

Sheeting structure verification

Input data (Stage of construction 1)

Settings

(input for current task)

Materials and standards

| | |
|---|----------------------|
| Concrete structures : | EN 1992-1-1 (EC2) |
| Coefficients EN 1992-1-1 : | standard |
| Circle pile shear : | simplified method |
| Steel structures : | EN 1993-1-1 (EC3) |
| Partial factor on bearing capacity of steel cross section : | $\gamma_{M0} = 1,00$ |
| Timber structures : | EN 1995-1-1 (EC5) |
| Partial factor for timber property : | $\gamma_M = 1,30$ |
| Modif. factor of load duration and moisture content : | $k_{mod} = 0,50$ |
| Coeff. of effective width for shear stress : | $k_{cr} = 0,67$ |

Pressure analysis

| | |
|---|--|
| Verification methodology : | according to EN 1997 |
| Active earth pressure calculation : | Coulomb |
| Passive earth pressure calculation : | Caquot-Kerisel |
| Analysis method : | dependent pressures |
| Earthquake analysis : | Mononobe-Okabe |
| Modulus of subsoil reaction : | standard |
| Consider reduction of the modulus of subsoil reaction for a braced sheeting | |
| Design approach : | 2 - reduction of actions and resistances |

| Partial factors on actions (A) | | | |
|--------------------------------|--------------|--------------|------------|
| Permanent design situation | | | |
| | | Unfavourable | Favourable |
| Permanent actions : | $\gamma_G =$ | 1,35 [-] | 1,00 [-] |
| Variable actions : | $\gamma_Q =$ | 1,50 [-] | 0,00 [-] |
| Water load : | $\gamma_w =$ | 1,35 [-] | |

| Partial factors for resistances (R) | | | |
|---|------------------|----------|--|
| Permanent design situation | | | |
| Reduction coeff. of internal stability of anchors : | $\gamma_{Ris} =$ | 1,30 [-] | |
| Partial factor on earth resistance : | $\gamma_{Re} =$ | 1,40 [-] | |

| Partial factors for variable actions | | | |
|--------------------------------------|------------|----------|--|
| Permanent design situation | | | |
| Factor for combination value : | $\psi_0 =$ | 0,70 [-] | |
| Factor for frequent value : | $\psi_1 =$ | 0,50 [-] | |
| Factor for quasi-permanent value : | $\psi_2 =$ | 0,30 [-] | |

Anchors

Verification methodology : Limit states (LSD)

| Reduction coefficients | | | |
|---|--------------|----------|--|
| Reduction. coeff of steel strength : | $\gamma_s =$ | 1,10 [-] | |
| Reduction coefficient of pull out resistance (soil) : | $\gamma_e =$ | 1,35 [-] | |
| Reduction coefficient of pull out resistance (grouting) : | $\gamma_c =$ | 1,35 [-] | |

Geometry of structure

Structure length = 10,00 m

Cross-section name : Sheet pile : LARSEN 604 n

Area of cross-section $A = 1,57E-02 \text{ m}^2/\text{m}$

Moment of inertia $I = 3,04E-04 \text{ m}^4/\text{m}$

Sectional modulus $W = 1,600E-03 \text{ m}^3/\text{m}$

Plastic sectional modulus $W_{pl} = 1,862E-03 \text{ m}^3/\text{m}$

Material of structure

Structural steel: EN 10248-1 : S 240 GP

Yield strength $f_y = 240,00 \text{ MPa}$


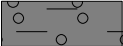

Elasticity modulus $E = 210000,00 \text{ MPa}$

Shear modulus $G = 81000,00 \text{ MPa}$


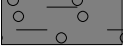
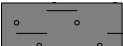
Modulus of reaction

Modulus of subsoil reaction is computed by method Schmitt.


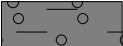

Basic soil parameters

| No. | Name | Pattern | Φ_{ef} [°] | c_{ef} [kPa] | γ [kN/m ³] | γ_{su} [kN/m ³] | δ [°] |
|-----|--------------------|---|--------------------|-------------------|----------------------------------|---------------------------------------|-----------------|
| 1 | Glina |  | 16,20 | 2,80 | 18,00 | 10,00 | 11,00 |
| 2 | Zameljen prod |  | 34,00 | 1,00 | 19,00 | 11,00 | 22,50 |
| 3 | Siva zbita peščena |  | 30,00 | 8,00 | 19,00 | 11,00 | 20,00 |

Soil parameters to compute pressure at rest

| No. | Name | Pattern | Type calculation | Φ_{ef} [°] | ν [-] | OCR [-] | K_r [-] |
|-----|--------------------|---|---------------------|--------------------|--------------|------------|--------------|
| 1 | Glina |  | cohesive | - | 0,30 | - | - |
| 2 | Zameljen prod |  | cohesionless | 34,00 | - | - | - |
| 3 | Siva zbita peščena |  | cohesive | - | 0,30 | - | - |

Parameters of soils to compute modulus of subsoil reaction (Schmitt)

| No. | Name | Pattern | ν [-] | E_{oed} [MPa] | E_{def} [MPa] |
|-----|--------------------|---|--------------|--------------------|--------------------|
| 1 | Glina |  | 0,30 | - | 5,00 |
| 2 | Zameljen prod |  | 0,30 | - | 15,00 |
| 3 | Siva zbita peščena |  | 0,30 | - | 18,00 |

Geological profile and assigned soils

| No. | Thickness of layer t [m] | Depth z [m] | Assigned soil | Pattern |
|-----|-------------------------------|------------------|---------------|---|
| 1 | 2,00 | 0,00 .. 2,00 | Glina |  |

Analysis results (Stage of construction 1)

Distribution of pressures acting on the structure (in front and behind the wall)

| Depth [m] | Ta,p [kPa] | Tk,p [kPa] | Tp,p [kPa] | Ta,z [kPa] | Tk,z [kPa] | Tp,z [kPa] |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.01 | 0.00 | 0.00 | -5.90 | 0.04 | 0.10 | 6.18 |
| 0.40 | 0.00 | -3.01 | -17.01 | 1.44 | 3.98 | 17.30 |
| 0.41 | 0.00 | -3.12 | -17.41 | 1.56 | 4.12 | 17.70 |
| 0.80 | -3.74 | -6.09 | -28.41 | 5.70 | 7.93 | 28.70 |
| 1.20 | -7.61 | -9.18 | -39.81 | 9.99 | 11.79 | 40.09 |
| 1.45 | -10.05 | -11.13 | -47.01 | 12.70 | 14.16 | 47.29 |
| 1.45 | -10.05 | -11.13 | -47.01 | 24.65 | 24.65 | 47.29 |
| 1.60 | -11.48 | -12.27 | -51.21 | 26.29 | 26.29 | 51.49 |
| 2.00 | -15.35 | -15.35 | -62.61 | 30.75 | 30.75 | 62.89 |
| 2.00 | -10.23 | -15.79 | -184.95 | 15.68 | 19.62 | 185.86 |
| 2.40 | -12.64 | -19.14 | -223.41 | 17.97 | 23.40 | 224.32 |
| 2.50 | -13.25 | -19.98 | -233.03 | 18.54 | 24.32 | 233.94 |
| 2.50 | -13.25 | -19.98 | -233.03 | 18.54 | 24.32 | 233.94 |
| 2.80 | -14.29 | -21.43 | -249.73 | 19.49 | 25.99 | 250.64 |
| 3.20 | -15.69 | -23.37 | -272.00 | 20.76 | 28.11 | 272.91 |
| 3.60 | -17.08 | -25.31 | -294.27 | 22.03 | 30.14 | 295.18 |
| 4.00 | -18.48 | -27.25 | -316.54 | 23.30 | 32.08 | 317.45 |
| 4.40 | -19.87 | -29.19 | -338.81 | 24.57 | 33.96 | 339.72 |
| 4.50 | -20.22 | -29.68 | -344.37 | 24.88 | 34.42 | 345.29 |
| 4.50 | -15.44 | -28.85 | -272.58 | 20.98 | 33.59 | 273.24 |
| 4.80 | -16.68 | -30.27 | -284.71 | 22.10 | 34.92 | 285.37 |
| 5.20 | -18.34 | -32.15 | -300.88 | 23.60 | 36.65 | 301.55 |
| 5.60 | -20.00 | -34.04 | -317.06 | 25.10 | 38.36 | 317.72 |
| 6.00 | -21.66 | -35.92 | -333.23 | 26.60 | 40.05 | 333.89 |
| 6.40 | -23.32 | -37.81 | -349.40 | 28.09 | 41.73 | 350.06 |
| 6.80 | -24.98 | -39.69 | -365.58 | 29.59 | 43.41 | 366.24 |
| 7.20 | -26.64 | -41.58 | -381.75 | 31.09 | 45.09 | 382.41 |
| 7.60 | -28.30 | -43.47 | -397.92 | 32.59 | 46.78 | 398.58 |
| 8.00 | -29.96 | -45.35 | -414.10 | 34.09 | 48.46 | 414.76 |
| 8.40 | -31.62 | -47.24 | -430.27 | 35.59 | 50.16 | 430.93 |
| 8.80 | -33.28 | -49.12 | -446.44 | 37.08 | 51.87 | 447.10 |
| 9.20 | -34.94 | -51.01 | -462.62 | 38.58 | 53.58 | 463.28 |
| 9.60 | -36.60 | -52.89 | -478.79 | 40.08 | 55.31 | 479.45 |
| 10.00 | -38.26 | -54.78 | -494.96 | 41.58 | 57.05 | 495.62 |

Distributions of the modulus of subsoil reaction and internal forces on the structure

| Depth [m] | kh,p [MN/m³] | kh,z [MN/m³] | Displacement [mm] | Pressure [kPa] | Shear Force [kN/m] | Moment [kNm/m] |
|--------------|-----------------|-----------------|----------------------|-------------------|-----------------------|-------------------|
| 0.00 | 0.00 | 0.00 | -0.27 | 0.00 | -0.00 | -0.00 |
| 0.01 | 6.68 | 0.00 | -0.27 | -1.80 | 0.01 | -0.00 |
| 0.50 | 6.68 | 6.68 | -0.26 | -2.26 | 1.18 | -0.28 |
| 1.00 | 6.68 | 6.68 | -0.24 | -1.01 | 1.99 | -1.10 |
| 1.50 | 6.68 | 0.00 | -0.22 | 12.20 | 1.60 | -2.16 |
| 2.00 | 28.89 | 0.00 | -0.19 | 9.81 | -4.76 | -1.36 |

| Depth [m] | kh,p [MN/m³] | kh,z [MN/m³] | Displacement [mm] | Pressure [kPa] | Shear Force [kN/m] | Moment [kNm/m] |
|--------------|-----------------|-----------------|----------------------|-------------------|-----------------------|-------------------|
| 2.50 | 28.89 | 28.89 | -0.16 | -4.94 | -2.70 | 0.66 |
| 3.00 | 28.89 | 28.89 | -0.13 | -2.86 | -0.77 | 1.48 |
| 3.50 | 28.89 | 28.89 | -0.10 | -1.24 | 0.23 | 1.58 |
| 4.00 | 28.89 | 28.89 | -0.09 | -0.12 | 0.56 | 1.36 |
| 4.50 | 36.84 | 36.84 | -0.07 | -0.55 | 0.48 | 1.10 |
| 5.00 | 36.84 | 36.84 | -0.06 | -0.02 | 0.61 | 0.81 |
| 5.50 | 36.84 | 36.84 | -0.06 | 0.24 | 0.54 | 0.52 |
| 6.00 | 36.84 | 36.84 | -0.05 | 0.31 | 0.40 | 0.28 |
| 6.50 | 36.84 | 36.84 | -0.05 | 0.28 | 0.25 | 0.12 |
| 7.00 | 36.84 | 36.84 | -0.05 | 0.21 | 0.13 | 0.03 |
| 7.50 | 36.84 | 36.84 | -0.04 | 0.13 | 0.05 | -0.02 |
| 8.00 | 36.84 | 36.84 | -0.04 | 0.06 | 0.00 | -0.03 |
| 8.50 | 36.84 | 36.84 | -0.04 | 0.02 | -0.02 | -0.02 |
| 9.00 | 36.84 | 36.84 | -0.04 | -0.01 | -0.02 | -0.01 |
| 9.50 | 36.84 | 36.84 | -0.03 | -0.02 | -0.01 | -0.00 |
| 10.00 | 36.84 | 36.84 | -0.03 | -0.02 | -0.00 | 0.00 |

Maximum values of internal forces acting on the structure

Maximum shear force = 4,96 kN/m
Maximum moment = 2,25 kNm/m
Maximum displacement = 0,3 mm


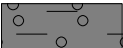
Terrain settlement behind the structure

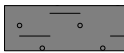
Terrain settlement δ_{max} = 0,2 mm

| | Coordinates x [m] | Settlement z [mm] |
|----|----------------------|----------------------|
| 1 | 0,00 | 0,2 |
| 2 | 0,75 | 0,2 |
| 3 | 1,49 | 0,2 |
| 4 | 2,24 | 0,3 |
| 5 | 2,99 | 0,3 |
| 6 | 3,73 | 0,3 |
| 7 | 4,48 | 0,2 |
| 8 | 5,23 | 0,2 |
| 9 | 5,97 | 0,1 |
| 10 | 6,72 | 0,1 |
| 11 | 7,47 | 0,0 |
| 12 | 7,47 | 0,0 |

Input data (Stage of construction 2)

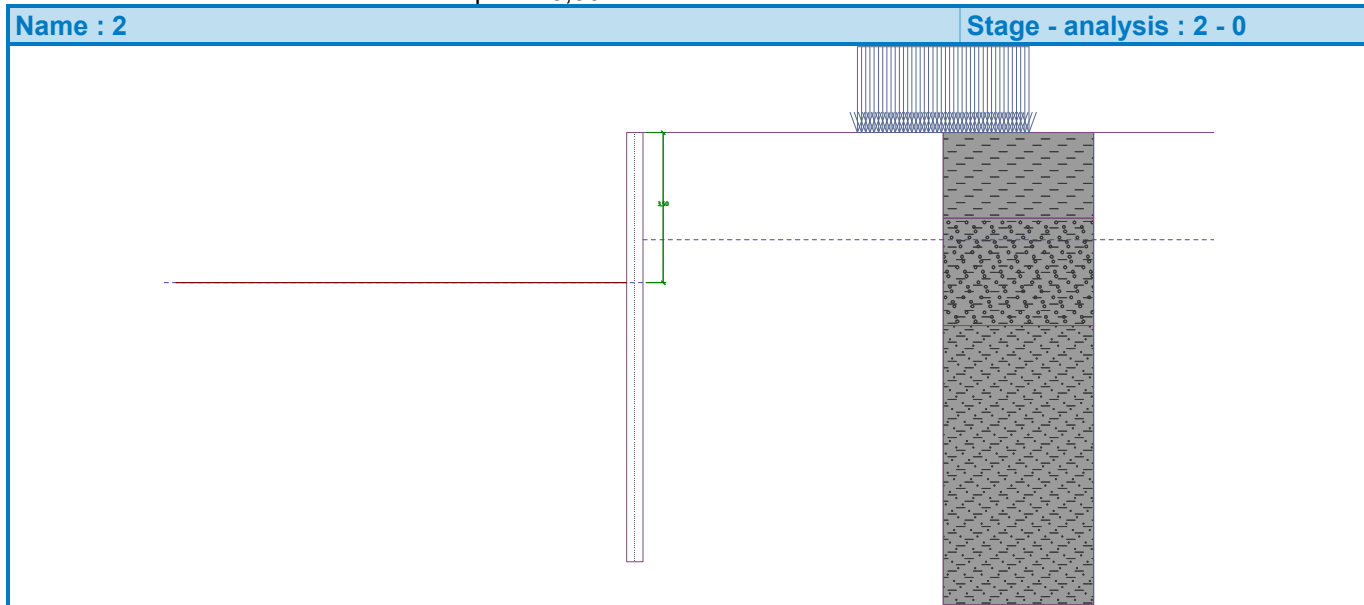
Geological profile and assigned soils

| No. | Thickness of layer t [m] | Depth z [m] | Assigned soil | Pattern |
|-----|-----------------------------|----------------|---------------|---|
| 1 | 2,00 | 0,00 .. 2,00 | Glina |  |
| 2 | 2,50 | 2,00 .. 4,50 | Zameljen prod |  |

| No. | Thickness of layer t [m] | Depth z [m] | Assigned soil | Pattern |
|-----|-----------------------------|----------------|--------------------|---|
| 3 | - | 4,50 .. ∞ | Siva zbita peščena |  |

Excavation

Soil in front of wall is excavated to a depth of 3,50 m.



Terrain profile

Terrain behind the structure is flat.

Water influence

GWT behind the structure lies at a depth of 2,50 m

GWT in front of the structure lies at a depth of 3,50 m

Subgrade at the heel is permeable.

Hydraulic gradient = 0,07

Input surface surcharges

| No. | Surcharge | | Action | Mag.1 [kN/m ²] | Mag.2 [kN/m ²] | Ord.x x [m] | Length l [m] | Depth z [m] |
|-----|-----------|--------|----------|-------------------------------|-------------------------------|----------------|-----------------|----------------|
| | new | change | | | | | | |
| 1 | No | No | variable | 20,00 | | 5,00 | 4,00 | on terrain |

| No. | Name |
|-----|------------------|
| 1 | Prometna obtežba |

Settings of the stage of construction

Design situation : permanent

Analysis results (Stage of construction 2)

Distribution of pressures acting on the structure (in front and behind the wall)

| Depth [m] | Ta,p [kPa] | Tk,p [kPa] | Tp,p [kPa] | Ta,z [kPa] | Tk,z [kPa] | Tp,z [kPa] |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.90 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.90 |
| 0.40 | 0.00 | 0.00 | 0.00 | 1.45 | 4.02 | 17.41 |
| 0.42 | 0.00 | 0.00 | 0.00 | 1.59 | 4.15 | 17.77 |
| 0.83 | 0.00 | 0.00 | 0.00 | 6.06 | 8.25 | 29.65 |
| 1.25 | 0.00 | 0.00 | 0.00 | 10.52 | 12.27 | 41.52 |

| |
|--|
| |
|--|

| Depth [m] | Ta,p [kPa] | Tk,p [kPa] | Tp,p [kPa] | Ta,z [kPa] | Tk,z [kPa] | Tp,z [kPa] |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 1.45 | 0.00 | 0.00 | 0.00 | 12.70 | 14.16 | 47.29 |
| 1.45 | 0.00 | 0.00 | 0.00 | 24.65 | 24.65 | 47.29 |
| 1.67 | 0.00 | 0.00 | 0.00 | 27.04 | 27.04 | 53.39 |
| 2.00 | 0.00 | 0.00 | 0.00 | 30.75 | 30.75 | 62.89 |
| 2.00 | 0.00 | 0.00 | 0.00 | 15.68 | 19.62 | 185.86 |
| 2.08 | 0.00 | 0.00 | 0.00 | 16.16 | 20.42 | 193.87 |
| 2.50 | 0.00 | 0.00 | 0.00 | 18.54 | 24.32 | 233.94 |
| 2.50 | 0.00 | 0.00 | 0.00 | 18.54 | 24.32 | 233.94 |
| 2.92 | 0.00 | 0.00 | 0.00 | 25.58 | 30.92 | 261.62 |
| 3.33 | 0.00 | 0.00 | 0.00 | 32.62 | 37.39 | 289.30 |
| 3.50 | 0.00 | 0.00 | 0.00 | 35.44 | 39.95 | 300.37 |
| 3.50 | 0.00 | -0.00 | -3.66 | 35.44 | 39.96 | 300.38 |
| 3.75 | 0.00 | -1.13 | -16.67 | 35.77 | 40.88 | 314.92 |
| 3.85 | 0.00 | -1.57 | -21.65 | 35.90 | 41.23 | 320.49 |
| 4.17 | -1.05 | -3.02 | -38.36 | 36.32 | 42.37 | 339.16 |
| 4.50 | -2.13 | -4.53 | -55.71 | 36.76 | 43.51 | 358.56 |
| 4.50 | 0.00 | -4.41 | -62.94 | 32.94 | 42.67 | 284.54 |
| 4.58 | 0.00 | -4.78 | -66.09 | 33.10 | 42.94 | 288.03 |
| 5.00 | 0.00 | -6.61 | -81.84 | 33.91 | 44.25 | 305.52 |
| 5.42 | 0.00 | -8.45 | -97.60 | 34.72 | 45.53 | 323.00 |
| 5.83 | 0.00 | -10.29 | -113.35 | 35.52 | 46.78 | 340.48 |
| 6.07 | 0.00 | -11.31 | -122.13 | 35.97 | 47.47 | 350.23 |
| 6.25 | -0.72 | -12.12 | -129.10 | 36.33 | 48.02 | 357.97 |
| 6.67 | -2.33 | -13.96 | -144.85 | 37.14 | 49.26 | 375.45 |
| 7.08 | -3.95 | -15.80 | -160.61 | 37.95 | 50.49 | 392.93 |
| 7.50 | -5.56 | -17.63 | -176.36 | 38.75 | 51.73 | 410.42 |
| 7.92 | -7.18 | -19.47 | -192.11 | 39.56 | 52.98 | 427.90 |
| 8.33 | -8.80 | -21.31 | -207.87 | 40.37 | 54.23 | 445.38 |
| 8.75 | -10.41 | -23.14 | -223.62 | 41.18 | 55.49 | 462.87 |
| 9.17 | -12.03 | -24.98 | -239.37 | 41.98 | 56.76 | 480.35 |
| 9.58 | -13.65 | -26.82 | -255.13 | 42.79 | 58.05 | 497.83 |
| 10.00 | -15.26 | -28.65 | -270.88 | 43.60 | 59.34 | 515.31 |

Distributions of the modulus of subsoil reaction and internal forces on the structure

| Depth [m] | kh,p [MN/m³] | kh,z [MN/m³] | Displacement [mm] | Pressure [kPa] | Shear Force [kN/m] | Moment [kNm/m] |
|--------------|-----------------|-----------------|----------------------|-------------------|-----------------------|-------------------|
| 0.00 | 0.00 | 0.00 | -59.79 | 0.00 | -0.00 | 0.00 |
| 0.50 | 0.00 | 0.00 | -54.40 | 2.48 | -0.48 | 0.08 |
| 1.00 | 0.00 | 0.00 | -49.01 | 7.84 | -3.07 | 0.85 |
| 1.50 | 0.00 | 0.00 | -43.62 | 25.18 | -8.93 | 3.61 |
| 2.00 | 0.00 | 0.00 | -38.25 | 30.75 | -22.91 | 11.45 |
| 2.50 | 0.00 | 0.00 | -32.93 | 18.54 | -32.22 | 25.34 |
| 3.00 | 0.00 | 0.00 | -27.71 | 26.99 | -43.60 | 44.12 |
| 3.50 | 0.00 | 0.00 | -22.70 | 35.37 | -59.07 | 69.41 |
| 3.50 | 0.00 | 0.00 | -22.62 | 31.58 | -59.33 | 69.88 |
| 4.00 | 0.00 | 0.00 | -17.89 | 6.42 | -68.76 | 102.16 |
| 4.50 | 0.00 | 0.00 | -13.51 | -18.95 | -65.62 | 136.29 |

| Depth [m] | kh,p [MN/m³] | kh,z [MN/m³] | Displacement [mm] | Pressure [kPa] | Shear Force [kN/m] | Moment [kNm/m] |
|--------------|-----------------|-----------------|----------------------|-------------------|-----------------------|-------------------|
| 5.00 | 0.00 | 0.00 | -9.67 | -47.93 | -46.69 | 164.86 |
| 5.50 | 0.00 | 0.00 | -6.48 | -65.87 | -18.24 | 181.47 |
| 6.00 | 0.00 | 0.00 | -3.98 | -83.80 | 19.18 | 181.61 |
| 6.50 | 36.84 | 0.00 | -2.19 | -57.27 | 59.21 | 161.24 |
| 7.00 | 36.84 | 0.00 | -1.03 | -15.70 | 76.58 | 126.43 |
| 7.50 | 36.84 | 1.84 | -0.37 | 19.98 | 73.83 | 88.02 |
| 8.00 | 36.84 | 1.84 | -0.04 | 31.71 | 60.46 | 54.20 |
| 8.50 | 36.84 | 1.84 | 0.06 | 35.13 | 43.50 | 28.14 |
| 9.00 | 36.84 | 1.84 | 0.06 | 34.19 | 26.05 | 10.78 |
| 9.50 | 36.84 | 1.84 | 0.00 | 31.52 | 9.59 | 1.92 |
| 10.00 | 36.84 | 0.00 | -0.06 | 12.84 | 0.00 | -0.00 |

Maximum values of internal forces acting on the structure

Maximum shear force = 77,99 kN/m
Maximum moment = 183,81 kNm/m
Maximum displacement = 59,8 mm



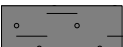
Terrain settlement behind the structure

Terrain settlement δ_{\max} = 28,9 mm

| | Coordinates x [m] | Settlement z [mm] |
|----|----------------------|----------------------|
| 1 | 0,00 | 29,9 |
| 2 | 0,75 | 37,3 |
| 3 | 1,49 | 42,4 |
| 4 | 2,24 | 45,2 |
| 5 | 2,99 | 45,7 |
| 6 | 3,73 | 43,8 |
| 7 | 4,48 | 39,7 |
| 8 | 5,23 | 33,2 |
| 9 | 5,97 | 24,5 |
| 10 | 6,72 | 13,4 |
| 11 | 7,47 | 0,0 |
| 12 | 7,47 | 0,0 |

Input data (Stage of construction 3)

Geological profile and assigned soils

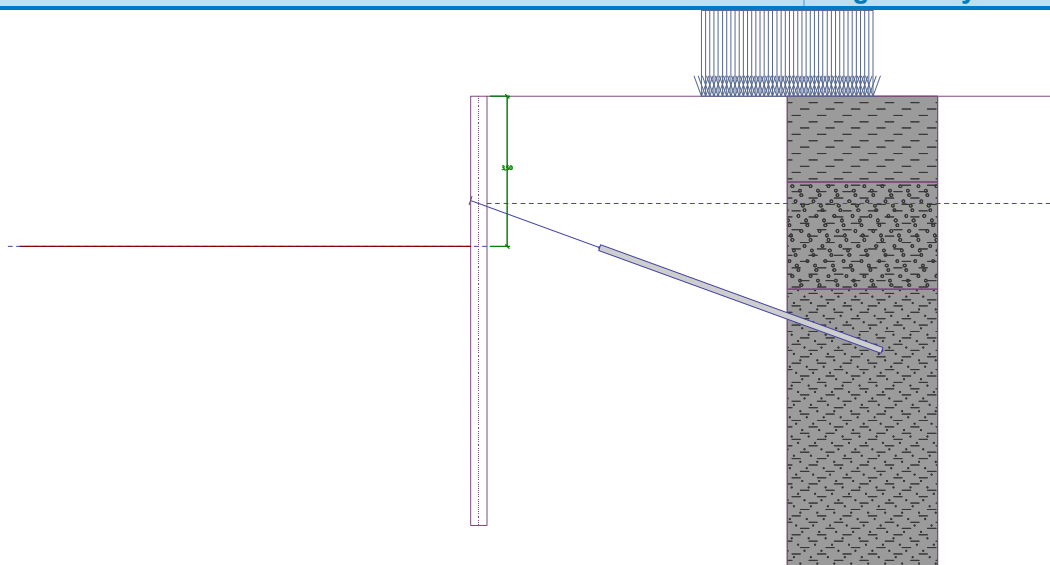
| No. | Thickness of layer t [m] | Depth z [m] | Assigned soil | Pattern |
|-----|-----------------------------|----------------|--------------------|---|
| 1 | 2,00 | 0,00 .. 2,00 | Glina |  |
| 2 | 2,50 | 2,00 .. 4,50 | Zameljen prod |  |
| 3 | - | 4,50 .. ∞ | Siva zbita peščena |  |

Excavation

Soil in front of wall is excavated to a depth of 3,50 m.

Name : 3

Stage - analysis : 3 - 0



Terrain profile

Terrain behind the structure is flat.

Water influence

GWT behind the structure lies at a depth of 2,50 m

GWT in front of the structure lies at a depth of 3,50 m

Subgrade at the heel is permeable.

Hydraulic gradient = 0,07

Input surface surcharges

| No. | Surcharge new | Surcharge change | Action | Mag.1 [kN/m ²] | Mag.2 [kN/m ²] | Ord.x x [m] | Length l [m] | Depth z [m] |
|-----|------------------|---------------------|----------|-------------------------------|-------------------------------|----------------|-----------------|----------------|
| 1 | No | No | variable | 20,00 | | 5,00 | 4,00 | on terrain |

| No. | Name |
|-----|------------------|
| 1 | Prometna obtežba |

Input anchors

| No. | New anchor | Depth z [m] | Name | Post-stressing | Force F [kN] |
|-----|---------------|----------------|-------------------------------|----------------|-----------------|
| 1 | Yes | 2,50 | Anchor No. : 1 (user-defined) | | 30,00 |

List of the new anchors

Anchor No. : 1 (user-defined)

Anchor type : prestressed bar

Production set : user-defined

Depth : z = 2,50 m

Free length : l = 3,00 m

Root length : l_k = 7,00 m

Slope : α = 20,00 °

Spacing : b = 2,40 m

Area of cross-section : A = 791,00 mm²

Elasticity modulus : E = 210000,00 MPa

Pre-stressing force : F = 30,00 kN

Tension strength : R_t = 500,00 kN

Pull out resistance (soil) : calculate from bond strength

Diameter of root : d = 140,0 mm

Bond strength : f = 150,00 kPa

Pull out resistance (grouting) : calculate from concrete strength

Standard for concrete structures : EN 1992-1-1 (EC2)
Concrete strength in compression : $f_{ck} = 20,00$ MPa
Coefficient of cohesion : $\eta_1 = 1,00$

Settings of the stage of construction

Design situation : permanent

Analysis results (Stage of construction 3)

Distribution of pressures acting on the structure (in front and behind the wall)

| Depth [m] | Ta,p [kPa] | Tk,p [kPa] | Tp,p [kPa] | Ta,z [kPa] | Tk,z [kPa] | Tp,z [kPa] |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.90 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.90 |
| 0.40 | 0.00 | 0.00 | 0.00 | 1.45 | 4.02 | 17.41 |
| 0.42 | 0.00 | 0.00 | 0.00 | 1.59 | 4.15 | 17.77 |
| 0.83 | 0.00 | 0.00 | 0.00 | 6.06 | 8.25 | 29.65 |
| 1.25 | 0.00 | 0.00 | 0.00 | 10.52 | 12.27 | 41.52 |
| 1.45 | 0.00 | 0.00 | 0.00 | 12.70 | 14.16 | 47.29 |
| 1.45 | 0.00 | 0.00 | 0.00 | 24.65 | 24.65 | 47.29 |
| 1.67 | 0.00 | 0.00 | 0.00 | 27.04 | 27.04 | 53.39 |
| 2.00 | 0.00 | 0.00 | 0.00 | 30.75 | 30.75 | 62.89 |
| 2.00 | 0.00 | 0.00 | 0.00 | 15.68 | 19.62 | 185.86 |
| 2.08 | 0.00 | 0.00 | 0.00 | 16.16 | 20.42 | 193.87 |
| 2.50 | 0.00 | 0.00 | 0.00 | 18.54 | 24.32 | 233.94 |
| 2.50 | 0.00 | 0.00 | 0.00 | 18.54 | 24.32 | 233.94 |
| 2.92 | 0.00 | 0.00 | 0.00 | 25.58 | 30.92 | 261.62 |
| 3.33 | 0.00 | 0.00 | 0.00 | 32.62 | 37.39 | 289.30 |
| 3.50 | 0.00 | 0.00 | 0.00 | 35.44 | 39.95 | 300.37 |
| 3.50 | 0.00 | -0.00 | -3.66 | 35.44 | 39.96 | 300.38 |
| 3.75 | 0.00 | -1.13 | -16.67 | 35.77 | 40.88 | 314.92 |
| 3.85 | 0.00 | -1.57 | -21.65 | 35.90 | 41.23 | 320.49 |
| 4.17 | -1.05 | -3.02 | -38.36 | 36.32 | 42.37 | 339.16 |
| 4.50 | -2.13 | -4.53 | -55.71 | 36.76 | 43.51 | 358.56 |
| 4.50 | 0.00 | -4.41 | -62.94 | 32.94 | 42.67 | 284.54 |
| 4.58 | 0.00 | -4.78 | -66.09 | 33.10 | 42.94 | 288.03 |
| 5.00 | 0.00 | -6.61 | -81.84 | 33.91 | 44.25 | 305.52 |
| 5.42 | 0.00 | -8.45 | -97.60 | 34.72 | 45.53 | 323.00 |
| 5.83 | 0.00 | -10.29 | -113.35 | 35.52 | 46.78 | 340.48 |
| 6.07 | 0.00 | -11.31 | -122.13 | 35.97 | 47.47 | 350.23 |
| 6.25 | -0.72 | -12.12 | -129.10 | 36.33 | 48.02 | 357.97 |
| 6.67 | -2.33 | -13.96 | -144.85 | 37.14 | 49.26 | 375.45 |
| 7.08 | -3.95 | -15.80 | -160.61 | 37.95 | 50.49 | 392.93 |
| 7.50 | -5.56 | -17.63 | -176.36 | 38.75 | 51.73 | 410.42 |
| 7.92 | -7.18 | -19.47 | -192.11 | 39.56 | 52.98 | 427.90 |
| 8.33 | -8.80 | -21.31 | -207.87 | 40.37 | 54.23 | 445.38 |
| 8.75 | -10.41 | -23.14 | -223.62 | 41.18 | 55.49 | 462.87 |
| 9.17 | -12.03 | -24.98 | -239.37 | 41.98 | 56.76 | 480.35 |
| 9.58 | -13.65 | -26.82 | -255.13 | 42.79 | 58.05 | 497.83 |
| 10.00 | -15.26 | -28.65 | -270.88 | 43.60 | 59.34 | 515.31 |

Distributions of the modulus of subsoil reaction and internal forces on the structure

| Depth [m] | kh,p [MN/m ³] | kh,z [MN/m ³] | Displacement [mm] | Pressure [kPa] | Shear Force [kN/m] | Moment [kNm/m] |
|--------------|------------------------------|------------------------------|----------------------|-------------------|-----------------------|-------------------|
| 0.00 | 0.00 | 0.33 | -59.59 | 0.07 | -0.00 | -0.00 |
| 0.50 | 0.00 | 0.00 | -54.21 | 2.48 | -0.69 | 0.17 |
| 1.00 | 0.00 | 6.68 | -48.83 | 9.04 | -3.52 | 0.63 |
| 1.50 | 0.00 | 6.68 | -43.45 | 26.32 | -9.96 | 3.77 |
| 2.00 | 0.00 | 0.00 | -38.09 | 62.89 | -26.23 | 12.65 |
| 2.50 | 0.00 | 28.89 | -32.78 | 22.72 | -38.36 | 27.77 |
| 2.50 | 0.00 | 28.89 | -32.78 | 22.72 | -26.61 | 27.77 |
| 3.00 | 0.00 | 28.89 | -27.59 | 30.46 | -39.92 | 44.30 |
| 3.50 | 0.00 | 28.89 | -22.61 | 38.04 | -56.92 | 68.22 |
| 3.50 | 0.00 | 28.89 | -22.53 | 34.23 | -57.22 | 68.68 |
| 4.00 | 0.00 | 28.89 | -17.82 | 8.32 | -67.78 | 100.28 |
| 4.50 | 0.00 | 36.84 | -13.47 | -17.27 | -65.33 | 134.05 |
| 5.00 | 0.00 | 36.84 | -9.64 | -46.74 | -47.14 | 162.74 |
| 5.50 | 0.00 | 36.84 | -6.45 | -64.91 | -19.26 | 179.77 |
| 6.00 | 0.00 | 36.84 | -3.96 | -82.85 | 17.65 | 180.60 |
| 6.50 | 36.84 | 36.84 | -2.17 | -55.11 | 56.87 | 161.19 |
| 7.00 | 36.84 | 36.84 | -1.00 | -13.31 | 73.06 | 127.86 |
| 7.50 | 36.84 | 36.84 | -0.34 | 9.87 | 73.23 | 90.82 |
| 8.00 | 36.84 | 36.84 | -0.03 | 31.43 | 62.12 | 56.53 |
| 8.50 | 36.84 | 36.84 | 0.06 | 36.96 | 44.51 | 29.76 |
| 9.00 | 36.84 | 36.84 | 0.02 | 33.69 | 26.61 | 12.05 |
| 9.50 | 36.84 | 36.84 | -0.06 | 26.75 | 11.42 | 2.69 |
| 10.00 | 36.84 | 36.84 | -0.16 | 18.88 | 0.00 | 0.00 |

Maximum values of internal forces acting on the structure

Maximum shear force = 74,54 kN/m
Maximum moment = 182,50 kNm/m
Maximum displacement = 59,6 mm

Anchors forces

| No. | Depth [m] | Displacement [mm] | Anchor force [kN] |
|-----|--------------|----------------------|----------------------|
| 1 | 2,50 | -32,8 | 30,00 |

Terrain settlement behind the structure


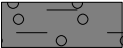
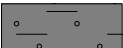
Terrain settlement δ_{\max} = 28,7 mm

| | Coordinates x [m] | Settlement z [mm] |
|----|----------------------|----------------------|
| 1 | 0,00 | 29,9 |
| 2 | 0,75 | 37,2 |
| 3 | 1,49 | 42,3 |
| 4 | 2,24 | 45,0 |
| 5 | 2,99 | 45,5 |
| 6 | 3,73 | 43,7 |
| 7 | 4,48 | 39,5 |
| 8 | 5,23 | 33,1 |
| 9 | 5,97 | 24,4 |
| 10 | 6,72 | 13,3 |

| | Coordinates x [m] | Settlement z [mm] |
|----|----------------------|----------------------|
| 11 | 7,47 | 0,0 |
| 12 | 7,47 | 0,0 |

Input data (Stage of construction 4)

Geological profile and assigned soils

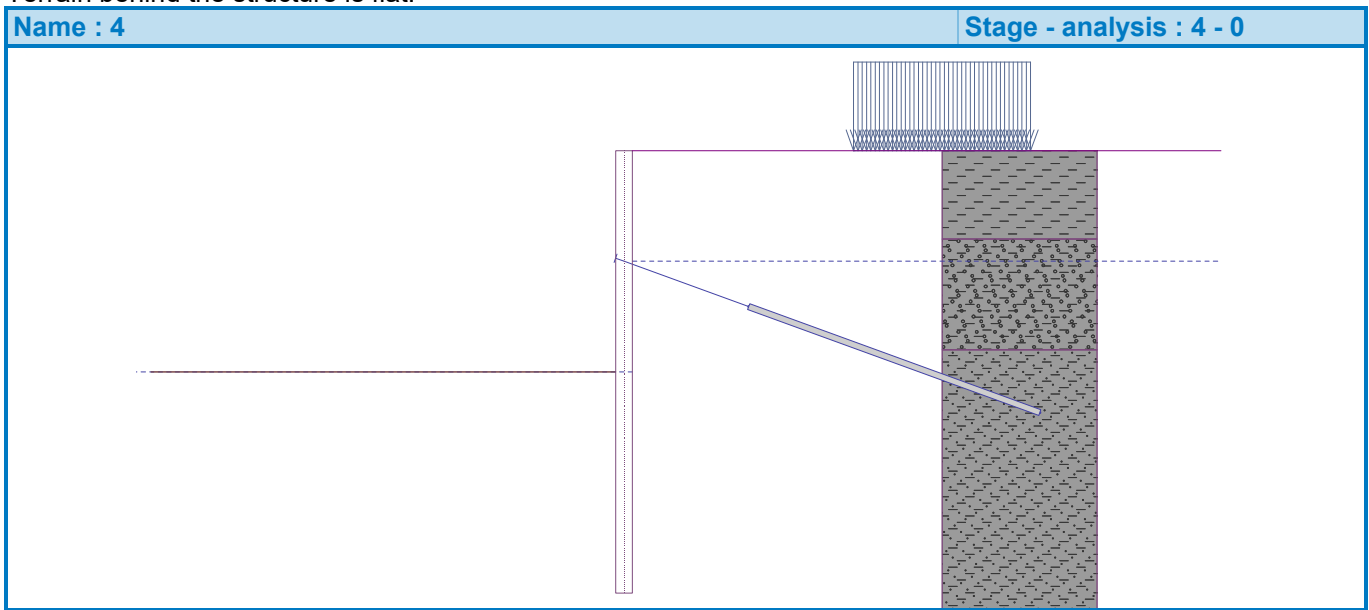
| No. | Thickness of layer t [m] | Depth z [m] | Assigned soil | Pattern |
|-----|-----------------------------|----------------|--------------------|---|
| 1 | 2,00 | 0,00 .. 2,00 | Glina |  |
| 2 | 2,50 | 2,00 .. 4,50 | Zameljen prod |  |
| 3 | - | 4,50 .. ∞ | Siva zbita peščena |  |

Excavation

Soil in front of wall is excavated to a depth of 5,00 m.

Terrain profile

Terrain behind the structure is flat.



Water influence

GWT behind the structure lies at a depth of 2,50 m

GWT in front of the structure lies at a depth of 5,00 m

Subgrade at the heel is permeable.

Hydraulic gradient = 0,20

Input surface surcharges

| No. | Surcharge | | Action | Mag.1 [kN/m ²] | Mag.2 [kN/m ²] | Ord.x x [m] | Length l [m] | Depth z [m] |
|-----|-----------|--------|----------|-------------------------------|-------------------------------|----------------|-----------------|----------------|
| | new | change | | | | | | |
| 1 | No | No | variable | 20,00 | | 5,00 | 4,00 | on terrain |

| No. | Name |
|-----|------------------|
| 1 | Prometna obtežba |

Input anchors

| No. | New anchor | Depth z [m] | Name | Post-stressing | Force F [kN] |
|-----|------------|-------------|-------------------------------|----------------|--------------|
| 1 | No | 2,50 | Anchor No. : 1 (user-defined) | | 276,84 |

Settings of the stage of construction

Design situation : permanent

Analysis results (Stage of construction 4)

Distribution of pressures acting on the structure (in front and behind the wall)

| Depth [m] | Ta,p [kPa] | Tk,p [kPa] | Tp,p [kPa] | Ta,z [kPa] | Tk,z [kPa] | Tp,z [kPa] |
|-----------|------------|------------|------------|------------|------------|------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.90 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.90 |
| 0.40 | 0.00 | 0.00 | 0.00 | 1.45 | 4.02 | 17.41 |
| 0.42 | 0.00 | 0.00 | 0.00 | 1.59 | 4.15 | 17.77 |
| 0.83 | 0.00 | 0.00 | 0.00 | 6.06 | 8.25 | 29.65 |
| 1.25 | 0.00 | 0.00 | 0.00 | 10.52 | 12.27 | 41.52 |
| 1.45 | 0.00 | 0.00 | 0.00 | 12.70 | 14.16 | 47.29 |
| 1.45 | 0.00 | 0.00 | 0.00 | 24.65 | 24.65 | 47.29 |
| 1.67 | 0.00 | 0.00 | 0.00 | 27.04 | 27.04 | 53.39 |
| 2.00 | 0.00 | 0.00 | 0.00 | 30.75 | 30.75 | 62.89 |
| 2.00 | 0.00 | 0.00 | 0.00 | 15.68 | 19.62 | 185.86 |
| 2.08 | 0.00 | 0.00 | 0.00 | 16.16 | 20.42 | 193.87 |
| 2.50 | 0.00 | 0.00 | 0.00 | 18.54 | 24.32 | 233.94 |
| 2.50 | 0.00 | 0.00 | 0.00 | 18.54 | 24.32 | 233.94 |
| 2.92 | 0.00 | 0.00 | 0.00 | 25.75 | 31.15 | 264.33 |
| 3.33 | 0.00 | 0.00 | 0.00 | 32.96 | 37.87 | 294.72 |
| 3.75 | 0.00 | 0.00 | 0.00 | 40.17 | 44.48 | 325.11 |
| 4.17 | 0.00 | 0.00 | 0.00 | 47.38 | 51.01 | 355.50 |
| 4.50 | 0.00 | 0.00 | 0.00 | 53.15 | 56.18 | 379.82 |
| 4.50 | 0.00 | 0.00 | 0.00 | 49.48 | 55.31 | 302.23 |
| 4.58 | 0.00 | 0.00 | 0.00 | 50.98 | 56.58 | 306.81 |
| 5.00 | 0.00 | 0.00 | 0.00 | 58.48 | 62.93 | 329.69 |
| 5.00 | 0.00 | -0.00 | -25.13 | 58.49 | 62.93 | 329.70 |
| 5.42 | 0.00 | -1.61 | -38.92 | 57.55 | 63.00 | 348.12 |
| 5.83 | 0.00 | -3.21 | -52.70 | 56.62 | 63.04 | 366.54 |
| 6.25 | 0.00 | -4.82 | -66.48 | 55.68 | 63.07 | 384.96 |
| 6.67 | 0.00 | -6.43 | -80.27 | 54.74 | 63.09 | 403.38 |
| 7.08 | 0.00 | -8.04 | -94.05 | 53.80 | 63.11 | 421.80 |
| 7.50 | 0.00 | -9.64 | -107.84 | 52.87 | 63.14 | 440.23 |
| 7.92 | 0.00 | -11.25 | -121.62 | 51.93 | 63.17 | 458.65 |
| 7.93 | 0.00 | -11.31 | -122.13 | 51.89 | 63.17 | 459.33 |
| 8.33 | -1.36 | -12.86 | -135.40 | 50.99 | 63.21 | 477.07 |
| 8.75 | -2.78 | -14.46 | -149.19 | 50.05 | 63.26 | 495.49 |
| 9.17 | -4.19 | -16.07 | -162.97 | 49.12 | 63.32 | 513.91 |
| 9.58 | -5.60 | -17.68 | -176.75 | 48.18 | 63.39 | 532.34 |
| 10.00 | -7.02 | -19.29 | -190.54 | 47.24 | 63.47 | 550.76 |

Distributions of the modulus of subsoil reaction and internal forces on the structure

| Depth [m] | kh,p [MN/m ³] | kh,z [MN/m ³] | Displacement [mm] | Pressure [kPa] | Shear Force [kN/m] | Moment [kNm/m] |
|--------------|------------------------------|------------------------------|----------------------|-------------------|-----------------------|-------------------|
| 0.00 | 0.00 | 0.00 | -55.36 | 5.90 | 0.00 | -0.00 |
| 0.50 | 0.00 | 0.00 | -51.66 | 20.15 | -6.51 | 1.33 |
| 1.00 | 0.00 | 6.68 | -47.97 | 14.75 | -15.24 | 6.45 |
| 1.50 | 0.00 | 0.00 | -44.31 | 25.18 | -22.26 | 16.13 |
| 2.00 | 0.00 | 0.00 | -40.72 | 30.75 | -36.25 | 30.64 |
| 2.50 | 0.00 | 0.00 | -37.24 | 18.54 | -45.55 | 51.19 |
| 2.50 | 0.00 | 0.00 | -37.24 | 18.54 | 62.84 | 51.19 |
| 3.00 | 0.00 | 0.00 | -33.93 | 27.19 | 51.41 | 22.45 |
| 3.50 | 0.00 | 0.00 | -30.72 | 35.85 | 35.65 | 0.51 |
| 4.00 | 0.00 | 0.00 | -27.50 | 44.50 | 15.56 | -12.48 |
| 4.50 | 0.00 | 0.00 | -24.25 | 53.15 | -8.85 | -14.33 |
| 5.00 | 0.00 | 0.00 | -20.96 | 58.41 | -35.79 | -3.41 |
| 5.00 | 0.00 | 0.00 | -20.91 | 33.22 | -36.16 | -3.12 |
| 5.50 | 0.00 | 0.00 | -17.62 | 15.69 | -48.29 | 18.18 |
| 6.00 | 0.00 | 0.00 | -14.37 | -1.97 | -51.72 | 43.55 |
| 6.50 | 0.00 | 0.00 | -11.30 | -19.64 | -46.32 | 68.43 |
| 7.00 | 0.00 | 0.00 | -8.49 | -37.30 | -32.08 | 88.40 |
| 7.50 | 0.00 | 0.00 | -6.02 | -54.97 | -9.01 | 99.04 |
| 8.00 | 0.00 | 0.00 | -3.94 | -72.64 | 22.89 | 95.94 |
| 8.50 | 36.84 | 0.00 | -2.22 | -44.75 | 56.92 | 75.13 |
| 9.00 | 36.84 | 0.00 | -0.80 | 4.62 | 66.59 | 43.23 |
| 9.50 | 0.00 | 36.84 | 0.45 | 74.79 | 48.04 | 12.89 |
| 10.00 | 0.00 | 36.84 | 1.65 | 117.27 | -0.00 | -0.00 |

Maximum values of internal forces acting on the structure

Maximum shear force = 66,60 kN/m
Maximum moment = 99,69 kNm/m
Maximum displacement = 55,4 mm

Anchors forces

| No. | Depth [m] | Displacement [mm] | Anchor force [kN] |
|-----|--------------|----------------------|----------------------|
| 1 | 2,50 | -37,2 | 276,84 |

Dimensioning No. 1 (Stage of construction 4)

Failure by heave

Favourable weight of soil $\sigma_{stb} = 85,50$ kPa
Unfavourable water pressure $u_{dst} = 33,75$ kPa

Verification of failure by heave is SATISFACTORY

Verification of failure by piping

Critical hydraulic gradient $i_c = 0,73$
Hydraulic gradient $i = 0,20$

Verification of failure by piping is SATISFACTORY

Dimensioning No. 1

Distribution of forces on construction

| | Disp. min [mm] | Disp. max [mm] | Shear force min. [kN/m] | Shear force max [kN/m] | Moment min. [kNm/m] | Moment max. [kNm/m] |
|-------|-------------------|-------------------|----------------------------|---------------------------|------------------------|------------------------|
| 0.00 | -59.79 | -0.27 | -0.00 | 0.00 | -0.00 | 0.00 |
| 0.01 | -59.72 | -0.27 | -0.04 | -0.00 | 0.00 | 0.00 |
| 0.01 | -59.64 | -0.27 | -0.10 | 0.01 | -0.00 | 0.00 |
| 0.50 | -54.40 | -0.26 | -6.51 | 1.18 | -0.28 | 1.33 |
| 1.00 | -49.01 | -0.24 | -15.24 | 1.99 | -1.10 | 6.45 |
| 1.50 | -44.31 | -0.22 | -22.26 | 1.60 | -2.16 | 16.13 |
| 2.00 | -40.72 | -0.19 | -36.25 | -4.76 | -1.36 | 30.64 |
| 2.50 | -37.24 | -0.16 | -45.55 | -2.70 | 0.66 | 51.19 |
| 2.50 | -37.24 | -0.16 | -32.22 | 62.84 | 0.66 | 51.19 |
| 3.00 | -33.93 | -0.13 | -43.60 | 51.41 | 1.48 | 44.30 |
| 3.50 | -30.74 | -0.10 | -59.07 | 35.79 | 0.66 | 69.41 |
| 3.50 | -30.74 | -0.10 | -59.07 | 35.79 | 0.66 | 69.41 |
| 3.50 | -30.72 | -0.10 | -59.20 | 35.65 | 0.51 | 69.64 |
| 3.50 | -30.69 | -0.10 | -59.33 | 35.50 | 0.37 | 69.88 |
| 3.50 | -30.69 | -0.10 | -59.33 | 35.50 | 0.37 | 69.88 |
| 4.00 | -27.50 | -0.09 | -68.76 | 15.56 | -12.48 | 102.16 |
| 4.50 | -24.25 | -0.07 | -65.62 | 0.48 | -14.33 | 136.29 |
| 5.00 | -20.96 | -0.06 | -47.32 | 0.61 | -3.41 | 164.66 |
| 5.00 | -20.94 | -0.06 | -47.14 | 0.61 | -3.26 | 164.86 |
| 5.00 | -20.91 | -0.06 | -46.94 | 0.61 | -3.12 | 165.04 |
| 5.00 | -20.91 | -0.06 | -46.94 | 0.61 | -3.12 | 165.04 |
| 5.50 | -17.62 | -0.06 | -48.29 | 0.54 | 0.52 | 181.47 |
| 6.00 | -14.37 | -0.05 | -51.72 | 19.18 | 0.28 | 181.61 |
| 6.50 | -11.30 | -0.05 | -46.32 | 59.21 | 0.12 | 161.24 |
| 7.00 | -8.49 | -0.05 | -32.08 | 76.58 | 0.03 | 127.86 |
| 7.50 | -6.02 | -0.04 | -9.01 | 73.83 | -0.02 | 99.04 |
| 8.00 | -3.94 | -0.03 | 0.00 | 62.12 | -0.03 | 95.94 |
| 8.50 | -2.22 | 0.06 | -0.02 | 56.92 | -0.02 | 75.13 |
| 9.00 | -0.80 | 0.06 | -0.02 | 66.59 | -0.01 | 43.23 |
| 9.50 | -0.06 | 0.45 | -0.01 | 48.04 | -0.00 | 12.89 |
| 10.00 | -0.16 | 1.65 | -0.00 | 0.00 | -0.00 | 0.00 |

Maximum values of internal forces

Maximum displacement = -59,8 mm
Minimum displacement = 1,7 mm
Maximum bending moment = 183,81 kNm/m
Minimum bending moment = -15,07 kNm/m
Maximum shear force = 77,99 kN/m

Verification of steel section according to EN 1993-1-1

All construction stages are taken into the analysis.
Partial factor on load = 1,00

Internal forces per 1 m of wall

$M_{\max} = 183,81 \text{ kNm/m}; \quad Q = 3,13 \text{ kN/m}$
 $Q_{\max} = 77,99 \text{ kN/m}; \quad M = 110,89 \text{ kNm/m}$

Verification of max. moment $M_{\max} + Q$:

Verification of bending:

$M_{\max}/M_{c,Rd} = 0,479 \leq 1$ **Is satisfactory**

Verification of shear:

$Q/V_{c,Rd} = 0,004 \leq 1$ **Is satisfactory**

Verification of plane state of stress:

Normal stress $\sigma_{x,Ed} = 108,84$ MPa

Shear stress $\tau_{Ed} = 0,41$ MPa

Verification: $(\sigma_{x,Ed}/(f_y/\gamma_{M0}))^2 + 3*(\tau_{Ed}/(f_y/\gamma_{M0}))^2 = 0,206 \leq 1$ **Is satisfactory**

Verification of max. shear force Q_{\max} + M:

Verification of bending:

$M/M_{c,Rd} = 0,289 \leq 1$ **Is satisfactory**

Verification of shear:

$Q_{\max}/V_{c,Rd} = 0,105 \leq 1$ **Is satisfactory**

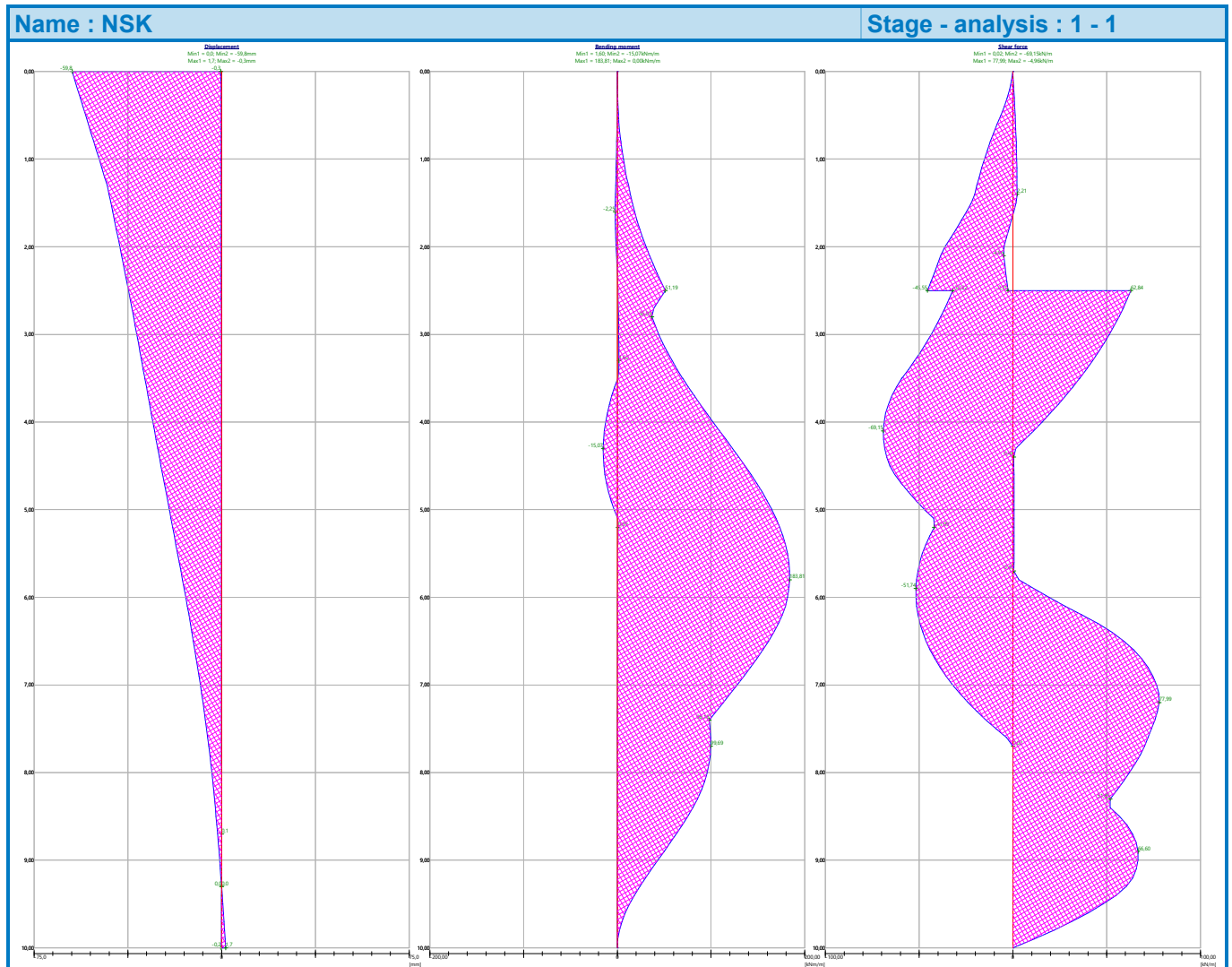
Verification of plane state of stress:

Normal stress $\sigma_{x,Ed} = 65,66$ MPa

Shear stress $\tau_{Ed} = 10,16$ MPa

Verification: $(\sigma_{x,Ed}/(f_y/\gamma_{M0}))^2 + 3*(\tau_{Ed}/(f_y/\gamma_{M0}))^2 = 0,080 \leq 1$ **Is satisfactory**

Cross section is SATISFACTORY



Verification of anchors

| Anchor | Stage | Depth z [m] | Max. force F [kN] | Anchor strength R _t [kN] | Pull-out res. (soil) R _e [kN] | Pull-out res. (grouting) R _c [kN] | Verification |
|--------|-------|----------------|-------------------------|---|--|--|---------------------------|
| 1 | 4 | 2,50 | 276,84 | 454,55 | 342,08 | 639,91 | is satisfactory (80,93 %) |

Anchor with max. utilization - Nr. 1. (Stage 4; z = 2,50 m)

Utilization is 80,93 %

anchors bearing capacity is SATISFACTORY