

STATIČKI PRORAČUN

ZAHVAT 1

		EU funded project Projekat finansira Europska Unija			
Client/Klient		Consultant/Konsultant			
INFRASTRUCTURE PROJECTS FACILITY IN THE WESTERN BALKANS		WYG INTERNATIONAL UK		 INSTITUT ZA HIDROTEHNIKU GRADJEVINSKOG FAKULTETA U SARAJEVU	
Project/Projekat					
REGIONALNI SISTEM VODOSNABDIJEVANJA PLAVA VODA					
Project status/Tip Projekta	Drawing date /Datum crteža: 09.05.2011. Drawing approved/Crtež odobren: 09.06.2011.	Drawing status /Status Crteža FINAL	Drawing scale/Mjerilo crteža (Priloga)		
GLAVNI PROJEKT			Format A3(420/297 mm)		
Drawing name/Ime Priloga	Prepared by:	Drawing no/ Prilog broj			
STATIČKI PRORAČUN ZAHVAT 1	 INSTITUT ZA HIDROTEHNIKU GRADJEVINSKOG FAKULTETA U SARAJEVU Sarajeva, Tomića 1, Sarajvo, Bosnia i Hercegovina Bul. F.R.K. 21 24 660/7, 20 24 595, 195, 4205, E-70481, info@ihf.hr, ihf.hr OIB: 620606910000, PIB: 620606910000, Reg. broj u sudu: 1419410000	3.9.1		Sheet/List	Of/Od
				1	19

ANALIZA OPTEREĆENJA

Napomena: sopstvena težina uzeta automatski kroz proračun

1. Pokrovna ploča zahvata

Opis slojeva	debljina m	g KN/m3	opterećenje KN/m2
A) STALNO OPTEREĆENJE			
Mogućice opterećenje od slojeva		g=	1.00
STALNO OPTEREĆENJE		g=	1.00
B) KORISNO OPTEREĆENJE			
Korisno opterećenje		p=	1.50
KORISNO OPTEREĆENJE		p=	1.50
C) UKUPNO OPTEREĆENJE		q=	2.50

2. Temeljna ploča zahvata-

Opis slojeva	debljina m	g KN/m3	opterećenje KN/m2
A) STALNO OPTEREĆENJE			
Nagibni beton	0.06	24	1.44
SOPSTVENA TEZINA		g=	1.44
B) KORISNO OPTEREĆENJE			
Radni nivo vode w1=voda h1=	1.60	10	16.00
Max nivo vode w2=voda h2=	1.90	10	19.00
Uzgon u=voda h2=	0.00	10	0.00

3. Pritisak nasipa-zemlje na čeonu zidove zahvata - stanje mirovanja

Karakteristike materijala za zatrpavanje

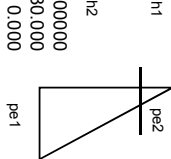
φ= 30
γ= 20 KN/m3
C = 0 KN/m2

Ugao unutrašnjeg trenja zemlje u step 30 cos= 0.8660254
Ugao unutrašnjeg trenja zemlje u radi 0.523598776 sin= 0.5000000
tan= 0.5773503

Zemlja sa vanjske strane - viši dio bazena

Visina zemlje iznad gornje ploče h1= 0 m
Visina objekta h2= 3 m

λk= 1-sinφ= 0.5000000
pe1= 30.000
pe2= 0.000



Pritisak zemlje na konstrukciju zida-prema izvorištu mjereno po visini od nivoa ploče

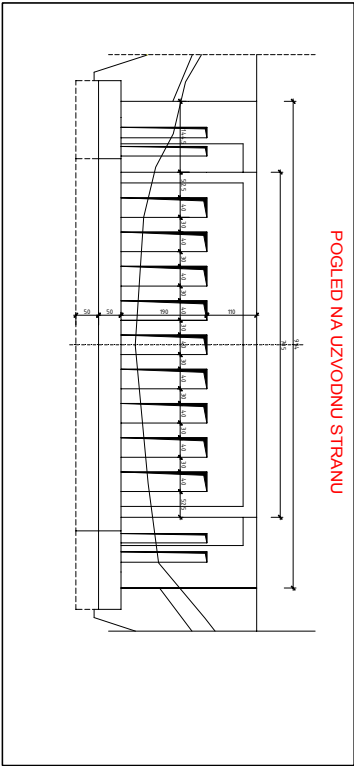
Zid H=3.0 m (max visina zida)	p=
h=1.9 m	3.00 30.00 KN/m2 1.90 19.00 KN/m2

Vertikalno opterećenje na temelje	3.00 60.00 KN/m2
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4. Opterećenje vodom na stranice kanala zahvata

	H=	pw=
voda na koti 517.55 K.V.V.	1.60	16.00 KN/m2
h=1.9 voda na max koti	1.90	19.00 KN/m2

5. Opterećenje na stubove-otvore u zidu - KAMENI NABACAJ



Opterećenje na stubove-otvore u zidu š= 0.735 m

Pritisak zemlje na konstrukciju zida-prema izvorištu mjereno po visini od nivoa ploče

Zid H=3.0 m (max visina zida)	p (Kn/m2)	p (Kn/m)
h=1.9 m	3.00 30.00	22.05 KN/m' 13.97 KN/m'

Opterećenje na stubove-otvore u zidu š= 0.35 m

Pritisak zemlje na konstrukciju zida-prema izvorištu mjereno po visini od nivoa ploče

Zid H=3.0 m (max visina zida)	p (Kn/m2)	p (Kn/m)
h=1.9 m	3.00 30.00	10.50 KN/m' 6.65 KN/m'

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Osnovni podaci o modelu

[illegible]

Ulazni podaci - Konstrukcija

Sena nivoa					
Naziv		z [m]	h [m]		
Pokrovna ploča		2.85	0.95	rub otvora	
				1.90	1.90

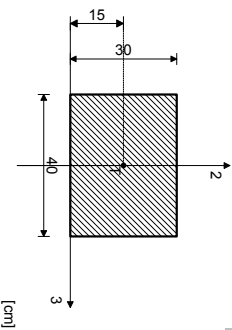
			Naziv		
betonji					

Tabela materijala					
No	Naziv materijala	E[kN/m2]	μ	γ [kN/m3]	α [1/C]
1	Beton MB 30	3.150e+7	0.20	25.00	1.000e-5
				E_m [kN/m2]	μ_m
				3.150e+7	0.20

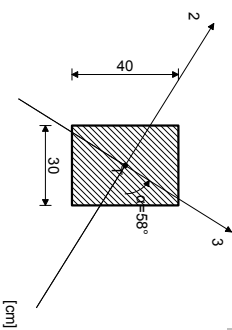
Setovi ploča					
No	d[m]	e[m]	Materijal	Tip proračuna	Otrotropia
<1>	0.500	0.000	1	Tanka ploča	Izotropna
<2>	0.300	0.150	1	Tanka ploča	Izotropna
					$E2$ [kN/m2]
					G [kN/m2]
					α

Setovi greda

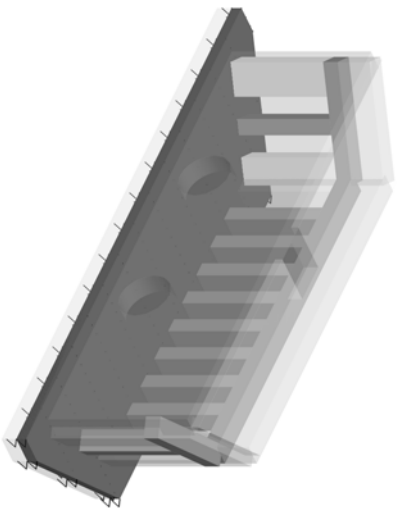
Set: 1 Presek: b/d=40/30, Fiktivna ekscentričnost					
Mat.		A1	A2	A3	I_1
1 - Beton MB 30		1.200e-1	1.000e-1	1.000e-1	1.944e-3
					I_2
					1.600e-3
					I_3
					9.000e-4



Set: 2 Presek: b/d=30/40, Fiktivna ekscentričnost					
Mat.		A1	A2	A3	I_1
1 - Beton MB 30		1.200e-1	1.000e-1	7.302e-2	1.944e-3
					I_2
					1.403e-3
					I_3
					1.097e-3

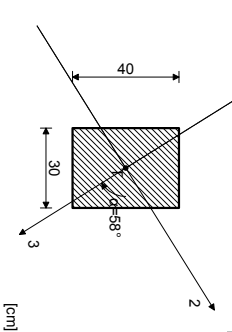


Setovi površinskih oslonaca					
Set	K.R1	K.R2	K.R3		
1	4.000e+4	4.000e+4	4.000e+4		

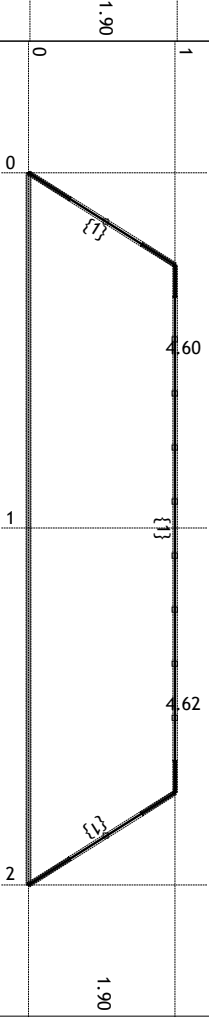
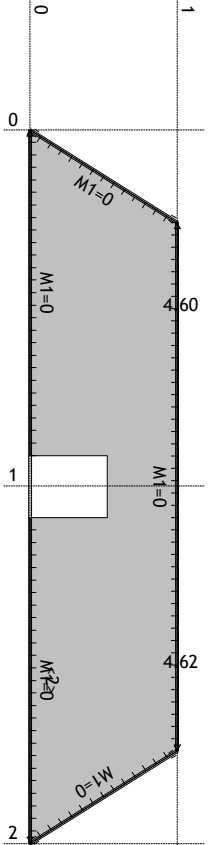
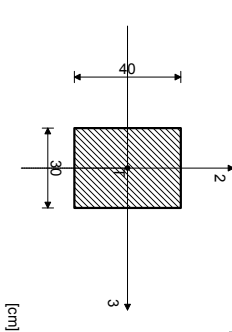


No	d[m]	e[m]	Materijal	Tip proračuna	Otrotropia	$E2$ [kN/m2]	G [kN/m2]	α
<3>	0.400	0.200	1	Tanka ploča	Izotropna			

Set: 3 Presek: b/d=30/40, Fiktivna ekscentričnost					
Mat.		A1	A2	A3	I_1
1 - Beton MB 30		1.200e-1	1.000e-1	7.302e-2	1.944e-3
					I_2
					1.403e-3
					I_3
					1.097e-3



Set: 4 Presek: b/d=30/40, Fiktivna ekscentričnost					
Mat.		A1	A2	A3	I_1
1 - Beton MB 30		1.200e-1	1.000e-1	1.000e-1	1.944e-3
					I_2
					9.000e-4
					I_3
					1.600e-3

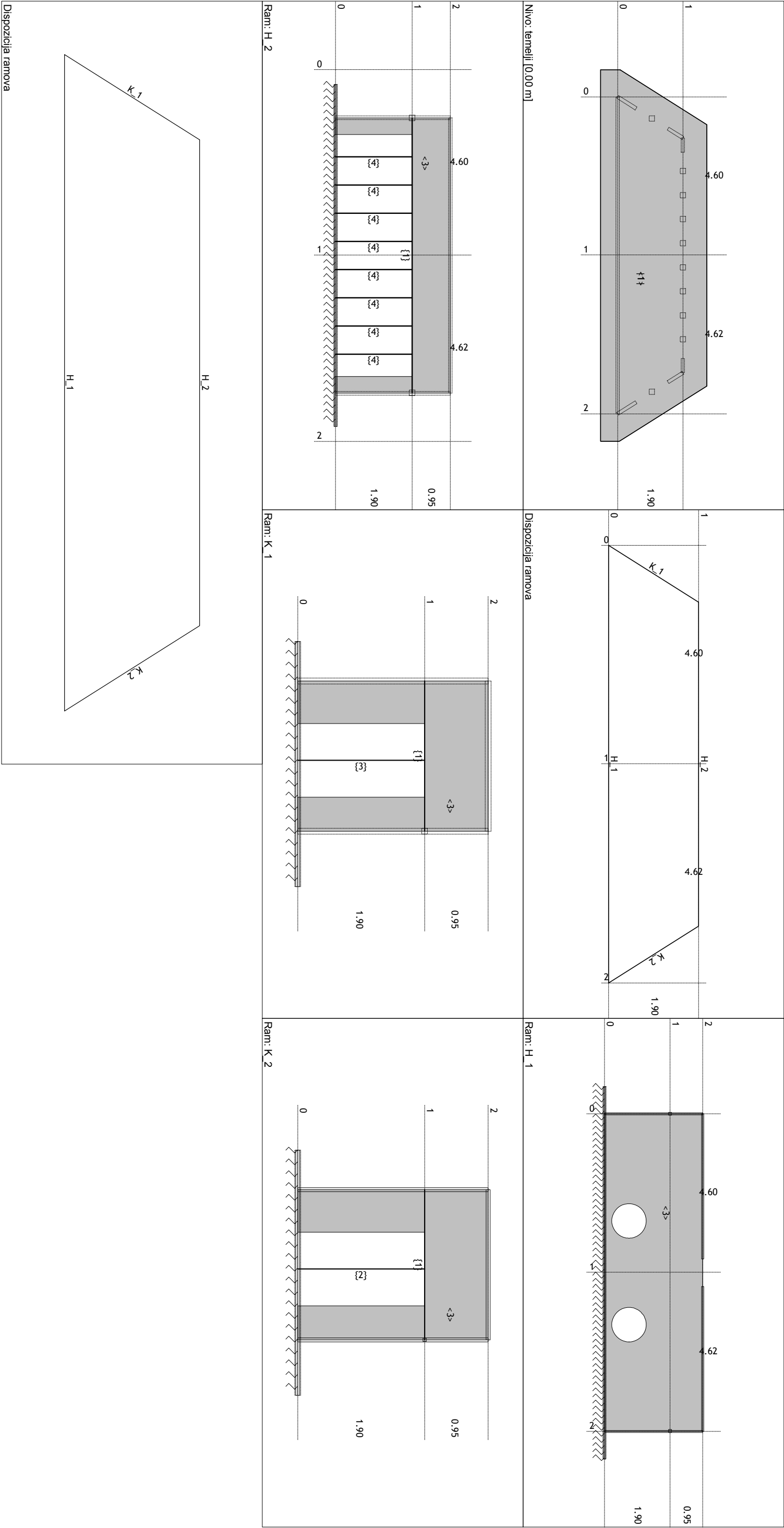


Izometrija

Nivo: Pokrovna ploča [2.85 m]

Nivo: rub otvora [1.90 m]

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Ulazni podaci - Opterećenje

Lista slučajeva opterećenja

No	Naziv
1	Stalno (g)
2	Korisno
3	Zemlja
4	voda max
5	Komb.: I+II
6	Komb.: I+III
7	Komb.: I+II+III
8	Komb.: I+IV

No	Naziv
9	Komb.: I+II+IV
10	Komb.: I+II+V
11	Komb.: I+II+III+IV
12	Komb.: 1.6xI+
13	Komb.: I+1.8xII+1.8xIII+1.8xIV
14	Komb.: 1.6xI+1.8xII+1.8xIII

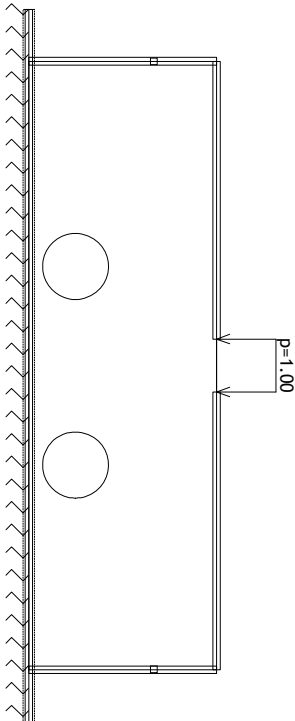
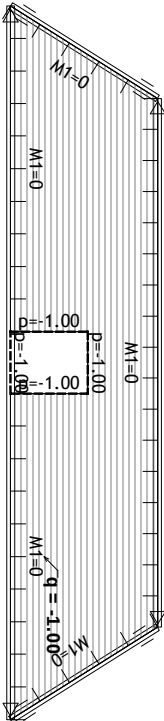
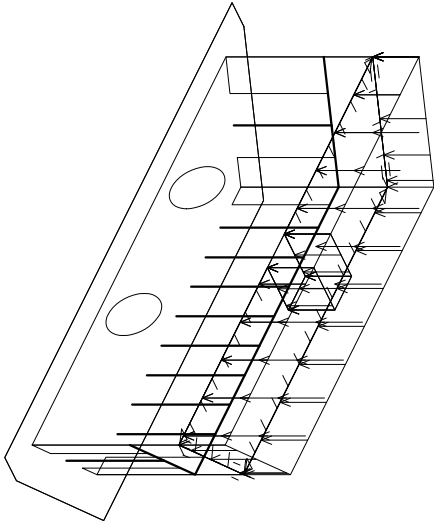
No	Naziv
15	Komb.: 1.6xI+1.8xII+1.8xIV
16	Komb.: 1.6xI+1.8xII+1.8xIV
17	Komb.: I+1.8xII+1.8xIV
18	Komb.: I+1.8xII+1.8xIV
19	Komb.: I+1.8xII+1.8xIII
20	Komb.: 1.6xI+1.8xII
21	Komb.: 1.6xI+1.8xII
22	Komb.: 1.6xI+1.8xIV

No	Naziv
23	Komb.: I+1.8xIII
24	Komb.: I+1.8xII
25	Komb.: I+1.8xIV
26	Komb.: 1.6xI
27	Komb.: I

Opt. 1: Stalno (g)

Opt. 1: Stalno (g)

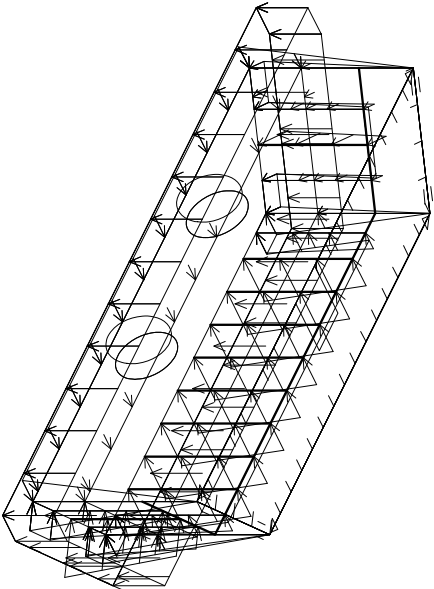
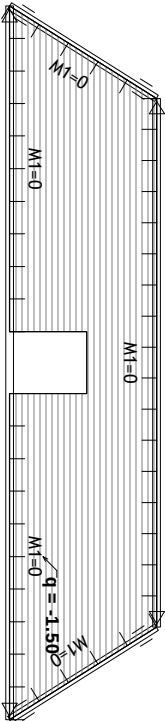
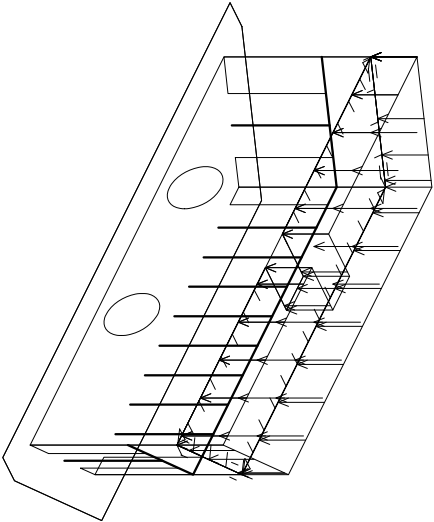
Opt. 1: Stalno (g)



Izometrija
Opt. 2: Korisno

Nivo: Pokrovnna ploca [2.85 m]
Opt. 2: Korisno

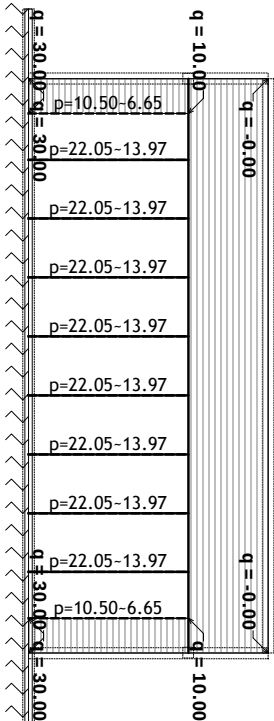
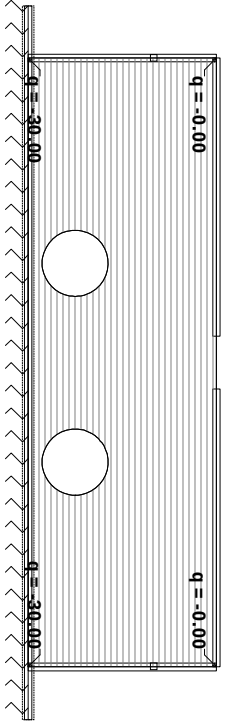
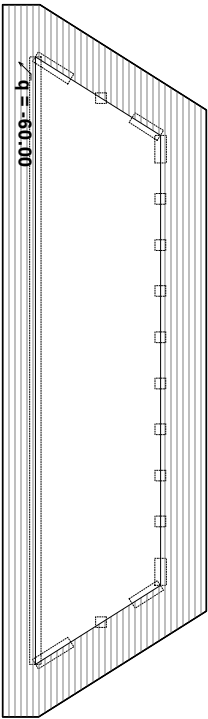
Ram: H 1
Opt. 3: Zemlja



Izometrija
Opt. 3: Zemlja

Nivo: Pokrovnna ploca [2.85 m]
Opt. 3: Zemlja

Izometrija
Opt. 3: Zemlja



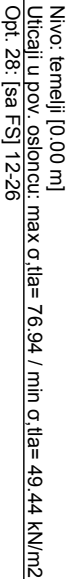
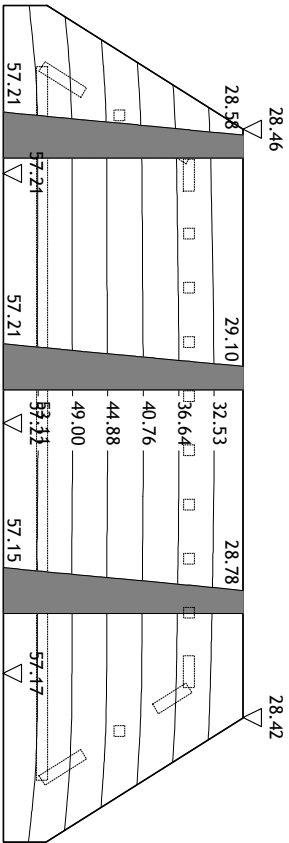
Nivo: temelji [0.00 m]

Ram: H 1

Ram: H 2

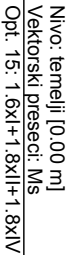
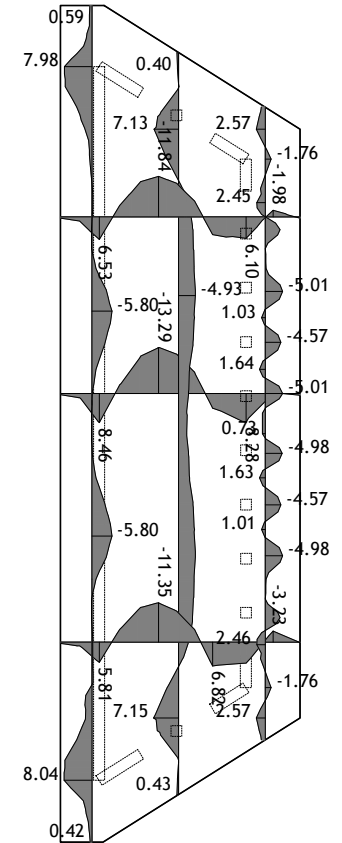
Opt. 3: Zemlja Ram: K 1 Opt. 4: voda max	Opt. 3: Zemlja Ram: K 2 Opt. 4: voda max	Opt. 4: voda max Izometrija
Nivo: temelji [0.00 m] Nivo: temelji [0.00 m]	Ram: H 1 Ram: H 1	

Opt. 7: I+I+I+I+I



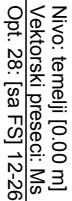
Nivo: temelji [0,00 m]
 Uticali u pov. osloncu: max σ_{tla} = 57.22 / min σ_{tla} = 28.42 kN/m²
 Opt. 12: 1.6xI+1.8xII+1.8xIII+1.8xIV

Nivo: temelji [0.00 m]
 Uticali u pov. osloncu: max σ_{tla} = 93.17 / min σ_{tla} = 51.85 kN/m²
 Opt. 14: 1.6x1+1.8x1+1.8x1

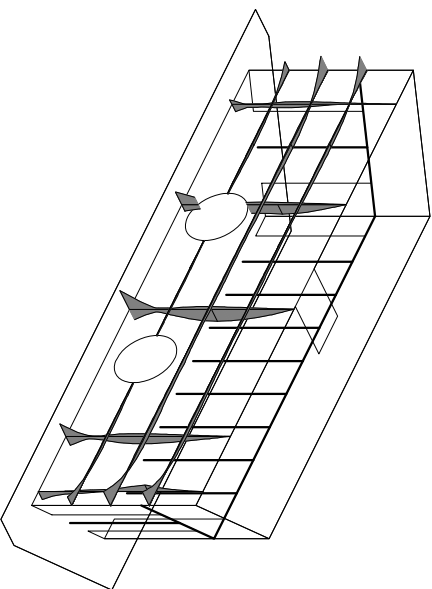


Nivo: temelji [0.00 m]
Vektorski preseči: Ms

Nivo: temelji [0.00 m]
Vektorski preseči: Ms



Opt. 28: [sa FS] 12-26

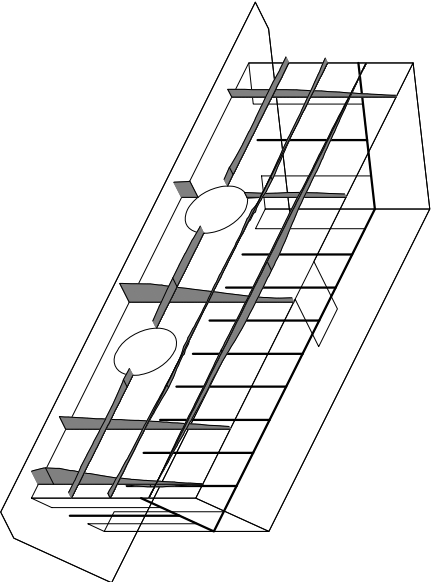
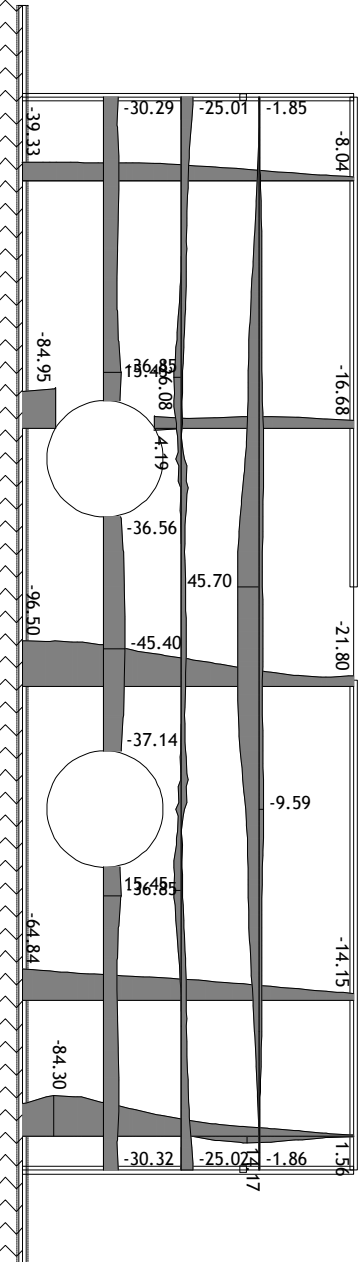
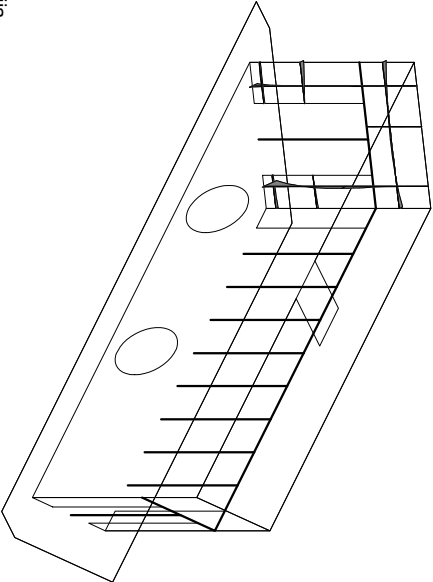
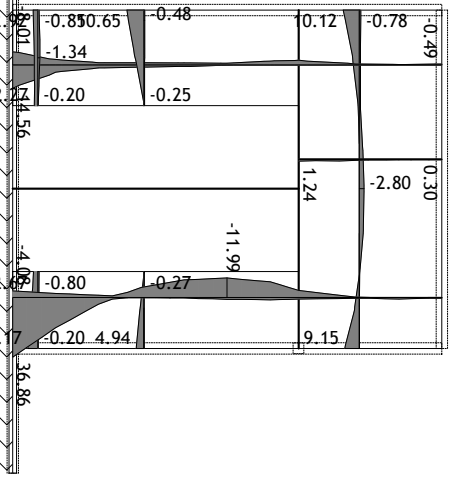
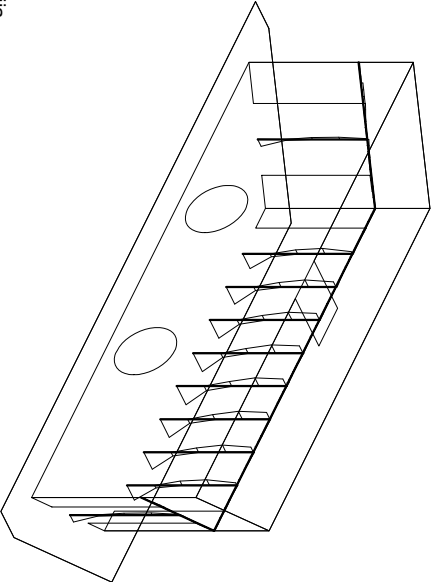
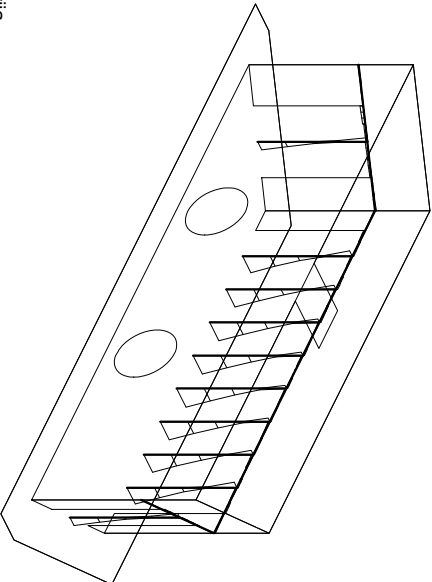
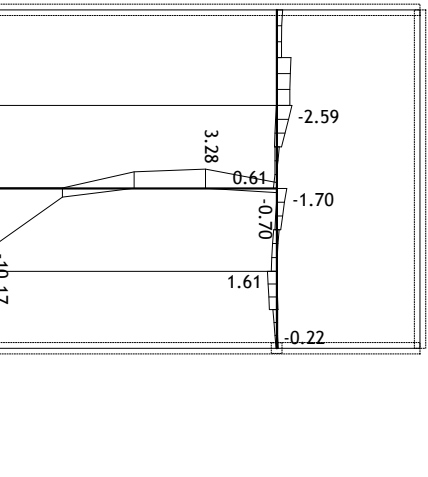
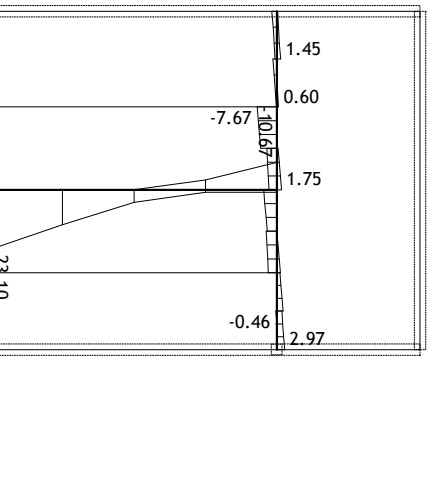
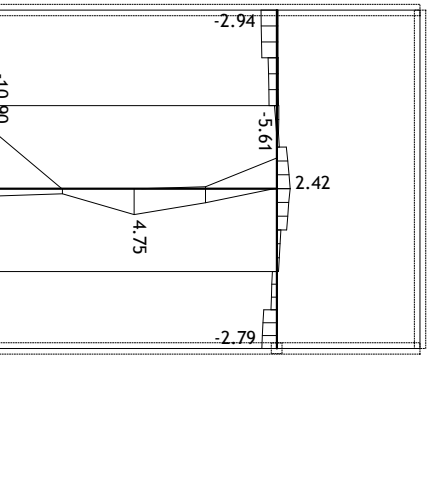
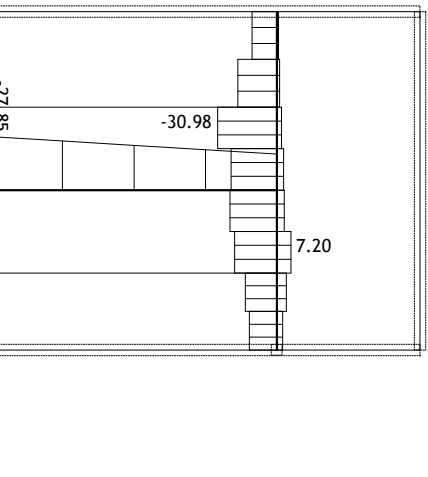
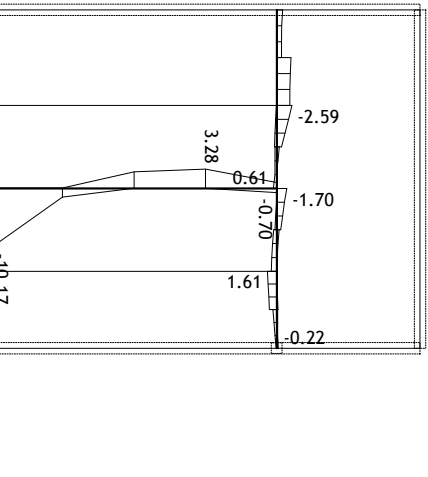
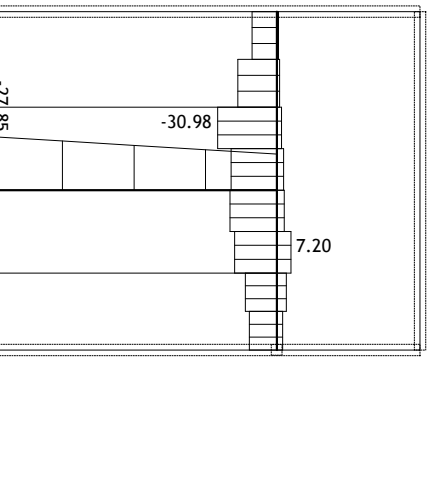


Ram: H_1
Vektorski presecki: Ms

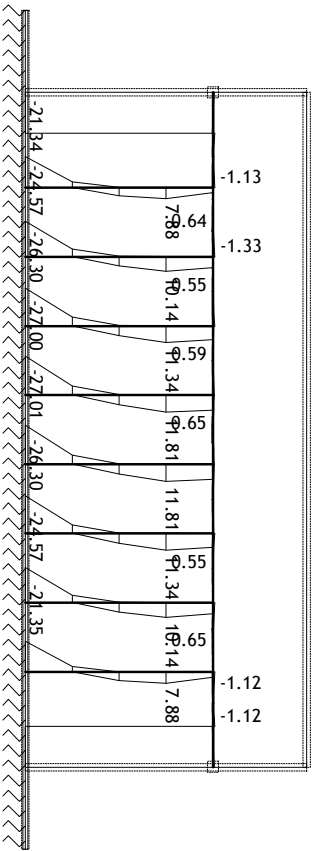
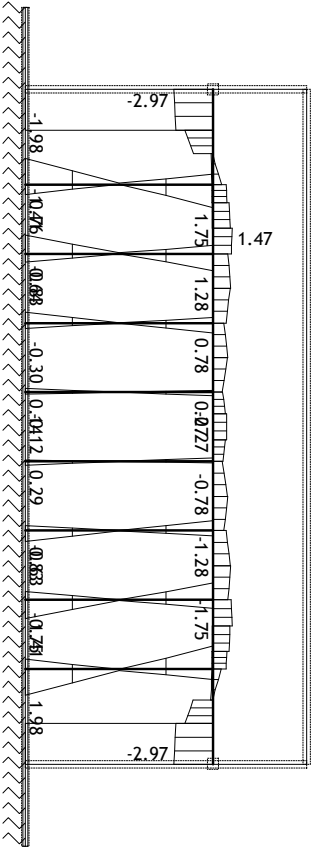
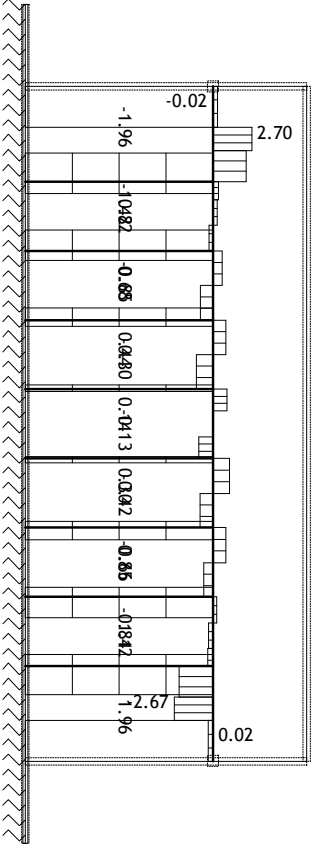
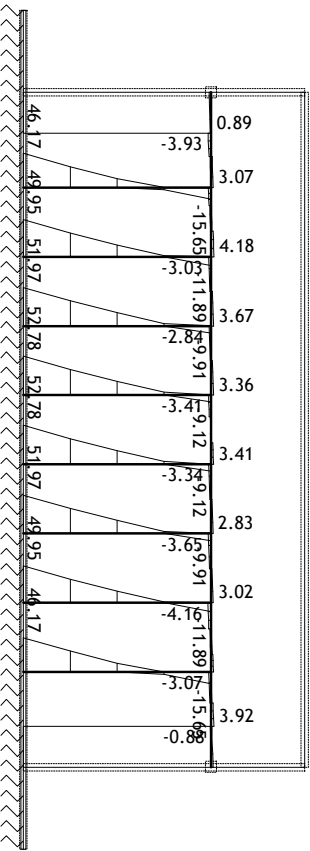
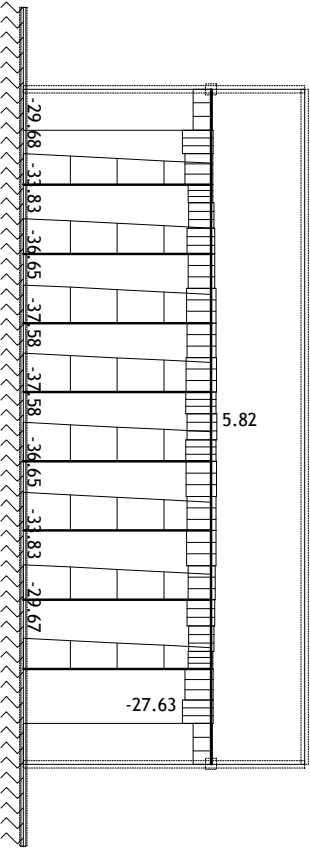
Izometrija

Vektorski preseki: Ms

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Opt. 28: [sa FS] 12-26 	Opt. 28: [sa FS] 12-26 
Izometrija Vektorski preseci: Ms Opt. 28: [sa FS] 12-26 	Ram: K_1 Vektorski preseci: Ms Opt. 28: [sa FS] 12-26 
Izometrija Uticali u gredi: max M3= 11.81 / min M3= -27.01 kNm Opt. 28: [sa FS] 12-26 	Izometrija Uticali u gredi: max T2= 52.78 / min T2= -15.65 kN Opt. 28: [sa FS] 12-26 
Ram: K_1 Uticali u gredi: max M3= 3.28 / min M3= -10.17 kNm Tower - 3D Model Builder 6.0 	Ram: K_1 Uticali u gredi: max T2= 23.10 / min T2= -10.67 kN Registered to d.o.o. „FALE“ Sarajevo 
Ram: K_1 Uticali u gredi: max M2= 4.75 / min M2= -10.90 kNm Opt. 28: [sa FS] 12-26 	Ram: K_1 Uticali u gredi: max N1= 7.22 / min N1= -37.58 kN Opt. 28: [sa FS] 12-26 
Ram: K_1 Uticali u gredi: max M3= 3.28 / min M3= -10.17 kNm Tower - 3D Model Builder 6.0 	Ram: K_1 Uticali u gredi: max N1= 7.22 / min N1= -37.58 kN Opt. 28: [sa FS] 12-26 

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Opt. 28: [sa FS] 12-26  Ram: H_2 Ulica<u>l</u>i u gredi: max M3= 11.81 / min M3= -27.01 kNm Opt. 28: [sa FS] 12-26	Opt. 28: [sa FS] 12-26  Ram: H_2 Ulica<u>l</u>i u gredi: max M2= 1.98 / min M2= -2.97 kNm Opt. 28: [sa FS] 12-26	Opt. 28: [sa FS] 12-26  Ram: H_2 Ulica<u>l</u>i u gredi: max T3= 2.70 / min T3= -2.67 kN
Ram: H_2 Ulica<u>l</u>i u gredi: max T2= 52.78 / min T2= -15.65 kN 	Ram: H_2 Ulica<u>l</u>i u gredi: max N1= 5.82 / min N1= -37.58 kN 	

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Dimenzionisanje (beton)

Merodavno opterećenje - PBAB 87

- Slučajevi opterećenja
- I Stalno (g) - <Stalno>
 - II Korisno - <Korisno>
 - III Zemlja - <Povremeno>
 - IV voda max - <Povremeno>

- Kombinacije
- 01. T. 60xI+1.80xII+1.80xIII+1.80xIV
 - 02. I+1.80xII+1.80xIII+1.80xIV
 - 03. 1.60xI+1.80xII+1.80xIII
 - 04. 1.60xI+1.80xII+1.80xIV
 - 05. 1.60xI+1.80xIII+1.80xIV
 - 06. I+1.80xIII+1.80xIV
 - 07. I+1.80xII+1.80xIV
 - 08. I+1.80xII+1.80xIII
 - 09. 1.60xI+1.80xII
 - 10. 1.60xI+1.80xIII
 - 11. 1.60xI+1.80xIV
 - 12. I+1.80xIII
 - 13. I+1.80xII
 - 14. I+1.80xIV
 - 15. 1.60xI
 - 16. I

Merodavno opterećenje: Kompletna šema PBAB 87, MB 30, RA 400/500, a=5.00 cm		Merodavno opterećenje: Kompletna šema PBAB 87, MB 30, RA 400/500, a=5.00 cm		Usvojena armatura PBAB 87, MB 30, RA 400/500, a=5.00 cm		Usvojena armatura PBAB 87, MB 30, RA 400/500, a=5.00 cm	
Aa - g.zona [cm2/m] -0.91 -0.00		Aa - d.zona [cm2/m] 0.00 0.93		Aa - g.zona [cm2/m] -0.91 -0.46 0.00		Aa - d.zona [cm2/m] 0.00 0.47 0.94	
Nivo: temelji [0.00 m] Aa - g.zona - max Aa,g= -0.91 cm2/m		Nivo: temelji [0.00 m] Aa - d.zona - max Aa,d= 0.93 cm2/m		Nivo: temelji [0.00 m] Aa - g.zona		Nivo: temelji [0.00 m] Aa - d.zona	

Tačka 2

X=4.26 m, Y=1.90 m, Z=0.00 m
Pravac 1: (α=0°)
Merodavna kombinacija:
1.60xI+1.80xII+1.80xIV
Mu = 4.04 kNm
Nu = 0.00 kN
eb/ea = -0.154/10.000 ‰
Ag1 = 0.08 cm2/m
Ad1 = 0.22 cm2/m
Usvojeno (gornja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Usvojeno (donja zona):
1.60xI+1.80xIII
Mu = -4.33 kNm
Nu = 0.00 kN
Procenat armiranja: 0.21%

Tačka 3

X=4.21 m, Y=0.77 m, Z=0.00 m
Pravac 1: (α=0°)
Merodavna kombinacija:
1.60xI+1.80xII+1.80xIV
Mu = 1.94 kNm
Nu = 0.00 kN
eb/ea = -0.111/10.000 ‰
Ag1 = 0.06 cm2/m
Ad1 = 0.10 cm2/m
Usvojeno (gornja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Usvojeno (donja zona):
1.60xI+1.80xIII
Mu = -4.33 kNm
Nu = 0.00 kN
Procenat armiranja: 0.21%

Tačka 4

X=0.63 m, Y=1.00 m, Z=0.00 m
Pravac 1: (α=0°)
Merodavna kombinacija:
1.60xI+1.80xII+1.80xIV
Mu = 7.95 kNm
Nu = 0.00 kN
eb/ea = -0.202/10.000 ‰
Ag1 = 0.00 cm2/m
Ad1 = 0.44 cm2/m
Usvojeno (gornja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Usvojeno (donja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Procenat armiranja: 0.21%

Tačka 5

X=8.41 m, Y=1.24 m, Z=0.00 m
Pravac 1: (α=0°)
Merodavna kombinacija:
1.60xI+1.80xII+1.80xIV
Mu = 8.22 kNm
Nu = 0.00 kN
eb/ea = -0.205/10.000 ‰
Ag1 = 0.00 cm2/m
Ad1 = 0.46 cm2/m
Usvojeno (gornja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Usvojeno (donja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Procenat armiranja: 0.21%

Tačka 6

X=1.14 m, Y=1.00 m, Z=0.00 m
Pravac 1: (α=0°)
Merodavna kombinacija:
1.60xI+1.80xII+1.80xIV
Mu = -5.41 kNm
Nu = 0.00 kN
eb/ea = -0.166/10.000 ‰
Ag1 = 0.30 cm2/m
Ad1 = 0.00 cm2/m
Usvojeno (gornja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Usvojeno (donja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Procenat armiranja: 0.21%

Tačka 7

X=1.20 m, Y=0.77 m, Z=0.00 m
Pravac 1: (α=0°)
Merodavna kombinacija:
1.60xI+1.80xII+1.80xIV
Mu = 3.02 kNm
Nu = 0.00 kN
eb/ea = -0.133/10.000 ‰
Ag1 = 0.06 cm2/m
Ad1 = 0.16 cm2/m
Usvojeno (gornja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Usvojeno (donja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Procenat armiranja: 0.21%

Tačka 8

X=4.21 m, Y=0.77 m, Z=0.00 m
Pravac 2: (α=90°)
Merodavna kombinacija:
1.60xI+1.80xII+1.80xIII
Mu = -15.85 kNm
Nu = 0.00 kN
eb/ea = -0.289/10.000 ‰
Ag2 = 0.89 cm2/m
Ad2 = 0.00 cm2/m
Usvojeno (gornja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Usvojeno (donja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Procenat armiranja: 0.21%

Tačka 9

X=4.21 m, Y=0.77 m, Z=0.00 m
Pravac 2: (α=90°)
Merodavna kombinacija:
1.60xI+1.80xII+1.80xIII
Mu = -15.85 kNm
Nu = 0.00 kN
eb/ea = -0.289/10.000 ‰
Ag2 = 0.89 cm2/m
Ad2 = 0.00 cm2/m
Usvojeno (gornja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Usvojeno (donja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Procenat armiranja: 0.21%

Tačka 10

X=4.21 m, Y=0.77 m, Z=0.00 m
Pravac 2: (α=90°)
Merodavna kombinacija:
1.60xI+1.80xII+1.80xIII
Mu = -15.85 kNm
Nu = 0.00 kN
eb/ea = -0.289/10.000 ‰
Ag2 = 0.89 cm2/m
Ad2 = 0.00 cm2/m
Usvojeno (gornja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Usvojeno (donja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Procenat armiranja: 0.21%

Tačka 11

X=4.21 m, Y=0.77 m, Z=0.00 m
Pravac 2: (α=90°)
Merodavna kombinacija:
1.60xI+1.80xII+1.80xIII
Mu = -15.85 kNm
Nu = 0.00 kN
eb/ea = -0.289/10.000 ‰
Ag2 = 0.89 cm2/m
Ad2 = 0.00 cm2/m
Usvojeno (gornja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Usvojeno (donja zona):
Q-524 Ø10/15 (5.24 cm2/m)
Procenat armiranja: 0.21%

STATIČKI PRORAČUN-ZAHVAT NO-1

Nivo: temelji 10.00 ml - PBAB 87

MB 30 (d,p=50.0 cm)
Gornja zona: RA 400/500 (a=5.0 cm)
Donja zona: RA 400/500 (a=5.0 cm)
E_b(0) = 3.15e+007 kN/m²
E_a = 2e+008 kN/m²
f_{0.25} = 1807.15 kN/m²
φ = 2.60
X = 0.80
ε_s = 0.000‰
k₁ = 0.40
β₁ = 1.00

Tačka 1
X=2.09 m, Y=1.00 m, Z=0.00 m
Gornja zona
Ø10/15 α = 0°

Ø10/15 α = 90°
Donja zona
Ø10/15 α = 0°
Ø10/15 α = 90°
Pravac 1: (α=0°)
T = 0 Presjek bez prsline
φ = 2.60
T = ∞ Presjek bez prsline
Pravac 2: (α=90°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline
Pravac 2: (α=90°)
T = ∞ Presjek bez prsline
Ø10/15 α = 0°

Tačka 2
X=5.59 m, Y=1.00 m, Z=0.00 m
Gornja zona
Ø10/15 α = 0°
Ø10/15 α = 90°
Donja zona
Ø10/15 α = 0°
Ø10/15 α = 90°
Pravac 1: (α=0°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline
Pravac 2: (α=90°)
T = ∞ Presjek bez prsline
Ø10/15 α = 0°

T = ∞ Presjek bez prsline
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline
Tačka 3
X=4.26 m, Y=1.90 m, Z=0.00 m
Gornja zona
Ø10/15 α = 0°
Ø10/15 α = 90°
Donja zona
Ø10/15 α = 0°
Ø10/15 α = 90°
Pravac 1: (α=0°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline
T = ∞ Presjek bez prsline

Pravac 2: (α=90°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline
Tačka 4
X=4.21 m, Y=0.00 m, Z=0.00 m
Gornja zona
Ø10/15 α = 0°
Ø10/15 α = 90°
Donja zona
Ø10/15 α = 0°
Ø10/15 α = 90°
Pravac 1: (α=0°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline

T = ∞ Presjek bez prsline
Pravac 2: (α=90°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline
Tačka 5
X=4.74 m, Y=1.00 m, Z=0.00 m
Gornja zona
Ø10/15 α = 0°
Ø10/15 α = 90°
Donja zona
Ø10/15 α = 0°
Ø10/15 α = 90°
Pravac 1: (α=0°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline

Pravac 1: (α=0°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline
Pravac 2: (α=90°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline
T = ∞ Presjek bez prsline

Usvojena armatura
PBAB 87, MB 30, RA 400/500, a=4.00 cm

T = 0 Presjek bez prsline
Aa - d.zona [cm²/m]
0.00
0.93

Usvojena armatura
PBAB 87, MB 30, RA 400/500, a=4.00 cm

T = 0 Presjek bez prsline
Aa - g.zona [cm²/m]
-0.22
-0.00

Usvojena armatura
PBAB 87, MB 30, RA 400/500, a=4.00 cm

Aa - g.zona [cm²/m]
-0.22
-0.00

Nivo: Pokrovna ploca [2.85 m]

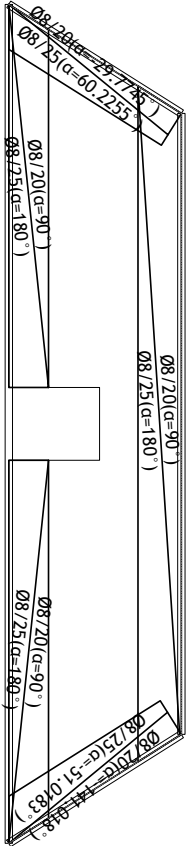
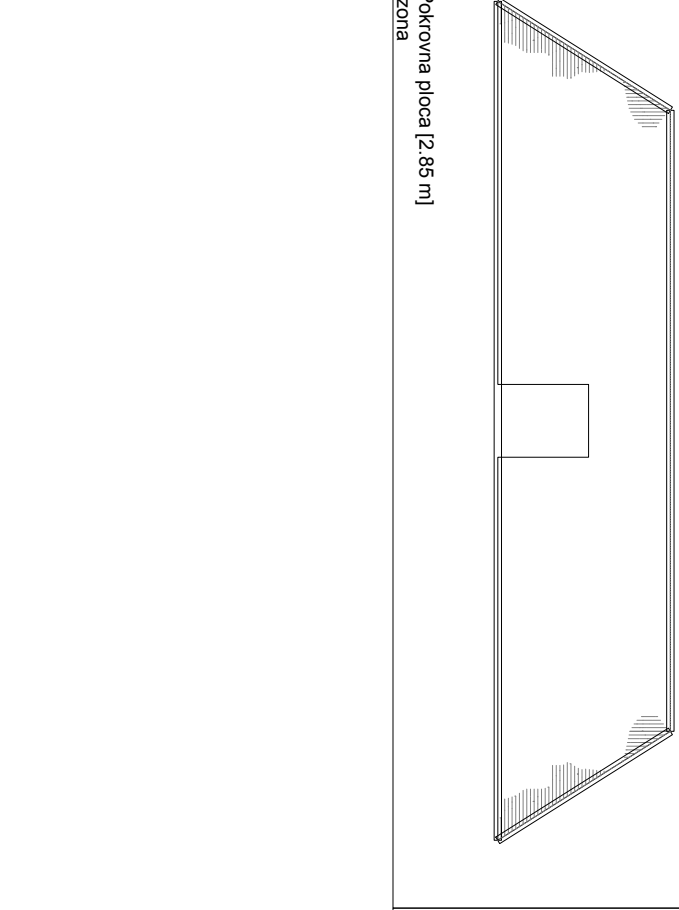
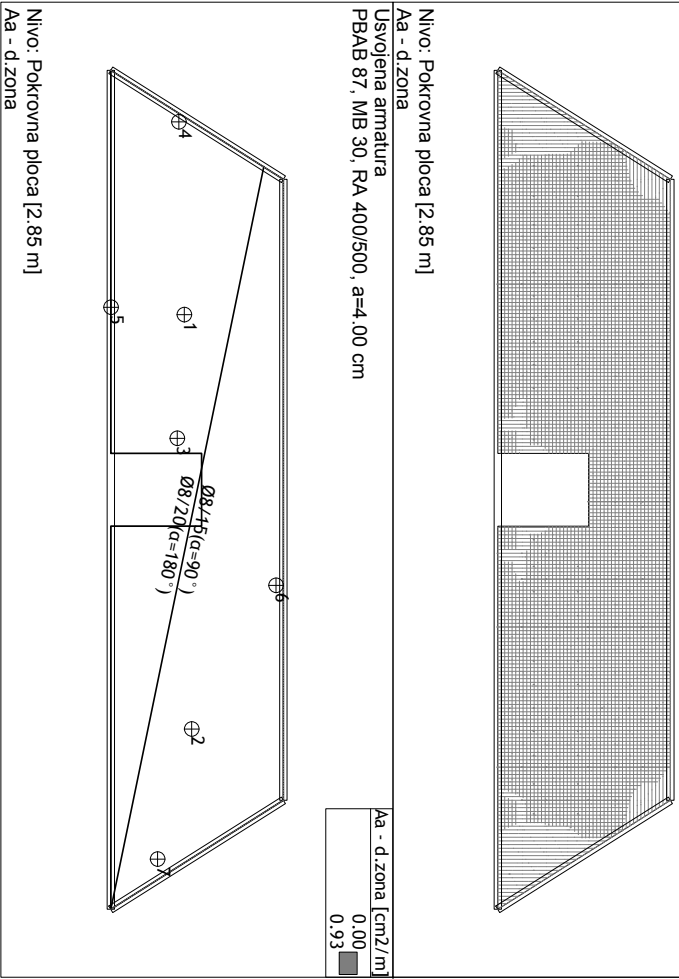
Aa - d.zona

Usvojena armatura
PBAB 87, MB 30, RA 400/500, a=4.00 cm

Nivo: Pokrovna ploca [2.85 m]

Nivo: Pokrovna ploca [2.85 m]

Aa - g.zona



Nivo: Pokrovna ploca [2.85 m]
PBAB 87
d,p=30.0 cm
MB 30
Gornja zona: RA 400/500 (a=4.0 cm)
Donja zona: RA 400/500 (a=4.0 cm)
Kompletna šema opterećenja

Gornja zona
Pravac 1: (α=0°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 1.69 kNm
Nu = 0.00 kN
e_b/e_a = -0.325/10.000 ‰
Ag₁ = 0.00 cm²/m

Tačka 1
X=2.61 m, Y=0.77 m, Z=2.85 m
Donja zona
Pravac 1: (α=90°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 6.62 kNm
Nu = 0.00 kN
e_b/e_a = -0.325/10.000 ‰
Ad₁ = 0.64 cm²/m

Usvojeno (donja zona):
Ø8/15 (3.35 cm²/m)
Procenat armiranja: 0.11%

Pravac 2: (α=0°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 1.69 kNm
Nu = 0.00 kN
e_b/e_a = -0.160/10.000 ‰
Ad₂ = 0.16 cm²/m

Usvojeno (donja zona):
Ø8/20 (2.51 cm²/m)
Procenat armiranja: 0.08%

Pravac 2: (α=0°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 1.94 kNm
Nu = 0.00 kN
e_b/e_a = -0.172/10.000 ‰
Ad₂ = 0.19 cm²/m

Usvojeno (donja zona):
Ø8/20 (2.51 cm²/m)
Procenat armiranja: 0.08%

Gornja zona
Pravac 1: (α=0°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 1.94 kNm
Nu = 0.00 kN
e_b/e_a = -0.172/10.000 ‰
Ag₁ = 0.00 cm²/m

Pravac 2: (α=90°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 5.99 kNm
Nu = 0.00 kN
e_b/e_a = -0.308/10.000 ‰
Ag₂ = 0.00 cm²/m

Usvojeno (donja zona):
Ø8/15 (3.35 cm²/m)
Procenat armiranja: 0.11%

Tačka 3
X=3.91 m, Y=0.77 m, Z=2.85 m
Donja zona
Pravac 1: (α=90°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 8.92 kNm
Nu = 0.00 kN
e_b/e_a = -0.381/10.000 ‰
Ad₁ = 0.87 cm²/m

Usvojeno (donja zona):
Ø8/15 (3.35 cm²/m)
Procenat armiranja: 0.11%

Pravac 2: (α=0°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 2.45 kNm
Nu = 0.00 kN
e_b/e_a = -0.194/10.000 ‰
Ad₁ = 0.24 cm²/m

Usvojeno (donja zona):
Ø8/15 (3.35 cm²/m)
Procenat armiranja: 0.21%

Gornja zona
Pravac 1: (α=0°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 0.72 kNm
Nu = 0.00 kN
e_b/e_a = -0.104/10.000 ‰
Ad₂ = 0.07 cm²/m

Pravac 2: (α=90°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 8.92 kNm
Nu = 0.00 kN
e_b/e_a = -0.381/10.000 ‰
Ag₂ = 0.00 cm²/m

Usvojeno (donja zona):
Ø8/20 (2.51 cm²/m)
Procenat armiranja: 0.21%

Pravac 2: (α=90°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 2.45 kNm
Nu = 0.00 kN
e_b/e_a = -0.194/10.000 ‰
Ad₁ = 0.24 cm²/m

Usvojeno (donja zona):
Ø8/15 (3.35 cm²/m)
Procenat armiranja: 0.21%

Pravac 2: (α=0°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = -0.90 kNm
Nu = 0.00 kN
e_b/e_a = -0.116/10.000 ‰
Ad₂ = 0.00 cm²/m

Usvojeno (donja zona):
Ø8/20 (2.51 cm²/m)
Procenat armiranja: 0.19%

Usvojeno (gornja zona):
Ø8/25 (2.01 cm²/m)
Procenat armiranja: 0.21%

Tačka 5
X=2.61 m, Y=0.00 m, Z=2.85 m
Pravac 1: (α=90°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 0.73 kNm
Nu = 0.00 kN
e_b/e_a = -0.129/10.000 ‰
Ag₁ = 0.11 cm²/m

Gornja zona
Pravac 1: (α=30°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 0.73 kNm
Nu = 0.00 kN
e_b/e_a = -0.104/10.000 ‰
Ag₁ = 0.00 cm²/m

Usvojeno (gornja zona):
Ø8/20 (2.51 cm²/m)
Procenat armiranja: 0.20%

Pravac 2: (α=0°)
Meredavna kombinacija:
1.60xI+1.80xII+1.80xIV
Nu = 0.68 kNm
Nu = 0.00 kN
e_b/e_a = -0.101/10.000 ‰
Ag₂ = 0.07 cm²/m

Usvojeno (gornja zona):
Ø8/25 (2.01 cm²/m)
Procenat armiranja: 0.21%

Usvojeno (donja zona):
Ø8/20 (2.51 cm²/m)
Procenat armiranja: 0.15%

STATIČKI PRORAČUN-ZAHVAT NO-1

Tačka 6
X=5.59 m, Y=1.90 m, Z=2.85 m
Pravac 1: ($\alpha=90^\circ$)
Maksimalna kombinacija:
1.60xI+1.80xIV
Mu = 0.00 kNm
Nu = 1.21 kNm
e_b/e_a = -0.135/10.000 ‰
Ag1 = 0.00 cm²/m
Ad1 = 0.12 cm²/m
Usvojeno (gornja zona):
Ø8/20 (2.51 cm²/m)
Usvojeno (donja zona):
Ø8/15 (3.35 cm²/m)
Procenat armiranja: 0.20%

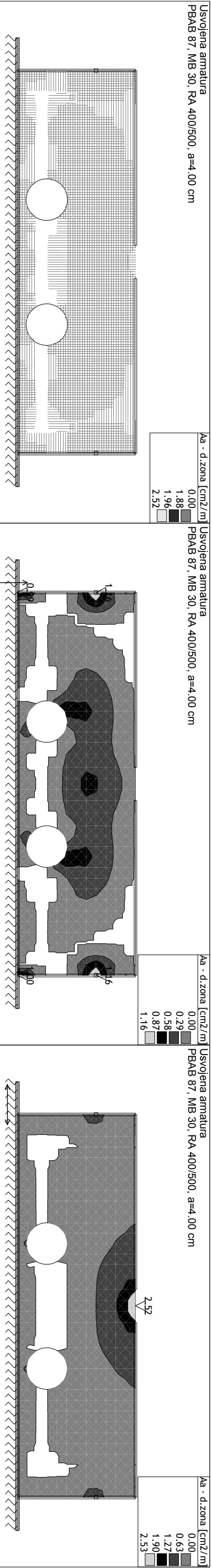
Pravac 2: ($\alpha=0^\circ$)
Maksimalna kombinacija:
1.60xI+1.80xII+1.80xIV
Mu = 0.86 kNm
Nu = 0.00 kN
e_b/e_a = -0.117/10.000 ‰
Ag2 = 0.00 cm²/m
Ad2 = 0.08 cm²/m
Usvojeno (gornja zona):
Ø8/25 (2.01 cm²/m)
Usvojeno (donja zona):
Ø8/20 (2.51 cm²/m)
Procenat armiranja: 0.15%

Tačka 7
X=8.62 m, Y=0.54 m, Z=2.85 m
Donja zona
Pravac 1: ($\alpha=90^\circ$)
Maksimalna kombinacija:
1.60xI+1.80xII
Mu = -0.31 kNm
Nu = 0.00 kN
e_b/e_a = -0.069/10.000 ‰
Ad2 = 0.00 cm²/m
Usvojeno (donja zona):
Ø8/20 (2.51 cm²/m)
Procenat armiranja: 0.19%

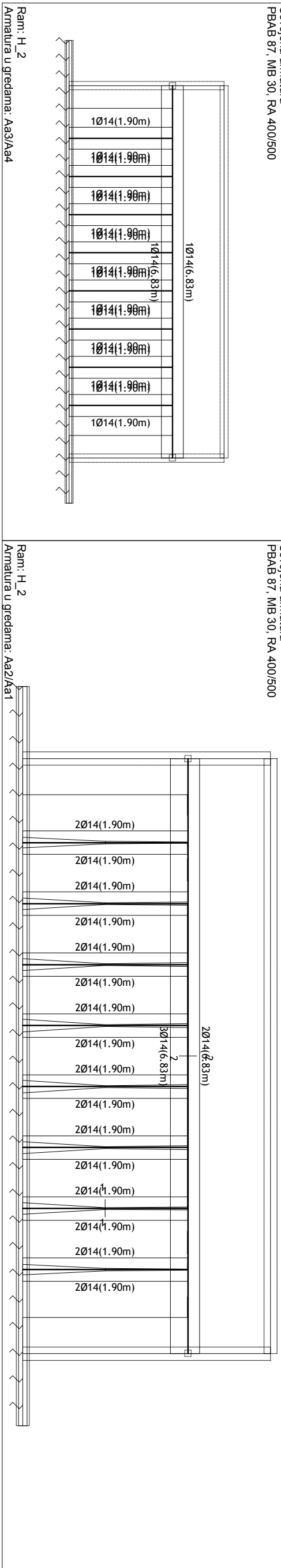
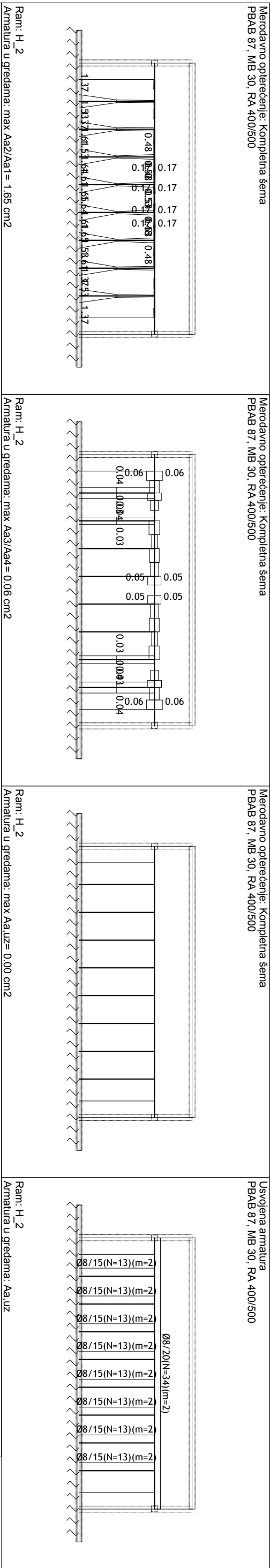
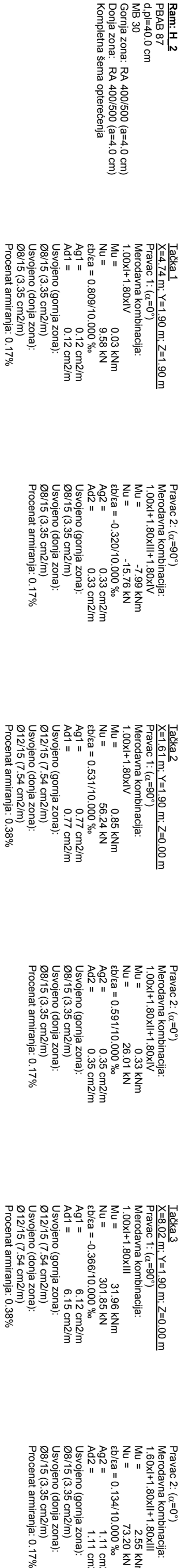
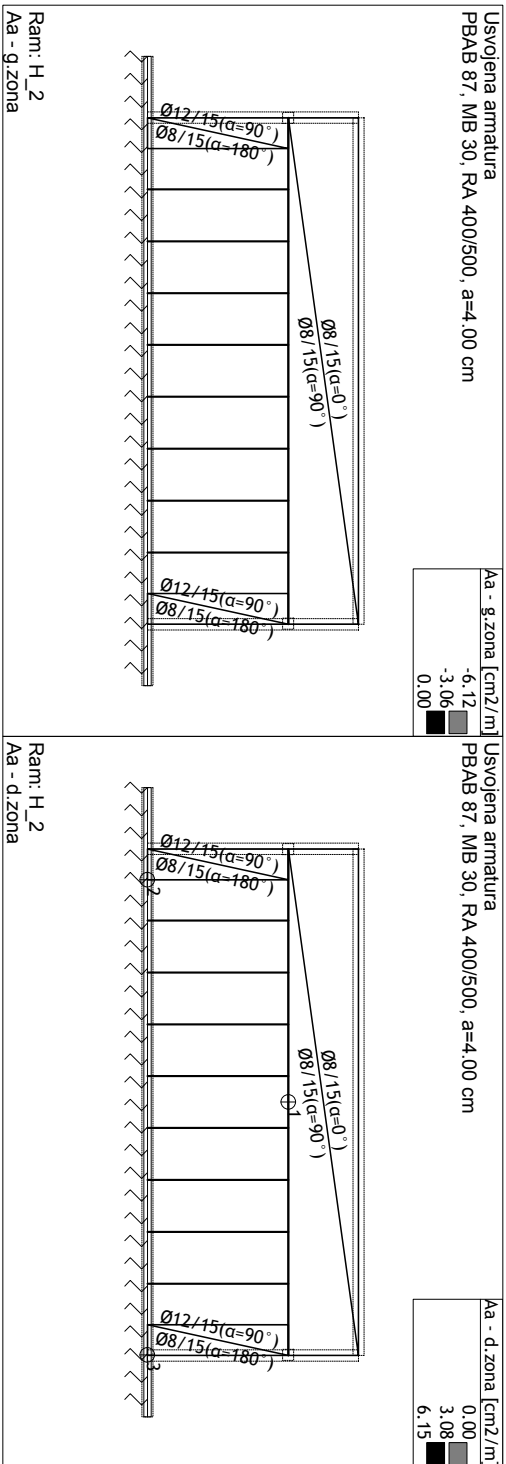
Pravac 2: ($\alpha=0^\circ$)
Maksimalna kombinacija:
1.60xI+1.80xII
Mu = -0.31 kNm
Nu = 0.00 kN
e_b/e_a = -0.069/10.000 ‰
Ad2 = 0.00 cm²/m
Usvojeno (donja zona):
Ø8/20 (2.51 cm²/m)
Procenat armiranja: 0.19%

Gornja zona
Pravac 1: ($\alpha=39^\circ$)
Maksimalna kombinacija:
1.60xI+1.80xII+1.80xIV
Mu = 1.95 kNm
Nu = 0.00 kN
e_b/e_a = -0.172/10.000 ‰
Ag1 = 0.00 cm²/m
Usvojeno (gornja zona):
Ø8/20 (2.51 cm²/m)
Procenat armiranja: 0.22%

Pravac 2: ($\alpha=51^\circ$)
Maksimalna kombinacija:
1.60xI+1.80xII+1.80xIV
Mu = -0.80 kNm
Nu = 0.00 kN
e_b/e_a = -0.110/10.000 ‰
Ag2 = 0.08 cm²/m
Usvojeno (gornja zona):
Ø8/25 (2.01 cm²/m)
Procenat armiranja: 0.21%



Tower - 3D Model Builder 6.0
Registered to d.o.o. "FALE" Sarajevo
RadimpeX - www.radimpeX.rs

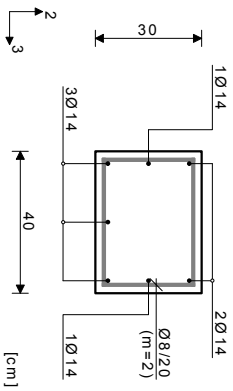


STATIČKI PRORAČUN-ZAHVAT NO-1

Greda 438-1299

PBAB 87
MB 30
RA 400/500
Kompletna šema opterećenja

Presjek 2-2 x = 3.55m



Merodavna kombinacija za savijanje:
1.60xI+1.80xII+1.80xIV
N1u = 5.82 kN
M2u = -0.01 kNm
M3u = 0.62 kNm

Merodavna kombinacija za smicanje:

1.60xI+1.80xII+1.80xIII
T2u = 0.63 kN
T3u = 0.00 kN
M1u = -0.00 kNm

fb/fca = -0.176/10.000 ‰
Aa1 = 0.13 cm2
Aa2 = 0.13 cm2
Aa3 = 0.00 cm2
Aa4 = 0.00 cm2
Aa.uZ = 0.00 cm2/m
(Ukupno Aa.uZ = Ø8/20(m=2) = 2.51 cm2/m)

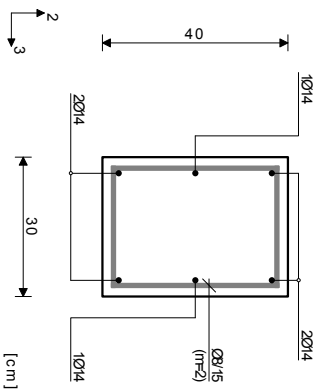
Procenat armiranja: 0.90%

Greda 1122-857

PBAB 87
MB 30
RA 400/500
Kompletna šema opterećenja

II,2 = 1.90 m (I,2 = 21.94)
II,3 = 1.90 m (I,3 = 16.45)
Nepomerljiva konstrukcija

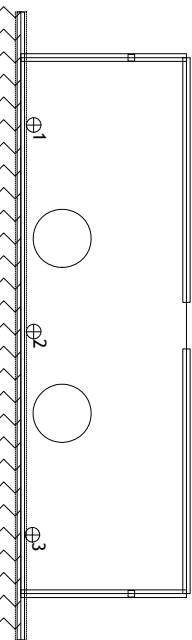
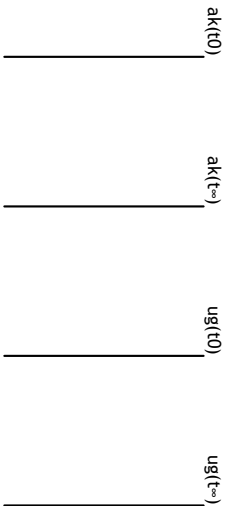
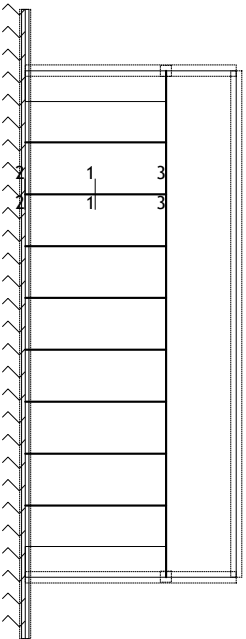
Presjek 1-1 x = 0.95m



Merodavna kombinacija za savijanje:
1.00xI+1.80xII+1.80xIV
N1u = -13.92 kN
M2u = 0.04 kNm
M3u = 6.14 kNm
Merodavna kombinacija za torziju:
1.00xI+1.80xII+1.80xIII
M1u = 0.52 kNm
Merodavna kombinacija za smicanje:
1.60xI+1.80xIII
T2u = 15.51 kN
T3u = 1.42 kN
M1u = 0.52 kNm
fb/fca = -0.534/10.000 ‰
Aa1 = 0.24 + 0.02 = 0.26 cm2
Aa2 = 0.24 + 0.02 = 0.26 cm2
Aa3 = 0.00 + 0.03 = 0.03 cm2
Aa4 = 0.00 + 0.03 = 0.03 cm2
Aa.uZ = 0.00 cm2/m
(Ukupno Aa.uZ = Ø8/15(m=2) = 3.35 cm2/m)
τV = 0.29MPa < τf , τf = 1.10MPa
τZ = 0.15MPa < τf , τf = 1.10MPa
Procenat armiranja: 0.77%
) - dodatno postavlja armaturu za prijenos torzije

PBAB 87, MB 30, RA 400/500

Merodavno opterećenje: Kompletna šema
PBAB 87, MB 30, RA 400/500



Ram: H 2

Diagram prsline: max ak(t∞) = 0.00 mm

Prsline i ugibi: (410-656)

Ram: H 1
ak2/ak1,10

Ram: H 1 - PBAB 87
MB 30 (d,β=40.0 cm)
Gornja zona: RA 400/500 (a=4.0 cm)
Donja zona: RA 400/500 (a=4.0 cm)
E0(t0) = 3.15e+007 kN/m2
Ea = 2e+008 kN/m2
fbzs = 1853 kN/m2
φ = 2.60
X = 0.80
εs = 0.0007‰
k1 = 0.40
β1 = 1.00

Tablica 1
X=1.04 m, Y=0.00 m, Z=0.24 m
Gornja zona
Ø8/15 α = 0°
Ø8/15 α = 0°
Ø8/15 α = 90°
Ø8/15 α = 90°
Ø10/15 α = 90°
Ø10/15 α = 90°
Donja zona
Ø8/15 α = 0°
Ø8/15 α = 90°
Ø10/15 α = 90°

Pravac 1: (α=0°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline
Pravac 2: (α=90°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline

Tablica 2
X=4.74 m, Y=0.00 m, Z=0.24 m
Gornja zona
Ø8/15 α = 0°
Ø8/15 α = 0°
Ø8/15 α = 90°
Ø8/15 α = 90°
Ø10/15 α = 90°
Ø10/15 α = 90°
Donja zona
Ø8/15 α = 0°
Ø8/15 α = 90°
Ø10/15 α = 90°

Pravac 1: (α=0°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline
Pravac 2: (α=90°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline

Tablica 3
X=8.18 m, Y=0.00 m, Z=0.24 m
Gornja zona
Ø8/15 α = 0°
Ø8/15 α = 0°
Ø8/15 α = 90°
Ø8/15 α = 90°
Ø10/15 α = 90°
Ø10/15 α = 90°
Donja zona
Ø8/15 α = 0°
Ø8/15 α = 90°
Ø10/15 α = 90°

Pravac 1: (α=0°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline
Pravac 2: (α=90°)
T = 0 Presjek bez prsline
T = ∞ Presjek bez prsline

Statički proračun uradio

Šefko Muhović, dipl.ing.građ.