

STATIČKI PRORAČUN ZAHVAT 2

	EU funded project Projekat finansira Evropska Unija			
Client/Klient	Consultant/Konsultant		WYG International creative minds with heart	
INFRASTRUCTURE PROJECTS FACILITY IN THE WESTERN BALKANS	WYG INTERNATIONAL UK	Drawing scale/Mjerilo crteža (Priloga)		
Project/Projekat	Drawing no/ Prilog broj			
Project status/Tip Projekta	Drawing date /Datum crteža: 09.05.2011.	Drawing status /Status Crteža FINAL	Drawing no/ Prilog broj	
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Drawing name/Ime Priloga	Prepared by:		Drawing no/ Prilog broj	
STATIČKI PRORAČUN ZAHVAT 2	 INSTITUT ZA HIDROTEHNIKU GRADJEVINSKOG PARIJETA U SARAJEVU Sarajevo, Teniska 1, Sarajevo, Bosna i Hercegovina Tel: +381 (0)66 610 101, Fax: +381 (0)66 610 102, E-mail: info@ihp.ba Web: www.ihp.ba		Sheet/List 1	
			Of/Ofd 28	

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		1.44
SOPSTVENA TEZINA		g=	1.44
B) KORISNO OPTEREĆENJE			
Radni nivo vode w1=voda h1=	2.00	10	20.00
Max nivo vode w2=voda h2=	2.50	10	25.00
Uzgon u=voda h2=	2.00	10	-20.00

Opterećenje od ograde

g= 1.0 kN/m'

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

Karakteristike materijala za zatrpavanje

$\varphi=$ 30
 $\gamma=$ 20 kN/m3
 $C=$ 0 kN/m2

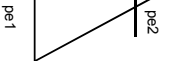
Ugao unutrašnjeg trenja zemlje u stij 30 $\cos=$ 0.8660254
Ugao unutrašnjeg trenja zemlje u radi 0.523598776 $\sin=$ 0.5000000

$\tan=$ 0.5773503

Zemlja sa vanjske strane - viši dio bazena

Visina zemlje iznad gornje ploce h1= 0 m
Visina objekta h2= 3.8 m

$\lambda_k=$ 1-sin $\varphi=$ 0.5000000
 $pe1=$ 38.000
 $pe2=$ 0.000



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

	p=	
Zid H=3.8 m (max visina zida)	3.80	38.00 kN/m2
h=3.15 m	3.15	31.50 kN/m2
h=2.15 m	2.15	21.50 kN/m2

Vertikalno opterećenje na temelje 3.80 76.00 kN/m2

Pritisak zemlje na konstrukciju zida-bočna strana mjereno po visini od nivoa ploče

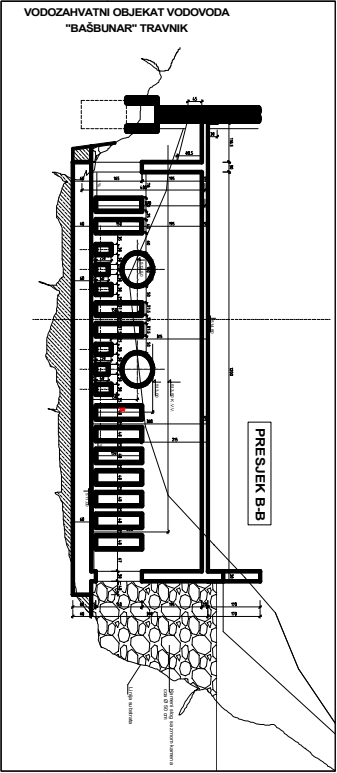
	p=	
Zid H=3.8 +1m (max visina zida)	4.80	48.00 kN/m2
h=3.15 m+1 m zasipa	4.15	41.50 kN/m2
h=2.15 m+1 m zasipa	3.15	31.50 kN/m2

Vertikalno opterećenje na temelje 4.80 96.00 kN/m2

4. Opterećenje vodom na stranice kanala zahvata

	H=	pw=
voda na koti 513.50 K.V.V.	2.50	25.00 kN/m2
h=2.00 voda na koti 513.00	2.00	20.00 kN/m2

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



Opterećenje na stubove-otvore u zidu $\S=$ 0.65 m

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

	p (kN/m2)		p (kN/m)
Zid H=3.8 m (max visina zida)	3.80	38.00	24.70 kN/m'
h=2.15 m	2.15	21.50	13.98 kN/m'

opterećenje na rubove otvora u zidu-otvor 150*40 $\S=$ 0.2 m

	p (kN/m2)		p (kN/m)
Zid H=3.8 m (max visina zida)	3.80	38.00	7.60 kN/m'
h=2.15 m	2.15	21.50	4.30 kN/m'

opterećenje na rubove otvora u zidu-otvor 50*30 $\S=$ 0.15 m

	p (kN/m2)		p (kN/m)
Zid H=3.8 m (max visina zida)	3.80	38.00	5.70 kN/m'
h=3.15 m	3.15	31.50	4.73 kN/m'

Pritisak zemlje na konstrukciju zida-bočna strana mjereno po visini od nivoa ploče

	$\S=$		0.65 m
Opterećenje na stubove-otvore u zidu	p (kN/m2)		p (kN/m)
Zid H=3.8 +1m (max visina zida)	4.80	48.00	31.20 kN/m'
h=3.15 m+1 m zasipa	4.15	41.50	26.98 kN/m'

opterećenje na rubove otvora u zidu-otvor 150*40 $\S=$ 0.2 m

	p (kN/m2)		p (kN/m)
Zid H=3.8 +1m (max visina zida)	4.80	48.00	9.60 kN/m'
h=3.15 m+1 m zasipa	4.15	41.50	8.30 kN/m'

STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

Sadržaj	
Osnovni podaci o modelu	5
Ulazni podaci	
Ulazni podaci - Konstrukcija	6
Ulazni podaci - Opterećenje	9
Rezultati	
Statčki proračun	12
Dimenzionisanje (beton)	16

STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

Osnovni podaci o modelu

[illegible]

STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

Ulazni podaci - Konstrukcija

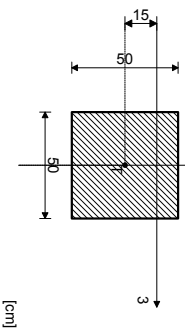
Sema nivoa							
Naziv		z [m]	h [m]	Naziv		z [m]	h [m]
Poz 100		3.70	1.70	rub preliva		2.00	0.35

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[mkN/m2]
					μ m

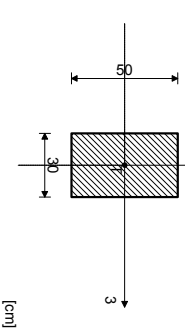
Setovi ploča					
No	dl[m]	el[m]	Materijal	Tip proračuna	Orotropia
<1>	0.200	0.100	1	Tanka ploča	Izotropna
<2>	0.600	0.300	1	Tanka ploča	Izotropna
<3>	0.300	0.150	1	Tanka ploča	Izotropna

Setovi greda

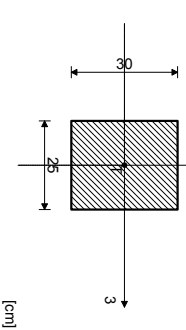
Set: 1 Presjek: b/d=50/50, Fiktivna ekscentričnost					
Mat.		A1	A2	A3	
1 - Beton MB 30		2.500e-1	2.083e-1	2.083e-1	
				8.802e-3	5.208e-3
					5.208e-3



Set: 3 Presjek: b/d=30/50, Fiktivna ekscentričnost					
Mat.		A1	A2	A3	
1 - Beton MB 30		1.500e-1	1.250e-1	1.250e-1	
				2.817e-3	1.125e-3
					3.125e-3



Set: 4 Presjek: b/d=25/30, Fiktivna ekscentričnost					
Mat.		A1	A2	A3	
1 - Beton MB 30		7.500e-2	6.250e-2	6.250e-2	
				7.752e-4	3.906e-4
					5.625e-4



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

Setovi linjskih oslonaca				
Set	K.R1	K.R2	K.R3	K.M1
1	1.000e+4	1.000e+4	1.000e+4	0.350

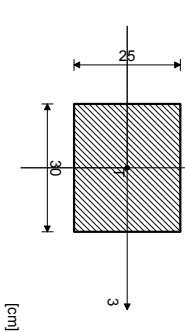
Naziv			
z [m]	h [m]		
1.65	1.65		

Naziv			
z [m]	h [m]		
0.00	0.30		

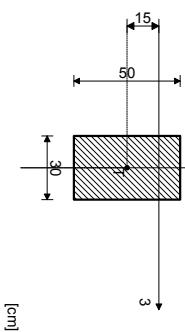
Naziv			
z [m]	h [m]		
-0.30			

No	dl[m]	el[m]	Materijal	Tip proračuna	Orotropia	E2[kN/m2]	G[kN/m2]	α
<4>	0.500	0.250	1	Tanka ploča	Izotropna			
<5>	0.125	0.063	1	Tanka ploča	Izotropna			
<6>	0.350	0.175	1	Tanka ploča	Izotropna			

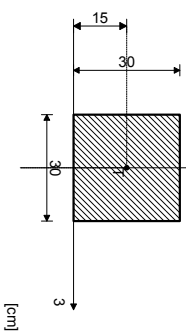
Set: 5 Presjek: b/d=30/25, Fiktivna ekscentričnost					
Mat.		A1	A2	A3	
1 - Beton MB 30		7.500e-2	6.250e-2	6.250e-2	
				7.752e-4	5.625e-4
					3.906e-4



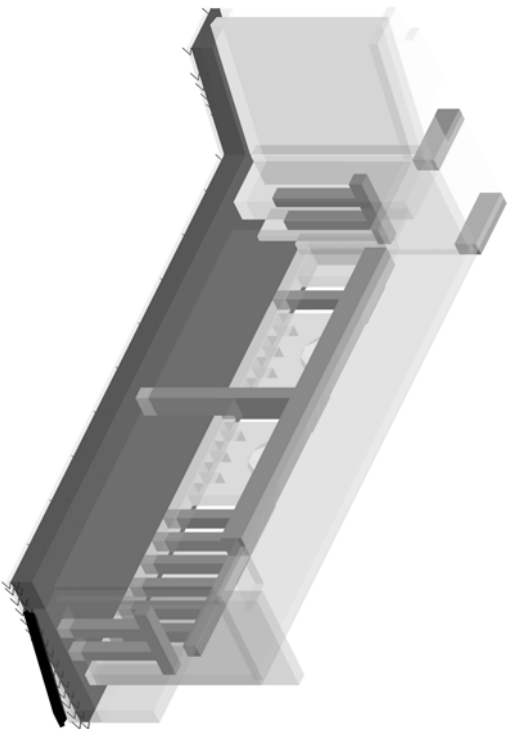
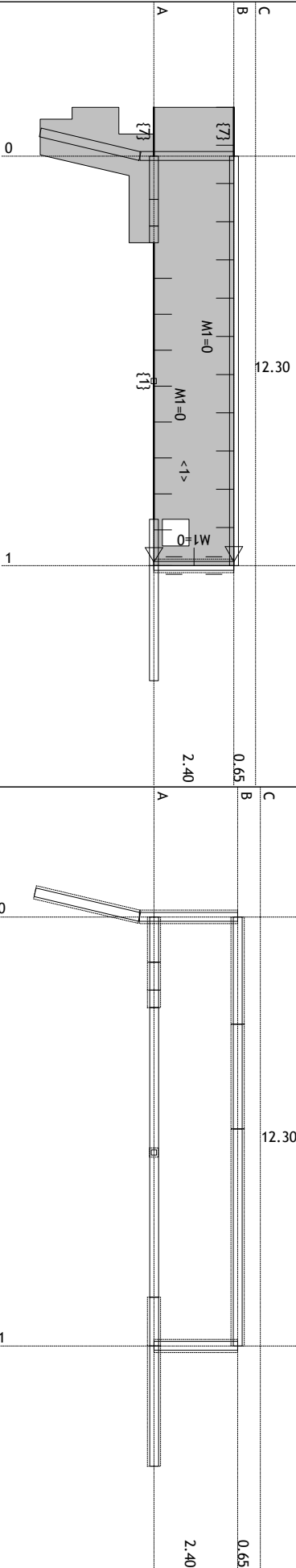
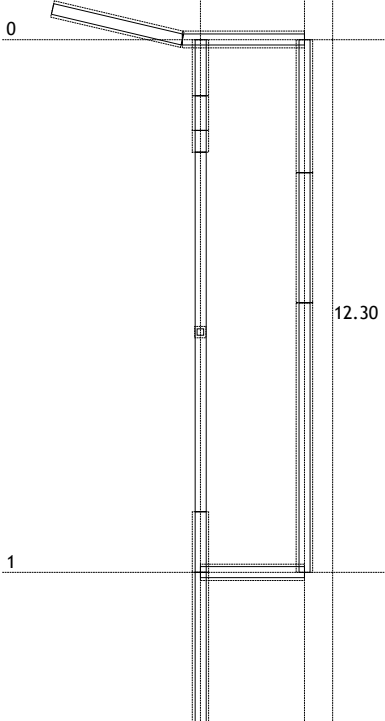
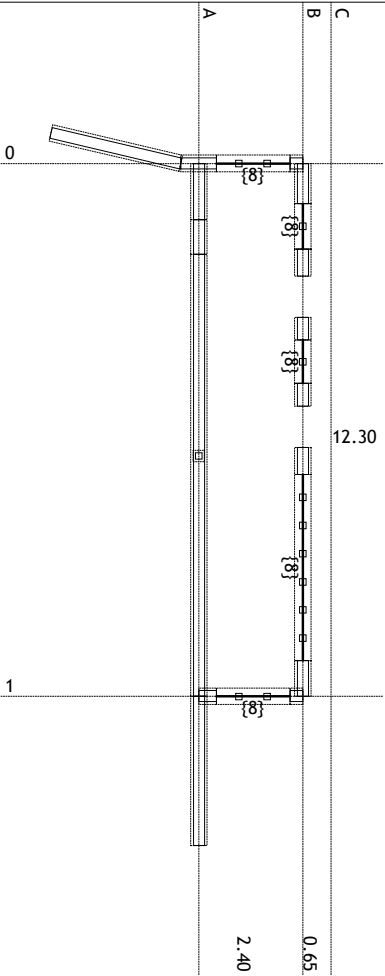
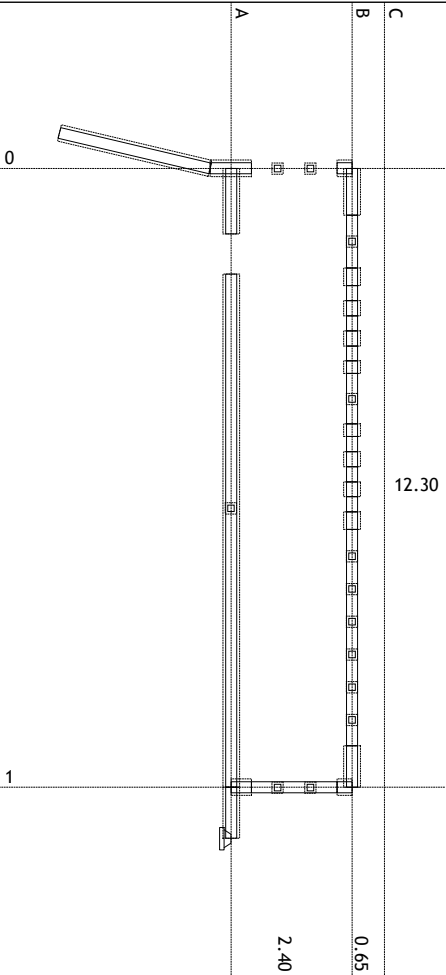
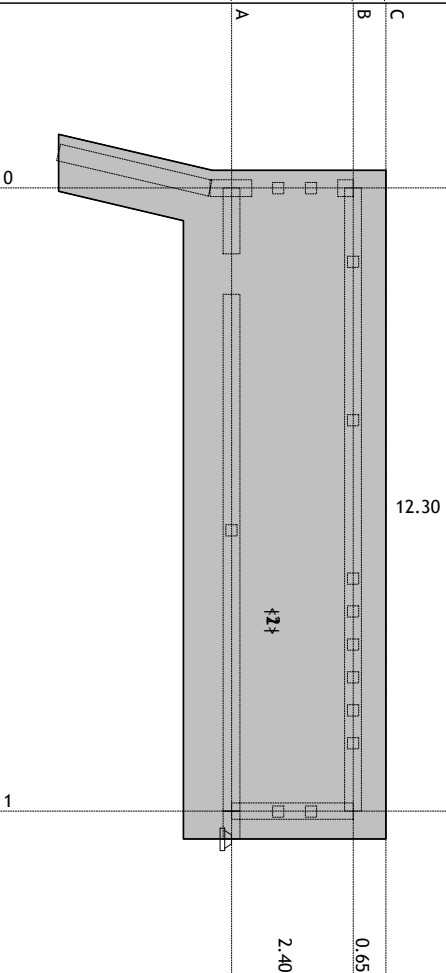
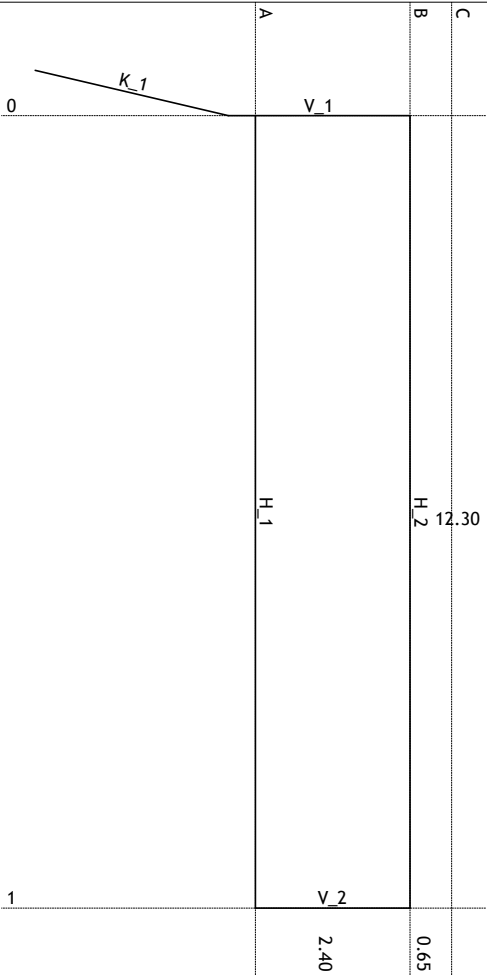
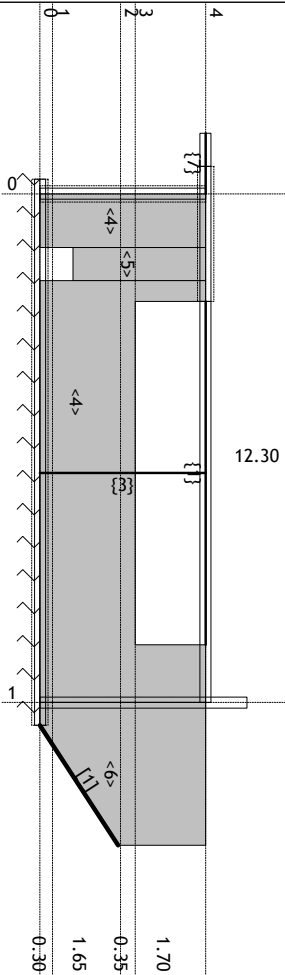
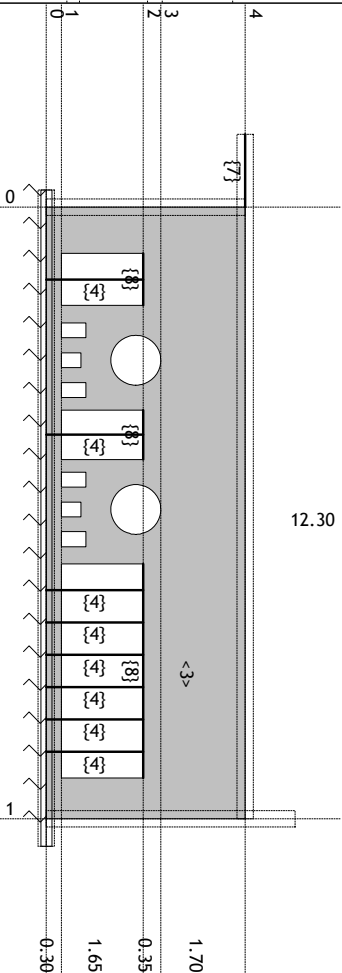
Set: 7 Presjek: b/d=30/50, Fiktivna ekscentričnost					
Mat.		A1	A2	A3	
1 - Beton MB 30		1.500e-1	1.250e-1	1.250e-1	
				2.817e-3	1.125e-3
					3.125e-3



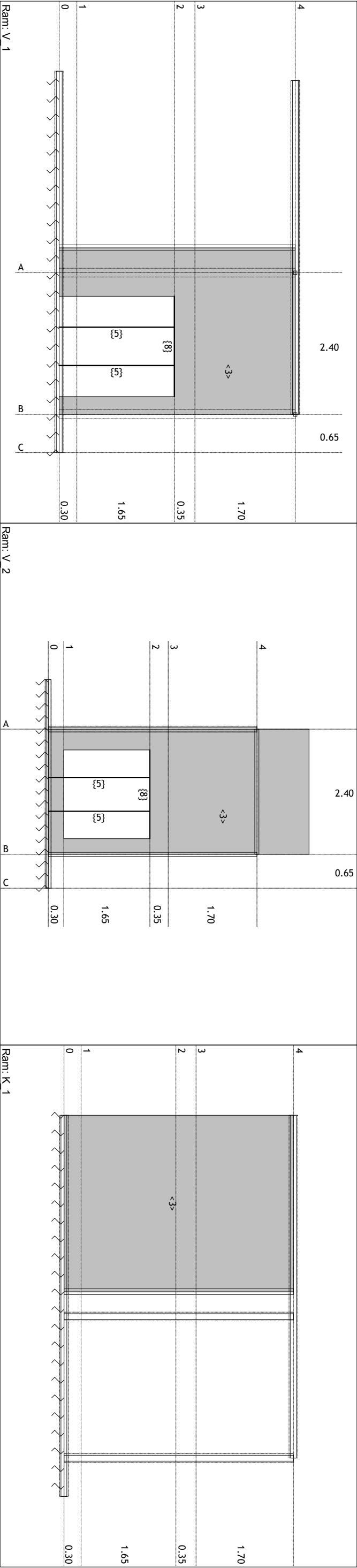
Set: 8 Presjek: b/d=30/30, Fiktivna ekscentričnost					
Mat.		A1	A2	A3	
1 - Beton MB 30		9.000e-2	7.500e-2	7.500e-2	
				1.141e-3	6.750e-4
					6.750e-4



STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

					
Izometrija		Nivo: Poz 100 [3.70 m]		Nivo: rub preliva [2.00 m]	
					
Nivo: rub otvora [1.65 m]		Nivo: [0.00 m]		Nivo: temelji [-0.30 m]	
					
Dispozicija ramova		Ram: H 1		Ram: H 2	

STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2



STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

Ulazni podaci - Opterećenje

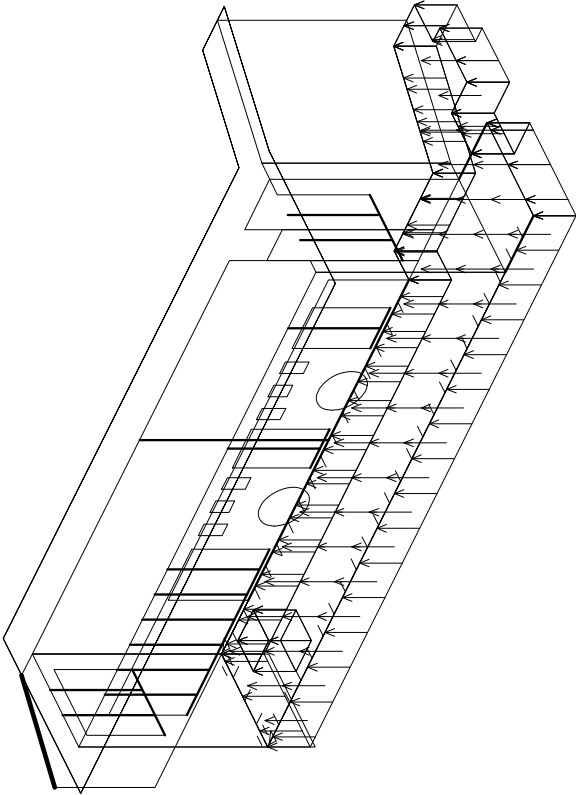
Lista slučajeva opterećenja	
No	Naziv
1	Stalno (g)
2	Korisno
3	Zemlja
4	Voda max nivo
5	Voda radni nivo
6	Uzgon
7	Komb.: I+II
8	Komb.: I+III

No	Naziv
9	Komb.: I+II+III
10	Komb.: I+V
11	Komb.: I+II+V
12	Komb.: I+V
13	Komb.: I+II+V
14	Komb.: I+VI
15	Komb.: 1.6xI+1.8xII+1.8xIII
16	Komb.: 1.6xI+1.8xII+1.8xV

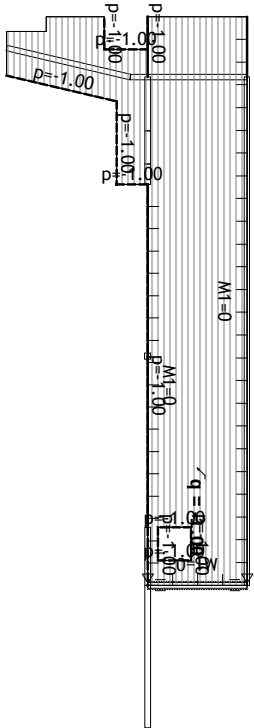
No	Naziv
17	Komb.: 1.6xI+1.8xII+1.8xIV
18	Komb.: I+1.8xI+1.8xII
19	Komb.: I+1.8xII+1.8xV
20	Komb.: I+1.8xII+1.8xIV
21	Komb.: 1.6xI+1.8xVI
22	Komb.: 1.6xI+1.8xIV
23	Komb.: 1.6xI+1.8xV
24	Komb.: 1.6xI+1.8xII

No	Naziv
25	Komb.: 1.6xI+1.8xIII
26	Komb.: I+1.8xIV
27	Komb.: I+1.8xVI
28	Komb.: I+1.8xV
29	Komb.: I+1.8xV
30	Komb.: I+1.8xIII
31	Komb.: 1.6xI
32	Komb.: I

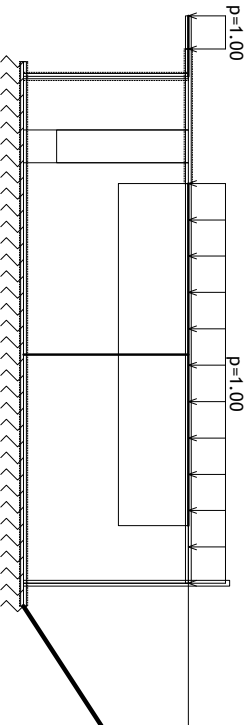
Opt. 1: Stalno (g)



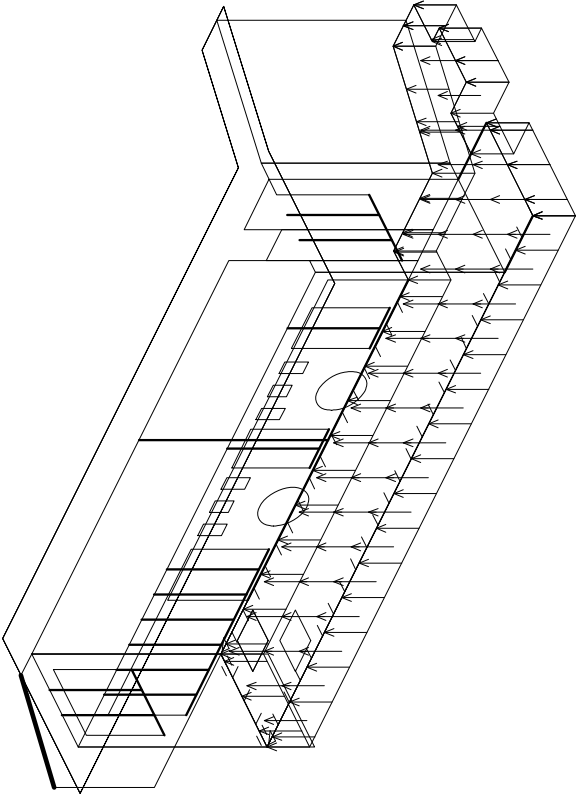
Opt. 1: Stalno (g)



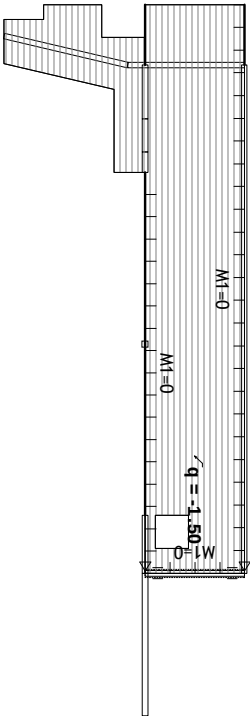
Opt. 1: Stalno (g)



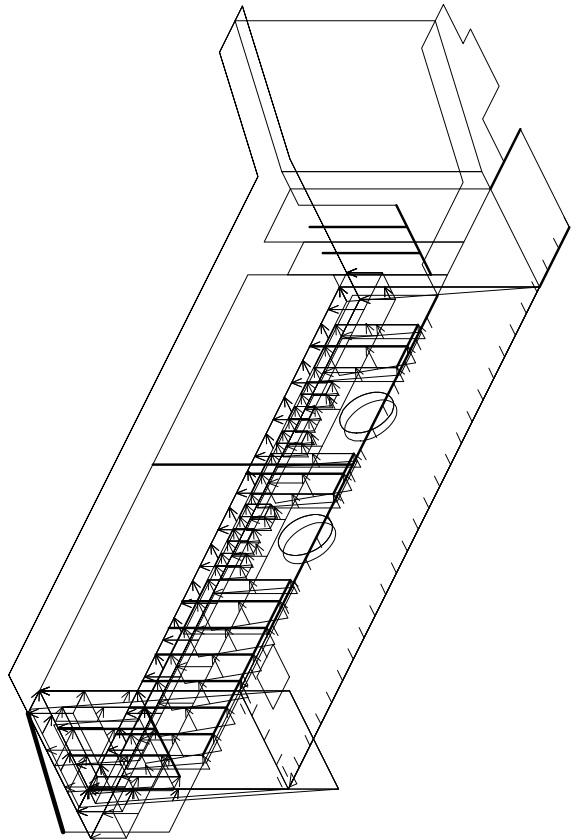
Izometrija
Opt. 2: Korisno



Nivo: Poz 100 [3.70 m]
Opt. 2: Korisno



Ram: H 1
Opt. 3: Zemlja

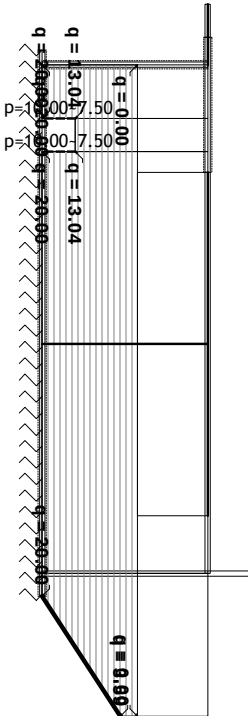
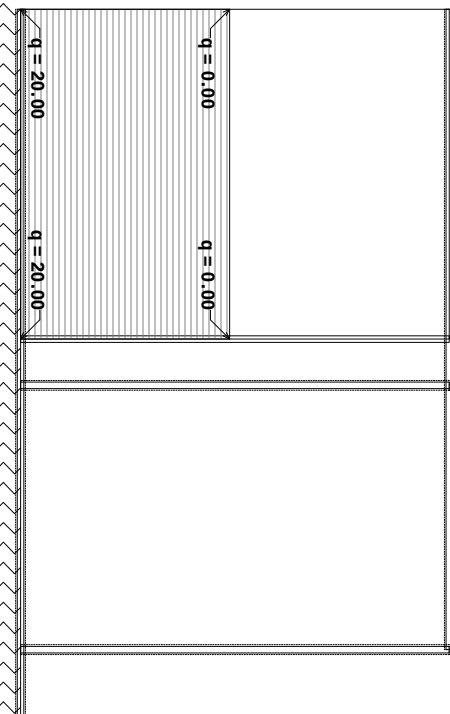
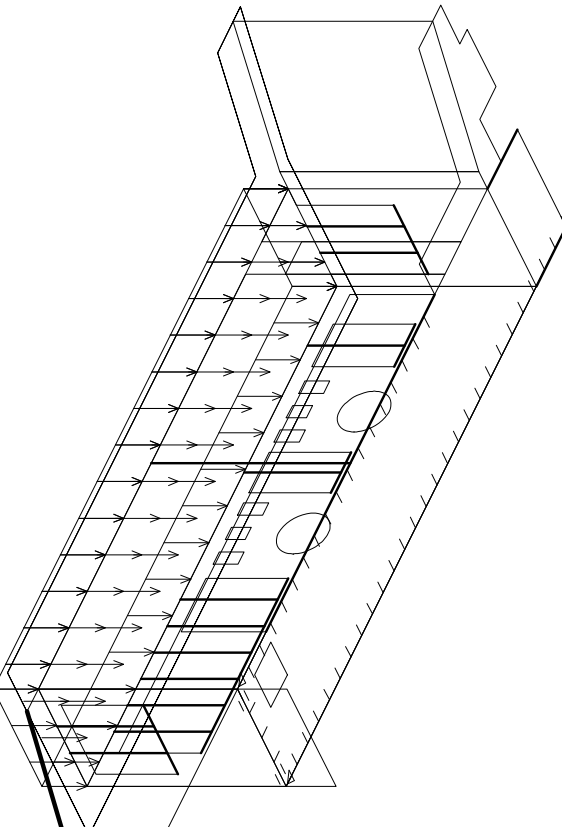
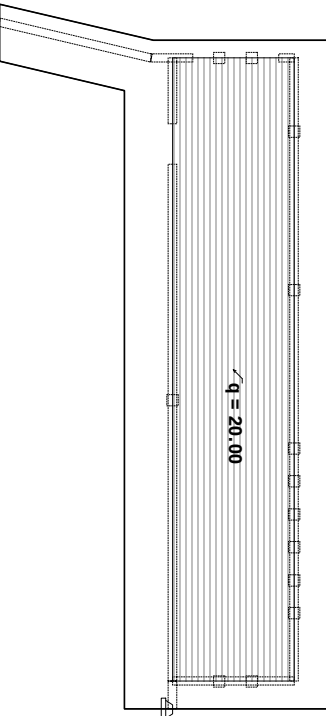
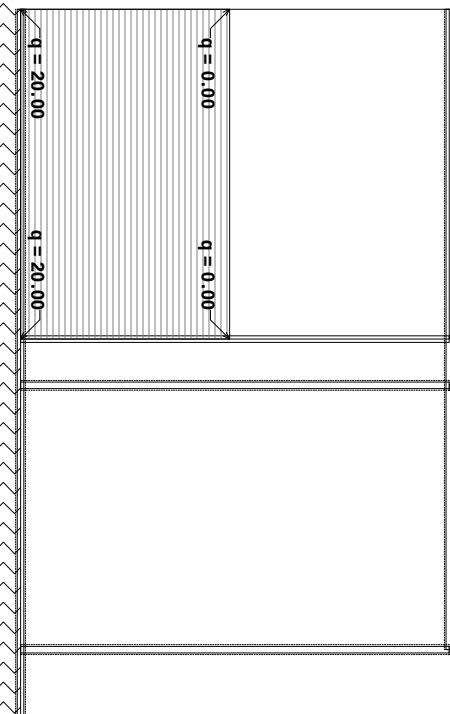
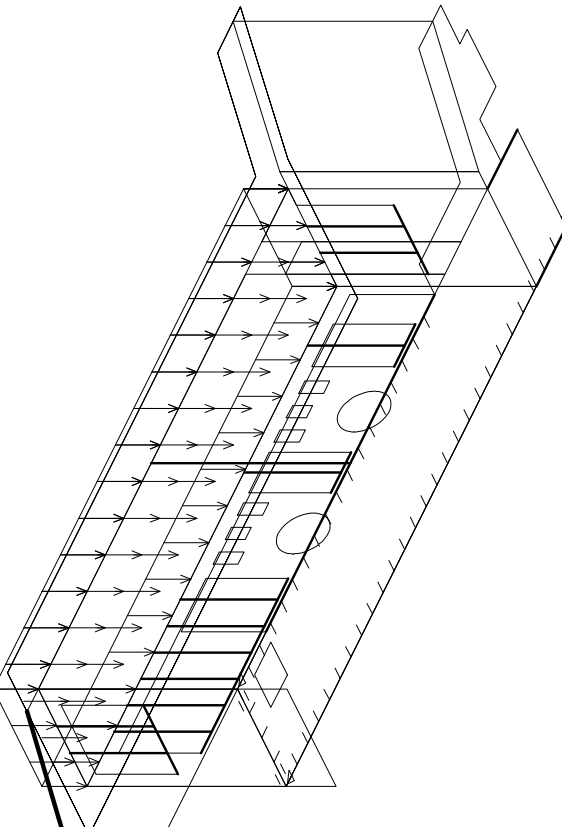
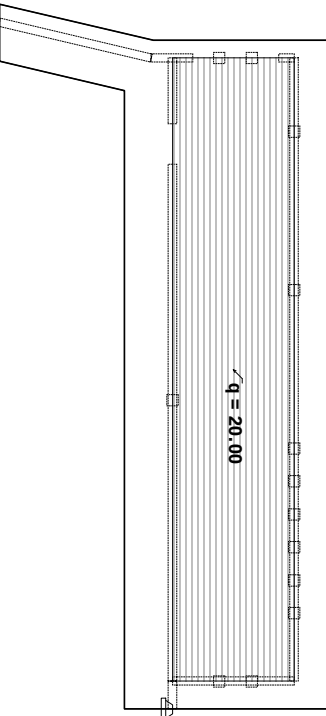


Izometrija

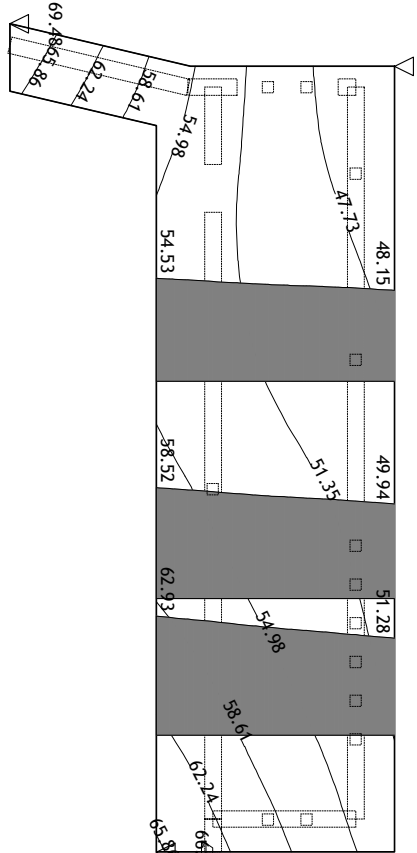
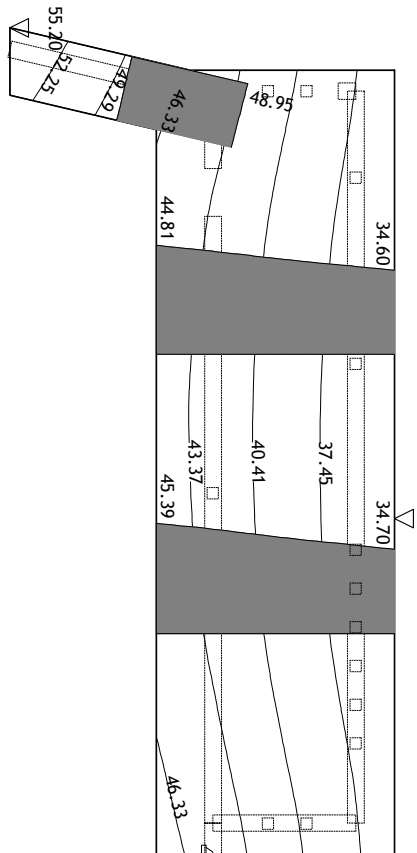
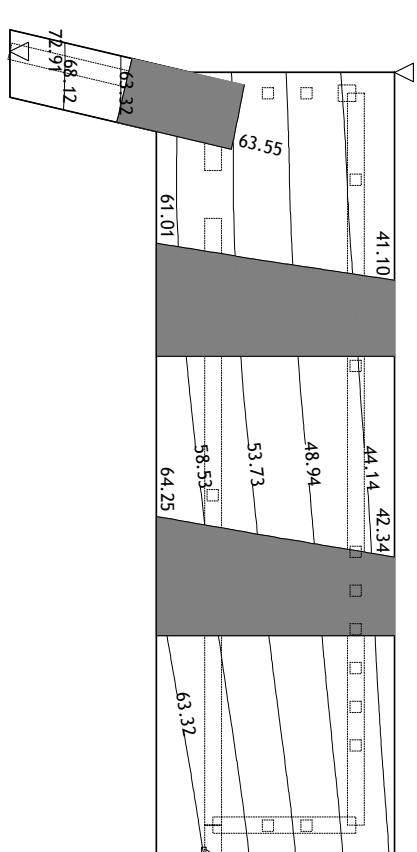
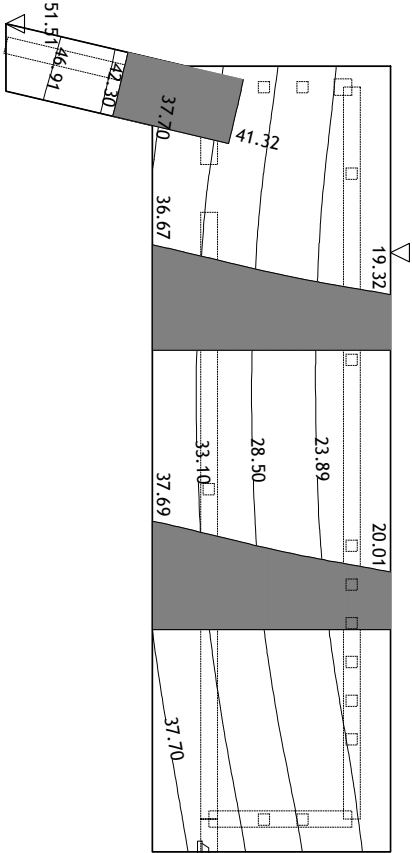
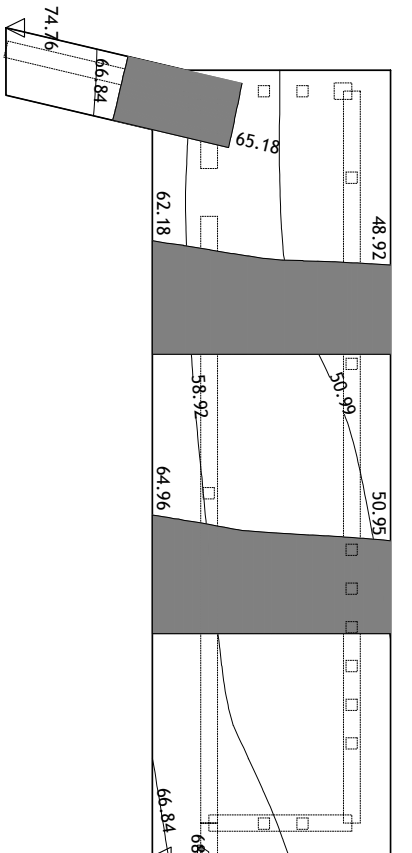
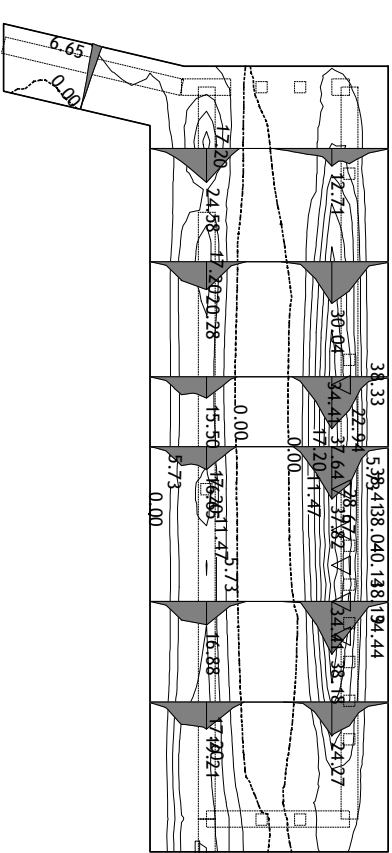
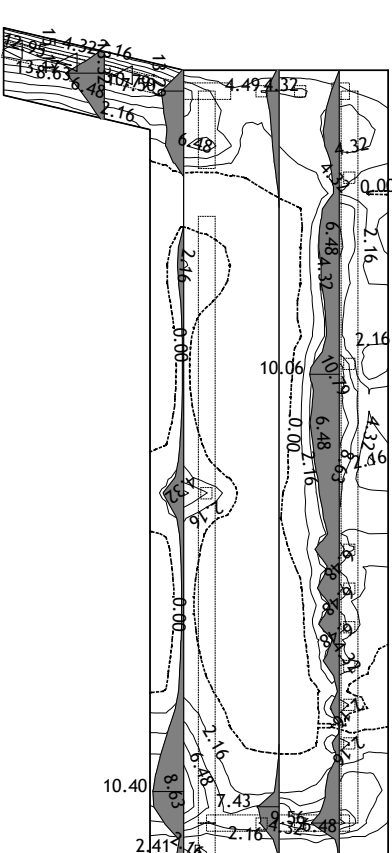
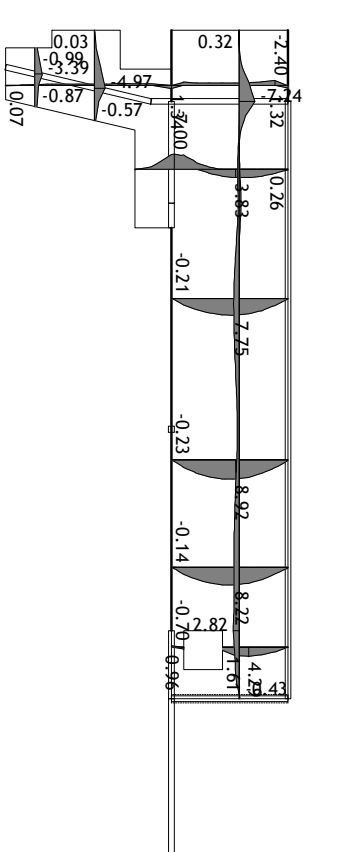
Nivo: Poz 100 [3.70 m]

Izometrija

STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

Opt. 5: Voda radni nivo 	Opt. 5: Voda radni nivo 	Opt. 6: Uzgon 
Ram: H 1 Opt. 6: Uzgon 	Ram: K 1 	Izometrija 
Nivo: temelji [-0.30 m] 		

STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

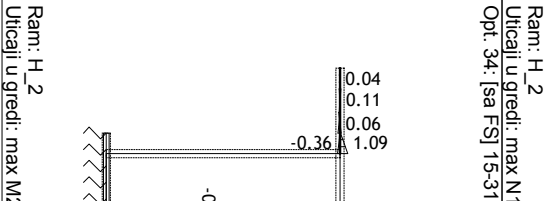
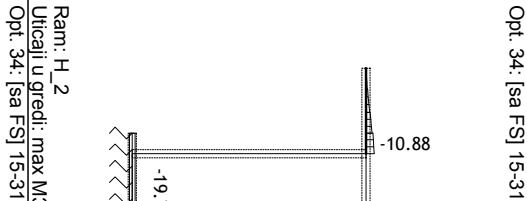
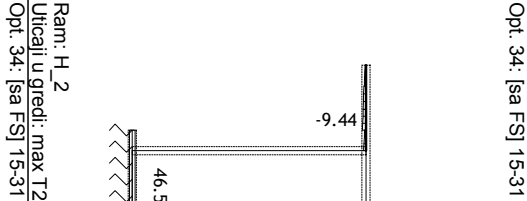
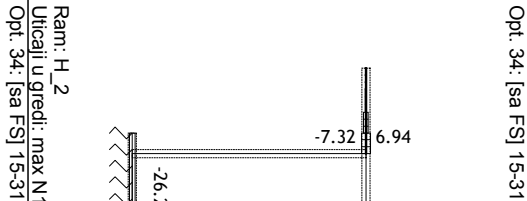
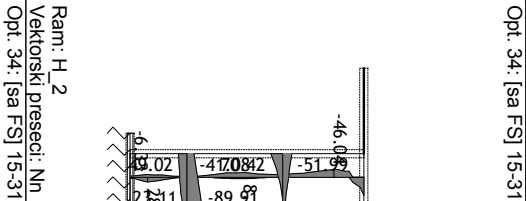
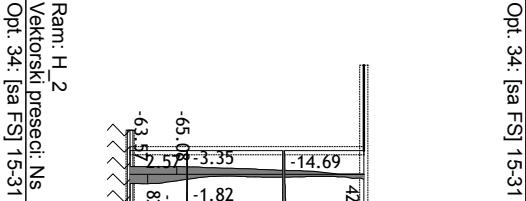
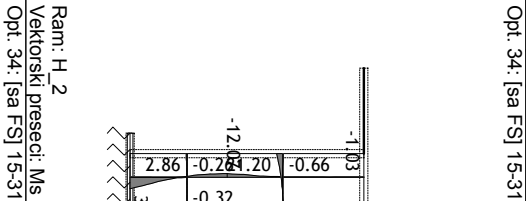
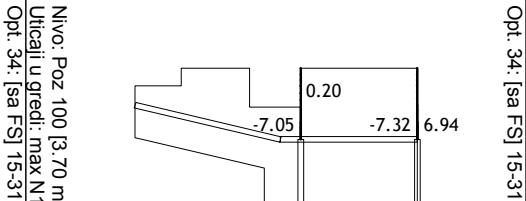
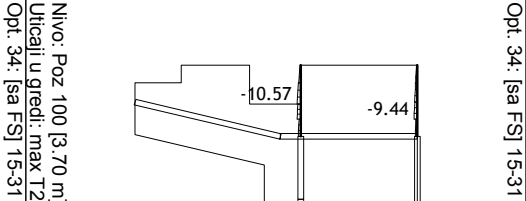
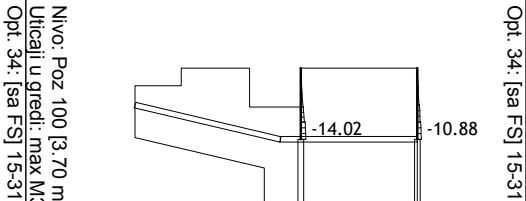
Statički proračun			
Opt. 8: I+II.10  Nivo: temelji [-0.30 m] Uticaji u pov. osloncu: max σ, τ tla= 69.48 / min σ, τ tla= 44.10 kN/m² Opt. 14: I+VI 19.30	Opt. 7: I+II  Nivo: temelji [-0.30 m] Uticaji u pov. osloncu: max σ, τ tla= 55.20 / min σ, τ tla= 34.50 kN/m² Opt. 15: [Bez FS] 7-14	Opt. 10: I+II.36  Nivo: temelji [-0.30 m] Uticaji u pov. osloncu: max σ, τ tla= 72.91 / min σ, τ tla= 39.36 kN/m²	
Opt. 34: [sa FS] 15-31  Nivo: temelji [-0.30 m] Uticaji u pov. osloncu: max σ, τ tla= 51.51 / min σ, τ tla= 19.30 kN/m²	Opt. 34: [sa FS] 15-31  Nivo: temelji [-0.30 m] Uticaji u pov. osloncu: max σ, τ tla= 74.76 / min σ, τ tla= 19.30 kN/m²		
Opt. 34: [sa FS] 15-31  Nivo: temelji [-0.30 m] Uticaji u ploči: max My= 40.14 / min My= 0.00 kNm/m	Opt. 34: [sa FS] 15-31  Nivo: temelji [-0.30 m] Uticaji u ploči: max Mx= 15.11 / min Mx= 0.00 kNm/m	Opt. 34: [sa FS] 15-31  Nivo: Poz 100 [3.70 m] Vektorski preseći: Ms	

Takođe je za slučaj opterećenja od uzgona (Šema I+VI) evidentno da je težina objekta daleko veća od uticaja Uzgona i da objekat ne može isplivati. Kombinacija stalna težina objekta i sile uzgona bez uticaja vode sa unutrašnje strane.

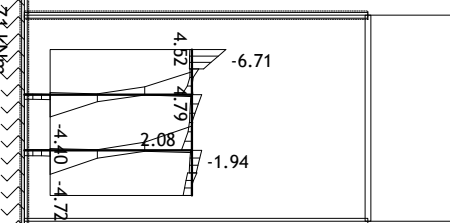
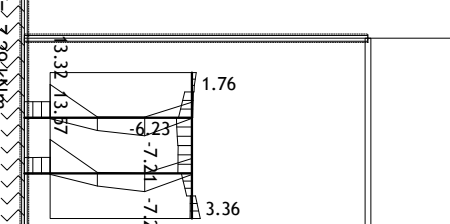
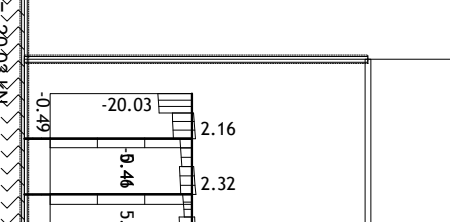
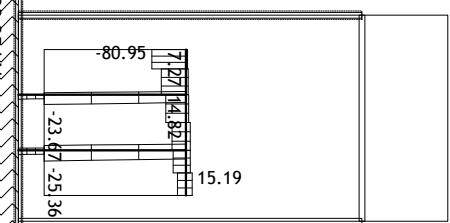
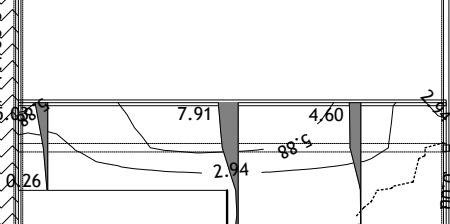
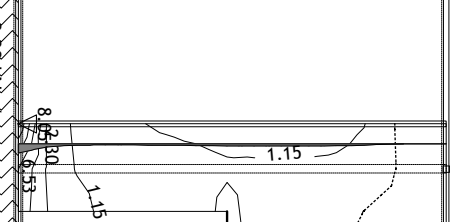
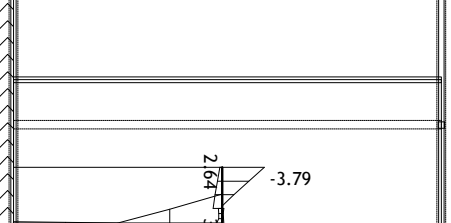
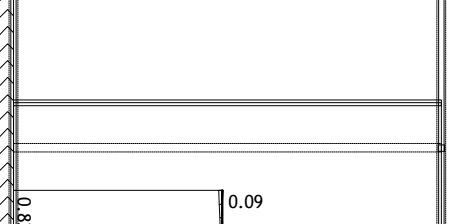
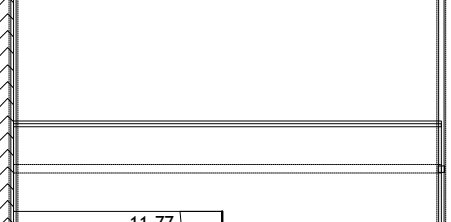
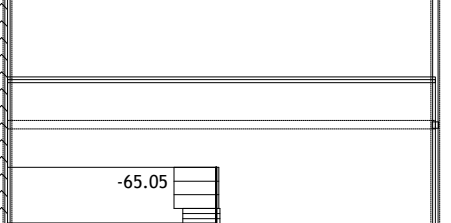
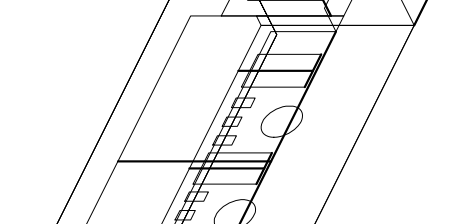
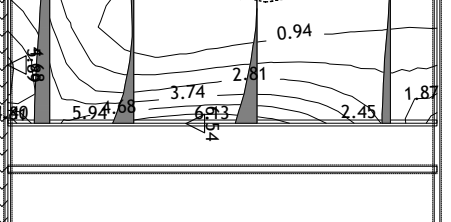
Računski aponi u tlu su max σ , τ tla= 74.76 / min σ , τ tla= 19.30 kN/m², a što je daleko manje od pretpostavljenih dopuštenih napona σ , τ tla= 350 kN/m² za teren -supstrat, odnosno zamjenu od betona MB20.

Računski apori u tlu su max σ , τ tla= 74.76 / min σ , τ tla= 19.30 kN/m², a što je daleko manje od pretpostavljenih dopuštenih napona σ , τ tla= 350 kN/m² za teren -supstrat, odnosno zamjenu od betona MB20.

Takođe je za slučaj opterećenja od uzgona (šema I+VI) evidentno da je težina objekta daleko veća od uticaja Uzgona i da objekat ne može isplivati. Kombinacija stalna težina objekta i sile uzgona bez uticaja vode sa unutrašnje strane.



STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

Opt. 34: [sa FS] 15-31  Ram: V_2 Uticaji u gredi: max M3= 4.79 / min M3= -6.71 kNm Opt. 34: [sa FS] 15-31	Opt. 34: [sa FS] 15-31  Ram: V_2 Uticaji u gredi: max M2= 13.57 / min M2= -7.29 kNm Opt. 34: [sa FS] 15-31	Opt. 34: [sa FS] 15-31  Ram: V_2 Uticaji u gredi: max T2= 5.77 / min T2= -20.03 kN Opt. 34: [sa FS] 15-31
Opt. 34: [sa FS] 15-31  Ram: V_2 Uticaji u gredi: max N1= 15.19 / min N1= -80.95 kN Opt. 34: [sa FS] 15-31	Opt. 34: [sa FS] 15-31  Ram: V_1 Uticaji u ploči: max Mx= 20.57 / min Mx= 0.00 kNm/m Opt. 34: [sa FS] 15-31	Opt. 34: [sa FS] 15-31  Ram: V_1 Uticaji u ploči: max My= 8.05 / min My= 0.00 kNm/m Opt. 34: [sa FS] 15-31
Opt. 34: [sa FS] 15-31  Ram: V_1 Uticaji u gredi: max M3= 3.12 / min M3= -3.79 kNm Opt. 34: [sa FS] 15-31	Opt. 34: [sa FS] 15-31  Ram: V_1 Uticaji u gredi: max M2= 1.27 / min M2= -3.59 kNm Opt. 34: [sa FS] 15-31	Opt. 34: [sa FS] 15-31  Ram: V_1 Uticaji u gredi: max T2= 3.37 / min T2= -1.77 kN Opt. 34: [sa FS] 15-31
Opt. 34: [sa FS] 15-31  Ram: V_1 Uticaji u gredi: max N1= 8.64 / min N1= -65.05 kN Opt. 34: [sa FS] 15-31	Opt. 34: [sa FS] 15-31  Izometrija Uticaji u ploči: max Mx= 6.54 / min Mx= 0.00 kNm/m	Opt. 34: [sa FS] 15-31  Ram: K_1 Uticaji u ploči: max Mx= 6.54 / min Mx= 0.00 kNm/m



STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

Dimenzionisanje (beton)

Merodavno opterećenje - PBAB 87

- Slučajevi opterećenja
- I Stalno (g) - <Stalno>
 - II Korisno - <Korisno>
 - III Zemlja - <Povremeno>
 - IV Voda max nivo - <Povremeno>
 - V Voda radni nivo - <Povremeno>
 - VI Uzgona - <Povremeno>

Ne kombinu! sa

II-> VI

III-> IV, V, VI

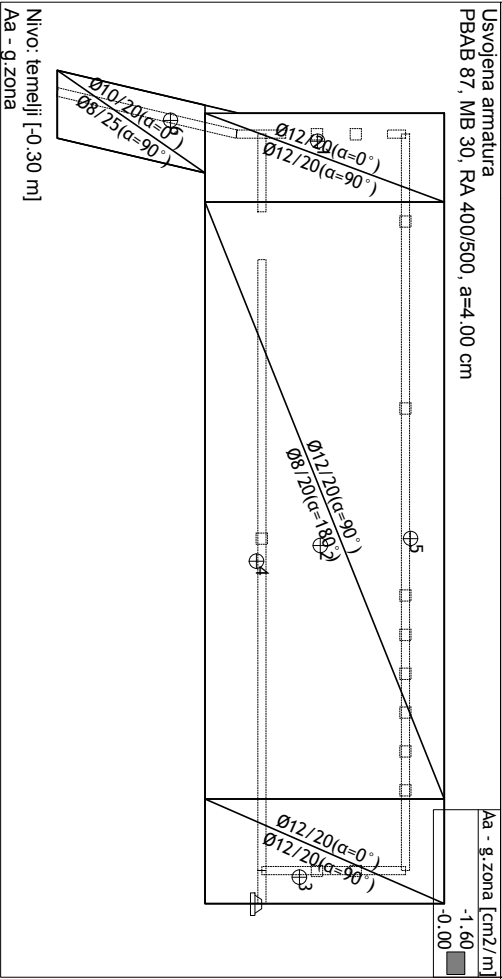
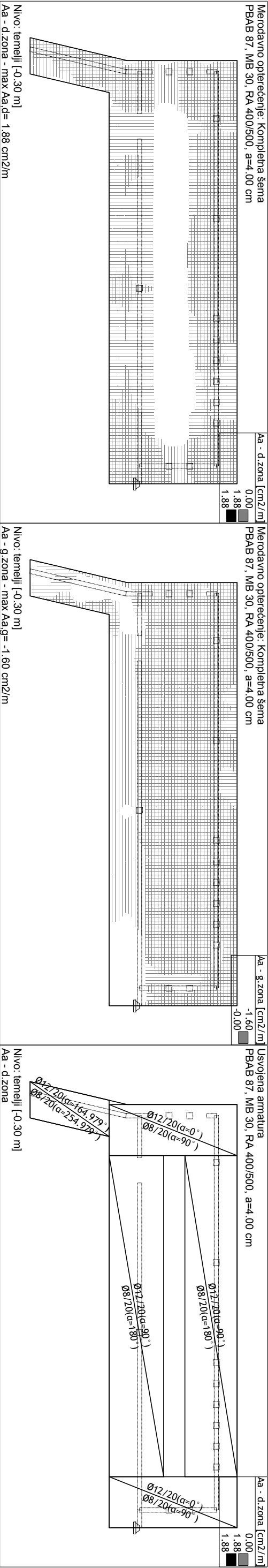
IV-> III, V, VI

V-> III, IV, VI

VI-> II, III, IV, V

Kombinacije

- 01. 1,60xI+1,80xII+1,80xIII
- 02. 1,60xI+1,80xII+1,80xV
- 03. 1,60xI+1,80xII+1,80xIV
- 04. I+1,80xII+1,80xIII
- 05. I+1,80xII+1,80xV



Nivo: temelji [-0.30 m]

PBAB 87

d,pI=60,0 cm

MB 30

Gornja zona: RA 400/500 (a=4,0 cm)

Donja zona: RA 400/500 (a=4,0 cm)

Kompletna šema opterećenja

Tačka 1

X=0,00 m; Y=0,93 m; Z=-0,30 m

Pravac 1: (α=0°)

Merodavna kombinacija:

1,00xI+1,80xIII

Mu = -2,55 kNm

Nu = 0,00 kN

eb/ea = -0,11/10,000 ‰

Ag1 = 0,11 cm2/m

Usvojeno (gornja zona): Ø12/20 (5,65 cm2/m)

Usvojeno (donja zona): Ø12/20 (5,65 cm2/m)

Procenat armiranja: 0,19%

Pravac 2: (α=90°)

Merodavna kombinacija:

1,60xI+1,80xII

Mu = -23,08 kNm

Nu = 0,00 kN

eb/ea = -0,283/10,000 ‰

Ag2 = 1,04 cm2/m

Ad2 = 0,11 cm2/m

Usvojeno (gornja zona): Ø12/20 (5,65 cm2/m)

Usvojeno (donja zona): Ø8/20 (2,51 cm2/m)

Procenat armiranja: 0,14%

Pravac 2: (α=90°)

Merodavna kombinacija:

1,60xI+1,80xVI

Mu = -26,47 kNm

Nu = 0,00 kN

eb/ea = -0,300/10,000 ‰

Ag2 = 0,00 cm2/m

Gornja zona

Pravac 1: (α=0°)

Merodavna kombinacija:

1,60xI+1,80xVI

Mu = -26,47 kNm

Nu = 0,00 kN

eb/ea = -0,300/10,000 ‰

Ag1 = 1,19 cm2/m

Usvojeno (gornja zona): Ø12/20 (5,65 cm2/m)

Usvojeno (donja zona): Ø12/20 (5,65 cm2/m)

Procenat armiranja: 0,09%

Pravac 2: (α=0°)

Merodavna kombinacija:

1,60xI+1,80xVI

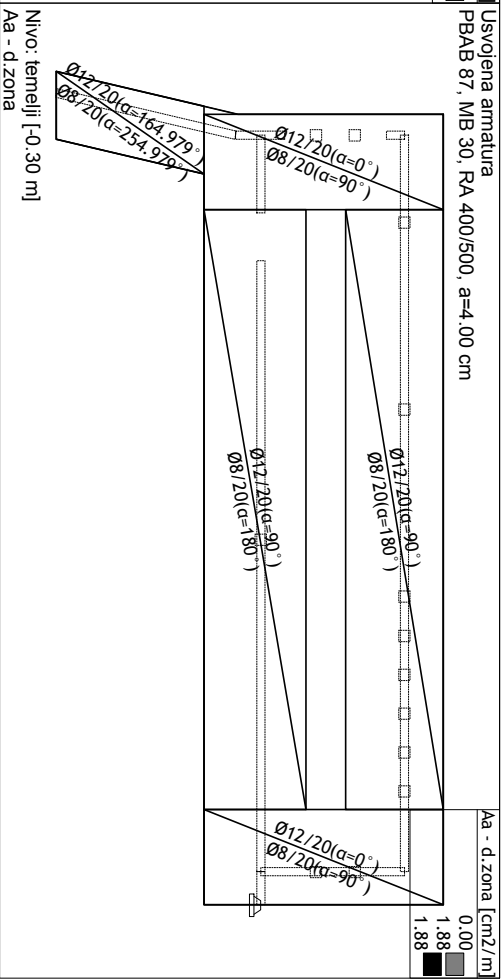
Mu = -7,05 kNm

Nu = 0,00 kN

eb/ea = -0,152/10,000 ‰

Ag2 = 0,32 cm2/m

- 06. I+1,80xII+1,80xIV
- 07. 1,60xI+1,80xVI
- 08. 1,60xI+1,80xIV
- 09. 1,60xI+1,80xV
- 10. 1,60xI+1,80xII
- 11. 1,60xI+1,80xIII
- 12. I+1,80xIV
- 13. I+1,80xVI
- 14. I+1,80xII
- 15. I+1,80xV
- 16. I+1,80xIII
- 17. 1,60xI
- 18. I



Pravac 2: (α=90°)

Merodavna kombinacija:

1,00xI+1,80xII+1,80xIII

Mu = -14,15 kNm

Nu = 0,00 kN

eb/ea = -0,223/10,000 ‰

Ag2 = 0,63 cm2/m

Ad2 = 0,14 cm2/m

Usvojeno (gornja zona): Ø12/20 (5,65 cm2/m)

Usvojeno (donja zona): Ø8/20 (2,51 cm2/m)

Procenat armiranja: 0,14%

Tačka 4

X=7,18 m; Y=0,00 m; Z=-0,30 m

Pravac 1: (α=90°)

Merodavna kombinacija:

1,60xI+1,80xII

Mu = 14,01 kNm

Nu = 0,00 kN

eb/ea = -0,216/10,000 ‰

Ag1 = 0,00 cm2/m

Ad1 = 0,63 cm2/m

Usvojeno (gornja zona): Ø12/20 (5,65 cm2/m)

Usvojeno (donja zona): Ø12/20 (5,65 cm2/m)

Procenat armiranja: 0,19%

Tačka 5

X=7,18 m; Y=0,00 m; Z=-0,30 m

Pravac 1: (α=90°)

Merodavna kombinacija:

1,60xI+1,80xII

Mu = 14,01 kNm

Nu = 0,00 kN

eb/ea = -0,216/10,000 ‰

Ag1 = 0,00 cm2/m

Ad1 = 0,63 cm2/m

Usvojeno (gornja zona): Ø12/20 (5,65 cm2/m)

Usvojeno (donja zona): Ø12/20 (5,65 cm2/m)

Procenat armiranja: 0,19%

Pravac 2: (α=0°)

Merodavna kombinacija:

1,60xI+1,80xIII

Mu = -4,93 kNm

Nu = 0,00 kN

eb/ea = -0,128/10,000 ‰

Ag2 = 0,22 cm2/m

Ad2 = 0,00 cm2/m

Usvojeno (gornja zona): Ø8/20 (2,51 cm2/m)

Usvojeno (donja zona): Ø8/20 (2,51 cm2/m)

Procenat armiranja: 0,08%

Tačka 6

X=0,27 m; Y=-1,57 m; Z=-0,30 m

Pravac 1: (α=-15°)

Merodavna kombinacija:

1,60xI+1,80xIV

Mu = 21,47 kNm

Nu = 0,00 kN

eb/ea = -0,272/10,000 ‰

Ag1 = 0,10 cm2/m

Ad1 = 0,97 cm2/m

Usvojeno (gornja zona): Ø12/20 (5,65 cm2/m)

Usvojeno (donja zona): Ø12/20 (5,65 cm2/m)

Procenat armiranja: 0,17%

Tačka 6

X=0,27 m; Y=-1,57 m; Z=-0,30 m

Pravac 1: (α=-15°)

Merodavna kombinacija:

1,60xI+1,80xIV

Mu = 22,33 kNm [kxy]

Nu = 0,00 kN

eb/ea = -0,275/10,000 ‰

Ad1 = 1,01 cm2/m

Usvojeno (donja zona): Ø12/20 (5,65 cm2/m)

Procenat armiranja: 0,17%

STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

[illegible]

Pravac 2: ($\alpha=90^\circ$)	0,16 kNm
Međodavna kombinacija:	
1,60xII+1,80xIII	
Nu =	0,00 kNm
Ed/EA = -0,108/10.000	%o
Nije potrebna armatura.	
Usvajeno (gornja zona):	
R-335 Ø5/25 (0,79 cm ² /m)	
Usvajeno (donja zona):	
Ø-188 Ø6/15 (1,88 cm ² /m)	
Procenat armiranja: 0,13%	

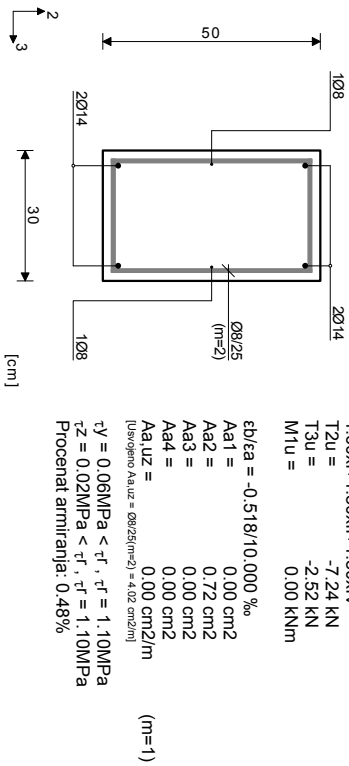
[illegible]

STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

Greda 568.-359

PBAB 87
MB 30
RA 400/500
Kompletna šema opterećenja

Presjek 3-3 x = 0.00m



Merodavna kombinacija za savijanje:
1.60xI+1.80xII+1.80xIII
N1u = -4.27 kN
M2u = 0.00 kNm
M3u = -14.02 kNm

Merodavna kombinacija za smicanje:

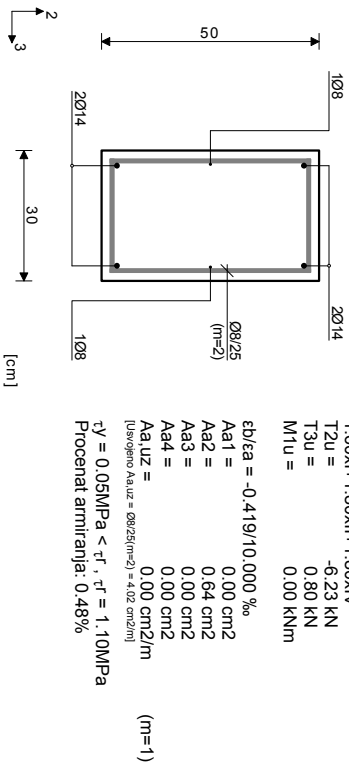
1.60xI+1.80xII+1.80xIV
T2u = -7.24 kN
T3u = -2.52 kN
M1u = 0.00 kNm

eb/ea = -0.518/10.000 ‰
Aa1 = 0.00 cm2
Aa2 = 0.72 cm2
Aa3 = 0.00 cm2
Aa4 = 0.00 cm2
Aa,uZ = 0.00 cm2/m
(uZ opterećenje = 0.00 cm2/m)
tV = 0.06MPa < tV', tV' = 1.10MPa
tZ = 0.02MPa < tV', tV' = 1.10MPa
Procenat armiranja: 0.46%

Greda 984.-728

PBAB 87
MB 30
RA 400/500
Kompletna šema opterećenja

Presjek 4-4 x = 0.00m



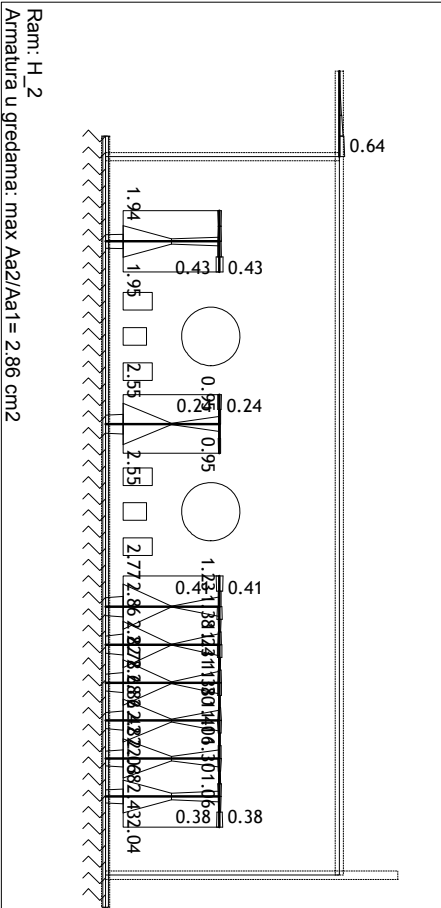
Merodavna kombinacija za savijanje:
1.60xI+1.80xII+1.80xIII
N1u = 3.57 kN
M2u = 0.00 kNm
M3u = -10.78 kNm

Merodavna kombinacija za smicanje:

1.60xI+1.80xII+1.80xIV
T2u = -6.23 kN
T3u = 0.80 kN
M1u = 0.00 kNm

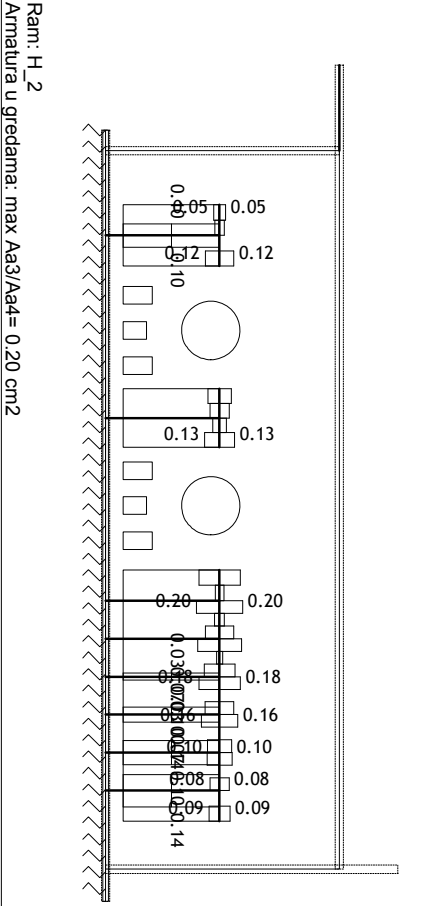
eb/ea = -0.419/10.000 ‰
Aa1 = 0.00 cm2
Aa2 = 0.64 cm2
Aa3 = 0.00 cm2
Aa4 = 0.00 cm2
Aa,uZ = 0.00 cm2/m
(uZ opterećenje = 0.00 cm2/m)
tV = 0.05MPa < tV', tV' = 1.10MPa
Procenat armiranja: 0.48%

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



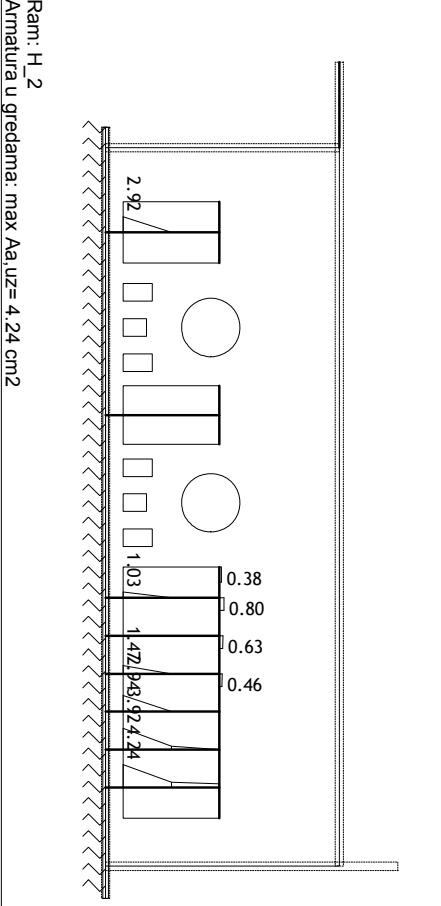
Ram: H_2
Armatura u gredama: max Aa2/Aa1 = 2.86 cm2

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



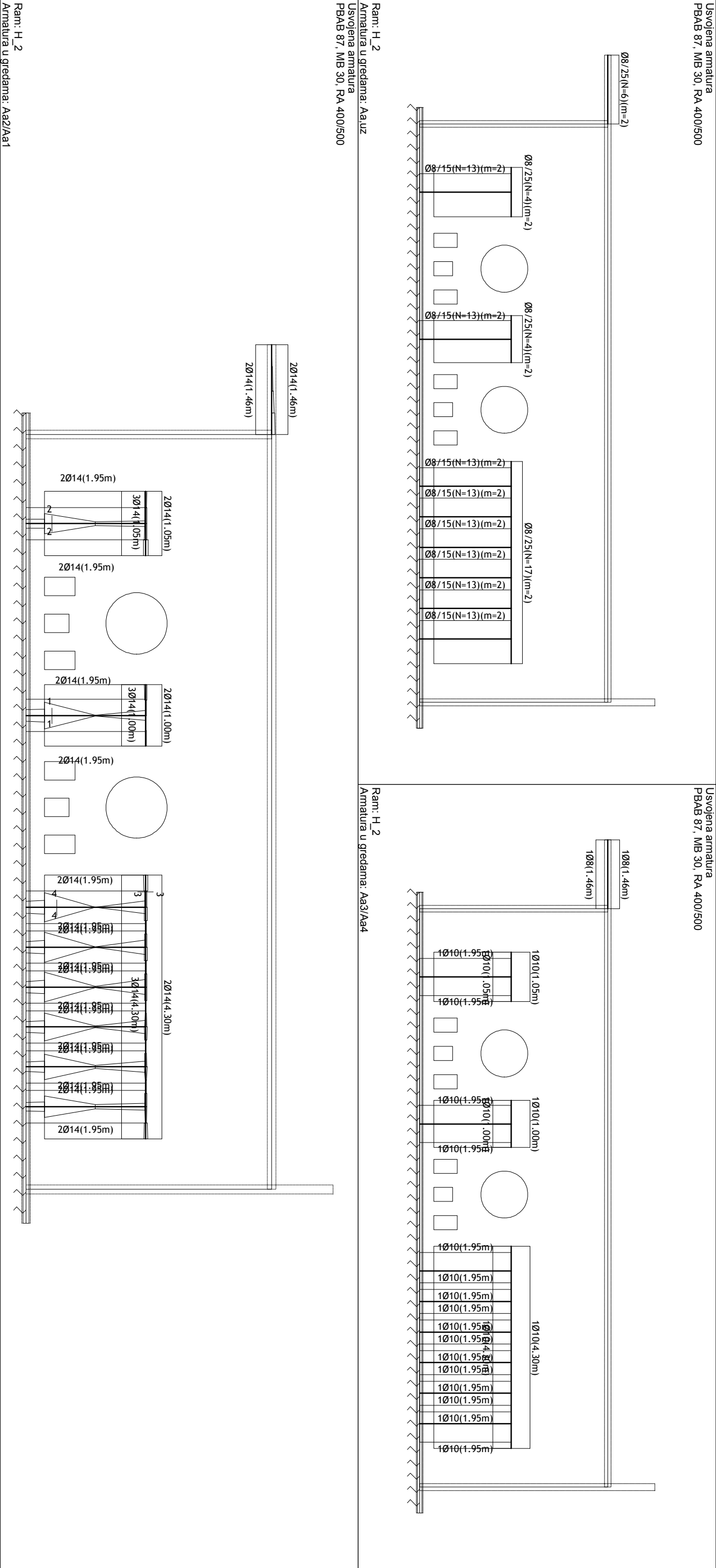
Ram: H_2
Armatura u gredama: max Aa3/Aa4 = 0.20 cm2

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



Ram: H_2
Armatura u gredama: max Aa,uZ = 4.24 cm2

STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2



Greda 1833-2529 PBAB 87 MB 30 RA 400/500 Kompletna šema opterećenja Presjek 3-3 X = 0.26m Merodavna kombinacija za smicanje: 1.00X+1.80XII+1.80XIII T2u = 0.38 kN T3u = -2.15 kN M1u = 0.65 kNm Merodavna kombinacija za savijanje: 1.00X+1.80XIV N1u = 8.04 kN M2u = -0.10 kNm M3u = 0.31 kNm Merodavna kombinacija za torziju: 1.00X+1.80XI+1.80XIII M1u = 0.65 kNm	Greda 877-548 PBAB 87 MB 30 RA 400/500 Kompletna šema opterećenja Presjek 2-2 X = 1.65m Merodavna kombinacija za smicanje: 1.60X+1.80XII+1.80XIII T2u = 46.57 kN T3u = 0.56 kN M1u = -1.35 kNm Merodavna kombinacija za savijanje: 1.00X+1.80XIII N1u = -5.14 kN M2u = 0.56 kNm M3u = -19.60 kNm Merodavna kombinacija za torziju: 1.60X+1.80XII+1.80XIII M1u = -1.35 kNm	Greda 1392-1080 PBAB 87 MB 30 RA 400/500 Kompletna šema opterećenja Presjek 1-1 X = 1.65m Merodavna kombinacija za smicanje: 1.60X+1.80XII+1.80XIII T2u = 54.87 kN T3u = 0.60 kN M1u = -0.22 kNm Merodavna kombinacija za savijanje: 1.00X+1.80XIII N1u = -14.43 kN M2u = 0.48 kNm M3u = -27.16 kNm Merodavna kombinacija za torziju: 1.60X+1.80XII+1.80XIII M1u = -0.22 kNm	Greda 1918-1595 PBAB 87 MB 30 RA 400/500 Kompletna šema opterećenja Presjek 4-4 X = 1.65m Merodavna kombinacija za smicanje: 1.60X+1.80XII+1.80XIII T2u = 54.87 kN T3u = 0.60 kN M1u = -0.22 kNm Merodavna kombinacija za savijanje: 1.00X+1.80XIII N1u = -20.25 kN M2u = 0.50 kNm M3u = -29.90 kNm Merodavna kombinacija za torziju: 1.60X+1.80XII+1.80XIII M1u = -0.22 kNm
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STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

Merodavna kombinacija za torziju:
1.60xI+1.80xII+1.80xIII
M1u = -0.36 kNm

Merodavna kombinacija za smicanje:
1.60xI+1.80xII+1.80xIII
T2u = 58.67 kN
T3u = 0.85 kN
M1u = -0.36 kNm

$\epsilon_b/\epsilon_a = -1.887/10.000 ‰$

Aa1 = 2.78 cm2
Aa2 = 2.77 cm2
Aa3 = 0.00 cm2
Aa4 = 0.00 cm2
Aa uz = 1.03 cm2/m
[Usvojeno Aa uz = 0.8915(m=2) = 6.73 cm2/m]

(m=1)

$\tau_y = 1.23MPa \leq 3\tau_f$, $\tau_f = 1.10MPa$
 $\tau_z = 0.24MPa < \tau_f$, $\tau_f = 1.10MPa$
Procenat armiranja: 1.03%

Usvojena armatura
PBAB 87, MB 30, RA 400/500, a=3.00 cm

Aa - d.zona [cm2/m]

0.00

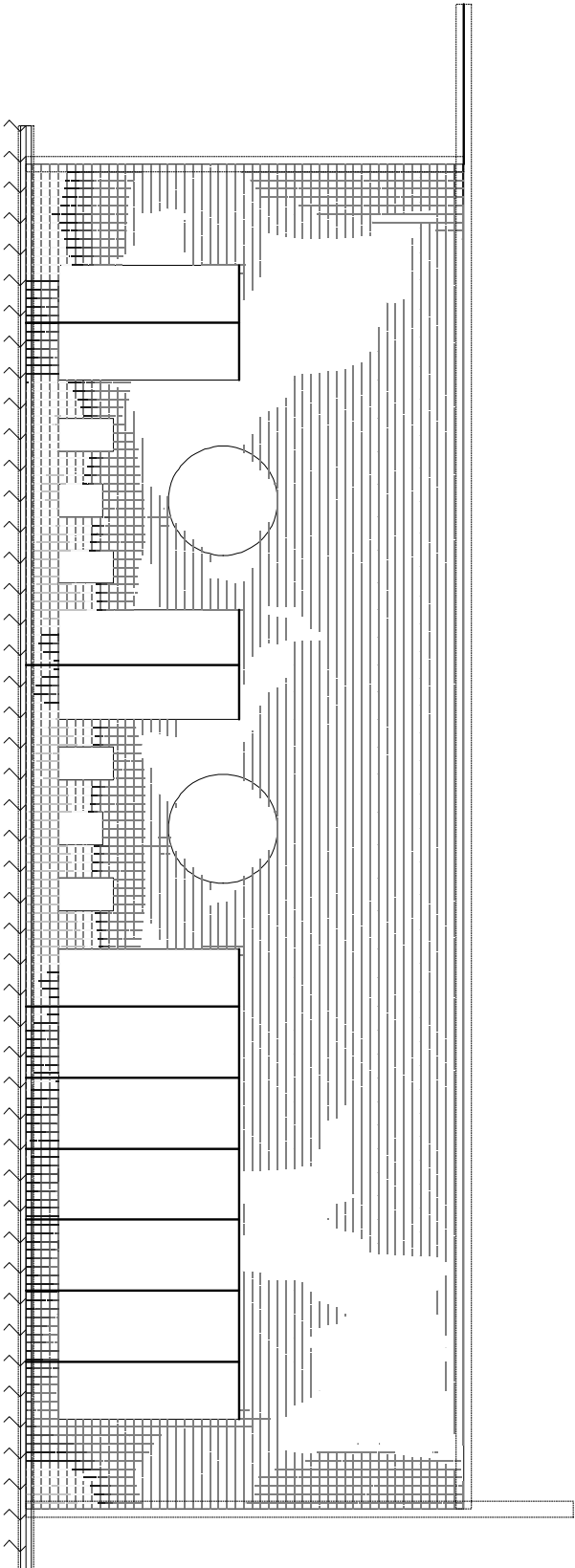
1.88

2.57

3.35

5.03

7.43



Ram: H_2
Aa - d.zona
Usvojena armatura
PBAB 87, MB 30, RA 400/500, a=3.00 cm

Aa - g.zona [cm2/m]

-4.51

-3.35

-2.57

-1.88

-0.00

Aa - d.zona [cm2/m]

0.00

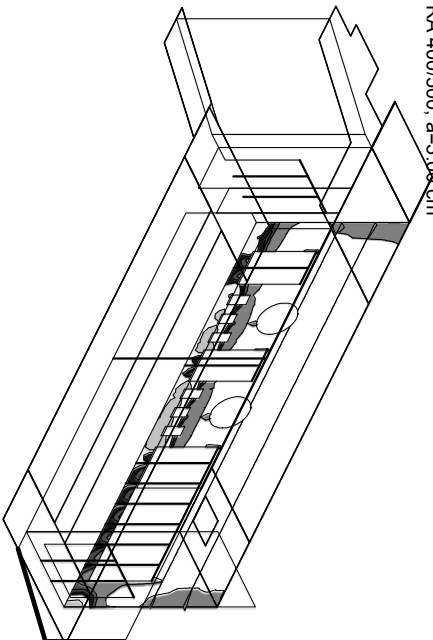
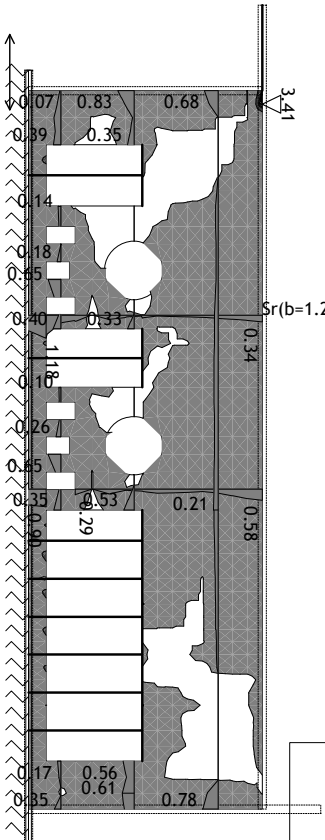
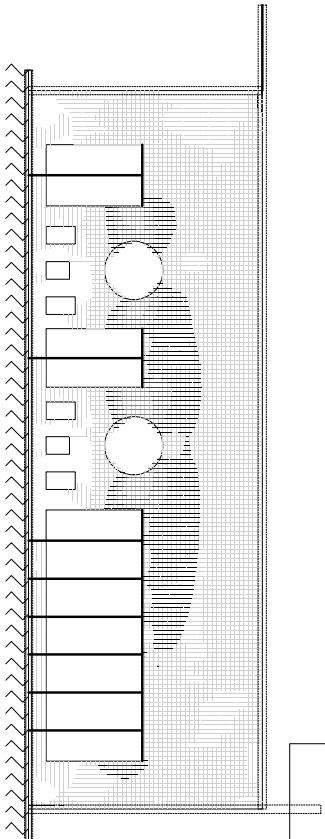
1.88

2.57

3.35

5.03

7.43



Ram: H_2
Aa - g.zona
Usvojena armatura
PBAB 87, MB 30, RA 400/500, a=3.00 cm

Aa - d.zona [cm2/m]

0.00

1.88

2.57

3.35

5.03

7.43

Aa - g.zona [cm2/m]

-4.51

-3.35

-2.57

-1.88

-0.00



Ram: H_2
Aa - d.zona
Usvojena armatura
PBAB 87, MB 30, RA 400/500, a=3.00 cm

Aa - g.zona [cm2/m]

-4.51

-3.35

-2.57

-1.88

-0.00

Aa - d.zona [cm2/m]

0.00

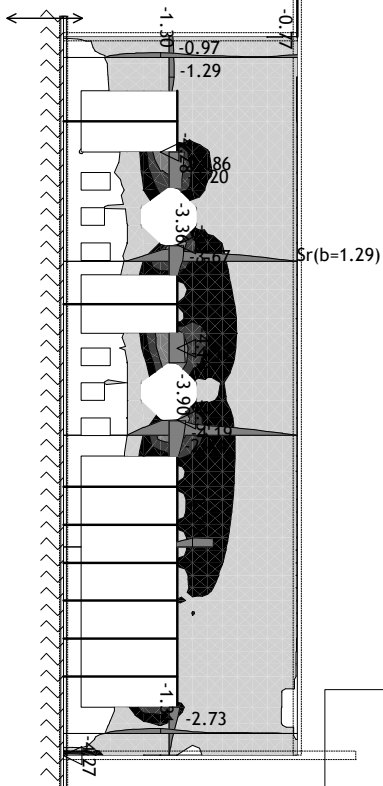
1.88

2.57

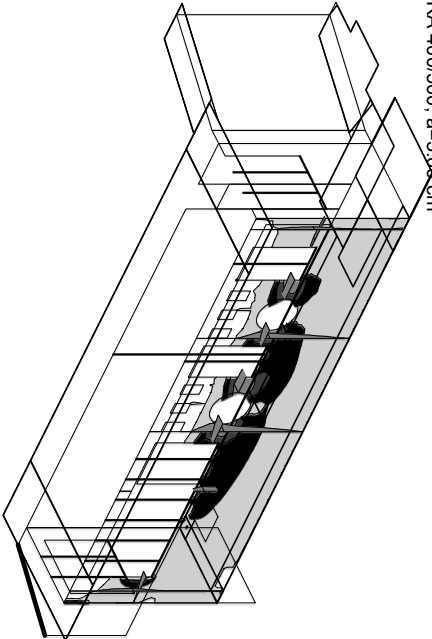
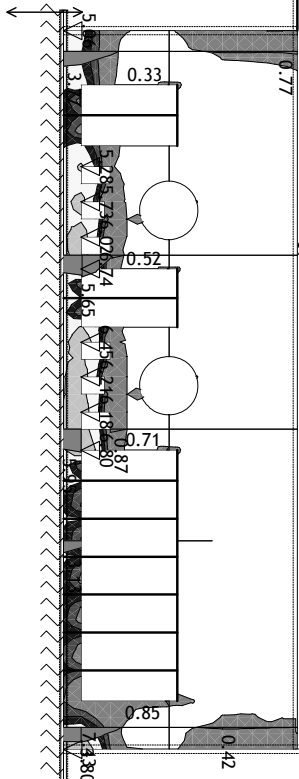
3.35

5.03

7.43



Ram: H_2
Aa - d.zona
Izometrija
Aa - g.zona





	Paravac 2: ($\gamma=90^\circ$) Merodna kombinacija: $1.00\text{Xi}+1.80\text{XIII}$ Mu = -21.38 kNm Nu = -19.98 kN $\text{tbf/a} = -0.620/10.000 \%$ Agf = 0.00 cm ² /m	
Gorja zona	Usvojeno (donja zona): Ø8/15 (3.35 cm ² /m) Procenat armiranja: 0.22%	
Paravac 1: ($\alpha=90^\circ$) Merodna kombinacija: $1.00\text{XI}+1.80\text{XIII}$ Mu = -21.38 kNm Nu = -19.98 kN $\text{tbf/a} = -0.620/10.000 \%$ Agf = 1.75 cm ² /m		

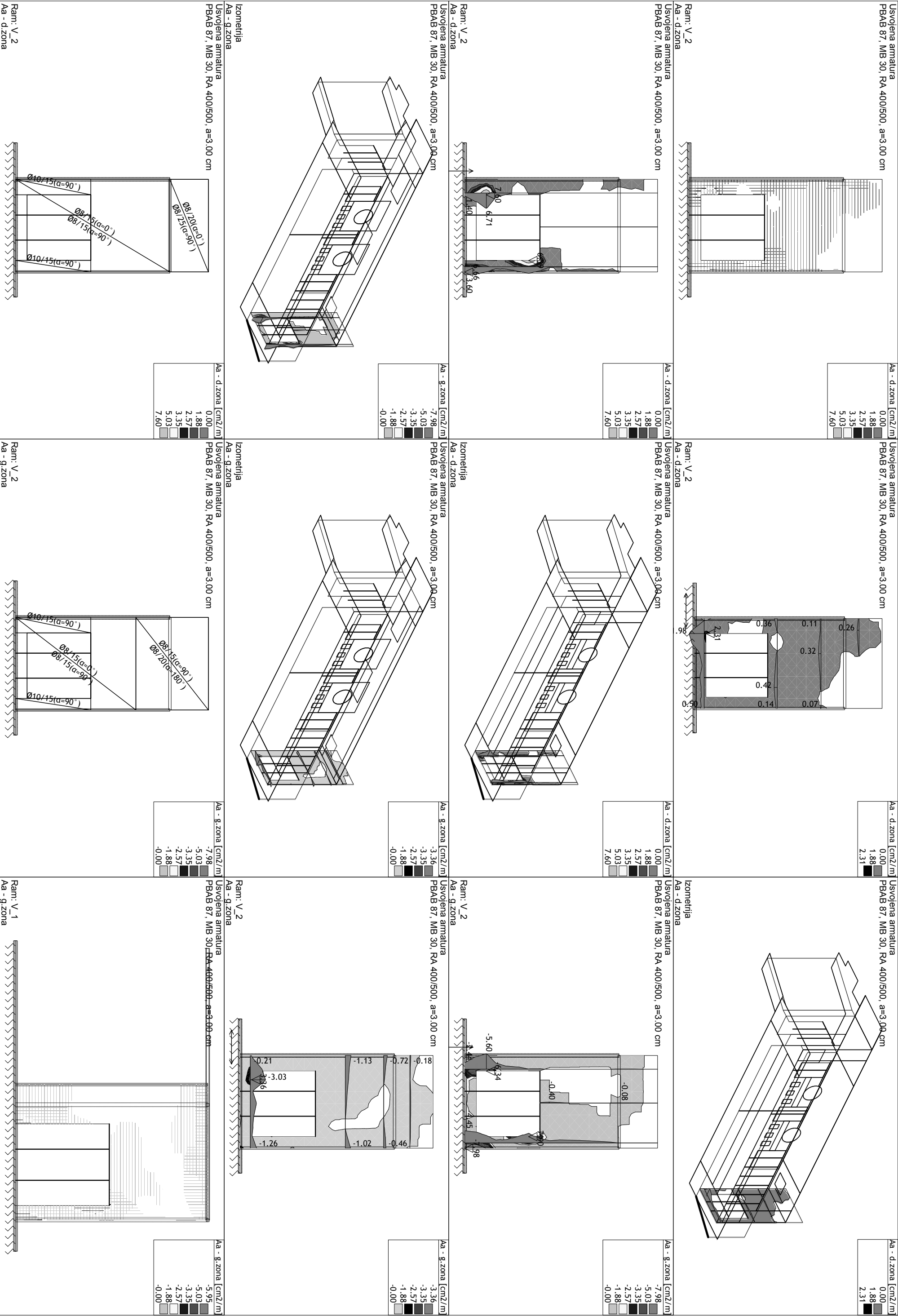
Usvojena a PBAB 87,	Ram: V_2 Armatura u
------------------------	------------------------

Greda 2417-2094
PBAB 87
MB 30
RA 400/500
Kompletná šema opterečenia

Prísek 1-1 x = 1,65m

250
300
10/14
10/10
20/14
30

STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2



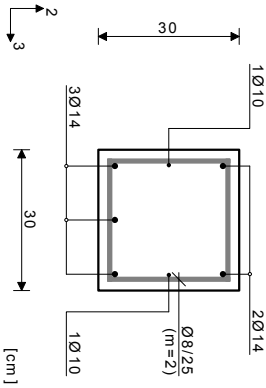
STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

Usvojena armatura PBAB 87, MB 30- RA-400/500 -a=3.00-cm		Aa - d.zona [cm2/m]	Usvojena armatura PBAB 87, MB 30- RA-400/500 -a=3.00-cm		Aa - d.zona [cm2/m]
Ram: V_1 Aa - d.zona Merodavno opterećenje: Kompletna šema PBAB 87, MB 30- RA-400/500		Ram: V_1 Aa - d.zona Merodavno opterećenje: Kompletna šema PBAB 87, MB 30- RA-400/500	Ram: V_1 Aa - d.zona Merodavno opterećenje: Kompletna šema PBAB 87, MB 30- RA-400/500		Ram: V_1 Aa - g.zona Merodavno opterećenje: Kompletna šema PBAB 87, MB 30- RA-400/500
Ram: V_1 Armatura u gredama: max Aa2/Aa1 = 0.30 cm2 Usvojena armatura PBAB 87, MB 30- RA-400/500		Ram: V_1 Armatura u gredama: max Aa3/Aa4 = 0.03 cm2 Usvojena armatura PBAB 87, MB 30- RA-400/500	Ram: V_1 Armatura u gredama: max Aa_uz=0.00 cm2 Usvojena armatura PBAB 87, MB 30- RA-400/500		Ram: V_1 Armatura u gredama: Aa2/Aa1

Greda 337-581

PBAB 87
MB 30
RA 400/500
Kompletna šema opterećenja

Prsek 2-2 x = 0.53m



Merodavna kombinacija za savijanje:
N1u = 7.64 kN
M2u = 0.00 kNm
M3u = 0.16 kNm

Merodavna kombinacija za torziju:
M1u = 0.45 kNm

Merodavna kombinacija za smicanje:
T2u = -6.25 kN
T3u = -1.30 kN
M1u = 0.45 kNm

eb/ea = -0.004/10.000 %
Aa1 = 0.11 + 0.03 = 0.14 cm2
Aa2 = 0.10 + 0.03 = 0.12 cm2
Aa3 = 0.00 + 0.03 = 0.03 cm2
Aa4 = 0.00 + 0.03 = 0.03 cm2
Aa_uz = 0.00 cm2/m (m=1)
(Usvojeno Aa_uz = Ø8/25(m=2) = 4.02 cm2/m)

STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

Greda 400-208

PBAB 87

MB 30

RA 400/500

Kompletna šema opterećenja

Merodavna kombinacija za savijanje:

1.90xI+2.10xII+2.10xIII

N1u = -25.97 kN

M2u = -0.20 kNm

M3u = -0.04 kNm

Merodavna kombinacija za torziju:

1.60xI+1.80xII+1.80xIV

M1u = -0.10 kNm

Merodavna kombinacija za smicanje:

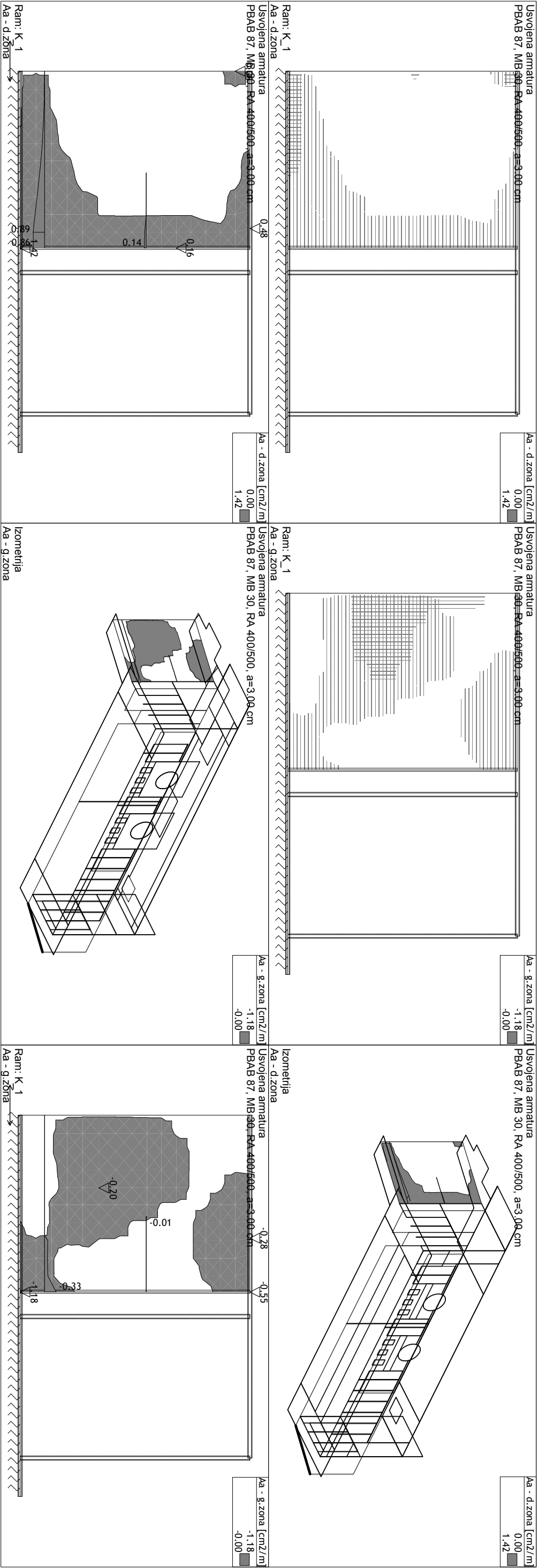
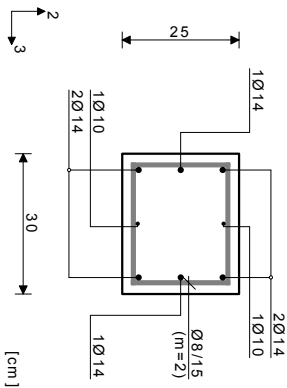
1.00xI+1.80xIII

T2u = 2.77 kN

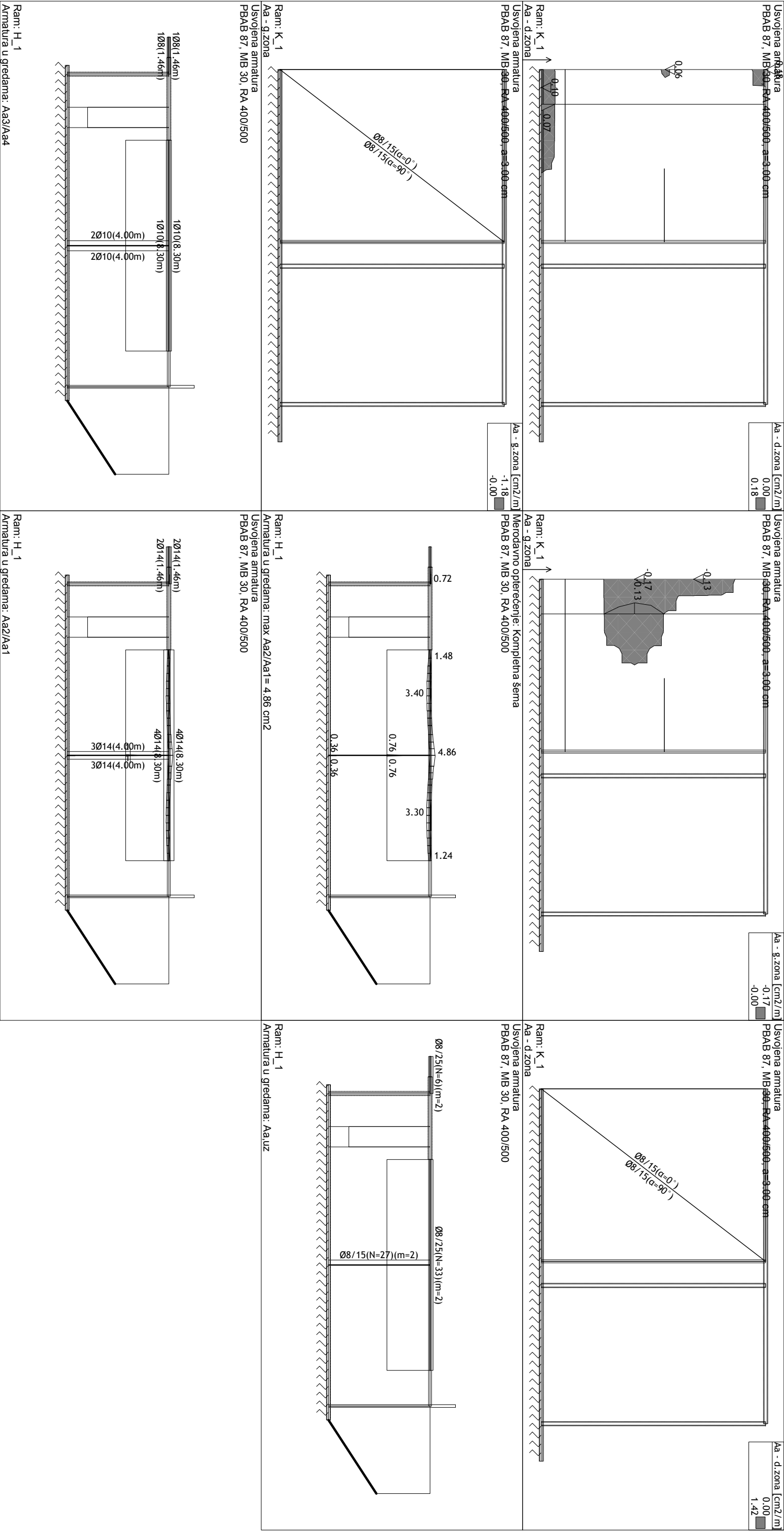
T3u = 0.95 kN

M1u = 0.05 kNm

Nije potrebna armatura.



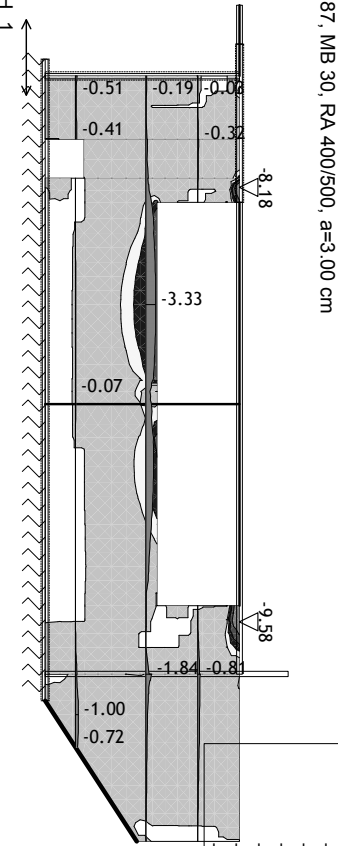
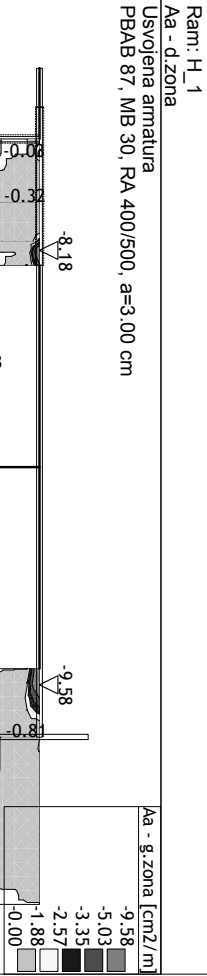
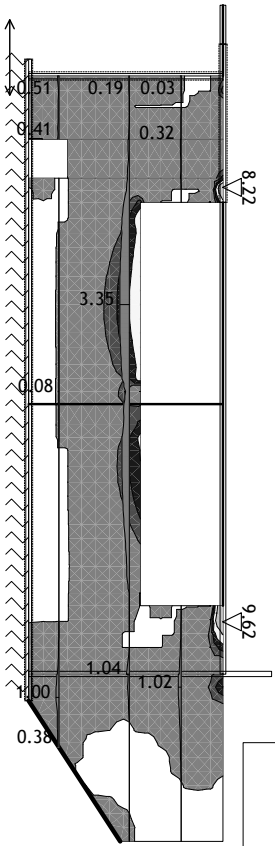
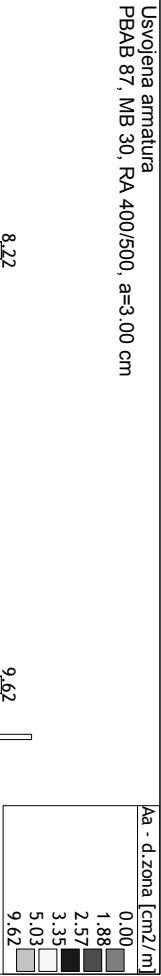
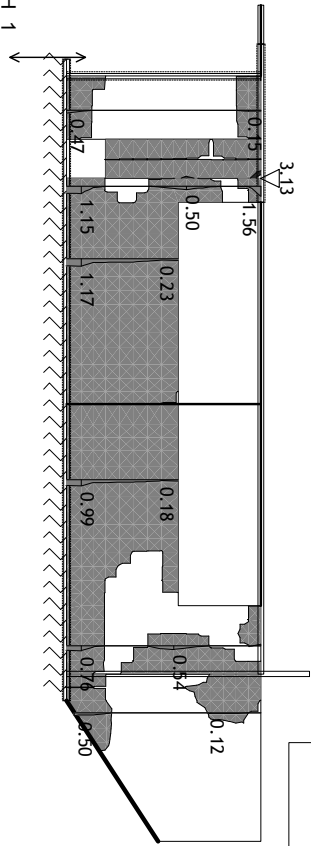
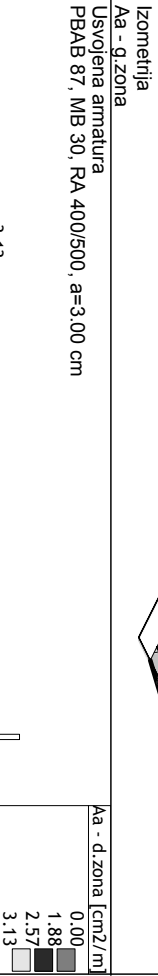
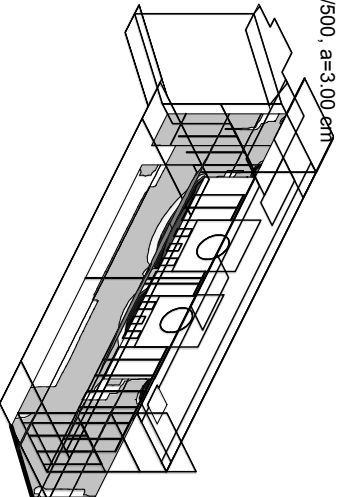
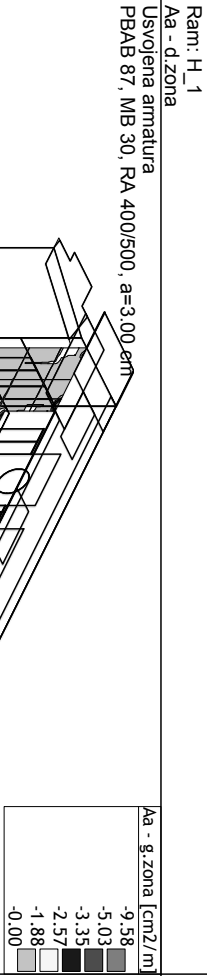
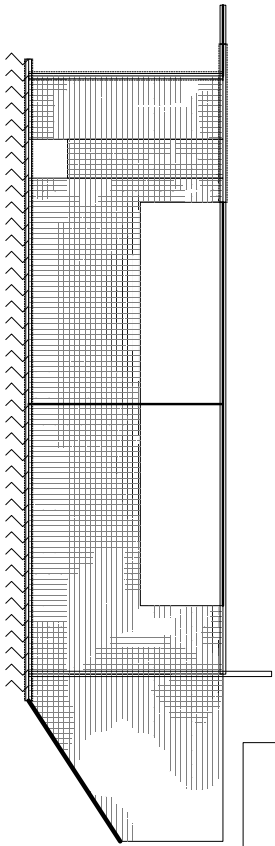
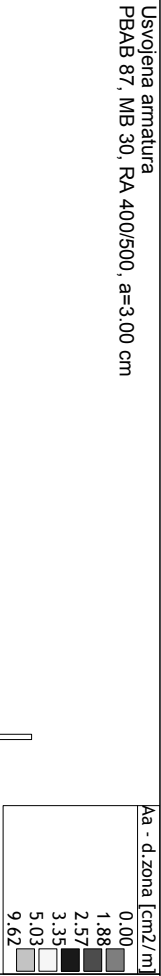
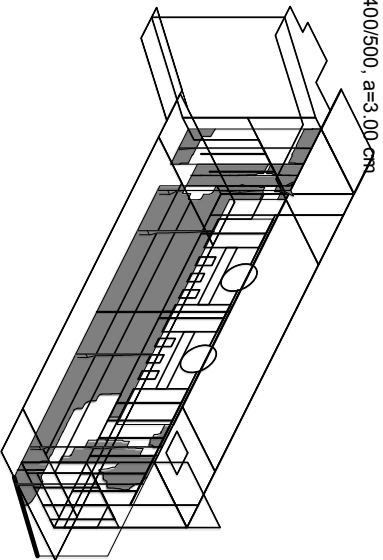
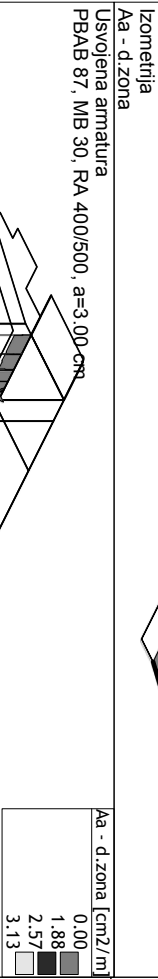
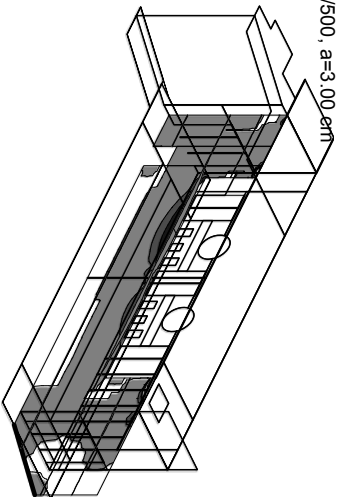
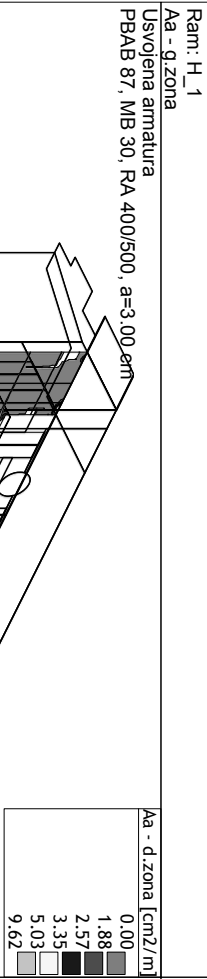
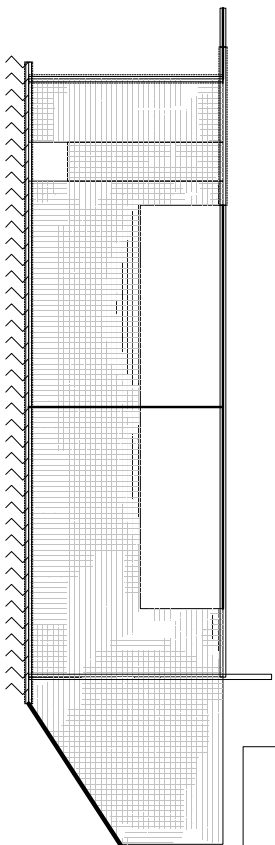
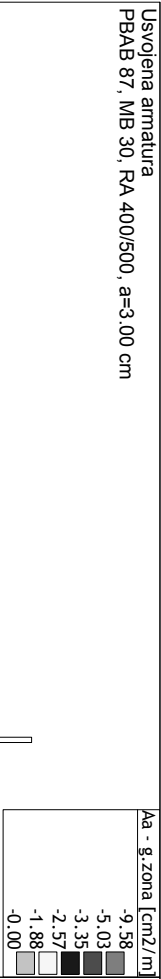
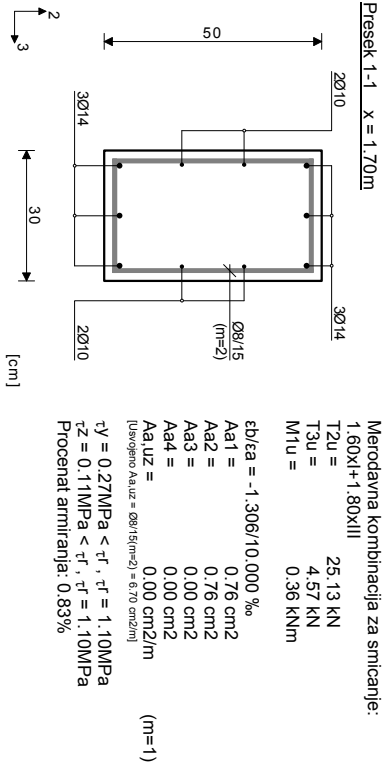
STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2



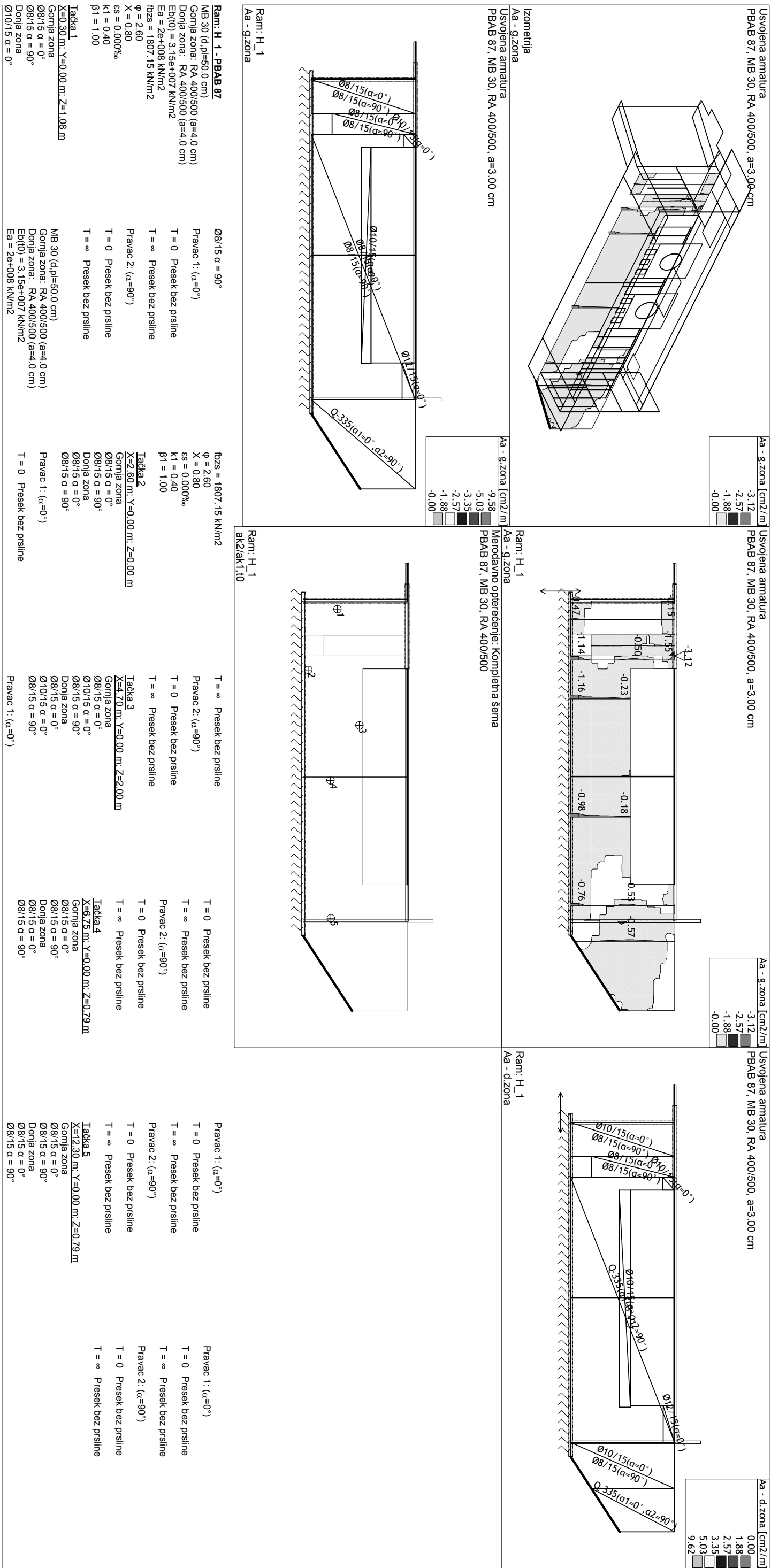
STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2

Greda 1705-1038
PBAB 87
MB 30
RA 400/500
Kompletna šema opterećenja
Il.2 = 4.00 m (λ.2 = 46.19)
Il.3 = 4.00 m (λ.3 = 27.71)
Nepomerljiva konstrukcija

Merodavna kombinacija za savijanje:
1.00xI+1.80xIII
N1u = -81.87 kN
M2u = 3.36 kNm
M3u = -32.70 kNm
Merodavna kombinacija za torziju:
1.60xI+1.80xIII
M1u = 0.36 kNm



STATIČKI PRORAČUN -ZAHVATNA GRADJEVINA BR-2



Statički proračun uradio:

Šefko Muhović, dipl.ing.građ.