

NASLOVNA STRAN NAČRTA

NAČRT GRADBENIŠTVA

PODATKI O GRADNJI

naziv gradnje	Ureditev območja pokopališče Idrija
kratek opis gradnje	Izdelava armiranobetonskih opornih zidov.

VRSTE GRADNJE

označiti vse ustrezne vrste gradnje

- ☐ NOVOGRADNJA - NOVOZGRAJEN OBJEKT
☐ NOVOGRADNJA - PRIZIDAVA
☐ REKONSTRUKCIJA
☐ SPREMEMBA NAMEMBOSTI
☐ ODSTRANITEV CELOTNEGA OBJEKTA
☐ LEGALIZACIJA
☒ INVESTICIJSKO VZDRŽEVALNA DELA

PODATKI O PROJEKTNi DOKUMENTACIJI

vrsta dokumentacije	PZR (projektna dokumentacija za razpis)
številka projekta	7/2025

PODATKI O NAČRTU

strokovno področje načrta	
naziv načrta	Načrt gradbeništva
številka načrta	107/26
datum izdelave	16.10.2026
datum spremembe	

PODATKI O PROJEKTANTU NAČRTA

projektant načrta (naziv družbe)	STATIK D.O.O.
naslov	PREŠERNOVA 2, 5280 IDRİJA
odgovorna oseba projektanta načrta	Matevž Govekar, u.d.i.g.
podpis odgovorne osebe projektanta načrta	

STATIK d.o.o.
Projektiranje in svetovanje
Prešernova ul. 2, 5280 Idrija

PODATKI O IZDELOVALCU NAČRTA

ime in priimek pooblaščenega arhitekta, pooblaščenega inženirja	Matevž Govekar, u.d.i.g.
identifikacijska številka	IZS G - 3743
podpis pooblaščenega arhitekta, pooblaščenega inženirja	

MATEVŽ GOVEKAR
univ. dipl. inž. grad.
IZS G - 3743



STATIK d.o.o

OBJEKT : Ureditev območja pokopališča Idrija

NAROČNIK : Občina Idrija – Mestni trg 1
5280 Idrija

PROJEKTANTSKO : STATIK d.o.o., podjetje za projektiranje in svetovanje
PODJETJE Prešernova 2, 5280 Idrija

NAČRT : **TEHNIČNO POROČILO**
STATIČNI RAČUN

številka projekta

7/2025

številka načrta

107/26

ODGOVORNI PROJEKTANT : MATEVŽ GOVEKAR, univ. dipl. inž. grad.

IZS * G - 3743 *

PROJEKTANT : MATEVŽ GOVEKAR, univ. dipl. inž. grad.

KRAJ in DATUM: Idrija, oktober 2026

VSEBINA

1.0. TEHNIČNO POROČILO

2.0. OPORNI ZIDOVI

TEHNIČNO POROČILO

Za ureditev območja pokopališča v Idriji se bodo izvedli novi podporni zidovi.

Potem opornih zidov je razviden in načrta arhitekture.

Vsi temelji so narejeni tako, da je temelj izveden neprekinjeno, stene pa so dilatirane. Dilatacije se izvedejo kot navidezne dilatacije z oslabitvijo prečnega prereza z trikotno letvico in vgradnjo iniciatorjev razpok.

V kolikor se investitor odloči za izdelavo brez dilatacij, je potrebno prilagoditi betonsko mešanico.

Predvidena kvaliteta betona temeljev in sten opornega zidu je C25/30 XC4, XD2, XF1. Armiranje bo izvedeno z rebrasto in mrežno armaturo kvalitete B 500B.

Zaščitni sloj betona je 4,0 cm za rebrasto armaturo in 3,0 cm za mrežno armaturo.

Predpis

Pri izdelavi predložene tehnične dokumentacije je bila upoštevana veljavna tehnična regulativa, ki zajema gradnjo objektov, varovanje okolja, varstvo pri delu, varstvo pred hrupom, varstvo pred požarom in potresom. Upoštevani so tehnični predpisi za področja gradbene mehanike, materialov in izvedbe.

Pri obravnavi obtežb, statični in dinamični analizi ter dimenzioniranju so bili upoštevani standardi Eurocode s pripadajočimi nacionalnimi dodatki.

Za izračun nosilne konstrukcije je bil uporabljen program:

- GEO5 »Catilever wall«
- A.B. oporni zidovi

2.0 OPORNI ZIDOVI

2.1. Zasnova

Oporni zid 1

Temelj (POZ T)
Stena (POZ St)

b/h = 40/60 cm
d = 20 cm

Oporni zid 2

Temelj (POZ T)
Stena (POZ St)

b/h = 25/50 cm
d = 20 cm

Oporni zid 3

Temelj (POZ T)
Stena (POZ St)

b/h = 25/50 cm
d = 20 cm

Oporni zid 4

Temelj (POZ T)
Stena (POZ St)

b/h = 25/60 cm
d = 20 cm

Oporni zid 5

Temelj (POZ T)
Stena (POZ St)

b/h = 25/60 cm
d = 20 cm

Oporni zid 6

Temelj (POZ T)
Stena (POZ St)

b/h = 30/110 cm
d = 25 cm

Oporni zid 7

Temelj (POZ T)
Stena (POZ St)

b/h = 30/90 cm
d = 25 cm

Oporni zid 7A

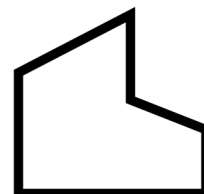
Temelj (POZ T)
Stena (POZ St)

b/h = 30/110 cm
d = 25 cm

Oporni zid 8

Temelj (POZ T)
Stena (POZ St)

b/h = 30/70 cm
d = 20 cm



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Oporni zid 9

Temelj (POZ T)
Stena (POZ St)

b/h = 30/90 cm
d = 25 cm

Oporni zid 10

Temelj (POZ T)
Stena (POZ St)

b/h = 30/90 cm
d = 25 cm

Oporni zid 11

Temelj (POZ T)
Stena (POZ St)

b/h = 30/90 cm
d = 25 cm

7.2. Obtežba

Oporni zid:

Lastna:

Lastna teža =

Obtežba zaledne zemljine:

zemljina

Unit weight :

$\gamma = 19,00 \text{ kN/m}^3$

Stress-state :

effective

Angle of internal friction :

$\varphi_{ef} = 25,00^\circ$

Cohesion of soil :

$c_{ef} = 1,00 \text{ kPa}$

Angle of friction struc.-soil :

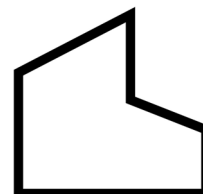
$\delta = 5,00^\circ$

Soil :

cohesionless

Saturated unit weight :

$\gamma_{sat} = 19,00 \text{ kN/m}^3$



STATIK d.o.o

Obtežba sprednje zemljine:

nasutje spredaj

Unit weight :	$\gamma = 20,00 \text{ kN/m}^3$
Stress-state :	effective
Angle of internal friction :	$\varphi_{ef} = 30,00^\circ$
Cohesion of soil :	$c_{ef} = 5,00 \text{ kPa}$
Angle of friction struc.-soil :	$\delta = 3,00^\circ$
Soil :	cohesionless
Saturated unit weight :	$\gamma_{sat} = 20,00 \text{ kN/m}^3$

Po odkopu gradbene jame je potrebno preveriti dejansko nosilnost temeljnih tal in po potrebi prilagoditi dimenzije temeljev.

Po odkopu gradbene jame je potrebno preveriti dejanske karakteristike zaledne in sprednje zemljine in po potrebi prilagoditi dimenzije opornih zidov.

2.3. Obremenitev in dimenzioniranje

Obremenitve in dimenzionirane AB konstrukcije ter izračun armature so narejene s programom **GEO 5 » Cantilever wall »**

Cantilever wall analysis

Input data

Settings

Slovenia - EN 1997

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)
Coefficients EN 1992-1-1 : standard

Wall analysis

Verification methodology : according to EN 1997
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Caquot-Kerisel
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Base key : The base key is considered as inclined footing bottom
Allowable eccentricity : 0,333
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				
Partial factor on overturning :		$\gamma_{Rv} =$	1,40	[-]
Partial factor on sliding resistance :		$\gamma_{Rh} =$	1,10	[-]
Partial factor on bearing capacity :		$\gamma_{Re} =$	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	[-]

Material of structure

Unit weight $\gamma = 23,00 \text{ kN/m}^3$

Analysis of concrete structures carried out according to the standard EN 1992-1-1 (EC2).

Concrete: C 25/30

Cylinder compressive strength $f_{ck} = 25,00 \text{ MPa}$
Tensile strength $f_{ctm} = 2,60 \text{ MPa}$

Longitudinal steel: B500B

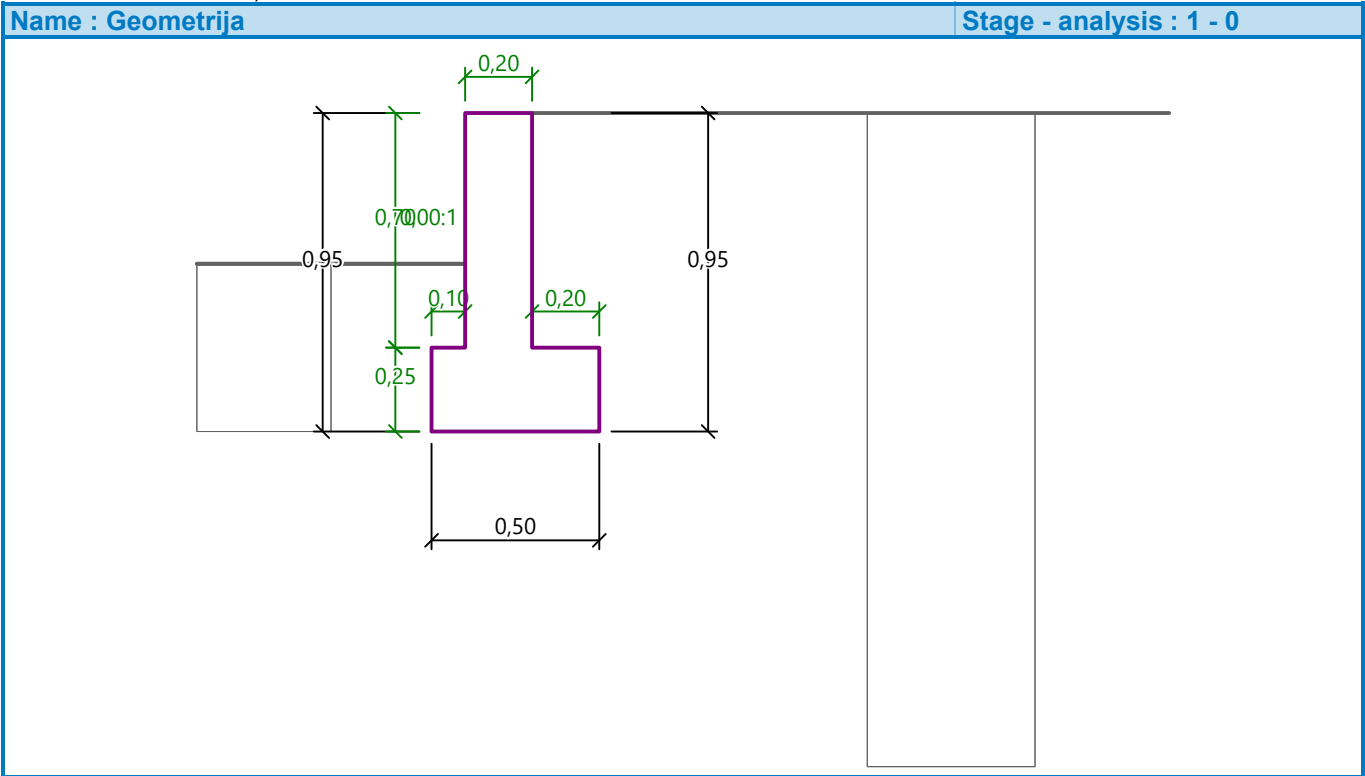
Yield strength $f_{yk} = 500,00 \text{ MPa}$

Geometry of structure

No.	Coordinate X [m]	Depth Z [m]
1	0,00	0,00
2	0,00	0,70
3	0,20	0,70
4	0,20	0,95

No.	Coordinate X [m]	Depth Z [m]
5	-0,30	0,95
6	-0,30	0,70
7	-0,20	0,70
8	-0,20	0,00

The origin [0,0] is located at the most upper right point of the wall.
Wall section area = 0,27 m².



Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m³]	γ_{su} [kN/m³]	δ [°]
1	zemljina		27,00	5,00	19,00	9,00	5,00
2	nasutje spredaj		30,00	5,00	20,00	10,00	3,00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

zemljina

Unit weight : $\gamma = 19,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 27,00^\circ$
Cohesion of soil : $c_{ef} = 5,00 \text{ kPa}$
Angle of friction struc.-soil : $\delta = 5,00^\circ$
Soil : cohesionless
Saturated unit weight : $\gamma_{sat} = 19,00 \text{ kN/m}^3$

nasutje spredaj

Unit weight : $\gamma = 20,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 30,00^\circ$

Cohesion of soil : $c_{ef} = 5,00 \text{ kPa}$
 Angle of friction struc.-soil : $\delta = 3,00^\circ$
 Soil : cohesionless
 Saturated unit weight : $\gamma_{sat} = 20,00 \text{ kN/m}^3$

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	-	0,00 .. ∞	zemljina	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind the structure is flat.

Water influence

Ground water table is located below the structure.

Resistance on front face of the structure

Resistance on front face of the structure: 1/3 pass., 2/3 at rest

Soil on front face of the structure - nasutje spredaj

Angle of friction struc.-soil $\delta = 30,00^\circ$

Soil thickness in front of structure $h = 0,50 \text{ m}$

Terrain in front of structure is flat.

Settings of the stage of construction

Design situation : permanent

The wall is free to move. Active earth pressure is therefore assumed.

Reduction of soil/soil friction angle : do not reduce

Verification No. 1

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
1	0,25	0,00	30,00	5,00	20,00	-30,00	6,420	
2	0,00	89,23(30,00)	30,00	5,00	20,00	-30,00	2,780	MODIFIED
3	0,25	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,25	5,00	0,00	57,44	49,74	-28,72
2	0,25	5,00	0,00	30,57	15,64	26,27
	0,25	5,03	0,00	30,65	15,68	26,33
3	0,25	5,03	0,00	57,61	49,89	-28,81
	0,50	10,00	0,00	89,54	77,54	-44,77

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,25	0,00	30,00	5,00	20,00	0,500	
2	0,00	89,23(80,00)	30,00	5,00	20,00	0,500	MODIFIED
3	0,25	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,25	5,00	0,00	2,50	2,50	0,00
2	0,25	5,00	0,00	4,94	0,43	4,92
	0,25	5,03	0,00	4,97	0,44	4,95
3	0,25	5,03	0,00	2,51	2,51	0,00
	0,50	10,00	0,00	5,00	5,00	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_a	Comment
1	0,37	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,33	31,50	27,00	5,00	19,00	27,00	0,719	
3	0,16	0,00	27,00	5,00	19,00	5,00	0,358	
4	0,09	0,00	27,00	5,00	19,00	5,00	0,358	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,37	7,10	0,00	0,00	0,00	0,00
2	0,37	7,10	0,00	0,64	0,33	0,55
	0,70	13,30	0,00	5,10	2,66	4,35
3	0,70	13,30	0,00	0,00	0,00	0,00
	0,86	16,26	0,00	0,00	0,00	0,00
4	0,86	16,26	0,00	0,00	0,00	0,00
	0,95	18,05	0,00	0,64	0,64	0,06

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overturn.	Coeff. sliding	Coeff. stress
Weight - wall	0,00	-0,38	6,10	0,22	1,000	1,000	1,350
Weight - soil	0,00	-0,38	0,50	0,05	1,000	1,000	1,350
FF resistance	-9,10	-0,20	-4,75	-0,06	1,000	1,000	1,350
Weight - earth wedge	0,00	-0,36	0,62	0,37	1,000	1,000	1,350
Active pressure	0,52	-0,35	0,80	0,43	1,350	1,350	1,350

Verification of complete wall

Check for overturning stability

Resisting moment $M_{res} = 1,70$ kNm/m

Overturning moment $M_{ovr} = -1,57$ kNm/m

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force $H_{res} = 3,91$ kN/m

Active horizontal force $H_{act} = -8,40$ kN/m

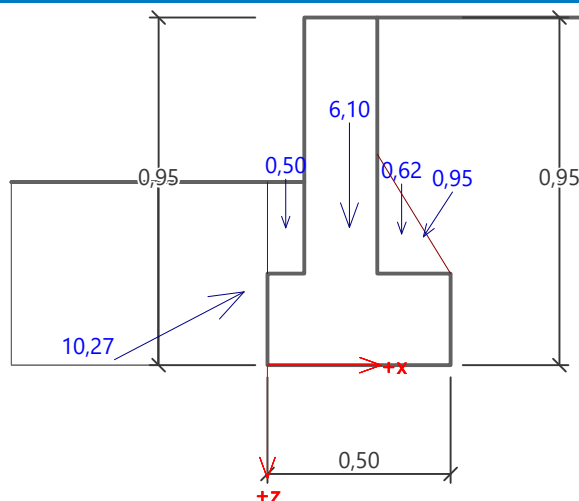
Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 8,81 kPa

Name : Kontrola prevrnitve in zdrsa

Stage - analysis : 1 - 1



Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	-4,16	4,41	-11,58	0,000	8,81
2	-3,07	3,54	-8,40	0,000	7,09

Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	-3.08	3.26	-8.58

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification

Max. eccentricity of normal force $e = 0,000$

Maximum allowable eccentricity $e_{alw} = 0,333$

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity

Bearing capacity of foundation soil $R = 300,00 \text{ kPa}$

Partial factor on bearing capacity $\gamma_{Ry} = 1,40$

Max. stress at footing bottom	$\sigma =$	8,81 kPa
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Bearing capacity of foundation soil $R_d = 214,29 \text{ kPa}$

Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Dimensioning No. 1

Wall heel check

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
1	0,25	0,00	30,00	5,00	20,00	-30,00	6,420	
2	0,00	89,23(30,00)	30,00	5,00	20,00	-30,00	2,780	MODIFIED
3	0,25	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,25	5,00	0,00	57,44	49,74	-28,72
2	0,25	5,00	0,00	30,57	15,64	26,27
	0,25	5,03	0,00	30,65	15,68	26,33
3	0,25	5,03	0,00	57,61	49,89	-28,81
	0,50	10,00	0,00	89,54	77,54	-44,77

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,25	0,00	30,00	5,00	20,00	0,500	
2	0,00	89,23(80,00)	30,00	5,00	20,00	0,500	MODIFIED
3	0,25	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,25	5,00	0,00	2,50	2,50	0,00
2	0,25	5,00	0,00	4,94	0,43	4,92
	0,25	5,03	0,00	4,97	0,44	4,95
3	0,25	5,03	0,00	2,51	2,51	0,00
	0,50	10,00	0,00	5,00	5,00	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_a	Comment
1	0,37	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,33	31,50	27,00	5,00	19,00	27,00	0,719	
3	0,16	0,00	27,00	5,00	19,00	5,00	0,358	
4	0,09	0,00	27,00	5,00	19,00	5,00	0,358	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,37	7,10	0,00	0,00	0,00	0,00
2	0,37	7,10	0,00	0,64	0,33	0,55
	0,70	13,30	0,00	5,10	2,66	4,35
3	0,70	13,30	0,00	0,00	0,00	0,00
	0,86	16,26	0,00	0,00	0,00	0,00

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
4	0,86	16,26	0,00	0,00	0,00	0,00
	0,95	18,05	0,00	0,64	0,64	0,06

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - wall	0,00	-0,12	1,15	0,40	1,350
Weight - earth wedge	0,00	-0,36	0,62	0,37	1,350
Active pressure	0,52	-0,35	0,80	0,43	1,350
Contact stress	0,00	0,00	0,00	0,30	1,000

Wall heel check

Reinforcement and dimensions of the cross-section
5 prof. 12,0 mm, cover 30,0 mm
Inputted reinforcement area = 565,5 mm²
Required reinforcement area = 289,3 mm²
Cross-section width = 1,00 m
Cross-section height = 0,25 m
Reinforcement ratio ρ = 0,26 % > 0,14 % = ρ_{min}
Position of neutral axis x = 0,02 m < 0,13 m = x_{max}
Ultimate shear force V_{Rd} = 103,29 kN > 3,47 kN = V_{Ed}
Ultimate moment M_{Rd} = 50,80 kNm > 0,35 kNm = M_{Ed}

Cross-section is SATISFACTORY.

Annexes

Cantilever wall analysis

Input data

Settings

Slovenia - EN 1997

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)
Coefficients EN 1992-1-1 : standard

Wall analysis

Verification methodology : according to EN 1997
Active earth pressure calculation : Coulomb
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Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Base key : The base key is considered as inclined footing bottom
Allowable eccentricity : 0,333
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				
Partial factor on overturning :		$\gamma_{Rv} =$	1,40	[-]
Partial factor on sliding resistance :		$\gamma_{Rh} =$	1,10	[-]
Partial factor on bearing capacity :		$\gamma_{Re} =$	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	[-]

Material of structure

Unit weight $\gamma = 23,00 \text{ kN/m}^3$

Analysis of concrete structures carried out according to the standard EN 1992-1-1 (EC2).

Concrete: C 25/30

Cylinder compressive strength $f_{ck} = 25,00 \text{ MPa}$
Tensile strength $f_{ctm} = 2,60 \text{ MPa}$

Longitudinal steel: B500B

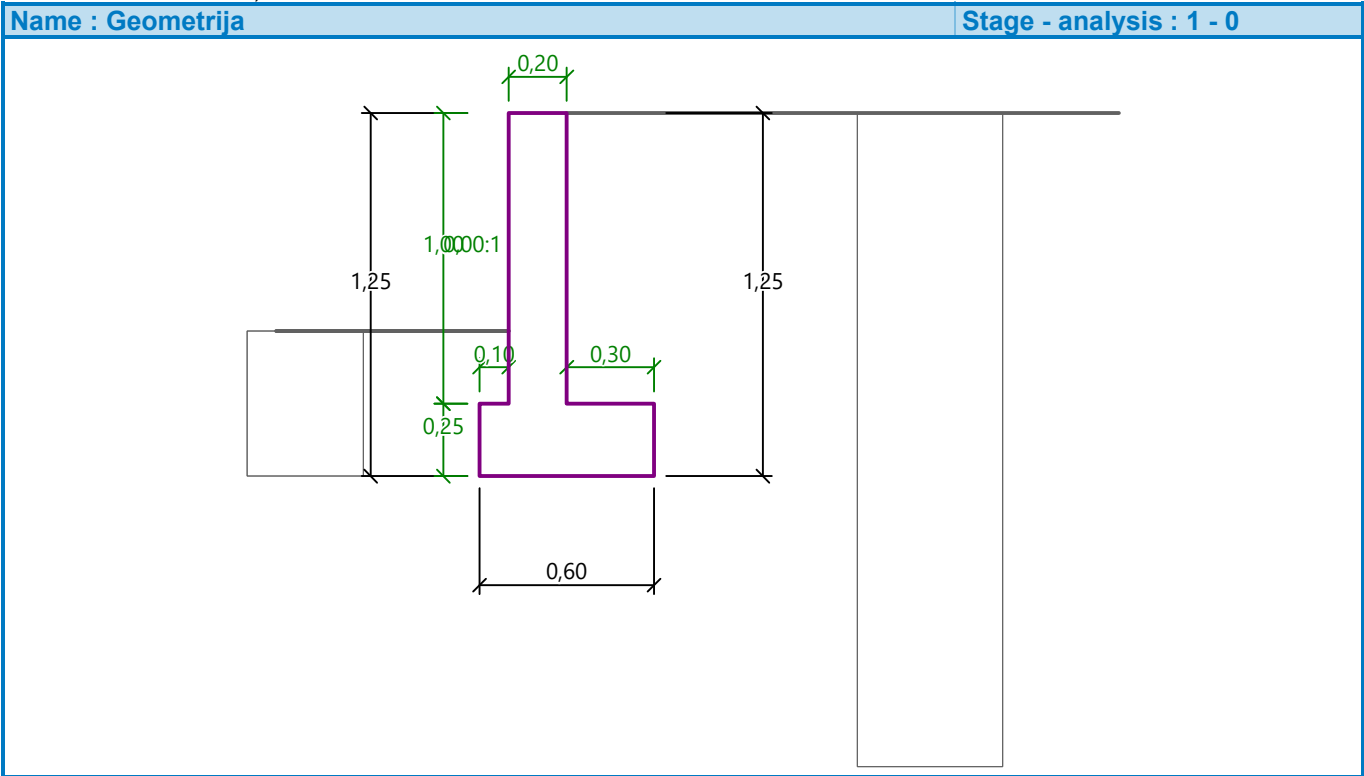
Yield strength $f_{yk} = 500,00 \text{ MPa}$

Geometry of structure

No.	Coordinate X [m]	Depth Z [m]
1	0,00	0,00
2	0,00	1,00
3	0,30	1,00
4	0,30	1,25

No.	Coordinate X [m]	Depth Z [m]
5	-0,30	1,25
6	-0,30	1,00
7	-0,20	1,00
8	-0,20	0,00

The origin [0,0] is located at the most upper right point of the wall.
Wall section area = 0,35 m².



Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m ³]	γ_{su} [kN/m ³]	δ [°]
1	zemljina		27,00	5,00	19,00	9,00	5,00
2	nasutje spredaj		30,00	5,00	20,00	10,00	3,00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

zemljina

Unit weight : $\gamma = 19,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 27,00^\circ$
Cohesion of soil : $c_{ef} = 5,00 \text{ kPa}$
Angle of friction struc.-soil : $\delta = 5,00^\circ$
Soil : cohesionless
Saturated unit weight : $\gamma_{sat} = 19,00 \text{ kN/m}^3$

nasutje spredaj

Unit weight : $\gamma = 20,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 30,00^\circ$

Cohesion of soil : $c_{ef} = 5,00 \text{ kPa}$
 Angle of friction struc.-soil : $\delta = 3,00^\circ$
 Soil : cohesionless
 Saturated unit weight : $\gamma_{sat} = 20,00 \text{ kN/m}^3$

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	-	0,00 .. ∞	zemljina	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind the structure is flat.

Water influence

Ground water table is located below the structure.

Resistance on front face of the structure

Resistance on front face of the structure: 1/3 pass., 2/3 at rest

Soil on front face of the structure - nasutje spredaj

Angle of friction struc.-soil $\delta = 30,00^\circ$

Soil thickness in front of structure $h = 0,50 \text{ m}$

Terrain in front of structure is flat.

Settings of the stage of construction

Design situation : permanent

The wall is free to move. Active earth pressure is therefore assumed.

Reduction of soil/soil friction angle : do not reduce

Verification No. 1

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,25	0,00	30,00	5,00	20,00	-30,00	6,420	
2	0,00	89,23(30,00)	30,00	5,00	20,00	-30,00	2,780	MODIFIED
3	0,25	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,25	5,00	0,00	57,44	49,74	-28,72
2	0,25	5,00	0,00	30,57	15,64	26,27
	0,25	5,03	0,00	30,65	15,68	26,33
3	0,25	5,03	0,00	57,61	49,89	-28,81
	0,50	10,00	0,00	89,54	77,54	-44,77

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,25	0,00	30,00	5,00	20,00	0,500	
2	0,00	89,23(80,00)	30,00	5,00	20,00	0,500	MODIFIED
3	0,25	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,25	5,00	0,00	2,50	2,50	0,00
2	0,25	5,00	0,00	4,94	0,43	4,92
	0,25	5,03	0,00	4,97	0,44	4,95
3	0,25	5,03	0,00	2,51	2,51	0,00
	0,50	10,00	0,00	5,00	5,00	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_a	Comment
1	0,51	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,49	31,50	27,00	5,00	19,00	27,00	0,719	
3	0,25	0,00	27,00	5,00	19,00	5,00	0,358	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,51	9,70	0,00	0,00	0,00	0,00
2	0,51	9,70	0,00	2,51	1,31	2,14
	1,00	19,00	0,00	9,19	4,80	7,84
3	1,00	19,00	0,00	0,98	0,98	0,09
	1,25	23,75	0,00	2,69	2,67	0,23

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overturn.	Coeff. sliding	Coeff. stress
Weight - wall	0,00	-0,48	8,05	0,24	1,000	1,000	1,350
Weight - soil	0,00	-0,38	0,50	0,05	1,000	1,000	1,350
FF resistance	-9,10	-0,20	-4,75	-0,06	1,000	1,000	1,350
Weight - earth wedge	0,00	-0,41	1,40	0,40	1,000	1,000	1,350
Active pressure	1,95	-0,37	2,48	0,48	1,350	1,350	1,350

Verification of complete wall

Check for overturning stability

Resisting moment M_{res} = 3,18 kNm/m

Overturning moment M_{ovr} = -0,85 kNm/m

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force H_{res} = 6,68 kN/m

Active horizontal force H_{act} = -6,46 kN/m

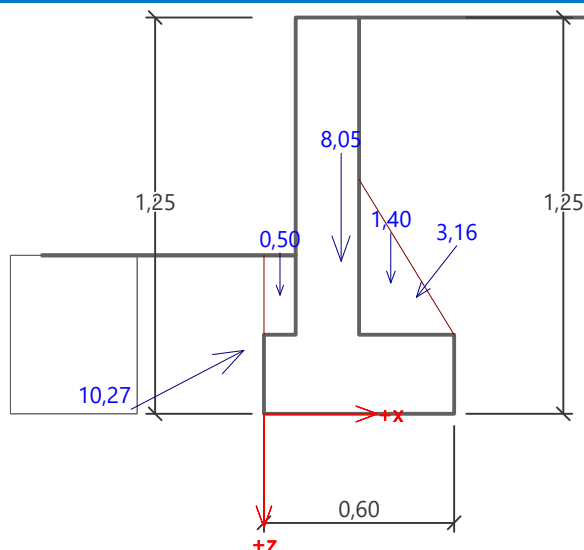
Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 17,27 kPa

Name : Kontrola prevrnitve in zdrsra

Stage - analysis : 1 - 1



Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	-3,82	10,36	-9,65	0,000	17,27
2	-2,74	8,54	-6,46	0,000	14,24

Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	-2,83	7,67	-7,15

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification

Max. eccentricity of normal force $e = 0,000$

Maximum allowable eccentricity $e_{alw} = 0,333$

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity

Bearing capacity of foundation soil $R = 300,00 \text{ kPa}$

Partial factor on bearing capacity $\gamma_{Rv} = 1,40$

Max. stress at footing bottom $\sigma = 17,27 \text{ kPa}$

Bearing capacity of foundation soil $R_d = 214,29 \text{ kPa}$

Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Dimensioning No. 1

Wall heel check

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
1	0,25	0,00	30,00	5,00	20,00	-30,00	6,420	
2	0,00	89,23(30,00)	30,00	5,00	20,00	-30,00	2,780	MODIFIED
3	0,25	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,25	5,00	0,00	57,44	49,74	-28,72
2	0,25	5,00	0,00	30,57	15,64	26,27
	0,25	5,03	0,00	30,65	15,68	26,33
3	0,25	5,03	0,00	57,61	49,89	-28,81
	0,50	10,00	0,00	89,54	77,54	-44,77

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,25	0,00	30,00	5,00	20,00	0,500	
2	0,00	89,23(80,00)	30,00	5,00	20,00	0,500	MODIFIED
3	0,25	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,25	5,00	0,00	2,50	2,50	0,00
2	0,25	5,00	0,00	4,94	0,43	4,92
	0,25	5,03	0,00	4,97	0,44	4,95
3	0,25	5,03	0,00	2,51	2,51	0,00
	0,50	10,00	0,00	5,00	5,00	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_a	Comment
1	0,51	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,49	31,50	27,00	5,00	19,00	27,00	0,719	
3	0,25	0,00	27,00	5,00	19,00	5,00	0,358	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,51	9,70	0,00	0,00	0,00	0,00
2	0,51	9,70	0,00	2,51	1,31	2,14
	1,00	19,00	0,00	9,19	4,80	7,84
3	1,00	19,00	0,00	0,98	0,98	0,09
	1,25	23,75	0,00	2,69	2,67	0,23

Forces acting on construction

Name	F _{hor} [kN/m]	App.Pt. z [m]	F _{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - wall	0,00	-0,12	1,72	0,45	1,350
Weight - earth wedge	0,00	-0,41	1,40	0,40	1,350
Active pressure	1,95	-0,37	2,48	0,48	1,350
Contact stress	0,00	0,00	0,00	0,30	1,000

Wall heel check

Reinforcement and dimensions of the cross-section
5 prof. 12,0 mm, cover 30,0 mm
Inputted reinforcement area = 565,5 mm²
Required reinforcement area = 289,3 mm²
Cross-section width = 1,00 m
Cross-section height = 0,25 m
Reinforcement ratio ρ = 0,26 % > 0,14 % = ρ_{min}
Position of neutral axis x = 0,02 m < 0,13 m = x_{max}
Ultimate shear force V_{Rd} = 103,29 kN > 7,56 kN = V_{Ed}
Ultimate moment M_{Rd} = 50,80 kNm > 1,82 kNm = M_{Ed}

Cross-section is SATISFACTORY.

Annexes

Cantilever wall analysis

Input data

Settings

Slovenia - EN 1997

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)
Coefficients EN 1992-1-1 : standard

Wall analysis

Verification methodology : according to EN 1997
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Caquot-Kerisel
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Base key : The base key is considered as inclined footing bottom
Allowable eccentricity : 0,333
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				
Partial factor on overturning :		$\gamma_{Rv} =$	1,40	[-]
Partial factor on sliding resistance :		$\gamma_{Rh} =$	1,10	[-]
Partial factor on bearing capacity :		$\gamma_{Re} =$	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	[-]

Material of structure

Unit weight $\gamma = 23,00 \text{ kN/m}^3$

Analysis of concrete structures carried out according to the standard EN 1992-1-1 (EC2).

Concrete: C 25/30

Cylinder compressive strength $f_{ck} = 25,00 \text{ MPa}$
Tensile strength $f_{ctm} = 2,60 \text{ MPa}$

Longitudinal steel: B500B

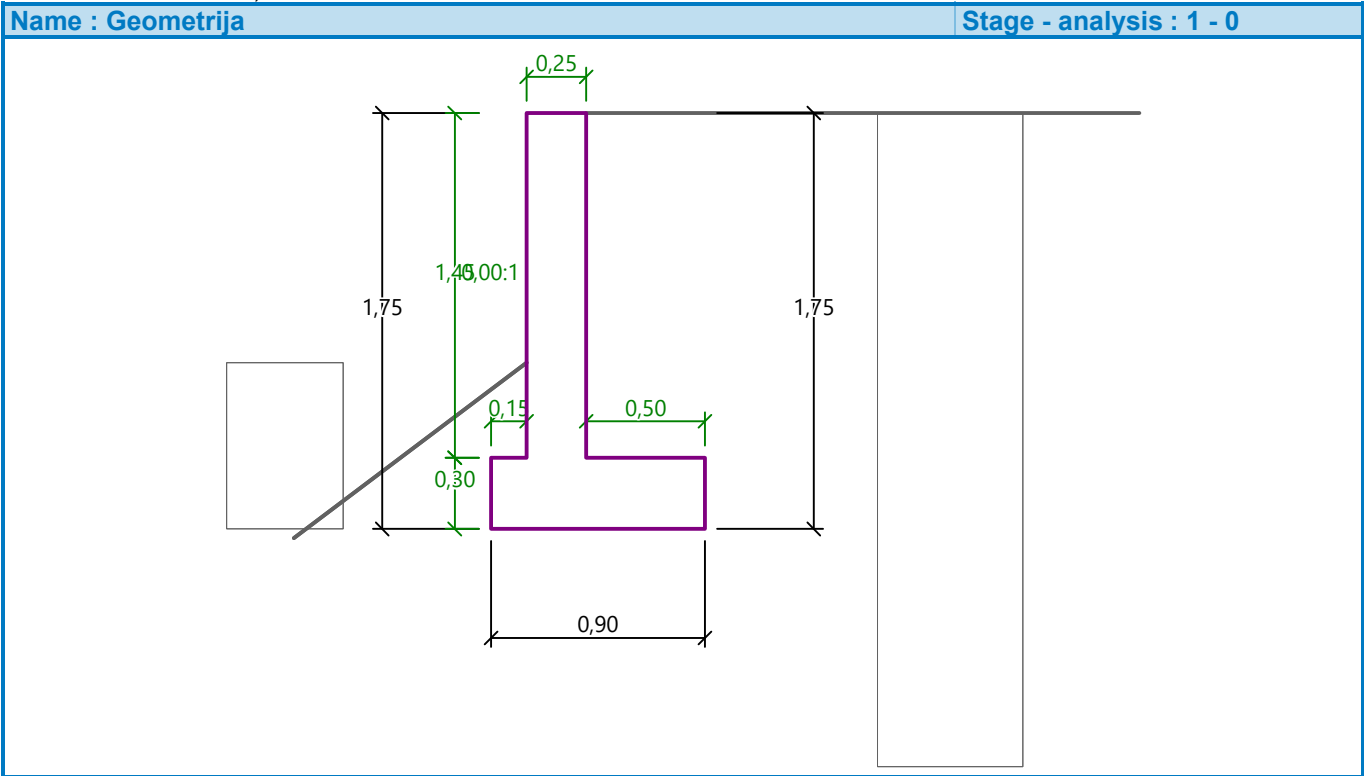
Yield strength $f_{yk} = 500,00 \text{ MPa}$

Geometry of structure

No.	Coordinate X [m]	Depth Z [m]
1	0,00	0,00
2	0,00	1,45
3	0,50	1,45
4	0,50	1,75

No.	Coordinate X [m]	Depth Z [m]
5	-0,40	1,75
6	-0,40	1,45
7	-0,25	1,45
8	-0,25	0,00

The origin [0,0] is located at the most upper right point of the wall.
Wall section area = 0,63 m².



Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m ³]	γ_{su} [kN/m ³]	δ [°]
1	zemljina		27,00	5,00	19,00	9,00	5,00
2	nasutje spredaj		30,00	5,00	20,00	10,00	3,00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

zemljina

Unit weight : $\gamma = 19,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 27,00^\circ$
Cohesion of soil : $c_{ef} = 5,00 \text{ kPa}$
Angle of friction struc.-soil : $\delta = 5,00^\circ$
Soil : cohesionless
Saturated unit weight : $\gamma_{sat} = 19,00 \text{ kN/m}^3$

nasutje spredaj

Unit weight : $\gamma = 20,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 30,00^\circ$

Cohesion of soil : $c_{ef} = 5,00 \text{ kPa}$
 Angle of friction struc.-soil : $\delta = 3,00^\circ$
 Soil : cohesionless
 Saturated unit weight : $\gamma_{sat} = 20,00 \text{ kN/m}^3$

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	-	0,00 .. ∞	zemljina	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind the structure is flat.

Water influence

Ground water table is located below the structure.

Resistance on front face of the structure

Resistance on front face of the structure: 1/3 pass., 2/3 at rest

Soil on front face of the structure - nasutje spredaj

Angle of friction struc.-soil $\delta = 30,00^\circ$

Soil thickness in front of structure $h = 0,70 \text{ m}$

Soil slope in front of structure $\beta = -37,00^\circ$

Settings of the stage of construction

Design situation : permanent

The wall is free to move. Active earth pressure is therefore assumed.

Reduction of soil/soil friction angle : do not reduce

Verification No. 1

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
1	0,40	0,00	30,00	5,00	20,00	-30,00	0,786	
2	0,00	89,48(30,00)	30,00	5,00	20,00	-30,00	0,340	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	-30,00	0,786	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	8,87	7,68	-4,43
	0,40	8,00	0,00	15,16	13,12	-7,58
2	0,40	8,00	0,00	8,56	4,35	7,37
	0,40	8,03	0,00	8,57	4,35	7,38
3	0,40	8,03	0,00	15,18	13,14	-7,59
	0,70	14,00	0,00	19,87	17,21	-9,94

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,40	0,00	30,00	5,00	20,00	0,500	
2	0,00	89,48(80,00)	30,00	5,00	20,00	0,500	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,40	8,00	0,00	2,37	2,37	0,00
2	0,40	8,00	0,00	4,68	0,41	4,66
	0,40	8,03	0,00	4,69	0,41	4,68
3	0,40	8,03	0,00	2,37	2,37	0,00
	0,70	14,00	0,00	4,14	4,14	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_a	Comment
1	0,63	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,82	31,50	27,00	5,00	19,00	27,00	0,719	
3	0,30	0,00	27,00	5,00	19,00	5,00	0,358	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,63	12,05	0,00	0,00	0,00	0,00
2	0,63	12,05	0,00	4,20	2,19	3,58
	1,45	27,55	0,00	15,34	8,01	13,08
3	1,45	27,55	0,00	4,05	4,03	0,35
	1,75	33,25	0,00	6,09	6,07	0,53

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overturn.	Coeff. sliding	Coeff. stress
Weight - wall	0,00	-0,65	14,55	0,35	1,000	1,000	1,350
Weight - soil	0,00	-0,47	1,03	0,08	1,000	1,000	1,350
FF resistance	-3,86	-0,29	-1,66	-0,08	1,000	1,000	1,350
Weight - earth wedge	0,00	-0,57	3,88	0,57	1,000	1,000	1,350
Active pressure	5,68	-0,50	6,93	0,70	1,350	1,350	1,350

Verification of complete wall

Check for overturning stability

Resisting moment M_{res} = 10,04 kNm/m

Overturning moment M_{ovr} = 2,72 kNm/m

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force H_{res} = 16,37 kN/m

Active horizontal force H_{act} = 3,80 kN/m

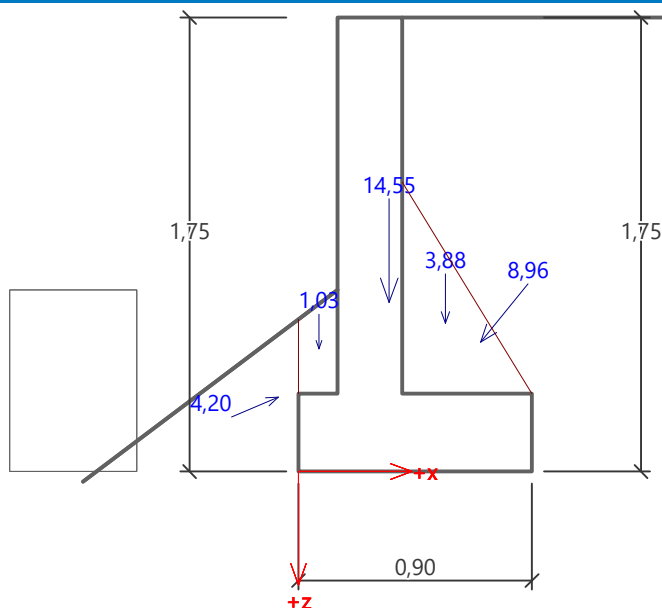
Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 38,81 kPa

Name : Kontrola prevrnitve in zdrsra

Stage - analysis : 1 - 1



Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	0,67	33,37	2,45	0,022	38,81
2	0,88	27,14	3,80	0,036	32,50

Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	0,50	24,72	1,82

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification

Max. eccentricity of normal force $e = 0,036$

Maximum allowable eccentricity $e_{alw} = 0,333$

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity

Bearing capacity of foundation soil $R = 300,00 \text{ kPa}$

Partial factor on bearing capacity $\gamma_{Rv} = 1,40$

Max. stress at footing bottom $\sigma = 38,81 \text{ kPa}$

Bearing capacity of foundation soil $R_d = 214,29 \text{ kPa}$

Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Dimensioning No. 1

Wall stem check - front reinf.

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,40	0,00	30,00	5,00	20,00	-30,00	0,786	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	8,87	7,68	-4,43
	0,40	7,98	0,00	15,14	13,11	-7,57

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,40	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,40	7,98	0,00	2,36	2,36	0,00

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	1,45	0,00	27,00	5,00	19,00	0,546	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	1,45	27,53	0,00	15,03	15,03	0,00

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0,00	-0,72	8,33	0,12	1,000	1,350	1,000
FF resistance	-1,69	-0,17	-0,80	0,00	1,000	1,000	1,000
Pressure at rest	10,89	-0,48	0,00	0,25	1,350	1,000	1,350

Wall stem check - front reinf.

Front reinforcement is not required.

Wall stem check - back reinf.

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,40	0,00	30,00	5,00	20,00	-30,00	0,786	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	8,87	7,68	-4,43
	0,40	7,98	0,00	15,14	13,11	-7,57

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,40	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,40	7,98	0,00	2,36	2,36	0,00

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	1,45	0,00	27,00	5,00	19,00	0,546	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	1,45	27,53	0,00	15,03	15,03	0,00

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0,00	-0,72	8,33	0,12	1,000	1,350	1,000
FF resistance	-1,69	-0,17	-0,80	0,00	1,000	1,000	1,000
Pressure at rest	10,89	-0,48	0,00	0,25	1,350	1,000	1,350

Wall stem check - back reinf.

Wall check at the construction joint 1,45 m from the wall crest

Reinforcement and dimensions of the cross-section

5 prof. 12,0 mm, cover 30,0 mm

Inputted reinforcement area = 565,5 mm²

Required reinforcement area = 289,3 mm²

Cross-section width = 1,00 m

Cross-section height = 0,25 m

Reinforcement ratio ρ = 0,26 % > 0,14 % = ρ_{min}

Position of neutral axis x = 0,02 m < 0,13 m = x_{max}

Ultimate shear force V_{Rd} = 103,29 kN > 13,00 kN = V_{Ed}

Ultimate moment M_{Rd} = 52,06 kNm > 6,71 kNm = M_{Ed}

Cross-section is SATISFACTORY.

Wall heel check

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
1	0,40	0,00	30,00	5,00	20,00	-30,00	0,786	

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
2	0,00	89,48(30,00)	30,00	5,00	20,00	-30,00	0,340	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	-30,00	0,786	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	8,87	7,68	-4,43
	0,40	8,00	0,00	15,16	13,12	-7,58
2	0,40	8,00	0,00	8,56	4,35	7,37
	0,40	8,03	0,00	8,57	4,35	7,38
3	0,40	8,03	0,00	15,18	13,14	-7,59
	0,70	14,00	0,00	19,87	17,21	-9,94

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,40	0,00	30,00	5,00	20,00	0,500	MODIFIED
2	0,00	89,48(80,00)	30,00	5,00	20,00	0,500	
3	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,40	8,00	0,00	2,37	2,37	0,00
2	0,40	8,00	0,00	4,68	0,41	4,66
	0,40	8,03	0,00	4,69	0,41	4,68
3	0,40	8,03	0,00	2,37	2,37	0,00
	0,70	14,00	0,00	4,14	4,14	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_a	Comment
1	0,63	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,82	31,50	27,00	5,00	19,00	27,00	0,719	
3	0,30	0,00	27,00	5,00	19,00	5,00	0,358	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,63	12,05	0,00	0,00	0,00	0,00
2	0,63	12,05	0,00	4,20	2,19	3,58
	1,45	27,55	0,00	15,34	8,01	13,08
3	1,45	27,55	0,00	4,05	4,03	0,35
	1,75	33,25	0,00	6,09	6,07	0,53

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - wall	0,00	-0,15	3,45	0,65	1,350

Name	F _{hor} [kN/m]	App.Pt. z [m]	F _{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - earth wedge	0,00	-0,57	3,88	0,57	1,350
Active pressure	5,68	-0,50	6,93	0,70	1,350
Contact stress	0,00	0,00	-17,44	0,64	1,000

Wall heel check

Reinforcement and dimensions of the cross-section
5 prof. 12,0 mm, cover 30,0 mm
Inputted reinforcement area = 565,5 mm²
Required reinforcement area = 356,9 mm²
Cross-section width = 1,00 m
Cross-section height = 0,30 m
Reinforcement ratio ρ = 0,21 % > 0,14 % = ρ_{min}
Position of neutral axis x = 0,02 m < 0,16 m = x_{max}
Ultimate shear force V_{Rd} = 118,18 kN > 1,81 kN = V_{Ed}
Ultimate moment M_{Rd} = 63,09 kNm > 6,71 kNm = M_{Ed}

Cross-section is SATISFACTORY.

Annexes

Cantilever wall analysis

Input data

Settings

Slovenia - EN 1997

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)
Coefficients EN 1992-1-1 : standard

Wall analysis

Verification methodology : according to EN 1997
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Caquot-Kerisel
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Base key : The base key is considered as inclined footing bottom
Allowable eccentricity : 0,333
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				
Partial factor on overturning :		$\gamma_{Rv} =$	1,40	[-]
Partial factor on sliding resistance :		$\gamma_{Rh} =$	1,10	[-]
Partial factor on bearing capacity :		$\gamma_{Re} =$	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	[-]

Material of structure

Unit weight $\gamma = 23,00 \text{ kN/m}^3$

Analysis of concrete structures carried out according to the standard EN 1992-1-1 (EC2).

Concrete: C 25/30

Cylinder compressive strength $f_{ck} = 25,00 \text{ MPa}$
Tensile strength $f_{ctm} = 2,60 \text{ MPa}$

Longitudinal steel: B500B

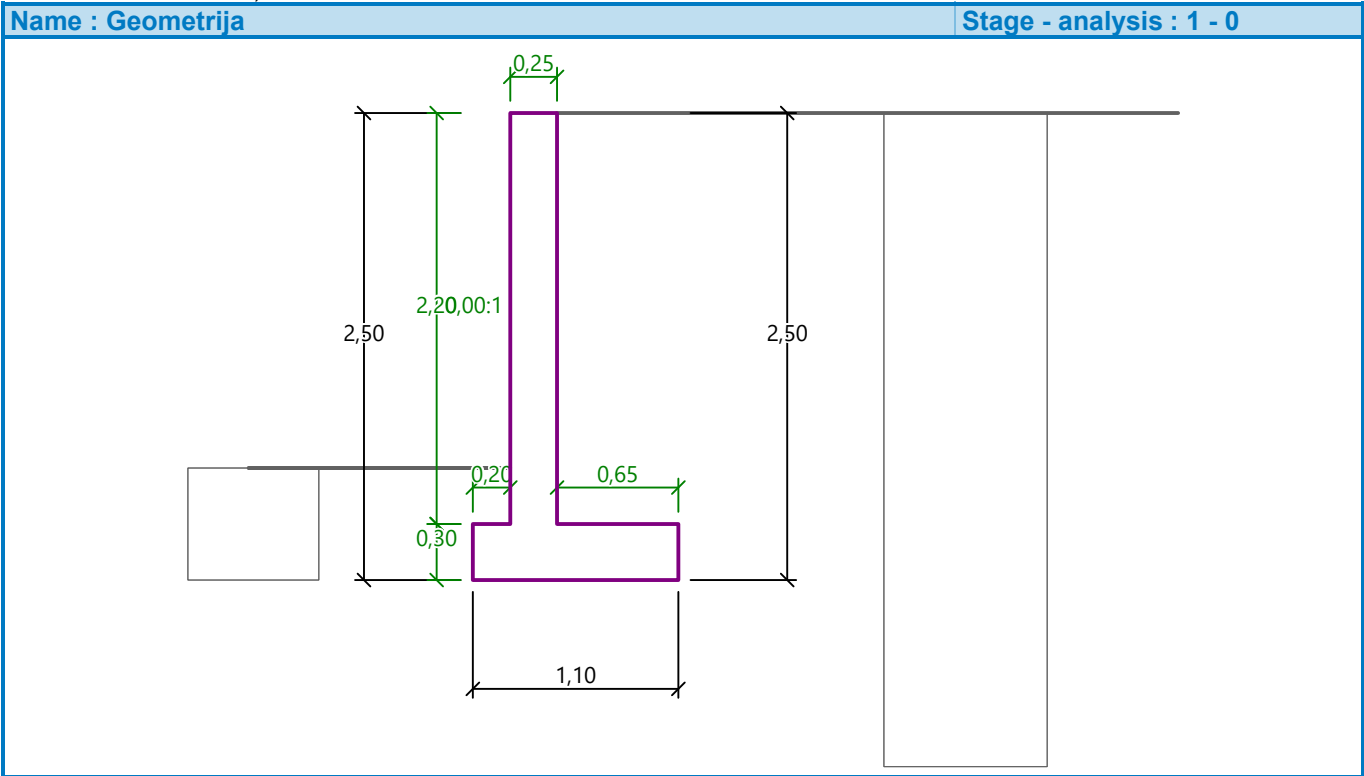
Yield strength $f_{yk} = 500,00 \text{ MPa}$

Geometry of structure

No.	Coordinate X [m]	Depth Z [m]
1	0,00	0,00
2	0,00	2,20
3	0,65	2,20
4	0,65	2,50

No.	Coordinate X [m]	Depth Z [m]
5	-0,45	2,50
6	-0,45	2,20
7	-0,25	2,20
8	-0,25	0,00

The origin [0,0] is located at the most upper right point of the wall.
Wall section area = 0,88 m².



Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m³]	γ_{su} [kN/m³]	δ [°]
1	zemljina		27,00	5,00	19,00	9,00	5,00
2	nasutje spredaj		30,00	5,00	20,00	10,00	3,00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

zemljina

Unit weight : $\gamma = 19,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 27,00^\circ$
Cohesion of soil : $c_{ef} = 5,00 \text{ kPa}$
Angle of friction struc.-soil : $\delta = 5,00^\circ$
Soil : cohesionless
Saturated unit weight : $\gamma_{sat} = 19,00 \text{ kN/m}^3$

nasutje spredaj

Unit weight : $\gamma = 20,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 30,00^\circ$

Cohesion of soil : $c_{ef} = 5,00 \text{ kPa}$
 Angle of friction struc.-soil : $\delta = 3,00^\circ$
 Soil : cohesionless
 Saturated unit weight : $\gamma_{sat} = 20,00 \text{ kN/m}^3$

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	-	0,00 .. ∞	zemljina	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind the structure is flat.

Water influence

Ground water table is located below the structure.

Resistance on front face of the structure

Resistance on front face of the structure: 1/3 pass., 2/3 at rest

Soil on front face of the structure - nasutje spredaj

Angle of friction struc.-soil $\delta = 30,00^\circ$

Soil thickness in front of structure $h = 0,60 \text{ m}$

Terrain in front of structure is flat.

Settings of the stage of construction

Design situation : permanent

The wall is free to move. Active earth pressure is therefore assumed.

Reduction of soil/soil friction angle : do not reduce

Verification No. 1

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	
2	0,00	89,61(30,00)	30,00	5,00	20,00	-30,00	2,780	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,30	6,00	0,00	63,86	55,30	-31,93
2	0,30	6,00	0,00	33,35	16,87	28,77
	0,30	6,03	0,00	33,43	16,91	28,84
3	0,30	6,03	0,00	64,03	55,45	-32,02
	0,60	12,00	0,00	102,38	88,66	-51,19

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	
2	0,00	89,61(80,00)	30,00	5,00	20,00	0,500	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	6,00	0,00	3,00	3,00	0,00
2	0,30	6,00	0,00	5,93	0,52	5,91
	0,30	6,03	0,00	5,96	0,52	5,94
3	0,30	6,03	0,00	3,01	3,01	0,00
	0,60	12,00	0,00	6,00	6,00	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_a	Comment
1	0,86	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,28	0,00	27,00	5,00	19,00	5,00	0,358	
3	1,06	31,50	27,00	5,00	19,00	27,00	0,719	
4	0,30	0,00	27,00	5,00	19,00	5,00	0,358	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,86	16,26	0,00	0,00	0,00	0,00
2	0,86	16,26	0,00	0,00	0,00	0,00
	1,14	21,65	0,00	1,93	1,92	0,17
3	1,14	21,65	0,00	11,10	5,80	9,46
	2,20	41,80	0,00	25,58	13,36	21,81
4	2,20	41,80	0,00	9,15	9,12	0,80
	2,50	47,50	0,00	11,19	11,15	0,98

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overturn.	Coeff. sliding	Coeff. stress
Weight - wall	0,00	-0,93	20,24	0,41	1,000	1,000	1,350
Weight - soil	0,00	-0,45	1,20	0,10	1,000	1,000	1,350
FF resistance	-12,23	-0,24	-6,35	-0,13	1,000	1,000	1,350
Weight - earth wedge	0,00	-0,65	6,55	0,67	1,000	1,000	1,350
Active pressure	13,48	-0,64	16,87	0,82	1,350	1,350	1,350

Verification of complete wall

Check for overturning stability

Resisting moment $M_{res} = 23,08 \text{ kNm/m}$

Overturning moment $M_{ovr} = 8,68 \text{ kNm/m}$

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force $H_{res} = 25,41 \text{ kN/m}$

Active horizontal force $H_{act} = 5,96 \text{ kN/m}$

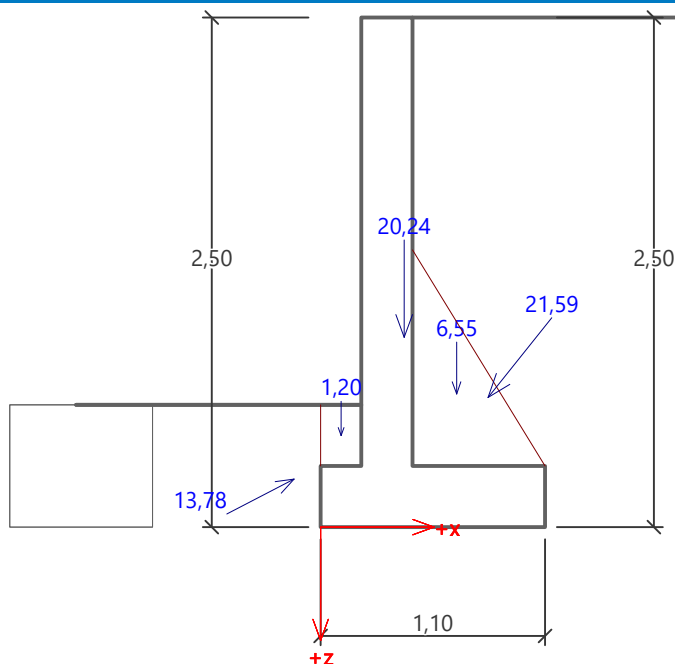
Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 47,27 kPa

Name : Kontrola prevrnitve in zdrsa

Stage - analysis : 1 - 1



Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	-0,80	52,00	1,68	0,000	47,27
2	0,80	44,42	5,96	0,016	41,75

Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	-0,59	38,52	1,25

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification

Max. eccentricity of normal force $e = 0,016$

Maximum allowable eccentricity $e_{alw} = 0,333$

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity

Bearing capacity of foundation soil $R = 300,00 \text{ kPa}$

Partial factor on bearing capacity $\gamma_{Ry} = 1,40$

Max. stress at footing bottom	$\sigma = 47,27 \text{ kPa}$
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Bearing capacity of foundation soil $R_d = 214,29 \text{ kPa}$

Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Dimensioning No. 1

Wall stem check - front reinf.

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,30	5,98	0,00	63,70	55,17	-31,85

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	5,98	0,00	2,99	2,99	0,00

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	2,20	0,00	27,00	5,00	19,00	0,546	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	2,20	41,78	0,00	22,81	22,81	0,00

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0,00	-1,10	12,64	0,12	1,000	1,350	1,000
FF resistance	-4,13	-0,13	-2,21	0,00	1,000	1,000	1,000
Pressure at rest	25,08	-0,73	0,00	0,25	1,350	1,000	1,350

Wall stem check - front reinf.

Front reinforcement is not required.

Wall stem check - back reinf.

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,30	5,98	0,00	63,70	55,17	-31,85

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	5,98	0,00	2,99	2,99	0,00

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	2,20	0,00	27,00	5,00	19,00	0,546	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	2,20	41,78	0,00	22,81	22,81	0,00

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0,00	-1,10	12,64	0,12	1,000	1,350	1,000
FF resistance	-4,13	-0,13	-2,21	0,00	1,000	1,000	1,000
Pressure at rest	25,08	-0,73	0,00	0,25	1,350	1,000	1,350

Wall stem check - back reinf.

Wall check at the construction joint 2,20 m from the wall crest

Reinforcement and dimensions of the cross-section

5 prof. 12,0 mm, cover 30,0 mm

Inputted reinforcement area = 565,5 mm²

Required reinforcement area = 289,3 mm²

Cross-section width = 1,00 m

Cross-section height = 0,25 m

Reinforcement ratio ρ = 0,26 % > 0,14 % = ρ_{min}

Position of neutral axis x = 0,02 m < 0,13 m = x_{max}

Ultimate shear force V_{Rd} = 103,29 kN > 29,72 kN = V_{Ed}

Ultimate moment M_{Rd} = 52,06 kNm > 24,02 kNm = M_{Ed}

Cross-section is SATISFACTORY.

Wall heel check

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
2	0,00	89,61(30,00)	30,00	5,00	20,00	-30,00	2,780	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,30	6,00	0,00	63,86	55,30	-31,93
2	0,30	6,00	0,00	33,35	16,87	28,77
	0,30	6,03	0,00	33,43	16,91	28,84
3	0,30	6,03	0,00	64,03	55,45	-32,02
	0,60	12,00	0,00	102,38	88,66	-51,19

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	
2	0,00	89,61(80,00)	30,00	5,00	20,00	0,500	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	6,00	0,00	3,00	3,00	0,00
2	0,30	6,00	0,00	5,93	0,52	5,91
	0,30	6,03	0,00	5,96	0,52	5,94
3	0,30	6,03	0,00	3,01	3,01	0,00
	0,60	12,00	0,00	6,00	6,00	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_a	Comment
1	0,86	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,28	0,00	27,00	5,00	19,00	5,00	0,358	
3	1,06	31,50	27,00	5,00	19,00	27,00	0,719	
4	0,30	0,00	27,00	5,00	19,00	5,00	0,358	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,86	16,26	0,00	0,00	0,00	0,00
2	0,86	16,26	0,00	0,00	0,00	0,00
	1,14	21,65	0,00	1,93	1,92	0,17
3	1,14	21,65	0,00	11,10	5,80	9,46
	2,20	41,80	0,00	25,58	13,36	21,81
4	2,20	41,80	0,00	9,15	9,12	0,80
	2,50	47,50	0,00	11,19	11,15	0,98

Forces acting on construction

Name	F _{hor} [kN/m]	App.Pt. z [m]	F _{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - wall	0,00	-0,15	4,49	0,78	1,350
Weight - earth wedge	0,00	-0,65	6,55	0,67	1,350
Active pressure	13,48	-0,64	16,87	0,82	1,350
Contact stress	0,00	0,00	-31,78	0,78	1,000

Wall heel check

Reinforcement and dimensions of the cross-section
5 prof. 12,0 mm, cover 30,0 mm
Inputted reinforcement area = 565,5 mm²
Required reinforcement area = 356,9 mm²
Cross-section width = 1,00 m
Cross-section height = 0,30 m
Reinforcement ratio $\rho = 0,21\% > 0,14\% = \rho_{min}$
Position of neutral axis $x = 0,02\text{ m} < 0,16\text{ m} = x_{max}$
Ultimate shear force $V_{Rd} = 118,18\text{ kN} > 5,89\text{ kN} = V_{Ed}$
Ultimate moment $M_{Rd} = 63,09\text{ kNm} > 16,73\text{ kNm} = M_{Ed}$

Cross-section is SATISFACTORY.

Annexes

Cantilever wall analysis

Input data

Settings

Slovenia - EN 1997

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)
Coefficients EN 1992-1-1 : standard

Wall analysis

Verification methodology : according to EN 1997
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Caquot-Kerisel
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Base key : The base key is considered as inclined footing bottom
Allowable eccentricity : 0,333
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				
Partial factor on overturning :		$\gamma_{Rv} =$	1,40	[-]
Partial factor on sliding resistance :		$\gamma_{Rh} =$	1,10	[-]
Partial factor on bearing capacity :		$\gamma_{Re} =$	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	[-]

Material of structure

Unit weight $\gamma = 23,00 \text{ kN/m}^3$

Analysis of concrete structures carried out according to the standard EN 1992-1-1 (EC2).

Concrete: C 25/30

Cylinder compressive strength $f_{ck} = 25,00 \text{ MPa}$
Tensile strength $f_{ctm} = 2,60 \text{ MPa}$

Longitudinal steel: B500B

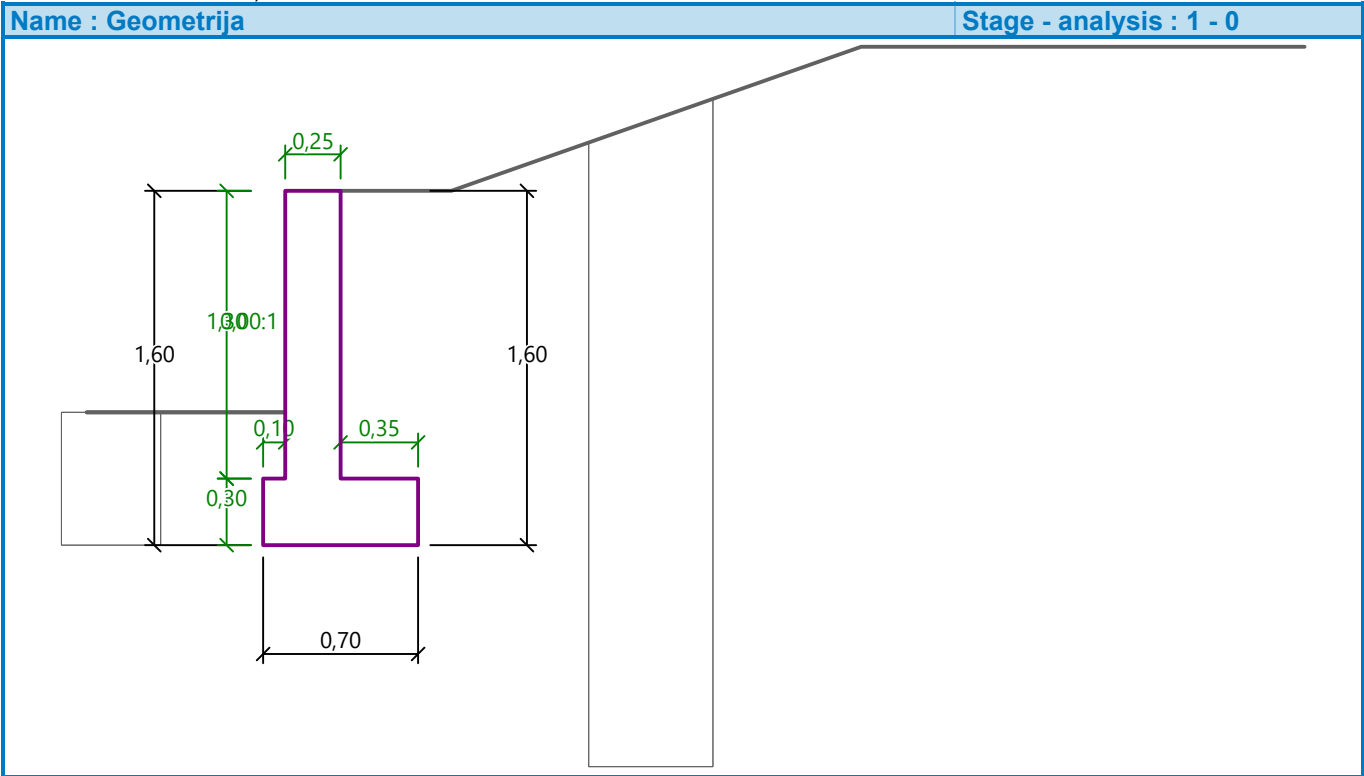
Yield strength $f_{yk} = 500,00 \text{ MPa}$

Geometry of structure

No.	Coordinate X [m]	Depth Z [m]
1	0,00	0,00
2	0,00	1,30
3	0,35	1,30
4	0,35	1,60

No.	Coordinate X [m]	Depth Z [m]
5	-0,35	1,60
6	-0,35	1,30
7	-0,25	1,30
8	-0,25	0,00

The origin [0,0] is located at the most upper right point of the wall.
Wall section area = 0,53 m².



Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m ³]	γ_{su} [kN/m ³]	δ [°]
1	zemljina		27,00	5,00	19,00	9,00	5,00
2	nasutje spredaj		30,00	5,00	20,00	10,00	3,00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

zemljina

Unit weight : $\gamma = 19,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 27,00^\circ$
Cohesion of soil : $c_{ef} = 5,00 \text{ kPa}$
Angle of friction struc.-soil : $\delta = 5,00^\circ$
Soil : cohesionless
Saturated unit weight : $\gamma_{sat} = 19,00 \text{ kN/m}^3$

nasutje spredaj

Unit weight : $\gamma = 20,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 30,00^\circ$

Cohesion of soil :
Angle of friction struc.-soil :
Soil :
Saturated unit weight :

c_{ef}
 δ
cohesionless
 γ_{sat}

=
=

=
5,00 kPa
3,00 °

20,00 kN/m³

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1		- 0,00 .. ∞	zemljina	

Foundation

Type of foundation : soil from geological profile

Terrain profile

No.	Coordinates x [m]	Depth z [m]
1	0,00	0,00
2	0,50	0,00
3	2,35	-0,65
4	3,35	-0,65

Origin [0,0] is located in upper right edge of construction.
Positive coordinate +z has downward direction.

Water influence

Ground water table is located below the structure.

Resistance on front face of the structure

Resistance on front face of the structure: 1/3 pass., 2/3 at rest
Soil on front face of the structure - nasutje spredaj
Angle of friction struc.-soil
Soil thickness in front of structure

δ

 h

=

=
30,00 °
0,60 m

Terrain in front of structure is flat.

Settings of the stage of construction

Design situation : permanent
The wall is free to move. Active earth pressure is therefore assumed.
Reduction of soil/soil friction angle : do not reduce

Verification No. 1

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	
2	0,00	89,23(30,00)	30,00	5,00	20,00	-30,00	2,780	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,30	6,00	0,00	63,86	55,30	-31,93
2	0,30	6,00	0,00	33,35	17,07	28,66
	0,30	6,03	0,00	33,43	17,10	28,72
3	0,30	6,03	0,00	64,03	55,45	-32,02
	0,60	12,00	0,00	102,38	88,66	-51,19

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	
2	0,00	89,23(80,00)	30,00	5,00	20,00	0,500	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	6,00	0,00	3,00	3,00	0,00
2	0,30	6,00	0,00	5,93	0,52	5,91
	0,30	6,03	0,00	5,96	0,52	5,94
3	0,30	6,03	0,00	3,01	3,01	0,00
	0,60	12,00	0,00	6,00	6,00	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_a	Comment
1	0,18	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,00	0,00(0,00)	27,00	5,00	19,00	5,00	0,000	MODIFIED
3	0,33	0,00	27,00	5,00	19,00	5,00	0,358	
4	0,06	23,93	27,00	5,00	19,00	27,00	0,585	
5	0,73	23,93	27,00	5,00	19,00	27,00	0,947	
6	0,30	0,00	27,00	5,00	19,00	5,00	0,491	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,18	3,34	0,00	0,00	0,00	0,00
2	0,18	3,34	0,00	0,00	0,00	0,00
	0,18	3,36	0,00	0,00	0,00	0,00
3	0,18	3,36	0,00	0,00	0,00	0,00
	0,51	9,71	0,00	0,00	0,00	0,00
4	0,51	9,71	0,00	1,18	0,74	0,92
	0,57	10,78	0,00	1,80	1,14	1,40
5	0,57	10,78	0,00	1,80	1,14	1,40
	1,30	24,70	0,00	14,99	9,45	11,64
6	1,30	24,70	0,00	3,60	3,58	0,31
	1,60	30,40	0,00	6,39	6,37	0,56

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overtur.	Coeff. sliding	Coeff. stress
Weight - wall	0,00	-0,64	12,30	0,27	1,000	1,000	1,350
Weight - soil	0,00	-0,45	0,60	0,05	1,000	1,000	1,350
FF resistance	-12,23	-0,24	-6,35	-0,07	1,000	1,000	1,350
Weight - earth wedge	0,00	-0,56	2,62	0,47	1,000	1,000	1,350
Active pressure	5,42	-0,46	4,97	0,58	1,350	1,350	1,350

Verification of complete wall

Check for overturning stability

Resisting moment $M_{res} = 6,38 \text{ kNm/m}$

Overturning moment $M_{ovr} = 0,45 \text{ kNm/m}$

Wall for overturning is SATISFACTORY

Check for slip

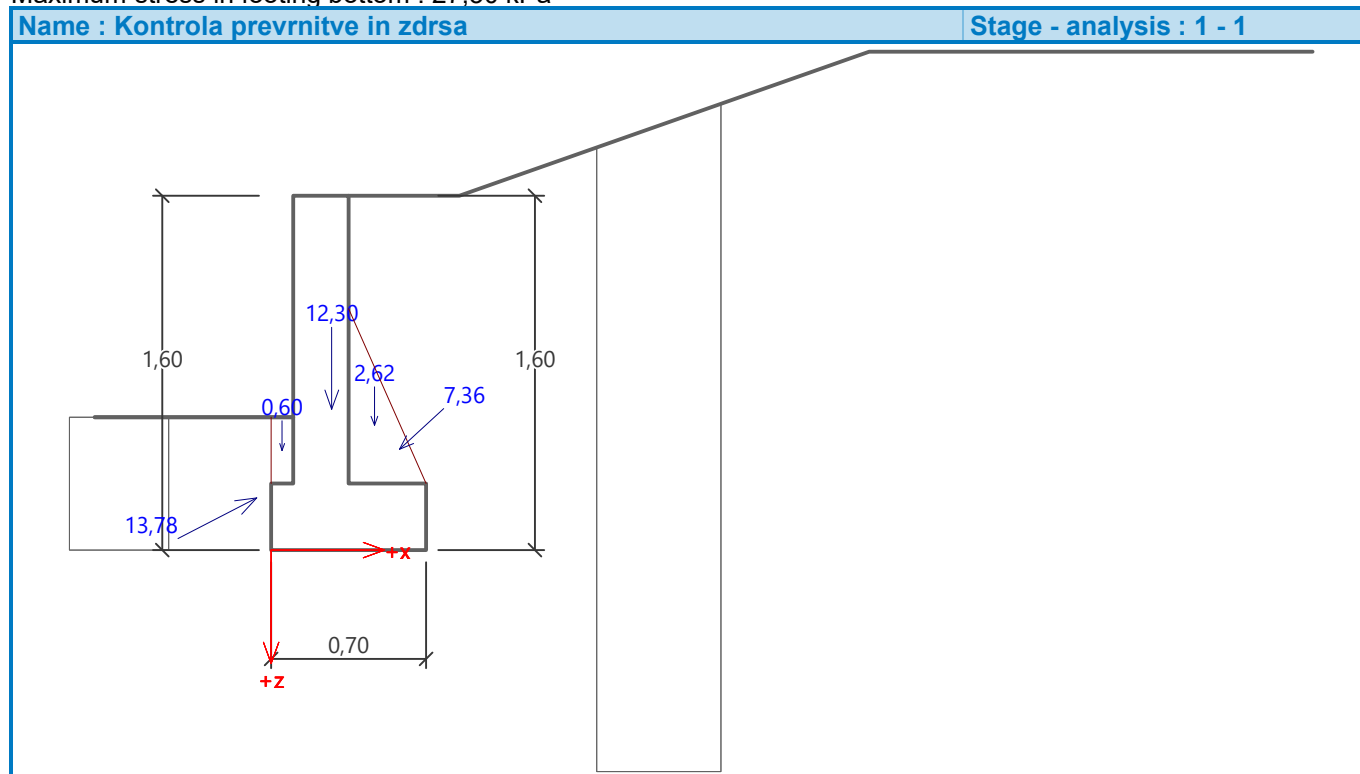
Resisting horizontal force $H_{res} = 10,54 \text{ kN/m}$

Active horizontal force $H_{act} = -4,91 \text{ kN/m}$

Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 27,30 kPa



Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	-4,57	19,11	-9,19	0,000	27,30
2	-2,92	15,89	-4,91	0,000	22,71

Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	-3,38	14,15	-6,81

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification

Max. eccentricity of normal force $e = 0,000$

Maximum allowable eccentricity $e_{alw} = 0,333$

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity

Bearing capacity of foundation soil $R = 300,00 \text{ kPa}$

Partial factor on bearing capacity $\gamma_{Rv} = 1,40$

Max. stress at footing bottom $\sigma = 27,30 \text{ kPa}$

Bearing capacity of foundation soil $R_d = 214,29 \text{ kPa}$

Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Dimensioning No. 1

Wall stem check - front reinf.

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,30	5,98	0,00	63,70	55,17	-31,85

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	5,98	0,00	2,99	2,99	0,00

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,18	0,00	27,00	5,00	19,00	0,546	
2	0,00	0,00(0,00)	27,00	5,00	19,00	0,000	MODIFIED
3	0,72	0,00	27,00	5,00	19,00	0,546	
4	0,41	0,00	27,00	5,00	19,00	0,680	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,18	3,34	0,00	1,82	1,82	0,00
2	0,18	3,34	0,00	0,00	0,00	0,00
	0,18	3,36	0,00	0,00	0,00	0,00
3	0,18	3,36	0,00	1,83	1,83	0,00
	0,89	16,98	0,00	9,27	9,27	0,00
4	0,89	16,98	0,00	9,27	9,27	0,00
	1,30	24,68	0,00	14,50	14,50	0,00

Forces acting on construction

Name	F _{hor} [kN/m]	App.Pt. z [m]	F _{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0,00	-0,65	7,47	0,12	1,000	1,350	1,000
FF resistance	-4,13	-0,13	-2,21	0,00	1,000	1,000	1,000
Pressure at rest	8,96	-0,43	0,00	0,25	1,350	1,000	1,350

Wall stem check - front reinf.

Front reinforcement is not required.

Wall stem check - back reinf.

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,30	5,98	0,00	63,70	55,17	-31,85

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	5,98	0,00	2,99	2,99	0,00

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,18	0,00	27,00	5,00	19,00	0,546	
2	0,00	0,00(0,00)	27,00	5,00	19,00	0,000	MODIFIED
3	0,72	0,00	27,00	5,00	19,00	0,546	
4	0,41	0,00	27,00	5,00	19,00	0,680	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,18	3,34	0,00	1,82	1,82	0,00
2	0,18	3,34	0,00	0,00	0,00	0,00
	0,18	3,36	0,00	0,00	0,00	0,00
3	0,18	3,36	0,00	1,83	1,83	0,00
	0,89	16,98	0,00	9,27	9,27	0,00
4	0,89	16,98	0,00	9,27	9,27	0,00
	1,30	24,68	0,00	14,50	14,50	0,00

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0,00	-0,65	7,47	0,12	1,000	1,350	1,000
FF resistance	-4,13	-0,13	-2,21	0,00	1,000	1,000	1,000
Pressure at rest	8,96	-0,43	0,00	0,25	1,350	1,000	1,350

Wall stem check - back reinf.

Wall check at the construction joint 1,30 m from the wall crest

Reinforcement and dimensions of the cross-section

5 prof. 12,0 mm, cover 30,0 mm

Inputted reinforcement area = 565,5 mm²

Required reinforcement area = 289,3 mm²

Cross-section width = 1,00 m

Cross-section height = 0,25 m

Reinforcement ratio ρ = 0,26 % > 0,14 % = ρ_{min}

Position of neutral axis x = 0,02 m < 0,13 m = x_{max}

Ultimate shear force V_{Rd} = 103,29 kN > 7,96 kN = V_{Ed}

Ultimate moment M_{Rd} = 52,06 kNm > 4,35 kNm = M_{Ed}

Cross-section is SATISFACTORY.

Wall stem check - back reinf. - V_{Ed}

Wall check at the construction joint 1,27 m from the wall crest

Reinforcement and dimensions of the cross-section

5 prof. 12,0 mm, cover 30,0 mm

Inputted reinforcement area = 565,5 mm²

Required reinforcement area = 289,3 mm²

Cross-section width = 1,00 m

Cross-section height = 0,25 m

Ultimate shear force V_{Rd} = 103,29 kN > 7,97 kN = V_{Ed}

Cross-section is SATISFACTORY.

Wall heel check

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	
2	0,00	89,23(30,00)	30,00	5,00	20,00	-30,00	2,780	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,30	6,00	0,00	63,86	55,30	-31,93
2	0,30	6,00	0,00	33,35	17,07	28,66
	0,30	6,03	0,00	33,43	17,10	28,72
3	0,30	6,03	0,00	64,03	55,45	-32,02
	0,60	12,00	0,00	102,38	88,66	-51,19

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
2	0,00	89,23(80,00)	30,00	5,00	20,00	0,500	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	6,00	0,00	3,00	3,00	0,00
2	0,30	6,00	0,00	5,93	0,52	5,91
	0,30	6,03	0,00	5,96	0,52	5,94
3	0,30	6,03	0,00	3,01	3,01	0,00
	0,60	12,00	0,00	6,00	6,00	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_a	Comment
1	0,18	0,00	27,00	5,00	19,00	5,00	0,358	MODIFIED
2	0,00	0,00(0,00)	27,00	5,00	19,00	5,00	0,000	
3	0,33	0,00	27,00	5,00	19,00	5,00	0,358	
4	0,06	23,93	27,00	5,00	19,00	27,00	0,585	
5	0,73	23,93	27,00	5,00	19,00	27,00	0,947	
6	0,30	0,00	27,00	5,00	19,00	5,00	0,491	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,18	3,34	0,00	0,00	0,00	0,00
2	0,18	3,34	0,00	0,00	0,00	0,00
	0,18	3,36	0,00	0,00	0,00	0,00
3	0,18	3,36	0,00	0,00	0,00	0,00
	0,51	9,71	0,00	0,00	0,00	0,00
4	0,51	9,71	0,00	1,18	0,74	0,92
	0,57	10,78	0,00	1,80	1,14	1,40
5	0,57	10,78	0,00	1,80	1,14	1,40
	1,30	24,70	0,00	14,99	9,45	11,64
6	1,30	24,70	0,00	3,60	3,58	0,31
	1,60	30,40	0,00	6,39	6,37	0,56

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - wall	0,00	-0,15	2,42	0,52	1,350
Weight - earth wedge	0,00	-0,56	2,62	0,47	1,350
Active pressure	5,42	-0,46	4,97	0,58	1,350
Contact stress	0,00	0,00	0,97	0,34	1,000

Wall heel check

Reinforcement and dimensions of the cross-section
5 prof. 12,0 mm, cover 30,0 mm
Inputted reinforcement area = 565,5 mm²
Required reinforcement area = 356,9 mm²

Cross-section width = 1,00 m
Cross-section height = 0,30 m
Reinforcement ratio ρ = 0,21 % > 0,14 % = ρ_{min}
Position of neutral axis x = 0,02 m < 0,16 m = x_{max}
Ultimate shear force V_{Rd} = 118,18 kN > 14,48 kN = V_{Ed}
Ultimate moment M_{Rd} = 63,09 kNm > 4,35 kNm = M_{Ed}

Cross-section is SATISFACTORY.

Annexes

Cantilever wall analysis

Input data

Settings

Slovenia - EN 1997

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)
Coefficients EN 1992-1-1 : standard

Wall analysis

Verification methodology : according to EN 1997
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Caquot-Kerisel
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Base key : The base key is considered as inclined footing bottom
Allowable eccentricity : 0,333
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				
Partial factor on overturning :		$\gamma_{Rv} =$	1,40	[-]
Partial factor on sliding resistance :		$\gamma_{Rh} =$	1,10	[-]
Partial factor on bearing capacity :		$\gamma_{Re} =$	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	[-]

Material of structure

Unit weight $\gamma = 23,00 \text{ kN/m}^3$

Analysis of concrete structures carried out according to the standard EN 1992-1-1 (EC2).

Concrete: C 25/30

Cylinder compressive strength $f_{ck} = 25,00 \text{ MPa}$
Tensile strength $f_{ctm} = 2,60 \text{ MPa}$

Longitudinal steel: B500B

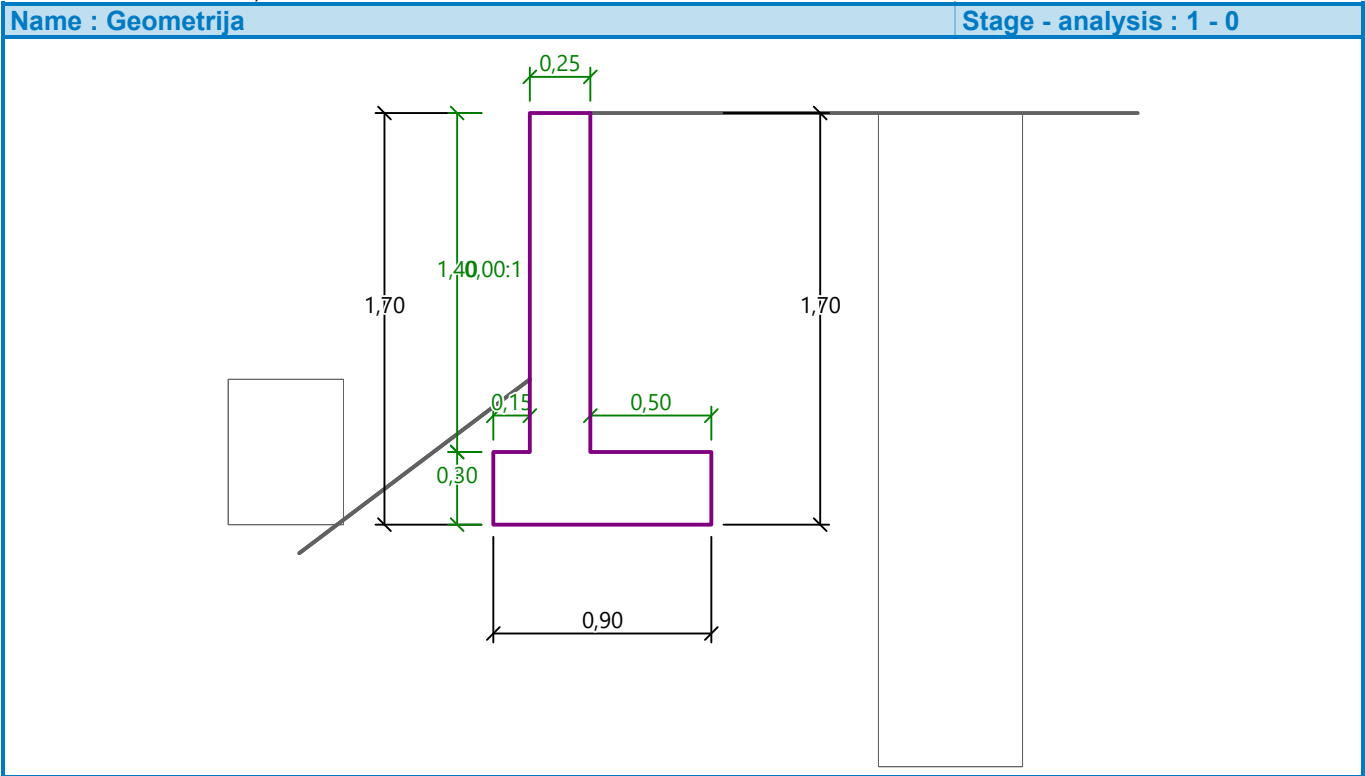
Yield strength $f_{yk} = 500,00 \text{ MPa}$

Geometry of structure

No.	Coordinate X [m]	Depth Z [m]
1	0,00	0,00
2	0,00	1,40
3	0,50	1,40
4	0,50	1,70

No.	Coordinate X [m]	Depth Z [m]
5	-0,40	1,70
6	-0,40	1,40
7	-0,25	1,40
8	-0,25	0,00

The origin [0,0] is located at the most upper right point of the wall.
Wall section area = 0,62 m².



Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m ³]	γ_{su} [kN/m ³]	δ [°]
1	zemljina		27,00	5,00	19,00	9,00	5,00
2	nasutje spredaj		30,00	5,00	20,00	10,00	3,00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

zemljina

Unit weight : $\gamma = 19,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 27,00^\circ$
Cohesion of soil : $c_{ef} = 5,00 \text{ kPa}$
Angle of friction struc.-soil : $\delta = 5,00^\circ$
Soil : cohesionless
Saturated unit weight : $\gamma_{sat} = 19,00 \text{ kN/m}^3$

nasutje spredaj

Unit weight : $\gamma = 20,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 30,00^\circ$

Cohesion of soil : $c_{ef} = 5,00 \text{ kPa}$
 Angle of friction struc.-soil : $\delta = 3,00^\circ$
 Soil : cohesionless
 Saturated unit weight : $\gamma_{sat} = 20,00 \text{ kN/m}^3$

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	-	0,00 .. ∞	zemljina	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind the structure is flat.

Water influence

Ground water table is located below the structure.

Resistance on front face of the structure

Resistance on front face of the structure: 1/3 pass., 2/3 at rest

Soil on front face of the structure - nasutje spredaj

Angle of friction struc.-soil $\delta = 30,00^\circ$

Soil thickness in front of structure $h = 0,60 \text{ m}$

Soil slope in front of structure $\beta = -37,00^\circ$

Settings of the stage of construction

Design situation : permanent

The wall is free to move. Active earth pressure is therefore assumed.

Reduction of soil/soil friction angle : do not reduce

Verification No. 1

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	0,786	
2	0,00	89,48(30,00)	30,00	5,00	20,00	-30,00	0,340	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	-30,00	0,786	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	8,87	7,68	-4,43
	0,30	6,00	0,00	13,58	11,76	-6,79
2	0,30	6,00	0,00	7,88	4,00	6,79
	0,30	6,03	0,00	7,89	4,00	6,79
3	0,30	6,03	0,00	13,60	11,78	-6,80
	0,60	12,00	0,00	18,30	15,85	-9,15

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	
2	0,00	89,48(80,00)	30,00	5,00	20,00	0,500	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	6,00	0,00	1,77	1,77	0,00
2	0,30	6,00	0,00	3,51	0,31	3,50
	0,30	6,03	0,00	3,52	0,31	3,51
3	0,30	6,03	0,00	1,78	1,78	0,00
	0,60	12,00	0,00	3,55	3,55	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_a	Comment
1	0,58	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,82	31,50	27,00	5,00	19,00	27,00	0,719	
3	0,30	0,00	27,00	5,00	19,00	5,00	0,358	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,58	11,10	0,00	0,00	0,00	0,00
2	0,58	11,10	0,00	3,51	1,84	3,00
	1,40	26,60	0,00	14,66	7,66	12,50
3	1,40	26,60	0,00	3,71	3,69	0,32
	1,70	32,30	0,00	5,75	5,73	0,50

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overturn.	Coeff. sliding	Coeff. stress
Weight - wall	0,00	-0,63	14,26	0,35	1,000	1,000	1,350
Weight - soil	0,00	-0,42	0,73	0,08	1,000	1,000	1,350
FF resistance	-3,06	-0,25	-1,35	-0,09	1,000	1,000	1,350
Weight - earth wedge	0,00	-0,57	3,88	0,57	1,000	1,000	1,350
Active pressure	5,29	-0,49	6,44	0,70	1,350	1,350	1,350

Verification of complete wall

Check for overturning stability

Resisting moment M_{res} = 9,65 kNm/m

Overturning moment M_{ovr} = 2,77 kNm/m

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force H_{res} = 15,87 kN/m

Active horizontal force H_{act} = 4,08 kN/m

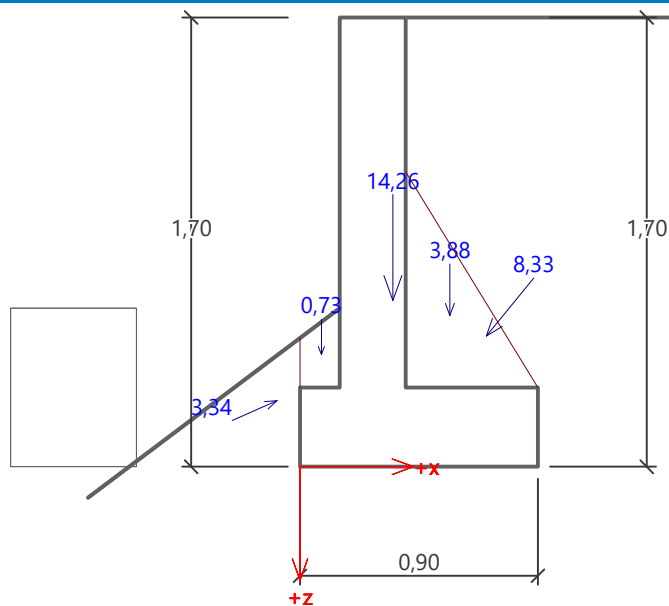
Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 38,48 kPa

Name : Kontrola prevrnitve in zdrsa

Stage - analysis : 1 - 1



Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	0,96	32,35	3,01	0,033	38,48
2	1,05	26,22	4,08	0,045	31,98

Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	0,71	23,96	2,23

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification

Max. eccentricity of normal force $e = 0,045$

Maximum allowable eccentricity $e_{alw} = 0,333$

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity

Bearing capacity of foundation soil $R = 300,00 \text{ kPa}$

Partial factor on bearing capacity $\gamma_{Rv} = 1,40$

Max. stress at footing bottom $\sigma = 38,48 \text{ kPa}$

Bearing capacity of foundation soil $R_d = 214,29 \text{ kPa}$

Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Dimensioning No. 1

Wall stem check - front reinf.

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	0,786	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	8,87	7,68	-4,43
	0,30	5,98	0,00	13,56	11,75	-6,78

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	5,98	0,00	1,77	1,77	0,00

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	1,40	0,00	27,00	5,00	19,00	0,546	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	1,40	26,58	0,00	14,51	14,51	0,00

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0,00	-0,70	8,04	0,12	1,000	1,350	1,000
FF resistance	-1,14	-0,13	-0,56	0,00	1,000	1,000	1,000
Pressure at rest	10,15	-0,47	0,00	0,25	1,350	1,000	1,350

Wall stem check - front reinf.

Front reinforcement is not required.

Wall stem check - back reinf.

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	0,786	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	8,87	7,68	-4,43
	0,30	5,98	0,00	13,56	11,75	-6,78

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	5,98	0,00	1,77	1,77	0,00

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	1,40	0,00	27,00	5,00	19,00	0,546	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	1,40	26,58	0,00	14,51	14,51	0,00

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0,00	-0,70	8,04	0,12	1,000	1,350	1,000
FF resistance	-1,14	-0,13	-0,56	0,00	1,000	1,000	1,000
Pressure at rest	10,15	-0,47	0,00	0,25	1,350	1,000	1,350

Wall stem check - back reinf.

Wall check at the construction joint 1,40 m from the wall crest

Reinforcement and dimensions of the cross-section

5 prof. 12,0 mm, cover 30,0 mm

Inputted reinforcement area = 565,5 mm²

Required reinforcement area = 289,3 mm²

Cross-section width = 1,00 m

Cross-section height = 0,25 m

Reinforcement ratio ρ = 0,26 % > 0,14 % = ρ_{min}

Position of neutral axis x = 0,02 m < 0,13 m = x_{max}

Ultimate shear force V_{Rd} = 103,29 kN > 12,56 kN = V_{Ed}

Ultimate moment M_{Rd} = 52,06 kNm > 6,17 kNm = M_{Ed}

Cross-section is SATISFACTORY.

Wall heel check

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	0,786	

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
2	0,00	89,48(30,00)	30,00	5,00	20,00	-30,00	0,340	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	-30,00	0,786	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	8,87	7,68	-4,43
	0,30	6,00	0,00	13,58	11,76	-6,79
2	0,30	6,00	0,00	7,88	4,00	6,79
	0,30	6,03	0,00	7,89	4,00	6,79
3	0,30	6,03	0,00	13,60	11,78	-6,80
	0,60	12,00	0,00	18,30	15,85	-9,15

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	MODIFIED
2	0,00	89,48(80,00)	30,00	5,00	20,00	0,500	
3	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	6,00	0,00	1,77	1,77	0,00
2	0,30	6,00	0,00	3,51	0,31	3,50
	0,30	6,03	0,00	3,52	0,31	3,51
3	0,30	6,03	0,00	1,78	1,78	0,00
	0,60	12,00	0,00	3,55	3,55	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_a	Comment
1	0,58	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,82	31,50	27,00	5,00	19,00	27,00	0,719	
3	0,30	0,00	27,00	5,00	19,00	5,00	0,358	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,58	11,10	0,00	0,00	0,00	0,00
2	0,58	11,10	0,00	3,51	1,84	3,00
	1,40	26,60	0,00	14,66	7,66	12,50
3	1,40	26,60	0,00	3,71	3,69	0,32
	1,70	32,30	0,00	5,75	5,73	0,50

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - wall	0,00	-0,15	3,45	0,65	1,350

Name	F _{hor} [kN/m]	App.Pt. z [m]	F _{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - earth wedge	0,00	-0,57	3,88	0,57	1,350
Active pressure	5,29	-0,49	6,44	0,70	1,350
Contact stress	0,00	0,00	-16,39	0,64	1,000

Wall heel check

Reinforcement and dimensions of the cross-section
5 prof. 12,0 mm, cover 30,0 mm
Inputted reinforcement area = 565,5 mm²
Required reinforcement area = 356,9 mm²
Cross-section width = 1,00 m
Cross-section height = 0,30 m
Reinforcement ratio ρ = 0,21 % > 0,14 % = ρ_{min}
Position of neutral axis x = 0,02 m < 0,16 m = x_{max}
Ultimate shear force V_{Rd} = 118,18 kN > 2,19 kN = V_{Ed}
Ultimate moment M_{Rd} = 63,09 kNm > 6,17 kNm = M_{Ed}

Cross-section is SATISFACTORY.

Annexes

Cantilever wall analysis

Input data

Settings

Slovenia - EN 1997

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)
Coefficients EN 1992-1-1 : standard

Wall analysis

Verification methodology : according to EN 1997
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Caquot-Kerisel
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Base key : The base key is considered as inclined footing bottom
Allowable eccentricity : 0,333
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				
Partial factor on overturning :		$\gamma_{Rv} =$	1,40	[-]
Partial factor on sliding resistance :		$\gamma_{Rh} =$	1,10	[-]
Partial factor on bearing capacity :		$\gamma_{Re} =$	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	[-]

Material of structure

Unit weight $\gamma = 23,00 \text{ kN/m}^3$

Analysis of concrete structures carried out according to the standard EN 1992-1-1 (EC2).

Concrete: C 25/30

Cylinder compressive strength $f_{ck} = 25,00 \text{ MPa}$
Tensile strength $f_{ctm} = 2,60 \text{ MPa}$

Longitudinal steel: B500B

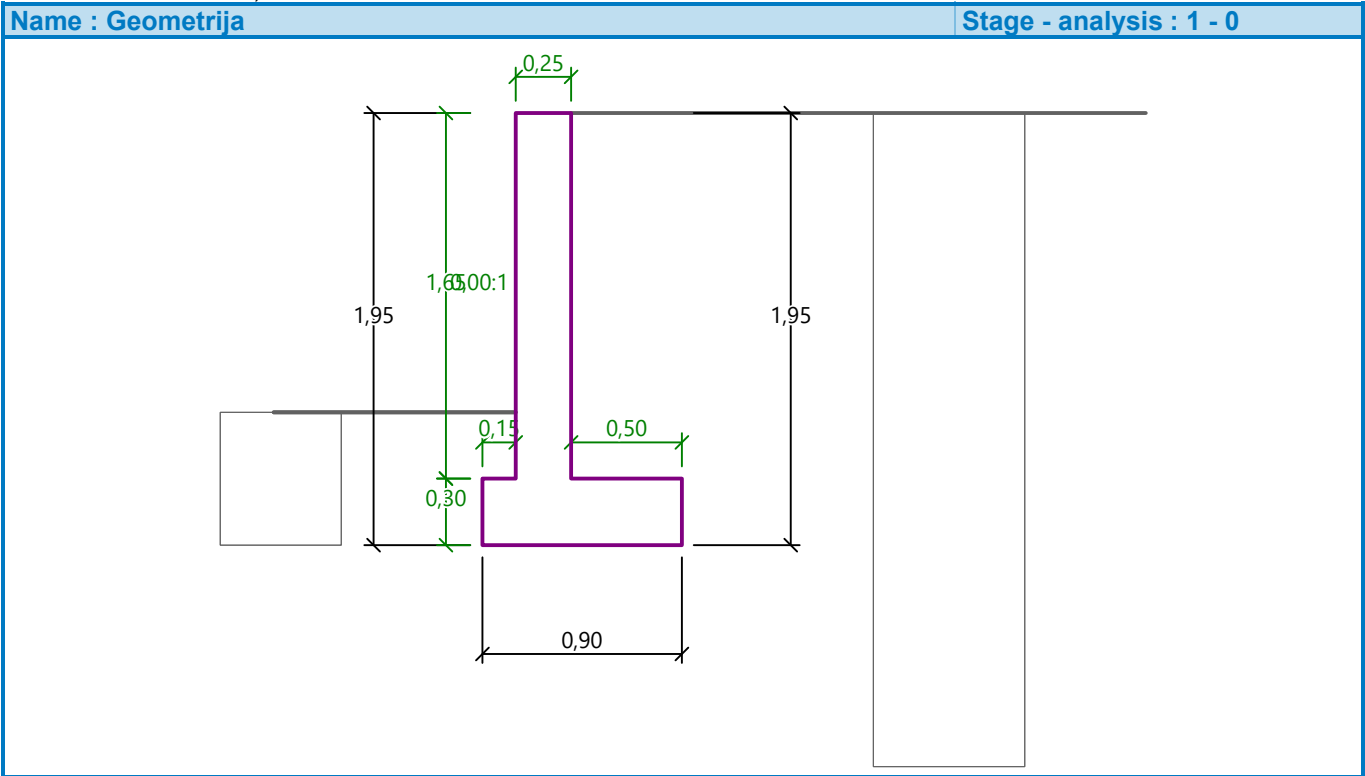
Yield strength $f_{yk} = 500,00 \text{ MPa}$

Geometry of structure

No.	Coordinate X [m]	Depth Z [m]
1	0,00	0,00
2	0,00	1,65
3	0,50	1,65
4	0,50	1,95

No.	Coordinate X [m]	Depth Z [m]
5	-0,40	1,95
6	-0,40	1,65
7	-0,25	1,65
8	-0,25	0,00

The origin [0,0] is located at the most upper right point of the wall.
Wall section area = 0,68 m².



Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m ³]	γ_{su} [kN/m ³]	δ [°]
1	zemljina		27,00	5,00	19,00	9,00	5,00
2	nasutje spredaj		30,00	5,00	20,00	10,00	3,00

All soils are considered as cohesionless for at rest pressure analysis.

Soil parameters

zemljina

Unit weight : $\gamma = 19,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 27,00^\circ$
Cohesion of soil : $c_{ef} = 5,00 \text{ kPa}$
Angle of friction struc.-soil : $\delta = 5,00^\circ$
Soil : cohesionless
Saturated unit weight : $\gamma_{sat} = 19,00 \text{ kN/m}^3$

nasutje spredaj

Unit weight : $\gamma = 20,00 \text{ kN/m}^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef} = 30,00^\circ$

Cohesion of soil :
Angle of friction struc.-soil :
Soil :
Saturated unit weight :

$c_{ef} = 5,00 \text{ kPa}$
 $\delta = 3,00^\circ$
cohesionless
 $\gamma_{sat} = 20,00 \text{ kN/m}^3$

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	-	0,00 .. ∞	zemljina	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind the structure is flat.

Water influence

Ground water table is located below the structure.

Resistance on front face of the structure

Resistance on front face of the structure: 1/3 pass., 2/3 at rest

Soil on front face of the structure - nasutje spredaj

Angle of friction struc.-soil $\delta = 30,00^\circ$

Soil thickness in front of structure $h = 0,60 \text{ m}$

Terrain in front of structure is flat.

Settings of the stage of construction

Design situation : permanent

The wall is free to move. Active earth pressure is therefore assumed.

Reduction of soil/soil friction angle : do not reduce

Verification No. 1

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	
2	0,00	89,48(30,00)	30,00	5,00	20,00	-30,00	2,780	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,30	6,00	0,00	63,86	55,30	-31,93
2	0,30	6,00	0,00	33,35	16,94	28,73
	0,30	6,03	0,00	33,43	16,97	28,80
3	0,30	6,03	0,00	64,03	55,45	-32,02
	0,60	12,00	0,00	102,38	88,66	-51,19

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	
2	0,00	89,48(80,00)	30,00	5,00	20,00	0,500	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	6,00	0,00	3,00	3,00	0,00
2	0,30	6,00	0,00	5,93	0,52	5,91
	0,30	6,03	0,00	5,96	0,52	5,94
3	0,30	6,03	0,00	3,01	3,01	0,00
	0,60	12,00	0,00	6,00	6,00	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_a	Comment
1	0,83	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,82	31,50	27,00	5,00	19,00	27,00	0,719	
3	0,30	0,00	27,00	5,00	19,00	5,00	0,358	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,83	15,85	0,00	0,00	0,00	0,00
2	0,83	15,85	0,00	6,93	3,62	5,91
	1,65	31,35	0,00	18,07	9,44	15,41
3	1,65	31,35	0,00	5,41	5,39	0,47
	1,95	37,05	0,00	7,45	7,42	0,65

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overturn.	Coeff. sliding	Coeff. stress
Weight - wall	0,00	-0,74	15,70	0,34	1,000	1,000	1,350
Weight - soil	0,00	-0,45	0,90	0,08	1,000	1,000	1,350
FF resistance	-12,23	-0,24	-6,35	-0,10	1,000	1,000	1,350
Weight - earth wedge	0,00	-0,57	3,88	0,57	1,000	1,000	1,350
Active pressure	7,25	-0,51	8,86	0,69	1,350	1,350	1,350

Verification of complete wall

Check for overturning stability

Resisting moment M_{res} = 11,83 kNm/m

Overturning moment M_{ovr} = 2,14 kNm/m

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force H_{res} = 16,18 kN/m

Active horizontal force H_{act} = -2,44 kN/m

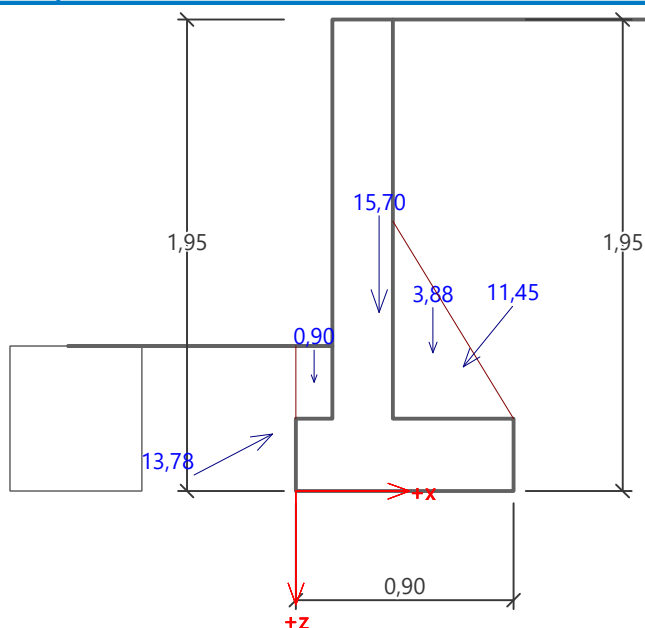
Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 34,48 kPa

Name : Kontrola prevrnitve in zdrsa

Stage - analysis : 1 - 1



Bearing capacity of foundation soil

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	-4,36	31,04	-6,72	0,000	34,48
2	-2,67	26,09	-2,44	0,000	28,99

Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	-3,23	22,99	-4,98

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification

Max. eccentricity of normal force $e = 0,000$

Maximum allowable eccentricity $e_{alw} = 0,333$

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity

Bearing capacity of foundation soil $R = 300,00 \text{ kPa}$

Partial factor on bearing capacity $\gamma_{Rv} = 1,40$

Max. stress at footing bottom $\sigma = 34,48 \text{ kPa}$

Bearing capacity of foundation soil $R_d = 214,29 \text{ kPa}$

Bearing capacity of foundation soil is SATISFACTORY

Overall verification - bearing capacity of found. soil is SATISFACTORY

Dimensioning No. 1

Wall stem check - front reinf.

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,30	5,98	0,00	63,70	55,17	-31,85

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	5,98	0,00	2,99	2,99	0,00

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	K_r	Comment
1	1,65	0,00	27,00	5,00	19,00	0,546	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	1,65	31,33	0,00	17,10	17,10	0,00

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0,00	-0,82	9,48	0,12	1,000	1,350	1,000
FF resistance	-4,13	-0,13	-2,21	0,00	1,000	1,000	1,000
Pressure at rest	14,10	-0,55	0,00	0,25	1,350	1,000	1,350

Wall stem check - front reinf.

Front reinforcement is not required.

Wall stem check - back reinf.

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,30	5,98	0,00	63,70	55,17	-31,85

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	5,98	0,00	2,99	2,99	0,00

Pressure at rest behind the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	1,65	0,00	27,00	5,00	19,00	0,546	

Pressure at rest distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	1,65	31,33	0,00	17,10	17,10	0,00

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. moment	Coeff. norm.force	Coeff. shear for.
Weight - wall	0,00	-0,82	9,48	0,12	1,000	1,350	1,000
FF resistance	-4,13	-0,13	-2,21	0,00	1,000	1,000	1,000
Pressure at rest	14,10	-0,55	0,00	0,25	1,350	1,000	1,350

Wall stem check - back reinf.

Wall check at the construction joint 1,65 m from the wall crest

Reinforcement and dimensions of the cross-section

5 prof. 12,0 mm, cover 30,0 mm

Inputted reinforcement area = 565,5 mm²

Required reinforcement area = 289,3 mm²

Cross-section width = 1,00 m

Cross-section height = 0,25 m

Reinforcement ratio ρ = 0,26 % > 0,14 % = ρ_{min}

Position of neutral axis x = 0,02 m < 0,13 m = x_{max}

Ultimate shear force V_{Rd} = 103,29 kN > 14,90 kN = V_{Ed}

Ultimate moment M_{Rd} = 52,06 kNm > 9,66 kNm = M_{Ed}

Cross-section is SATISFACTORY.

Wall heel check

Passive pressure on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	Φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
1	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_p	Comment
2	0,00	89,48(30,00)	30,00	5,00	20,00	-30,00	2,780	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	-30,00	6,420	

Passive pressure distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	25,34	21,94	-12,67
	0,30	6,00	0,00	63,86	55,30	-31,93
2	0,30	6,00	0,00	33,35	16,94	28,73
	0,30	6,03	0,00	33,43	16,97	28,80
3	0,30	6,03	0,00	64,03	55,45	-32,02
	0,60	12,00	0,00	102,38	88,66	-51,19

Pressure at rest on front face of the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	K_r	Comment
1	0,30	0,00	30,00	5,00	20,00	0,500	
2	0,00	89,48(80,00)	30,00	5,00	20,00	0,500	MODIFIED
3	0,30	0,00	30,00	5,00	20,00	0,500	

Pressure at rest distribution on front face of the structure

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,30	6,00	0,00	3,00	3,00	0,00
2	0,30	6,00	0,00	5,93	0,52	5,91
	0,30	6,03	0,00	5,96	0,52	5,94
3	0,30	6,03	0,00	3,01	3,01	0,00
	0,60	12,00	0,00	6,00	6,00	0,00

Active pressure behind the structure - partial results

Layer No.	Thickness [m]	α [°]	φ_d [°]	c_d [kPa]	γ [kN/m ³]	δ_d [°]	K_a	Comment
1	0,83	0,00	27,00	5,00	19,00	5,00	0,358	
2	0,82	31,50	27,00	5,00	19,00	27,00	0,719	
3	0,30	0,00	27,00	5,00	19,00	5,00	0,358	

Active pressure distribution behind the structure (without surcharge)

Layer No.	Start [m] End [m]	σ_z [kPa]	σ_w [kPa]	Pressure [kPa]	Hor. comp. [kPa]	Vert. comp. [kPa]
1	0,00	0,00	0,00	0,00	0,00	0,00
	0,83	15,85	0,00	0,00	0,00	0,00
2	0,83	15,85	0,00	6,93	3,62	5,91
	1,65	31,35	0,00	18,07	9,44	15,41
3	1,65	31,35	0,00	5,41	5,39	0,47
	1,95	37,05	0,00	7,45	7,42	0,65

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - wall	0,00	-0,15	3,45	0,65	1,350

Name	F _{hor} [kN/m]	App.Pt. z [m]	F _{vert} [kN/m]	App.Pt. x [m]	Design coefficient
Weight - earth wedge	0,00	-0,57	3,88	0,57	1,350
Active pressure	7,25	-0,51	8,86	0,69	1,350
Contact stress	0,00	0,00	-24,41	0,68	1,000

Wall heel check

Reinforcement and dimensions of the cross-section

5 prof. 12,0 mm, cover 30,0 mm

Inputted reinforcement area = 565,5 mm²

Required reinforcement area = 0,0 mm²

Cross-section width = 1,00 m

Cross-section height = 0,30 m

Fibers loaded in tension are on the front side of the cross-section, the cross-section cannot be checked using this program.

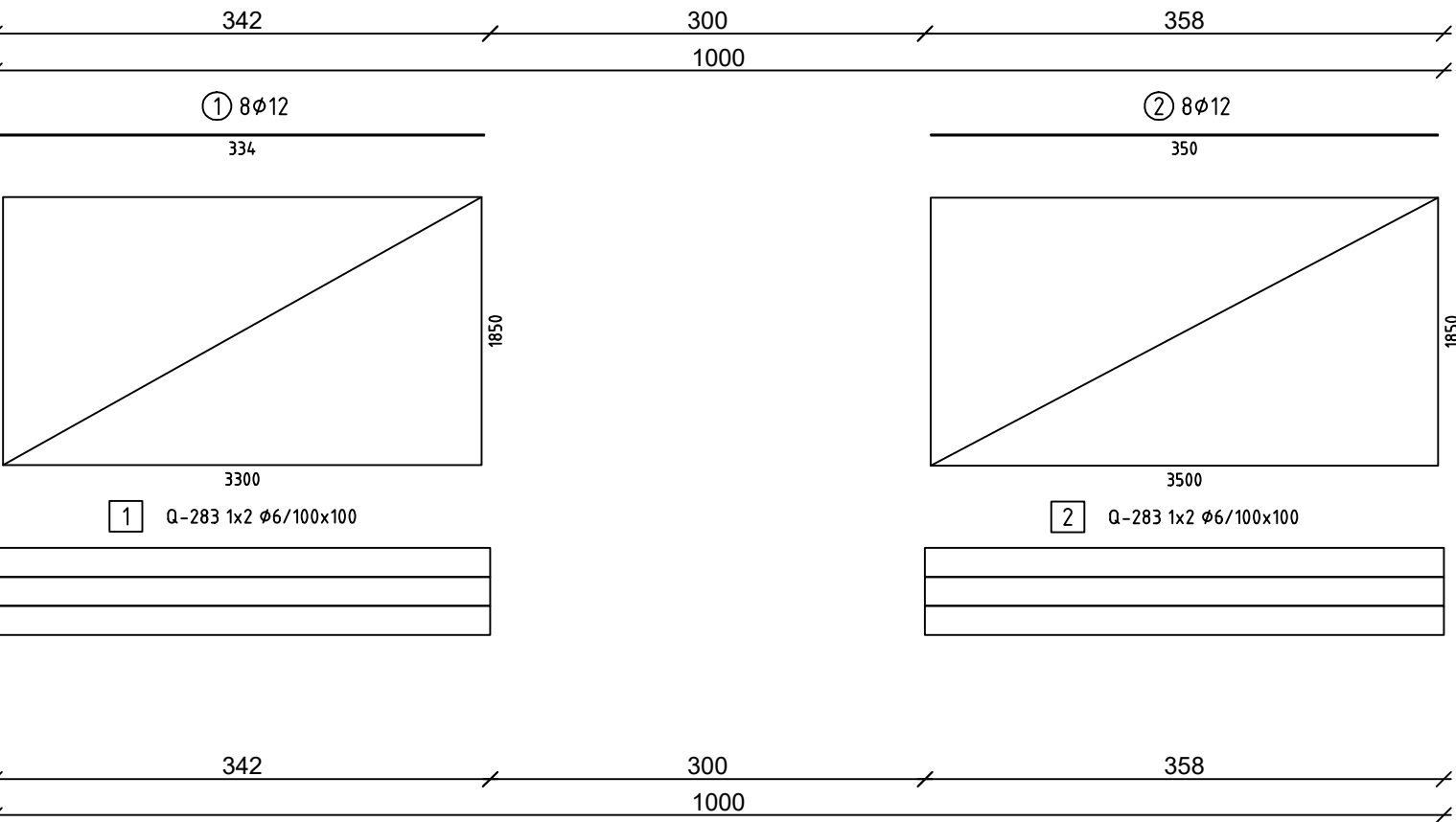
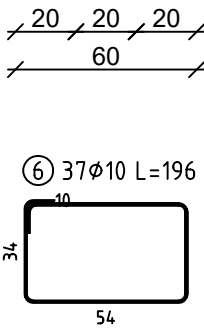
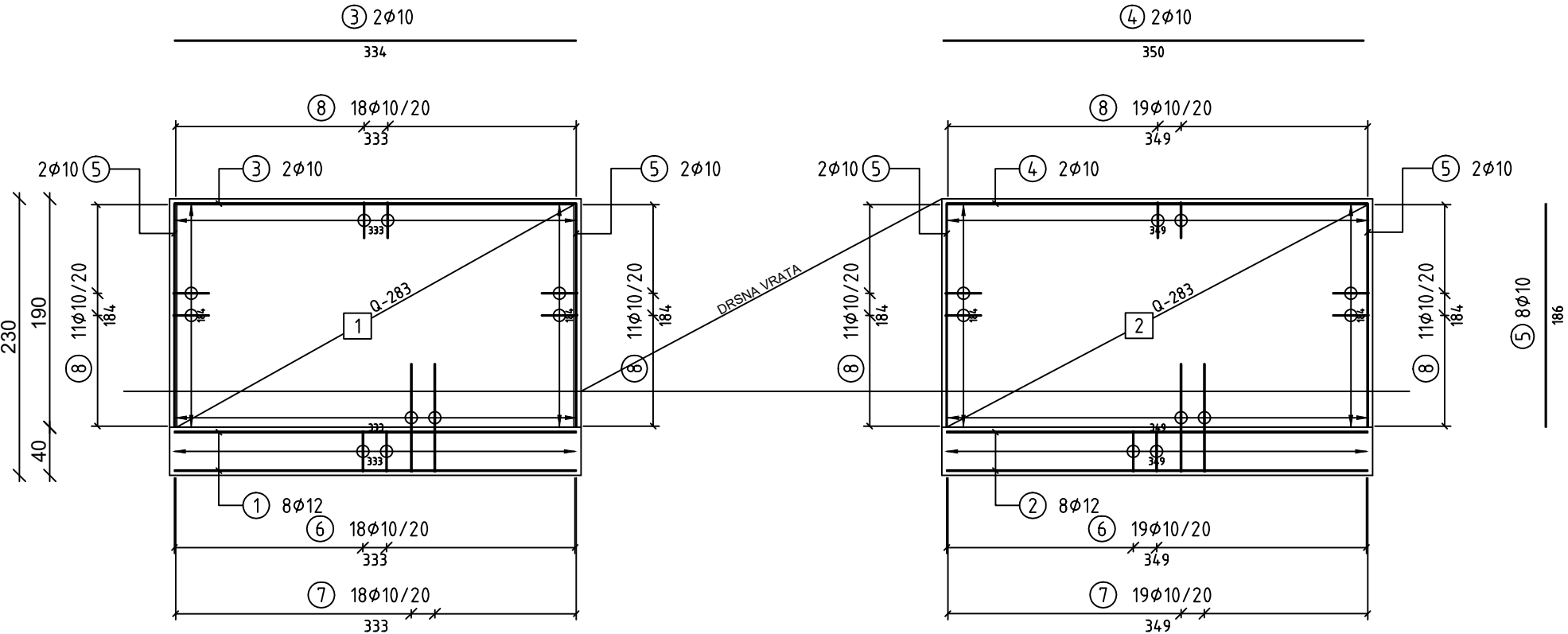
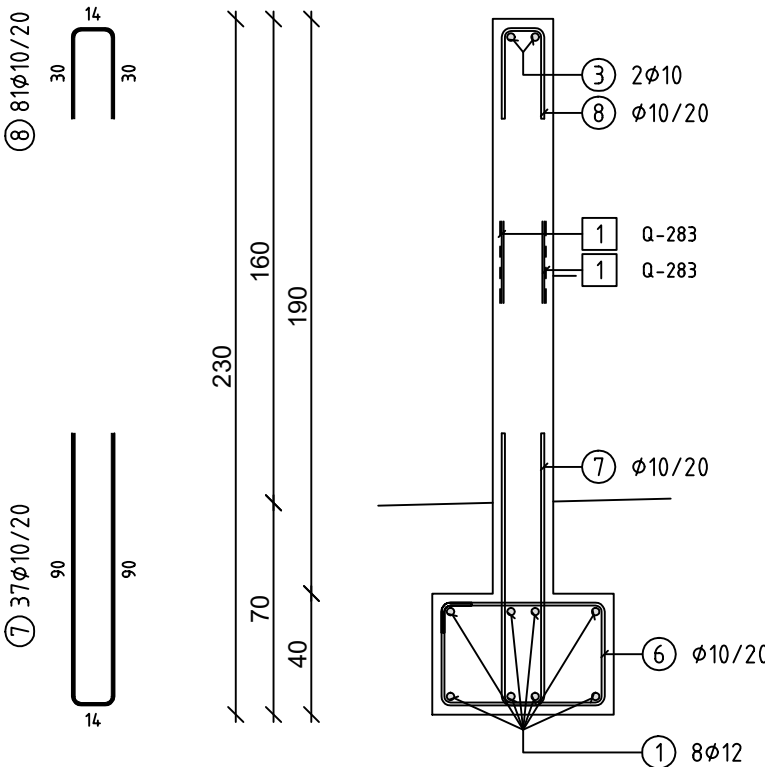
Annexes

ARMATURA OPORNEGA ZIDU Z1

Dzi = 20 cm, kos : 1

M 1 : 50

M 1 : 25



POZICIJA	STEVILO	ø mm	L [cm]	SK. DOL. [m]	TEZA [kg]	CODE	OBLIKA [cm] (Zunanja mera)
1	8	12	334.0	26.72	23.73	000	334
2	8	12	350.0	28.00	24.86	000	350
3	2	10	334.0	6.68	4.12	000	334
4	2	10	350.0	7.00	4.32	000	350
5	8	10	186.0	14.88	9.18	000	186
6	37	10	196.0	72.52	44.74	515	34 54
7	37	10	194.0	71.78	44.29	212	90 90 30
8	81	10	74.0	59.94	36.98	252	30 30 14
SKUPNA TEZA:					192.22		

Belonging Element						Num.	
Type	Q-283		Standard Sheet Dimension		Sheet Surface	Weight /m2	
S 500			215x600 [cm]		12.9 [m2]	4.44 [kg]	
Pos.	Dimension [cm]	Note	Layer [n]	Sheets Size [n]	Purchase Sheets [n]	Tot. Surface [m2]	Tot. Weigth [kg]
1	330x185		2	2	2	12.21	54.21
2	350x185		2	2	2	12.95	57.50
Total used						25.16 m2	111.71 kg
Total purchase					4	51.6 m2	229.1 kg

- VSE MERE IN KOM ARMATURE KONTROLIRATI NA GRADBIŠČU IN JIH PO POTREBI USTREZNO KORIGIRATI, PRED NAROČILOM ARMATURE !!!

- OBVEZEN GEOMEHANSKI PREGLED TEMELJNIH TAL !

- PRED BETONIRANJEM VSTAVITI VSE INŠTALACIJE - GLEJ NAČRTE INŠTALACIJ!!!

- Evd TAMPONSKE BLAZINE = MIN. 40 MPa

BETON - C25/30,Dmax 16, XC2

ZAŠČITNI SLOJ BETONA:
- rebrasta armatura 3,0 - 4,0cm
- mrežna armatura 3,0cm

ARMATURA - S500

OPORNI ZID Z1

M 1:50, 1:25



STATIK d.o.o.
Podjetje za projektiranje in svetovanje
Prešernova 2, 5280 Idrija

Naročnik:
Občina Idrija
Mestni trg 1
5280 Idrija

Objekt:
Ureditev območja pokopališča Idrija

Vrsta načrta	Načrt gradbenih konstrukcij	Faza:	PZR
Pooblaščen arhitekt	Polona Troha K., u.d.l.a.	A - 1448	
Pooblaščen inženir	Matevž Govekar, u.d.l.g.	G - 3743	
Sodelavec			
Številka načrta	107/26		
Številka projekta	7/2025	Merilo:	M 1:50, 1:25

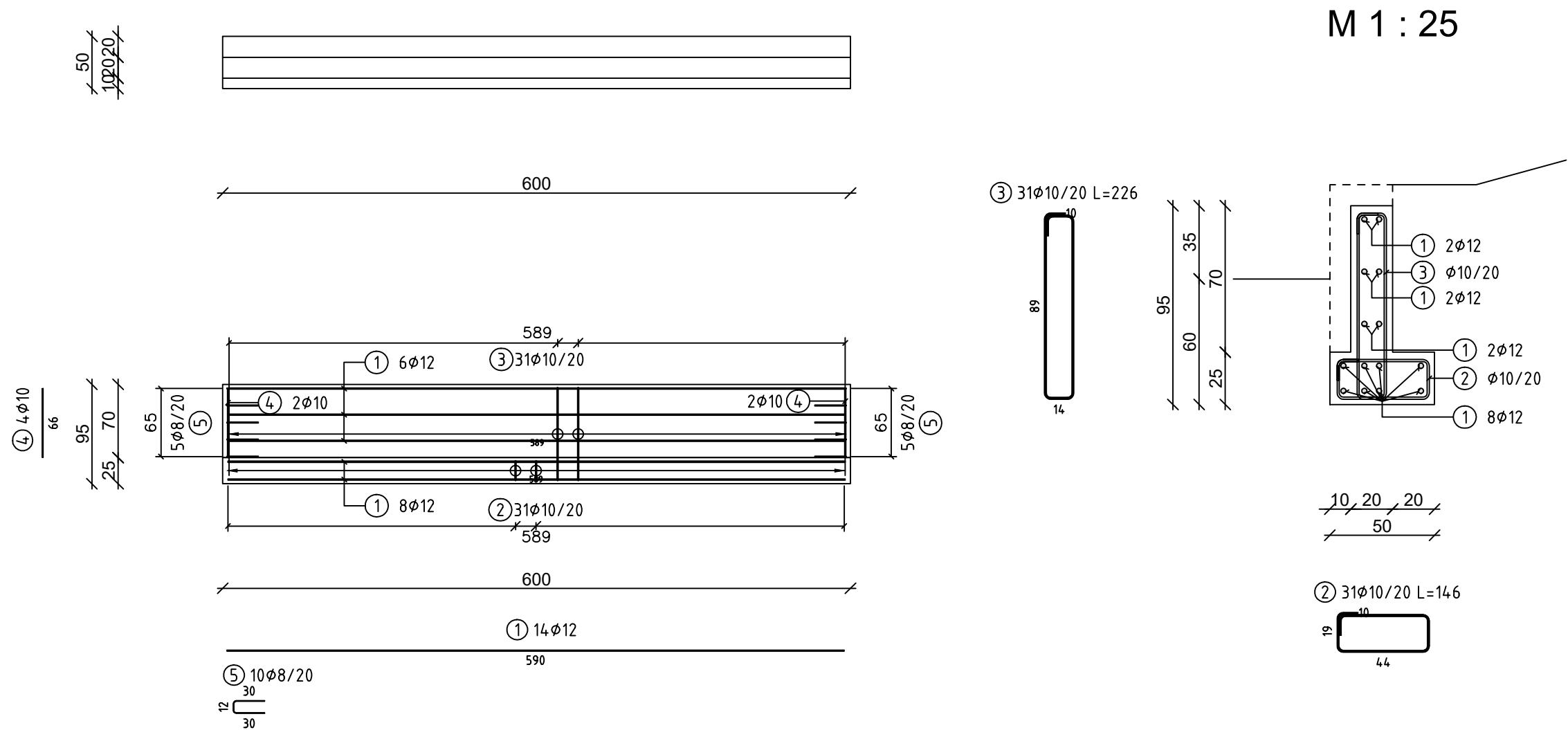
Projektant: Kolektor Koling d.o.o. Arkova 43 5280 Idrija	Naslov risbe: Armaturni načrt - Oporni zid Z1	Št. lista:
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1.

ARMATURA OPORNEGA ZIDU Z2

Dzl = 20 cm, kos : 1

M 1 : 50



POZICIJA	STEVILO	φ mm	L [cm]	SK. DOL. [m]	TEZA [kg]	CODE	OBLIKA [cm] (Zunanja mera)
1	14	12	590.0	82.60	73.35	000	590
2	31	10	146.0	45.26	27.93	515	10 44
3	31	10	226.0	70.06	43.23	515	10 89 14
4	4	10	66.0	2.64	1.63	000	66
5	10	8	72.0	7.20	2.84	212	12 30 30
SKUPNA TEZA:					148.98		

- VSE MERE IN KOM ARMATURE KONTROLIRATI NA GRADBIŠČU IN JIH PO POTREBI USTREZNO KORIGIRATI, PRED NAROČILOM ARMATURE !!!
- OBVEZEN GEOMEHANSKI PREGLED TEMELJNIH TAL !
- PRED BETONIRANJEM VSTAVITI VSE INŠTALACIJE - GLEJ NAČRTE INŠTALACIJ!!!
- Evd TAMPONSKE BLAZINE = MIN. 40 MPa

BETON - C25/30,Dmax 16, XC2

ZAŠČITNI SLOJ BETONA:
- rebrasta armatura 3,0 - 4,0cm

ARMATURA - S500

OPORNI ZID Z2

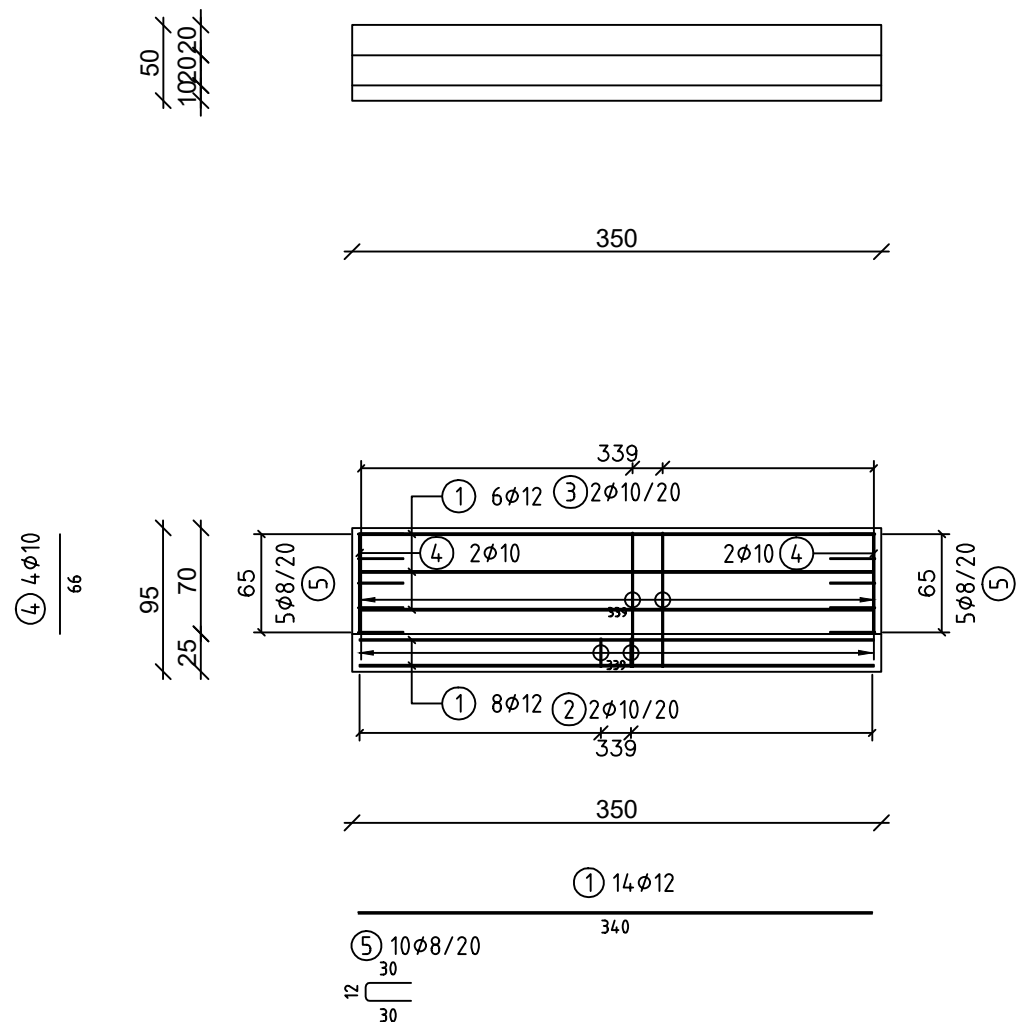
M 1:50, 1:25

STATIK d.o.o. Podjetje za projektiranje in svetovanje Prešernova 2, 5280 Idrija				
Naročnik: Občina Idrija Mestni trg 1 5280 Idrija	Objekt: Ureditev območja pokopališča Idrija			
	Vrsta načrta	Načrt gradbenih konstrukcij	Faza:	PZR
Projektant načrta: STATIK d.o.o. podjetje za projektiranje in svetovanje Prešernova 2, 5280 Idrija	Pooblaščen arhitekt	Polona Troha K., u.d.i.a.	A - 1448	
	Pooblaščen inženir	Matevž Govekar, u.d.i.g.	G - 3743	
	Sodelavec			
	Številka načrta	107/26		
Projektant: Kolektor Koling d.o.o. Arkova 43 5280 Idrija	Številka projekta	7/2025	Merilo:	M 1:50, 1:25
	Datum	oktober 2026		Št. lista:
	Naslov risbe: Armaturni načrt - Oporni zid Z2			

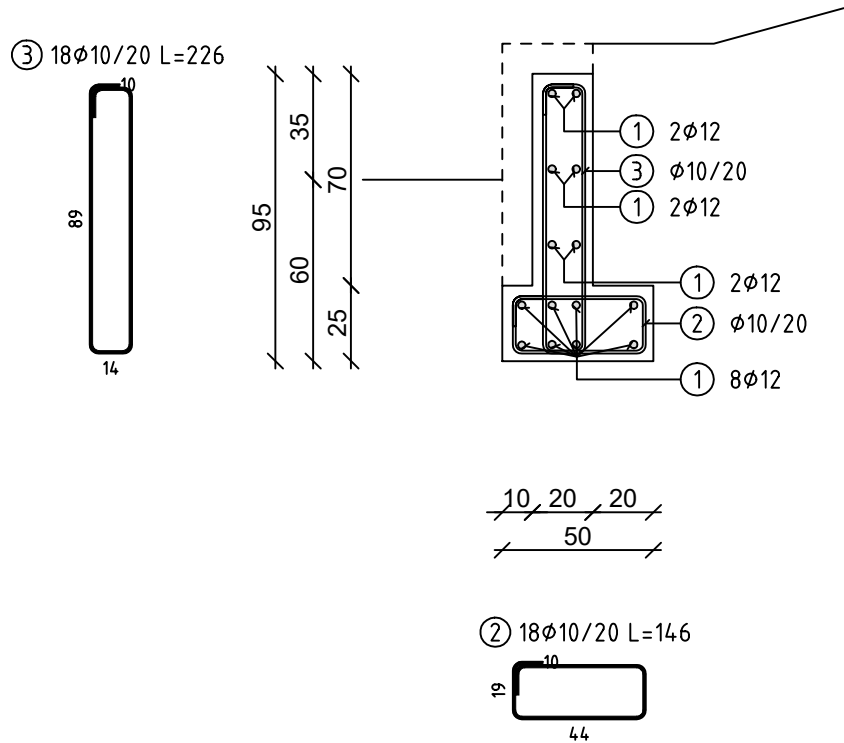
ARMATURA OPORNEGA ZIDU Z3

Dzl = 20 cm, kos : 1

M 1 : 50



M 1 : 25



POZICIJA	STEVILO	φ mm	L [cm]	SK. DOL. [m]	TEZA [kg]	CODE	OBLIKA [cm] (Zunanja mera)
1	14	12	340.0	47.60	42.27	000	340
2	18	10	146.0	26.28	16.21	515	19 10 44
3	18	10	226.0	40.68	25.10	515	10 14 89
4	4	10	66.0	2.64	1.63	000	66
5	10	8	72.0	7.20	2.84	212	12 30 30
SKUPNA TEZA:					88.05		

- VSE MERE IN KOM ARMATURE KONTROLIRATI NA GRADBIŠČU IN JIH PO POTREBI USTREZNO KORIGIRATI, PRED NAROČILOM ARMATURE !!!

- OBVEZEN GEOMEHANSKI PREGLED TEMELJNIH TAL !

- PRED BETONIRANJEM VSTAVITI VSE INŠTALACIJE - GLEJ NAČRTE INŠTALACIJ!!!

- Evd TAMPONSKE BLAZINE = MIN. 40 MPa

BETON - C25/30,Dmax 16, XC2

ZAŠČITNI SLOJ BETONA:
- rebrasta armatura 3,0 - 4,0cm

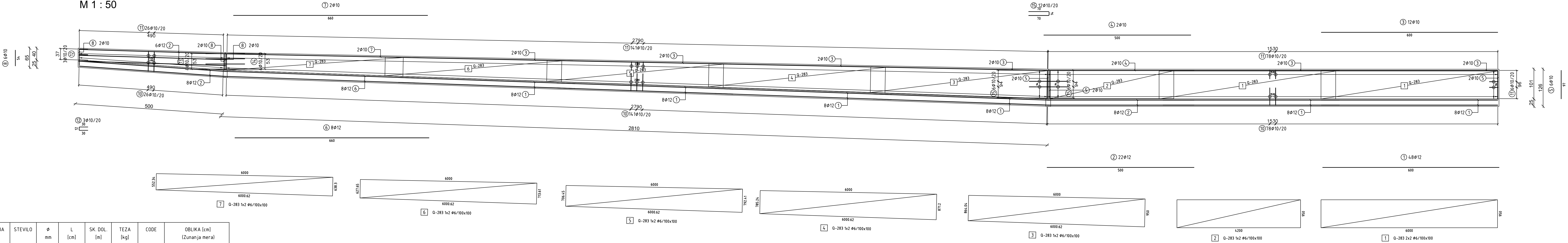
ARMATURA - S500

OPORNI ZID Z3

M 1:50, 1:25

STATIK d.o.o. Podjetje za projektiranje in svetovanje Prešernova 2, 5280 Idrija				
Naročnik: Občina Idrija Mestni trg 1 5280 Idrija	Objekt: Ureditev območja pokopališča Idrija			
	Vrsta načrta	Načrt gradbenih konstrukcij	Faza:	PZR
Projektant načrta: STATIK d.o.o. podjetje za projektiranje in svetovanje Prešernova 2, 5280 Idrija	Pooblaščen arhitekt	Polona Troha K., u.d.i.a.	A - 1448	
	Pooblaščen inženir	Matevž Govekar, u.d.i.g.	G - 3743	
	Sodelavec			
	Številka načrta	107/26		
Projektant: Kolektor Koling d.o.o. Arkova 43 5280 Idrija	Številka projekta	7/2025	Merilo:	M 1:50, 1:25
	Datum	oktober 2026		Št. lista:
	Naslov risbe: Armaturni načrt - Oporni zid Z3			3.

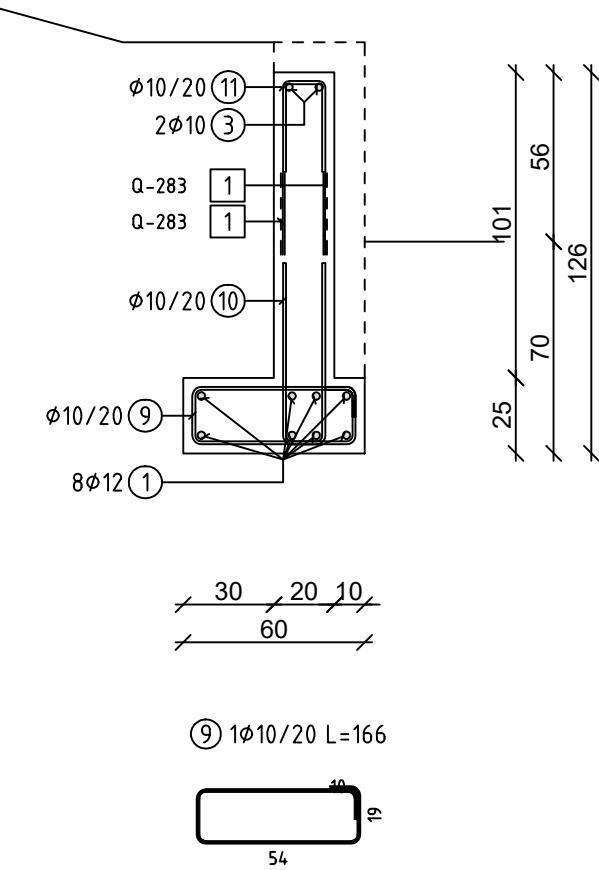
ARMATURA OPORNEGA ZIDU Z4
Dzl = 20 cm, kos : 1
M 1 : 50



POZICIJA	STEVILO	Ø mm	L [cm]	SK. DOL. [m]	TEZA [kg]	CODE	OBLIKA [cm] (Zunanja mera)
1	48	12	600.0	288.00	255.74	000	600
2	22	12	500.0	110.00	97.68	000	500
3	12	10	600.0	72.00	44.42	000	600
4	2	10	500.0	10.00	6.17	000	500
5	6	10	97.0	5.82	3.59	000	97
6	8	12	660.0	52.80	46.89	000	660
7	2	10	660.0	13.20	8.14	000	660
8	6	10	54.0	3.24	2.00	000	54
9	1	10	166.0	1.66	1.02	555	166
10	245	10	134.0	328.30	202.56	252	134
11	251	10	74.0	185.74	114.60	212	74
12	3	10	72.0	2.16	1.33	252	72
13	4	10	154.4	6.18	3.81	252	154
14	4	10	154.1	6.17	3.80	252	154
15	12	10	154.0	18.48	11.40	212	154
SKUPNA TEZA:					803.15		

Belonging Element						Num	
Type	Q-283	Ø6/10x10	Standard Sheet Dimension	Sheet Surface	Weight		
Pos.	Dimension [m]	Note	Layer [m]	Sheet's Size [m]	Purchase Sheets [m]	Tot. Surface [m²]	Tot. Weight [kg]
1	600x95		2	4	2	22.80	10123
2	420x95		2	2	1	7.98	3543
3	600x95		2	2	1	11.40	5062
4	600x71.1		2	2	1	10.45	4642
5	600x79.2		2	2	1	9.51	4222
6	600x71.4		2	2	1	8.56	3802
7	600x38		2	2	1	7.66	3401
Total used						78.37 m²	347.95 kg
Total purchase					8	103.2 m²	458.21 kg

M 1 : 25



Dzl = 25 cm, kos : 1
M 1 : 50



Belonging Element							Num.
Pos.	Dimension (cm)	Note	Layer [n]	Sheets Size [n]	Purchase Sheets [n]	Tot. Surface [m2]	Tot. Weight [kg]
1	600x135		2	10	10	81.00	3
2	600x195		2	2	2	16.20	
3	600x132.5		2	2	2	15.90	
4	600x117		2	2	2	14.04	
5	600x1016		2	2	1	12.19	
6	600x86.2		2	2	1	10.34	
7	484x70.7		2	2	1	6.85	
8	464x133.9		2	2	2	12.43	
Total used					21	168.95 m2	750
Total purchase					21	270.9 m2	1200

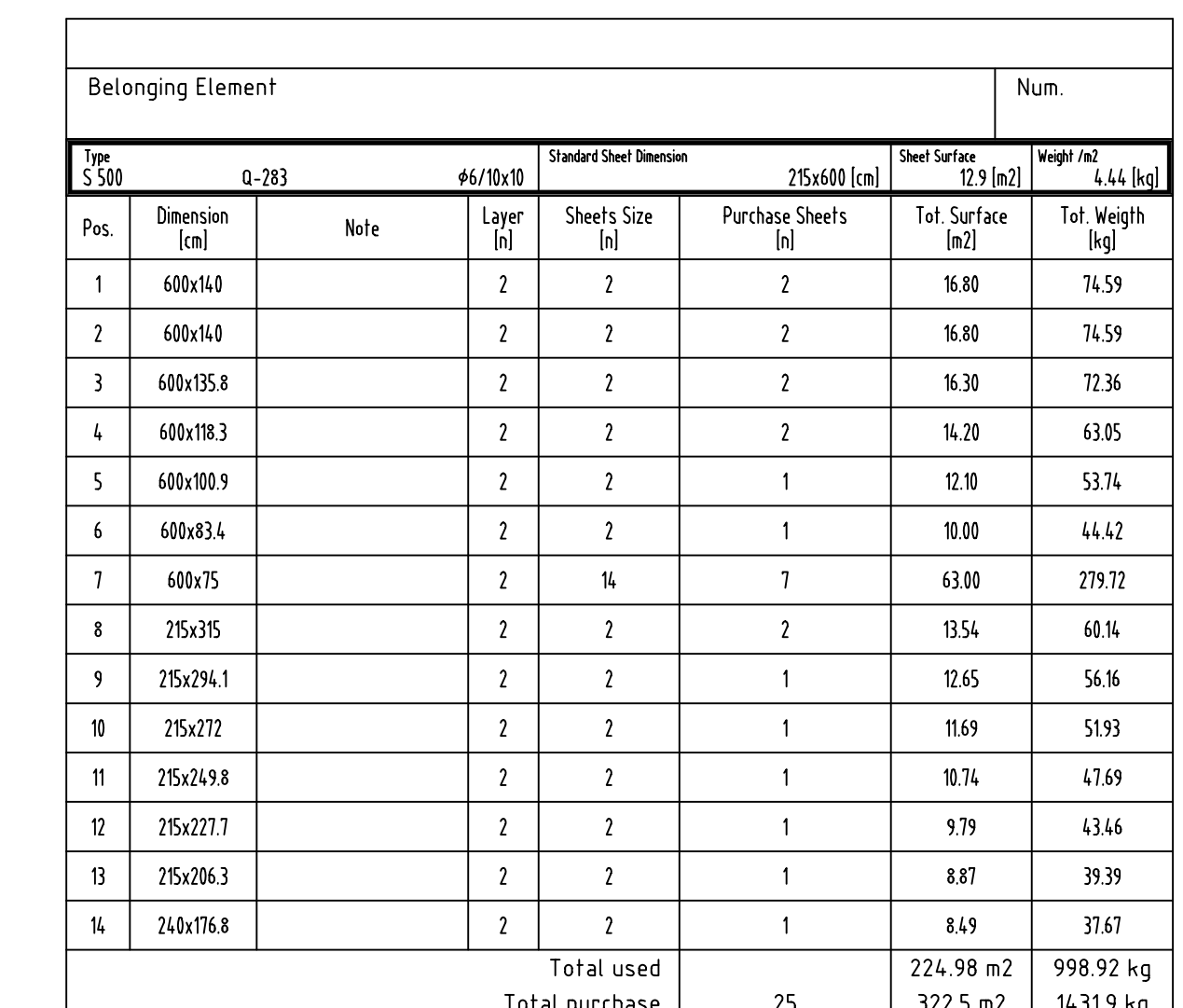
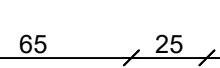
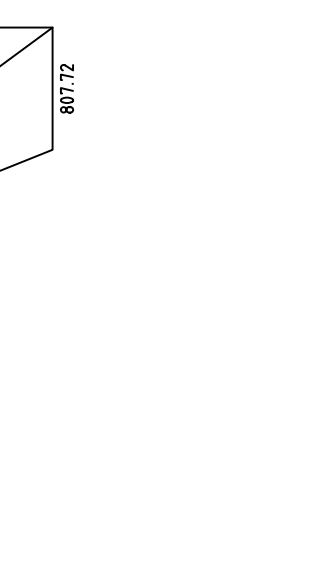
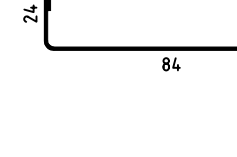
- E_{vd} TAMPONSKE BLAZINE = MIN. 40 MPa

ZAŠČITNI SLOJ BETONA:
- rebrasta armatura 3,0 - 4,0cm
- mrežna armatura 3,0cm

M 1:50, 1:25

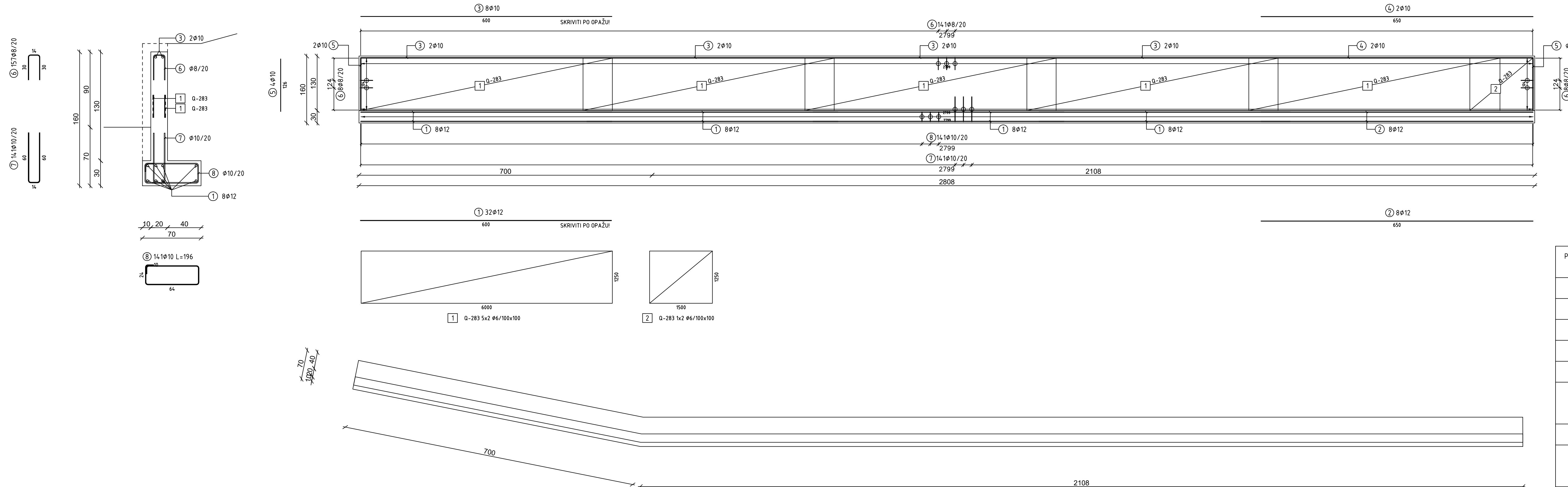
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Naraznik: Občina Idrija Mezni trg 1 5200 Idrija	Ojekt: Ureditve območja pokopališča Idrija																																			
Projektant naročita: STATIK d.o.o. Podjetje za projektiranje in svetovanje Prešernova 2, 5280 Idrija	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Vrsta načrta:</td> <td style="width: 33%;">način gradnje/izvedbe:</td> <td style="width: 33%;">Faza:</td> <td style="width: 33%;">PZR</td> </tr> <tr> <td>Ploščadni arhitekta</td> <td>Polovna Traha K. u.d.l.a</td> <td>A : 148</td> <td></td> </tr> <tr> <td>Ploščadni inženir</td> <td>Martenc Gudelj, u.d.p.</td> <td>C : 303</td> <td></td> </tr> <tr> <td>Sodržina:</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Številna načrta:</td> <td>10/726</td> <td></td> <td></td> </tr> <tr> <td>Številka projekta:</td> <td>7/2025</td> <td>Merilo:</td> <td>M 1:50, 1:25</td> </tr> <tr> <td>Datum:</td> <td>oktober 2026</td> <td></td> <td></td> </tr> <tr> <td>Naziv ribar:</td> <td></td> <td></td> <td>St. lista:</td> </tr> </table>				Vrsta načrta:	način gradnje/izvedbe:	Faza:	PZR	Ploščadni arhitekta	Polovna Traha K. u.d.l.a	A : 148		Ploščadni inženir	Martenc Gudelj, u.d.p.	C : 303		Sodržina:				Številna načrta:	10/726			Številka projekta:	7/2025	Merilo:	M 1:50, 1:25	Datum:	oktober 2026			Naziv ribar:			St. lista:
Vrsta načrta:	način gradnje/izvedbe:	Faza:	PZR																																	
Ploščadni arhitekta	Polovna Traha K. u.d.l.a	A : 148																																		
Ploščadni inženir	Martenc Gudelj, u.d.p.	C : 303																																		
Sodržina:																																				
Številna načrta:	10/726																																			
Številka projekta:	7/2025	Merilo:	M 1:50, 1:25																																	
Datum:	oktober 2026																																			
Naziv ribar:			St. lista:																																	
Projektant: Kolarik Kiling d.o.o. Arkova 43 42600 Idrija	Armaturni načrt - Oporni zd. zadrž																																			
	6.																																			

M 1 : 50

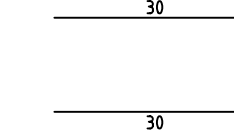
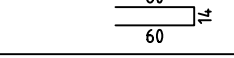
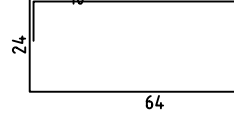
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M 1 : 50

M 1 : 25



Belonging Element						Num.	
Type S 500		Q-283		Standard Sheet Dimension φ6/10x10		Sheet Surface 215x600 [cm]	Weight /m2 12.9 [m2]
Pos.	Dimension [cm]	Note	Layer [n]	Sheets Size [n]	Purchase Sheets [n]	Tot. Surface [m2]	Tot. Weight [kg]
1	600x125		2	10	10	75.00	333.00
2	150x125		2	2	1	3.75	16.65
Total used Total purchase					11	78.75 m2 14.19 m2	349.65 kg 630.04 kg

POZICIJA	STEVILO	Ø mm	L [cm]	SK. DOL. [m]	TEZA [kg]	CODE	OBLIKA [cm] (Zunanja mera)
1	32	12	600.0	192.00	170.50	000	
2	8	12	650.0	52.00	46.18	000	
3	8	10	600.0	48.00	29.62	000	
4	2	10	650.0	13.00	8.02	000	
5	4	10	126.0	5.04	3.11	000	
6	157	8	74.0	116.18	45.89	252	
7	141	10	134.0	188.94	116.58	212	
8	141	10	196.0	276.36	170.51	515	
SKUPNA TEZA:					590.41		

- E_{vd} TAMPONSKE BLAZINE = MIN. 40 MPa

BETON - C25/30,Dmax 16, XC2

ZAŠČITNI SLOJ BETONA:

- rebrasta armatura 3,0 - 4,0cm

- mrežna armatura 3,0cm

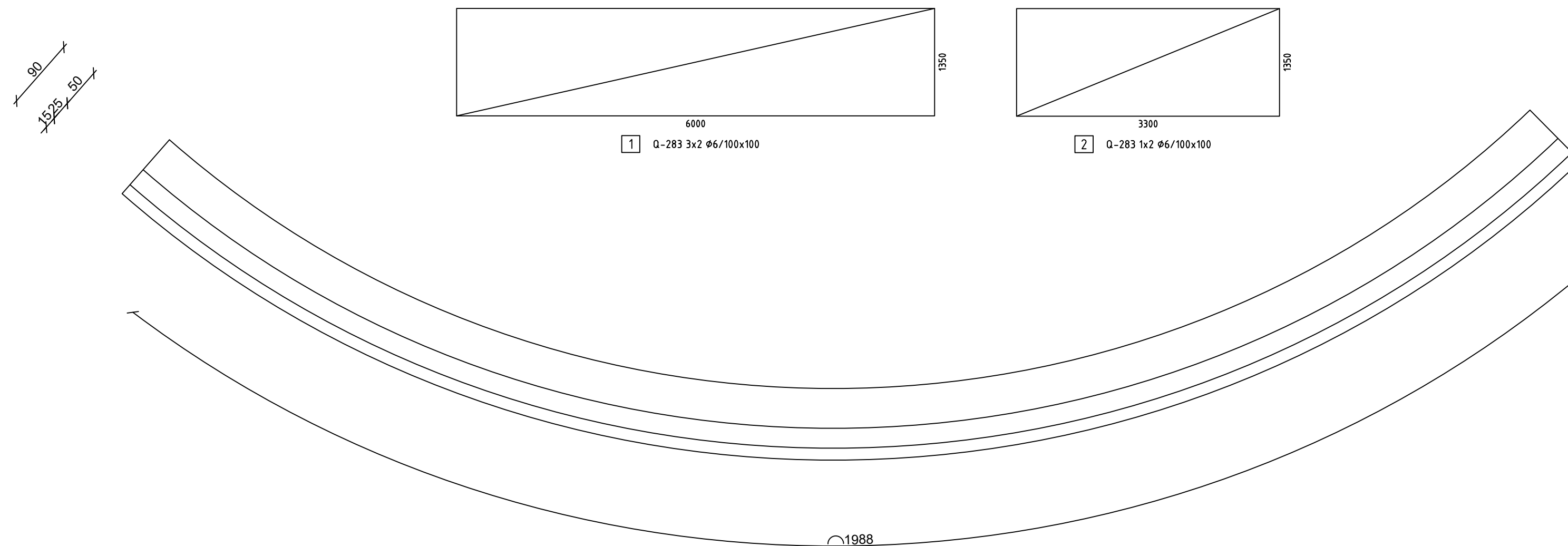
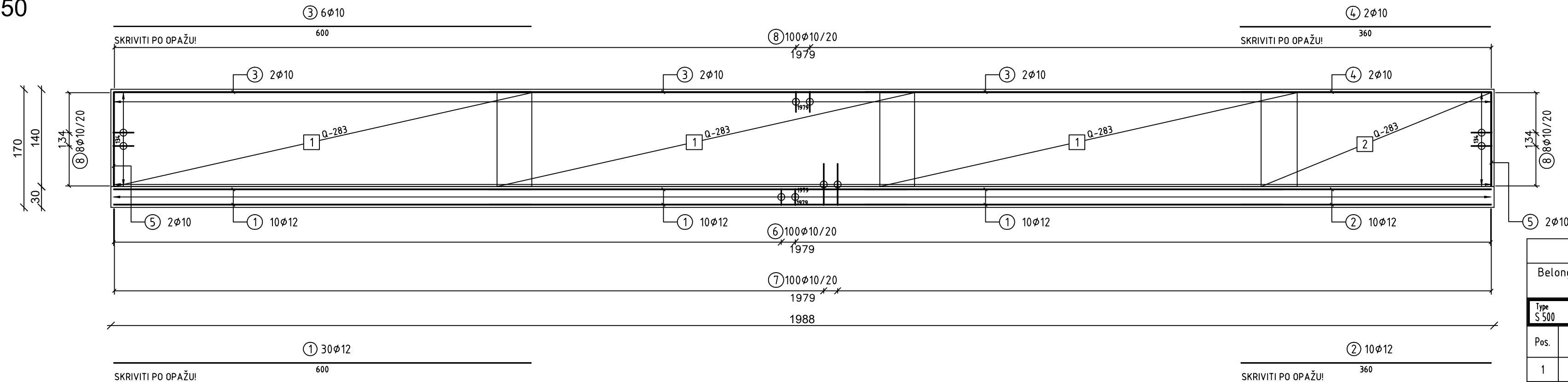
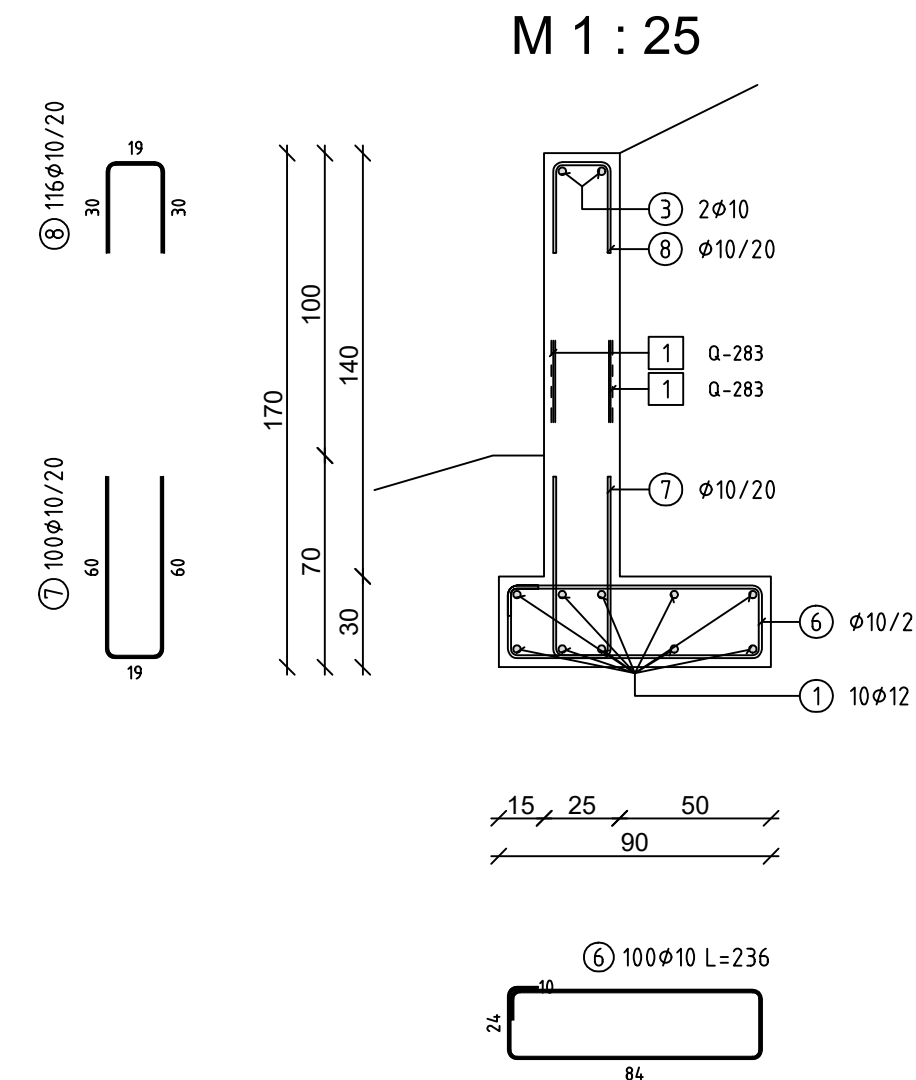
ARMATURA - S500

OPORNI ZID Z8

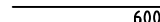
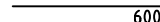
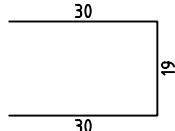
M 1:50, 1:25

 STATIK d.o.o.	STATIK d.o.o. Podjetje za projektiranje in svetovanje Prešernova 2, 5280 Idrija																											
	Naročnik: Občina Idrija Mestni trg 1 5280 Idrija																											
	Objekt: Ureditev območja pokopališča Idrija																											
	<table border="1"> <tr> <td>Vrsta načrta</td> <td>Načrt gradbenih konstrukcij</td> <td>Faza:</td> <td>PZR</td> </tr> <tr> <td>Pooblaščen arhitekt</td> <td>Polona Trešna K., u.d.i.g.</td> <td>A - 1448</td> <td></td> </tr> <tr> <td>Sodelavec:</td> <td>Matevž Govekar, u.d.i.g.</td> <td>S - 3743</td> <td></td> </tr> <tr> <td>Številka načrta</td> <td>107/26</td> <td></td> <td></td> </tr> <tr> <td>Številka projekta</td> <td>7/2025</td> <td>Merilo:</td> <td>M 1:50, 1:20</td> </tr> <tr> <td>Datum</td> <td>oktober 2026</td> <td></td> <td>Št. list</td> </tr> </table>				Vrsta načrta	Načrt gradbenih konstrukcij	Faza:	PZR	Pooblaščen arhitekt	Polona Trešna K., u.d.i.g.	A - 1448		Sodelavec:	Matevž Govekar, u.d.i.g.	S - 3743		Številka načrta	107/26			Številka projekta	7/2025	Merilo:	M 1:50, 1:20	Datum	oktober 2026		Št. list
	Vrsta načrta	Načrt gradbenih konstrukcij	Faza:	PZR																								
Pooblaščen arhitekt	Polona Trešna K., u.d.i.g.	A - 1448																										
Sodelavec:	Matevž Govekar, u.d.i.g.	S - 3743																										
Številka načrta	107/26																											
Številka projekta	7/2025	Merilo:	M 1:50, 1:20																									
Datum	oktober 2026		Št. list																									
Projektant: Kolektor Koling d.o.o. Atrkovo 53 5280 Idrija																												

M 1 : 50



Belonging Element							Num.	
Type S 500	Q-283			Φ6/10x10	Standard Sheet Dimension 215x600 [cm]		Sheet Surface 12.9 [m2]	Weight /m2 4.44 [kg]
Pos.	Dimension [cm]	Note	Layer [n]	Sheets Size [n]	Purchase Sheets [n]	Tot. Surface [m2]	Tot. Weight [kg]	
1	600x135		2	6	6	48.60	215.78	
2	330x135		2	2	2	8.91	39.56	
Total used						57.51 m2	255.34 kg	
Total purchase					8	103.2 m2	458.21 kg	

POZICIJA	STEVILO	Ø mm	L [cm]	SK. DOL. [m]	TEŽA [kg]	CODE	OBLIKA [cm] (Zunanja mera)
1	30	12	600.0	180.00	159.84	000	
2	10	12	360.0	36.00	31.97	000	
3	6	10	600.0	36.00	22.21	000	
4	2	10	360.0	7.20	4.44	000	
5	4	10	136.0	5.44	3.36	000	
6	100	10	236.0	236.00	145.61	515	
7	100	10	139.0	139.00	85.76	212	
8	116	10	79.0	91.64	56.54	252	
SKUPNA TEŽA:					509.73		

- E_{vd} TAMPONSKE BLAZINE = MIN. 40 MPa

BETON - C25/30,Dmax 16, XC2

- mrežna armatura 3,0cm

ARMATURA - S500

OPORNI ZID Z9

M 1:50, 1:25

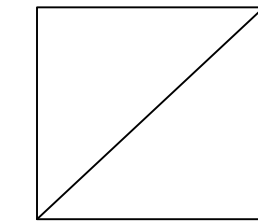
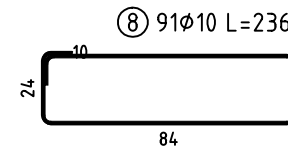
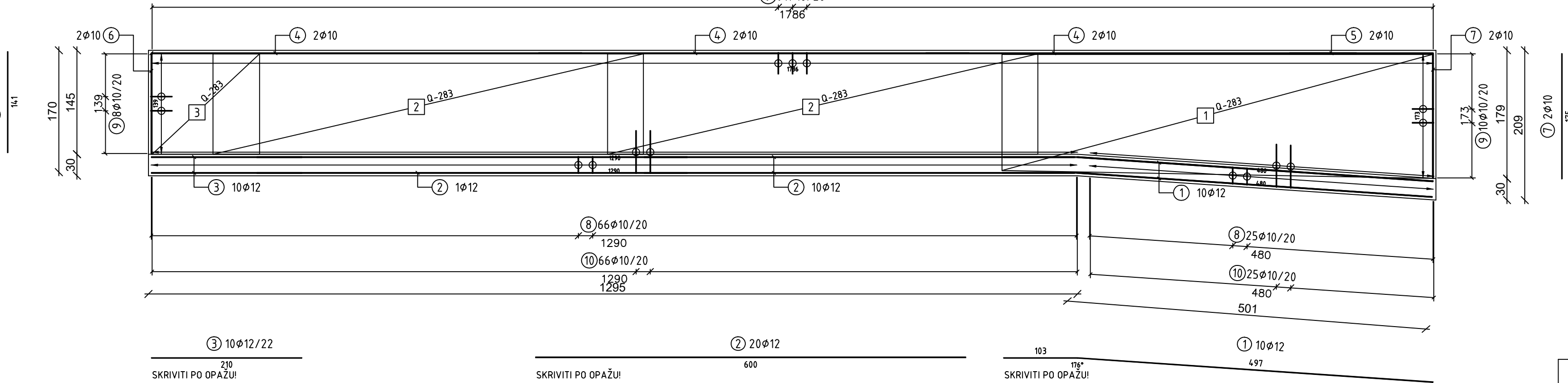
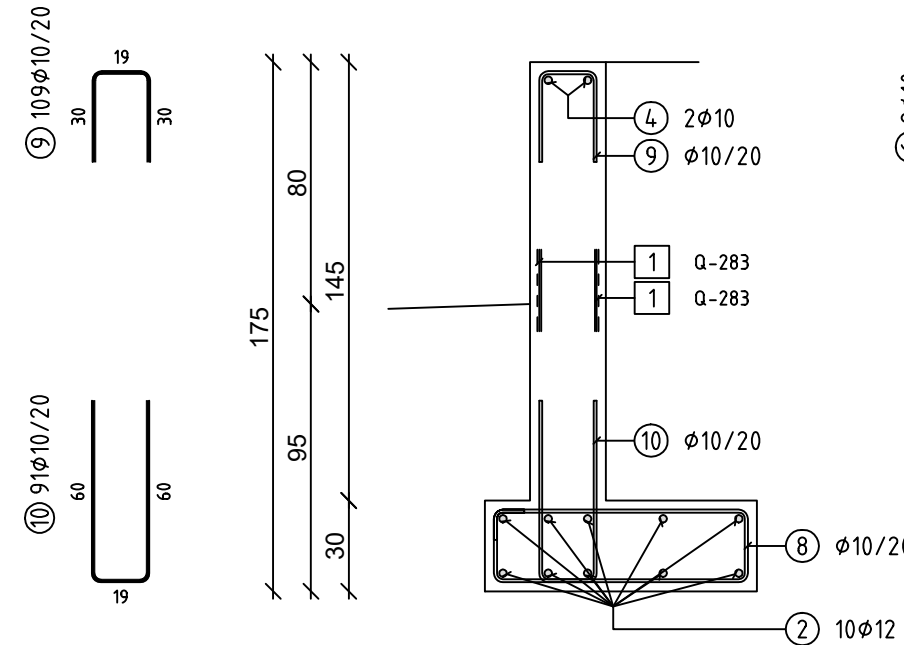
 STATIK d.o.o.	STATIK d.o.o. Podjetje za projektiranje in svetovanje Prešernova 2, 5280 Idrija			
	Objekt: Ureditev območja pokopališča Idrija			
Naročnik: Občina Idrija Mestni trg 1 5280 Idrija	Vrsta načrta Pooblaščen arhitekt Pooblaščen inženir Sodelavec	Načrt gradbenih konstrukcij Polona Troha K., u.d.i.a. Matevž Govekar, u.d.i.g.	Faza: A - 1448 G - 3743	PZR
Projektant načrta: STATIK d.o.o. podjetje za projektiranje in svetovanje Prešernova 2, 5280 Idrija	Številka načrta 102/126	Številka projekta 7/2025	Merilo: M 1:50, 1:25	Datum oktober 2026
Projektant: Kolektor Koling d.o.o. Arkova 43 5280 Idrija	Nadom risbe: Armaturni načrt - Oporni zid Z9			Št. lista 9.

ARMATURA OPORNEGA ZIDU Z10

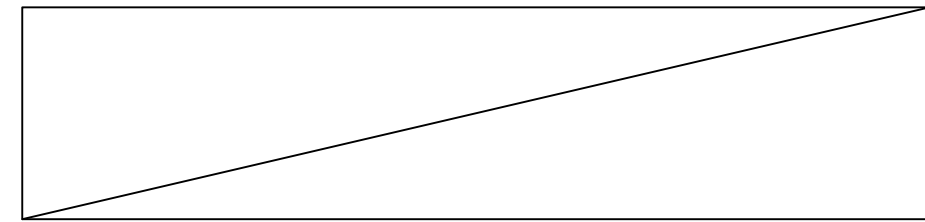
Dzl = 25 cm, kos : 1

M 1 : 50

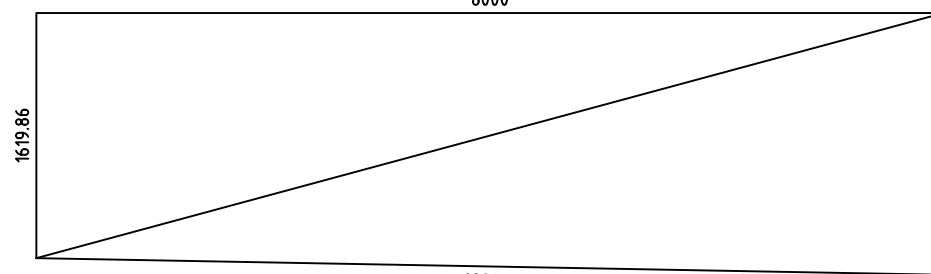
M 1 : 25



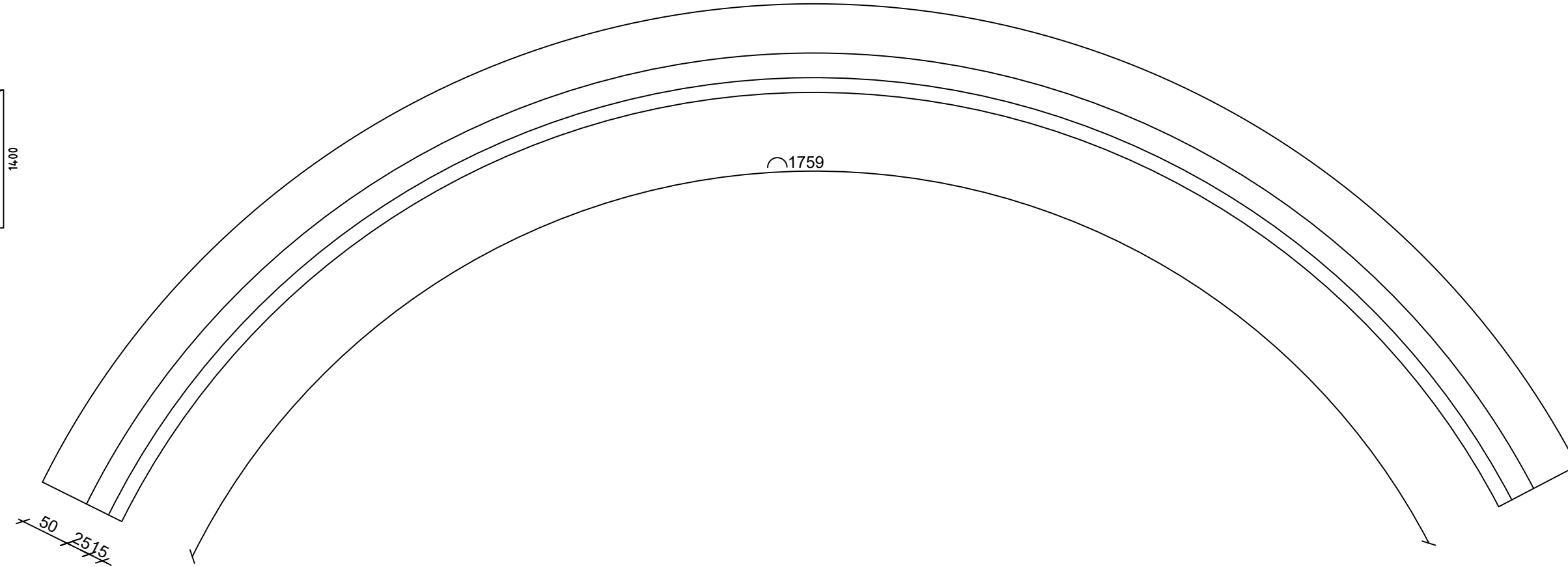
3 Q-283 1x2 Ø6/100x100



2 Q-283 2x2 Ø6/100x100



1 Q-283 1x2 Ø6/100x100



Belonging Element						Num.	
Type	Q-283	Ø6/10x10	Standard Sheet Dimension	Sheet Surface	Weight /m2		
S 500			215x600 [cm]	12.9 [m2]	4.44 [kg]		
Pos.	Dimension [cm]	Note	Layer [n]	Sheet's Size [n]	Purchase Sheets [n]	Tot. Surface [m2]	Tot. Weight [kg]
1	600x173		2	2	2	20.76	92.17
2	600x140		2	4	4	33.60	149.18
3	150x140		2	2	1	4.20	18.65
Total used						58.56 m2	260.01 kg
Total purchase					7	90.3 m2	400.93 kg

POZICIJA	STEVIL0	Ø mm	L [cm]	SK. DOL. [m]	TEZA [kg]	CODE	OBLIKA [cm] (Zunanja mera)
1	10	12	600.0	60.00	53.28	151	176* 497 103
2	20	12	600.0	120.00	106.56	000	600
3	10	12	210.0	21.00	18.65	000	210
4	6	10	600.0	36.00	22.21	000	600
5	2	10	200.0	4.00	2.47	000	200
6	2	10	141.0	2.82	1.74	000	141
7	2	10	175.0	3.50	2.16	000	175
8	91	10	236.0	214.76	132.51	515	10 24 84 30 30 60 60
9	109	10	79.0	86.11	53.13	252	30 30 60 60
10	91	10	139.0	126.49	78.04	212	60 60
SKUPNA TEZA:					470.75		

- VSE MERE IN KOM ARMATURE KONTROLIRATI NA GRADBIŠČU IN JIH PO POTREBI USTREZNO KORIGIRATI, PRED NAROČILOM ARMATURE !!!

- OBVEZEN GEOMEHANSKI PREGLED TEMELJNIH TAL !

- PRED BETONIRANJEM VSTAVITI VSE INŠTALACIJE - GLEJ NAČRTE INŠTALACIJ!!!

- Evd TAMPONSKE BLAZINE = MIN. 40 MPa

BETON - C25/30,Dmax 16, XC2

ZAŠČITNI SLOJ BETONA:
- rebrasta armatura 3,0 - 4,0cm
- mrežna armatura 3,0cm

ARMATURA - S500

OPORNI ZID Z10

M 1:50, 1:25

**STATIK d.o.o.**
Podjetje za projektiranje in svetovanje
Prešernova 2, 5280 Idrija

STATIK d.o.o.
Podjetje za projektiranje in svetovanje
Prešernova 2, 5280 Idrija

Naročnik:
Občina Idrija
Mestni trg 1
5280 Idrija

Objekt:
Ureditev območja pokopališča Idrija

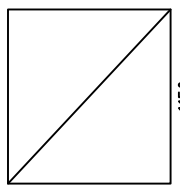
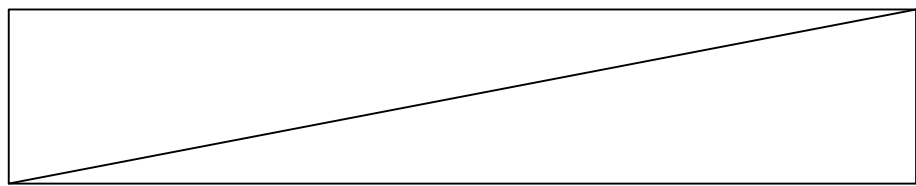
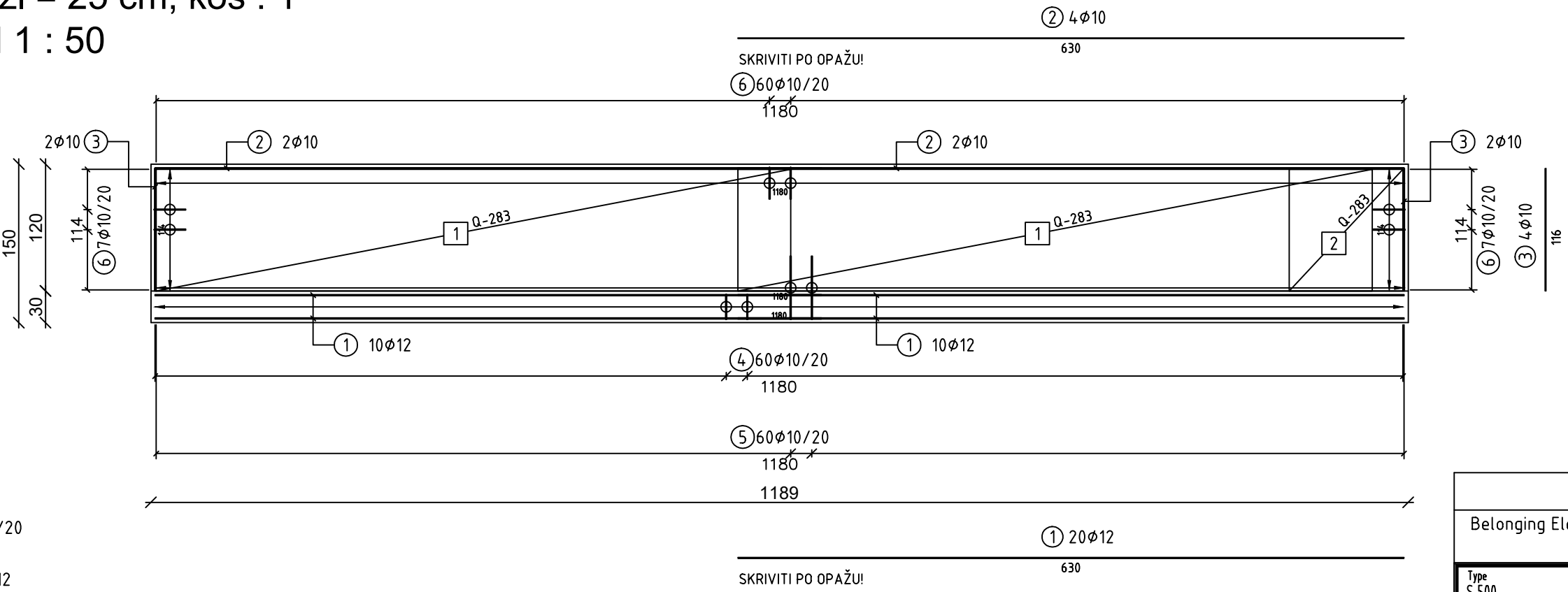
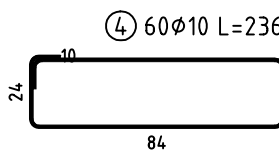
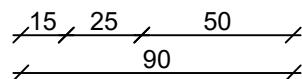
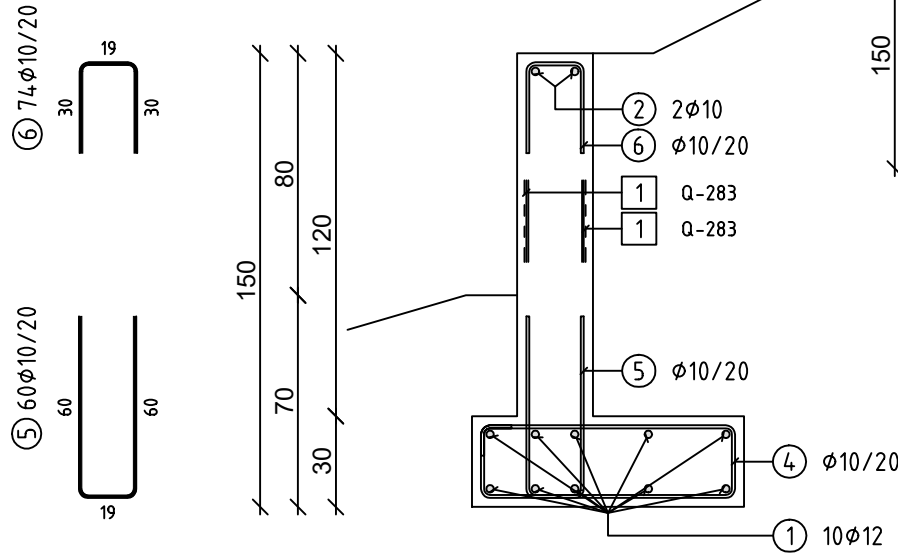
Vrsta načrta	Načrt gradbenih konstrukcij	Faza:	PZR
Projektant načrta:	Pooblaščen arhitekt	Polona Troha K., u.d.l.a.	A - 1448
STATIK d.o.o.	Pooblaščen inženir	Matevž Govekar, u.d.l.g.	G - 3743
podjetje za projektiranje in svetovanje	Sodelavec		
Prešernova 2, 5280 Idrija	Številka načrta	107/26	
	Številka projekta	7/2025	Merilo: M 1:50, 1:25
Datum	oktober 2026		Št. lista:
Projektant:	Naslov risbe:		
Kolektor Koling d.o.o.	Armatureni načrt -		
Arkova 43	Oporni zid Z10		
5280 Idrija			

ARMATURA OPORNEGA ZIDU Z11

Dzl = 25 cm, kos : 1

M 1 : 50

M 1 : 25



Belonging Element								Num.	
Type	Q-283			Standard Sheet Dimension		Sheet Surface	Weight /m2		
S 500	ø6/10x10			215x600 [cm]		12.9 [m2]	4.44 [kg]		
Pos.	Dimension [cm]	Note	Layer [n]	Sheets Size [n]	Purchase Sheets [n]	Tot. Surface [m2]	Tot. Weight [kg]		
1	600x115		2	4	4	27.60	122.54		
2	107.5x115		2	2	1	2.47	10.98		
Total used						30.07 m2	133.52 kg		
Total purchase					5	64.5 m2	286.38 kg		

POZICIJA	STEVILO	φ mm	L [cm]	SK. DOL. [m]	TEZA [kg]	CODE	OBLIKA [cm] (Zunanja mera)
1	20	12	630.0	126.00	111.89	000	630
2	4	10	630.0	25.20	15.55	000	630
3	4	10	116.0	4.64	2.86	000	116
4	60	10	236.0	141.60	87.37	515	84
5	60	10	139.0	83.40	51.46	212	60
6	74	10	79.0	58.46	36.07	252	30
SKUPNA TEZA:					305.20		

- VSE MERE IN KOM ARMATURE KONTROLIRATI NA GRADBIŠČU IN JIH PO POTREBI USTREZNO KORIGIRATI, PRED NAROČILOM ARMATURE !!!

- OBVEZEN GEOMEHANSKI PREGLED TEMELJNIH TAL !

- PRED BETONIRANJEM VSTAVITI VSE INŠTALACIJE - GLEJ NAČRTE INŠTALACIJ!!!

- Evd TAMPONSKE BLAZINE = MIN. 40 MPa

BETON - C25/30,Dmax 16, XC2

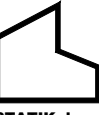
ZAŠČITNI SLOJ BETONA:

- rebrasta armatura 3,0 - 4,0cm
- mrežna armatura 3,0cm

ARMATURA - S500

OPORNI ZID Z11

M 1:50, 1:25

**STATIK d.o.o.**
Podjetje za projektiranje in svetovanje
Prešernova 2, 5280 Idrija

Naročnik:
Občina Idrija
Mestni trg 1
5280 Idrija

Objekt:
Ureditev območja pokopališča Idrija

Projektant načrta:
STATIK d.o.o.
podjetje za projektiranje in svetovanje
Prešernova 2, 5280 Idrija

Vrsta načrta	Načrt gradbenih konstrukcij	Faza:	PZR
Pooblaščen arhitekt	Polona Troha K., u.d.l.a.	A - 1448	
Pooblaščen inženir	Matvez Govekar, u.d.i.g.	G - 3743	
Sodelavec			
Številka načrta	107/26		
Številka projekta	7/2025	Merilo:	M 1:50, 1:25
Datum	oktober 2026		

Projektant:
Kolektor Koling d.o.o.
Aikova 43
5280 Idrija

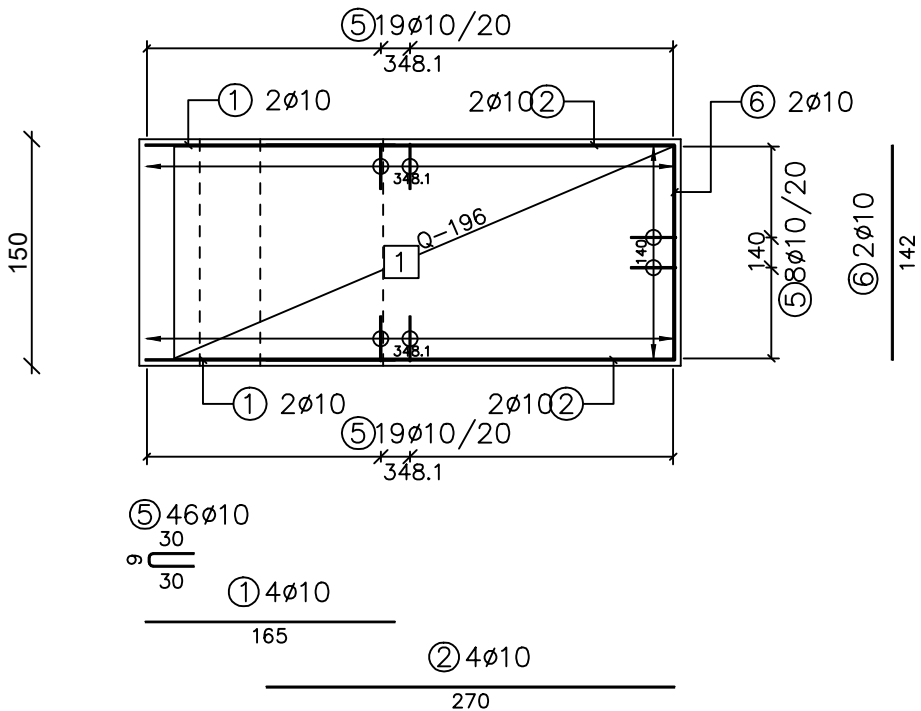
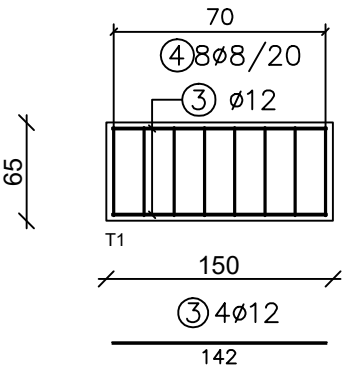
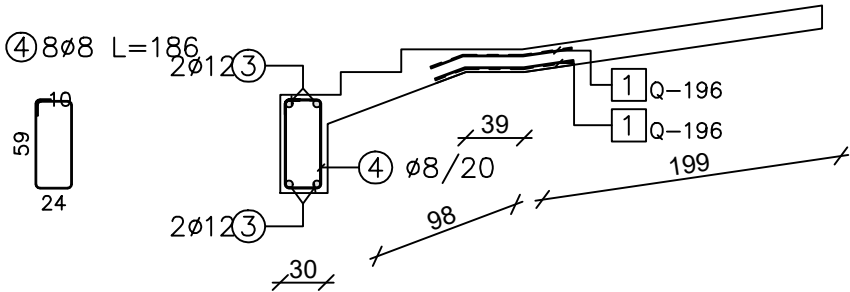
Naslov risbe:
Armaturni načrt - Oporni zid Z11

11.

ARMATURA STOPNIC BS1

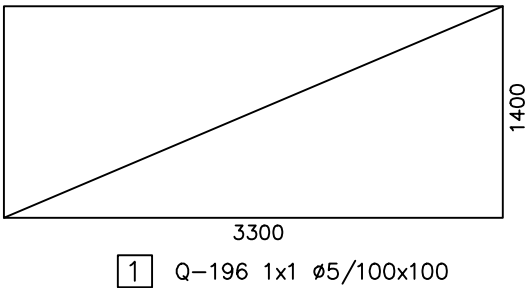
kos : 1

M 1 : 50



POZICIJA	STEVILO	ø mm	L [cm]	SK. DOL [m]	TEZA [kg]	CODE	OBLIKA [cm] (Zunanja mera)
1	4	10	165.0	6.60	4.07	000	165
2	4	10	270.0	10.80	6.66	000	270
3	4	12	142.0	5.68	5.04	000	142
4	8	8	186.0	14.88	5.88	515	59 24
5	46	10	69.0	31.74	19.58	252	30 30
6	2	10	142.0	2.84	1.75	000	142
SKUPNA TEZA:					42.98		

Belonging Element							Num.
Type	Q-196		Standard Sheet Dimension		Sheet Surface	Weight /m2	
S500	ø5/10x10		215x600 [cm]		12.9 [m2]	3.11 [kg]	
Pos.	Dimension [cm]	Note	Layer [n]	Sheets Size [n]	Purchase Sheets [n]	Tot. Surface [m2]	Tot. Weigh [kg]
1	330x140		1	1	1	4.62	14.37
Total used						4.62 m2	14.37 kg
Total purchase					1	12.9 m2	40.12 kg



- VSE MERE IN KOM ARMATURE KONTROLIRATI NA GRADBIŠČU IN JIH PO POTREBI USTREZNO KORIGIRATI, PRED NAROČILOM ARMATURE !!!

- OBVEZEN GEOMEHANSKI PREGLED TEMELJNIH TAL !

- PRED BETONIRANJEM VSTAVITI VSE INŠTALACIJE - GLEJ NAČRTE INŠTALACIJ!!!

- Evd TAMPONSKE BLAZINE = MIN. 40 MPa

BETON - C25/30,Dmax 16, XC2

ZAŠČITNI SLOJ BETONA:

- rebrasta armatura 3,0 - 4,0cm

- mrežna armatura 3,0cm

ARMATURA - S500

STOPNICE BS1

M 1:50, 1:25

STATIK d.o.o. Podjetje za projektiranje in svetovanje Prešernova 2, 5280 Idrija				
Naročnik: Občina Idrija Mestni trg 1 5280 Idrija		Objekt: Ureditev območja pokopališča Idrija		
Projektant načrta: STATIK d.o.o. podjetje za projektiranje in svetovanje Prešernova 2, 5280 Idrija		Vrsta načrta	Načrt gradbenih konstrukcij	Faza: PZR
		Pooblaščen arhitekt	Polona Troha K., u.d.i.a.	A - 1448
		Pooblaščen inženir	Matevž Govekar, u.d.i.g.	G - 3743
		Sodelavec		
		Številka načrta	107/26	
		Številka projekta	7/2025	Merilo: M 1:50, 1:25
Projektant: Kolektor Koling d.o.o. Arkova 43 5280 Idrija		Datum	oktober 2026	Št. lista:
		Naslov risbe: Armaturni načrt - Stopnice BS1	12.	