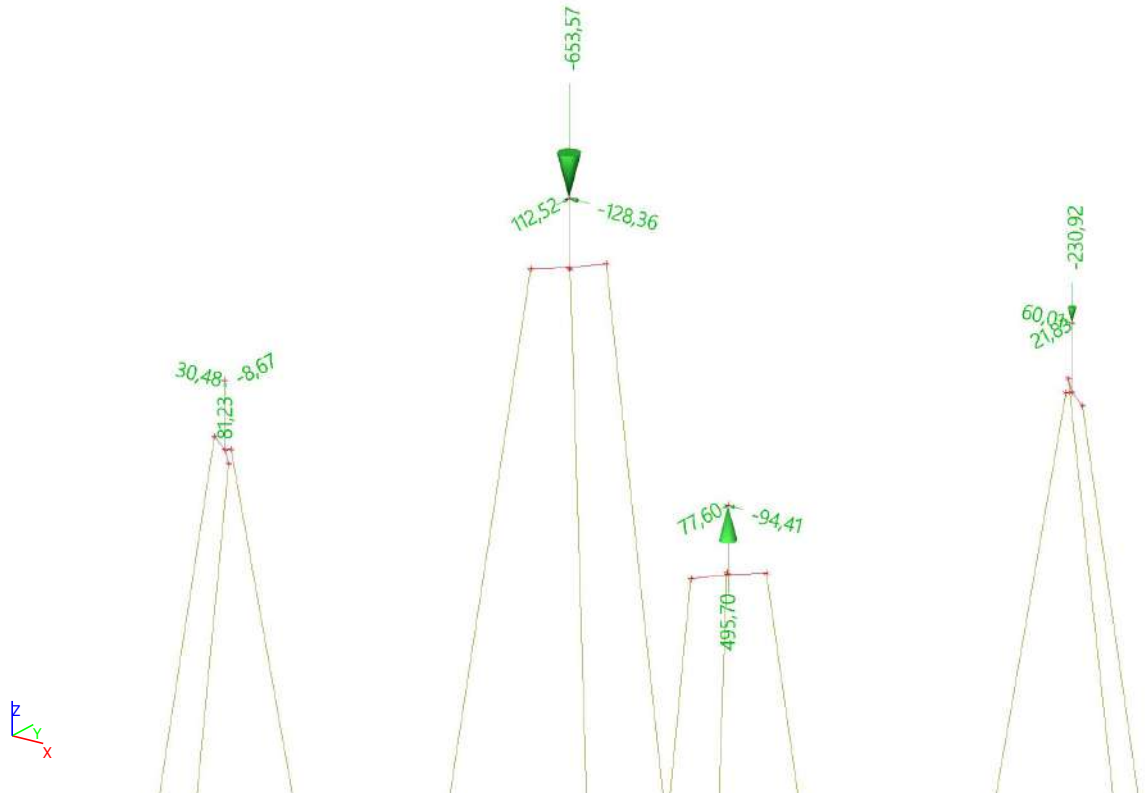


6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Force	-135,30
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Force	-118,48
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Force	-686,94
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Force	27,81
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Force	12,75
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Force	67,83
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Force	-91,88
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Force	-73,80
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Force	482,83
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Force	67,33
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Force	-28,04
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Force	-265,06

6.1.5. Load cases - low max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			

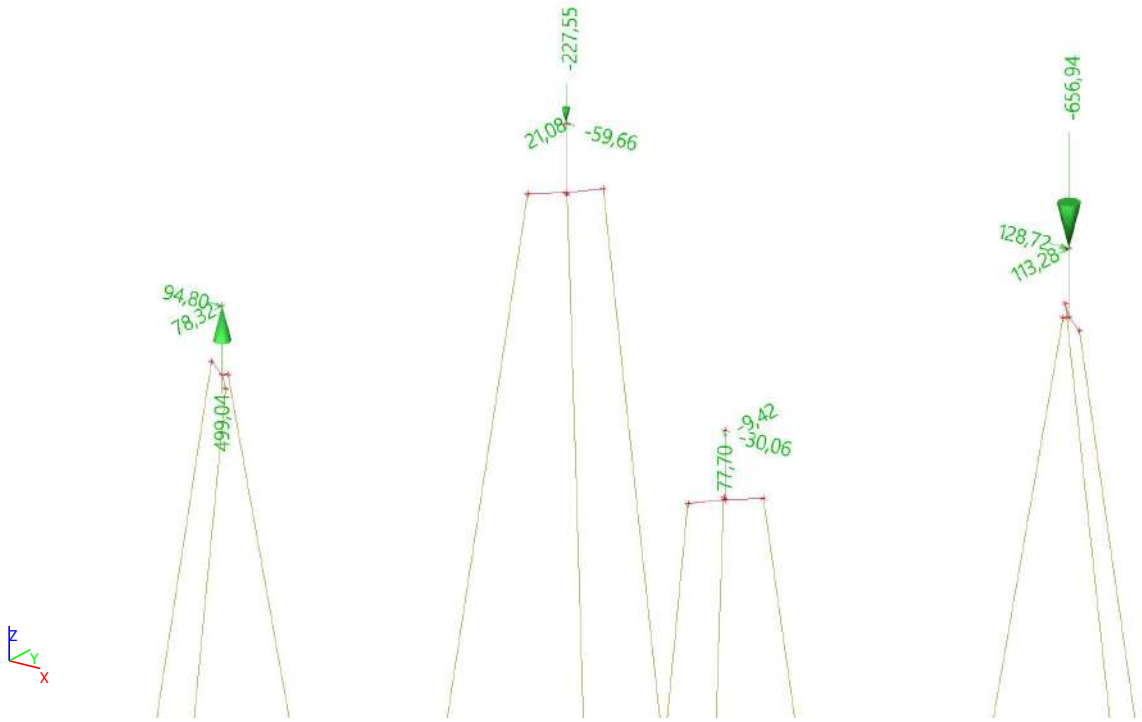


6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Force	30,48
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Force	-8,67
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Force	81,23
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Force	-128,36
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Force	112,52
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Force	-653,57
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Force	60,01
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Force	21,83
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Force	-230,92
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Force	-94,41
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Force	77,60
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Force	495,70

6.1.6. Load cases - low max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



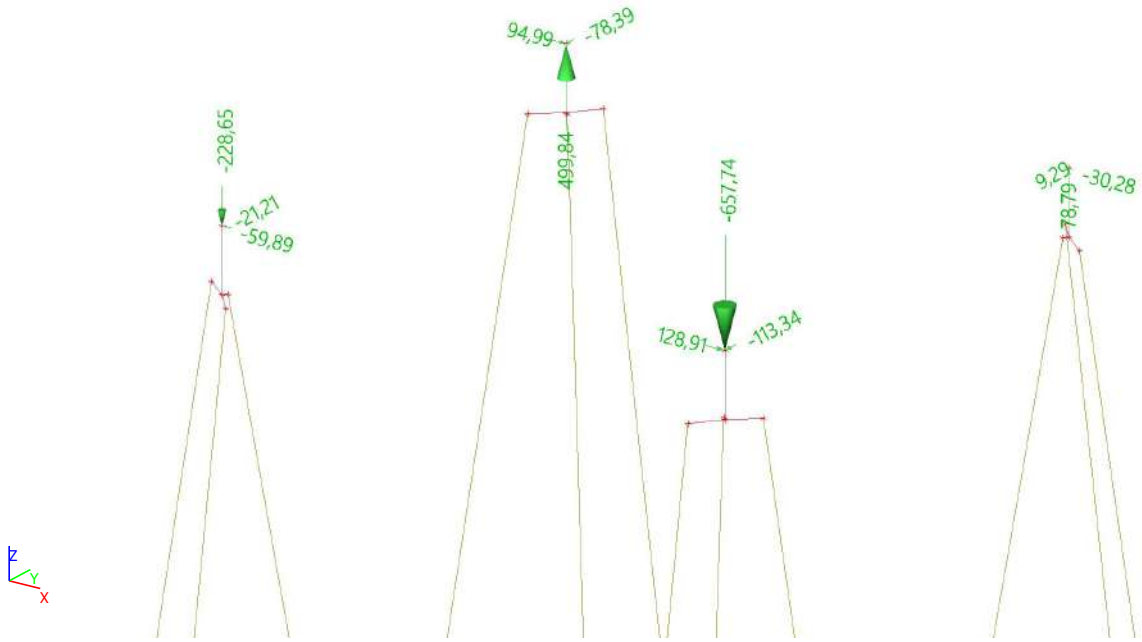
6.1.6.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Force	94,80
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Force	78,32
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Force	499,04
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Force	-59,66
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Force	21,08
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Force	-227,55
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Force	128,72
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Force	113,28
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Force	-656,94
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Force	-30,06
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Force	-9,42

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Force	77,70

6.1.7. Load cases - low max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



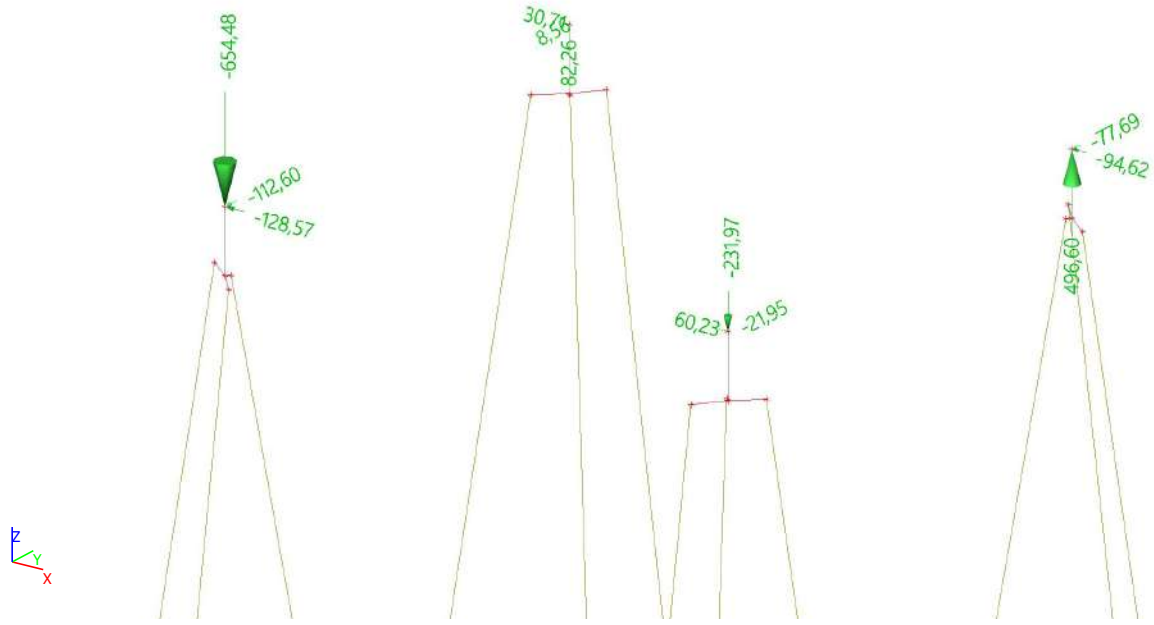
6.1.7.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Force	-59,89
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Force	-21,21
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Force	-228,65
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Force	94,99
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Force	-78,39
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Force	499,84
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Force	-30,28
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Force	9,29

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Force	78,79
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Force	128,91
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Force	-113,34
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Force	-657,74

6.1.8. Load cases - low max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



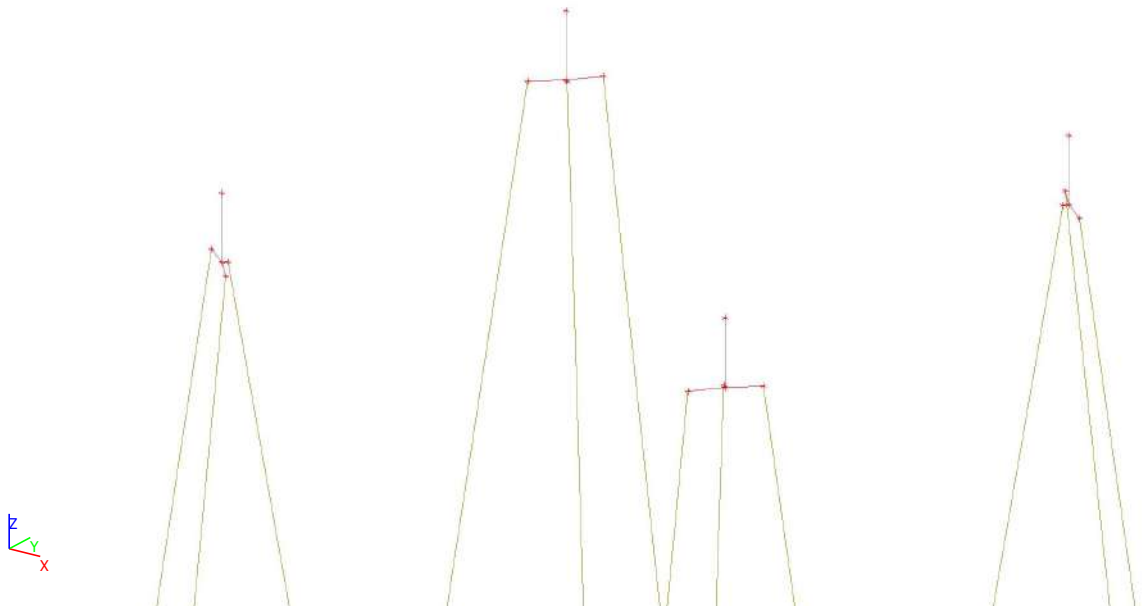
6.1.8.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Force	-128,57
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Force	-112,60
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Force	-654,48
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Force	30,71
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Force	8,56

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Force	82,26
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Force	-94,62
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Force	-77,69
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Force	496,60
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Force	60,23
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Force	-21,95
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Force	-231,97

6.1.9. Load cases - EG_Fundering

Name	Description	Action type	Load group	Direction
	Spec	Load type		
EG_Fundering		Permanent	LG1	-Z
		Self weight		



6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
low max Wnd ;45° - EG_Gunstig	Ultimate	low max Wnd ;45°	1,000
		EG_Fundering	0,900
low max Wnd ;135° - EG_Gunstig	Ultimate	low max Wnd ;135°	1,000
		EG_Fundering	0,900
low max Wnd ;225° - EG_Gunstig	Ultimate	low max Wnd ;225°	1,000
		EG_Fundering	0,900
low max Wnd ;315° - EG_Gunstig	Ultimate	low max Wnd ;315°	1,000
		EG_Fundering	0,900
high max Wnd ;45° - EG_Ongunstig	Ultimate	high max Wnd ;45°	1,000
		EG_Fundering	1,200
high max Wnd ;135° - EG_Ongunstig	Ultimate	high max Wnd ;135°	1,000
		EG_Fundering	1,200
high max Wnd ;225° - EG_Ongunstig	Ultimate	high max Wnd ;225°	1,000
		EG_Fundering	1,200
high max Wnd ;315° - EG_Ongunstig	Ultimate	high max Wnd ;315°	1,000
		EG_Fundering	1,200

6.3. Result classes

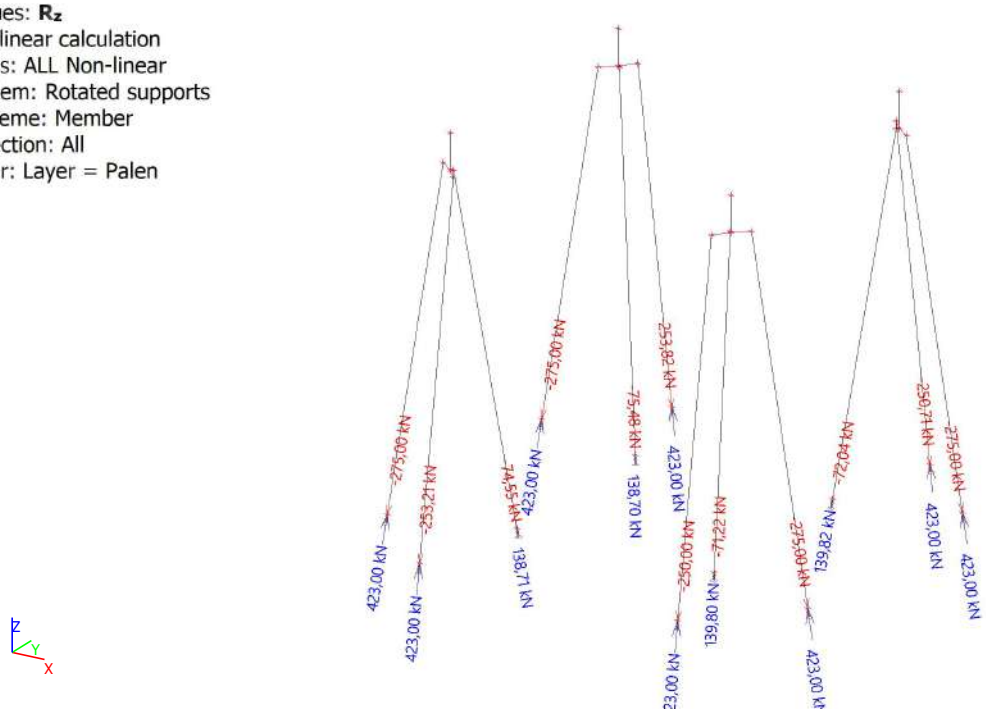
Name	List
ALL Non-linear	low max Wnd ;45° - EG_Gunstig
	low max Wnd ;135° - EG_Gunstig
	low max Wnd ;225° - EG_Gunstig
	low max Wnd ;315° - EG_Gunstig
	high max Wnd ;45° - EG_Ongunstig
	high max Wnd ;135° - EG_Ongunstig
	high max Wnd ;225° - EG_Ongunstig
	high max Wnd ;315° - EG_Ongunstig

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen

Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_X_3/N13	high max Wnd ;315° - EG_Ongunstig	**0,00**	0,00	264,75	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	high max Wnd ;45° - EG_Ongunstig	**0,00**	0,00	-264,36	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_1/N20	high max Wnd ;225° - EG_Ongunstig	0,00	**0,00**	-220,66	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	low max Wnd ;135° - EG_Gunstig	0,00	**0,00**	127,48	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_P_3/N6	low max Wnd ;315° - EG_Gunstig	0,00	0,00	**423,00**	0,00	0,00	0,00	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: ALL Non-linear

System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen

Nodal reactions

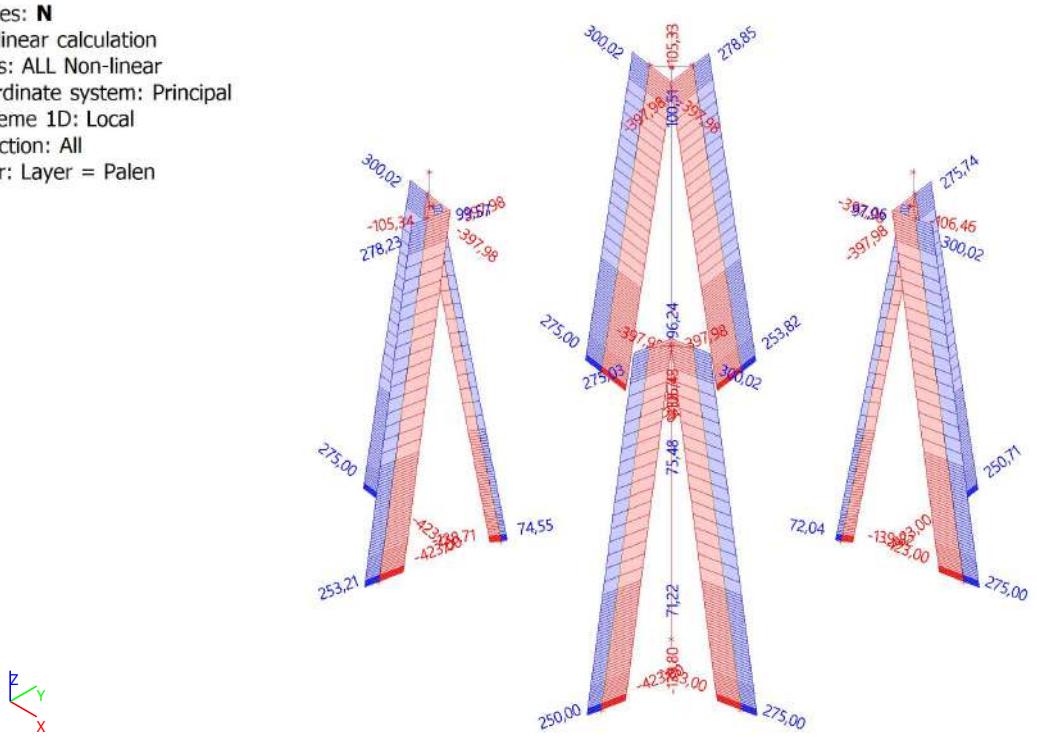
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_3/N6	high max Wnd ;45° - EG_Ongunstig	0,00	**0,00**	58,08	0,00	0,00	0,00	0,0	0,0
S_P_3/N6	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-253,21**	0,00	0,00	0,00	0,0	0,0
S_P_3/N6	low max Wnd ;315° - EG_Gunstig	**0,00**	**0,00**	**423,00**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_1/N5	low max Wnd ;315° - EG_Gunstig	**0,00**	**0,00**	**423,00**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_1/N5	low max Wnd ;135° - EG_Gunstig	**0,00**	0,00	**-275,00**	0,00	0,00	**0,00**	0,0	0,0
S_P_2/N22	low max Wnd ;315° - EG_Gunstig	0,00	**0,00**	**-74,55**	0,00	0,00	0,00	0,0	0,0
S_P_2/N22	high max Wnd ;135° - EG_Ongunstig	**0,00**	0,00	**138,71**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_2/N22	low max Wnd ;135° - EG_Gunstig	**0,00**	**0,00**	127,21	0,00	0,00	**0,00**	0,0	0,0
S_X_3/N13	high max Wnd ;45° - EG_Ongunstig	**0,00**	**0,00**	-264,36	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_3/N13	low max Wnd ;45° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	low max Wnd ;225° - EG_Gunstig	0,00	0,00	**423,00**	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	high max Wnd ;315° - EG_Ongunstig	**0,00**	0,00	264,75	0,00	0,00	**0,00**	0,0	0,0
S_X_1/N12	high max Wnd ;45° - EG_Ongunstig	0,00	**0,00**	-224,30	0,00	0,00	0,00	0,0	0,0
S_X_1/N12	low max Wnd ;225° - EG_Gunstig	**0,00**	0,00	**423,00**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_1/N12	low max Wnd ;45° - EG_Gunstig	0,00	**0,00**	**-250,00**	0,00	0,00	**0,00**	0,0	0,0
S_X_2/N8	high max Wnd ;45° - EG_Ongunstig	0,00	**0,00**	**139,80**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_2/N8	low max Wnd ;225° - EG_Gunstig	**0,00**	0,00	**-71,22**	0,00	0,00	0,00	0,0	0,0
S_X_2/N8	low max Wnd ;45° - EG_Gunstig	**0,00**	**0,00**	127,40	0,00	0,00	**0,00**	0,0	0,0
S_XY_3/N17	high max Wnd ;45° - EG_Ongunstig	**0,00**	**0,00**	163,27	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_3/N17	low max Wnd ;315° - EG_Gunstig	0,00	0,00	**-250,71**	0,00	0,00	0,00	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_XY_3/N17	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**423,00**	0,00	0,00	0,00	0,0	0,0
S_XY_3/N17	low max Wnd ;45° - EG_Gunstig	0,00	**0,00**	129,93	0,00	0,00	**0,00**	0,0	0,0
S_XY_1/N16	low max Wnd ;315° - EG_Gunstig	**0,00**	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_XY_1/N16	low max Wnd ;135° - EG_Gunstig	0,00	**0,00**	**423,00**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_1/N16	high max Wnd ;45° - EG_Ongunstig	**0,00**	0,00	264,58	0,00	0,00	**0,00**	0,0	0,0
S_XY_2/N18	low max Wnd ;225° - EG_Gunstig	0,00	**0,00**	35,73	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_2/N18	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-72,04**	0,00	0,00	0,00	0,0	0,0
S_XY_2/N18	high max Wnd ;315° - EG_Ongunstig	**0,00**	0,00	**139,82**	0,00	0,00	0,00	0,0	0,0
S_XY_2/N18	low max Wnd ;315° - EG_Gunstig	**0,00**	**0,00**	127,20	0,00	0,00	**0,00**	0,0	0,0
S_Y_3/N10	low max Wnd ;45° - EG_Gunstig	**0,00**	**0,00**	**423,00**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_3/N10	low max Wnd ;225° - EG_Gunstig	**0,00**	0,00	**-275,00**	0,00	0,00	**0,00**	0,0	0,0
S_Y_1/N20	high max Wnd ;225° - EG_Ongunstig	0,00	**0,00**	-220,66	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	low max Wnd ;135° - EG_Gunstig	**0,00**	**0,00**	127,48	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_1/N20	low max Wnd ;225° - EG_Gunstig	0,00	0,00	**-253,82**	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	low max Wnd ;45° - EG_Gunstig	0,00	0,00	**423,00**	0,00	0,00	**0,00**	0,0	0,0
S_Y_2/N21	low max Wnd ;225° - EG_Gunstig	**0,00**	**0,00**	127,01	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_2/N21	low max Wnd ;45° - EG_Gunstig	0,00	**0,00**	**-75,48**	0,00	0,00	0,00	0,0	0,0
S_Y_2/N21	high max Wnd ;225° - EG_Ongunstig	**0,00**	0,00	**138,70**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

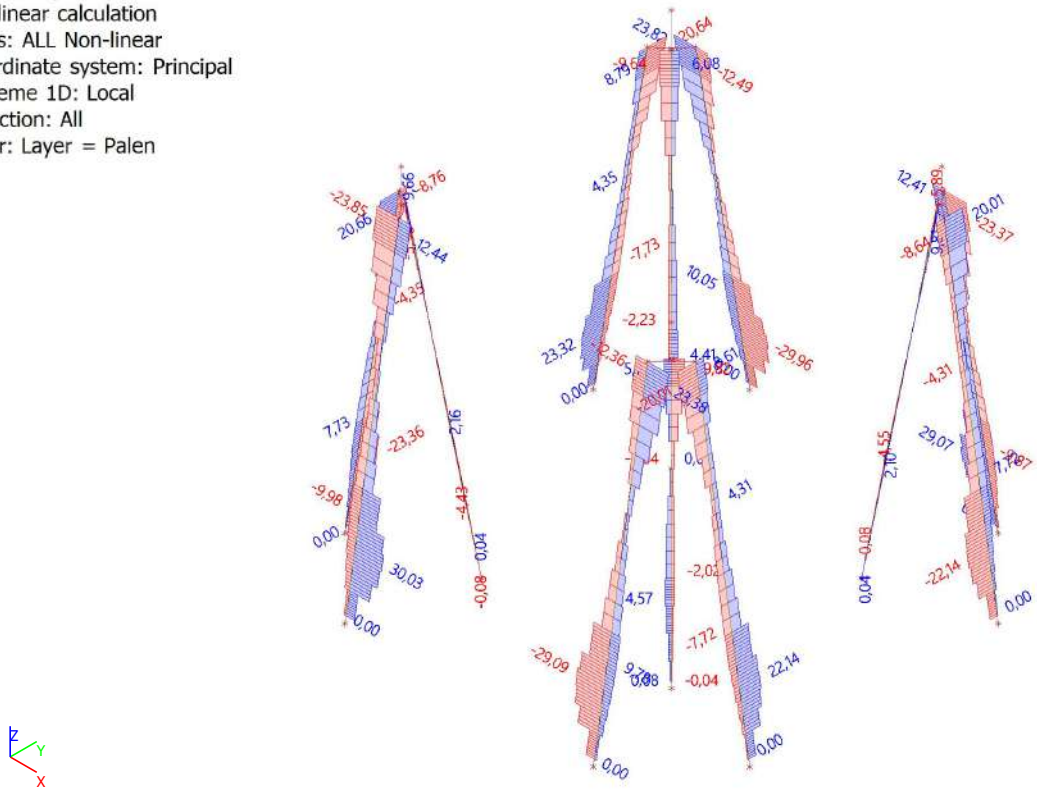
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



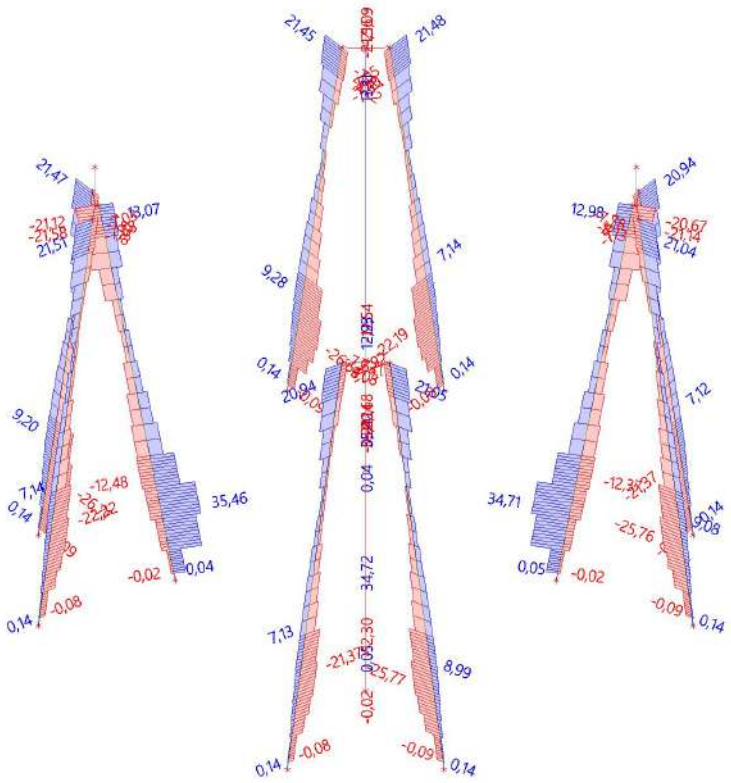
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



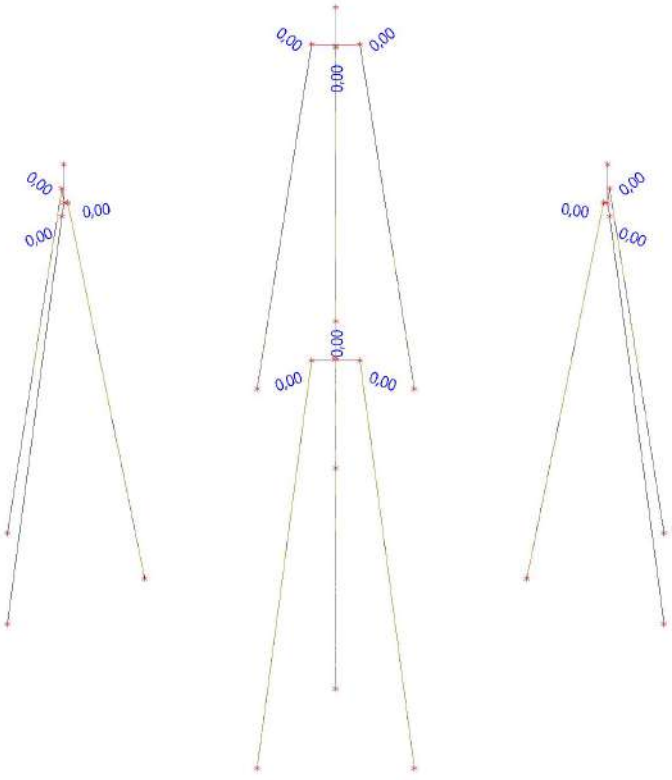
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



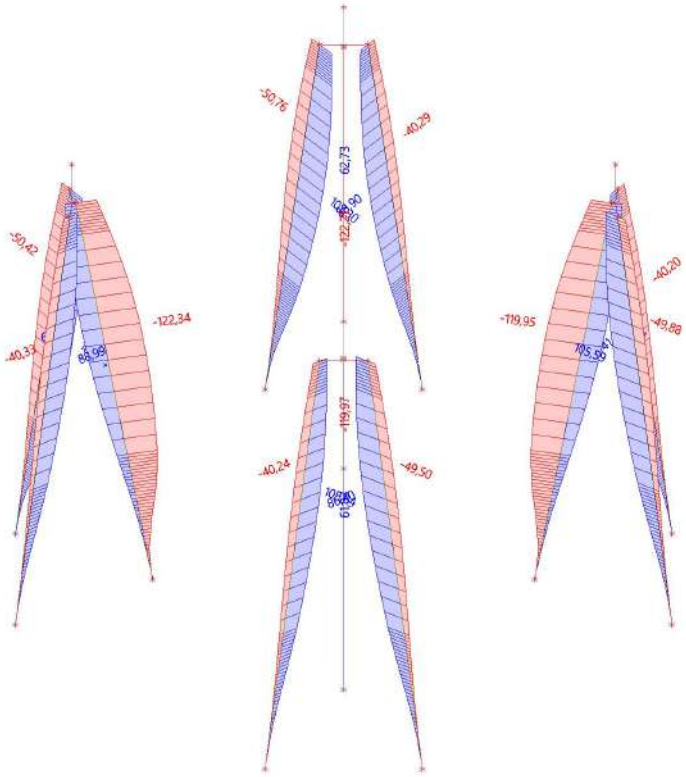
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



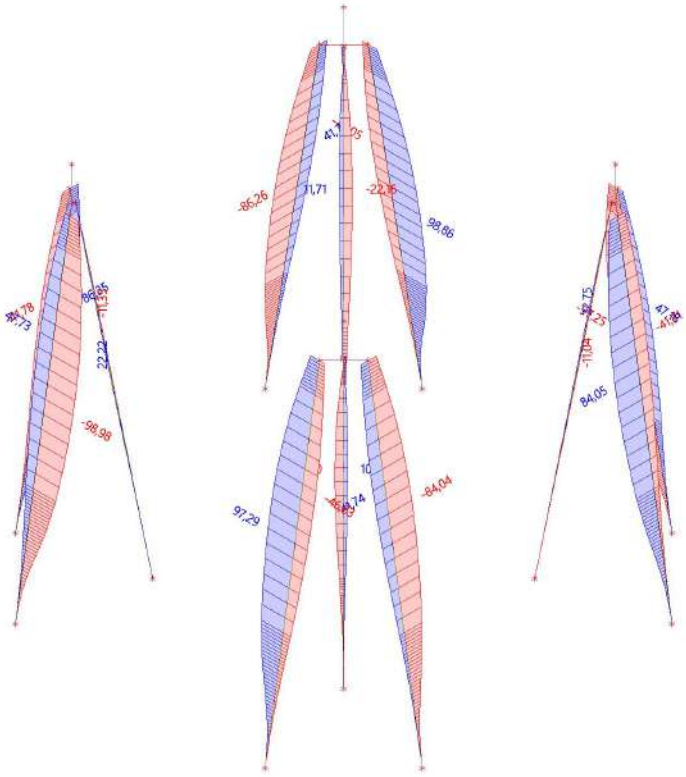
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_P_3	11,977	low max Wnd ;315° - EG_Gunstig	**-423,00**	0,00	0,14	0,00	0,00	0,00
Paal_P_1	0,000	low max Wnd ;135° - EG_Gunstig	**300,02**	-8,76	-7,83	**0,00**	-34,34	-23,18
Paal_Y_1	9,500+	high max Wnd ;45° - EG_Ongunstig	-416,80	**-29,96**	-22,07	0,00	33,96	46,86
Paal_P_3	9,500+	high max Wnd ;315° - EG_Ongunstig	-416,80	**30,03**	-22,12	0,00	34,04	-46,96
Paal_P_1	9,500+	high max Wnd ;315° - EG_Ongunstig	-416,80	-23,36	**-26,71**	0,00	40,67	37,11
Paal_P_2	9,000+	high max Wnd ;315° - EG_Ongunstig	12,45	-3,66	**35,46**	0,00	-73,96	6,42
Paal_P_2	4,000-	high max Wnd ;315° - EG_Ongunstig	29,17	1,86	-5,38	0,00	**-122,34**	22,22
Paal_P_1	4,500-	high max Wnd ;315° - EG_Ongunstig	-400,95	3,29	1,36	0,00	**107,44**	86,35
Paal_P_3	5,375-	high max Wnd ;315° - EG_Ongunstig	-403,39	-0,28	-1,73	0,00	87,48	**-98,98**
Paal_Y_1	5,375-	high max Wnd ;45° - EG_Ongunstig	-403,39	0,27	-1,74	0,00	87,38	**98,86**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer Y	1,200	low max Wnd ;225° - EG_Gunstig	**499,84**	-122,60	-11,74	**0,00**	0,00	0,00
Poer Y	0,000	low max Wnd ;225° - EG_Gunstig	470,07	**-122,60**	-11,74	0,00	14,09	**147,12**
Poer Y	0,000	high max Wnd ;315° - EG_Ongunstig	28,14	-10,65	**-28,68**	0,00	**34,42**	12,78
Poer P	0,000	high max Wnd ;45° - EG_Ongunstig	27,99	-10,63	**28,65**	0,00	**-34,38**	12,76
Poer P	0,000	high max Wnd ;315° - EG_Ongunstig	**-726,63**	**179,45**	-11,89	0,00	14,27	**-215,34**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Blokpoer 3xBeton40x40 Mast-S+9
Author	[redacted]
Date	01-09-2025
Structure	General XYZ
No. of nodes :	32
No. of beams :	16
No. of slabs :	0
No. of solids :	0
No. of used profiles :	2
No. of load cases :	9
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materials

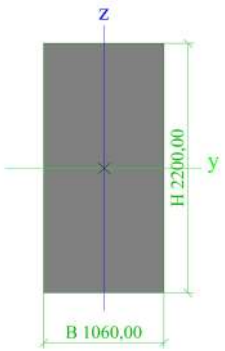
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C12/15 Gescheurd	Concrete	2500,00	2600,00	7,0000e+03	0.2	0,01e-003	12,00	
C20/25 Ongescheurd	Concrete	1500,00	2600,00	2,4000e+04	0.2	0,01e-003	20,00	

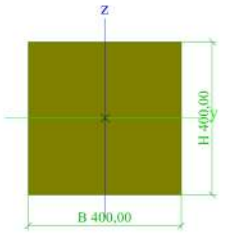
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

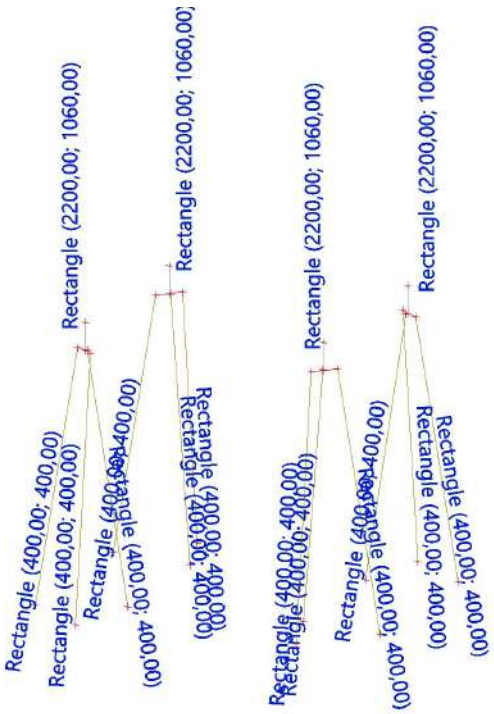
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Reinforcement steel	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

4.2. Cross-sections

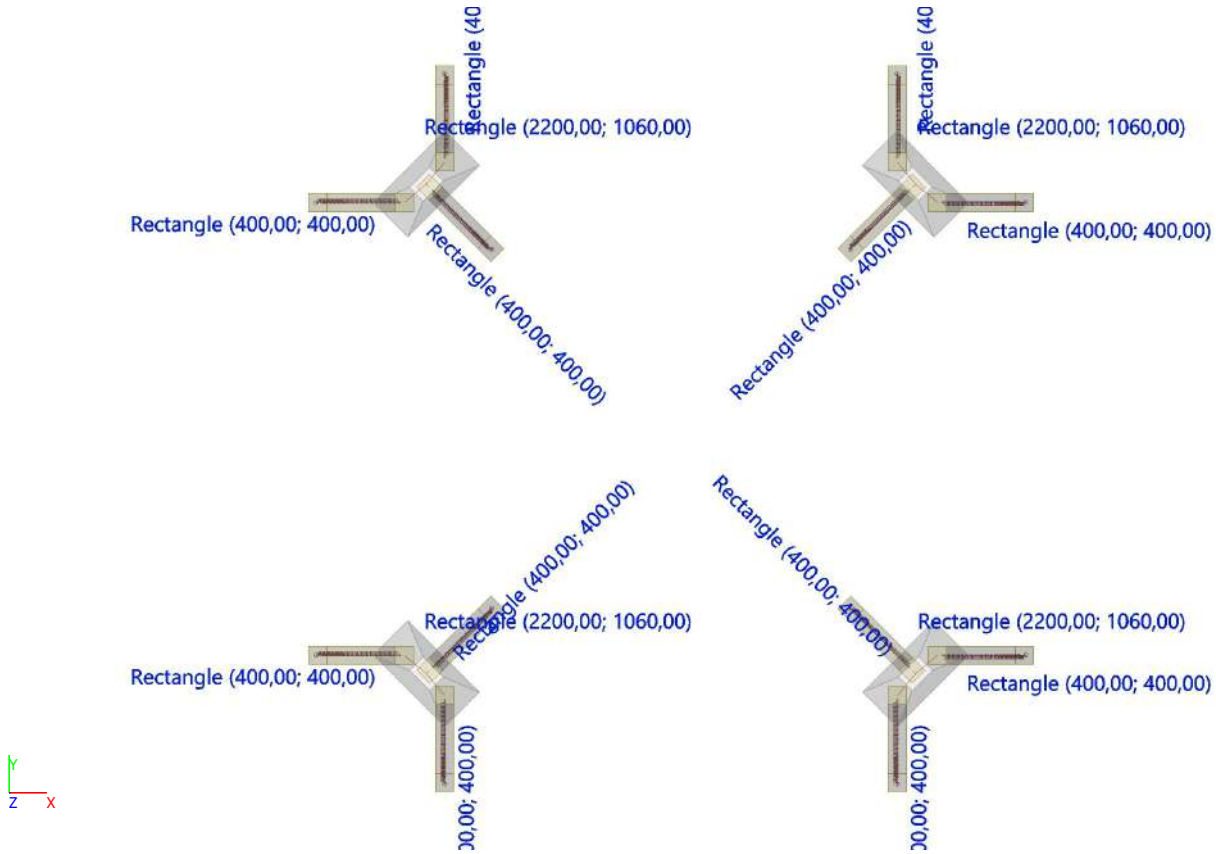
Poer		
Type	Rectangle	
Detailed	2200,00; 1060,00	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	concrete	
Colour		
A [mm²]	2,3320e+06	
A_y [mm²], A_z [mm²]	1,9433e+06	1,9433e+06
A_L [m²/m], A_D [m²/m]	6,5200e+00	6,5200e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	530,00	1100,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	9,4057e+11	2,1835e+11
i_y [mm], i_z [mm]	635,09	306,00
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	8,5507e+08	4,1199e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	6,0907e+11	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		
Paal 40x40		
Type	Rectangle	
Detailed	400,00; 400,00	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [mm²]	1,6000e+05	

A_y [mm²], A_z [mm²]	1,3333e+05	1,3333e+05
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200,00	200,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	2,1333e+09	2,1333e+09
i_y [mm], i_z [mm]	115,47	115,47
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,0667e+07	1,0667e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	3,6027e+09	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	MeshSetup1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	1
Average size of 2D mesh element [m]	0,500
Average size of 1D mesh element on curved 1D members [m]	0,200
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N1	0,000	0,000	0,000
1P	0,000	0,000	1,200
1P2	0,400	-0,480	0,000
1P4	-0,480	0,400	0,000
1P6	0,070	0,070	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N2	10,646	0,000	0,000
1Y	10,646	0,000	1,200
1P9	11,126	0,400	0,000
1P11	10,246	-0,480	0,000
1P13	10,576	0,070	0,000

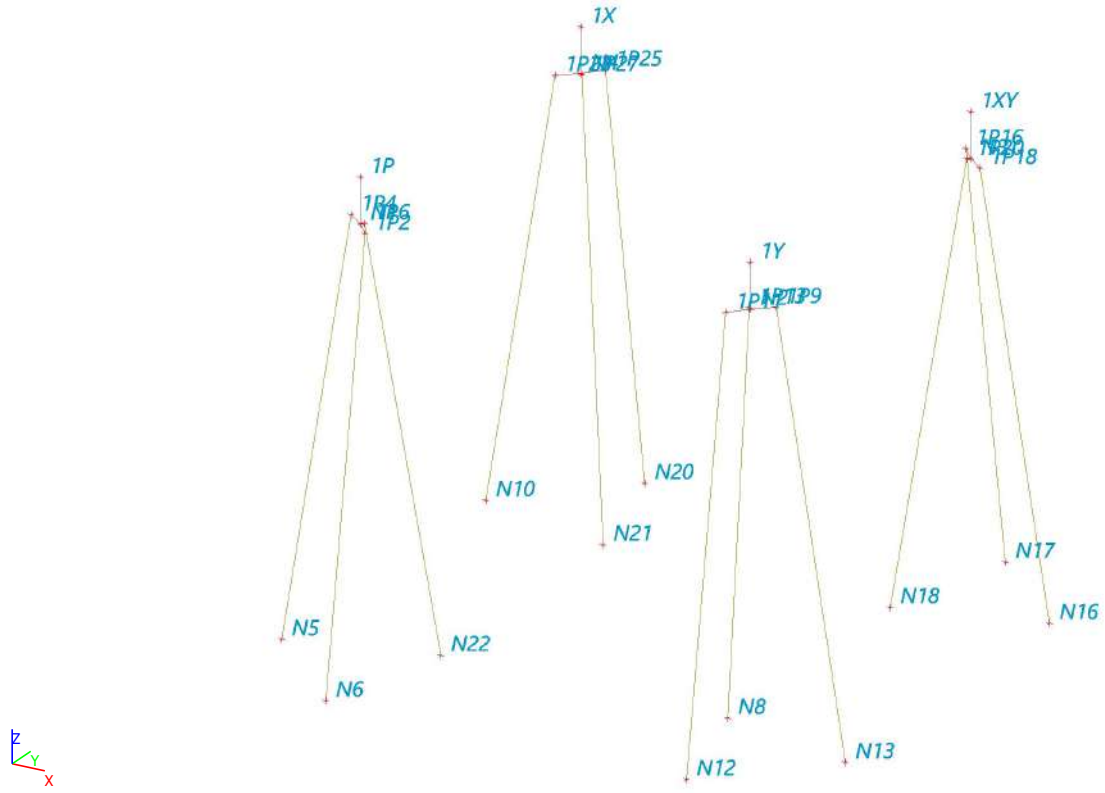
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N3	10,646	10,646	0,000
1XY	10,646	10,646	1,200
1P16	10,246	11,126	0,000
1P18	11,126	10,246	0,000
1P20	10,576	10,576	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N4	0,000	10,646	0,000
1X	0,000	10,646	1,200
1P23	-0,480	10,246	0,000
1P25	0,400	11,126	0,000
1P27	0,070	10,576	0,000
N5	-2,370	0,400	-11,320

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N6	0,400	-2,370	-11,320
N8	9,240	1,406	-11,320
N10	-2,370	10,246	-11,320
N12	10,246	-2,370	-11,320
N13	13,016	0,400	-11,320
N16	13,016	10,246	-11,320

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N17	10,246	13,016	-11,320
N18	9,240	9,240	-11,320
N20	0,400	13,016	-11,320
N21	1,406	9,240	-11,320
N22	1,406	1,406	-11,320

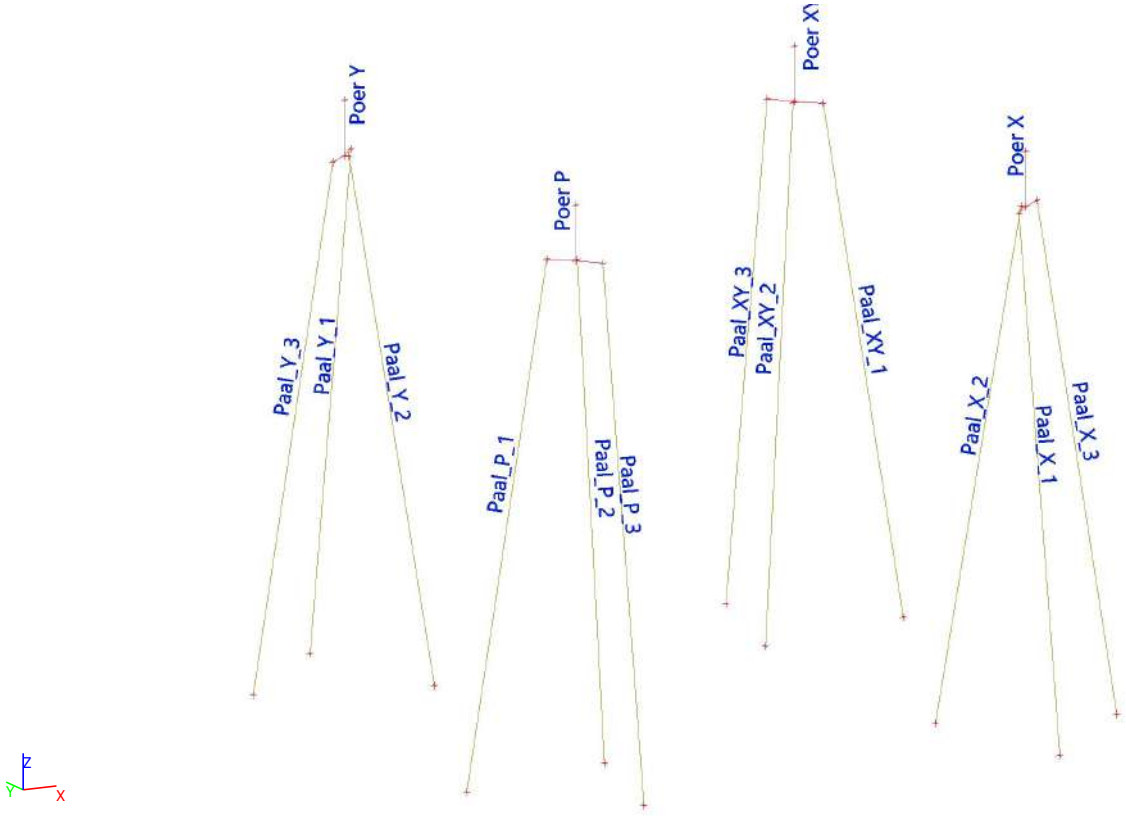
5.2. Analyse model met knopen



5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,477	1P4	N5	column (100)
Poer P	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N1	1P	column (100)
Poer X	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N2	1Y	column (100)
Poer XY	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N3	1XY	column (100)
Poer Y	Poer - Rectangle (2200,00; 1060,00)	C12/15 Gescheurd	1,200	N4	1X	column (100)
Paal_P_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,477	1P6	N22	column (100)
Paal_P_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,477	1P2	N6	column (100)
Paal_XY_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,477	1P18	N16	column (100)
Paal_XY_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,477	1P20	N18	column (100)
Paal_XY_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,477	1P16	N17	column (100)
Paal_X_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,477	1P11	N12	column (100)
Paal_X_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,477	1P13	N8	column (100)
Paal_X_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,477	1P9	N13	column (100)
Paal_Y_1	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,477	1P25	N20	column (100)
Paal_Y_2	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,477	1P27	N21	column (100)
Paal_Y_3	Paal 40x40 - Rectangle (400,00; 400,00)	C20/25 Ongescheurd	11,477	1P23	N10	column (100)

5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
S_P_1	N5	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,50
S_P_2	N22	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,72;Ry-6,72
S_P_3	N6	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,50
S_X_1	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,50
S_X_2	N8	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,72;Ry6,72
S_X_3	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,50
S_XY_1	N16	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,50
S_XY_2	N18	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,72;Ry6,72
S_XY_3	N17	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,50
S_Y_1	N20	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,50
S_Y_2	N21	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,72;Ry-6,72
S_Y_3	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,50

5.6. Analyse model met Knoopondersteuningen

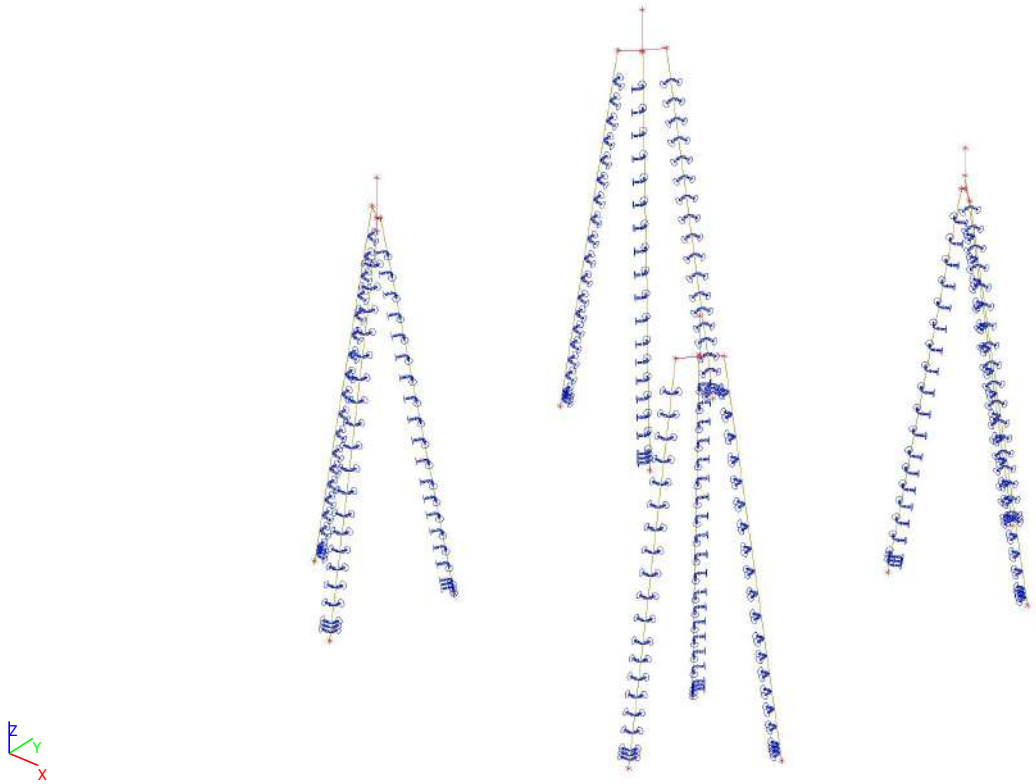
5.7. Line supports on member

Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
Slb_P_1_10	Line	Paal_P_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_3_10	Line	Paal_P_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_1_10	Line	Paal_X_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_3_10	Line	Paal_X_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_1_10	Line	Paal_XY_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_3_10	Line	Paal_XY_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_1_10	Line	Paal_Y_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_10	Line	Paal_Y_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_2_10	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_2_10	Line	Paal_X_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_2_10	Line	Paal_XY_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_2_10	Line	Paal_Y_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_Veen	Line	Paal_P_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen1	Line	Paal_P_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

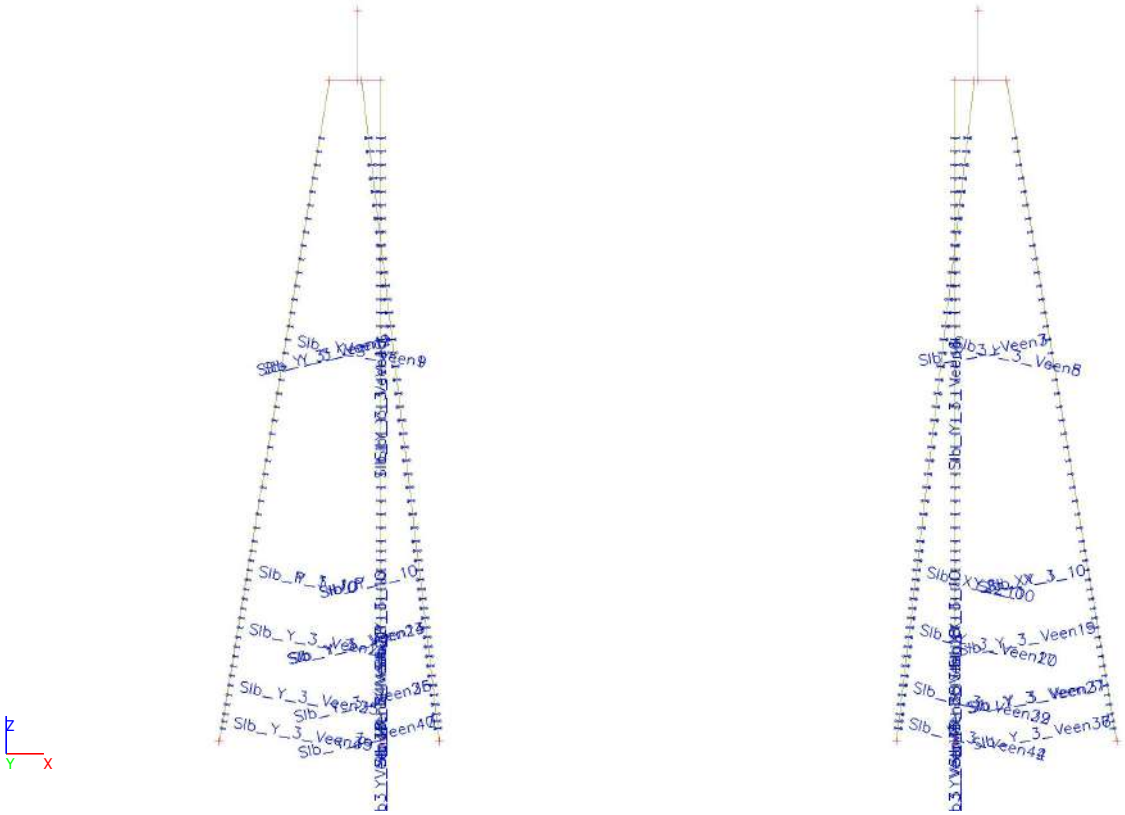
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
Slb_Y_3_Veen2	Line	Paal_P_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen3	Line	Paal_X_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen4	Line	Paal_X_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen5	Line	Paal_X_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen6	Line	Paal_XY_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen7	Line	Paal_XY_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen8	Line	Paal_XY_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen9	Line	Paal_Y_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen10	Line	Paal_Y_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen11	Line	Paal_Y_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen12	Line	Paal_P_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen13	Line	Paal_P_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen14	Line	Paal_P_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen15	Line	Paal_X_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen16	Line	Paal_X_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen17	Line	Paal_X_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen18	Line	Paal_XY_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen19	Line	Paal_XY_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen20	Line	Paal_XY_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen21	Line	Paal_Y_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen22	Line	Paal_Y_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen23	Line	Paal_Y_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_Veen24	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen25	Line	Paal_P_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen26	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen27	Line	Paal_X_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen28	Line	Paal_X_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen29	Line	Paal_X_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen30	Line	Paal_XY_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen31	Line	Paal_XY_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen32	Line	Paal_XY_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_Veen33	Line	Paal_Y_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	11,000 11,250	From start						
Slb_Y_3_Veen34	Line	Paal_Y_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen35	Line	Paal_Y_2 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen36	Line	Paal_X_3 LCS	11,000 11,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen37	Line	Paal_XY_1 LCS	11,000 11,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen38	Line	Paal_P_3 LCS	11,000 11,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen39	Line	Paal_P_1 LCS	11,000 11,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen40	Line	Paal_P_2 LCS	11,000 11,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen41	Line	Paal_X_1 LCS	11,000 11,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen42	Line	Paal_X_2 LCS	11,000 11,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen43	Line	Paal_XY_3 LCS	11,000 11,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen44	Line	Paal_XY_2 LCS	11,000 11,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen45	Line	Paal_Y_3 LCS	11,000 11,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen46	Line	Paal_Y_1 LCS	11,000 11,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen47	Line	Paal_Y_2 LCS	11,000 11,250	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

5.8. Analyse model met Lijnondersteuningen



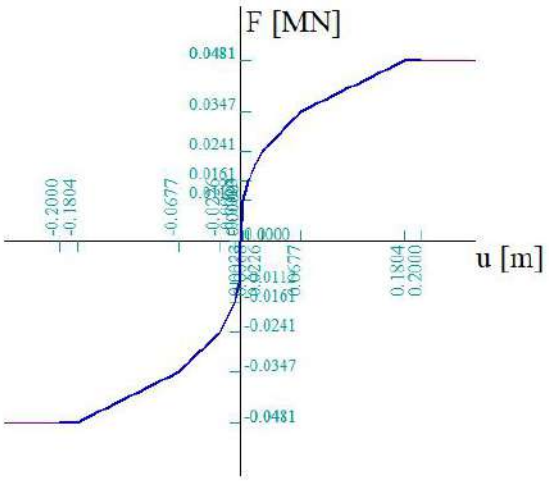
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

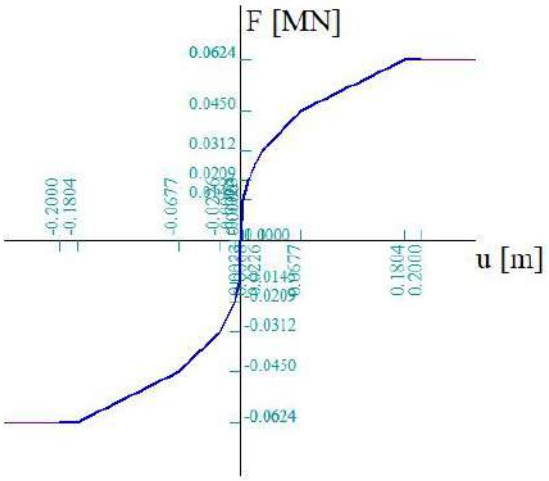
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-0.200000 / -48130.000000	Free	Free
		-0.180400 / -48130.000000		
		-0.067650 / -34710.000000		
		-0.022550 / -24064.500000		
		-0.006765 / -16109.569000		
		-0.002255 / -11169.751000		
		0.000000 / 0.000000		
		0.002255 / 11169.751000		
		0.006765 / 16109.569000		
		0.022550 / 24064.500000		
		0.067650 / 34707.015000		
		0.180400 / 48129.000000		
		0.200000 / 48129.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-0.200000 / -62400.000000	Free	Free
		-0.180400 / -62400.000000		
		-0.067650 / -45000.000000		
		-0.022550 / -31200.000000		
		-0.006765 / -20900.000000		
		-0.002255 / -14500.000000		
		0.000000 / 0.000000		
		0.002255 / 14490.000000		
		0.006765 / 20900.000000		
		0.022550 / 31220.000000		
		0.067650 / 45020.000000		
		0.180400 / 62430.000000		
		0.200000 / 62430.000000		

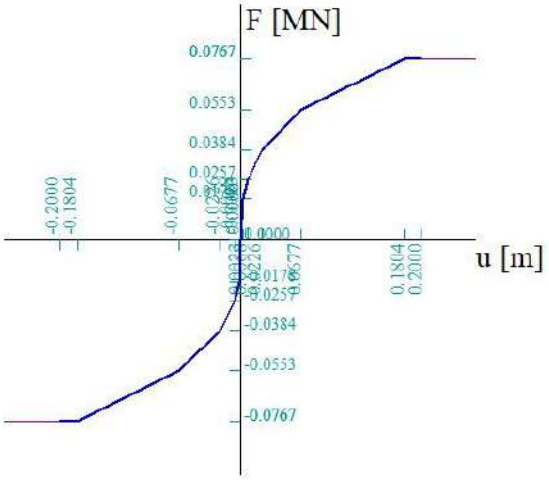
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-0.200000 / -76737.000000	Free	Free
		-0.180400 / -76737.000000		
		-0.067650 / -55336.953000		
		-0.022550 / -38368.500000		
		-0.006765 / -25685.138000		
		-0.002255 / -17809.080000		
		0.000000 / 0.000000		
		0.002255 / 17809.080000		
		0.006765 / 25685.138000		
		0.022550 / 38368.500000		

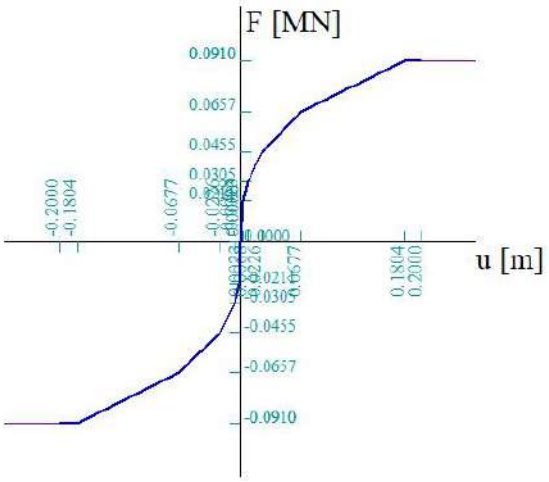
Name	Type	u / F	Positive end	Negative end
		0.067650 / 55336.953000		
		0.180400 / 76737.000000		
		0.200000 / 76737.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-0.200000 / -91041.000000	Free	Free
		-0.180400 / -91041.000000		
		-0.067650 / -65651.922000		
		-0.022550 / -45520.500000		
		-0.006765 / -30472.923000		
		-0.002255 / -21128.744000		
		0.000000 / 0.000000		
		0.002255 / 21128.744000		
		0.006765 / 30472.923000		
		0.022550 / 45520.500000		
		0.067650 / 65651.922000		
		0.180400 / 91041.000000		
		0.200000 / 91041.000000		

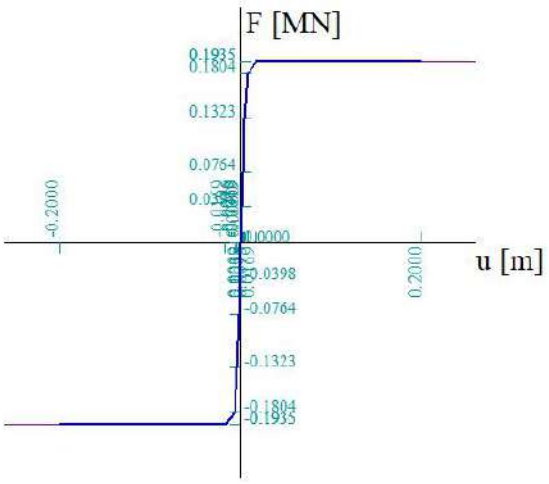
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-0.200000 / -193489.147000	Free	Free
		-0.016913 / -193489.147000		
		-0.007517 / -180407.835000		
		-0.003758 / -132256.824000		

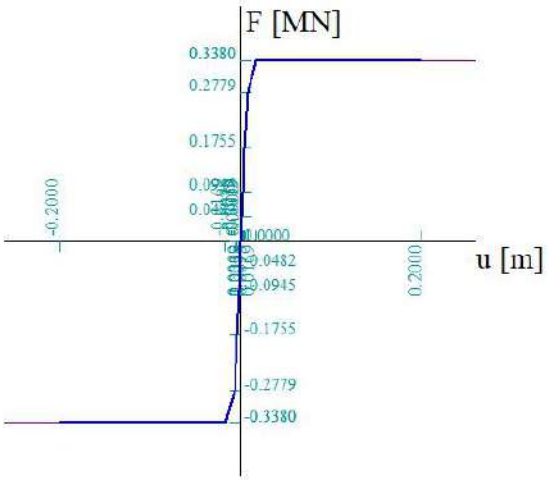
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -76421.758000		
		-0.000940 / -39826.202000		
		0.000000 / 0.000000		
		0.000940 / 39826.202000		
		0.001879 / 76421.758000		
		0.003758 / 132256.824000		
		0.007517 / 180407.835000		
		0.016913 / 193489.147000		
		0.200000 / 193489.147000		

Drawing



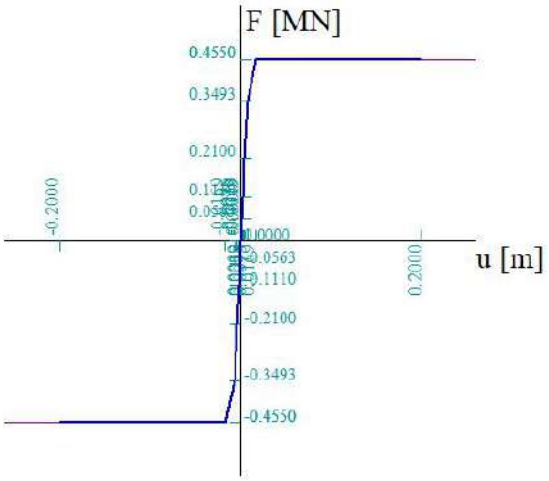
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-0.200000 / -338024.958000	Free	Free
		-0.016913 / -338024.958000		
		-0.007517 / -277917.886000		
		-0.003758 / -175526.039000		
		-0.001879 / -94450.113000		
		-0.000940 / -48160.629000		
		0.000000 / 0.000000		
		0.000940 / 48160.629000		
		0.001879 / 94450.113000		
		0.003758 / 175526.039000		
		0.007517 / 277917.886000		
		0.016913 / 338024.958000		
		0.200000 / 338024.958000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-0.200000 / -454964.396000	Free	Free
		-0.016913 / -454964.396000		
		-0.007517 / -349336.178000		
		-0.003758 / -210048.905000		
		-0.001879 / -110961.163000		
		-0.000940 / -56287.593000		
		0.000000 / 0.000000		
		0.000940 / 56287.593000		
		0.001879 / 110961.163000		
		0.003758 / 210048.905000		
		0.007517 / 349336.178000		
		0.016913 / 454964.396000		
		0.200000 / 454964.396000		

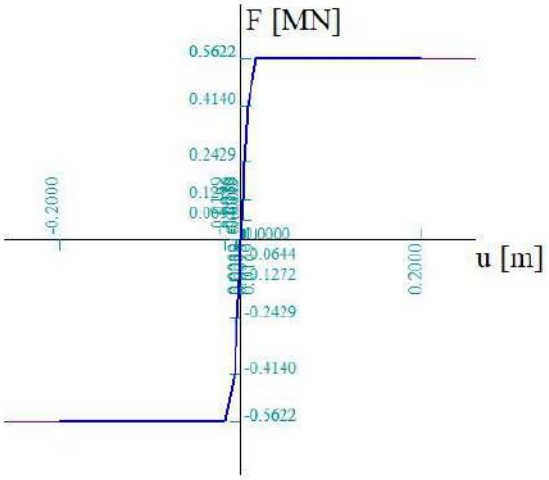
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-0.200000 / -562170.498000	Free	Free
		-0.016913 / -562170.498000		
		-0.007517 / -413992.721000		
		-0.003758 / -242873.332000		
		-0.001879 / -127210.864000		
		-0.000940 / -64380.055000		
		0.000000 / 0.000000		
		0.000940 / 64380.055000		
		0.001879 / 127210.864000		
		0.003758 / 242873.332000		

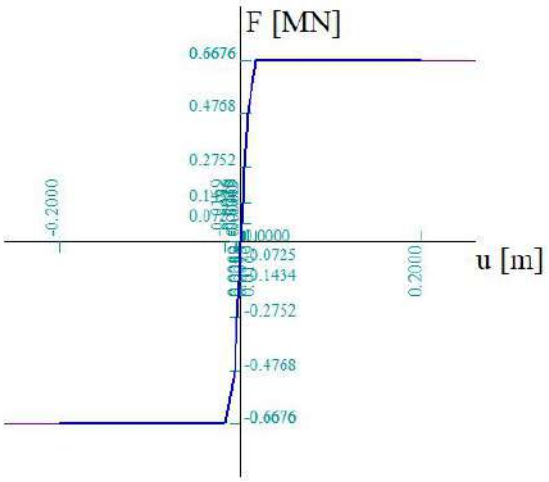
Name	Type	u / F	Positive end	Negative end
		0.007517 / 413992.721000		
		0.016913 / 562170.498000		
		0.200000 / 562170.498000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-0.200000 / -667564.512000	Free	Free
		-0.016913 / -667564.512000		
		-0.007517 / -476770.926000		
		-0.003758 / -275233.374000		
		-0.001879 / -143390.211000		
		-0.000940 / -72463.274000		
		0.000000 / 0.000000		
		0.000940 / 72463.274000		
		0.001879 / 143390.211000		
		0.003758 / 275233.374000		
		0.007517 / 476770.926000		
		0.016913 / 667564.512000		
		0.200000 / 667564.512000		

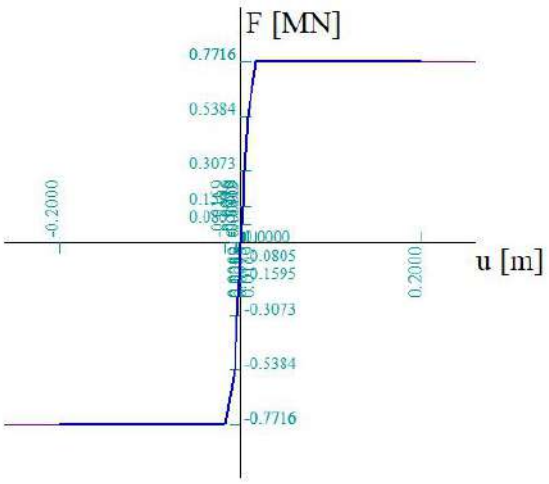
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-0.200000 / -771639.629000	Free	Free
		-0.016913 / -771639.629000		
		-0.007517 / -538432.081000		
		-0.003758 / -307337.483000		

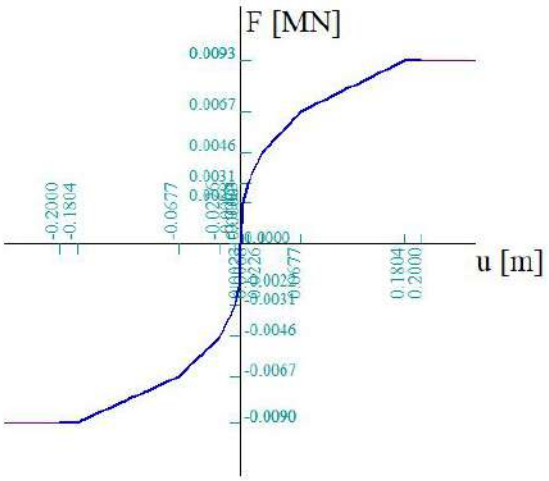
Name	Type	u / F	Positive end	Negative end
		-0.001879 / -159531.700000		
		-0.000940 / -80541.551000		
		0.000000 / 0.000000		
		0.000940 / 80541.551000		
		0.001879 / 159531.700000		
		0.003758 / 307337.483000		
		0.007517 / 538432.081000		
		0.016913 / 771639.629000		
		0.200000 / 771639.629000		

Drawing



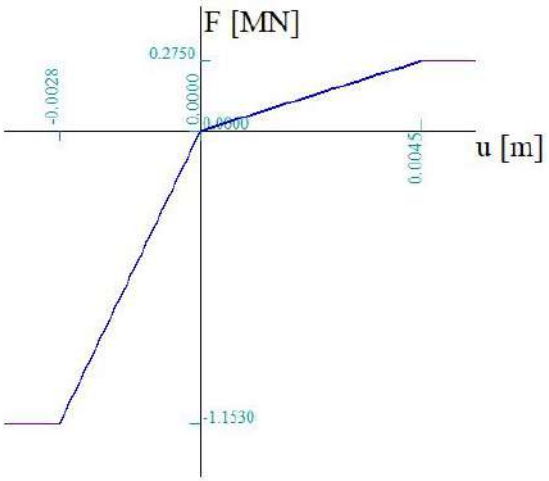
Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-0.200000 / -9000.000000	Free	Free
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		
		-0.006765 / -3100.000000		
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing



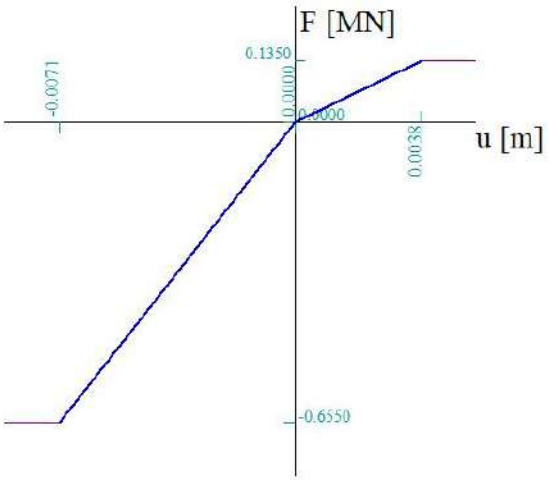
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+9-paalpunt	Translation	-0.002830 / -1153000.000000	Free	Free
		0.000000 / 0.000000		
		0.004470 / 275000.000000		

Drawing



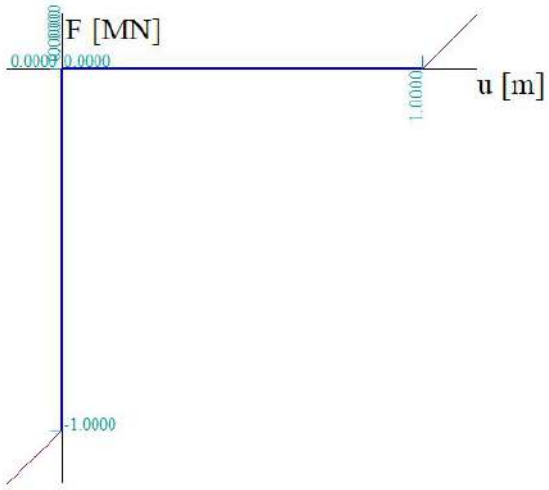
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+0-paalpunt_cap	Translation	-0.007100 / -655000.000000	Free	Free
		0.000000 / 0.000000		
		0.003800 / 135000.000000		

Drawing



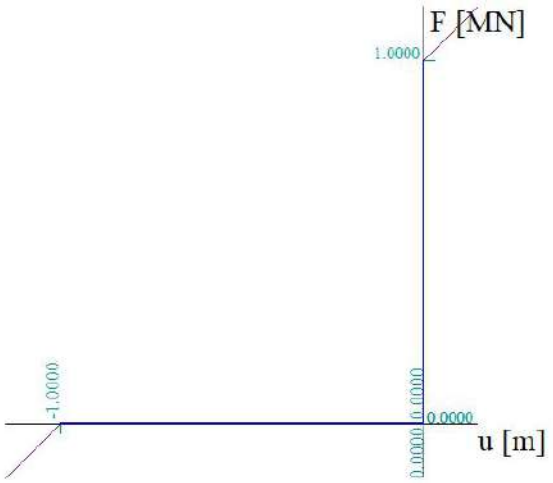
Name	Type	u / F	Positive end	Negative end
press only	Translation	-0.000001 / -1000000.000000	Flexible	Flexible
		0.000000 / 0.000000		
		1.000000 / 0.000000		

Drawing



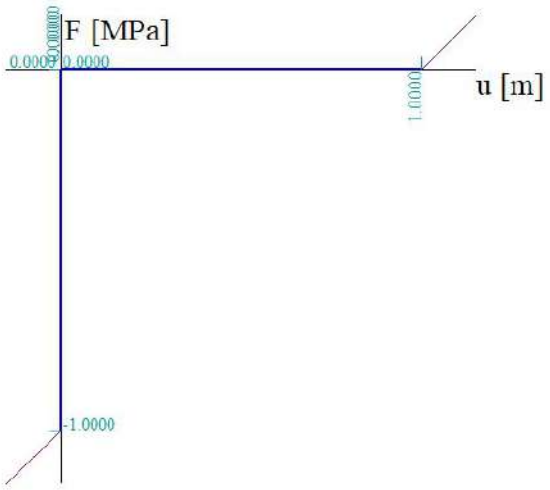
Name	Type	u / F	Positive end	Negative end
tension only	Translation	-1.000000 / 0.000000	Flexible	Flexible
		0.000000 / 0.000000		
		0.000001 / 1000000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing

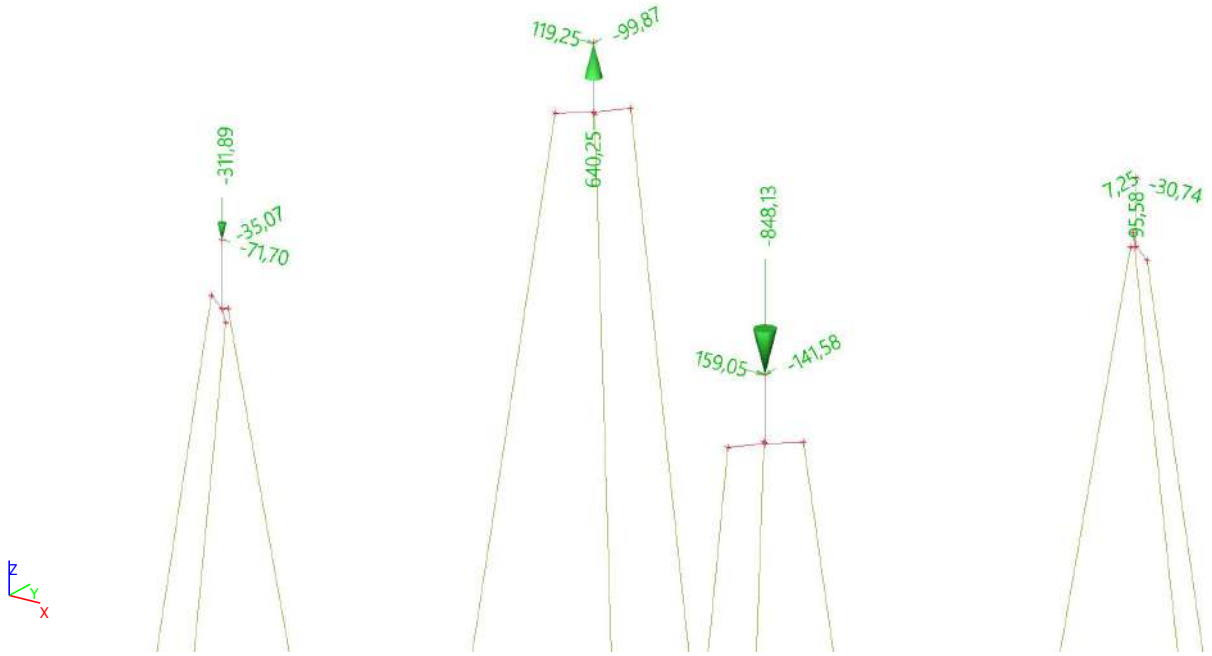


6. Belastingen

6.1. Load cases

6.1.1. Load cases - high max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



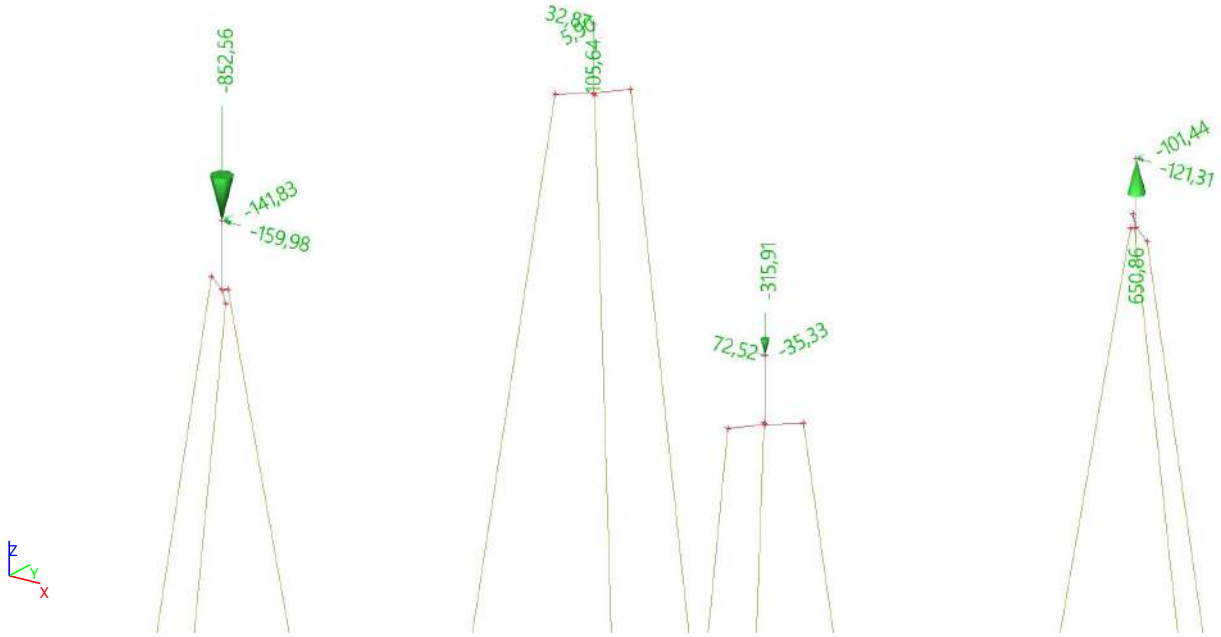
6.1.1.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1P_X	1P	high max Wnd ;45°	GCS	X	Force	-71,70
high max Wnd ;45°_1P_Y	1P	high max Wnd ;45°	GCS	Y	Force	-35,07
high max Wnd ;45°_1P_Z	1P	high max Wnd ;45°	GCS	Z	Force	-311,89
high max Wnd ;45°_1X_X	1X	high max Wnd ;45°	GCS	X	Force	119,25
high max Wnd ;45°_1X_Y	1X	high max Wnd ;45°	GCS	Y	Force	-99,87
high max Wnd ;45°_1X_Z	1X	high max Wnd ;45°	GCS	Z	Force	640,25
high max Wnd ;45°_1XY_X	1XY	high max Wnd ;45°	GCS	X	Force	-30,74
high max Wnd ;45°_1XY_Y	1XY	high max Wnd ;45°	GCS	Y	Force	7,25
high max Wnd ;45°_1XY_Z	1XY	high max Wnd ;45°	GCS	Z	Force	95,58

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;45°_1Y_X	1Y	high max Wnd ;45°	GCS	X	Force	159,05
high max Wnd ;45°_1Y_Y	1Y	high max Wnd ;45°	GCS	Y	Force	-141,58
high max Wnd ;45°_1Y_Z	1Y	high max Wnd ;45°	GCS	Z	Force	-848,13

6.1.2. Load cases - high max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



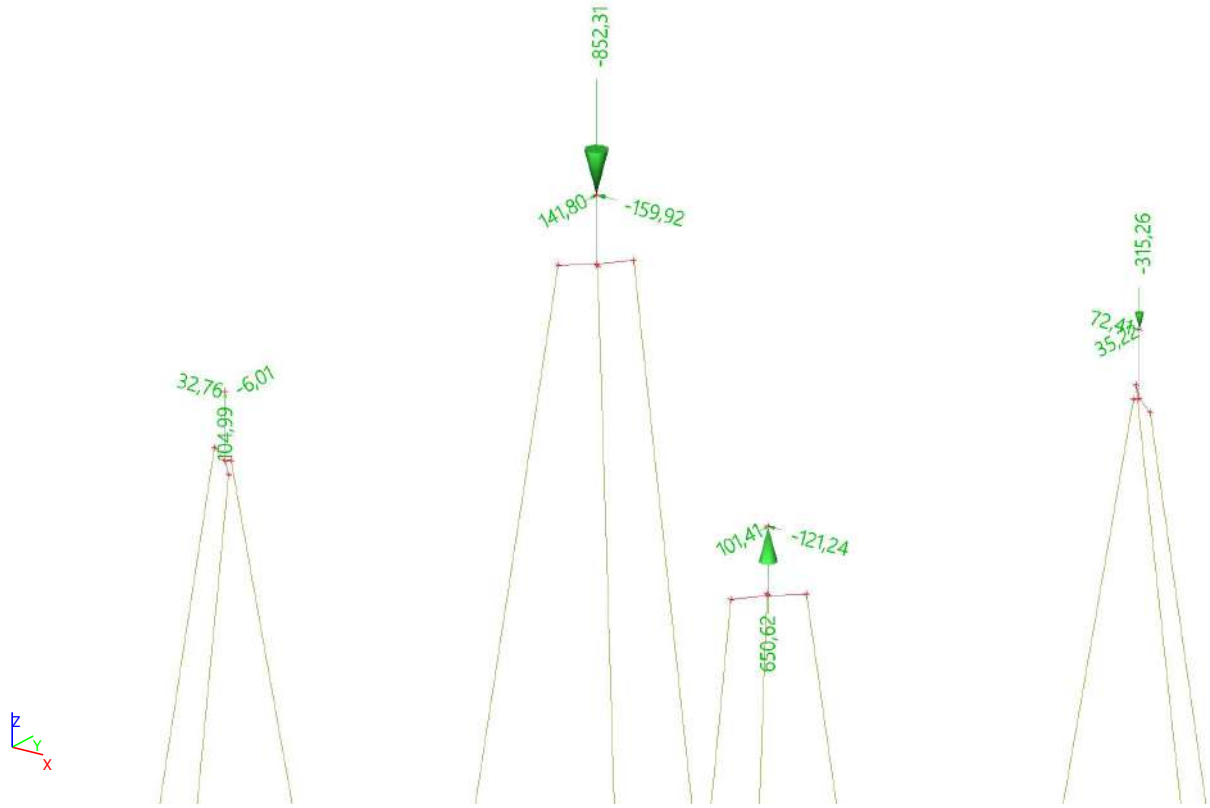
6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1P_X	1P	high max Wnd ;135°	GCS	X	Force	-159,98
high max Wnd ;135°_1P_Y	1P	high max Wnd ;135°	GCS	Y	Force	-141,83
high max Wnd ;135°_1P_Z	1P	high max Wnd ;135°	GCS	Z	Force	-852,56
high max Wnd ;135°_1X_X	1X	high max Wnd ;135°	GCS	X	Force	32,87
high max Wnd ;135°_1X_Y	1X	high max Wnd ;135°	GCS	Y	Force	5,90
high max Wnd ;135°_1X_Z	1X	high max Wnd ;135°	GCS	Z	Force	105,64

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;135°_1XY_X	1XY	high max Wnd ;135°	GCS	X	Force	-121,31
high max Wnd ;135°_1XY_Y	1XY	high max Wnd ;135°	GCS	Y	Force	-101,44
high max Wnd ;135°_1XY_Z	1XY	high max Wnd ;135°	GCS	Z	Force	650,86
high max Wnd ;135°_1Y_X	1Y	high max Wnd ;135°	GCS	X	Force	72,52
high max Wnd ;135°_1Y_Y	1Y	high max Wnd ;135°	GCS	Y	Force	-35,33
high max Wnd ;135°_1Y_Z	1Y	high max Wnd ;135°	GCS	Z	Force	-315,91

6.1.3. Load cases - high max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



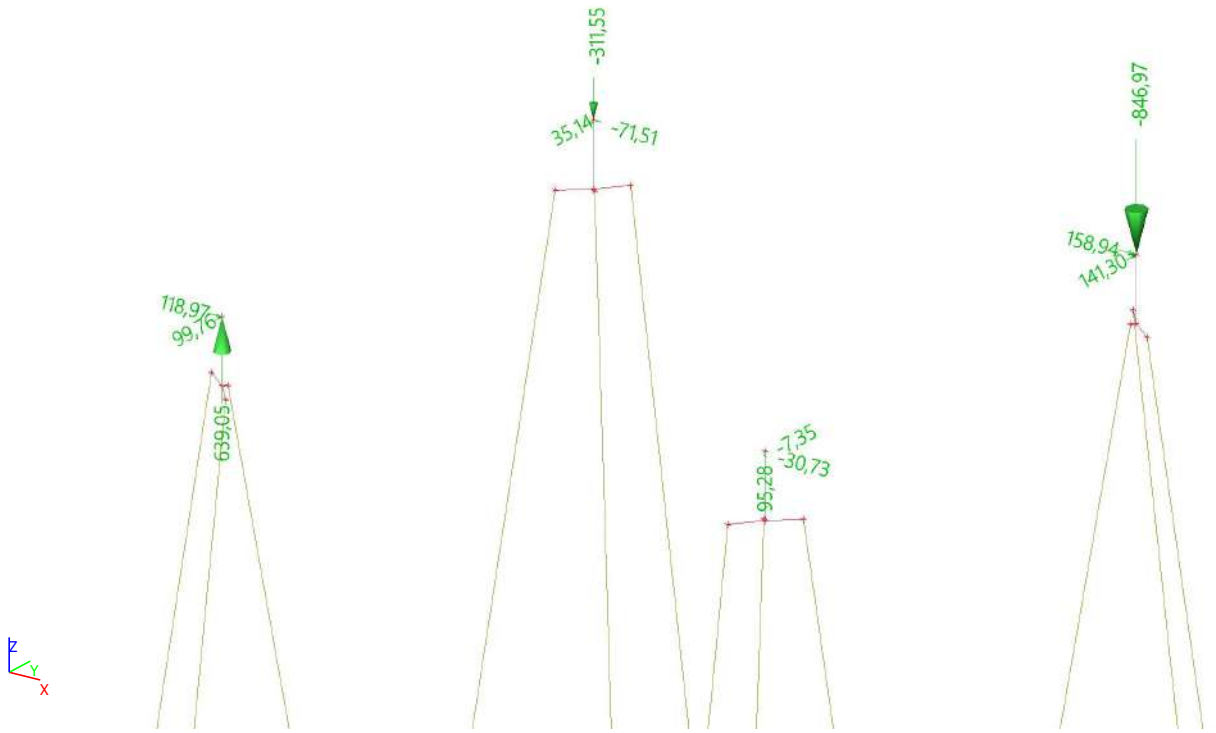
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1P_X	1P	high max Wnd ;225°	GCS	X	Force	32,76
high max Wnd ;225°_1P_Y	1P	high max Wnd ;225°	GCS	Y	Force	-6,01
high max Wnd ;225°_1P_Z	1P	high max Wnd ;225°	GCS	Z	Force	104,99

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;225°_1X_X	1X	high max Wnd ;225°	GCS	X	Force	-159,92
high max Wnd ;225°_1X_Y	1X	high max Wnd ;225°	GCS	Y	Force	141,80
high max Wnd ;225°_1X_Z	1X	high max Wnd ;225°	GCS	Z	Force	-852,31
high max Wnd ;225°_1XY_X	1XY	high max Wnd ;225°	GCS	X	Force	72,41
high max Wnd ;225°_1XY_Y	1XY	high max Wnd ;225°	GCS	Y	Force	35,22
high max Wnd ;225°_1XY_Z	1XY	high max Wnd ;225°	GCS	Z	Force	-315,26
high max Wnd ;225°_1Y_X	1Y	high max Wnd ;225°	GCS	X	Force	-121,24
high max Wnd ;225°_1Y_Y	1Y	high max Wnd ;225°	GCS	Y	Force	101,41
high max Wnd ;225°_1Y_Z	1Y	high max Wnd ;225°	GCS	Z	Force	650,62

6.1.4. Load cases - high max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
high max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			

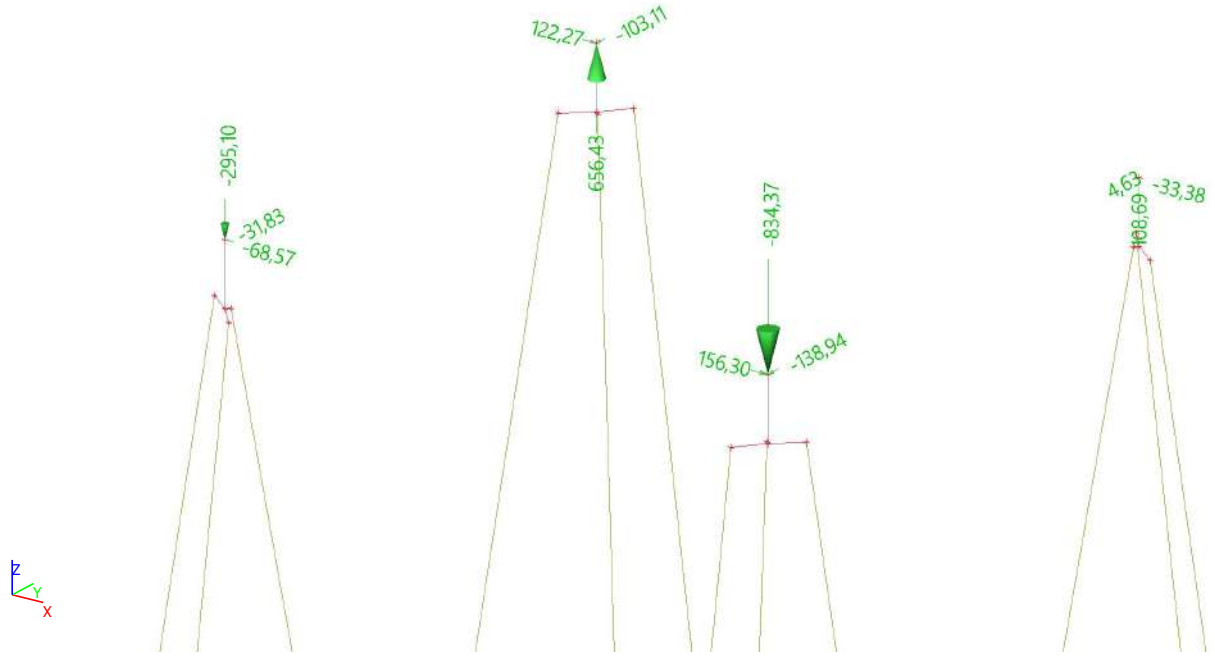


6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
high max Wnd ;315°_1P_X	1P	high max Wnd ;315°	GCS	X	Force	118,97
high max Wnd ;315°_1P_Y	1P	high max Wnd ;315°	GCS	Y	Force	99,76
high max Wnd ;315°_1P_Z	1P	high max Wnd ;315°	GCS	Z	Force	639,05
high max Wnd ;315°_1X_X	1X	high max Wnd ;315°	GCS	X	Force	-71,51
high max Wnd ;315°_1X_Y	1X	high max Wnd ;315°	GCS	Y	Force	35,14
high max Wnd ;315°_1X_Z	1X	high max Wnd ;315°	GCS	Z	Force	-311,55
high max Wnd ;315°_1XY_X	1XY	high max Wnd ;315°	GCS	X	Force	158,94
high max Wnd ;315°_1XY_Y	1XY	high max Wnd ;315°	GCS	Y	Force	141,30
high max Wnd ;315°_1XY_Z	1XY	high max Wnd ;315°	GCS	Z	Force	-846,97
high max Wnd ;315°_1Y_X	1Y	high max Wnd ;315°	GCS	X	Force	-30,73
high max Wnd ;315°_1Y_Y	1Y	high max Wnd ;315°	GCS	Y	Force	-7,35
high max Wnd ;315°_1Y_Z	1Y	high max Wnd ;315°	GCS	Z	Force	95,28

6.1.5. Load cases - low max Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			

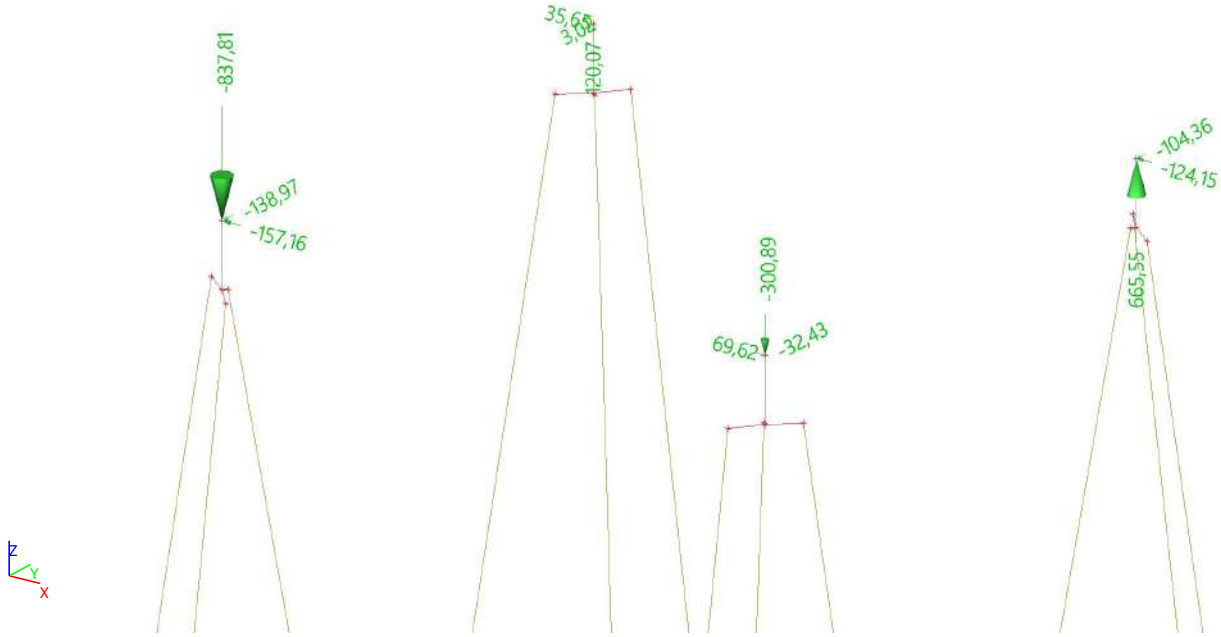


6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;45°_1P_X	1P	low max Wnd ;45°	GCS	X	Force	-68,57
low max Wnd ;45°_1P_Y	1P	low max Wnd ;45°	GCS	Y	Force	-31,83
low max Wnd ;45°_1P_Z	1P	low max Wnd ;45°	GCS	Z	Force	-295,10
low max Wnd ;45°_1X_X	1X	low max Wnd ;45°	GCS	X	Force	122,27
low max Wnd ;45°_1X_Y	1X	low max Wnd ;45°	GCS	Y	Force	-103,11
low max Wnd ;45°_1X_Z	1X	low max Wnd ;45°	GCS	Z	Force	656,43
low max Wnd ;45°_1XY_X	1XY	low max Wnd ;45°	GCS	X	Force	-33,38
low max Wnd ;45°_1XY_Y	1XY	low max Wnd ;45°	GCS	Y	Force	4,63
low max Wnd ;45°_1XY_Z	1XY	low max Wnd ;45°	GCS	Z	Force	108,69
low max Wnd ;45°_1Y_X	1Y	low max Wnd ;45°	GCS	X	Force	156,30
low max Wnd ;45°_1Y_Y	1Y	low max Wnd ;45°	GCS	Y	Force	-138,94
low max Wnd ;45°_1Y_Z	1Y	low max Wnd ;45°	GCS	Z	Force	-834,37

6.1.6. Load cases - low max Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			



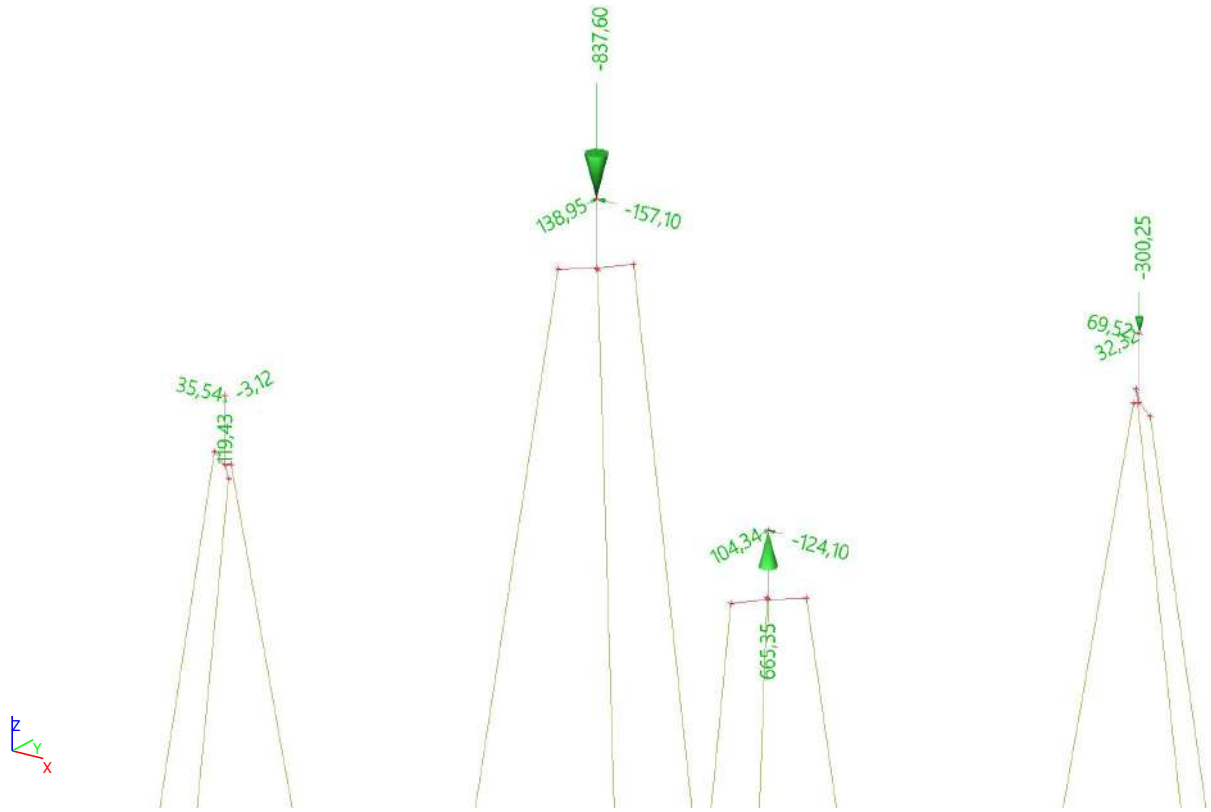
6.1.6.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1P_X	1P	low max Wnd ;135°	GCS	X	Force	-157,16
low max Wnd ;135°_1P_Y	1P	low max Wnd ;135°	GCS	Y	Force	-138,97
low max Wnd ;135°_1P_Z	1P	low max Wnd ;135°	GCS	Z	Force	-837,81
low max Wnd ;135°_1X_X	1X	low max Wnd ;135°	GCS	X	Force	35,65
low max Wnd ;135°_1X_Y	1X	low max Wnd ;135°	GCS	Y	Force	3,02
low max Wnd ;135°_1X_Z	1X	low max Wnd ;135°	GCS	Z	Force	120,07
low max Wnd ;135°_1XY_X	1XY	low max Wnd ;135°	GCS	X	Force	-124,15
low max Wnd ;135°_1XY_Y	1XY	low max Wnd ;135°	GCS	Y	Force	-104,36
low max Wnd ;135°_1XY_Z	1XY	low max Wnd ;135°	GCS	Z	Force	665,55
low max Wnd ;135°_1Y_X	1Y	low max Wnd ;135°	GCS	X	Force	69,62
low max Wnd ;135°_1Y_Y	1Y	low max Wnd ;135°	GCS	Y	Force	-32,43

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;135°_1Y_Z	1Y	low max Wnd ;135°	GCS	Z	Force	-300,89

6.1.7. Load cases - low max Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



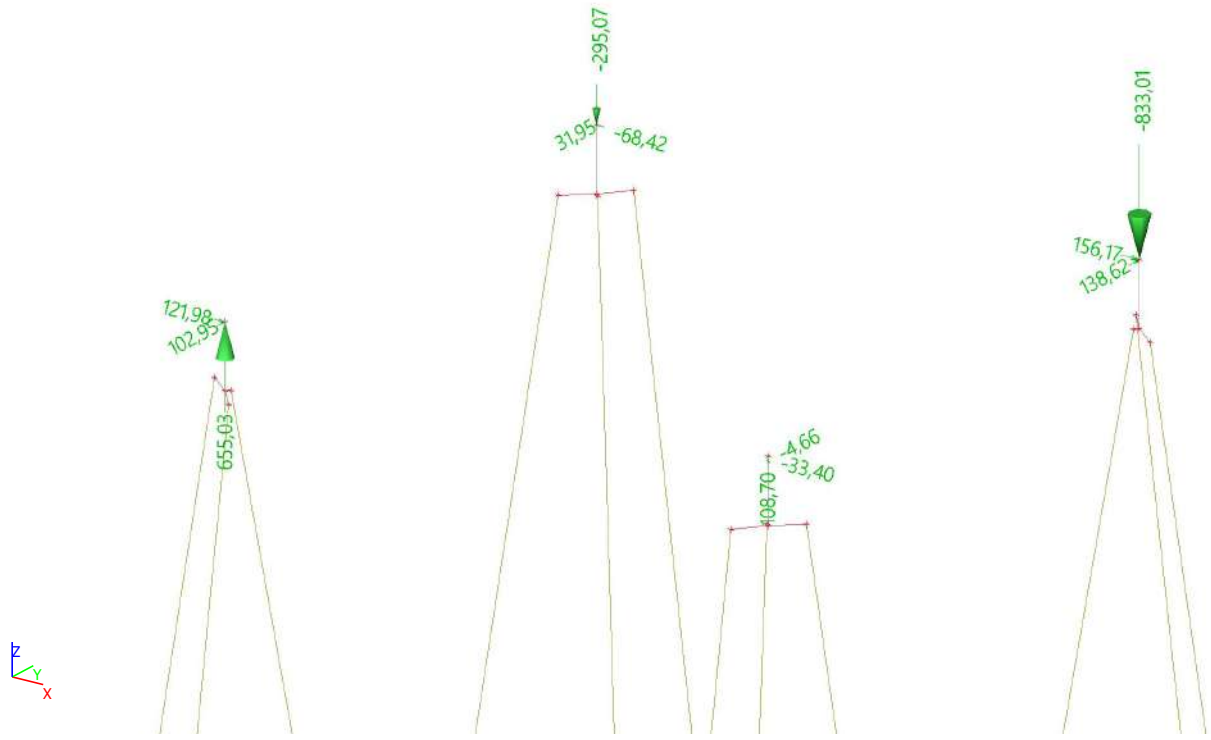
6.1.7.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1P_X	1P	low max Wnd ;225°	GCS	X	Force	35,54
low max Wnd ;225°_1P_Y	1P	low max Wnd ;225°	GCS	Y	Force	-3,12
low max Wnd ;225°_1P_Z	1P	low max Wnd ;225°	GCS	Z	Force	119,43
low max Wnd ;225°_1X_X	1X	low max Wnd ;225°	GCS	X	Force	-157,10
low max Wnd ;225°_1X_Y	1X	low max Wnd ;225°	GCS	Y	Force	138,95
low max Wnd ;225°_1X_Z	1X	low max Wnd ;225°	GCS	Z	Force	-837,60
low max Wnd ;225°_1XY_X	1XY	low max Wnd ;225°	GCS	X	Force	69,52
low max Wnd ;225°_1XY_Y	1XY	low max Wnd ;225°	GCS	Y	Force	32,32

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;225°_1XY_Z	1XY	low max Wnd ;225°	GCS	Z	Force	-300,25
low max Wnd ;225°_1Y_X	1Y	low max Wnd ;225°	GCS	X	Force	-124,10
low max Wnd ;225°_1Y_Y	1Y	low max Wnd ;225°	GCS	Y	Force	104,34
low max Wnd ;225°_1Y_Z	1Y	low max Wnd ;225°	GCS	Z	Force	665,35

6.1.8. Load cases - low max Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
low max Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



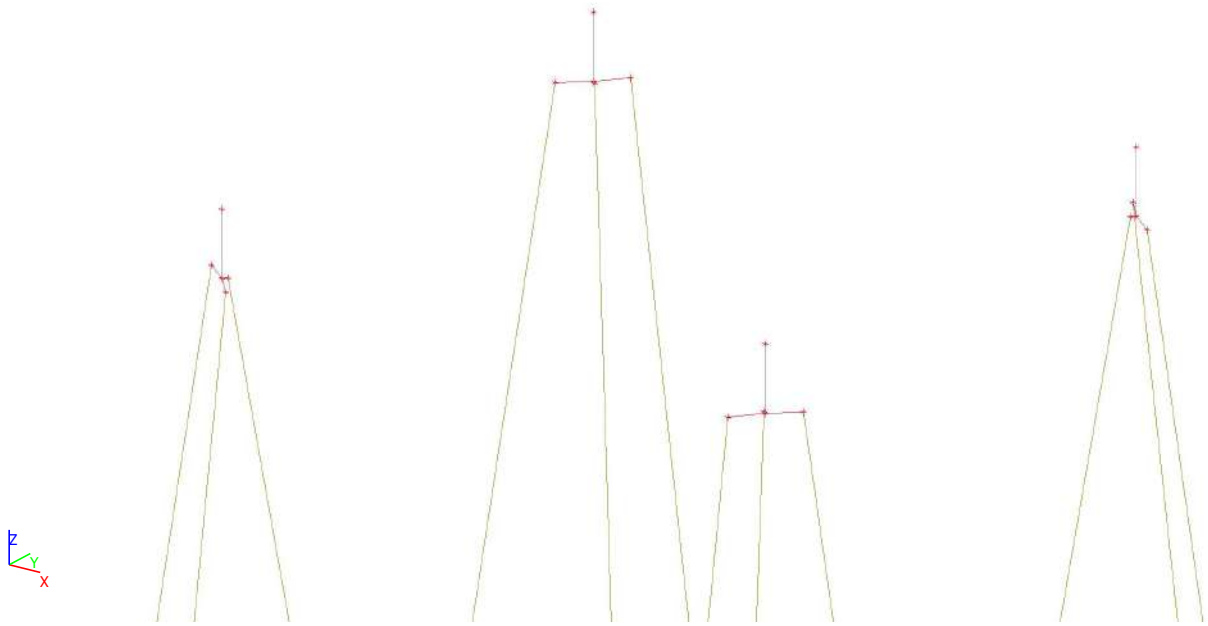
6.1.8.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1P_X	1P	low max Wnd ;315°	GCS	X	Force	121,98
low max Wnd ;315°_1P_Y	1P	low max Wnd ;315°	GCS	Y	Force	102,95
low max Wnd ;315°_1P_Z	1P	low max Wnd ;315°	GCS	Z	Force	655,03
low max Wnd ;315°_1X_X	1X	low max Wnd ;315°	GCS	X	Force	-68,42
low max Wnd ;315°_1X_Y	1X	low max Wnd ;315°	GCS	Y	Force	31,95

Name	Node	Load case	System	Dir	Type	Value - F [kN]
low max Wnd ;315°_1X_Z	1X	low max Wnd ;315°	GCS	Z	Force	-295,07
low max Wnd ;315°_1XY_X	1XY	low max Wnd ;315°	GCS	X	Force	156,17
low max Wnd ;315°_1XY_Y	1XY	low max Wnd ;315°	GCS	Y	Force	138,62
low max Wnd ;315°_1XY_Z	1XY	low max Wnd ;315°	GCS	Z	Force	-833,01
low max Wnd ;315°_1Y_X	1Y	low max Wnd ;315°	GCS	X	Force	-33,40
low max Wnd ;315°_1Y_Y	1Y	low max Wnd ;315°	GCS	Y	Force	-4,66
low max Wnd ;315°_1Y_Z	1Y	low max Wnd ;315°	GCS	Z	Force	108,70

6.1.9. Load cases - EG_Fundering

Name	Description	Action type	Load group	Direction
	Spec	Load type		
EG_Fundering		Permanent	LG1	-Z
		Self weight		



6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
low max Wnd ;45° - EG_Gunstig	Ultimate	low max Wnd ;45°	1,000
		EG_Fundering	0,900
low max Wnd ;135° - EG_Gunstig	Ultimate	low max Wnd ;135°	1,000
		EG_Fundering	0,900
low max Wnd ;225° - EG_Gunstig	Ultimate	low max Wnd ;225°	1,000
		EG_Fundering	0,900
low max Wnd ;315° - EG_Gunstig	Ultimate	low max Wnd ;315°	1,000
		EG_Fundering	0,900
high max Wnd ;45° - EG_Ongunstig	Ultimate	high max Wnd ;45°	1,000
		EG_Fundering	1,200
high max Wnd ;135° - EG_Ongunstig	Ultimate	high max Wnd ;135°	1,000
		EG_Fundering	1,200
high max Wnd ;225° - EG_Ongunstig	Ultimate	high max Wnd ;225°	1,000
		EG_Fundering	1,200
high max Wnd ;315° - EG_Ongunstig	Ultimate	high max Wnd ;315°	1,000
		EG_Fundering	1,200

6.3. Result classes

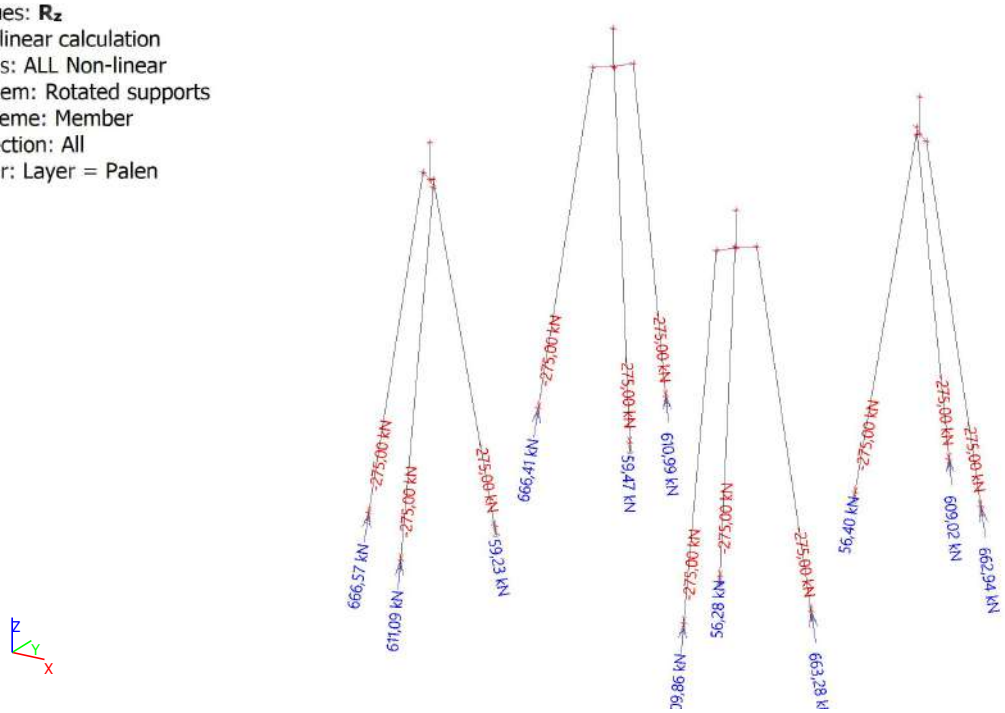
Name	List
ALL Non-linear	low max Wnd ;45° - EG_Gunstig
	low max Wnd ;135° - EG_Gunstig
	low max Wnd ;225° - EG_Gunstig
	low max Wnd ;315° - EG_Gunstig
	high max Wnd ;45° - EG_Ongunstig
	high max Wnd ;135° - EG_Ongunstig
	high max Wnd ;225° - EG_Ongunstig
	high max Wnd ;315° - EG_Ongunstig

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen

Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_Y_3/N10	high max Wnd ;225° - EG_Ongunstig	**0,00**	0,00	666,41	0,00	0,00	0,00	0,0	0,0
S_X_1/N12	high max Wnd ;45° - EG_Ongunstig	0,00	**0,00**	609,86	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	high max Wnd ;225° - EG_Ongunstig	0,00	**0,00**	610,99	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_2/N22	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	high max Wnd ;135° - EG_Ongunstig	**0,00**	0,00	**666,57**	0,00	0,00	0,00	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: ALL Non-linear
System: Rotated supports
Extreme: Member
Selection: All

Filter: Layer = Palen

Nodal reactions

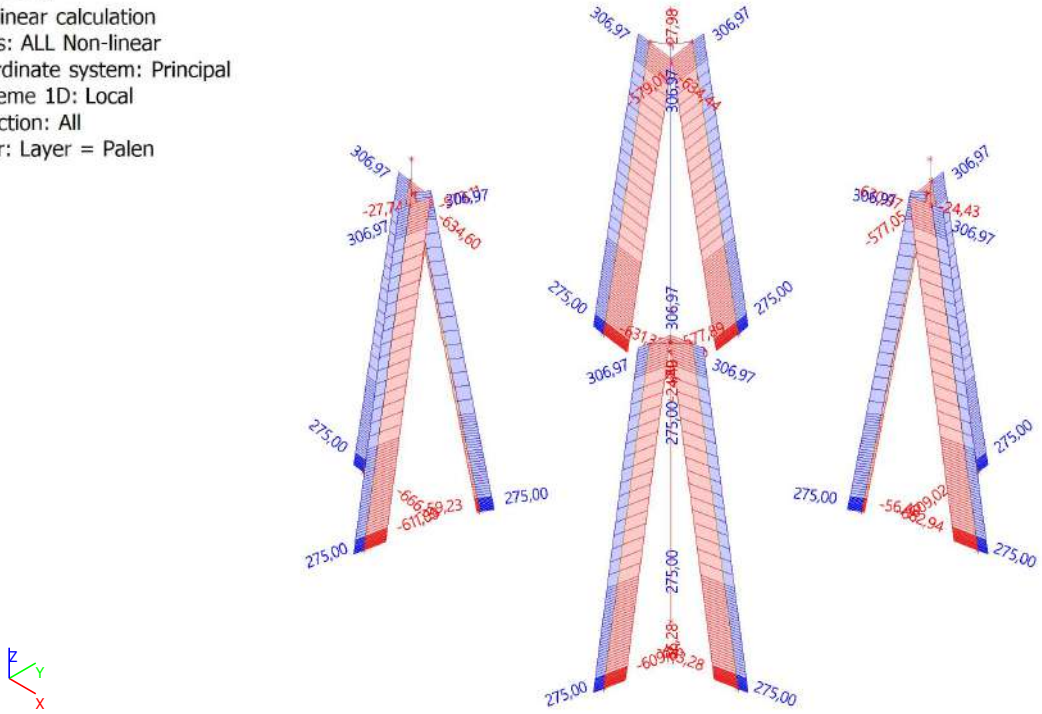
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_3/N6	high max Wnd ;135° - EG_Ongunstig	0,00	**0,00**	**611,09**	0,00	0,00	0,00	0,0	0,0
S_P_3/N6	high max Wnd ;45° - EG_Ongunstig	**0,00**	**0,00**	204,07	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_3/N6	low max Wnd ;315° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_P_1/N5	high max Wnd ;135° - EG_Ongunstig	**0,00**	**0,00**	**666,57**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_1/N5	low max Wnd ;315° - EG_Gunstig	**0,00**	0,00	**-275,00**	0,00	0,00	**0,00**	0,0	0,0
S_P_2/N22	low max Wnd ;225° - EG_Gunstig	**0,00**	0,00	51,72	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_2/N22	low max Wnd ;135° - EG_Gunstig	0,00	**0,00**	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_P_2/N22	high max Wnd ;225° - EG_Ongunstig	0,00	0,00	**59,23**	0,00	0,00	0,00	0,0	0,0
S_P_2/N22	high max Wnd ;315° - EG_Ongunstig	**0,00**	**0,00**	36,97	0,00	0,00	**0,00**	0,0	0,0
S_X_3/N13	low max Wnd ;45° - EG_Gunstig	**0,00**	**0,00**	639,03	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_3/N13	low max Wnd ;225° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_X_3/N13	high max Wnd ;45° - EG_Ongunstig	**0,00**	0,00	**663,28**	0,00	0,00	**0,00**	0,0	0,0
S_X_1/N12	high max Wnd ;45° - EG_Ongunstig	**0,00**	**0,00**	**609,86**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_1/N12	low max Wnd ;225° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_X_1/N12	low max Wnd ;45° - EG_Gunstig	0,00	**0,00**	585,92	0,00	0,00	**0,00**	0,0	0,0
S_X_2/N8	high max Wnd ;135° - EG_Ongunstig	**0,00**	0,00	-59,19	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_2/N8	high max Wnd ;315° - EG_Ongunstig	0,00	**0,00**	**56,28**	0,00	0,00	0,00	0,0	0,0
S_X_2/N8	low max Wnd ;45° - EG_Gunstig	**0,00**	**0,00**	**-275,00**	0,00	0,00	**0,00**	0,0	0,0
S_XY_3/N17	high max Wnd ;315° - EG_Ongunstig	0,00	**0,00**	**609,02**	0,00	0,00	0,00	0,0	0,0
S_XY_3/N17	low max Wnd ;225° - EG_Gunstig	**0,00**	**0,00**	182,26	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_3/N17	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_XY_1/N16	low max Wnd ;225° - EG_Gunstig	**0,00**	**0,00**	287,71	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_1/N16	low max Wnd ;135° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_XY_1/N16	high max Wnd ;315° - EG_Ongunstig	0,00	0,00	**662,94**	0,00	0,00	0,00	0,0	0,0
S_XY_1/N16	low max Wnd ;315° - EG_Gunstig	**0,00**	0,00	638,63	0,00	0,00	**0,00**	0,0	0,0
S_XY_2/N18	low max Wnd ;135° - EG_Gunstig	**0,00**	0,00	-24,81	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_2/N18	low max Wnd ;315° - EG_Gunstig	0,00	**0,00**	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_XY_2/N18	high max Wnd ;45° - EG_Ongunstig	**0,00**	**0,00**	**56,40**	0,00	0,00	**0,00**	0,0	0,0
S_Y_3/N10	low max Wnd ;225° - EG_Gunstig	**0,00**	**0,00**	641,89	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_3/N10	low max Wnd ;45° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_Y_3/N10	high max Wnd ;225° - EG_Ongunstig	**0,00**	0,00	**666,41**	0,00	0,00	**0,00**	0,0	0,0
S_Y_1/N20	low max Wnd ;225° - EG_Gunstig	0,00	**0,00**	586,34	0,00	0,00	0,00	0,0	0,0
S_Y_1/N20	high max Wnd ;225° - EG_Ongunstig	**0,00**	**0,00**	**610,99**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_1/N20	low max Wnd ;45° - EG_Gunstig	0,00	0,00	**-275,00**	0,00	0,00	**0,00**	0,0	0,0
S_Y_2/N21	low max Wnd ;135° - EG_Gunstig	0,00	**0,00**	51,96	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_2/N21	low max Wnd ;225° - EG_Gunstig	**0,00**	**0,00**	**-275,00**	0,00	0,00	0,00	0,0	0,0
S_Y_2/N21	high max Wnd ;135° - EG_Ongunstig	0,00	0,00	**59,47**	0,00	0,00	0,00	0,0	0,0
S_Y_2/N21	low max Wnd ;45° - EG_Gunstig	**0,00**	0,00	-15,47	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

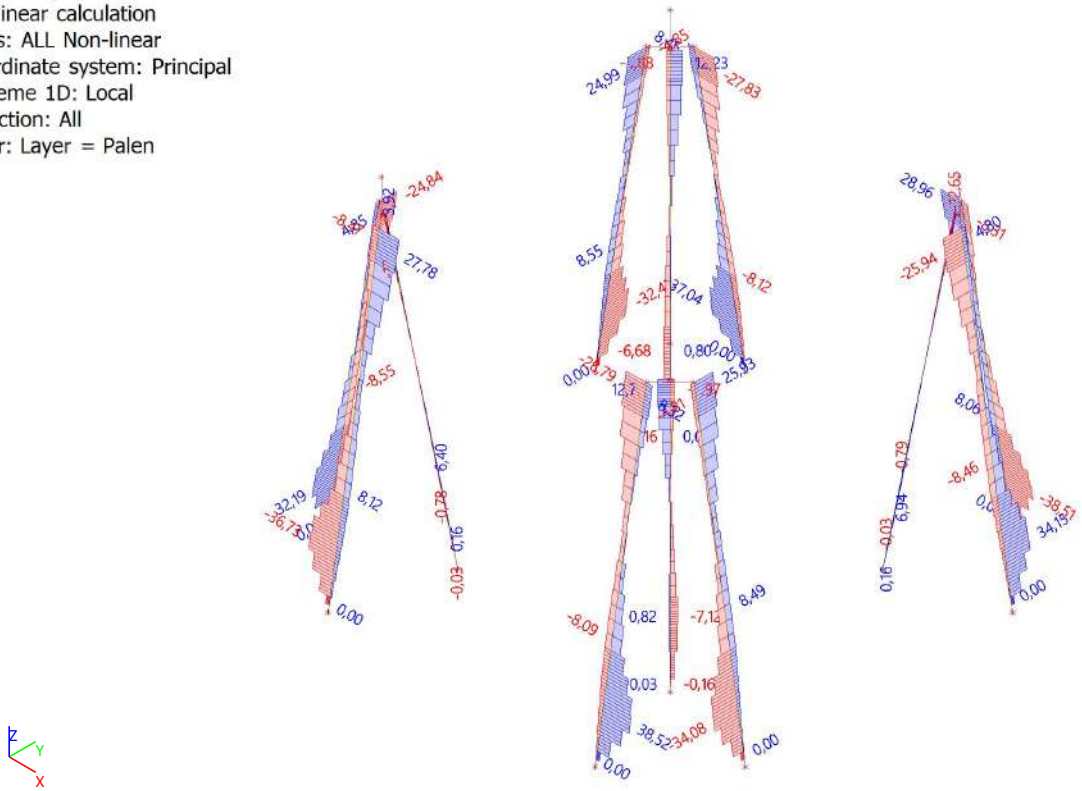
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



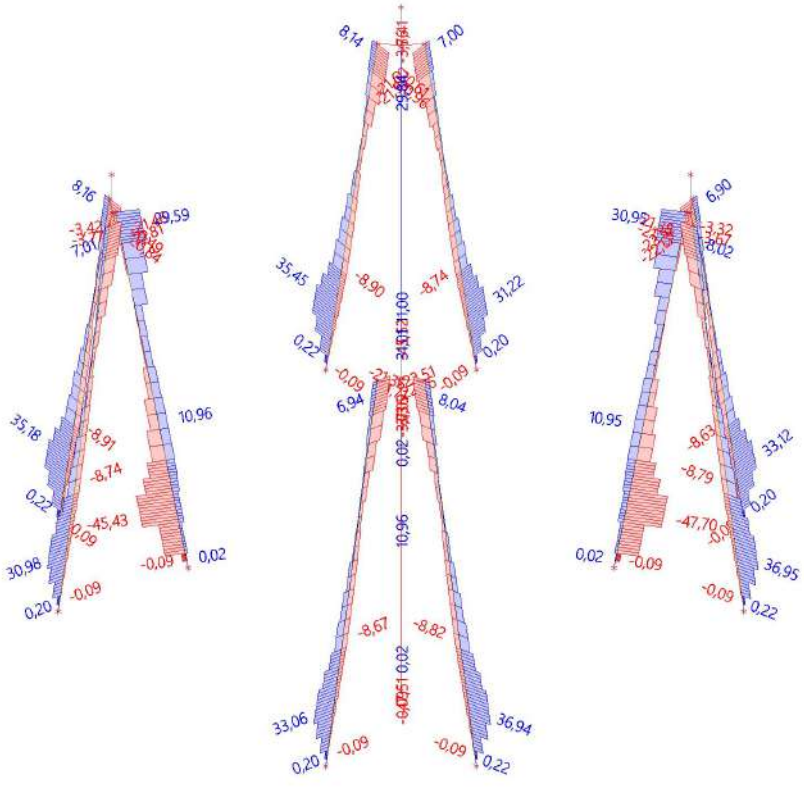
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



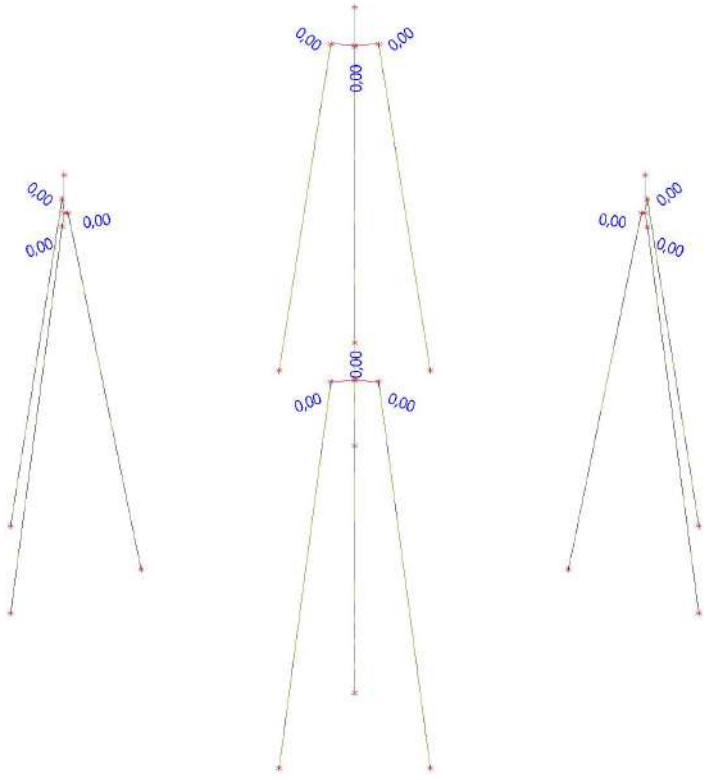
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



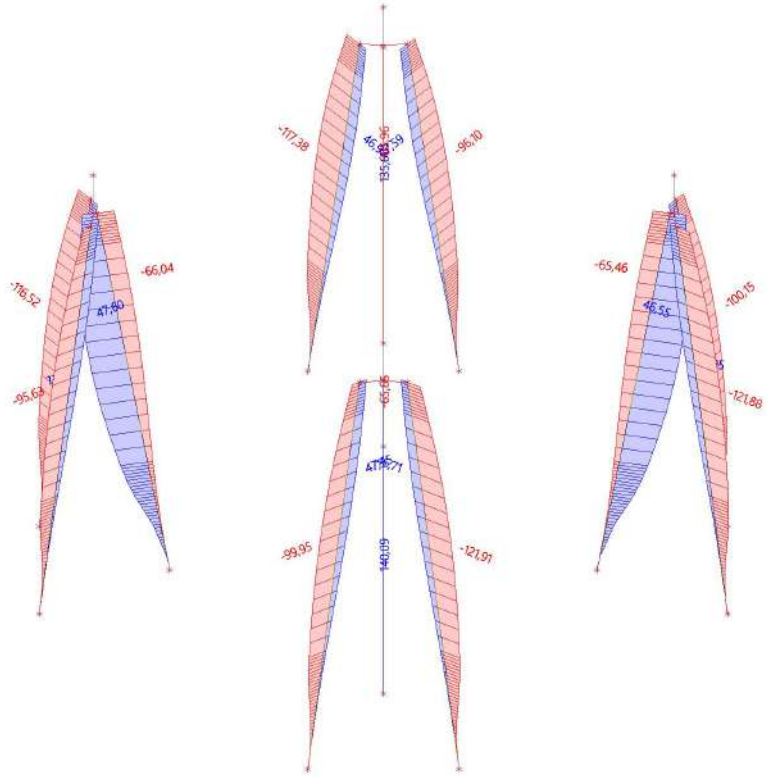
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



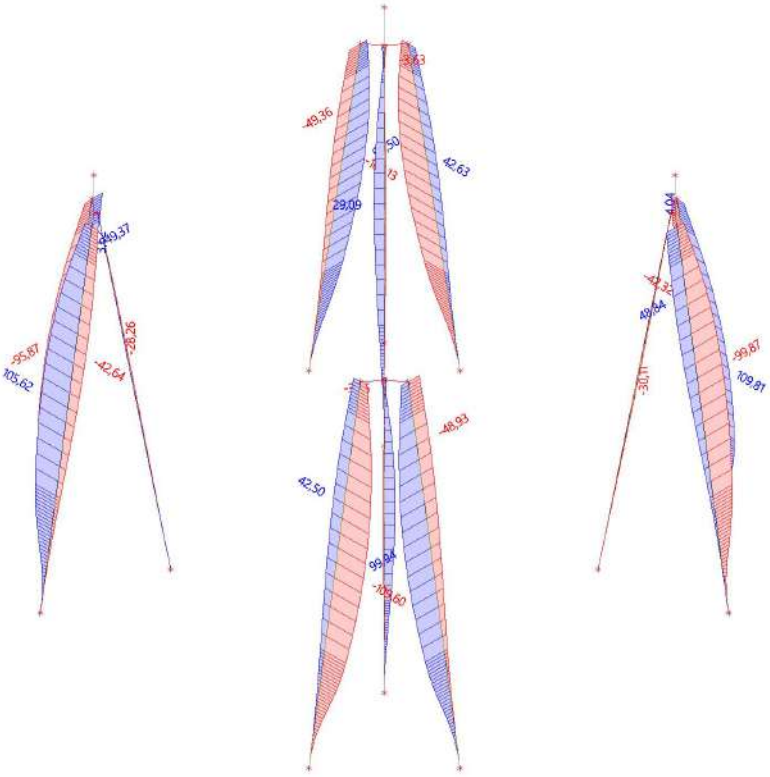
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_P_1	11,477	high max Wnd ;135° - EG_Ongunstig	**-666,57**	0,00	0,22	0,00	0,00	0,00
Paal_P_3	0,000	high max Wnd ;315° - EG_Ongunstig	**306,97**	24,40	-17,33	**0,00**	-34,41	26,11
Paal_XY_3	9,500+	low max Wnd ;135° - EG_Gunstig	278,61	**-38,51**	33,12	0,00	-37,42	43,27
Paal_X_1	9,500+	low max Wnd ;225° - EG_Gunstig	278,61	**38,52**	33,06	0,00	-37,36	-43,28
Paal_XY_2	9,000+	low max Wnd ;135° - EG_Gunstig	28,94	6,62	**-47,70**	0,00	75,41	-10,71
Paal_XY_1	9,500+	low max Wnd ;135° - EG_Gunstig	278,61	34,15	**36,95**	0,00	-41,28	-38,35
Paal_X_3	4,500-	low max Wnd ;225° - EG_Gunstig	290,49	4,86	-0,83	0,00	**-121,91**	99,94
Paal_X_2	4,500-	low max Wnd ;225° - EG_Gunstig	40,08	1,72	4,74	0,00	**140,09**	30,51
Paal_X_1	5,375+	low max Wnd ;225° - EG_Gunstig	286,84	4,60	5,47	0,00	-98,80	**-109,60**
Paal_XY_3	5,375+	low max Wnd ;135° - EG_Gunstig	286,84	-4,66	5,48	0,00	-98,99	**109,81**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

Nonlinear calculation
Class: ALL Non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer XY	1,200	low max Wnd ;135° - EG_Gunstig	**665,55**	-161,58	13,99	**0,00**	0,00	0,00
Poer XY	0,000	low max Wnd ;135° - EG_Gunstig	635,78	**-161,58**	13,99	0,00	-16,79	**193,90**
Poer Y	0,000	high max Wnd ;135° - EG_Ongunstig	65,95	-19,07	**-27,41**	0,00	**32,90**	22,88
Poer P	0,000	high max Wnd ;225° - EG_Ongunstig	65,30	-18,92	**27,41**	0,00	**-32,90**	22,70
Poer P	0,000	high max Wnd ;135° - EG_Ongunstig	**-892,25**	**213,41**	-12,83	0,00	15,40	**-256,09**

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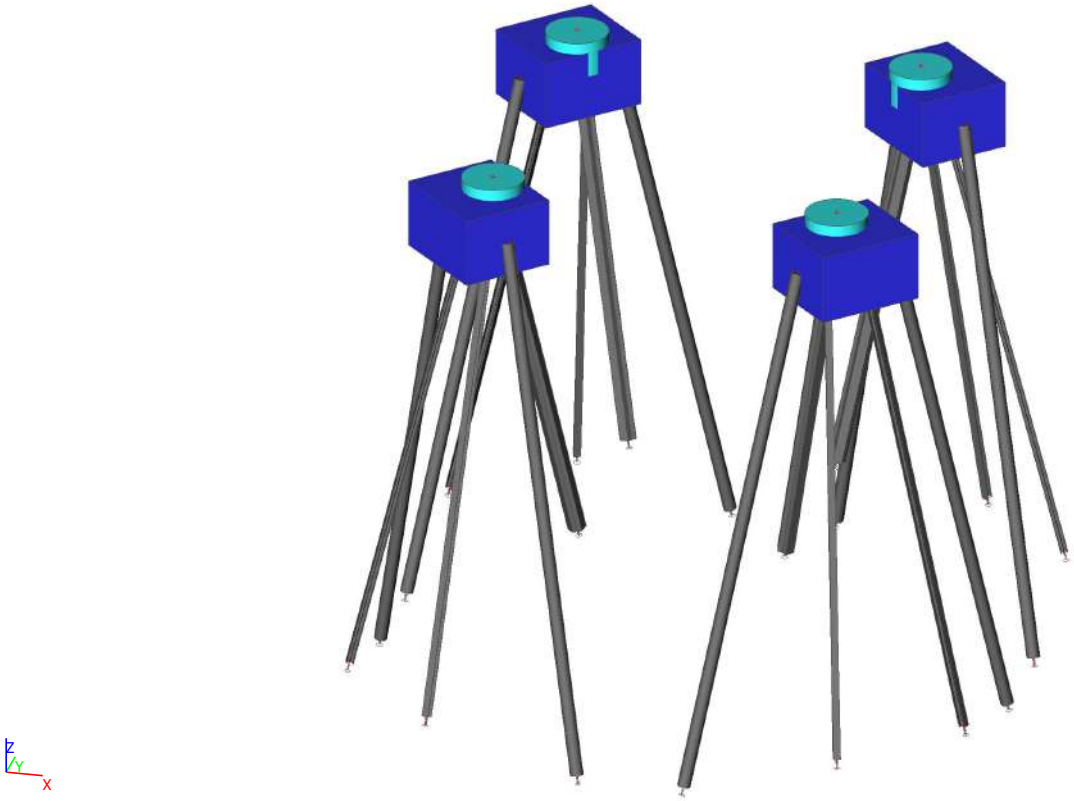
2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Cilinderpoer-2xMV-1xLD1-2 Tubex - HB
Author	[redacted]
Date	7-05-2026
Structure	General XYZ
No. of nodes :	52
No. of beams :	28
No. of slabs :	0
No. of solids :	0
No. of used profiles :	5
No. of load cases :	5
No. of used materials :	8
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analysis model



4. Modeleigenschappen

4.1. Materials

Steel EC3

Name	ρ [kg/m³]	E_{mod} [MPa]	μ [-]	Lower limit [mm]	Upper limit [mm]	F_y [MPa]	F_u [MPa]	Colour
		G_{mod} [MPa]	α [m/mK]					
S 235	6850,00	2,1000e+05	0,30	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	
S 235	6850,00	2,1000e+05	0,30	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	
S 235	6850,00	2,1000e+05	0,30	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	

Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ [-]	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C12/15 Gescheurd	Concrete	2500,00	2600,00	7,0000e+03	0,20	0,01e-003	12,00	
C12/15 en zand Tubex	Concrete	1005,00	2600,00	2,7000e+04	0,20	0,01e-003	12,00	
C30/37 Gescheurd	Concrete	2500,00	2600,00	1,1000e+04	0,20	0,01e-003	30,00	
C12/15 Gescheurd	Concrete	1500,00	2600,00	7,0000e+03	0,20	0,01e-003	12,00	

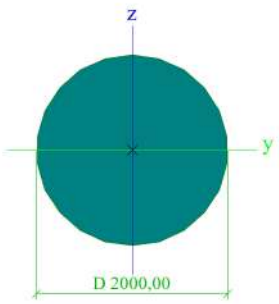
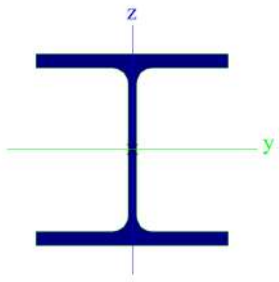
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

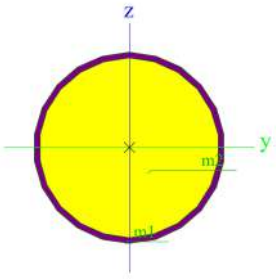
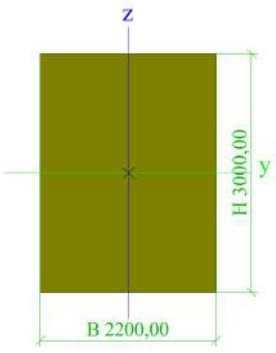
Reinforcement EC2

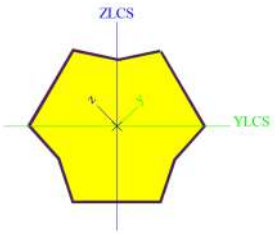
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Reinforcement steel	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

4.2. Cross-sections

Poer		
Type	Circle	
Detailed	2000,00	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	general	
Colour		
A [mm²]	3,1416e+06	
A_y [mm²], A_z [mm²]	2,8274e+06	2,8274e+06
A_L [m²/m], A_D [m²/m]	6,2829e+00	6,2829e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	1000,00	1000,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	7,8540e+11	7,8540e+11
i_y [mm], i_z [mm]	499,95	499,95
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	7,8540e+08	7,8540e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	1,3333e+09	1,3333e+09
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	1,5708e+12	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00

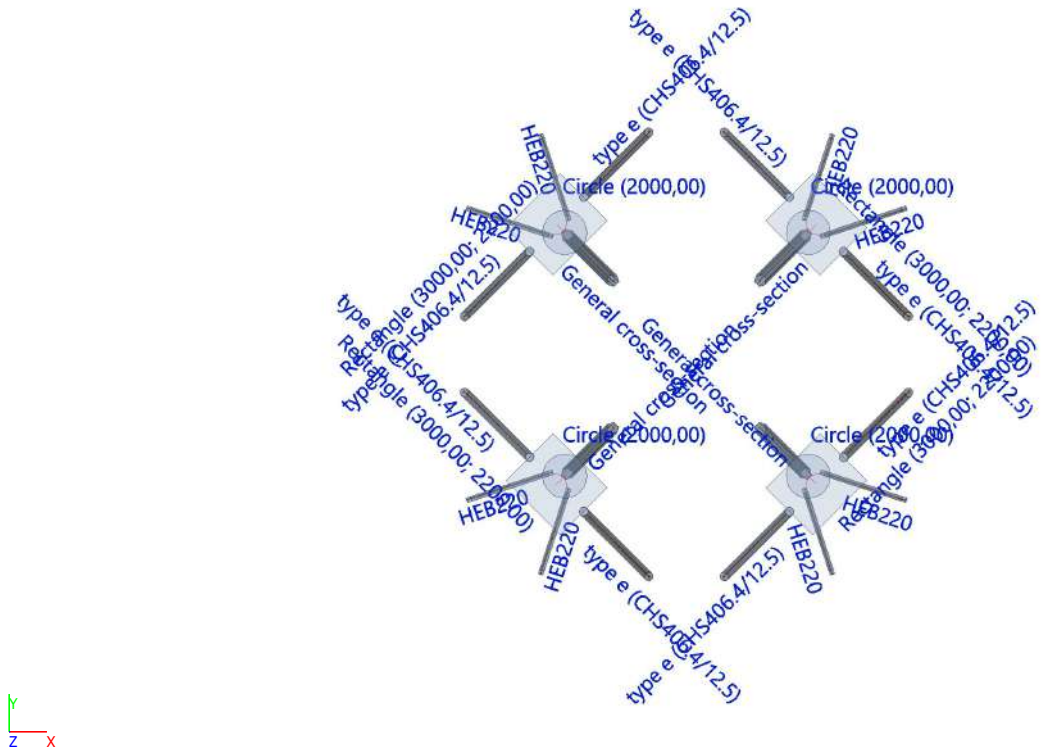
Picture		
MV Paal		
Type	HEB220	
Formcode	1 - I section	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	b	c
A [mm²]	9,1040e+03	
A_y [mm²], A_z [mm²]	6,7051e+03	2,2063e+03
A_L [m²/m], A_D [m²/m]	1,2700e+00	1,2700e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	110,00	110,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	8,0910e+07	2,8430e+07
i_y [mm], i_z [mm]	94,27	55,88
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	7,3550e+05	2,5850e+05
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	8,2700e+05	3,9390e+05
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	194462180,02	194462180,02
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	92575756,56	92575756,56
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	7,6570e+05	2,9542e+11
β_y [mm], β_z [mm]	0,00	0,00
Picture		
TubexPaal		
Type	type e	
Detailed	CHS406.4/12.5	
Shape type	Thick-walled	
Item material	S 235	
	C12/15 en zand Tubex	
Fabrication	concrete	
Flexural buckling y-y, Flexural buckling z-z	a	a
A [mm²]	3,0151e+04	
A_y [mm²], A_z [mm²]	2,3655e+04	2,3655e+04
A_L [m²/m], A_D [m²/m]	1,2767e+00	1,2767e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	203,20	203,20
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	4,3368e+08	4,3368e+08
i_y [mm], i_z [mm]	119,93	119,93
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	2,1342e+06	2,1342e+06
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	2,1144e+06	2,1144e+06
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$	496889449,79	496889449,79

[Nmm]		
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	496889449,79	496889449,79
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	8,8937e+08	5,0557e+03
β_y [mm], β_z [mm]	0,00	0,00
Picture		
Balk		
Type	Rectangle	
Detailed	3000,00; 2200,00	
Shape type	Thick-walled	
Item material	C30/37 Gescheurd	
Fabrication	concrete	
Colour		
A [mm²]	6,6000e+06	
A_y [mm²], A_z [mm²]	5,5000e+06	5,5000e+06
A_L [m²/m], A_D [m²/m]	1,0400e+01	1,0400e+01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	1100,00	1500,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	4,9500e+12	2,6620e+12
i_y [mm], i_z [mm]	866,03	635,09
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	3,3000e+09	2,4200e+09
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	5,8624e+12	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		
LD1(31-plank)		
Type	General cross-section	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
	S 235	
Fabrication	concrete	
Flexural buckling y-y, Flexural buckling z-z	d	d
A [mm²]	6,0572e+05	
A_y [mm²], A_z [mm²]	3,6248e+05	3,6314e+05
A_L [m²/m], A_D [m²/m]	1,7651e+00	3,4664e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	553,25	9,99

$I_{Y.LCS}$ [mm⁴], $I_{Z.LCS}$ [mm⁴]	1,6274e+10	1,6264e+10
$I_{YZ.LCS}$ [mm⁴]	-1,0231e+08	
α [deg]	43,55	
I_y [mm⁴], I_z [mm⁴]	1,6372e+10	1,6167e+10
i_y [mm], i_z [mm]	164,40	163,37
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	5,7898e+07	5,8163e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	4,9594e+07	4,9245e+07
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	601215312,58	595125922,92
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	597037111,16	590937542,96
d_y [mm], d_z [mm]	0,12	0,03
I_t [mm⁴], I_w [mm⁶]	2,6243e+10	1,7700e+12
β_y [mm], β_z [mm]	0,09	0,21
Picture		

4.3. Analyse model met doorsneden

4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	MeshSetup1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	1
Average size of 2D mesh element [m]	0,200
Average size of 1D mesh element on curved 1D members [m]	0,100
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual
Group of load cases for automatic mesh refinement	EG_Fundering

5. Geometrie

5.1. Nodes

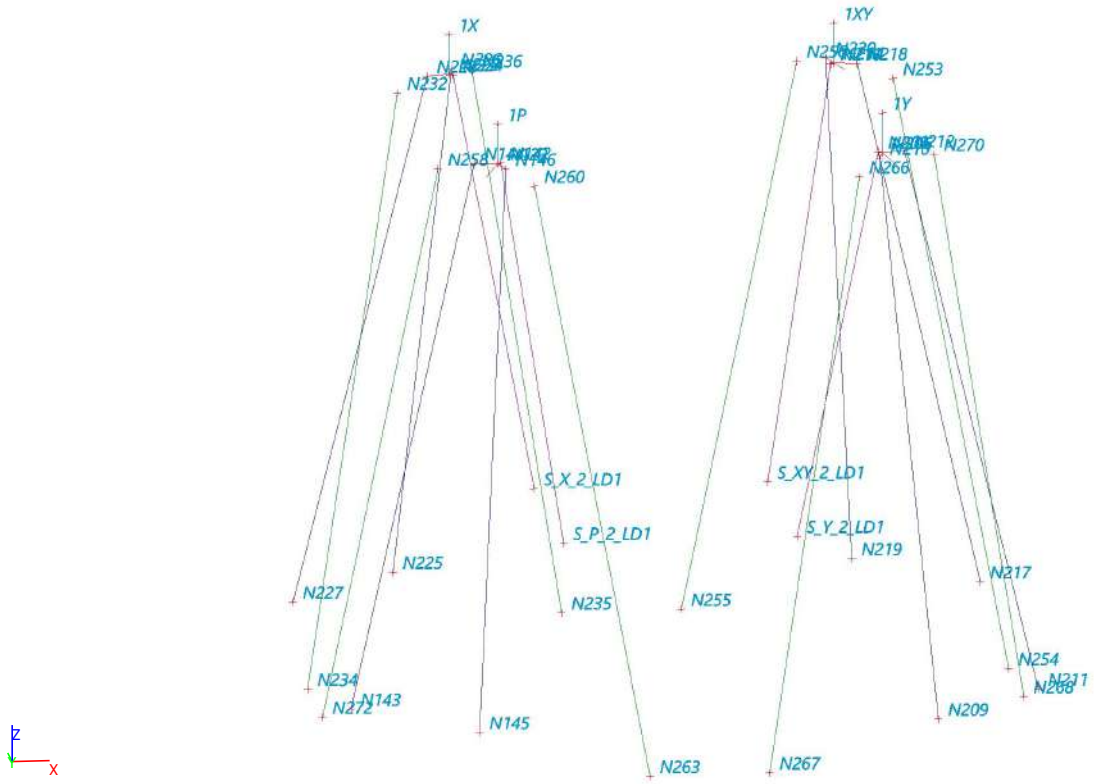
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N123	0,000	0,000	-0,300
1P	0,000	0,000	0,850
S_P_2_LD1	2,162	2,162	-11,949
N142	0,100	0,100	-0,300

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N143	-4,331	-1,061	-15,830
N144	-0,650	0,150	-0,300
N145	-1,061	-4,331	-15,830
N146	0,150	-0,650	-0,300

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N206	11,000	0,000	-0,300
1Y	11,000	0,000	0,850
S_Y_2_LD1	8,838	2,162	-11,949
N208	10,900	0,100	-0,300
N209	12,061	-4,331	-15,830
N210	10,850	-0,650	-0,300
N211	15,331	-1,061	-15,830
N212	11,650	0,150	-0,300
N214	11,000	11,000	-0,300
1XY	11,000	11,000	0,850
S_XY_2_LD1	8,838	8,838	-11,949
N216	10,900	10,900	-0,300
N217	15,331	12,061	-15,830
N218	11,650	10,850	-0,300
N219	12,061	15,331	-15,830
N220	10,850	11,650	-0,300
N222	0,000	11,000	-0,300
1X	0,000	11,000	0,850
S_X_2_LD1	2,162	8,838	-11,949
N224	0,100	10,900	-0,300
N225	-1,061	15,331	-15,830
N226	0,150	11,650	-0,300

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N227	-4,331	12,061	-15,830
N228	-0,650	10,850	-0,300
N232	-1,591	10,145	-0,600
N234	-4,525	7,211	-17,210
N235	3,789	15,525	-17,210
N236	0,855	12,591	-0,600
N253	12,591	10,145	-0,600
N254	15,525	7,211	-17,210
N255	7,211	15,525	-17,210
N256	10,145	12,591	-0,600
N258	-1,591	0,855	-0,600
N260	0,855	-1,591	-0,600
N263	3,789	-4,525	-17,210
N266	10,145	-1,591	-0,600
N267	7,211	-4,525	-17,210
N268	15,525	3,789	-17,210
N270	12,591	0,855	-0,600
N272	-4,525	3,789	-17,210
N278	11,376	11,360	-0,600
N284	-0,376	11,360	-0,600
N285	11,376	-0,360	-0,600
N286	-0,376	-0,360	-0,600

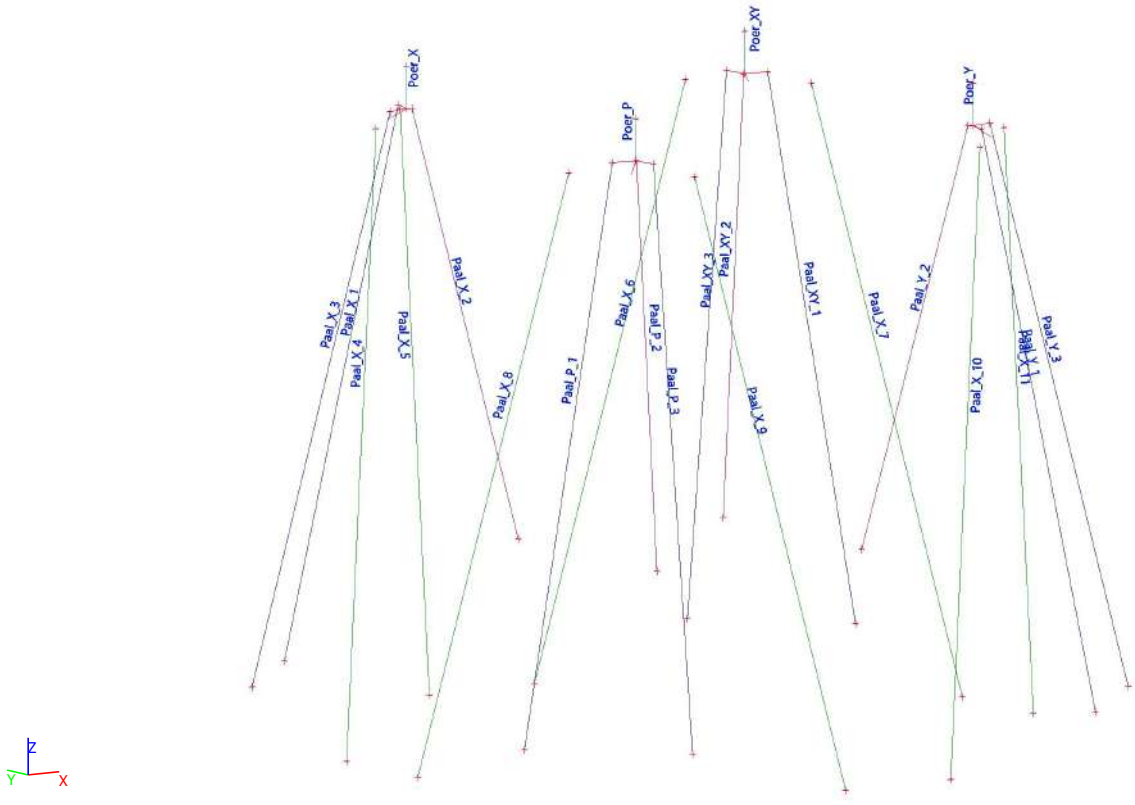
5.2. Analyse model met knopen



5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
balk8	Balk - Rectangle (3000,00; 2200,00)	C30/37 Gescheurd	3,460	N256	N253	beam (80)
balk13	Balk - Rectangle (3000,00; 2200,00)	C30/37 Gescheurd	3,460	N236	N232	beam (80)
balk14	Balk - Rectangle (3000,00; 2200,00)	C30/37 Gescheurd	3,460	N266	N270	beam (80)
balk15	Balk - Rectangle (3000,00; 2200,00)	C30/37 Gescheurd	3,460	N260	N258	beam (80)
Paal_P_1	MV Paal - HEB220	S 235	16,007	N144	N143	column (100)
Paal_P_2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	12,009	N142	S_P_2_LD1	column (100)
Paal_P_3	MV Paal - HEB220	S 235	16,007	N146	N145	column (100)
Paal_XY_1	MV Paal - HEB220	S 235	16,007	N218	N217	column (100)
Paal_XY_2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	12,009	N216	S_XY_2_LD1	column (100)
Paal_XY_3	MV Paal - HEB220	S 235	16,007	N220	N219	column (100)
Paal_X_1	MV Paal - HEB220	S 235	16,007	N226	N225	column (100)
Paal_X_2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	12,009	N224	S_X_2_LD1	column (100)
Paal_X_3	MV Paal - HEB220	S 235	16,007	N228	N227	column (100)
Paal_X_4	TubexPaal - type e (CHS406.4/12.5)	S 235	17,121	N232	N234	column (100)
Paal_X_5	TubexPaal - type e (CHS406.4/12.5)	S 235	17,121	N236	N235	column (100)
Paal_X_6	TubexPaal - type e (CHS406.4/12.5)	S 235	17,121	N256	N255	column (100)
Paal_X_7	TubexPaal - type e (CHS406.4/12.5)	S 235	17,121	N253	N254	column (100)
Paal_X_8	TubexPaal - type e (CHS406.4/12.5)	S 235	17,121	N258	N272	column (100)
Paal_X_9	TubexPaal - type e (CHS406.4/12.5)	S 235	17,121	N260	N263	column (100)
Paal_X_10	TubexPaal - type e (CHS406.4/12.5)	S 235	17,121	N266	N267	column (100)
Paal_X_11	TubexPaal - type e (CHS406.4/12.5)	S 235	17,121	N270	N268	column (100)
Paal_Y_1	MV Paal - HEB220	S 235	16,007	N210	N209	column (100)
Paal_Y_2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	12,009	N208	S_Y_2_LD1	column (100)
Paal_Y_3	MV Paal - HEB220	S 235	16,007	N212	N211	column (100)
Poer_P	Poer - Circle (2000,00)	C12/15 Gescheurd	1,150	N123	1P	column (100)
Poer_X	Poer - Circle (2000,00)	C12/15 Gescheurd	1,150	N222	1X	column (100)
Poer_XY	Poer - Circle (2000,00)	C12/15 Gescheurd	1,150	N214	1XY	column (100)
Poer_Y	Poer - Circle (2000,00)	C12/15 Gescheurd	1,150	N206	1Y	column (100)

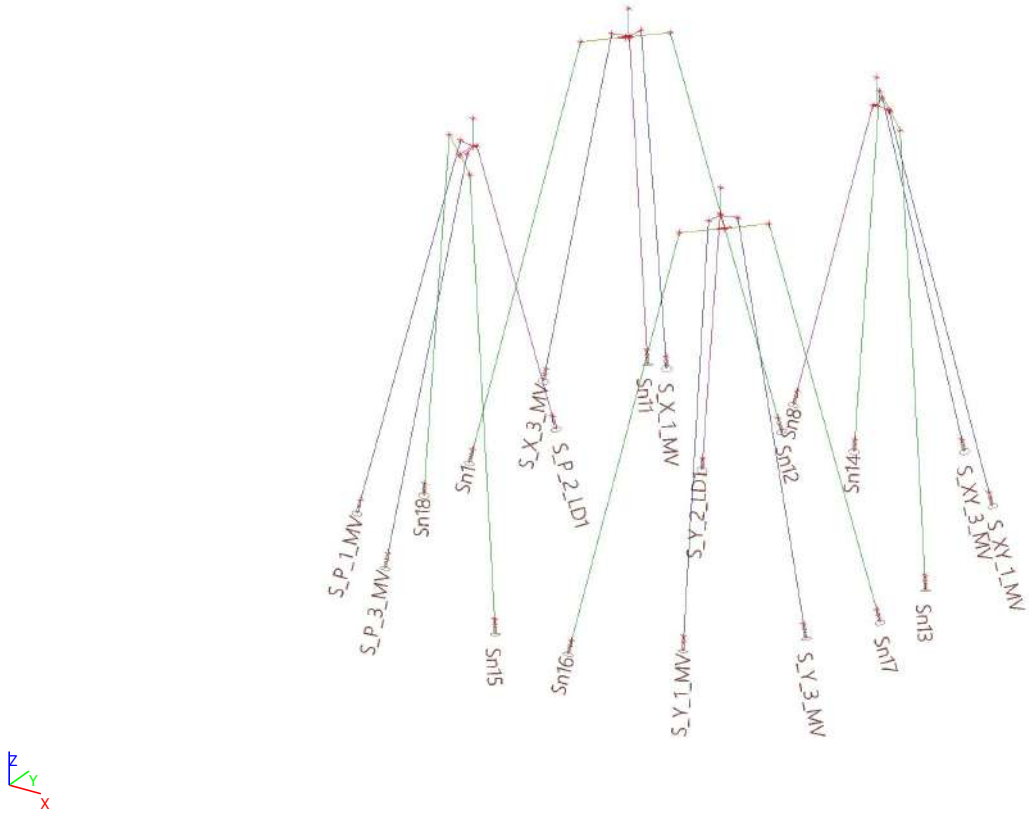
5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
S_P_2_LD1	S_P_2_LD1	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx10,04;Ry-10,04;Rz45,00
S_P_1_MV	N143	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-4,46;Ry13,33;Rz18,22
S_P_3_MV	N145	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-13,33;Ry4,46;Rz-18,22
S_Y_2_LD1	S_Y_2_LD1	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx10,04;Ry10,04;Rz-45,00
S_Y_1_MV	N209	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-13,33;Ry-4,46;Rz18,22
S_Y_3_MV	N211	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-4,46;Ry-13,33;Rz-18,22
Sn8	S_XY_2_LD1	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-10,04;Ry10,04;Rz45,00
S_XY_1_MV	N217	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx4,46;Ry-13,33;Rz18,22
S_XY_3_MV	N219	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx13,33;Ry-4,46;Rz-18,22
Sn11	S_X_2_LD1	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-10,04;Ry-10,04;Rz-45,00
S_X_1_MV	N225	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx13,33;Ry4,46;Rz18,22
S_X_3_MV	N227	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx4,46;Ry13,33;Rz-18,22
Sn1	N234	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,87;Rx-9,87
Sn12	N235	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,87;Rx9,87
Sn13	N254	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,87;Rx-9,87
Sn14	N255	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,87;Rx9,87
Sn15	N263	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,87;Rx-9,87
Sn16	N267	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,87;Rx-9,87
Sn17	N268	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-9,87;Rx9,87
Sn18	N272	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry9,87;Rx9,87

5.6. Analyse model met Knoopondersteuningen



5.7. Line supports on member

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Slb_P_1_Veen	Line	Paal_P_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V1	Line	Paal_P_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V2	Line	Paal_P_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V3	Line	Paal_P_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V4	Line	Paal_P_1 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V5	Line	Paal_P_1 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V6	Line	Paal_P_1 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V7	Line	Paal_P_1 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V8	Line	Paal_P_1 LCS	15,000 15,900	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_2_Veen	Line	Paal_P_2 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_Veen	Line	Paal_P_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_Veen	Line	Paal_Y_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_2_Veen	Line	Paal_Y_2 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen	Line	Paal_Y_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_2_Veen	Line	Paal_XY_2 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_Veen	Line	Paal_XY_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_Veen	Line	Paal_XY_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_2_Veen	Line	Paal_X_2 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_Veen	Line	Paal_X_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_Veen	Line	Paal_X_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_V1	Line	Paal_P_3 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_2_V1	Line	Paal_P_2 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_V1	Line	Paal_Y_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_2_V1	Line	Paal_Y_2 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_V1	Line	Paal_Y_3 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_2_V1	Line	Paal_XY_2 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_V1	Line	Paal_XY_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_V1	Line	Paal_XY_3 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_2_V1	Line	Paal_X_2 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_V1	Line	Paal_X_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V1	Line	Paal_X_3 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Slb_P_3_V2	Line	Paal_P_3 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_V3	Line	Paal_P_3 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_V4	Line	Paal_P_3 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_V5	Line	Paal_P_3 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_V6	Line	Paal_P_3 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_V7	Line	Paal_P_3 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_V8	Line	Paal_P_3 LCS	15,000 15,900	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_2_V2	Line	Paal_P_2 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_2_V3	Line	Paal_P_2 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_2_V4	Line	Paal_P_2 LCS	11,000 11,900	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_V2	Line	Paal_Y_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_V3	Line	Paal_Y_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_V4	Line	Paal_Y_1 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_V5	Line	Paal_Y_1 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_V6	Line	Paal_Y_1 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_V7	Line	Paal_Y_1 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_V8	Line	Paal_Y_1 LCS	15,000 15,900	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_V2	Line	Paal_Y_3 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_V3	Line	Paal_Y_3 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_V4	Line	Paal_Y_3 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_V5	Line	Paal_Y_3 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_V6	Line	Paal_Y_3 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_V7	Line	Paal_Y_3 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_V8	Line	Paal_Y_3 LCS	15,000 15,900	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_2_V2	Line	Paal_Y_2 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_2_V3	Line	Paal_Y_2 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_2_V4	Line	Paal_Y_2 LCS	11,000 11,900	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_2_V2	Line	Paal_XY_2 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_2_V3	Line	Paal_XY_2 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_2_V4	Line	Paal_XY_2 LCS	11,000 11,900	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_V2	Line	Paal_XY_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_V3	Line	Paal_XY_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

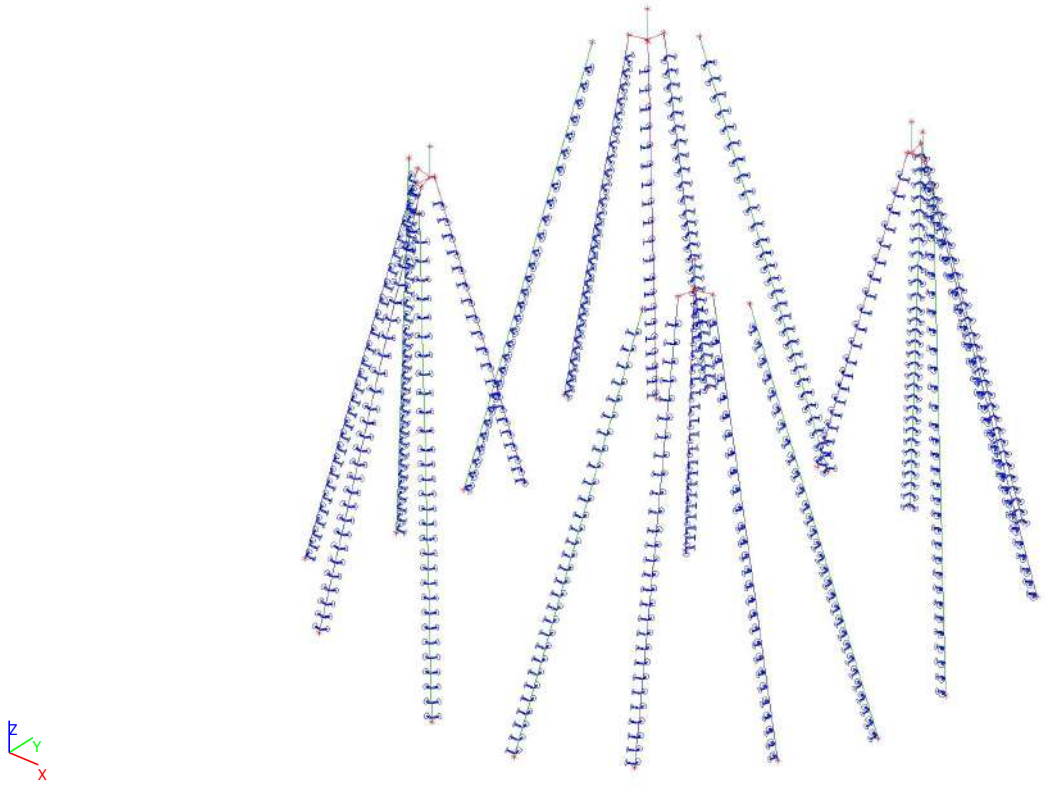
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Slb_XY_1_V4	Line	Paal_XY_1 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_V5	Line	Paal_XY_1 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_V6	Line	Paal_XY_1 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_V7	Line	Paal_XY_1 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_V8	Line	Paal_XY_1 LCS	15,000 15,900	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_V2	Line	Paal_XY_3 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_V3	Line	Paal_XY_3 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_V4	Line	Paal_XY_3 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_V5	Line	Paal_XY_3 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_V6	Line	Paal_XY_3 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_V7	Line	Paal_XY_3 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_V8	Line	Paal_XY_3 LCS	15,000 15,900	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_2_V2	Line	Paal_X_2 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_2_V3	Line	Paal_X_2 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_2_V4	Line	Paal_X_2 LCS	11,000 11,900	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_V2	Line	Paal_X_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_V3	Line	Paal_X_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_V4	Line	Paal_X_1 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_V5	Line	Paal_X_1 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_V6	Line	Paal_X_1 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_V7	Line	Paal_X_1 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_V8	Line	Paal_X_1 LCS	15,000 15,900	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V2	Line	Paal_X_3 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V3	Line	Paal_X_3 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V4	Line	Paal_X_3 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V5	Line	Paal_X_3 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V6	Line	Paal_X_3 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V7	Line	Paal_X_3 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V8	Line	Paal_X_3 LCS	15,000 15,900	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_Veen1	Line	Paal_X_4 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V11	Line	Paal_X_4 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V12	Line	Paal_X_4 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Slb_X_3_V13	Line	Paal_X_4 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V14	Line	Paal_X_4 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V15	Line	Paal_X_4 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V16	Line	Paal_X_4 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V17	Line	Paal_X_4 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V18	Line	Paal_X_4 LCS	15,000 16,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V19	Line	Paal_X_4 LCS	16,000 17,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_Veen2	Line	Paal_X_5 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V21	Line	Paal_X_5 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V22	Line	Paal_X_5 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V23	Line	Paal_X_5 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V24	Line	Paal_X_5 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V25	Line	Paal_X_5 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V26	Line	Paal_X_5 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V27	Line	Paal_X_5 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V28	Line	Paal_X_5 LCS	15,000 16,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V29	Line	Paal_X_5 LCS	16,000 17,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_Veen3	Line	Paal_X_6 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V30	Line	Paal_X_6 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V31	Line	Paal_X_6 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V32	Line	Paal_X_6 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V33	Line	Paal_X_6 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V34	Line	Paal_X_6 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V35	Line	Paal_X_6 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V36	Line	Paal_X_6 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V37	Line	Paal_X_6 LCS	15,000 16,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V38	Line	Paal_X_6 LCS	16,000 17,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_Veen4	Line	Paal_X_7 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V39	Line	Paal_X_7 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V40	Line	Paal_X_7 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V41	Line	Paal_X_7 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V42	Line	Paal_X_7 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

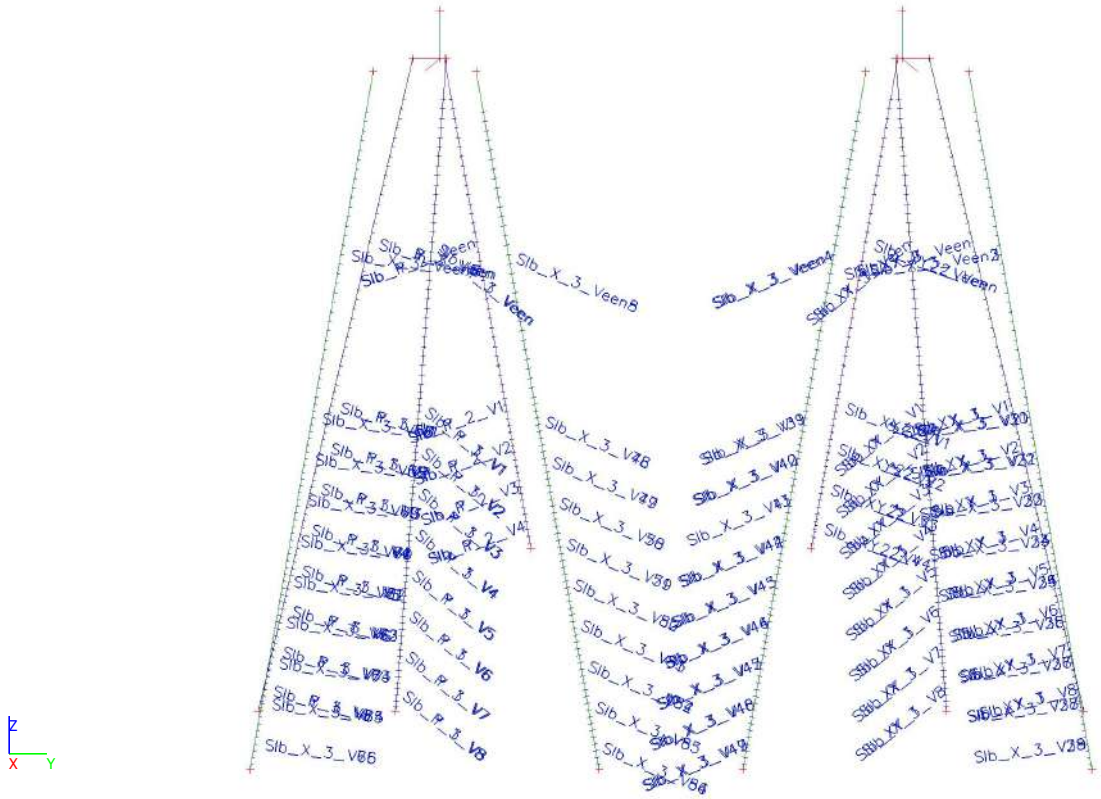
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Slb_X_3_V43	Line	Paal_X_7 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V44	Line	Paal_X_7 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V45	Line	Paal_X_7 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V46	Line	Paal_X_7 LCS	15,000 16,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V47	Line	Paal_X_7 LCS	16,000 17,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_Veen5	Line	Paal_X_8 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V48	Line	Paal_X_8 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V49	Line	Paal_X_8 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V50	Line	Paal_X_8 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V51	Line	Paal_X_8 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V52	Line	Paal_X_8 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V53	Line	Paal_X_8 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V54	Line	Paal_X_8 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V55	Line	Paal_X_8 LCS	15,000 16,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V56	Line	Paal_X_8 LCS	16,000 17,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_Veen6	Line	Paal_X_9 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V58	Line	Paal_X_9 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V59	Line	Paal_X_9 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V60	Line	Paal_X_9 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V61	Line	Paal_X_9 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V62	Line	Paal_X_9 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V63	Line	Paal_X_9 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V64	Line	Paal_X_9 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V65	Line	Paal_X_9 LCS	15,000 16,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V66	Line	Paal_X_9 LCS	16,000 17,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_Veen7	Line	Paal_X_10 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V67	Line	Paal_X_10 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V68	Line	Paal_X_10 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V69	Line	Paal_X_10 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V70	Line	Paal_X_10 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V71	Line	Paal_X_10 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V72	Line	Paal_X_10 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Slb_X_3_V73	Line	Paal_X_10 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V74	Line	Paal_X_10 LCS	15,000 16,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V75	Line	Paal_X_10 LCS	16,000 17,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_Veen8	Line	Paal_X_11 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V76	Line	Paal_X_11 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V77	Line	Paal_X_11 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V78	Line	Paal_X_11 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V79	Line	Paal_X_11 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V80	Line	Paal_X_11 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V81	Line	Paal_X_11 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V82	Line	Paal_X_11 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V83	Line	Paal_X_11 LCS	15,000 16,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V84	Line	Paal_X_11 LCS	16,000 17,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free

5.8. Analyse model met Lijnondersteuningen



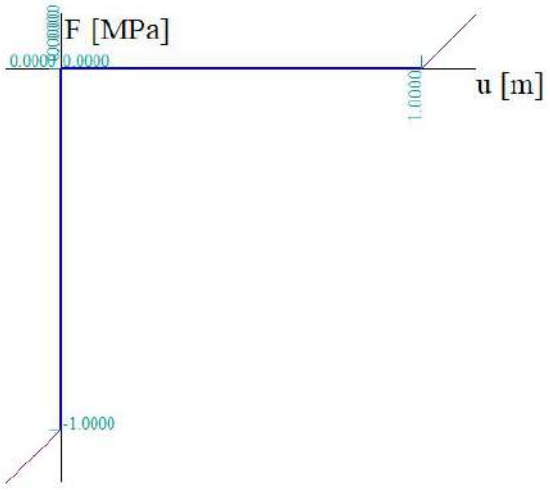
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

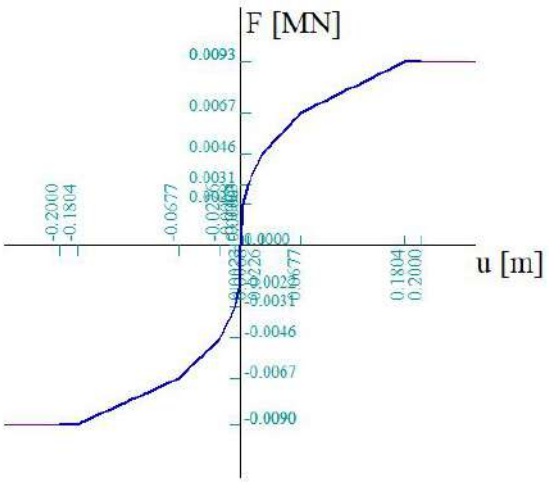
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve_Veen	Translation	-0.200000 / -9000.000000	Free	Free
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		
		-0.006765 / -3100.000000		

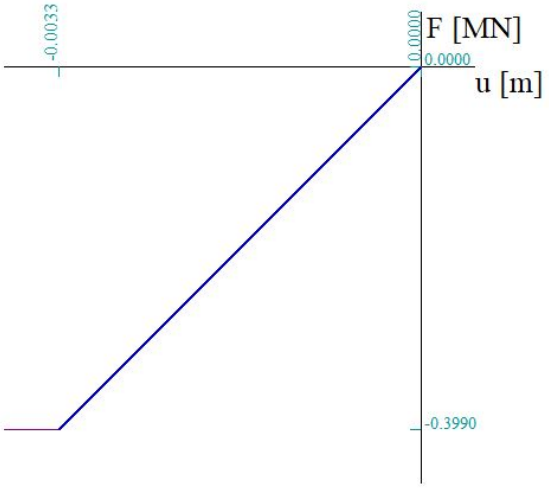
Name	Type	u / F	Positive end	Negative end
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing



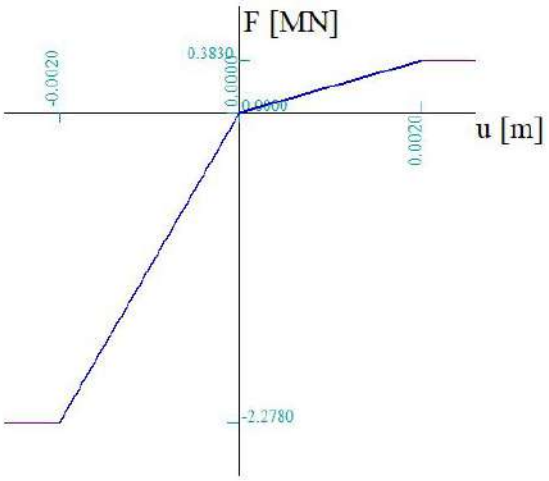
Name	Type	u / F	Positive end	Negative end
Druk-LD1-paalpunt_mst156	Translation	-0.003306 / -399000.000000	Free	Free
		0.000000 / 0.000000		

Drawing



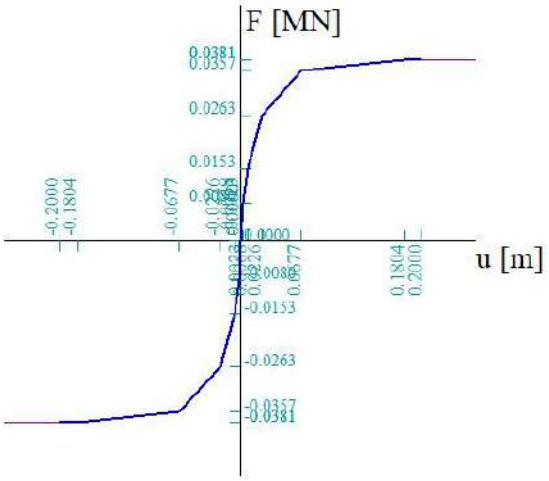
Name	Type	u / F	Positive end	Negative end
Trek-druk-MV-paalpunt_mst156	Translation	-0.001953 / -2278000.000000	Free	Free
		0.000000 / 0.000000		
		0.002001 / 383000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V9	Translation	-0.200000 / -38100.000000	Free	Free
		-0.180400 / -38100.000000		
		-0.067650 / -35700.000000		
		-0.022550 / -26300.000000		
		-0.006765 / -15300.000000		
		-0.002255 / -8000.000000		
		0.000000 / 0.000000		
		0.002255 / 8000.000000		
		0.006765 / 15300.000000		
		0.022550 / 26300.000000		
		0.067650 / 35700.000000		
		0.180400 / 38100.000000		
		0.200000 / 38100.000000		

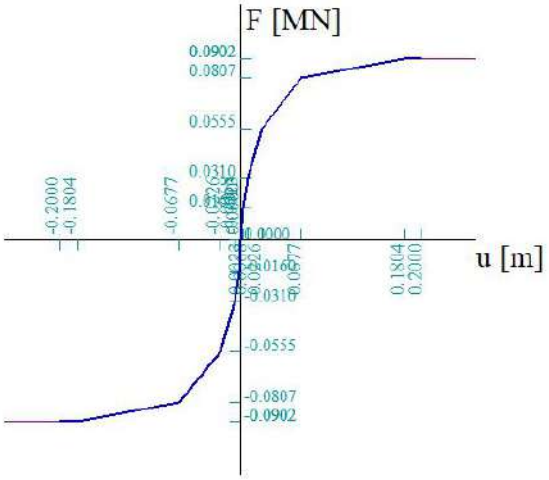
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V10	Translation	-0.200000 / -90200.000000	Free	Free
		-0.180400 / -90200.000000		
		-0.067650 / -80700.000000		
		-0.022550 / -55500.000000		
		-0.006765 / -31000.000000		
		-0.002255 / -16000.000000		
		0.000000 / 0.000000		
		0.002255 / 16000.000000		
		0.006765 / 31000.000000		
		0.022550 / 55500.000000		

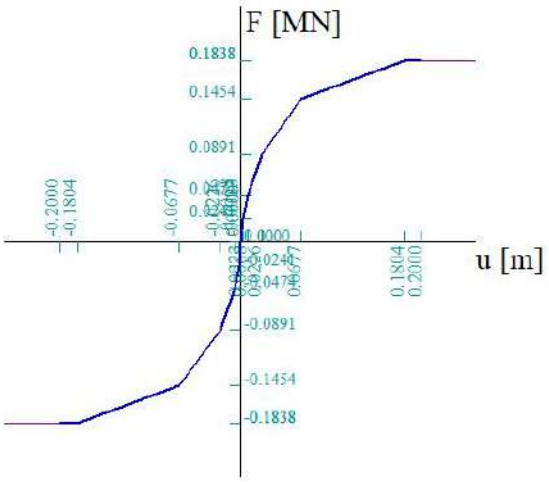
Name	Type	u / F	Positive end	Negative end
		0.067650 / 80700.000000		
		0.180400 / 90200.000000		
		0.200000 / 90200.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V11	Translation	-0.200000 / -183800.000000	Free	Free
		-0.180400 / -183800.000000		
		-0.067650 / -145400.000000		
		-0.022550 / -89100.000000		
		-0.006765 / -47400.000000		
		-0.002255 / -24100.000000		
		0.000000 / 0.000000		
		0.002255 / 24100.000000		
		0.006765 / 47400.000000		
		0.022550 / 89100.000000		
		0.067650 / 145400.000000		
		0.180400 / 183800.000000		
		0.200000 / 183800.000000		

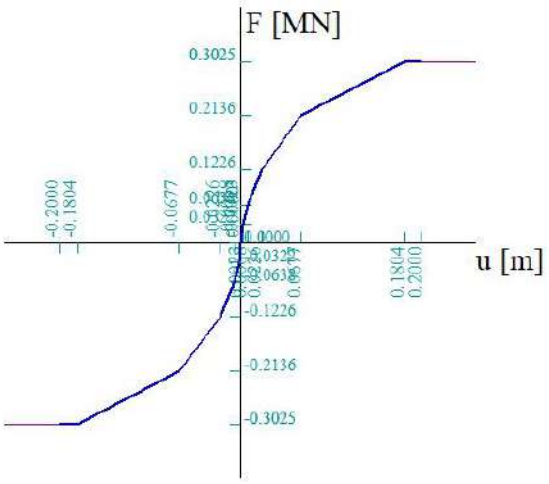
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V12	Translation	-0.200000 / -302500.000000	Free	Free
		-0.180400 / -302500.000000		
		-0.067650 / -213600.000000		
		-0.022550 / -122600.000000		

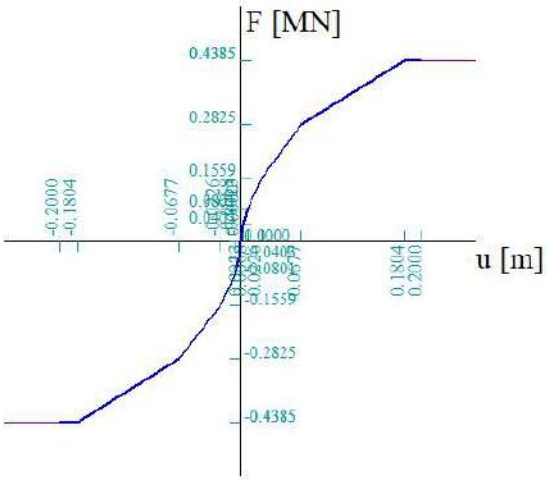
Name	Type	u / F	Positive end	Negative end
		-0.006765 / -63800.000000		
		-0.002255 / -32200.000000		
		0.000000 / 0.000000		
		0.002255 / 32200.000000		
		0.006765 / 63800.000000		
		0.022550 / 122600.000000		
		0.067650 / 213600.000000		
		0.180400 / 302500.000000		
		0.200000 / 302500.000000		

Drawing



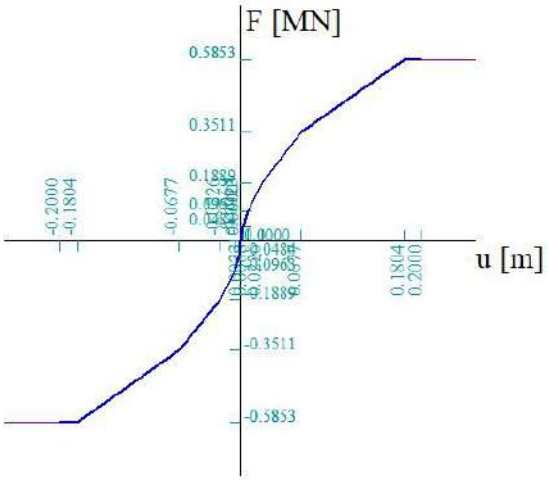
Name	Type	u / F	Positive end	Negative end
PY-curve-2_V13	Translation	-0.200000 / -438500.000000	Free	Free
		-0.180400 / -438500.000000		
		-0.067650 / -282500.000000		
		-0.022550 / -155900.000000		
		-0.006765 / -80100.000000		
		-0.002255 / -40300.000000		
		0.000000 / 0.000000		
		0.002255 / 40300.000000		
		0.006765 / 80100.000000		
		0.022550 / 155900.000000		
		0.067650 / 282500.000000		
		0.180400 / 438500.000000		
		0.200000 / 438500.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V14	Translation	-0.200000 / -585300.000000	Free	Free
		-0.180400 / -585300.000000		
		-0.067650 / -351100.000000		
		-0.022550 / -188900.000000		
		-0.006765 / -96300.000000		
		-0.002255 / -48400.000000		
		0.000000 / 0.000000		
		0.002255 / 48400.000000		
		0.006765 / 96300.000000		
		0.022550 / 188900.000000		
		0.067650 / 351100.000000		
		0.180400 / 585300.000000		
		0.200000 / 585300.000000		

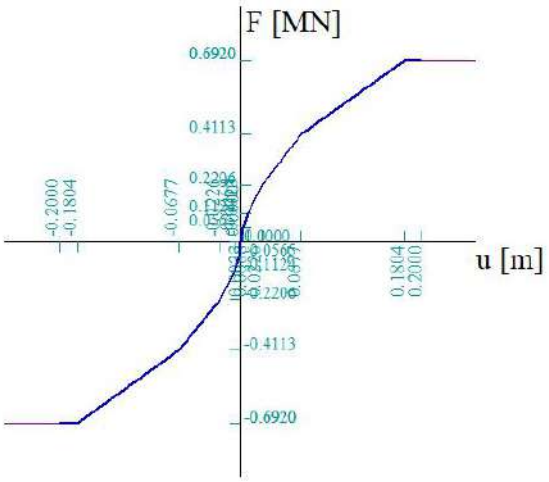
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V15	Translation	-0.200000 / -692000.000000	Free	Free
		-0.180400 / -692000.000000		
		-0.067650 / -411300.000000		
		-0.022550 / -220600.000000		
		-0.006765 / -112400.000000		
		-0.002255 / -56500.000000		
		0.000000 / 0.000000		
		0.002255 / 56500.000000		
		0.006765 / 112400.000000		
		0.022550 / 220600.000000		

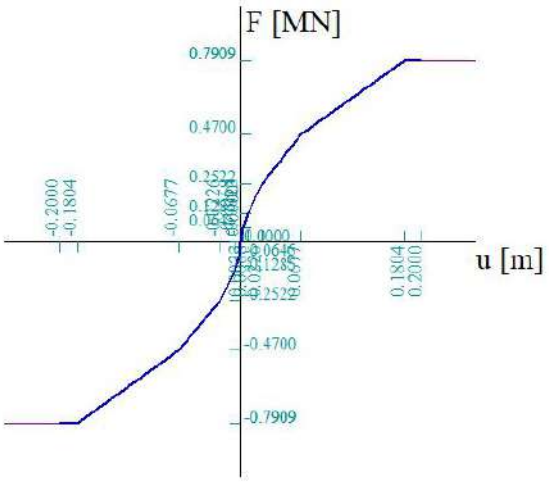
Name	Type	u / F	Positive end	Negative end
		0.067650 / 411300.000000		
		0.180400 / 692000.000000		
		0.200000 / 692000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V16	Translation	-0.200000 / -790900.000000	Free	Free
		-0.180400 / -790900.000000		
		-0.067650 / -470000.000000		
		-0.022550 / -252200.000000		
		-0.006765 / -128500.000000		
		-0.002255 / -64500.000000		
		0.000000 / 0.000000		
		0.002255 / 64500.000000		
		0.006765 / 128500.000000		
		0.022550 / 252200.000000		
		0.067650 / 470000.000000		
		0.180400 / 790900.000000		
		0.200000 / 790900.000000		

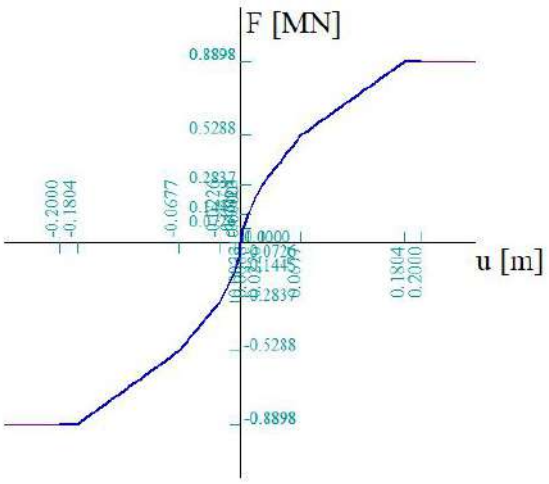
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V17	Translation	-0.200000 / -889800.000000	Free	Free
		-0.180400 / -889800.000000		
		-0.067650 / -528800.000000		
		-0.022550 / -283700.000000		

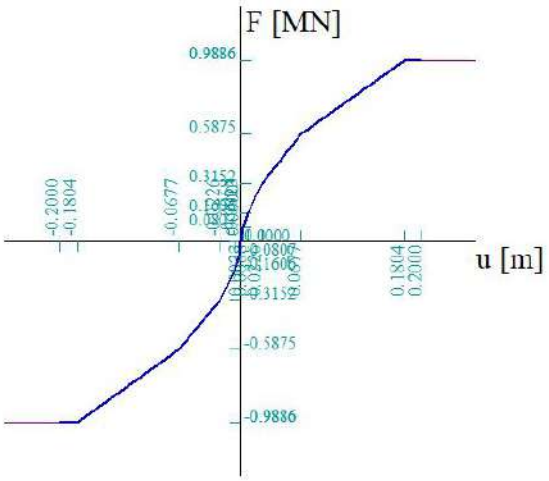
Name	Type	u / F	Positive end	Negative end
		-0.006765 / -144500.000000		
		-0.002255 / -72600.000000		
		0.000000 / 0.000000		
		0.002255 / 72600.000000		
		0.006765 / 144500.000000		
		0.022550 / 283700.000000		
		0.067650 / 528800.000000		
		0.180400 / 889800.000000		
		0.200000 / 889800.000000		

Drawing



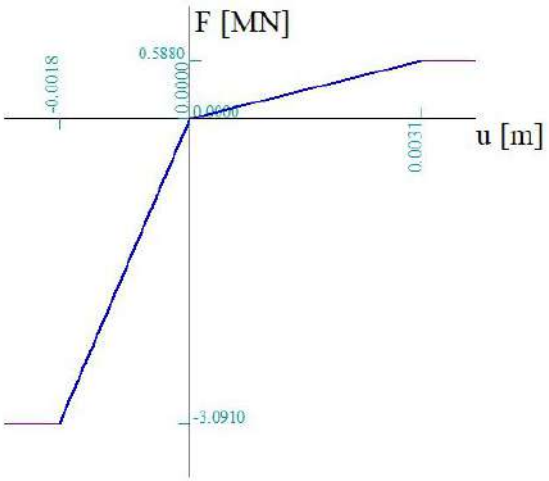
Name	Type	u / F	Positive end	Negative end
PY-curve-2_V18	Translation	-0.200000 / -988600.000000	Free	Free
		-0.180400 / -988600.000000		
		-0.067650 / -587500.000000		
		-0.022550 / -315200.000000		
		-0.006765 / -160600.000000		
		-0.002255 / -80700.000000		
		0.000000 / 0.000000		
		0.002255 / 80700.000000		
		0.006765 / 160600.000000		
		0.022550 / 315200.000000		
		0.067650 / 587500.000000		
		0.180400 / 988600.000000		
		0.200000 / 988600.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
Trek-druk-Tubex-paalpunt_mst156	Translation	-0.001766 / -3091000.000000	Free	Free
		0.000000 / 0.000000		
		0.003143 / 588000.000000		

Drawing

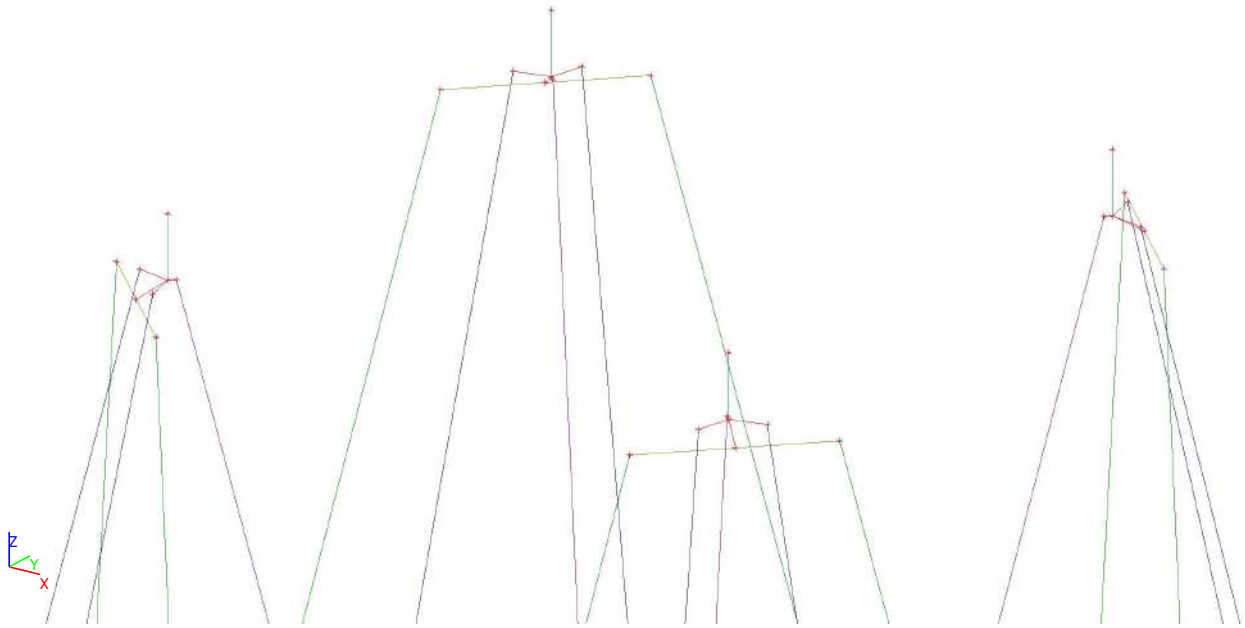


6. Belastingen

6.1. Load cases

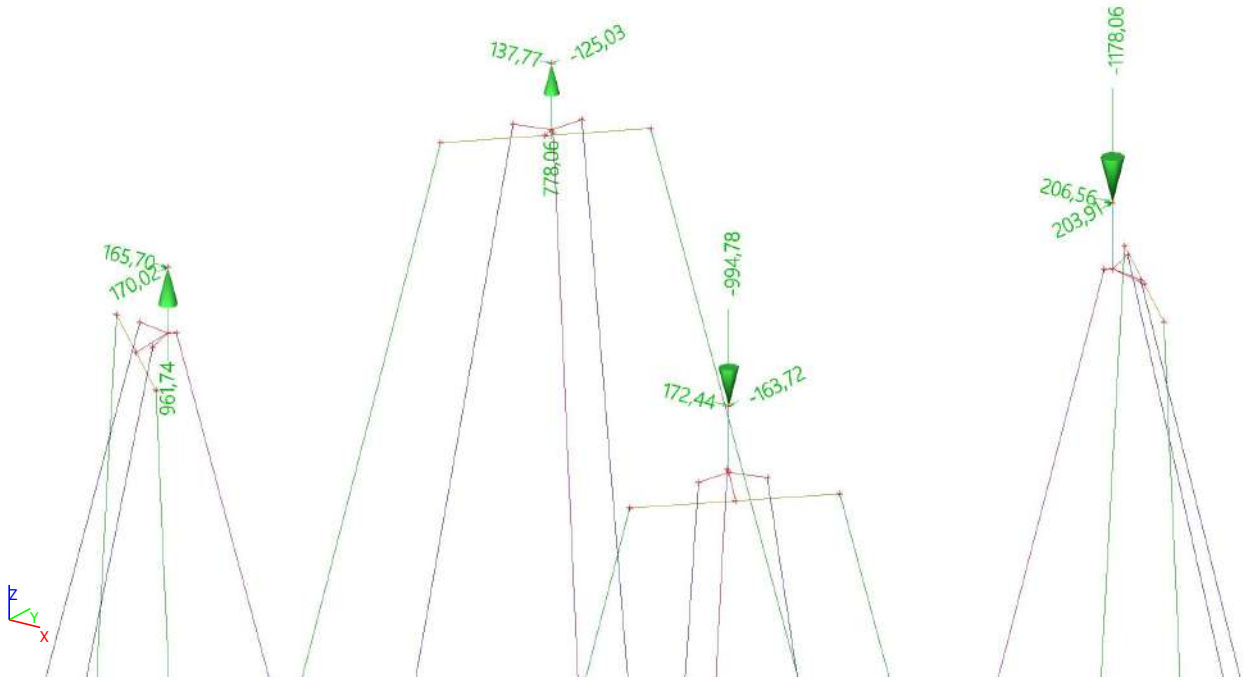
6.1.1. Load cases - EG_Fundering

Name	Description	Action type	Load group	Direction
	Spec	Load type		
EG_Fundering		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - hL Bck + Wnd ;135°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;135°		Variable	LG4	Short	None
	Standard	Static			

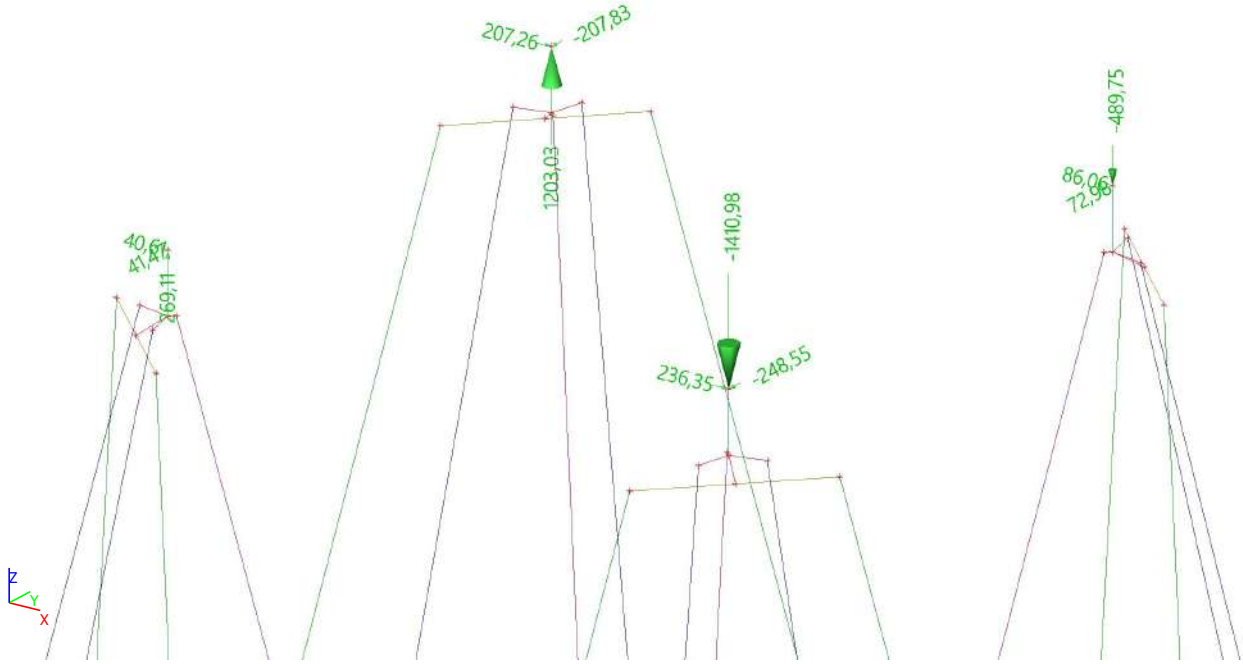


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;135°_1P_X	1P	hL Bck + Wnd ;135°	GCS	X	Force	165,70
hL Bck + Wnd ;135°_1X_X	1X	hL Bck + Wnd ;135°	GCS	X	Force	137,77
hL Bck + Wnd ;135°_1XY_X	1XY	hL Bck + Wnd ;135°	GCS	X	Force	206,56
hL Bck + Wnd ;135°_1Y_X	1Y	hL Bck + Wnd ;135°	GCS	X	Force	172,44
hL Bck + Wnd ;135°_1P_Y	1P	hL Bck + Wnd ;135°	GCS	Y	Force	170,02
hL Bck + Wnd ;135°_1X_Y	1X	hL Bck + Wnd ;135°	GCS	Y	Force	-125,03
hL Bck + Wnd ;135°_1XY_Y	1XY	hL Bck + Wnd ;135°	GCS	Y	Force	203,91
hL Bck + Wnd ;135°_1Y_Y	1Y	hL Bck + Wnd ;135°	GCS	Y	Force	-163,72
hL Bck + Wnd ;135°_1P_Z	1P	hL Bck + Wnd ;135°	GCS	Z	Force	961,74
hL Bck + Wnd ;135°_1X_Z	1X	hL Bck + Wnd ;135°	GCS	Z	Force	778,06
hL Bck + Wnd ;135°_1XY_Z	1XY	hL Bck + Wnd ;135°	GCS	Z	Force	-1178,06
hL Bck + Wnd ;135°_1Y_Z	1Y	hL Bck + Wnd ;135°	GCS	Z	Force	-994,78

6.1.3. Load cases - hL Bck + Wnd ;270°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;270°		Variable	LG4	Short	None
	Standard	Static			



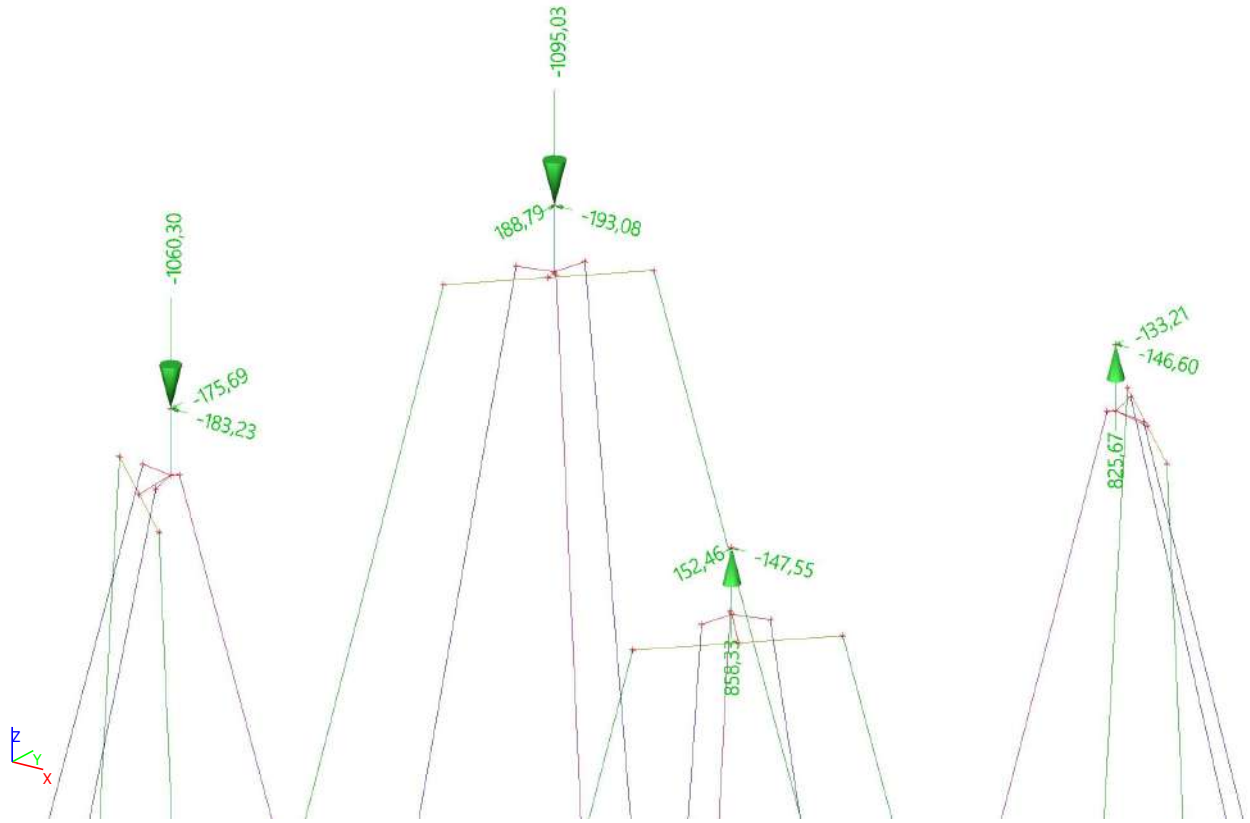
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;270°_1P_X	1P	hL Bck + Wnd ;270°	GCS	X	Force	40,61
hL Bck + Wnd ;270°_1X_X	1X	hL Bck + Wnd ;270°	GCS	X	Force	207,26
hL Bck + Wnd ;270°_1XY_X	1XY	hL Bck + Wnd ;270°	GCS	X	Force	86,06
hL Bck + Wnd ;270°_1Y_X	1Y	hL Bck + Wnd ;270°	GCS	X	Force	236,35
hL Bck + Wnd ;270°_1P_Y	1P	hL Bck + Wnd ;270°	GCS	Y	Force	41,47
hL Bck + Wnd ;270°_1X_Y	1X	hL Bck + Wnd ;270°	GCS	Y	Force	-207,83
hL Bck + Wnd ;270°_1XY_Y	1XY	hL Bck + Wnd ;270°	GCS	Y	Force	72,98
hL Bck + Wnd ;270°_1Y_Y	1Y	hL Bck + Wnd ;270°	GCS	Y	Force	-248,55
hL Bck + Wnd ;270°_1P_Z	1P	hL Bck + Wnd ;270°	GCS	Z	Force	269,11
hL Bck + Wnd ;270°_1X_Z	1X	hL Bck + Wnd ;270°	GCS	Z	Force	1203,03
hL Bck + Wnd ;270°_1XY_Z	1XY	hL Bck + Wnd ;270°	GCS	Z	Force	-489,75

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;270°_1Y_Z	1Y	hL Bck + Wnd ;270°	GCS	Z	Force	-1410,98

6.1.4. Load cases - hL Ahd + Wnd ;45°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;45°		Variable	LG4	Short	None
	Standard	Static			



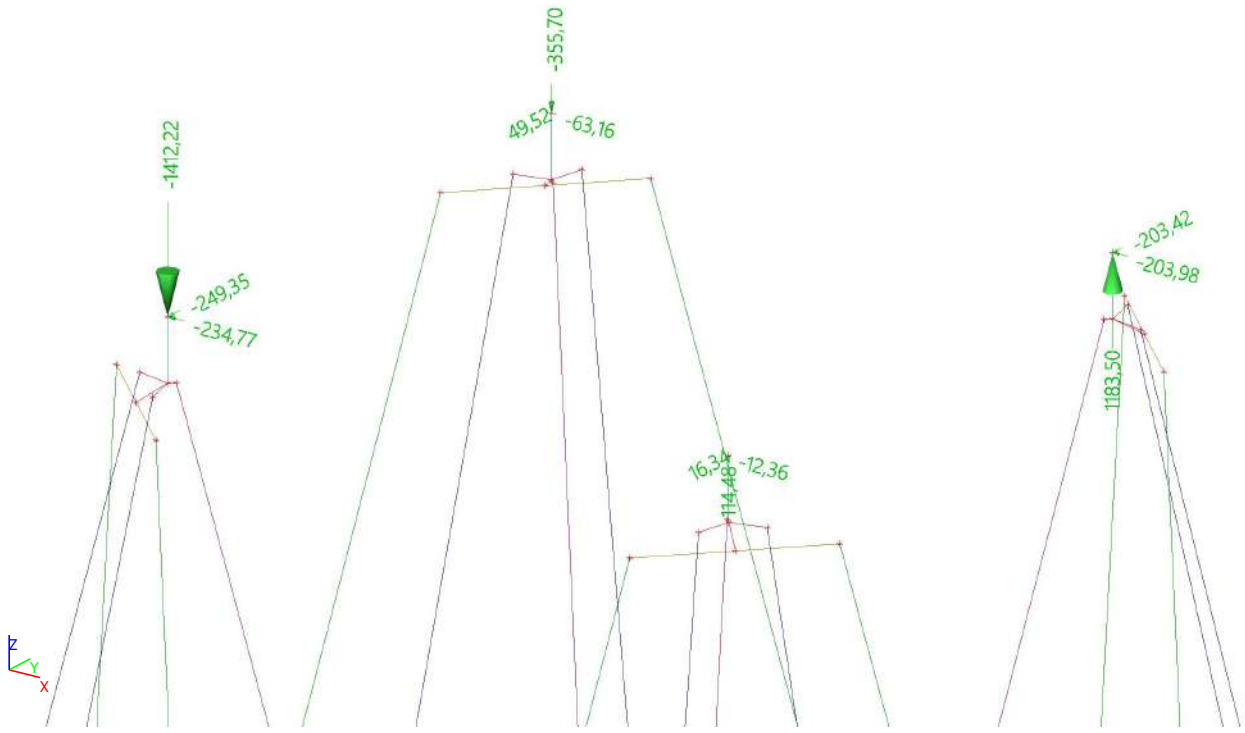
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;45°_1P_X	1P	hL Ahd + Wnd ;45°	GCS	X	Force	-183,23
hL Ahd + Wnd ;45°_1X_X	1X	hL Ahd + Wnd ;45°	GCS	X	Force	-193,08
hL Ahd + Wnd ;45°_1XY_X	1XY	hL Ahd + Wnd ;45°	GCS	X	Force	-146,60
hL Ahd + Wnd ;45°_1Y_X	1Y	hL Ahd + Wnd ;45°	GCS	X	Force	-147,55
hL Ahd + Wnd ;45°_1P_Y	1P	hL Ahd + Wnd ;45°	GCS	Y	Force	-175,69
hL Ahd + Wnd ;45°_1X_Y	1X	hL Ahd + Wnd ;45°	GCS	Y	Force	188,79
hL Ahd + Wnd ;45°_1XY_Y	1XY	hL Ahd + Wnd ;45°	GCS	Y	Force	-133,21
hL Ahd + Wnd ;45°_1Y_Y	1Y	hL Ahd + Wnd ;45°	GCS	Y	Force	152,46

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;45°_1P_Z	1P	hL Ahd + Wnd ;45°	GCS	Z	Force	-1060,30
hL Ahd + Wnd ;45°_1X_Z	1X	hL Ahd + Wnd ;45°	GCS	Z	Force	-1095,03
hL Ahd + Wnd ;45°_1XY_Z	1XY	hL Ahd + Wnd ;45°	GCS	Z	Force	825,67
hL Ahd + Wnd ;45°_1Y_Z	1Y	hL Ahd + Wnd ;45°	GCS	Z	Force	858,33

6.1.5. Load cases - hL Ahd + Wnd ;270°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;270°		Variable	LG4	Short	None
	Standard	Static			



6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;270°_1P_X	1P	hL Ahd + Wnd ;270°	GCS	X	Force	-234,77
hL Ahd + Wnd ;270°_1X_X	1X	hL Ahd + Wnd ;270°	GCS	X	Force	-63,16
hL Ahd + Wnd ;270°_1XY_X	1XY	hL Ahd + Wnd ;270°	GCS	X	Force	-203,98
hL Ahd + Wnd ;270°_1Y_X	1Y	hL Ahd + Wnd ;270°	GCS	X	Force	-12,36
hL Ahd + Wnd ;270°_1P_Y	1P	hL Ahd + Wnd ;270°	GCS	Y	Force	-249,35

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;270°_1X_Y	1X	hL Ahd + Wnd ;270°	GCS	Y	Force	49,52
hL Ahd + Wnd ;270°_1XY_Y	1XY	hL Ahd + Wnd ;270°	GCS	Y	Force	-203,42
hL Ahd + Wnd ;270°_1Y_Y	1Y	hL Ahd + Wnd ;270°	GCS	Y	Force	16,34
hL Ahd + Wnd ;270°_1P_Z	1P	hL Ahd + Wnd ;270°	GCS	Z	Force	-1412,22
hL Ahd + Wnd ;270°_1X_Z	1X	hL Ahd + Wnd ;270°	GCS	Z	Force	-355,70
hL Ahd + Wnd ;270°_1XY_Z	1XY	hL Ahd + Wnd ;270°	GCS	Z	Force	1183,50
hL Ahd + Wnd ;270°_1Y_Z	1Y	hL Ahd + Wnd ;270°	GCS	Z	Force	114,48

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
hL Bck + Wnd ;90° - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		hL Bck + Wnd ;135°	1,000
hL Bck + Wnd ;225° - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		hL Ahd + Wnd ;45°	1,000
hL Ahd + Wnd ;315° - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		hL Bck + Wnd ;270°	1,000
hL Ahd + Wnd ;90 - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		hL Ahd + Wnd ;270°	1,000
hL Bck + Wnd ;90° - EG_gunstig	Ultimate	EG_Fundering	0,900
		hL Bck + Wnd ;135°	1,000
hL Bck + Wnd ;225° - EG_gunstig	Ultimate	EG_Fundering	0,900
		hL Ahd + Wnd ;45°	1,000
hL Ahd + Wnd ;315° - EG_gunstig	Ultimate	EG_Fundering	0,900
		hL Bck + Wnd ;270°	1,000
hL Ahd + Wnd ;90 - EG_gunstig	Ultimate	EG_Fundering	0,900
		hL Ahd + Wnd ;270°	1,000

6.3. Result classes

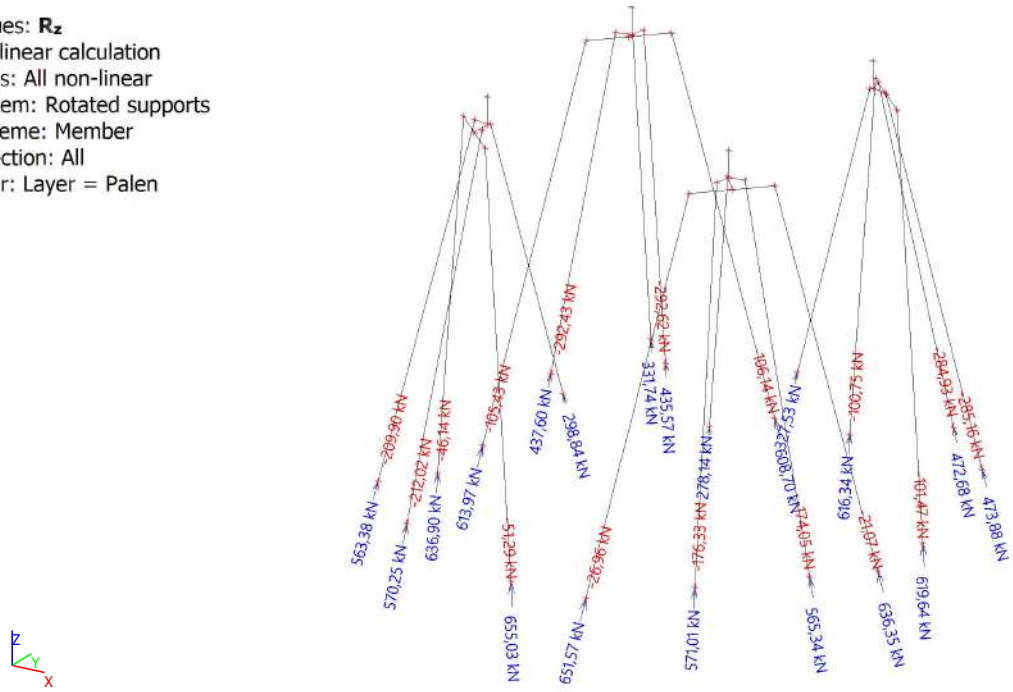
Name	List
All non-linear	hL Bck + Wnd ;90° - EG_Ongunstig
	hL Bck + Wnd ;225° - EG_Ongunstig
	hL Ahd + Wnd ;315° - EG_Ongunstig
	hL Ahd + Wnd ;90 - EG_Ongunstig
	hL Bck + Wnd ;90° - EG_gunstig
	hL Bck + Wnd ;225° - EG_gunstig
	hL Ahd + Wnd ;315° - EG_gunstig
	hL Ahd + Wnd ;90 - EG_gunstig

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Cross-section = MV Paal - HEB220
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_X_1_MV/N225	hL Ahd + Wnd ;315° - EG_gunstig	0,00	0,00	**-292,62**	0,00	0,00	0,00	0,0	0,0
S_Y_1_MV/N209	hL Ahd + Wnd ;315° - EG_gunstig	**0,00**	**0,00**	**571,01**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Cross-section = LD1(31-plank) - General cross-section
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_2_LD1/S_P_2_LD1	hL Ahd + Wnd ;90 - EG_Ongunstig	0,00	0,00	**0,00**	0,00	0,00	0,00	-	-
Sn11/S_X_2_LD1	hL Ahd + Wnd ;315° - EG_Ongunstig	**0,00**	**0,00**	**331,74**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.4. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Cross-section = TubexPaal - type e (CHS406.4/12.5)
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn12/N235	hL Ahd + Wnd ;315° - EG_gunstig	0,00	0,00	**-106,14**	0,00	0,00	0,00	0,0	0,0
Sn15/N263	hL Ahd + Wnd ;90 - EG_Ongunstig	**0,00**	**0,00**	**655,03**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.5. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_2_LD1/S_P_2_LD1	hL Ahd + Wnd ;90 - EG_Ongunstig	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	-	-
S_P_2_LD1/S_P_2_LD1	hL Bck + Wnd ;90° - EG_Ongunstig	0,00	0,00	**298,84**	0,00	0,00	**0,00**	0,0	0,0
S_P_1_MV/N143	hL Bck + Wnd ;90° - EG_gunstig	0,00	0,00	**-209,90**	0,00	0,00	0,00	0,0	0,0
S_P_1_MV/N143	hL Ahd + Wnd ;90 - EG_gunstig	**0,00**	**0,00**	**563,38**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_3_MV/N145	hL Bck + Wnd ;90° - EG_gunstig	0,00	0,00	**-212,02**	0,00	0,00	0,00	0,0	0,0
S_P_3_MV/N145	hL Ahd + Wnd ;90 - EG_gunstig	**0,00**	**0,00**	**570,25**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_2_LD1/S_Y_2_LD1	hL Ahd + Wnd ;315° - EG_Ongunstig	0,00	0,00	**0,00**	0,00	0,00	0,00	-	-
S_Y_2_LD1/S_Y_2_LD1	hL Bck + Wnd ;225° - EG_Ongunstig	**0,00**	**0,00**	**278,14**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_1_MV/N209	hL Bck + Wnd ;225° - EG_gunstig	0,00	0,00	**-176,33**	0,00	0,00	0,00	0,0	0,0
S_Y_1_MV/N209	hL Ahd + Wnd ;315° -	**0,00**	**0,00**	**571,01**	**0,00**	**0,00**	**0,00**	0,0	0,0

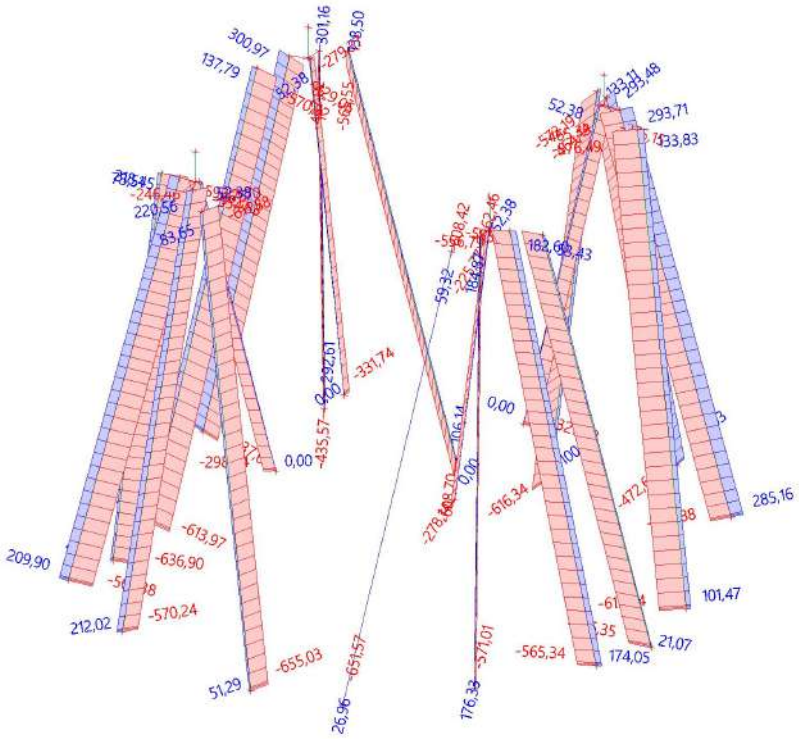
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	EG_gunstig								
S_Y_3_MV/N211	hL Bck + Wnd ;225° - EG_gunstig	0,00	0,00	**-174,05**	0,00	0,00	0,00	0,0	0,0
S_Y_3_MV/N211	hL Ahd + Wnd ;315° - EG_gunstig	**0,00**	**0,00**	**565,34**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn8/S_XY_2_LD1	hL Ahd + Wnd ;90 - EG_Ongunstig	**0,00**	**0,00**	**327,53**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn8/S_XY_2_LD1	hL Bck + Wnd ;90° - EG_Ongunstig	0,00	0,00	**0,00**	0,00	0,00	**0,00**	-	-
S_XY_1_MV/N217	hL Ahd + Wnd ;90 - EG_gunstig	0,00	0,00	**-285,16**	0,00	0,00	0,00	0,0	0,0
S_XY_1_MV/N217	hL Bck + Wnd ;90° - EG_gunstig	**0,00**	**0,00**	**473,88**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_3_MV/N219	hL Ahd + Wnd ;90 - EG_gunstig	0,00	0,00	**-284,93**	0,00	0,00	0,00	0,0	0,0
S_XY_3_MV/N219	hL Bck + Wnd ;90° - EG_gunstig	**0,00**	**0,00**	**472,68**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn11/S_X_2_LD1	hL Bck + Wnd ;225° - EG_Ongunstig	0,00	0,00	**0,00**	0,00	0,00	0,00	-	-
Sn11/S_X_2_LD1	hL Ahd + Wnd ;315° - EG_Ongunstig	**0,00**	**0,00**	**331,74**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_1_MV/N225	hL Ahd + Wnd ;315° - EG_gunstig	0,00	0,00	**-292,62**	0,00	0,00	0,00	0,0	0,0
S_X_1_MV/N225	hL Bck + Wnd ;225° - EG_gunstig	**0,00**	**0,00**	**435,57**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_3_MV/N227	hL Ahd + Wnd ;315° - EG_gunstig	0,00	0,00	**-292,43**	0,00	0,00	0,00	0,0	0,0
S_X_3_MV/N227	hL Bck + Wnd ;225° - EG_gunstig	**0,00**	**0,00**	**437,60**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn1/N234	hL Ahd + Wnd ;315° - EG_gunstig	0,00	0,00	**-105,43**	0,00	0,00	0,00	0,0	0,0
Sn1/N234	hL Bck + Wnd ;225° - EG_Ongunstig	**0,00**	**0,00**	**613,97**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn12/N235	hL Ahd + Wnd ;315° - EG_gunstig	0,00	0,00	**-106,14**	0,00	0,00	0,00	0,0	0,0
Sn12/N235	hL Bck + Wnd ;225° - EG_Ongunstig	**0,00**	**0,00**	**608,70**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn14/N255	hL Ahd + Wnd ;90 - EG_gunstig	**0,00**	**0,00**	**-100,75**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn14/N255	hL Bck + Wnd ;90° - EG_Ongunstig	0,00	0,00	**616,34**	0,00	0,00	**0,00**	0,0	0,0
Sn13/N254	hL Ahd + Wnd ;90 - EG_gunstig	**0,00**	**0,00**	**-101,47**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn13/N254	hL Bck + Wnd ;90° -	0,00	0,00	**619,64**	0,00	0,00	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	EG_Ongunstig								
Sn18/N272	hL Bck + Wnd ;90° - EG_gunstig	0,00	0,00	**-46,14**	0,00	0,00	0,00	0,0	0,0
Sn18/N272	hL Ahd + Wnd ;90 - EG_Ongunstig	**0,00**	**0,00**	**636,90**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn15/N263	hL Bck + Wnd ;90° - EG_gunstig	0,00	0,00	**-51,29**	0,00	0,00	0,00	0,0	0,0
Sn15/N263	hL Ahd + Wnd ;90 - EG_Ongunstig	**0,00**	**0,00**	**655,03**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn16/N267	hL Bck + Wnd ;225° - EG_gunstig	0,00	0,00	**-26,96**	0,00	0,00	0,00	0,0	0,0
Sn16/N267	hL Ahd + Wnd ;315° - EG_Ongunstig	**0,00**	**0,00**	**651,57**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn17/N268	hL Bck + Wnd ;225° - EG_gunstig	0,00	0,00	**-21,07**	0,00	0,00	0,00	0,0	0,0
Sn17/N268	hL Ahd + Wnd ;315° - EG_Ongunstig	**0,00**	**0,00**	**636,35**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

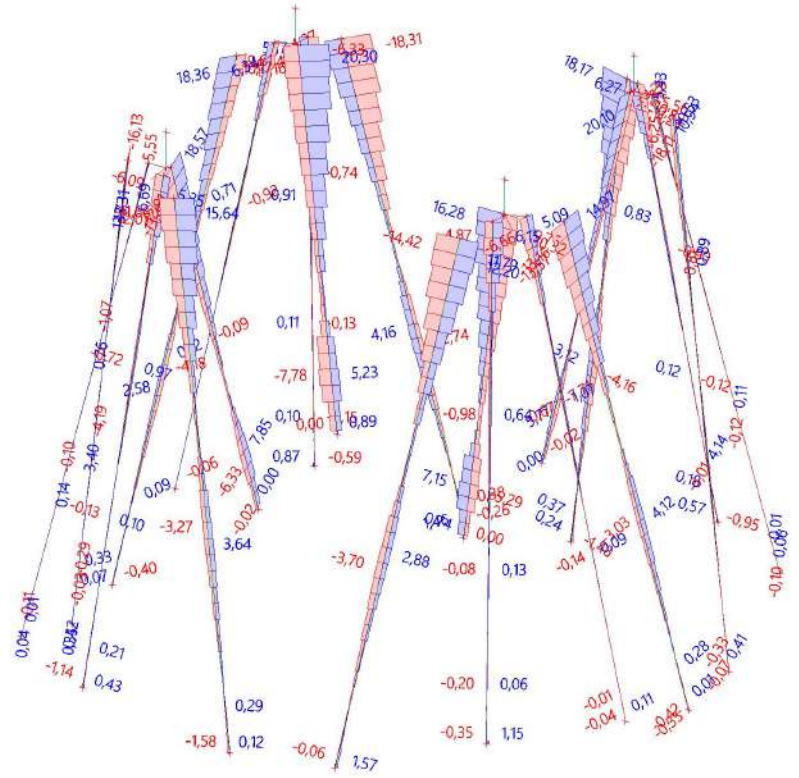
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



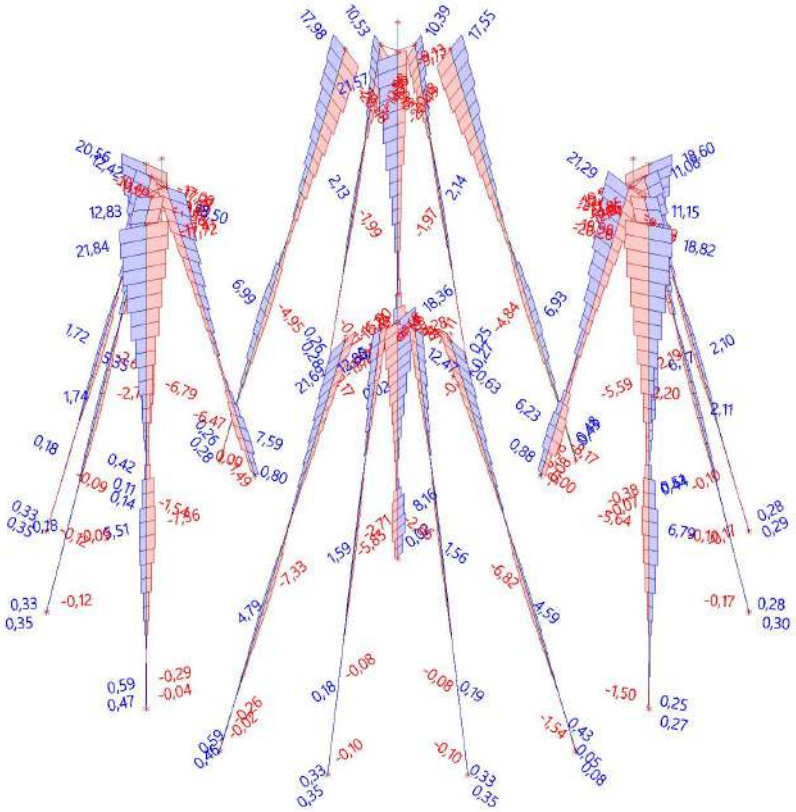
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



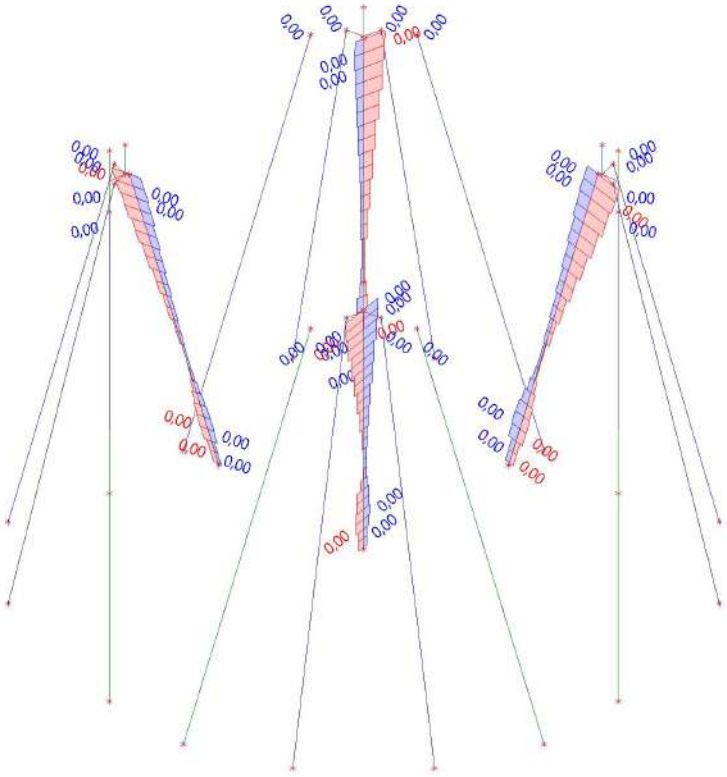
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



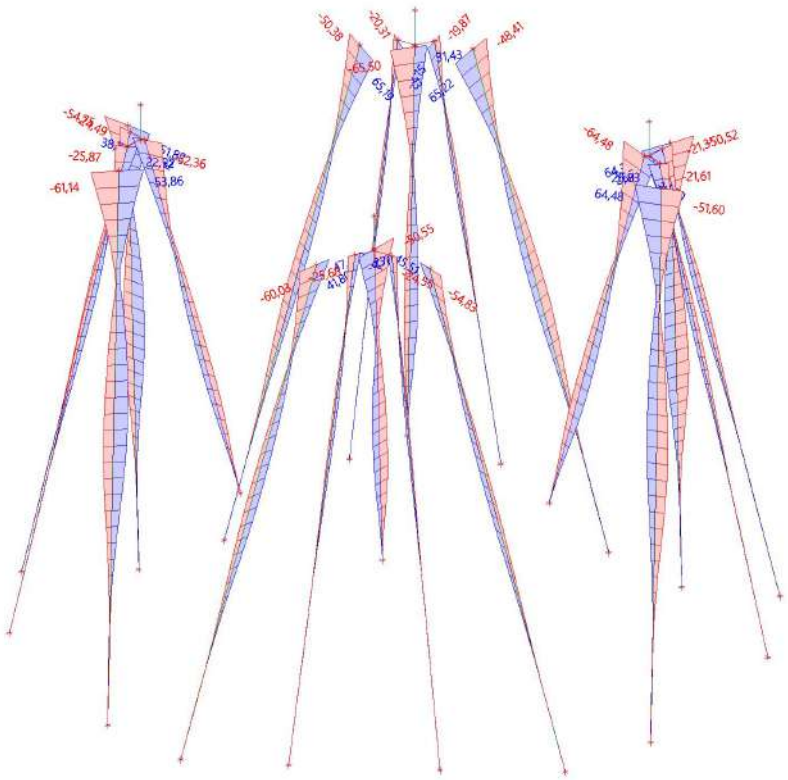
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



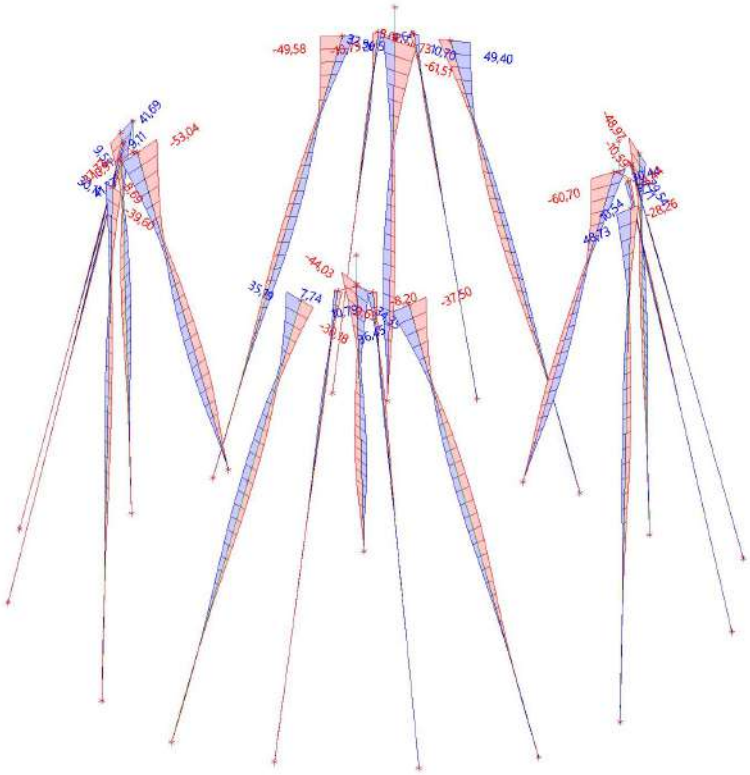
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Nothing in selection to display.

7.2.8. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Cross-section = MV Paal - HEB220

Name	dx [m]	Case	Cross-section	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_Y_1	16,007	hL Ahd + Wnd ;315° - EG_gunstig	MV Paal - HEB220	**-571,01**	1,15	0,33	0,00	0,00	0,00
Paal_X_1	0,000	hL Ahd + Wnd ;315° - EG_gunstig	MV Paal - HEB220	**301,16**	-6,20	-11,80	**0,00**	26,10	10,37
Paal_Y_3	0,000	hL Ahd + Wnd ;315° - EG_gunstig	MV Paal - HEB220	-556,79	**-6,66**	12,47	0,00	-23,92	**10,79**
Paal_X_1	1,000-	hL Ahd + Wnd ;315° - EG_Ongunstig	MV Paal - HEB220	270,95	-6,33	**-12,16**	0,00	15,08	4,37
Paal_P_3	0,000	hL Ahd + Wnd ;90 - EG_gunstig	MV Paal - HEB220	-561,70	-6,09	**12,83**	0,00	-25,23	9,52
Paal_P_3	0,000	hL Ahd + Wnd ;90 - EG_Ongunstig	MV Paal - HEB220	-556,76	-5,75	12,61	0,00	**-25,87**	9,19
Paal_X_1	0,000	hL Ahd + Wnd ;315° - EG_Ongunstig	MV Paal - HEB220	271,66	-6,33	-11,98	0,00	**27,15**	10,70
Paal_P_1	0,000	hL Ahd + Wnd ;90 - EG_gunstig	MV Paal - HEB220	-554,83	**6,69**	12,42	0,00	-23,87	**-10,91**

7.2.9. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Cross-section = TubexPaal - type e (CHS406.4/12.5)

Name	dx [m]	Case	Cross-section	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_X_9	17,121	hL Ahd + Wnd ;90 - EG_Ongunstig	TubexPaal - type e (CHS406.4/12.5)	**-655,03**	-1,58	0,47	0,00	0,00	0,00
Paal_X_5	0,000	hL Ahd + Wnd ;315° - EG_gunstig	TubexPaal - type e (CHS406.4/12.5)	**138,50**	-17,30	-19,84	**0,00**	61,91	46,42
Paal_X_5	0,000	hL Ahd + Wnd ;315° - EG_Ongunstig	TubexPaal - type e (CHS406.4/12.5)	85,10	**-18,31**	-20,18	0,00	**65,22**	**49,40**
Paal_X_5	1,000-	hL Ahd + Wnd ;315° - EG_Ongunstig	TubexPaal - type e (CHS406.4/12.5)	82,58	-17,76	**-20,49**	0,00	44,88	31,36
Paal_X_9	0,000	hL Ahd + Wnd ;90 - EG_Ongunstig	TubexPaal - type e (CHS406.4/12.5)	-611,88	-11,04	**21,84**	0,00	**-61,14**	29,80
Paal_X_4	0,000	hL Ahd + Wnd ;315° - EG_Ongunstig	TubexPaal - type e (CHS406.4/12.5)	84,39	**18,36**	-20,17	0,00	65,19	**-49,58**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

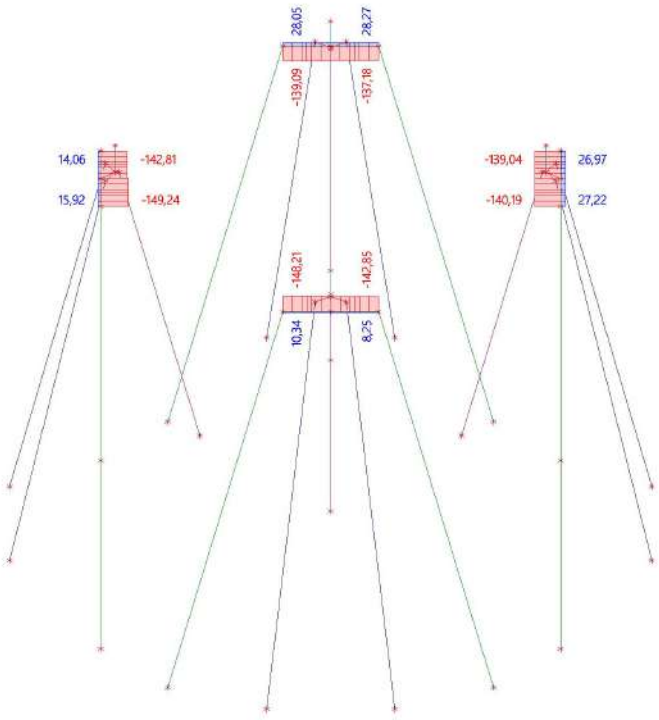
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer_X	1,150	hL Ahd + Wnd ;315° - EG_Ongunstig	**1203,03**	-293,51	0,40	**0,00**	0,00	0,00
Poer_X	0,000	hL Ahd + Wnd ;315° - EG_gunstig	1123,31	**-293,51**	0,40	0,00	-0,46	**337,54**
Poer_XY	0,000	hL Ahd + Wnd ;315° - EG_Ongunstig	-596,04	112,46	**-9,25**	0,00	**10,64**	-129,33
Poer_P	0,000	hL Ahd + Wnd ;90 - EG_Ongunstig	**-1518,51**	342,32	**10,31**	0,00	**-11,86**	-393,67
Poer_Y	0,000	hL Ahd + Wnd ;315° - EG_Ongunstig	-1517,27	**342,88**	-8,63	0,00	9,92	**-394,31**

7.4. Krachten van de Funderingsbalken

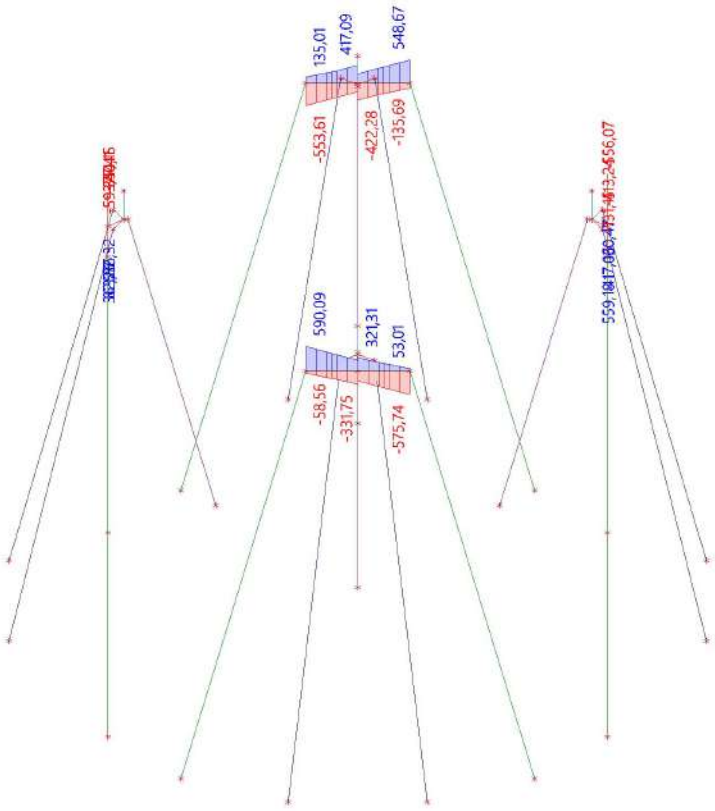
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



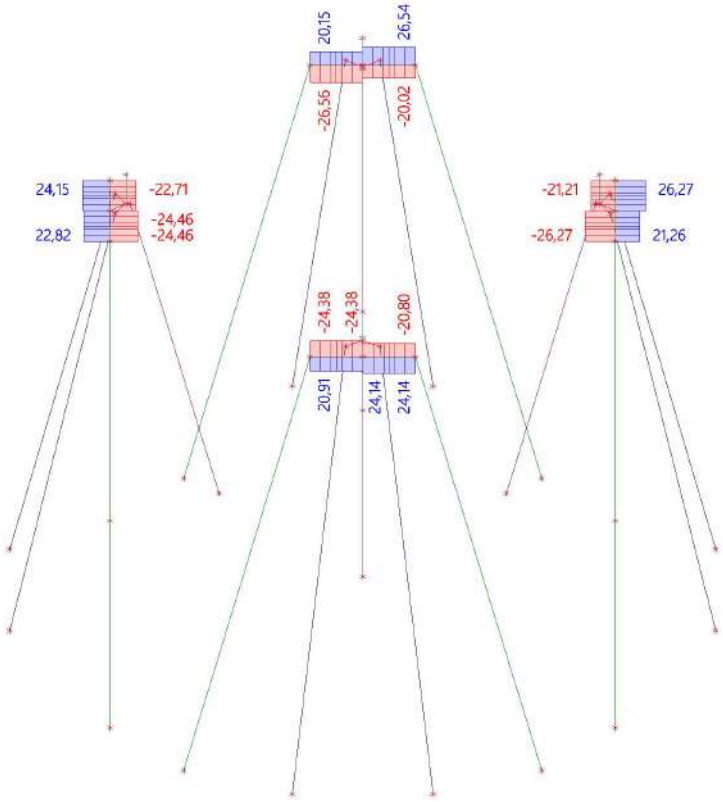
7.4.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



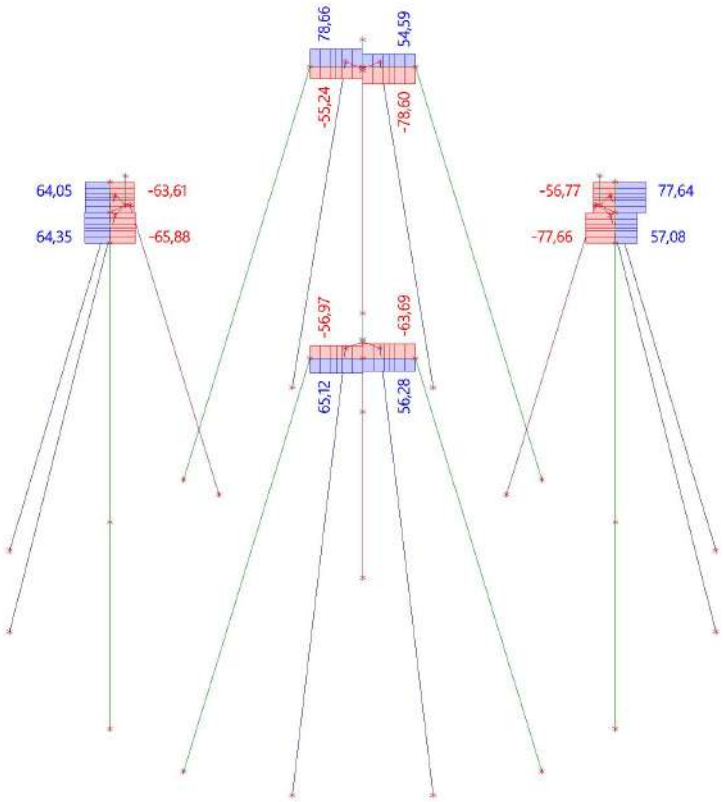
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



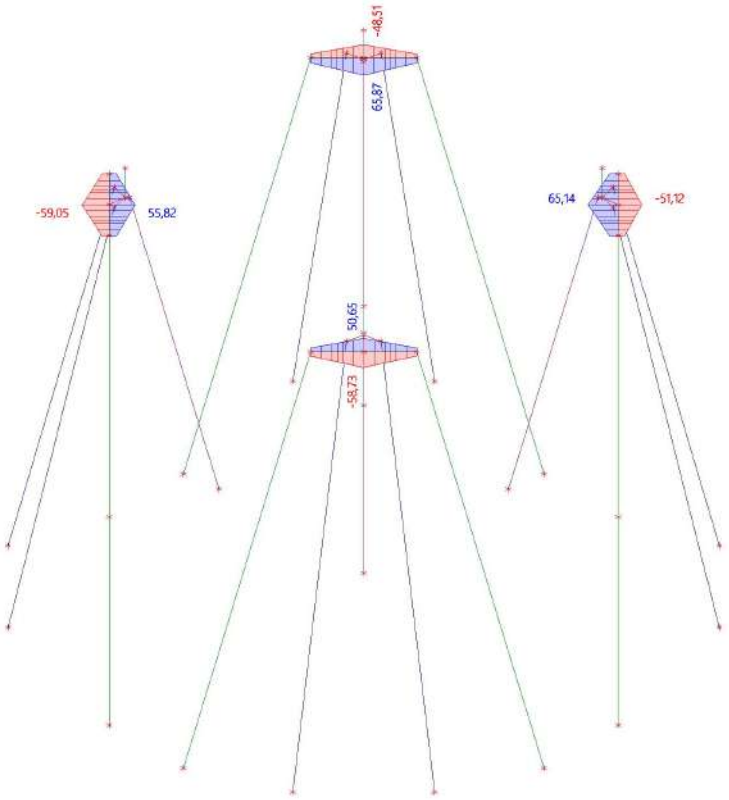
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



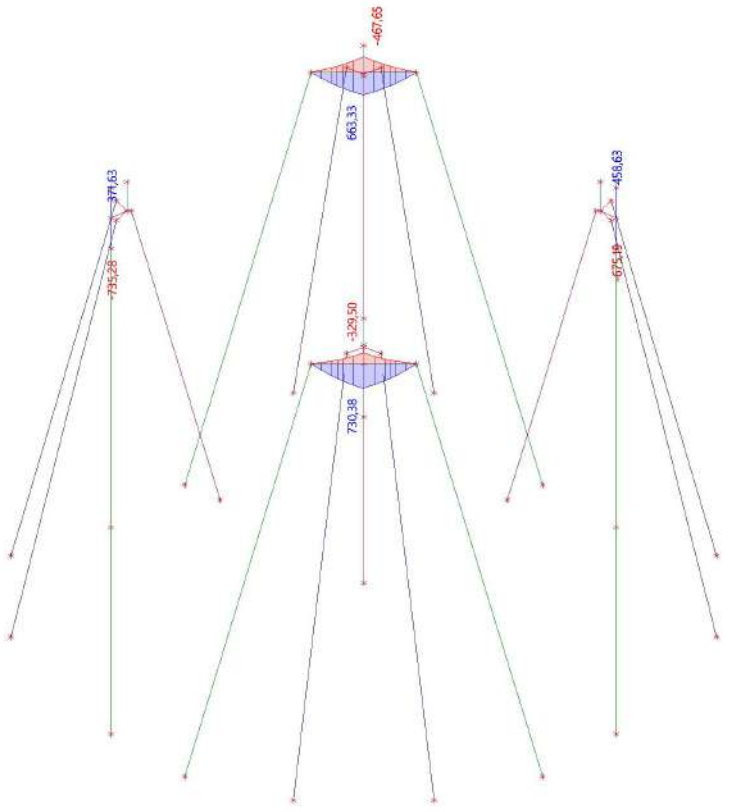
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Balken

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
balk13	0,000	hL Ahd + Wnd ;315° - EG_gunstig	**28,27**	-135,69	25,76	-74,40	18,58	-10,40
balk15	0,000	hL Ahd + Wnd ;90 - EG_Ongunstig	**-149,24**	**-593,40**	-24,46	-65,88	-16,46	3,74
balk14	0,000	hL Ahd + Wnd ;315° - EG_Ongunstig	-148,21	**590,09**	-24,38	65,12	-16,27	-2,87
balk13	2,773	hL Ahd + Wnd ;315° - EG_Ongunstig	14,42	216,86	**-26,56**	**78,66**	37,91	-114,77
balk13	1,393	hL Ahd + Wnd ;315° - EG_Ongunstig	14,64	-354,63	**26,54**	**-78,60**	56,62	-317,03
balk13	1,742-	hL Ahd + Wnd ;315° - EG_Ongunstig	14,64	-422,28	26,54	-78,60	**65,87**	-452,35
balk15	1,742-	hL Ahd + Wnd ;90 - EG_Ongunstig	-149,24	-255,19	-24,46	-65,88	**-59,05**	**-735,28**
balk14	1,742-	hL Ahd + Wnd ;315° - EG_Ongunstig	-148,21	251,88	-24,38	65,12	-58,73	**730,38**

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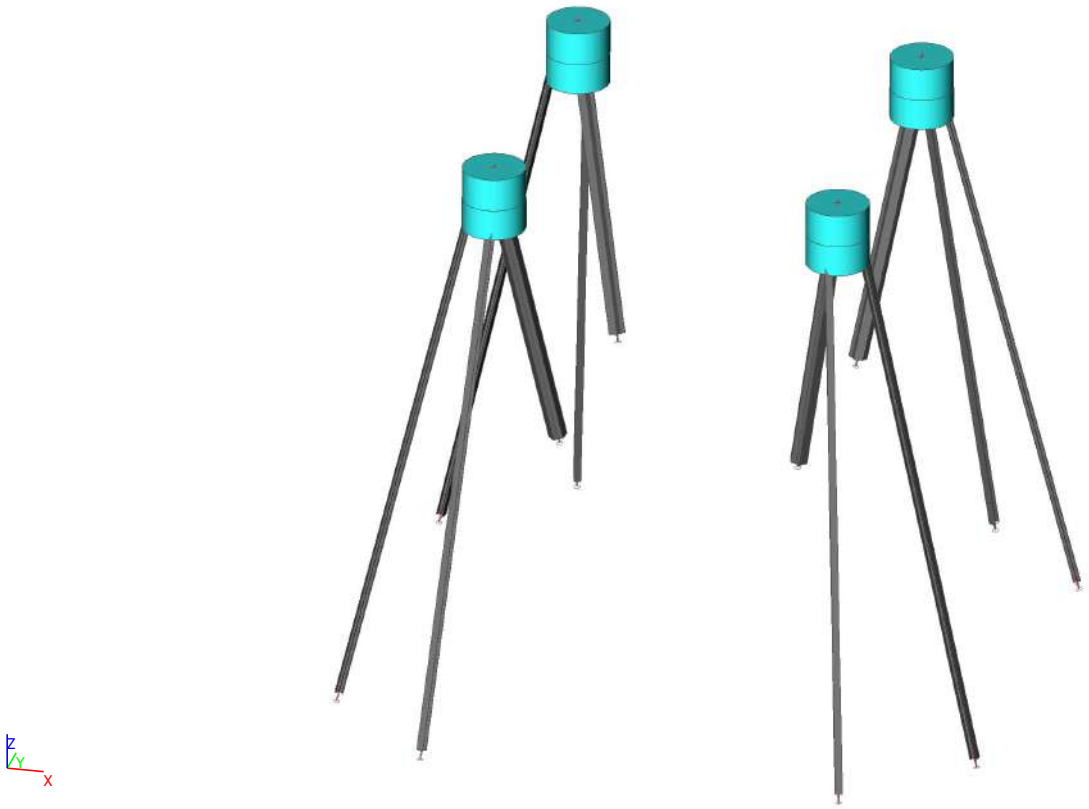
2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Cilinderpoer 2xMV 1xLD1 HA
Author	[redacted]
Date	7-05-2026
Structure	General XYZ
No. of nodes :	36
No. of beams :	20
No. of slabs :	0
No. of solids :	0
No. of used profiles :	3
No. of load cases :	5
No. of used materials :	6
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analysis model



4. Modeleigenschappen

4.1. Materials

Steel EC3

Name	ρ [kg/m³]	E_{mod} [MPa]	μ [-]	Lower limit [mm]	Upper limit [mm]	F_y [MPa]	F_u [MPa]	Colour
		G_{mod} [MPa]	α [m/mK]					
S 235	6850,00	2,1000e+05	0,30	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	
S 235	6850,00	2,1000e+05	0,30	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	
S 235	6850,00	2,1000e+05	0,30	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	

Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ [-]	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C12/15 Gescheurd	Concrete	2500,00	2600,00	7,0000e+03	0,20	0,01e-003	12,00	
C12/15 Gescheurd	Concrete	1500,00	2600,00	7,0000e+03	0,20	0,01e-003	12,00	

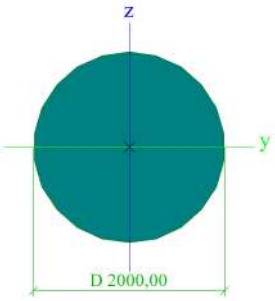
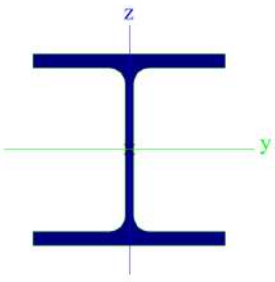
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

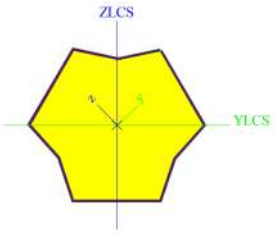
Reinforcement EC2

Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Reinforcement steel	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

4.2. Cross-sections

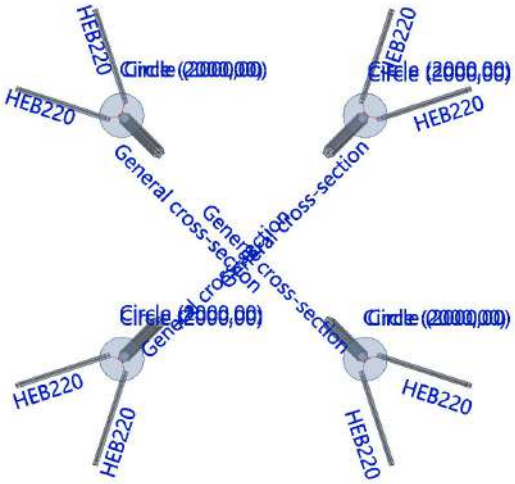
Poer		
Type	Circle	
Detailed	2000,00	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	general	
Colour		
A [mm²]	3,1416e+06	
A_y [mm²], A_z [mm²]	2,8274e+06	2,8274e+06
A_L [m²/m], A_D [m²/m]	6,2829e+00	6,2829e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	1000,00	1000,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	7,8540e+11	7,8540e+11
i_y [mm], i_z [mm]	499,95	499,95
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	7,8540e+08	7,8540e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	1,3333e+09	1,3333e+09
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	1,5708e+12	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00

Picture		
MV Paal		
Type	HEB220	
Formcode	1 - I section	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	b	c
A [mm²]	9,1040e+03	
A_y [mm²], A_z [mm²]	6,7051e+03	2,2063e+03
A_L [m²/m], A_D [m²/m]	1,2700e+00	1,2700e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	110,00	110,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	8,0910e+07	2,8430e+07
i_y [mm], i_z [mm]	94,27	55,88
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	7,3550e+05	2,5850e+05
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	8,2700e+05	3,9390e+05
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	194462180,02	194462180,02
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	92575756,56	92575756,56
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	7,6570e+05	2,9542e+11
β_y [mm], β_z [mm]	0,00	0,00
Picture		
LD1(31-plank)		
Type	General cross-section	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd S 235	
Fabrication	concrete	
Flexural buckling y-y, Flexural buckling z-z	d	d
A [mm²]	6,0572e+05	
A_y [mm²], A_z [mm²]	3,6248e+05	3,6314e+05
A_L [m²/m], A_D [m²/m]	1,7651e+00	3,4664e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	553,25	9,99
$I_{Y.LCS}$ [mm⁴], $I_{Z.LCS}$ [mm⁴]	1,6274e+10	1,6264e+10
$I_{YZ.LCS}$ [mm⁴]	-1,0231e+08	
α [deg]	43,55	
I_y [mm⁴], I_z [mm⁴]	1,6372e+10	1,6167e+10
i_y [mm], i_z [mm]	164,40	163,37
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	5,7898e+07	5,8163e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	4,9594e+07	4,9245e+07

$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	601215312,58	595125922,92
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	597037111,16	590937542,96
d_y [mm], d_z [mm]	0,12	0,03
I_t [mm^4], I_w [mm^6]	2,6243e+10	1,7700e+12
β_y [mm], β_z [mm]	0,09	0,21
Picture		

4.3. Analyse model met doorsneden

4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	MeshSetup1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	1
Average size of 2D mesh element [m]	0,200
Average size of 1D mesh element on curved 1D members [m]	0,100
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

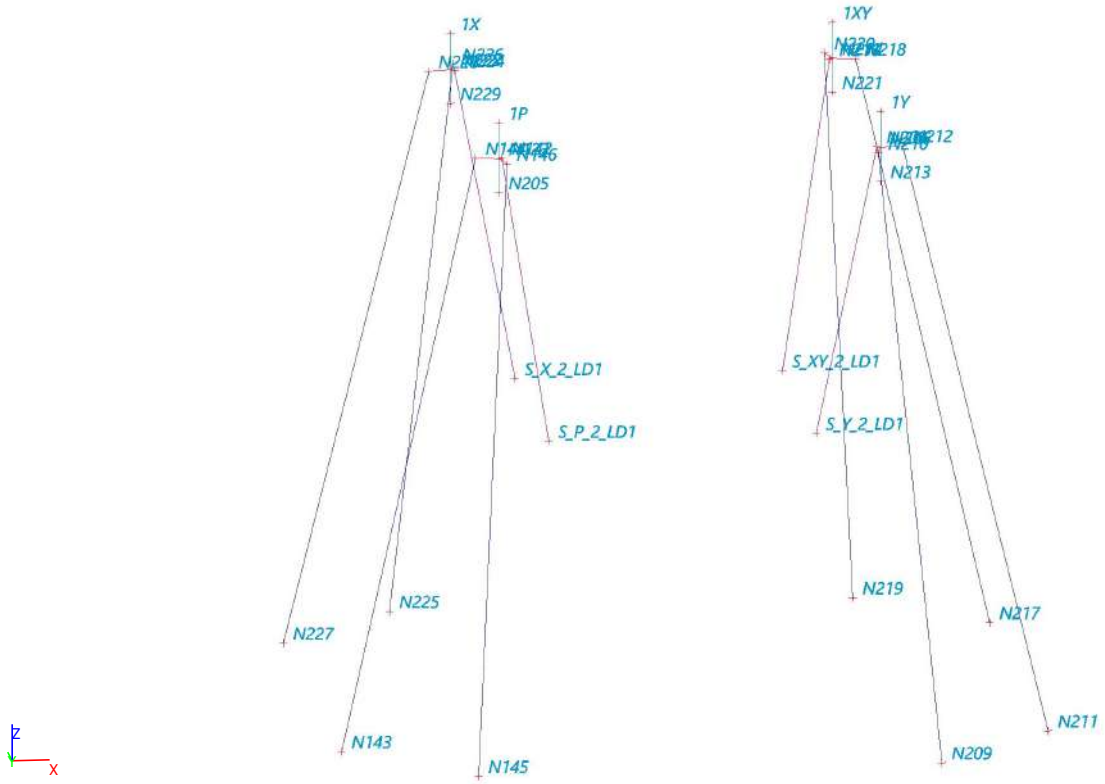
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N123	0,000	0,000	0,000
1P	0,000	0,000	1,050
S_P_2_LD1	1,646	1,646	-8,732
N142	0,100	0,100	0,000
N143	-4,676	-1,175	-16,986

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N144	-0,650	0,150	0,000
N145	-1,175	-4,676	-16,986
N146	0,150	-0,650	0,000
N205	0,000	0,000	-1,000
N206	11,000	0,000	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
1Y	11,000	0,000	1,050
S_Y_2_LD1	9,354	1,646	-8,732
N208	10,900	0,100	0,000
N209	12,175	-4,676	-16,986
N210	10,850	-0,650	0,000
N211	15,676	-1,175	-16,986
N212	11,650	0,150	0,000
N213	11,000	0,000	-1,000
N214	11,000	11,000	0,000
1XY	11,000	11,000	1,050
S_XY_2_LD1	9,354	9,354	-8,732
N216	10,900	10,900	0,000
N217	15,676	12,175	-16,986

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N218	11,650	10,850	0,000
N219	12,175	15,676	-16,986
N220	10,850	11,650	0,000
N221	11,000	11,000	-1,000
N222	0,000	11,000	0,000
1X	0,000	11,000	1,050
S_X_2_LD1	1,646	9,354	-8,732
N224	0,100	10,900	0,000
N225	-1,175	15,676	-16,986
N226	0,150	11,650	0,000
N227	-4,676	12,175	-16,986
N228	-0,650	10,850	0,000
N229	0,000	11,000	-1,000

5.2. Analyse model met knopen

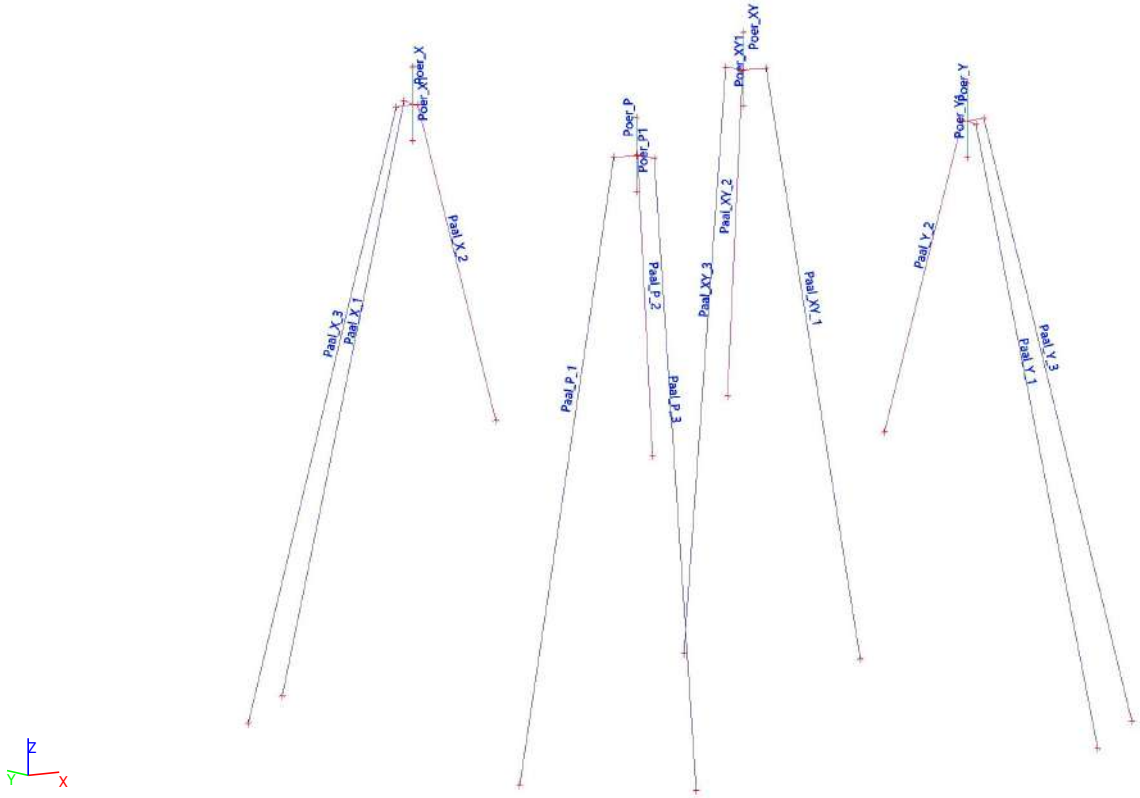


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_1	MV Paal - HEB220	S 235	17,507	N144	N143	column (100)
Paal_P_2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	9,002	N142	S_P_2_LD1	column (100)
Paal_P_3	MV Paal - HEB220	S 235	17,507	N146	N145	column (100)
Paal_XY_1	MV Paal - HEB220	S 235	17,507	N218	N217	column (100)
Paal_XY_2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	9,002	N216	S_XY_2_LD1	column (100)
Paal_XY_3	MV Paal - HEB220	S 235	17,507	N220	N219	column (100)
Paal_X_1	MV Paal - HEB220	S 235	17,507	N226	N225	column (100)
Paal_X_2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	9,002	N224	S_X_2_LD1	column (100)
Paal_X_3	MV Paal - HEB220	S 235	17,507	N228	N227	column (100)
Paal_Y_1	MV Paal - HEB220	S 235	17,507	N210	N209	column (100)
Paal_Y_2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	9,002	N208	S_Y_2_LD1	column (100)
Paal_Y_3	MV Paal - HEB220	S 235	17,507	N212	N211	column (100)
Poer_P	Poer - Circle (2000,00)	C12/15 Gescheurd	1,050	N123	1P	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Poer_P1	Poer - Circle (2000,00)	C12/15 Gescheurd	1,000	N205	N123	column (100)
Poer_X	Poer - Circle (2000,00)	C12/15 Gescheurd	1,050	N222	1X	column (100)
Poer_X1	Poer - Circle (2000,00)	C12/15 Gescheurd	1,000	N229	N222	column (100)
Poer_XY	Poer - Circle (2000,00)	C12/15 Gescheurd	1,050	N214	1XY	column (100)
Poer_XY1	Poer - Circle (2000,00)	C12/15 Gescheurd	1,000	N221	N214	column (100)
Poer_Y	Poer - Circle (2000,00)	C12/15 Gescheurd	1,050	N206	1Y	column (100)
Poer_Y1	Poer - Circle (2000,00)	C12/15 Gescheurd	1,000	N213	N206	column (100)

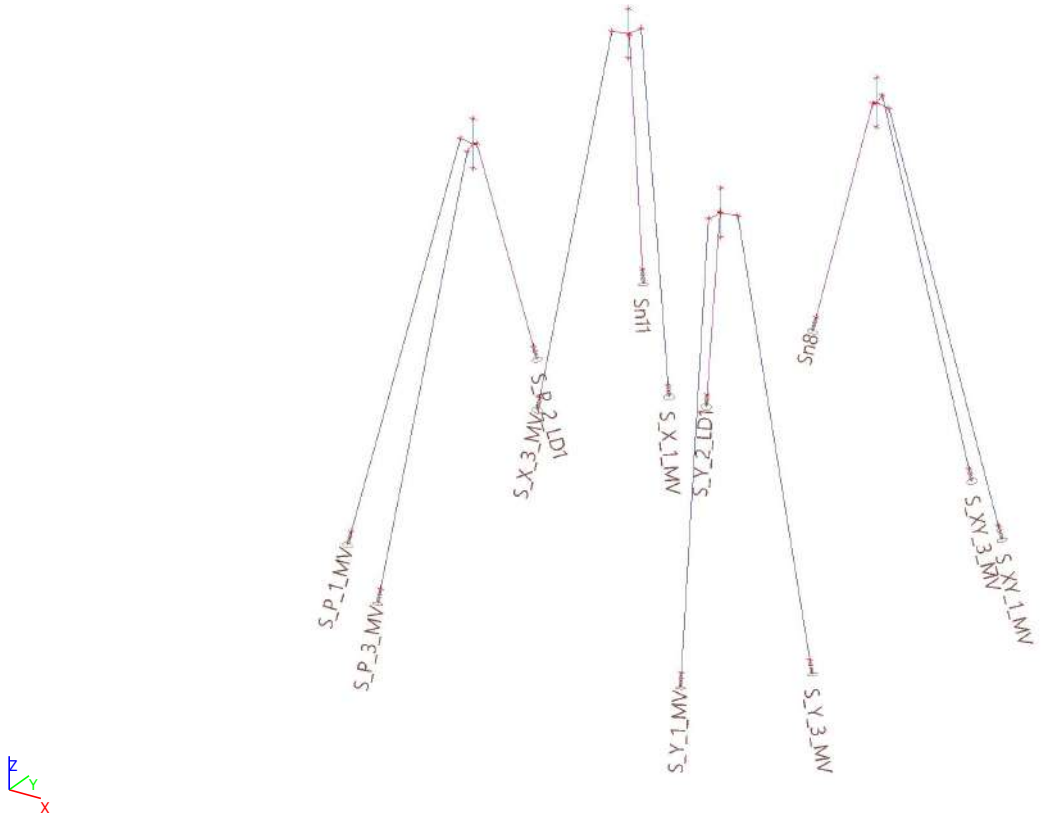
5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
S_P_2_LD1	S_P_2_LD1	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,89;Ry-9,89
S_P_1_MV	N143	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-4,34;Ry13,29
S_P_3_MV	N145	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-13,29;Ry4,34
S_Y_2_LD1	S_Y_2_LD1	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,89;Ry9,89
S_Y_1_MV	N209	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-13,29;Ry-4,34
S_Y_3_MV	N211	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-4,34;Ry-13,29
Sn8	S_XY_2_LD1	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,89;Ry9,89
S_XY_1_MV	N217	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx4,34;Ry-13,29
S_XY_3_MV	N219	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx13,29;Ry-4,34
Sn11	S_X_2_LD1	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,89;Ry-9,89
S_X_1_MV	N225	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx13,29;Ry4,34
S_X_3_MV	N227	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx4,34;Ry13,29

5.6. Analyse model met Knoopondersteuningen



5.7. Line supports on member

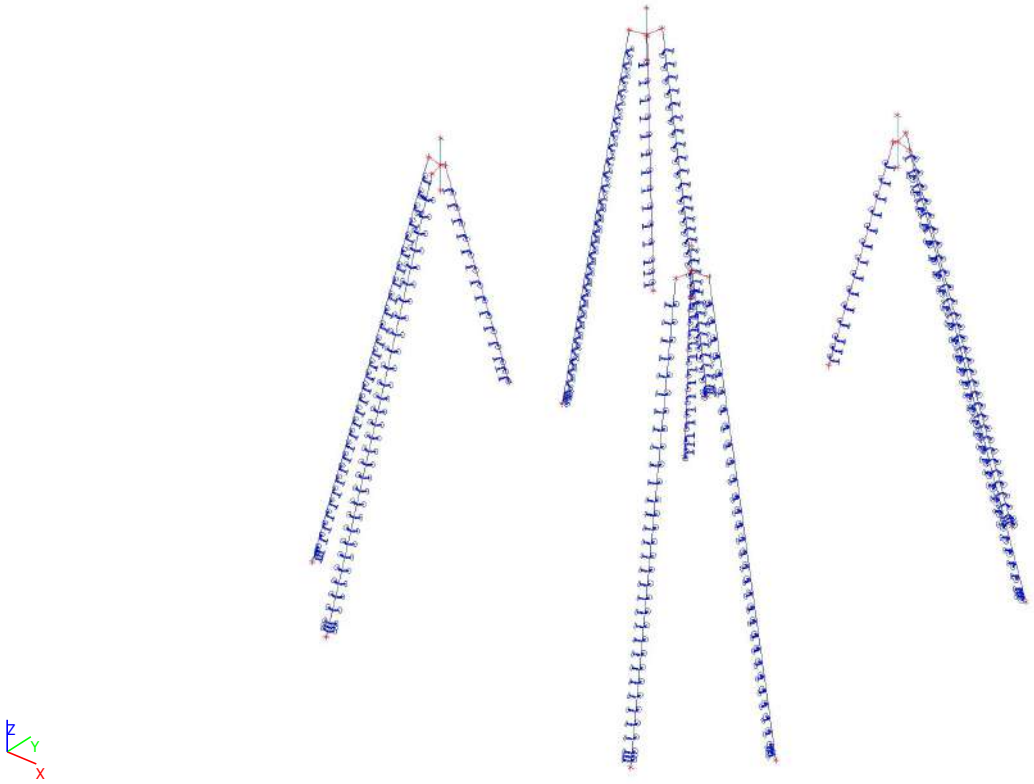
Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
Slb_P_1_Veen	Line	Paal_P_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_P_1_V1	Line	Paal_P_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_1_V2	Line	Paal_P_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_1_V3	Line	Paal_P_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_P_1_V4	Line	Paal_P_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_P_1_V5	Line	Paal_P_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_P_1_V6	Line	Paal_P_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_P_1_V7	Line	Paal_P_1	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_P_1_V8	Line	Paal_P_1	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
Slb_P_1_V9	Line	Paal_P_1	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
Slb_P_2_Veen	Line	Paal_P_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_P_1_V10	Line	Paal_P_1	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,300	From start						
Slb_P_3_Veen	Line	Paal_P_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_1_Veen	Line	Paal_Y_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
Slb_Y_2_Veen	Line	Paal_Y_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_Y_3_Veen	Line	Paal_Y_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_2_Veen	Line	Paal_XY_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_1_Veen	Line	Paal_XY_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_3_Veen	Line	Paal_XY_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_X_2_Veen	Line	Paal_X_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_X_1_Veen	Line	Paal_X_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_X_3_Veen	Line	Paal_X_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_P_3_V1	Line	Paal_P_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_2_V1	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,800	From start						
Slb_Y_1_V1	Line	Paal_Y_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_2_V1	Line	Paal_Y_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,800	From start						
Slb_Y_3_V1	Line	Paal_Y_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_2_V1	Line	Paal_XY_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,800	From start						
Slb_XY_1_V1	Line	Paal_XY_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_3_V1	Line	Paal_XY_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_2_V1	Line	Paal_X_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,800	From start						
Slb_X_1_V1	Line	Paal_X_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_3_V1	Line	Paal_X_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_3_V2	Line	Paal_P_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_3_V3	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_P_3_V4	Line	Paal_P_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_P_3_V5	Line	Paal_P_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_P_3_V6	Line	Paal_P_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_P_3_V7	Line	Paal_P_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_P_3_V8	Line	Paal_P_3	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
Slb_P_3_V9	Line	Paal_P_3	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
Slb_P_3_V10	Line	Paal_P_3	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,300	From start						
Slb_Y_1_V2	Line	Paal_Y_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_1_V3	Line	Paal_Y_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_1_V4	Line	Paal_Y_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_1_V5	Line	Paal_Y_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

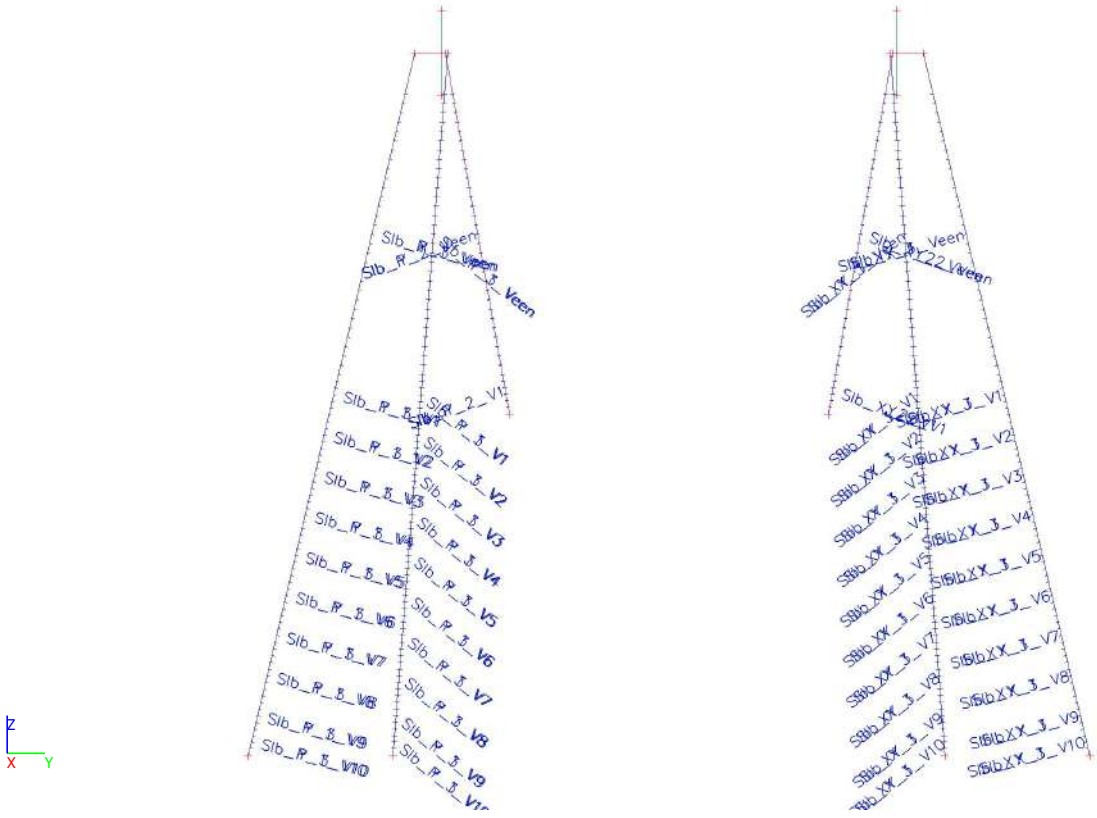
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	13,000	From start						
Slb_Y_1_V6	Line	Paal_Y_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_1_V7	Line	Paal_Y_1	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_Y_1_V8	Line	Paal_Y_1	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
Slb_Y_1_V9	Line	Paal_Y_1	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
Slb_Y_1_V10	Line	Paal_Y_1	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,300	From start						
Slb_Y_3_V2	Line	Paal_Y_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_V3	Line	Paal_Y_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_V4	Line	Paal_Y_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_V5	Line	Paal_Y_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_V6	Line	Paal_Y_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_V7	Line	Paal_Y_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_Y_3_V8	Line	Paal_Y_3	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
Slb_Y_3_V9	Line	Paal_Y_3	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
Slb_Y_3_V10	Line	Paal_Y_3	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,300	From start						
Slb_XY_1_V2	Line	Paal_XY_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_1_V3	Line	Paal_XY_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_1_V4	Line	Paal_XY_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_XY_1_V5	Line	Paal_XY_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_XY_1_V6	Line	Paal_XY_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_XY_1_V7	Line	Paal_XY_1	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_XY_1_V8	Line	Paal_XY_1	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
Slb_XY_1_V9	Line	Paal_XY_1	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
Slb_XY_1_V10	Line	Paal_XY_1	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,300	From start						
Slb_XY_3_V2	Line	Paal_XY_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_3_V3	Line	Paal_XY_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_3_V4	Line	Paal_XY_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_XY_3_V5	Line	Paal_XY_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_XY_3_V6	Line	Paal_XY_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_XY_3_V7	Line	Paal_XY_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_XY_3_V8	Line	Paal_XY_3	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
Slb_XY_3_V9	Line	Paal_XY_3	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
Slb_XY_3_V10	Line	Paal_XY_3	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	17,300	From start						
Slb_X_1_V2	Line	Paal_X_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_1_V3	Line	Paal_X_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_X_1_V4	Line	Paal_X_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_X_1_V5	Line	Paal_X_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_X_1_V6	Line	Paal_X_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_X_1_V7	Line	Paal_X_1	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_X_1_V8	Line	Paal_X_1	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
Slb_X_1_V9	Line	Paal_X_1	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
Slb_X_1_V10	Line	Paal_X_1	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,300	From start						
Slb_X_3_V2	Line	Paal_X_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_3_V3	Line	Paal_X_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_X_3_V4	Line	Paal_X_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_X_3_V5	Line	Paal_X_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_X_3_V6	Line	Paal_X_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_X_3_V7	Line	Paal_X_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_X_3_V8	Line	Paal_X_3	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	16,000	From start						
Slb_X_3_V9	Line	Paal_X_3	16,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,000	From start						
Slb_X_3_V10	Line	Paal_X_3	17,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	17,300	From start						

5.8. Analyse model met Lijnondersteuningen



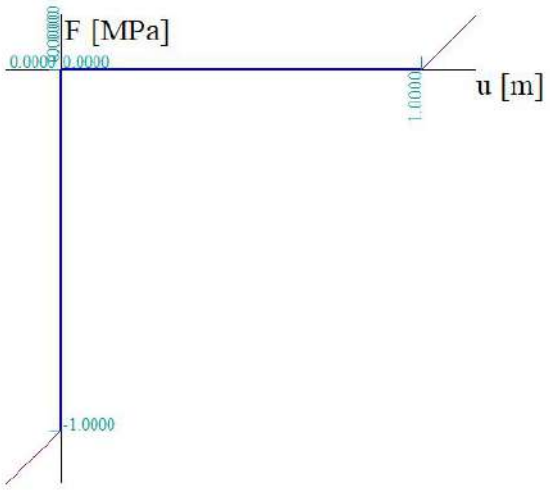
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

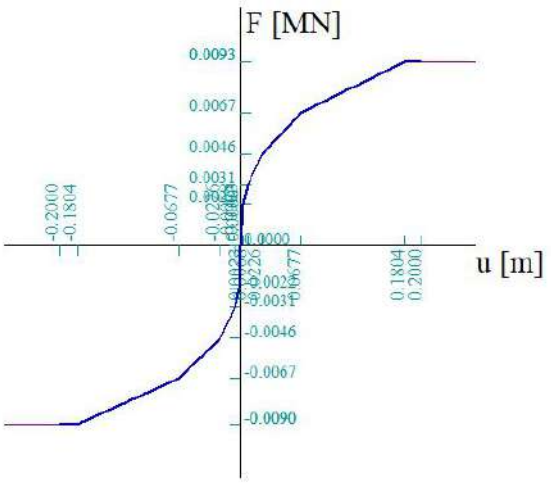
Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing



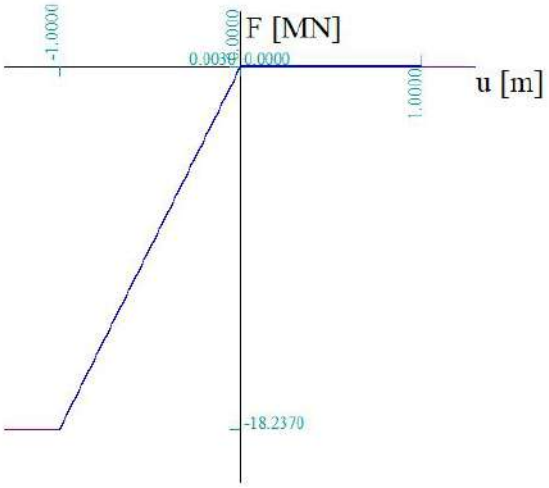
Name	Type	u / F	Positive end	Negative end
PY-curve_Veen	Translation	-0.200000 / -9000.000000	Free	Free
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		
		-0.006765 / -3100.000000		
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing



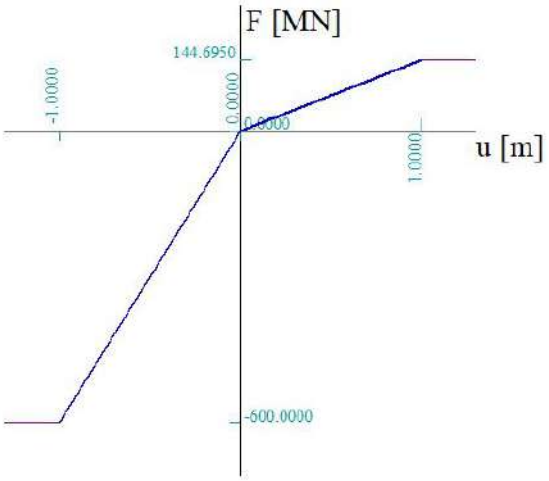
Name	Type	u / F	Positive end	Negative end
Trek-druk-LD1-paalpunt_mst127	Translation	-1.000000 / -18237000.000000	Free	Free
		0.000000 / 0.000000		
		1.000000 / 3000.000000		

Drawing



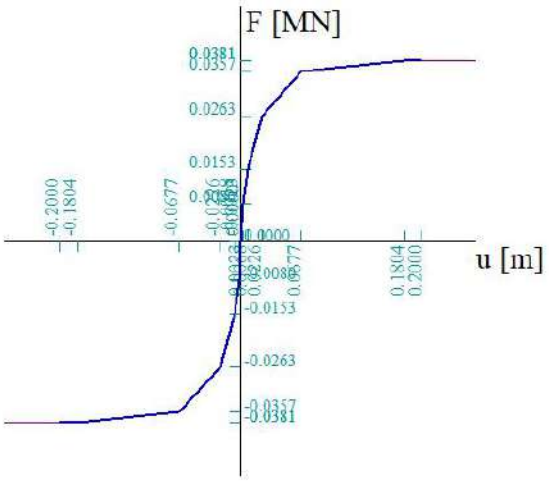
Name	Type	u / F	Positive end	Negative end
Trek-druk-MV-paalpunt_mst127	Translation	-1.000000 / -600000000.000000	Free	Free
		0.000000 / 0.000000		
		1.000000 / 144695000.000000		

Drawing



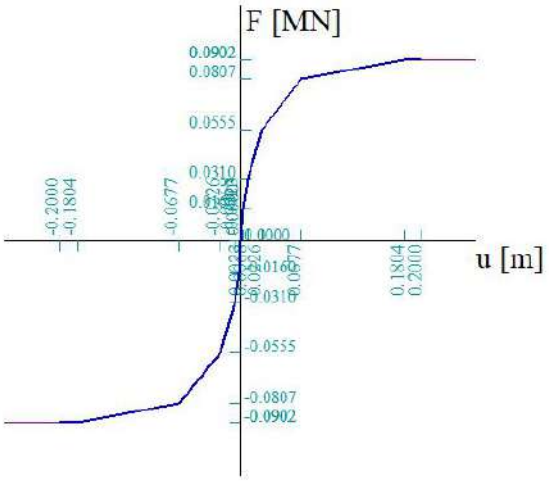
Name	Type	u / F	Positive end	Negative end
PY-curve-2_V9	Translation	-0.200000 / -38100.000000	Free	Free
		-0.180400 / -38100.000000		
		-0.067650 / -35700.000000		
		-0.022550 / -26300.000000		
		-0.006765 / -15300.000000		
		-0.002255 / -8000.000000		
		0.000000 / 0.000000		
		0.002255 / 8000.000000		
		0.006765 / 15300.000000		
		0.022550 / 26300.000000		
		0.067650 / 35700.000000		
		0.180400 / 38100.000000		
		0.200000 / 38100.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V10	Translation	-0.200000 / -90200.000000	Free	Free
		-0.180400 / -90200.000000		
		-0.067650 / -80700.000000		
		-0.022550 / -55500.000000		
		-0.006765 / -31000.000000		
		-0.002255 / -16000.000000		
		0.000000 / 0.000000		
		0.002255 / 16000.000000		
		0.006765 / 31000.000000		
		0.022550 / 55500.000000		
		0.067650 / 80700.000000		
		0.180400 / 90200.000000		
		0.200000 / 90200.000000		

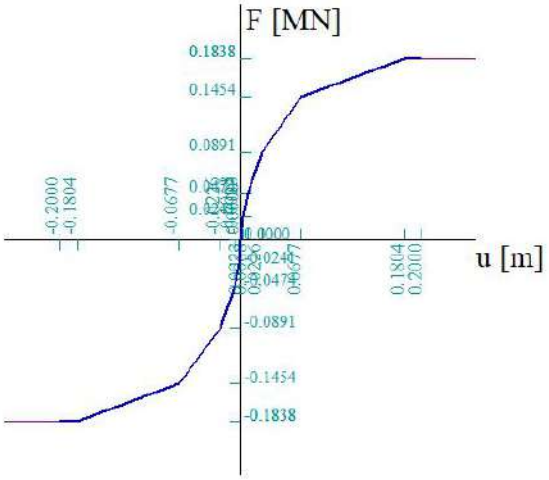
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V11	Translation	-0.200000 / -183800.000000	Free	Free
		-0.180400 / -183800.000000		
		-0.067650 / -145400.000000		
		-0.022550 / -89100.000000		
		-0.006765 / -47400.000000		
		-0.002255 / -24100.000000		
		0.000000 / 0.000000		
		0.002255 / 24100.000000		
		0.006765 / 47400.000000		
		0.022550 / 89100.000000		

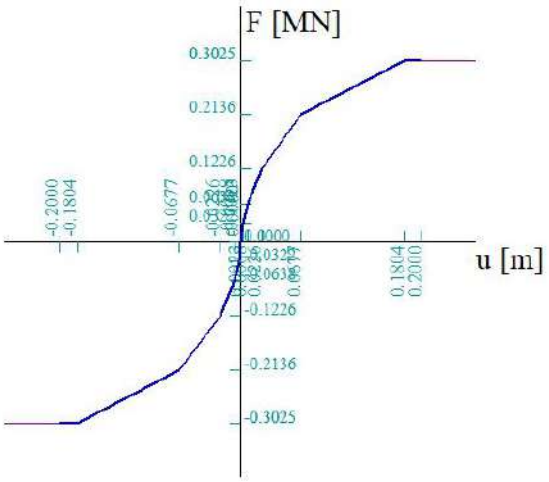
Name	Type	u / F	Positive end	Negative end
		0.067650 / 145400.000000		
		0.180400 / 183800.000000		
		0.200000 / 183800.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V12	Translation	-0.200000 / -302500.000000	Free	Free
		-0.180400 / -302500.000000		
		-0.067650 / -213600.000000		
		-0.022550 / -122600.000000		
		-0.006765 / -63800.000000		
		-0.002255 / -32200.000000		
		0.000000 / 0.000000		
		0.002255 / 32200.000000		
		0.006765 / 63800.000000		
		0.022550 / 122600.000000		
		0.067650 / 213600.000000		
		0.180400 / 302500.000000		
		0.200000 / 302500.000000		

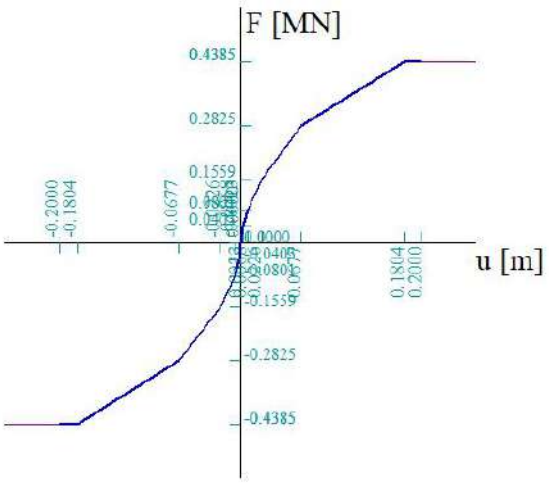
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V13	Translation	-0.200000 / -438500.000000	Free	Free
		-0.180400 / -438500.000000		
		-0.067650 / -282500.000000		
		-0.022550 / -155900.000000		

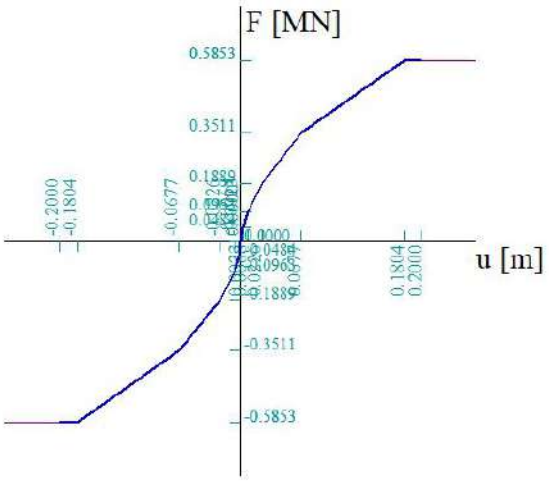
Name	Type	u / F	Positive end	Negative end
		-0.006765 / -80100.000000		
		-0.002255 / -40300.000000		
		0.000000 / 0.000000		
		0.002255 / 40300.000000		
		0.006765 / 80100.000000		
		0.022550 / 155900.000000		
		0.067650 / 282500.000000		
		0.180400 / 438500.000000		
		0.200000 / 438500.000000		

Drawing



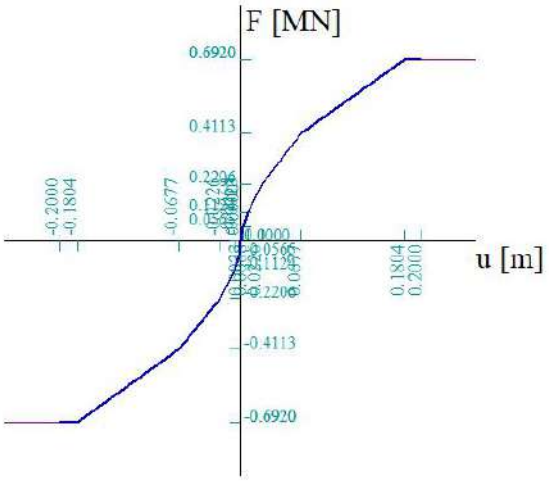
Name	Type	u / F	Positive end	Negative end
PY-curve-2_V14	Translation	-0.200000 / -585300.000000	Free	Free
		-0.180400 / -585300.000000		
		-0.067650 / -351100.000000		
		-0.022550 / -188900.000000		
		-0.006765 / -96300.000000		
		-0.002255 / -48400.000000		
		0.000000 / 0.000000		
		0.002255 / 48400.000000		
		0.006765 / 96300.000000		
		0.022550 / 188900.000000		
		0.067650 / 351100.000000		
		0.180400 / 585300.000000		
		0.200000 / 585300.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V15	Translation	-0.200000 / -692000.000000	Free	Free
		-0.180400 / -692000.000000		
		-0.067650 / -411300.000000		
		-0.022550 / -220600.000000		
		-0.006765 / -112400.000000		
		-0.002255 / -56500.000000		
		0.000000 / 0.000000		
		0.002255 / 56500.000000		
		0.006765 / 112400.000000		
		0.022550 / 220600.000000		
		0.067650 / 411300.000000		
		0.180400 / 692000.000000		
		0.200000 / 692000.000000		

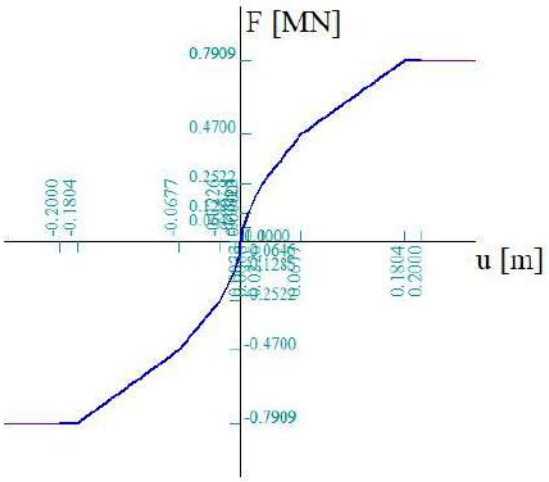
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V16	Translation	-0.200000 / -790900.000000	Free	Free
		-0.180400 / -790900.000000		
		-0.067650 / -470000.000000		
		-0.022550 / -252200.000000		
		-0.006765 / -128500.000000		
		-0.002255 / -64500.000000		
		0.000000 / 0.000000		
		0.002255 / 64500.000000		
		0.006765 / 128500.000000		
		0.022550 / 252200.000000		

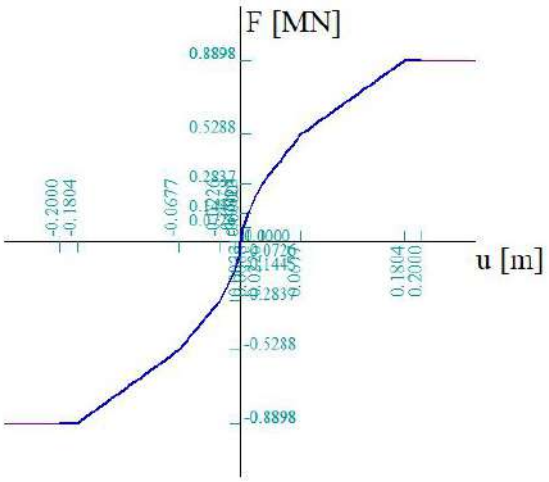
Name	Type	u / F	Positive end	Negative end
		0.067650 / 470000.000000		
		0.180400 / 790900.000000		
		0.200000 / 790900.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V17	Translation	-0.200000 / -889800.000000	Free	Free
		-0.180400 / -889800.000000		
		-0.067650 / -528800.000000		
		-0.022550 / -283700.000000		
		-0.006765 / -144500.000000		
		-0.002255 / -72600.000000		
		0.000000 / 0.000000		
		0.002255 / 72600.000000		
		0.006765 / 144500.000000		
		0.022550 / 283700.000000		
		0.067650 / 528800.000000		
		0.180400 / 889800.000000		
		0.200000 / 889800.000000		

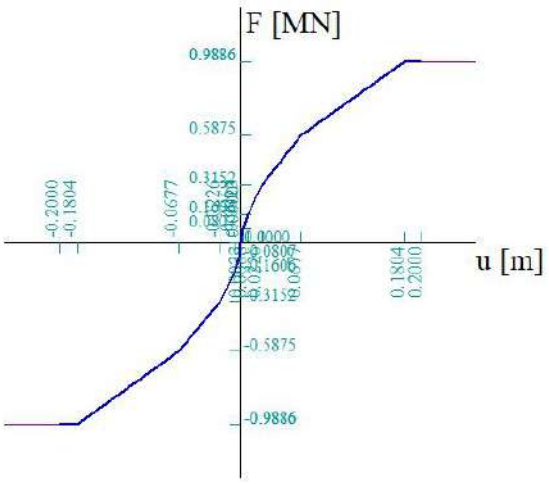
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V18	Translation	-0.200000 / -988600.000000	Free	Free
		-0.180400 / -988600.000000		
		-0.067650 / -587500.000000		
		-0.022550 / -315200.000000		

Name	Type	u / F	Positive end	Negative end
		-0.006765 / -160600.000000		
		-0.002255 / -80700.000000		
		0.000000 / 0.000000		
		0.002255 / 80700.000000		
		0.006765 / 160600.000000		
		0.022550 / 315200.000000		
		0.067650 / 587500.000000		
		0.180400 / 988600.000000		
		0.200000 / 988600.000000		

Drawing

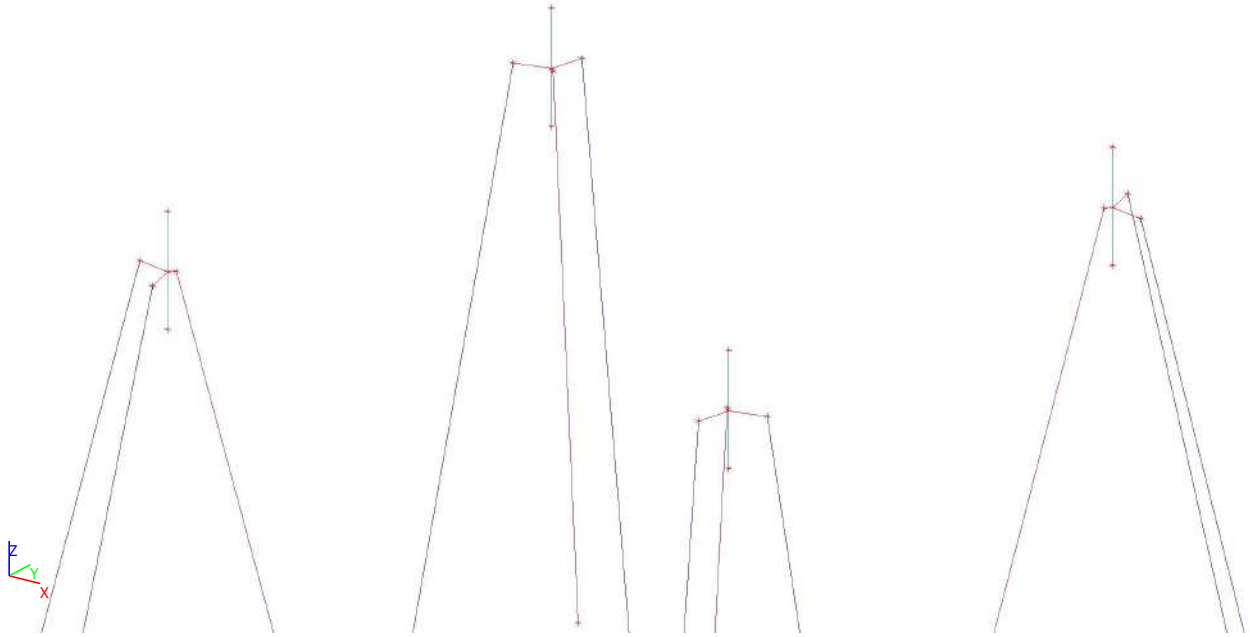


6. Belastingen

6.1. Load cases

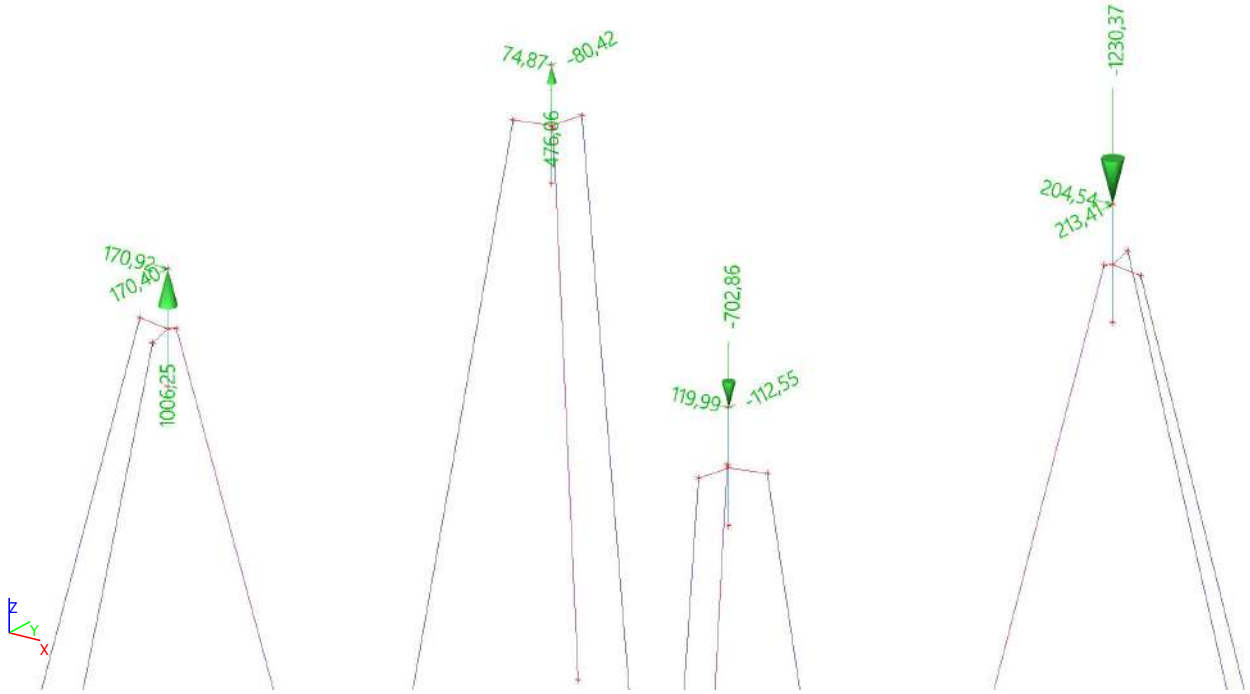
6.1.1. Load cases - EG_Fundering

Name	Description	Action type	Load group	Direction
	Spec	Load type		
EG_Fundering		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - hL Bck + Wnd ;90°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;90°		Variable	LG4	Short	None
	Standard	Static			

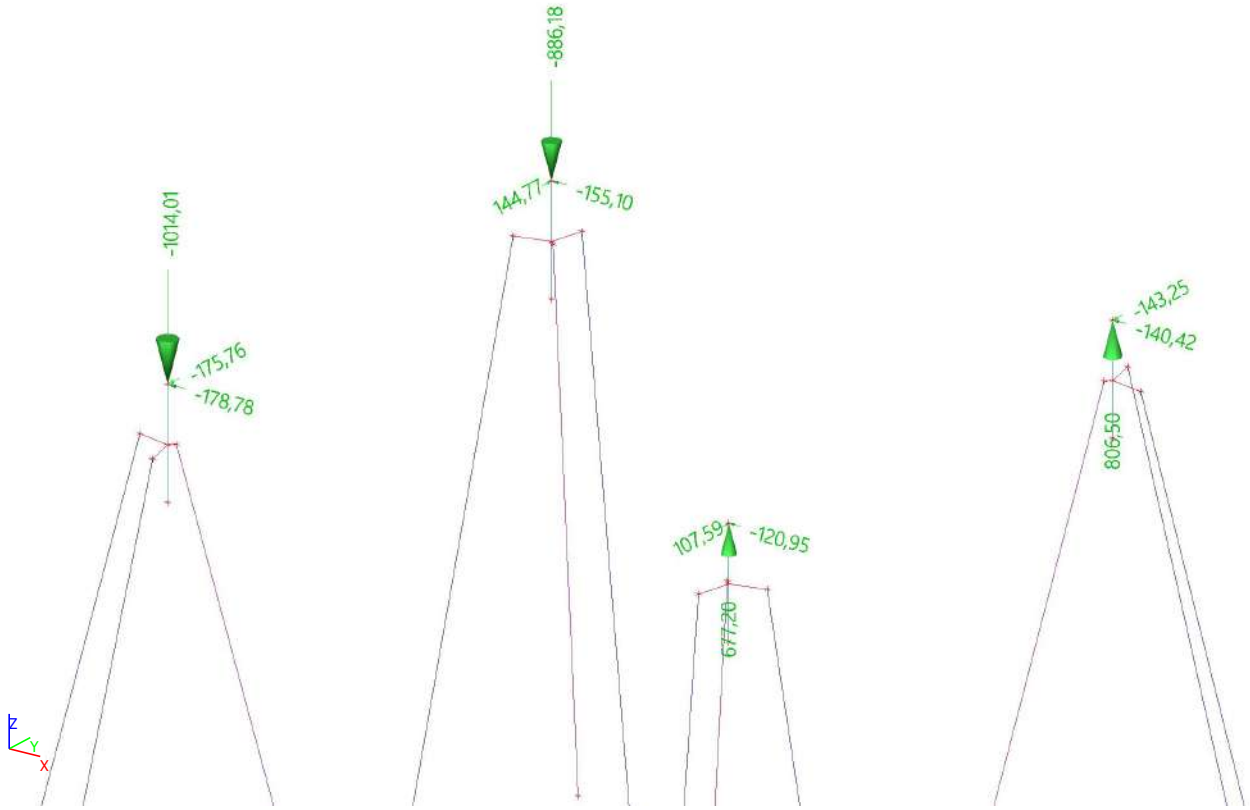


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;90°_1P_X	1P	hL Bck + Wnd ;90°	GCS	X	Force	170,92
hL Bck + Wnd ;90°_1P_Y	1P	hL Bck + Wnd ;90°	GCS	Y	Force	170,40
hL Bck + Wnd ;90°_1P_Z	1P	hL Bck + Wnd ;90°	GCS	Z	Force	1006,25
hL Bck + Wnd ;90°_1X_X	1X	hL Bck + Wnd ;90°	GCS	X	Force	74,87
hL Bck + Wnd ;90°_1X_Y	1X	hL Bck + Wnd ;90°	GCS	Y	Force	-80,42
hL Bck + Wnd ;90°_1X_Z	1X	hL Bck + Wnd ;90°	GCS	Z	Force	476,06
hL Bck + Wnd ;90°_1XY_X	1XY	hL Bck + Wnd ;90°	GCS	X	Force	204,54
hL Bck + Wnd ;90°_1XY_Y	1XY	hL Bck + Wnd ;90°	GCS	Y	Force	213,41
hL Bck + Wnd ;90°_1XY_Z	1XY	hL Bck + Wnd ;90°	GCS	Z	Force	-1230,37
hL Bck + Wnd ;90°_1Y_X	1Y	hL Bck + Wnd ;90°	GCS	X	Force	119,99
hL Bck + Wnd ;90°_1Y_Y	1Y	hL Bck + Wnd ;90°	GCS	Y	Force	-112,55
hL Bck + Wnd ;90°_1Y_Z	1Y	hL Bck + Wnd ;90°	GCS	Z	Force	-702,86

6.1.3. Load cases - hL Ahd + Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



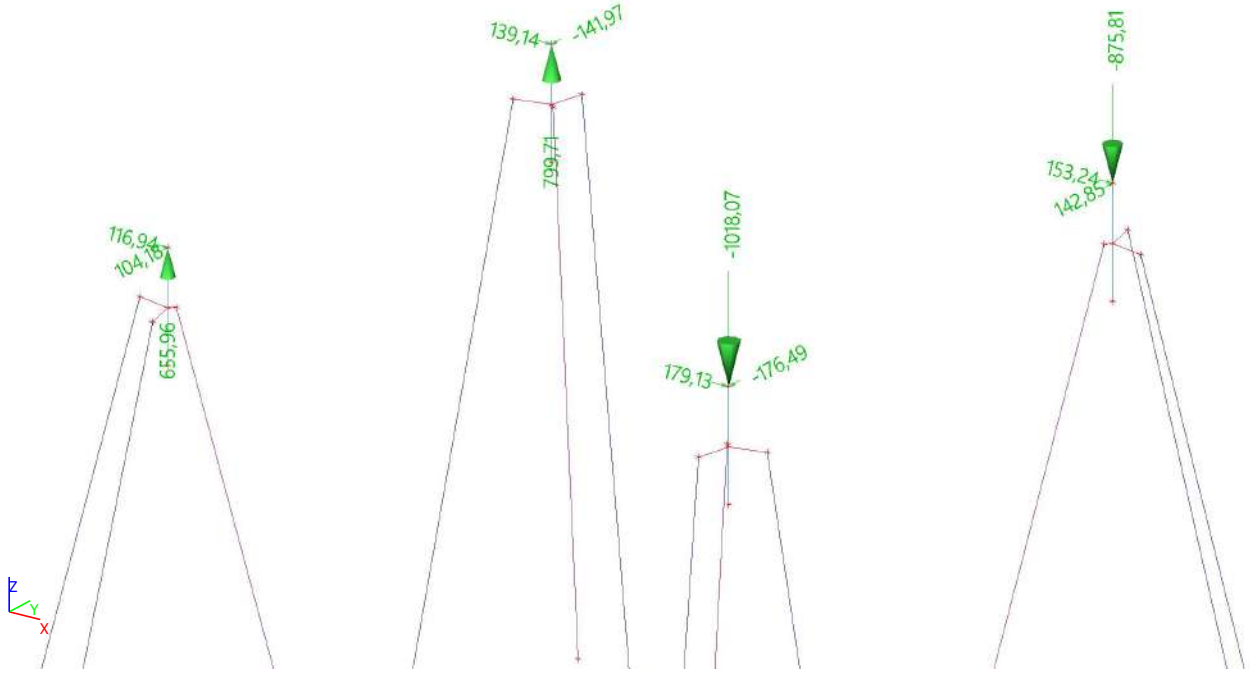
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;315°_1P_X	1P	hL Ahd + Wnd ;315°	GCS	X	Force	-178,78
hL Ahd + Wnd ;315°_1P_Y	1P	hL Ahd + Wnd ;315°	GCS	Y	Force	-175,76
hL Ahd + Wnd ;315°_1P_Z	1P	hL Ahd + Wnd ;315°	GCS	Z	Force	-1014,01
hL Ahd + Wnd ;315°_1X_X	1X	hL Ahd + Wnd ;315°	GCS	X	Force	-155,10
hL Ahd + Wnd ;315°_1X_Y	1X	hL Ahd + Wnd ;315°	GCS	Y	Force	144,77
hL Ahd + Wnd ;315°_1X_Z	1X	hL Ahd + Wnd ;315°	GCS	Z	Force	-886,18
hL Ahd + Wnd ;315°_1XY_X	1XY	hL Ahd + Wnd ;315°	GCS	X	Force	-140,42
hL Ahd + Wnd ;315°_1XY_Y	1XY	hL Ahd + Wnd ;315°	GCS	Y	Force	-143,25
hL Ahd + Wnd ;315°_1XY_Z	1XY	hL Ahd + Wnd ;315°	GCS	Z	Force	806,50
hL Ahd + Wnd ;315°_1Y_X	1Y	hL Ahd + Wnd ;315°	GCS	X	Force	-120,95
hL Ahd + Wnd ;315°_1Y_Y	1Y	hL Ahd + Wnd ;315°	GCS	Y	Force	107,59

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;315°_1Y_Z	1Y	hL Ahd + Wnd ;315°	GCS	Z	Force	677,20

6.1.4. Load cases - hL Bck + Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



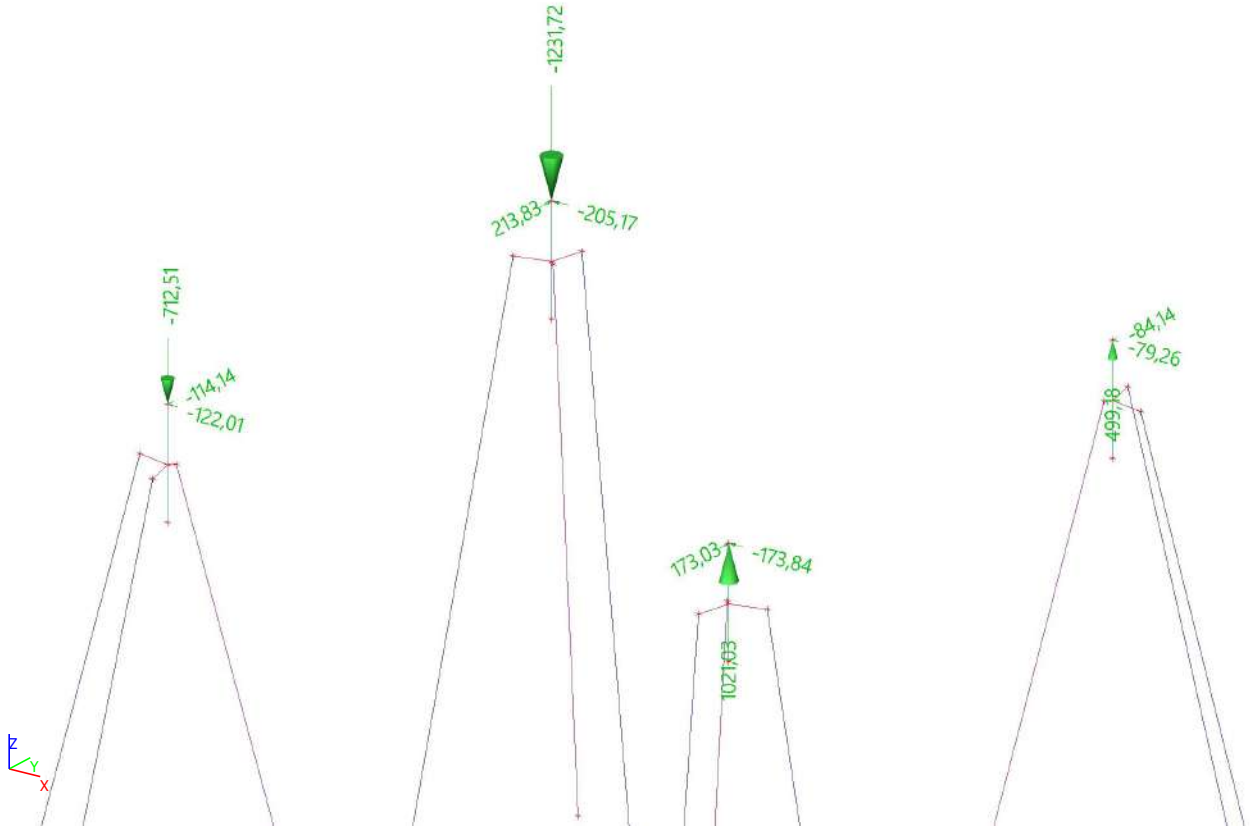
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;225°_1P_X	1P	hL Bck + Wnd ;225°	GCS	X	Force	116,94
hL Bck + Wnd ;225°_1P_Y	1P	hL Bck + Wnd ;225°	GCS	Y	Force	104,18
hL Bck + Wnd ;225°_1P_Z	1P	hL Bck + Wnd ;225°	GCS	Z	Force	655,96
hL Bck + Wnd ;225°_1X_X	1X	hL Bck + Wnd ;225°	GCS	X	Force	139,14
hL Bck + Wnd ;225°_1X_Y	1X	hL Bck + Wnd ;225°	GCS	Y	Force	-141,97
hL Bck + Wnd ;225°_1X_Z	1X	hL Bck + Wnd ;225°	GCS	Z	Force	799,71
hL Bck + Wnd ;225°_1XY_X	1XY	hL Bck + Wnd ;225°	GCS	X	Force	153,24
hL Bck + Wnd ;225°_1XY_Y	1XY	hL Bck + Wnd ;225°	GCS	Y	Force	142,85

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;225°_1XY_Z	1XY	hL Bck + Wnd ;225°	GCS	Z	Force	-875,81
hL Bck + Wnd ;225°_1Y_X	1Y	hL Bck + Wnd ;225°	GCS	X	Force	179,13
hL Bck + Wnd ;225°_1Y_Y	1Y	hL Bck + Wnd ;225°	GCS	Y	Force	-176,49
hL Bck + Wnd ;225°_1Y_Z	1Y	hL Bck + Wnd ;225°	GCS	Z	Force	-1018,07

6.1.5. Load cases - hL Ahd + Wnd ;90°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;90°		Variable	LG4	Short	None
	Standard	Static			



6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;90°_1P_X	1P	hL Ahd + Wnd ;90°	GCS	X	Force	-122,01
hL Ahd + Wnd ;90°_1P_Y	1P	hL Ahd + Wnd ;90°	GCS	Y	Force	-114,14
hL Ahd + Wnd ;90°_1P_Z	1P	hL Ahd + Wnd ;90°	GCS	Z	Force	-712,51
hL Ahd + Wnd ;90°_1X_X	1X	hL Ahd + Wnd ;90°	GCS	X	Force	-205,17
hL Ahd + Wnd ;90°_1X_Y	1X	hL Ahd + Wnd ;90°	GCS	Y	Force	213,83

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;90°_1X_Z	1X	hL Ahd + Wnd ;90°	GCS	Z	Force	-1231,72
hL Ahd + Wnd ;90°_1XY_X	1XY	hL Ahd + Wnd ;90°	GCS	X	Force	-79,26
hL Ahd + Wnd ;90°_1XY_Y	1XY	hL Ahd + Wnd ;90°	GCS	Y	Force	-84,14
hL Ahd + Wnd ;90°_1XY_Z	1XY	hL Ahd + Wnd ;90°	GCS	Z	Force	499,18
hL Ahd + Wnd ;90°_1Y_X	1Y	hL Ahd + Wnd ;90°	GCS	X	Force	-173,84
hL Ahd + Wnd ;90°_1Y_Y	1Y	hL Ahd + Wnd ;90°	GCS	Y	Force	173,03
hL Ahd + Wnd ;90°_1Y_Z	1Y	hL Ahd + Wnd ;90°	GCS	Z	Force	1021,03

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
hL Bck + Wnd ;90° - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		hL Bck + Wnd ;90°	1,000
hL Bck + Wnd ;225° - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		hL Bck + Wnd ;225°	1,000
hL Ahd + Wnd ;315° - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		hL Ahd + Wnd ;315°	1,000
hL Ahd + Wnd ;90 - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		hL Ahd + Wnd ;90°	1,000
hL Bck + Wnd ;90° - EG_gunstig	Ultimate	EG_Fundering	0,900
		hL Bck + Wnd ;90°	1,000
hL Bck + Wnd ;225° - EG_gunstig	Ultimate	EG_Fundering	0,900
		hL Bck + Wnd ;225°	1,000
hL Ahd + Wnd ;315° - EG_gunstig	Ultimate	EG_Fundering	0,900
		hL Ahd + Wnd ;315°	1,000
hL Ahd + Wnd ;90 - EG_gunstig	Ultimate	EG_Fundering	0,900
		hL Ahd + Wnd ;90°	1,000

6.3. Result classes

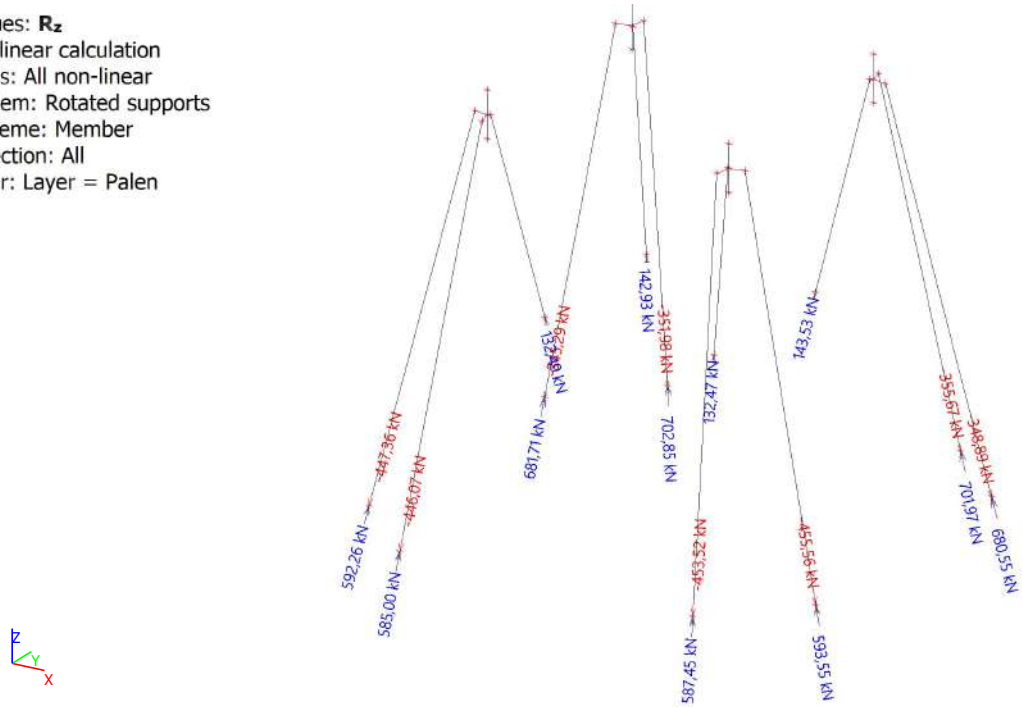
Name	List
All non-linear	hL Bck + Wnd ;90° - EG_Ongunstig
	hL Bck + Wnd ;225° - EG_Ongunstig
	hL Ahd + Wnd ;315° - EG_Ongunstig
	hL Ahd + Wnd ;90 - EG_Ongunstig
	hL Bck + Wnd ;90° - EG_gunstig
	hL Bck + Wnd ;225° - EG_gunstig
	hL Ahd + Wnd ;315° - EG_gunstig
	hL Ahd + Wnd ;90 - EG_gunstig

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Cross-section = LD1(31-plank) - General cross-section
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_2_LD1/S_P_2_LD1	hL Bck + Wnd ;90° - EG_gunstig	0,00	0,00	**49,97**	0,00	0,00	0,00	0,0	0,0
Sn8/S_XY_2_LD1	hL Bck + Wnd ;90° - EG_Ongunstig	**0,00**	**0,00**	**143,53**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Cross-section = MV Paal - HEB220
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_Y_3_MV/N211	hL Ahd + Wnd ;90 - EG_gunstig	0,00	0,00	**-455,56**	0,00	0,00	0,00	0,0	0,0
S_X_1_MV/N225	hL Ahd + Wnd ;90 - EG_Ongunstig	**0,00**	**0,00**	**702,85**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.4. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen

Nodal reactions

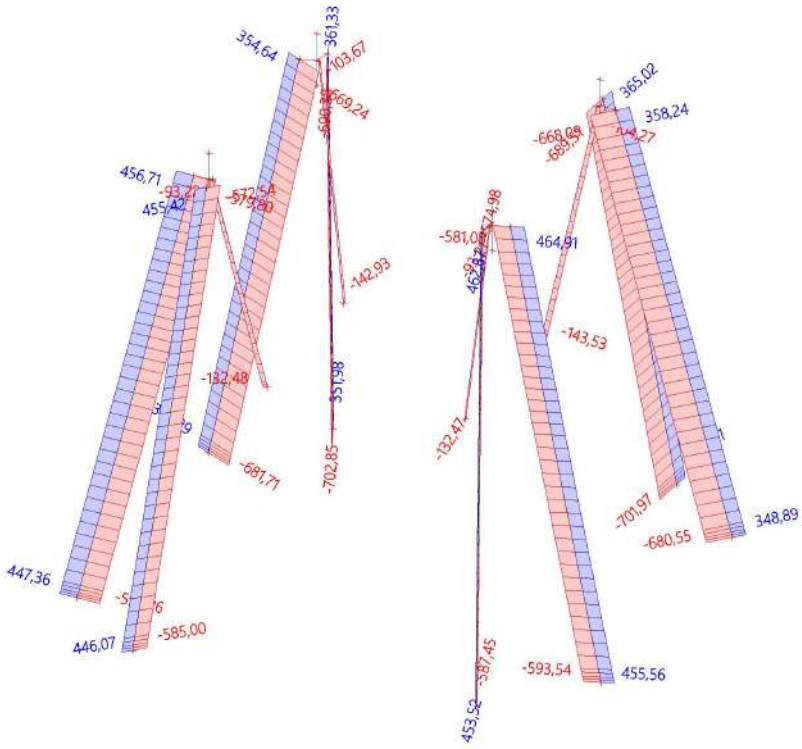
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_2_LD1/S_P_2_LD1	hL Bck + Wnd ;90° - EG_gunstig	0,00	0,00	**49,97**	0,00	0,00	0,00	0,0	0,0
S_P_2_LD1/S_P_2_LD1	hL Ahd + Wnd ;90 - EG_Ongunstig	**0,00**	**0,00**	**132,49**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_1_MV/N143	hL Bck + Wnd ;90° - EG_gunstig	0,00	0,00	**-447,36**	0,00	0,00	0,00	0,0	0,0
S_P_1_MV/N143	hL Ahd + Wnd ;315° - EG_Ongunstig	**0,00**	**0,00**	**592,26**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_3_MV/N145	hL Bck + Wnd ;90° - EG_gunstig	0,00	0,00	**-446,07**	0,00	0,00	0,00	0,0	0,0
S_P_3_MV/N145	hL Ahd + Wnd ;315° - EG_Ongunstig	**0,00**	**0,00**	**585,00**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_2_LD1/S_Y_2_LD1	hL Ahd + Wnd ;90 - EG_gunstig	**0,00**	**0,00**	**50,38**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_2_LD1/S_Y_2_LD1	hL Bck + Wnd ;90° - EG_Ongunstig	0,00	0,00	**132,47**	0,00	0,00	**0,00**	0,0	0,0
S_Y_1_MV/N209	hL Ahd + Wnd ;90 - EG_gunstig	0,00	0,00	**-453,52**	0,00	0,00	0,00	0,0	0,0
S_Y_1_MV/N209	hL Bck + Wnd ;225° - EG_Ongunstig	**0,00**	**0,00**	**587,45**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_3_MV/N211	hL Ahd + Wnd ;90 - EG_gunstig	0,00	0,00	**-455,56**	0,00	0,00	0,00	0,0	0,0
S_Y_3_MV/N211	hL Bck + Wnd ;225° - EG_Ongunstig	**0,00**	**0,00**	**593,55**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn8/S_XY_2_LD1	hL Ahd + Wnd ;90 - EG_gunstig	**0,00**	**0,00**	**52,99**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn8/S_XY_2_LD1	hL Bck + Wnd ;90° - EG_Ongunstig	0,00	0,00	**143,53**	0,00	0,00	**0,00**	0,0	0,0
S_XY_1_MV/N217	hL Ahd + Wnd ;315° - EG_gunstig	**0,00**	**0,00**	**-348,89**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_1_MV/N217	hL Bck + Wnd ;90° -	0,00	0,00	**680,55**	0,00	0,00	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	EG_Ongunstig								
S_XY_3_MV/N219	hL Ahd + Wnd ;315° - EG_gunstig	**0,00**	**0,00**	**-355,67**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_3_MV/N219	hL Bck + Wnd ;90° - EG_Ongunstig	0,00	0,00	**701,97**	0,00	0,00	**0,00**	0,0	0,0
Sn11/S_X_2_LD1	hL Bck + Wnd ;90° - EG_gunstig	0,00	0,00	**53,27**	0,00	0,00	0,00	0,0	0,0
Sn11/S_X_2_LD1	hL Ahd + Wnd ;90 - EG_Ongunstig	**0,00**	**0,00**	**142,93**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_1_MV/N225	hL Bck + Wnd ;225° - EG_gunstig	0,00	0,00	**-351,98**	0,00	0,00	0,00	0,0	0,0
S_X_1_MV/N225	hL Ahd + Wnd ;90 - EG_Ongunstig	**0,00**	**0,00**	**702,85**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_3_MV/N227	hL Bck + Wnd ;225° - EG_gunstig	0,00	0,00	**-345,29**	0,00	0,00	0,00	0,0	0,0
S_X_3_MV/N227	hL Ahd + Wnd ;90 - EG_Ongunstig	**0,00**	**0,00**	**681,71**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

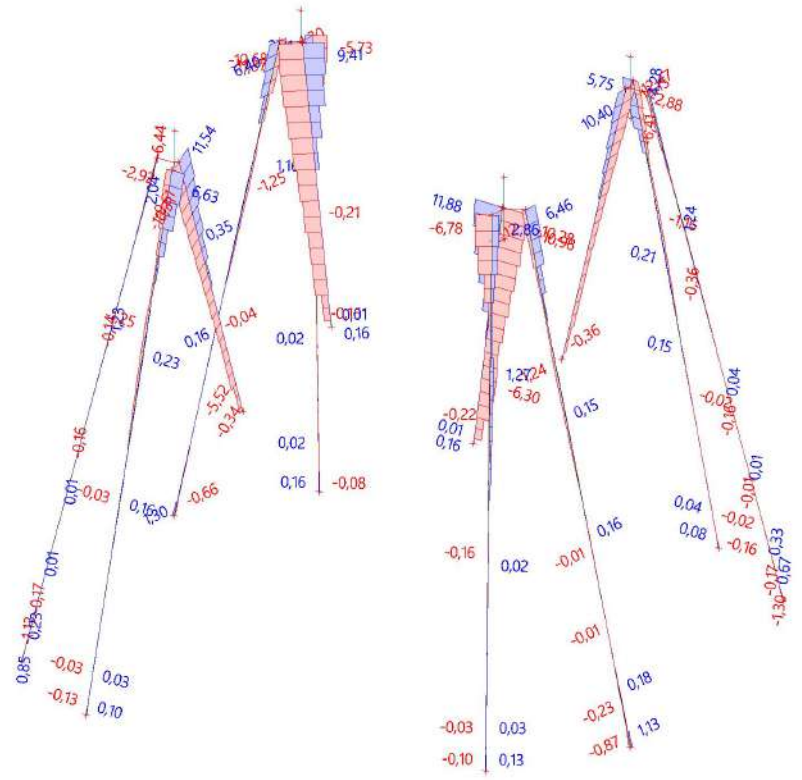
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



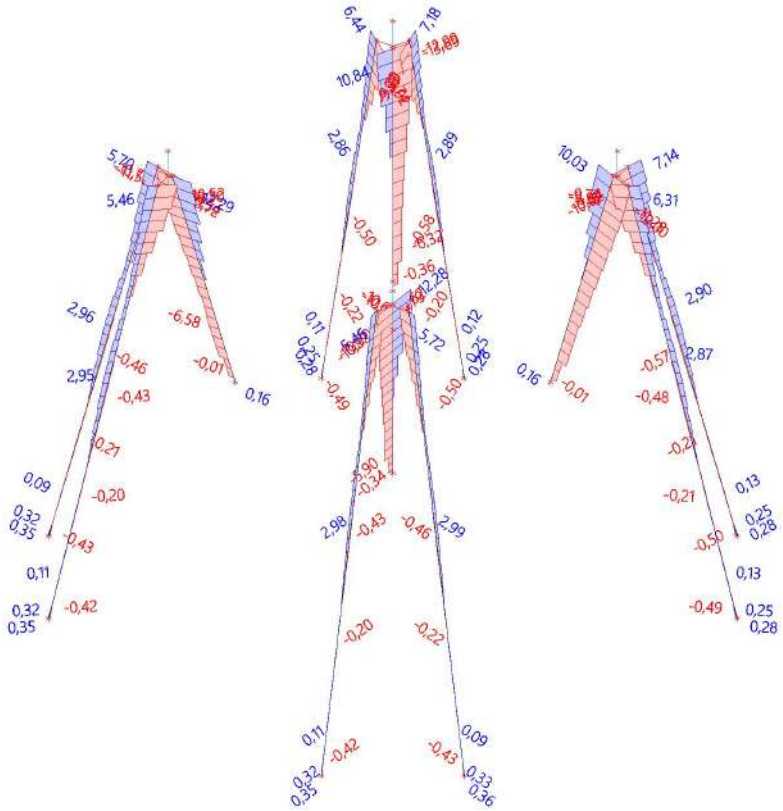
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



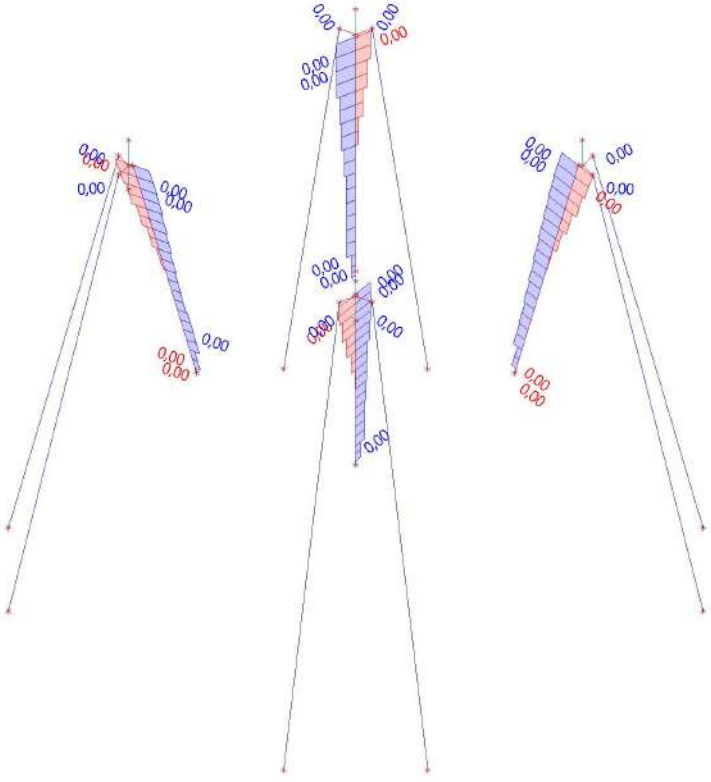
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



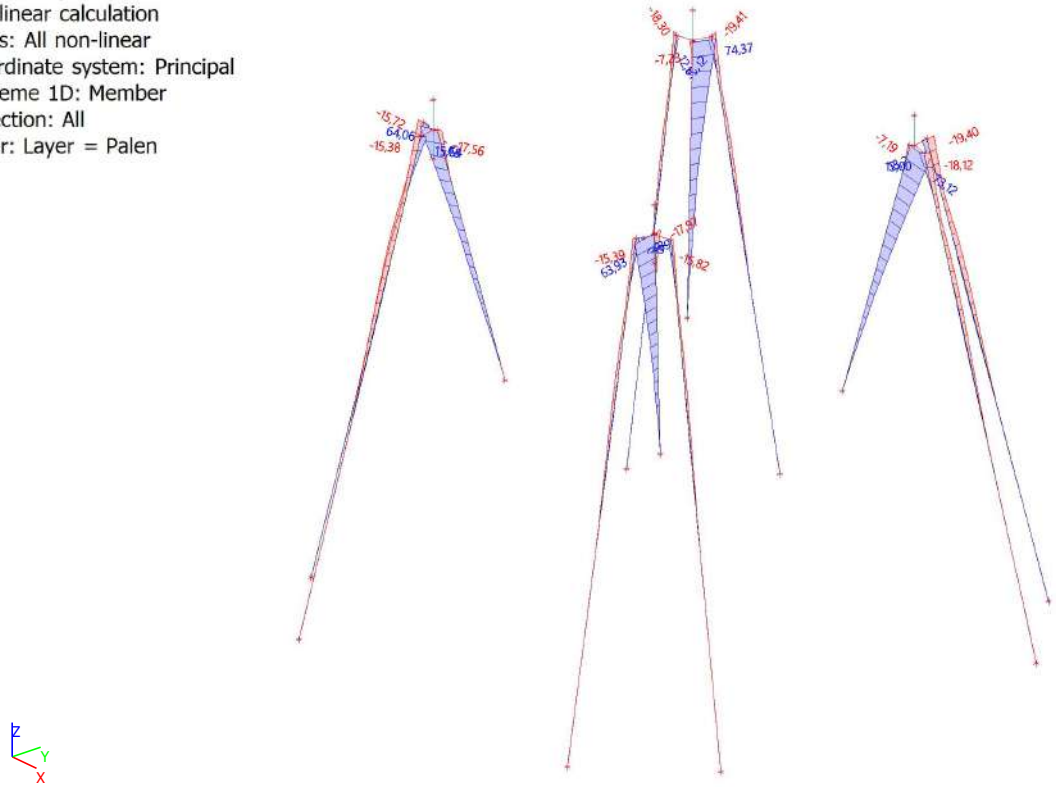
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



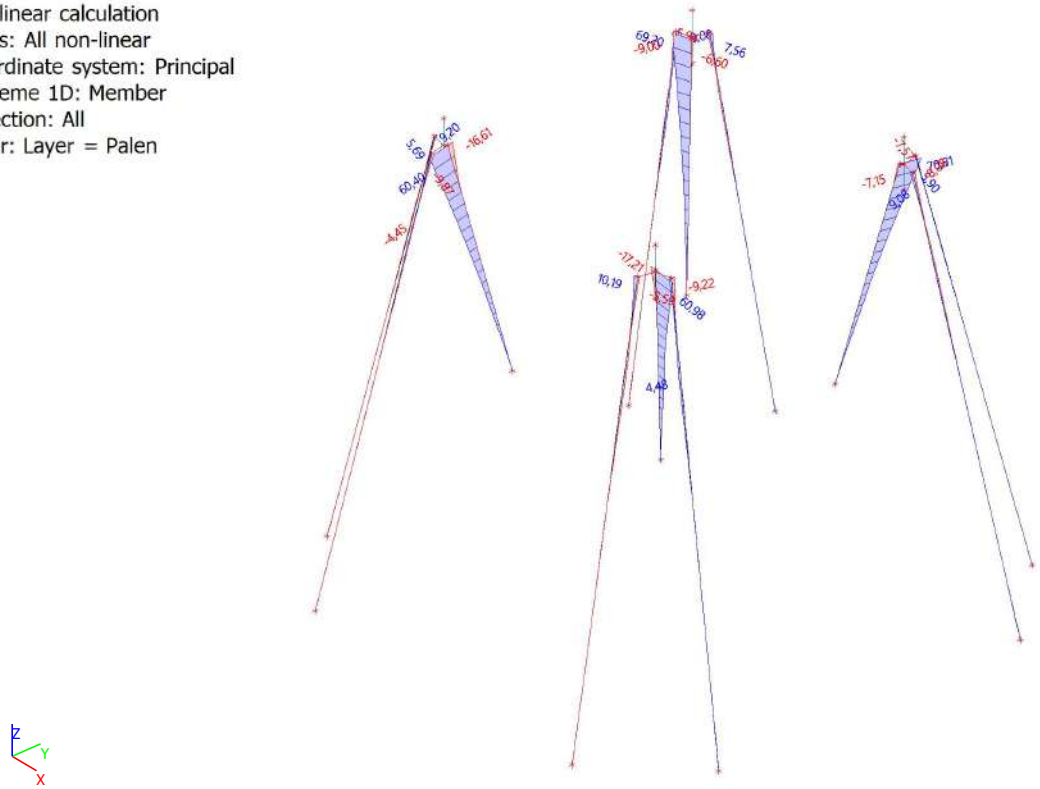
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Nothing in selection to display.

7.2.8. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Cross-section = MV Paal - HEB220

Name	dx [m]	Case	Cross-section	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_X_1	17,507	hL Ahd + Wnd ;90 - EG_Ongunstig	MV Paal - HEB220	**-702,85**	0,16	-0,50	0,00	0,00	0,00
Paal_Y_1	0,000	hL Ahd + Wnd ;315° - EG_Ongunstig	MV Paal - HEB220	258,31	**-6,78**	-8,29	0,00	9,71	**10,19**
Paal_Y_3	1,000-	hL Ahd + Wnd ;90 - EG_Ongunstig	MV Paal - HEB220	449,98	6,46	**-10,82**	0,00	4,83	-2,76
Paal_X_1	0,000	hL Ahd + Wnd ;90 - EG_gunstig	MV Paal - HEB220	-674,19	1,74	**7,18**	0,00	**-19,41**	-4,00
Paal_Y_3	0,000	hL Ahd + Wnd ;90 - EG_gunstig	MV Paal - HEB220	**464,91**	6,14	-10,34	**0,00**	**15,95**	-8,87
Paal_P_3	0,000	hL Bck + Wnd ;225° - EG_Ongunstig	MV Paal - HEB220	248,23	**6,63**	-8,15	0,00	9,39	**-9,87**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer_Y	1,050	hL Ahd + Wnd ;90 - EG_Ongunstig	**1021,03**	-245,27	-0,57	**0,00**	0,00	0,00
Poer_Y	0,000	hL Ahd + Wnd ;90 - EG_gunstig	948,24	**-245,27**	-0,57	0,00	0,60	**257,54**
Poer_Y	0,000	hL Ahd + Wnd ;315° - EG_Ongunstig	580,15	-161,60	**-9,45**	0,00	**9,92**	169,68
Poer_P	0,000	hL Bck + Wnd ;225° - EG_Ongunstig	558,91	-156,36	**9,02**	0,00	**-9,47**	164,17
Poer_X	0,000	hL Ahd + Wnd ;90 - EG_Ongunstig	**-1328,77**	**296,28**	-6,12	0,00	6,43	**-311,09**

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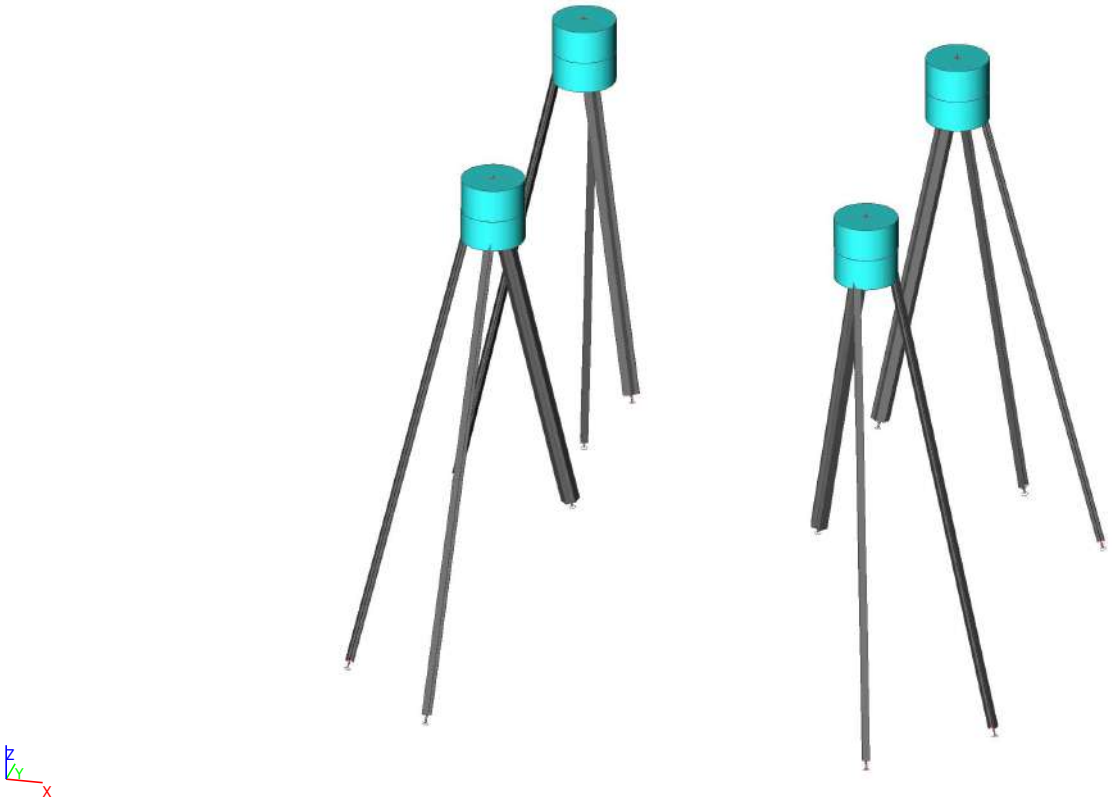
2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Cilinderpoer 2xMV 1xLD1 HE+6
Author	[redacted]
Date	12-05-2026
Structure	General XYZ
No. of nodes :	36
No. of beams :	20
No. of slabs :	0
No. of solids :	0
No. of used profiles :	3
No. of load cases :	5
No. of used materials :	5
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analysis model



4. Modeleigenschappen

4.1. Materials

Steel EC3

Name	ρ [kg/m³]	E_{mod} [MPa]	μ [-]	Lower limit [mm]	Upper limit [mm]	F_y [MPa]	F_u [MPa]	Colour
		G_{mod} [MPa]	α [m/mK]					
S 235	6850,00	2,1000e+05	0,30	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	
S 235	6850,00	2,1000e+05	0,30	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	

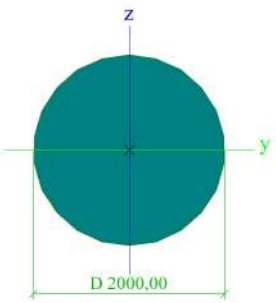
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ [-]	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C12/15 Gescheurd	Concrete	2500,00	2600,00	7,0000e+03	0,20	0,01e-003	12,00	
C12/15 Gescheurd	Concrete	1500,00	2600,00	7,0000e+03	0,20	0,01e-003	12,00	

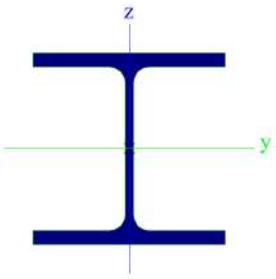
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

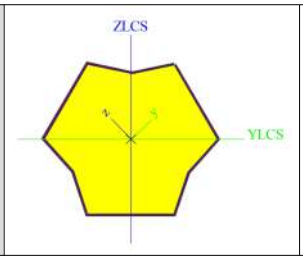
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Reinforcement steel	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

4.2. Cross-sections

Poer		
Type	Circle	
Detailed	2000,00	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
Fabrication	general	
Colour		
A [mm²]	3,1416e+06	
A_y [mm²], A_z [mm²]	2,8274e+06	2,8274e+06
A_L [m²/m], A_D [m²/m]	6,2829e+00	6,2829e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	1000,00	1000,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	7,8540e+11	7,8540e+11
i_y [mm], i_z [mm]	499,95	499,95
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	7,8540e+08	7,8540e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	1,3333e+09	1,3333e+09
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	1,5708e+12	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		

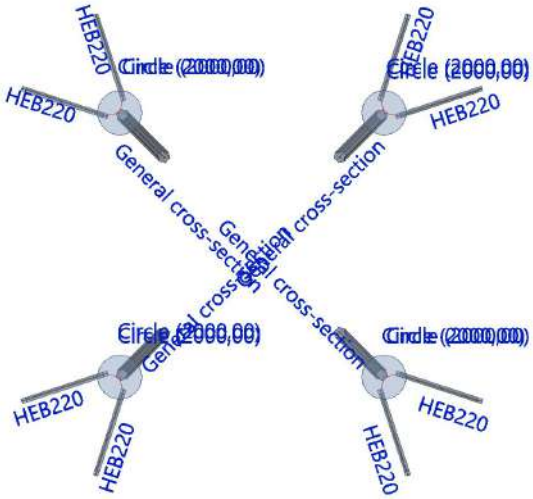
MV Paal		
Type	HEB220	
Formcode	1 - I section	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	b	c
A [mm²]	9,1040e+03	
A_y [mm²], A_z [mm²]	6,7051e+03	2,2063e+03
A_L [m²/m], A_D [m²/m]	1,2700e+00	1,2700e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	110,00	110,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	8,0910e+07	2,8430e+07
i_y [mm], i_z [mm]	94,27	55,88
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	7,3550e+05	2,5850e+05
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	8,2700e+05	3,9390e+05
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	194462180,02	194462180,02
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	92575756,56	92575756,56
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	7,6570e+05	2,9542e+11
β_y [mm], β_z [mm]	0,00	0,00
Picture		

LD1(31-plank)		
Type	General cross-section	
Shape type	Thick-walled	
Item material	C12/15 Gescheurd	
	S 235	
Fabrication	concrete	
Flexural buckling y-y, Flexural buckling z-z	d	d
A [mm²]	6,0572e+05	
A_y [mm²], A_z [mm²]	3,6248e+05	3,6314e+05
A_L [m²/m], A_D [m²/m]	1,7651e+00	3,4664e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	553,25	9,99
$I_{Y.LCS}$ [mm⁴], $I_{Z.LCS}$ [mm⁴]	1,6274e+10	1,6264e+10
$I_{YZ.LCS}$ [mm⁴]	-1,0231e+08	
α [deg]	43,55	
I_y [mm⁴], I_z [mm⁴]	1,6372e+10	1,6167e+10
i_y [mm], i_z [mm]	164,40	163,37
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	5,7898e+07	5,8163e+07
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	4,9594e+07	4,9245e+07
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	601215312,58	595125922,92
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	597037111,16	590937542,96
d_y [mm], d_z [mm]	0,12	0,03
I_t [mm⁴], I_w [mm⁶]	2,6243e+10	1,7700e+12
β_y [mm], β_z [mm]	0,09	0,21

Picture		

4.3. Analyse model met doorsneden

4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	MeshSetup1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	1
Average size of 2D mesh element [m]	0,200
Average size of 1D mesh element on curved 1D members [m]	0,100
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

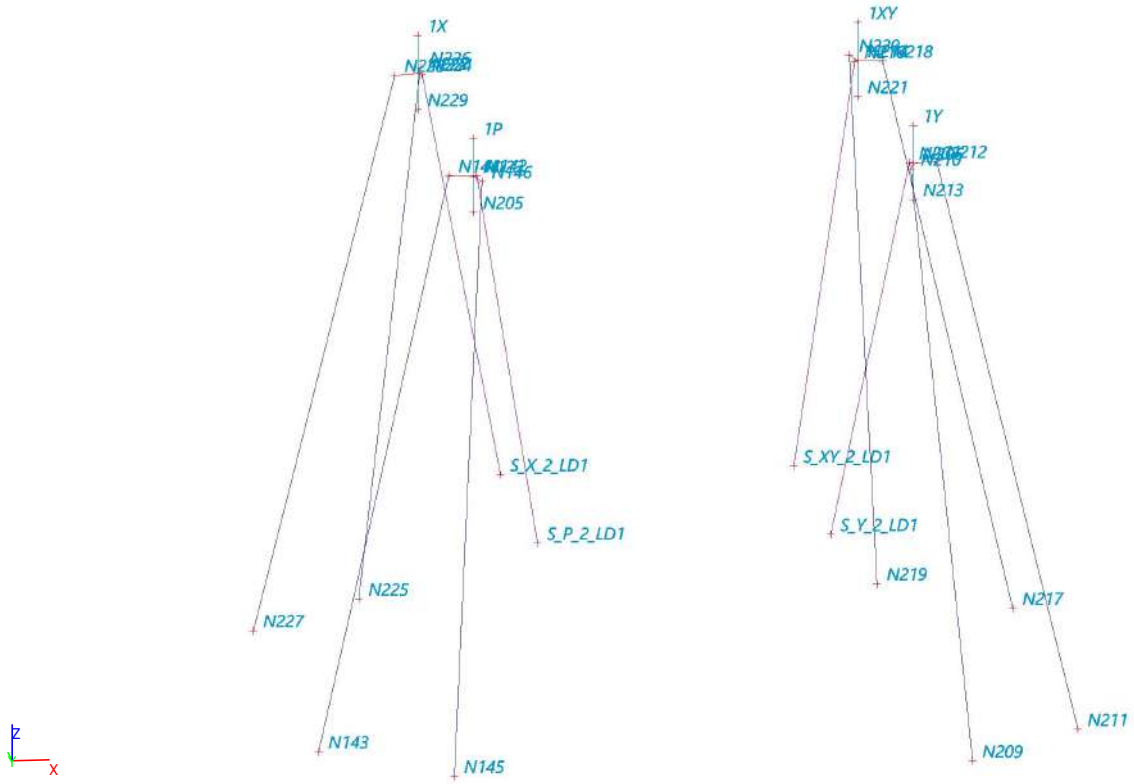
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N123	0,000	0,000	0,000
1P	0,000	0,000	1,050
S_P_2_LD1	1,990	1,990	-10,679
N142	0,100	0,100	0,000
N143	-4,331	-1,061	-15,530

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N144	-0,650	0,150	0,000
N145	-1,061	-4,331	-15,530
N146	0,150	-0,650	0,000
N205	0,000	0,000	-1,000
N206	11,938	0,000	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
1Y	11,938	0,000	1,050
S_Y_2_LD1	9,948	1,990	-10,679
N208	11,838	0,100	0,000
N209	12,999	-4,331	-15,530
N210	11,788	-0,650	0,000
N211	16,269	-1,061	-15,530
N212	12,588	0,150	0,000
N213	11,938	0,000	-1,000
N214	11,938	11,938	0,000
1XY	11,938	11,938	1,050
S_XY_2_LD1	9,948	9,948	-10,679
N216	11,838	11,838	0,000
N217	16,269	12,999	-15,530

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N218	12,588	11,788	0,000
N219	12,999	16,269	-15,530
N220	11,788	12,588	0,000
N221	11,938	11,938	-1,000
N222	0,000	11,938	0,000
1X	0,000	11,938	1,050
S_X_2_LD1	1,990	9,948	-10,679
N224	0,100	11,838	0,000
N225	-1,061	16,269	-15,530
N226	0,150	12,588	0,000
N227	-4,331	12,999	-15,530
N228	-0,650	11,788	0,000
N229	0,000	11,938	-1,000

5.2. Analyse model met knopen

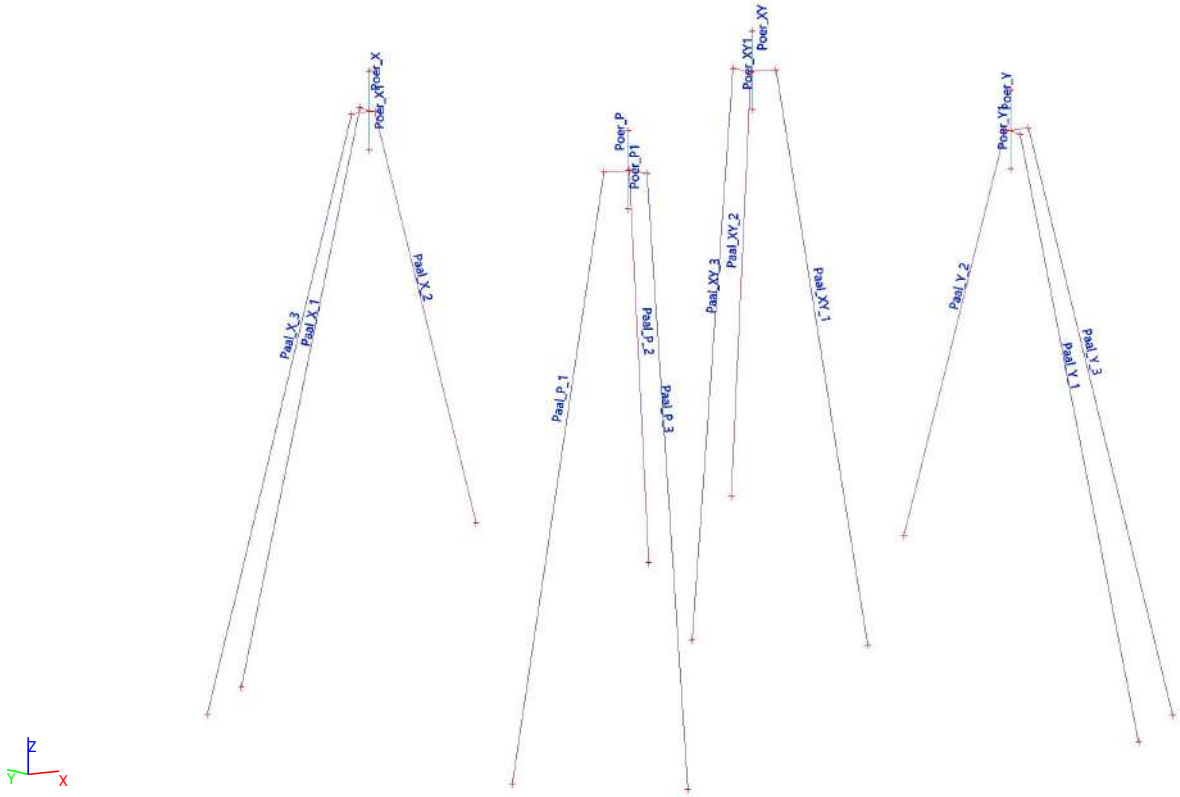


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_1	MV Paal - HEB220	S 235	16,007	N144	N143	column (100)
Paal_P_2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	11,009	N142	S_P_2_LD1	column (100)
Paal_P_3	MV Paal - HEB220	S 235	16,007	N146	N145	column (100)
Paal_XY_1	MV Paal - HEB220	S 235	16,007	N218	N217	column (100)
Paal_XY_2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	11,009	N216	S_XY_2_LD1	column (100)
Paal_XY_3	MV Paal - HEB220	S 235	16,007	N220	N219	column (100)
Paal_X_1	MV Paal - HEB220	S 235	16,007	N226	N225	column (100)
Paal_X_2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	11,009	N224	S_X_2_LD1	column (100)
Paal_X_3	MV Paal - HEB220	S 235	16,007	N228	N227	column (100)
Paal_Y_1	MV Paal - HEB220	S 235	16,007	N210	N209	column (100)
Paal_Y_2	LD1(31-plank) - General cross-section	C12/15 Gescheurd	11,009	N208	S_Y_2_LD1	column (100)
Paal_Y_3	MV Paal - HEB220	S 235	16,007	N212	N211	column (100)
Poer_P	Poer - Circle (2000,00)	C12/15 Gescheurd	1,050	N123	1P	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Poer_P1	Poer - Circle (2000,00)	C12/15 Gescheurd	1,000	N205	N123	column (100)
Poer_X	Poer - Circle (2000,00)	C12/15 Gescheurd	1,050	N222	1X	column (100)
Poer_X1	Poer - Circle (2000,00)	C12/15 Gescheurd	1,000	N229	N222	column (100)
Poer_XY	Poer - Circle (2000,00)	C12/15 Gescheurd	1,050	N214	1XY	column (100)
Poer_XY1	Poer - Circle (2000,00)	C12/15 Gescheurd	1,000	N221	N214	column (100)
Poer_Y	Poer - Circle (2000,00)	C12/15 Gescheurd	1,050	N206	1Y	column (100)
Poer_Y1	Poer - Circle (2000,00)	C12/15 Gescheurd	1,000	N213	N206	column (100)

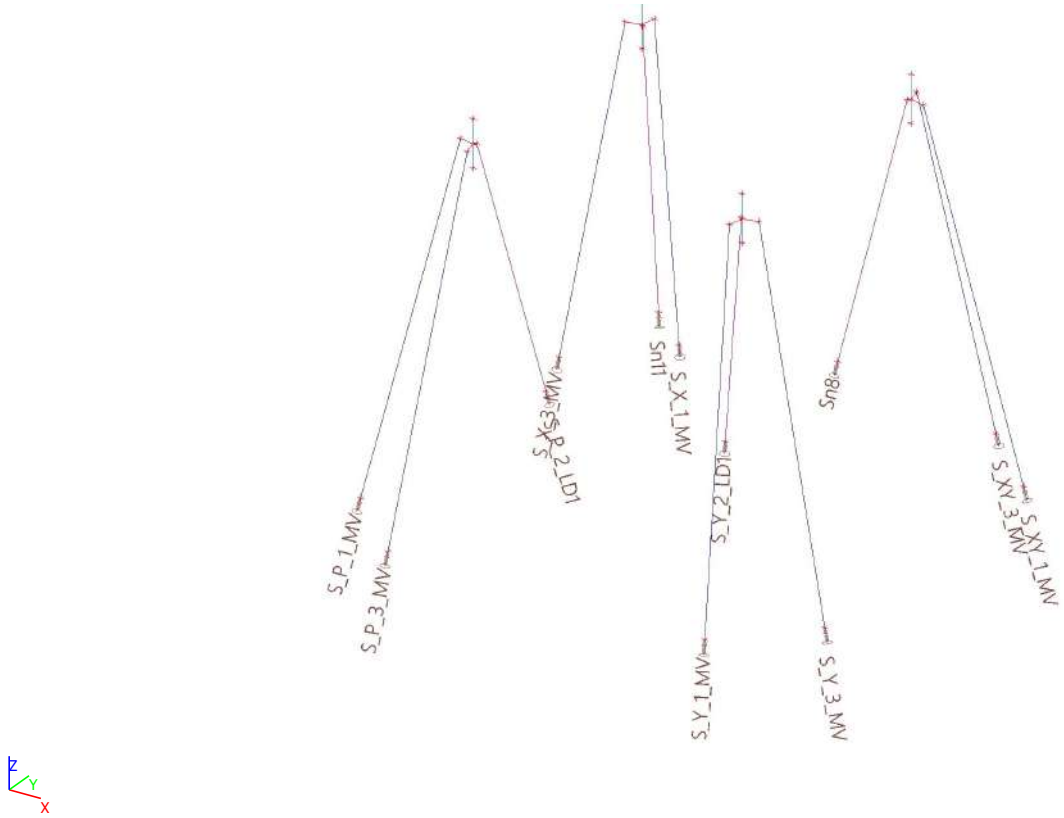
5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
S_P_2_LD1	S_P_2_LD1	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,89;Ry-9,89
S_P_1_MV	N143	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-4,34;Ry13,29
S_P_3_MV	N145	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-13,29;Ry4,34
S_Y_2_LD1	S_Y_2_LD1	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,89;Ry9,89
S_Y_1_MV	N209	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-13,29;Ry-4,34
S_Y_3_MV	N211	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-4,34;Ry-13,29
Sn8	S_XY_2_LD1	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,89;Ry9,89
S_XY_1_MV	N217	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx4,34;Ry-13,29
S_XY_3_MV	N219	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx13,29;Ry-4,34
Sn11	S_X_2_LD1	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,89;Ry-9,89
S_X_1_MV	N225	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx13,29;Ry4,34
S_X_3_MV	N227	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx4,34;Ry13,29

5.6. Analyse model met Knoopondersteuningen



5.7. Line supports on member

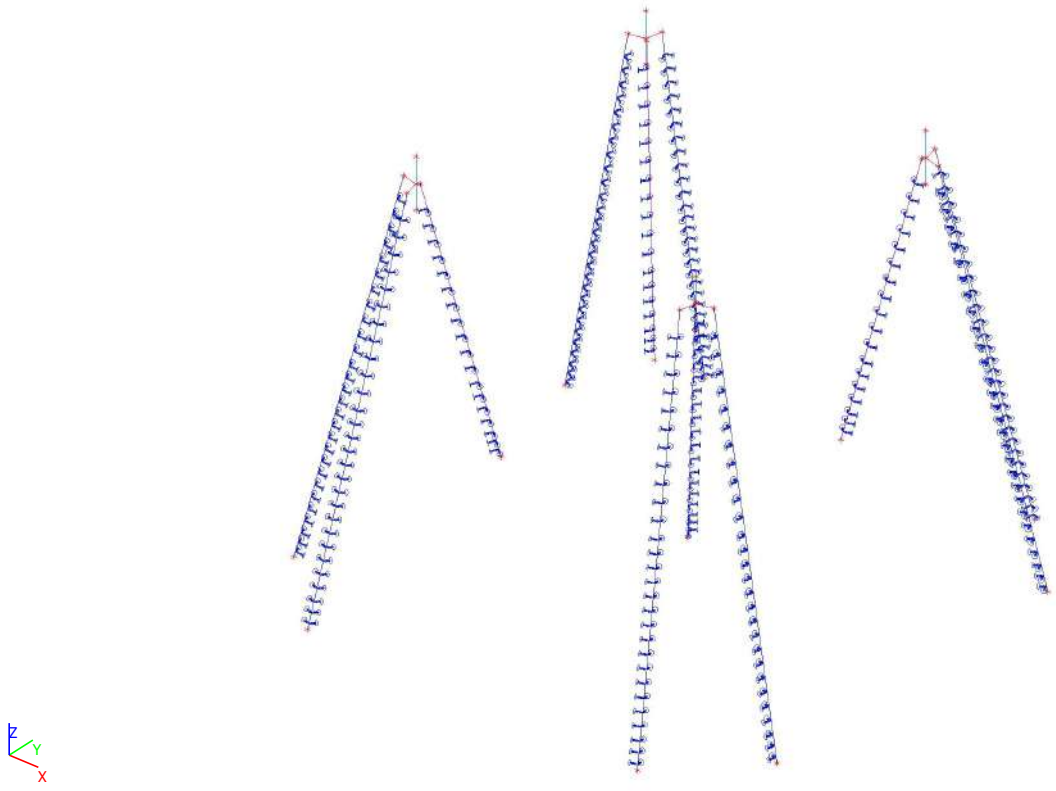
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Slb_P_1_Veen	Line	Paal_P_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V1	Line	Paal_P_1 LCS	8,000 9,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V2	Line	Paal_P_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V3	Line	Paal_P_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V4	Line	Paal_P_1 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V5	Line	Paal_P_1 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V6	Line	Paal_P_1 LCS	13,000 14,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V7	Line	Paal_P_1 LCS	14,000 15,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V8	Line	Paal_P_1 LCS	15,000 15,800	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_2_Veen	Line	Paal_P_2 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_Veen	Line	Paal_P_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_Veen	Line	Paal_Y_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_2_Veen	Line	Paal_Y_2 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen	Line	Paal_Y_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
Slb_XY_2_Veen	Line	Paal_XY_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_1_Veen	Line	Paal_XY_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_XY_3_Veen	Line	Paal_XY_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_X_2_Veen	Line	Paal_X_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_X_1_Veen	Line	Paal_X_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_X_3_Veen	Line	Paal_X_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_P_3_V1	Line	Paal_P_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_2_V1	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_1_V1	Line	Paal_Y_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_2_V1	Line	Paal_Y_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_V1	Line	Paal_Y_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_2_V1	Line	Paal_XY_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_1_V1	Line	Paal_XY_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_3_V1	Line	Paal_XY_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_2_V1	Line	Paal_X_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_1_V1	Line	Paal_X_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_3_V1	Line	Paal_X_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_3_V2	Line	Paal_P_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_3_V3	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_P_3_V4	Line	Paal_P_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_P_3_V5	Line	Paal_P_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_P_3_V6	Line	Paal_P_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_P_3_V7	Line	Paal_P_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_P_3_V8	Line	Paal_P_3	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,800	From start						
Slb_P_2_V2	Line	Paal_P_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_2_V3	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,700	From start						
Slb_Y_1_V2	Line	Paal_Y_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_1_V3	Line	Paal_Y_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_1_V4	Line	Paal_Y_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_1_V5	Line	Paal_Y_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_1_V6	Line	Paal_Y_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_1_V7	Line	Paal_Y_1	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

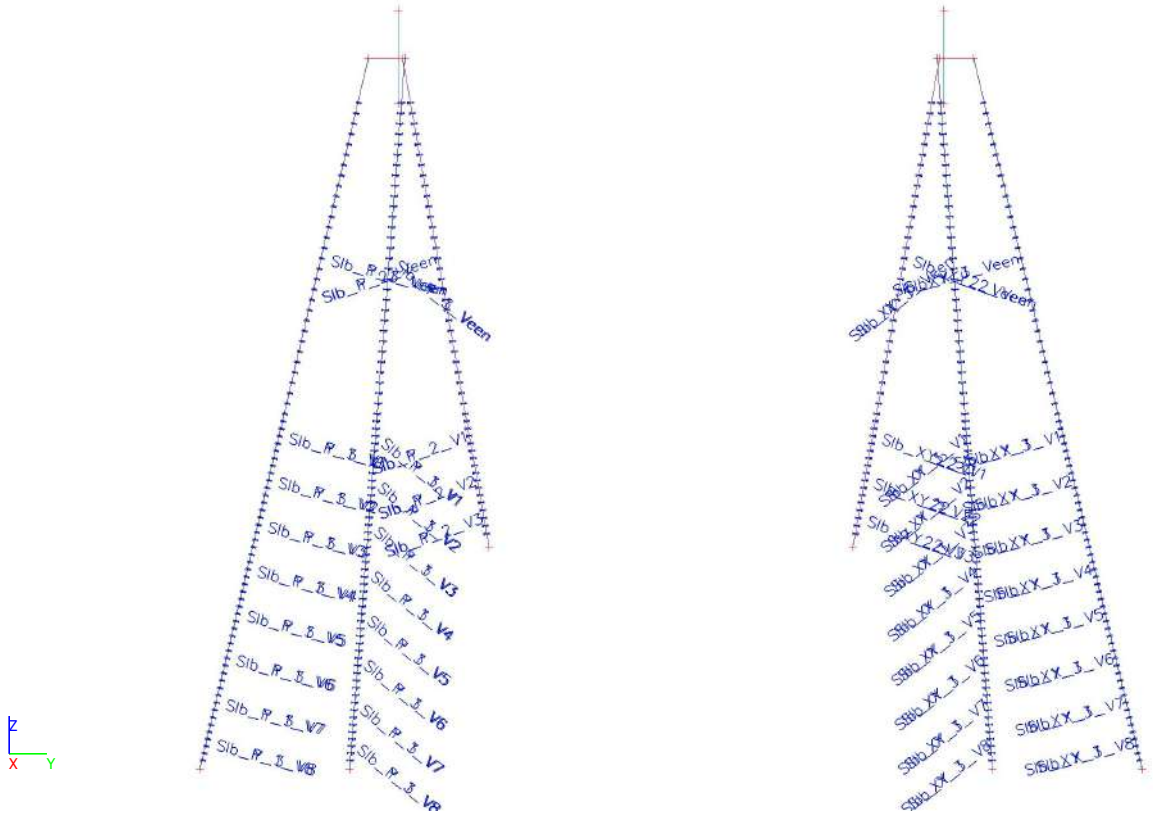
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	15,000	From start						
Slb_Y_1_V8	Line	Paal_Y_1	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,800	From start						
Slb_Y_3_V2	Line	Paal_Y_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_3_V3	Line	Paal_Y_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_Y_3_V4	Line	Paal_Y_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_Y_3_V5	Line	Paal_Y_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_Y_3_V6	Line	Paal_Y_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_Y_3_V7	Line	Paal_Y_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_Y_3_V8	Line	Paal_Y_3	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,800	From start						
Slb_Y_2_V2	Line	Paal_Y_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_Y_2_V3	Line	Paal_Y_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,700	From start						
Slb_XY_2_V2	Line	Paal_XY_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_2_V3	Line	Paal_XY_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,700	From start						
Slb_XY_1_V2	Line	Paal_XY_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_1_V3	Line	Paal_XY_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_1_V4	Line	Paal_XY_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_XY_1_V5	Line	Paal_XY_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_XY_1_V6	Line	Paal_XY_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_XY_1_V7	Line	Paal_XY_1	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_XY_1_V8	Line	Paal_XY_1	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,800	From start						
Slb_XY_3_V2	Line	Paal_XY_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_XY_3_V3	Line	Paal_XY_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_XY_3_V4	Line	Paal_XY_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_XY_3_V5	Line	Paal_XY_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_XY_3_V6	Line	Paal_XY_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_XY_3_V7	Line	Paal_XY_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_XY_3_V8	Line	Paal_XY_3	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,800	From start						
Slb_X_2_V2	Line	Paal_X_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_2_V3	Line	Paal_X_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,700	From start						
Slb_X_1_V2	Line	Paal_X_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_1_V3	Line	Paal_X_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_X_1_V4	Line	Paal_X_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_X_1_V5	Line	Paal_X_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	13,000	From start						
Slb_X_1_V6	Line	Paal_X_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_X_1_V7	Line	Paal_X_1	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_X_1_V8	Line	Paal_X_1	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,800	From start						
Slb_X_3_V2	Line	Paal_X_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_X_3_V3	Line	Paal_X_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_X_3_V4	Line	Paal_X_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_X_3_V5	Line	Paal_X_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_X_3_V6	Line	Paal_X_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	14,000	From start						
Slb_X_3_V7	Line	Paal_X_3	14,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,000	From start						
Slb_X_3_V8	Line	Paal_X_3	15,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	15,800	From start						

5.8. Analyse model met Lijnondersteuningen



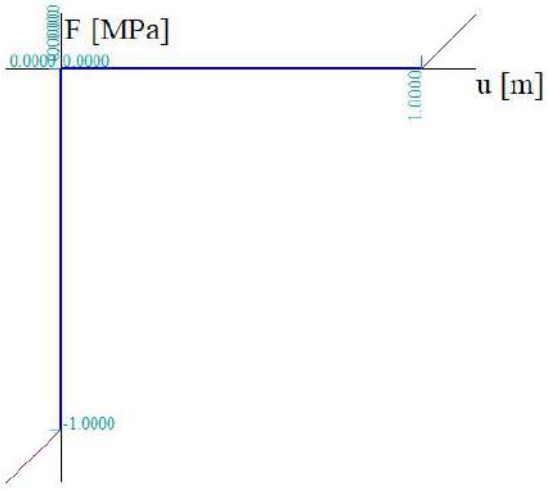
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

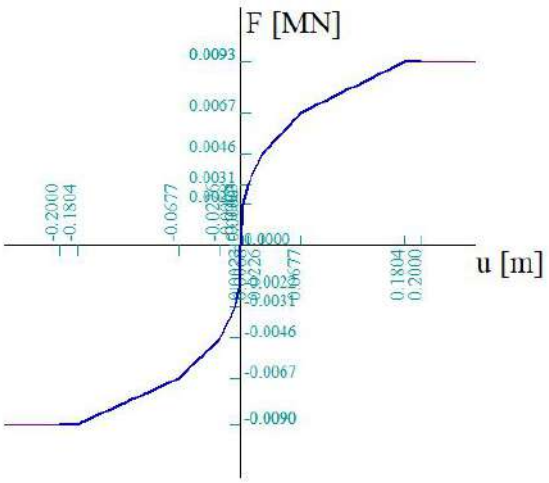
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve_Veen	Translation	-0.200000 / -9000.000000	Free	Free
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		
		-0.006765 / -3100.000000		

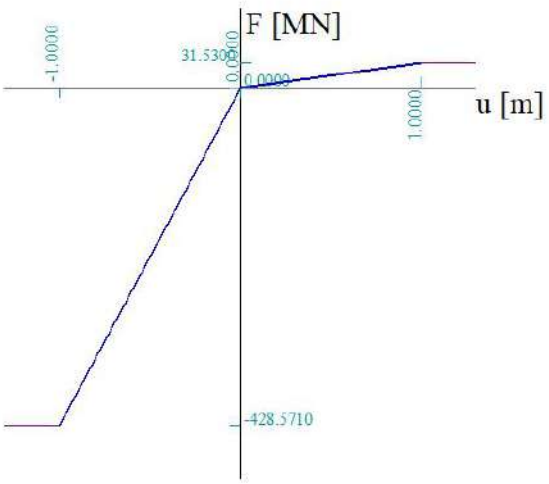
Name	Type	u / F	Positive end	Negative end
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing



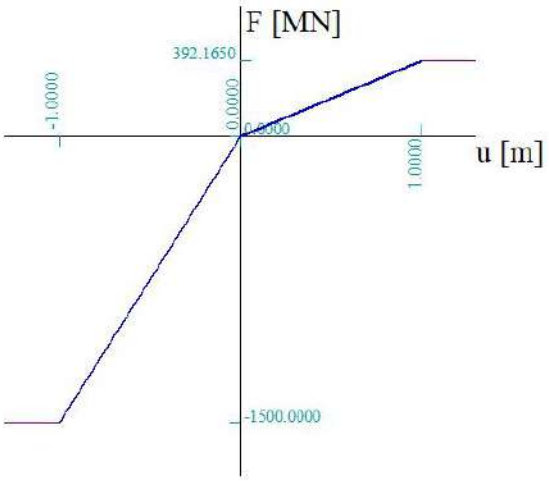
Name	Type	u / F	Positive end	Negative end
Trek-druk-LD1-paalpunt_mst149	Translation	-1.000000 / -428571000.000000	Free	Free
		0.000000 / 0.000000		
		1.000000 / 31530000.000000		

Drawing



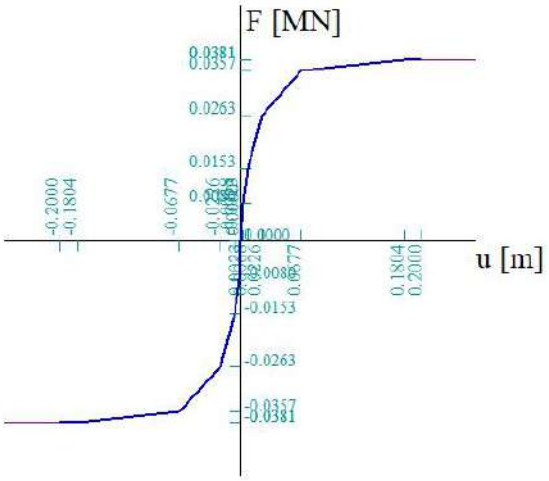
Name	Type	u / F	Positive end	Negative end
Trek-druk-MV-paalpunt_mst149	Translation	-1.000000 / -1500000000.000000	Free	Free
		0.000000 / 0.000000		
		1.000000 / 392165000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V9	Translation	-0.200000 / -38100.000000	Free	Free
		-0.180400 / -38100.000000		
		-0.067650 / -35700.000000		
		-0.022550 / -26300.000000		
		-0.006765 / -15300.000000		
		-0.002255 / -8000.000000		
		0.000000 / 0.000000		
		0.002255 / 8000.000000		
		0.006765 / 15300.000000		
		0.022550 / 26300.000000		
		0.067650 / 35700.000000		
		0.180400 / 38100.000000		
		0.200000 / 38100.000000		

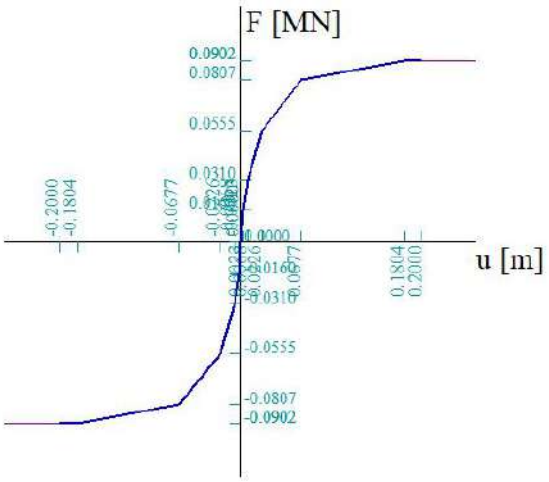
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V10	Translation	-0.200000 / -90200.000000	Free	Free
		-0.180400 / -90200.000000		
		-0.067650 / -80700.000000		
		-0.022550 / -55500.000000		
		-0.006765 / -31000.000000		
		-0.002255 / -16000.000000		
		0.000000 / 0.000000		
		0.002255 / 16000.000000		
		0.006765 / 31000.000000		
		0.022550 / 55500.000000		

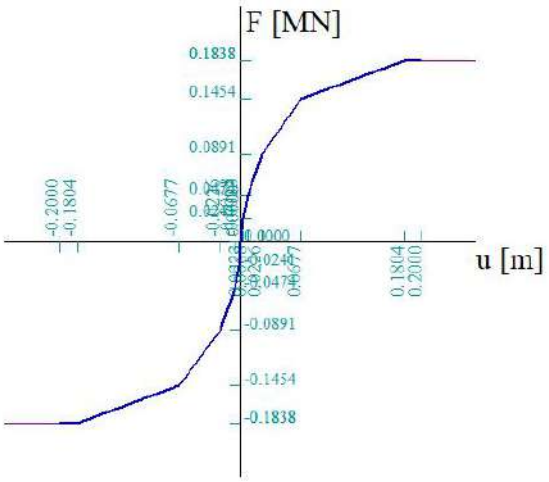
Name	Type	u / F	Positive end	Negative end
		0.067650 / 80700.000000		
		0.180400 / 90200.000000		
		0.200000 / 90200.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V11	Translation	-0.200000 / -183800.000000	Free	Free
		-0.180400 / -183800.000000		
		-0.067650 / -145400.000000		
		-0.022550 / -89100.000000		
		-0.006765 / -47400.000000		
		-0.002255 / -24100.000000		
		0.000000 / 0.000000		
		0.002255 / 24100.000000		
		0.006765 / 47400.000000		
		0.022550 / 89100.000000		
		0.067650 / 145400.000000		
		0.180400 / 183800.000000		
		0.200000 / 183800.000000		

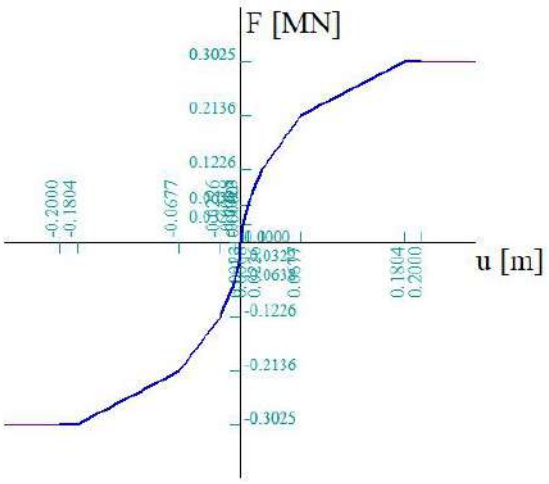
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V12	Translation	-0.200000 / -302500.000000	Free	Free
		-0.180400 / -302500.000000		
		-0.067650 / -213600.000000		
		-0.022550 / -122600.000000		

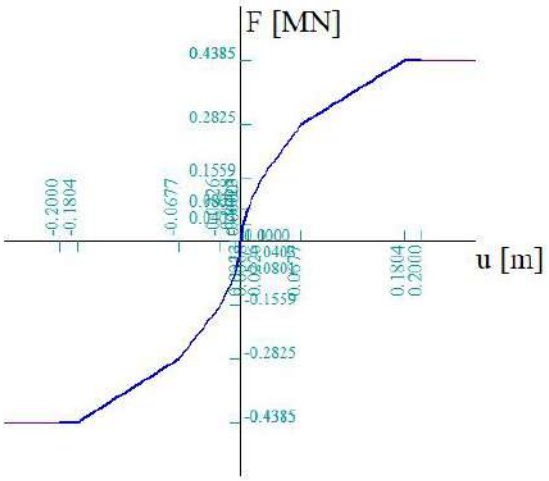
Name	Type	u / F	Positive end	Negative end
		-0.006765 / -63800.000000		
		-0.002255 / -32200.000000		
		0.000000 / 0.000000		
		0.002255 / 32200.000000		
		0.006765 / 63800.000000		
		0.022550 / 122600.000000		
		0.067650 / 213600.000000		
		0.180400 / 302500.000000		
		0.200000 / 302500.000000		

Drawing



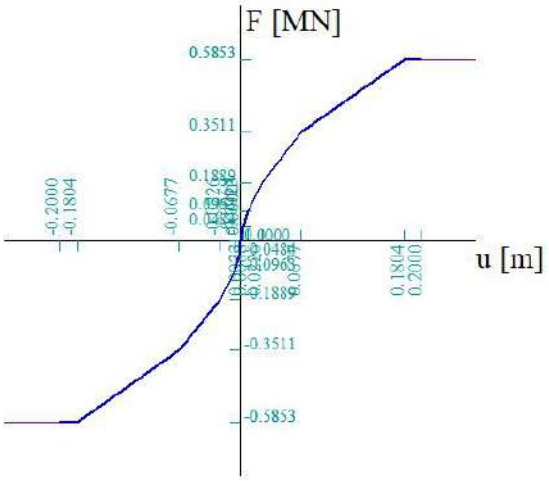
Name	Type	u / F	Positive end	Negative end
PY-curve-2_V13	Translation	-0.200000 / -438500.000000	Free	Free
		-0.180400 / -438500.000000		
		-0.067650 / -282500.000000		
		-0.022550 / -155900.000000		
		-0.006765 / -80100.000000		
		-0.002255 / -40300.000000		
		0.000000 / 0.000000		
		0.002255 / 40300.000000		
		0.006765 / 80100.000000		
		0.022550 / 155900.000000		
		0.067650 / 282500.000000		
		0.180400 / 438500.000000		
		0.200000 / 438500.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V14	Translation	-0.200000 / -585300.000000	Free	Free
		-0.180400 / -585300.000000		
		-0.067650 / -351100.000000		
		-0.022550 / -188900.000000		
		-0.006765 / -96300.000000		
		-0.002255 / -48400.000000		
		0.000000 / 0.000000		
		0.002255 / 48400.000000		
		0.006765 / 96300.000000		
		0.022550 / 188900.000000		
		0.067650 / 351100.000000		
		0.180400 / 585300.000000		
		0.200000 / 585300.000000		

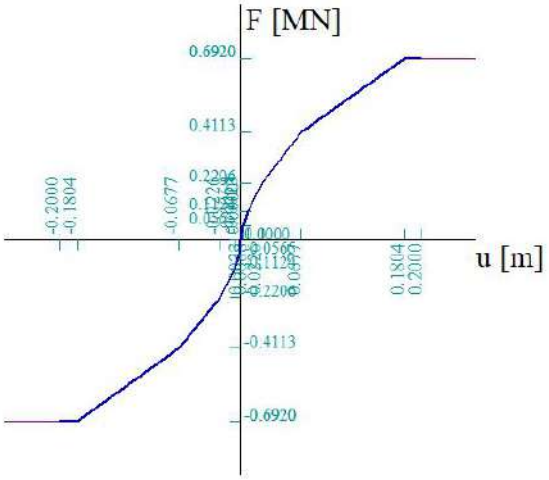
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V15	Translation	-0.200000 / -692000.000000	Free	Free
		-0.180400 / -692000.000000		
		-0.067650 / -411300.000000		
		-0.022550 / -220600.000000		
		-0.006765 / -112400.000000		
		-0.002255 / -56500.000000		
		0.000000 / 0.000000		
		0.002255 / 56500.000000		
		0.006765 / 112400.000000		
		0.022550 / 220600.000000		

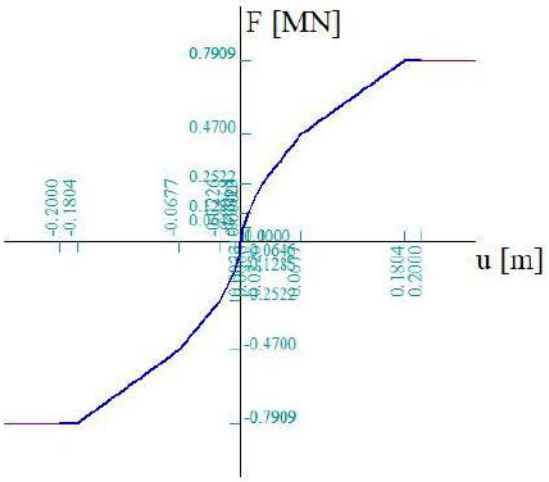
Name	Type	u / F	Positive end	Negative end
		0.067650 / 411300.000000		
		0.180400 / 692000.000000		
		0.200000 / 692000.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V16	Translation	-0.200000 / -790900.000000	Free	Free
		-0.180400 / -790900.000000		
		-0.067650 / -470000.000000		
		-0.022550 / -252200.000000		
		-0.006765 / -128500.000000		
		-0.002255 / -64500.000000		
		0.000000 / 0.000000		
		0.002255 / 64500.000000		
		0.006765 / 128500.000000		
		0.022550 / 252200.000000		
		0.067650 / 470000.000000		
		0.180400 / 790900.000000		
		0.200000 / 790900.000000		

Drawing

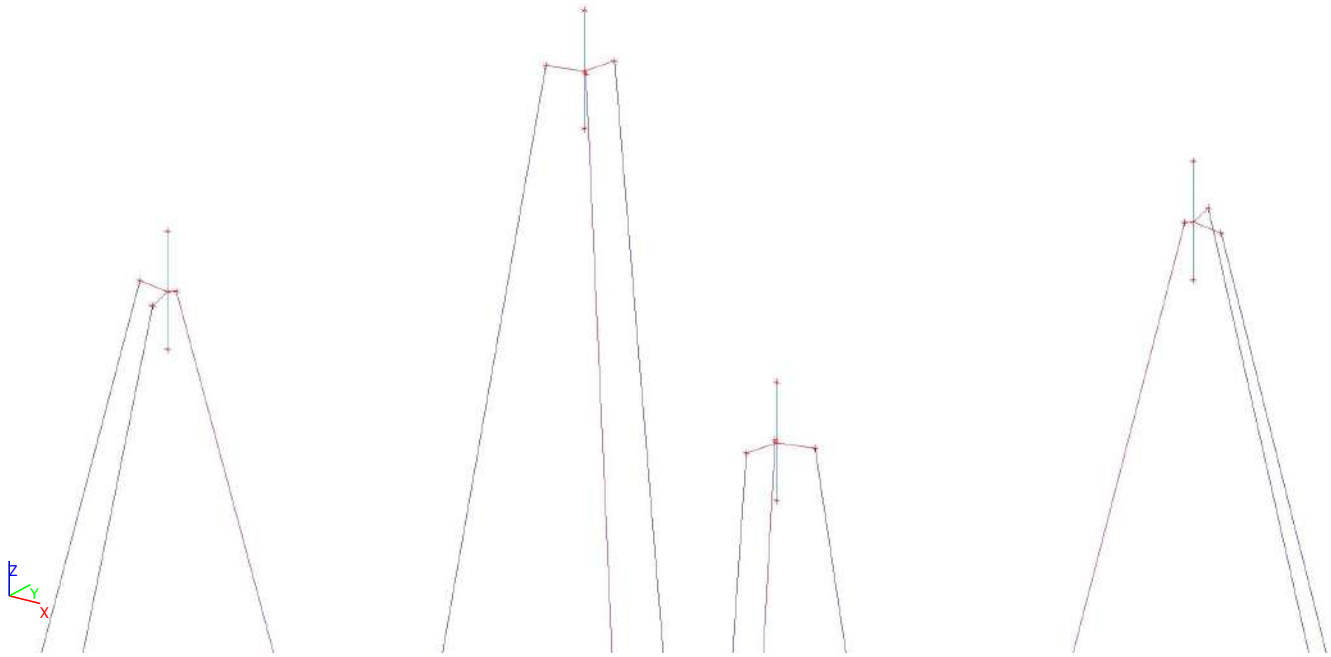


6. Belastingen

6.1. Load cases

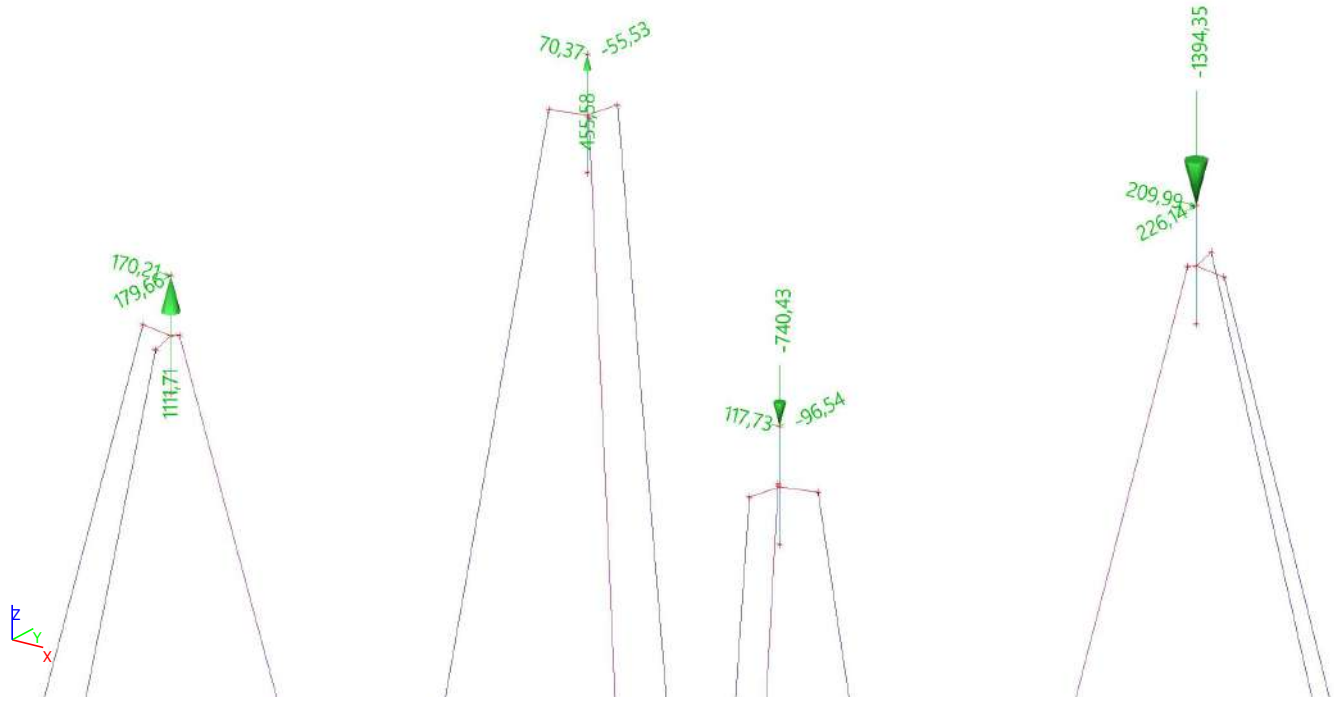
6.1.1. Load cases - EG_Fundering

Name	Description	Action type	Load group	Direction
	Spec	Load type		
EG_Fundering		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - hL Bck + Wnd ;90°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;90°		Variable	LG4	Short	None
	Standard	Static			

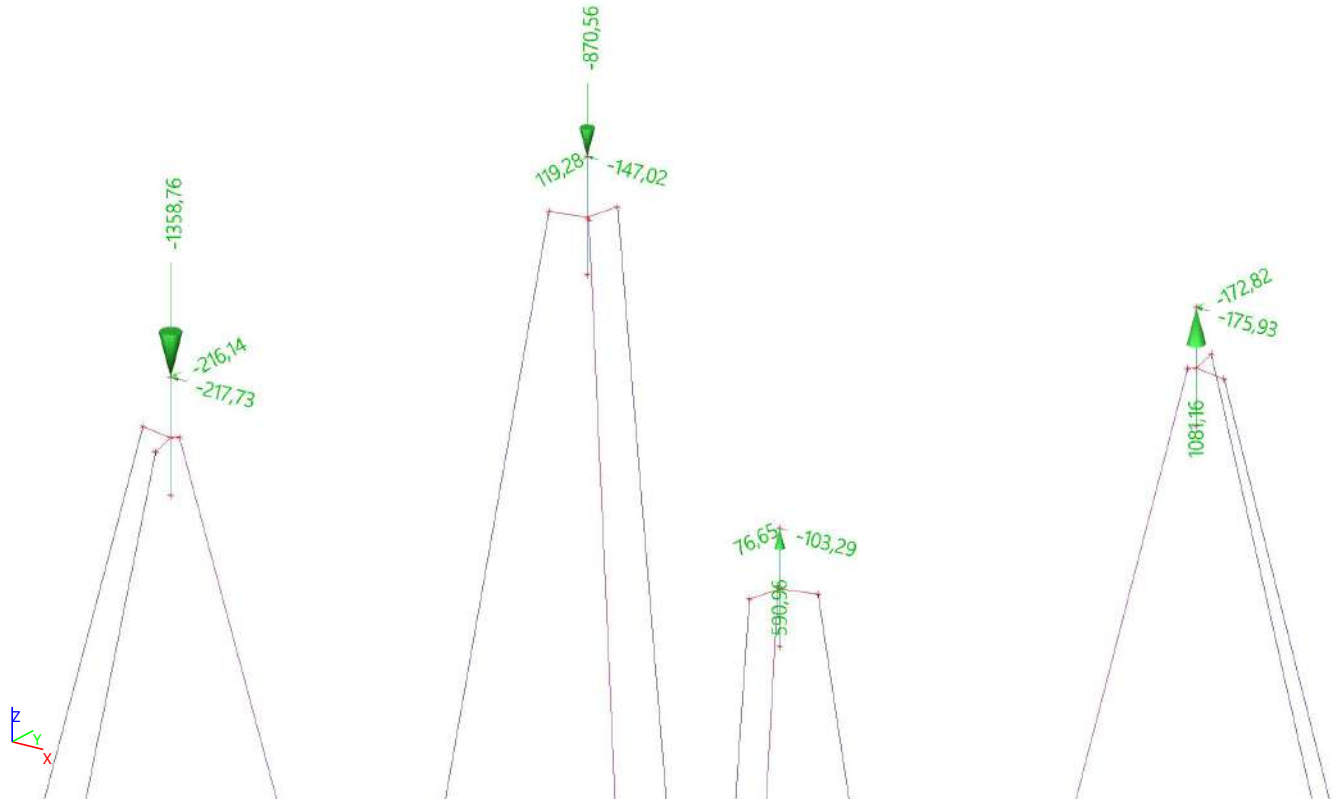


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;90°_1P_X	1P	hL Bck + Wnd ;90°	GCS	X	Force	170,21
hL Bck + Wnd ;90°_1P_Y	1P	hL Bck + Wnd ;90°	GCS	Y	Force	179,66
hL Bck + Wnd ;90°_1P_Z	1P	hL Bck + Wnd ;90°	GCS	Z	Force	1111,71
hL Bck + Wnd ;90°_1X_X	1X	hL Bck + Wnd ;90°	GCS	X	Force	70,37
hL Bck + Wnd ;90°_1X_Y	1X	hL Bck + Wnd ;90°	GCS	Y	Force	-55,53
hL Bck + Wnd ;90°_1X_Z	1X	hL Bck + Wnd ;90°	GCS	Z	Force	455,58
hL Bck + Wnd ;90°_1XY_X	1XY	hL Bck + Wnd ;90°	GCS	X	Force	209,99
hL Bck + Wnd ;90°_1XY_Y	1XY	hL Bck + Wnd ;90°	GCS	Y	Force	226,14
hL Bck + Wnd ;90°_1XY_Z	1XY	hL Bck + Wnd ;90°	GCS	Z	Force	-1394,35
hL Bck + Wnd ;90°_1Y_X	1Y	hL Bck + Wnd ;90°	GCS	X	Force	117,73
hL Bck + Wnd ;90°_1Y_Y	1Y	hL Bck + Wnd ;90°	GCS	Y	Force	-96,54
hL Bck + Wnd ;90°_1Y_Z	1Y	hL Bck + Wnd ;90°	GCS	Z	Force	-740,43

6.1.3. Load cases - hL Ahd + Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



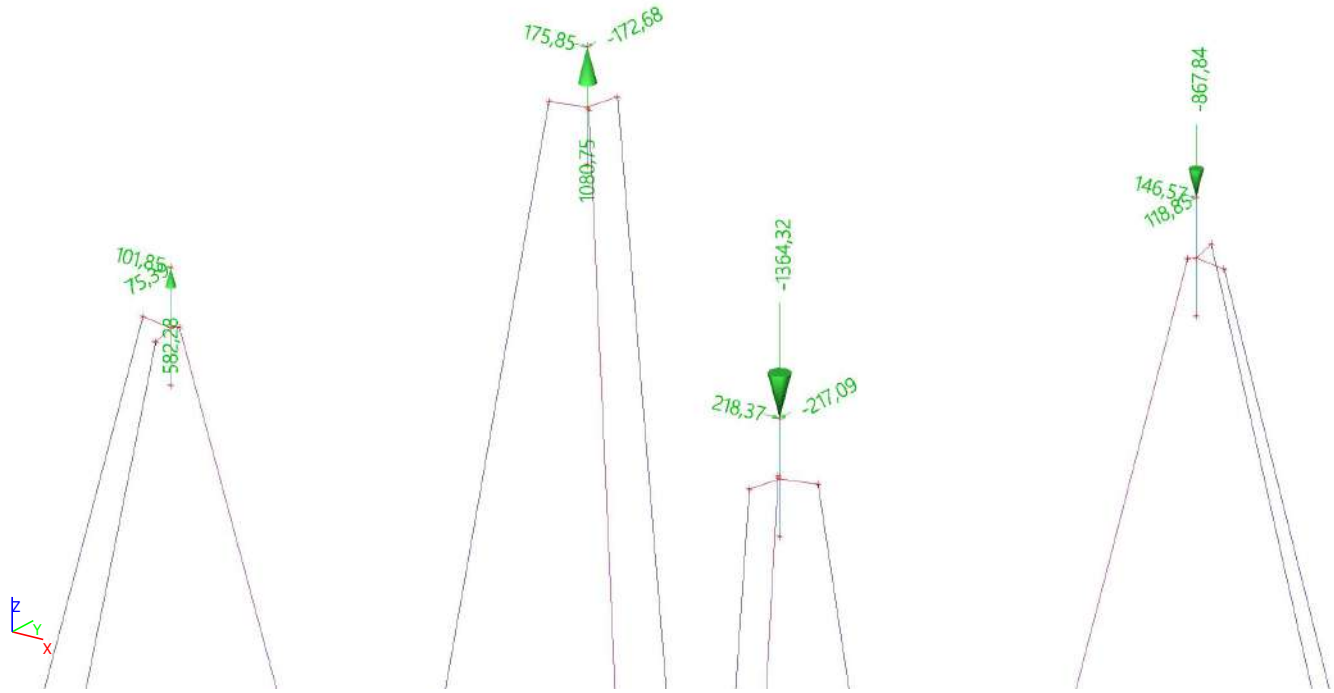
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;315°_1P_X	1P	hL Ahd + Wnd ;315°	GCS	X	Force	-217,73
hL Ahd + Wnd ;315°_1P_Y	1P	hL Ahd + Wnd ;315°	GCS	Y	Force	-216,14
hL Ahd + Wnd ;315°_1P_Z	1P	hL Ahd + Wnd ;315°	GCS	Z	Force	-1358,76
hL Ahd + Wnd ;315°_1X_X	1X	hL Ahd + Wnd ;315°	GCS	X	Force	-147,02
hL Ahd + Wnd ;315°_1X_Y	1X	hL Ahd + Wnd ;315°	GCS	Y	Force	119,28
hL Ahd + Wnd ;315°_1X_Z	1X	hL Ahd + Wnd ;315°	GCS	Z	Force	-870,56
hL Ahd + Wnd ;315°_1XY_X	1XY	hL Ahd + Wnd ;315°	GCS	X	Force	-175,93
hL Ahd + Wnd ;315°_1XY_Y	1XY	hL Ahd + Wnd ;315°	GCS	Y	Force	-172,82
hL Ahd + Wnd ;315°_1XY_Z	1XY	hL Ahd + Wnd ;315°	GCS	Z	Force	1081,16
hL Ahd + Wnd ;315°_1Y_X	1Y	hL Ahd + Wnd ;315°	GCS	X	Force	-103,29
hL Ahd + Wnd ;315°_1Y_Y	1Y	hL Ahd + Wnd ;315°	GCS	Y	Force	76,65

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;315°_1Y_Z	1Y	hL Ahd + Wnd ;315°	GCS	Z	Force	590,96

6.1.4. Load cases - hL Bck + Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			



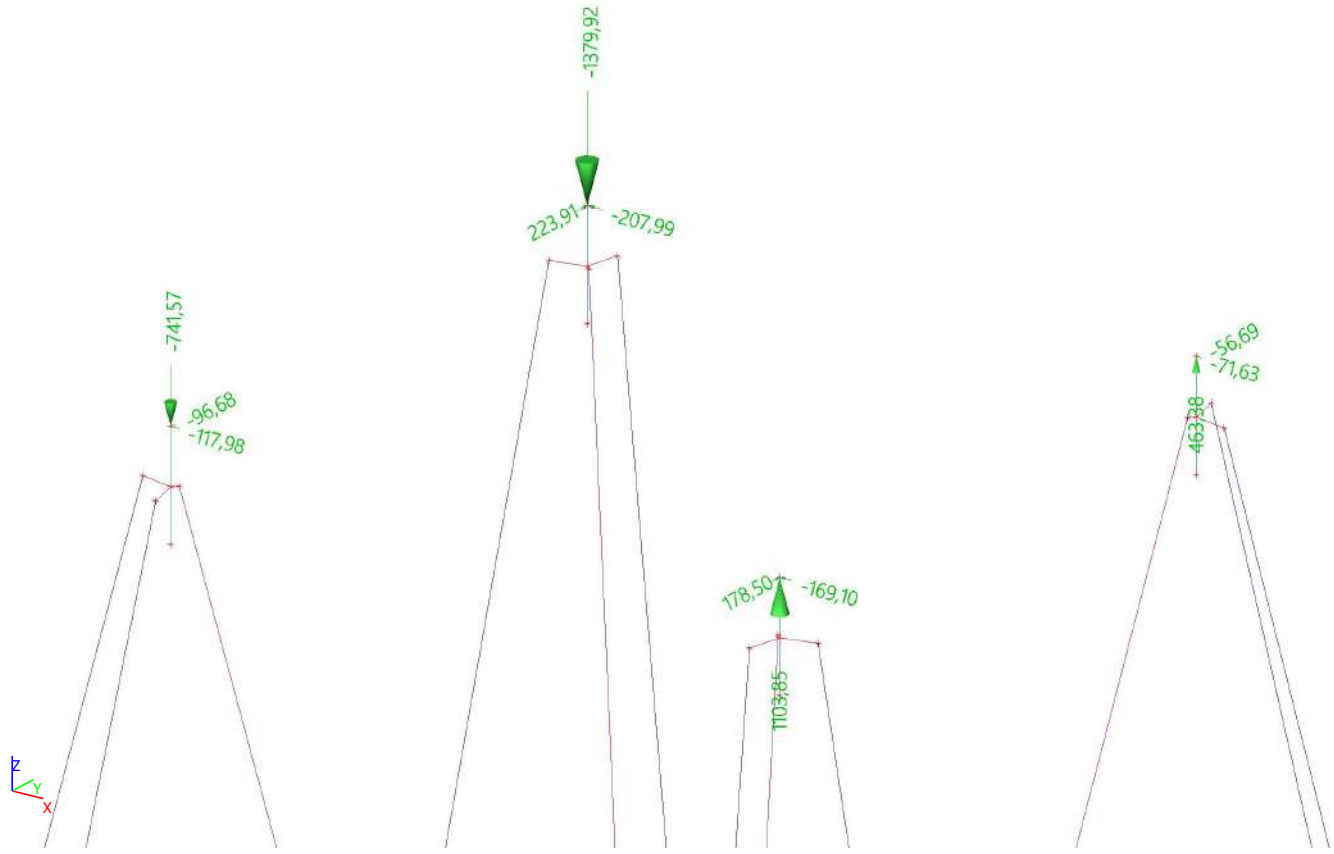
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;225°_1P_X	1P	hL Bck + Wnd ;225°	GCS	X	Force	101,85
hL Bck + Wnd ;225°_1P_Y	1P	hL Bck + Wnd ;225°	GCS	Y	Force	75,39
hL Bck + Wnd ;225°_1P_Z	1P	hL Bck + Wnd ;225°	GCS	Z	Force	582,28
hL Bck + Wnd ;225°_1X_X	1X	hL Bck + Wnd ;225°	GCS	X	Force	175,85
hL Bck + Wnd ;225°_1X_Y	1X	hL Bck + Wnd ;225°	GCS	Y	Force	-172,68
hL Bck + Wnd ;225°_1X_Z	1X	hL Bck + Wnd ;225°	GCS	Z	Force	1080,75
hL Bck + Wnd ;225°_1XY_X	1XY	hL Bck + Wnd ;225°	GCS	X	Force	146,57
hL Bck + Wnd ;225°_1XY_Y	1XY	hL Bck + Wnd ;225°	GCS	Y	Force	118,85

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;225°_1XY_Z	1XY	hL Bck + Wnd ;225°	GCS	Z	Force	-867,84
hL Bck + Wnd ;225°_1Y_X	1Y	hL Bck + Wnd ;225°	GCS	X	Force	218,37
hL Bck + Wnd ;225°_1Y_Y	1Y	hL Bck + Wnd ;225°	GCS	Y	Force	-217,09
hL Bck + Wnd ;225°_1Y_Z	1Y	hL Bck + Wnd ;225°	GCS	Z	Force	-1364,32

6.1.5. Load cases - hL Ahd + Wnd ;90°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;90°		Variable	LG4	Short	None
	Standard	Static			



6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;90°_1P_X	1P	hL Ahd + Wnd ;90°	GCS	X	Force	-117,98
hL Ahd + Wnd ;90°_1P_Y	1P	hL Ahd + Wnd ;90°	GCS	Y	Force	-96,68
hL Ahd + Wnd ;90°_1P_Z	1P	hL Ahd + Wnd ;90°	GCS	Z	Force	-741,57
hL Ahd + Wnd ;90°_1X_X	1X	hL Ahd + Wnd ;90°	GCS	X	Force	-207,99
hL Ahd + Wnd ;90°_1X_Y	1X	hL Ahd + Wnd ;90°	GCS	Y	Force	223,91

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;90°_1X_Z	1X	hL Ahd + Wnd ;90°	GCS	Z	Force	-1379,92
hL Ahd + Wnd ;90°_1XY_X	1XY	hL Ahd + Wnd ;90°	GCS	X	Force	-71,63
hL Ahd + Wnd ;90°_1XY_Y	1XY	hL Ahd + Wnd ;90°	GCS	Y	Force	-56,69
hL Ahd + Wnd ;90°_1XY_Z	1XY	hL Ahd + Wnd ;90°	GCS	Z	Force	463,38
hL Ahd + Wnd ;90°_1Y_X	1Y	hL Ahd + Wnd ;90°	GCS	X	Force	-169,10
hL Ahd + Wnd ;90°_1Y_Y	1Y	hL Ahd + Wnd ;90°	GCS	Y	Force	178,50
hL Ahd + Wnd ;90°_1Y_Z	1Y	hL Ahd + Wnd ;90°	GCS	Z	Force	1103,85

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
hL Bck + Wnd ;90°	Ultimate	EG_Fundering	1,200
		hL Bck + Wnd ;90°	1,000
hL Bck + Wnd ;225°	Ultimate	EG_Fundering	1,200
		hL Bck + Wnd ;225°	1,000
hL Ahd + Wnd ;315°	Ultimate	EG_Fundering	1,200
		hL Ahd + Wnd ;315°	1,000
hL Ahd + Wnd ;90°	Ultimate	EG_Fundering	1,200
		hL Ahd + Wnd ;90°	1,000
hL Bck + Wnd ;90°+EG gunstig	Ultimate	EG_Fundering	0,900
		hL Bck + Wnd ;90°	1,000
hL Bck + Wnd ;225°+EG gunstig	Ultimate	EG_Fundering	0,900
		hL Bck + Wnd ;225°	1,000
hL Ahd + Wnd ;315° +EG gunstig	Ultimate	EG_Fundering	0,900
		hL Ahd + Wnd ;315°	1,000
hL Ahd + Wnd ;90°+EG gunstig	Ultimate	EG_Fundering	0,900
		hL Ahd + Wnd ;90°	1,000

6.3. Result classes

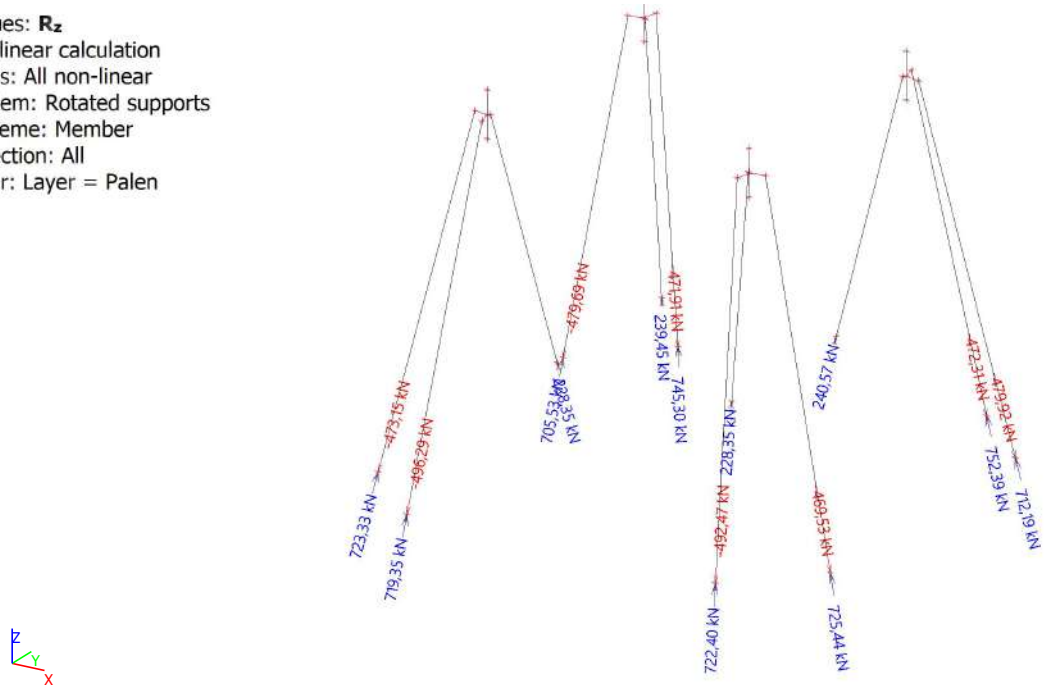
Name	List
All non-linear	hL Bck + Wnd ;90°
	hL Bck + Wnd ;225°
	hL Ahd + Wnd ;315°
	hL Ahd + Wnd ;90°
	hL Bck + Wnd ;90°+EG gunstig
	hL Bck + Wnd ;225°+EG gunstig
	hL Ahd + Wnd ;315° +EG gunstig
	hL Ahd + Wnd ;90°+EG gunstig

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Cross-section = LD1(31-plank) - General cross-section
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_2_LD1/S_P_2_LD1	hL Bck + Wnd ;90°+EG gunstig	0,00	0,00	**24,04**	0,00	0,00	0,00	0,0	0,0
Sn8/S_XY_2_LD1	hL Bck + Wnd ;90°	**0,00**	**0,00**	**240,57**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Cross-section = MV Paal - HEB220
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_3_MV/N145	hL Bck + Wnd ;90°+EG gunstig	0,00	0,00	**-496,29**	0,00	0,00	0,00	0,0	0,0
S_XY_3_MV/N219	hL Bck +	**0,00**	**0,00**	**752,39**	**0,00**	**0,00**	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;90°								

7.1.4. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen
Nodal reactions

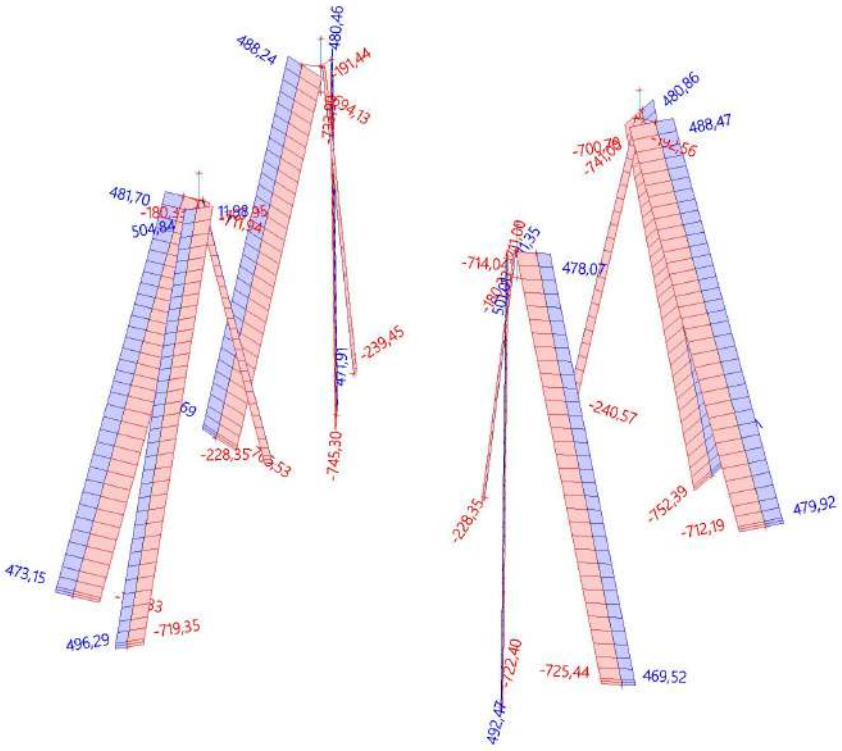
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
S_P_2_LD1/S_P_2_LD1	hL Bck + Wnd ;90°+EG gunstig	0,00	0,00	**24,04**	0,00	0,00	0,00	0,0	0,0
S_P_2_LD1/S_P_2_LD1	hL Ahd + Wnd ;90°	**0,00**	**0,00**	**228,35**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_1_MV/N143	hL Bck + Wnd ;90°+EG gunstig	0,00	0,00	**-473,15**	0,00	0,00	0,00	0,0	0,0
S_P_1_MV/N143	hL Ahd + Wnd ;315°	**0,00**	**0,00**	**723,33**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_P_3_MV/N145	hL Bck + Wnd ;90°+EG gunstig	0,00	0,00	**-496,29**	0,00	0,00	0,00	0,0	0,0
S_P_3_MV/N145	hL Ahd + Wnd ;315°	**0,00**	**0,00**	**719,35**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_2_LD1/S_Y_2_LD1	hL Ahd + Wnd ;90°+EG gunstig	**0,00**	**0,00**	**24,67**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_2_LD1/S_Y_2_LD1	hL Bck + Wnd ;90°	0,00	0,00	**228,35**	0,00	0,00	**0,00**	0,0	0,0
S_Y_1_MV/N209	hL Ahd + Wnd ;90°+EG gunstig	0,00	0,00	**-492,47**	0,00	0,00	0,00	0,0	0,0
S_Y_1_MV/N209	hL Bck + Wnd ;225°	**0,00**	**0,00**	**722,40**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_Y_3_MV/N211	hL Ahd + Wnd ;90°+EG gunstig	0,00	0,00	**-469,53**	0,00	0,00	0,00	0,0	0,0
S_Y_3_MV/N211	hL Bck + Wnd ;225°	**0,00**	**0,00**	**725,44**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn8/S_XY_2_LD1	hL Ahd + Wnd ;315° +EG gunstig	**0,00**	**0,00**	**38,28**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn8/S_XY_2_LD1	hL Bck + Wnd ;90°	0,00	0,00	**240,57**	0,00	0,00	**0,00**	0,0	0,0
S_XY_1_MV/N217	hL Ahd + Wnd ;315° +EG gunstig	**0,00**	**0,00**	**-479,92**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_1_MV/N217	hL Bck + Wnd ;90°	0,00	0,00	**712,19**	0,00	0,00	**0,00**	0,0	0,0
S_XY_3_MV/N219	hL Ahd + Wnd ;315° +EG gunstig	**0,00**	**0,00**	**-472,31**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_XY_3_MV/N219	hL Bck + Wnd ;90°	0,00	0,00	**752,39**	0,00	0,00	**0,00**	0,0	0,0
Sn11/S_X_2_LD1	hL Bck +	0,00	0,00	**38,07**	0,00	0,00	0,00	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;225°+EG gunstig								
Sn11/S_X_2_LD1	hL Ahd + Wnd ;90°	**0,00**	**0,00**	**239,45**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_1_MV/N225	hL Bck + Wnd ;225°+EG gunstig	0,00	0,00	**-471,91**	0,00	0,00	0,00	0,0	0,0
S_X_1_MV/N225	hL Ahd + Wnd ;90°	**0,00**	**0,00**	**745,30**	**0,00**	**0,00**	**0,00**	0,0	0,0
S_X_3_MV/N227	hL Bck + Wnd ;225°+EG gunstig	0,00	0,00	**-479,69**	0,00	0,00	0,00	0,0	0,0
S_X_3_MV/N227	hL Ahd + Wnd ;90°	**0,00**	**0,00**	**705,53**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

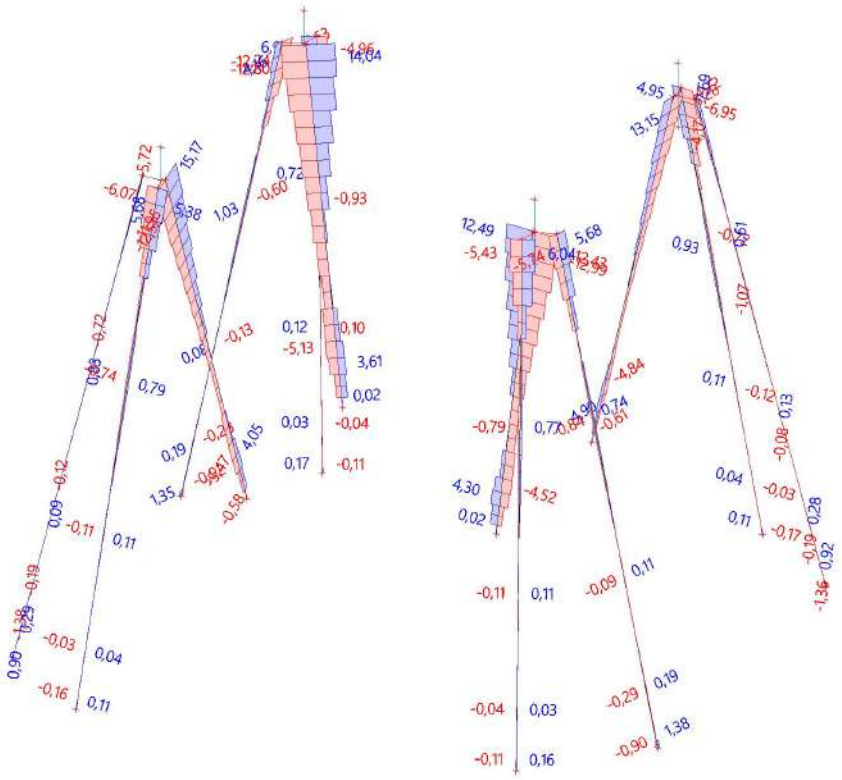
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



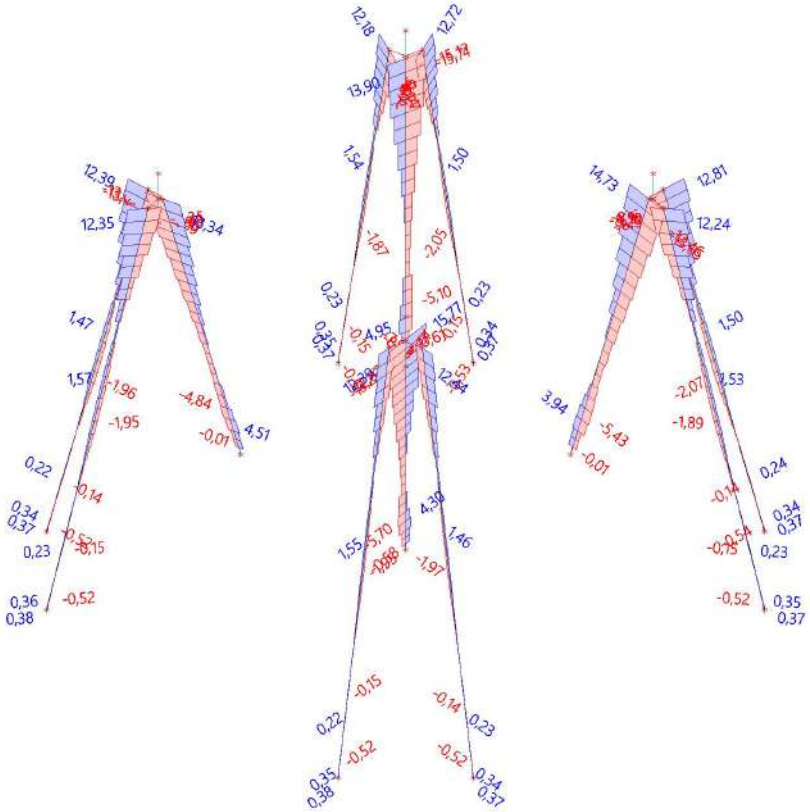
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



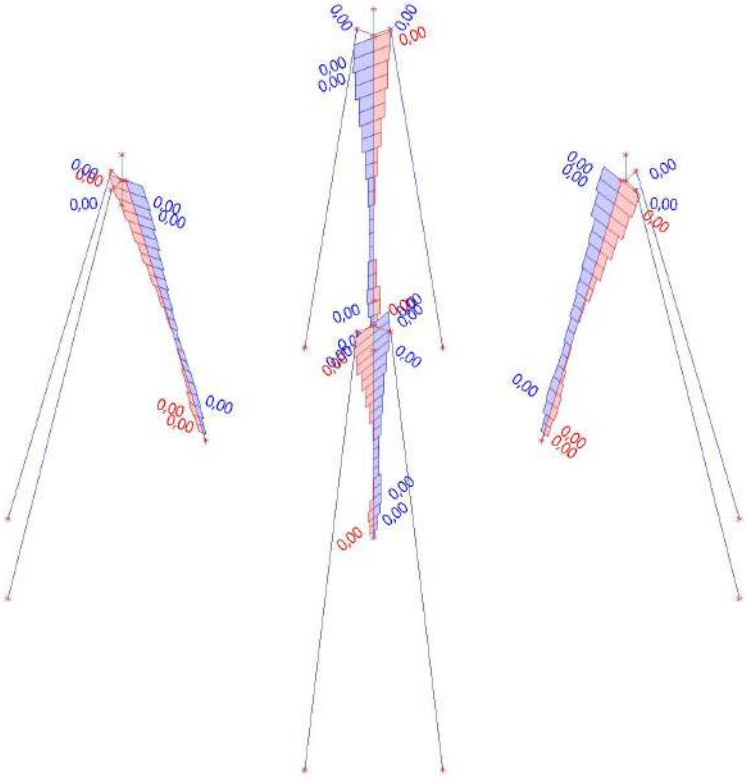
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



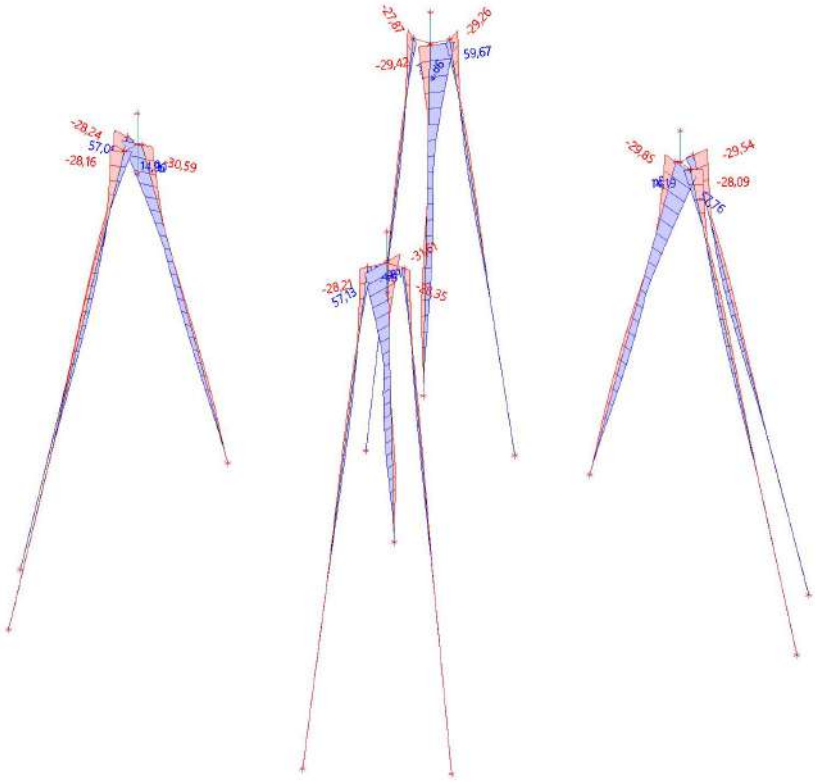
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



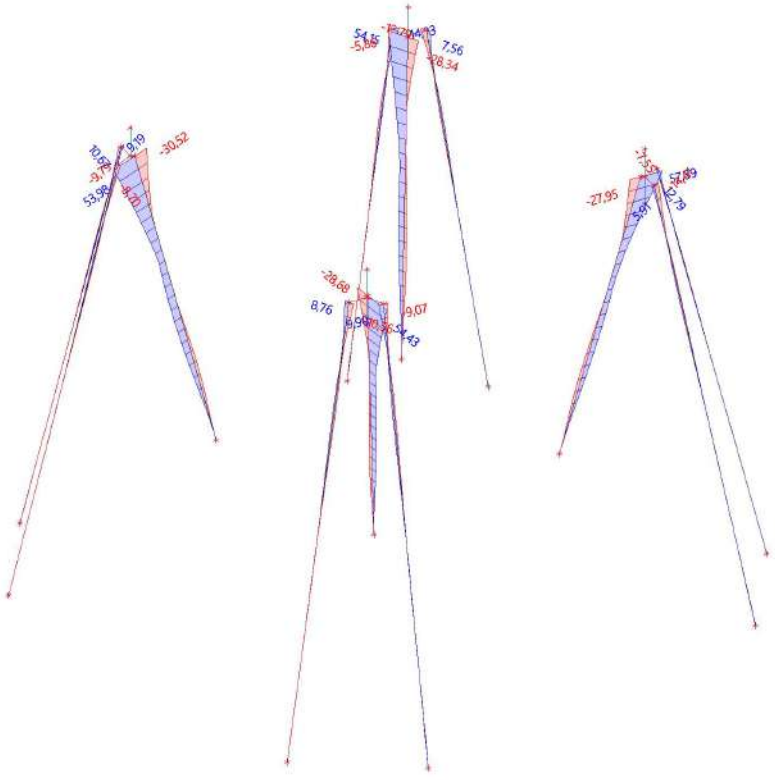
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Nothing in selection to display.

7.2.8. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Cross-section = MV Paal - HEB220

Name	dx [m]	Case	Cross-section	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_XY_3	16,007	hL Bck + Wnd ;90°	MV Paal - HEB220	**-752,39**	-0,17	-0,54	0,00	0,00	0,00
Paal_X_3	0,000	hL Ahd + Wnd ;90°	MV Paal - HEB220	-694,13	**-7,63**	12,18	0,00	-27,87	**14,23**
Paal_P_3	1,000-	hL Bck + Wnd ;90°+EG gunstig	MV Paal - HEB220	504,30	3,29	**-8,48**	0,00	6,49	-1,00
Paal_XY_3	0,000	hL Bck + Wnd ;90°	MV Paal - HEB220	-741,00	-3,63	**12,81**	0,00	**-29,54**	5,64
Paal_P_3	0,000	hL Bck + Wnd ;90°+EG gunstig	MV Paal - HEB220	**504,84**	3,29	-8,35	**0,00**	**14,90**	-4,29
Paal_XY_1	0,000	hL Bck + Wnd ;90°	MV Paal - HEB220	-700,79	**7,69**	12,24	0,00	-28,09	**-14,41**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer_P	1,050	hL Bck + Wnd ;90°	**1111,71**	-247,40	-6,68	**0,00**	0,00	0,00
Poer_P	0,000	hL Bck + Wnd ;90°+EG gunstig	1038,92	**-247,40**	-6,68	0,00	7,02	**259,77**
Poer_XY	0,000	hL Bck + Wnd ;225°	-964,89	187,68	**-19,60**	0,00	**20,58**	-197,06
Poer_X	0,000	hL Ahd + Wnd ;315°	-967,61	188,30	**19,62**	0,00	**-20,60**	-197,72
Poer_XY	0,000	hL Bck + Wnd ;90°	**-1491,40**	**308,39**	11,42	0,00	-11,99	**-323,81**

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-BVW 380kV
Part	Cilinderpoer 4xTubex406-560
Author	[redacted]
Date	02-09-2025
Structure	General XYZ
No. of nodes :	48
No. of beams :	24
No. of slabs :	0
No. of solids :	0
No. of used profiles :	3
No. of load cases :	3
No. of used materials :	5
Acceleration of gravity [m/s^2]	9,807
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materials

Steel EC3

Name	ρ [kg/m³]	E_{mod} [MPa]	μ	Lower limit [mm]	Upper limit [mm]	F_y [MPa]	F_u [MPa]	Colour
		G_{mod} [MPa]	α [m/mK]					
S 235	6850,00	2,1000e+05	0.3	0,00	40,00	235,0	360,0	
		8,0769e+04	0,01e-003	40,00	80,00	215,0	360,0	
S 275	6850,00	2,1000e+05	0.3	0,00	40,00	275,0	430,0	
		8,0769e+04	0,01e-003	40,00	80,00	255,0	410,0	

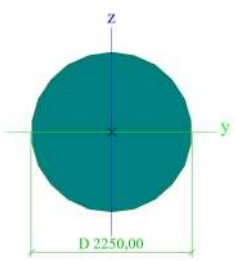
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C35/45	Concrete	2500,00	2600,00	1,1667e+04	0.2	0,01e-003	35,00	
C12/15 en zand	Concrete	1059,00	2600,00	2,7100e+04	0.2	0,01e-003	12,00	

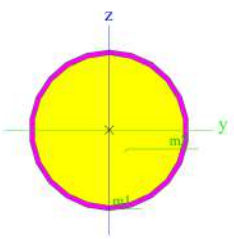
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

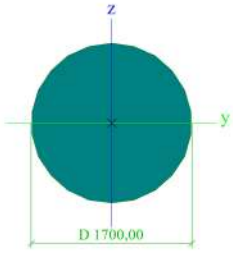
Reinforcement EC2

Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 400A	Reinforcement steel	7850,00	2,0000e+05	8,3333e+04	0,01e-003	400,0

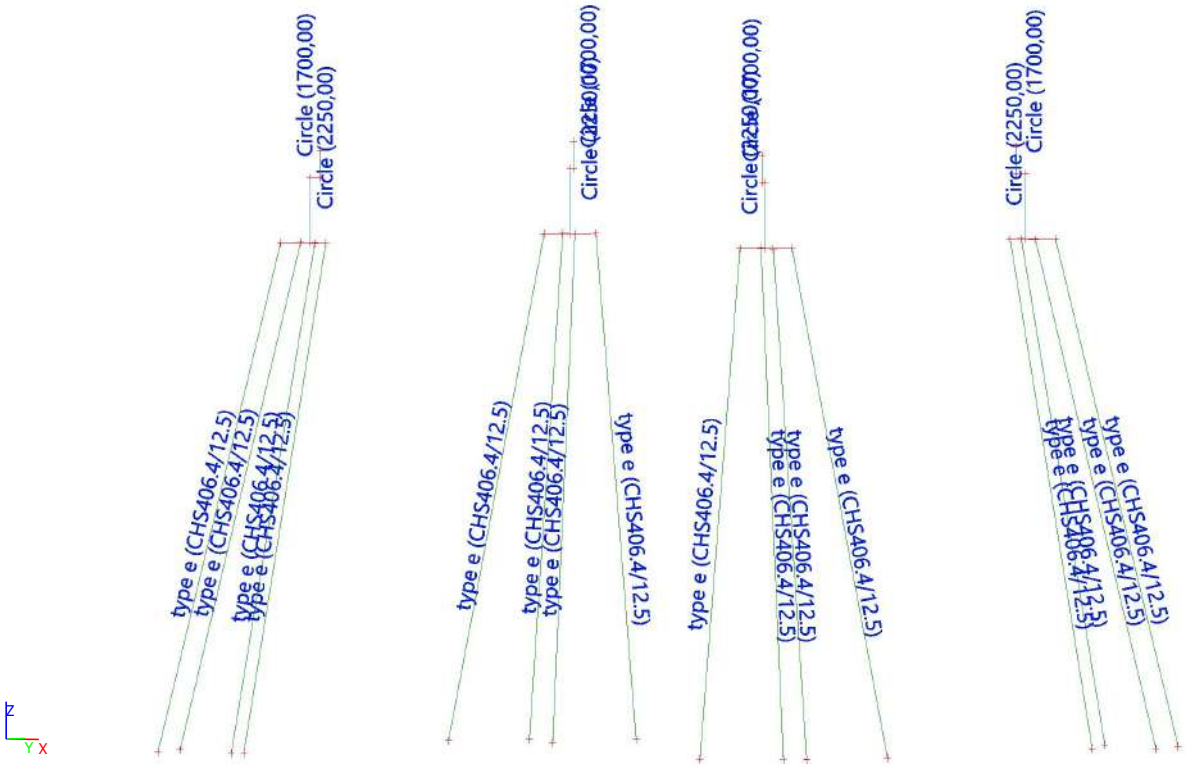
4.2. Cross-sections

Poer2250		
Type	Circle	
Detailed	2250,00	
Shape type	Thick-walled	
Item material	C35/45	
Fabrication	general	
Colour		
A [mm²]	3,9761e+06	
A_y [mm²], A_z [mm²]	3,5785e+06	3,5785e+06
A_L [m²/m], A_D [m²/m]	7,0682e+00	7,0682e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	1125,00	1125,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	1,2581e+12	1,2581e+12
i_y [mm], i_z [mm]	562,44	562,44
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,1183e+09	1,1183e+09
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	1,8984e+09	1,8984e+09
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	2,5161e+12	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		
TubexPaal		
Type	type e	

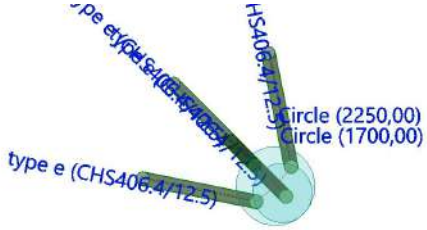
Detailed	CHS406.4/12.5	
Shape type	Thick-walled	
Item material	S 275	
	C12/15 en zand	
Fabrication	concrete	
Flexural buckling y-y, Flexural buckling z-z	a	a
A [mm²]	3,0206e+04	
A_y [mm²], A_z [mm²]	2,3711e+04	2,3711e+04
A_L [m²/m], A_D [m²/m]	1,2767e+00	1,2767e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	203,20	203,20
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	4,3417e+08	4,3417e+08
i_y [mm], i_z [mm]	119,89	119,89
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	2,1367e+06	2,1367e+06
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	2,0947e+06	2,0947e+06
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	576035986,87	576035986,87
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	576035986,87	576035986,87
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	8,9044e+08	5,0549e+03
β_y [mm], β_z [mm]	0,00	0,00
Picture		
PoerOpstort1700		
Type	Circle	
Detailed	1700,00	

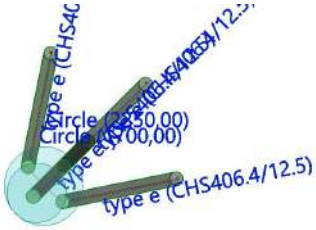
Shape type	Thick-walled	
Item material	C35/45	
Fabrication	general	
Colour		
A [mm²]	2,2698e+06	
A_y [mm²], A_z [mm²]	2,0428e+06	2,0428e+06
A_L [m²/m], A_D [m²/m]	5,3404e+00	5,3404e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	850,00	850,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	4,0998e+11	4,0998e+11
i_y [mm], i_z [mm]	424,96	424,96
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	4,8233e+08	4,8233e+08
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	8,1883e+08	8,1883e+08
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	0,00	0,00
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	0,00	0,00
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	8,1997e+11	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		

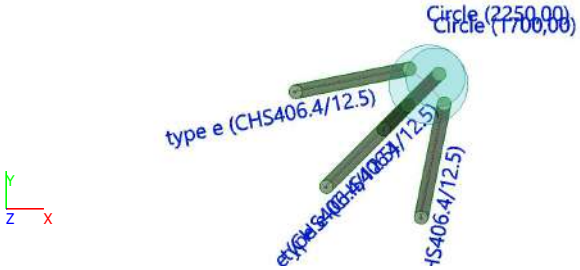
4.3. Analyse model met doorsneden

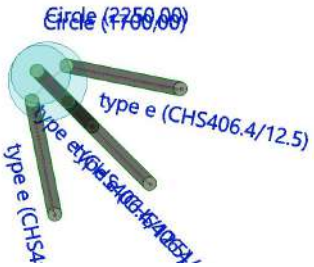


4.4. Analyse model met doorsneden









4.5. Mesh setup

Name	MeshSetup1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	1
Average size of 2D mesh element [m]	0,200
Average size of 1D mesh element on curved 1D members [m]	0,100
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N122	0,000	0,000	-2,400
N123	0,194	0,194	-0,700
1P	0,194	0,194	0,000
N138	0,000	0,000	-0,700
N139	-2,898	-2,898	-15,595

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N140	-0,566	-0,566	-2,400
N141	-1,267	-1,267	-15,648
N142	0,297	0,297	-2,400
N143	-3,773	-0,208	-15,595
N144	-0,544	0,445	-2,400

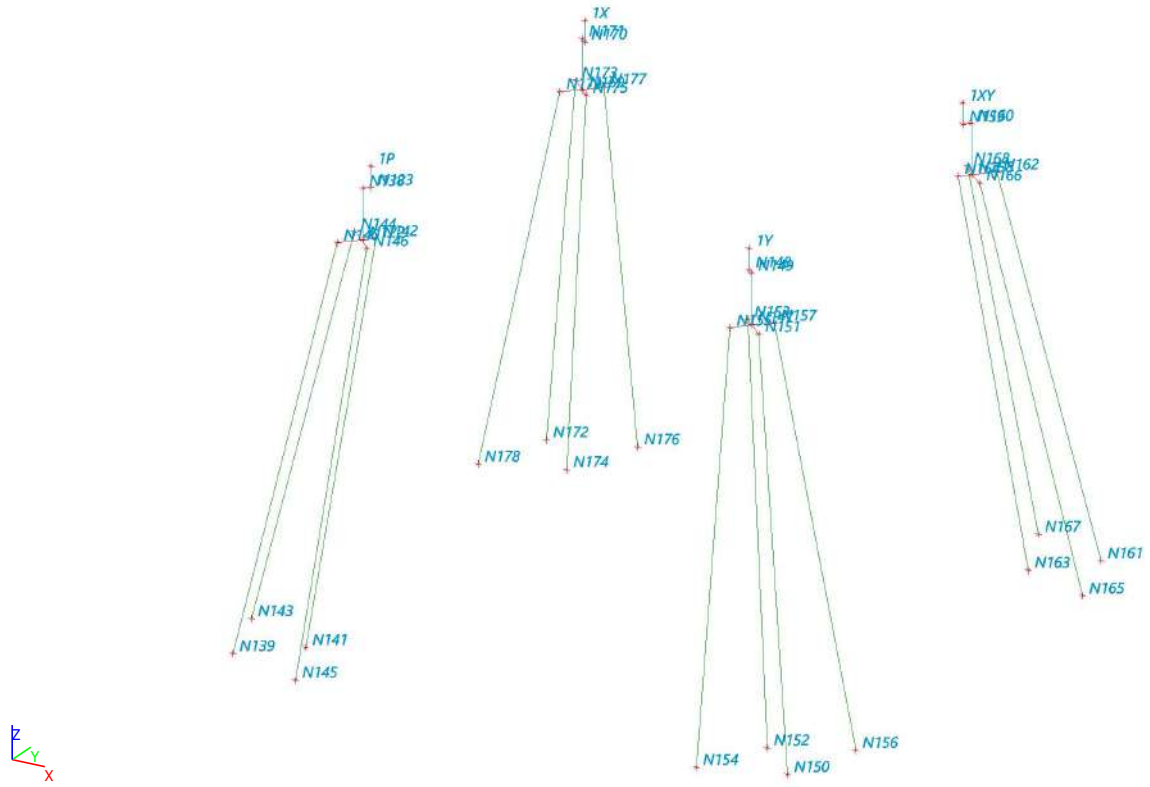
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N145	-0,208	-3,773	-15,595
N146	0,445	-0,544	-2,400
N147	13,606	0,000	-2,400
N148	13,412	0,194	-0,700
1Y	13,412	0,194	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N149	13,606	0,000	-0,700
N150	16,504	-2,898	-15,595
N151	14,172	-0,566	-2,400
N152	14,873	-1,267	-15,648
N153	13,309	0,297	-2,400
N154	13,814	-3,773	-15,595
N155	13,161	-0,544	-2,400
N156	17,379	-0,208	-15,595
N157	14,150	0,445	-2,400
N158	13,606	13,606	-2,400
N159	13,412	13,412	-0,700

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
1XY	13,412	13,412	0,000
N160	13,606	13,606	-0,700
N161	16,504	16,504	-15,595
N162	14,172	14,172	-2,400
N163	14,873	14,873	-15,648
N164	13,309	13,309	-2,400
N165	17,379	13,814	-15,595
N166	14,150	13,161	-2,400
N167	13,814	17,379	-15,595
N168	13,161	14,150	-2,400
N169	0,000	13,606	-2,400

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N170	0,194	13,412	-0,700
1X	0,194	13,412	0,000
N171	0,000	13,606	-0,700
N172	-2,898	16,504	-15,595
N173	-0,566	14,172	-2,400
N174	-1,267	14,873	-15,648
N175	0,297	13,309	-2,400
N176	-0,208	17,379	-15,595
N177	0,445	14,150	-2,400
N178	-3,773	13,814	-15,595
N179	-0,544	13,161	-2,400

5.2. Analyse model met knopen

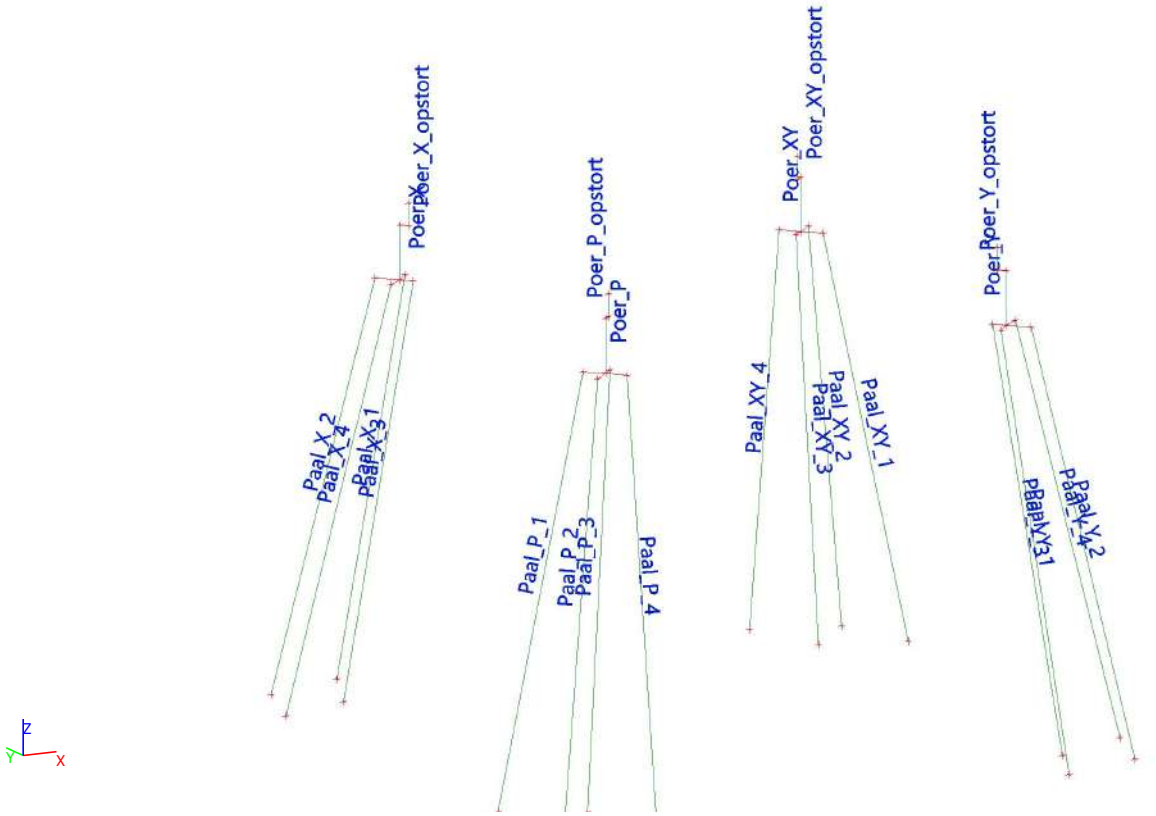


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_1	TubexPaal - type e (CHS406.4/12.5)	S 275	13,600	N144	N143	column (100)
Paal_P_2	TubexPaal - type e (CHS406.4/12.5)	S 275	13,601	N140	N139	column (100)
Paal_P_3	TubexPaal - type e (CHS406.4/12.5)	S 275	13,431	N142	N141	column (100)
Paal_P_4	TubexPaal - type e (CHS406.4/12.5)	S 275	13,600	N146	N145	column (100)
Paal_XY_1	TubexPaal - type e (CHS406.4/12.5)	S 275	13,600	N166	N165	column (100)
Paal_XY_2	TubexPaal - type e (CHS406.4/12.5)	S 275	13,601	N162	N161	column (100)
Paal_XY_3	TubexPaal - type e (CHS406.4/12.5)	S 275	13,431	N164	N163	column (100)
Paal_XY_4	TubexPaal - type e (CHS406.4/12.5)	S 275	13,600	N168	N167	column (100)
Paal_X_1	TubexPaal - type e (CHS406.4/12.5)	S 275	13,600	N177	N176	column (100)
Paal_X_2	TubexPaal - type e (CHS406.4/12.5)	S 275	13,601	N173	N172	column (100)
Paal_X_3	TubexPaal - type e (CHS406.4/12.5)	S 275	13,431	N175	N174	column (100)
Paal_X_4	TubexPaal - type e (CHS406.4/12.5)	S 275	13,600	N179	N178	column (100)
Paal_Y_1	TubexPaal - type e (CHS406.4/12.5)	S 275	13,600	N155	N154	column (100)
Paal_Y_2	TubexPaal - type e (CHS406.4/12.5)	S 275	13,601	N151	N150	column (100)
Paal_Y_3	TubexPaal - type e (CHS406.4/12.5)	S 275	13,431	N153	N152	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_Y_4	TubexPaal - type e (CHS406.4/12.5)	S 275	13,600	N157	N156	column (100)
Poer_P	Poer2250 - Circle (2250,00)	C35/45	1,700	N122	N138	column (100)
Poer_P_opstort	PoerOpstort1700 - Circle (1700,00)	C35/45	0,700	N123	1P	column (100)
Poer_X	Poer2250 - Circle (2250,00)	C35/45	1,700	N169	N171	column (100)
Poer_XY	Poer2250 - Circle (2250,00)	C35/45	1,700	N158	N160	column (100)
Poer_XY_opstort	PoerOpstort1700 - Circle (1700,00)	C35/45	0,700	N159	1XY	column (100)
Poer_X_opstort	PoerOpstort1700 - Circle (1700,00)	C35/45	0,700	N170	1X	column (100)
Poer_Y	Poer2250 - Circle (2250,00)	C35/45	1,700	N147	N149	column (100)
Poer_Y_opstort	PoerOpstort1700 - Circle (1700,00)	C35/45	0,700	N148	1Y	column (100)

5.4. Analyse model met Staven



5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn1	N139	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,87;Ry9,87
Sn2	N141	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,69;Ry6,69
Sn3	N143	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-2,75;Ry13,73
Sn4	N145	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-13,73;Ry2,75
Sn5	N150	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-9,87;Ry-9,87
Sn6	N152	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-6,69;Ry-6,69
Sn7	N154	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-13,73;Ry-2,75
Sn8	N156	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-2,75;Ry-13,73
Sn9	N161	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,87;Ry-9,87
Sn10	N163	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,69;Ry-6,69
Sn11	N165	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx2,75;Ry-13,73
Sn12	N167	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx13,73;Ry-2,75
Sn13	N172	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx9,87;Ry9,87
Sn14	N174	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx6,69;Ry6,69
Sn15	N176	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx13,73;Ry2,75
Sn16	N178	GCS	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx2,75;Ry13,73

5.6. Analyse model met Knoopondersteuningen

5.7. Line supports on member

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
Slb_P_1_Veen	Line	Paal_P_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_3_Veen	Line	Paal_P_2 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_2_Veen	Line	Paal_P_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_4_Veen	Line	Paal_P_4 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_Veen	Line	Paal_Y_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_2_Veen	Line	Paal_Y_2 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_Veen	Line	Paal_Y_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_4_Veen	Line	Paal_Y_4 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_Veen	Line	Paal_XY_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_2_Veen	Line	Paal_XY_2 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_Veen	Line	Paal_XY_3 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_4_Veen	Line	Paal_XY_4 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_Veen	Line	Paal_X_1 LCS	1,000 8,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_2_Veen	Line	Paal_X_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
Slb_X_3_Veen	Line	Paal_X_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_X_4_Veen	Line	Paal_X_4	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Slb_P_1_V9	Line	Paal_P_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_2_V9	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_3_V9	Line	Paal_P_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_4_V9	Line	Paal_P_4	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_1_V9	Line	Paal_Y_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_2_V9	Line	Paal_Y_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_3_V9	Line	Paal_Y_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_Y_4_V9	Line	Paal_Y_4	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_1_V9	Line	Paal_XY_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_2_V9	Line	Paal_XY_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_3_V9	Line	Paal_XY_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_XY_4_V9	Line	Paal_XY_4	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_1_V9	Line	Paal_X_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_2_V9	Line	Paal_X_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_3_V9	Line	Paal_X_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_X_4_V9	Line	Paal_X_4	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
Slb_P_1_V10	Line	Paal_P_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_1_V11	Line	Paal_P_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_P_1_V12	Line	Paal_P_1	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_P_1_V13	Line	Paal_P_1	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_P_2_V10	Line	Paal_P_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_2_V11	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_P_2_V12	Line	Paal_P_2	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_P_2_V13	Line	Paal_P_2	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_P_3_V10	Line	Paal_P_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_3_V11	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	11,000	From start						
Slb_P_3_V12	Line	Paal_P_3	11,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	12,000	From start						
Slb_P_3_V13	Line	Paal_P_3	12,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,000	From start						
Slb_P_4_V10	Line	Paal_P_4	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
Slb_P_4_V11	Line	Paal_P_4	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

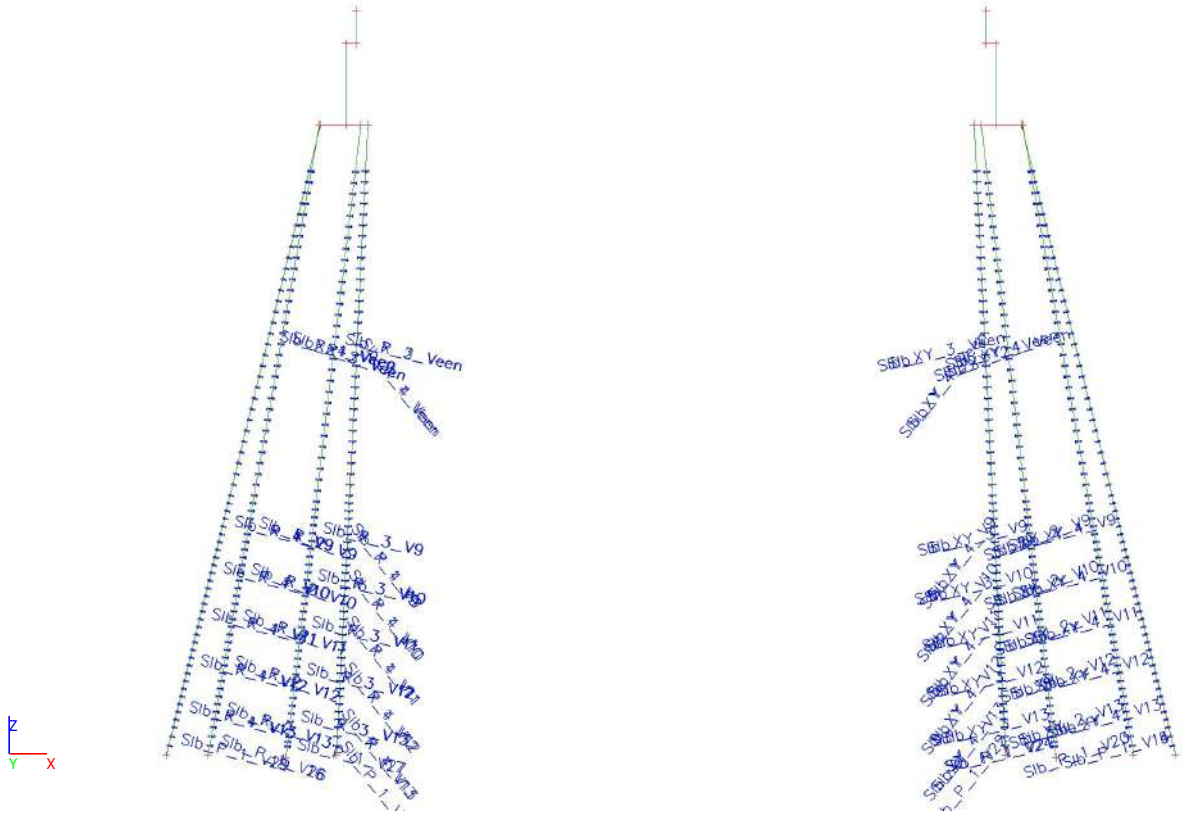
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	11,000 12,000	From start Abso						
Slb_P_4_V12	Line	Paal_P_4 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_4_V13	Line	Paal_P_4 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_V10	Line	Paal_Y_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_V11	Line	Paal_Y_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_V12	Line	Paal_Y_1 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_1_V13	Line	Paal_Y_1 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_V10	Line	Paal_Y_3 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_V11	Line	Paal_Y_3 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_V12	Line	Paal_Y_3 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_3_V13	Line	Paal_Y_3 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_2_V10	Line	Paal_Y_2 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_2_V11	Line	Paal_Y_2 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_2_V12	Line	Paal_Y_2 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_2_V13	Line	Paal_Y_2 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_4_V10	Line	Paal_Y_4 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_4_V11	Line	Paal_Y_4 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_4_V12	Line	Paal_Y_4 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_Y_4_V13	Line	Paal_Y_4 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_V10	Line	Paal_XY_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_V11	Line	Paal_XY_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_V12	Line	Paal_XY_1 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_1_V13	Line	Paal_XY_1 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_V10	Line	Paal_XY_3 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_V11	Line	Paal_XY_3 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_V12	Line	Paal_XY_3 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_3_V13	Line	Paal_XY_3 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_2_V10	Line	Paal_XY_2 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_2_V11	Line	Paal_XY_2 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_2_V12	Line	Paal_XY_2 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_2_V13	Line	Paal_XY_2 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_4_V10	Line	Paal_XY_4 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_4_V11	Line	Paal_XY_4	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	11,000 12,000	From start Abso						
Slb_XY_4_V12	Line	Paal_XY_4 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_XY_4_V13	Line	Paal_XY_4 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_V10	Line	Paal_X_1 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_V11	Line	Paal_X_1 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_V12	Line	Paal_X_1 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_1_V13	Line	Paal_X_1 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V10	Line	Paal_X_3 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V11	Line	Paal_X_3 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V12	Line	Paal_X_3 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_3_V13	Line	Paal_X_3 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_2_V10	Line	Paal_X_2 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_2_V11	Line	Paal_X_2 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_2_V12	Line	Paal_X_2 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_2_V13	Line	Paal_X_2 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_4_V10	Line	Paal_X_4 LCS	9,000 10,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_4_V11	Line	Paal_X_4 LCS	10,000 11,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_4_V12	Line	Paal_X_4 LCS	11,000 12,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_X_4_V13	Line	Paal_X_4 LCS	12,000 13,000	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V14	Line	Paal_Y_4 LCS	13,000 13,400	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V15	Line	Paal_XY_1 LCS	13,000 13,400	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V16	Line	Paal_P_2 LCS	13,000 13,400	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V17	Line	Paal_P_3 LCS	13,000 13,200	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V18	Line	Paal_P_1 LCS	13,000 13,400	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V19	Line	Paal_P_4 LCS	13,000 13,400	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V20	Line	Paal_Y_2 LCS	13,000 13,400	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V21	Line	Paal_Y_3 LCS	13,000 13,200	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V22	Line	Paal_Y_1 LCS	13,000 13,400	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V23	Line	Paal_XY_2 LCS	13,000 13,400	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V24	Line	Paal_XY_3 LCS	13,000 13,200	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V25	Line	Paal_XY_4 LCS	13,000 13,400	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V26	Line	Paal_X_2 LCS	13,000 13,400	Abso From start	Free	Nonlinear	Nonlinear	Free	Free	Free
Slb_P_1_V27	Line	Paal_X_3	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
		LCS	13,200	From start						
Slb_P_1_V28	Line	Paal_X_1	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,400	From start						
Slb_P_1_V29	Line	Paal_X_4	13,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	13,400	From start						

5.8. Analyse model met Lijnondersteuningen

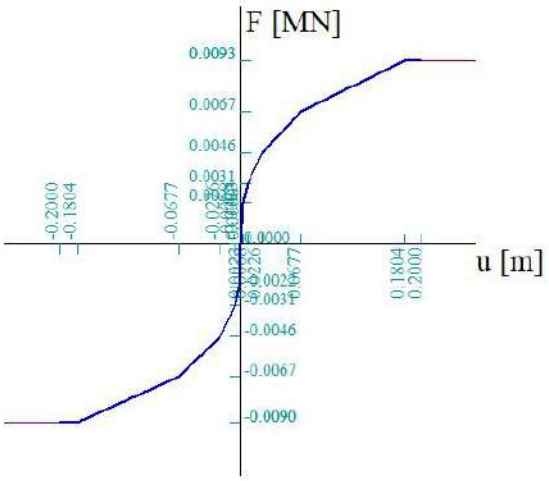
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

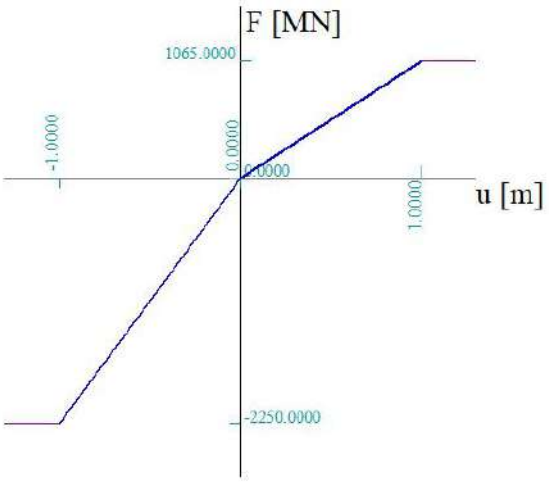
Name	Type	u / F	Positive end	Negative end
PY-curve-Veen	Translation	-0.200000 / -9000.000000	Free	Free
		-0.180400 / -9000.000000		
		-0.067650 / -6700.000000		
		-0.022550 / -4630.000000		
		-0.006765 / -3100.000000		
		-0.002255 / -2150.000000		
		0.000000 / 0.000000		
		0.002255 / 2150.000000		
		0.006765 / 3100.000000		
		0.022550 / 4630.000000		
		0.067650 / 6700.000000		
		0.180400 / 9270.000000		
		0.200000 / 9270.000000		

Drawing



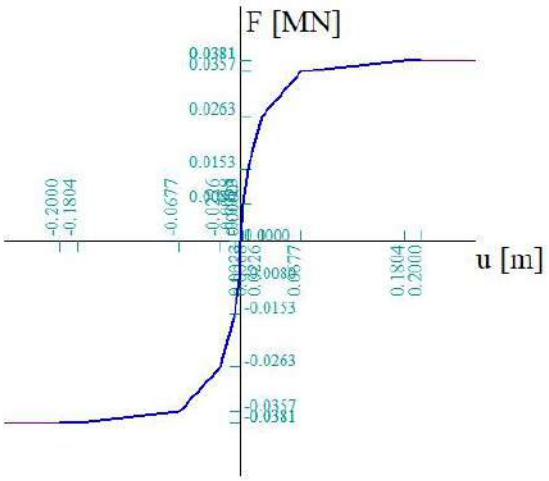
Name	Type	u / F	Positive end	Negative end
Trek-druk-Mast_155-paalpunt	Translation	-1.000000 / -2250000000.000000	Free	Free
		0.000000 / 0.000000		
		1.000000 / 1065000000.000000		

Drawing



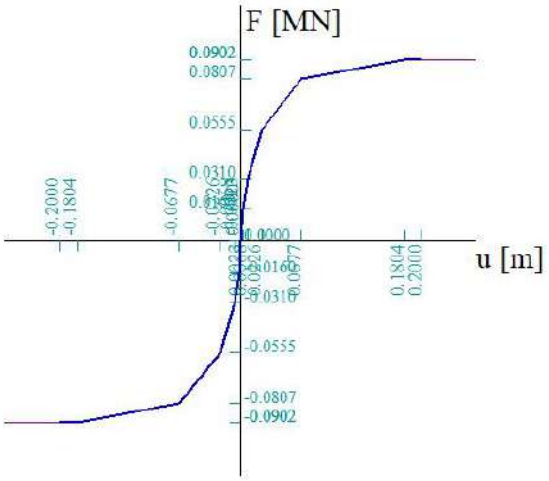
Name	Type	u / F	Positive end	Negative end
PY-curve-2_V9	Translation	-0.200000 / -38100.000000	Free	Free
		-0.180400 / -38100.000000		
		-0.067650 / -35700.000000		
		-0.022550 / -26300.000000		
		-0.006765 / -15300.000000		
		-0.002255 / -8000.000000		
		0.000000 / 0.000000		
		0.002255 / 8000.000000		
		0.006765 / 15300.000000		
		0.022550 / 26300.000000		
		0.067650 / 35700.000000		
		0.180400 / 38100.000000		
		0.200000 / 38100.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V10	Translation	-0.200000 / -90200.000000	Free	Free
		-0.180400 / -90200.000000		
		-0.067650 / -80700.000000		
		-0.022550 / -55500.000000		
		-0.006765 / -31000.000000		
		-0.002255 / -16000.000000		
		0.000000 / 0.000000		
		0.002255 / 16000.000000		
		0.006765 / 31000.000000		
		0.022550 / 55500.000000		
		0.067650 / 80700.000000		
		0.180400 / 90200.000000		
		0.200000 / 90200.000000		

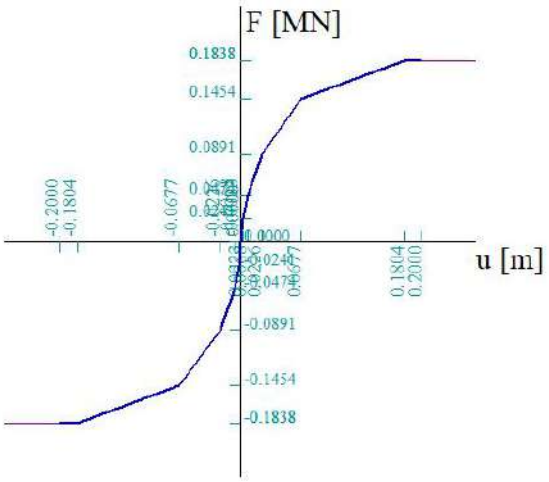
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V11	Translation	-0.200000 / -183800.000000	Free	Free
		-0.180400 / -183800.000000		
		-0.067650 / -145400.000000		
		-0.022550 / -89100.000000		
		-0.006765 / -47400.000000		
		-0.002255 / -24100.000000		
		0.000000 / 0.000000		
		0.002255 / 24100.000000		
		0.006765 / 47400.000000		
		0.022550 / 89100.000000		

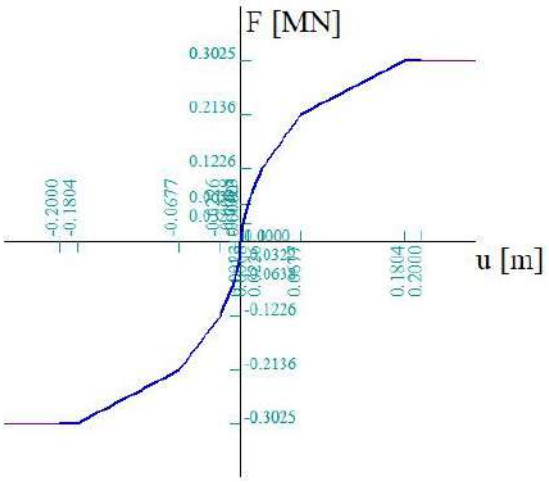
Name	Type	u / F	Positive end	Negative end
		0.067650 / 145400.000000		
		0.180400 / 183800.000000		
		0.200000 / 183800.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V12	Translation	-0.200000 / -302500.000000	Free	Free
		-0.180400 / -302500.000000		
		-0.067650 / -213600.000000		
		-0.022550 / -122600.000000		
		-0.006765 / -63800.000000		
		-0.002255 / -32200.000000		
		0.000000 / 0.000000		
		0.002255 / 32200.000000		
		0.006765 / 63800.000000		
		0.022550 / 122600.000000		
		0.067650 / 213600.000000		
		0.180400 / 302500.000000		
		0.200000 / 302500.000000		

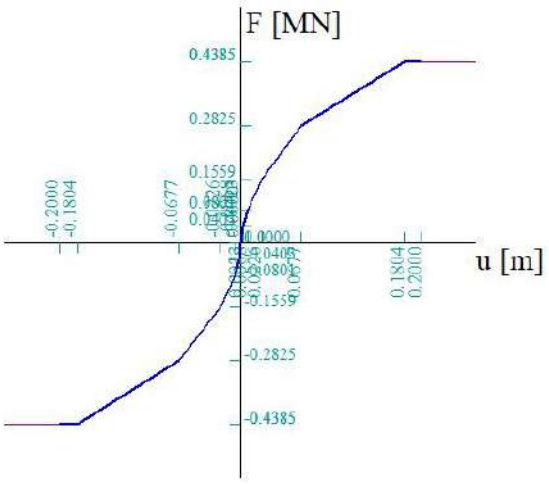
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-2_V13	Translation	-0.200000 / -438500.000000	Free	Free
		-0.180400 / -438500.000000		
		-0.067650 / -282500.000000		
		-0.022550 / -155900.000000		

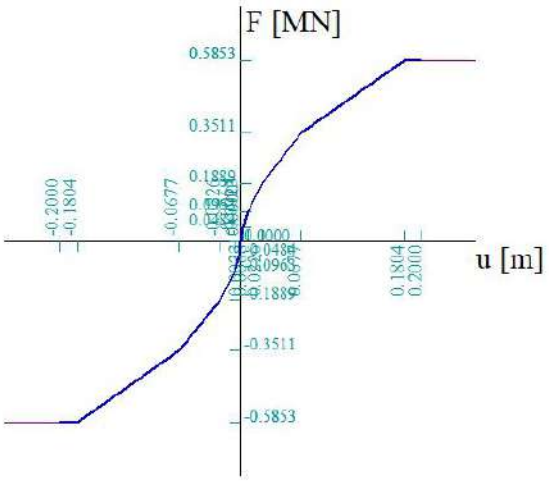
Name	Type	u / F	Positive end	Negative end
		-0.006765 / -80100.000000		
		-0.002255 / -40300.000000		
		0.000000 / 0.000000		
		0.002255 / 40300.000000		
		0.006765 / 80100.000000		
		0.022550 / 155900.000000		
		0.067650 / 282500.000000		
		0.180400 / 438500.000000		
		0.200000 / 438500.000000		

Drawing



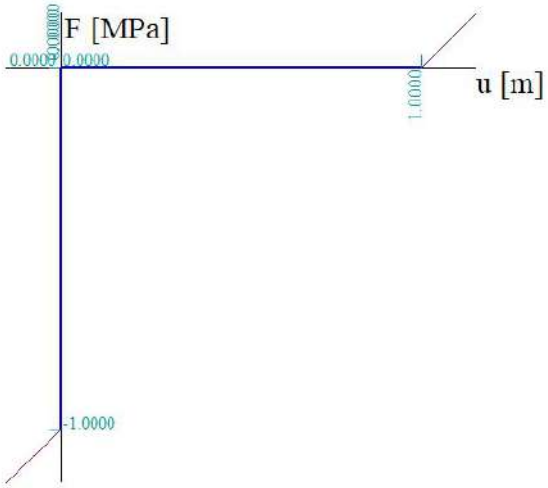
Name	Type	u / F	Positive end	Negative end
PY-curve-2_V14	Translation	-0.200000 / -585300.000000	Free	Free
		-0.180400 / -585300.000000		
		-0.067650 / -351100.000000		
		-0.022550 / -188900.000000		
		-0.006765 / -96300.000000		
		-0.002255 / -48400.000000		
		0.000000 / 0.000000		
		0.002255 / 48400.000000		
		0.006765 / 96300.000000		
		0.022550 / 188900.000000		
		0.067650 / 351100.000000		
		0.180400 / 585300.000000		
		0.200000 / 585300.000000		

Drawing



Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing

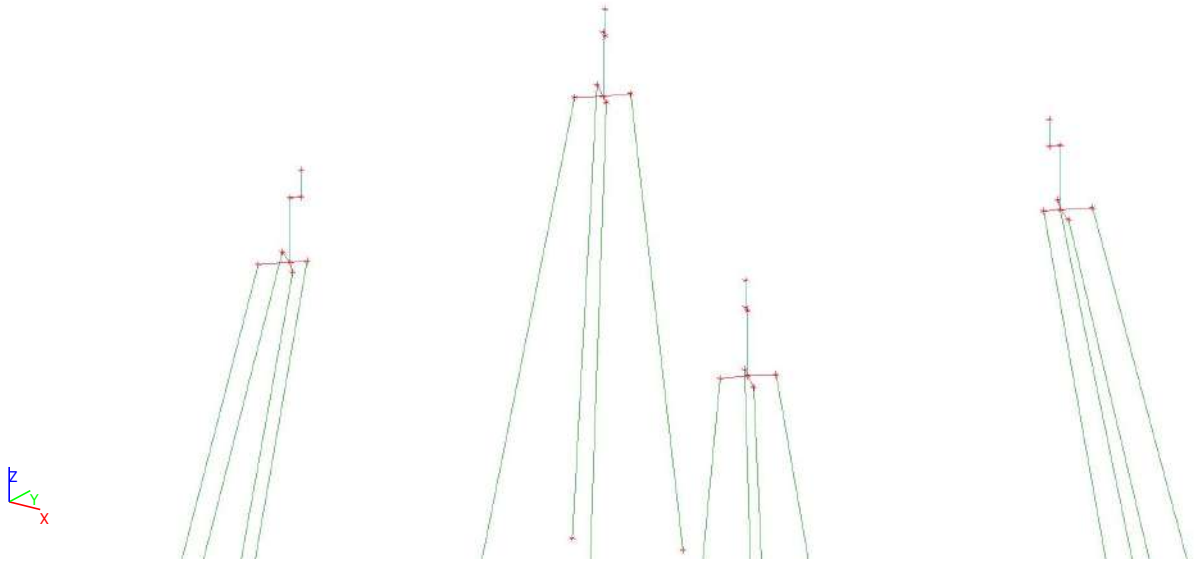


6. Belastingen

6.1. Load cases

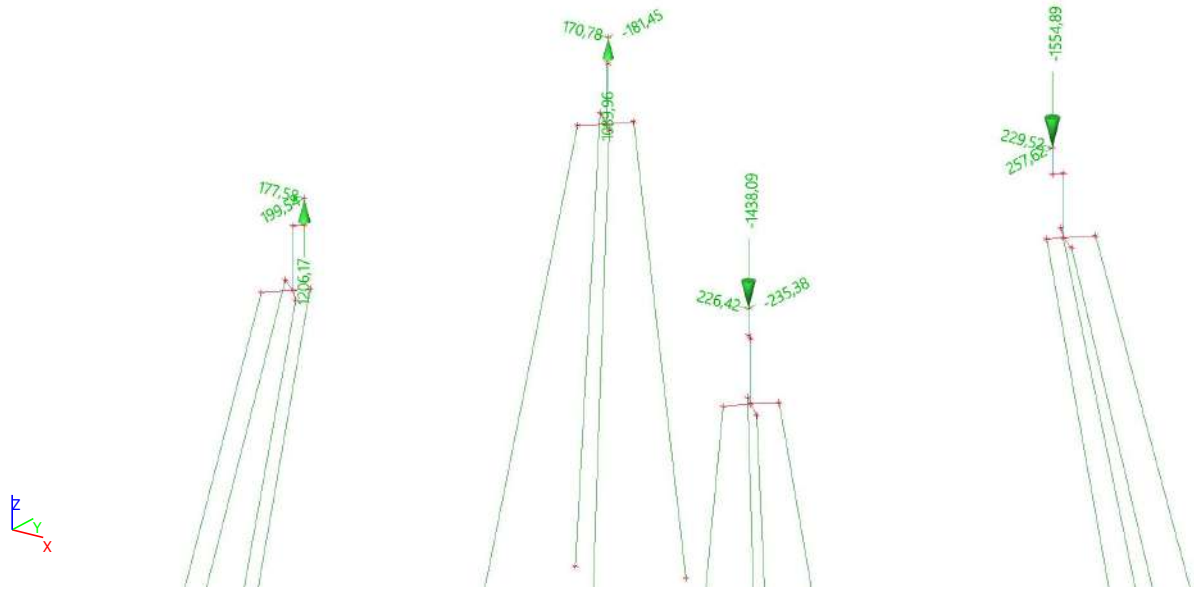
6.1.1. Load cases - EG_Fundering

Name	Description	Action type	Load group	Direction
	Spec	Load type		
EG_Fundering		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - hL Bck + Wnd

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd		Variable	LG4	Short	None
	Standard	Static			

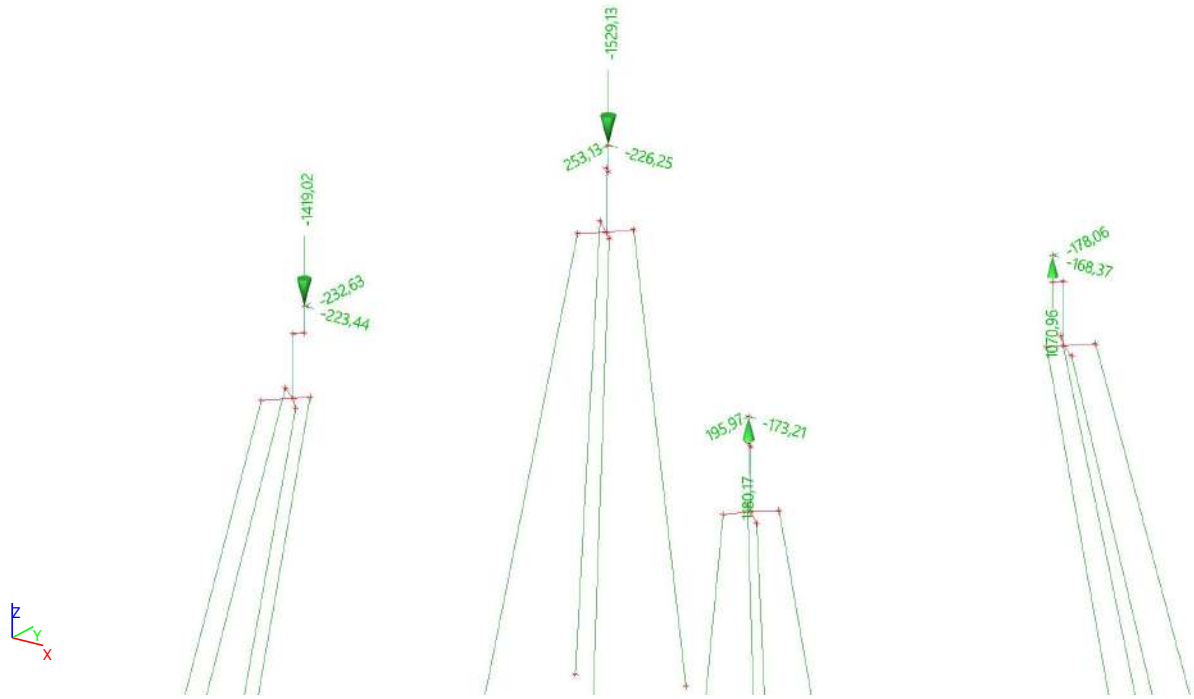


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd_1P_X	1P	hL Bck + Wnd	GCS	X	Force	177,58
hL Bck + Wnd_1P_Y	1P	hL Bck + Wnd	GCS	Y	Force	199,54
hL Bck + Wnd_1P_Z	1P	hL Bck + Wnd	GCS	Z	Force	1206,17
hL Bck + Wnd_1X_X	1X	hL Bck + Wnd	GCS	X	Force	170,78
hL Bck + Wnd_1X_Y	1X	hL Bck + Wnd	GCS	Y	Force	-181,45
hL Bck + Wnd_1X_Z	1X	hL Bck + Wnd	GCS	Z	Force	1089,96
hL Bck + Wnd_1XY_X	1XY	hL Bck + Wnd	GCS	X	Force	229,52
hL Bck + Wnd_1XY_Y	1XY	hL Bck + Wnd	GCS	Y	Force	257,62
hL Bck + Wnd_1XY_Z	1XY	hL Bck + Wnd	GCS	Z	Force	-1554,89
hL Bck + Wnd_1Y_X	1Y	hL Bck + Wnd	GCS	X	Force	226,42
hL Bck + Wnd_1Y_Y	1Y	hL Bck + Wnd	GCS	Y	Force	-235,38
hL Bck + Wnd_1Y_Z	1Y	hL Bck + Wnd	GCS	Z	Force	-1438,09

6.1.3. Load cases - hL Ahd + Wnd

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd		Variable	LG4	Short	None
	Standard	Static			



6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd_1XY_X	1XY	hL Ahd + Wnd	GCS	X	Force	-168,37
hL Ahd + Wnd_1XY_Y	1XY	hL Ahd + Wnd	GCS	Y	Force	-178,06
hL Ahd + Wnd_1XY_Z	1XY	hL Ahd + Wnd	GCS	Z	Force	1070,96
hL Ahd + Wnd_1Y_X	1Y	hL Ahd + Wnd	GCS	X	Force	-173,21
hL Ahd + Wnd_1Y_Y	1Y	hL Ahd + Wnd	GCS	Y	Force	195,97
hL Ahd + Wnd_1Y_Z	1Y	hL Ahd + Wnd	GCS	Z	Force	1180,17
hL Ahd + Wnd_1P_X	1P	hL Ahd + Wnd	GCS	X	Force	-223,44
hL Ahd + Wnd_1P_Y	1P	hL Ahd + Wnd	GCS	Y	Force	-232,63
hL Ahd + Wnd_1P_Z	1P	hL Ahd + Wnd	GCS	Z	Force	-1419,02
hL Ahd + Wnd_1X_X	1X	hL Ahd + Wnd	GCS	X	Force	-226,25
hL Ahd + Wnd_1X_Y	1X	hL Ahd + Wnd	GCS	Y	Force	253,13
hL Ahd + Wnd_1X_Z	1X	hL Ahd + Wnd	GCS	Z	Force	-1529,13

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
hL Bck + Wnd - EG_Gunstig	Ultimate	EG_Fundering	1,200
		hL Bck + Wnd	1,000
hL Ahd + Wnd - EG_Gunstig	Ultimate	EG_Fundering	1,200
		hL Ahd + Wnd	1,000
hL Bck + Wnd - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		hL Bck + Wnd	1,000
hL Ahd + Wnd - EG_Ongunstig	Ultimate	EG_Fundering	1,200
		hL Ahd + Wnd	1,000

6.3. Result classes

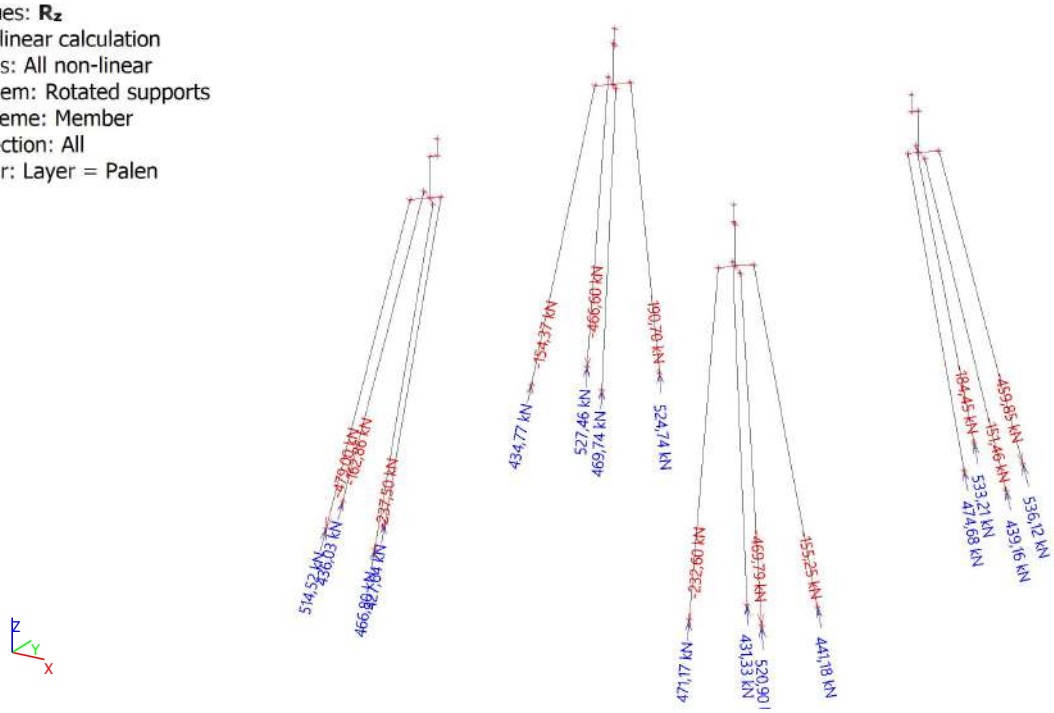
Name	List
All non-linear	hL Bck + Wnd - EG_Gunstig
	hL Ahd + Wnd - EG_Gunstig
	hL Bck + Wnd - EG_Ongunstig
	hL Ahd + Wnd - EG_Ongunstig

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen

Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn16/N178	hL Ahd + Wnd - EG_Gunstig	**0,00**	0,00	434,77	0,00	0,00	0,00	0,0	0,0
Sn8/N156	hL Bck + Wnd - EG_Gunstig	**0,00**	0,00	441,18	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn14/N174	hL Ahd + Wnd - EG_Gunstig	0,00	**0,00**	469,74	0,00	0,00	0,00	0,0	0,0
Sn15/N176	hL Ahd + Wnd - EG_Gunstig	0,00	**0,00**	524,74	0,00	0,00	0,00	0,0	0,0
Sn9/N161	hL Bck + Wnd - EG_Gunstig	0,00	0,00	**536,12**	0,00	0,00	0,00	0,0	0,0
Sn1/N139	hL Bck + Wnd - EG_Gunstig	0,00	0,00	**-479,00**	0,00	0,00	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear

System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen

Nodal reactions

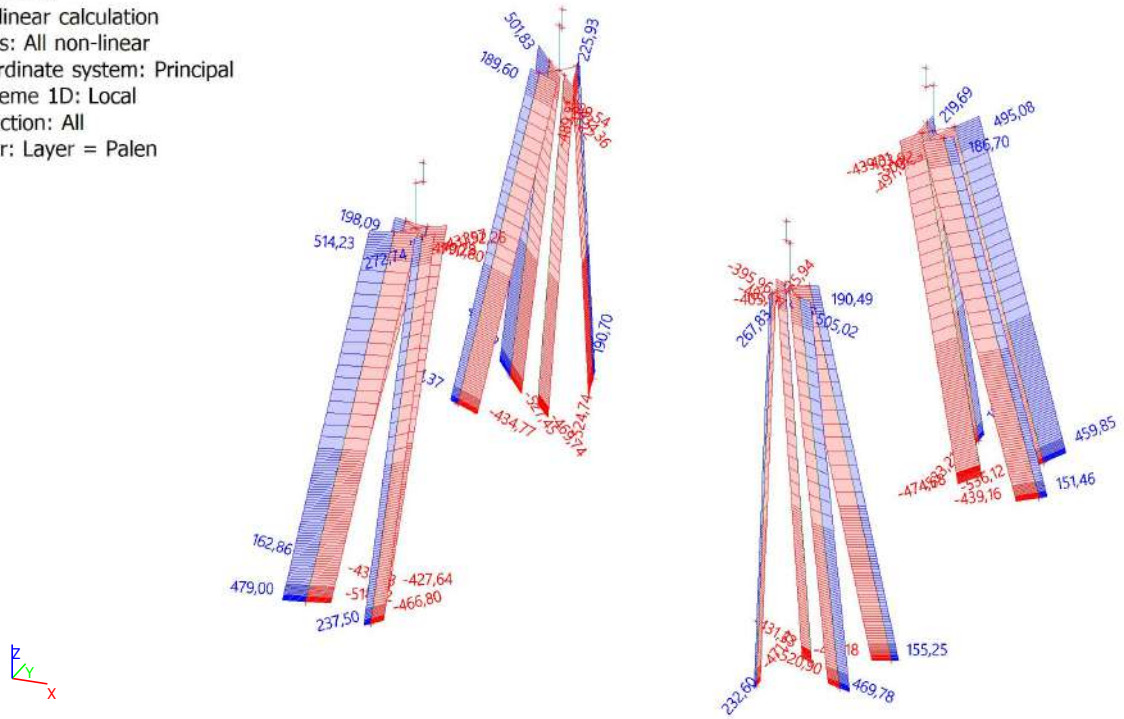
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn1/N139	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**514,52**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn1/N139	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**-479,00**	0,00	0,00	**0,00**	0,0	0,0
Sn2/N141	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**427,64**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn2/N141	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**21,93**	0,00	0,00	**0,00**	0,0	0,0
Sn3/N143	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**436,03**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn3/N143	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**-162,86**	0,00	0,00	**0,00**	0,0	0,0
Sn4/N145	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**-237,50**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn4/N145	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**466,80**	0,00	0,00	**0,00**	0,0	0,0
Sn5/N150	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**-469,79**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn5/N150	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**520,90**	0,00	0,00	**0,00**	0,0	0,0
Sn6/N152	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**431,33**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn6/N152	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**26,92**	0,00	0,00	**0,00**	0,0	0,0
Sn7/N154	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**471,17**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn7/N154	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**-232,60**	0,00	0,00	**0,00**	0,0	0,0
Sn8/N156	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**441,18**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn8/N156	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**-155,25**	0,00	0,00	**0,00**	0,0	0,0
Sn9/N161	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**-459,85**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn9/N161	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**536,12**	0,00	0,00	**0,00**	0,0	0,0
Sn10/N163	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**474,68**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn10/N163	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**75,81**	0,00	0,00	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn11/N165	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**-151,46**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn11/N165	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**439,16**	0,00	0,00	**0,00**	0,0	0,0
Sn12/N167	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**533,21**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn12/N167	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**-184,45**	0,00	0,00	**0,00**	0,0	0,0
Sn13/N172	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**527,46**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn13/N172	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**-466,60**	0,00	0,00	**0,00**	0,0	0,0
Sn14/N174	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**469,74**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn14/N174	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**72,18**	0,00	0,00	**0,00**	0,0	0,0
Sn15/N176	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**-190,70**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn15/N176	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**524,74**	0,00	0,00	**0,00**	0,0	0,0
Sn16/N178	hL Bck + Wnd - EG_Gunstig	**0,00**	**0,00**	**-154,37**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn16/N178	hL Ahd + Wnd - EG_Gunstig	**0,00**	**0,00**	**434,77**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

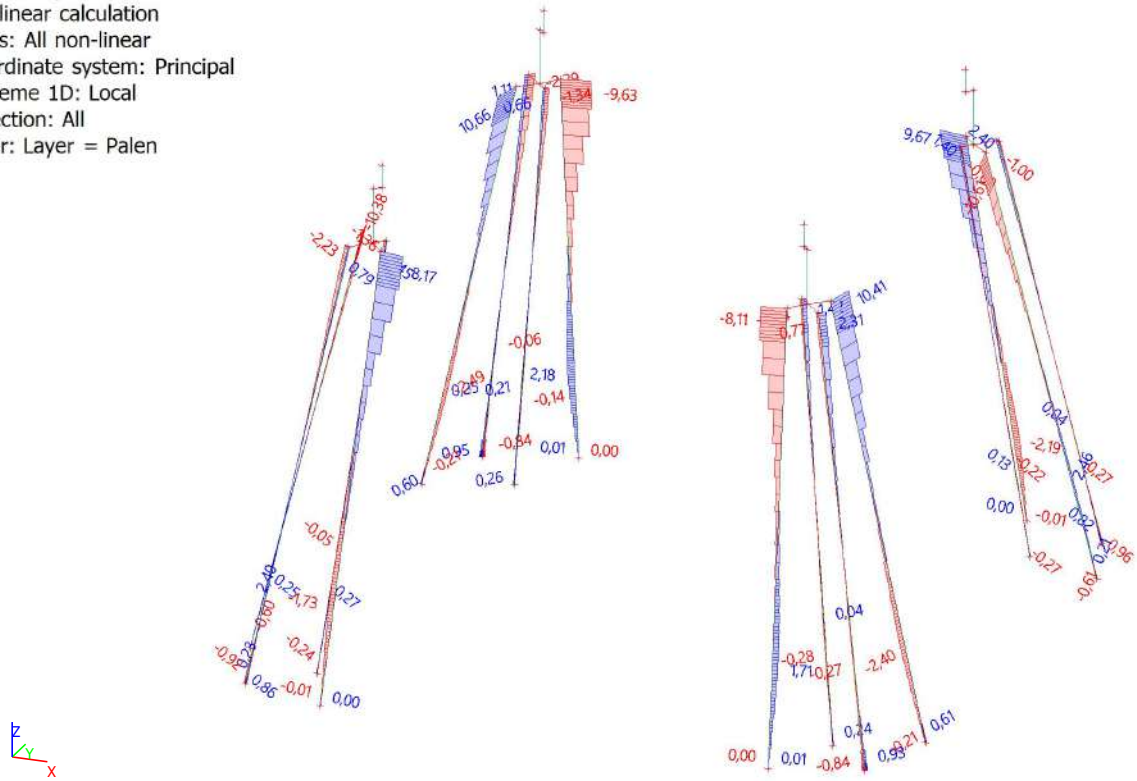
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



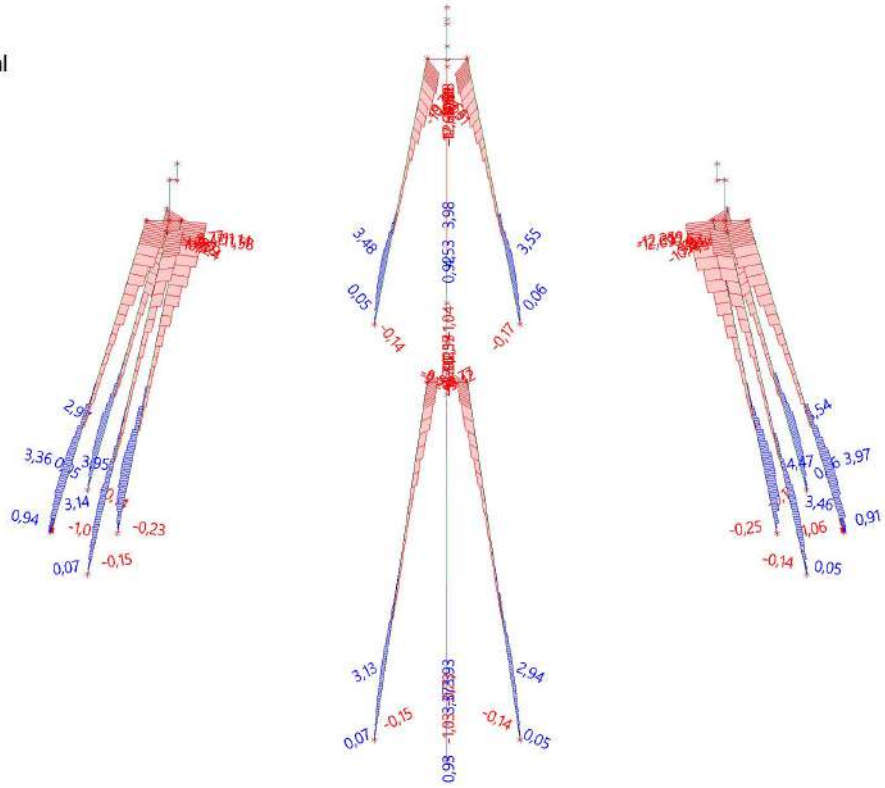
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



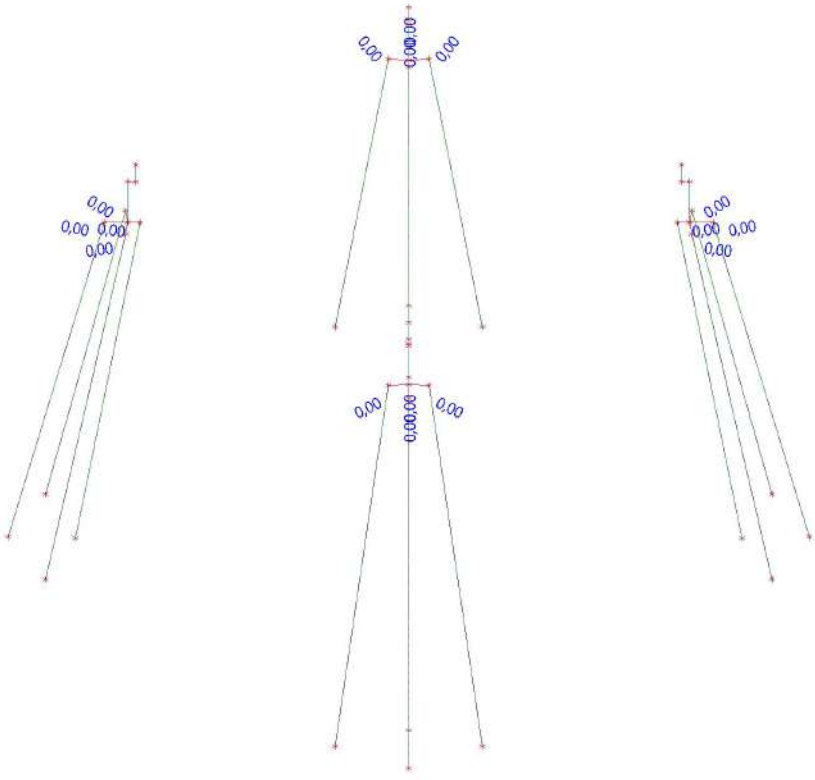
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



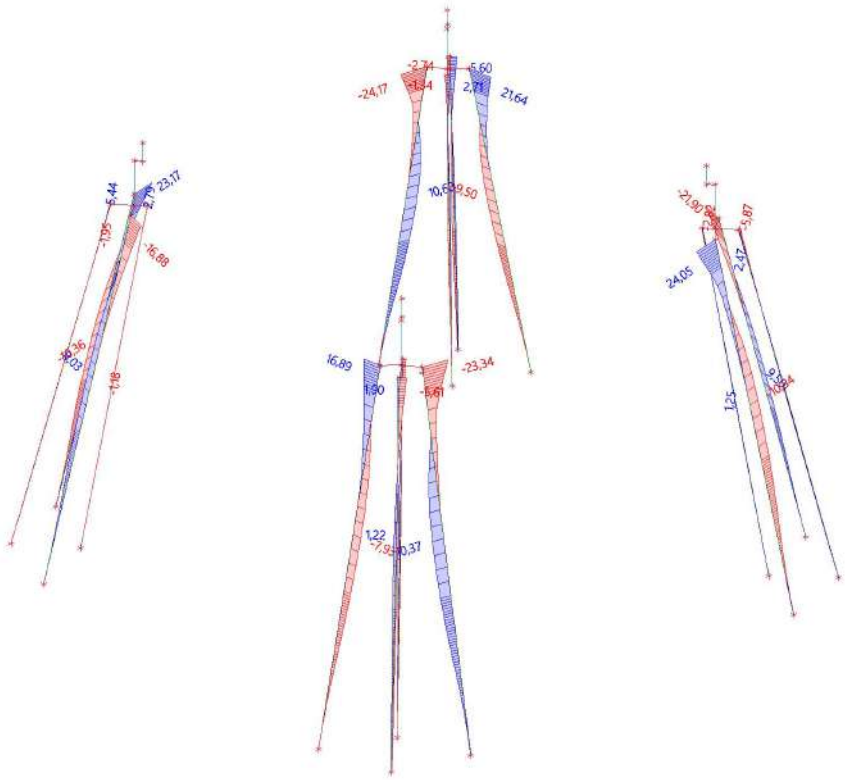
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



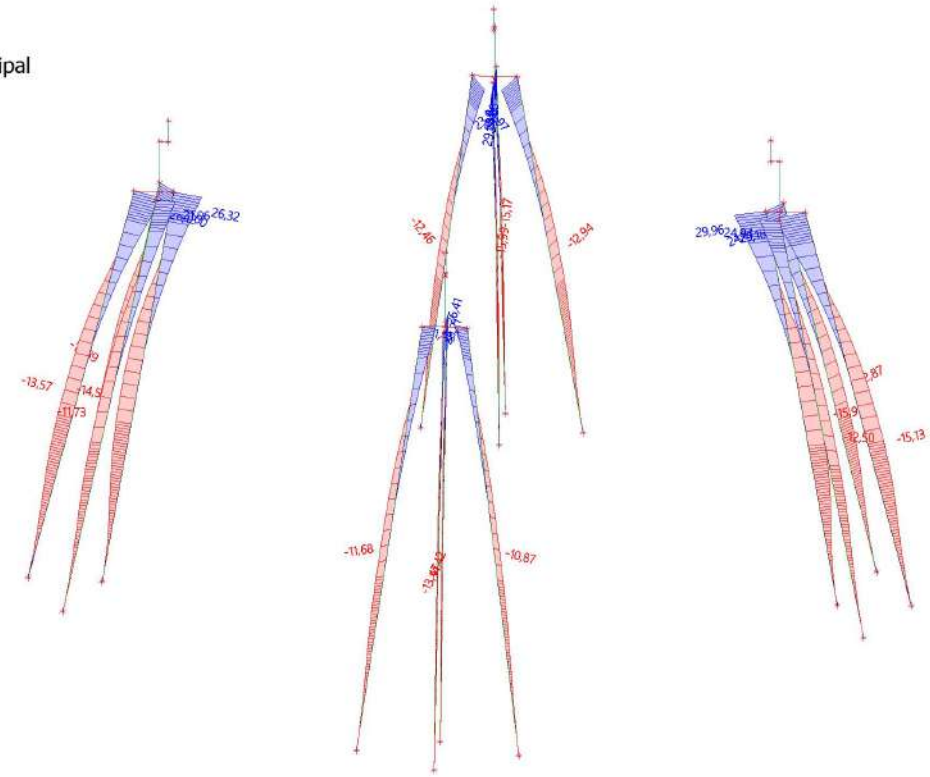
7.2.5. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_XY_2	13,601	hL Bck + Wnd - EG_Gunstig	**-536,12**	-0,96	-1,06	0,00	0,00	0,00
Paal_P_2	0,000	hL Bck + Wnd - EG_Gunstig	**514,23**	-2,23	-9,73	**0,00**	22,48	5,44
Paal_XY_1	0,000	hL Ahd + Wnd - EG_Gunstig	186,70	**-10,61**	-9,67	0,00	24,04	**24,05**
Paal_XY_3	1,000-	hL Ahd + Wnd - EG_Gunstig	-43,07	-0,60	**-12,69**	0,00	17,48	0,63
Paal_X_3	10,000+	hL Bck + Wnd - EG_Gunstig	-64,46	-0,14	**4,53**	0,00	-10,75	0,26
Paal_X_3	7,125-	hL Bck + Wnd - EG_Gunstig	-54,42	-0,03	-0,42	0,00	**-15,99**	0,54
Paal_XY_3	0,000	hL Ahd + Wnd - EG_Gunstig	-40,44	-0,60	-12,25	0,00	**29,96**	1,23
Paal_X_4	0,000	hL Bck + Wnd - EG_Gunstig	189,60	**10,66**	-9,66	0,00	23,97	**-24,17**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer_P_opstort	0,700	hL Bck + Wnd - EG_Gunstig	**1206,17**	-266,66	-15,53	0,00	0,00	0,00
Poer_P_opstort	0,000	hL Bck + Wnd - EG_Gunstig	1159,42	**-266,66**	-15,53	0,00	10,87	**186,66**
Poer_P	0,000	hL Bck + Wnd - EG_Gunstig	960,56	15,53	**-266,66**	-4,27	**321,15**	-37,27
Poer_X	0,000	hL Ahd + Wnd - EG_Gunstig	-1774,74	19,01	338,97	**-5,23**	-380,17	-45,62
Poer_XY	0,000	hL Bck + Wnd - EG_Gunstig	**-1800,50**	-19,87	**344,46**	**5,46**	**-386,25**	47,69
Poer_XY_opstort	0,000	hL Bck + Wnd - EG_Gunstig	-1601,64	**344,46**	19,87	0,00	-13,91	**-241,12**

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Projectgegevens

Projectnaam	Anker capaciteit berekeningen KIJ-DIM
Projectnr.	Ankerstaven type A
Auteur	[redacted]
Omschrijving	Toetsing voetplaat
Datum	1-5-2025
Norm	EN

Berekening deel 1: toetsing van voetplaat en lassen

Let op: In deel 1 wordt enkel de voetplaat en zijn lassen getoetst. Toetsingen van de ankers en de poer worden met grotere nauwkeurigheid in deel 2 hertoetst.

Materiaal

Staal	S 235
Beton	C12/15

Projectonderdeel Ankerstaaf type A

Berekening

Naam	Ankerstaaf type A
Omschrijving	
Berekening	Spanning, rek/ gesimplificeerde belasting

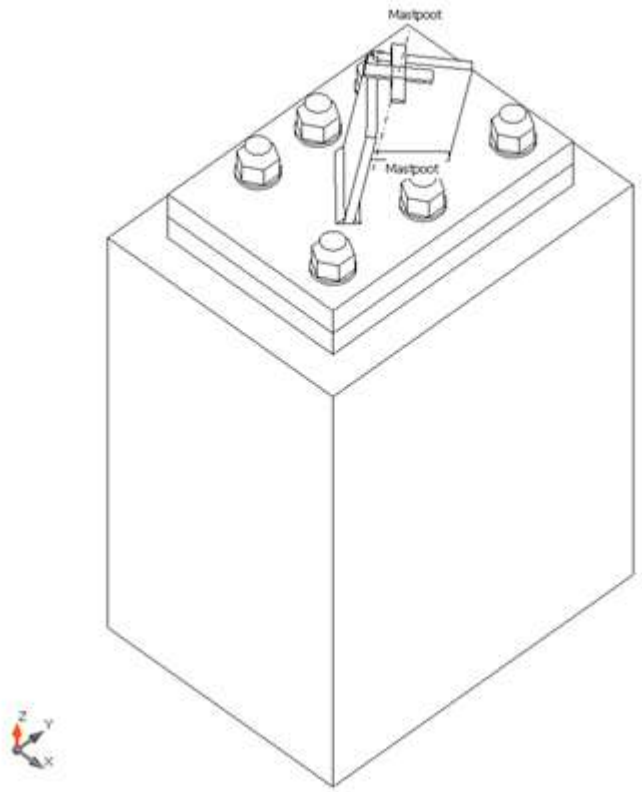
Elementen

Geometrie

Naam	Doorsnede	β – Richting [°]	γ - Rol [°]	α - Rotatie [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]
Mastpoot	1 - L250X24	0,0	77,5	45,0	0	0	0

Ondersteuningen en krachten

Naam	Ondersteuning	Krachten in	X [mm]
Mastpoot / einde	Mx-My-Mz	Knoop	0



Doorsneden

Naam	Materiaal
1 - L250X24	S 235

Ankers

Naam	Diameter [mm]	f_y [MPa]	f_u [MPa]	Bruto oppervlak [mm^2]
M64 4.6	64	240,0	400,0	3217

Lasteffecten (Evenwicht is niet noodzakelijk)

Naam	Staaf	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
+1250kN trek	Mastpoot / Einde	1250,0	0,0	0,0	0,0	0,0	0,0
-2100kN druk	Mastpoot / Einde	-2100,0	0,0	0,0	0,0	0,0	0,0

Fundatieblok

Onderdeel	Waarde	Eenheid
BB 1		
Maatvoering	750 x 1000	mm
Hoogte	1300	mm
Anker	M64 4.6	
Verankeringslengte	1000	mm
Dwarskracht overdracht	Ankers	
Mortelvoeg	70	mm

Controle

Opsomming

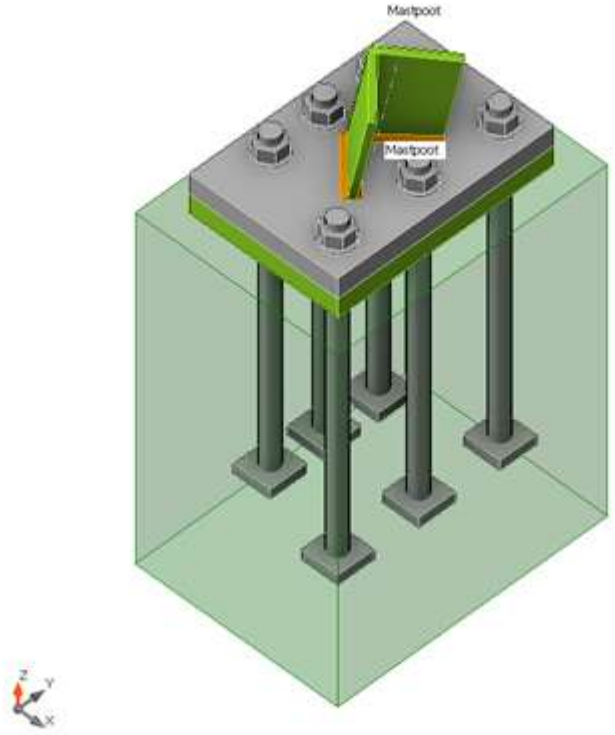
Naam	Waarde	Controle status
Berekening	100,0%	OK
Platen	0,2 < 5,0%	OK
Ankers	117,7 > 100%	**Niet Okay!**
Lassen	98,1 < 100%	OK
Betonpoer	87,5 < 100%	OK
Knik	Niet berekend	

Platen

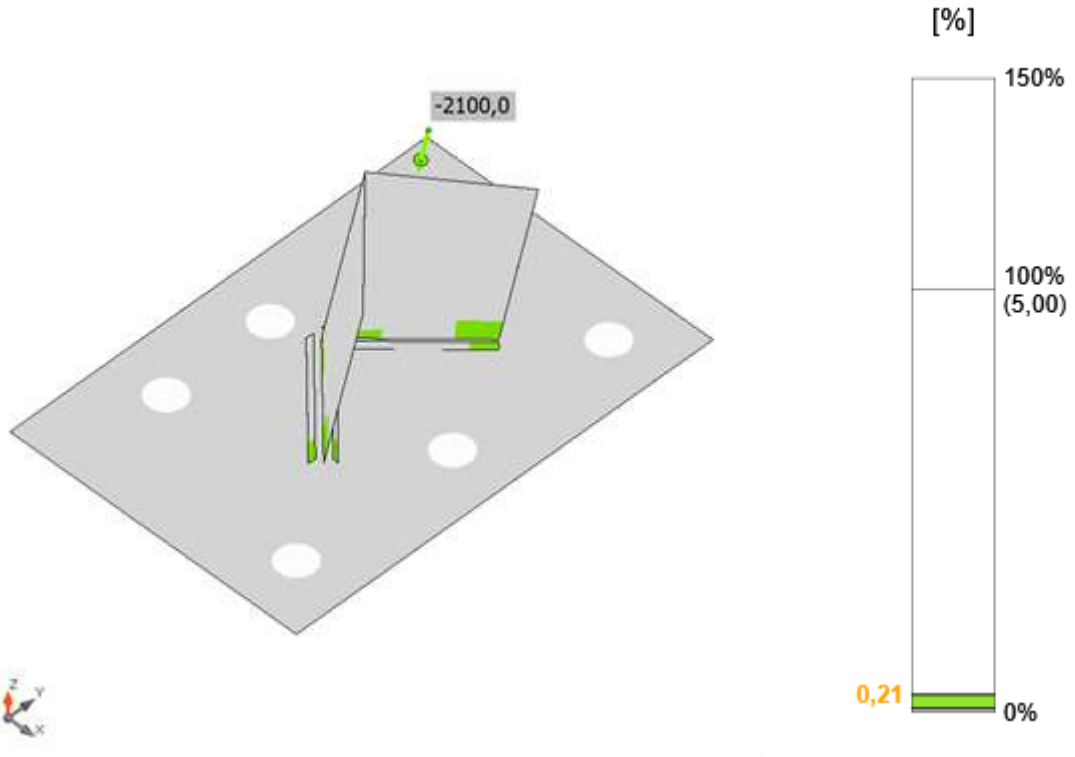
Naam	Materiaal	t_p [mm]	Lasten	σ_{Ed} [MPa]	ε_{Pl} [%]	$\sigma_{c,Ed}$ [MPa]	Status
Mastpoot-tfl 1	S 235	24,0	-2100kN druk	235,4	0,2	0,0	OK
Mastpoot-w 1	S 235	24,0	-2100kN druk	235,4	0,2	0,0	OK
Voetplaat	S 235 - 1	75,0	-2100kN druk	186,0	0,0	0,0	OK

Ontwerpgegevens

Materiaal	f_y [MPa]	ε_{lim} [%]
S 235	235,0	5,0
S 235 - 1	215,0	5,0

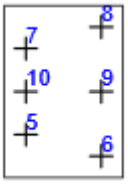


Complete controle, -2100kN druk



Rekcontrole, -2100kN druk

Ankers

Vorm	Onderdeel	Lasten	N_{Ed} [kN]	V_{Ed} [kN]	$N_{Rd,p}$ [kN]	$N_{Rd,cb}$ [kN]	$V_{Rd,s}$ [kN]	Ut_t [%]	Ut_s [%]	Ut_{ts} [%]	Status
	A5	+1250kN trek	167,9	44,8	750,4	642,9	0,0	94,7	14,2	92,1	OK
	A6	+1250kN trek	142,2	43,5	750,4	555,9	0,0	111,5	13,8	117,7	**Niet Okay!**
	A7	+1250kN trek	167,9	44,8	750,4	642,9	0,0	94,7	14,2	92,1	OK
	A8	+1250kN trek	142,2	43,5	750,4	555,9	0,0	111,5	13,8	117,7	**Niet Okay!**
	A9	+1250kN trek	335,1	47,1	750,4	555,9	0,0	111,5	14,9	117,7	**Niet Okay!**
	A10	+1250kN trek	272,8	46,9	750,4	642,9	0,0	94,7	14,9	92,1	OK

Ontwerpgegevens

Kwaliteit	$N_{Rd,s}$ [kN]
M64 4.6 - 1	655,1

Lassen

Onderdeel	Rand	T_w [mm]	L [mm]	Lasten	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	$\sigma_{\perp}$ [MPa]	$\tau_{\perp}$ [MPa]	$\tau_{\parallel}$ [MPa]	Ut [%]	Ut_c [%]	Status
Voetplaat	Mastpoot-tfl 1	◢ 12,0 ◣	240	-2100kN druk	352,9	0,0	-179,4	-157,2	77,7	98,0	80,5	OK
		◢ 12,0 ◣	240	-2100kN druk	353,2	0,3	-100,7	155,4	118,5	98,1	86,5	OK
Voetplaat	Mastpoot-w 1	◢ 12,0 ◣	240	-2100kN druk	353,2	0,3	-101,0	-155,9	-117,8	98,1	86,5	OK
		◢ 12,0 ◣	240	-2100kN druk	352,8	0,0	-180,1	157,7	-76,3	98,0	80,5	OK

Ontwerpgegevens

Materiaal	f_u [MPa]	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	360,0	0,80	360,0	259,2

Betonpoer

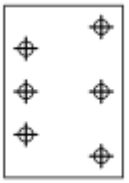
Onderdeel	Lasten	c [mm]	A_{eff} [mm^2]	σ [MPa]	k_j [-]	f_{jd} [MPa]	Ut [%]	Status
BB 1	-2100kN druk	236	322345	6,4	1,36	7,3	87,5	OK

Knik

Knikberekening is niet uitgevoerd.

Materialenstaat

Vervaardigingshandelingen

Naam	Platen [mm]	Vorm	No.	Lassen [mm]	Lengte [mm]	Bouten	No.
Voetplaat	P75,0x550-800 (S 235)		1			M64 4.6	6
Las				Dubbele hoeklas: 12,0	482		

Verklaring symbool

Hoeklas	laskeeldoorsnede

Lassen

Type	Materiaal	Keeldoorsnede [mm]	Beengrootte [mm]	Lengte [mm]
Dubbele hoeklas	S 235	12,0	17,0	482

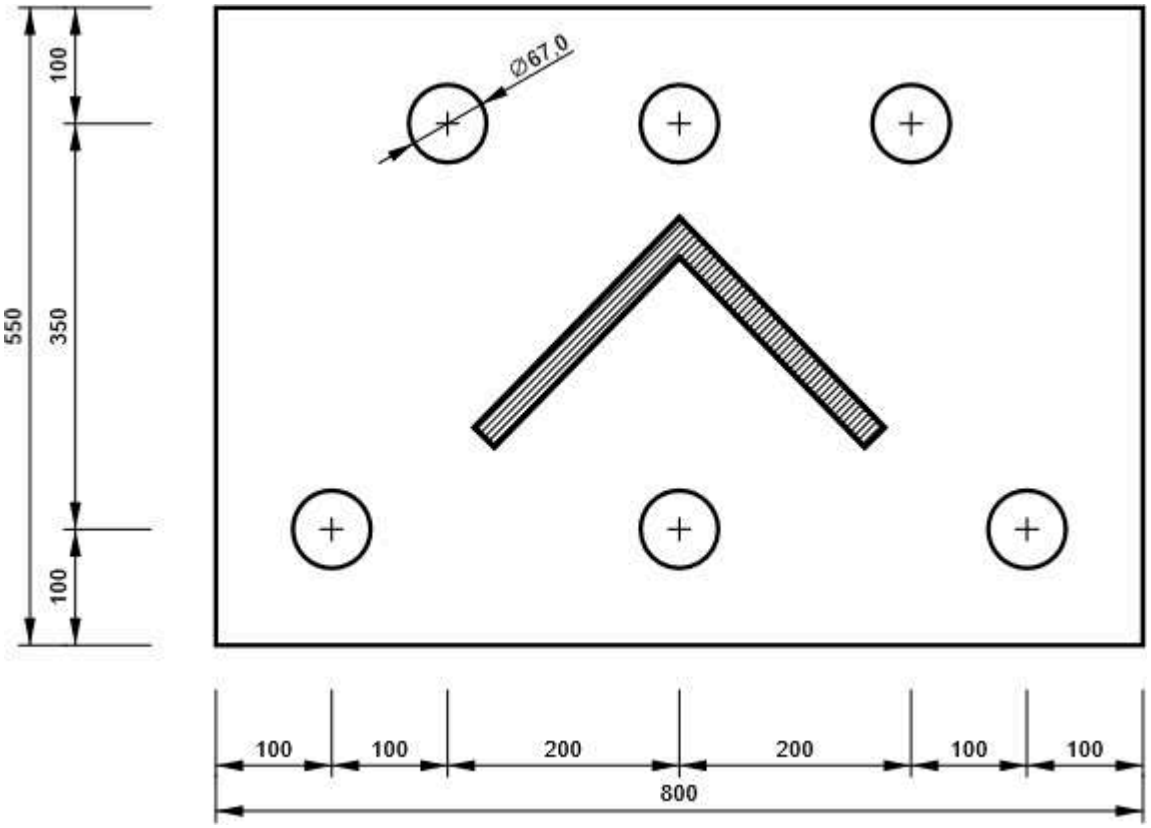
Ankers

Naam	Lengte [mm]	Boorlengte [mm]	Aantal
M64 4.6	1145	1000	6

Tekening

Voetplaat

P75,0x800-550 (S 235)



Norminstelling

Onderdeel	Waarde	Eenheid	Referentie
Veiligheidsfactor γ_{M0}	1,00	-	EN 1993-1-1: 6.1
Veiligheidsfactor γ_{M1}	1,00	-	EN 1993-1-1: 6.1
Veiligheidsfactor γ_{M2}	1,25	-	EN 1993-1-1: 6.1
Veiligheidsfactor γ_{M3}	1,25	-	EN 1993-1-8: 2.2
Veiligheidsfactor γ_{C}	1,50	-	EN 1992-1-1: 2.4.2.4
Veiligheidsfactor γ_{Inst}	1,20	-	EN 1992-4: Table 4.1
Verbindingscoëfficiënt βj	0,67	-	EN 1993-1-8: 6.2.5
Effectief oppervlak - coëfficiënt van max spanning	0,10	-	
Wrijvingscoëfficiënt - beton	0,25	-	EN 1993-1-8
Wrijvingscoëfficiënt slipweerstand	0,30	-	EN 1993-1-8 tab 3.7
Grenswaarde plastische rek	0,05	-	EN 1993-1-5
Detaillering	Nee		
Afstand tussen bouten [d]	2,20	-	EN 1993-1-8: tab 3.3
Afstand tussen bouten en de rand [d]	1,20	-	EN 1993-1-8: tab 3.3
Beton uitbreekweerstand	Geen		EN 1992-4: 7.2.1.4 and 7.2.2.5
Gebruik berekening αb in de stuikcontrole.	Ja		EN 1993-1-8: tab 3.4
Gescheurd beton	Ja		EN 1992-4
Controle lokale vervorming	Ja		CIDECT DG 1, 3 - 1.1
Grens lokale vervorming	0,03	-	CIDECT DG 1, 3 - 1.1
Geometrische niet-lineairiteit (GMNA)	Ja		Sta grote vervormingen van kokerdoorsnedes toe
Geschoord systeem	Ja		EN 1993-1-8: 5.2.2.5

Projectgegevens

Projectnaam	Opwaardering KIJ-DIM
Projectnr.	
Auteur	[redacted]
Omschrijving	Toetsing anker Type A
Datum	3-5-2025
Ontwerpnorm	EN

Berekening deel 2: toetsing van ankers en betonpoer

Verankering Type A heeft 6*R65 rechte ankers (gemodelleerd als M64). De scope van het model is de opgetorte poer en een snede uit de onderliggende balklaag.

Wapening is volgens beschikbare asset data gemodellerd. De vorm van het betonlichaam is een omhulling van de in werkelijk taps toelopende opstorting. Daarnaast wordt ook een betonkwaliteit van C12/15 gehanteerd in plaats van C13/16. Dit is gedaan door beperkingen van de software en de minimale impact op de resultaten.

De anker eindes zijn zonder eindhaak gemodelleerd omdat deze niet zal voldoen aan huidige verankeringsvereisten. De schieters zijn dus niet mechanisch verbonden aan elkaar.

De gemodelleeerde poer is verankerd aan de snede van de balklaag, waarbij een fictieve 150MN/m/paal is teruggerekend naar het totale oppervlakte van snedes.

Materialen

Beton

Naam	f_{ck} [MPa]	$f_{ctk,0.05}$ [MPa]	f_{ctm} [MPa]	E_{cm} [MPa]	ν [-]	φ_{perm}	φ_{pres}
C12/15	12,0	1,1	1,6	27085,2	0,20	2,5	2,5
	ε_{c2} = 20,0 1e-4, ε_{cu2} = 500,0 1e-4, Type diagram: Parabolisch φ_{perm}: 2,50 φ_{pres}: 2,50						

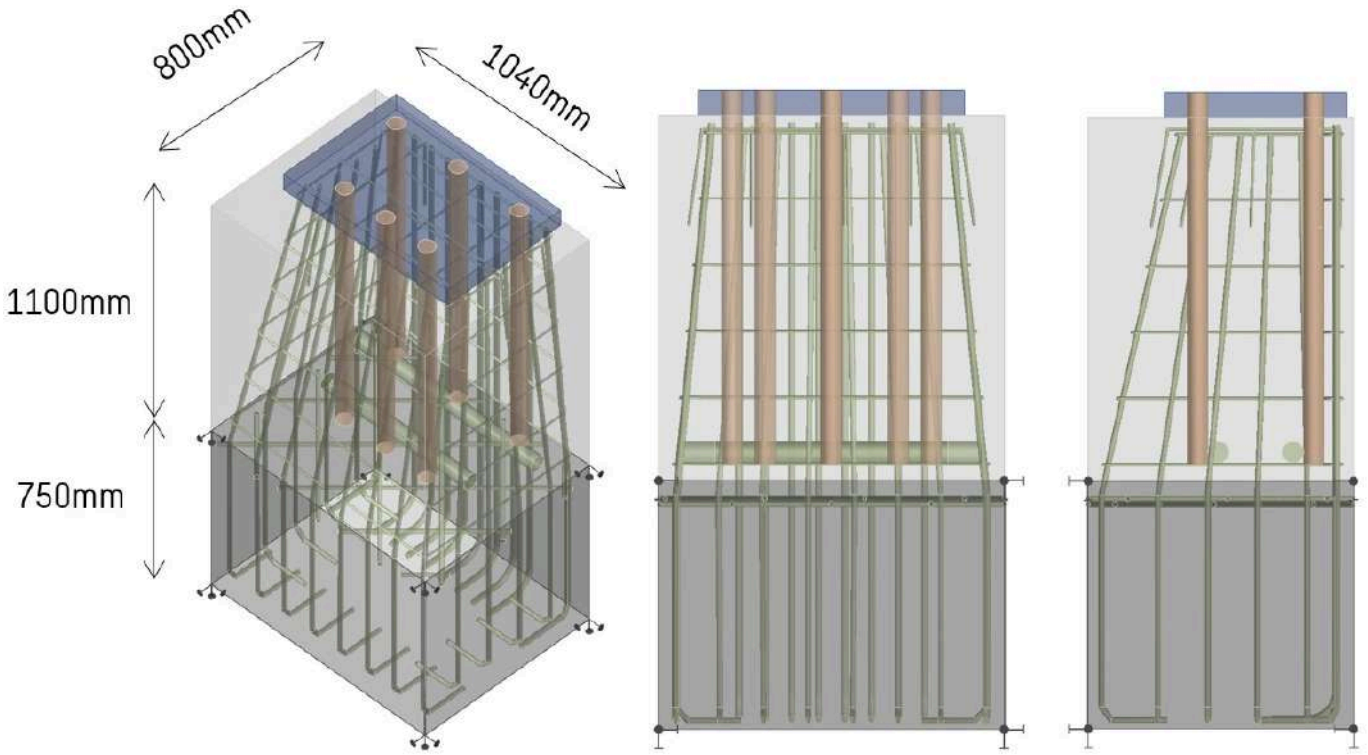
Wapening

Naam	f_{yk} [MPa]	k [-]	E_s [MPa]	Eenheid massa [kg/m^3]	ε_{uk} [1e-4]	Oppervlak
B 400B	400,0	1,08	200000,0	7850	500,0	Geribd
	ε_{st} = 500,0 1e-4, ε_{sc} = 500,0 1e-4,					

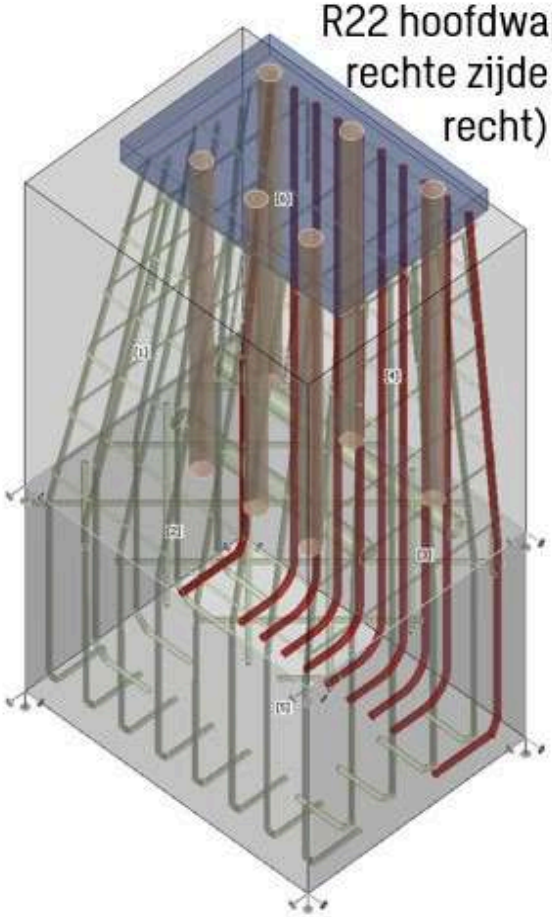
Staal

Naam	E [MPa]
S 235	210000,0

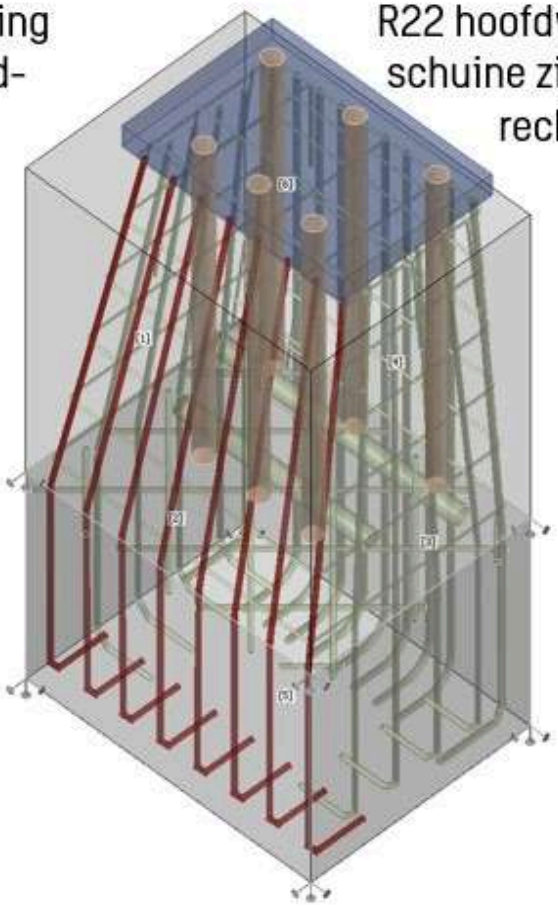
Anker Type A



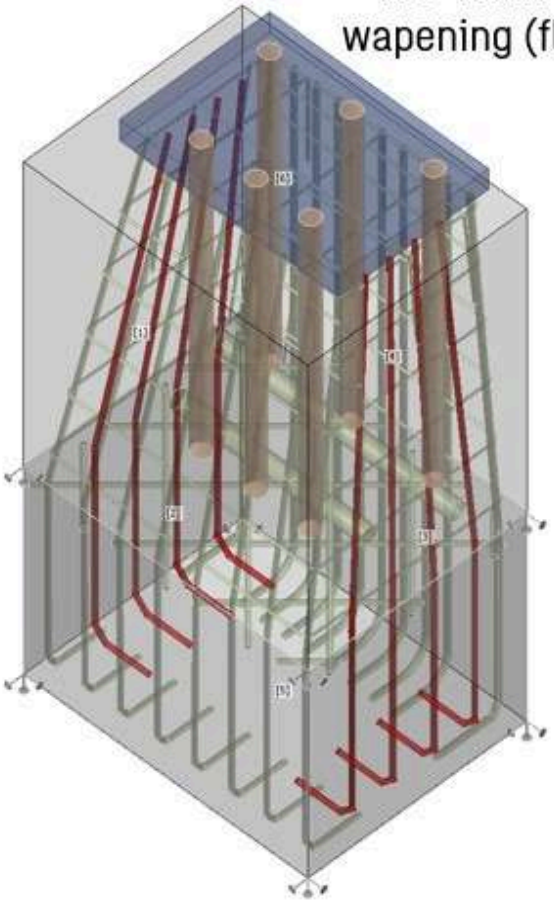
R22 hoofdwapening rechte zijde (hfd-recht)



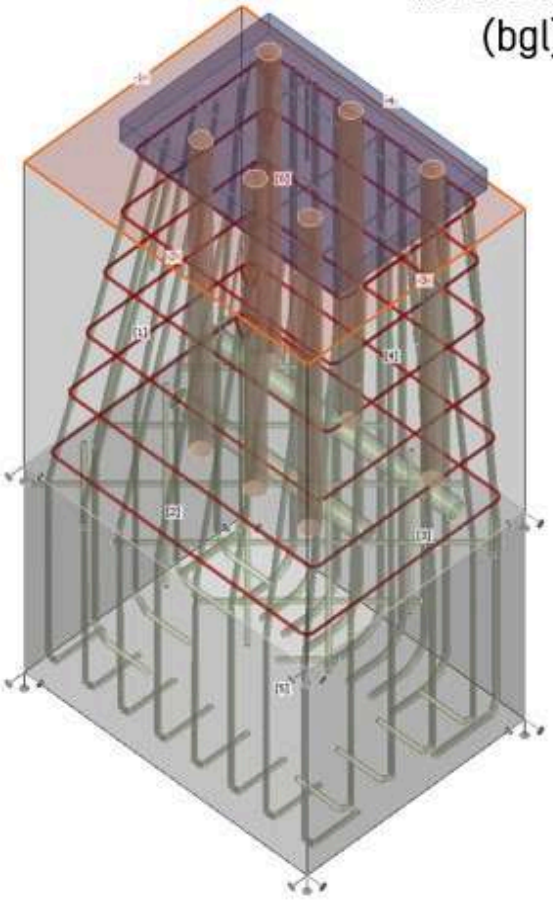
R22 hoofdwapening schuine zijde (hfd-recht)



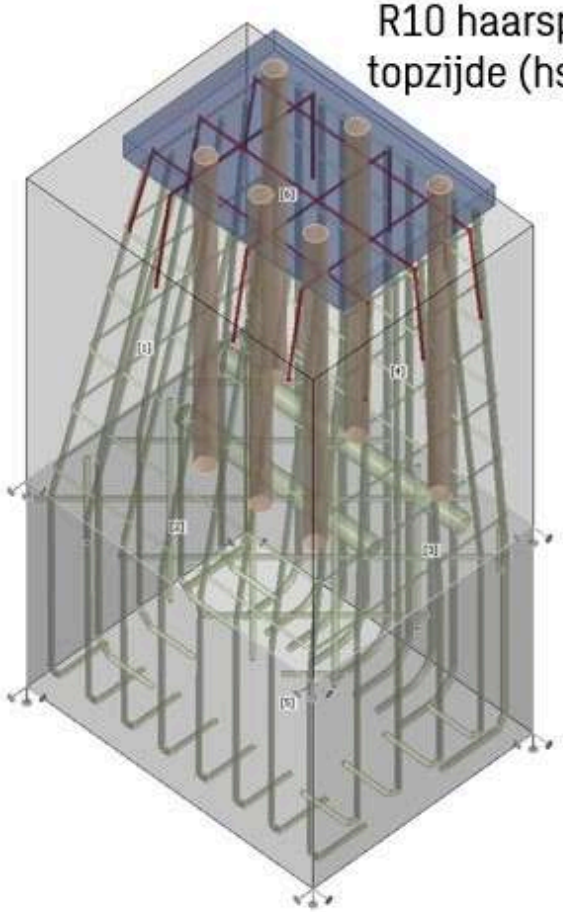
R18 flank-wapening (flk)



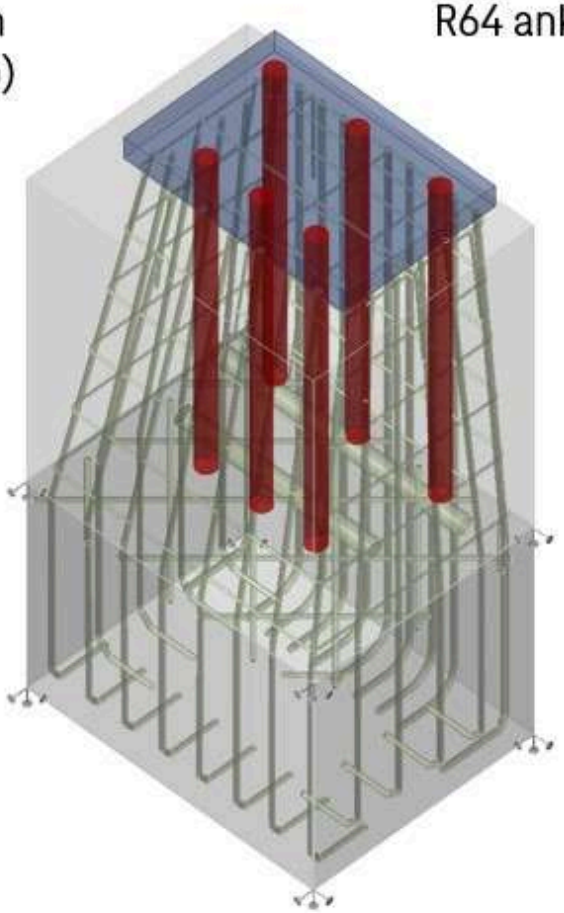
R10 beugels (bgl)



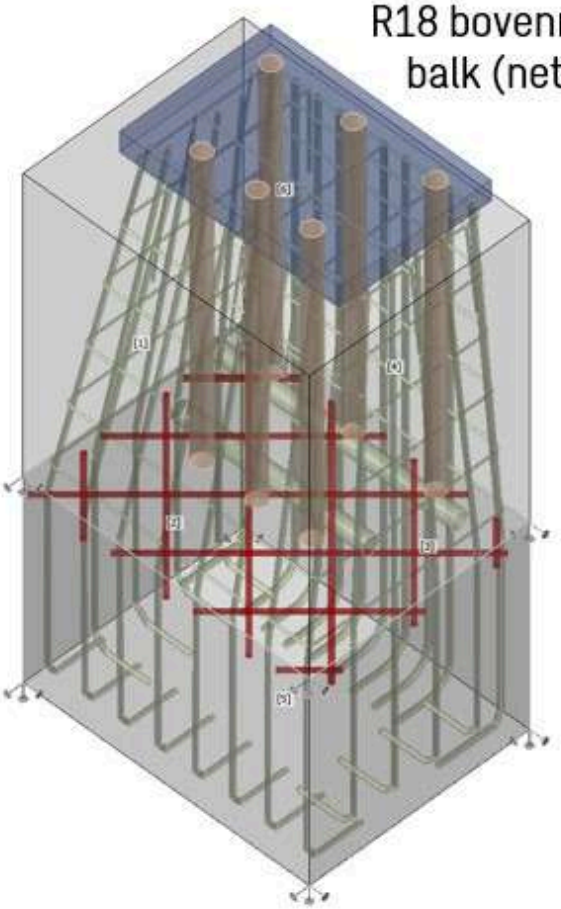
R10 haarspelden topzijde (hsp-top)



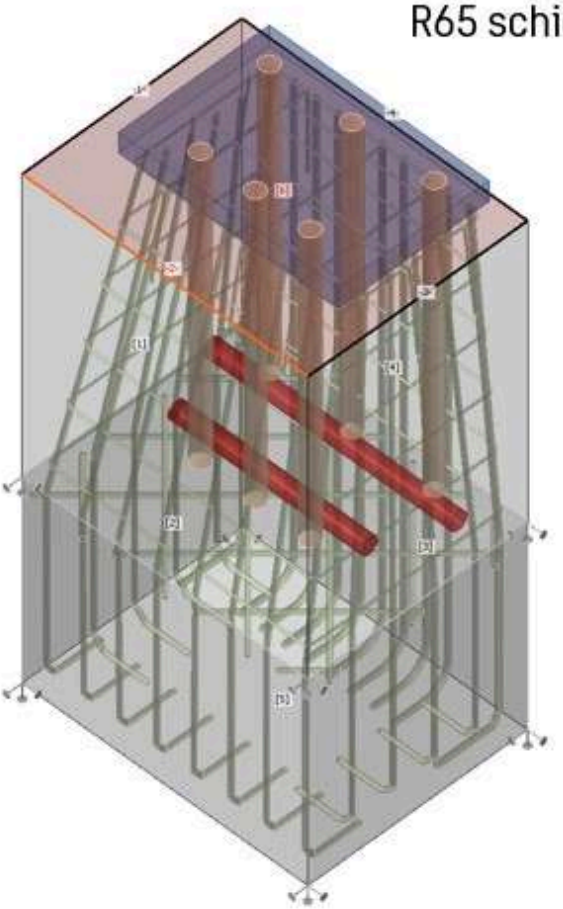
R64 ankers

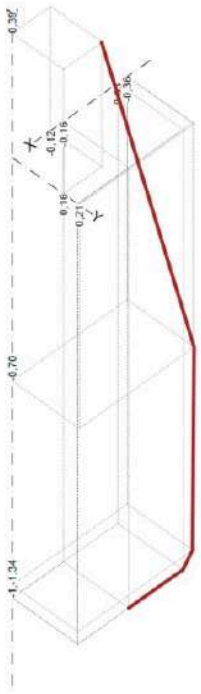


R18 bovennet balk (net)

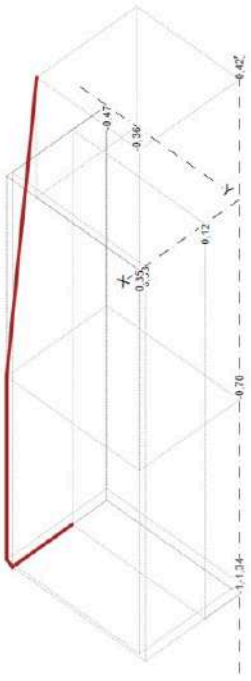


R65 schieters

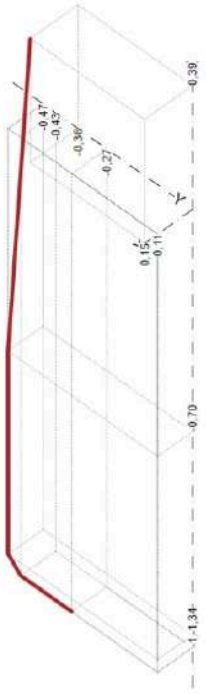




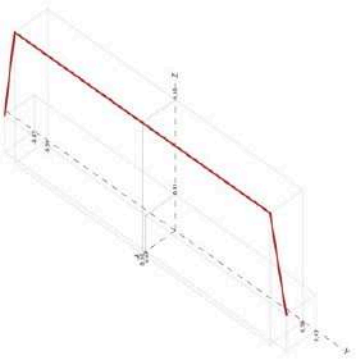
R22 hoofdwapening schuine zijde (hfd-recht)



R22 hoofdwapening rechte zijde (hfd-recht)



R18 flank-wapening (flk)



R10 haarspelden topzijde (hsp-top)

Geometrie

Overzicht tabel

Naam	Type	Eigenschappen	Positie
Poer	Betonpoer	Vorm: Algemeen; H: 1,85 m; Materiaal: C12/15	X: 0,00 m; Y: 0,00 m; Z: -1,41 m
Voetplaat	Voetplaat	W: 0,30 m; T: 0,08 m; D: 0,30 m; Materiaal: S 235; : Belasting; Overdracht van dwarskrachten: Ankers	M: Poer, Rand 0, Oppervlak 5; X: -0,08 m; Y: 0,00 m
Zijde 1	Oppervlakteondersteuning	X: 9 MN/m2; Y: 9 MN/m2; Z: 91 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 2; Geometrisch type: Polylijn
Zijde 2	Oppervlakteondersteuning	X: 9 MN/m2; Y: 9 MN/m2; Z: 91 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 3; Geometrisch type: Polylijn
Zijde 3	Oppervlakteondersteuning	X: 9 MN/m2; Y: 9 MN/m2; Z: 91 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 1; Geometrisch type: Polylijn
Zijde 4	Oppervlakteondersteuning	X: 9 MN/m2; Y: 9 MN/m2; Z: 91 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 4; Geometrisch type: Polylijn
Anker 1	Verankering - Belasting	L1: 0,08 m; L2: 1,05 m; Φ: 64 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,47 m
Anker 2	Verankering - Belasting	L1: 0,08 m; L2: 1,05 m; Φ: 64 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,12 m
Anker 3	Verankering - Belasting	L1: 0,08 m; L2: 1,05 m; Φ: 64 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,47 m
Anker 4	Verankering - Belasting	L1: 0,08 m; L2: 1,05 m; Φ: 64 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,12 m
Anker 5	Verankering - Belasting	L1: 0,08 m; L2: 1,05 m; Φ: 64 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,12 m
Anker 6	Verankering - Belasting	L1: 0,08 m; L2: 1,05 m; Φ: 64 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,47 m

Lasten

Combinaties

Naam	Type	Inhoud
Trekkracht	ULS	+1250kN
Drukkracht	ULS	-2100kN

Resultaten

Opsomming

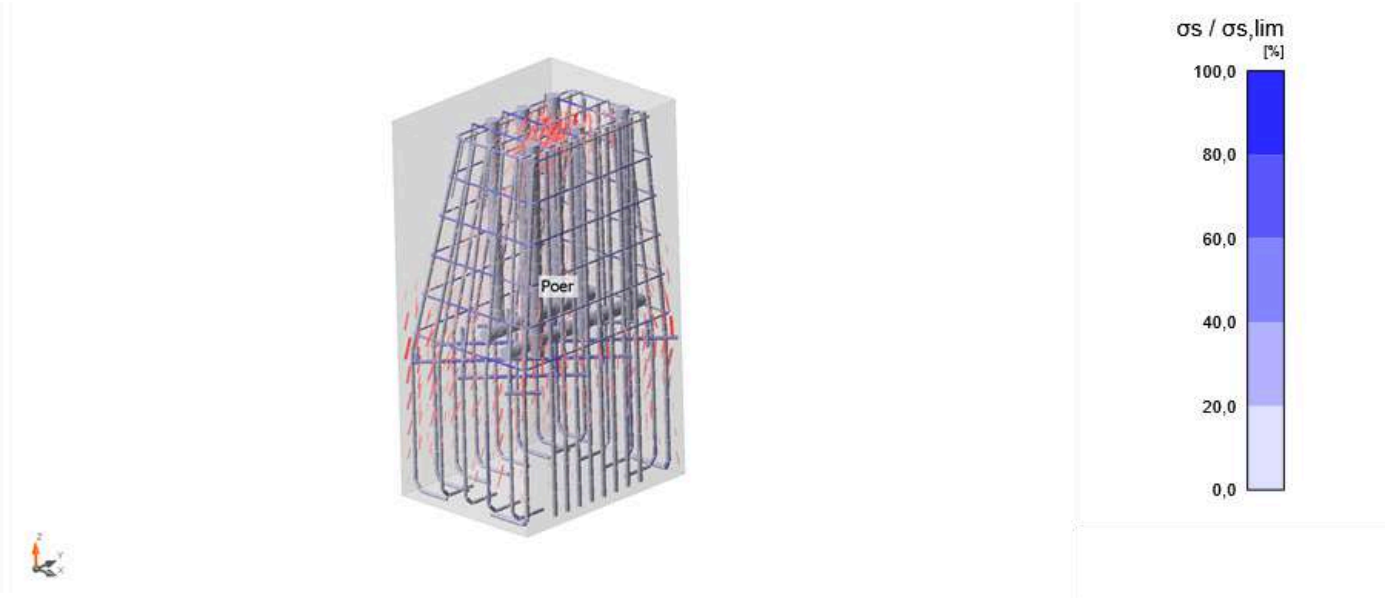
Overzicht tabel

Controle deel	Combinaties	Toename	Onderdeel	
UGT	Drukkracht	G100,0%	Sterkte van het beton	✓

Controle deel	Onderdeel	Uitnutting	
Sterkte van het beton	Poer	σc/σc,lim: 99,6%	✓
Sterkte van de wapening		εs/εs,lim: 10,0%, σs/σs,lim: 72,9%	✓
Verankeringslengte		τb/fbd: 100,1%	✓

UGT - Opsomming

Verloop van de spanningen



Boven vloeispanning	Druk	Verklaringen
		Dikte in verhouding tot de kracht

Opsomming van de reactiekrachten en de toegepaste lasten: Drukkracht, Lastincrement: G100,0%

Type	F_x [kN]	F_y [kN]	F_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Opsommingen van de reacties	454,5	0,0	2050,0	-0,4	-141,3	0,0
Opsomming van de toegepaste lasten	-454,5	0,0	-2050,0	0,0	20,6	-0,3
Controleer evenwicht	0,0	0,0	0,0	-0,4	-120,7	-0,3

UGT - Sterkte

Gedetailleerde resultaten van de betonsterktes: Drukkracht, Lastincrement: G100,0%

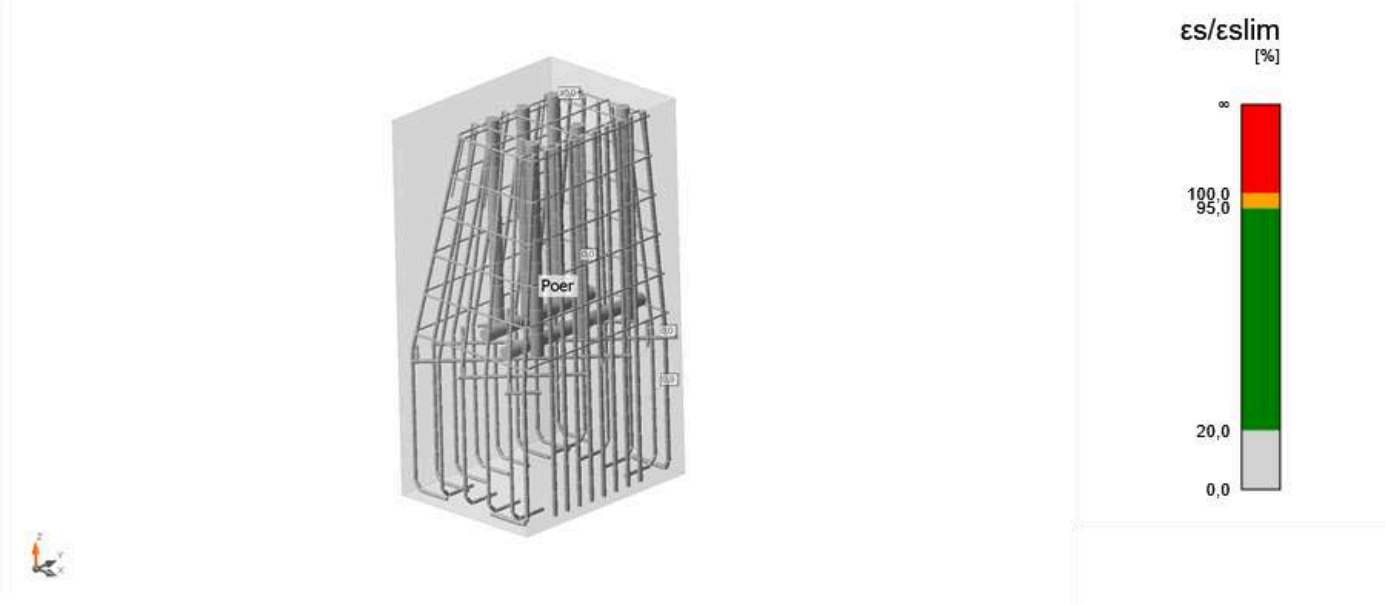
Staaf	$\sigma_{c,eq}$ [MPa]	ε_c [1e-4]	ε_{pl} [1e-4]	$\sigma_{c,eq}/\sigma_{c,lim}$ [%]	
Poer	-8,0	-76,7	-66,7	99,6	Oké

Gedetailleerde resultaten van de wapeningsterkte: Drukkracht, Lastincrement: G100,0%

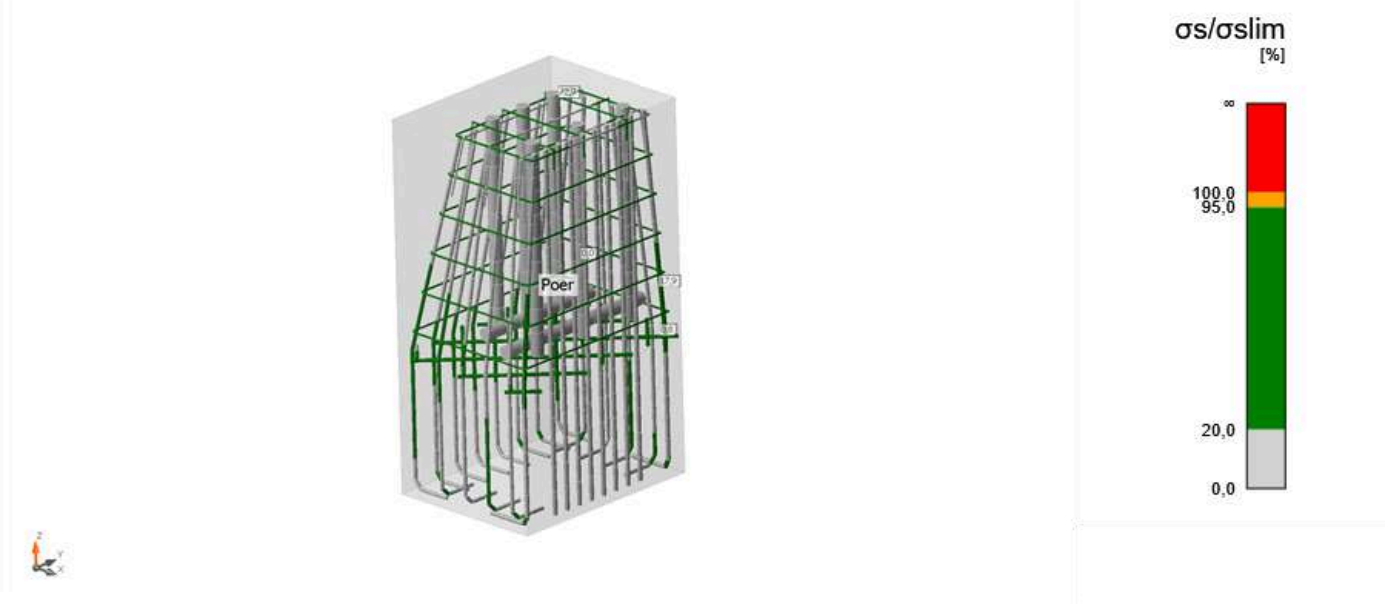
Staaf	σ_s [MPa]	ε_s [1e-4]	$\sigma_s/\sigma_{s,lim}$ [%]	$\varepsilon_s/\varepsilon_{s,lim}$ [%]	
R10 hsp-top_2	273,9	10,2	72,9	10,0	Oké
R10 bgl_6	260,2	10,2	69,3	8,3	Oké
R10 hsp-top_1	249,9	9,1	66,5	8,6	Oké
R18 hfd-schuin_8	31,4	1,2	65,3	2,7	Oké
R18 hfd-schuin_1	29,9	0,5	63,2	2,6	Oké
R10 hsp-top_3	235,0	8,4	62,6	7,9	Oké
R10 bgl_5	209,5	6,5	55,8	7,2	Oké
R18_net_10	207,6	7,6	55,3	6,1	Oké
R10 bgl_4	201,3	6,0	53,6	6,5	Oké
R10 bgl_3	198,2	5,2	52,8	6,5	Oké
R18_net_4	193,7	6,8	51,6	5,6	Oké
R10 bgl_2	187,8	4,5	50,0	5,4	Oké
R18_net_9	183,9	6,3	49,0	5,2	Oké
R18_net_3	179,0	6,0	47,6	5,1	Oké
R18_net_2	161,8	5,4	43,1	4,5	Oké
R18_net_8	159,7	5,2	42,5	4,2	Oké
R18_net_11	158,8	5,1	42,3	4,2	Oké
R22 hfd-recht_1	95,3	3,5	40,2	1,7	Oké
R18_net_1	148,4	4,1	39,5	3,8	Oké
R22 hfd-recht_10	93,9	3,4	38,9	1,6	Oké
R18_net_5	145,6	4,1	38,7	3,7	Oké
R18 flk_rechts_1	94,4	2,1	38,6	1,6	Oké
R18 flk_links_1	91,3	1,9	38,3	1,6	Oké
R18 flk_links_3	136,8	5,0	36,4	2,7	Oké
R10 bgl_1	136,1	2,6	36,2	2,9	Oké
R18 flk_rechts_3	135,6	5,0	36,1	2,7	Oké
R18_net_7	119,7	4,1	31,9	2,5	Oké
R18_net_12	118,0	2,7	31,4	1,6	Oké
R18 hfd-schuin_5	26,7	0,1	30,1	1,3	Oké
R18 hfd-schuin_4	25,7	0,1	30,1	1,3	Oké
R18 hfd-schuin_2	83,9	2,3	29,7	1,3	Oké
R18 hfd-schuin_7	103,0	3,3	28,7	1,8	Oké
R18 hfd-schuin_3	76,0	1,9	28,5	1,2	Oké
R18 hfd-schuin_6	52,8	1,2	28,2	1,2	Oké
R18 flk_rechts_4	86,7	2,6	23,1	1,4	Oké
R10 hsp-top_6	85,8	1,7	22,8	1,3	Oké
R18 flk_links_4	84,1	2,0	22,4	1,3	Oké
R10 hsp-top_5	83,1	0,4	22,1	0,4	Oké
R18 flk_links_2	60,6	1,0	21,6	0,9	Oké
R18_net_6	76,0	1,9	20,2	1,1	Oké
R10 hsp-top_4	70,9	0,4	18,9	0,4	Oké
R18 flk_rechts_2	59,0	0,9	18,2	0,7	Oké
R22 hfd-recht2-9	65,3	1,9	17,9	0,8	Oké

Staaf	σ_s [MPa]	ε_s [1e-4]	$\sigma_s/\sigma_{s,lim}$ [%]	$\varepsilon_s/\varepsilon_{s,lim}$ [%]	
Anker 5	6,6	0,0	13,2	0,4	Oké
Anker 2	1,3	0,0	5,6	0,2	Oké
Anker 4	1,9	0,0	5,6	0,2	Oké
Anker 6	0,2	0,0	3,3	0,1	Oké
R65 schieter_2	10,8	0,1	2,9	0,0	Oké
R65 schieter_1	10,2	0,1	2,7	0,0	Oké
Anker 3	0,7	0,0	1,0	0,0	Oké
Anker 1	1,8	0,0	0,5	0,0	Oké

Wapening rek/grens verhouding - $\varepsilon_s/\varepsilon_{s,lim}$ [%]



Wapening spanning/sterkte verhouding - $\sigma_s/\sigma_{s,lim}$ [%]



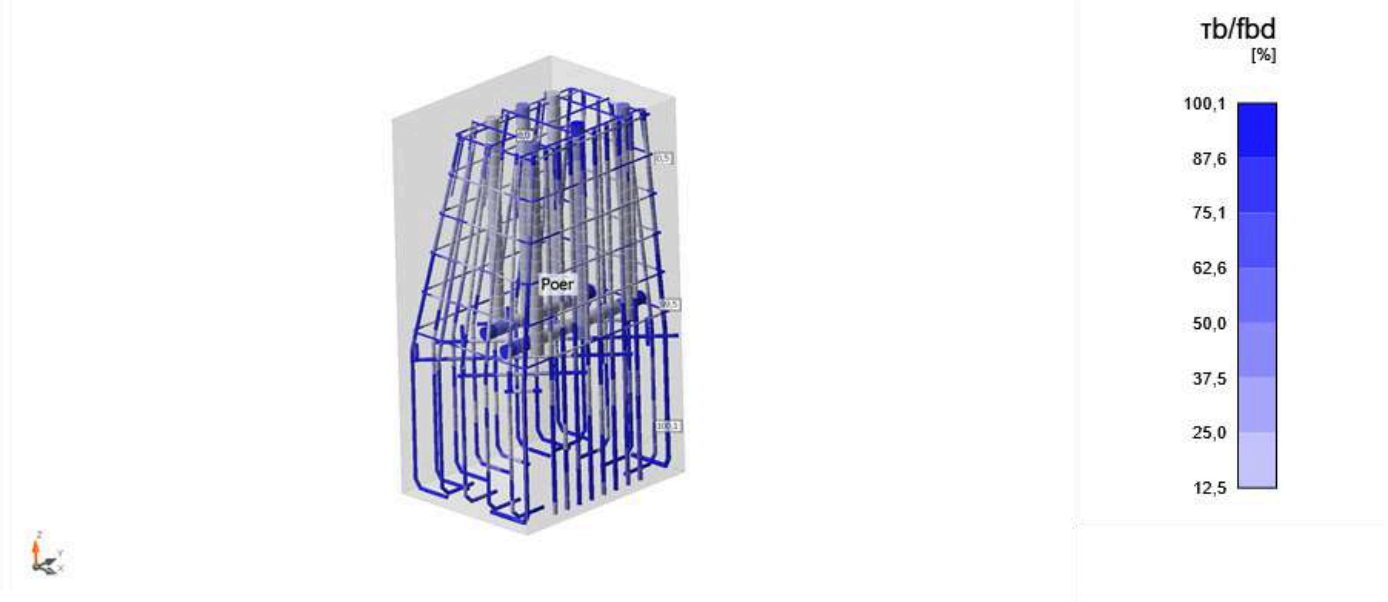
UGT - Verankering

Gedetailleerde resultaten van de verankering - Wapening: Drukkracht, Lastincrement: G100,0%

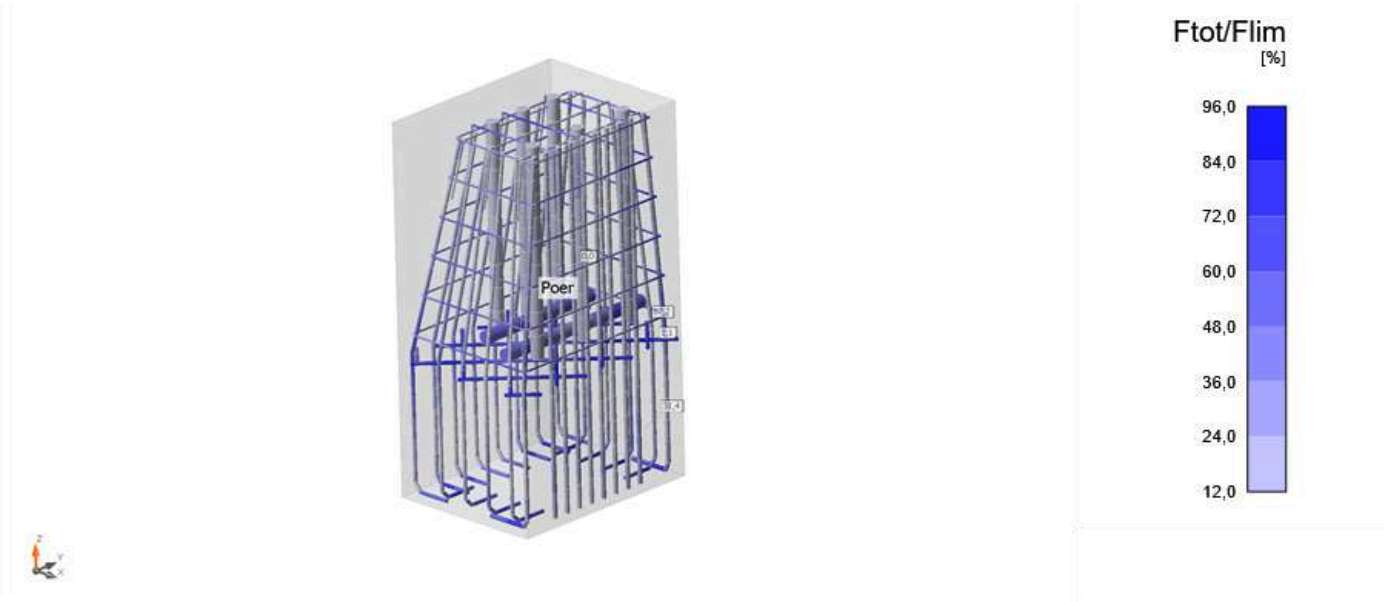
Staaf	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R22 hfd-recht_10	1,7	0,1	-55,5	75,8	142,8	100,1	Oké
R22 hfd-recht_1	1,7	0,1	-57,4	75,7	142,8	100,0	Oké
R18 flk_rechts_1	1,6	0,1	-36,9	75,7	95,6	99,8	Oké
R18 flk_links_1	1,6	0,1	-36,6	75,7	95,6	99,7	Oké
R18_net_4	1,6	26,5	49,3	85,1	81,2	99,7	Oké
R18_net_10	1,6	26,5	52,8	87,7	81,2	99,7	Oké
R18 flk_rechts_4	1,6	0,1	22,1	75,6	95,6	99,7	Oké
R18_net_3	1,6	26,5	45,5	85,1	81,2	99,6	Oké
R18_net_9	1,6	26,5	46,8	85,1	81,2	99,6	Oké
R18 flk_links_4	1,6	0,1	21,4	75,6	95,6	99,6	Oké
R18 hfd-schuin_7	1,6	0,1	-27,5	75,6	95,6	99,6	Oké
R18 hfd-schuin_2	1,6	0,1	-28,4	75,6	95,6	99,6	Oké
R18 hfd-schuin_1	1,6	0,1	-60,4	63,2	71,3	99,6	Oké
R18 hfd-schuin_6	1,6	0,1	-26,9	75,6	95,6	99,6	Oké
R10 bgl_6	1,6	8,2	20,4	82,5	29,5	99,6	Oké
R18_net_8	1,6	26,5	40,6	80,7	61,8	99,6	Oké
R18_net_2	1,6	26,5	41,2	85,4	67,7	99,6	Oké
R18 flk_rechts_2	1,6	0,1	-17,4	75,6	95,6	99,6	Oké
R18 flk_links_2	1,6	0,1	-20,6	66,2	95,6	99,6	Oké
R18 flk_rechts_3	1,6	0,1	34,5	75,6	95,6	99,6	Oké
R18 hfd-schuin_3	1,6	0,1	-27,3	75,6	95,6	99,6	Oké
R18 hfd-schuin_8	1,6	0,1	-62,5	65,3	71,3	99,6	Oké
R18 flk_links_3	1,6	0,1	34,8	75,6	95,6	99,6	Oké
R18_net_7	1,6	26,5	30,5	83,3	36,6	99,6	Oké
R18_net_1	1,6	26,5	37,8	81,8	48,0	99,5	Oké
R22 hfd-recht2-9	1,6	7,8	-25,6	31,4	125,1	99,5	Oké
R10 hsp-top_2	1,6	0,0	21,5	72,9	29,5	99,5	Oké
R10 bgl_5	1,6	8,0	16,5	75,0	29,5	99,5	Oké
R10 hsp-top_1	1,6	0,0	19,6	66,5	29,5	99,5	Oké
R10 hsp-top_3	1,6	0,0	18,5	62,6	29,5	99,5	Oké
R10 bgl_3	1,6	8,2	15,6	75,7	29,5	99,5	Oké
R18 hfd-schuin_4	1,6	0,1	-28,7	51,1	71,3	99,5	Oké
R18 hfd-schuin_5	1,6	0,0	-28,8	45,7	71,3	99,5	Oké
R10 bgl_2	1,1	8,2	14,7	81,9	29,5	99,0	Oké
R10 bgl_4	1,6	7,6	15,8	71,0	29,5	99,5	Oké
Anker 5	8,0	-0,1	-148,2	13,2	375,0	99,9	Oké
Anker 5	8,0	-0,1	-148,2	13,2	375,0	99,9	Oké
Anker 5	8,0	-0,1	-148,2	13,2	375,0	99,9	Oké
Anker 5	8,0	-0,1	-148,2	13,2	375,0	99,9	Oké
Anker 5	8,0	-0,1	-148,2	13,2	375,0	99,9	Oké
Anker 5	8,0	-0,1	-148,2	13,2	375,0	99,9	Oké
R18_net_11	1,6	26,5	40,4	81,7	67,7	99,5	Oké

Staaf	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R10 bgl_1	1,1	8,2	10,7	75,4	29,5	99,0	Oké
R10 hsp-top_5	1,6	0,0	6,5	22,1	29,5	99,0	Oké
R65 schieter_2	1,1	1,2	35,7	61,7	100,6	98,9	Oké
R18_net_5	1,6	26,5	37,1	80,6	61,8	99,5	Oké
R18_net_12	1,6	19,0	30,0	62,6	48,0	99,5	Oké
R18_net_6	1,6	16,7	19,3	52,9	36,6	99,5	Oké
R10 hsp-top_6	1,6	0,0	6,7	22,8	29,5	99,5	Oké
R10 hsp-top_4	1,6	0,0	5,6	24,5	29,5	99,5	Oké
R65 schieter_1	1,1	1,1	33,8	58,7	78,2	98,9	Oké

Aanhechtspanning grenswaarde - τ_b/f_{bd} [%]



Kracht controle waarde - F_{tot}/F_{lim} [%]



Verklaring

Symbool	Verklaring
f_{ck}	Karakteristieke cylindrische betondruksterkte bij 28 dagen
$f_{ctk,0.05}$	Karakteristieke treksterkte van beton 5% onderschrijdingskans
f_{ctm}	Gemiddelde axiale treksterkte van beton
E_{cm}	Secant elasticiteitsmodulus van beton
ν	Poisson-factor
ε_c	Betondrukrek bij piekspanning fc
ε_{cu}	Uiterste drukrek in het beton
φ_{perm}	Uiteindelijke waarde van de kruipcoëfficiënt op het tijdsinterval (t0 = 28 dagen, tinf = ontwerplevensduur) voor permanente belasting
φ_{pres}	Uiteindelijke waarde van de kruipcoëfficiënt op het tijdsinterval (t0 = 28 dagen, tinf = ontwerplevensduur) voor voorspanbelasting
f_{yk}	Karakteristieke vloeisterkte van de wapening
E_s	Elasticiteitsmodulus van wapeningsstaal
ε_{uk}	Karakteristieke rek van de wapening of voorspanstaal bij de maximale belasting
Eigenschappen	W - Breedte; H - Hoogte; T - Dikte; D - Hoogte; L - Lengte; r - straal; α - Helling
Positie	M - Hoofd; MP - Master punt; IP - Voeg punt in
$\sigma_{c,eq}$	Equivalent principal stress Sigma c,eq, which expresses the equivalent uni-axial stress for a general tri-axial stress state.
ε_c	Minimale betondrukrek εc
ε_{pl}	Minimale plastische drukrek εpl van beton
$\sigma_{c,eq}/\sigma_{c,lim}$	De verhouding van de betonspanning en -sterkte. Het geeft het nivo van de uitnutting van het materiaal t.o.v. de sterkte van het beton weer.
σ_s	Maximale spanning langs de lengte van de wapeningstaaf.
ε_s	Maximale rek langs de lengte van de wapeningstaaf.
$\sigma_s/\sigma_{s,lim}$	De verhouding spanning en vloeisterkte van de wapening.
$\varepsilon_s/\varepsilon_{s,lim}$	De verhouding rek en grensrek van de wapening.
τ_b	Aanhechtspanning op het oppervlak van de wapeningstaaf
F_a	De kracht van de verankering. Het wordt ontwikkeld vanaf de staafeinden t.g.v. de verankering door de ribben op de wapeningstaaf.
F_{tot}	De totale kracht ontwikkeld langs de de volledige lengte van de wapeningstaaf. Het bestaat uit de ankerkracht t.g.v. de verankering door de ribben en de aanhechtkracht: de integratie van alle aanhechtspanning de op het wapeningsoppervlak werken.
F_{tot}/F_{lim}	De verhouding van de totale kracht in de staaf en de grenswaarde van de kracht. De grenswaarde van de kracht is berekend als het minimum van twee waardes: (a) de berekende kracht als de som van de uiterste ankerkracht en de kracht ontwikkeld vanaf het eind van de staaf tot het beschouwde punt met in achtname van volledige hechtsterkte, (b) de uiterste kracht van de staaf.
F_{lim}	De grenswaarde van de kracht. De grenswaarde van de kracht is berekend als het minimum van twee waarden: (a) de berekende kracht als de som van de uiterste ankerkracht en de kracht ontwikkeld vanaf het eind van de staaf tot het beschouwde punt met in achtname van volledige hechtsterkte, (b) de uiterste kracht van de staaf.
τ_b/f_{bd}	De verhouding van de aanhechtspanning en de uiterste aanhechtspanning is weergegeven voor de geselecteerde (groep van) staven en het toegepaste deel van de lat. Het toont het nivo van de uitnutting in verhouding tot de uiterste hechtsterkte tussen de wapeningstaaf en het omringende beton.

Norminstellingen

Artikel	Naam	Waarde	Omschrijving
2.4.2.4 (1)	γ_c	1,50	Materiaalfactor voor beton
2.4.2.4 (1)	γ_s	1,15	Materiaalfactor voor wapening
3.1.6 (1)	α_{cc}	1,00	Coëfficiënt die rekening houdt met de lange-termijn effecten van de drukspanning en het ongunstige effect van de manier waarop de belasting is toegepast.
3.2.7 (2)	$\varepsilon_{ud}/\varepsilon_{uk}$	0,90	Verhouding van de rekenwaarde en de karakteristiek rekgrens.
3.2.7 (2)	$\varepsilon_{ud}/\varepsilon_{uk}$	0,90	Verhouding van de rekenwaarde en de karakteristiek rekgrens.
5.10.2.1(1)	k1	0,80	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk vóór de verankering.
5.10.2.1(1)	k2	0,90	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk vóór de verankering.
5.10.3(2)	k7	0,75	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk na het opspannen of na de overdracht
5.10.3(2)	k8	0,85	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk na het opspannen of na de overdracht
7.2(2)	k1	0,60	Coëfficiënt voor de berekening van de maximale drukspanning in beton tijdens BGT - karakteristieke combinatie
7.2(3)	k2	0,45	Coëfficiënt voor berekening van de spanning in het beton voor de BGT - quasi-blijvende combinatie
7.2(5)	k3	0,80	Coëfficiënt voor het berekenen van de maximale trekspanning in de wapening voor de BGT-karakteristieke combinatie
7.2(5)	k5	0,75	Coëfficiënt voor het berekenen van de maximale trekspanning in de spankabel voor de BGT-karakteristieke combinatie
8.3(2)	Φ m,min - Φs <= 16mm (4,00 Φs)	4,00	Minimale doorndiameter van de beugel als veelvoud van de beugeldiameter
8.3(2)	Φ m,min - Φs > 16mm (7,00 Φs)	7,00	Minimale doorndiameter van de beugel als veelvoud van de beugeldiameter

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Projectgegevens

Projectnaam	Capaciteit ankers KIJ-DIM
Projectnr.	Ankerstaven type B
Auteur	[redacted]
Omschrijving	Toetsing voetplaat
Datum	1-5-2025
Norm	EN

Berekening deel 1: toetsing van voetplaat en lassen

Let op: In deel 1 wordt enkel de voetplaat en zijn lassen getoetst. Toetsingen van de ankers en de poer worden met grotere nauwkeurigheid in deel 2 hertoetst.

Materiaal

Staal	S 235
Beton	C12/15

Projectonderdeel Ankerstaaf type B

Berekening

Naam	Ankerstaaf type B
Omschrijving	
Berekening	Spanning, rek/ lasten in evenwicht

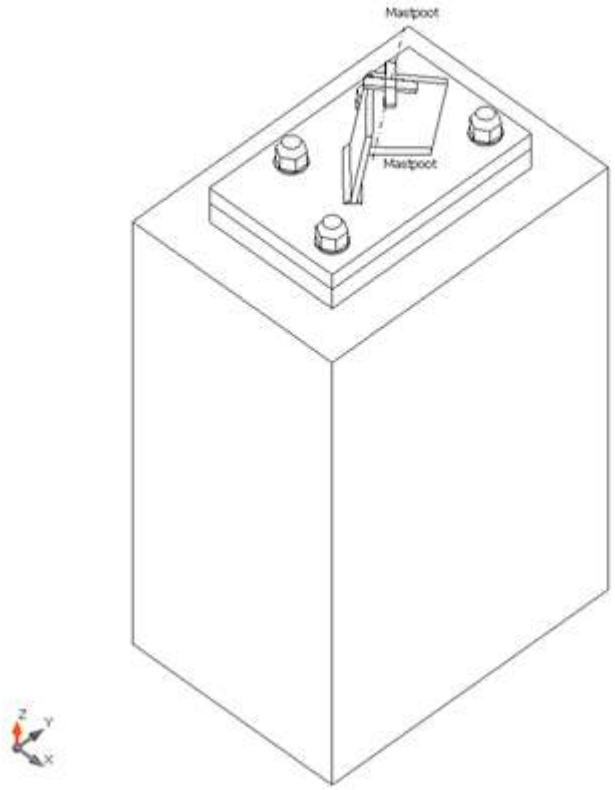
Elementen

Geometrie

Naam	Doorsnede	β – Richting [°]	γ - Rol [°]	α - Rotatie [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]
Mastpoot	1 - L150X12	0,0	78,5	45,0	0	0	0

Ondersteuningen en krachten

Naam	Ondersteuning	Krachten in	X [mm]
Mastpoot / einde	Mx-My-Mz	Knoop	0



Doorsneden

Naam	Materiaal
1 - L150X12	S 235

Ankers

Naam	Diameter [mm]	f_y [MPa]	f_u [MPa]	Bruto oppervlak [mm^2]
M36 4.6	36	240,0	400,0	1018

Lasteffecten (Krachten in evenwicht)

Naam	Staaf	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
+600kN trek	Mastpoot / Einde	600,0	0,0	0,0	0,0	0,0	0,0
-800kN druk	Mastpoot / Einde	-800,0	0,0	0,0	0,0	0,0	0,0

Ongebalanceerde krachten

Naam	X [kN]	Y [kN]	Z [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
+600kN trek	119,6	0,0	588,0	0,0	0,0	0,0
-800kN druk	-159,5	0,0	-783,9	0,0	0,0	0,0

Fundatieblok

Onderdeel	Waarde	Eenheid
BB 1		
Maatvoering	520 x 720	mm
Hoogte	1100	mm
Anker	M36 4.6	
Verankeringslengte	800	mm
Dwarskracht overdracht	Ankers	
Mortelvoeg	50	mm

Controle

Opsomming

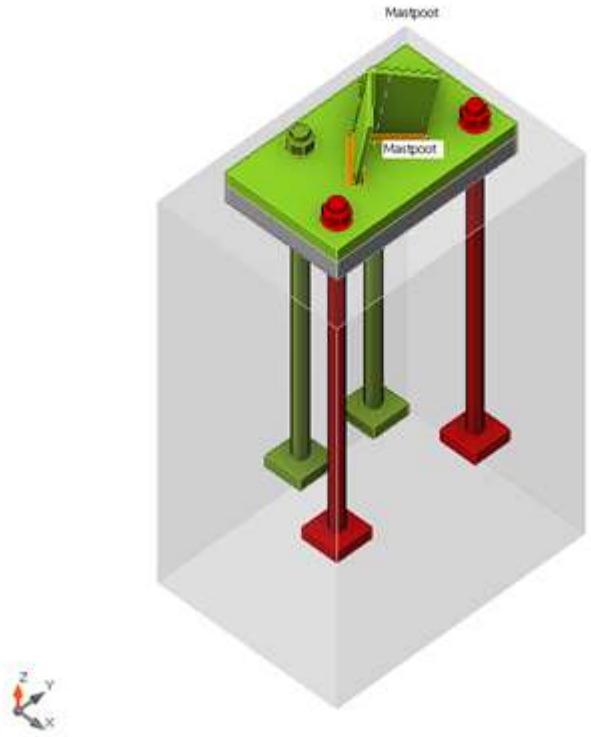
Naam	Waarde	Controle status
Berekening	100,0%	OK
Platen	1,4 < 5,0%	OK
Ankers	113,0 > 100%	**Niet Okay!**
Lassen	98,2 < 100%	OK
Betonpoer	91,7 < 100%	OK
Knik	Niet berekend	

Platen

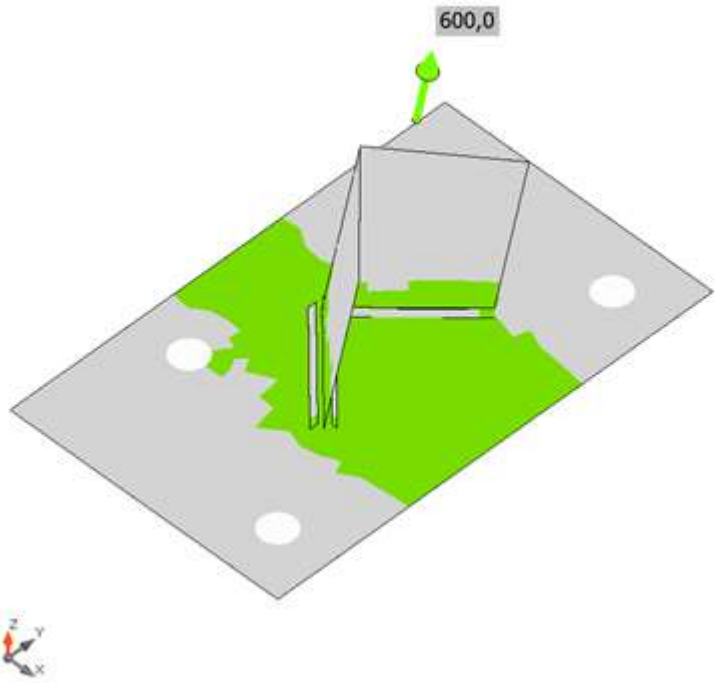
Naam	t_p [mm]	Lasten	σ_{Ed} [MPa]	ε_{Pl} [%]	$\sigma_{c,Ed}$ [MPa]	Status
Mastpoot-tfl 1	12,0	+600kN trek	238,0	1,4	0,0	OK
Mastpoot-w 1	12,0	+600kN trek	237,9	1,4	0,0	OK
Voetplaat	38,0	+600kN trek	235,6	0,3	0,0	OK

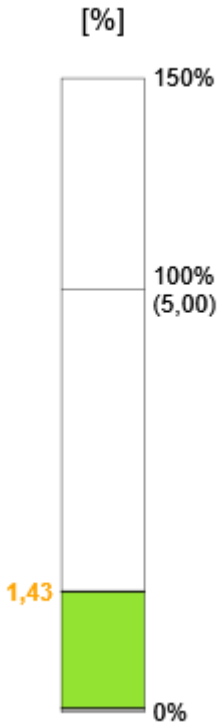
Ontwerpgegevens

Materiaal	f_y [MPa]	ε_{lim} [%]
S 235	235,0	5,0



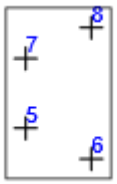
Complete controle, +600kN trek





Rekcontrole, +600kN trek

Ankers

Vorm	Onderdeel	Lasten	N_{Ed} [kN]	V_{Ed} [kN]	$N_{Rd,p}$ [kN]	$N_{Rd,cb}$ [kN]	$V_{Rd,s}$ [kN]	Ut_t [%]	Ut_s [%]	Ut_{ts} [%]	Status
	A5	+600kN trek	146,6	30,7	449,1	331,5	0,0	88,4	31,9	84,2	OK
	A6	+600kN trek	147,4	29,2	449,1	271,7	0,0	108,5	30,3	113,0	**Niet Okay!**
	A7	+600kN trek	146,6	30,7	449,1	331,5	0,0	88,4	31,9	84,2	OK
	A8	+600kN trek	147,4	29,2	449,1	271,7	0,0	108,5	30,3	113,0	**Niet Okay!**

Ontwerpgegevens

Kwaliteit	$N_{Rd,s}$ [kN]
M36 4.6 - 1	200,0

Lassen

Onderdeel	Rand	T_w [mm]	L [mm]	Lasten	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	$\sigma_{\perp}$ [MPa]	$\tau_{\perp}$ [MPa]	$\tau_{\parallel}$ [MPa]	Ut [%]	Ut_c [%]	Status
Voetplaat	Mastpoot-tfl 1	◢ 8,0 ◣	145	+600kN trek	352,9	0,1	168,2	103,1	-146,5	98,0	72,8	OK
		◢ 8,0 ◣	145	+600kN trek	353,5	0,5	99,7	-133,6	-143,1	98,2	80,1	OK
Voetplaat	Mastpoot-w 1	◢ 8,0 ◣	145	+600kN trek	353,3	0,3	105,1	144,6	130,4	98,1	82,9	OK
		◢ 8,0 ◣	145	+600kN trek	352,9	0,0	180,1	-103,6	141,3	98,0	71,9	OK

Ontwerpgegevens

Materiaal	f_u [MPa]	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	360,0	0,80	360,0	259,2

Betonpoer

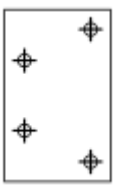
Onderdeel	Lasten	c [mm]	A_{eff} [mm^2]	σ [MPa]	k_j [-]	f_{jd} [MPa]	Ut [%]	Status
BB 1	-800kN druk	115	100184	7,8	1,59	8,5	91,7	OK

Knik

Knikberekening is niet uitgevoerd.

Materialenstaat

Vervaardigingshandelingen

Naam	Platen [mm]	Vorm	No.	Lassen [mm]	Lengte [mm]	Bouten	No.
Voetplaat	P38,0x320-520 (S 235)		1			M36 4.6	4
Las				Dubbele hoeklas: 8,0	291		

Verklaring symbool

Hoeklas	laskeeldoorsnede

Lassen

Type	Materiaal	Keeldoorsnede [mm]	Beengrootte [mm]	Lengte [mm]
Dubbele hoeklas	S 235	8,0	11,3	291

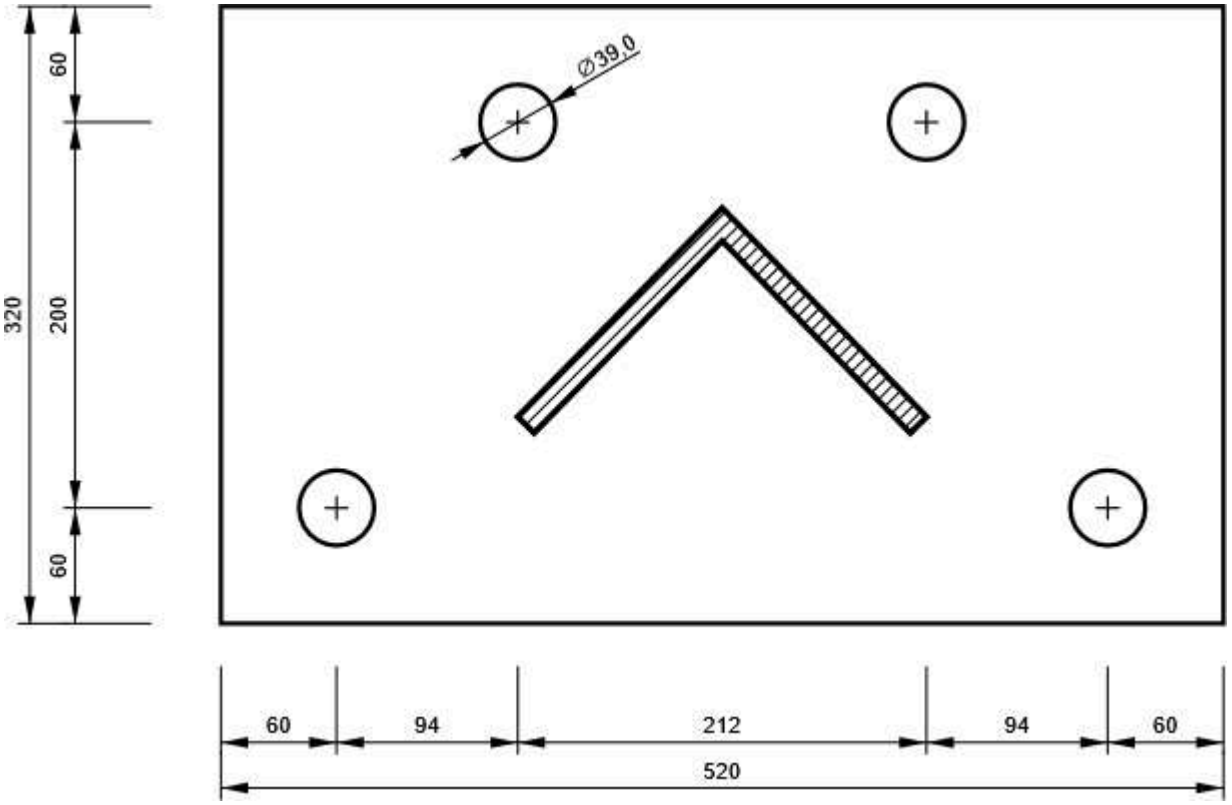
Ankers

Naam	Lengte [mm]	Boorlengte [mm]	Aantal
M36 4.6	888	800	4

Tekening

Voetplaat

P38,0x520-320 (S 235)



Norminstelling

Onderdeel	Waarde	Eenheid	Referentie
Veiligheidsfactor γ_{M0}	1,00	-	EN 1993-1-1: 6.1
Veiligheidsfactor γ_{M1}	1,00	-	EN 1993-1-1: 6.1
Veiligheidsfactor γ_{M2}	1,25	-	EN 1993-1-1: 6.1
Veiligheidsfactor γ_{M3}	1,25	-	EN 1993-1-8: 2.2
Veiligheidsfactor γ_{C}	1,50	-	EN 1992-1-1: 2.4.2.4
Veiligheidsfactor γ_{Inst}	1,20	-	EN 1992-4: Table 4.1
Verbindingscoëfficiënt βj	0,67	-	EN 1993-1-8: 6.2.5
Effectief oppervlak - coëfficiënt van max spanning	0,10	-	
Wrijvingscoëfficiënt - beton	0,25	-	EN 1993-1-8
Wrijvingscoëfficiënt slipweerstand	0,30	-	EN 1993-1-8 tab 3.7
Grenswaarde plastische rek	0,05	-	EN 1993-1-5
Detaillering	Nee		
Afstand tussen bouten [d]	2,20	-	EN 1993-1-8: tab 3.3
Afstand tussen bouten en de rand [d]	1,20	-	EN 1993-1-8: tab 3.3
Beton uitbreekweerstand	Geen		EN 1992-4: 7.2.1.4 and 7.2.2.5
Gebruik berekening αb in de stuikcontrole.	Ja		EN 1993-1-8: tab 3.4
Gescheurd beton	Ja		EN 1992-4
Controle lokale vervorming	Ja		CIDECT DG 1, 3 - 1.1
Grens lokale vervorming	0,03	-	CIDECT DG 1, 3 - 1.1
Geometrische niet-lineairiteit (GMNA)	Ja		Sta grote vervormingen van kokerdoorsnedes toe
Geschoord systeem	Nee		EN 1993-1-8: 5.2.2.5

Projectgegevens

Projectnaam	Opwaardering KIJ-BVW
Projectnr.	
Auteur	[redacted]
Omschrijving	Toetsing ankers type B
Datum	3-5-2025
Ontwerpnorm	EN

Berekening deel 2: Toetsing van ankers en betonpoer

Verankering Type B heeft 4*R38 rechte ankers (gemodelleerd als M36 4.6). De scope van het model is de opgetorte poer en een snede uit de onderliggende balklaag.

Wapening is volgens beschikbare asset data gemodellerd. De vorm van het betonlichaam is een omhulling van de in werkelijk taps toelopende opstorting. Daarnaast wordt ook een betonkwaliteit van C12/15 gehanteerd in plaats van C13/16. Dit is gedaan door beperkingen van de software en de minimale impact op de resultaten.

De anker eindes zijn zonder eindhaak gemodelleerd omdat deze niet zal voldoen aan huidige verankeringsvereisten. De schieters zijn dus niet mechanisch verbonden aan elkaar.

De gemodelleeerde poer is verankerd aan de snede van de balklaag, waarbij een fictieve 150MN/m/paal is teruggerekend naar het totale oppervlakte van snedes.

Ingevoerde krachten zijn op basis van voorlopige berekeningen. De definiteive krachten zijn middels een factor bij de belasting combinaties aangepast.

Materialen

Beton

Naam	f_{ck} [MPa]	$f_{ctk,0.05}$ [MPa]	f_{ctm} [MPa]	E_{cm} [MPa]	ν [-]	φ_{perm}	φ_{pres}
C12/15	12,0	1,1	1,6	27085,2	0,20	2,5	2,5
	ε_{c2} = 20,0 1e-4, ε_{cu2} = 500,0 1e-4, Type diagram: Parabolisch φ_{perm}: 2,50 φ_{pres}: 2,50						

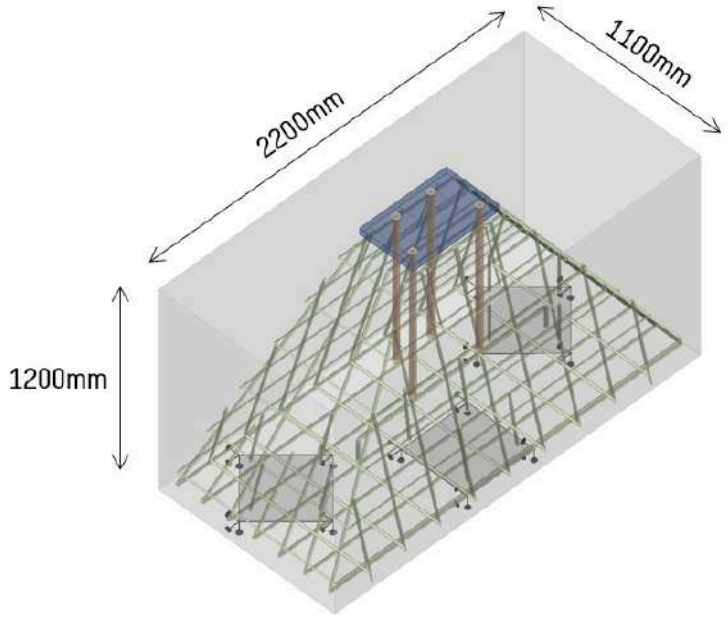
Wapening

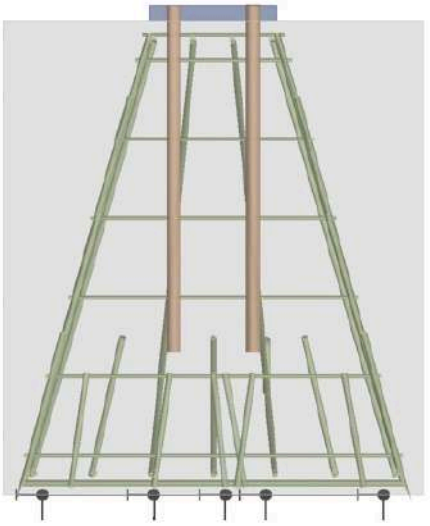
Naam	f_{yk} [MPa]	k [-]	E_s [MPa]	Eenheid massa [kg/m^3]	ε_{uk} [1e-4]	Oppervlak
B 400B	400,0	1,08	200000,0	7850	500,0	Geribd
	ε_{st} = 500,0 1e-4, ε_{sc} = 500,0 1e-4,					

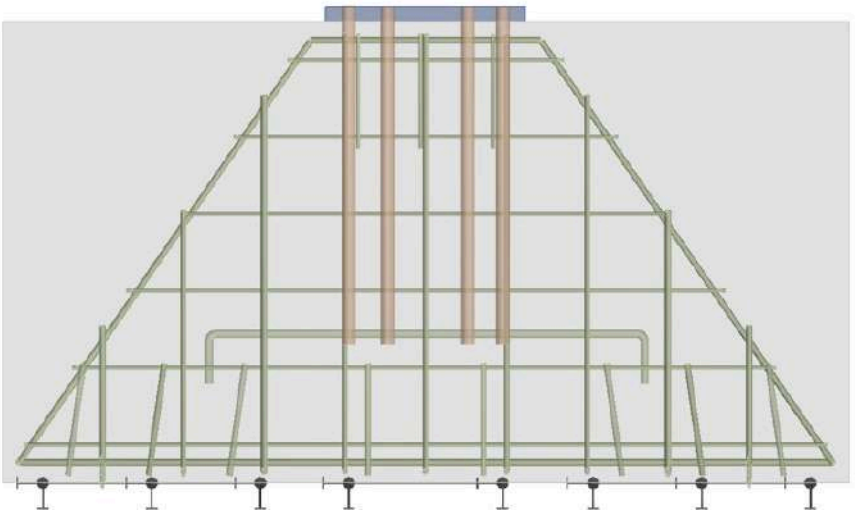
Staal

Naam	E [MPa]
S 235	210000,0

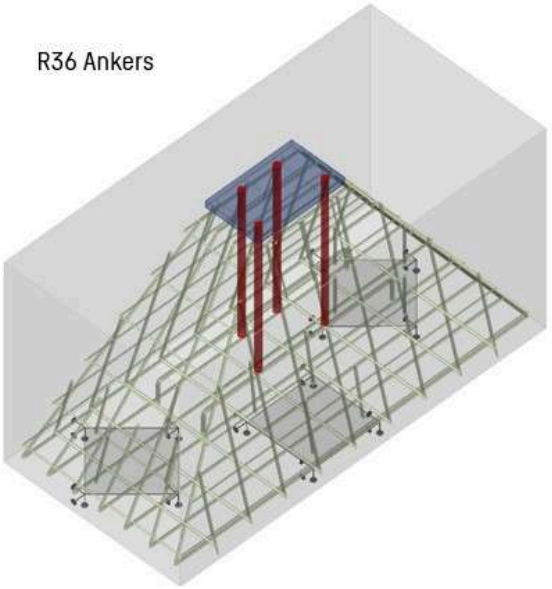
Anker type B



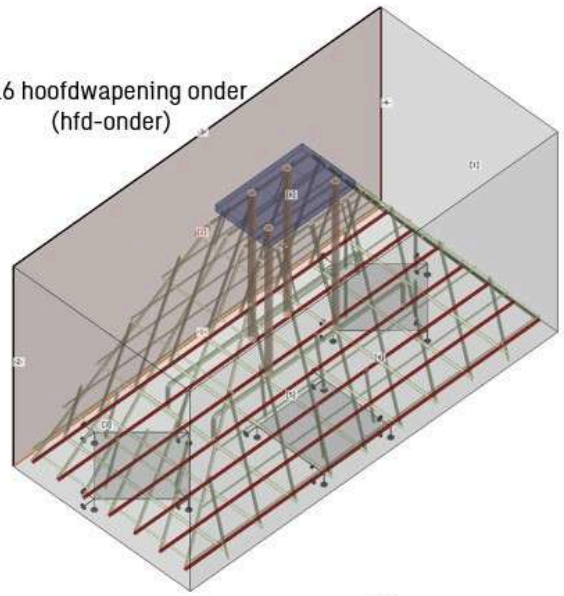




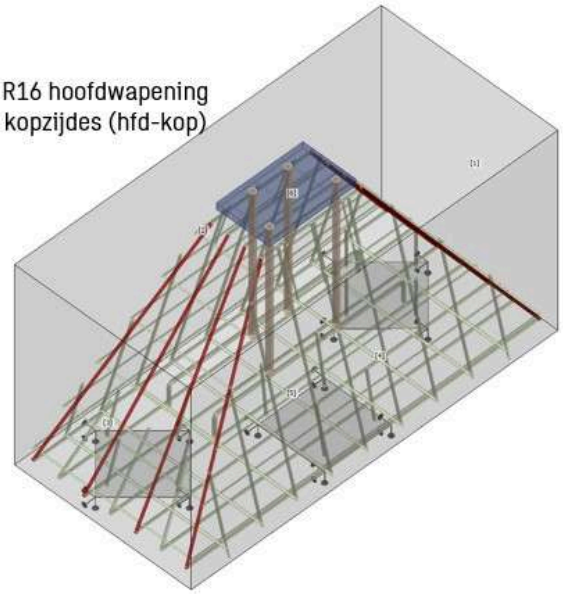
R36 Ankers



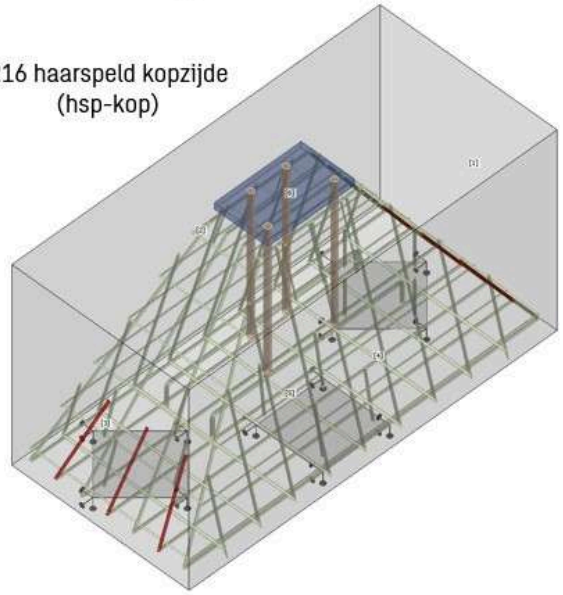
R16 hoofdwapening onder (hfd-onder)



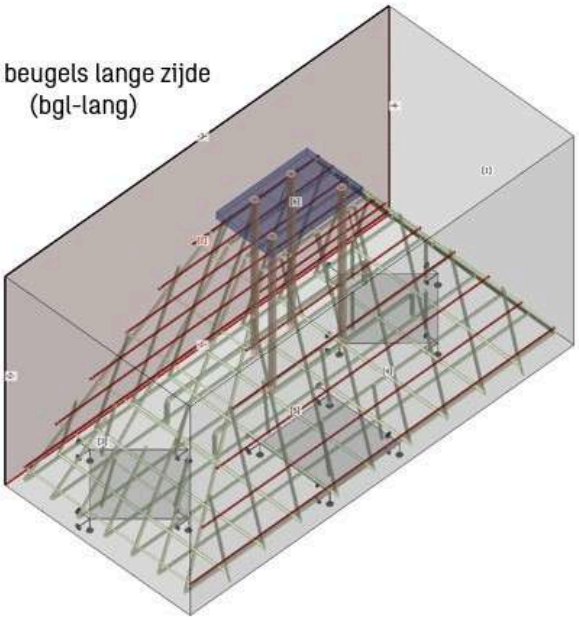
R16 hoofdwapening kopzijdes (hfd-kop)



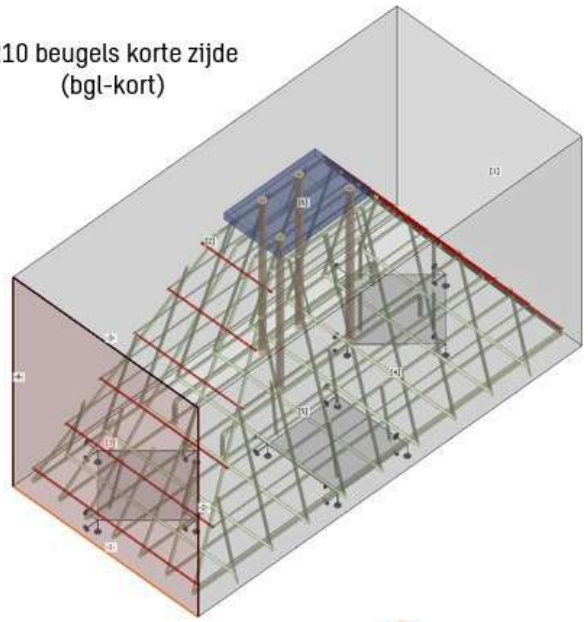
R16 haarspeld kopzijde (hsp-kop)



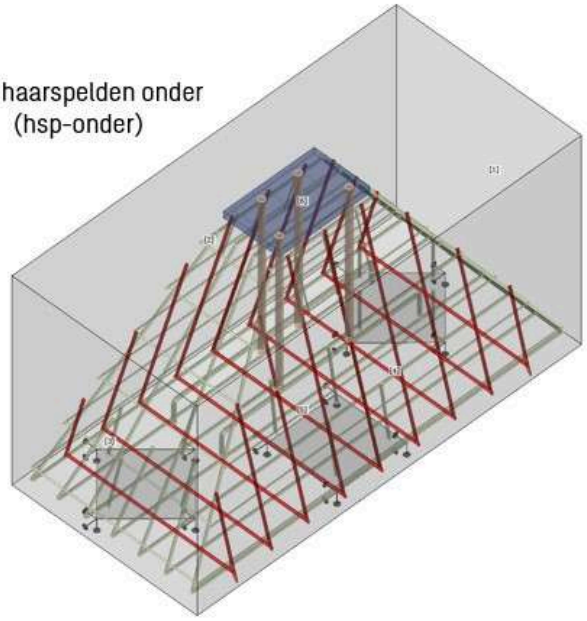
R10 beugels lange zijde
(bgl-lang)



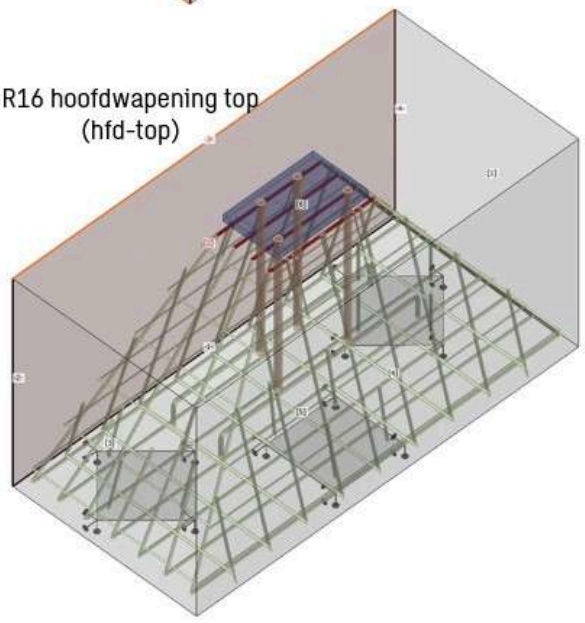
R10 beugels korte zijde
(bgl-kort)



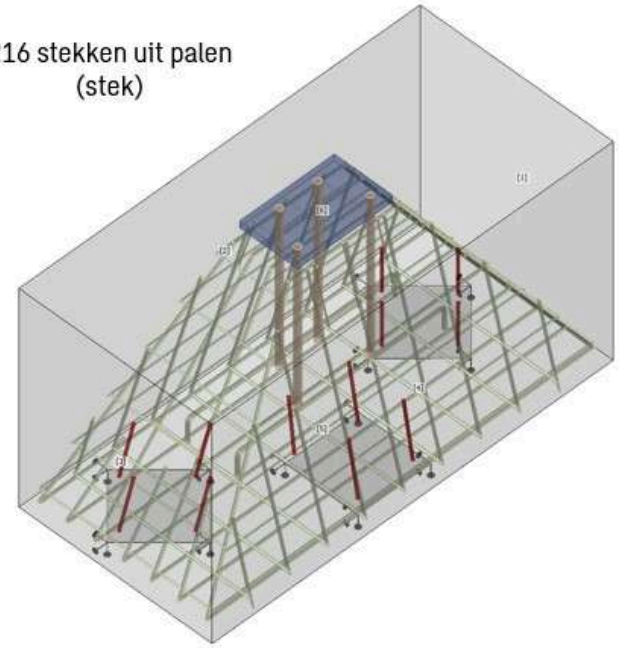
R16 haarspelden onder
(hsp-onder)



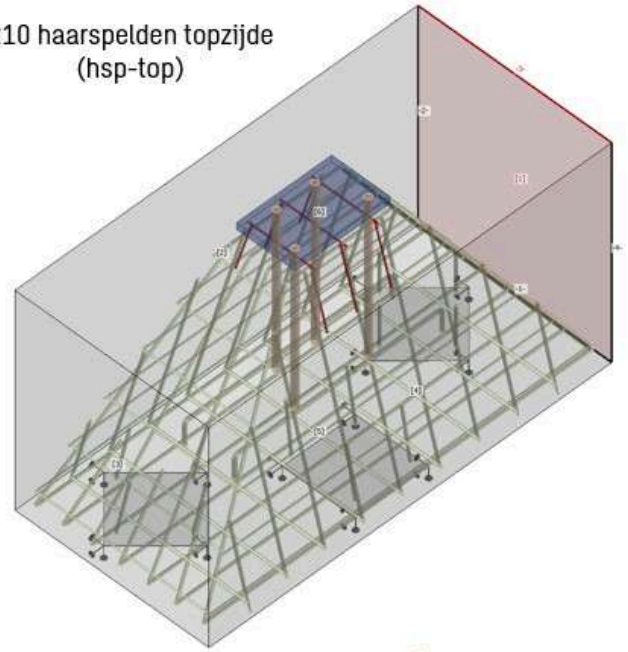
R16 hoofdwapening top
(hfd-top)



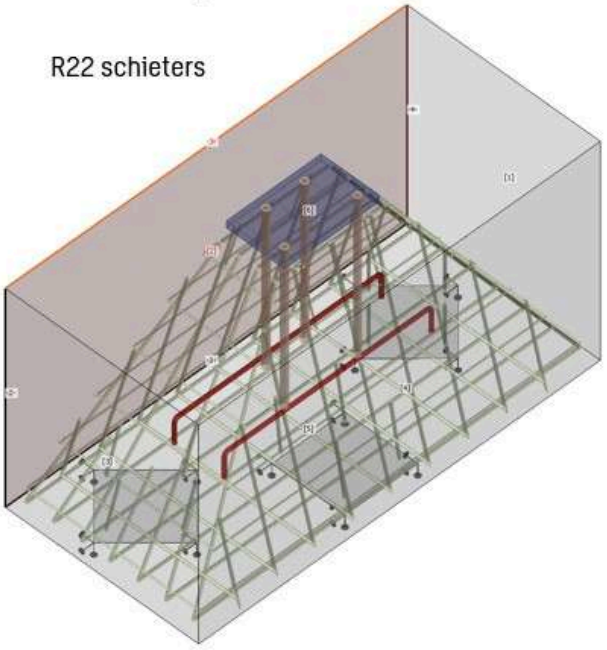
R16 stekken uit palen
(stek)



R10 haarspelden topzijde
(hsp-top)



R22 schieters



Geometrie

Overzicht tabel

Naam	Type	Eigenschappen	Positie
Poer	Betonpoer	Vorm: Algemeen; H: 1,20 m; Materiaal: C12/15	X: 0,00 m; Y: 0,00 m; Z: -1,17 m
Voetplaat	Voetplaat	W: 0,30 m; T: 0,04 m; D: 0,30 m; Materiaal: S 235; : Belasting; Overdracht van dwarskrachten: Ankers	M: Poer, Rand 0, Oppervlak 5; X: 0,27 m; Y: 0,74 m
Paal 1	Oppervlakteondersteuning	X: 94 MN/m2; Y: 94 MN/m2; Z: 937 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 5; Geometrisch type: Polylijn; X: -0,10 m; Y: 0,15 m; α: 0,0 °
Paal 2	Oppervlakteondersteuning	X: 94 MN/m2; Y: 94 MN/m2; Z: 937 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 5; Geometrisch type: Polylijn; X: 1,33 m; Y: 0,15 m; α: 0,0 °
Paal 3	Oppervlakteondersteuning	X: 94 MN/m2; Y: 94 MN/m2; Z: 937 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 5; Geometrisch type: Polylijn; X: 0,90 m; Y: 0,10 m; α: 0,0 °
Anker 1	Verankering - Belasting	L1: 0,04 m; L2: 0,84 m; Φ: 36 mm; Materiaal: 4.6	M: Poer, Rand: 3, Oppervlak: 6; X: 0,43 m
Anker 2	Verankering - Belasting	L1: 0,04 m; L2: 0,84 m; Φ: 36 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,43 m
Anker 3	Verankering - Belasting	L1: 0,04 m; L2: 0,84 m; Φ: 36 mm; Materiaal: 4.6	M: Poer, Rand: 3, Oppervlak: 6; X: 0,43 m
Anker 4	Verankering - Belasting	L1: 0,04 m; L2: 0,84 m; Φ: 36 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,43 m

Lasten

Combinaties

Naam	Type	Inhoud
Trekkracht	ULS	0,99*+600kN
Drukkracht	ULS	-800kN

Resultaten

Opsomming

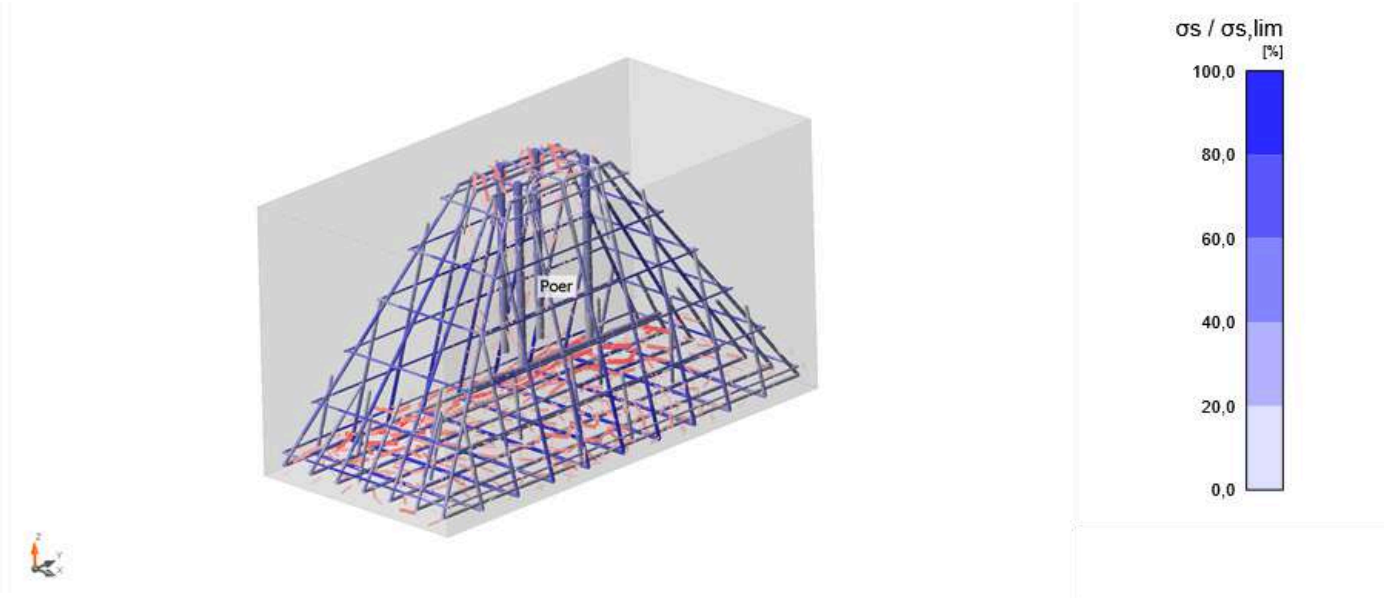
Overzicht tabel

Controle deel	Combinaties	Toename	Onderdeel	
UGT	Trekkracht	G100,0%	Sterkte van de wapening	✓

Controle deel	Onderdeel	Uitnutting	
Sterkte van het beton	Poer	σc/σc,lim: 99,6%	✓
Sterkte van de wapening	R16_hsp-onder_5	εs/εs,lim: 96,9%, σs/σs,lim: 99,7%	✓
Verankeringslengte	R16_stek_3	τb/fbd: 102,8%	✓

UGT - Opsomming

Verloop van de spanningen



Boven vloeispanning	Druk	Verklaringen
		Dikte in verhouding tot de kracht

Opsomming van de reactiekrachten en de toegepaste lasten: Trekkracht, Lastincrement: G100,0%

Type	F_x [kN]	F_y [kN]	F_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Opsommingen van de reacties	-118,4	0,0	-582,1	-2,4	33,1	0,0
Opsomming van de toegepaste lasten	118,4	0,0	582,1	1,4	3,6	0,0
Controleer evenwicht	0,0	0,0	0,0	-1,0	36,8	0,0

UGT - Sterkte

Gedetailleerde resultaten van de betonsterktes: Trekkracht, Lastincrement: G100,0%

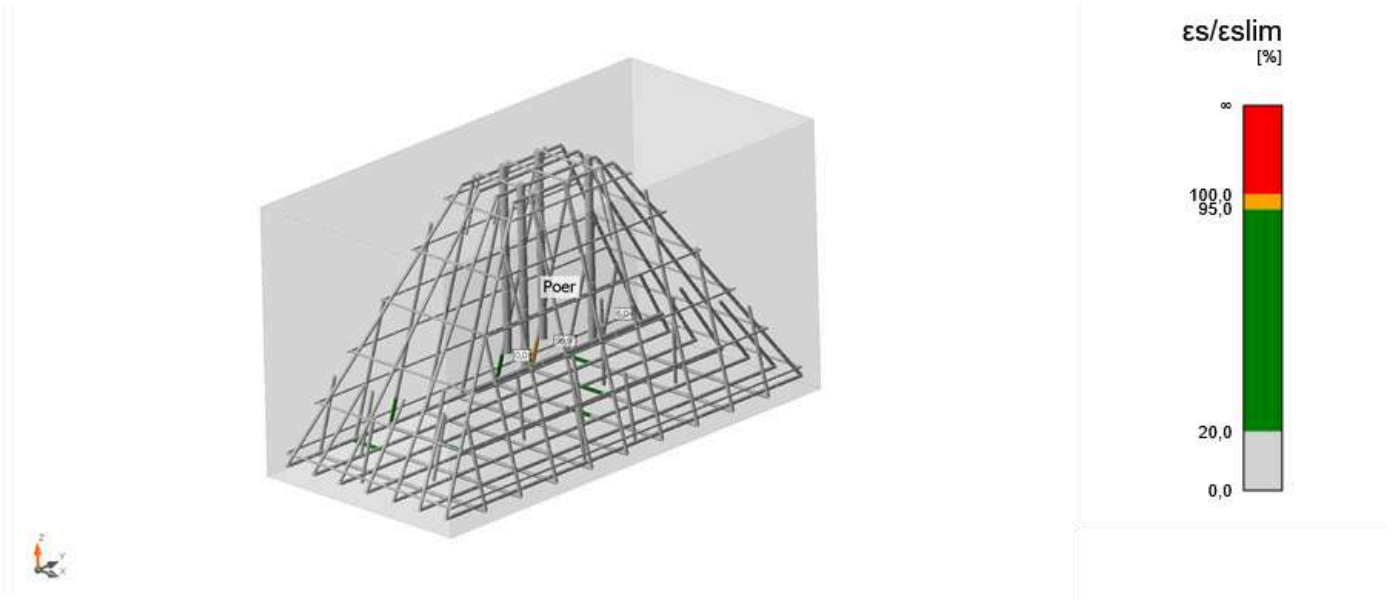
Staaf	X [m]	Y [m]	Z [m]	$\sigma_{c,eq}$ [MPa]	$\sigma_{c,3}/\sigma_{c,lim}$ [-]	ε_c [1e-4]	ε_{pl} [1e-4]	$\sigma_{c,eq}/\sigma_{c,lim}$ [%]	
Poer	-0,39	-0,61	-1,06	-8,0	100,0	-96,5	-86,5	99,6	Oké
Poer	-0,39	-0,61	-1,06	-8,0	100,0	-42,6	-57,1	99,6	Oké
Poer	-0,39	-0,61	-1,06	-8,0	154,4	-28,0	-15,9	99,5	Oké
Poer	-0,39	-0,61	-1,06	-3,8	100,0	-5,3	-0,7	47,2	Oké
Poer	-0,39	-0,61	-1,06	-2,9	100,0	-3,6	0,0	36,4	Oké
Poer	-0,39	-0,61	-1,06	-0,4	100,0	-0,5	0,0	4,7	Oké

Gedetailleerde resultaten van de wapeningsterkte: Trekkracht, Lastincrement: G100,0%

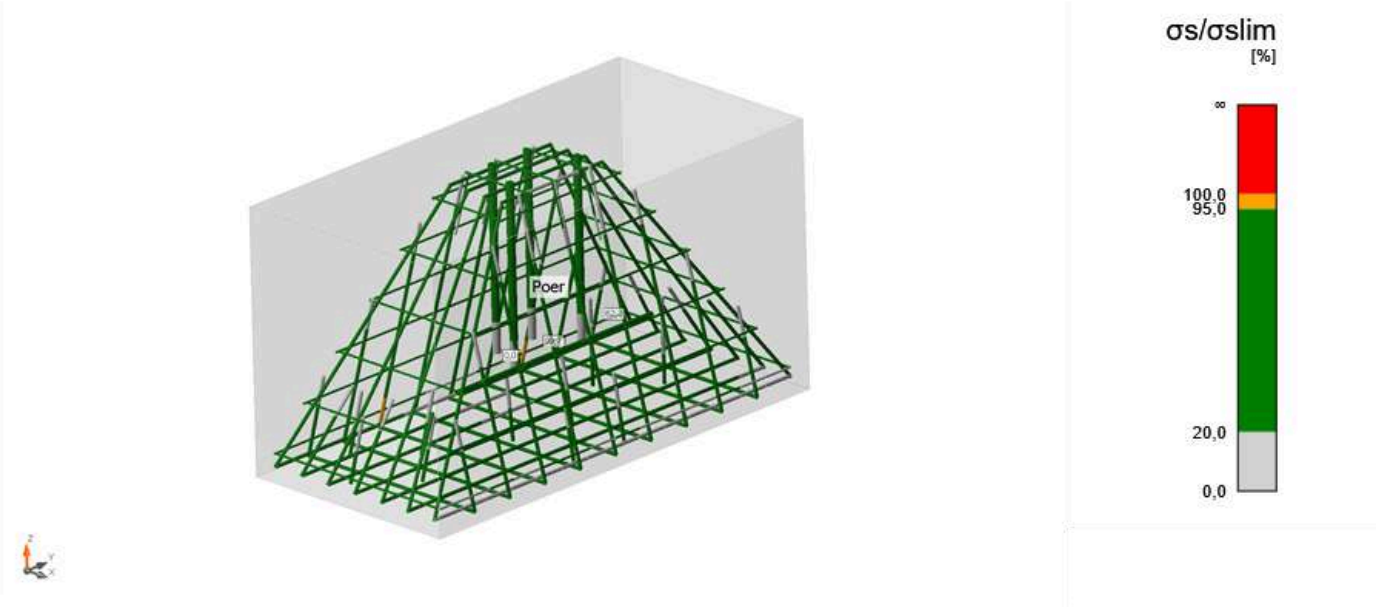
Staaf	X [m]	Y [m]	Z [m]	σ_s [MPa]	ε_s [1e-4]	$\sigma_s/\sigma_{s,lim}$ [%]	$\varepsilon_s/\varepsilon_{s,lim}$ [%]	
R16_hsp-onder_5	-0,48	0,42	-1,14	374,6	93,3	99,7	96,9	Oké
R16_hsp-onder_4	-0,48	-0,42	-1,14	372,0	85,4	99,0	88,7	Oké
R16_hsp-onder_7	-0,34	-0,63	-1,14	355,7	62,5	94,7	34,5	Oké
R16_hsp-onder_6	-0,34	0,63	-1,14	353,1	46,8	94,0	25,8	Oké
R16_hsp-onder_2	0,07	0,21	-1,14	351,3	35,2	93,5	20,1	Oké
R16_hsp-onder_8	-0,07	-0,84	-1,14	350,0	27,1	93,2	16,2	Oké
R16_hsp-onder_9	-0,07	0,84	-1,14	349,9	26,9	93,2	16,1	Oké
R16_hsp-onder_1	0,21	0,00	-1,14	349,8	26,5	93,1	15,3	Oké
R16_hsp-onder_3	0,07	-0,21	-1,14	349,7	26,3	93,1	15,1	Oké
R10-bgl-kort_1	-0,07	-1,04	-1,07	348,6	14,1	92,8	18,9	Oké
R10-bgl-lang_1	-0,48	-0,60	-1,07	343,0	13,8	91,3	13,0	Oké
R10-bgl-lang_4	-0,31	0,22	-0,47	323,8	10,4	86,2	15,8	Oké
R10-bgl-lang_5	-0,25	0,21	-0,27	310,9	9,7	82,8	14,8	Oké
R10-bgl-lang_3	-0,36	0,07	-0,67	306,5	9,5	81,6	14,5	Oké
R10-bgl-lang_2	-0,42	0,30	-0,87	298,8	9,1	79,5	13,9	Oké
R16-hfd-kop_7	-0,12	0,81	-0,75	287,8	8,7	76,6	13,0	Oké
R10-bgl-kort_4	-0,06	0,63	-0,47	281,0	8,3	74,8	12,5	Oké
R16-hfd-kop_6	-0,12	-0,81	-0,75	264,7	7,5	70,5	11,2	Oké
R16_hfd-onder_1-7	-0,30	0,76	-1,12	259,9	10,7	69,2	7,2	Oké
R16-hfd-kop_6	-0,13	-0,89	-0,88	258,2	9,5	68,7	9,1	Oké
R16-hfd-kop_7	-0,13	0,89	-0,88	258,2	9,4	68,7	9,1	Oké
R16-hfd-kop_5	0,12	-0,81	-0,75	256,3	7,1	68,2	10,6	Oké
R10-bgl-kort_2	0,00	-0,91	-0,87	253,0	6,9	67,4	10,4	Oké
R10-bgl-kort_2	-0,14	-0,91	-0,87	252,4	6,9	67,2	10,3	Oké
R10-bgl-kort_3	0,07	0,77	-0,67	248,3	6,7	66,1	10,0	Oké
R16-hfd-kop_8	0,12	0,81	-0,75	246,8	6,6	65,7	9,9	Oké
R16-hfd-kop_2	-0,39	0,89	-0,88	241,4	8,9	64,2	7,9	Oké
R16-hfd-kop_5	0,09	-0,55	-0,39	233,7	7,3	62,2	8,7	Oké
R16-hfd-kop_3	-0,32	-0,72	-0,63	230,1	7,8	61,3	8,0	Oké
R16-hfd-kop_8	0,13	0,89	-0,88	230,1	7,9	61,3	7,9	Oké
R10-bgl-kort_5	0,00	0,49	-0,27	227,9	5,7	60,7	8,5	Oké
R10-bgl-lang_6	-0,19	0,07	-0,07	220,0	8,0	58,6	6,8	Oké
Anker 2	0,10	-0,20	-0,11	196,0	7,7	56,4	1,8	Oké
Anker 4	0,10	0,20	-0,11	195,5	7,7	56,2	1,8	Oké
Anker 1	-0,10	-0,10	-0,11	192,2	7,7	55,2	1,7	Oké
Anker 3	-0,10	0,11	-0,11	192,1	7,7	55,2	1,7	Oké
R16-hfd-kop_1	0,22	0,47	-0,26	192,3	6,4	51,2	5,8	Oké
R16-hfd-kop_4	0,22	-0,47	-0,26	190,8	6,4	50,8	5,7	Oké
R10-bgl-kort_6	-0,07	0,35	-0,07	175,9	3,1	46,8	4,6	Oké
R16_hsp-kop_4	0,28	-0,98	-1,00	173,2	5,0	46,1	5,1	Oké
R16_hfd-top_1-4	-0,15	0,00	-0,02	168,7	6,3	44,9	4,0	Oké
R10_hsp-top_1-3	-0,06	0,18	0,00	168,5	4,9	44,9	4,8	Oké
R10_hsp-top_1-3	-0,06	-0,18	0,00	168,5	4,9	44,9	4,8	Oké

Staaf	X [m]	Y [m]	Z [m]	σ_s [MPa]	ε_s [1e-4]	$\sigma_s/\sigma_{s,lim}$ [%]	$\varepsilon_s/\varepsilon_{s,lim}$ [%]	
R16_hsp-kop_1	0,28	0,98	-1,00	167,3	4,7	44,5	4,8	Oké
R22_Schieter_1	0,13	-0,29	-0,78	159,7	2,2	42,5	3,3	Oké
R10_hsp-top_4	-0,19	0,18	-0,10	132,6	3,5	35,3	3,1	Oké
R10_hsp-top_8	-0,19	-0,01	-0,10	132,6	4,0	35,3	3,0	Oké
R10_hsp-top_5	-0,19	-0,18	-0,10	132,6	3,4	35,3	3,1	Oké
R10_hsp-top_6	0,19	-0,18	-0,10	132,4	3,7	35,2	3,1	Oké
R10_hsp-top_7	0,19	0,18	-0,10	132,4	3,7	35,2	3,1	Oké
R16_hsp-kop_3	-0,31	-1,06	-1,12	121,8	3,5	32,4	2,6	Oké
R16_hsp-kop_2	-0,31	1,06	-1,12	121,7	3,5	32,4	2,6	Oké
R16_hsp-kop_5	0,00	-1,06	-1,12	120,4	3,1	32,0	2,6	Oké
R16_hsp-kop_6	0,00	1,06	-1,12	120,4	3,1	32,0	2,6	Oké
R10_hsp-top_9	0,19	-0,01	-0,10	107,9	1,8	28,7	1,8	Oké
R16_stek_3	-0,36	-0,72	-1,15	93,9	0,5	25,0	0,5	Oké
R16_stek_2	-0,36	0,72	-1,15	93,9	0,5	25,0	0,5	Oké
R16_stek_11	-0,15	-0,51	-1,15	93,6	0,5	24,9	0,7	Oké
R16_stek_9	-0,15	0,51	-1,15	93,5	0,5	24,9	0,7	Oké
R16_stek_12	-0,15	-0,93	-1,15	93,3	0,8	24,8	0,8	Oké
R16_stek_8	-0,15	0,93	-1,15	93,2	0,8	24,8	0,8	Oké
R16_stek_7	0,06	0,72	-1,15	92,7	0,5	24,7	0,7	Oké
R16_stek_10	0,06	-0,72	-1,15	92,6	0,5	24,7	0,7	Oké
R16_stek_6	0,08	0,15	-1,15	92,2	0,5	24,5	0,7	Oké
R16_stek_5	0,03	-0,15	-1,15	91,5	0,5	24,4	0,7	Oké
R16_stek_4	0,38	-0,15	-1,15	91,3	0,5	24,3	0,5	Oké
R16_stek_1	0,38	0,15	-1,15	91,2	0,5	24,3	0,5	Oké

Wapening rek/grens verhouding - $\varepsilon_s/\varepsilon_{s,lim}$ [%]



Wapening spanning/sterkte verhouding - $\sigma_s/\sigma_{s,lim}$ [%]



UGT - Verankering

Gedetailleerde resultaten van de verankering - Wapening: Trekkracht, Lastincrement: G100,0%

Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R16_stek_3	-0,32	-0,68	-0,86	1,7	21,0	6,4	52,2	12,2	102,8	Oké
R16_stek_3	-0,36	-0,72	-1,15	1,6	21,0	18,9	77,3	24,4	99,6	Oké
R16_stek_3	-0,34	-0,70	-1,01	1,7	21,0	6,4	52,2	12,2	102,5	Oké
R16_stek_2	-0,32	0,68	-0,86	1,7	21,0	6,4	52,1	12,2	102,8	Oké
R16_stek_2	-0,36	0,72	-1,15	1,6	21,0	18,9	77,3	24,4	99,6	Oké
R16_stek_2	-0,34	0,70	-1,01	1,7	21,0	6,4	52,1	12,2	102,5	Oké
R16_stek_11	-0,11	-0,47	-0,86	1,7	20,9	6,3	52,0	12,2	102,4	Oké
R16_stek_11	-0,15	-0,51	-1,15	1,6	20,9	18,8	77,1	24,4	99,5	Oké
R16_stek_11	-0,13	-0,49	-1,01	1,7	20,9	6,3	52,0	12,2	102,1	Oké
R16_stek_9	-0,11	0,47	-0,86	1,7	20,9	6,3	51,9	12,2	102,3	Oké
R16_stek_9	-0,15	0,51	-1,15	1,6	20,9	18,8	77,0	24,4	99,5	Oké
R16_stek_9	-0,13	0,49	-1,01	1,7	20,9	6,3	51,9	12,2	102,0	Oké
R16_stek_12	-0,11	-0,89	-0,86	1,7	20,8	6,3	51,8	12,2	102,1	Oké
R16_stek_12	-0,15	-0,93	-1,15	1,6	20,8	18,8	76,9	24,4	99,5	Oké
R16_stek_12	-0,13	-0,91	-1,01	1,7	20,8	6,3	51,8	12,2	101,8	Oké
R16_hsp-onder_8	-0,38	-0,84	-0,76	1,7	0,1	5,6	51,9	10,8	102,1	Oké
R16_hsp-onder_8	-0,07	-0,84	-1,14	1,4	0,1	70,4	93,2	75,5	84,9	Oké
R16_hsp-onder_8	0,38	-0,84	-0,76	1,6	0,1	5,5	50,7	10,8	99,6	Oké
R16_hsp-onder_8	0,34	-0,84	-1,14	1,6	0,1	40,1	53,0	75,5	99,6	Oké
R16_hsp-onder_9	-0,38	0,84	-0,76	1,7	0,1	5,6	51,9	10,8	102,1	Oké
R16_hsp-onder_9	-0,07	0,84	-1,14	1,6	0,1	70,4	93,2	75,5	99,5	Oké
R16_hsp-onder_9	0,38	0,84	-0,76	1,6	0,1	5,5	50,7	10,8	99,6	Oké
R16_hsp-onder_9	0,34	0,84	-1,14	1,6	0,1	37,7	50,0	75,5	99,6	Oké
R16_stek_8	-0,11	0,89	-0,86	1,7	20,8	6,3	51,7	12,2	102,0	Oké
R16_stek_8	-0,15	0,93	-1,15	1,6	20,8	18,7	76,8	24,4	99,5	Oké
R16_stek_8	-0,13	0,91	-1,01	1,7	20,8	6,3	51,7	12,2	101,6	Oké
R16_stek_5	0,00	-0,15	-0,86	1,7	20,4	6,2	51,5	12,0	101,5	Oké
R16_stek_5	0,03	-0,15	-1,15	1,6	20,4	18,4	76,4	24,1	99,5	Oké
R16_stek_5	0,02	-0,15	-1,01	1,7	20,4	6,2	51,5	12,0	101,1	Oké
R16_stek_6	0,03	0,15	-0,86	1,7	20,6	6,2	51,4	12,2	101,3	Oké
R16_stek_6	0,08	0,15	-1,15	1,6	20,6	18,5	76,3	24,3	99,5	Oké
R16_stek_6	0,06	0,15	-1,01	1,7	20,6	6,2	51,4	12,2	100,9	Oké
R16_stek_7	0,10	0,68	-0,86	1,7	20,7	6,3	51,4	12,2	101,3	Oké
R16_stek_7	0,06	0,72	-1,15	1,6	20,7	18,6	76,4	24,4	99,5	Oké
R16_stek_7	0,08	0,70	-1,01	1,7	20,7	6,3	51,4	12,2	101,1	Oké
R16_stek_10	0,10	-0,68	-0,86	1,7	20,7	6,3	51,4	12,2	101,2	Oké
R16_stek_10	0,06	-0,72	-1,15	1,6	20,7	18,6	76,3	24,4	99,5	Oké
R16_stek_10	0,08	-0,70	-1,01	1,7	20,7	6,3	51,4	12,2	101,0	Oké
R16_hsp-onder_7	-0,29	-0,63	-0,46	1,7	0,1	6,0	51,4	11,7	101,2	Oké
R16_hsp-onder_7	-0,34	-0,63	-1,14	1,5	0,1	71,5	94,7	75,5	90,7	Oké
R16_hsp-onder_7	0,29	-0,63	-0,46	1,6	0,1	5,9	50,6	11,7	99,6	Oké
R16_hsp-onder_7	0,21	-0,63	-1,14	1,6	0,1	56,7	75,1	75,5	99,6	Oké

Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R16_hsp-onder_6	-0,29	0,63	-0,46	1,7	0,1	6,0	51,4	11,7	101,1	Oké
R16_hsp-onder_6	-0,34	0,63	-1,14	1,5	0,1	71,0	94,0	75,5	89,3	Oké
R16_hsp-onder_6	0,29	0,63	-0,46	1,6	0,1	5,9	50,6	11,7	99,6	Oké
R16_hsp-onder_6	0,21	0,63	-1,14	1,6	0,1	51,9	68,8	75,5	99,5	Oké
R16-hfd-kop_6	-0,16	-1,06	-1,12	1,7	21,0	27,2	77,9	35,0	100,9	Oké
R16-hfd-kop_6	-0,12	-0,81	-0,75	0,5	21,0	53,2	74,0	71,9	33,1	Oké
R16-hfd-kop_6	-0,06	-0,38	-0,14	1,6	21,0	27,1	77,6	35,0	99,6	Oké
R16-hfd-kop_6	-0,13	-0,89	-0,88	1,6	21,0	51,9	87,1	59,6	99,6	Oké
R16-hfd-kop_6	-0,11	-0,72	-0,63	0,6	21,0	49,3	65,3	75,5	36,5	Oké
R16-hfd-kop_7	-0,16	1,06	-1,12	1,7	21,0	27,2	77,9	35,0	100,7	Oké
R16-hfd-kop_7	-0,12	0,81	-0,75	0,9	21,0	57,9	80,5	71,9	55,2	Oké
R16-hfd-kop_7	-0,06	0,38	-0,14	1,6	21,0	27,1	77,6	35,0	99,6	Oké
R16-hfd-kop_7	-0,13	0,89	-0,88	1,6	21,0	51,9	87,1	59,6	99,6	Oké
R16-hfd-kop_7	-0,11	0,72	-0,63	1,2	21,0	51,9	68,8	75,5	75,7	Oké
R16_hsp-kop_3	-0,23	-0,82	-0,77	1,7	21,0	6,1	51,0	11,9	100,4	Oké
R16_hsp-kop_3	-0,31	-1,06	-1,12	1,7	21,0	24,5	70,9	34,5	100,1	Oké
R16_hsp-kop_3	-0,26	-0,90	-0,89	1,7	21,0	6,1	51,0	11,9	100,3	Oké
R16_hsp-kop_3	-0,28	-0,98	-1,00	1,7	21,0	18,0	75,9	23,8	100,1	Oké
R16_hsp-kop_2	-0,23	0,82	-0,77	1,7	21,0	6,1	51,0	11,9	100,3	Oké
R16_hsp-kop_2	-0,31	1,06	-1,12	1,7	21,0	24,5	70,9	34,5	99,9	Oké
R16_hsp-kop_2	-0,26	0,90	-0,89	1,7	21,0	6,1	51,0	11,9	100,3	Oké
R16_hsp-kop_2	-0,28	0,98	-1,00	1,7	21,0	18,0	75,8	23,8	99,9	Oké
R16-hfd-kop_3	-0,46	-1,06	-1,12	1,7	21,0	27,3	77,5	35,3	100,3	Oké
R16-hfd-kop_3	-0,32	-0,72	-0,63	0,1	21,0	46,3	61,3	75,5	3,3	Oké
R16-hfd-kop_3	-0,18	-0,38	-0,14	1,6	21,0	27,3	77,3	35,3	99,6	Oké
R16-hfd-kop_3	-0,43	-0,98	-1,00	1,6	21,0	39,9	83,5	47,9	99,6	Oké
R16-hfd-kop_2	-0,46	1,06	-1,12	1,7	21,0	27,3	77,5	35,3	100,2	Oké
R16-hfd-kop_2	-0,39	0,89	-0,88	1,6	21,0	48,5	80,3	60,4	96,1	Oké
R16-hfd-kop_2	-0,18	0,38	-0,14	1,6	21,0	27,3	77,4	35,3	99,6	Oké
R16-hfd-kop_2	-0,43	0,98	-1,00	1,6	21,0	39,9	83,5	47,9	99,6	Oké
R16-hfd-kop_2	-0,32	0,72	-0,63	0,0	21,0	43,1	57,1	75,5	0,3	Oké
R10_hsp-top_8	-0,25	-0,01	-0,30	1,7	8,2	2,7	50,7	5,4	100,1	Oké
R10_hsp-top_8	-0,19	-0,01	-0,10	1,6	8,2	10,4	73,1	14,2	99,6	Oké
R10_hsp-top_8	-0,22	-0,01	-0,20	1,6	8,2	8,1	75,5	10,8	99,8	Oké
R10_hsp-top_4	-0,25	0,18	-0,30	1,7	8,2	2,7	50,7	5,4	100,0	Oké
R10_hsp-top_4	-0,19	0,18	-0,10	1,6	8,2	10,4	73,1	14,2	99,6	Oké
R10_hsp-top_4	-0,22	0,18	-0,20	1,6	8,2	8,1	75,5	10,8	99,8	Oké
R10-bgl-kort_1	-0,48	1,04	-1,07	1,7	8,2	11,7	73,9	15,9	100,0	Oké
R10-bgl-kort_1	-0,07	-1,04	-1,07	1,1	8,2	27,4	92,8	29,5	69,6	Oké
R10-bgl-kort_1	0,34	-1,04	-1,07	1,6	8,2	11,7	73,7	15,9	99,5	Oké
R10-bgl-kort_1	0,07	-1,04	-1,07	1,6	8,2	20,4	69,1	29,5	99,5	Oké
R10-bgl-kort_5	0,25	0,49	-0,27	1,7	8,2	11,4	74,7	15,3	100,0	Oké
R10-bgl-kort_5	0,00	0,49	-0,27	0,0	8,2	17,9	82,3	21,8	0,8	Oké
R10-bgl-kort_5	-0,25	0,49	-0,27	1,6	8,2	11,4	74,7	15,3	99,8	Oké

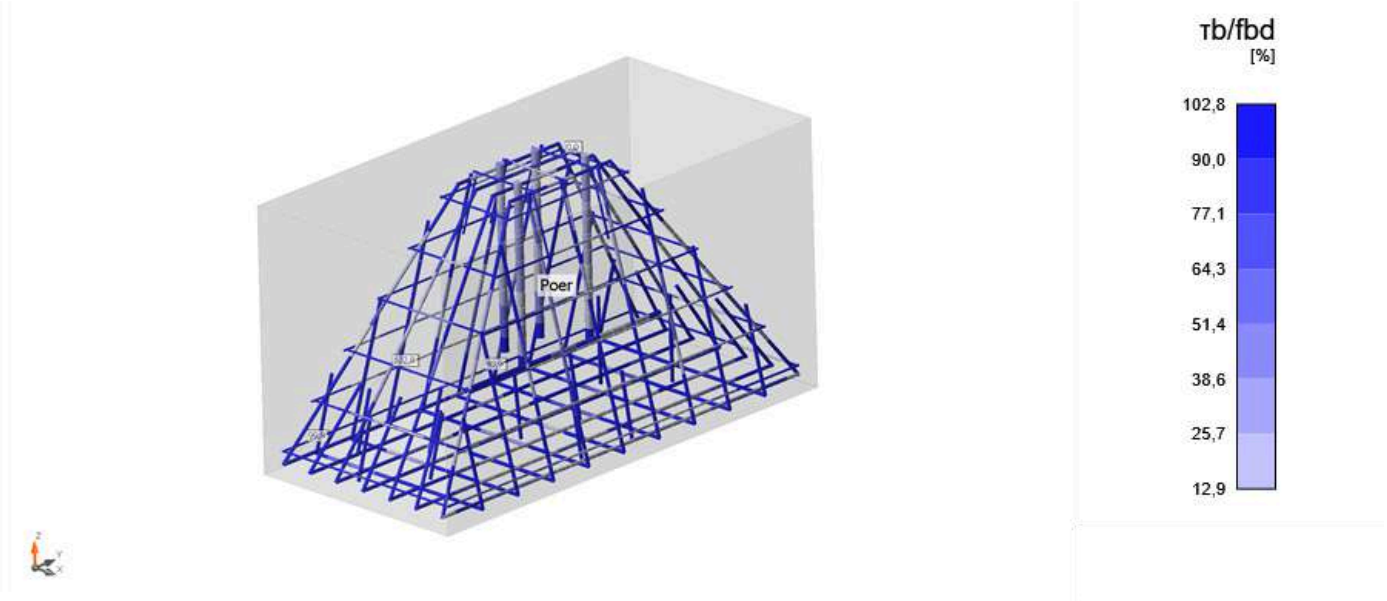
Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R10-bgl-kort_5	0,00	-0,49	-0,27	0,0	8,2	17,9	82,2	21,8	0,3	Oké
R10_hsp-top_5	-0,25	-0,18	-0,30	1,7	8,2	2,7	50,7	5,4	100,0	Oké
R10_hsp-top_5	-0,19	-0,18	-0,10	1,6	8,2	10,4	73,1	14,2	99,6	Oké
R10_hsp-top_5	-0,22	-0,18	-0,20	1,6	8,2	8,1	75,5	10,8	99,8	Oké
R16_hsp-onder_1	-0,16	0,00	0,00	1,7	0,1	6,2	50,8	12,2	100,0	Oké
R16_hsp-onder_1	0,21	0,00	-1,14	1,6	0,1	70,3	93,1	75,5	99,5	Oké
R16_hsp-onder_1	0,16	0,00	0,00	1,6	0,1	6,2	50,6	12,2	99,5	Oké
R16_hsp-onder_1	0,40	0,00	-0,86	1,6	0,1	63,9	84,6	75,5	99,6	Oké
R16_hsp-kop_6	0,00	0,82	-0,77	1,7	21,0	5,9	50,8	11,7	100,0	Oké
R16_hsp-kop_6	0,00	1,06	-1,12	1,6	21,0	24,2	70,5	34,3	99,8	Oké
R16_hsp-kop_6	0,00	0,90	-0,89	1,7	21,0	5,9	50,8	11,7	99,9	Oké
R16_hsp-kop_6	0,00	0,98	-1,00	1,6	21,0	17,7	75,6	23,4	99,8	Oké
R10-bgl-kort_6	-0,20	0,35	-0,07	1,2	8,2	10,6	77,7	13,6	99,9	Oké
R10-bgl-kort_6	-0,07	0,35	-0,07	1,1	8,2	13,8	74,9	18,4	99,3	Oké
R10-bgl-kort_6	0,07	-0,35	-0,07	1,1	8,2	10,6	77,7	13,6	99,3	Oké
R10-bgl-kort_6	-0,07	-0,35	-0,07	1,1	8,2	13,8	74,9	18,4	99,3	Oké
R16_hsp-kop_5	0,00	-0,82	-0,77	1,7	21,0	5,9	50,8	11,7	100,0	Oké
R16_hsp-kop_5	0,00	-1,06	-1,12	1,6	21,0	24,2	70,5	34,3	99,8	Oké
R16_hsp-kop_5	0,00	-0,90	-0,89	1,6	21,0	5,9	50,8	11,7	99,9	Oké
R16_hsp-kop_5	0,00	-0,98	-1,00	1,6	21,0	17,7	75,6	23,4	99,8	Oké
R10_hsp-top_1-3	-0,18	0,18	0,00	1,2	8,2	10,4	78,7	13,2	99,9	Oké
R10_hsp-top_1-3	-0,06	-0,18	0,00	1,1	8,2	13,2	75,7	17,5	99,1	Oké
R10_hsp-top_1-3	0,06	0,00	0,00	0,2	8,2	10,3	78,6	13,2	16,7	Oké
R10_hsp-top_1-3	-0,06	0,18	0,00	1,1	8,2	13,2	75,7	17,5	99,1	Oké
R16_hsp-onder_2	-0,16	0,21	0,00	1,6	0,1	6,2	50,7	12,2	99,9	Oké
R16_hsp-onder_2	0,07	0,21	-1,14	0,9	0,1	70,6	93,5	75,5	54,9	Oké
R16_hsp-onder_2	0,16	0,21	0,00	1,6	0,1	6,2	50,6	12,2	99,5	Oké
R16_hsp-onder_2	0,40	0,21	-0,86	1,6	0,1	57,2	75,7	75,5	99,5	Oké
R16_stek_4	0,33	-0,15	-0,86	1,6	20,4	6,2	50,7	12,2	99,9	Oké
R16_stek_4	0,38	-0,15	-1,15	1,6	20,4	18,4	75,5	24,3	99,5	Oké
R16_stek_4	0,36	-0,15	-1,01	1,6	20,4	6,2	50,7	12,2	99,8	Oké
R16_hsp-onder_3	-0,16	-0,21	0,00	1,6	0,1	6,2	50,7	12,2	99,9	Oké
R16_hsp-onder_3	0,07	-0,21	-1,14	0,6	0,1	70,3	93,1	75,5	35,2	Oké
R16_hsp-onder_3	0,16	-0,21	0,00	1,6	0,1	6,2	50,6	12,2	99,5	Oké
R16_hsp-onder_3	0,40	-0,21	-0,86	1,4	0,1	47,6	63,0	75,5	83,4	Oké
R16-hfd-kop_5	0,16	-1,06	-1,12	1,6	21,0	27,1	77,6	35,0	99,8	Oké
R16-hfd-kop_5	0,12	-0,81	-0,75	1,6	21,0	51,5	71,7	71,9	99,5	Oké
R16-hfd-kop_5	0,06	-0,38	-0,14	1,6	21,0	27,1	77,6	35,0	99,6	Oké
R16-hfd-kop_5	0,14	-0,98	-1,00	1,6	21,0	39,5	83,5	47,3	99,6	Oké
R16-hfd-kop_5	0,11	-0,72	-0,63	1,0	21,0	49,2	65,2	75,5	60,2	Oké
R16_stek_1	0,33	0,15	-0,86	1,6	20,4	6,2	50,7	12,2	99,8	Oké
R16_stek_1	0,38	0,15	-1,15	1,6	20,4	18,3	75,5	24,3	99,5	Oké
R16_stek_1	0,36	0,15	-1,01	1,6	20,4	6,2	50,7	12,2	99,8	Oké
R16-hfd-kop_8	0,16	1,06	-1,12	1,6	21,0	27,1	77,6	35,0	99,8	Oké

Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R16-hfd-kop_8	0,12	0,81	-0,75	1,0	21,0	49,6	69,0	71,9	59,4	Oké
R16-hfd-kop_8	0,06	0,38	-0,14	1,6	21,0	27,1	77,6	35,0	99,6	Oké
R16-hfd-kop_8	0,14	0,98	-1,00	1,6	21,0	39,5	83,5	47,3	99,5	Oké
R16-hfd-kop_8	0,11	0,72	-0,63	1,6	21,0	42,9	56,7	75,5	98,6	Oké
R10-bgl-kort_4	0,31	0,63	-0,47	1,6	8,2	11,4	74,7	15,3	99,8	Oké
R10-bgl-kort_4	-0,06	0,63	-0,47	1,6	8,2	22,1	78,7	28,1	99,5	Oké
R10-bgl-kort_4	-0,31	0,63	-0,47	1,6	8,2	11,4	74,7	15,3	99,7	Oké
R10-bgl-kort_4	0,06	0,63	-0,47	1,6	8,2	17,8	82,2	21,7	99,5	Oké
R10-bgl-kort_4	-0,06	-0,63	-0,47	0,8	8,2	21,0	74,9	28,1	51,1	Oké
R10-bgl-lang_5	-0,25	0,50	-0,27	1,6	8,2	11,9	73,3	16,2	99,8	Oké
R10-bgl-lang_5	-0,25	0,21	-0,27	1,6	8,2	24,4	82,8	29,5	99,5	Oké
R10-bgl-lang_5	0,25	0,50	-0,27	1,6	8,2	11,9	73,2	16,2	99,6	Oké
R10-bgl-lang_5	-0,25	-0,07	-0,27	1,6	8,2	22,6	76,5	29,5	99,5	Oké
R16_hfd-onder_1-7	-0,45	-1,06	-1,12	1,6	21,0	27,2	77,5	35,2	99,8	Oké
R16_hfd-onder_1-7	-0,30	0,76	-1,12	1,6	21,0	52,3	86,8	60,2	99,5	Oké
R16_hfd-onder_1-7	-0,45	0,00	-1,12	0,8	21,0	-2,1	2,7	-75,5	48,9	Oké
R16_hfd-onder_1-7	-0,45	0,45	-1,12	1,6	21,0	25,0	33,1	75,5	99,6	Oké
R16_hsp-onder_5	-0,21	0,42	-0,16	1,6	0,1	6,1	50,7	12,0	99,8	Oké
R16_hsp-onder_5	-0,48	0,42	-1,14	1,6	0,1	75,3	99,7	75,5	99,6	Oké
R16_hsp-onder_5	0,21	0,42	-0,16	1,6	0,1	6,1	50,6	12,0	99,5	Oké
R16_hsp-onder_5	0,44	0,42	-1,00	1,6	0,1	52,2	69,1	75,5	99,5	Oké
R10-bgl-lang_1	-0,48	-1,05	-1,07	1,6	8,2	12,1	72,8	16,6	99,7	Oké
R10-bgl-lang_1	-0,48	-0,60	-1,07	1,6	8,2	26,9	91,3	29,5	99,6	Oké
R10-bgl-lang_1	-0,48	0,15	-1,07	1,4	8,2	0,2	0,6	29,5	86,4	Oké
R10-bgl-lang_1	-0,48	0,60	-1,07	1,6	8,2	21,8	73,9	29,5	99,6	Oké
R16_hsp-onder_4	-0,21	-0,42	-0,16	1,6	0,1	6,1	50,7	12,0	99,7	Oké
R16_hsp-onder_4	-0,48	-0,42	-1,14	1,6	0,1	74,8	99,0	75,5	99,6	Oké
R16_hsp-onder_4	0,21	-0,42	-0,16	1,6	0,1	6,1	50,6	12,0	99,5	Oké
R16_hsp-onder_4	0,44	-0,42	-1,00	1,6	0,1	52,8	69,9	75,5	99,5	Oké
R10-bgl-lang_6	-0,19	-0,36	-0,07	1,1	8,2	10,8	76,9	14,0	99,3	Oké
R10-bgl-lang_6	-0,19	0,07	-0,07	0,3	8,2	17,3	70,9	24,4	24,0	Oké
R10-bgl-lang_6	0,19	0,07	-0,07	0,8	8,2	9,5	38,8	24,4	73,1	Oké
R10-bgl-lang_6	-0,19	-0,07	-0,07	0,3	8,2	16,0	83,1	19,2	24,1	Oké
R16_hsp-kop_4	0,31	-1,06	-1,12	1,6	21,0	26,9	77,9	34,5	99,6	Oké
R16_hsp-kop_4	0,28	-0,98	-1,00	1,6	21,0	34,8	75,0	46,4	99,5	Oké
R16_hsp-kop_4	0,26	-0,90	-0,89	1,6	21,0	26,9	77,9	34,5	99,5	Oké
R10-bgl-kort_3	0,37	0,77	-0,67	1,6	8,2	12,0	73,0	16,4	99,6	Oké
R10-bgl-kort_3	0,07	0,77	-0,67	1,6	8,2	19,5	81,5	23,9	99,5	Oké
R10-bgl-kort_3	-0,37	-0,77	-0,67	1,6	8,2	12,0	73,0	16,4	99,6	Oké
R10-bgl-kort_3	-0,07	-0,77	-0,67	1,6	8,2	15,4	52,3	29,5	99,5	Oké
R16_hfd-top_1-4	-0,15	-0,30	-0,02	1,1	21,0	25,3	80,8	31,3	99,2	Oké
R16_hfd-top_1-4	-0,15	0,00	-0,02	1,1	21,0	33,9	85,0	39,9	99,0	Oké
R16_hfd-top_1-4	0,15	-0,15	-0,02	1,1	21,0	13,6	34,0	39,9	99,0	Oké
R16_hsp-kop_1	0,31	1,06	-1,12	1,6	21,0	26,9	77,9	34,5	99,6	Oké

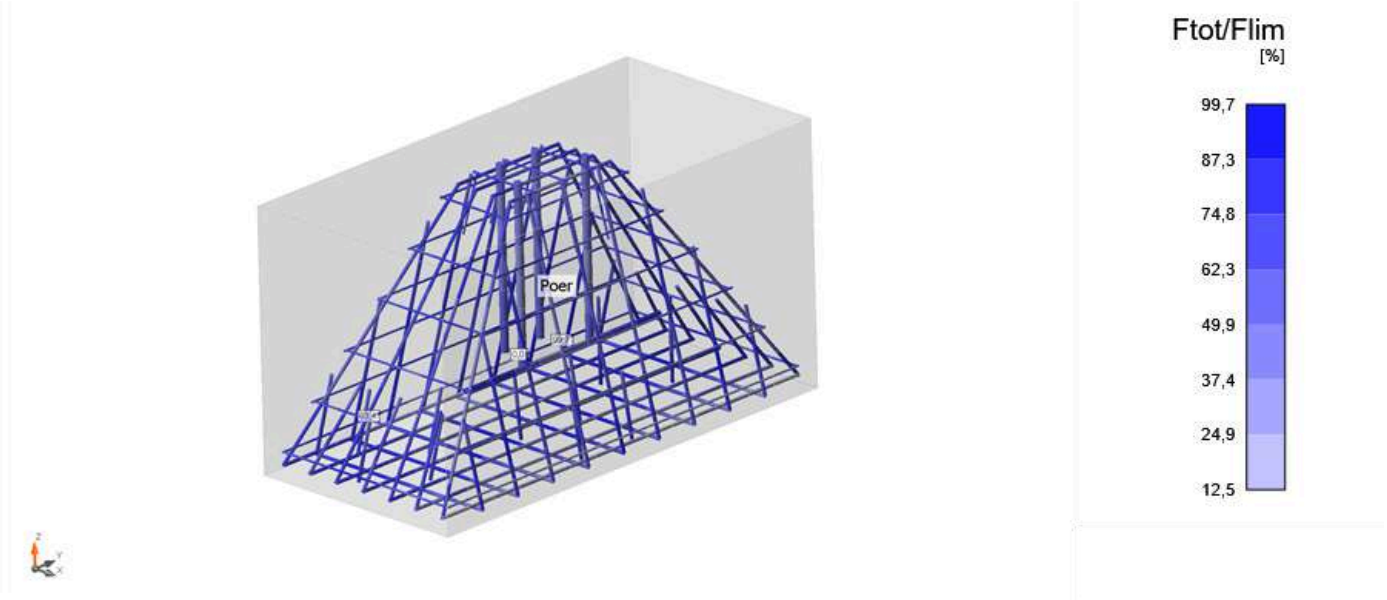
Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R16_hsp-kop_1	0,28	0,98	-1,00	1,6	21,0	33,6	72,5	46,4	99,5	Oké
R16_hsp-kop_1	0,26	0,90	-0,89	1,6	21,0	24,5	71,0	34,5	99,5	Oké
R10-bgl-lang_4	0,31	-0,63	-0,47	1,6	8,2	11,8	73,3	16,1	99,6	Oké
R10-bgl-lang_4	-0,31	0,22	-0,47	0,0	8,2	25,4	86,2	29,5	0,6	Oké
R10-bgl-lang_4	-0,31	-0,49	-0,47	1,6	8,2	11,8	73,3	16,1	99,5	Oké
R10-bgl-lang_4	-0,31	0,08	-0,47	0,6	8,2	23,9	80,9	29,5	36,5	Oké
R10-bgl-kort_2	0,42	-0,91	-0,87	1,6	8,2	11,8	73,4	16,1	99,6	Oké
R10-bgl-kort_2	0,42	0,91	-0,87	1,6	8,2	11,8	73,4	16,1	99,6	Oké
R10-bgl-kort_2	0,00	-0,91	-0,87	0,2	8,2	19,9	67,4	29,5	14,7	Oké
R10-bgl-kort_2	-0,42	-0,91	-0,87	1,6	8,2	11,8	73,4	16,1	99,6	Oké
R10-bgl-kort_2	-0,28	0,91	-0,87	1,6	8,2	19,0	81,7	23,3	99,5	Oké
R10-bgl-lang_2	-0,42	-0,92	-0,87	1,6	8,2	12,1	72,5	16,7	99,6	Oké
R10-bgl-lang_2	-0,42	0,30	-0,87	0,7	8,2	23,5	79,5	29,5	42,6	Oké
R10-bgl-lang_2	0,42	0,91	-0,87	1,6	8,2	7,2	43,0	16,7	99,5	Oké
R10-bgl-lang_2	-0,42	0,45	-0,87	0,8	8,2	21,2	72,0	29,5	47,2	Oké
R16-hfd-kop_4	0,15	-0,30	-0,02	1,6	21,0	27,3	77,3	35,3	99,6	Oké
R16-hfd-kop_4	0,22	-0,47	-0,26	1,6	21,0	38,4	80,2	47,9	99,5	Oké
R16-hfd-kop_4	0,39	-0,89	-0,88	0,3	21,0	22,3	36,8	60,4	19,9	Oké
R16-hfd-kop_4	0,32	-0,72	-0,63	0,3	21,0	29,3	38,8	75,5	16,5	Oké
Anker 1	-0,10	-0,10	-0,81	8,0	212,2	63,5	50,2	126,6	99,9	Oké
Anker 1	-0,10	-0,10	-0,11	1,0	212,2	195,6	55,2	354,0	12,0	Oké
Anker 1	-0,10	-0,10	-0,81	8,0	212,2	63,5	50,2	126,6	99,9	Oké
Anker 1	-0,10	-0,10	-0,11	1,0	212,2	195,6	55,2	354,0	12,0	Oké
Anker 1	-0,10	-0,10	-0,81	8,0	212,2	63,5	50,2	126,6	99,9	Oké
Anker 1	-0,10	-0,10	-0,11	1,0	212,2	195,6	55,2	354,0	12,0	Oké
Anker 1	-0,10	-0,10	-0,81	8,0	212,2	63,5	50,2	126,6	99,9	Oké
Anker 1	-0,10	-0,10	-0,11	1,0	212,2	195,6	55,2	354,0	12,0	Oké
R10_hsp-top_7	0,22	0,18	-0,20	1,6	8,2	2,7	50,5	5,4	99,6	Oké
R10_hsp-top_7	0,25	0,18	-0,30	1,6	8,2	2,7	50,5	5,4	99,6	Oké
R10_hsp-top_7	0,19	0,18	-0,10	1,6	8,2	10,4	73,0	14,2	99,5	Oké
R10_hsp-top_7	0,22	0,18	-0,20	1,6	8,2	8,1	75,3	10,8	99,6	Oké
R16-hfd-kop_1	0,15	0,30	-0,02	1,6	21,0	27,3	77,3	35,3	99,6	Oké
R16-hfd-kop_1	0,22	0,47	-0,26	1,6	21,0	38,7	80,8	47,9	96,9	Oké
R16-hfd-kop_1	0,39	0,89	-0,88	0,3	21,0	21,8	36,1	60,4	19,0	Oké
R16-hfd-kop_1	0,32	0,72	-0,63	0,2	21,0	28,9	38,2	75,5	12,5	Oké
R10_hsp-top_6	0,25	-0,18	-0,30	1,6	8,2	2,7	50,5	5,4	99,6	Oké
R10_hsp-top_6	0,19	-0,18	-0,10	1,6	8,2	10,4	73,0	14,2	99,5	Oké
R10_hsp-top_6	0,22	-0,18	-0,20	1,6	8,2	8,1	75,3	10,8	99,5	Oké
R10-bgl-lang_3	0,36	-0,78	-0,67	1,6	8,2	11,8	73,3	16,2	99,6	Oké
R10-bgl-lang_3	-0,36	0,07	-0,67	0,2	8,2	24,1	81,6	29,5	14,5	Oké
R10-bgl-lang_3	-0,36	0,78	-0,67	1,6	8,2	11,8	73,3	16,2	99,5	Oké
R10-bgl-lang_3	-0,36	0,21	-0,67	0,5	8,2	23,3	79,0	29,5	30,0	Oké
R22_Schieter_1	0,13	0,58	-0,78	1,6	39,6	47,8	80,7	59,2	99,5	Oké
R22_Schieter_1	0,13	-0,29	-0,78	1,5	39,6	60,7	80,3	75,6	92,1	Oké

Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R22_Schieter_1	0,13	0,00	-0,78	0,8	39,6	38,9	35,9	108,4	49,0	Oké
R22_Schieter_1	0,13	0,15	-0,78	1,4	39,6	43,1	39,7	108,4	86,3	Oké
R10_hsp-top_9	0,25	-0,01	-0,30	1,6	6,0	2,7	50,5	5,4	99,5	Oké
R10_hsp-top_9	0,19	-0,01	-0,10	0,9	6,0	8,5	59,5	14,2	54,4	Oké
R10_hsp-top_9	0,22	-0,01	-0,20	1,6	6,0	7,7	71,3	10,8	99,0	Oké

Aanhechtspanning grenswaarde - τ_b/f_{bd} [%]



Kracht controle waarde - F_{tot}/F_{lim} [%]



Verklaring

Symbool	Verklaring
f_{ck}	Karakteristieke cylindrische betondruksterkte bij 28 dagen
$f_{ctk,0.05}$	Karakteristieke treksterkte van beton 5% onderschrijdingskans
f_{ctm}	Gemiddelde axiale treksterkte van beton

Symbool	Verklaring
E_{cm}	Secant elasticiteitsmodulus van beton
ν	Poisson-factor
ε_c	Betondrukrek bij piekspanning fc
ε_{cu}	Uiterste drukrek in het beton
φ_{perm}	Uiteindelijke waarde van de kruipcoëfficiënt op het tijdsinterval (t0 = 28 dagen, tinf = ontwerplevensduur) voor permanente belasting
φ_{pres}	Uiteindelijke waarde van de kruipcoëfficiënt op het tijdsinterval (t0 = 28 dagen, tinf = ontwerplevensduur) voor voorspanbelasting
f_{yk}	Karakteristieke vloeisterkte van de wapening
E_s	Elasticiteitsmodulus van wapeningsstaal
ε_{uk}	Karakteristieke rek van de wapening of voorspanstaal bij de maximale belasting
Eigenschappen	W - Breedte; H - Hoogte; T - Dikte; D - Hoogte; L - Lengte; r - straal; α - Helling
Positie	M - Hoofd; MP - Master punt; IP - Voeg punt in
$\sigma_{c,eq}$	Equivalent principal stress Sigma c,eq, which expresses the equivalent uni-axial stress for a general tri-axial stress state.
ε_c	Minimale betondrukrek εc
ε_{pl}	Minimale plastische drukrek εpl van beton
$\sigma_{c,eq}/\sigma_{c,lim}$	De verhouding van de betonspanning en -sterkte. Het geeft het nivo van de uitnutting van het materiaal t.o.v. de sterkte van het beton weer.
σ_s	Maximale spanning langs de lengte van de wapeningstaaf.
ε_s	Maximale rek langs de lengte van de wapeningstaaf.
$\sigma_s/\sigma_{s,lim}$	De verhouding spanning en vloeisterkte van de wapening.
$\varepsilon_s/\varepsilon_{s,lim}$	De verhouding rek en grensrek van de wapening.
τ_b	Aanhechtspanning op het oppervlak van de wapeningstaaf
F_a	De kracht van de verankering. Het wordt ontwikkeld vanaf de staafeinden t.g.v. de verankering door de ribben op de wapeningstaaf.
F_{tot}	De totale kracht ontwikkeld langs de de volledige lengte van de wapeningstaaf. Het bestaat uit de ankerkracht t.g.v. de verankering door de ribben en de aanhechtkracht: de integratie van alle aanhechtspanning de op het wapeningsoppervlak werken.
F_{tot}/F_{lim}	De verhouding van de totale kracht in de staaf en de grenswaarde van de kracht. De grenswaarde van de kracht is berekend als het minimum van twee waardes: (a) de berekende kracht als de som van de uiterste ankerkracht en de kracht ontwikkeld vanaf het eind van de staaf tot het beschouwde punt met in achtname van volledige hechtsterkte, (b) de uiterste kracht van de staaf.
F_{lim}	De grenswaarde van de kracht. De grenswaarde van de kracht is berekend als het minimum van twee waarden: (a) de berekende kracht als de som van de uiterste ankerkracht en de kracht ontwikkeld vanaf het eind van de staaf tot het beschouwde punt met in achtname van volledige hechtsterkte, (b) de uiterste kracht van de staaf.
τ_b/f_{bd}	De verhouding van de aanhechtspanning en de uiterste aanhechtspanning is weergegeven voor de geselecteerde (groep van) staven en het toegepaste deel van de lat. Het toont het nivo van de uitnutting in verhouding tot de uiterste hechtsterkte tussen de wapeningstaaf en het omringende beton.

Norminstellingen

Artikel	Naam	Waarde	Omschrijving
2.4.2.4 (1)	γ_c	1,50	Materiaalfactor voor beton
2.4.2.4 (1)	γ_s	1,15	Materiaalfactor voor wapening
3.1.6 (1)	α_{cc}	1,00	Coëfficiënt die rekening houdt met de lange-termijn effecten van de drukspanning en het ongunstige effect van de manier waarop de belasting is toegepast.
3.2.7 (2)	$\varepsilon_{ud}/\varepsilon_{uk}$	0,90	Verhouding van de rekenwaarde en de karakteristiek rekgrens.

Artikel	Naam	Waarde	Omschrijving
3.2.7 (2)	$\varepsilon_{ud}/\varepsilon_{uk}$	0,90	Verhouding van de rekenwaarde en de karakteristiek rekgrens.
5.10.2.1(1)	k1	0,80	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk vóór de verankering.
5.10.2.1(1)	k2	0,90	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk vóór de verankering.
5.10.3(2)	k7	0,75	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk na het opspannen of na de overdracht
5.10.3(2)	k8	0,85	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk na het opspannen of na de overdracht
7.2(2)	k1	0,60	Coëfficiënt voor de berekening van de maximale drukspanning in beton tijdens BGT - karakteristieke combinatie
7.2(3)	k2	0,45	Coëfficiënt voor berekening van de spanning in het beton voor de BGT - quasi-blijvende combinatie
7.2(5)	k3	0,80	Coëfficiënt voor het berekenen van de maximale trekspanning in de wapening voor de BGT-karakteristieke combinatie
7.2(5)	k5	0,75	Coëfficiënt voor het berekenen van de maximale trekspanning in de spankabel voor de BGT-karakteristieke combinatie
8.3(2)	Φ m,min - Φs <= 16mm (1,00 Φs)	1,00	Minimale doorndiameter van de beugel als veelvoud van de beugeldiameter
8.3(2)	Φ m,min - Φs > 16mm (1,00 Φs)	1,00	Minimale doorndiameter van de beugel als veelvoud van de beugeldiameter

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Projectgegevens

Projectnaam	Capaciteit ankers KIJ-DIM
Projectnr.	Ankerstaven type C
Auteur	[redacted]
Omschrijving	Toetsing voetplaat
Datum	1-5-2025
Norm	EN

Berekening deel 1: toetsing van voetplaat en lassen

Let op: In deel 1 wordt enkel de voetplaat en zijn lassen getoetst. Toetsingen van de ankers en de poer worden met grotere nauwkeurigheid in deel 2 hertoetst.

Materiaal

Staal	S 235
Beton	C12/15

Projectonderdeel Ankerstaaf type C

Berekening

Naam	Ankerstaaf type C
Omschrijving	
Berekening	Spanning, rek/ lasten in evenwicht

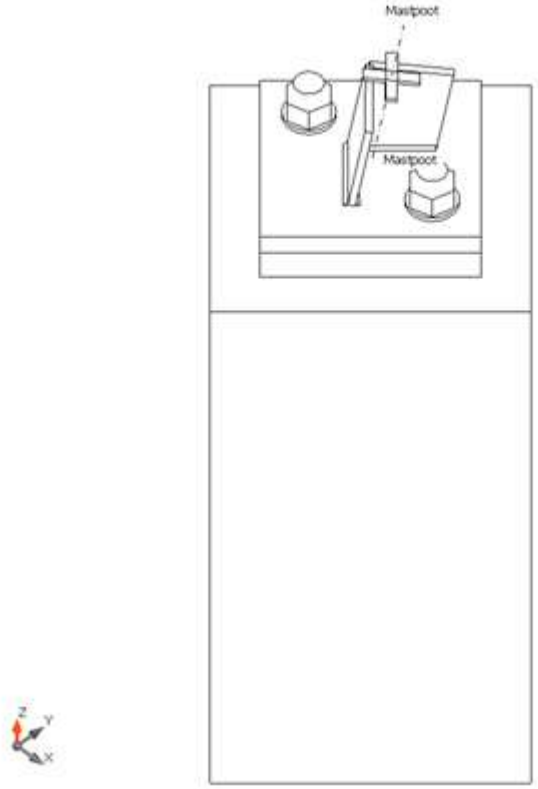
Elementen

Geometrie

Naam	Doorsnede	β – Richting [°]	γ - Rol [°]	α - Rotatie [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]
Mastpoot	1 - L180X16	0,0	78,6	45,0	0	0	0

Ondersteuningen en krachten

Naam	Ondersteuning	Krachten in	X [mm]
Mastpoot / einde	Mx-My-Mz	Knoop	0



Doorsneden

Naam	Materiaal
1 - L180X16	S 235

Ankers

Naam	Diameter [mm]	f_y [MPa]	f_u [MPa]	Bruto oppervlak [mm^2]
M64 4.6	64	240,0	400,0	3217

Lasteffecten (Krachten in evenwicht)

Naam	Staaf	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
+708kN trek	Mastpoot / Einde	708,0	0,0	0,0	0,0	0,0	0,0
-1000kN druk	Mastpoot / Einde	-1000,0	0,0	0,0	0,0	0,0	0,0

Ongebalanceerde krachten

Naam	X [kN]	Y [kN]	Z [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
+708kN trek	139,9	0,0	694,0	0,0	0,0	0,0
-1000kN druk	-197,7	0,0	-980,3	0,0	0,0	0,0

Fundatieblok

Onderdeel	Waarde	Eenheid
BB 1		
Maatvoering	650 x 650	mm
Hoogte	1350	mm
Anker	M64 4.6	
Verankeringslengte	1050	mm
Dwarskracht overdracht	Ankers	
Mortelvoeg	70	mm

Controle

Opsomming

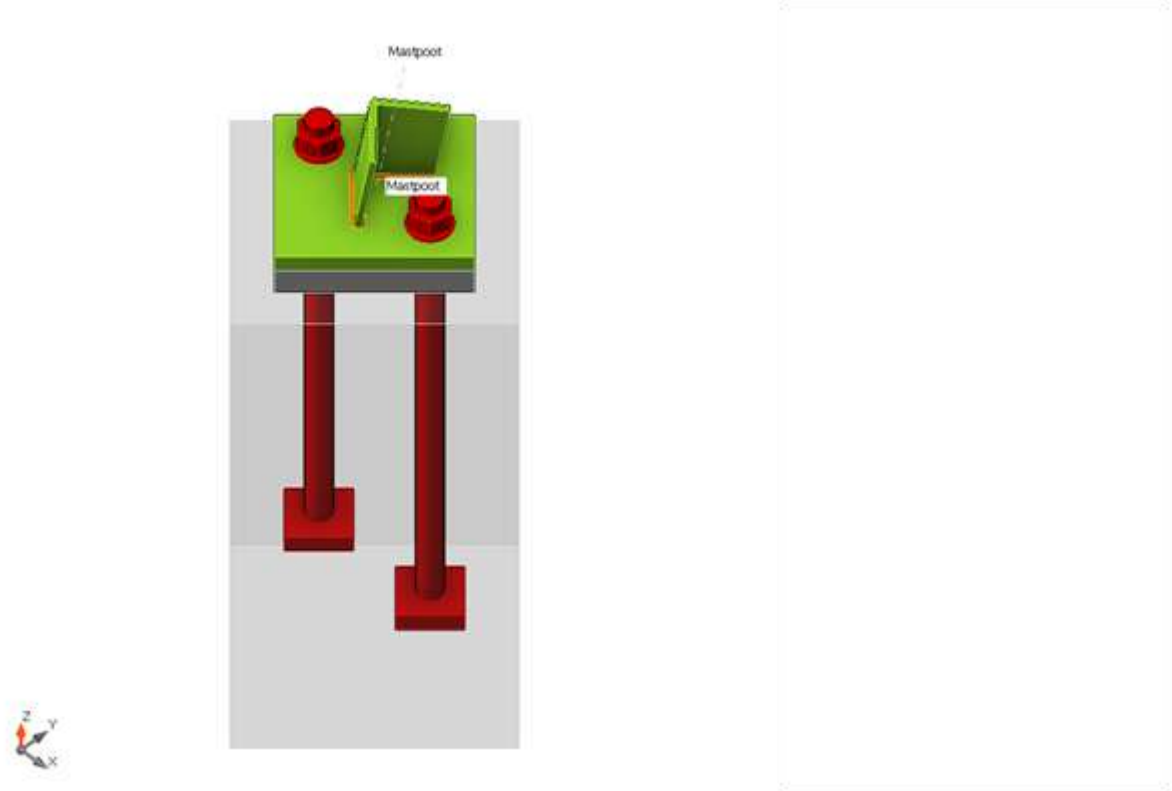
Naam	Waarde	Controle status
Berekening	100,0%	OK
Platen	0,1 < 5,0%	OK
Ankers	176,4 > 100%	**Niet Okay!**
Lassen	98,9 < 100%	OK
Betonpoer	85,9 < 100%	OK
Knik	Niet berekend	

Platen

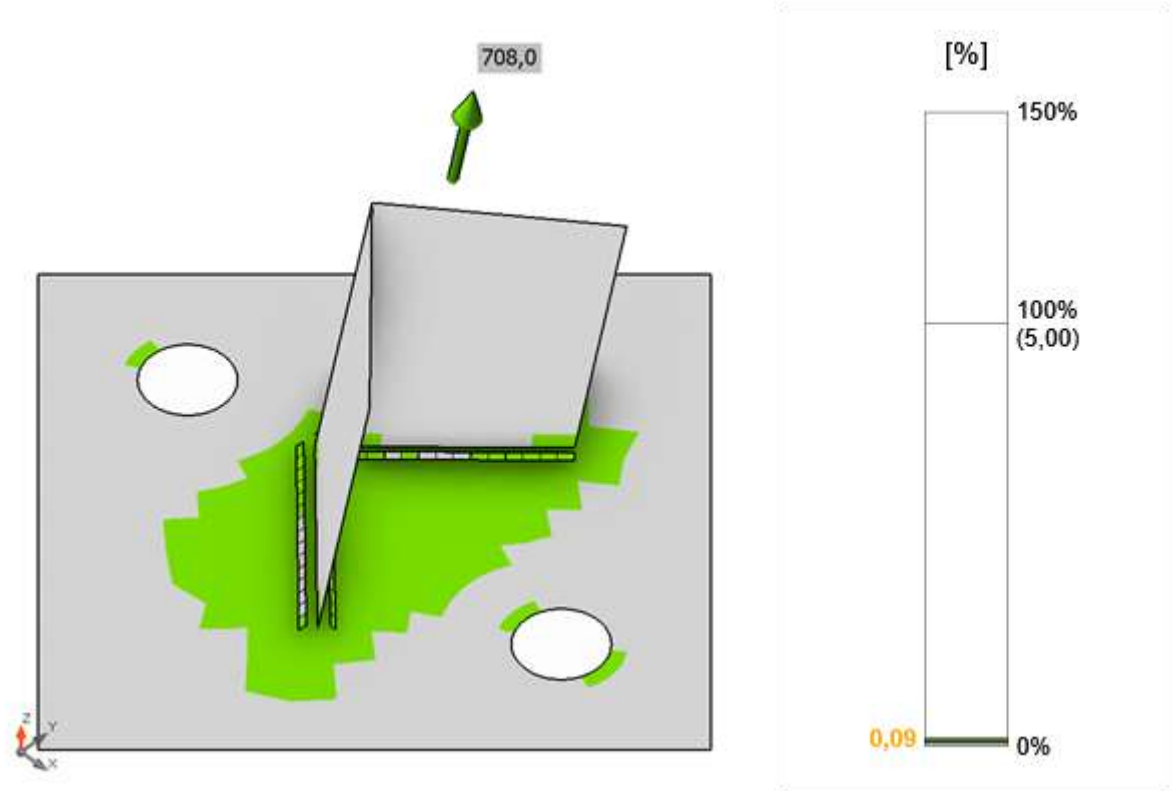
Naam	Materiaal	t_p [mm]	Lasten	σ_{Ed} [MPa]	ε_{Pl} [%]	$\sigma_{c,Ed}$ [MPa]	Status
Mastpoot-tfl 1	S 235	16,0	-1000kN druk	235,1	0,0	0,0	OK
Mastpoot-w 1	S 235	16,0	-1000kN druk	235,1	0,0	0,0	OK
Voetplaat	S 235 - 1	45,0	+708kN trek	215,2	0,1	0,0	OK

Ontwerpgegevens

Materiaal	f_y [MPa]	ε_{lim} [%]
S 235	235,0	5,0
S 235 - 1	215,0	5,0

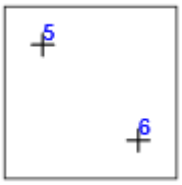


Complete controle, +708kN trek



Rekcontrole, +708kN trek

Ankers

Vorm	Onderdeel	Lasten	N_{Ed} [kN]	V_{Ed} [kN]	$N_{Rd,p}$ [kN]	$N_{Rd,cb}$ [kN]	$V_{Rd,s}$ [kN]	Ut_t [%]	Ut_s [%]	Ut_{ts} [%]	Status
	A5	+708kN trek	393,4	70,5	1040,4	269,4	0,0	146,0	22,4	176,4	Niet Okay!
	A6	+708kN trek	393,4	69,4	1040,4	269,4	0,0	146,0	22,0	176,4	Niet Okay!

Ontwerpgegevens

Kwaliteit	$N_{Rd,s}$ [kN]
M64 4.6 - 1	655,1

Lassen

Onderdeel	Rand	T_w [mm]	L [mm]	Lasten	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	$\sigma_{\perp}$ [MPa]	$\tau_{\perp}$ [MPa]	$\tau_{\parallel}$ [MPa]	Ut [%]	Ut_c [%]	Status
Voetplaat	Mastpoot-tfl 1	◢ 6,0 ◣	173	-1000kN druk	355,2	1,7	-189,4	-171,0	29,2	98,7	94,1	OK
		◢ 6,0 ◣	173	-1000kN druk	356,0	2,2	-162,8	181,1	-24,5	98,9	95,0	OK
Voetplaat	Mastpoot-w 1	◢ 6,0 ◣	173	-1000kN druk	356,0	2,2	-163,0	-181,2	23,2	98,9	95,0	OK
		◢ 6,0 ◣	173	-1000kN druk	355,2	1,6	-189,5	171,1	-28,0	98,7	94,1	OK

Ontwerpgegevens

Materiaal	f_u [MPa]	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	360,0	0,80	360,0	259,2

Betonpoer

Onderdeel	Lasten	c [mm]	A_{eff} [mm^2]	σ [MPa]	k_j [-]	f_{jd} [MPa]	Ut [%]	Status
BB 1	-1000kN druk	134	140155	7,0	1,52	8,1	85,9	OK

Knik

Knikberekening is niet uitgevoerd.

Materialenstaat

Vervaardigingshandelingen

Naam	Platen [mm]	Vorm	No.	Lassen [mm]	Lengte [mm]	Bouten	No.
Voetplaat	P45,0x450-450 (S 235)		1			M64 4.6	2
Las				Dubbele hoeklas: 6,0	347		

Verklaring symbool

Hoeklas	laskeeldoorsnede

Lassen

Type	Materiaal	Keeldoorsnede [mm]	Beengrootte [mm]	Lengte [mm]
Dubbele hoeklas	S 235	6,0	8,5	347

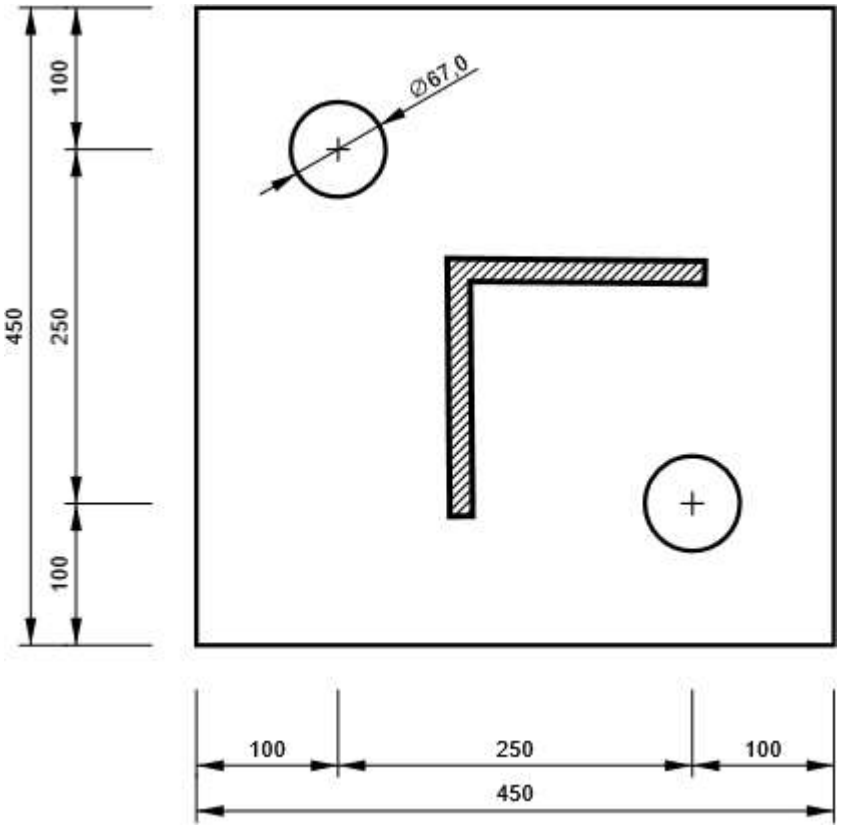
Ankers

Naam	Lengte [mm]	Boorlengte [mm]	Aantal
M64 4.6	1165	1050	2

Tekening

Voetplaat

P45,0x450-450 (S 235)



Norminstelling

Onderdeel	Waarde	Eenheid	Referentie
Veiligheidsfactor γ_{M0}	1,00	-	EN 1993-1-1: 6.1
Veiligheidsfactor γ_{M1}	1,00	-	EN 1993-1-1: 6.1
Veiligheidsfactor γ_{M2}	1,25	-	EN 1993-1-1: 6.1
Veiligheidsfactor γ_{M3}	1,25	-	EN 1993-1-8: 2.2
Veiligheidsfactor γ_{C}	1,50	-	EN 1992-1-1: 2.4.2.4
Veiligheidsfactor γ_{Inst}	1,20	-	EN 1992-4: Table 4.1
Verbindingscoëfficiënt βj	0,67	-	EN 1993-1-8: 6.2.5
Effectief oppervlak - coëfficiënt van max spanning	0,10	-	
Wrijvingscoëfficiënt - beton	0,25	-	EN 1993-1-8
Wrijvingscoëfficiënt slipweerstand	0,30	-	EN 1993-1-8 tab 3.7
Grenswaarde plastische rek	0,05	-	EN 1993-1-5
Detaillering	Nee		
Afstand tussen bouten [d]	2,20	-	EN 1993-1-8: tab 3.3
Afstand tussen bouten en de rand [d]	1,20	-	EN 1993-1-8: tab 3.3
Beton uitbreekweerstand	Geen		EN 1992-4: 7.2.1.4 and 7.2.2.5
Gebruik berekening αb in de stuikcontrole.	Ja		EN 1993-1-8: tab 3.4
Gescheurd beton	Ja		EN 1992-4
Controle lokale vervorming	Ja		CIDECT DG 1, 3 - 1.1
Grens lokale vervorming	0,03	-	CIDECT DG 1, 3 - 1.1
Geometrische niet-lineairiteit (GMNA)	Ja		Sta grote vervormingen van kokerdoorsnedes toe
Geschoord systeem	Nee		EN 1993-1-8: 5.2.2.5

Projectgegevens

Projectnaam	Opwaardering KIJ-DIM
Projectnr.	
Auteur	[redacted]
Omschrijving	Toetsing ankers type C
Datum	3-5-2025
Ontwerpnorm	EN

Berekening deel 2: Toetsing van ankers en betonpoer

Verankering Type D heeft 2*R65 rechte ankers (gemodelleerd als M64 4.6). De scope van het model is de opgetorte poer en een snede uit de onderliggende balk.

Wapening en beton opstort is volgens beschikbare asset data gemodelleerd.

Er betonkwaliteit van C12/15 gehanteerd in plaats van C13/16. Dit is gedaan door beperkingen van de software en de minimale impact op de resultaten.

De anker eindes zijn zonder eindhaak gemodelleerd omdat deze niet zal voldoen aan huidige verankeringsvereisten. De schieters zijn dus niet mechanisch verbonden aan elkaar.

De gemodelleerde poer is verankerd aan de snede van de balklaag, waarbij een fictieve 150MN/m/paal is teruggerekend naar het totale oppervlakte van snedes. Ingevoerde krachten zijn op basis van voorlopige berekeningen. De definitieve krachten zijn middels een factor bij de belastingcombinaties gewijzigd.

Materialen

Beton

Naam	f_{ck} [MPa]	$f_{ctk,0.05}$ [MPa]	f_{ctm} [MPa]	E_{cm} [MPa]	ν [-]	φ_{perm}	φ_{pres}
C12/15	12,0	1,1	1,6	27085,2	0,20	2,5	2,5
	ε_{c2} = 20,0 1e-4, ε_{cu2} = 500,0 1e-4, Type diagram: Parabolisch φ_{perm}: 2,50 φ_{pres}: 2,50						

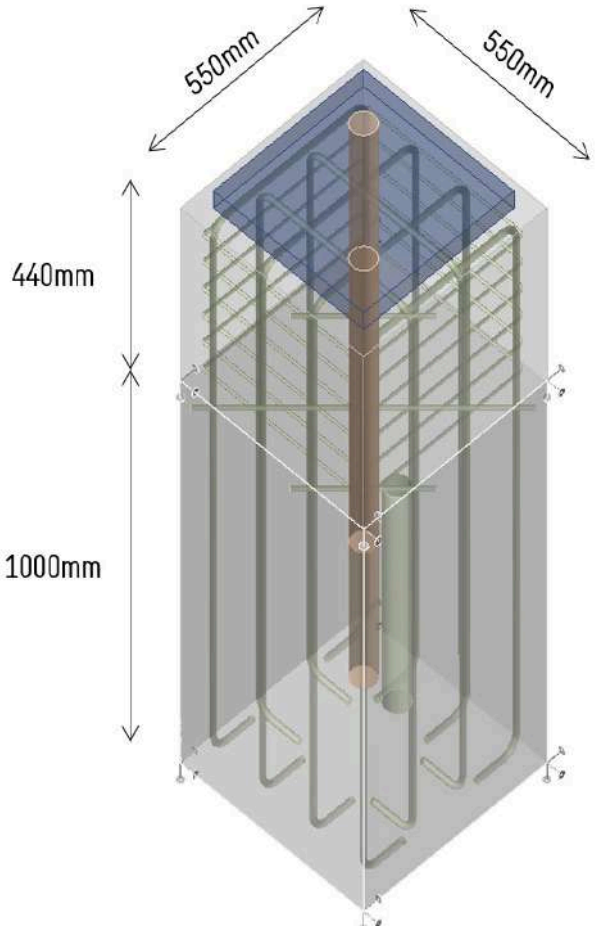
Wapening

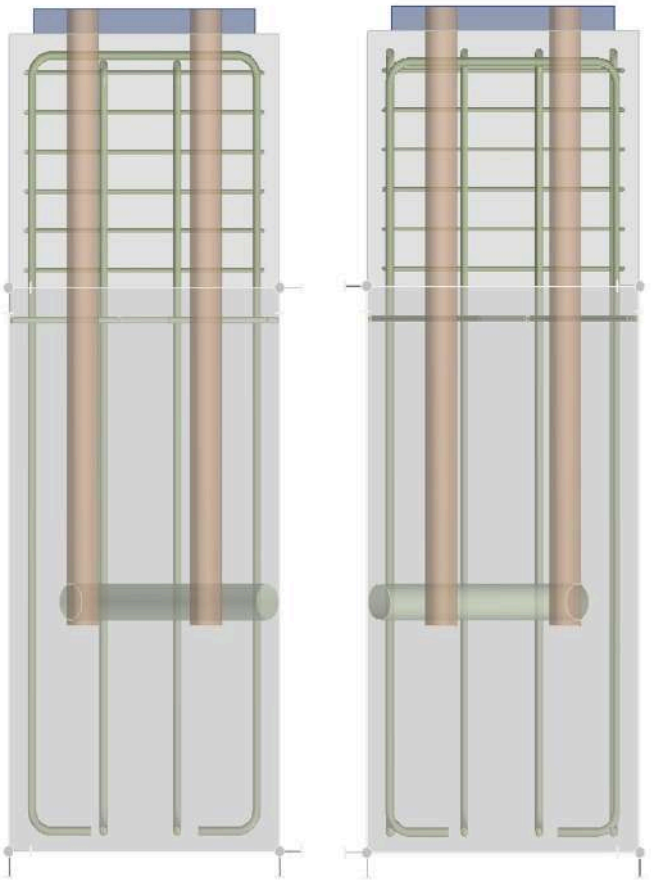
Naam	f_{yk} [MPa]	k [-]	E_s [MPa]	Eenheid massa [kg/m^3]	ε_{uk} [1e-4]	Oppervlak
B 400B	400,0	1,08	200000,0	7850	500,0	Geribd
	ε_{st} = 500,0 1e-4, ε_{sc} = 500,0 1e-4,					

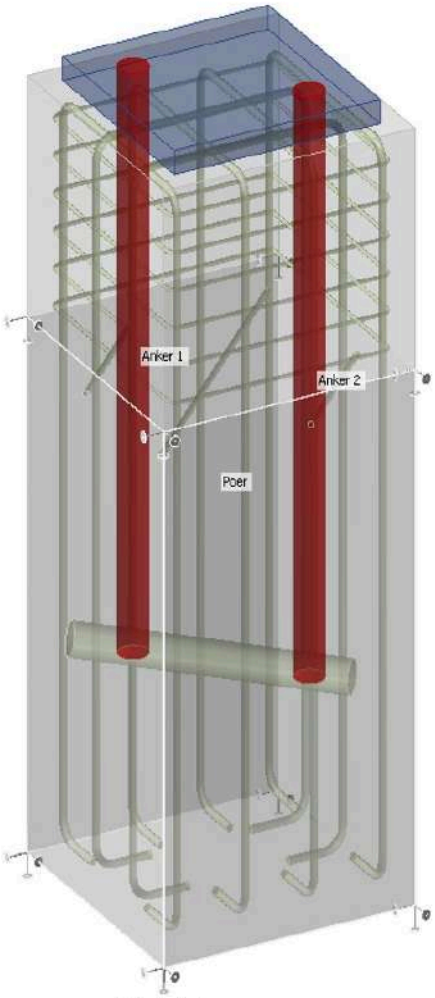
Staal

Naam	E [MPa]
S 235	210000,0

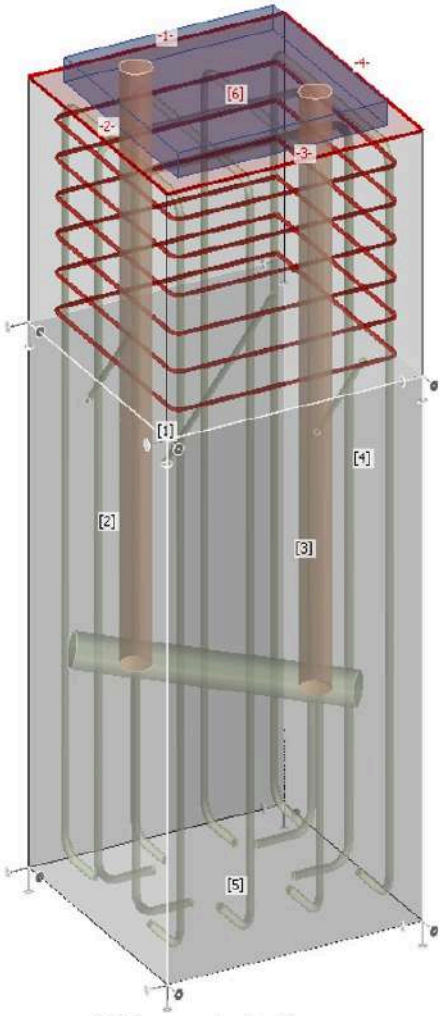
Anker type C



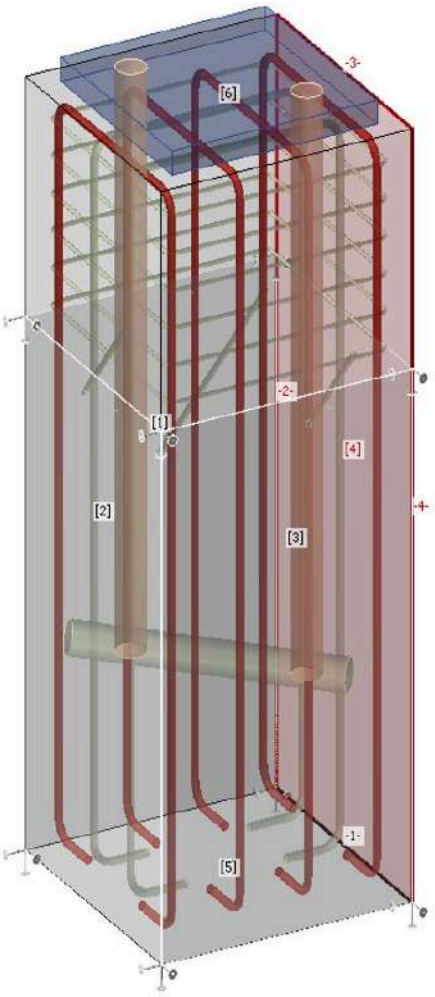




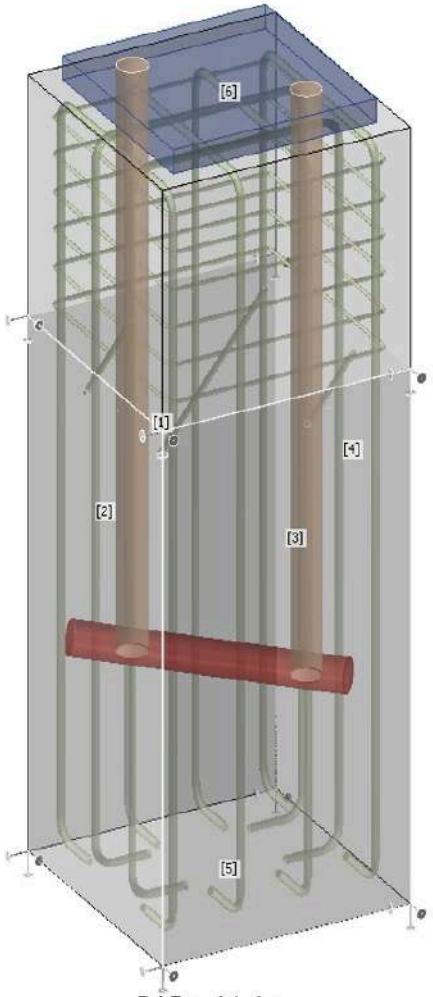
R64 Ankers



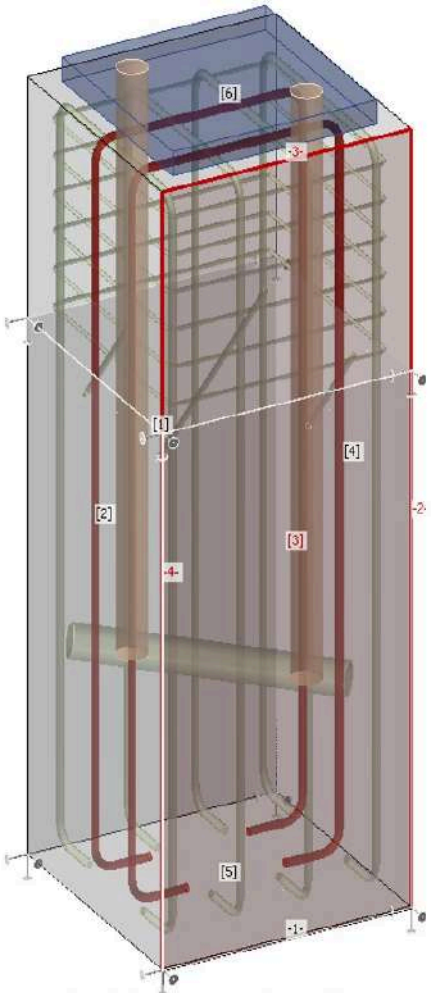
R8 beugels (bgl)



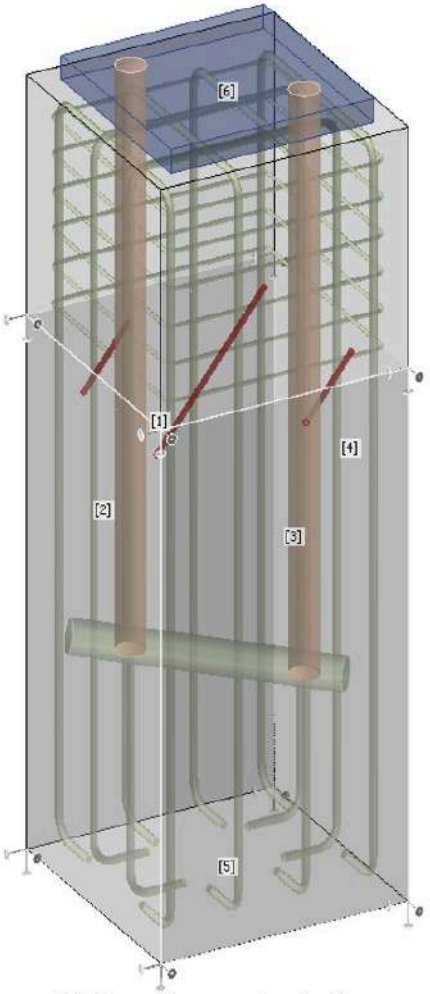
R16 hoofdwapening (hfd)



R65 schieter



R16 flankwapening (flk)



R16 hoofdwapening balk (hfd-balk)

Geometrie

Overzicht tabel

Naam	Type	Eigenschappen	Positie
Poer	Betonpoer	Vorm: Algemeen; H: 1,45 m; Materiaal: C12/15	X: 0,00 m; Y: 0,00 m; Z: -1,44 m
Voetplaat	Voetplaat	W: 0,30 m; T: 0,05 m; D: 0,30 m; Materiaal: S 235; : Belasting; Overdracht van dwarskrachten: Ankers	M: Poer, Rand 0, Oppervlak 5; X: 0,00 m; Y: 0,00 m
Zijde 1	Oppervlakteondersteuning	X: 4 MN/m2; Y: 4 MN/m2; Z: 40 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 1; Geometrisch type: Polylijn
Zijde 2	Oppervlakteondersteuning	X: 4 MN/m2; Y: 4 MN/m2; Z: 40 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 2; Geometrisch type: Polylijn
Zijde 3	Oppervlakteondersteuning	X: 4 MN/m2; Y: 4 MN/m2; Z: 40 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 3; Geometrisch type: Polylijn
Zijde 4	Oppervlakteondersteuning	X: 4 MN/m2; Y: 4 MN/m2; Z: 40 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 4; Geometrisch type: Polylijn
Zijde 5	Oppervlakteondersteuning	X: 4 MN/m2; Y: 4 MN/m2; Z: 40 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 5; Geometrisch type: Polylijn
Anker 1	Verankering - Belasting	L1: 0,05 m; L2: 1,05 m; Φ: 64 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,40 m
Anker 2	Verankering - Belasting	L1: 0,05 m; L2: 1,05 m; Φ: 64 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,15 m

Lasten

Combinaties

Naam	Type	Inhoud
Trekkracht	ULS	1,18*+600kN
Drukkracht	ULS	-1000kN

Resultaten

Opsomming

Overzicht tabel

Controle deel	Combinaties	Toename	Onderdeel	
UGT	Trekkracht	G100,0%	Sterkte van het beton	✓

Controle deel	Onderdeel	Uitnutting	
Sterkte van het beton	Poer	σc/σc,lim: 99,6%	✓
Sterkte van de wapening		εs/εs,lim: 91,2%, σs/σs,lim: 99,3%	✓
Verankeringslengte		τb/fbd: 102,0%	✓

UGT - Opsomming

Verloop van de spanningen

Boven vloeispanning	Druk	Verklaringen
		Dikte in verhouding tot de kracht

Opsomming van de reactiekrachten en de toegepaste lasten: Trekkracht, Lastincrement: G100,0%

Type	F_x [kN]	F_y [kN]	F_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Opsommingen van de reacties	-134,1	0,0	-665,1	10,2	55,5	8,2
Opsomming van de toegepaste lasten	134,1	0,0	665,1	-2,6	1,4	-9,5
Controleer evenwicht	0,0	0,0	0,0	7,7	56,9	-1,3

UGT - Sterkte

Gedetailleerde resultaten van de betonsterktes: Trekkracht, Lastincrement: G100,0%

Staaf	X [m]	Y [m]	Z [m]	$\sigma_{c,eq}$ [MPa]	$\sigma_{c,3}/\sigma_{c,lim}$ [-]	ε_c [1e-4]	ε_{pl} [1e-4]	$\sigma_{c,eq}/\sigma_{c,lim}$ [%]	
Poer	-0,28	0,09	0,01	-8,0	100,0	-91,9	-82,9	99,6	Oké
Poer	-0,28	0,09	0,01	-9,4	217,4	-106,7	-89,6	99,6	Oké
Poer	-0,28	0,09	0,01	-10,0	224,9	-47,6	-30,1	99,5	Oké
Poer	-0,28	0,09	0,01	-7,9	100,0	-19,2	-9,3	98,5	Oké
Poer	-0,28	0,09	0,01	-7,8	100,0	-16,9	-9,0	97,9	Oké
Poer	-0,28	0,09	0,01	-1,5	100,0	-1,9	0,0	18,6	Oké
Poer	-0,28	0,09	0,01	0,0	100,0	1,0	0,0	0,0	Oké

Gedetailleerde resultaten van de wapeningsterkte: Trekkracht, Lastincrement: G100,0%

Staaf	X [m]	Y [m]	Z [m]	σ_s [MPa]	ε_s [1e-4]	$\sigma_s/\sigma_{s,lim}$ [%]	$\varepsilon_s/\varepsilon_{s,lim}$ [%]	
R8-bgl_1-6	-0,13	0,24	-0,41	372,9	115,2	99,3	91,2	Oké
R16-hfd_1-4	-0,23	-0,23	-0,52	365,5	154,5	97,3	61,7	Oké
R16-flk_1-2	-0,23	-0,07	-0,71	353,6	60,7	94,1	26,3	Oké
Anker 2	0,13	-0,13	-0,08	175,4	7,4	50,4	1,6	Oké
R12-hfd-balk_3	-0,08	-0,06	-0,50	158,2	2,1	42,1	3,2	Oké
Anker 1	-0,13	0,13	-0,08	138,4	5,6	39,8	1,2	Oké
R12-hfd-balk_2	-0,22	0,11	-0,50	64,7	0,3	17,2	0,5	Oké
R12-hfd-balk_1	0,11	-0,22	-0,50	64,4	0,3	17,1	0,5	Oké
R65-schieter_1	-0,08	-0,02	-1,00	15,4	0,1	4,1	0,1	Oké

Wapening rek/grens verhouding - $\varepsilon_s/\varepsilon_{s,lim}$ [%]

Wapening spanning/sterkte verhouding - $\sigma_s/\sigma_{s,lim}$ [%]

UGT - Verankering

Gedetailleerde resultaten van de verankering - Wapening: Trekkracht, Lastincrement: G100,0%

Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R12-hfd-balk_3	-0,27	-0,25	-0,50	1,7	0,0	2,9	51,6	5,7	102,0	Oké
R12-hfd-balk_3	-0,08	-0,06	-0,50	1,4	0,0	17,9	78,6	22,8	83,0	Oké
R12-hfd-balk_3	0,19	0,21	-0,50	1,6	0,0	2,9	50,8	5,7	99,6	Oké
R12-hfd-balk_3	-0,14	-0,12	-0,50	1,6	0,0	14,4	84,2	17,1	99,6	Oké
R12-hfd-balk_3	-0,01	0,01	-0,50	1,3	0,0	16,0	70,1	22,8	79,7	Oké
R12-hfd-balk_2	-0,27	0,05	-0,50	1,7	0,0	2,5	51,3	4,8	100,8	Oké
R12-hfd-balk_2	-0,22	0,11	-0,50	1,7	0,0	7,3	75,9	9,6	100,0	Oké
R12-hfd-balk_2	-0,11	0,22	-0,50	1,6	0,0	2,5	50,9	4,8	99,6	Oké
R12-hfd-balk_1	0,05	-0,27	-0,50	1,7	0,0	2,5	51,0	4,8	100,0	Oké
R12-hfd-balk_1	0,11	-0,22	-0,50	1,6	0,0	7,3	75,6	9,6	99,7	Oké
R12-hfd-balk_1	0,22	-0,11	-0,50	1,6	0,0	2,4	50,8	4,8	99,5	Oké
R16-flk_1-2	-0,23	0,08	-1,41	1,6	21,0	24,6	82,2	30,0	99,9	Oké
R16-flk_1-2	-0,23	-0,07	-0,71	0,1	21,0	71,1	94,1	75,5	6,0	Oké
R16-flk_1-2	0,23	0,08	-0,18	0,6	21,0	13,4	17,7	75,5	35,9	Oké
R16-flk_1-2	0,23	-0,07	-0,79	0,2	21,0	26,4	35,0	75,5	15,1	Oké
R16-hfd_1-4	-0,23	-0,23	-1,32	1,6	21,0	32,1	85,6	37,5	99,8	Oké
R16-hfd_1-4	-0,23	-0,23	-0,52	0,1	21,0	73,5	97,3	75,5	6,8	Oké
R16-hfd_1-4	0,22	0,20	-0,03	0,4	21,0	9,3	12,3	75,5	32,6	Oké
R16-hfd_1-4	0,22	0,23	-0,79	1,6	21,0	42,5	56,2	75,5	99,5	Oké
R8-bgl_1-6	0,24	0,24	-0,41	1,6	5,2	7,2	75,4	9,5	99,7	Oké
R8-bgl_1-6	-0,13	0,24	-0,41	1,3	5,2	18,7	99,3	18,9	77,5	Oké
R8-bgl_1-6	-0,24	-0,04	-0,06	1,1	5,2	1,4	7,7	18,9	99,0	Oké
R8-bgl_1-6	-0,13	0,24	-0,06	1,1	5,2	11,7	61,8	18,9	99,0	Oké
R65-schieter_1	-0,25	0,15	-1,00	1,1	1,2	10,2	56,5	18,1	99,3	Oké
R65-schieter_1	-0,08	-0,02	-1,00	0,2	1,2	51,1	70,7	72,3	21,5	Oké
R65-schieter_1	0,09	-0,19	-1,00	1,1	1,2	10,2	56,4	18,1	99,0	Oké
R65-schieter_1	-0,14	0,04	-1,00	1,1	1,2	46,4	85,5	54,2	98,9	Oké
Anker 1	-0,13	0,13	-1,04	8,0	433,3	70,7	50,3	140,6	99,9	Oké
Anker 1	-0,13	0,13	-0,08	7,5	433,3	445,1	39,8	1119,0	94,0	Oké
Anker 1	-0,13	0,13	-1,04	8,0	433,3	70,7	50,3	140,6	99,9	Oké
Anker 1	-0,13	0,13	-0,08	7,5	433,3	445,1	39,8	1119,0	94,0	Oké

Aanhechtspanning grenswaarde - τ_b/f_{bd} [%]

Kracht controle waarde - F_{tot}/F_{lim} [%]

Verklaring

Symbool	Verklaring
f_{ck}	Karakteristieke cylindrische betondruksterkte bij 28 dagen
$f_{ctk,0.05}$	Karakteristieke treksterkte van beton 5% onderschrijdingskans
f_{ctm}	Gemiddelde axiale treksterkte van beton
E_{cm}	Secant elasticiteitsmodulus van beton
ν	Poisson-factor
ε_c	Betondrukrek bij piekspanning fc
ε_{cu}	Uiterste drukrek in het beton
φ_{perm}	Uiteindelijke waarde van de kruipcoëfficiënt op het tijdsinterval (t0 = 28 dagen, tinf = ontwerplevensduur) voor permanente belasting

Symbool	Verklaring
φ_{pres}	Uiteindelijke waarde van de kruipcoëfficiënt op het tijdsinterval (t0 = 28 dagen, tinf = ontwerplevensduur) voor voorspanbelasting
f_{yk}	Karakteristieke vloeisterkte van de wapening
E_s	Elasticiteitsmodulus van wapeningsstaal
ε_{uk}	Karakteristieke rek van de wapening of voorspanstaal bij de maximale belasting
Eigenschappen	W - Breedte; H - Hoogte; T - Dikte; D - Hoogte; L - Lengte; r - straal; α - Helling
Positie	M - Hoofd; MP - Master punt; IP - Voeg punt in
$\sigma_{c,eq}$	Equivalent principal stress Sigma c,eq, which expresses the equivalent uni-axial stress for a general tri-axial stress state.
ε_c	Minimale betondrukrek εc
ε_{pl}	Minimale plastische drukrek εpl van beton
$\sigma_{c,eq}/\sigma_{c,lim}$	De verhouding van de betonspanning en -sterkte. Het geeft het nivo van de uitnutting van het materiaal t.o.v. de sterkte van het beton weer.
σ_s	Maximale spanning langs de lengte van de wapeningstaaf.
ε_s	Maximale rek langs de lengte van de wapeningstaaf.
$\sigma_s/\sigma_{s,lim}$	De verhouding spanning en vloeisterkte van de wapening.
$\varepsilon_s/\varepsilon_{s,lim}$	De verhouding rek en grensrek van de wapening.
τ_b	Aanhechtspanning op het oppervlak van de wapeningstaaf
F_a	De kracht van de verankering. Het wordt ontwikkeld vanaf de staafeinden t.g.v. de verankering door de ribben op de wapeningstaaf.
F_{tot}	De totale kracht ontwikkeld langs de de volledige lengte van de wapeningstaaf. Het bestaat uit de ankerkracht t.g.v. de verankering door de ribben en de aanhechtkracht: de integratie van alle aanhechtspanning de op het wapeningsoppervlak werken.
F_{tot}/F_{lim}	De verhouding van de totale kracht in de staaf en de grenswaarde van de kracht. De grenswaarde van de kracht is berekend als het minimum van twee waardes: (a) de berekende kracht als de som van de uiterste ankerkracht en de kracht ontwikkeld vanaf het eind van de staaf tot het beschouwde punt met in achtname van volledige hechtsterkte, (b) de uiterste kracht van de staaf.
F_{lim}	De grenswaarde van de kracht. De grenswaarde van de kracht is berekend als het minimum van twee waarden: (a) de berekende kracht als de som van de uiterste ankerkracht en de kracht ontwikkeld vanaf het eind van de staaf tot het beschouwde punt met in achtname van volledige hechtsterkte, (b) de uiterste kracht van de staaf.
τ_b/f_{bd}	De verhouding van de aanhechtspanning en de uiterste aanhechtspanning is weergegeven voor de geselecteerde (groep van) staven en het toegepaste deel van de lat. Het toont het nivo van de uitnutting in verhouding tot de uiterste hechtsterkte tussen de wapeningstaaf en het omringende beton.

Norminstellingen

Artikel	Naam	Waarde	Omschrijving
2.4.2.4 (1)	γ_c	1,50	Materiaalfactor voor beton
2.4.2.4 (1)	γ_s	1,15	Materiaalfactor voor wapening
3.1.6 (1)	α_{cc}	1,00	Coëfficiënt die rekening houdt met de lange-termijn effecten van de drukspanning en het ongunstige effect van de manier waarop de belasting is toegepast.
3.2.7 (2)	$\varepsilon_{ud}/\varepsilon_{uk}$	0,90	Verhouding van de rekenwaarde en de karakteristiek rekgrens.
3.2.7 (2)	$\varepsilon_{ud}/\varepsilon_{uk}$	0,90	Verhouding van de rekenwaarde en de karakteristiek rekgrens.
5.10.2.1(1)	k1	0,80	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk vóór de verankering.
5.10.2.1(1)	k2	0,90	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk vóór de verankering.
5.10.3(2)	k7	0,75	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk na het opspannen of na de overdracht

Artikel	Naam	Waarde	Omschrijving
5.10.3(2)	k8	0,85	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk na het opspannen of na de overdracht
7.2(2)	k1	0,60	Coëfficiënt voor de berekening van de maximale drukspanning in beton tijdens BGT - karakteristieke combinatie
7.2(3)	k2	0,45	Coëfficiënt voor berekening van de spanning in het beton voor de BGT - quasi-blijvende combinatie
7.2(5)	k3	0,80	Coëfficiënt voor het berekenen van de maximale trekspanning in de wapening voor de BGT-karakteristieke combinatie
7.2(5)	k5	0,75	Coëfficiënt voor het berekenen van de maximale trekspanning in de spankabel voor de BGT-karakteristieke combinatie
8.3(2)	Φ m,min - Φs <= 16mm (4,00 Φs)	4,00	Minimale doorndiameter van de beugel als veelvoud van de beugeldiameter
8.3(2)	Φ m,min - Φs > 16mm (1,00 Φs)	1,00	Minimale doorndiameter van de beugel als veelvoud van de beugeldiameter

Berekening aannames

- Minimale hoeveelheid wapening die tenminste de trekspanning opneemt, moet worden aangebracht in de gescheurde zones.
- Er wordt aangenomen dat een dwarsstaaf of voldoende overlap is toegepast om de volledige verankering van de beugels te verkrijgen.
- De berekening en de normcontrole worden uitgevoerd voor oplegsituaties zoals aangegeven in het project. Er worden geen wijzigingen van de opleggingen in bouw-/gebruiksfases beschouwd.

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Projectgegevens

Projectnaam	Anker capaciteit berekeningen KIJ-DIM
Projectnr.	Ankerstaven type D
Auteur	[redacted]
Omschrijving	Toetsing voetplaat
Datum	1-5-2025
Norm	EN

Berekening deel 1: toetsing van voetplaat en lassen

Let op: In deel 1 wordt enkel de voetplaat en zijn lassen getoetst. Toetsingen van de ankers en de poer worden met grotere nauwkeurigheid in deel 2 hertoetst.

Materiaal

Staal	S 235
Beton	C12/15

Projectonderdeel Ankerstaaf type D

Berekening

Naam	Ankerstaaf type D
Omschrijving	
Berekening	Spanning, rek/ gesimplificeerde belasting

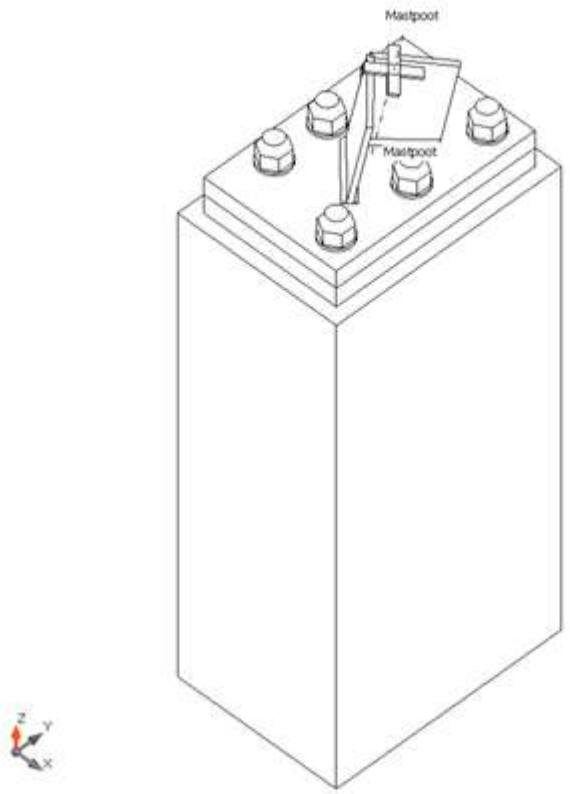
Elementen

Geometrie

Naam	Doorsnede	β – Richting [°]	γ - Rol [°]	α - Rotatie [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]
Mastpoot	1 - L250X18	0,0	77,5	45,0	0	0	0

Ondersteuningen en krachten

Naam	Ondersteuning	Krachten in	X [mm]
Mastpoot / einde	Mx-My-Mz	Knoop	0



Doorsneden

Naam	Materiaal
1 - L250X18	S 235

Ankers

Naam	Diameter [mm]	f_y [MPa]	f_u [MPa]	Bruto oppervlak [mm^2]
M64 4.6	64	240,0	400,0	3217

Lasteffecten (Evenwicht is niet noodzakelijk)

Naam	Staaf	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
BG1	Mastpoot / Einde	1250,0	0,0	0,0	0,0	0,0	0,0
BG2	Mastpoot / Einde	-2000,0	0,0	0,0	0,0	0,0	0,0

Fundatieblok

Onderdeel	Waarde	Eenheid
BB 1		
Maatvoering	600 x 850	mm
Hoogte	1750	mm
Anker	M64 4.6	
Verankeringslengte	1500	mm
Dwarskracht overdracht	Ankers	
Mortelvoeg	70	mm

Controle

Opsomming

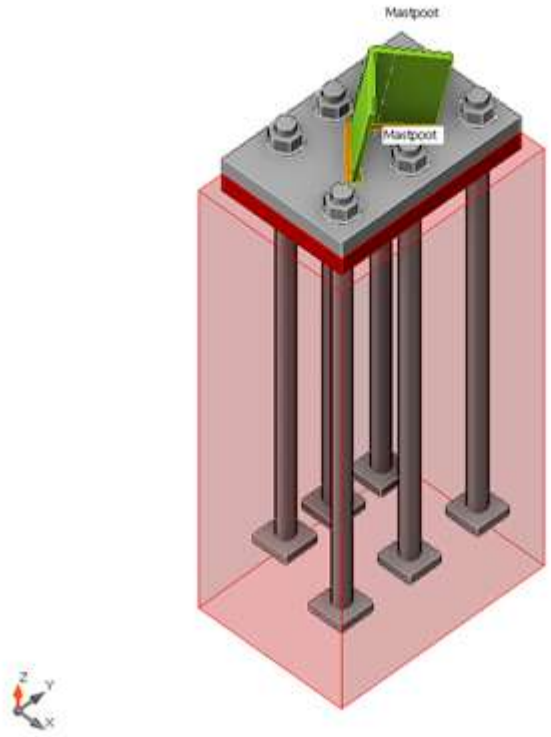
Naam	Waarde	Controle status
Berekening	100,0%	OK
Platen	0,4 < 5,0%	OK
Ankers	149,6 > 100%	**Niet Okay!**
Lassen	98,2 < 100%	OK
Betonpoer	112,0 > 100%	**Niet Okay!**
Knik	Niet berekend	

Platen

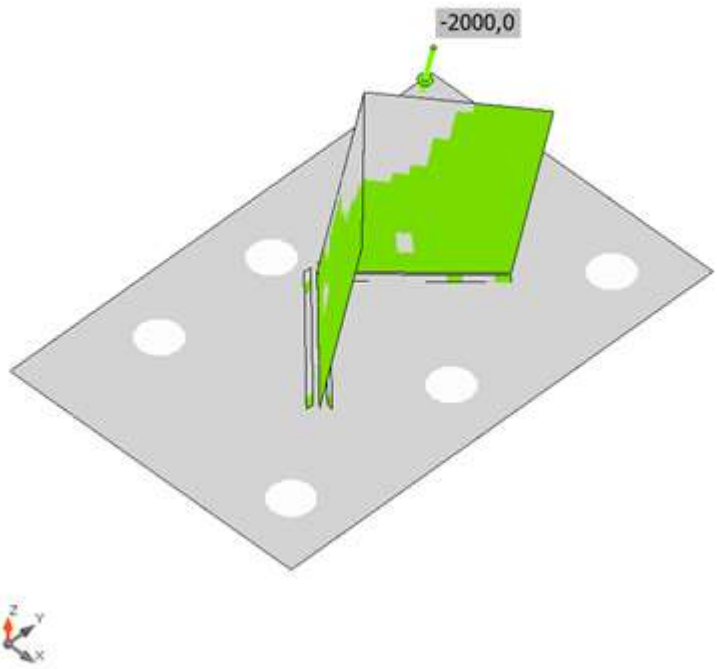
Naam	Materiaal	t_p [mm]	Lasten	σ_{Ed} [MPa]	ε_{Pl} [%]	$\sigma_{c,Ed}$ [MPa]	Status
Mastpoot-tfl 1	S 235	18,0	BG2	235,9	0,4	0,0	OK
Mastpoot-w 1	S 235	18,0	BG2	235,9	0,4	0,0	OK
Voetplaat	S 235 - 1	65,0	BG2	173,8	0,0	0,0	OK

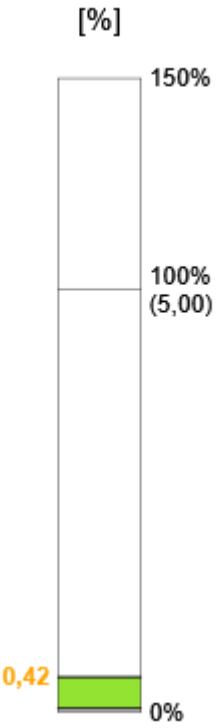
Ontwerpgegevens

Materiaal	f_y [MPa]	ε_{lim} [%]
S 235	235,0	5,0
S 235 - 1	215,0	5,0



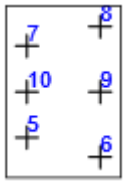
Complete controle, BG2





Rekcontrole, BG2

Ankers

Vorm	Onderdeel	Lasten	N_{Ed} [kN]	V_{Ed} [kN]	$N_{Rd,p}$ [kN]	$N_{Rd,cb}$ [kN]	$V_{Rd,s}$ [kN]	Ut_t [%]	Ut_s [%]	Ut_{ts} [%]	Status
	A5	BG1	158,4	44,6	750,4	570,8	0,0	108,2	14,2	112,5	Niet Okay!
	A6	BG1	134,9	43,2	750,4	476,6	0,0	130,8	13,7	149,6	Niet Okay!
	A7	BG1	158,4	44,6	750,4	570,8	0,0	108,2	14,2	112,5	Niet Okay!
	A8	BG1	134,9	43,2	750,4	476,6	0,0	130,8	13,7	149,6	Niet Okay!
	A9	BG1	353,6	47,4	750,4	476,6	0,0	130,8	15,0	149,6	Niet Okay!
	A10	BG1	300,8	47,5	750,4	570,8	0,0	108,2	15,1	112,5	Niet Okay!

Ontwerpgegevens

Kwaliteit	$N_{Rd,s}$ [kN]
M64 4.6 - 1	655,1

Lassen

Onderdeel	Rand	T_w [mm]	L [mm]	Lasten	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	$\sigma_{\perp}$ [MPa]	$\tau_{\perp}$ [MPa]	$\tau_{\parallel}$ [MPa]	Ut [%]	Ut_c [%]	Status
Voetplaat	Mastpoot-tfl 1	◢ 10,0 ◣	243	BG2	352,9	0,0	-186,0	-154,0	79,1	98,0	78,5	OK
		◢ 10,0 ◣	243	BG2	353,6	0,5	-115,5	158,7	109,7	98,2	88,0	OK
Voetplaat	Mastpoot-w 1	◢ 10,0 ◣	243	BG2	353,6	0,5	-115,1	-158,3	-110,5	98,2	88,0	OK
		◢ 10,0 ◣	243	BG2	352,9	0,0	-186,3	154,1	-78,5	98,0	78,5	OK

Ontwerpgegevens

Materiaal	f_u [MPa]	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	360,0	0,80	360,0	259,2

Betonpoer

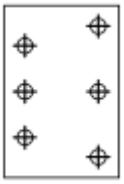
Onderdeel	Lasten	c [mm]	A_{eff} [mm^2]	σ [MPa]	k_j [-]	f_{jd} [MPa]	Ut [%]	Status
BB 1	BG2	216	268967	7,3	1,21	6,5	112,0	Niet Okay!

Knik

Knikberekening is niet uitgevoerd.

Materialenstaat

Vervaardigingshandelingen

Naam	Platen [mm]	Vorm	No.	Lassen [mm]	Lengte [mm]	Bouten	No.
Voetplaat	P65,0x500-750 (S 235)		1			M64 4.6	6
Las				Dubbele hoeklas: 10,0	488		

Verklaring symbool

Hoeklas	laskeeldoorsnede

Lassen

Type	Materiaal	Keeldoorsnede [mm]	Beengrootte [mm]	Lengte [mm]
Dubbele hoeklas	S 235	10,0	14,1	488

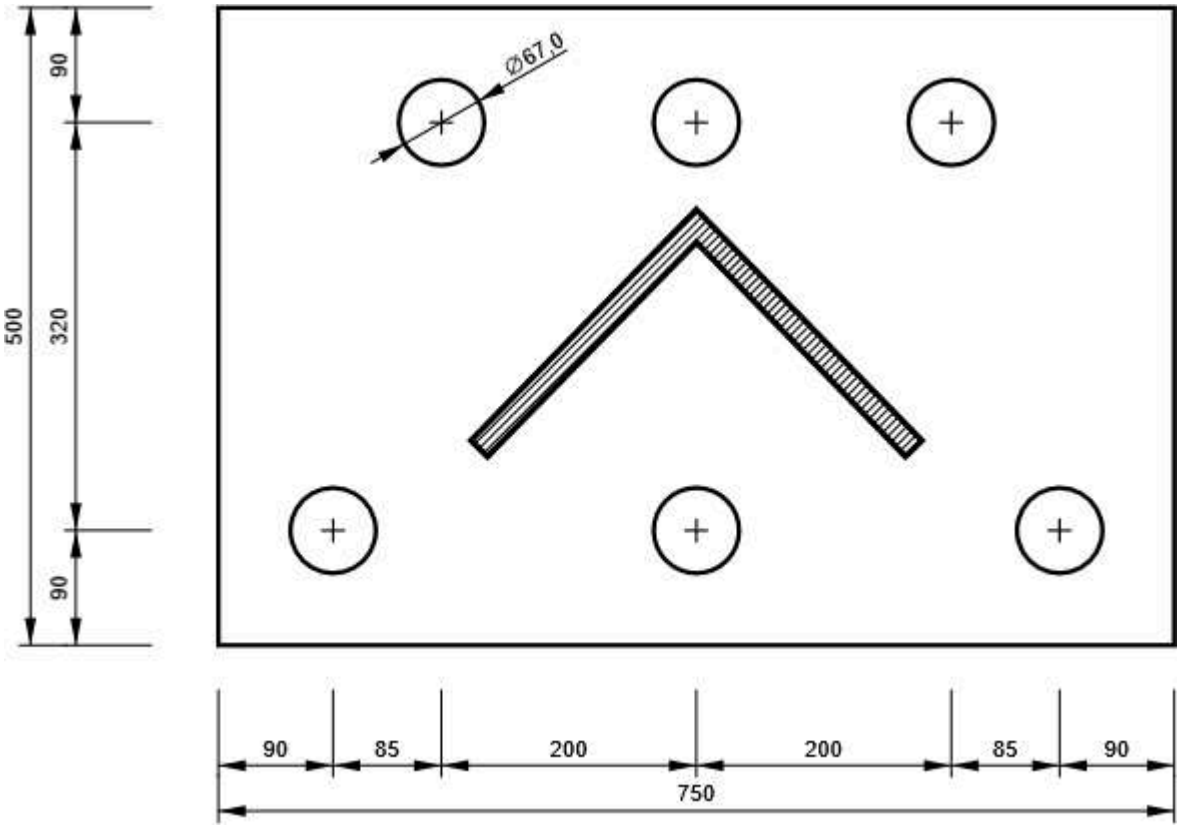
Ankers

Naam	Lengte [mm]	Boorlengte [mm]	Aantal
M64 4.6	1635	1500	6

Tekening

Voetplaat

P65,0x750-500 (S 235)



Norminstelling

Onderdeel	Waarde	Eenheid	Referentie
Veiligheidsfactor γ_{M0}	1,00	-	EN 1993-1-1: 6.1
Veiligheidsfactor γ_{M1}	1,00	-	EN 1993-1-1: 6.1
Veiligheidsfactor γ_{M2}	1,25	-	EN 1993-1-1: 6.1
Veiligheidsfactor γ_{M3}	1,25	-	EN 1993-1-8: 2.2
Veiligheidsfactor γ_{C}	1,50	-	EN 1992-1-1: 2.4.2.4
Veiligheidsfactor γ_{Inst}	1,20	-	EN 1992-4: Table 4.1
Verbindingscoëfficiënt βj	0,67	-	EN 1993-1-8: 6.2.5
Effectief oppervlak - coëfficiënt van max spanning	0,10	-	
Wrijvingscoëfficiënt - beton	0,25	-	EN 1993-1-8
Wrijvingscoëfficiënt slipweerstand	0,30	-	EN 1993-1-8 tab 3.7
Grenswaarde plastische rek	0,05	-	EN 1993-1-5
Detaillering	Nee		
Afstand tussen bouten [d]	2,20	-	EN 1993-1-8: tab 3.3
Afstand tussen bouten en de rand [d]	1,20	-	EN 1993-1-8: tab 3.3
Beton uitbreekweerstand	Geen		EN 1992-4: 7.2.1.4 and 7.2.2.5
Gebruik berekening αb in de stuikcontrole.	Ja		EN 1993-1-8: tab 3.4
Gescheurd beton	Ja		EN 1992-4
Controle lokale vervorming	Ja		CIDECT DG 1, 3 - 1.1
Grens lokale vervorming	0,03	-	CIDECT DG 1, 3 - 1.1
Geometrische niet-lineairiteit (GMNA)	Ja		Sta grote vervormingen van kokerdoorsnedes toe
Geschoord systeem	Ja		EN 1993-1-8: 5.2.2.5

Projectgegevens

Projectnaam	Opwaardering KIJ-DIM
Projectnr.	
Auteur	[redacted]
Omschrijving	Toetsing ankers poer
Datum	3-2-2025
Ontwerpnorm	EN

Berekening deel 2: Toetsing van ankers en betonpoer

Verankering Type D heeft 6*2" rechte ankers (gemodelleerd als R51 4.6). De scope van het model is de opgetorte poer en een snede uit de onderliggende balklaag.

Wapening is volgens beschikbare asset data gemodellerd. De vorm van het betonlichaam is een omhulling van de in werkelijk taps toelopende opstorting. Daarnaast wordt ook een betonkwaliteit van C12/15 gehanteerd in plaats van C13/16. Dit is gedaan door beperkingen van de software en de minimale impact op de resultaten.

De anker eindes zijn zonder eindhaak gemodelleerd omdat deze niet zal voldoen aan huidige verankeringsvereisten. De schieters zijn dus niet mechanisch verbonden aan elkaar.

De gemodelleeerde poer is verankerd aan de snede van de balklaag, waarbij een fictieve 150MN/m/paal is teruggerekend naar het totale oppervlakte van snedes.

Ingevoerde krachten zijn op basis van voorlopige berekeningen. De definiteve krachten zijn middels een factor bij de belasting combinaties gewijzigd.

Materialen

Beton

Naam	f_{ck} [MPa]	$f_{ctk,0.05}$ [MPa]	f_{ctm} [MPa]	E_{cm} [MPa]	ν [-]	φ_{perm}	φ_{pres}
C12/15	12,0	1,1	1,6	27085,2	0,20	2,5	2,5
	ε_{c2} = 20,0 1e-4, ε_{cu2} = 500,0 1e-4, Type diagram: Parabolisch φ_{perm}: 2,50 φ_{pres}: 2,50						

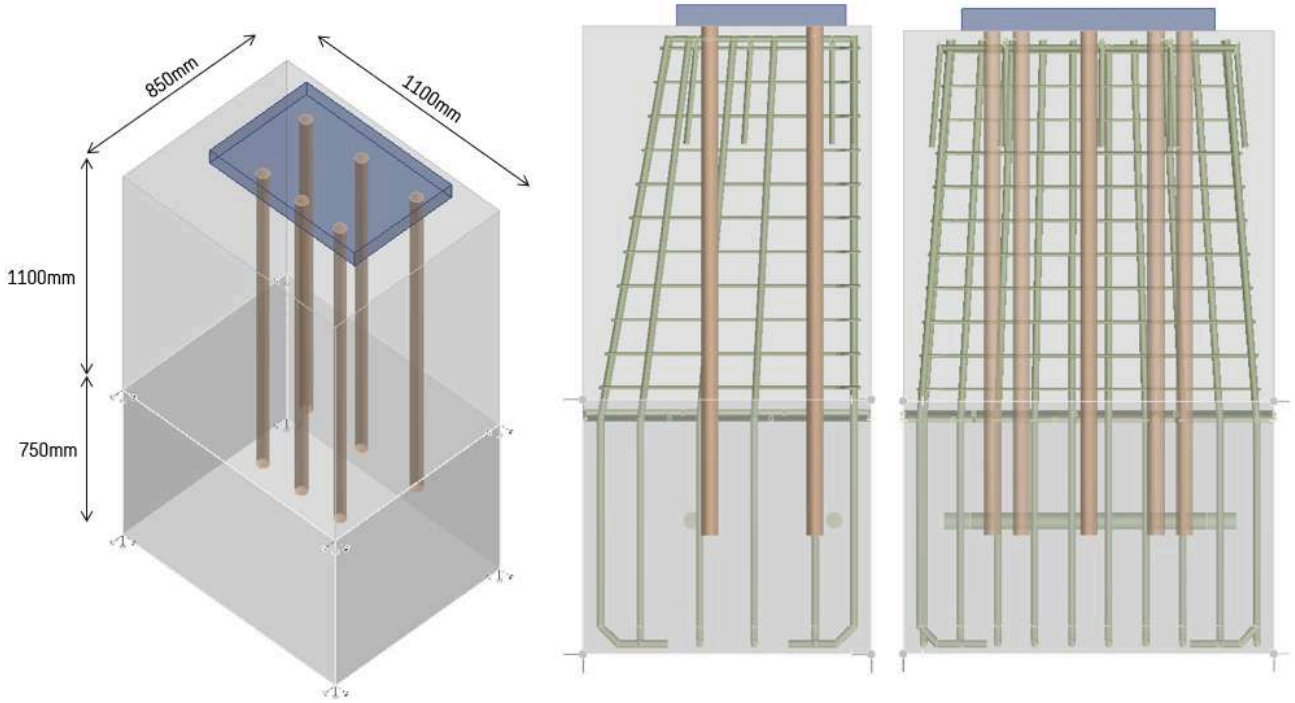
Wapening

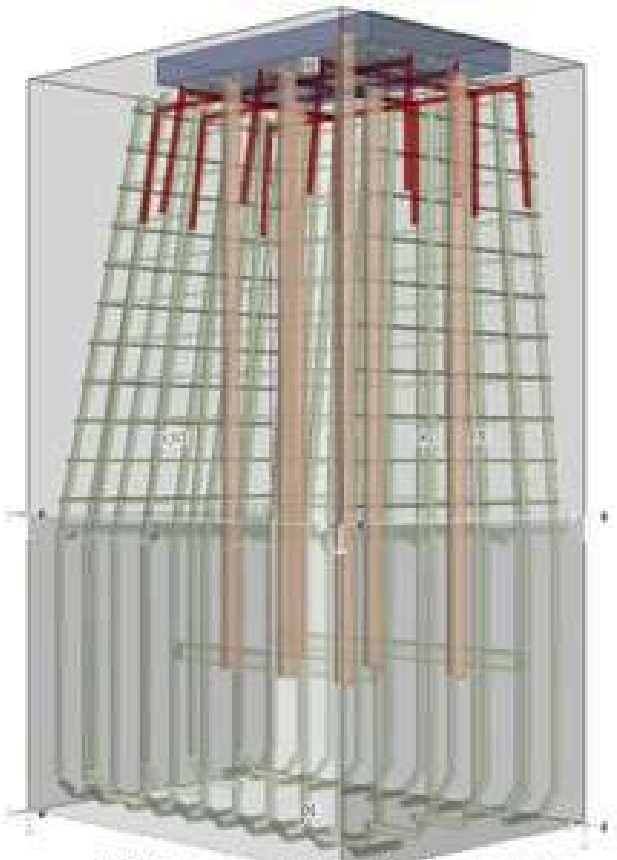
Naam	f_{yk} [MPa]	k [-]	E_s [MPa]	Eenheid massa [kg/m^3]	ε_{uk} [1e-4]	Oppervlak
B 400B	400,0	1,08	200000,0	7850	500,0	Geribd
	ε_{st} = 500,0 1e-4, ε_{sc} = 500,0 1e-4,					

Staal

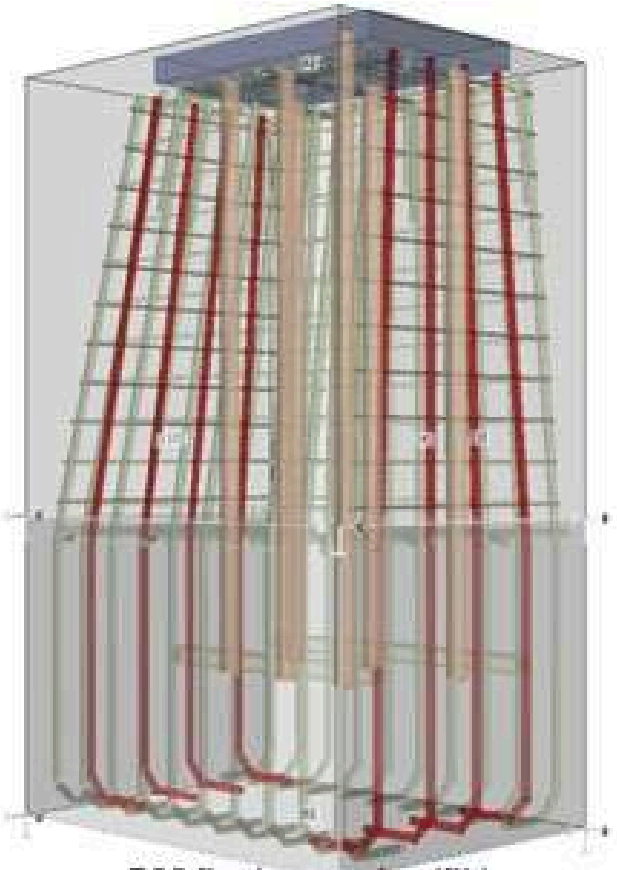
Naam	E [MPa]
S 235	210000,0

Anker type D

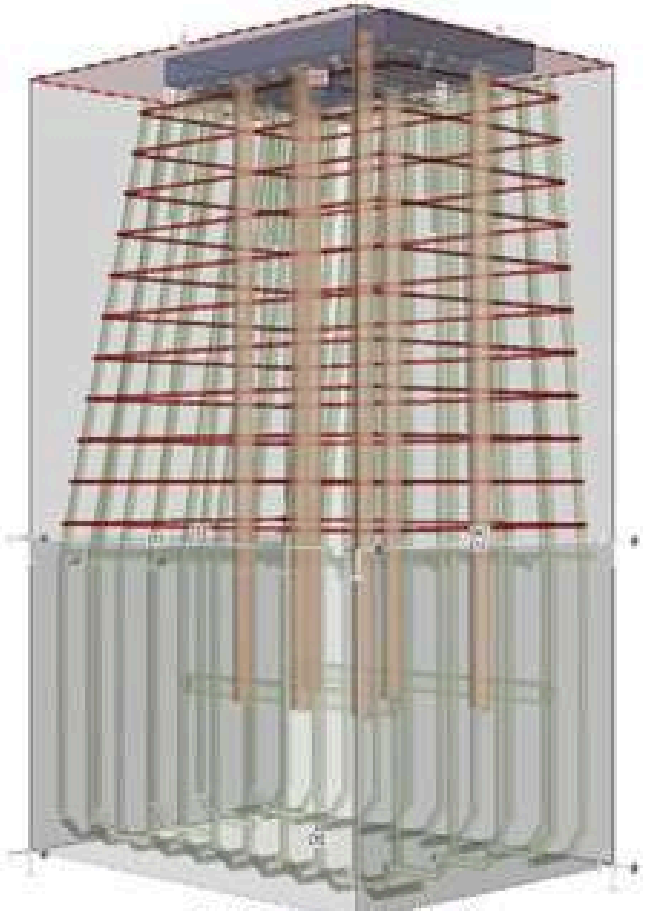

850mm
1100mm
1100mm
750mm



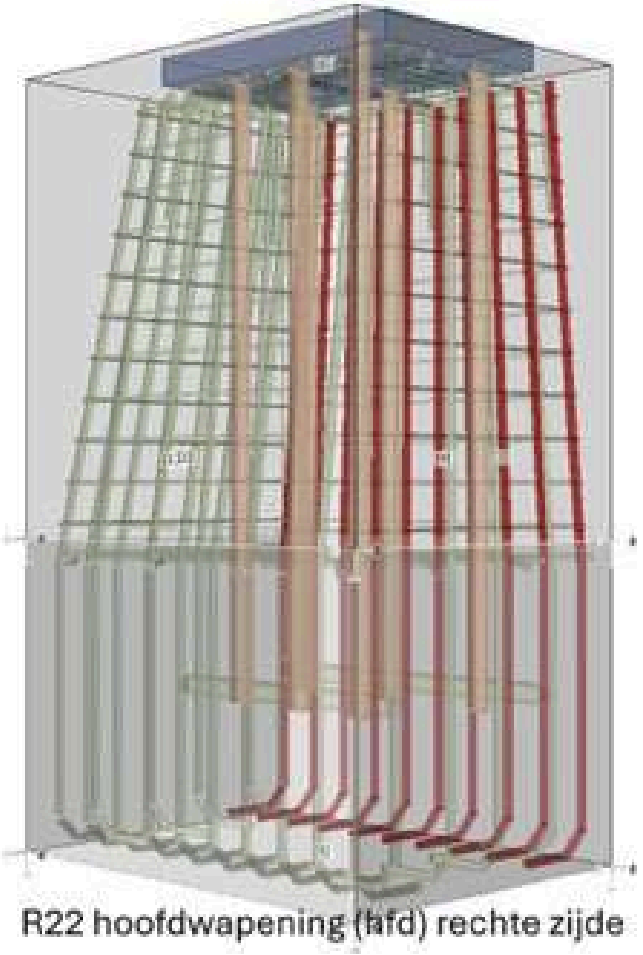
R18 haarspelden (hsp) aan top



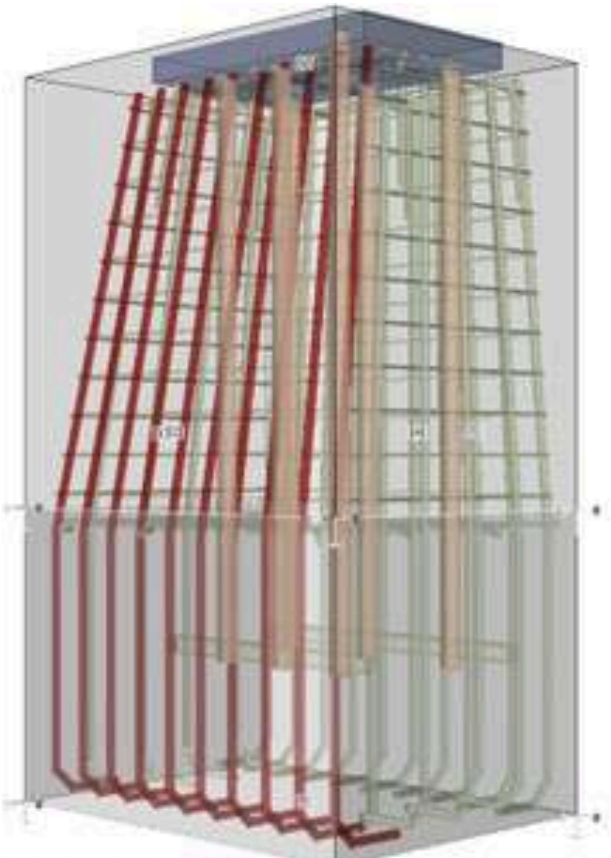
R22 flankwapening (flk)



R10 beugels (bgl)

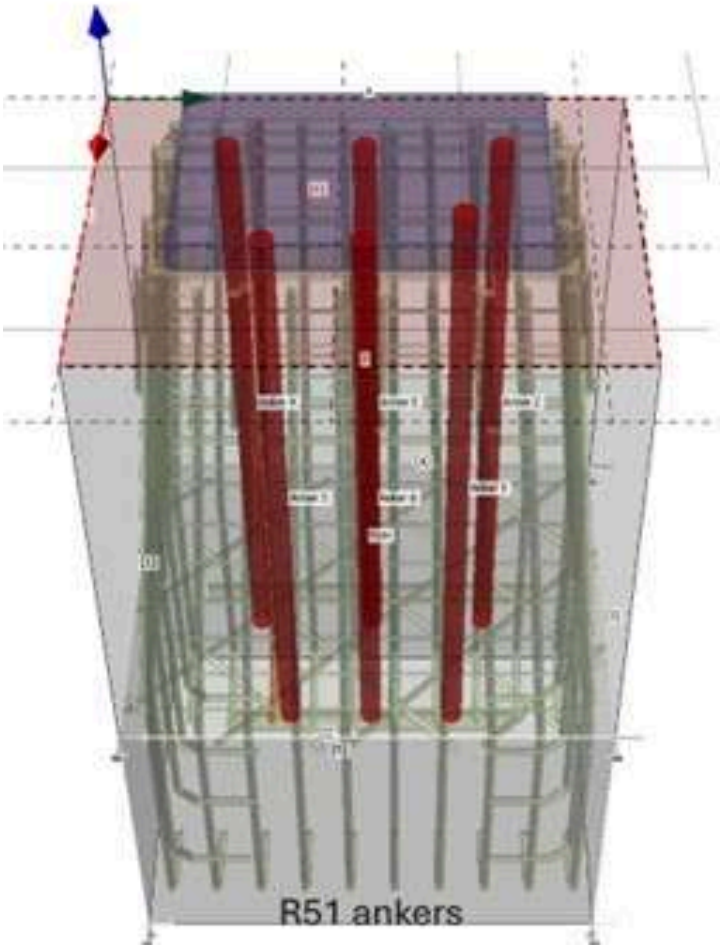


R22 hoofdwapening (hfd) rechte zijde

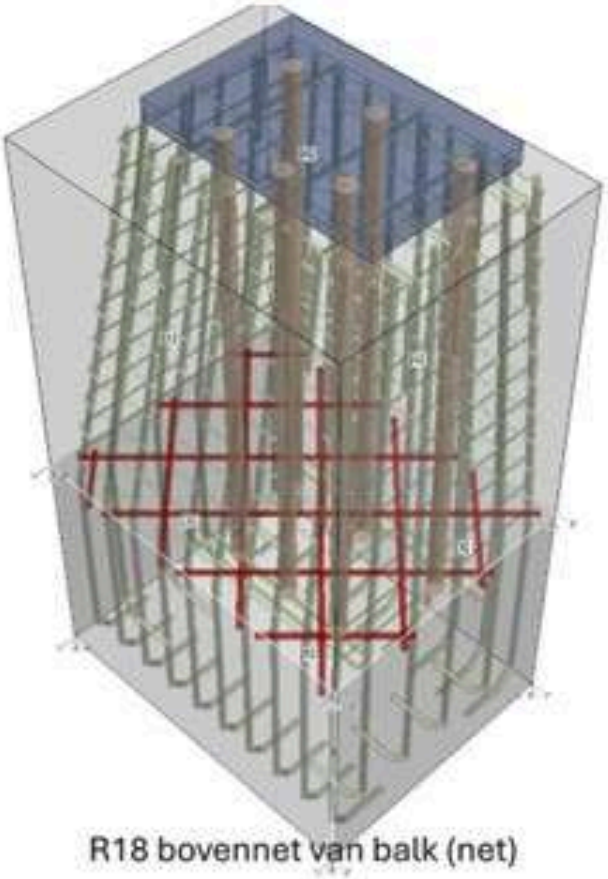


R22 hoofdwapening (mid) schuine zijde

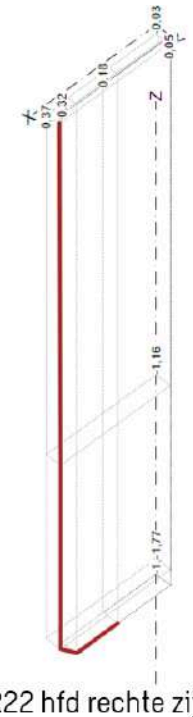
R51 schieters



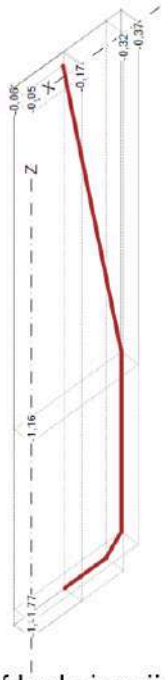
R51 ankers



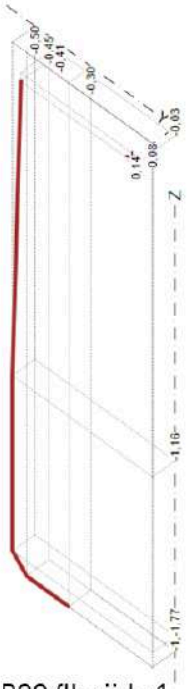
R18 bovennet van balk (net)



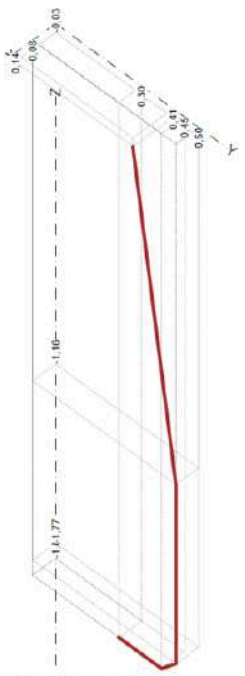
R22 hfd rechte zijde



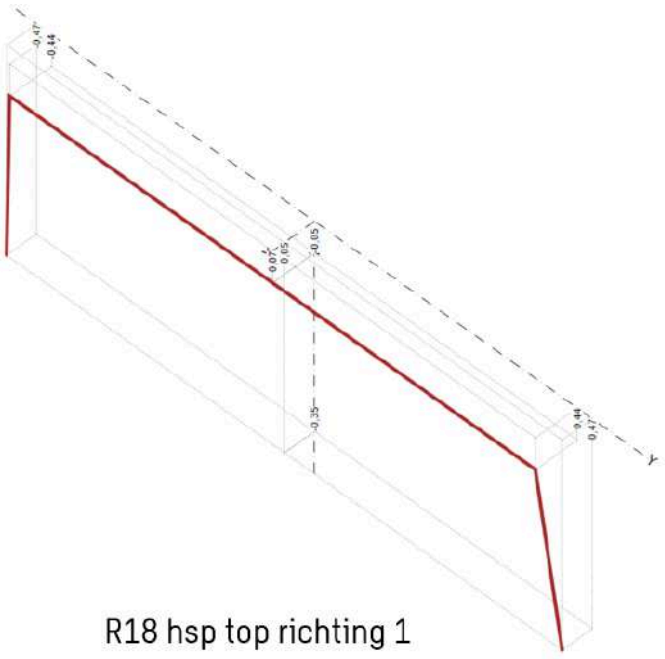
R22 hfd schuine zijde



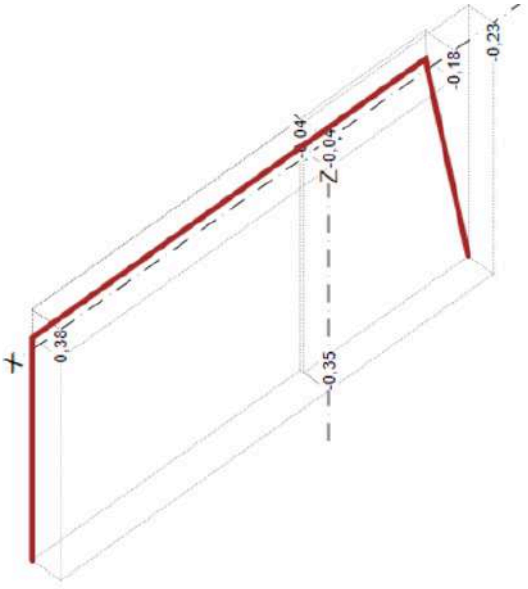
R22 flk zijde 1



R22 flk zijde 2



R18 hsp top richting 1



R18 hsp top richting 2

Geometrie

Overzicht tabel

Naam	Type	Eigenschappen	Positie
Poer	Betonpoer	Vorm: Algemeen; H: 1,85 m; Materiaal: C12/15	X: 0,00 m; Y: 0,00 m; Z: -1,85 m
Voetplaat	Voetplaat	W: 0,30 m; T: 0,07 m; D: 0,30 m; Materiaal: S 235; : Belasting; Overdracht van dwarskrachten: Ankers	M: Poer, Rand 0, Oppervlak 5; X: 0,00 m; Y: 0,13 m
Zijde 1	Oppervlakteondersteuning	X: 9 MN/m2; Y: 9 MN/m2; Z: 86 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 2; Geometrisch type: Polylijn
Zijde 2	Oppervlakteondersteuning	X: 9 MN/m2; Y: 9 MN/m2; Z: 86 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 3; Geometrisch type: Polylijn
Zijde 3	Oppervlakteondersteuning	X: 9 MN/m2; Y: 9 MN/m2; Z: 87 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 1; Geometrisch type: Polylijn
Zijde 4	Oppervlakteondersteuning	X: 9 MN/m2; Y: 9 MN/m2; Z: 86 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 4; Geometrisch type: Polylijn
Anker 1	Verankering - Belasting	L1: 0,07 m; L2: 1,50 m; Φ: 51 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,48 m
Anker 2	Verankering - Belasting	L1: 0,07 m; L2: 1,50 m; Φ: 51 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,17 m
Anker 3	Verankering - Belasting	L1: 0,07 m; L2: 1,50 m; Φ: 51 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,48 m
Anker 4	Verankering - Belasting	L1: 0,07 m; L2: 1,50 m; Φ: 51 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,17 m
Anker 5	Verankering - Belasting	L1: 0,07 m; L2: 1,50 m; Φ: 51 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,17 m
Anker 6	Verankering - Belasting	L1: 0,07 m; L2: 1,50 m; Φ: 51 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,48 m

Lasten

Combinaties

Naam	Type	Inhoud
Trekkracht	ULS	1,19*+1050kN
Drukkracht	ULS	-2000kN

Resultaten

Opsomming

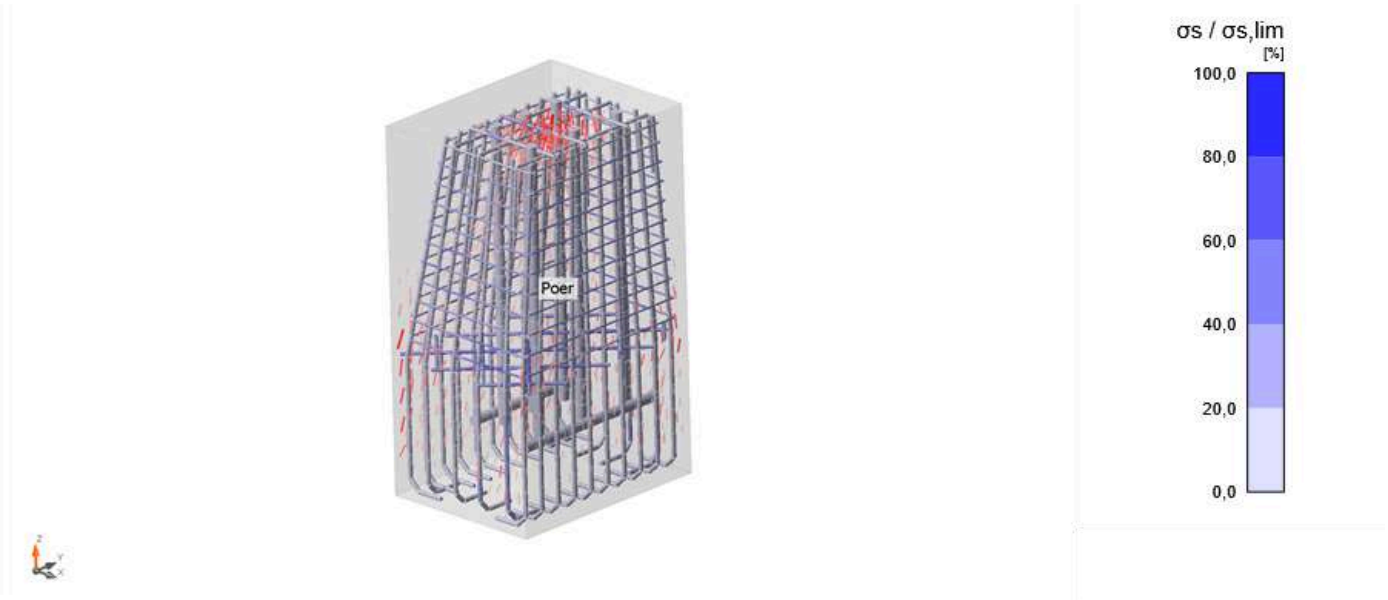
Overzicht tabel

Controle deel	Combinaties	Toename	Onderdeel	
UGT	Drukkracht	G100,0%	Sterkte van het beton	✓

Controle deel	Onderdeel	Uitnutting	
Sterkte van het beton	Poer	σc/σc,lim: 99,6%	✓
Sterkte van de wapening		εs/εs,lim: 5,8%, σs/σs,lim: 61,0%	✓
Verankeringslengte		τb/fbd: 99,7%	✓

UGT - Opsomming

Verloop van de spanningen



Boven vloeispanning	Druk	Verklaringen
		Dikte in verhouding tot de kracht

Opsomming van de reactiekrachten en de toegepaste lasten: Drukkracht, Lastincrement: G100,0%

Type	F_x [kN]	F_y [kN]	F_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Opsommingen van de reacties	432,9	0,0	1953,0	0,2	-265,1	0,0
Opsomming van de toegepaste lasten	-432,9	0,0	-1953,0	0,0	201,0	-0,3
Controleer evenwicht	0,0	0,0	0,0	0,2	-64,1	-0,3

UGT - Sterkte

Gedetailleerde resultaten van de betonsterktes: Drukkracht, Lastincrement: G100,0%

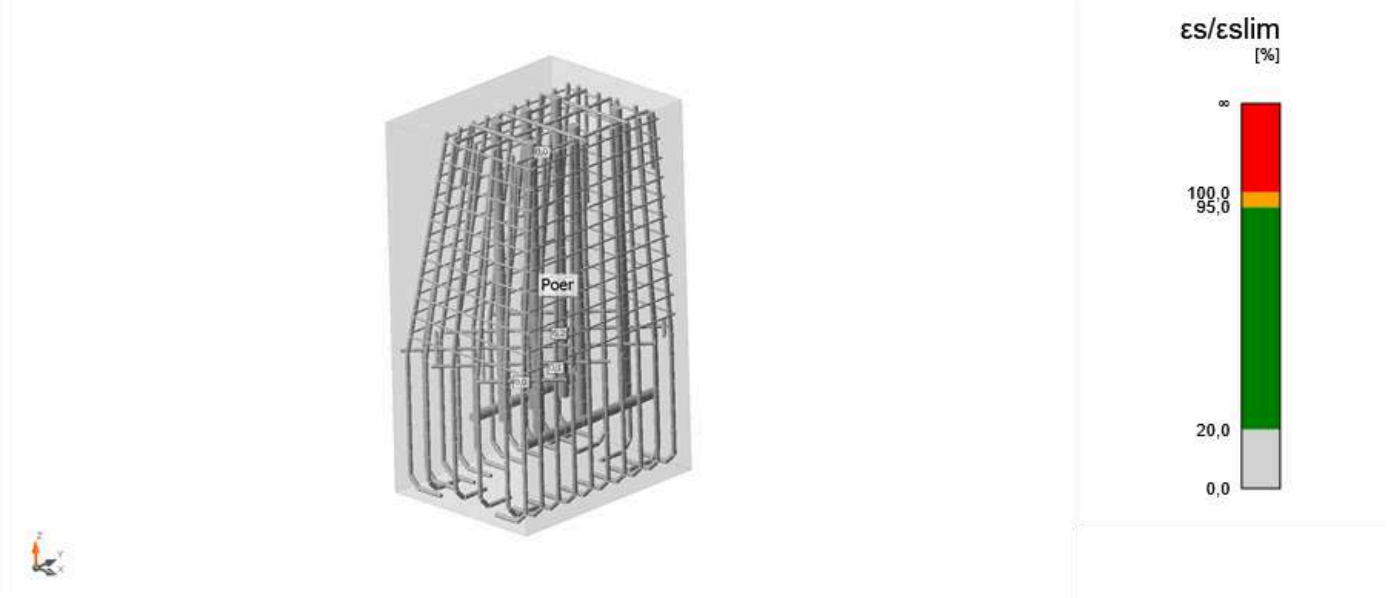
Staaf	$\sigma_{c,eq}$ [MPa]	ε_c [1e-4]	ε_{pl} [1e-4]	$\sigma_{c,eq}/\sigma_{c,lim}$ [%]	
Poer	-8,0	-55,2	-45,2	99,6	Oké

Gedetailleerde resultaten van de wapeningsterkte: Drukkracht, Lastincrement: G100,0%

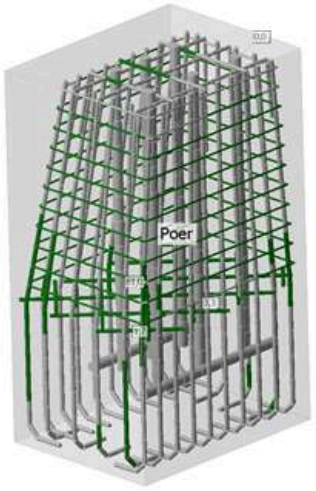
Staaf	σ_s [MPa]	ε_s [1e-4]	$\sigma_s/\sigma_{s,lim}$ [%]	$\varepsilon_s/\varepsilon_{s,lim}$ [%]	
R10 bgl_11	229,0	9,3	61,0	5,8	Oké
R22 hfd-schuin_10	18,5	0,1	51,6	2,2	Oké
R18-net_4	192,7	5,7	51,3	6,2	Oké
R22 hfd-schuin_1	12,2	0,1	51,2	2,1	Oké
R18-net_3	186,3	4,9	49,6	5,9	Oké
R18-net_10	185,1	5,2	49,3	5,8	Oké
R10 bgl_10	183,5	5,2	48,8	5,7	Oké
R18-net_9	181,0	5,2	48,2	5,6	Oké
R18-net_2	173,6	4,8	46,2	5,1	Oké
R18-net_11	169,6	4,6	45,1	4,9	Oké
R18-net_5	162,1	3,8	43,1	4,4	Oké
R10 bgl_9	160,9	3,6	42,8	4,3	Oké
R18-net_12	160,4	4,1	42,7	4,4	Oké
R10 bgl_7	155,1	3,5	41,3	4,1	Oké
R10 bgl_8	153,6	3,4	40,9	4,0	Oké
R10 bgl_6	151,2	3,2	40,3	3,7	Oké
R10 bgl_5	147,3	3,3	39,2	3,6	Oké
R10 bgl_3	145,4	2,9	38,7	3,4	Oké
R10 bgl_4	144,4	3,5	38,4	3,3	Oké
R18-net_8	143,5	3,2	38,2	3,5	Oké
R22 flk_1	66,3	1,5	35,0	1,5	Oké
R10 bgl_2	129,9	2,3	34,6	2,6	Oké
R22 flk_5	74,6	1,9	34,5	1,4	Oké
R18-net_6	125,0	3,1	33,3	2,1	Oké
R18-net_1	123,6	4,0	32,9	2,6	Oké
R22 hfd-recht_1	54,5	1,8	31,4	1,3	Oké
R22 hfd-recht_10	50,9	1,7	31,3	1,3	Oké
R22 flk_8	109,0	4,1	29,0	1,7	Oké
R22 flk_4	108,9	4,1	29,0	1,8	Oké
R18 hsp-top_5	105,6	3,4	28,1	1,9	Oké
R10 bgl_1	96,1	1,6	25,6	1,4	Oké
R18 hsp-top_4	82,6	2,1	22,0	1,3	Oké
R22 hfd-schuin_7	34,7	0,6	21,9	0,9	Oké
R18-net_7	82,2	1,6	21,9	1,1	Oké
R22 flk_7	81,7	2,1	21,7	1,2	Oké
R18 hsp-top_6	81,6	2,3	21,7	1,2	Oké
R22 hfd-schuin_5	18,2	0,1	21,1	0,9	Oké
R22 flk_3	79,1	1,9	21,1	1,2	Oké
R22 hfd-schuin_2	68,2	2,2	20,9	0,9	Oké
R22 hfd-schuin_9	67,7	2,1	20,7	0,9	Oké
R22 hfd-recht_9	62,1	1,9	20,6	0,9	Oké
R22 hfd-recht_2	63,4	1,9	20,3	0,8	Oké
R22 hfd-schuin_6	23,1	0,1	19,4	0,8	Oké

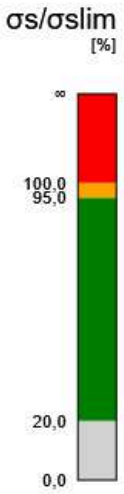
Staaf	σ_s [MPa]	ε_s [1e-4]	$\sigma_s/\sigma_{s,lim}$ [%]	$\varepsilon_s/\varepsilon_{s,lim}$ [%]	
R22 hfd-schuin_4	24,9	0,1	19,0	0,8	Oké
R22 hfd-schuin_8	56,3	1,7	17,9	0,7	Oké
Anker 5	32,7	0,9	17,9	0,6	Oké
R22 flk_2	45,3	0,4	17,3	0,7	Oké
R22 hfd-schuin_3	57,9	1,7	17,1	0,7	Oké
R22 hfd-recht_5	62,7	1,6	16,9	0,7	Oké
R22 hfd-recht_8	60,1	1,9	16,6	0,7	Oké
R22 hfd-recht_7	58,3	1,4	16,4	0,7	Oké
R22 flk_6	50,5	0,7	16,2	0,7	Oké
R22 hfd-recht_3	59,5	1,8	15,8	0,7	Oké
R22 hfd-recht_4	50,9	1,4	14,7	0,6	Oké
R22 hfd-recht_6	54,1	1,4	14,4	0,5	Oké
Anker 4	36,3	0,9	10,4	0,2	Oké
Anker 6	2,6	0,0	10,1	0,3	Oké
R18 hsp-top_3	36,0	0,5	9,6	0,2	Oké
Anker 2	33,0	0,8	9,5	0,2	Oké
R51_schieter_2	31,5	0,2	8,4	0,1	Oké
R18 hsp-top_2	31,1	0,2	8,3	0,3	Oké
R18 hsp-top_1	31,0	0,2	8,3	0,1	Oké
Anker 3	8,4	0,0	4,2	0,1	Oké
Anker 1	11,8	0,1	3,4	0,1	Oké
R51_schieter_1	12,6	0,1	3,3	0,1	Oké

Wapening rek/grens verhouding - $\varepsilon_s/\varepsilon_{s,lim}$ [%]



Wapening spanning/sterkte verhouding - $\sigma_s/\sigma_{s,lim}$ [%]





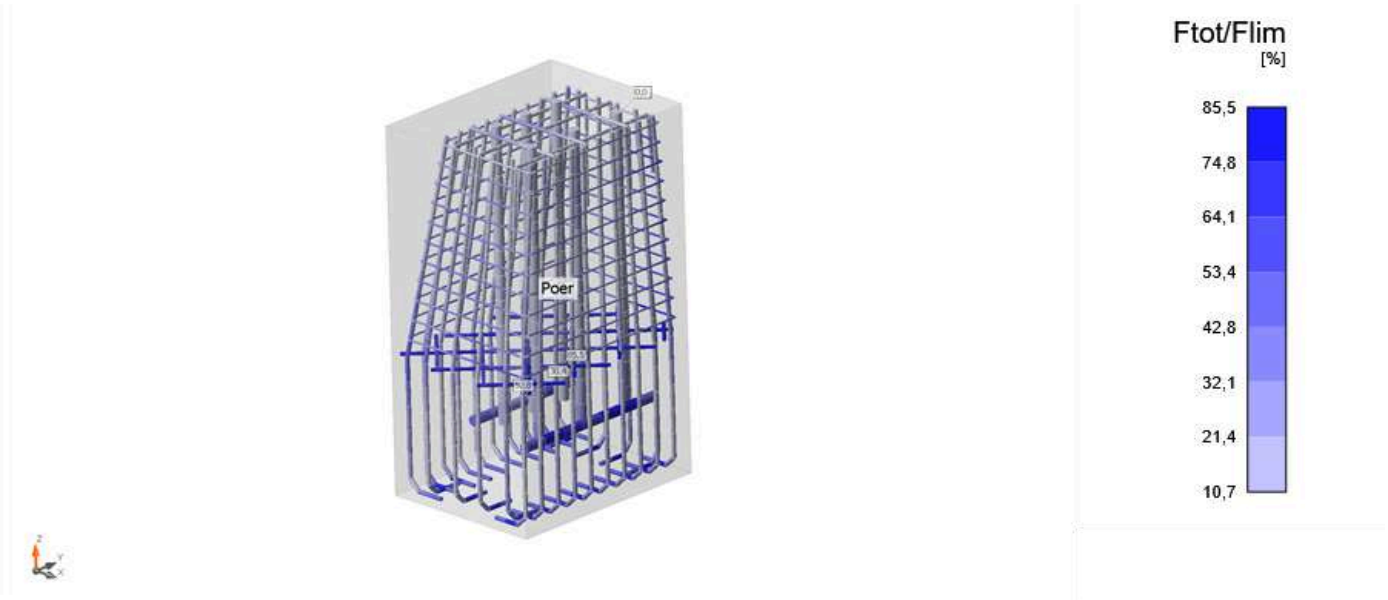
UGT - Verankering

Gedetailleerde resultaten van de verankering - Wapening: Drukkracht, Lastincrement: G100,0%

Staaf	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R22 hfd-recht_1	1,6	0,1	-44,9	75,9	142,8	99,7	Oké
R22 hfd-recht_10	1,6	0,1	-44,7	75,9	142,8	99,7	Oké
R22 flk_1	1,6	0,1	-50,0	75,8	142,8	99,7	Oké
R22 hfd-recht_9	1,6	0,1	-29,4	75,9	142,8	99,7	Oké
R22 flk_5	1,6	0,1	-49,2	75,8	142,8	99,7	Oké
R22 hfd-recht_2	1,6	0,1	-29,0	75,9	142,8	99,6	Oké
R22 flk_8	1,6	0,1	41,4	75,8	142,8	99,6	Oké
R22 hfd-recht_8	1,6	0,1	-23,7	75,8	142,8	99,6	Oké
R22 flk_4	1,6	0,1	41,4	75,8	142,8	99,6	Oké
R18-net_4	1,6	26,5	49,0	84,9	83,9	99,6	Oké
R22 flk_7	1,6	0,1	31,0	75,8	142,8	99,6	Oké
R18-net_10	1,6	26,5	47,1	84,9	83,9	99,6	Oké
R22 flk_3	1,6	0,1	30,1	75,8	142,8	99,6	Oké
R22 hfd-recht_3	1,6	0,1	22,6	75,8	142,8	99,6	Oké
R22 hfd-schuin_2	1,6	0,1	-29,9	75,8	142,8	99,6	Oké
R18-net_9	1,6	26,5	46,1	84,9	83,4	99,6	Oké
R10 bgl_11	1,6	8,2	18,0	75,7	29,5	99,6	Oké
R18-net_3	1,6	26,5	47,4	84,9	83,4	99,6	Oké
R18-net_11	1,6	26,5	43,1	84,9	73,0	99,6	Oké
R22 hfd-schuin_9	1,6	0,1	-29,6	75,8	142,8	99,6	Oké
R22 flk_6	1,6	0,1	-23,1	75,8	142,8	99,6	Oké
R22 hfd-recht_7	1,6	0,1	-23,5	70,1	142,8	99,6	Oké
R22 hfd-schuin_1	1,6	0,1	-73,2	51,6	77,3	99,6	Oké
R22 hfd-recht_4	1,6	0,1	-21,1	69,3	142,8	99,6	Oké
R22 hfd-recht_5	1,6	0,1	-24,1	75,8	142,8	99,6	Oké
R22 hfd-schuin_8	1,6	0,1	-25,5	75,8	142,8	99,6	Oké
R18-net_2	1,6	26,5	44,2	84,4	64,2	99,6	Oké
R22 flk_2	1,6	0,1	-24,7	75,8	142,8	99,6	Oké
R22 hfd-schuin_3	1,6	0,1	-24,4	75,8	142,8	99,6	Oké
R18-net_12	1,6	26,5	40,8	85,5	47,7	99,5	Oké
R22 hfd-schuin_10	1,6	0,1	-73,6	51,6	77,3	99,5	Oké
R51_schieter_2	1,3	0,7	63,9	77,0	105,6	99,3	Oké
R22 hfd-recht_6	1,6	0,1	20,6	75,8	142,8	99,5	Oké
R18-net_1	1,6	26,5	31,5	81,6	38,5	99,5	Oké
Anker 5	8,0	0,1	-125,9	30,5	705,0	99,9	Oké
Anker 5	8,0	0,1	-125,9	30,5	705,0	99,9	Oké
Anker 5	8,0	0,1	-125,9	30,5	705,0	99,9	Oké
Anker 5	8,0	0,1	-125,9	30,5	705,0	99,9	Oké
Anker 5	8,0	0,1	-125,9	30,5	705,0	99,9	Oké
Anker 5	8,0	0,1	-125,9	30,5	705,0	99,9	Oké
R22 hfd-schuin_7	1,6	0,1	-31,3	51,6	142,8	99,5	Oké
R10 bgl_8	1,6	5,6	12,1	58,0	29,5	99,5	Oké

Staaf	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R18 hsp-top_5	1,6	0,0	26,9	28,1	95,6	99,5	Oké
R51_schieter_1	1,3	0,7	25,5	52,8	74,3	99,3	Oké
R10 bgl_4	1,6	5,7	11,3	58,1	29,5	99,5	Oké
R10 bgl_5	1,6	5,5	11,6	56,7	29,5	99,5	Oké
R10 bgl_6	1,6	5,5	11,9	57,3	29,5	99,5	Oké
R10 bgl_9	1,6	5,5	12,6	56,5	29,5	99,5	Oké
R18-net_5	1,6	20,3	41,3	72,4	73,0	99,5	Oké
R10 bgl_7	1,6	5,6	12,2	56,8	29,5	99,5	Oké
R10 bgl_10	1,6	5,9	14,4	59,7	29,5	99,5	Oké
R18 hsp-top_4	1,6	0,0	21,0	22,0	95,6	99,5	Oké
R18 hsp-top_6	1,6	0,0	20,8	21,7	95,6	99,5	Oké
R10 bgl_3	1,1	6,4	11,4	64,9	29,5	99,0	Oké
R18-net_6	1,6	22,8	31,8	72,1	47,7	99,5	Oké
R18-net_8	1,6	22,2	36,5	69,7	64,2	99,5	Oké
R22 hfd-schuin_4	1,6	0,1	-27,1	51,3	142,8	99,5	Oké
R10 bgl_2	1,1	5,8	10,2	60,5	29,5	99,0	Oké
R18-net_7	1,6	16,4	20,9	54,3	38,5	99,5	Oké
R10 bgl_1	1,1	2,6	7,5	27,4	29,5	99,0	Oké
R22 hfd-schuin_5	1,6	0,1	-30,1	46,5	77,3	99,5	Oké
R22 hfd-schuin_6	1,6	0,1	-27,7	53,3	77,3	99,5	Oké
R18 hsp-top_2	1,1	0,0	7,9	8,3	95,6	99,0	Oké
R18 hsp-top_1	1,1	0,0	7,9	8,3	95,6	99,0	Oké
R18 hsp-top_3	1,1	0,0	9,2	19,1	95,6	99,0	Oké

Kracht controle waarde - F_{tot}/F_{lim} [%]



Verklaring

Symbool	Verklaring
f_{ck}	Karakteristieke cylindrische betondruksterkte bij 28 dagen

Symbool	Verklaring
$f_{ctk,0.05}$	Karakteristieke treksterkte van beton 5% onderschrijdingskans
f_{ctm}	Gemiddelde axiale treksterkte van beton
E_{cm}	Secant elasticiteitsmodulus van beton
ν	Poisson-factor
ε_c	Betondrukrek bij piekspanning fc
ε_{cu}	Uiterste drukrek in het beton
φ_{perm}	Uiteindelijke waarde van de kruipcoëfficiënt op het tijdsinterval (t0 = 28 dagen, tinf = ontwerplevensduur) voor permanente belasting
φ_{pres}	Uiteindelijke waarde van de kruipcoëfficiënt op het tijdsinterval (t0 = 28 dagen, tinf = ontwerplevensduur) voor voorspanbelasting
f_{yk}	Karakteristieke vloeisterkte van de wapening
E_s	Elasticiteitsmodulus van wapeningsstaal
ε_{uk}	Karakteristieke rek van de wapening of voorspanstaal bij de maximale belasting
Eigenschappen	W - Breedte; H - Hoogte; T - Dikte; D - Hoogte; L - Lengte; r - straal; α - Helling
Positie	M - Hoofd; MP - Master punt; IP - Voeg punt in
$\sigma_{c,eq}$	Equivalent principal stress Sigma c,eq, which expresses the equivalent uni-axial stress for a general tri-axial stress state.
ε_c	Minimale betondrukrek εc
ε_{pl}	Minimale plastische drukrek εpl van beton
$\sigma_{c,eq}/\sigma_{c,lim}$	De verhouding van de betonspanning en -sterkte. Het geeft het nivo van de uitnutting van het materiaal t.o.v. de sterkte van het beton weer.
σ_s	Maximale spanning langs de lengte van de wapeningstaaf.
ε_s	Maximale rek langs de lengte van de wapeningstaaf.
$\sigma_s/\sigma_{s,lim}$	De verhouding spanning en vloeisterkte van de wapening.
$\varepsilon_s/\varepsilon_{s,lim}$	De verhouding rek en grensrek van de wapening.
τ_b	Aanhechtspanning op het oppervlak van de wapeningstaaf
F_a	De kracht van de verankering. Het wordt ontwikkeld vanaf de staafeinden t.g.v. de verankering door de ribben op de wapeningstaaf.
F_{tot}	De totale kracht ontwikkeld langs de de volledige lengte van de wapeningstaaf. Het bestaat uit de ankerkracht t.g.v. de verankering door de ribben en de aanhechtkracht: de integratie van alle aanhechtspanning de op het wapeningsoppervlak werken.
F_{tot}/F_{lim}	De verhouding van de totale kracht in de staaf en de grenswaarde van de kracht. De grenswaarde van de kracht is berekend als het minimum van twee waardes: (a) de berekende kracht als de som van de uiterste ankerkracht en de kracht ontwikkeld vanaf het eind van de staaf tot het beschouwde punt met in achtname van volledige hechtsterkte, (b) de uiterste kracht van de staaf.
F_{lim}	De grenswaarde van de kracht. De grenswaarde van de kracht is berekend als het minimum van twee waarden: (a) de berekende kracht als de som van de uiterste ankerkracht en de kracht ontwikkeld vanaf het eind van de staaf tot het beschouwde punt met in achtname van volledige hechtsterkte, (b) de uiterste kracht van de staaf.
τ_b/f_{bd}	De verhouding van de aanhechtspanning en de uiterste aanhechtspanning is weergegeven voor de geselecteerde (groep van) staven en het toegepaste deel van de lat. Het toont het nivo van de uitnutting in verhouding tot de uiterste hechtsterkte tussen de wapeningstaaf en het omringende beton.

Norminstellingen

Artikel	Naam	Waarde	Omschrijving
2.4.2.4 (1)	γ_c	1,50	Materiaalfactor voor beton
2.4.2.4 (1)	γ_s	1,15	Materiaalfactor voor wapening

Artikel	Naam	Waarde	Omschrijving
3.1.6 (1)	α_{cc}	1,00	Coëfficiënt die rekening houdt met de lange-termijn effecten van de drukspanning en het ongunstige effect van de manier waarop de belasting is toegepast.
3.2.7 (2)	$\varepsilon_{ud}/\varepsilon_{uk}$	0,90	Verhouding van de rekenwaarde en de karakteristiek rekgrens.
3.2.7 (2)	$\varepsilon_{ud}/\varepsilon_{uk}$	0,90	Verhouding van de rekenwaarde en de karakteristiek rekgrens.
5.10.2.1(1)	k1	0,80	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk vóór de verankering.
5.10.2.1(1)	k2	0,90	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk vóór de verankering.
5.10.3(2)	k7	0,75	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk na het opspannen of na de overdracht
5.10.3(2)	k8	0,85	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk na het opspannen of na de overdracht
7.2(2)	k1	0,60	Coëfficiënt voor de berekening van de maximale drukspanning in beton tijdens BGT - karakteristieke combinatie
7.2(3)	k2	0,45	Coëfficiënt voor berekening van de spanning in het beton voor de BGT - quasi-blijvende combinatie
7.2(5)	k3	0,80	Coëfficiënt voor het berekenen van de maximale trekspanning in de wapening voor de BGT-karakteristieke combinatie
7.2(5)	k5	0,75	Coëfficiënt voor het berekenen van de maximale trekspanning in de spankabel voor de BGT-karakteristieke combinatie
8.3(2)	Φ m,min - Φs <= 16mm (4,00 Φs)	4,00	Minimale doorndiameter van de beugel als veelvoud van de beugeldiameter
8.3(2)	Φ m,min - Φs > 16mm (7,00 Φs)	7,00	Minimale doorndiameter van de beugel als veelvoud van de beugeldiameter

Toetsing inleiding krachten in fundering

Projectnaam	Opwaardering KIJ-BVW 380kV	**Rekensheet versie**	3.1
Lijn	KIJ-DIM Ronde Venen	**Datum**	1-2-2026
Subtype deuvels aan randstijl	L	**Auteur**	[redacted]
Subtype deuvels aan paal	C5 deel LD1	**Eerste interne controle**	Mauny Bahri (RO)
Mastnummer(s)	127,132,137,149 en 156(bestaand)	**Tweede interne controle**	[redacted]

Samenvatting	UC	Check	F_{Rd}	
Maatgevende unity check	**1,00**	OK		
Max UC randstijldeuvels beton	0,17	OK	D:6043 T:5640	kN
Max UC paaldeuvels beton	0,84	OK	1133	kN
Max UC lassen	1,00	OK	954	kN
Max UC staalciteria	0,70	OK	1363	kN
Trekkracht uit randstijl	$F_{Ed,t}$		*953*	kN
Drukkracht uit randstijl	$F_{Ed,c}$		*953*	kN
Spanningsbegrenzing		$=0,7f_{cd}$	Nee	
Toetsing incl. buiging			Nee	
Toetsing incl. las reductie		$=f_w/1,2$	Ja	

Zie voor de maximaal optredende paalkrachten het constructief rapport

Materialen				
Betonkwaliteit	-		C30/37	
Beton omsloten	-		Ja	
Karakteristieke druksterkte	f_{ck}		30	N/mm^2
Verhogingsfactor druksterkte	C_a	$=min[\sqrt{(A_{c2}/A_{f1})};2,5]$	2,10	-
Verhoogde druksterkte	f_{jk}	$=f_{ck}C_a$	63,02	N/mm^2
Betondruksterkte	f_{cd}	$=f_{jk}/\gamma_c$	42,01	N/mm^2
Staalsoort 1: funderingspaal	-		S235	N/mm^2
Treksterkte staalsoort 1	$f_{u,1}$		360	N/mm^2
Vloeispanning staalsoort 1	$f_{y,1}$		235	N/mm^2
Staalsoort 2: randstijl	-		S235	N/mm^2
Treksterkte staalsoort 2	$f_{u,2}$		360	N/mm^2
Vloeispanning staalsoort 2	$f_{y,2}$		235	N/mm^2
Staalsoort 3: deuvels	-		S235	N/mm^2
Treksterkte staalsoort 3	$f_{u,3}$		360	N/mm^2
Vloeispanning staalsoort 3	$f_{y,3}$		235	N/mm^2
Lassterkte deuvels paal	$f_{w,Rd}$	$=f_{u1,3}/(w_r\beta_w\gamma_s)$	300	N/mm^2
Lassterkte deuvels randstijl	$f_{w,Rd}$	$=f_{u2,3}/(w_r\beta_w\gamma_s)$	300	N/mm^2
Partiële factor beton	γ_c		1,50	-
Partiële factor staal	γ_s		1,25	-
Corrolatiefactor lassen	β_w		0,80	-
Reductiefactor lassen	w_r		1,2	-

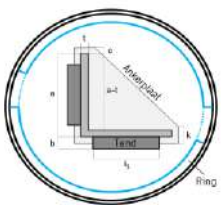
Hoekprofiel randstijl			250x250x20	
Zijde	L_w		250	mm
Dikte	t_w		20	mm
Lengte verankering	L_e		2260	mm

Geometrie				
Hoofdtype deuvels (zie figuren onderaan)			1	
Aantal palen per randstijl*	n_p		1	#
Type paal*			LD1	
Diameter paal uitwendig (indien buispaal)	$ø_{p,out}$		n.v.t.	mm
Wanddikte paal	t_p		8,0	mm
Roestreductie paalwand	$t_{p,red}$		4	mm
Lengte paaldeuvel als % van omtrek paal	P_b		31,00%	%
Aantal lagen deuvels aan paal	$n_{b,p}$		2	#
Breedte deuvels/ lengte stift aan paal*	b_1		30	mm
Dikte deuvels aan fundatiepaal*	h_1		50	mm
Diameter paal inwendig (indien buispaal)	$ø_{p,in}$	$=ø_{p,out}-2t_p$	n.v.t.	mm
Inwendige omtrek paal o.b.v. tabellen	P_{in}	$=[0;ø_{p,in}\pi]$	1450	mm
Laslengte paaldeuvel	L_b	$=P_{in}P_b$	450	mm
Oppervlakte deuvels per laag aan paal**	$A_{b,i}$	$=[P_b(ø_{p,in}-b_1)\pi b_1;L_bb_1]$	13485	mm2
Deuvels aan buitenzijde randstijl	n_{out}		14	#
Deuvels aan binnenzijde randstijl	n_{in}		0	#
Seperatie deuvels	s		290	mm
(las)Lengte deuvel buitenzijde*	L_{out}		230	mm
Uitkragende lengte deuvel buitenzijde	e		0	mm
(las)Lengte deuvel binnenzijde*	L_{in}		0	mm
Breedte deuvels aan randstijl	b_2		30	mm
Dikte deuvels aan randstijl	h_2		50	mm
Diameter stiftdeuvel	$ø_b$		0	mm
Oppervlakte enkele deuvel buitenzijde	$A_{f1,out,i}$	$=[L_{out}b;L_{out}ø_b]$	6900	mm^2
Oppervlakte enkele deuvel binnenzijde	$A_{f1,in,i}$	$=[L_{in}b;L_{in}ø_b]$	0	mm^2
Las ankerplaat|randstijl	a_1		4	mm
Las deuvel|paal	a_2		4	mm
Las deuvel|buitenzijde randstijl	a_3		4	mm
Las deuvel|binnenzijde randstijl	a_4		0	mm
Lengte rugplaat aan ankerplaat	L_{rp}		0	mm
Dikte ankerplaat/rugplaat	t_f		20	mm
n-zijden buitenrand ankerplaat	n_c		2	#
Breedte buitenrand ankerplaat	c		25	mm
Rechte zijde ankerplaat	k_{pl}		37	mm
Aanvullende reductie omvang ankerplaat	$A_{p,red2}$		3600	mm^2
(Las)Lengte ankerplaat binnenzijde	L_{ip}	$=[4;2](L_w-t_w-a_1\sqrt{2})$	449	mm
Effectief oppervlakte ankerplaat druk	$A_{p,c}$	$=A_{p,r}-A_{p,red1,2}$	47238	mm^2
Effectief oppervlakte ankerplaat trek	$A_{p,t}$	$=A_{p,r}-A_{p,red1,2}-A_s$	37638	mm^2

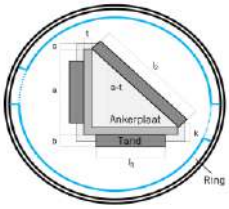
Notities

* 1xLD1+ 2xMV paal

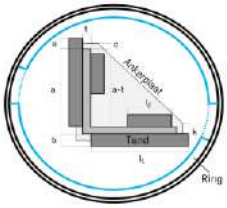
Hoofdtype 1
Tanddeuvels aan buitenzijde + ankerplaat



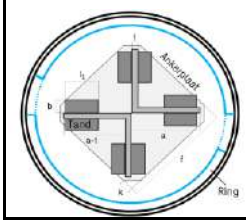
Hoofdtype 2
Tanddeuvels aan buitenzijde +
knag aan rand van de flensen + ankerplaat



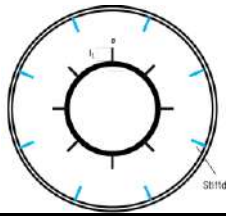
Hoofdtype 3
Tanddeuvels aan buitenzijde en binnenzijde
+ ankerplaat



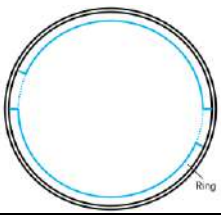
Hoofdtype 4
Tanddeuvels dubbele randstaaf + ankerplaat



Hoofdtype 5
Stiftdeuvels aan ronde buisprofiel, geen ankerplaat



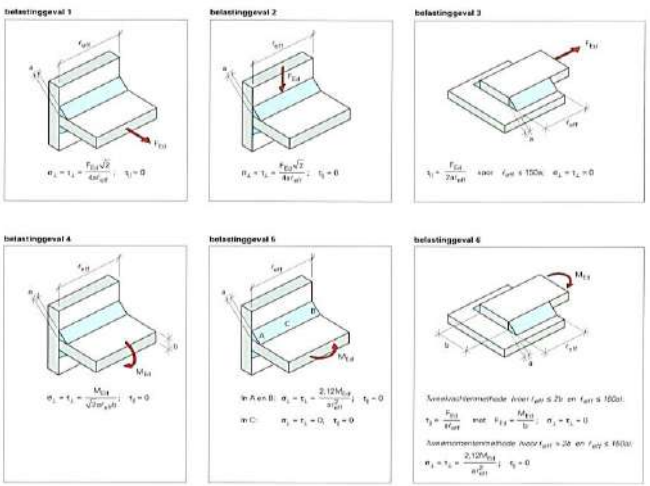
Hoofdtype 6
Enkel toetsing van knaggen aan
funderingspaal + doorsnede paal



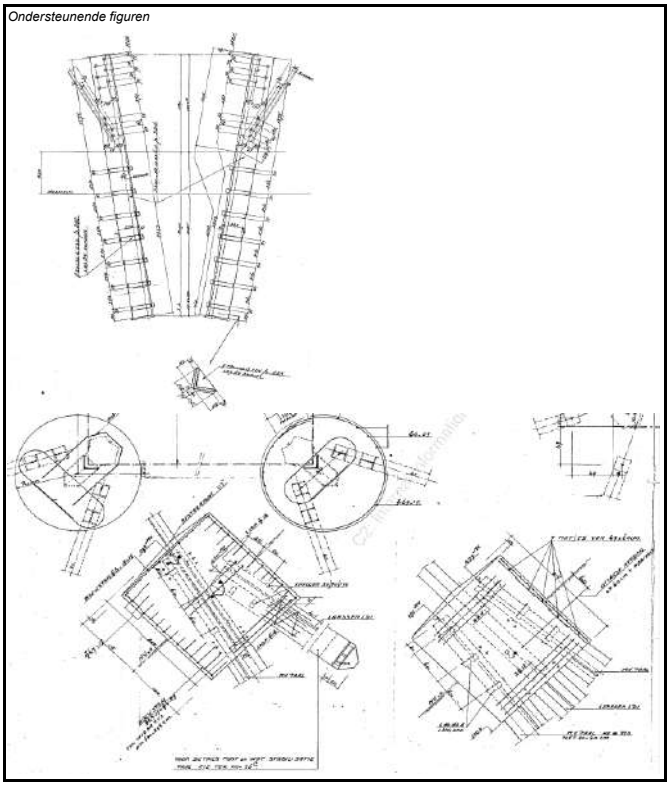
Toetsing capaciteit randstijldeuvels				
Capaciteit ankerplaat bij druk	$F_{Rd,c,p}$	$=A_{p,c}f_{cd}$	1984,6	kN
Capaciteit ankerplaat bij trek	$F_{Rd,t,p}$	$=A_{p,t}f_{cd}$	1581,3	kN
Capaciteit buitendeuvels	$F_{Rd,b,out}$	$=A_{f1,out,i}f_{cd}n_{out}$	4058,5	kN
Capaciteit binnendeuvels	$F_{Rd,b,in}$	$=A_{f1,in,i}f_{cd}n_{in}$	0,0	kN
Capaciteit totaal bij druk	$F_{Rd,c}$	$=F_{Rd,c,p}+F_{Rd,b+o/i}$	6043,1	kN
Capaciteit totaal bij trek	$F_{Rd,t}$	$=F_{Rd,t,p}+F_{Rd,b+o/i}$	5639,7	kN
Betondrukspanning deuvels bij druk	$\sigma_{c,Ed,c}$	$=F_{ed,c}/(A_{p,c}+A_{f,o/i})$	6,63	N/mm²
Betondrukspanning bij deuvels bij trek	$\sigma_{c,Ed,t}$	$=F_{ed,t}/(A_{p,t}+A_{f,o/i})$	7,10	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed,c}$		0	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed,t}$		0	N/mm²
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=[F_{Ed,c}/F_{Rd,c};F_{Ed,t}/F_{Rd,t}]$	0,17	OK
Toetsing capaciteit paaldeuvels				
Capaciteit deuvels enkele paal	$F_{Rd,b}$	$=A_{b,i}*n_{b,p}*f_{cd}$	1133,1	kN
Betondrukspanning bij deuvels	$\sigma_{c,Ed+max}$	$=F_{Ed}/(A_{b,i}*n_b)$	35,3	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed}$		0,0	N/mm²
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=F_{Ed}/(F_{Rd,b}+F_{Rd,b,c/st})$	0,84	OK
Toetsing lassen				
Type las randstijldeuvels			Dubbelzijdig	
Type las paaldeuvels			Dubbelzijdig	
Lasspanning ankerplaat	$\sigma_{vw1,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	132,1	N/mm²
Lasspanning buitendeuvels	$\sigma_{vw2,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	60,2	N/mm²
Lasspanning binnendeuvels	$\sigma_{vw3,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	n.v.t.	N/mm²
Lasspanning paaldeuvels	$\sigma_{vw4,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	300	N/mm²
Maatgevende UC		$=\sigma_{vw,Ed}/f_{w,Rd}$	1,00	OK
Toetsing paalcapaciteit				
Effectieve doorsnede paal	$A_{p,eff}$	$=P_{in}(t_p-t_{p,red})$	5800	mm²
Maximale spanning in paal	$\sigma_{s,Ed}$	$=F_{Ed}/(A_{p,eff}n_p)$	164,3	N/mm²
UC doorsnede paal		$=\sigma_{s,Ed}/f_{y,1}$	0,70	OK

Achterliggende logica				
Afschuifprojectievlak NEN-EN1994-2 F1.1				
Oppervlakte projectie afschuifweerstand	A_{f2}	$=A_{f2,out}+A_{f2,in}$	30448	mm²
Minimale h.o.h. seperatie deuvels	s_{min}	$=[250;2*L_w]$	n.v.t.	mm
Breedte projectievlak buitendeuvels	$b_{f2,out}$	$=b+s/5$	88	mm
Lengte projectievlak buitendeuvels	$L_{f2,out}$	$=L_{out}+2s/5$	346	mm
Oppervlak projectie buitendeuvels	$A_{f2,out}$	$=b_{f2,out}L_{f2,out}$	30448	mm²
Breedte projectievlak binnendeuvels	$b_{f2,in}$	$=b+s/5$	0	mm
Lengte projectievlak binnendeuvels	$L_{f2,in}$	$=L_{in}+2s/5$	0	mm
Oppervlak projectie binnendeuvels	$A_{f2,in}$	$=b_{f2,in}L_{f2,in}$	0	mm²
Effectieve oppervlakte ankerplaat NEN-EN1993-1-8 p. 4.10				
Oppervlakte ankerplaat excl. reducties	$A_{p,i}$	$=(L_w+cn_c)^2-0,5((w+cn_c-k)^2$	55415,5	mm²
Reductie ineffectief oppervlak ankerplaat	$A_{p,red1}$	$=0,5b_{ineff}^2$	4578	mm²
Oppervlakte staalprofiel	A_s	$=(2L_w-t_w)t_w$	9600	mm²
Effectieve breedte ankerplaat	b_{eff}	$=t_w+2a_1\sqrt{2}+7kt_f$	171,3	mm
Factor meewerkende breedte	k	$=\min[(t/t_w);1,0]$	1,00	-
Ineffectieve breedte	b_{ineff}	$=L_w+cn_c-(2c+t_w+b_{eff})+k_{pl}$	95,7	mm
Momentarm ankerplaat (voor toetsing incl. buiging)				
Momentarm ankerplaat	a_{lp}	$=[\sqrt{(2(z_1-z_2)^2)};0]$	22,9	mm
Zwaartepunt ankerplaat t.o.v. onderhoek	z_1	$=\sum A_i*z_i/A_T$	111,1	mm
Zwaartepunt randstijl t.o.v. onderhoek	z_2	$=\sum A_i*z_i/A_T$	94,9	mm
Staalspanning (voor toetsing incl. buiging)				
Weerstandsmoment ankerplaat	W_1	$=1/6*2(L_w-t_w)t_f^2$	30667	mm³
Weerstandsmoment buitendeuvels	W_2	$=1/6(L_{out}-e)h_2^2$	95833	mm³
Weerstandsmoment binnendeuvels	W_3	$=1/6L_{in}h_2^2$	0	mm³
Weerstandsmoment paaldeuvels	W_4	$=1/6L_1h_1^2$	187292	mm³
Staalspanning ankerplaat (druk)	$\sigma_{s,Ed,c}$	$=A_{p,c}\sigma_{c:Ed,c}a_{lp}/W_1$	234	N/mm²
Staalspanning buitendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{f1,out,c}\sigma_{c:Ed,c}(b_2/2)/W_2$	7	N/mm²
Staalspanning binnendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{f1,in,c}\sigma_{c:Ed,c}(b_2/2)/W_3$	0	N/mm²
Staalspanning paaldeuvels (max)	$\sigma_{s,Ed,c,t}$	$=A_t\sigma_{c:Ed,max}(b_1/2)/W_4$	38	N/mm²
Staalspanning ankerplaat (trek)	$\sigma_{s,Ed,t}$	$=A_{p,t}\sigma_{c:Ed,t}a_{lp}/W_1$	200	N/mm²
Staalspanning buitendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{f1,out,c}\sigma_{c:Ed,t}(b_2/2)/W_2$	8	N/mm²
Staalspanning binnendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{f1,in,c}\sigma_{c:Ed,t}(b_2/2)/W_3$	0	N/mm²
Optionele meewerkende betondoorsnede paal				
Enkel van toepassing als krachten uit randstijl via schachtwrijving naar de paalwand overbracht kunnen worden.				
Meewerkende wapeningstaven	n_{st}		0	#
Staafdiameter	$ø_{st}$		0	mm
Materiaalkwaliteit staaf	-		-	-
Factor effectiviteit betondoorsnede	α		0,00	-
Vloeigrens	f_{yd}		0	N/mm²
Trekcapaciteit wapening	$F_{Rd,b,st}$	$=0,25n_{st}ø_{st}^2\pi F_{yd}$	0	kN
Betondoorsnede paal	$A_{c,p}$	$=\alpha*0,25P_{in}^2/\pi$	0	mm²
Drukserkte betondoorsnede	$F_{Rd,b,c}$	$=A_{c,p}f_{ck}/\gamma_c$	0	kN
Gereduceerde breedte als knaggen geprofileerd zijn volgens NEN-EN1993-1-8 p. 4.10				
Flensdikte aangelast profiel	$t_{f,b}$		0	mm
Factor meewerkende breedte (k)	k_b	$=\min[(t_{f,b}/t_{f,b});1,0]$	0,00	-
Effectieve breedte knag	$b_{eff,b}$	$=0,5(t_{f,b}+2a_2\sqrt{2}+7k_bt_{f,b})$	0	mm

Lasspanningen NEN-EN 1993-1-8 p. 4.5.3						
Onderdeel	Ankerplaat	Buitendeuvels	Binnendeuvels (T3)	Binnendeuvels (T2)	Paaldeuvels	
Som σ_T	66,1	30,1	0,0	0,0	149,9	N/mm²
Som τ_T	66,1	30,1	0,0	0,0	149,9	N/mm²
Som $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 1	Ja	Nee	Nee	Nee	Nee	
M1 σ_T	66,1	0,0	0,0	0,0	0,0	N/mm²
M1 τ_T	66,1	0,0	0,0	0,0	0,0	N/mm²
M1 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 2	Nee	Ja	Ja	Nee	Ja	
M2 σ_T	0,0	18,8	0,0	0,0	93,7	N/mm²
M2 τ_T	0,0	18,8	0,0	0,0	93,7	N/mm²
M2 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 3	Nee	Nee	Nee	Ja	Nee	
M3 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M3 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M3 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 4	Nee	Ja	Ja	Nee	Ja	
M4 σ_T	0,0	11,3	0,0	0,0	56,2	N/mm²
M4 τ_T	0,0	11,3	0,0	0,0	56,2	N/mm²
M4 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 5	Nee	Nee	Nee	Nee	Nee	
M5 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M5 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M5 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 6	Nee	Nee	Nee	Nee	Nee	
M6 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M6 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M6 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²



Ondersteunende figuren



Toetsing inleiding krachten in fundering

Projectnaam	Opwaardering KIJ-BVW 380kV	**Rekensheet versie**	3.1
Lijn	KIJ-DIM Ronde Venen	**Datum**	1-2-2026
Subtype deuvels aan randstijl	Zie deel LD1	**Auteur**	[redacted]
Subtype deuvels aan paal	C5 deel MV	**Eerste interne controle**	Mauny Bahri (RO)
Mastnummer(s)	127,132,137,149 en 156(bestaand)	**Tweede interne controle**	[redacted]

Samenvatting	UC	Check	F_{Rd}	
Maatgevende unity check	**1,00**	OK		
Max UC randstijldeuvels beton	n.v.t.	OK	D:0 T:0	kN
Max UC paaldeuvels beton	0,46	OK	6568	kN
Max UC lassen	0,72	OK	4157	kN
Max UC staalciteria	1,00	OK	3011	kN
Trekkracht uit randstijl	$F_{Ed,t}$		*3010*	kN
Drukkracht uit randstijl	$F_{Ed,c}$		*3010*	kN
Spanningsbegrenzing		=0,7f_{cd}	Nee	
Toetsing incl. buiging			Nee	
Toetsing incl. las reductie		=f_w/1,2	Ja	

Zie voor de maximaal optredende paalkrachten het constructief rapport

Materialen				
Betonkwaliteit	-		C30/37	
Beton omsloten	-		Ja	
Karakteristieke druksterkte	f_{ck}		30	N/mm^2
Verhogingsfactor druksterkte	C_a	=min[√(A_{c2}/A_{f1});2,5]	2,42	-
Verhoogde druksterkte	f_{jk}	=$f_{ck}C_a$	72,62	N/mm^2
Betondruksterkte	f_{cd}	=f_{jk}/γ_c	48,42	N/mm^2
Staalsoort 1: funderingspaal	-		S235	N/mm^2
Treksterkte staalsoort 1	$f_{u,1}$		360	N/mm^2
Vloeispanning staalsoort 1	$f_{y,1}$		235	N/mm^2
Staalsoort 2: randstijl	-		S235	N/mm^2
Treksterkte staalsoort 2	$f_{u,2}$		360	N/mm^2
Vloeispanning staalsoort 2	$f_{y,2}$		235	N/mm^2
Staalsoort 3: deuvels	-		S235	N/mm^2
Treksterkte staalsoort 3	$f_{u,3}$		360	N/mm^2
Vloeispanning staalsoort 3	$f_{y,3}$		235	N/mm^2
Lassterkte deuvels paal	$f_{w,Rd}$	=$f_{u1,3}$/($w_r\beta_w\gamma_s$)	300	N/mm^2
Lassterkte deuvels randstijl	$f_{w,Rd}$	=$f_{u2,3}$/($w_r\beta_w\gamma_s$)	300	N/mm^2
Partiële factor beton	γ_c		1,50	-
Partiële factor staal	γ_s		1,25	-
Corrolatiefactor lassen	β_w		0,80	-
Reductiefactor lassen	w_r		1,2	-

Hoekprofiel randstijl			0x0x0	
Zijde	L_w		0	mm
Dikte	t_w		0	mm
Lengte verankering	L_e		0	mm

Geometrie				
Hoofdtype deuvels (zie figuren onderaan)			6	
Aantal palen per randstijl*	n_p		2	#
Type paal*			MV	
Diameter paal uitwendig (indien buispaal)	$ø_{p,out}$		n.v.t.	mm
Wanddikte paal	t_p		14,2	mm
Roestreductie paalwand	$t_{p,red}$		4	mm
Lengte paaldeuvel als % van omtrek paal	P_b		95,60%	%
Aantal lagen deuvels aan paal	$n_{b,p}$		3	#
Seperatie paaldeuvels	s_1		600	mm
Breedte deuvels/ lengte stift aan paal*	b_1		80	mm
Dikte deuvels aan fundatiepaal*	h_1		80	mm
Diameter paal inwendig (indien buispaal)	$ø_{p,in}$	=$ø_{p,out}$-2t_p	n.v.t.	mm
Inwendige omtrek paal o.b.v. tabellen	P_{in}	=[0;$ø_{p,in}$π]	628	mm
Laslengte paaldeuvel	L_b	=$P_{in}P_b$	600	mm
Oppervlakte deuvels per laag aan paal**	$A_{b,1,i}$	=[P_b($ø_{p,in}$-b_1)πb_1;$L_b$$b_1$]	22608	mm2
Deuvels aan buitenzijde randstijl	n_{out}		0	#
Deuvels aan binnenzijde randstijl	n_{in}		0	#
Seperatie randstijldeuvels	s_2		0	mm
(las)Lengte deuvel buitenzijde*	L_{out}		0	mm
Uitkragende lengte deuvel buitenzijde	e		0	mm
(las)Lengte deuvel binnenzijde*	L_{in}		0	mm
Breedte deuvels aan randstijl	b_2		0	mm
Dikte deuvels aan randstijl	h_2		0	mm
Diameter stiftdeuvel	$ø_b$		0	mm
Oppervlakte enkele deuvel buitenzijde	$A_{f1,out,i}$	=[L_{out}b;$L_{out}$$ø_b$]	0	mm^2
Oppervlakte enkele deuvel binnenzijde	$A_{f1,in,i}$	=[L_{in}b;$L_{in}$$ø_b$]	0	mm^2
Las ankerplaat|randstijl	a_1		0	mm
Las deuvel|paal	a_2		4	mm
Las deuvel|buitenzijde randstijl	a_3		0	mm
Las deuvel|binnenzijde randstijl	a_4		0	mm
Lengte rugplaat aan ankerplaat	L_{rp}		0	mm
Dikte ankerplaat/rugplaat	t_r		0	mm
n-zijden buitenrand ankerplaat	n_c		2	#
Breedte buitenrand ankerplaat	c		0	mm
Rechte zijde ankerplaat	k_{pl}		0	mm
Aanvullende reductie omvang ankerplaat	$A_{p,red2}$		0	mm^2
(Las)Lengte ankerplaat binnenzijde	L_{fp}	=[4;2](2L_w-t_w-a_1√2)	0	mm
Effectief oppervlakte ankerplaat druk	$A_{p,c}$	=$A_{p,r}$-$A_{p,red1,2}$	0	mm^2
Effectief oppervlakte ankerplaat trek	$A_{p,t}$	=$A_{p,r}$-$A_{p,red1,2}$-A_s	0	mm^2

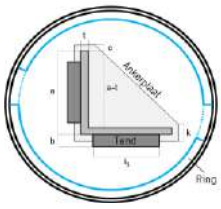
Notities

* 1xLD1+ 2xMV paal

** Gereduceerde breedte voor L80.8 profiel

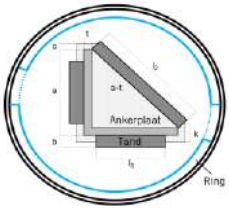
Hoofdtype 1

Tanddeuvels aan buitenzijde + ankerplaat



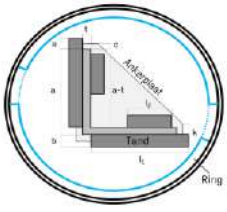
Hoofdtype 2

Tanddeuvels aan buitenzijde +
knag aan rand van de flensen + ankerplaat



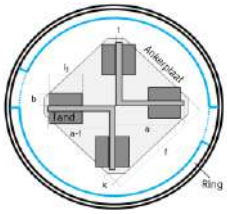
Hoofdtype 3

Tanddeuvels aan buitenzijde en binnenzijde
+ ankerplaat



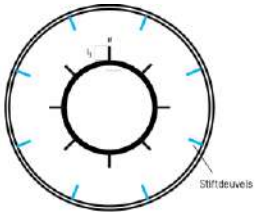
Hoofdtype 4

Tanddeuvels dubbele randstaaf + ankerplaat



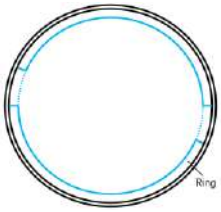
Hoofdtype 5

Stiftdeuvels aan ronde buisprofiel, geen ankerplaat



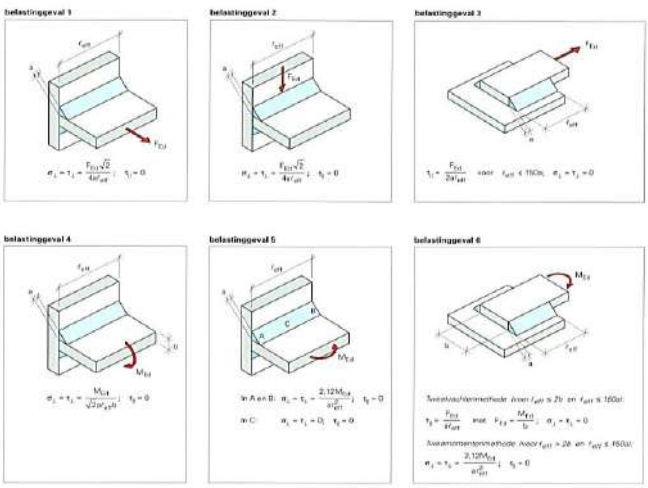
Hoofdtype 6

Enkel toetsing van knaggen aan
funderingspaal + doorsnede paal



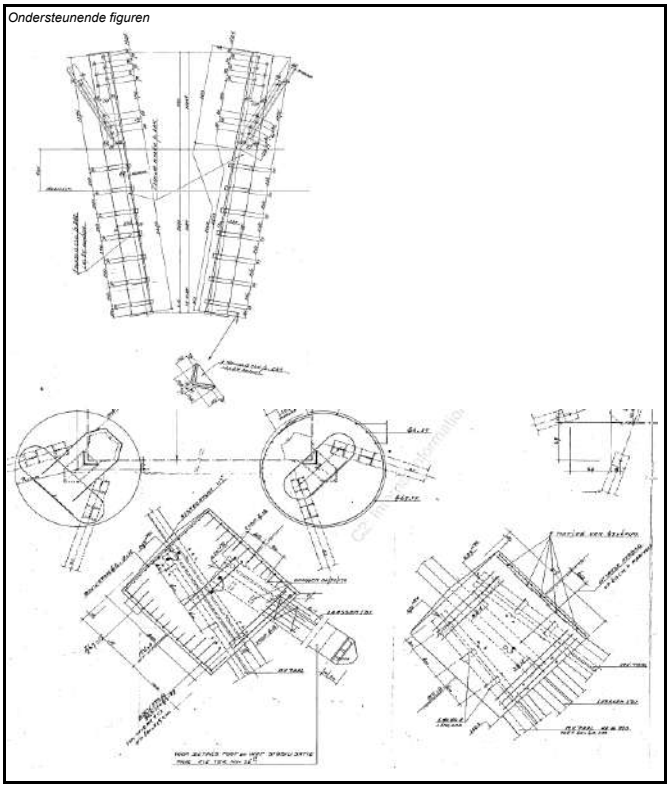
Toetsing capaciteit randstijldeuvels				
Capaciteit ankerplaat bij druk	$F_{Rd,c,p}$	$=A_{p,c}f_{cd}$	0,0	kN
Capaciteit ankerplaat bij trek	$F_{Rd,t,p}$	$=A_{p,t}f_{cd}$	0,0	kN
Capaciteit buitendeuvels	$F_{Rd,b,out}$	$=A_{rf1,out,i}f_{cd}n_{out}$	0,0	kN
Capaciteit binnendeuvels	$F_{Rd,b,in}$	$=A_{rf1,in,i}f_{cd}n_{in}$	0,0	kN
Capaciteit totaal bij druk	$F_{Rd,c}$	$=F_{Rd,c,p}+F_{Rd,b+o/i}$	0,0	kN
Capaciteit totaal bij trek	$F_{Rd,t}$	$=F_{Rd,t,p}+F_{Rd,b+o/i}$	0,0	kN
Betondrukspanning deuvels bij druk	$\sigma_{c,Ed,c}$	$=F_{ed,c}/(A_{p,c}+A_{rf,o/i})$	0,00	N/mm²
Betondrukspanning bij deuvels bij trek	$\sigma_{c,Ed,t}$	$=F_{ed,t}/(A_{p,t}+A_{rf,o/i})$	0,00	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed,c}$		0	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed,t}$		0	N/mm²
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	n.v.t.	OK
UC (betoncriterium)		$=[F_{Ed,c}/F_{Rd,c};F_{Ed,t}/F_{Rd,t}]$	n.v.t.	OK
Toetsing capaciteit paaldeuvels				
Capaciteit deuvels enkele paal	$F_{Rd,b}$	$=A_{b,i}*n_{b,p}*f_{cd}$	3283,8	kN
Betondrukspanning bij deuvels	$\sigma_{c,Ed+max}$	$=F_{Ed}/(A_{b,i}*n_b)$	22,2	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed}$		0,0	N/mm²
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=F_{Ed}/(F_{Rd,b}+F_{Rd,b,c/st})$	0,46	OK
Toetsing lassen				
Type las randstijldeuvels			Dubbelzijdig	
Type las paaldeuvels			Dubbelzijdig	
Lasspanning ankerplaat	$\sigma_{vw1,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	n.v.t.	N/mm²
Lasspanning buitendeuvels	$\sigma_{vw2,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	n.v.t.	N/mm²
Lasspanning binnendeuvels	$\sigma_{vw3,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	n.v.t.	N/mm²
Lasspanning paaldeuvels	$\sigma_{vw4,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	217	N/mm²
Maatgevende UC		$=\sigma_{vw,Ed}/f_{w,Rd}$	0,72	OK
Toetsing paalcapaciteit				
Effectieve doorsnede paal	$A_{p,eff}$	$=P_{in}(t_p-t_{p,red})$	6406	mm²
Maximale spanning in paal	$\sigma_{s,Ed}$	$=F_{Ed}/(A_{p,eff}n_p)$	235,0	N/mm²
UC doorsnede paal		$=\sigma_{s,Ed}/f_{y,1}$	1,00	OK

Lasspanningen NEN-EN 1993-1-8 p. 4.5.3						
Onderdeel	Ankerplaat	Buitendeuvels	Binnendeuvels (T3)	Binnendeuvels (T2)	Paaldeuvels	
Som σ_T	0,0	0,0	0,0	0,0	108,6	N/mm²
Som τ_T	0,0	0,0	0,0	0,0	108,6	N/mm²
Som $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 1	Ja	Nee	Nee	Nee	Nee	
M1 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M1 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M1 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 2	Nee	Ja	Ja	Nee	Ja	
M2 σ_T	0,0	0,0	0,0	0,0	73,9	N/mm²
M2 τ_T	0,0	0,0	0,0	0,0	73,9	N/mm²
M2 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 3	Nee	Nee	Nee	Ja	Nee	
M3 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M3 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M3 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 4	Nee	Ja	Ja	Nee	Ja	
M4 σ_T	0,0	0,0	0,0	0,0	34,8	N/mm²
M4 τ_T	0,0	0,0	0,0	0,0	34,8	N/mm²
M4 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 5	Nee	Nee	Nee	Nee	Nee	
M5 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M5 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M5 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 6	Nee	Nee	Nee	Nee	Nee	
M6 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M6 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M6 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²



Achterliggende logica				
Afschuifprojectievlak NEN-EN1994-2 F1.1				
Oppervlakte projectie afschuifweerstand	A_{f2}	$=A_{f2,out}+A_{f2,in}$	0	mm²
Minimale h.o.h. seperatie deuvels	s_{min}	$=[250;2*L_w]$	n.v.t.	mm
Breedte projectievlak buitendeuvels	$b_{f2,out}$	$=b_2+s_2/5$	0	mm
Lengte projectievlak buitendeuvels	$L_{f2,out}$	$=L_{out}+2s_2/5$	0	mm
Oppervlak projectie buitendeuvels	$A_{f2,out}$	$=b_{f2,out}L_{f2,out}$	0	mm²
Breedte projectievlak binnendeuvels	$b_{f2,in}$	$=b_2+s_2/5$	0	mm
Lengte projectievlak binnendeuvels	$L_{f2,in}$	$=L_{in}+2s_2/5$	0	mm
Oppervlak projectie binnendeuvels	$A_{f2,in}$	$=b_{f2,in}L_{f2,in}$	0	mm²
Breedte projectievlak paaldeuvels	$b_{f2,p}$	$=\min[b_i;b_{eff,b}]+s_i/5$	158	mm
Lengte projectievlak paaldeuvels	$L_{f2,p}$	$=L_b+2s_i/5$	840	mm
Oppervlak projectie paaldeuvels	$A_{f2,p}$	$=b_{f2,p}L_{f2,p}$	132490	mm²
Effectieve oppervlakte ankerplaat NEN-EN1993-1-8 p. 4.10				
Oppervlakte ankerplaat excl. reducties	$A_{p,i}$	$=(L_w+cn_c)^2-0,5((w+cn_c-k)^2$	0	mm²
Reductie ineffectief oppervlak ankerplaat	$A_{p,red1}$	$=0,5b_{ineff}^2$	0	mm²
Oppervlakte staalprofiel	A_s	$=(2L_w-t_w)t_w$	0	mm²
Effectieve breedte ankerplaat	b_{eff}	$=t_w+2a_1\sqrt{2}+7kt_f$	0,0	mm
Factor meewerkende breedte	k	$=\min[(t_f/t_w);1,0]$	0,00	-
Ineffectieve breedte	b_{ineff}	$=L_w+cn_c-(2c+t_w+b_{eff})+k_{pl}$	0,0	mm
Momentarm ankerplaat (voor toetsing incl. buiging)				
Momentarm ankerplaat	a_{fp}	$=[\sqrt{(2(z_1-z_2)^2)};0]$	0,0	mm
Zwaartepunt ankerplaat t.o.v. onderhoek	z_1	$=\sum A_i*z_i/A_T$	0,0	mm
Zwaartepunt randstijl t.o.v. onderhoek	z_2	$=\sum A_i*z_i/A_T$	0,0	mm
Staalspanning (voor toetsing incl. buiging)				
Weerstandsmoment ankerplaat	W_1	$=1/6*2(L_w-t_w)t_f^2$	0	mm³
Weerstandsmoment buitendeuvels	W_2	$=1/6(L_{out}-e)h_2^2$	0	mm³
Weerstandsmoment binnendeuvels	W_3	$=1/6L_{in}h_2^2$	0	mm³
Weerstandsmoment paaldeuvels	W_4	$=1/6L_ih_1^2$	640393	mm³
Staalspanning ankerplaat (druk)	$\sigma_{s,Ed,c}$	$=A_{p,c}\sigma_{c\text{-}Ed,c}a_{fp}/W_1$	0	N/mm²
Staalspanning buitendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{rf1,out,c}\sigma_{c\text{-}Ed,c}(b_2/2)/W_2$	0	N/mm²
Staalspanning binnendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{rf1,in,c}\sigma_{c\text{-}Ed,c}(b_2/2)/W_3$	0	N/mm²
Staalspanning paaldeuvels (max)	$\sigma_{s,Ed,c,t}$	$=A_i\sigma_{c\text{-}Ed,max}(b_1/2)/W_4$	31	N/mm²
Staalspanning ankerplaat (trek)	$\sigma_{s,Ed,t}$	$=A_{p,t}\sigma_{c\text{-}Ed,t}a_f/W_1$	0	N/mm²
Staalspanning buitendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{rf1,out,c}\sigma_{c\text{-}Ed,t}(b_2/2)/W_2$	0	N/mm²
Staalspanning binnendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{rf1,in,c}\sigma_{c\text{-}Ed,t}(b_2/2)/W_3$	0	N/mm²
Optionele meewerkende betondoorsnede paal				
Enkel van toepassing als krachten uit randstijl via schachtwrijving naar de paalwand overbracht kunnen worden.				
Meewerkende wapeningstaven	n_{st}		0	#
Staafdiameter	$ø_{st}$		0	mm
Materiaalkwaliteit staaf	-		-	-
Factor effectiviteit betondoorsnede	α		0,00	-
Vloeigrens	f_{yd}		0	N/mm²
Trekcapaciteit wapening	$F_{Rd,b,st}$	$=0,25n_{st}ø_{st}^2\pi F_{yd}$	0	kN
Betondoorsnede paal	$A_{c,p}$	$=\alpha*0,25P_{in}^2/\pi$	0	mm²
Druksterkte betondoorsnede	$F_{Rd,b,c}$	$=A_{c,p}f_{cd}/\gamma_c$	0	kN
Gereduceerde breedte als knaggen geprofileerd zijn volgens NEN-EN1993-1-8 p. 4.10				
Flensdikte aangelast profiel	$t_{f,b}$		8	mm
Factor meewerkende breedte (k)	k_b	$=\min[(t_{f,b}/t_{f,b});1,0]$	1,00	-
Effectieve breedte knag	$b_{eff,b}$	$=0,5(t_{f,b}+2a_2\sqrt{2}+7k_bt_{f,b})$	38	mm

Ondersteunende figuren



Toetsing inleiding krachten in fundering

Projectnaam	Opwaardering KIJ-BVW 380kV	**Rekensheet versie**	3.1
Lijn	KIJ-DIM Ronde Venen	**Datum**	1-2-2026
Subtype deuvels aan randstijl	K	**Auteur**	[redacted]
Subtype deuvels aan paal	C6	**Eerste interne controle**	Mauny Bahri (RO)
Mastnummer(s)	155	**Tweede interne controle**	[redacted]

Samenvatting	UC	Check	F_{Rd}	
Maatgevende unity check	**1,00**	OK		
Max UC randstijldeuvels beton	1,00	OK	D:4154 T:3936	kN
Max UC paaldeuvels beton	0,93	OK	4452	kN
Max UC lassen	0,58	OK	7175	kN
Max UC staalciteria	0,43	OK	9574	kN
Trekkracht uit randstijl	$F_{Ed,t}$		*3935*	kN
Drukkracht uit randstijl	$F_{Ed,c}$		*4153*	kN
Spanningsbegrenzing		$=0,7f_{cd}$	Nee	
Toetsing incl. buiging			Nee	
Toetsing incl. las reductie		$=f_w/1,2$	Ja	

Zie voor de maximaal optredende paalkrachten het constructief rapport

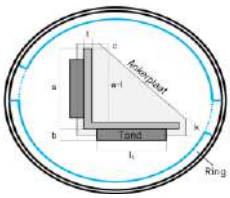
Materialen				
Betonkwaliteit	-		C30/37	
Beton omsloten	-		Ja	
Karakteristieke druksterkte	f_{ck}		30	N/mm^2
Verhogingsfactor druksterkte	C_a	$=\min[\sqrt{(A_{f2}/A_{f1})};2,5]$	1,26	-
Verhoogde druksterkte	f_{jk}	$=f_{ck}C_a$	37,80	N/mm^2
Betondruksterkte	f_{cd}	$=f_{jk}/\gamma_c$	25,20	N/mm^2
Staalsoort 1: funderingspaal	-		S235	N/mm^2
Treksterkte staalsoort 1	$f_{u,1}$		360	N/mm^2
Vloeispanning staalsoort 1	$f_{y,1}$		235	N/mm^2
Staalsoort 2: randstijl	-		S235	N/mm^2
Treksterkte staalsoort 2	$f_{u,2}$		360	N/mm^2
Vloeispanning staalsoort 2	$f_{y,2}$		235	N/mm^2
Staalsoort 3: deuvels	-		S235	N/mm^2
Treksterkte staalsoort 3	$f_{u,3}$		360	N/mm^2
Vloeispanning staalsoort 3	$f_{y,3}$		235	N/mm^2
Lassterkte deuvels paal	$f_{w,Rd}$	$=f_{u1,3}/(w_i\beta_w\gamma_s)$	300	N/mm^2
Lassterkte deuvels randstijl	$f_{w,Rd}$	$=f_{u2,3}/(w_i\beta_w\gamma_s)$	300	N/mm^2
Partiële factor beton	γ_c		1,50	-
Partiële factor staal	γ_s		1,25	-
Corrolatiefactor lassen	β_w		0,80	-
Reductiefactor lassen	w_i		1,2	-

Hoekprofiel randstijl			250x250x18	
Zijde	L_w		250	mm
Dikte	t_w		18	mm
Lengte verankering	L_e		1140	mm

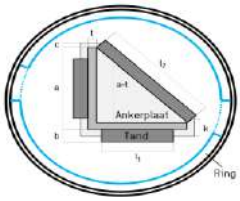
Geometrie				
Hoofdtype deuvels (zie figuren onderaan)			2	
Aantal palen per randstijl*	n_p		4	#
Type paal*			Buispaal	
Diameter paal uitwendig (indien buispaal)	$ø_{p,out}$		406,4	mm
Wanddikte paal	t_p		12,5	mm
Roestreductie paalwand	$t_{p,red}$		4	mm
Lengte paaldeuvel als % van omtrek paal	P_b		52,60%	%
Aantal lagen deuvels aan paal	$n_{b,p}$		3	#
Seperatie paaldeuvels	s_1		200	mm
Breedte deuvels/ lengte stift aan paal*	b_1		25	mm
Dikte deuvels aan fundatiepaal*	h_1		25	mm
Diameter paal inwendig (indien buispaal)	$ø_{p,in}$	$=ø_{p,out}-2t_p$	381,4	mm
Inwendige omtrek paal o.b.v. paaldiameter	P_{in}	$=[0;ø_{p,in}\pi]$	1198	mm
Laslengte paaldeuvel	L_b	$=P_{in}P_b$	630	mm
Oppervlakte deuvels per laag aan paal**	$A_{b,1,i}$	$=[P_b(ø_{p,in}-b_1)\pi b_1;L_b b_1]$	14724	mm2
Deuvels aan buitenzijde randstijl	n_{out}		10	#
Deuvels aan binnenzijde randstijl	n_{in}		4	#
Seperatie randstijldeuvels	s_2		100	mm
(las)Lengte deuvel buitenzijde*	L_{out}		260	mm
Uitkragende lengte deuvel buitenzijde	e		20	mm
(las)Lengte deuvel binnenzijde*	L_{in}		370	mm
Breedte deuvels aan randstijl	b_2		30	mm
Dikte deuvels aan randstijl	h_2		50	mm
Diameter stiftdeuvel	$ø_b$		0	mm
Oppervlakte enkele deuvel buitenzijde	$A_{f1,out,i}$	$=[L_{out}b;L_{out}ø_b]$	7800	mm^2
Oppervlakte enkele deuvel binnenzijde	$A_{f1,in,i}$	$=[L_{in}b;L_{in}ø_b]$	11100	mm^2
Las ankerplaat|randstijl	a_1		10	mm
Las deuvel|paal	a_2		6	mm
Las deuvel|buitenzijde randstijl	a_3		10	mm
Las deuvel|binnenzijde randstijl	a_4		10	mm
Lengte rugplaat aan ankerplaat	L_{rp}		0	mm
Dikte ankerplaat/rugplaat	t_f		20	mm
n-zijden buitenrand ankerplaat	n_c		1	#
Breedte buitenrand ankerplaat	c		30	mm
Rechte zijde ankerplaat	k_{pl}		37	mm
Aanvullende reductie omvang ankerplaat	$A_{p,red2}$		5016	mm^2
(Las)Lengte ankerplaat binnenzijde	L_{ip}	$=[4;2](L_w-t_w-a_3\sqrt{2})$	436	mm
Effectief oppervlakte ankerplaat druk	$A_{p,c}$	$=A_{p,i}-A_{p,red1,2}$	42470	mm^2
Effectief oppervlakte ankerplaat trek	$A_{p,t}$	$=A_{p,i}-A_{p,red1,2}-A_s$	33794	mm^2

Notities

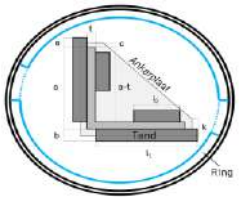
Hoofdtype 1
Tanddeuvels aan buitenzijde + ankerplaat



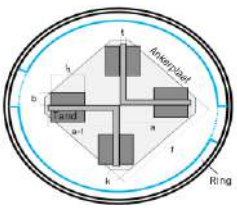
Hoofdtype 2
Tanddeuvels aan buitenzijde +
knag aan rand van de flensen + ankerplaat



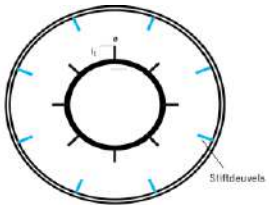
Hoofdtype 3
Tanddeuvels aan buitenzijde en binnenzijde
+ ankerplaat



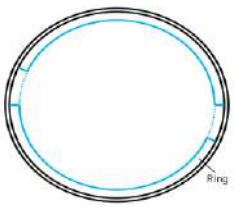
Hoofdtype 4
Tanddeuvels dubbele randstaaf + ankerplaat



Hoofdtype 5
Stiftdeuvels aan ronde buisprofiel, geen ankerplaat

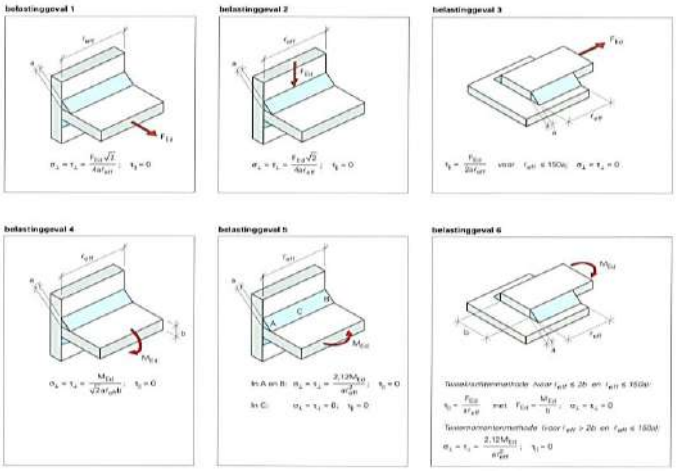


Hoofdtype 6
Enkel toetsing van knaggen aan
funderingspaal + doorsnede paal



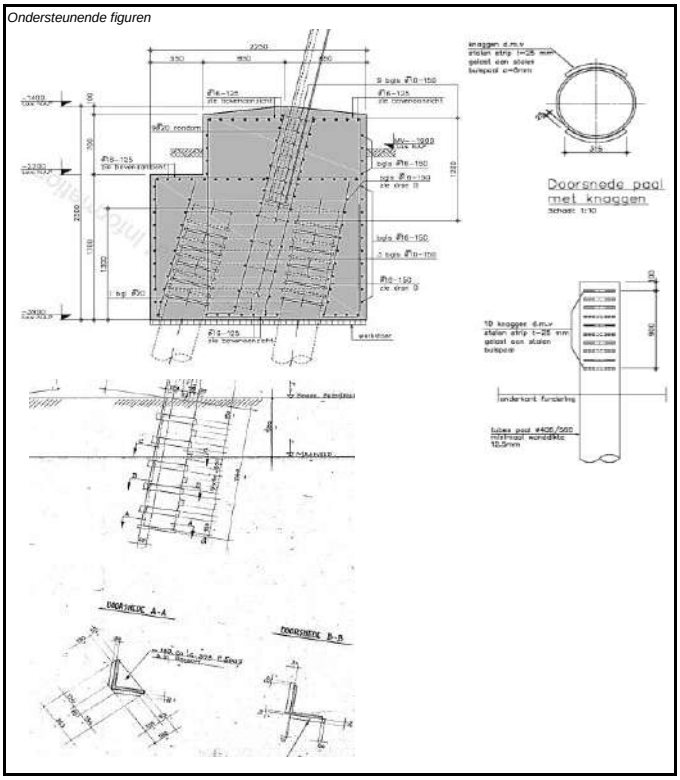
Toetsing capaciteit randstijldeuvels				
Capaciteit ankerplaat bij druk	$F_{Rd,c,p}$	$=A_{p,c}f_{cd}$	1070,1	kN
Capaciteit ankerplaat bij trek	$F_{Rd,t,p}$	$=A_{p,t}f_{cd}$	851,5	kN
Capaciteit buitendeuvels	$F_{Rd,b,out}$	$=A_{t1,out,i}f_{cd}n_{out}$	1965,4	kN
Capaciteit binnendeuvels	$F_{Rd,b,in}$	$=A_{t1,in,i}f_{cd}n_{in}$	1118,8	kN
Capaciteit totaal bij druk	$F_{Rd,c}$	$=F_{Rd,c,p}+F_{Rd,b+o/i}$	4154,3	kN
Capaciteit totaal bij trek	$F_{Rd,t}$	$=F_{Rd,t,p}+F_{Rd,b+o/i}$	3935,7	kN
Betondrukspanning deuvels bij druk	$\sigma_{c,Ed,c}$	$=F_{ed,c}/(A_{p,c}+A_{t,o/i})$	25,19	N/mm^2
Betondrukspanning bij deuvels bij trek	$\sigma_{c,Ed,t}$	$=F_{ed,t}/(A_{p,t}+A_{t,o/i})$	25,19	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed,c}$		0	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed,t}$		0	N/mm^2
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,s}$	0,00	OK
UC (betoncriterium)		$=[F_{Ed,c}/F_{Rd,c};F_{Ed,t}/F_{Rd,t}]$	1,00	OK
Toetsing capaciteit paaldeuvels				
Capaciteit deuvels enkele paal	$F_{Rd,b}$	$=A_{b,i}*n_{b,p}*f_{cd}$	1113,0	kN
Betondrukspanning bij deuvels	$\sigma_{c,Ed+max}$	$=F_{Ed}/(A_{b,i}*n_b)$	22,3	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed}$		0,0	N/mm^2
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,s}$	0,00	OK
UC (betoncriterium)		$=F_{Ed}/(F_{Rd,b}+F_{Rd,b,c/st})$	0,93	OK
Toetsing lassen				
Type las randstijldeuvels			Dubbelzijdig	
Type las paaldeuvels			Dubbelzijdig	
Lasspanning ankerplaat	$\sigma_{vw1,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	173,6	N/mm^2
Lasspanning buitendeuvels	$\sigma_{vw2,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	92,6	N/mm^2
Lasspanning binnendeuvels	$\sigma_{vw3,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	0,0	N/mm^2
Lasspanning paaldeuvels	$\sigma_{vw4,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	123	N/mm^2
Maatgevende UC		$=\sigma_{vw,Ed}/f_{w,Rd}$	0,58	OK
Toetsing paalcapaciteit				
Effectieve doorsnede paal	$A_{p,eff}$	$=P_{in}(t_p-t_{p,red})$	10185	mm^2
Maximale spanning in paal	$\sigma_{s,Ed}$	$=F_{Ed}/(A_{p,eff}n_p)$	101,9	N/mm^2
UC doorsnede paal		$=\sigma_{s,Ed}/f_{y,s}$	0,43	OK

Lasspanningen NEN-EN 1993-1-8 p. 4.5.3						
Onderdeel	Ankerplaat	Buitendeuvels	Binnendeuvels (T3)	Binnendeuvels (T2)	Paaldeuvels	
Som σ_T	86,8	46,3	42,8	0,0	61,3	N/mm^2
Som τ_T	86,8	46,3	42,8	0,0	61,3	N/mm^2
Som $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 1	Ja	Nee	Nee	Nee	Nee	
M1 σ_T	86,8	0,0	0,0	0,0	0,0	N/mm^2
M1 τ_T	86,8	0,0	0,0	0,0	0,0	N/mm^2
M1 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 2	Nee	Ja	Ja	Nee	Ja	
M2 σ_T	0,0	28,9	26,7	0,0	30,7	N/mm^2
M2 τ_T	0,0	28,9	26,7	0,0	30,7	N/mm^2
M2 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 3	Nee	Nee	Nee	Ja	Nee	
M3 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M3 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M3 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 4	Nee	Ja	Ja	Nee	Ja	
M4 σ_T	0,0	17,4	16,0	0,0	30,7	N/mm^2
M4 τ_T	0,0	17,4	16,0	0,0	30,7	N/mm^2
M4 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 5	Nee	Nee	Nee	Nee	Nee	
M5 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M5 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M5 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 6	Nee	Nee	Nee	Nee	Nee	
M6 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M6 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M6 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2



Achterliggende logica				
Afschuifprojectievlak NEN-EN1994-2 F1.1				
Oppervlakte projectie afschuifweerstand	A_{t2}	$=A_{t2,out}+A_{t2,in}$	30000	mm^2
Minimale h.o.h. seperatie deuvels	s_{min}	$=[250;2*L_w]$	n.v.t.	mm
Breedte projectievlak buitendeuvels	$b_{t2,out}$	$=b_2+s_2/5$	50	mm
Lengte projectievlak buitendeuvels	$L_{t2,out}$	$=L_{,out}+2s_2/5$	300	mm
Oppervlak projectie buitendeuvels	$A_{t2,out}$	$=b_{t2,out}L_{t2,out}$	15000	mm^2
Breedte projectievlak binnendeuvels	$b_{t2,in}$	$=b_2+s_2/5$	50	mm
Lengte projectievlak binnendeuvels	L_{t2+in}	$=L_{,in}+2s_2/5$	300	mm
Oppervlak projectie binnendeuvels	$A_{t2,in}$	$=b_{t2,in}L_{t2,in}$	15000	mm^2
Breedte projectievlak paaldeuvels	$b_{t2,p}$	$=\min[b_1;b_{eff,b}]+s_1/5$	65	mm
Lengte projectievlak paaldeuvels	$L_{t2,p}$	$=L_b+2s_1/5$	710	mm
Oppervlak projectie paaldeuvels	$A_{t2,p}$	$=b_{t2,p}L_{t2,p}$	46167	mm^2
Effectieve oppervlakte ankerplaat NEN-EN1993-1-8 p. 4.10				
Oppervlakte ankerplaat excl. reducties	$A_{p,i}$	$=(L_w+cn_c)^2-0,5((w+cn_c-k)^2$	48875,5	mm^2
Reductie ineffectief oppervlak ankerplaat	$A_{p,red1}$	$=0,5b_{ineff}^2$	1389	mm^2
Oppervlakte staalprofiel	A_s	$=(2L_w-t_w)t_w$	8676	mm^2
Effectieve breedte ankerplaat	b_{eff}	$=t_w+2a_1\sqrt{2}+7kt_f$	186,3	mm
Factor meewerkende breedte	k	$=\min[(t_f/t_w);1,0]$	1,00	-
Ineffectieve breedte	b_{ineff}	$=L_w+cn_c-(2c+t_w+b_{eff})+k_{pl}$	52,7	mm
Momentarm ankerplaat (voor toetsing incl. buiging)				
Momentarm ankerplaat	a_{fp}	$=[\sqrt{(2(z_1-z_2)^2)};0]$	7,3	mm
Zwaartepunt ankerplaat t.o.v. onderhoek	z_1	$=\Sigma A_i*z_i/A_T$	104,4	mm
Zwaartepunt randstijl t.o.v. onderhoek	z_2	$=\Sigma A_i*z_i/A_T$	99,2	mm
Staalspanning (voor toetsing incl. buiging)				
Weerstandsmoment ankerplaat	W_1	$=1/6*2(L_w-t_w)t_f^2$	30933	mm^3
Weerstandsmoment buitendeuvels	W_2	$=1/6(L_{out}-e)h_2^2$	100000	mm^3
Weerstandsmoment binnendeuvels	W_3	$=1/6L_{in}h_2^2$	12500	mm^3
Weerstandsmoment paaldeuvels	W_4	$=1/6L_ih_1^2$	65652	mm^3
Staalspanning ankerplaat (druk)	$\sigma_{s,Ed,c}$	$=A_{p,c}\sigma_{c,Ed,c}a_{fp}/W_1$	254	N/mm^2
Staalspanning buitendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{t1,out,c}\sigma_{c,Ed,c}(b_2/2)/W_2$	29	N/mm^2
Staalspanning binnendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{t1,in,c}\sigma_{c,Ed,c}(b_2/2)/W_3$	1034,534379	N/mm^2
Staalspanning paaldeuvels (max)	$\sigma_{s,Ed,c,t}$	$=A_i\sigma_{c,Ed,max}(b_1/2)/W_4$	62	N/mm^2
Staalspanning ankerplaat (trek)	$\sigma_{s,Ed,t}$	$=A_{p,t}\sigma_{c,Ed,t}a_f/W_1$	202	N/mm^2
Staalspanning buitendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{t1,out,c}\sigma_{c,Ed,t}(b_2/2)/W_2$	29	N/mm^2
Staalspanning binnendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{t1,in,c}\sigma_{c,Ed,t}(b_2/2)/W_3$	1035	N/mm^2
Optionele meewerkende betondoorsnede paal				
Enkel van toepassing als krachten uit randstijl via schachtwrijving naar de paalwand overbracht kunnen worden.				
Meewerkende wapeningstaven	n_{st}		0	#
Staafdiameter	$ø_{st}$		0	mm
Materiaalkwaliteit staaf	-		-	-
Factor effectiviteit betondoorsnede	α		0,00	-
Vloeigrens	f_{yd}		0	N/mm^2
Trekcapaciteit wapening	$F_{Rd,b,st}$	$=0,25n_{st}ø_{st}^2\pi F_{yd}$	0	kN
Betondoorsnede paal	$A_{c,p}$	$=α*0,25P_{in}^2/\pi$	0	mm^2
Druksterkte betondoorsnede	$F_{Rd,b,c}$	$=A_{c,p}f_{ck}/\gamma_c$	0	kN
Gereduceerde breedte als knaggen geprofileerd zijn volgens NEN-EN1993-1-8 p. 4.10				
Flensdikte aangelast profiel	$t_{f,b}$		0	mm
Factor meewerkende breedte (k)	k_b	$=\min[(t_{f,b}/t_{f,b});1,0]$	0,00	-
Effectieve breedte knag	$b_{eff,b}$	$=0,5(t_{f,b}+2a_2\sqrt{2}+7k_bt_{f,b})$	0	mm

Ondersteunende figuren



Toetsing inleiding krachten in fundering

Projectnaam	Opwaardering KIJ-BVW 380kV	**Rekensheet versie**	3.1
Lijn	KIJ-DIM	**Datum**	1-2-2026
Subtype deuvels aan randstijl	M	**Auteur**	[redacted]
Subtype deuvels aan paal	C7	**Eerste interne controle**	Mauny Bahri (RO)
Mastnummer(s)	154	**Tweede interne controle**	[redacted]

Samenvatting	UC	Check	F_{Rd}	
Maatgevende unity check	**1,00**	OK		
Max UC randstijldeuvels beton	1,00	OK	D:1663 T:1663	kN
Max UC paaldeuvels beton	0,79	OK	2101	kN
Max UC lassen	0,69	OK	2406	kN
Max UC staalciteria	0,35	OK	4787	kN
Trekkracht uit randstijl	$F_{Ed,t}$		*1662*	kN
Drukkracht uit randstijl	$F_{Ed,c}$		*1662*	kN
Spanningsbegrenzing		$=0,7f_{cd}$	Nee	
Toetsing incl. buiging			Nee	
Toetsing incl. las reductie		$=f_w/1,2$	Ja	

Zie voor de maximaal optredende paalkrachten het constructief rapport

Materialen				
Betonkwaliteit	-		C30/37	
Beton omsloten	-		Ja	
Karakteristieke druksterkte	f_{ck}		30	N/mm^2
Verhogingsfactor druksterkte	C_a	$=min[\sqrt{(A_{f2}/A_{f1})};2,5]$	1,76	-
Verhoogde druksterkte	f_{jk}	$=f_{ck}C_a$	52,78	N/mm^2
Betondruksterkte	f_{cd}	$=f_{jk}/\gamma_c$	35,19	N/mm^2
Staalsoort 1: funderingspaal	-		S235	N/mm^2
Treksterkte staalsoort 1	$f_{u,1}$		360	N/mm^2
Vloeispanning staalsoort 1	$f_{y,1}$		235	N/mm^2
Staalsoort 2: randstijl	-		S235	N/mm^2
Treksterkte staalsoort 2	$f_{u,2}$		360	N/mm^2
Vloeispanning staalsoort 2	$f_{y,2}$		235	N/mm^2
Staalsoort 3: deuvels	-		S235	N/mm^2
Treksterkte staalsoort 3	$f_{u,3}$		360	N/mm^2
Vloeispanning staalsoort 3	$f_{y,3}$		235	N/mm^2
Lassterkte deuvels paal	$f_{w,Rd}$	$=f_{u1,3}/(w_r\beta_w\gamma_s)$	300	N/mm^2
Lassterkte deuvels randstijl	$f_{w,Rd}$	$=f_{u2,3}/(w_r\beta_w\gamma_s)$	300	N/mm^2
Partiële factor beton	γ_c		1,50	-
Partiële factor staal	γ_s		1,25	-
Corrolatiefactor lassen	β_w		0,80	-
Reductiefactor lassen	w_r		1,2	-

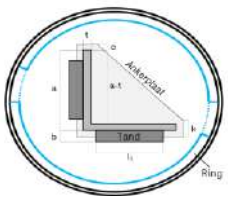
Hoekprofiel randstijl			0x0x0	
Zijde	L_w		0	mm
Dikte	t_w		0	mm
Lengte verankering	L_e		950	mm

Geometrie				
Hoofdtype deuvels (zie figuren onderaan)			1	
Aantal palen per randstijl*	n_p		2	#
Type paal*			Buispaal	
Diameter paal uitwendig (indien buispaal)	$ø_{p,out}$		406,4	mm
Wanddikte paal	t_p		12,5	mm
Roestreductie paalwand	$t_{p,red}$		4	mm
Lengte paaldeuvel als % van omtrek paal	P_b		30,05%	%
Aantal lagen deuvels aan paal	$n_{b,p}$		3	#
Seperatie paaldeuvels	s_1		200	mm
Breedte deuvels/ lengte stift aan paal*	b_1		30	mm
Dikte deuvels aan fundatiepaal*	h_1		30	mm
Diameter paal inwendig (indien buispaal)	$ø_{p,in}$	$=ø_{p,out}-2t_p$	381,4	mm
Inwendige omtrek paal o.b.v. paaldiameter	P_{in}	$=[0;ø_{p,in}\pi]$	1198	mm
Laslengte paaldeuvel	L_b	$=P_{in}P_b$	360	mm
Oppervlakte deuvels per laag aan paal**	$A_{b,1,i}$	$=[P_b(ø_{p,in}-b_1)\pi b_1;L_b b_1]$	9952	mm2
Deuvels aan buitenzijde randstijl	n_{out}		6	#
Deuvels aan binnenzijde randstijl	n_{in}		0	#
Seperatie randstijldeuvels	s_2		200	mm
(las)Lengte deuvel buitenzijde*	L_{out}		315	mm
Uitkragende lengte deuvel buitenzijde	e		0	mm
(las)Lengte deuvel binnenzijde*	L_{in}		0	mm
Breedte deuvels aan randstijl	b_2		25	mm
Dikte deuvels aan randstijl	h_2		25	mm
Diameter stiftdeuvel	$ø_b$		0	mm
Oppervlakte enkele deuvel buitenzijde	$A_{f1,out,i}$	$=[L_{out}b;L_{out}ø_b]$	7875	mm^2
Oppervlakte enkele deuvel binnenzijde	$A_{f1,in,i}$	$=[L_{in}b;L_{in}ø_b]$	0	mm^2
Las ankerplaat|randstijl	a_1		0	mm
Las deuvel|paal	a_2		6	mm
Las deuvel|buitenzijde randstijl	a_3		6	mm
Las deuvel|binnenzijde randstijl	a_4		0	mm
Lengte rugplaat aan ankerplaat	L_{rp}		0	mm
Dikte ankerplaat/rugplaat	t_r		0	mm
n-zijden buitenrand ankerplaat	n_c		1	#
Breedte buitenrand ankerplaat	c		0	mm
Rechte zijde ankerplaat	k_{pl}		0	mm
Aanvullende reductie omvang ankerplaat	$A_{p,red2}$		0	mm^2
(Las)Lengte ankerplaat binnenzijde	L_{fp}	$=[4;2](L_w-t_w-a_1\sqrt{2})$	0	mm
Effectief oppervlakte ankerplaat druk	$A_{p,c}$	$=A_{p,r}-A_{p,red1,2}$	0	mm^2
Effectief oppervlakte ankerplaat trek	$A_{p,t}$	$=A_{p,r}-A_{p,red1,2}-A_s$	0	mm^2

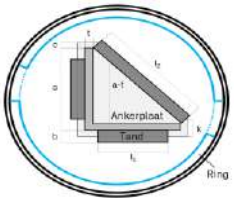
Notities

* 1xLP2S+ 2xBP406/560
** Knaggen aan buitenzijde LP2S paal
*** Capaciteit strippen aan randstijl/LP2S paal
is met een handberekening bepaald op 1990kN o.b.v. lassen
de randstijl betreft hier de knaggen aan de buitenzijde van de LP2S paal

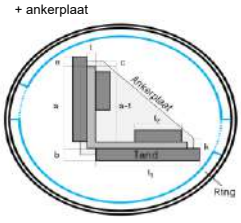
Hoofdtype 1
Tanddeuvels aan buitenzijde + ankerplaat



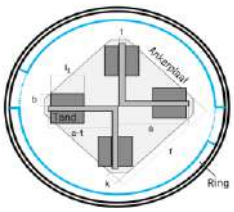
Hoofdtype 2
Tanddeuvels aan buitenzijde +
knag aan rand van de flensen + ankerplaat



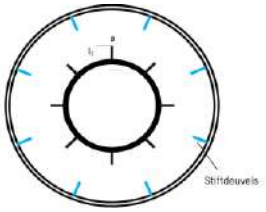
Hoofdtype 3
Tanddeuvels aan buitenzijde en binnenzijde
+ ankerplaat



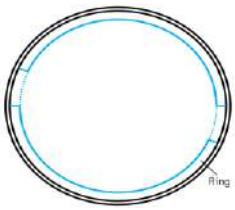
Hoofdtype 4
Tanddeuvels dubbele randstaaf + ankerplaat



Hoofdtype 5
Stiftdeuvels aan ronde buisprofiel, geen ankerplaat



Hoofdtype 6
Enkel toetsing van knaggen aan
funderingspaal + doorsnede paal

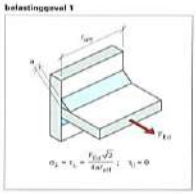


Toetsing capaciteit randstijldeuvels				
Capaciteit ankerplaat bij druk	$F_{Rd,c,p}$	$=A_{p,c}f_{cd}$	0,0	kN
Capaciteit ankerplaat bij trek	$F_{Rd,t,p}$	$=A_{p,t}f_{cd}$	0,0	kN
Capaciteit buitendeuvels	$F_{Rd,b,out}$	$=A_{f1,out,i}f_{cd}n_{out}$	1662,6	kN
Capaciteit binnendeuvels	$F_{Rd,b,in}$	$=A_{f1,in,i}f_{cd}n_{in}$	0,0	kN
Capaciteit totaal bij druk	$F_{Rd,c}$	$=F_{Rd,c,p}+F_{Rd,b+o/i}$	1662,6	kN
Capaciteit totaal bij trek	$F_{Rd,t}$	$=F_{Rd,t,p}+F_{Rd,b+o/i}$	1662,6	kN
Betondrukspanning deuvels bij druk	$\sigma_{c,Ed,c}$	$=F_{ed,c}/(A_{p,c}+A_{f,o/i})$	35,17	N/mm²
Betondrukspanning bij deuvels bij trek	$\sigma_{c,Ed,t}$	$=F_{ed,t}/(A_{p,t}+A_{f,o/i})$	35,17	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed,c}$		0	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed,t}$		0	N/mm²
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=[F_{Ed,c}/F_{Rd,c};F_{Ed,t}/F_{Rd,t}]$	1,00	OK
Toetsing capaciteit paaldeuvels				
Capaciteit deuvels enkele paal	$F_{Rd,b}$	$=A_{b,i}*n_{b,p}*f_{cd}$	1050,5	kN
Betondrukspanning bij deuvels	$\sigma_{c,Ed+max}$	$=F_{Ed}/(A_{b,i}*n_b)$	27,8	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed}$		0,0	N/mm²
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=F_{Ed}/(F_{Rd,b}+F_{Rd,b,c/st})$	0,79	OK
Toetsing lassen				
Type las randstijldeuvels			Dubbelzijdig	
Type las paaldeuvels			Dubbelzijdig	
Lasspanning ankerplaat	$\sigma_{vw1,Ed}$	$=\sqrt{(\sigma_\perp^2+3(\tau_T^2+\tau_{//}^2))}$	0,0	N/mm²
Lasspanning buitendeuvels	$\sigma_{vw2,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	207,3	N/mm²
Lasspanning binnendeuvels	$\sigma_{vw3,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	n.v.t.	N/mm²
Lasspanning paaldeuvels	$\sigma_{vw4,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	181	N/mm²
Maatgevende UC		$=\sigma_{vw,Ed}/f_{w,Rd}$	0,69	OK
Toetsing paalcapaciteit				
Effectieve doorsnede paal	$A_{p,eff}$	$=P_{in}(t_p-t_{p,red})$	10185	mm²
Maximale spanning in paal	$\sigma_{s,Ed}$	$=F_{Ed}/(A_{p,eff}n_p)$	81,6	N/mm²
UC doorsnede paal		$=\sigma_{s,Ed}/f_{y,1}$	0,35	OK

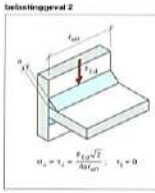
Lasspanningen NEN-EN 1993-1-8 p. 4.5.3						
Onderdeel	Ankerplaat	Buitendeuvels	Binnendeuvels (T3)	Binnendeuvels (T2)	Paaldeuvels	
Som σ_T	0,0	103,6	0,0	0,0	90,7	N/mm²
Som τ_T	0,0	103,6	0,0	0,0	90,7	N/mm²
Som $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 1	Ja	Nee	Nee	Nee	Nee	
M1 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M1 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M1 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 2	Nee	Ja	Ja	Nee	Ja	
M2 σ_T	0,0	51,8	0,0	0,0	45,3	N/mm²
M2 τ_T	0,0	51,8	0,0	0,0	45,3	N/mm²
M2 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 3	Nee	Nee	Nee	Ja	Nee	
M3 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M3 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M3 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 4	Nee	Ja	Ja	Nee	Ja	
M4 σ_T	0,0	51,8	0,0	0,0	45,3	N/mm²
M4 τ_T	0,0	51,8	0,0	0,0	45,3	N/mm²
M4 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 5	Nee	Nee	Nee	Nee	Nee	
M5 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M5 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M5 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 6	Nee	Nee	Nee	Nee	Nee	
M6 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M6 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M6 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²

Achterliggende logica				
Afschuifprojectievlak NEN-EN1994-2 F1.1				
Oppervlakte projectie afschuifweerstand	A_{f2}	$=A_{f2,out}+A_{f2,in}$	25675	mm²
Minimale h.o.h. seperatie deuvels	s_{min}	$=[250;2*L_w]$	n.v.t.	mm
Breedte projectievlak buitendeuvels	$b_{f2,out}$	$=b_2+s_2/5$	65	mm
Lengte projectievlak buitendeuvels	$L_{f2,out}$	$=L_{out}+2s_2/5$	395	mm
Oppervlak projectie buitendeuvels	$A_{f2,out}$	$=b_{f2,out}L_{f2,out}$	25675	mm²
Breedte projectievlak binnendeuvels	$b_{f2,in}$	$=b_2+s_2/5$	0	mm
Lengte projectievlak binnendeuvels	$L_{f2,in}$	$=L_{in}+2s_2/5$	0	mm
Oppervlak projectie binnendeuvels	$A_{f2,in}$	$=b_{f2,in}L_{f2,in}$	0	mm²
Breedte projectievlak paaldeuvels	$b_{f2,p}$	$=\min[b_i;b_{eff,b}]+s_1/5$	70	mm
Lengte projectievlak paaldeuvels	$L_{f2,p}$	$=L_b+2s_1/5$	440	mm
Oppervlak projectie paaldeuvels	$A_{f2,p}$	$=b_{f2,p}L_{f2,p}$	30804	mm²
Effectieve oppervlakte ankerplaat NEN-EN1993-1-8 p. 4.10				
Oppervlakte ankerplaat excl. reducties	$A_{p,i}$	$=(L_w+cn_c)^2-0,5((w+cn_c-k)^2$	0	mm²
Reductie ineffectief oppervlak ankerplaat	$A_{p,red1}$	$=0,5b_{ineff}^2$	0	mm²
Oppervlakte staalprofiel	A_s	$=(2L_w-t_w)t_w$	0	mm²
Effectieve breedte ankerplaat	b_{eff}	$=t_w+2a_1\sqrt{2}+7kt_f$	0,0	mm
Factor meewerkende breedte	k	$=\min[(t_f/t_w);1,0]$	0,00	-
Ineffectieve breedte	b_{ineff}	$=L_w+cn_c-(2c+t_w+b_{eff})+k_{pl}$	0,0	mm
Momentarm ankerplaat (voor toetsing incl. buiging)				
Momentarm ankerplaat	a_{fp}	$=[\sqrt{(2(z_1-z_2)^2)};0]$	0,0	mm
Zwaartepunt ankerplaat t.o.v. onderhoek	z_1	$=\sum A^*z_i/A_T$	0,0	mm
Zwaartepunt randstijl t.o.v. onderhoek	z_2	$=\sum A^*z_i/A_T$	0,0	mm
Staalspanning (voor toetsing incl. buiging)				
Weerstandsmoment ankerplaat	W_1	$=1/6*2(L_w-t_w)t_f^2$	0	mm³
Weerstandsmoment buitendeuvels	W_2	$=1/6(L_{out}-e)h_2^2$	32813	mm³
Weerstandsmoment binnendeuvels	W_3	$=1/6L_{in}h_2^2$	0	mm³
Weerstandsmoment paaldeuvels	W_4	$=1/6L_ph_1^2$	54009	mm³
Staalspanning ankerplaat (druk)	$\sigma_{s,Ed,c}$	$=A_{p,c}\sigma_{c,Ed,c}a_{fp}/W_1$	0	N/mm²
Staalspanning buitendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{f1,out,c}\sigma_{c,Ed,c}(b_2/2)/W_2$	106	N/mm²
Staalspanning binnendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{f1,in,c}\sigma_{c,Ed,c}(b_2/2)/W_3$	0	N/mm²
Staalspanning paaldeuvels (max)	$\sigma_{s,Ed,c,t}$	$=A_i\sigma_{c,Ed,max}(b_1/2)/W_4$	77	N/mm²
Staalspanning ankerplaat (trek)	$\sigma_{s,Ed,t}$	$=A_{p,t}\sigma_{c,Ed,t}a_f/W_1$	0	N/mm²
Staalspanning buitendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{f1,out,c}\sigma_{c,Ed,t}(b_2/2)/W_2$	106	N/mm²
Staalspanning binnendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{f1,in,c}\sigma_{c,Ed,t}(b_2/2)/W_3$	0	N/mm²
Optionele meewerkende betondoorsnede paal				
Enkel van toepassing als krachten uit randstijl via schachtwrijving naar de paalwand overbracht kunnen worden.				
Meewerkende wapeningstaven	n_{st}		0	#
Staafdiameter	$ø_{st}$		0	mm
Materiaalkwaliteit staaf	-		-	-
Factor effectiviteit betondoorsnede	α		0,00	-
Vloeigrens	f_{yd}		0	N/mm²
Trekcapaciteit wapening	$F_{Rd,b,st}$	$=0,25n_{st}ø_{st}^2\pi F_{yd}$	0	kN
Betondoorsnede paal	$A_{c,p}$	$=\alpha*0,25P_{in}^2/\pi$	0	mm²
Druksterkte betondoorsnede	$F_{Rd,b,c}$	$=A_{c,p}f_{cd}/\gamma_c$	0	kN
Gereduceerde breedte als knaggen geprofileerd zijn volgens NEN-EN1993-1-8 p. 4.10				
Flensdikte aangelast profiel	$t_{f,b}$		0	mm
Factor meewerkende breedte (k)	k_b	$=\min[(t_{f,b}/t_{f,b});1,0]$	0,00	-
Effectieve breedte knag	$b_{eff,b}$	$=0,5(t_{f,b}+2a_2\sqrt{2}+7k_bt_{f,b})$	0	mm

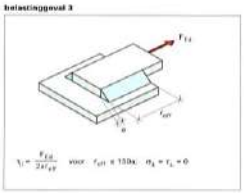
belastinggeval 1



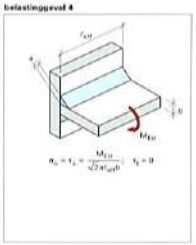
belastinggeval 2



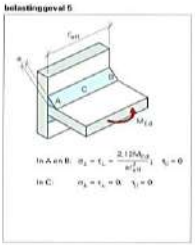
belastinggeval 3



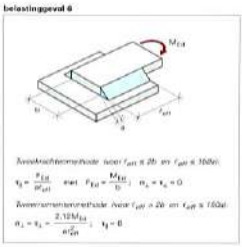
belastinggeval 4



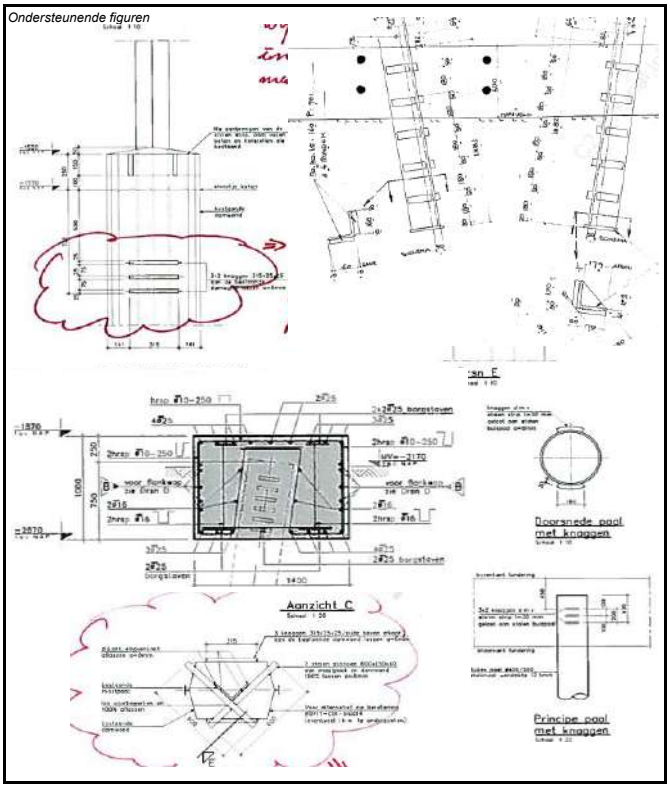
belastinggeval 5



belastinggeval 6



Ondersteunende figuren



Toetsing inleiding krachten in fundering

Projectnaam	Opwaardering KIJ-BVW 380kV	**Rekensheet versie**	3.1
Lijn	KIJ-DIM Ronde Venen	**Datum**	1-2-2026
Subtype deuvels aan randstijl	Zie berekening bestaand deel	**Auteur**	[redacted]
Subtype deuvels aan paal	C8 Verzwaring 2013	**Eerste interne controle**	Mauny Bahri (RO)
Mastnummer(s)	156 (verzwaring)	**Tweede interne controle**	[redacted]

Samenvatting	UC	Check	F_{Rd}	
Maatgevende unity check	**1,00**	OK		
Max UC randstijldeuvels beton	n.v.t.	OK	D:0 T:0	kN
Max UC paaldeuvels beton	0,69	OK	2987	kN
Max UC lassen	1,00	OK	2062	kN
Max UC staalciteria	0,43	OK	4787	kN
Trekkracht uit randstijl	$F_{Ed,t}$		*2062*	kN
Drukkracht uit randstijl	$F_{Ed,c}$		*2062*	kN
Spanningsbegrenzing		$=0,7f_{cd}$	Nee	
Toetsing incl. buiging			Nee	
Toetsing incl. las reductie		$=f_w/1,2$	Ja	

Zie voor de maximaal optredende paalkrachten het constructief rapport

Materialen				
Betonkwaliteit	-		C30/37	
Beton omsloten	-		Ja	
Karakteristieke druksterkte	f_{ck}		30	N/mm^2
Verhogingsfactor druksterkte	C_a	$=\min[\sqrt{(A_{f2}/A_{f1})};2,5]$	1,59	-
Verhoogde druksterkte	f_{jk}	$=f_{ck}C_a$	47,74	N/mm^2
Betondruksterkte	f_{cd}	$=f_{jk}/\gamma_c$	31,82	N/mm^2
Staalsoort 1: funderingspaal	-		S235	N/mm^2
Treksterkte staalsoort 1	$f_{u,1}$		360	N/mm^2
Vloeispanning staalsoort 1	$f_{y,1}$		235	N/mm^2
Staalsoort 2: randstijl	-		S235	N/mm^2
Treksterkte staalsoort 2	$f_{u,2}$		360	N/mm^2
Vloeispanning staalsoort 2	$f_{y,2}$		235	N/mm^2
Staalsoort 3: deuvels	-		S235	N/mm^2
Treksterkte staalsoort 3	$f_{u,3}$		360	N/mm^2
Vloeispanning staalsoort 3	$f_{y,3}$		235	N/mm^2
Lassterkte deuvels paal	$f_{w,Rd}$	$=f_{u1,3}/(w_f\beta_w\gamma_s)$	300	N/mm^2
Lassterkte deuvels randstijl	$f_{w,Rd}$	$=f_{u2,3}/(w_f\beta_w\gamma_s)$	300	N/mm^2
Partiële factor beton	γ_c		1,50	-
Partiële factor staal	γ_s		1,25	-
Corrolatiefactor lassen	β_w		0,80	-
Reductiefactor lassen	w_f		1,2	-

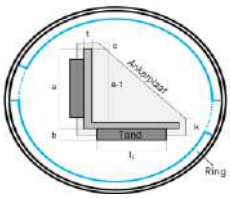
Hoekprofiel randstijl			250x250x18	
Zijde	L_w		250	mm
Dikte	t_w		18	mm
Lengte verankering	L_e		700	mm

Geometrie				
Hoofdtype deuvels (zie figuren onderaan)			6	
Aantal palen per randstijl*	n_p		2	#
Type paal*			Buispaal	
Diameter paal uitwendig (indien buispaal)	$ø_{p,out}$		406,4	mm
Wanddikte paal	t_p		12,5	mm
Roestreductie paalwand	$t_{p,red}$		4	mm
Lengte paaldeuvel als % van omtrek paal	P_b		30,05%	%
Aantal lagen deuvels aan paal	$n_{b,p}$		3	#
Seperatie paaldeuvels	s_1		200	mm
Breedte deuvels/ lengte stift aan paal*	b_1		50	mm
Dikte deuvels aan fundatiepaal*	h_1		30	mm
Diameter paal inwendig (indien buispaal)	$ø_{p,in}$	$=ø_{p,out}-2t_p$	381,4	mm
Inwendige omtrek paal o.b.v. paaldiameter	P_{in}	$=[0;ø_{p,in}\pi]$	1198	mm
Laslengte paaldeuvel	L_b	$=P_{in}P_b$	360	mm
Oppervlakte deuvels per laag aan paal**	$A_{b,1,i}$	$=[P_b(ø_{p,in}-b_1)\pi b_1;L_b b_1]$	15643	mm2
Deuvels aan buitenzijde randstijl	n_{out}		0	#
Deuvels aan binnenzijde randstijl	n_{in}		0	#
Seperatie randstijldeuvels	s_2		290	mm
(las)Lengte deuvel buitenzijde*	L_{out}		0	mm
Uitkragende lengte deuvel buitenzijde	e		0	mm
(las)Lengte deuvel binnenzijde*	L_{in}		0	mm
Breedte deuvels aan randstijl	b_2		0	mm
Dikte deuvels aan randstijl	h_2		0	mm
Diameter stiftdeuvel	$ø_b$		0	mm
Oppervlakte enkele deuvel buitenzijde	$A_{f1,out,i}$	$=[L_{out}b;L_{out}ø_b]$	0	mm^2
Oppervlakte enkele deuvel binnenzijde	$A_{f1,in,i}$	$=[L_{in}b;L_{in}ø_b]$	0	mm^2
Las ankerplaat|randstijl	a_1		0	mm
Las deuvel|paal	a_2		6	mm
Las deuvel|buitenzijde randstijl	a_3		0	mm
Las deuvel|binnenzijde randstijl	a_4		0	mm
Lengte rugplaat aan ankerplaat	L_{rp}		0	mm
Dikte ankerplaat/rugplaat	t_f		0	mm
n-zijden buitenrand ankerplaat	n_c		2	#
Breedte buitenrand ankerplaat	c		0	mm
Rechte zijde ankerplaat	k_{vl}		34	mm
Aanvullende reductie omvang ankerplaat	$A_{p,red2}$		0	mm^2
(Las)Lengte ankerplaat binnenzijde	L_{ip}	$=[4;2](L_w-t_w-a_3\sqrt{2})$	0	mm
Effectief oppervlakte ankerplaat druk	$A_{p,c}$	$=A_{p,i}-A_{p,red1,2}$	0	mm^2
Effectief oppervlakte ankerplaat trek	$A_{p,t}$	$=A_{p,i}-A_{p,red1,2}-A_s$	0	mm^2

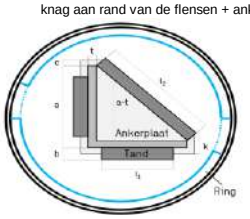
Notities

* Origineel + verzwaring 1xLD + 2xMV + 2xBP406/560,
deze sheet enkel verzwaring

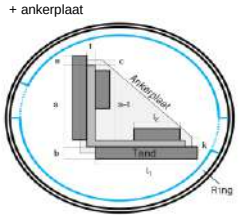
Hoofdtype 1
Tanddeuvels aan buitenzijde + ankerplaat



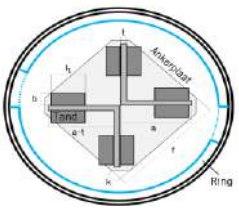
Hoofdtype 2
Tanddeuvels aan buitenzijde +
knag aan rand van de flensen + ankerplaat



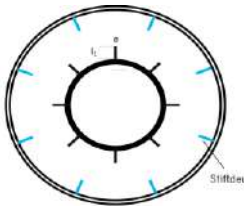
Hoofdtype 3
Tanddeuvels aan buitenzijde en binnenzijde
+ ankerplaat



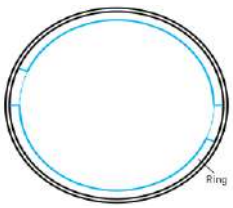
Hoofdtype 4
Tanddeuvels dubbele randstaaf + ankerplaat



Hoofdtype 5
Stiftdeuvels aan ronde buisprofiel, geen ankerplaat



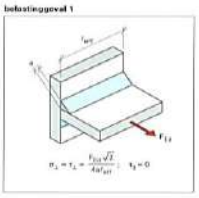
Hoofdtype 6
Enkel toetsing van knaggen aan
funderingspaal + doorsnede paal

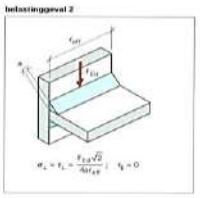


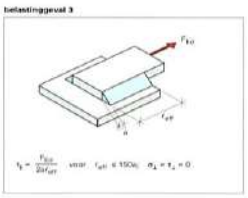
Toetsing capaciteit randstijldeuvels				
Capaciteit ankerplaat bij druk	$F_{Rd,c,p}$	$=A_{p,c}f_{cd}$	0,0	kN
Capaciteit ankerplaat bij trek	$F_{Rd,t,p}$	$=A_{p,t}f_{cd}$	0,0	kN
Capaciteit buitendeuvels	$F_{Rd,b,out}$	$=A_{t1,out,i}f_{cd}n_{out}$	0,0	kN
Capaciteit binnendeuvels	$F_{Rd,b,in}$	$=A_{t1,in,i}f_{cd}n_{in}$	0,0	kN
Capaciteit totaal bij druk	$F_{Rd,c}$	$=F_{Rd,c,p}+F_{Rd,b+o/i}$	0,0	kN
Capaciteit totaal bij trek	$F_{Rd,t}$	$=F_{Rd,t,p}+F_{Rd,b+o/i}$	0,0	kN
Betondrukspanning deuvels bij druk	$\sigma_{c,Ed,c}$	$=F_{ed,c}/(A_{p,c}+A_{t,o/i})$	0,00	N/mm^2
Betondrukspanning bij deuvels bij trek	$\sigma_{c,Ed,t}$	$=F_{ed,p}/(A_{p,t}+A_{t,o/i})$	0,00	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed,c}$		0	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed,t}$		0	N/mm^2
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	n.v.t.	OK
UC (betoncriterium)		$=[F_{Ed,c}/F_{Rd,c};F_{Ed,t}/F_{Rd,t}]$	n.v.t.	OK
Toetsing capaciteit paaldeuvels				
Capaciteit deuvels enkele paal	$F_{Rd,b}$	$=A_{b,i}*n_{b,p}*f_{cd}$	1493,4	kN
Betondrukspanning bij deuvels	$\sigma_{c,Ed+max}$	$=F_{Ed}/(A_{b,i}*n_b)$	22,0	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed}$		0,0	N/mm^2
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=F_{Ed}/(F_{Rd,b}+F_{Rd,b,c/st})$	0,69	OK
Toetsing lassen				
Type las randstijldeuvels			Dubbelzijdig	
Type las paaldeuvels			Dubbelzijdig	
Lasspanning ankerplaat	$\sigma_{vw1,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	n.v.t.	N/mm^2
Lasspanning buitendeuvels	$\sigma_{vw2,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	n.v.t.	N/mm^2
Lasspanning binnendeuvels	$\sigma_{vw3,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	n.v.t.	N/mm^2
Lasspanning paaldeuvels	$\sigma_{vw4,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	300	N/mm^2
Maatgevende UC		$=\sigma_{vw,Ed}/f_{w,Rd}$	1,00	OK
Toetsing paalcapaciteit				
Effectieve doorsnede paal	$A_{p,eff}$	$=P_{in}(t_p-t_{p,red})$	10185	mm^2
Maximale spanning in paal	$\sigma_{s,Ed}$	$=F_{Ed}/(A_{p,eff}n_p)$	101,2	N/mm^2
UC doorsnede paal		$=\sigma_{s,Ed}/f_{y,1}$	0,43	OK

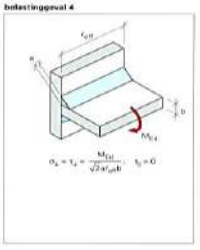
Achterliggende logica				
Afschuifprojectievlak NEN-EN1994-2 F1.1				
Oppervlakte projectie afschuifweerstand	A_{f2}	$=A_{f2,out}+A_{f2,in}$	6728	mm^2
Minimale h.o.h. seperatie deuvels	s_{min}	$=[250;2*L_w]$	n.v.t.	mm
Breedte projectievlak buitendeuvels	$b_{f2,out}$	$=b_2+s_2/5$	58	mm
Lengte projectievlak buitendeuvels	$L_{f2,out}$	$=L_{,out}+2s_2/5$	116	mm
Oppervlak projectie buitendeuvels	$A_{f2,out}$	$=b_{f2,out}L_{f2,out}$	6728	mm^2
Breedte projectievlak binnendeuvels	$b_{f2,in}$	$=b_2+s_2/5$	0	mm
Lengte projectievlak binnendeuvels	L_{f2+in}	$=L_{,in}+2s_2/5$	0	mm
Oppervlak projectie binnendeuvels	$A_{f2,in}$	$=b_{f2,in}L_{f2,in}$	0	mm^2
Breedte projectievlak paaldeuvels	$b_{f2,p}$	$=\min[b_1;b_{eff,b}]+s_1/5$	90	mm
Lengte projectievlak paaldeuvels	$L_{f2,p}$	$=L_b+2s_1/5$	440	mm
Oppervlak projectie paaldeuvels	$A_{f2,p}$	$=b_{f2,p}L_{f2,p}$	39605	mm^2
Effectieve oppervlakte ankerplaat NEN-EN1993-1-8 p. 4.10				
Oppervlakte ankerplaat excl. reducties	$A_{p,i}$	$=(L_w+cn_c)^2-0,5((w+cn_c-k)^2$	0	mm^2
Reductie ineffectief oppervlak ankerplaat	$A_{p,red1}$	$=0,5b_{ineff}^2$	0	mm^2
Oppervlakte staalprofiel	A_s	$=(2L_w-t_w)t_w$	0	mm^2
Effectieve breedte ankerplaat	b_{eff}	$=t_w+2a_1\sqrt{2}+7kt_f$	0,0	mm
Factor meewerkende breedte	k	$=\min[(t_f/t_w);1,0]$	0,00	-
Ineffectieve breedte	b_{ineff}	$=L_w+cn_c-(2c+t_w+b_{eff})+k_{pl}$	0,0	mm
Momentarm ankerplaat (voor toetsing incl. buiging)				
Momentarm ankerplaat	a_{fp}	$=[\sqrt{(2(z_1-z_2)^2)};0]$	0,0	mm
Zwaartepunt ankerplaat t.o.v. onderhoek	z_1	$=\Sigma A_i*z_i/A_T$	0,0	mm
Zwaartepunt randstijl t.o.v. onderhoek	z_2	$=\Sigma A_i*z_i/A_T$	0,0	mm
Staalspanning (voor toetsing incl. buiging)				
Weerstandsmoment ankerplaat	W_1	$=1/6*2(L_w-t_w)t_f^2$	0	mm^3
Weerstandsmoment buitendeuvels	W_2	$=1/6(L_{out}-e)h_2^2$	0	mm^3
Weerstandsmoment binnendeuvels	W_3	$=1/6L_{in}h_2^2$	0	mm^3
Weerstandsmoment paaldeuvels	W_4	$=1/6L_ih_1^2$	54009	mm^3
Staalspanning ankerplaat (druk)	$\sigma_{s,Ed,c}$	$=A_{p,c}\sigma_{c-Ed,c}a_{fp}/W_1$	0	N/mm^2
Staalspanning buitendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{t1,out,c}\sigma_{c-Ed,c}(b_2/2)/W_2$	0	N/mm^2
Staalspanning binnendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{t1,in,c}\sigma_{c-Ed,c}(b_2/2)/W_3$	0	N/mm^2
Staalspanning paaldeuvels (max)	$\sigma_{s,Ed,c,t}$	$=A_i\sigma_{c-Ed,max}(b_1/2)/W_4$	159	N/mm^2
Staalspanning ankerplaat (trek)	$\sigma_{s,Ed,t}$	$=A_{p,t}\sigma_{c-Ed,t}a_f/W_1$	0	N/mm^2
Staalspanning buitendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{t1,out,c}\sigma_{c-Ed,t}(b_2/2)/W_2$	0	N/mm^2
Staalspanning binnendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{t1,in,c}\sigma_{c-Ed,t}(b_2/2)/W_3$	0	N/mm^2
Optionele meewerkende betondoorsnede paal				
Enkel van toepassing als krachten uit randstijl via schachtwrijving naar de paalwand overbracht kunnen worden.				
Meewerkende wapeningstaven	n_{st}		0	#
Staafdiameter	$ø_{st}$		0	mm
Materiaalkwaliteit staaf	-		-	-
Factor effectiviteit betondoorsnede	α		0,00	-
Vloeigrens	f_{yd}		0	N/mm^2
Trekcapaciteit wapening	$F_{Rd,b,st}$	$=0,25n_{st}ø_{st}^2\pi F_{yd}$	0	kN
Betondoorsnede paal	$A_{c,p}$	$=α*0,25P_{in}^2/\pi$	0	mm^2
Drukssterkte betondoorsnede	$F_{Rd,b,c}$	$=A_{c,p}f_{ck}/\gamma_c$	0	kN
Gereduceerde breedte als knaggen geprofileerd zijn volgens NEN-EN1993-1-8 p. 4.10				
Flensdikte aangelast profiel	$t_{f,b}$		0	mm
Factor meewerkende breedte (k)	k_b	$=\min[(t_{f,b}/t_{f,b});1,0]$	0,00	-
Effectieve breedte knag	$b_{eff,b}$	$=0,5(t_{f,b}+2a_2\sqrt{2}+7k_bt_{f,b})$	0	mm

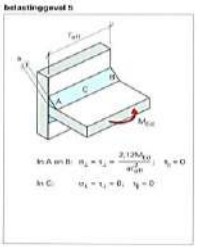
Lasspanningen NEN-EN 1993-1-8 p. 4.5.3						
Onderdeel	Ankerplaat	Buitendeuvels	Binnendeuvels (T3)	Binnendeuvels (T2)	Paaldeuvels	
Som σ_T	0,0	0,0	0,0	0,0	150,0	N/mm^2
Som τ_T	0,0	0,0	0,0	0,0	150,0	N/mm^2
Som $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 1	Ja	Nee	Nee	Nee	Nee	
M1 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M1 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M1 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 2	Nee	Ja	Ja	Nee	Ja	
M2 σ_T	0,0	0,0	0,0	0,0	56,2	N/mm^2
M2 τ_T	0,0	0,0	0,0	0,0	56,2	N/mm^2
M2 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 3	Nee	Nee	Nee	Ja	Nee	
M3 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M3 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M3 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 4	Nee	Ja	Ja	Nee	Ja	
M4 σ_T	0,0	0,0	0,0	0,0	93,7	N/mm^2
M4 τ_T	0,0	0,0	0,0	0,0	93,7	N/mm^2
M4 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 5	Nee	Nee	Nee	Nee	Nee	
M5 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M5 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M5 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 6	Nee	Nee	Nee	Nee	Nee	
M6 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M6 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M6 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2

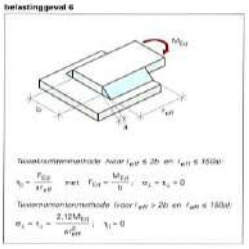




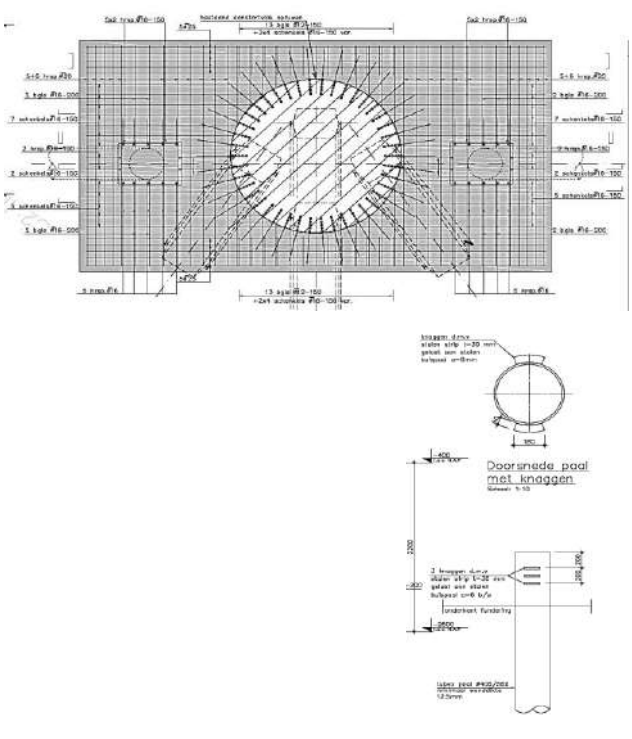








Ondersteunende figuren



Toetsing inleiding krachten in fundering

Projectnaam	Opwaardering KIJ-BVW 380kV	**Rekensheet versie**	3.1
Lijn	KIJ-DIM Ronde Venen	**Datum**	1-2-2026
Subtype deuvels aan randstijl	Zie deel LD1	**Auteur**	[redacted]
Subtype deuvels aan paal	C9	**Eerste interne controle**	Mauny Bahri (RO)
Mastnummer(s)	148	**Tweede interne controle**	[redacted]

Samenvatting	UC	Check	F_{Rd}	
Maatgevende unity check	**1,00**	OK		
Max UC randstijldeuvels beton	n.v.t.	OK	D:0 T:0	kN
Max UC paaldeuvels beton	0,77	OK	3544	kN
Max UC lassen	0,74	OK	3666	kN
Max UC staalciteria	1,00	OK	2726	kN
Trekkracht uit randstijl	$F_{Ed,t}$		*2725*	kN
Drukkracht uit randstijl	$F_{Ed,c}$		*2725*	kN
Spanningsbegrenzing		$=0,7f_{cd}$	Nee	
Toetsing incl. buiging			Nee	
Toetsing incl. las reductie		$=f_w/1,2$	Ja	

Zie voor de maximaal optredende paalkrachten het constructief rapport

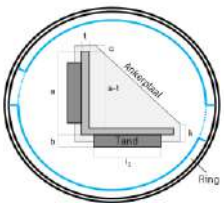
Materialen				
Betonkwaliteit	-		C30/37	
Beton omsloten	-		Ja	
Karakteristieke druksterkte	f_{ck}		30	N/mm^2
Verhogingsfactor druksterkte	C_a	$=\min[\sqrt{(A_{f2}/A_{f1})};2,5]$	2,19	-
Verhoogde druksterkte	f_{jk}	$=f_{ck}C_a$	65,62	N/mm^2
Betondruksterkte	f_{cd}	$=f_{jk}/\gamma_c$	43,75	N/mm^2
Staalsoort 1: funderingspaal	-		S235	N/mm^2
Treksterkte staalsoort 1	$f_{u,1}$		360	N/mm^2
Vloeispanning staalsoort 1	$f_{y,1}$		235	N/mm^2
Staalsoort 2: randstijl	-		S235	N/mm^2
Treksterkte staalsoort 2	$f_{u,2}$		360	N/mm^2
Vloeispanning staalsoort 2	$f_{y,2}$		235	N/mm^2
Staalsoort 3: deuvels	-		S235	N/mm^2
Treksterkte staalsoort 3	$f_{u,3}$		360	N/mm^2
Vloeispanning staalsoort 3	$f_{y,3}$		235	N/mm^2
Lassterkte deuvels paal	$f_{w,Rd}$	$=f_{u1,3}/(w\beta_w\gamma_s)$	300	N/mm^2
Lassterkte deuvels randstijl	$f_{w,Rd}$	$=f_{u2,3}/(w\beta_w\gamma_s)$	300	N/mm^2
Partiële factor beton	γ_c		1,50	-
Partiële factor staal	γ_s		1,25	-
Corrolatiefactor lassen	β_w		0,80	-
Reductiefactor lassen	w_f		1,2	-

Hoekprofiel randstijl			0x0x0	
Zijde	L_w		0	mm
Dikte	t_w		0	mm
Lengte verankering	L_e		0	mm

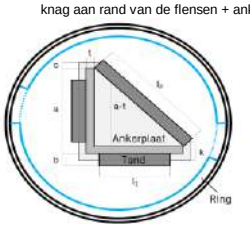
Geometrie				
Hoofdtype deuvels (zie figuren onderaan)			6	
Aantal palen per randstijl*	n_p		2	#
Type paal*			LD1	
Diameter paal uitwendig (indien buispaal)	$ø_{p,out}$		n.v.t.	mm
Wanddikte paal	t_p		8,0	mm
Roestreductie paalwand	$t_{p,red}$		4	mm
Lengte paaldeuvel als % van omtrek paal	P_b		37,25%	%
Aantal lagen deuvels aan paal	$n_{b,p}$		3	#
Seperatie paaldeuvels	s_1		350	mm
Breedte deuvels/ lengte stift aan paal*	b_1		25	mm
Dikte deuvels aan fundatiepaal*	h_1		50	mm
Diameter paal inwendig (indien buispaal)	$ø_{p,in}$	$=ø_{p,out}-2t_p$	n.v.t.	mm
Inwendige omtrek paal o.b.v. tabellen	P_{in}	$=[0;ø_{p,in}\pi]$	1450	mm
Laslengte paaldeuvel	L_b	$=P_{in}P_b$	540	mm
Oppervlakte deuvels per laag aan paal**	$A_{b,1,i}$	$=[P_b(ø_{p,in}-b_1)\pi b_1;L_b b_1]$	13503	mm2
Deuvels aan buitenzijde randstijl	n_{out}		0	#
Deuvels aan binnenzijde randstijl	n_{in}		0	#
Seperatie randstijldeuvels	s_2		0	mm
(las)Lengte deuvel buitenzijde*	L_{out}		0	mm
Uitkragende lengte deuvel buitenzijde	e		0	mm
(las)Lengte deuvel binnenzijde*	L_{in}		0	mm
Breedte deuvels aan randstijl	b_2		0	mm
Dikte deuvels aan randstijl	h_2		0	mm
Diameter stiftdeuvel	$ø_b$		0	mm
Oppervlakte enkele deuvel buitenzijde	$A_{f1,out,i}$	$=[L_{out}b;L_{out}ø_b]$	0	mm^2
Oppervlakte enkele deuvel binnenzijde	$A_{f1,in,i}$	$=[L_{in}b;L_{in}ø_b]$	0	mm^2
Las ankerplaat|randstijl	a_1		0	mm
Las deuvel|paal	a_2		4	mm
Las deuvel|buitenzijde randstijl	a_3		0	mm
Las deuvel|binnenzijde randstijl	a_4		0	mm
Lengte rugplaat aan ankerplaat	L_{rp}		0	mm
Dikte ankerplaat/rugplaat	t_f		0	mm
n-zijden buitenrand ankerplaat	n_c		2	#
Breedte buitenrand ankerplaat	c		0	mm
Rechte zijde ankerplaat	k_{vl}		0	mm
Aanvullende reductie omvang ankerplaat	$A_{p,red2}$		0	mm^2
(Las)Lengte ankerplaat binnenzijde	L_{ip}	$=[4;2](L_w-t_w-a_3\sqrt{2})$	0	mm
Effectief oppervlakte ankerplaat druk	$A_{p,c}$	$=A_{p,i}-A_{p,red1,2}$	0	mm^2
Effectief oppervlakte ankerplaat trek	$A_{p,t}$	$=A_{p,i}-A_{p,red1,2}-A_s$	0	mm^2

Notities

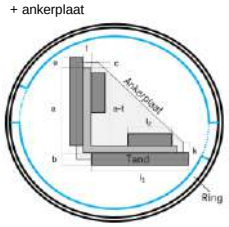
Hoofdtype 1
Tanddeuvels aan buitenzijde + ankerplaat



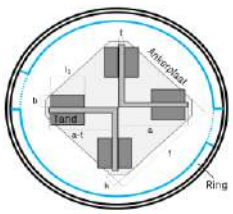
Hoofdtype 2
Tanddeuvels aan buitenzijde +
knag aan rand van de flensen + ankerplaat



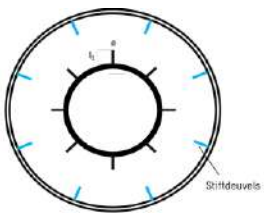
Hoofdtype 3
Tanddeuvels aan buitenzijde en binnenzijde
+ ankerplaat



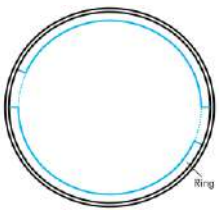
Hoofdtype 4
Tanddeuvels dubbele randstaaf + ankerplaat



Hoofdtype 5
Stiftdeuvels aan ronde buisprofiel, geen ankerplaat

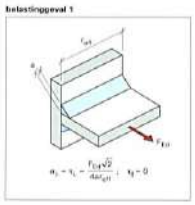


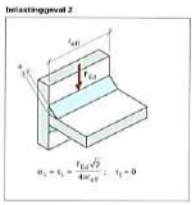
Hoofdtype 6
Enkel toetsing van knaggen aan
funderingspaal + doorsnede paal

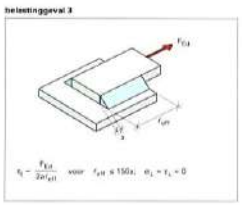


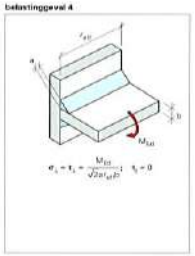
Toetsing capaciteit randstijldeuvels				
Capaciteit ankerplaat bij druk	$F_{Rd,c,p}$	$=A_{p,c}f_{cd}$	0,0	kN
Capaciteit ankerplaat bij trek	$F_{Rd,t,p}$	$=A_{p,i}f_{cd}$	0,0	kN
Capaciteit buitendeuvels	$F_{Rd,b,out}$	$=A_{t1,out,i}f_{cd}n_{out}$	0,0	kN
Capaciteit binnendeuvels	$F_{Rd,b,in}$	$=A_{t1,in,i}f_{cd}n_{in}$	0,0	kN
Capaciteit totaal bij druk	$F_{Rd,c}$	$=F_{Rd,c,p}+F_{Rd,b+o/i}$	0,0	kN
Capaciteit totaal bij trek	$F_{Rd,t}$	$=F_{Rd,t,p}+F_{Rd,b+o/i}$	0,0	kN
Betondrukspanning deuvels bij druk	$\sigma_{c,Ed,c}$	$=F_{ed,c}/(A_{p,c}+A_{t,o/i})$	0,00	N/mm^2
Betondrukspanning bij deuvels bij trek	$\sigma_{c,Ed,t}$	$=F_{ed,i}/(A_{p,i}+A_{t,o/i})$	0,00	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed,c}$		0	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed,t}$		0	N/mm^2
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	n.v.t.	OK
UC (betoncriterium)		$=[F_{Ed,c}/F_{Rd,c};F_{Ed,i}/F_{Rd,i}]$	n.v.t.	OK
Toetsing capaciteit paaldeuvels				
Capaciteit deuvels enkele paal	$F_{Rd,b}$	$=A_{b,i}*n_{b,p}*f_{cd}$	1772,2	kN
Betondrukspanning bij deuvels	$\sigma_{c,Ed+max}$	$=F_{Ed}/(A_{b,i}*n_b)$	33,6	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed}$		0,0	N/mm^2
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=F_{Ed}/(F_{Rd,b}+F_{Rd,b,c/st})$	0,77	OK
Toetsing lassen				
Type las randstijldeuvels			Dubbelzijdig	
Type las paaldeuvels			Dubbelzijdig	
Lasspanning ankerplaat	$\sigma_{vw1,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	n.v.t.	N/mm^2
Lasspanning buitendeuvels	$\sigma_{vw2,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	n.v.t.	N/mm^2
Lasspanning binnendeuvels	$\sigma_{vw3,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	n.v.t.	N/mm^2
Lasspanning paaldeuvels	$\sigma_{vw4,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	223	N/mm^2
Maatgevende UC		$=\sigma_{vw,Ed}/f_{w,Rd}$	0,74	OK
Toetsing paalcapaciteit				
Effectieve doorsnede paal	$A_{p,eff}$	$=P_{in}(t_p-t_{p,red})$	5800	mm^2
Maximale spanning in paal	$\sigma_{s,Ed}$	$=F_{Ed}/(A_{p,eff}n_p)$	234,9	N/mm^2
UC doorsnede paal		$=\sigma_{s,Ed}/f_{y,1}$	1,00	OK

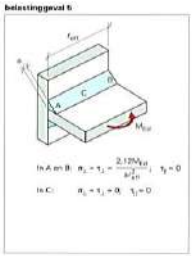
Lasspanningen NEN-EN 1993-1-8 p. 4.5.3						
Onderdeel	Ankerplaat	Buitendeuvels	Binnendeuvels (T3)	Binnendeuvels (T2)	Paaldeuvels	
Som σ_T	0,0	0,0	0,0	0,0	111,5	N/mm^2
Som τ_T	0,0	0,0	0,0	0,0	111,5	N/mm^2
Som $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 1	Ja	Nee	Nee	Nee	Nee	
M1 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M1 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M1 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 2	Nee	Ja	Ja	Nee	Ja	
M2 σ_T	0,0	0,0	0,0	0,0	74,3	N/mm^2
M2 τ_T	0,0	0,0	0,0	0,0	74,3	N/mm^2
M2 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 3	Nee	Nee	Nee	Ja	Nee	
M3 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M3 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M3 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 4	Nee	Ja	Ja	Nee	Ja	
M4 σ_T	0,0	0,0	0,0	0,0	37,2	N/mm^2
M4 τ_T	0,0	0,0	0,0	0,0	37,2	N/mm^2
M4 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 5	Nee	Nee	Nee	Nee	Nee	
M5 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M5 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M5 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 6	Nee	Nee	Nee	Nee	Nee	
M6 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M6 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M6 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2

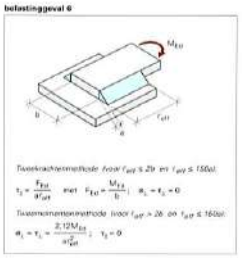






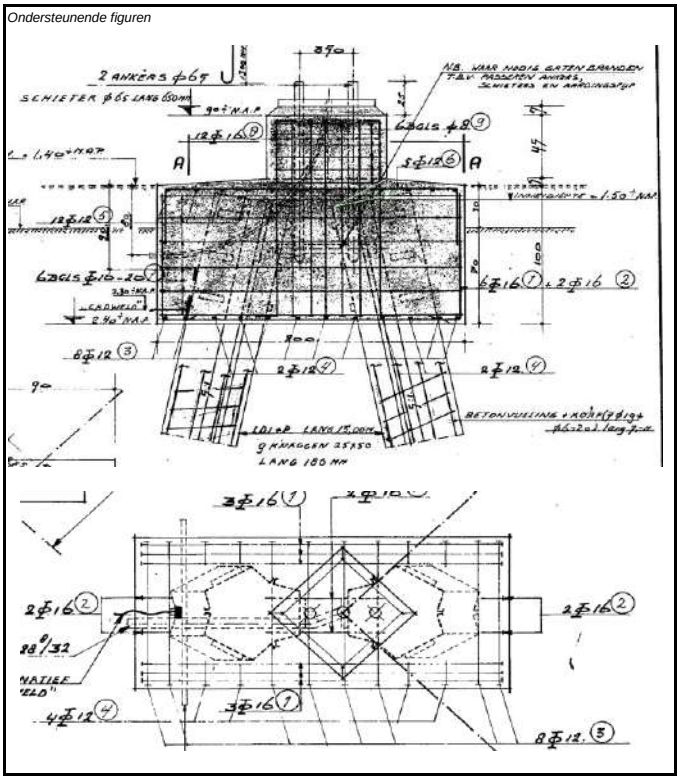






Achterliggende logica				
Afschuifprojectievlak NEN-EN1994-2 F1.1				
Oppervlakte projectie afschuifweerstand	A_{t2}	$=A_{t2,out}+A_{t2,in}$	0	mm^2
Minimale h.o.h. seperatie deuvels	s_{min}	$=[250;2*L_w]$	n.v.t.	mm
Breedte projectievlak buitendeuvels	$b_{t2,out}$	$=b_2+s_2/5$	0	mm
Lengte projectievlak buitendeuvels	$L_{t2,out}$	$=L_{,out}+2s_2/5$	0	mm
Oppervlak projectie buitendeuvels	$A_{t2,out}$	$=b_{t2,out}L_{t2,out}$	0	mm^2
Breedte projectievlak binnendeuvels	$b_{t2,in}$	$=b_2+s_2/5$	0	mm
Lengte projectievlak binnendeuvels	L_{t2+in}	$=L_{,in}+2s_2/5$	0	mm
Oppervlak projectie binnendeuvels	$A_{t2,in}$	$=b_{t2,in}L_{t2,in}$	0	mm^2
Breedte projectievlak paaldeuvels	$b_{t2,p}$	$=\min[b_1;b_{eff,b}]+s_1/5$	95	mm
Lengte projectievlak paaldeuvels	$L_{t2,p}$	$=L_b+2s_1/5$	680	mm
Oppervlak projectie paaldeuvels	$A_{t2,p}$	$=b_{t2,p}L_{t2,p}$	64612	mm^2
Effectieve oppervlakte ankerplaat NEN-EN1993-1-8 p. 4.10				
Oppervlakte ankerplaat excl. reducties	$A_{p,i}$	$=(L_w+cn_c)^2-0,5((w+cn_c-k)^2$	0	mm^2
Reductie ineffectief oppervlak ankerplaat	$A_{p,red1}$	$=0,5b_{ineff}^2$	0	mm^2
Oppervlakte staalprofiel	A_s	$=(2L_w-t_w)t_w$	0	mm^2
Effectieve breedte ankerplaat	b_{eff}	$=t_w+2a_1\sqrt{2}+7kt_f$	0,0	mm
Factor meewerkende breedte	k	$=\min[(t_f/t_w);1,0]$	0,00	-
Ineffectieve breedte	b_{ineff}	$=L_w+cn_c-(2c+t_w+b_{eff})+k_{pl}$	0,0	mm
Momentarm ankerplaat (voor toetsing incl. buiging)				
Momentarm ankerplaat	a_{fp}	$=[\sqrt{(2(z_1-z_2)^2)};0]$	0,0	mm
Zwaartepunt ankerplaat t.o.v. onderhoek	z_1	$=\Sigma A_i*z_i/A_T$	0,0	mm
Zwaartepunt randstijl t.o.v. onderhoek	z_2	$=\Sigma A_i*z_i/A_T$	0,0	mm
Staalspanning (voor toetsing incl. buiging)				
Weerstandsmoment ankerplaat	W_1	$=1/6*2(L_w-t_w)t_f^2$	0	mm^3
Weerstandsmoment buitendeuvels	W_2	$=1/6(L_{out}-e)h_2^2$	0	mm^3
Weerstandsmoment binnendeuvels	W_3	$=1/6L_{in}h_2^2$	0	mm^3
Weerstandsmoment paaldeuvels	W_4	$=1/6L_ih_1^2$	225052	mm^3
Staalspanning ankerplaat (druk)	$\sigma_{s,Ed,c}$	$=A_{p,c}\sigma_{c\text{-}Ed,c}a_{fp}/W_1$	0	N/mm^2
Staalspanning buitendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{t1,out,c}\sigma_{c\text{-}Ed,c}(b_2/2)/W_2$	0	N/mm^2
Staalspanning binnendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{t1,in,c}\sigma_{c\text{-}Ed,c}(b_2/2)/W_3$	0	N/mm^2
Staalspanning paaldeuvels (max)	$\sigma_{s,Ed,c,t}$	$=A_i\sigma_{c\text{-}Ed,max}(b_1/2)/W_4$	25	N/mm^2
Staalspanning ankerplaat (trek)	$\sigma_{s,Ed,t}$	$=A_{p,i}\sigma_{c\text{-}Ed,t}a_f/W_1$	0	N/mm^2
Staalspanning buitendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{t1,out,c}\sigma_{c\text{-}Ed,t}(b_2/2)/W_2$	0	N/mm^2
Staalspanning binnendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{t1,in,c}\sigma_{c\text{-}Ed,t}(b_2/2)/W_3$	0	N/mm^2
Optionele meewerkende betondoorsnede paal				
Enkel van toepassing als krachten uit randstijl via schachtwrijving naar de paalwand overbracht kunnen worden.				
Meewerkende wapeningstaven	n_{st}		0	#
Staafdiameter	$ø_{st}$		0	mm
Materiaalkwaliteit staaf	-		-	-
Factor effectiviteit betondoorsnede	α		0,00	-
Vloeigrens	f_{yd}		0	N/mm^2
Trekcapaciteit wapening	$F_{Rd,b,st}$	$=0,25n_{st}ø_{st}^2\pi F_{yd}$	0	kN
Betondoorsnede paal	$A_{c,p}$	$=α*0,25P_{in}^2/\pi$	0	mm^2
Druksterkte betondoorsnede	$F_{Rd,b,c}$	$=A_{c,p}f_{ck}/\gamma_c$	0	kN
Gereduceerde breedte als knaggen geprofileerd zijn volgens NEN-EN1993-1-8 p. 4.10				
Flensdikte aangelast profiel	$t_{f,b}$		0	mm
Factor meewerkende breedte (k)	k_b	$=\min[(t_{f,b}/t_{f,b});1,0]$	0,00	-
Effectieve breedte knag	$b_{eff,b}$	$=0,5(t_{f,b}+2a_2\sqrt{2}+7k_bt_{f,b})$	0	mm

Ondersteunende figuren



Toetsing inleiding krachten in fundering

Projectnaam	Opwaardering KIJ-BVW 380kV	**Rekensheet versie**	3.1
Lijn	KIJ-DIM	**Datum**	1-2-2026
Subtype deuvels aan randstijl	J	**Auteur**	[redacted]
Subtype deuvels aan paal	F	**Eerste interne controle**	Mauny Bahri (RO)
Mastnummer(s)	104	**Tweede interne controle**	[redacted]

Samenvatting	UC	Check	F_{Rd}	
Maatgevende unity check	**1,00**	OK		
Max UC randstijldeuvels beton	0,52	OK	D:7961 T:7551	kN
Max UC paaldeuvels beton	0,53	OK	7401	kN
Max UC lassen	1,00	OK	3939	kN
Max UC staalciteria	0,80	OK	4945	kN
Trekkracht uit randstijl	$F_{Ed,t}$		*3938*	kN
Drukkracht uit randstijl	$F_{Ed,c}$		*3938*	kN
Spanningsbegrenzing		=0,7f_{cd}	Nee	
Toetsing incl. buiging			Nee	
Toetsing incl. las reductie		=f_w/1,2	Ja	

Zie voor de maximaal optredende paalkrachten het constructief rapport

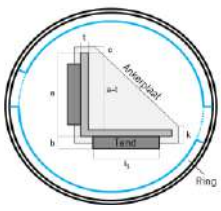
Materialen				
Betonkwaliteit	-		C28/35	=B35
Beton omsloten	-		Ja	
Karakteristieke druksterkte	f_{ck}		28	N/mm^2
Verhogingsfactor druksterkte	C_a	=min[√(A_{c2}/A_{f1});2,5]	1,85	-
Verhoogde druksterkte	f_{jk}	=$f_{ck}C_a$	51,80	N/mm^2
Betondruksterkte	f_{cd}	=f_{jk}/γ_c	34,53	N/mm^2
Staalsoort 1: funderingspaal	-		S235	N/mm^2
Treksterkte staalsoort 1	$f_{u,1}$		360	N/mm^2
Vloeispanning staalsoort 1	$f_{y,1}$		235	N/mm^2
Staalsoort 2: randstijl	-		S235	N/mm^2
Treksterkte staalsoort 2	$f_{u,2}$		360	N/mm^2
Vloeispanning staalsoort 2	$f_{y,2}$		235	N/mm^2
Staalsoort 3: deuvels	-		S235	N/mm^2
Treksterkte staalsoort 3	$f_{u,3}$		360	N/mm^2
Vloeispanning staalsoort 3	$f_{y,3}$		235	N/mm^2
Lassterkte deuvels paal	$f_{w,Rd}$	=$f_{u1,3}$/($w_r\beta_w\gamma_s$)	300	N/mm^2
Lassterkte deuvels randstijl	$f_{w,Rd}$	=$f_{u2,3}$/($w_r\beta_w\gamma_s$)	300	N/mm^2
Partiële factor beton	γ_c		1,50	-
Partiële factor staal	γ_s		1,25	-
Corrolatiefactor lassen	β_w		0,80	-
Reductiefactor lassen	w_r		1,2	-

Hoekprofiel randstijl			250x250x25	
Zijde	L_w		250	mm
Dikte	t_w		25	mm
Lengte verankering	L_e		1900	mm

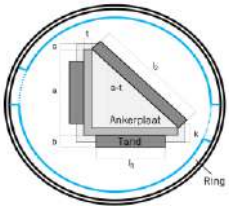
Geometrie				
Hoofdtype deuvels (zie figuren onderaan)			3	
Aantal palen per randstijl*	n_p		1	#
Type paal*			Buispaal	
Diameter paal uitwendig (indien buispaal)	$ø_{p,out}$		813,0	mm
Wanddikte paal	t_p		12,5	mm
Roestreductie paalwand	$t_{p,red}$		4	mm
Lengte paaldeuvel als % van omtrek paal	P_b		100,00%	%
Aantal lagen deuvels aan paal	$n_{b,p}$		3	#
Seperatie paaldeuvels	s_1		400	mm
Breedte deuvels/ lengte stift aan paal*	b_1		30	mm
Dikte deuvels aan fundatiepaal*	h_1		50	mm
Diameter paal inwendig (indien buispaal)	$ø_{p,in}$	=$ø_{p,out}$-2t_p	788,0	mm
Inwendige omtrek paal o.b.v. paaldiameter	P_{in}	=[0;$ø_{p,in}$π]	2476	mm
Laslengte paaldeuvel	L_b	=$P_{in}P_b$	2476	mm
Oppervlakte deuvels per laag aan paal**	$A_{b,1,i}$	=[P_b($ø_{p,in}$-b_1)πb_1;$L_b$$b_1$]	71440	mm2
Deuvels aan buitenzijde randstijl	n_{out}		12	#
Deuvels aan binnenzijde randstijl	n_{in}		12	#
Seperatie randstijldeuvels	s_2		200	mm
(las)Lengte deuvel buitenzijde*	L_{out}		250	mm
Uitkragende lengte deuvel buitenzijde	e		0	mm
(las)Lengte deuvel binnenzijde*	L_{in}		200	mm
Breedte deuvels aan randstijl	b_2		30	mm
Dikte deuvels aan randstijl	h_2		50	mm
Diameter stiftdeuvel	$ø_b$		0	mm
Oppervlakte enkele deuvel buitenzijde	$A_{f1,out,i}$	=[L_{out}b;$L_{out}$$ø_b$]	7500	mm^2
Oppervlakte enkele deuvel binnenzijde	$A_{f1,in,i}$	=[L_{in}b;$L_{in}$$ø_b$]	6000	mm^2
Las ankerplaat|randstijl	a_1		8	mm
Las deuvel|paal	a_2		4	mm
Las deuvel|buitenzijde randstijl	a_3		8	mm
Las deuvel|binnenzijde randstijl	a_4		8	mm
Lengte rugplaat aan ankerplaat	L_{rp}		0	mm
Dikte ankerplaat/rugplaat	t_r		30	mm
n-zijden buitenrand ankerplaat	n_c		2	#
Breedte buitenrand ankerplaat	c		30	mm
Rechte zijde ankerplaat	k_{pl}		80	mm
Aanvullende reductie omvang ankerplaat	$A_{p,red2}$		0	mm^2
(Las)Lengte ankerplaat binnenzijde	L_{fp}	=[4;2](L$_w$-t_w-a_1√2)	427	mm
Effectief oppervlakte ankerplaat druk	$A_{p,c}$	=$A_{p,r}$-$A_{p,red1,2}$	68528	mm^2
Effectief oppervlakte ankerplaat trek	$A_{p,t}$	=$A_{p,r}$-$A_{p,red1,2}$-A_s	56653	mm^2

Notities

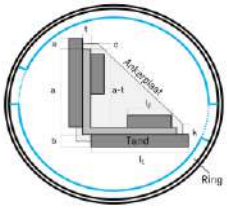
Hoofdtype 1
Tanddeuvels aan buitenzijde + ankerplaat



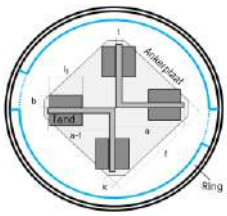
Hoofdtype 2
Tanddeuvels aan buitenzijde +
knag aan rand van de flensen + ankerplaat



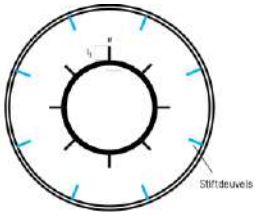
Hoofdtype 3
Tanddeuvels aan buitenzijde en binnenzijde
+ ankerplaat



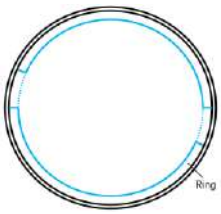
Hoofdtype 4
Tanddeuvels dubbele randstaaf + ankerplaat



Hoofdtype 5
Stiftdeuvels aan ronde buisprofiel, geen ankerplaat



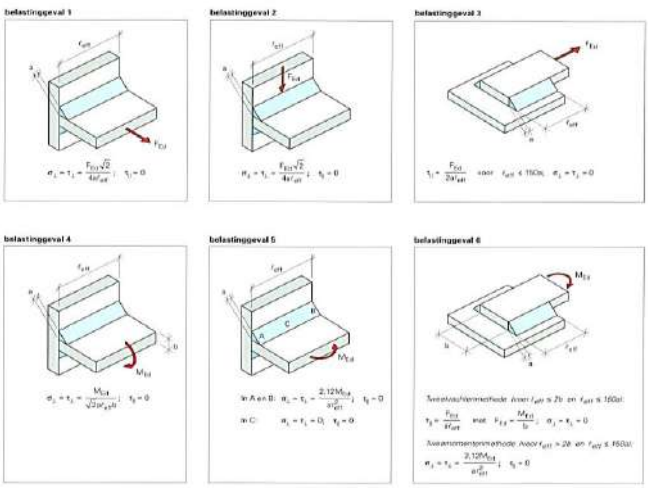
Hoofdtype 6
Enkel toetsing van knaggen aan
funderingspaal + doorsnede paal



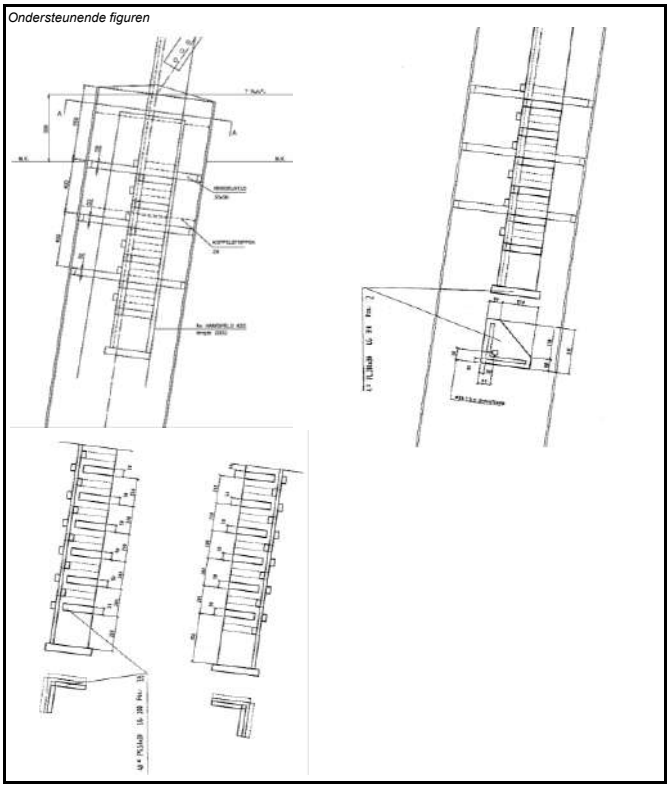
Toetsing capaciteit randstijldeuvels				
Capaciteit ankerplaat bij druk	$F_{Rd,c,p}$	$=A_{p,c}f_{cd}$	2366,4	kN
Capaciteit ankerplaat bij trek	$F_{Rd,t,p}$	$=A_{p,t}f_{cd}$	1956,3	kN
Capaciteit buitendeuvels	$F_{Rd,b,out}$	$=A_{rt,out,i}f_{cd}n_{out}$	3107,9	kN
Capaciteit binnendeuvels	$F_{Rd,b,in}$	$=A_{rt,in,i}f_{cd}n_{in}$	2486,3	kN
Capaciteit totaal bij druk	$F_{Rd,c}$	$=F_{Rd,c,p}+F_{Rd,b+o/i}$	7960,6	kN
Capaciteit totaal bij trek	$F_{Rd,t}$	$=F_{Rd,t,p}+F_{Rd,b+o/i}$	7550,5	kN
Betondrukspanning deuvels bij druk	$\sigma_{c,Ed,c}$	$=F_{ed,c}/(A_{p,c}+A_{t,o/i})$	17,08	N/mm^2
Betondrukspanning bij deuvels bij trek	$\sigma_{c,Ed,t}$	$=F_{ed,t}/(A_{p,t}+A_{t,o/i})$	18,01	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed,c}$		0	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed,t}$		0	N/mm^2
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=[F_{Ed,c}/F_{Rd,c};F_{Ed,t}/F_{Rd,t}]$	0,52	OK
Toetsing capaciteit paaldeuvels				
Capaciteit deuvels enkele paal	$F_{Rd,b}$	$=A_{b,i}*n_{b,p}*f_{cd}$	7400,9	kN
Betondrukspanning bij deuvels	$\sigma_{c,Ed+max}$	$=F_{Ed}/(A_{b,i}*n_b)$	18,4	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed}$		0,0	N/mm^2
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=F_{Ed}/(F_{Rd,b}+F_{Rd,b,c/st})$	0,53	OK
Toetsing lassen				
Type las randstijldeuvels			Dubbelzijdig	
Type las paaldeuvels			Enkelzijdig	
Lasspanning ankerplaat	$\sigma_{vw1,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	255,3	N/mm^2
Lasspanning buitendeuvels	$\sigma_{vw2,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	76,4	N/mm^2
Lasspanning binnendeuvels	$\sigma_{vw3,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	76,4	N/mm^2
Lasspanning paaldeuvels	$\sigma_{vw4,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	300	N/mm^2
Maatgevende UC		$=\sigma_{vw,Ed}/f_{w,Rd}$	1,00	OK
Toetsing paalcapaciteit				
Effectieve doorsnede paal	$A_{p,eff}$	$=P_{in}(t_p-t_{p,red})$	21042	mm^2
Maximale spanning in paal	$\sigma_{s,Ed}$	$=F_{Ed}/(A_{p,eff}n_p)$	187,1	N/mm^2
UC doorsnede paal		$=\sigma_{s,Ed}/f_{y,1}$	0,80	OK

Lasspanningen NEN-EN 1993-1-8 p. 4.5.3						
Onderdeel	Ankerplaat	Buitendeuvels	Binnendeuvels (T3)	Binnendeuvels (T2)	Paaldeuvels	
Som σ_T	127,6	38,2	38,2	0,0	75,0	N/mm^2
Som τ_T	127,6	38,2	38,2	0,0	75,0	N/mm^2
Som $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 1	Ja	Nee	Nee	Nee	Nee	
M1 σ_T	127,6	0,0	0,0	0,0	0,0	N/mm^2
M1 τ_T	127,6	0,0	0,0	0,0	0,0	N/mm^2
M1 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 2	Nee	Ja	Ja	Nee	Ja	
M2 σ_T	0,0	23,9	23,9	0,0	46,9	N/mm^2
M2 τ_T	0,0	23,9	23,9	0,0	46,9	N/mm^2
M2 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 3	Nee	Nee	Nee	Ja	Nee	
M3 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M3 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M3 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 4	Nee	Ja	Ja	Nee	Ja	
M4 σ_T	0,0	14,3	14,3	0,0	28,1	N/mm^2
M4 τ_T	0,0	14,3	14,3	0,0	28,1	N/mm^2
M4 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 5	Nee	Nee	Nee	Nee	Nee	
M5 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M5 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M5 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 6	Nee	Nee	Nee	Nee	Nee	
M6 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M6 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M6 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2

Achterliggende logica				
Afschuifprojectievlak NEN-EN1994-2 F1.1				
Oppervlakte projectie afschuifweerstand	A_{f2}	$=A_{f2,out}+A_{f2,in}$	46200	mm^2
Minimale h.o.h. seperatie deuvels	s_{min}	$=[250;2*L_w]$	n.v.t.	mm
Breedte projectievlak buitendeuvels	$b_{f2,out}$	$=b_2+s_2/5$	70	mm
Lengte projectievlak buitendeuvels	$L_{f2,out}$	$=L_{out}+2s_2/5$	330	mm
Oppervlak projectie buitendeuvels	$A_{f2,out}$	$=b_{f2,out}L_{f2,out}$	23100	mm^2
Breedte projectievlak binnendeuvels	$b_{f2,in}$	$=b_2+s_2/5$	70	mm
Lengte projectievlak binnendeuvels	$L_{f2,in}$	$=L_{in}+2s_2/5$	330	mm
Oppervlak projectie binnendeuvels	$A_{f2,in}$	$=b_{f2,in}L_{f2,in}$	23100	mm^2
Breedte projectievlak paaldeuvels	$b_{f2,p}$	$=\min[b_i;b_{eff,b}]+s_1/5$	110	mm
Lengte projectievlak paaldeuvels	$L_{f2,p}$	$=L_b+2s_1/5$	2636	mm
Oppervlak projectie paaldeuvels	$A_{f2,p}$	$=b_{f2,p}L_{f2,p}$	289913	mm^2
Effectieve oppervlakte ankerplaat NEN-EN1993-1-8 p. 4.10				
Oppervlakte ankerplaat excl. reducties	$A_{p,i}$	$=(L_w+cn_c)^2-0,5((w+cn_c-k)^2$	69650	mm^2
Reductie ineffectief oppervlak ankerplaat	$A_{p,red1}$	$=0,5b_{ineff}^2$	1122	mm^2
Oppervlakte staalprofiel	A_s	$=(2L_w-t_w)t_w$	11875	mm^2
Effectieve breedte ankerplaat	b_{eff}	$=t_w+2a_1\sqrt{2}+7kt_f$	257,6	mm
Factor meewerkende breedte	k	$=\min[(t_f/t_w);1,0]$	1,00	-
Ineffectieve breedte	b_{ineff}	$=L_w+cn_c-(2c+t_w+b_{eff})+k_{pl}$	47,4	mm
Momentarm ankerplaat (voor toetsing incl. buiging)				
Momentarm ankerplaat	a_{fp}	$=[\sqrt{(2(z_T-z_2)^2)};0]$	33,3	mm
Zwaartepunt ankerplaat t.o.v. onderhoek	z_1	$=\sum A_i*z_i/A_T$	125,3	mm
Zwaartepunt randstijl t.o.v. onderhoek	z_2	$=\sum A_i*z_i/A_T$	101,7	mm
Staalspanning (voor toetsing incl. buiging)				
Weerstandsmoment ankerplaat	W_1	$=1/6*2(L_w-t_w)t_f^2$	67500	mm^3
Weerstandsmoment buitendeuvels	W_2	$=1/6(L_{out}-e)h_2^2$	104167	mm^3
Weerstandsmoment binnendeuvels	W_3	$=1/6L_{in}h_2^2$	83333,33333	mm^3
Weerstandsmoment paaldeuvels	W_4	$=1/6L_ph_1^2$	1031490	mm^3
Staalspanning ankerplaat (druk)	$\sigma_{s,Ed,c}$	$=A_{p,c}\sigma_{c\text{-}Ed,c}a_{fp}/W_1$	577	N/mm^2
Staalspanning buitendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{rt,out,c}\sigma_{c\text{-}Ed,c}(b_2/2)/W_2$	18	N/mm^2
Staalspanning binnendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{rt,in,c}\sigma_{c\text{-}Ed,c}(b_2/2)/W_3$	18,44913195	N/mm^2
Staalspanning paaldeuvels (max)	$\sigma_{s,Ed,c,t}$	$=A_t\sigma_{c\text{-}Ed,max}(b_1/2)/W_4$	19	N/mm^2
Staalspanning ankerplaat (trek)	$\sigma_{s,Ed,t}$	$=A_{p,t}\sigma_{c\text{-}Ed,t}a_f/W_1$	503	N/mm^2
Staalspanning buitendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{rt,out,c}\sigma_{c\text{-}Ed,t}(b_2/2)/W_2$	19	N/mm^2
Staalspanning binnendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{rt,in,c}\sigma_{c\text{-}Ed,t}(b_2/2)/W_3$	19	N/mm^2
Optionele meewerkende betondoorsnede paal				
Enkel van toepassing als krachten uit randstijl via schachtwrijving naar de paalwand overbracht kunnen worden.				
Meewerkende wapeningstaven	n_{st}		0	#
Staafdiameter	$ø_{st}$		0	mm
Materiaalkwaliteit staaf	-		-	-
Factor effectiviteit betondoorsnede	α		0,00	-
Vloeigrens	f_{yd}		0	N/mm^2
Trekcapaciteit wapening	$F_{Rd,b,st}$	$=0,25n_{st}ø_{st}^2\pi F_{yd}$	0	kN
Betondoorsnede paal	$A_{c,p}$	$=\alpha*0,25P_{in}^2/\pi$	0	mm^2
Druksterkte betondoorsnede	$F_{Rd,b,c}$	$=A_{c,p}f_{cd}/\gamma_c$	0	kN
Gereduceerde breedte als knaggen geprofileerd zijn volgens NEN-EN1993-1-8 p. 4.10				
Flensdikte aangelast profiel	$t_{f,b}$		0	mm
Factor meewerkende breedte (k)	k_b	$=\min[(t_{f,b}/t_{f,b});1,0]$	0,00	-
Effectieve breedte knag	$b_{eff,b}$	$=0,5(t_{f,b}+2a_2\sqrt{2}+7k_bt_{f,b})$	0	mm



Ondersteunende figuren



Toetsing inleiding krachten in fundering

Projectnaam	Opwaardering KIJ-BVW 380kV	**Rekensheet versie**	3.1
Lijn	KIJ-DIM Ronde Venen	**Datum**	1-2-2026
Subtype deuvels aan randstijl	M	**Auteur**	[redacted]
Subtype deuvels aan paal	G	**Eerste interne controle**	Mauny Bahri (RO)
Mastnummer(s)	85, 126, 128, 129, 130, 131, 133, 134, 135, 136, 138, 139, 140, 141, 142, 143, 144, 145, 152, 153	**Tweede interne controle**	[redacted]

Samenvatting	UC	Check	F_{Rd}	
Maatgevende unity check	**1,00**	OK		
Max UC randstijldeuvels beton	0,55	OK	D:1800 T:1669	kN
Max UC paaldeuvels beton	0,86	OK	1061	kN
Max UC lassen	1,00	OK	917	kN
Max UC staalciteria	0,67	OK	1363	kN
Trekkracht uit randstijl	$F_{Ed,t}$		*916*	kN
Drukkracht uit randstijl	$F_{Ed,c}$		*916*	kN
Spanningsbegrenzing		$=0,7f_{cd}$	Nee	
Toetsing incl. buiging			Nee	
Toetsing incl. las reductie		$=f_w/1,2$	Ja	

Zie voor de maximaal optredende paalkrachten het constructief rapport

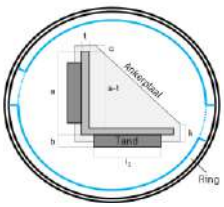
Materialen				
Betonkwaliteit	-		C30/37	
Beton omsloten	-		Ja	
Karakteristieke druksterkte	f_{ck}		30	N/mm^2
Verhogingsfactor druksterkte	C_a	$=\min[\sqrt{(A_{f2}/A_{f1})};2,5]$	1,64	-
Verhoogde druksterkte	f_{jk}	$=f_{ck}C_a$	49,10	N/mm^2
Betondruksterkte	f_{cd}	$=f_{jk}/\gamma_c$	32,73	N/mm^2
Staalsoort 1: funderingspaal	-		S235	N/mm^2
Treksterkte staalsoort 1	$f_{u,1}$		360	N/mm^2
Vloeispanning staalsoort 1	$f_{y,1}$		235	N/mm^2
Staalsoort 2: randstijl	-		S235	N/mm^2
Treksterkte staalsoort 2	$f_{u,2}$		360	N/mm^2
Vloeispanning staalsoort 2	$f_{y,2}$		235	N/mm^2
Staalsoort 3: deuvels	-		S235	N/mm^2
Treksterkte staalsoort 3	$f_{u,3}$		360	N/mm^2
Vloeispanning staalsoort 3	$f_{y,3}$		235	N/mm^2
Lassterkte deuvels paal	$f_{w,Rd}$	$=f_{u1,3}/(w\beta_w\gamma_s)$	300	N/mm^2
Lassterkte deuvels randstijl	$f_{w,Rd}$	$=f_{u2,3}/(w\beta_w\gamma_s)$	300	N/mm^2
Partiële factor beton	γ_c		1,50	-
Partiële factor staal	γ_s		1,25	-
Corrolatiefactor lassen	β_w		0,80	-
Reductiefactor lassen	w_f		1,2	-

Hoekprofiel randstijl			150x150x14	
Zijde	L_w		150	mm
Dikte	t_w		14	mm
Lengte verankering	L_e		1330	mm

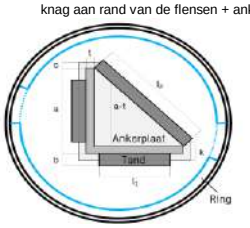
Geometrie				
Hoofdtype deuvels (zie figuren onderaan)			1	
Aantal palen per randstijl*	n_p		1	#
Type paal*			LD1	
Diameter paal uitwendig (indien buispaal)	$ø_{p,out}$		n.v.t.	mm
Wanddikte paal	t_p		8,0	mm
Roestreductie paalwand	$t_{p,red}$		4	mm
Lengte paaldeuvel als % van omtrek paal	P_b		37,25%	%
Aantal lagen deuvels aan paal	$n_{b,p}$		2	#
Seperatie paaldeuvels	s_1		200	mm
Breedte deuvels/ lengte stift aan paal*	b_1		30	mm
Dikte deuvels aan fundatiepaal*	h_1		30	mm
Diameter paal inwendig (indien buispaal)	$ø_{p,in}$	$=ø_{p,out}-2t_p$	n.v.t.	mm
Inwendige omtrek paal o.b.v. tabellen	P_{in}	$=[0;ø_{p,in}\pi]$	1450	mm
Laslengte paaldeuvel	L_b	$=P_{in}P_b$	540	mm
Oppervlakte deuvels per laag aan paal**	$A_{b,1,i}$	$=[P_{bi}(ø_{p,in}-b_1)\pi b_1;L_b b_1]$	16204	mm2
Deuvels aan buitenzijde randstijl	n_{out}		12	#
Deuvels aan binnenzijde randstijl	n_{in}		0	#
Seperatie randstijldeuvels	s_2		200	mm
(las)Lengte deuvel buitenzijde*	L_{out}		100	mm
Uitkragende lengte deuvel buitenzijde	e		0	mm
(las)Lengte deuvel binnenzijde*	L_{in}		0	mm
Breedte deuvels aan randstijl	b_2		30	mm
Dikte deuvels aan randstijl	h_2		50	mm
Diameter stiftdeuvel	$ø_b$		0	mm
Oppervlakte enkele deuvel buitenzijde	$A_{f1,out,i}$	$=[L_{out}b;L_{out}ø_b]$	3000	mm^2
Oppervlakte enkele deuvel binnenzijde	$A_{f1,in,i}$	$=[L_{in}b;L_{in}ø_b]$	0	mm^2
Las ankerplaat|randstijl	a_1		4	mm
Las deuvel|paal	a_2		4	mm
Las deuvel|buitenzijde randstijl	a_3		4	mm
Las deuvel|binnenzijde randstijl	a_4		0	mm
Lengte rugplaat aan ankerplaat	L_{ip}		0	mm
Dikte ankerplaat/rugplaat	t_f		20	mm
n-zijden buitenrand ankerplaat	n_c		1	#
Breedte buitenrand ankerplaat	c		31	mm
Rechte zijde ankerplaat	k_{pl}		31	mm
Aanvullende reductie omvang ankerplaat	$A_{p,red2}$		2530	mm^2
(Las)Lengte ankerplaat binnenzijde	L_{ip}	$=[4;2](L_w-t_w-a_3\sqrt{2})$	261	mm
Effectief oppervlakte ankerplaat druk	$A_{p,c}$	$=A_{p,i}-A_{p,red1,2}$	18981	mm^2
Effectief oppervlakte ankerplaat trek	$A_{p,t}$	$=A_{p,i}-A_{p,red1,2}-A_s$	14977	mm^2

Notities

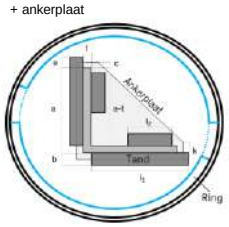
Hoofdtype 1
Tanddeuvels aan buitenzijde + ankerplaat



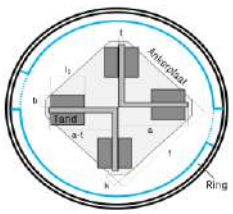
Hoofdtype 2
Tanddeuvels aan buitenzijde +
knag aan rand van de flensen + ankerplaat



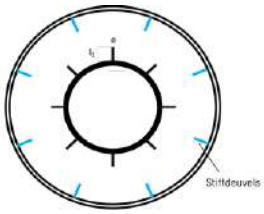
Hoofdtype 3
Tanddeuvels aan buitenzijde en binnenzijde
+ ankerplaat



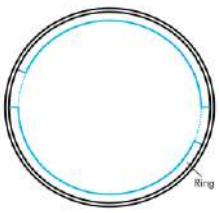
Hoofdtype 4
Tanddeuvels dubbele randstaaf + ankerplaat



Hoofdtype 5
Stiftdeuvels aan ronde buisprofiel, geen ankerplaat

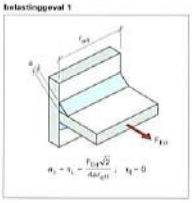


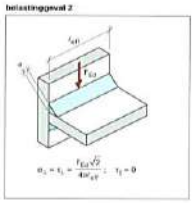
Hoofdtype 6
Enkel toetsing van knaggen aan
funderingspaal + doorsnede paal

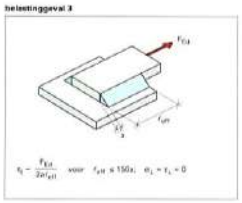


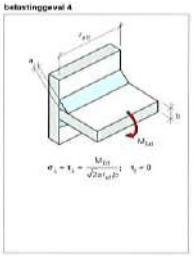
Toetsing capaciteit randstijldeuvels				
Capaciteit ankerplaat bij druk	$F_{Rd,c,p}$	$=A_{p,c}f_{cd}$	621,3	kN
Capaciteit ankerplaat bij trek	$F_{Rd,t,p}$	$=A_{p,t}f_{cd}$	490,3	kN
Capaciteit buitendeuvels	$F_{Rd,b,out}$	$=A_{t1,out,i}f_{cd}\eta_{out}$	1178,5	kN
Capaciteit binnendeuvels	$F_{Rd,b,in}$	$=A_{t1,in,i}f_{cd}\eta_{in}$	0,0	kN
Capaciteit totaal bij druk	$F_{Rd,c}$	$=F_{Rd,c,p}+F_{Rd,b+o/i}$	1799,8	kN
Capaciteit totaal bij trek	$F_{Rd,t}$	$=F_{Rd,t,p}+F_{Rd,b+o/i}$	1668,7	kN
Betondrukspanning deuvels bij druk	$\sigma_{c,Ed,c}$	$=F_{ed,c}/(A_{p,c}+A_{t,o/i})$	16,66	N/mm²
Betondrukspanning bij deuvels bij trek	$\sigma_{c,Ed,t}$	$=F_{ed,t}/(A_{p,t}+A_{t,o/i})$	17,97	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed,c}$		0	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed,t}$		0	N/mm²
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=[F_{Ed,c}/F_{Rd,c};F_{Ed,t}/F_{Rd,t}]$	0,55	OK
Toetsing capaciteit paaldeuvels				
Capaciteit deuvels enkele paal	$F_{Rd,b}$	$=A_{b,i}*n_{b,p}*f_{cd}$	1060,9	kN
Betondrukspanning bij deuvels	$\sigma_{c,Ed+max}$	$=F_{Ed}/(A_{b,i}*n_b)$	28,3	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed}$		0,0	N/mm²
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=F_{Ed}/(F_{Rd,b}+F_{Rd,b,c/st})$	0,86	OK
Toetsing lassen				
Type las randstijldeuvels			Dubbelzijdig	
Type las paaldeuvels			Dubbelzijdig	
Lasspanning ankerplaat	$\sigma_{vw1,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	231,3	N/mm²
Lasspanning buitendeuvels	$\sigma_{vw2,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	152,5	N/mm²
Lasspanning binnendeuvels	$\sigma_{vw3,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	n.v.t.	N/mm²
Lasspanning paaldeuvels	$\sigma_{vw4,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	300	N/mm²
Maatgevende UC		$=\sigma_{vw,Ed}/f_{w,Rd}$	1,00	OK
Toetsing paalcapaciteit				
Effectieve doorsnede paal	$A_{p,eff}$	$=P_{in}(t_p-t_{p,red})$	5800	mm²
Maximale spanning in paal	$\sigma_{s,Ed}$	$=F_{Ed}/(A_{p,eff}n_p)$	157,9	N/mm²
UC doorsnede paal		$=\sigma_{s,Ed}/f_{y,1}$	0,67	OK

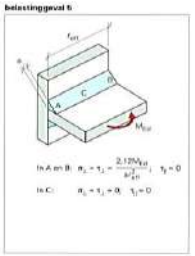
Lasspanningen NEN-EN 1993-1-8 p. 4.5.3						
Onderdeel	Ankerplaat	Buitendeuvels	Binnendeuvels (T3)	Binnendeuvels (T2)	Paaldeuvels	
Som σ_T	115,6	76,2	0,0	0,0	149,9	N/mm²
Som τ_T	115,6	76,2	0,0	0,0	149,9	N/mm²
Som $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 1	Ja	Nee	Nee	Nee	Nee	
M1 σ_T	115,6	0,0	0,0	0,0	0,0	N/mm²
M1 τ_T	115,6	0,0	0,0	0,0	0,0	N/mm²
M1 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 2	Nee	Ja	Ja	Nee	Ja	
M2 σ_T	0,0	47,6	0,0	0,0	74,9	N/mm²
M2 τ_T	0,0	47,6	0,0	0,0	74,9	N/mm²
M2 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 3	Nee	Nee	Nee	Ja	Nee	
M3 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M3 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M3 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 4	Nee	Ja	Ja	Nee	Ja	
M4 σ_T	0,0	28,6	0,0	0,0	74,9	N/mm²
M4 τ_T	0,0	28,6	0,0	0,0	74,9	N/mm²
M4 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 5	Nee	Nee	Nee	Nee	Nee	
M5 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M5 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M5 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 6	Nee	Nee	Nee	Nee	Nee	
M6 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M6 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M6 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²

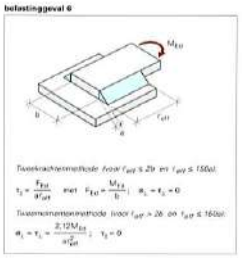






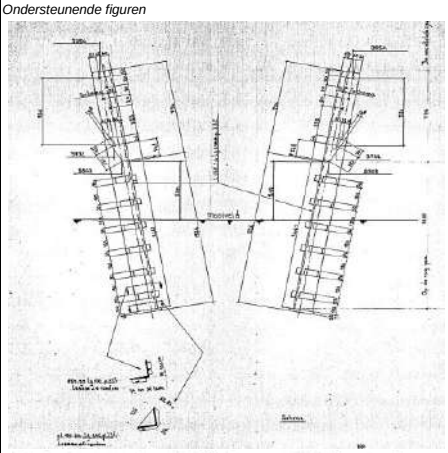


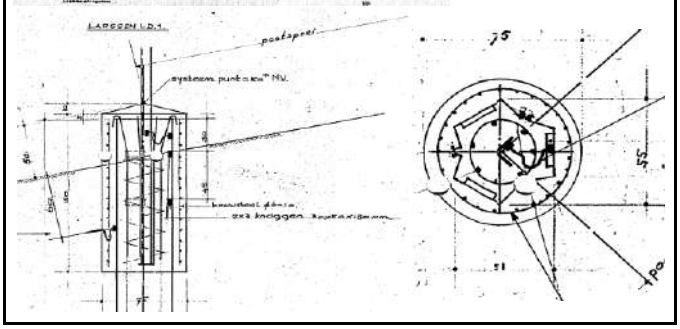




Achterliggende logica				
Afschuifprojectievlak NEN-EN1994-2 F1.1				
Oppervlakte projectie afschuifweerstand	A_{f2}	$=A_{f2,out}+A_{f2,in}$	12600	mm²
Minimale h.o.h. seperatie deuvels	s_{min}	$=[250;2*L_w]$	n.v.t.	mm
Breedte projectievlak buitendeuvels	$b_{f2,out}$	$=b_2+s_2/5$	70	mm
Lengte projectievlak buitendeuvels	$L_{f2,out}$	$=L_{,out}+2s_2/5$	180	mm
Oppervlak projectie buitendeuvels	$A_{f2,out}$	$=b_{f2,out}L_{f2,out}$	12600	mm²
Breedte projectievlak binnendeuvels	$b_{f2,in}$	$=b_2+s_2/5$	0	mm
Lengte projectievlak binnendeuvels	L_{f2+in}	$=L_{,in}+2s_2/5$	0	mm
Oppervlak projectie binnendeuvels	$A_{f2,in}$	$=b_{f2,in}L_{f2,in}$	0	mm²
Breedte projectievlak paaldeuvels	$b_{f2,p}$	$=\min[b_1;b_{eff,b}]+s_1/5$	70	mm
Lengte projectievlak paaldeuvels	$L_{f2,p}$	$=L_b+2s_1/5$	620	mm
Oppervlak projectie paaldeuvels	$A_{f2,p}$	$=b_{f2,p}L_{f2,p}$	43409	mm²
Effectieve oppervlakte ankerplaat NEN-EN1993-1-8 p. 4.10				
Oppervlakte ankerplaat excl. reducties	$A_{p,i}$	$=(L_w+cn_c)^2-0,5((w+cn_c-k)^2$	21511	mm²
Reductie ineffectief oppervlak ankerplaat	$A_{p,red1}$	$=0,5b_{ineff}^2$	0	mm²
Oppervlakte staalprofiel	A_s	$=(2L_w-t_w)t_w$	4004	mm²
Effectieve breedte ankerplaat	b_{eff}	$=t_w+2a_1\sqrt{2}+7kt_f$	165,3	mm
Factor meewerkende breedte	k	$=\min[(t_f/t_w);1,0]$	1,00	-
Ineffectieve breedte	b_{ineff}	$=L_w+cn_c-(2c+t_w+b_{eff})+k_{pl}$	0,0	mm
Momentarm ankerplaat (voor toetsing incl. buiging)				
Momentarm ankerplaat	a_{fp}	$=[\sqrt{(2(z_1-z_2)^2)};0]$	6,1	mm
Zwaartepunt ankerplaat t.o.v. onderhoek	z_1	$=\Sigma A_i*z_i/A_T$	69,3	mm
Zwaartepunt randstijl t.o.v. onderhoek	z_2	$=\Sigma A_i*z_i/A_T$	73,7	mm
Staalspanning (voor toetsing incl. buiging)				
Weerstandsmoment ankerplaat	W_1	$=1/6*2(L_w-t_w)t_f^2$	18133	mm³
Weerstandsmoment buitendeuvels	W_2	$=1/6(L_{out}-e)h_2^2$	41667	mm³
Weerstandsmoment binnendeuvels	W_3	$=1/6L_{in}h_2^2$	0	mm³
Weerstandsmoment paaldeuvels	W_4	$=1/6L_ih_1^2$	81019	mm³
Staalspanning ankerplaat (druk)	$\sigma_{s,Ed,c}$	$=A_{p,c}\sigma_{c-Ed,c}a_{fp}/W_1$	107	N/mm²
Staalspanning buitendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{t1,out,c}\sigma_{c-Ed,c}(b_2/2)/W_2$	18	N/mm²
Staalspanning binnendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{t1,in,c}\sigma_{c-Ed,c}(b_2/2)/W_3$	0	N/mm²
Staalspanning paaldeuvels (max)	$\sigma_{s,Ed,c,i}$	$=A_i\sigma_{c-Ed,max}(b_1/2)/W_4$	85	N/mm²
Staalspanning ankerplaat (trek)	$\sigma_{s,Ed,t}$	$=A_{p,t}\sigma_{c-Ed,t}a_f/W_1$	91	N/mm²
Staalspanning buitendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{t1,out,c}\sigma_{c-Ed,t}(b_2/2)/W_2$	19	N/mm²
Staalspanning binnendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{t1,in,c}\sigma_{c-Ed,t}(b_2/2)/W_3$	0	N/mm²
Optionele meewerkende betondoorsnede paal				
Enkel van toepassing als krachten uit randstijl via schachtwrijving naar de paalwand overbracht kunnen worden.				
Meewerkende wapeningstaven	n_{st}		0	#
Staafdiameter	$ø_{st}$		0	mm
Materiaalkwaliteit staaf	-		-	-
Factor effectiviteit betondoorsnede	α		0,00	-
Vloeigrens	f_{yd}		0	N/mm²
Trekcapaciteit wapening	$F_{Rd,b,st}$	$=0,25n_{st}ø_{st}^2\pi F_{yd}$	0	kN
Betondoorsnede paal	$A_{c,p}$	$=\alpha*0,25P_{in}^2/\pi$	0	mm²
Druksterkte betondoorsnede	$F_{Rd,b,c}$	$=A_{c,p}f_{ck}/\gamma_c$	0	kN
Gereduceerde breedte als knaggen geprofileerd zijn volgens NEN-EN1993-1-8 p. 4.10				
Flensdikte aangelast profiel	$t_{f,b}$		0	mm
Factor meewerkende breedte (k)	k_b	$=\min[(t_{f,b}/t_{f,b});1,0]$	0,00	-
Effectieve breedte knag	$b_{eff,b}$	$=0,5(t_{f,b}+2a_2\sqrt{2}+7k_bt_{f,b})$	0	mm

Ondersteunende figuren





Toetsing inleiding krachten in fundering

Projectnaam	Opwaardering KIJ-BVW 380kV	**Rekensheet versie**	3.1
Lijn	KIJ-DIM	**Datum**	1-2-2026
Subtype deuvels aan randstijl	N	**Auteur**	[redacted]
Subtype deuvels aan paal	G	**Eerste interne controle**	Mauny Bahri (RO)
Mastnummer(s)	150,151	**Tweede interne controle**	[redacted]

Samenvatting	UC	Check	F_{Rd}	
Maatgevende unity check	**1,00**	OK		
Max UC randstijldeuvels beton	0,35	OK	D:2834 T:2653	kN
Max UC paaldeuvels beton	0,52	OK	1751	kN
Max UC lassen	1,00	OK	917	kN
Max UC staalciteria	0,67	OK	1363	kN
Trekkracht uit randstijl	$F_{Ed,t}$		*916*	kN
Drukkracht uit randstijl	$F_{Ed,c}$		*916*	kN
Spanningsbegrenzing		$=0,7f_{cd}$	Nee	
Toetsing incl. buiging			Nee	
Toetsing incl. las reductie		$=f_w/1,2$	Ja	

Zie voor de maximaal optredende paalkrachten het constructief rapport

Materialen				
Betonkwaliteit	-		C30/37	
Beton omsloten	-		Ja	
Karakteristieke druksterkte	f_{ck}		30	N/mm^2
Verhogingsfactor druksterkte	C_a	$=\min[\sqrt{(A_{c2}/A_{f1})};2,5]$	1,64	-
Verhoogde druksterkte	f_{jk}	$=f_{ck}C_a$	49,10	N/mm^2
Betondruksterkte	f_{cd}	$=f_{jk}/\gamma_c$	32,73	N/mm^2
Staalsoort 1: funderingspaal	-		S235	N/mm^2
Treksterkte staalsoort 1	$f_{u,1}$		360	N/mm^2
Vloeispanning staalsoort 1	$f_{y,1}$		235	N/mm^2
Staalsoort 2: randstijl	-		S235	N/mm^2
Treksterkte staalsoort 2	$f_{u,2}$		360	N/mm^2
Vloeispanning staalsoort 2	$f_{y,2}$		235	N/mm^2
Staalsoort 3: deuvels	-		S235	N/mm^2
Treksterkte staalsoort 3	$f_{u,3}$		360	N/mm^2
Vloeispanning staalsoort 3	$f_{y,3}$		235	N/mm^2
Lassterkte deuvels paal	$f_{w,Rd}$	$=f_{u1,3}/(w_r\beta_w\gamma_s)$	300	N/mm^2
Lassterkte deuvels randstijl	$f_{w,Rd}$	$=f_{u2,3}/(w_r\beta_w\gamma_s)$	300	N/mm^2
Partiële factor beton	γ_c		1,50	-
Partiële factor staal	γ_s		1,25	-
Corrolatiefactor lassen	β_w		0,80	-
Reductiefactor lassen	w_r		1,2	-

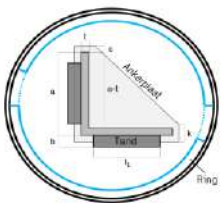
Hoekprofiel randstijl			180x180x16	
Zijde	L_w		180	mm
Dikte	t_w		16	mm
Lengte verankering	L_e		1380	mm

Geometrie				
Hoofdtype deuvels (zie figuren onderaan)			1	
Aantal palen per randstijl*	n_p		1	#
Type paal*			LD1	
Diameter paal uitwendig (indien buispaal)	$ø_{p,out}$		n.v.t.	mm
Wanddikte paal	t_p		8,0	mm
Roestreductie paalwand	$t_{p,red}$		4	mm
Lengte paaldeuvel als % van omtrek paal	P_b		37,25%	%
Aantal lagen deuvels aan paal	$n_{b,p}$		2	#
Seperatie paaldeuvels	s_1		200	mm
Breedte deuvels/ lengte stift aan paal*	b_1		30	mm
Dikte deuvels aan fundatiepaal*	h_1		30	mm
Diameter paal inwendig (indien buispaal)	$ø_{p,in}$	$=ø_{p,out}-2t_p$	n.v.t.	mm
Inwendige omtrek paal o.b.v. tabellen	P_{in}	$=[0;ø_{p,in}\pi]$	1450	mm
Laslengte paaldeuvel	L_b	$=P_{in}P_b$	540	mm
Oppervlakte deuvels per laag aan paal**	$A_{b,1,i}$	$=[P_b(ø_{p,in}-b_1)\pi b_1;L_b b_1]$	16204	mm2
Deuvels aan buitenzijde randstijl	n_{out}		12	#
Deuvels aan binnenzijde randstijl	n_{in}		0	#
Seperatie randstijldeuvels	s_2		200	mm
(las)Lengte deuvel buitenzijde*	L_{out}		160	mm
Uitkragende lengte deuvel buitenzijde	e		0	mm
(las)Lengte deuvel binnenzijde*	L_{in}		0	mm
Breedte deuvels aan randstijl	b_2		30	mm
Dikte deuvels aan randstijl	h_2		50	mm
Diameter stiftdeuvel	$ø_b$		0	mm
Oppervlakte enkele deuvel buitenzijde	$A_{f1,out,i}$	$=[L_{out}b;L_{out}ø_b]$	4800	mm^2
Oppervlakte enkele deuvel binnenzijde	$A_{f1,in,i}$	$=[L_{in}b;L_{in}ø_b]$	0	mm^2
Las ankerplaat|randstijl	a_1		4	mm
Las deuvel|paal	a_2		4	mm
Las deuvel|buitenzijde randstijl	a_3		4	mm
Las deuvel|binnenzijde randstijl	a_4		0	mm
Lengte rugplaat aan ankerplaat	L_{rp}		0	mm
Dikte ankerplaat/rugplaat	t_r		20	mm
n-zijden buitenrand ankerplaat	n_c		2	#
Breedte buitenrand ankerplaat	c		15	mm
Rechte zijde ankerplaat	k_{pl}		50	mm
Aanvullende reductie omvang ankerplaat	$A_{p,red2}$		1250	mm^2
(Las)Lengte ankerplaat binnenzijde	L_{fp}	$=[4;2](L_w-t_w-a_1\sqrt{2})$	317	mm
Effectief oppervlakte ankerplaat druk	$A_{p,c}$	$=A_{p,r}-A_{p,red1,2}$	28960	mm^2
Effectief oppervlakte ankerplaat trek	$A_{p,t}$	$=A_{p,r}-A_{p,red1,2}-A_s$	23456	mm^2

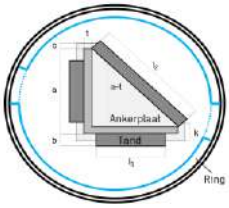
Notities

* Afdracht van krachten gaat via randstijl naar buiswand via gewapend beton in de paal. Weerstand trekcapaciteit is gebasseerd op weerstand van de wapeningskorf. Drukweerstand is gelijk aan het betonciterium van alle knaggen en ankerplaat samen.

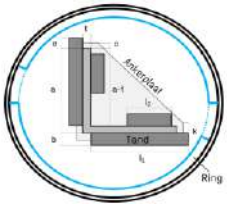
Hoofdtype 1
Tanddeuvels aan buitenzijde + ankerplaat



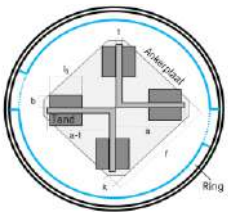
Hoofdtype 2
Tanddeuvels aan buitenzijde +
knag aan rand van de flensen + ankerplaat



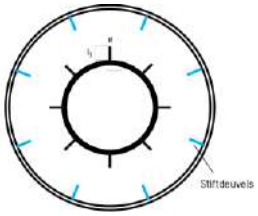
Hoofdtype 3
Tanddeuvels aan buitenzijde en binnenzijde
+ ankerplaat



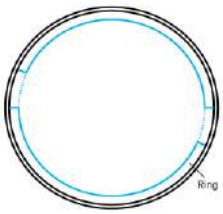
Hoofdtype 4
Tanddeuvels dubbele randstaaf + ankerplaat



Hoofdtype 5
Stiftdeuvels aan ronde buisprofiel, geen ankerplaat

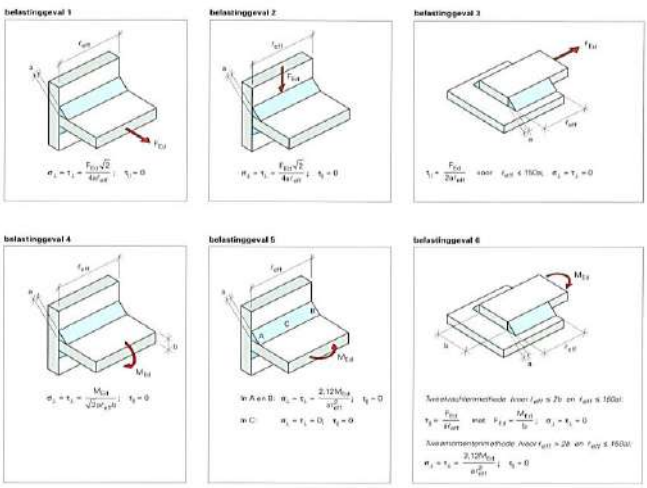


Hoofdtype 6
Enkel toetsing van knaggen aan
funderingspaal + doorsnede paal



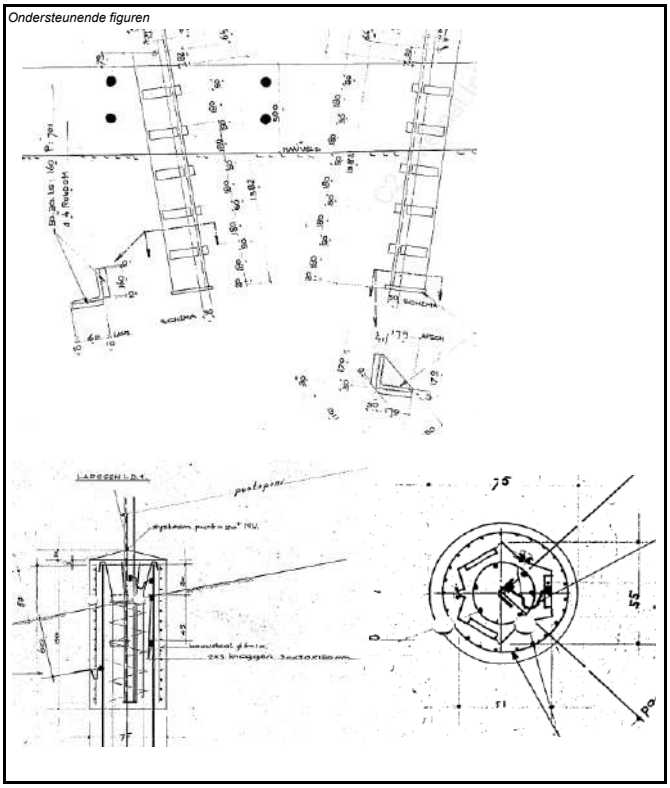
Toetsing capaciteit randstijldeuvels				
Capaciteit ankerplaat bij druk	$F_{Rd,c,p}$	$=A_{p,c}f_{cd}$	948,0	kN
Capaciteit ankerplaat bij trek	$F_{Rd,t,p}$	$=A_{p,t}f_{cd}$	767,8	kN
Capaciteit buitendeuvels	$F_{Rd,b,out}$	$=A_{rt,out,i}f_{cd}n_{out}$	1885,5	kN
Capaciteit binnendeuvels	$F_{Rd,b,in}$	$=A_{rt,in,i}f_{cd}n_{in}$	0,0	kN
Capaciteit totaal bij druk	$F_{Rd,c}$	$=F_{Rd,c,p}+F_{Rd,b+o/i}$	2833,5	kN
Capaciteit totaal bij trek	$F_{Rd,t}$	$=F_{Rd,t,p}+F_{Rd,b+o/i}$	2653,4	kN
Betondrukspanning deuvels bij druk	$\sigma_{c,Ed,c}$	$=F_{ed,c}/(A_{p,c}+A_{t,o/i})$	10,58	N/mm^2
Betondrukspanning bij deuvels bij trek	$\sigma_{c,Ed,t}$	$=F_{ed,t}/(A_{p,t}+A_{t,o/i})$	11,30	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed,c}$		0	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed,t}$		0	N/mm^2
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=[F_{Ed,c}/F_{Rd,c};F_{Ed,t}/F_{Rd,t}]$	0,35	OK
Toetsing capaciteit paaldeuvels				
Capaciteit deuvels enkele paal	$F_{Rd,b}$	$=A_{b,i}*n_{b,p}*f_{cd}$	1060,9	kN
Betondrukspanning bij deuvels	$\sigma_{c,Ed+max}$	$=F_{Ed}/(A_{b,i}*n_b)$	28,3	N/mm^2
Max. buigspanning in staal	$\sigma_{s,Ed}$		0,0	N/mm^2
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=F_{Ed}/(F_{Rd,b}+F_{Rd,b,c/st})$	0,52	OK
Toetsing lassen				
Type las randstijldeuvels			Dubbelzijdig	
Type las paaldeuvels			Dubbelzijdig	
Lasspanning ankerplaat	$\sigma_{vw1,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	182,7	N/mm^2
Lasspanning buitendeuvels	$\sigma_{vw2,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	95,9	N/mm^2
Lasspanning binnendeuvels	$\sigma_{vw3,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	n.v.t.	N/mm^2
Lasspanning paaldeuvels	$\sigma_{vw4,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	300	N/mm^2
Maatgevende UC		$=\sigma_{vw,Ed}/f_{w,Rd}$	1,00	OK
Toetsing paalcapaciteit				
Effectieve doorsnede paal	$A_{p,eff}$	$=P_{in}(t_p-t_{p,red})$	5800	mm^2
Maximale spanning in paal	$\sigma_{s,Ed}$	$=F_{Ed}/(A_{p,eff}n_p)$	157,9	N/mm^2
UC doorsnede paal		$=\sigma_{s,Ed}/f_{y,1}$	0,67	OK

Lasspanningen NEN-EN 1993-1-8 p. 4.5.3						
Onderdeel	Ankerplaat	Buitendeuvels	Binnendeuvels (T3)	Binnendeuvels (T2)	Paaldeuvels	
Som σ_T	91,3	47,9	0,0	0,0	149,9	N/mm^2
Som τ_T	91,3	47,9	0,0	0,0	149,9	N/mm^2
Som $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 1	Ja	Nee	Nee	Nee	Nee	
M1 σ_T	91,3	0,0	0,0	0,0	0,0	N/mm^2
M1 τ_T	91,3	0,0	0,0	0,0	0,0	N/mm^2
M1 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 2	Nee	Ja	Ja	Nee	Ja	
M2 σ_T	0,0	30,0	0,0	0,0	74,9	N/mm^2
M2 τ_T	0,0	30,0	0,0	0,0	74,9	N/mm^2
M2 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 3	Nee	Nee	Nee	Ja	Nee	
M3 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M3 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M3 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 4	Nee	Ja	Ja	Nee	Ja	
M4 σ_T	0,0	18,0	0,0	0,0	74,9	N/mm^2
M4 τ_T	0,0	18,0	0,0	0,0	74,9	N/mm^2
M4 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 5	Nee	Nee	Nee	Nee	Nee	
M5 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M5 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M5 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2
Mechanisme 6	Nee	Nee	Nee	Nee	Nee	
M6 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M6 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm^2
M6 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm^2



Achterliggende logica				
Afschuifprojectievlak NEN-EN1994-2 F1.1				
Oppervlakte projectie afschuifweerstand	A_{f2}	$=A_{f2,out}+A_{f2,in}$	16800	mm^2
Minimale h.o.h. seperatie deuvels	s_{min}	$=[250;2*L_w]$	n.v.t.	mm
Breedte projectievlak buitendeuvels	$b_{f2,out}$	$=b_2+s_2/5$	70	mm
Lengte projectievlak buitendeuvels	$L_{f2,out}$	$=L_{out}+2s_2/5$	240	mm
Oppervlak projectie buitendeuvels	$A_{f2,out}$	$=b_{f2,out}L_{f2,out}$	16800	mm^2
Breedte projectievlak binnendeuvels	$b_{f2,in}$	$=b_2+s_2/5$	0	mm
Lengte projectievlak binnendeuvels	$L_{f2,in}$	$=L_{in}+2s_2/5$	0	mm
Oppervlak projectie binnendeuvels	$A_{f2,in}$	$=b_{f2,in}L_{f2,in}$	0	mm^2
Breedte projectievlak paaldeuvels	$b_{f2,p}$	$=\min[b_i;b_{eff,b}]+s_i/5$	70	mm
Lengte projectievlak paaldeuvels	$L_{f2,p}$	$=L_b+2s_i/5$	620	mm
Oppervlak projectie paaldeuvels	$A_{f2,p}$	$=b_{f2,p}L_{f2,p}$	43409	mm^2
Effectieve oppervlakte ankerplaat NEN-EN1993-1-8 p. 4.10				
Oppervlakte ankerplaat excl. reducties	$A_{p,i}$	$=(L_w+cn_c)^2-0,5((w+cn_c-k)^2$	31300	mm^2
Reductie ineffectief oppervlak ankerplaat	$A_{p,red1}$	$=0,5b_{ineff}^2$	1090	mm^2
Oppervlakte staalprofiel	A_s	$=(2L_w-t_w)t_w$	5504	mm^2
Effectieve breedte ankerplaat	b_{eff}	$=t_w+2a_1\sqrt{2}+7kt_f$	167,3	mm
Factor meewerkende breedte	k	$=\min[(t_f/t_w);1,0]$	1,00	-
Ineffectieve breedte	b_{ineff}	$=L_w+cn_c-(2c+t_w+b_{eff})+k_{pl}$	46,7	mm
Momentarm ankerplaat (voor toetsing incl. buiging)				
Momentarm ankerplaat	a_{fp}	$=[\sqrt{(2(z_1-z_2)^2)};0]$	25,4	mm
Zwaartepunt ankerplaat t.o.v. onderhoek	z_1	$=\sum A*z_i/A_T$	83,9	mm
Zwaartepunt randstijl t.o.v. onderhoek	z_2	$=\sum A*z_i/A_T$	65,9	mm
Staalspanning (voor toetsing incl. buiging)				
Weerstandsmoment ankerplaat	W_1	$=1/6*2(L_w-t_w)t_f^2$	21867	mm^3
Weerstandsmoment buitendeuvels	W_2	$=1/6(L_{out}-e)h_2^2$	66667	mm^3
Weerstandsmoment binnendeuvels	W_3	$=1/6L_{in}h_2^2$	0	mm^3
Weerstandsmoment paaldeuvels	W_4	$=1/6L_ih_1^2$	81019	mm^3
Staalspanning ankerplaat (druk)	$\sigma_{s,Ed,c}$	$=A_{p,c}\sigma_{c,Ed,c}a_{fp}/W_1$	356	N/mm^2
Staalspanning buitendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{rt,out,c}\sigma_{c,Ed,c}(b_2/2)/W_2$	11	N/mm^2
Staalspanning binnendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{rt,in,c}\sigma_{c,Ed,c}(b_2/2)/W_3$	0	N/mm^2
Staalspanning paaldeuvels (max)	$\sigma_{s,Ed,c,t}$	$=A_i\sigma_{c,Ed,max}(b_1/2)/W_4$	85	N/mm^2
Staalspanning ankerplaat (trek)	$\sigma_{s,Ed,t}$	$=A_{p,t}\sigma_{c,Ed,t}a_f/W_1$	308	N/mm^2
Staalspanning buitendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{rt,out,c}\sigma_{c,Ed,t}(b_2/2)/W_2$	12	N/mm^2
Staalspanning binnendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{rt,in,c}\sigma_{c,Ed,t}(b_2/2)/W_3$	0	N/mm^2
Optionele meewerkende betondoorsnede paal				
Enkel van toepassing als krachten uit randstijl via schachtwrijving naar de paalwand overbracht kunnen worden.				
Meewerkende wapeningstaven	n_{st}		7	#
Staafdiameter	$ø_{st}$		19	mm
Materiaalkwaliteit staaf	-		B400	-
Factor effectiviteit betondoorsnede	α		0,75	-
Vloeigrens	f_{yd}		348	N/mm^2
Trekcapaciteit wapening	$F_{Rd,b,st}$	$=0,25n_{st}ø_{st}^2\pi F_{yd}$	690	kN
Betondoorsnede paal	$A_{c,p}$	$=\alpha*0,25P_{in}^2/\pi$	125484	mm^2
Druksterkte betondoorsnede	$F_{Rd,b,c}$	$=A_{c,p}f_{ck}/\gamma_c$	2510	kN
Gereduceerde breedte als knaggen geprofileerd zijn volgens NEN-EN1993-1-8 p. 4.10				
Flensdikte aangelast profiel	$t_{f,b}$		0	mm
Factor meewerkende breedte (k)	k_b	$=\min[(t_{f,b}/t_{f,b});1,0]$	0,00	-
Effectieve breedte knag	$b_{eff,b}$	$=0,5(t_{f,b}+2a_2\sqrt{2}+7k_bt_{f,b})$	0	mm

Ondersteunende figuren



Toetsing inleiding krachten in fundering

Projectnaam	Opwaardering KIJ-BVW 380kV	**Rekensheet versie**	3.1
Lijn	KIJ-DIM	**Datum**	1-2-2026
Subtype deuvels aan randstijl	N	**Auteur**	[redacted]
Subtype deuvels aan paal	H	**Eerste interne controle**	Mauny Bahri (RO)
Mastnummer(s)	106	**Tweede interne controle**	[redacted]

Samenvatting	UC	Check	F_{Rd}	
Maatgevende unity check	**1,00**	OK		
Max UC randstijldeuvels beton	0,90	OK	D:2087 T:1950	kN
Max UC paaldeuvels beton	0,55	OK	3177	kN
Max UC lassen	1,00	OK	1749	kN
Max UC staalciteria	1,00	OK	1754	kN
Trekkracht uit randstijl	$F_{Ed,t}$		*1749*	kN
Drukkracht uit randstijl	$F_{Ed,c}$		*1749*	kN
Spanningsbegrenzing		$=0,7f_{cd}$	Nee	
Toetsing incl. buiging			Nee	
Toetsing incl. las reductie		$=f_w/1,2$	Ja	

Zie voor de maximaal optredende paalkrachten het constructief rapport

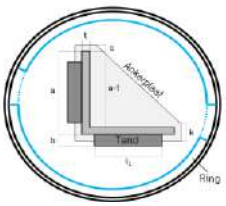
Materialen				
Betonkwaliteit	-		C28/35	=B35
Beton omsloten	-		Ja	
Karakteristieke druksterkte	f_{ck}		28	N/mm^2
Verhogingsfactor druksterkte	C_a	$=\min[\sqrt{(A_{f2}/A_{f1})};2,5]$	1,60	-
Verhoogde druksterkte	f_{jk}	$=f_{ck}C_a$	44,82	N/mm^2
Betondruksterkte	f_{cd}	$=f_{jk}/\gamma_c$	29,88	N/mm^2
Staalsoort 1: funderingspaal	-		S235	N/mm^2
Treksterkte staalsoort 1	$f_{u,1}$		360	N/mm^2
Vloeispanning staalsoort 1	$f_{y,1}$		235	N/mm^2
Staalsoort 2: randstijl	-		S235	N/mm^2
Treksterkte staalsoort 2	$f_{u,2}$		360	N/mm^2
Vloeispanning staalsoort 2	$f_{y,2}$		235	N/mm^2
Staalsoort 3: deuvels	-		S235	N/mm^2
Treksterkte staalsoort 3	$f_{u,3}$		360	N/mm^2
Vloeispanning staalsoort 3	$f_{y,3}$		235	N/mm^2
Lassterkte deuvels paal	$f_{w,Rd}$	$=f_{u1,3}/(w\beta_w\gamma_s)$	300	N/mm^2
Lassterkte deuvels randstijl	$f_{w,Rd}$	$=f_{u2,3}/(w\beta_w\gamma_s)$	300	N/mm^2
Partiële factor beton	γ_c		1,50	-
Partiële factor staal	γ_s		1,25	-
Corrolatiefactor lassen	β_w		0,80	-
Reductiefactor lassen	w_r		1,2	-

Hoekprofiel randstijl			160x160x15	
Zijde	L_w		160	mm
Dikte	t_w		15	mm
Lengte verankering	L_e		1340	mm

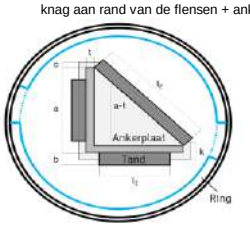
Geometrie				
Hoofdtype deuvels (zie figuren onderaan)			1	
Aantal palen per randstijl*	n_p		1	#
Type paal*			Buispaal	
Diameter paal uitwendig (indien buispaal)	$ø_{p,out}$		610,0	mm
Wanddikte paal	t_p		8,0	mm
Roestreductie paalwand	$t_{p,red}$		4	mm
Lengte paaldeuvel als % van omtrek paal	P_b		100,00%	%
Aantal lagen deuvels aan paal	$n_{b,p}$		2	#
Seperatie paaldeuvels	s_1		200	mm
Breedte deuvels/ lengte stift aan paal*	b_1		30	mm
Dikte deuvels aan fundatiepaal*	h_1		30	mm
Diameter paal inwendig (indien buispaal)	$ø_{p,in}$	$=ø_{p,out}-2t_p$	594,0	mm
Inwendige omtrek paal o.b.v. paaldiameter	P_{in}	$=[0;ø_{p,in}\pi]$	1866	mm
Laslengte paaldeuvel	L_b	$=P_{in}P_b$	1866	mm
Oppervlakte deuvels per laag aan paal**	$A_{b,1,i}$	$=[P_b(ø_{p,in}-b_1)\pi b_1;L_b b_1]$	53156	mm2
Deuvels aan buitenzijde randstijl	n_{out}		10	#
Deuvels aan binnenzijde randstijl	n_{in}		0	#
Seperatie randstijldeuvels	s_2		200	mm
(las)Lengte deuvel buitenzijde*	L_{out}		160	mm
Uitkragende lengte deuvel buitenzijde	e		0	mm
(las)Lengte deuvel binnenzijde*	L_{in}		0	mm
Breedte deuvels aan randstijl	b_2		30	mm
Dikte deuvels aan randstijl	h_2		50	mm
Diameter stiftdeuvel	$ø_b$		0	mm
Oppervlakte enkele deuvel buitenzijde	$A_{f1,out,i}$	$=[L_{out}b;L_{out}ø_b]$	4800	mm^2
Oppervlakte enkele deuvel binnenzijde	$A_{f1,in,i}$	$=[L_{in}b;L_{in}ø_b]$	0	mm^2
Las ankerplaat|randstijl	a_1		5	mm
Las deuvel|paal	a_2		5	mm
Las deuvel|buitenzijde randstijl	a_3		5	mm
Las deuvel|binnenzijde randstijl	a_4		0	mm
Lengte rugplaat aan ankerplaat	L_{rp}		0	mm
Dikte ankerplaat/rugplaat	t_f		20	mm
n-zijden buitenrand ankerplaat	n_c		2	#
Breedte buitenrand ankerplaat	c		10	mm
Rechte zijde ankerplaat	k_{pl}		35	mm
Aanvullende reductie omvang ankerplaat	$A_{p,red2}$		0	mm^2
(Las)Lengte ankerplaat binnenzijde	L_{ip}	$=[4;2](L_w-t_w-a_3\sqrt{2})$	276	mm
Effectief oppervlakte ankerplaat druk	$A_{p,c}$	$=A_{p,i}-A_{p,red1,2}$	21829	mm^2
Effectief oppervlakte ankerplaat trek	$A_{p,t}$	$=A_{p,i}-A_{p,red1,2}-A_s$	17254	mm^2

Notities

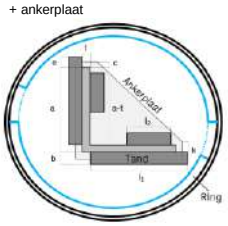
Hoofdtype 1
Tanddeuvels aan buitenzijde + ankerplaat



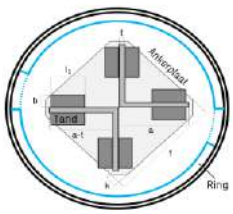
Hoofdtype 2
Tanddeuvels aan buitenzijde +
knag aan rand van de flensen + ankerplaat



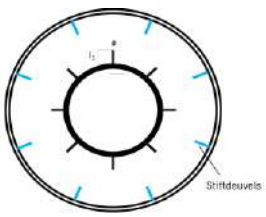
Hoofdtype 3
Tanddeuvels aan buitenzijde en binnenzijde
+ ankerplaat



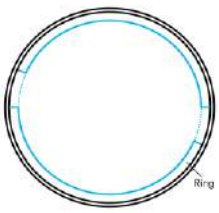
Hoofdtype 4
Tanddeuvels dubbele randstaaf + ankerplaat



Hoofdtype 5
Stiftdeuvels aan ronde buisprofiel, geen ankerplaat



Hoofdtype 6
Enkel toetsing van knaggen aan
funderingspaal + doorsnede paal

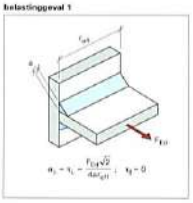


Toetsing capaciteit randstijldeuvels				
Capaciteit ankerplaat bij druk	$F_{Rd,c,p}$	$=A_{p,c}f_{cd}$	652,3	kN
Capaciteit ankerplaat bij trek	$F_{Rd,t,p}$	$=A_{p,t}f_{cd}$	515,6	kN
Capaciteit buitendeuvels	$F_{Rd,b,out}$	$=A_{t1,out,i}f_{cd}\eta_{out}$	1434,4	kN
Capaciteit binnendeuvels	$F_{Rd,b,in}$	$=A_{t1,in,i}f_{cd}\eta_{in}$	0,0	kN
Capaciteit totaal bij druk	$F_{Rd,c}$	$=F_{Rd,c,p}+F_{Rd,b+o/i}$	2086,7	kN
Capaciteit totaal bij trek	$F_{Rd,t}$	$=F_{Rd,t,p}+F_{Rd,b+o/i}$	1950,0	kN
Betondrukspanning deuvels bij druk	$\sigma_{c,Ed,c}$	$=F_{ed,c}/(A_{p,c}+A_{t,o/i})$	25,05	N/mm²
Betondrukspanning bij deuvels bij trek	$\sigma_{c,Ed,t}$	$=F_{ed,t}/(A_{p,t}+A_{t,o/i})$	26,80	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed,c}$		0	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed,t}$		0	N/mm²
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=[F_{Ed,c}/F_{Rd,c};F_{Ed,t}/F_{Rd,t}]$	0,90	OK
Toetsing capaciteit paaldeuvels				
Capaciteit deuvels enkele paal	$F_{Rd,b}$	$=A_{b,i}*n_{b,p}*f_{cd}$	3176,9	kN
Betondrukspanning bij deuvels	$\sigma_{c,Ed+max}$	$=F_{Ed}/(A_{b,i}*n_b)$	16,5	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed}$		0,0	N/mm²
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=F_{Ed}/(F_{Rd,b}+F_{Rd,b,c/st})$	0,55	OK
Toetsing lassen				
Type las randstijldeuvels			Dubbelzijdig	
Type las paaldeuvels			Dubbelzijdig	
Lasspanning ankerplaat	$\sigma_{vw1,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	299,9	N/mm²
Lasspanning buitendeuvels	$\sigma_{vw2,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	181,9	N/mm²
Lasspanning binnendeuvels	$\sigma_{vw3,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	n.v.t.	N/mm²
Lasspanning paaldeuvels	$\sigma_{vw4,Ed}$	$=\sqrt{(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))}$	133	N/mm²
Maatgevende UC		$=\sigma_{vw,Ed}/f_{w,Rd}$	1,00	OK
Toetsing paalcapaciteit				
Effectieve doorsnede paal	$A_{p,eff}$	$=P_{in}(t_p-t_{p,red})$	7464	mm²
Maximale spanning in paal	$\sigma_{s,Ed}$	$=F_{Ed}/(A_{p,eff}n_p)$	234,3	N/mm²
UC doorsnede paal		$=\sigma_{s,Ed}/f_{y,1}$	1,00	OK

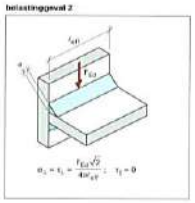
Achterliggende logica				
Afschuifprojectievlak NEN-EN1994-2 F1.1				
Oppervlakte projectie afschuifweerstand	A_{f2}	$=A_{f2,out}+A_{f2,in}$	16800	mm²
Minimale h.o.h. seperatie deuvels	s_{min}	$=[250;2*L_w]$	n.v.t.	mm
Breedte projectievlak buitendeuvels	$b_{f2,out}$	$=b_2+s_2/5$	70	mm
Lengte projectievlak buitendeuvels	$L_{f2,out}$	$=L_{,out}+2s_2/5$	240	mm
Oppervlak projectie buitendeuvels	$A_{f2,out}$	$=b_{f2,out}L_{f2,out}$	16800	mm²
Breedte projectievlak binnendeuvels	$b_{f2,in}$	$=b_2+s_2/5$	0	mm
Lengte projectievlak binnendeuvels	L_{f2+in}	$=L_{,in}+2s_2/5$	0	mm
Oppervlak projectie binnendeuvels	$A_{f2,in}$	$=b_{f2,in}L_{f2,in}$	0	mm²
Breedte projectievlak paaldeuvels	$b_{f2,p}$	$=\min[b_1;b_{eff,b}]+s_1/5$	70	mm
Lengte projectievlak paaldeuvels	$L_{f2,p}$	$=L_b+2s_1/5$	1946	mm
Oppervlak projectie paaldeuvels	$A_{f2,p}$	$=b_{f2,p}L_{f2,p}$	136227	mm²
Effectieve oppervlakte ankerplaat NEN-EN1993-1-8 p. 4.10				
Oppervlakte ankerplaat excl. reducties	$A_{p,i}$	$=(L_w+cn_c)^2-0,5((w+cn_c-k)^2$	21887,5	mm²
Reductie ineffectief oppervlak ankerplaat	$A_{p,red1}$	$=0,5b_{ineff}^2$	59	mm²
Oppervlakte staalprofiel	A_s	$=(2L_w-t_w)t_w$	4575	mm²
Effectieve breedte ankerplaat	b_{eff}	$=t_w+2a_1\sqrt{2}+7kt_f$	169,1	mm
Factor meewerkende breedte	k	$=\min[(t_f/t_w);1,0]$	1,00	-
Ineffectieve breedte	b_{ineff}	$=L_w+cn_c-(2c+t_w+b_{eff})+k_{pl}$	10,9	mm
Momentarm ankerplaat (voor toetsing incl. buiging)				
Momentarm ankerplaat	a_{fp}	$=[\sqrt{(2(z_1-z_2)^2)};0]$	20,4	mm
Zwaartepunt ankerplaat t.o.v. onderhoek	z_1	$=\Sigma A_i*z_i/A_T$	70,0	mm
Zwaartepunt randstijl t.o.v. onderhoek	z_2	$=\Sigma A_i*z_i/A_T$	55,5	mm
Staalspanning (voor toetsing incl. buiging)				
Weerstandsmoment ankerplaat	W_1	$=1/6*2(L_w-t_w)t_f^2$	19333	mm³
Weerstandsmoment buitendeuvels	W_2	$=1/6(L_{out}-e)h_2^2$	66667	mm³
Weerstandsmoment binnendeuvels	W_3	$=1/6L_{in}h_2^2$	0	mm³
Weerstandsmoment paaldeuvels	W_4	$=1/6L_ih_1^2$	279916	mm³
Staalspanning ankerplaat (druk)	$\sigma_{s,Ed,c}$	$=A_{p,c}\sigma_{c,Ed,c}a_{fp}/W_1$	578	N/mm²
Staalspanning buitendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{t1,out,c}\sigma_{c,Ed,c}(b_2/2)/W_2$	27	N/mm²
Staalspanning binnendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{t1,in,c}\sigma_{c,Ed,c}(b_2/2)/W_3$	0	N/mm²
Staalspanning paaldeuvels (max)	$\sigma_{s,Ed,c,t}$	$=A_i\sigma_{c,Ed,max}(b_1/2)/W_4$	47	N/mm²
Staalspanning ankerplaat (trek)	$\sigma_{s,Ed,t}$	$=A_{p,t}\sigma_{c,Ed,t}a_f/W_1$	489	N/mm²
Staalspanning buitendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{t1,out,c}\sigma_{c,Ed,t}(b_2/2)/W_2$	29	N/mm²
Staalspanning binnendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{t1,in,c}\sigma_{c,Ed,t}(b_2/2)/W_3$	0	N/mm²
Optionele meewerkende betondoorsnede paal				
Enkel van toepassing als krachten uit randstijl via schachtwrijving naar de paalwand overbracht kunnen worden.				
Meewerkende wapeningstaven	n_{st}		0	#
Staafdiameter	$ø_{st}$		0	mm
Materiaalkwaliteit staaf	-		-	-
Factor effectiviteit betondoorsnede	α		0,00	-
Vloeigrens	f_{yd}		0	N/mm²
Trekcapaciteit wapening	$F_{Rd,b,st}$	$=0,25n_{st}ø_{st}^2\pi F_{yd}$	0	kN
Betondoorsnede paal	$A_{c,p}$	$=\alpha*0,25P_{in}^2/\pi$	0	mm²
Druksterkte betondoorsnede	$F_{Rd,b,c}$	$=A_{c,p}f_{ck}/\gamma_c$	0	kN
Gereduceerde breedte als knaggen geprofileerd zijn volgens NEN-EN1993-1-8 p. 4.10				
Flensdikte aangelast profiel	$t_{f,b}$		0	mm
Factor meewerkende breedte (k)	k_b	$=\min[(t_{f,b}/t_{f,b});1,0]$	0,00	-
Effectieve breedte knag	$b_{eff,b}$	$=0,5(t_{f,b}+2a_2\sqrt{2}+7k_bt_{f,b})$	0	mm

Lasspanningen NEN-EN 1993-1-8 p. 4.5.3						
Onderdeel	Ankerplaat	Buitendeuvels	Binnendeuvels (T3)	Binnendeuvels (T2)	Paaldeuvels	
Som σ_T	150,0	91,0	0,0	0,0	66,3	N/mm²
Som τ_T	150,0	91,0	0,0	0,0	66,3	N/mm²
Som $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 1	Ja	Nee	Nee	Nee	Nee	
M1 σ_T	150,0	0,0	0,0	0,0	0,0	N/mm²
M1 τ_T	150,0	0,0	0,0	0,0	0,0	N/mm²
M1 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 2	Nee	Ja	Ja	Nee	Ja	
M2 σ_T	0,0	56,9	0,0	0,0	33,1	N/mm²
M2 τ_T	0,0	56,9	0,0	0,0	33,1	N/mm²
M2 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 3	Nee	Nee	Nee	Ja	Nee	
M3 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M3 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M3 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 4	Nee	Ja	Ja	Nee	Ja	
M4 σ_T	0,0	34,1	0,0	0,0	33,1	N/mm²
M4 τ_T	0,0	34,1	0,0	0,0	33,1	N/mm²
M4 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 5	Nee	Nee	Nee	Nee	Nee	
M5 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M5 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M5 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 6	Nee	Nee	Nee	Nee	Nee	
M6 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M6 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M6 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²

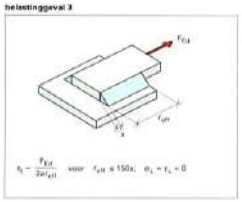
belastinggeval 1



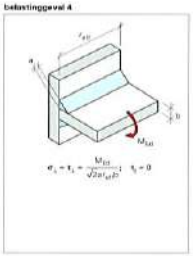
belastinggeval 2



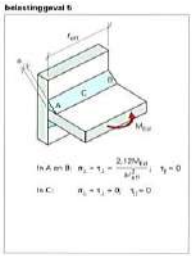
belastinggeval 3



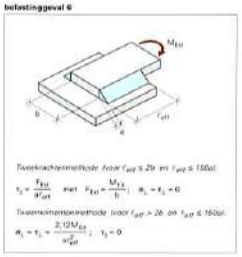
belastinggeval 4



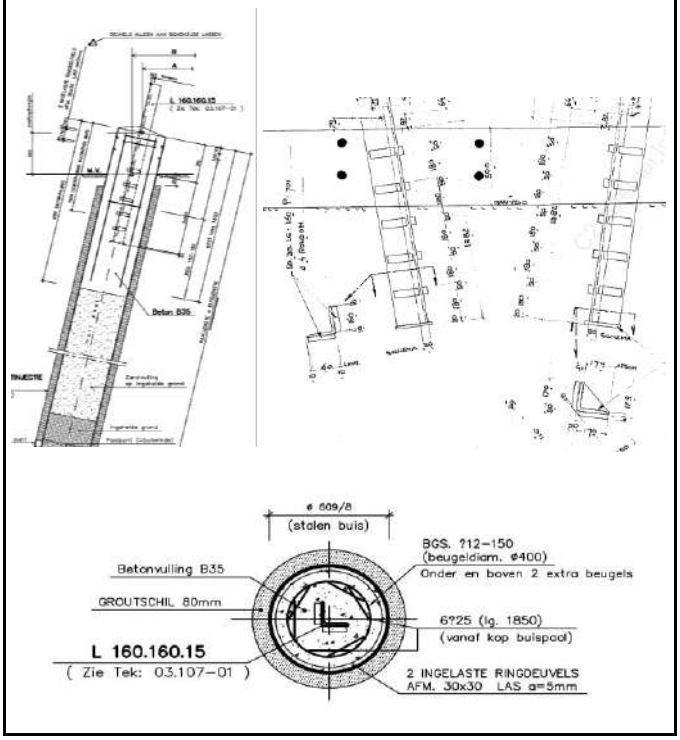
belastinggeval 5



belastinggeval 6



Ondersteunende figuren



Toetsing inleiding krachten in fundering

Projectnaam	Opwaardering KIJ-BVW 380kV	**Rekensheet versie**	3.1
Lijn	KIJ-DIM	**Datum**	1-2-2026
Subtype deuvels aan randstijl	Q	**Auteur**	[redacted]
Subtype deuvels aan paal	H	**Eerste interne controle**	Mauny Bahri (RO)
Mastnummer(s)	107,109,113	**Tweede interne controle**	[redacted]

Samenvatting	UC	Check	F_{Rd}	
Maatgevende unity check	**1,00**	OK		
Max UC randstijldeuvels beton	0,85	OK	D:1729 T:1626	kN
Max UC paaldeuvels beton	0,43	OK	3177	kN
Max UC lassen	1,00	OK	1382	kN
Max UC staalciteria	0,79	OK	1754	kN
Trekkracht uit randstijl	$F_{Ed,t}$		*1380*	kN
Drukkracht uit randstijl	$F_{Ed,c}$		*1380*	kN
Spanningsbegrenzing		$=0,7f_{cd}$	Nee	
Toetsing incl. buiging			Nee	
Toetsing incl. las reductie		$=f_w/1,2$	Ja	

Zie voor de maximaal optredende paalkrachten het constructief rapport

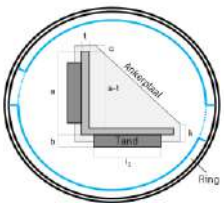
Materialen				
Betonkwaliteit	-		C28/35	=B35
Beton omsloten	-		Ja	
Karakteristieke druksterkte	f_{ck}		28	N/mm^2
Verhogingsfactor druksterkte	C_a	$=\min[\sqrt{(A_{f2}/A_{f1})};2,5]$	1,60	-
Verhoogde druksterkte	f_{jk}	$=f_{ck}C_a$	44,82	N/mm^2
Betondruksterkte	f_{cd}	$=f_{jk}/\gamma_c$	29,88	N/mm^2
Staalsoort 1: funderingspaal	-		S235	N/mm^2
Treksterkte staalsoort 1	$f_{u,1}$		360	N/mm^2
Vloeispanning staalsoort 1	$f_{y,1}$		235	N/mm^2
Staalsoort 2: randstijl	-		S235	N/mm^2
Treksterkte staalsoort 2	$f_{u,2}$		360	N/mm^2
Vloeispanning staalsoort 2	$f_{y,2}$		235	N/mm^2
Staalsoort 3: deuvels	-		S235	N/mm^2
Treksterkte staalsoort 3	$f_{u,3}$		360	N/mm^2
Vloeispanning staalsoort 3	$f_{y,3}$		235	N/mm^2
Lassterkte deuvels paal	$f_{w,Rd}$	$=f_{u1,3}/(w\beta_w\gamma_s)$	300	N/mm^2
Lassterkte deuvels randstijl	$f_{w,Rd}$	$=f_{u2,3}/(w\beta_w\gamma_s)$	300	N/mm^2
Partiële factor beton	γ_c		1,50	-
Partiële factor staal	γ_s		1,25	-
Corrolatiefactor lassen	β_w		0,80	-
Reductiefactor lassen	w_r		1,2	-

Hoekprofiel randstijl			150x150x12	
Zijde	L_w		150	mm
Dikte	t_w		12	mm
Lengte verankering	L_e		1140	mm

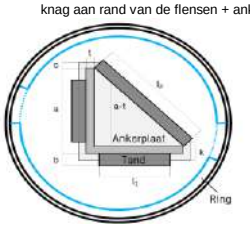
Geometrie				
Hoofdtype deuvels (zie figuren onderaan)			1	
Aantal palen per randstijl*	n_p		1	#
Type paal*			Buispaal	
Diameter paal uitwendig (indien buispaal)	$ø_{p,out}$		610,0	mm
Wanddikte paal	t_p		8,0	mm
Roestreductie paalwand	$t_{p,red}$		4	mm
Lengte paaldeuvel als % van omtrek paal	P_b		100,00%	%
Aantal lagen deuvels aan paal	$n_{b,p}$		2	#
Seperatie paaldeuvels	s_1		200	mm
Breedte deuvels/ lengte stift aan paal*	b_1		30	mm
Dikte deuvels aan fundatiepaal*	h_1		30	mm
Diameter paal inwendig (indien buispaal)	$ø_{p,in}$	$=ø_{p,out}-2t_p$	594,0	mm
Inwendige omtrek paal o.b.v. paaldiameter	P_{in}	$=[0;ø_{p,in}\pi]$	1866	mm
Laslengte paaldeuvel	L_b	$=P_{in}P_b$	1866	mm
Oppervlakte deuvels per laag aan paal**	$A_{b,1,i}$	$=[P_{bi}(ø_{p,in}-b_1)\pi rb_1;L_bb_1]$	53156	mm2
Deuvels aan buitenzijde randstijl	n_{out}		8	#
Deuvels aan binnenzijde randstijl	n_{in}		0	#
Seperatie randstijldeuvels	s_2		200	mm
(las)Lengte deuvel buitenzijde*	L_{out}		150	mm
Uitkragende lengte deuvel buitenzijde	e		0	mm
(las)Lengte deuvel binnenzijde*	L_{in}		0	mm
Breedte deuvels aan randstijl	b_2		30	mm
Dikte deuvels aan randstijl	h_2		50	mm
Diameter stiftdeuvel	$ø_b$		0	mm
Oppervlakte enkele deuvel buitenzijde	$A_{f1,out,i}$	$=[L_{out}b;L_{out}ø_b]$	4500	mm^2
Oppervlakte enkele deuvel binnenzijde	$A_{f1,in,i}$	$=[L_{in}b;L_{in}ø_b]$	0	mm^2
Las ankerplaat|randstijl	a_1		5	mm
Las deuvel|paal	a_2		5	mm
Las deuvel|buitenzijde randstijl	a_3		5	mm
Las deuvel|binnenzijde randstijl	a_4		0	mm
Lengte rugplaat aan ankerplaat	L_{ip}		0	mm
Dikte ankerplaat/rugplaat	t_f		20	mm
n-zijden buitenrand ankerplaat	n_c		2	#
Breedte buitenrand ankerplaat	c		15	mm
Rechte zijde ankerplaat	k_{pl}		35	mm
Aanvullende reductie omvang ankerplaat	$A_{p,red2}$		0	mm^2
(Las)Lengte ankerplaat binnenzijde	L_{ip}	$=[4;2](L_w-t_w-a_3\sqrt{2})$	262	mm
Effectief oppervlakte ankerplaat druk	$A_{p,c}$	$=A_{p,i}-A_{p,red1,2}$	21864	mm^2
Effectief oppervlakte ankerplaat trek	$A_{p,t}$	$=A_{p,i}-A_{p,red1,2}-A_s$	18408	mm^2

Notities

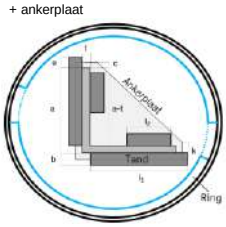
Hoofdtype 1
Tanddeuvels aan buitenzijde + ankerplaat



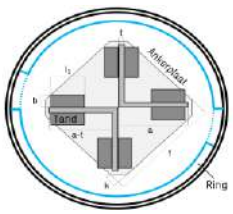
Hoofdtype 2
Tanddeuvels aan buitenzijde +
knag aan rand van de flensen + ankerplaat



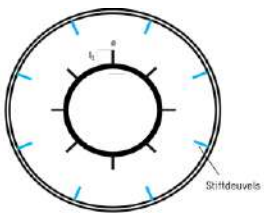
Hoofdtype 3
Tanddeuvels aan buitenzijde en binnenzijde
+ ankerplaat



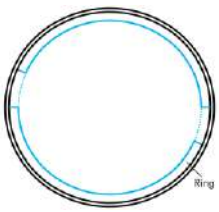
Hoofdtype 4
Tanddeuvels dubbele randstaaf + ankerplaat



Hoofdtype 5
Stiftdeuvels aan ronde buisprofiel, geen ankerplaat

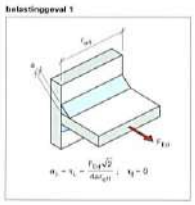


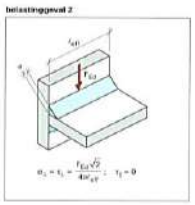
Hoofdtype 6
Enkel toetsing van knaggen aan
funderingspaal + doorsnede paal

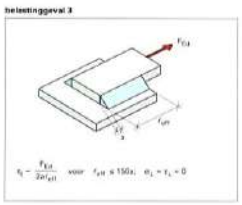


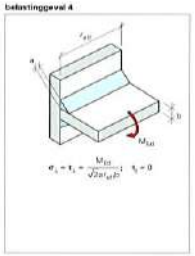
Toetsing capaciteit randstijldeuvels				
Capaciteit ankerplaat bij druk	$F_{Rd,c,p}$	$=A_{p,c}f_{cd}$	653,4	kN
Capaciteit ankerplaat bij trek	$F_{Rd,t,p}$	$=A_{p,t}f_{cd}$	550,1	kN
Capaciteit buitendeuvels	$F_{Rd,b,out}$	$=A_{t1,out,i}f_{cd}\eta_{out}$	1075,8	kN
Capaciteit binnendeuvels	$F_{Rd,b,in}$	$=A_{t1,in,i}f_{cd}\eta_{in}$	0,0	kN
Capaciteit totaal bij druk	$F_{Rd,c}$	$=F_{Rd,c,p}+F_{Rd,b+ofi}$	1729,1	kN
Capaciteit totaal bij trek	$F_{Rd,t}$	$=F_{Rd,t,p}+F_{Rd,b+ofi}$	1625,9	kN
Betondrukspanning deuvels bij druk	$\sigma_{c,Ed,c}$	$=F_{ed,c}/(A_{p,c}+A_{t,ofi})$	23,85	N/mm²
Betondrukspanning bij deuvels bij trek	$\sigma_{c,Ed,t}$	$=F_{ed,t}/(A_{p,t}+A_{t,ofi})$	25,36	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed,c}$		0	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed,t}$		0	N/mm²
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=[F_{Ed,c}/F_{Rd,c};F_{Ed,t}/F_{Rd,t}]$	0,85	OK
Toetsing capaciteit paaldeuvels				
Capaciteit deuvels enkele paal	$F_{Rd,b}$	$=A_{b,i}*n_{b,p}*f_{cd}$	3176,9	kN
Betondrukspanning bij deuvels	$\sigma_{c,Ed+max}$	$=F_{Ed}/(A_{b,i}*n_b)$	13,0	N/mm²
Max. buigspanning in staal	$\sigma_{s,Ed}$		0,0	N/mm²
UC (staalcriterium)		$=\sigma_{s,Ed}/f_{y,3}$	0,00	OK
UC (betoncriterium)		$=F_{Ed}/(F_{Rd,b}+F_{Rd,b,c/st})$	0,43	OK
Toetsing lassen				
Type las randstijldeuvels			Dubbelzijdig	
Type las paaldeuvels			Dubbelzijdig	
Lasspanning ankerplaat	$\sigma_{vw1,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	299,5	N/mm²
Lasspanning buitendeuvels	$\sigma_{vw2,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	172,2	N/mm²
Lasspanning binnendeuvels	$\sigma_{vw3,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	n.v.t.	N/mm²
Lasspanning paaldeuvels	$\sigma_{vw4,Ed}$	$=v(\sigma_T^2+3(\tau_T^2+\tau_{//}^2))$	105	N/mm²
Maatgevende UC		$=\sigma_{vw,Ed}/f_{w,Rd}$	1,00	OK
Toetsing paalcapaciteit				
Effectieve doorsnede paal	$A_{p,eff}$	$=P_{in}(t_p-t_{p,red})$	7464	mm²
Maximale spanning in paal	$\sigma_{s,Ed}$	$=F_{Ed}/(A_{p,eff}n_p)$	184,9	N/mm²
UC doorsnede paal		$=\sigma_{s,Ed}/f_{y,1}$	0,79	OK

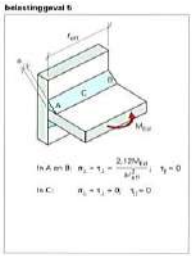
Lasspanningen NEN-EN 1993-1-8 p. 4.5.3						
Onderdeel	Ankerplaat	Buitendeuvels	Binnendeuvels (T3)	Binnendeuvels (T2)	Paaldeuvels	
Som σ_T	149,7	86,1	0,0	0,0	52,3	N/mm²
Som τ_T	149,7	86,1	0,0	0,0	52,3	N/mm²
Som $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 1	Ja	Nee	Nee	Nee	Nee	
M1 σ_T	149,7	0,0	0,0	0,0	0,0	N/mm²
M1 τ_T	149,7	0,0	0,0	0,0	0,0	N/mm²
M1 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 2	Nee	Ja	Ja	Nee	Ja	
M2 σ_T	0,0	53,8	0,0	0,0	26,1	N/mm²
M2 τ_T	0,0	53,8	0,0	0,0	26,1	N/mm²
M2 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 3	Nee	Nee	Nee	Ja	Nee	
M3 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M3 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M3 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 4	Nee	Ja	Ja	Nee	Ja	
M4 σ_T	0,0	32,3	0,0	0,0	26,1	N/mm²
M4 τ_T	0,0	32,3	0,0	0,0	26,1	N/mm²
M4 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 5	Nee	Nee	Nee	Nee	Nee	
M5 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M5 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M5 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²
Mechanisme 6	Nee	Nee	Nee	Nee	Nee	
M6 σ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M6 τ_T	0,0	0,0	0,0	0,0	0,0	N/mm²
M6 $\tau_{//}$	0,0	0,0	0,0	0,0	0,0	N/mm²

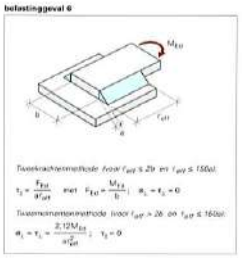






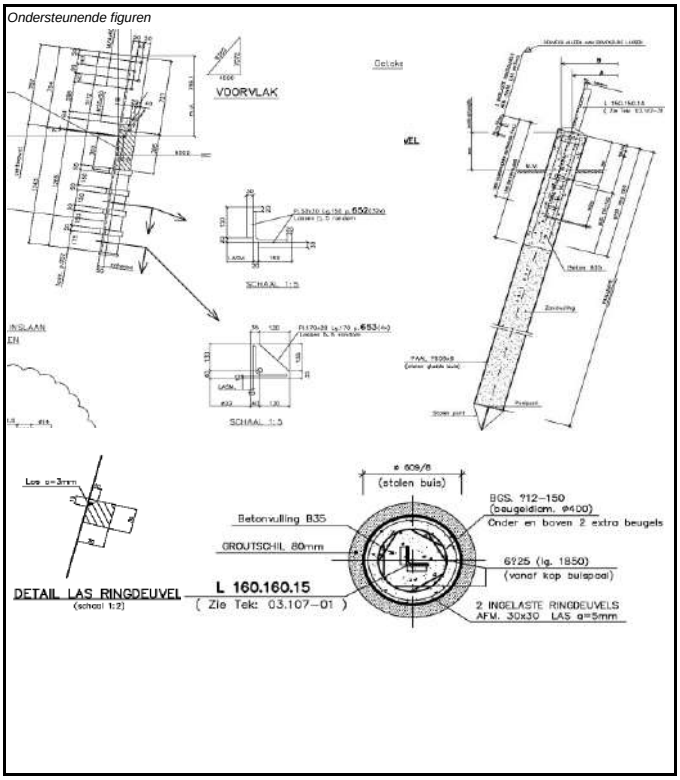




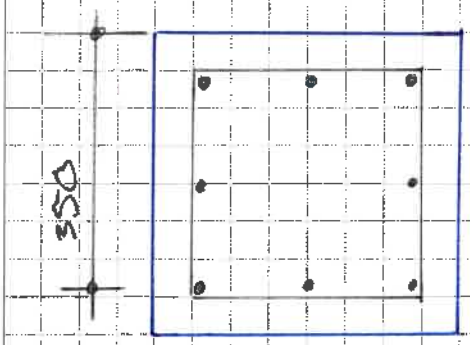


Achterliggende logica				
Afschuifprojectievlak NEN-EN1994-2 F1.1				
Oppervlakte projectie afschuifweerstand	A_{t2}	$=A_{t2,out}+A_{t2,in}$	16100	mm²
Minimale h.o.h. seperatie deuvels	s_{min}	$=[250;2*L_w]$	n.v.t.	mm
Breedte projectievlak buitendeuvels	$b_{t2,out}$	$=b_2+s_2/5$	70	mm
Lengte projectievlak buitendeuvels	$L_{t2,out}$	$=L_{,out}+2s_2/5$	230	mm
Oppervlak projectie buitendeuvels	$A_{t2,out}$	$=b_{t2,out}L_{t2,out}$	16100	mm²
Breedte projectievlak binnendeuvels	$b_{t2,in}$	$=b_2+s_2/5$	0	mm
Lengte projectievlak binnendeuvels	L_{t2+in}	$=L_{,in}+2s_2/5$	0	mm
Oppervlak projectie binnendeuvels	$A_{t2,in}$	$=b_{t2,in}L_{t2,in}$	0	mm²
Breedte projectievlak paaldeuvels	$b_{t2,p}$	$=\min[b_1;b_{eff,b}]+s_1/5$	70	mm
Lengte projectievlak paaldeuvels	$L_{t2,p}$	$=L_b+2s_1/5$	1946	mm
Oppervlak projectie paaldeuvels	$A_{t2,p}$	$=b_{t2,p}L_{t2,p}$	136227	mm²
Effectieve oppervlakte ankerplaat NEN-EN1993-1-8 p. 4.10				
Oppervlakte ankerplaat excl. reducties	$A_{p,i}$	$=(L_w+cn_c)^2-0,5((w+cn_c-k)^2$	21887,5	mm²
Reductie ineffectief oppervlak ankerplaat	$A_{p,red1}$	$=0,5b_{ineff}^2$	24	mm²
Oppervlakte staalprofiel	A_s	$=(2L_w-t_w)t_w$	3456	mm²
Effectieve breedte ankerplaat	b_{eff}	$=t_w+2a_1\sqrt{2}+7kt_f$	166,1	mm
Factor meewerkende breedte	k	$=\min[(t_f/t_w);1,0]$	1,00	-
Ineffectieve breedte	b_{ineff}	$=L_w+cn_c-(2c+t_w+b_{eff})+k_{pl}$	6,9	mm
Momentarm ankerplaat (voor toetsing incl. buiging)				
Momentarm ankerplaat	a_{fp}	$=[\sqrt{(2(z_1-z_2)^2)};0]$	18,5	mm
Zwaartepunt ankerplaat t.o.v. onderhoek	z_1	$=\Sigma A_i*z_i/A_T$	70,0	mm
Zwaartepunt randstijl t.o.v. onderhoek	z_2	$=\Sigma A_i*z_i/A_T$	56,9	mm
Staalspanning (voor toetsing incl. buiging)				
Weerstandsmoment ankerplaat	W_1	$=1/6*2(L_w-t_w)t_f^2$	18400	mm³
Weerstandsmoment buitendeuvels	W_2	$=1/6(L_{out}-e)h_2^2$	62500	mm³
Weerstandsmoment binnendeuvels	W_3	$=1/6L_{in}h_2^2$	0	mm³
Weerstandsmoment paaldeuvels	W_4	$=1/6L_ih_1^2$	279916	mm³
Staalspanning ankerplaat (druk)	$\sigma_{s,Ed,c}$	$=A_{p,c}\sigma_{c,Ed,c}a_{fp}/W_1$	523	N/mm²
Staalspanning buitendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{t1,out,c}\sigma_{c,Ed,c}(b_2/2)/W_2$	26	N/mm²
Staalspanning binnendeuvels (druk)	$\sigma_{s,Ed,c}$	$=A_{t1,in,c}\sigma_{c,Ed,c}(b_2/2)/W_3$	0	N/mm²
Staalspanning paaldeuvels (max)	$\sigma_{s,Ed,c,t}$	$=A_i\sigma_{c,Ed,max}(b_1/2)/W_4$	37	N/mm²
Staalspanning ankerplaat (trek)	$\sigma_{s,Ed,t}$	$=A_{p,t}\sigma_{c,Ed,t}a_f/W_1$	468	N/mm²
Staalspanning buitendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{t1,out,c}\sigma_{c,Ed,t}(b_2/2)/W_2$	27	N/mm²
Staalspanning binnendeuvels (trek)	$\sigma_{s,Ed,t}$	$=A_{t1,in,c}\sigma_{c,Ed,t}(b_2/2)/W_3$	0	N/mm²
Optionele meewerkende betondoorsnede paal				
Enkel van toepassing als krachten uit randstijl via schachtwrijving naar de paalwand overbracht kunnen worden.				
Meewerkende wapeningstaven	n_{st}		0	#
Staafdiameter	$ø_{st}$		0	mm
Materiaalkwaliteit staaf	-		-	-
Factor effectiviteit betondoorsnede	α		0,00	-
Vloeigrens	f_{yd}		0	N/mm²
Trekcapaciteit wapening	$F_{Rd,b,st}$	$=0,25n_{st}ø_{st}^2\pi F_{yd}$	0	kN
Betondoorsnede paal	$A_{c,p}$	$=α*0,25P_{in}^2/\pi$	0	mm²
Druksterkte betondoorsnede	$F_{Rd,b,c}$	$=A_{c,p}f_{ck}/\gamma_c$	0	kN
Gereduceerde breedte als knaggen geprofileerd zijn volgens NEN-EN1993-1-8 p. 4.10				
Flensdikte aangelast profiel	$t_{f,b}$		0	mm
Factor meewerkende breedte (k)	k_b	$=\min[(t_{f,b}/t_{f,b});1,0]$	0,00	-
Effectieve breedte knag	$b_{eff,b}$	$=0,5(t_{f,b}+2a_2\sqrt{2}+7k_bt_{f,b})$	0	mm

Ondersteunende figuren



Verschillende configuraties t.b.v. 2400 mm² wapening.

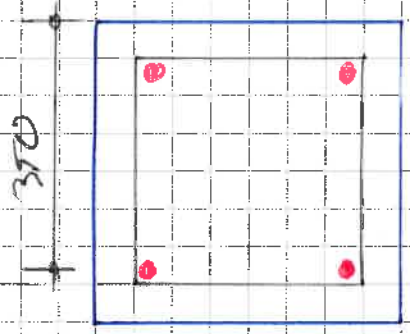


400×400 mm

$8 \times \phi 20 = 2513\ mm^2$

$942\ mm^2 \Rightarrow 942 \times 348 \times 350 \times 0{,}9$

$M_r = 103{,}2\ kN.m$

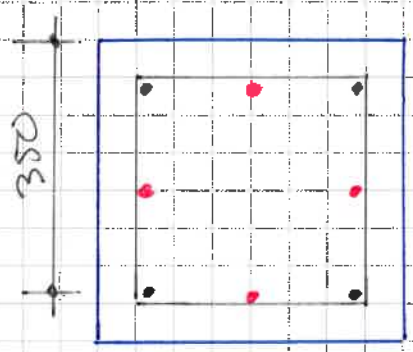


400×400 mm

$4 \times \phi 25 = 1963\ mm^2$

$982\ mm^2 \Rightarrow 982 \times 348 \times 350 \times 0{,}9$

$M_r = 107{,}6\ kN.m$

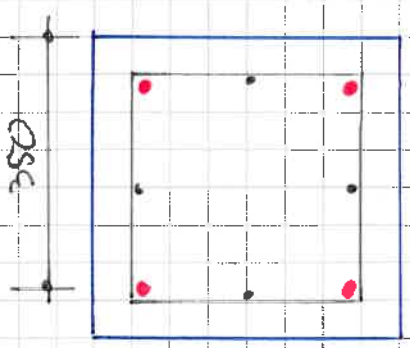


400×400 mm

$4 \times \phi 20 + 4 \times \phi 25 = 3220\ mm^2$

$1119\ mm^2 \Rightarrow 1119 \times 348 \times 350 \times 0{,}9$

$M_r = 122{,}6\ kN.m$



400×400 mm

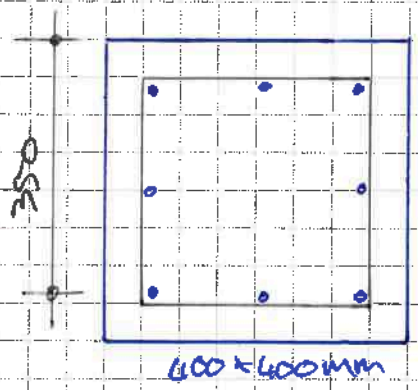
$4 \times \phi 25 + 4 \times \phi 20 = 3220\ mm^2$

$1296\ mm^2 \Rightarrow 1296 \times 348 \times 350 \times 0{,}9$

$M_r = 142{,}0\ kN.m$

SWECO	AFDELING: Bouw	WERK: KIJ - BUW ONDERDEEL: Paalwap. capaciteit.	ORDERNUMMER: BLAD: 1
	OPSTELLER: CBA	PARAAF:	DATUM: 04/2025

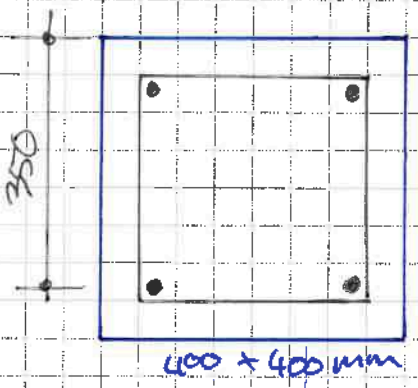
Fictieve configuratie t.b.v. 2400 mm wapening.



8 staven = 2400 mm²

3/8 x 2400 ⇒ 900 x 348 x 350 x 0,9

Mr = 98,6 kNm



4 staven = 2400 mm²

2/4 x 2400 ⇒ 1200 x 348 x 350 x 0,9

Mr = 131,5 kNm

T.b.v. max Md = 53,93 kN.m.

As ben = $54 \cdot 6 / 348 \times 350 \times 0,9$

= 693 mm²

T.b.v. max tvk = 360 kN.

As ben = $360 \cdot 3 / 348$

= 1055 mm²

Over 8 staven = 132 mm² / staaf.

4 staven = 264 mm² / staaf.

Rest cap. = $[900 - ((3 \times 132) + 693)] \times 350 \times 348 \times 0,9$

= 1,21 kN.m

Voldoende wap. in paal

SWECO	AFDELING: Bouw	WERK: IJ-BUW	ORDERNUMMER:
		ONDERDEEL: Paal wapening capaciteit.	BLAD: 2
	OPSTELLER: [redacted]	PARAAF: [redacted]	DATUM: 04/2025

Druk capaciteit vanuit paal naar balk.

opp paal ⇒ 400 × 400 = 160000 mm²

beton poer/balk K225 ⇒ C13/17 ⇒ 13 N/mm²

160000 × 13 = 2080 kN. druk.

Rest capaciteit wapen (trek) met 53,93 kN.m

$= [900 - ((3 \times 132) + 493)) \times 8/3 \times 348$

= 10,2 kN. trek cap.

Totaal cap. verb. met 53,93 kN.m mom.

= 10,2 + 360

= 370,2 kN

SWECO	AFDELING: Bouw	WERK: KIJ - BUW ONDERDEEL: Paal wap. capaciteit.	ORDERNUMMER: BLAD: 3
	OPSTELLER: [redacted]	PARAAF: [redacted]	ATUM: 04/2025

Mu ∅16

$md = 54\,\varepsilon^{6} / 348 \times 270 \times 0{,}9$

$= 638\ mm^2$ $\qquad 8\,\varnothing 16 = 1608$

verdeeld over $(3\times1) + (2\times0{,}5)$ staven

$= 159{,}5\ mm^2 = uc = 1{,}00$

Blijft dus $201 - 159{,}5 = 41{,}5\ mm^2$ over voor trek.

$8 \times 41{,}5 = 332\ mm^2$ voor trek.

$Fu = 332 \times 348 = 115{,}5$ kN trek cap/paal.

Mu. theo

Dan voor 1,5 % van $320 \times 320 = 1536$

per staaf dus $1536/8 = 192\ mm^2$

$192 - 159{,}5 = 32{,}5\ mm^2$/staaf.

Fu.teo $8 \times 32{,}5\ mm^2 \times 348 = 90{,}5$ kN trek/paal

Fd

$Fu = 320 \times 320 \times 13$ $\qquad C13/17$

$= 1331{,}2$ kN.

SWECO	AFDELING:	WERK: KIJ - BUW ONDERDEEL: 320×320 prefab paal capaciteit.	ORDERNUMMER: BLAD:
	OPSTELLER: [redacted]	PARAAF: [redacted]	ATUM: 22/5/2025

$M_d = 54 \varepsilon^6 / 348 + 300 + 0{,}9$

$= 575 \text{ mm}^2$ $\quad 6\phi 20 + 6\phi 16 = 2061$

$\phi 20 = 314 \text{ mm}^2$

$\phi 16 = 201 \text{ mm}^2$

M_u $\phi 20 + \phi 16$

$100\% \Rightarrow 1^e \text{ lijn} = 2\phi 20 + 1\phi 16 = 829 \text{ mm}^2$

$50\% \Rightarrow 2^e \text{ lijn} = 2\phi 16 = 402 \text{ mm}^2$

$829 / 0{,}5 + 402 = 4{,}124$ ratio

~~$\therefore M_u$ Blijft dus~~

575 mm² verdeeld over 4,124 + 1 staven

$= 112{,}2 \text{ mm}^2 = \mu_c = 1{,}00$

Blijft dus $201 - 112{,}5 = 88{,}78 \text{ mm}^2$ over voor trek.

$8 \times 88{,}78 = 710{,}2 \text{ mm}^2$ voor trek.

$F_u = 710{,}26 \times 348 = 247{,}2 \text{ kN}$ trek cap. per paal.

Dan voor 1,5% van $350 \times 350 = 1837{,}5 \text{ mm}^2$

per staaf dus $1837{,}5 / 8 = 229{,}69 \text{ mm}^2$

$229{,}69 - 112{,}5 = 117{,}2 \text{ mm}^2$ / staaf

$F_{u,theo.}$ $8 \times 117{,}2 \times 348 = 326{,}3 \text{ kN}$ / paal

F_d

$F_u = 350 \times 350 \times 13$ $\quad C13/17$

$= 1592{,}5 \text{ kN}$

SWECO	AFDELING:	WERK: IJ-BOW
	ONDERDEEL: 350 × 350 prefab paal capaciteit	ORDERNUMMER:
		BLAD:
OPSTELLER: [redacted]	PARAAF: [redacted]	DATUM:

BIJLAGE 40
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Sweco Nederland B.V.
-
Gebruikslicentie COMMERCIELE-versie tot 1-2-2026

B beton EC
Versie : 5.18.12 ; NDP : NL
printdatum : 09-04-2025

berekening buigwapening in een rechthoekige betondoorsnede: 1000 x 750
volgens eurocode 1992-1-1 inclusief controle scheurwijdte en betondekking

	algemene gegevens	werk		KIJ-DIM	
		werknummer		10	
		onderdeel		Balkrooster	
2.4.2.4		ontwerpsituatie		blijvend en tijdelijk	
	buigend moment in de doorsnede				
	rekenwaarde moment **voor** herverdelen	$M_{Ed,elastisch}$	=	499	kNm
	rekenwaarde moment **na** herverdelen	$M_{Ed,totaal}$ (= $M_{Ed,\ herverdeeld}$)	=	499	kNm
	invloedsfactor minimum wapening	belang van het constructieonderdeel		primair	
	doorsnedegegevens en wapening				
	kwaliteit beton	betonklasse	=	C12/15	
	kwaliteit staal	staalsoort	=	FeB 400	
	wapeningsklasse	A, B of C	=	B	-
	betonbreedte	b	=	1000	mm
	betonhoogte	h	=	750	mm
	betondekking gedrukte zijde	$c_{drukzijde}$ **dekking op de buitenste wapening**	=	30	mm
	betondekking getrokken zijde	$c_{trekzijde}$	=	40	mm
	betondekking zijkanten	$c_{zijkant}$	=	30	mm
	wapening aan getrokken zijde	aantal n1	=	6	stuks
		diameter c	=	22	mm
		aantal n2	=	0	stuks
		diameter c	=	0	mm
	wapening aan gedrukte zijde	aantal n3	=	6	stuks
		diameter c	=	22	mm
		aantal n4	=	0	stuks
		diameter c	=	0	mm
	flankwapening per zijde	aantal n5	=	2	stuks
		diameter d_5	=	16	mm
	beugels (of verdeelwapening in buitenste laag)	diameter d_{bg}	=	18	mm
	scheurwijdte **zonder berekening** en betondekking				
	verhouding tussen de frequente combinatie en uiterste grenstoestand:	M_{fr} / M_{Ed}	=	0,75	-
a	ontwerplevensduur		=	30	jaar
b	omgevingsfactoren	milieuklasse A (kies uit X0- XC- XD- of XS-serie)	=	XC4	-
b		milieuklasse B (kies uit X0- XC- XD- of XS-serie)	=	XC4	-
c	soort constructie	soort constructie	=	balk	
d	dekking verhogen bij oncontroleerbaarheid van de wapening (geen eis in eurocode)		=	nee	
e	wordt de beton nabewerkt		=	nee	
f	verhoging dekking bij toepassing grote grindkorrel (>32mm) tabel 4.2		=	nee	
g	ondergrond waarop gestort wordt		=	bekisting	
h	bundeling wapeningstaven (trekwapening)	worden staven d1 gebundeld?	=	nee	
h		worden staven d2 gebundeld?	=	nee	
i	kwaliteitsbeheersing	is specifieke kwaliteitsbeheersing gewaarborgd?		nee	
j	luchtinsluiting	luchtinsluiting van meer dan 4% toegepast?		nee	
k	verhoging dekking bij toepassing grote staafdiameter (>25mm) geen eis in eurocode			nee	
	gegevens invloedsfactoren met **berekende** scheurwijdte				
k1	aanhechteigenschap	de aanhechting van de wapeningstaven is		goed	
k2	wijze van belasting	de betondoorsnede wordt belast door		buiging	
kt	belastingduur (bij berekende scheurwijdte)	de belastingduur is		langdurend	
	milieuklasse	de milieuklasse van de beton is		b) buitenmilieu - RH=80%	
	belasten constructie na aantal dagen	de constructie wordt belast na t_0 is		100	dagen
	cementklasse	de gekozen cementklasse is		N	
	omtrek dat bloot staat aan uitdroging	het aantal zijden dat aan uitdroging bloot staat is		2 zijden 2b	

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resultaten

Balkrooster

opneembaar moment

maatgevende waarde opneembaar moment	$M_{Rd,totaal}$	bij gekozen wapening	=	499	kNm

buigwapening

totale hoeveelheid trekwapening benodigd	$A_{s1,totaal} = A_{s1} + A_{s2}$		=	2279	mm^2
totale hoeveelheid drukwapening benodigd	$A_{s2} = M_{Ed2} / (f_{y,d} (d-d2) * 10^6$		=	0	mm^2
minimum wapening	ρ_{min1}		=	673	mm^2

scheurwijdte

toelaatbare scheurwijdte	w * k_x		=	0,34	mm
scheurwijdtecontrole zonder berekening	maximum staafdiameter		=	9,4	mm
scheurwijdtecontrole zonder berekening	maximum hart op hart afstand		=	200,0	mm
optredende scheurwijdte met berekening	w_k		=	#N/B	mm

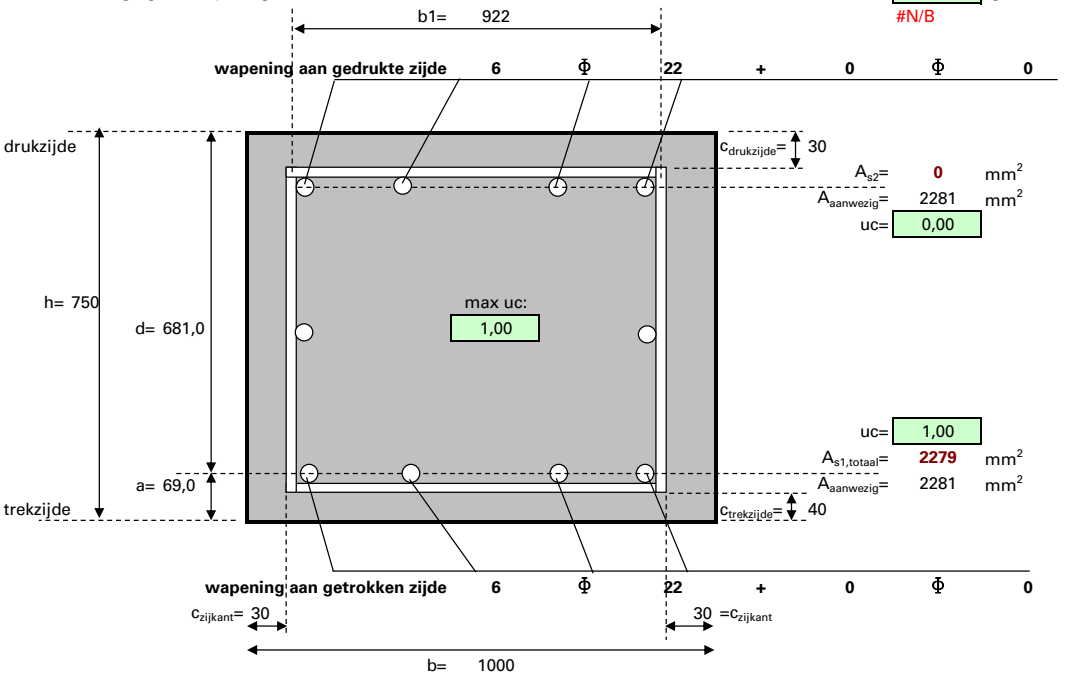
betondekking

minimum betondekking	c_{nom}	op de buitenste wapening	=	35	mm
constructieklasse (betondekking)	S		S	4	-

unity-checks buigwapening, scheurwijdte en dekking, herverdeling

	buigend moment	$M_{Ed,totaal} / M_{Rd,totaal}$	499	/	499	= 1,00	-
	trekwapening benodigd	$A_{s1,totaal} / A_{aanw,trek}$	2279	/	2281	= 1,00	-
	drukwapening benodigd	$A_{s2} / A_{aanw,druk}$	0	/	2281	= 0,00	-
	herverdeling momenten	δ / δ_{her}	0,70	/	1,00	= 0,70	-
	positie drukwapening	d2 / d2,max	59,0	/	66,5	= 0,00	-
	minimum wapeningspercentage	ρ_{min} / ρ_{trek}	0,10	/	0,33	= n.v.t.	-
9.2.1.1(3)	maximum percentage trekwap.	ρ_{trek} / ρ_{max}	0,30	/	4,0	= 0,08	-
	maximum percentage drukwap.	ρ_{druk} / ρ_{max}	0,30	/	4,0	= 0,08	-
	scheurwijdte zonder berekening	diameter of hoh afstand	2,33	of	0,88	= 0,88	-
	scheurwijdte met berekening	w_k / w * k_x	#N/B	/	0,30	= #N/B	-
	min. wapening bij scheurwijdte	$A_{s,min} / A_{aanw,trek}$	590	/	2281	0,26	-
	minimale betondekking	$c_{nom} / c_{trekzijde}$	35	/	40	= 0,88	-
	moment ongescheurde doorsnec	$M_{Ed,totaal} / M_r$ (ongewapend)	499	/	147	= 3,38	(geen eis)
	verlenging trekwapening	$\varepsilon_s / \varepsilon_{ud}$	14,5	/	45	= 0,32	(geen eis)

#N/B



betondekking

berekening minimum betondekking op trekwapening

Balkrooster

tab4.3N	correctie van de constructieklasse: uitgangspunt:constructieklasse bij 50 jaar					S	4	-
a	correctie tgv ontwerplevensduur						0	-
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse A of B)						0	-
c	correctie tgv geometrie						0	-
i	correctie tgv kwaliteitsbeheersing						0	+
	totale waarde constructieklasse					S	4	
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse A)						0	
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse B)						0	
	berekening van de nominale dekking voor hoofdwapening en beugels (in mm)						hoofdwapening	beugels
tabel 4.2	minimum dekking t.g.v. **aanhechting**	$c_{min,b} > d_n$	$c_{grindkorrel}$= 0		$c_{min,b}+c_{grindkorrel}$	=	22	18
tab 4.4N	minimum dekking tgv milieuklasse A	$c_{min,dur}$				=	30	30
	minimum dekking tgv milieuklasse B	$c_{min,dur}$				=	30	30
	resulterende minimum dekking	$c_{min,dur}$	(duurzaamheid)			=	30	30
e	correctie tgv nabewerking	c_{extra}				=	0	0
	gecorrigeerde min. dekking **duurzaamheid**	$c_{min,dur}$	inclusief c_{extra}			=	30	30
4.2	**minimum dekking**	c_{min} = max($c_{min,b}$; $c_{min,dur}$; 10mm)				=	30	30
	toeslagen uitvoeringstoleranties	Δc_{dev}				=	5	5
g	storten op werkvloer / maaiveld / kist	Δc_{dev}				=	0	0
d	t.g.v. oncontroleerbaarheid	Δc_{dev}	**geen eis in eurocode!**			=	0	0
4.1	nominale waarde betondekking	$c_{nom}=c_{min} + \Sigma\Delta c_{dev}$				=	35	35
k	t.g.v. toegepaste hoofdwapening >25mm	c_{nom}= 1,5d_n	**geen eis in eurocode!**			=	0	0
	equivalente staafdiameter	d_n=max($d1_{eq}$;$d2_{eq}$)=	22,0		d_{bg}= 18			
	dekking op de buitenste wapening	Hoofdwapening: c_{nom}- d_{bg}		Beugels: c_{nom}		=	17	35
	resulterende waarde minimale dekking	c_{nom}	op de buitenste wapening			=	35	

wapeninggegevens

	totaal aantal staven in trekzone	Σn_{trek}=n1+n2	=	6,0	st
	totaal aantal staven in drukzone	Σn_{druk}=n3+n4	=	6,0	st
	gewogen gemiddelde diameter trekwapening	$d_{gem,trek}$=(n1*d_1*D_1+n2*d_2*D_2) / (n1*D_1+n2*D_2) =		22,0	mm
	gewogen gemiddelde diameter drukwapening	$d_{gem,druk}$=(n3*d_3*D_3+n4*d_4*D_4) / (n3 *D_3+ n4* D_4)	=	22,0	mm
	doorsnede per staaf 1, trekwapening	D_1=0,25πd_1^2	=	380,1	mm^2
	doorsnede per staaf 2, trekwapening	D_2=0,25πd_2^2	=	0,0	mm^2
	doorsnede per staaf 3, drukwapening	D_3=0,25πd_3^2	=	380,1	mm^2
	doorsnede per staaf 4, drukwapening	D_4=0,25πd_4^2	=	0,0	mm^2
	doorsnede per staaf 5, flankwapening	D_5=0,25πd_5^2	=	201,1	mm^2
	doorsnede per beugel enkelsnedig	D_{bg}=0,25πd_{bg}2	A_{sw}=	254,5	mm^2
	aantal snedige beugel bij dwarskracht	n_{sn}	n_{sn}=	2	snedig
	horizontale maat in breedte van de balk	$s_{t,bg}$ = b1 / (n_{sn}-1)	=	922	mm
	aanwezige beugelwapening (n-snedig)	A_{bgls} = n_{sn} * D_{bg} * 1000 / $s_{aanwezig}$	=	3393	mm^2/m'
	horizontale beugelmaat (hartmaat)	b1=b-2$c_{zijkant}$-d_{bg}	=	922	mm
	vertikale beugelmaat (hartmaat)	h1=h-$c_{trekzijde}$-$c_{drukzijde}$-d_{bg}	=	662	mm
	aanwezige trekwapening	$A_{aanw,trek}$	=	2281	mm^2
	aanwezige drukwapening	$A_{aanw,druk}$	=	2281	mm^2
	aanwezige drukwapening	ρ_{druk}= 100 * $A_{aanw,druk}$ / bh (art. 9.2.1.1(3))	=	0,30	%
	aanwezige flankwapening	$A_{aanw,flank}$ per zijde	=	402	mm^2
	zwaartepunt staven vanaf de beugel	z= (n1 D_1 $^1/_2$ d1+n2 D_2 $^1/_2$ d2) / (n1D_1+n2D_2)	=	11,0	mm
	equivalente diameter wapening (buigwap)	$d_{equi,trek}$= 2 * z (t.b.v. berekening van d)	=	22,0	mm
7.12	equivalente diameter trekwapening (scheurw)	$d_{equi,trek}$= (n1 d_1^2 +n2 d_2^2) / (n1 d_1+n2 d_2)	=	22,0	mm
7.12	equivalente diameter drukwapening	$d_{equi,druk}$= (n3 d_3^2 +n4 d_4^2) / (n3 d_3+n4 d_4)	=	22,0	mm

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buigwapening

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materiaalgegevens

	materiaalfactor beton	γ_c	=	1,5	-
	materiaalfactor wapeningstaal	γ_s	=	1,15	-
	karakteristieke cilinderdruksterkte	f_{ck}	=	12	N/mm^2
	karakteristieke kubusdruksterkte	f_{ck}	=	15	N/mm^2
	gemiddelde cilinderdruksterkte	$f_{cm}=f_{ck}+8$	=	20	N/mm^2
3.15	rekenwaarde betondruksterkte	$f_{cd}=f_{ck}/\gamma_c$	=	8,0	N/mm^2
3.4	gemiddelde cilindertreksterkte	$f_{ctm}=0{,}3f_{ck}^{(2/3)}$ als $f_{ck}<=50$ of $f_{ctm}=2{,}12\ln(1+f_{cm}/10)$	=	1,57	N/mm^2
3.1.8(1)	gemiddelde buigtreksterkte beton (3.23)	$f_{ctm,fl}$= max (1,6 - h/1000) f_{ctm} ; f_{ctm})	=	1,57	N/mm^2
	karakteristieke ondergrens treksterkte	$f_{ctk0,05}=0{,}7f_{ctm}$	=	1,10	N/mm^2
3.16	rekenwaarde treksterkte	$f_{ctd}=f_{ctk0,05}/\gamma_c$	=	0,73	N/mm^2
	elasticiteitsmodulus	$E_{cm}=22000*(f_{cm}/10)^{0,3}$	=	27085	N/mm^2
3.5	elasticiteitsmodulus afgerond	E_{cm}	=	27000	N/mm^2
tabel 3.1	relatieve verkorting beton	ε_{c3}=1,75+0,55 [(f_{ck} - 50) / 40] voor f_{ck}>=50; 1,75		1,750	$^0/_{00}$
tabel 3.1	relatieve verkorting beton	ε_{cu3}= 2,6+ 35 [(90-f_{ck}) / 100]^4 als f_{ck}>=50; 3,50		3,500	$^0/_{00}$
	elasticiteitsmodulus	$E=f_{cd}/\varepsilon_{c3}$	=	4571	N/mm^2
	hoogte betondrukzone: $k_{xu,max}$ (*d)	$k_{xu,max}=\varepsilon_{cu}\,10^6/(\varepsilon_{cu}\,10^6+7f_{yd})$	=	0,590	-
	maximum wapeningspercentage	$\rho_{max}=\alpha\ k_{xu,max}f_{cd}/f_{yd}$	=	1,017	%
	factor oppervlak betondrukzone	α= { ε_{cu3} - (ε_{c3} / 2) } / ε_{cu3}	=	0,750	-
	factor zwaartepunt betondrukzone	$\beta=\{\varepsilon^2_{cu3}-(\varepsilon_{c3}*\varepsilon_{cu3})+\varepsilon^2_{c3}/3\}/\{2\,\varepsilon^2_{cu3}-\varepsilon_{c3}\,\varepsilon_{cu3}\}$	=	0,39	-
	staaltrekspanning	f_{yk}	=	400	N/mm^2
	rekenwaarde staaltrekspanning	$f_{yd}=f_{yk}/\gamma_s$	=	348	N/mm^2
	elasticiteitsmodulus wapeningstaal	E_s	=	200000	N/mm^2

berekening buigwapening (met trekwapening zonder drukwapening)

	nuttige hoogte	$d=h-c-d_{bg}-0{,}5d_{equi,trek}$	=	681,0	mm
	maximale hoogte betondrukzone	$x_{u,max}=k_{xu,max}*d$	=	401,6	mm
	hoogte betondrukzone	$x_u=[\,d-\sqrt{\{d^2-4\beta M_{ED}/(\alpha b f_{cd})\}}\,]/2\beta$	=	132,1	mm
	maatgevende waarde betondrukzone	x_u=	=	132,1	mm
	grootte betondrukkracht	$N_c=\alpha\ x_u\ f_{cd}\ b\ 10^{-3}$	=	792,5	kN
	grootte staaltrekkracht	$N_s=A_s\ f_{yd}\ 10^{-3}$	=	792,5	kN
	relatieve verlenging betonstaal	$\varepsilon_{s=}(d-x_u)*\varepsilon_{cu3}/x_u$	=	14,5	$^0/_{00}$
	verlenging volgens art. 3,2,7(2)	ε_{uk}	=	50	$^0/_{00}$
	maximaal toelaatbare verlenging	$\varepsilon_{ud}=0{,}9\varepsilon_{uk}$	=	45	$^0/_{00}$
	momentarm afhankelijk gekozen wapening	z = d - β.x = d - β. $A_{s,aanw}$. f_{yd} / α. f_{cd} . b)	=	629,6	mm
	momentarm	z = z / d * d	z=	0,92	* d
	benodigde hoeveelheid wapening	$A_{s1}=\alpha\ b\ x_u\ f_{cd}/f_{yd}$	=	2279	mm^2
	opneembaar moment (zonder drukwap.)	$M_{Rd}=A_{aanw,trek}\,f_{yd}\,z\,10^{-6}$	=	499	kNm
	opneembaar moment (globale schatting.)	$M_{Rd}=A_{aanw,trek}\,f_{yd}\,z\,10^{-6}$ met z= 0,92 * d	=	499	kNm
	benodigd wapeningspercentage	$\rho=A_{s1}/bd*100$	=	0,33	%
	wapeningspercentage trekwapening	ρ_{trek}= 100 * $A_{aanw,trek}$ / bd	=	0,33	%
	wapeningspercentage trekwapening	ρ_{trek}= 100 * $A_{aanw,trek}$ / bh (art. 9.2.1.1 (3))	=	0,30	%
	minimum wapening	$A_{min,1}=\rho_{min}\ b\ d\ /100$	=	673	mm^2
	minimum wapening	$A_{min,2}$= x * A_{s1}	=	2848	mm^2
	factor	x afhankelijk van primaire of secundaire constructie		1,25	-
	minimum wapening	A_{min}	=	673	mm^2
	maximum wapening	$A_{max}=\rho_{max}\ b\ d\ /100$	=	6928	mm^2
	"traditionele" berekening A_s	$a=\beta f_{y,d}{}^2/(b\,f_{cd}\,\alpha)$	=	7,8	-
	(oplossen vierkantsvergelijking)	b= - f_{yd} * d	=	-236870	-
		c=+M_{Ed}	=	499	10^6 Nmm
	benodigde hoeveelheid wapening	A_s={ -b - $\sqrt{(b^2-4ac)}$ } / 2a	=	2278,5	mm^2

berekening buigwapening (met trek- en drukwapenning)

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	specifieke verkorting drukwapening	$\varepsilon_{s,druk}>=f_{yd}/E_s*1000$	=	1,74	$^0/_{00}$
	hart drukwapening tot uiterste vezel	eis: d2< x_u - $\varepsilon_{s,druk}$ * x_u / ε_{cu3}	=	66,5	mm
	hart drukwapening tot uiterste vezel	$d2=c_{drukzijde}+d_{bgl}+0{,}5d_{gem,druk}$	=	59,0	mm
	opneembaar moment tot $x_{u,max}$	$M_{Rd1}=\rho_{max}\ b\ d\ *\ f_{yd}\ *z*\ 10^{-6}$	=	1265	kNm
	met als inwendige hefboomsarm	z= d - β $k_{x,max}$ d	=	525	mm
	uitwendig moment zonder drukwapening	$M_{Ed1}=M_{Rd1}$	=	1265	kNm
	op te nemen moment met drukwapening	M_{Ed2}= $M_{Ed,totaal}$ - M_{Rd1}	=	0,0	kNm
	opneembaar moment met drukwapening	M_{Rd2}= $A_{aanw,druk}$ f_{yd} (d-d2)*10^{-6}	=	493,4	kNm
	totaal opneembaar moment incl. drukwap	$M_{Rd,totaal}=M_{Rd1}+M_{Rd2}$	=	1758,1	kNm
	benodigde hoeveelheid drukwapening	A_{s2}= M_{Ed2} / { $f_{v,d}$ (d-d2) } * 10^6	=	0	mm^2
	benodigde hoeveelheid trekwapening	A_{s1} (zonder aandeel drukwapening)	=	2279	mm^2
	totaal benodigde trekwapening	$A_{s1,totaal}$= A_{s1} + A_{s2}	=	2279	mm^2
	maatgevende waarde opneembaar moment	$M_{Rd,totaal}$	=	499	kNm

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berekening moment en wapening bij maximaal toegestane verlenging betonstaal

	minimale hoogte betondrukzone	$x_{min}=\varepsilon_{cu3}$ * d / (ε_{ud} + ε_{cu3})	=	49,1	mm
	bijbehorende drukkracht in de beton	$N_{cd}=\alpha$ b x_{min} f_{cd} 10^{-3}	=	294,9	kN
	inwendige hefboomsarm	z=d - β x_{min}	=	661,9	mm
	opneembaar moment	$M_{Rd,d}$ = N_{cd} z 10^{-6}	=	195	kNm
	bijbehorende wapening	A_s = N_{cd} 10^3 / $f_{y,d}$	=	848	mm^2
3.4	gemiddelde cilindertreksterkte beton	f_{ctm}	=	1,57	N/mm^2
	scheurmoment in ongewapende doorsnede	$M_{E,min}$= W_c * f_{ctm} 10^{-3}	=	147,4	kNm
	weerstandsmoment ongescheurde doorsnede	W_c= 1/6 b h^2 10^{-3}	=	93750	cm^3
	hierbij behorende (minimum) wapening	A_{min}=$M_{E,min}$ * 10^6 / z f_{yd} met z= 629,6	=	673	mm^2
	minimum wapeningspercentage	ρ_{min}=100 * A_{min} / bd met A_{min}= 673	=	0,099	%

lineaire berekening met beperkte herverdeling art 5.5 herverdelen

	verhouding tussen momenten	δ_{her} = $M_{Ed,herverdeeld}$ / $M_{Ed,elastisch}$	=	1,000	-
5.5(4)	maximaal toelaatbare verhouding	δ=afhankelijk van de kubusdruksterkte f_{ck}	=	0,604	-
	minimum afhankelijk van staalklasse	klasse A: > k_6, klasse B en C: >=k_5	=	0,700	-
	maatgevende waarde	δ	=	0,700	-
5.10.a	maximale herverdeling f_{ck} <= 50Mpa	δ>=k_1+k_2 x_u / d	=	0,604	-
5.10.b	maximale herverdeling f_{ck} > 50Mpa	δ>=k_3+k_4 x_u / d	=	0,604	-
	factoren volgens NB 2011	k_1 = f / (500 + f)	=	0,41	-
		k_2	=	1,00	-
		k_3 = 7 f / (ε_{cu} 10^6 + 7 f)	=	0,41	-
		k_4	=	1,00	-
	minimale waarde voor wapeningklasse B en C	k_5	=	0,7	-
	minimale waarde voor wapeningklasse A	k_6	=	0,8	-
		e_{cu2}	=	3,50	$^0/_{00}$
	hoogte betondrukzone na herverdelen	x_u	=	132,1	mm
	nuttige hoogte	d	=	681,0	mm

scheurwijdte

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controle scheurwijdte zonder directe berekening art.7.3.3

	optredende staalspanning	σ_s=M_{fr} / M_{Ed} * $A_{s1,totaal}$ / $A_{aanw,trek}$ * f_{yd}		=	261	N/mm^2
	diameter staven d1	d1		=	22,0	mm
	aantal staven	n_1		=	6	st
	diameter staven d2	d2		=	0,0	mm
	aantal staven	n_2		=	0	st
7.12	equivalente staafdiameter	d_{eq}=(n_1*$d1^2$+n_2*$d2^2$) / (n_1*d1+n_2*d2)		=	22,0	mm
	werkelijke hart op hart afstand	s= (b - 2c_{zij} - 2d_{bg}-d_{trek}) / (n-1)		=	176	mm
	gemiddelde h.o.h.- afstand staven	s_{gem} = b / $\sum n_{trek}$		=	167	mm
	toelaatbare scheurwijdte	w	milieuklasse A	=	0,30	mm
	toelaatbare scheurwijdte	w	milieuklasse B	=	0,30	mm
	toelaatbare scheurwijdte	w	maatgevende waarde	=	0,30	mm
	toelaatbare staafdiameter	d_{max}	zonder de invloed van k_x	=	14	mm
	toelaatbare hart op hart-afstand	s	zonder de invloed van k_x	=	175	mm
	toegepaste dekking op buitenste wapening	$c_{applied}$ = $c_{trekzijde}$		=	40	mm
	minimale betondekking	c_{nom}=c_{min}+$\sum\Delta c_{dev}$ (incl. correcties)		=	35	mm
	vergrotingsfactor	k_x=$c_{applied}$ / c_{nom} <=2,0		=	1,14	-
	toelaatbare staafdiameter	d_{max}	met de invloed van factor en k_x	=	9,4	mm
	toelaatbare hart op hart-afstand	s	met de invloed van k_x	=	200	mm
(7.6N)	correctiefactor buiging (diameter)	factor = $f_{ct,eff}$ * k_c h_{cr} / { 2,9 *2 * (h-d) }		=	0,59	-
(7.7N)	correctiefactor trek (diameter)	factor = $f_{ct,eff}$ * h_{cr} / { 2,9 *8 * (h-d) }		=	0,37	-
	gemiddelde axiale treksterkte	$f_{ct,eff}$	= f_{ctm} tabel 3.1	=	1,57	N/mm^2
	coëfficient afhankelijk van spanningsverdeling	k_c	= buiging =0,4, trek=1,0	=	0,40	-
	hoogte trekzone direct voor scheuren	h_{cr}	= 0,5 h bij rechthoekige doorsnec	=	375	mm
	afstand hart wapening tot buitenkant beton	(h-d)		=	69	mm
	maatgevende correctiefactor	voor toelaatbare diameter		=	0,59	-

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controle scheurwijdte met berekening art. 7,3,4

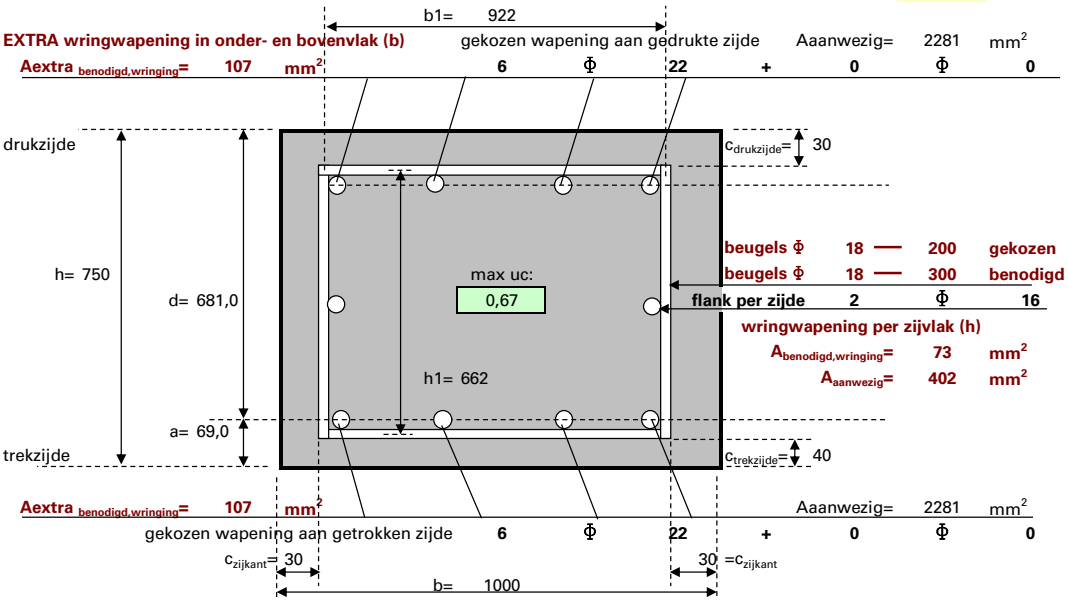
7.8	berekende scheurwijdte	$w_k=s_{r,max}(\varepsilon_{sm}-\varepsilon_{cm})$		=	#N/B	mm
		$s_{r,max}$		=	#N/B	mm
7.9		$(\varepsilon_{sm}-\varepsilon_{cm})=\{\sigma_s-k_t * f_{ct,eff}/\rho_{p,eff}*(1+\alpha_e*\rho_{p,eff})\}/E_s$ =			#N/B	-
	minimale waarde	$(\varepsilon_{sm}-\varepsilon_{cm}) >= 0,6\ \sigma_s / E_s$		=	0,000782	-
	maatgevende waarde	$(\varepsilon_{sm}-\varepsilon_{cm})$		=	#N/B	-
		$\sigma_s=M_{fr} / M_{Ed} * A_{s1,totaal} / A_{aanw,trek} * f_{yd}$		=	261	N/mm²
	gemiddelde waarde treksterkte op tijd t	$f_{ctm(t)}$	**tijd t nog eens programmeren**	=	1,57	N/mm²
	gemiddelde waarde treksterkte	$f_{ct,eff}$	op tijdstip van eerste scheuren	=	1,57	N/mm²
7.10		$\rho_{p,eff}=(A_s+\xi^2_1 A'_p) / A_{c,ef}$		=	#N/B	-
	doorsnede trekwapening	$A_s=A_{aanw,trek}$		=	2281	mm²
7.3.2(3)	doorsnede voorspanelementen	A'_p		=	0	mm²
		$A_{c,eff}$	minimum waarde onderstaande formules		#N/B	mm²
	meewerkend oppervlak	$A_{c,eff}$ =b* 2,5 (h-d)		=	172500	mm²
		$A_{c,eff}$ = b* (h-x) / 3		=	#N/B	mm²
	van toepassing bij zuivere trek!	$A_{c,eff}$ = b* h/2		=	375000	mm²
7,5		ξ_1		=	0	-
	factor	k_t		=	0,4	-
		E_s		=	200000	N/mm²
7.11	+C2:2011-NB2016	$s_{r,max}=k_3 c+k_1 k_2 k_4 d_{eq} /\rho_{p,eff}$< max {(50-0,8$f_{ck}$)$\Phi$ en 15Φ}			#N/B	mm
		maximum van (50-0,8f_{ck})Φ en 15Φ		=	888,8	mm
	maximale hoh om 7.11 toe te mogen passen	h.o.h. s_{gem} <= 5(c+φ/2) met φ=d_{eq}		<=	345	mm
	dekking op de beschouwde staaf	c		=	58	mm
7.12		$d_{eq}=(n_{b1}*d1_{eq}^2+n_{b2}*d2_{eq}^2) / (n_{b1}*d1_{eq}+n_{b2}*d2_{eq})$ =			22,0	mm
		k1=		=	0,8	-
		k2=		=	0,5	-
7.13	tussenliggende waarden	k2= (e1 + e2) / 2e1		=	n.t.b.	-
		k3=		=	3,4	-
		k4=		=	0,425	-
7.14	bovengrens als s_{gem}> 5 (c+φ/2)	$s_{r,max}$= 1,3 (h-x)		=	#N/B	mm
	hoogte betondrukzone	x=		=	#N/B	mm
7.15	bovengrens	$s_{r,max}= 1 / (\cos O / s_{r,max,y} + \sin O / s_{r,max,z})$	=		n.t.b.	mm
	bij wapening onder een hoek O					
	berekening van de betondrukzone x en kruipfactor φ in de bruikbaarheidsgrenstoestand					
	oppervlakte van de betondoorsnede	A_c= b * h		=	750000	mm²
	omtrek dat bloot staat aan uitdroging	u=	2 zijden 2b	=	2000	mm
	fictieve dikte	h_0=	2 Ac / u (ho <= 1500)	=	750	mm
3.1.4	kruipfactor a.d.h.v. grafiek 3.1 (2)	φ	bepaald volgens art. 3.1.4	=	#N/B	-
7.20	gereduceerde elasticiteitsmodulus	$E_{c,eff}=E_{cm} / (1+\varphi)$		=	#N/B	N/mm²
	effectieve verhouding elasticiteitsmodulus	α_e=	$E_s / E_{c,eff}$	=	#N/B	-
	hoogte betondrukzone x in BGT	$x=[-\alpha_e\rho+\sqrt{\{(\alpha_e\rho)^2+2\alpha_e\rho\}}]d$		=	#N/B	mm
7.3.2(2)	minimum wapening vereist	$A_{s,min}=k_c k f_{ct,eff} A_{ct} / \sigma_s$	7.1	=	590	mm²
	coëfficient	k=factor voor lijven en flenzen		=	1,00	-
	oppervlakte beton binnen trekzone	Act= 0,5 bh (vlak voor het scheuren)		=	375000	mm²
	maximaal toelaatbare spanning in staal	$\sigma_s = f_{yk}$	tbv berekening minimum wapening	=	400	N/mm²

opmerking:

berekening dwarskracht en wringing op rechthoekige doorsnede volgens eurocode 2

1000 x 750

	algemene gegevens	werk		KIJ-DIM	
		werknummer		10	
		onderdeel		Balkrooster	
2.4.2.4		ontwerpsituatie		blijvend en tijdelijk	
doorsnedegegevens					
	kwaliteit beton	betonklasse	=	C12/15	
	kwaliteit staal	staalsoort	=	FeB 400	
	betonbreedte	b	=	1000	mm
	betonhoogte	h	=	750	mm
	betondekking gedrukte zijde	$c_{drukzijde}$	=	30	mm
	betondekking getrokken zijde	$c_{trekzijde}$	=	40	mm
	betondekking zijkanten	$c_{zijkant}$	=	30	mm
	wapening aan getrokken zijde	aantal	n1=	6	stuks
		diameter	d1=	22	mm
		aantal	n2=		stuks
		diameter	d2=		mm
	wapening aan gedrukte zijde	aantal	n3=	6	stuks
		diameter	d3=	22	mm
		aantal	n4=		stuks
		diameter	d4=		mm
	flankwapening per zijde	aantal	n5=	2	stuks
		diameter	d5=	16	mm
gegevens tbv berekening dwarskrachtwapening					
	rekenwaarde dwarskracht	V_{Ed}	=	594	kN
	rekenwaarde wringend moment	T_{Ed}	=	40	kNm
	rekenwaarde moment in doorsnede	M_{Ed} **z wordt nauwkeurig berekend**	=	153	kNm
	normaalkracht in doorsnede	N_{cd}	=	0	kN
	verhoging afschuifsterkte t.g.v. toepassing staalvezels e.d.		=	0	N/mm²
	gelijkmatig verdeelde belasting op ligger	q_d	=	0	kN/m
	afstand rand oplegging tot begin belasting	a_v	=	1131	mm
	lengte van de oplegging	c in de richting van de overspanni	=	400	mm
	helling betondrukdiagonaal	Θ **(tussen 21,8 en 45 graden)**	=	45	graden
	wapening in verankeringsgebied	A_{sl} (meestal $A_{aanw,trek}$)	=	0	mm²
	helling dwarskrachtbeugels	α de helling van de beugels is 90 g	=	90	graden
	beugels	diameter	d_{bg}=	18	mm
	aantal sneden per beugel	n_{sn} (normale beugels zijn 2-snedig)	n_{sn}=	4	snedig
	gekozen hart op hart afstand basisbeugels	$s_{l,bg}$	=	200	mm
	diameter opgebogen staven	$d_{opgebogen}$	=	0	mm
	hoh maat rijen van opgebogen staven	$s_{b,opgb}$	=	0	mm
	aantal opgebogen staven per rij	$n_{opgebogen}$	=	0	stuks



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resultaten — Balkrooster

	rekenwaarde schuifspanning	v_{Ed}	door uitwendige belasting	=	0,87	N/mm²
	maatgevende waarde schuifsterkte	$v_{Rd,c}$	door beton	=	0,23	N/mm²
6.9	bovengrens schuifsterkte	$v_{Rd,max}$	door beton	=	2,35	N/mm²
	rekenwaarde dwarskrachtweerstand	$V_{Rd,c}$	door beton	=	158,1	kN
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s}$	door wapening	=	1179	kN
	rekenwaarde max. dwarskrachtweerstand	$V_{Rd,max}$	door beton	=	1599	kN

wapening tbv dwarskracht

benodigde beugelwapening per m'	$A_{bg}=1000/s * A_{sw} * n_{bg}$ (n - snedig)		=	2564	mm²/m'
minimum dwarskrachtwapening	$A_{bgls,min}=\rho_{w,min} * b\ 1000\ /100$	**per m'**	=	693	mm²/m'
benodigde h.o.h.-afstand beugels	$s_{benodigd}$		=	300	mm
lengte gevaarlijk gebied (alleen bij q-last)	$y= (V_{Ed}- V_{Rd,s}) / q_d$	naast basisbeugels	=	n.v.t.	mm

wapening tbv wringing en dwarskracht

benodigde h.o.h.-afstand beugels	$s_{benodigd}$		=	327	mm
langswapening per zijvlak (h)	tgv wringing		=	73	mm²
langswapening onder/boven (b)	tgv wringing		=	107	mm²
benodigde beugelwapening	$A_{s,w,bgls} * =1000 / s_{bgls} * A_{sw}$		=	3110	mm² / m'

unity-checks dwarskracht

	maximum dwarskracht	$V_{Ed} / V_{Rd,max}$	594,0	/	1598,7	=	0,37 -
	dwarskracht gewapend	$(V_{Ed} - V_{Ed,red}) / V_{Rd,s}$	594,0	/	1179,2	=	0,50 -
	helling betondrukgebied	21,8 =< ϴ <= 45	=	1,00	-		
	betondrukdiagonaal	$V_{Ed} / V_{Ed,max}$	594,0	/	1555,9	=	0,38 -
	minimum beugelwapening	$A_{bgls,min} / A_{bgls}$	692,8	/	5089	=	0,14 -
	dwarskracht ongewapend	$(V_{Ed} - V_{Ed,red}) / V_{Rd,c}$	594,0	/	158,1	=	3,76 -

unity-checks wringing + dwarskracht — dwarskrachtwapening toepassen !!

	maximum wringingmoment	$T_{Ed} / T_{Rd,max}$	40	/	412	=	0,10 -
6.29	wringing+dwarskracht	$T_{Ed} / T_{Rd,max} + V_{Ed} / V_{Rd,max}$	0,10	+	0,37	=	0,47 -
	wringing+dwarskracht beugels	$s_{aanwezig} / s_{benodigd}$	200	/	327	=	0,61 -
	wringing ongewapend	$T_{Ed} / T_{Rd,c}$	40	/	132,4	=	0,30 -
6.31	wringing+dwarskracht ongew.	$T_{Ed}/T_{Rd,c}+(V_{Ed}-V_{Ed,red})/V_{Rd,c}$	0,30	+	3,76	=	4,06 -
	wringing hoeveelheid langswapening in de zijvlakken (h)		73	/	402	=	0,18 -

wringing hoeveelheid langswapening in de onder- en bovenvlakken (b) moet worden opgeteld bij de buigwapening

toelaatbare afstanden van dwarskrachtwapening — dwarskracht- en of wringwapening toepassen !!

9.2.2(6)	toelaatbare hoh afstand	$s_{l,bg} / s_{l,max}$	200	/	300	=	0,67 -
9.2.2(7)	afstand opgebogen wapening	$s_{b,opbg} / s_{b,max}$	0	/	409	=	0,00 -
9.2.2(8)	max beugelmaat in de breedte	$s_{t,bg} / s_{t,max}$	307	/	500	=	0,61 balken
9.3.2(5)	max beugelmaat in de breedte	$s_{t,bg} / s_{t,max}$	307	/	1022	=	0,30 vloeren

wapeninggegevens

totaal aantal staven in trekzone	$\Sigma n_{trek}=n1+n2$		=	6,0	st
totaal aantal staven in drukzone	$\Sigma n_{druk}=n3+n4$		=	6,0	st
gewogen diameter trekwapening	$d_{gem,trek}=(n1*d_1*D_1+n2*d_2*D_2) / (n1*D_1+n2*D_2)$		=	22,0	mm
gewogen diameter drukwapening	$d_{gem,druk}=(n3*d_3*D_3+n4*d_4*D_4) / (n3*D_3+ n4*D_4)$		=	22,0	mm
doorsnede per staaf 1, trekwapening	$D_1=0{,}25\pi d_1^2$		=	380	mm²
doorsnede per staaf 2, trekwapening	$D_2=0{,}25\pi d_2^2$		=	0	mm²
doorsnede per staaf 3, drukwapening	$D_3=0{,}25\pi d_3^2$		=	380	mm²
doorsnede per staaf 4, drukwapening	$D_4=0{,}25\pi d_4^2$		=	0	mm²
doorsnede per staaf 5, flankwapening	$D_5=0{,}25\pi d_5^2$		=	201	mm²
doorsnede per beugel enkelsnedig	$D_{bg}=0{,}25\pi d_{bg}2$		A_{sw}=	254	mm²
aantal snedige beugel bij dwarskracht	n_{sn}		=	4	snedig
horizontale maat in breedte van de balk	$s_{t,bg} = b1 / (n_{sn}-1)$		=	307	mm
aanwezige beugelwapening (n-snedig)	$A_{bgls} = n_{sn} * D_{bg} * 1000 / s_{aanwezig}$		=	5089	mm²/m'
horizontale beugelmaat (hartmaat)	$b1=b-2c_{zijkant}-d_{bg}$		=	922	mm
vertikale beugelmaat (hartmaat)	$h1=h-c_{trekzijde}-c_{drukzijde}-d_{bg}$		=	662	mm
zwaartepunt staven vanaf de beugel	$z= (n1\ D_1\ ^1/_2\ d1+n2\ D_2\ ^1/_2\ d2\ ) / (\ n1D_1+n2D_2)$		=	11,0	mm
equivalente diameter wapening	$d_{equi,trek}= 2 * z$ (t.b.v. berekening van d)		=	22,0	mm

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materiaalgegevens

Balkrooster

	materiaalfactor beton	γ_c	=	1,50	-
	materiaalfactor wapeningstaal	γ_s	=	1,15	-
	karakteristieke cilinderdruksterkte	f_{ck}	=	12	N/mm^2
	karakteristieke kubusdruksterkte	f_{ck}	=	15	N/mm^2
	gemiddelde cilinderdruksterkte	$f_{cm}=f_{ck}+8$	=	20	N/mm^2
3.15	rekenwaarde betondruksterkte	$f_{cd}=f_{ck}/\gamma_c$	=	8,0	N/mm^2
3.4	gemiddelde cilindertreksterkte	$f_{ctm}=0{,}3f_{ck}^{(2/3)}$ als $f_{ck<}$=50: $f_{ctm}=2{,}12\ln(1+f_{cm}/10)$	=	1,57	N/mm^2
3.1.8(1)	gemiddelde buigtreksterkte beton (3.23)	$f_{ctm,fl}$= max (1,6 - h/1000) f_{ctm} ; f_{ctm})	=	1,57	N/mm^2
	karakteristieke ondergrens treksterkte	$f_{ctk0,05}=0{,}7f_{ctm}$	=	1,10	N/mm^2
3.16	rekenwaarde treksterkte	$f_{ctd}=f_{ctk0,05}/\gamma_c$	=	0,73	N/mm^2
tabel 3.1	relatieve verkorting	ε_{c3}=1,75+0,55 [(f_{ck} - 50) / 40] voor f_{ck}>=50; 1,75	=	1,750	$^0/_{00}$
tabel 3.1	relatieve verkorting	ε_{cu3}= 2,6+ 35 [(90-f_{ck}) / 100]^4 als f_{ck}>=50; 3,50	=	3,500	$^0/_{00}$
	hoogte betondrukzone: $k_{xu,max}$ (*d)	$k_{xu,max}$ = (1-x)/1,25(0,6+1,4/ε_{cu3})	=	0,448	-
	factor in formule	x	=	0,44	-
	factor oppervlak betondrukzone	α= { ε_{cu3} - (ε_{c3} / 2) } / ε_{cu3}	=	0,750	-
	factor zwaartepunt betondrukzone	β={ε^2_{cu3} - (ε_{c3}*ε_{cu3}) +ε^2_{c3}/3 } / { 2 ε^2_{cu3} - ε_{c3} ε_{cu3}}	=	0,39	-
	staaltrekspanning	f_{yk}	=	400	N/mm^2
	rekenwaarde staaltrekspanning	f_{yd} = f_{yk} / γ_m	=	348	N/mm^2
	elasticiteitsmodulus wapeningstaal	E_s	=	200000	N/mm^2
	nuttige hoogte	d=h-c- d_{bg}-0,5$d_{equi,trek}$	=	681,0	mm
	hoogte betondrukzone	x_u=[d - $\sqrt{}${d^2 - 4βM_{ED} / (αbf_{cd}) }] / 2β	=	38,3	mm
	momentarm	z=d-β x_u als M_{Ed}=0 rekenen met z=0,9d	=	666,1	mm

berekening dwarskrachtwapening (beugels)

	aantal snedige beugel		n_{sn}	=	4	snedig
	reductiefactor belasting in gebied 2d		β=a_v / 2d >=0,25	=	0,83	-
	reductie dwarskracht		$V_{Ed,red}$= 0,5 q_d c + 1,25 q_d d	=	0,0	kN
	gereduceerde dwarskracht		V_{Ed}- $V_{Ed,red}$ (op afstand d uit oplegging)	=	594,0	kN
	rekenwaarde schuifspanning		v_{Ed}=(V_{Ed} - $V_{Ed,red}$) / bd	=	0,87	N/mm^2
6.2.b	ondergrens schuifsterkte	of	$v_{Rd,c}$=v_{min}=0,035$k^{3/2}\sqrt{f_{ck}}$ + $k_1\sigma_{cp}$	=	0,23	N/mm^2
6.2.a	rekenwaarde schuifsterkte	of	$v_{Rd,c}$=$C_{Rd,c}$ * k * (100 ρ_l f_{ck})$^{1/3}$ +$k_1\sigma_{cp}$	=	0,00	N/mm^2
	maatgevende waarde schuifsterkte		$v_{Rd,c}$= 0,23 + 0,00	=	0,23	N/mm^2
	correctiefactor schuifsterkte		$C_{Rd,c}$ = 0,18 / γ_c	=	0,12	-
	factor		k= 1 + $\sqrt{}$ (200/d) <=2,0	=	1,54	-
	wapeningspercentage		ρ_l=A_{sl} / bd*100 <2%	=	0,00	%
	factor		k_1 waarde volgens NB	=	0,15	-
	normaaldrukspanning in doorsnede		σ_{cp} = N_{cd} / bh	=	0,00	N/mm^2
	rekenwaarde dwarskrachtweerstand		$V_{Rd,c}$=$v_{Rd,c}$ b d 10^{-3} met beton	=	158,1	kN
	minimum dwarskrachtwapening		$\rho_{w,min}$= 0,08 $\sqrt{}$ f_{ck} / f_{yk}	=	0,07	%
	minimum dwarskrachtwapening		$A_{bgls,min}$=$\rho_{w,min}$ * b 1000 /100 **per m'**	=	692,8	mm^2/m'
6.5	betondrukdiagonaal		V_{Ed}<=$V_{Ed,max}$= 0,5 b_w d v f_{cd}	$V_{Ed,max}$=	1555,9	kN
6.9	bovengrens schuifsterkte		$v_{Rd,max}$=α_{cw}*(z/d)* v_1 f_{cd} / (cotΘ + tanΘ)	=	2,35	N/mm^2
	voor niet-voorgespannen constructies		α_{cw}	=	1,0	-
	sterktereductiefactor	of	v_1=v=0,6 (1-f_{ck} / 250) als σ_{yd}>0,8f_{yk}	=	0,57	-
		of	v_1=0,6; σ_{yd}<=0,8$f_{yk;}$ f_{ck}<=60	=	0,60	-
		of	v_1=0,9-f_{ck}/200>0,5; σ_{yd}<=0,8$f_{yk;}$ f_{ck}>60	=	0,84	-
	maatgevende waarde factor		v_1	=	0,60	-
	staalspanning in (dwarskracht)beugels		$\sigma_{s\ bgls}$ = s_{aanw} / $s_{bgls\ V+T}$ * f_{yd}	=	213	N/mm^2
	sinus helling betondrukdiagonaal		*sin Θ*	=	0,707	-
	cosinus helling betondrukdiagonaal		*cos Θ*	=	0,707	-
	tangens helling betondrukdiagonaal		*tan Θ*	=	1,000	-
	cotangens helling betondrukdiagonaal		*cot Θ*	=	1,000	-
	cotangens helling dwarskrachtwapening		*cot* α *= 1 / tan* α	=	0,000	-
	rekenwaarde max. dwarskrachtweerstand		$V_{Rd,max}$=$v_{Rd,max}$ b d 10^{-3}	=	1598,7	kN
	afstand verschoven M-lijn	of	a_1=z (cotΘ - cot α) / 2 >=d	=	333,1	mm
9.2.1.3	verschuivingsregel	of	a_1=d	=	681,0	mm
6.8	opneembare schuifspanning (n-snedig)		$v_{Rd,s}$=A_{sw} * f_{yd} * z * cotΘ / (s * b * d)	=	1,73	N/mm^2
	verhouding		z/d (in tabellen wordt 0,9 aangehouden!)	=	0,98	-
	rekenwaarde dwarskrachtweerstand		$V_{Rd,s}$=$v_{Rd,s}$ b d 10^{-3} (met beugels)	=	1179,2	kN
	benodigde h.o.h-afstand beugels		s=n_{sn}*A_{sw} f_{yd} z cotΘ / (v_{Ed} b d) (n_{sn}-snedig)	=	397	mm
9.2.2(6)	maximaal toelaatbare hoh afstand		$s_{l,max}$= 0,75 d (1 + cot α) en <=300mm	=	300	mm
9.2.2(7)	max. afstand opgebogen wapening langsrichti		$s_{b,max}$ = 0,6 d (1 + cot α)	=	409	mm
9.2.2(8)	max beugelmaat in de breedte (balken)		als V_{Ed} <=0,5 $V_{Rd,max}$	$s_{t,max}$ =	500	mm
	+C2:2011-NB2016		als V_{Ed} >0,5 $V_{Rd,max}$ $s_{t,max}$ = 0,75 d < 500	$s_{t,max}$ =	500	mm
			maatgevende waarde	$s_{t,max}$ =	500	mm
9.3.2(5)	max beugelmaat in de breedte (vloeren)		$s_{t,max}$ = 1,5 d	=	1022	mm
	benodigde beugelwapening per m'		A_{bg} = 1000 / s * A_{sw} * n_{sn} (n - snedig)	=	2564	mm^2/m'
	directe berekening (alternatief)		A_{bg} = (V_{Ed}-$V_{Ed,red}$)*1000 / (f_{yd}*z* cotΘ)	=	2564	mm^2/m'

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berekening dwarskrachtwapening met alleen opgebogen staven (zonder beugelwapening) Balkrooster

	doorsnede opgebogen wapening	$D_{opgebogen}$	=	1	mm^2
	opgebogen wapening (zonder beugels)	$A_{opgebogen}=v_{Ed}\ b\ d\ ^1/_2\ y\ \sqrt{2}\ /\ (z\ f_{yd})$	=	1813	$mm^2/m'/b$
	wapening per afstand $s_{opgebogen}$	$A_{opgeb,s}=A_{opgebogen} * s_{opgebogen} / 1000$	=	2	mm^2/s_{opgeb}
		de gekozen afstand s voldoet			
	benodigd aantal staven per breedte	$n_{opgebogen}=A_{opgeb,s} / d_{opgebogen}$	=	2,31	stuks
	benodigde h.o.h. afstand in de breedte	$a_{breedte}=b / n_{opgebogen}$	=	433,2	mm
	maximaal toelaatbare afstand	s_{max} (kleinste waarde s_{max} en d_a)	=	500	mm
		$d_a=h-c_{trek}-c_{druk}-2*d_{bgl}-(d_{gem,trek}+d_{gem,druk})/2$	=	622	mm
		$s_{max}=$	=	500	mm
	aanwezig opgebogen wapening	$A_{opgebogen,aanw}=1000*D_{opgebogen} * n_{opgebogen} /s_{opgebogen}$		0	$mm^2/m'/b$
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s,opgeb}= A_{opgebogen,aanw}\ z\ f_{yd} / (\ ^1/_2\ y\ \sqrt{2})$	=	0	kN

berekening dwarskrachtwapening met opgebogen staven (45 graden) en met beugelwapening

	diameter opgebogen staven	$d_{opgebogen}$	=	1	mm
	hoh maat rijen van opgebogen staven	$s_{b,opgb}$	=	1	mm
	aantal opgebogen staven per rij	$n_{opgebogen}$	=	0	stuks
	doorsnede opgebogen wapening	$D_{opgebogen}$	=	1	mm^2
	opgebogen wapening (zonder beugels)	$A_{opgebogen}=(v_{Ed}-v_{Rd,s})\ b\ d\ ^1/_2\ y\ \sqrt{2}\ /\ (z\ f_{yd})$	=	-1786	$mm^2/m'/b$
	wapening per afstand $s_{opgebogen}$	$A_{opgeb,s}=A_{opgebogen} * s_{b,opgb} / 1000$	=	-2	mm^2/s_{opgeb}
		de gekozen afstand s voldoet			
	benodigd aantal staven per breedte	$n_{opgebogen}=A_{opgeb,s} / d_{opgebogen}$	=	-2,27	stuks
	benodigde h.o.h. afstand in de breedte	$a_{breedte}=b / n_{opgebogen}$	=	n.v.t.	mm
	max. toelaatbare afstand opgebogen wap.	s_{max} (kleinste waarde s_{max} en d_a)	=	500	mm
		$d_a=h-c_{trek}-c_{druk}-2*d_{bgl}-(d_{gem,trek}+d_{gem,druk})/2$	=	622	mm
		$s_{max,500}=$ maximale waarde	=	500	mm
	aanwezig opgebogen wapening	$A_{opgebogen,aanw}=1000*D_{opgebogen} * n_{opgebogen} /s_{b,opgb}$		0	$mm^2/m'/b$
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s,opgeb}= A_{opgebogen,aanw}\ z\ f_{yd} / (\ ^1/_2\ y\ \sqrt{2})$	=	0	kN
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s,bgls}=v_{Rd,s}\ b\ d\ 10^{-3}$	=	1179	kN
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s}$=totaal van beugels + opgebogen wapening		1179	kN
9.2.2 (4)	minimaal 50% van de dwarskracht moet met beugels worden opgenomen				

berekening wringwapening (hier wordt altijd met een 2-snedige beugel gerekend)

	scheurmoment wringing	$T_{Rd,c}=f_{ctd}\ t_{ef,i}\ 2\ A_k\ 10^{-6}$	=	132,4	kNm
		$t_{ef,i}=A / u$	=	214,3	mm
		$A=bh$	=	750000	mm^2
		$u=2\ (b+h)$	=	3500	mm
	horizontale beugelmaat (hartmaat)	$b1=b-2c_{zijkant}-d_{bg}$	=	922	mm
	vertikale beugelmaat (hartmaat)	$h1=h-c_{trekzijde}-c_{drukzijde}-d_{bg}$	=	662	mm
	minimum waarde meewerkende wanddikte				
	aan gedrukte zijde	$t_{ef,i,min}=(c_{druk}+d_{bgl}+0,5d_{gem,druk})*2$	=	118,0	mm
	aan getrokken zijde	$t_{ef,i,min}=(c_{trek}+d_{bgl}+0,5d_{gem,trek})*2$	=	138,0	mm
	aan de zijkanten	$t_{ef,i,min}=(c_{zij}+d_{bgl}+0,5d_{gem,trek})*2$	=	118,0	mm
	maatgevende waarde meewerkende breedte				
	aan gedrukte zijde	$t_{ef,i,druk}$	=	214,3	mm
	aan getrokken zijde	$t_{ef,i,trek}$	=	214,3	mm
	aan de zijkanten	$t_{ef,i,zij}$	=	214,3	mm
	effectieve hoogte	$z_{i,h}=h1_{eff}=h-0,5t_{eff,i,druk}-0,5t_{eff,i,trek}$	=	535,7	mm
	effectieve breedte	$z_{i,b}=b1_{eff}=b-*t_{eff,i,zij}$	=	785,7	mm
	kleinste waarde maatgevende breedte	$t_{ef,i,min}=$	=	214,3	mm
		$A_k=b1_{eff}\ h1_{eff}$	=	420918	mm^2
		$u_k=2\ (b1_{eff}+h1_{eff})$	=	2643	mm
6.30	grenswaarde wringmoment	$T_{Rd,max}=2\ v\ f_{cd}\ t_{ef,i}\ A_k\ \sin\theta\ \cos\theta$	=	412,2	kNm
		$v=0,6\ (1-f_{ck}/250)$	=	0,57	-
	totale langswapening	$A_{s,langs}=T_{Ed}\ \cot\theta\ u_k / (2\ A_k\ f_{yd})$	=	361	mm^2
	langswapening per zijvlak (h)	$A_{s,langs} * h1_{eff} / u_k$	=	73	mm^2
	langswapening onder/boven (b)	$A_{s,langs} * b1_{eff} / u_k$	=	107	mm^2
	maximale beugelsafstand	$s_{w,max}=2\ A_{s,bgl}\ b1_{eff}\ h1_{eff}\ f_{yd}\ \cot\theta/T_{Ed}$	=	1863	mm

berekening wringing en dwarskracht

	aantal beugels per m' tbv wringing	$n_{bgls,TEd}=1000 / s_{w,max}$	=	0,5	st per m'
	benodigde h.o.h-afstand beugels(dwarskracht)	$s=n_{sn}*A_{sw}\ f_{yd}\ z\ \cot\theta / (v_{Ed}\ b\ d)$ (n_{sn}-snedig)	=	397	mm
	aantal beugels per m' tbv dwarskracht	$n_{bgls,VEd}=1000 / s$	=	2,5	st per m'
	totaal aantal beugels per m'	$n_{bgls}=n_{bgls,VEd}+n_{bgls\ TEd}$	=	3,1	st per m'
	benodigde hart op hart afstand beugels	$s_{bgl\ V+T}= 1000 / n_{bgls}$	=	327	mm
9.2.2(6)	maximaal toelaatbare hoh afstand (dwarskrach	$s_{max}= 3/4\ d\ (1+\cot\alpha)$ met α=90 graden	=	511	mm
	benodigde beugelwapening	$A_{s,w,bgls} * =n_{sn} *1000 / s_{bgls} * A_{sw}$	=	3110	mm^2 / m'
9.2.3(3)	maximaal toelaatbare hoh afstand (wringing)	s_{max}=minimum (u / 8 ; b ; h)	=	438	mm
	optredende staalspanning in de beugels	$\sigma_{s\ bgls} = s_{aanw} / s_{bgls\ V+T} * f_{yd}$	=	213	N/mm^2

opmerking:

BIJLAGE 41
Meridian kenmerk 1668992

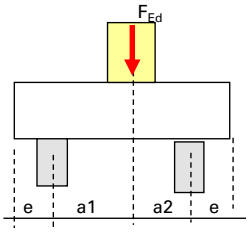
Sweco Nederland B.V.
-
Gebruikslicentie COMMERCIELE-versie tot 1-2-2026

B 2-paalspoer staafwerk EC
Versie : 5.29.14 ; NDP : NL
printdatum : 28-05-2025

tweepaals poer belast door een puntlast 900 x 1000
volgens de theorie van staafwerkmodellen art. 6.5

algemene gegevens	werk			Opwaardering KIJ-BVW	
	werknummer			10	
	onderdeel			Blokpoer(200)	
	ontwerpsituatie			blijvend en tijdelijk	
rekenwaarde van de kolombelasting	F_{Ed}		=	975	kN
	splitsing puntlast F_{Ed} in twee halve puntlasten?			ja	-

materiaalgegevens en poerafmetingen



kwaliteit beton	betonklasse		=	C12/15	
kwaliteit staal	staalsoort		=	FeB 400	
wapeningsklasse	A, B of C		=	B	-
poerbreedte	b		b=	900	mm
poerhoogte	h		h=	1000	mm
afstand van paal 1 tot hart kolom	a1		a1=	550	mm
afstand van kolom tot paal 2	a2		a2=	550	mm
inwendige hefboomsarm			z_{UGT}=	620	mm
toelaatbare inwendige hefboomsarm in BGT	z_{BGT}=0,2 l + 0,4 h < 0,6 l volgens art. 6.1(10)		=	620	mm
afstand hart ondersteuning tot eind poer	e		=	400	mm
vorm van de kolom	rond of rechthoekig			rechthoekig	
afmeting kolom in richting poerlengte	L_{kolom}		=	450	mm
afmeting kolom loodrecht op poerlengte	B_{kolom}		=	450	mm
vorm van de ondersteuning	rond of rechthoekig			rond	
afm. ondersteuning in richting poer	L_{paal}		=	400	mm
afm. ondersteuning loodrecht poerrichting	B_{paal}		=	400	mm

wapeninggegevens

betondekking getrokken zijde	$c_{trekzijde}$	dekking op de buitenste wapenin	=	40	mm
betondekking zijkanten / uiteind	$c_{zijkant}$	=$c_{uiteind}$	=	30	mm
wapening aan getrokken zijde	aantal n1		=	6	stuks
	diameter d_1		=	16	mm
	aantal n2		=	0	stuks
	diameter d_2		=	0	mm
bij wapening in meerdere lagen	aantal staven dat niet in de buitenste laag ligt		n_s=	0	staven
correctie van de nuttige hoogte d ten gevolge van het wapenen in meerdere lagen			d_{red}=	0	mm
invloedsfactor verankeringslengte (α1)	staafbeeindiging van de trekstaven		=	rechte staaf	
doorndiameter omgebogen trekstaven	factor voor ombuiging		=	8	* $d_{max1,2}$
diameter beugels			d_{bg}=	16	mm
wordt er bij de knopen boven de palen voldaan aan één van de randvoorwaarden van artikel 6.5.4(5) ?				ja	

invloedsfactoren voor scheurwijdte en betondekking

verhouding tussen de frequente combinatie en uiterste grenstoestand:		F_{fr} / F_{Ed}	=	0,75	-
a ontwerplevensduur			=	50	jaar
b omgevingsfactoren	milieuklasse A (kies uit X0- XC- XD- of XS-serie)		=	XC4	-
b	milieuklasse B (kies uit X0- XC- XD- of XS-serie)		=	XC4	-
c soort constructie	soort constructie		=	poer	
d dekking verhogen bij oncontroleerbaarheid van de wapening (geen eis in eurocode)			=	nee	
e wordt de beton nabewerkt			=	nee	
f verhoging dekking bij toepassing grote grindkorrel (>32mm) tabel 4.2			=	nee	
g ondergrond waarop gestort wordt			=	bekisting	
h bundeling wapeningstaven (trekwapening)	worden staven d1 gebundeld?		=	nee	
staven kunnen niet worden gebundeld	worden staven d2 gebundeld?		=	nee	
i kwaliteitsbeheersing	is specifieke kwaliteitsbeheersing gewaarborg		=	nee	
j luchtinsluiting	luchtinsluiting van meer dan 4% toegepast?		=	nee	
k verhoging dekking bij toepassing grote staafdiameter (>25mm) geen eis in eurocode			=	nee	
k1 aanhechteigenschap	de aanhechting van de wapeningstaven is		=	goed	
k2 wijze van belasting	de betondoorsnede wordt belast door		=	zuivere trek	
kt belastingduur (bij berekende scheurwijdte)	de belastingduur is		=	langdurend	
milieuklasse	de milieuklasse van de beton is			b) buitenmilieu - RH=80%	
belasten constructie na aantal dagen	de constructie wordt belast na t_0 is			30	dagen
cementklasse	de gekozen cementklasse is			N	
omtrek dat bloot staat aan uitdroging	het aantal zijden dat aan uitdroging bloot staat is			4 zijden 2b+2h	
de staalspanning bij controle scheurwijdte vermenigvuldigen met correctiefactor		z_{UGT} / z_{BGT}	=	1,00	

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unity-checks

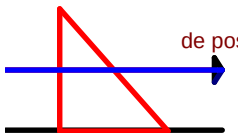
Blokpoer(200)

er wordt gerekend met alle trekwapening in één laag

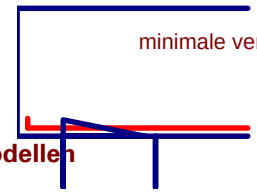
knoop onder kolom	spanning onder kolom	4,8	/	8,4	0,57	-
	spanning in diagonaal	5,9	/	8,4	0,70	-
knoop bij paal 1	spanning boven paal	3,9	/	7,1	0,54	-
	spanning in diagonaal	5,1	/	7,1	0,72	-
knoop bij paal 2	spanning boven paal	3,9	/	7,1	0,54	-
	spanning in diagonaal	5,1	/	7,1	0,72	-
geometrie	hoogte z	620	/	881	0,70	-
	hoogte h	739	/	1000	0,74	-
	positie trekband	54,4	/	128,0	0,42	-
trekband tussen de palen	$A_{s,trek}$ / $A_{aanw,trek}$	1191	/	1206	= 0,99	-
scheurwijdte zonder berekening	diameter of hoh	1,85	of	1,55	= **1,55**	-
scheurwijdte met berekening	w_k / w * k_x	#N/B	/	0,34	= #N/B	-
betondekking	c_{nom} / $c_{trekzijde}$	35	/	40	= 0,88	-
verankeringslengte	l_2 / d	75	/	936	= 0,08	-
8.3(3) doorndiameter bezwijken beton	$\Phi_{m,min}$ / D_{doorn}	74	/	128	= **n.v.t.**	-

spatkrachten T tgv het uitwaaieren drukdiagonaal (art. 6.5.3) zijn onderaan deze sheet getoetst! #N/B

positie knoop boven paal 1 en 2 t.o.v. de onderkant van de poer

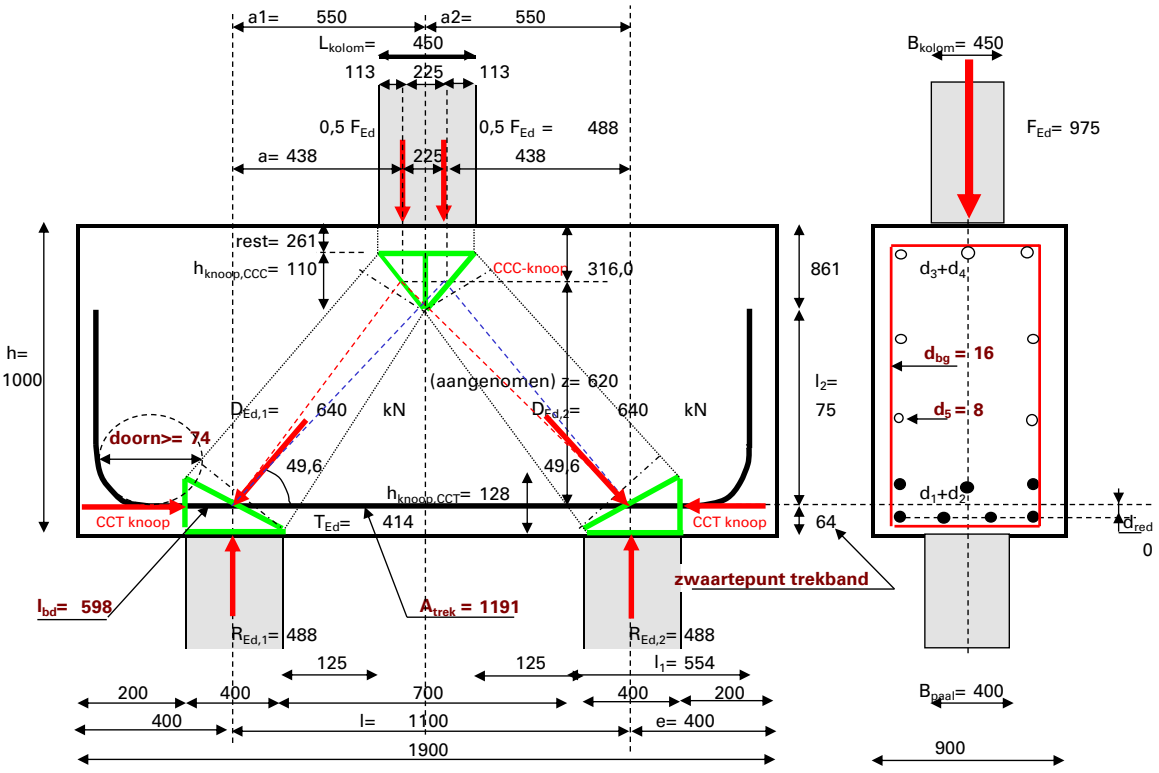


de positie van de trekband voldoet



minimale verankering

schematische weergave tweepaals poer met staafwerkmodellen



samenvatting resultaten

hoeveelheden:	1,71 m^3 beton	113,2 kg staal	wapeningshoeveelheid = 66,2	kg/m^3

trekband

grootte van de benodigde trekbandwapening	$A_{trek} = T_{Ed} / f_{yd}$	= 1191	mm^2
inwendige hefboomsarm	z	= 620	mm
hart trekband tot onderkant poer	$c_{trekzijde} + d_{bg} + 0,5 * d_{gem} + d_{red}$	= 64	mm

scheurwijdte

scheurwijdtecontrole zonder berekening	maximum staafdiameter	= 8,7	mm
scheurwijdtecontrole zonder berekening	maximum hart op hart afstand	= 102	mm
toelaatbare scheurwijdte	w * k_x	= 0,34	mm

	optredende scheurwijdte met berekening	$w_k=s_{r,max}(\varepsilon_{sm}-\varepsilon_{cm})$				=	#N/B	mm
betondekking								
	nominale betondekking	c_{nom}	op de buitenste wapening			=	35	mm
verankeringslengte en buigdiameter								
8.4	rekenwaarde verankeringslengte trekwap.	$l_{bd}=\alpha1\ \alpha2\ \alpha3\ \alpha4\ \alpha5\ l_{b,rqd}>=l_{b,min}$				=	598	mm
8.1	minimale buigdiameter (doorndiameter)	$\Phi_{m,min}=F_{bt}[(1/a_b)+1/(2\Phi)]/f_{cd}$				=	74	mm
minimum flankwapening en -beugels, toevallige inklemming en uitwaaieren trekband								
6.5.3	flankwapening ivm staafwerkmodel trekstaaf per zijde		358	mm^2/m'	beugelwapening		305	mm^2/m'
5.3.1(3)	flankwapening ivm gedrongen liggers per zijde		900	mm^2/m'	beugelwapening		900	mm^2/m'
	paal 1 uitwaaieren trekband bgls verankeringsgebied l=		560	mm	benodigde beugels		0	mm^2/m'
	paal 2 uitwaaieren trekband bgls verankeringsgebied l=		560	mm	benodigde beugels		0	mm^2/m'
9.2.1.2(1)	min. bovenwap. t.g.v toevallig inklemmingsmom = 0,15 * A_{trek}=		0,15	1191		=	179	mm^2

berekening poer volgens de theorie van staafwerkmodellen art. 6.5

krachtsverdeling **er wordt gerekend met twee puntlasten**

	h.o.h. afstand palen (ondersteuningen)			l=	550	+	550		=	1100	mm
	oplegreactie	$R_{Ed,1}$= a2 / l * F_{Ed}		550	/	1100	975		=	488	kN
	oplegreactie	$R_{Ed,2}$= a1 / l * F_{Ed}		550	/	1100	975		=	488	kN

berekening hoeken

hoek $\alpha1$	werklijn paal 1 naar F_{links}		boogtan (	620,0	/	437,5	)	=	54,8	graden
hoek $\alpha2$	werklijn paal 1 naar F_{rechts}		boogtan (	620,0	/	662,5	)	=	43,1	graden
hoek $\alpha3$	hellingshoek drukstaaf paal 1		boogtan (	487,5	/	414,4	)	=	49,6	graden
hoek $\beta1$	werklijn paal 2 naar F_{links}		boogtan (	620,0	/	662,5	)	=	43,1	graden
hoek $\beta2$	werklijn paal 2 naar F_{rechts}		boogtan (	620,0	/	437,5	)	=	54,8	graden
hoek $\beta3$	hellingshoek drukstaaf paal 2		boogtan (	487,5	/	414,4	)	=	49,6	graden
hoek a	krachtenveelhoek F_{links}		90	-	43,1			=	46,9	graden
hoek b	idem	180	-	46,9	-	35,2		=	97,9	graden
hoek c	idem		90	-	54,8			=	35,2	graden
hoek d	krachtenveelhoek F_{rechts}		90	-	54,8			=	35,2	graden
hoek e	idem	180	-	35,2	-	46,9		=	97,9	graden
hoek f	idem		90	-	43,1			=	46,9	graden

staafkrachten

staafkrachten tgv linker halve puntlast									
D1=0,5F_{Ed} sin c/sin b	=	487,5	sin	35,2	/ sin	97,9	=	284	kN
H1=D1 cos $\beta1$	=	283,8	cos	43,1			=	207	kN
staafkrachten tgv rechter halve puntlast									
D2=0,5F_{Ed} sin f/sin e	=	487,5	sin	46,9	/ sin	97,9	=	359	kN
H2=D2 cos $\beta2$	=	359,3	cos	54,8			=	207	kN
totale trekkracht in onderregel	T_{Ed}= H1+H2 =			207,2	+	207,2	=	414	kN
drukdiagonaal paal 1	$D_{Ed,1}$=	√	(487,5 ^{2}	+	414,4 ^{2}	)	=	640	kN
drukdiagonaal paal 2	$D_{Ed,2}$=	√	(487,5 ^{2}	+	414,4 ^{2}	)	=	640	kN

hoek contactvlakken en horizontaal 90-$\alpha3$	links	90,0	-	49,6	=	40,4	graden
hoek contactvlakken en horizontaal 90-$\beta3$	rechts	90,0	-	49,6	=	40,4	graden

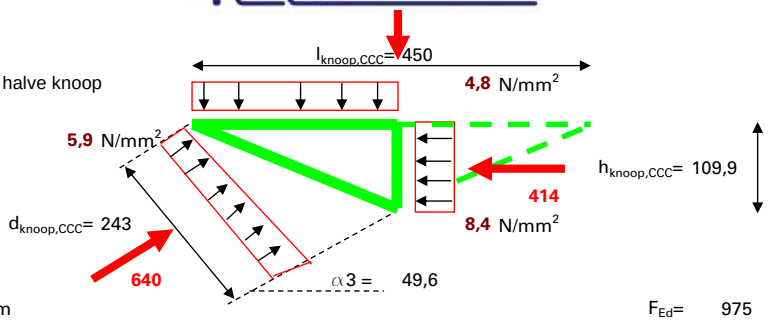
controles

materiaalfactor beton	γ_c				=	1,50	-
materiaalfactor wapeningstaal	γ_s				=	1,15	-
karakteristieke cilinderdruksterkte	f_{ck}				=	12	N/mm^2
3.15 rekenwaarde betondruksterkte	$f_{cd}=f_{ck}/\gamma_c$ =	12	/	1,50	=	8,0	N/mm^2
6.57 sterktereductiefactor	v ' = (1-f_{ck} / 250) =	(1 -	12	/ 250)	=	0,95	-

controle knoop onder de kolom type CCC

6.60	drukspanning $\sigma_{Rd,max,1}=\alpha\ k_1\ v'\ f_{cd}$ =	1,10	1,00	0,95	8,0	=	**8,4**	N/mm^2
			975					

schematische weergave halve knoop



horizontale vlak

normaalkracht uit kolom						F_{Ed}=	975	kN
oppervlak kolom			1,000	450	450	10^{-2} =	2025	cm^2
drukspanning direct onder kolom		975	10^3 /	2025	10^2	=	4,8	N/mm^2
toetsing drukspanning onder kolom			4,8	/	8,4	=	0,57	-

vertikale vlak

normaalkracht = trekkracht in trekband						T_{Ed}=	414	kN
breedte van CCC-knoop onder kolom		$b_{knoop,CCC}$	equivalente afmeting			=	450	mm
minimaal benodigde hoogte CCC-knoop		414	10^3 /	450	8,4	=	109,9	mm

schuine vlak met diagonaal naar paal 1

schuine lengte knoop CCC	√ (	225 ²	+	109,9 ²	)	=	250,4	mm
hoek knoop CCC met horizontaal		boogtan (	109,9	/	225,0	) =	26,0	graden
hoek contactvlak en loodrechte van drukdiagonaal bij CCC			26,0	-	40,4	=	-14,3	graden
werkelijke lengte drukvlak bij CCC		250,4	cos	-14,3		=	242,6	mm
normaalkracht in drukdiagonaal						$D_{Ed,1}$=	639,8	kN
drukspanning in diagonaal bij CCC	639,8	10^3 / (	242,6	*	450	) =	5,9	N/mm^2
toetsing drukdiagonaal bij CCC			5,9	/	8,4	=	0,70	-

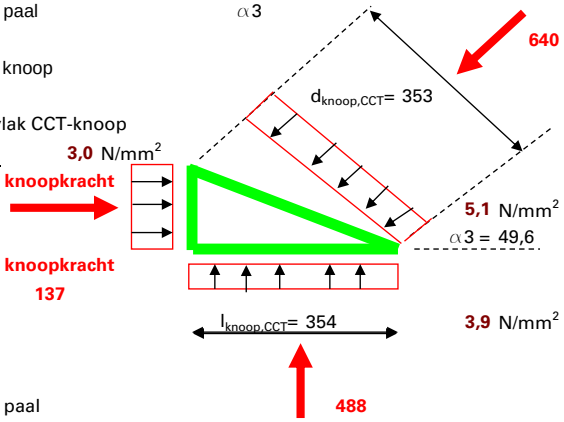
controle knoop bij paal 1, type CCT

6.61 drukspanning $\sigma_{Rd,max,2}$ = α k_2 v' f_{cd} =			1,10	0,85	0,95	8,0	=	7,1	N/mm^2
helling drukdiagonaal bij deze paal			α3				=	49,6	graden

schematische weergave knoop

spanning op vertikaal vlak CCT-knoop

137,2 10^3 = 3,0 N/mm^2
354 128 knoopkracht



trekstaaf 414 | reductie 277 | knoopkracht 137

horizontale vlak

normaalkracht= reactie paal						$R_{Ed,1}$=	487,5	kN
breedte van CCT-knoop boven paal		$b_{knoop,CCT}$	equivalente afmeting			=	354	mm
oppervlak paal			0,785	400	400	10^{-2} =	1257	cm^2
drukspanning direct boven de paal		487,5	10^3 /	1257	10^2	=	3,9	N/mm^2
toetsing drukspanning boven paal			3,9	/	7,1	=	0,54	-

vertikale vlak

gereduceerde kracht tegen de knoop= T_{Ed} * (l_{bd}-L_{paal})/l_{bd} =			414	198	/ 598	T_{Ed}=	137,2	kN
beschikbare knoophoogte		$h_{knoop,CCT}$=	2	64		=	128	mm
minimaal benodigde hoogte CCT-knoop		137,2	10^3 /	354	7,1	=	54,4	mm

schuine vlak

schuine lengte knoop CCT	√ (	354 ²	+	128,0 ²	)	=	376,9	mm
hoek knoop CCT met horizontaal		boogtan (	128,0	/	354,5	) =	19,9	graden
hoek contactvlak en loodrechte van drukdiagonaal			19,9	-	40,4	=	-20,5	graden
werkelijke lengte drukvlak		376,9	cos	-20,5		=	353,0	mm
normaalkracht= drukdiagonaal						$D_{Ed,1}$=	639,8	kN
drukspanning in diagonaal	639,8	10^3 / (	353,0	*	354	) =	5,1	N/mm^2
toetsing drukdiagonaal			5,1	/	7,1	=	0,72	-

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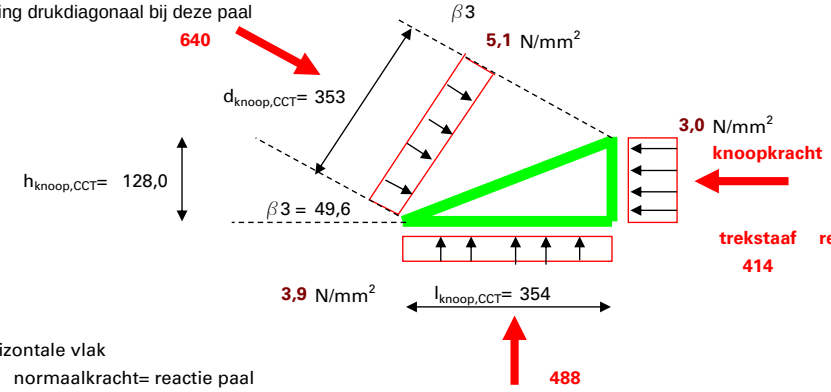
controle knoop bij paal 2, type CCT

6.61	drukspanning $\sigma_{Rd,max,2} = \alpha\ k_2\ v'\ f_{cd}$ =	1,10	0,85	0,95	8,0	=	7,1	N/mm²
	helling drukdiagonaal bij deze paal	$\beta 3$				=	49,6	graden



horizontale vlak

	normaalkracht= reactie paal					$R_{Ed,2}$=	487,5	kN
	breedte van CCT-knoop boven paal	$b_{knoop,CCT}$	equivalente afmeting			=	354	mm
	oppervlak paal		0,785	400	400	10^{-2} =	1257	cm²
	drukspanning direct boven de paal	487,5	10^3 /	1257	10^2	=	3,9	N/mm²
	toetsing drukspanning boven paal		3,9	/	7,1	=	0,54	-

vertikale vlak

	normaalkracht = trekkracht in trekband					T_{Ed}=	414,4	kN
	breedte	$b_{knoop,CCT}$				=	354	mm
	beschikbare hoogte CCT-knoop	zie paal 1				=	128,0	mm

schuine vlak

	schuine lengte knoop CCT	√ (354 ²	+	128,0 ²	)	=	376,9	mm
	hoek knoop CCT met horizontaal	boogtan (	128,0	/	354,5)	=	19,9	graden
	hoek contactvlak en loodrechte van drukdiagonaal		19,9	-	40,4	=	-20,5	graden
	werkelijke lengte drukvlak	376,9	cos	-20,5		=	353,0	mm
	normaalkracht= drukdiagonaal					$D_{Ed,2}$=	639,8	kN
	drukspanning in diagonaal	639,8	10^3 / (	353,0	* 354)	=	5,1	N/mm²
	toetsing drukdiagonaal		5,1	/	7,1	=	0,72	-

controle trekstaaf tussen paal 1-2

	trekkracht in trekband					T_{Ed}=	414,4	kN
	benodigde trekwapening	$A_{s1,2}$=	414	10^3 /	348	=	1191	mm²
	toetsing gekozen trekband		1191	/	1206	=	0,99	-

controle inwendige hefboomsarm z en totale poerhoogte

	geschatte hoogte van de inwendige hefboomsarm z					=	620	mm
	maximaal toelaatbare hoogte z	1000 -	64,0	-	109,9 / 2	=	881	mm
	toetsing geschatte hoogte z		620	/	881	=	0,70	-
	minimaal benodigde poerhoogte h	64,0 +	620	+	55,0	=	739	mm
	toetsing totale hoogte h		739	/	1000	=	0,74	-

controle ligging trekband

	toetsing positie trekband		54,4	/	128	=	0,42	-

controle verankeringslengte

$l_{bd}=\alpha 1\ \alpha 2\ \alpha 3\ \alpha 4\ \alpha 5\ l_{b,rqd}$=	1,00	0,72	1,00	1,00	1,00	832	=	598	mm
8.4	rekenwaarde verankeringslengte trekwapenin	$l_{bd}=\alpha 1\ \alpha 2\ \alpha 3\ \alpha 4\ \alpha 5\ l_{b,rqd} >= l_{b,min}$					=	598	mm
	staalspanning bij begin van verankering	$\sigma_{sd} = f_{yd} * A_{s,trek} / A_{aanw,trek}$					=	343	N/mm²
	staalspanning bij begin van de bocht	$\sigma_{sd1} = (l_{bd} - l_{hor}) / l_{bd} * \sigma_{sd}$					=	67	N/mm²
6.5.4(7)	beschikbare ruimte horizontale verankering	$l_1 = e + 0,5\ L_{paal} - c - d_{5,flank} - 0,5\ d_{max}$					=	554	mm
	doorndiameter omgebogen staven	D_{doorn} = factor * $d_{max1,2}$					=	128	mm
	beschikbare lengte tot de bocht	$l_{hor} = l_1 - 0,5\ D_{doorn} - 0,5\Phi$					=	482	mm
	lengte van de verankering in de bocht	$l_{bocht} = 0,25\ \pi\ (D_{doorn} + \Phi)$					=	113	mm
	restant verankeringslengte in vertikale deel	$l_{vert} = l_{bd} - l_{hor} - l_{bocht}$					=	3	mm
	benodigde ruimte vertikale verankering	$l_2 = 0,5\ D_{doorn} + l_{vert} + 0,5\ \Phi$					=	75	mm
8.1	minimale buigdiameter	$\Phi_{m,min} = F_{bt} [(1/a_b) + 1 / (2\Phi)] / f_{cd}$					=	74	mm

controle scheurwijdte

optredende staalspanning	$\sigma_s=F_{qp}$ / F_{Ed} * $A_{s,trek}$ / $A_{aanw,trek}$ * f_{yd}		=	258	N/mm²
toelaatbare scheurwijdte	w	maatgevende waarde	=	0,30	mm
toelaatbare staafdiameter	d_{max}	met de invloed van k_x	=	8,7	mm
toelaatbare hart op hart-afstand	s	met de invloed van k_x	=	102,1	mm
maximale staafdiameter	d_{max}		=	16	mm
werkelijke hart op hart afstand	s= (b - 2c_{zij} - 2d_{bg}-d_{trek}) / (n-n_s-1)		s = 2 a_b=	158	mm

betondekking

berekening minimum betondekking op trekwapening

Blokpoer(200)

tab4.3N	correctie van de constructieklasse: uitgangspunt:constructieklasse bij 50 jaar			S	4	-
a	correctie tgv ontwerplevensduur				0	-
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse A of B)				0	-
c	correctie tgv geometrie				0	-
i	correctie tgv kwaliteitsbeheersing				0	+
	totale waarde constructieklasse			S	4	
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse A)				0	
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse B)				0	
	berekening van de nominale dekking voor hoofdwapening en beugels (in mm)				hoofdwapening	beugels
tabel 4.2	minimum dekking t.g.v. **aanhechting**	$c_{min,b}$ >d_n	$c_{grindkorrel}$= 0	$c_{min,b}$+$c_{grindkorrel}$=	16	16
tab 4.4N	minimum dekking tgv milieuklasse A	$c_{min,dur}$		=	30	30
	minimum dekking tgv milieuklasse B	$c_{min,dur}$		=	30	30
	resulterende minimum dekking	$c_{min,dur}$	(duurzaamheid)	=	30	30
e	correctie tgv nabewerking	c_{extra}		=	0	0
	gecorrigeerde min. dekking **duurzaamheid**	$c_{min,dur}$	inclusief c_{extra}	=	30	30
4.2	**minimum dekking**	c_{min} = max($c_{min,b}$; $c_{min,dur}$; 10mm)		=	30	30
	toeslagen uitvoeringstoleranties	Δc_{dev}		=	5	5
g	storten op werkvloer / maaiveld / kist	Δc_{dev}		=	0	0
d	t.g.v. oncontroleerbaarheid	Δc_{dev}	**geen eis in eurocode!**	=	0	0
4.1	**nominale betondekking** op staaf	c_{nom}=c_{min} + $\Sigma\Delta c_{dev}$		=	35	35
k	t.g.v. toegepaste hoofdwapening >25mm	c_{nom}=1,5d_n		=	0	0
	equivalente staafdiameter	d_n=max($d1_{eq}$;$d2_{eq}$)=	16,0	d_{bg}= 16		
	dekking op de buitenste wapening	Hoofdwapening: c_{nom}- d_{bg}	Beugels: c_{nom}	=	19	35
	nominale betondekking buitenste wapening	c_{nom}	(minimum waarde op tekening)	=	35	

wapeninggegevens

totaal aantal staven in trekzone	Σn_{trek}=n1+n2	=	6,0	st
totaal aantal staven in drukzone	Σn_{druk}=n3+n4	=	4,0	st
gewogen gemiddelde diameter trekwapening	$d_{gem,trek}$=(n1*d_1*D_1+n2*d_2*D_2) / (n1*D_1+n2*D_2)	=	16,0	mm
gewogen gemiddelde diameter drukwapening	$d_{gem,druk}$=(n3*d_3*D_3+n4*d_4*D_4) / (n3 *D_3+ n4* D_4)	=	11,2	mm
doorsnede per staaf 1, trekwapening	D_1=0,25πd_1^2	=	201,1	mm²
doorsnede per staaf 2, trekwapening	D_2=0,25πd_2^2	=	0,0	mm²
doorsnede per staaf 3, drukwapening	D_3=0,25πd_3^2	=	78,5	mm²
doorsnede per staaf 4, drukwapening	D_4=0,25πd_4^2	=	113,1	mm²
doorsnede per staaf 5, flankwapening	D_5=0,25πd_5^2	=	50,3	mm²
doorsnede per beugel enkelsnedig	D_{bg}=0,25πd_{bg}2	A_{sw}=	201,1	mm²
aantal snedige beugel bij dwarskracht	n_{sn}	n_{sn}=	2	snedig
horizontale maat in breedte van de balk	$s_{t,bg}$ = b1 / (n_{sn}-1)	=	824	mm
aanwezige beugelwapening (n-snedig)	A_{bgls} = n_{sn} * D_{bg} * 1000 / $s_{aanwezig}$	=	2011	mm²/m'
horizontale beugelmaat (hartmaat)	b1=b-2$c_{zijkant}$-d_{bg}	=	824	mm
vertikale beugelmaat (hartmaat)	h1=h-$c_{trekzijde}$-$c_{drukzijde}$-d_{bg}	=	904	mm
aanwezige trekwapening	$A_{aanw,trek}$	=	1206	mm²
aanwezige drukwapening	$A_{aanw,druk}$	=	383	mm²
aanwezige drukwapening	ρ_{druk}= 100 * $A_{aanw,druk}$ / bh (art. 9.2.1.1(3))	=	0,04	%
aanwezige flankwapening	$A_{aanw,flank}$ per zijde	=	101	mm²
zwaartepunt staven vanaf de beugel	z= (n1 D_1 $^1/_2$ d1+n2 D_2 $^1/_2$ d2) / (n1D_1+n2D_2)	=	8,0	mm
equivalente diameter wapening	$d_{equi,trek}$= 2 * z (t.b.v. berekening van d)	=	16,0	mm

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scheurwijdte

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controle scheurwijdte zonder directe berekening art.7,3,3

	optredende staalspanning	$\sigma_{s,qp}=F_{fr}$ / F_{Ed} * $A_{s1,totaal}$ / $A_{aanw,trek}$ * f_{yd} * z_{UGT} / z_{BGT}	=	258	N/mm²
	diameter staven d1	d1	=	16,0	mm
	aantal staven	n_1	=	6	st
	diameter staven d2	d2	=	0,0	mm
	aantal staven	n_2	=	0	st
7.12	equivalente staafdiameter	$d_{eq}=(n_1*d1^2+n_2*d2^2)/(n_1*d1+n_2*d2)$	=	16,0	mm
	werkelijke hart op hart afstand	$s=(b-2c_{zij}-2d_{bg}-d_{trek})/(n-n_s-1)$	=	158	mm
	gemiddelde h.o.h.- afstand staven	$s_{gem}=b/(\sum n_{trek}-n_s)$	=	150	mm
	toelaatbare scheurwijdte	w milieuklasse A	=	0,30	mm
	toelaatbare scheurwijdte	w milieuklasse B	=	0,30	mm
	toelaatbare scheurwijdte	w maatgevende waarde	=	0,30	mm
tabel 7.2N	toelaatbare staafdiameter zonder k_x en "factor	d_{max}	=	14,3	mm
tabel 7.3N	toelaatbare h.o.h.-afstand zonder k_x	s afstand vermenigvuldigd me 0,5	=	89,4	mm
	toegepaste dekking beschouwde staaf	$c_{applied}=c_{trekzijde}$ (buitenste wapening)	=	40	mm
	minimale betondekking	$c_{nom}=c_{min}+\sum\Delta c_{dev}$ (incl. correcties)	=	35	mm
	vergrotingsfactor NB 7.3.1 (5)	$k_x=c_{applied}/c_{nom}$ <=2,0	=	1,14	-
	toelaatbare staafdiameter	d_{max} met de invloed van factor en k_x	=	8,7	mm
	toelaatbare hart op hart-afstand	s met de invloed van k_x	=	102	mm
(7.6N)	correctiefactor buiging (diameter)	factor = $f_{ct,eff}$ * k_c h_{cr} / { 2,9 *2 * (h-d) }	=	2,12	-
(7.7N)	correctiefactor trek (diameter)	factor = $f_{ct,eff}$ * h_{cr} / { 2,9 *8 * (h-d) }	=	0,53	-
	gemiddelde axiale treksterkte	$f_{ct,eff}$ = f_{ctm} tabel 3.1	=	1,57	N/mm²
	coëfficient afhankelijk van spanningsverdelin	k_c = buiging =0,4, trek=1,0	=	1,00	-
	hoogte trekzone direct voor scheuren	h_{cr} = 0,5 h bij rechthoekige doorsnec	=	500	mm
	afstand hart wapening tot buitenkant beton	(h-d)	=	64	mm
	maatgevende "factor" (7.6N) of (7.7N)	alleen voor toelaatbare diameter	=	0,53	-

controle scheurwijdte met berekening art. 7,3,4

7.8	berekende scheurwijdte	$w_k=s_{r,max}(\varepsilon_{sm}-\varepsilon_{cm})$	=	#N/B	mm
		$s_{r,max}$	=	450,1	mm
7.9		$(\varepsilon_{sm}-\varepsilon_{cm})=\{\sigma_s-k_t*f_{ct,eff}/\rho_{p,eff}*(1+\alpha_e*\rho_{p,eff})\}/E_s$ =		#N/B	-
	minimale waarde	$(\varepsilon_{sm}-\varepsilon_{cm})>=0,6\,\sigma_s/E_s$	=	0,000773	-
	maatgevende waarde	$(\varepsilon_{sm}-\varepsilon_{cm})$	=	#N/B	-
		$\sigma_{s,qp}=F_{fr}$ / F_{Ed} * $A_{s1,totaal}$ / $A_{aanw,trek}$ * f_{yd} * z_{UGT} / z_{BGT}	=	258	N/mm²
	gemiddelde waarde treksterkte op tijd t	$f_{ctm(t)}$ **tijd t nog eens programmeren**	=	1,57	N/mm²
	gemiddelde waarde treksterkte	$f_{ct,eff}$ op tijdstip van eerste scheuren	=	1,57	N/mm²
7.10		$\rho_{p,eff}=(A_s+\xi_1^2 A'_p)/A_{c,ef}$	=	0,021	-
	doorsnede trekwapening	$A_s=A_{aanw,trek}$	=	1206	mm²
7.3.2(3)	doorsnede voorspanelementen	A'_p	=	0	mm²
		$A_{c,eff}$ minimum waarde onderstaande formules		57600	mm²
		$A_{c,eff}=b*2,5\,(h-d)$	=	144000	mm²
		$A_{c,eff}=b*(h-x)/3$	=	#N/B	mm²
	van toepassing bij zuivere trek!	$A_{c,eff}=b*h/2$ met h=2*(h-d)= 128	=	57600	mm²
7,5		ξ_1	=	0	-
	factor	k_t	=	0,4	-
		E_s	=	200000	N/mm²
7.11	+C2:2011-NB2016	$s_{r,max}=k_3\,c+k_1\,k_2\,k_4\,d_{eq}/\rho_{p,eff}$< max {(50-0,8$f_{ck}$)$\Phi$ en 15Φ}	=	450,1	mm
		maximum van (50-0,8f_{ck})Φ en 15Φ	=	646,4	mm
	maximale hoh om 7.11 toe te mogen passen	h.o.h. s_{gem} <= 5(c+φ/2) met $\varphi=d_{eq}$	<=	320	mm
	dekking op de beschouwde staaf	c	=	56,0	mm
7.12		$d_{eq}=(n_{b1}*d1_{eq}^2+n_{b2}*d2_{eq}^2)/(n_{b1}*d1_{eq}+n_{b2}*d2_{eq})$ =		16,0	mm
		k1=	=	0,8	-
		k2=	=	1,0	-
7.13	tussenliggende waarden	k2= (e1 + e2) / 2e1	=	n.t.b.	-
		k3=	=	3,40	-
		k4=	=	0,425	-
7.14	bovengrens als s_{gem}> 5 (c+φ/2)	$s_{r,max}$= 1,3 (h-x)	=	1300	mm
	hoogte betondrukzone	x=	=	0	mm
7.15	bovengrens	$s_{r,max}$= 1 / (cos O / $s_{r,max,y}$ + sin O / $s_{r,max,z}$) =		n.t.b.	mm

	bij wapening onder een hoek O					
	berekening van de betondrukzone x en kruipfactor φ in de bruikbaarheidsgrenstoestand					
	oppervlakte van de betondoorsnede	A_c= b * h		=	900000	mm^2
	omtrek dat bloot staat aan uitdroging	u=	4 zijden 2b+2h	=	3800	mm
	fictieve dikte	h_0=	2 A_c / u en < 1500mm	=	473,7	mm
3.1.4	kruipfactor a.d.h.v. grafiek 3.1 (2)	φ	bepaald volgens art. 3.1.4	=	#N/B	-
7.20	gereduceerde elasticiteitsmodulus	$E_{c,eff}$ = E_{cm} / (1 + φ)		=	#N/B	N/mm^2
	effectieve verhouding elasticiteitsmodulus	α_e=	E_s / $E_{c,eff}$	=	#N/B	-
	hoogte betondrukzone x in BGT	x= [- $\alpha_e \rho$ + $\sqrt{}$ { ($\alpha_e \rho$)^2 + 2 $\alpha_e \rho$ }] d		=	#N/B	mm
7.3.2(2)	minimum wapening vereist	$A_{s,min}$=k_c k $f_{ct,eff}$ A_{ct} / σ_s	7.1	=	2034	mm^2
	coëfficient	k=factor voor lijven en flenzen		=	1,0	-
	oppervlakte beton binnen trekzone	A_{ct}= 0,5 bh (vlak voor het scheuren)		=	450000	mm^2
	maximaal toelaatbare spanning in staal	σ_s = f_{yd}	tbv berekening minimum wapening	=	348	N/mm^2

verankerings- en overlappingslengte

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verankeringslengte trekwapening art. 8.4

	karakteristieke cilinderdruksterkte	f_{ck}	=	12	N/mm^2
	karakteristieke kubusdruksterkte	f_{ck}	=	15	N/mm^2
3.4	gemiddelde cilindertreksterkte	f_{ctm}=0,3$f_{ck}^{(2/3)}$	=	1,57	N/mm^2
	karakteristieke ondergrens treksterkte	$f_{ctk0,05}$=0,7f_{ctm}	=	1,10	N/mm^2
3.16	rekenwaarde treksterkte	f_{ctd}=$f_{ctk0,05}$/1,5	=	0,73	N/mm^2
	staaltrekspanning	f_{yk}	=	400	N/mm^2
	rekenwaarde staaltrekspanning	f_{yd}	=	348	N/mm^2
	gemiddelde diameter trekwapening	d_{gem}	=	16,0	mm
	verhouding benodigde/aanwezige wapening	$A_{s1,totaal}$ / $A_{aanw,trek}$	=	0,99	-
	staalspanning in trekwapening	σ_{sd}= $A_{s1,totaal}$ / $A_{aanw,trek}$ * f_{yd}	=	343	N/mm^2
	aantal staven in bundel (max 2)	n	=	1	st
8.3	basisverankeringslengte trekwapening	$l_{b,rqd}$= 0,25 * $d_{gem,trek}$ * $\sqrt{}$n * σ_{sd} / f_{bd}	=	832	mm
		$l_{b,rqd}$	=	52	*d_{gem}
8.2		f_{bd}=2,25 η_1 η_2 f_{ctd}	=	1,65	N/mm^2
		η1 bovenstaaf=0,7, algemeen=1,0	=	1,00	-
		η2 als d_{gem}<= 32;1 ; (132-d_{gem}) / 100	=	1,00	-
8.4	rekenwaarde verankeringslengte trekwapenin	l_{bd}=α1 α2 α3 α4 α5 $l_{b,rqd}$>=$l_{b,min}$	=	598	mm

l_{bd}=α1 α2 α3 α4 α5 $l_{b,rqd}$=	1,00	0,72	1,00	1,00	1,00	832

			=	598	mm
	vorm van de staven	α1 afhankelijk van staafeinde	=	1,00	-
	effect minimum dekking	α2=1-0,15*(c_d-x*$d_{gem,trek}$) / $d_{gem,trek}$ en <1,0	=	0,72	-
		x= factor afhankelijk staafeinde	=	1	-
	uiteindelijke waarde α2	0,7 < α2 < 1,0	=	0,72	-
	rekenwaarde dekking op rechte staaf	c_d= min (a/2 ; c_1 ; c)	=	46,0	mm
	rekenwaarde dekking op gebogen staaf	c_d= min (a/2 ; c_1)	=	46,0	mm
	maatgevende waarde	c_d (dekking op te verankeren staaf)	=	46,0	mm
	effect dwarswapening niet gelast aan hoofdw	α3=1-Kλ (opsluiting dwarswapening)	=	1,00	-
	maatgevende waarde	α3=1-Kλ (opsluiting dwarswapening) >0,7 en <1,0	:	1,00	-
		K (afhankelijk van positie losse dwarsstaaf)	=	0,00	-
		λ=(ΣA_{st}-$\Sigma A_{st,min}$) / A_s	=	-0,25	-
	oppervlak doorsnede dwarswapening over lengte l_{bd}		ΣA_{st}	0	mm^2
		$\Sigma A_{st,min}$ 0,25A_{st} bij balken	=	50	mm^2
		A_s doorsnede enkelvoudig verankerde staaf	=	201	mm^2
	effect aangelaste dwarsstaven	α4: (dwarsstaaf gelast aan hoofdwapening)	=	1,00	-
	effect dwarsdruk	α5=1-0,04p (dwarsdruk bij trekstaven)	=	1,00	-
		p= dwarsdruk in Mpa over lengte l_{bd}	=	0,00	N/mm^2
8.5	maximale waarde	α2 α3 α5 >=0,7	=	0,72	-
8.6		$l_{b,min}$:max(0,3 $l_{b,rqd}$; 10$d_{gem,trek}$, 100)	=	249,6	mm
	halve tussenmaat tussen staven	a / 2	=	71,2	mm

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buigdiameter (trekstaaf)

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	kwaliteit beton	betonklasse					=	C12/15	-
	diameter om te buigen staaf	diameter					Φ=	16,0	mm
	totale verankeringslengte	$l_{bd}=\alpha1\ \alpha2\ \alpha3\ \alpha4\ \alpha5\ l_{b,rqd}>=l_{b,min}$					=	598,1	mm
	verankering tot aan de bocht	maat vanaf begin verankering tot begin bocht					x=	482,0	mm
	hart op hart afstand van de te buigen staven	h.o.h. = 2 a_b					2 a_b=	158,4	mm
	betreft de te buigen staaf een randstaaf	dus zit de staaf bij een elementrand?					=	nee	-
	is er een dwarsstaaf aanwezig	met een diameter >= de staafdiameter					=	nee	-
	betondekking op te buigen staaf	c					=	56,0	mm
	grootte van de te verankeren kracht:	$F_{bt}=1/4\ \pi\Phi^2\ \sigma_{sd1}$ =	201	67	10^{-3}		=	13,4	kN
	gekozen buigdiameter	Φ_m	(minimum: Φ<=16: 4Φ anders 5Φ)				=	128,0	mm
	toetsingen								
	doorndiameter ivm bezwijken wapening		64	/	128		=	0,50	
	verankering na de bocht : $l_{bd\ na\ de\ bocht}$ / 5 D		3	/	80		=	0,04	
	randstaaf of tussenstaaf		tussenstaaf=1,0 en randstaaf = 2,0					1,0	
	dwarsstaaf aanwezig?		ja=1,0 en nee=2,0 (voldoet niet)				=	2,0	
	onderstaande unitycheck is niet van toepassing								
8.3(3)	doorndiameter ivm bezwijken beton	Φ_{min} /Φ_m =	74	/	128		=	n.v.t.	-
	karakteristieke cilinderdruksterkte	f_{ck}					=	12	N/mm^2
3.15	rekenwaarde betondruksterkte	$f_{cd}=f_{ck}/1,5$=	12	/	1,5		=	8,0	N/mm^2
	factor voor maximale buigdiameter	tabel 8.1					f=	4	-
	minimale buigstraal om niet te hoeven toetse	Φ_m=f Φ	4	*	16,0		=	64	mm
	resterende verankeringslengte	(l_{bd} - x) =	598,1	-	482,0		=	116,1	mm
	verankeringslengte in de bocht	$l_{bocht}=0,25\ \pi\ (D_{doorn}+\Phi)=0,25\pi$			144,0		=	113	mm
	verankeringslengte na de bocht	$l_{bd,na\ de\ bocht}$	116,1	-	113		=	3	mm
	maat a_b	tussenstaven: de helft van de hoh-afstand					a_b=	79,20	mm
	doorsnede staaf	A= 0,25 π Φ^2					=	201,1	mm^2
	optredende staalspanning	$\sigma_{s,bt}=F_{bt}$ / 0,25 π Φ^2					=	66,7	N/mm^2
	staafkracht bij het begin van de bocht	F_{bt}= F * (l_{bd} - x) / l_{bd}					=	13,4	kN
8.1	minimale buigdiameter	$\Phi_{m,min}=F_{bt}$ [(1/a_b) + 1 / (2Φ)] / f_{cd}					=	74	mm

minimum wapening (flankwapening, beugels en toevallige inklemming)

6.5.3	**paal 1**	F=	640	kN	a=	243	mm	H=	759	mm	h=	379	mm	α:	49,6	graden
6.59	T=0,25(1-0,7*	243	/	759	) *	640	=	124	kN	$A_{s,req}$=	941	mm^2/m'				
	flankwapening per zijde=0,5*$A_{s,req}$*sinα=	358	mm^2/m'		beugels = 0,5*$A_{s,req}$*cosα=	305	mm^2/m'									
6.5.3	**paal 2**	F=	640	kN	a=	243	mm	H=	759	mm	h=	379	mm	α:	49,6	graden
6.59	T=0,25(1-0,7*	243	/	759	) *	640	=	124	kN	$A_{s,req}$=	941	mm^2/m'				
	flankwapening per zijde=0,5*$A_{s,req}$*sinα=	358	mm^2/m'		beugels = 0,5*$A_{s,req}$*cosα=	305	mm^2/m'									
5.3.1(3)	minimum wapening i.v.m. gedrongen constructie = 0,001 b 1000 = 0,(								900	1000				=	900	mm^2/m'
9.2.1.2(1)	minimum bovenwapening t.g.v toevallig inklemmingsmoment = 0,15								0,15	1191				=	179	mm^2

uitwaaieren wapening naast de oplegging

	paal 1	doorsnede hoeveelheid wapening die NAAST de oplegging zit						$A_{s;naast;paal\ 1}$=	0	mm^2
	beugels in verankeringsgebied pa	1000	0	343	/	560	348	=	0	mm^2/m'
	paal 2	doorsnede hoeveelheid wapening die NAAST de oplegging zit						$A_{s;naast;paal\ 1}$=	0	mm^2
	beugels in verankeringsgebied pa	1000	0	343	/	560	348	=	0	mm^2/m'

opmerking:

Projectgegevens

Projectnaam	Opwaardering KIJ-BVW
Projectnr.	
Auteur	[redacted]
Omschrijving	Doorsnedetoets blokpoer (220)
Datum	3-5-2025
Ontwerpnorm	EN

Materialen

Beton

Naam	f_{ck} [MPa]	$f_{ctk,0.05}$ [MPa]	f_{ctm} [MPa]	E_{cm} [MPa]	ν [-]	φ_{perm}	φ_{pres}
C12/15	12,0	1,1	1,6	27085,2	0,20	2,5	2,5
	ε_{c2} = 20,0 1e-4, ε_{cu2} = 500,0 1e-4, Type diagram: Parabolisch φ_{perm}: 2,50 φ_{pres}: 2,50						

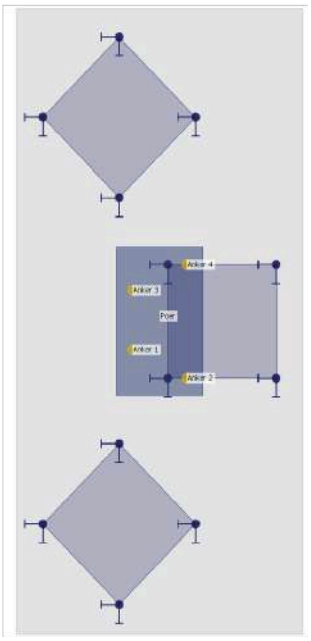
Wapening

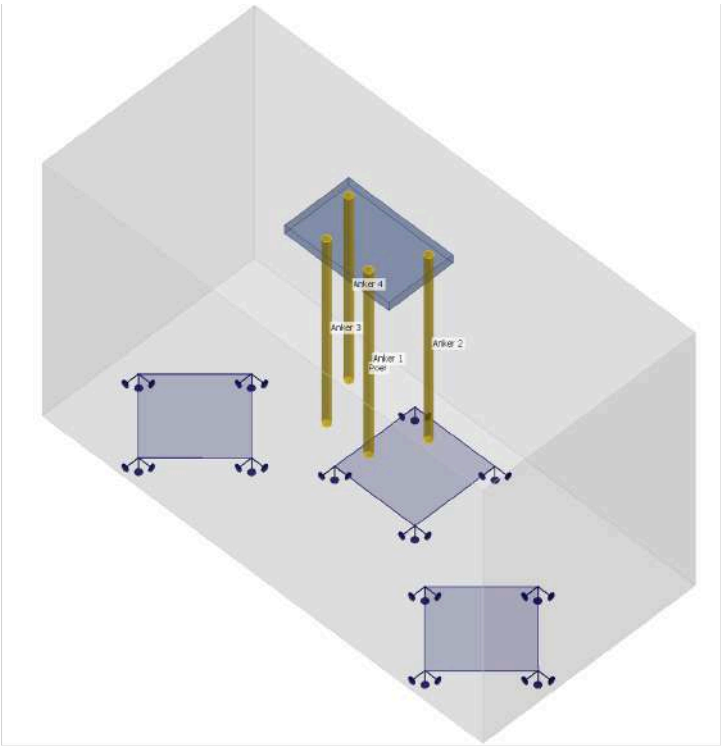
Naam	f_{yk} [MPa]	k [-]	E_s [MPa]	Eenheid massa [kg/m^3]	ε_{uk} [1e-4]	Oppervlak
B 400B	400,0	1,08	200000,0	7850	500,0	Geribd
	ε_{st} = 500,0 1e-4, ε_{sc} = 500,0 1e-4,					

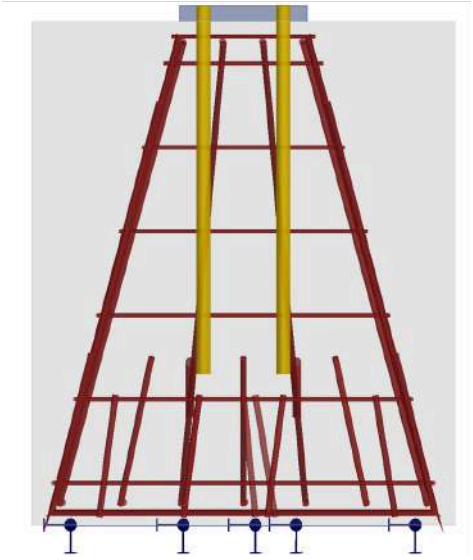
Staal

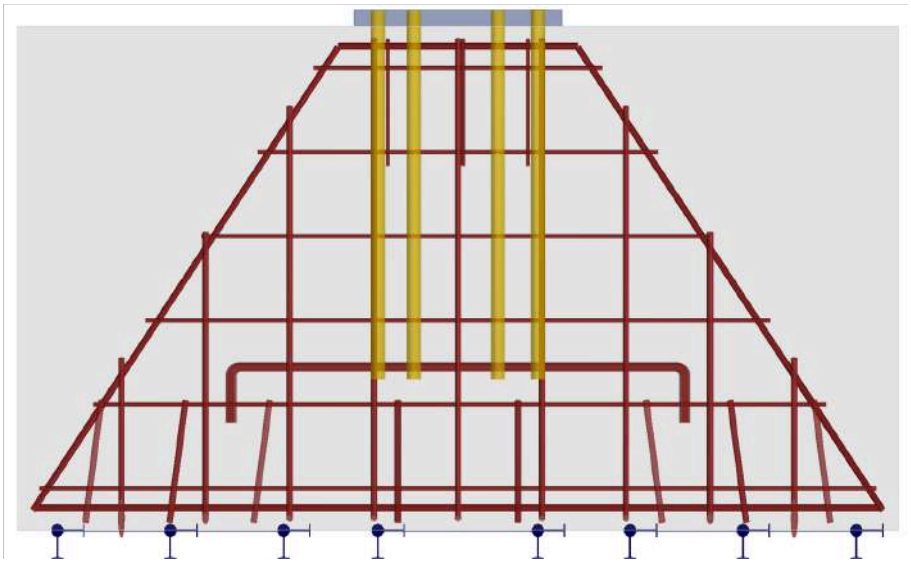
Naam	E [MPa]
S 235	210000,0

Blokpoer (220)









Geometrie

Overzicht tabel

Naam	Type	Eigenschappen	Positie
Poer	Betonpoer	Vorm: Algemeen; H: 1,20 m; Materiaal: C12/15	X: 0,00 m; Y: 0,00 m; Z: -1,17 m
Voetplaat	Voetplaat	W: 0,30 m; T: 0,04 m; D: 0,30 m; Materiaal: S 235; : Belasting; Overdracht van dwarskrachten: Ankers	M: Poer, Rand 0, Oppervlak 5; X: 0,27 m; Y: 0,74 m
Paal 1	Oppervlakteondersteuning	X: 94 MN/m2; Y: 94 MN/m2; Z: 937 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 5; Geometrisch type: Polylijn; X: -0,10 m; Y: 0,15 m; α: 0,0 °
Paal 2	Oppervlakteondersteuning	X: 94 MN/m2; Y: 94 MN/m2; Z: 937 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 5; Geometrisch type: Polylijn; X: 1,33 m; Y: 0,15 m; α: 0,0 °
Paal 3	Oppervlakteondersteuning	X: 94 MN/m2; Y: 94 MN/m2; Z: 937 MN/m2; Richting - Globaal	M: Poer, Oppervlak: 5; Geometrisch type: Polylijn; X: 0,90 m; Y: 0,10 m; α: 0,0 °
Anker 1	Verankering - Belasting	L1: 0,04 m; L2: 0,84 m; Φ: 36 mm; Materiaal: 4.6	M: Poer, Rand: 3, Oppervlak: 6; X: 0,43 m
Anker 2	Verankering - Belasting	L1: 0,04 m; L2: 0,84 m; Φ: 36 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,43 m
Anker 3	Verankering - Belasting	L1: 0,04 m; L2: 0,84 m; Φ: 36 mm; Materiaal: 4.6	M: Poer, Rand: 3, Oppervlak: 6; X: 0,43 m
Anker 4	Verankering - Belasting	L1: 0,04 m; L2: 0,84 m; Φ: 36 mm; Materiaal: 4.6	M: Poer, Rand: 1, Oppervlak: 6; X: 0,43 m

Lasten

Combinaties

Naam	Type	Inhoud
Trekkracht	ULS	0,99*+600kN
Drukkracht	ULS	-800kN

Resultaten

Opsomming

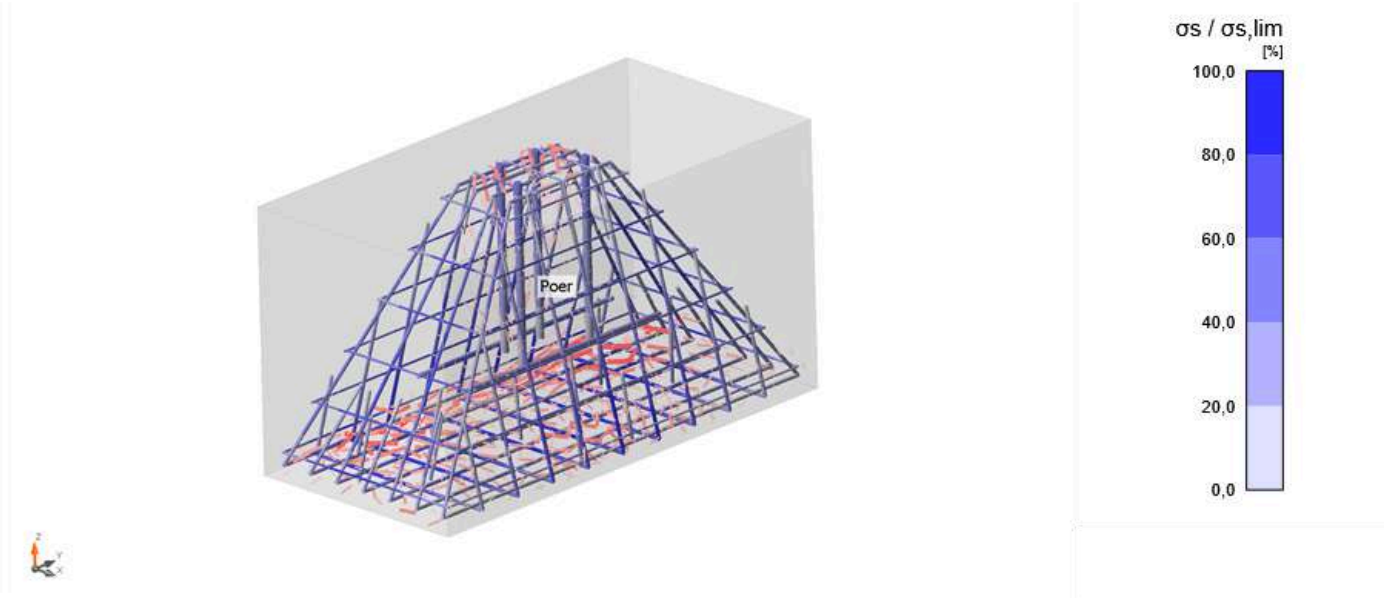
Overzicht tabel

Controle deel	Combinaties	Toename	Onderdeel	
UGT	Trekkracht	G100,0%	Sterkte van de wapening	✓

Controle deel	Onderdeel	Uitnutting	
Sterkte van het beton	Poer	σc/σc,lim: 99,6%	✓
Sterkte van de wapening		εs/εs,lim: 97,0%, σs/σs,lim: 99,7%	✓
Verankeringslengte		τb/fbd: 102,8%	✓

UGT - Opsomming

Verloop van de spanningen



Boven vloeispanning	Druk	Verklaringen
		Dikte in verhouding tot de kracht

Opsomming van de reactiekrachten en de toegepaste lasten: Trekkracht, Lastincrement: G100,0%

Type	F_x [kN]	F_y [kN]	F_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Opsommingen van de reacties	-118,4	0,0	-582,1	-2,4	33,1	0,0
Opsomming van de toegepaste lasten	118,4	0,0	582,1	1,4	3,6	0,0
Controleer evenwicht	0,0	0,0	0,0	-1,0	36,7	0,0

UGT - Sterkte

Gedetailleerde resultaten van de betonsterktes: Trekkracht, Lastincrement: G100,0%

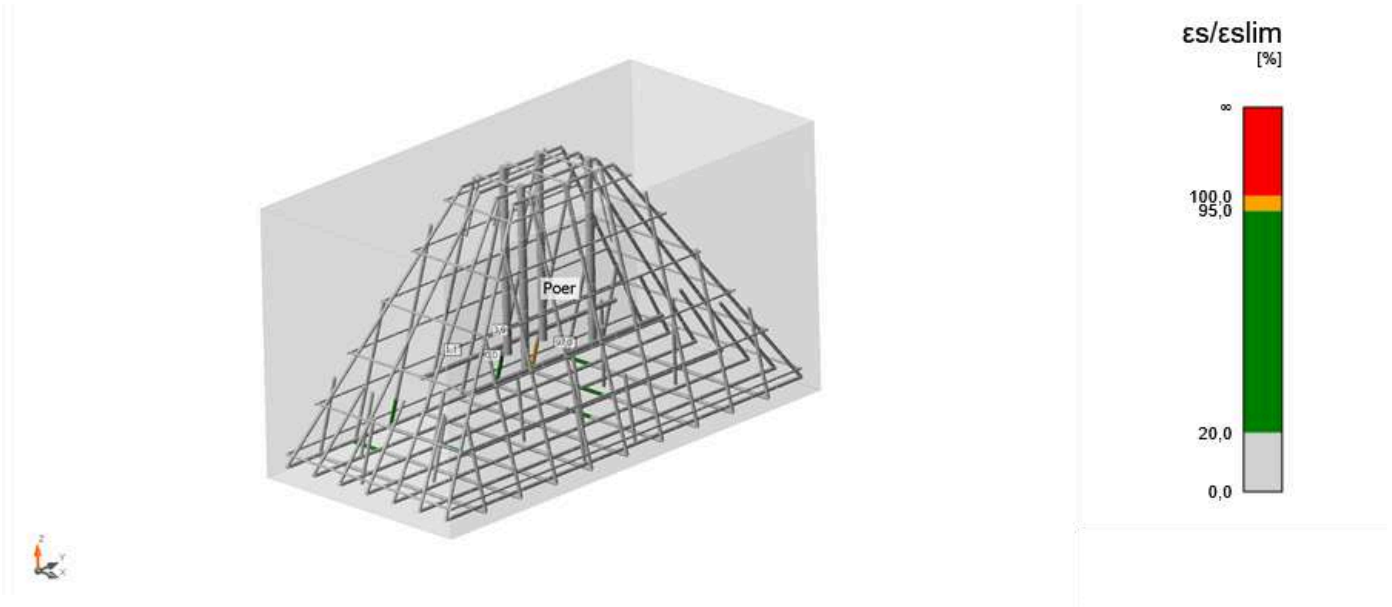
Staaf	X [m]	Y [m]	Z [m]	$\sigma_{c,eq}$ [MPa]	$\sigma_{c,3}/\sigma_{c,lim}$ [-]	ε_c [1e-4]	ε_{pl} [1e-4]	$\sigma_{c,eq}/\sigma_{c,lim}$ [%]	
Poer	-0,39	-0,61	-1,06	-8,0	100,0	-96,5	-86,6	99,6	Oké
Poer	-0,39	-0,61	-1,06	-8,0	100,0	-42,4	-56,5	99,6	Oké
Poer	-0,39	-0,61	-1,06	-8,0	154,7	-28,4	-16,2	99,5	Oké
Poer	-0,39	-0,61	-1,06	-3,7	100,0	-5,2	-0,7	46,5	Oké
Poer	-0,39	-0,61	-1,06	-3,0	100,0	-3,9	-0,1	37,9	Oké
Poer	-0,39	-0,61	-1,06	-0,5	100,0	-0,6	0,0	5,8	Oké

Gedetailleerde resultaten van de wapeningsterkte: Trekkracht, Lastincrement: G100,0%

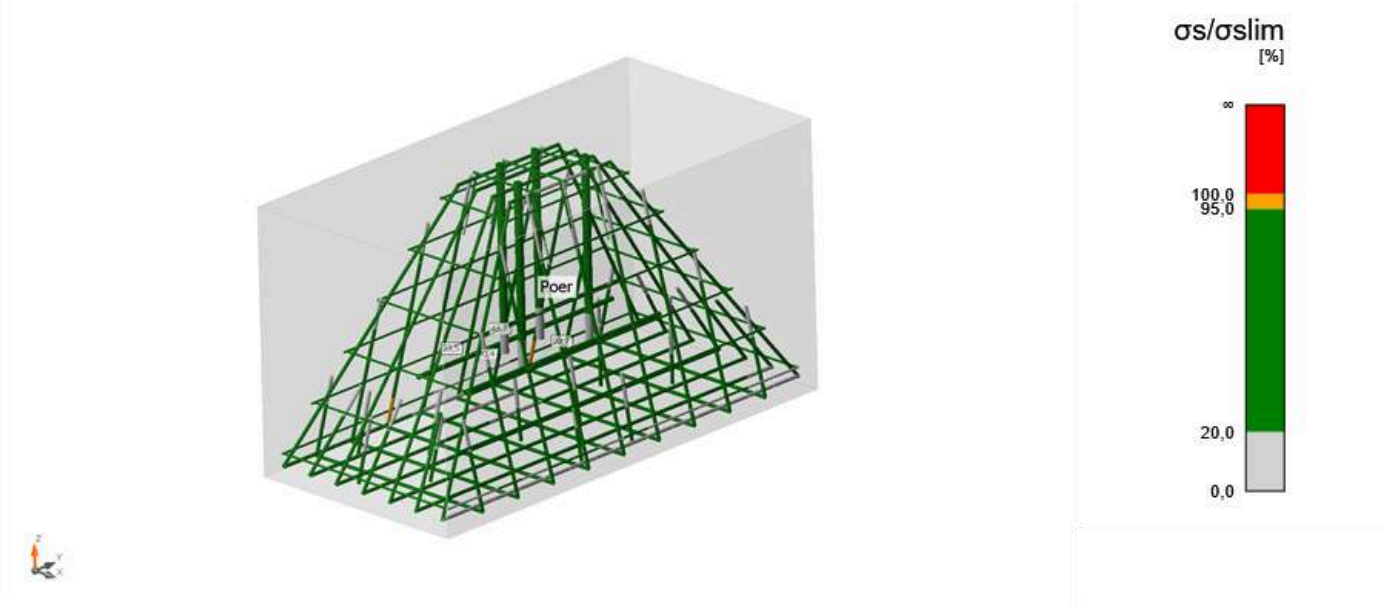
Staaf	X [m]	Y [m]	Z [m]	σ_s [MPa]	ε_s [1e-4]	$\sigma_s/\sigma_{s,lim}$ [%]	$\varepsilon_s/\varepsilon_{s,lim}$ [%]	
R16_hsp-onder_5	-0,48	0,42	-1,14	374,7	93,4	99,7	97,0	Oké
R16_hsp-onder_4	-0,48	-0,42	-1,14	372,0	85,4	99,0	88,7	Oké
R16_hsp-onder_7	-0,34	-0,63	-1,14	355,7	62,3	94,7	34,4	Oké
R16_hsp-onder_6	-0,34	0,63	-1,14	353,1	46,8	94,0	25,8	Oké
R16_hsp-onder_2	0,07	0,21	-1,14	351,3	35,1	93,5	20,1	Oké
R16_hsp-onder_8	-0,07	-0,84	-1,14	349,9	26,8	93,2	16,1	Oké
R16_hsp-onder_1	0,21	0,00	-1,14	349,9	26,9	93,1	15,6	Oké
R16_hsp-onder_9	-0,07	0,84	-1,14	349,9	26,5	93,1	15,9	Oké
R16_hsp-onder_3	0,07	-0,21	-1,14	349,7	26,2	93,1	15,1	Oké
R10-bgl-kort_1	-0,07	-1,04	-1,07	348,3	13,4	92,7	17,9	Oké
R10-bgl-lang_1	-0,48	-0,60	-1,07	337,8	13,5	89,9	12,8	Oké
R10-bgl-lang_5	-0,25	0,21	-0,27	292,6	8,8	77,9	13,4	Oké
R16-hfd-kop_7	-0,12	0,81	-0,75	289,9	8,8	77,2	13,1	Oké
R10-bgl-kort_4	-0,06	0,63	-0,47	281,0	8,3	74,8	12,5	Oké
R16-hfd-kop_6	-0,12	-0,81	-0,75	280,4	8,3	74,6	12,4	Oké
R10-bgl-lang_4	-0,31	0,22	-0,47	279,8	8,2	74,5	12,4	Oké
R10-bgl-lang_3	-0,36	0,07	-0,67	264,9	7,4	70,5	11,3	Oké
R16_hfd-onder_1-7	-0,30	0,76	-1,12	259,0	10,7	68,9	7,2	Oké
R16-hfd-kop_6	-0,13	-0,89	-0,88	258,2	9,5	68,7	9,1	Oké
R16-hfd-kop_7	-0,13	0,89	-0,88	258,2	9,4	68,7	9,2	Oké
R10-bgl-lang_2	-0,42	-0,31	-0,87	256,3	7,0	68,2	10,6	Oké
R10-bgl-kort_2	0,00	-0,91	-0,87	247,5	6,6	65,9	10,0	Oké
R16-hfd-kop_5	0,12	-0,81	-0,75	245,0	6,5	65,2	9,8	Oké
R16-hfd-kop_8	0,12	0,81	-0,75	242,4	6,4	64,5	9,6	Oké
R16-hfd-kop_2	-0,39	0,89	-0,88	241,2	8,9	64,2	7,9	Oké
R10-bgl-kort_3	0,07	0,77	-0,67	237,8	6,1	63,3	9,2	Oké
R16-hfd-kop_8	0,13	0,89	-0,88	229,4	7,9	61,1	7,9	Oké
R10-bgl-kort_5	0,00	0,49	-0,27	227,8	5,7	60,7	8,5	Oké
R16-hfd-kop_3	-0,32	-0,72	-0,63	223,9	7,5	59,6	7,7	Oké
R16-hfd-kop_5	0,09	-0,55	-0,39	222,5	6,8	59,2	8,0	Oké
Anker 2	0,10	-0,20	-0,11	195,7	7,7	56,3	1,8	Oké
Anker 4	0,10	0,20	-0,11	195,3	7,7	56,2	1,8	Oké
R10-bgl-lang_6	-0,19	0,07	-0,07	209,9	7,5	55,9	6,4	Oké
Anker 1	-0,10	-0,10	-0,11	191,0	7,6	54,9	1,7	Oké
Anker 3	-0,10	0,11	-0,11	190,7	7,6	54,8	1,7	Oké
R16-hfd-kop_1	0,22	0,47	-0,26	182,7	6,0	48,6	5,4	Oké
R16-hfd-kop_4	0,22	-0,47	-0,26	182,5	5,9	48,6	5,4	Oké
R10-bgl-kort_6	-0,07	0,35	-0,07	175,9	3,1	46,8	4,6	Oké
R10-bgl-kort_6	-0,07	-0,35	-0,07	175,9	3,1	46,8	4,6	Oké
R16_hsp-kop_4	0,28	-0,98	-1,00	173,2	5,0	46,1	5,1	Oké
R16_hfd-top_1-4	-0,15	0,00	-0,02	168,7	6,3	44,9	4,0	Oké
R10_hsp-top_1-3	-0,06	0,18	0,00	168,5	4,9	44,9	4,8	Oké
R10_hsp-top_1-3	-0,06	-0,18	0,00	168,5	4,9	44,9	4,8	Oké

Staaf	X [m]	Y [m]	Z [m]	σ_s [MPa]	ε_s [1e-4]	$\sigma_s/\sigma_{s,lim}$ [%]	$\varepsilon_s/\varepsilon_{s,lim}$ [%]	
R16_hsp-kop_1	0,28	0,98	-1,00	167,0	4,7	44,5	4,8	Oké
R22_Schieter_2	-0,13	-0,29	-0,78	164,3	2,7	43,7	3,9	Oké
R22_Schieter_1	0,13	-0,29	-0,78	145,5	1,7	38,7	2,5	Oké
R10_hsp-top_8	-0,19	-0,01	-0,10	132,6	4,0	35,3	3,0	Oké
R10_hsp-top_4	-0,19	0,18	-0,10	132,6	3,5	35,3	3,1	Oké
R10_hsp-top_5	-0,19	-0,18	-0,10	132,5	3,4	35,3	3,1	Oké
R10_hsp-top_6	0,19	-0,18	-0,10	132,4	3,7	35,2	3,1	Oké
R10_hsp-top_7	0,19	0,18	-0,10	132,4	3,7	35,2	3,1	Oké
R16_hsp-kop_3	-0,31	-1,06	-1,12	121,8	3,5	32,4	2,6	Oké
R16_hsp-kop_2	-0,31	1,06	-1,12	121,7	3,5	32,4	2,6	Oké
R16_hsp-kop_5	0,00	-1,06	-1,12	120,4	3,1	32,0	2,6	Oké
R16_hsp-kop_6	0,00	1,06	-1,12	120,4	3,1	32,0	2,6	Oké
R10_hsp-top_9	0,19	-0,01	-0,10	107,8	1,7	28,7	1,8	Oké
R16_stek_3	-0,36	-0,72	-1,15	93,9	0,5	25,0	0,5	Oké
R16_stek_2	-0,36	0,72	-1,15	93,9	0,5	25,0	0,5	Oké
R16_stek_11	-0,15	-0,51	-1,15	93,6	0,5	24,9	0,7	Oké
R16_stek_9	-0,15	0,51	-1,15	93,5	0,5	24,9	0,7	Oké
R16_stek_12	-0,15	-0,93	-1,15	93,3	0,8	24,8	0,8	Oké
R16_stek_8	-0,15	0,93	-1,15	93,2	0,8	24,8	0,8	Oké
R16_stek_7	0,06	0,72	-1,15	92,7	0,5	24,7	0,7	Oké
R16_stek_10	0,06	-0,72	-1,15	92,6	0,5	24,7	0,7	Oké
R16_stek_6	0,08	0,15	-1,15	92,2	0,5	24,5	0,7	Oké
R16_stek_5	0,03	-0,15	-1,15	91,5	0,5	24,4	0,7	Oké
R16_stek_4	0,38	-0,15	-1,15	91,3	0,5	24,3	0,5	Oké
R16_stek_1	0,38	0,15	-1,15	91,2	0,5	24,3	0,5	Oké

Wapening rek/grens verhouding - $\varepsilon_s/\varepsilon_{s,lim}$ [%]



Wapening spanning/sterkte verhouding - $\sigma_s/\sigma_{s,lim}$ [%]



UGT - Verankering

Gedetailleerde resultaten van de verankering - Wapening: Trekkracht, Lastincrement: G100,0%

Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R16_stek_3	-0,32	-0,68	-0,86	1,7	21,0	6,4	52,2	12,2	102,8	Oké
R16_stek_3	-0,36	-0,72	-1,15	1,6	21,0	18,9	77,3	24,4	99,6	Oké
R16_stek_3	-0,34	-0,70	-1,01	1,7	21,0	6,4	52,2	12,2	102,5	Oké
R16_stek_2	-0,32	0,68	-0,86	1,7	21,0	6,4	52,1	12,2	102,8	Oké
R16_stek_2	-0,36	0,72	-1,15	1,6	21,0	18,9	77,3	24,4	99,6	Oké
R16_stek_2	-0,34	0,70	-1,01	1,7	21,0	6,4	52,1	12,2	102,5	Oké
R16_stek_11	-0,11	-0,47	-0,86	1,7	20,9	6,3	52,0	12,2	102,5	Oké
R16_stek_11	-0,15	-0,51	-1,15	1,6	20,9	18,8	77,1	24,4	99,5	Oké
R16_stek_11	-0,13	-0,49	-1,01	1,7	20,9	6,3	52,0	12,2	102,1	Oké
R16_stek_9	-0,11	0,47	-0,86	1,7	20,9	6,3	51,9	12,2	102,3	Oké
R16_stek_9	-0,15	0,51	-1,15	1,6	20,9	18,8	77,0	24,4	99,5	Oké
R16_stek_9	-0,13	0,49	-1,01	1,7	20,9	6,3	51,9	12,2	102,0	Oké
R16_stek_12	-0,11	-0,89	-0,86	1,7	20,8	6,3	51,8	12,2	102,1	Oké
R16_stek_12	-0,15	-0,93	-1,15	1,6	20,8	18,8	76,9	24,4	99,5	Oké
R16_stek_12	-0,13	-0,91	-1,01	1,7	20,8	6,3	51,8	12,2	101,8	Oké
R16_hsp-onder_9	-0,38	0,84	-0,76	1,7	0,1	5,6	51,9	10,8	102,1	Oké
R16_hsp-onder_9	-0,07	0,84	-1,14	1,6	0,1	70,3	93,1	75,5	99,5	Oké
R16_hsp-onder_9	0,38	0,84	-0,76	1,6	0,1	5,5	50,7	10,8	99,6	Oké
R16_hsp-onder_9	0,34	0,84	-1,14	1,6	0,1	37,7	49,8	75,5	99,6	Oké
R16_hsp-onder_8	-0,38	-0,84	-0,76	1,7	0,1	5,6	51,9	10,8	102,1	Oké
R16_hsp-onder_8	-0,07	-0,84	-1,14	1,4	0,1	70,4	93,2	75,5	87,4	Oké
R16_hsp-onder_8	0,38	-0,84	-0,76	1,6	0,1	5,5	50,7	10,8	99,6	Oké
R16_hsp-onder_8	0,34	-0,84	-1,14	1,6	0,1	40,0	52,9	75,5	99,6	Oké
R16_stek_8	-0,11	0,89	-0,86	1,7	20,8	6,3	51,7	12,2	102,0	Oké
R16_stek_8	-0,15	0,93	-1,15	1,6	20,8	18,7	76,8	24,4	99,5	Oké
R16_stek_8	-0,13	0,91	-1,01	1,7	20,8	6,3	51,7	12,2	101,6	Oké
R16_stek_5	0,00	-0,15	-0,86	1,7	20,4	6,2	51,5	12,0	101,4	Oké
R16_stek_5	0,03	-0,15	-1,15	1,6	20,4	18,4	76,4	24,1	99,5	Oké
R16_stek_5	0,02	-0,15	-1,01	1,7	20,4	6,2	51,5	12,0	101,0	Oké
R16_stek_7	0,10	0,68	-0,86	1,7	20,7	6,3	51,4	12,2	101,3	Oké
R16_stek_7	0,06	0,72	-1,15	1,6	20,7	18,6	76,4	24,4	99,5	Oké
R16_stek_7	0,08	0,70	-1,01	1,7	20,7	6,3	51,4	12,2	101,1	Oké
R16_stek_6	0,03	0,15	-0,86	1,7	20,6	6,2	51,4	12,2	101,3	Oké
R16_stek_6	0,08	0,15	-1,15	1,6	20,6	18,5	76,3	24,3	99,5	Oké
R16_stek_6	0,06	0,15	-1,01	1,7	20,6	6,2	51,4	12,2	100,9	Oké
R16_stek_10	0,10	-0,68	-0,86	1,7	20,7	6,3	51,4	12,2	101,2	Oké
R16_stek_10	0,06	-0,72	-1,15	1,6	20,7	18,6	76,3	24,4	99,5	Oké
R16_stek_10	0,08	-0,70	-1,01	1,7	20,7	6,3	51,4	12,2	101,0	Oké
R16_hsp-onder_7	-0,29	-0,63	-0,46	1,7	0,1	6,0	51,4	11,7	101,2	Oké
R16_hsp-onder_7	-0,34	-0,63	-1,14	1,5	0,1	71,5	94,7	75,5	90,7	Oké
R16_hsp-onder_7	0,29	-0,63	-0,46	1,6	0,1	5,9	50,6	11,7	99,6	Oké
R16_hsp-onder_7	0,21	-0,63	-1,14	1,6	0,1	56,7	75,0	75,5	99,6	Oké

Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R16_hsp-onder_6	-0,29	0,63	-0,46	1,7	0,1	6,0	51,4	11,7	101,1	Oké
R16_hsp-onder_6	-0,34	0,63	-1,14	1,5	0,1	71,0	94,0	75,5	89,6	Oké
R16_hsp-onder_6	0,29	0,63	-0,46	1,6	0,1	5,9	50,6	11,7	99,6	Oké
R16_hsp-onder_6	0,21	0,63	-1,14	1,6	0,1	51,8	68,6	75,5	99,5	Oké
R16-hfd-kop_6	-0,16	-1,06	-1,12	1,7	21,0	27,2	77,9	35,0	101,0	Oké
R16-hfd-kop_6	-0,12	-0,81	-0,75	1,6	21,0	56,4	78,4	71,9	99,5	Oké
R16-hfd-kop_6	-0,06	-0,38	-0,14	1,6	21,0	27,1	77,6	35,0	99,5	Oké
R16-hfd-kop_6	-0,13	-0,89	-0,88	1,6	21,0	51,9	87,1	59,6	99,6	Oké
R16-hfd-kop_6	-0,11	-0,72	-0,63	1,6	21,0	44,4	58,8	75,5	99,5	Oké
R16-hfd-kop_7	-0,16	1,06	-1,12	1,7	21,0	27,2	77,9	35,0	100,7	Oké
R16-hfd-kop_7	-0,12	0,81	-0,75	1,6	21,0	58,3	81,1	71,9	99,5	Oké
R16-hfd-kop_7	-0,06	0,38	-0,14	1,6	21,0	27,1	77,6	35,0	99,6	Oké
R16-hfd-kop_7	-0,13	0,89	-0,88	1,6	21,0	51,9	87,1	59,6	99,6	Oké
R16-hfd-kop_7	-0,11	0,72	-0,63	1,6	21,0	48,5	64,2	75,5	99,5	Oké
R16_hsp-kop_3	-0,23	-0,82	-0,77	1,7	21,0	6,1	51,0	11,9	100,4	Oké
R16_hsp-kop_3	-0,31	-1,06	-1,12	1,7	21,0	24,5	70,9	34,5	100,1	Oké
R16_hsp-kop_3	-0,26	-0,90	-0,89	1,7	21,0	6,1	51,0	11,9	100,3	Oké
R16_hsp-kop_3	-0,28	-0,98	-1,00	1,7	21,0	18,0	75,9	23,8	100,1	Oké
R16_hsp-kop_2	-0,23	0,82	-0,77	1,7	21,0	6,1	51,0	11,9	100,3	Oké
R16_hsp-kop_2	-0,31	1,06	-1,12	1,7	21,0	24,5	70,9	34,5	99,9	Oké
R16_hsp-kop_2	-0,26	0,90	-0,89	1,7	21,0	6,1	51,0	11,9	100,3	Oké
R16_hsp-kop_2	-0,28	0,98	-1,00	1,7	21,0	18,0	75,8	23,8	99,9	Oké
R16-hfd-kop_3	-0,46	-1,06	-1,12	1,7	21,0	27,3	77,5	35,3	100,3	Oké
R16-hfd-kop_3	-0,32	-0,72	-0,63	0,5	21,0	45,0	59,6	75,5	27,9	Oké
R16-hfd-kop_3	-0,18	-0,38	-0,14	1,6	21,0	27,3	77,3	35,3	99,5	Oké
R16-hfd-kop_3	-0,43	-0,98	-1,00	1,6	21,0	39,9	83,5	47,9	99,6	Oké
R16-hfd-kop_2	-0,46	1,06	-1,12	1,7	21,0	27,3	77,5	35,3	100,2	Oké
R16-hfd-kop_2	-0,39	0,89	-0,88	1,6	21,0	48,5	80,2	60,4	97,0	Oké
R16-hfd-kop_2	-0,18	0,38	-0,14	1,6	21,0	27,3	77,3	35,3	99,6	Oké
R16-hfd-kop_2	-0,43	0,98	-1,00	1,6	21,0	39,9	83,5	47,9	99,6	Oké
R16-hfd-kop_2	-0,32	0,72	-0,63	0,0	21,0	42,7	56,5	75,5	2,6	Oké
R10_hsp-top_8	-0,25	-0,01	-0,30	1,7	8,2	2,7	50,7	5,4	100,0	Oké
R10_hsp-top_8	-0,19	-0,01	-0,10	1,6	8,2	10,4	73,1	14,2	99,6	Oké
R10_hsp-top_8	-0,22	-0,01	-0,20	1,6	8,2	8,1	75,5	10,8	99,8	Oké
R10-bgl-kort_1	-0,48	1,04	-1,07	1,7	8,2	11,7	73,9	15,9	100,0	Oké
R10-bgl-kort_1	-0,07	-1,04	-1,07	1,1	8,2	27,4	92,7	29,5	68,5	Oké
R10-bgl-kort_1	0,34	-1,04	-1,07	1,6	8,2	11,7	73,7	15,9	99,5	Oké
R10-bgl-kort_1	0,07	-1,04	-1,07	1,6	8,2	20,3	69,0	29,5	99,5	Oké
R10_hsp-top_4	-0,25	0,18	-0,30	1,7	8,2	2,7	50,7	5,4	100,0	Oké
R10_hsp-top_4	-0,19	0,18	-0,10	1,6	8,2	10,4	73,1	14,2	99,6	Oké
R10_hsp-top_4	-0,22	0,18	-0,20	1,6	8,2	8,1	75,5	10,8	99,8	Oké
R16_hsp-kop_6	0,00	0,82	-0,77	1,7	21,0	5,9	50,8	11,7	100,0	Oké
R16_hsp-kop_6	0,00	1,06	-1,12	1,6	21,0	24,2	70,5	34,3	99,8	Oké
R16_hsp-kop_6	0,00	0,90	-0,89	1,7	21,0	5,9	50,8	11,7	99,9	Oké

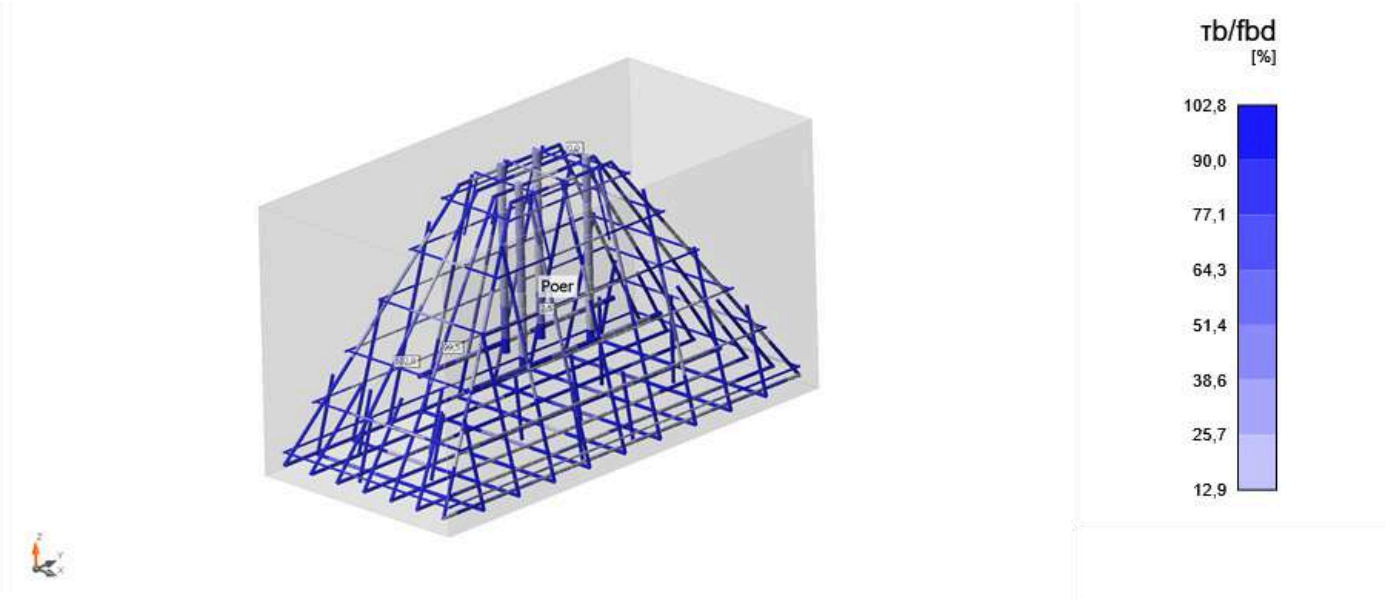
Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R16_hsp-kop_6	0,00	0,98	-1,00	1,6	21,0	17,7	75,6	23,4	99,8	Oké
R16_hsp-kop_5	0,00	-0,82	-0,77	1,7	21,0	5,9	50,8	11,7	100,0	Oké
R16_hsp-kop_5	0,00	-1,06	-1,12	1,6	21,0	24,2	70,5	34,3	99,8	Oké
R16_hsp-kop_5	0,00	-0,90	-0,89	1,6	21,0	5,9	50,8	11,7	99,9	Oké
R16_hsp-kop_5	0,00	-0,98	-1,00	1,6	21,0	17,7	75,6	23,4	99,8	Oké
R10_hsp-top_5	-0,25	-0,18	-0,30	1,7	8,2	2,7	50,7	5,4	99,9	Oké
R10_hsp-top_5	-0,19	-0,18	-0,10	1,6	8,2	10,4	73,1	14,2	99,6	Oké
R10_hsp-top_5	-0,22	-0,18	-0,20	1,6	8,2	8,1	75,5	10,8	99,8	Oké
R16_hsp-onder_1	-0,16	0,00	0,00	1,7	0,1	6,2	50,8	12,2	99,9	Oké
R16_hsp-onder_1	0,21	0,00	-1,14	1,6	0,1	70,3	93,1	75,5	99,5	Oké
R16_hsp-onder_1	0,16	0,00	0,00	1,6	0,1	6,2	50,6	12,2	99,5	Oké
R16_hsp-onder_1	0,40	0,00	-0,86	1,6	0,1	63,3	83,9	75,5	99,6	Oké
R10-bgl-kort_6	-0,20	0,35	-0,07	1,2	8,2	10,6	77,7	13,6	99,8	Oké
R10-bgl-kort_6	-0,07	0,35	-0,07	1,1	8,2	13,8	74,9	18,4	99,3	Oké
R10-bgl-kort_6	0,07	-0,35	-0,07	1,1	8,2	10,6	77,7	13,6	99,3	Oké
R10-bgl-kort_6	-0,07	-0,35	-0,07	1,1	8,2	13,8	74,9	18,4	99,3	Oké
R10-bgl-kort_5	0,25	0,49	-0,27	1,6	8,2	11,4	74,7	15,3	99,9	Oké
R10-bgl-kort_5	0,00	0,49	-0,27	0,0	8,2	17,9	82,2	21,8	0,6	Oké
R10-bgl-kort_5	-0,25	0,49	-0,27	1,6	8,2	11,4	74,6	15,3	99,8	Oké
R10-bgl-kort_5	0,00	-0,49	-0,27	0,0	8,2	17,9	82,2	21,8	0,2	Oké
R10_hsp-top_1-3	-0,18	0,18	0,00	1,2	8,2	10,4	78,7	13,2	99,8	Oké
R10_hsp-top_1-3	-0,06	-0,18	0,00	1,1	8,2	13,2	75,7	17,5	99,1	Oké
R10_hsp-top_1-3	0,06	0,00	0,00	0,3	8,2	10,3	78,6	13,2	25,4	Oké
R10_hsp-top_1-3	-0,06	0,18	0,00	1,1	8,2	13,2	75,7	17,5	99,1	Oké
R16_stek_4	0,33	-0,15	-0,86	1,6	20,4	6,2	50,7	12,2	99,9	Oké
R16_stek_4	0,38	-0,15	-1,15	1,6	20,4	18,4	75,5	24,3	99,5	Oké
R16_stek_4	0,36	-0,15	-1,01	1,6	20,4	6,2	50,7	12,2	99,8	Oké
R16_hsp-onder_2	-0,16	0,21	0,00	1,6	0,1	6,2	50,7	12,2	99,9	Oké
R16_hsp-onder_2	0,07	0,21	-1,14	1,0	0,1	70,6	93,5	75,5	57,7	Oké
R16_hsp-onder_2	0,16	0,21	0,00	1,6	0,1	6,2	50,6	12,2	99,5	Oké
R16_hsp-onder_2	0,40	0,21	-0,86	1,6	0,1	56,5	74,8	75,5	99,5	Oké
R16-hfd-kop_5	0,16	-1,06	-1,12	1,6	21,0	27,1	77,6	35,0	99,8	Oké
R16-hfd-kop_5	0,12	-0,81	-0,75	1,6	21,0	49,3	68,5	71,9	99,5	Oké
R16-hfd-kop_5	0,06	-0,38	-0,14	1,6	21,0	27,1	77,6	35,0	99,6	Oké
R16-hfd-kop_5	0,14	-0,98	-1,00	1,6	21,0	39,5	83,5	47,3	99,6	Oké
R16-hfd-kop_5	0,11	-0,72	-0,63	0,7	21,0	48,0	63,5	75,5	42,9	Oké
R16_hsp-onder_3	-0,16	-0,21	0,00	1,6	0,1	6,2	50,7	12,2	99,8	Oké
R16_hsp-onder_3	0,07	-0,21	-1,14	0,5	0,1	70,3	93,1	75,5	31,5	Oké
R16_hsp-onder_3	0,16	-0,21	0,00	1,6	0,1	6,2	50,6	12,2	99,5	Oké
R16_hsp-onder_3	0,40	-0,21	-0,86	1,4	0,1	47,1	62,3	75,5	83,9	Oké
R16_stek_1	0,33	0,15	-0,86	1,6	20,4	6,2	50,7	12,2	99,8	Oké
R16_stek_1	0,38	0,15	-1,15	1,6	20,4	18,3	75,5	24,3	99,5	Oké
R16_stek_1	0,36	0,15	-1,01	1,6	20,4	6,2	50,7	12,2	99,8	Oké
R16-hfd-kop_8	0,16	1,06	-1,12	1,6	21,0	27,1	77,6	35,0	99,8	Oké

Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R16-hfd-kop_8	0,12	0,81	-0,75	1,0	21,0	48,7	67,8	71,9	57,6	Oké
R16-hfd-kop_8	0,06	0,38	-0,14	1,6	21,0	27,1	77,6	35,0	99,6	Oké
R16-hfd-kop_8	0,14	0,98	-1,00	1,6	21,0	39,5	83,5	47,3	99,5	Oké
R16-hfd-kop_8	0,11	0,72	-0,63	1,6	21,0	41,0	54,3	75,5	99,5	Oké
R16_hfd-onder_1-7	-0,45	-1,06	-1,12	1,6	21,0	27,2	77,5	35,2	99,8	Oké
R16_hfd-onder_1-7	-0,30	0,76	-1,12	1,6	21,0	52,1	86,5	60,2	99,5	Oké
R16_hfd-onder_1-7	-0,45	0,00	-1,12	0,7	21,0	-2,6	3,4	-75,5	42,7	Oké
R16_hfd-onder_1-7	-0,45	0,45	-1,12	1,6	21,0	24,2	32,1	75,5	99,6	Oké
R16_hsp-onder_5	-0,21	0,42	-0,16	1,6	0,1	6,1	50,7	12,0	99,8	Oké
R16_hsp-onder_5	-0,48	0,42	-1,14	1,6	0,1	75,3	99,7	75,5	99,6	Oké
R16_hsp-onder_5	0,21	0,42	-0,16	1,6	0,1	6,1	50,6	12,0	99,5	Oké
R16_hsp-onder_5	0,44	0,42	-1,00	1,6	0,1	51,6	68,3	75,5	99,5	Oké
R10-bgl-kort_4	0,31	0,63	-0,47	1,6	8,2	11,4	74,7	15,3	99,8	Oké
R10-bgl-kort_4	-0,06	0,63	-0,47	1,6	8,2	22,1	78,7	28,1	99,5	Oké
R10-bgl-kort_4	-0,31	0,63	-0,47	1,6	8,2	11,4	74,7	15,3	99,7	Oké
R10-bgl-kort_4	0,06	0,63	-0,47	1,6	8,2	17,8	82,2	21,7	99,5	Oké
R10-bgl-kort_4	-0,06	-0,63	-0,47	0,6	8,2	20,7	73,6	28,1	33,6	Oké
R10-bgl-lang_1	-0,48	-1,05	-1,07	1,6	8,2	12,1	72,8	16,6	99,7	Oké
R10-bgl-lang_1	-0,48	-0,60	-1,07	1,6	8,2	26,5	89,9	29,5	99,6	Oké
R10-bgl-lang_1	-0,48	0,15	-1,07	1,6	8,2	-1,0	3,3	-29,5	99,5	Oké
R10-bgl-lang_1	-0,48	0,60	-1,07	1,6	8,2	21,1	71,5	29,5	99,6	Oké
R16_hsp-onder_4	-0,21	-0,42	-0,16	1,6	0,1	6,1	50,7	12,0	99,7	Oké
R16_hsp-onder_4	-0,48	-0,42	-1,14	1,6	0,1	74,8	99,0	75,5	99,6	Oké
R16_hsp-onder_4	0,21	-0,42	-0,16	1,6	0,1	6,1	50,6	12,0	99,5	Oké
R16_hsp-onder_4	0,44	-0,42	-1,00	1,6	0,1	52,2	69,2	75,5	99,5	Oké
R10-bgl-lang_5	-0,25	0,50	-0,27	1,6	8,2	11,9	73,2	16,2	99,7	Oké
R10-bgl-lang_5	-0,25	0,21	-0,27	1,2	8,2	23,0	77,9	29,5	71,9	Oké
R10-bgl-lang_5	0,25	0,50	-0,27	1,6	8,2	11,9	73,2	16,2	99,6	Oké
R10-bgl-lang_5	-0,25	0,36	-0,27	1,6	8,2	19,3	81,6	23,6	99,6	Oké
R10-bgl-lang_5	-0,25	-0,07	-0,27	1,1	8,2	21,1	71,6	29,5	64,6	Oké
R10-bgl-lang_6	-0,19	-0,36	-0,07	1,1	8,2	10,8	76,9	14,0	99,3	Oké
R10-bgl-lang_6	-0,19	0,07	-0,07	0,8	8,2	16,5	67,6	24,4	69,2	Oké
R10-bgl-lang_6	0,19	0,07	-0,07	0,6	8,2	9,3	38,2	24,4	54,5	Oké
R10-bgl-lang_6	-0,19	-0,07	-0,07	0,8	8,2	16,0	83,1	19,2	69,3	Oké
R16_hsp-kop_4	0,31	-1,06	-1,12	1,6	21,0	26,9	77,9	34,5	99,6	Oké
R16_hsp-kop_4	0,28	-0,98	-1,00	1,6	21,0	34,8	75,0	46,4	99,5	Oké
R16_hsp-kop_4	0,26	-0,90	-0,89	1,6	21,0	26,9	77,9	34,5	99,5	Oké
R16_hsp-kop_1	0,31	1,06	-1,12	1,6	21,0	26,9	77,9	34,5	99,6	Oké
R16_hsp-kop_1	0,28	0,98	-1,00	1,6	21,0	33,6	72,3	46,4	99,5	Oké
R16_hsp-kop_1	0,26	0,90	-0,89	1,6	21,0	24,4	70,7	34,5	99,5	Oké
R10-bgl-kort_3	0,37	0,77	-0,67	1,6	8,2	12,0	73,0	16,4	99,6	Oké
R10-bgl-kort_3	0,07	0,77	-0,67	1,6	8,2	18,7	78,0	23,9	99,5	Oké
R10-bgl-kort_3	-0,37	-0,77	-0,67	1,6	8,2	12,0	73,0	16,4	99,6	Oké
R10-bgl-kort_3	-0,07	-0,77	-0,67	1,6	8,2	15,5	52,5	29,5	99,5	Oké

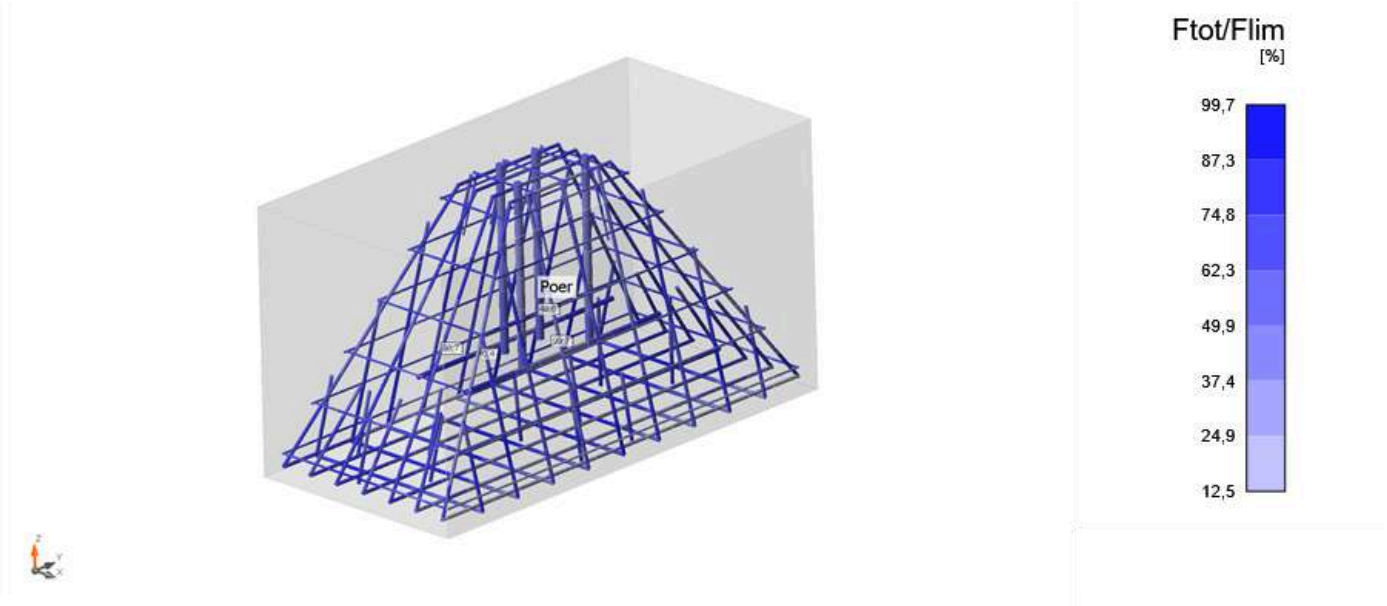
Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R16_hfd-top_1-4	-0,15	-0,30	-0,02	1,1	21,0	25,3	80,8	31,3	99,2	Oké
R16_hfd-top_1-4	-0,15	0,00	-0,02	1,1	21,0	33,9	85,0	39,9	99,0	Oké
R16_hfd-top_1-4	0,15	-0,15	-0,02	1,1	21,0	12,7	31,8	39,9	99,0	Oké
R10-bgl-kort_2	0,42	-0,91	-0,87	1,6	8,2	11,8	73,4	16,1	99,6	Oké
R10-bgl-kort_2	0,42	0,91	-0,87	1,6	8,2	11,8	73,4	16,1	99,6	Oké
R10-bgl-kort_2	0,00	-0,91	-0,87	0,3	8,2	19,4	65,9	29,5	20,2	Oké
R10-bgl-kort_2	-0,42	0,91	-0,87	1,6	8,2	11,8	73,4	16,1	99,6	Oké
R10-bgl-kort_2	-0,28	0,91	-0,87	1,6	8,2	19,0	81,7	23,3	99,5	Oké
R10-bgl-lang_4	0,31	-0,63	-0,47	1,6	8,2	11,8	73,3	16,1	99,6	Oké
R10-bgl-lang_4	-0,31	0,22	-0,47	0,7	8,2	22,0	74,5	29,5	39,5	Oké
R10-bgl-lang_4	-0,31	-0,49	-0,47	1,6	8,2	11,8	73,3	16,1	99,5	Oké
R10-bgl-lang_4	0,31	0,50	-0,47	1,6	8,2	19,1	81,6	23,4	99,5	Oké
R10-bgl-lang_4	-0,31	0,08	-0,47	0,5	8,2	21,2	71,9	29,5	30,6	Oké
R10-bgl-lang_2	-0,42	-0,92	-0,87	1,6	8,2	12,1	72,5	16,7	99,6	Oké
R10-bgl-lang_2	-0,42	-0,31	-0,87	0,1	8,2	20,1	68,2	29,5	7,3	Oké
R10-bgl-lang_2	0,42	0,91	-0,87	1,6	8,2	6,4	38,5	16,7	99,5	Oké
R10-bgl-lang_2	-0,42	-0,77	-0,87	1,2	8,2	12,1	72,5	16,7	75,5	Oké
R10-bgl-lang_2	-0,42	0,45	-0,87	0,3	8,2	19,0	64,2	29,5	16,9	Oké
Anker 1	-0,10	-0,10	-0,81	8,0	212,2	63,5	50,2	126,6	99,9	Oké
Anker 1	-0,10	-0,10	-0,11	1,0	212,2	194,4	54,9	354,0	12,5	Oké
Anker 1	-0,10	-0,10	-0,81	8,0	212,2	63,5	50,2	126,6	99,9	Oké
Anker 1	-0,10	-0,10	-0,11	1,0	212,2	194,4	54,9	354,0	12,5	Oké
Anker 1	-0,10	-0,10	-0,81	8,0	212,2	63,5	50,2	126,6	99,9	Oké
Anker 1	-0,10	-0,10	-0,11	1,0	212,2	194,4	54,9	354,0	12,5	Oké
Anker 1	-0,10	-0,10	-0,81	8,0	212,2	63,5	50,2	126,6	99,9	Oké
Anker 1	-0,10	-0,10	-0,11	1,0	212,2	194,4	54,9	354,0	12,5	Oké
R10_hsp-top_7	0,22	0,18	-0,20	1,6	8,2	2,7	50,5	5,4	99,6	Oké
R10_hsp-top_7	0,25	0,18	-0,30	1,6	8,2	2,7	50,5	5,4	99,6	Oké
R10_hsp-top_7	0,19	0,18	-0,10	1,6	8,2	10,4	73,0	14,2	99,5	Oké
R10_hsp-top_7	0,22	0,18	-0,20	1,6	8,2	8,1	75,3	10,8	99,6	Oké
R10_hsp-top_6	0,25	-0,18	-0,30	1,6	8,2	2,7	50,5	5,4	99,6	Oké
R10_hsp-top_6	0,19	-0,18	-0,10	1,6	8,2	10,4	73,0	14,2	99,5	Oké
R10_hsp-top_6	0,22	-0,18	-0,20	1,6	8,2	8,1	75,3	10,8	99,5	Oké
R16-hfd-kop_4	0,15	-0,30	-0,02	1,6	21,0	27,3	77,3	35,3	99,6	Oké
R16-hfd-kop_4	0,22	-0,47	-0,26	1,6	21,0	36,7	76,7	47,9	99,5	Oké
R16-hfd-kop_4	0,39	-0,89	-0,88	0,2	21,0	21,4	35,4	60,4	10,8	Oké
R16-hfd-kop_4	0,18	-0,38	-0,14	1,6	21,0	27,3	77,3	35,3	99,5	Oké
R16-hfd-kop_4	0,32	-0,72	-0,63	0,3	21,0	28,1	37,2	75,5	17,7	Oké
R16-hfd-kop_1	0,15	0,30	-0,02	1,6	21,0	27,3	77,3	35,3	99,5	Oké
R16-hfd-kop_1	0,22	0,47	-0,26	1,3	21,0	36,7	76,8	47,9	75,8	Oké
R16-hfd-kop_1	0,39	0,89	-0,88	0,1	21,0	20,8	34,4	60,4	5,8	Oké
R16-hfd-kop_1	0,18	0,38	-0,14	1,6	21,0	27,3	77,3	35,3	99,5	Oké
R16-hfd-kop_1	0,32	0,72	-0,63	0,2	21,0	27,6	36,6	75,5	14,2	Oké
R10-bgl-lang_3	0,36	-0,78	-0,67	1,6	8,2	11,8	73,3	16,2	99,5	Oké

Staaf	X [m]	Y [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	F_{lim} [kN]	τ_b/f_{bd} [%]	
R10-bgl-lang_3	-0,36	0,07	-0,67	0,5	8,2	20,8	70,5	29,5	31,3	Oké
R10-bgl-lang_3	-0,36	0,64	-0,67	1,6	8,2	11,4	48,4	23,5	99,5	Oké
R10-bgl-lang_3	-0,36	0,78	-0,67	1,6	8,2	11,8	73,3	16,2	99,5	Oké
R10-bgl-lang_3	-0,36	0,21	-0,67	0,6	8,2	19,3	65,4	29,5	36,6	Oké
R22_Schieter_2	-0,13	-0,58	-0,78	1,6	39,6	47,8	80,7	59,2	99,5	Oké
R22_Schieter_2	-0,13	-0,29	-0,78	0,5	39,6	62,4	67,8	92,0	28,8	Oké
R22_Schieter_2	-0,13	0,43	-0,78	0,9	39,6	47,8	80,7	59,2	52,5	Oké
R22_Schieter_2	-0,13	-0,15	-0,78	1,5	39,6	53,1	49,0	108,4	92,9	Oké
R22_Schieter_1	0,13	0,58	-0,78	1,6	39,6	47,8	80,7	59,2	99,5	Oké
R22_Schieter_1	0,13	-0,29	-0,78	1,2	39,6	55,3	73,1	75,6	75,4	Oké
R22_Schieter_1	0,13	0,00	-0,78	0,8	39,6	32,3	29,8	108,4	48,7	Oké
R22_Schieter_1	0,13	0,15	-0,78	1,6	39,6	36,6	33,8	108,4	97,8	Oké
R10_hsp-top_9	0,25	-0,01	-0,30	1,6	6,0	2,7	50,5	5,4	99,5	Oké
R10_hsp-top_9	0,19	-0,01	-0,10	0,9	6,0	8,5	59,4	14,2	54,0	Oké
R10_hsp-top_9	0,22	-0,01	-0,20	1,6	6,0	7,7	71,3	10,8	99,1	Oké

Aanhechtspanning grenswaarde - τ_b/f_{bd} [%]



Kracht controle waarde - F_{tot}/F_{lim} [%]



Verklaring

Symbool	Verklaring
f_{ck}	Karakteristieke cylindrische betondruksterkte bij 28 dagen
$f_{ctk,0.05}$	Karakteristieke treksterkte van beton 5% onderschrijdingskans
f_{ctm}	Gemiddelde axiale treksterkte van beton
E_{cm}	Secant elasticiteitsmodulus van beton
ν	Poisson-factor
ε_c	Betondrukrek bij piekspanning fc
ε_{cu}	Uiterste drukrek in het beton
φ_{perm}	Uiteindelijke waarde van de kruipcoëfficiënt op het tijdsinterval (t0 = 28 dagen, tinf = ontwerplevensduur) voor permanente belasting
φ_{pres}	Uiteindelijke waarde van de kruipcoëfficiënt op het tijdsinterval (t0 = 28 dagen, tinf = ontwerplevensduur) voor voorspanbelasting
f_{yk}	Karakteristieke vloeisterkte van de wapening
E_s	Elasticiteitsmodulus van wapeningsstaal
ε_{uk}	Karakteristieke rek van de wapening of voorspanstaal bij de maximale belasting
Eigenschappen	W - Breedte; H - Hoogte; T - Dikte; D - Hoogte; L - Lengte; r - straal; α - Helling
Positie	M - Hoofd; MP - Master punt; IP - Voeg punt in
$\sigma_{c,eq}$	Equivalent principal stress Sigma c,eq, which expresses the equivalent uni-axial stress for a general tri-axial stress state.
ε_c	Minimale betondrukrek εc
ε_{pl}	Minimale plastische drukrek εpl van beton
$\sigma_{c,eq}/\sigma_{c,lim}$	De verhouding van de betonspanning en -sterkte. Het geeft het nivo van de uitnutting van het materiaal t.o.v. de sterkte van het beton weer.
σ_s	Maximale spanning langs de lengte van de wapeningstaaf.
ε_s	Maximale rek langs de lengte van de wapeningstaaf.
$\sigma_s/\sigma_{s,lim}$	De verhouding spanning en vloeisterkte van de wapening.
$\varepsilon_s/\varepsilon_{s,lim}$	De verhouding rek en grensrek van de wapening.

Symbool	Verklaring
τ_b	Aanhechtspanning op het oppervlak van de wapeningstaaf
F_a	De kracht van de verankering. Het wordt ontwikkeld vanaf de staafeinden t.g.v. de verankering door de ribben op de wapeningstaaf.
F_{tot}	De totale kracht ontwikkeld langs de de volledige lengte van de wapeningstaaf. Het bestaat uit de ankerkracht t.g.v. de verankering door de ribben en de aanhechtkracht: de integratie van alle aanhechtspanning de op het wapeningsoppervlak werken.
F_{tot}/F_{lim}	De verhouding van de totale kracht in de staaf en de grenswaarde van de kracht. De grenswaarde van de kracht is berekend als het minimum van twee waardes: (a) de berekende kracht als de som van de uiterste ankerkracht en de kracht ontwikkeld vanaf het eind van de staaf tot het beschouwde punt met in achtname van volledige hechtsterkte, (b) de uiterste kracht van de staaf.
F_{lim}	De grenswaarde van de kracht. De grenswaarde van de kracht is berekend als het minimum van twee waarden: (a) de berekende kracht als de som van de uiterste ankerkracht en de kracht ontwikkeld vanaf het eind van de staaf tot het beschouwde punt met in achtname van volledige hechtsterkte, (b) de uiterste kracht van de staaf.
τ_b/f_{bd}	De verhouding van de aanhechtspanning en de uiterste aanhechtspanning is weergegeven voor de geselecteerde (groep van) staven en het toegepaste deel van de lat. Het toont het nivo van de uitnutting in verhouding tot de uiterste hechtsterkte tussen de wapeningstaaf en het omringende beton.

Norminstellingen

Artikel	Naam	Waarde	Omschrijving
2.4.2.4 (1)	γ_c	1,50	Materiaalfactor voor beton
2.4.2.4 (1)	γ_s	1,15	Materiaalfactor voor wapening
3.1.6 (1)	α_{cc}	1,00	Coëfficiënt die rekening houdt met de lange-termijn effecten van de drukspanning en het ongunstige effect van de manier waarop de belasting is toegepast.
3.2.7 (2)	$\varepsilon_{ud}/\varepsilon_{uk}$	0,90	Verhouding van de rekenwaarde en de karakteristiek rekgrens.
3.2.7 (2)	$\varepsilon_{ud}/\varepsilon_{uk}$	0,90	Verhouding van de rekenwaarde en de karakteristiek rekgrens.
5.10.2.1(1)	k1	0,80	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk vóór de verankering.
5.10.2.1(1)	k2	0,90	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk vóór de verankering.
5.10.3(2)	k7	0,75	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk na het opspannen of na de overdracht
5.10.3(2)	k8	0,85	Coëfficiënt voor de berekening van de maximale trekspanning in het spanelement onmiddellijk na het opspannen of na de overdracht
7.2(2)	k1	0,60	Coëfficiënt voor de berekening van de maximale drukspanning in beton tijdens BGT - karakteristieke combinatie
7.2(3)	k2	0,45	Coëfficiënt voor berekening van de spanning in het beton voor de BGT - quasi-blijvende combinatie
7.2(5)	k3	0,80	Coëfficiënt voor het berekenen van de maximale trekspanning in de wapening voor de BGT-karakteristieke combinatie
7.2(5)	k5	0,75	Coëfficiënt voor het berekenen van de maximale trekspanning in de spankabel voor de BGT-karakteristieke combinatie
8.3(2)	Φ m,min - Φs <= 16mm (1,00 Φs)	1,00	Minimale doorndiameter van de beugel als veelvoud van de beugeldiameter
8.3(2)	Φ m,min - Φs > 16mm (1,00 Φs)	1,00	Minimale doorndiameter van de beugel als veelvoud van de beugeldiameter

BIJLAGE 43
Meridian kenmerk 1668994

Sweco Nederland B.V.
-
Gebruikslicentie COMMERCIELE-versie tot 1-2-2026

B beton EC B beton EC
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berekening buigwapening in een rechthoekige betondoorsnede: 3000 x 2200 incl. samer
volgens eurocode 1992-1-1 inclusief controle scheurwijdte en betondekking

	algemene gegevens	werk			KIJ-DIM	
		werknummer			10	
		onderdeel			Blokpoer(553)	
2.4.2.4		ontwerpsituatie			blijvend en tijdelijk	
	buigend moment in de doorsnede					
	rekenwaarde moment voor herverdelen	$M_{Ed,elastisch}$	=	3600	kNm	
	rekenwaarde moment na herverdelen	$M_{Ed,totaal}$ (= $M_{Ed,\ herverdeeld}$)	=	3600	kNm	
	invloedsfactor minimum wapening	belang van het constructieonderdeel		primair		
	doorsnedegegevens en wapening					
	kwaliteit beton	betonklasse	=	C30/37		
	kwaliteit staal	staalsoort	=	B 500		
	wapeningsklasse	A, B of C	=	B	-	
	betonbreedte	b	=	3000	mm	
	betonhoogte	h	=	2200	mm	
	betondekking gedrukte zijde	$c_{drukzijde}$ **dekking op de buitenste wapening**	=	50	mm	
	betondekking getrokken zijde	$c_{trekzijde}$	=	50	mm	
	betondekking zijkanten	$c_{zijkant}$	=	50	mm	
	wapening aan getrokken zijde	aantal n1	=	10	stuks	
		diameter d	=	25	mm	
		aantal n2	=	0	stuks	
		diameter d	=	0	mm	
	wapening aan gedrukte zijde	aantal n3	=	10	stuks	
		diameter d	=	25	mm	
		aantal n4	=	0	stuks	
		diameter d	=	0	mm	
	flankwapening per zijde	aantal n5	=	13	stuks	
		diameter d_5	=	16	mm	
	beugels (of verdeelwapening in buitenste laag)	diameter d_{bg}	=	10	mm	
	scheurwijdte **zonder berekening** en betondekking					
	verhouding tussen de frequente combinatie en uiterste grenstoestand:	M_{fr} / M_{Ed}	=	0,75	-	
a	ontwerplevensduur		=	30	jaar	
b	omgevingsfactoren	milieuklasse A (kies uit X0- XC- XD- of XS-serie)	=	XC4	-	
b		milieuklasse B (kies uit X0- XC- XD- of XS-serie)	=	XC4	-	
c	soort constructie	soort constructie	=	balk		
d	dekking verhogen bij oncontroleerbaarheid van de wapening (geen eis in eurocode)		=	nee		
e	wordt de beton nabewerkt		=	nee		
f	verhoging dekking bij toepassing grote grindkorrel (>32mm) tabel 4.2		=	nee		
g	ondergrond waarop gestort wordt		=	bekisting		
h	bundeling wapeningstaven (trekwapening)	worden staven d1 gebundeld?	=	nee		staven kun
h		worden staven d2 gebundeld?	=	nee		
i	kwaliteitsbeheersing	is specifieke kwaliteitsbeheersing gewaarborgd?		nee		
j	luchtinsluiting	luchtinsluiting van meer dan 4% toegepast?		nee		
k	verhoging dekking bij toepassing grote staafdiameter (>25mm) geen eis in eurocode			nee		
	gegevens invloedsfactoren met **berekende** scheurwijdte					
k1	aanhechteigenschap	de aanhechting van de wapeningstaven is		goed		
k2	wijze van belasting	de betondoorsnede wordt belast door		buiging		
kt	belastingduur (bij berekende scheurwijdte)	de belastingduur is		langdurend		
	milieuklasse	de milieuklasse van de beton is		b) buitenmilieu - RH=80%		
	belasten constructie na aantal dagen	de constructie wordt belast na t_0 is		100	dagen	
	cementklasse	de gekozen cementklasse is		N		
	omtrek dat bloot staat aan uitdroging	het aantal zijden dat aan uitdroging bloot staat is		2 zijden 2b		

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resultaten

Blokpoer(553)

opneembaar moment

maatgevende waarde opneembaar moment	$M_{Rd,totaal}$	bij gekozen wapening	=	4501	kNm

buigwapening

totale hoeveelheid trekwapening benodigd	$A_{s1,totaal} = A_{s1} + A_{s2}$		=	4899	mm^2
totale hoeveelheid drukwapening benodigd	$A_{s2} = M_{Ed2} / (f_{y,d} (d-d2) * 10^6$		=	0	mm^2
minimum wapening	ρ_{min1}		=	4899	mm^2

scheurwijdte

toelaatbare scheurwijdte	w * k_x		=	0,43	mm
scheurwijdtecontrole zonder berekening	maximum staafdiameter		=	42,2	mm
scheurwijdtecontrole zonder berekening	maximum hart op hart afstand		=	133,9	mm
optredende scheurwijdte met berekening	w_k		=	0,63	mm

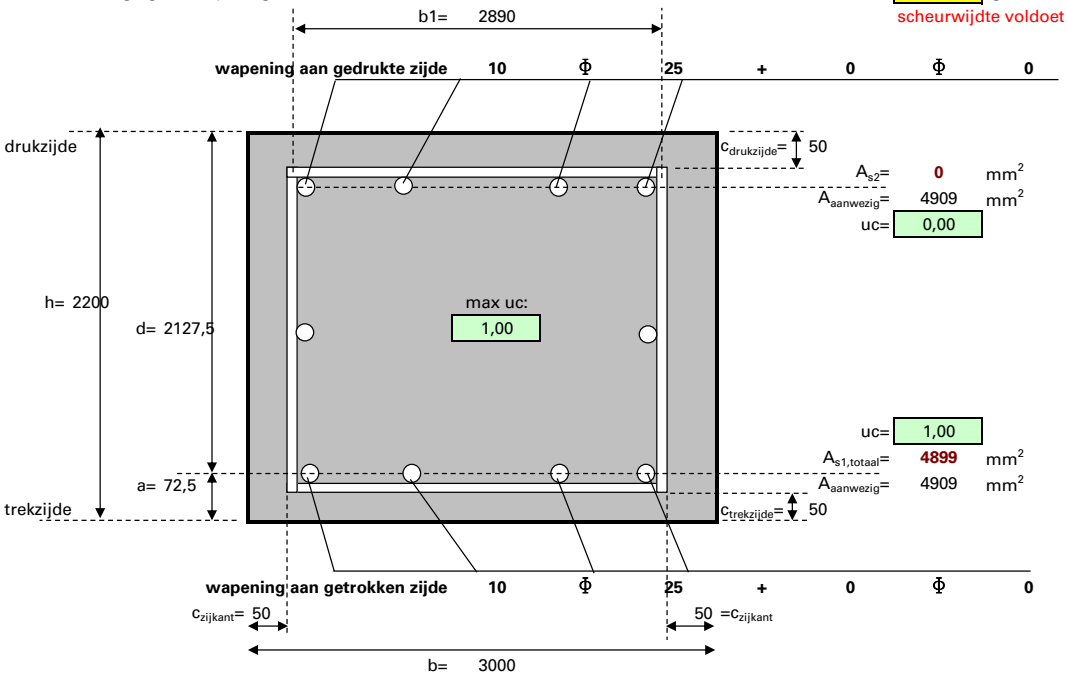
betondekking

minimum betondekking	c_{nom}	op de buitenste wapening	=	35	mm
constructieklasse (betondekking)	S		S	4	-

unity-checks buigwapening, scheurwijdte en dekking, herverdeling

	buigend moment	$M_{Ed,totaal} / M_{Rd,totaal}$	3600	/	4501	=	0,80	-
	trekwapening benodigd	$A_{s1,totaal} / A_{aanw,trek}$	4899	/	4909	=	1,00	-
	drukwapening benodigd	$A_{s2} / A_{aanw,druk}$	0	/	4909	=	0,00	-
	herverdeling momenten	δ / δ_{her}	0,70	/	1,00	=	0,70	-
	positie drukwapening	d2 / d2,max	72,5	/	14,3	=	0,00	-
	minimum wapeningspercentage	ρ_{min} / ρ_{trek}	0,12	/	0,08	=	n.v.t.	-
9.2.1.1(3)	maximum percentage trekwap.	ρ_{trek} / ρ_{max}	0,07	/	4,0	=	0,02	-
	maximum percentage drukwap.	ρ_{druk} / ρ_{max}	0,07	/	4,0	=	0,02	-
	scheurwijdte zonder berekening	diameter of hoh afstand	0,59	of	2,37	=	0,59	-
	scheurwijdte met berekening	w_k / w * k_x	0,63	/	0,30	=	1,48	-
	min. wapening bij scheurwijdte	$A_{s,min} / A_{aanw,trek}$	7647	/	4909		1,56	-
	minimale betondekking	$c_{nom} / c_{trekzijde}$	35	/	50	=	0,70	-
	moment ongescheurde doorsnec	$M_{Ed,totaal} / M_r$ (ongewapend)	3600	/	7009	=	0,51	(geen eis) van de ong
	verlenging trekwapening	$\varepsilon_s / \varepsilon_{ud}$	193,2	/	45	=	4,29	(geen eis) aan deze ei

scheurwijdte voldoet



betondekking

berekening minimum betondekking op trekwapening

Blokpoer(553)

tab4.3N	correctie van de constructieklasse: uitgangspunt:constructieklasse bij 50 jaar				S	4	-
a	correctie tgv ontwerplevensduur					0	-
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse A of B)					0	-
c	correctie tgv geometrie					0	-
i	correctie tgv kwaliteitsbeheersing					0	+
	totale waarde constructieklasse				S	4	
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse A)					0	
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse B)					0	
	berekening van de nominale dekking voor hoofdwapening en beugels (in mm)					hoofdwapening	beugels
tabel 4.2	minimum dekking t.g.v. **aanhechting**	$c_{min,b} > d_n$	$c_{grindkorrel}$= 0	$c_{min,b}+c_{grindkorrel}$=		25	10
tab 4.4N	minimum dekking tgv milieuklasse A	$c_{min,dur}$			=	30	30
	minimum dekking tgv milieuklasse B	$c_{min,dur}$			=	30	30
	resulterende minimum dekking	$c_{min,dur}$	(duurzaamheid)		=	30	30
e	correctie tgv nabewerking	c_{extra}			=	0	0
	gecorrigeerde min. dekking **duurzaamheid**	$c_{min,dur}$	inclusief c_{extra}		=	30	30
4.2	**minimum dekking**	c_{min} = max($c_{min,b}$; $c_{min,dur}$; 10mm)			=	30	30
	toeslagen uitvoeringstoleranties	Δc_{dev}			=	5	5
g	storten op werkvloer / maaiveld / kist	Δc_{dev}			=	0	0
d	t.g.v. oncontroleerbaarheid	Δc_{dev}	**geen eis in eurocode!**		=	0	0
4.1	nominale waarde betondekking	$c_{nom}=c_{min} + \Sigma\Delta c_{dev}$			=	35	35
k	t.g.v. toegepaste hoofdwapening >25mm	c_{nom}=1,5d_n	**geen eis in eurocode!**		=	0	0
	equivalente staafdiameter	d_n=max($d1_{eq}$;$d2_{eq}$)=	25,0	d_{bg}= 10			
	dekking op de buitenste wapening	Hoofdwapening: c_{nom}- d_{bg}	Beugels: c_{nom}		=	25	35
	resulterende waarde minimale dekking	c_{nom}	op de buitenste wapening		=	35	

wapeninggegevens

	totaal aantal staven in trekzone	Σn_{trek}=n1+n2	=	10,0	st
	totaal aantal staven in drukzone	Σn_{druk}=n3+n4	=	10,0	st
	gewogen gemiddelde diameter trekwapening	$d_{gem,trek}$=(n1*d_1*D_1+n2*d_2*D_2) / (n1*D_1+n2*D_2) =		25,0	mm
	gewogen gemiddelde diameter drukwapening	$d_{gem,druk}$=(n3*d_3*D_3+n4*d_4*D_4) / (n3 *D_3+ n4* D_4) =		25,0	mm
	doorsnede per staaf 1, trekwapening	D_1=0,25πd_1^2	=	490,9	mm^2
	doorsnede per staaf 2, trekwapening	D_2=0,25πd_2^2	=	0,0	mm^2
	doorsnede per staaf 3, drukwapening	D_3=0,25πd_3^2	=	490,9	mm^2
	doorsnede per staaf 4, drukwapening	D_4=0,25πd_4^2	=	0,0	mm^2
	doorsnede per staaf 5, flankwapening	D_5=0,25πd_5^2	=	201,1	mm^2
	doorsnede per beugel enkelsnedig	D_{bg}=0,25πd_{bg}2	A_{sw}=	78,5	mm^2
	aantal snedige beugel bij dwarskracht	n_{sn}	n_{sn}=	2	snedig
	horizontale maat in breedte van de balk	$s_{t,bg}$ = b1 / (n_{sn}-1)	=	2890	mm
	aanwezige beugelwapening (n-snedig)	A_{bgls} = n_{sn} * D_{bg} * 1000 / $s_{aanwezig}$	=	1047	mm^2/m'
	horizontale beugelmaat (hartmaat)	b1=b-2$c_{zijkant}$-d_{bg}	=	2890	mm
	vertikale beugelmaat (hartmaat)	h1=h-$c_{trekzijde}$-$c_{drukzijde}$-d_{bg}	=	2090	mm
	aanwezige trekwapening	$A_{aanw,trek}$	=	4909	mm^2
	aanwezige drukwapening	$A_{aanw,druk}$	=	4909	mm^2
	aanwezige drukwapening	ρ_{druk}= 100 * $A_{aanw,druk}$ / bh (art. 9.2.1.1(3))	=	0,07	%
	aanwezige flankwapening	$A_{aanw,flank}$ per zijde	=	2614	mm^2
	zwaartepunt staven vanaf de beugel	z= (n1 D_1 $^1/_2$ d1+n2 D_2 $^1/_2$ d2) / (n1D_1+n2D_2)	=	12,5	mm
	equivalente diameter wapening (buigwap)	$d_{equi,trek}$= 2 * z (t.b.v. berekening van d)	=	25,0	mm
7.12	equivalente diameter trekwapening (scheurw)	$d_{equi,trek}$= (n1 d_1^2 +n2 d_2^2) / (n1 d_1+n2 d_2)	=	25,0	mm
7.12	equivalente diameter drukwapening	$d_{equi,druk}$= (n3 d_3^2 +n4 d_4^2) / (n3 d_3+n4 d_4)	=	25,0	mm

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buigwapening

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materiaalgegevens

	materiaalfactor beton	γ_c	=	1,5	-
	materiaalfactor wapeningstaal	γ_s	=	1,15	-
	karakteristieke cilinderdruksterkte	f_{ck}	=	30	N/mm^2
	karakteristieke kubusdruksterkte	f_{ck}	=	37	N/mm^2
	gemiddelde cilinderdruksterkte	$f_{cm}=f_{ck}+8$	=	38	N/mm^2
3.15	rekenwaarde betondruksterkte	$f_{cd}=f_{ck} / \gamma_c$	=	20,0	N/mm^2
3.4	gemiddelde cilindertreksterkte	$f_{ctm}=0,3f_{ck}^{(2/3)}$ als $f_{ck}<=50$ of $f_{ctm}=2,12\ln(1+f_{cm}/10)$	=	2,90	N/mm^2
3.1.8(1)	gemiddelde buigtreksterkte beton (3.23)	$f_{ctm,fl}$= max (1,6 - h/1000) f_{ctm} ; f_{ctm})	=	2,90	N/mm^2
	karakteristieke ondergrens treksterkte	$f_{ctk0,05}=0,7f_{ctm}$	=	2,03	N/mm^2
3.16	rekenwaarde treksterkte	$f_{ctd}=f_{ctk0,05} / \gamma_c$	=	1,35	N/mm^2
	elasticiteitsmodulus	$E_{cm}=22000*(f_{cm}/10)^{0,3}$	=	32837	N/mm^2
3.5	elasticiteitsmodulus afgerond	E_{cm}	=	33000	N/mm^2
tabel 3.1	relatieve verkorting beton	ε_{c3}=1,75+0,55 [(f_{ck} - 50) / 40] voor f_{ck}>=50; 1,75		1,750	$^0/_{00}$
tabel 3.1	relatieve verkorting beton	ε_{cu3}= 2,6+ 35 [(90-f_{ck}) / 100]^4 als f_{ck}>=50; 3,50		3,500	$^0/_{00}$
	elasticiteitsmodulus	$E=f_{cd}/\varepsilon_{c3}$	=	11429	N/mm^2
	hoogte betondrukzone: $k_{xu,max}$ (*d)	$k_{xu,max}=\varepsilon_{cu}\ 10^6 / (\varepsilon_{cu}\ 10^6 + 7f_{yd})$	=	0,535	-
	maximum wapeningspercentage	$\rho_{max}=\alpha\ k_{xu,max}f_{cd}/f_{yd}$	=	1,845	%
	factor oppervlak betondrukzone	α= { ε_{cu3} - (ε_{c3} / 2) } / ε_{cu3}	=	0,750	-
	factor zwaartepunt betondrukzone	β={ε^2_{cu3} - (ε_{c3}*ε_{cu3}) +ε^2_{c3}/3 } / { 2 ε^2_{cu3} - ε_{c3} ε_{cu3}}	=	0,39	-
	staaltrekspanning	f_{yk}	=	500	N/mm^2
	rekenwaarde staaltrekspanning	$f_{yd} = f_{yk} / \gamma_s$	=	435	N/mm^2
	elasticiteitsmodulus wapeningstaal	E_s	=	200000	N/mm^2

berekening buigwapening (met trekwapening zonder drukwapening)

	nuttige hoogte	d=h-c- d_{bg}-0,5$d_{equi,trek}$	=	2127,5	mm
	maximale hoogte betondrukzone	$x_{u,max}$= $k_{xu,max}$ * d	=	1138,0	mm
	hoogte betondrukzone	x_u=[d - $\sqrt{}${d^2 - 4βM_{ED} / (αbf_{cd}) }] / 2β	=	37,9	mm
	maatgevende waarde betondrukzone	x_u=	=	37,9	mm
	grootte betondrukkracht	$N_c=\alpha\ x_u\ f_{cd}\ b\ 10^{-3}$	=	1703,9	kN
	grootte staaltrekkracht	$N_s=A_s\ f_{yd}\ 10^{-3}$	=	1703,9	kN
	relatieve verlenging betonstaal	$\varepsilon_{s=}$ (d-x_u) * ε_{cu3} / x_u	=	193,2	$^0/_{00}$
	verlenging volgens art. 3,2,7(2)	ε_{uk}	=	50	$^0/_{00}$
	maximaal toelaatbare verlenging	ε_{ud}=0,9ε_{uk}	=	45	$^0/_{00}$
	momentarm afhankelijk gekozen wapening	z = d - β.x = d - β. $A_{s,aanw}$. f_{yd} / α. f_{cd} . b)	=	2109,1	mm
	momentarm	z = z / d * d	z=	0,99	* d
	benodigde hoeveelheid wapening	$A_{s1}=\alpha$ b x_u f_{cd} / f_{yd}	=	3919	mm^2
	opneembaar moment (zonder drukwap.)	$M_{Rd}=A_{aanw,trek}\ f_{yd}\ z\ 10^{-6}$	=	4501	kNm
	opneembaar moment (globale schatting.)	$M_{Rd}=A_{aanw,trek}\ f_{yd}\ z\ 10^{-6}$ met z= 0,99 * d	=	4501	kNm
	benodigd wapeningspercentage	$\rho=A_{s1}$ / bd*100	=	0,08	%
	wapeningspercentage trekwapening	ρ_{trek}= 100 * $A_{aanw,trek}$ / bd	=	0,08	%
	wapeningspercentage trekwapening	ρ_{trek}= 100 * $A_{aanw,trek}$ / bh (art. 9.2.1.1 (3))	=	0,07	%
	minimum wapening	$A_{min,1}=\rho_{min}$ b d /100	=	7644	mm^2
	minimum wapening	$A_{min,2}$= x * A_{s1}	=	4899	mm^2
	factor	x afhankelijk van primaire of secundaire constructie		1,25	-
	minimum wapening	A_{min}	=	4899	mm^2
	maximum wapening	$A_{max}=\rho_{max}$ b d /100	=	117779	mm^2
	"traditionele" berekening A_s	a=$\beta f_{y,d}^2$ / (b f_{cd} α)	=	1,6	-
	(oplossen vierkantsvergelijking)	b= - f_{yd} * d	=	-925000	-
		c=+M_{Ed}	=	3600	10^6 Nmm
	benodigde hoeveelheid wapening	A_s={ -b - $\sqrt{}$ (b^2 -4ac) } / 2a	=	3919,0	mm^2

berekening buigwapening (met trek- en drukwapenning)

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	specifieke verkorting drukwapening	$\varepsilon_{s,druk}$ >=f_{yd} / E_s*1000	=	2,17	$^0/_{00}$
	hart drukwapening tot uiterste vezel	eis: d2< x_u - $\varepsilon_{s,druk}$ * x_u / ε_{cu3}	=	14,3	mm
	hart drukwapening tot uiterste vezel	d2=$c_{drukzijde}$+d_{bgl}+0,5$d_{gem,druk}$	=	72,5	mm
	opneembaar moment tot $x_{u,max}$	$M_{Rd1}=\rho_{max}$ b d * f_{yd} *z* 10^{-6}	=	86284	kNm
	met als inwendige hefboomsarm	z= d - β $k_{x,max}$ d	=	1685	mm
	uitwendig moment zonder drukwapening	$M_{Ed1}=M_{Rd1}$	=	86284	kNm
	op te nemen moment met drukwapening	M_{Ed2}= $M_{Ed,totaal}$ - M_{Rd1}	=	0,0	kNm
	opneembaar moment met drukwapening	M_{Rd2}= $A_{aanw,druk}$ f_{yd} (d-d2)*10^{-6}	=	4385,9	kNm
	totaal opneembaar moment incl. drukwap	$M_{Rd,totaal}=M_{Rd1}+M_{Rd2}$	=	90669,9	kNm
	benodigde hoeveelheid drukwapening	A_{s2}= M_{Ed2} / { $f_{v,d}$ (d-d2) } * 10^6	=	0	mm^2
	benodigde hoeveelheid trekwapening	A_{s1} (zonder aandeel drukwapening)	=	4899	mm^2
	totaal benodigde trekwapening	$A_{s1,totaal}$= A_{s1} + A_{s2}	=	4899	mm^2
	maatgevende waarde opneembaar moment	$M_{Rd,totaal}$	=	4501	kNm

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berekening moment en wapening bij maximaal toegestane verlenging betonstaal

	minimale hoogte betondrukzone	$x_{min}=\varepsilon_{cu3} * d / (\varepsilon_{ud} + \varepsilon_{cu3})$	=	153,5	mm
	bijbehorende drukkracht in de beton	$N_{cd}=\alpha\ b\ x_{min}\ f_{cd}\ 10^{-3}$	=	6908,9	kN
	inwendige hefboomsarm	$z=d - \beta\ x_{min}$	=	2067,8	mm
	opneembaar moment	$M_{Rd,d} = N_{cd}\ z\ 10^{-6}$	=	14286	kNm
	bijbehorende wapening	$A_s = N_{cd}\ 10^3 / f_{y,d}$	=	15890	mm^2
3.4	gemiddelde cilindertreksterkte beton	f_{ctm}	=	2,90	N/mm^2
	scheurmoment in ongewapende doorsnede	$M_{E,min}= W_c * f_{ctm}\ 10^{-3}$	=	7009,5	kNm
	weerstandsmoment ongescheurde doorsnede	$W_c= 1/6\ b\ h^2\ 10^{-3}$	=	2420000	cm^3
	hierbij behorende (minimum) wapening	$A_{min}=M_{E,min} * 10^6 / z\ f_{yd}$ met z= 2109,1	=	7644	mm^2
	minimum wapeningspercentage	$\rho_{min}=100 * A_{min} / bd$ met A_{min}= 4899	=	0,120	%

lineaire berekening met beperkte herverdeling art 5.5 herverdelen

	verhouding tussen momenten	$\delta_{her} = M_{Ed,herverdeeld} / M_{Ed,elastisch}$	=	1,000	-
5.5(4)	maximaal toelaatbare verhouding	δ=afhankelijk van de kubusdruksterkte f_{ck}	=	0,483	-
	minimum afhankelijk van staalklasse	klasse A: > k_6, klasse B en C: >=k_5	=	0,700	-
	maatgevende waarde	δ	=	0,700	-
5.10.a	maximale herverdeling f_{ck} <= 50Mpa	$\delta>=k_1+k_2\ x_u / d$	=	0,483	-
5.10.b	maximale herverdeling f_{ck} > 50Mpa	$\delta>=k_3+k_4\ x_u / d$	=	0,483	-
	factoren volgens NB 2011	$k_1 = f / (500 + f)$	=	0,47	-
		k_2	=	1,00	-
		$k_3 = 7\ f / (\varepsilon_{cu}\ 10^6 + 7\ f)$	=	0,47	-
		k_4	=	1,00	-
	minimale waarde voor wapeningklasse B en C	k_5	=	0,7	-
	minimale waarde voor wapeningklasse A	k_6	=	0,8	-
		e_{cu2}	=	3,50	$^0/_{00}$
	hoogte betondrukzone na herverdelen	x_u	=	37,9	mm
	nuttige hoogte	d	=	2127,5	mm

scheurwijdte

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controle scheurwijdte zonder directe berekening art.7.3.3

	optredende staalspanning	$\sigma_s=M_{fr} / M_{Ed} * A_{s1,totaal} / A_{aanw,trek} * f_{yd}$		=	325	N/mm^2
	diameter staven d1	d1		=	25,0	mm
	aantal staven	n_1		=	10	st
	diameter staven d2	d2		=	0,0	mm
	aantal staven	n_2		=	0	st
7.12	equivalente staafdiameter	$d_{eq}=(n_1*d1^2+n_2*d2^2) / (n_1*d1+n_2*d2)$		=	25,0	mm
	werkelijke hart op hart afstand	$s= (b - 2c_{zij} - 2d_{bg}-d_{trek}) / (n-1)$		=	317	mm
	gemiddelde h.o.h.- afstand staven	$s_{gem} = b / \Sigma n_{trek}$		=	300	mm
	toelaatbare scheurwijdte	w	milieuklasse A	=	0,30	mm
	toelaatbare scheurwijdte	w	milieuklasse B	=	0,30	mm
	toelaatbare scheurwijdte	w	maatgevende waarde	=	0,30	mm
	toelaatbare staafdiameter	d_{max}	zonder de invloed van k_x	=	9,75	mm
	toelaatbare hart op hart-afstand	s	zonder de invloed van k_x	=	93,75	mm
	toegepaste dekking op buitenste wapening	$c_{applied} = c_{trekzijde}$		=	50	mm
	minimale betondekking	$c_{nom}=c_{min}+\Sigma\Delta c_{dev}$ (incl. correcties)		=	35	mm
	vergrotingsfactor	$k_x=c_{applied} / c_{nom}$ <=2,0		=	1,43	-
	toelaatbare staafdiameter	d_{max}	met de invloed van factor en k_x	=	42,2	mm
	toelaatbare hart op hart-afstand	s	met de invloed van k_x	=	134	mm
(7.6N)	correctiefactor buiging (diameter)	factor = $f_{ct,eff}$ * $k_c\ h_{cr}$ / { 2,9 *2 * (h-d) }		=	3,03	-
(7.7N)	correctiefactor trek (diameter)	factor = $f_{ct,eff}$ * h_{cr} / { 2,9 *8 * (h-d) }		=	1,89	-
	gemiddelde axiale treksterkte	$f_{ct,eff}$	= f_{ctm} tabel 3.1	=	2,90	N/mm^2
	coëfficient afhankelijk van spanningsverdeling	k_c	= buiging =0,4, trek=1,0	=	0,40	-
	hoogte trekzone direct voor scheuren	h_{cr}	= 0,5 h bij rechthoekige doorsnec	=	1100	mm
	afstand hart wapening tot buitenkant beton	(h-d)		=	73	mm
	maatgevende correctiefactor	voor toelaatbare diameter		=	3,03	-

controle scheurwijdte met berekening art. 7,3,4

7.8	berekende scheurwijdte	$w_k=s_{r,max}$ (ε_{sm} - ε_{cm})	=	0,63	mm
		$s_{r,max}$	=	650,0	mm
7.9		(ε_{sm} -ε_{cm})= {σ_s-k_t * $f_{ct,eff}/\rho_{p,eff}$*(1+α_e*$\rho_{p,eff}$) }/E_s =		0,000896	-
	minimale waarde	(ε_{sm} -ε_{cm}) >= 0,6 σ_s / E_s	=	0,000976	-
	maatgevende waarde	(ε_{sm} -ε_{cm})	=	0,000976	-
		σ_s=M_{fr} / M_{Ed} * $A_{s1,totaal}$ / $A_{aanw,trek}$ * f_{yd}	=	325	N/mm^2
	gemiddelde waarde treksterkte op tijd t	$f_{ctm(t)}$ **tijd t nog eens programmeren**	=	2,90	N/mm^2
	gemiddelde waarde treksterkte	$f_{ct,eff}$ op tijdstip van eerste scheuren	=	2,90	N/mm^2
7.10		$\rho_{p,eff}$= (A_s + ξ^2_1 A'$_p$) / $A_{c,ef}$	=	0,009	-
	doorsnede trekwapening	A_s=$A_{aanw,trek}$	=	4909	mm^2
7.3.2(3)	doorsnede voorspanelementen	A'$_p$	=	0	mm^2
		$A_{c,eff}$ minimum waarde onderstaande formules		543750	mm^2
	meewerkend oppervlak	$A_{c,eff}$ =b* 2,5 (h-d)	=	543750	mm^2
		$A_{c,eff}$ = b* (h-x) / 3	=	1895760	mm^2
	van toepassing bij zuivere trek!	$A_{c,eff}$ = b* h/2	=	3300000	mm^2
7,5		ξ_1	=	0	-
	factor	k_t	=	0,4	-
		E_s	=	200000	N/mm^2
7.11	+C2:2011-NB2016	$s_{r,max}$=k_3 c+k_1 k_2 k_4 d_{eq} /$\rho_{p,eff}$< max {(50-0,8f_{ck})Φ en 15Φ}		650,0	mm
		maximum van (50-0,8f_{ck})Φ en 15Φ	=	650,0	mm
	maximale hoh om 7.11 toe te mogen passen	h.o.h. s_{gem} <= 5(c+φ/2) met φ=d_{eq}	<=	363	mm
	dekking op de beschouwde staaf	c	=	60	mm
7.12		d_{eq}=(n_{b1}*$d1_{eq}^2$+n_{b2}*$d2_{eq}^2$) / (n_{b1}*$d1_{eq}$+n_{b2}*$d2_{eq}$) =		25,0	mm
		k1=	=	0,8	-
		k2=	=	0,5	-
7.13	tussenliggende waarden	k2= (e1 + e2) / 2e1	=	n.t.b.	-
		k3=	=	3,4	-
		k4=	=	0,425	-
7.14	bovengrens als s_{gem}> 5 (c+φ/2)	$s_{r,max}$= 1,3 (h-x)	=	2464	mm
	hoogte betondrukzone	x=	=	304	mm
7.15	bovengrens	$s_{r,max}$= 1 / (cos O / $s_{r,max,y}$ + sin O / $s_{r,max,z}$) =		n.t.b.	mm
	bij wapening onder een hoek O				
	berekening van de betondrukzone x en kruipfactor φ in de bruikbaarheidsgrenstoestand				
	oppervlakte van de betondoorsnede	A_c= b * h	=	6600000	mm^2
	omtrek dat bloot staat aan uitdroging	u= 2 zijden 2b	=	6000	mm
	fictieve dikte	h_0= 2 Ac / u (ho <= 1500)	=	1500	mm
3.1.4	kruipfactor a.d.h.v. grafiek 3.1 (2)	φ bepaald volgens art. 3.1.4	=	1,56	-
7.20	gereduceerde elasticiteitsmodulus	$E_{c,eff}$ = E_{cm} / (1 + φ)	=	12892	N/mm^2
	effectieve verhouding elasticiteitsmodulus	α_e= E_s / $E_{c,eff}$	=	15,5	-
	hoogte betondrukzone x in BGT	x= [- $\alpha_e \rho$ + √{ ($\alpha_e \rho$)^2 + 2 $\alpha_e \rho$ }] d	=	304,2	mm
7.3.2(2)	minimum wapening vereist	$A_{s,min}$=k_c k $f_{ct,eff}$ A_{ct} / σ_s 7.1	=	7647	mm^2
	coëfficient	k=factor voor lijven en flenzen	=	1,00	-
	oppervlakte beton binnen trekzone	Act= 0,5 bh (vlak voor het scheuren)	=	3300000	mm^2
	maximaal toelaatbare spanning in staal	σ_s = f_{yk} tbv berekening minimum wapening	=	500	N/mm^2

opmerking:

	benaming betonkwaliteit bij eigen opgave		=	**eigen opgave**	
	karakteristieke cilinderdruksterkte	f_{ck}	=	**19**	N/mm^2
	karakteristieke kubusdruksterkte	f_{ck}	=	**23**	N/mm^2
	benaming staalwaliteit bij eigen opgave		=	**QR36**	
	karakteristieke staaltrekspanning	f_{yk}	=	**360**	N/mm^2
	rekenwaarde staaltrekspanning	f_{yd}	=	**270**	N/mm^2

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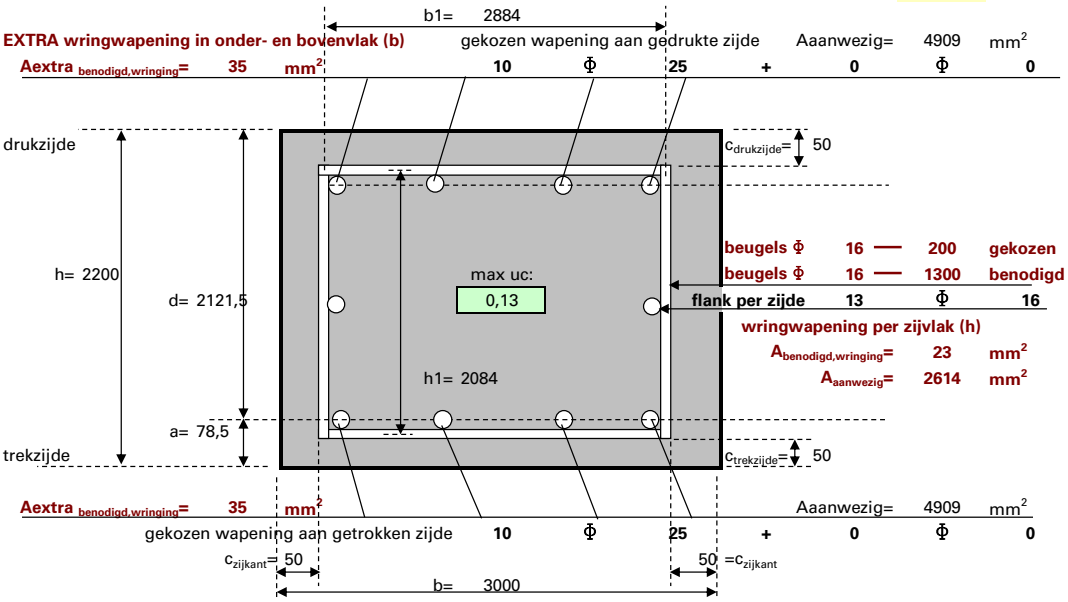
berekening dwarskracht en wringing op rechthoekige doorsnede volgens eurocode 2

3000 x 2200

	algemene gegevens	werk		KIJ-DIM	
		werknummer		10	
		onderdeel		Blokpoer(553)	
2.4.2.4		ontwerpsituatie		blijvend en tijdelijk	
doorsnedegegevens					
	kwaliteit beton	betonklasse	=	C30/37	
	kwaliteit staal	staalsoort	=	B 500	
	betonbreedte	b	=	3000	mm
	betonhoogte	h	=	2200	mm
	betondekking gedrukte zijde	$c_{drukzijde}$	=	50	mm
	betondekking getrokken zijde	$c_{trekzijde}$	=	50	mm
	betondekking zijkanten	$c_{zijkant}$	=	50	mm
	wapening aan getrokken zijde	aantal	n1=	10	stuks
		diameter	d1=	25	mm
		aantal	n2=		stuks
		diameter	d2=		mm
	wapening aan gedrukte zijde	aantal	n3=	10	stuks
		diameter	d3=	25	mm
		aantal	n4=		stuks
		diameter	d4=		mm
	flankwapening per zijde	aantal	n5=	13	stuks
		diameter	d5=	16	mm
gegevens tbv berekening dwarskrachtwapening					
	rekenwaarde dwarskracht	V_{Ed}	=	499	kN
	rekenwaarde wringend moment	T_{Ed}	=	47	kNm
	rekenwaarde moment in doorsnede	M_{Ed} **z wordt nauwkeurig berekend**	=	869	kNm
	normaalkracht in doorsnede	N_{cd}	=	0	kN
	verhoging afschuifsterkte t.g.v. toepassing staalvezels e.d.		=	0	N/mm^2
	gelijkmatig verdeelde belasting op ligger	q_d	=	0	kN/m
	afstand rand oplegging tot begin belasting	a_v	=	1900	mm
	lengte van de oplegging	c in de richting van de overspanni	=	400	mm
	helling betondrukdiagonaal	Θ **(tussen 21,8 en 45 graden)**	=	45	graden
	wapening in verankeringsgebied	A_{sl} (meestal $A_{aanw,trek}$)	=	0	mm^2
	helling dwarskrachtbeugels	α de helling van de beugels is 90 g	=	90	graden
	beugels	diameter	d_{bg}=	16	mm
	aantal sneden per beugel	n_{sn} (normale beugels zijn 2-snedig)	n_{sn}=	4	snedig
	gekozen hart op hart afstand basisbeugels	$s_{l,bg}$	=	200	mm
	diameter opgebogen staven	$d_{opgebogen}$	=	0	mm
	hoh maat rijen van opgebogen staven	$s_{b,opgb}$	=	0	mm
	aantal opgebogen staven per rij	$n_{opgebogen}$	=	0	stuks



resultaten Blokpoer(553

	rekenwaarde schuifspanning	v_{Ed}	door uitwendige belasting	=	0,08	N/mm²
	maatgevende waarde schuifsterkte	$v_{Rd,c}$	door beton	=	0,29	N/mm²
6.9	bovengrens schuifsterkte	$v_{Rd,max}$	door beton	=	5,99	N/mm²
	rekenwaarde dwarskrachtweerstand	$V_{Rd,c}$	door beton	=	1823,2	kN
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s}$	door wapening	=	3703	kN
	rekenwaarde max. dwarskrachtweerstand	$V_{Rd,max}$	door beton	=	38123	kN

wapening tbv dwarskracht

	benodigde beugelwapening per m'	A_{bg}=1000/s * A_{sw} * n_{bg} (n - snedig)		=	0	mm²/m'
	minimum dwarskrachtwapening	$A_{bgls,min}$=$\rho_{w,min}$ * b 1000 /100	**per m'**	=	2629	mm²/m'
	benodigde h.o.h.-afstand beugels	$s_{benodigd}$		=	n.v.t.	mm
	lengte gevaarlijk gebied (alleen bij q-last)	y= (V_{Ed}- $V_{Rd,s}$) / q_d	naast basisbeugels	=	n.v.t.	mm

wapening tbv wringing en dwarskracht

	benodigde h.o.h.-afstand beugels	$s_{benodigd}$		=	1300	mm
	langswapening per zijvlak (h)	tgv wringing		=	23	mm²
	langswapening onder/boven (b)	tgv wringing		=	35	mm²
	benodigde beugelwapening	$A_{s,w,bgls}$ * =1000 / s_{bgls} * A_{sw}		=	600	mm² / m'

unity-checks dwarskracht

	maximum dwarskracht	V_{Ed} / $V_{Rd,max}$	499,0	/	38123,2	=	0,01	-
	dwarskracht gewapend	(V_{Ed} - $V_{Ed,red}$) /$V_{Rd,s}$	499,0	/	3703,0	=	0,13	-
	helling betondrukgebied	21,8 =< ϴ <= 45	=	1,00	-			
	betondrukdiagonaal	V_{Ed} / $V_{Ed,max}$	499,0	/	33604,6	=	0,01	-
	minimum beugelwapening	$A_{bgls,min}$ / A_{bgls}	2629,1	/	4021	=	n.v.t.	-
	dwarskracht ongewapend	(V_{Ed} - $V_{Ed,red}$) /$V_{Rd,c}$	499,0	/	1823,2	=	0,27	-

unity-checks wringing + dwarskracht

	maximum wringingmoment	T_{Ed} / $T_{Rd,max}$	47	/	24814	=	0,00	-
6.29	wringing+dwarskracht	T_{Ed} / $T_{Rd,max}$ +V_{Ed} / $V_{Rd,max}$	0,00	+	0,01	=	0,01	-
	wringing+dwarskracht beugels	$s_{aanwezig}$ / $s_{benodigd}$	200	/	1300	=	n.v.t.	-
	wringing ongewapend	T_{Ed} / $T_{Rd,c}$	47	/	6352,4	=	0,01	-
6.31	wringing+dwarskracht ongew.	T_{Ed}/$T_{Rd,c}$+(V_{Ed}-$V_{Ed,red}$)/$V_{Rd,c}$	0,01	+	0,27	=	0,28	-
	wringing hoeveelheid langswapening in de zijvlakken (h)		23	/	2614	=	0,01	-

wringing hoeveelheid langswapening in de onder- en bovenvlakken (b) moet worden opgeteld bij de buigwapening

toelaatbare afstanden van dwarskrachtwapening

9.2.2(6)	toelaatbare hoh afstand	$s_{l,bg}$ / $s_{l,max}$	200	/	300	=	n.v.t.	-
9.2.2(7)	afstand opgebogen wapening	$s_{b,opbg}$ / $s_{b,max}$	0	/	1273	=	n.v.t	-
9.2.2(8)	max beugelmaat in de breedte	$s_{t,bg}$ / $s_{t,max}$	961	/	500	=	n.v.t.	balken
9.3.2(5)	max beugelmaat in de breedte	$s_{t,bg}$ / $s_{t,max}$	961	/	3182	=	n.v.t.	vloeren

wapeninggegevens

	totaal aantal staven in trekzone	Σn_{trek}=n1+n2		=	10,0	st
	totaal aantal staven in drukzone	Σn_{druk}=n3+n4		=	10,0	st
	gewogen diameter trekwapening	$d_{gem,trek}$=(n1*d_1*D_1+n2*d_2*D_2) / (n1*D_1+n2*D_2)		=	25,0	mm
	gewogen diameter drukwapening	$d_{gem,druk}$=(n3*d_3*D_3+n4*d_4*D_4) / (n3 *D_3+ n4* D_4)		=	25,0	mm
	doorsnede per staaf 1, trekwapening	D_1=0,25$\pi$$d_1^2$		=	491	mm²
	doorsnede per staaf 2, trekwapening	D_2=0,25$\pi$$d_2^2$		=	0	mm²
	doorsnede per staaf 3, drukwapening	D_3=0,25$\pi$$d_3^2$		=	491	mm²
	doorsnede per staaf 4, drukwapening	D_4=0,25$\pi$$d_4^2$		=	0	mm²
	doorsnede per staaf 5, flankwapening	D_5=0,25$\pi$$d_5^2$		=	201	mm²
	doorsnede per beugel enkelsnedig	D_{bg}=0,25$\pi$$d_{bg}$2		A_{sw}=	201	mm²
	aantal snedige beugel bij dwarskracht	n_{sn}		=	4	snedig
	horizontale maat in breedte van de balk	$s_{t,bg}$ = b1 / (n_{sn}-1)		=	961	mm
	aanwezige beugelwapening (n-snedig)	A_{bgls} = n_{sn} * D_{bg} * 1000 / $s_{aanwezig}$		=	4021	mm²/m'
	horizontale beugelmaat (hartmaat)	b1=b-2$c_{zijkant}$-d_{bg}		=	2884	mm
	vertikale beugelmaat (hartmaat)	h1=h-$c_{trekzijde}$-$c_{drukzijde}$-d_{bg}		=	2084	mm
	zwaartepunt staven vanaf de beugel	z= (n1 D_1 $^1/_2$ d1+n2 D_2 $^1/_2$ d2) / (n1D_1+n2D_2)		=	12,5	mm
	equivalente diameter wapening	$d_{equi,trek}$= 2 * z (t.b.v. berekening van d)		=	25,0	mm

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materiaalgegevens

Blokpoer(553)

	materiaalfactor beton	γ_c	=	1,50	-
	materiaalfactor wapeningstaal	γ_s	=	1,15	-
	karakteristieke cilinderdruksterkte	f_{ck}	=	30	N/mm^2
	karakteristieke kubusdruksterkte	f_{ck}	=	37	N/mm^2
	gemiddelde cilinderdruksterkte	$f_{cm}=f_{ck}+8$	=	38	N/mm^2
3.15	rekenwaarde betondruksterkte	$f_{cd}=f_{ck} / \gamma_c$	=	20,0	N/mm^2
3.4	gemiddelde cilindertreksterkte	$f_{ctm}=0{,}3f_{ck}^{(2/3)}$ als $f_{ck<}$=50: $f_{ctm}=2{,}12\ln(1+f_{cm}/10)$	=	2,90	N/mm^2
3.1.8(1)	gemiddelde buigtreksterkte beton (3.23)	$f_{ctm,fl}$= max (1,6 - h/1000) f_{ctm} ; f_{ctm})	=	2,90	N/mm^2
	karakteristieke ondergrens treksterkte	$f_{ctk0,05}=0{,}7f_{ctm}$	=	2,03	N/mm^2
3.16	rekenwaarde treksterkte	$f_{ctd}=f_{ctk0,05} / \gamma_c$	=	1,35	N/mm^2
tabel 3.1	relatieve verkorting	ε_{c3}=1,75+0,55 [(f_{ck} - 50) / 40] voor f_{ck}>=50; 1,75	=	1,750	$^0/_{00}$
tabel 3.1	relatieve verkorting	ε_{cu3}= 2,6+ 35 [(90-f_{ck}) / 100]^4 als f_{ck}>=50; 3,50	=	3,500	$^0/_{00}$
	hoogte betondrukzone: $k_{xu,max}$ (*d)	$k_{xu,max}$ = (1-x)/1,25(0,6+1,4/ε_{cu3})	=	0,448	-
	factor in formule	x	=	0,44	-
	factor oppervlak betondrukzone	α= { ε_{cu3} - (ε_{c3} / 2) } / ε_{cu3}	=	0,750	-
	factor zwaartepunt betondrukzone	β={ε^2_{cu3} - (ε_{c3}*ε_{cu3}) +ε^2_{c3}/3 } / { 2 ε^2_{cu3} - ε_{c3} ε_{cu3} }	=	0,39	-
	staaltrekspanning	f_{yk}	=	500	N/mm^2
	rekenwaarde staaltrekspanning	f_{yd} = f_{yk} / γ_m	=	435	N/mm^2
	elasticiteitsmodulus wapeningstaal	E_s	=	200000	N/mm^2
	nuttige hoogte	d=h-c- d_{bg}-0,5$d_{equi,trek}$	=	2121,5	mm
	hoogte betondrukzone	x_u=[d - $\sqrt{}${d^2 - 4βM_{ED} / (αbf_{cd}) }] / 2β	=	9,1	mm
	momentarm	z=d-β x_u als M_{Ed}=0 rekenen met z=0,9d	=	2118,0	mm

berekening dwarskrachtwapening (beugels)

	aantal snedige beugel	n_{sn}	=	4	snedig
	reductiefactor belasting in gebied 2d	β=a_v / 2d >=0,25	=	0,45	-
	reductie dwarskracht	$V_{Ed,red}$= 0,5 q_d c + 1,25 q_d d	=	0,0	kN
	gereduceerde dwarskracht	V_{Ed}- $V_{Ed,red}$ (op afstand d uit oplegging)	=	499,0	kN
	rekenwaarde schuifspanning	ν_{Ed}=(V_{Ed} - $V_{Ed,red}$) / bd	=	0,08	N/mm^2
6.2.b	ondergrens schuifsterkte of	$\nu_{Rd,c}$=ν_{min}=0,035$k^{3/2}\sqrt{}f_{ck}$ + $k_1\sigma_{cp}$	=	0,29	N/mm^2
6.2.a	rekenwaarde schuifsterkte of	$\nu_{Rd,c}$=$C_{Rd,c}$ * k * (100 ρ_l f_{ck})$^{1/3}$ +$k_1\sigma_{cp}$	=	0,00	N/mm^2
	maatgevende waarde schuifsterkte	$v_{Rd,c}$= 0,29 + 0,00	=	0,29	N/mm^2
	correctiefactor schuifsterkte	$C_{Rd,c}$ = 0,18 / γ_c	=	0,12	-
	factor	k= 1 + $\sqrt{}$ (200/d) <=2,0	=	1,31	-
	wapeningspercentage	ρ_l=A_{sl} / bd*100 <2%	=	0,00	%
	factor	k_1 waarde volgens NB	=	0,15	-
	normaaldrukspanning in doorsnede	σ_{cp} = N_{cd} / bh	=	0,00	N/mm^2
	rekenwaarde dwarskrachtweerstand	$V_{Rd,c}$=$\nu_{Rd,c}$ b d 10^{-3} met beton	=	1823,2	kN
	minimum dwarskrachtwapening	$\rho_{w,min}$= 0,08 $\sqrt{}$ f_{ck} / f_{yk}	=	0,09	%
	minimum dwarskrachtwapening	$A_{bgls,min}$=$\rho_{w,min}$ * b 1000 /100 **per m'**	=	2629,1	mm^2/m'
6.5	betondrukdiagonaal	V_{Ed}<=$V_{Ed,max}$= 0,5 b_w d v f_{cd}	$V_{Ed,max}$=	33604,6	kN
6.9	bovengrens schuifsterkte	$\nu_{Rd,max}$=α_{cw}*(z/d)* ν_1 f_{cd} / (cotΘ + tanΘ)	=	5,99	N/mm^2
	voor niet-voorgespannen constructies	α_{cw}	=	1,0	-
	sterktereductiefactor of	v_1=v=0,6 (1-f_{ck} / 250) als σ_{yd}>0,8f_{yk}	=	0,53	-
	of	v_1=0,6; σ_{yd}<=0,8$f_{yk;}$ f_{ck}<=60	=	0,60	-
	of	v_1=0,9-f_{ck}/200>0,5; σ_{yd}<=0,8$f_{yk;}$ f_{ck}>60	=	0,75	-
	maatgevende waarde factor	v_1	=	0,60	-
	staalspanning in (dwarskracht)beugels	$\sigma_{s\ bgls}$ = s_{aanw} / $s_{bgls\ V+T}$ * f_{yd}	=	65	N/mm^2
	sinus helling betondrukdiagonaal	*sin Θ*	=	0,707	-
	cosinus helling betondrukdiagonaal	*cos Θ*	=	0,707	-
	tangens helling betondrukdiagonaal	*tan Θ*	=	1,000	-
	cotangens helling betondrukdiagonaal	*cot Θ*	=	1,000	-
	cotangens helling dwarskrachtwapening	*cot* α = *1 / tan* α	=	0,000	-
	rekenwaarde max. dwarskrachtweerstand	$V_{Rd,max}$=$\nu_{Rd,max}$ b d 10^{-3}	=	38123,2	kN
	afstand verschoven M-lijn of	a_1=z (cotΘ - cot α) / 2 >=d	=	1059,0	mm
9.2.1.3	verschuivingsregel of	a_1=d	=	2121,5	mm
6.8	opneembare schuifspanning (n-snedig)	$\nu_{Rd,s}$=A_{sw} * f_{yd} * z * cotΘ / (s * b * d)	=	0,58	N/mm^2
	verhouding	z/d (in tabellen wordt 0,9 aangehouden!)	=	1,00	-
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s}$=$\nu_{Rd,s}$ b d 10^{-3} (met beugels)	=	3703,0	kN
	benodigde h.o.h-afstand beugels	s=n_{sn}*A_{sw} f_{yd} z cotΘ / (ν_{Ed} b d) (n_{sn}-snedig)	=	0	mm
9.2.2(6)	maximaal toelaatbare hoh afstand	$s_{l,max}$= 0,75 d (1 + cot α) en <=300mm	=	300	mm
9.2.2(7)	max. afstand opgebogen wapening langsrichti	$s_{b,max}$ = 0,6 d (1 + cot α)	=	1273	mm
9.2.2(8)	max beugelmaat in de breedte (balken)	als V_{Ed} <=0,5 $V_{Rd,max}$	$s_{t,max}$ =	500	mm
	+C2:2011-NB2016	als V_{Ed} >0,5 $V_{Rd,max}$ $s_{t,max}$ = 0,75 d < 500	$s_{t,max}$ =	500	mm
		maatgevende waarde	$s_{t,max}$ =	500	mm
9.3.2(5)	max beugelmaat in de breedte (vloeren)	$s_{t,max}$ = 1,5 d	=	3182	mm
	benodigde beugelwapening per m'	A_{bg} = 1000 / s * A_{sw} * n_{sn} (n - snedig)	=	0	mm^2/m'
	directe berekening (alternatief)	A_{bg} = (V_{Ed}-$V_{Ed,red}$)*1000 / (f_{yd}*z* cotΘ)	=	542	mm^2/m'

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berekening dwarskrachtwapening met alleen opgebogen staven (zonder beugelwapening) Blokpoer(553)

	doorsnede opgebogen wapening	$D_{opgebogen}$	=	1	mm^2
	opgebogen wapening (zonder beugels)	$A_{opgebogen}=v_{Ed}\ b\ d\ ^1/_2\ y\ \sqrt{2}\ /\ (z\ f_{yd})$	=	0	$mm^2/m'/b$
	wapening per afstand $s_{opgebogen}$	$A_{opgeb,s}=A_{opgebogen} * s_{opgebogen} / 1000$	=	0	mm^2/s_{opgeb}
		de gekozen afstand s voldoet			
	benodigd aantal staven per breedte	$n_{opgebogen}=A_{opgeb,s} / d_{opgebogen}$	=	0,00	stuks
	benodigde h.o.h. afstand in de breedte	$a_{breedte}=b / n_{opgebogen}$	=	n.v.t.	mm
	maximaal toelaatbare afstand	s_{max} (kleinste waarde s_{max} en d_a)	=	500	mm
		$d_a=h-c_{trek}-c_{druk}-2*d_{bgl}-(d_{gem,trek}+d_{gem,druk})/2$	=	2043	mm
		$s_{max}=$	=	500	mm
	aanwezig opgebogen wapening	$A_{opgebogen,aanw}=1000*D_{opgebogen} * n_{opgebogen} /s_{opgebogen}$		0	$mm^2/m'/b$
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s,opgeb}= A_{opgebogen,aanw}\ z\ f_{yd} / (\ ^1/_2\ y\ \sqrt{2})$	=	0	kN

berekening dwarskrachtwapening met opgebogen staven (45 graden) en met beugelwapening

	diameter opgebogen staven	$d_{opgebogen}$	=	1	mm
	hoh maat rijen van opgebogen staven	$s_{b,opgb}$	=	1	mm
	aantal opgebogen staven per rij	$n_{opgebogen}$	=	0	stuks
	doorsnede opgebogen wapening	$D_{opgebogen}$	=	1	mm^2
	opgebogen wapening (zonder beugels)	$A_{opgebogen}=(v_{Ed}-v_{Rd,s})\ b\ d\ ^1/_2\ y\ \sqrt{2}\ /\ (z\ f_{yd})$	=	0	$mm^2/m'/b$
	wapening per afstand $s_{opgebogen}$	$A_{opgeb,s}=A_{opgebogen} * s_{b,opgb} / 1000$	=	0	mm^2/s_{opgeb}
		de gekozen afstand s voldoet			
	benodigd aantal staven per breedte	$n_{opgebogen}=A_{opgeb,s} / d_{opgebogen}$	=	0,00	stuks
	benodigde h.o.h. afstand in de breedte	$a_{breedte}=b / n_{opgebogen}$	=	n.v.t.	mm
	max. toelaatbare afstand opgebogen wap.	s_{max} (kleinste waarde s_{max} en d_a)	=	500	mm
		$d_a=h-c_{trek}-c_{druk}-2*d_{bgl}-(d_{gem,trek}+d_{gem,druk})/2$	=	2043	mm
		$s_{max,500}=$ maximale waarde	=	500	mm
	aanwezig opgebogen wapening	$A_{opgebogen,aanw}=1000*D_{opgebogen} * n_{opgebogen} /s_{b,opgb}$		0	$mm^2/m'/b$
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s,opgeb}= A_{opgebogen,aanw}\ z\ f_{yd} / (\ ^1/_2\ y\ \sqrt{2})$	=	0	kN
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s,bgls}=v_{Rd,s}\ b\ d\ 10^{-3}$	=	3703	kN
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s}$=totaal van beugels + opgebogen wapening		3703	kN
9.2.2 (4)	minimaal 50% van de dwarskracht moet met beugels worden opgenomen				

berekening wringwapening (hier wordt altijd met een 2-snedige beugel gerekend)

	scheurmoment wringing	$T_{Rd,c}=f_{ctd}\ t_{ef,i}\ 2\ A_k\ 10^{-6}$	=	6352,4	kNm
		$t_{ef,i}=A / u$	=	634,6	mm
		$A=bh$	=	6600000	mm^2
		$u=2\ (b+h)$	=	10400	mm
	horizontale beugelmaat (hartmaat)	$b1=b-2c_{zijkant}-d_{bg}$	=	2884	mm
	vertikale beugelmaat (hartmaat)	$h1=h-c_{trekzijde}-c_{drukzijde}-d_{bg}$	=	2084	mm
	minimum waarde meewerkende wanddikte				
	aan gedrukte zijde	$t_{ef,i,min}=(c_{druk}+d_{bgl}+0,5d_{gem,druk})*2$	=	157,0	mm
	aan getrokken zijde	$t_{ef,i,min}=(c_{trek}+d_{bgl}+0,5d_{gem,trek})*2$	=	157,0	mm
	aan de zijkanten	$t_{ef,i,min}=(c_{zij}+d_{bgl}+0,5d_{gem,trek})*2$	=	157,0	mm
	maatgevende waarde meewerkende breedte				
	aan gedrukte zijde	$t_{ef,i,druk}$	=	634,6	mm
	aan getrokken zijde	$t_{ef,i,trek}$	=	634,6	mm
	aan de zijkanten	$t_{ef,i,zij}$	=	634,6	mm
	effectieve hoogte	$z_{i,h}=h1_{eff}=h-0,5t_{eff,i,druk}-0,5t_{eff,i,trek}$	=	1565,4	mm
	effectieve breedte	$z_{i,b}=b1_{eff}=b-*t_{eff,i,zij}$	=	2365,4	mm
	kleinste waarde maatgevende breedte	$t_{ef,i,min}=$	=	634,6	mm
		$A_k=b1_{eff}\ h1_{eff}$	=	3702737	mm^2
		$u_k=2\ (b1_{eff}+h1_{eff})$	=	7862	mm
6.30	grenswaarde wringmoment	$T_{Rd,max}=2\ v\ f_{cd}\ t_{ef,i}\ A_k\ \sin\theta\ \cos\theta$	=	24814,0	kNm
		$v=0,6\ (1-f_{ck}/250)$	=	0,53	-
	totale langswapening	$A_{s,langs}=T_{Ed}\ \cot\theta\ u_k / (2\ A_k\ f_{yd})$	=	115	mm^2
	langswapening per zijvlak (h)	$A_{s,langs} * h1_{eff} / u_k$	=	23	mm^2
	langswapening onder/boven (b)	$A_{s,langs} * b1_{eff} / u_k$	=	35	mm^2
	maximale beugelsafstand	$s_{w,max}=2\ A_{s,bgl}\ b1_{eff}\ h1_{eff}\ f_{yd}\ \cot\theta/T_{Ed}$	=	13774	mm

berekening wringing en dwarskracht

	aantal beugels per m' tbv wringing	$n_{bgls,TEd}=1000 / s_{w,max}$	=	0,1	st per m'
	benodigde h.o.h-afstand beugels(dwarskracht)	$s=n_{sn}*A_{sw}\ f_{yd}\ z\ \cot\theta / (v_{Ed}\ b\ d)$ (n_{sn}-snedig)	=	1484	mm
	aantal beugels per m' tbv dwarskracht	$n_{bgls,VEd}=1000 / s$	=	0,7	st per m'
	totaal aantal beugels per m'	$n_{bgls}=n_{bgls,VEd}+n_{bgls\ TEd}$	=	0,7	st per m'
	benodigde hart op hart afstand beugels	$s_{bgl\ V+T}= 1000 / n_{bgls}$	=	1340	mm
9.2.2(6)	maximaal toelaatbare hoh afstand (dwarskrach	$s_{max}= 3/4\ d\ (1+\cot\alpha)$ met α=90 graden	=	1591	mm
	benodigde beugelwapening	$A_{s,w,bgls} * =n_{sn} *1000 / s_{bgls} * A_{sw}$	=	600	mm^2 / m'
9.2.3(3)	maximaal toelaatbare hoh afstand (wringing)	s_{max}=minimum (u / 8 ; b ; h)	=	1300	mm
	optredende staalspanning in de beugels	$\sigma_{s\ bgls} = s_{aanw} / s_{bgls\ V+T} * f_{yd}$	=	65	N/mm^2

opmerking:

BIJLAGE 44
Meridian kenmerk 1668996

Sweco Nederland B.V.
-
Gebruikslicentie COMMERCIELE-versie tot 1-2-2026

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berekening buigwapening in een rechthoekige betondoorsnede: 1400 x 1000
volgens eurocode 1992-1-1 inclusief controle scheurwijdte en betondekking

	algemene gegevens	werk		KIJ-DIM	
		werknummer		10	
		onderdeel		Blokpoer(700)	
2.4.2.4		ontwerpsituatie		blijvend en tijdelijk	
	buigend moment in de doorsnede				
	rekenwaarde moment **voor** herverdelen	$M_{Ed,elastisch}$	=	1200	kNm
	rekenwaarde moment **na** herverdelen	$M_{Ed,totaal}$ (= $M_{Ed,\ herverdeeld}$)	=	1200	kNm
	invloedsfactor minimum wapening	belang van het constructieonderdeel		primair	
	doorsnedegegevens en wapening				
	kwaliteit beton	betonklasse	=	C35/45	
	kwaliteit staal	staalsoort	=	B 500	
	wapeningsklasse	A, B of C	=	B	-
	betonbreedte	b	=	1400	mm
	betonhoogte	h	=	1000	mm
	betondekking gedrukte zijde	$c_{drukzijde}$ **dekking op de buitenste wapening**	=	50	mm
	betondekking getrokken zijde	$c_{trekzijde}$	=	50	mm
	betondekking zijkanten	$c_{zijkant}$	=	50	mm
	wapening aan getrokken zijde	aantal n1	=	7	stuks
		diameter c	=	25	mm
		aantal n2	=	0	stuks
		diameter c	=	0	mm
	wapening aan gedrukte zijde	aantal n3	=	7	stuks
		diameter c	=	25	mm
		aantal n4	=	0	stuks
		diameter c	=	0	mm
	flankwapening per zijde	aantal n5	=	5	stuks
		diameter d_5	=	16	mm
	beugels (of verdeelwapening in buitenste laag)	diameter d_{bg}	=	10	mm
	scheurwijdte **zonder berekening** en betondekking				
	verhouding tussen de frequente combinatie en uiterste grenstoestand:	M_{fr} / M_{Ed}	=	0,75	-
a	ontwerplevensduur		=	30	jaar
b	omgevingsfactoren	milieuklasse A (kies uit X0- XC- XD- of XS-serie)	=	XC4	-
b		milieuklasse B (kies uit X0- XC- XD- of XS-serie)	=	XC4	-
c	soort constructie	soort constructie	=	balk	
d	dekking verhogen bij oncontroleerbaarheid van de wapening (geen eis in eurocode)		=	nee	
e	wordt de beton nabewerkt		=	nee	
f	verhoging dekking bij toepassing grote grindkorrel (>32mm) tabel 4.2		=	nee	
g	ondergrond waarop gestort wordt		=	bekisting	
h	bundeling wapeningstaven (trekwapening)	worden staven d1 gebundeld?	=	nee	
h		worden staven d2 gebundeld?	=	nee	
i	kwaliteitsbeheersing	is specifieke kwaliteitsbeheersing gewaarborgd?		nee	
j	luchtinsluiting	luchtinsluiting van meer dan 4% toegepast?		nee	
k	verhoging dekking bij toepassing grote staafdiameter (>25mm) geen eis in eurocode			nee	
	gegevens invloedsfactoren met **berekende** scheurwijdte				
k1	aanhechteigenschap	de aanhechting van de wapeningstaven is		goed	
k2	wijze van belasting	de betondoorsnede wordt belast door		buiging	
kt	belastingduur (bij berekende scheurwijdte)	de belastingduur is		langdurend	
	milieuklasse	de milieuklasse van de beton is		b) buitenmilieu - RH=80%	
	belasten constructie na aantal dagen	de constructie wordt belast na t_0 is		100	dagen
	cementklasse	de gekozen cementklasse is		N	
	omtrek dat bloot staat aan uitdroging	het aantal zijden dat aan uitdroging bloot staat is		2 zijden 2b	

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resultaten

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opneembaar moment

maatgevende waarde opneembaar moment	$M_{Rd,totaal}$	bij gekozen wapening	=	1350	kNm

buigwapening

totale hoeveelheid trekwapening benodigd	$A_{s1,totaal} = A_{s1} + A_{s2}$		=	3045	mm^2
totale hoeveelheid drukwapening benodigd	$A_{s2} = M_{Ed2} / (f_{y,d} (d-d2) * 10^6$		=	0	mm^2
minimum wapening	ρ_{min1}		=	1906	mm^2

scheurwijdte

toelaatbare scheurwijdte	$w * k_x$		=	0,43	mm
scheurwijdtecontrole zonder berekening	maximum staafdiameter		=	25,3	mm
scheurwijdtecontrole zonder berekening	maximum hart op hart afstand		=	200,0	mm
optredende scheurwijdte met berekening	w_k		=	0,45	mm

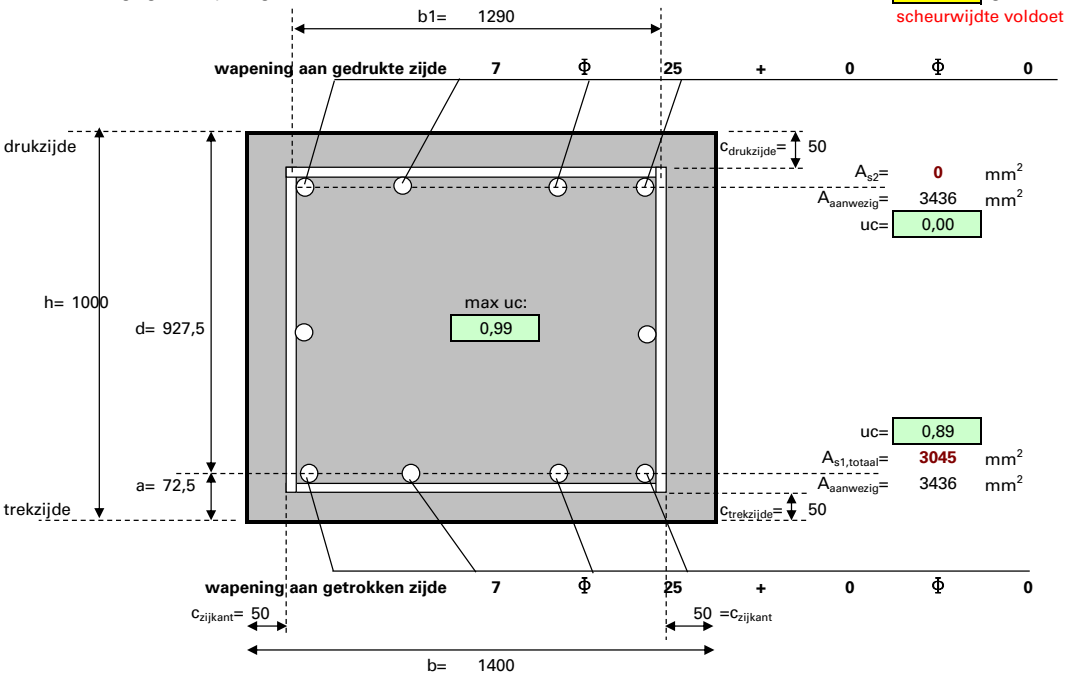
betondekking

minimum betondekking	c_{nom}	op de buitenste wapening	=	35	mm
constructieklasse (betondekking)	S		S	4	-

unity-checks buigwapening, scheurwijdte en dekking, herverdeling

	buigend moment	$M_{Ed,totaal} / M_{Rd,totaal}$	1200	/	1350	= 0,89	-
	trekwapening benodigd	$A_{s1,totaal} / A_{aanw,trek}$	3045	/	3436	= 0,89	-
	drukwapening benodigd	$A_{s2} / A_{aanw,druk}$	0	/	3436	= 0,00	-
	herverdeling momenten	δ / δ_{her}	0,70	/	1,00	= 0,70	-
	positie drukwapening	d2 / d2,max	72,5	/	20,5	= 0,00	-
	minimum wapeningspercentage	ρ_{min} / ρ_{trek}	0,15	/	0,26	= n.v.t.	-
9.2.1.1(3)	maximum percentage trekwap.	ρ_{trek} / ρ_{max}	0,25	/	4,0	= 0,06	-
	maximum percentage drukwap.	ρ_{druk} / ρ_{max}	0,25	/	4,0	= 0,06	-
	scheurwijdte zonder berekening	diameter of hoh afstand	0,99	of	1,05	= 0,99	-
	scheurwijdte met berekening	$w_k / w * k_x$	0,45	/	0,30	= 1,06	-
	min. wapening bij scheurwijdte	$A_{s,min} / A_{aanw,trek}$	1798	/	3436	0,52	-
	minimale betondekking	$c_{nom} / c_{trekzijde}$	35	/	50	= 0,70	-
	moment ongescheurde doorsnede	$M_{Ed,totaal} / M_r$ (ongewapend)	1200	/	749	= 1,60	(geen eis)
	verlenging trekwapening	$\varepsilon_s / \varepsilon_{ud}$	56,6	/	45	= 1,26	(geen eis)

scheurwijdte voldoet



betondekking

berekening minimum betondekking op trekwapening

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tab4.3N	correctie van de constructieklasse: uitgangspunt:constructieklasse bij 50 jaar				S	4	-
a	correctie tgv ontwerplevensduur					0	-
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse A of B)					0	-
c	correctie tgv geometrie					0	-
i	correctie tgv kwaliteitsbeheersing					0	+
	totale waarde constructieklasse				S	4	
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse A)					0	
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse B)					0	
	berekening van de nominale dekking voor hoofdwapening en beugels (in mm)					hoofdwapening	beugels
tabel 4.2	minimum dekking t.g.v. **aanhechting**	$c_{min,b} > d_n$	$c_{grindkorrel}$= 0	$c_{min,b}+c_{grindkorrel}$	=	25	10
tab 4.4N	minimum dekking tgv milieuklasse A	$c_{min,dur}$			=	30	30
	minimum dekking tgv milieuklasse B	$c_{min,dur}$			=	30	30
	resulterende minimum dekking	$c_{min,dur}$	(duurzaamheid)		=	30	30
e	correctie tgv nabewerking	c_{extra}			=	0	0
	gecorrigeerde min. dekking **duurzaamheid**	$c_{min,dur}$	inclusief c_{extra}		=	30	30
4.2	**minimum dekking**	c_{min} = max($c_{min,b}$; $c_{min,dur}$; 10mm)			=	30	30
	toeslagen uitvoeringstoleranties	Δc_{dev}			=	5	5
g	storten op werkvloer / maaiveld / kist	Δc_{dev}			=	0	0
d	t.g.v. oncontroleerbaarheid	Δc_{dev}	**geen eis in eurocode!**		=	0	0
4.1	nominale waarde betondekking	$c_{nom}=c_{min} + \Sigma\Delta c_{dev}$			=	35	35
k	t.g.v. toegepaste hoofdwapening >25mm	c_{nom}= 1,5d_n	**geen eis in eurocode!**		=	0	0
	equivalente staafdiameter	d_n=max($d1_{eq}$;$d2_{eq}$)=	25,0	d_{bg}= 10			
	dekking op de buitenste wapening	Hoofdwapening: c_{nom}- d_{bg}	Beugels: c_{nom}		=	25	35
	resulterende waarde minimale dekking	c_{nom}	op de buitenste wapening		=	35	

wapeninggegevens

	totaal aantal staven in trekzone	Σn_{trek}=n1+n2	=	7,0	st
	totaal aantal staven in drukzone	Σn_{druk}=n3+n4	=	7,0	st
	gewogen gemiddelde diameter trekwapening	$d_{gem,trek}$=(n1*d_1*D_1+n2*d_2*D_2) / (n1*D_1+n2*D_2) =		25,0	mm
	gewogen gemiddelde diameter drukwapening	$d_{gem,druk}$=(n3*d_3*D_3+n4*d_4*D_4) / (n3 *D_3+ n4* D_4) =		25,0	mm
	doorsnede per staaf 1, trekwapening	D_1=0,25πd_1^2	=	490,9	mm^2
	doorsnede per staaf 2, trekwapening	D_2=0,25πd_2^2	=	0,0	mm^2
	doorsnede per staaf 3, drukwapening	D_3=0,25πd_3^2	=	490,9	mm^2
	doorsnede per staaf 4, drukwapening	D_4=0,25πd_4^2	=	0,0	mm^2
	doorsnede per staaf 5, flankwapening	D_5=0,25πd_5^2	=	201,1	mm^2
	doorsnede per beugel enkelsnedig	D_{bg}=0,25πd_{bg}2	A_{sw}=	78,5	mm^2
	aantal snedige beugel bij dwarskracht	n_{sn}	n_{sn}=	2	snedig
	horizontale maat in breedte van de balk	$s_{t,bg}$ = b1 / (n_{sn}-1)	=	1290	mm
	aanwezige beugelwapening (n-snedig)	A_{bgls} = n_{sn} * D_{bg} * 1000 / $s_{aanwezig}$	=	1047	mm^2/m'
	horizontale beugelmaat (hartmaat)	b1=b-2$c_{zijkant}$-d_{bg}	=	1290	mm
	vertikale beugelmaat (hartmaat)	h1=h-$c_{trekzijde}$-$c_{drukzijde}$-d_{bg}	=	890	mm
	aanwezige trekwapening	$A_{aanw,trek}$	=	3436	mm^2
	aanwezige drukwapening	$A_{aanw,druk}$	=	3436	mm^2
	aanwezige drukwapening	ρ_{druk}= 100 * $A_{aanw,druk}$ / bh (art. 9.2.1.1(3))	=	0,25	%
	aanwezige flankwapening	$A_{aanw,flank}$ per zijde	=	1005	mm^2
	zwaartepunt staven vanaf de beugel	z= (n1 D_1 $^1/_2$ d1+n2 D_2 $^1/_2$ d2) / (n1D_1+n2D_2)	=	12,5	mm
	equivalente diameter wapening (buigwap)	$d_{equi,trek}$= 2 * z (t.b.v. berekening van d)	=	25,0	mm
7.12	equivalente diameter trekwapening (scheurw)	$d_{equi,trek}$= (n1 d_1^2 +n2 d_2^2) / (n1 d_1+n2 d_2)	=	25,0	mm
7.12	equivalente diameter drukwapening	$d_{equi,druk}$= (n3 d_3^2 +n4 d_4^2) / (n3 d_3+n4 d_4)	=	25,0	mm

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buigwapening

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materiaalgegevens

	materiaalfactor beton	γ_c	=	1,5	-
	materiaalfactor wapeningstaal	γ_s	=	1,15	-
	karakteristieke cilinderdruksterkte	f_{ck}	=	35	N/mm^2
	karakteristieke kubusdruksterkte	f_{ck}	=	45	N/mm^2
	gemiddelde cilinderdruksterkte	$f_{cm}=f_{ck}+8$	=	43	N/mm^2
3.15	rekenwaarde betondruksterkte	$f_{cd}=f_{ck}/\gamma_c$	=	23,3	N/mm^2
3.4	gemiddelde cilindertreksterkte	$f_{ctm}=0{,}3f_{ck}^{(2/3)}$ als $f_{ck}<=50$ of $f_{ctm}=2{,}12\ln(1+f_{cm}/10)$	=	3,21	N/mm^2
3.1.8(1)	gemiddelde buigtreksterkte beton (3.23)	$f_{ctm,fl}$= max (1,6 - h/1000) f_{ctm} ; f_{ctm})	=	3,21	N/mm^2
	karakteristieke ondergrens treksterkte	$f_{ctk0,05}=0{,}7f_{ctm}$	=	2,25	N/mm^2
3.16	rekenwaarde treksterkte	$f_{ctd}=f_{ctk0,05}/\gamma_c$	=	1,50	N/mm^2
	elasticiteitsmodulus	$E_{cm}=22000*(f_{cm}/10)^{0,3}$	=	34077	N/mm^2
3.5	elasticiteitsmodulus afgerond	E_{cm}	=	34000	N/mm^2
tabel 3.1	relatieve verkorting beton	ε_{c3}=1,75+0,55 [(f_{ck} - 50) / 40] voor f_{ck}>=50; 1,75		1,750	$^0/_{00}$
tabel 3.1	relatieve verkorting beton	ε_{cu3}= 2,6+ 35 [(90-f_{ck}) / 100]^4 als f_{ck}>=50; 3,50		3,500	$^0/_{00}$
	elasticiteitsmodulus	$E=f_{cd}/\varepsilon_{c3}$	=	13333	N/mm^2
	hoogte betondrukzone: $k_{xu,max}$ (*d)	$k_{xu,max}=\varepsilon_{cu}\,10^6/(\varepsilon_{cu}\,10^6+7f_{yd})$	=	0,535	-
	maximum wapeningspercentage	$\rho_{max}=\alpha\ k_{xu,max}f_{cd}/f_{yd}$	=	2,153	%
	factor oppervlak betondrukzone	α= { ε_{cu3} - (ε_{c3} / 2) } / ε_{cu3}	=	0,750	-
	factor zwaartepunt betondrukzone	$\beta=\{\varepsilon^2_{cu3}-(\varepsilon_{c3}*\varepsilon_{cu3})+\varepsilon^2_{c3}/3\}/\{2\,\varepsilon^2_{cu3}-\varepsilon_{c3}\,\varepsilon_{cu3}\}$	=	0,39	-
	staaltrekspanning	f_{yk}	=	500	N/mm^2
	rekenwaarde staaltrekspanning	$f_{yd}=f_{yk}/\gamma_s$	=	435	N/mm^2
	elasticiteitsmodulus wapeningstaal	E_s	=	200000	N/mm^2

berekening buigwapening (met trekwapening zonder drukwapening)

	nuttige hoogte	$d=h-c-d_{bg}-0{,}5d_{equi,trek}$	=	927,5	mm
	maximale hoogte betondrukzone	$x_{u,max}=k_{xu,max}*d$	=	496,1	mm
	hoogte betondrukzone	$x_u=[\,d-\sqrt{\{d^2-4\beta M_{ED}/(\alpha bf_{cd})\}}\,]/2\beta$	=	54,0	mm
	maatgevende waarde betondrukzone	x_u=	=	54,0	mm
	grootte betondrukkracht	$N_c=\alpha\ x_u\ f_{cd}\ b\ 10^{-3}$	=	1323,8	kN
	grootte staaltrekkracht	$N_s=A_s\ f_{yd}\ 10^{-3}$	=	1323,8	kN
	relatieve verlenging betonstaal	$\varepsilon_{s=}(d-x_u)*\varepsilon_{cu3}/x_u$	=	56,6	$^0/_{00}$
	verlenging volgens art. 3,2,7(2)	ε_{uk}	=	50	$^0/_{00}$
	maximaal toelaatbare verlenging	$\varepsilon_{ud}=0{,}9\varepsilon_{uk}$	=	45	$^0/_{00}$
	momentarm afhankelijk gekozen wapening	z = d - β.x = d - β. $A_{s,aanw}$. f_{yd} / α. f_{cd} . b)	=	903,8	mm
	momentarm	z = z / d * d	z=	0,97	* d
	benodigde hoeveelheid wapening	$A_{s1}=\alpha\ b\ x_u\ f_{cd}/f_{yd}$	=	3045	mm^2
	opneembaar moment (zonder drukwap.)	$M_{Rd}=A_{aanw,trek}\,f_{yd}\,z\,10^{-6}$	=	1350	kNm
	opneembaar moment (globale schatting.)	$M_{Rd}=A_{aanw,trek}\,f_{yd}\,z\,10^{-6}$ met z= 0,97 * d	=	1350	kNm
	benodigd wapeningspercentage	$\rho=A_{s1}/bd*100$	=	0,23	%
	wapeningspercentage trekwapening	ρ_{trek}= 100 * $A_{aanw,trek}$ / bd	=	0,26	%
	wapeningspercentage trekwapening	ρ_{trek}= 100 * $A_{aanw,trek}$ / bh (art. 9.2.1.1 (3))	=	0,25	%
	minimum wapening	$A_{min,1}=\rho_{min}\ b\ d\ /100$	=	1906	mm^2
	minimum wapening	$A_{min,2}$= x * A_{s1}	=	3806	mm^2
	factor	x afhankelijk van primaire of secundaire constructie		1,25	-
	minimum wapening	A_{min}	=	1906	mm^2
	maximum wapening	$A_{max}=\rho_{max}\ b\ d\ /100$	=	27955	mm^2
	"traditionele" berekening A_s	$a=\beta f_{y,d}^2/(b\,f_{cd}\,\alpha)$	=	3,0	-
	(oplossen vierkantsvergelijking)	b= - f_{yd} * d	=	-403261	-
		c=+M_{Ed}	=	1200	10^6 Nmm
	benodigde hoeveelheid wapening	$A_s=\{-b-\sqrt{(b^2-4ac)}\}/2a$	=	3044,7	mm^2

berekening buigwapening (met trek- en drukwapenning)

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	specifieke verkorting drukwapening	$\varepsilon_{s,druk}$ >=f_{yd} / E_s*1000	=	2,17	$^0/_{00}$
	hart drukwapening tot uiterste vezel	eis: d2< x_u - $\varepsilon_{s,druk}$ * x_u / ε_{cu3}	=	20,5	mm
	hart drukwapening tot uiterste vezel	$d2=c_{drukzijde}+d_{bgl}+0{,}5d_{gem,druk}$	=	72,5	mm
	opneembaar moment tot $x_{u,max}$	$M_{Rd1}=\rho_{max}\ b\ d\ *\ f_{yd}\ *z*\ 10^{-6}$	=	8928	kNm
	met als inwendige hefboomsarm	z= d - β $k_{x,max}$ d	=	735	mm
	uitwendig moment zonder drukwapening	$M_{Ed1}=M_{Rd1}$	=	8928	kNm
	op te nemen moment met drukwapening	M_{Ed2}= $M_{Ed,totaal}$ - M_{Rd1}	=	0,0	kNm
	opneembaar moment met drukwapening	M_{Rd2}= $A_{aanw,druk}$ f_{yd} (d-d2)*10^{-6}	=	1277,3	kNm
	totaal opneembaar moment incl. drukwap	$M_{Rd,totaal}=M_{Rd1}+M_{Rd2}$	=	10205,7	kNm
	benodigde hoeveelheid drukwapening	A_{s2}= M_{Ed2} / { $f_{v,d}$ (d-d2) } * 10^6	=	0	mm^2
	benodigde hoeveelheid trekwapening	A_{s1} (zonder aandeel drukwapening)	=	3045	mm^2
	totaal benodigde trekwapening	$A_{s1,totaal}$= A_{s1} + A_{s2}	=	3045	mm^2
	maatgevende waarde opneembaar moment	$M_{Rd,totaal}$	=	1350	kNm

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berekening moment en wapening bij maximaal toegestane verlenging betonstaal

	minimale hoogte betondrukzone	$x_{min}=\varepsilon_{cu3}$ * d / (ε_{ud} + ε_{cu3})	=	66,9	mm
	bijbehorende drukkracht in de beton	$N_{cd}=\alpha$ b x_{min} f_{cd} 10^{-3}	=	1639,9	kN
	inwendige hefboomsarm	z=d - β x_{min}	=	901,5	mm
	opneembaar moment	$M_{Rd,d}$ = N_{cd} z 10^{-6}	=	1478	kNm
	bijbehorende wapening	A_s = N_{cd} 10^3 / $f_{y,d}$	=	3772	mm^2
3.4	gemiddelde cilindertreksterkte beton	f_{ctm}	=	3,21	N/mm^2
	scheurmoment in ongewapende doorsnede	$M_{E,min}$= W_c * f_{ctm} 10^{-3}	=	749,0	kNm
	weerstandsmoment ongescheurde doorsnede	W_c= 1/6 b h^2 10^{-3}	=	233333	cm^3
	hierbij behorende (minimum) wapening	A_{min}=$M_{E,min}$ * 10^6 / z f_{yd} met z= 903,8	=	1906	mm^2
	minimum wapeningspercentage	ρ_{min}=100 * A_{min} / bd met A_{min}= 1906	=	0,147	%

lineaire berekening met beperkte herverdeling art 5.5 herverdelen

	verhouding tussen momenten	δ_{her} = $M_{Ed,herverdeeld}$ / $M_{Ed,elastisch}$	=	1,000	-
5.5(4)	maximaal toelaatbare verhouding	δ=afhankelijk van de kubusdruksterkte f_{ck}	=	0,523	-
	minimum afhankelijk van staalklasse	klasse A: > k_6, klasse B en C: >=k_5	=	0,700	-
	maatgevende waarde	δ	=	0,700	-
5.10.a	maximale herverdeling f_{ck} <= 50Mpa	δ>=k_1+k_2 x_u / d	=	0,523	-
5.10.b	maximale herverdeling f_{ck} > 50Mpa	δ>=k_3+k_4 x_u / d	=	0,523	-
	factoren volgens NB 2011	k_1 = f / (500 + f)	=	0,47	-
		k_2	=	1,00	-
		k_3 = 7 f / (ε_{cu} 10^6 + 7 f)	=	0,47	-
		k_4	=	1,00	-
	minimale waarde voor wapeningklasse B en C	k_5	=	0,7	-
	minimale waarde voor wapeningklasse A	k_6	=	0,8	-
		e_{cu2}	=	3,50	$^0/_{00}$
	hoogte betondrukzone na herverdelen	x_u	=	54,0	mm
	nuttige hoogte	d	=	927,5	mm

scheurwijdte

Blokpoer(700)

controle scheurwijdte zonder directe berekening art.7.3.3

	optredende staalspanning	σ_s=M_{fr} / M_{Ed} * $A_{s1,totaal}$ / $A_{aanw,trek}$ * f_{yd}		=	289	N/mm^2
	diameter staven d1	d1		=	25,0	mm
	aantal staven	n_1		=	7	st
	diameter staven d2	d2		=	0,0	mm
	aantal staven	n_2		=	0	st
7.12	equivalente staafdiameter	d_{eq}=(n_1*$d1^2$+n_2*$d2^2$) / (n_1*d1+n_2*d2)		=	25,0	mm
	werkelijke hart op hart afstand	s= (b - 2c_{zij} - 2d_{bg}-d_{trek}) / (n-1)		=	209	mm
	gemiddelde h.o.h.- afstand staven	s_{gem} = b / $\sum n_{trek}$		=	200	mm
	toelaatbare scheurwijdte	w	milieuklasse A	=	0,30	mm
	toelaatbare scheurwijdte	w	milieuklasse B	=	0,30	mm
	toelaatbare scheurwijdte	w	maatgevende waarde	=	0,30	mm
	toelaatbare staafdiameter	d_{max}	zonder de invloed van k_x	=	11,6	mm
	toelaatbare hart op hart-afstand	s	zonder de invloed van k_x	=	140	mm
	toegepaste dekking op buitenste wapening	$c_{applied}$ = $c_{trekzijde}$		=	50	mm
	minimale betondekking	c_{nom}=c_{min}+$\sum\Delta c_{dev}$ (incl. correcties)		=	35	mm
	vergrotingsfactor	k_x=$c_{applied}$ / c_{nom} <=2,0		=	1,43	-
	toelaatbare staafdiameter	d_{max}	met de invloed van factor en k_x	=	25,3	mm
	toelaatbare hart op hart-afstand	s	met de invloed van k_x	=	200	mm
(7.6N)	correctiefactor buiging (diameter)	factor = $f_{ct,eff}$ * k_c h_{cr} / { 2,9 *2 * (h-d) }		=	1,53	-
(7.7N)	correctiefactor trek (diameter)	factor = $f_{ct,eff}$ * h_{cr} / { 2,9 *8 * (h-d) }		=	0,95	-
	gemiddelde axiale treksterkte	$f_{ct,eff}$	= f_{ctm} tabel 3.1	=	3,21	N/mm^2
	coëfficient afhankelijk van spanningsverdeling	k_c	= buiging =0,4, trek=1,0	=	0,40	-
	hoogte trekzone direct voor scheuren	h_{cr}	= 0,5 h bij rechthoekige doorsnec	=	500	mm
	afstand hart wapening tot buitenkant beton	(h-d)		=	73	mm
	maatgevende correctiefactor	voor toelaatbare diameter		=	1,53	-

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controle scheurwijdte met berekening art. 7,3,4

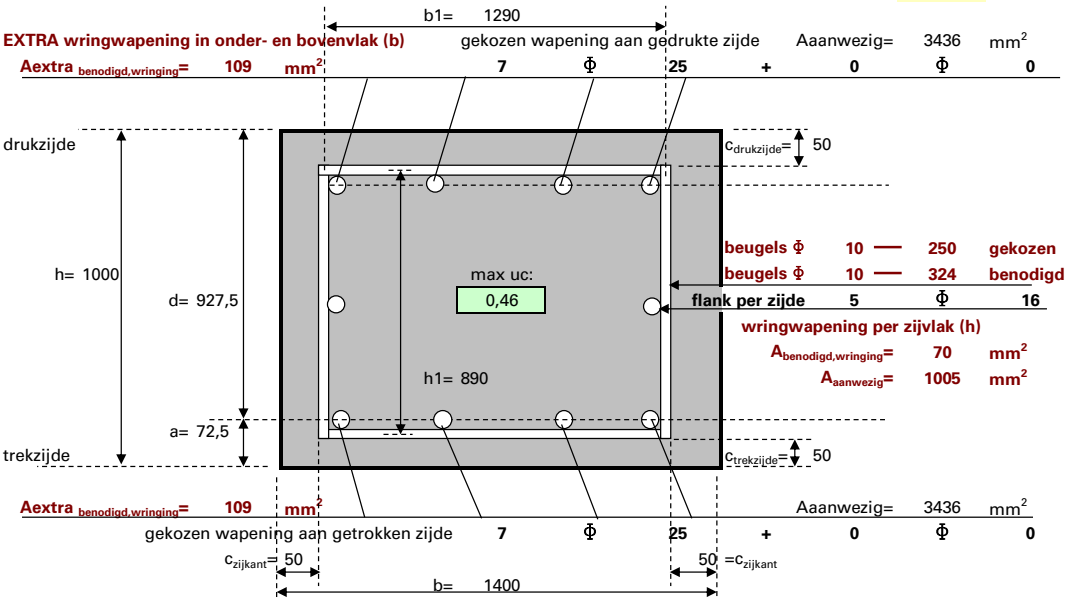
7.8	berekende scheurwijdte	$w_k=s_{r,max}(\varepsilon_{sm}-\varepsilon_{cm})$	=	0,45	mm
		$s_{r,max}$	=	517,9	mm
7.9		$(\varepsilon_{sm}-\varepsilon_{cm})=\{\sigma_s-k_t * f_{ct,eff}/\rho_{p,eff}*(1+\alpha_e*\rho_{p,eff})\}/E_s$ =		0,000878	-
	minimale waarde	$(\varepsilon_{sm}-\varepsilon_{cm}) >= 0,6\ \sigma_s / E_s$	=	0,000867	-
	maatgevende waarde	$(\varepsilon_{sm}-\varepsilon_{cm})$	=	0,000878	-
		$\sigma_s=M_{fr} / M_{Ed} * A_{s1,totaal} / A_{aanw,trek} * f_{yd}$	=	289	N/mm²
	gemiddelde waarde treksterkte op tijd t	$f_{ctm(t)}$ **tijd t nog eens programmeren**	=	3,21	N/mm²
	gemiddelde waarde treksterkte	$f_{ct,eff}$ op tijdstip van eerste scheuren	=	3,21	N/mm²
7.10		$\rho_{p,eff}=(A_s+\xi^2_1 A'_p)/A_{c,ef}$	=	0,014	-
	doorsnede trekwapening	$A_s=A_{aanw,trek}$	=	3436	mm²
7.3.2(3)	doorsnede voorspanelementen	A'_p	=	0	mm²
		$A_{c,eff}$ minimum waarde onderstaande formules		253750	mm²
	meewerkend oppervlak	$A_{c,eff}$ =b* 2,5 (h-d)	=	253750	mm²
		$A_{c,eff}$ = b* (h-x) / 3	=	362679	mm²
	van toepassing bij zuivere trek!	$A_{c,eff}$ = b* h/2	=	700000	mm²
7,5		ξ_1	=	0	-
	factor	k_t	=	0,4	-
		E_s	=	200000	N/mm²
7.11	+C2:2011-NB2016	$s_{r,max}=k_3\ c+k_1\ k_2\ k_4\ d_{eq}/\rho_{p,eff}$< max {(50-0,8$f_{ck}$)$\Phi$ en 15Φ		517,9	mm
		maximum van (50-0,8f_{ck})Φ en 15Φ	=	550,0	mm
	maximale hoh om 7.11 toe te mogen passen	h.o.h. s_{gem} <= 5(c+φ/2) met $\varphi=d_{eq}$	<=	363	mm
	dekking op de beschouwde staaf	c	=	60	mm
7.12		$d_{eq}=(n_{b1}*d1_{eq}^2+n_{b2}*d2_{eq}^2)/(n_{b1}*d1_{eq}+n_{b2}*d2_{eq})$ =		25,0	mm
		k1=	=	0,8	-
		k2=	=	0,5	-
7.13	tussenliggende waarden	k2= (e1 + e2) / 2e1	=	n.t.b.	-
		k3=	=	3,4	-
		k4=	=	0,425	-
7.14	bovengrens als s_{gem}> 5 (c+φ/2)	$s_{r,max}$= 1,3 (h-x)	=	1010	mm
	hoogte betondrukzone	x=	=	223	mm
7.15	bovengrens	$s_{r,max}=1/(\cos O / s_{r,max,y}+\sin O / s_{r,max,z})$ =		n.t.b.	mm
	bij wapening onder een hoek O				
	berekening van de betondrukzone x en kruipfactor φ in de bruikbaarheidsgrenstoestand				
	oppervlakte van de betondoorsnede	A_c= b * h	=	1400000	mm²
	omtrek dat bloot staat aan uitdroging	u= 2 zijden 2b	=	2800	mm
	fictieve dikte	h_0= 2 Ac / u (ho <= 1500)	=	1000	mm
3.1.4	kruipfactor a.d.h.v. grafiek 3.1 (2)	φ bepaald volgens art. 3.1.4	=	1,44	-
7.20	gereduceerde elasticiteitsmodulus	$E_{c,eff}=E_{cm}/(1+\varphi)$	=	13933	N/mm²
	effectieve verhouding elasticiteitsmodulus	α_e= $E_s / E_{c,eff}$	=	14,4	-
	hoogte betondrukzone x in BGT	$x=[-\alpha_e\rho+\sqrt{\{(\alpha_e\rho)^2+2\alpha_e\rho\}}]\ d$	=	222,8	mm
7.3.2(2)	minimum wapening vereist	$A_{s,min}=k_c\ k\ f_{ct,eff}\ A_{ct}/\sigma_s$ 7.1	=	1798	mm²
	coëfficient	k=factor voor lijven en flenzen	=	1,00	-
	oppervlakte beton binnen trekzone	Act= 0,5 bh (vlak voor het scheuren)	=	700000	mm²
	maximaal toelaatbare spanning in staal	$\sigma_s=f_{yk}$ tbv berekening minimum wapening	=	500	N/mm²

opmerking:

berekening dwarskracht en wringing op rechthoekige doorsnede volgens eurocode 2

1400 x 1000

	algemene gegevens	werk		KIJ-DIM	
		werknummer		10	
		onderdeel		Blokpoer(700)	
2.4.2.4		ontwerpsituatie		blijvend en tijdelijk	
doorsnedegegevens					
	kwaliteit beton	betonklasse	=	C35/45	
	kwaliteit staal	staalsoort	=	B 500	
	betonbreedte	b	=	1400	mm
	betonhoogte	h	=	1000	mm
	betondekking gedrukte zijde	$c_{drukzijde}$	=	50	mm
	betondekking getrokken zijde	$c_{trekzijde}$	=	50	mm
	betondekking zijkanten	$c_{zijkant}$	=	50	mm
	wapening aan getrokken zijde	aantal	n1=	7	stuks
		diameter	d1=	25	mm
		aantal	n2=		stuks
		diameter	d2=		mm
	wapening aan gedrukte zijde	aantal	n3=	7	stuks
		diameter	d3=	25	mm
		aantal	n4=		stuks
		diameter	d4=		mm
	flankwapening per zijde	aantal	n5=	5	stuks
		diameter	d5=	16	mm
gegevens tbv berekening dwarskrachtwapening					
	rekenwaarde dwarskracht	V_{Ed}	=	229	kN
	rekenwaarde wringend moment	T_{Ed}	=	67	kNm
	rekenwaarde moment in doorsnede	M_{Ed} **z wordt nauwkeurig berekend**	=	767	kNm
	normaalkracht in doorsnede	N_{cd}	=	0	kN
	verhoging afschuifsterkte t.g.v. toepassing staalvezels e.d.		=	0	N/mm^2
	gelijkmatig verdeelde belasting op ligger	q_d	=	0	kN/m
	afstand rand oplegging tot begin belasting	a_v	=	2830	mm
	lengte van de oplegging	c in de richting van de overspanni	=	400	mm
	helling betondrukdiagonaal	Θ **(tussen 21,8 en 45 graden)**	=	45	graden
	wapening in verankeringsgebied	A_{sl} (meestal $A_{aanw,trek}$)	=	0	mm^2
	helling dwarskrachtbeugels	α de helling van de beugels is 90 g	=	90	graden
	beugels	diameter	d_{bg}=	10	mm
	aantal sneden per beugel	n_{sn} (normale beugels zijn 2-snedig)	n_{sn}=	4	snedig
	gekozen hart op hart afstand basisbeugels	$s_{l,bg}$	=	250	mm
	diameter opgebogen staven	$d_{opgebogen}$	=	0	mm
	hoh maat rijen van opgebogen staven	$s_{b,opgb}$	=	0	mm
	aantal opgebogen staven per rij	$n_{opgebogen}$	=	0	stuks



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resultaten Blokpoer(70(

	rekenwaarde schuifspanning	v_{Ed}	door uitwendige belasting		=	0,18	N/mm²
	maatgevende waarde schuifsterkte	$v_{Rd,c}$	door beton		=	0,37	N/mm²
6.9	bovengrens schuifsterkte	$v_{Rd,max}$	door beton		=	6,90	N/mm²
	rekenwaarde dwarskrachtweerstand	$V_{Rd,c}$	door beton		=	476,5	kN
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s}$	door wapening		=	499	kN
	rekenwaarde max. dwarskrachtweerstand	$V_{Rd,max}$	door beton		=	8959	kN

wapening tbv dwarskracht

benodigde beugelwapening per m'	$A_{bg}=1000/s * A_{sw} * n_{bg}$ (n - snedig)			=	0	mm²/m'
minimum dwarskrachtwapening	$A_{bgls,min}=\rho_{w,min} * b\ 1000\ /100$	**per m'**		=	1325	mm²/m'
benodigde h.o.h.-afstand beugels	$s_{benodigd}$			=	n.v.t.	mm
lengte gevaarlijk gebied (alleen bij q-last)	$y= (V_{Ed}- V_{Rd,s}) / q_d$	naast basisbeugels		=	n.v.t.	mm

wapening tbv wringing en dwarskracht

benodigde h.o.h.-afstand beugels	$s_{benodigd}$			=	324	mm
langswapening per zijvlak (h)	tgv wringing			=	70	mm²
langswapening onder/boven (b)	tgv wringing			=	109	mm²
benodigde beugelwapening	$A_{s,w,bgls} * =1000 / s_{bgls} * A_{sw}$			=	969	mm² / m'

unity-checks dwarskracht

	maximum dwarskracht	$V_{Ed} / V_{Rd,max}$	229,0	/	8959,0	=	0,03 -
	dwarskracht gewapend	$(V_{Ed} - V_{Ed,red}) / V_{Rd,s}$	229,0	/	499,5	=	0,46 -
	helling betondrukgebied	21,8 =< ϴ <= 45	=	1,00	-		
	betondrukdiagonaal	$V_{Ed} / V_{Ed,max}$	229,0	/	7817,0	=	0,03 -
	minimum beugelwapening	$A_{bgls,min} / A_{bgls}$	1325,2	/	1257	=	n.v.t. -
	dwarskracht ongewapend	$(V_{Ed} - V_{Ed,red}) / V_{Rd,c}$	229,0	/	476,5	=	0,48 -

unity-checks wringing + dwarskracht

	maximum wringingmoment	$T_{Ed} / T_{Rd,max}$	67	/	2757	=	0,02 -
6.29	wringing+dwarskracht	$T_{Ed} / T_{Rd,max} + V_{Ed} / V_{Rd,max}$	0,02	+	0,03	=	0,05 -
	wringing+dwarskracht beugels	$s_{aanwezig} / s_{benodigd}$	250	/	324	=	n.v.t. -
	wringing ongewapend	$T_{Ed} / T_{Rd,c}$	67	/	686,0	=	0,10 -
6.31	wringing+dwarskracht ongew.	$T_{Ed}/T_{Rd,c}+(V_{Ed}-V_{Ed,red})/V_{Rd,c}$	0,10	+	0,48	=	0,58 -
	wringing hoeveelheid langswapening in de zijvlakken (h)		70	/	1005	=	0,07 -
	wringing hoeveelheid langswapening in de onder- en bovenvlakken (b) moet worden opgeteld bij de buigwapening						

toelaatbare afstanden van dwarskrachtwapening

9.2.2(6)	toelaatbare hoh afstand	$s_{l,bg} / s_{l,max}$	250	/	300	=	n.v.t. -
9.2.2(7)	afstand opgebogen wapening	$s_{b,opbg} / s_{b,max}$	0	/	557	=	n.v.t -
9.2.2(8)	max beugelmaat in de breedte	$s_{t,bg} / s_{t,max}$	430	/	500	=	n.v.t. balken
9.3.2(5)	max beugelmaat in de breedte	$s_{t,bg} / s_{t,max}$	430	/	1391	=	n.v.t. vloeren

wapeninggegevens

totaal aantal staven in trekzone	$\Sigma n_{trek}=n1+n2$	=	7,0	st	
totaal aantal staven in drukzone	$\Sigma n_{druk}=n3+n4$	=	7,0	st	
gewogen diameter trekwapening	$d_{gem,trek}=(n1*d_1*D_1+n2*d_2*D_2) / (n1*D_1+n2*D_2)$	=	25,0	mm	
gewogen diameter drukwapening	$d_{gem,druk}=(n3*d_3*D_3+n4*d_4*D_4) / (n3*D_3+ n4*D_4)$	=	25,0	mm	
doorsnede per staaf 1, trekwapening	$D_1=0{,}25\pi d_1^2$	=	491	mm²	
doorsnede per staaf 2, trekwapening	$D_2=0{,}25\pi d_2^2$	=	0	mm²	
doorsnede per staaf 3, drukwapening	$D_3=0{,}25\pi d_3^2$	=	491	mm²	
doorsnede per staaf 4, drukwapening	$D_4=0{,}25\pi d_4^2$	=	0	mm²	
doorsnede per staaf 5, flankwapening	$D_5=0{,}25\pi d_5^2$	=	201	mm²	
doorsnede per beugel enkelsnedig	$D_{bg}=0{,}25\pi d_{bg}2$	A_{sw}=	79	mm²	
aantal snedige beugel bij dwarskracht	n_{sn}	=	4	snedig	
horizontale maat in breedte van de balk	$s_{t,bg} = b1 / (n_{sn}-1)$	=	430	mm	
aanwezige beugelwapening (n-snedig)	$A_{bgls} = n_{sn} * D_{bg} * 1000 / s_{aanwezig}$	=	1257	mm²/m'	
horizontale beugelmaat (hartmaat)	$b1=b-2c_{zijkant}-d_{bg}$	=	1290	mm	
vertikale beugelmaat (hartmaat)	$h1=h-c_{trekzijde}-c_{drukzijde}-d_{bg}$	=	890	mm	
zwaartepunt staven vanaf de beugel	$z= (n1\ D_1\ ^1/_2\ d1+n2\ D_2\ ^1/_2\ d2) / (n1D_1+n2D_2)$	=	12,5	mm	
equivalente diameter wapening	$d_{equi,trek}= 2 * z$ (t.b.v. berekening van d)	=	25,0	mm	

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materiaalgegevens

Blokpoer(700)

	materiaalfactor beton	γ_c	=	1,50	-
	materiaalfactor wapeningstaal	γ_s	=	1,15	-
	karakteristieke cilinderdruksterkte	f_{ck}	=	35	N/mm^2
	karakteristieke kubusdruksterkte	f_{ck}	=	45	N/mm^2
	gemiddelde cilinderdruksterkte	$f_{cm}=f_{ck}+8$	=	43	N/mm^2
3.15	rekenwaarde betondruksterkte	$f_{cd}=f_{ck}/\gamma_c$	=	23,3	N/mm^2
3.4	gemiddelde cilindertreksterkte	$f_{ctm}=0{,}3f_{ck}^{(2/3)}$ als $f_{ck<}$=50: $f_{ctm}=2{,}12\ln(1+f_{cm}/10)$	=	3,21	N/mm^2
3.1.8(1)	gemiddelde buigtreksterkte beton (3.23)	$f_{ctm,fl}$= max (1,6 - h/1000) f_{ctm} ; f_{ctm})	=	3,21	N/mm^2
	karakteristieke ondergrens treksterkte	$f_{ctk0,05}=0{,}7f_{ctm}$	=	2,25	N/mm^2
3.16	rekenwaarde treksterkte	$f_{ctd}=f_{ctk0,05}/\gamma_c$	=	1,50	N/mm^2
tabel 3.1	relatieve verkorting	ε_{c3}=1,75+0,55 [(f_{ck} - 50) / 40] voor f_{ck}>=50; 1,75	=	1,750	$^0/_{00}$
tabel 3.1	relatieve verkorting	ε_{cu3}= 2,6+ 35 [(90-f_{ck}) / 100]^4 als f_{ck}>=50; 3,50	=	3,500	$^0/_{00}$
	hoogte betondrukzone: $k_{xu,max}$ (*d)	$k_{xu,max}$ = (1-x)/1,25(0,6+1,4/ε_{cu3})	=	0,448	-
	factor in formule	x	=	0,44	-
	factor oppervlak betondrukzone	α= { ε_{cu3} - (ε_{c3} / 2) } / ε_{cu3}	=	0,750	-
	factor zwaartepunt betondrukzone	β={ε^2_{cu3} - (ε_{c3}*ε_{cu3}) +ε^2_{c3}/3 } / { 2 ε^2_{cu3} - ε_{c3} ε_{cu3} }	=	0,39	-
	staaltrekspanning	f_{yk}	=	500	N/mm^2
	rekenwaarde staaltrekspanning	f_{yd} = f_{yk} / γ_m	=	435	N/mm^2
	elasticiteitsmodulus wapeningstaal	E_s	=	200000	N/mm^2
	nuttige hoogte	d=h-c- d_{bg}-0,5$d_{equi,trek}$	=	927,5	mm
	hoogte betondrukzone	x_u=[d - $\sqrt{}${d^2 - 4βM_{ED} / (αbf_{cd}) }] / 2β	=	34,2	mm
	momentarm	z=d-β x_u als M_{Ed}=0 rekenen met z=0,9d	=	914,2	mm

berekening dwarskrachtwapening (beugels)

	aantal snedige beugel		n_{sn}	=	4	snedig
	reductiefactor belasting in gebied 2d		β=a_v / 2d >=0,25	=	1,53	-
	reductie dwarskracht		$V_{Ed,red}$= 0,5 q_d c + 1,25 q_d d	=	0,0	kN
	gereduceerde dwarskracht		V_{Ed}- $V_{Ed,red}$ (op afstand d uit oplegging)	=	229,0	kN
	rekenwaarde schuifspanning		v_{Ed}=(V_{Ed} - $V_{Ed,red}$) / bd	=	0,18	N/mm^2
6.2.b	ondergrens schuifsterkte	of	$v_{Rd,c}$=v_{min}=0,035$k^{3/2}\sqrt{f_{ck}}$ + $k_1\sigma_{cp}$	=	0,37	N/mm^2
6.2.a	rekenwaarde schuifsterkte	of	$v_{Rd,c}$=$C_{Rd,c}$ * k * (100 ρ_l f_{ck})$^{1/3}$ +$k_1\sigma_{cp}$	=	0,00	N/mm^2
	maatgevende waarde schuifsterkte		$v_{Rd,c}$= 0,37 + 0,00	=	0,37	N/mm^2
	correctiefactor schuifsterkte		$C_{Rd,c}$ = 0,18 / γ_c	=	0,12	-
	factor		k= 1 + $\sqrt{}$ (200/d) <=2,0	=	1,46	-
	wapeningspercentage		ρ_l=A_{sl} / bd*100 <2%	=	0,00	%
	factor		k_1 waarde volgens NB	=	0,15	-
	normaaldrukspanning in doorsnede		σ_{cp} = N_{cd} / bh	=	0,00	N/mm^2
	rekenwaarde dwarskrachtweerstand		$V_{Rd,c}$=$v_{Rd,c}$ b d 10^{-3} met beton	=	476,5	kN
	minimum dwarskrachtwapening		$\rho_{w,min}$= 0,08 $\sqrt{}$ f_{ck} / f_{yk}	=	0,09	%
	minimum dwarskrachtwapening		$A_{bgls,min}$=$\rho_{w,min}$ * b 1000 /100 **per m'**	=	1325,2	mm^2/m'
6.5	betondrukdiagonaal		V_{Ed}<=$V_{Ed,max}$= 0,5 b_w d v f_{cd}	$V_{Ed,max}$=	7817,0	kN
6.9	bovengrens schuifsterkte		$v_{Rd,max}$=α_{cw}*(z/d)* v_1 f_{cd} / (cotΘ + tanΘ)	=	6,90	N/mm^2
	voor niet-voorgespannen constructies		α_{cw}	=	1,0	-
	sterktereductiefactor	of	v_1=v=0,6 (1-f_{ck} / 250) als σ_{yd}>0,8f_{yk}	=	0,52	-
		of	v_1=0,6; σ_{yd}<=0,8$f_{yk;}$ f_{ck}<=60	=	0,60	-
		of	v_1=0,9-f_{ck}/200>0,5; σ_{yd}<=0,8$f_{yk;}$ f_{ck}>60	=	0,73	-
	maatgevende waarde factor		v_1	=	0,60	-
	staalspanning in (dwarskracht)beugels		$\sigma_{s\ bgls}$ = s_{aanw} / $s_{bgls\ V+T}$ * f_{yd}	=	335	N/mm^2
	sinus helling betondrukdiagonaal		*sin Θ*	=	0,707	-
	cosinus helling betondrukdiagonaal		*cos Θ*	=	0,707	-
	tangens helling betondrukdiagonaal		*tan Θ*	=	1,000	-
	cotangens helling betondrukdiagonaal		*cot Θ*	=	1,000	-
	cotangens helling dwarskrachtwapening		*cot* α *= 1 / tan* α	=	0,000	-
	rekenwaarde max. dwarskrachtweerstand		$V_{Rd,max}$=$v_{Rd,max}$ b d 10^{-3}	=	8959,0	kN
	afstand verschoven M-lijn	of	a_1=z (cotΘ - cot α) / 2 >=d	=	457,1	mm
9.2.1.3	verschuivingsregel	of	a_1=d	=	927,5	mm
6.8	opneembare schuifspanning (n-snedig)		$v_{Rd,s}$=A_{sw} * f_{yd} * z * cotΘ / (s * b * d)	=	0,38	N/mm^2
	verhouding		z/d (in tabellen wordt 0,9 aangehouden!)	=	0,99	-
	rekenwaarde dwarskrachtweerstand		$V_{Rd,s}$=$v_{Rd,s}$ b d 10^{-3} (met beugels)	=	499,5	kN
	benodigde h.o.h-afstand beugels		s=n_{sn}*A_{sw} f_{yd} z cotΘ / (v_{Ed} b d) (n_{sn}-snedig)	=	0	mm
9.2.2(6)	maximaal toelaatbare hoh afstand		$s_{l,max}$= 0,75 d (1 + cot α) en <=300mm	=	300	mm
9.2.2(7)	max. afstand opgebogen wapening langsrichti		$s_{b,max}$ = 0,6 d (1 + cot α)	=	557	mm
9.2.2(8)	max beugelmaat in de breedte (balken)		als V_{Ed} <=0,5 $V_{Rd,max}$	$s_{t,max}$ =	500	mm
	+C2:2011-NB2016		als V_{Ed} >0,5 $V_{Rd,max}$ $s_{t,max}$ = 0,75 d < 500	$s_{t,max}$ =	500	mm
			maatgevende waarde	$s_{t,max}$ =	500	mm
9.3.2(5)	max beugelmaat in de breedte (vloeren)		$s_{t,max}$ = 1,5 d	=	1391	mm
	benodigde beugelwapening per m'		A_{bg} = 1000 / s * A_{sw} * n_{sn} (n - snedig)	=	0	mm^2/m'
	directe berekening (alternatief)		A_{bg} = (V_{Ed}-$V_{Ed,red}$)*1000 / (f_{yd}*z* cotΘ)	=	576	mm^2/m'

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berekening dwarskrachtwapening met alleen opgebogen staven (zonder beugelwapening) Blokpoer(700)

	doorsnede opgebogen wapening	$D_{opgebogen}$	=	1	mm^2
	opgebogen wapening (zonder beugels)	$A_{opgebogen}=v_{Ed}\ b\ d\ ^1/_2\ y\ \sqrt{2}\ /\ (z\ f_{yd})$	=	0	$mm^2/m'/b$
	wapening per afstand $s_{opgebogen}$	$A_{opgeb,s}=A_{opgebogen} * s_{opgebogen} / 1000$	=	0	mm^2/s_{opgeb}
		de gekozen afstand s voldoet			
	benodigd aantal staven per breedte	$n_{opgebogen}=A_{opgeb,s} / d_{opgebogen}$	=	0,00	stuks
	benodigde h.o.h. afstand in de breedte	$a_{breedte}=b / n_{opgebogen}$	=	n.v.t.	mm
	maximaal toelaatbare afstand	s_{max} (kleinste waarde s_{max} en d_a)	=	500	mm
		$d_a=h-c_{trek}-c_{druk}-2*d_{bgl}-(d_{gem,trek}+d_{gem,druk})/2$	=	855	mm
		$s_{max}=$	=	500	mm
	aanwezig opgebogen wapening	$A_{opgebogen,aanw}=1000*D_{opgebogen} * n_{opgebogen} /s_{opgebogen}$		0	$mm^2/m'/b$
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s,opgeb}= A_{opgebogen,aanw}\ z\ f_{yd} / (\ ^1/_2\ y\ \sqrt{2})$	=	0	kN

berekening dwarskrachtwapening met opgebogen staven (45 graden) en met beugelwapening

	diameter opgebogen staven	$d_{opgebogen}$	=	1	mm
	hoh maat rijen van opgebogen staven	$s_{b,opgb}$	=	1	mm
	aantal opgebogen staven per rij	$n_{opgebogen}$	=	0	stuks
	doorsnede opgebogen wapening	$D_{opgebogen}$	=	1	mm^2
	opgebogen wapening (zonder beugels)	$A_{opgebogen}=(v_{Ed}-v_{Rd,s})\ b\ d\ ^1/_2\ y\ \sqrt{2}\ /\ (z\ f_{yd})$	=	0	$mm^2/m'/b$
	wapening per afstand $s_{opgebogen}$	$A_{opgeb,s}=A_{opgebogen} * s_{b,opgb} / 1000$	=	0	mm^2/s_{opgeb}
		de gekozen afstand s voldoet			
	benodigd aantal staven per breedte	$n_{opgebogen}=A_{opgeb,s} / d_{opgebogen}$	=	0,00	stuks
	benodigde h.o.h. afstand in de breedte	$a_{breedte}=b / n_{opgebogen}$	=	n.v.t.	mm
	max. toelaatbare afstand opgebogen wap.	s_{max} (kleinste waarde s_{max} en d_a)	=	500	mm
		$d_a=h-c_{trek}-c_{druk}-2*d_{bgl}-(d_{gem,trek}+d_{gem,druk})/2$	=	855	mm
		$s_{max,500}=$ maximale waarde	=	500	mm
	aanwezig opgebogen wapening	$A_{opgebogen,aanw}=1000*D_{opgebogen} * n_{opgebogen} /s_{b,opgb}$		0	$mm^2/m'/b$
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s,opgeb}= A_{opgebogen,aanw}\ z\ f_{yd} / (\ ^1/_2\ y\ \sqrt{2})$	=	0	kN
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s,bgls}=v_{Rd,s}\ b\ d\ 10^{-3}$	=	499	kN
	rekenwaarde dwarskrachtweerstand	$V_{Rd,s}$=totaal van beugels + opgebogen wapening		499	kN
9.2.2 (4)	minimaal 50% van de dwarskracht moet met beugels worden opgenomen				

berekening wringwapening (hier wordt altijd met een 2-snedige beugel gerekend)

	scheurmoment wringing	$T_{Rd,c}=f_{ctd}\ t_{ef,i}\ 2\ A_k\ 10^{-6}$	=	686,0	kNm
		$t_{ef,i}=A / u$	=	291,7	mm
		$A=bh$	=	1400000	mm^2
		$u=2\ (b+h)$	=	4800	mm
	horizontale beugelmaat (hartmaat)	$b1=b-2c_{zijkant}-d_{bg}$	=	1290	mm
	vertikale beugelmaat (hartmaat)	$h1=h-c_{trekzijde}-c_{drukzijde}-d_{bg}$	=	890	mm
	minimum waarde meewerkende wanddikte				
	aan gedrukte zijde	$t_{ef,i,min}=(c_{druk}+d_{bgl}+0,5d_{gem,druk})*2$	=	145,0	mm
	aan getrokken zijde	$t_{ef,i,min}=(c_{trek}+d_{bgl}+0,5d_{gem,trek})*2$	=	145,0	mm
	aan de zijkanten	$t_{ef,i,min}=(c_{zij}+d_{bgl}+0,5d_{gem,trek})*2$	=	145,0	mm
	maatgevende waarde meewerkende breedte				
	aan gedrukte zijde	$t_{ef,i,druk}$	=	291,7	mm
	aan getrokken zijde	$t_{ef,i,trek}$	=	291,7	mm
	aan de zijkanten	$t_{ef,i,zij}$	=	291,7	mm
	effectieve hoogte	$z_{i,h}=h1_{eff}=h-0,5t_{eff,i,druk}-0,5t_{eff,i,trek}$	=	708,3	mm
	effectieve breedte	$z_{i,b}=b1_{eff}=b-*t_{eff,i,zij}$	=	1108,3	mm
	kleinste waarde maatgevende breedte	$t_{ef,i,min}=$	=	291,7	mm
		$A_k=b1_{eff}\ h1_{eff}$	=	785069	mm^2
		$u_k=2\ (b1_{eff}+h1_{eff})$	=	3633	mm
6.30	grenswaarde wringmoment	$T_{Rd,max}=2\ v\ f_{cd}\ t_{ef,i}\ A_k\ \sin\theta\ \cos\theta$	=	2756,9	kNm
		$v=0,6\ (1-f_{ck}/250)$	=	0,52	-
	totale langswapening	$A_{s,langs}=T_{Ed}\ \cot\theta\ u_k / (2\ A_k\ f_{yd})$	=	357	mm^2
	langswapening per zijvlak (h)	$A_{s,langs} * h1_{eff} / u_k$	=	70	mm^2
	langswapening onder/boven (b)	$A_{s,langs} * b1_{eff} / u_k$	=	109	mm^2
	maximale beugelsafstand	$s_{w,max}=2\ A_{s,bgl}\ b1_{eff}\ h1_{eff}\ f_{yd}\ \cot\theta/T_{Ed}$	=	800	mm

berekening wringing en dwarskracht

	aantal beugels per m' tbv wringing	$n_{bgls,TEd}=1000 / s_{w,max}$	=	1,2	st per m'
	benodigde h.o.h-afstand beugels(dwarskracht)	$s=n_{sn}*A_{sw}\ f_{yd}\ z\ \cot\theta / (v_{Ed}\ b\ d)$ (n_{sn}-snedig)	=	545	mm
	aantal beugels per m' tbv dwarskracht	$n_{bgls,VEd}=1000 / s$	=	1,8	st per m'
	totaal aantal beugels per m'	$n_{bgls}=n_{bgls,VEd}+n_{bgls\ TEd}$	=	3,1	st per m'
	benodigde hart op hart afstand beugels	$s_{bgl\ V+T}= 1000 / n_{bgls}$	=	324	mm
9.2.2(6)	maximaal toelaatbare hoh afstand (dwarskrach	$s_{max}= 3/4\ d\ (1+\cot\alpha)$ met α=90 graden	=	696	mm
	benodigde beugelwapening	$A_{s,w,bgls} * =n_{sn} *1000 / s_{bgls} * A_{sw}$	=	969	mm^2 / m'
9.2.3(3)	maximaal toelaatbare hoh afstand (wringing)	s_{max}=minimum (u / 8 ; b ; h)	=	600	mm
	optredende staalspanning in de beugels	$\sigma_{s\ bgls} = s_{aanw} / s_{bgls\ V+T} * f_{yd}$	=	335	N/mm^2

opmerking:

BIJLAGE 45
Meridian kenmerk 1668998

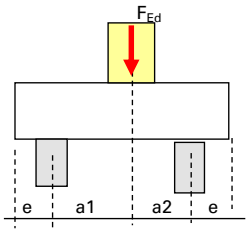
Sweco Nederland B.V.
-
Gebruikslicentie COMMERCIELE-versie tot 1-2-2026

B 2-paalspoer staafwerk EC
Versie : 5.29.14 ; NDP : NL
printdatum : 10-04-2025

tweepaals poer belast door een puntlast 2000 x 2150
volgens de theorie van staafwerkmodellen art. 6.5

algemene gegevens	werk			Opwaardering KIJ-BVW	
	werknummer			10	
	onderdeel			Cilinderpoer(200)	
	ontwerpsituatie			blijvend en tijdelijk	
rekenwaarde van de kolombelasting	F_{Ed}		=	1260	kN
	splitsing puntlast F_{Ed} in twee halve puntlasten?			ja	-

materiaalgegevens en poerafmetingen



kwaliteit beton	betonklasse		=	C12/15	
kwaliteit staal	staalsoort		=	FeB 400	
wapeningsklasse	A, B of C		=	B	-
poerbreedte	b		b=	2000	mm
poerhoogte	h		h=	2150	mm
afstand van paal 1 tot hart kolom	a1		a1=	650	mm
afstand van kolom tot paal 2	a2		a2=	650	mm
inwendige hefboomsarm			z_{UGT}=	780	mm
toelaatbare inwendige hefboomsarm in BGT	z_{BGT}=0,2 l + 0,4 h < 0,6 l volgens art. 6.1(10)		=	780	mm
afstand hart ondersteuning tot eind poer	e		=	350	mm
vorm van de kolom	rond of rechthoekig			rechthoekig	
afmeting kolom in richting poerlengte	L_{kolom}		=	390	mm
afmeting kolom loodrecht op poerlengte	B_{kolom}		=	390	mm
vorm van de ondersteuning	rond of rechthoekig			rond	
afm. ondersteuning in richting poer	L_{paal}		=	400	mm
afm. ondersteuning loodrecht poerrichting	B_{paal}		=	400	mm

wapeninggegevens

betondekking getrokken zijde	$c_{trekzijde}$	dekking op de buitenste wapenin	=	70	mm
betondekking zijkanten / uiteind	$c_{zijkant}$	=$c_{uiteind}$	=	50	mm
wapening aan getrokken zijde	aantal n1		=	10	stuks
	diameter d_1		=	18	mm
	aantal n2		=	0	stuks
	diameter d_2		=	0	mm
bij wapening in meerdere lagen	aantal staven dat niet in de buitenste laag ligt		n_s=	6	staven
correctie van de nuttige hoogte d ten gevolge van het wapenen in meerdere lagen			d_{red}=	75	mm
invloedsfactor verankeringslengte (α1)	staafbeeindiging van de trekstaven		=	haarspeld	
doorndiameter omgebogen trekstaven	factor voor ombuiging		=	8	* $d_{max1,2}$
diameter beugels			d_{bg}=	6,5	mm
wordt er bij de knopen boven de palen voldaan aan één van de randvoorwaarden van artikel 6.5.4(5) ?				ja	

invloedsfactoren voor scheurwijdte en betondekking

	verhouding tussen de frequente combinatie en uiterste grenstoestand:	F_{fr} / F_{Ed}	=	0,75	-
a	ontwerplevensduur		=	50	jaar
b	omgevingsfactoren	milieuklasse A (kies uit X0- XC- XD- of XS-serie)	=	XC3	-
b		milieuklasse B (kies uit X0- XC- XD- of XS-serie)	=	XC3	-
c	soort constructie	soort constructie	=	poer	
d	dekking verhogen bij oncontroleerbaarheid van de wapening (geen eis in eurocode)		=	nee	
e	wordt de beton nabewerkt		=	nee	
f	verhoging dekking bij toepassing grote grindkorrel (>32mm) tabel 4.2		=	nee	
g	ondergrond waarop gestort wordt		=	bekisting	
h	bundeling wapeningstaven (trekwapening)	worden staven d1 gebundeld?	=	nee	
	staven kunnen niet worden gebundeld	worden staven d2 gebundeld?	=	nee	
i	kwaliteitsbeheersing	is specifieke kwaliteitsbeheersing gewaarborg	=	nee	
j	luchtinsluiting	luchtinsluiting van meer dan 4% toegepast?	=	nee	
k	verhoging dekking bij toepassing grote staafdiameter (>25mm) geen eis in eurocode		=	nee	
k1	aanhechteigenschap	de aanhechting van de wapeningstaven is	=	goed	
k2	wijze van belasting	de betondoorsnede wordt belast door	=	zuivere trek	
kt	belastingduur (bij berekende scheurwijdte)	de belastingduur is	=	langdurend	
	milieuklasse	de milieuklasse van de beton is		b) buitenmilieu - RH=80%	
	belasten constructie na aantal dagen	de constructie wordt belast na t_0 is		100	dagen
	cementklasse	de gekozen cementklasse is		N	
	omtrek dat bloot staat aan uitdroging	het aantal zijden dat aan uitdroging bloot staat is		3 zijden 2b + h	
	de staalspanning bij controle scheurwijdte vermenigvuldigen met correctiefactor z_{UGT} / z_{BGT}		=	1,00	

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unity-checks

Cilinderpoer(200)

er wordt gerekend met trekwapening in meerdere lagen

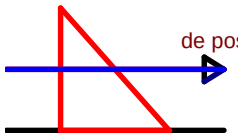
knoop onder kolom	spanning onder kolom	8,3	/	8,4		0,99	-
	spanning in diagonaal	8,3	/	8,4		0,99	-
knoop bij paal 1	spanning boven paal	5,0	/	7,1		0,70	-
	spanning in diagonaal	4,8	/	7,1		0,67	-
knoop bij paal 2	spanning boven paal	5,0	/	7,1		0,70	-
	spanning in diagonaal	4,8	/	7,1		0,67	-
geometrie	hoogte z	780	/	1911		0,41	-
	hoogte h	1019	/	2150		0,47	-
	positie trekband	0,0	/	321,0		0,00	-

l_bd is kleiner dan Lpaal; de verankeringslengte komt niet voorbij einde ondersteuning; T_Ed=0

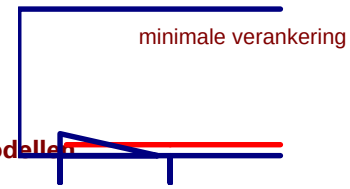
trekband tussen de palen	$A_{s,trek}$ / $A_{aanw,trek}$	1475	/	2545	=	0,58	-
scheurwijdte zonder berekening	diameter of hoh	0,62	of	2,08	=	0,62	-
scheurwijdte met berekening	w_k / w * k_x	#N/B	/	0,60	=	#N/B	-
betondekking	c_{nom} / $c_{trekzijde}$	30	/	70	=	0,43	-
verankeringslengte	l_2 / d	0	/	1990	=	0,00	-
8.3(3) doorndiameter bezwijken beton	$\Phi_{m,min}$ / D_{doorn}	90	/	144	=	n.v.t.	-

spatkrachten T tgv het uitwaaieren drukdiagonaal (art. 6.5.3) zijn onderaan deze sheet getoetst! #N/B

positie knoop boven paal 1 en 2 t.o.v. de onderkant van de poer

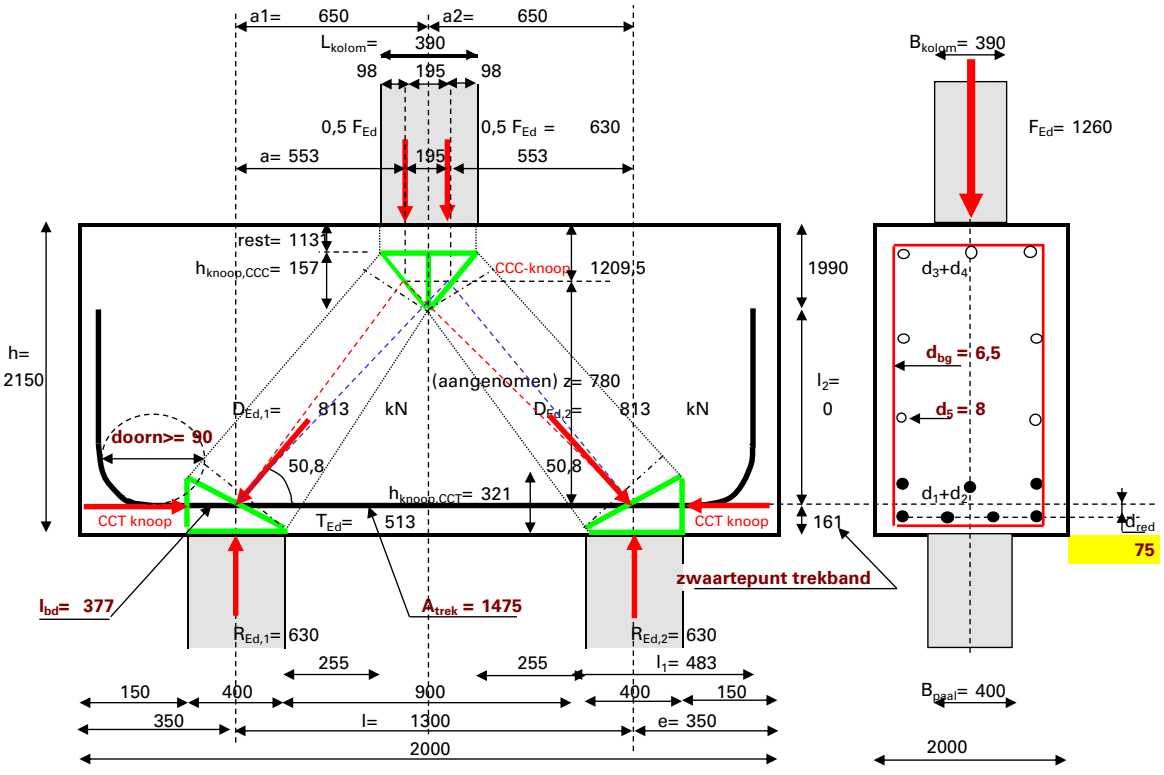


de positie van de trekband voldoet



minimale verankering

schematische weergave tweepaals poer met staafwerkmodellen



samenvatting resultaten

hoeveelheden:	8,6 m^3 beton	151,5 kg staal	wapeningshoeveelheid =	17,6	kg/m^3

trekband

grootte van de benodigde trekbandwapening	$A_{trek} = T_{Ed} / f_{yd}$	=	1475	mm^2
inwendige hefboomsarm	z	=	780	mm
hart trekband tot onderkant poer	$c_{trekzijde} + d_{bg} + 0,5 * d_{gem} + d_{red}$	=	160,5	mm

scheurwijdte

scheurwijdtecontrole zonder berekening	maximum staafdiameter	=	29,1	mm
scheurwijdtecontrole zonder berekening	maximum hart op hart afstand	=	300	mm

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toelaatbare scheurwijdte	$w * k_x$	=	0,60	mm

	optredende scheurwijdte met berekening	$w_k=s_{r,max}(\varepsilon_{sm}-\varepsilon_{cm})$					=	#N/B	mm
betondekking									
	nominale betondekking	c_{nom}	op de buitenste wapening				=	30	mm
verankeringslengte en buigdiameter									
8.4	rekenwaarde verankeringslengte trekwap.	$l_{bd}=\alpha1\ \alpha2\ \alpha3\ \alpha4\ \alpha5\ l_{b,rqd}>=l_{b,min}$					=	377	mm
8.1	minimale buigdiameter (doorndiameter)	$\Phi_{m,min}=F_{bt}[(1/a_b)+1/(2\Phi)]/f_{cd}$					=	0	mm
minimum flankwapening en -beugels, toevallige inklemming en uitwaaieren trekband									
6.5.3	flankwapening ivm staafwerkmodel trekstaaf per zijde		387	mm^2/m'	beugelwapening	315	mm^2/m'		
5.3.1(3)	flankwapening ivm gedrongen liggers per zijde		2000	mm^2/m'	beugelwapening	2000	mm^2/m'		
	paal 1 uitwaaieren trekband bgls verankeringsgebied l=		377	mm	benodigde beugels	0	mm^2/m'		
	paal 2 uitwaaieren trekband bgls verankeringsgebied l=		377	mm	benodigde beugels	0	mm^2/m'		
9.2.1.2(1)	min. bovenwap. t.g.v toevallig inklemmingsmom = 0,15 * A_{trek}=		0,15		1475	=	221	mm^2	

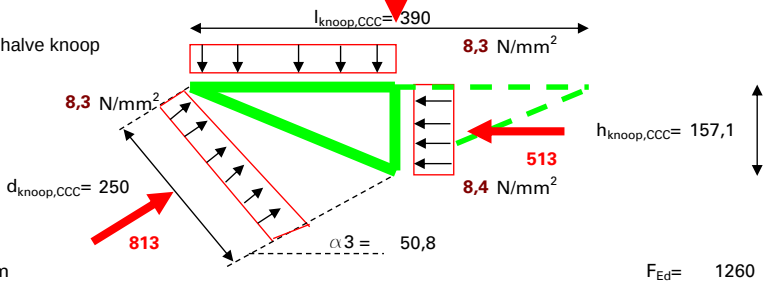
berekening poer volgens de theorie van staafwerkmodellen art. 6.5

krachtsverdeling	**er wordt gerekend met twee puntlasten**								
	h.o.h. afstand palen (ondersteuningen)	l=	650	+	650	=	1300	mm	
	oplegreactie	$R_{Ed,1}$= a2 / l * F_{Ed}	650	/	1300	1260	=	630	kN
	oplegreactie	$R_{Ed,2}$= a1 / l * F_{Ed}	650	/	1300	1260	=	630	kN
berekening hoeken									
	hoek $\alpha1$	werklijn paal 1 naar F_{links}	boogtan (	780,0	/	552,5	) =	54,7	graden
	hoek $\alpha2$	werklijn paal 1 naar F_{rechts}	boogtan (	780,0	/	747,5	) =	46,2	graden
	hoek $\alpha3$	hellingshoek drukstaaf paal 1	boogtan (	630,0	/	513,2	) =	50,8	graden
	hoek $\beta1$	werklijn paal 2 naar F_{links}	boogtan (	780,0	/	747,5	) =	46,2	graden
	hoek $\beta2$	werklijn paal 2 naar F_{rechts}	boogtan (	780,0	/	552,5	) =	54,7	graden
	hoek $\beta3$	hellingshoek drukstaaf paal 2	boogtan (	630,0	/	513,2	) =	50,8	graden
	hoek a	krachtenveelhoek F_{links}	90	-	46,2		=	43,8	graden
	hoek b	idem 180	90	-	43,8	- 35,3	=	100,9	graden
	hoek c	idem	90	-	54,7		=	35,3	graden
	hoek d	krachtenveelhoek F_{rechts}	90	-	54,7		=	35,3	graden
	hoek e	idem 180	90	-	35,3	- 43,8	=	100,9	graden
	hoek f	idem	90	-	46,2		=	43,8	graden
staafkrachten									
	staafkrachten tgv linker halve puntlast								
	D1=0,5F_{Ed} sin c/sin b	= 630	sin	35,3	/ sin	100,9	=	371	kN
	H1=D1 cos $\beta1$	= 370,9	cos	46,2			=	257	kN
	staafkrachten tgv rechter halve puntlast								
	D2=0,5F_{Ed} sin f/sin e	= 630	sin	43,8	/ sin	100,9	=	444	kN
	H2=D2 cos $\beta2$	= 443,9	cos	54,7			=	257	kN
	totale trekkracht in onderregel	T_{Ed}= H1+H2 =		256,6	+	256,6	=	513	kN
	drukdiagonaal paal 1	$D_{Ed,1}$= √ (	630,0 ^{2}	+	513,2 ^{2}	)	=	813	kN
	drukdiagonaal paal 2	$D_{Ed,2}$= √ (	630,0 ^{2}	+	513,2 ^{2}	)	=	813	kN
	hoek contactvlakken en horizontaal 90-$\alpha3$		links	90,0	-	50,8	=	39,2	graden
	hoek contactvlakken en horizontaal 90-$\beta3$		rechts	90,0	-	50,8	=	39,2	graden

controles

materiaalfactor beton	γ_c					=	1,50	-
materiaalfactor wapeningstaal	γ_s					=	1,15	-
karakteristieke cilinderdruksterkte	f_{ck}					=	12	N/mm^2
3.15	rekenwaarde betondruksterkte	$f_{cd}=f_{ck}/\gamma_c$ =	12	/	1,50	=	8,0	N/mm^2
6.57	sterktereductiefactor	v ' = (1-f_{ck} / 250) =	(1 -	12	/ 250)	=	0,95	-
controle knoop onder de kolom type CCC								
6.60	drukspanning	$\sigma_{Rd,max,1}=\alpha\ k_1\ v'\ f_{cd}$ =	1,10	1,00	0,95	8,0	=	**8,4**	N/mm^2
				1260					

schematische weergave halve knoop



horizontale vlak

normaalkracht uit kolom						F_{Ed}=	1260	kN
oppervlak kolom			1,000	390	390	10^{-2} =	1521	cm^2
drukspanning direct onder kolom		1260	10^3 /	1521	10^2	=	8,3	N/mm^2
toetsing drukspanning onder kolom			8,3	/	8,4	=	0,99	-

vertikale vlak

normaalkracht = trekkracht in trekband						T_{Ed}=	513	kN
breedte van CCC-knoop onder kolom		$b_{knoop,CCC}$	equivalente afmeting			=	390	mm
minimaal benodigde hoogte CCC-knoop		513	10^3 /	390	8,4	=	157,1	mm

schuine vlak met diagonaal naar paal 1

schuine lengte knoop CCC	√ (	195 ²	+	157,1 ²	)	=	250,4	mm
hoek knoop CCC met horizontaal		boogtan (	157,1	/	195,0	) =	38,9	graden
hoek contactvlak en loodrechte van drukdiagonaal bij CCC			38,9	-	39,2	=	-0,3	graden
werkelijke lengte drukvlak bij CCC			250,4	cos	-0,3	=	250,4	mm
normaalkracht in drukdiagonaal						$D_{Ed,1}$=	812,6	kN
drukspanning in diagonaal bij CCC	812,6	10^3 / (	250,4	*	390	) =	8,3	N/mm^2
toetsing drukdiagonaal bij CCC			8,3	/	8,4	=	0,99	-

controle knoop bij paal 1, type CCT

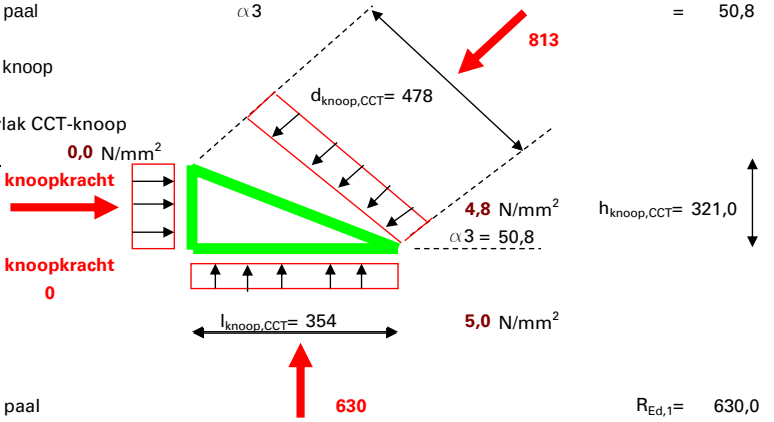
6.61 drukspanning $\sigma_{Rd,max,2}$ = α k_2 v' f_{cd} =			1,10	0,85	0,95	8,0	=	7,1	N/mm^2
helling drukdiagonaal bij deze paal			α3				=	50,8	graden

schematische weergave knoop

spanning op vertikaal vlak CCT-knoop

0,0 10^3 = 0,0 N/mm^2
354 321 **knoopkraft**

trekstaaf	**reductie**	**knoopkraft**
513	**513**	**0**



horizontale vlak

normaalkracht= reactie paal						$R_{Ed,1}$=	630,0	kN
breedte van CCT-knoop boven paal		$b_{knoop,CCT}$	equivalente afmeting			=	354	mm
oppervlak paal			0,785	400	400	10^{-2} =	1257	cm^2
drukspanning direct boven de paal		630,0	10^3 /	1257	10^2	=	5,0	N/mm^2
toetsing drukspanning boven paal			5,0	/	7,1	=	0,70	-

vertikale vlak **l_bd is kleiner dan Lpaal; de verankeringslengte komt niet voorbij einde ondersteuning; T_Ed=0**

gereduceerde kracht tegen de knoop= T_{Ed} * (l_{bd}-L_{paal})/l_{bd} =			513	0	/ 377	T_{Ed}=	0,0	kN
beschikbare knoophoogte		$h_{knoop,CCT}$=	2	161		=	321	mm
minimaal benodigde hoogte CCT-knoop		0,0	10^3 /	354	7,1	=	0,0	mm

schuine vlak

schuine lengte knoop CCT	√ (	354 ²	+	321,0 ²	)	=	478,2	mm
hoek knoop CCT met horizontaal		boogtan (	321,0	/	354,5	) =	42,2	graden
hoek contactvlak en loodrechte van drukdiagonaal			42,2	-	39,2	=	3,0	graden
werkelijke lengte drukvlak			478,2	cos	3,0	=	477,6	mm
normaalkracht= drukdiagonaal						$D_{Ed,1}$=	812,6	kN
drukspanning in diagonaal	812,6	10^3 / (	477,6	*	354	) =	4,8	N/mm^2
toetsing drukdiagonaal			4,8	/	7,1	=	0,67	-

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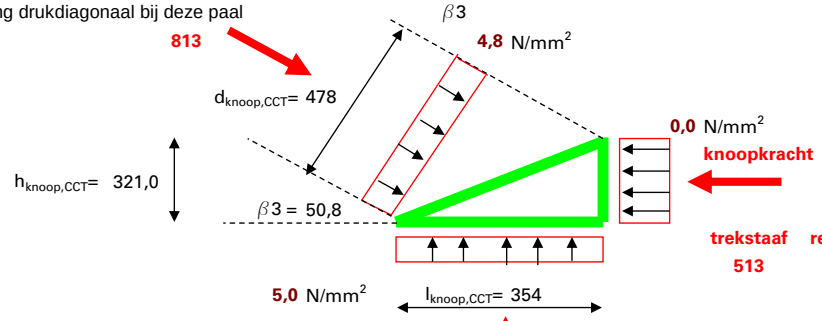
controle knoop bij paal 2, type CCT

6.61 drukspanning $\sigma_{Rd,max,2} = \alpha\ k_2\ v'\ f_{cd}$ = 1,10 0,85 0,95 8,0 = 7,1 N/mm²

helling drukdiagonaal bij deze paal $\beta 3$ = 50,8 graden



horizontale vlak

normaalkracht= reactie paal						$R_{Ed,2}$=	630,0	kN
breedte van CCT-knoop boven paal		$b_{knoop,CCT}$	equivalente afmeting			=	354	mm
oppervlak paal			0,785	400	400	10^{-2} =	1257	cm²
drukspanning direct boven de paal		630,0	10^3 /	1257	10^2	=	5,0	N/mm²
toetsing drukspanning boven paal			5,0	/	7,1	=	0,70	-

vertikale vlak

normaalkracht = trekkracht in trekband						T_{Ed}=	513,2	kN
breedte		$b_{knoop,CCT}$				=	354	mm
beschikbare hoogte CCT-knoop		zie paal 1				=	321,0	mm

schuine vlak

schuine lengte knoop CCT	√ (354 ²		+	321,0 ²		) =	478,2	mm
hoek knoop CCT met horizontaal		boogtan (	321,0	/	354,5	) =	42,2	graden
hoek contactvlak en loodrechte van drukdiagonaal			42,2	-	39,2	=	3,0	graden
werkelijke lengte drukvlak		478,2	cos	3,0		=	477,6	mm
normaalkracht= drukdiagonaal						$D_{Ed,2}$=	812,6	kN
drukspanning in diagonaal	812,6	10^3 / (	477,6	*	354	) =	4,8	N/mm²
toetsing drukdiagonaal			4,8	/	7,1	=	0,67	-

controle trekstaaf tussen paal 1-2

trekkracht in trekband						T_{Ed}=	513,2	kN
benodigde trekwapening		$A_{s1,2}$=	513	10^3 /	348	=	1475	mm²
toetsing gekozen trekband			1475	/	2545	=	0,58	-

controle inwendige hefboomsarm z en totale poerhoogte

geschatte hoogte van de inwendige hefboomsarm z						=	780	mm
maximaal toelaatbare hoogte z	2150	-	160,5	-	157,1	/ 2 =	1911	mm
toetsing geschatte hoogte z			780	/	1911	=	0,41	-
minimaal benodigde poerhoogte h	160,5	+	780	+	78,5	=	1019	mm
toetsing totale hoogte h			1019	/	2150	=	0,58	-

controle ligging trekband

toetsing positie trekband			0,0	/	321	=	0,00	-

controle verankeringslengte

$l_{bd} = \alpha 1\ \alpha 2\ \alpha 3\ \alpha 4\ \alpha 5\ l_{b,rqd}$ =	0,70	0,98	1,00	1,00	1,00	550	=	377	mm
8.4 rekenwaarde verankeringslengte trekwapenin	$l_{bd} = \alpha 1\ \alpha 2\ \alpha 3\ \alpha 4\ \alpha 5\ l_{b,rqd} >= l_{b,min}$						=	377	mm
staalspanning bij begin van verankering	$\sigma_{sd} = f_{yd} * A_{s,trek} / A_{aanw,trek}$						=	202	N/mm²
staalspanning bij begin van de bocht	$\sigma_{sd1} = (l_{bd} - l_{hor}) / l_{bd} * \sigma_{sd}$						=	0	N/mm²
6.5.4(7) beschikbare ruimte horizontale verankering	$l_1 = e + 0,5\ L_{paal} - c - d_{5,flank} - 0,5\ d_{max}$						=	483	mm
doorndiameter omgebogen staven	D_{doorn} = factor * $d_{max1,2}$						=	144	mm
beschikbare lengte tot de bocht	$l_{hor} = l_1 - 0,5\ D_{doorn} - 0,5\Phi$						=	402	mm
lengte van de verankering in de bocht	$l_{bocht} = 0,25\ \pi\ (D_{doorn} + \Phi)$						=	127	mm
restant verankeringslengte in vertikale deel	$l_{vert} = l_{bd} - l_{hor} - l_{bocht}$						=	-152	mm
benodigde ruimte vertikale verankering	$l_2 = 0,5\ D_{doorn} + l_{vert} + 0,5\ \Phi$						=	-71	mm
8.1 minimale buigdiameter	$\Phi_{m,min} = F_{bt}\ [\ (1/a_b) + 1\ /\ (2\Phi)\ ]\ /\ f_{cd}$						=	0	mm

controle scheurwijdte

optredende staalspanning	$\sigma_s=F_{qp}$ / F_{Ed} * $A_{s,trek}$ / $A_{aanw,trek}$ * f_{yd}		=	151	N/mm^2
toelaatbare scheurwijdte	w	maatgevende waarde	=	0,30	mm
toelaatbare staafdiameter	d_{max}	met de invloed van k_x	=	29,1	mm
toelaatbare hart op hart-afstand	s	met de invloed van k_x	=	300,0	mm
maximale staafdiameter	d_{max}		=	18	mm
werkelijke hart op hart afstand	s= (b - 2c_{zij} - 2d_{bg}-d_{trek}) / (n-n_s-1)		s = 2 a_b=	623	mm

betondekking

berekening minimum betondekking op trekwapening

Cilinderpoer(200)

tab4.3N	correctie van de constructieklasse: uitgangspunt:constructieklasse bij 50 jaar			S	4	-
a	correctie tgv ontwerplevensduur				0	-
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse A of B)				0	-
c	correctie tgv geometrie				0	-
i	correctie tgv kwaliteitsbeheersing				0	+
	totale waarde constructieklasse			S	4	
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse A)				0	
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse B)				0	
	berekening van de nominale dekking voor hoofdwapening en beugels (in mm)				hoofdwapening	beugels
tabel 4.2	minimum dekking t.g.v. **aanhechting**	$c_{min,b}$ >d_n	$c_{grindkorrel}$= 0	$c_{min,b}$+$c_{grindkorrel}$=	18	6,5
tab 4.4N	minimum dekking tgv milieuklasse A	$c_{min,dur}$		=	25	25
	minimum dekking tgv milieuklasse B	$c_{min,dur}$		=	25	25
	resulterende minimum dekking	$c_{min,dur}$	(duurzaamheid)	=	25	25
e	correctie tgv nabewerking	c_{extra}		=	0	0
	gecorrigeerde min. dekking **duurzaamheid**	$c_{min,dur}$	inclusief c_{extra}	=	25	25
4.2	**minimum dekking**	c_{min} = max($c_{min,b}$; $c_{min,dur}$; 10mm)		=	25	25
	toeslagen uitvoeringstoleranties	Δc_{dev}		=	5	5
g	storten op werkvloer / maaiveld / kist	Δc_{dev}		=	0	0
d	t.g.v. oncontroleerbaarheid	Δc_{dev}	**geen eis in eurocode!**	=	0	0
4.1	**nominale betondekking** op staaf	c_{nom}=c_{min} + $\Sigma\Delta c_{dev}$		=	30	30
k	t.g.v. toegepaste hoofdwapening >25mm	c_{nom}= 1,5d_n		=	0	0
	equivalente staafdiameter	d_n=max($d1_{eq}$;$d2_{eq}$)=	18,0	d_{bg}= 6,5		
	dekking op de buitenste wapening	Hoofdwapening: c_{nom}- d_{bg}	Beugels: c_{nom}	=	24	30
	nominale betondekking buitenste wapening	c_{nom}	(minimum waarde op tekening)	=	30	

wapeninggegevens

totaal aantal staven in trekzone	Σn_{trek}=n1+n2	=	10,0	st
totaal aantal staven in drukzone	Σn_{druk}=n3+n4	=	4,0	st
gewogen gemiddelde diameter trekwapening	$d_{gem,trek}$=(n1*d_1*D_1+n2*d_2*D_2) / (n1*D_1+n2*D_2)	=	18,0	mm
gewogen gemiddelde diameter drukwapening	$d_{gem,druk}$=(n3*d_3*D_3+n4*d_4*D_4) / (n3 *D_3+ n4* D_4)	=	11,2	mm
doorsnede per staaf 1, trekwapening	D_1=0,25πd_1^2	=	254,5	mm^2
doorsnede per staaf 2, trekwapening	D_2=0,25πd_2^2	=	0,0	mm^2
doorsnede per staaf 3, drukwapening	D_3=0,25πd_3^2	=	78,5	mm^2
doorsnede per staaf 4, drukwapening	D_4=0,25πd_4^2	=	113,1	mm^2
doorsnede per staaf 5, flankwapening	D_5=0,25πd_5^2	=	50,3	mm^2
doorsnede per beugel enkelsnedig	D_{bg}=0,25πd_{bg}2	A_{sw}=	33,2	mm^2
aantal snedige beugel bij dwarskracht	n_{sn}	n_{sn}=	2	snedig
horizontale maat in breedte van de balk	$s_{t,bg}$ = b1 / (n_{sn}-1)	=	1894	mm
aanwezige beugelwapening (n-snedig)	A_{bgls} = n_{sn} * D_{bg} * 1000 / $s_{aanwezig}$	=	332	mm^2/m'
horizontale beugelmaat (hartmaat)	b1=b-2$c_{zijkant}$-d_{bg}	=	1894	mm
vertikale beugelmaat (hartmaat)	h1=h-$c_{trekzijde}$-$c_{drukzijde}$-d_{bg}	=	2004	mm
aanwezige trekwapening	$A_{aanw,trek}$	=	2545	mm^2
aanwezige drukwapening	$A_{aanw,druk}$	=	383	mm^2
aanwezige drukwapening	ρ_{druk}= 100 * $A_{aanw,druk}$ / bh (art. 9.2.1.1(3))	=	0,01	%
aanwezige flankwapening	$A_{aanw,flank}$ per zijde	=	101	mm^2
zwaartepunt staven vanaf de beugel	z= (n1 D_1 $^1/_2$ d1+n2 D_2 $^1/_2$ d2) / (n1D_1+n2D_2)	=	9,0	mm
equivalente diameter wapening	$d_{equi,trek}$= 2 * z (t.b.v. berekening van d)	=	18,0	mm

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scheurwijdte

Cilinderpoer(200)

controle scheurwijdte zonder directe berekening art.7,3,3

	optredende staalspanning	$\sigma_{s,qp}=F_{fr} / F_{Ed} * A_{s1,totaal} / A_{aanw,trek} * f_{yd} * z_{UGT} / z_{BGT}$	=	151	N/mm^2
	diameter staven d1	d1	=	18,0	mm
	aantal staven	n_1	=	10	st
	diameter staven d2	d2	=	0,0	mm
	aantal staven	n_2	=	0	st
7.12	equivalente staafdiameter	$d_{eq}=(n_1*d1^2+n_2*d2^2) / (n_1*d1+n_2*d2)$	=	18,0	mm
	werkelijke hart op hart afstand	$s= (b - 2c_{zij} - 2d_{bg}-d_{trek}) / (n-n_s-1)$	=	623	mm
	gemiddelde h.o.h.- afstand staven	$s_{gem} = b / (\Sigma n_{trek} - n_s)$	=	500	mm
	toelaatbare scheurwijdte	w milieuklasse A	=	0,30	mm
	toelaatbare scheurwijdte	w milieuklasse B	=	0,30	mm
	toelaatbare scheurwijdte	w maatgevende waarde	=	0,30	mm
tabel 7.2N	toelaatbare staafdiameter zonder k_x en "factor	d_{max}	=	32,0	mm
tabel 7.3N	toelaatbare h.o.h.-afstand zonder k_x	s afstand vermenigvuldigd me 0,5	=	150,0	mm
	toegepaste dekking beschouwde staaf	$c_{applied} = c_{trekzijde}$ (buitenste wapening)	=	70	mm
	minimale betondekking	$c_{nom}=c_{min}+\Sigma\Delta c_{dev}$ (incl. correcties)	=	30	mm
	vergrotingsfactor NB 7.3.1 (5)	$k_x=c_{applied} / c_{nom}$ <=2,0	=	2,00	-
	toelaatbare staafdiameter	d_{max} met de invloed van factor en k_x	=	29,1	mm
	toelaatbare hart op hart-afstand	s met de invloed van k_x	=	300	mm
(7.6N)	correctiefactor buiging (diameter)	factor = $f_{ct,eff}$ * k_c h_{cr} / { 2,9 *2 * (h-d) }	=	1,82	-
(7.7N)	correctiefactor trek (diameter)	factor = $f_{ct,eff}$ * h_{cr} / { 2,9 *8 * (h-d) }	=	0,45	-
	gemiddelde axiale treksterkte	$f_{ct,eff}$ = f_{ctm} tabel 3.1	=	1,57	N/mm^2
	coëfficient afhankelijk van spanningsverdelin	k_c = buiging =0,4, trek=1,0	=	1,00	-
	hoogte trekzone direct voor scheuren	h_{cr} = 0,5 h bij rechthoekige doorsnec	=	1075	mm
	afstand hart wapening tot buitenkant beton	(h-d)	=	161	mm
	maatgevende "factor" (7.6N) of (7.7N)	alleen voor toelaatbare diameter	=	0,45	-

controle scheurwijdte met berekening art. 7,3,4

7.8	berekende scheurwijdte	$w_k=s_{r,max} (\varepsilon_{sm} - \varepsilon_{cm})$	=	#N/B	mm
		$s_{r,max}$	=	2795,0	mm
7.9		$(\varepsilon_{sm} -\varepsilon_{cm})= \{\sigma_s-k_t * f_{ct,eff}/\rho_{p,eff}*(1+\alpha_e*\rho_{p,eff})\}/E_s$ =		#N/B	-
	minimale waarde	$(\varepsilon_{sm} -\varepsilon_{cm}) >= 0,6 \sigma_s / E_s$	=	0,000454	-
	maatgevende waarde	$(\varepsilon_{sm} -\varepsilon_{cm})$	=	#N/B	-
		$\sigma_{s,qp}=F_{fr} / F_{Ed} * A_{s1,totaal} / A_{aanw,trek} * f_{yd} * z_{UGT} / z_{BGT}$	=	151	N/mm^2
	gemiddelde waarde treksterkte op tijd t	$f_{ctm(t)}$ **tijd t nog eens programmeren**	=	1,57	N/mm^2
	gemiddelde waarde treksterkte	$f_{ct,eff}$ op tijdstip van eerste scheuren	=	1,57	N/mm^2
7.10		$\rho_{p,eff}= (A_s + \xi^2_1 A'_p) / A_{c,ef}$	=	0,008	-
	doorsnede trekwapening	$A_s=A_{aanw,trek}$	=	2545	mm^2
7.3.2(3)	doorsnede voorspanelementen	A'_p	=	0	mm^2
		$A_{c,eff}$ minimum waarde onderstaande formules		321000	mm^2
		$A_{c,eff} = b*2,5 (h-d)$	=	802500	mm^2
		$A_{c,eff} = b*(h-x) / 3$	=	#N/B	mm^2
	van toepassing bij zuivere trek!	$A_{c,eff} =b* h/2$ met h=2*(h-d)= 321	=	321000	mm^2
7,5		ξ_1	=	0	-
	factor	k_t	=	0,4	-
		E_s	=	200000	N/mm^2
7.11	+C2:2011-NB2016	$s_{r,max}=k_3 c+k_1 k_2 k_4 d_{eq} /\rho_{p,eff}$< max {(50-0,8$f_{ck}$)$\Phi$ en 15Φ}	=	727,2	mm
		maximum van (50-0,8f_{ck})Φ en 15Φ	=	727,2	mm
	maximale hoh om 7.11 toe te mogen passen	h.o.h. s_{gem} <= 5(c+φ/2) met φ=d_{eq}	<=	427,5	mm
	dekking op de beschouwde staaf	c	=	76,5	mm
7.12		$d_{eq}=(n_{b1}*d1_{eq}^2+n_{b2}*d2_{eq}^2) / (n_{b1}*d1_{eq}+n_{b2}*d2_{eq})$ =		18,0	mm
		k1=	=	0,8	-
		k2=	=	1,0	-
7.13	tussenliggende waarden	k2= (e1 + e2) / 2e1	=	n.t.b.	-
		k3=	=	3,40	-
		k4=	=	0,425	-
7.14	bovengrens als s_{gem}> 5 (c+φ/2)	$s_{r,max}$= 1,3 (h-x)	=	2795	mm
	hoogte betondrukzone	x=	=	0	mm
7.15	bovengrens	$s_{r,max}$= 1 / (cos O / $s_{r,max,y}$ + sin O / $s_{r,max,z}$) =		n.t.b.	mm

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bij wapening onder een hoek O

berekening van de betondrukzone x en kruipfactor φ in de bruikbaarheidsgrenstoestand

	oppervlakte van de betondoorsnede	A_c= b * h		=	4300000	mm^2
	omtrek dat bloot staat aan uitdroging	u=	3 zijden 2b + h	=	6150	mm
	fictieve dikte	h_0=	2 A_c / u en < 1500mm	=	1398,4	mm
3.1.4	kruipfactor a.d.h.v. grafiek 3.1 (2)	φ	bepaald volgens art. 3.1.4	=	#N/B	-
7.20	gereduceerde elasticiteitsmodulus	$E_{c,eff} = E_{cm} / (1 + \varphi)$		=	#N/B	N/mm^2
	effectieve verhouding elasticiteitsmodulus	α_e=	$E_s / E_{c,eff}$	=	#N/B	-
	hoogte betondrukzone x in BGT	x= [- $\alpha_e \rho$ + √ { ($\alpha_e \rho$)^2 + 2 $\alpha_e \rho$ }] d		=	#N/B	mm
7.3.2(2)	minimum wapening vereist	$A_{s,min}$=k_c k $f_{ct,eff}$ A_{ct} / σ_s	7.1	=	9720	mm^2
	coëfficient	k=factor voor lijven en flenzen		=	1,0	-
	oppervlakte beton binnen trekzone	A_{ct}= 0,5 bh (vlak voor het scheuren)		=	2150000	mm^2
	maximaal toelaatbare spanning in staal	$\sigma_s = f_{yd}$	tbv berekening minimum wapening	=	348	N/mm^2

verankerings- en overlappingslengte

Cilinderpoer(200)

verankeringslengte trekwapening art. 8.4

	karakteristieke cilinderdruksterkte	f_{ck}	=	12	N/mm^2
	karakteristieke kubusdruksterkte	f_{ck}	=	15	N/mm^2
3.4	gemiddelde cilindertreksterkte	$f_{ctm}=0,3f_{ck}^{(2/3)}$	=	1,57	N/mm^2
	karakteristieke ondergrens treksterkte	$f_{ctk0,05}=0,7f_{ctm}$	=	1,10	N/mm^2
3.16	rekenwaarde treksterkte	$f_{ctd}=f_{ctk0,05}/1,5$	=	0,73	N/mm^2
	staaltrekspanning	f_{yk}	=	400	N/mm^2
	rekenwaarde staaltrekspanning	f_{yd}	=	348	N/mm^2
	gemiddelde diameter trekwapening	d_{gem}	=	18,0	mm
	verhouding benodigde/aanwezige wapening	$A_{s1,totaal}$ / $A_{aanw,trek}$	=	0,58	-
	staalspanning in trekwapening	σ_{sd}= $A_{s1,totaal}$ / $A_{aanw,trek}$ * f_{yd}	=	202	N/mm^2
	aantal staven in bundel (max 2)	n	=	1	st
8.3	basisverankeringslengte trekwapening	$l_{b,rqd}$= 0,25 * $d_{gem,trek}$ * √n * σ_{sd} / f_{bd}	=	550	mm
		$l_{b,rqd}$	=	31	*d_{gem}
8.2		f_{bd}=2,25 η_1 η_2 f_{ctd}	=	1,65	N/mm^2
		η1 bovenstaaf=0,7, algemeen=1,0	=	1,00	-
		η2 als d_{gem}<= 32;1 ; (132-d_{gem}) / 100	=	1,00	-
8.4	rekenwaarde verankeringslengte trekwapenin	l_{bd}=α1 α2 α3 α4 α5 $l_{b,rqd}$>=$l_{b,min}$	=	377	mm

l_{bd}=α1 α2 α3 α4 α5 $l_{b,rqd}$=	0,70	0,98	1,00	1,00	1,00	550	=	377	mm

	vorm van de staven	α1 afhankelijk van staafeinde	=	0,70	-
	effect minimum dekking	α2=1-0,15*(c_d-x*$d_{gem,trek}$) / $d_{gem,trek}$ en <1,0	=	0,98	-
		x= factor afhankelijk staafeinde	=	3	-
	uiteindelijke waarde α2	0,7 < α2 < 1,0	=	0,98	-
	rekenwaarde dekking op rechte staaf	c_d= min (a/2 ; c_1 ; c)	=	56,5	mm
	rekenwaarde dekking op gebogen staaf	c_d= min (a/2 ; c_1)	=	56,5	mm
	maatgevende waarde	c_d (dekking op te verankeren staaf)	=	56,5	mm
	effect dwarswapening niet gelast aan hoofdw	α3=1-Kλ (opsluiting dwarswapening)	=	1,00	-
	maatgevende waarde	α3=1-Kλ (opsluiting dwarswapening) >0,7 en <1,0	:	1,00	-
		K (afhankelijk van positie losse dwarsstaaf)	=	0,00	-
		λ=(ΣA_{st}-$\Sigma A_{st,min}$) / A_s	=	-0,25	-
	oppervlak doorsnede dwarswapening over lengte l_{bd}		ΣA_{st}	0	mm^2
		$\Sigma A_{st,min}$ 0,25A_{st} bij balken	=	64	mm^2
		A_s doorsnede enkelvoudig verankerde staaf	=	254	mm^2
	effect aangelaste dwarsstaven	α4: (dwarsstaaf gelast aan hoofdwapening)	=	1,00	-
	effect dwarsdruk	α5=1-0,04p (dwarsdruk bij trekstaven)	=	1,00	-
		p= dwarsdruk in Mpa over lengte l_{bd}	=	0,00	N/mm^2
8.5	maximale waarde	α2 α3 α5 >=0,7	=	0,98	-
8.6		$l_{b,min}$:max(0,3 $l_{b,rqd}$; 10$d_{gem,trek}$, 100)	=	180,0	mm
	halve tussenmaat tussen staven	a / 2	=	302,5	mm

buigdiameter (trekstaaf)

Cilinderpoer(200)

	kwaliteit beton	betonklasse				=	C12/15	-
	diameter om te buigen staaf	diameter				Φ=	18,0	mm
	totale verankeringslengte	$l_{bd}=\alpha1\ \alpha2\ \alpha3\ \alpha4\ \alpha5\ l_{b,rqd}>=l_{b,min}$				=	376,7	mm
	verankering tot aan de bocht	maat vanaf begin verankering tot begin bocht				x=	402,0	mm
	hart op hart afstand van de te buigen staven	h.o.h. = 2 a_b				2 a_b=	623,0	mm
	betreft de te buigen staaf een randstaaf	dus zit de staaf bij een elementrand?				=	nee	-
	is er een dwarsstaaf aanwezig	met een diameter >= de staafdiameter				=	nee	-
	betondekking op te buigen staaf	c				=	76,5	mm
	grootte van de te verankeren kracht:	$F_{bt}=\frac{1}{4}\pi\Phi^2\sigma_{sd1}$ =	254	0	10^{-3}	=	0,0	kN
	gekozen buigdiameter	Φ_m (minimum: Φ<=16: 4Φ anders 5Φ)				=	144,0	mm
	toetsingen							
	doorndiameter ivm bezwijken wapening		90	/ 144		=	0,63	
	verankering na de bocht : $l_{bd\ na\ de\ bocht}$ / 5 D		0	/ 90		=	0,00	
	randstaaf of tussenstaaf	tussenstaaf=1,0 en randstaaf = 2,0					1,0	
	dwarsstaaf aanwezig?	ja=1,0 en nee=2,0 (voldoet niet)				=	2,0	
	onderstaande unitycheck is niet van toepassing							
8.3(3)	doorndiameter ivm bezwijken beton	Φ_{min}/Φ_m =	0	/ 144		=	n.v.t.	-
	karakteristieke cilinderdruksterkte	f_{ck}				=	12	N/mm^2
3.15	rekenwaarde betondruksterkte	$f_{cd}=f_{ck}/1,5$=	12	/ 1,5		=	8,0	N/mm^2
	factor voor maximale buigdiameter	tabel 8.1				f=	5	-
	minimale buigstraal om niet te hoeven toetse	Φ_m=f Φ	5	* 18,0		=	90	mm
	resterende verankeringslengte	(l_{bd} - x) =	376,7	- 402,0		=	0,0	mm
	verankeringslengte in de bocht	$l_{bocht}=0,25\ \pi\ (D_{doorn}+\Phi)=0,25\pi$		162,0		=	127	mm
	verankeringslengte na de bocht	$l_{bd,na\ de\ bocht}$	0,0	- 127		=	0	mm
	maat a_b	tussenstaven: de helft van de hoh-afstand				a_b=	311,50	mm
	doorsnede staaf	A= 0,25 π Φ^2				=	254,5	mm^2
	optredende staalspanning	$\sigma_{s,bt}=F_{bt}$ / 0,25 π Φ^2				=	0,0	N/mm^2
	staafkracht bij het begin van de bocht	F_{bt}= F * (l_{bd} - x) / l_{bd}				=	0,0	kN
8.1	minimale buigdiameter	$\Phi_{m,min}=F_{bt}$ [(1/a_b) + 1 / (2Φ)] / f_{cd}				=	0	mm

minimum wapening (flankwapening, beugels en toevallige inklemming)

6.5.3	**paal 1**	F=	813	kN	a=	250	mm	H=	956	mm	h=	478	mm	α:	50,8	graden
6.59	T=0,25(1-0,7*	250	/	956	) *	813	=	166	kN	$A_{s,req}$=	998	mm^2/m'				
	flankwapening per zijde=0,5*$A_{s,req}$*sinα=	387	mm^2/m'		beugels = 0,5*$A_{s,req}$*cosα=	315	mm^2/m'									
6.5.3	**paal 2**	F=	813	kN	a=	250	mm	H=	956	mm	h=	478	mm	α:	50,8	graden
6.59	T=0,25(1-0,7*	250	/	956	) *	813	=	166	kN	$A_{s,req}$=	998	mm^2/m'				
	flankwapening per zijde=0,5*$A_{s,req}$*sinα=	387	mm^2/m'		beugels = 0,5*$A_{s,req}$*cosα=	315	mm^2/m'									
5.3.1(3)	minimum wapening i.v.m. gedrongen constructie = 0,001 b 1000 = 0,(							2000	1000	=	2000	mm^2/m'				
9.2.1.2(1)	minimum bovenwapening t.g.v toevallig inklemmingsmoment = 0,15							0,15	1475	=	221	mm^2				

uitwaaieren wapening naast de oplegging

	paal 1	doorsnede hoeveelheid wapening die NAAST de oplegging zit						$A_{s;naast;paal\ 1}$=	0	mm^2	
	beugels in verankeringsgebied pa	1000	0	202	/	377	348	=	0	mm^2/m'	
	paal 2	doorsnede hoeveelheid wapening die NAAST de oplegging zit						$A_{s;naast;paal\ 1}$=	0	mm^2	
	beugels in verankeringsgebied pa	1000	0	202	/	377	348	=	0	mm^2/m'	

opmerking:

BIJLAGE 46
Meridian kenmerk 1668999

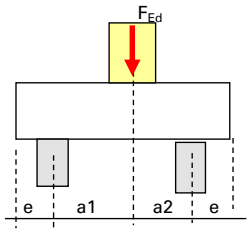
Sweco Nederland B.V.
-
Gebruikslicentie COMMERCIELE-versie tot 1-2-2026

B 2-paalspoer staafwerk EC
Versie : 5.29.14 ; NDP : NL
printdatum : 10-04-2025

tweepaals poer belast door een puntlast 2250 x 1700
volgens de theorie van staafwerkmodellen art. 6.5

algemene gegevens	werk			Opwaardering KIJ-BVW	
	werknummer			10	
	onderdeel			Cilinderpoer(200)	
	ontwerpsituatie			blijvend en tijdelijk	
rekenwaarde van de kolombelasting	F_{Ed}		=	1650	kN
	splitsing puntlast F_{Ed} in twee halve puntlasten?			ja	-

materiaalgegevens en poerafmetingen



kwaliteit beton	betonklasse		=	C35/45	
kwaliteit staal	staalsoort		=	B 500	
wapeningsklasse	A, B of C		=	B	-
poerbreedte	b		b=	2250	mm
poerhoogte	h		h=	1700	mm
afstand van paal 1 tot hart kolom	a1		a1=	725	mm
afstand van kolom tot paal 2	a2		a2=	725	mm
inwendige hefboomsarm			z_{UGT}=	870	mm
toelaatbare inwendige hefboomsarm in BGT	z_{BGT}=0,2 l + 0,4 h < 0,6 l volgens art. 6.1(10)		=	870	mm
afstand hart ondersteuning tot eind poer	e		=	400	mm
vorm van de kolom	rond of rechthoekig			rechthoekig	
afmeting kolom in richting poerlengte	L_{kolom}		=	390	mm
afmeting kolom loodrecht op poerlengte	B_{kolom}		=	390	mm
vorm van de ondersteuning	rond of rechthoekig			rond	
afm. ondersteuning in richting poer	L_{paal}		=	406	mm
afm. ondersteuning loodrecht poerrichting	B_{paal}		=	406	mm

wapeninggegevens

betondekking getrokken zijde	$c_{trekzijde}$	dekking op de buitenste wapenin	=	60	mm
betondekking zijkanten / uiteind	$c_{zijkant}$	=$c_{uiteind}$	=	50	mm
wapening aan getrokken zijde	aantal n1		=	13	stuks
	diameter d_1		=	16	mm
	aantal n2		=	0	stuks
	diameter d_2		=	0	mm
bij wapening in meerdere lagen	aantal staven dat niet in de buitenste laag ligt		n_s=	8	staven
correctie van de nuttige hoogte d ten gevolge van het wapenen in meerdere lagen			d_{red}=	300	mm
invloedsfactor verankeringslengte (α1)	staafbeeindiging van de trekstaven		=	haarspeld	
doorndiameter omgebogen trekstaven	factor voor ombuiging		=	8	* $d_{max1,2}$
diameter beugels			d_{bg}=	16	mm
wordt er bij de knopen boven de palen voldaan aan één van de randvoorwaarden van artikel 6.5.4(5) ?				ja	

invloedsfactoren voor scheurwijdte en betondekking

verhouding tussen de frequente combinatie en uiterste grenstoestand:		F_{fr} / F_{Ed}	=	0,75	-
a ontwerplevensduur			=	50	jaar
b omgevingsfactoren	milieuklasse A (kies uit X0- XC- XD- of XS-serie)		=	XC3	-
b	milieuklasse B (kies uit X0- XC- XD- of XS-serie)		=	XC3	-
c soort constructie	soort constructie		=	poer	
d dekking verhogen bij oncontroleerbaarheid van de wapening (geen eis in eurocode)			=	nee	
e wordt de beton nabewerkt			=	nee	
f verhoging dekking bij toepassing grote grindkorrel (>32mm) tabel 4.2			=	nee	
g ondergrond waarop gestort wordt			=	bekisting	
h bundeling wapeningstaven (trekwapening)	worden staven d1 gebundeld?		=	nee	
staven kunnen niet worden gebundeld	worden staven d2 gebundeld?		=	nee	
i kwaliteitsbeheersing	is specifieke kwaliteitsbeheersing gewaarborg		=	nee	
j luchtinsluiting	luchtinsluiting van meer dan 4% toegepast?		=	nee	
k verhoging dekking bij toepassing grote staafdiameter (>25mm) geen eis in eurocode			=	nee	
k1 aanhechteigenschap	de aanhechting van de wapeningstaven is		=	goed	
k2 wijze van belasting	de betondoorsnede wordt belast door		=	zuivere trek	
kt belastingduur (bij berekende scheurwijdte)	de belastingduur is		=	langdurend	
milieuklasse	de milieuklasse van de beton is			b) buitenmilieu - RH=80%	
belasten constructie na aantal dagen	de constructie wordt belast na t_0 is			100	dagen
cementklasse	de gekozen cementklasse is			N	
omtrek dat bloot staat aan uitdroging	het aantal zijden dat aan uitdroging bloot staat is			4 zijden 2b+2h	
de staalspanning bij controle scheurwijdte vermenigvuldigen met correctiefactor		z_{UGT} / z_{BGT}	=	1,00	

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unity-checks

Cilinderpoer(200)

er wordt gerekend met trekwapening in meerdere lagen

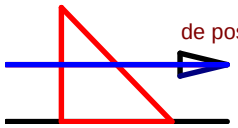
knoop onder kolom	spanning onder kolom	10,8	/	22,1	0,49	-
	spanning in diagonaal	13,6	/	22,1	0,62	-
knoop bij paal 1	spanning boven paal	6,4	/	18,8	0,34	-
	spanning in diagonaal	3,9	/	18,8	0,21	-
knoop bij paal 2	spanning boven paal	6,4	/	18,8	0,34	-
	spanning in diagonaal	3,9	/	18,8	0,21	-
geometrie	hoogte z	870	/	1277	0,68	-
	hoogte h	1293	/	1700	0,76	-
	positie trekband	0,0	/	768,0	0,00	-

l_bd is kleiner dan Lpaal; de verankeringslengte komt niet voorbij einde ondersteuning; T_Ed=0

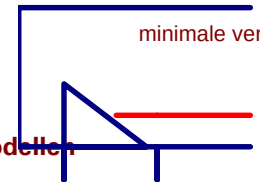
trekband tussen de palen	$A_{s,trek}$ / $A_{aanw,trek}$	1553	/	2614	=	0,59	-
scheurwijdte zonder berekening	diameter of hoh	1,00	of	2,03	=	1,00	-
scheurwijdte met berekening	w_k / w * k_x	1,28	/	0,60	=	**2,14**	-
betondekking	c_{nom} / $c_{trekzijde}$	25	/	60	=	0,42	-
verankeringslengte	l_2 / d	0	/	1316	=	0,00	-
8.3(3) doorndiameter bezwijken beton	$\Phi_{m,min}$ / D_{doorn}	64	/	128	=	n.v.t.	-

spatkrachten T tgv het uitwaaieren drukdiagonaal (art. 6.5.3) zijn onderaan deze sheet getoetst! scheurwijdte voldoet

positie knoop boven paal 1 en 2 t.o.v. de onderkant van de poer

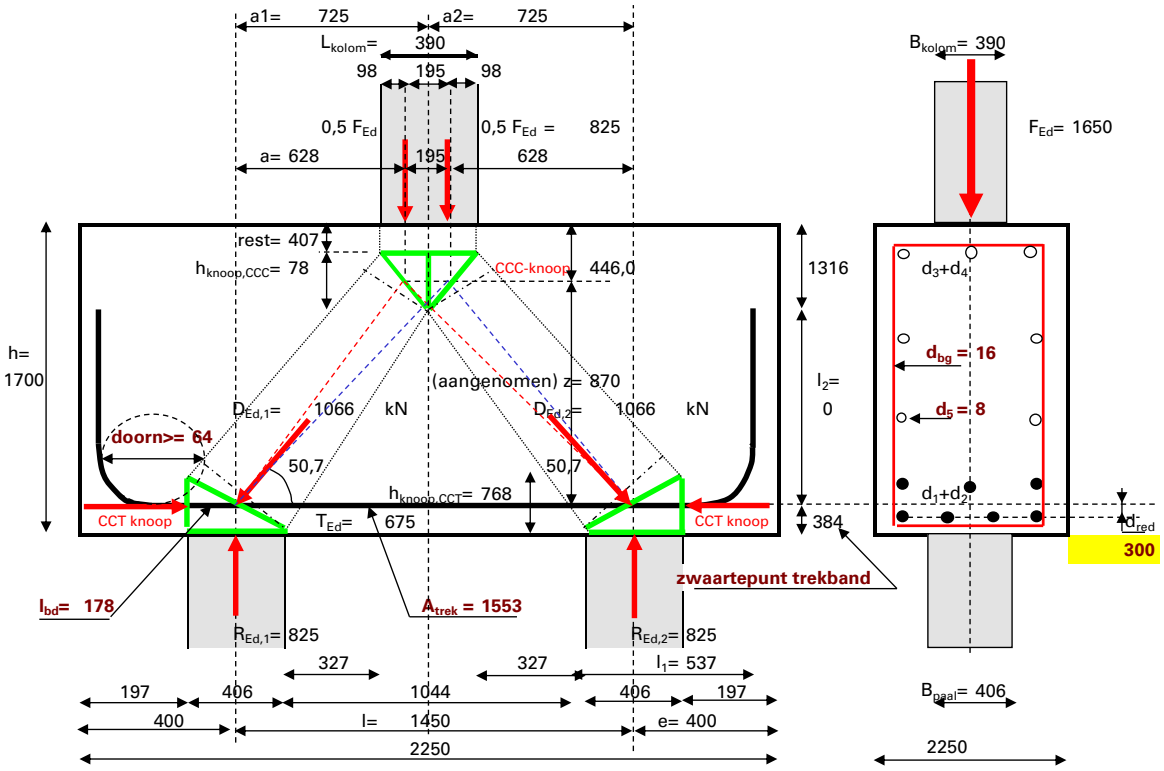


de positie van de trekband voldoet



minimale verankering

schematische weergave tweepaals poer met staafwerkmodellen



samenvatting resultaten

hoeveelheden:	8,60625 m^3 beton	276,0 kg staal	wapeningshoeveelheid =	32,1 kg/m^3

trekband

grootte van de benodigde trekbandwapening	$A_{trek} = T_{Ed} / f_{yd}$	=	1553	mm^2
inwendige hefboomsarm	z	=	870	mm
hart trekband tot onderkant poer	$c_{trekzijde} + d_{bg} + 0,5 * d_{gem} + d_{red}$	=	384	mm

scheurwijdte

scheurwijdtecontrole zonder berekening	maximum staafdiameter	=	16,1	mm
scheurwijdtecontrole zonder berekening	maximum hart op hart afstand	=	259	mm

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toelaatbare scheurwijdte	$w * k_x$	=	0,60	mm

	optredende scheurwijdte met berekening	$w_k=s_{r,max}(\varepsilon_{sm}-\varepsilon_{cm})$				=	1,28	mm
betondekking								
	nominale betondekking	c_{nom}	op de buitenste wapening			=	25	mm
verankeringslengte en buigdiameter								
8.4	rekenwaarde verankeringslengte trekwap.	$l_{bd}=\alpha1\ \alpha2\ \alpha3\ \alpha4\ \alpha5\ l_{b,rqd}>=l_{b,min}$				=	178	mm
8.1	minimale buigdiameter (doorndiameter)	$\Phi_{m,min}=F_{bt}[(1/a_b)+1/(2\Phi)]/f_{cd}$				=	0	mm
minimum flankwapening en -beugels, toevallige inklemming en uitwaaieren trekband								
6.5.3	flankwapening ivm staafwerkmodel trekstaaf per zijde	384	mm^2/m'	beugelwapening	314	mm^2/m'		
5.3.1(3)	flankwapening ivm gedrongen liggers per zijde	1700	mm^2/m'	beugelwapening	1700	mm^2/m'		
	paal 1 uitwaaieren trekband bgls verankeringsgebied l=	178	mm	benodigde beugels	0	mm^2/m'		
	paal 2 uitwaaieren trekband bgls verankeringsgebied l=	178	mm	benodigde beugels	0	mm^2/m'		
9.2.1.2(1)	min. bovenwap. t.g.v toevallig inklemmingsmom = 0,15 * A_{trek}=	0,15	1553		=	233	mm^2	

berekening poer volgens de theorie van staafwerkmodellen art. 6.5

krachtsverdeling	**er wordt gerekend met twee puntlasten**									
	h.o.h. afstand palen (ondersteuningen)		l=	725	+	725	=	1450	mm	
	oplegreactie	$R_{Ed,1}$= a2 / l * F_{Ed}	725	/	1450	1650	=	825	kN	
	oplegreactie	$R_{Ed,2}$= a1 / l * F_{Ed}	725	/	1450	1650	=	825	kN	
berekening hoeken										
	hoek $\alpha1$	werklijn paal 1 naar F_{links}	boogtan (	870,0	/	627,5	) =	54,2	graden	
	hoek $\alpha2$	werklijn paal 1 naar F_{rechts}	boogtan (	870,0	/	822,5	) =	46,6	graden	
	hoek $\alpha3$	hellingshoek drukstaaf paal 1	boogtan (	825,0	/	675,1	) =	50,7	graden	
	hoek $\beta1$	werklijn paal 2 naar F_{links}	boogtan (	870,0	/	822,5	) =	46,6	graden	
	hoek $\beta2$	werklijn paal 2 naar F_{rechts}	boogtan (	870,0	/	627,5	) =	54,2	graden	
	hoek $\beta3$	hellingshoek drukstaaf paal 2	boogtan (	825,0	/	675,1	) =	50,7	graden	
	hoek a	krachtenveelhoek F_{links}	90	-	46,6		=	43,4	graden	
	hoek b	idem 180	90	-	43,4	- 35,8	=	100,8	graden	
	hoek c	idem	90	-	54,2		=	35,8	graden	
	hoek d	krachtenveelhoek F_{rechts}	90	-	54,2		=	35,8	graden	
	hoek e	idem 180	90	-	35,8	- 43,4	=	100,8	graden	
	hoek f	idem	90	-	46,6		=	43,4	graden	
staafkrachten										
	staafkrachten tgv linker halve puntlast									
	D1=0,5F_{Ed} sin c/sin b	= 825	sin	35,8	/ sin	100,8	=	491	kN	
	H1=D1 cos $\beta1$	= 491,3	cos	46,6			=	338	kN	
	staafkrachten tgv rechter halve puntlast									
	D2=0,5F_{Ed} sin f/sin e	= 825	sin	43,4	/ sin	100,8	=	577	kN	
	H2=D2 cos $\beta2$	= 577,0	cos	54,2			=	338	kN	
	totale trekkracht in onderregel	T_{Ed}= H1+H2 =		337,5	+	337,5	=	675	kN	
	drukdiagonaal paal 1	$D_{Ed,1}$= √ (	825,0 ^{2}	+	675,1 ^{2}	)	=	1066	kN	
	drukdiagonaal paal 2	$D_{Ed,2}$= √ (	825,0 ^{2}	+	675,1 ^{2}	)	=	1066	kN	
	hoek contactvlakken en horizontaal 90-$\alpha3$		links	90,0	-	50,7	=	39,3	graden	
	hoek contactvlakken en horizontaal 90-$\beta3$		rechts	90,0	-	50,7	=	39,3	graden	

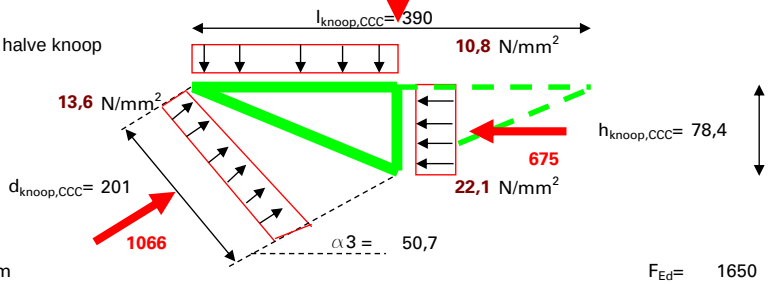
controles

materiaalfactor beton	γ_c				=	1,50	-
materiaalfactor wapeningstaal	γ_s				=	1,15	-
karakteristieke cilinderdruksterkte	f_{ck}				=	35	N/mm^2
3.15 rekenwaarde betondruksterkte	$f_{cd}=f_{ck}/\gamma_c$	=	35	/ 1,50	=	23,3	N/mm^2
6.57 sterktereductiefactor	v ' = (1-f_{ck} / 250) =		(1 -	35 / 250)	=	0,86	-

controle knoop onder de kolom type CCC

6.60 drukspanning	$\sigma_{Rd,max,1}=\alpha\ k_1\ v'\ f_{cd}$ =	1,10	1,00	0,86	23,3	=	**22,1** N/mm^2
			1650				

schematische weergave halve knoop



horizontale vlak

normaalkracht uit kolom						F_{Ed}=	1650	kN
oppervlak kolom		1,000	390	390	10^{-2}	=	1521	cm^2
drukspanning direct onder kolom	1650	10^3 /	1521	10^2		=	10,8	N/mm^2
toetsing drukspanning onder kolom		10,8	/	22,1		=	0,49	-

vertikale vlak

normaalkracht = trekkracht in trekband						T_{Ed}=	675	kN
breedte van CCC-knoop onder kolom	$b_{knoop,CCC}$	equivalente afmeting				=	390	mm
minimaal benodigde hoogte CCC-knoop	675	10^3 /	390	22,1		=	78,4	mm

schuine vlak met diagonaal naar paal 1

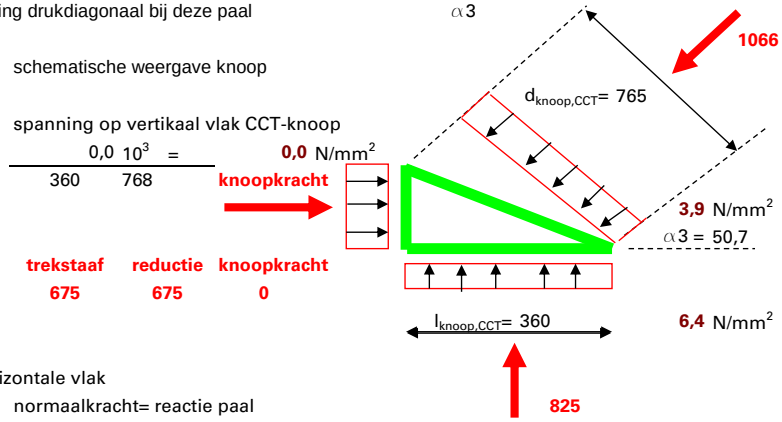
schuine lengte knoop CCC	√ (	195 ²	+	78,4 ²	)	=	210,2	mm
hoek knoop CCC met horizontaal	boogtan (	78,4	/	195,0	)	=	21,9	graden
hoek contactvlak en loodrechte van drukdiagonaal bij CCC		21,9	-	39,3		=	-17,4	graden
werkelijke lengte drukvlak bij CCC		210,2	cos	-17,4		=	200,6	mm
normaalkracht in drukdiagonaal						$D_{Ed,1}$=	1066,0	kN
drukspanning in diagonaal bij CCC	1066,0	10^3 / (	200,6	*	390	) =	13,6	N/mm^2
toetsing drukdiagonaal bij CCC		13,6	/	22,1		=	0,62	-

controle knoop bij paal 1, type CCT

6.61 drukspanning $\sigma_{Rd,max,2} = \alpha$ k_2 v' f_{cd} =		1,10	0,85	0,86	23,3	=	18,8	N/mm^2
helling drukdiagonaal bij deze paal		α3				=	50,7	graden

schematische weergave knoop

spanning op vertikaal vlak CCT-knoop



horizontale vlak

normaalkracht= reactie paal						$R_{Ed,1}$=	825,0	kN
breedte van CCT-knoop boven paal	$b_{knoop,CCT}$	equivalente afmeting				=	360	mm
oppervlak paal		0,785	406	406	10^{-2}	=	1295	cm^2
drukspanning direct boven de paal	825,0	10^3 /	1295	10^2		=	6,4	N/mm^2
toetsing drukspanning boven paal		6,4	/	18,8		=	0,34	-

vertikale vlak **l_bd is kleiner dan Lpaal; de verankeringslengte komt niet voorbij einde ondersteuning; T_Ed=0**

gereduceerde kracht tegen de knoop= T_{Ed} * (l_{bd}-L_{paal})/l_{bd} =		675	0	/ 178		T_{Ed}=	0,0	kN
beschikbare knoophoogte	$h_{knoop,CCT}$=	2	384			=	768	mm
minimaal benodigde hoogte CCT-knoop	0,0	10^3 /	360	18,8		=	0,0	mm

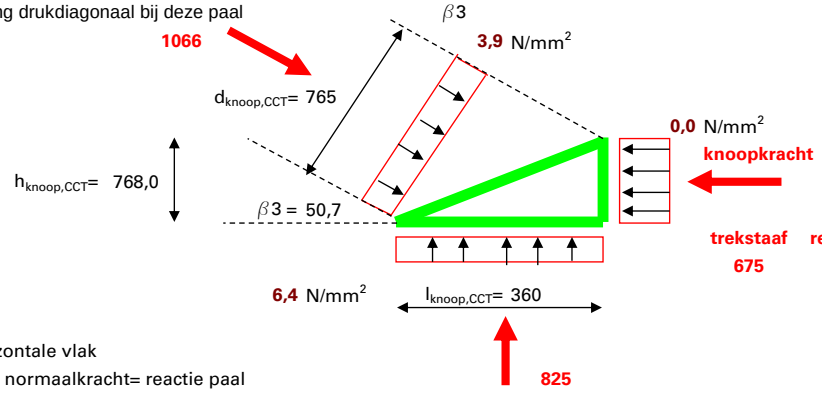
schuine vlak

schuine lengte knoop CCT	√ (	360 ²	+	768,0 ²	)	=	848,1	mm
hoek knoop CCT met horizontaal	boogtan (	768,0	/	359,8	)	=	64,9	graden
hoek contactvlak en loodrechte van drukdiagonaal		64,9	-	39,3		=	25,6	graden
werkelijke lengte drukvlak		848,1	cos	25,6		=	764,8	mm
normaalkracht= drukdiagonaal						$D_{Ed,1}$=	1066,0	kN
drukspanning in diagonaal	1066,0	10^3 / (	764,8	*	360	) =	3,9	N/mm^2
toetsing drukdiagonaal		3,9	/	18,8		=	0,21	-

controle knoop bij paal 2, type CCT

6.61 drukspanning $\sigma_{Rd,max,2} = \alpha\ k_2\ v'\ f_{cd}$ = 1,10 0,85 0,86 23,3 = 18,8 N/mm²

helling drukdiagonaal bij deze paal $\beta 3$ = 50,7 graden



	trekstaaf	reductie	knoopkracht
	675	675	0

horizontale vlak

normaalkracht= reactie paal						$R_{Ed,2}$=	825,0	kN
breedte van CCT-knoop boven paal		$b_{knoop,CCT}$	equivalente afmeting			=	360	mm
oppervlak paal			0,785	406	406	10^{-2} =	1295	cm²
drukspanning direct boven de paal		825,0	10^3 /	1295	10^2	=	6,4	N/mm²
toetsing drukspanning boven paal			6,4	/	18,8	=	0,34	-

vertikale vlak

normaalkracht = trekkracht in trekband						T_{Ed}=	675,1	kN
breedte		$b_{knoop,CCT}$				=	360	mm
beschikbare hoogte CCT-knoop		zie paal 1				=	768,0	mm

schuine vlak

schuine lengte knoop CCT	√ (	360 ²	+	768,0 ²		) =	848,1	mm
hoek knoop CCT met horizontaal		boogtan (	768,0	/	359,8	) =	64,9	graden
hoek contactvlak en loodrechte van drukdiagonaal			64,9	-	39,3	=	25,6	graden
werkelijke lengte drukvlak		848,1	cos	25,6		=	764,8	mm
normaalkracht= drukdiagonaal						$D_{Ed,2}$=	1066,0	kN
drukspanning in diagonaal	1066,0	10^3 / (	764,8	*	360	) =	3,9	N/mm²
toetsing drukdiagonaal			3,9	/	18,8	=	0,21	-

controle trekstaaf tussen paal 1-2

trekkracht in trekband						T_{Ed}=	675,1	kN
benodigde trekwapening		$A_{s1,2}$=	675	10^3 /	435	=	1553	mm²
toetsing gekozen trekband			1553	/	2614	=	0,59	-

controle inwendige hefboomsarm z en totale poerhoogte

geschatte hoogte van de inwendige hefboomsarm z						=	870	mm
maximaal toelaatbare hoogte z	1700	-	384,0	-	78,4	/ 2 =	1277	mm
toetsing geschatte hoogte z			870	/	1277	=	0,68	-
minimaal benodigde poerhoogte h	384,0	+	870	+	39,2	=	1293	mm
toetsing totale hoogte h			1293	/	1700	=	0,76	-

controle ligging trekband

toetsing positie trekband			0,0	/	768	=	0,00	-

controle verankeringslengte

$l_{bd} = \alpha 1\ \alpha 2\ \alpha 3\ \alpha 4\ \alpha 5\ l_{b,rqd}$ =	0,70	0,83	1,00	1,00	1,00	307	=	178	mm
8.4 rekenwaarde verankeringslengte trekwapenin	$l_{bd} = \alpha 1\ \alpha 2\ \alpha 3\ \alpha 4\ \alpha 5\ l_{b,rqd} >= l_{b,min}$						=	178	mm
staalspanning bij begin van verankering	$\sigma_{sd} = f_{yd} * A_{s,trek} / A_{aanw,trek}$						=	258	N/mm²
staalspanning bij begin van de bocht	$\sigma_{sd1} = (l_{bd} - l_{hor}) / l_{bd} * \sigma_{sd}$						=	0	N/mm²
6.5.4(7) beschikbare ruimte horizontale verankering	$l_1 = e + 0,5\ L_{paal} - c - d_{5,flank} - 0,5\ d_{max}$						=	537	mm
doorndiameter omgebogen staven	D_{doorn} = factor * $d_{max1,2}$						=	128	mm
beschikbare lengte tot de bocht	$l_{hor} = l_1 - 0,5\ D_{doorn} - 0,5\Phi$						=	465	mm
lengte van de verankering in de bocht	$l_{bocht} = 0,25\ \pi\ (D_{doorn} + \Phi)$						=	113	mm
restant verankeringslengte in vertikale deel	$l_{vert} = l_{bd} - l_{hor} - l_{bocht}$						=	-400	mm
benodigde ruimte vertikale verankering	$l_2 = 0,5\ D_{doorn} + l_{vert} + 0,5\ \Phi$						=	-328	mm
8.1 minimale buigdiameter	$\Phi_{m,min} = F_{bt}\ [\ (1/a_b) + 1\ /\ (2\Phi)\ ]\ /\ f_{cd}$						=	0	mm

controle scheurwijdte

optredende staalspanning	$\sigma_s=F_{qp}$ / F_{Ed} * $A_{s,trek}$ / $A_{aanw,trek}$ * f_{yd}		=	194	N/mm^2
toelaatbare scheurwijdte	w	maatgevende waarde	=	0,30	mm
toelaatbare staafdiameter	d_{max}	met de invloed van k_x	=	16,1	mm
toelaatbare hart op hart-afstand	s	met de invloed van k_x	=	258,8	mm
maximale staafdiameter	d_{max}		=	16	mm
werkelijke hart op hart afstand	s= (b - 2c_{zij} - 2d_{bg}-d_{trek}) / (n-n_s-1)		s = 2 a_b=	526	mm

betondekking

berekening minimum betondekking op trekwapening

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tab4.3N	correctie van de constructieklasse: uitgangspunt:constructieklasse bij 50 jaar				S	4	-
a	correctie tgv ontwerplevensduur					0	-
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse A of B)					-1	-
c	correctie tgv geometrie					0	-
i	correctie tgv kwaliteitsbeheersing					0	+
	totale waarde constructieklasse				S	3	
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse A)					-1	
b, j	correctie tgv betonsterkteklasse (afhankelijk van milieuklasse B)					-1	
	berekening van de nominale dekking voor hoofdwapening en beugels (in mm)					hoofdwapening	beugels
tabel 4.2	minimum dekking t.g.v. **aanhechting**	$c_{min,b}$ >d_n	$c_{grindkorrel}$= 0	$c_{min,b}$+$c_{grindkorrel}$=		16	16
tab 4.4N	minimum dekking tgv milieuklasse A	$c_{min,dur}$			=	20	20
	minimum dekking tgv milieuklasse B	$c_{min,dur}$			=	20	20
	resulterende minimum dekking	$c_{min,dur}$	(duurzaamheid)		=	20	20
e	correctie tgv nabewerking	c_{extra}			=	0	0
	gecorrigeerde min. dekking **duurzaamheid**	$c_{min,dur}$	inclusief c_{extra}		=	20	20
4.2	**minimum dekking**	c_{min} = max($c_{min,b}$; $c_{min,dur}$; 10mm)			=	20	20
	toeslagen uitvoeringstoleranties	Δc_{dev}			=	5	5
g	storten op werkvloer / maaiveld / kist	Δc_{dev}			=	0	0
d	t.g.v. oncontroleerbaarheid	Δc_{dev}	**geen eis in eurocode!**		=	0	0
4.1	**nominale betondekking** op staaf	$c_{nom}=c_{min}$ + $\sum\Delta c_{dev}$			=	25	25
k	t.g.v. toegepaste hoofdwapening >25mm	c_{nom}= 1,5d_n			=	0	0
	equivalente staafdiameter	d_n=max($d1_{eq}$;$d2_{eq}$)=	16,0	d_{bg}= 16			
	dekking op de buitenste wapening	Hoofdwapening: c_{nom}- d_{bg}	Beugels: c_{nom}		=	9	25
	nominale betondekking buitenste wapening	c_{nom}	(minimum waarde op tekening)		=	25	

wapeninggegevens

totaal aantal staven in trekzone	$\sum n_{trek}$=n1+n2	=	13,0	st
totaal aantal staven in drukzone	$\sum n_{druk}$=n3+n4	=	4,0	st
gewogen gemiddelde diameter trekwapening	$d_{gem,trek}$=(n1*d_1*D_1+n2*d_2*D_2) / (n1*D_1+n2*D_2)	=	16,0	mm
gewogen gemiddelde diameter drukwapening	$d_{gem,druk}$=(n3*d_3*D_3+n4*d_4*D_4) / (n3 *D_3+ n4* D_4)	=	11,2	mm
doorsnede per staaf 1, trekwapening	D_1=0,25$\pi$$d_1^2$	=	201,1	mm^2
doorsnede per staaf 2, trekwapening	D_2=0,25$\pi$$d_2^2$	=	0,0	mm^2
doorsnede per staaf 3, drukwapening	D_3=0,25$\pi$$d_3^2$	=	78,5	mm^2
doorsnede per staaf 4, drukwapening	D_4=0,25$\pi$$d_4^2$	=	113,1	mm^2
doorsnede per staaf 5, flankwapening	D_5=0,25$\pi$$d_5^2$	=	50,3	mm^2
doorsnede per beugel enkelsnedig	D_{bg}=0,25$\pi$$d_{bg}$2	A_{sw}=	201,1	mm^2
aantal snedige beugel bij dwarskracht	n_{sn}	n_{sn}=	2	snedig
horizontale maat in breedte van de balk	$s_{t,bg}$ = b1 / (n_{sn}-1)	=	2134	mm
aanwezige beugelwapening (n-snedig)	A_{bgls} = n_{sn} * D_{bg} * 1000 / $s_{aanwezig}$	=	2011	mm^2/m'
horizontale beugelmaat (hartmaat)	b1=b-2$c_{zijkant}$-d_{bg}	=	2134	mm
vertikale beugelmaat (hartmaat)	h1=h-$c_{trekzijde}$-$c_{drukzijde}$-d_{bg}	=	1564	mm
aanwezige trekwapening	$A_{aanw,trek}$	=	2614	mm^2
aanwezige drukwapening	$A_{aanw,druk}$	=	383	mm^2
aanwezige drukwapening	ρ_{druk}= 100 * $A_{aanw,druk}$ / bh (art. 9.2.1.1(3))	=	0,01	%
aanwezige flankwapening	$A_{aanw,flank}$ per zijde	=	101	mm^2
zwaartepunt staven vanaf de beugel	z= (n1 D_1 $^1/_2$ d1+n2 D_2 $^1/_2$ d2) / (n1D_1+n2D_2)	=	8,0	mm
equivalente diameter wapening	$d_{equi,trek}$= 2 * z (t.b.v. berekening van d)	=	16,0	mm

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scheurwijdte

Cilinderpoer(200)

controle scheurwijdte zonder directe berekening art.7,3,3

	optredende staalspanning	$\sigma_{s,qp}=F_{fr} / F_{Ed} * A_{s1,totaal} / A_{aanw,trek} * f_{yd} * z_{UGT} / z_{BGT}$	=	194	N/mm²
	diameter staven d1	d1	=	16,0	mm
	aantal staven	n_1	=	13	st
	diameter staven d2	d2	=	0,0	mm
	aantal staven	n_2	=	0	st
7.12	equivalente staafdiameter	$d_{eq}=(n_1*d1^2+n_2*d2^2) / (n_1*d1+n_2*d2)$	=	16,0	mm
	werkelijke hart op hart afstand	$s= (b - 2c_{zij} - 2d_{bg}-d_{trek}) / (n-n_s-1)$	=	526	mm
	gemiddelde h.o.h.- afstand staven	$s_{gem} = b / (\Sigma n_{trek} - n_s)$	=	450	mm
	toelaatbare scheurwijdte	w milieuklasse A	=	0,30	mm
	toelaatbare scheurwijdte	w milieuklasse B	=	0,30	mm
	toelaatbare scheurwijdte	w maatgevende waarde	=	0,30	mm
tabel 7.2N	toelaatbare staafdiameter zonder k_x en "factor	d_{max}	=	26,2	mm
tabel 7.3N	toelaatbare h.o.h.-afstand zonder k_x	s afstand vermenigvuldigd me 0,5	=	129,4	mm
	toegepaste dekking beschouwde staaf	$c_{applied} = c_{trekzijde}$ (buitenste wapening)	=	60	mm
	minimale betondekking	$c_{nom}=c_{min}+\Sigma\Delta c_{dev}$ (incl. correcties)	=	25	mm
	vergrotingsfactor NB 7.3.1 (5)	$k_x=c_{applied} / c_{nom}$ <=2,0	=	2,00	-
	toelaatbare staafdiameter	d_{max} met de invloed van factor en k_x	=	16,1	mm
	toelaatbare hart op hart-afstand	s met de invloed van k_x	=	259	mm
(7.6N)	correctiefactor buiging (diameter)	factor = $f_{ct,eff}$ * k_c h_{cr} / { 2,9 *2 * (h-d) }	=	1,23	-
(7.7N)	correctiefactor trek (diameter)	factor = $f_{ct,eff}$ * h_{cr} / { 2,9 *8 * (h-d) }	=	0,31	-
	gemiddelde axiale treksterkte	$f_{ct,eff}$ = f_{ctm} tabel 3.1	=	3,21	N/mm²
	coëfficient afhankelijk van spanningsverdelin	k_c = buiging =0,4, trek=1,0	=	1,00	-
	hoogte trekzone direct voor scheuren	h_{cr} = 0,5 h bij rechthoekige doorsnec	=	850	mm
	afstand hart wapening tot buitenkant beton	(h-d)	=	384	mm
	maatgevende "factor" (7.6N) of (7.7N)	alleen voor toelaatbare diameter	=	0,31	-

controle scheurwijdte met berekening art. 7,3,4

7.8	berekende scheurwijdte	$w_k=s_{r,max} (\varepsilon_{sm} - \varepsilon_{cm})$	=	1,28	mm
		$s_{r,max}$	=	2210,0	mm
7.9		$(\varepsilon_{sm} -\varepsilon_{cm})= \{\sigma_s-k_t * f_{ct,eff}/\rho_{p,eff}*(1+\alpha_e*\rho_{p,eff}) \}/E_s$ =		-0,001246	-
	minimale waarde	$(\varepsilon_{sm} -\varepsilon_{cm}) >= 0,6 \sigma_s / E_s$	=	0,000581	-
	maatgevende waarde	$(\varepsilon_{sm} -\varepsilon_{cm})$	=	0,000581	-
		$\sigma_{s,qp}=F_{fr} / F_{Ed} * A_{s1,totaal} / A_{aanw,trek} * f_{yd} * z_{UGT} / z_{BGT}$	=	194	N/mm²
	gemiddelde waarde treksterkte op tijd t	$f_{ctm(t)}$ **tijd t nog eens programmeren**	=	3,21	N/mm²
	gemiddelde waarde treksterkte	$f_{ct,eff}$ op tijdstip van eerste scheuren	=	3,21	N/mm²
7.10		$\rho_{p,eff}= (A_s + \xi^2_1 A'_p) / A_{c,ef}$	=	0,003	-
	doorsnede trekwapening	$A_s=A_{aanw,trek}$	=	2614	mm²
7.3.2(3)	doorsnede voorspanelementen	A'_p	=	0	mm²
		$A_{c,eff}$ minimum waarde onderstaande formules		864000	mm²
		$A_{c,eff}$ = b*2,5 (h-d)	=	2160000	mm²
		$A_{c,eff}$ = b*(h-x) / 3	=	1129820	mm²
	van toepassing bij zuivere trek!	$A_{c,eff}$ =b* h/2 met h=2*(h-d)= 768	=	864000	mm²
7,5		ξ_1	=	0	-
	factor	k_t	=	0,4	-
		E_s	=	200000	N/mm²
7.11	+C2:2011-NB2016	$s_{r,max}=k_3 c+k_1 k_2 k_4 d_{eq} /\rho_{p,eff}$< max {(50-0,8$f_{ck}$)$\Phi$ en 15Φ}	=	352,0	mm
		maximum van (50-0,8f_{ck})Φ en 15Φ	=	352,0	mm
	maximale hoh om 7.11 toe te mogen passen	h.o.h. s_{gem} <= 5(c+φ/2) met φ=d_{eq}	<=	420	mm
	dekking op de beschouwde staaf	c	=	76,0	mm
7.12		$d_{eq}=(n_{b1}*d1_{eq}^2+n_{b2}*d2_{eq}^2) / (n_{b1}*d1_{eq}+n_{b2}*d2_{eq})$ =		16,0	mm
		k1=	=	0,8	-
		k2=	=	1,0	-
7.13	tussenliggende waarden	k2= (e1 + e2) / 2e1	=	n.t.b.	-
		k3=	=	3,40	-
		k4=	=	0,425	-
7.14	bovengrens als s_{gem}> 5 (c+φ/2)	$s_{r,max}$= 1,3 (h-x)	=	2210	mm
	hoogte betondrukzone	x=	=	0	mm
7.15	bovengrens	$s_{r,max}$= 1 / (cos O / $s_{r,max,y}$ + sin O / $s_{r,max,z}$) =		n.t.b.	mm

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bij wapening onder een hoek O

berekening van de betondrukzone x en kruipfactor φ in de bruikbaarheidsgrenstoestand

	oppervlakte van de betondoorsnede	A_c= b * h			= 3825000	mm^2
	omtrek dat bloot staat aan uitdroging	u=	4 zijden 2b+2h		= 7900	mm
	fictieve dikte	h_0=	2 A_c / u en < 1500mm		= 968,4	mm
3.1.4	kruipfactor a.d.h.v. grafiek 3.1 (2)	φ	bepaald volgens art. 3.1.4		= 1,44	-
7.20	gereduceerde elasticiteitsmodulus	$E_{c,eff}$ = E_{cm} / (1 + φ)			= 13919	N/mm^2
	effectieve verhouding elasticiteitsmodulus	α_e=	E_s / $E_{c,eff}$		= 14,4	-
	hoogte betondrukzone x in BGT	x= [- $\alpha_e \rho$ + √ { ($\alpha_e \rho$)² + 2 $\alpha_e \rho$ }] d			= 193,6	mm
7.3.2(2)	minimum wapening vereist	$A_{s,min}$=k_c k $f_{ct,eff}$ A_{ct} / σ_s		7.1	= 14120	mm^2
	coëfficient	k=factor voor lijven en flenzen			= 1,0	-
	oppervlakte beton binnen trekzone	A_{ct}= 0,5 bh (vlak voor het scheuren)			= 1912500	mm^2
	maximaal toelaatbare spanning in staal	σ_s = f_{yd}	tbv berekening minimum wapening		= 435	N/mm^2

verankerings- en overlappingslengte

Cilinderpoer(200)

verankeringslengte trekwapening art. 8.4

	karakteristieke cilinderdruksterkte	f_{ck}			= 35	N/mm^2
	karakteristieke kubusdruksterkte	f_{ck}			= 45	N/mm^2
3.4	gemiddelde cilindertreksterkte	f_{ctm}=0,3$f_{ck}^{(2/3)}$			= 3,21	N/mm^2
	karakteristieke ondergrens treksterkte	$f_{ctk0,05}$=0,7f_{ctm}			= 2,25	N/mm^2
3.16	rekenwaarde treksterkte	f_{ctd}=$f_{ctk0,05}$/1,5			= 1,50	N/mm^2
	staaltrekspanning	f_{yk}			= 500	N/mm^2
	rekenwaarde staaltrekspanning	f_{yd}			= 435	N/mm^2
	gemiddelde diameter trekwapening	d_{gem}			= 16,0	mm
	verhouding benodigde/aanwezige wapening	$A_{s1,totaal}$ / $A_{aanw,trek}$			= 0,59	-
	staalspanning in trekwapening	σ_{sd}= $A_{s1,totaal}$ / $A_{aanw,trek}$ * f_{yd}			= 258	N/mm^2
	aantal staven in bundel (max 2)	n			= 1	st
8.3	basisverankeringslengte trekwapening	$l_{b,rqd}$= 0,25 * $d_{gem,trek}$ * √n * σ_{sd} / f_{bd}			= 307	mm
		$l_{b,rqd}$			= 19	*d_{gem}
8.2		f_{bd}=2,25 η_1 η_2 f_{ctd}			= 3,37	N/mm^2
		η1	bovenstaaf=0,7, algemeen=1,0		= 1,00	-
		η2	als d_{gem}<= 32;1 ; (132-d_{gem}) / 100		= 1,00	-
8.4	rekenwaarde verankeringslengte trekwapenin	l_{bd}=α1 α2 α3 α4 α5 $l_{b,rqd}$>=$l_{b,min}$			= 178	mm

l_{bd}=α1 α2 α3 α4 α5 $l_{b,rqd}$=	0,70	0,83	1,00	1,00	1,00	307

					= 178	mm
	vorm van de staven	α1 afhankelijk van staafeinde			= 0,70	-
	effect minimum dekking	α2=1-0,15*(c_d-x*$d_{gem,trek}$) / $d_{gem,trek}$ en <1,0			= 0,83	-
		x= factor afhankelijk staafeinde			= 3	-
	uiteindelijke waarde α2	0,7 < α2 < 1,0			= 0,83	-
	rekenwaarde dekking op rechte staaf	c_d= min (a/2 ; c_1 ; c)			= 66,0	mm
	rekenwaarde dekking op gebogen staaf	c_d= min (a/2 ; c_1)			= 66,0	mm
	maatgevende waarde	c_d (dekking op te verankeren staaf)			= 66,0	mm
	effect dwarswapening niet gelast aan hoofdw	α3=1-Kλ (opsluiting dwarswapening)			= 1,00	-
	maatgevende waarde	α3=1-Kλ (opsluiting dwarswapening) >0,7 en <1,0			: 1,00	-
		K (afhankelijk van positie losse dwarsstaaf)			= 0,00	-
		λ=(ΣA_{st}-$\Sigma A_{st,min}$) / A_s			= -0,25	-
	oppervlak doorsnede dwarswapening over lengte l_{bd}				ΣA_{st} 0	mm^2
		$\Sigma A_{st,min}$	0,25A_{st} bij balken		= 50	mm^2
		A_s doorsnede enkelvoudig verankerde staaf			= 201	mm^2
	effect aangelaste dwarsstaven	α4: (dwarsstaaf gelast aan hoofdwapening)			= 1,00	-
	effect dwarsdruk	α5=1-0,04p (dwarsdruk bij trekstaven)			= 1,00	-
		p= dwarsdruk in Mpa over lengte l_{bd}			= 0,00	N/mm^2
8.5	maximale waarde	α2 α3 α5 >=0,7			= 0,83	-
8.6		$l_{b,min}$:max(0,3 $l_{b,rqd}$; 10$d_{gem,trek}$, 100)			= 160,0	mm
	halve tussenmaat tussen staven	a / 2			= 254,8	mm

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buigdiameter (trekstaaf)

Cilinderpoer(200)

	kwaliteit beton	betonklasse				=	C35/45	-
	diameter om te buigen staaf	diameter				Φ=	16,0	mm
	totale verankeringslengte	$l_{bd}=\alpha1\ \alpha2\ \alpha3\ \alpha4\ \alpha5\ l_{b,rqd}>=l_{b,min}$				=	178,4	mm
	verankering tot aan de bocht	maat vanaf begin verankering tot begin bocht				x=	465,0	mm
	hart op hart afstand van de te buigen staven	h.o.h. = 2 a_b				2 a_b=	525,5	mm
	betreft de te buigen staaf een randstaaf	dus zit de staaf bij een elementrand?				=	nee	-
	is er een dwarsstaaf aanwezig	met een diameter >= de staafdiameter				=	nee	-
	betondekking op te buigen staaf	c				=	76,0	mm
	grootte van de te verankeren kracht:	$F_{bt}=^1/_4\ \pi\Phi^2\ \sigma_{sd1}$ =	201	0	10^{-3}	=	0,0	kN
	gekozen buigdiameter	Φ_m (minimum: Φ<=16: 4Φ anders 5Φ)				=	128,0	mm
	toetsingen							
	doorndiameter ivm bezwijken wapening		64	/ 128		=	0,50	
	verankering na de bocht : $l_{bd\ na\ de\ bocht}$ / 5 D		0	/ 80		=	0,00	
	randstaaf of tussenstaaf	tussenstaaf=1,0 en randstaaf = 2,0					1,0	
	dwarsstaaf aanwezig?	ja=1,0 en nee=2,0 (voldoet niet)				=	2,0	
	onderstaande unitycheck is niet van toepassing							
8.3(3)	doorndiameter ivm bezwijken beton	Φ_{min}/Φ_m =	0	/ 128		=	n.v.t.	-
	karakteristieke cilinderdruksterkte	f_{ck}				=	35	N/mm^2
3.15	rekenwaarde betondruksterkte	$f_{cd}=f_{ck}/1,5$=	35	/ 1,5		=	23,3	N/mm^2
	factor voor maximale buigdiameter	tabel 8.1				f=	4	-
	minimale buigstraal om niet te hoeven toetse	Φ_m=f Φ	4	* 16,0		=	64	mm
	resterende verankeringslengte	(l_{bd} - x) =	178,4	- 465,0		=	0,0	mm
	verankeringslengte in de bocht	$l_{bocht}=0,25\ \pi\ (D_{doorn}+\Phi)=0,25\pi$		144,0		=	113	mm
	verankeringslengte na de bocht	$l_{bd,na\ de\ bocht}$	0,0	- 113		=	0	mm
	maat a_b	tussenstaven: de helft van de hoh-afstand				a_b=	262,75	mm
	doorsnede staaf	A= 0,25 $\pi\ \Phi^2$				=	201,1	mm^2
	optredende staalspanning	$\sigma_{s,bt}=F_{bt}$ / 0,25 $\pi\ \Phi^2$				=	0,0	N/mm^2
	staafkracht bij het begin van de bocht	F_{bt}= F * (l_{bd} - x) / l_{bd}				=	0,0	kN
8.1	minimale buigdiameter	$\Phi_{m,min}=F_{bt}$ [(1/a_b) + 1 / (2Φ)] / f_{cd}				=	0	mm

minimum wapening (flankwapening, beugels en toevallige inklemming)

6.5.3	**paal 1**	F=	1066	kN	a=	201	mm	H=	1073	mm	h=	536	mm	α:	50,7	graden
6.59	T=0,25(1-0,7*	201	/	1073	) *	1066	=	232	kN	$A_{s,req}$=	993	mm^2/m'				
	flankwapening per zijde=0,5*$A_{s,req}$*sinα=	384	mm^2/m'				beugels = 0,5*$A_{s,req}$*cosα=	314	mm^2/m'							
6.5.3	**paal 2**	F=	1066	kN	a=	201	mm	H=	1073	mm	h=	536	mm	α:	50,7	graden
6.59	T=0,25(1-0,7*	201	/	1073	) *	1066	=	232	kN	$A_{s,req}$=	993	mm^2/m'				
	flankwapening per zijde=0,5*$A_{s,req}$*sinα=	384	mm^2/m'				beugels = 0,5*$A_{s,req}$*cosα=	314	mm^2/m'							
5.3.1(3)	minimum wapening i.v.m. gedrongen constructie = 0,001 b	1000 = 0,(	1700	1000										=	1700	mm^2/m'
9.2.1.2(1)	minimum bovenwapening t.g.v toevallig inklemmingsmoment = 0,15		0,15	1553										=	233	mm^2

uitwaaieren wapening naast de oplegging

	paal 1	doorsnede hoeveelheid wapening die NAAST de oplegging zit						$A_{s;naast;paal\ 1}$=	0	mm^2
	beugels in verankeringsgebied pa	1000	0	258	/ 178	435		=	0	mm^2/m'
	paal 2	doorsnede hoeveelheid wapening die NAAST de oplegging zit						$A_{s;naast;paal\ 1}$=	0	mm^2
	beugels in verankeringsgebied pa	1000	0	258	/ 178	435		=	0	mm^2/m'

opmerking:

15-05-2026

[redacted]

Lijst versterkingen

Op basis van lijst mastfundaties behorende bij versie D04 van de rapportage bijgewerkt. (zie bijlage 49)

Mastnummer(s)	Poertype	Verzwaring	Type	Aantal typen
158	Balkrooster (4*B)	Aanstorting met 3 extra palen	F5	1
157	Balkrooster (4*B)	Aanstorting met 2 extra palen	F5	1
37	Balkrooster (5*B)	Aanstorting met 2 extra palen	F5	1
~~146~~,~~147~~	~~Balkrooster (5*B)~~	~~Aanstorting met 3 extra palen~~	~~F5~~	~~1~~
~~148~~	~~Blokpoer (200) (2*LD1)~~	~~Blokpoer met 2 extra palen~~	~~F5~~	~~1~~
7,9,14,52,56,57,65,66,90,111,	Blokpoer (220) (3*B)	Ballast licht	F1	2
6,18,28,73,	Blokpoer (220) (3*B)	Ballast zwaar	F1	2
13,19,22,51,53,54,55,64,118,123	Blokpoer (220) (3*B)	Ballast + Koppelbalk	F2	2
4,5,10,16,21,23,24,26,27,29,33, 34,50,58,59,69,71,124	Blokpoer (220) (3*B)	Lijnpoer met 2 extra palen	F4	3
121,~~128~~,~~130~~,~~131~~,~~135~~,~~136~~, ~~145~~, 152	Cilinderpoer (75) (1*LD1)	Ballast	F1	2
86,126,~~141~~,~~142~~,~~143~~,150,151, 153	Cilinderpoer (75) (1*LD1)	Extra palen (2 stuks)	F3	3
~~144~~	~~Koppelframe (Cilinderpoer 1*LD1)~~	~~Extra palen (2 stuks)~~	~~F3~~	~~1~~
				20 typen

Opmerkingen: De masten 128 t/m 148 maken onderdeel uit van de gemeente De Ronde Venen en zijn in een aparte rapportage behandeld, om die reden zijn ze in bovenstaande tabel doorgehaald.

Samenvatting gegevens bestaande en nieuwe mastfundaties

Mast	Paaltype	Poertype	Overkoepelende toetsing	Versterking	Categorie (F1 t/m F5)
1	40*40 cm bet.	Balkrooster (5*B)	0,87		
2			0,00		
3	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
4	40*40 cm bet.	Blokpoer(220) (3*B)	1,29	Lijnpoer met 2 extra palen	F4
5	40*40 cm bet.	Blokpoer(220) (3*B)	1,52	Lijnpoer met 2 extra palen	F4
6	40*40 cm bet.	Blokpoer(220) (3*B)	1,14	Ballast zwaar	F1
7	40*40 cm bet.	Blokpoer(220) (3*B)	1,05	Ballast licht	F1
8	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
9	40*40 cm bet.	Blokpoer(220) (3*B)	1,03	Ballast licht	F1
10	40*40 cm bet.	Blokpoer(220) (3*B)	1,57	Lijnpoer met 2 extra palen	F4
11	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
12	40*40 cm bet.	Balkrooster (5*B)	0,88		
13	40*40 cm bet.	Blokpoer(220) (3*B)	1,23	Ballast + Koppelbalk	F2
14	40*40 cm bet.	Blokpoer(220) (3*B)	1,03	Ballast licht	F1
15	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
16	40*40 cm bet.	Blokpoer(220) (3*B)	1,46	Lijnpoer met 2 extra palen	F4
17	40*40 cm bet.	Balkrooster (5*B)	0,83		
18	40*40 cm bet.	Blokpoer(220) (3*B)	1,10	Ballast zwaar	F1
19	40*40 cm bet.	Blokpoer(220) (3*B)	1,18	Ballast + Koppelbalk	F2
20	40*40 cm bet.	Blokpoer(220) (3*B)	1,00		
21	40*40 cm bet.	Blokpoer(220) (3*B)	1,35	Lijnpoer met 2 extra palen	F4
22	40*40 cm bet.	Blokpoer(220) (3*B)	1,16	Ballast + Koppelbalk	F2
23	40*40 cm bet.	Blokpoer(220) (3*B)	3,06	Lijnpoer met 2 extra palen	F4
24	40*40 cm bet.	Blokpoer(220) (3*B)	1,35	Lijnpoer met 2 extra palen	F4
25	40*40 cm bet.	Balkrooster (5*B)	0,82		
26	40*40 cm bet.	Blokpoer(220) (3*B)	1,34	Lijnpoer met 2 extra palen	F4
27	40*40 cm bet.	Blokpoer(220) (3*B)	1,53	Lijnpoer met 2 extra palen	F4
28	40*40 cm bet.	Blokpoer(220) (3*B)	1,12	Ballast zwaar	F1
29	40*40 cm bet.	Blokpoer(220) (3*B)	1,35	Lijnpoer met 2 extra palen	F4
30	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
31	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
32	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
33	40*40 cm bet.	Blokpoer(220) (3*B)	1,49	Lijnpoer met 2 extra palen	F4
34	40*40 cm bet.	Blokpoer(220) (3*B)	1,28	Lijnpoer met 2 extra palen	F4
35	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
36	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
37	40*40 cm bet.	Balkrooster (5*B)	1,01	Aanstorting met 2 palen	F5
38	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
39	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
40	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
41	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
42	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
43	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
44	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
45	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
46	40*40 cm bet.	Blokpoer(220) (3*B)	0,99		
47	40*40 cm bet.	Balkrooster (5*B)	0,78		
48	40*40 cm bet.	Blokpoer(220) (3*B)	0,80		
49	40*40 cm bet.	Blokpoer(220) (3*B)	0,98		
50	40*40 cm bet.	Blokpoer(220) (3*B)	1,33	Lijnpoer met 2 extra palen	F4
51	40*40 cm bet.	Blokpoer(220) (3*B)	1,18	Ballast + Koppelbalk	F2
52	40*40 cm bet.	Blokpoer(220) (3*B)	1,02	Ballast licht	F1
53	40*40 cm bet.	Blokpoer(220) (3*B)	1,21	Ballast + Koppelbalk	F2
54	40*40 cm bet.	Blokpoer(220) (3*B)	1,12	Ballast + Koppelbalk	F2
55	40*40 cm bet.	Blokpoer(220) (3*B)	1,18	Ballast + Koppelbalk	F2
56	40*40 cm bet.	Blokpoer(220) (3*B)	1,05	Ballast licht	F1
57	40*40 cm bet.	Blokpoer(220) (3*B)	1,01	Ballast licht	F1
58	40*40 cm bet.	Blokpoer(220) (3*B)	1,45	Lijnpoer met 2 extra palen	F4
59	40*40 cm bet.	Blokpoer(220) (3*B)	1,37	Lijnpoer met 2 extra palen	F4
60	40*40 cm bet.	Balkrooster (5*B)	0,86		
61	40*40 cm bet.	Blokpoer(220) (3*B)	0,80		
62	40*40 cm bet.	Blokpoer(220) (3*B)	0,96		
63	40*40 cm bet.	Blokpoer(220) (3*B)	0,80		
64	40*40 cm bet.	Blokpoer(220) (3*B)	1,19	Ballast+Koppelbalk	F2
65	40*40 cm bet.	Blokpoer(220) (3*B)	1,04	Ballast licht	F1

66	40*40 cm bet.	Blokpoer(220) (3*B)	**1,02**	Ballast licht	F1
67	40*40 cm bet.	Blokpoer(220) (3*B)	**0,93**		
68	40*40 cm bet.	Balkrooster (5*B)	**1,00**		
69	40*40 cm bet.	Blokpoer(220) (3*B)	**1,60**	Lijnpoer met 2 extra palen	F4
70	40*40 cm bet.	Blokpoer(220) (3*B)	**0,97**		
71	40*40 cm bet.	Blokpoer(220) (3*B)	**1,29**	Lijnpoer met 2 extra palen	F4
72	40*40 cm bet.	Blokpoer(220) (3*B)	**0,89**		
73	40*40 cm bet.	Blokpoer(220) (3*B)	**1,08**	Ballast zwaar	F1
74	40*40 cm bet.	Blokpoer(220) (3*B)	**0,84**		
75	40*40 cm bet.	Balkrooster (5*B)	**0,88**		
76	40*40 cm bet.	Blokpoer(220) (3*B)+2LD1?	**0,89**		
77	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**		
78	40*40 cm bet.	Blokpoer(220) (3*B)	**0,84**		
79	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**		
80	40*40 cm bet.	Blokpoer(220) (3*B)	**0,97**		
81	40*40 cm bet.	Blokpoer(220) (3*B)	**0,83**		
82	40*40 cm bet.	Blokpoer(220) (3*B)	**0,92**		
83	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**		
84	35*35 cm bet.	Balkrooster (5*B)	**0,93**		
85	LD1+p	Cilinderpoer(75) (1*LD1)	**0,86**		
86	LD1+p	Cilinderpoer(75) (1*LD1)	**1,61**	Extra palen (2 stuks)	F3
87	40*40 cm bet.	Blokpoer(220) (3*B)	**0,94**		
88	40*40 cm bet.	Blokpoer(220) (3*B)	**0,95**		
89	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**		
90	40*40 cm bet.	Blokpoer(220) (3*B)	**1,02**	Ballast licht	F1
91	40*40 cm bet.	Blokpoer(220) (3*B)	**0,89**		
92	40*40 cm bet.	Blokpoer(220) (3*B)	**0,88**		
93	40*40 cm bet.	Blokpoer(220) (3*B)	**0,86**		
94	40*40 cm bet.	Balkrooster (5*B)	**0,74**		
95	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**		
96	40*40 cm bet.	Blokpoer(220) (3*B)	**0,84**		
97	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**		
98	40*40 cm bet.	Blokpoer(220) (3*B)	**0,81**		
99	40*40 cm bet.	Blokpoer(220) (3*B)	**0,89**		
100	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**		
101	40*40 cm bet.	Blokpoer(220) (3*B)	**0,94**		
102	40*40 cm bet.	Blokpoer(220) (3*B)	**0,85**		
103	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**		
104	Ø813	1xSI	**0,61**		
105	40*40 cm bet.	Balkrooster (5*B)	**0,87**		
106	Ø609/670	1xSI	**0,76**		
107	Ø609/630	1xSI	**0,53**		
108	40*40 cm bet.	Balkrooster (5*B)	**0,80**		
109	Ø609/630	1xSI	**0,74**		
110	40*40 cm bet.	Blokpoer(220) (3*B)	**0,90**		
111	40*40 cm bet.	Blokpoer(220) (3*B)	**1,05**	Ballast licht	F1
112	40*40 cm bet.	Blokpoer(220) (3*B)	**0,96**		
113	Ø609/630	1xSI	**0,76**		
114	40*40 cm bet.	Blokpoer(220) (3*B)	**0,89**		
115	40*40 cm bet.	Blokpoer(220) (3*B)	**0,96**		
116	40*40 cm bet.	Blokpoer(220) (3*B)	**0,80**		
117	40*40 cm bet.	Blokpoer(220) (3*B)	**0,89**		
118	40*40 cm bet.	Blokpoer(220) (3*B)	**1,14**	Ballast + Koppelbalk	F2
119	40*40 cm bet.	Balkrooster (5*B)	**0,90**		
120	LD1+p	Balkrooster (5LP)	**0,82**		
121	LD1+p	Cilinderpoer(75) (1*LD1)	**1,16**	Ballast	F1
122	40*40 cm bet.	Blokpoer(220) (3*B)	**0,89**		
123	40*40 cm bet.	Blokpoer(220) (3*B)	**1,24**	Ballast + Koppelbalk	F2
124	40*40 cm bet.	Blokpoer(220) (3*B)	**1,43**	Lijnpoer met 2 extra palen	F4
125	40*40 cm bet.	Blokpoer(220) (3*B)	**0,95**		
126	LD1+p	Cilinderpoer(75) (1*LD1)	**1,31**	Extra palen (2 stuks)	F3
127 deel 1	LD1	Cilinderpoer(200) (2*MV+1*LD1)	**0,59**		
127 deel 2	2*MV	Cilinderpoer(200) (2*MV+1*LD1)	**0,97**		
128	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~**1,27**~~	~~Ballast~~	~~F1~~
129	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~**0,91**~~		
130	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~**1,18**~~	~~Ballast~~	~~F1~~
131	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	~~**1,11**~~	~~Ballast~~	~~F1~~

132 deel 1	~~LD1~~	~~Cilinderpoer(200) (2*MV+1*LD1)~~	**~~0,54~~**		
132 deel 2	~~2*MV~~	~~Cilinderpoer(200) (2*MV+1*LD1)~~	**~~0,66~~**		
133	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	**~~0,99~~**		
134	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	**~~0,96~~**		
135	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	**~~1,29~~**	~~Ballast~~	~~F1~~
136	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	**~~1,30~~**	~~Ballast~~	~~F1~~
137 deel 1	~~LD1~~	~~Cilinderpoer(200) (2*MV+1*LD1)~~	**~~0,58~~**		
137 deel 2	~~2*MV~~	~~Cilinderpoer(200) (2*MV+1*LD1)~~	**~~0,85~~**		
138	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	**~~0,85~~**		
139	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	**~~0,81~~**		
140	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	**~~0,84~~**		
141	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	**~~1,66~~**	~~Extra palen (2 stuks)~~	~~F3~~
142	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	**~~1,60~~**	~~Extra palen (2 stuks)~~	~~F3~~
143	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	**~~1,41~~**	~~Extra palen (2 stuks)~~	~~F3~~
144	~~LD1+p~~	~~Koppelframe (Cilinderpoer 1*LD1)~~	**~~1,01~~**	~~Extra palen (2 stuks) lijnpoer~~	~~F3~~
145	~~LD1+p~~	~~Cilinderpoer(75) (1*LD1)~~	**~~1,10~~**	~~Ballast~~	~~F1~~
146 optie 2	~~32*32 cm bet.~~	~~Balkrooster (5*B)~~	**~~0,97~~**	~~Aanstorting met 3 palen~~	~~F5~~
146 optie 1	~~LD1+p~~	~~Balkrooster (5*B)~~	**~~1,50~~**	~~Aanstorting met 3 palen~~	~~F5~~
147 optie 2	~~32*32 cm bet.~~	~~Balkrooster (5*B)~~	**~~2,52~~**	~~Aanstorting met 3 palen~~	~~F5~~
147 optie 1	~~LD1+p~~	~~Balkrooster (5*B)~~	**~~1,54~~**	~~Aanstorting met 3 palen~~	~~F5~~
148	~~2 LD1+p~~	~~Blokpoer(200) (2*LD1)~~	**~~1,00~~**	~~Blokpoer met 2 extra palen~~	~~F5~~
149 deel 1	LD1	Cilinderpoer(200) (2*MV+1*LD1)	**0,69**		
149 deel 2	2*MV	Cilinderpoer(200) (2*MV+1*LD1)	**0,96**		
150	LD1+p	Cilinderpoer(75) (1*LD1)	**1,49**	Extra palen (2 stuks)	F3
151	LD1+p	Cilinderpoer(75) (1*LD1)	**1,81**	Extra palen (2 stuks)	F3
152	LD1+p	Cilinderpoer(75) (1*LD1)	**1,18**	Ballast (let op knaggen)	F1
153	LD1+p	Cilinderpoer(75) (1*LD1)	**1,65**	Extra palen (2 stuks)	F3
154 best.	LD1+p	Cilinderpoer(75) (1*LD1)	**0,68**		
154 aanvul	Ø406/560	Blokpoer(700)	**0,59**		
155	Ø406/560	Cilinderpoer(225) (4*Ø406/560)	**0,64**		
156 best deel 2	2 MV	Cilinderpoer(200) (2*MV+1*LD1)	**0,76**		
156 best deel 1	LD1	Cilinderpoer(200) (2*MV+1*LD1)	**0,83**		
156 aanvul	Ø406/560	Cilinderpoer(200) (2*MV+1*LD1)	**0,59**		
157	40*40 cm bet.	Balkrooster (4*B)	**1,33**	Aanstorting met 3 palen	F5
158	40*40 cm bet.	Balkrooster (4*B)	**1,09**	Aanstorting met 2 palen	F5
159	40*40 cm bet.	Balkrooster (7*B)	**0,94**		

BIJLAGE 48
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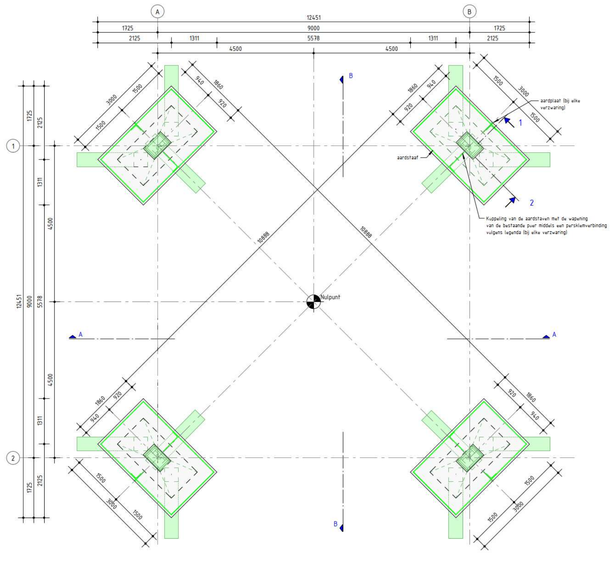
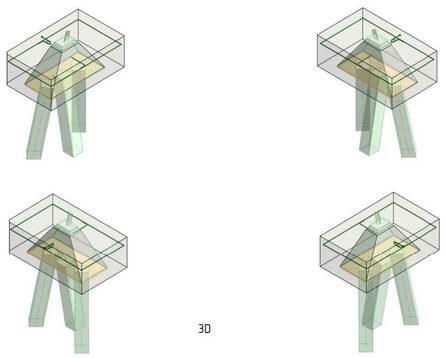
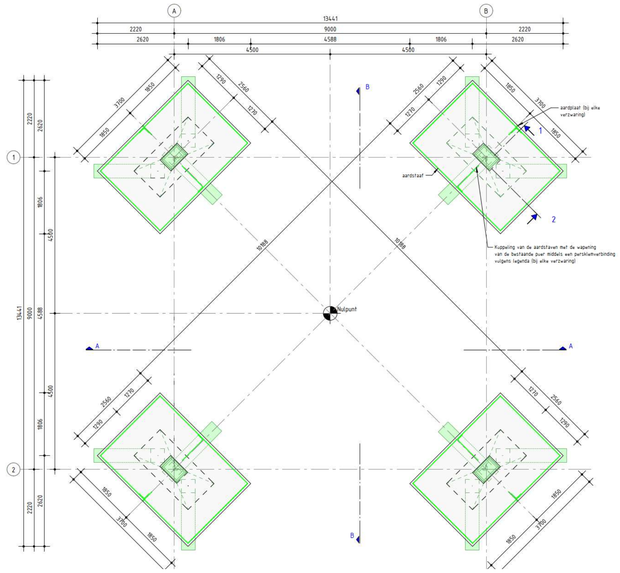
BLOKPOER (220 (3*B) - S+0
PRINCIPE FUNDERINGSVERSTERKING - BALLAST LICHT
MAST 7 / 9 / 14 / 56 / 57 / 65 / 66 / 90 / 111



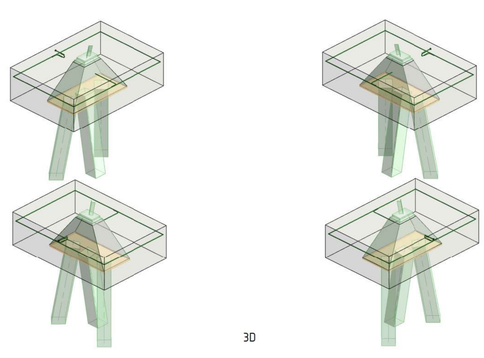
3D



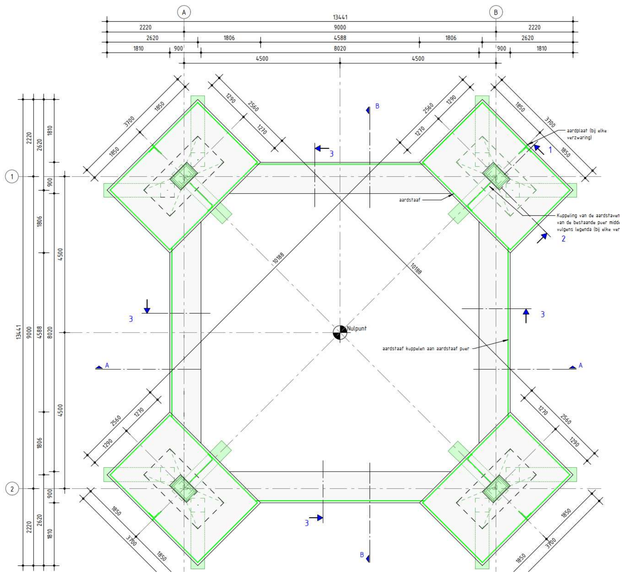
BLOKPOER (220 (3*B) - S+0
PRINCIPE FUNDERINGSVERSTERKING - BALLAST ZWAAR
MAST 6 / 18 / 28 / 73

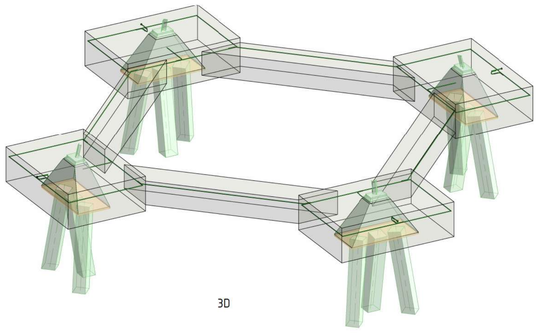


3D



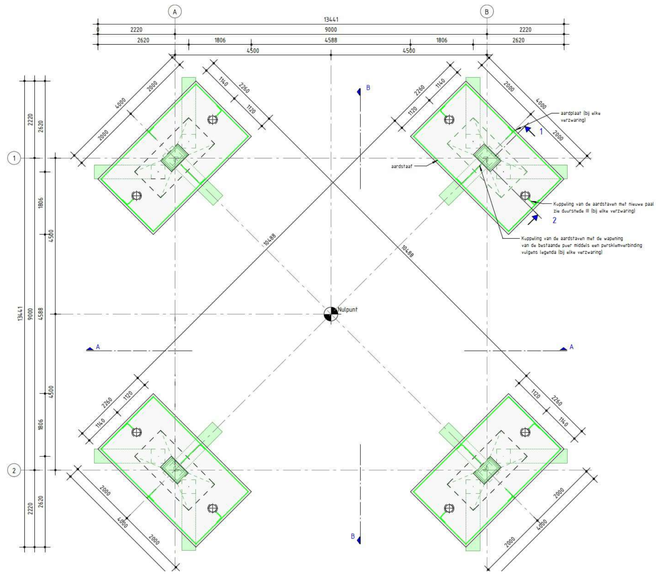
BLOKPOER (220 (3*B) - S+0
PRINCIPE FUNDERINGSVERSTERKING - BALLAST+KOPPELBALK
MAST 13 / 19 / 22 / 51 / 54 / 64 / 118

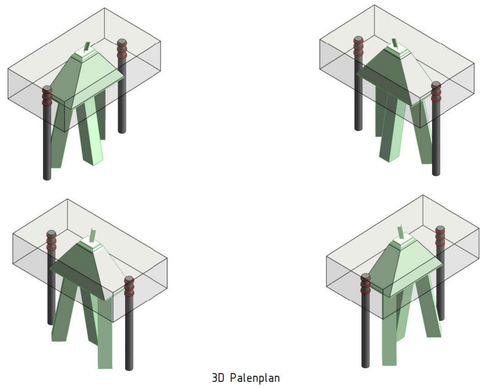




3D

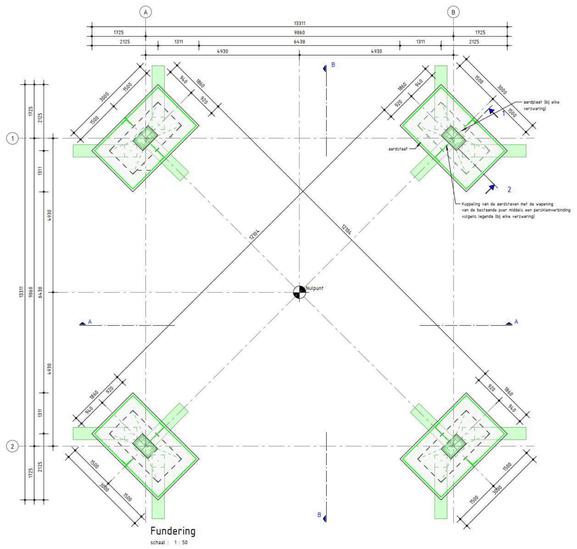
BLOKPOER (220 (3*B) - S+0
PRINCIPE FUNDERINGSVERSTERKING - 2 EXTRA PALEN
MAST 4 / 5 / 10 / 16 / 21 / 23 / 24 / 26 / 27 / 29 / 33 / 34 / 50 / 58 / 59 / 124

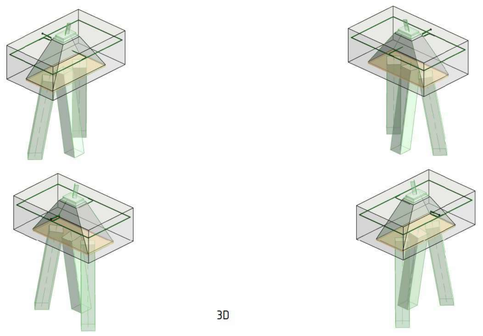




3D Palenplan

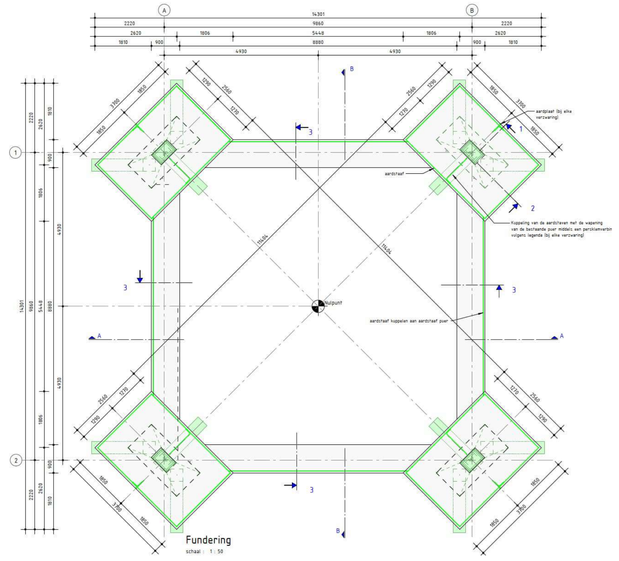
BLOKPOER (220 (3*B) - S+6
PRINCIPE FUNDERINGSVERSTERKING - BALLAST LICHT
MAST 52

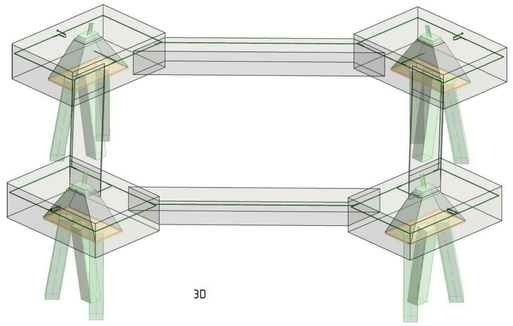




3D

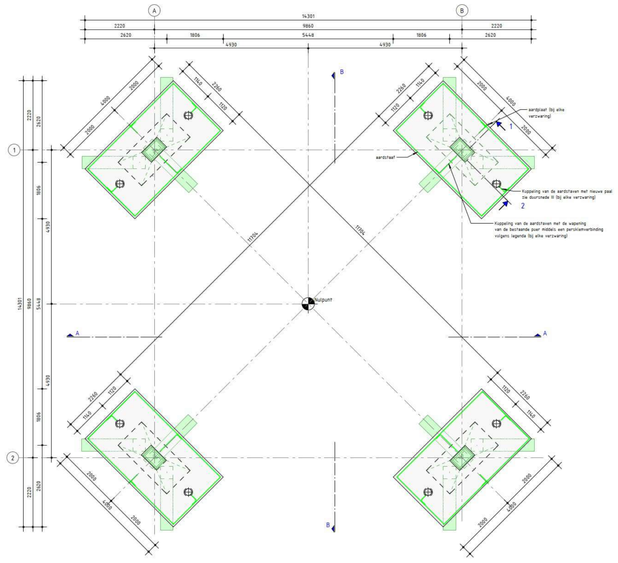
BLOKPOER (220 (3*B) - S+6
PRINCIPE FUNDERINGSVERSTERKING - BALLAST+KOPPELBALK
MAST 53 / 123

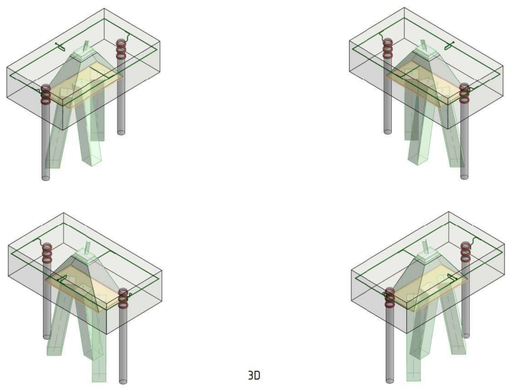




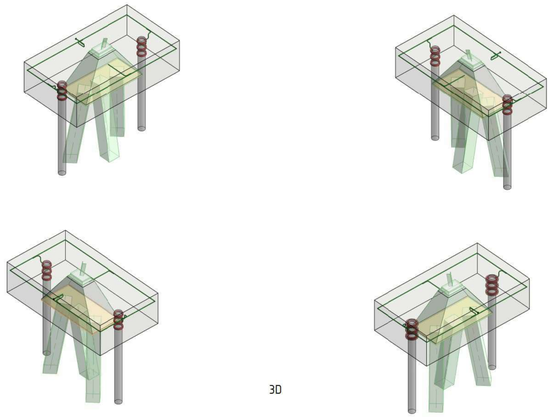
3D

BLOKPOER (220 (3*B) - S+6
PRINCIPE FUNDERINGSVERSTERKING - 2 EXTRA PALEN
MAST 69

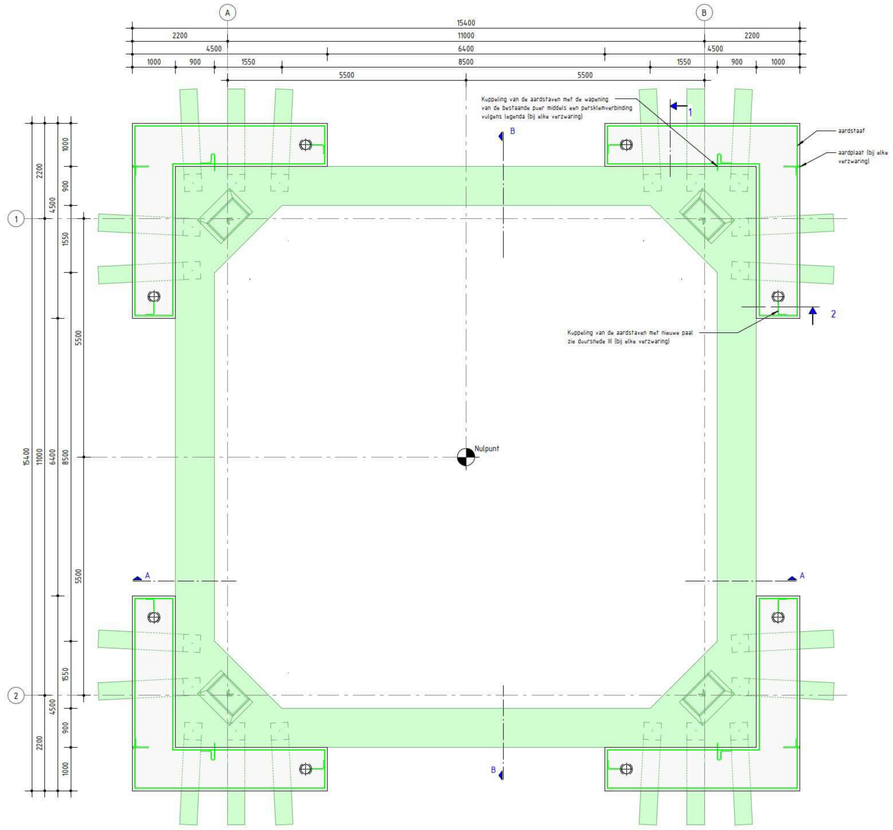




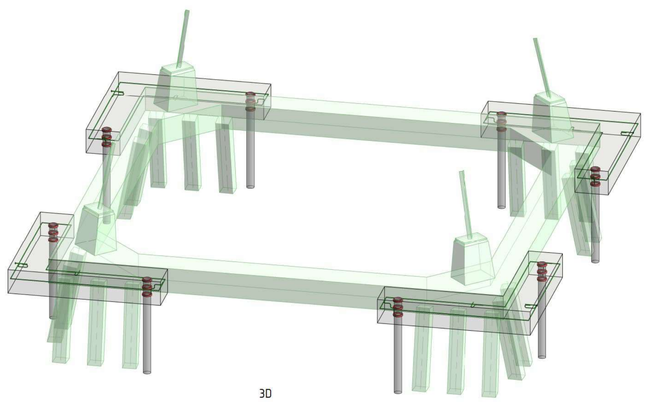
BLOKPOER (220 (3*B) - S+9
PRINCIPE FUNDERINGSVERSTERKING - 2 EXTRA PALEN
MAST 71



BALKROOSTER (5*B) - HA+0
PRINCIPE FUNDERINGSVERSTERKING - AANSTORTING + 2 EXTRA PALEN
MAST 37

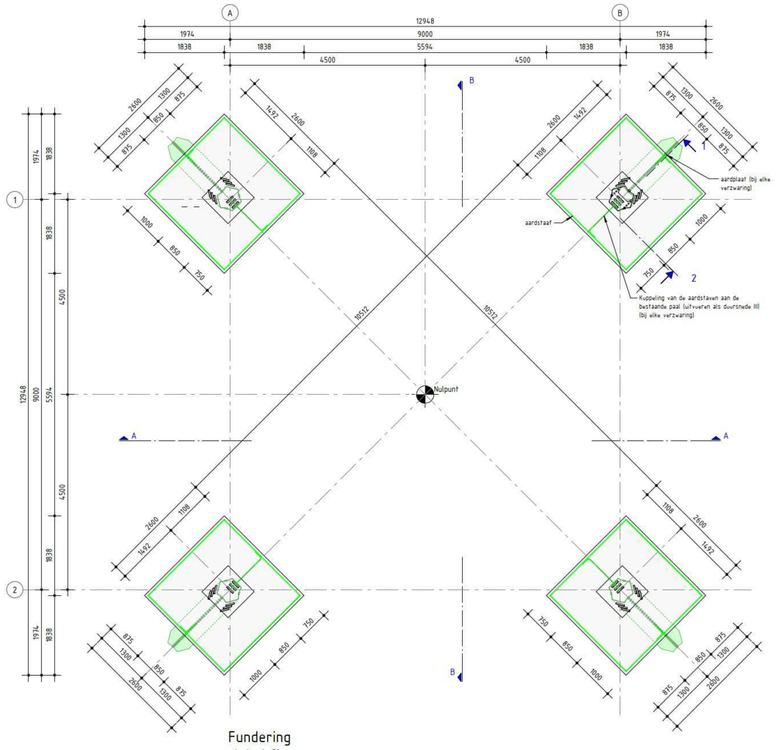


Fundering
schaal : 1 : 50

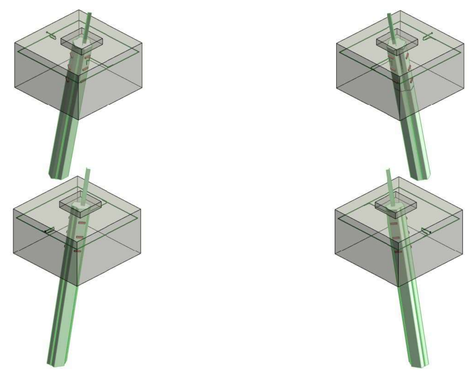


3D

CILINDERPOER (75) (1*LD1) - S+0
PRINCIPE FUNDERINGSVERSTERKING - BALLAST
MAST 152

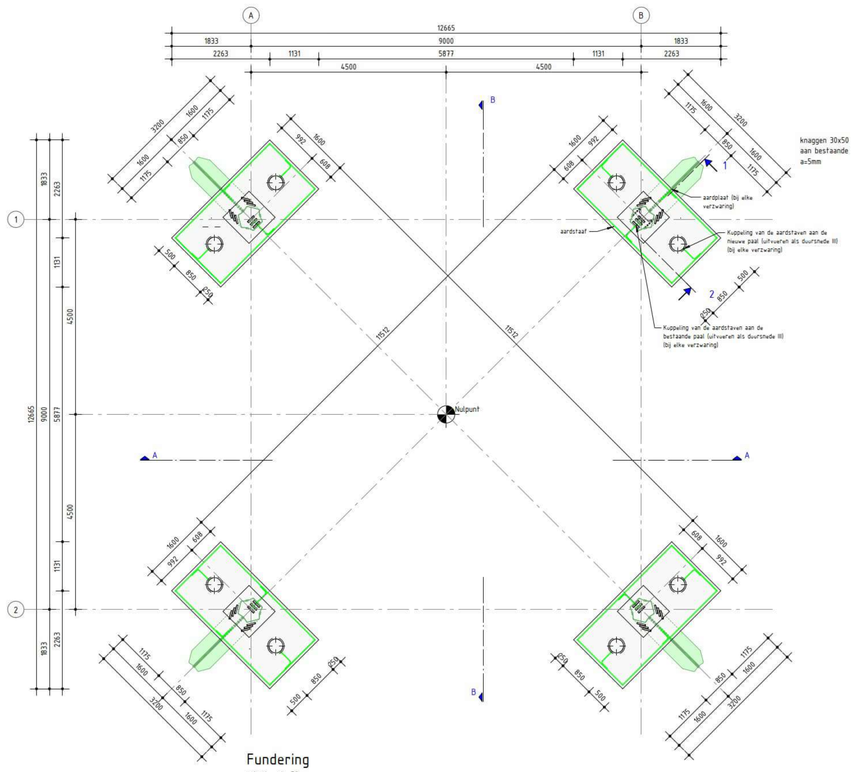


Fundering
schaal : 1 : 50

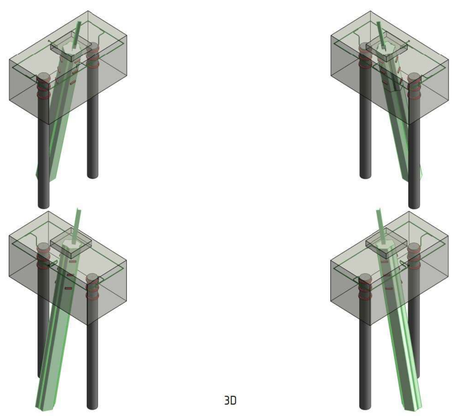


3D

CILINDERPOER (75) (1*LD1) - S+0
PRINCIPE FUNDERINGSVERSTERKING - 2 EXTRA PALEN
MAST 86

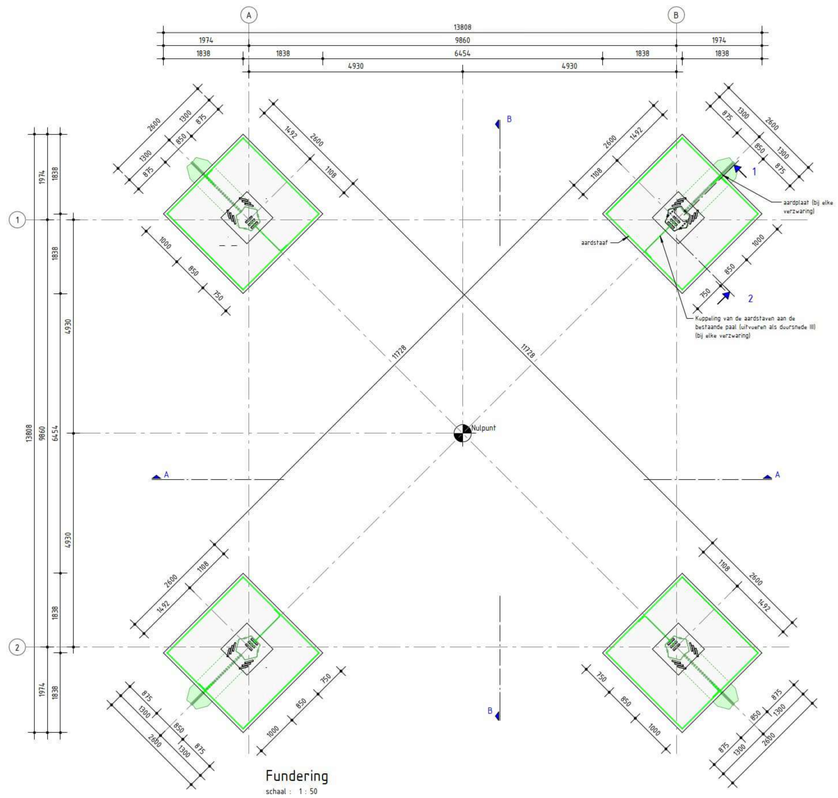


Fundering
schaal : 1 : 50

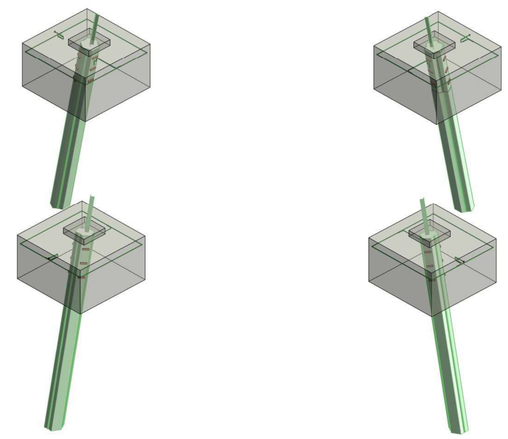


3D

CILINDERPOER (75) (1*LD1) - S+6
PRINCIPE FUNDERINGSVERSTERKING - BALLAST
MAST 121

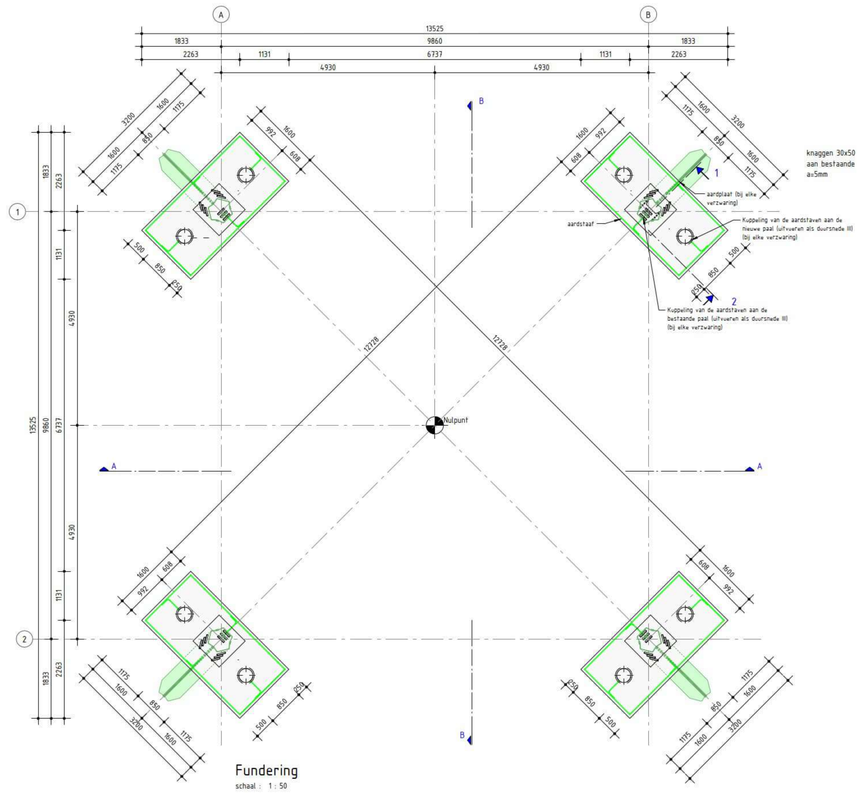


Fundering
schaal : 1 : 50

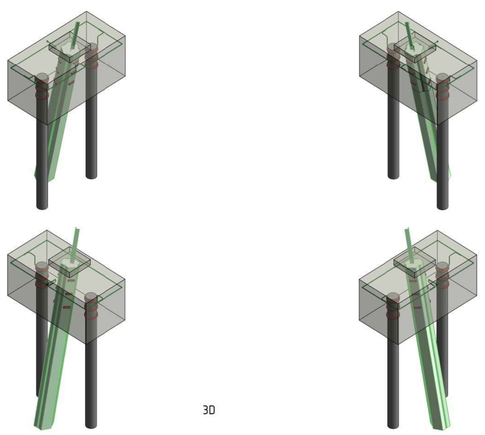


3D

CILINDERPOER (75) (1*LD1) - S+6
PRINCIPE FUNDERINGSVERSTERKING - 2 EXTRA PALEN
MAST 126

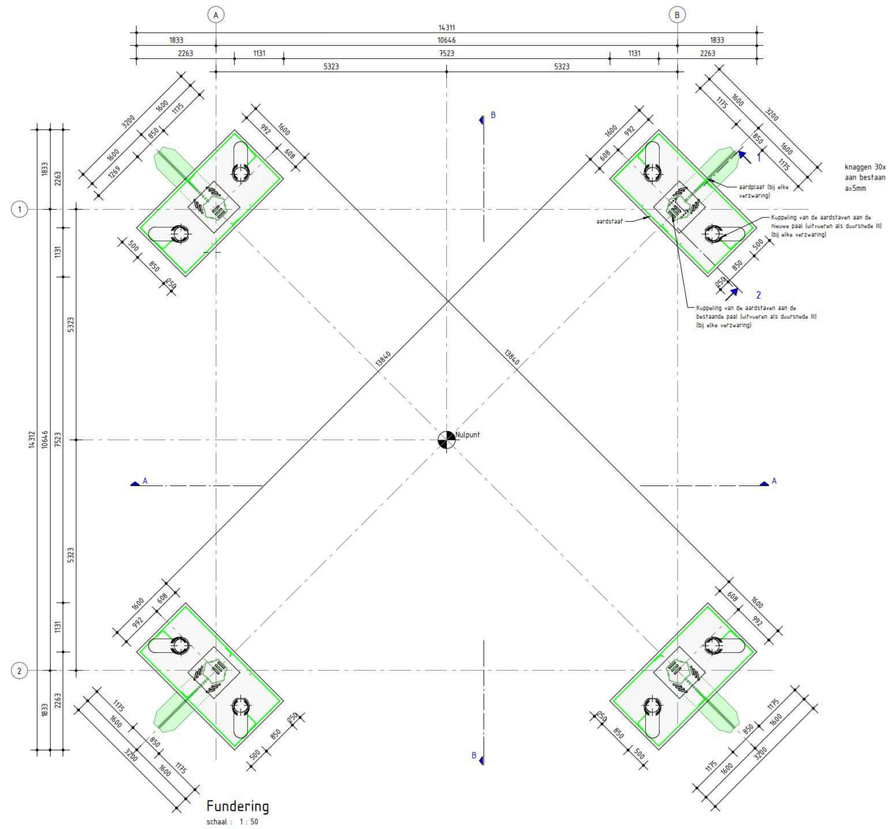


Fundering
schaal : 1 : 50

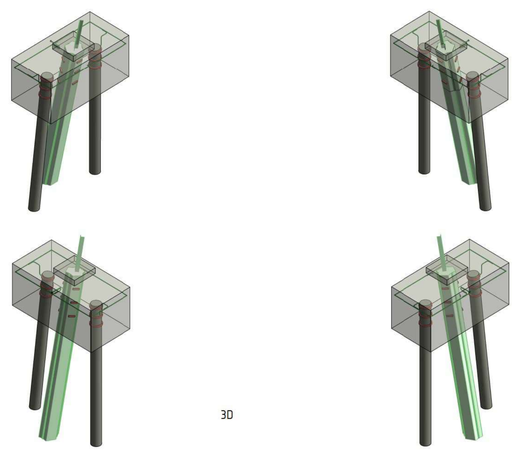


3D

CILINDERPOER (75) (1*LD1) - S+9
PRINCIPE FUNDERINGSVERSTERKING - 2 EXTRA SCHOORPALEN
MAST 150 / 151

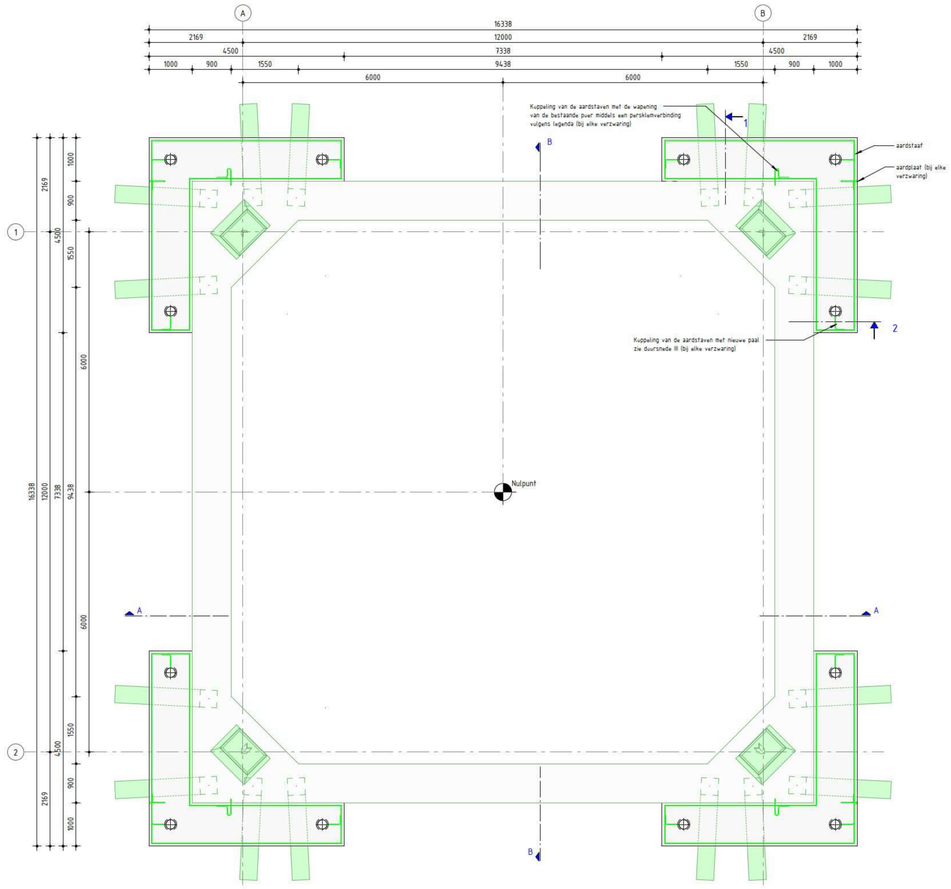


Fundering
schaal : 1 : 50

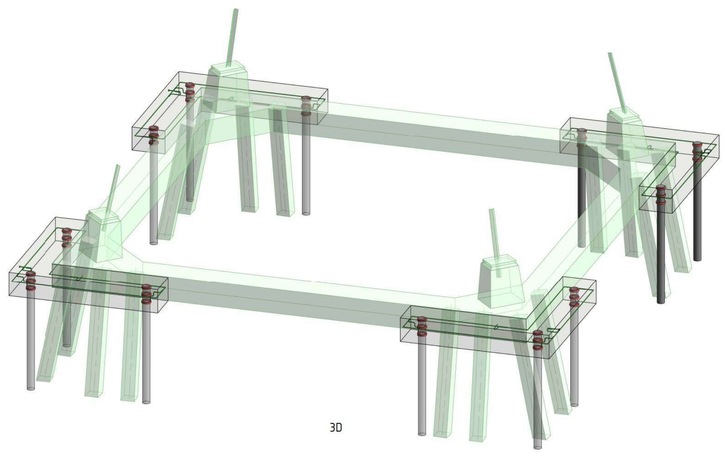


3D

BALKROOSTER (4*B) - S+24
PRINCIPE FUNDERINGSVERSTERKING - AANSTORTING + 3 EXTRA PALEN
MAST 157

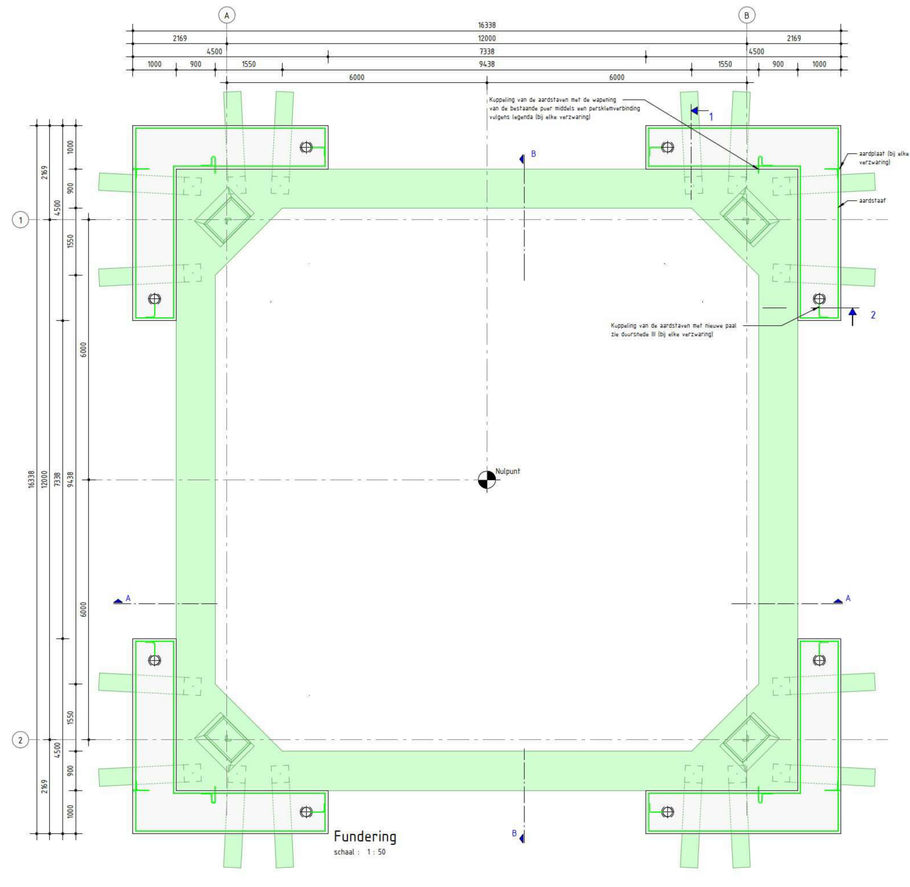


Fundering
schaal : 1 : 50

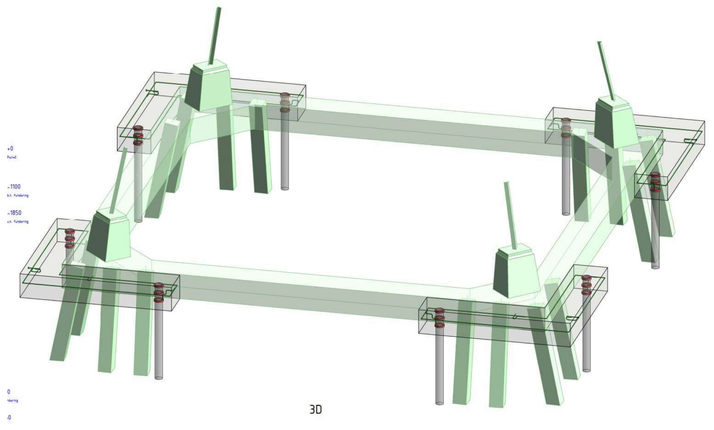


3D

BALKROOSTER (4*B) - S+24
PRINCIPE FUNDERINGSVERSTERKING - AANSTORTING + 2 EXTRA PALEN
MAST 158

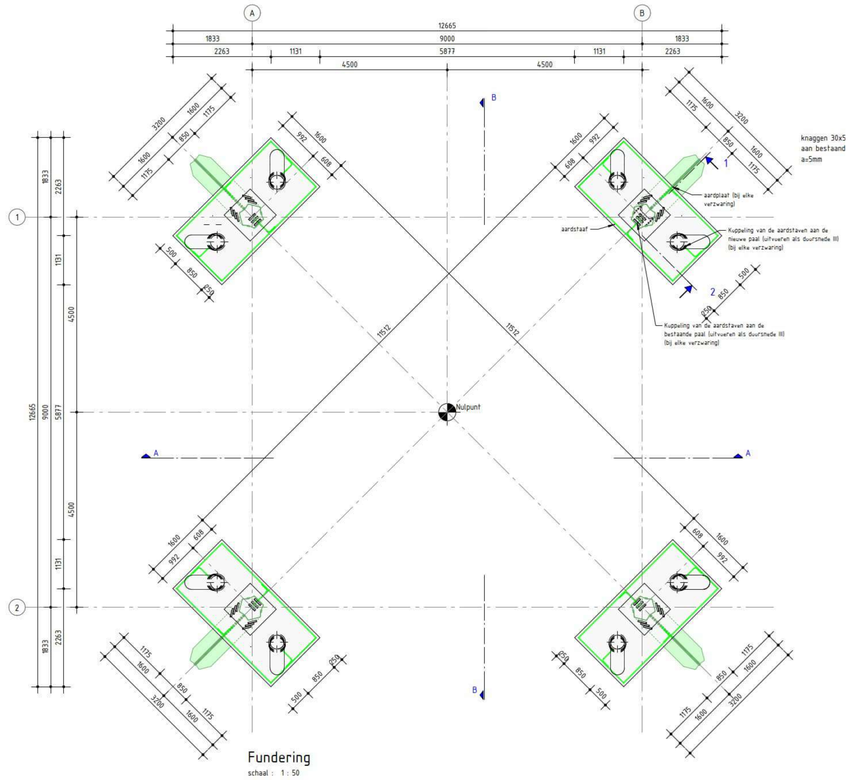


Fundering
schaal : 1 : 50

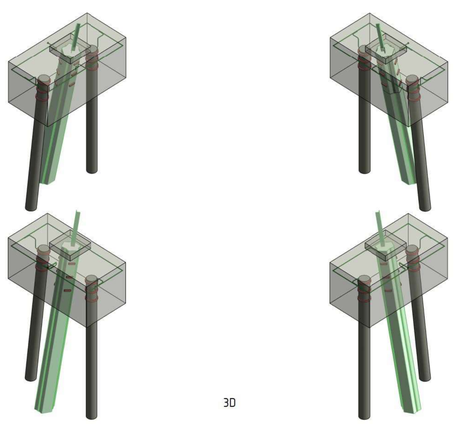


3D

CILINDERPOER (75) (1*LD1) - S+0
PRINCIPE FUNDERINGSVERSTERKING - 2 EXTRA SCHOORPALEN
MAST 153



Fundering
schaal : 1 : 50



3D

BIJLAGE 49
Meridian kenmerk 1669003

Samenvatting gegevens bestaande en nieuwe mastfundaties

Paalgegevens bestaand / GEO / Paalgewicht één-paals-poeren

Mast	Mastmodel	Mast type	Mastfunctie	Masthoogte	Paaltype	Aantal palen per randstijl	Aantal palen totaal	Paal boven maaiveld [m]	Maaiveld t.o.v. NAP [m]	Syst. punt t.o.v. MV [cm]	Paalpuntniveau t.o.v. MV [m]	Paallengte [m]	Schoorstand palen (°)	GEO Drukcapaciteit enkele paal [kN]	GEO Trekcapaciteit enkele paal [kN]	Gewicht paal (kN/strekkende meter)	Gewicht paal [kN]	Toelichting
1	Donaumast	EA+0	Eindmast	49	40*40 cm bet.	5	20	1			18,5	19,5	5:1	1918	306			
2																		
3	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	1			24	25	6:1	948	290			
4	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			20	20,5	6:1	965	214			
5	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			18,5	19	6:1	1075	181			
6	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			18	18,5	6:1	1340	242			
7	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			18	18,5	6:1	1400	263			
8	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			16,5	17	6:1	1409	310			
9	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15,5	16	6:1	1577	266			
10	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			20	20,5	6:1	960	175			
11	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			20,5	21	6:1	1767	325			
12	Donaumast	HA+0	Hoekmast	48	40*40 cm bet.	5	20	0			19	19	5:1	1324	266			
13	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			18	18,5	6:1	1011	224			
14	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			18	18,5	6:1	1289	268			
15	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	1,0@0,5			17,0@17,5	18	6:1	1433	290			
16	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15,5	16	6:1	1138	189			
17	Donaumast	HA+0	Hoekmast	45	40*40 cm bet.	5	20	0			18	18	5:1	824	239			
18	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			18	18,5	6:1	1169	250			
19	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			17	17,5	6:1	979	234			
20	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			16	16,5	6:1	1284	276			
21	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			16,5	17	6:1	1068	204			
22	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	1,0@0,5			16,0@16,5	17	6:1	1270	237			
23	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			22	22,5	6:1	700	90			
24	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			21,5	22	6:1	721	204			
25	Donaumast	HA+0	Hoekmast	45	40*40 cm bet.	5	20	1,0@0,5			19,5@20	20,5	5:1	1237	352			
26	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			17,5	18	6:1	849	205			
27	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			16	16,5	6:1	905	180			
28	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15	15,5	6:1	1199	246			
29	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			17	17,5	6:1	655	204			
30	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			22	22,5	6:1	802	333			
31	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			20,5	21	6:1	1548	393			
32	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			18	18,5	6:1	1324	308			
33	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15,5	16	6:1	787	185			
34	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			17	17,5	6:1	661	215			
35	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			18,5	19	6:1	1250	291			
36	Donaumast	S+3	Steunmast	51	40*40 cm bet.	3	12	0,5			19	19,5	6:1	1230	292			
37	Donaumast	HA+0	Hoekmast	45	40*40 cm bet.	5	20	0			18	18	5:1	915	138			
38	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	1,0@0,5			17,5@18	18,5	6:1	1553	330			
39	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			16,5	17	6:1	1314	297			
40	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			18	18,5	6:1	1604	347			
41	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			17,5	18	6:1	1231	335			
42	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			16,5	17	6:1	1317	296			
43	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15,5	16	6:1	1877	341			
44	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			12	12,5	6:1	1728	282			
45	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			11,5	12	6:1	1780	310			
46	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15,5	16	6:1	1048	341			
47	Donaumast	HA+0	Hoekmast	45	40*40 cm bet.	5	20	0			20	20	5:1	1260	300			
48	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	1,0@0,5			17,5@18	18,5	6:1	1709	337			
49	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			18	18,5	6:1	1533	276			
50	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			16	16,5	6:1	1020	203			
51	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	1,0@0,5			16,0@16,5	17	6:1	1063	228			
52	Donaumast	S+6	Steunmast	54	40*40 cm bet.	3	12	0,5			16	16,5	6:1	1478	269			
53	Donaumast	S+6	Steunmast	54	40*40 cm bet.	3	12	0,5			15,5	16	6:1	1481	228			
54	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15	15,5	6:1	1233	240			
55	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15	15,5	6:1	1401	228			
56	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15,5	16	6:1	1580	256			
57	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			13,5	14	6:1	1699	271			
58	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			12,5	13	6:1	1630	186			
59	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			12,5	13	6:1	1150	197			
60	Donaumast	WA	Wisselmast	46	40*40 cm bet.	5	20	0			13,5	13,5	5:1	1425	223			
61	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			14,5	15	6:1	1474	341			
62	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			14,5	15	6:1	1487	281			
63	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15	15,5	6:1	1941	351			
64	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	1,0@0,5			14,5@15	15,5	6:1	1239	226			
65	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			12,5	13	6:1	1526	260			
66	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			13	13,5	6:1	1319	270			
67	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			12,5	13	6:1	1485	288			
68	Donaumast	HA+0	Hoekmast	45	40*40 cm bet.	5	20	0			12,5	12,5	5:1	1463	176			
69	Donaumast	S+6	Steunmast	54	40*40 cm bet.	3	12	0,5			11,5	12	6:1	423	172			
70	Donaumast	S+9	Steunmast	57	40*40 cm bet.	3	12	0,5			11	11,5	6:1	1281	377			
71	Donaumast	S+9	Steunmast	57	40*40 cm bet.	3	12	0,5			13	13,5	6:1	1153	214			
72	Donaumast	S+6	Steunmast	54	40*40 cm bet.	3	12	0,5			14	14,5	6:1	2064	414			
73	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			12	12,5	6:1	1569	250			
74	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			14,5	15	6:1	1620	319			
75	Donaumast	HB+0	Hoekmast	45	40*40 cm bet.	5	20	-0,7			14,2	13,5	5:1	2222	427			
76	Donaumast	S+6	Steunmast	54	40*40 cm bet.	3	12	0,5			15	15,5	6:1 en 5:1	1744	391			
77	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			16	16,5	6:1	1642	374			
78	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15	15,5	6:1	1297	322			
79	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			14,5	15	6:1	1677	359			
80	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15,5	16	6:1	1345	278			
81	Donaumast	S+3	Steunmast	51	40*40 cm bet.	3	12	0,5			15	15,5	6:1	1705	331			
82	Donaumast	S+3	Steunmast	51	40*40 cm bet.	3	12	0,5			15	15,5	6:1	1382	299			
83	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			12,5	13	6:1	1401	346			
84	Donaumast	HA+0	Hoekmast	45	35*35 cm bet.	5	20	0			11	11	5:1	2155	353			
85	Donaumast	S+3	Steunmast	51	LD1+p	1	4	1,5@0,5			12,0@13,0	13,5	4,9:4	1686	461	3,82	45,84	LD1: Gewicht op basis van doorsnede in SCIA-model. Betondeel 191.680 mm² met (2500-1000)=1500 kg/m³ Staaldeel 13.802 mm² met (7850-1000)=6850 kg/m³
86	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,5@0,5			12,5@13,5	14	4,9:4	1252	255	3,82	47,75	
87	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			13,5	14	6:1	994	285			
88	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			14	14,5	6:1	1009	282			
89	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15	15,5	6:1	1680	453			
90	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			14,5	15	6:1	1324	263			
91	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			13	13,5	6:1	1723	303			
92	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			13	13,5	6:1	1561	306			
93	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			13,5	14	6:1	1516	314			
94	Donaumast	HA+0	Hoekmast	45	40*40 cm bet.	5	20	0			13,5	13,5	5:1	1675	323			
95	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			14,5	15	6:1	2302	401			
96	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			14,5	15	6:1	1417	320			
97	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			13	13,5	6:1	1694	343			
98	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			13,5	14	6:1	1617	331			
99	Donaumast	S+6	Steunmast	54	40*40 cm bet.	3	12	0,5			13	13,5	6:1	1302	311			
100	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			13,5	14	6:1	1326	341			
101	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			14	14,5	6:1	1353	285			
102	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			14	14,5	6:1	1508	316			
103	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15	15,5	6:1	1591	342			
104	Donaumast	EA+3/K	Eindmast	48	Ø813	1	4	0,5			27,5	28	4,93:1	5921	1329	4,80	158,25	Gewicht op basis assetdata: buis Ø813 waarvan buitenste 12,5 mm staal. bovenste **5m** beton gewicht staat vast, zand (onder water) per strekkende meter komt erbijop.
105	Donaumast	HB+0	Hoekmast	45	40*40 cm bet.	5	20	0			16	16	5:1	1820	321			
106	Donaumast	SHV+6	Steunmast	54	Ø609/670	1	4	0,5			22,517	23,017	4,92:1	3284	785	2,51	72,93	Gewicht op basis assetdata: buis Ø609 waarvan buitenste 8 mm staal. bovenste **2m** beton gewicht staat vast, zand (onder water) per strekkende meter komt erbijop, evenals 80mm grout (20kN/m3) rondom.
107	Donaumast	S+0/V	Steunmast S+0	48	Ø609/630	1	4	0,5			23,629	24,129	4,92:1	2938	802	2,51	65,18	Gewicht op basis assetdata: buis Ø609 waarvan buitenste 8 mm staal. bovenste **1,7m** beton gewicht staat vast, zand (onder water) per strekkende meter komt erbijop.
108	Donaumast	WA	Wisselmast	46	40*40 cm bet.	5	20	0			13,5	13,5	5:1	1044	181			
109	Donaumast	S+3	Steunmast	51	Ø609/630	1	4	0,5			15,674	16,174	4,92:1	3244	558	2,51	45,21	Gewicht op basis assetdata: buis Ø609 waarvan buitenste 8 mm staal. bovenste **1,7m** beton gewicht staat vast, zand (onder water) per strekkende meter komt erbijop.
110	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			12,5	13	6:1	1516	300			
111	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			12,5	13	6:1	1376	257			
112	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			14	14,5	6:1	1187	279			
113	Donaumast	S+6	Steunmast	54	Ø609/630	1	4	0,5			17,619	18,119	4,92:1	2838	617	2,51	50,09	Gewicht op basis assetdata: buis Ø609 waarvan buitenste 8 mm staal. bovenste **1,7m** beton gewicht staat vast, zand (onder water) per strekkende meter komt erbijop.
114	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			13,5	14	6:1	1262	302			
115	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			17	17,5	6:1	1328	280			
116	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			15,5	16	6:1	1411	370			
117	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			13,5	14	6:1	1221	302			
118	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			13	13,5	6:1	1288	236			
119	Donaumast	HB+0	Hoekmast	45	40*40 cm bet.	5	20	0			16,5	16,5	5:1	1328	275			
120	Donaumast	HA+3	Hoekmast	48	LD1+p	5	20	0,5			17	17,5	5:1	1262	283			
121	Donaumast	S+6	Steunmast	54	LD1+p	1	4	0,5			16	16,5	4,9:1	1627	387	3,82	57,30	
122	Donaumast	S+6	Steunmast	54	40*40 cm bet.	3	12	0,5			15	15,5	6:1	1820	371			
123	Donaumast	S+6	Steunmast	54	40*40 cm bet.	3	12	0,5			13,5	14	6:1	1180	222			
124	Donaumast	S+0	Steunmast	48	40*40 cm bet.	3	12	0,5			12,5	13	6:1	1192	188			
125	Donaumast	S+6	Steunmast	54	40*40 cm bet.	3	12	0,5			12	12,5	6:1	1456	290			
126	Donaumast	S+6	Steunmast	54	LD1+p	1	4	1,5@0,5			14,0@15,0	15,5	4,9:1	1250	345	3,82	53,48	
127 deel 1	Donaumast	HA+0	Hoekmast	45	LD1	1	4	0,2		115+	11,35	12	4:1	370	59			
127 deel 2	Donaumast	HA+0	Hoekmast	45	2*MV	2	8	0,95		115+	15,9	17,5	4:1	1391	471			
128	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,5@0,5			12,5@13,5	14	4,9:1	1319	322	3,82	47,75	
129	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,5@0,5			13,5@15,0	15,5	4,9:1	1576	445	3,82	53,48	
130	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,0@0,5			12,5@13,0	13,5	4,9:1	1454	348	3,82	45,84	
131	Donaumast	S+6	Steunmast	54	LD1+p	1	4	2,5@1,5			12,0@14,0	14,5	4,9:1	1245	409	3,82	49,66	
132 deel 1	Donaumast	HA+0	Hoekmast	45	LD1	2	8	0,2		115+	8,5	9	4:1	840	142			
132 deel 2	Donaumast	HA+0	Hoekmast	45	2*MV	2	8	0,95		115+	15,9	17,5	4:1	2180	693			
133	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,5@0,5			13,0@14,0	14,5	4,9:1	1223	413	3,82	49,66	
134	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,5@0,5			12,0@13,0	13,5	4,9:1	1505	428	3,82	45,84	
135	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,5@0,5			12,5@13,5	14	4,9:1	1457	317	3,82	47,75	
136	Donaumast	S+0	Steunmast	48	LD1+p	1	4	2,5@0,5			10,0@12,0	12,5	4,9:1	1271	319	3,82	42,02	
137 deel 1	Donaumast	HA+0	Hoekmast	45	LD1	1	4	0,2		115+	8,5	9	4:1	771	116			
137 deel 2	Donaumast	HA+0	Hoekmast	45	2*MV	2	8	0,95		115+	15,9	17,5	4:1	1559	536			
138	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,5@0,5			15,5@16,0	16,5	4,9:1	2379	473	3,82	57,30	
139	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,5@0,5			13,0@14,0	14,5	4,9:1	1447	507	3,82	49,66	
140	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,5@0,5			13,0@14,0	14,5	4,9:1	2180	488	3,82	49,66	
141	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,5@0,5			11,5@12,5	13	4,9:1	1253	249	3,82	43,93	
142	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,5@0,5			12,5@13,5	14	4,9:1	1119	256	3,82	47,75	
143	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1,5			13	14,5	4,9:1	1349	289	3,82	49,66	
144	Donaumast	S+6	Steunmast	54	LD1+p	1	4	3,5		275+	14	17,5	4,9:1	1159	302			
145	Donaumast	S+6	Steunmast	54	LD1+p	1	4	0,5		50+	14	14,5	4,9:1	1900	414	3,82	49,66	
146 optie 1	Donaumast	S+9	Steunmast	57	32*32 cm bet.	5	20	1,5@1,0		50+	7,5@8,0	9	5:1	135	1			
146 optie 2	Donaumast	S+9	Steunmast	57	LD1+p	1	4	1,5@1,0		50+	14@14,5	15,5	5:1	821	308	3,82	53,48	
147 optie 1	Donaumast	S+9	Steunmast	57	32*32 cm bet.	5	20	1,5@1,0		80+	7,5@8,0	9	5:1	561	45			
147 optie 2	Donaumast	S+9	Steunmast	57	LD1+p	1	4	1,5@1,0		80+	13,5@14	15	5:1	901	274	3,82	51,57	
148	Donaumast	S+12	Steunmast	60	2 LD1+p	2	8	1,5		80+	13,5	15	5:1	1174	237	3,82	51,57	-
149 deel 1	Donaumast	HE+6	Hoekmast	51	LD1	1	4	0,2		115+	10,4	11	4:1	920	167			
149 deel 2	Donaumast	HE+6	Hoekmast	51	2*MV	2	8	0,95		115+	14,5	16	4:1	2593	519			
150	Donaumast	S+9	Steunmast	57	LD1+p	1	4	2		80+	14,5	16,5	4,9:1	1998	390	3,82	57,30	
151	Donaumast	S+9	Steunmast	57	LD1+p	1	4	2,5		130+	13	15,5	4,9:1	1278	327	3,82	53,48	
152	Donaumast	S+0	Steunmast	48	LD1+p	1	4	0,5		145+	18	18,5	4,9:1	1572	436	3,82	64,94	
153	Donaumast	S+0	Steunmast	48	LD1+p	1	4	1		135+	15,5	16,5	4,9:1	1115	316	3,82	57,30	
154 best.	Donaumast	S+0	Steunmast	48	LP2S	1	4	1		135+	15,5	16,5	4,9:1	992	231			
154 aanvul	Donaumast	S+0	Steunmast	48	Ø406/560	2	8	0,05	2,17-		12,33	12,63	4,9:1	737	149			
155	Donaumast	HA+12	Hoekmast	57	Ø406/560	4	16	-0,7	1,90-	50+	20,1	20,1	4:1	2558	750			
156 best deel 2	Donaumast	HB+0	Hoekmast	45	2 MV	2	8	0,95		115+	14,45	16	4:1	2278	383			
156 best deel 1	Donaumast	HB+0	Hoekmast	45	LD1	1	4	0,2		115+	11,35	12	4:1	399	135			
156 aanvul	Donaumast	HB+0	Hoekmast	45	Ø406/560	2	8	-0,1	1,80-		17,2	17,75	4:1	3091	588			
157	Donaumast	S+24	Steunmast	75,5	40*40 cm bet.	4	16	0		50+	15,5	15,5	5:1	656	248			
158	Donaumast	S+24	Steunmast	75,5	40*40 cm bet.	4	16	0,0@0,5		50+	21,0@21,5	21	5:1	1040	293			
159	Donaumast	EA+0	Eindmast	49	40*40 cm bet.	7	28	0		50+	23	23	5:1	1656	482			

Poergevens bestaand / Verankering

Mast	Poer- type	b [m]	l [m]	h [m]	hoek [m]	b poer [m]	l poer [m]	h poer [m]	Volume poer [m³]	EG poer[kN]	Fd;eg poer / paal [kN]	Type Ringen of stiftdeuvels	Type Blokdeuvel	Type ankers/ voetplaat	Capaciteit drukkracht mast - fundatie [kN]	Capaciteit trekkracht mast - fundatie [kN]	Capaciteit drukkracht fundatie - paal [kN/paal]	Capaciteit trekkracht fundatie - paal [kN/paal]
1	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
2																		
3	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
4	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
5	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
6	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
7	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
8	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
9	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
10	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
11	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
12	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
13	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
14	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
15	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
16	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
17	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
18	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
19	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
20	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
21	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
22	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
23	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
24	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
25	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
26	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
27	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
28	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
29	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
30	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
31	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
32	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
33	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
34	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
35	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
36	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
37	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
38	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
39	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
40	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
41	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
42	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
43	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
44	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
45	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
46	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
47	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
48	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
49	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
50	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
51	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
52	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
53	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
54	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
55	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
56	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
57	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
58	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
59	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
60	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
61	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
62	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
63	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
64	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
65	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
66	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
67	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
68	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
69	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
70	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	?	?	C: 2xM64-450.450.45	950	708	2080	370
71	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	?	?	C: 2xM64-450.450.45	950	708	2080	370
72	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
73	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
74	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
75	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
76	Blokpoer(220) (3*B)+2LD1?	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
77	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
78	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
79	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
80	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
81	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
82	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
83	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
84	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	1592,5	247,2
85	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
86	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
87	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
88	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
89	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
90	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
91	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
92	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
93	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
94	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
95	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
96	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
97	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
98	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
99	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
100	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
101	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
102	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
103	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
104	1xSI	0	0	0	0	0	0	0	0,000	0,0	0,0	F: 3x30.50.inf	J: 12x50.30.250 + 12x50.30.200	n.v.t.	4945	4945	3939	3939
105	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
106	1xSI	0	0	0	0	0	0	0	0,000	0,0	0,0	H: 2x30.30.inf	N: 10x50.30.160	n.v.t.	1749	1749	1754	1754
107	1xSI	0	0	0	0	0	0	0	0,000	0,0	0,0	H: 2x30.30.inf	Q: 8x50.30.150	n.v.t.	1382	1382	1754	1754
108	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
109	1xSI	0	0	0	0	0	0	0	0,000	0,0	0,0	H: 2x30.30.inf	Q: 8x50.30.150	n.v.t.	1382	1382	1754	1754
110	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
111	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
112	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
113	1xSI	0	0	0	0	0	0	0	0,000	0,0	0,0	H: 2x30.30.inf	Q: 8x50.30.150	n.v.t.	1382	1382	1754	1754
114	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
115	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
116	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
117	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
118	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
119	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
120	Balkrooster (5LP)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370
121	Cilinderpoer(75)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
122	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
123	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
124	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
125	Blokpoer(220) (3*B)	0,74	1,41	1,2	0	0	0	0	5,008	120,2	10,0	n.v.t.	n.v.t.	B: 4xM36-520.320.38	800	594	2080	370
126	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
127 deel 1	Cilinderpoer(200) (2*MV+1*LD1)	1,7725	1,7725	2,22	0	0	0	0	27,899	669,57	167,4	C5: Poer	L: 14x50.30.230	n.v.t.	2164	2164	953	953
127 deel 2	Cilinderpoer(200) (2*MV+1*LD1)	1,7725	1,7725	2,22	0	0	0	0	27,899	669,57	83,7	C5: Poer	L: 14x50.30.230	n.v.t.	n.v.t.	n.v.t.	1505	1505
128	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
129	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
130	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
131	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
132 deel 1	Cilinderpoer(200) (2*MV+1*LD1)	1,7725	1,7725	2,22	0	0	0	0	27,899	669,57	83,7	C5: Poer	L: 14x50.30.230	n.v.t.	2164	2164	953	953
132 deel 2	Cilinderpoer(200) (2*MV+1*LD1)	1,7725	1,7725	2,22	0	0	0	0	27,899	669,57	83,7	C5: Poer	L: 14x50.30.230	n.v.t.	n.v.t.	n.v.t.	1505	1505
133	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
134	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
135	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
136	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
137 deel 1	Cilinderpoer(200) (2*MV+1*LD1)	1,7725	1,7725	2,22	0	0	0	0	27,899	669,57	167,4	C5: Poer	L: 14x50.30.230	n.v.t.	2164	1630	953	953
137 deel 2	Cilinderpoer(200) (2*MV+1*LD1)	1,7725	1,7725	2,22	0	0	0	0	27,899	669,57	83,7	C5: Poer	L: 14x50.30.230	n.v.t.	n.v.t.	n.v.t.	1505	1505
138	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
139	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
140	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
141	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
142	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
143	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
144	Koppelframe (Cilinderpoer 1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
145	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
146 optie 1	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	?	?	C: 2xM64-450.450.45	1000	708	1331,2	90,5
146 optie 2	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	242,1	?	?	C: 2xM64-450.450.45	1000	708	953	953
147 optie 1	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	48,4	?	?	C: 2xM64-450.450.45	1000	708	1331,2	90,5
147 optie 2	Balkrooster (5*B)	0,9	12,5	0,75	1,55	0,94	0,68	1,17	40,345	968,3	242,1	?	?	C: 2xM64-450.450.45	1000	708	953	953
148	Blokpoer(200) (2*LD1)	0,9	2	1,05	0	0,55	0,55	0,5	8,165	196	24,5	C9: Poer	n.v.t.	C: 2xM64-450.450.45	1000	708	1363	1363
149 deel 1	Cilinderpoer(200) (2*MV+1*LD1)	1,7725	1,7725	2,22	0	0	0	0	27,899	669,57	167,4	C5: Poer	L: 14x50.30.230	n.v.t.	2164	2164	953	953
149 deel 2	Cilinderpoer(200) (2*MV+1*LD1)	1,7725	1,7725	2,22	0	0	0	0	27,899	669,57	83,7	C5: Poer	L: 14x50.30.230	n.v.t.	n.v.t.	n.v.t.	1505	1505
150	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	N: 10x50.30.160	n.v.t.	1504	1504	916	916
151	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	N: 10x50.30.160	n.v.t.	1504	1504	916	916
152	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
153	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	G: 6x30.50.180	M: 12x50.30.100	n.v.t.	1205	1205	916	916
154 best.	Cilinderpoer(75) (1*LD1)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	16,5	C7: Poer	M: 12x50.30.100	n.v.t.	1990	1990	1990	1990
154 aanvul	Blokpoer(700)	1,4	7	1	0	0,456	0,385	1	39,902	957,7	79,8	C7: Poer	M: 12x50.30.100	n.v.t.	1663	1663	1329	1329
155	Cilinderpoer(225) (4*Ø406/560)	0,66467	0,66467	1,56	0	0	0	0	2,757	66,2	4,1	C6: Poer	K: 10x50.30.260 + 4x50.30.370	n.v.t.	4154	3936	1550	1550
156 best deel 2	Cilinderpoer(200) (2*MV+1*LD1)	1,7725	1,7725	2,22	0	0	0	0	27,899	669,57	83,7	C5: Poer	L: 14x50.30.230	n.v.t.	n.v.t.	n.v.t.	1505	1505
156 best deel 1	Cilinderpoer(200) (2*MV+1*LD1)	1,7725	1,7725	2,22	0	0	0	0	27,899	669,57	167,4	C5: Poer	L: 14x50.30.230	n.v.t.	2164	2164	953	953
156 aanvul	Cilinderpoer(200) (2*MV+1*LD1)	1,7725	1,7725	2,22	0	0	0	0	27,899	669,57	83,7	C8: Poer	L: 14x50.30.230	n.v.t.	n.v.t.	n.v.t.	1031	1031
157	Balkrooster (4*B)	0,9	13,438	0,75	1,55	1	0,75	1,17	43,396	1041,5	65,1	n.v.t.	n.v.t.	D: 6xM65-700.500.55	2000	1250	2080	370
158	Balkrooster (4*B)	0,9	13,438	0,75	1,55	1	0,75	1,17	43,396	1041,5	65,1	n.v.t.	n.v.t.	D: 6xM65-700.500.55	2000	1250	2080	370
159	Balkrooster (7*B)	0,9	12,5	0,75	1,55	0,8175	1,07	1,94	44,142	1059,4	37,8	n.v.t.	n.v.t.	A: 6xM64-800.550.75	2100	1250	2080	370

SCIA model fundering input / SCIA model resultaten

Mast	Naam SCIA-model funderingstype	Beschouwde belasting	Toelichting	Windgebied	Maatgevende belasting	PY Curve 1 of 2	Begrensde paalcapaciteit beschouwd	Opmerking	Maximale drukkracht in één fundatiepaal onderkant paal[kN]	Maximale trekkracht in één fundatiepaal onderkant paal [kN]	Maximale drukkracht in één fundatiepaal bovenkant paal [kN]	Maximale trekkracht in één fundatiepaal bovenkant paal [kN]
1	Balkrooster-5xBeton-40x40	Mastnr. 37		2		1	1237 druk en 266 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	388,6	232,8	358	256
2												
3	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
4	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
5	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
6	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
7	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
8	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
9	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
10	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
11	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
12	Balkrooster-5xBeton-40x40	Mastnr. 37		2		1	1237 druk en 266 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	388,6	232,8	358	256
13	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
14	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
15	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
16	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
17	Balkrooster-5xBeton-40x40 mast 17	Mastnr. 17		2		1	824 druk en 239 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	395,3	199,1	345	236
18	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek	Afwijkend: Antenne	537,3	275	504	308
19	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
20	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
21	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
22	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
23	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
24	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
25	Balkrooster-5xBeton-40x40	Mastnr. 37		2		1	1237 druk en 266 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	388,6	232,8	358	256
26	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
27	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
28	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
29	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
30	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
31	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
32	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
33	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
34	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
35	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
36	Blokpoer-3xBeton40x40-MASTEN-S+3	Mast 36		2		1	1230 druk en 275 trek		646,3	275	590	332
37	Balkrooster-5xBeton-40x40 mast 37	Mastnr. 37		2		1	915 druk en 138 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	400,8	138	351	188
38	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
39	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
40	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
41	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
42	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
43	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
44	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
45	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
46	Blokpoer-3xBeton40x40-MAST-S_II	S+0 max wind II		2		1	655 druk en 275 trek		537,3	275	504	308
47	Balkrooster-5xBeton-40x40	Mastnr. 37		2		1	1237 druk en 266 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	388,6	232,8	358	256
48	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III		3		1	994 druk en 275 trek		491,9	269,2	457	295
49	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		1	994 druk en 275 trek		491,9	269,2	457	295
50	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		1	994 druk en 275 trek		491,9	269,2	457	295
51	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		1	994 druk en 275 trek		491,9	269,2	457	295
52	Blokpoer-3xBeton40x40-MASTEN-S+6	S+6 max		3		1	423 druk en 275 trek		423	275	398	300
53	Blokpoer-3xBeton40x40-MASTEN-S+6	S+6 max		3		1	423 druk en 275 trek		423	275	398	300
54	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		1	994 druk en 275 trek		491,9	269,2	457	295
55	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		1	994 druk en 275 trek		491,9	269,2	457	295
56	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		1	994 druk en 275 trek		491,9	269,2	457	295
57	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		1	994 druk en 275 trek		491,9	269,2	457	295
58	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		1	994 druk en 275 trek		491,9	269,2	457	295
59	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		1	994 druk en 275 trek		491,9	269,2	457	295
60	Balkrooster-5xBeton-40x40 mast 60	Mastnr. 60		2		1	1425 druk en 223 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	368,4	192,7	331	221
61	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		1 of 2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
62	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
63	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
64	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
65	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
66	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
67	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
68	Balkrooster-5xBeton-40x40 mast 68	Mastnr. 68		2		2	1463 druk en 176 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	377,1	176	343	202
69	Blokpoer-3xBeton40x40-MASTEN-S+6	S+6 max		3		2 (1 beschouwd)	423 druk en 275 trek		423	275	398	300
70	Blokpoer-3xBeton40x40-MASTEN-S+9	S+9 max		3		2	1153 druk en 275 trek		666,6	275	635	307
71	Blokpoer-3xBeton40x40-MASTEN-S+9	S+9 max		3		2	1153 druk en 275 trek		666,6	275	635	307
72	Blokpoer-3xBeton40x40-MASTEN-S+6	S+6 max		3		2 (1 beschouwd)	423 druk en 275 trek		423	275	398	300
73	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48) (Ook hier S+0 R3 last gerekend, maatgevend over specifieke locatie met antennelast)	3		2	994 druk en 275 trek	Afwijkend: Antenne	491,9	269,2	457	295
74	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
75	Balkrooster-5xBeton-40x40	Mastnr. 37		3		2	1237 druk en 266 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	388,6	232,8	358	256
76	Blokpoer-3xBeton40x40-MASTEN-S+6	S+6 max		3		2 (1 beschouwd)	423 druk en 275 trek		423	275	398	300
77	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
78	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
79	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
80	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
81	Blokpoer-3xBeton40x40-MASTEN-S+3	S+3 max		3		2 (1 ingevoerd)	1382 druk en 275 trek		520,2	275	478	307
82	Blokpoer-3xBeton40x40-MASTEN-S+3	S+3 max		3		2 (1 ingevoerd)	1382 druk en 275 trek		520,2	275	478	307
83	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
84	Balkrooster-5xBeton-40x40 mast 84	Mastnr. 84		3		2	2155 druk en 200 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	370,4	200	340	231
85	nvt.			3		2			*712*	*397*	*637*	*453*
86	nvt.			3					*711*	*410*	*634*	*468*
87	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2	994 druk en 275 trek	Afwijkend: Antenne	491,9	269,2	457	295
88	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
89	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
90	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
91	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
92	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
93	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
94	Balkrooster-5xBeton-40x40	Mastnr. 37		2		2	1237 druk en 266 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	388,6	232,8	358	256
95	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
96	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
97	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
98	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
99	Blokpoer-3xBeton40x40-MASTEN-S+6	S+6 max		3		2 (1 beschouwd)	423 druk en 275 trek		423	275	398	300
100	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
101	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
102	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
103	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3		2 (1 beschouwd)	994 druk en 275 trek		491,9	269,2	457	295
104	nvt.		Rapportage ontbreekt	3		2			*1455*	*813*	*1265*	*955*
105	Balkrooster-5xBeton-40x40	Mastnr. 37		2		2	1237 druk en 266 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	388,6	232,8	358	256
106	nvt.		TvW: Rapportage ontbreekt	3				Afwijkend: Open stalen buispaal	*937*	*598*	*849*	*664*
107	nvt.			3					*714*	*422*	*636*	*481*
108	Balkrooster-5xBeton-40x40 mast 108	Mastnr. 108		2		2	1044 druk en 181 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	390,9	144	329	191
109	nvt.			3					*691*	*412*	*637*	*453*
110	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3			994 druk en 275 trek		491,9	269,2	457	295
111	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3			994 druk en 275 trek		491,9	269,2	457	295
112	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3			994 druk en 275 trek		491,9	269,2	457	295
113	nvt.			3					*769*	*470*	*709*	*515*
114	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3			994 druk en 275 trek		491,9	269,2	457	295
115	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3			994 druk en 275 trek		491,9	269,2	457	295
116	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3			994 druk en 275 trek		491,9	269,2	457	295
117	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3			994 druk en 275 trek		491,9	269,2	457	295
118	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3			994 druk en 275 trek		491,9	269,2	457	295
119	Balkrooster-5xBeton-40x40	Mastnr. 37		2		2	1237 druk en 266 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	388,6	232,8	358	256
120	Balkrooster-5xBeton-40x40	Mastnr. 37		3		2	1237 druk en 266 trek	PY Curve 1 is beschouwd met een Reductiefactor van 96%	388,6	232,8	358	256
121	nvt.			3					*799*	*449*	*710*	*515*
122	Blokpoer-3xBeton40x40-MASTEN-S+6	S+6 max		3		(1 beschouwd)	423 druk en 275 trek		423	275	398	300
123	Blokpoer-3xBeton40x40-MASTEN-S+6	S+6 max		3		(1 beschouwd)	423 druk en 275 trek		423	275	398	300
124	Blokpoer-3xBeton40x40-MAST-S_III	S+0 max wind III	(Zie mastnr. 48)	3			994 druk en 275 trek		491,9	269,2	457	295
125	Blokpoer-3xBeton40x40-MASTEN-S+6	S+6 max		3		(1 beschouwd)	423 druk en 275 trek		423	275	398	300
126	nvt.			3					*794*	*452*	*710*	*515*
127 deel 1	Cilinderpoer-2xMV-1xLD1-HA	Mastnr. 127		3	Mastnr. 127	2		resultaten van paal LD1	143,3	0	104	0
127 deel 2	Cilinderpoer-2xMV-1xLD1-HA	Mastnr. 127		3	Mastnr. 127	2		resultaten van paal MV	702,9	455,6	690	465
128	nvt.			3					*711*	*410*	*634*	*468*
129	nvt.			3					*718*	*405*	*634*	*468*
130	nvt.			3					*709*	*412*	*634*	*468*
131	nvt.			3					*789*	*455*	*710*	*515*
132 deel 1	Cilinderpoer-2xMV-1xLD1-HA	Mastnr. 127		3	Mastnr. 127	2		resultaten van paal LD1	143,3	0	119	0
132 deel 2	Cilinderpoer-2xMV-1xLD1-HA	Mastnr. 127		3	Mastnr. 127	2		resultaten van paal MV	702,9	455,6	684	467
133	nvt.			3					*713*	*408*	*634*	*468*
134	nvt.			3					*709*	*412*	*634*	*468*
135	nvt.			3					*711*	*410*	*634*	*468*
136	nvt.			3					*704*	*415*	*634*	*468*
137 deel 1	Cilinderpoer-2xMV-1xLD1-HA	Mastnr. 127		3	Mastnr. 127	2		resultaten van paal LD1	143,3	0	119	0
137 deel 2	Cilinderpoer-2xMV-1xLD1-HA	Mastnr. 127		3	Mastnr. 127	2		resultaten van paal MV	702,9	455,6	684	467
138	nvt.			3					*723*	*402*	*634*	*468*
139	nvt.			3					*713*	*408*	*634*	*468*
140	nvt.			3					*713*	*408*	*634*	*468*
141	nvt.			3					*707*	*414*	*634*	*468*
142	nvt.			3					*713*	*410*	*634*	*468*
143	nvt.			3					*713*	*408*	*634*	*468*
144	Koppelframe-1xLD1	S+6 max		3					*967*	*303,7*	*779*	*445*
145	nvt.			3					*789*	*455*	*710*	*515*
146 optie 1	KD-DIM380-Balkrooster-5xBeton32x32 mast 146	S+9		3	S+9	2		PY Curve 1 is beschouwd met een Reductiefactor van 96%	–	–	volgens GEO hebben de palen geen veerstijfheid op trek , daarom kan de constructie de huidige belasting niet dragen	volgens GEO hebben de palen geen veerstijfheid op trek , daarom kan de constructie de huidige belasting niet dragen
146 optie 2	n.v.t.	S+9		3	S+9	2		PY Curve 1 is beschouwd met een Reductiefactor van 96%	1234	419	879	685
147 optie 1	KD-DIM380-Balkrooster-5xBeton32x32 mast 147	S+9		3	S+9	2		PY Curve 1 is beschouwd met een Reductiefactor van 96%	300	113,6	284	126
147 optie 2	n.v.t.	S+9		3	S+9	2		PY Curve 1 is beschouwd met een Reductiefactor van 96%	1231	421	879	685
148	Blokpoer-2xLD1	Mastnr. 148		3	Mastnr. 148	2 (1 beschouwd)	1174 druk en 237 trek	PY Curve 1 is beschouwd	960,5	237	798	399
149 deel 1	Cilinderpoer-2xMV-1xLD1-HEplus6	Mast nr.149		2	Mast nr.149	2		resultaten van paal LD1	240,6	0	193	12
149 deel 2	Cilinderpoer-2xMV-1xLD1-HEplus6	Mast nr.149		2	Mast nr.149	2		resultaten van paal MV	752,4	496,3	741	505
150	nvt.			2					*923*	*581*	*834*	*647*
151	nvt.			2					*932*	*593*	*848*	*656*
152	nvt.			2					*847*	*515*	*749*	*588*
153	nvt.			2					*838*	*522*	*749*	*588*
154 best.	Blokpoer-1xLD1-2xTubex	S+0 max		2	S+0 max	2		PY Curve 1 is beschouwd, resultaten van paal LD1	674,9	140	603	194
154 aanvul	Blokpoer-1xLD1-2xTubex	S+0 max		2	S+0 max	2		PY Curve 1 is beschouwd, resultaten van paal Tubex	305,5	88,6	267	118
155	Cilinderpoer-4xTubex406-560			2					536,1	479	501	514
156 best deel 2	Cilinderpoer-2xMV-1xLD1-2xTubex - HB	Mastnr. 156		2	Mastnr. 156	1	2278 druk en 383 trek	PY Curve 1 is beschouwd, resultaten van paal MV	571	292,6	562	301
156 best deel 1	Cilinderpoer-2xMV-1xLD1-2xTubex - HB	Mastnr. 156		2	Mastnr. 156	1	399 druk en 0 trek	PY Curve 1 is beschouwd, resultaten van paal LD1	331,8	0	279	52
156 aanvul	Cilinderpoer-2xMV-1xLD1-2xTubex - HB	Mastnr. 156		2	Mastnr. 156	1	3091 druk en 588 trek	PY Curve 1 is beschouwd, resultaten van paal Tubex	655	106,2	612	139
157	Balkrooster-4xBeton-40x40 mast 157	S+24 mast 157		2	Mastnr. 157	2		PY Curve 1 is beschouwd.	585,3	330,1	542	362
158	Balkrooster-4xBeton-40x40 mast 158	S+24 mast 158		2	Mastnr. 157	2		PY Curve 1 is beschouwd.	593,7	319,6	536	362
159	Balkrooster-7xBeton-40x40 mast 159	Mastnr. 159		2	Mastnr. 159	2		PY Curve 1 is beschouwd met een Reductiefactor van 96%	408,7	226,1	359	263

Input vanuit Lijnen / Toetsingen

Mast	AK: Maximale drukkracht in één randstijl [kN]	AK: Maximale trekkracht in één randstijl [kN]	VB: Maximale drukkracht in één randstijl [kN]	VB: Maximale trekkracht in één randstijl [kN]	ΔF_druk per randstijl [kN] (Fd_VB - Fd_AK)	ΔF_trek per randstijl [kN] (Ft_VB - Ft_AK)	Toetsing verankering randstijl op maximale drukkracht	Toetsing verankering randstijl op maximale trekkracht	Toetsing verankering fundering op maximale drukkracht	Toetsing verankering fundering op maximale trekkracht	Toetsing paalcapaciteit op maximale drukkracht	Toetsing paalcapaciteit op maximale trekkracht	Overkoepelende toetsing	Opmerking	Versterking	Categorie
1	1425	1092					0,68	0,87	0,17	0,69	0,20	0,76	**0,87**		-	-
2							n.v.t.	n.v.t.	n.v.t.	n.v.t.	n.v.t.	n.v.t.	0,00	Geen mast	-	-
3	749	588					0,94	0,99	0,24	0,83	0,57	0,95	**0,99**		-	-
4	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,56	1,29	**1,29**		Lijnpoer met 2 extra palen	F4
5	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,50	1,52	**1,52**		Lijnpoer met 2 extra palen	F4
6	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,40	1,14	**1,14**		Ballast zwaar	F1
7	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,38	1,05	**1,05**		Ballast licht	F1
8	749	588					0,94	0,99	0,24	0,83	0,38	0,89	**0,99**		-	-
9	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,34	1,03	**1,03**		Ballast licht	F1
10	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,56	1,57	**1,57**		Lijnpoer met 2 extra palen	F4
11	749	588					0,94	0,99	0,24	0,83	0,30	0,85	**0,99**		-	-
12	1211	997					0,58	0,80	0,17	0,69	0,29	0,88	**0,88**		-	-
13	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,53	1,23	**1,23**		Ballast+Koppelbalk	F2
14	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,42	1,03	**1,03**		Ballast licht	F1
15	749	588					0,94	0,99	0,24	0,83	0,37	0,95	**0,99**		-	-
16	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,47	1,46	**1,46**		Lijnpoer met 2 extra palen	F4
17	1270	1040					0,60	0,83	0,17	0,64	0,48	0,83	**0,83**		-	-
18	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,46	1,10	**1,10**		Ballast zwaar	F1
19	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,55	1,18	**1,18**		Ballast+Koppelbalk	F2
20	749	588					0,94	0,99	0,24	0,83	0,42	1,00	**1,00**		-	-
21	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,50	1,35	**1,35**		Lijnpoer met 2 extra palen	F4
22	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,42	1,16	**1,16**		Ballast+Koppelbalk	F2
23	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,77	3,06	**3,06**		Lijnpoer met 2 extra palen	F4
24	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,75	1,35	**1,35**		Lijnpoer met 2 extra palen	F4
25	1252	1024					0,60	0,82	0,17	0,69	0,31	0,66	**0,82**		-	-
26	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,63	1,34	**1,34**		Lijnpoer met 2 extra palen	F4
27	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,59	1,53	**1,53**		Lijnpoer met 2 extra palen	F4
28	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,45	1,12	**1,12**		Ballast zwaar	F1
29	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,82	1,35	**1,35**		Lijnpoer met 2 extra palen	F4
30	749	588					0,94	0,99	0,24	0,83	0,67	0,83	**0,99**		-	-
31	749	588					0,94	0,99	0,24	0,83	0,35	0,70	**0,99**		-	-
32	749	588					0,94	0,99	0,24	0,83	0,41	0,89	**0,99**		-	-
33	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,68	1,49	**1,49**		Lijnpoer met 2 extra palen	F4
34	749	588	963	796	214	208	0,94	0,99	0,24	0,83	0,81	1,28	**1,28**		Lijnpoer met 2 extra palen	F4
35	749	588					0,94	0,99	0,24	0,83	0,43	0,95	**0,99**		-	-
36	769	586					0,96	0,99	0,28	0,90	0,53	0,94	**0,99**		-	-
37	1353	1120	1443	1187	90	67	0,64	0,90	0,17	0,51	0,44	1,01	**1,01**		Aanstorting met 2 palen	F5
38	749	588					0,94	0,99	0,24	0,83	0,35	0,83	**0,99**		-	-
39	749	588					0,94	0,99	0,24	0,83	0,41	0,93	**0,99**		-	-
40	749	588					0,94	0,99	0,24	0,83	0,33	0,79	**0,99**		-	-
41	749	588					0,94	0,99	0,24	0,83	0,44	0,82	**0,99**		-	-
42	749	588					0,94	0,99	0,24	0,83	0,41	0,93	**0,99**		-	-
43	749	588					0,94	0,99	0,24	0,83	0,29	0,81	**0,99**		-	-
44	749	588					0,94	0,99	0,24	0,83	0,31	0,98	**0,99**		-	-
45	749	588					0,94	0,99	0,24	0,83	0,30	0,89	**0,99**		-	-
46	749	588					0,94	0,99	0,24	0,83	0,51	0,81	**0,99**		-	-
47	1172	948					0,56	0,76	0,17	0,69	0,31	0,78	**0,78**		-	-
48	634	468					0,79	0,79	0,22	0,80	0,29	0,80	**0,80**		-	-
49	634	468					0,79	0,79	0,22	0,80	0,32	0,98	**0,98**		-	-
50	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,48	1,33	**1,33**		Lijnpoer met 2 extra palen	F4
51	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,46	1,18	**1,18**		Ballast + Koppelbalk	F2
52	719	536	906	707	187	171	0,90	0,90	0,19	0,81	0,29	1,02	**1,02**		Ballast licht	F1
53	710	515	906	707	196	192	0,89	0,87	0,19	0,81	0,29	1,21	**1,21**		Ballast + Koppelbalk	F2
54	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,40	1,12	**1,12**		Ballast + Koppelbalk	F2
55	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,35	1,18	**1,18**		Ballast + Koppelbalk	F2
56	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,31	1,05	**1,05**		Ballast licht	F1
57	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,29	1,01	**1,01**		Ballast licht	F1
58	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,30	1,45	**1,45**		Lijnpoer met 2 extra palen	F4
59	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,43	1,37	**1,37**		Lijnpoer met 2 extra palen	F4
60	1215	982					0,58	0,79	0,16	0,60	0,26	0,86	**0,86**		-	-
61	634	468					0,79	0,79	0,22	0,80	0,33	0,79	**0,80**		-	-
62	634	468					0,79	0,79	0,22	0,80	0,33	0,96	**0,96**		-	-
63	634	468					0,79	0,79	0,22	0,80	0,25	0,77	**0,80**		-	-
64	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,40	1,19	**1,19**		Ballast + Koppelbalk	F2
65	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,32	1,04	**1,04**		Ballast licht	F1
66	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,37	1,02	**1,02**		Ballast licht	F1
67	634	468					0,79	0,79	0,22	0,80	0,33	0,93	**0,93**		-	-
68	1255	1030	1329	1075	74	45	0,60	0,82	0,16	0,55	0,26	1,00	**1,00**		-	-
69	710	515	906	707	196	192	0,89	0,87	0,19	0,81	1,00	1,60	**1,60**		Lijnpoer met 2 extra palen	F4
70	879	685					0,93	0,97	0,31	0,83	0,52	0,73	**0,97**		-	-
71	879	685	1127	918	248	233	0,93	0,97	0,31	0,83	0,58	1,29	**1,29**		Lijnpoer met 2 extra palen	F4
72	710	515					0,89	0,87	0,19	0,81	0,20	0,66	**0,89**		-	-
73	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,31	1,08	**1,08**		Ballast zwaar	F1
74	634	468					0,79	0,79	0,22	0,80	0,30	0,84	**0,84**		-	-
75	1329	1097					0,63	0,88	0,17	0,69	0,17	0,55	**0,88**		-	-
76	710	515					0,89	0,87	0,19	0,81	0,24	0,70	**0,89**	Getoetst op basis van blokpoer met 3 betonpalen. Wel check nodig op werkelijke uitvoering 3B + 2xLD1	-	-
77	606	446					0,76	0,75	0,22	0,80	0,30	0,72	**0,80**		-	-
78	634	468					0,79	0,79	0,22	0,80	0,38	0,84	**0,84**		-	-
79	634	468					0,79	0,79	0,22	0,80	0,29	0,75	**0,80**		-	-
80	634	468					0,79	0,79	0,22	0,80	0,37	0,97	**0,97**		-	-
81	637	453					0,80	0,76	0,23	0,83	0,31	0,83	**0,83**		-	-
82	637	453					0,80	0,76	0,23	0,83	0,38	0,92	**0,92**		-	-
83	634	468					0,79	0,79	0,22	0,80	0,35	0,78	**0,80**		-	-
84	1163	932					0,55	0,75	0,21	0,93	0,17	0,57	**0,93**		-	-
85	637	453					0,53	0,38	0,70	0,49	0,42	0,86	**0,86**		-	-
86	634	468	813	639	179	171	0,53	0,39	0,69	0,51	0,57	1,61	**1,61**		Extra palen (2 stuks)	F3
87	634	468					0,79	0,79	0,22	0,80	0,49	0,94	**0,94**		-	-
88	634	468					0,79	0,79	0,22	0,80	0,49	0,95	**0,95**		-	-
89	634	468					0,79	0,79	0,22	0,80	0,29	0,59	**0,80**		-	-
90	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,37	1,02	**1,02**		Ballast licht	F1
91	634	468					0,79	0,79	0,22	0,80	0,29	0,89	**0,89**		-	-
92	634	468					0,79	0,79	0,22	0,80	0,32	0,88	**0,88**		-	-
93	634	468					0,79	0,79	0,22	0,80	0,32	0,86	**0,86**		-	-
94	1163	922					0,55	0,74	0,17	0,69	0,23	0,72	**0,74**		-	-
95	634	468					0,79	0,79	0,22	0,80	0,21	0,67	**0,80**		-	-
96	634	468					0,79	0,79	0,22	0,80	0,35	0,84	**0,84**		-	-
97	634	468					0,79	0,79	0,22	0,80	0,29	0,78	**0,80**		-	-
98	634	468					0,79	0,79	0,22	0,80	0,30	0,81	**0,81**		-	-
99	710	515					0,89	0,87	0,19	0,81	0,32	0,88	**0,89**		-	-
100	634	468					0,79	0,79	0,22	0,80	0,37	0,79	**0,80**		-	-
101	634	468					0,79	0,79	0,22	0,80	0,36	0,94	**0,94**		-	-
102	634	468					0,79	0,79	0,22	0,80	0,33	0,85	**0,85**		-	-
103	634	468					0,79	0,79	0,22	0,80	0,31	0,79	**0,80**		-	-
104	1265	955					0,26	0,19	0,32	0,24	0,25	0,61	**0,61**		-	-
105	1344	1087					0,64	0,87	0,17	0,69	0,21	0,73	**0,87**		-	-
106	849	664					0,49	0,38	0,48	0,38	0,29	0,76	**0,76**		-	-
107	636	481					0,46	0,35	0,36	0,27	0,24	0,53	**0,53**		-	-
108	1198	974					0,57	0,78	0,16	0,52	0,37	0,80	**0,80**		-	-
109	637	453					0,46	0,33	0,36	0,26	0,21	0,74	**0,74**		-	-
110	634	468					0,79	0,79	0,22	0,80	0,32	0,90	**0,90**		-	-
111	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,36	1,05	**1,05**		Ballast licht	F1
112	634	468					0,79	0,79	0,22	0,80	0,41	0,96	**0,96**		-	-
113	709	515					0,51	0,37	0,40	0,29	0,27	0,76	**0,76**		-	-
114	634	468					0,79	0,79	0,22	0,80	0,39	0,89	**0,89**		-	-
115	634	468					0,79	0,79	0,22	0,80	0,37	0,96	**0,96**		-	-
116	634	468					0,79	0,79	0,22	0,80	0,35	0,73	**0,80**		-	-
117	634	468					0,79	0,79	0,22	0,80	0,40	0,89	**0,89**		-	-
118	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,38	1,14	**1,14**		Ballast + Koppelbalk	F2
119	1353	1122					0,64	0,90	0,17	0,69	0,29	0,85	**0,90**		-	-
120	1259	1016					0,60	0,81	0,17	0,69	0,31	0,82	**0,82**	Aandachtspunt is verificatie of inderdaad LD1 palen zijn toegepast. Op basis van LD1 palen is geen versterking nodig.	-	-
121	710	515	906	707	196	192	0,59	0,43	0,78	0,56	0,49	1,16	**1,16**		Ballast	F1
122	710	515					0,89	0,87	0,19	0,81	0,23	0,74	**0,89**			
123	710	515	906	707	196	192	0,89	0,87	0,19	0,81	0,36	1,24	**1,24**		Ballast + Koppelbalk	F2
124	634	468	813	639	179	171	0,79	0,79	0,22	0,80	0,41	1,43	**1,43**		Lijnpoer met 2 extra palen	F4
125	710	515					0,89	0,87	0,19	0,81	0,29	0,95	**0,95**			
126	710	515	877	686	167	171	0,59	0,43	0,78	0,56	0,64	1,31	**1,31**		Extra palen (2 stuks)	F3
127 deel 1	1267	1050	1341	1096	74	46	0,59	0,49	0,11	0,00	0,39	0,00	**0,59**	LD1 paal (geen trek)	-	-
127 deel 2	1267	1050	1341	1096	74	46	n.v.t.	n.v.t.	0,46	0,31	0,51	0,97	**0,97**	MV palen	-	-
128	634	468	813	639	179	171	0,53	0,39	0,69	0,51	0,54	1,27	1,27		Ballast	F1
129	634	468					0,53	0,39	0,69	0,51	0,46	0,91	0,91	-	-	-
130	634	468	813	639	179	171	0,53	0,39	0,69	0,51	0,49	1,18	1,18		Ballast	F1
131	710	515	906	707	196	192	0,59	0,43	0,78	0,56	0,63	1,11	1,11		Ballast (let op knaggen)	F1
132 deel 1	1176	951					0,54	0,44	0,12	0,00	0,17	0,00	0,54	LD1 paal (geen trek)	-	-
132 deel 2	1176	951					n.v.t.	n.v.t.	0,45	0,31	0,32	0,66	0,66	MV palen	-	-
133	634	468					0,53	0,39	0,69	0,51	0,58	0,99	0,99		-	-
134	634	468					0,53	0,39	0,69	0,51	0,47	0,96	0,96		-	-
135	634	468	813	639	179	171	0,53	0,39	0,69	0,51	0,49	1,29	1,29		Ballast	F1
136	634	468	813	639	179	171	0,53	0,39	0,69	0,51	0,55	1,30	1,30		Ballast	F1
137 deel 1	1169	938					0,54	0,58	0,12	0,00	0,19	0,00	0,58	LD1 paal (geen trek)	-	-
137 deel 2	1169	938					n.v.t.	n.v.t.	0,45	0,31	0,45	0,85	0,85	MV palen	-	-
138	634	468					0,53	0,39	0,69	0,51	0,30	0,85	0,85	-	-	-
139	634	468					0,53	0,39	0,69	0,51	0,49	0,81	0,81	-	-	-
140	634	468					0,53	0,39	0,69	0,51	0,33	0,84	0,84	-	-	-
141	634	468	813	639	179	171	0,53	0,39	0,69	0,51	0,56	1,66	1,66		Extra palen (2 stuks)	F3
142	634	468	813	639	179	171	0,53	0,39	0,69	0,51	0,64	1,60	1,60		Extra palen (2 stuks)	F3
143	634	468	813	639	179	171	0,53	0,39	0,69	0,51	0,53	1,41	1,41		Extra palen (2 stuks)	F3
144	710	515	906	707	196	192	0,59	0,43	0,85	0,49	0,83	1,01	1,01	Terp is niet aangebracht	Extra palen (2 stuks) + Koppelbalk	F3
145	710	515	906	707	196	192	0,59	0,43	0,78	0,56	0,42	1,10	1,10		Ballast	F1
146 optie 1	879	685	1127	918	248	233	0,88	0,97	n.v.t.	n.v.t.	n.t.b.	n.t.b.	0,97	Werkhypothese is versterken ivm beperkte draagkracht betonpalen. Deze staan nauwelijks in de zandlaag.	Aanstorting met 3 palen	F5
146 optie 2	879	685	1127	918	248	233	0,88	0,97	0,92	0,72	1,50	1,36	1,50	Hypothetische variant van 146 met paalfundering 1xLD1 per hoek.	Aanstorting met 3 palen	F5
147 optie 1	879	685	1127	918	248	233	0,88	0,97	0,21	1,39	0,53	2,52	2,52	Werkhypothese is versterken ivm beperkte draagkracht betonpalen. Deze staan nauwelijks in de zandlaag.	Aanstorting met 3 palen	F5
147 optie 2	879	685	1127	918	248	233	0,88	0,97	0,92	0,72	1,37	1,54	1,54	Hypothetische variant van 147 met paalfundering 1xLD1 per hoek.	Aanstorting met 3 palen	F5
148	799	598	993	794	194	196	0,80	0,84	0,59	0,29	0,82	1,00	1,00		Blokpoer met 2 extra palen	F5
149 deel 1	1490	1254					0,69	0,58	0,20	0,01	0,26	0,00	**0,69**	LD1 paal	-	-
149 deel 2	1490	1254					n.v.t.	n.v.t.	0,49	0,34	0,29	0,96	**0,96**	MV palen	-	-
150	834	647	1127	918	293	271	0,55	0,43	0,91	0,71	0,46	1,49	**1,49**		Extra palen (2 stuks) - Schoorpalen	F3
151	848	656	1127	918	279	262	0,56	0,44	0,93	0,72	0,73	1,81	**1,81**		Extra palen (2 stuks) - Schoorpalen	F3
152	749	588	963	773	214	185	0,62	0,49	0,82	0,64	0,54	1,18	**1,18**		Ballast	F1
153	749	588	963	773	214	185	0,62	0,49	0,82	0,64	0,75	1,65	**1,65**		Extra palen (2 stuks) - Schoorpalen	F3
154 best.	749	588					0,38	0,30	0,30	0,10	0,68	0,61	**0,68**	LP2S	-	-
154 aanvul	749	588					0,45	0,35	0,20	0,09	0,41	0,59	**0,59**	Tubex	-	-
155	1593	1235					0,38	0,31	0,32	0,33	0,21	0,64	**0,64**		-	-
156 best deel 2	1412	1203					n.v.t.	n.v.t.	0,37	0,20	0,25	0,76	**0,76**	MV palen	-	-
156 best deel 1	1412	1203					0,65	0,56	0,29	0,05	0,83	0,00	**0,83**	LD1 paal	-	-
156 aanvul	1412	1203					n.v.t.	n.v.t.	0,59	0,13	0,21	0,18	**0,59**	Tubex	-	-
157	1519	1218	1957	1658	438	440	0,76	0,97	0,26	0,98	0,89	1,33	**1,33**		Aanstorting met 3 palen	F5
158	1492	1193	1924	1619	432	426	0,75	0,95	0,26	0,98	0,57	1,09	**1,09**		Aanstorting met 2 palen	F5
159	1465	1172					0,70	0,94	0,17	0,71	0,25	0,47	**0,94**	Aandachtspunt is 6 of 7 palen per hoek	-	-

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2. Project

Licence user	[redacted]
Project	Opwaardering KIJ-DIM 380kV
Part	Balkrooster 5xBeton40x40 mast 84
Author	[redacted]
Date	12-05-2025
Structure	General XYZ
No. of nodes :	52
No. of beams :	28
No. of slabs :	0
No. of solids :	0
No. of used profiles :	3
No. of load cases :	6
No. of used materials :	3
Acceleration of gravity [m/s^2]	9,810
National code	EC - EN

3. Analyse model

4. Modeleigenschappen

4.1. Materials

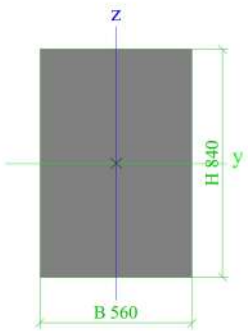
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C20/25 Ongescheurd	Concrete	1500,0	2600,0	2,4000e+04	0.2	0,00	20,00	
C20/25 Gescheurd	Concrete	2500,0	2600,0	8,0000e+03	0.2	0,00	20,00	

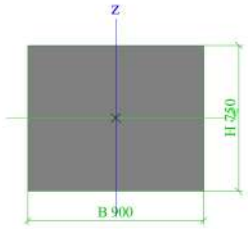
Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

Reinforcement EC2

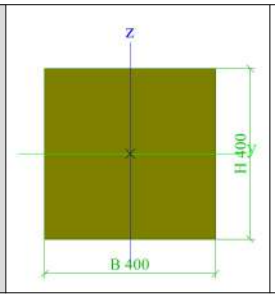
Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 500B	Reinforcement steel	6850,0	2,0000e+05	8,3333e+04	0,00	500,0

4.2. Cross-sections

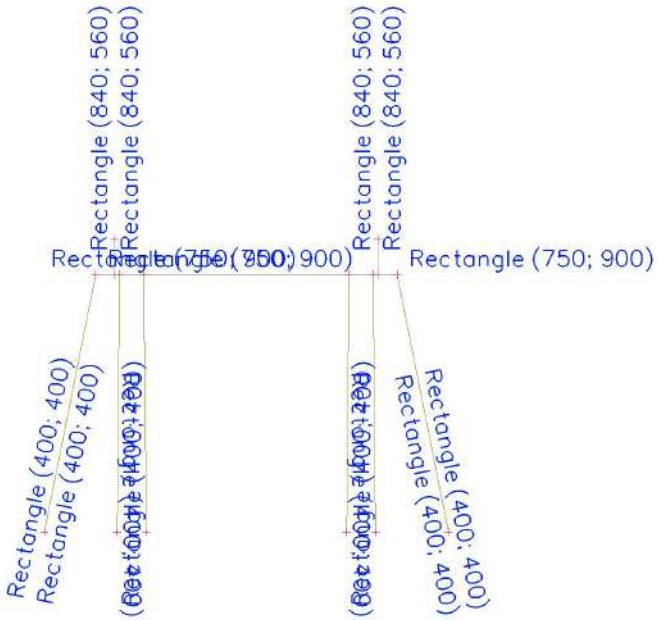
Poer.Opstort		
Type	Rectangle	
Detailed	840; 560	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	4,7040e-01	
A_y [m²], A_z [m²]	3,9200e-01	3,9200e-01
A_L [m²/m], A_D [m²/m]	2,8000e+00	2,8000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	280	420
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,7660e-02	1,2293e-02
i_y [mm], i_z [mm]	242	162
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	6,5856e-02	4,3904e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	2,8888e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

Balk		
Type	Rectangle	
Detailed	750; 900	
Shape type	Thick-walled	
Item material	C20/25 Gescheurd	
Fabrication	concrete	
Colour		
A [m²]	6,7500e-01	
A_y [m²], A_z [m²]	5,6250e-01	5,6250e-01
A_L [m²/m], A_D [m²/m]	3,3000e+00	3,3000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	450	375
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	3,1641e-02	4,5563e-02
i_y [mm], i_z [mm]	217	260
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	8,4375e-02	1,0125e-01
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	6,3112e-02	0,0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

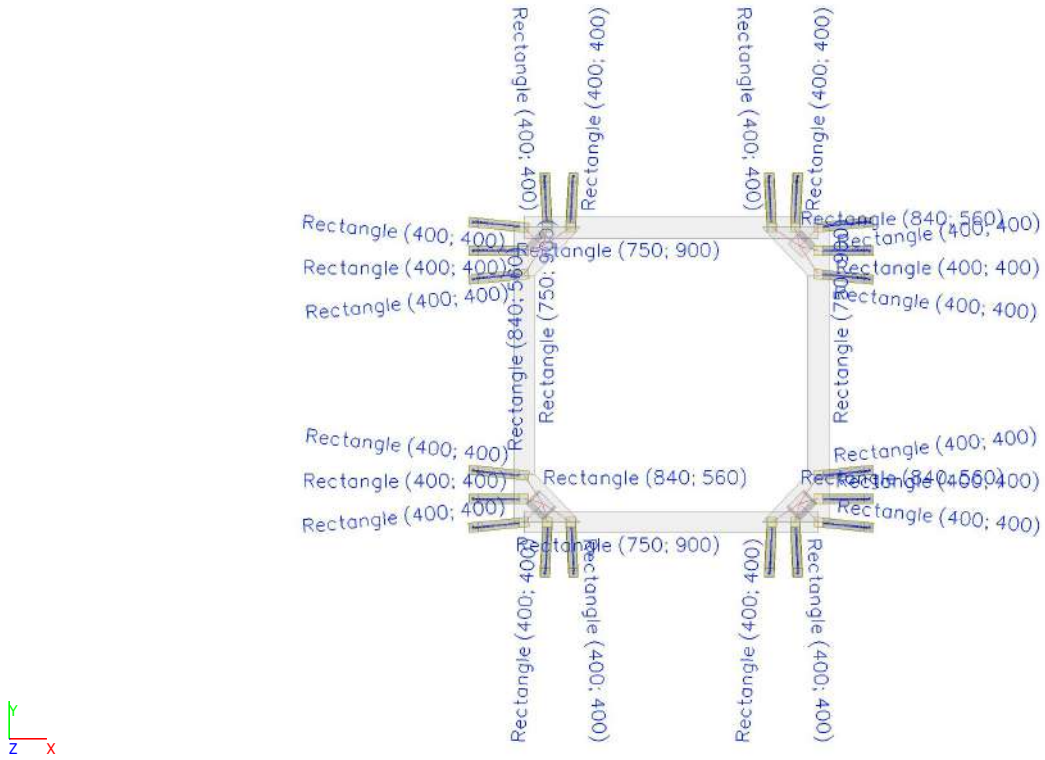
Funderingspaal		
Type	Rectangle	
Detailed	400; 400	
Shape type	Thick-walled	
Item material	C20/25 Ongescheurd	
Fabrication	concrete	
Colour		
A [m²]	1,6000e-01	
A_y [m²], A_z [m²]	1,3333e-01	1,3333e-01
A_L [m²/m], A_D [m²/m]	1,6000e+00	1,6000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	200	200
α [deg]	0,00	
I_y [m⁴], I_z [m⁴]	2,1333e-03	2,1333e-03
i_y [mm], i_z [mm]	115	115
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	1,0667e-02	1,0667e-02
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0,0000e+00	0,0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0,00e+00	0,00e+00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0,00e+00	0,00e+00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	3,6027e-03	0,0000e+00
β_y [mm], β_z [mm]	0	0

Picture		

4.3. Analyse model met doorsneden



4.4. Analyse model met doorsneden



4.5. Mesh setup

Name	NetInstelling1
Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	5
Average size of 2D mesh element [m]	0,250
Average size of 1D mesh element on curved 1D members [m]	0,100
Minimal length of beam element [m]	0,100
Maximal length of beam element [m]	1000,000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1,000
Maximal out of plane angle of a quadrilateral [mrad]	30,0
Minimal distance between definition point and line [m]	0,001
Average size of panel element [m]	1,000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

5. Geometrie

5.1. Nodes

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N5	13,000	1,400	0,000
N6	13,000	2,400	0,000
N7	12,000	0,400	0,000
N1	11,000	0,400	0,000
N17	0,400	0,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N21	0,400	13,000	0,000
1Y	12,200	1,200	1,475
N22	12,200	1,200	0,000
N23	12,200	12,200	0,000
1XY	12,200	12,200	1,475

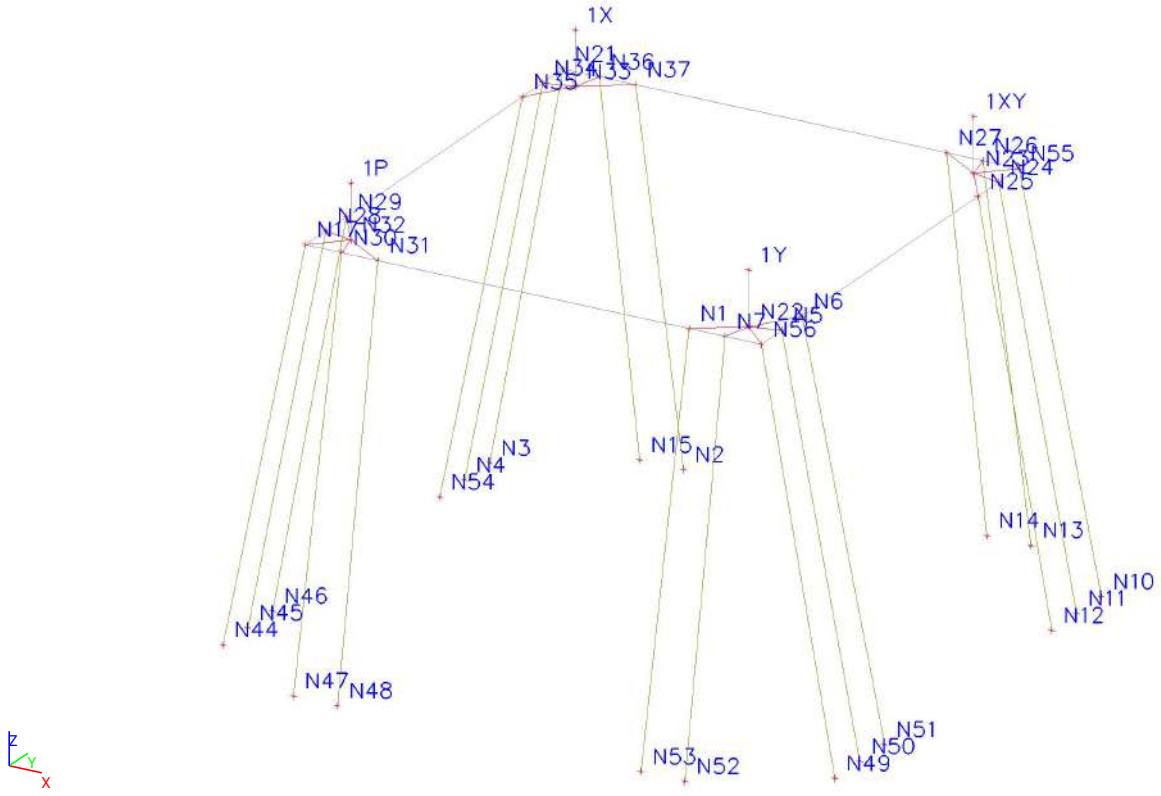
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N24	13,000	12,000	0,000
N25	13,000	11,000	0,000
N26	12,000	13,000	0,000
N27	11,000	13,000	0,000
N28	0,400	1,400	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N29	0,400	2,400	0,000
N30	1,400	0,400	0,000
N31	2,400	0,400	0,000
1P	1,200	1,200	1,475
N32	1,200	1,200	0,000
N33	1,200	12,200	0,000
1X	1,200	12,187	1,475
N34	0,400	12,000	0,000
N35	0,400	11,000	0,000
N36	1,400	13,000	0,000
N37	2,400	13,000	0,000
N38	12,200	1,200	0,000
N39	1,200	1,200	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N40	12,200	12,200	0,000
N41	1,200	12,200	0,000
N44	-1,757	0,184	-10,784
N45	-1,757	1,400	-10,783
N46	-1,757	2,616	-10,784
N47	1,292	-1,757	-10,783
N48	2,508	-1,757	-10,783
N49	15,157	0,184	-10,784
N50	15,157	1,400	-10,783
N51	15,157	2,616	-10,784
N52	12,108	-1,757	-10,783
N53	10,892	-1,757	-10,783
N10	15,157	13,216	-10,784

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N11	15,157	12,000	-10,783
N12	15,157	10,784	-10,784
N13	12,108	15,157	-10,783
N14	10,892	15,157	-10,783
N15	1,292	15,157	-10,783
N2	2,508	15,157	-10,783
N3	-1,757	13,216	-10,784
N4	-1,757	12,000	-10,783
N54	-1,757	10,784	-10,784
N55	13,000	13,000	0,000
N56	13,000	0,400	0,000

5.2. Analyse model met knopen

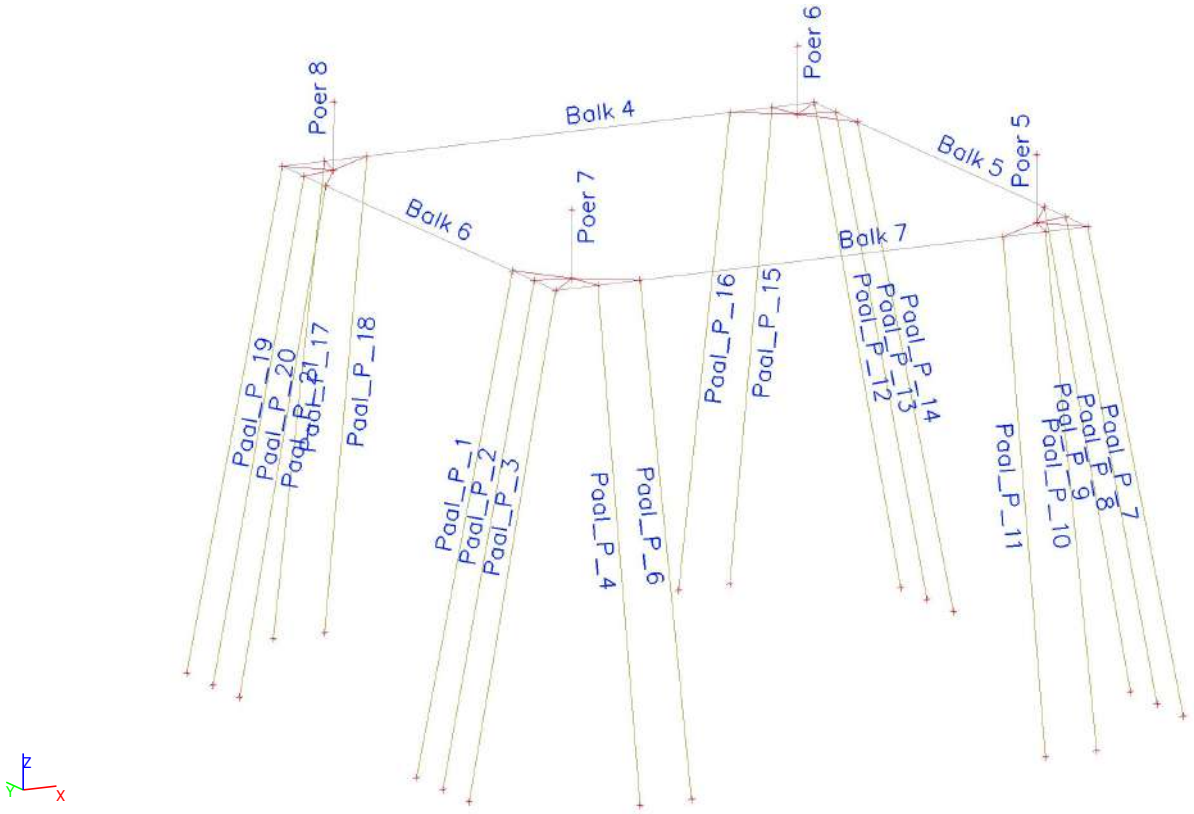


5.3. Members

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Balk 4	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N55	N21	beam (80)
Balk 5	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N55	beam (80)
Balk 6	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N17	N21	beam (80)
Balk 7	Balk - Rectangle (750; 900)	C20/25 Gescheurd	12,600	N56	N17	beam (80)
Poer 5	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N22	1Y	column (100)
Poer 6	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N23	1XY	column (100)
Poer 7	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N32	1P	column (100)
Poer 8	Poer.Opstort - Rectangle (840; 560)	C20/25 Gescheurd	1,475	N33	1X	column (100)
Paal_P_1	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N29	N46	column (100)
Paal_P_2	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,996	N28	N45	column (100)
Paal_P_3	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N17	N44	column (100)
Paal_P_4	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N30	N47	column (100)
Paal_P_6	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N31	N48	column (100)

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
Paal_P_7	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N56	N49	column (100)
Paal_P_8	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,996	N5	N50	column (100)
Paal_P_9	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N6	N51	column (100)
Paal_P_10	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N7	N52	column (100)
Paal_P_11	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N1	N53	column (100)
Paal_P_12	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N55	N10	column (100)
Paal_P_13	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,996	N24	N11	column (100)
Paal_P_14	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N25	N12	column (100)
Paal_P_15	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N26	N13	column (100)
Paal_P_16	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N27	N14	column (100)
Paal_P_17	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N36	N15	column (100)
Paal_P_18	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,997	N37	N2	column (100)
Paal_P_19	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N21	N3	column (100)
Paal_P_20	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	10,996	N34	N4	column (100)
Paal_P_21	Funderingspaal - Rectangle (400; 400)	C20/25 Ongescheurd	11,000	N35	N54	column (100)

5.4. Analyse model met Staven

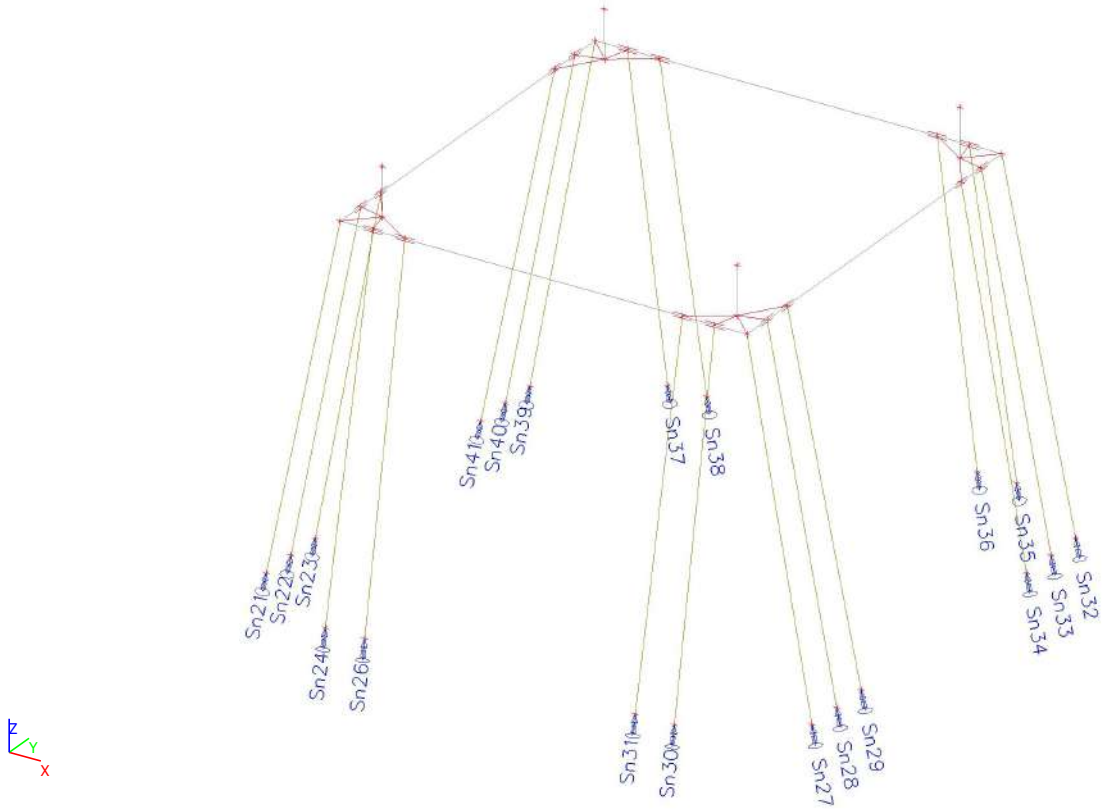


5.5. Nodal supports

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn21	N44	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31
Sn22	N45	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn23	N46	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn24	N47	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn26	N48	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn27	N49	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn28	N50	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31
Sn29	N51	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn30	N52	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx-11,31
Sn31	N53	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx-11,31
Sn32	N10	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry-11,31
Sn33	N11	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-11,31

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz	Angle [deg]
Sn34	N12	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry-11,31
Sn35	N13	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn36	N14	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn37	N15	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry0,56;Rx11,31
Sn38	N2	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry-0,56;Rx11,31
Sn39	N3	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx1,12;Ry11,31
Sn40	N4	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Ry11,31
Sn41	N54	LCS of node	Standard	Free	Free	Nonlinear	Free	Free	Free	Rx-1,12;Ry11,31

5.6. Analyse model met Knoopondersteuningen



5.7. Line supports on member

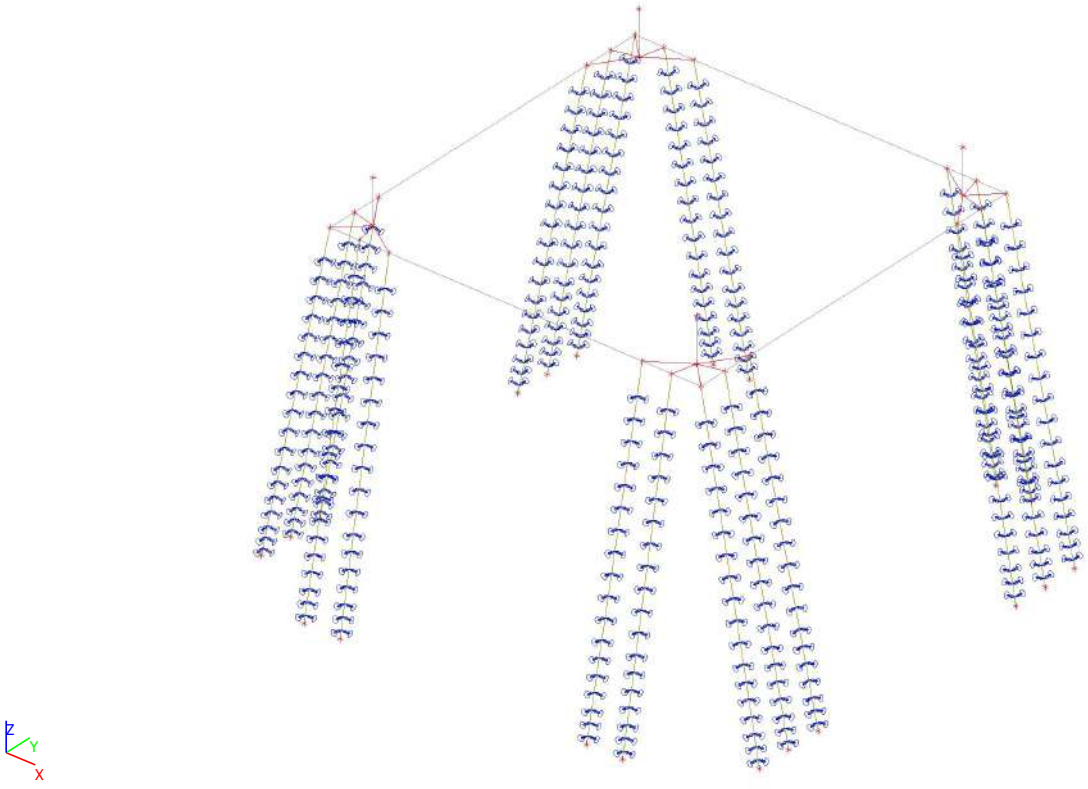
Name	Type	Member	Pos x_1 [m]	Coor	X	Y	Z	Rx	Ry	Rz
		System	Pos x_2 [m]	Orig						
Veen	Line	Paal_P_1	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Veen3	Line	Paal_P_2	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
Veen4	Line	Paal_P_3	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)1	Line	Paal_P_3	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V1)3	Line	Paal_P_2	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V1)4	Line	Paal_P_1	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)	Line	Paal_P_3	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V2)1	Line	Paal_P_2	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V2)2	Line	Paal_P_1	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	10,000	From start						
(PY-curve-1_V3)	Line	Paal_P_3	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
(PY-curve-1_V3)19	Line	Paal_P_2	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
(PY-curve-1_V3)12	Line	Paal_P_1	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen18	Line	Paal_P_4	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)14	Line	Paal_P_4	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)7	Line	Paal_P_4	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)5	Line	Paal_P_4	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen9	Line	Paal_P_6	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)18	Line	Paal_P_6	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)9	Line	Paal_P_6	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)8	Line	Paal_P_6	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen8	Line	Paal_P_7	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)19	Line	Paal_P_7	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)12	Line	Paal_P_7	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)10	Line	Paal_P_7	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen16	Line	Paal_P_8	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)8	Line	Paal_P_8	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)14	Line	Paal_P_8	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)9	Line	Paal_P_8	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen13	Line	Paal_P_9	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)2	Line	Paal_P_9	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)16	Line	Paal_P_9	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)1	Line	Paal_P_9	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen10	Line	Paal_P_10	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)15	Line	Paal_P_10	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)18	Line	Paal_P_10	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)11	Line	Paal_P_10	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen5	Line	Paal_P_11	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)16	Line	Paal_P_11	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)4	Line	Paal_P_11	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)15	Line	Paal_P_11	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen7	Line	Paal_P_12	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

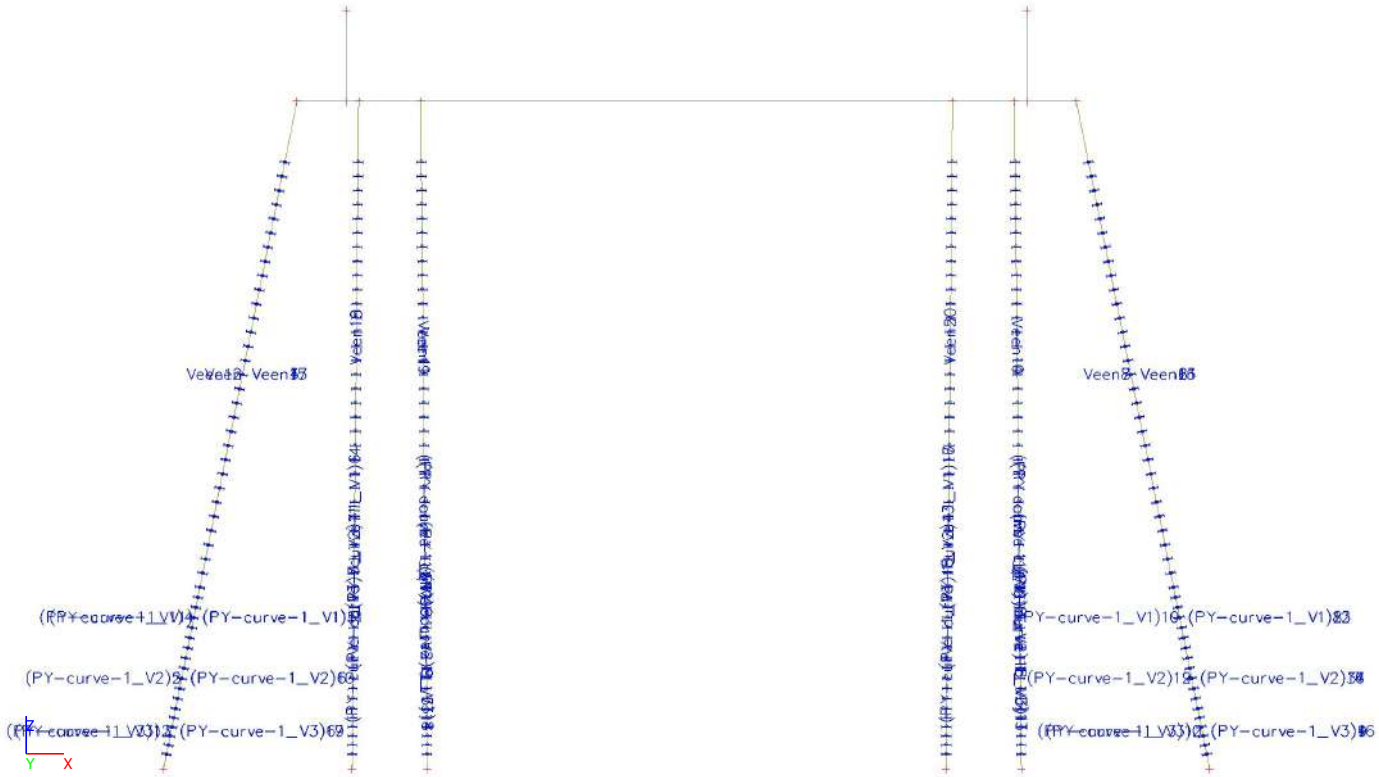
Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
(PY-curve-1_V1)10	Line	Paal_P_12	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)19	Line	Paal_P_12	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)2	Line	Paal_P_12	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen21	Line	Paal_P_13	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)12	Line	Paal_P_13	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)3	Line	Paal_P_13	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)16	Line	Paal_P_13	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen6	Line	Paal_P_14	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)13	Line	Paal_P_14	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)17	Line	Paal_P_14	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)4	Line	Paal_P_14	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen14	Line	Paal_P_15	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)7	Line	Paal_P_15	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)15	Line	Paal_P_15	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)13	Line	Paal_P_15	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen20	Line	Paal_P_16	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)17	Line	Paal_P_16	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)13	Line	Paal_P_16	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)18	Line	Paal_P_16	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen19	Line	Paal_P_17	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)6	Line	Paal_P_17	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)11	Line	Paal_P_17	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)7	Line	Paal_P_17	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen11	Line	Paal_P_18	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)9	Line	Paal_P_18	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)8	Line	Paal_P_18	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)14	Line	Paal_P_18	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen17	Line	Paal_P_19	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)11	Line	Paal_P_19	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)6	Line	Paal_P_19	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)6	Line	Paal_P_19	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen15	Line	Paal_P_20	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free

Name	Type	Member System	Pos x_1 [m] Pos x_2 [m]	Coor Orig	X	Y	Z	Rx	Ry	Rz
		LCS	8,000	From start						
(PY-curve-1_V1)5	Line	Paal_P_20	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)10	Line	Paal_P_20	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)17	Line	Paal_P_20	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						
Veen12	Line	Paal_P_21	1,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	8,000	From start						
(PY-curve-1_V1)	Line	Paal_P_21	8,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	9,000	From start						
(PY-curve-1_V2)5	Line	Paal_P_21	9,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,000	From start						
(PY-curve-1_V3)3	Line	Paal_P_21	10,000	Abso	Free	Nonlinear	Nonlinear	Free	Free	Free
		LCS	10,750	From start						

5.8. Analyse model met Lijnondersteuningen



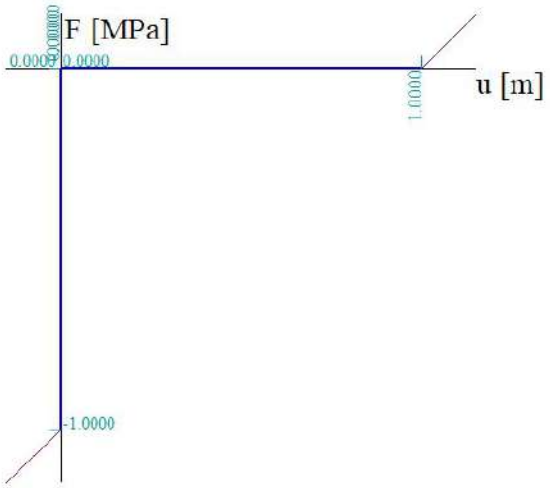
5.9. Analyse model met Lijnondersteuningen



5.10. Nonlinear functions

Name	Type	u / F	Positive end	Negative end
soil press only	Nonlinear subsoil		Flexible	Flexible

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V1	Translation	-2,0000e-01[m] / -4,6204e-02[MN]	Free	Free
		-1,8040e-01[m] / -4,6204e-02[MN]		
		-6,7650e-02[m] / -3,3319e-02[MN]		
		-2,2550e-02[m] / -2,3102e-02[MN]		
		-6,7650e-03[m] / -1,5465e-02[MN]		

Name	Type	u / F	Positive end	Negative end
		-2,2550e-03[m] / -1,0723e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 1,0723e-02[MN]		
		6,7650e-03[m] / 1,5465e-02[MN]		
		2,2550e-02[m] / 2,3102e-02[MN]		
		6,7650e-02[m] / 3,3319e-02[MN]		
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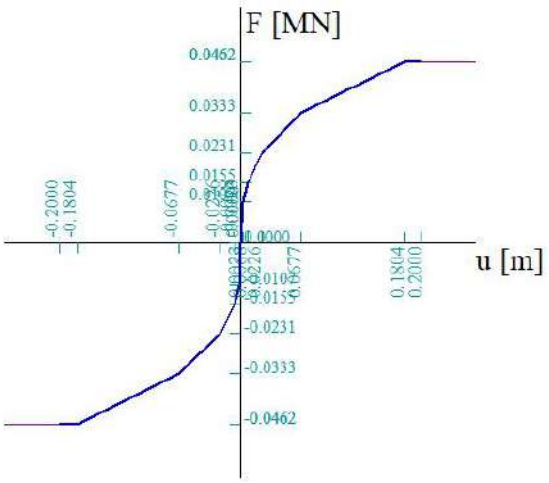
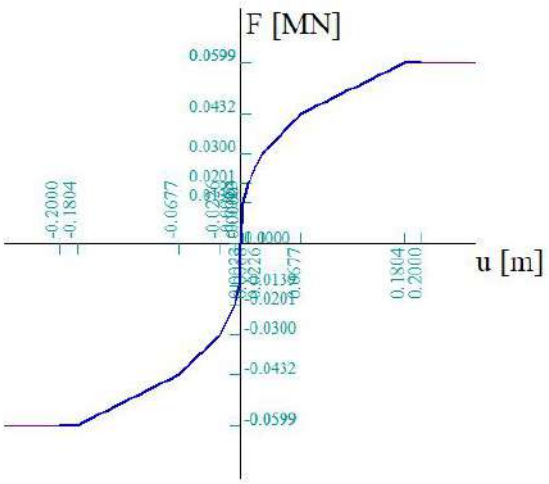
Drawing



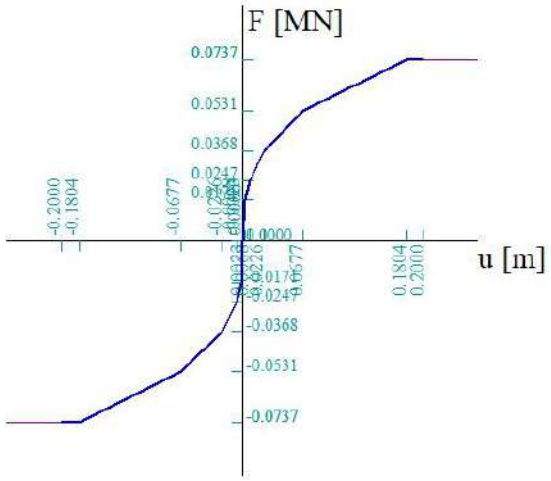
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V2	Translation	-2,0000e-01[m] / -5,9936e-02[MN]	Free	Free
		-1,8040e-01[m] / -5,9936e-02[MN]		
		-6,7650e-02[m] / -4,3221e-02[MN]		
		-2,2550e-02[m] / -2,9968e-02[MN]		
		-6,7650e-03[m] / -2,0061e-02[MN]		
		-2,2550e-03[m] / -1,3910e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 1,3910e-02[MN]		
		6,7650e-03[m] / 2,0061e-02[MN]		
		2,2550e-02[m] / 2,9968e-02[MN]		
		6,7650e-02[m] / 4,3221e-02[MN]		
		1,8040e-01[m] / 5,9936e-02[MN]		
		2,0000e-01[m] / 5,9936e-02[MN]		

Drawing



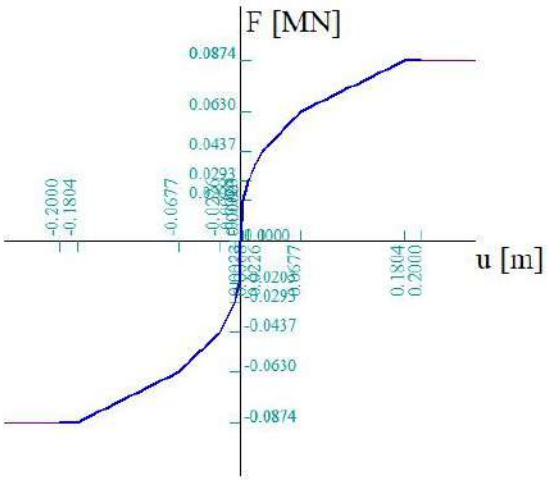
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V3	Translation	-2,0000e-01[m] / -7,3668e-02[MN]	Free	Free
		-1,8040e-01[m] / -7,3668e-02[MN]		
		-6,7650e-02[m] / -5,3123e-02[MN]		
		-2,2550e-02[m] / -3,6834e-02[MN]		
		-6,7650e-03[m] / -2,4658e-02[MN]		
		-2,2550e-03[m] / -1,7097e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 1,7097e-02[MN]		
		6,7650e-03[m] / 2,4658e-02[MN]		
		2,2550e-02[m] / 3,6834e-02[MN]		
		6,7650e-02[m] / 5,3123e-02[MN]		
		1,8040e-01[m] / 7,3668e-02[MN]		
		2,0000e-01[m] / 7,3668e-02[MN]		

Drawing



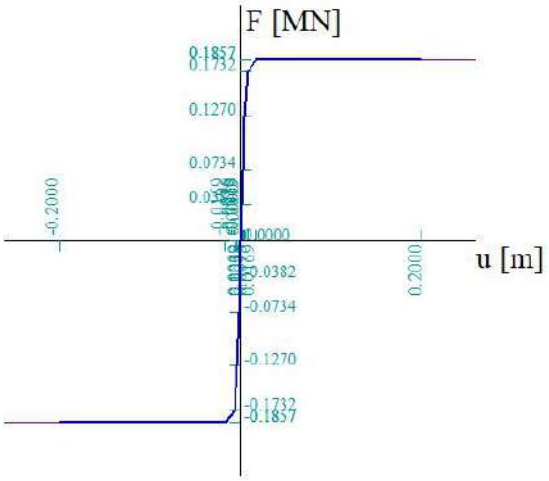
Name	Type	u / F	Positive end	Negative end
PY-curve-1_V4	Translation	-2,0000e-01[m] / -8,7399e-02[MN]	Free	Free
		-1,8040e-01[m] / -8,7399e-02[MN]		
		-6,7650e-02[m] / -6,3026e-02[MN]		
		-2,2550e-02[m] / -4,3700e-02[MN]		
		-6,7650e-03[m] / -2,9254e-02[MN]		
		-2,2550e-03[m] / -2,0284e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 2,0284e-02[MN]		
		6,7650e-03[m] / 2,9254e-02[MN]		
		2,2550e-02[m] / 4,3700e-02[MN]		
		6,7650e-02[m] / 6,3026e-02[MN]		
		1,8040e-01[m] / 8,7399e-02[MN]		
		2,0000e-01[m] / 8,7399e-02[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V5	Translation	-2,0000e-01[m] / -1,8575e-01[MN]	Free	Free
		-1,6913e-02[m] / -1,8575e-01[MN]		
		-7,5167e-03[m] / -1,7319e-01[MN]		
		-3,7583e-03[m] / -1,2697e-01[MN]		
		-1,8792e-03[m] / -7,3365e-02[MN]		
		-9,3958e-04[m] / -3,8233e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 3,8233e-02[MN]		
		1,8792e-03[m] / 7,3365e-02[MN]		
		3,7583e-03[m] / 1,2697e-01[MN]		
		7,5167e-03[m] / 1,7319e-01[MN]		
		1,6913e-02[m] / 1,8575e-01[MN]		
		2,0000e-01[m] / 1,8575e-01[MN]		

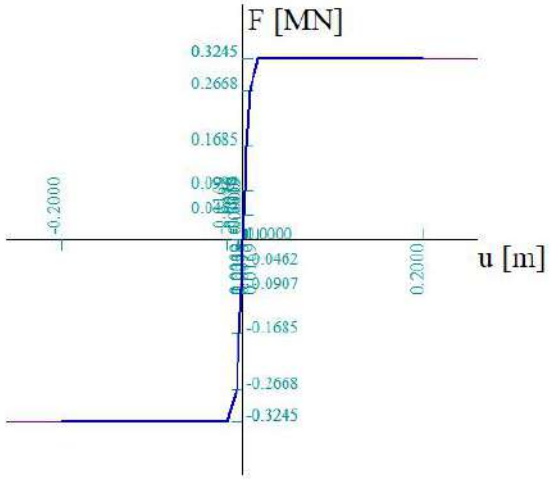
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V6	Translation	-2,0000e-01[m] / -3,2450e-01[MN]	Free	Free
		-1,6913e-02[m] / -3,2450e-01[MN]		
		-7,5167e-03[m] / -2,6680e-01[MN]		
		-3,7583e-03[m] / -1,6850e-01[MN]		
		-1,8792e-03[m] / -9,0672e-02[MN]		
		-9,3958e-04[m] / -4,6234e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 4,6234e-02[MN]		
		1,8792e-03[m] / 9,0672e-02[MN]		
		3,7583e-03[m] / 1,6850e-01[MN]		

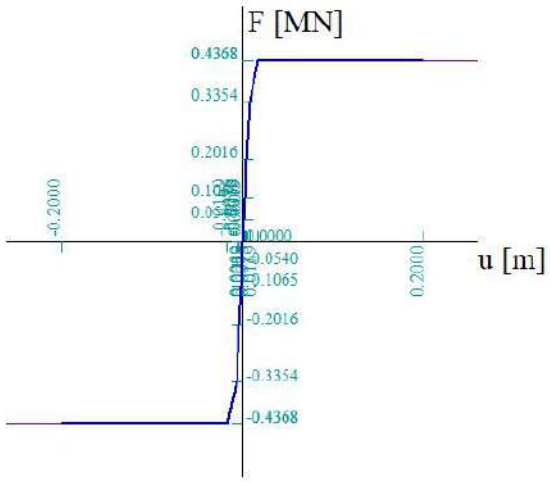
Name	Type	u / F	Positive end	Negative end
		7,5167e-03[m] / 2,6680e-01[MN]		
		1,6913e-02[m] / 3,2450e-01[MN]		
		2,0000e-01[m] / 3,2450e-01[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V7	Translation	-2,0000e-01[m] / -4,3677e-01[MN]	Free	Free
		-1,6913e-02[m] / -4,3677e-01[MN]		
		-7,5167e-03[m] / -3,3536e-01[MN]		
		-3,7583e-03[m] / -2,0165e-01[MN]		
		-1,8792e-03[m] / -1,0652e-01[MN]		
		-9,3958e-04[m] / -5,4036e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 5,4036e-02[MN]		
		1,8792e-03[m] / 1,0652e-01[MN]		
		3,7583e-03[m] / 2,0165e-01[MN]		
		7,5167e-03[m] / 3,3536e-01[MN]		
		1,6913e-02[m] / 4,3677e-01[MN]		
		2,0000e-01[m] / 4,3677e-01[MN]		

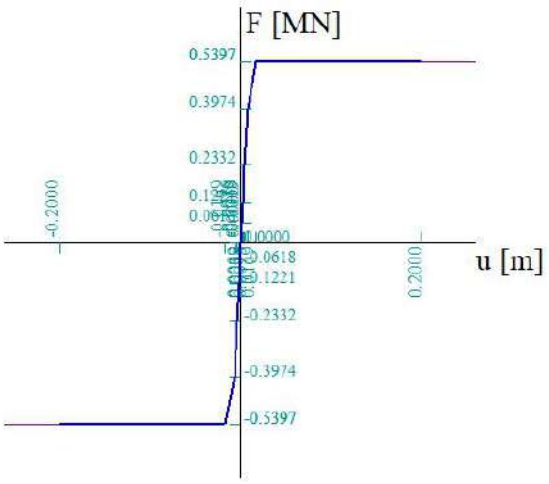
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V8	Translation	-2,0000e-01[m] / -5,3968e-01[MN]	Free	Free
		-1,6913e-02[m] / -5,3968e-01[MN]		
		-7,5167e-03[m] / -3,9743e-01[MN]		
		-3,7583e-03[m] / -2,3316e-01[MN]		

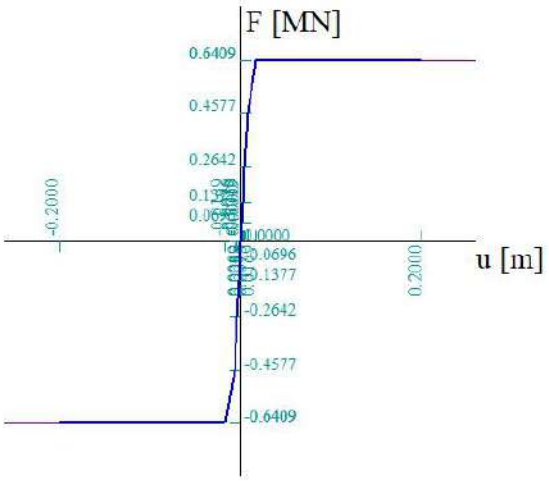
Name	Type	u / F	Positive end	Negative end
		-1,8792e-03[m] / -1,2212e-01[MN]		
		-9,3958e-04[m] / -6,1805e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 6,1805e-02[MN]		
		1,8792e-03[m] / 1,2212e-01[MN]		
		3,7583e-03[m] / 2,3316e-01[MN]		
		7,5167e-03[m] / 3,9743e-01[MN]		
		1,6913e-02[m] / 5,3968e-01[MN]		
		2,0000e-01[m] / 5,3968e-01[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V9	Translation	-2,0000e-01[m] / -6,4086e-01[MN]	Free	Free
		-1,6913e-02[m] / -6,4086e-01[MN]		
		-7,5167e-03[m] / -4,5770e-01[MN]		
		-3,7583e-03[m] / -2,6422e-01[MN]		
		-1,8792e-03[m] / -1,3765e-01[MN]		
		-9,3958e-04[m] / -6,9565e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 6,9565e-02[MN]		
		1,8792e-03[m] / 1,3765e-01[MN]		
		3,7583e-03[m] / 2,6422e-01[MN]		
		7,5167e-03[m] / 4,5770e-01[MN]		
		1,6913e-02[m] / 6,4086e-01[MN]		
		2,0000e-01[m] / 6,4086e-01[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_V10	Translation	-2,0000e-01[m] / -7,4077e-01[MN]	Free	Free
		-1,6913e-02[m] / -7,4077e-01[MN]		
		-7,5167e-03[m] / -5,1689e-01[MN]		
		-3,7583e-03[m] / -2,9504e-01[MN]		
		-1,8792e-03[m] / -1,5315e-01[MN]		
		-9,3958e-04[m] / -7,7320e-02[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,3958e-04[m] / 7,7320e-02[MN]		
		1,8792e-03[m] / 1,5315e-01[MN]		
		3,7583e-03[m] / 2,9504e-01[MN]		
		7,5167e-03[m] / 5,1689e-01[MN]		
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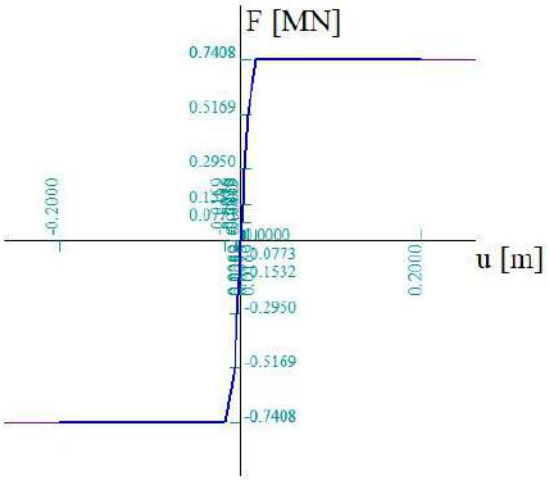
		2,0000e-01[m] / 7,4077e-01[MN]		

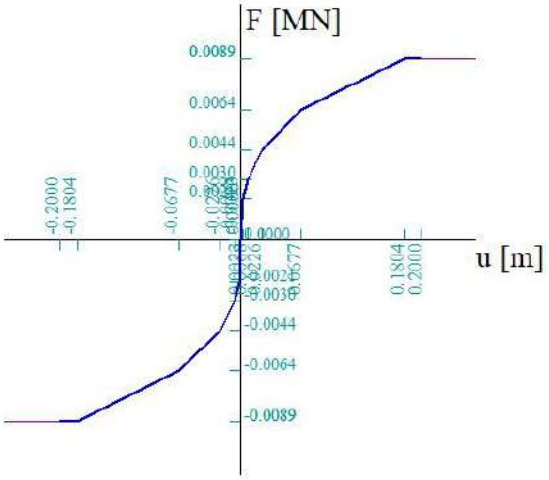
Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen	Translation	-2,0000e-01[m] / -8,8944e-03[MN]	Free	Free
		-1,8040e-01[m] / -8,8944e-03[MN]		
		-6,7650e-02[m] / -6,4138e-03[MN]		
		-2,2550e-02[m] / -4,4477e-03[MN]		
		-6,7650e-03[m] / -2,9770e-03[MN]		
		-2,2550e-03[m] / -2,0640e-03[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 2,0640e-03[MN]		
		6,7650e-03[m] / 2,9770e-03[MN]		
		2,2550e-02[m] / 4,4477e-03[MN]		

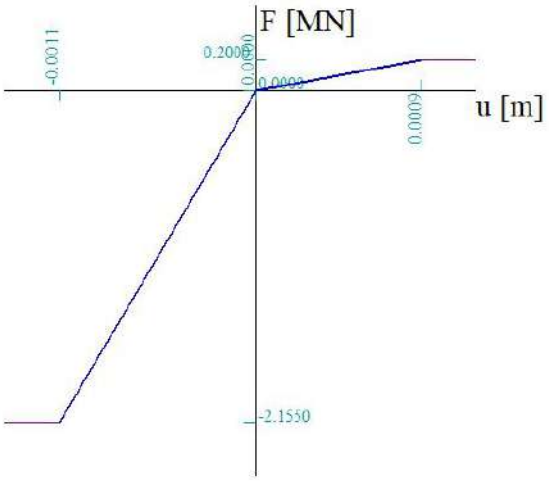
Name	Type	u / F	Positive end	Negative end
		6,7650e-02[m] / 6,4138e-03[MN]		
		1,8040e-01[m] / 8,8944e-03[MN]		
		2,0000e-01[m] / 8,8944e-03[MN]		

Drawing



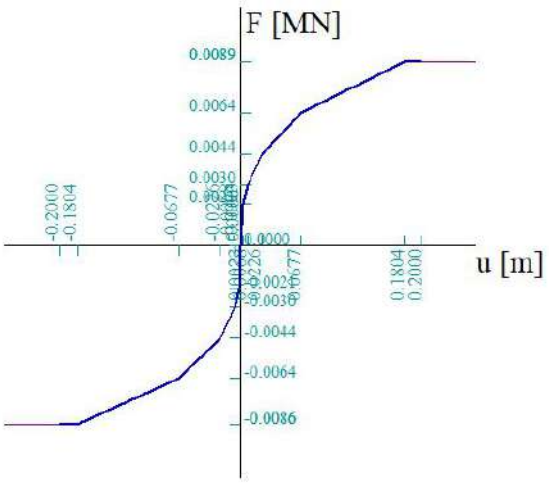
Name	Type	u / F	Positive end	Negative end
Trek-druk-S+paalpunt	Translation	-1,0800e-03[m] / -2,1550e+00[MN]	Free	Free
		0,0000e+00[m] / 0,0000e+00[MN]		
		9,2000e-04[m] / 2,0000e-01[MN]		

Drawing



Name	Type	u / F	Positive end	Negative end
PY-curve-1_Veen reduced	Translation	-2,0000e-01[m] / -8,6400e-03[MN]	Free	Free
		-1,8040e-01[m] / -8,6400e-03[MN]		
		-6,7650e-02[m] / -6,4320e-03[MN]		
		-2,2550e-02[m] / -4,4448e-03[MN]		
		-6,7650e-03[m] / -2,9760e-03[MN]		
		-2,2550e-03[m] / -2,0640e-03[MN]		
		0,0000e+00[m] / 0,0000e+00[MN]		
		2,2550e-03[m] / 2,0640e-03[MN]		
		6,7650e-03[m] / 2,9760e-03[MN]		
		2,2550e-02[m] / 4,4448e-03[MN]		
		6,7650e-02[m] / 6,4320e-03[MN]		
		1,8040e-01[m] / 8,8992e-03[MN]		
		2,0000e-01[m] / 8,8992e-03[MN]		

Drawing

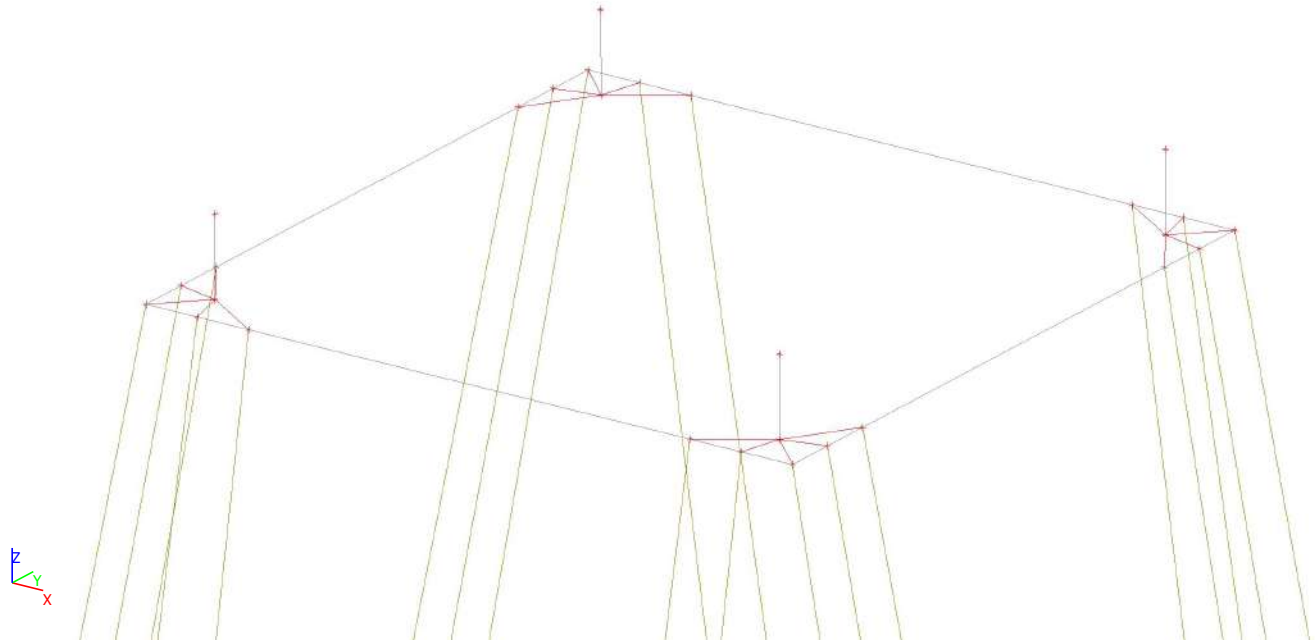

F [MN]
0.0089
0.0064
0.0044
0.0030
-0.2000
-0.1804
-0.0677
0.0000
0.1804
0.2000
u [m]
-0.0030
-0.0044
-0.0064
-0.0086

6. Belastingen

6.1. Load cases

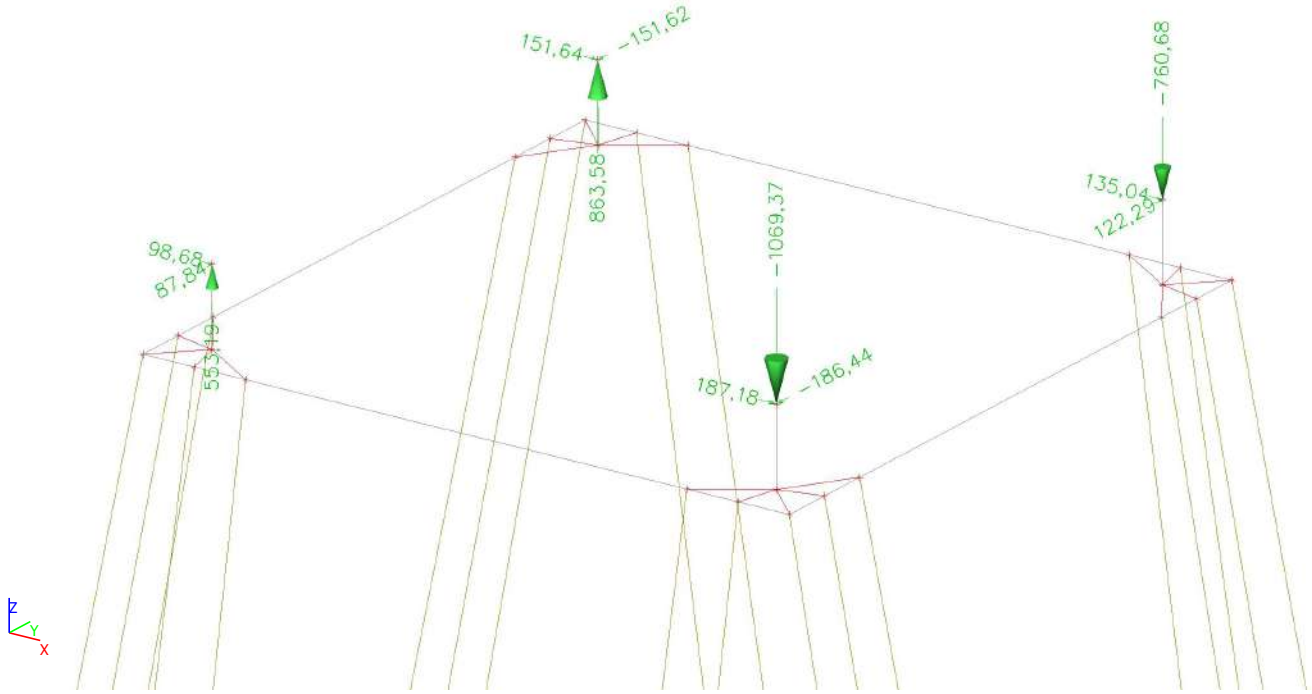
6.1.1. Load cases - E.G.

Name	Description	Action type	Load group	Direction
	Spec	Load type		
E.G.		Permanent	LG1	-Z
		Self weight		



6.1.2. Load cases - hL Bck + Wnd ;225°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;225°		Variable	LG4	Short	None
	Standard	Static			

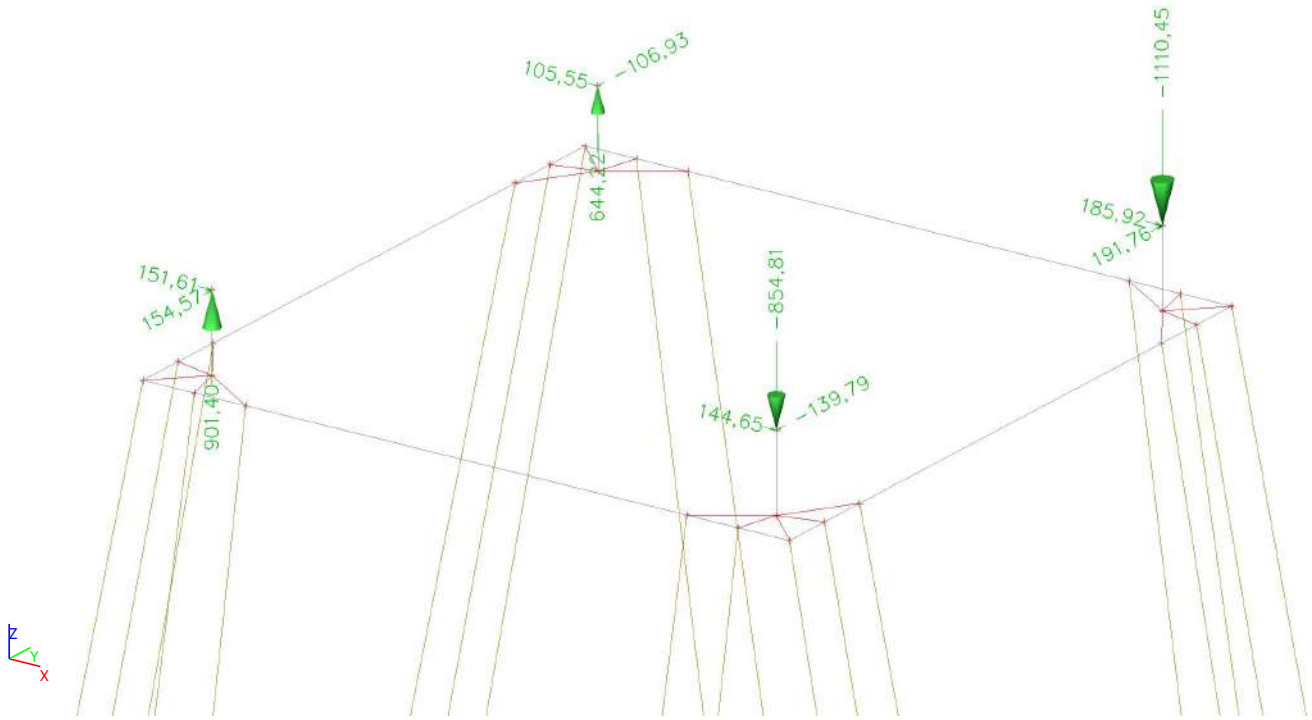


6.1.2.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;225°_1P_X	1P	hL Bck + Wnd ;225°	GCS	X	Force	98,68
hL Bck + Wnd ;225°_1P_Y	1P	hL Bck + Wnd ;225°	GCS	Y	Force	87,84
hL Bck + Wnd ;225°_1P_Z	1P	hL Bck + Wnd ;225°	GCS	Z	Force	553,19
hL Bck + Wnd ;225°_1X_X	1X	hL Bck + Wnd ;225°	GCS	X	Force	151,64
hL Bck + Wnd ;225°_1X_Y	1X	hL Bck + Wnd ;225°	GCS	Y	Force	-151,62
hL Bck + Wnd ;225°_1X_Z	1X	hL Bck + Wnd ;225°	GCS	Z	Force	863,58
hL Bck + Wnd ;225°_1XY_X	1XY	hL Bck + Wnd ;225°	GCS	X	Force	135,04
hL Bck + Wnd ;225°_1XY_Y	1XY	hL Bck + Wnd ;225°	GCS	Y	Force	122,29
hL Bck + Wnd ;225°_1XY_Z	1XY	hL Bck + Wnd ;225°	GCS	Z	Force	-760,68
hL Bck + Wnd ;225°_1Y_X	1Y	hL Bck + Wnd ;225°	GCS	X	Force	187,18
hL Bck + Wnd ;225°_1Y_Y	1Y	hL Bck + Wnd ;225°	GCS	Y	Force	-186,44
hL Bck + Wnd ;225°_1Y_Z	1Y	hL Bck + Wnd ;225°	GCS	Z	Force	-1069,37

6.1.3. Load cases - hL Bck + Wnd ;90°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Bck + Wnd ;90°		Variable	LG4	Short	None
	Standard	Static			



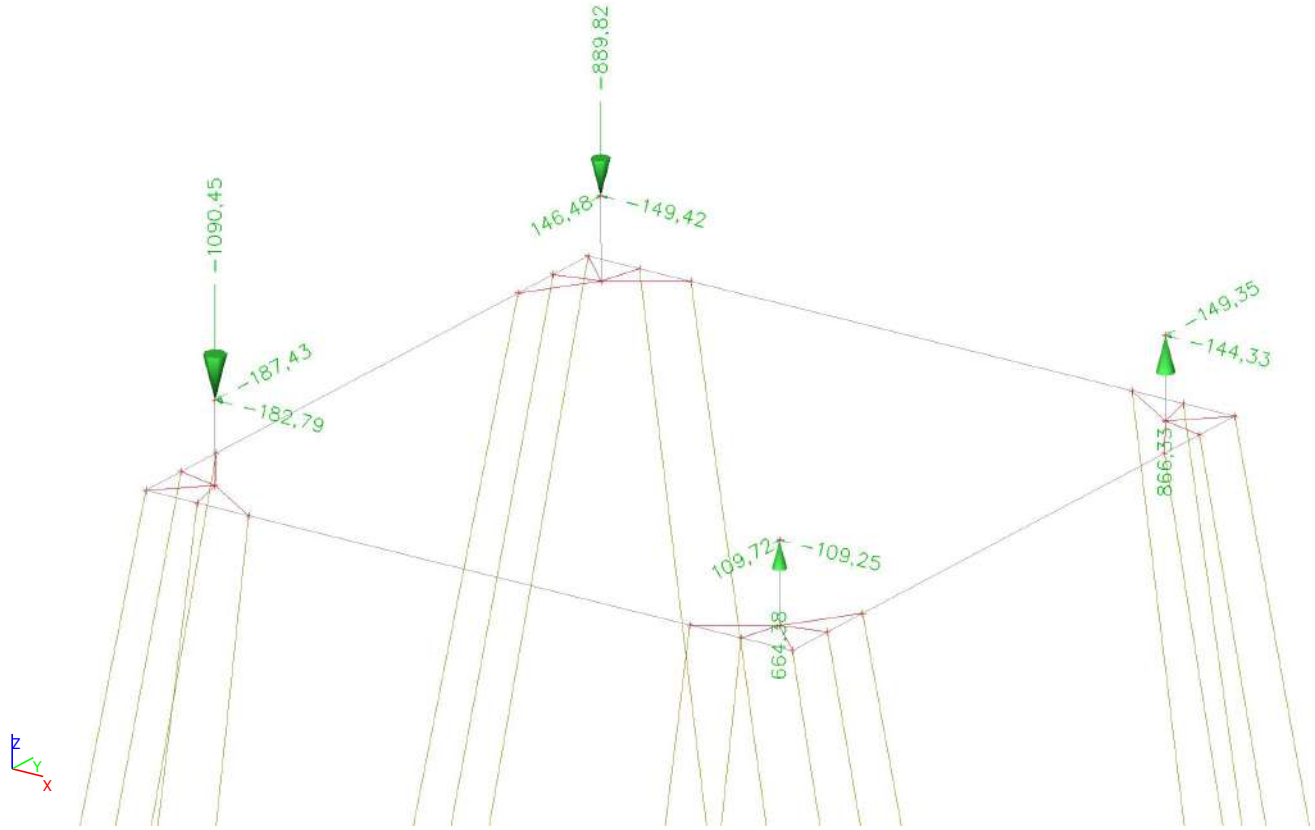
6.1.3.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;90°_1P_X	1P	hL Bck + Wnd ;90°	GCS	X	Force	151,61
hL Bck + Wnd ;90°_1P_Y	1P	hL Bck + Wnd ;90°	GCS	Y	Force	154,57
hL Bck + Wnd ;90°_1P_Z	1P	hL Bck + Wnd ;90°	GCS	Z	Force	901,40
hL Bck + Wnd ;90°_1X_X	1X	hL Bck + Wnd ;90°	GCS	X	Force	105,55
hL Bck + Wnd ;90°_1X_Y	1X	hL Bck + Wnd ;90°	GCS	Y	Force	-106,93
hL Bck + Wnd ;90°_1X_Z	1X	hL Bck + Wnd ;90°	GCS	Z	Force	644,22
hL Bck + Wnd ;90°_1XY_X	1XY	hL Bck + Wnd ;90°	GCS	X	Force	185,92
hL Bck + Wnd ;90°_1XY_Y	1XY	hL Bck + Wnd ;90°	GCS	Y	Force	191,76
hL Bck + Wnd ;90°_1XY_Z	1XY	hL Bck + Wnd ;90°	GCS	Z	Force	-1110,45
hL Bck + Wnd ;90°_1Y_X	1Y	hL Bck + Wnd ;90°	GCS	X	Force	144,65
hL Bck + Wnd ;90°_1Y_Y	1Y	hL Bck + Wnd ;90°	GCS	Y	Force	-139,79

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Bck + Wnd ;90°_1Y_Z	1Y	hL Bck + Wnd ;90°	GCS	Z	Force	-854,81

6.1.4. Load cases - hL Ahd + Wnd ;270°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;270°		Variable	LG4	Short	None
	Standard	Static			



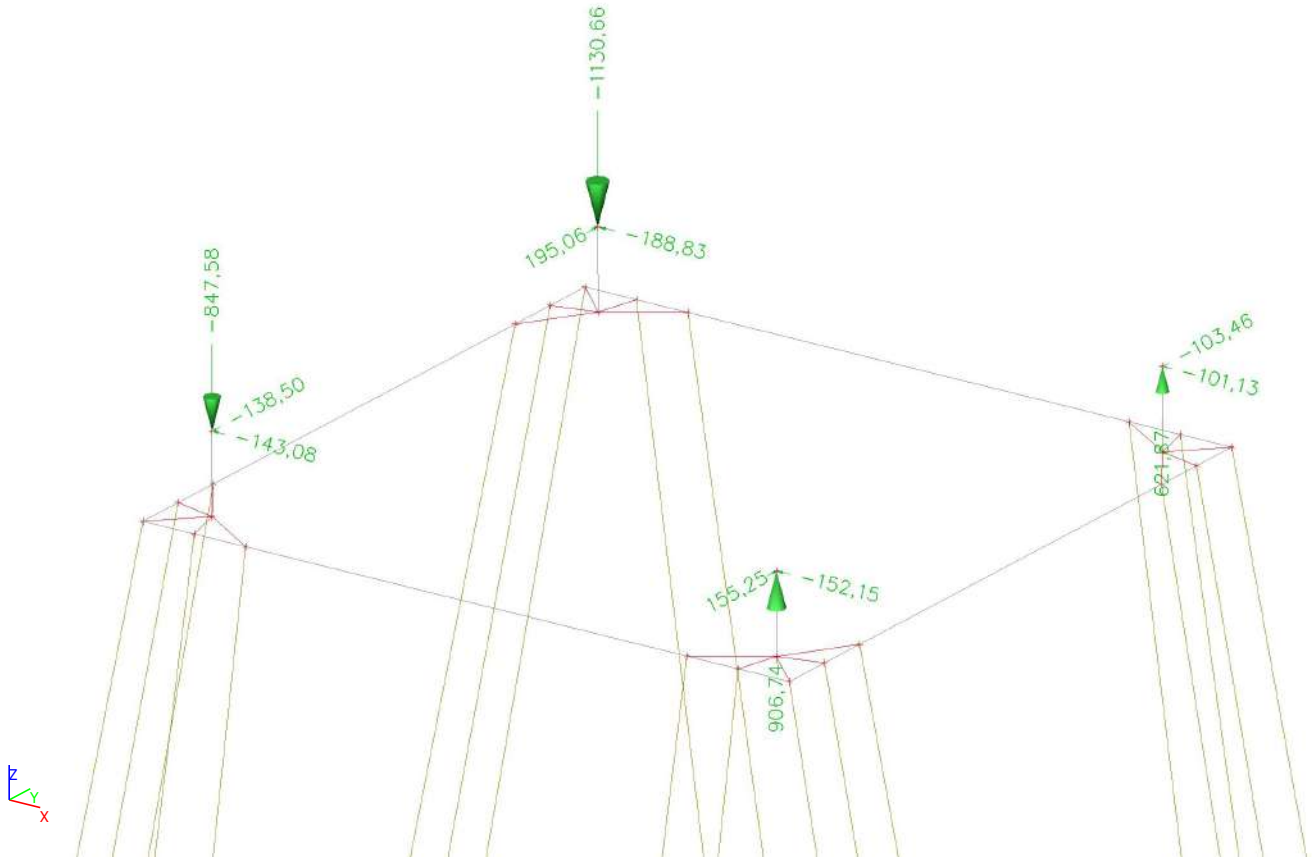
6.1.4.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;270°_1P_X	1P	hL Ahd + Wnd ;270°	GCS	X	Force	-182,79
hL Ahd + Wnd ;270°_1P_Y	1P	hL Ahd + Wnd ;270°	GCS	Y	Force	-187,43
hL Ahd + Wnd ;270°_1P_Z	1P	hL Ahd + Wnd ;270°	GCS	Z	Force	-1090,45
hL Ahd + Wnd ;270°_1X_X	1X	hL Ahd + Wnd ;270°	GCS	X	Force	-149,42
hL Ahd + Wnd ;270°_1X_Y	1X	hL Ahd + Wnd ;270°	GCS	Y	Force	146,48
hL Ahd + Wnd ;270°_1X_Z	1X	hL Ahd + Wnd ;270°	GCS	Z	Force	-889,82
hL Ahd + Wnd ;270°_1XY_X	1XY	hL Ahd + Wnd ;270°	GCS	X	Force	-144,33
hL Ahd + Wnd ;270°_1XY_Y	1XY	hL Ahd + Wnd ;270°	GCS	Y	Force	-149,35

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;270°_1XY_Z	1XY	hL Ahd + Wnd ;270°	GCS	Z	Force	866,33
hL Ahd + Wnd ;270°_1Y_X	1Y	hL Ahd + Wnd ;270°	GCS	X	Force	-109,25
hL Ahd + Wnd ;270°_1Y_Y	1Y	hL Ahd + Wnd ;270°	GCS	Y	Force	109,72
hL Ahd + Wnd ;270°_1Y_Z	1Y	hL Ahd + Wnd ;270°	GCS	Z	Force	664,38

6.1.5. Load cases - hL Ahd + Wnd ;90°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;90°		Variable	LG4	Short	None
	Standard	Static			



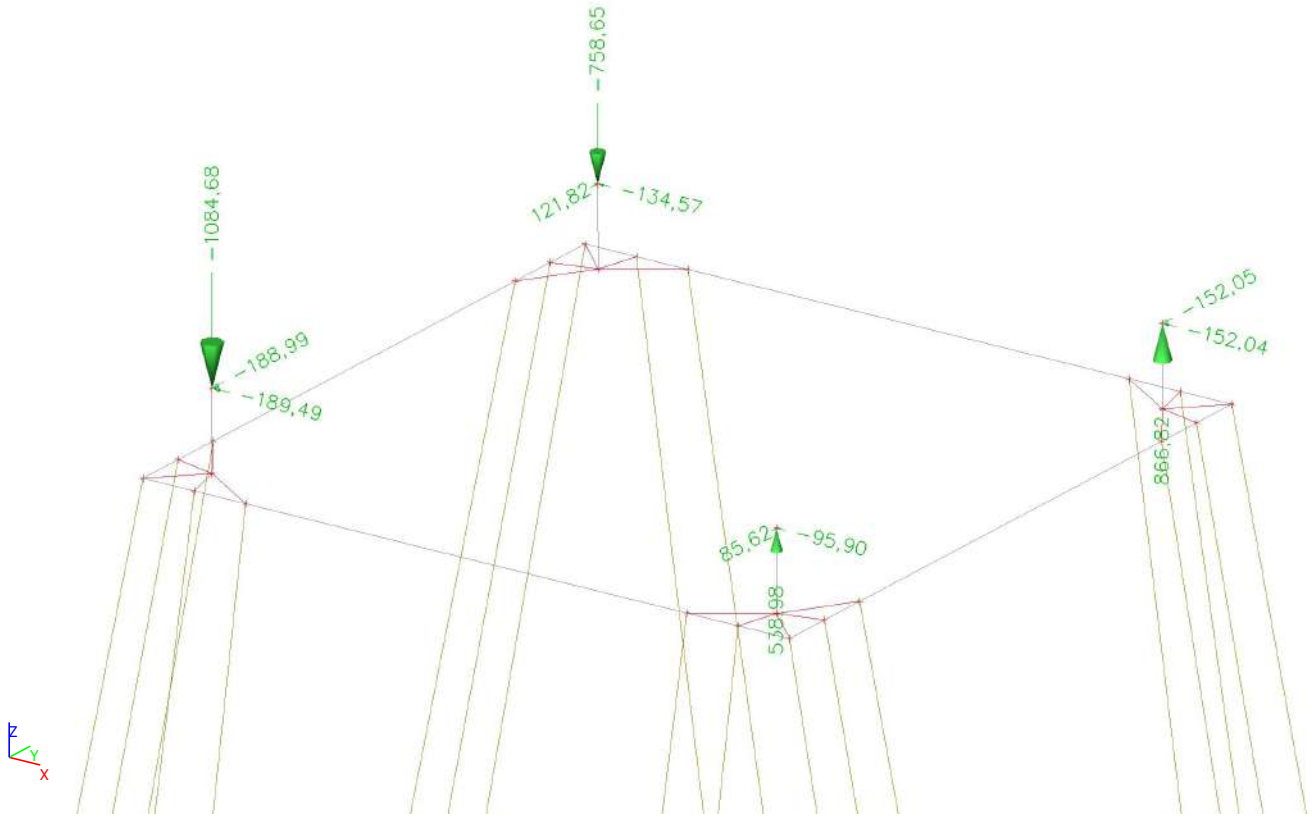
6.1.5.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;90°_1P_X	1P	hL Ahd + Wnd ;90°	GCS	X	Force	-143,08
hL Ahd + Wnd ;90°_1P_Y	1P	hL Ahd + Wnd ;90°	GCS	Y	Force	-138,50
hL Ahd + Wnd ;90°_1P_Z	1P	hL Ahd + Wnd ;90°	GCS	Z	Force	-847,58
hL Ahd + Wnd ;90°_1X_X	1X	hL Ahd + Wnd ;90°	GCS	X	Force	-188,83
hL Ahd + Wnd ;90°_1X_Y	1X	hL Ahd + Wnd ;90°	GCS	Y	Force	195,06

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;90°_1X_Z	1X	hL Ahd + Wnd ;90°	GCS	Z	Force	-1130,66
hL Ahd + Wnd ;90°_1XY_X	1XY	hL Ahd + Wnd ;90°	GCS	X	Force	-101,13
hL Ahd + Wnd ;90°_1XY_Y	1XY	hL Ahd + Wnd ;90°	GCS	Y	Force	-103,46
hL Ahd + Wnd ;90°_1XY_Z	1XY	hL Ahd + Wnd ;90°	GCS	Z	Force	621,87
hL Ahd + Wnd ;90°_1Y_X	1Y	hL Ahd + Wnd ;90°	GCS	X	Force	-152,15
hL Ahd + Wnd ;90°_1Y_Y	1Y	hL Ahd + Wnd ;90°	GCS	Y	Force	155,25
hL Ahd + Wnd ;90°_1Y_Z	1Y	hL Ahd + Wnd ;90°	GCS	Z	Force	906,74

6.1.6. Load cases - hL Ahd + Wnd ;315°

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
hL Ahd + Wnd ;315°		Variable	LG4	Short	None
	Standard	Static			



6.1.6.1. Point force in node

Name	Node	Load case	System	Dir	Type	Value - F [kN]
hL Ahd + Wnd ;315°_1P_X	1P	hL Ahd + Wnd ;315°	GCS	X	Force	-189,49
hL Ahd + Wnd ;315°_1P_Y	1P	hL Ahd + Wnd ;315°	GCS	Y	Force	-188,99
hL Ahd + Wnd ;315°_1P_Z	1P	hL Ahd + Wnd ;315°	GCS	Z	Force	-1084,68
hL Ahd + Wnd ;315°_1X_X	1X	hL Ahd + Wnd ;315°	GCS	X	Force	-134,57
hL Ahd + Wnd ;315°_1X_Y	1X	hL Ahd + Wnd ;315°	GCS	Y	Force	121,82
hL Ahd + Wnd ;315°_1X_Z	1X	hL Ahd + Wnd ;315°	GCS	Z	Force	-758,65
hL Ahd + Wnd ;315°_1XY_X	1XY	hL Ahd + Wnd ;315°	GCS	X	Force	-152,04
hL Ahd + Wnd ;315°_1XY_Y	1XY	hL Ahd + Wnd ;315°	GCS	Y	Force	-152,05
hL Ahd + Wnd ;315°_1XY_Z	1XY	hL Ahd + Wnd ;315°	GCS	Z	Force	866,82
hL Ahd + Wnd ;315°_1Y_X	1Y	hL Ahd + Wnd ;315°	GCS	X	Force	-95,90
hL Ahd + Wnd ;315°_1Y_Y	1Y	hL Ahd + Wnd ;315°	GCS	Y	Force	85,62
hL Ahd + Wnd ;315°_1Y_Z	1Y	hL Ahd + Wnd ;315°	GCS	Z	Force	538,98

6.2. Nonlinear combinations

Name	Type	Load cases	Coeff. [-]
hL Bck + Wnd ;135°	Ultimate	E.G.	1,20
		hL Bck + Wnd ;225°	1,00
hL Bck + Wnd ;270°	Ultimate	E.G.	1,20
		hL Bck + Wnd ;90°	1,00
hL Ahd + Wnd ;270°	Ultimate	E.G.	1,20
		hL Ahd + Wnd ;270°	1,00
hL Ahd + Wnd ;45°	Ultimate	E.G.	1,20
		hL Ahd + Wnd ;90°	1,00
hL Ahd + Wnd ;315°	Ultimate	E.G.	1,20
		hL Ahd + Wnd ;315°	1,00

6.3. Result classes

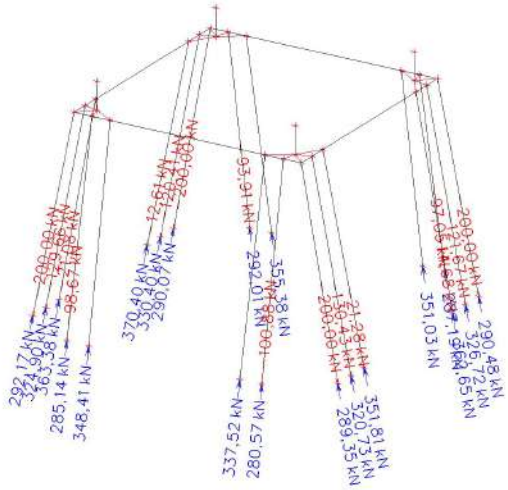
Name	List
All non-linear	hL Bck + Wnd ;135°
	hL Bck + Wnd ;270°
	hL Ahd + Wnd ;270°
	hL Ahd + Wnd ;45°
	hL Ahd + Wnd ;315°

7. Resultaten

7.1. Reacties van de palen

7.1.1. Reactions; R_z

Values: R_z
Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen



7.1.2. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Global
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn21/N44	hL Bck + Wnd ;270°	0,00	0,00	**-200,00**	0,00	0,00	0,00	0,0	0,0
Sn41/N54	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**370,40**	**0,00**	**0,00**	**0,00**	0,0	0,0

7.1.3. Reactions

Nonlinear calculation
Class: All non-linear
System: Rotated supports
Extreme: Member
Selection: All
Filter: Layer = Palen
Nodal reactions

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn21/N44	hL Bck + Wnd ;270°	0,00	0,00	**-200,00**	0,00	0,00	0,00	0,0	0,0
Sn21/N44	hL Ahd + Wnd ;315°	**0,00**	**0,00**	**292,17**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn22/N45	hL Bck + Wnd ;270°	0,00	0,00	**-129,66**	0,00	0,00	0,00	0,0	0,0
Sn22/N45	hL Ahd +	**0,00**	**0,00**	**324,90**	**0,00**	**0,00**	**0,00**	0,0	0,0

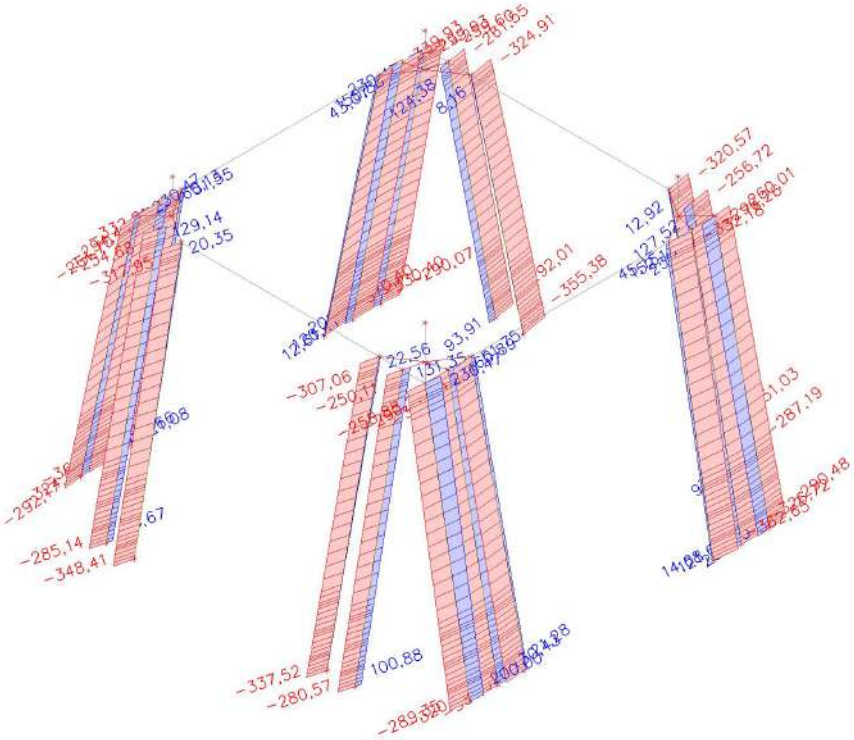
Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;270°								
Sn23/N46	hL Bck + Wnd ;270°	0,00	0,00	**-21,08**	0,00	0,00	0,00	0,0	0,0
Sn23/N46	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**363,38**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn24/N47	hL Bck + Wnd ;270°	0,00	0,00	**-98,67**	0,00	0,00	0,00	0,0	0,0
Sn24/N47	hL Ahd + Wnd ;315°	**0,00**	**0,00**	**285,14**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn26/N48	hL Bck + Wnd ;270°	0,00	0,00	**10,11**	0,00	0,00	0,00	0,0	0,0
Sn26/N48	hL Ahd + Wnd ;270°	**0,00**	**0,00**	**348,41**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn27/N49	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**-200,00**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn27/N49	hL Bck + Wnd ;135°	0,00	0,00	**289,35**	0,00	0,00	**0,00**	0,0	0,0
Sn28/N50	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**-130,43**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn28/N50	hL Bck + Wnd ;135°	0,00	0,00	**320,73**	0,00	0,00	**0,00**	0,0	0,0
Sn29/N51	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**-21,28**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn29/N51	hL Bck + Wnd ;135°	0,00	0,00	**351,81**	0,00	0,00	**0,00**	0,0	0,0
Sn30/N52	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**-100,88**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn30/N52	hL Bck + Wnd ;135°	0,00	0,00	**280,57**	0,00	0,00	**0,00**	0,0	0,0
Sn31/N53	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**7,90**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn31/N53	hL Bck + Wnd ;135°	0,00	0,00	**337,52**	0,00	0,00	**0,00**	0,0	0,0
Sn32/N10	hL Ahd + Wnd ;270°	0,00	0,00	**-200,00**	0,00	0,00	0,00	0,0	0,0
Sn32/N10	hL Bck + Wnd ;270°	**0,00**	**0,00**	**290,48**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn33/N11	hL Ahd + Wnd ;315°	0,00	0,00	**-121,67**	0,00	0,00	0,00	0,0	0,0
Sn33/N11	hL Bck + Wnd ;270°	**0,00**	**0,00**	**326,72**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn34/N12	hL Ahd + Wnd ;270°	0,00	0,00	**-14,68**	0,00	0,00	0,00	0,0	0,0
Sn34/N12	hL Bck + Wnd ;270°	**0,00**	**0,00**	**362,65**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn35/N13	hL Ahd + Wnd ;315°	0,00	0,00	**-97,05**	0,00	0,00	0,00	0,0	0,0
Sn35/N13	hL Bck + Wnd ;270°	**0,00**	**0,00**	**287,19**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn36/N14	hL Ahd + Wnd ;270°	0,00	0,00	**17,54**	0,00	0,00	0,00	0,0	0,0
Sn36/N14	hL Bck + Wnd ;270°	**0,00**	**0,00**	**351,03**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**292,01**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn37/N15	hL Bck + Wnd ;135°	0,00	0,00	**-93,91**	0,00	0,00	**0,00**	0,0	0,0
Sn38/N2	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**355,38**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn38/N2	hL Bck + Wnd ;135°	0,00	0,00	**22,31**	0,00	0,00	**0,00**	0,0	0,0
Sn39/N3	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**290,07**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn39/N3	hL Bck + Wnd ;135°	0,00	0,00	**-200,00**	0,00	0,00	**0,00**	0,0	0,0
Sn40/N4	hL Ahd +	**0,00**	**0,00**	**330,40**	**0,00**	**0,00**	**0,00**	0,0	0,0

Name	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
	Wnd ;45°								
Sn40/N4	hL Bck + Wnd ;135°	0,00	0,00	**-120,41**	0,00	0,00	**0,00**	0,0	0,0
Sn41/N54	hL Ahd + Wnd ;45°	**0,00**	**0,00**	**370,40**	**0,00**	**0,00**	**0,00**	0,0	0,0
Sn41/N54	hL Bck + Wnd ;135°	0,00	0,00	**-12,61**	0,00	0,00	**0,00**	0,0	0,0

7.2. Krachten van de Funderingspalen

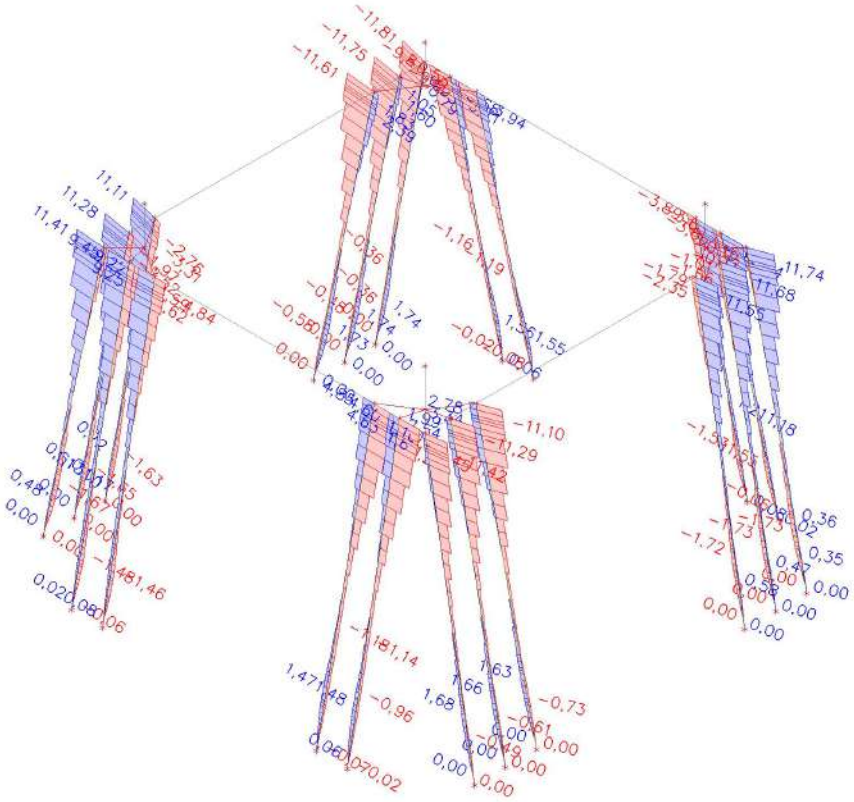
7.2.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



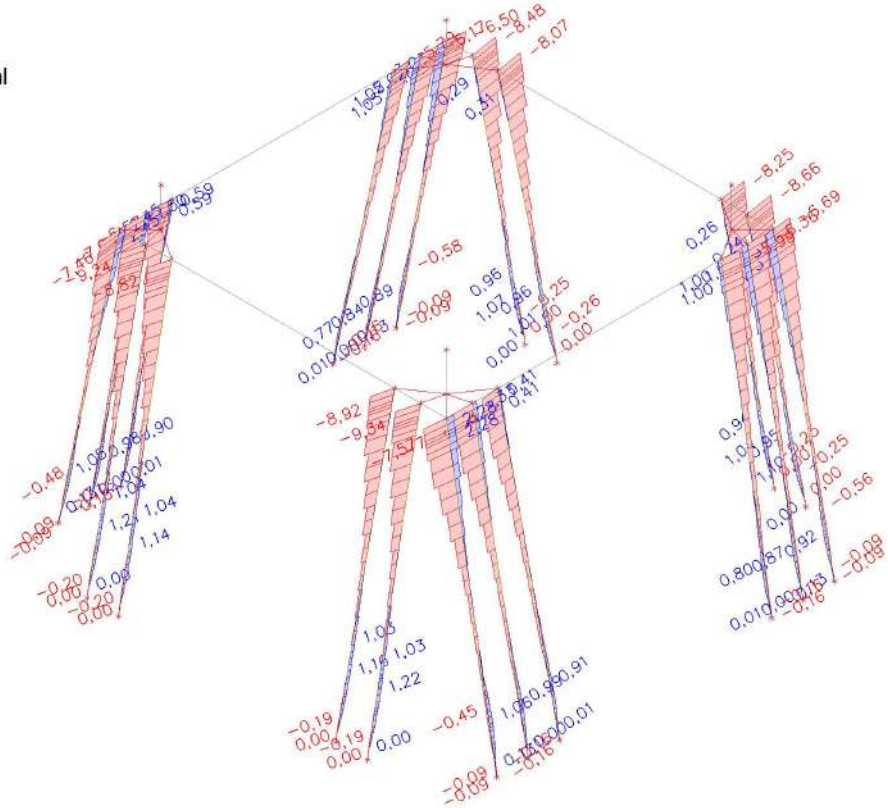
7.2.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



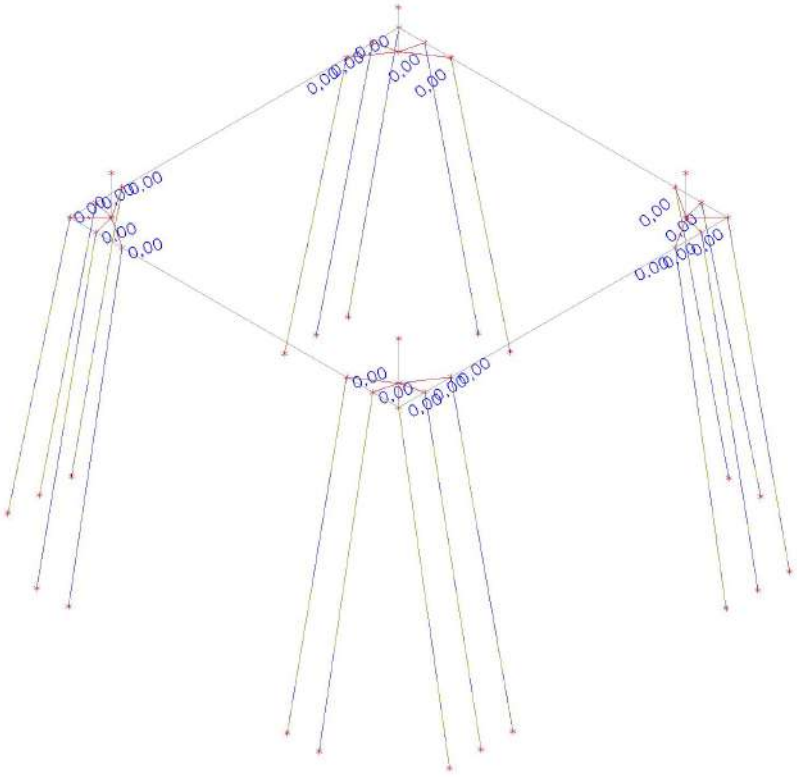
7.2.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



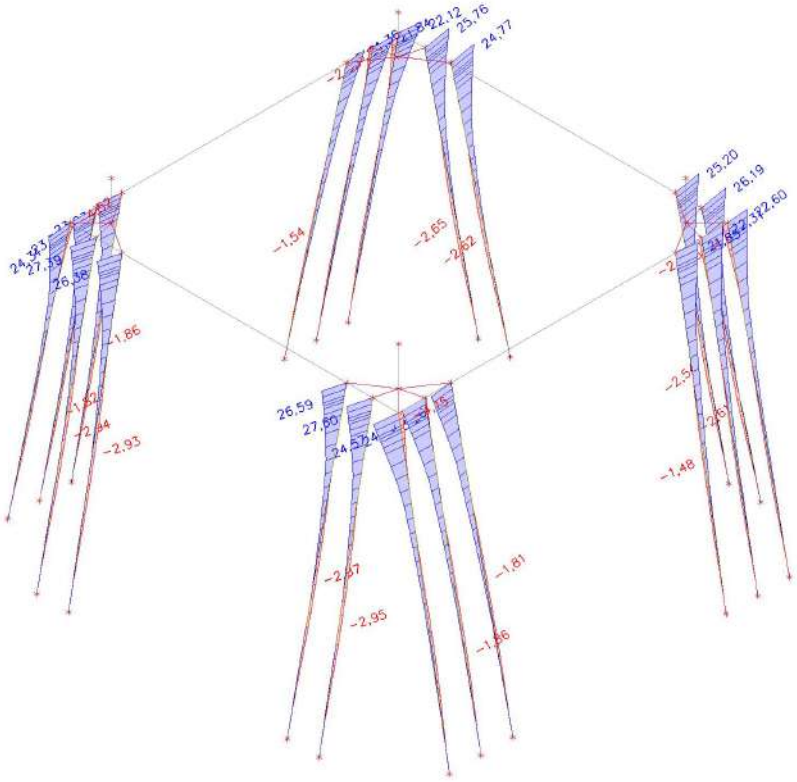
7.2.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Palen



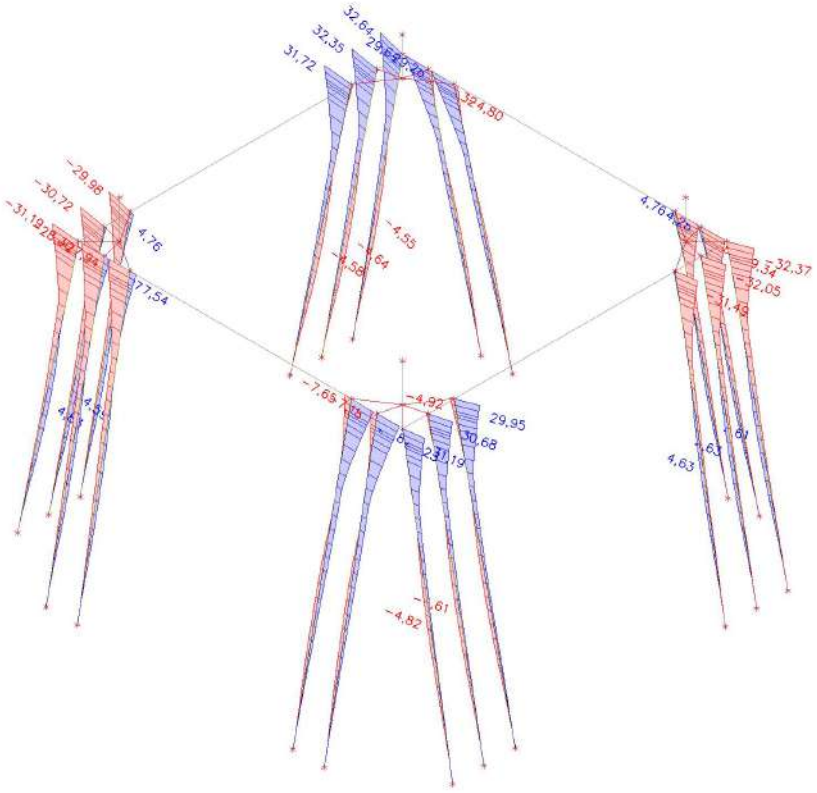
7.2.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Palen



7.2.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Palen

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Paal_P_21	11,000	hL Ahd + Wnd ;45°	**-370,40**	0,00	-0,16	0,00	0,00	0,00
Paal_P_3	0,000	hL Bck + Wnd ;270°	**230,47**	0,95	-2,58	**0,00**	13,98	-9,55
Paal_P_10	0,000	hL Ahd + Wnd ;315°	33,48	4,60	**-9,34**	0,00	**27,60**	-7,18
Paal_P_19	1,000-	hL Ahd + Wnd ;315°	-186,90	-11,25	**3,03**	0,00	-2,82	21,11
Paal_P_19	0,000	hL Ahd + Wnd ;315°	-184,13	**-11,81**	3,03	0,00	**-5,85**	**32,64**
Paal_P_12	0,000	hL Bck + Wnd ;135°	-187,40	**11,74**	2,95	0,00	-5,80	**-32,37**

7.3. Krachten van de Poeren

7.3.1. 1D internal forces

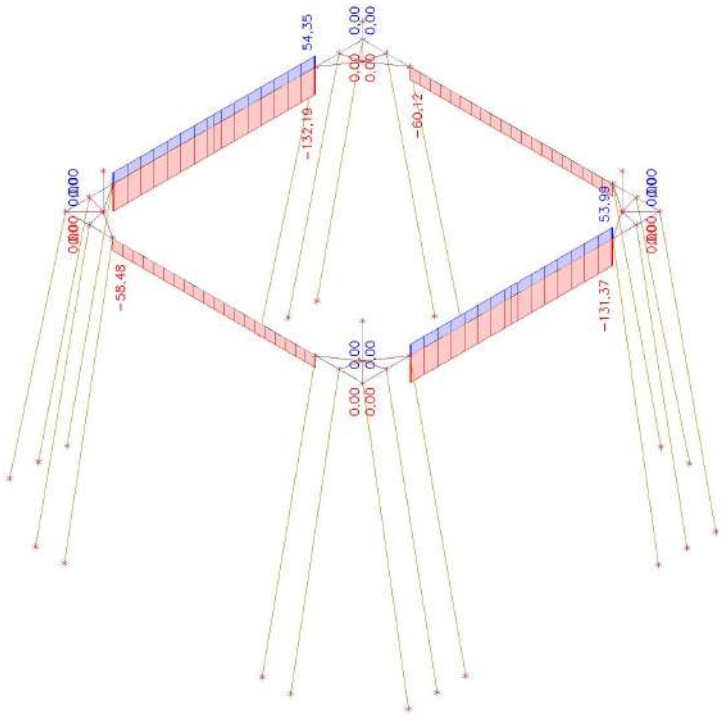
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: All
Filter: Layer = Poeren

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Poer 8	0,000	hL Ahd + Wnd ;45°	**-1157,13**	-264,25	-2,81	0,29	4,02	266,50
Poer 5	1,475	hL Ahd + Wnd ;45°	**906,74**	-217,36	2,19	0,03	0,00	-10,88
Poer 7	0,000	hL Ahd + Wnd ;315°	-1112,59	**-267,63**	0,35	-0,04	-0,52	**276,41**
Poer 6	0,000	hL Bck + Wnd ;270°	-1135,24	**267,06**	4,13	0,45	-6,09	-272,88
Poer 8	0,000	hL Ahd + Wnd ;315°	-784,49	-176,41	**-13,90**	**1,49**	**20,39**	177,18
Poer 8	1,475	hL Bck + Wnd ;135°	864,88	209,05	**5,40**	-0,06	0,00	10,38
Poer 6	0,000	hL Bck + Wnd ;135°	-785,48	181,96	-9,02	**-0,97**	13,30	-185,13
Poer 8	0,000	hL Bck + Wnd ;135°	840,09	209,21	5,25	-0,58	**-7,86**	-216,17
Poer 5	0,000	hL Bck + Wnd ;135°	-1097,28	264,19	0,52	0,06	-0,77	**-273,00**

7.4. Krachten van de Funderingsbalken

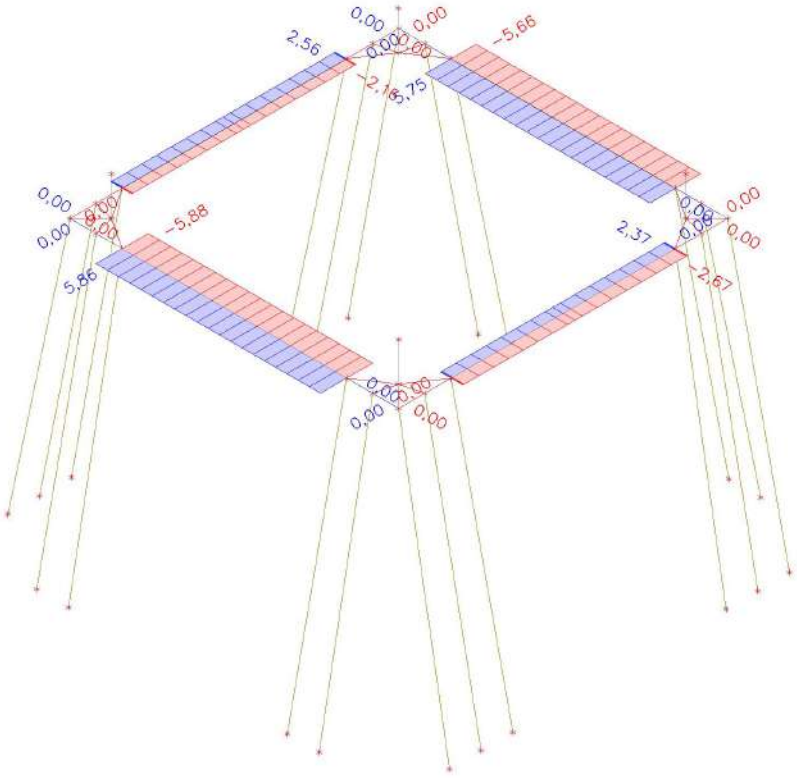
7.4.1. Interne 1D- krachten; N

Values: **N**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



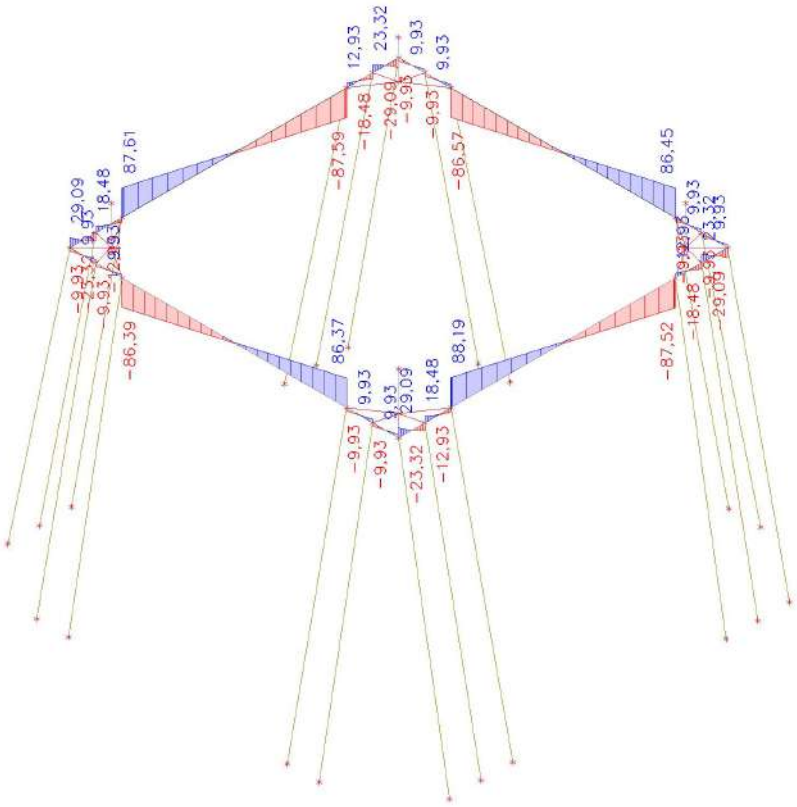
7.4.2. Interne 1D- krachten; V_y

Values: **V_y**
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



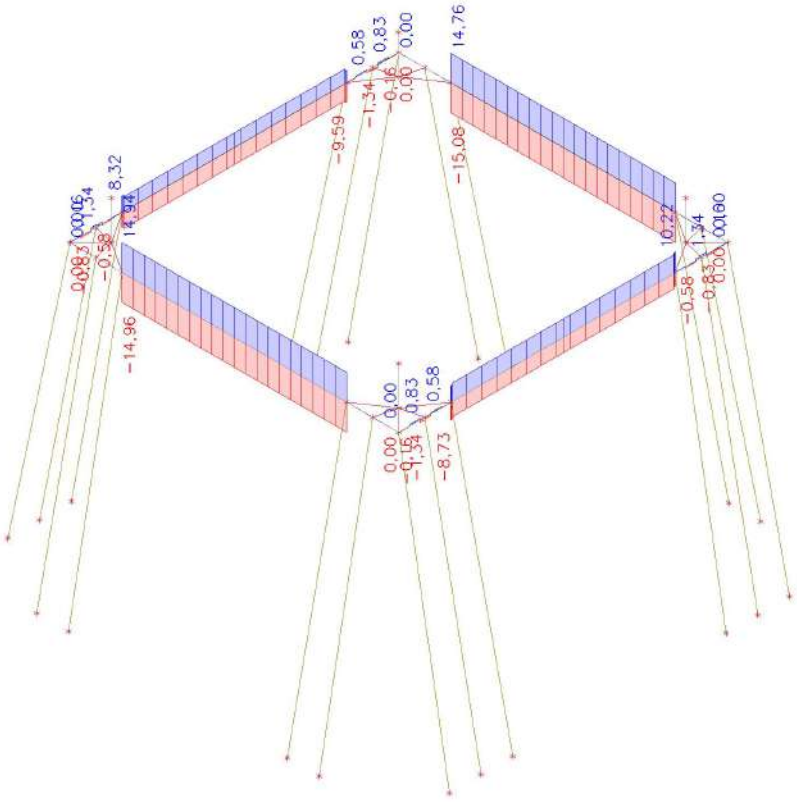
7.4.3. Interne 1D- krachten; V_z

Values: V_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



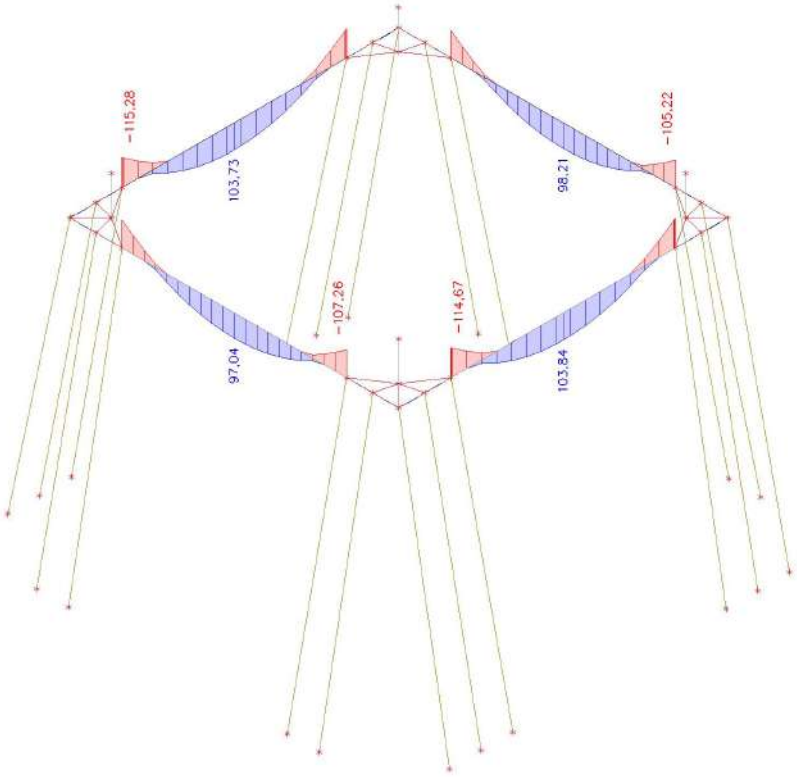
7.4.4. Interne 1D- krachten; M_x

Values: M_x
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Local
Selection: All
Filter: Layer = Balken



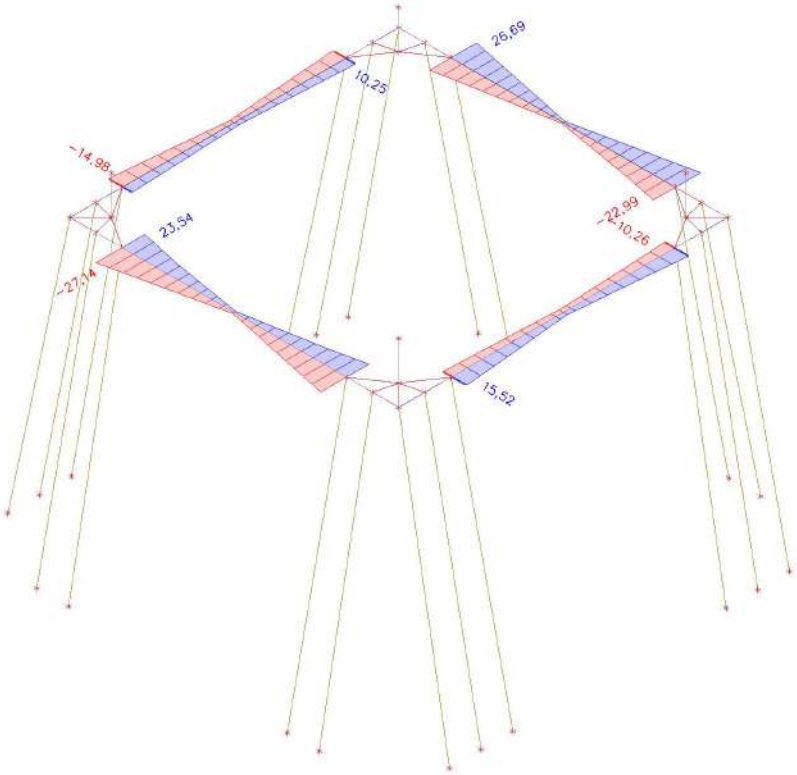
7.4.5. Interne 1D- krachten; M_y

Values: M_y
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.6. Interne 1D- krachten; M_z

Values: M_z
Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Layer = Balken



7.4.7. 1D internal forces

Nonlinear calculation
Class: All non-linear
Coordinate system: Principal
Extreme 1D: Global
Selection: Named selection - FunderingsBalken
Filter: Layer = Balken

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
Balk 6	2,000+	hL Ahd + Wnd ;270°	**54,35**	0,88	85,90	-2,84	-114,10	0,07
Balk 7	2,000+	hL Bck + Wnd ;270°	-57,75	**5,86**	86,37	-14,96	-91,18	-26,89
Balk 6	10,600-	hL Bck + Wnd ;270°	**-132,19**	-2,16	**-87,59**	6,31	-89,14	-11,93
Balk 5	2,000+	hL Ahd + Wnd ;315°	-127,15	-2,67	**88,19**	8,21	-91,87	14,14
Balk 6	2,000+	hL Ahd + Wnd ;315°	50,35	1,40	86,06	-5,36	**-115,28**	-2,31
Balk 5	6,300	hL Ahd + Wnd ;45°	-131,22	2,37	-2,07	-7,75	**103,84**	4,21
Balk 7	10,600-	hL Ahd + Wnd ;45°	-58,48	**-5,88**	-86,39	**14,94**	-90,80	**-27,14**
Balk 4	10,600-	hL Ahd + Wnd ;315°	-60,12	5,75	-86,57	**-15,08**	-90,40	**26,69**