DE LANGE
ADVIESBUREAU

Watergoorweg 102B
3861 MA Nijkerk
(033) 245 03 20
info@aadl.nl



Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## WIND

| | | | | | |
|---|---|---|---|---|---|
| Terrein categorie ...[4.3.2]...: | Onbebouwd | | | | |
| Windgebied .....: | 2 | Vb,0 ..[4.2].....: | 27.000 | | |
| Positie spant in het gebouw....: | 2.000 | Kr ....[4.3.2].....: | 0.209 | | |
| z0 .....[4.3.2]...: | 0.200 | Zmin ..[4.3.2].....: | 4.000 | | |
| 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

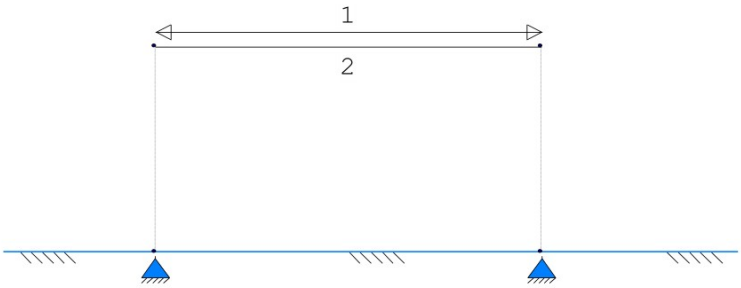
| | |
|---|---|
| Sneeuwbelasting (sk) 50 jaar : | 0.70 |
| Sneeuwbelasting (sn) n jaar : | 0.70 |

## STAAFTYPEN

| Type | staven |
|---|---|
| 5:Linker gevel. | : 1 |
| 6:Rechter gevel. | : 3 |
| 7:Dak. | : 2 |

## LASTVELDEN

Veranderlijke belastingen door personen




## LASTVELDEN

| Nr | Staaf | Tabel | Klasse-Gebruiksfunctie | Verd. | $q_k$ | $Q_k$ | $F_t / F_{t0}$ |
|---|---|---|---|---|---|---|---|
| 1 | 2-2 | 6.10 | H-Dak (onder dakbeschot) | 1 | -1.00 | -2.00 | 1.00 |

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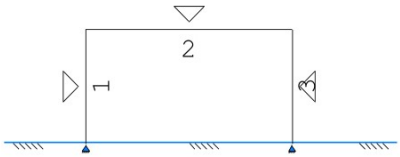
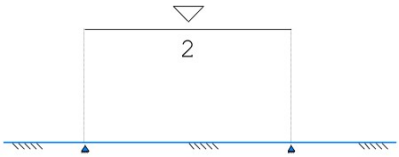
## LASTVELDEN

Wind staven




Sneeuw staven

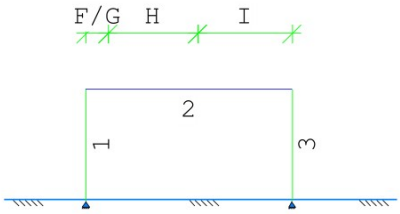



## WIND DAKTYPES

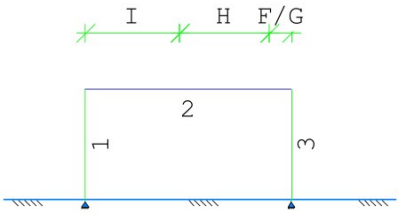
| Nr. | Staaf | Type | reductie bij wind van links | reductie bij wind van rechts | Cpe volgens art: |
|---|---|---|---|---|---|
| 1 | 1 | Gevel | 1.000 | 1.000 | 7.2.2 |
| 2 | 2 | Plat dak | 1.000 | 1.000 | 7.2.3 |
| 3 | 3 | Gevel | 1.000 | 1.000 | 7.2.2 |

## WIND ZONES

Wind van links




Wind van rechts




**WIND VAN LINKS ZONES**

| Nr. | Staaf | Positie | Lengte | Zone |
|---|---|---|---|---|
| 1 | 1 | 0.000 | 3.800 | D |
| 2 | 2 | 0.000 | 0.760 | F/G |
| 3 | 2 | 0.760 | 3.040 | H |
| 4 | 2 | 3.800 | 3.200 | I |
| 5 | 3 | 0.000 | 3.800 | E |

**WIND VAN RECHTS ZONES**

| Nr. | Staaf | Positie | Lengte | Zone |
|---|---|---|---|---|
| 1 | 3 | 0.000 | 3.800 | D |
| 2 | 2 | 0.000 | 0.760 | F/G |
| 3 | 2 | 0.760 | 3.040 | H |
| 4 | 2 | 3.800 | 3.200 | I |
| 5 | 1 | 0.000 | 3.800 | E |

## Wind indexen

| Index | CsCd | Cpe/Cpi | qp | breedte reductie | Qw | Zone | Hoek(en) |
|---|---|---|---|---|---|---|---|
| Qw1 | | 0.300 | 0.596 | 4.300 | -0.769 | -i | |
| Qw2 | | 0.300 | 0.596 | 4.800 | -0.858 | -i | |
| Qw3 | | -0.300 | 0.596 | 4.300 | 0.769 | -i | |
| Qw4 | 1.00 | 0.800 | 0.596 | 4.300 | -2.050 | D | |
| Qw5 | 1.00 | -1.800 | 0.596 | 1.900 | 2.038 | F | 0.0 |
| Qw6 | 1.00 | -1.200 | 0.596 | 2.900 | 2.074 | G | 0.0 |
| Qw7 | 1.00 | -0.700 | 0.596 | 4.800 | 2.002 | H | 0.0 |
| Qw8 | 1.00 | -0.200 | 0.596 | 4.800 | 0.572 | I | 0.0 |
| Qw9 | 1.00 | 0.500 | 0.596 | 4.300 | -1.281 | E | |
| Qw10 | | -0.200 | 0.596 | 4.300 | 0.513 | +i | |

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Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## Wind indexen

| Index | CsCd | Cpe/Cpi | qp | breedte | reductie | Qw | Zone | Hoek(en) |
|---|---|---|---|---|---|---|---|---|
| Qw11 | | -0.200 | 0.596 | 4.800 | | 0.572 | +i | |
| Qw12 | | 0.200 | 0.596 | 4.300 | | -0.513 | +i | |
| Qw13 | 1.00 | 0.200 | 0.596 | 4.800 | | -0.572 | I | 0.0 |
| Qw14 | 1.00 | -0.800 | 0.596 | 4.300 | | 2.050 | D | |
| Qw15 | 1.00 | -0.500 | 0.596 | 4.300 | | 1.281 | E | |

## SNEEUW DAKTYPEN

| Staaf | artikel |
|---|---|
| 2-2 | 5.3.2 Lessenaarsdak |

## Sneeuw indexen

| Index | art | μ | $s_k$ | red. | posfac | breedte | $Q_s$ | hoek |
|---|---|---|---|---|---|---|---|---|
| Qs1 | 5.3.2 | 0.800 | 0.70 | 1.00 | | 4.800 | 2.688 | 0.0 |

## BELASTINGGEVALLEN

| | B.G. | Omschrijving | | Type | |
|---|---|---|---|---|---|
| | 1 | Permanente belasting | EGZ=-1.00 | 1 | |
| g | 2 | Ver. bel. pers. ed. (q_k) | | 2 | |
| g | 3 | Ver. bel. pers. ed. (Q_k) | | 3 | |
| g | 4 | Wind van links onderdruk A | | 7 | |
| g | 5 | Wind van links overdruk A | | 8 | |
| g | 6 | Wind van links onderdruk B | | 9 | |
| g | 7 | Wind van links overdruk B | | 10 | |
| g | 8 | Wind van rechts onderdruk A | | 11 | |
| g | 9 | Wind van rechts overdruk A | | 12 | |
| g | 10 | Wind van rechts onderdruk B | | 13 | |
| g | 11 | Wind van rechts overdruk B | | 14 | |
| g | 12 | Sneeuw A | | 22 | |
| | 13 | Knik | | 0 | Onbekend |

g = gegenereerd belastinggeval

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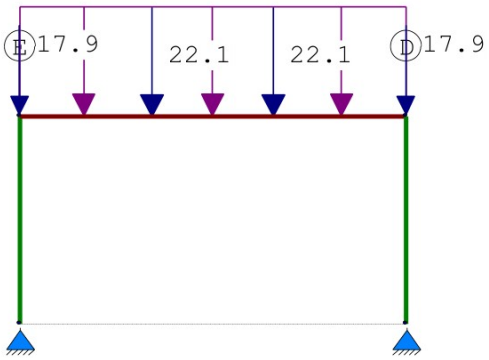
Onderdeel....: S021 portaal uitbouw

## BELASTINGEN

B.G:1 Permanente belasting

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




## KNOOPBELASTINGEN

B.G:1 Permanente belasting

| Last | Knoop | Richting | waarde | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|
| 1 | 2 | Z | -17.900 | | | |
| 2 | 3 | Z | -17.900 | | | |

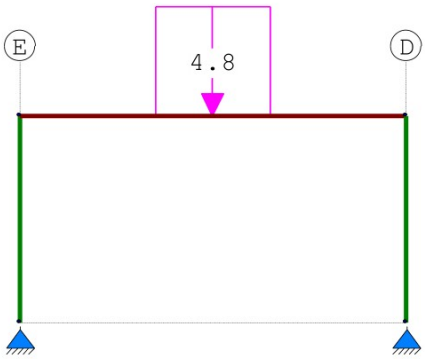
## STAAFBELASTINGEN

B.G:1 Permanente belasting

| Staaf | Type | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|
| 2 | 3:QZgeProj. | -1.00 | -1.00 | 0.000 | 0.000 | | | |
| 2 | 8:PZLokaal | -22.10 | | 2.400 | | | | |
| 2 | 8:PZLokaal | -22.10 | | 4.600 | | | | |

## BELASTINGEN

B.G:2 Ver. bel. pers. ed. (q_k)



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Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

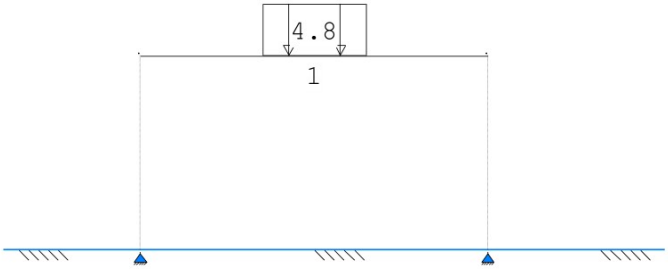
## STAAFBELASTINGEN

B.G:2 Ver. bel. pers. ed. (q_k)

| Staaf | Type | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|
| 2 | 3:QZgeProj. | -4.80 | -4.80 | 2.458 | 2.458 | 0.00 | 0.00 | 0.00 |

## SITUATIES BELAST/ONBELAST

B.G:2 Ver. bel. pers. ed. (q_k)



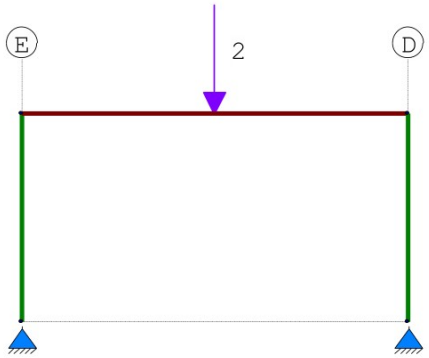

## SITUATIES BELAST/ONBELAST

Belastingtype: q_k

| Nr | Lastvelden belast | Lastvelden onbelast |
|---|---|---|
| 1 | 1 | |

## BELASTINGEN

B.G:3 Ver. bel. pers. ed. (Q_k)




## STAAFBELASTINGEN

B.G:3 Ver. bel. pers. ed. (Q_k)

| Staaf | Type | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|
| 2 | 10:PZGeproj. | -2.00 | | 3.500 | | 0.00 | 0.00 | 0.00 |

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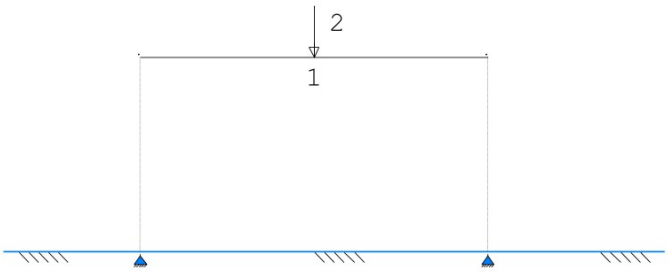
| Werknummer: | Bladnr.: 165 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## SITUATIES BELAST/ONBELAST

B.G:3 Ver. bel. pers. ed. (Q_k)



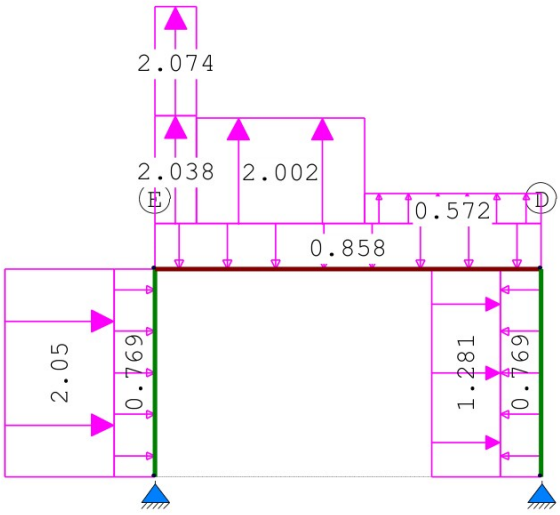

## SITUATIES BELAST/ONBELAST

Belastingtype: Q_k

| Nr | Lastvelden belast | Lastvelden onbelast |
|---|---|---|
| 1 | 1 | |

## BELASTINGEN

B.G:4 Wind van links onderdruk A




## STAAFBELASTINGEN

B.G:4 Wind van links onderdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.77 | -0.77 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -0.86 | -0.86 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw3 | 0.77 | 0.77 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw4 | -2.05 | -2.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw5 | 2.04 | 2.04 | 0.000 | 6.240 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw6 | 2.07 | 2.07 | 0.000 | 6.240 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 2.00 | 2.00 | 0.760 | 3.200 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.57 | 0.57 | 3.800 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | -1.28 | -1.28 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

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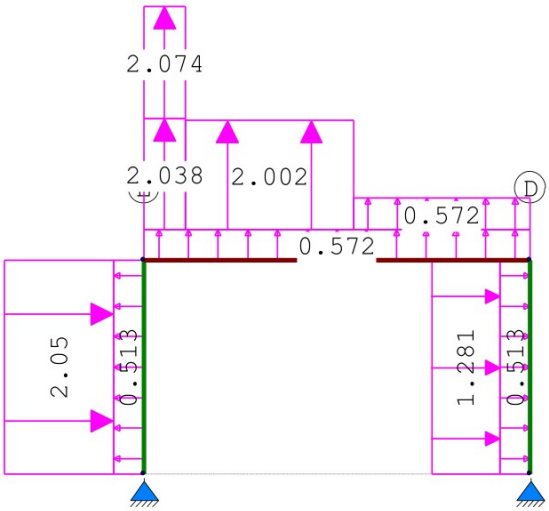
| Werknummer: | Bladnr.: 166 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## BELASTINGEN

B.G:5 Wind van links overdruk A




## STAAFBELASTINGEN

B.G:5 Wind van links overdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw10 | 0.51 | 0.51 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw11 | 0.57 | 0.57 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw12 | -0.51 | -0.51 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw4 | -2.05 | -2.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw5 | 2.04 | 2.04 | 0.000 | 6.240 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw6 | 2.07 | 2.07 | 0.000 | 6.240 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 2.00 | 2.00 | 0.760 | 3.200 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.57 | 0.57 | 3.800 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | -1.28 | -1.28 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

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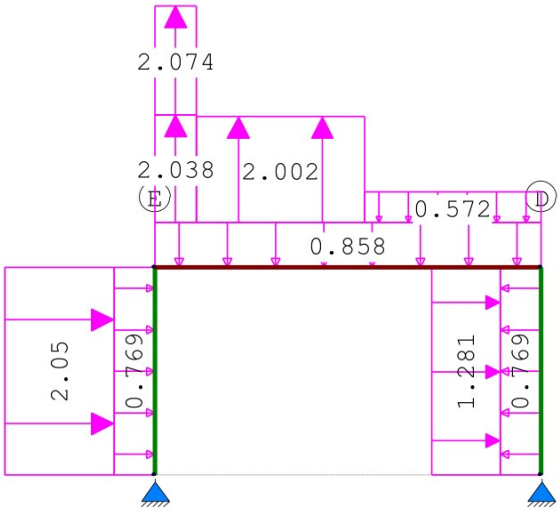
| Werknummer: | Bladnr.: 167 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## BELASTINGEN

B.G:6 Wind van links onderdruk B




## STAAFBELASTINGEN

B.G:6 Wind van links onderdruk B

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.77 | -0.77 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -0.86 | -0.86 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw3 | 0.77 | 0.77 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw4 | -2.05 | -2.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw5 | 2.04 | 2.04 | 0.000 | 6.240 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw6 | 2.07 | 2.07 | 0.000 | 6.240 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 2.00 | 2.00 | 0.760 | 3.200 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw13 | -0.57 | -0.57 | 3.800 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | -1.28 | -1.28 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

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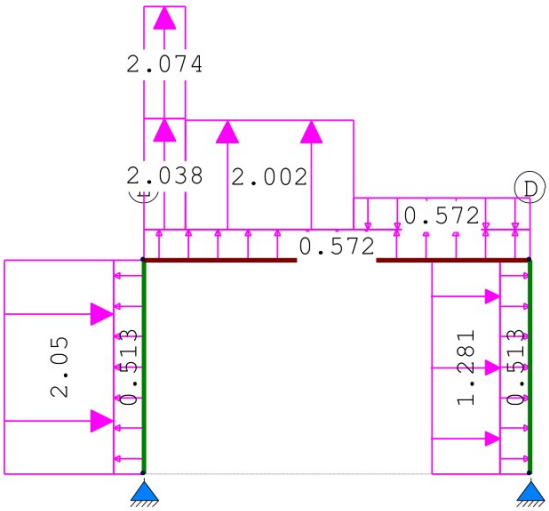
Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## BELASTINGEN

B.G:7 Wind van links overdruk B




## STAAFBELASTINGEN

B.G:7 Wind van links overdruk B

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw10 | 0.51 | 0.51 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw11 | 0.57 | 0.57 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw12 | -0.51 | -0.51 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw4 | -2.05 | -2.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw5 | 2.04 | 2.04 | 0.000 | 6.240 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw6 | 2.07 | 2.07 | 0.000 | 6.240 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 2.00 | 2.00 | 0.760 | 3.200 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw13 | -0.57 | -0.57 | 3.800 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw9 | -1.28 | -1.28 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

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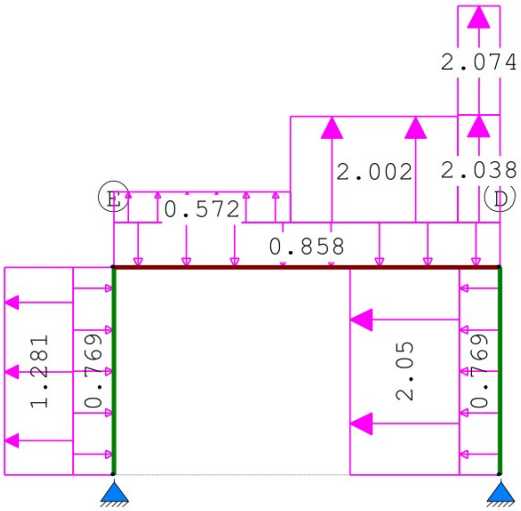
Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## BELASTINGEN

B.G:8 Wind van rechts onderdruk A




## STAAFBELASTINGEN

B.G:8 Wind van rechts onderdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.77 | -0.77 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -0.86 | -0.86 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw3 | 0.77 | 0.77 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw14 | 2.05 | 2.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw5 | 2.04 | 2.04 | 6.240 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw6 | 2.07 | 2.07 | 6.240 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 2.00 | 2.00 | 3.200 | 0.760 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.57 | 0.57 | 0.000 | 3.800 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw15 | 1.28 | 1.28 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

DE LANGE
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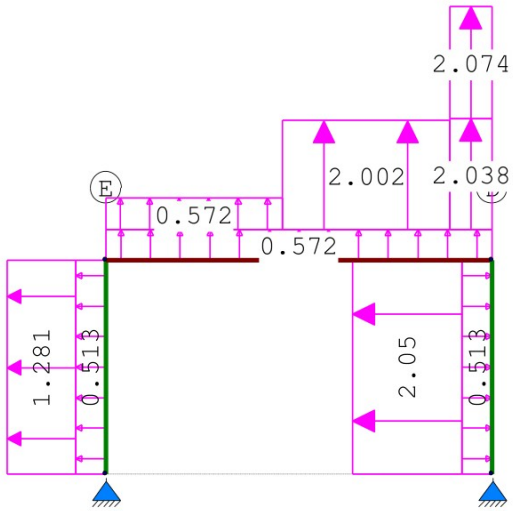
| Werknummer: | Bladnr.: 170 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## BELASTINGEN

B.G:9 Wind van rechts overdruk A




## STAAFBELASTINGEN

B.G:9 Wind van rechts overdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw10 | 0.51 | 0.51 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw11 | 0.57 | 0.57 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw12 | -0.51 | -0.51 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw14 | 2.05 | 2.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw5 | 2.04 | 2.04 | 6.240 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw6 | 2.07 | 2.07 | 6.240 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 2.00 | 2.00 | 3.200 | 0.760 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw8 | 0.57 | 0.57 | 0.000 | 3.800 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw15 | 1.28 | 1.28 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

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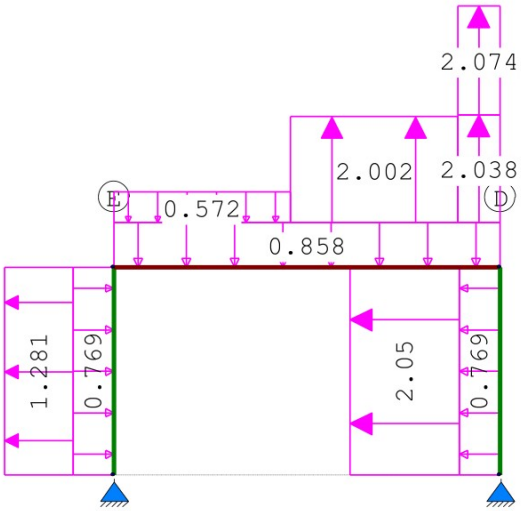
| Werknummer: | Bladnr.: 171 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## BELASTINGEN

B.G:10 Wind van rechts onderdruk B




## STAAFBELASTINGEN

B.G:10 Wind van rechts onderdruk B

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.77 | -0.77 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw2 | -0.86 | -0.86 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw3 | 0.77 | 0.77 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw14 | 2.05 | 2.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw5 | 2.04 | 2.04 | 6.240 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw6 | 2.07 | 2.07 | 6.240 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 2.00 | 2.00 | 3.200 | 0.760 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw13 | -0.57 | -0.57 | 0.000 | 3.800 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw15 | 1.28 | 1.28 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

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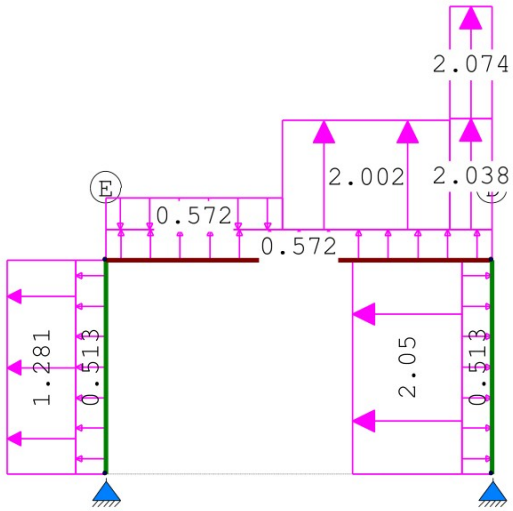
| Werknummer: | Bladnr.: 172 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## BELASTINGEN

B.G:11 Wind van rechts overdruk B



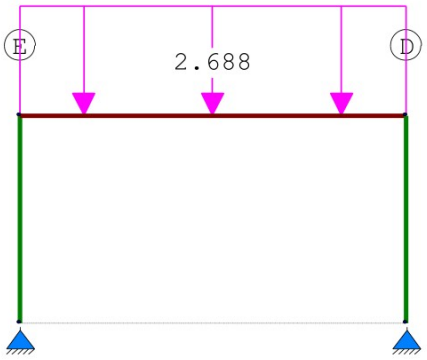

## STAAFBELASTINGEN

B.G:11 Wind van rechts overdruk B

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw10 | 0.51 | 0.51 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw11 | 0.57 | 0.57 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw12 | -0.51 | -0.51 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 3 | 1:QZLokaal | Qw14 | 2.05 | 2.05 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw5 | 2.04 | 2.04 | 6.240 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw6 | 2.07 | 2.07 | 6.240 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw7 | 2.00 | 2.00 | 3.200 | 0.760 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw13 | -0.57 | -0.57 | 0.000 | 3.800 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw15 | 1.28 | 1.28 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

## BELASTINGEN

B.G:12 Sneeuw A



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Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

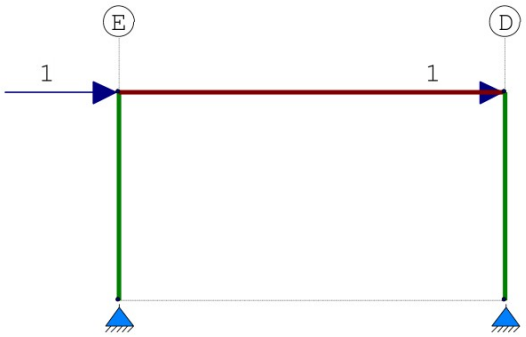
## STAAFBELASTINGEN

B.G:12 Sneeuw A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 3:QZgeProj. | Qs1 | -2.69 | -2.69 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |

## BELASTINGEN

B.G:13 Knik




## KNOOPBELASTINGEN

B.G:13 Knik

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

## REACTIES

| Kn. | B.G. | X | Z | M |
|---|---|---|---|---|
| 1 | 1 | 6.32 | 47.09 | |
| 1 | 2 | 1.31 | 5.00 | |
| 1 | 3 | 0.27 | 1.00 | |
| 1 | 4 | -8.76 | -7.91 | |
| 1 | 5 | -7.35 | -12.92 | |
| 1 | 6 | -8.45 | -7.07 | |
| 1 | 7 | -7.03 | -12.08 | |
| 1 | 8 | 3.90 | 2.88 | |
| 1 | 9 | 5.31 | -2.13 | |
| 1 | 10 | 4.21 | 5.70 | |
| 1 | 11 | 5.63 | 0.69 | |
| 1 | 12 | 1.69 | 9.41 | |
| 1 | 13 | -0.99 | -1.09 | |

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Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## REACTIES

| Kn. | B.G. | X | Z | M |
|---|---|---|---|---|
| 4 | 1 | -6.32 | 47.09 | |
| 4 | 2 | -1.31 | 5.00 | |
| 4 | 3 | -0.27 | 1.00 | |
| 4 | 4 | -3.90 | 2.88 | |
| 4 | 5 | -5.31 | -2.13 | |
| 4 | 6 | -4.21 | 5.70 | |
| 4 | 7 | -5.63 | 0.69 | |
| 4 | 8 | 8.76 | -7.91 | |
| 4 | 9 | 7.35 | -12.92 | |
| 4 | 10 | 8.45 | -7.07 | |
| 4 | 11 | 7.03 | -12.08 | |
| 4 | 12 | -1.69 | 9.41 | |
| 4 | 13 | -1.01 | 1.09 | |

## 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. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,2}$ |
| 15 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,3}$ |
| 16 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,4}$ |
| 17 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,5}$ |
| 18 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,6}$ |
| 19 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,7}$ |
| 20 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,8}$ |
| 21 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,9}$ |
| 22 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,10}$ |
| 23 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,11}$ |
| 24 | Fund. | 0.90 $G_{k,1}$ | + | 1.35 | $Q_{k,12}$ |
| 25 | Kar. | 1.00 $G_{k,1}$ | + | 1.00 | $Q_{k,2}$ |
| 26 | Kar. | 1.00 $G_{k,1}$ | + | 1.00 | $Q_{k,3}$ |
| 27 | Kar. | 1.00 $G_{k,1}$ | + | 1.00 | $Q_{k,4}$ |

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Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## BELASTINGCOMBINATIES

| BC | Type | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 28 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,5}$ |
| 29 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,6}$ |
| 30 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,7}$ |
| 31 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,8}$ |
| 32 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,9}$ |
| 33 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,10}$ |
| 34 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,11}$ |
| 35 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,12}$ |
| 36 | Quas. | 1.00 | $G_{k,1}$ | | | | |
| 37 | Freq. | 1.00 | $G_{k,1}$ | | | | |
| 38 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,4}$ |
| 39 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,5}$ |
| 40 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,6}$ |
| 41 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,7}$ |
| 42 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,8}$ |
| 43 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,9}$ |
| 44 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,10}$ |
| 45 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,11}$ |
| 46 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ | $Q_{k,12}$ |
| 47 | 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 | Alle staven de factor:0.90 |
| 15 | Alle staven de factor:0.90 |
| 16 | Alle staven de factor:0.90 |
| 17 | Alle staven de factor:0.90 |
| 18 | Alle staven de factor:0.90 |
| 19 | Alle staven de factor:0.90 |
| 20 | Alle staven de factor:0.90 |

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Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## GUNSTIGE WERKING PERMANENTE BELASTINGEN

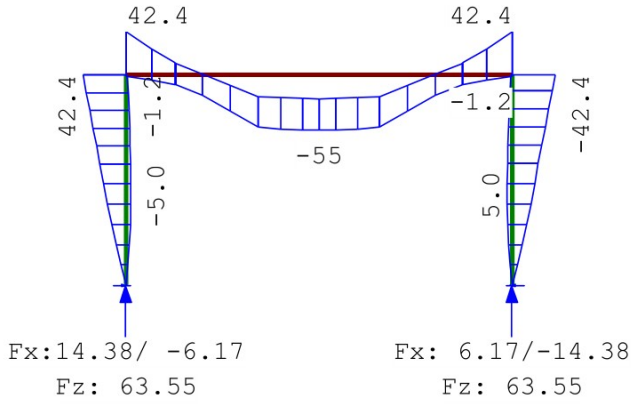
BC Staven met gunstige werking

21 Alle staven de factor:0.90
22 Alle staven de factor:0.90
23 Alle staven de factor:0.90
24 Alle staven de factor:0.90

## OMHULLENDE VAN DE FUNDAMENTELE COMBINATIES

### MOMENTEN

Fundamentele combinatie



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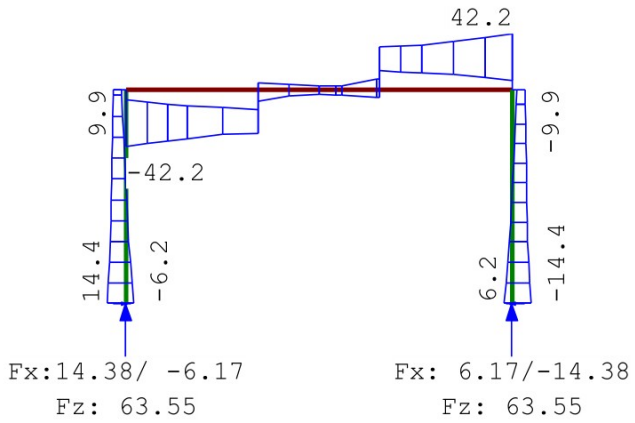
Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

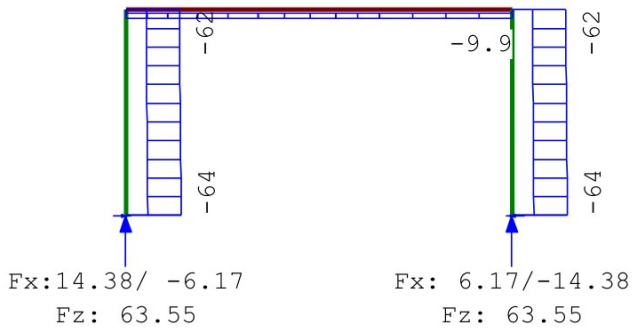
## DWARSKRACHTEN

Fundamentele combinatie




## NORMAALKRACHTEN

Fundamentele combinatie




## REACTIES

Fundamentele combinatie

| Kn. | X-min | X-max | Z-min | Z-max | M-min | M-max |
|---|---|---|---|---|---|---|
| 1 | -6.17 | 14.38 | 24.94 | 63.55 | | |
| 4 | -14.38 | 6.17 | 24.94 | 63.55 | | |

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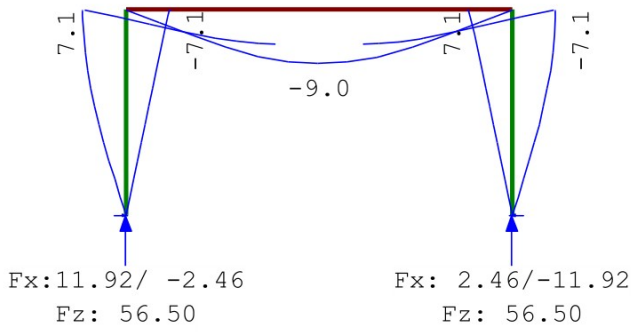
# OMHULLENDE VAN DE KARAKTERISTIEKE COMBINATIES

## VERPLAATSINGEN [mm] Karakteristieke combinatie




## STAALPROFIELEN - ALGEMENE GEGEVENS

| | | |
|---|---|---|
| Stabiliteit: | Classificatie gehele constructie: | Ongeschoord |
| | Belastinggeval m.b.t. bepaling kniklengte: | 13=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 |

## PROFIEL/MATERIAAL

| P/M nr. | Profielnaam | Vloeisp. [N/mm²] | Productie methode | Min. drsn. klasse |
|---|---|---|---|---|
| 1 | IPE330 | 235 | Gewalst | 1 |
| 2 | IPE330 | 235 | Gewalst | 1 |

Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

## KNIKSTABILITEIT

| Staaf | $l_{sys}$ [m] | Classif. y sterke as | $l_{knik;y}$ [m] | Extra aanp. y [kN] | Classif. z zwakke as | $l_{knik;z}$ [m] | Extra aanp. z [kN] |
|---|---|---|---|---|---|---|---|
| 1 | 3.800 | Ongeschoord | 10.622 | 0.0 | Geschoord | 3.800 | 0.0 |
| 2 | 7.000 | Geschoord | 7.000 | 0.0 | Geschoord | 7.000 | 0.0 |
| 3 | 3.800 | Ongeschoord | 10.572 | 0.0 | Geschoord | 3.800 | 0.0 |

Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## KIPSTABILITEIT

| Staaf | Plts. aangr. | | l gaffel [m] | Kipsteunafstanden [m] |
|---|---|---|---|---|
| 1 | 1.0*h | boven: | 3.80 | 3.800 |
| | | onder: | | 3.800 |
| 2 | 1.0*h | boven: | 7.00 | 5*1,4 |
| | | onder: | | 7.000 |
| 3 | 0.0*h | boven: | 3.80 | 3.800 |
| | | onder: | | 3.800 |

## TOETSING SPANNINGEN

| Staaf nr. | P/M | BC | Sit | Kl | Plaats | Norm | Artikel | Formule | Hoogste toetsing U.C. | [N/mm²] | Opm. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 11 | 1 | 1 | Staaf | EN3-1-1 | 6.3.3 | (6.62) | 0.298 | 70 | 47 |
| 2 | 1 | 13 | 1 | 1 | My-max | EN3-1-1 | 6.2.9.1 | (6.45+6.31y) | 0.319 | 75 | 46 |
| 3 | 2 | 7 | 1 | 1 | Staaf | EN3-1-1 | 6.3.3 | (6.62) | 0.298 | 70 | 47 |

Opmerkingen:
[ 46] T.b.v. kip is een equivalente Q-last berekend.
[ 47] Bij verlopende normaalkracht wordt de grootste drukkracht genomen.

## TOETSING DOORBUIGING

| Staaf | Soort | Mtg | Lengte [m] | Overst I | Overst J | Zeeg [mm] | $u_{tot}$ [mm] | BC | Sit | | u [mm] | Toelaatbaar [mm] | Toelaatbaar *l |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | Dak b | db | 7.00 | N | N | 5.0 | -9.7 | 35 | 1 | Eind | -4.7 | -28.0 | 0.004 |
| | | db | | | | | | 35 | 1 | Bijk | -2.0 | -21.0 | 0.003 |

## TOETSING HORIZONTALE VERPLAATSING

| Staaf | BC | Sit | Lengte [m] | $u_{eind}$ [mm] | Toelaatbaar [mm] | Maatgevend [h/] | |
|---|---|---|---|---|---|---|---|
| 1 | 27 | 1 | 3.800 | -7.8 | 12.7 | 300 | scheefstand |
| 3 | 31 | 1 | 3.800 | 7.8 | 12.7 | 300 | scheefstand |

## TOETSING HOR. VERPLAATSING GLOBAAL

Er is een maximale horizontale verplaatsing van 0.0078 [m] gevonden
bij knoop 2 en combinatie 27; belastingsituatie 1 (combinatietype 2).
Bij een hoogte van 3.800 [m] levert dit h / 486 (toel.: h / 300).

**verd**

## VERBINDINGEN - BASISGEGEVENS — Voetpl:1

| | |
|---|---|
| Verbindingstype | Voetplaat |
| Knopen | 1,4 |
| Rekenwaarde vloeispanning f y;d platen | 235 |
| Hoek basis staaf AB t.o.v. globale as (linksom positief) | 0 |
| Classificatie constructie | Ongeschoord |
| Rekenmodel gebruikt bij de mechanicaresultaten | 1e orde elastisch |
| Statisch systeem | Statisch onbepaald |
| Verbinding t.p.v. plastisch scharnier | Nee |
| Alternatieve methode T-stuk volgens EN 1993-1-8 tabel 6.2 | Ja |
| Is poer gewapend? | Ja |

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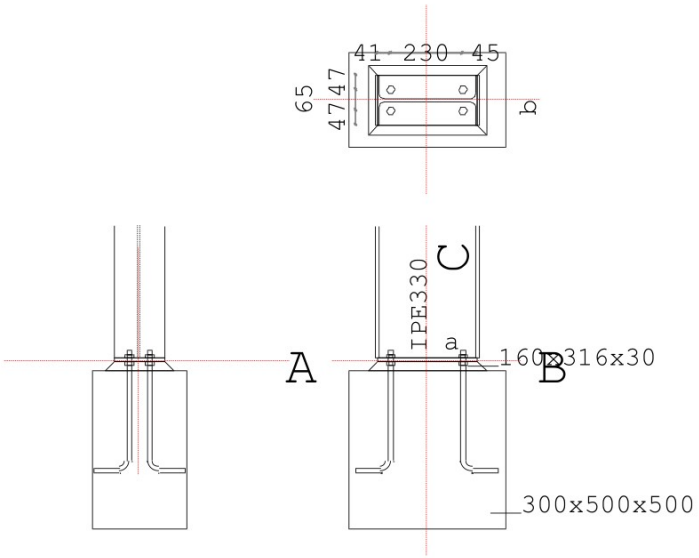
| Werknummer: | Bladnr.: 180 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: S021 portaal uitbouw




## LEGENDA

| | Onderdeel | Afmetingen | Aantal | Lassen (d=dubb. hoeklas) |
|---|---|---|---|---|
| a | Voetplaat | 160x316-12 | 1 | aw=4d af=6d |
| b | Anker | M16 4.6 | 4 | Lb1=316 r=32.0 Lb2=80 Lb,tot=469 |

## PROFIELEN

| | Naam | Lengte | Prod.meth. | Exc | Hoek | $f_{y;d}$ |
|---|---|---|---|---|---|---|
| Staaf C | IPE330 | 3800 | Gewalst | 0 | 0 | 235 |

## PROFIELGEGEVENS [mm]

**Gewalst Klasse 2 IPE330**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| h : | 330.0 | $i_y$ : | 137.1 | A : | 6260.0 | $W_{ey}$ : | 713.0E3 | $I_y$ : | 11770.0E4 |
| b : | 160.0 | $i_z$ : | 35.5 | | | $W_{ez}$ : | 98.5E3 | $I_z$ : | 788.0E4 |
| $t_w$ : | 7.5 | r : | 18.0 | | | $W_{py}$ : | 804.0E3 | $I_t$ : | 28.1E4 |
| $t_f$ : | 11.5 | | | | | $W_{pz}$ : | 153.6E3 | $I_w$ : | 199097.3E6 |

## PLATEN

| | Plaats | h | b | t | Exc | $a_w$ | $a_f$ | $a_e$ | Hoek | Las | $f_{y;d}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Voetplaat | Staaf C | 316 | 160 | 12.0 | 0 | ΔΔ4 | ΔΔ6 | | | | 235 |

Δ = Enkele stompe of hoeklas of dubbele hoeklas met slechts 1 las effectief
ΔΔ = Dubbele hoeklas

## ANKERS

| | d | kwal | hoh | milieu | lengte | v (vanaf zijde C) |
|---|---|---|---|---|---|---|
| Staaf C | M16 | 4.6 | 65 | Niet-corr. | 316 | 45;275 |

## ANKERGEGEVENS

| d | $d_0$ | $d_m$ | $d_{kop}$ | $t_{kop}$ | $d_{moer}$ | $t_{moer}$ | A | $A_s$ | $\gamma_M$ | $f_{ybd}$ | $f_{tbd}$ | Draad |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.0 | 20.0 | 33.3 | 24.0 | 10.0 | 24.0 | 13.0 | 201.1 | 156.7 | 1.25 | 240 | 400 | Gesneden |

| d | Type | $L_{b1}$ | r | $L_{b2}$ | $L_{b,aanw}$ | $L_{b,tot}$ | $A_{st}$ | K | $p_{ldr}$ |
|---|---|---|---|---|---|---|---|---|---|
| M16 | Haak | 316 | 32 | 80 | 284 | 339 | 0 | 0.00 | 0.0 |

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| Werknummer: | Bladnr.: 181 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## BETON EN VOEG

| | Lengte | Breedte | Dikte | Helling | Kwaliteit |
|---|---|---|---|---|---|
| Beton | 500 | 300 | 500.0 | 90.0 | C20/25 |
| Voeg | 316 | 160 | 30.0 | 45.0 | C20/25 |

## KRACHTEN

Kn:1 BC:13 Sit:1

| | Normaalkr. | Dwarskr. | Moment | MSteun | DSteun |
|---|---|---|---|---|---|
| Staaf C | 63.55 | -10.02 | -0.00 | 0.00 | 0.00 |

## RESULTATEN DRUKZONE

Kn:1 BC:13 Sit:1

| | | | | |
|---|---|---|---|---|
| Vergrotingsfactor | $k_c$ | : | 1.72 | |
| Rekenwaarde druksterkte | $f'_{c,Rd}$ | : | 13.33 | |
| Rekenwaarde druksterkte | $f_{jd}$ | : | 15.31 | |
| Vorm van de indrukkingsprent | | : | I-vormig | 30 * 160 |
| | | : | | 254 * 59 |
| | | : | | 30 * 160 |
| Max. drukoppervlakte | | : | | 24941 |
| Spreidingsmaat // flenzen | $l_s$ | : | 26.01 | |
| Spreidingsmaat // lijf | $l_{s\ lijf}$ | : | 26.01 | |
| Rek meest gedrukte zijde | eps $_c$ | : | 0.00017 | |
| Spanning meest gedrukte zijde | sigma $_c$ | : | 2.55 | |
| Rek minst gedrukte zijde | eps $_t$ | : | 0.00017 | N.B. Er is niet gerekend op |
| Spanning minst gedrukte zijde | sigma $_t$ | : | 2.55 | druk in de ankers. |
| Momentcapaciteit | | : | 25.51 | |
| Moment tbv. lassen | | : | 151.15 | gebaseerd op 0.8*MplRd |
| Max. opneembare dwarskracht | | : | 483.84 | $F_{1.vb.Rd}$ 3.6.1 (Tabel 3.4) |
| | | : | 73.81 | $F_{2.vb.Rd}$ 6.2.2(7) (6.2) |
| | | : | 12.71 | $F_{f.Rd}$ 6.2.2(6) (6.1) |
| | | : | 86.52 | 6.2.2(5) |
| | | : | | Comb. afsch. en wrijving |
| Trekcapaciteit ankerrij | | : | 76.72 | |

## RESULTATEN VERANKERING

$l_{b,tot} = l_{b,aanw} + t_{moer} + t_{pl} + t_{voeg} = 284 + 13 + 12 + 30 = 339$ mm (druk)

$\eta_1 = 1.00$ $f_{aanh.} = 2.0$ (aanhechtingsfactor)

$\eta_2 = 1.00$ $f_{vergr.} = 1.7$ (vergrotingsfactor)

$\sigma_{sd} = 0.0$ N/mm$^2$

$l_{bd} = f_{aanh.} * \alpha_1 * \alpha_2 * \alpha_3 * \alpha_4 * l_{b,rqd}$
$= 2.0 * 1.00 * 1.000 * 1.0 * 1.0 * 0 = 0$ mm

$l_{b,min} = 160$ mm

## TOETSING VOETPLAAT-VERBINDING

Kn:1 BC:13 Sit:1

| Artikel | | | | | | Toetsing |
|---|---|---|---|---|---|---|
| 6.2.6.5 | $m_{Ed}$ / $m_{pl,Rd}$ | = | 862 / | 8460 | = | 0.10 |
| 6.2.6.5 | $\sigma_{Ed}$ / $f_{jd}$ | = | 2.55 / | 15.31 | = | 0.17 |
| EN2 8.4.4 | $L_{bd}$ / $L_{b,aanw}$ | = | 160.0 / | 284.0 | = | 0.56 |

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Onderdeel....: S021 portaal uitbouw

## TOETSING PROFIELEN EN AFSCHUIVING

Kn:1 BC:13 Sit:1

| Plaats | Profiel | | Artikel | Formule | Toetsing |
|---|---|---|---|---|---|
| Staaf C | IPE330 | EN3-1-1 | 6.2.4 | (6.9) | 0.04 |
| | | EN3-1-1 | 6.2.6 | (6.17) | 0.02 |
| | | EN3-1-1 | 6.2.1(6) | N+D | 0.07 |
| | | EN3-1-8 | 6.2.2(7) | (6.2) | 0.12 |

## MOMENTCLASSIFICATIE EN3-1-8 art.5.2.3

Kn:1 BC:13 Sit:1

| Plaats | $M_{j,Rd}$ | $M_{j,Rd,staaf}$ | Classificatie |
|---|---|---|---|
| Staaf C | 25.51 | 188.94 | Scharnierend |

## KRACHTEN

Kn:4 BC:13 Sit:1

| | Normaalkr. | Dwarskr. | Moment | MSteun | DSteun |
|---|---|---|---|---|---|
| Staaf C | 63.55 | 10.02 | -0.00 | 0.00 | 0.00 |

## RESULTATEN DRUKZONE

Kn:4 BC:13 Sit:1

| | | | | |
|---|---|---|---|---|
| Vergrotingsfactor | $k_c$ | : | 1.72 | |
| Rekenwaarde druksterkte | $f'_{c,Rd}$ | : | 13.33 | |
| Rekenwaarde druksterkte | $f_{jd}$ | : | 15.31 | |
| Vorm van de indrukkingsprent | | : | I-vormig | 30 * 160 |
| | | : | | 254 * 59 |
| | | : | | 30 * 160 |
| Max. drukoppervlakte | | : | | 24941 |
| Spreidingsmaat // flenzen | $l_s$ | : | 26.01 | |
| Spreidingsmaat // lijf | $l_{s\ lijf}$ | : | 26.01 | |
| Rek meest gedrukte zijde | eps $_c$ | : | 0.00017 | |
| Spanning meest gedrukte zijde | sigma $_c$ | : | 2.55 | |
| Rek minst gedrukte zijde | eps $_t$ | : | 0.00017 | N.B. Er is niet gerekend op |
| Spanning minst gedrukte zijde | sigma $_t$ | : | 2.55 | druk in de ankers. |
| Momentcapaciteit | | : | 25.51 | |
| Moment tbv. lassen | | : | 151.15 | gebaseerd op 0.8*MplRd |
| Max. opneembare dwarskracht | | : | 465.41 | $F_{1.vb.Rd}$ 3.6.1 (Tabel 3.4) |
| | | : | 73.81 | $F_{2.vb.Rd}$ 6.2.2(7) (6.2) |
| | | : | 12.71 | $F_{f.Rd}$ 6.2.2(6) (6.1) |
| | | : | 86.52 | 6.2.2(5) |
| | | : | | Comb. afsch. en wrijving |
| Trekcapaciteit ankerrij | | : | 76.72 | |

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Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## RESULTATEN VERANKERING

$l_{b,tot} = l_{b,aanw} + t_{moer} + t_{pl} + t_{voeg} = 284 + 13 + 12 + 30 = 339$ mm (druk)
$\eta_1 = 1.00$ $f_{aanh.} = 2.0$ (aanhechtingsfactor)
$\eta_2 = 1.00$ $f_{vergr.} = 1.7$ (vergrotingsfactor)
$\sigma_{sd} = 0.0$ N/mm²
$l_{bd} = f_{aanh.} * \alpha_1 * \alpha_2 * \alpha_3 * \alpha_4 * l_{b,rqd}$
$= 2.0 * 1.00 * 1.000 * 1.0 * 1.0 * 0 = 0$ mm
$l_{b,min} = 160$ mm

## TOETSING VOETPLAAT-VERBINDING

Kn:4 BC:13 Sit:1

| Artikel | | | | | Toetsing |
|---|---|---|---|---|---|
| 6.2.6.5 | $m_{Ed}$ / $m_{pl,Rd}$ | = | 862 / | 8460 | = 0.10 |
| 6.2.6.5 | $\sigma_{Ed}$ / $f_{jd}$ | = | 2.55 / | 15.31 | = 0.17 |
| EN2 8.4.4 | $L_{bd}$ / $L_{b,aanw}$ | = | 160.0 / | 284.0 | = 0.56 |

## TOETSING PROFIELEN EN AFSCHUIVING

Kn:4 BC:13 Sit:1

| Plaats | Profiel | | Artikel | Formule | Toetsing |
|---|---|---|---|---|---|
| Staaf C | IPE330 | EN3-1-1 | 6.2.4 | (6.9) | 0.04 |
| | | EN3-1-1 | 6.2.6 | (6.17) | 0.02 |
| | | EN3-1-1 | 6.2.1(6) | N+D | 0.07 |
| | | EN3-1-8 | 6.2.2(7) | (6.2) | 0.12 |

## MOMENTCLASSIFICATIE EN3-1-8 art.5.2.3

Kn:4 BC:13 Sit:1

| Plaats | $M_{j,Rd}$ | $M_{j,Rd,staaf}$ | Classificatie |
|---|---|---|---|
| Staaf C | 25.51 | 188.94 | Scharnierend |

**voetplaat**

## VERBINDINGEN - BASISGEGEVENS Knie:1

| | |
|---|---|
| Verbindingstype | Knie Gebout |
| Knopen | 2,3 |
| Rekenwaarde vloeispanning f y;d platen | 235 |
| Hoek basis staaf AB t.o.v. globale as (linksom positief) | 270 |
| Classificatie constructie | Ongeschoord |
| Classificatie lijf staaf AB | Geschoord |
| Afschuiving lijf staaf AB actief? | Ja |
| Rekenmodel gebruikt bij de mechanicaresultaten | 1e orde elastisch |
| Statisch systeem | Statisch onbepaald |
| Verbinding t.p.v. plastisch scharnier | Ja |
| Alternatieve methode T-stuk volgens EN 1993-1-8 tabel 6.2 | Ja |

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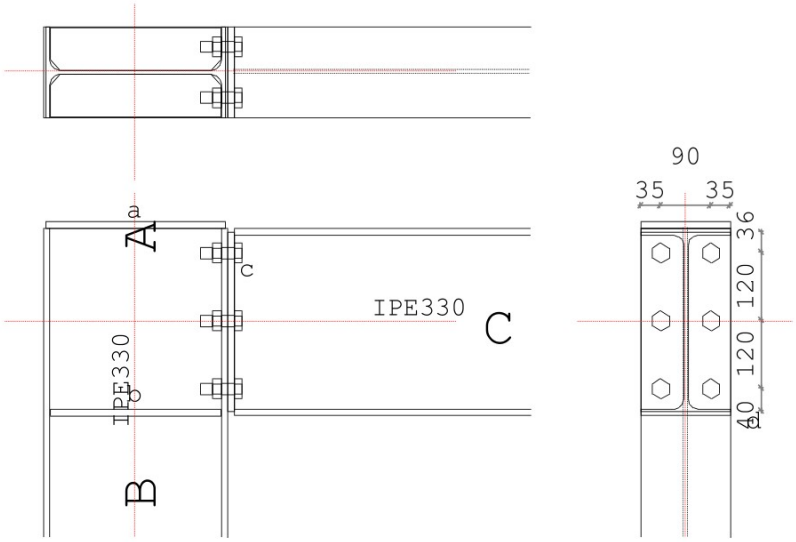
| Werknummer: | Bladnr.: 184 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: S021 portaal uitbouw




## LEGENDA

| | Onderdeel | Afmetingen | Aantal | Lassen (d=dubb. hoeklas) |
|---|---|---|---|---|
| a | Afdekplaat | 160x320-12 | 1 | aw=4d af=11 |
| b | Schot AB | 75x305-12 | 1 | aw=6d af=6d |
| c | Kopplaat | 160x316-12 | 1 | aw=4d af=6d |
| d | Bout | M20 8.8 | 6 | |

## PROFIELEN

| | Naam | Lengte | Prod.meth. | Exc | Hoek | $f_{y;d}$ |
|---|---|---|---|---|---|---|
| Staaf B | IPE330 | 3800 | Gewalst | 0 | 270 | 235 |
| Staaf C | IPE330 | 7000 | Gewalst | 0 | 0 | 235 |
| Staaf A | | 165 | | | | |

## PROFIELGEGEVENS [mm]

**Gewalst Klasse 1 IPE330**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| h : | 330.0 | $i_y$ : | 137.1 | A : | 6260.0 | $W_{ey}$ : | 713.0E3 | $I_y$ : | 11770.0E4 |
| b : | 160.0 | $i_z$ : | 35.5 | | | $W_{ez}$ : | 98.5E3 | $I_z$ : | 788.0E4 |
| $t_w$ : | 7.5 | r : | 18.0 | | | $W_{py}$ : | 804.0E3 | $I_t$ : | 28.1E4 |
| $t_f$ : | 11.5 | | | | | $W_{pz}$ : | 153.6E3 | $I_w$ : | 199097.3E6 |

## PLATEN

| | Plaats | h | b | t | Exc | $a_w$ | $a_f$ | $a_e$ | Hoek | Las | $f_{y;d}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Kopplaat | Staaf C | 316 | 160 | 12.0 | 0 | ΔΔ4 | ΔΔ6 | | | | 235 |
| Schot | Staaf B | 305 | 75 | 12.0 | -160 | ΔΔ6 | ΔΔ6 | | 0 | | 235 |
| Afdekplaat | | 320 | 160 | 12.0 | 0 | ΔΔ4 | Δ11 | | 0 | | 235 |

Δ = Enkele stompe of hoeklas of dubbele hoeklas met slechts 1 las effectief
ΔΔ = Dubbele hoeklas

## BOUTEN

| | d | kwal | hoh | milieu | lengte | v (vanaf zijde B) |
|---|---|---|---|---|---|---|
| Staaf C | M20 | 8.8 | 90 | Niet-corr. | 38 | 40;160;280 |

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Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## BOUTGEGEVENS

| d | $d_0$ | $d_m$ | $d_{kop}$ | $t_{kop}$ | $d_{moer}$ | $t_{moer}$ | A | $A_s$ | $\gamma_M$ | $f_{ybd}$ | $f_{tbd}$ | Draad |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20.0 | 22.0 | 41.6 | 30.0 | 13.0 | 30.0 | 16.0 | 314.2 | 244.8 | 1.25 | 640 | 800 | Gerold |

## KRACHTEN

Kn:2 BC:11 Sit:1

| | Normaalkr. | Dwarskr. | Moment | MSteun | DSteun |
|---|---|---|---|---|---|
| Staaf B | 56.53 | -9.86 | -42.45 | 4.24 | -0.99 |
| Staaf C | 9.86 | 37.20 | 42.45 | 4.24 | 3.72 |

## BEZWIJKKRACHTEN

Kn:2 BC:11 Sit:1

| Onderdeel | $F_{Rd}$ | Formule | $b_{eff}$ | Staaf C |
|---|---|---|---|---|
| Afsch. lijf staaf AB | 376.13 | (6.7) | Avc= 3080 | omega=0.90 beta=1.00 |
| Druk lijf staaf AB | 592.87 | (6.9) | 172.5 | Drukpunt 0.00 |
| Plooi lijf staaf AB | 592.87 | | 172.5 | kwc=1.00 l_rel=0.90 |
| Drukzone kopplaat staaf C/D | 583.36 | (6.21) | | |
| Trek bout | 141.00 | | | |
| Trek boutrij | 282.01 | | | |

Let op: De normaalkracht is verwerkt in bovengenoemde bezwijkkrachten.
Dwarskrachtcapaciteiten:

| | | |
|---|---|---|
| Stuik flens staaf AB | 993.60 | (6.7) |
| Stuik kopplaat | 879.71 | (6.7) |
| Afsch.cap. bouten na red. trek | 384.91 | (6.7) |

## BOUTRIJKRACHTEN

Herverdeling: Nee
EN3-1-8 art. 6.2.7.2 Reductie : Ja
Kn:2 BC:11 Sit:1
Staaf C

| Rij | $F_{t,Rd,herv}$ | $F_{t,Rd}$ | Arm | M | Criterium |
|---|---|---|---|---|---|
| 3 | 190.21 | 190.21 | 280.0 | 53.26 | Kopplaat: Plaat+Bout |
| 2 | 165.92 | 165.92 | 160.0 | 26.55 | Kopplaat: Plaat+Bout |
| 1 | 123.72 | 20.00 | 40.0 | 0.80 | Trek lijf staaf AB |
| | Som F= | 376.13 | $M_{j,Rd}$ = | **80.61** | Afsch. lijf staaf AB |
| | Moment tbv. lassen = | | | 188.94 | gebaseerd op 1.0*MplRd |
| | | | $V_{j,Rd}$ = | **384.91** | Afsch.cap. bouten na red. trek |

## TOETSING VERBINDING

Kn:2 BC:11 Sit:1

| Artikel | $M_{j,Ed}$ | $M_{j,Rd}$ | z | $V_{wp,Ed}$ | $V_{wp,Rd}$ | Toetsing |
|---|---|---|---|---|---|---|
| 6.2.7.1 | 46.69 | 80.61 | | | | 0.58 |
| 6.2.6.1 | | | 214 | -10.84 | 376.13 | 0.03 |

Let op: Normaalkrachten in staven C & D zijn verwerkt in de bezwijk-
en/of de boutrijkrachten. De conservatieve toetsingsformule van
EN 1993-1-8 art. 6.2.7.1 (3) is niet gebruikt.

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Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## TOETSING PROFIELEN EN AFSCHUIVING

Kn:2 BC:11 Sit:1

| Plaats | Profiel | | Artikel | Formule | Toetsing |
|---|---|---|---|---|---|
| Staaf B | IPE330 | EN3-1-1 | 6.2.10 | (6.45+6.31y) | 0.25 |
| | | EN3-1-1 | 6.2.8 | (6.30) | 0.25 |
| | | EN3-1-1 | 6.2.5 | (6.12y) | 0.25 |
| | | EN3-1-1 | 6.2.6 | (6.17) | 0.03 |
| | | EN3-1-1 | 6.2.4 | (6.9) | 0.04 |
| | | EN3-1-1 | 6.2.1(6) | N+D | 0.06 |
| Staaf C | IPE330 | EN3-1-1 | 6.2.10 | (6.45+6.31y) | 0.25 |
| | | EN3-1-1 | 6.2.8 | (6.30) | 0.25 |
| | | EN3-1-1 | 6.2.5 | (6.12y) | 0.25 |
| | | EN3-1-1 | 6.2.6 | (6.17) | 0.10 |
| | | EN3-1-1 | 6.2.1(6) | N+D | 0.10 |
| | | EN3-1-8 | T.3.4 | | 0.11 |

## MOMENTCLASSIFICATIE EN3-1-8 art.5.2.3

Kn:2 BC:11 Sit:1

| Plaats | $M_{j,Rd}$ | $M_{j,Rd,staaf}$ | Classificatie |
|---|---|---|---|
| Staaf C | 80.61 | 188.94 | Niet volledig sterk |

## KRACHTEN

Kn:3 BC:7 Sit:1

| | Normaalkr. | Dwarskr. | Moment | MSteun | DSteun |
|---|---|---|---|---|---|
| Staaf B | 56.53 | 9.86 | 42.45 | 4.24 | 0.99 |
| Staaf D | 9.86 | -37.20 | -42.45 | 4.24 | -3.72 |

## BEZWIJKKRACHTEN

Kn:3 BC:7 Sit:1

| Onderdeel | $F_{Rd}$ | Formule | $b_{eff}$ | Staaf D |
|---|---|---|---|---|
| Afsch. lijf staaf AB | 376.13 | (6.7) | Avc= 3080 omega=0.90 beta=1.00 | |
| Druk lijf staaf AB | 592.87 | (6.9) | 172.5 Drukpunt | 0.00 |
| Plooi lijf staaf AB | 592.87 | | 172.5 kwc=1.00 l_rel=0.90 | |
| Drukzone kopplaat staaf C/D | 583.36 | (6.21) | | |
| Trek bout | 141.00 | | | |
| Trek boutrij | 282.01 | | | |

Let op: De normaalkracht is verwerkt in bovengenoemde bezwijkkrachten.
Dwarskrachtcapaciteiten:

| | | |
|---|---|---|
| Stuik flens staaf AB | 993.60 | (6.7) |
| Stuik kopplaat | 879.71 | (6.7) |
| Afsch.cap. bouten na red. trek | 384.91 | (6.7) |

## BOUTRIJKRACHTEN

Herverdeling: Nee
EN3-1-8 art. 6.2.7.2 Reductie : Ja

Kn:3 BC:7 Sit:1
Staaf D

| Rij | $F_{t,Rd,herv}$ | $F_{t,Rd}$ | Arm | M | Criterium |
|---|---|---|---|---|---|
| 3 | 190.21 | 190.21 | 280.0 | 53.26 | Kopplaat: Plaat+Bout |
| 2 | 165.92 | 165.92 | 160.0 | 26.55 | Kopplaat: Plaat+Bout |
| 1 | 123.72 | 20.00 | 40.0 | 0.80 | Trek lijf staaf AB |
| | Som F= | 376.13 | $M_{j,Rd}$ = | **80.61** | Afsch. lijf staaf AB |
| | Moment tbv. lassen = | | | 188.94 | gebaseerd op 1.0*MplRd |
| | | | $V_{j,Rd}$ = | **384.91** | Afsch.cap. bouten na red. trek |

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Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## TOETSING VERBINDING

Kn:3 BC:7 Sit:1

| Artikel | $M_{j,Ed}$ | $M_{j,Rd}$ | z | $V_{wp,Ed}$ | $V_{wp,Rd}$ | Toetsing |
|---|---|---|---|---|---|---|
| 6.2.7.1 | -46.69 | 80.61 | | | | 0.58 |
| 6.2.6.1 | | | 214 | 10.84 | 376.13 | 0.03 |

Let op: Normaalkrachten in staven C & D zijn verwerkt in de bezwijk- en/of de boutrijkrachten. De conservatieve toetsingsformule van EN 1993-1-8 art. 6.2.7.1 (3) is niet gebruikt.

## TOETSING PROFIELEN EN AFSCHUIVING

Kn:3 BC:7 Sit:1

| Plaats | Profiel | | Artikel | Formule | Toetsing |
|---|---|---|---|---|---|
| Staaf B | IPE330 | EN3-1-1 | 6.2.10 | (6.45+6.31y) | 0.25 |
| | | EN3-1-1 | 6.2.8 | (6.30) | 0.25 |
| | | EN3-1-1 | 6.2.5 | (6.12y) | 0.25 |
| | | EN3-1-1 | 6.2.6 | (6.17) | 0.03 |
| | | EN3-1-1 | 6.2.4 | (6.9) | 0.04 |
| | | EN3-1-1 | 6.2.1(6) | N+D | 0.06 |
| Staaf D | IPE330 | EN3-1-1 | 6.2.10 | (6.45+6.31y) | 0.25 |
| | | EN3-1-1 | 6.2.8 | (6.30) | 0.25 |
| | | EN3-1-1 | 6.2.5 | (6.12y) | 0.25 |
| | | EN3-1-1 | 6.2.6 | (6.17) | 0.10 |
| | | EN3-1-1 | 6.2.1(6) | N+D | 0.10 |
| | | EN3-1-8 | T.3.4 | | 0.11 |

## MOMENTCLASSIFICATIE EN3-1-8 art.5.2.3

Kn:3 BC:7 Sit:1

| Plaats | $M_{j,Rd}$ | $M_{j,Rd,staaf}$ | Classificatie |
|---|---|---|---|
| Staaf D | 80.61 | 188.94 | Niet volledig sterk |

DE LANGE
ADVIESBUREAU

Watergoorweg 102B
3861 MA Nijkerk
(033) 245 03 20
info@aadl.nl

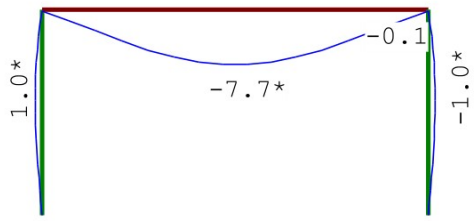


Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## VERVORMINGEN w1

Blijvende combinatie

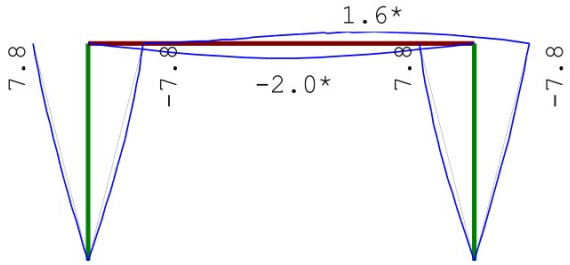
* - relatief aan de rechte lijn die de uiteinden verbindt




## VERVORMINGEN Wbij

Karakteristieke combinatie

* - relatief aan de rechte lijn die de uiteinden verbindt



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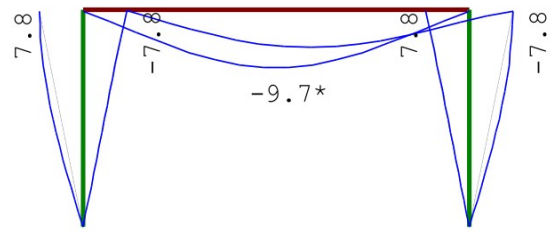
Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

## VERVORMINGEN Wtot

Karakteristieke combinatie

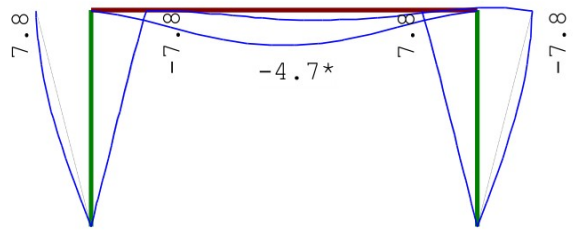
* - relatief aan de rechte lijn die de uiteinden verbindt




## VERVORMINGEN Wmax

Karakteristieke combinatie

* - relatief aan de rechte lijn die de uiteinden verbindt




## DOORBUIGINGEN

Karakteristieke combinatie

| Nr. | staven | Zijde | positie [m] | $l_{rep}$ [mm] | $w_1$ [mm] | $w_2$ [mm] | $w_{bij}$ [mm] | $w_{bij}$ [lrep/] | $w_{tot}$ [mm] | $w_c$ [mm] | $w_{max}$ [mm] | $w_{max}$ [lrep/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 2 | Neg. | 3.720 | 7000 | -7.7 | | -2.0 | 3543 | -9.7 | 5.0 | -4.7 | 1494 |
| 2 | 2 | Pos. | 4.160 | 7000 | -7.4 | | 1.6 | 4456 | -5.8 | 4.8 | -1.0 | 7261 |

## HORIZONTALE VERPLAATSING

Karakteristieke combinatie

| Nr. | staven | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | $u_{tot}$ [mm] | [h/] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | Neg. | 3800 | -0.0 | | -7.8 | -7.8 | 486 |
| 1 | 1 | Pos. | 3800 | -0.0 | | 7.8 | 7.8 | 489 |
| 3 | 3 | Neg. | 3800 | 0.0 | | -7.8 | -7.8 | 489 |
| 3 | 3 | Pos. | 3800 | 0.0 | | 7.8 | 7.8 | 486 |

## TOTALE HORIZONTALE VERPLAATSING

Karakteristieke combinatie

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

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Project.....: 24-533
Onderdeel....: S021 portaal uitbouw

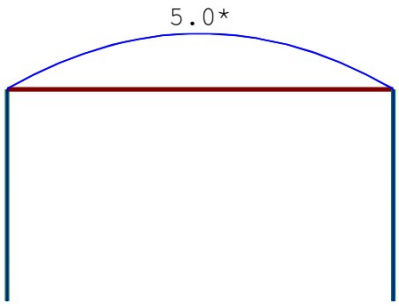
## TOTALE HORIZONTALE VERPLAATSING

Karakteristieke combinatie

| knoop | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | \|-- $u_{tot}$ --\| [mm] | [h/] |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | Neg. | 3800 | -0.0 | | -7.8 | -7.8 | 486 |
| 2 | Pos. | 3800 | 0.0 | | 7.8 | 7.8 | 486 |

## ZEEG wc

* - relatief aan de rechte lijn die de uiteinden verbindt



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| Werknummer: | Bladnr.: 191 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

## SL1.4

## Technosoft Liggers release 6.81 31 jan 2025

Project.....: 24-533
Onderdeel....: liggers
Constructeur.: AADL - ir. [redacted]
Dimensies....: kN/m/rad
Datum.....: 21/01/2025
Bestand.....: P:\2024\24-533 Uitbreiding woning Koevordermeerstraat 1 Lemmer\02_Statische berekeningen\SL1.4.dlw

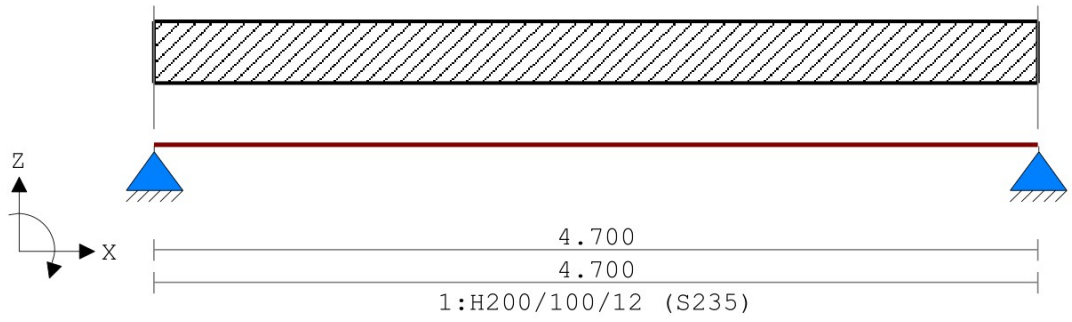
Betrouwbaarheidsklasse : 1 Referentieperiode : 50

## 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) |
| Staal | NEN-EN 1993-1-1:2006 | C2:2011,A1:2016 | NB:2016(nl) |

## GEOMETRIE

Ligger:SL1.4




## VELDLENGTEN

Ligger:SL1.4

| Veld | Vanaf | Tot | Lengte |
|---|---|---|---|
| 1 | 0.000 | 4.700 | 4.700 |

## 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 | H200/100/12 | 1:S235 | 3.4700e+03 | 1.4380e+07 | 0.00 |

## PROFIELEN vervolg [mm]

| Prof. | Staaftype | Breedte | Hoogte | e | Type | b1 | h1 | b2 | h2 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0:Normaal | 100 | 200 | 70.4 | | | | | |

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Project.....: 24-533
Onderdeel....: liggers

## PROFIELVORMEN [mm]

1 H200/100/12

## BELASTINGGEVALLEN

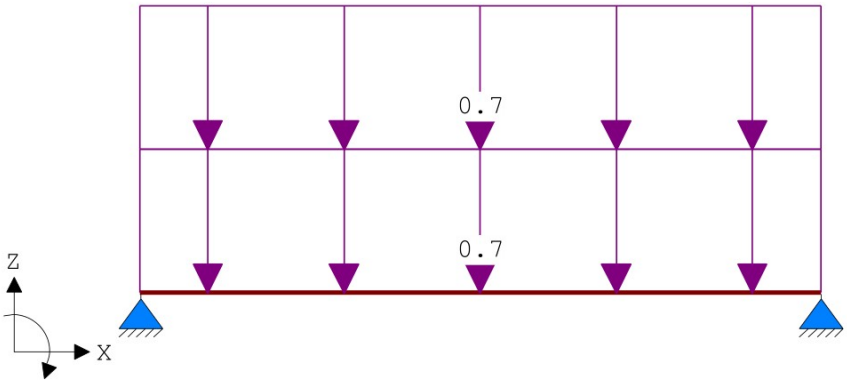
| B.G. | Omschrijving | Belast/onbelast | $\psi_0$ | $\psi_1$ | $\psi_2$ | e.g. |
|---|---|---|---|---|---|---|
| 1 | Permanent | 2:Permanent EN1991 | | | | -1.00 |
| 2 | Veranderlijk | 1:Schaakbord EN1991 | 0.40 | 0.50 | 0.30 | 0.00 |

## BELASTINGGEVALLEN

| B.G. | Omschrijving | Type |
|---|---|---|
| 1 | Permanent | 1 Permanente belasting |
| 2 | Veranderlijk | 2 Ver. bel. pers. ed. (q_k) |

## VELDBELASTINGEN

Ligger:SL1.4 B.G:1 Permanent



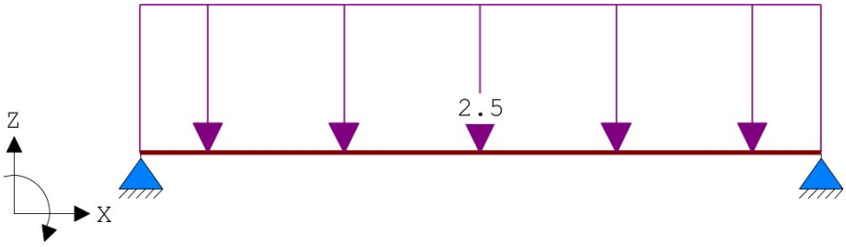

## VELDBELASTINGEN

Ligger:SL1.4 B.G:1 Permanent

| Last | Ref. | Type | Omschrijving | q1/p/m | q2 | psi | Afstand | Lengte |
|---|---|---|---|---|---|---|---|---|
| 1 | | 1:q-last | | -0.700 | -0.700 | | 0.000 | 4.700 |
| 2 | | 1:q-last | | -0.700 | -0.700 | | 0.000 | 4.700 |

## VELDBELASTINGEN

Ligger:SL1.4 B.G:2 Veranderlijk



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Project.....: 24-533
Onderdeel....: liggers

## VELDBELASTINGEN

Ligger:SL1.4 B.G:2 Veranderlijk

| Last | Ref. | Type | Omschrijving | q1/p/m | q2 | psi | Afstand | Lengte |
|---|---|---|---|---|---|---|---|---|
| 1 | | 1:q-last | | -2.500 | -2.500 | | 0.000 | 4.700 |

## BELASTINGCOMBINATIES

| BC | Type | BG | Gen. | Factor | BG | Gen. | Factor | BG | Gen. | Factor | BG | Gen. | Factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Fund. | 1 | Perm | 1.22 | | | | | | | | | |
| 2 | Fund. | 1 | Perm | 1.22 | 2 | psi0 | 1.35 | | | | | | |
| 3 | Fund. | 1 | Perm | 1.08 | 2 | Extr | 1.35 | | | | | | |
| 4 | Fund. | 1 | Perm | 0.90 | | | | | | | | | |
| 5 | Fund. | 1 | Perm | 0.90 | 2 | psi0 | 1.35 | | | | | | |
| 6 | Fund. | 1 | Perm | 0.90 | 2 | Extr | 1.35 | | | | | | |
| 7 | Kar. | 1 | Perm | 1.00 | 2 | Extr | 1.00 | | | | | | |
| 8 | Freq. | 1 | Perm | 1.00 | | | | | | | | | |
| 9 | Freq. | 1 | Perm | 1.00 | 2 | psi1 | 1.00 | | | | | | |
| 10 | Quas. | 1 | Perm | 1.00 | | | | | | | | | |
| 11 | Quas. | 1 | Perm | 1.00 | 2 | psi2 | 1.00 | | | | | | |
| 12 | Blij. | 1 | Perm | 1.00 | | | | | | | | | |

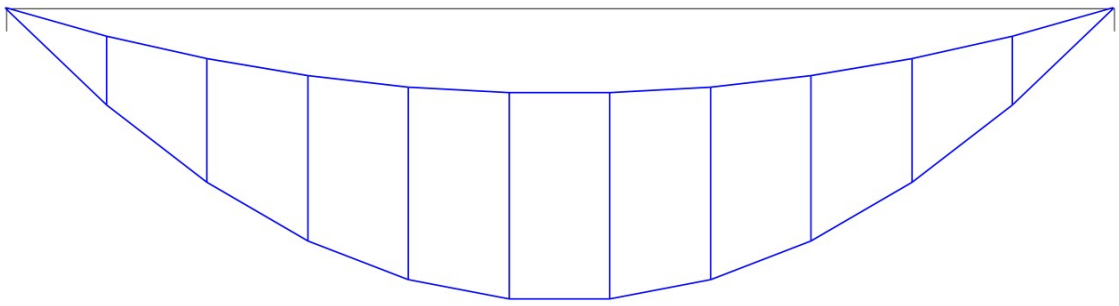
## GUNSTIGE WERKING PERMANENTE BELASTINGEN

| BC | Velden met gunstige werking |
|---|---|
| 1 | Geen |
| 2 | Geen |
| 3 | Geen |
| 4 | Alle velden de factor:0.90 |
| 5 | Alle velden de factor:0.90 |
| 6 | Alle velden de factor:0.90 |

## OMHULLENDE VAN DE FUNDAMENTELE COMBINATIES

### MOMENTEN

Ligger:SL1.4 Fundamentele combinatie



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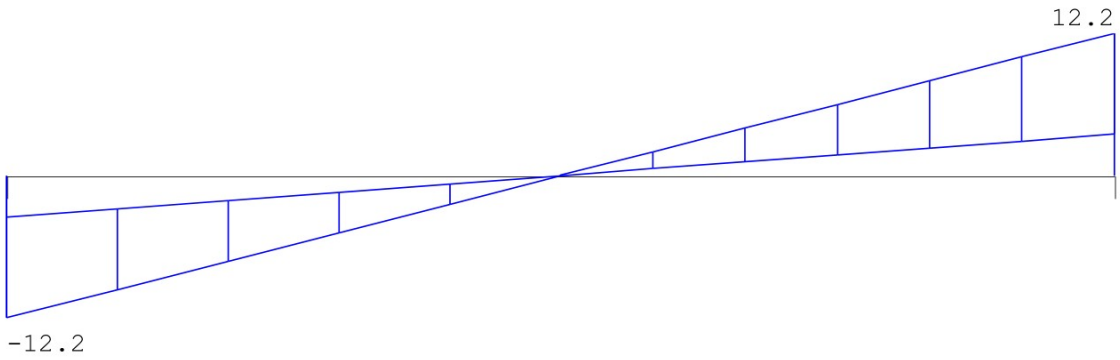
(033) 245 03 20
info@aadl.nl

| Werknummer: | Bladnr.: 194 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: liggers

## DWARSKRACHTEN

Ligger:SL1.4 Fundamentele combinatie




Fmin:3.54 3.54
Fmax:12.2 12.2

## REACTIES

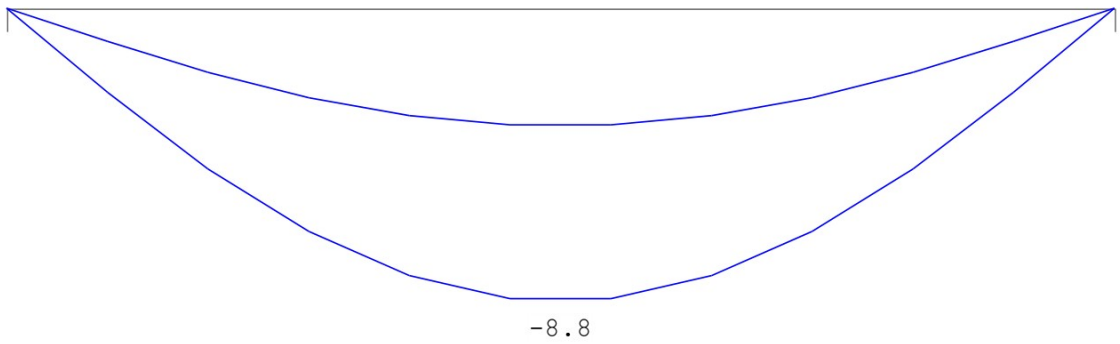
Ligger:SL1.4 Fundamentele combinatie

| Stp | Fmin | Fmax | Mmin | Mmax |
|---|---|---|---|---|
| 1 | 3.54 | 12.18 | 0.00 | 0.00 |
| 2 | 3.54 | 12.18 | 0.00 | 0.00 |

## OMHULLENDE VAN DE KARAKTERISTIEKE COMBINATIES

## VERPLAATSINGEN [mm]

Ligger:SL1.4 Karakteristieke combinatie



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(033) 245 03 20
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Project.....: 24-533
Onderdeel....: liggers

## STAALPROFIELEN - ALGEMENE GEGEVENS

Ligger:SL1.4

Stabiliteit: Classificatie gehele constructie: Geschoord

## PROFIEL/MATERIAAL

| P/M nr. | Profielnaam | Vloeisp. [N/mm²] | Productie methode | Min. drsn. klasse |
|---|---|---|---|---|
| 1 | H200/100/12 | 235 | Gewalst | 1 |

Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

## KIPSTABILITEIT

Ligger:SL1.4

| Staaf | Plts. aangr. | | l gaffel [m] | Kipsteunafstanden [m] |
|---|---|---|---|---|
| 1 | 1.0*h | boven: | 4.70 | 4,7 |
| | | onder: | | 4,7 |

## TOETSING SPANNINGEN

Ligger:SL1.4

| Staaf | P/M nr. | BC | Sit | Kl | Plaats | Norm | Artikel | Formule | Hoogste toetsing U.C. | [N/mm²] | Opm. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 3 | 1 | 3 | My-max | EN3-1-1 | 6.2.5 | (6.12y) | 0.548 | 129 | 76 |

Opmerkingen:
**[ 76] Toetsing van kipstabiliteit voor dit profieltype is niet voorzien.**

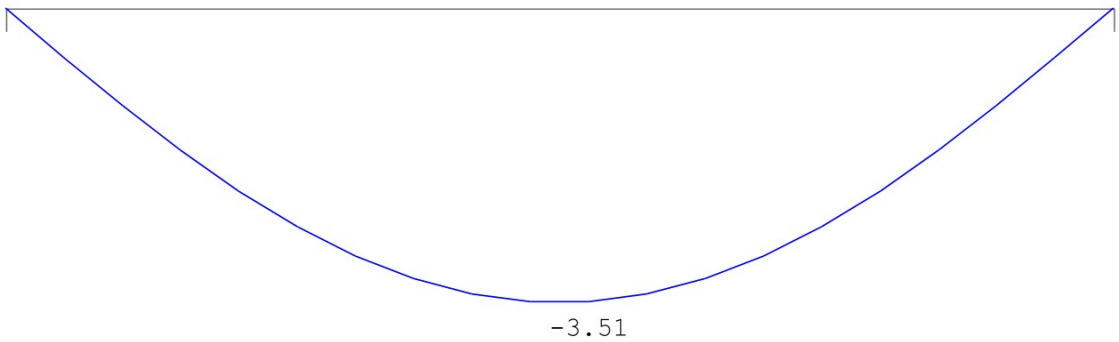
## TOETSING DOORBUIGING

Ligger:SL1.4

| Staaf | Soort | Mtg | Lengte [m] | Overst I | Overst J | Zeeg [mm] | $u_{tot}$ [mm] | BC | Sit | | u [mm] | Toelaatbaar [mm] | *1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Vlr+w | db | 4.70 | N | N | 0.0 | -8.8 | 7 | 1 | Eind | -8.8 | ±18.8 | 0.004 |
| | | db | | | | | | 7 | 1 | Bijk | -5.3 | ±9.4 | 0.002 |

## DOORBUIGINGEN w1 [mm]

Ligger:SL1.4 Blijvende combinatie



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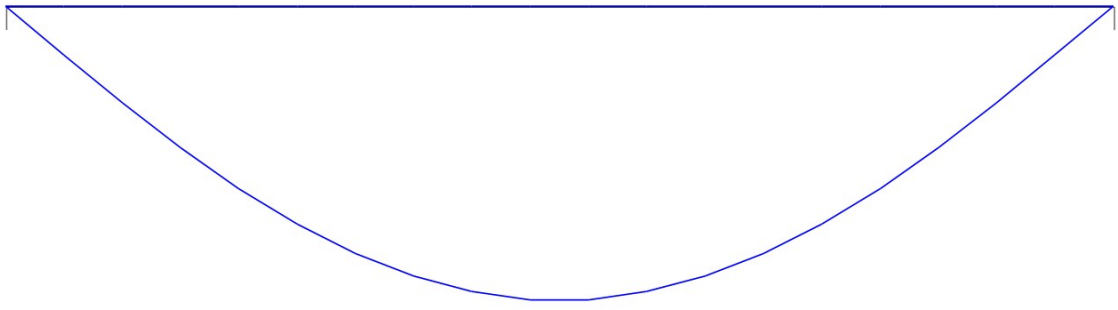
| Werknummer: | Bladnr.: 196 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: liggers

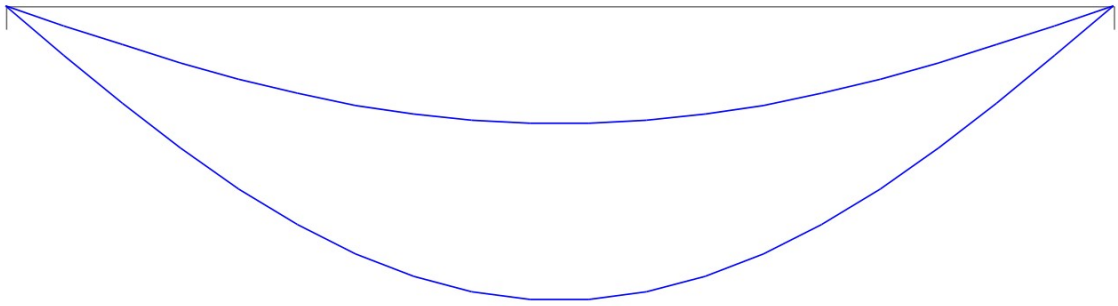
## DOORBUIGINGEN Wbij [mm]

Ligger:SL1.4 Karakteristieke combinatie




## DOORBUIGINGEN Wmax [mm]

Ligger:SL1.4 Karakteristieke combinatie




## DOORBUIGINGEN

Karakteristieke combinatie

| Veld | 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/] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Neg. | 2.474 | 4700 | -3.5 | | -5.2 | 897 | -8.7 | | -8.7 | 537 |

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# S02

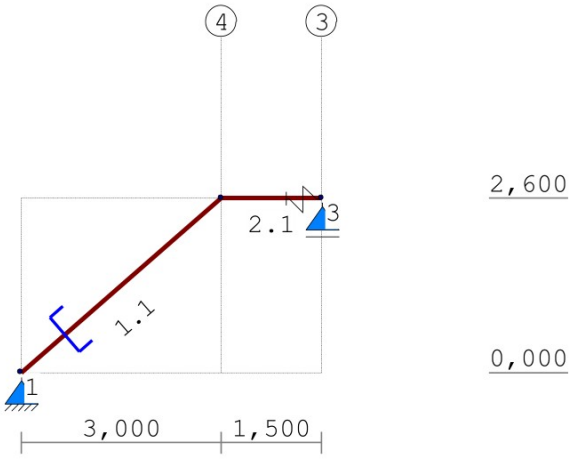
## Technosoft Raamwerken release 6.82a 10 feb 2025

```
Project......: 24-533
Onderdeel....: S02 half spant trap
Constructeur.: AADL - ir. [redacted]
Dimensies....: kN;m;rad  (tenzij anders aangegeven)
Datum........: 30/01/2025
Bestand......: P:\2024\24-533 Uitbreiding woning Koevordermeerstraat 1
               Lemmer\02_Statische berekeningen\S02 half spant trap.rww

Belastingbreedte.:   0.500
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 1991-1-4:2005 | 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 | | 0.000 | 0.000 | 2.600 |
| 2 | 4 | 3.000 | 0.000 | 4.000 |
| 3 | 3 | 4.500 | 0.000 | 4.000 |

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3861 MA Nijkerk
(033) 245 03 20
info@aadl.nl



Project.....: 24-533
Onderdeel....: S02 half spant trap

## NIVEAUS

| Nr. | Z | X-min | X-max |
|---|---|---|---|
| 1 | 0.000 | 0.000 | 4.500 |
| 2 | 2.600 | 0.000 | 4.500 |

## 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 | UNP180 | 1:S235 | 2.7960e+03 | 1.3540e+07 | 0.00 |

## PROFIELEN vervolg [mm]

| Prof. | Staaftype | Breedte | Hoogte | e | Type | b1 | h1 | b2 | h2 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0:Normaal | 70 | 180 | 90.0 | | | | | |

## PROFIELVORMEN [mm]

1 UNP180

## KNOPEN

| Knoop | X | Z |
|---|---|---|
| 1 | 0.000 | 0.000 |
| 2 | 3.000 | 2.600 |
| 3 | 4.500 | 2.600 |

## STAVEN

| St. | ki | kj | Profiel | Aansl.i | Aansl.j | Lengte | Opm. |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2 | 1:UNP180 | NDM | NDM | 3.970 | |
| 2 | 2 | 3 | 1:UNP180 | NDM | NDM | 1.500 | |

## VASTE STEUNPUNTEN

| Nr. | knoop | Kode XZR | 1=vast 0=vrij | Hoek |
|---|---|---|---|---|
| 1 | 1 | 110 | | 0.00 |
| 2 | 3 | 010 | | 0.00 |

## VEREN

| Veer | Knoop | Richting | Hoek | Veerwaarde | Type | Ondergrens | Bovengrens |
|---|---|---|---|---|---|---|---|
| 1 | 3 | 1:X-transl. | 0.00 | 4.000e+03 | Normaal | -4.000 | 4.000 |

DE LANGE
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Project.....: 24-533
Onderdeel....: S02 half spant trap

## BELASTINGGENERATIE ALGEMEEN.

| | | | |
|---|---|---|---|
| Betrouwbaarheidsklasse.....: | 1 | Referentieperiode.....: | 50 |
| Gebouwdiepte.....: | 20.00 | Gebouwhoogte.....: | 2.60 |
| Niveau aansl.terrein.....: | 0.00 | E.g. scheid.w. [kN/m2]: | 0.00 |

## WIND

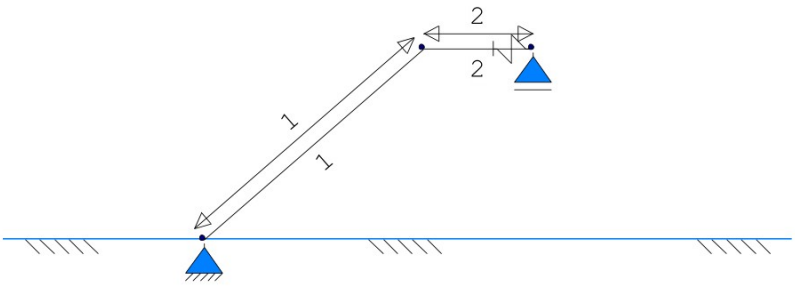
| | | | |
|---|---|---|---|
| Terrein categorie ...[4.3.2]...: | Onbebouwd | | |
| Windgebied .....: | 2 | Vb,0 ..[4.2].....: | 27.000 |
| Positie spant in het gebouw....: | 5.000 | Kr ....[4.3.2].....: | 0.209 |
| z0 .....[4.3.2]...: | 0.200 | Zmin ..[4.3.2].....: | 4.000 |
| Co wind van links ..[4.3.3]...: | 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 | | |

## STAAFTYPEN

| Type | staven |
|---|---|
| 7:Dak. | : 1,2 |

## LASTVELDEN

Veranderlijke belastingen door personen




## LASTVELDEN

| Nr | Staaf | Tabel | Klasse-Gebruiksfunctie | Verd. | $q_k$ | $Q_k$ | $F_t / F_{t\,0}$ |
|---|---|---|---|---|---|---|---|
| 1 | 1-1 | 6.10 | H-Dak (onder dakbeschot) | 0 | 0.00 | -2.00 | 1.00 |
| 2 | 2-2 | 6.2 | A-Balkons | 1 | -2.50 | -3.00 | 1.00 |

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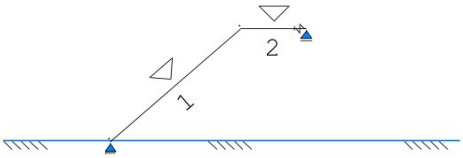
Onderdeel....: S02 half spant trap

## LASTVELDEN

Wind staven



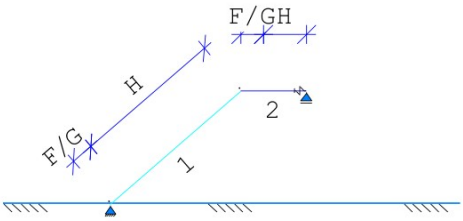

Sneeuw staven

## WIND DAKTYPES

| Nr. | Staaf | Type | reductie bij wind van links | reductie bij wind van rechts | Cpe volgens art: |
|---|---|---|---|---|---|
| 1 | 1 | Zadeldak | 1.000 | 1.000 | 7.2.5 |
| 2 | 2 | Plat dak | 1.000 | 1.000 | 7.2.3 |

## WIND ZONES

Wind van links




Wind van rechts

### WIND VAN LINKS ZONES

| Nr. | Staaf | Positie | Lengte | Zone |
|---|---|---|---|---|
| 1 | 1 | 0.000 | 0.520 | F/G |
| 2 | 1 | 0.520 | 3.450 | H |
| 3 | 2 | 0.000 | 0.520 | F/G |
| 4 | 2 | 0.520 | 0.980 | H |

## Wind indexen

| Index | CsCd | Cpe/Cpi | qp | breedte reductie | Qw | Zone | Hoek(en) |
|---|---|---|---|---|---|---|---|
| Qw1 | | 0.300 | 0.596 | 0.500 | -0.089 | -i | |
| Qw2 | 1.00 | 0.700 | 0.596 | 0.500 | -0.209 | G | 40.9 |
| Qw3 | 1.00 | 0.545 | 0.596 | 0.500 | -0.162 | H | 40.9 |
| Qw4 | 1.00 | -1.200 | 0.596 | 0.500 | 0.358 | G | 0.0 |
| Qw5 | 1.00 | -0.700 | 0.596 | 0.500 | 0.209 | H | 0.0 |
| Qw6 | | -0.200 | 0.596 | 0.500 | 0.060 | +i | |
| Qw7 | 1.00 | -0.137 | 0.596 | 0.500 | 0.041 | G | 40.9 |
| Qw8 | 1.00 | -0.055 | 0.596 | 0.500 | 0.016 | H | 40.9 |

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Project.....: 24-533
Onderdeel....: S02 half spant trap

## BELASTINGGEVALLEN

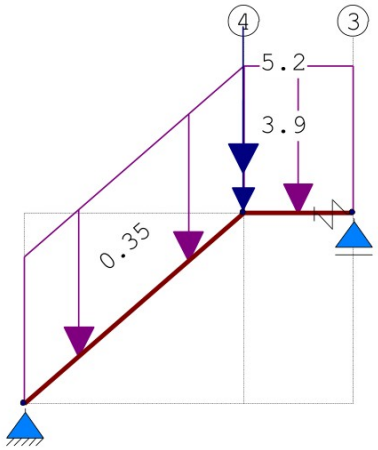
| | B.G. | Omschrijving | | Type | |
|---|---|---|---|---|---|
| | 1 | Permanente belasting | EGZ=-1.00 | 1 | |
| g* | 2 | Ver. bel. pers. ed. (q_k) | | 2 | |
| g | 3 | Ver. bel. pers. ed. (Q_k) | | 3 | |
| g | 4 | Wind van links onderdruk A | | 7 | |
| g | 5 | Wind van links overdruk A | | 8 | |
| g | 6 | Wind van links onderdruk B | | 9 | |
| g | 7 | Wind van links overdruk B | | 10 | |
| | 8 | Knik | | 0 | Onbekend |

g = gegenereerd belastinggeval
* = belastinggeval bevat 1 of meer handmatig toegevoegde en/of gewijzigde lasten

## BELASTINGEN

B.G:1 Permanente belasting

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




## KNOOPBELASTINGEN

B.G:1 Permanente belasting

| Last | Knoop | Richting | waarde | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|
| 1 | 2 | Z | -3.900 | | | |
| 2 | 2 | Z | -5.200 | | | |

## STAAFBELASTINGEN

B.G:1 Permanente belasting

| Staaf | Type | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|
| 1 | 5:QZGlobaal | -0.35 | -0.35 | 0.000 | 0.000 | | | |
| 2 | 5:QZGlobaal | -0.35 | -0.35 | 0.000 | 0.000 | | | |

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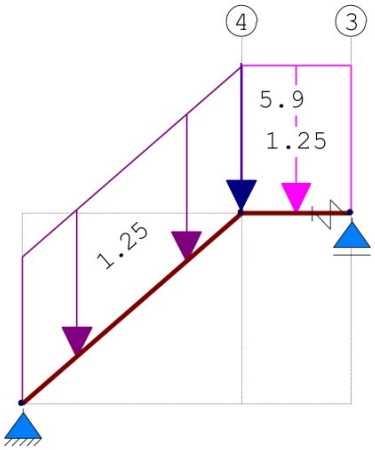
Onderdeel....: S02 half spant trap

## BELASTINGEN

B.G:2 Ver. bel. pers. ed. (q_k)




## KNOOPBELASTINGEN

B.G:2 Ver. bel. pers. ed. (q_k)

| Last | Knoop | Richting | waarde | $\psi_0$ | $\psi_1$ | $\psi_2$ | Opm. |
|---|---|---|---|---|---|---|---|
| 1 | 2 | Z | -5.900 | 0.40 | 0.50 | 0.30 | * |

Opmerkingen
[*] Deze belasting is handmatig toegevoegd of gewijzigd.

## STAAFBELASTINGEN

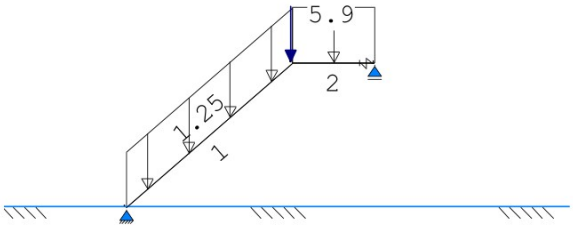
B.G:2 Ver. bel. pers. ed. (q_k)

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5:QZGlobaal | * | -1.25 | -1.25 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| 2 | 3:QZgeProj. | | -1.25 | -1.25 | 0.000 | 0.000 | 0.40 | 0.50 | 0.30 |

Opmerkingen
[*] Deze belasting is handmatig toegevoegd of gewijzigd.

## SITUATIES BELAST/ONBELAST

B.G:2 Ver. bel. pers. ed. (q_k)



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Project.....: 24-533
Onderdeel....: S02 half spant trap

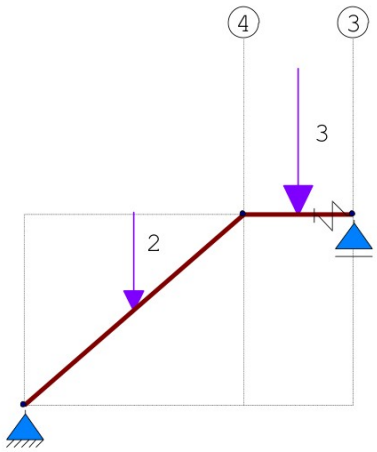
## SITUATIES BELAST/ONBELAST

Belastingtype: q_k

| Nr | Lastvelden belast | Lastvelden onbelast |
|---|---|---|
| 1 | 1,2 | |

## BELASTINGEN

B.G:3 Ver. bel. pers. ed. (Q_k)



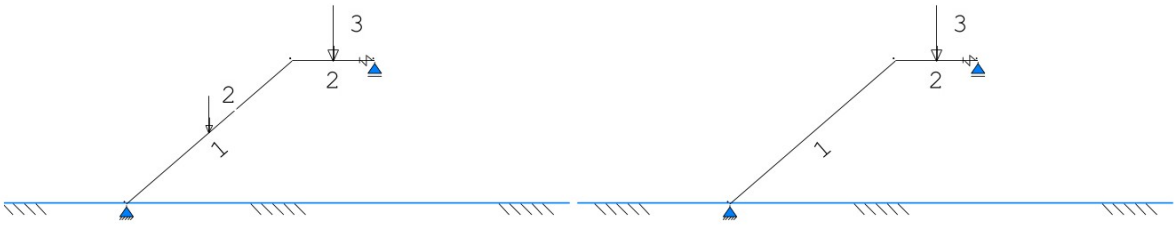

## STAAFBELASTINGEN

B.G:3 Ver. bel. pers. ed. (Q_k)

| Staaf | Type | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|
| 1 | 10:PZGeproj. | -2.00 | | 1.985 | | 0.00 | 0.00 | 0.00 |
| 2 | 10:PZGeproj. | -3.00 | | 0.750 | | 0.40 | 0.50 | 0.30 |

## SITUATIES BELAST/ONBELAST

B.G:3 Ver. bel. pers. ed. (Q_k)



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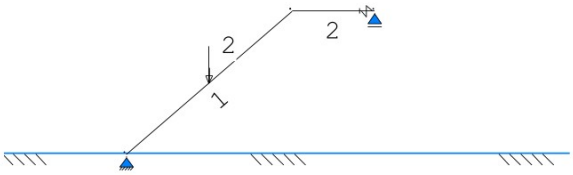
Onderdeel....: S02 half spant trap

## SITUATIES BELAST/ONBELAST

B.G:3 Ver. bel. pers. ed. (Q_k)



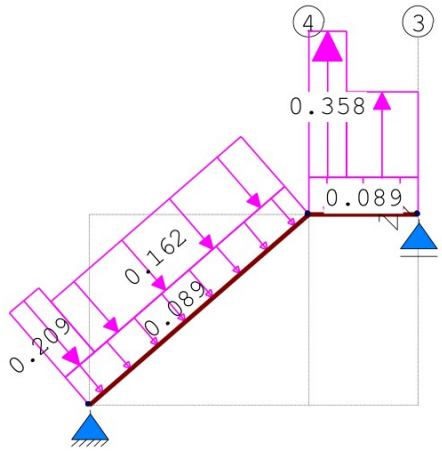

## SITUATIES BELAST/ONBELAST

Belastingtype: Q_k

| Nr | Lastvelden belast | Lastvelden onbelast |
|---|---|---|
| 1 | 1,2 | |
| 2 | 2 | 1 |
| 3 | 1 | 2 |

## BELASTINGEN

B.G:4 Wind van links onderdruk A




## STAAFBELASTINGEN

B.G:4 Wind van links onderdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.09 | -0.09 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.09 | -0.09 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -0.21 | -0.21 | 0.000 | 3.450 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw3 | -0.16 | -0.16 | 0.520 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw4 | 0.36 | 0.36 | 0.000 | 0.980 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw5 | 0.21 | 0.21 | 0.520 | 0.000 | 0.00 | 0.20 | 0.00 |

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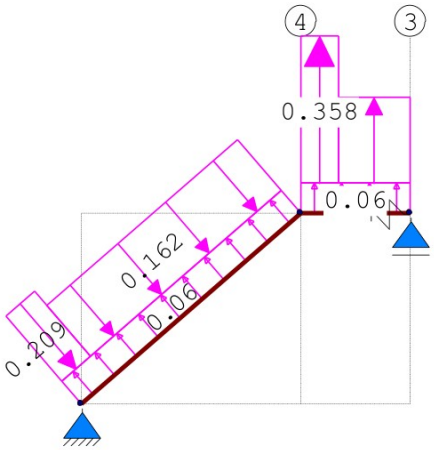
| Werknummer: | Bladnr.: 205 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: S02 half spant trap

## BELASTINGEN

B.G:5 Wind van links overdruk A



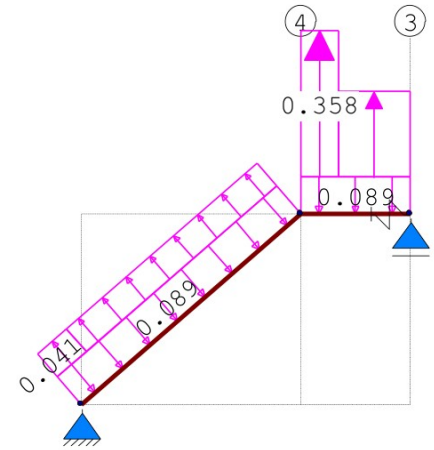

## STAAFBELASTINGEN

B.G:5 Wind van links overdruk A

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw6 | 0.06 | 0.06 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw6 | 0.06 | 0.06 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw2 | -0.21 | -0.21 | 0.000 | 3.450 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw3 | -0.16 | -0.16 | 0.520 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw4 | 0.36 | 0.36 | 0.000 | 0.980 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw5 | 0.21 | 0.21 | 0.520 | 0.000 | 0.00 | 0.20 | 0.00 |

## BELASTINGEN

B.G:6 Wind van links onderdruk B



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| Werknummer: | Bladnr.: 206 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: S02 half spant trap

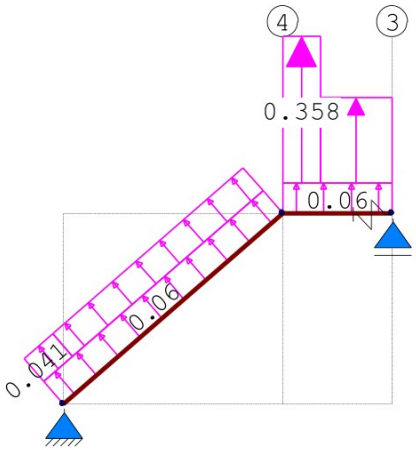
## STAAFBELASTINGEN

B.G:6 Wind van links onderdruk B

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw1 | -0.09 | -0.09 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw1 | -0.09 | -0.09 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw7 | 0.04 | 0.04 | 0.000 | 3.450 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw8 | 0.02 | 0.02 | 0.520 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw4 | 0.36 | 0.36 | 0.000 | 0.980 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw5 | 0.21 | 0.21 | 0.520 | 0.000 | 0.00 | 0.20 | 0.00 |

## BELASTINGEN

B.G:7 Wind van links overdruk B




## STAAFBELASTINGEN

B.G:7 Wind van links overdruk B

| Staaf | Type | Index | q1/p/m | q2 | A | B | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:QZLokaal | Qw6 | 0.06 | 0.06 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw6 | 0.06 | 0.06 | 0.000 | 0.000 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw7 | 0.04 | 0.04 | 0.000 | 3.450 | 0.00 | 0.20 | 0.00 |
| 1 | 1:QZLokaal | Qw8 | 0.02 | 0.02 | 0.520 | 0.000 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw4 | 0.36 | 0.36 | 0.000 | 0.980 | 0.00 | 0.20 | 0.00 |
| 2 | 1:QZLokaal | Qw5 | 0.21 | 0.21 | 0.520 | 0.000 | 0.00 | 0.20 | 0.00 |

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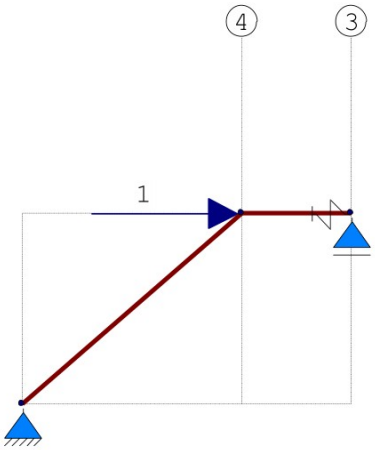
Project.....: 24-533
Onderdeel....: S02 half spant trap

## BELASTINGEN

B.G:8 Knik




## KNOOPBELASTINGEN

B.G:8 Knik

| Last | Knoop | Richting | waarde | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|---|---|---|
| 1 | 2 | X | 1.000 | | | |

## REACTIES

| Kn. | B.G. | X-min | X-max | Z-min | Z-max | M-min | M-max |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 4.00 | | 6.99 | | | |
| 1 | 2 | 4.00 | | 7.90 | | | |
| 1 | 3 | 1.29 | 2.65 | 1.25 | 3.36 | | |
| 1 | 4 | -0.02 | | 0.65 | | | |
| 1 | 5 | -0.18 | | 0.11 | | | |
| 1 | 6 | -0.08 | | 0.09 | | | |
| 1 | 7 | -0.24 | | -0.45 | | | |
| 1 | 8 | -0.34 | | -0.20 | | | |
| | | | | | | | |
| 3 | 1 | -4.00 | | 5.22 | | | |
| 3 | 2 | -4.00 | | 4.84 | | | |
| 3 | 3 | -2.65 | -1.29 | -0.12 | 1.75 | | |
| 3 | 4 | -0.65 | | -0.14 | | | |
| 3 | 5 | -0.10 | | -0.27 | | | |
| 3 | 6 | -0.10 | | -0.13 | | | |
| 3 | 7 | 0.45 | | -0.27 | | | |
| 3 | 8 | -0.66 | | 0.20 | | | |

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Project.....: 24-533
Onderdeel....: S02 half spant trap

## BELASTINGCOMBINATIES

| BC | Type | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Fund. | 1.22 | $G_{k,1}$ | | | | | | | |
| 2 | Fund. | 0.90 | $G_{k,1}$ | | | | | | | |
| 3 | Fund. | 1.22 | $G_{k,1}$ | + | 1.35 | $\psi_0$ | $Q_{k,2}$ | | | |
| 4 | Fund. | 1.22 | $G_{k,1}$ | + | 1.35 | $\psi_0$ | $Q_{k,3}$ | | | |
| 5 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,2}$ | | | |
| 6 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,3}$ | | | |
| 7 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,4}$ | | | |
| 8 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,5}$ | | | |
| 9 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,6}$ | | | |
| 10 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,7}$ | | | |
| 11 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | $\psi_0$ | $Q_{k,2}$ | | | |
| 12 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,2}$ | | | |
| 13 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | $\psi_0$ | $Q_{k,3}$ | | | |
| 14 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,3}$ | | | |
| 15 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,4}$ | | | |
| 16 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,5}$ | | | |
| 17 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,6}$ | | | |
| 18 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,7}$ | | | |
| 19 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,4}$ | + | 1.35 $\psi_0$ | $Q_{k,2}$ |
| 20 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,4}$ | + | 1.35 $\psi_0$ | $Q_{k,3}$ |
| 21 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,5}$ | + | 1.35 $\psi_0$ | $Q_{k,2}$ |
| 22 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,5}$ | + | 1.35 $\psi_0$ | $Q_{k,3}$ |
| 23 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,6}$ | + | 1.35 $\psi_0$ | $Q_{k,2}$ |
| 24 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,6}$ | + | 1.35 $\psi_0$ | $Q_{k,3}$ |
| 25 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,7}$ | + | 1.35 $\psi_0$ | $Q_{k,2}$ |
| 26 | Fund. | 1.08 | $G_{k,1}$ | + | 1.35 | | $Q_{k,7}$ | + | 1.35 $\psi_0$ | $Q_{k,3}$ |
| 27 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,4}$ | + | 1.35 $\psi_0$ | $Q_{k,2}$ |
| 28 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,4}$ | + | 1.35 $\psi_0$ | $Q_{k,3}$ |
| 29 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,5}$ | + | 1.35 $\psi_0$ | $Q_{k,2}$ |
| 30 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,5}$ | + | 1.35 $\psi_0$ | $Q_{k,3}$ |
| 31 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,6}$ | + | 1.35 $\psi_0$ | $Q_{k,2}$ |
| 32 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,6}$ | + | 1.35 $\psi_0$ | $Q_{k,3}$ |
| 33 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,7}$ | + | 1.35 $\psi_0$ | $Q_{k,2}$ |
| 34 | Fund. | 0.90 | $G_{k,1}$ | + | 1.35 | | $Q_{k,7}$ | + | 1.35 $\psi_0$ | $Q_{k,3}$ |
| 35 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,2}$ | | | |
| 36 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,3}$ | | | |
| 37 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,4}$ | | | |
| 38 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,5}$ | | | |
| 39 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,6}$ | | | |
| 40 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,7}$ | | | |
| 41 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | | $Q_{k,4}$ | + | 1.00 $\psi_0$ | $Q_{k,2}$ |

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Project.....: 24-533
Onderdeel....: S02 half spant trap

## BELASTINGCOMBINATIES

| BC | Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 42 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | $Q_{k,4}$ | + | 1.00 | $\psi_0$ | $Q_{k,3}$ | | |
| 43 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | $Q_{k,5}$ | + | 1.00 | $\psi_0$ | $Q_{k,2}$ | | |
| 44 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | $Q_{k,5}$ | + | 1.00 | $\psi_0$ | $Q_{k,3}$ | | |
| 45 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | $Q_{k,6}$ | + | 1.00 | $\psi_0$ | $Q_{k,2}$ | | |
| 46 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | $Q_{k,6}$ | + | 1.00 | $\psi_0$ | $Q_{k,3}$ | | |
| 47 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | $Q_{k,7}$ | + | 1.00 | $\psi_0$ | $Q_{k,2}$ | | |
| 48 | Kar. | 1.00 | $G_{k,1}$ | + | 1.00 | $Q_{k,7}$ | + | 1.00 | $\psi_0$ | $Q_{k,3}$ | | |
| 49 | Quas. | 1.00 | $G_{k,1}$ | | | | | | | | | |
| 50 | Quas. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_2$ $Q_{k,2}$ | | | | | | |
| 51 | Quas. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_2$ $Q_{k,3}$ | | | | | | |
| 52 | Freq. | 1.00 | $G_{k,1}$ | | | | | | | | | |
| 53 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,2}$ | | | | | | |
| 54 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,3}$ | | | | | | |
| 55 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,4}$ | | | | | | |
| 56 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,5}$ | | | | | | |
| 57 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,6}$ | | | | | | |
| 58 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,7}$ | | | | | | |
| 59 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,4}$ | + | 1.00 | $\psi_2$ | $Q_{k,2}$ | | |
| 60 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,4}$ | + | 1.00 | $\psi_2$ | $Q_{k,3}$ | | |
| 61 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,5}$ | + | 1.00 | $\psi_2$ | $Q_{k,2}$ | | |
| 62 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,5}$ | + | 1.00 | $\psi_2$ | $Q_{k,3}$ | | |
| 63 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,6}$ | + | 1.00 | $\psi_2$ | $Q_{k,2}$ | | |
| 64 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,6}$ | + | 1.00 | $\psi_2$ | $Q_{k,3}$ | | |
| 65 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,7}$ | + | 1.00 | $\psi_2$ | $Q_{k,2}$ | | |
| 66 | Freq. | 1.00 | $G_{k,1}$ | + | 1.00 | $\psi_1$ $Q_{k,7}$ | + | 1.00 | $\psi_2$ | $Q_{k,3}$ | | |
| 67 | 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 | Alle staven de factor:0.90 |
| 12 | Alle staven de factor:0.90 |
| 13 | Alle staven de factor:0.90 |

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Project.....: 24-533
Onderdeel....: S02 half spant trap

## GUNSTIGE WERKING PERMANENTE BELASTINGEN

| BC | Staven met gunstige werking |
| --- | --- |
| 14 | Alle staven de factor:0.90 |
| 15 | Alle staven de factor:0.90 |
| 16 | Alle staven de factor:0.90 |
| 17 | Alle staven de factor:0.90 |
| 18 | Alle staven de factor:0.90 |
| 19 | Geen |
| 20 | Geen |
| 21 | Geen |
| 22 | Geen |
| 23 | Geen |
| 24 | Geen |
| 25 | Geen |
| 26 | Geen |
| 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 |

## OMHULLENDE VAN DE FUNDAMENTELE COMBINATIES

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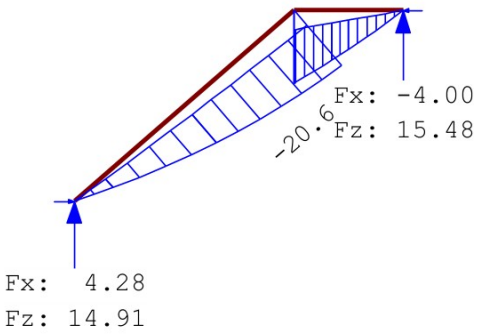
| Werknummer: | Bladnr.: 211 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: S02 half spant trap

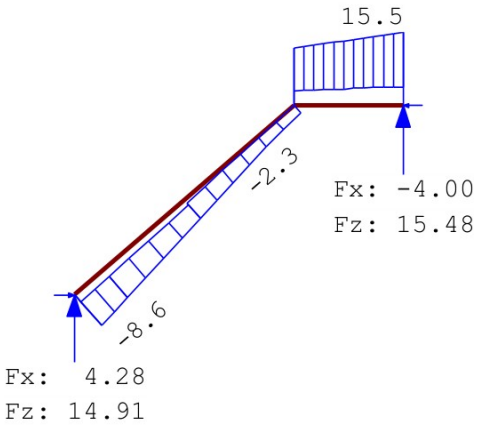
## MOMENTEN

Fundamentele combinatie




## DWARSKRACHTEN

Fundamentele combinatie



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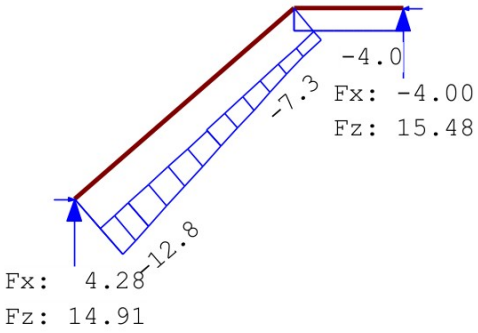
Project.....: 24-533
Onderdeel....: S02 half spant trap

## NORMAALKRACHTEN

Fundamentele combinatie




## REACTIES

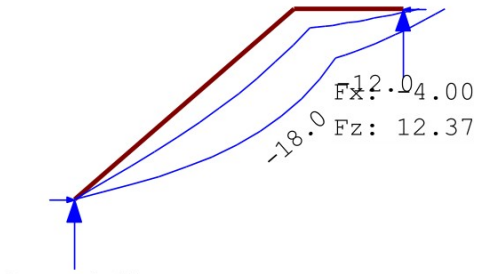
Fundamentele combinatie

| Kn. | X-min | X-max | Z-min | Z-max | M-min | M-max |
|---|---|---|---|---|---|---|
| 1 | 3.09 | 4.28 | 6.27 | 14.91 | | |
| 3 | -4.00 | -4.00 | 3.76 | 15.48 | | |

## OMHULLENDE VAN DE KARAKTERISTIEKE COMBINATIES

## VERPLAATSINGEN [mm]

Karakteristieke combinatie



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Project.....: 24-533
Onderdeel....: S02 half spant trap

## STAALPROFIELEN - ALGEMENE GEGEVENS

Stabiliteit: Classificatie gehele constructie: Geschoord
Doorbuiging en verplaatsing:
Aantal bouwlagen: 1
Gebouwtype: Overig
Toel. horiz. verplaatsing gehele gebouw: h/150
Kleinste gevelhoogte [m]: 0.0

## PROFIEL/MATERIAAL

| P/M nr. | Profielnaam | Vloeisp. [N/mm²] | Productie methode | Min. drsn. klasse |
|---|---|---|---|---|
| 1 | UNP180 | 235 | Gewalst | 1 |

Partiële veiligheidsfactoren:
Gamma M;0 : 1.00 Gamma M;1 : 1.00

## KNIKSTABILITEIT

| Staaf | $l_{sys}$ [m] | Classif. y sterke as | $l_{knik;y}$ [m] | Extra aanp. y [kN] | Classif. z zwakke as | $l_{knik;z}$ [m] | Extra aanp. z [kN] |
|---|---|---|---|---|---|---|---|
| 1 | 3.970 | Geschoord | 3.970 | 0.0 | Geschoord | 3.970 | 0.0 |
| 2 | 1.500 | Geschoord | 1.500 | 0.0 | Geschoord | 1.500 | 0.0 |

## KIPSTABILITEIT

| Staaf | Plts. aangr. | | l gaffel [m] | Kipsteunafstanden [m] |
|---|---|---|---|---|
| 1 | 1.0*h | boven: | 3.97 | 3.970 |
| | | onder: | | 3.970 |
| 2 | 1.0*h | boven: | 1.50 | 1.500 |
| | | onder: | | 1.500 |

## TOETSING SPANNINGEN

| Staaf | P/M nr. | BC | Sit | Kl | Plaats | Norm | Artikel | Formule | Hoogste toetsing U.C. | [N/mm²] | Opm. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 5 | 1 | 1 | Einde | EN3-1-1 | 6.2.1 | (6.2) | 0.501 | 118 | 47,76,18,40 |
| 2 | 1 | 5 | 1 | 1 | Begin | EN3-1-1 | 6.2.1 | (6.2) | 0.496 | 117 | 76,18,40 |

Opmerkingen:
**[ 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.**
[ 47] Bij verlopende normaalkracht wordt de grootste drukkracht genomen.
**[ 76] Toetsing van kipstabiliteit voor dit profieltype is niet voorzien.**

## TOETSING DOORBUIGING

| Staaf | Soort | Mtg | Lengte [m] | Overst I | Overst J | Zeeg [mm] | $u_{tot}$ [mm] | BC | Sit | | u [mm] | Toelaatbaar [mm] | *l |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Vloer | ss | 3.97 | N | N | 0.0 | -15.8 | 35 | 1 | Eind | -15.8 | ±31.8 | 2*0.004 |
| | | ss | | | | | | 35 | 1 | Bijk | -9.1 | ±23.8 | 2*0.003 |
| 2 | Vloer | ss | 1.50 | N | N | 0.0 | -12.0 | 35 | 1 | Eind | -12.0 | ±12.0 | 2*0.004 |
| | | ss | | | | | | 35 | 1 | Bijk | -6.9 | ±9.0 | 2*0.003 |

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Onderdeel....: S02 half spant trap

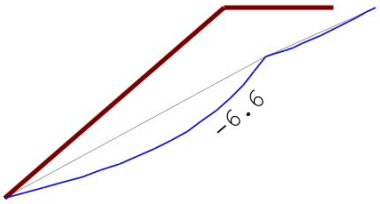
## TOETSING HOR. VERPLAATSING GLOBAAL

Er is een maximale horizontale verplaatsing van  0.0103 [m] gevonden
bij knoop 2 en combinatie 35; belastingsituatie 1 (combinatietype 2).
Bij een hoogte van  2.600 [m] levert dit h / 253 (toel.: h /  150).

## VERVORMINGEN w1

Blijvende combinatie

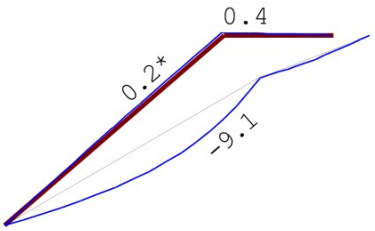
* - relatief aan de rechte lijn die de uiteinden verbindt




## VERVORMINGEN Wbij

Karakteristieke combinatie

* - relatief aan de rechte lijn die de uiteinden verbindt



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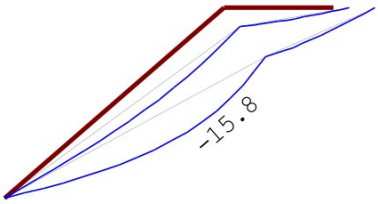
Onderdeel....: S02 half spant trap

## VERVORMINGEN Wmax

Karakteristieke combinatie

* - relatief aan de rechte lijn die de uiteinden verbindt




## 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/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | Neg. | / | 7940 | -6.6 | | -9.1 | 870 | -15.8 | | -15.8 | 504 |
| 2 | 2 | Neg. | 0.750 | 1500 | -0.4 | | -0.5 | 3062 | -0.9 | | -0.9 | 1747 |
| 2 | 2 | Pos. | / | 3000 | 5.0 | | 6.9 | 434 | 12.0 | | 12.0 | 251 |

## TOTALE HORIZONTALE VERPLAATSING

Karakteristieke combinatie

| knoop | Zijde | h [mm] | $u_1$ [mm] | $u_2$ [mm] | $u_3$ [mm] | $u_{tot}$ [mm] | [h/] |
|---|---|---|---|---|---|---|---|
| 2 | Pos. | 2600 | 4.3 | | 6.0 | 10.3 | 253 |

## 3.3 Uitvoer fundering

**Funderingsbalken**

**Technosoft Balkroosters release 6.81 10 feb 2025**

```
Project......: 24-533
Onderdeel....: funderingsbalkemn
Constructeur.: AADL - ir. [redacted]
Dimensies....: kN/m/rad
Datum........: 03/02/2025
Bestand......: P:\2024\24-533 Uitbreiding woning Koevordermeerstraat 1
               Lemmer\02_Statische berekeningen\funderingsbalken.grw
Torsiefac....: 50 %

Betrouwbaarheidsklasse        :   1      Referentieperiode          : 50
Ouderdom bij belasten         :  28      Relatieve vochtigheid      : 50%
Doorbuigingen(beton) zijn dmv gecorrigeerde stijfheden berekend.

Fysisch lineair : Er is gerekend met de e-modulus uit de materiaaltabel.
Fys.NLE.kort    : Er is gerekend met een gecorrigeerde e-modulus (korte duur).
Deze e-mod. is berekend mbv de krachten uit de fysisch lineair berekening.
```

**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) |
| Beton | NEN-EN 1992-1-1:2011(nl) | C2/A1:2015(nl) | NB:2016(nl) |

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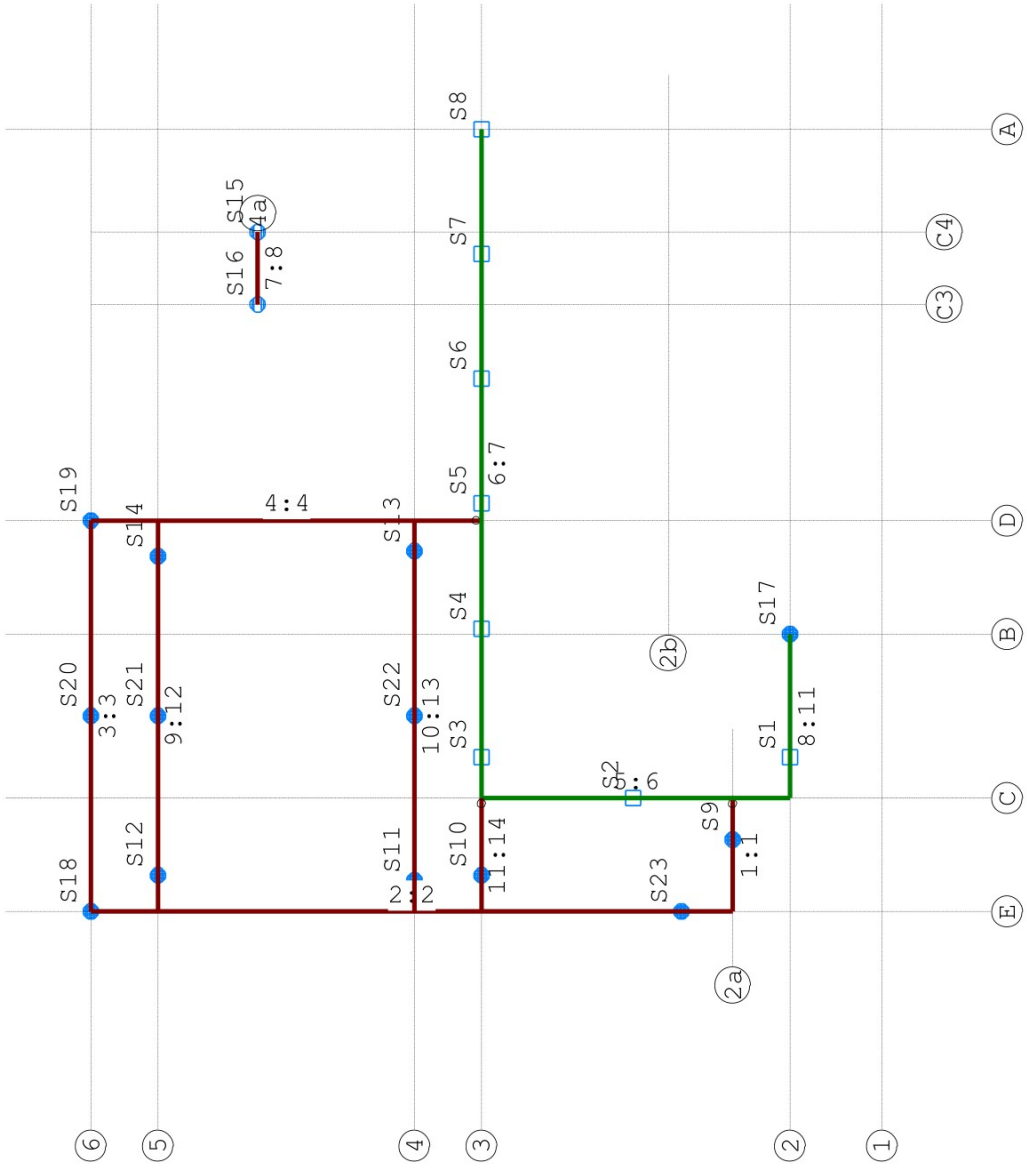
| Werknummer: | Bladnr.: 217 |
|---|---|
| 24-533 | Datum: 13-2-2025 |

Project.....: 24-533
Onderdeel....: funderingsbalkemn

## GEOMETRIE




## MATERIALEN

| Mt | Kwaliteit | E-modulus[N/mm2] | S.G. | Pois. | Uitz. coëff |
|---|---|---|---|---|---|
| 1 | C20/25 | 7480 | 25.0 | 0.20 | 1.0000e-05 |

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Project.....: 24-533
Onderdeel....: funderingsbalkemn

## MATERIALEN vervolg

| Mt | Kwaliteit | Cement | Kruipfac. |
|---|---|---|---|
| 1 | C20/25 | | 3.01 |

## PROFIELEN [mm]

| Prof. | Omschrijving | Materiaal | Oppervlak | Torsietr. | Traagheid | Vormf. |
|---|---|---|---|---|---|---|
| 1 | B*H 300*500 | 1:C20/25 | 1.500e+05 | 2.850e+09 | 3.125e+09 | 0.00 |
| 2 | B*H 300*350 | 1:C20/25 | 1.050e+05 | 1.553e+09 | 1.072e+09 | 0.00 |

## PROFIELEN vervolg [mm]

| Prof. | Staaftype | Breedte | Hoogte | Zs | Rek.As | Type | b1 | h1 | b2 | h2 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0:Normaal | 300 | 500 | 250 | 0.00 | 0:RH | | | | |
| 2 | 0:Normaal | 300 | 350 | 175 | 0.00 | 0:RH | | | | |

## PROFIELVORMEN [mm]

1 B*H 300*500

2 B*H 300*350

## STRAMIENLIJNEN

| Nr. | Naam | X-begin | Y-begin | X-eind | Y-Eind |
|---|---|---|---|---|---|
| 1 | 6 | -4.225 | 15.400 | 17.634 | 15.400 |
| 2 | 5 | -4.225 | 14.100 | 17.634 | 14.100 |
| 3 | 4 | -4.225 | 9.100 | 17.634 | 9.100 |
| 4 | 3 | -4.225 | 7.800 | 17.634 | 7.800 |
| 5 | 2 | -4.225 | 1.790 | 17.634 | 1.790 |
| 6 | 1 | -4.225 | -0.000 | 17.634 | -0.000 |
| 7 | E | -0.000 | -2.108 | -0.000 | 17.056 |
| 8 | C | 2.200 | -2.108 | 2.200 | 17.056 |
| 9 | B | 5.390 | -2.108 | 5.390 | 17.056 |
| 10 | D | 7.600 | -2.108 | 7.600 | 17.056 |
| 11 | A | 15.200 | -2.108 | 15.200 | 17.056 |
| 12 | 2a | -1.059 | 2.905 | 3.548 | 2.905 |
| 13 | 4a | 13.202 | 12.152 | 11.760 | 12.152 |
| 14 | 2b | 5.390 | 4.160 | 16.251 | 4.160 |
| 15 | C3 | 11.800 | 0.000 | 11.800 | 15.400 |
| 16 | C4 | 13.200 | 0.000 | 13.200 | 15.400 |

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Project.....: 24-533
Onderdeel....: funderingsbalkemn

## BALKEN

| Nr. | Naam | Begin | Eind | Profiel |
|---|---|---|---|---|
| 1 | 1 | E;2a | C;2a | 1:B*H 300*500 |
| 2 | 2 | E;2a | 6;E | 1:B*H 300*500 |
| 3 | 3 | 6;E | 6;D | 1:B*H 300*500 |
| 4 | 4 | 3;D | 6;D | 1:B*H 300*500 |
| 5 | 6 | 2;C | 3;C | 2:B*H 300*350 |
| 6 | 7 | 3;C | 3;A | 2:B*H 300*350 |
| 7 | 8 | 4a;C3 | 4a;C4 | 1:B*H 300*500 |
| 8 | 11 | 2;C | 2;B | 2:B*H 300*350 |
| 9 | 12 | 5;E | 5;D | 1:B*H 300*500 |
| 10 | 13 | 4;E | 4;D | 1:B*H 300*500 |
| 11 | 14 | 3;E | 3;C | 1:B*H 300*500 |

## BALKEN vervolg

| Nr. | Naam | Aansl.begin | Aansl.eind | Excentr. | Pasm.begin | Pasm.eind | Opm. |
|---|---|---|---|---|---|---|---|
| 1 | 1 | WDM | WD- | 0.000 | 0.000 | 0.000 | |
| 2 | 2 | WDM | WDM | 0.000 | 0.000 | 0.000 | |
| 3 | 3 | WDM | WDM | 0.000 | 0.000 | 0.000 | |
| 4 | 4 | WD- | WDM | 0.000 | 0.000 | 0.000 | |
| 5 | 6 | WDM | WDM | 0.000 | 0.000 | 0.000 | |
| 6 | 7 | WDM | WDM | 0.000 | 0.000 | 0.000 | |
| 7 | 8 | WDM | WDM | 0.000 | 0.000 | 0.000 | |
| 8 | 11 | WDM | WDM | 0.000 | 0.000 | 0.000 | |
| 9 | 12 | WDM | WDM | 0.000 | 0.000 | 0.000 | |
| 10 | 13 | WDM | WDM | 0.000 | 0.000 | 0.000 | |
| 11 | 14 | WDM | WD- | 0.000 | 0.000 | 0.000 | |

Opmerkingen:
De torsie traagheid van alle balken is tot 50% gereduceerd

## BALKEN vervolg

| Nr. | Naam | Toevallige inklemming % begin | tussen | eind |
|---|---|---|---|---|
| | Alle balken | 15 | 15 | 15 |

## STEUNPUNTTYPEN

| | | |
|---|---|---|
| Nr. | : 1 | Assenstelsel: Globaal |
| Afmeting | : Rond 219 | Rx:Vrij Z:Vast Ry:Vrij |
| FRd | : 170.000000 | |
| Min.afst. | : 0.500 | |
| Nr. | : 2 | Assenstelsel: Globaal |
| Afmeting | : 220*220 | Rx:Vrij Z:Vast Ry:Vrij |
| FRd | : 165.000000 | |
| Min.afst. | : 0.150 | |