Project

Job name : Zemeljski plaz na parceli št. 466/2 k.o. 758 pri hiši Okoška gora 51
Part : Pilotna stena
Description : Konzola nad piloti
Client : Občina Oplotnica
Author : GEOING d.o.o.
Date : 28/01/2025

Standard

Standard **EN 1992-1-1/Default EC**.

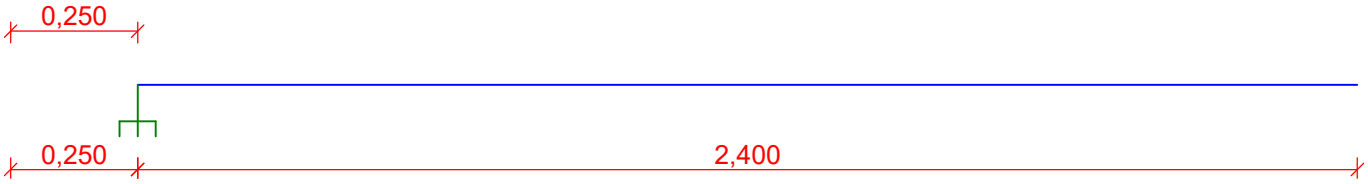
1 Konzola

1.1 Input data

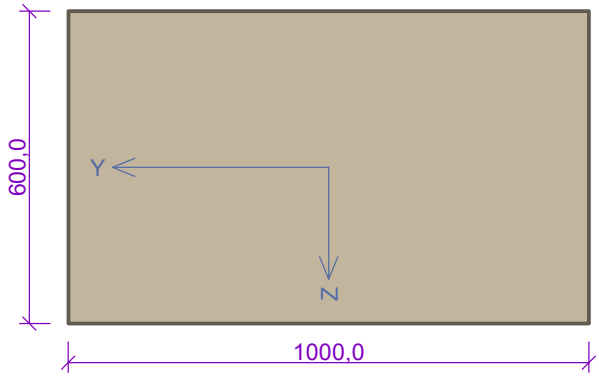
Geometry

Length = 2,40m

x [m]	Point kind	Width [m]	A/L [m]	I/L [m³]	Offset [m]
0,000	fixed support	0,250	-	-	0,250
2,400	free	-	-	-	-



Cross-section



Materials

Concrete: C 30/37
f_{ck} = 30,0 MPa; f_{ctm} = 2,9 MPa; E_{cm} = 33000 MPa

Longitudinal steel: B500B
f_{yk} = 500,0 MPa; E_s = 200000 MPa

Transverse steel: B500B
f_{yk} = 500,0 MPa; E_s = 200000 MPa

Load cases

no.	Name	Code	Type	As* main	γ_f ($\gamma_{f,inf}$)**	Factors for combinations				
						ξ	Categ.***	ψ_0	ψ_1	ψ_2
1	G1 force -hiša	Force	Permanent	-	1,35(0,90)	0,85	-	-	-	-
2	G2 self weight-permanent	Self weight	Permanent	-	1,35(0,90)	0,85	-	-	-	-

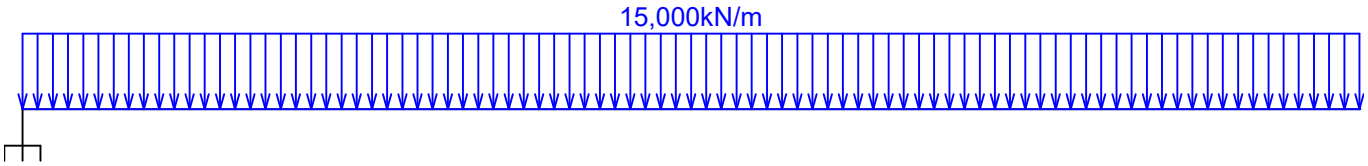
* load acts in combinations as main variable
** $\gamma_{f,inf}$ for favourable dead loads
*** Category of live loads according to table A1.1 in EN 1990

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G1 force -hiša - load				
Type	Coor.x [m]	Length [m]	Size1	Size2
force	2,000	-	100,000kN	-



G2 self weight-permanent - load				
Type	Coor.x [m]	Length [m]	Size1	Size2
uniform	0,000	2,400	15,000kN/m	-



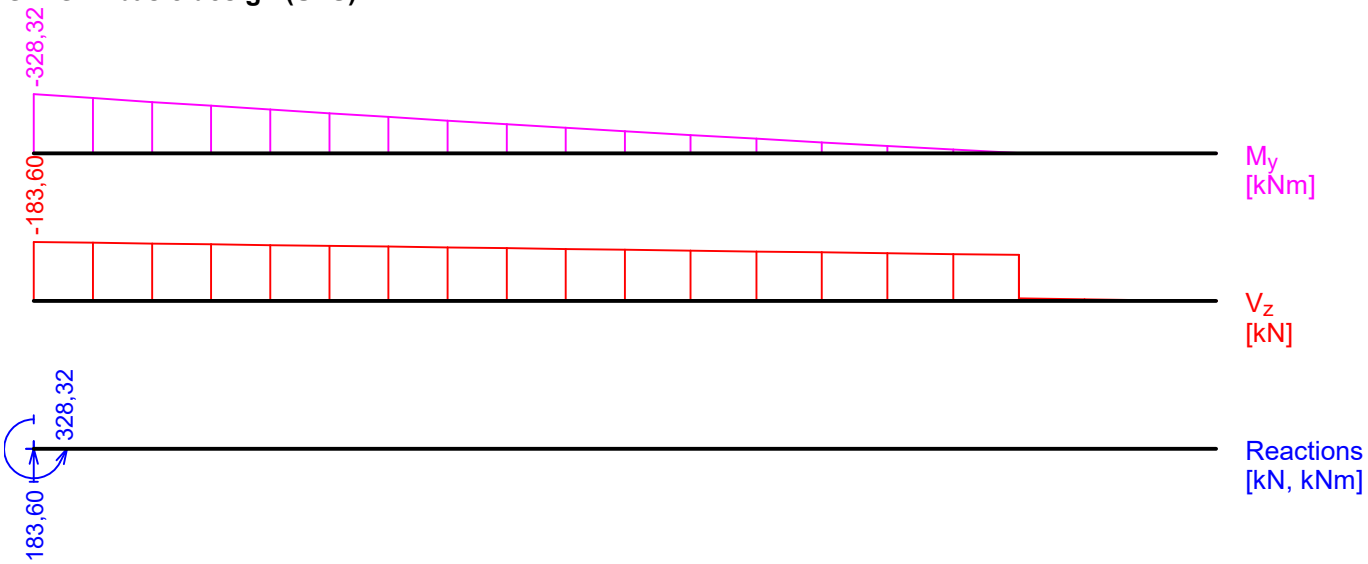
Combinations

Combination for check of ultimate limit state (ULS), 1st order

Number	Comb. name and type
	Composition
1	G1+G2; basic combination
	$\gamma_{f,sup,1}(1,35)$*G1 + $\gamma_{f,sup,2}(1,35)$*G2

Internal forces

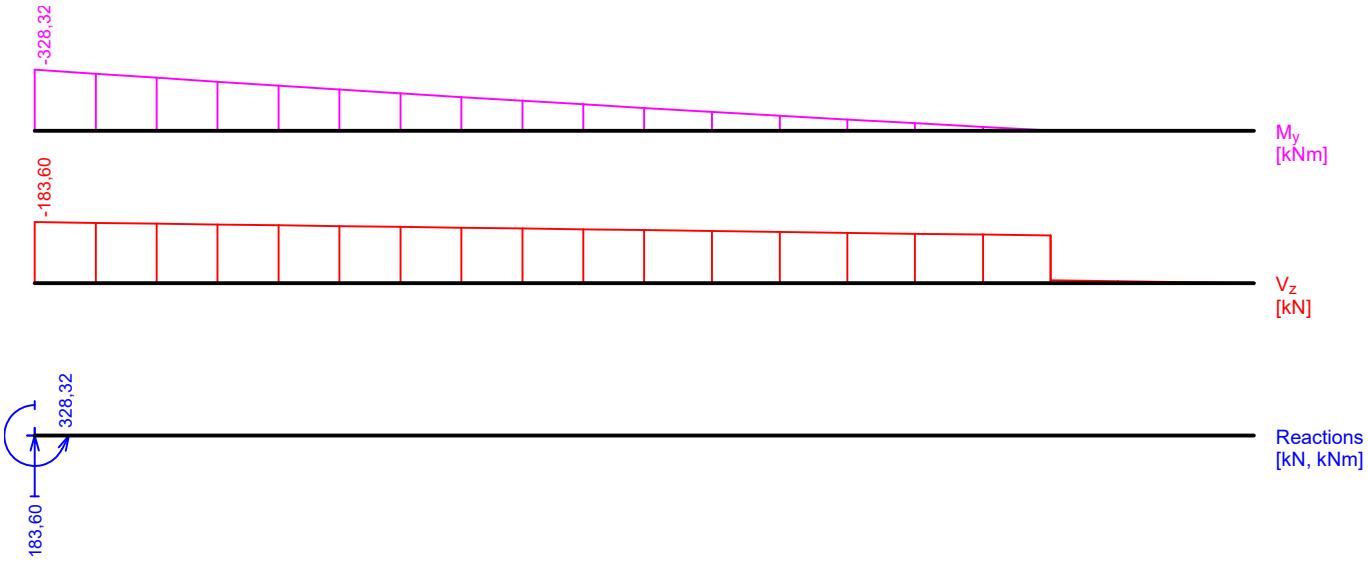
G1+G2 - basic design (ULS)



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Envelopes

Envelope basic design (ULS)								
x [m]	Max M_{Edy} [kNm]	Min M_{Edy} [kNm]	Max V_{Edz} [kN]	Min V_{Edz} [kN]	Max R_z [kN]	Min R_z [kN]	Max RO_x [kNm]	Min RO_x [kNm]
0,000	-328,32	-328,32	-183,60	-183,60	183,60	183,60	328,32	328,32
0,120	-306,45	-306,45	-181,17	-181,17	-	-	-	-
0,240	-284,84	-284,84	-178,74	-178,74	-	-	-	-
0,360	-263,55	-263,55	-176,31	-176,31	-	-	-	-
0,480	-242,52	-242,52	-173,88	-173,88	-	-	-	-
0,600	-221,82	-221,82	-171,45	-171,45	-	-	-	-
0,720	-201,38	-201,38	-169,02	-169,02	-	-	-	-
0,840	-181,26	-181,26	-166,59	-166,59	-	-	-	-
0,960	-161,40	-161,40	-164,16	-164,16	-	-	-	-
1,080	-141,86	-141,86	-161,73	-161,73	-	-	-	-
1,200	-122,58	-122,58	-159,30	-159,30	-	-	-	-
1,333	-101,59	-101,59	-156,61	-156,61	-	-	-	-
1,467	-80,78	-80,78	-153,89	-153,89	-	-	-	-
1,600	-60,48	-60,48	-151,20	-151,20	-	-	-	-
1,733	-40,56	-40,56	-148,51	-148,51	-	-	-	-
1,867	-20,85	-20,85	-145,79	-145,79	-	-	-	-
2,000	-1,62L	-1,62L	-143,10L	-143,10L	-	-	-	-
2,000	-1,62R	-1,62R	-8,10R	-8,10R	-	-	-	-
2,133	-0,74	-0,74	-5,41	-5,41	-	-	-	-
2,267	-0,19	-0,19	-2,69	-2,69	-	-	-	-
2,400	0,00	0,00	0,00	0,00	-	-	-	-



Reactions extremes

Reactions extremes basic design (ULS)	
x [m]	Reaction
0,000	Max R_z = 183,60kN - G1+G2
0,000	Min R_z = 183,60kN - G1+G2
0,000	Max RO_x = 328,32kNm - G1+G2

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Reactions extremes basic design (ULS)	
x [m]	Reaction
0,000	Min RO_x = 328,32kNm - G1+G2

Longitudinal reinf.

Bar type	Beginning [m]	End [m]	Cover [mm]	Profile [mm]	Count
Upper	0,000	2,400	30,0	16	7
Bottom	0,000	2,400	30,0	16	4

Reinforcement in compression not considered.

Shear reinf.

Sector no.: 1, (0,00m - 2,40m)
Boundary stirrups
Profile: 10 mm; Distance: 200,0 mm

Ties, inner stirrups
Profile: 10 mm; Distance: 200,0 mm; Legs: 5

Minimum cover

Structural class: S4
c_{min} = max($c_{min,b}$; $c_{min,dur}$; 10) = max(10; 10; 10) = 10 mm
c_{nom} = c_{min} + Δc_{dev} + $\varnothing_s$ = 10 + 10 + 10 = 30 mm

1.2 Check of ultimate limit state

Ultimate limit state is checked for envelope of extreme loads

Bent-up bar

Reinforcement in compression not considered; moment reduction - no; shear effect considered

Check of bar spacings

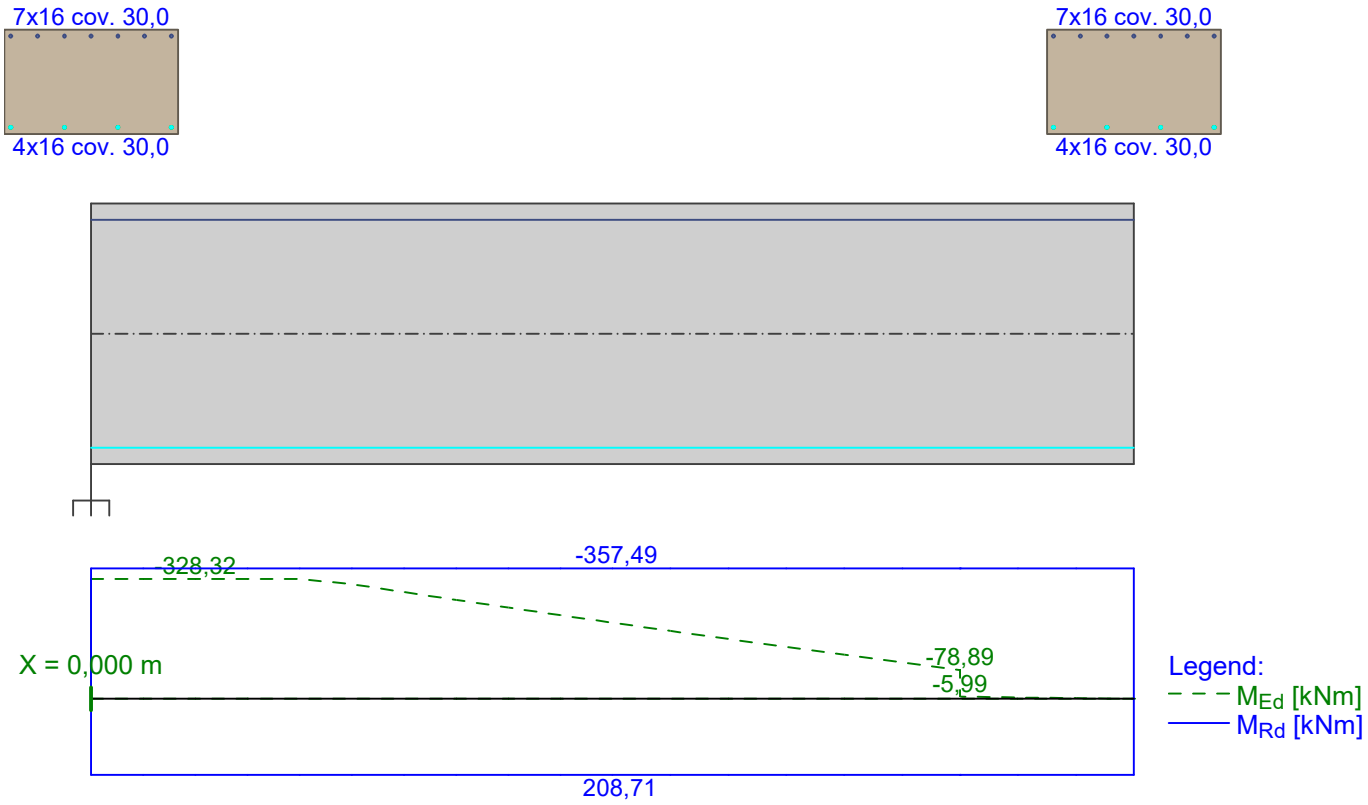
Bar spacing pass.

Check of min and max reinforcement level

Beam (reinforcement in tension - min, total reinforcement - max):
$\rho_{s,t}$ = 0,0025 $\geq$ $\rho_{s,min}$ = 0,00151 $\Rightarrow$ **Pass**
ρ_s = 0,00369 $\leq$ $\rho_{s,max}$ = 0,04 $\Rightarrow$ **Pass**

Critical cut at point x = 0,000m
M_{Ed} = -328,32kNm $\leq$ M_{Rd} = -357,49kNm $\Rightarrow$ Pass
Member bending PASS

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Shear

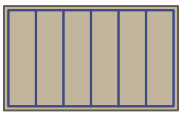
Member type: beam
Critical cut at point x = 0,000m

Shear reinforcement ratio

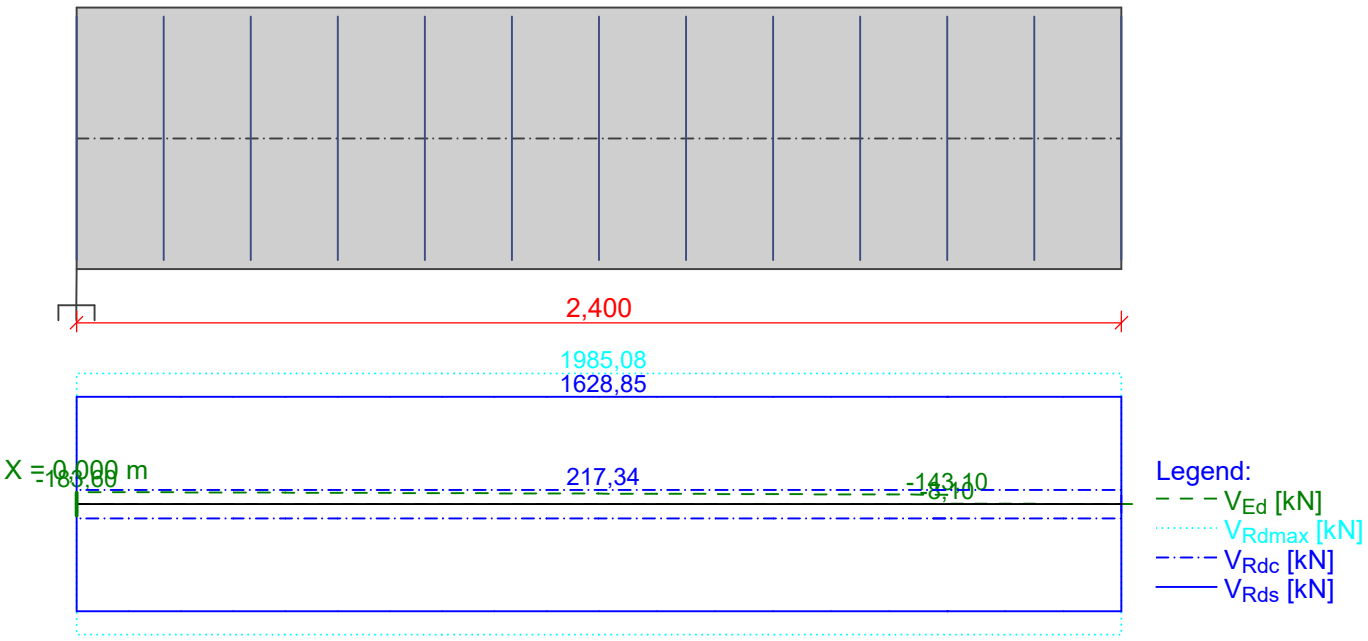
$\rho_{w,min} = 0{,}000876 \leq \rho_w = 0{,}00275 \Rightarrow$ **Pass**
Max stirrup spacing $s_{l,max} = 421{,}5$ mm $\geq 200{,}0$ mm $\Rightarrow$ **Pass**
Max stirrup legs spacing $s_{t,max} = 421{,}5$ mm $\geq 158{,}3$ mm $\Rightarrow$ **Pass**

$V_{Ed} = 183{,}60\text{kN} \leq V_{Rd} = 1628{,}85\text{kN} \Rightarrow$ Pass
Member shear PASS

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Boundary stirrups: 2x10mm
pc: 11; 0,200m
Ties, inner stirrups: 5x10mm
pc: 11; 0,200m



Anchorage

End adjustment of bars - Straight bar

Type	profile	Beginning		End		Eff. length	Total length
		σ_{sd}	l_{bd}	σ_{sd}	l_{bd}		
	[mm]	[MPa]	[m]	[MPa]	[m]	[m]	[m]
Upper	16	434,78	0,719	434,78	0,719	2,400	3,839
Bottom	16	-397,83	0,160	434,78	0,504	2,400	3,064

Ultimate limit state PASS

1.3 Check of serviceability limit state

No service loads are set.

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