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# Project

# BK2022-082
# Plaatsen tijdelijke loods a/d Nieuwendammerdijk 284 te Amsterdam

**Opdrachtgever**

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**Rapport**

BK2022-082-KB01

**Onderdeel**

Statische berekening

| | |
|---|---|
| **Datum** | O  08-02-2023 |
| **Gewijzigd** | |
| **Bladen** | 149 (inclusief bijlagen) |
| **Status** | Bouwaanvraag |
| **Constructeur** | Ir. A.C.M. Schijvenaars |
| **Controleur** | Ing. J.S. van der Leeuw |

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# 1 Algemeen

## 1.1 Uitgangspunten

| | | | | | |
|---|---|---|---|---|---|
| • Hout | | | | | C18/C24 |
| • Staalkwaliteit | Walsprofielen | | | | S235 |
| | Kokerprofielen | | | | S275 |
| | Bouten | | | | 8.8 |
| | Ankers | | | | 4.6 |
| • Betonsterkteklasse | In het werk gestort | | | | C30/37 |
| • Betonstaal | | | | | B500A/B |
| • Milieuklasse | Fundering | Onder | XC2 | | c = 40 mm |
| | *op palen* | Boven | XC2 | | c = 40 mm |
| • Wind | Windgebied | | | | II; bebouwd |

- Betrouwbaarheidsklasse RC1 – opslagfunctie (schuur)
- Gevolgklasse CC1
- Referentieperiode 15 jaar

**Alle uitgangspunten in dit rapport dienen in het werk door de eigenaar / aannemer geverifieerd te worden.**

## 1.2 Voorschriften

De berekeningen zijn uitgevoerd conform de Nederlandse normen, namelijk:

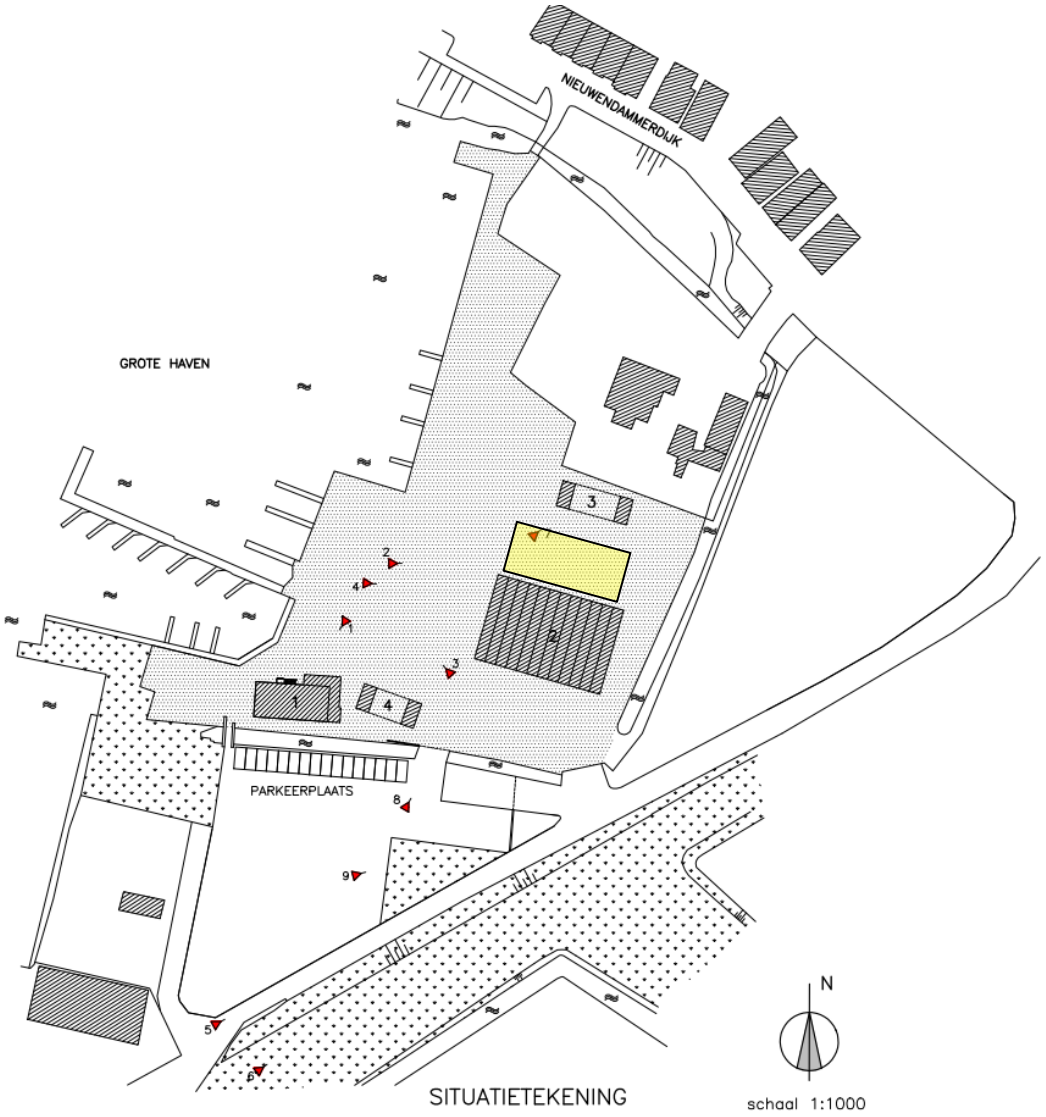
| Norm | Onderwerp |
|---|---|
| NEN-EN 1990 Eurocode 0 | Grondslagen voor het constructief ontwerp |
| NEN-EN 1991 Eurocode 1 | Belastingen op constructies |
| NEN-EN 1992 Eurocode 2 | Betonconstructies |
| NEN-EN 1993 Eurocode 3 | Staalconstructies |
| NEN-EN 1994 Eurocode 4 | Staal-beton constructies |
| NEN-EN 1995 Eurocode 5 | Houtconstructies |
| NEN-EN 1996 Eurocode 6 | Constructies in metselwerk |
| NEN-EN 1997 Eurocode 7 | Geotechnisch ontwerp |

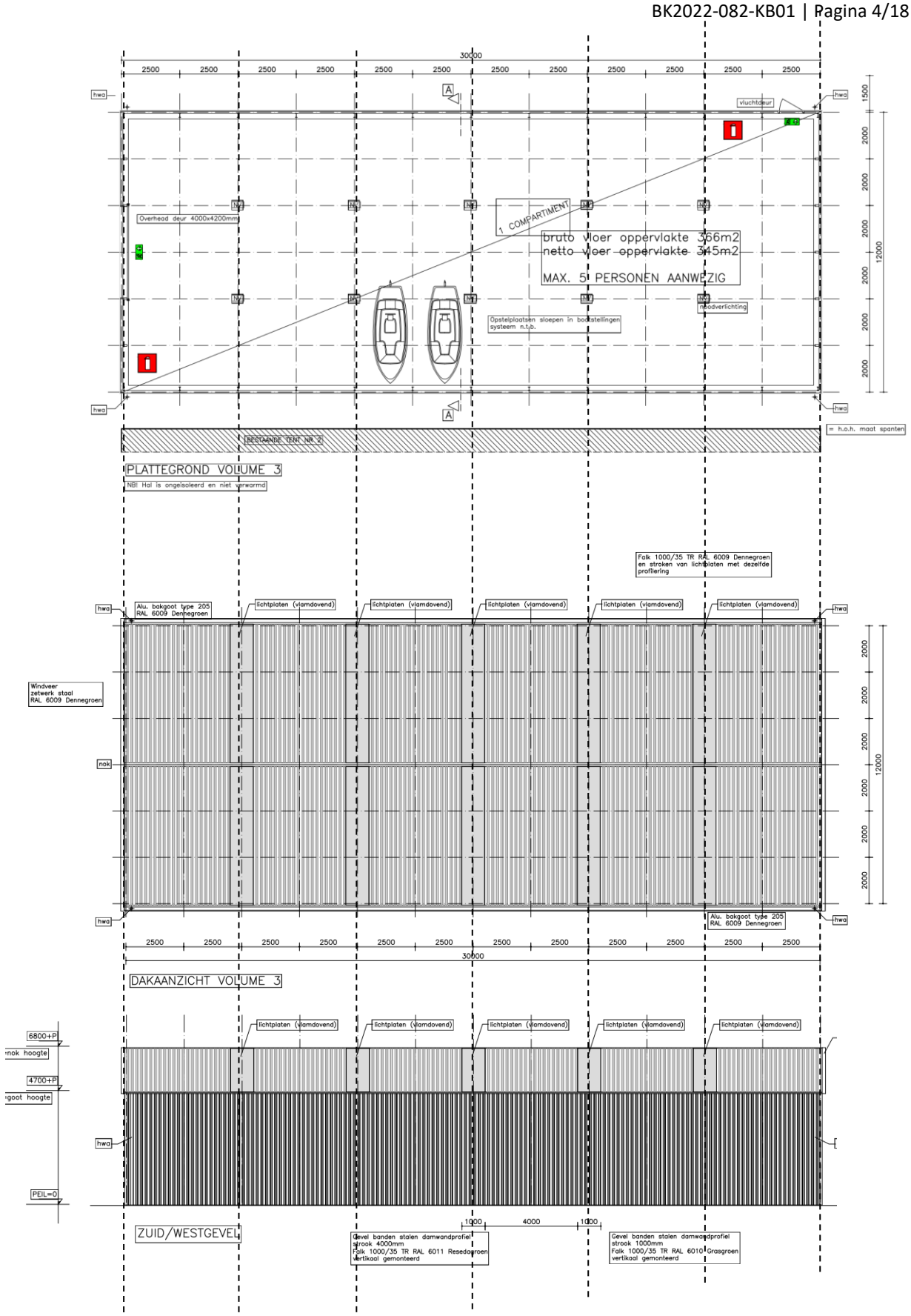
## 1.3 Revisies

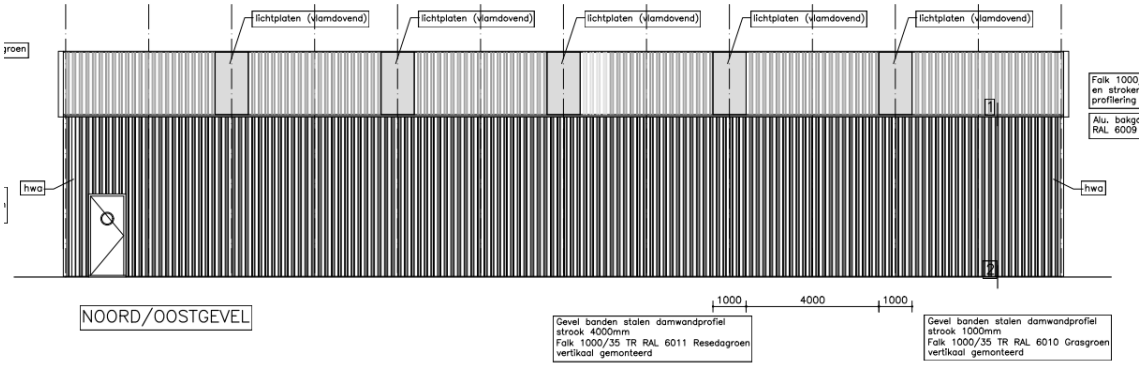
| Revisie | Datum | Omschrijving |
|---|---|---|
| 0 | 8-2-2023 | Opstellen rapport. |

# 2 Projectinformatie

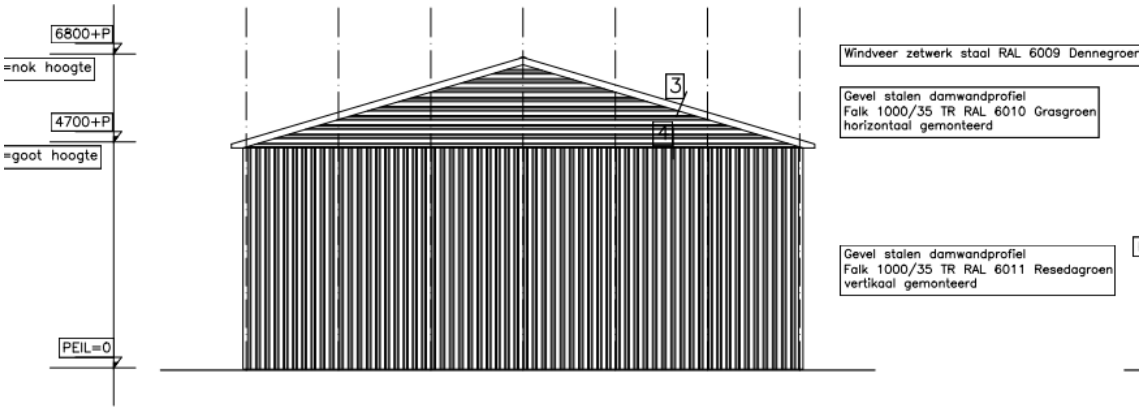
## 2.1 Algemene gegevens

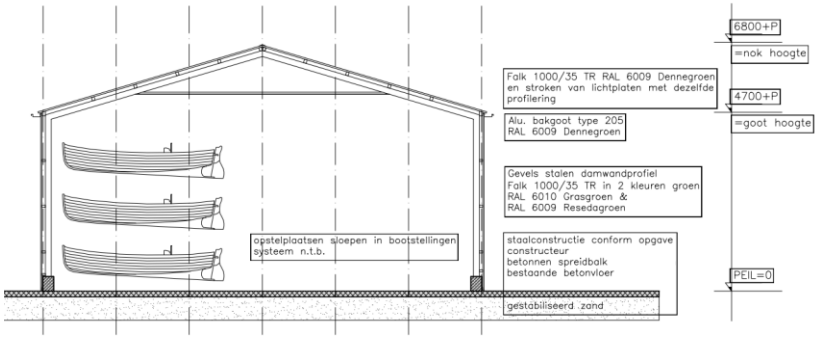



30000
2500
hwa
vluchtdeur
1500
2000
12000
Overhead deur 4000x4200mm
1 COMPARTIMENT
bruto vloer oppervlakte 366m2
netto vloer oppervlakte 345m2
MAX. 5 PERSONEN AANWEZIG
noodverlichting
Opstelplaatsen sloepen in bokstellingen systeem n.t.b.
A
BESTAANDE TENT NR 2
= h.o.h. maat spanten
PLATTEGROND VOLUME 3
NB! Hal is ongeïsoleerd en niet verwarmd
Falk 1000/35 TR RAL 6009 Dennegroen en stroken van lichtplaten met dezelfde profilering
Alu. bakgoot type 205 RAL 6009 Dennegroen
lichtplaten (vlamdovend)
Windveer zetwerk staal RAL 6009 Dennegroen
nok
DAKAANZICHT VOLUME 3
6800+P
nok hoogte
4700+P
goot hoogte
PEIL=0
ZUID/WESTGEVEL
1000
4000
Gevel banden stalen damwandprofiel stroken 4000mm Falk 1000/35 TR RAL 6011 Resedagroen vertikaal gemonteerd
Gevel banden stalen damwandprofiel stroken 1000mm Falk 1000/35 TR RAL 6010 Grasgroen vertikaal gemonteerd

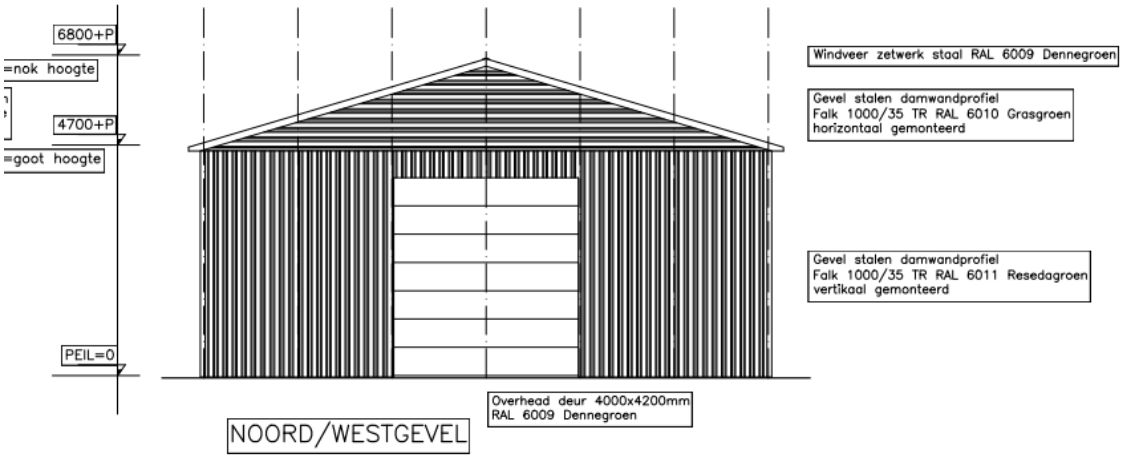



NOORD/OOSTGEVEL




DOORSNEDE A–A VOLUME 3




## 2.2 Beschrijving project.

Plaatsen van een tijdelijke loods voor opslag boten. Zie 2.1 algemene gegevens.

# 3 Belastingen

**1 Kap**

| | | $\psi_0$ | $\psi_1$ | $\psi_2$ | | | | |
|---|---|---|---|---|---|---|---|---|
| v.b. | *Veranderlijke belasting* | | | | | | | |
| S | sneeuw ref 0,75*0,56 | 0,0 | 0,2 | 0,0 | $P_{q;rep}$ | = | 0,42 | kN/m² |
| r.b. | *Rustende belasting* | | | | | | | |
| | eg kap 0,25/cos18 | | | | | = | 0,26 | kN/m² |
| | | | | | $P_{g;rep}$ | = | 0,26 | kN/m² |

Referentieperiode 15 jaar

| **Uiterste grenstoestanden** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vergelijking 6.10a | 1,22 | × | $G_k$ | + | 1,35 | × | $\psi_{0,i} \times Q_{k,i}$ | | | | | |
| Vergelijking 6.10b | 1,08 | × | $G_k$ | + | 1,35 | × | $Q_{k,1}$ | + | 1,35 | × | $\psi_{0,i} \times Q_{k,i}$ (i >1) | |
| | | | | | | | | | | | | |
| **Buitengewone combinaties:** | | | | | | | | | | | | |
| Vergelijking 6.11a (brand) | 1,00 | × | $G_k$ | + | 1,00 | × | $\psi_{1,1} \times Q_k$ | + | 1,00 | × | $\psi_{2,i} \times Q_{k,i}$ (i >1) | |

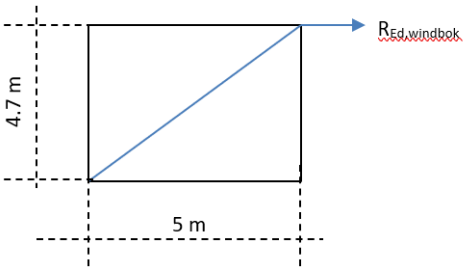
# 4 Stabiliteit

## 4.1 Stabiliteit in dwarsrichting

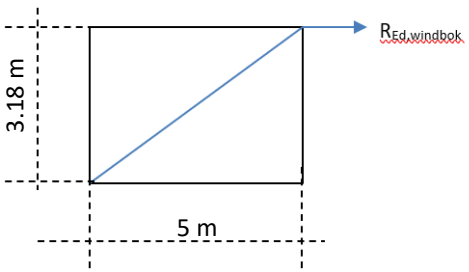
**Toepassen portalen en de kopgevels geschoord. (zie spanten en kopgevels)**

## 4.2 Stabiliteit in langsrichting

| | | | | | |
|---|---|---|---|---|---|
| $P_{w,studruk}$ | = | 0,493 | = | 0,49 | kN/m² |
| $H_{1,gebouw}$ | = | 6,8 | = | 6,80 | m |
| $H_{2,gebouw}$ | = | 4,70 | = | 4,70 | m |
| $H_1$-$H_2$ | = | 6,80-4,70 | = | 2,10 | m |
| $B_{gebouw}$ | = | 12 | = | 12,00 | m |
| $A_{gevel}$ | = | 12,00*4,70+0,5*12,00*2,10 | = | 69,00 | m2 |
| $\gamma_{CC1}$ | = | 1,35 | = | 1,35 | |
| $H_{w,1}$ | = | 0,5*69,00*0,49*(0,8+0,5) | = | 21,98 | kN |
| | = | | = | | |
| | = | | | | |
| R | = | 0,5*69,00*0,49*(0,8+0,5) | = | 21,98 | kN |
| | = | | = | | |
| $R_{Ed}$ | = | 21,98*1,35 | = | 29,67 | kN |
| $R_{Ed,windbok}$ | = | 29,67/2,00 | = | 14,84 | kN |
| $n_{WV,gevel}$ | = | 2 | = | 2,00 | |
| | | **Trek/druk** | | | |
| $a_{spant}$ | = | 5 | = | 5,00 | m |
| $N_{Ed,kolom}$ | = | 14,84*4,70/5,00 | = | 13,95 | kN |
| | | **Windverband dak** | | | |
| $L_{diagonaal,dak}$ | = | ((6,357/2)^2+5,00^2)^0,5 | = | 5,92 | m |
| $S_{diagonaal,dak}$ | = | 5,92/5,00*14,84 | = | 17,57 | kN |
| | | **Windbok gevel** | | | |
| $L_{diagonaal}$ | = | (4,70^2+5,00^2)^0,5 | = | 6,86 | m |
| $S_{diagonaal}$ | = | 6,86/5,00*14,84 | = | 20,36 | kN |
| $A_{ben,dak}$ | = | 17,57*1000/235 | = | 74,77 | mm² |
| $A_{ben,gevel}$ | = | 20,36*1000/235 | = | 86,64 | mm² |




**Gevel strip 60x8**




**Dak L60x60x8**

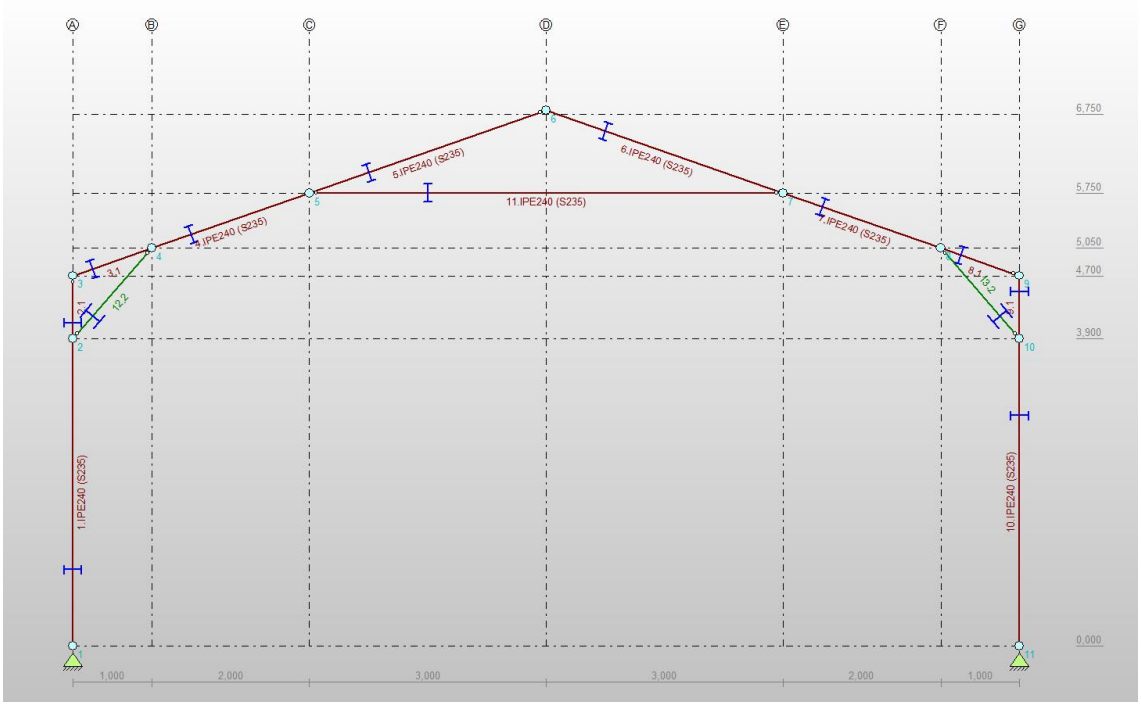
# 5 Kap + gevel

## 5.1 Gordingen

*Voor berekening zie bijlage A vanaf bladzijde A-2*

**Toepassen 100x225 kwal. C24 hoh 1261 mm.**

## 5.2 Spanten



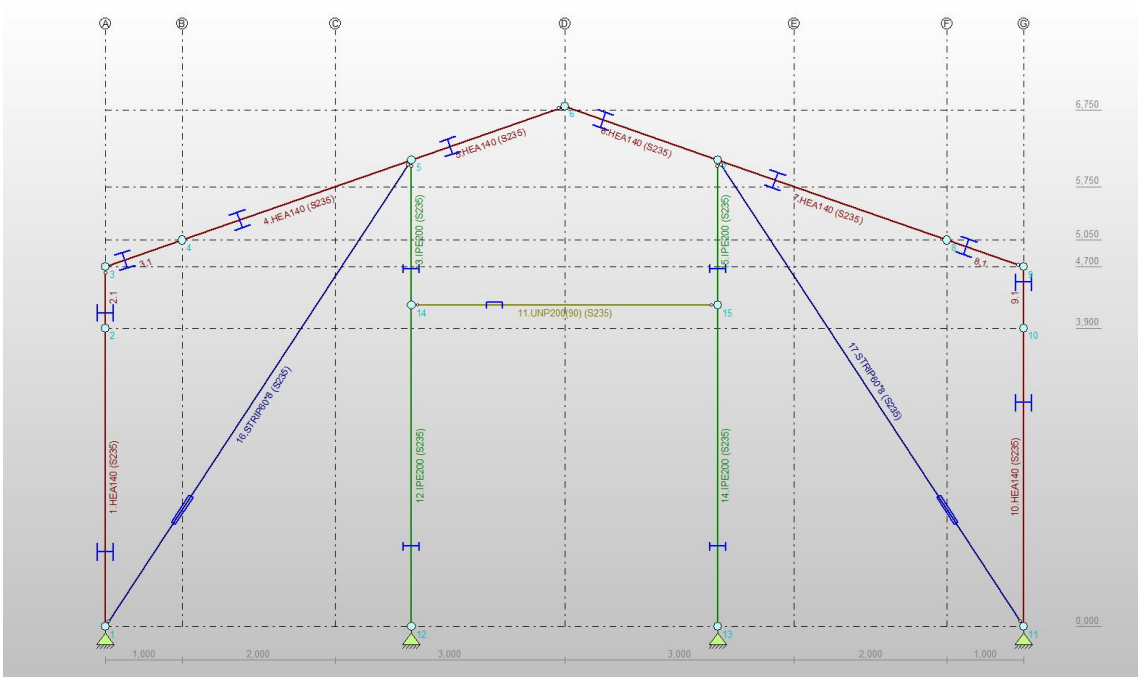

| spant | | | | G | $Q_k$ | $\Psi_0$ | $\Sigma G_g$ kN/m¹ | $\Sigma Q_k$ kN/m¹ | Comb. 6.10a | Comb. 6.10b | Comb. 6.11a | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kap | 5,00 x | 1,00 x | 1,00 x | 0,26 | 0,42 | 0,0 | 1,30 | 2,10 | 1,58 | 3,86 | 1,66 | e |
| **Totaal:** | | | | | | **Σ** | **1,30** | **2,10** | **1,58** | **3,86** | **1,66** | kN/m¹ |

*Voor berekening zie bijlage A vanaf bladzijde A-7*

**Profielen voldoen.**
**Kolommen en spantbenen IPE240**
**Trekbalk IPE240**
**Schoren HEA100.**

**Verbindingen en ankerplan volgens berekening en tekening staalleverancier.**

## 5.3 Kopgevels




| spant kopgevel | | | | G | $Q_k$ | $\Psi_0$ | $\Sigma G_g$ kN/m¹ | $\Sigma Q_k$ kN/m¹ | Comb. 6.10a | Comb. 6.10b | Comb. 6.11a | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kap | 0,50 x | 5,00 x | 1,00 x | 0,26 | 0,42 | 0,0 | 0,65 | 1,05 | 0,79 | 1,93 | 0,83 | e |
| **Totaal:** | | | | | | **Σ** | **0,65** | **1,05** | **0,79** | **1,93** | **0,83** | kN/m¹ |

*Voor berekening zie bijlage A vanaf bladzijde A-61*

Profielen voldoen.

**spantbenen en dakliggers HEA140**
**gevelkolommen IPE200 en randregel deur UNP200**

In berekening trek-drukstaaf gebruikt. Vervangen door tweestrippen 60x8.

Ntd = 14.88 kN

**Berekening**

| | | | | | |
|---|---|---|---|---|---|
| $N_{t,Ed}$ | = | 14,88 | = | 14,88 | kN |
| $A_{ben}$ | = | 14,88*1000/235 | = | 63,32 | mm² |

**Toepassen strip 60x8 en 2M16 8.8.**

**Verbindingen en ankerplan volgens berekening en tekening staalleverancier.**

## 5.4 Gevelregels

Toepassen houten regels.

| gevelregels | | | | G | $Q_k$ | $\Psi_0$ | $\Sigma G_g$ kN/m¹ | $\Sigma Q_k$ kN/m¹ | Comb. 6.10a | Comb. 6.10b | Comb. 6.11a | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| wind | 1,10 x | 1,00 x | 1,00 x | 0,00 | 0,42 | 0,0 | 0,00 | 0,46 | 0,00 | 0,54 | 0,08 | e |
| **Totaal:** | | | | | | **Σ** | **0,00** | **0,46** | **0,00** | **0,54** | **0,08** | kN/m¹ |

*Voor berekening zie bijlage A vanaf bladzijde A-121*

**Toepassen 71x196 C24 hoh 1567 mm.**

# 6 Fundering

## 6.1 Ringbalk

**Tpv spant**

| | | | | | |
|---|---|---|---|---|---|
| $N_{Ed}$ | = | 30,39 | = | 30,39 | kN |
| $N_{Ed,wind}$ | = | 13,95 | = | 13,95 | kN |
| $0.9N_{eg}$ | = | 0,9*12,37 | = | 11,13 | kN |
| $N_{Ed}$ ↑ | = | 13,95-11,13 | = | 2,82 | kN |

Tpv wb kopgevel

| | | | | | |
|---|---|---|---|---|---|
| $N_{Ed}$ ↑ | = | 8,25 | = | 8,25 | kN |

Voor trek windbok kopgevel maatgevend

**Berekening balk**

| | | | | | |
|---|---|---|---|---|---|
| $N_{Ed}$ ↑ | = | 8,25 | = | 8,25 | kN |
| $G_{ben}$ | = | 8,25/(0,9*25) | = | 0,37 | $m^3$ |
| $A_{balk}$ | = | 0,35*0,4 | = | 0,14 | $m^2$ |
| $L_{balk}$ | = | 0,37/0,14 | = | 2,64 | m |
| $M_{Ed}$ | = | 0,5*8,25*1,32 | = | 5,45 | kNm |

**Resultaten controle buigwapening** *v2.6.9*

| | | | | | |
|---|---|---|---|---|---|
| b x h | = | 400 x 400 mm² | d | = | 346 mm |
| beton | : | C30/37 | $f_{cd}$ | = | 20,0 N/mm² |
| wapening | : | B500a | $f_{yd}$ | = | 434,8 N/mm² |
| $M_{Ed}$ | = | 5,45 kNm | $M_{E;frequent}$ | = | 4,36 kNm |
| z | = | 345,0 mm | $x_u$ | = | 2,6 mm |
| $A_{ben}$ | = | 36 mm² | $M_{rd}$ ($M_{cr}$) | = | 10,46 kNm (30,90 kNm) |
| **Keuze** | : | **3Ø12** | $A_s$ | = | 339 mm² |
| ρ | = | 339 / (400 x 346) * 100 = 0,25% | | | |
| $A_{s;max}$ | = | 2554 mm² | | | |
| **U.C.** | = | **172 / 339 = 0,51** | | | |
| *minimale wapening vlgs 7.3.2 maatgevend* | | | $A_{s,min}$ | = | 172 mm² |

**Scheurvorming**

| | | | | | |
|---|---|---|---|---|---|
| $\sigma_s$ | = | 37,2 N/mm² | $c_{HW}$ | = | 48 mm (c + v.w. = 40 + 8) |
| $\alpha_e$ | = | 6,06 | $s_{r;max}$ | = | 312,0 mm |
| $h_{c;eff}$ | = | 115,1 mm | $\varepsilon_{sm} - \varepsilon_{cm}$ | = | 0,00011 |
| $\rho_{p;eff}$ | = | 0,0074 | $w_k$ | = | 0,03 mm |
| Milieuklasse | = | XD3 | $k_x$ | = | 1,00 |
| | | | $w_{max}$ | = | 0,20 mm |
| **U.C.** | = | **0,03 / 0,20 = 0,17** | | | |

**Toepassen balk 400x400**

**Wapening 3Ø12 o/b en bgls Ø8-300 en flank 2Ø8**

## 6.2 Verbinding aan vloer

| | | | | | |
|---|---|---|---|---|---|
| $H_{Ed}$ | = | 14,72 | = | 14,72 | kN |
| $M_{Ed}$ | = | 14,72*0,43 | = | 6,33 | kNm |
| | | | = | | |

*Voor berekening zie bijlage A vanaf bladzijde A-124*

Toepassen:

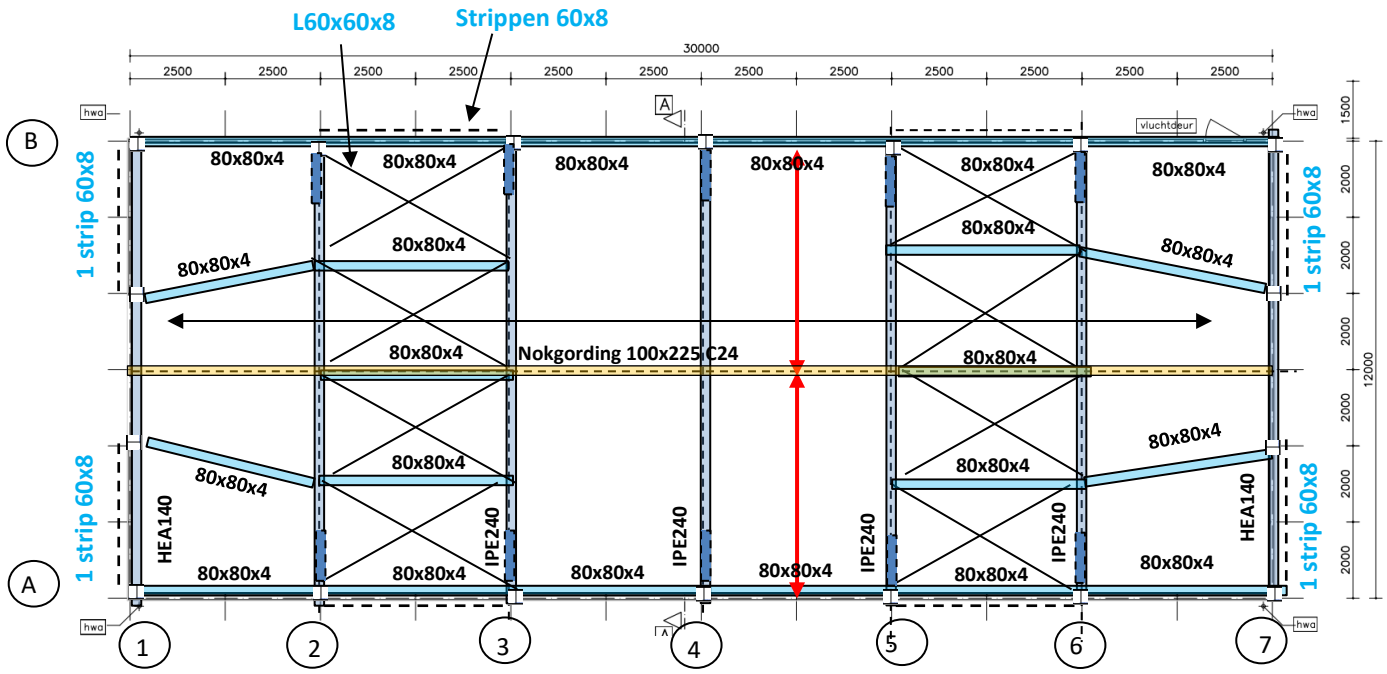
### 1 Invoergegevens




| | |
|---|---|
| **Ankertype en -afmeting:** | **HIT-HY 200-A + HAS-U A4 M12** |
| Retourperiode (levensduur in jaren): | 50 |
| Artikelnummer: | 2223842 HAS-U A4 M12x110 (insert) / 2022696 HIT-HY 200-A (mortel) |
| Effectieve verankeringsdiepte: | $h_{ef,opti}$ = 70,0 mm ($h_{ef,limit}$ = 76,0 mm) |
| Materiaal: | A4 |
| Goedkeuring nr.: | ETA 11/0493 |
| Uitgegeven I Geldig: | 10-12-2021 \| - |
| Aantoning: | rekenmethode EN 1992-4, chemisch |

# 7 Constructieoverzichten

## 7.1 Dakplan

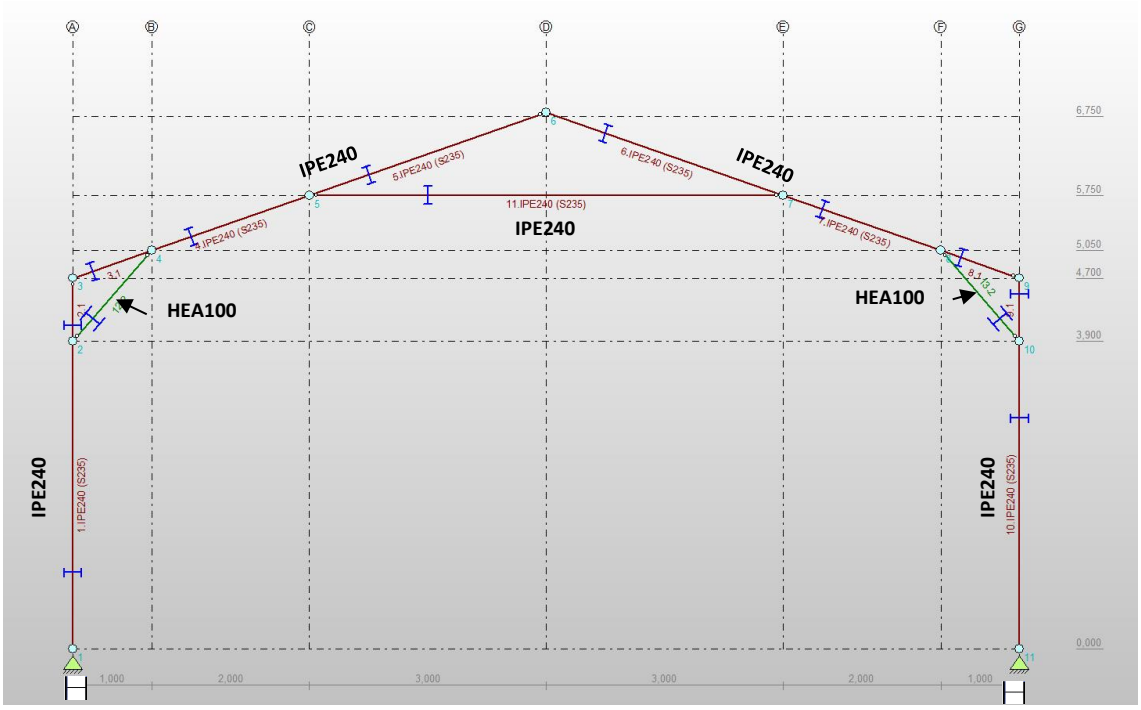



Gordingen 100x225 kwal. C24 (overspant heen)

Overspanning dakplaten volgens leverancier

Windverbanden dak L60x60x8; windbokken gevel strippen 60x8

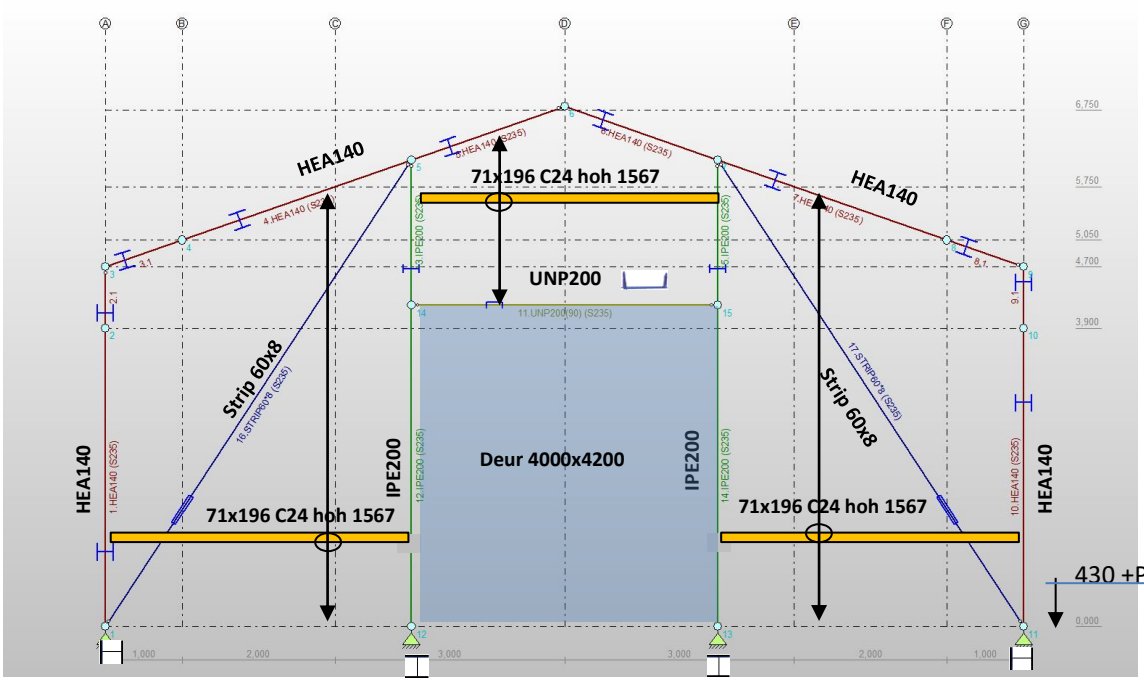
## 7.2 Spant




spanten

ALLE MATEN IN HET WERK CONTROLEREN

## 7.3 Spant kopgevels

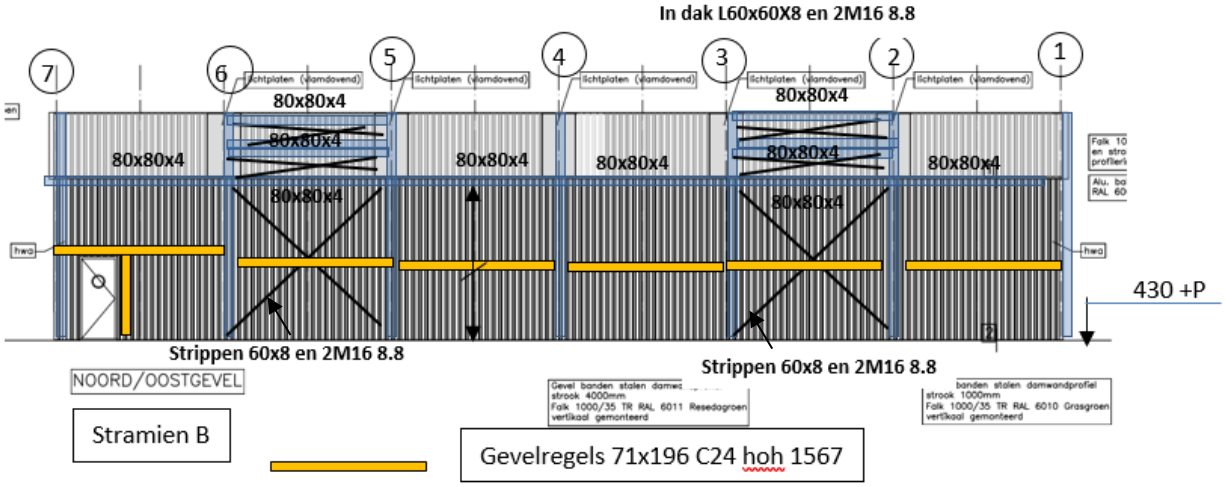



*Stramien 1*

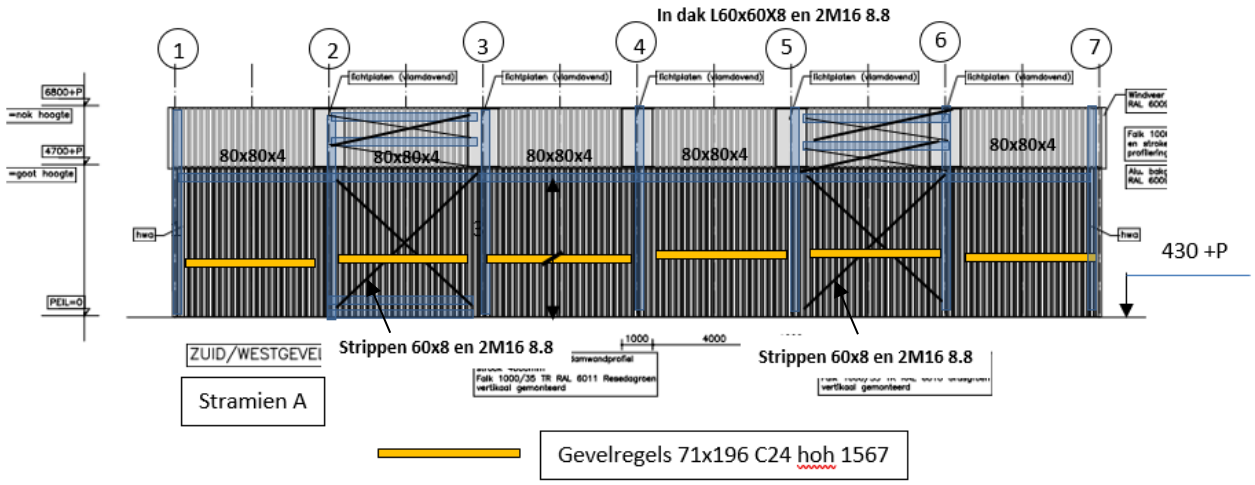
Spant stramien 7 als stramien 1 maar zonder UNP200 en geen deur.

**Stalen gevelplaten volgens berekening en tekening leverancier.**
**ALLE MATEN IN HET WERK CONTROLEREN**

## 7.4 Zijgevels

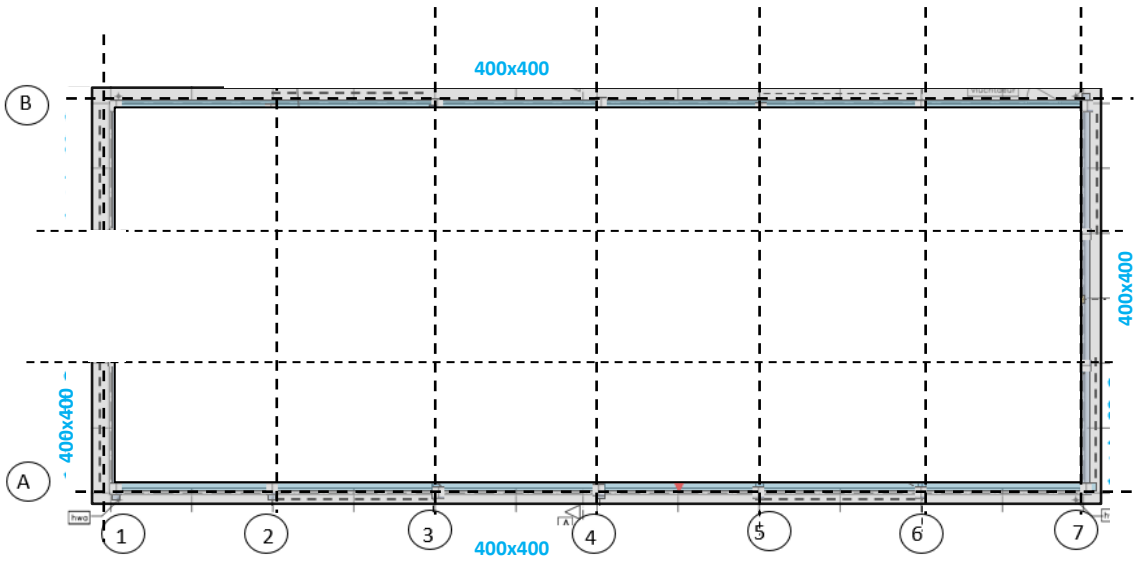



**Stalen gevelplaten volgens berekening en tekening leverancier.**




**Stalen gevelplaten volgens berekening en tekening leverancier.**

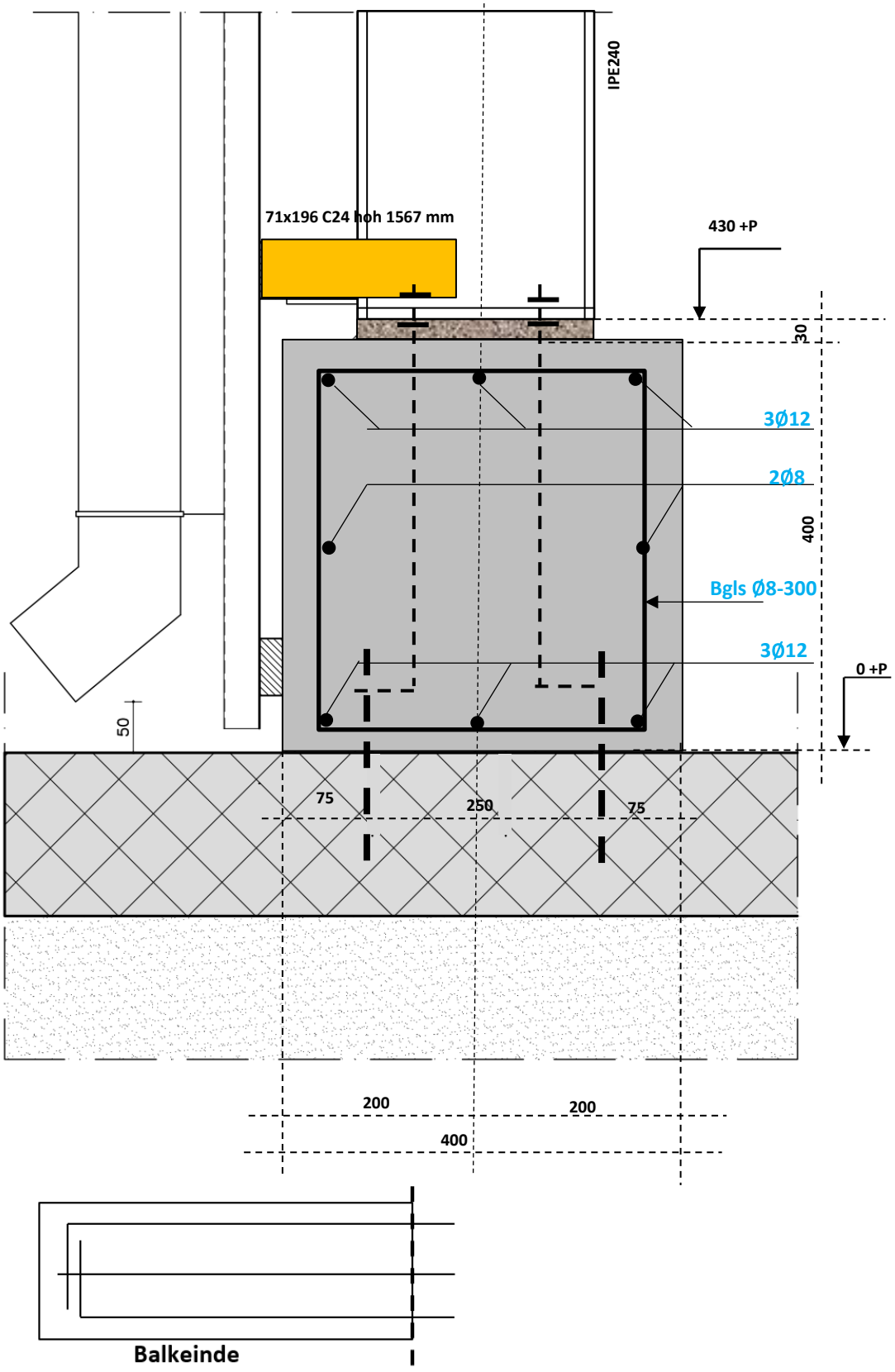
## 7.5 Fundering




**Betonkwaliteit C30/37**
**Betonstaalkwaliteit B500A/B**
**Milieuklasse XD3**
**Dekking 40 mm o/b**

**Toepassen balk 400x400**

**Wapening 3Ø12 o/b en bgls Ø8-300 en flank 2Ø8**



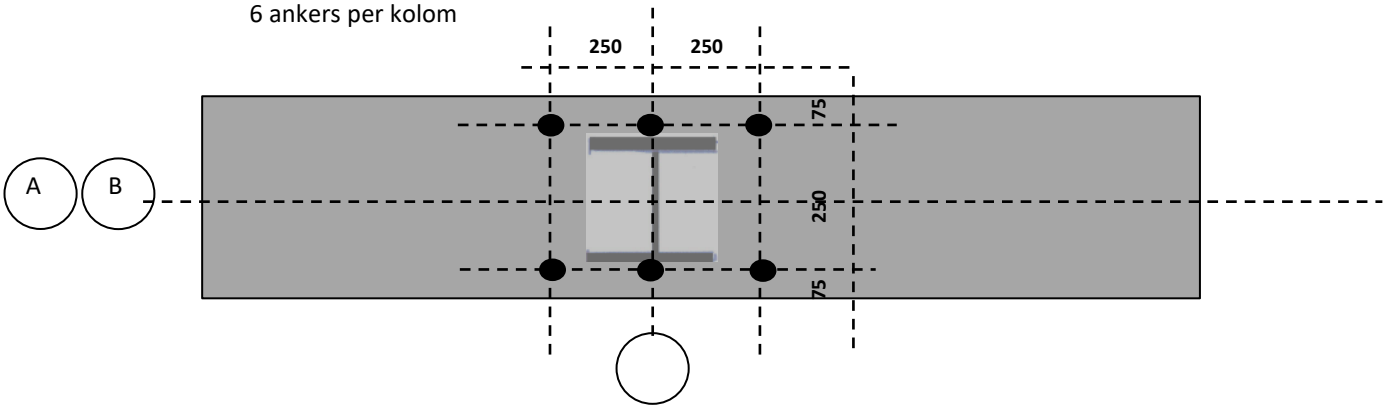

**Ankerplan volgens berekening en tekening staalleverancier.**

## 1 Invoergegevens




| | |
|---|---|
| **Ankertype en -afmeting:** | **HIT-HY 200-A + HAS-U A4 M12** |
| Retourperiode (levensduur in jaren): | 50 |
| Artikelnummer: | 2223842 HAS-U A4 M12x110 (insert) / 2022696 HIT-HY 200-A (mortel) |
| Effectieve verankeringsdiepte: | $h_{ef,opti}$ = 70,0 mm ($h_{ef,limit}$ = 76,0 mm) |
| Materiaal: | A4 |
| Goedkeuring nr.: | ETA 11/0493 |
| Uitgegeven I Geldig: | 10-12-2021 \| - |
| Aantoning: | rekenmethode EN 1992-4, chemisch |

6 ankers per kolom



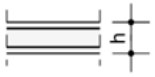

# BETONCONSTRUCTIES

- Betonconstructies: Eurocode 2
- Betonkwaliteit: C30/37
- Grootste korrelafmeting (D) 31,5mm.
- Uitvoering volgens: GTB 2010
- Betonstaalkwaliteit: B500B (voor staven en netten)
- Basisgegevens toepassen (tenzij anders aangegeven)

LAS- EN VERANKERINGSLENGTEN

goed aanhechtingsomstandigheden (h<250mm)

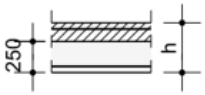
| beton-sterkteklasse | staafdiameter 6 t/m 32 |
|---|---|
| C20/25 | 47 |
| C25/30 | 40 |
| C30/37 | 36 |




h ≤250mm

slechte aanhechtingsomstandigheden (250mm<h<600mm)

| beton-sterkteklasse | staafdiameter 6 t/m 32 |
|---|---|
| C20/25 | 67 |
| C25/30 | 58 |
| C30/37 | 51 |



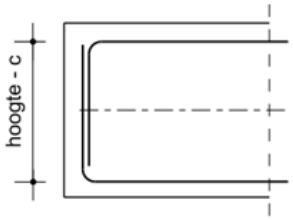

250mm< h ≤600mm

- lassen verspringend aanbrengen

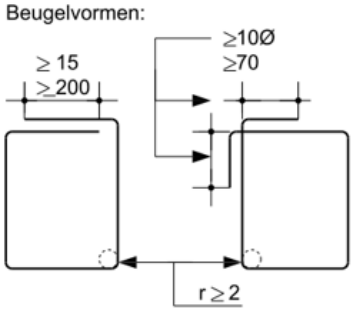
MINIMUMBETONDEKKING BETONSTAAL

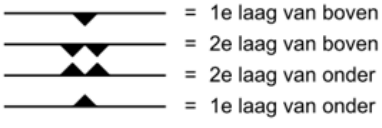
| constructieklasse | milieuklasse | | | | | |
|---|---|---|---|---|---|---|
| betonsterkteklasse | X0 | XC1 | XC2/XC3 | XC4 | XD1/XS1 | XD2/XD3/XS2/XS3 |
| ontwerplevensduur 50jr (S4) | 10 | 15 | 25 | 30 | 35 | 40 |

Balkbeëindiging:




Beugelvormen:



# Bijlage A : Computeruitvoer

# A.1. Gordingen

## Technosoft Construct release 6.72a 7 feb 2023

Project : BK2022-082
Onderdeel : gordingen
Datum : 07/02/2023
Eenheden : kN/m/rad
Bestand : E:\Bouwkenners\BK2022-082 - Berekening Loods paalfundering - Nuijens - Richter\Berekeningen\BK2022-082-KB01 - Statische berekening\gordingen.cnw

## Toegepaste normen volgens Eurocode met Nederlandse NB

| | | | |
|---|---|---|---|
| Belastingen | NEN-EN 1990:2002 | C2:2010,A1:2019 | NB:2019(nl) |
| | NEN-EN 1991-1-1:2002 | C1/C11:2019 | NB:2019(nl) |
| | NEN-EN 1991-1-3:2003 | C1:2009 | NB:2011(nl) |
| | NEN-EN 1991-1-4:2005 | C2:2011 | NB:2011(nl) |
| Hout | NEN-EN 1995-1-1:2005 | A1:2011,C1:2006 | NB:2013(nl) |
| | NEN-EN 14080:2013 | | |

## Gording berekening. (H) zadeldak dubbele buiging

### Algemene gegevens

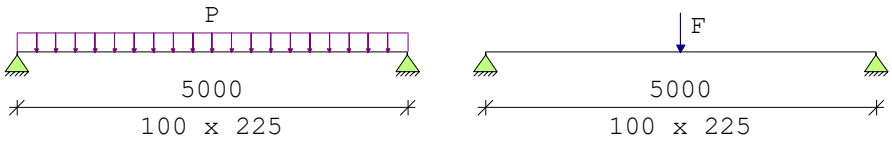
| | | | | | |
|---|---|---|---|---|---|
| B x H | [mm] : 100 x 225 | | Sterkteklasse | : | C24 |
| Overspanning | [mm] : 5000 | | Klimaatklasse | : | I |
| Aantal zijdl. steunen | : 0 | | Referentie periode [j] | : | 15 |
| Opleglengte | [mm] : 100 | | | | |
| Hoh in het dakvlak | [mm] : 1261 | | | | |
| Helling | : 18.00 | | | | |
| Beschot sterkteklasse | : C18 | | | | |
| Dikte beschot | [mm] : 18 | | $E_{0,mean}$ x I | [Nm²/m] : | 4374.0 |
| Gebouw L x B x H | [m] : 30.00 x 12.00 x 6.80 | | | | |

### Permanente belastingen $G_{rep}$

| | |
|---|---|
| EG balklaag | : 0.25 |
| Isolatie | : 0.00 |
| Extra gewicht | : 0.00 |
| Totaal [kN/m²] | : 0.25 |

### Veranderlijke belastingen

| | | |
|---|---|---|
| $Q_k$ | [kN] : 1.50 | |
| $Q_k$ oppervlak | [m²] : 0.05 x 0.05 | |
| Reductiefactor | : 1.00 | |
| Wind $Q_{p,prob}$ | [kN/m²] : 0.49 | (= Cprob² * Qp = 0.92² * 0.58) |
| Sneeuw vormfactor $\mu_1$ | : 1.00 | |




Belastingfactoren (NEN-EN 1990 - Bijlage A1.3)
Formule 6.10a: $\gamma_G$ : 1.22 $\gamma_Q$ : 1.35
Formule 6.10b: $\xi\gamma_G$ : 1.08 $\gamma_Q$ : 1.35
Perm.bel. gunstig : 0.90

Partiële factor (Tabel 2.3 NEN-EN 1995-1-1)
$\gamma_M$ [-]: 1.30

| Meegenomen combinaties in de berekening : | $k_{mod}$ [-] | $b_{ef}$ [mm] | $k_{c,90,q}$ $k_{c,90,F}$ |
|---|---|---|---|
| * Permanent | 0.60 | 100 | 1.00 |
| * Permanent + sneeuw | 0.90 | 100 | 1.00 |
| * Permanent + geconcentreerde belasting | 0.80 | 100 | 1.00 1.50 |
| * Permanent + wind | 0.90 | 100 | 1.00 |
| * Permanent gunstig + wind omhoog | 0.90 | 100 | 1.00 |
| * Permanent gunstig + wind loodr. | 0.90 | 100 | 1.00 |

**Tussenresultaten m.b.t. wind**

| | | | | | |
|---|---|---|---|---|---|
| $C_{pi_onderdruk}$ | : | -0.30 | $C_{pi_overdruk}$ | : | 0.20 |
| $C_{pe_onderdruk}$ (druk) | : | 0.30 | $C_{pe_overdruk}$ (zuiging) | : | -1.32 |
| $C_{index_onderdruk}$ | : | 0.60 | $C_{index_overdruk}$ | : | -1.52 |
| $C_{scd}$ | : | 1.00 | | | |
| $C_f$ | : | 1.00 | | | |

**Tussenresultaten m.b.t. belastingen**

| Belastinggeval | | $q_{k_LR}$ [kN/m] | $Q_{k_LR}$ [kN] | $q_{k_EW}$ [kN/m] | $Q_{k_EW}$ [kN] |
|---|---|---|---|---|---|
| Permanent | : | 0.30 | | 0.10 | |
| Sneeuw | : | 0.60 | | 0.19 | |
| Geconc. belasting | : | | 1.43 | | 0.46 |
| Wind | : | 0.37 | | | |
| Wind omhoog | : | -0.93 | | | |
| Wind loodrecht | : | -0.12 | | | |

**Tussenresultaten m.b.t. doorbuiging**

| | | | | | |
|---|---|---|---|---|---|
| Traagheidsmom. Y [mm4] | : | 9492.19e4 | Traagheidsmom. Z [mm4] | : | 1875.00e4 |
| $E_{0,mean}$ [N/mm²] | : | 11000 | $\Psi_2$ [-] | : | 0.00 |
| $u_{perm,ogenbl.}$ [mm] | : | 2.34 | $k_{def}$ [-] | : | 0.60 |
| $u_{c(zeeg)}$ [mm] | : | 0.00 | | | |

Doorbuigingen loodrecht [mm]

| Belastingcombinatie | $u_{inst}$ | $u_{creep}$ | $u_{bij}$ | $u_{net,fin}$ |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Permanent : | 2.34 | 1.40 | 1.40 | 3.74 |
| Permanent + sneeuw : | 7.01 | 1.40 | 6.07 | 8.41 |
| Permanent + geconc. : | 5.89 | 1.40 | 4.96 | 7.30 |
| Permanent + wind : | 5.21 | 1.40 | 4.27 | 6.61 |
| Permanent + wind omhoog: | -4.94 | 1.40 | -5.88 | -3.54 |
| Permanent + wind loodr.: | 1.38 | 1.40 | 0.44 | 2.78 |

Mtg. doorbuiging : Permanent + sneeuw

Doorbuigingen evenwijdig [mm]

| Belastingcombinatie | $u_{inst}$ | $u_{creep}$ | $u_{bij}$ | $u_{net,fin}$ |
|---|---|---|---|---|
| Permanent : | 3.84 | 2.31 | 2.31 | 6.15 |
| Permanent + sneeuw : | 11.53 | 2.31 | 9.99 | 13.83 |
| Permanent + geconc. : | 9.70 | 2.31 | 8.16 | 12.00 |
| Permanent + wind : | n.v.t. | | | |
| Permanent + wind omhoog: | n.v.t. | | | |
| Permanent + wind loodr.: | n.v.t. | | | |

De doorbuiging is als volgt bepaald (art. 2.2.3(5) van NEN-EN 1995-1-1:2004):
doorbuiging m.b.t. belastingcombinatie permanent

$u_{inst} = u_{perm,ogenblikkelijk}$
$u_{net,fin} = u_{inst}(1 + k_{def})$
$u_{creep} = w_{net,fin} - u_{inst}$
$u_{bij} = u_{creep}$

doorbuiging m.b.t. belastingcombinatie veranderlijk

$u_{inst} = u_{perm,ogenblikkelijk} + u_{ver,ogenblikkelijk}$
$u_{net,fin} = u_{inst,G}(1 + k_{def}) + u_{inst,Q}(1 + \Psi_2 k_{def})$
$u_{creep} = u_{net,fin} - u_{inst}$
$u_{bij} = u_{net,fin} - u_{inst,G}$

Mtg. doorbuiging : Permanent + sneeuw

**Stabiliteit**

1.Toetsing kipstabiliteit m.b.t. montagefase volgens par.6.3.3. is n.v.t.:
- u hebt het belastingsgeval 'Uitvoering' niet toegepast.

2.Factoren t.b.v. toetsing kipstabiliteit m.b.t. gebruiksfase volgens par.6.3.3:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $\sigma_{my,crit}$ | [N/mm²] : | 51.20 | frm(6.32) | $l_{ef,y}$ | [mm] : | 5010.00 | tab(6.1 ) |
| $\sigma_{mz,crit}$ | [N/mm²] : | 583.25 | frm(6.32) | $l_{ef,z}$ | [mm] : | 5010.00 | tab(6.1 ) |
| $\lambda_{rel,my}$ | [-] : | 0.68 | frm(6.30) | $k_{crit,y}$ | [-] : | 1.00 | frm(6.34) |
| $\lambda_{rel,mz}$ | [-] : | 0.20 | frm(6.30) | $k_{crit,z}$ | [-] : | 1.00 | frm(6.34) |

Met uitzondering van belastingcombinatie Geconc. belasting:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $\sigma_{my,crit}$ | [N/mm²] : | 56.97 | frm(6.32) | $l_{ef,y}$ | [mm] : | 4503.33 | tab(6.1 ) |
| $\sigma_{mz,crit}$ | [N/mm²] : | 648.87 | frm(6.32) | $l_{ef,z}$ | [mm] : | 4503.33 | tab(6.1 ) |
| $\lambda_{rel,my}$ | [-] : | 0.65 | frm(6.30) | $k_{crit,y}$ | [-] : | 1.00 | frm(6.34) |
| $\lambda_{rel,mz}$ | [-] : | 0.19 | frm(6.30) | $k_{crit,z}$ | [-] : | 1.00 | frm(6.34) |

Belastingcombinatie wind omhoog (opbuigend moment):

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $\sigma_{my,crit}$ | [N/mm²] : | 57.68 | frm(6.32) | $l_{ef,y}$ | [mm] : | 4447.50 | tab(6.1 ) |
| $\sigma_{mz,crit}$ | [N/mm²] : | 583.25 | frm(6.32) | $l_{ef,z}$ | [mm] : | 5010.00 | tab(6.1 ) |
| $\lambda_{rel,my}$ | [-] : | 0.65 | frm(6.30) | $k_{crit,y}$ | [-] : | 1.00 | frm(6.34) |
| $\lambda_{rel,mz}$ | [-] : | 0.20 | frm(6.30) | $k_{crit,z}$ | [-] : | 1.00 | frm(6.34) |

**Tussenresultaten (per combinatie)**

Factoren t.b.v. toetsing ULS:
$k_m$ [-] : 0.70 par(6.1.6)

| | | | eis | u.c. |
|---|---|---|---|---|
| Permanent | frm(6.13) | $\tau_{v,d}$ = 0.06 < 1.85 [N/mm²] | | 0.03 |
| | frm(6.3 ) | $\sigma_{c,90,q,d}/(k_{c,90,q}*f_{c,90,d}) + \sigma_{c,90,F,d}/(k_{c,90,F}*f_{c,90,d}) < 1.00$ = 0.09/ 1.15+ 0.00/ 1.73 = | | 0.08 |
| | frm(6.11) | $\sigma_{m,y,d}$ = 1.35 < 11.08 [N/mm²] | | 0.12 |
| | frm(6.12) | $\sigma_{m,z,d}$ = 0.99 < 12.01 [N/mm²] | | 0.08 |
| | frm(6.11) | Maatgevende combinatie buiging | | 0.18 |
| Sneeuw | frm(6.13) | $\tau_{v,d}$ = 0.18 < 2.77 [N/mm²] | | 0.07 |
| | frm(6.3 ) | $\sigma_{c,90,q,d}/(k_{c,90,q}*f_{c,90,d}) + \sigma_{c,90,F,d}/(k_{c,90,F}*f_{c,90,d}) < 1.00$ = 0.28/ 1.73+ 0.00/ 2.60 = | | 0.16 |
| | frm(6.11) | $\sigma_{m,y,d}$ = 4.20 < 16.62 [N/mm²] | | 0.25 |
| | frm(6.12) | $\sigma_{m,z,d}$ = 3.07 < 18.02 [N/mm²] | | 0.17 |
| | frm(6.11) | Maatgevende combinatie buiging | | 0.37 |
| Geconc. belasting | frm(6.13) | $\tau_{v,d}$ = 0.16 < 2.46 [N/mm²] | | 0.07 |
| | frm(6.3 ) | $\sigma_{c,90,q,d}/(k_{c,90,q}*f_{c,90,d}) + \sigma_{c,90,F,d}/(k_{c,90,F}*f_{c,90,d}) < 1.00$ = 0.08/ 1.54+ 0.19/ 2.31 = | | 0.14 |
| | frm(6.11) | $\sigma_{m,y,d}$ = 4.05 < 14.77 [N/mm²] | | 0.27 |
| | frm(6.12) | $\sigma_{m,z,d}$ = 2.96 < 16.02 [N/mm²] | | 0.18 |
| | frm(6.11) | Maatgevende combinatie buiging | | 0.40 |
| Wind | frm(6.13) | $\tau_{v,d}$ = 0.12 < 2.77 [N/mm²] | | 0.04 |
| | frm(6.3 ) | $\sigma_{c,90,q,d}/(k_{c,90,q}*f_{c,90,d}) + \sigma_{c,90,F,d}/(k_{c,90,F}*f_{c,90,d}) < 1.00$ = 0.21/ 1.73+ 0.00/ 2.60 = | | 0.12 |
| | frm(6.11) | $\sigma_{m,y,d}$ = 3.04 < 16.62 [N/mm²] | | 0.18 |
| | frm(6.12) | $\sigma_{m,z,d}$ = 0.88 < 18.02 [N/mm²] | | 0.05 |
| | frm(6.11) | Maatgevende combinatie buiging | | 0.22 |
| Wind omhoog | frm(6.13) | $\tau_{v,d}$ = 0.15 < 2.77 [N/mm²] | | 0.05 |
| | | $\sigma_{t,90,d}$ = -0.25 reactie omhoog is niet getoetst! | | |
| | frm(6.11) | $\sigma_{m,y,d}$ = -3.67 < 16.62 [N/mm²] | | 0.22 |
| | frm(6.12) | $\sigma_{m,z,d}$ = 0.73 < 18.02 [N/mm²] | | 0.04 |
| | frm(6.11) | Maatgevende combinatie buiging | | 0.25 |
| Wind loodrecht | frm(6.13) | $\tau_{v,d}$ = 0.02 < 2.77 [N/mm²] | | 0.01 |
| | frm(6.3 ) | $\sigma_{c,90,q,d}/(k_{c,90,q}*f_{c,90,d}) + \sigma_{c,90,F,d}/(k_{c,90,F}*f_{c,90,d}) < 1.00$ = 0.03/ 1.73+ 0.00/ 2.60 = | | 0.02 |
| | frm(6.11) | $\sigma_{m,y,d}$ = 0.39 < 16.62 [N/mm²] | | 0.02 |
| | frm(6.12) | $\sigma_{m,z,d}$ = 0.73 < 18.02 [N/mm²] | | 0.04 |
| | frm(6.11) | Maatgevende combinatie buiging | | 0.06 |

| **Resultaten (maatgevende combinaties)** | | | **eis** | **u.c.** |
|---|---|---|---|---|
| Geconc. belasting | frm(6.13) | $\tau_{v,d}$ = 0.16 < 2.46 [N/mm²] | | 0.07 |
| Sneeuw | frm(6.3 ) | $\sigma_{c,90,q,d}/(k_{c,90,q}*f_{c,90,d}) + \sigma_{c,90,F,d}/(k_{c,90,F}*f_{c,90,d}) < 1.00$ = 0.28/ 1.73+ 0.00/ 2.60 = | | 0.16 |
| | frm(6.11) | $\sigma_{m,y,d}$ = 4.05 < 14.77 [N/mm²] | | 0.27 |
| | frm(6.12) | $\sigma_{m,z,d}$ = 2.96 < 16.02 [N/mm²] | | 0.18 |
| Geconc. belasting | frm(6.11) | Maatgevende combinatie buiging | | 0.40 |

Let op: bij 1 of meerdere belastingcombinaties wind treedt een opwaartse oplegreactie op. Houdt hiermee rekening in het ontwerp van de oplegverbinding.

| | | | | | |
|---|---|---|---|---|---|
| Sneeuw | $u_{bij}$ | = 6.07 < | 20.00 | [mm] | 0.30 |
| Sneeuw | $u_{net,fin}$ | = 8.41 < | 20.00 | [mm] | 0.42 |
| Sneeuw | $u_{bij,z}$ | = 9.99 < | 20.00 | [mm] | 0.50 |
| Sneeuw | $u_{net,fin,z}$ | = 13.83 < | 20.00 | [mm] | 0.69 |

# A.2. Spant

**Technosoft Raamwerken release 6.76** **7 feb 2023**

```
Project......: BK2022-082
Onderdeel....: spant
Dimensies....: kN;m;rad  (tenzij anders aangegeven)
Datum........: 07/02/2023
Bestand......: E:\Bouwkenners\BK2022-082 - Berekening Loods
               paalfundering - Nuijens -
               Richter\Berekeningen\BK2022-082-KB01 - Statische
               berekening\spant.rww

Belastingbreedte.:   5.000
Rekenmodel........: 1e-orde-elastisch.
Theorie voor de bepaling van de krachtsverdeling:
   Geometrisch lineair.
   Fysisch lineair.

Gunstige werking van de permanente belasting wordt automatisch verwerkt.
```

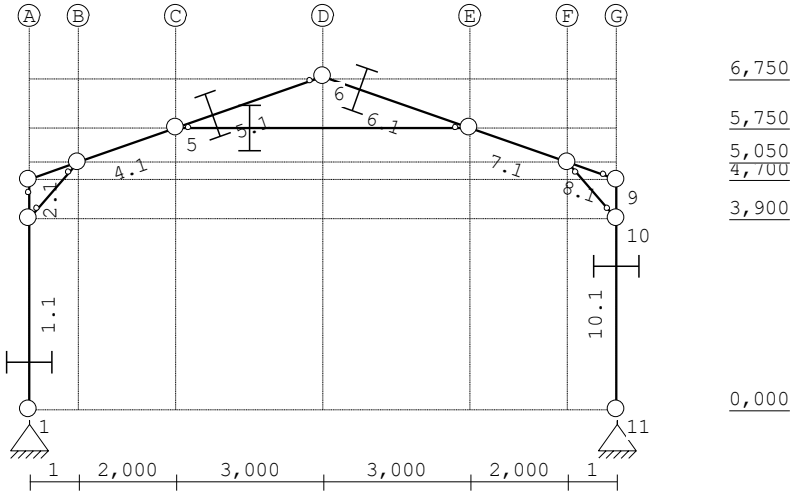
**Toegepaste normen volgens Eurocode met Nederlandse NB**

| | | | |
|---|---|---|---|
| Belastingen | NEN-EN 1990:2002 | C2:2010,A1:2019 | NB:2019(nl) |
| | NEN-EN 1991-1-1:2002 | C1/C11:2019 | NB:2019(nl) |
| | NEN-EN 1991-1-3:2003 | C1:2009 | NB:2011(nl) |
| | NEN-EN 1991-1-4:2005 | C2:2011 | NB:2011(nl) |
| Staal | NEN-EN 1993-1-1:2006 | C2:2011,A1:2016 | NB:2016(nl) |

**K82509**

Project.....: BK2022-082
Onderdeel....: spant

**GEOMETRIE**




**STRAMIENLIJNEN**

| Nr. | Naam | X | Z-min | Z-max |
|---|---|---|---|---|
| 1 | A | 0.000 | 0.000 | 6.800 |
| 2 | B | 1.000 | 0.000 | 6.800 |
| 3 | C | 3.000 | 0.000 | 6.800 |
| 4 | D | 6.000 | 0.000 | 6.800 |
| 5 | E | 9.000 | 0.000 | 6.800 |
| 6 | F | 11.000 | 0.000 | 6.800 |
| 7 | G | 12.000 | 0.000 | 6.800 |

**NIVEAUS**

| Nr. | Z | X-min | X-max |
|---|---|---|---|
| 1 | 0.000 | 0.000 | 12.000 |
| 2 | 3.900 | 0.000 | 12.000 |
| 3 | 4.700 | 0.000 | 12.000 |
| 4 | 5.050 | 0.000 | 12.000 |
| 5 | 5.750 | 0.000 | 12.000 |
| 6 | 6.750 | 0.000 | 12.000 |

**MATERIALEN**

| Mt | Kwaliteit | E-modulus[N/mm2] | S.G. | Pois. | Uitz. coëff |
|---|---|---|---|---|---|
| 1 | S235 | 210000 | 78.5 | 0.30 | 1.2000e-05 |

**PROFIELEN [mm]**

| Prof. | Omschrijving | Materiaal | Oppervlak | Traagheid | Vormf. |
|---|---|---|---|---|---|
| 1 | IPE240 | 1:S235 | 3.9100e+03 | 3.8920e+07 | 0.00 |
| 2 | HEA100 | 1:S235 | 2.1240e+03 | 3.4900e+06 | 0.00 |

**PROFIELEN vervolg [mm]**

| Prof. | Staaftype | Breedte | Hoogte | e | Type | b1 | h1 | b2 | h2 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0:Normaal | 120 | 240 | 120.0 | | | | | |
| 2 | 0:Normaal | 100 | 96 | 48.0 | | | | | |

Project.....: BK2022-082
Onderdeel....: spant

**PROFIELVORMEN [mm]**

1 IPE240



2 HEA100



**KNOPEN**

| Knoop | X | Z | Knoop | X | Z |
|---|---|---|---|---|---|
| 1 | 0.000 | 0.000 | 6 | 6.000 | 6.800 |
| 2 | 0.000 | 3.900 | 7 | 9.000 | 5.750 |
| 3 | 0.000 | 4.700 | 8 | 11.000 | 5.050 |
| 4 | 1.000 | 5.050 | 9 | 12.000 | 4.700 |
| 5 | 3.000 | 5.750 | 10 | 12.000 | 3.900 |
| 11 | 12.000 | 0.000 | | | |

**STAVEN**

| St. | ki | kj | Profiel | Aansl.i | Aansl.j | Lengte | Opm. |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2 | 1:IPE240 | NDM | NDM | 3.900 | |
| 2 | 2 | 3 | 1:IPE240 | NDM | ND | 0.800 | |
| 3 | 3 | 4 | 1:IPE240 | NDM | NDM | 1.059 | |
| 4 | 4 | 5 | 1:IPE240 | NDM | NDM | 2.119 | |
| 5 | 5 | 6 | 1:IPE240 | NDM | ND | 3.178 | |
| 6 | 6 | 7 | 1:IPE240 | NDM | NDM | 3.178 | |
| 7 | 7 | 8 | 1:IPE240 | NDM | NDM | 2.119 | |
| 8 | 8 | 9 | 1:IPE240 | NDM | ND | 1.059 | |
| 9 | 9 | 10 | 1:IPE240 | NDM | NDM | 0.800 | |
| 10 | 10 | 11 | 1:IPE240 | NDM | NDM | 3.900 | |
| 11 | 5 | 7 | 1:IPE240 | ND | ND | 6.000 | |
| 12 | 2 | 4 | 2:HEA100 | ND | ND | 1.524 | |
| 13 | 10 | 8 | 2:HEA100 | ND | ND | 1.524 | |

**VASTE STEUNPUNTEN**

| Nr. | knoop | Kode XZR 1=vast 0=vrij | Hoek |
|---|---|---|---|
| 1 | 1 | 110 | 0.00 |
| 2 | 11 | 110 | 0.00 |

**BELASTINGGENERATIE ALGEMEEN.**

| | | | |
|---|---|---|---|
| Betrouwbaarheidsklasse.....: | 1 | Referentieperiode.....: | 15 |
| Gebouwdiepte.....: | 30.00 | Gebouwhoogte.....: | 6.80 |
| Niveau aansl.terrein.....: | 0.00 | E.g. scheid.w. [kN/m2]: | 1.20 |

**WIND**

| | | | |
|---|---|---|---|
| Terrein categorie ...[4.3.2]...: | Bebouwd | | |
| Windgebied .....: | 2 | Vb,0 ..[4.2].....: | 27.000 |
| Referentie periode wind.....: | 15.00 | Vb(p)..[4.2].....: | 24.970 |
| K .....[4.2].....: | 0.230 | n ....[4.2].....: | 0.500 |
| Positie spant in het gebouw....: | 5.000 | Kr ....[4.3.2].....: | 0.223 |
| z0 .....[4.3.2]...: | 0.500 | Zmin ..[4.3.2].....: | 7.000 |

Project.....: BK2022-082
Onderdeel....: spant

**WIND**

Co wind van links ..[4.3.3]...: 1.000 Co wind van rechts....: 1.000
Co wind loodrecht ..[4.3.3]...: 1.000
Cpi wind van links ..[7.2.9]...: 0.200 -0.300
Cpi windloodrecht ...[7.2.9]...: 0.200 -0.300
Cpi wind van rechts .[7.2.9]...: 0.200 -0.300
Cfr windwrijving ....[7.5].....: 0.040

**SNEEUW**

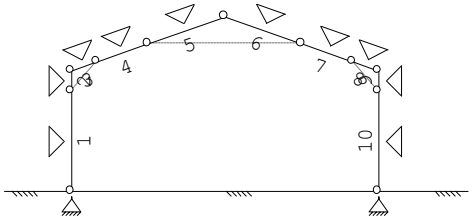
Sneeuwbelasting (sk) 50 jaar : 0.70
Sneeuwbelasting (sn) n jaar : 0.53

**STAAFTYPEN**

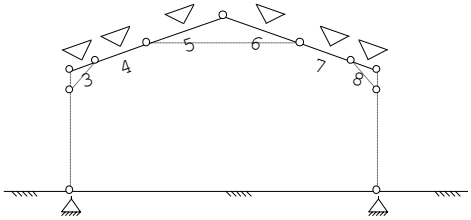
| Type | staven |
|---|---|
| 1:Vloer. | : 11 |
| 5:Linker gevel. | : 1,2 |
| 6:Rechter gevel. | : 9,10 |
| 7:Dak. | : 3-8 |
| 9:Open. | : 12,13 |

**LASTVELDEN**

Wind staven




Sneeuw staven

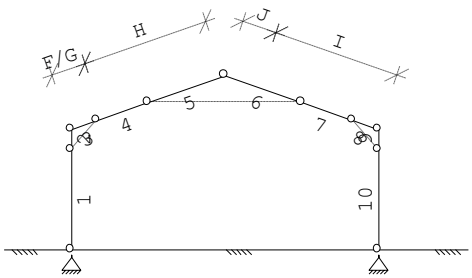



**WIND DAKTYPES**

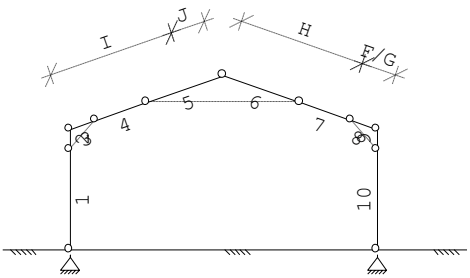
| Nr. | Staaf | Type | reductie bij wind van links | reductie bij wind van rechts | Cpe volgens art: |
|---|---|---|---|---|---|
| 1 | 1-2 | Gevel | 1.000 | 1.000 | 7.2.2 |
| 2 | 3-5 | Zadeldak | 1.000 | 1.000 | 7.2.5 |
| 3 | 6-8 | Zadeldak | 1.000 | 1.000 | 7.2.5 |
| 4 | 9-10 | Gevel | 1.000 | 1.000 | 7.2.2 |

**WIND ZONES**

Wind van links




Wind van rechts




**WIND VAN LINKS ZONES**

| Nr. | Staaf | Positie | Lengte | Zone |
|---|---|---|---|---|
| 1 | 1-2 | 0.000 | 4.700 | D |
| 2 | 3-5 | 0.000 | 1.360 | F/G |
| 3 | 3-5 | 1.360 | 4.997 | H |
| 4 | 6-8 | 0.000 | 1.360 | J |
| 5 | 6-8 | 1.360 | 4.997 | I |
| 6 | 9-10 | 0.000 | 4.700 | E |

**WIND VAN RECHTS ZONES**

| Nr. | Staaf | Positie | Lengte | Zone |
|---|---|---|---|---|
| 1 | 9-10 | 0.000 | 4.700 | D |
| 2 | 6-8 | 0.000 | 1.360 | F/G |
| 3 | 6-8 | 1.360 | 4.997 | H |
| 4 | 3-5 | 0.000 | 1.360 | J |
| 5 | 3-5 | 1.360 | 4.997 | I |
| 6 | 1-2 | 0.000 | 4.700 | E |

Project.....: BK2022-082
Onderdeel....: spant

**Wind indexen**

| Index | CsCd | Cpe/Cpi | qp | breedte | reductie | Qw | Zone | Hoek(en) |
|---|---|---|---|---|---|---|---|---|
| Qw1 | | 0.300 | 0.493 | 5.000 | | -0.739 | -i | |
| Qw2 | 1.00 | 0.800 | 0.493 | 5.000 | | -1.972 | D | |
| Qw3 | 1.00 | 0.343 | 0.493 | 0.900 | | -0.152 | F | 19.3 |
| Qw4 | 1.00 | 0.343 | 0.493 | 4.100 | | -0.694 | G | 19.3 |
| Qw5 | 1.00 | 0.257 | 0.493 | 5.000 | | -0.634 | H | 19.3 |
| Qw6 | 1.00 | -0.857 | 0.493 | 5.000 | | 2.112 | J | 19.3 |
| Qw7 | 1.00 | -0.400 | 0.493 | 5.000 | | 0.986 | I | 19.3 |
| Qw8 | 1.00 | -0.500 | 0.493 | 5.000 | | 1.232 | E | |
| Qw9 | | -0.200 | 0.493 | 5.000 | | 0.493 | +i | |
| Qw10 | 1.00 | -0.785 | 0.493 | 0.900 | | 0.348 | F | 19.3 |
| Qw11 | 1.00 | -0.714 | 0.493 | 4.100 | | 1.443 | G | 19.3 |
| Qw12 | 1.00 | -0.271 | 0.493 | 5.000 | | 0.669 | H | 19.3 |
| Qw13 | 1.00 | -0.800 | 0.493 | 5.000 | | 1.972 | B | |
| Qw14 | 1.00 | -0.657 | 0.493 | 3.500 | | 1.134 | H | 19.3 |
| Qw15 | 1.00 | -0.500 | 0.493 | 1.500 | | 0.370 | I | 19.3 |
| Qw16 | 1.00 | -0.500 | 0.493 | 5.000 | | 1.232 | C | |
| Qw17 | 1.00 | -0.500 | 0.493 | 5.000 | | 1.232 | I | 19.3 |

**SNEEUW DAKTYPEN**

| Staaf | artikel |
|---|---|
| 3-5 | 5.3.3 Zadeldak |
| 6-8 | 5.3.3 Zadeldak |

**Sneeuw indexen**

| Index | art | μ | $s_k$ | red. | posfac | breedte | $Q_s$ | hoek |
|---|---|---|---|---|---|---|---|---|
| Qs1 | 5.3.3 | 0.800 | 0.53 | 1.00 | | 5.000 | 2.102 | 19.3 |
| Qs2 | 5.3.3 | 0.400 | 0.53 | 1.00 | | 5.000 | 1.051 | 19.3 |

**BELASTINGGEVALLEN**

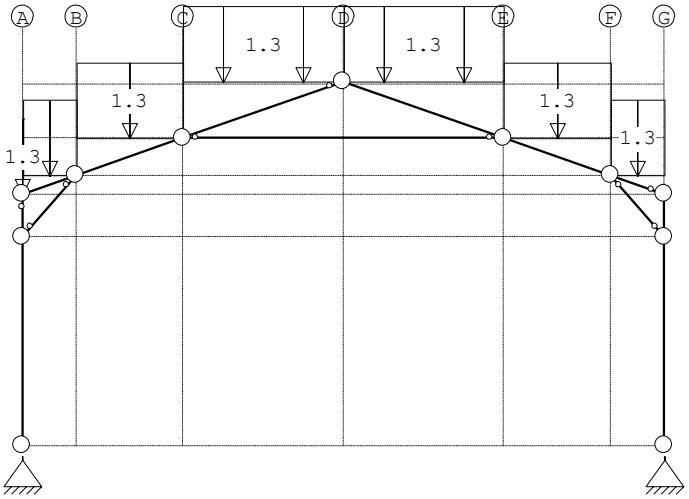
| | B.G. | Omschrijving | Type | |
|---|---|---|---|---|
| | 1 | Permanente belasting EGZ=-1.00 | 1 | |
| g | 2 | Wind van links onderdruk A | 7 | |
| g | 3 | Wind van links overdruk A | 8 | |
| g | 4 | Wind van links onderdruk B | 9 | |
| g | 5 | Wind van links overdruk B | 10 | |
| g | 6 | Wind van links onderdruk C | 37 | |
| g | 7 | Wind van links overdruk C | 38 | |
| g | 8 | Wind van links onderdruk D | 39 | |
| g | 9 | Wind van links overdruk D | 40 | |
| g | 10 | Wind van rechts onderdruk A | 11 | |
| g | 11 | Wind van rechts overdruk A | 12 | |
| g | 12 | Wind van rechts onderdruk B | 13 | |
| g | 13 | Wind van rechts overdruk B | 14 | |
| g | 14 | Wind van rechts onderdruk C | 41 | |
| g | 15 | Wind van rechts overdruk C | 42 | |
| g | 16 | Wind van rechts onderdruk D | 43 | |
| g | 17 | Wind van rechts overdruk D | 44 | |
| g | 18 | Wind loodrecht onderdruk A | 15 | |
| g | 19 | Wind loodrecht overdruk A | 16 | |
| g | 20 | Wind loodrecht onderdruk B | 45 | |
| g | 21 | Wind loodrecht overdruk B | 46 | |
| g | 22 | Sneeuw A | 22 | |
| g | 23 | Sneeuw B | 23 | |
| g | 24 | Sneeuw C | 33 | |
| | 25 | Knik | 0 | Onbekend |

g = gegenereerd belastinggeval

Project.....: BK2022-082
Onderdeel....: spant

**BELASTINGEN** B.G:1 Permanente belasting

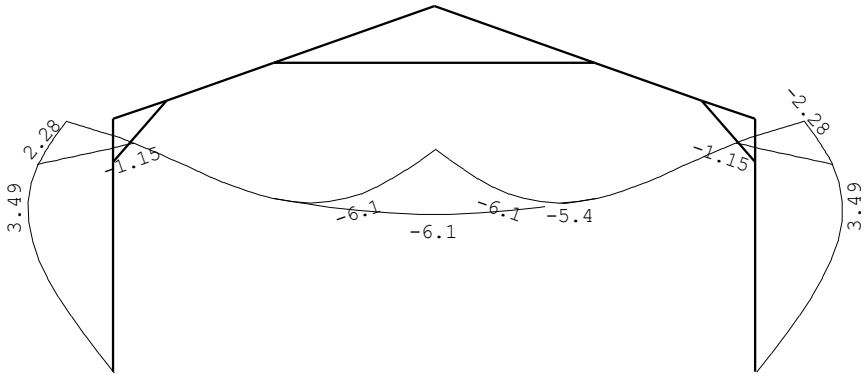
Eigen gewicht van alle staven is meegenomen in berekening. Richting:↓




**STAAFBELASTINGEN** B.G:1 Permanente belasting

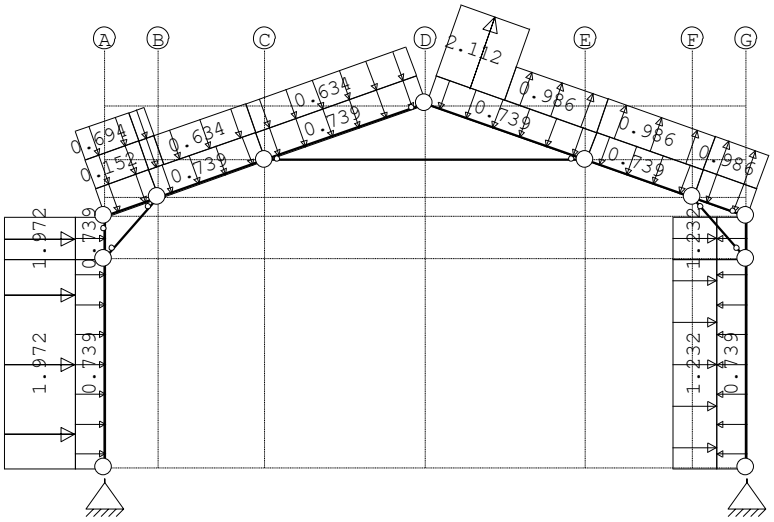
| Staaf | Type | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|
| 2 | 3:QZgeProj. | -1.30 | -1.30 | 0.000 | 0.000 | | | |
| 3 | 3:QZgeProj. | -1.30 | -1.30 | 0.000 | 0.000 | | | |
| 4 | 3:QZgeProj. | -1.30 | -1.30 | 0.000 | 0.000 | | | |
| 5 | 3:QZgeProj. | -1.30 | -1.30 | 0.000 | 0.000 | | | |
| 6 | 3:QZgeProj. | -1.30 | -1.30 | 0.000 | 0.000 | | | |
| 7 | 3:QZgeProj. | -1.30 | -1.30 | 0.000 | 0.000 | | | |
| 8 | 3:QZgeProj. | -1.30 | -1.30 | 0.000 | 0.000 | | | |

**VERPLAATSINGEN** [mm] B.G:1 Permanente belasting



Project.....: BK2022-082
Onderdeel....: spant

**BELASTINGEN** B.G:2 Wind van links onderdruk A

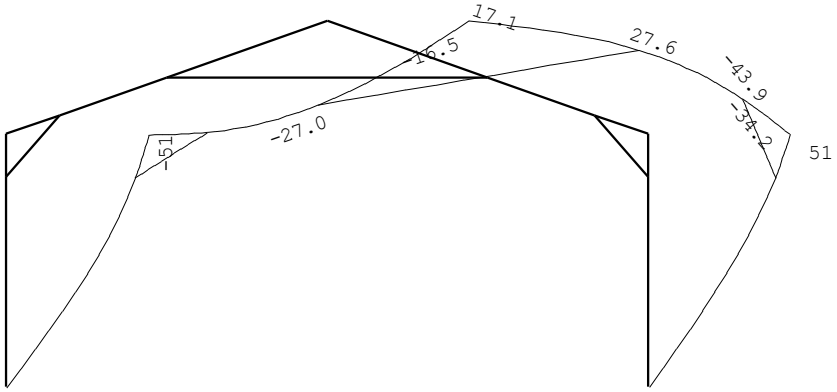



**STAAFBELASTINGEN** B.G:2 Wind van links onderdruk A

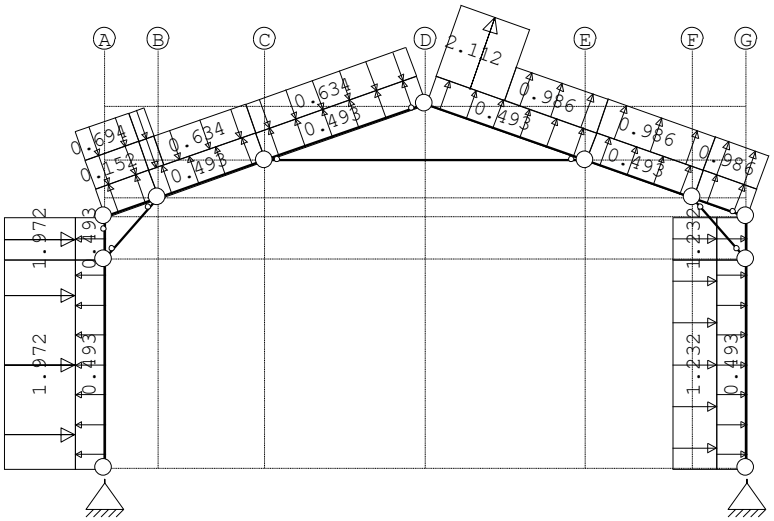
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw6 | 2.11 | 2.11 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 1.360 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:2 Wind van links onderdruk A




**BELASTINGEN** B.G:3 Wind van links overdruk A




**STAAFBELASTINGEN** B.G:3 Wind van links overdruk A

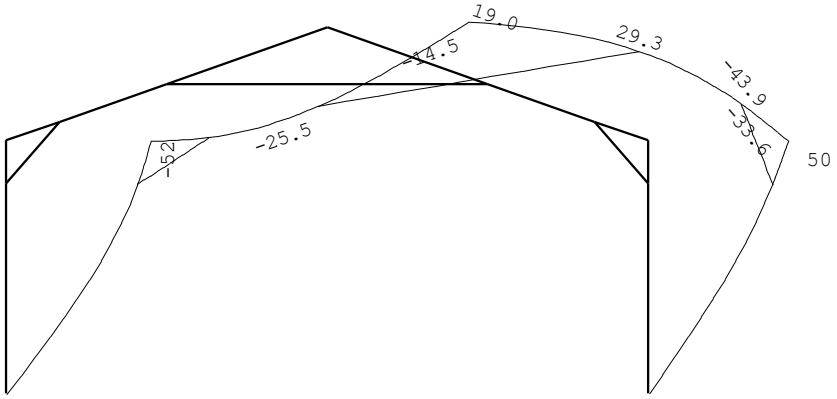
| Staaf | Type | Index | q1/p/m | q2 | A | B | ψ0 | ψ1 | ψ2 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw6 | 2.11 | 2.11 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

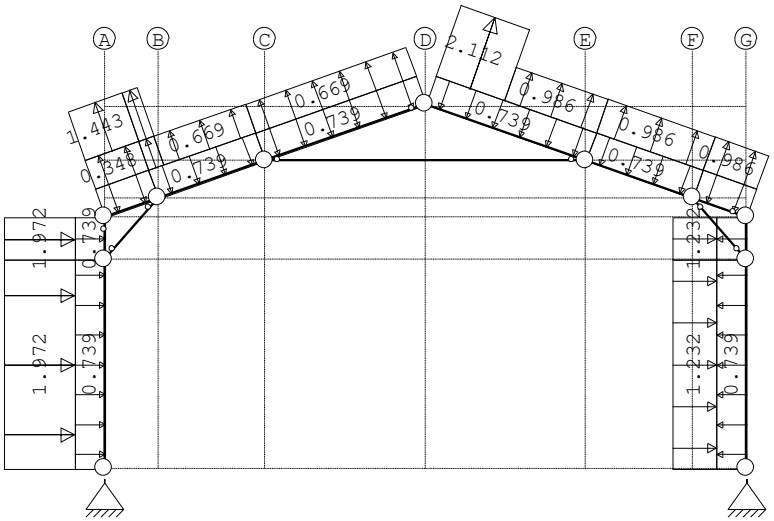
**STAAFBELASTINGEN** B.G:3 Wind van links overdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 1.360 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:3 Wind van links overdruk A




**BELASTINGEN** B.G:4 Wind van links onderdruk B




**STAAFBELASTINGEN** B.G:4 Wind van links onderdruk B

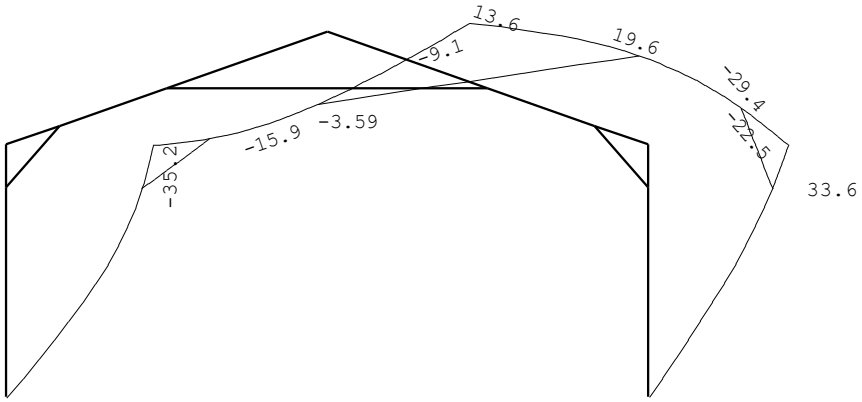
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

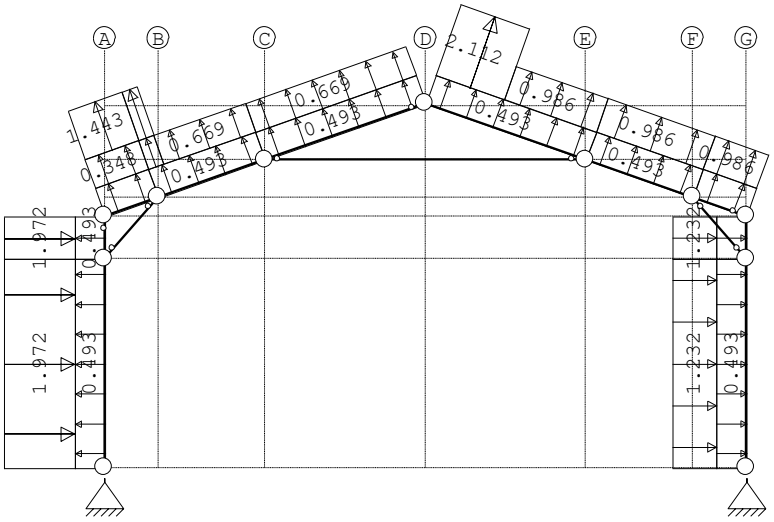
**STAAFBELASTINGEN** B.G:4 Wind van links onderdruk B

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw6 | 2.11 | 2.11 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 1.360 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:4 Wind van links onderdruk B




**BELASTINGEN** B.G:5 Wind van links overdruk B

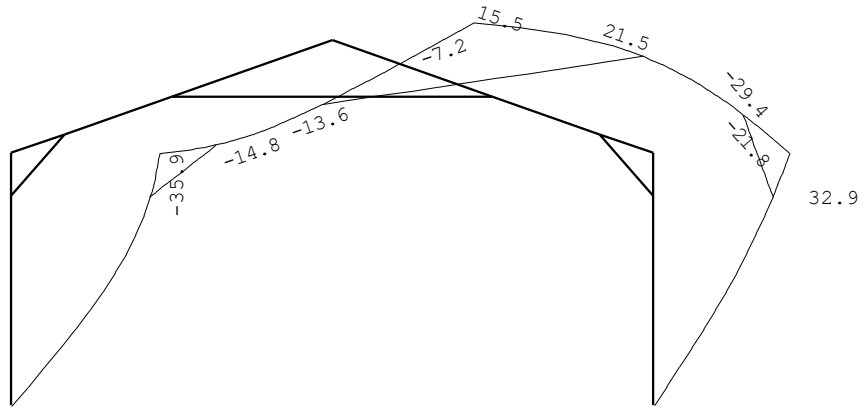


Project.....: BK2022-082
Onderdeel....: spant

**STAAFBELASTINGEN** B.G:5 Wind van links overdruk B

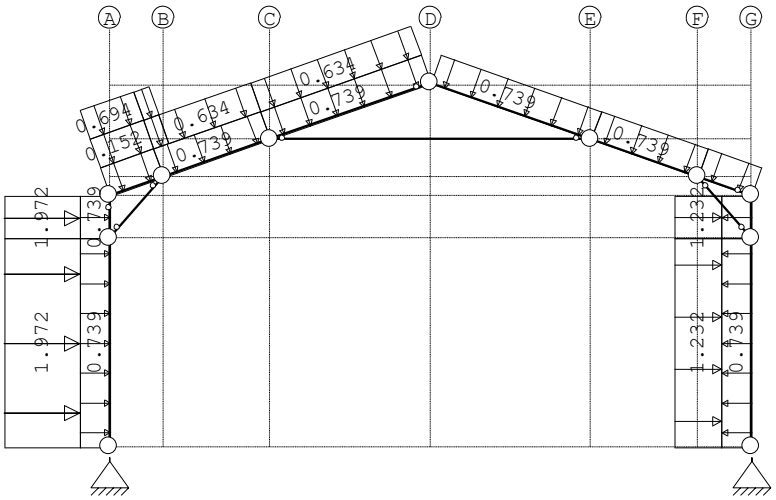
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw6 | 2.11 | 2.11 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 1.360 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:5 Wind van links overdruk B



Project.....: BK2022-082
Onderdeel....: spant

**BELASTINGEN** B.G:6 Wind van links onderdruk C

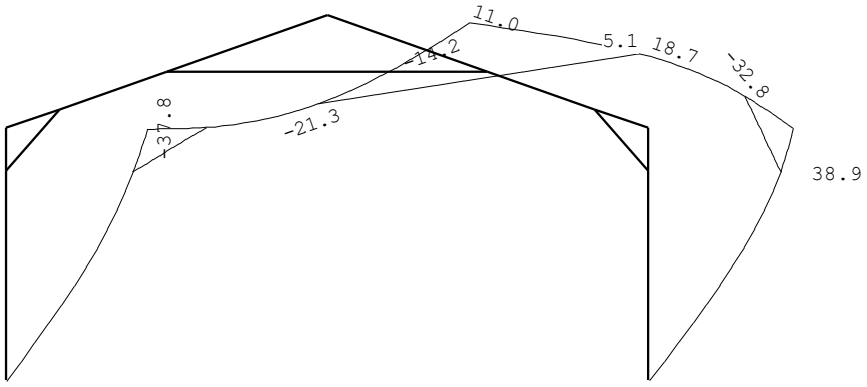



**STAAFBELASTINGEN** B.G:6 Wind van links onderdruk C

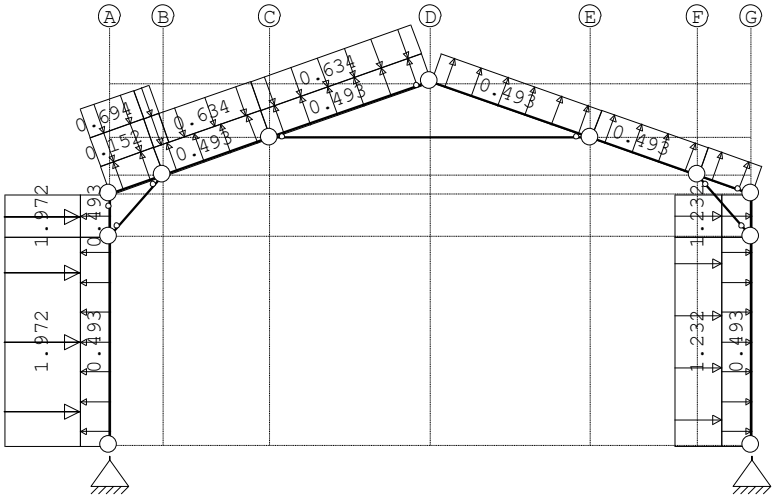
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:6 Wind van links onderdruk C




**BELASTINGEN** B.G:7 Wind van links overdruk C

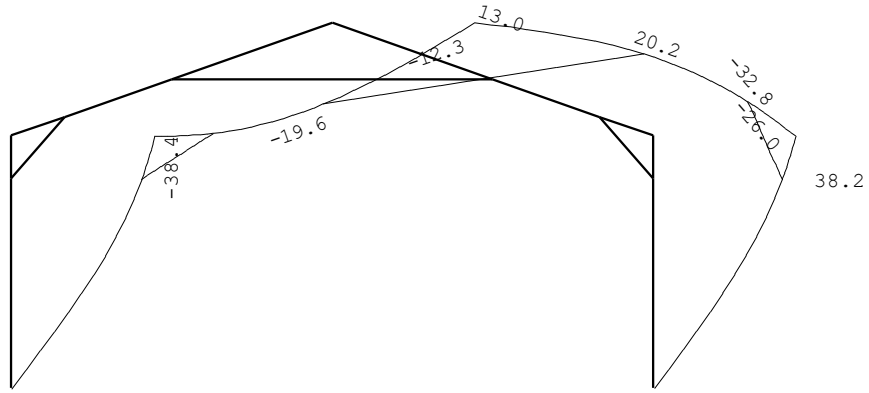



**STAAFBELASTINGEN** B.G:7 Wind van links overdruk C

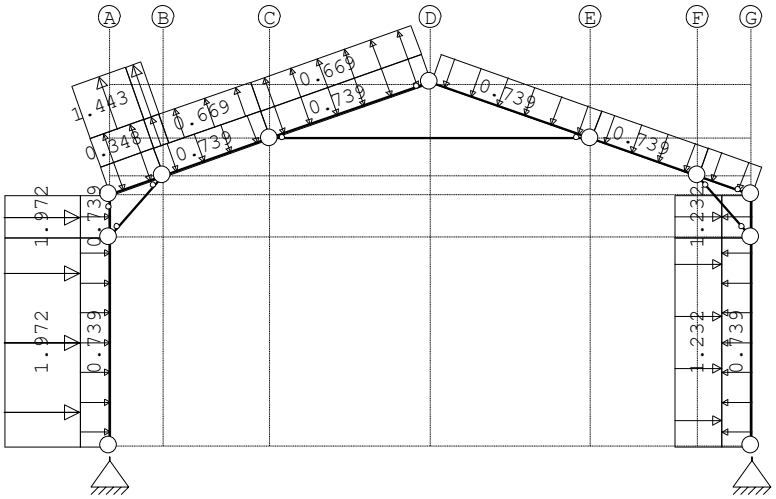
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:7 Wind van links overdruk C




**BELASTINGEN** B.G:8 Wind van links onderdruk D

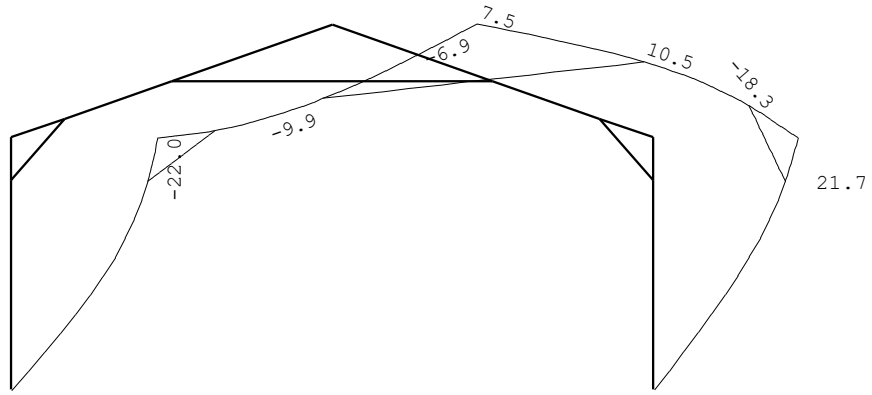



**STAAFBELASTINGEN** B.G:8 Wind van links onderdruk D

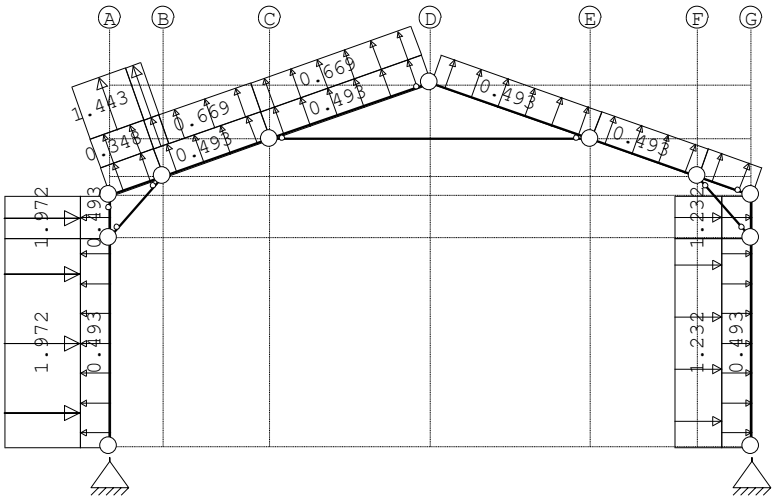
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:8 Wind van links onderdruk D




**BELASTINGEN** B.G:9 Wind van links overdruk D

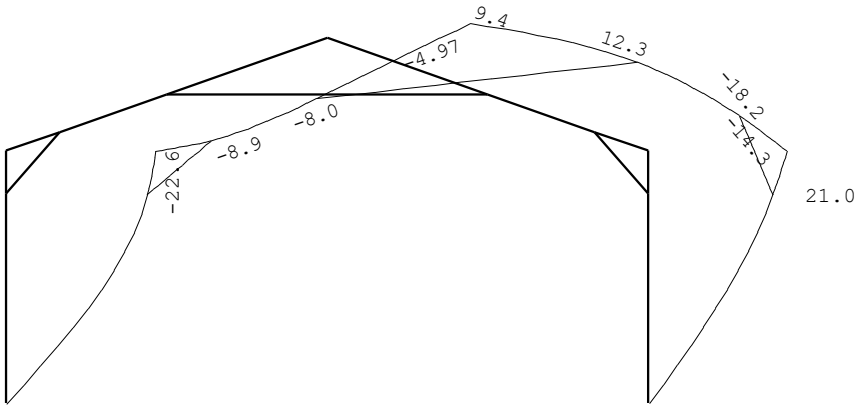



**STAAFBELASTINGEN** B.G:9 Wind van links overdruk D

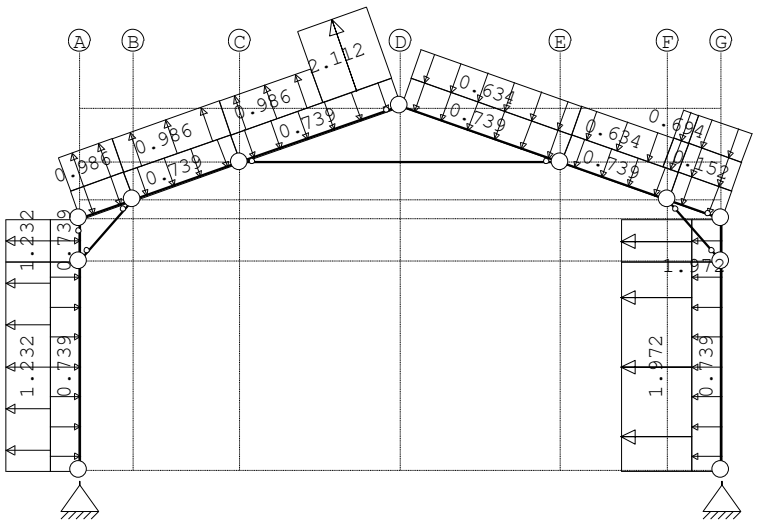
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 0.000 | 1.818 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:9 Wind van links overdruk D




**BELASTINGEN** B.G:10 Wind van rechts onderdruk A




**STAAFBELASTINGEN** B.G:10 Wind van rechts onderdruk A

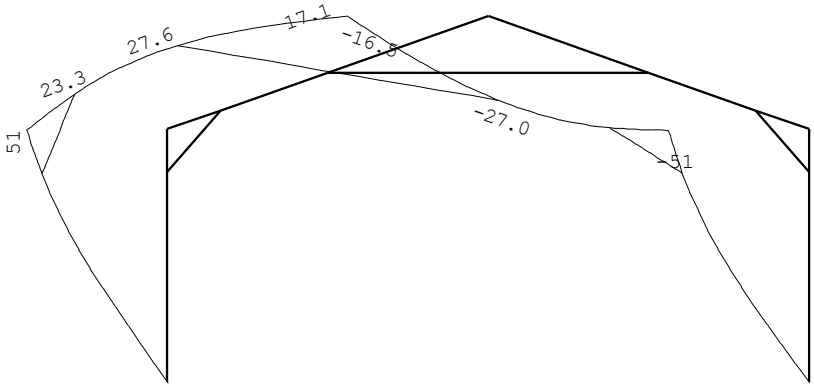
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw6 | 2.11 | 2.11 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

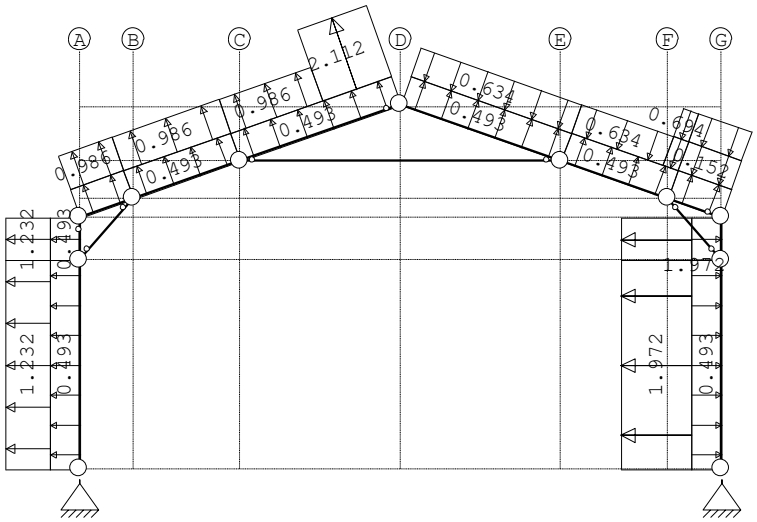
**STAAFBELASTINGEN** B.G:10 Wind van rechts onderdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 1.360 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:10 Wind van rechts onderdruk A




**BELASTINGEN** B.G:11 Wind van rechts overdruk A




**STAAFBELASTINGEN** B.G:11 Wind van rechts overdruk A

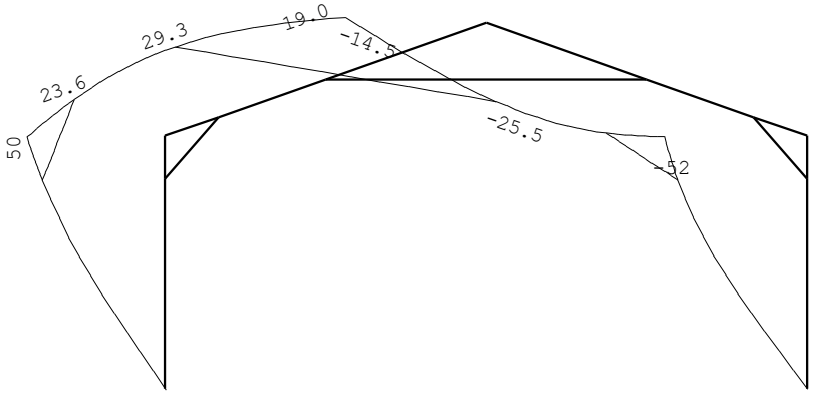
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

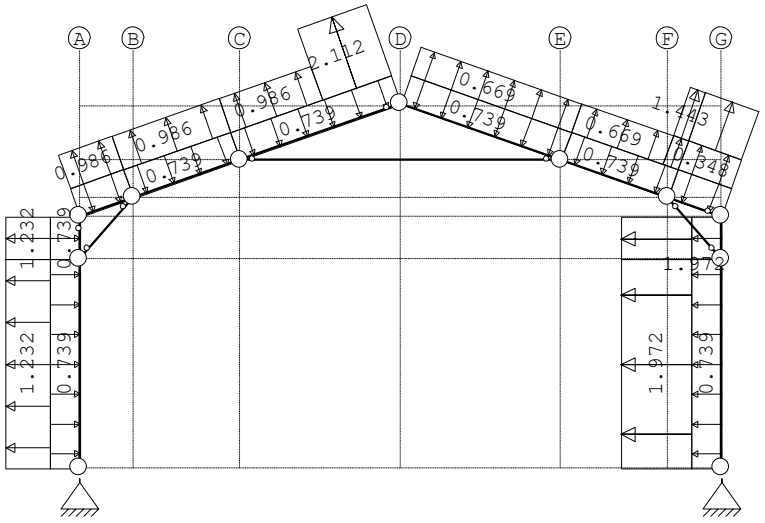
**STAAFBELASTINGEN** B.G:11 Wind van rechts overdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw6 | 2.11 | 2.11 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 1.360 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:11 Wind van rechts overdruk A




**BELASTINGEN** B.G:12 Wind van rechts onderdruk B

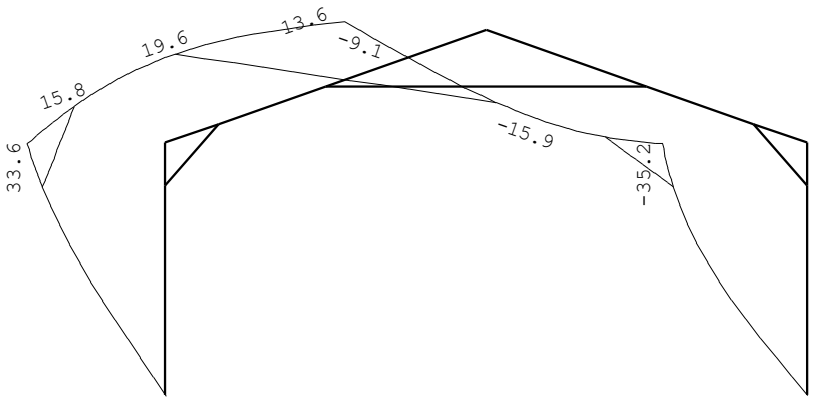


Project.....: BK2022-082
Onderdeel....: spant

**STAAFBELASTINGEN** B.G:12 Wind van rechts onderdruk B

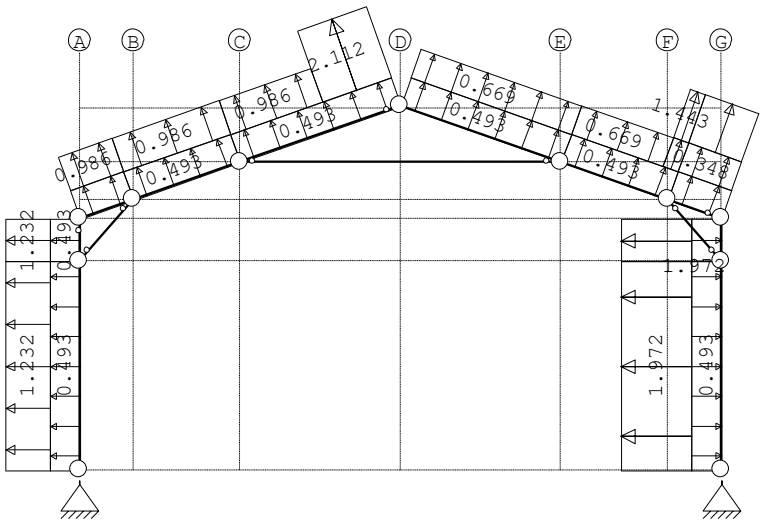
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw6 | 2.11 | 2.11 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 1.360 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:12 Wind van rechts onderdruk B



Project.....: BK2022-082
Onderdeel....: spant

**BELASTINGEN** B.G:13 Wind van rechts overdruk B

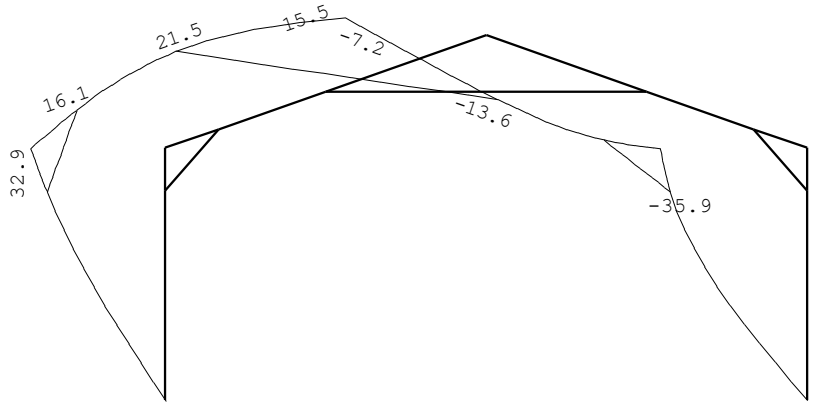



**STAAFBELASTINGEN** B.G:13 Wind van rechts overdruk B

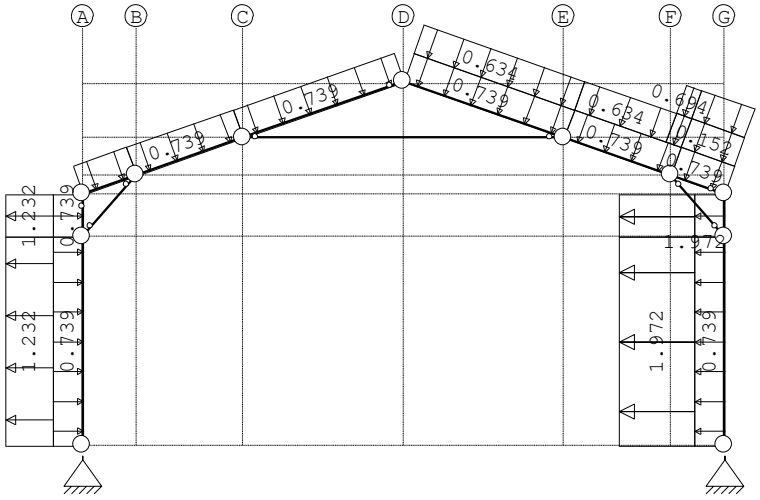
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw6 | 2.11 | 2.11 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 1.360 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw7 | 0.99 | 0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:13 Wind van rechts overdruk B




**BELASTINGEN** B.G:14 Wind van rechts onderdruk C

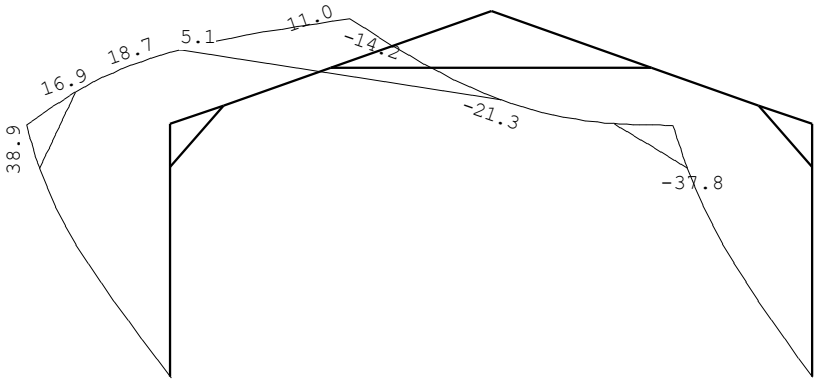



**STAAFBELASTINGEN** B.G:14 Wind van rechts onderdruk C

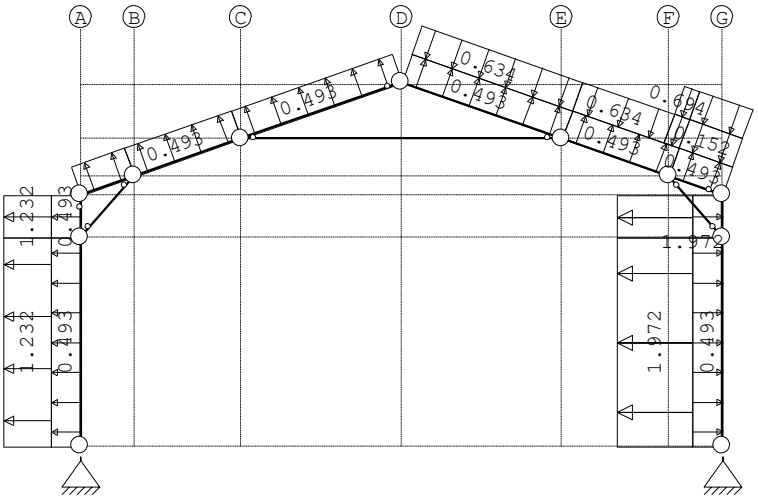
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:14 Wind van rechts onderdruk C




**BELASTINGEN** B.G:15 Wind van rechts overdruk C

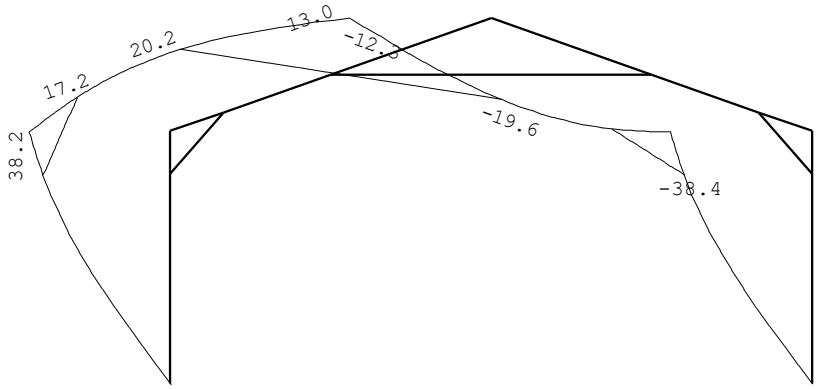



**STAAFBELASTINGEN** B.G:15 Wind van rechts overdruk C

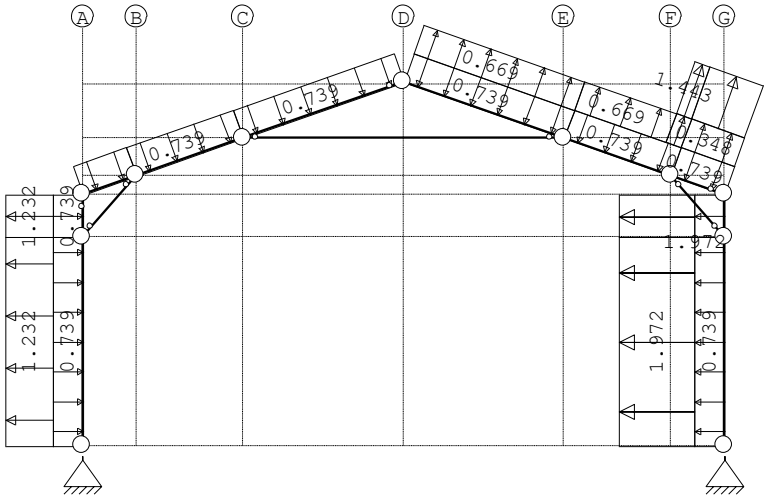
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw3 | -0.15 | -0.15 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw4 | -0.69 | -0.69 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw5 | -0.63 | -0.63 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:15 Wind van rechts overdruk C




**BELASTINGEN** B.G:16 Wind van rechts onderdruk D

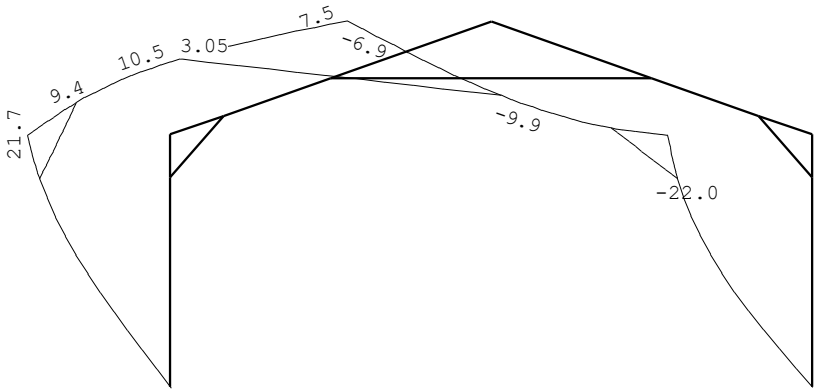



**STAAFBELASTINGEN** B.G:16 Wind van rechts onderdruk D

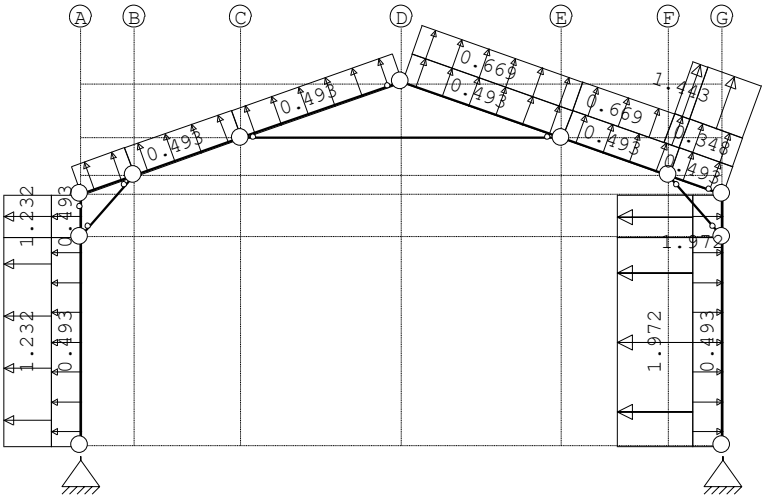
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:16 Wind van rechts onderdruk D




**BELASTINGEN** B.G:17 Wind van rechts overdruk D

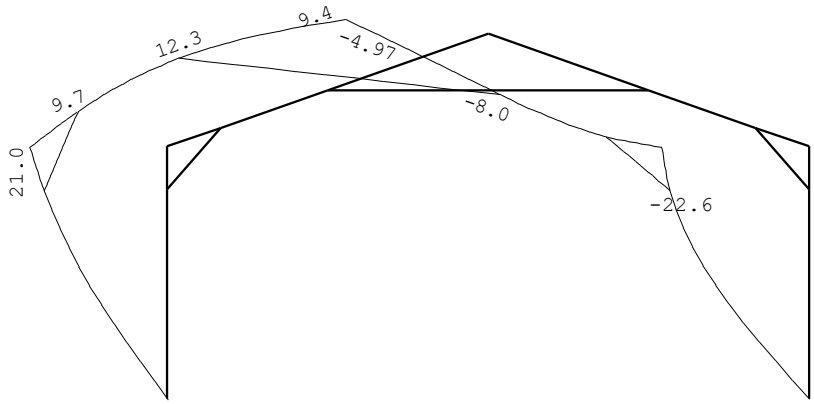



**STAAFBELASTINGEN** B.G:17 Wind van rechts overdruk D

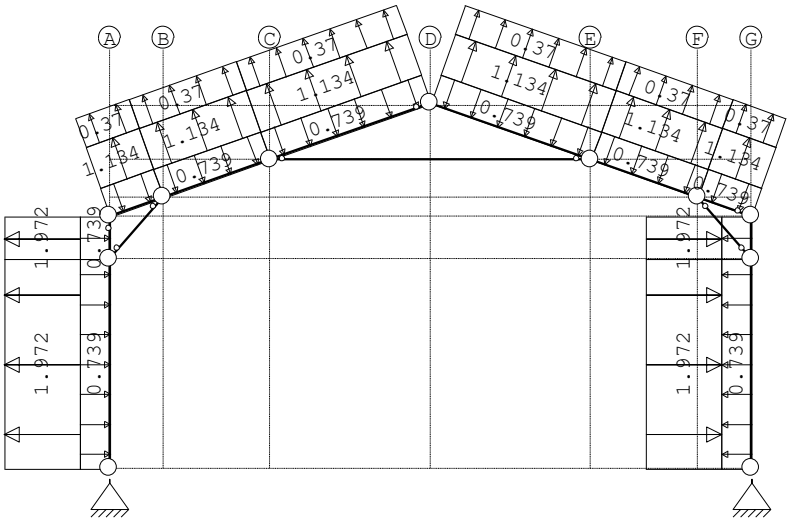
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -1.97 | -1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw10 | 0.35 | 0.35 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw11 | 1.44 | 1.44 | 1.818 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw12 | 0.67 | 0.67 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw8 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:17 Wind van rechts overdruk D




**BELASTINGEN** B.G:18 Wind loodrecht onderdruk A




**STAAFBELASTINGEN** B.G:18 Wind loodrecht onderdruk A

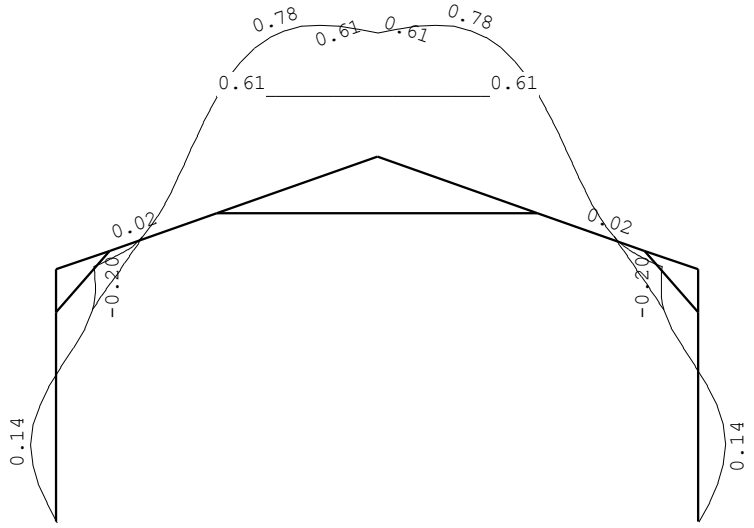
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw13 | 1.97 | 1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw13 | 1.97 | 1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw13 | 1.97 | 1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw13 | 1.97 | 1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw14 | 1.13 | 1.13 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw15 | 0.37 | 0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw14 | 1.13 | 1.13 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw15 | 0.37 | 0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw14 | 1.13 | 1.13 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw15 | 0.37 | 0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

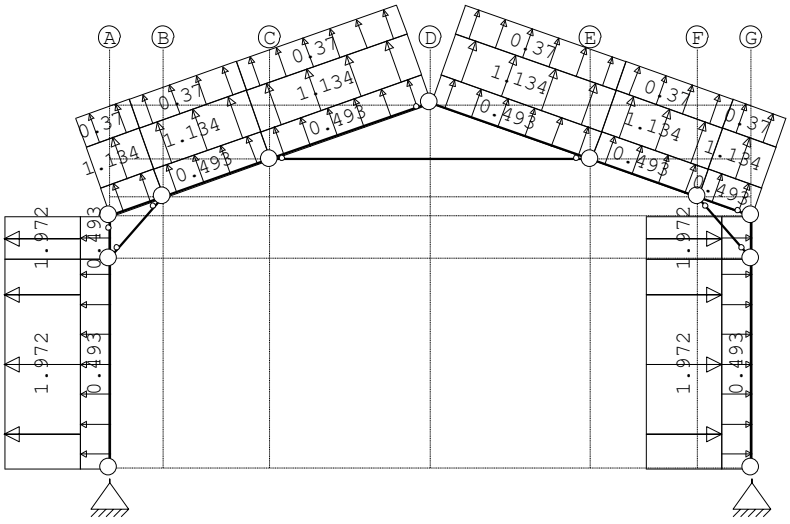
**STAAFBELASTINGEN** B.G:18 Wind loodrecht onderdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 1:QZLokaal | Qw14 | 1.13 | 1.13 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw15 | 0.37 | 0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw14 | 1.13 | 1.13 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw15 | 0.37 | 0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw14 | 1.13 | 1.13 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw15 | 0.37 | 0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:18 Wind loodrecht onderdruk A




**BELASTINGEN** B.G:19 Wind loodrecht overdruk A

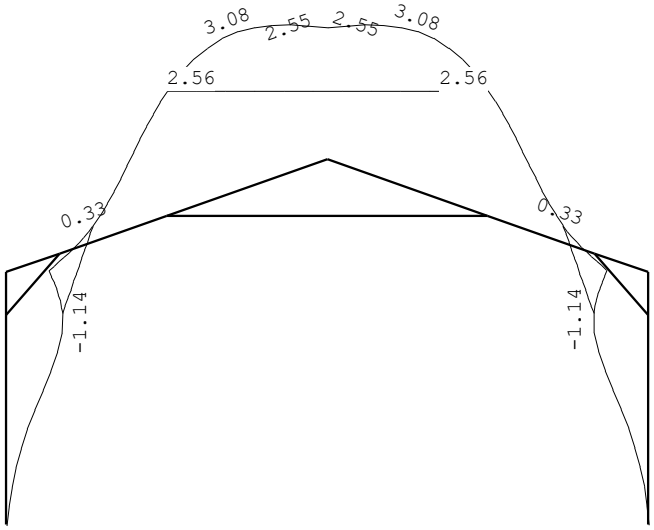


Project.....: BK2022-082
Onderdeel....: spant

**STAAFBELASTINGEN** B.G:19 Wind loodrecht overdruk A

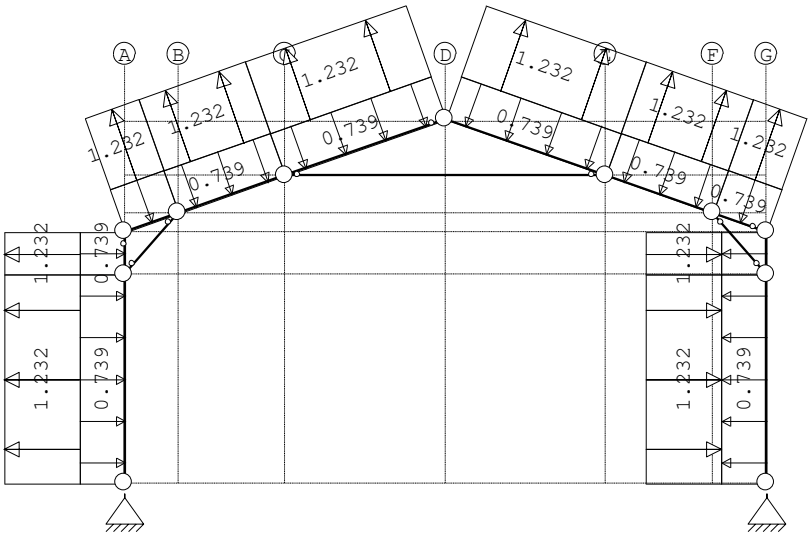
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw13 | 1.97 | 1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw13 | 1.97 | 1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw13 | 1.97 | 1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw13 | 1.97 | 1.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw14 | 1.13 | 1.13 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw15 | 0.37 | 0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw14 | 1.13 | 1.13 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw15 | 0.37 | 0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw14 | 1.13 | 1.13 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw15 | 0.37 | 0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw14 | 1.13 | 1.13 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw15 | 0.37 | 0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw14 | 1.13 | 1.13 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw15 | 0.37 | 0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw14 | 1.13 | 1.13 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw15 | 0.37 | 0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:19 Wind loodrecht overdruk A



Project.....: BK2022-082
Onderdeel....: spant

**BELASTINGEN** B.G:20 Wind loodrecht onderdruk B

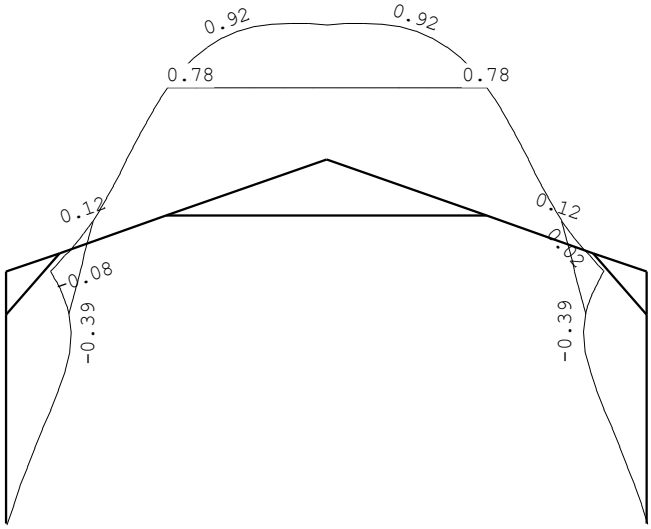



**STAAFBELASTINGEN** B.G:20 Wind loodrecht onderdruk B

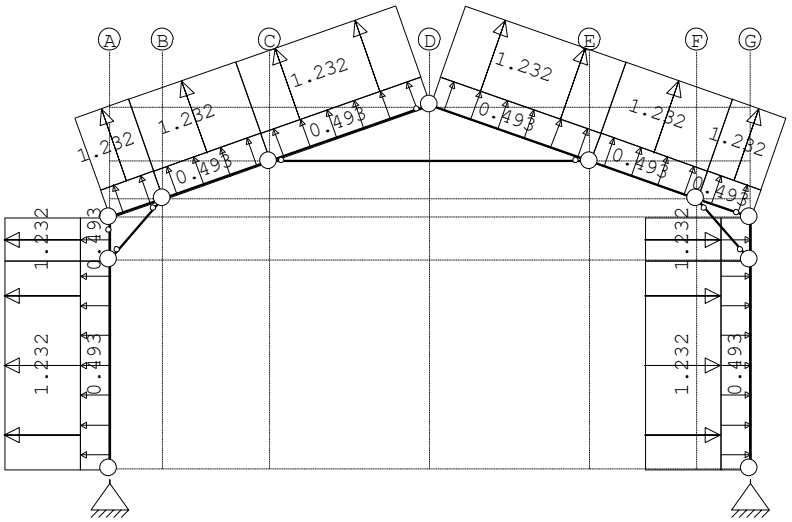
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.74 | -0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw16 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw16 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw16 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw16 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw17 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw17 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw17 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw17 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw17 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw17 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:20 Wind loodrecht onderdruk B




**BELASTINGEN** B.G:21 Wind loodrecht overdruk B




**STAAFBELASTINGEN** B.G:21 Wind loodrecht overdruk B

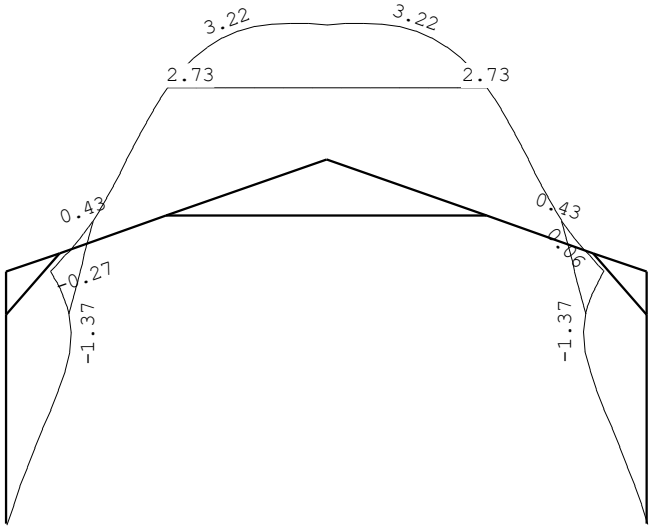
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw9 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw16 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw16 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw16 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw16 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

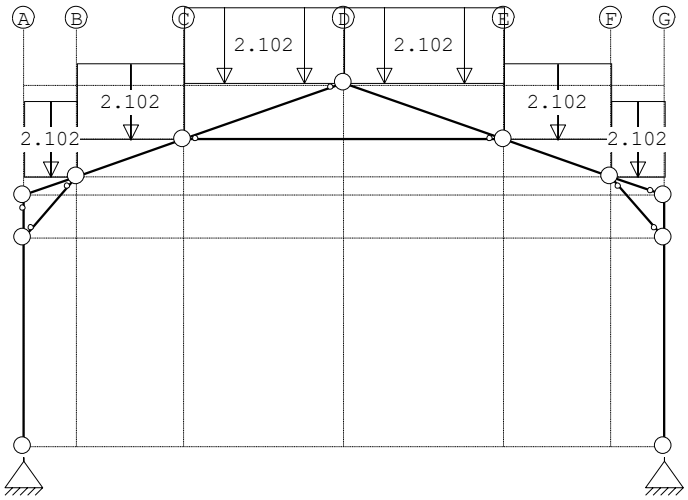
**STAAFBELASTINGEN** B.G:21 Wind loodrecht overdruk B

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 1:QZLokaal | Qw17 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw17 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw17 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw17 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw17 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw17 | 1.23 | 1.23 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:21 Wind loodrecht overdruk B




**BELASTINGEN** B.G:22 Sneeuw A

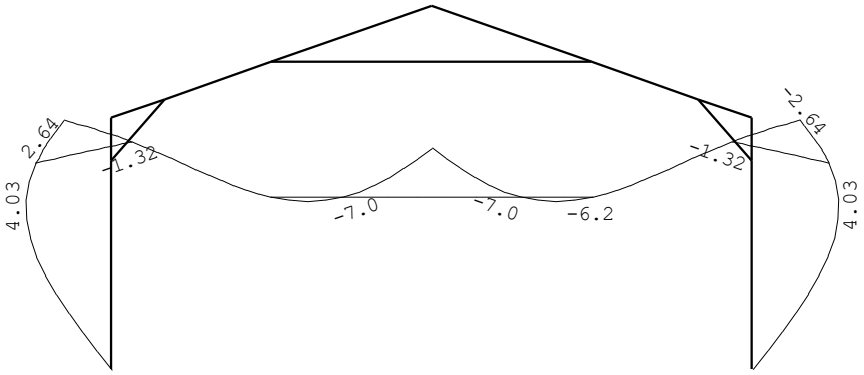


Project.....: BK2022-082
Onderdeel....: spant

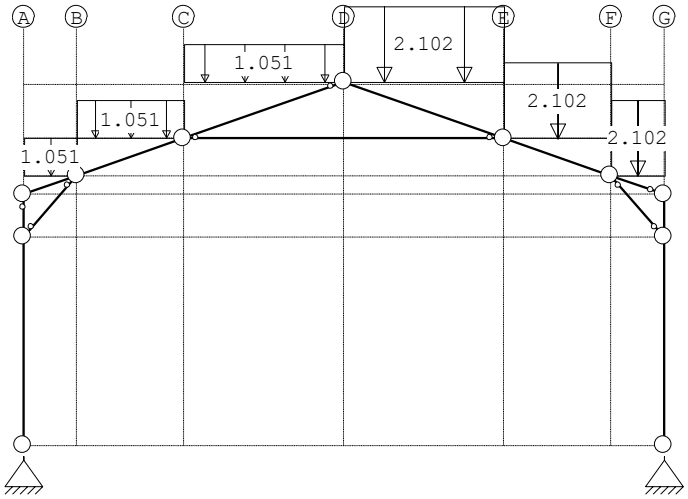
**STAAFBELASTINGEN** B.G:22 Sneeuw A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 3:QZgeProj. | Qs1 | -2.10 | -2.10 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 3:QZgeProj. | Qs1 | -2.10 | -2.10 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 3:QZgeProj. | Qs1 | -2.10 | -2.10 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 3:QZgeProj. | Qs1 | -2.10 | -2.10 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 3:QZgeProj. | Qs1 | -2.10 | -2.10 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 3:QZgeProj. | Qs1 | -2.10 | -2.10 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:22 Sneeuw A




**BELASTINGEN** B.G:23 Sneeuw B

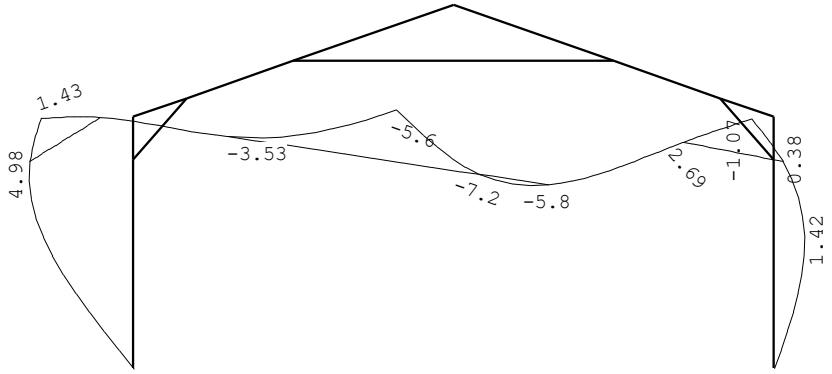



**STAAFBELASTINGEN** B.G:23 Sneeuw B

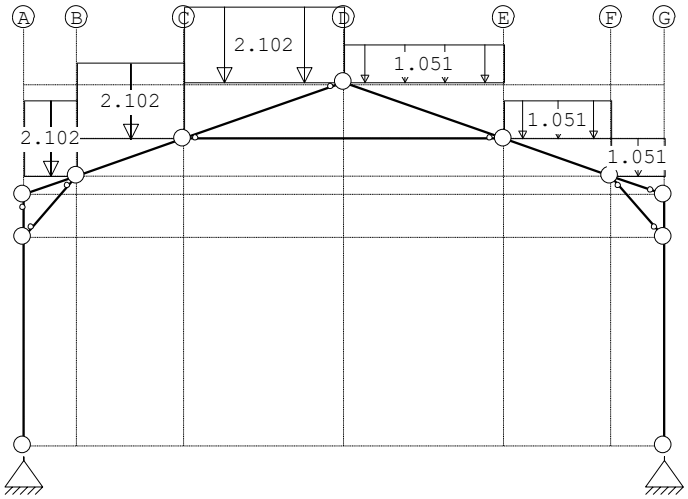
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 3:QZgeProj. | Qs2 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 3:QZgeProj. | Qs2 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 3:QZgeProj. | Qs2 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 3:QZgeProj. | Qs1 | -2.10 | -2.10 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 3:QZgeProj. | Qs1 | -2.10 | -2.10 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 3:QZgeProj. | Qs1 | -2.10 | -2.10 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:23 Sneeuw B




**BELASTINGEN** B.G:24 Sneeuw C

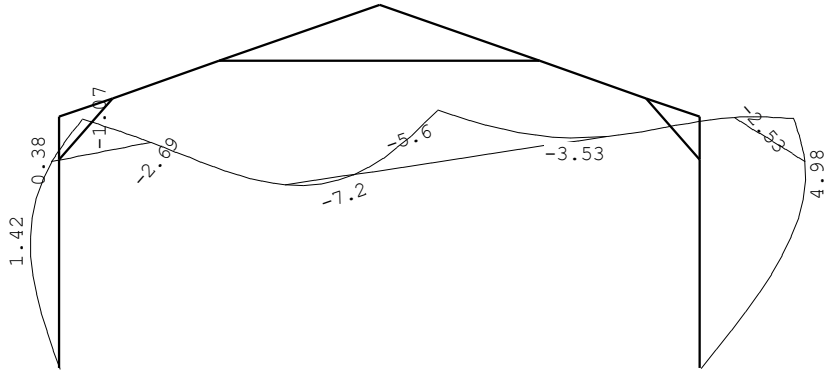



**STAAFBELASTINGEN** B.G:24 Sneeuw C

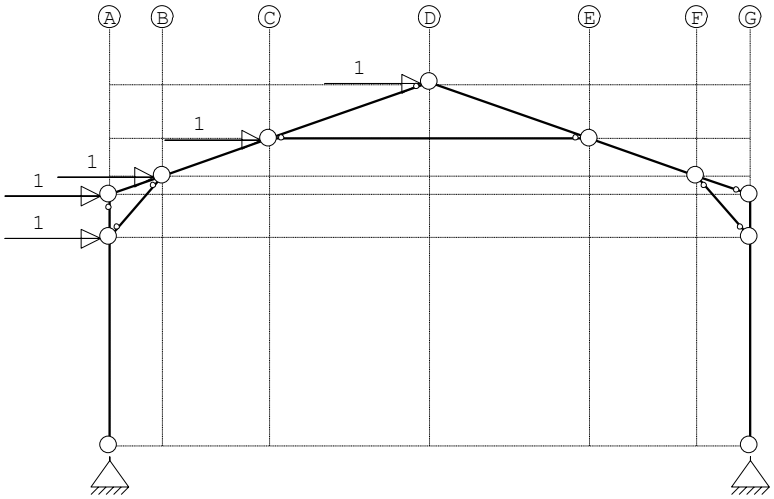
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 3:QZgeProj. | Qs1 | -2.10 | -2.10 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 3:QZgeProj. | Qs1 | -2.10 | -2.10 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 3:QZgeProj. | Qs1 | -2.10 | -2.10 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 3:QZgeProj. | Qs2 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 3:QZgeProj. | Qs2 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 3:QZgeProj. | Qs2 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:24 Sneeuw C




**BELASTINGEN** B.G:25 Knik

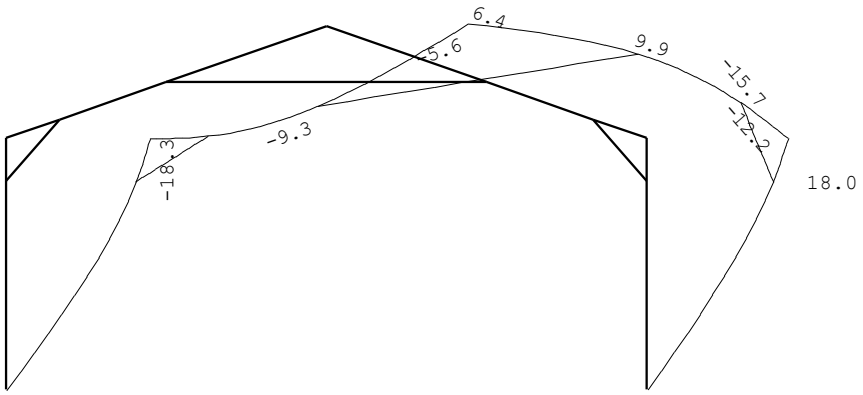



**KNOOPBELASTINGEN** B.G:25 Knik

| Last | Knoop | Richting | waarde | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|
| 1 | 2 | X | 1.000 | | | |
| 2 | 3 | X | 1.000 | | | |
| 3 | 4 | X | 1.000 | | | |
| 4 | 5 | X | 1.000 | | | |
| 5 | 6 | X | 1.000 | | | |

Project.....: BK2022-082
Onderdeel....: spant

**VERPLAATSINGEN** [mm] B.G:25 Knik




**REACTIES**

| Kn. | B.G. | X | Z | M |
|---|---|---|---|---|
| 1 | 1 | 2.96 | 12.37 | |
| 1 | 2 | -11.64 | 0.53 | |
| 1 | 3 | -10.52 | -6.87 | |
| 1 | 4 | -11.05 | -5.40 | |
| 1 | 5 | -9.94 | -12.79 | |
| 1 | 6 | -9.32 | 3.92 | |
| 1 | 7 | -8.21 | -3.47 | |
| 1 | 8 | -8.73 | -2.01 | |
| 1 | 9 | -7.62 | -9.40 | |
| 1 | 10 | 7.43 | 5.06 | |
| 1 | 11 | 8.54 | -2.33 | |
| 1 | 12 | 4.68 | 1.46 | |
| 1 | 13 | 5.79 | -5.94 | |
| 1 | 14 | 7.17 | 9.03 | |
| 1 | 15 | 8.28 | 1.63 | |
| 1 | 16 | 4.42 | 5.43 | |
| 1 | 17 | 5.53 | -1.97 | |
| 1 | 18 | 1.85 | -4.59 | |
| 1 | 19 | 2.96 | -11.98 | |
| 1 | 20 | 0.44 | -2.96 | |
| 1 | 21 | 1.56 | -10.35 | |
| 1 | 22 | 3.41 | 12.61 | |
| 1 | 23 | 2.56 | 7.88 | |
| 1 | 24 | 2.56 | 11.04 | |
| 1 | 25 | -2.71 | -2.18 | |

Project.....: BK2022-082
Onderdeel....: spant

**REACTIES**

| Kn. | B.G. | X | Z | M |
|---|---|---|---|---|
| 11 | 1 | -2.96 | 12.37 | |
| 11 | 2 | -7.43 | 5.06 | |
| 11 | 3 | -8.54 | -2.33 | |
| 11 | 4 | -4.68 | 1.46 | |
| 11 | 5 | -5.79 | -5.94 | |
| 11 | 6 | -7.17 | 9.03 | |
| 11 | 7 | -8.28 | 1.63 | |
| 11 | 8 | -4.42 | 5.43 | |
| 11 | 9 | -5.53 | -1.97 | |
| 11 | 10 | 11.64 | 0.53 | |
| 11 | 11 | 10.52 | -6.87 | |
| 11 | 12 | 11.05 | -5.40 | |
| 11 | 13 | 9.94 | -12.79 | |
| 11 | 14 | 9.32 | 3.92 | |
| 11 | 15 | 8.21 | -3.47 | |
| 11 | 16 | 8.73 | -2.01 | |
| 11 | 17 | 7.62 | -9.40 | |
| 11 | 18 | -1.85 | -4.59 | |
| 11 | 19 | -2.96 | -11.98 | |
| 11 | 20 | -0.44 | -2.96 | |
| 11 | 21 | -1.56 | -10.35 | |
| 11 | 22 | -3.41 | 12.61 | |
| 11 | 23 | -2.56 | 11.04 | |
| 11 | 24 | -2.56 | 7.88 | |
| 11 | 25 | -2.29 | 2.18 | |

**BELASTINGCOMBINATIES**

| BC | Type | | | | |
|---|---|---|---|---|---|
| 1 | Fund. | 1.22 $G_{k,1}$ | | | |
| 2 | Fund. | 0.90 $G_{k,1}$ | | | |
| 3 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,2}$ |
| 4 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,3}$ |
| 5 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,4}$ |
| 6 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,5}$ |
| 7 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,6}$ |
| 8 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,7}$ |
| 9 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,8}$ |
| 10 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,9}$ |
| 11 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,10}$ |
| 12 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,11}$ |
| 13 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,12}$ |
| 14 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,13}$ |
| 15 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,14}$ |
| 16 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,15}$ |
| 17 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,16}$ |
| 18 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,17}$ |
| 19 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,18}$ |
| 20 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,19}$ |
| 21 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,20}$ |
| 22 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,21}$ |
| 23 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,22}$ |
| 24 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,23}$ |
| 25 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,24}$ |
| 26 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,2}$ |
| 27 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,3}$ |
| 28 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,4}$ |
| 29 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,5}$ |
| 30 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,6}$ |
| 31 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,7}$ |
| 32 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,8}$ |

Project.....: BK2022-082
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**BELASTINGCOMBINATIES**

| BC | Type | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 33 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,9}$ |
| 34 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,10}$ |
| 35 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,11}$ |
| 36 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,12}$ |
| 37 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,13}$ |
| 38 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,14}$ |
| 39 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,15}$ |
| 40 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,16}$ |
| 41 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,17}$ |
| 42 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,18}$ |
| 43 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,19}$ |
| 44 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,20}$ |
| 45 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,21}$ |
| 46 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,22}$ |
| 47 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,23}$ |
| 48 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,24}$ |
| 49 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,2}$ |
| 50 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,3}$ |
| 51 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,4}$ |
| 52 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,5}$ |
| 53 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,6}$ |
| 54 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,7}$ |
| 55 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,8}$ |
| 56 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,9}$ |
| 57 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,10}$ |
| 58 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,11}$ |
| 59 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,12}$ |
| 60 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,13}$ |
| 61 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,14}$ |
| 62 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,15}$ |
| 63 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,16}$ |
| 64 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,17}$ |
| 65 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,18}$ |
| 66 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,19}$ |
| 67 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,20}$ |
| 68 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,21}$ |
| 69 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,22}$ |
| 70 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,23}$ |
| 71 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,24}$ |
| 72 | Quas. | 1.00 | $G_{k,1}$ | | | | |
| 73 | Freq. | 1.00 | $G_{k,1}$ | | | | |
| 74 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,2}$ |
| 75 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,3}$ |
| 76 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,4}$ |
| 77 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,5}$ |
| 78 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,6}$ |
| 79 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,7}$ |
| 80 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,8}$ |
| 81 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,9}$ |
| 82 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,10}$ |
| 83 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,11}$ |
| 84 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,12}$ |
| 85 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,13}$ |
| 86 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,14}$ |
| 87 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,15}$ |

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Onderdeel....: spant

**BELASTINGCOMBINATIES**

| BC | Type | | | | | |
|---|---|---|---|---|---|---|
| 88 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,16}$ |
| 89 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,17}$ |
| 90 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,18}$ |
| 91 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,19}$ |
| 92 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,20}$ |
| 93 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,21}$ |
| 94 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,22}$ |
| 95 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,23}$ |
| 96 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,24}$ |
| 97 | Blij. | 1.00 $G_{k,1}$ | | | |

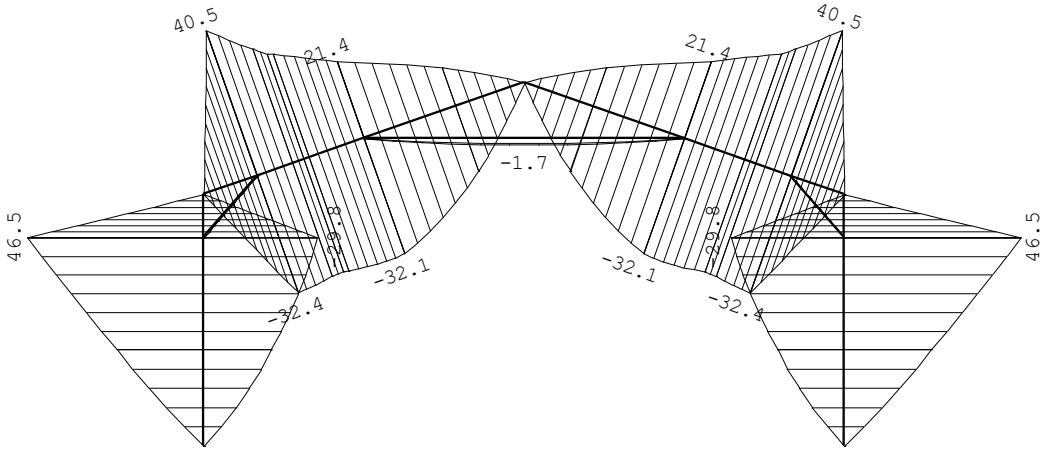
**GUNSTIGE WERKING PERMANENTE BELASTINGEN**

| BC | Staven met gunstige werking |
|---|---|
| 1 | Geen |
| 2 | Alle staven de factor:0.90 |
| 3 | Geen |
| 4 | Geen |
| 5 | Geen |
| 6 | Geen |
| 7 | Geen |
| 8 | Geen |
| 9 | Geen |
| 10 | Geen |
| 11 | Geen |
| 12 | Geen |
| 13 | Geen |
| 14 | Geen |
| 15 | Geen |
| 16 | Geen |
| 17 | Geen |
| 18 | Geen |
| 19 | Geen |
| 20 | Geen |
| 21 | Geen |
| 22 | Geen |
| 23 | Geen |
| 24 | Geen |
| 25 | Geen |
| 26 | Alle staven de factor:0.90 |
| 27 | Alle staven de factor:0.90 |
| 28 | Alle staven de factor:0.90 |
| 29 | Alle staven de factor:0.90 |
| 30 | Alle staven de factor:0.90 |
| 31 | Alle staven de factor:0.90 |
| 32 | Alle staven de factor:0.90 |
| 33 | Alle staven de factor:0.90 |
| 34 | Alle staven de factor:0.90 |
| 35 | Alle staven de factor:0.90 |
| 36 | Alle staven de factor:0.90 |
| 37 | Alle staven de factor:0.90 |
| 38 | Alle staven de factor:0.90 |
| 39 | Alle staven de factor:0.90 |
| 40 | Alle staven de factor:0.90 |
| 41 | Alle staven de factor:0.90 |
| 42 | Alle staven de factor:0.90 |
| 43 | Alle staven de factor:0.90 |
| 44 | Alle staven de factor:0.90 |
| 45 | Alle staven de factor:0.90 |
| 46 | Alle staven de factor:0.90 |
| 47 | Alle staven de factor:0.90 |
| 48 | Alle staven de factor:0.90 |

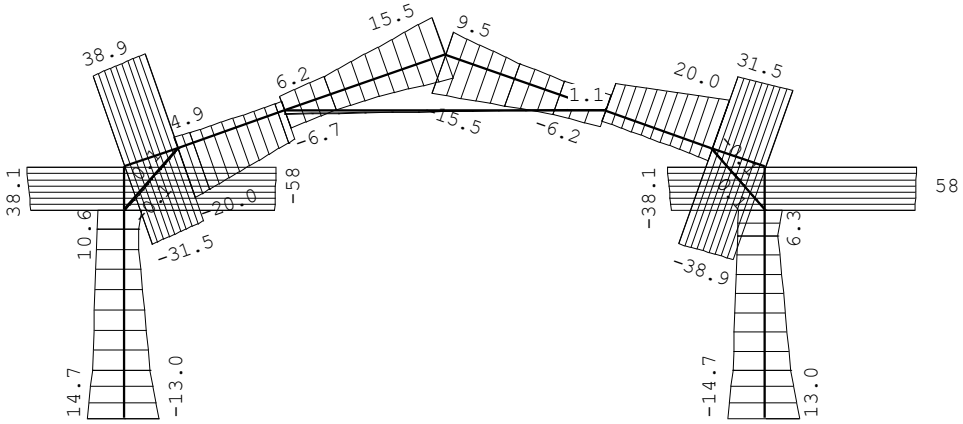
Project.....: BK2022-082
Onderdeel....: spant

**OMHULLENDE VAN DE FUNDAMENTELE COMBINATIES**

**MOMENTEN** Fundamentele combinatie

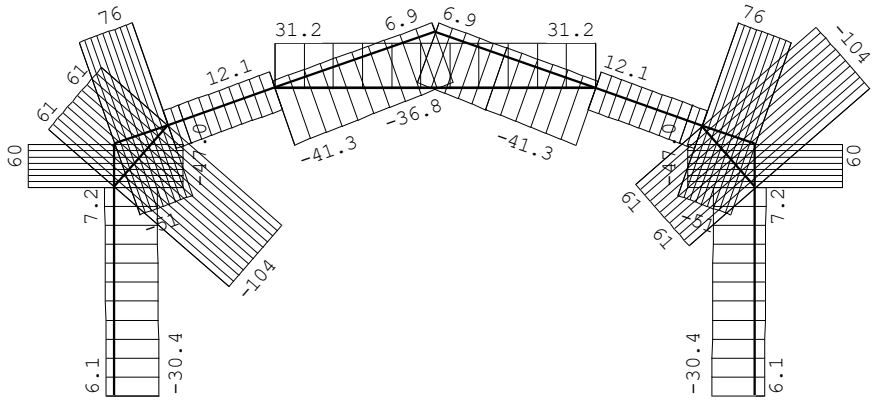



**DWARSKRACHTEN** Fundamentele combinatie



Project.....: BK2022-082
Onderdeel....: spant

**NORMAALKRACHTEN** Fundamentele combinatie

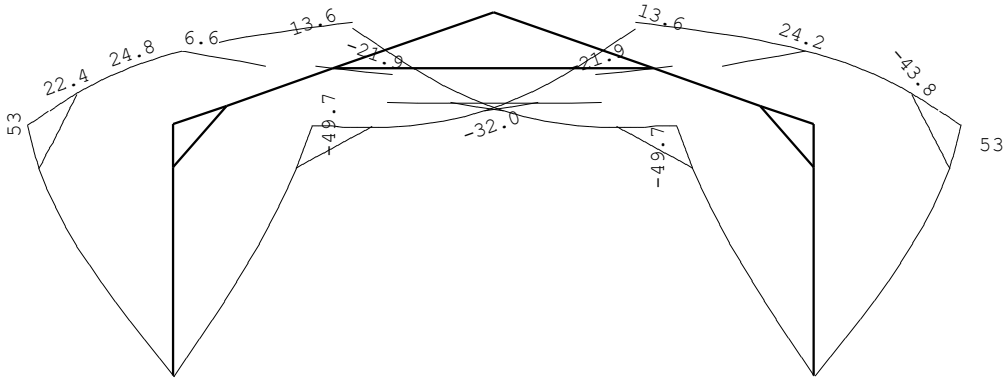



**REACTIES** Fundamentele combinatie

| Kn. | X-min | X-max | Z-min | Z-max | M-min | M-max |
|---|---|---|---|---|---|---|
| 1 | -13.04 | 14.72 | -6.14 | 30.39 | | |
| 11 | -14.72 | 13.04 | -6.14 | 30.39 | | |

**OMHULLENDE VAN DE KARAKTERISTIEKE COMBINATIES**

**VERPLAATSINGEN** [mm] Karakteristieke combinatie



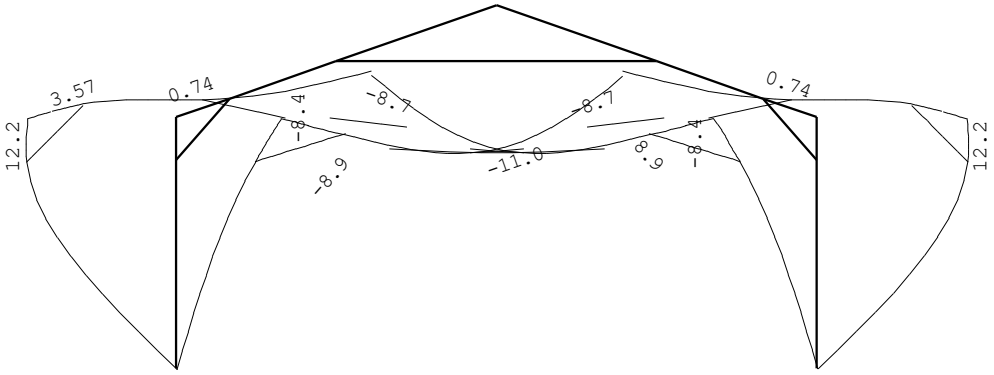

**REACTIES** Karakteristieke combinatie

| Kn. | X-min | X-max | Z-min | Z-max | M-min | M-max |
|---|---|---|---|---|---|---|
| 1 | -8.68 | 11.50 | -0.43 | 24.98 | | |
| 11 | -11.50 | 8.68 | -0.43 | 24.98 | | |

Project.....: BK2022-082
Onderdeel....: spant

## OMHULLENDE VAN DE FREQUENTE COMBINATIES

**VERPLAATSINGEN** [mm] Frequente combinatie

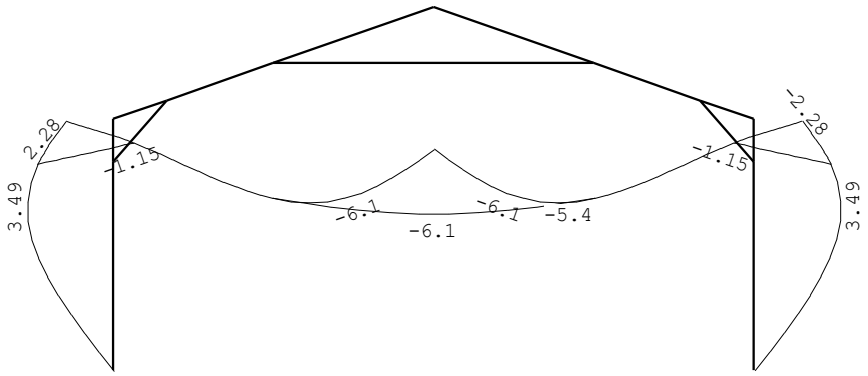



**REACTIES** Frequente combinatie

| Kn. | X-min | X-max | Z-min | Z-max | M-min | M-max |
|---|---|---|---|---|---|---|
| 1 | 0.63 | 4.67 | 9.81 | 14.89 | | |
| 11 | -4.67 | -0.63 | 9.81 | 14.89 | | |

## OMHULLENDE VAN DE QUASI-BLIJVENDE COMBINATIES

**VERPLAATSINGEN** [mm] Quasi-blijvende combinatie




**REACTIES** Quasi-blijvende combinatie

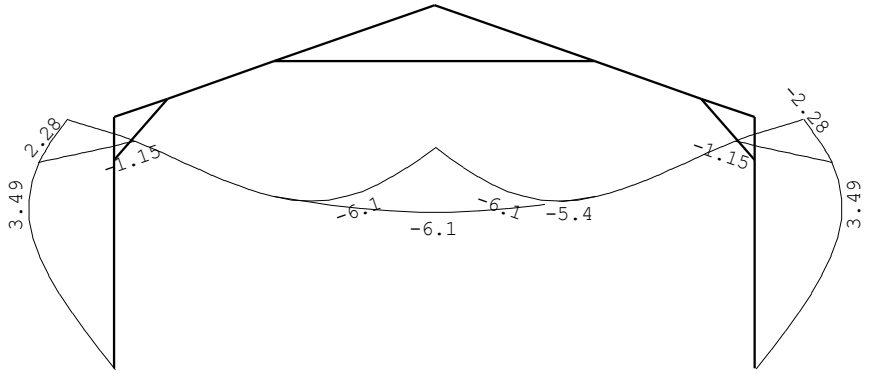
| Kn. | X | Z | M |
|---|---|---|---|
| 1 | 2.96 | 12.37 | |
| 11 | -2.96 | 12.37 | |

Project.....: BK2022-082
Onderdeel....: spant

## OMHULLENDE VAN DE BLIJVENDE COMBINATIES

### VERPLAATSINGEN [mm]

Blijvende combinatie




### REACTIES

Blijvende combinatie

| Kn. | X | Z | M |
|---|---|---|---|
| 1 | 2.96 | 12.37 | |
| 11 | -2.96 | 12.37 | |

### STAALPROFIELEN - ALGEMENE GEGEVENS

| | | |
|---|---|---|
| Stabiliteit: | Classificatie gehele constructie: | Ongeschoord |
| | Belastinggeval m.b.t. bepaling kniklengte: | 25=Knik |
| | Aanpassing inkl. parameter C : | Steunpunten |
| Tweede-orde-effect: | | |
| | Aan te houden verhouding n/(n-1) | |
| | voor steunmomenten en verplaatsingen: | 1.10 |
| Doorbuiging en verplaatsing: | | |
| | Aantal bouwlagen: | 1 |
| | Gebouwtype: | Overig |
| | Toel. horiz. verplaatsing gehele gebouw: | h/300 |
| | Kleinste gevelhoogte [m]: | 0.0 |

### GEOMETRIE

**L-sys [m]: 4.700 Staaf: 1-2 BC: 15 Sit:1**

### PROFIELGEGEVENS [mm]

**Gewalst Klasse 1 IPE240**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 240.0 | $i_y$ : | 99.8 | A : | 3910.0 | $W_{ey}$ : | 324.0E3 | $I_y$ : | 3892.0E4 |
| b : | 120.0 | $i_z$ : | 26.9 | | | $W_{ez}$ : | 47.3E3 | $I_z$ : | 283.6E4 |
| $t_w$ : | 6.2 | r : | 15.0 | | | $W_{py}$ : | 366.6E3 | $I_t$ : | 12.9E4 |
| $t_f$ : | 9.8 | | | | | $W_{pz}$ : | 74.0E3 | $I_w$ : | 37391.2E6 |

### MATERIAALGEGEVENS

| | | | |
|---|---|---|---|
| Vloeispanning $f_{y;d}$ [N/mm$^2$] : | 235.00 | Elasticiteitsmod. [N/mm$^2$] : | 210000 |
| Partiële veiligheidsfactoren: | | | |
| Gamma M;0 : | 1.00 | Gamma M;1 : | 1.00 |

### KRACHTEN

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | -25.5 | 0.0 | 12.9 |
| Midden : | -24.8 | 28.4 | 11.3 |
| My-max : | -24.3 | 45.2 | -56.2 |
| Einde : | 52.6 | 0.0 | -56.7 |

Project.....: BK2022-082
Onderdeel....: spant

**KNIKSTABILITEIT**

| | | Geschoord y Begin | Einde | | Geschoord z Begin | Einde |
|---|---|---|---|---|---|---|
| Kniklengte [m]: | | | 4.700 | | | 4.700 |
| N.Ed [kN]: | | | 25.547 | | | 25.547 |
| Slankheid lambda : | | | 47.109 | | | 174.515 |
| Ncr (F Euler)[kN]: | | | 3651.7 | | | 266.1 |
| Lambda rel. : | | | 0.502 | | | 1.858 |
| Phi : | | | 0.657 | | | 2.508 |
| Imp.factor alpha : | | | 0.210 | | | 0.340 |
| Red.factor chi : | kromme a | | 0.924 | kromme b | | 0.238 |
| Nb.Rd [kN]: | | | 848.8 | | | 219.1 |
| Mom.verd.factor : | Cmy | | 0.950 | Cmz | | 1.000 |
| : | CmLT | | 0.950 | | | |
| Interactiefactor : | kyy | | 0.959 | kyz | | 0.698 |
| | kzy | | 0.983 | kzz | | 1.163 |

**KIPSTABILITEIT**

| | | | |
|---|---|---|---|
| lgaf boven [m]: | 4.700 | lgaf onder [m]: | 4.700 |
| Lst [m]: | | | 4.700 |
| Ltus.eff.kipst[m]: | | | 4,7 |
| Voorwaarde : | (NB.74) | Q-last [kN/m]: | 28.943 |
| Plaats aangr.last: | 1.00*h | P-last [kN]: | 0.000 |
| Lengte lkip [m] : | 4.700 | Verhouding beta : | 0.000 |
| Kipmom. Mcr [kNm]: | 88.6 | Factor k_red : | 1.000 |
| Tabel NB.NB.1 : | | | |
| Coëfficiënt $C_1$ : | 1.130 | Coëfficiënt $C_2$ : | 0.469 |
| Coëfficiënt C : | 5.278 | Factor S : | 905.5 |
| Lambda rel LT : kromme b | 0.986 | Chi LT (6.57) : | 0.708 |
| Corr. factor $k_c$ : | 0.940 | Red. factor f : | 0.972 |
| | | Chi LT.mod (6.58): | 0.729 |
| Moment [kNm] : | 45.152 | Mb.Rd [kNm] : | 62.774 |

**TOETSING STABILITEIT/STERKTE** **Druk en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.1.1 | (6.46y) | | 0.030 | 7 |
| | | | (6.46z) | | 0.117 | 27 |
| | EN3-1-1 | 6.3.2 | (6.54) | | 0.719 | 169 |
| | EN3-1-1 | 6.3.3 | (6.61) | 0.03 + 0.69 + 0.00 = | 0.720 | 169 |
| | | | (6.62) | 0.12 + 0.71 + 0.00 = | **0.824** | **194** |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.03 + 0.05 + 0.00 = | 0.077 | 18 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.028 | 7 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.050 | 7 |
| My-max | EN3-1-1 | 6.2.1(6) | N+D | 0.03 + 0.22 + 0.00 = | 0.243 | 57 |
| | EN3-1-1 | 6.2.10 | (6.45+6.31y) | | 0.577 | 135 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.026 | 6 |
| | EN3-1-1 | 6.2.5 | (6.12y) | | 0.577 | 135 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.238 | 32 |
| | EN3-1-1 | 6.2.8 | (6.30) | | 0.577 | 135 |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.06 + 0.22 + 0.00 = | 0.276 | 65 |
| | EN3-1-1 | 6.2.3 | (6.5) | | 0.057 | 13 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.219 | 30 |

Opmerkingen:
**[ 42] Waarschuwing: Er sluiten tussentijds staven en/of opleggingen aan.**
[ 46] T.b.v. kip is een equivalente Q-last berekend.
[ 47] Bij verlopende normaalkracht wordt de grootste drukkracht genomen.

**TOETSING HOR. VERPL.** **Lengte [m]: 4.700 Staaf: 1-2 BC: 57 Sit:1**

| verpl.[mm] | Eindverplaatsing | Aangehouden tweede-orde-verh.: 1.100 |
|---|---|---|
| Begin 0.0 | $u_{eind}$ $\frac{57.9}{15.7}$ [mm] | |
| Extreem 0.0 | $u_{toel}$ | |
| Midden 33.8 | [h/] 300.0 | Maatgevend: scheefstand |
| Einde 52.7 | | |

Project.....: BK2022-082
Onderdeel....: spant

**GEOMETRIE** **L-sys [m]: 6.357 Staaf: 3-5 BC: 11 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 IPE240**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 240.0 | $i_y$: | 99.8 | A : | 3910.0 | $W_{ey}$: | 324.0E3 | $I_y$: | 3892.0E4 |
| b : | 120.0 | $i_z$: | 26.9 | | | $W_{ez}$: | 47.3E3 | $I_z$: | 283.6E4 |
| $t_w$: | 6.2 | r : | 15.0 | | | $W_{py}$: | 366.6E3 | $I_t$: | 12.9E4 |
| $t_f$: | 9.8 | | | | | $W_{pz}$: | 74.0E3 | $I_w$: | 37391.2E6 |

**MATERIAALGEGEVENS**

Vloeispanning $f_{y;d}$ [N/mm$^2$] : 235.00 Elasticiteitsmod. [N/mm$^2$] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

**KRACHTEN**

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | 75.0 | 0.0 | 37.6 |
| My-max : | -15.0 | 40.5 | -12.7 |
| Midden : | -20.6 | 16.4 | -10.1 |
| Einde : | -18.8 | 0.0 | -4.8 |

**KNIKSTABILITEIT**

| | Geschoord y | | | Geschoord z | | |
|---|---|---|---|---|---|---|
| | | Begin | Einde | | Begin | Einde |
| Kniklengte [m]: | | | 6.357 | | | 3.178 |
| N.Ed [kN]: | | | 20.575 | | | 20.575 |
| Slankheid lambda : | | | 63.716 | | | 118.002 |
| Ncr (F Euler)[kN]: | | | 1996.2 | | | 582.0 |
| Lambda rel. : | | | 0.678 | | | 1.257 |
| Phi : | | | 0.780 | | | 1.469 |
| Imp.factor alpha : | | | 0.210 | | | 0.340 |
| Red.factor chi : | kromme a | | 0.858 | kromme b | | 0.448 |
| Nb.Rd [kN]: | | | 788.0 | | | 412.0 |
| Mom.verd.factor : | Cmy | | 0.950 | Cmz | | 1.000 |
| : | CmLT | | 0.950 | | | |
| Interactiefactor : | kyy | | 0.962 | kyz | | 0.642 |
| | kzy | | 0.993 | kzz | | 1.070 |

**KIPSTABILITEIT**

| | | | | |
|---|---|---|---|---|
| lgaf boven [m]: | 6.357 | lgaf onder [m]: | 6.357 |
| Kipst.boven [m]: | | | 2*3,178 |
| Lst [m]: | | | 6.357 |
| Ltus.eff.kipst[m]: | | | 6,3569 |
| Voorwaarde : | (NB.74) | Q-last [kN/m]: | 14.441 |
| Plaats aangr.last: | 1.00*h | P-last [kN]: | 0.000 |
| Lengte lkip [m] : | 6.357 | Verhouding beta : | 0.000 |
| Kipmom. Mcr [kNm]: | 58.4 | Factor k_red : | 1.000 |
| Tabel NB.NB.1 : | | | |
| Coëfficiënt $C_1$ : | 1.130 | Coëfficiënt $C_2$ : | 0.469 |
| Coëfficiënt C : | 4.705 | Factor S : | 905.5 |
| Lambda rel LT : kromme b | 1.214 | Chi LT (6.57) : | 0.571 |
| Corr. factor $k_c$ : | 0.940 | Red. factor f : | 0.980 |
| | | Chi LT.mod (6.58): | 0.582 |
| Moment [kNm] : | 40.526 | Mb.Rd [kNm] : | 50.179 |

**TOETSING STABILITEIT/STERKTE** **Druk en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm$^2$ |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.1.1 | (6.46y) | | 0.026 | 6 |
| | | | (6.46z) | | 0.050 | 12 |
| | EN3-1-1 | 6.3.2 | (6.54) | | 0.808 | 190 |
| | EN3-1-1 | 6.3.3 | (6.61) | 0.03 + 0.78 + 0.00 = | 0.803 | 189 |
| | | | (6.62) | 0.05 + 0.80 + 0.00 = | **0.852** | **200** |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.08 + 0.14 + 0.00 = | 0.227 | 53 |
| | EN3-1-1 | 6.2.3 | (6.5) | | 0.082 | 19 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.145 | 20 |
| My-max | EN3-1-1 | 6.2.1(6) | N+D | 0.02 + 0.05 + 0.00 = | 0.065 | 15 |
| | EN3-1-1 | 6.2.10 | (6.45+6.31y) | | 0.517 | 122 |

Project.....: BK2022-082
Onderdeel....: spant

| | | | | | | |
|---|---|---|---|---|---|---|
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.016 | 4 |
| | EN3-1-1 | 6.2.5 | (6.12y) | | 0.517 | 122 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.054 | 7 |
| | EN3-1-1 | 6.2.8 | (6.30) | | 0.517 | 122 |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.02 + 0.02 + 0.00 = | 0.039 | 9 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.020 | 5 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.019 | 3 |

Opmerkingen:
**[ 42] Waarschuwing: Er sluiten tussentijds staven en/of opleggingen aan.**
[ 46] T.b.v. kip is een equivalente Q-last berekend.
[ 47] Bij verlopende normaalkracht wordt de grootste drukkracht genomen.

## TOETSING DOORBUIGING

**Staaf: 3-5 BC: 49 Sit:1**

Staafsoort: Dak — Overstek begin: Nee einde: Nee
Lengte [m]: 6.357 — Aangehouden tweede-orde-verhouding: 1.100

| | Verpl. | Onmidd. | Korte duur | Bijkomend | Einddoorb. | [mm] |
|---|---|---|---|---|---|---|
| Begin | 0.6 | -16.3 | $u_{bij}$ -11.2 | $u_{eind}$ -14.2 | $u_{tot}$ -14.2 | |
| Extreem | -6.1 | -32.0 | $u_{toel}$ -25.4 | $u_{toel}$ -25.4 | Zeeg 0.0 | |
| Midden | -5.1 | -32.0 | 0.00400*l | 0.00400*l | | |
| Einde | -5.4 | -21.9 | Maatgevend: doorbuiging | | | |
| | | | | Staaf: 3-5 BC: 58 Sit:1 | | |
| | | | | ueind 9.9 | utot 9.9 | |

## GEOMETRIE

**L-sys [m]: 6.357 Staaf: 6-8 BC: 3 Sit:1**

## PROFIELGEGEVENS [mm]

**Gewalst Klasse 1 IPE240**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| h : | 240.0 | $i_y$: | 99.8 | A : 3910.0 | $W_{ey}$: | 324.0E3 | $I_y$: | 3892.0E4 |
| b : | 120.0 | $i_z$: | 26.9 | | $W_{ez}$: | 47.3E3 | $I_z$: | 283.6E4 |
| $t_w$: | 6.2 | r : | 15.0 | | $W_{py}$: | 366.6E3 | $I_t$: | 12.9E4 |
| $t_f$: | 9.8 | | | | $W_{pz}$: | 74.0E3 | $I_w$: | 37391.2E6 |

## MATERIAALGEGEVENS

Vloeispanning $f_{y;d}$ [N/mm²] : 235.00 — Elasticiteitsmod. [N/mm²] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 — Gamma M;1 : 1.00

## KRACHTEN

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | -18.8 | 0.0 | 4.8 |
| Midden : | -20.6 | 16.4 | 10.1 |
| My-max : | -15.0 | 40.5 | -38.9 |
| Einde : | 75.0 | 0.0 | -37.6 |

## KNIKSTABILITEIT

| | Geschoord y | | | Geschoord z | |
|---|---|---|---|---|---|
| | Begin | Einde | | Begin | Einde |
| Kniklengte [m]: | | 6.357 | | | 3.178 |
| N.Ed [kN]: | | 20.574 | | | 20.574 |
| Slankheid lambda : | | 63.716 | | | 118.002 |
| Ncr (F Euler)[kN]: | | 1996.2 | | | 582.0 |
| Lambda rel. : | | 0.678 | | | 1.257 |
| Phi : | | 0.780 | | | 1.469 |
| Imp.factor alpha : | | 0.210 | | | 0.340 |
| Red.factor chi : | kromme a | 0.858 | | kromme b | 0.448 |
| Nb.Rd [kN]: | | 788.0 | | | 412.0 |
| Mom.verd.factor : | Cmy | 0.950 | | Cmz | 1.000 |
| : | CmLT | 0.950 | | | |
| Interactiefactor : | kyy | 0.962 | | kyz | 0.642 |
| | kzy | 0.993 | | kzz | 1.070 |

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Onderdeel....: spant

**KIPSTABILITEIT**

| | | | | | |
|---|---|---|---|---|---|
| lgaf boven [m]: | | 6.357 | lgaf onder [m]: | | 6.357 |
| Kipst.boven [m]: | | | | | 2*3,178 |
| Lst [m]: | | | | | 6.357 |
| Ltus.eff.kipst[m]: | | | | | 6,3569 |
| Voorwaarde : | | (NB.74) | Q-last [kN/m]: | | 14.441 |
| Plaats aangr.last: | | 1.00*h | P-last [kN]: | | 0.000 |
| Lengte lkip [m] : | | 6.357 | Verhouding beta : | | 0.000 |
| Kipmom. Mcr [kNm]: | | 58.7 | Factor k_red : | | 1.000 |
| Figuur NB.NB.4 : | | | B* : | | 0.000 |
| Coëfficiënt $C_1$ : | | 1.130 | Coëfficiënt $C_2$ : | | 0.481 |
| Coëfficiënt C : | | 4.726 | Factor S : | | 905.5 |
| Lambda rel LT : | kromme b | 1.212 | Chi LT (6.57) : | | 0.572 |
| Corr. factor $k_c$ : | | 0.940 | Red. factor f : | | 0.980 |
| | | | Chi LT.mod (6.58): | | 0.584 |
| Moment [kNm] : | | 40.530 | Mb.Rd [kNm] : | | 50.318 |

**TOETSING STABILITEIT/STERKTE** **Druk en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.1.1 | (6.46y) | | 0.026 | 6 |
| | | | (6.46z) | | 0.050 | 12 |
| | EN3-1-1 | 6.3.2 | (6.54) | | 0.805 | 189 |
| | EN3-1-1 | 6.3.3 | (6.61) | 0.03 + 0.77 + 0.00 = | 0.801 | 188 |
| | | | (6.62) | 0.05 + 0.80 + 0.00 = | **0.850** | **200** |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.02 + 0.02 + 0.00 = | 0.039 | 9 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.020 | 5 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.019 | 3 |
| My-max | EN3-1-1 | 6.2.1(6) | N+D | 0.02 + 0.15 + 0.00 = | 0.166 | 39 |
| | EN3-1-1 | 6.2.10 | (6.45+6.31y) | | 0.518 | 122 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.016 | 4 |
| | EN3-1-1 | 6.2.5 | (6.12y) | | 0.518 | 122 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.165 | 22 |
| | EN3-1-1 | 6.2.8 | (6.30) | | 0.518 | 122 |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.08 + 0.14 + 0.00 = | 0.227 | 53 |
| | EN3-1-1 | 6.2.3 | (6.5) | | 0.082 | 19 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.159 | 22 |

Opmerkingen:
**[ 42] Waarschuwing: Er sluiten tussentijds staven en/of opleggingen aan.**
[ 46] T.b.v. kip is een equivalente Q-last berekend.
[ 47] Bij verlopende normaalkracht wordt de grootste drukkracht genomen.

**TOETSING HOR. VERPL.** **Lengte [m]: 6.357 Staaf: 6-8 BC: 57 Sit:1**

verpl.[mm] Eindverplaatsing Aangehouden tweede-orde-verh.: 1.100

| | | | | |
|---|---|---|---|---|
| Begin | -21.9 | $u_{eind}$ | -14.2 | [mm] |
| Extreem | -32.0 | $u_{toel}$ | 21.2 | |
| Midden | -32.0 | [h/] | 300.0 | Maatgevend: doorbuiging |
| Einde | -16.3 | | | |

**GEOMETRIE** **L-sys [m]: 4.700 Staaf: 9-10 BC: 7 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 IPE240**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 240.0 | $i_y$ : | 99.8 | A : | 3910.0 | $W_{ey}$ : | 324.0E3 | $I_y$ : | 3892.0E4 |
| b : | 120.0 | $i_z$ : | 26.9 | | | $W_{ez}$ : | 47.3E3 | $I_z$ : | 283.6E4 |
| $t_w$ : | 6.2 | r : | 15.0 | | | $W_{py}$ : | 366.6E3 | $I_t$ : | 12.9E4 |
| $t_f$ : | 9.8 | | | | | $W_{pz}$ : | 74.0E3 | $I_w$ : | 37391.2E6 |

**MATERIAALGEGEVENS**

Vloeispanning $f_{y;d}$ [N/mm²] : 235.00 Elasticiteitsmod. [N/mm²] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

Project.....: BK2022-082
Onderdeel....: spant

**KRACHTEN**

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | 52.6 | 0.0 | 56.7 |
| My-max : | -24.3 | 45.2 | 56.2 |
| Midden : | -24.8 | 28.4 | -11.3 |
| Einde : | -25.5 | 0.0 | -12.9 |

**KNIKSTABILITEIT**

| | Geschoord y | Begin | Einde | Geschoord z | Begin | Einde |
|---|---|---|---|---|---|---|
| Kniklengte [m]: | | | 4.700 | | | 4.700 |
| N.Ed [kN]: | | | 25.547 | | | 25.547 |
| Slankheid lambda : | | | 47.109 | | | 174.515 |
| Ncr (F Euler)[kN]: | | | 3651.7 | | | 266.1 |
| Lambda rel. : | | | 0.502 | | | 1.858 |
| Phi : | | | 0.657 | | | 2.508 |
| Imp.factor alpha : | | | 0.210 | | | 0.340 |
| Red.factor chi : | kromme a | | 0.924 | kromme b | | 0.238 |
| Nb.Rd [kN]: | | | 848.8 | | | 219.1 |
| Mom.verd.factor : | Cmy | | 0.950 | Cmz | | 1.000 |
| : | CmLT | | 0.984 | | | |
| Interactiefactor : | kyy | | 0.959 | kyz | | 0.698 |
| | kzy | | 0.984 | kzz | | 1.163 |

**KIPSTABILITEIT**

| | | | |
|---|---|---|---|
| lgaf boven [m]: | 4.700 | lgaf onder [m]: | 4.700 |
| Kipst.boven [m]: | | | 2*2,35 |
| Kipst.onder [m]: | | | 2*2,35 |
| Lst [m]: | | | 2.350 |
| Ltus.eff.kipst[m]: | | | 2*2,35 |
| Voorwaarde : | (NB.74) | Q-last [kN/m]: | 0.665 |
| Plaats aangr.last: | 1.00*h | P-last [kN]: | 0.000 |
| Lengte lkip [m] : | 3.290 | Verhouding beta : | 0.000 |
| Kipmom. Mcr [kNm]: | 176.9 | Factor k_red : | 1.000 |
| Figuur NB.NB.4 : | | B* : | 0.984 |
| Coëfficiënt $C_1$ : | 1.763 | Coëfficiënt $C_2$ : | 0.011 |
| Coëfficiënt C : | 10.536 | Factor S : | 905.5 |
| Lambda rel LT : kromme b | 0.698 | Chi LT (6.57) : | 0.871 |
| Corr. factor $k_c$ : | 1.000 | Red. factor f : | 1.000 |
| Moment [kNm] : | 45.152 | Mb.Rd [kNm] : | 75.014 |
| | | Maatg. deelveld : | 0.00 t/m 2.35 |

**TOETSING STABILITEIT/STERKTE** **Druk en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.1.1 | (6.46y) | | 0.030 | 7 |
| | | | (6.46z) | | 0.117 | 27 |
| | EN3-1-1 | 6.3.2 | (6.54) | | 0.602 | 141 |
| | EN3-1-1 | 6.3.3 | (6.61) | 0.03 + 0.58 + 0.00 = | 0.607 | 143 |
| | | | (6.62) | 0.12 + 0.59 + 0.00 = | **0.709** | **167** |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.06 + 0.22 + 0.00 = | 0.276 | 65 |
| | EN3-1-1 | 6.2.3 | (6.5) | | 0.057 | 13 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.219 | 30 |
| My-max | EN3-1-1 | 6.2.1(6) | N+D | 0.03 + 0.22 + 0.00 = | 0.243 | 57 |
| | EN3-1-1 | 6.2.10 | (6.45+6.31y) | | 0.577 | 135 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.026 | 6 |
| | EN3-1-1 | 6.2.5 | (6.12y) | | 0.577 | 135 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.238 | 32 |
| | EN3-1-1 | 6.2.8 | (6.30) | | 0.577 | 135 |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.03 + 0.05 + 0.00 = | 0.077 | 18 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.028 | 7 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.050 | 7 |

Opmerkingen:
**[ 42] Waarschuwing: Er sluiten tussentijds staven en/of opleggingen aan.**
[ 46] T.b.v. kip is een equivalente Q-last berekend.
[ 47] Bij verlopende normaalkracht wordt de grootste drukkracht genomen.

Project.....: BK2022-082
Onderdeel....: spant

**TOETSING HOR. VERPL.** **Lengte [m]: 4.700 Staaf: 9-10 BC: 49 Sit:1**

| | verpl.[mm] | Eindverplaatsing | | Aangehouden tweede-orde-verh.: 1.100 |
|---|---|---|---|---|
| Begin | 0.0 | $u_{eind}$ | *-57.9* [mm] | |
| Extreem | -0.0 | $u_{toel}$ | 15.7 | |
| Midden | -33.8 | [h/] | 300.0 | Maatgevend: scheefstand |
| Einde | -52.7 | | | |

**GEOMETRIE** **L-sys [m]: 6.000 Staaf: 11 BC: 23 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 IPE240**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 240.0 | $i_y$: | 99.8 | A : | 3910.0 | $W_{ey}$: | 324.0E3 | $I_y$: | 3892.0E4 |
| b : | 120.0 | $i_z$: | 26.9 | | | $W_{ez}$: | 47.3E3 | $I_z$: | 283.6E4 |
| $t_w$: | 6.2 | r : | 15.0 | | | $W_{py}$: | 366.6E3 | $I_t$: | 12.9E4 |
| $t_f$: | 9.8 | | | | | $W_{pz}$: | 74.0E3 | $I_w$: | 37391.2E6 |

**MATERIAALGEGEVENS**

Vloeispanning $f_{y;d}$ [N/mm²] : 235.00 Elasticiteitsmod. [N/mm²] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

**KRACHTEN**

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | 31.2 | 0.0 | -0.99 |
| My-max : | 31.2 | -1.5 | 0.00 |
| Einde : | 31.2 | 0.0 | 0.99 |

**KIPSTABILITEIT**

| | | | | | |
|---|---|---|---|---|---|
| lgaf boven [m]: | 6.000 | lgaf onder [m]: | 6.000 | | |
| Lst [m]: | | | 6.000 | | |
| Ltus.eff.kipst[m]: | | | 6 | | |
| Voorwaarde : | (NB.74) | Q-last [kN/m]: | -0.331 | | |
| Plaats aangr.last: | 1.00*h | P-last [kN]: | 0.000 | | |
| Lengte lkip [m] : | 6.000 | Verhouding beta : | 0.000 | | |
| Kipmom. Mcr [kNm]: | 42.3 | Factor k_red : | 1.000 | | |
| Tabel NB.NB.1 : | | | | | |
| Coëfficiënt $C_1$ : | 1.130 | Coëfficiënt $C_2$ : | -0.469 | | |
| Coëfficiënt C : | 3.218 | Factor S : | 905.5 | | |
| Lambda rel LT : | kromme b | 1.427 | Chi LT 6.3.2.2 4): | 1.000 | |
| Moment [kNm] : | -1.492 | Mb.Rd [kNm] : | 86.151 | | |

**TOETSING STABILITEIT/STERKTE** **Trek en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.2 | (6.54) | | 0.017 | 4 |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.03 + 0.00 + 0.00 = | **0.038** | **9** |
| | EN3-1-1 | 6.2.3 | (6.5) | | **0.034** | **8** |
| My-max | EN3-1-1 | 6.2.3 | (6.5) | | **0.034** | **8** |
| | EN3-1-1 | 6.2.5 | (6.12y) | | 0.019 | 4 |
| | EN3-1-1 | 6.2.9.1 | (6.45+6.31y) | | 0.019 | 4 |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.03 + 0.00 + 0.00 = | **0.038** | **9** |
| | EN3-1-1 | 6.2.3 | (6.5) | | **0.034** | **8** |

**TOETSING DOORBUIGING** **Staaf: 11 BC: 49 Sit:1**

Staafsoort: Vloer Overstek begin: Nee einde: Nee
Lengte [m]: 6.000 Aangehouden tweede-orde-verhouding: 1.100

| | Verpl. | Onmidd. | Korte duur | Bijkomend | Einddoorb. | [mm] |
|---|---|---|---|---|---|---|
| Begin | -5.4 | -14.9 | $u_{bij}$ -21.6 | $u_{eind}$ -21.6 | $u_{tot}$ -21.6 | |
| Extreem | -6.1 | 0.0 | $u_{toel}$ ±36.0 | $u_{toel}$ ±48.0 | Zeeg | 0.0 |
| Midden | -6.1 | -5.8 | 2*0.00300*1 | 2*0.00400*1 | | |
| Einde | -5.4 | 4.7 | Maatgevend: scheefstand | | | |

Project.....: BK2022-082
Onderdeel....: spant

**GEOMETRIE** **L-sys [m]: 1.524 Staaf: 12 BC: 11 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 HEA100**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 96.0 | $i_y$: | 40.5 | A : | 2124.0 | $W_{ey}$: | 72.8E3 | $I_y$: | 349.0E4 |
| b : | 100.0 | $i_z$: | 25.1 | | | $W_{ez}$: | 26.8E3 | $I_z$: | 133.8E4 |
| $t_w$: | 5.0 | r : | 12.0 | | | $W_{py}$: | 83.0E3 | $I_t$: | 5.3E4 |
| $t_f$: | 8.0 | | | | | $W_{pz}$: | 41.1E3 | $I_w$: | 2581.3E6 |

**MATERIAALGEGEVENS**

Vloeispanning $f_{y;d}$ [N/mm²] : 235.00 Elasticiteitsmod. [N/mm²] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

**KRACHTEN**

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | -104.5 | 0.00 | -0.09 |
| Midden : | -104.4 | -0.03 | 0.00 |
| Einde : | -104.3 | 0.00 | 0.09 |

**KNIKSTABILITEIT**

| | Geschoord y | | Geschoord z | |
|---|---|---|---|---|
| | Begin | Einde | Begin | Einde |
| Kniklengte [m]: | | 1.524 | | 1.524 |
| N.Ed [kN]: | | 104.499 | | 104.499 |
| Slankheid lambda : | | 37.596 | | 60.719 |
| Ncr (F Euler)[kN]: | | 3114.5 | | 1194.0 |
| Lambda rel. : | | 0.400 | | 0.647 |
| Phi : | | 0.614 | | 0.818 |
| Imp.factor alpha : | | 0.340 | | 0.490 |
| Red.factor chi : | kromme b | 0.926 | kromme c | 0.757 |
| Nb.Rd [kN]: | | 462.2 | | 378.1 |

**TOETSING STABILITEIT/STERKTE**

| Plaats[m] | Norm | Artikel | Formule | | Druk U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.1.1 | (6.46y) | | 0.226 | 53 |
| | | | (6.46z) | | **0.276** | **65** |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.21 + 0.00 + 0.00 = | 0.210 | 49 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.209 | 49 |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.21 + 0.00 + 0.00 = | 0.210 | 49 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.209 | 49 |

**GEOMETRIE** **L-sys [m]: 1.524 Staaf: 13 BC: 3 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 HEA100**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 96.0 | $i_y$: | 40.5 | A : | 2124.0 | $W_{ey}$: | 72.8E3 | $I_y$: | 349.0E4 |
| b : | 100.0 | $i_z$: | 25.1 | | | $W_{ez}$: | 26.8E3 | $I_z$: | 133.8E4 |
| $t_w$: | 5.0 | r : | 12.0 | | | $W_{py}$: | 83.0E3 | $I_t$: | 5.3E4 |
| $t_f$: | 8.0 | | | | | $W_{pz}$: | 41.1E3 | $I_w$: | 2581.3E6 |

**MATERIAALGEGEVENS**

Vloeispanning $f_{y;d}$ [N/mm²] : 235.00 Elasticiteitsmod. [N/mm²] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

**KRACHTEN**

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | -104.5 | 0.00 | 0.09 |
| Midden : | -104.4 | 0.03 | 0.00 |
| Einde : | -104.3 | 0.00 | -0.09 |

Project.....: BK2022-082
Onderdeel....: spant

## KNIKSTABILITEIT

| | Geschoord y | | Geschoord z | |
|---|---|---|---|---|
| | Begin | Einde | Begin | Einde |
| Kniklengte [m]: | | 1.524 | | 1.524 |
| N.Ed [kN]: | | 104.499 | | 104.499 |
| Slankheid lambda : | | 37.596 | | 60.719 |
| Ncr (F Euler)[kN]: | | 3114.5 | | 1194.0 |
| Lambda rel. : | | 0.400 | | 0.647 |
| Phi : | | 0.614 | | 0.818 |
| Imp.factor alpha : | | 0.340 | | 0.490 |
| Red.factor chi : | kromme b | 0.926 | kromme c | 0.757 |
| Nb.Rd [kN]: | | 462.2 | | 378.1 |

## TOETSING STABILITEIT/STERKTE

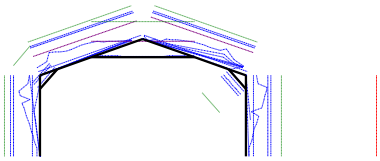
| Plaats[m] | Norm | Artikel | Formule | | Druk U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.1.1 | (6.46y) | | 0.226 | 53 |
| | | | (6.46z) | | **0.276** | **65** |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.21 + 0.00 + 0.00 = | 0.210 | 49 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.209 | 49 |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.21 + 0.00 + 0.00 = | 0.210 | 49 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.209 | 49 |

## TOETSING HOR. VERPLAATSING GLOBAAL

Er is een maximale horizontale verplaatsing van 0.0597 [m] gevonden
bij knoop 7 en combinatie 49; belastingsituatie 1 (combinatietype 2).
Bij een hoogte van 5.750 [m] levert dit h / *96* (toel.: h / 300).

## UNITY-CHECK'S

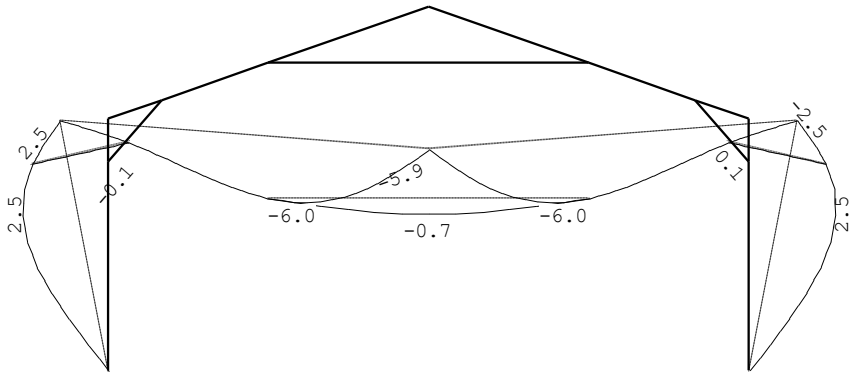
OMHULLENDE VAN ALLES



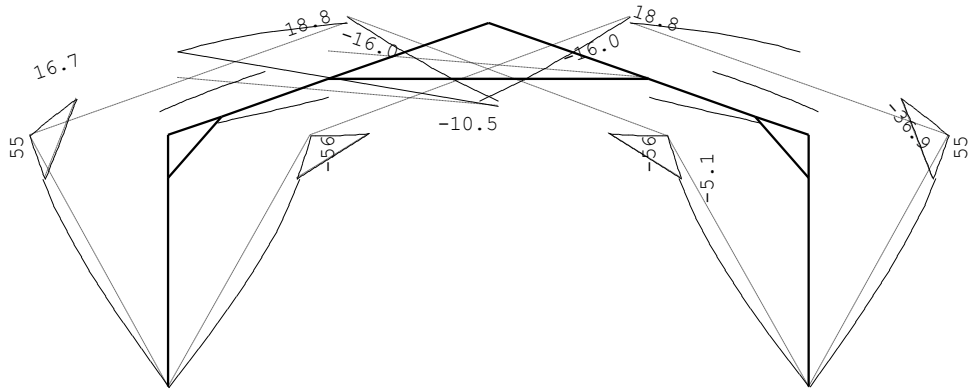
Toelaatbare unity-check (1.0)
Hoogste unity-check i.v.m. knikstabiliteit
Unity-check i.v.m. kipstabiliteit
Unity-check i.v.m. kip- en knikstabiliteit
Hoogste unity-check i.v.m. doorsnedecontrole
Hoogste unity-check i.v.m. doorbuiging
Unity-check te hoog (> 1.0)

Project.....: BK2022-082
Onderdeel....: spant

**VERVORMINGEN w1** Blijvende combinatie

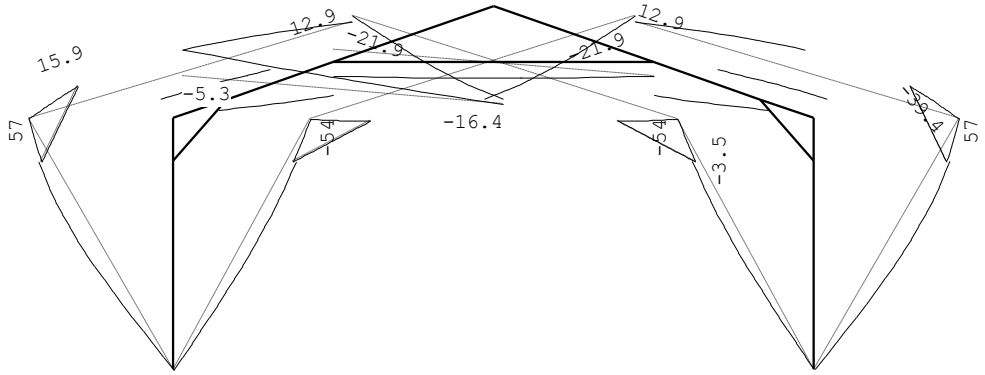



**VERVORMINGEN Wbij** Karakteristieke combinatie



Project.....: BK2022-082
Onderdeel....: spant

**VERVORMINGEN Wmax** Karakteristieke combinatie




**DOORBUIGINGEN** Karakteristieke combinatie

| Nr. | staven | Zijde | positie [m] | $l_{rep}$ [mm] | $w_1$ [mm] | $w_2$ [mm] | $w_{bij}$ [mm] | [lrep/] | $w_{tot}$ [mm] | $w_c$ [mm] | $w_{max}$ [mm] | [lrep/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 3-5 | Neg. | 3.178 | 6357 | -3.0 | | -10.3 | 619 | -13.3 | | -13.3 | 480 |
| 2 | 3-5 | Pos. | 1.059 | 6357 | -0.8 | | 16.7 | 381 | 15.9 | | 15.9 | 401 |
| 3 | 6-8 | Neg. | 3.178 | 6357 | -3.0 | | -10.3 | 619 | -13.3 | | -13.3 | 480 |
| 3 | 6-8 | Pos. | 5.297 | 6357 | -0.8 | | 16.7 | 381 | 6.8 | | 6.8 | 934 |
| 5 | 11 | Neg. | / | 12000 | | | -21.6 | 557 | -21.6 | | -21.6 | 557 |
| 6 | 12 | Neg. | / | 3048 | -2.6 | | -10.0 | 306 | -12.6 | | -12.6 | 242 |
| 6 | 12 | Pos. | / | 3048 | -2.6 | | 11.4 | 269 | 8.7 | | 8.7 | 349 |
| 7 | 13 | Neg. | / | 3048 | 2.6 | | -11.4 | 269 | -8.7 | | -8.7 | 349 |
| 7 | 13 | Pos. | / | 3048 | 2.6 | | 10.0 | 306 | 12.6 | | 12.6 | 242 |

**HORIZONTALE VERPLAATSING** Karakteristieke combinatie

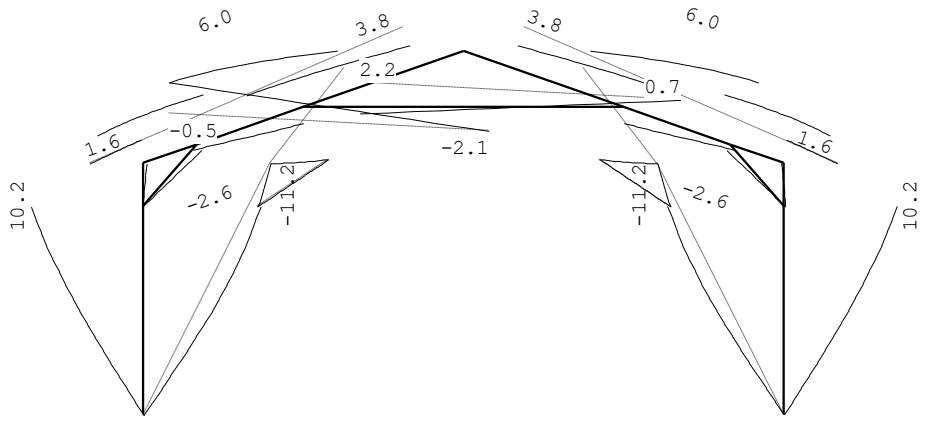
| Nr. | staven | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | $u_{tot}$ [mm] | [h/] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1-2 | Neg. | 4700 | 2.1 | | -56.1 | -54.0 | 87 |
| 1 | 1-2 | Pos. | 4700 | 2.1 | | 55.1 | 57.2 | 82 |
| 4 | 9-10 | Neg. | 4700 | -2.1 | | -55.1 | -57.2 | 82 |
| 4 | 9-10 | Pos. | 4700 | -2.1 | | 56.1 | 54.0 | 87 |

**TOTALE HORIZONTALE VERPLAATSING** Karakteristieke combinatie

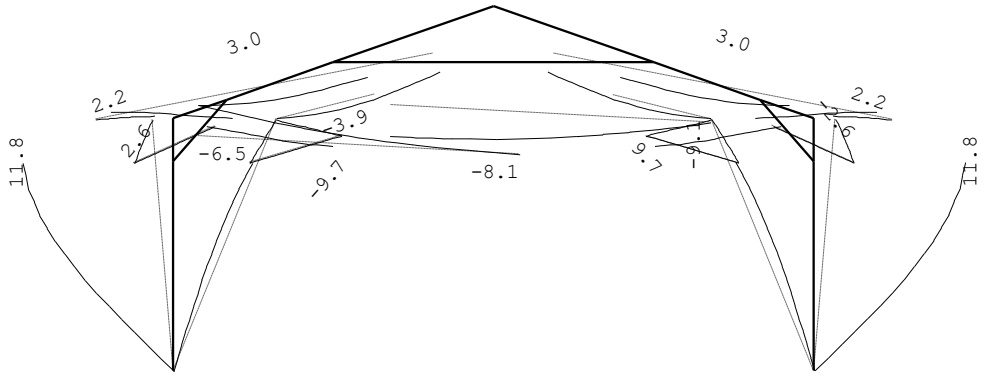
| knoop | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | $u_{tot}$ [mm] | [h/] |
|---|---|---|---|---|---|---|---|
| 5 | Neg. | 5750 | -3.4 | | -56.3 | -59.7 | 96 |
| 10 | Pos. | 3900 | 3.4 | | 56.3 | 59.7 | 65 |

Project.....: BK2022-082
Onderdeel....: spant

**VERVORMINGEN Wbij** Frequente combinatie




**VERVORMINGEN Wmax** Frequente combinatie




**DOORBUIGINGEN** Frequente combinatie

| Nr. | staven | Zijde | positie [m] | $l_{rep}$ [mm] | $w_1$ [mm] | $w_2$ [mm] | $w_{bij}$ [mm] | [lrep/] | $w_{tot}$ [mm] | $w_c$ [mm] | $w_{max}$ [mm] | [lrep/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 3-5 | Neg. | 1.059 | 6357 | -0.8 | | -2.6 | 2453 | -3.4 | | -3.4 | 1865 |
| 2 | 3-5 | Pos. | 3.178 | 6357 | -3.0 | | 6.0 | 1057 | 3.0 | | 3.0 | 2098 |
| 3 | 6-8 | Neg. | / | 12714 | 6.6 | | -7.5 | 1701 | -0.9 | | -0.9 | 14431 |
| 3 | 6-8 | Pos. | 3.178 | 6357 | -3.0 | | 6.0 | 1057 | 3.0 | | 3.0 | 2098 |
| 5 | 11 | Neg. | / | 12000 | | | -4.3 | 2783 | -4.3 | | -4.3 | 2783 |
| 5 | 11 | Pos. | / | 12000 | | | 1.2 | 9934 | 1.2 | | 1.2 | 9934 |
| 6 | 12 | Neg. | / | 3048 | -2.6 | | -2.0 | 1528 | -4.6 | | -4.6 | 661 |
| 7 | 13 | Pos. | / | 3048 | 2.6 | | 2.0 | 1528 | 4.6 | | 4.6 | 661 |

**HORIZONTALE VERPLAATSING** Frequente combinatie

| Nr. | staven | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | $u_{tot}$ [mm] | [h/] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1-2 | Neg. | 4700 | 2.1 | | -11.2 | -9.1 | 517 |
| 1 | 1-2 | Pos. | 4700 | 2.1 | | -0.2 | 1.9 | 2482 |

Project.....: BK2022-082
Onderdeel....: spant

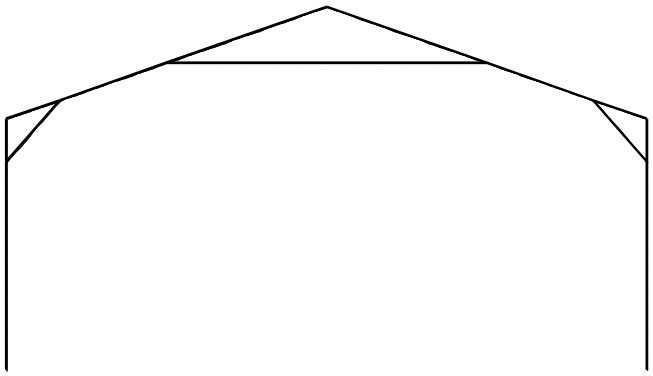
**HORIZONTALE VERPLAATSING** Frequente combinatie

| Nr. | staven | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | \|-- $u_{tot}$ --\| [mm] | [h/] |
|---|---|---|---|---|---|---|---|---|
| 4 | 9-10 | Neg. | 4700 | -2.1 | | 0.2 | -1.9 | 2482 |
| 4 | 9-10 | Pos. | 4700 | -2.1 | | 11.2 | 9.1 | 517 |

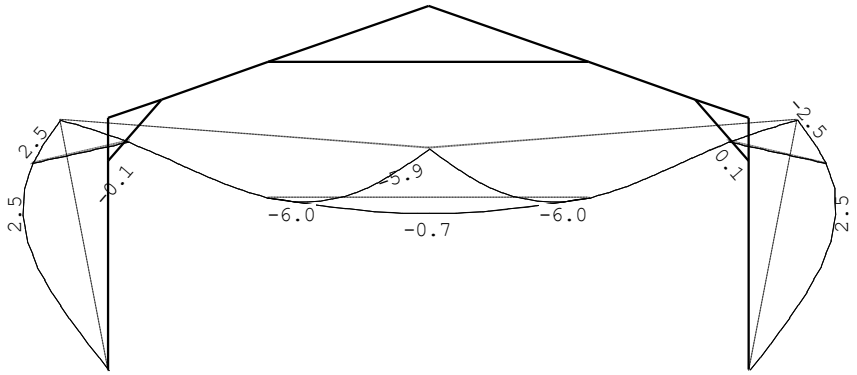
**TOTALE HORIZONTALE VERPLAATSING** Frequente combinatie

| knoop | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | \|-- $u_{tot}$ --\| [mm] | [h/] |
|---|---|---|---|---|---|---|---|
| 2 | Neg. | 3900 | -3.4 | | -10.0 | -13.4 | 292 |
| 10 | Pos. | 3900 | 3.4 | | 10.0 | 13.4 | 292 |

**VERVORMINGEN Wbij** Quasi-blijvende combinatie



**VERVORMINGEN Wmax** Quasi-blijvende combinatie




**DOORBUIGINGEN** Quasi-blijvende combinatie

| Nr. | staven | Zijde | positie [m] | $l_{rep}$ [mm] | $w_1$ [mm] | $w_2$ [mm] | \|-- $w_{bij}$ --\| [mm] | [lrep/] | $w_{tot}$ [mm] | $w_c$ [mm] | \|-- $w_{max}$ --\| [mm] | [lrep/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 3-5 | Neg. | 1.059 | 6357 | -0.8 | | | | -0.8 | | -0.8 | 7767 |
| 3 | 6-8 | Neg. | 3.178 | 6357 | -3.0 | | | | -3.0 | | -3.0 | 2132 |
| 3 | 6-8 | Pos. | 3.178 | 6357 | -3.0 | | | | -3.0 | | -3.0 | 2132 |
| 5 | 11 | Neg. | 2.000 | 6000 | -0.6 | | | | -0.6 | | -0.6 | 9903 |

Project.....: BK2022-082
Onderdeel....: spant

**DOORBUIGINGEN** Quasi-blijvende combinatie

| Nr. | staven | Zijde | positie [m] | $l_{rep}$ [mm] | $w_1$ [mm] | $w_2$ [mm] | \|-- $w_{bij}$ --\| [mm] | [lrep/] | $w_{tot}$ [mm] | $w_c$ [mm] | \|-- $w_{max}$ --\| [mm] | [lrep/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 12 | Neg. | / | 3048 | -2.6 | | | | -2.6 | | -2.6 | 1165 |
| 7 | 13 | Pos. | / | 3048 | 2.6 | | | | 2.6 | | 2.6 | 1165 |

**HORIZONTALE VERPLAATSING** Quasi-blijvende combinatie

| Nr. | staven | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | \|-- $u_{tot}$ --\| [mm] | [h/] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1-2 | Pos. | 4700 | 2.1 | | | 2.1 | 2208 |
| 4 | 9-10 | Neg. | 4700 | -2.1 | | | -2.1 | 2208 |

**TOTALE HORIZONTALE VERPLAATSING** Quasi-blijvende combinatie

| knoop | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | \|-- $u_{tot}$ --\| [mm] | [h/] |
|---|---|---|---|---|---|---|---|
| 2 | Neg. | 3900 | -3.4 | | | -3.4 | 1153 |
| 10 | Pos. | 3900 | 3.4 | | | 3.4 | 1153 |

# A.3. Spant kopgevel

**Technosoft Raamwerken release 6.76** **7 feb 2023**

```
Project......: BK2022-082
Onderdeel....: spant kopgevel
Dimensies....: kN;m;rad  (tenzij anders aangegeven)
Datum........: 07/02/2023
Bestand......: E:\Bouwkenners\BK2022-082 - Berekening Loods
               paalfundering - Nuijens -
               Richter\Berekeningen\BK2022-082-KB01 - Statische
               berekening\kopgevelspant.rww

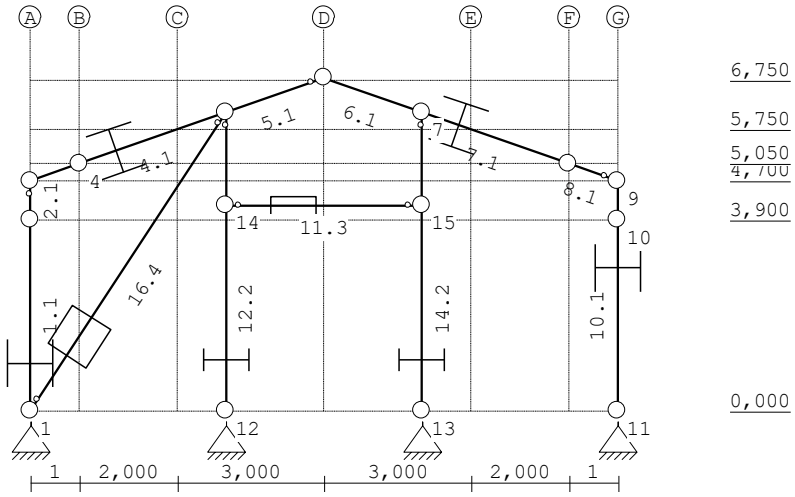
Belastingbreedte.:   2.500
Rekenmodel.......: 1e-orde-elastisch.
Theorie voor de bepaling van de krachtsverdeling:
   Geometrisch lineair.
   Fysisch lineair.

Gunstige werking van de permanente belasting wordt automatisch verwerkt.
```

**Toegepaste normen volgens Eurocode met Nederlandse NB**

| | | | |
|---|---|---|---|
| Belastingen | NEN-EN 1990:2002 | C2:2010,A1:2019 | NB:2019(nl) |
| | NEN-EN 1991-1-1:2002 | C1/C11:2019 | NB:2019(nl) |
| | NEN-EN 1991-1-3:2003 | C1:2009 | NB:2011(nl) |
| | NEN-EN 1991-1-4:2005 | C2:2011 | NB:2011(nl) |
| Staal | NEN-EN 1993-1-1:2006 | C2:2011,A1:2016 | NB:2016(nl) |

**GEOMETRIE**




**STRAMIENLIJNEN**

| Nr. | Naam | X | Z-min | Z-max |
|---|---|---|---|---|
| 1 | A | 0.000 | 0.000 | 6.800 |
| 2 | B | 1.000 | 0.000 | 6.800 |
| 3 | C | 3.000 | 0.000 | 6.800 |
| 4 | D | 6.000 | 0.000 | 6.800 |
| 5 | E | 9.000 | 0.000 | 6.800 |
| 6 | F | 11.000 | 0.000 | 6.800 |
| 7 | G | 12.000 | 0.000 | 6.800 |

**NIVEAUS**

| Nr. | Z | X-min | X-max |
|---|---|---|---|
| 1 | 0.000 | 0.000 | 12.000 |
| 2 | 3.900 | 0.000 | 12.000 |
| 3 | 4.700 | 0.000 | 12.000 |
| 4 | 5.050 | 0.000 | 12.000 |
| 5 | 5.750 | 0.000 | 12.000 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**NIVEAUS**

| Nr. | Z | X-min | X-max |
|---|---|---|---|
| 6 | 6.750 | 0.000 | 12.000 |

**MATERIALEN**

| Mt | Kwaliteit | E-modulus[N/mm2] | S.G. | Pois. | Uitz. coëff |
|---|---|---|---|---|---|
| 1 | S235 | 210000 | 78.5 | 0.30 | 1.2000e-05 |

**PROFIELEN [mm]**

| Prof. | Omschrijving | Materiaal | Oppervlak | Traagheid | Vormf. |
|---|---|---|---|---|---|
| 1 | HEA140 | 1:S235 | 3.1420e+03 | 1.0330e+07 | 0.00 |
| 2 | IPE200 | 1:S235 | 2.8480e+03 | 1.9430e+07 | 0.00 |
| 3 | UNP200(90) | 1:S235 | 3.2200e+03 | 1.4780e+06 | 0.00 |
| 4 | K120/120/6CF | 1:S235 | 2.6433e+03 | 5.6216e+06 | 0.00 |

**PROFIELEN vervolg [mm]**

| Prof. | Staaftype | Breedte | Hoogte | e | Type | b1 | h1 | b2 | h2 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0:Normaal | 140 | 133 | 66.5 | | | | | |
| 2 | 0:Normaal | 100 | 200 | 100.0 | | | | | |
| 3 | 0:Normaal | 75 | 200 | 20.1 | | | | | |
| 4 | 0:Normaal | 120 | 120 | 60.0 | | | | | |

**PROFIELVORMEN [mm]**

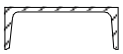
1 HEA140



2 IPE200



3 UNP200(90)



4 K120/120/6CF



**KNOPEN**

| Knoop | X | Z | Knoop | X | Z |
|---|---|---|---|---|---|
| 1 | 0.000 | 0.000 | 6 | 6.000 | 6.800 |
| 2 | 0.000 | 3.900 | 7 | 8.000 | 6.100 |
| 3 | 0.000 | 4.700 | 8 | 11.000 | 5.050 |
| 4 | 1.000 | 5.050 | 9 | 12.000 | 4.700 |
| 5 | 4.000 | 6.100 | 10 | 12.000 | 3.900 |
| 11 | 12.000 | 0.000 | | | |
| 12 | 4.000 | 0.000 | | | |
| 13 | 8.000 | 0.000 | | | |
| 14 | 4.000 | 4.200 | | | |
| 15 | 8.000 | 4.200 | | | |

**STAVEN**

| St. | ki | kj | Profiel | Aansl.i | Aansl.j | Lengte | Opm. |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2 | 1:HEA140 | NDM | NDM | 3.900 | |
| 2 | 2 | 3 | 1:HEA140 | NDM | ND | 0.800 | |
| 3 | 3 | 4 | 1:HEA140 | NDM | NDM | 1.059 | |
| 4 | 4 | 5 | 1:HEA140 | NDM | NDM | 3.178 | |
| 5 | 5 | 6 | 1:HEA140 | NDM | ND | 2.119 | |
| 6 | 6 | 7 | 1:HEA140 | NDM | NDM | 2.119 | |
| 7 | 7 | 8 | 1:HEA140 | NDM | NDM | 3.178 | |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**STAVEN**

| St. | ki | kj | Profiel | Aansl.i | Aansl.j | Lengte | Opm. |
|---|---|---|---|---|---|---|---|
| 8 | 8 | 9 | 1:HEA140 | NDM | ND | 1.059 | |
| 9 | 9 | 10 | 1:HEA140 | NDM | NDM | 0.800 | |
| 10 | 10 | 11 | 1:HEA140 | NDM | NDM | 3.900 | |
| 11 | 14 | 15 | 3:UNP200(90) | ND | ND | 4.000 | |
| 12 | 12 | 14 | 2:IPE200 | NDM | NDM | 4.200 | |
| 13 | 14 | 5 | 2:IPE200 | NDM | ND | 1.900 | |
| 14 | 13 | 15 | 2:IPE200 | NDM | NDM | 4.200 | |
| 15 | 15 | 7 | 2:IPE200 | NDM | ND | 1.900 | |
| 16 | 1 | 5 | 4:K120/120/6CF | ND | ND | 7.295 | |

**VASTE STEUNPUNTEN**

| Nr. | knoop | Kode XZR 1=vast 0=vrij | Hoek |
|---|---|---|---|
| 1 | 1 | 110 | 0.00 |
| 2 | 11 | 110 | 0.00 |
| 3 | 12 | 110 | 0.00 |
| 4 | 13 | 110 | 0.00 |

**BELASTINGGENERATIE ALGEMEEN.**

| | | | |
|---|---|---|---|
| Betrouwbaarheidsklasse.....: | 1 | Referentieperiode.....: | 15 |
| Gebouwdiepte.....: | 30.00 | Gebouwhoogte.....: | 6.80 |
| Niveau aansl.terrein.....: | 0.00 | E.g. scheid.w. [kN/m2]: | 1.20 |

**WIND**

| | | | |
|---|---|---|---|
| Terrein categorie ...[4.3.2]...: | Bebouwd | | |
| Windgebied .....: | 2 | Vb,0 ..[4.2].....: | 27.000 |
| Referentie periode wind.....: | 15.00 | Vb(p)..[4.2].....: | 24.970 |
| K .....[4.2].....: | 0.230 | n ....[4.2].....: | 0.500 |
| Positie spant in het gebouw....: | 0.000 | Kr ....[4.3.2].....: | 0.223 |
| z0 .....[4.3.2]...: | 0.500 | Zmin ..[4.3.2].....: | 7.000 |
| Co wind van links ..[4.3.3]...: | 1.000 | Co wind van rechts....: | 1.000 |
| Co wind loodrecht ..[4.3.3]...: | 1.000 | | |
| Cpi wind van links ..[7.2.9]...: | 0.200 | -0.300 | |
| Cpi windloodrecht ...[7.2.9]...: | 0.200 | -0.300 | |
| Cpi wind van rechts .[7.2.9]...: | 0.200 | -0.300 | |
| Cfr windwrijving ....[7.5].....: | 0.040 | | |

**SNEEUW**

| | |
|---|---|
| Sneeuwbelasting (sk) 50 jaar : | 0.70 |
| Sneeuwbelasting (sn) n jaar : | 0.53 |

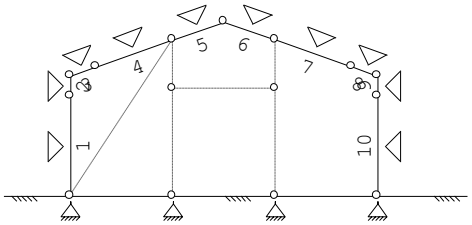
**STAAFTYPEN**

| Type | staven |
|---|---|
| 1:Vloer. | : 11 |
| 4:Wand / kolom. | : 12-15 |
| 5:Linker gevel. | : 1,2 |
| 6:Rechter gevel. | : 9,10 |
| 7:Dak. | : 3-8 |
| 9:Open. | : 16 |

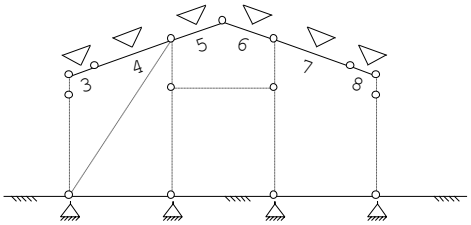
Project.....: BK2022-082
Onderdeel....: spant kopgevel

## LASTVELDEN

Wind staven




Sneeuw staven

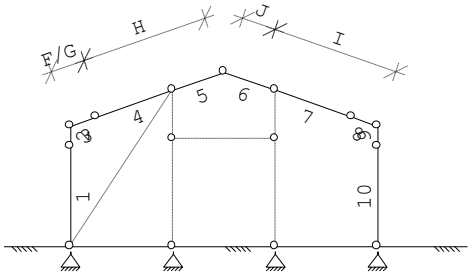



## WIND DAKTYPES

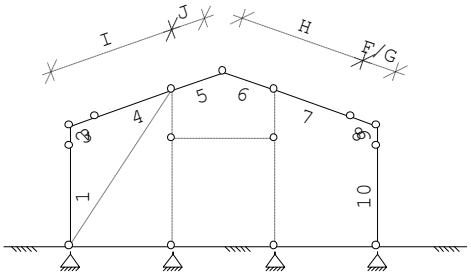
| Nr. | Staaf | Type | reductie bij wind van links | reductie bij wind van rechts | Cpe volgens art: |
|---|---|---|---|---|---|
| 1 | 1-2 | Gevel | 1.000 | 1.000 | 7.2.2 |
| 2 | 3-5 | Zadeldak | 1.000 | 1.000 | 7.2.5 |
| 3 | 6-8 | Zadeldak | 1.000 | 1.000 | 7.2.5 |
| 4 | 9-10 | Gevel | 1.000 | 1.000 | 7.2.2 |

## WIND ZONES

Wind van links




Wind van rechts




**WIND VAN LINKS ZONES**

| Nr. | Staaf | Positie | Lengte | Zone |
|---|---|---|---|---|
| 1 | 1-2 | 0.000 | 4.700 | D |
| 2 | 3-5 | 0.000 | 1.360 | F/G |
| 3 | 3-5 | 1.360 | 4.997 | H |
| 4 | 6-8 | 0.000 | 1.360 | J |
| 5 | 6-8 | 1.360 | 4.997 | I |
| 6 | 9-10 | 0.000 | 4.700 | E |

**WIND VAN RECHTS ZONES**

| Nr. | Staaf | Positie | Lengte | Zone |
|---|---|---|---|---|
| 1 | 9-10 | 0.000 | 4.700 | D |
| 2 | 6-8 | 0.000 | 1.360 | F/G |
| 3 | 6-8 | 1.360 | 4.997 | H |
| 4 | 3-5 | 0.000 | 1.360 | J |
| 5 | 3-5 | 1.360 | 4.997 | I |
| 6 | 1-2 | 0.000 | 4.700 | E |

## Wind indexen

| Index | CsCd | Cpe/Cpi | qp | breedte reductie | Qw | Zone | Hoek(en) |
|---|---|---|---|---|---|---|---|
| Qw1 | | 0.300 | 0.493 | 2.500 | -0.370 | -i | |
| Qw2 | 1.00 | 0.800 | 0.493 | 2.500 | -0.986 | D | |
| Qw3 | 1.00 | 0.343 | 0.493 | 2.500 | -0.423 | F | 19.3 |
| Qw4 | 1.00 | 0.257 | 0.493 | 2.500 | -0.317 | H | 19.3 |
| Qw5 | 1.00 | -0.857 | 0.493 | 2.500 | 1.056 | J | 19.3 |
| Qw6 | 1.00 | -0.400 | 0.493 | 2.500 | 0.493 | I | 19.3 |
| Qw7 | 1.00 | -0.500 | 0.493 | 2.500 | 0.616 | E | |
| Qw8 | | -0.200 | 0.493 | 2.500 | 0.246 | +i | |
| Qw9 | 1.00 | -0.785 | 0.493 | 2.500 | 0.968 | F | 19.3 |
| Qw10 | 1.00 | -0.271 | 0.493 | 2.500 | 0.334 | H | 19.3 |
| Qw11 | 1.00 | -1.200 | 0.493 | 2.400 | 1.420 | A | |
| Qw12 | 1.00 | -0.800 | 0.493 | 0.100 | 0.039 | B | |
| Qw13 | 1.00 | -1.243 | 0.493 | 1.200 | 0.735 | F | 19.3 |
| Qw14 | 1.00 | -0.657 | 0.493 | 1.300 | 0.421 | H | 19.3 |
| Qw15 | 1.00 | -1.329 | 0.493 | 1.200 | 0.786 | G | 19.3 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**Wind indexen**

| Index | CsCd | Cpe/Cpi | qp | breedte reductie | Qw | Zone | Hoek(en) |
|---|---|---|---|---|---|---|---|
| Qw16 | 1.00 | -0.500 | 0.493 | 2.500 | 0.616 | C | |
| Qw17 | 1.00 | -0.500 | 0.493 | 2.500 | 0.616 | I | 19.3 |

**SNEEUW DAKTYPEN**

| Staaf | artikel |
|---|---|
| 3-5 | 5.3.3 Zadeldak |
| 6-8 | 5.3.3 Zadeldak |

**Sneeuw indexen**

| Index | art | μ | $s_k$ | red. | posfac | breedte | $Q_s$ | hoek |
|---|---|---|---|---|---|---|---|---|
| Qs1 | 5.3.3 | 0.800 | 0.53 | 1.00 | | 2.500 | 1.051 | 19.3 |
| Qs2 | 5.3.3 | 0.400 | 0.53 | 1.00 | | 2.500 | 0.526 | 19.3 |

**BELASTINGGEVALLEN**

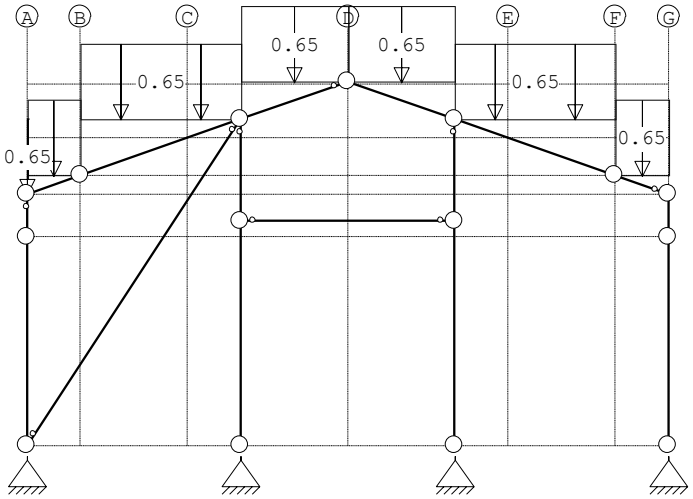
| | B.G. | Omschrijving | Type | |
|---|---|---|---|---|
| | 1 | Permanente belasting EGZ=-1.00 | 1 | |
| g | 2 | Wind van links onderdruk A | 7 | |
| g | 3 | Wind van links overdruk A | 8 | |
| g | 4 | Wind van links onderdruk B | 9 | |
| g | 5 | Wind van links overdruk B | 10 | |
| g | 6 | Wind van links onderdruk C | 37 | |
| g | 7 | Wind van links overdruk C | 38 | |
| g | 8 | Wind van links onderdruk D | 39 | |
| g | 9 | Wind van links overdruk D | 40 | |
| g | 10 | Wind van rechts onderdruk A | 11 | |
| g | 11 | Wind van rechts overdruk A | 12 | |
| g | 12 | Wind van rechts onderdruk B | 13 | |
| g | 13 | Wind van rechts overdruk B | 14 | |
| g | 14 | Wind van rechts onderdruk C | 41 | |
| g | 15 | Wind van rechts overdruk C | 42 | |
| g | 16 | Wind van rechts onderdruk D | 43 | |
| g | 17 | Wind van rechts overdruk D | 44 | |
| g | 18 | Wind loodrecht onderdruk A | 15 | |
| g | 19 | Wind loodrecht overdruk A | 16 | |
| g | 20 | Wind loodrecht onderdruk B | 45 | |
| g | 21 | Wind loodrecht overdruk B | 46 | |
| g | 22 | Sneeuw A | 22 | |
| g | 23 | Sneeuw B | 23 | |
| g | 24 | Sneeuw C | 33 | |
| | 25 | Knik | 0 | Onbekend |

g = gegenereerd belastinggeval

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**BELASTINGEN** B.G:1 Permanente belasting

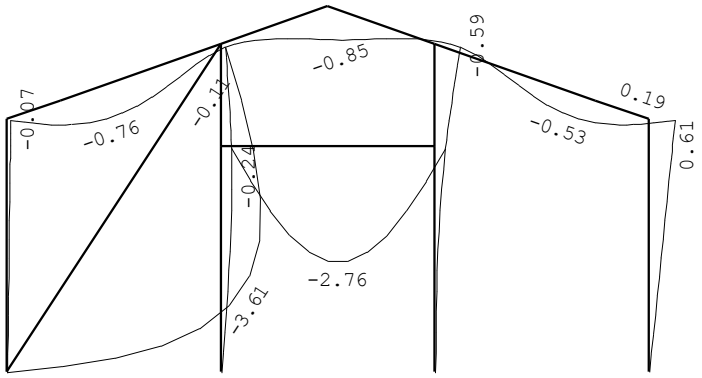
Eigen gewicht van alle staven is meegenomen in berekening. Richting:↓




**STAAFBELASTINGEN** B.G:1 Permanente belasting

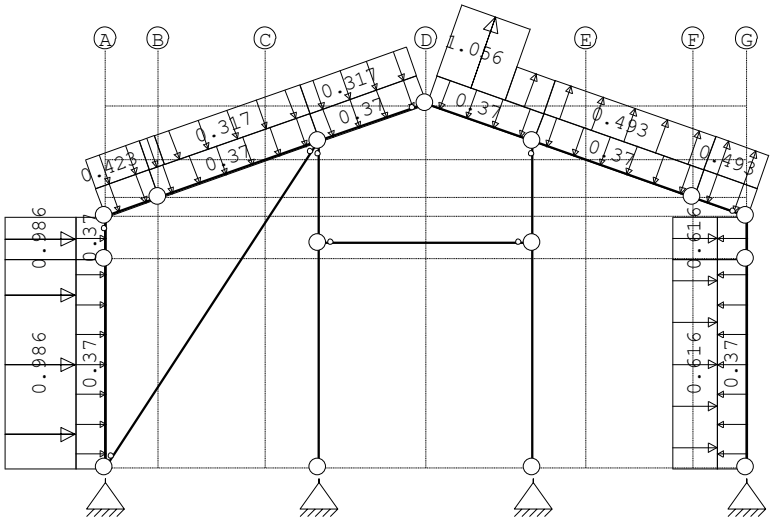
| Staaf | Type | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|
| 2 | 3:QZgeProj. | -0.65 | -0.65 | 0.000 | 0.000 | | | |
| 3 | 3:QZgeProj. | -0.65 | -0.65 | 0.000 | 0.000 | | | |
| 4 | 3:QZgeProj. | -0.65 | -0.65 | 0.000 | 0.000 | | | |
| 5 | 3:QZgeProj. | -0.65 | -0.65 | 0.000 | 0.000 | | | |
| 6 | 3:QZgeProj. | -0.65 | -0.65 | 0.000 | 0.000 | | | |
| 7 | 3:QZgeProj. | -0.65 | -0.65 | 0.000 | 0.000 | | | |
| 8 | 3:QZgeProj. | -0.65 | -0.65 | 0.000 | 0.000 | | | |

**VERPLAATSINGEN** [mm] B.G:1 Permanente belasting



Project.....: BK2022-082
Onderdeel....: spant kopgevel

**BELASTINGEN** B.G:2 Wind van links onderdruk A

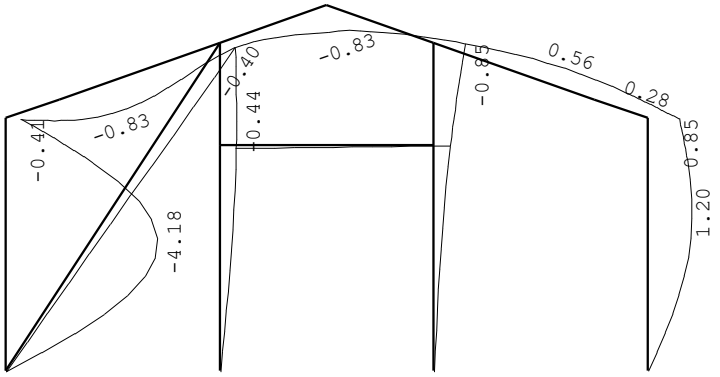



**STAAFBELASTINGEN** B.G:2 Wind van links onderdruk A

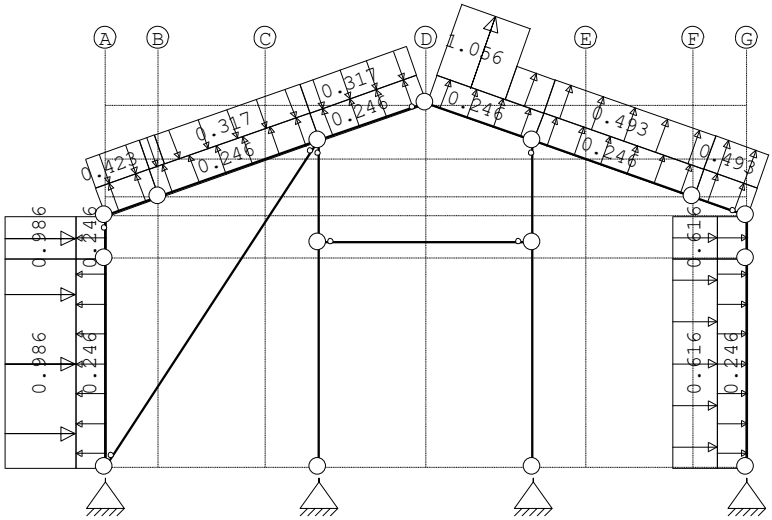
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 0.000 | 2.878 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw5 | 1.06 | 1.06 | 0.000 | 0.759 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 1.360 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**VERPLAATSINGEN** [mm] B.G:2 Wind van links onderdruk A




**BELASTINGEN** B.G:3 Wind van links overdruk A




**STAAFBELASTINGEN** B.G:3 Wind van links overdruk A

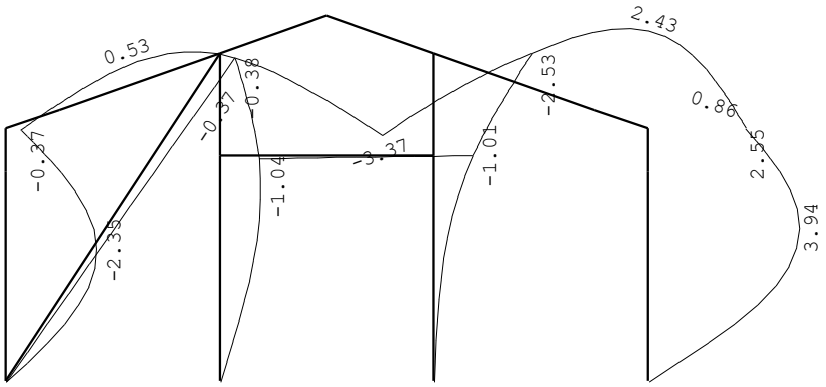
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 0.000 | 2.878 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw5 | 1.06 | 1.06 | 0.000 | 0.759 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 1.360 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

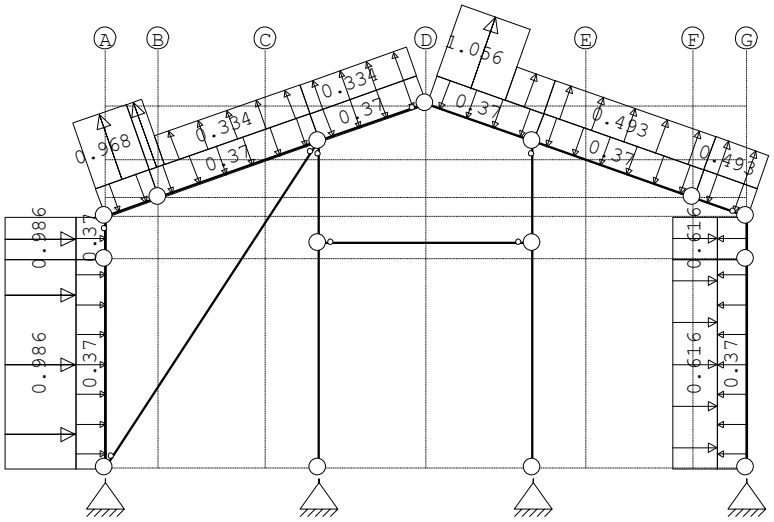
**STAAFBELASTINGEN** B.G:3 Wind van links overdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:3 Wind van links overdruk A




**BELASTINGEN** B.G:4 Wind van links onderdruk B




**STAAFBELASTINGEN** B.G:4 Wind van links onderdruk B

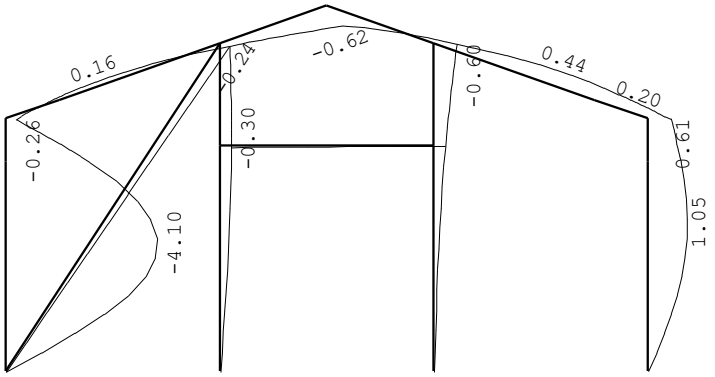
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 0.000 | 2.878 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

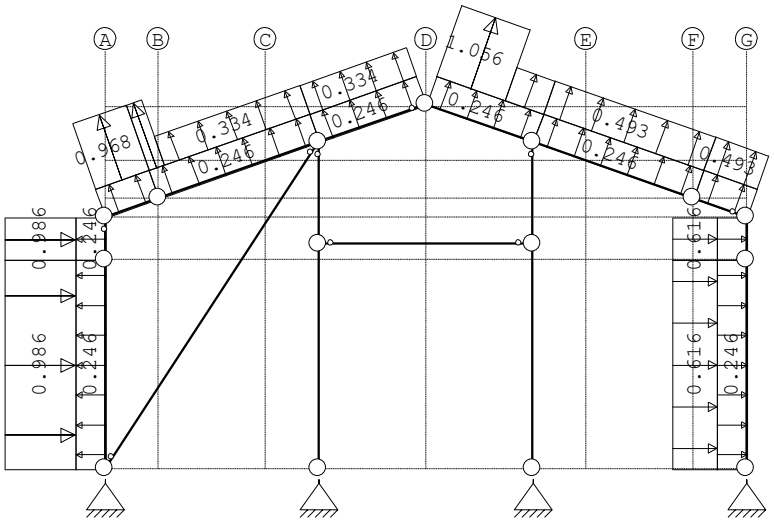
**STAAFBELASTINGEN** B.G:4 Wind van links onderdruk B

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw5 | 1.06 | 1.06 | 0.000 | 0.759 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 1.360 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:4 Wind van links onderdruk B




**BELASTINGEN** B.G:5 Wind van links overdruk B




**STAAFBELASTINGEN** B.G:5 Wind van links overdruk B

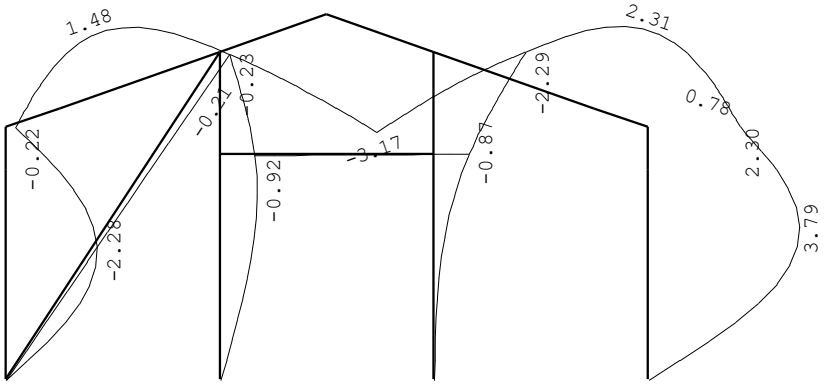
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

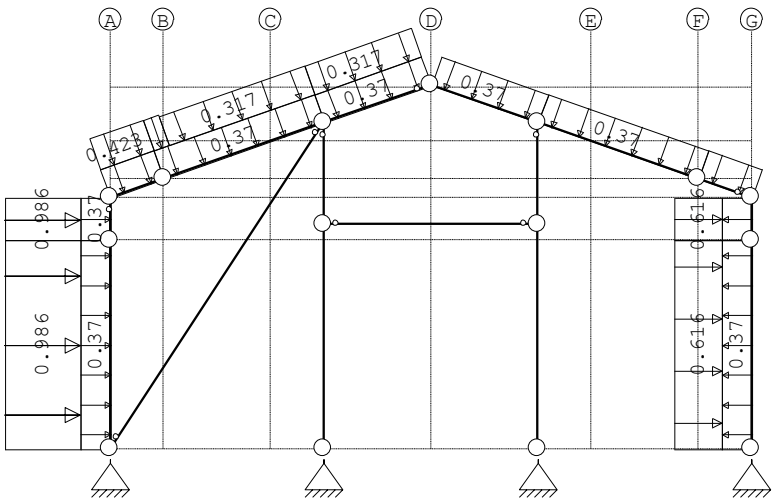
**STAAFBELASTINGEN** B.G:5 Wind van links overdruk B

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 10 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 0.000 | 2.878 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw5 | 1.06 | 1.06 | 0.000 | 0.759 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 1.360 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:5 Wind van links overdruk B




**BELASTINGEN** B.G:6 Wind van links onderdruk C

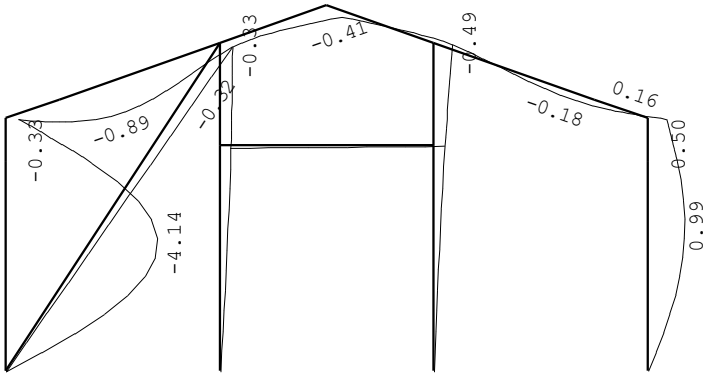


Project.....: BK2022-082
Onderdeel....: spant kopgevel

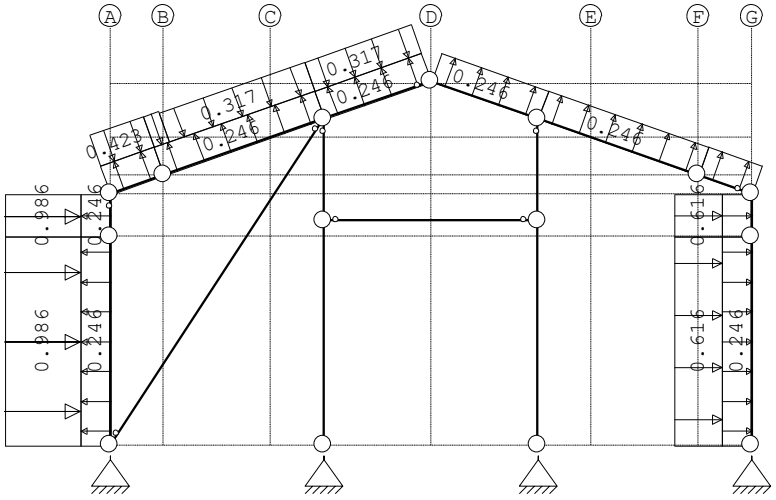
**STAAFBELASTINGEN** B.G:6 Wind van links onderdruk C

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 0.000 | 2.878 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:6 Wind van links onderdruk C




**BELASTINGEN** B.G:7 Wind van links overdruk C

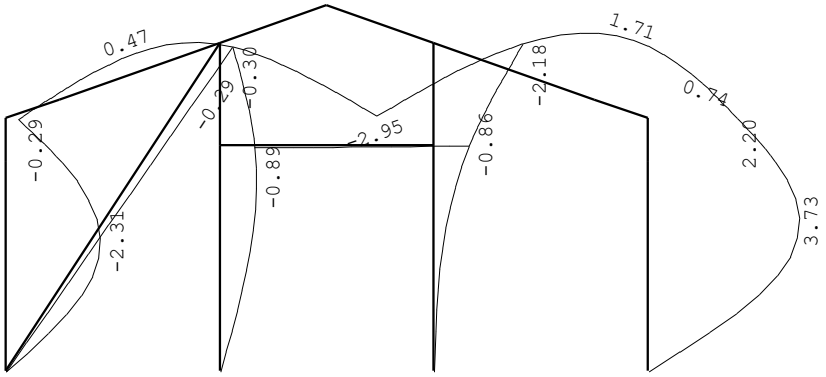


Project.....: BK2022-082
Onderdeel....: spant kopgevel

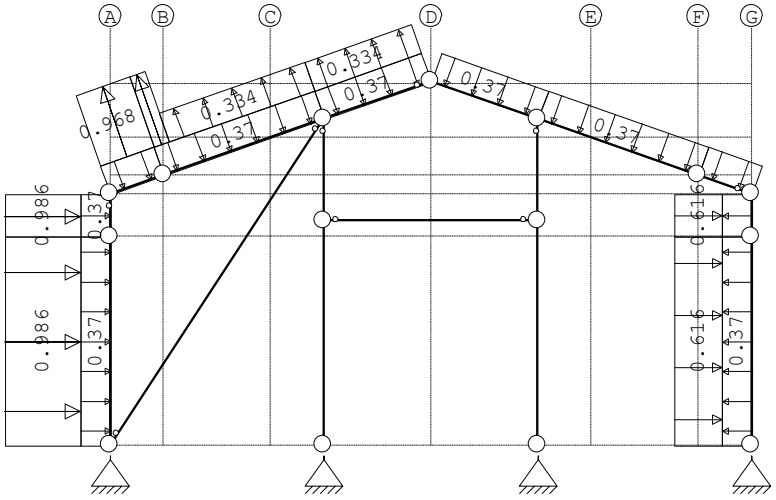
**STAAFBELASTINGEN** B.G:7 Wind van links overdruk C

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 0.000 | 2.878 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:7 Wind van links overdruk C




**BELASTINGEN** B.G:8 Wind van links onderdruk D

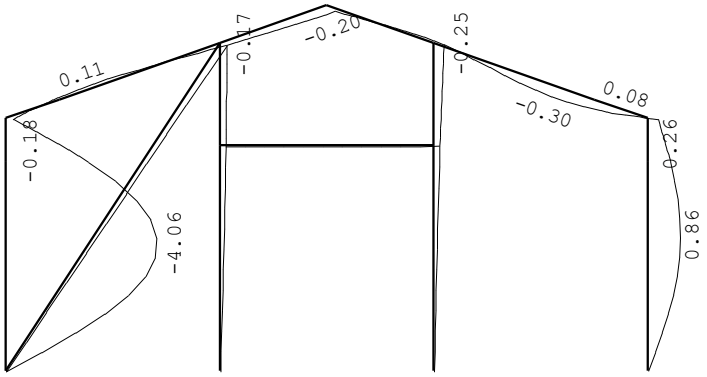


Project.....: BK2022-082
Onderdeel....: spant kopgevel

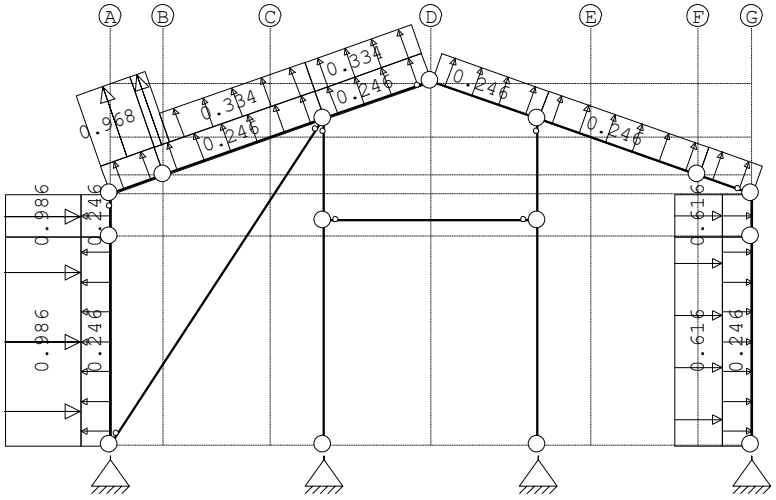
**STAAFBELASTINGEN** B.G:8 Wind van links onderdruk D

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 0.000 | 2.878 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:8 Wind van links onderdruk D




**BELASTINGEN** B.G:9 Wind van links overdruk D

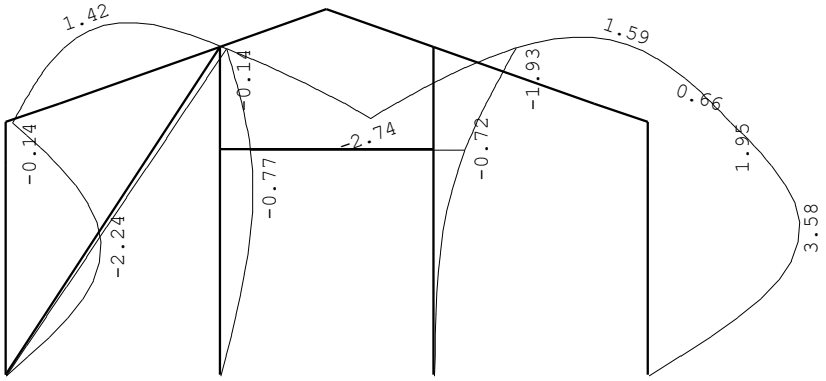


Project.....: BK2022-082
Onderdeel....: spant kopgevel

**STAAFBELASTINGEN** B.G:9 Wind van links overdruk D

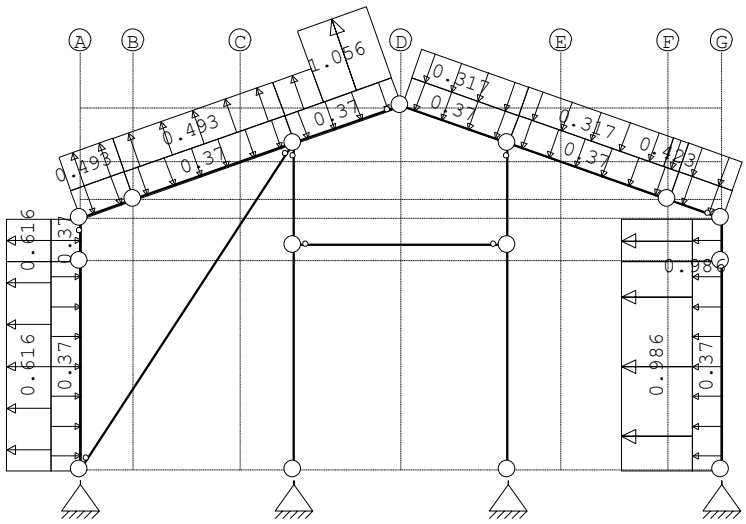
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 0.000 | 2.878 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.301 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:9 Wind van links overdruk D



Project.....: BK2022-082
Onderdeel....: spant kopgevel

**BELASTINGEN** B.G:10 Wind van rechts onderdruk A

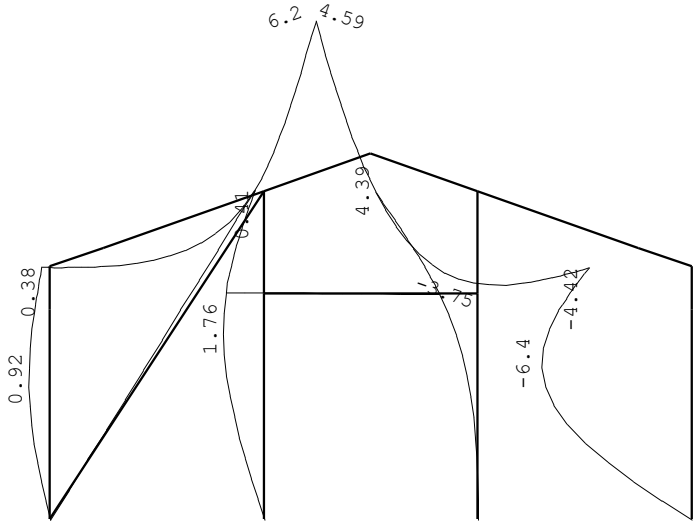



**STAAFBELASTINGEN** B.G:10 Wind van rechts onderdruk A

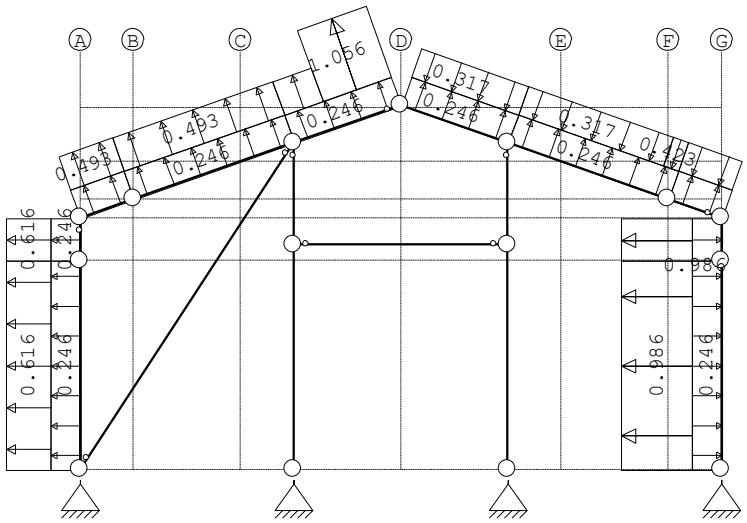
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 2.878 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw5 | 1.06 | 1.06 | 0.759 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 1.360 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**VERPLAATSINGEN** [mm] B.G:10 Wind van rechts onderdruk A




**BELASTINGEN** B.G:11 Wind van rechts overdruk A




**STAAFBELASTINGEN** B.G:11 Wind van rechts overdruk A

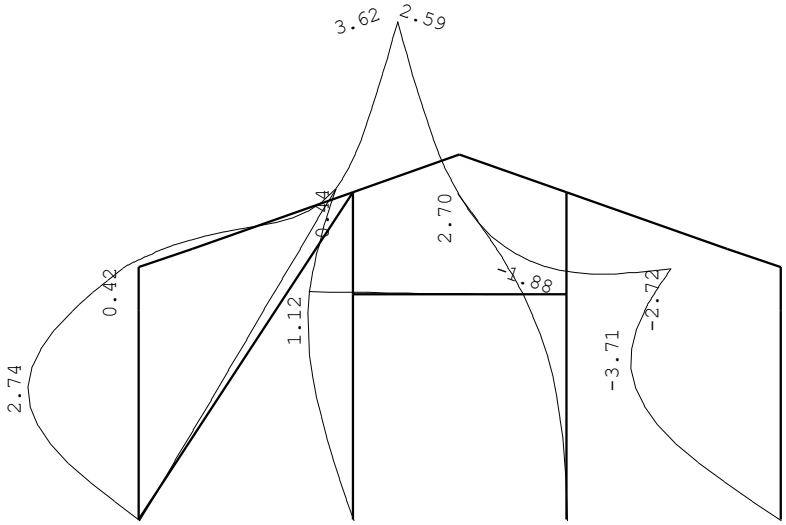
| Staaf | Type | Index | q1/p/m | q2 | A | B | ψ0 | ψ1 | ψ2 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 2.878 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

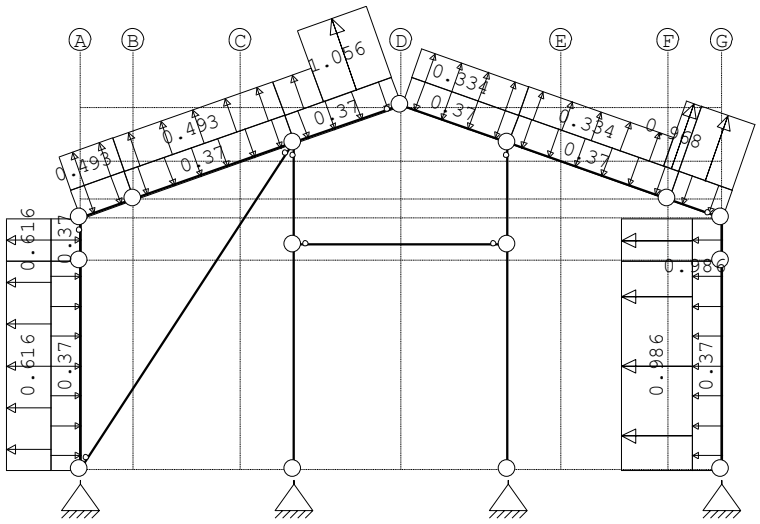
**STAAFBELASTINGEN** B.G:11 Wind van rechts overdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 7 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw5 | 1.06 | 1.06 | 0.759 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 1.360 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:11 Wind van rechts overdruk A




**BELASTINGEN** B.G:12 Wind van rechts onderdruk B

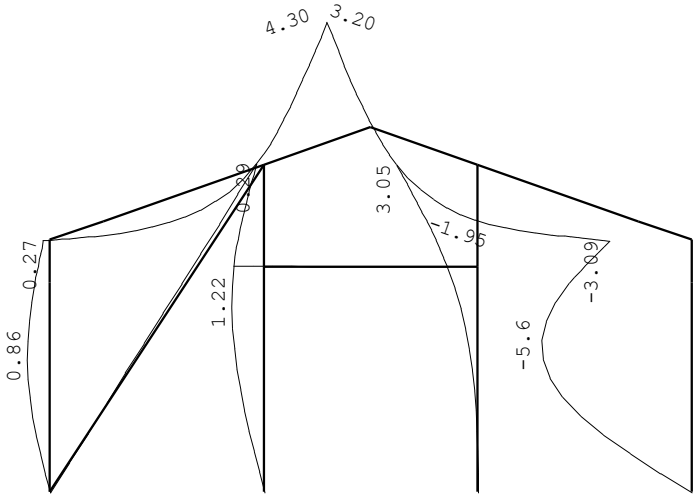


Project.....: BK2022-082
Onderdeel....: spant kopgevel

**STAAFBELASTINGEN** B.G:12 Wind van rechts onderdruk B

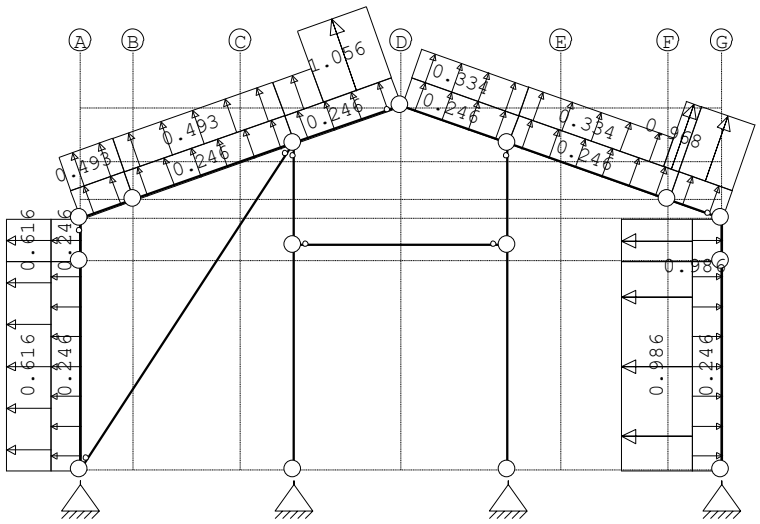
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 2.878 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw5 | 1.06 | 1.06 | 0.759 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 1.360 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:12 Wind van rechts onderdruk B



Project.....: BK2022-082
Onderdeel....: spant kopgevel

**BELASTINGEN** B.G:13 Wind van rechts overdruk B

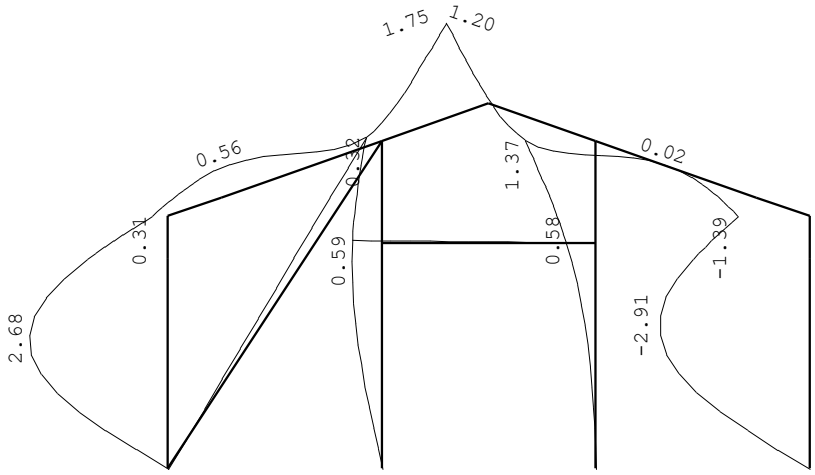



**STAAFBELASTINGEN** B.G:13 Wind van rechts overdruk B

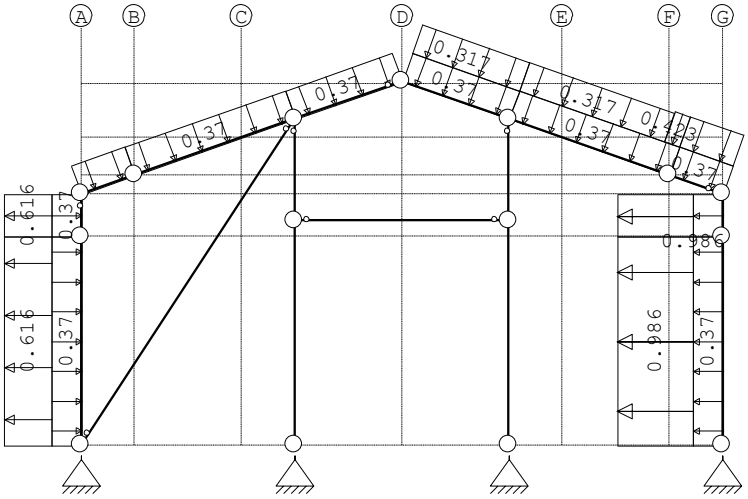
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 2.878 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw5 | 1.06 | 1.06 | 0.759 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 1.360 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw6 | 0.49 | 0.49 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**VERPLAATSINGEN** [mm] B.G:13 Wind van rechts overdruk B




**BELASTINGEN** B.G:14 Wind van rechts onderdruk C




**STAAFBELASTINGEN** B.G:14 Wind van rechts onderdruk C

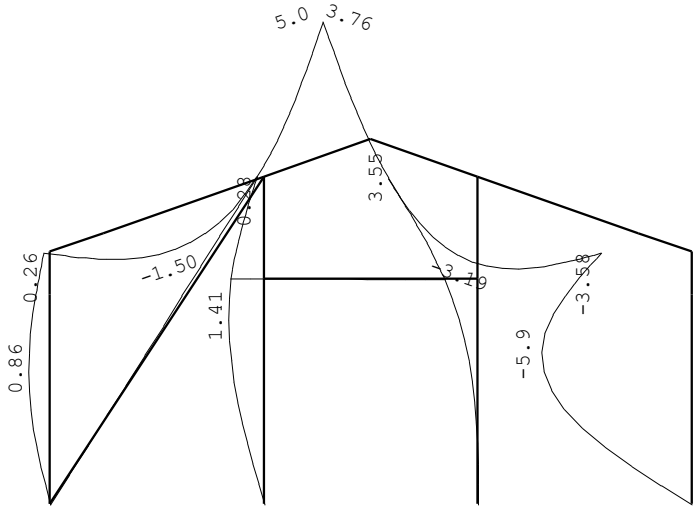
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 2.878 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

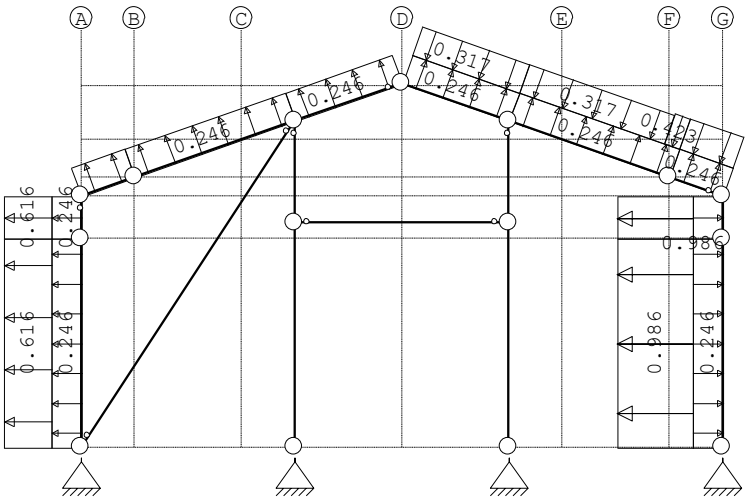
**STAAFBELASTINGEN** B.G:14 Wind van rechts onderdruk C

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:14 Wind van rechts onderdruk C




**BELASTINGEN** B.G:15 Wind van rechts overdruk C




**STAAFBELASTINGEN** B.G:15 Wind van rechts overdruk C

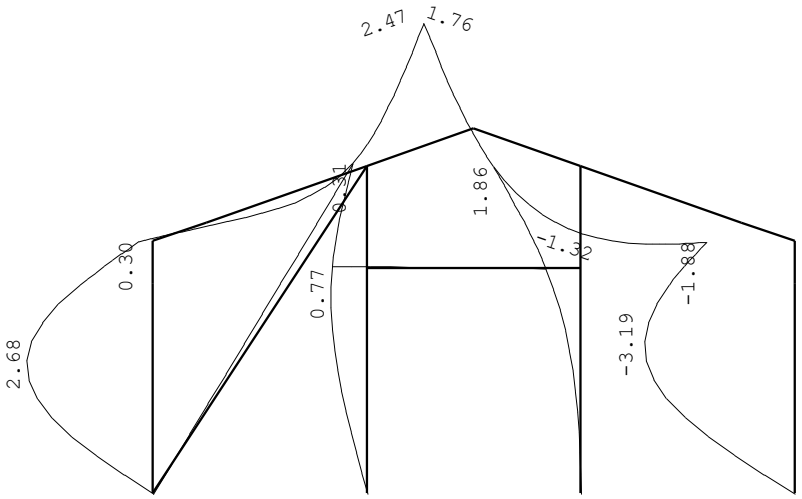
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

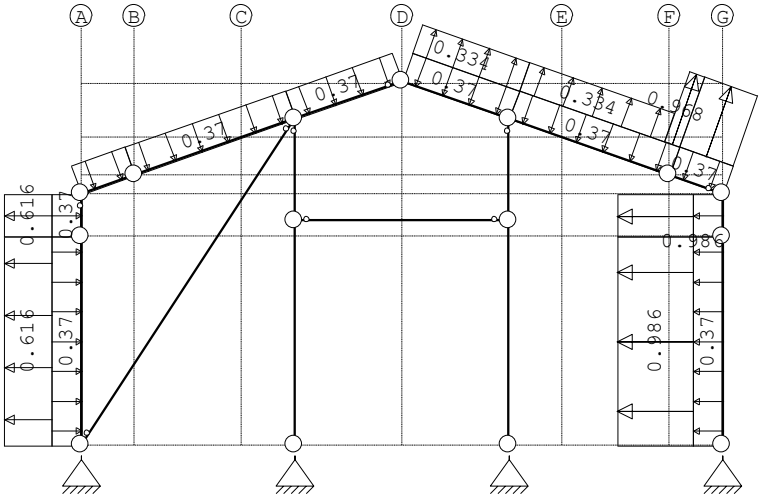
**STAAFBELASTINGEN** B.G:15 Wind van rechts overdruk C

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw3 | -0.42 | -0.42 | 2.878 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw4 | -0.32 | -0.32 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:15 Wind van rechts overdruk C




**BELASTINGEN** B.G:16 Wind van rechts onderdruk D




**STAAFBELASTINGEN** B.G:16 Wind van rechts onderdruk D

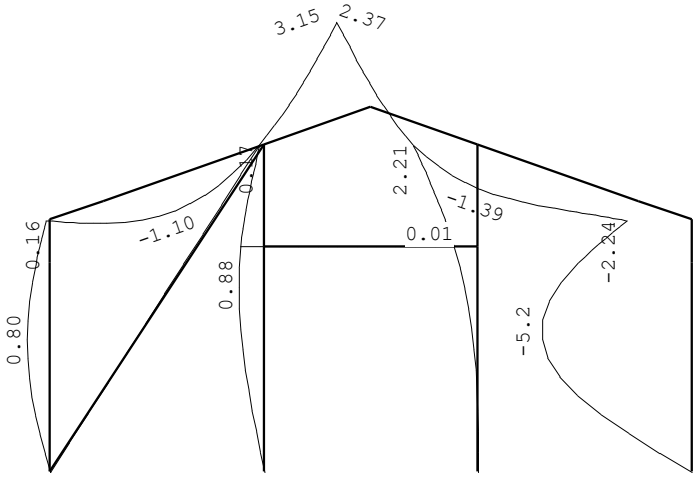
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

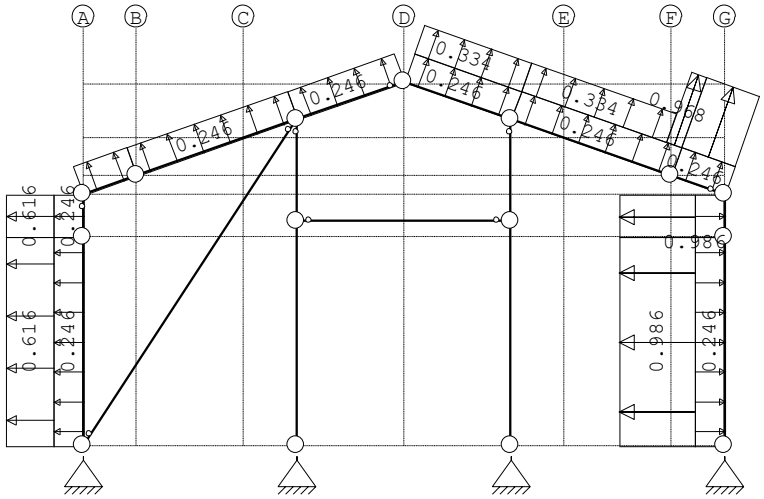
**STAAFBELASTINGEN** B.G:16 Wind van rechts onderdruk D

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 7 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 2.878 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:16 Wind van rechts onderdruk D




**BELASTINGEN** B.G:17 Wind van rechts overdruk D

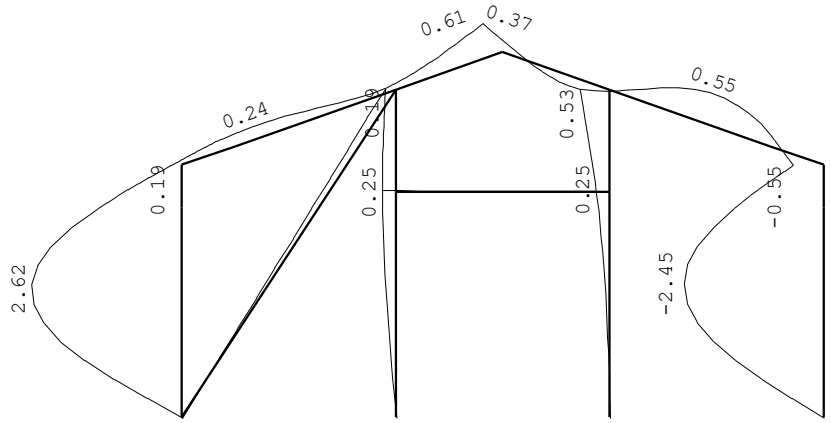


Project.....: BK2022-082
Onderdeel....: spant kopgevel

**STAAFBELASTINGEN** B.G:17 Wind van rechts overdruk D

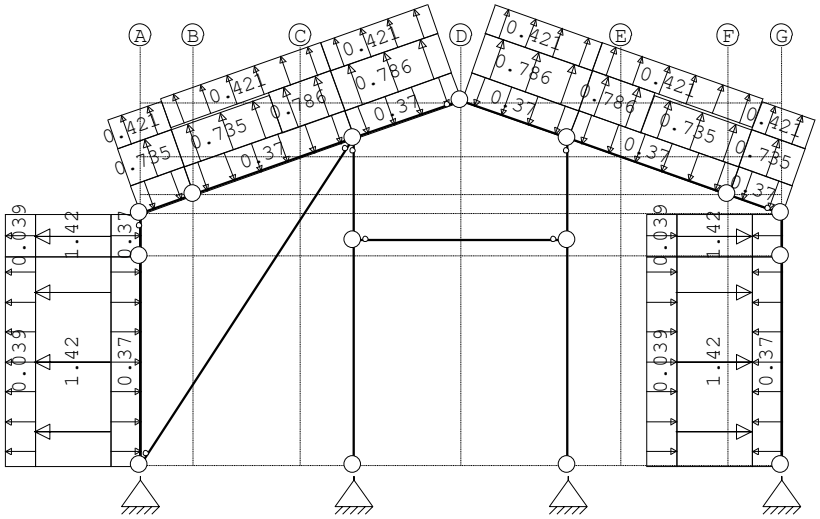
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw2 | -0.99 | -0.99 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw9 | 0.97 | 0.97 | 2.878 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.000 | 0.301 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw10 | 0.33 | 0.33 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw7 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:17 Wind van rechts overdruk D



Project.....: BK2022-082
Onderdeel....: spant kopgevel

**BELASTINGEN** B.G:18 Wind loodrecht onderdruk A

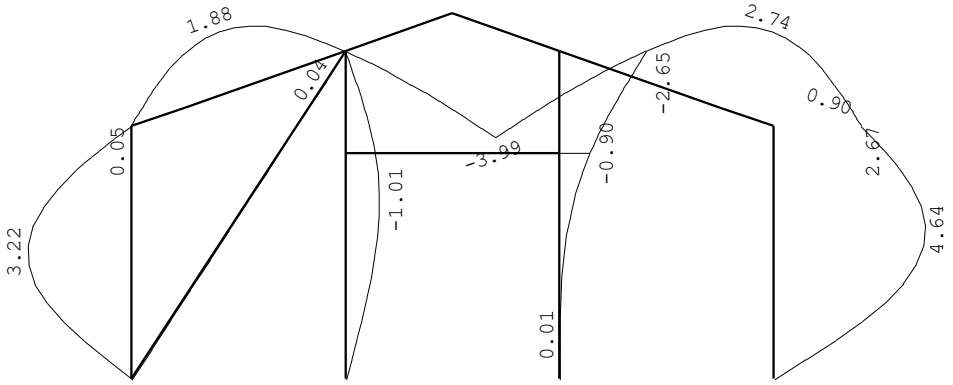



**STAAFBELASTINGEN** B.G:18 Wind loodrecht onderdruk A

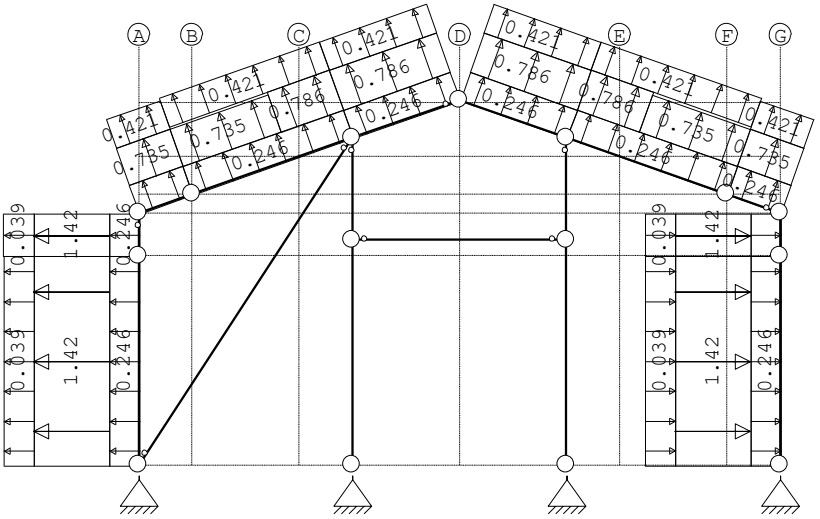
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw11 | 1.42 | 1.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw12 | 0.04 | 0.04 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw11 | 1.42 | 1.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw12 | 0.04 | 0.04 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw11 | 1.42 | 1.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw12 | 0.04 | 0.04 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw11 | 1.42 | 1.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw12 | 0.04 | 0.04 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw13 | 0.74 | 0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw14 | 0.42 | 0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw15 | 0.79 | 0.79 | 1.940 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw13 | 0.74 | 0.74 | 0.000 | 1.238 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw14 | 0.42 | 0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw15 | 0.79 | 0.79 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw14 | 0.42 | 0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw15 | 0.79 | 0.79 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw14 | 0.42 | 0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw13 | 0.74 | 0.74 | 1.238 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw15 | 0.79 | 0.79 | 0.000 | 1.940 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw14 | 0.42 | 0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw13 | 0.74 | 0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw14 | 0.42 | 0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**VERPLAATSINGEN** [mm] B.G:18 Wind loodrecht onderdruk A




**BELASTINGEN** B.G:19 Wind loodrecht overdruk A




**STAAFBELASTINGEN** B.G:19 Wind loodrecht overdruk A

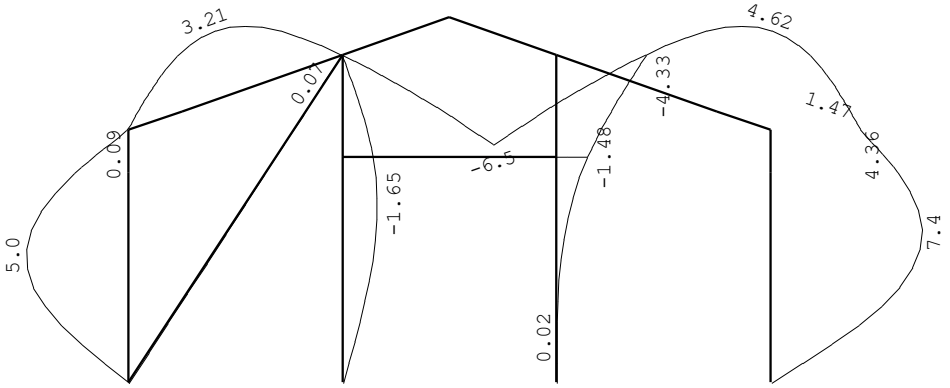
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw11 | 1.42 | 1.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw12 | 0.04 | 0.04 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw11 | 1.42 | 1.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw12 | 0.04 | 0.04 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw11 | 1.42 | 1.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw12 | 0.04 | 0.04 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw11 | 1.42 | 1.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw12 | 0.04 | 0.04 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw13 | 0.74 | 0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw14 | 0.42 | 0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

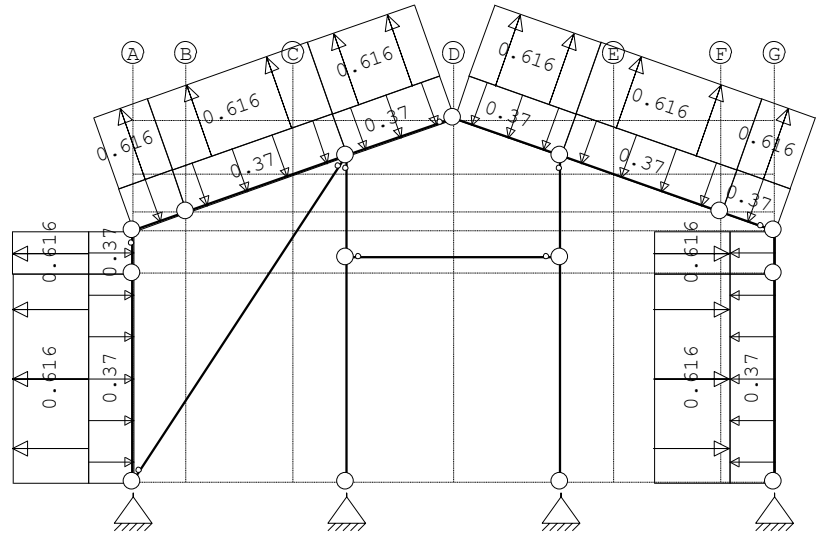
**STAAFBELASTINGEN** B.G:19 Wind loodrecht overdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 1:QZLokaal | Qw15 | 0.79 | 0.79 | 1.940 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw13 | 0.74 | 0.74 | 0.000 | 1.238 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw14 | 0.42 | 0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw15 | 0.79 | 0.79 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw14 | 0.42 | 0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw15 | 0.79 | 0.79 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw14 | 0.42 | 0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw13 | 0.74 | 0.74 | 1.238 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw15 | 0.79 | 0.79 | 0.000 | 1.940 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw14 | 0.42 | 0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw13 | 0.74 | 0.74 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw14 | 0.42 | 0.42 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:19 Wind loodrecht overdruk A




**BELASTINGEN** B.G:20 Wind loodrecht onderdruk B

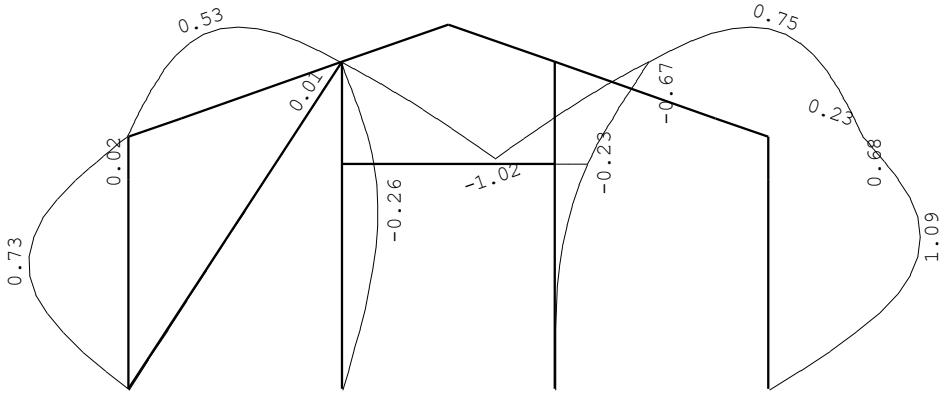


Project.....: BK2022-082
Onderdeel....: spant kopgevel

**STAAFBELASTINGEN** B.G:20 Wind loodrecht onderdruk B

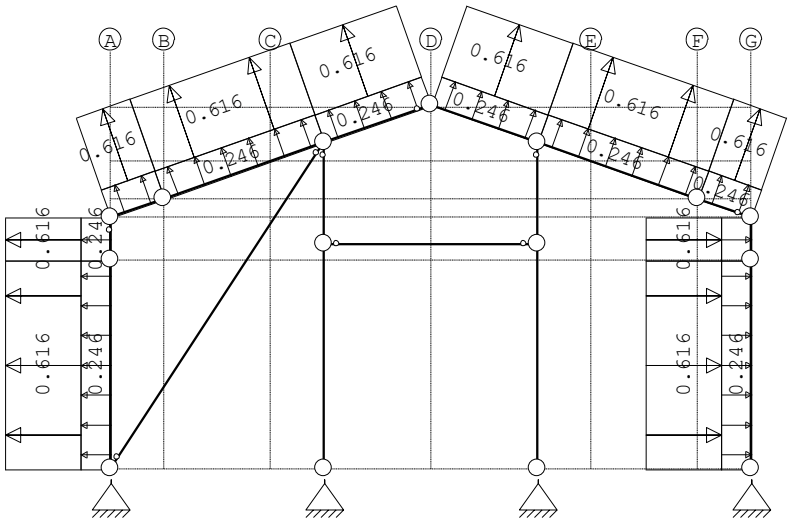
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw1 | -0.37 | -0.37 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw16 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw16 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw16 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw16 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw17 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw17 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw17 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw17 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw17 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw17 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

**VERPLAATSINGEN** [mm] B.G:20 Wind loodrecht onderdruk B



Project.....: BK2022-082
Onderdeel....: spant kopgevel

**BELASTINGEN** B.G:21 Wind loodrecht overdruk B

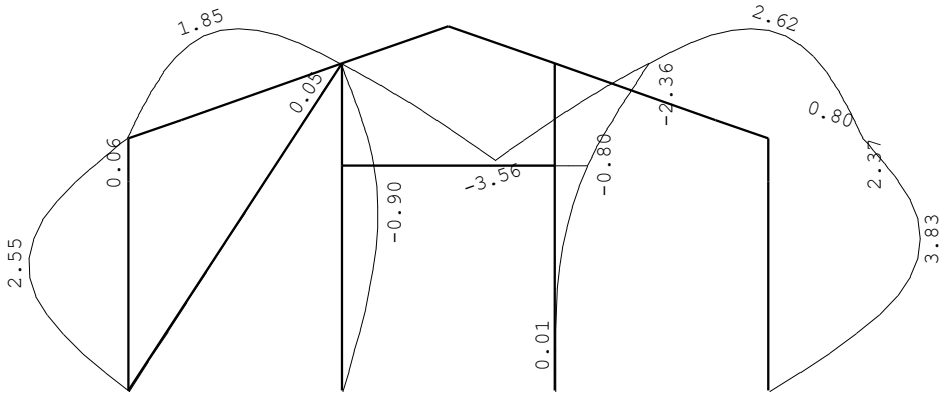



**STAAFBELASTINGEN** B.G:21 Wind loodrecht overdruk B

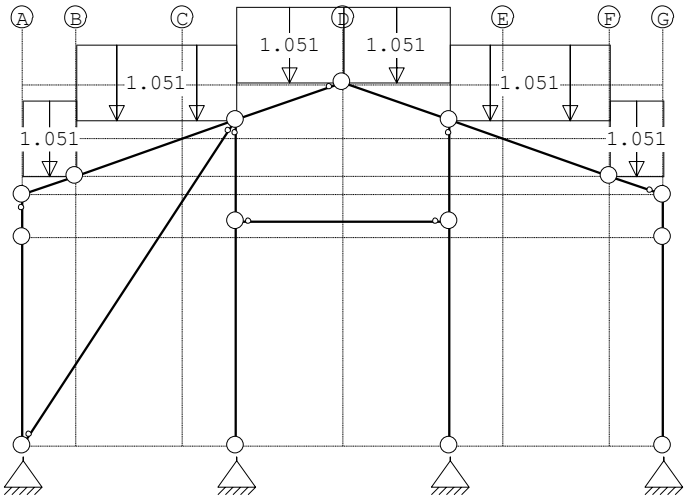
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw8 | 0.25 | 0.25 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw16 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw16 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 9 | 1:QZLokaal | Qw16 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 10 | 1:QZLokaal | Qw16 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw17 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 1:QZLokaal | Qw17 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 1:QZLokaal | Qw17 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 1:QZLokaal | Qw17 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 1:QZLokaal | Qw17 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 1:QZLokaal | Qw17 | 0.62 | 0.62 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**VERPLAATSINGEN** [mm] B.G:21 Wind loodrecht overdruk B




**BELASTINGEN** B.G:22 Sneeuw A

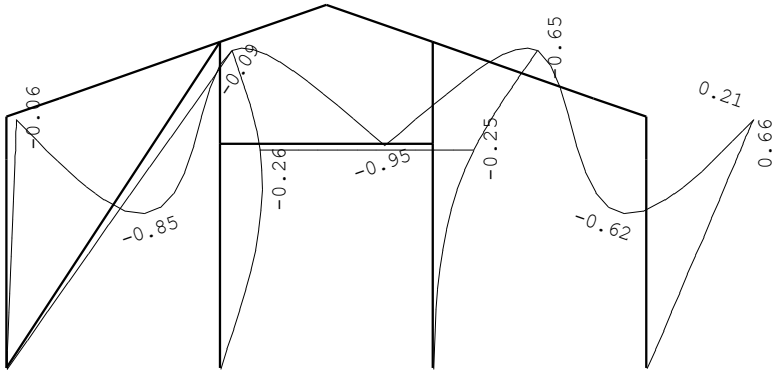



**STAAFBELASTINGEN** B.G:22 Sneeuw A

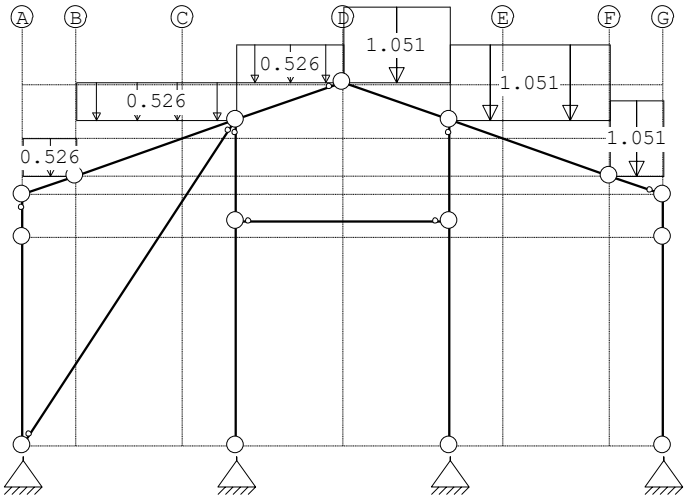
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 3:QZgeProj. | Qs1 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 3:QZgeProj. | Qs1 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 3:QZgeProj. | Qs1 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 3:QZgeProj. | Qs1 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 3:QZgeProj. | Qs1 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 3:QZgeProj. | Qs1 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**VERPLAATSINGEN** [mm] B.G:22 Sneeuw A




**BELASTINGEN** B.G:23 Sneeuw B

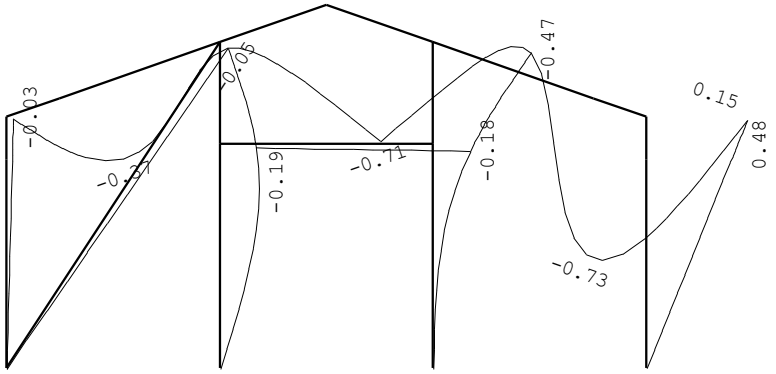



**STAAFBELASTINGEN** B.G:23 Sneeuw B

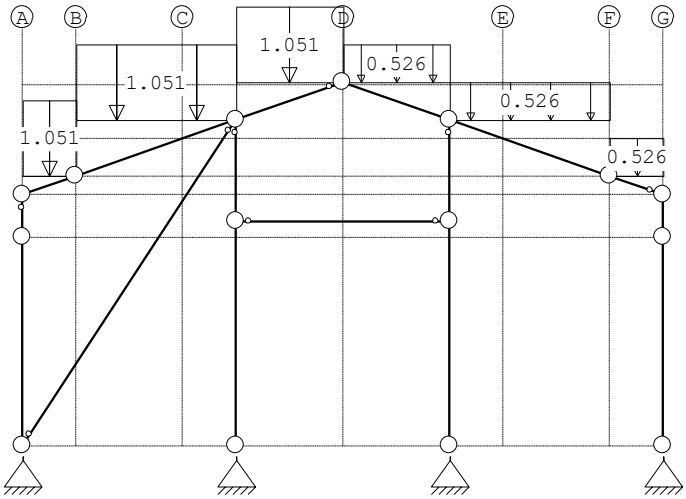
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 3:QZgeProj. | Qs2 | -0.53 | -0.53 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 3:QZgeProj. | Qs2 | -0.53 | -0.53 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 3:QZgeProj. | Qs2 | -0.53 | -0.53 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 3:QZgeProj. | Qs1 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 3:QZgeProj. | Qs1 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 3:QZgeProj. | Qs1 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**VERPLAATSINGEN** [mm] B.G:23 Sneeuw B




**BELASTINGEN** B.G:24 Sneeuw C

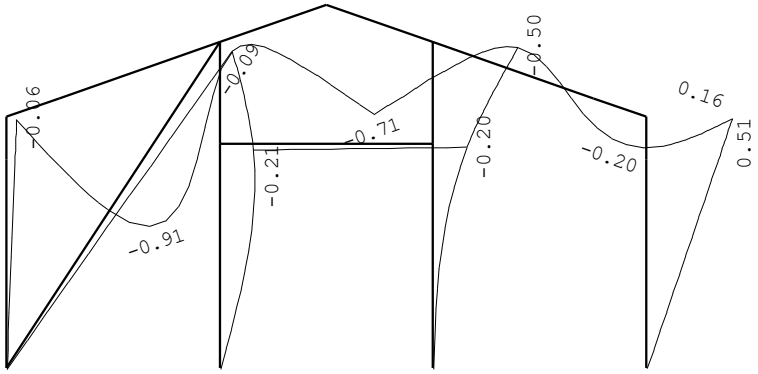



**STAAFBELASTINGEN** B.G:24 Sneeuw C

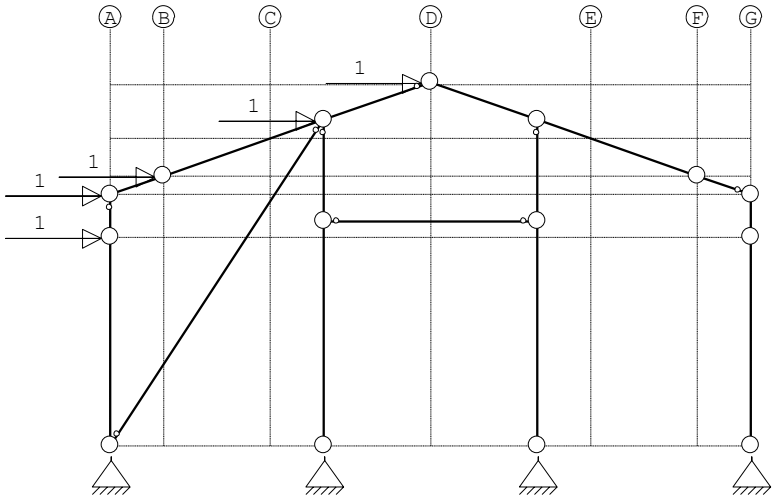
| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 3:QZgeProj. | Qs1 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 4 | 3:QZgeProj. | Qs1 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 5 | 3:QZgeProj. | Qs1 | -1.05 | -1.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 6 | 3:QZgeProj. | Qs2 | -0.53 | -0.53 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 7 | 3:QZgeProj. | Qs2 | -0.53 | -0.53 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 8 | 3:QZgeProj. | Qs2 | -0.53 | -0.53 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**VERPLAATSINGEN** [mm] B.G:24 Sneeuw C




**BELASTINGEN** B.G:25 Knik

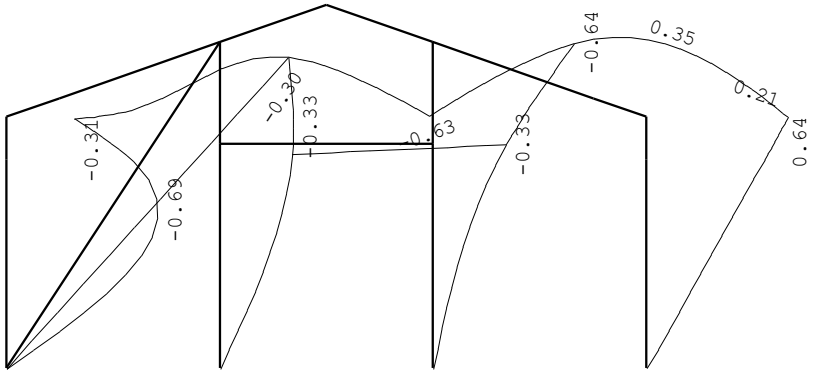



**KNOOPBELASTINGEN** B.G:25 Knik

| Last | Knoop | Richting | waarde | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|
| 1 | 2 | X | 1.000 | | | |
| 2 | 3 | X | 1.000 | | | |
| 3 | 4 | X | 1.000 | | | |
| 4 | 5 | X | 1.000 | | | |
| 5 | 6 | X | 1.000 | | | |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**VERPLAATSINGEN** [mm] B.G:25 Knik




**REACTIES**

| Kn. | B.G. | X | Z | M |
|---|---|---|---|---|
| 1 | 1 | 0.00 | 3.31 | |
| 1 | 2 | -8.95 | -6.37 | |
| 1 | 3 | -7.50 | -8.31 | |
| 1 | 4 | -7.25 | -5.80 | |
| 1 | 5 | -5.80 | -7.74 | |
| 1 | 6 | -7.66 | -4.36 | |
| 1 | 7 | -6.22 | -6.30 | |
| 1 | 8 | -5.96 | -3.79 | |
| 1 | 9 | -4.52 | -5.73 | |
| 1 | 10 | 6.35 | 9.09 | |
| 1 | 11 | 7.79 | 7.15 | |
| 1 | 12 | 4.65 | 6.28 | |
| 1 | 13 | 6.09 | 4.34 | |
| 1 | 14 | 5.06 | 7.89 | |
| 1 | 15 | 6.51 | 5.94 | |
| 1 | 16 | 3.36 | 5.08 | |
| 1 | 17 | 4.81 | 3.14 | |
| 1 | 18 | 2.56 | -2.82 | |
| 1 | 19 | 4.01 | -4.76 | |
| 1 | 20 | 0.58 | -0.78 | |
| 1 | 21 | 2.03 | -2.72 | |
| 1 | 22 | 0.00 | 1.60 | |
| 1 | 23 | 0.00 | 0.77 | |
| 1 | 24 | 0.00 | 1.63 | |
| 1 | 25 | -5.00 | -6.54 | |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**REACTIES**

| Kn. | B.G. | X | Z | M |
|---|---|---|---|---|
| 11 | 1 | 0.00 | 2.55 | |
| 11 | 2 | -0.58 | -0.50 | |
| 11 | 3 | -2.03 | -2.44 | |
| 11 | 4 | -0.58 | -0.48 | |
| 11 | 5 | -2.03 | -2.42 | |
| 11 | 6 | -0.58 | 0.44 | |
| 11 | 7 | -2.03 | -1.50 | |
| 11 | 8 | -0.58 | 0.46 | |
| 11 | 9 | -2.03 | -1.48 | |
| 11 | 10 | 3.19 | 3.22 | |
| 11 | 11 | 1.74 | 1.28 | |
| 11 | 12 | 3.19 | 0.96 | |
| 11 | 13 | 1.74 | -0.98 | |
| 11 | 14 | 3.19 | 3.08 | |
| 11 | 15 | 1.74 | 1.14 | |
| 11 | 16 | 3.19 | 0.83 | |
| 11 | 17 | 1.74 | -1.11 | |
| 11 | 18 | -2.56 | -2.82 | |
| 11 | 19 | -4.01 | -4.76 | |
| 11 | 20 | -0.58 | -0.78 | |
| 11 | 21 | -2.03 | -2.72 | |
| 11 | 22 | 0.00 | 1.60 | |
| 11 | 23 | 0.00 | 1.63 | |
| 11 | 24 | 0.00 | 0.77 | |
| 11 | 25 | 0.00 | -0.06 | |
| | | | | |
| 12 | 1 | -0.06 | 6.70 | |
| 12 | 2 | -0.05 | 10.25 | |
| 12 | 3 | -0.27 | 8.49 | |
| 12 | 4 | -0.04 | 4.86 | |
| 12 | 5 | -0.26 | 3.10 | |
| 12 | 6 | -0.02 | 8.57 | |
| 12 | 7 | -0.24 | 6.82 | |
| 12 | 8 | -0.01 | 3.19 | |
| 12 | 9 | -0.22 | 1.43 | |
| 12 | 10 | 0.50 | -10.17 | |
| 12 | 11 | 0.28 | -11.93 | |
| 12 | 12 | 0.35 | -7.41 | |
| 12 | 13 | 0.13 | -9.17 | |
| 12 | 14 | 0.41 | -5.62 | |
| 12 | 15 | 0.19 | -7.37 | |
| 12 | 16 | 0.26 | -2.86 | |
| 12 | 17 | 0.04 | -4.61 | |
| 12 | 18 | -0.34 | -2.06 | |
| 12 | 19 | -0.55 | -3.82 | |
| 12 | 20 | -0.09 | -0.70 | |
| 12 | 21 | -0.30 | -2.46 | |
| 12 | 22 | -0.07 | 4.70 | |
| 12 | 23 | -0.05 | 2.45 | |
| 12 | 24 | -0.05 | 4.60 | |
| 12 | 25 | -0.04 | 6.38 | |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**REACTIES**

| Kn. | B.G. | X | Z | M |
|---|---|---|---|---|
| 13 | 1 | 0.06 | 5.95 | |
| 13 | 2 | 0.05 | -0.58 | |
| 13 | 3 | 0.27 | -2.34 | |
| 13 | 4 | 0.04 | -0.65 | |
| 13 | 5 | 0.26 | -2.40 | |
| 13 | 6 | 0.02 | 1.83 | |
| 13 | 7 | 0.24 | 0.07 | |
| 13 | 8 | 0.01 | 1.76 | |
| 13 | 9 | 0.22 | 0.01 | |
| 13 | 10 | -0.50 | 0.66 | |
| 13 | 11 | -0.28 | -1.10 | |
| 13 | 12 | -0.35 | -1.90 | |
| 13 | 13 | -0.13 | -3.66 | |
| 13 | 14 | -0.41 | 1.12 | |
| 13 | 15 | -0.19 | -0.63 | |
| 13 | 16 | -0.26 | -1.43 | |
| 13 | 17 | -0.04 | -3.19 | |
| 13 | 18 | 0.34 | -2.06 | |
| 13 | 19 | 0.55 | -3.82 | |
| 13 | 20 | 0.09 | -0.70 | |
| 13 | 21 | 0.30 | -2.46 | |
| 13 | 22 | 0.07 | 4.70 | |
| 13 | 23 | 0.05 | 4.60 | |
| 13 | 24 | 0.05 | 2.45 | |
| 13 | 25 | 0.04 | 0.22 | |

**BELASTINGCOMBINATIES**

| BC | Type | | | | |
|---|---|---|---|---|---|
| 1 | Fund. | 1.22 $G_{k,1}$ | | | |
| 2 | Fund. | 0.90 $G_{k,1}$ | | | |
| 3 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,2}$ |
| 4 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,3}$ |
| 5 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,4}$ |
| 6 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,5}$ |
| 7 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,6}$ |
| 8 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,7}$ |
| 9 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,8}$ |
| 10 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,9}$ |
| 11 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,10}$ |
| 12 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,11}$ |
| 13 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,12}$ |
| 14 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,13}$ |
| 15 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,14}$ |
| 16 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,15}$ |
| 17 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,16}$ |
| 18 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,17}$ |
| 19 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,18}$ |
| 20 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,19}$ |
| 21 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,20}$ |
| 22 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,21}$ |
| 23 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,22}$ |
| 24 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,23}$ |
| 25 | Fund. | 1.08 $G_{k,1}$ | + | 1.35 | $Q_{k,24}$ |
| 26 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,2}$ |
| 27 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,3}$ |
| 28 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,4}$ |
| 29 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,5}$ |
| 30 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,6}$ |
| 31 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,7}$ |
| 32 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,8}$ |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**BELASTINGCOMBINATIES**

| BC | Type | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 33 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,9}$ |
| 34 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,10}$ |
| 35 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,11}$ |
| 36 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,12}$ |
| 37 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,13}$ |
| 38 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,14}$ |
| 39 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,15}$ |
| 40 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,16}$ |
| 41 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,17}$ |
| 42 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,18}$ |
| 43 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,19}$ |
| 44 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,20}$ |
| 45 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,21}$ |
| 46 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,22}$ |
| 47 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,23}$ |
| 48 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,24}$ |
| 49 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,2}$ |
| 50 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,3}$ |
| 51 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,4}$ |
| 52 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,5}$ |
| 53 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,6}$ |
| 54 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,7}$ |
| 55 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,8}$ |
| 56 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,9}$ |
| 57 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,10}$ |
| 58 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,11}$ |
| 59 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,12}$ |
| 60 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,13}$ |
| 61 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,14}$ |
| 62 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,15}$ |
| 63 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,16}$ |
| 64 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,17}$ |
| 65 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,18}$ |
| 66 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,19}$ |
| 67 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,20}$ |
| 68 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,21}$ |
| 69 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,22}$ |
| 70 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,23}$ |
| 71 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,24}$ |
| 72 | Quas. | 1.00 | $G_{k,1}$ | | | | |
| 73 | Freq. | 1.00 | $G_{k,1}$ | | | | |
| 74 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,2}$ |
| 75 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,3}$ |
| 76 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,4}$ |
| 77 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,5}$ |
| 78 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,6}$ |
| 79 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,7}$ |
| 80 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,8}$ |
| 81 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,9}$ |
| 82 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,10}$ |
| 83 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,11}$ |
| 84 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,12}$ |
| 85 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,13}$ |
| 86 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,14}$ |
| 87 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,15}$ |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**BELASTINGCOMBINATIES**

| BC | Type | | | | | |
|---|---|---|---|---|---|---|
| 88 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,16}$ |
| 89 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,17}$ |
| 90 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,18}$ |
| 91 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,19}$ |
| 92 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,20}$ |
| 93 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,21}$ |
| 94 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,22}$ |
| 95 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,23}$ |
| 96 | Freq. | 1.00 $G_{k,1}$ | + | 1.00 $\psi_1$ | $Q_{k,24}$ |
| 97 | Blij. | 1.00 $G_{k,1}$ | | | |

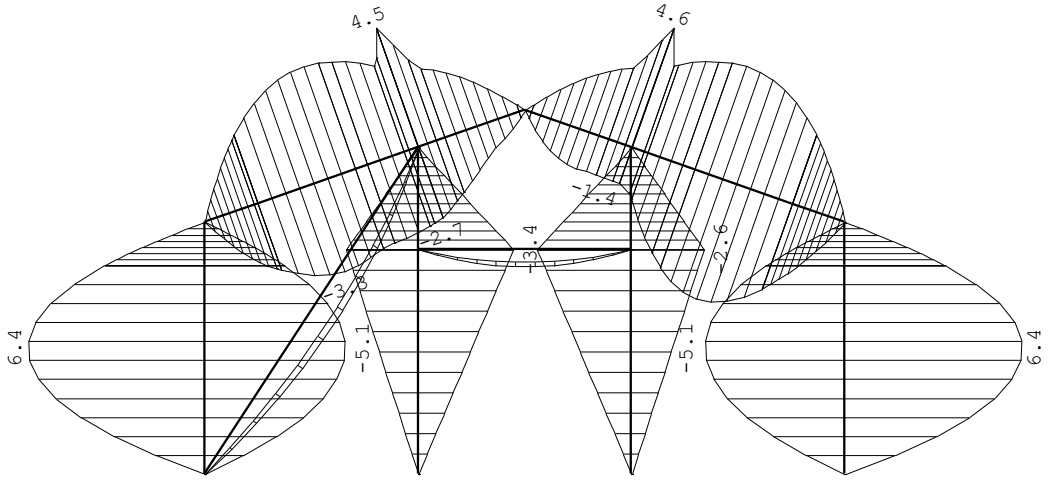
**GUNSTIGE WERKING PERMANENTE BELASTINGEN**

| BC | Staven met gunstige werking |
|---|---|
| 1 | Geen |
| 2 | Alle staven de factor:0.90 |
| 3 | Geen |
| 4 | Geen |
| 5 | Geen |
| 6 | Geen |
| 7 | Geen |
| 8 | Geen |
| 9 | Geen |
| 10 | Geen |
| 11 | Geen |
| 12 | Geen |
| 13 | Geen |
| 14 | Geen |
| 15 | Geen |
| 16 | Geen |
| 17 | Geen |
| 18 | Geen |
| 19 | Geen |
| 20 | Geen |
| 21 | Geen |
| 22 | Geen |
| 23 | Geen |
| 24 | Geen |
| 25 | Geen |
| 26 | Alle staven de factor:0.90 |
| 27 | Alle staven de factor:0.90 |
| 28 | Alle staven de factor:0.90 |
| 29 | Alle staven de factor:0.90 |
| 30 | Alle staven de factor:0.90 |
| 31 | Alle staven de factor:0.90 |
| 32 | Alle staven de factor:0.90 |
| 33 | Alle staven de factor:0.90 |
| 34 | Alle staven de factor:0.90 |
| 35 | Alle staven de factor:0.90 |
| 36 | Alle staven de factor:0.90 |
| 37 | Alle staven de factor:0.90 |
| 38 | Alle staven de factor:0.90 |
| 39 | Alle staven de factor:0.90 |
| 40 | Alle staven de factor:0.90 |
| 41 | Alle staven de factor:0.90 |
| 42 | Alle staven de factor:0.90 |
| 43 | Alle staven de factor:0.90 |
| 44 | Alle staven de factor:0.90 |
| 45 | Alle staven de factor:0.90 |
| 46 | Alle staven de factor:0.90 |
| 47 | Alle staven de factor:0.90 |
| 48 | Alle staven de factor:0.90 |

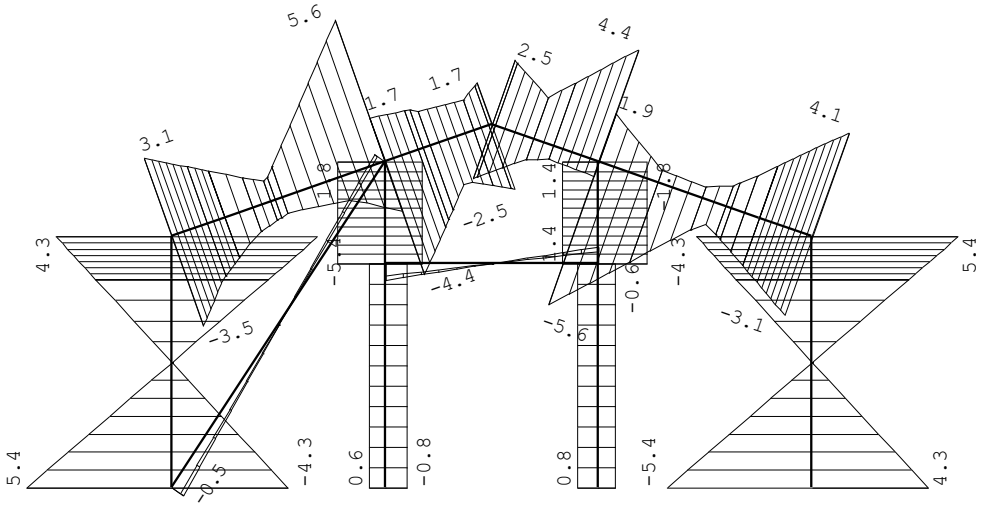
Project.....: BK2022-082
Onderdeel....: spant kopgevel

**OMHULLENDE VAN DE FUNDAMENTELE COMBINATIES**

**MOMENTEN** Fundamentele combinatie

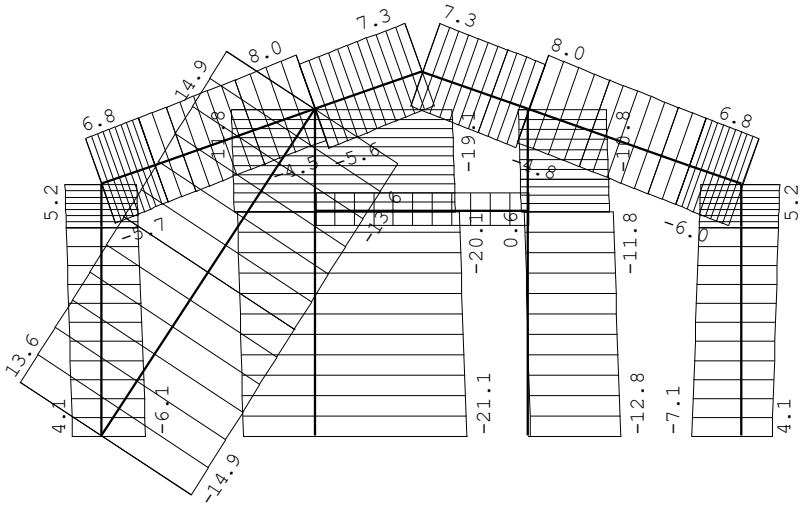



**DWARSKRACHTEN** Fundamentele combinatie



Project.....: BK2022-082
Onderdeel....: spant kopgevel

**NORMAALKRACHTEN** Fundamentele combinatie




**STAAFKRACHTEN** Fundamentele combinatie

| | | | NXi/NXj | | | DZi/DZj | | | MYi/MYj | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| St. | Kn. | Pos. | Min | BC | Max BC | Min | BC | Max BC | Min | BC | Max BC |
| 1 | 1 | | -6.09 | 7 | 4.13 43 | -4.30 | 26 | 5.41 20 | 0.00 | 5 | 0.00 20 |
| 1 | | 2.350 | -5.46 | 7 | 4.65 43 | 0.00 | 26 | 0.00 20 | -5.05 | 5 | 6.36 20 |
| 1 | 2 | | -5.05 | 7 | 5.00 43 | -3.57 | 20 | 2.84 3 | -2.85 | 5 | 3.59 20 |
| 2 | 2 | | -5.05 | 7 | 5.00 43 | -3.57 | 20 | 2.84 28 | -2.85 | 3 | 3.59 43 |
| 2 | 3 | | -4.83 | 7 | 5.17 43 | -5.41 | 20 | 4.30 28 | 0.00 | 3 | 0.00 43 |
| 3 | 3 | | -5.66 | 7 | 6.82 43 | -3.50 | 25 | 3.10 43 | 0.00 | 25 | 0.00 43 |
| 3 | 4 | | -5.33 | 7 | 7.09 43 | -1.56 | 15 | 1.86 43 | -2.51 | 25 | 2.63 43 |
| 4 | 4 | | -5.33 | 7 | 7.09 43 | -1.56 | 15 | 1.86 43 | -2.51 | 25 | 2.63 43 |
| 4 | | 0.911 | -5.07 | 30 | 7.34 20 | -0.71 | 34 | 0.85 20 | -3.28 | 15 | 3.84 43 |
| 4 | | 1.138 | -5.01 | 30 | 7.41 20 | -0.58 | 34 | 1.24 23 | -3.32 | 15 | 3.99 43 |
| 4 | | 1.602 | -4.89 | 30 | 7.55 20 | -0.71 | 35 | 2.23 23 | -3.17 | 15 | 4.12 43 |
| 4 | | 2.908 | -4.56 | 30 | 7.95 20 | -1.59 | 43 | 5.03 23 | -2.79 | 34 | 3.31 20 |
| 4 | 5 | | -4.49 | 30 | 8.03 20 | -1.92 | 43 | 5.61 23 | -2.65 | 34 | 4.55 23 |
| 5 | 5 | | -5.62 | 15 | 6.72 43 | -4.41 | 23 | 1.74 35 | -2.65 | 34 | 4.55 23 |
| 5 | | 1.328 | -5.21 | 15 | 7.06 43 | -1.67 | 4 | 1.30 34 | -0.97 | 34 | 1.66 20 |
| 5 | | 1.758 | -5.08 | 15 | 7.17 43 | -2.14 | 20 | 1.22 34 | -0.52 | 38 | 0.84 20 |
| 5 | 6 | | -4.97 | 15 | 7.27 43 | -2.54 | 43 | 1.67 15 | -0.00 | 15 | 0.00 43 |
| 6 | 6 | | -4.93 | 15 | 7.27 43 | -2.13 | 11 | 2.54 43 | 0.00 | 11 | 0.00 43 |
| 6 | | 0.823 | -5.18 | 15 | 7.05 43 | -0.81 | 36 | 1.64 20 | -1.19 | 34 | 1.72 20 |
| 6 | | 1.216 | -5.30 | 15 | 6.95 43 | -0.51 | 36 | 2.48 23 | -1.36 | 34 | 2.28 20 |
| 6 | | 1.280 | -5.32 | 15 | 6.94 43 | -0.51 | 37 | 2.62 23 | -1.36 | 34 | 2.36 20 |
| 6 | | 1.519 | -5.39 | 15 | 6.88 43 | -0.52 | 37 | 3.13 23 | -1.31 | 34 | 2.60 20 |
| 6 | | 1.869 | -5.50 | 15 | 6.79 43 | -0.54 | 37 | 3.88 23 | -1.36 | 36 | 3.52 23 |
| 6 | 7 | | -5.58 | 15 | 6.72 43 | -0.56 | 37 | 4.42 23 | -1.34 | 36 | 4.55 23 |
| 7 | 7 | | -4.82 | 34 | 8.03 20 | -5.61 | 23 | 1.92 43 | -1.34 | 36 | 4.55 23 |
| 7 | | 0.239 | -4.88 | 34 | 7.96 20 | -5.10 | 23 | 1.62 43 | -1.59 | 36 | 3.27 23 |
| 7 | | 1.576 | -5.23 | 34 | 7.55 20 | -2.24 | 23 | 0.47 37 | -4.12 | 11 | 4.12 43 |
| 7 | | 2.041 | -5.35 | 34 | 7.41 20 | -1.24 | 23 | 0.44 37 | -4.35 | 11 | 4.00 43 |
| 7 | | 2.076 | -5.35 | 34 | 7.40 20 | -1.17 | 23 | 0.47 36 | -4.35 | 11 | 3.98 43 |
| 7 | | 2.236 | -5.40 | 34 | 7.35 20 | -0.82 | 23 | 0.59 36 | -4.33 | 11 | 3.87 43 |
| 7 | 8 | | -5.66 | 11 | 7.09 43 | -1.86 | 43 | 2.03 11 | -3.25 | 11 | 2.63 43 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**STAAFKRACHTEN** Fundamentele combinatie

| | | | NXi/NXj | | | DZi/DZj | | | MYi/MYj | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| St. | Kn. | Pos. | Min | BC | Max BC | Min | BC | Max BC | Min | BC | Max BC |
| 8 | 8 | | -5.66 | 11 | 7.09 43 | -1.86 | 43 | 2.03 11 | -3.25 | 11 | 2.63 43 |
| 8 | 9 | | -5.99 | 11 | 6.82 43 | -3.10 | 43 | 4.10 11 | -0.00 | 11 | 0.00 43 |
| 9 | 9 | | -5.84 | 11 | 5.17 43 | -4.30 | 38 | 5.41 43 | 0.00 | 15 | 0.00 43 |
| 9 | 10 | | -6.06 | 11 | 5.00 43 | -2.84 | 38 | 3.57 43 | -2.85 | 15 | 3.59 43 |
| 10 | 10 | | -6.06 | 11 | 5.00 43 | -2.84 | 40 | 3.57 43 | -2.85 | 15 | 3.59 43 |
| 10 | | 1.550 | -6.47 | 11 | 4.65 43 | 0.00 | 40 | 0.00 43 | -5.05 | 15 | 6.36 43 |
| 10 | 11 | | -7.10 | 11 | 4.13 43 | -5.41 | 20 | 4.30 11 | 0.00 | 15 | 0.00 43 |
| 11 | 14 | | -1.98 | 34 | 2.60 20 | -0.61 | 1 | -0.45 2 | 0.00 | 1 | 0.00 2 |
| 11 | | 2.000 | -1.98 | 34 | 2.60 20 | -0.00 | 1 | 0.00 2 | -0.61 | 1 | -0.45 2 |
| 11 | 15 | | -1.98 | 34 | 2.60 20 | 0.45 | 2 | 0.61 1 | -0.00 | 1 | 0.00 2 |
| 12 | 12 | | -21.07 | 3 | 10.07 35 | -0.81 | 20 | 0.62 34 | 0.00 | 20 | 0.00 34 |
| 12 | 14 | | -20.06 | 3 | 10.92 35 | -0.81 | 20 | 0.62 34 | -3.40 | 20 | 2.59 34 |
| 13 | 14 | | -19.51 | 3 | 11.37 35 | -1.36 | 34 | 1.79 20 | -3.40 | 20 | 2.59 34 |
| 13 | 5 | | -19.05 | 3 | 11.75 35 | -1.36 | 34 | 1.79 20 | 0.00 | 20 | 0.00 34 |
| 14 | 13 | | -12.77 | 23 | -0.20 43 | -0.62 | 34 | 0.81 20 | 0.00 | 34 | 0.00 20 |
| 14 | 15 | | -11.76 | 23 | 0.65 43 | -0.62 | 34 | 0.81 20 | -2.59 | 34 | 3.40 20 |
| 15 | 15 | | -11.21 | 23 | 1.10 43 | -1.79 | 20 | 1.36 34 | -2.59 | 34 | 3.40 20 |
| 15 | 7 | | -10.75 | 23 | 1.48 43 | -1.79 | 20 | 1.36 34 | 0.00 | 34 | 0.00 20 |
| 16 | 1 | | -14.88 | 12 | 13.63 26 | -0.50 | 1 | -0.37 2 | 0.00 | 1 | 0.00 2 |
| 16 | | 3.647 | -14.20 | 12 | 14.20 26 | -0.00 | 1 | 0.00 2 | -0.92 | 1 | -0.68 2 |
| 16 | 5 | | -13.63 | 35 | 14.88 3 | 0.37 | 2 | 0.50 1 | -0.00 | 1 | 0.00 2 |

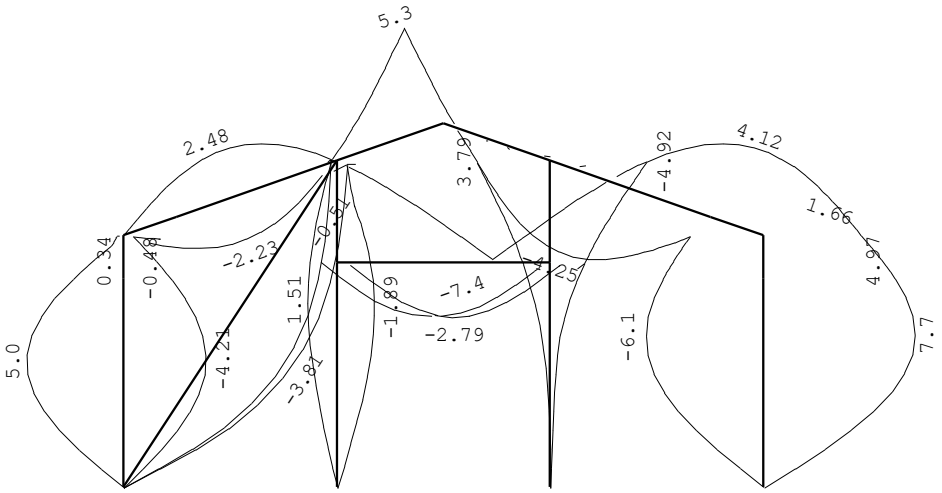
**REACTIES** Fundamentele combinatie

| Kn. | X-min | X-max | Z-min | Z-max | M-min | M-max |
|---|---|---|---|---|---|---|
| 1 | -12.09 | 10.52 | -8.25 | 15.85 | | |
| 11 | -5.41 | 4.30 | -4.13 | 7.10 | | |
| 12 | -0.81 | 0.62 | -10.07 | 21.07 | | |
| 13 | -0.62 | 0.81 | 0.20 | 12.77 | | |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

## OMHULLENDE VAN DE KARAKTERISTIEKE COMBINATIES

**VERPLAATSINGEN** [mm] Karakteristieke combinatie

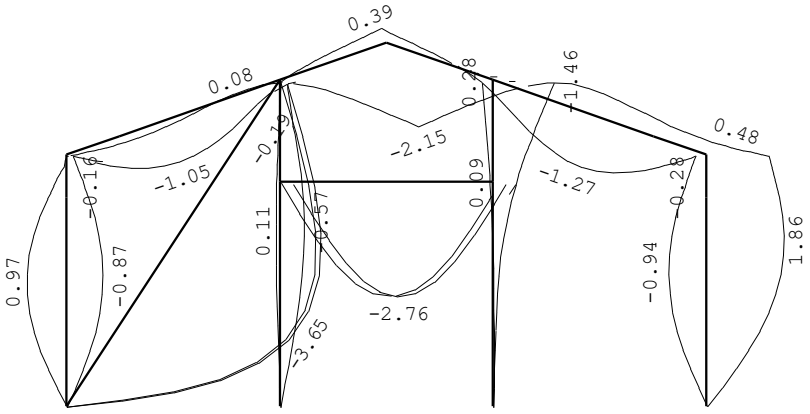



**REACTIES** Karakteristieke combinatie

| Kn. | X-min | X-max | Z-min | Z-max | M-min | M-max |
|---|---|---|---|---|---|---|
| 1 | -8.95 | 7.79 | -5.01 | 12.40 | | |
| 11 | -4.01 | 3.19 | -2.21 | 5.77 | | |
| 12 | -0.61 | 0.44 | -5.23 | 16.95 | | |
| 13 | -0.44 | 0.61 | 2.13 | 10.65 | | |

## OMHULLENDE VAN DE FREQUENTE COMBINATIES

**VERPLAATSINGEN** [mm] Frequente combinatie



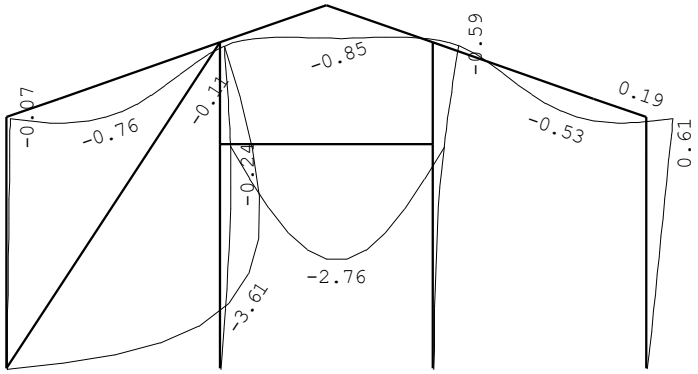

**REACTIES** Frequente combinatie

| Kn. | X-min | X-max | Z-min | Z-max | M-min | M-max |
|---|---|---|---|---|---|---|
| 1 | -1.79 | 1.56 | 1.65 | 5.13 | | |
| 11 | -0.80 | 0.64 | 1.60 | 3.19 | | |
| 12 | -0.17 | 0.04 | 4.31 | 8.75 | | |
| 13 | -0.04 | 0.17 | 5.18 | 6.89 | | |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

## OMHULLENDE VAN DE QUASI-BLIJVENDE COMBINATIES

**VERPLAATSINGEN** [mm] Quasi-blijvende combinatie

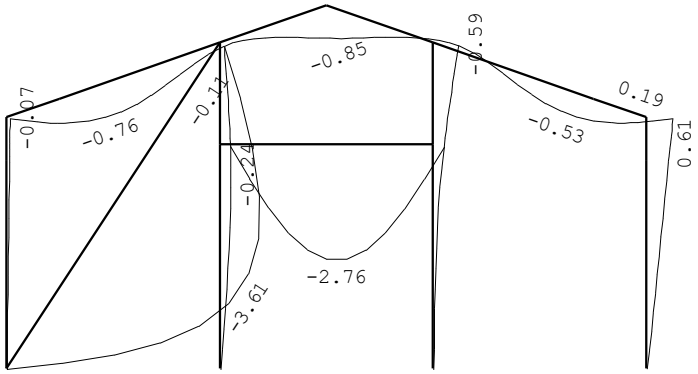



**REACTIES** Quasi-blijvende combinatie

| Kn. | X | Z | M |
|---|---|---|---|
| 1 | 0.00 | 3.31 | |
| 11 | 0.00 | 2.55 | |
| 12 | -0.06 | 6.70 | |
| 13 | 0.06 | 5.95 | |

## OMHULLENDE VAN DE BLIJVENDE COMBINATIES

**VERPLAATSINGEN** [mm] Blijvende combinatie




**REACTIES** Blijvende combinatie

| Kn. | X | Z | M |
|---|---|---|---|
| 1 | 0.00 | 3.31 | |
| 11 | 0.00 | 2.55 | |
| 12 | -0.06 | 6.70 | |
| 13 | 0.06 | 5.95 | |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

## STAALPROFIELEN - ALGEMENE GEGEVENS

| | | |
|---|---|---|
| Stabiliteit: | Classificatie gehele constructie: | Ongeschoord |
| | Belastinggeval m.b.t. bepaling kniklengte: | 25=Knik |
| | Aanpassing inkl. parameter C : | Steunpunten |
| Tweede-orde-effect: | | |
| | Aan te houden verhouding n/(n-1) | |
| | voor steunmomenten en verplaatsingen: | 1.10 |
| Doorbuiging en verplaatsing: | | |
| | Aantal bouwlagen: | 1 |
| | Gebouwtype: | Overig |
| | Toel. horiz. verplaatsing gehele gebouw: | h/300 |
| | Kleinste gevelhoogte [m]: | 0.0 |

## GEOMETRIE **L-sys [m]: 4.700 Staaf: 1-2 BC: 20 Sit:1**

## PROFIELGEGEVENS [mm] **Gewalst Klasse 1 HEA140**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 133.0 | $i_y$: | 57.3 | A : | 3142.0 | $W_{ey}$: | 155.4E3 | $I_y$: | 1033.0E4 |
| b : | 140.0 | $i_z$: | 35.2 | | | $W_{ez}$: | 55.6E3 | $I_z$: | 389.0E4 |
| $t_w$: | 5.5 | r : | 12.0 | | | $W_{py}$: | 173.4E3 | $I_t$: | 8.1E4 |
| $t_f$: | 8.5 | | | | | $W_{pz}$: | 84.8E3 | $I_w$: | 15063.7E6 |

## MATERIAALGEGEVENS

Vloeispanning $f_{y;d}$ [N/mm$^2$] : 235.00 Elasticiteitsmod. [N/mm$^2$] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

## KRACHTEN

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | 3.7 | 0.0 | 5.4 |
| My-max : | 4.3 | 6.4 | 0.0 |
| Einde : | 4.9 | 0.0 | -5.4 |

## KIPSTABILITEIT

| | | | | | |
|---|---|---|---|---|---|
| lgaf boven [m]: | 4.700 | lgaf onder [m]: | 4.700 |
| Lst [m]: | | | 4.700 |
| Ltus.eff.kipst[m]: | | | 4,7 |
| Voorwaarde : | (NB.74) | Q-last [kN/m]: | 2.303 |
| Plaats aangr.last: | 1.00*h | P-last [kN]: | 0.000 |
| Lengte lkip [m] : | 4.700 | Verhouding beta : | 0.000 |
| Kipmom. Mcr [kNm]: | 76.2 | Factor k_red : | 1.000 |
| Tabel NB.NB.1 : | | | |
| Coëfficiënt $C_1$ : | 1.130 | Coëfficiënt $C_2$ : | 0.481 |
| Coëfficiënt C : | 4.901 | Factor S : | 743.1 |
| Lambda rel LT : kromme b | 0.731 | Chi LT 6.3.2.2 4): | 1.000 |
| Moment [kNm] : | 6.358 | Mb.Rd [kNm] : | 40.749 |

## TOETSING STABILITEIT/STERKTE **Trek en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm$^2$ |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.2 | (6.54) | | 0.156 | 37 |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.00 + 0.04 + 0.00 = | 0.044 | 10 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.039 | 5 |
| My-max | EN3-1-1 | 6.2.5 | (6.12y) | | **0.172** | **40** |
| | EN3-1-1 | 6.2.9.1 | (6.45+6.31y) | | **0.172** | **40** |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.01 + 0.04 + 0.00 = | 0.046 | 11 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.039 | 5 |

## TOETSING HOR. VERPL. **Lengte [m]: 4.700 Staaf: 1-2 BC: 66 Sit:1**

Aangehouden tweede-orde-verh.: 1.100

| verpl.[mm] | | | |
|---|---|---|---|
| Begin | 0.0 | $u_{eind}$ | 5.5 [mm] |
| Extreem | 5.0 | $u_{toel}$ | 15.7 |
| Midden | 5.0 | [h/] | 300.0 Maatgevend: doorbuiging |
| Einde | 0.0 | | |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**GEOMETRIE** **L-sys [m]: 6.357 Staaf: 3-5 BC: 23 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 HEA140**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 133.0 | $i_y$: | 57.3 | A : | 3142.0 | $W_{ey}$: | 155.4E3 | $I_y$: | 1033.0E4 |
| b : | 140.0 | $i_z$: | 35.2 | | | $W_{ez}$: | 55.6E3 | $I_z$: | 389.0E4 |
| $t_w$: | 5.5 | r : | 12.0 | | | $W_{py}$: | 173.4E3 | $I_t$: | 8.1E4 |
| $t_f$: | 8.5 | | | | | $W_{pz}$: | 84.8E3 | $I_w$: | 15063.7E6 |

**MATERIAALGEGEVENS**

Vloeispanning $f_{y;d}$ [N/mm$^2$] : 235.00 Elasticiteitsmod. [N/mm$^2$] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

| **KRACHTEN** Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | -1.2 | 0.0 | -3.5 |
| Midden : | 1.2 | -0.2 | 3.3 |
| My-max : | -1.9 | 4.5 | -4.4 |
| Einde : | -0.3 | 0.0 | 0.1 |

| **KNIKSTABILITEIT** | **Geschoord y** Begin | Einde | **Geschoord z** Begin | Einde |
|---|---|---|---|---|
| Kniklengte [m]: | | 6.357 | | 1.272 |
| N.Ed [kN]: | | 1.932 | | 1.932 |
| Slankheid lambda : | | 110.866 | | 36.151 |
| Ncr (F Euler)[kN]: | | 529.8 | | 4983.0 |
| Lambda rel. : | | 1.181 | | 0.385 |
| Phi : | | 1.363 | | 0.619 |
| Imp.factor alpha : | | 0.340 | | 0.490 |
| Red.factor chi : | kromme b | 0.489 | kromme c | 0.905 |
| Nb.Rd [kN]: | | 360.9 | | 668.4 |

**KIPSTABILITEIT**

| | | | | |
|---|---|---|---|---|
| lgaf boven [m]: | 6.357 | lgaf onder [m]: | 6.357 |
| Kipst.boven [m]: | | | 4*1,271;1,273 |
| Kipst.onder [m]: | | | 1,0595;3,178;2,1194 |
| Lst [m]: | | | 1.695 |
| Ltus.eff.kipst[m]: | | | 2*1,2714;1,6952;2,119 |
| Voorwaarde : | (NB.74) | Q-last [kN/m]: | -2.141 |
| Plaats aangr.last: | 1.00*h | P-last [kN]: | 0.000 |
| Lengte lkip [m] : | 2.373 | Verhouding beta : | -0.415 |
| Kipmom. Mcr [kNm]: | 275.0 | Factor k_red : | 1.000 |
| Figuur NB.NB.4 : | | B* : | -0.855 |
| Coëfficiënt $C_1$ : | 2.300 | Coëfficiënt $C_2$ : | -0.182 |
| Coëfficiënt C : | 23.911 | Factor S : | 743.1 |
| Lambda rel LT : | kromme b 0.385 | Chi LT 6.3.2.2 4): | 1.000 |
| Moment [kNm] : | 4.546 | Mb.Rd [kNm] : | 40.749 |
| | | Maatg. deelveld : | 2.54 t/m 4.24 |

**KNIK- EN KIPSTABILITEIT**

| | | | | |
|---|---|---|---|---|
| Maatg. deelveld : 4.24 t/m 6.36 | | | | |
| Lst [m]: | 2.119 | Q-last [kN/m]: | -2.141 |
| Plaats aangr.last: | 1.00*h | P-last [kN]: | 0.000 |
| Lengte lkip [m] : | 2.966 | Verhouding beta : | 0.000 |
| Kipmom. Mcr [kNm]: | 192.4 | Factor k_red : | 1.000 |
| Figuur NB.NB.4 : | | B* : | -0.791 |
| Coëfficiënt $C_1$ : | 2.300 | Coëfficiënt $C_2$ : | -0.265 |
| Coëfficiënt C : | 16.734 | Factor S : | 743.1 |
| Lambda rel LT : | kromme b 0.460 | Chi LT 6.3.2.2 4): | 1.000 |
| Mom.verd.factor : | Cmy 0.950 | Cmz | 1.000 |
| : | CmLT 0.400 | | |
| Interactiefactor : | kyy 0.954 | kyz | 0.600 |
| | kzy 0.985 | kzz | 1.000 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**TOETSING STABILITEIT/STERKTE** **Druk en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.2 | (6.54) | | 0.112 | 26 |
| | EN3-1-1 | 6.3.3 | (6.61) | 0.01 + 0.11 + 0.00 = | 0.112 | 26 |
| | | | (6.62) | 0.00 + 0.11 + 0.00 = | 0.113 | 27 |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.00 + 0.03 + 0.00 = | 0.027 | 6 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.025 | 3 |
| My-max | EN3-1-1 | 6.2.1(6) | N+D | 0.00 + 0.03 + 0.00 = | 0.035 | 8 |
| | EN3-1-1 | 6.2.10 | (6.45+6.31y) | | **0.123** | **29** |
| | EN3-1-1 | 6.2.5 | (6.12y) | | **0.123** | **29** |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.035 | 5 |
| | EN3-1-1 | 6.2.8 | (6.30) | | **0.123** | **29** |

Opmerkingen:
**[ 42] Waarschuwing: Er sluiten tussentijds staven en/of opleggingen aan.**
[ 46] T.b.v. kip is een equivalente Q-last berekend.
[ 47] Bij verlopende normaalkracht wordt de grootste drukkracht genomen.

**TOETSING DOORBUIGING** **Staaf: 3-5 BC: 57 Sit:1**

Staafsoort: Dak Overstek begin: Nee einde: Nee
Lengte [m]: 6.357 Aangehouden tweede-orde-verhouding: 1.100

| Verpl. | Onmidd. | Korte duur | Bijkomend | Einddoorb. | [mm] |
|---|---|---|---|---|---|
| Begin | -0.0 | 0.0 | $u_{bij}$ -4.6 | $u_{eind}$ -4.6 | $u_{tot}$ -4.6 |
| Extreem | -0.8 | 2.5 | $u_{toel}$ -25.4 | $u_{toel}$ -25.4 | Zeeg 0.0 |
| Midden | -0.4 | 2.0 | 0.00400*l | 0.00400*l | |
| Einde | -0.8 | -7.4 | Maatgevend: doorbuiging | | |
| | | | | Staaf: 3-5 BC: 66 Sit:1 | |
| | | | | ueind 6.2 utot 6.2 | |

**GEOMETRIE** **L-sys [m]: 6.357 Staaf: 6-8 BC: 23 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 HEA140**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 133.0 | $i_y$ : | 57.3 | A : | 3142.0 | $W_{ey}$ : | 155.4E3 | $I_y$ : | 1033.0E4 |
| b : | 140.0 | $i_z$ : | 35.2 | | | $W_{ez}$ : | 55.6E3 | $I_z$ : | 389.0E4 |
| $t_w$ : | 5.5 | r : | 12.0 | | | $W_{py}$ : | 173.4E3 | $I_t$ : | 8.1E4 |
| $t_f$ : | 8.5 | | | | | $W_{pz}$ : | 84.8E3 | $I_w$ : | 15063.7E6 |

**MATERIAALGEGEVENS**

Vloeispanning $f_{y;d}$[N/mm²] : 235.00 Elasticiteitsmod. [N/mm²] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

**KRACHTEN**

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | -0.3 | 0.0 | -0.1 |
| My-max : | -1.9 | 4.6 | -5.6 |
| Midden : | 1.2 | -0.2 | -3.3 |
| Einde : | -1.2 | 0.0 | 3.5 |

**KNIKSTABILITEIT**

| | Geschoord y | | | Geschoord z | | |
|---|---|---|---|---|---|---|
| | | Begin | Einde | | Begin | Einde |
| Kniklengte [m]: | | | 6.357 | | | 1.272 |
| N.Ed [kN]: | | | 1.933 | | | 1.933 |
| Slankheid lambda : | | | 110.866 | | | 36.151 |
| Ncr (F Euler)[kN]: | | | 529.8 | | | 4983.0 |
| Lambda rel. : | | | 1.181 | | | 0.385 |
| Phi : | | | 1.363 | | | 0.619 |
| Imp.factor alpha : | | | 0.340 | | | 0.490 |
| Red.factor chi : | kromme b | | 0.489 | kromme c | | 0.905 |
| Nb.Rd [kN]: | | | 360.9 | | | 668.4 |
| Mom.verd.factor : | Cmy | | 0.950 | Cmz | | 1.000 |
| : | CmLT | | 0.924 | | | |
| Interactiefactor : | kyy | | 0.954 | kyz | | 0.600 |
| | kzy | | 0.985 | kzz | | 1.000 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**KIPSTABILITEIT**

| | | | | | |
|---|---|---|---|---|---|
| lgaf boven [m]: | | 6.357 | lgaf onder [m]: | | 6.357 |
| Kipst.boven [m]: | | | | | 4*1,271;1,273 |
| Kipst.onder [m]: | | | | | 3,1784;2,119;1,0595 |
| Lst [m]: | | | | | 3.814 |
| Ltus.eff.kipst[m]: | | | | | 3,8141;1,2699;1,2729 |
| Voorwaarde : | | (NB.74) | Q-last [kN/m]: | | -2.141 |
| Plaats aangr.last: | | 1.00*h | P-last [kN]: | | 0.000 |
| Lengte lkip [m] : | | 5.340 | Verhouding beta : | | -0.000 |
| Kipmom. Mcr [kNm]: | | 44.8 | Factor k_red : | | 1.000 |
| Figuur NB.NB.4 : | | | B* : | | 0.326 |
| Coëfficiënt $C_1$ : | | 1.113 | Coëfficiënt $C_2$ : | | -0.386 |
| Coëfficiënt C : | | 3.894 | Factor S : | | 743.1 |
| Lambda rel LT : | kromme b | 0.954 | Chi LT 6.3.2.2 4): | | 1.000 |
| Moment [kNm] : | | 4.554 | Mb.Rd [kNm] : | | 40.749 |
| | | | Maatg. deelveld : | 0.00 t/m 3.81 | |

**TOETSING STABILITEIT/STERKTE** **Druk en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.2 | (6.54) | | 0.112 | 26 |
| | EN3-1-1 | 6.3.3 | (6.61) | 0.01 + 0.11 + 0.00 = | 0.112 | 26 |
| | | | (6.62) | 0.00 + 0.11 + 0.00 = | 0.113 | 27 |
| My-max | EN3-1-1 | 6.2.1(6) | N+D | 0.00 + 0.04 + 0.00 = | 0.043 | 10 |
| | EN3-1-1 | 6.2.10 | (6.45+6.31y) | | **0.123** | **29** |
| | EN3-1-1 | 6.2.5 | (6.12y) | | **0.123** | **29** |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.045 | 6 |
| | EN3-1-1 | 6.2.8 | (6.30) | | **0.123** | **29** |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.00 + 0.03 + 0.00 = | 0.027 | 6 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.025 | 3 |

Opmerkingen:
**[ 42] Waarschuwing: Er sluiten tussentijds staven en/of opleggingen aan.**
[ 46] T.b.v. kip is een equivalente Q-last berekend.
[ 47] Bij verlopende normaalkracht wordt de grootste drukkracht genomen.

**TOETSING HOR. VERPL.** **Lengte [m]: 6.357 Staaf: 6-8 BC: 66 Sit:1**

| verpl.[mm] | | Eindverplaatsing | | Aangehouden tweede-orde-verh.: 1.100 |
|---|---|---|---|---|
| Begin | -5.7 | $u_{eind}$ | -8.1 [mm] | |
| Extreem | 4.1 | $u_{toel}$ | 21.2 | |
| Midden | 3.6 | [h/] | 300.0 Maatgevend: scheefstand | |
| Einde | 1.7 | | | |

**GEOMETRIE** **L-sys [m]: 4.700 Staaf: 9-10 BC: 20 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 HEA140**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 133.0 | $i_y$: | 57.3 | A : | 3142.0 | $W_{ey}$: | 155.4E3 | $I_y$: | 1033.0E4 |
| b : | 140.0 | $i_z$: | 35.2 | | | $W_{ez}$: | 55.6E3 | $I_z$: | 389.0E4 |
| $t_w$: | 5.5 | r : | 12.0 | | | $W_{py}$: | 173.4E3 | $I_t$: | 8.1E4 |
| $t_f$: | 8.5 | | | | | $W_{pz}$: | 84.8E3 | $I_w$: | 15063.7E6 |

**MATERIAALGEGEVENS**

| | | | |
|---|---|---|---|
| Vloeispanning $f_{y;d}$ [N/mm²] : | 235.00 | Elasticiteitsmod. [N/mm²] : | 210000 |
| Partiële veiligheidsfactoren: | | | |
| Gamma M;0 : | 1.00 | Gamma M;1 : | 1.00 |

**KRACHTEN**

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | 4.9 | 0.0 | 5.4 |
| My-max : | 4.3 | 6.4 | 0.0 |
| Einde : | 3.7 | 0.0 | -5.4 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**KIPSTABILITEIT**

| | | | | | |
|---|---|---|---|---|---|
| lgaf boven [m]: | | 4.700 | lgaf onder [m]: | | 4.700 |
| Lst [m]: | | | | | 4.700 |
| Ltus.eff.kipst[m]: | | | | | 4,7 |
| Voorwaarde : | | (NB.74) | Q-last [kN/m]: | | 2.303 |
| Plaats aangr.last: | | 1.00*h | P-last [kN]: | | 0.000 |
| Lengte lkip [m] : | | 4.700 | Verhouding beta : | | 0.000 |
| Kipmom. Mcr [kNm]: | | 76.2 | Factor k_red : | | 1.000 |
| Tabel NB.NB.1 : | | | | | |
| Coëfficiënt $C_1$ : | | 1.130 | Coëfficiënt $C_2$ : | | 0.481 |
| Coëfficiënt C : | | 4.901 | Factor S : | | 743.1 |
| Lambda rel LT : | kromme b | 0.731 | Chi LT 6.3.2.2 4): | | 1.000 |
| Moment [kNm] : | | 6.358 | Mb.Rd [kNm] : | | 40.749 |

**TOETSING STABILITEIT/STERKTE** **Trek en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.2 | (6.54) | | 0.156 | 37 |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.01 + 0.04 + 0.00 = | 0.046 | 11 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.039 | 5 |
| My-max | EN3-1-1 | 6.2.5 | (6.12y) | | **0.172** | **40** |
| | EN3-1-1 | 6.2.9.1 | (6.45+6.31y) | | **0.172** | **40** |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.00 + 0.04 + 0.00 = | 0.044 | 10 |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.039 | 5 |

**TOETSING HOR. VERPL.** **Lengte [m]: 4.700 Staaf: 9-10 BC: 66 Sit:1**

| verpl.[mm] | | Eindverplaatsing | | Aangehouden tweede-orde-verh.: 1.100 |
|---|---|---|---|---|
| Begin | 0.0 | $u_{eind}$ | -5.5 [mm] | |
| Extreem | -7.7 | $u_{toel}$ | 15.7 | |
| Midden | -7.5 | [h/] | 300.0 Maatgevend: doorbuiging | |
| Einde | -5.0 | | | |

**GEOMETRIE** **L-sys [m]: 4.000 Staaf: 11 BC: 11 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 UNP200(90)**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 200.0 | $i_y$: | 77.0 | A : | 3220.0 | $W_{ey}$: | 191.1E3 | $I_y$: | 1911.0E4 |
| b : | 75.0 | $i_z$: | 21.4 | | | $W_{ez}$: | 27.0E3 | $I_z$: | 147.8E4 |
| $t_w$: | 8.5 | r : | 11.5 | | | $W_{py}$: | 227.8E3 | $I_t$: | 10.8E4 |
| $t_f$: | 11.5 | $r_1$: | 6.0 | | | $W_{pz}$: | 51.9E3 | $I_w$: | 11493.4E6 |
| $e_y$: | 100.0 | | | | | $W_{negy}$: | 191.1E3 | $e_{negy}$: | 100.0 |
| $e_z$: | 54.9 | | | | | $W_{negz}$: | 73.3E3 | $e_{negz}$: | 20.1 |

**MATERIAALGEGEVENS**

Vloeispanning $f_{y;d}$[N/mm²] : 235.00 Elasticiteitsmod. [N/mm²] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

**KRACHTEN**

| Plaats[m] | N [kN] | $M_z$ [kNm] | $V_y$ [kN] |
|---|---|---|---|
| Begin : | -1.9 | 0.00 | -0.55 |
| Mz-max : | -1.9 | -0.55 | 0.00 |
| Einde : | -1.9 | 0.00 | 0.55 |

**KNIKSTABILITEIT**

| | Geschoord y | | Geschoord z | |
|---|---|---|---|---|
| | Begin | Einde | Begin | Einde |
| Kniklengte [m]: | | 4.000 | | 4.000 |
| N.Ed [kN]: | | 1.941 | | 1.941 |
| Slankheid lambda : | | 51.923 | | 186.703 |
| Ncr (F Euler)[kN]: | | 2475.5 | | 191.5 |
| Lambda rel. : | | 0.553 | | 1.988 |
| Phi : | | 0.739 | | 2.914 |
| Imp.factor alpha : | | 0.490 | | 0.490 |
| Red.factor chi : | kromme c | 0.813 | kromme c | 0.198 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

| | | | | | |
|---|---|---|---|---|---|
| Nb.Rd [kN]: | | 615.2 | | | 150.0 |
| Mom.verd.factor : | Cmy | 1.000 | | Cmz | 0.950 |
| : | CmLT | 0.000 | | | |
| Interactiefactor : | kyy | 1.001 | | kyz | 0.580 |
| | kzy | 0.601 | | kzz | 0.967 |

**TOETSING STABILITEIT/STERKTE** **Druk en buiging om zwakke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.1.1 | (6.46z) | | 0.013 | 3 |
| | EN3-1-1 | 6.3.3 | (6.61) | 0.00 + 0.00 + 0.03 = | 0.029 | 7 |
| | | | (6.62) | 0.01 + 0.00 + 0.04 = | **0.056** | **13** |
| Mz-max | EN3-1-1 | 6.2.1 | (6.2) | 0.00 + 0.00 + 0.05 = | **0.052** | **12** |
| | EN3-1-1 | 6.2.5 | (6.12z) | | 0.049 | 12 |

Opmerkingen:
**[ 76] Toetsing van kipstabiliteit voor dit profieltype is niet voorzien.**
**[ 18] Eulerse torsiekracht N cr;T is onbekend. De toetsing op torsie volgens EC3 1.1/NB 6.3.1.4 (2) is niet uitgevoerd.**
**[ 40] Eulerse torsieknikkracht N cr;TF is onbekend. De toetsing op torsieknik volgens EC3 1.1/NB 6.3.1.4 (2) is niet uitgevoerd.**
**[ 66] Er zijn 1 of meer elastische profielgrootheden gebruikt.**

**TOETSING DOORBUIGING Staaf: 11 BC bijk: 57 Sit:1 / eind: 49 Sit:1**

Staafsoort: Vloer Overstek begin: Nee einde: Nee
Lengte [m]: 4.000 Aangehouden tweede-orde-verhouding: 1.100

| Verpl. | Onmidd. | Korte duur | Bijkomend | Einddoorb. | [mm] |
|---|---|---|---|---|---|
| Begin | -0.0 | -0.1 | $u_{bij}$ -0.1 | $u_{eind}$ -3.0 | $u_{tot}$ -3.0 |
| Extreem | -2.8 | -2.8 | $u_{toel}$ ±24.0 | $u_{toel}$ ±16.0 | Zeeg 0.0 |
| Midden | -2.8 | -2.8 | 2*0.00300*l | 0.00400*l | |
| Einde | -0.0 | -0.0 | Maatgevend: scheefstand/doorbuiging | | |

**GEOMETRIE** **L-sys [m]: 4.200 Staaf: 12 BC: 4 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 IPE200**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 200.0 | $i_y$: | 82.6 | A : | 2848.0 | $W_{ey}$: | 194.3E3 | $I_y$: | 1943.0E4 |
| b : | 100.0 | $i_z$: | 22.4 | | | $W_{ez}$: | 28.5E3 | $I_z$: | 142.4E4 |
| $t_w$: | 5.6 | r : | 12.0 | | | $W_{py}$: | 220.6E3 | $I_t$: | 6.9E4 |
| $t_f$: | 8.5 | | | | | $W_{pz}$: | 44.6E3 | $I_w$: | 12988.1E6 |

**MATERIAALGEGEVENS**

Vloeispanning $f_{y;d}$[N/mm²] : 235.00 Elasticiteitsmod. [N/mm²] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

**KRACHTEN**

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | -18.7 | 0.0 | -0.43 |
| Midden : | -18.2 | -0.9 | -0.43 |
| Einde : | -17.7 | -1.8 | -0.43 |

**KNIKSTABILITEIT**

| | Ongeschoord y | | Geschoord z | |
|---|---|---|---|---|
| | Begin | Einde | Begin | Einde |
| Inkl. parameter C: | 5.000 | 0.103 | | |
| Kniklengte [m]: | | 8.556 | | 4.200 |
| N.Ed [kN]: | | 18.699 | | 18.699 |
| Slankheid lambda : | | 103.589 | | 187.830 |
| Ncr (F Euler)[kN]: | | 550.1 | | 167.3 |
| Lambda rel. : | | 1.103 | | 2.000 |
| Phi : | | 1.203 | | 2.806 |
| Imp.factor alpha : | | 0.210 | | 0.340 |
| Red.factor chi : | kromme a | 0.594 | kromme b | 0.209 |
| Nb.Rd [kN]: | | 397.5 | | 140.2 |
| Mom.verd.factor : | Cmy | 0.900 | Cmz | 1.000 |
| : | CmLT | 0.600 | | |
| Interactiefactor : | kyy | 0.934 | kyz | 0.712 |
| | kzy | 0.962 | kzz | 1.187 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**KIPSTABILITEIT**

| | | | | | |
|---|---|---|---|---|---|
| lgaf boven [m]: | | 4.200 | lgaf onder [m]: | | 4.200 |
| Lst [m]: | | | | | 4.200 |
| Ltus.eff.kipst[m]: | | | | | 4,2 |
| Voorwaarde : | | (NB.75) | Q-last [kN/m]: | | 0.000 |
| Plaats aangr.last: | | 1.00*h | P-last [kN]: | | 0.000 |
| Lengte lkip [m] : | | 4.200 | Verhouding beta : | | -0.000 |
| Kipmom. Mcr [kNm]: | | 61.0 | Factor k_red : | | 1.000 |
| Tabel NB.NB.1 : | | | | | |
| Coëfficiënt $C_1$ : | | 1.750 | Coëfficiënt $C_2$ : | | -0.000 |
| Coëfficiënt C : | | 6.267 | Factor S : | | 731.5 |
| Lambda rel LT : | kromme b | 0.922 | Chi LT 6.3.2.2 4): | | 1.000 |
| Moment [kNm] : | | -1.811 | Mb.Rd [kNm] : | | 51.841 |

**TOETSING STABILITEIT/STERKTE** **Druk en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.1.1 | (6.46y) | | 0.047 | 11 |
| | | | (6.46z) | | 0.133 | 31 |
| | EN3-1-1 | 6.3.2 | (6.54) | | 0.035 | 8 |
| | EN3-1-1 | 6.3.3 | (6.61) | 0.05 + 0.03 + 0.00 = | 0.080 | 19 |
| | | | (6.62) | 0.13 + 0.03 + 0.00 = | **0.167** | **39** |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.03 + 0.00 + 0.00 = | 0.030 | 7 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.028 | 7 |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.03 + 0.00 + 0.00 = | 0.029 | 7 |
| | EN3-1-1 | 6.2.10 | (6.45+6.31y) | | 0.038 | 9 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.026 | 6 |
| | EN3-1-1 | 6.2.5 | (6.12y) | | 0.038 | 9 |
| | EN3-1-1 | 6.2.8 | (6.30) | | 0.038 | 9 |

Opmerkingen:
[ 47] Bij verlopende normaalkracht wordt de grootste drukkracht genomen.

**TOETSING HOR. VERPL.** **Lengte [m]: 4.200 Staaf: 12 BC: 66 Sit:1**

| verpl.[mm] | | Eindverplaatsing | | Aangehouden tweede-orde-verh.: 1.100 |
|---|---|---|---|---|
| Begin | 0.0 | $u_{eind}$ | -1.9 [mm] | |
| Extreem | -1.9 | $u_{toel}$ | 14.0 | |
| Midden | -1.5 | [h/] | 300.0 | Maatgevend: scheefstand |
| Einde | -1.7 | | | |

**GEOMETRIE** **L-sys [m]: 1.900 Staaf: 13 BC: 4 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 IPE200**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 200.0 | $i_y$ : | 82.6 | A : | 2848.0 | $W_{ey}$ : | 194.3E3 | $I_y$ : | 1943.0E4 |
| b : | 100.0 | $i_z$ : | 22.4 | | | $W_{ez}$ : | 28.5E3 | $I_z$ : | 142.4E4 |
| $t_w$ : | 5.6 | r : | 12.0 | | | $W_{py}$ : | 220.6E3 | $I_t$ : | 6.9E4 |
| $t_f$ : | 8.5 | | | | | $W_{pz}$ : | 44.6E3 | $I_w$ : | 12988.1E6 |

**MATERIAALGEGEVENS**

| | | | |
|---|---|---|---|
| Vloeispanning $f_{y;d}$ [N/mm²] : | 235.00 | Elasticiteitsmod. [N/mm²] : | 210000 |
| Partiële veiligheidsfactoren: | | | |
| Gamma M;0 : | 1.00 | Gamma M;1 : | 1.00 |

**KRACHTEN**

| Plaats[m] | | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|---|
| Begin | : | -17.1 | -1.8 | 0.95 |
| Midden | : | -16.9 | -0.9 | 0.95 |
| Einde | : | -16.7 | 0.0 | 0.95 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**KNIKSTABILITEIT**

| | Ongeschoord y | | | Geschoord z | |
|---|---|---|---|---|---|
| | Begin | Einde | | Begin | Einde |
| Moment [kNm]: | -0.173 | 0.000 | | | |
| Rotatie [rad]: | 0.000018 | -0.000022 | | | |
| Inkl. parameter C: | 0.228 | 9999.000 | | | |
| Kniklengte [m]: | | 4.619 | | | 1.900 |
| N.Ed [kN]: | | 17.139 | | | 17.139 |
| Slankheid lambda : | | 55.926 | | | 84.971 |
| Ncr (F Euler)[kN]: | | 1887.2 | | | 817.6 |
| Lambda rel. : | | 0.596 | | | 0.905 |
| Phi : | | 0.719 | | | 1.029 |
| Imp.factor alpha : | | 0.210 | | | 0.340 |
| Red.factor chi : | kromme a | 0.892 | | kromme b | 0.658 |
| Nb.Rd [kN]: | | 596.8 | | | 440.5 |
| Mom.verd.factor : | Cmy | 0.900 | | Cmz | 1.000 |
| : | CmLT | 0.600 | | | |
| Interactiefactor : | kyy | 0.910 | | kyz | 0.628 |
| | kzy | 0.990 | | kzz | 1.047 |

**KIPSTABILITEIT**

| | | | |
|---|---|---|---|
| lgaf boven [m]: | 1.900 | lgaf onder [m]: | 1.900 |
| Lst [m]: | | | 1.900 |
| Ltus.eff.kipst[m]: | | | 1,9 |
| Voorwaarde : | (NB.75) | Q-last [kN/m]: | 0.000 |
| Plaats aangr.last: | 1.00*h | P-last [kN]: | 0.000 |
| Lengte lkip [m] : | 1.900 | Verhouding beta : | -0.000 |
| Kipmom. Mcr [kNm]: | 185.6 | Factor k_red : | 1.000 |
| Tabel NB.NB.1 : | | | |
| Coëfficiënt $C_1$ : | 1.750 | Coëfficiënt $C_2$ : | -0.000 |
| Coëfficiënt C : | 8.628 | Factor S : | 731.5 |
| Lambda rel LT : | kromme b 0.528 | Chi LT 6.3.2.2 4): | 1.000 |
| Moment [kNm] : | -1.811 | Mb.Rd [kNm] : | 51.841 |

**TOETSING STABILITEIT/STERKTE** **Druk en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.1.1 | (6.46y) | | 0.029 | 7 |
| | | | (6.46z) | | 0.039 | 9 |
| | EN3-1-1 | 6.3.2 | (6.54) | | 0.035 | 8 |
| | EN3-1-1 | 6.3.3 | (6.61) | 0.03 + 0.03 + 0.00 = | 0.061 | 14 |
| | | | (6.62) | 0.04 + 0.03 + 0.00 = | **0.074** | **17** |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.03 + 0.01 + 0.00 = | 0.031 | 7 |
| | EN3-1-1 | 6.2.10 | (6.45+6.31y) | | 0.038 | 9 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.026 | 6 |
| | EN3-1-1 | 6.2.5 | (6.12y) | | 0.038 | 9 |
| | EN3-1-1 | 6.2.8 | (6.30) | | 0.038 | 9 |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.02 + 0.01 + 0.00 = | 0.030 | 7 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.025 | 6 |

**TOETSING HOR. VERPL.** **Lengte [m]: 1.900 Staaf: 13 BC: 66 Sit:1**

verpl.[mm] Eindverplaatsing Aangehouden tweede-orde-verh.: 1.100

| | | | | |
|---|---|---|---|---|
| Begin | -1.7 | $u_{eind}$ | -1.8 | [mm] |
| Extreem | 0.0 | $u_{toel}$ | 6.3 | |
| Midden | -1.0 | [h/] | 300.0 | Maatgevend: scheefstand |
| Einde | -0.0 | | | |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**GEOMETRIE** **L-sys [m]: 4.200 Staaf: 14 BC: 23 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 IPE200**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 200.0 | $i_y$: | 82.6 | A : | 2848.0 | $W_{ey}$: | 194.3E3 | $I_y$: | 1943.0E4 |
| b : | 100.0 | $i_z$: | 22.4 | | | $W_{ez}$: | 28.5E3 | $I_z$: | 142.4E4 |
| $t_w$: | 5.6 | r : | 12.0 | | | $W_{py}$: | 220.6E3 | $I_t$: | 6.9E4 |
| $t_f$: | 8.5 | | | | | $W_{pz}$: | 44.6E3 | $I_w$: | 12988.1E6 |

**MATERIAALGEGEVENS**

Vloeispanning $f_{y;d}$ [N/mm$^2$] : 235.00 Elasticiteitsmod. [N/mm$^2$] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

**KRACHTEN**

| Plaats[m] | | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|---|
| Begin | : | -12.8 | 0.00 | 0.17 |
| Midden | : | -12.3 | 0.35 | 0.17 |
| Einde | : | -11.8 | 0.69 | 0.17 |

**KNIKSTABILITEIT**

| | Ongeschoord y | | Geschoord z | |
|---|---|---|---|---|
| | Begin | Einde | Begin | Einde |
| Inkl. parameter C: | 5.000 | 0.771 | | |
| Kniklengte [m]: | | 12.360 | | 4.200 |
| N.Ed [kN]: | | 12.772 | | 12.772 |
| Slankheid lambda : | | 149.646 | | 187.830 |
| Ncr (F Euler)[kN]: | | 263.6 | | 167.3 |
| Lambda rel. : | | 1.593 | | 2.000 |
| Phi : | | 1.916 | | 2.806 |
| Imp.factor alpha : | | 0.210 | | 0.340 |
| Red.factor chi : | kromme a | 0.336 | kromme b | 0.209 |
| Nb.Rd [kN]: | | 224.6 | | 140.2 |
| Mom.verd.factor : | Cmy | 0.900 | Cmz | 1.000 |
| : | CmLT | 0.600 | | |
| Interactiefactor : | kyy | 0.941 | kyz | 0.677 |
| | kzy | 0.974 | kzz | 1.128 |

**KIPSTABILITEIT**

| | | | |
|---|---|---|---|
| lgaf boven [m]: | 4.200 | lgaf onder [m]: | 4.200 |
| Lst [m]: | | | 4.200 |
| Ltus.eff.kipst[m]: | | | 4,2 |
| Voorwaarde : | (NB.75) | Q-last [kN/m]: | 0.000 |
| Plaats aangr.last: | 1.00*h | P-last [kN]: | 0.000 |
| Lengte lkip [m] : | 4.200 | Verhouding beta : | 0.000 |
| Kipmom. Mcr [kNm]: | 61.0 | Factor k_red : | 1.000 |
| Tabel NB.NB.1 : | | | |
| Coëfficiënt $C_1$ : | 1.750 | Coëfficiënt $C_2$ : | -0.000 |
| Coëfficiënt C : | 6.267 | Factor S : | 731.5 |
| Lambda rel LT : kromme b | 0.922 | Chi LT 6.3.2.2 4): | 1.000 |
| Moment [kNm] : | 0.695 | Mb.Rd [kNm] : | 51.841 |

**TOETSING STABILITEIT/STERKTE** **Druk en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm$^2$ |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.1.1 | (6.46y) | | 0.057 | 13 |
| | | | (6.46z) | | 0.091 | 21 |
| | EN3-1-1 | 6.3.2 | (6.54) | | 0.013 | 3 |
| | EN3-1-1 | 6.3.3 | (6.61) | 0.06 + 0.01 + 0.00 = | 0.069 | 16 |
| | | | (6.62) | 0.09 + 0.01 + 0.00 = | **0.104** | **24** |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.02 + 0.00 + 0.00 = | 0.020 | 5 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.019 | 4 |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.02 + 0.00 + 0.00 = | 0.018 | 4 |
| | EN3-1-1 | 6.2.10 | (6.45+6.31y) | | 0.015 | 3 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.018 | 4 |
| | EN3-1-1 | 6.2.5 | (6.12y) | | 0.015 | 3 |
| | EN3-1-1 | 6.2.8 | (6.30) | | 0.015 | 3 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel
Opmerkingen:
[ 47] Bij verlopende normaalkracht wordt de grootste drukkracht genomen.

**TOETSING HOR. VERPL.** **Lengte [m]: 4.200 Staaf: 14 BC: 66 Sit:1**

| verpl.[mm] | Eindverplaatsing | Aangehouden tweede-orde-verh.: 1.100 |
|---|---|---|
| Begin 0.0 | $u_{eind}$ -1.9 [mm] | |
| Extreem 0.0 | $u_{toel}$ 14.0 | |
| Midden -0.2 | [h/] 300.0 | Maatgevend: scheefstand |
| Einde -1.7 | | |

**GEOMETRIE** **L-sys [m]: 1.900 Staaf: 15 BC: 20 Sit:1**

**PROFIELGEGEVENS [mm]** **Gewalst Klasse 1 IPE200**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 200.0 | $i_y$: | 82.6 | A : | 2848.0 | $W_{ey}$: | 194.3E3 | $I_y$: | 1943.0E4 |
| b : | 100.0 | $i_z$: | 22.4 | | | $W_{ez}$: | 28.5E3 | $I_z$: | 142.4E4 |
| $t_w$: | 5.6 | r : | 12.0 | | | $W_{py}$: | 220.6E3 | $I_t$: | 6.9E4 |
| $t_f$: | 8.5 | | | | | $W_{pz}$: | 44.6E3 | $I_w$: | 12988.1E6 |

**MATERIAALGEGEVENS**

Vloeispanning $f_{y;d}$ [N/mm$^2$] : 235.00 Elasticiteitsmod. [N/mm$^2$] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

**KRACHTEN**

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] | $M_{steun}$ [kNm] | $V_{steun}$ [kN] |
|---|---|---|---|---|---|
| Begin : | 0.29 | 3.4 | -1.8 | 0.3 | -0.18 |
| Midden : | 0.52 | 1.7 | -1.8 | | |
| Einde : | 0.75 | 0.0 | -1.8 | 0.0 | -0.00 |

**KIPSTABILITEIT**

| | | | | |
|---|---|---|---|---|
| lgaf boven [m]: | 1.900 | lgaf onder [m]: | 1.900 | |
| Lst [m]: | | | 1.900 | |
| Ltus.eff.kipst[m]: | | | 1,9 | |
| Voorwaarde : | (NB.75) | Q-last [kN/m]: | 0.000 | |
| Plaats aangr.last: | 1.00*h | P-last [kN]: | 0.000 | |
| Lengte lkip [m] : | 1.900 | Verhouding beta : | 0.000 | |
| Kipmom. Mcr [kNm]: | 185.6 | Factor k_red : | 1.000 | |
| Tabel NB.NB.1 : | | | | |
| Coëfficiënt $C_1$ : | 1.750 | Coëfficiënt $C_2$ : | -0.000 | |
| Coëfficiënt C : | 8.628 | Factor S : | 731.5 | |
| Lambda rel LT : | kromme b 0.528 | Chi LT 6.3.2.2 4): | 1.000 | |
| Moment [kNm] : | 3.744 | Mb.Rd [kNm] : | 51.841 | |

**TOETSING STABILITEIT/STERKTE** **Trek en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm$^2$ |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.2 | (6.54) | | **0.072** | **17** |
| Begin | EN3-1-1 | 6.2.10 | (6.45+6.31y) | | **0.072** | **17** |
| | EN3-1-1 | 6.2.5 | (6.12y) | | **0.072** | **17** |
| | EN3-1-1 | 6.2.6 | (6.17) | | 0.010 | 1 |
| | EN3-1-1 | 6.2.8 | (6.30) | | **0.072** | **17** |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.00 + 0.01 + 0.00 = | 0.011 | 2 |

**TOETSING HOR. VERPL.** **Lengte [m]: 1.900 Staaf: 15 BC: 66 Sit:1**

| verpl.[mm] | Eindverplaatsing | Aangehouden tweede-orde-verh.: 1.100 |
|---|---|---|
| Begin -1.7 | $u_{eind}$ -3.5 [mm] | |
| Extreem 0.0 | $u_{toel}$ 6.3 | |
| Midden -3.2 | [h/] 300.0 | Maatgevend: scheefstand |
| Einde -4.9 | | |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**GEOMETRIE** **L-sys [m]: 7.295 Staaf: 16 BC: 11 Sit:1**

**PROFIELGEGEVENS [mm]** **Koudgevormd Klasse 1 K120/120/6CF**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| h : | 120.0 | $i_y$: | 46.1 | A : | 2643.3 | $W_{ey}$: | 93.7E3 | $I_y$: | 562.2E4 |
| b : | 120.0 | $i_z$: | 46.1 | | | $W_{ez}$: | 93.7E3 | $I_z$: | 562.2E4 |
| $t_w$: | 6.0 | r : | 0.0 | | | $W_{py}$: | 111.6E3 | $I_t$: | 913.5E4 |
| $t_f$: | 6.0 | | | | | $W_{pz}$: | 111.6E3 | | |
| $r_1$: | 6.0 | $r_2$: | 12.0 | | | | | | |

**MATERIAALGEGEVENS**

Vloeispanning $f_{y;d}$ [N/mm²] : 235.00 Elasticiteitsmod. [N/mm²] : 210000
Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

**KRACHTEN**

| Plaats[m] | N [kN] | $M_y$ [kNm] | $V_z$ [kN] |
|---|---|---|---|
| Begin : | -14.9 | 0.00 | -0.45 |
| My-max : | -14.2 | -0.82 | 0.00 |
| Einde : | -13.5 | 0.00 | 0.45 |

**KNIKSTABILITEIT**

| | Geschoord y | | Begin | Einde | Geschoord z | | Begin | Einde |
|---|---|---|---|---|---|---|---|---|
| Kniklengte [m]: | | | | 7.295 | | | | 7.295 |
| N.Ed [kN]: | | | | 14.880 | | | | 14.880 |
| Slankheid lambda : | | | | 158.176 | | | | 158.176 |
| Ncr (F Euler)[kN]: | | | | 219.0 | | | | 219.0 |
| Lambda rel. : | | | | 1.684 | | | | 1.684 |
| Phi : | | | | 2.282 | | | | 2.282 |
| Imp.factor alpha : | | | | 0.490 | | | | 0.490 |
| Red.factor chi : | kromme | c | | 0.262 | kromme | c | | 0.262 |
| Nb.Rd [kN]: | | | | 162.5 | | | | 162.5 |
| Mom.verd.factor : | Cmy | | | 0.950 | Cmz | | | 1.000 |
| : | CmLT | | | 0.000 | | | | |
| Interactiefactor : | kyy | | | 1.020 | kyz | | | 0.644 |
| | kzy | | | 0.000 | kzz | | | 1.073 |

**TOETSING STABILITEIT/STERKTE** **Druk en buiging om sterke as**

| Plaats[m] | Norm | Artikel | Formule | | U.C. | N/mm² |
|---|---|---|---|---|---|---|
| Staaf | EN3-1-1 | 6.3.1.1 | (6.46y) | | 0.092 | 22 |
| | | | (6.46z) | | 0.092 | 22 |
| | EN3-1-1 | 6.3.3 | (6.61) | 0.09 + 0.03 + 0.00 = | **0.123** | **29** |
| | | | (6.62) | 0.09 + 0.00 + 0.00 = | 0.092 | 22 |
| Begin | EN3-1-1 | 6.2.1(6) | N+D | 0.02 + 0.00 + 0.00 = | 0.026 | 6 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.024 | 6 |
| My-max | EN3-1-1 | 6.2.4 | (6.9) | | 0.023 | 5 |
| | EN3-1-1 | 6.2.5 | (6.12y) | | 0.034 | 8 |
| | EN3-1-1 | 6.2.9.1 | (6.45+6.31y) | | 0.034 | 8 |
| Einde | EN3-1-1 | 6.2.1(6) | N+D | 0.02 + 0.00 + 0.00 = | 0.024 | 6 |
| | EN3-1-1 | 6.2.4 | (6.9) | | 0.022 | 5 |

Opmerkingen:
[ 47] Bij verlopende normaalkracht wordt de grootste drukkracht genomen.

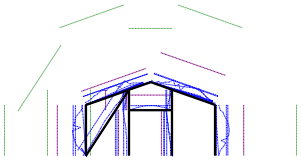
**TOETSING HOR. VERPLAATSING GLOBAAL**

Er is een maximale horizontale verplaatsing van 0.0074 [m] gevonden
bij knoop 10 en combinatie 66; belastingsituatie 1 (combinatietype 2).
Bij een hoogte van 3.900 [m] levert dit h / 529 (toel.: h / 300).

Project.....: BK2022-082
Onderdeel....: spant kopgevel

## UNITY-CHECK'S

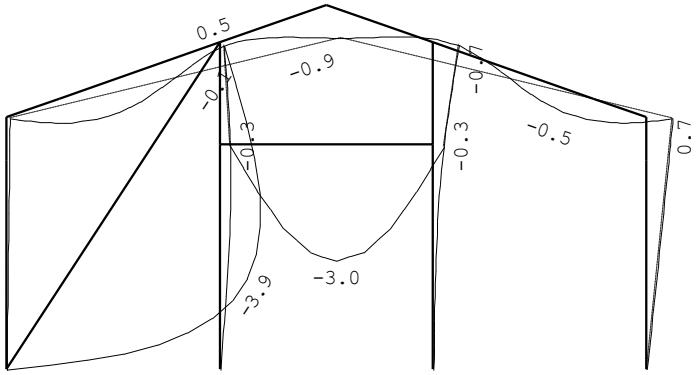
OMHULLENDE VAN ALLES



Toelaatbare unity-check (1.0)
Hoogste unity-check i.v.m. knikstabiliteit
Unity-check i.v.m. kipstabiliteit
Unity-check i.v.m. kip- en knikstabiliteit
Hoogste unity-check i.v.m. doorsnedecontrole
Hoogste unity-check i.v.m. doorbuiging

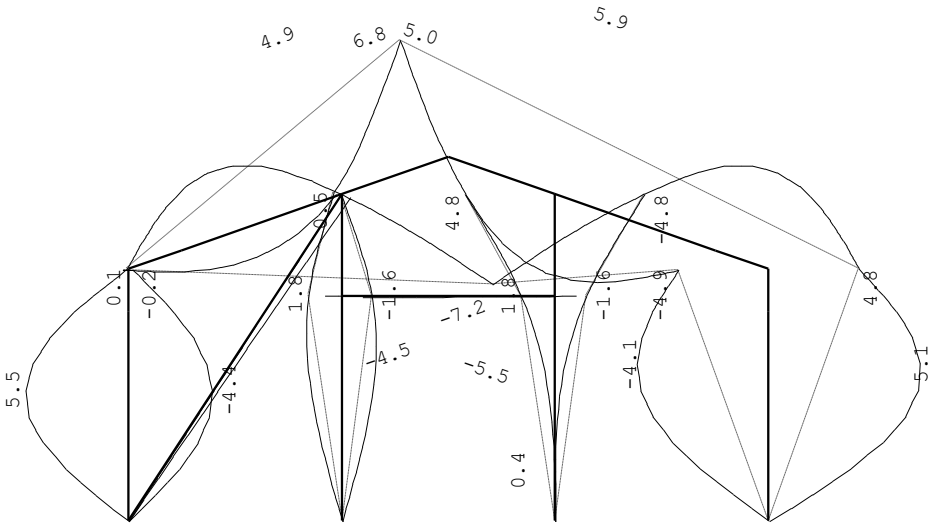
## VERVORMINGEN w1

Blijvende combinatie

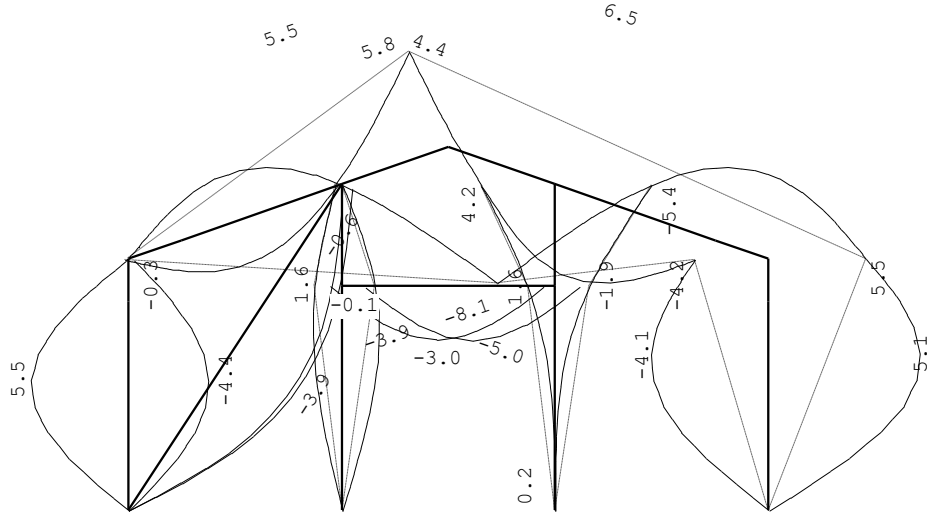


Project.....: BK2022-082
Onderdeel....: spant kopgevel

**VERVORMINGEN Wbij** Karakteristieke combinatie




**VERVORMINGEN Wmax** Karakteristieke combinatie




**DOORBUIGINGEN** Karakteristieke combinatie

| Nr. | staven | Zijde | positie [m] | $l_{rep}$ [mm] | $w_1$ [mm] | $w_2$ [mm] | $w_{bij}$ [mm] | [lrep/] | $w_{tot}$ [mm] | $w_c$ [mm] | $w_{max}$ [mm] | [lrep/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 3-5 | Neg. | 4.237 | 6357 | 0.5 | | -4.5 | 1420 | -3.9 | | -3.9 | 1614 |
| 2 | 3-5 | Pos. | 4.237 | 6357 | 0.5 | | 4.9 | 1291 | 5.5 | | 5.5 | 1163 |
| 3 | 6-8 | Neg. | 2.119 | 6357 | 0.5 | | -5.5 | 1154 | -1.7 | | -1.7 | 3645 |
| 3 | 6-8 | Pos. | 2.119 | 6357 | 0.5 | | 5.9 | 1075 | 3.2 | | 3.2 | 1956 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**DOORBUIGINGEN** Karakteristieke combinatie

| Nr. | staven | Zijde | positie [m] | $l_{rep}$ [mm] | $w_1$ [mm] | $w_2$ [mm] | $\|-- w_{bij} --\|$ [mm] | [lrep/] | $w_{tot}$ [mm] | $w_c$ [mm] | $\|-- w_{max} --\|$ [mm] | [lrep/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 11 | Neg. | 2.000 | 4000 | -3.0 | | | | -3.0 | | -3.0 | 1340 |
| 10 | 16 | Neg. | 3.891 | 7295 | -3.9 | | | | -3.9 | | -3.9 | 1876 |

**HORIZONTALE VERPLAATSING** Karakteristieke combinatie

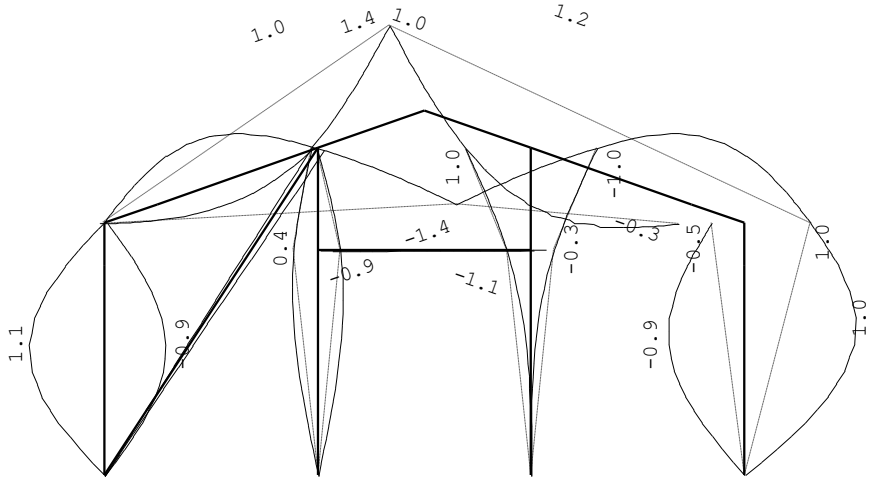
| Nr. | staven | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | $\|-- u_{tot} --\|$ [mm] | [h/] |
|---|---|---|---|---|---|---|---|---|
| 4 | 9-10 | Neg. | 4700 | -0.7 | | -4.8 | -5.5 | 859 |
| 4 | 9-10 | Pos. | 4700 | -0.7 | | 4.9 | 4.2 | 1121 |
| 6 | 12 | Neg. | 4200 | -0.3 | | -1.6 | -1.9 | 2246 |
| 6 | 12 | Pos. | 4200 | -0.3 | | 1.8 | 1.6 | 2705 |
| 7 | 13 | Neg. | 1900 | 0.2 | | -1.4 | -1.2 | 1581 |
| 7 | 13 | Pos. | 1900 | 0.2 | | 1.7 | 1.8 | 1036 |
| 8 | 14 | Neg. | 4200 | -0.3 | | -1.6 | -1.9 | 2231 |
| 8 | 14 | Pos. | 4200 | -0.3 | | 1.8 | 1.6 | 2689 |
| 9 | 15 | Neg. | 1900 | -0.4 | | -3.1 | -3.5 | 538 |
| 9 | 15 | Pos. | 1900 | -0.4 | | 3.0 | 2.6 | 728 |

Kolommen met een Wtot < h/9999 zijn niet afgedrukt

**TOTALE HORIZONTALE VERPLAATSING** Karakteristieke combinatie

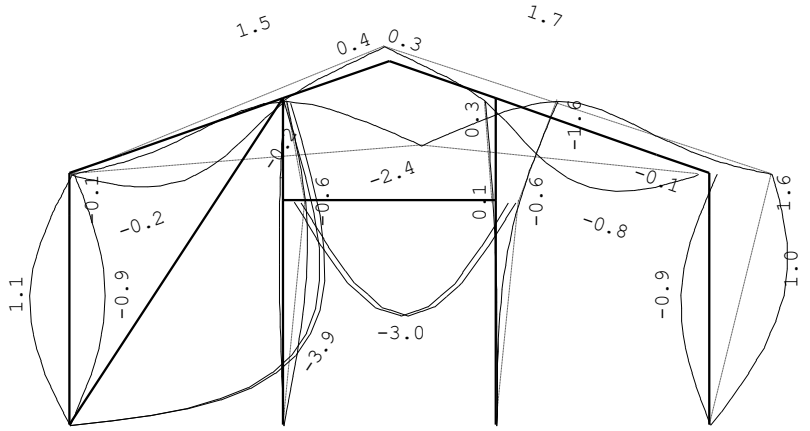
| knoop | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | $\|-- u_{tot} --\|$ [mm] | [h/] |
|---|---|---|---|---|---|---|---|
| 10 | Neg. | 3900 | | | -5.7 | -5.7 | 680 |
| 10 | Pos. | 3900 | 0.7 | | 6.7 | 7.4 | 529 |

**VERVORMINGEN Wbij** Frequente combinatie



Project.....: BK2022-082
Onderdeel....: spant kopgevel

**VERVORMINGEN Wmax** Frequente combinatie




**DOORBUIGINGEN** Frequente combinatie

| Nr. | staven | Zijde | positie [m] | $l_{rep}$ [mm] | $w_1$ [mm] | $w_2$ [mm] | $w_{bij}$ [mm] | [lrep/] | $w_{tot}$ [mm] | $w_c$ [mm] | $w_{max}$ [mm] | [lrep/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 3-5 | Neg. | 4.237 | 6357 | 0.5 | | -0.9 | 7098 | -0.4 | | -0.4 | 17841 |
| 2 | 3-5 | Pos. | 4.237 | 6357 | 0.5 | | 1.0 | 6454 | 1.5 | | 1.5 | 4170 |
| 3 | 6-8 | Neg. | 2.119 | 6357 | 0.5 | | -1.1 | 5772 | 0.1 | | 0.1 | 70771 |
| 3 | 6-8 | Pos. | 2.119 | 6357 | 0.5 | | 1.2 | 5373 | 1.1 | | 1.1 | 5840 |
| 5 | 11 | Neg. | 2.000 | 4000 | -3.0 | | | | -3.0 | | -3.0 | 1340 |
| 10 | 16 | Neg. | 3.891 | 7295 | -3.9 | | | | -3.9 | | -3.9 | 1876 |

**HORIZONTALE VERPLAATSING** Frequente combinatie

| Nr. | staven | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | $u_{tot}$ [mm] | [h/] |
|---|---|---|---|---|---|---|---|---|
| 4 | 9-10 | Neg. | 4700 | -0.7 | | -1.0 | -1.6 | 2886 |
| 6 | 12 | Neg. | 4200 | -0.3 | | -0.3 | -0.6 | 7232 |
| 7 | 13 | Pos. | 1900 | 0.2 | | 0.3 | 0.5 | 3849 |
| 8 | 14 | Neg. | 4200 | -0.3 | | -0.3 | -0.6 | 7187 |
| 9 | 15 | Neg. | 1900 | -0.4 | | -0.6 | -1.0 | 1861 |
| 9 | 15 | Pos. | 1900 | -0.4 | | 0.6 | 0.2 | 9141 |

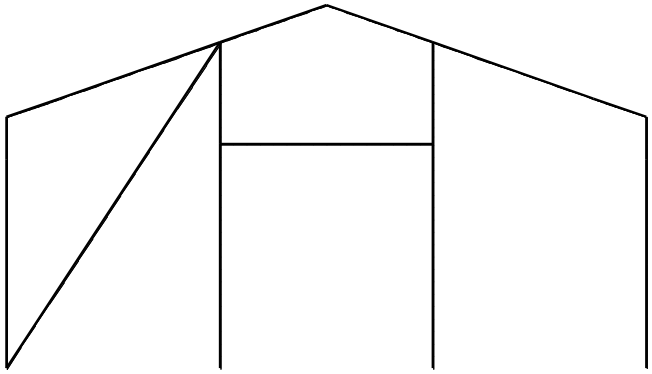
Kolommen met een Wtot < h/9999 zijn niet afgedrukt

**TOTALE HORIZONTALE VERPLAATSING** Frequente combinatie

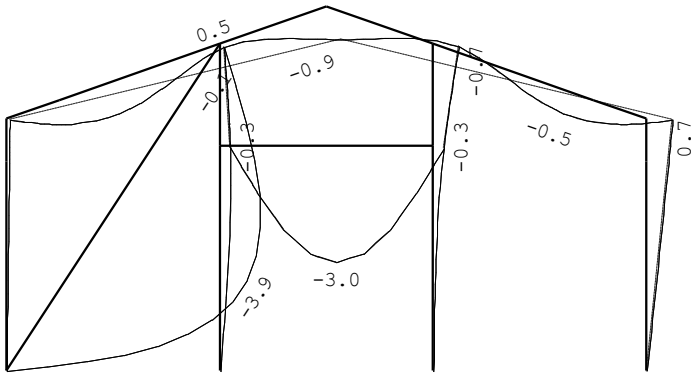
| knoop | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | $u_{tot}$ [mm] | [h/] |
|---|---|---|---|---|---|---|---|
| 10 | Neg. | 3900 | | | -0.7 | -0.7 | 5550 |
| 10 | Pos. | 3900 | 0.7 | | 1.2 | 1.9 | 2033 |

Project.....: BK2022-082
Onderdeel....: spant kopgevel

**VERVORMINGEN Wbij** Quasi-blijvende combinatie



**VERVORMINGEN Wmax** Quasi-blijvende combinatie




**DOORBUIGINGEN** Quasi-blijvende combinatie

| Nr. | staven | Zijde | positie [m] | $l_{rep}$ [mm] | $w_1$ [mm] | $w_2$ [mm] | $w_{bij}$ [mm] | [lrep/] | $w_{tot}$ [mm] | $w_c$ [mm] | $w_{max}$ [mm] | [lrep/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 11 | Neg. | 2.000 | 4000 | -3.0 | | | | -3.0 | | -3.0 | 1340 |
| 10 | 16 | Neg. | 3.891 | 7295 | -3.9 | | | | -3.9 | | -3.9 | 1876 |

Velden met een wbij en Wmax < lrep/9999 zijn niet afgedrukt

**HORIZONTALE VERPLAATSING** Quasi-blijvende combinatie

| Nr. | staven | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | $u_{tot}$ [mm] | [h/] |
|---|---|---|---|---|---|---|---|---|
| 4 | 9-10 | Neg. | 4700 | -0.7 | | | -0.7 | 7032 |
| 9 | 15 | Neg. | 1900 | -0.4 | | | -0.4 | 4837 |

Kolommen met een Wtot < h/9999 zijn niet afgedrukt

**TOTALE HORIZONTALE VERPLAATSING** Quasi-blijvende combinatie

| knoop | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | $u_{tot}$ [mm] | [h/] |
|---|---|---|---|---|---|---|---|

# A.4. Gevelregels

## Technosoft Construct release 6.72a 7 feb 2023

Project : BK2022-082
Onderdeel : gevelregels
Datum : 07/02/2023
Eenheden : kN/m/rad
Bestand : E:\Bouwkenners\BK2022-082 - Berekening Loods paalfundering - Nuijens - Richter\Berekeningen\BK2022-082-KB01 - Statische berekening\gevelregels.cnw

## Toegepaste normen volgens Eurocode met Nederlandse NB

| | | | |
|---|---|---|---|
| Belastingen | NEN-EN 1990:2002 | C2:2010,A1:2019 | NB:2019(nl) |
| | NEN-EN 1991-1-1:2002 | C1/C11:2019 | NB:2019(nl) |
| Hout | NEN-EN 1995-1-1:2005 | A1:2011,C1:2006 | NB:2013(nl) |
| | NEN-EN 14080:2013 | | |

## Balklaag berekening. (H)

### Algemene gegevens

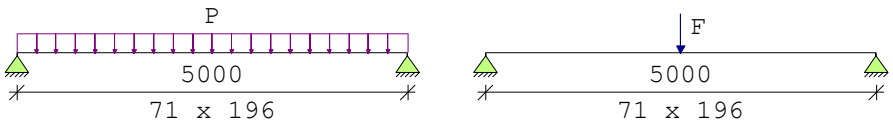
| | | | | | |
|---|---|---|---|---|---|
| B x H | [mm] : | 71 x 196 | Sterkteklasse | : | C24 |
| Overspanning | [mm] : | 5000 | Klimaatklasse | : | I |
| Opleglengte | [mm] : | 100 | Referentie periode [j] | : | 50 |
| H.o.h. afstand | [mm] : | 1567 | Min. eigenfreq. [Hz] | : | 3 |
| Beschot sterkteklasse: | | C18 | | | |
| Dikte beschot | [mm] : | 18 | $E_{0,mean}$ x I [Nm²/m] | : | 4374 |

### Permanente belastingen $G_{rep}$

| | | |
|---|---|---|
| EG balklaag | : | 0.00 |
| Extra belasting | : | 0.00+ |
| Totaal [kN/m²] | : | 0.00 |

### Veranderlijke belastingen

| | | | |
|---|---|---|---|
| $q_k$ $+P_{wanden}$ | [kN/m²] : | 0.46 = | 0.46 + 0.00 |
| $\Psi_0$ | [ - ] : | 0.00 | |
| $\Psi_2$ | [ - ] : | 0.30 | |
| $Q_k$ | [kN] : | 0.00 | |
| $Q_k$ oppervlak | [m²] : | 0.05 x 0.05 | |
| Reductiefactor | : | 1.00 | |




Belastingfactoren (NEN-EN 1990)
Formule 6.10a: $\gamma_G$ : 1.22 $\gamma_Q$ : 1.35
Formule 6.10b: $\xi\gamma_G$ : 1.08 $\gamma_Q$ : 1.35

Partiële factor (Tabel 2.3 NEN-EN 1995-1-1)
$\gamma_M$ [-]: 1.30

| Meegenomen combinaties in de berekening : | | $k_{mod}$ [-] | $b_{ef}$ [mm] | $k_{c,90,q}$ | $k_{c,90,F}$ |
|---|---|---|---|---|---|
| * Perm. + q-last (6.10a) | ($G_{rep}$ + $q_k$) | 0.60 | 71 | 1.00 | |
| * Perm. + q-last (6.10b) | ($G_{rep}$ + $q_k$) | 1.10 | 71 | 1.00 | |
| * Perm. + puntlast (6.10a) | ($G_{rep}$ + $Q_k$) | 0.60 | 71 | 1.00 | 1.00 |
| * Perm. + puntlast (6.10b) | ($G_{rep}$ + $Q_k$) | 0.80 | 71 | 1.00 | 1.00 |

| **Tussenresultaten (per combinatie)** | | | **eis** | **u.c.** |
|---|---|---|---|---|
| Perm + qlast(6.10a) | frm(6.11) | $\sigma_{m,y,d}$ | = 0.00 < 11.08 [N/mm²] | 0.00 |
| | frm(6.13) | $\tau_{v,d}$ | = 0.00 < 1.85 [N/mm²] | 0.00 |
| | frm(6.3 ) | $\sigma_{c,90,q,d}/(k_{c,90,q}*f_{c,90,d}) + \sigma_{c,90,F,d}/(k_{c,90,F}*f_{c,90,d}) < 1.00$ | = 0.00/ 1.15+ 0.00/ 1.15 = 0.00 | |
| Perm + qlast(6.10b) | frm(6.11) | $\sigma_{m,y,d}$ | = 6.69 < 20.31 [N/mm²] | 0.33 |
| | frm(6.13) | $\tau_{v,d}$ | = 0.26 < 3.38 [N/mm²] | 0.08 |
| | frm(6.3 ) | $\sigma_{c,90,q,d}/(k_{c,90,q}*f_{c,90,d}) + \sigma_{c,90,F,d}/(k_{c,90,F}*f_{c,90,d}) < 1.00$ | = 0.34/ 2.12+ 0.00/ 2.12 = 0.16 | |
| Perm + plast(6.10a) | frm(6.11) | $\sigma_{m,y,d}$ | = 0.00 < 11.08 [N/mm²] | 0.00 |
| | frm(6.13) | $\tau_{v,d}$ | = 0.00 < 1.85 [N/mm²] | 0.00 |
| | frm(6.3 ) | $\sigma_{c,90,q,d}/(k_{c,90,q}*f_{c,90,d}) + \sigma_{c,90,F,d}/(k_{c,90,F}*f_{c,90,d}) < 1.00$ | = 0.00/ 1.15+ 0.00/ 1.15 = 0.00 | |
| Perm + plast(6.10b) | frm(6.11) | $\sigma_{m,y,d}$ | = 0.00 < 14.77 [N/mm²] | 0.00 |
| | frm(6.13) | $\tau_{v,d}$ | = 0.00 < 2.46 [N/mm²] | 0.00 |
| | frm(6.3 ) | $\sigma_{c,90,q,d}/(k_{c,90,q}*f_{c,90,d}) + \sigma_{c,90,F,d}/(k_{c,90,F}*f_{c,90,d}) < 1.00$ | = 0.00/ 1.54+ 0.00/ 1.54 = 0.00 | |

**Tussenresultaten m.b.t. doorbuiging**

| | | | |
|---|---|---|---|
| Traagheidsmom. Y [mm4] : | 4454.98e4 | Traagheidsmom. Z [mm4] : | 584.59e4 |
| $E_{0,mean}$ [N/mm²] : | 11000 | $\Psi_2$ [-] : | 0.30 |
| $u_{perm,ogenbl.}$ [mm] : | 0.00 | $k_{def}$ [-] : | 0.60 |
| $u_{c(zeeg)}$ [mm] : | 0.00 | | |

Doorbuigingen [mm]

| Belastingcombinatie | | $u_{inst}$ | $u_{creep}$ | $u_{bij}$ | $u_{net,fin}$ |
|---|---|---|---|---|---|
| Permanent | : n.v.t. | | | | |
| Permanent + verdeeld | : | 11.97 | 2.15 | 14.12 | 14.12 |
| Permanent + geconc. | : n.v.t. | | | | |

De doorbuiging is als volgt bepaald (art. 2.2.3(5) van NEN-EN 1995-1-1:2004):
doorbuiging m.b.t. belastingscombinatie permanent

$u_{inst} = u_{perm,ogenblikkelijk}$
$u_{net,fin} = u_{inst}(1 + k_{def})$
$u_{creep} = w_{net,fin} - u_{inst}$
$u_{bij} = u_{creep}$

doorbuiging m.b.t. belastingscombinatie veranderlijk

$u_{inst} = u_{perm,ogenblikkelijk} + u_{ver,ogenblikkelijk}$
$u_{net,fin} = u_{inst,G}(1 + k_{def}) + u_{inst,Q}(1 + \Psi_2 k_{def})$
$u_{creep} = u_{net,fin} - u_{inst}$
$u_{bij} = u_{net,fin} - u_{inst,G}$

Te toetsen combinatie:

Mtg. doorbuiging : Permanent + verdeeld

| **Resultaten (maatgevende combinaties)** | | **eis** | **u.c.** |
|---|---|---|---|
| Perm + qlast(6.10b) frm(6.11) | $\sigma_{m,y,d}$ = 6.69 < | 20.31 [N/mm²] | 0.33 |
| Perm + qlast(6.10b) frm(6.13) | $\tau_{v,d}$ = 0.26 < | 3.38 [N/mm²] | 0.08 |
| Perm + qlast(6.10b) frm(6.3 ) | $\sigma_{c,90,q,d}/(k_{c,90,q}*f_{c,90,d}) + \sigma_{c,90,F,d}/(k_{c,90,F}*f_{c,90,d}) < 1.00$ = 0.34/ 2.12+ 0.00/ 2.12 = 0.16 | | |
| Verdeelde belasting | $u_{bij}$ = 14.12 < | 20.00 [mm] | 0.71 |
| Verdeelde belasting | $u_{net,fin}$ = 14.12 < | 20.00 [mm] | 0.71 |

# A.5. Berekening ankers in ondervloer

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| | | | |
|---|---|---|---|
| Firma: | Snijders Ingenieursgroep | Bladzijde: | 1 |
| Adres: | | Constructeur: | |
| Tel. I Fax: | 0402085474 \| | E-mail: | as@snijders-ig.nl |
| berekening: | beton - 8 feb. 2023 (1) | Datum: | 08-02-2023 |
| Sub-Project I Pos. Nr.: | | | |

**Opmerkingen van de constructeur:**

## 1 Invoergegevens



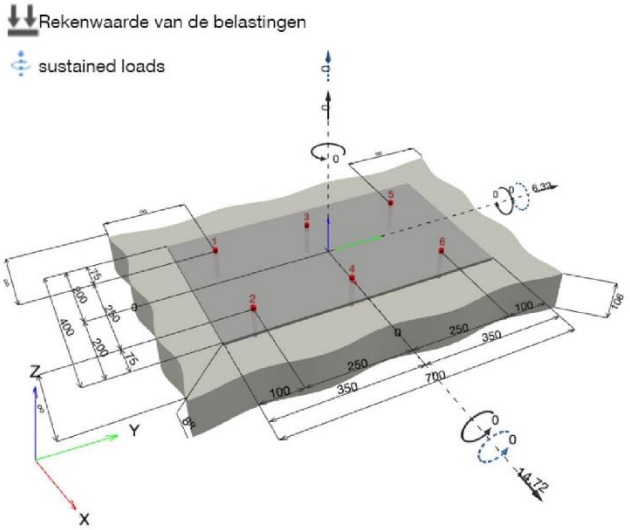




| | |
|---|---|
| **Ankertype en -afmeting:** | **HIT-HY 200-A + HAS-U A4 M12** |
| Retourperiode (levensduur in jaren): | 50 |
| Artikelnummer: | 2223842 HAS-U A4 M12x110 (insert) / 2022696 HIT-HY 200-A (mortel) |
| Effectieve verankeringsdiepte: | $h_{ef,opti}$ = 70,0 mm ($h_{ef,limit}$ = 76,0 mm) |
| Materiaal: | A4 |
| Goedkeuring nr.: | ETA 11/0493 |
| Uitgegeven I Geldig: | 10-12-2021 \| - |
| Aantoning: | rekenmethode EN 1992-4, chemisch |
| Afstandsmontage: | $e_b$ = 0,0 mm (geen afstandsmontage); t = 8,0 mm |
| Voetplaat[R] : | $l_x$ x $l_y$ x t = 400,0 mm x 700,0 mm x 8,0 mm; (Aanbevolen voetplaatdikte: niet berekend) |
| Staalprofiel: | geen profiel |
| Ondergrond: | gescheurd beton, C25/30, $f_{c,cyl}$ = 25,00 N/mm$^2$; h = 106,0 mm, Temp. kort/lang: 40/24 °C, Door de gebruiker gedefinieerde partiële materiaalveiligheidsfactor $\gamma_c$ = 1,500 |
| **Plaatsing:** | **automatisch gereinigd boorgat, plaatsingsconditie: droog** |
| Wapening: | Geen wapening of wapening met staafafstand >= 150 mm (elke Ø) of >= 100 (Ø <= 10mm) |
| | geen rechte randwapening |
| | Wapening om splijten te controleren volgens EN 1992-4,-7.2 1.7 (2) b) 2) aanwezig |

[R] - De ankerberekening wordt gebaseerd op de aanname van een rigide voetplaat.

**Geometrie [mm] & Belastingen [kN, kNm]**




Invoergegevens en resultaten moeten worden gecontroleerd op overeenstemming met de realiteit en op waarschijnlijkheid!
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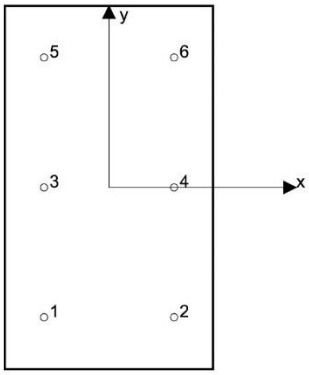
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| Tel. I Fax: | 0402085474 \| | E-mail: | as@snijders-ig.nl |
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### 1.1 Belastingscombinatie

| Geval | Omschrijving | Lasten [kN] / Momenten [kNm] | Seismisch | Brand | Max. uitnutting Anker [%] |
|---|---|---|---|---|---|
| 1 | Combinatie 1 | N = 0,000; $V_x$ = 14,720; $V_y$ = 6,320; $M_x$ = 0,000; $M_y$ = 0,000; $M_z$ = 0,000; $N_{sus}$ = 0,000; $M_{x,sus}$ = 0,000; $M_{y,sus}$ = 0,000; | Nee | nee | 15 |

## 2 Belastingsituatie/Resulterende ankerlasten




**Ankerreacties [kN]**
Trekkracht: (+ Trek, - Druk)

| Anker | Trekkracht | Afschuifkracht | Afschuifkracht x | Afschuifkracht y |
|---|---|---|---|---|
| 1 | 0,000 | 2,670 | 2,453 | 1,053 |
| 2 | 0,000 | 2,670 | 2,453 | 1,053 |
| 3 | 0,000 | 2,670 | 2,453 | 1,053 |
| 4 | 0,000 | 2,670 | 2,453 | 1,053 |
| 5 | 0,000 | 2,670 | 2,453 | 1,053 |
| 6 | 0,000 | 2,670 | 2,453 | 1,053 |

max. stuik van het beton: - [‰]
max. betondrukspanning: - [N/mm$^2$]
resulterende trekkracht in (x/y)=(0,0/0,0): 0,000 [kN]
resulterende drukkracht in (x/y)=(0,0/0,0): 0,000 [kN]

Ankerkrachten worden berekend op basis van de aanname van een rigide voetplaat.

Invoergegevens en resultaten moeten worden gecontroleerd op overeenstemming met de realiteit en op waarschijnlijkheid!
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## 3 Treklast (EN 1992-4, sectie 7.2.1)

| | Belasting [kN] | Capaciteit [kN] | Benutting $\beta_N$ [%] | Status |
|---|---|---|---|---|
| Staalbreuk* | N.V.T. | N.V.T. | N.V.T. | N.V.T. |
| Betonkegelbreuk** | N.V.T. | N.V.T. | N.V.T. | N.V.T. |
| Splijten** | N.V.T. | N.V.T. | N.V.T. | N.V.T. |

* ongunstigste anker **ankergroep (ankers onder trekbelasting)

Invoergegevens en resultaten moeten worden gecontroleerd op overeenstemming met de realiteit en op waarschijnlijkheid!
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| Adres: | | Constructeur: | |
| Tel. I Fax: | 0402085474 \| | E-mail: | as@snijders-ig.nl |
| berekening: | beton - 8 feb. 2023 (1) | Datum: | 08-02-2023 |
| Sub-Project I Pos. Nr.: | | | |

## 4 Afschuifbelasting (EN 1992-4, sectie 7.2.2)

| | Belasting [kN] | Capaciteit [kN] | Benutting $\beta_V$ [%] | Status |
|---|---|---|---|---|
| Staalbreuk (zonder hefboomsarm)* | 2,670 | 18,910 | 15 | OK |
| Staalbreuk (met hefboomsarm)* | N.V.T. | N.V.T. | N.V.T. | N.V.T. |
| Betonachteruitbreken** | 2,670 | 30,064 | 9 | OK |
| Betonrandbreuk in richting ** | N.V.T. | N.V.T. | N.V.T. | N.V.T. |

* ongunstigste anker **ankergroep (geactiveerde ankers)

### 4.1 Staalbreuk (zonder hefboomsarm)

| $V^0_{Rk,s}$ [kN] | $k_7$ | $V_{Rk,s}$ [kN] | $\gamma_{M,s}$ | $V_{Rd,s}$ [kN] | $V_{Ed}$ [kN] |
|---|---|---|---|---|---|
| 29,500 | 1,000 | 29,500 | 1,560 | 18,910 | 2,670 |

### 4.2 Betonachteruitbreken (door betonkegelbreuk)

| $A_{c,N}$ [mm²] | $A^0_{c,N}$ [mm²] | $c_{cr,N}$ [mm] | $s_{cr,N}$ [mm] | $k_8$ | $f_{c,cyl}$ [N/mm²] | |
|---|---|---|---|---|---|---|
| 44.100 | 44.100 | 105,0 | 210,0 | 2,000 | 25,00 | |
| $e_{c1,V}$ [mm] | $\psi_{ec1,N}$ | $e_{c2,V}$ [mm] | $\psi_{ec2,N}$ | $\psi_{s,N}$ | $\psi_{re,N}$ | $\psi_{M,N}$ |
| 0,0 | 1,000 | 0,0 | 1,000 | 1,000 | 1,000 | 1,000 |
| $k_1$ | $N^0_{Rk,c}$ [kN] | $\gamma_{M,c,p}$ | $V_{Rd,cp}$ [kN] | $V_{Ed}$ [kN] | | |
| 7,700 | 22,548 | 1,500 | 30,064 | 2,670 | | |

| Groepsanker-ID |
|---|
| 6 |

## 5 Verplaatsingen (hoogst belaste anker)

Kortdurende belastingen

$N_{Sk}$ = 0,000 [kN] $\delta_N$ = 0,0000 [mm]

$V_{Sk}$ = 1,978 [kN] $\delta_V$ = 0,0989 [mm]

$\delta_{NV}$ = 0,0989 [mm]

Langeduur-belastingen

$N_{Sk}$ = 0,000 [kN] $\delta_N$ = 0,0000 [mm]

$V_{Sk}$ = 1,978 [kN] $\delta_V$ = 0,1582 [mm]

$\delta_{NV}$ = 0,1582 [mm]

NB: Verplaatsingen t.g.v. trekbelasting zijn gebaseerd op de helft van het vereiste aandraaimoment voor ongescheurd beton! Verplaatsingen t. g. v. afschuiving zijn bepaald zonder inachtneming van wrijving tussen beton en voetplaat! De speling als gevolg van toleranties in boorgatdiameter en gatdiameter in voetplaat wordt niet beschouwd in deze berekening!

Hoeveel verplaatsing toelaatbaar is, hangt af van de verbinding en dient door de constructeur te worden bepaald!

Invoergegevens en resultaten moeten worden gecontroleerd op overeenstemming met de realiteit en op waarschijnlijkheid!
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## 6 Waarschuwingen

- De ankerberekeningsmethoden in PROFIS Engineering vereisen rigide voetplaten volgens de huidige regelgeving (AS 5216:2018, ETAG 001/Annex C, EOTA TR029, etc.). Dit betekend dat herverdeling van de belasting op de ankers als gevolg van elastische deformatie van de voetplaat niet wordt meegenomen - De voetplaat wordt stijf verondersteld, en dus niet vervormd wanneer onderhevig aan een belasting. PROFIS Engineering berekent de minimaal benodigde voetplaatdikte met EEM om de spanning in de voetplaat te minimaliseren, gebaseerd op de aannames zoals hierboven gesteld. Het bewijs dat de aanname correct is dat de voetplaat rigide is wordt niet door PROFIS engineering geleverd. Ingevoerde data en resultaten moeten worden gecontroleerd of deze in overeenstemming zijn met de bestaande voorwaarden en op geloofwaardigheid!
- Controleren van de overdracht van de belastingen naar het basismateriaal is vereist in overeenstemming met EN 1992-4, bijlage A!
- Het ontwerp is alleen geldig als het ruimingsgat in het armatuur niet groter is dan de waarde in tabel 6.1 van EN 1992-4! Voor grotere diameters van het ruimingsgat zie sectie 6.2.2 van EN 1992-4-1!
- De lijst van benodigdheden is slechts ter informatie voor de gebruiker. In elk geval, dienen de gebruiksinstructies behorende bij het produkt opgevolgd te worden om een juiste installatie te bewerkstelligen.
- Voor het vaststellen van de $\psi_{re,v}$ (falen van de betonnen rand) wordt de minimale betondekking, zoals gedefinieerd in de ontwerpinstellingen, gebruikt als de betondekking van de randwapening.
- Karakteristieke hechtspanningen zijn afhankelijk van korte en lange termijn temperaturen.
- Er is geen randwapening vereist om splijten te voorkomen
- Lastoverdracht van aanvullende wapening naar de structurele ligger moeten worden geverifieerd door de verantwoordelijke bouwkundige.
- Verzeker bij aanvullende wapening en achteraf geplaatste ankers dat de wapeningsstaven op de werklocatie niet worden doorboord.
- De karakteristieke aanhechtsterkten zijn afhankelijk van de retourperiode (levensduur in jaren): 50

## Verbinding is VEILIG!

Invoergegevens en resultaten moeten worden gecontroleerd op overeenstemming met de realiteit en op waarschijnlijkheid!
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| berekening: | beton - 8 feb. 2023 (1) | Datum: | 08-02-2023 |
| Sub-Project I Pos. Nr.: | | | |

## 7 Plaatsingsgegevens

Voetplaat staal: S 235; E = 210.000,00 N/mm$^2$; $f_{yk}$ = 235,00 N/mm$^2$

Staalprofiel: geen profiel

Gatdiameter in voetplaat: $d_f$ = 14,0 mm

Voetplaatdikte (invoer): 8,0 mm

Aanbevolen voetplaatdikte: niet berekend

Boormethode: SafeSet - automatisch reinigen

Boorgatreiniging: Automatische reiniging van het boorgat is vereist

Ankertype en -afmeting: HIT-HY 200-A + HAS-U A4 M12

Artikelnummer: 2223842 HAS-U A4 M12x110 (insert) / 2022696 HIT-HY 200-A (mortel)

Maximaal aanhaalmoment installatie: 40 Nm

Boorgatdiameter in het basismateriaal: 14,0 mm

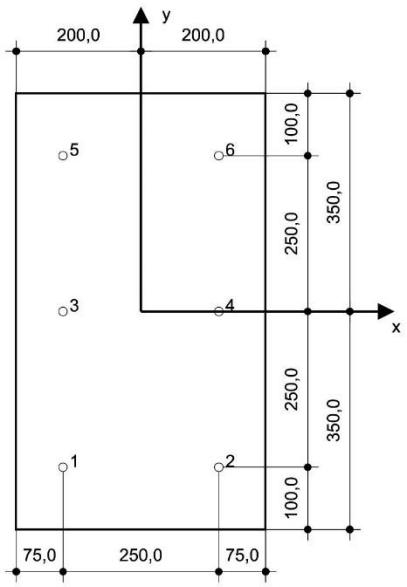
Boorgatdiepte in ondergrond: 70,0 mm

Minimale dikte van de ondergrond: 100,0 mm

Hilti HAS-U draadeinde met HIT-HY 200 injectiemortel met 70 mm inbedding h_ef, M12, Roestvast staal, SAFEset - Automatisch reinigen plaatsing per ETA 11/0493

### 7.1 Vereiste toebehoren

| Boren | Boorgatreiniging | Plaatsing |
|---|---|---|
| • Hamerboormachine<br>• Juiste maat van automatische reinigingsboor<br>• Stofzuiger | • Geen toebehoren benodigd | • Dispenser inclusief cassette en mixtuit<br>• Momentsleutel |




**Ankercoördinaten [mm]**

| Anker | x | y | $c_{-x}$ | $c_{+x}$ | $c_{-y}$ | $c_{+y}$ | Anker | x | y | $c_{-x}$ | $c_{+x}$ | $c_{-y}$ | $c_{+y}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -125,0 | -250,0 | - | - | - | - | 4 | 125,0 | 0,0 | - | - | - | - |
| 2 | 125,0 | -250,0 | - | - | - | - | 5 | -125,0 | 250,0 | - | - | - | - |
| 3 | -125,0 | 0,0 | - | - | - | - | 6 | 125,0 | 250,0 | - | - | - | - |

Invoergegevens en resultaten moeten worden gecontroleerd op overeenstemming met de realiteit en op waarschijnlijkheid!
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## 8 Opmerkingen

- Alle informatie en gegevens in de software hebben uitsluitend betrekking op het gebruik van Hilti-producten en zijn gebaseerd op de principes, formules en veiligheidsvoorschriften in overeenstemming met de technische aanwijzingen en bedienings-, montage- en assemblage-instructies van Hilti, enz. die strikt door de gebruiker moeten worden nageleefd. Alle cijfers hierin zijn gemiddelde cijfers, en daarom moeten gebruiksspecifieke tests worden uitgevoerd voordat het betreffende Hilti-product wordt gebruikt. De resultaten van de berekeningen die door middel van de Software worden uitgevoerd, zijn in essentie gebaseerd op de gegevens die u invoert. Daarom draagt u de volledige verantwoordelijkheid voor het ontbreken van fouten, de volledigheid en de relevantie van de gegevens die door u moet worden ingevoerd. Bovendien is het uw uitsluitende verantwoordelijkheid om de berekening te laten controleren en goedkeuren door een deskundige, in het bijzonder met betrekking tot de naleving van de geldende normen en vergunningen, voordat deze wordt gebruikt voor uw specifieke faciliteit. De software dient alleen ter ondersteuning om de normen en vergunningen te interpreteren en geeft geen enkele garantie met betrekking tot de afwezigheid van fouten, de juistheid en de relevantie van de resultaten of de geschiktheid voor een specifieke toepassing.
- U moet alle benodigde en redelijke maatregelen nemen ter vermijding en beperking van schade veroorzaakt door de software. In het bijzonder moet u zorgen voor een regelmatige back-up van programma's en gegevens en, indien van toepassing, regelmatig de updates van de door Hilti aangeboden Software uitvoeren. Indien u geen gebruik maakt van de AutoUpdate-functie van de Software, dient u ervoor te zorgen dat u telkens de actuele en dus up-to-date versie van de Software gebruikt door handmatig updates uit te voeren via de Hilti-website. Hilti is niet aansprakelijk voor de gevolgen, zoals het herstel van verloren of beschadigde data of programma's als gevolg van het feit dat u bewust tekort bent geschoten in de naleving van uw verplichtingen.

Invoergegevens en resultaten moeten worden gecontroleerd op overeenstemming met de realiteit en op waarschijnlijkheid!
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