Ulazni podaci - Konstrukcija

Izometrija

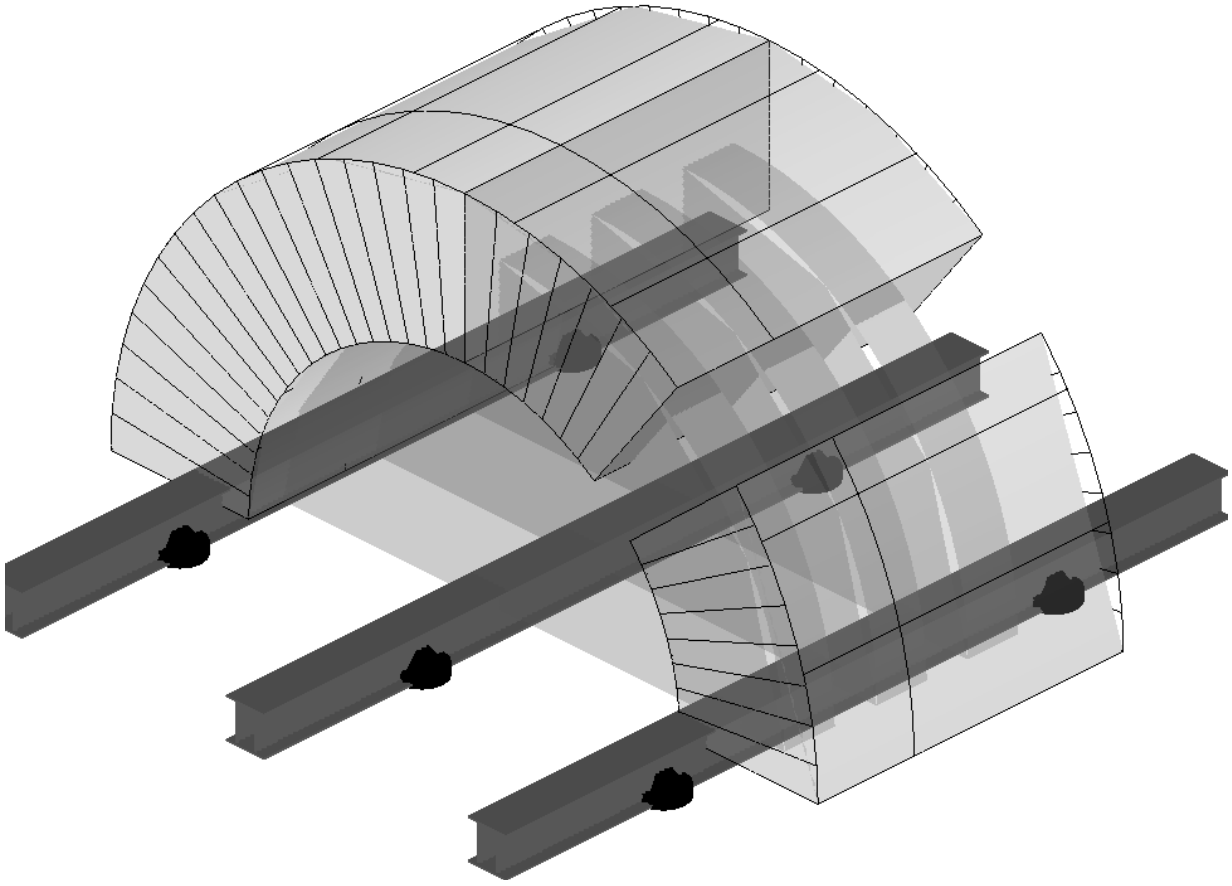
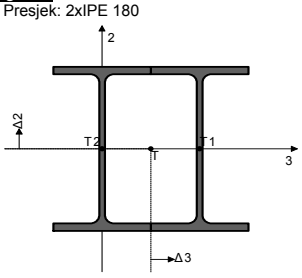


Tabela materijala

No	Naziv materijala	E[kN/m2]	μ	γ[kN/m3]	αt[1/C]	Em[kN/m2]	μm
1	Drvo-Četinari-Masivno	1.000e+7	0.20	5.00	1.000e-5	1.000e+7	0.20
2	kamen	5.000e+6	0.20	26.00	1.000e-5	1.000e+6	0.20
3	Čelik	2.100e+8	0.30	78.50	1.000e-5	2.100e+8	0.30

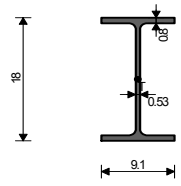
Setovi greda

Set: 1 Presjek: 2xIPE 180



Mat.	P/Z	A1	A2	A3	I1	I2	I3
3		4.780e-3	2.241e-3	2.539e-3	9.600e-8	1.192e-5	2.640e-5

No	Presjek	Δ3 [cm]	Δ2 [cm]	α	Mat.
1	IPE 180	9.10	0.00	0.00	3
2	IPE 180	0.00	0.00	0.00	3



IPE 180

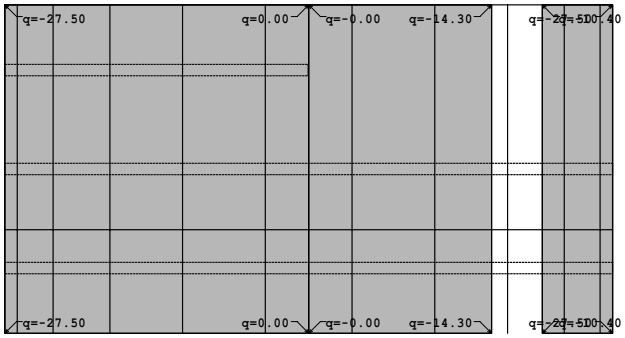
[cm]

Ulazni podaci - Opterećenje

Lista slučajeva opterećenja

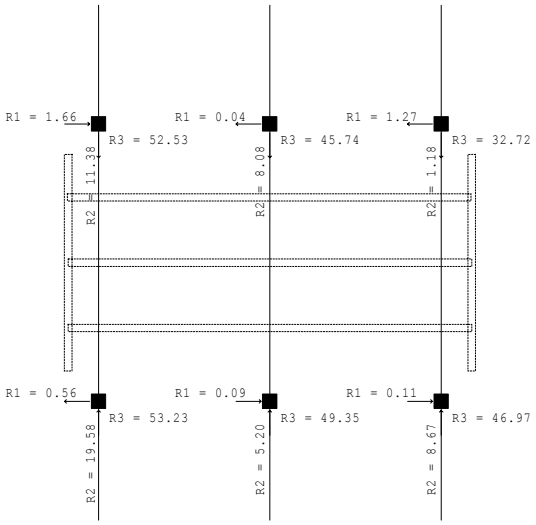
No	Naziv		
1	stalno (g)	3	Kombinacija: 1.35xI+1.35xII
2	dodatno stalno		

Opt. 2: dodatno stalno
3D

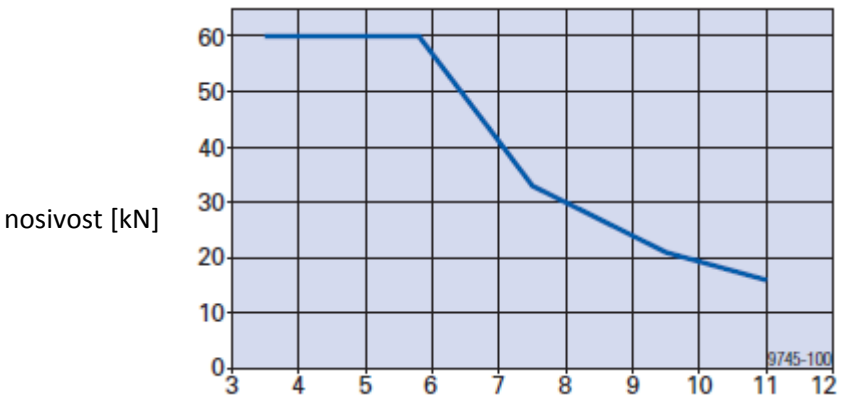


Statički proračun

Opt. 3: 1.35xI+1.35xII
Nivo: [-0.16]
Reakcije ležajeva



- usvojeno Doka Eurex 60 550

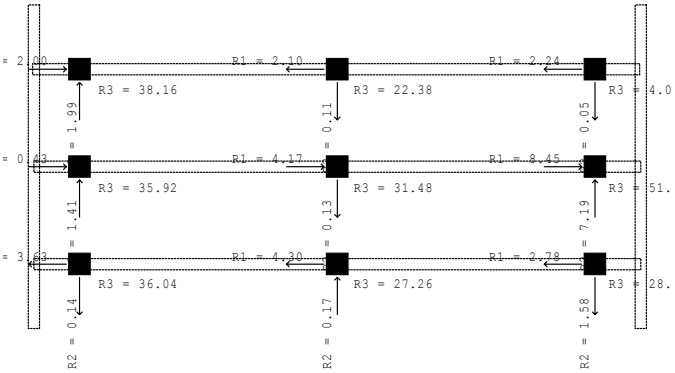


2 x I180 nosač preko Doka podupirača

- reakcije sa drvenih podupirača (0,5 od iznosa po jednom I180)

Statički proračun

Opt. 3: 1.35xI+1.35xII
Nivo: [-0.16]
Reakcije ležajeva



Ulazni podaci - Konstrukcija

Izometrija

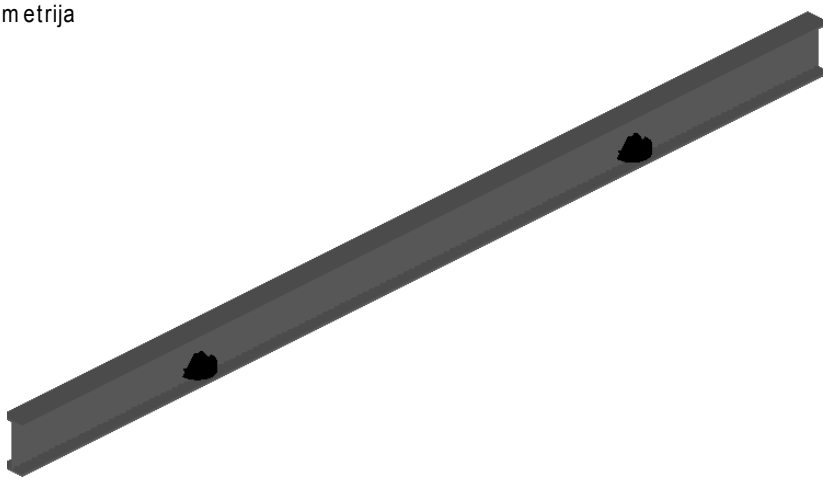
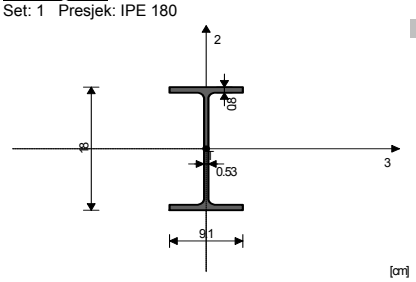


Tabela materijala

No	Naziv materijala	E[kN/m2]	μ	γ[kN/m3]	αt[1/C]	Em[kN/m2]	μm
1	Čelik	2.100e+8	0.30	78.50	1.000e-5	2.100e+8	0.30

Setovi greda

Set: 1 Presjek: IPE 180



Mat.	P/Z	A1	A2	A3	I1	I2	I3
1		2.390e-3	1.120e-3	1.270e-3	4.800e-8	1.010e-6	1.320e-5

Ulazni podaci - Opterećenje

Lista slučajeva opterećenja

No	Naziv
1	stalno (g)
2	reakcija
3	Kombinacija: 1.35xI+0.5xII

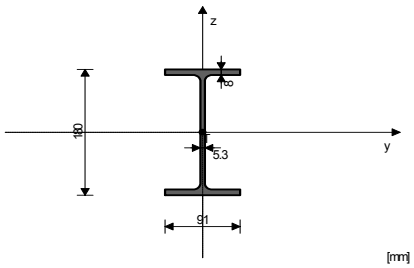




Kontrola stabilnosti

ŠTAP 1 - 4
POPREČNI PRESJEK: IPE 180 [Fe 360]
EUROCODE

GEOMETRIJSKE KARAKTERISTIKE PRESJEKA



Ax =	23.900	cm2
Ay =	12.696	cm2
Az =	11.204	cm2
Ix =	4.800	cm4
Iy =	1320.0	cm4
Iz =	101.00	cm4
Wy =	146.67	cm3
Wz =	22.198	cm3
Wy,pl =	169.42	cm3
Wz,pl =	33.124	cm3
γM0 =	1.100	
γM1 =	1.100	
γM2 =	1.250	
Anet/A =	0.900	

(fy = 23.5 kN/cm2, fu = 36.0 kN/cm2)

ŠTAP IZLOŽEN SAVIJANJU
(slučaj opterećenja 3, na 173.5 cm od početka štapa)

Poprečna sila u z pravcu	Vsd_z =	9.261 kN
Momenat savijanja oko y osi	Msd_y =	17.608 kNm
Sistemska duzina štapa	L =	347.00 cm

5.3 KLASIFIKACIJA POPREČNIH PRESJEKA
Klasa presjeka 1

5.4 OTPORNOST POPREČNIH PRESJEKA
5.4.5 Savijanje y-y

Računski plastični moment	Mpl.Rd =	36.195 kNm
Računska otp.na lokalno izbočavanje	Mo.Rd =	31.333 kNm
Računski elastični momenat	Mel.Rd =	31.333 kNm
Računska otpornost na savijanje	Mc.Rd =	36.195 kNm

Uvjet 5.17: Msd_y <= Mc.Rd_y (17.61 <= 36.20)

5.4.6 Posmik

Računska plast.otp.na posmik z-z	Vpl.Rd =	107.21 kN

Uvjet 5.20: Vsd_z <= Vpl.Rd_z (9.26 <= 107.21)

5.4.7 Savijanje i posmik
Nije potrebna redukcija momenata otpornosti
Uvjet: Vsd_z <= 50%Vpl.Rd_z

5.5 OTPORNOST ELEMENATA NA IZVIJANJE
5.5.2 Bočno-torziono izvijanje greda

Koeficijent	C1 =	1.132
Koeficijent	C2 =	0.459
Koeficijent	C3 =	0.525
Koef.efekt.dužine bočnog izvijanja	k =	1.000
Koef.efekt.dužine torzionog uvijanja	kw =	1.000

Kontrola napona

Koordinata	zg =	0.000	cm
Koordinata	zj =	0.000	cm
Razmak bočno pridržanih točaka	L =	347.00	cm
Sektorski moment inercije	Iw =	7431.2	cm6
Krit.mom.za bočno tor.izvijanje	Mcr =	33.892	kNm
Koeficijent	βw =	1.000	
Koeficijent imperf.	αLT =	0.210	
Bezdimenzionalna vitkost	λLT_ =	1.084	
Koeficijent redukcije	χLT =	0.607	
Računska otpornost na izvijanje	Mb.Rd =	21.974	kNm

Uvjet 5.48: Msd_y <= Mb.Rd (17.61 <= 21.97)

5.6 OTPORNOST NA IZBOČAVANJE POSMIKOM
za smicanje u ravnini z-z

Širina lima	d =	16.400	cm
Debljina lima	tw =	0.530	cm

Nema poprečnih ukrućenja u sredini

Koeficijent izbočavanja posmikom	kτ =	5.340	

Nije potrebna provjera otpornosti na izbočavanje posmikom

Uvjet: d / tw <= 69 ε (30.94 <= 69.00)

5.6.7 Interakcija posmične sile, savijanja i centr.sile
za smicanje u ravnini z-z

Računski plastični moment nožica	Mf.Rd =	23.572	kNm

Uvjeti 5.66a i 5.66b su ispunjeni

5.7 OTPORNOST REBRA NA POPREČNE SILE
5.7.7 Izvijanje tlačne nožice u ravnini rebra

Koeficijent (klasa nožice 1)	k =	0.300	
Površina rebra	Aw =	9.540	cm2
Površina tlač. nožice	Afc =	7.280	cm2

Spriječena je mogućnost izvijanja nožice u ravnini rebra

Uvjet 5.80: (30.94 <= 306.89)

PROVJERA OTPORNOSTI NA POSMIK
(slučaj opterećenja 3, na 80.0 cm od početka štapa)

Poprečna sila u z pravcu	Vsd_z =	-28.016	kN
Momenat savijanja oko y osi	Msd_y =	-0.081	kNm
Sistemska duzina štapa	L =	347.00	cm

5.4 OTPORNOST POPREČNIH PRESJEKA
5.4.6 Posmik

Računska plast.otp.na posmik z-z	Vpl.Rd =	107.21	kN

Uvjet 5.20: Vsd_z <= Vpl.Rd_z (28.02 <= 107.21)

5.6 OTPORNOST NA IZBOČAVANJE POSMIKOM
za smicanje u ravnini z-z

Širina lima	d =	16.400	cm
Debljina lima	tw =	0.530	cm

Nema poprečnih ukrućenja u sredini

Koeficijent izbočavanja posmikom	kτ =	5.340	

Nije potrebna provjera otpornosti na izbočavanje posmikom

Uvjet: d / tw <= 69 ε (30.94 <= 69.00)

A.B. RASTERETNA PLOČA d=10cm preko postojećeg saliža

Ulazni podaci - Konstrukcija

Tabela materijala

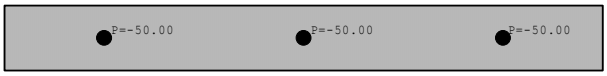
No	Naziv materijala	E[kN/m2]	μ	γ[kN/m3]	αt[1/C]	Em[kN/m2]	μm
1	Beton MB 30	3.150e+7	0.20	25.00	1.000e-5	3.150e+7	0.20

Ulazni podaci - Opterećenje

Lista slučajeva opterećenja

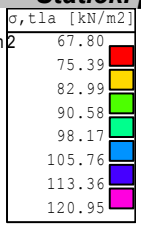
No	Naziv		
1	stalno (g)	3	Kombinacija: 1.35xI+II
2	reakcija		

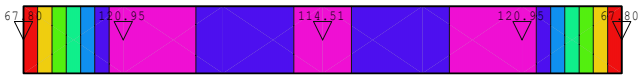
Opt. 2: reakcija



Statički proračun

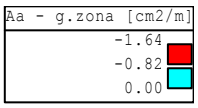
Opt. 3: 1.35xI+II
Utjecaji u pov. ležaju: max σ,tla= 120.95 / min σ,tla= 67.80 kN/m2



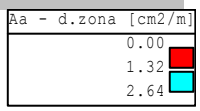


Dimenzioniranje (beton)

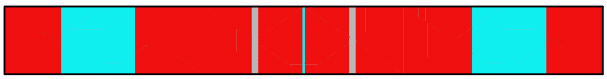
Mjerodavno opterećenje : 1.35xI+II
EUROCODE, C 20, S500H, a=2.50 cm
Aa - g.zona - max Ag= -1.63 cm2/m



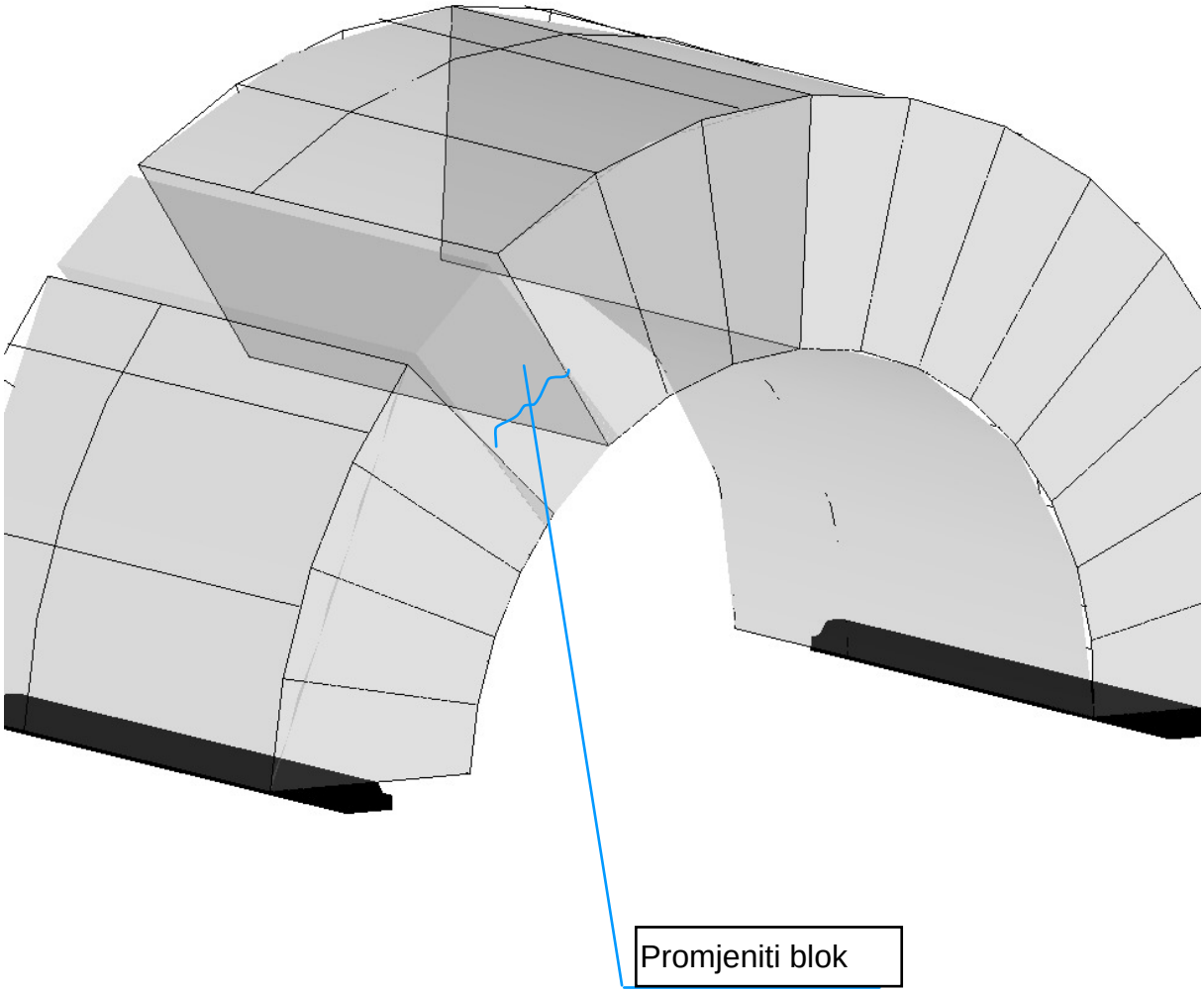
Mjerodavno opterećenje : 1.35xI+II
EUROCODE, C 20, S500H, a=2.50 cm
Aa - d.zona - max Ad= 2.63 cm2/m





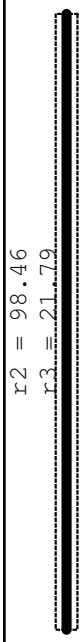


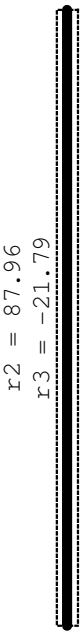
Model - Sanirano stanje



Izometrija (Nivo: [-0.16])

Opt. 3: 1.35xI+1.35xII





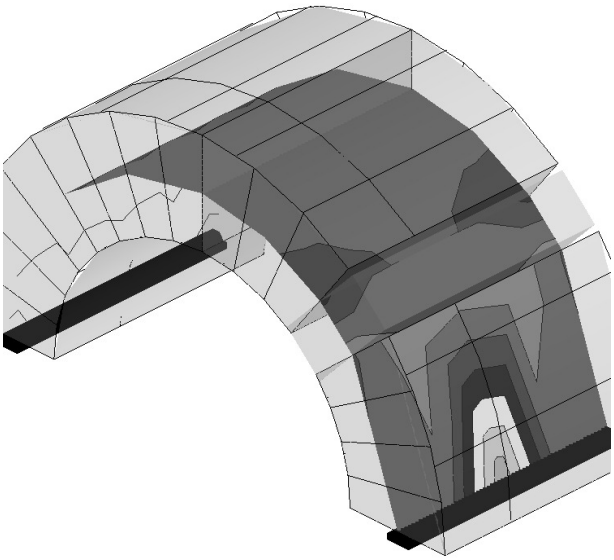
Horiz. reakcija = 21,79 kN/m' x 1,40m = 30,51 Kn =~3,0to

Prijenos sile na zid propugnaculuma osigurati injektiranjem zida i ispune propugnaculuma (na "kontrafor")

Nivo: [-0.16]
Reakcije ležajeva

Opt. 3: 1.35xI+1.35xII

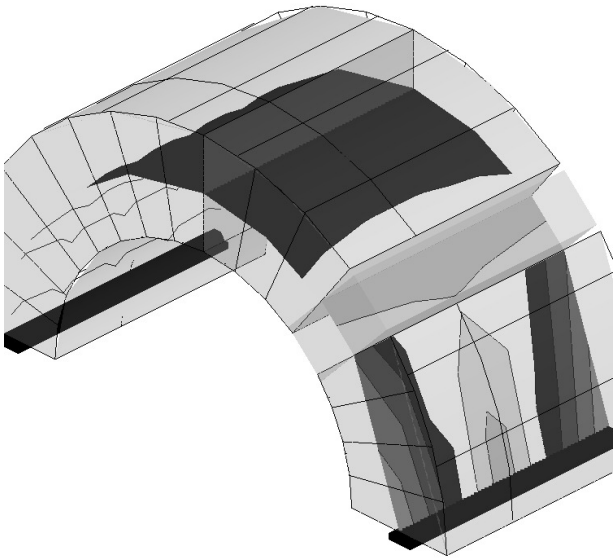
σ1,g [MPa]
-0.07
-0.04
0.00
0.03
0.07
0.10
0.14
0.17



Izometrija (Nivo: [-0.16])
Utjecaji u ploči: max σ1,g= 0.16 / min σ1,g= -0.07 MPa

Opt. 3: 1.35xI+1.35xII

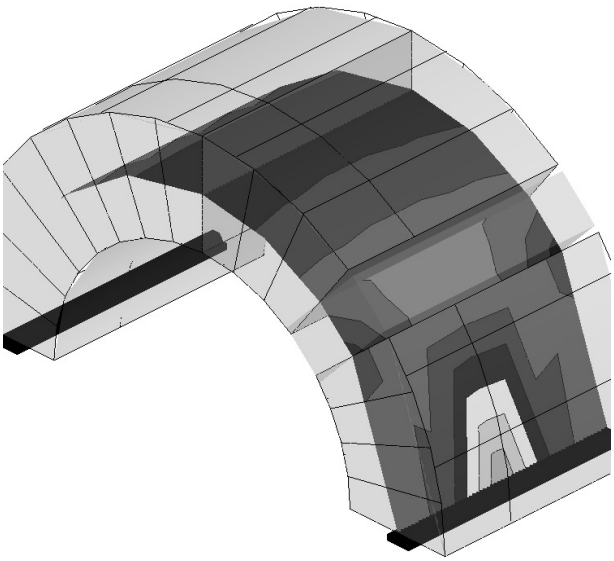
σ2,g [MPa]
-0.31
-0.27
-0.22
-0.18
-0.13
-0.09
-0.04
0.00



Izometrija (Nivo: [-0.16])
Utjecaji u ploči: max σ2,g= -0.01 / min σ2,g= -0.31 MPa

Opt. 3: 1.35xI+1.35xII

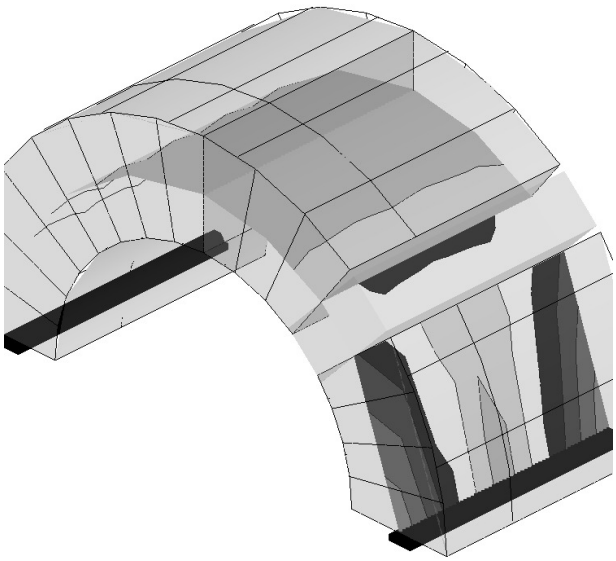
σ1,d [MPa]
-0.05
0.00
0.04
0.09
0.13
0.17
0.22
0.26



Izometrija (Nivo: [-0.16])
Utjecaji u ploči: max σ1,d= 0.26 / min σ1,d= -0.05 MPa

Opt. 3: 1.35xI+1.35xII

σ2,d [MPa]
-0.32
-0.27
-0.21
-0.16
-0.11
-0.05
0.00
0.04



Izometrija (Nivo: [-0.16])
Utjecaji u ploči: max σ2,d= 0.03 / min σ2,d= -0.31 MPa