PRILOGA 20A

MNENJE POOBLAŠČENEGA STROKOVNJAKA S PODROČJA GRADBENIŠTVA

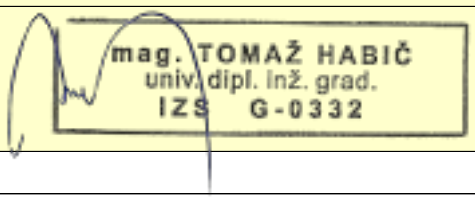
OSNOVNI PODATKI O INVESTITORJU, OBJEKTU IN ZEMLJIŠČIH	
ime in priimek ali naziv družbe	**ZRC SAZU**
naslov ali sedež družbe	**Novi trg 2, 1000 Ljubljana**
naziv objekta	**ZRC SAZU dvigalo**
naslov objekta	**Novi trg 2, 1000 Ljubljana**
katastrska občina	**1728 Ljubljana mesto**
parc. št.	**217**
št. stavbe	**177**
št. stanovanja v večstanovanjski stavbi	
PROJEKTANT/ NADZORNIK/ IZVAJALEC	
naziv družbe	**a2o2 arhitekti, d.o.o.**
poslovni naslov družbe	**Rimska cesta 12, 1000 Ljubljana**
odgovorna oseba	**Klara Bohinc, m.i.a.**
POOBLAŠČENI STROKOVNJAK S PODROČJA GRADBENIŠTVA	
ime in priimek	**mg. TOMAŽ HABIČ, univ.dipl.inž.gradb.**
identifikacijska številka	**G-0332**

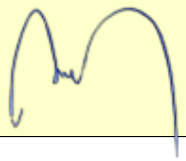
UGOTAVLJAVA, DA PREDVIDENA MANJŠA REKONSTRUKCIJA PREDSTAVLJA:

označiti vsa ustrezna dela

	statično ojačitev posameznega ali več posameznih konstrukcijskih elementov
	zamenjavo istovrstnih posameznih konstrukcijskih elementov (zamenjava ostrešja, delov medetažne konstrukcije, ipd.)
	zamenjavo elementov javnega vodovoda in javne kanalizacije
	dolbenje utorov in niš v nosilno konstrukcijo
	izvedbo odprtin in večjih konstrukcijskih prebojev ter povečanje obstoječih odprtin v objektu, ki ne presegajo ene tretjine površine posameznega konstrukcijskega elementa in niso širši od 2 m
	povečanje obstoječih prebojev fasade stavbe do 2 m; velikost povečanja odprtine ne presega ene tretjine površine fasade
	nov preboj fasade stavbe, pri čemer je ravnina fasade, na kateri se izvajajo preboji, oddaljena od meje zemljišča drugega lastnika več kot 2 m, velikost novih prebojev ne presega ene tretjine površine fasade in noben preboj ni širši od 2 m
x	***vgradnjo dvigala v notranjosti objekta, s katerim se posega v nosilno konstrukcijo***
	manjše povečanje prostornine, ki ne poveča bruto tlorisne površine objekta, ter pomeni izvedbo posameznih konstrukcijskih elementov na objektu (izvedba frčade, vsaj z dveh strani odprt nadstrešek na obstoječi pohodni strehi, dvig obodnega zidu pod poševno streho za višino horizontalne vezi za največ 0,3 m, ipd.)
	prizidavo nakladalnih ramp in klančin
	izvedbo nepohodnega konzolnega nadstreška površine do 6 m ^{2}

S KATERO SE NE BODO OGROŽALE ALI POSLABŠALE GRADBENOTEHNIČNE LASTNOSTI OBJEKTA.

datum	**mar.25**
podpis pooblaščenega strokovnjaka s področja gradbeništva	

podpis odgovorne osebe	

PRILOGA

	PZI Načrt gradbenih konstrukcij št.: 2023_20-G

PRILOGA 1C

NASLOVNA STRAN NAČRTA

PODATKI O GRADNJI		
naziv gradnje		**ZRC SAZU dvigalo**
kratek opis gradnje		**Novo notranje dvigalo je umeščeno ob vstopno avlo. Umestitev dvigala v bližino glavnega stopnišča omogoča enakopravno pot vsem obiskovalcem in dobro kontrolo dostopa. Dvigalni jašek bo armiranobetonski. V pritličju se za namen dvigala porabi prostor skladišča oz. bivše vložišče ob avli. V nadstropju se na račun dvigala zmanjša študijska soba, v 2. nadstropju pa arhiv računovodstva. Prav tako se preuredita obe pisarni računovodstva. v 3. in 4. nadstropju se preuredijo pisarne ISIM in FI. Namembnost, gabariti in konstrukcijska zasnova objekta se ohranjajo.**
VRSTE GRADNJE	☐	**NOVOGRADNJA - NOVOZGRAJEN OBJEKT**
označiti vse ustrezne vrste gradnje	☐	**NOVOGRADNJA - PRIZIDAVA**
	☐	**REKONSTRUKCIJA**
	☐	**SPREMEMBA NAMEMBNOSTI**
	☐	**ODSTRANITEV CELOTNEGA OBJEKTA**
	☐	**LEGALIZACIJA**
	☑	**MANJŠA REKONSTRUKCIJA**
PODATKI O PROJEKTNI DOKUMENTACIJI		
vrsta dokumentacije		**PZI (projektna dokumentacija za izvedbo gradnje)**
številka projekta		**2023_20**
PODATKI O NAČRTU		
strokovno področje načrta		**2 Načrt s področga gradbeništva**
naziv načrta		**2 Načrt gradbenih konstrukcij**
številka načrta		**2023_20-G**
datum izdelave		**marec 2025**
datum spremembe		
PODATKI O PROJEKTANTU NAČRTA		
projektant načrta (naziv družbe)		**HIŠA NIŠA d.o.o.**
naslov		**Verd 252, 1360 Vrhnika**
odgovorna oseba projektanta načrta		**mag. Tomaž Habič, univ. dipl. inž. grad.**
podpis odgovorne osebe projektanta načrta		
PODATKI O IZDELOVALCU NAČRTA		
ime in priimek pooblaščenega arhitekta, pooblaščenega inženirja		**mag. Tomaž Habič, univ. dipl. inž. grad.**
identifikacijska številka		**G-0332**
podpis pooblaščenega arhitekta, pooblaščenega inženirja		mag. TOMAŽ HABIČ univ. dipl. inž. grad. IZS G-0332

PRILOGA 2C

IZJAVA PROJEKTANTA NAČRTA IN POOBLAŠČENEGA STOKOVNJAKA, KI JE IZDELAL NAČRT V PZI IN PID

PROJEKTANT NAČRTA	
projektant načrta (naziv družbe)	**HIŠA NIŠA d.o.o.**
naslov	**Verd 252, 1360 Vrhnika**
odgovorna oseba projektanta načrta	**mag. Tomaž Habič, univ. dipl. inž. grad.**

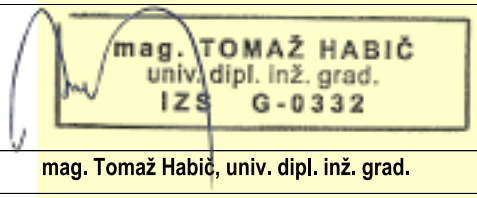
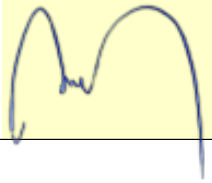
IN POOBLAŠČENI STROKOVNJAK, KI JE IZDELAL NAČRT	
pooblaščeni strokovnjak	**mag. Tomaž Habič, univ. dipl. inž. grad.**

IZJAVLJAVA:

da načrt

vrsta dokumentacije	**PZI (projektna dokumentacija za izvedbo gradnje)**
strokovno področje načrta	**2 Načrt s področja gradbeništva**
naziv načrta	**2 Načrt gradbenih konstrukcij**
številka načrta	**2023_20_G**
datum izdelave	**marec 2025**

upošteva relevantne predpise in druge normativne dokumente ter da so upoštevane ustrezne bistvene in druge zahteve.

pooblaščeni strokovnjak	**mag. Tomaž Habič, univ. dipl. inž. grad.**
identifikacijska številka	**G-0332**
podpis pooblaščenega strokovnjaka	
odgovorna oseba projektanta načrta	**mag. Tomaž Habič, univ. dipl. inž. grad.**
podpis odgovorne osebe projektanta načrta	

KAZALO VSEBINE NAČRTA ☐

NASLOVNA STRAN NAČRTA

IZJAVA PROJEKTANTA NAČRTA IN POOBLAŠČENEGA STROKOVNJAKA, KI JE IZDELAL NAČRT

TEHNIČNO POROČILO

		TEHNIČNI OPIS
		ANALIZA KONSTRUKCIJE

RISBE

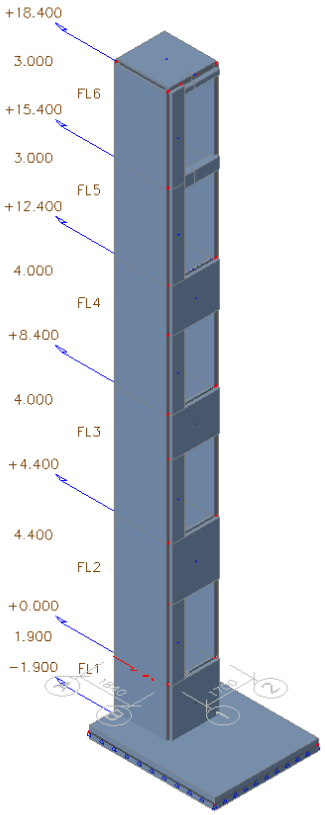
	A-1	OPAŽNO ARMATURNA RISBA PODBETONIRANJA TEMELJEV
	A-2	OPAŽNO ARMATURNA RISBA - DVIGALNI JAŠEK
	J-1	NOVA JEKLENA KONSTRUKCIJA NA KOTI +15,22m DISPOZICIJA, TLORISI, PREREZI
	J-2	NOVA JEKLENA KONSTRUKCIJA NA KOTI +15,22m - DETAJLI

KAZALO RISB

RISBE

	A-1	OPAŽNO ARMATURNA RISBA PODBETONIRANJA TEMELJEV
	A-2	OPAŽNO ARMATURNA RISBA - DVIGALNI JAŠEK
	J-1	NOVA JEKLENA KONSTRUKCIJA NA KOTI +15,22m DISPOZICIJA, TLORISI, PREREZI
	J-2	NOVA JEKLENA KONSTRUKCIJA NA KOTI +15,22m - DETAJLI

Objekt:	**ZRC SAZU – dvigalo**
Investitor:	ZRC SAZU, Novi trg 2, 1000 Ljubljana
Vrsta načrta:	2 – Načrt s področja gradbeništva
Vsebina:	TEHNIČNO POROČILO
	TEHNIČNI OPIS IN ANALIZA KONSTRUKCIJE



Projektant načrta:	HIŠA NIŠA d.o.o., Verd 252, 1360 Vrhnika
Pooblaščeni inženir:	mag. Tomaž Habič, univ. dipl. inž. grad. (IZS PI G-0332)
Sodelavci:	Miha BLATNIK, mag. inž. grad. (IZS PI G-4887)
Faza:	PZI
Št. projekta:	20/2024
Št. načrta:	20/2024-G
Revizija:	0
Kraj in datum:	Ljubljana, april 2025

KAZALO VSEBINE

A. TEHNIČNI OPIS A-1
A.1. SPLOŠNO A-1
A.2. PODLOGE ZA PROJEKTIRANJE A-1
A.3. STATIČNA ZASNOVA OBJEKTA A-1
A.3.1. Obstoječi objekt A-1
A.3.2. Umestitev dvigala A-2
A.3.3. Konstrukcijska zasnova A-2
A.4. UPORABLJENI STANDARDI A-4
A.5. UPORABLJENI MATERIALI A-4
A.6. RAČUNSKA ANALIZA A-5
A.6.1. Jašek dvigala: A-5
A.6.2. Obstoječa konstrukcija A-5
A.6.3. Opredelitev obsega rekonstrukcije A-5
A.7. VPLIVI NA KONSTRUKCIJO A-6
A.8. IZVEDBA ARMIRANOBETONSKE KONSTRUKCIJE A-6
A.9. IZDELAVA IN MONTAŽA JEKLENE KONSTRUKCIJE A-6
A.10. TEMELJENJE A-7
A.11. OPAZOVANJE KONSTRUKCIJE OBJEKTA - MONITORING A-7
A.12. POVZETEK KONSTRUKCIJSKIH POSEGOV IN PREDLOG ZAPOREDJA DEL A-7

B. ANALIZA KONSTRUKCIJE B-1
B.1. OBSTOJEČA KONSTRUKCIJA B-1
B.2. DVIGALO – ANALIZA OBTEŽB (SIST EN 1991-1) B-1
B.2.1. Lastna teža B-1
B.2.2. Stalni vplivi B-1
B.2.3. Koristni vplivi B-1
B.2.4. Vpliv snega B-1
B.2.5. Reologija betona B-1
B.2.6. Potresni vpliv (upoštevan pri analizi jaška dvigala) B-1
B.3. LASTNOSTI MATERIALOV B-2
B.4. KROVNI SLOJ BETONA B-2
B.5. MODELIRANJE KONSTRUKCIJE B-3
B.6. REZULTATI ANALIZE B-3
B.6.1. Minimalna armatura B-4
B.6.2. Potresno stanje – nosilnost temeljne plošče dvigalnega jaška B-5
B.6.3. Kontrola preboja temeljne plošče B-7
B.6.4. Omejitev poškodb – kontrola etažnih pomikov B-9
B.6.5. Vpliv teorije drugega reda (P-Δ efekt) B-10

C. PRILOGE C-1

A. TEHNIČNI OPIS

A.1. SPLOŠNO

Predmet načrta gradbenih konstrukcij je analiza konstrukcije, opažne, armaturne risbe jaška dvigala in risbe menjalnikov jeklene konstrukcije za umestitev osebnega dvigala v obstoječo zgradbo ZRC SAZU, Novi trg 2, Ljubljana. Novo dvigalo bo povezovalo pritličje, 1. in 2. nadstropje ter etaži v mansardi.

A.2. PODLOGE ZA PROJEKTIRANJE

Za izdelavo PZI načrta gradbenih konstrukcij so bile uporabljene:

- Arhitekturne podloge – PZI načrt arhitekture, a2o2 arhitekti, št. projekta: 2023_20, marec 2025.
- Sanacija in adaptacija podstrešja Novi trg 2, trakt A, PGD – arhitektura, popis, statika, SGI Slomškova 12, Ljubljana, št. projekta 113/97, junij 1997.

A.3. STATIČNA ZASNOVA OBJEKTA

A.3.1. Obstoječi objekt

Obstoječ objekt je starejša opečno kamnita zidana zgradba z masivnim obokanim stropom nad pritličjem ter v osnovi lesenimi stropovi nad 1. in 2. nadstropjem. Zidovi so predvidoma temeljeni na kamnitih pasovnih temeljih, ki so po navedbah projekta sanacije 1997 dokaj globoki, do 2 m pod koto tal pritličja.

Na osnovi projekta Sanacija in adaptacija podstrešja Novi trg 2, trakt A, PGD – arhitektura, popis, statika, SGI Slomškova 12, Ljubljana, št. projekta 113/97, junij 1997, je bila izvedena obsežna sanacija podstrešja. S projektom je bila predvidena izvedba nove plošče nad drugim nadstropjem in nova jeklena nosilna konstrukcija mansarde.



Nad drugim nadstropjem se je izvedla ab plošča debeline 20 cm, ki ima ležišče na spodnjih zidovih . Na teh mestih je ojačana z AB vezmi in sidrana v te zidove. Zaradi protipotresne sanacije so se injektirali zidovi in na nivojih etaž izvedle jeklene potresne vezi.

Konstrukcija etaž v mansardi je jeklena okvirna konstrukcija z izvedenimi zavetrovanji. Deloma se horizontalne obtežbe prenašajo v armiranobetonsko jedro, ki je zasnovano v oseh spodnjih sten ob stopnišču. Strešna konstrukcija je lesena.

A.3.2. Umestitev dvigala

Nov jašek za dvigalo je tlorisnih dimenzij 2,09 x 1,90m in višine ca 18,00m nad koto pritličja. Globina jaška pod tlakom pritličja (pod koto 0,00) je 2,10m. Jašek se izvede v armiranem betonu. Z izvedbo jaška se ne posega v obstoječo nosilno vertikalno konstrukcijo. Na mestu jaška se predre stropna konstrukcija nad pritličjem in 1. nadstropjem ter prvo etažo mansarde. Za prehod skozi prvo etažo mansarde bo potrebno predelati prečko v okvirju.





A.3.3. Konstrukcijska zasnova

Jašek za dvigalo je monolitna AB konstrukcija, temeljena na temeljni plošči. Jašek se zaključi pod strešno opno nad 2. etažo mansarde. Zidovi jaška so debeline 20 cm in 25 cm. Temeljna plošča je debeline 40 cm. Podzemni del jaška (pod koto tlaka pritličja) se izvede v vodotesni izvedbi. Konstrukcija dvigalnega jaška je na nivoju temeljne plošče in nivoju plošče nad drugim nadstropjem (+12,28 m) konstrukcijsko povezana z obstoječim

objektom. Konstrukcija obokov nad pritličjem in konstrukcija mansarde sta v celoti ločene od jaška dvigala. Leseno konstrukcijo 1. nadstropja pa na jašek naslanjamo, pri čemer so horizontalno konstrukciji mehko dilatirani.

Temelji jaška dvigala

Dejansko stanje in globina obstoječih temeljev še ni bila preverjena. Glede na ugotovljene globine obstoječih kamnitih temeljnih podstavkov se obstoječi temelji v izmeničnih kampadah podbetonirajo do globine potrebnega izkopa za novo temeljno ploščo. Obstoječi kamniti temelji se sistematično injektirajo.

Temeljna tla

Prav tako ni poznana točna sestava in nosilnost temeljnih tal. Zaradi tega mora izkop za temeljno ploščo pregledati geomehanik in predpisati vsa potrebna navodila za ustrezno pripravo tal pred izvedbo temeljne plošče.

Prehod na koti obokov (+4,46 m)

Na mestu prediranja obstoječe stropne konstrukcije nad pritličjem se izvede sanacija oboka. V obojestranska loka se ne posega.

Prehod na koti plošče nad 1. nadstropjem (+8,29 m)

Lesena konstrukcija oziroma AB plošča nad leseno konstrukcijo v 1. nadstropju se nasloni na stene jaška dvigala. Konstrukciji sta tako v vertikalni kot v horizontalni smeri mehko dilatirani.

Prehod skozi ploščo nad 2. nadstropjem (+12,28 m)

Armiranobetonska plošča nad 2. nadstropjem se konstrukcijsko poveže z ab stenami jaška dvigala. Obstoječo armaturo plošče se ohrani in preveže v armaturni koš jaška dvigala.

Prehod skozi prvo ploščo mansarde (+15,20 m)

Na nivoju prehoda jaška skozi konstrukcijo prve plošče mansarde se v obstoječi jekleni konstrukciji izvedejo menjalniki. Dimenzije jeklenih profilov so izbrane upoštevaje že izvedeno konstrukcijo (profili menjalnikov so praviloma večji ali enaki obstoječim profilom). Na poziciji prehoda jaška dvigala se izvede nov steber, ki služi kot podpora prečki etaže, ki se prekine. Pri izvedbi se po odstranitvi oblog ugotovi morebitno izvedena konstrukcija povezja, ki v risbah projekta iz leta 1997 ni prikazana, omenjena pa je v statiki. **Na licu mesta se določi morebitno potreba prilagoditev morebitno izvedenega horizontalnega povezja.**

Obstoječa konstrukcija mansarde in konstrukcija jaška dvigala, ostaneta nepovezani.

Zaključek jaška dvigala (+18,0m)

Jašek se zaključi pod strešno konstrukcijo. Po potrebi se odmontira in prestavi obstoječe sekundarne jeklene profile. Obstoječa konstrukcija strehe in konstrukcija jaška dvigala, ostaneta nepovezani.

Opozorilo:

Pred rušenjem obstoječih stropnih konstrukcij je potrebno obstoječo nosilno konstrukcijo na območju posegov in rušenja ustrezno strokovno podpreti! Projektno predvidena izvedba se potrdi oziroma po potrebi dopolni na mestu samem po odpiranju stropa s spodnje strani.

A.4. UPORABLJENI STANDARDI

Celotno dimenzioniranje konstrukcije je izvedeno v skladu z družino Evrokod standardov in pripadajočimi nacionalnimi dodatki:

SIST EN 1990:	**OSNOVE PROJEKTIRANJA**
SIST EN 1990:	OSNOVE PROJEKTIRANJA
SIST EN 1991:	**VPLIVI NA KONSTRUKCIJE**
SIST EN 1991-1-1:	PROSTORNINSKA TEŽA, LASTNA TEŽA, KORISTNE OBTEŽBE
SIST EN 1991-1-3:	OBTEŽBA SNEGA
SIST EN 1991-1-4:	OBTEŽBA VETRA
SIST EN 1992:	**PROJEKTIRANJE BETONSKIH KONSTRUKCIJ**
SIST EN 1992-1-1:	SPLOŠNA PRAVILA IN PRAVILA ZA STAVBE
SIST EN 1993:	**PROJEKTIRANJE JEKLENIH KONSTRUKCIJ**
SIST EN 1993-1-1:	SPLOŠNA PRAVILA IN PRAVILA ZA STAVBE
SIST EN 1995	**PROJEKTIRANJE LESENIH KONSTRUKCIJ**
SIST EN 1995-1-1:	SPLOŠNA PRAVILA IN PRAVILA ZA STAVBE
SIST EN 1998:	**PROJEKTIRANJE POTRESNO ODPORNIH KONSTRUKCIJ**
SIST EN 1998-1:	SPLOŠNA PRAVILA, POTRESNA OBTEŽBA IN PRAVILA ZA STAVBE

A.5. UPORABLJENI MATERIALI

Beton:

KONSTRUKCIJSKI ELEMENT	TRDNOST	IZPOSTAVLJENOST	KLORIDI	VODOTESNOST	VIDNI BETON	D_{MAX}	KROVNI SLOJ [CM]		
							ZUNAJ/ ZGORAJ	NOTRI/ SPODAJ	BOČNA
PODLOŽNI BETON	C12/15	-	-	-	-	-	-	-	-
TEMELJNA PLOŠČA	C30/37	XC2	-	PV-II	-	32	3,5	3,5	3,5
NOVO – STEBRI, STENE	C25/30	XC1	-	-	-	32	3,0	3,0	3,0
NOVO – PLOŠČE, NOSILCI	C25/30	XC1	-	-	-	32	3,0	3,0	3,0

Konstrukcije v stiku z zemljino so hidroizolirane, obenem v vodotesni izvedbi. Vse delovne stike je potrebno zatesniti. Na tehnoloških delovnih stikih v tem. pl. se vgradi tesnilni trak (npr. Besaflex profil AA 320/35). Na stiku tem. pl.-stena se vgradi pločevinast trak (npr. Sika Waterbar Type ST-15). Na tehnoloških delovnih stikih sten se vgradi pločevinast trak v sredino stene (npr. Sika Waterbar Type ST-15).

Pred izvedbo je potrebno izdelati projekt izvajanja betonskih konstrukcij (PIBK), s katerim je potrebno opredeliti recepturo betona, tehnologijo vgrajevanja in predpisati potrebno negovanje svežega betona, izvedbo opažev in potrebnih podpiranj ter razpiranj opažev.

Armaturno jeklo:

KONSTRUKCIJSKI ELEMENT	TRDNOST	RAZRED DUKTILNOSTI	f_{yk} [MPa]	f_{tk}/f_{yk}	ε_{uk} [%]
TEMELJI, STENE, STEBRI, NOSILCI, PLOŠČE	B500	B	500	≥1,08	≥5,0

Jeklena konstrukcija:

Osnovni material: S235 JR.

Vijačne zveze (vijaki, matice in podložke): kvaliteta 8.8 oz. 10.9 SIST EN 15048-1

Sidra:

Sistem Hilti, epoksidna masa Hilti HIT-RE 500 V4.

Vsi vgrajeni materiali in gradbeni proizvodi morajo imeti ustrezna potrdila (potrdila o kvaliteti materiala, izjave o lastnostih,… v skladu z Gradbenim zakonom in Zakonom o gradbenih proizvodih).

A.6. RAČUNSKA ANALIZA

A.6.1. Jašek dvigala:

Skladno z 8. členom pravilnika o mehanski odpornosti in stabilnosti objektov je načrt gradbenih konstrukcij izdelan skladno s pravili družine Evrokod standardov in pripadajočimi nacionalnimi dodatki.

V okviru projekta je narejena kontrola nosilnosti prerezov in stabilnosti elementov za vse merodajne obtežne kombinacije v stalnem in začasnem projektnem stanju ter potresnem projektnem stanju. Statične količine so izračunane z linearno elastično analizo. Nosilni elementi izpolnjujejo vse kontrole glede nosilnosti in stabilnosti. Potresna analiza je bila izvedena s pomočjo modalne analize konstrukcije ob uporabi spektrov odziva. Uporabljeni so bili ploskovni 2D in linijski 1D končni elementi.

A.6.2. Obstoječa konstrukcija

Sanacija obstoječe konstrukcije in s tem globalna analiza konstrukcije, razen lokalnih konstrukcijskih posegov na pozicijah preboja jaška dvigala, s tem projektom ni predvidena.

A.6.3. Opredelitev obsega rekonstrukcije

Predvidene je vgradnja dvigala v notranjosti objekta, s katerim se posega v nosilno konstrukcijo. S tem povezano se izvede statične ojačitve posameznega ali več posameznih konstrukcijskih elementov, zamenjava istovrstnih posameznih konstrukcijskih elementov, dolbenje utorov in niš v nosilno konstrukcijo.

Namembnost objekta in koristne obremenitve v etažah se ne spreminjajo. Gradbenotehnične lastnosti objekta se ne poslabšuje.

Z vidika statike lahko predvidene posege opredelimo kot manjšo rekonstrukcijo, saj Gradbeni zakon (GZ-1) kot manjšo rekonstrukcijo opredeljuje naslednja posamezna dela:

- **statične ojačitve posameznega ali več posameznih konstrukcijskih elementov**,
- **zamenjava istovrstnih posameznih konstrukcijskih elementov**, v katero spada **na primer zamenjava** ostrešja ali **delov medetažne konstrukcije**,
- zamenjava elementov javnega vodovoda in javne kanalizacije,
- **dolbenje utorov in niš v nosilno konstrukcijo**,
- izvedba odprtin in večjih konstrukcijskih prebojev ter povečanje obstoječih odprtin v objektu, ki ne presegajo ene tretjine površine posameznega konstrukcijskega elementa in niso širši od 2 m,
- povečanje obstoječih prebojev fasade stavbe do 2 m, pri čemer velikost povečanja odprtine ne sme presegati ene tretjine površine fasade.
- novi preboji fasade stavbe, če je ravnina fasade, na kateri se izvajajo preboji, od meje zemljišča drugega lastnika oddaljena več kot 2 m, pri čemer velikost novih prebojev ne presega ene tretjine površine fasade in noben preboj ni širši od 2 m,
- **vgradnja dvigala v notranjosti objekta, s katerim se posega v nosilno konstrukcijo**,

- manjše povečanje prostornine, ki ne poveča bruto tlorisne površine objekta, ter pomeni izvedbo posameznih konstrukcijskih elementov na objektu (npr. izvedba frčade, vsaj z dveh strani odprt nadstrešek na obstoječi pohodni strehi, dvig obodnega zidu pod poševno streho za višino horizontalne vezi za največ 0,3 m),
- prizidava nakladalnih ramp in klančin,
- izvedba nepohodnega konzolnega nadstreška površine do 6 m2,
- prizidava zunanjega odprtega stopnišča ali dvigala, ki ne povezuje več kot treh etaž in je zunanji rob stopnišča ali dvigala oddaljen od sosednjega objekta drugega lastnika več kot 4 m.

A.7. VPLIVI NA KONSTRUKCIJO

Glej poglavje B.1 Obstoječa konstrukcija

V okviru analize obstoječe jeklene konstrukcije mansarde smo upoštevali vplive, kot so bili upoštevani v osnovnem projektu Sanacija in adaptacija podstrešja Novi trg 2, trakt A, PGD – arhitektura, popis, statika, SGI Slomškova 12, Ljubljana, št. projekta 113/97, junij 1997.

Dvigalo – Analiza obtežb (SIST EN 1991-1).

A.8. IZVEDBA ARMIRANOBETONSKE KONSTRUKCIJE

Splošno:

Način izvedbe AB konstrukcij mora biti v skladu z zahtevami SISTEN 13670 opredeljen v Projektu izvajanja betonske konstrukcije, ki ga pripravi izvajalec.

Razred izvedbe betonskih konstrukcij:

Konstrukcija spada v 2. izvedbeni razred konstrukcije skladno s standardom SIST EN 13670.

Požarna zaščita betonskih konstrukcij:

AB konstrukcija mora zagotavljati R30 standardiziranega požara. Požarna zaščita armiranobetonskih konstrukcij je pasivna in jo zagotavlja zaščitna plast betona 3 cm.

A.9. IZDELAVA IN MONTAŽA JEKLENE KONSTRUKCIJE

Jeklena konstrukcija mora biti izdelana in montirana v skladu s projektno dokumentacijo in v skladu z določili slovenskega standarda: SIST EN 1090-2:2008+A1:2012 “Izvedba jeklenih in aluminijastih konstrukcij – 2. del: Tehnične zahteve za izvedbo jeklenih konstrukcij”, v katerem so navedene splošne zahteve za izdelavo in montažo jeklenih nosilnih konstrukcij, narejenih iz vroče valjanih, vroče obdelanih, varjenih in hladno oblikovanih jeklenih izdelkov.

V okviru izdelave in montaže jeklenih konstrukcije je potrebno upoštevati tudi druge standarde, ki jih krovni standard SIST EN 1090-2:2008+A1:2012 uvaja oziroma se na njih sklicuje. V skladu z objavo v evropskem uradnem listu je po 01.07.2014 potrebno obvezno upoštevati tudi določila harmoniziranega standarda: SIST EN 1090-1:2009+A1:2012 “Izvedba jeklenih in aluminijastih konstrukcij – 1. del: Zahteve za ugotavljanje skladnosti sestavnih delov konstrukcij”. Ves vgrajen material (pločevine, profili, dodajni material, spojna sredstva…) mora biti opremljen s potrdili o kvaliteti v skladu z zakonom o standardizaciji. Potrdila o kvaliteti morajo biti stopnje v skladu z določili podanimi v Tabeli 1 točke 5.2 standarda SIST EN 1090-2:2008+A1:2012. V vseh fazah izdelave in montaže nosilne jeklene konstrukcije mora biti zagotovljena sledljivost materiala.

Osnovni material

Za nosilno jekleno konstrukcijo je prepisan material kvalitete S235 JR.

Vijačni spoji

Vsi vijačeni spoji morajo biti vizualno pregledani. Izvajalec naj ob pritegovanju vijakov (po posameznih fazah montaže) izdela pisne protokole privijanja vijakov, iz katerega mora biti razvidno, kateri vijaki in na kakšen način so se pritegovali.

Sidra:

Naknadno vgrajena sidra so v betonsko konstrukcijo zalepljena po sistemu HILTI HVU HAS.

Protikorozijska zaščita jeklenih konstrukcij

Pri načrtovanju in izvedbi protikorozijske zaščite z barvami je potrebno upoštevati določila skupine standardov. Jeklena konstrukcija je zaščitena z barvami, ki skladno z SIST EN ISO 12944 (deli 1, 2, 3, 4, 5, 6, 7, 8) Barve in laki.

Korozijska zaščita jeklenih konstrukcij v objektu (notri) se izvede z zaščitnimi premaznimi sistemi, ki zagotavljajo visoko H trajnost (več kot 15 let) protikorozijske zaščite v okolju z nizko kategorijo C2 korozijske ogroženosti (neogrevani objekti kjer lahko pride do kondenzacije, shrambe, športni objekti).

Pregled stanja konstrukcije in Delavniška dokumentacija

Izvajalec mora, po odstranitvi oblog na jekleni konstrukciji mansarde, natančno gradbeno posneti jekleno konstrukcijo (geometrijo, profilacijo). O ugotovitvah je potrebno seznaniti projektanta, ki bo z ozirom na ugotovljeno stanje podal morebitno potrebne spremembe izvedbe predelave.

Po uskladitvi z dejanskim stanjem izvajalec na podlagi PZI projkta, ugotovljenega stanja in morebitnih podanih dodatnih ukrepih s strani statika, izdela delavniško dokumentacijo, na osnovi katere se izvede predelava.

A.10. TEMELJENJE

Točna sestava in nosilnost temeljnih tal ni poznana. Zaradi tega mora izkop za temeljno ploščo pregledati geomehanik in predpisati vsa potrebna navodila za ustrezno pripravo tal pred izvedbo temeljne plošče.

Projektne obremenitve v temeljnih tleh (MSN) so velikosti do 165 kN/m^2.

A.11. OPAZOVANJE KONSTRUKCIJE OBJEKTA - MONITORING

Tokom izvedbe je potrebno vzpostaviti monitoring stanja obstoječe konstrukcije. V začetnem stanju se pregleda obstoječo konstrukcijo, evidentira stanje in morebitne poškodbe. Tokom izvedbe se redno, vsakodnevno pregleda stanje obstoječih poškodb in ugotavlja morebitne novo nastale poškodbe. Novonastale poškodbe zaradi izvedbe dvigala se strokovno sanira.

A.12. POVZETEK KONSTRUKCIJSKIH POSEGOV IN PREDLOG ZAPOREDJA DEL

1. Lokalni odkop v območju umestitve jaška dvigala za potrebe izdelave talne plošče jaška dvigala. Prvo se izvede odkop do dna obstoječih temeljev.
2. Sledi injektiranje obstoječih kamnitih temeljnih podstavkov zidov.

3. Po injektiranju se izvede podbetonaža zidov v območju umeščanja jaška dvigala do potrebne globine. Izvedba podbetonaže po kampadah. Sočasno se izvede potreben odkop do dna temeljne plošče.
4. Pregled temeljnih tal. Temeljna tla morajo biti pregledana in potrjena s strani geomehanika, ki predpiše morebitne potrebne ukrepe za sanacijo tal. Tla se utrdi do mere, da bodo posedki talne plošče dvigala minimalni.
5. Izvedba talne plošče jaška dvigala, pri čemer se mikro lokacija sten jaška dvigala oziroma sider za stene jaška dvigala določi tako, da stene jaška dvigala ne posegajo v obstoječa loka nad pritličjem. Jašek dvigala mora biti ločen – dilatiran od etažne konstrukcije nad pritličjem (od sten in lokov).
6. Izvedba podpiranja lokov in obokov nad pritličjem ter izvedba sanacije obokov nad pritličjem.
7. Po izvedbi sanacije obokov nad pritličjem sledi izvedba začasnega podpiranja plošče nad prvim nadstropjem in izvedba odprtine v plošči nad prvim nadstropjem.
8. Sledi izdelava jaška dvigala do plošče nad prvim nadstropjem. Z izvedbo jaška do plošče nad prvim nadstropjem, se vzpostavi tudi končno podpiranje plošče nad prvim nadstropjem v območju preboja na stene jaška dvigala. Začasne podpore se ne odstrani!
9. Sledi izvedba začasnega podpiranja plošče nad drugim nadstropjem in izvedba odprtine v plošči. Posebej je potrebno biti pozoren, da bodo začasne podpore v območju naleganja obstoječega stebra imele zadostno nosilnost in bodo potekale zvezno do talne plošče dvigala.
   Armatura plošče nad 2. nadstropjem se ohrani in preveže v armaturo jaška dvigala.
10. Po izvedbi odprtine v plošči nad drugim nadstropjem se izvede jašek dvigala do plošče nad drugim nadstropjem. Plošča nad drugim nadstropjem in konstrukcija jaška dvigala sta projektno predvideni povezani.
11. Po izvedbi jaška do drugega nadstropja in tako podprtjem plošče nad 2. nadstropjem s konstrukcijo jaška dvigala se lahko pristopi k predelavi jeklene konstrukcije mansarde na nivoju prve etaže mansarde. Ta se začasno podpre, vgradi se dodatna stebra in po vgraditvi dodatnih stebrov izvede predelava okvirja in menjalnikov. Geometrija predelave (odrez, menjalniki) se prilagodi zatečeni geometriji obstoječe jeklene konstrukcije.
12. Sledi izvedba jaška do kote 18,00 m. Na koti 18,00 m se po potrebi odstrani/premesti obstoječe sekundarne nosilce strehe.

Opozorila:

Začasne podpore se lahko odstranijo šele po končanju del v mansardi.

Varnostni ukrepi se podrobneje opredelijo v Varnostnem načrtu.

Izvajalec mora za poterbe varne in strokovne izvedbe izdelati tehnološki elaborat z vsemi predvidenimi fazami izvajanja in potrebnimi ukrepi podpiranja.

Konstrukcija se mora izvajati pod projektantskim nadzorom, strokovnim gradbenim nadzorom in geotehničnim nadzorom.

Ljubljana, april 2025

Zapisala:

mag. Tomaž HABIČ, univ. dipl. inž. grad.

(IZS PI G-0332)

Miha BLATNIK, mag. inž. grad.

(IZS PI G-4887)

B. ANALIZA KONSTRUKCIJE

B.1. OBSTOJEČA KONSTRUKCIJA

V okviru analize obstoječe jeklene konstrukcije mansarde smo upoštevali vplive, kot so bili upoštevani v osnovnem projektu Sanacija in adaptacija podstrešja Novi trg 2, trakt A, PGD – arhitektura, popis, statika, SGI Slomškova 12, Ljubljana, št. projekta 113/97, junij 1997.

B.2. DVIGALO – ANALIZA OBTEŽB (SIST EN 1991-1)

B.2.1. Lastna teža

Lastno težo upošteva računalniški program SCIA Engineer sam.

B.2.2. Stalni vplivi

Stalni vplivi v etažah so povzeti po osnovnem projektu Sanacija in adaptacija podstrešja Novi trg 2, trakt A, PGD – arhitektura, popis, statika, SGI Slomškova 12, Ljubljana, št. projekta 113/97, junij 1997.

B.2.3. Koristni vplivi

SIST EN 1991-1-1:2004, 6.3.1

Etaže:

Kategorija: B – pisarne	q_k =	3,0	kN/m^2
Kategorija: A – stopnice	q_k =	2,5	kN/m^2
Predelne stene z lastno težo ≤3,0 kN/m	q_k =	1,2	kN/m^2

Streha:

Kategorija: H – strehe	q_k =	0,4	kN/m^2

Dvigalo:

Vplivi dvigala - bočne sile in vertikalne obremenitve na dnu dvigala in krovni plošči jaška dvigala.
Predpostavljene obtežbe je potrebno preveriti po izboru dvigala.

B.2.4. Vpliv snega

SIST EN 1991-1-3:2004

Ni merodajen za dimenzioniranje konstrukcije dvigala.

B.2.5. Reologija betona

Vplivi reologije betona niso merodajni za dimenzioniranje konstrukcije jaška dvigala.

B.2.6. Potresni vpliv (upoštevan pri analizi jaška dvigala)

Lokacija: Ljubljana

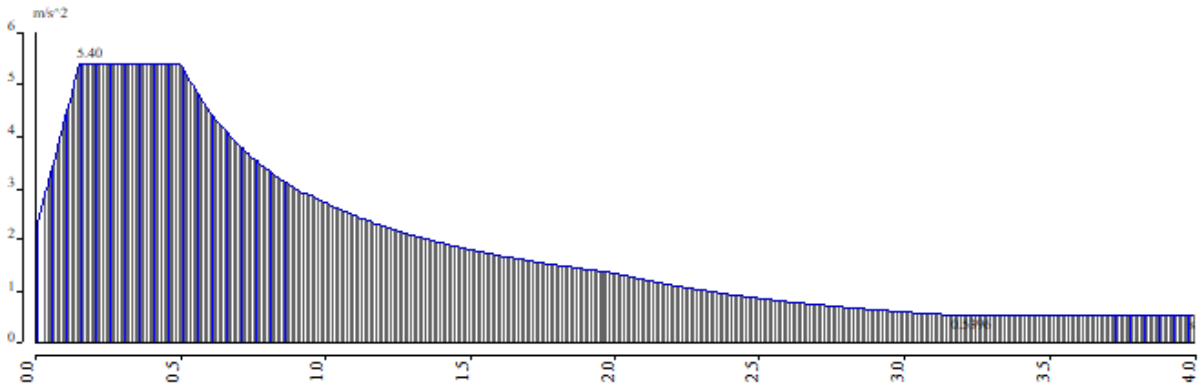
Tip tal: B (Karta tipa tal za mestno občino Ljubljana)

Kategorija pomembnosti: $\gamma = 1{,}0$

Referenčni pospešek tal: $a_{gR} = 0{,}275\ g$

Projektni pospešek tal: $a_g = 1{,}0 \cdot 0{,}25\ g = 0{,}275\ g$

Faktor obnašanja: $q = 1.50$



B.3. LASTNOSTI MATERIALOV

Beton:

		f_{ck}	$f_{ck,cube}$	f_{cm}	f_{ctm} [MPa]	E_{cm} [GPa]	ε_{c2}	ε_{cu2} [‰]
Betonski elementi	C25/30	25	30	33	2,6	31	2,0	3,5

Armatura:

	f_{yk}	f_{yd} [MPa]	E_s [MPa]	ε_{ud}	ε_{uk} [‰]
B500 B	500	435	200000	10	50

B.4. KROVNI SLOJ BETONA

Določitev krovnega sloja armiranobetonskih elementov v skladu s SIST EN 1992-1-2005, poglavje 4.4.1.

TEMELJNA PLOŠČA

C25/30, XC2, PV-II, D_{max} = 32 mm

$c_{min,b} = 16\ mm$

$c_{min,dur} = 20\ mm$

$\Delta c_{dur,\gamma} = 0\ mm$

$\Delta c_{dur,st} = 0\ mm$

$\Delta c_{dur,add} = 0\ mm$

$$c_{min} = \max\begin{cases} c_{min,b} = 16\ mm \\ c_{min,dur} - \Delta c_{dur,\gamma} - \Delta c_{dur,st} = 20 - 0 - 0 = 20\ mm = 20\ mm \\ 10\ mm \end{cases}$$

$\Delta c_{dev} = 10\ mm$

$c_{nom} = c_{min} + \Delta c_{dev} = 20 + 10 = 30\ mm \rightarrow izberem\ \boldsymbol{c_{nom} = 35\ mm}$

STENE, STEBRI

C25/30, XC1, D_{max} = 32 mm

$c_{min,b} = 14\ mm$

$c_{min,dur} = 15\ mm$

$\Delta c_{dur,\gamma} = 0\ mm$

$\Delta c_{dur,st} = 0\ mm$

$\Delta c_{dur,add} = 0\ mm$

$$c_{min} = \max\begin{cases} c_{min,b} = 14\ mm \\ c_{min,dur} - \Delta c_{dur,\gamma} - \Delta c_{dur,st} = 15 - 0 - 0 = 15\ mm = 15\ mm \\ 10\ mm \end{cases}$$

$\Delta c_{dev} = 10\ mm$

$c_{nom} = c_{min} + \Delta c_{dev} = 15 + 10 = 25\ mm \rightarrow izberem\ \boldsymbol{c_{nom} = 30\ mm}$

PLOŠČE, NOSILCI

C25/30, XC1, D_{max} = 32 mm

$c_{min,b} = 14\ mm$

$c_{min,dur} = 10\ mm$

$\Delta c_{dur,\gamma} = 0\ mm$

$\Delta c_{dur,st} = 0\ mm$

$\Delta c_{dur,add} = 0\ mm$

$$c_{min} = \max\begin{cases} c_{min,b} = 14\ mm \\ c_{min,dur} - \Delta c_{dur,\gamma} - \Delta c_{dur,st} = 10 - 0 - 0 = 10\ mm = 14\ mm \\ 10\ mm \end{cases}$$

$\Delta c_{dev} = 10\ mm$

$c_{nom} = c_{min} + \Delta c_{dev} = 14 + 10 = 24\ mm \rightarrow izberem\ \boldsymbol{c_{nom} = 30\ mm}$

B.5. MODELIRANJE KONSTRUKCIJE

Analiza konstrukcije je izvedena s programom SCIA Engineer. Izvedena je bila statična in dinamična (potresna) analiza konstrukcije ter vse potrebne preverbe in kontrole nosilnosti.

Za računski model konstrukcije so uporabljeni 2D končni elementi in 1D linijski elementi.

Pri dimenzioniranju je bila uporabljena naslednja programska oprema:

- SCIA Engineer
- IDEA StatiCa
- Pripomočki za dimenzioniranje izdelani s programskim orodjem Excel

B.6. REZULTATI ANALIZE

V nadaljevanju so prikazane kontrole in izračuni, ki niso obravnavani v izpisih analize konstrukcije. V prilogah se nahajajo rezultati in dimenzioniranje elementov:

P.1: Analiza konstrukcije – dvigalni jašek

P.2: Analiza konstrukcije – dimenzioniranje AB kratke konzole

P.3: Kontrola obremenitev v obstoječem jeklenem okvirju zaradi predelave prečke prve etaže

RAČUN ARMATURE

V prilogi P.1 so prikazani rezultati potrebne armature v elementih.

Smeri armature - splošno:

1 (rdeča puščica, v splošnem vzdolžna smer)

2 (zelena puščica, v splošnem prečna smer)

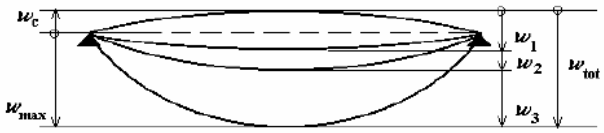
+ (modra puščica, v splošnem zgornja oz. zaledna smer)

- (modra puščica, v splošnem spodnja oz. notranja stran)

KONTROLA PREBOJA

Prebojno silo na vogalih in konceh sten izračunamo z integracijo glavnih strižnih napetosti ($q_{max.b}$) na kritičnem preseku tik ob vertikalnem elementu. Prebojno silo ob stebrih, ki so modelirani z linijskimi elementi, izračunamo z razliko osnih sil v stebrih pod in nad ploščo.

KONTROLA POVESOV



Upoštevamo omejitev za stropove na splošno, in sicer v velikosti w_{max}=L/300 ob upoštevanju reologije betona. Za določitev dolgotrajnih vplivov zaradi reologije upoštevamo povečanje elastičnih pomikov ob upoštevanju efektivnega elastičnega modula betona:

$$E_{c,eff} = \frac{E_{c,m}}{1+\varphi(\infty,t_0)},$$

oziroma ta vpliv zajamemo s faktorjem povečanja elastičnih računskih deformacij:

$$u_{lim} = u_{el}(1 + \varphi(\infty, t_0))$$

S faktorjem 1,2 zajamemo redukcijo modula elastičnosti plošče v območju nateznih razpok. Končni poves pri navidezno stalni kombinaciji je sedaj:

$$u_{lim} = u_{el}\big(1 + \varphi(\infty, t_0)\big) \cdot 1{,}2$$

B.6.1. Minimalna armatura

AB plošče

$$A_{s,min} = min\begin{cases} 0{,}26 \cdot \dfrac{f_{ctm}}{f_{yk}} \cdot b_t \cdot d \\ 0{,}0013 \cdot b_t \cdot t \end{cases}$$

Debelina [cm]	$A_{s,min}$ [cm²/m']
20	1.95
40	4.61

AB stene

V skladu s standardom SIST EN 1992-1-1 in pripadajočim nacionalnim dodatkom so podane zahteva za minimalno armaturo v stenah:

- Vodoravna armatura (skupno za ± stran):

$$A_{s,h,min} = max\begin{cases}0{,}002 \cdot A_c \\ 0{,}25 \cdot A_{s,v}\end{cases}$$

- Vertikalna armatura (skupno za ± stran):

$$A_{s,v,min} = 0{,}003 \cdot A_c$$

Vendar ne več kot: $A_{s,v,max} = 0{,}04 \cdot A_c$

V spodnji tabeli je izračunana minimalna/maksimalna armatura za posamezne debeline sten glede na zgornje izraze.

Debelina stene d [cm]	$A_{s,h,min}$ [cm²/m]	$A_{s,v,min}$ [cm²/m]	$A_{s,v,max}$ [cm²/m]
20	4,00	6,00	80,00
25	5,00	7,50	100,00

B.6.2. Potresno stanje – nosilnost temeljne plošče dvigalnega jaška

Standard SIST EN 1998-1, 4.4.2.6 (2)P navaja, da morajo biti učinki potresnega vpliv za temelje določeni ob uporabi metode načrtovanja nosilnosti in ob upoštevanju možne dodatne nosilnosti. Ni treba, da so vrednosti večje od vrednosti, dobljenih pri potresnem projektnem stanju, ob predpostavki, da je obnašanje elastično (q=1,0).

Projektne vrednosti učinkov vpliva E_{Fd} so na temelje izpeljane na naslednji način:

$$F_{Fd} = E_{F,G} + \gamma_{Rd} \cdot \Omega \cdot E_{F,E}$$

Kjer so:

γ_{Rd} Faktor dodatne nosilnosti

$E_{F,G}$ Učinek nepotresnih vplivov, ki so vključeni v projektno potresno stanje

$E_{F,E}$ Učinek vpliva, dobljen z analizo projektnega potresnega vpliva

Ω Vrednost za območje sipanja ali element konstrukcije, ki ima največji vpliv na obravnavani učinek potresa

Točka 4.4.2.6 (8) navaja, da pri skupnih temeljev več kot enega navpičnega elementa (npr. temeljne plošče

Pri skupnih temeljih več kot enega navpičnega elementa (temeljni nosilci, pasovni temelji, temeljne plošče itd.) se upošteva, da je zahteva (2)P izpolnjena, če je vrednost Ω, uporabljena v izrazu (4.30), določena za navpični element, ki ima v potresnem projektnem stanju največjo vodoravno prečno silo. Upošteva se tudi, da je zahteva

izpolnjena, če je v izrazu (4.30) uporabljena vrednost Ω = 1, vrednost faktorja dodatne nosilnosti γ_{Rd} pa je povečana na 1,4.

Računsko potrebna armatura v temeljni plošči je določena pri ovojnici mejnega stanja nosilnosti ter potresni ovojnici z povečanjem projektnega potresnega vpliva (q_x = 3,6 in q_y = 2,95) za faktor:

$$faktor\ povečanja = \gamma_{Rd} \cdot \Omega = 1{,}4 \cdot 1 = 1{,}4$$

Iz tega sledi za temeljno ploščo:

$$E_{Fd} = E_{F,G} + 1{,}4 \cdot 1 \cdot E_{F,E}$$

B.6.3. Kontrola preboja temeljne plošče

Schöck	001 Projekt	Stran: ...
	P 1	List: 1

Delovanje sil

Prebojna obremenitev	V_{Ed} = 545 kN
Dinamični delež	$V_{Ed,dyn}$ = 0 kN
Obremenitev tal	q_B = 180 kN/m²
Faktor povečanja obremenitve	β = 1.20

Dimenzija - Vogal stene

Debelina plošče	h = 400 mm
Koristna statična višina	d = 340 mm
Pokrivni sloj betona zgoraj/spodaj	co; cu = 40; 40 mm

Material

Beton	C30/37 (f_{ck} = 30.0 N/mm²)
Jeklo	B500 (f_{yk} = 500 N/mm²)
Stopnja armiranja	$\rho=(\rho_x\cdot\rho_y)^{1/2}=(1.12\cdot0.72)^{1/2}$ = 0.90 %

A_{sx} = 38.1 cm²/m (~ø20/82 mm); A_{sy} = 24.4 cm²/m (~ø16/82 mm)
Armatura mora biti zasidrana preko zunanjega zaokroženega preseka "Uout"

Protiprebojni izračun po DIN EC2:2015 + NA:2015 + ETA

Faktor κ	$\kappa = \min\{1+(200/d)^{1/2}; 2\}$ = 1.77
Vpliv debeline plošče	η = 1.00
Faktor $C_{Rd,c}$	$C_{Rd,c} = 0.15/\gamma_c$ = 0.10
Minimalna nosilnost betona	$v_{min} = (0{,}0525/\gamma_c)\cdot\kappa^{3/2}\cdot fck^{1/2}$ = 450.3 kN/m²
Nosilnost betona	$v_{Rd,c} = \max\{C_{Rd,c}\cdot\kappa\cdot(\rho\cdot f_{ck})^{1/3}; v_{min}\}$ = 529.6 kN/m²

Kritični zaokroženi presek u_{crit}

Kritična razdalja (iterativni)	a_{crit} =1.6d = 544 mm
Dolžina zaokroženega preseka	u_{crit} = 1.875 m
Površina zaokroženega preseka	A_{crit} = 1.047 m²
Prečna sila, ki se bo prenašala	$V_{Ed,red} = (V_{Ed}-q_B\cdot A_{1.6d})\cdot ß$ = 427.8 kN
Nosilnost betona	$V_{Rd,c,crit} = v_{Rd,c}\cdot d\cdot u_{1.6d}\cdot 2\cdot d/a_{1.6d}$ = 421.9 kN
Maksimalna nosilnost	$V_{Rd,max,crit} = V_{Rd,c,crit,(CRdc=0.12)}\cdot 1.5$ = 759.5 kN

$V_{Rd,c,crit}$=421.9kN ≤ $V_{Ed,red}$=427.8kN ≤ $V_{Rd,max,crit}$=759.5kN
Potrebna je protiprebojna armatura, izbran:

3x Schöck BOLE O 16/320-3/B605

Izračun nosilnosti jekla

$V_{Ed,red}$=427.8kN ≤ $V_{Rd,sy,crit}=m_c\cdot n_c\cdot A_{s,i}\cdot f_{yd}/\eta$=525kN

$V_{Ed,D}=(V_{Ed}-q_B\cdot A_{0.53m})\cdot ß/3$=132kN ≤ $V_{Rd,sy,D}=m_c\cdot A_{s,i}\cdot f_{yd}/\eta$=262kN (EOTA TR 060)

Zunanji zaokroženi presek u_{out} (ls + 1.5d)

Dolžina armiranega območja	ls = 530 mm
Dolžina zaokroženega preseka	u_{out} = 2.654 m
Faktor povečanja obremenitve	$ß_{red} = \max\{1/(1.2+ß/40\cdot l_s/d)\cdot ß; 1.1\}$ = 1.10
Površina zaokroženega preseka	$A_\Delta = A_{ls}$ = 1.021 m²
Prečna sila, ki se bo prenašala	$V_{Ed,out} = ß_{red}\cdot(V_{Ed}-\Delta V_{Ed})$ = 397.3 kN
Nosilnost betona	$v_{Rd,c,out} = \max\{C_{Rd,c,out}\cdot\kappa\cdot(\rho\cdot f_{ck})^{1/3}; v_{min}\}$ = 529.6 kN/m²
Nosilnost betona	$V_{Rd,c,out} = v_{Rd,c,out}\cdot d\cdot u_{out}$ = 477.8 kN

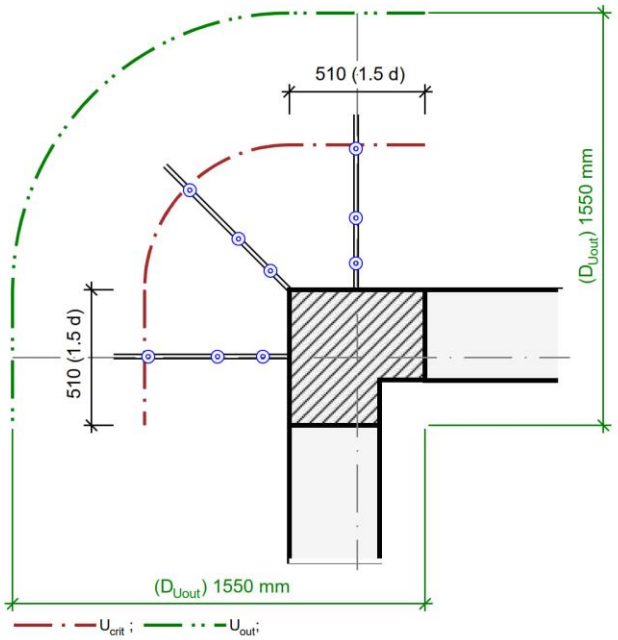
$V_{Ed,out}$=397.3kN ≤ $V_{Rd,c,out}$=477.8kN

Dolžina protiprebojne armature zadostna

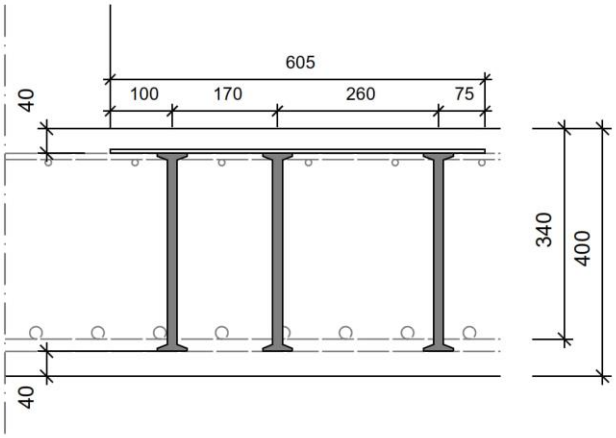
-/- Datum: 4. 04. 2025

Schöck BOLE Različica : 2.15.03

Schöck	001 Projekt	Stran: ...
	P 1	List: 2



3x Schöck BOLE O 16/320-3/B605



-/-

Datum: 4. 04. 2025

Schöck BOLE Različica : 2.15.03

B.6.4. Omejitev poškodb – kontrola etažnih pomikov

Inter-storey Drift:
Linear calculation, Extreme: Member
Selection: All
Load cases : Ex

Name	Δux [mm]	Δuy [mm]	Δuz [mm]	Δφx [mrad]	Δφy [mrad]	Δφz [mrad]
FL1	**-0.2**	**0.3**	**0.0**	**-0.1**	**-0.1**	**-0.1**
FL2	**0.1**	**-0.3**	**0.0**	**0.1**	**0.0**	**-0.1**
FL3	**0.2**	**-0.5**	**0.0**	**-0.2**	**-0.1**	**-0.2**
FL4	**-0.1**	**0.1**	**-0.1**	**-0.2**	**-0.1**	**0.0**
FL5	**-0.4**	**1.0**	**0.0**	**0.1**	**0.1**	**0.2**
FL6	**-0.4**	**-0.9**	**0.1**	**0.3**	**0.1**	**-0.4**
FL7	**0.4**	**-1.0**	**0.0**	**0.0**	**0.0**	**-0.4**

Inter-storey Drift:
Linear calculation, Extreme: Member
Selection: All
Load cases : Ey

Name	Δux [mm]	Δuy [mm]	Δuz [mm]	Δφx [mrad]	Δφy [mrad]	Δφz [mrad]
FL1	**-0.2**	**0.3**	**0.0**	**-0.1**	**-0.1**	**-0.1**
FL2	**0.1**	**-0.3**	**0.0**	**0.1**	**0.0**	**-0.1**
FL3	**0.2**	**-0.5**	**0.0**	**-0.2**	**-0.1**	**-0.2**
FL4	**-0.1**	**0.1**	**-0.1**	**-0.2**	**-0.1**	**0.0**
FL5	**-0.4**	**1.0**	**0.0**	**0.1**	**0.1**	**0.2**
FL6	**-0.4**	**-0.9**	**0.1**	**0.3**	**0.1**	**-0.4**
FL7	**0.4**	**-1.0**	**0.0**	**0.0**	**0.0**	**-0.4**

Standard SIST EN 1998-1:2006, 4.4.3.2 v sklopu omejitve poškodb podaja omejitve etažnih pomikov pri elastičnem spektru odziva – q=1,0.

Za stavbe, pri katerih so nekonstrukcijski elementi pritrjeni na konstrukcijo tako, da deformacije konstrukcije nanjo ne vplivajo je omejitev podana z izrazom:

$$d_r \cdot \nu \leq 0{,}01 \cdot h$$

Kjer je:

- d_r.. projektni etažni pomik, povprečje pomika na dnu in vrhu etaže
- h… etažna višina
- ν… redukcijski faktor, ki upošteva manjšo povratno dobo potresa, povezano z zahtevo po omejitvi poškodb.

V spodnji je v tabeli prikazana kontrola etažnih pomikov za vsako etažo nad koto 0.

Etaža	z_i [mm]	Δh [mm]	$d_{e,x}$ [mm]	$d_{e,y}$ [mm]	d_{rx} [mm]	d_{ry} [mm]	$\nu * d_{r\,max}$ [mm]	0.01*Δh	< 0.01*Δh
0	0		0.2	0.3					
P	1900	1900	0.3	0.3	0.45	0.45	0.18	19.00	**OK!**
1	6300	4400	0.5	0.5	0.75	0.75	0.30	44.00	**OK!**
2	10300	4000	0.1	0.1	0.15	0.15	0.06	40.00	**OK!**
3	14300	4000	1	1	1.5	1.5	0.60	40.00	**OK!**
4	17300	3000	0.9	0.9	1.35	1.35	0.54	30.00	**OK!**

5	20300	3000	1	1	1.5	1.5	0.60	30.00	**OK!**

ν= 0.4 Omejitev pomikov = 0.01

B.6.5. Vpliv teorije drugega reda (P-Δ efekt)

V skladu s točko SIST EN 1998-1:2006, 4.4.2.2 (2), vpliva teorija drugega red (P-Δ efekt) ni treba upoštevati, če je v vseh etažah izpolnjen pogoj:

$$\theta = \frac{(P_{tot} \cdot d_r)}{V_{tot} \cdot h} \leq 0{,}10$$

Kjer je:

- Θ…koeficient občutljivosti za etažne pomike
- P_{tot}…celotna sila težnosti v obravnavani etaži in nad njo, ki je upoštevana pri potresnem projektnem stanju
- d_r…projektni etažni pomik, določen kot razlika med povprečnima vodoravnima pomikoma d_s na vrhu in na dnu obravnavane etaže
- V_{tot}…celotna prečna sila v etaži zaradi potresa
- h…višina etaže

Etaža	Δh [mm]	d_{rx} [mm]	d_{ry} [mm]	$V_{tot,x}$	$V_{tot,y}$	P	Θ_x	Pogoj	Θ_y	Pogoj
P	1900	0.45	0.45	95.93	70.41	837.68	0.00	<0,1	0.00	<0,1
1	4400	0.75	0.75	97.79	63.58	803.62	0.00	<0,1	0.00	<0,1
2	4000	0.15	0.15	77.08	15.49	665.61	0.00	<0,1	0.00	<0,1
3	4000	1.50	1.50	106.15	108.8	432.23	0.00	<0,1	0.00	<0,1
4	3000	1.35	1.35	46.03	48.75	191.42	0.00	<0,2	0.00	<0,2
5	3000	1.50	1.50	36.54	35.76	105.3	0.00	<0,3	0.00	<0,3

Ker je v vseh etažah izpolnjen pogoj iz zgornjega izraza, ni potrebno upoštevati vpliva teorije drugega reda (P-Δ efekta).

C. PRILOGE

Seznam prilog:

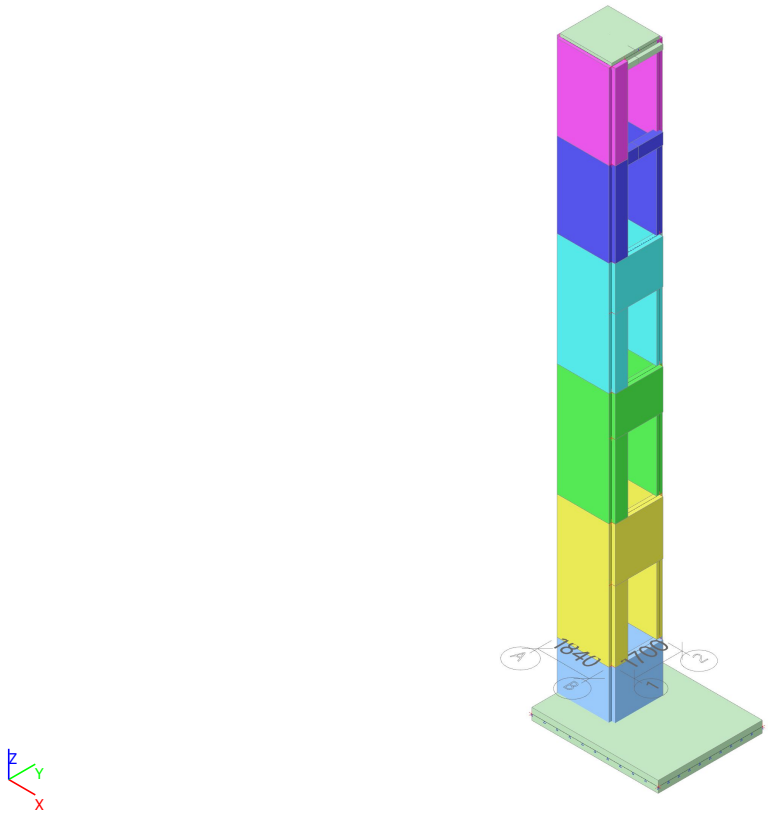
P.1: Analiza konstrukcije – dvigalni jašek

P.2: Analiza konstrukcije – dimenzioniranje AB kratke konzole

P.3: Analiza konstrukcije – kontrola obremenitev v obstoječem jeklenem okvirju zaradi predelave prečke prve etaže (osnovno stanje in novo stanje).

P.1

Analiza konstrukcije - dvigalni jašek



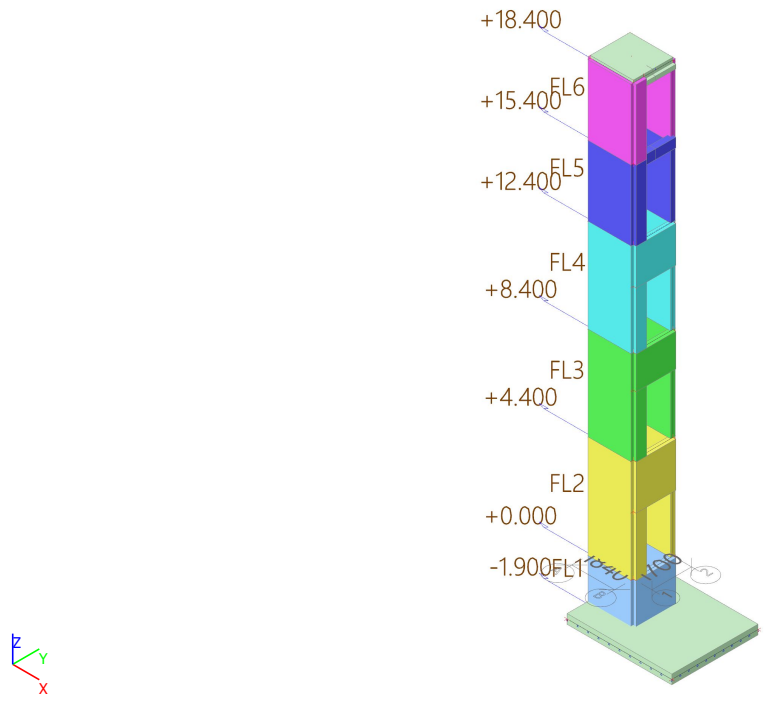
Licence user	mihablatnik1@gmail.com
Project	ZRC SAZU - dvigalni jašek - analiza konstrukcije
Part	PZI
Author	Miha Blatnik, mag. inž. grad.
Date	marec 2025
Structure	General XYZ
No. of nodes :	50
No. of beams :	2
No. of slabs :	29
No. of solids :	0
No. of used profiles :	2
No. of load cases :	12
No. of used materials :	3
Acceleration of gravity [m/s^2]	9.810
National code	EC - EN
Project filename	1-SAZU_PZI-MR_dvigalo_rev0-2025-04-04.esa

KAZALO VSEBINE

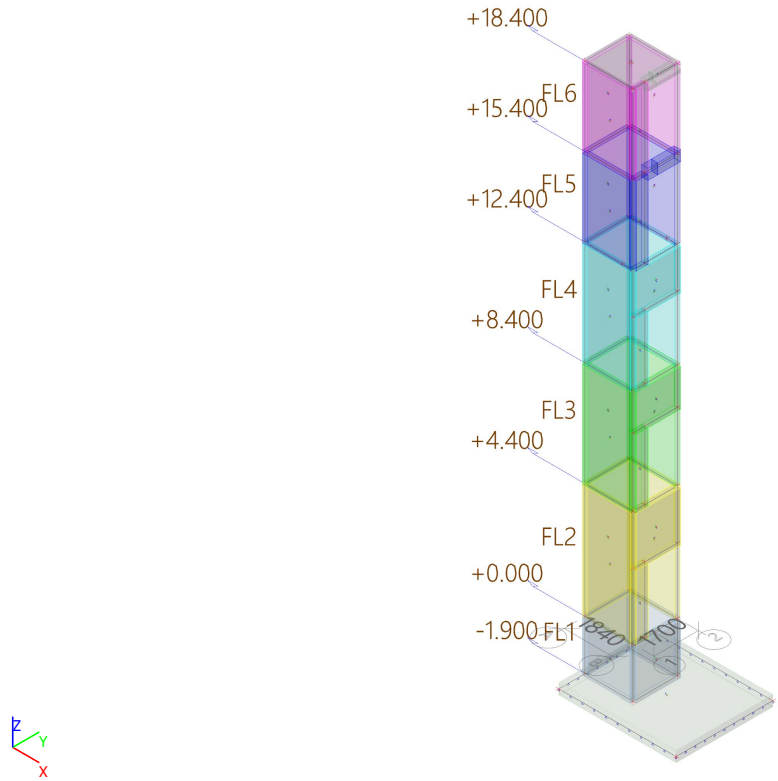
1. Računski model 3
1.1. 3D pogled - render 3
1.2. 3D pogled - transparenten 3
1.3. 3D pogled - žični 4
1.4. 3D pogled - debeline elementov 4
2. Vhodni podatki računalniškega programa 5
2.1. Materials 5
2.2. Cross-sections 5
2.3. 2D member supports 6
2.4. Subsoils 6
2.5. Stiffness factors 1D 7
2.6. Stiffness factors 2D 7
2.7. Modification groups 7
2.8. 1D stiffness modification 7
2.9. 2D stiffness modification 7
2.10. Solver setup 8
2.11. Mesh setup 8
2.12. Layers 9
2.13. Storey 9
3. Modeliranje vplivov 10
3.1. Modeliranje vplivov - ST 10
3.2. Modeliranje vplivov - Q 11
3.3. Modeliranje vplivov - S 12
4. Obtežbe in obtežne kombinacije 13
4.1. Load cases 13
4.2. Load groups 13
4.3. Combinations 13
4.4. Result classes 14
5. Potres in modalna analiza 15
5.1. Seismic spectrums 15
5.2. Calculation protocol 15
5.3. 3. nihajna oblika (Y smer) 18
5.4. 4. nihajna oblika (X smer) 19
5.5. 8. nihajna oblika (torzijska) 19
6. Rezultati analize 20
6.1. Calculation protocol 20
6.2. Detailed storey result 23
6.3. Betonska konstrukcija 24
6.3.1. Reakcije 24
6.3.2. Napetosti v tem. tleh 26
6.3.3. 1D elementi - dimenzioniranje 27
6.3.3.1. 1D elementi - dimenzioniranje - C-B1 27
6.3.3.2. 1D elementi - dimenzioniranje - C-R1 33
6.3.3.3. 1D elementi - dimenzioniranje - C-R3 39
6.3.4. Tem. pl. - dimenzioniranje 41
6.3.4.1. Tem. pl. - dimenzioniranje - Tem. pl. 41
6.3.5. AB plosce - dimenzioniranje 44
6.3.5.1. AB plosce - dimenzioniranje - Pl. nad N4 44
6.3.6. AB stene - dimenzioniranje 47
6.3.6.1. AB stene - dimenzioniranje - AB stene - K 47
6.3.6.2. AB stene - dimenzioniranje - AB stene - P 50
6.3.6.3. AB stene - dimenzioniranje - AB stene - N1 53
6.3.6.4. AB stene - dimenzioniranje - AB stene - N2 56
6.3.6.5. AB stene - dimenzioniranje - AB stene - N3 59
6.3.6.6. AB stene - dimenzioniranje - AB stene - N4 62

1. Računski model

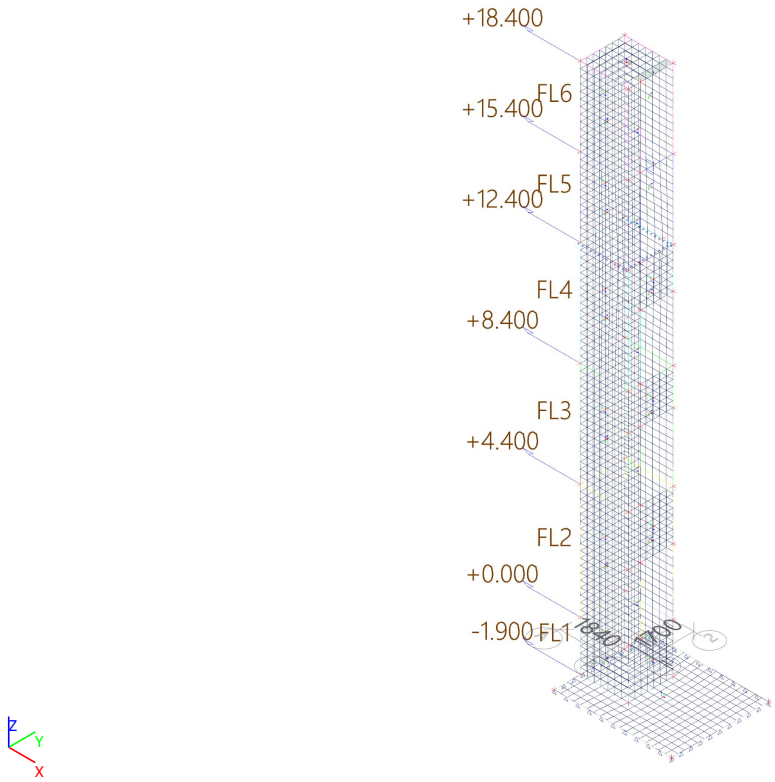
1.1. 3D pogled - render



1.2. 3D pogled - transparenten

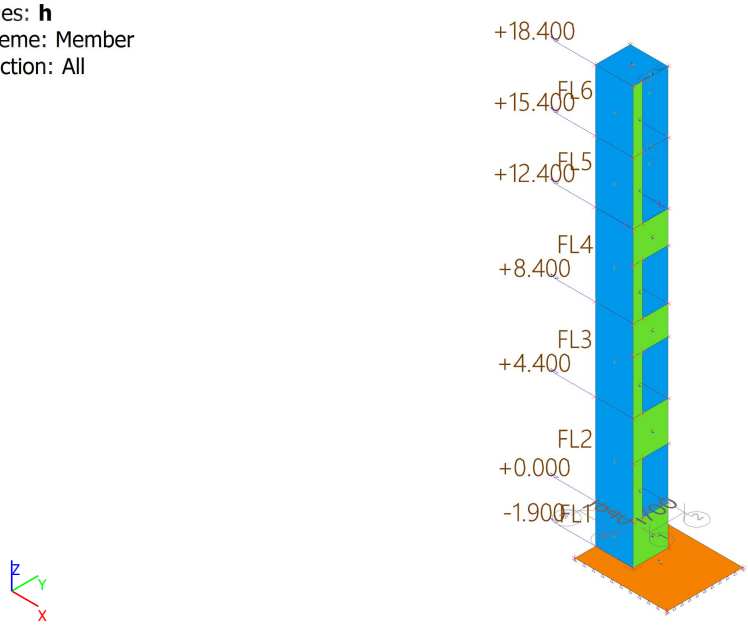


1.3. 3D pogled - žični



1.4. 3D pogled - debeline elementov

Values: **h**
Extreme: Member
Selection: All



h [m]

0.40	
0.25	
0.20	

2. Vhodni podatki računalniškega programa

2.1. Materials

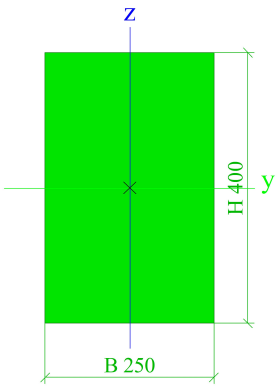
Name	Type	ρ [kg/m³]	Density in fresh state [kg/m³]	E_{mod} [MPa]	μ	α [m/mK]	$f_{c.k.28}$ [MPa]	Colour
C25/30	Concrete	2500.00	2600.00	3.1500e+04	0.2	0.01e-003	25.00	
C30/37	Concrete	2500.00	2600.00	3.2800e+04	0.2	0.01e-003	30.00	

Explanations of symbols	
Density in fresh state	The value in the density in fresh state property is used only in case a composite deck is input and its self-weight load is taken into account.

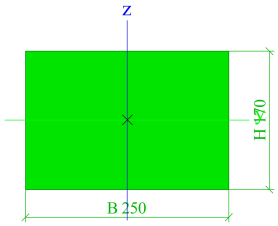
Reinforcement EC2

Name	Type	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/mK]	$f_{y.k}$ [MPa]
B 500B	Reinforcement steel	7850.00	2.0000e+05	8.3333e+04	0.01e-003	500.0

2.2. Cross-sections

C-B1		
Type	Rectangle	
Detailed	400; 250	
Shape type	Thick-walled	
Item material	C25/30	
Fabrication	concrete	
Colour		
A [m²]	1.0000e-01	
A_y [m²], A_z [m²]	8.3384e-02	8.3353e-02
A_L [m²/m], A_D [m²/m]	1.3000e+00	1.3000e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	125	200
α [deg]	0.00	
I_y [m⁴], I_z [m⁴]	1.3333e-03	5.2083e-04
i_y [mm], i_z [mm]	115	72
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	6.6667e-03	4.1667e-03
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0.0000e+00	0.0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0.00	0.00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0.00	0.00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	1.2738e-03	1.4188e-06
β_y [mm], β_z [mm]	0	0
Picture		

C-R1		
Type	Rectangle	
Detailed	170; 250	
Shape type	Thick-walled	
Item material	C25/30	
Fabrication	concrete	
Colour		
A [m²]	4.2500e-02	

A_y [m²], A_z [m²]	3.5428e-02	3.5442e-02
A_L [m²/m], A_D [m²/m]	8.4000e-01	8.4000e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	125	85
α [deg]	0.00	
I_y [m⁴], I_z [m⁴]	1.0235e-04	2.2135e-04
i_y [mm], i_z [mm]	49	72
$W_{el.y}$ [m³], $W_{el.z}$ [m³]	1.2042e-03	1.7708e-03
$W_{pl.y}$ [m³], $W_{pl.z}$ [m³]	0.0000e+00	0.0000e+00
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	0.00	0.00
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	0.00	0.00
d_y [mm], d_z [mm]	0	0
I_t [m⁴], I_w [m⁶]	2.3748e-04	7.9732e-08
β_y [mm], β_z [mm]	0	0
Picture		

Explanations of symbols	
A	Area
A_y	Shear Area in principal y-direction - Calculated by 2D FEM analysis
A_z	Shear Area in principal z-direction - Calculated by 2D FEM analysis
A_L	Circumference per unit length
A_D	Drying surface per unit length
$c_{Y.UCS}$	Centroid coordinate in Y-direction of Input axis system
$c_{Z.UCS}$	Centroid coordinate in Z-direction of Input axis system
$I_{Y.LCS}$	Second moment of area about the YLCS axis
$I_{Z.LCS}$	Second moment of area about the ZLCS axis
$I_{YZ.LCS}$	Product moment of area in the LCS system
α	Rotation angle of the principal axis system
I_y	Second moment of area about the principal y-axis
I_z	Second moment of area about the principal z-axis
i_y	Radius of gyration about the principal y-axis
i_z	Radius of gyration about the principal z-axis

Explanations of symbols	
$W_{el.y}$	Elastic section modulus about the principal y-axis
$W_{el.z}$	Elastic section modulus about the principal z-axis
$W_{pl.y}$	Plastic section modulus about the principal y-axis
$W_{pl.z}$	Plastic section modulus about the principal z-axis
$M_{pl.y.+}$	Plastic moment about the principal y-axis for a positive My moment
$M_{pl.y.-}$	Plastic moment about the principal y-axis for a negative My moment
$M_{pl.z.+}$	Plastic moment about the principal z-axis for a positive Mz moment
$M_{pl.z.-}$	Plastic moment about the principal z-axis for a negative Mz moment
d_y	Shear center coordinate in principal y-direction measured from the centroid - Calculated by 2D FEM analysis
d_z	Shear center coordinate in principal z-direction measured from the centroid - Calculated by 2D FEM analysis
I_t	Torsional constant - Calculated by 2D FEM analysis
I_w	Warping constant - Calculated by 2D FEM analysis
β_y	Mono-symmetry constant about the principal y-axis
β_z	Mono-symmetry constant about the principal z-axis

2.3. 2D member supports

Name	Type	Subsoil	2D member
SS1	Individual	Tla	S25

2.4. Subsoils

Name	C1x [MN/m³]	C1z	C1y [MN/m³]	Stiffness [MN/m³]	C2x [MN/m]	C2y [MN/m]
Tla	1.7500e+01	Flexible	1.7500e+01	2.5000e+01	0.0000e+00	0.0000e+00

2.5. Stiffness factors 1D

100%			
Type	Standard		
Correction factor for A_x, Correction factor for A_y, Correction factor for A_z	1.000	1.000	1.000
Correction factor for I_x, Correction factor for I_y, Correction factor for I_z	1.000	1.000	1.000
50%			
Type	Standard		
Correction factor for A_x, Correction factor for A_y, Correction factor for A_z	1.000	0.500	0.500
Correction factor for I_x, Correction factor for I_y, Correction factor for I_z	0.100	0.500	0.500

2.6. Stiffness factors 2D

100%						
Type	Percentage of stiffness					
Axial stiffness [%]	100					
Bending stiffness [%]	100					
Correction factor for D_{11}, Correction factor for D_{12}, Correction factor for D_{22}, Correction factor for D_{33}, Correction factor for D_{44}, Correction factor for D_{55}	1.000	1.000	1.000	1.000	1.000	1.000
Correction factor for d_{11}, Correction factor for d_{12}, Correction factor for d_{22}, Correction factor for d_{33}	1.000	1.000	1.000	1.000		
50%						
Description	Plošče					
Type	Standard					
Correction factor for D_{11}, Correction factor for D_{12}, Correction factor for D_{22}, Correction factor for D_{33}, Correction factor for D_{44}, Correction factor for D_{55}	0.500	0.500	0.500	0.100	0.500	0.500
Correction factor for d_{11}, Correction factor for d_{12}, Correction factor for d_{22}, Correction factor for d_{33}	1.000	1.000	1.000	0.500		
S-50%						
Description	Stene					
Type	Standard					
Correction factor for D_{11}, Correction factor for D_{12}, Correction factor for D_{22}, Correction factor for D_{33}, Correction factor for D_{44}, Correction factor for D_{55}	0.500	0.500	0.500	0.100	0.500	0.500
Correction factor for d_{11}, Correction factor for d_{12}, Correction factor for d_{22}, Correction factor for d_{33}	0.500	0.500	0.500	0.500		

2.7. Modification groups

Name
E

2.8. 1D stiffness modification

Name	Stiffness factors	Selfweight factor	Member	Modification group
SM1D1	50%	1.000	B1	E
SM1D2	50%	1.000	B2	E

2.9. 2D stiffness modification

Name	Stiffness factors	Selfweight factor	2D member	Modification group
SM2D1	S-50% - Stene	1.000	S5	E
SM2D2	S-50% - Stene	1.000	S6	E
SM2D3	S-50% - Stene	1.000	S7	E
SM2D4	S-50% - Stene	1.000	S9	E
SM2D5	S-50% - Stene	1.000	S10	E
SM2D6	S-50% - Stene	1.000	S11	E
SM2D7	S-50% - Stene	1.000	S12	E
SM2D8	S-50% - Stene	1.000	S13	E
SM2D9	S-50% - Stene	1.000	S14	E
SM2D10	S-50% - Stene	1.000	S15	E

Name	Stiffness factors	Selfweight factor	2D member	Modification group
SM2D11	S-50% - Stene	1.000	S16	E
SM2D12	S-50% - Stene	1.000	S17	E
SM2D13	S-50% - Stene	1.000	S18	E
SM2D14	S-50% - Stene	1.000	S19	E
SM2D15	S-50% - Stene	1.000	S20	E
SM2D16	S-50% - Stene	1.000	S21	E
SM2D17	S-50% - Stene	1.000	S22	E
SM2D18	S-50% - Stene	1.000	S23	E
SM2D19	50% - Plošče	1.000	S24	E
SM2D20	S-50% - Stene	1.000	S1	E
SM2D21	S-50% - Stene	1.000	S2	E
SM2D23	S-50% - Stene	1.000	S4	E
SM2D24	S-50% - Stene	1.000	S32	E

2.10. Solver setup

Name	SolverSetup1
Neglect shear force deformation (Ay, Az >> A)	×
Initial stress	×
Use IRS (Improved Reduced System) method	✓
Apply property modifiers	✓
Number of thicknesses of rib plate	20
Maximum soil interaction iterations	10
Maximum iterations	20
Number of increments	1
Number of buckling modes	2
Number of sections on average member	10
Number of eigenmodes	30
Step for soil/water pressure [m]	0.500
C1x [MN/m^3]	1.0000e-01
C1y [MN/m^3]	1.0000e-01
C1z [MN/m^3]	1.0000e+01
C2x [MN/m]	5.0000e+00
C2y [MN/m]	5.0000e+00
Coefficient for reinforcement	1
Warning when maximal translation is greater than [mm]	1000.0
Warning when maximal rotation is greater than [mrad]	100.0
Parallelism tolerance [deg]	10.00
Ratio to half - distance to adjacent beam beff,i/bi [-]	0.200
Ratio to effective span length beff,i/l0 [-]	0.100
Max ratio to effective span length beff,i/l0 [-]	0.200
Simply supported beam [-]	1.000
Inner span [-]	0.700
End span [-]	0.850
Cantilever, base ratio to current span [-]	1.000
Cantilever, base ratio to adjacent span [-]	0.150
Cantilever, max ratio to current span [-]	1.500
Max adjacent span length ratio [-]	1.500
Max cantilever length ratio to adjacent span [-]	0.500
Span length ratio Le/beff,i,max (1 side) [-]	8.00
Simply supported beam [-]	1.000
Inner span [-]	0.700
End span [-]	0.850
Cantilever [-]	2.000
Method used for non-concrete and non-steel / composite beams	EN 1994-1-1
Solver precision ratio	1
Soil combination	None
Bending theory of plate/shell analysis	Mindlin
Type of solver	Direct
Type of eigen value solver	Lanczos
Type of eigen value solver	Lanczos
Method of calculation	Picard

2.11. Mesh setup

Name	MeshSetup1

Generation of variable eccentricities on members instead of constant ones	×
Generation of nodes in connections of beam elements	×
Elastic mesh	✓
Use automatic mesh refinement	×
Connect members/nodes	✓
Division on haunches and arbitrary members	5
Division for integration strip and 2D-1D upgrade	50
Average number of 1D mesh elements on straight 1D members	5
Average size of 2D mesh element [m]	0.250
Average size of 1D mesh element on curved 1D members [m]	0.200
Minimal length of beam element [m]	0.100
Maximal length of beam element [m]	1000.000
Average size of tendons, elements on subsoil, nonlinear soil spring [m]	1.000
Maximal out of plane angle of a quadrilateral [mrad]	30.0
Predefined mesh ratio	1.5
Minimal distance between definition point and line [m]	0.001
Average size of panel element [m]	1.000
Mesh refinement following the beam type	None
Definition of mesh element size for panels	Manual

2.12. Layers

Name	Structural model only	Colour
Tem. pl.	×	
AB stene - K	×	
AB stene - P	×	
AB stene - N1	×	
AB stene - N2	×	
AB stene - N3	×	
AB stene - N4	×	
Pl. nad N4	×	

2.13. Storey

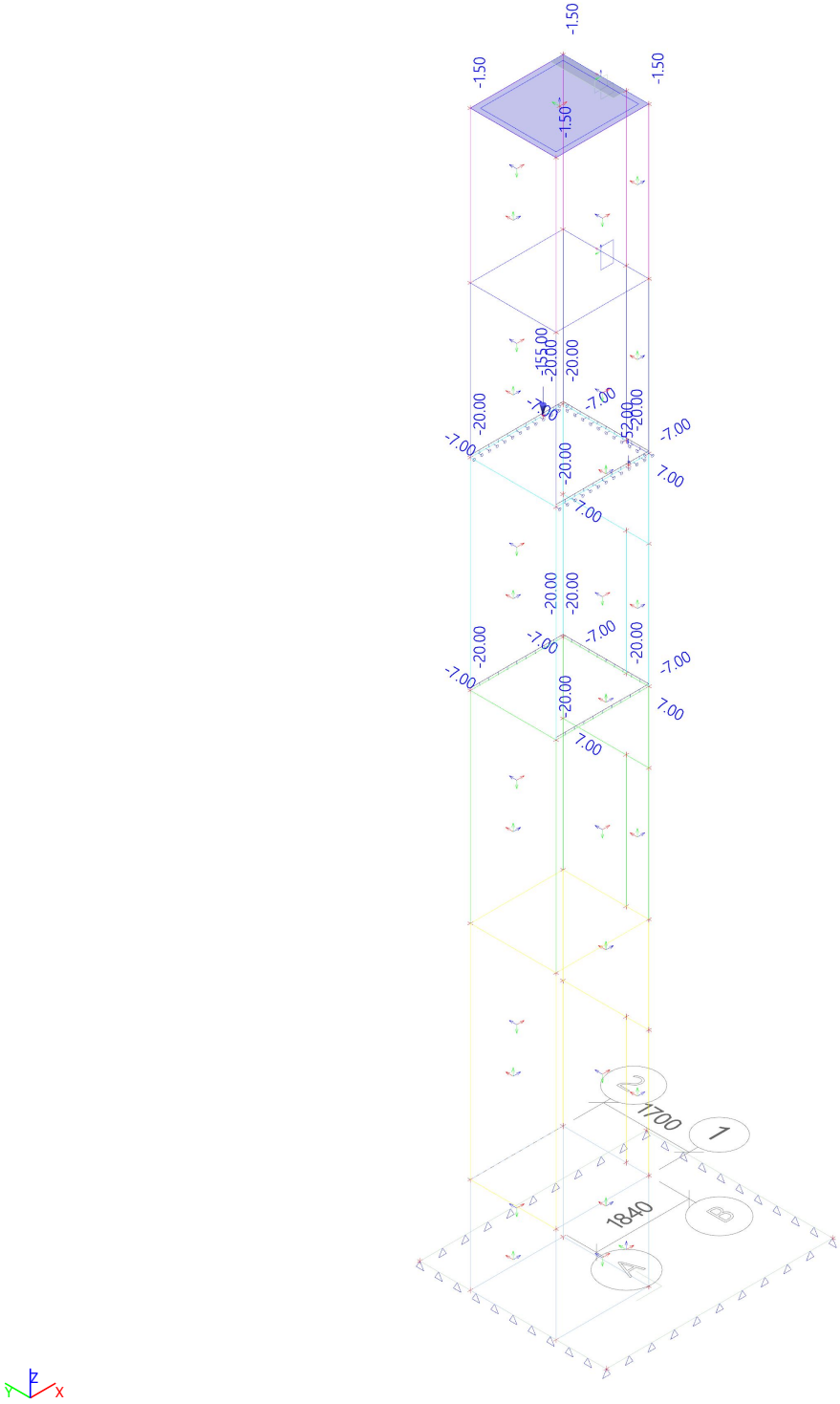
Name	Z-Bottom [m]	Height [m]
FL1	-1.900	1.900
FL2	0.000	4.400
FL3	4.400	4.000
FL4	8.400	4.000
FL5	12.400	3.000
FL6	15.400	3.000
FL7	18.400	0.000

Explanations of symbols	
Z-Bottom	Z-Bottom
Height	Height

3. Modeliranje vplivov

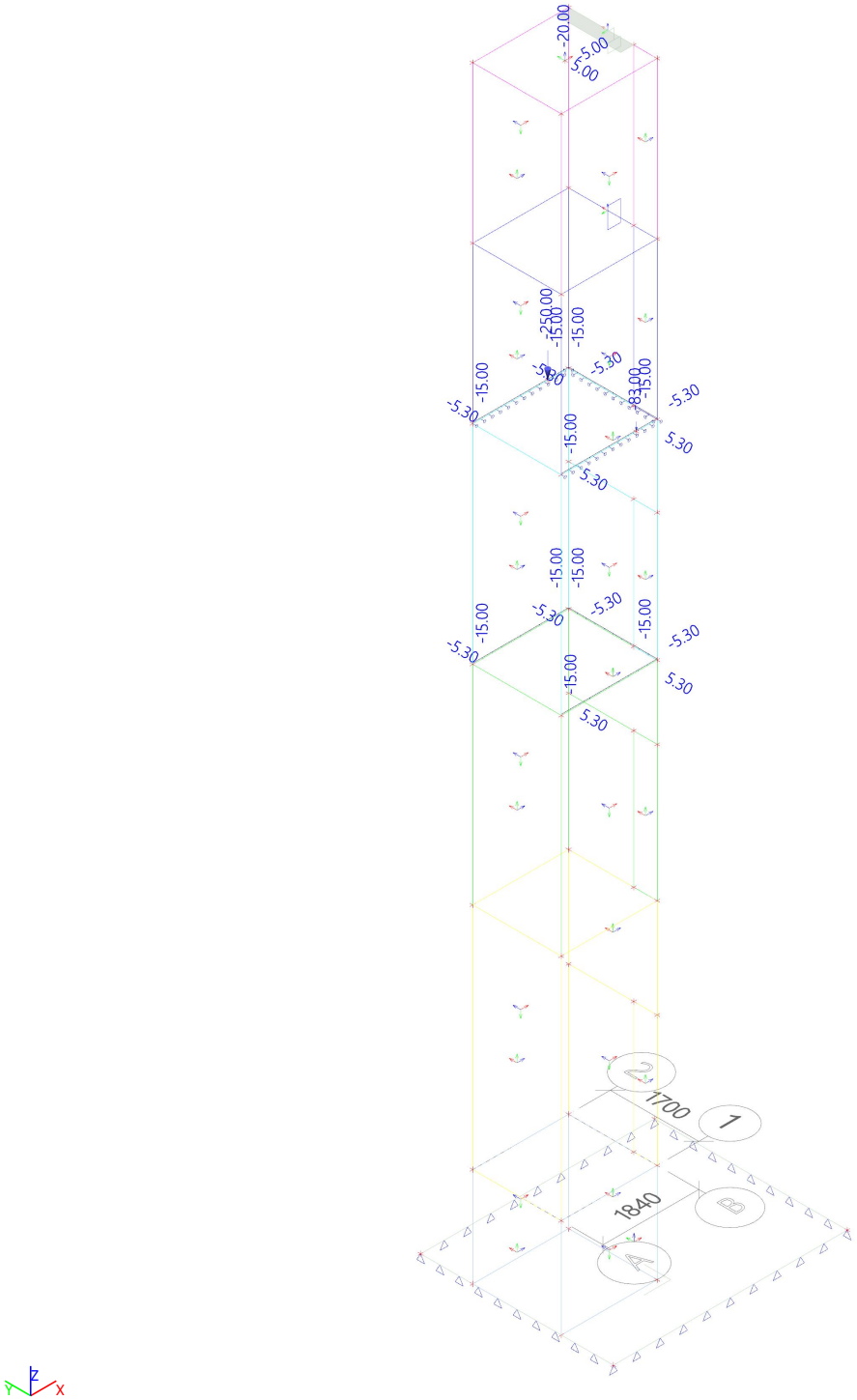
3.1. Modeliranje vplivov - ST

Name	Description	Action type	Load group	Modification group
	Spec	Load type		
ST	Stalna teza	Permanent	LT+ST	None
		Standard		



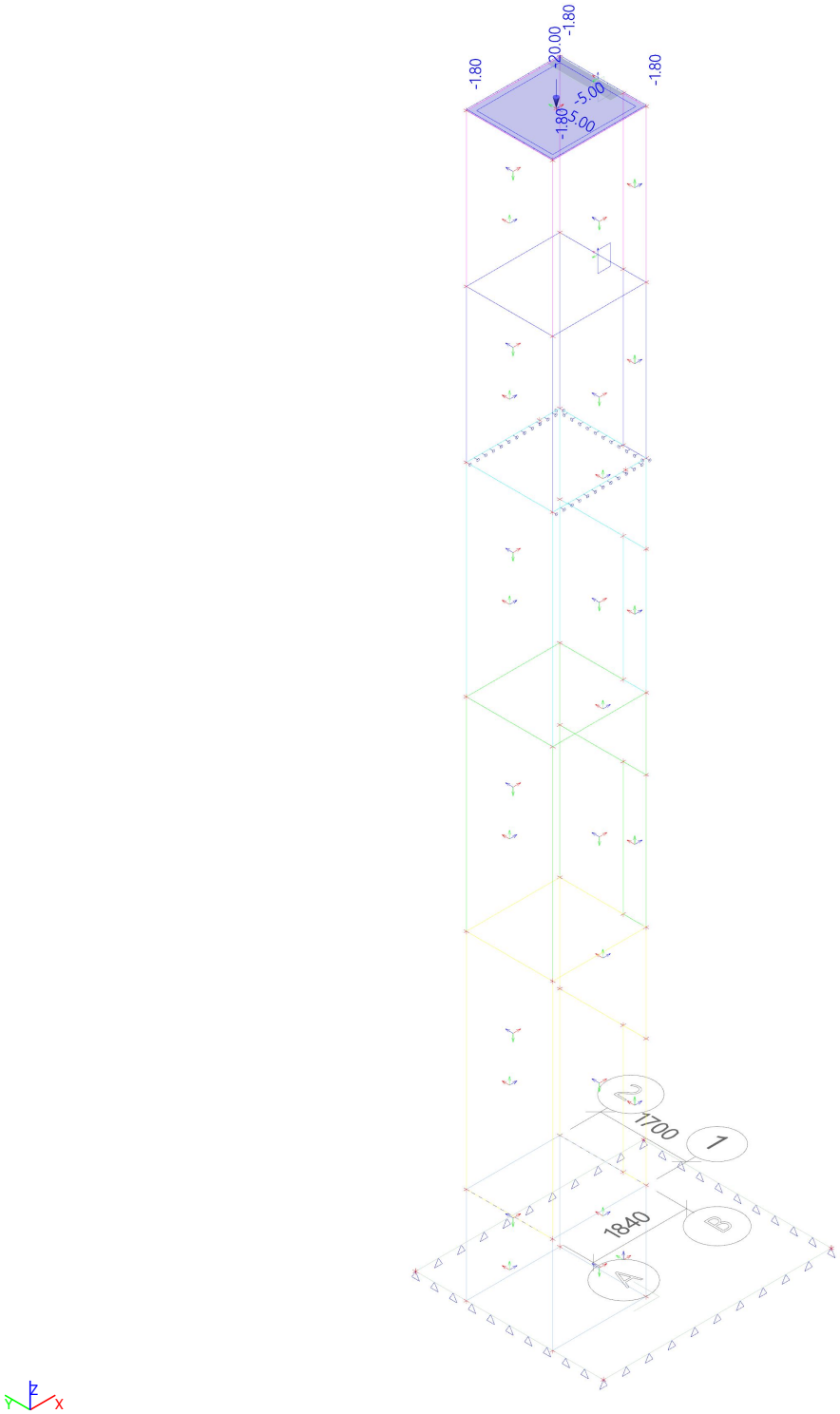
3.2. Modeliranje vplivov - Q

Name	Description	Action type	Load group	Duration	Master load case	Modification group
	Spec	Load type				
Q	Koristna	Variable	Q	Short	None	None
	Standard	Static				



3.3. Modeliranje vplivov - S

Name	Description	Action type	Load group	Duration	Master load case	Modification group
	Spec	Load type				
S	Sneg	Variable	S	Short	None	None
	Standard	Static				



4. Obtežbe in obtežne kombinacije

4.1. Load cases

Name	Description	Action type	Load group	Direction	Duration	Master load case	Modification group
	Spec	Load type					
LT	Lastna teza	Permanent Self weight	LT+ST	-Z			None
ST	Stalna teza	Permanent Standard	LT+ST				None
Q	Koristna Standard	Variable Static	Q		Short	None	None
S	Sneg Standard	Variable Static	S		Short	None	None
Ex	Potres X Seismicity	Variable Dynamic	E			None	E
Ey	Potres Y Seismicity	Variable Dynamic	E			None	E
Ey_AE	Accidental eccentricity for Ey Seismic accidental eccentricity	Variable Static	Ey_AE		Short	Ey - Potres Y	E
Ex_AE	Accidental eccentricity for Ex Seismic accidental eccentricity	Variable Static	Ex_AE		Short	Ex - Potres X	E
Ex_LT-j	Potres X Seismicity	Variable Dynamic	E			None	E
Ey_LT-j	Potres Y Seismicity	Variable Dynamic	E			None	E
Ey_LT-j_AE	Accidental eccentricity for Ey_LT-j Seismic accidental eccentricity	Variable Static	Ey_LT-j_AE		Short	Ey_LT-j - Potres Y	E
Ex_LT-j_AE	Accidental eccentricity for Ex_LT-j Seismic accidental eccentricity	Variable Static	Ex_LT-j_AE		Short	Ex_LT-j - Potres X	E

4.2. Load groups

Name	Load	Relation	Type
LT+ST	Permanent		
Q	Variable	Standard	Cat C : Congregation
S	Variable	Exclusive	Snow
E	Seismic	Exclusive	
Ey_AE	Seismic Accidental Eccentricity	Exclusive	
Ex_AE	Seismic Accidental Eccentricity	Exclusive	
Ey_LT-j_AE	Seismic Accidental Eccentricity	Exclusive	
Ex_LT-j_AE	Seismic Accidental Eccentricity	Exclusive	

4.3. Combinations

Name	Description	Type	Load cases	Coeff. [-]
MSN		EN-ULS (STR/GEO) Set B	LT - Lastna teza	1.000
			ST - Stalna teza	1.000
			Q - Koristna	1.000
MSU_K		EN-SLS Characteristic	LT - Lastna teza	1.000
			ST - Stalna teza	1.000
			Q - Koristna	1.000
MSU_QP		EN-SLS Quasi-permanent	LT - Lastna teza	1.000
			ST - Stalna teza	1.000
			Q - Koristna	1.000

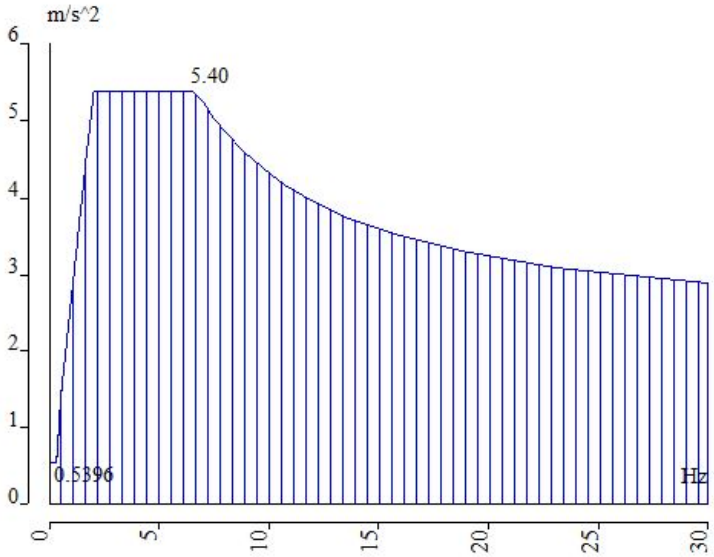
Name	Description	Type	Load cases	Coeff. [-]
E		EN-Seismic	LT - Lastna teza	1.000
			ST - Stalna teza	1.000
			Q - Koristna	1.000
			Ex - Potres X	1.000
			Ey - Potres Y	1.000
			Ey_AE - Accidental eccentricity for Ey	1.000
			Ex_AE - Accidental eccentricity for Ex	1.000
E_f		EN-Seismic	LT - Lastna teza	1.000
			ST - Stalna teza	1.000
			Q - Koristna	1.000
			Ex - Potres X	1.400
			Ey - Potres Y	1.400
			Ey_AE - Accidental eccentricity for Ey	1.400
			Ex_AE - Accidental eccentricity for Ex	1.400
Ey	Seismic load case "Ey" with accidental eccentricity effects	Envelope - ultimate	Ey - Potres Y	1.000
			Ey_AE - Accidental eccentricity for Ey	1.000
Ex	Seismic load case "Ex" with accidental eccentricity effects	Envelope - ultimate	Ex - Potres X	1.000
			Ex_AE - Accidental eccentricity for Ex	1.000
Ey_LT-j	Seismic load case "Ey_LT-j" with accidental eccentricity effects	Envelope - ultimate	Ey_LT-j - Potres Y	1.000
			Ey_LT-j_AE - Accidental eccentricity for Ey_LT-j	1.000
Ex_LT-j	Seismic load case "Ex_LT-j" with accidental eccentricity effects	Envelope - ultimate	Ex_LT-j - Potres X	1.000
			Ex_LT-j_AE - Accidental eccentricity for Ex_LT-j	1.000
E_LT-j		EN-Seismic	LT - Lastna teza	1.000
			Ex_LT-j - Potres X	1.000
			Ey_LT-j - Potres Y	1.000
			Ey_LT-j_AE - Accidental eccentricity for Ey_LT-j	1.000
			Ex_LT-j_AE - Accidental eccentricity for Ex_LT-j	1.000

4.4. Result classes

Name	List
MSN	MSN - EN-ULS (STR/GEO) Set B
MSU_K	MSU_K - EN-SLS Characteristic
E	E - EN-Seismic
E_f	E_f - EN-Seismic
MSN+E	MSN - EN-ULS (STR/GEO) Set B
	E - EN-Seismic
MSN+E_f	MSN - EN-ULS (STR/GEO) Set B
	E_f - EN-Seismic
E_LT-j	E_LT-j - EN-Seismic
MSU_K+E_f	E_f - EN-Seismic
	MSU_K - EN-SLS Characteristic

5. Potres in modalna analiza

5.1. Seismic spectrums

Name UniqueID	Type drawing	Info	Drawing
ES	Frequency	Type code - EN 1998-1:2004 – Eurocode Subsoil type - B Direction - Horizontal Spectrum type - type 1 coeff accel. ag - 0.275 ag - design acceleration - 2.69775 beta - 0.2 q - behaviour factor - 1.5	

5.2. Calculation protocol

Solution of Free vibration

Number of 2D elements	2348
Number of 1D elements	10
Number of mesh nodes	2441
Number of equations	14646
Combination of mass groups	MC1 CM1
Number of frequencies	30
Method	Lanczos
Bending theory	Mindlin
Type of analysis model	Standard using improved reduced system (IRS)
Start of calculation	04.04.2025 09:12
End of calculation	04.04.2025 09:12

Sum of masses

	Mass type	X [kg]	Y [kg]	Z [kg]
1	Moving mass	121902.87	85255.70	0.00
1	Total mass	126846.02	126846.02	0.00

Relative modal masses

Mode	mega [rad/s	Period [s]	Freq. [Hz]	W_{xi}/W_{xtot}	W_{yi}/W_{ytot}	W_{zi}/W_{ztot}	W_{xi_R}/W_{xtot_R}	W_{yi_R}/W_{ytot_R}	W_{zi_R}/W_{ztot_R}
1	40.9008	0.15	6.51	0.0008	0.0075	0.0000	0.5422	0.0000	0.0004
2	51.4206	0.12	8.18	0.0464	0.0127	0.0000	0.0006	0.4986	0.0006
3	63.9902	0.10	10.18	0.0171	0.6675	0.0000	0.0168	0.0081	0.0136
4	100.336	0.06	15.97	0.5103	0.0255	0.0000	0.0102	0.0000	0.0106
5	109.636	0.06	17.45	0.0316	0.0059	0.0000	0.2101	0.0033	0.1682
6	151.608	0.04	24.13	0.0002	0.0004	0.0000	0.0166	0.0000	0.0264
7	174.28	0.04	27.74	0.0270	0.0003	0.0000	0.0077	0.3545	0.0064

Mode	mega [rad/s	Period [s]	Freq. [Hz]	W_{xi}/W_{xtot}	W_{yi}/W_{ytot}	W_{zi}/W_{ztot}	M_{xi_R}/W_{xtot_R}	M_{yi_R}/W_{ytot_R}	M_{zi_R}/W_{ztot_R}
8	183.219	0.03	29.16	0.0009	0.0548	0.0000	0.0002	0.0002	0.3113
9	220.739	0.03	35.13	0.0039	0.0191	0.0000	0.0154	0.0006	0.0845
10	231.194	0.03	36.80	0.0003	0.0167	0.0000	0.1009	0.0022	0.1823
11	271.895	0.02	43.27	0.2530	0.0006	0.0000	0.0091	0.0539	0.0345
12	318.289	0.02	50.66	0.0000	0.0022	0.0000	0.0001	0.0350	0.0048
13	328.341	0.02	52.26	0.0187	0.0167	0.0000	0.0051	0.0011	0.0006
14	360.37	0.02	57.35	0.0013	0.0066	0.0000	0.0011	0.0002	0.0077
15	367.432	0.02	58.48	0.0020	0.0049	0.0000	0.0000	0.0001	0.0077
16	385.124	0.02	61.29	0.0163	0.0190	0.0000	0.0088	0.0092	0.0047
17	410.33	0.02	65.31	0.0034	0.0017	0.0000	0.0082	0.0022	0.0004
18	433.392	0.01	68.98	0.0320	0.0002	0.0000	0.0005	0.0139	0.0443
19	500.411	0.01	79.64	0.0235	0.0015	0.0000	0.0012	0.0099	0.0337
20	537.093	0.01	85.48	0.0025	0.0032	0.0000	0.0003	0.0001	0.0004
21	562.848	0.01	89.58	0.0000	0.0002	0.0000	0.0000	0.0026	0.0005
22	573.1	0.01	91.21	0.0000	0.0067	0.0000	0.0024	0.0000	0.0006
23	625.032	0.01	99.48	0.0002	0.0655	0.0000	0.0209	0.0001	0.0003
24	648.112	0.01	103.15	0.0024	0.0008	0.0000	0.0003	0.0009	0.0045
25	755.51	0.01	120.24	0.0001	0.0002	0.0000	0.0000	0.0001	0.0027
26	756.857	0.01	120.46	0.0001	0.0002	0.0000	0.0002	0.0003	0.0034
27	781.539	0.01	124.39	0.0003	0.0002	0.0000	0.0002	0.0001	0.0002
28	838.203	0.01	133.40	0.0000	0.0002	0.0000	0.0015	0.0000	0.0003
29	903.048	0.01	143.72	0.0000	0.0005	0.0000	0.0003	0.0000	0.0001
30	972.933	0.01	154.85	0.0000	0.0198	0.0000	0.0062	0.0000	0.0034
				0.9945	0.9614	0.0000	0.9872	0.9972	0.9589

Seismicity

Number of 2D elements	2348
Number of 1D elements	10
Number of mesh nodes	2441
Mass in analysis	Participating mass only
Signed results	✓
Load case	Ex
Combination of mass groups	CM1
Bending theory	Mindlin
Type of analysis model	Standard using improved reduced system (IRS)
Start of calculation	04.04.2025 09:12
End of calculation	04.04.2025 09:12

Seismicity

Number of 2D elements	2348
Number of 1D elements	10
Number of mesh nodes	2441
Mass in analysis	Participating mass only
Signed results	✓
Load case	Ey
Combination of mass groups	CM1
Bending theory	Mindlin
Type of analysis model	Standard using improved reduced system (IRS)
Start of calculation	04.04.2025 09:12
End of calculation	04.04.2025 09:12

Solution of Free vibration

Number of 2D elements	2348
Number of 1D elements	10
Number of mesh nodes	2441
Number of equations	14646
Combination of mass groups	MC2 CM2
Number of frequencies	30
Method	Lanczos
Bending theory	Mindlin
Type of analysis model	Standard using improved reduced system (IRS)
Start of calculation	04.04.2025 09:12

End of calculation	04.04.2025 09:12

Sum of masses

	Mass type	X [kg]	Y [kg]	Z [kg]
2	Moving mass	67401.13	67076.98	0.00
2	Total mass	67599.13	67599.13	0.00

Relative modal masses

Mode	mega [rad/s	Period [s]	Freq. [Hz]	W_{xi}/W_{xtot}	W_{yi}/W_{ytot}	W_{zi}/W_{ztot}	W_{xi_R}/W_{xtot_R}	W_{yi_R}/W_{ytot_R}	W_{zi_R}/W_{ztot_R}
1	44.8419	0.14	7.14	0.0013	0.0010	0.0000	0.5820	0.0003	0.0074
2	57.1961	0.11	9.10	0.0295	0.0138	0.0000	0.0016	0.5932	0.0008
3	72.5645	0.09	11.55	0.0171	0.6684	0.0000	0.0339	0.0123	0.0261
4	107.349	0.06	17.09	0.7250	0.0185	0.0000	0.0005	0.0001	0.0078
5	133.831	0.05	21.30	0.0087	0.0010	0.0000	0.1203	0.0015	0.2408
6	165.765	0.04	26.38	0.0048	0.0135	0.0000	0.0297	0.0001	0.0233
7	201.606	0.03	32.09	0.0038	0.0566	0.0000	0.0439	0.0009	0.2833
8	205.802	0.03	32.75	0.0138	0.0001	0.0000	0.0029	0.3170	0.0001
9	231.654	0.03	36.87	0.0009	0.0490	0.0000	0.0163	0.0001	0.0010
10	258.854	0.02	41.20	0.0004	0.0006	0.0000	0.0910	0.0076	0.2566
11	357.553	0.02	56.91	0.0291	0.0250	0.0000	0.0012	0.0000	0.0000
12	361.032	0.02	57.46	0.0419	0.0052	0.0000	0.0006	0.0021	0.0019
13	369.328	0.02	58.78	0.0079	0.0109	0.0000	0.0013	0.0013	0.0015
14	388.603	0.02	61.85	0.0142	0.0127	0.0000	0.0120	0.0003	0.0017
15	413.96	0.02	65.88	0.0018	0.0103	0.0000	0.0026	0.0010	0.0034
16	440.704	0.01	70.14	0.0090	0.0003	0.0000	0.0032	0.0039	0.0039
17	451.881	0.01	71.92	0.0479	0.0013	0.0000	0.0013	0.0304	0.0008
18	554.934	0.01	88.32	0.0123	0.0049	0.0000	0.0023	0.0143	0.0001
19	568.685	0.01	90.51	0.0001	0.0001	0.0000	0.0001	0.0001	0.0074
20	588.091	0.01	93.60	0.0003	0.0068	0.0000	0.0039	0.0002	0.0331
21	663.249	0.01	105.56	0.0002	0.0430	0.0000	0.0206	0.0000	0.0153
22	697.943	0.01	111.08	0.0080	0.0022	0.0000	0.0014	0.0014	0.0021
23	720.548	0.01	114.68	0.0026	0.0001	0.0000	0.0001	0.0012	0.0326
24	759.119	0.01	120.82	0.0011	0.0001	0.0000	0.0001	0.0011	0.0056
25	794.045	0.01	126.38	0.0008	0.0002	0.0000	0.0001	0.0009	0.0010
26	832.242	0.01	132.46	0.0003	0.0003	0.0000	0.0009	0.0003	0.0036
27	870.607	0.01	138.56	0.0011	0.0000	0.0000	0.0005	0.0001	0.0000
28	917.39	0.01	146.01	0.0009	0.0000	0.0000	0.0002	0.0005	0.0133
29	979.433	0.01	155.88	0.0007	0.0003	0.0000	0.0002	0.0004	0.0003
30	995.156	0.01	158.38	0.0001	0.0096	0.0000	0.0041	0.0001	0.0020
				0.9854	0.9559	0.0000	0.9787	0.9926	0.9763

Seismicity

Number of 2D elements	2348
Number of 1D elements	10
Number of mesh nodes	2441
Mass in analysis	Participating mass only
Signed results	✓
Load case	Ex_LT-j
Combination of mass groups	CM2
Bending theory	Mindlin
Type of analysis model	Standard using improved reduced system (IRS)
Start of calculation	04.04.2025 09:12
End of calculation	04.04.2025 09:12

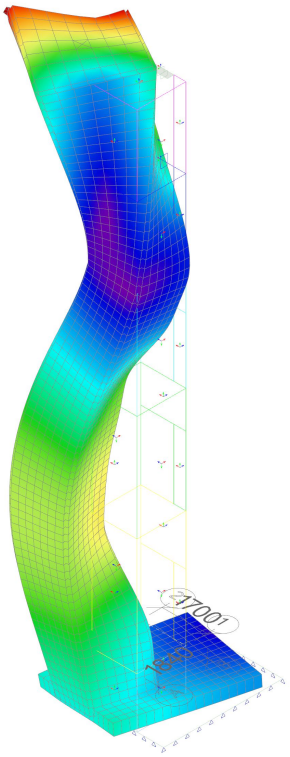
Seismicity

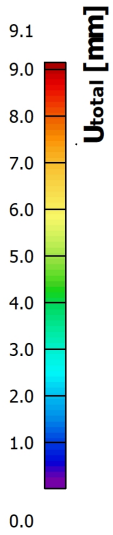
Number of 2D elements	2348
Number of 1D elements	10
Number of mesh nodes	2441
Mass in analysis	Participating mass only
Signed results	✓
Load case	Ey_LT-j

Combination of mass groups	CM2
Bending theory	Mindlin
Type of analysis model	Standard using improved reduced system (IRS)
Start of calculation	04.04.2025 09:12
End of calculation	04.04.2025 09:12

5.3. 3. nihajna oblika (Y smer)

Values: $\mathbf{U_{total}}$
Modal shapes are normalized, so that the generalized modal mass of each mode is equal
to 1kg.
Mass combination: CM2/3 - 11.55
Selection: All
Location: In nodes avg.. System: Global

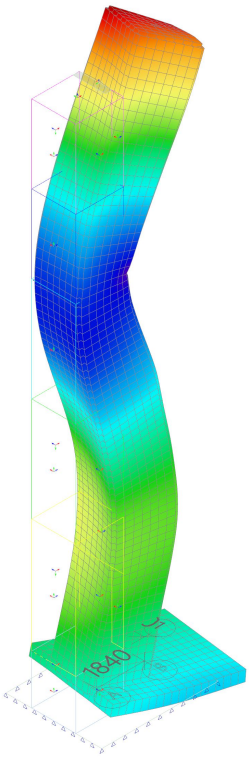


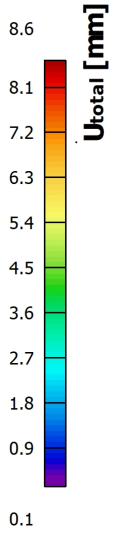




5.4. 4. nihajna oblika (X smer)

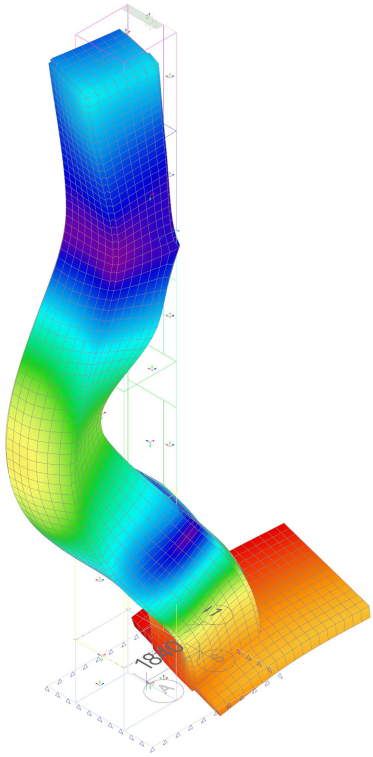
Values: **Utotal**
Modal shapes are normalized, so that the generalized modal mass of each mode is equal
to 1kg.
Mass combination: CM2/4 - 17.09
Selection: All
Location: In nodes avg.. System: Global

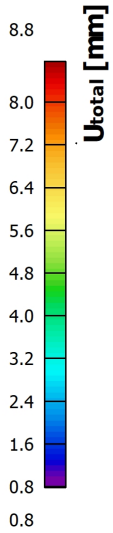




5.5. 8. nihajna oblika (torzijska)

Values: **Utotal**
Modal shapes are normalized, so that the generalized modal mass of each mode is equal
to 1kg.
Mass combination: CM2/8 - 32.75
Selection: All
Location: In nodes avg.. System: Global





6. Rezultati analize

6.1. Calculation protocol

Linear calculation

Number of 2D elements	2348
Number of 1D elements	10
Number of mesh nodes	2441
Number of equations	14646
Bending theory	Mindlin
Load cases	LT, ST, Q, S, Accidental torsional moments for Ey, Accidental torsional moments for Ex, Accidental torsional moments for Ey_LT-j, Accidental torsional moments for Ex_LT-j
Start of calculation	04.04.2025 09:12
End of calculation	04.04.2025 09:12

Sum of loads and reactions

Load case	Value	X [kN]	Y [kN]	Z [kN]
LT	loads	0.00	0.00	-826.12
	reaction in nodes	0.00	0.00	0.00
	reaction on lines	43.02	0.95	0.00
	contact 1D	0.00	0.00	0.00
	contact 2D	-43.02	-0.95	826.12
ST	loads	0.00	0.00	-426.89
	reaction in nodes	0.00	0.00	0.00
	reaction on lines	10.90	-6.74	0.00
	contact 1D	0.00	0.00	0.00
	contact 2D	-10.90	6.74	426.89
Q	loads	-5.00	5.00	-514.40
	reaction in nodes	0.00	0.00	0.00
	reaction on lines	19.94	-17.83	0.00
	contact 1D	0.00	0.00	0.00
	contact 2D	-14.94	12.83	514.40
S	loads	-5.00	5.00	-25.63
	reaction in nodes	0.00	0.00	0.00
	reaction on lines	8.68	-7.15	0.00
	contact 1D	0.00	0.00	0.00
	contact 2D	-3.68	2.15	25.63
Accidental torsional moments for Ey	loads	0.00	0.00	0.00
	reaction in nodes	0.00	0.00	0.00
	reaction on lines	0.00	0.00	0.00
	contact 1D	0.00	0.00	0.00
	contact 2D	0.00	0.00	0.00
Accidental torsional moments for Ex	loads	0.00	0.00	0.00
	reaction in nodes	0.00	0.00	0.00
	reaction on lines	0.00	0.00	0.00
	contact 1D	0.00	0.00	0.00
	contact 2D	0.00	0.00	0.00
Accidental torsional moments for Ey_LT-j	loads	0.00	0.00	0.00
	reaction in nodes	0.00	0.00	0.00
	reaction on lines	0.00	0.00	0.00
	contact 1D	0.00	0.00	0.00
	contact 2D	0.00	0.00	0.00
Accidental torsional moments for Ex_LT-j	loads	0.00	0.00	0.00
	reaction in nodes	0.00	0.00	0.00
	reaction on lines	0.00	0.00	0.00
	contact 1D	0.00	0.00	0.00
	contact 2D	0.00	0.00	0.00

The following dynamic load cases are detailed separately (see below):Ex, Ey, Ex_LT-j, Ey_LT-j

Dynamic load case 5 : Ex

Mode	Freq. [Hz]	Damp ratio	Damp coef.	Wi/Wtot [-]	G(j) [-]	Fx [kN]	Fy [kN]	Mx [kNm]	My [kNm]
1	6.51	0.05	1	0.01	-0.09	1.55	3.85	146.70	-15.04
2	8.18	0.05	1	0.03	-0.10	20.00	8.76	-70.38	140.06
3	10.18	0.05	1	0.48	0.24	-43.95	229.75	-1924.03	256.81
4	15.97	0.05	1	0.13	0.04	106.38	19.88	-114.22	-981.89
5	17.45	0.05	1	0.00	0.00	-0.81	0.29	7.00	6.19
6	24.13	0.05	1	0.00	0.00	-0.07	0.08	2.12	0.62
7	27.74	0.05	1	0.00	0.00	3.72	0.31	-12.08	-101.23
8	29.16	0.05	1	0.04	-0.01	-2.01	12.93	-124.40	14.46
9	35.13	0.05	1	0.01	0.00	-2.13	3.93	-16.77	15.55
10	36.80	0.05	1	0.01	0.00	0.71	4.30	-98.53	2.67
11	43.27	0.05	1	0.00	0.00	22.89	-0.96	29.03	-264.32
12	50.66	0.05	1	0.00	0.00	0.07	0.57	-5.96	12.73
13	52.26	0.05	1	0.01	0.00	-3.22	2.55	-15.73	33.62
14	57.35	0.05	1	0.01	0.00	1.00	1.89	-13.31	-7.19
15	58.48	0.05	1	0.01	0.00	1.14	1.47	-12.93	-11.90
16	61.29	0.05	1	0.02	0.00	6.89	6.23	-81.19	-89.42
17	65.31	0.05	1	0.00	0.00	-0.36	0.22	0.60	4.74
18	68.98	0.05	1	0.00	0.00	4.07	0.25	0.03	-50.97
19	79.64	0.05	1	0.00	0.00	0.73	-0.15	2.18	-9.11
20	85.48	0.05	1	0.00	0.00	-0.56	0.53	-5.82	5.70
21	89.58	0.05	1	0.00	0.00	0.02	0.06	-0.57	1.06
22	91.21	0.05	1	0.01	0.00	0.10	1.67	-20.99	-0.59
23	99.48	0.05	1	0.05	0.00	1.13	16.39	-203.14	-14.60
24	103.15	0.05	1	0.00	0.00	0.67	0.33	-4.11	-8.21
25	120.24	0.05	1	0.00	0.00	-0.03	0.03	-0.24	0.18
26	120.46	0.05	1	0.00	0.00	-0.03	0.04	-0.56	0.60
27	124.39	0.05	1	0.00	0.00	0.10	0.06	-0.91	-1.13
28	133.40	0.05	1	0.00	0.00	0.02	0.05	0.32	-0.04
29	143.72	0.05	1	0.00	0.00	-0.02	0.11	-1.55	0.06
30	154.85	0.05	1	0.02	0.00	-0.04	4.84	-59.87	0.65
Level=	0.00			0.85		-119.49	232.00	-1954.60	1069.12

Dynamic load case 6 : Ey

Mode	Freq. [Hz]	Damp ratio	Damp coef.	Wi/Wtot [-]	G(j) [-]	Fx [kN]	Fy [kN]	Mx [kNm]	My [kNm]
1	6.51	0.05	1	0.01	-0.09	1.55	3.85	146.70	-15.04
2	8.18	0.05	1	0.03	-0.10	20.00	8.76	-70.38	140.06
3	10.18	0.05	1	0.48	0.24	-43.95	229.75	-1924.03	256.81
4	15.97	0.05	1	0.13	0.04	106.38	19.88	-114.22	-981.89
5	17.45	0.05	1	0.00	0.00	-0.81	0.29	7.00	6.19
6	24.13	0.05	1	0.00	0.00	-0.07	0.08	2.12	0.62
7	27.74	0.05	1	0.00	0.00	3.72	0.31	-12.08	-101.23
8	29.16	0.05	1	0.04	-0.01	-2.01	12.93	-124.40	14.46
9	35.13	0.05	1	0.01	0.00	-2.13	3.93	-16.77	15.55
10	36.80	0.05	1	0.01	0.00	0.71	4.30	-98.53	2.67
11	43.27	0.05	1	0.00	0.00	22.89	-0.96	29.03	-264.32
12	50.66	0.05	1	0.00	0.00	0.07	0.57	-5.96	12.73
13	52.26	0.05	1	0.01	0.00	-3.22	2.55	-15.73	33.62
14	57.35	0.05	1	0.01	0.00	1.00	1.89	-13.31	-7.19
15	58.48	0.05	1	0.01	0.00	1.14	1.47	-12.93	-11.90
16	61.29	0.05	1	0.02	0.00	6.89	6.23	-81.19	-89.42
17	65.31	0.05	1	0.00	0.00	-0.36	0.22	0.60	4.74
18	68.98	0.05	1	0.00	0.00	4.07	0.25	0.03	-50.97
19	79.64	0.05	1	0.00	0.00	0.73	-0.15	2.18	-9.11
20	85.48	0.05	1	0.00	0.00	-0.56	0.53	-5.82	5.70
21	89.58	0.05	1	0.00	0.00	0.02	0.06	-0.57	1.06
22	91.21	0.05	1	0.01	0.00	0.10	1.67	-20.99	-0.59
23	99.48	0.05	1	0.05	0.00	1.13	16.39	-203.14	-14.60
24	103.15	0.05	1	0.00	0.00	0.67	0.33	-4.11	-8.21

Mode	Freq. [Hz]	Damp ratio	Damp coef.	Wi/Wtot [-]	G(j) [-]	Fx [kN]	Fy [kN]	Mx [kNm]	My [kNm]
25	120.24	0.05	1	0.00	0.00	-0.03	0.03	-0.24	0.18
26	120.46	0.05	1	0.00	0.00	-0.03	0.04	-0.56	0.60
27	124.39	0.05	1	0.00	0.00	0.10	0.06	-0.91	-1.13
28	133.40	0.05	1	0.00	0.00	0.02	0.05	0.32	-0.04
29	143.72	0.05	1	0.00	0.00	-0.02	0.11	-1.55	0.06
30	154.85	0.05	1	0.02	0.00	-0.04	4.84	-59.87	0.65
Level=	0.00			0.85		-119.49	232.00	-1954.60	1069.12

Dynamic load case 7 : Ex_LT-j

Mode	Freq. [Hz]	Damp ratio	Damp coef.	Wi/Wtot [-]	G(j) [-]	Fx [kN]	Fy [kN]	Mx [kNm]	My [kNm]
3	11.55	0.05	1	0.55	0.15	-27.61	172.08	-1188.01	87.29
4	17.09	0.05	1	0.14	0.03	77.00	12.27	-88.69	-631.18
7	32.09	0.05	1	0.04	0.00	-2.62	10.07	-136.54	14.16
9	36.87	0.05	1	0.04	0.00	-1.21	9.07	-106.45	7.95
11	56.91	0.05	1	0.04	0.00	6.91	6.39	-61.25	-57.92
21	105.56	0.05	1	0.04	0.00	-0.55	8.13	-101.08	5.03
2	9.10	0.05	1	0.03	-0.06	8.84	6.04	-37.66	165.48
13	58.78	0.05	1	0.02	0.00	2.25	2.64	-27.25	-24.14
Level=	0.00			0.90		82.65	173.49	-1210.51	-661.53

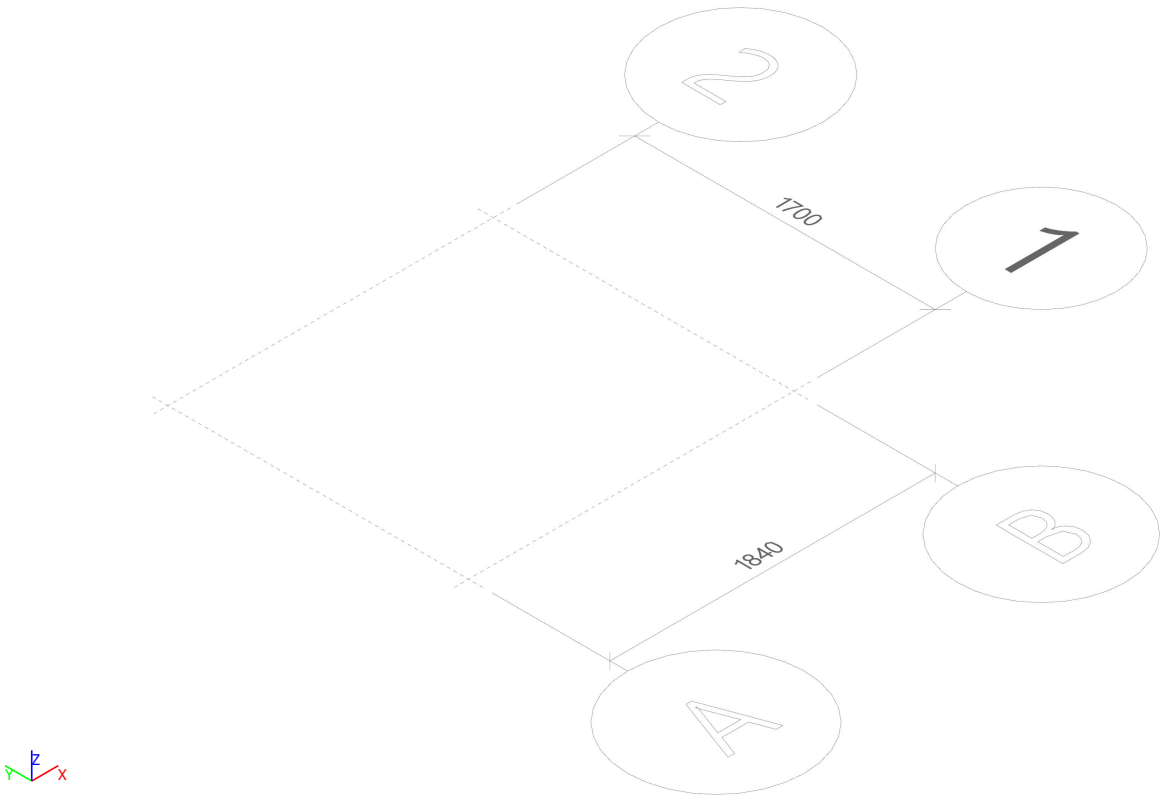
Dynamic load case 8 : Ey_LT-j

Mode	Freq. [Hz]	Damp ratio	Damp coef.	Wi/Wtot [-]	G(j) [-]	Fx [kN]	Fy [kN]	Mx [kNm]	My [kNm]
3	11.55	0.05	1	0.55	0.15	-27.61	172.08	-1188.01	87.29
4	17.09	0.05	1	0.14	0.03	77.00	12.27	-88.69	-631.18
7	32.09	0.05	1	0.04	0.00	-2.62	10.07	-136.54	14.16
9	36.87	0.05	1	0.04	0.00	-1.21	9.07	-106.45	7.95
11	56.91	0.05	1	0.04	0.00	6.91	6.39	-61.25	-57.92
21	105.56	0.05	1	0.04	0.00	-0.55	8.13	-101.08	5.03
2	9.10	0.05	1	0.03	-0.06	8.84	6.04	-37.66	165.48
13	58.78	0.05	1	0.02	0.00	2.25	2.64	-27.25	-24.14
Level=	0.00			0.90		82.65	173.49	-1210.51	-661.53

6.2. Detailed storey result

, Extreme: Member, System: Principal
Selection: All

Resulting forces per member



6.3. Betonska konstrukcija

6.3.1. Reakcije

Linear calculation
Class: MSN+E
Course: Average
System: Global
Extreme: Member
Selection: All

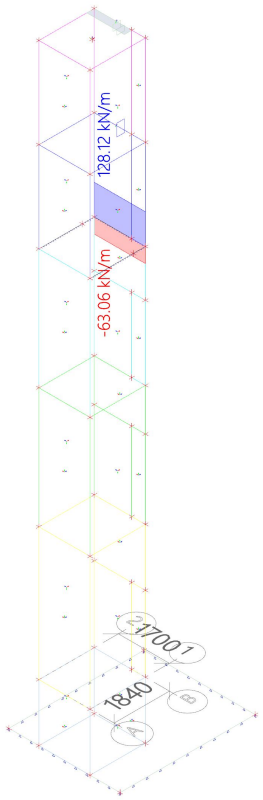
Linear Intensity

Name	dx [m]	Case	R_x [kN/m]	R_y [kN/m]	R_z [kN/m]	M_x [kNm/m]	M_y [kNm/m]	M_z [kNm/m]
Sle1/S14	0.000	MSN+E	0.00	**-45.92**	0.00	0.00	0.00	0.00
Sle1/S14	0.000	MSN+E	**0.00**	**75.09**	**0.00**	**0.00**	**0.00**	**0.00**
Sle2/S15	0.000	MSN+E	0.00	**-77.48**	0.00	0.00	0.00	0.00
Sle2/S15	0.000	MSN+E	**0.00**	**28.27**	**0.00**	**0.00**	**0.00**	**0.00**
Sle3/S17	0.000	MSN+E	**128.12**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Sle3/S17	0.000	MSN+E	**-63.06**	0.00	0.00	0.00	0.00	**0.00**

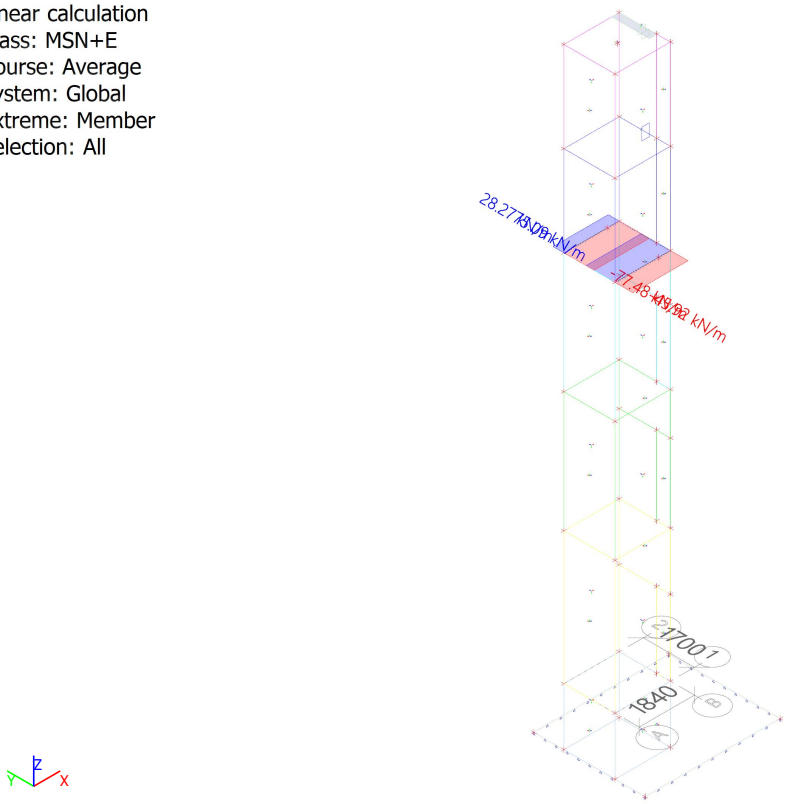
Reactions on line supports

Name	dx [m]	Case	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e [mm]
Sle1/S14	0.000	MSN+E	**-0.80**	**-7.06**	0.00	0.00	0.00	0.00	0.0
Sle1/S14	0.000	MSN+E	**5.17**	**10.58**	**0.00**	**0.00**	**0.00**	**0.00**	0.0
Sle2/S15	0.000	MSN+E	**5.66**	-3.62	**0.00**	**0.00**	**0.00**	**0.00**	0.0
Sle2/S15	0.000	MSN+E	2.42	**-11.25**	0.00	0.00	0.00	0.00	0.0
Sle2/S15	0.000	MSN+E	**-2.81**	**5.37**	0.00	0.00	0.00	0.00	0.0
Sle3/S17	0.000	MSN+E	**16.32**	0.92	**0.00**	**0.00**	**0.00**	**0.00**	0.0
Sle3/S17	0.000	MSN+E	4.66	**-6.04**	0.00	0.00	0.00	0.00	0.0
Sle3/S17	0.000	MSN+E	4.85	**3.81**	0.00	0.00	0.00	0.00	0.0
Sle3/S17	0.000	MSN+E	**-10.68**	-2.08	0.00	0.00	0.00	**0.00**	0.0

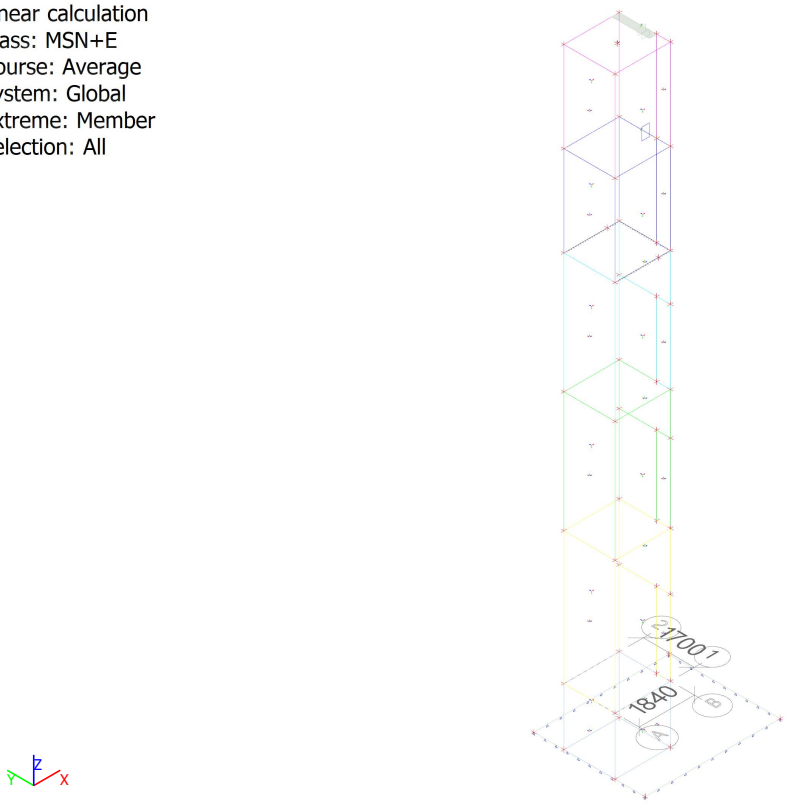
Values: **R_x**
Linear calculation
Class: MSN+E
Course: Average
System: Global
Extreme: Member
Selection: All



Values: R_y
Linear calculation
Class: MSN+E
Course: Average
System: Global
Extreme: Member
Selection: All

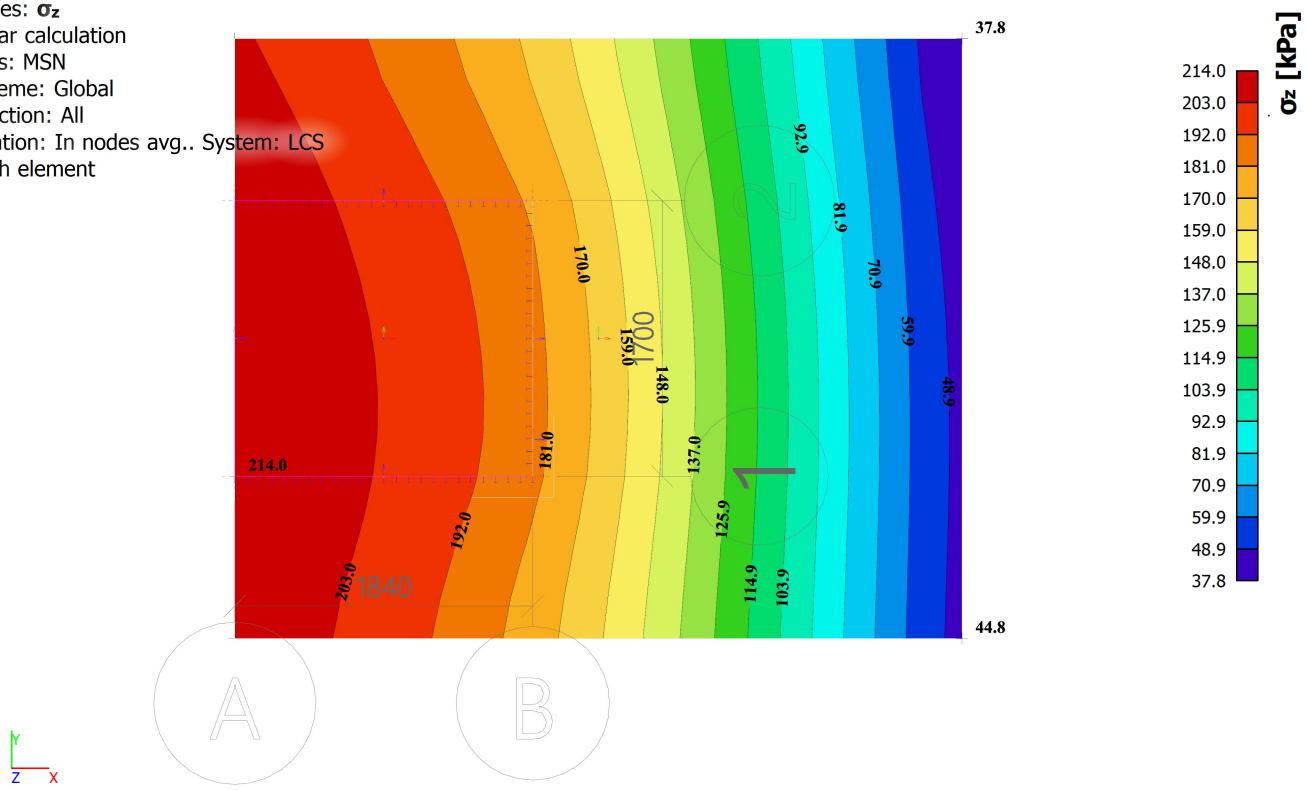


Values: R_z
Linear calculation
Class: MSN+E
Course: Average
System: Global
Extreme: Member
Selection: All



6.3.2. Napetosti v tem. tleh

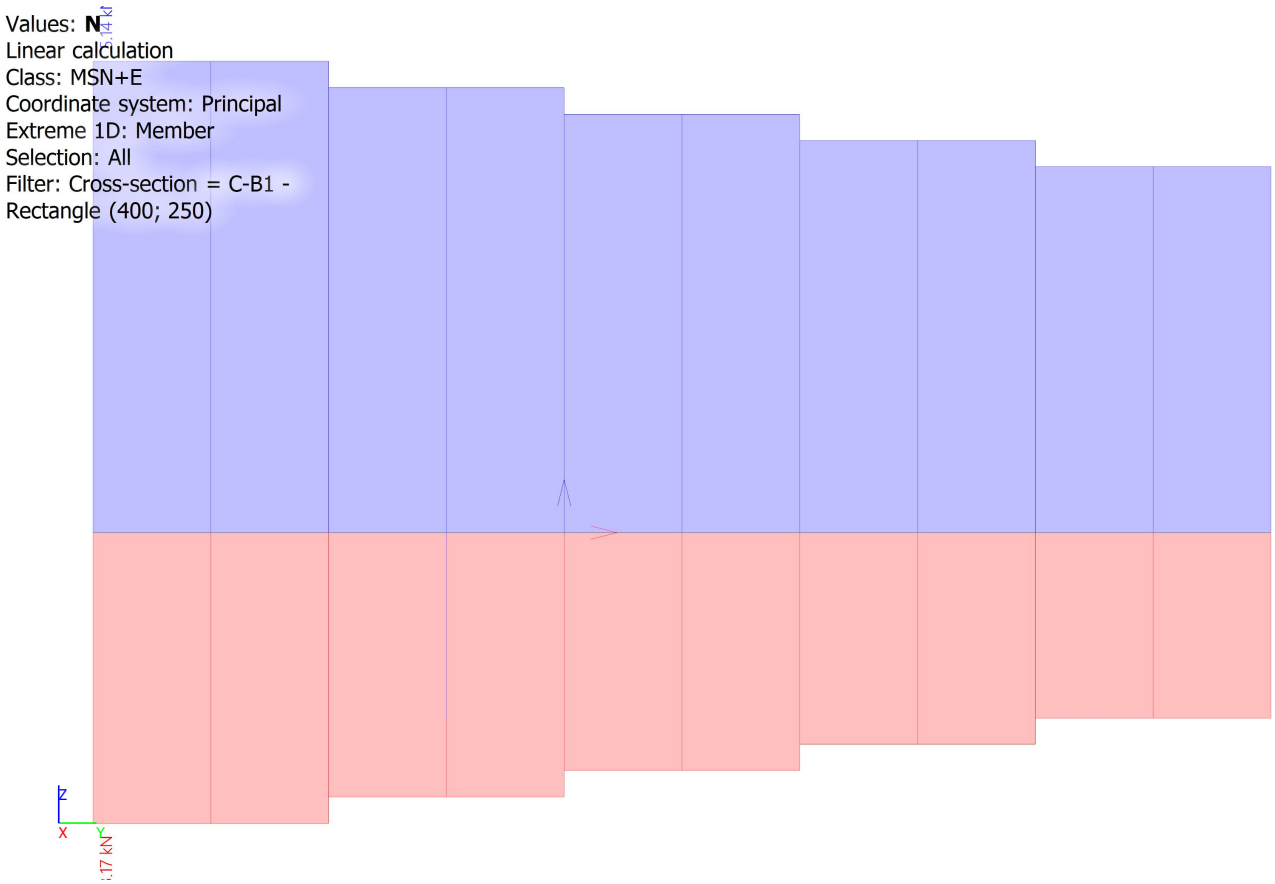
Values: σ_z
Linear calculation
Class: MSN
Extreme: Global
Selection: All
Location: In nodes avg.. System: LCS
mesh element



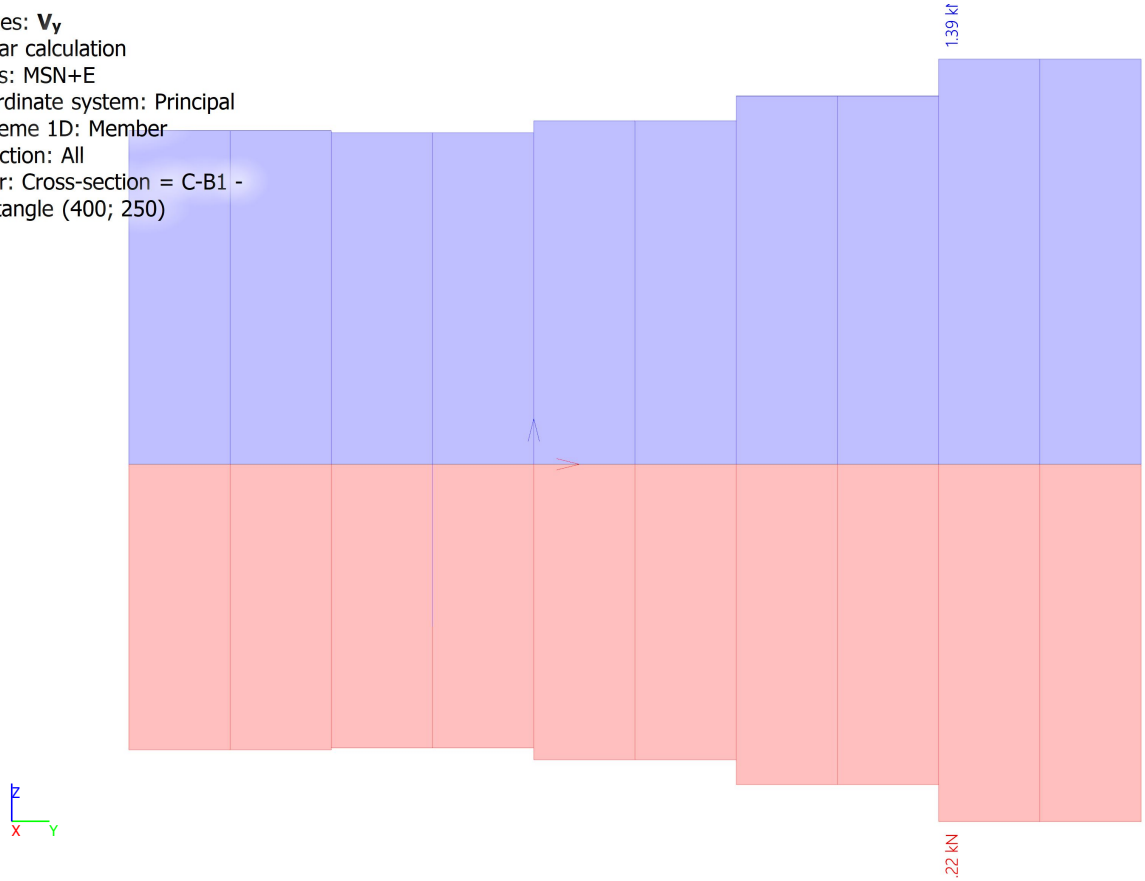
6.3.3. 1D elementi - dimenzioniranje

6.3.3.1. 1D elementi - dimenzioniranje - C-B1

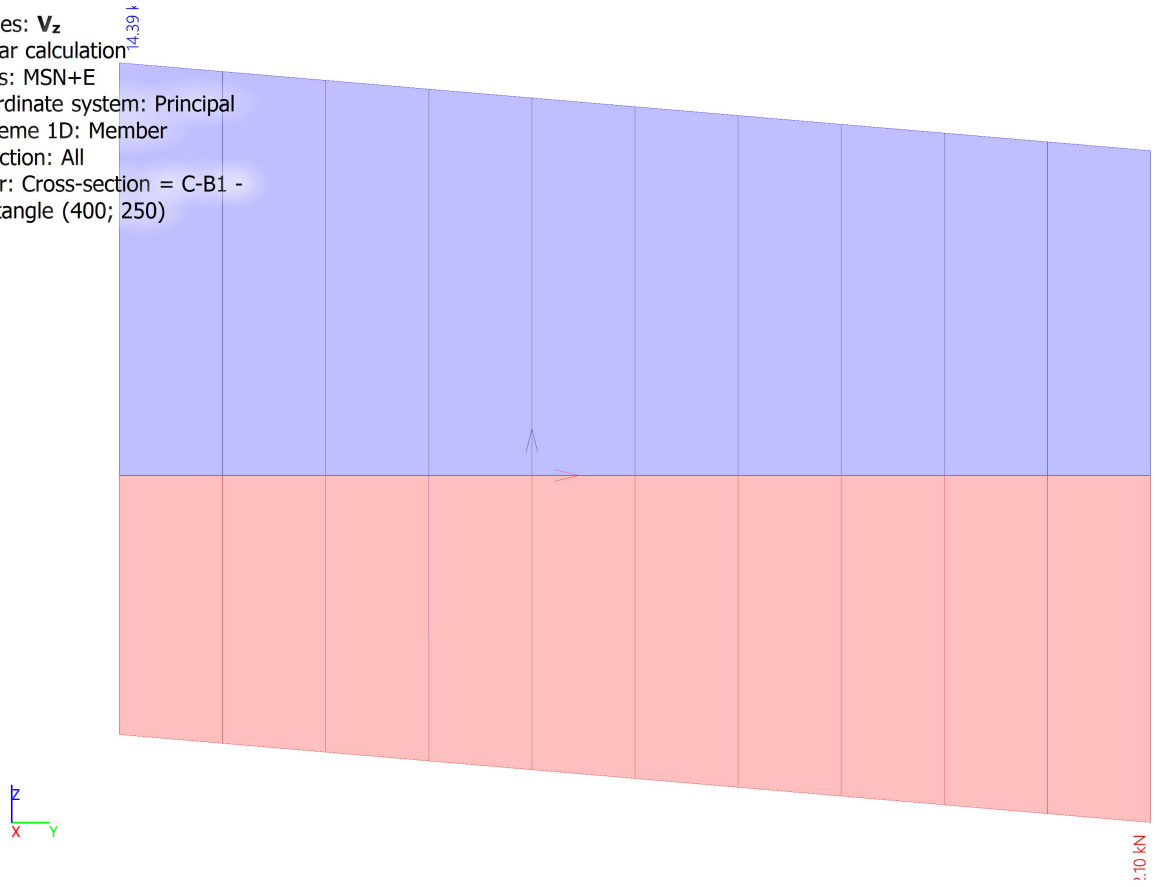
Name	Type	Item material	Fabrication	Colour
	Detailed			
C-B1	Rectangle 400; 250	C25/30	concrete	



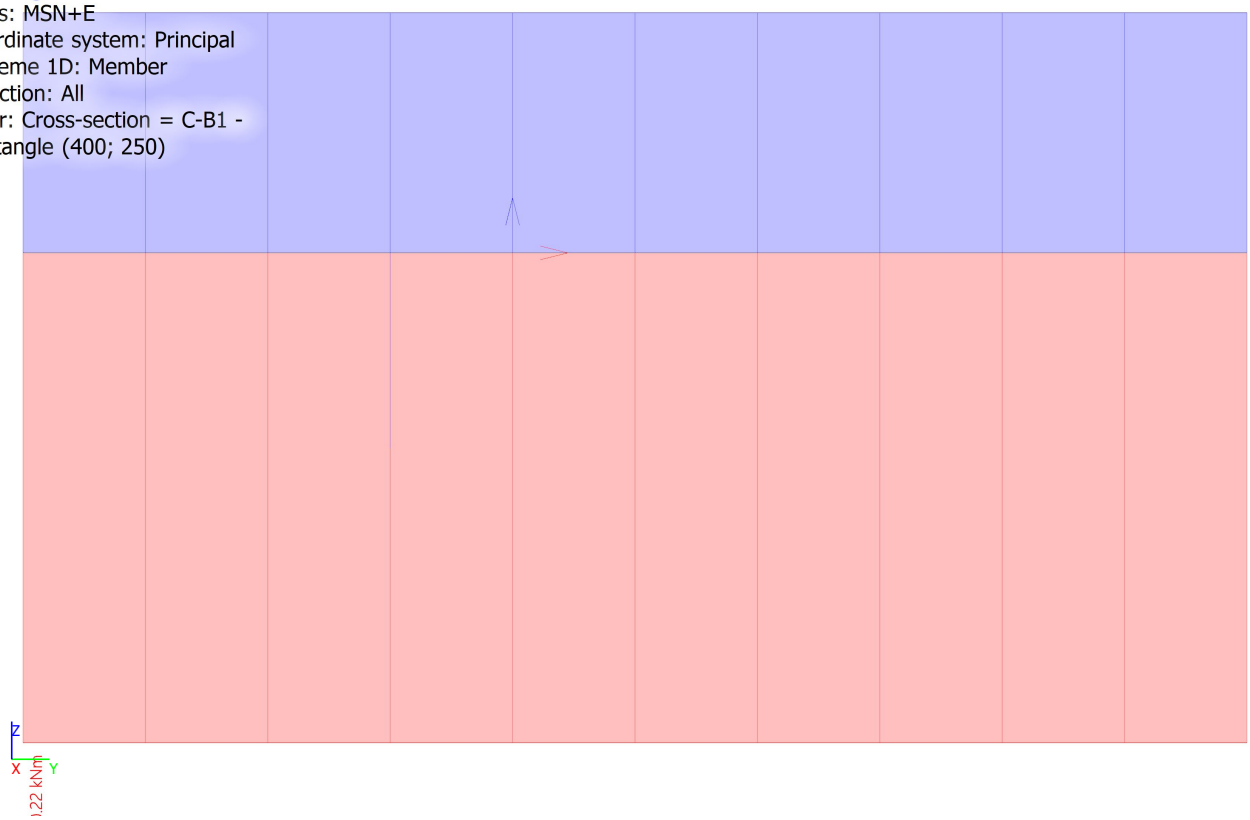
Values: V_y
Linear calculation
Class: MSN+E
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-B1 - Rectangle (400; 250)



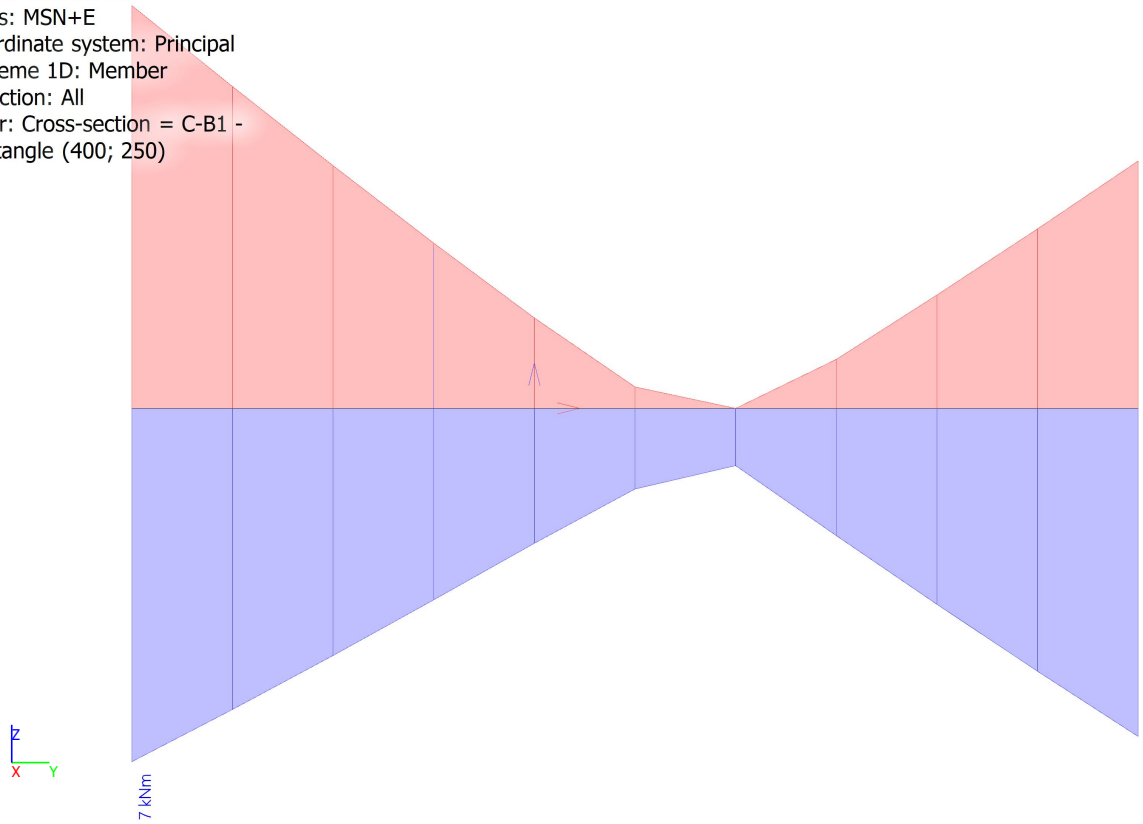
Values: V_z
Linear calculation
Class: MSN+E
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-B1 - Rectangle (400; 250)



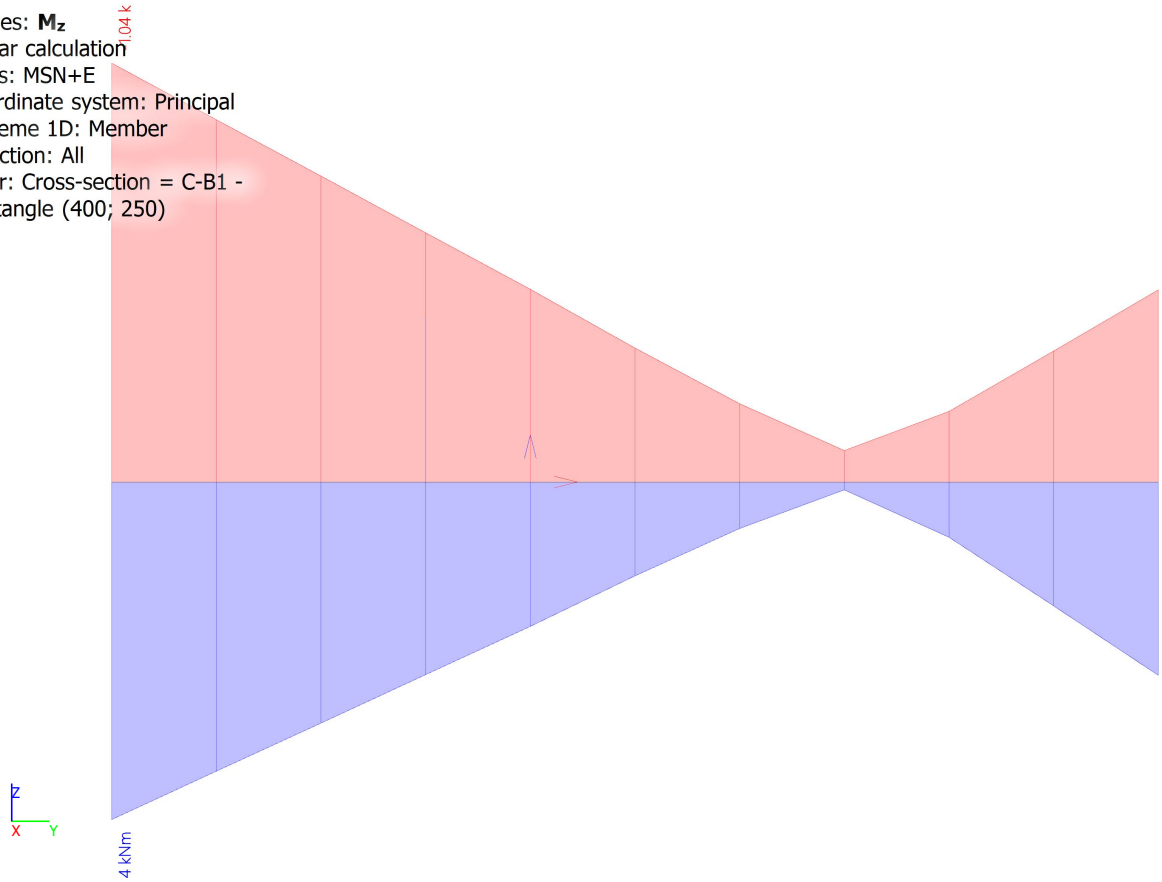
Values: M_x
Linear calculation
Class: MSN+E
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-B1 - Rectangle (400; 250)



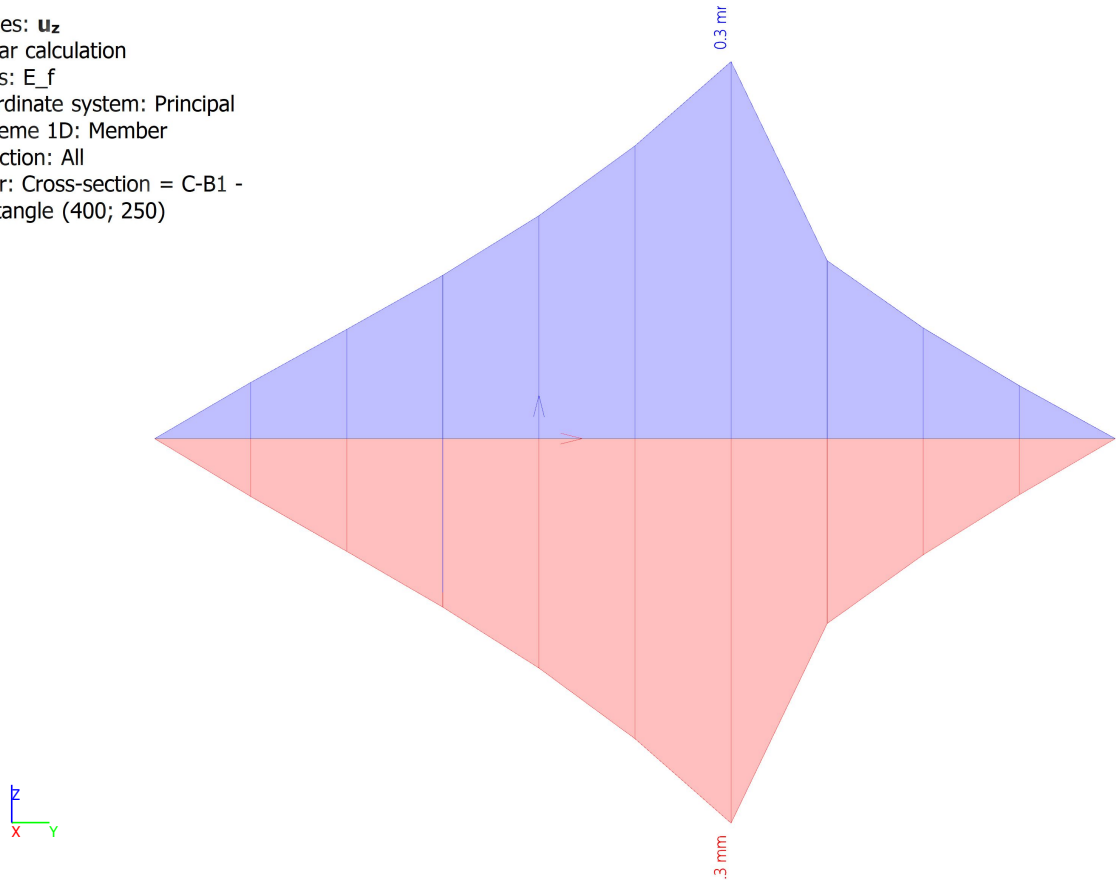
Values: M_y
Linear calculation
Class: MSN+E
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-B1 - Rectangle (400; 250)



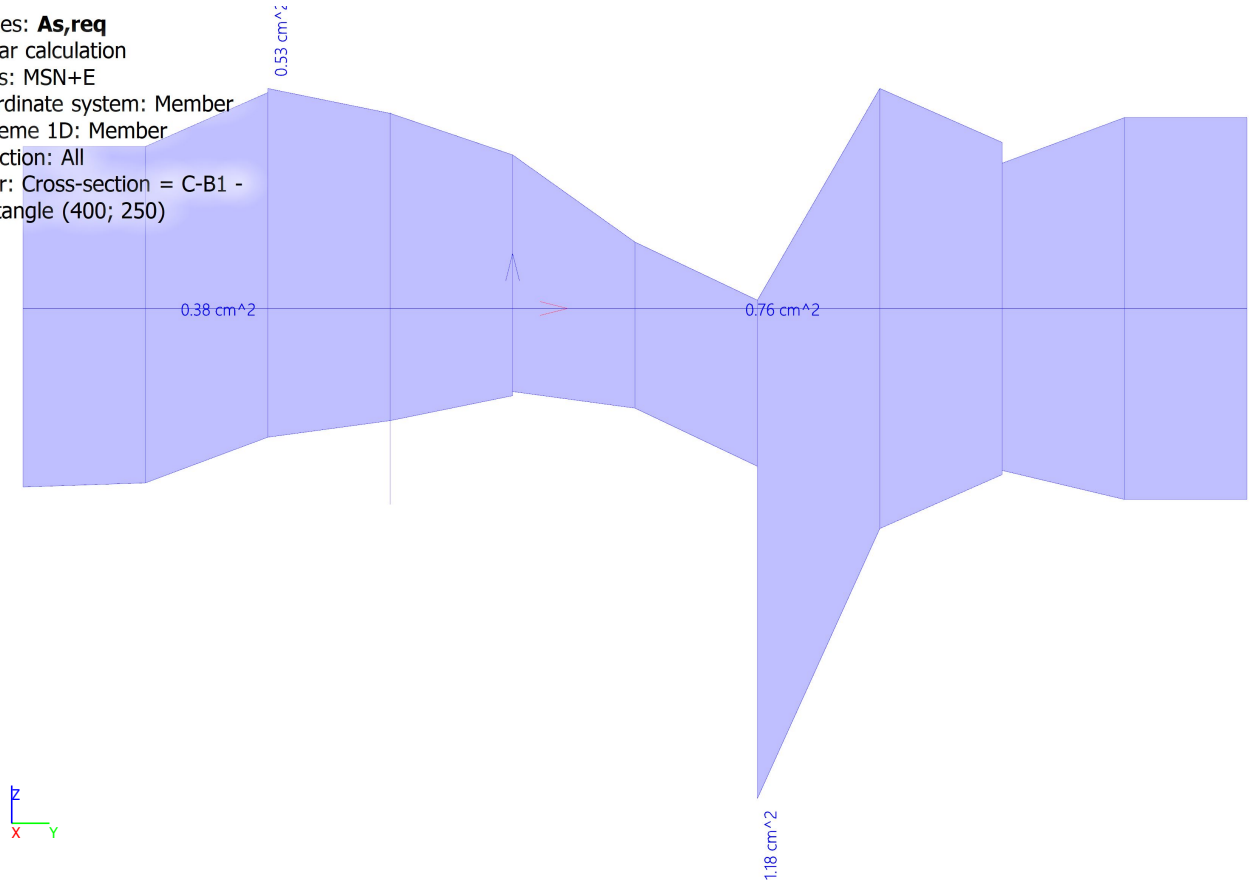
Values: M_z
Linear calculation
Class: MSN+E
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-B1 - Rectangle (400; 250)



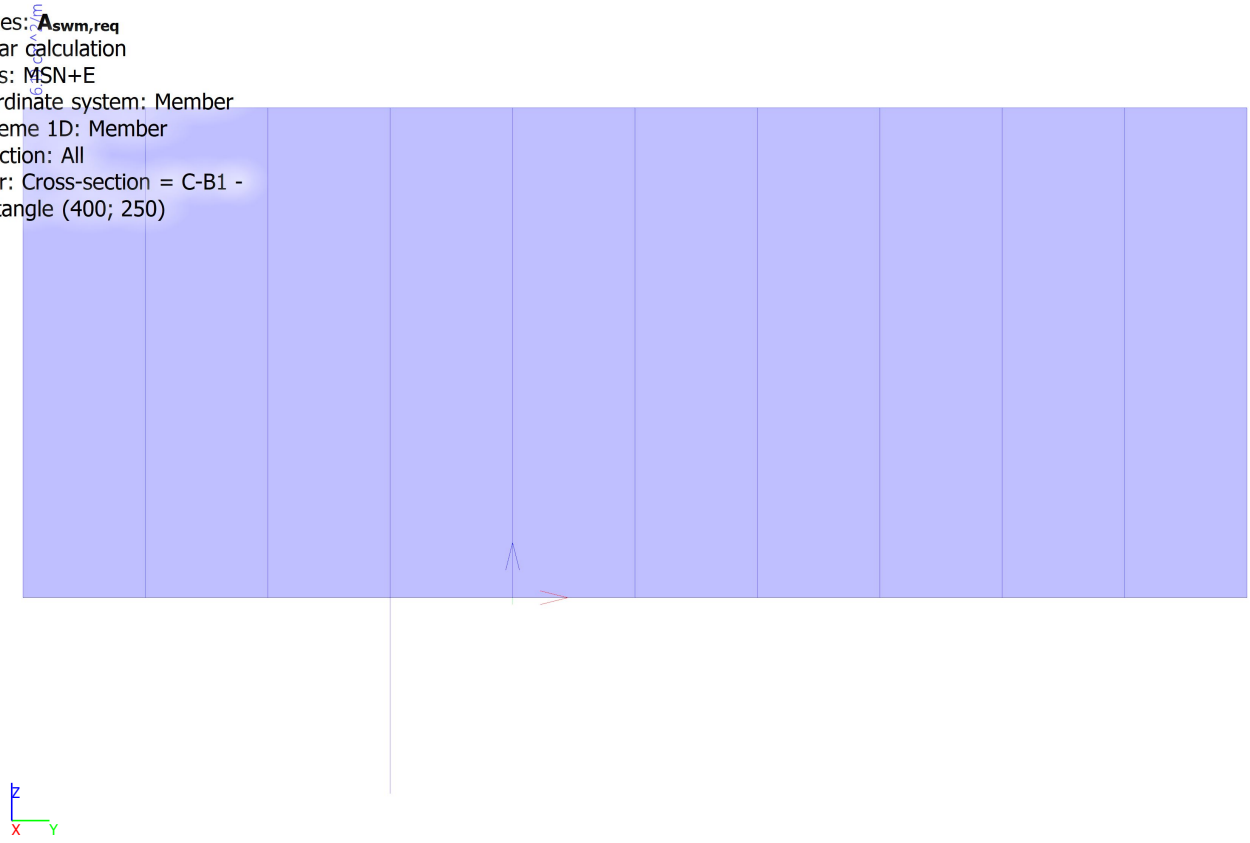
Values: u_z
Linear calculation
Class: E_f
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-B1 - Rectangle (400; 250)



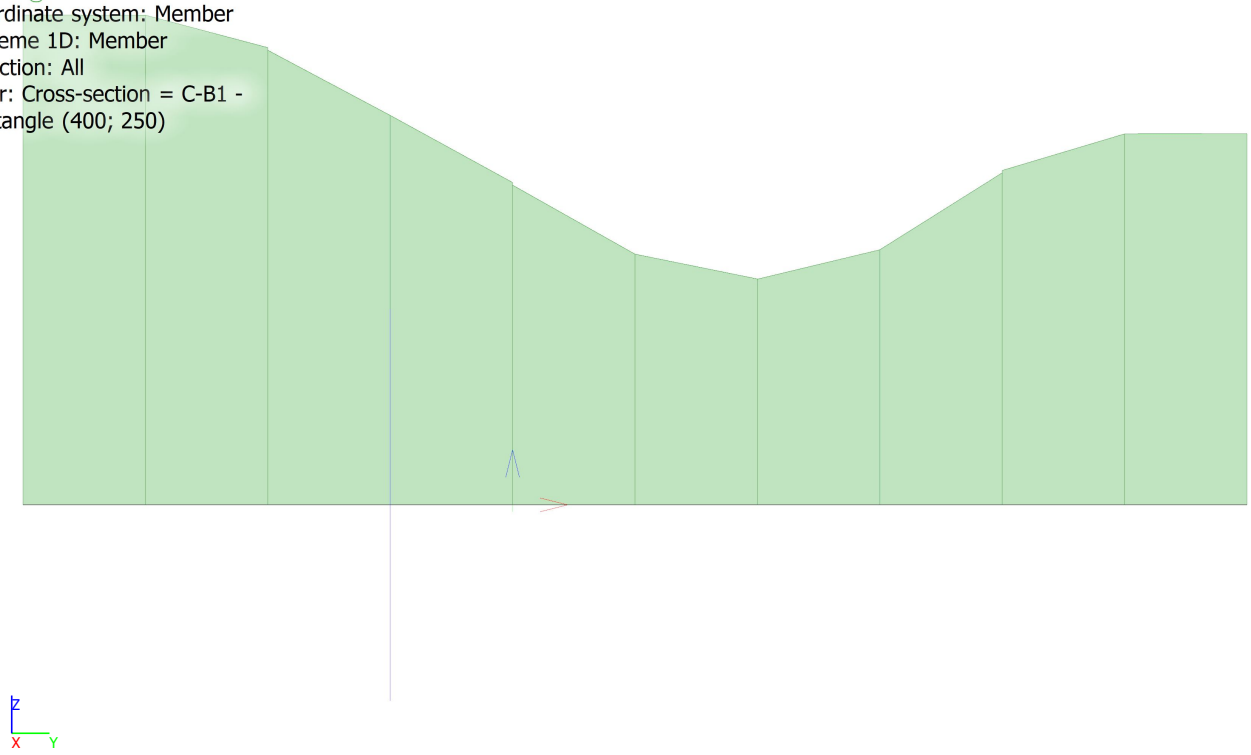
Values: **As,req**
Linear calculation
Class: MSN+E
Coordinate system: Member
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-B1 - Rectangle (400; 250)



Values: **Aswm,req**
Linear calculation
Class: MSN+E
Coordinate system: Member
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-B1 - Rectangle (400; 250)



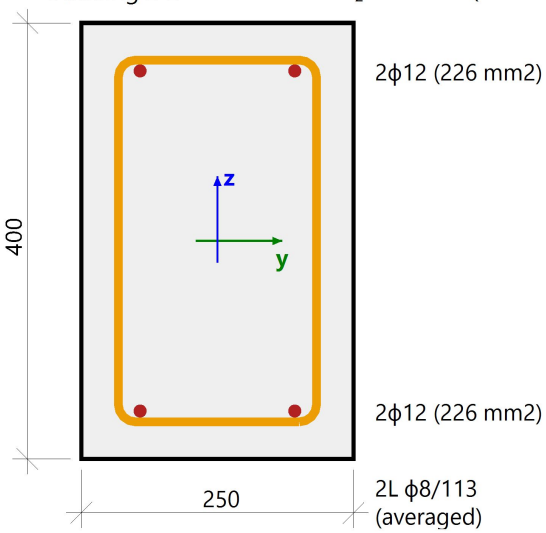
Values: **UC**
Linear calculation
Class: MSN+E
Coordinate system: Member
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-B1 - Rectangle (400; 250)



Linear calculation
Class: MSN+E
Coordinate system: Member
Extreme 1D: Cross-section
Selection: All
Filter: Cross-section = C-B1 - Rectangle (400; 250)

Beam B1	**Rectangle (400; 250)**
SIST EN 1992-1-1:2005/A101:2006	Section 0 [dx = 0 m]

Member length: L = 1.25 m
Buckling y-y: L_y = 1.25 m (non-sway)
Buckling z-z: L_z = 1.25 m (non-sway)



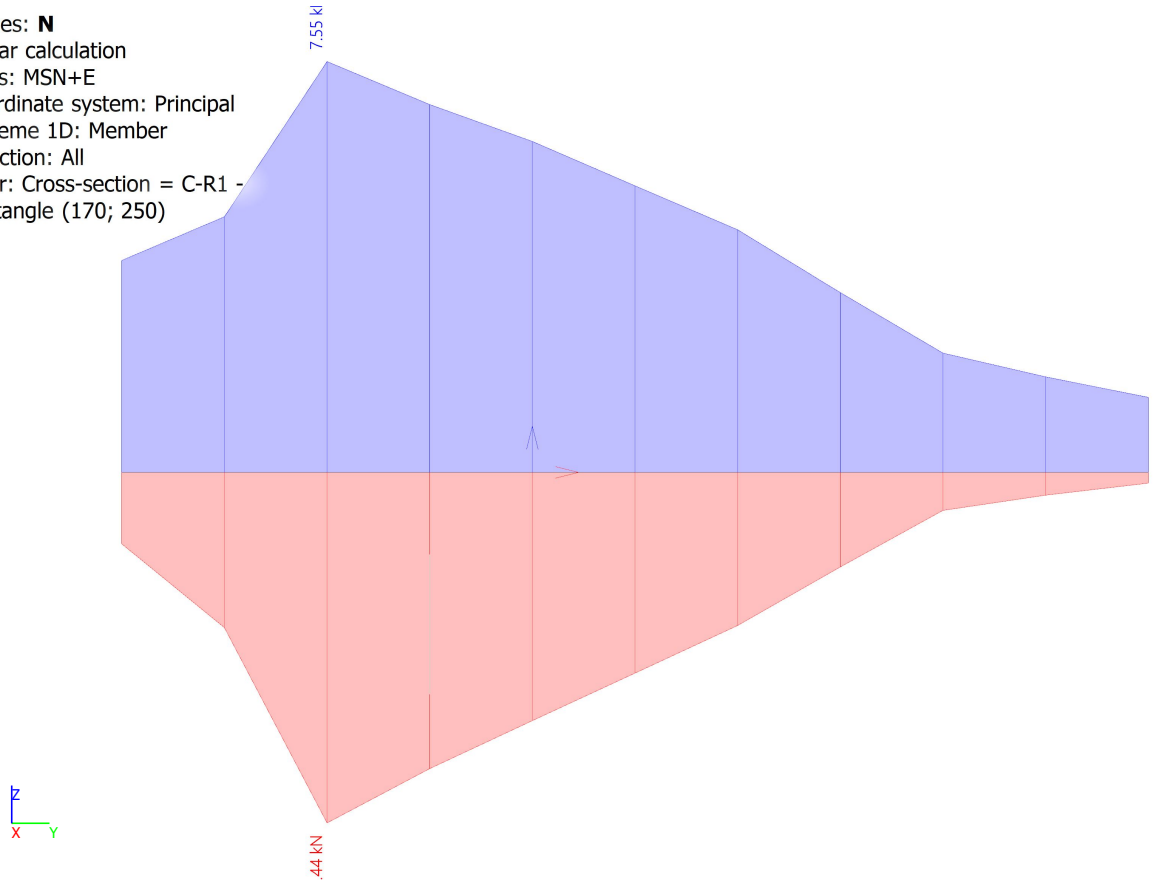
Concrete: C25/30
Bi-linear stress-strain diagram
Exposure class: XC3
Longitudinal reinforcement: B 500B
Bi-linear with an inclined top branch
4ϕ12 (452 mm^2)
ρ_l = 0.452 % (3.55 kg/m)
Shear reinforcement: B 500B
Bi-linear with an inclined top branch
2L ϕ8/113 (101 mm^2)
ρ_w = 0.352 % (6.96 kg/m)
Cover (stirrup)
Top: 30 mm
Bottom: 30 mm
Left: 30 mm
Right: 30 mm

Name	dx [m]	Combikey	UC_{resp}	UC_{int}	UC_{VT}	UC_{stress}	UC_{crack}	UC_{defl}	UC_{det}	UC
B1	0.000	LT+ST+0.60*Q+Ex+Acc dentaltorsionalmomentsforEx	0.23	0.21	0.06	-	-	-	-	0.23

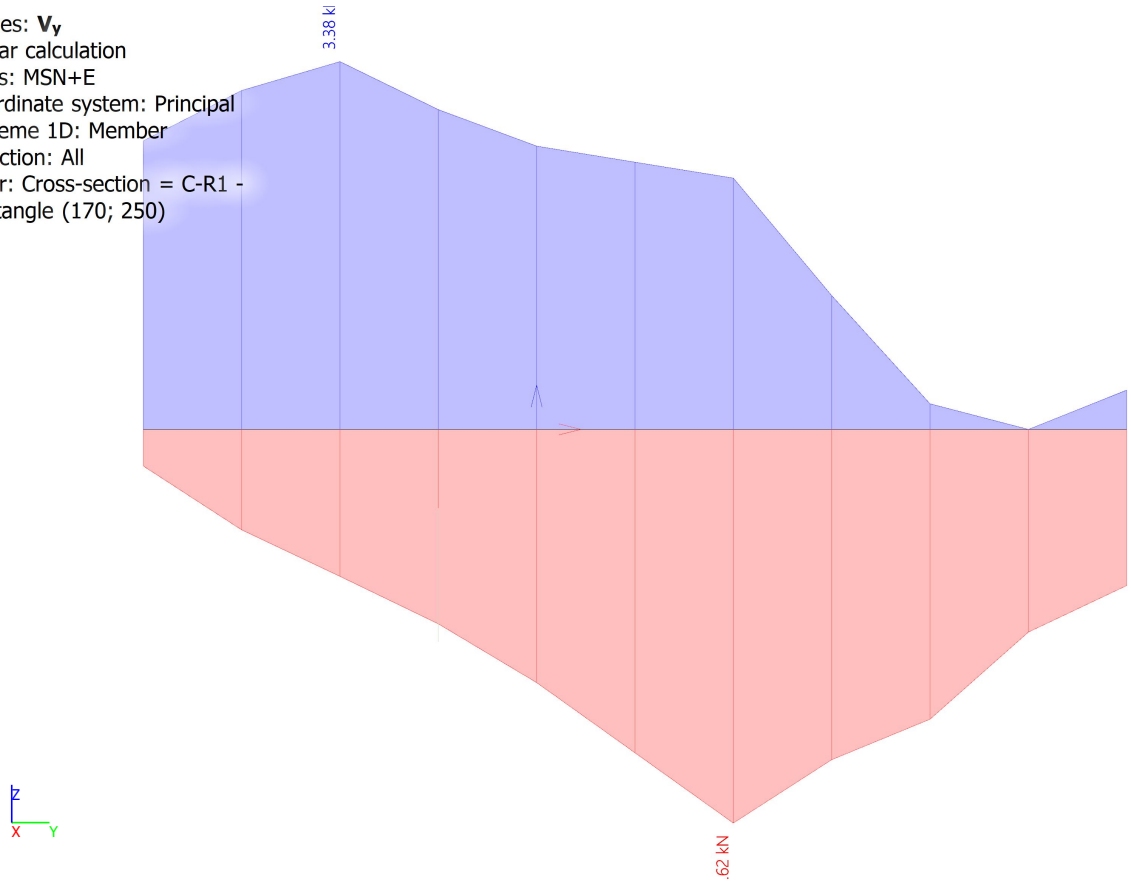
6.3.3.2. 1D elementi - dimenzioniranje - C-R1

Name	Type	Item material	Fabrication	Colour
	Detailed			
C-R1	Rectangle 170; 250	C25/30	concrete	

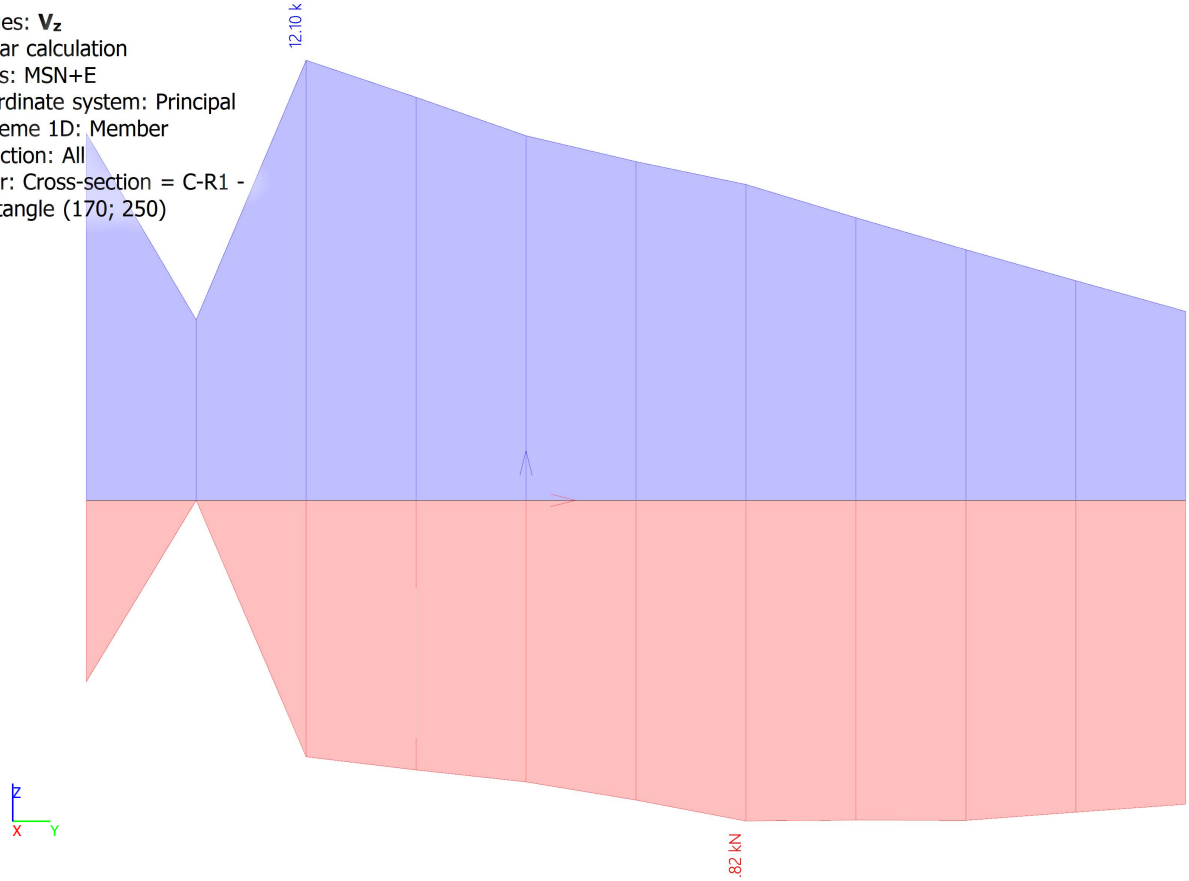
Values: **N**
Linear calculation
Class: MSN+E
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-R1 - Rectangle (170; 250)



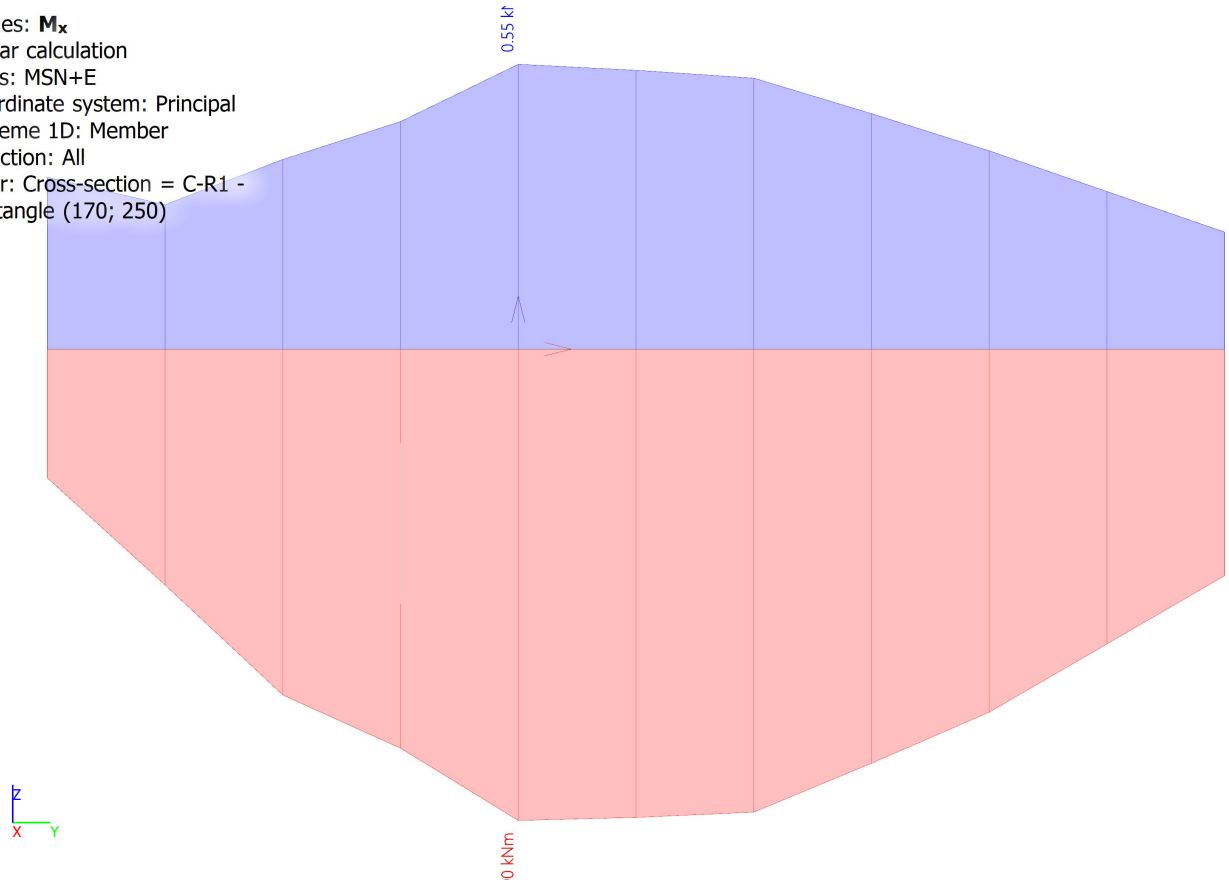
Values: V_y
Linear calculation
Class: MSN+E
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-R1 - Rectangle (170; 250)



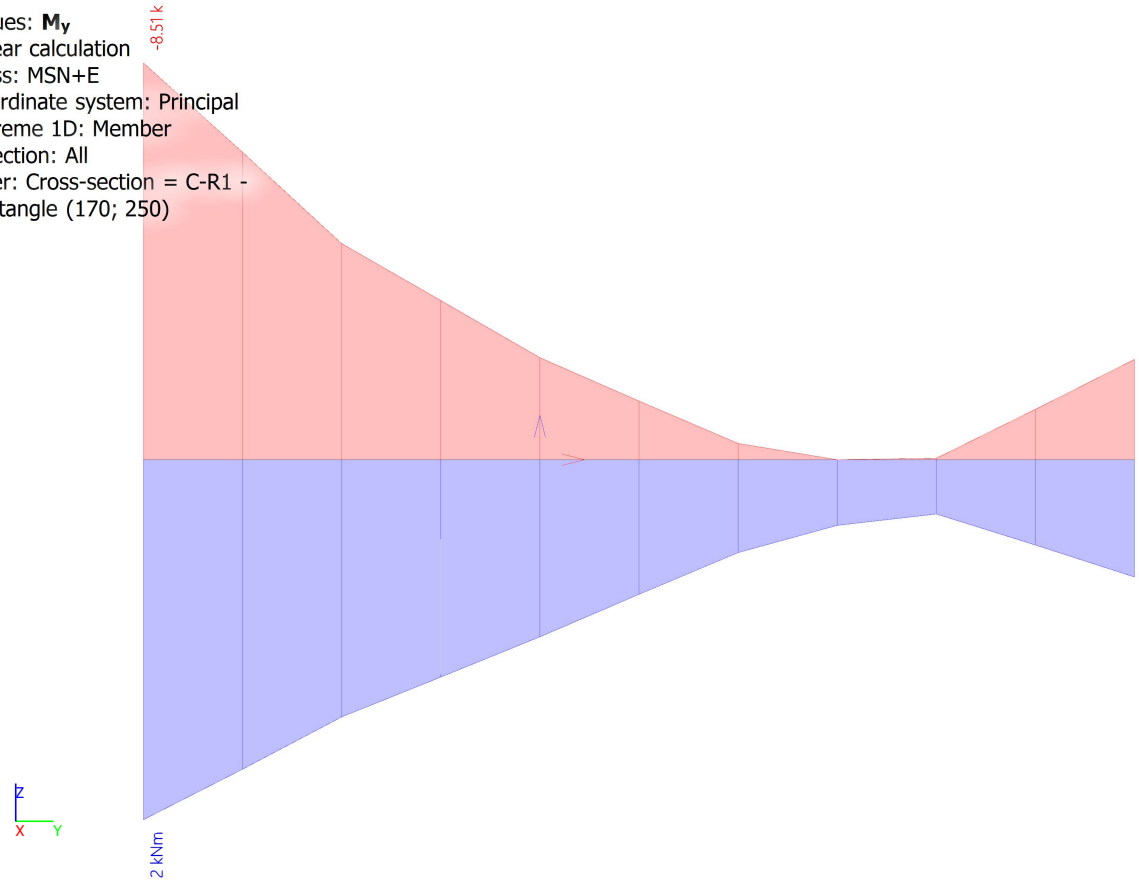
Values: V_z
Linear calculation
Class: MSN+E
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-R1 - Rectangle (170; 250)



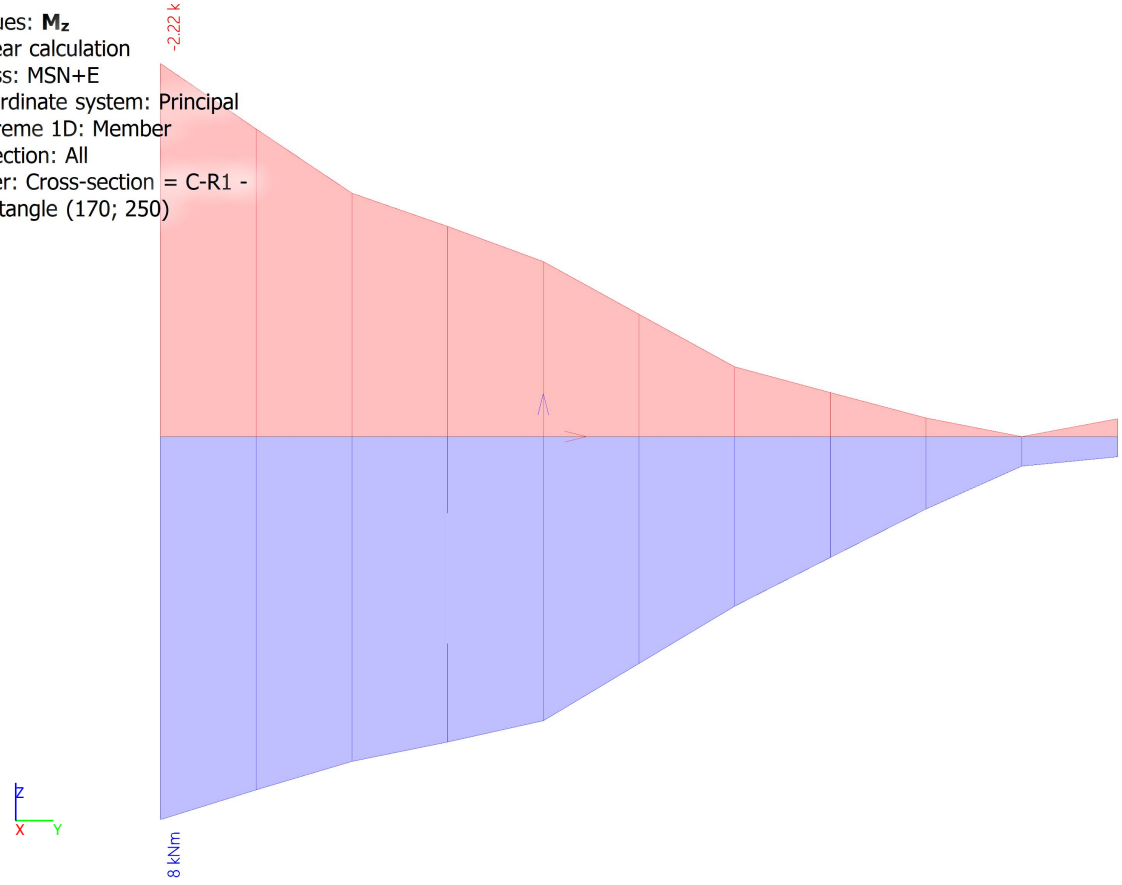
Values: M_x
Linear calculation
Class: MSN+E
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-R1 - Rectangle (170; 250)



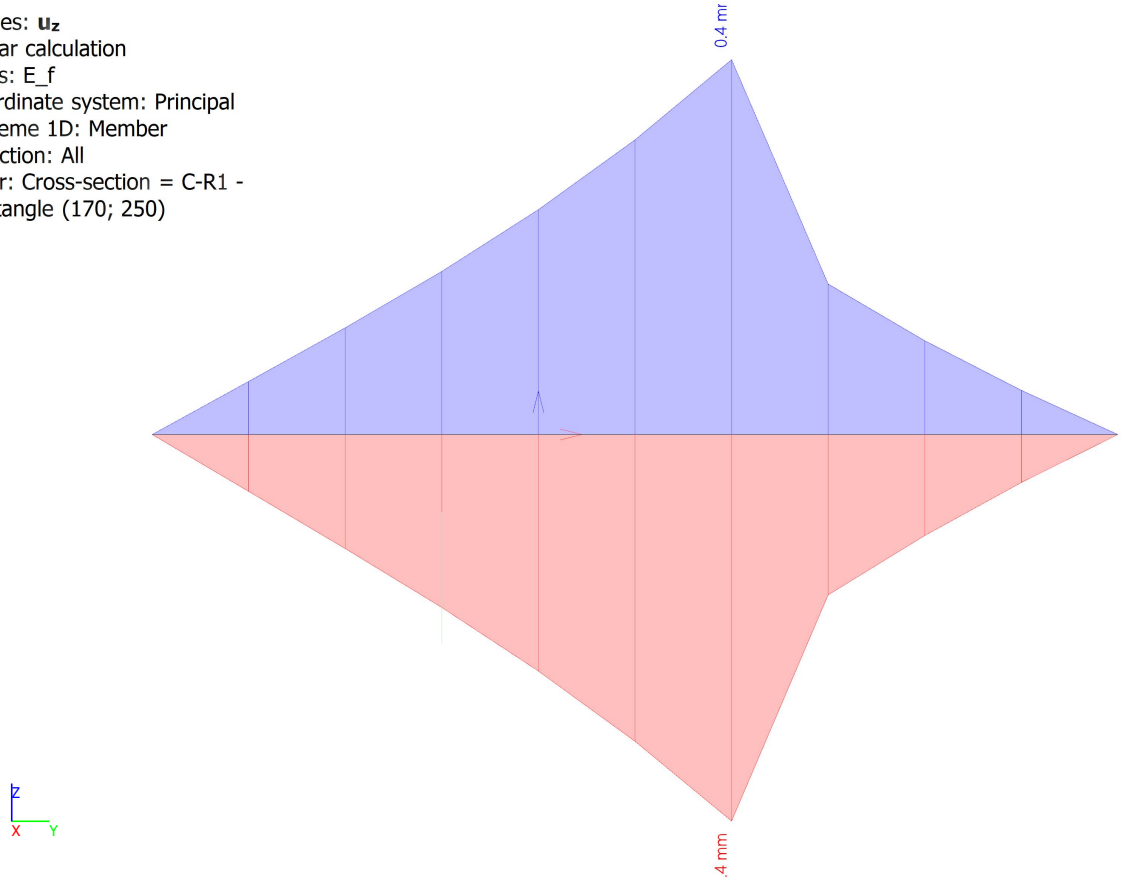
Values: M_y
Linear calculation
Class: MSN+E
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-R1 - Rectangle (170; 250)



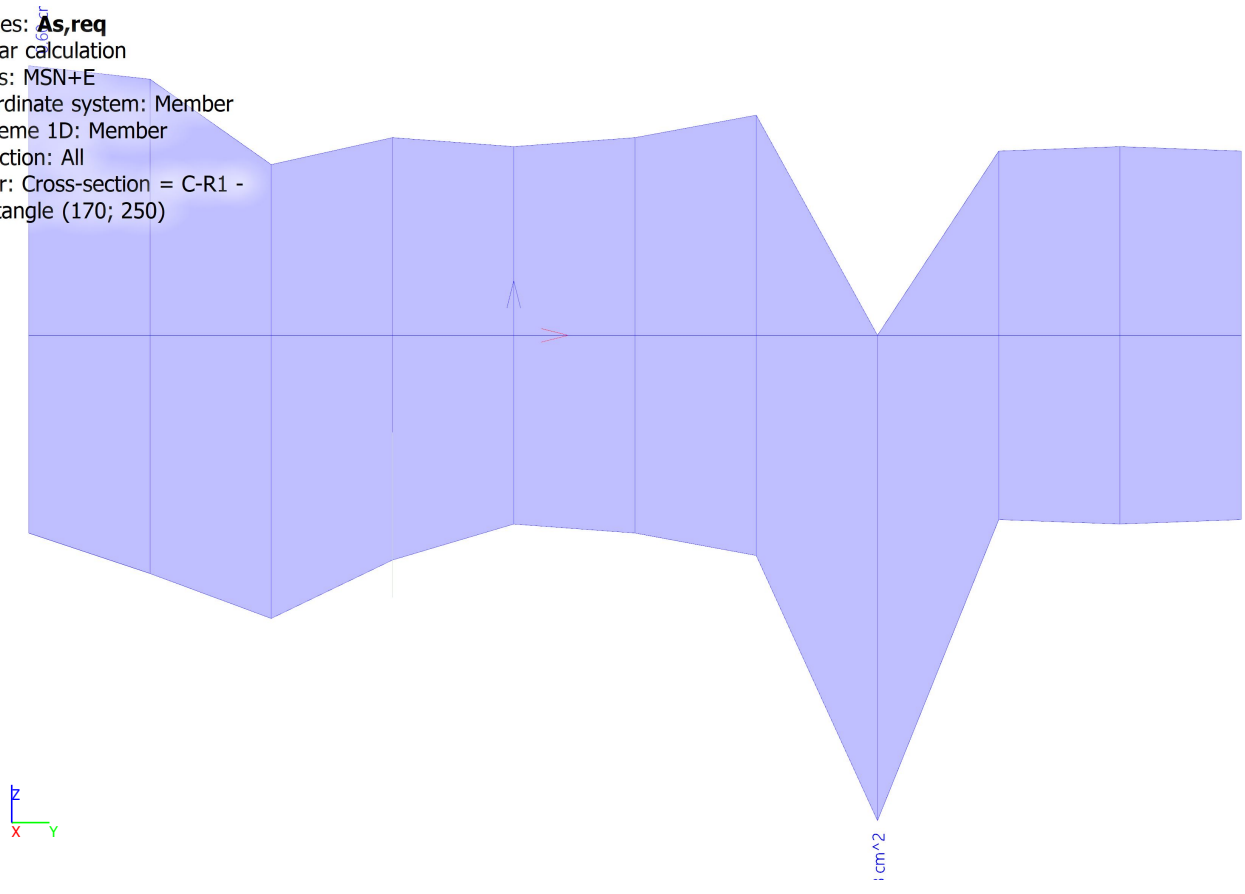
Values: M_z
Linear calculation
Class: MSN+E
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-R1 - Rectangle (170; 250)



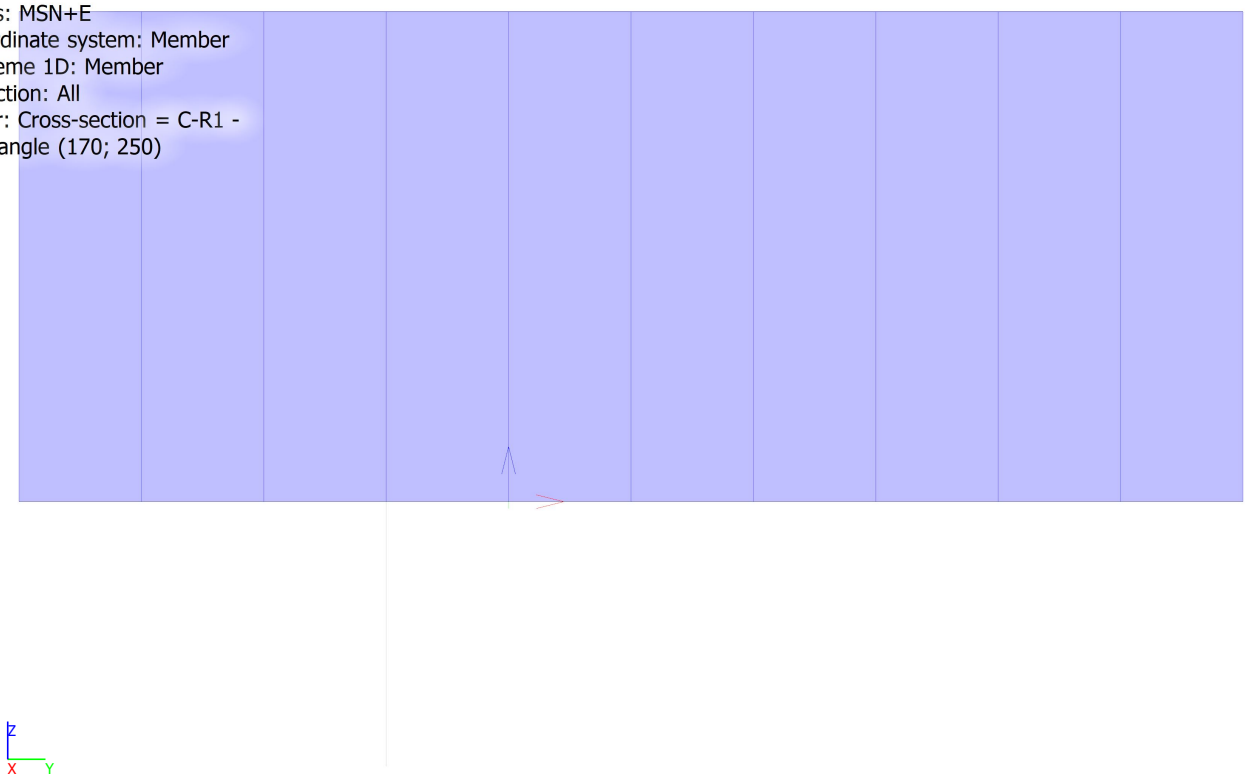
Values: u_z
Linear calculation
Class: E_f
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-R1 - Rectangle (170; 250)



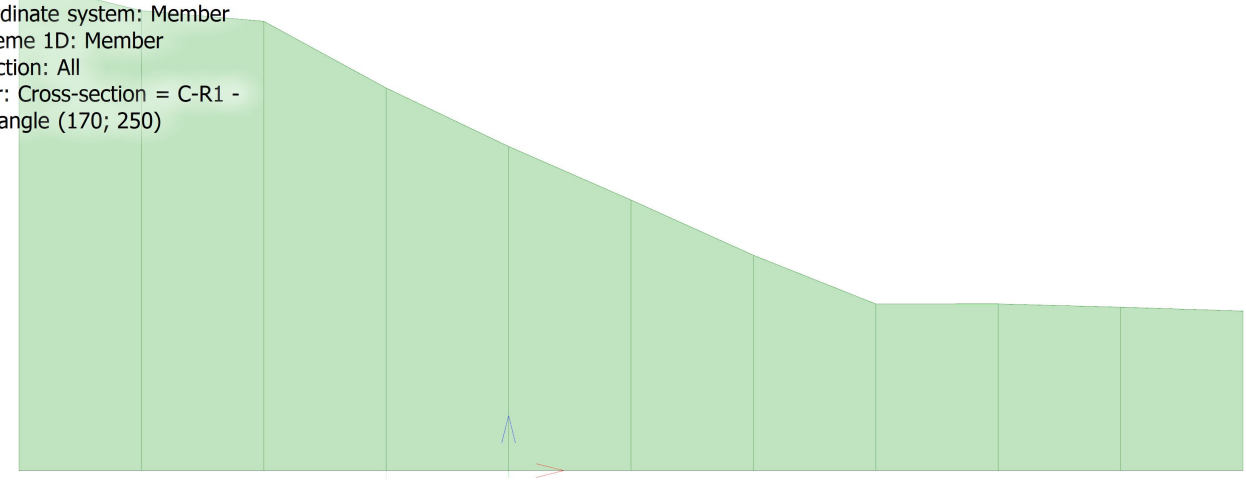
Values: **As,req**
Linear calculation
Class: MSN+E
Coordinate system: Member
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-R1 - Rectangle (170; 250)



Values: $A_{swm,req}$
Linear calculation
Class: MSN+E
Coordinate system: Member
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-R1 - Rectangle (170; 250)



Values: **UC**
Linear calculation
Class: MSN+E
Coordinate system: Member
Extreme 1D: Member
Selection: All
Filter: Cross-section = C-R1 - Rectangle (170; 250)

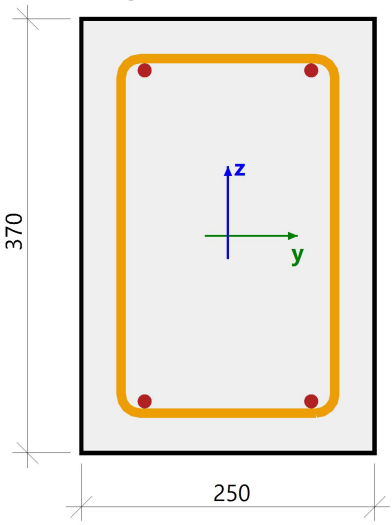




Linear calculation
Class: MSN+E
Coordinate system: Member
Extreme 1D: Cross-section
Selection: All
Filter: Cross-section = C-R1 - Rectangle (170; 250)

Rib B2	**Rectangle (370; 250)**
SIST EN 1992-1-1:2005/A101:2006	Section 0 [dx = 0 m]

Member length: L = 1.25 m
Buckling y-y⊥ L_y = 1.25 m (non-sway)
Buckling z-z⊥ L_z = 1.25 m (non-sway)



Concrete: C25/30
Bi-linear stress-strain diagram
Exposure class: XC3
Longitudinal reinforcement: B 500B
Bi-linear with an inclined top branch
4ϕ12 (452 mm^2)
ρ_l = 0.489 % (3.55 kg/m)
Shear reinforcement: B 500B
Bi-linear with an inclined top branch
2L ϕ8/139 (101 mm^2)
ρ_w = 0.290 % (5.68 kg/m)
Cover (stirrup)
Top: 30 mm
Bottom: 30 mm
Left: 30 mm
Right: 30 mm

Name	dx [m]	Combikey	UC_{resp}	UC_{int}	UC_{VT}	UC_{stress}	UC_{crack}	UC_{defl}	UC_{det}	UC
B2	0.000	LT+ST-Ex-Acc dentaltorsionalmomentsforEx	0.25	0.24	0.05	-	-	-	-	0.25

6.3.3.3. 1D elementi - dimenzioniranje - C-R3

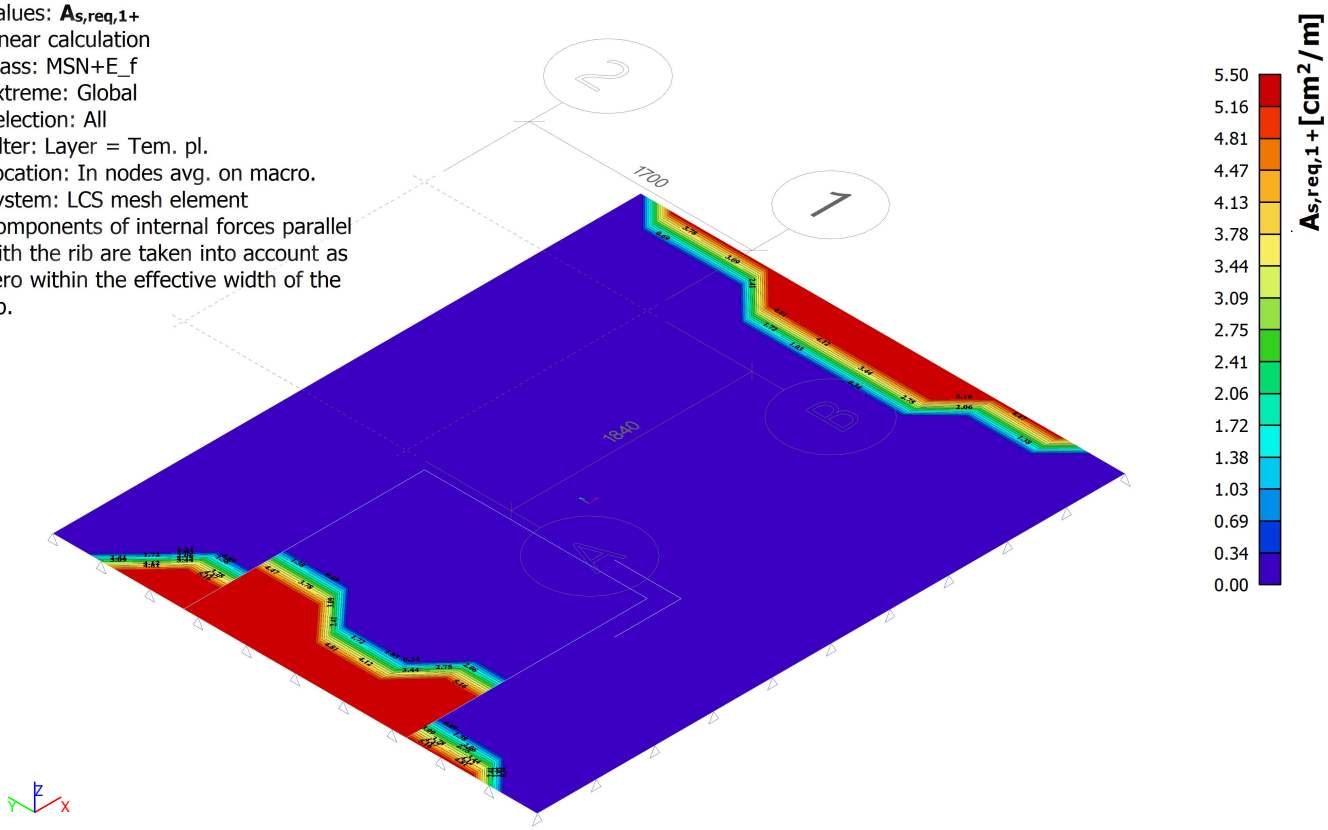
Name	Type	Item material	Fabrication	Colour
	Detailed			
C-R3	L g 370; 200; 200; 250	C25/30	concrete	

6.3.4. Tem. pl. - dimenzioniranje

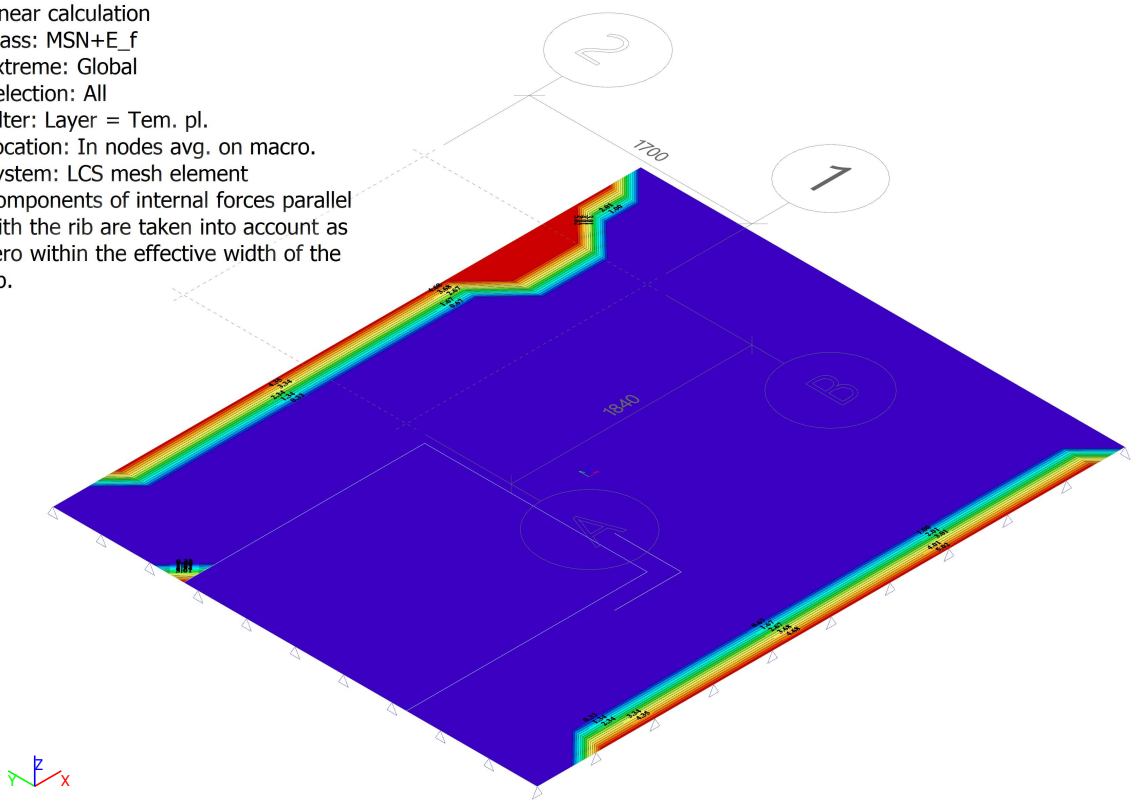
6.3.4.1. Tem. pl. - dimenzioniranje - Tem. pl.

Name	Structural model only	Colour
Tem. pl.	×	

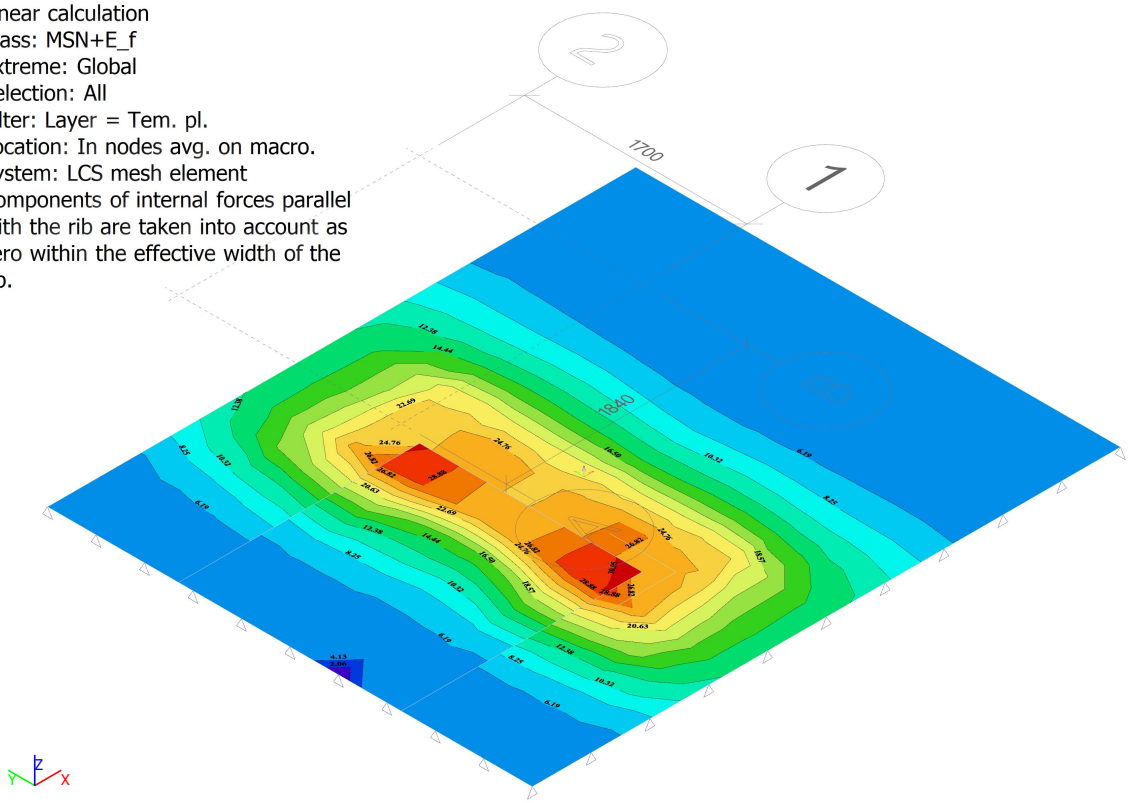
Values: $A_{s,req,1+}$
Linear calculation
Class: MSN+E_f
Extreme: Global
Selection: All
Filter: Layer = Tem. pl.
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.



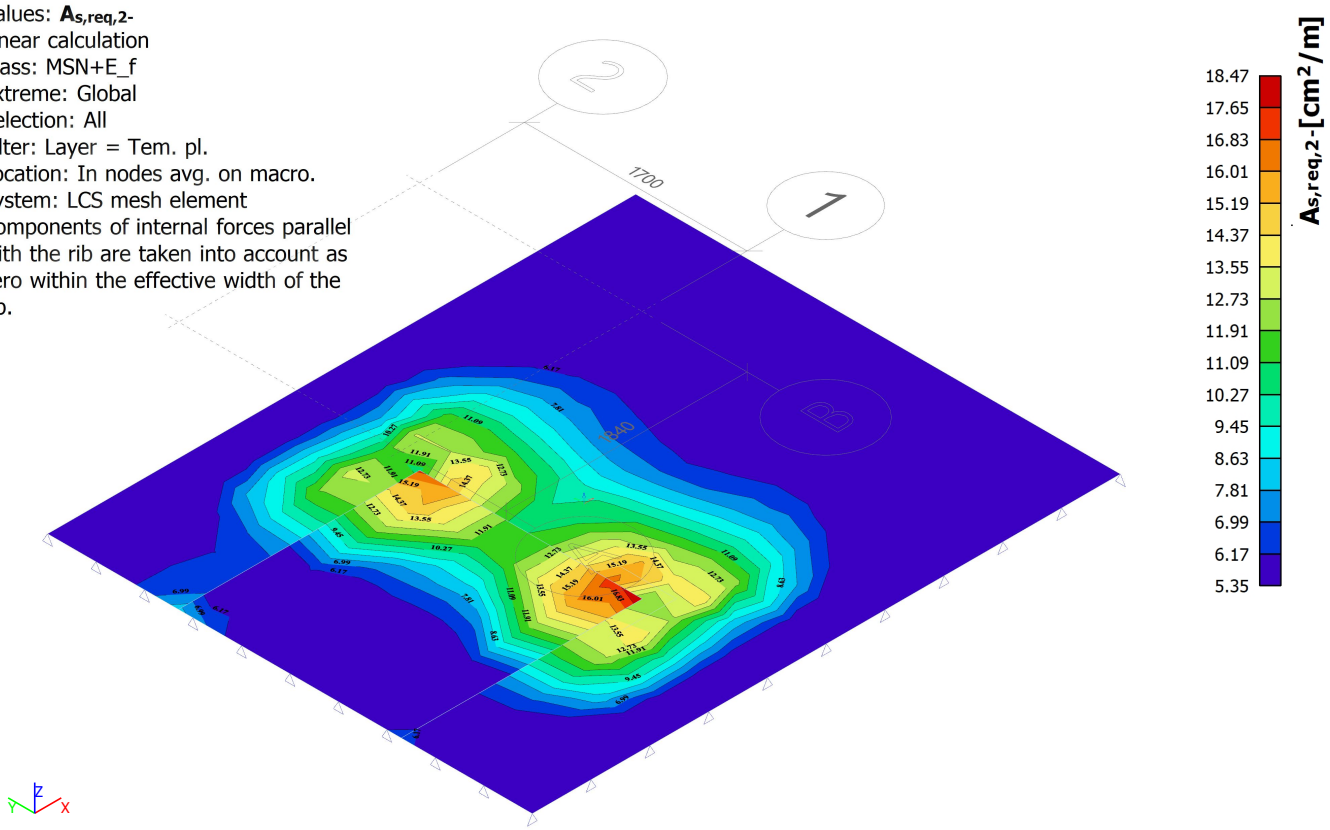
Values: $A_{s,req,2+}$
Linear calculation
Class: MSN+E_f
Extreme: Global
Selection: All
Filter: Layer = Tem. pl.
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.



Values: $A_{s,req,1-}$
Linear calculation
Class: MSN+E_f
Extreme: Global
Selection: All
Filter: Layer = Tem. pl.
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.



Values: $A_{s,req,2}$-
Linear calculation
Class: MSN+E_f
Extreme: Global
Selection: All
Filter: Layer = Tem. pl.
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

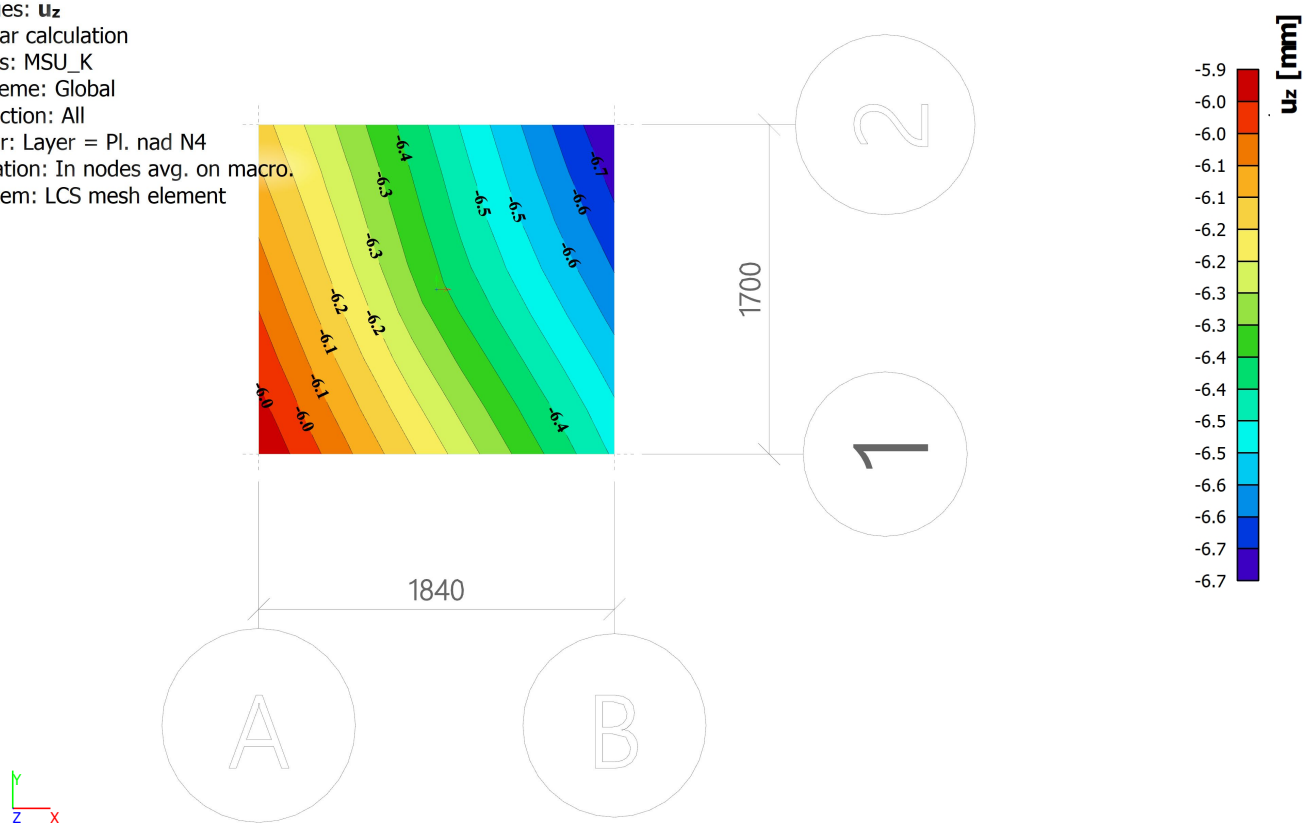


6.3.5. AB plosce - dimenzioniranje

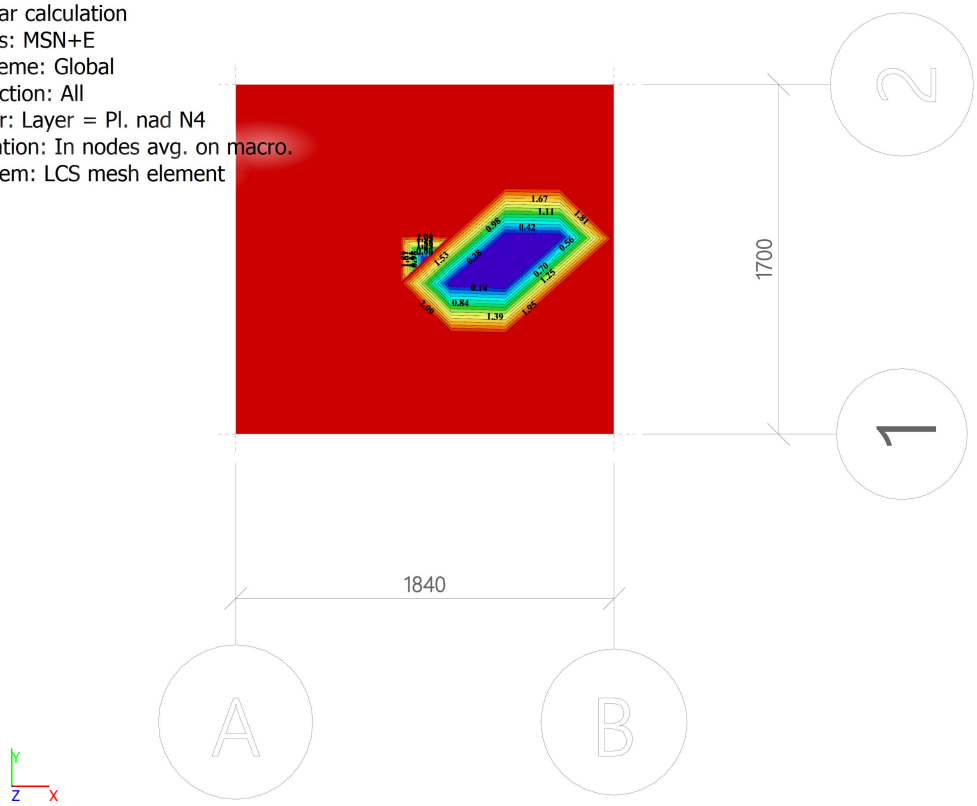
6.3.5.1. AB plosce - dimenzioniranje - Pl. nad N4

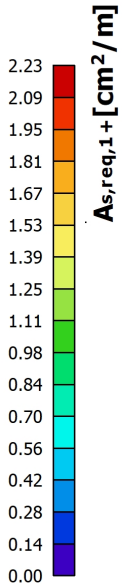
Name	Structural model only	Colour
Pl. nad N4	×	

Values: u_z
Linear calculation
Class: MSU_K
Extreme: Global
Selection: All
Filter: Layer = Pl. nad N4
Location: In nodes avg. on macro.
System: LCS mesh element

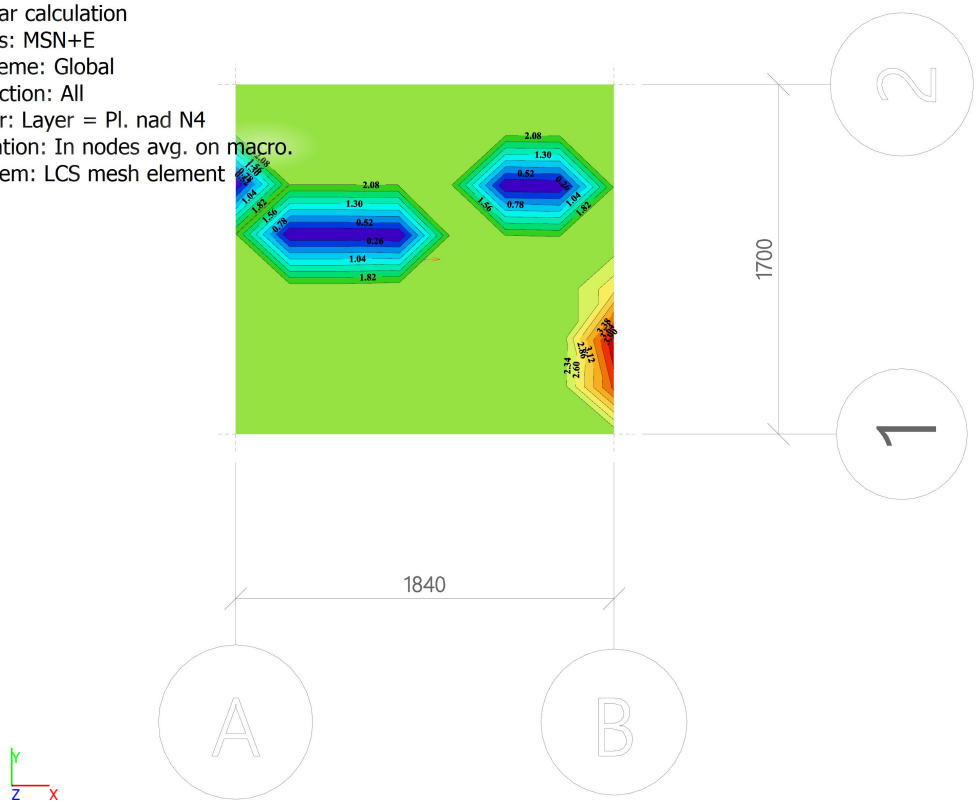


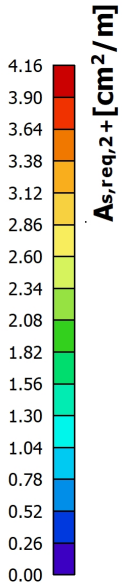
Values: $A_{s,req,1+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = Pl. nad N4
Location: In nodes avg. on macro.
System: LCS mesh element



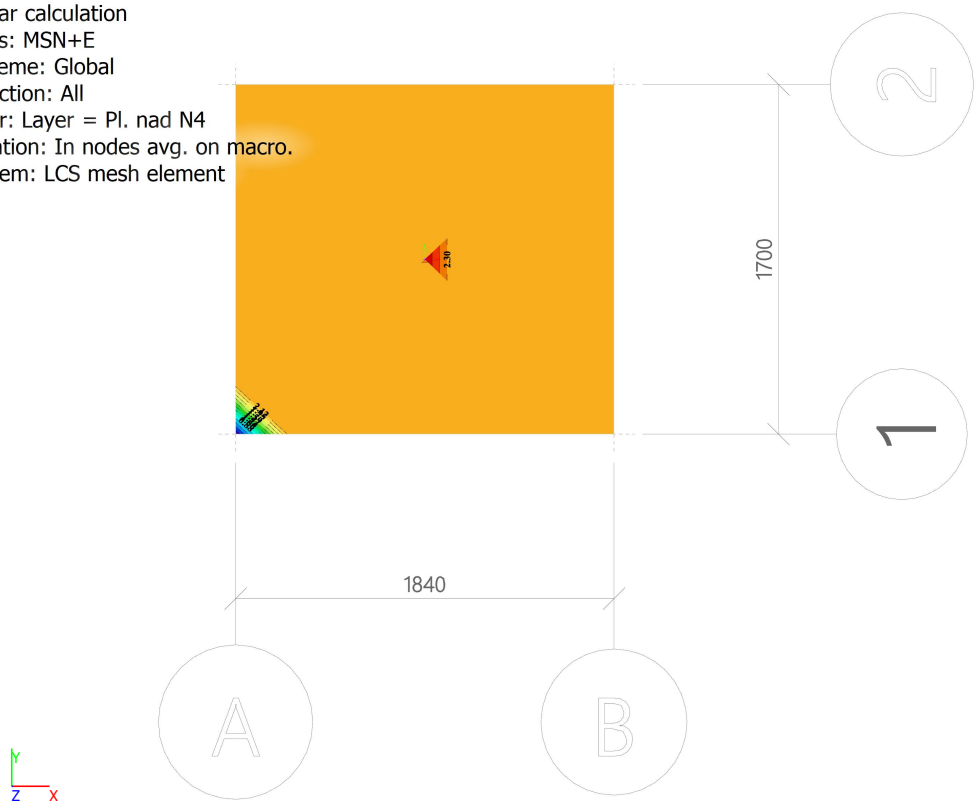


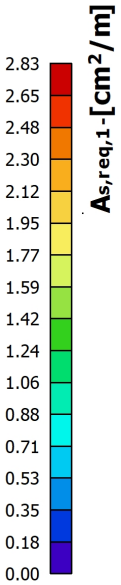
Values: $A_{s,req,2+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = Pl. nad N4
Location: In nodes avg. on macro.
System: LCS mesh element



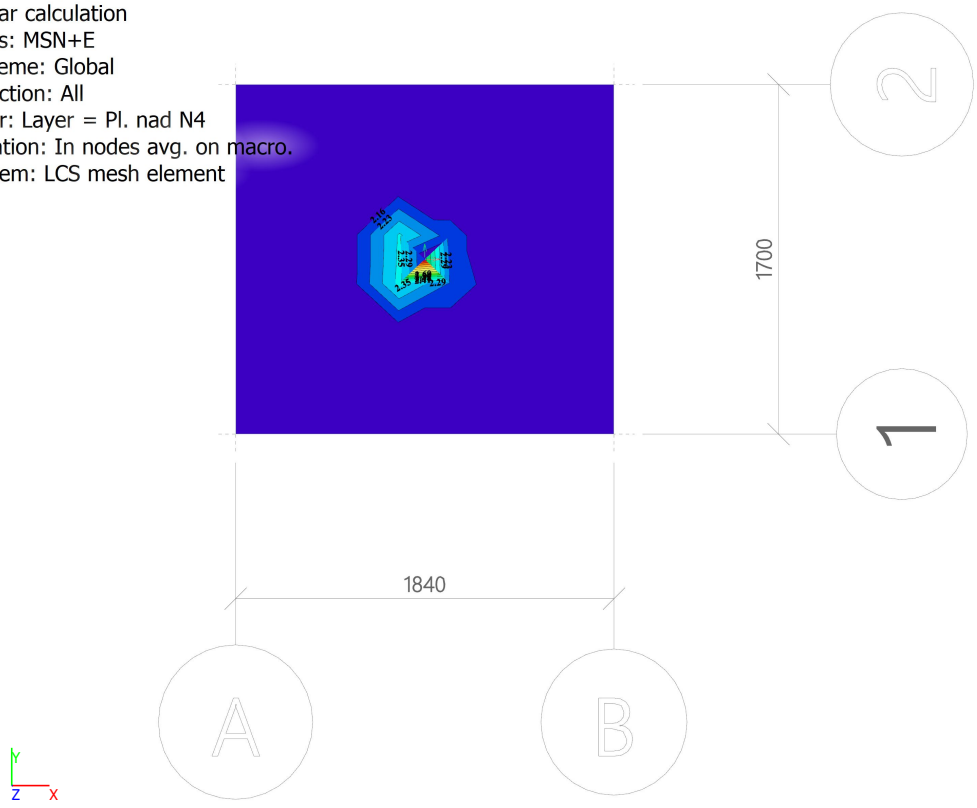


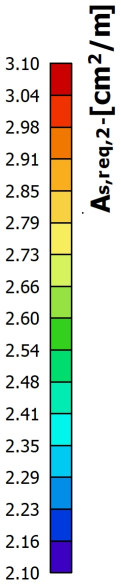
Values: $A_{s,req,1}$-
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = Pl. nad N4
Location: In nodes avg. on macro.
System: LCS mesh element





Values: $A_{s,req,2}$-
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = Pl. nad N4
Location: In nodes avg. on macro.
System: LCS mesh element



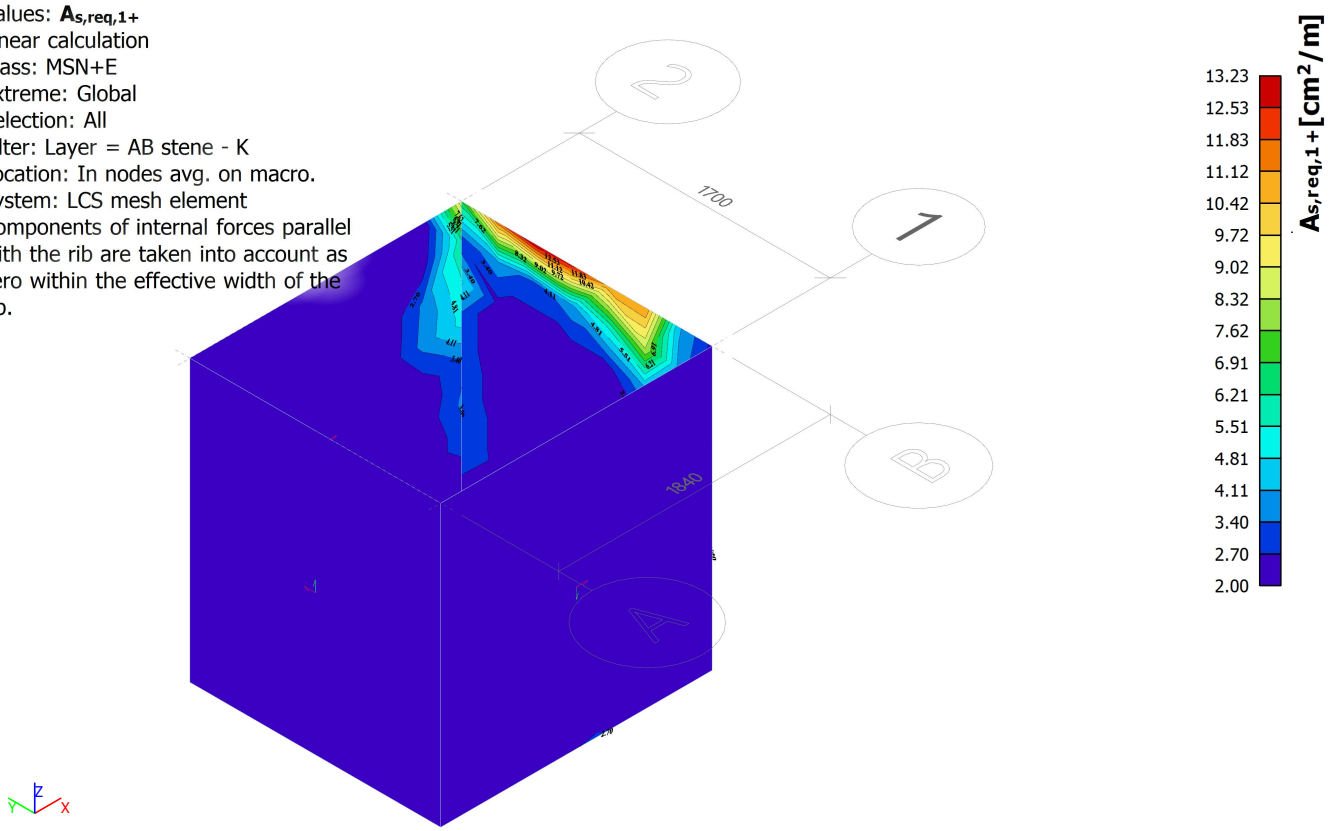


6.3.6. AB stene - dimenzioniranje

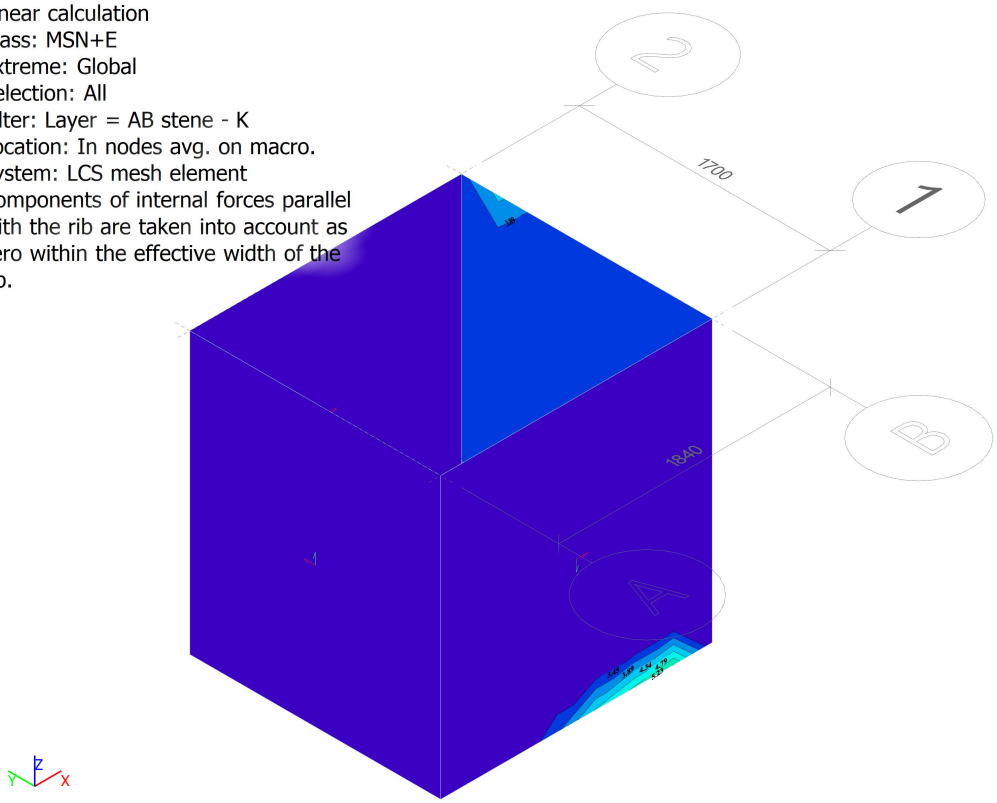
6.3.6.1. AB stene - dimenzioniranje - AB stene - K

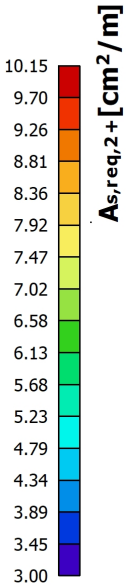
Name	Structural model only	Colour
AB stene - K	×	

Values: $A_{s,req,1+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - K
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

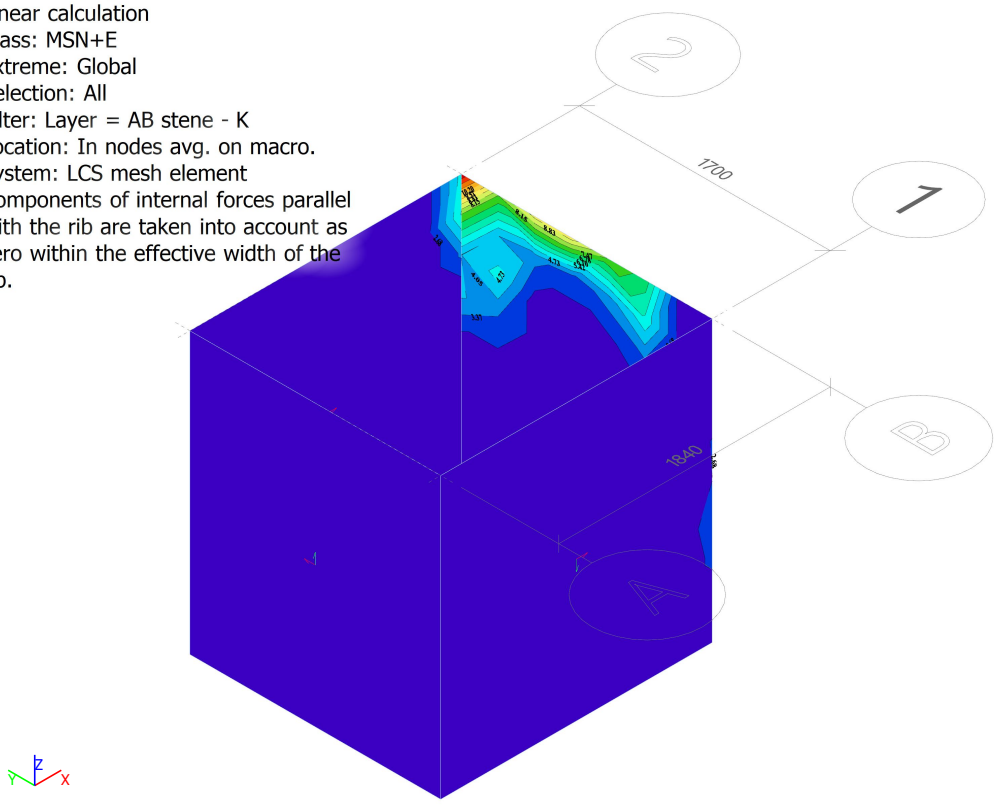


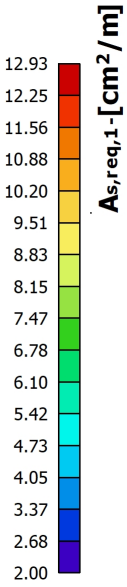
Values: $A_{s,req,2+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - K
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.



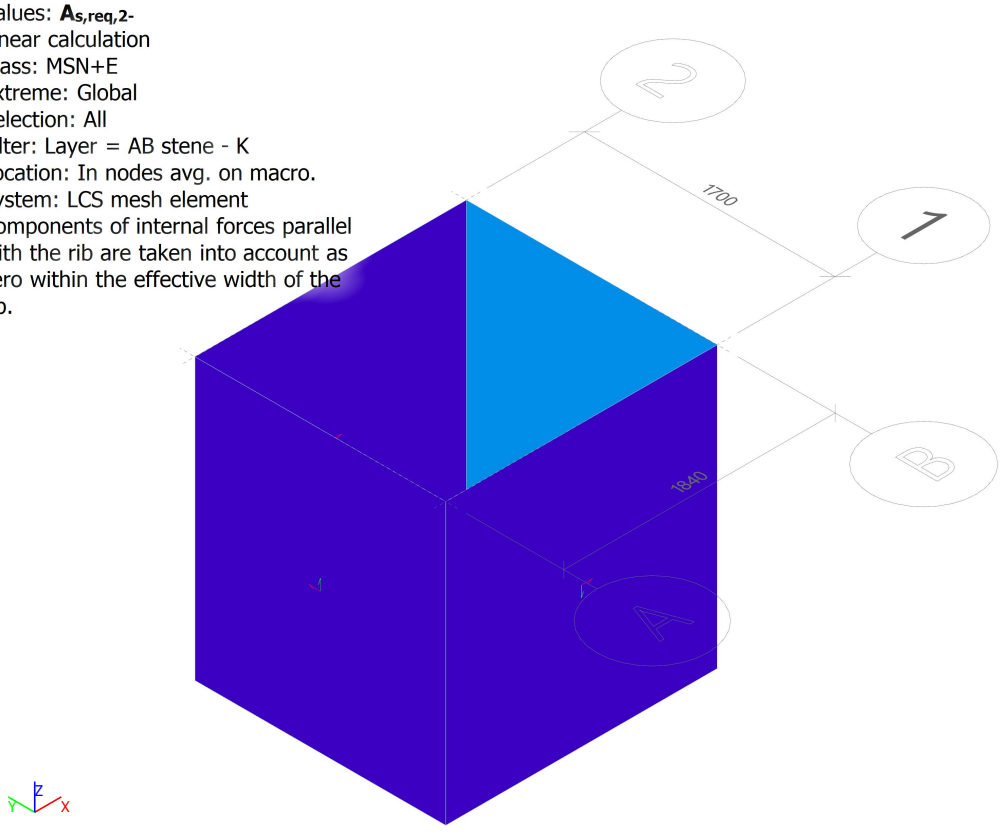


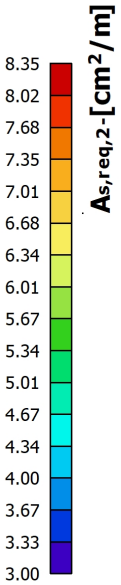
Values: $A_{s,req,1-}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - K
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.





Values: $A_{s,req,2}$-
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - K
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

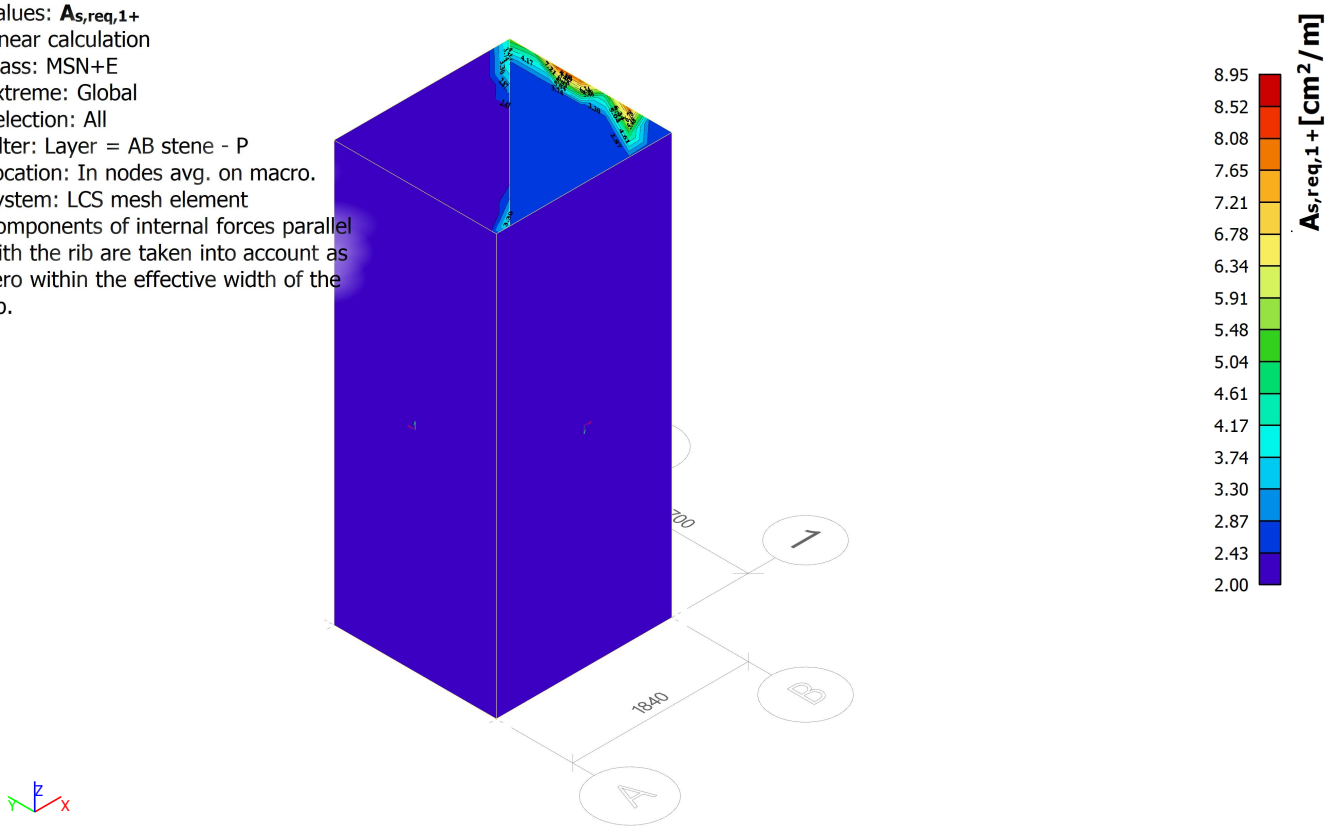




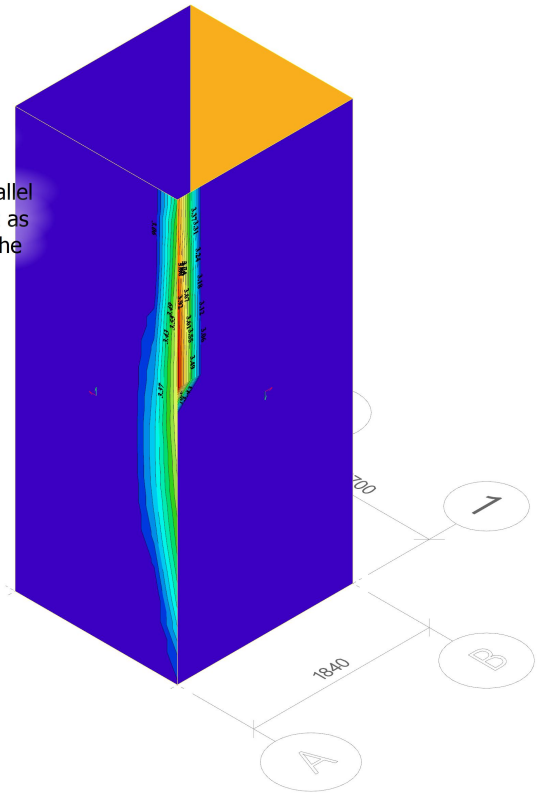
6.3.6.2. AB stene - dimenzioniranje - AB stene - P

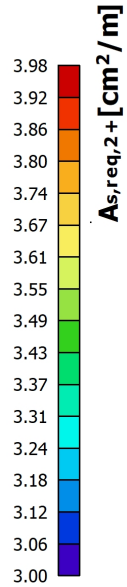
Name	Structural model only	Colour
AB stene - P	×	

Values: $A_{s,req,1+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - P
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

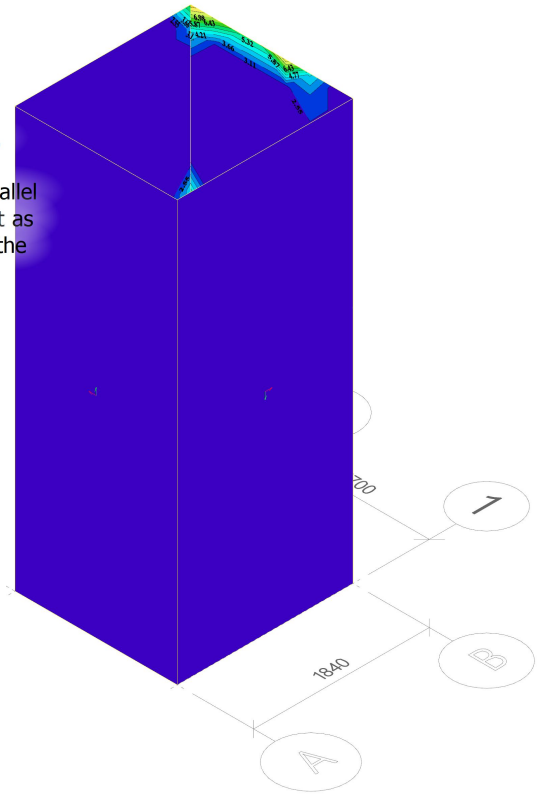


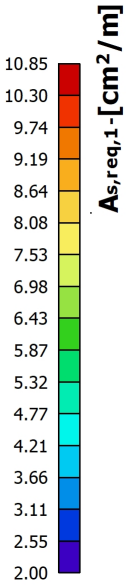
Values: $A_{s,req,2+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - P
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.



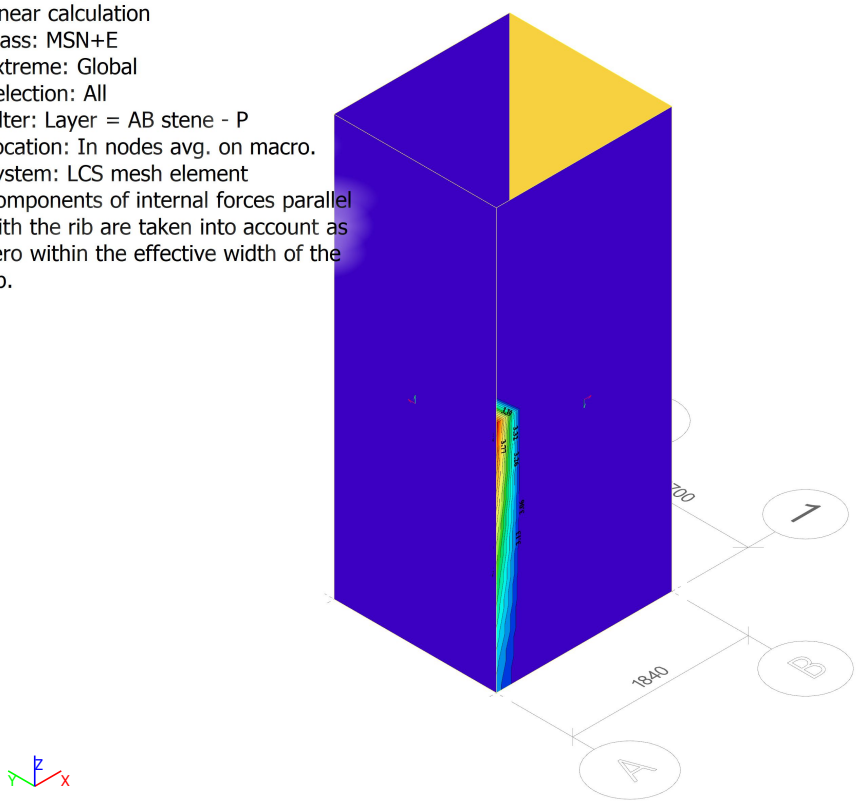


Values: $A_{s,req,1-}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - P
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.





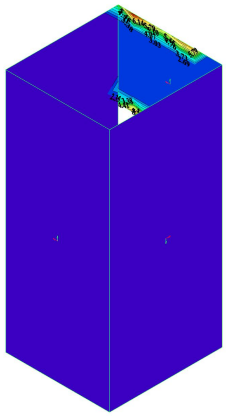
Values: $A_{s,req,2}$-
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - P
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

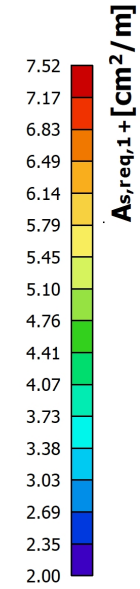


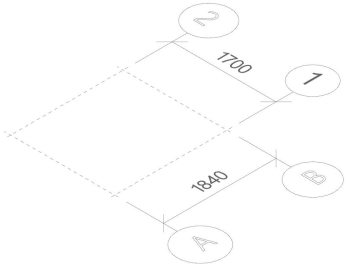
6.3.6.3. AB stene - dimenzioniranje - AB stene - N1

Name	Structural model only	Colour
AB stene - N1	×	

Values: $A_{s,req,1+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N1
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

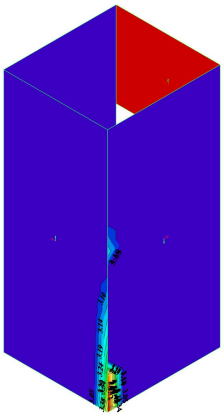


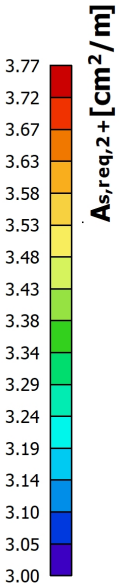


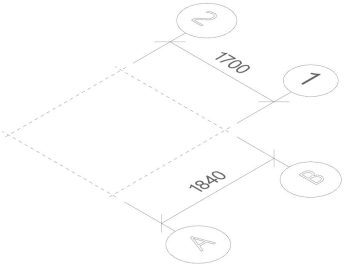




Values: $A_{s,req,2+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N1
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

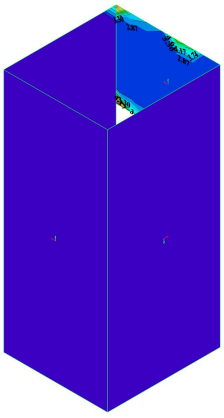


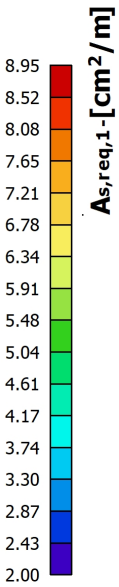


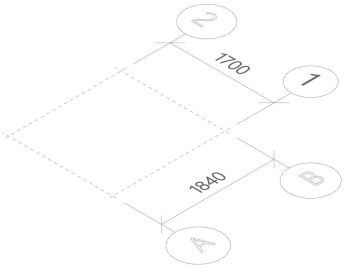




Values: $A_{s,req,1-}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N1
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

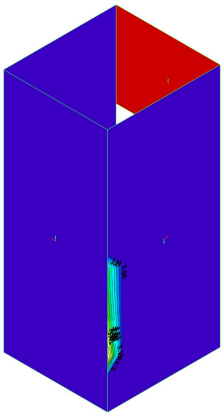


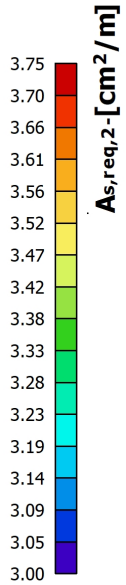


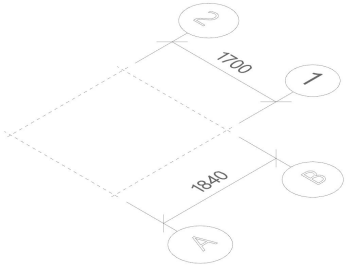




Values: $A_{s,req,2}$-
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N1
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.





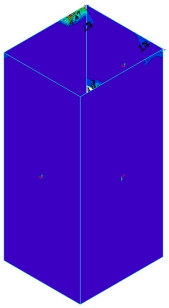


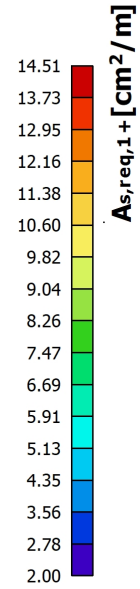


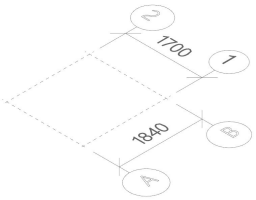
6.3.6.4. AB stene - dimenzioniranje - AB stene - N2

Name	Structural model only	Colour
AB stene - N2	×	

Values: $A_{s,req,1+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N2
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

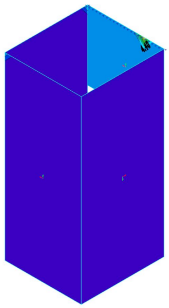


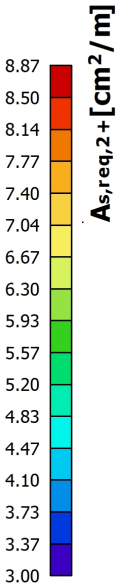


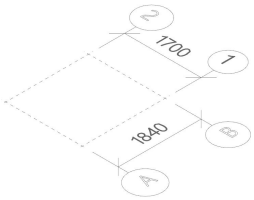




Values: $A_{s,req,2+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N2
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

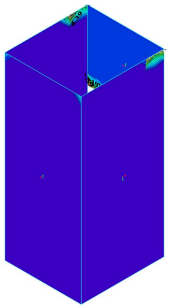


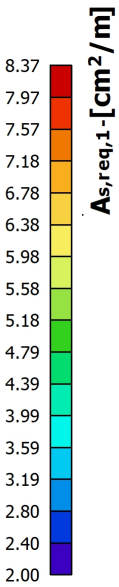


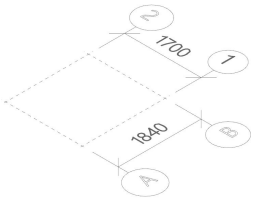




Values: $A_{s,req,1-}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N2
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

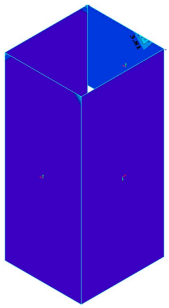


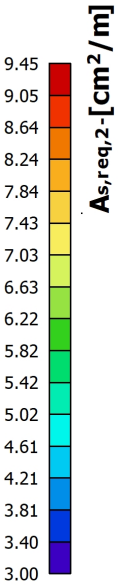


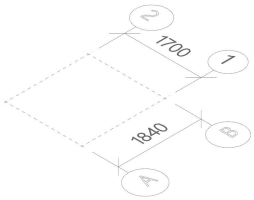




Values: $A_{s,req,2}$-
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N2
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.





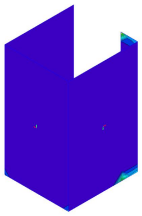


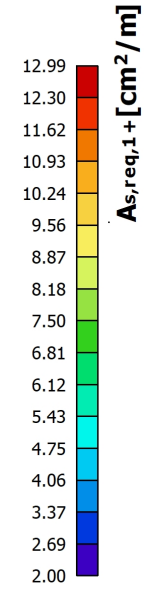


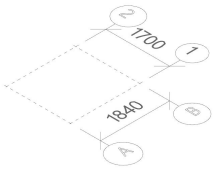
6.3.6.5. AB stene - dimenzioniranje - AB stene - N3

Name	Structural model only	Colour
AB stene - N3	×	

Values: $A_{s,req,1+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N3
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

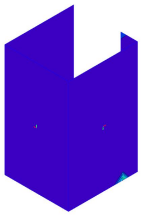


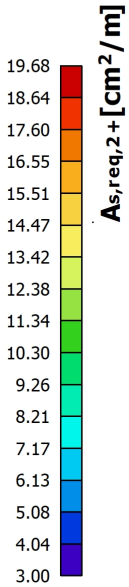


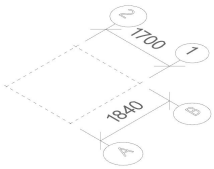




Values: $A_{s,req,2+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N3
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

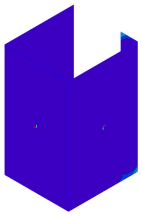


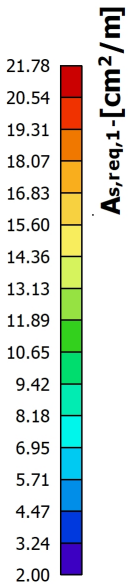


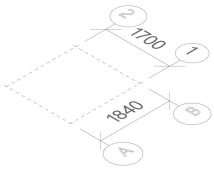




Values: $A_{s,req,1-}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N3
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

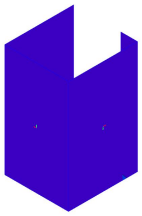


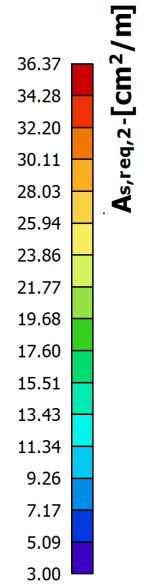


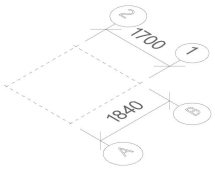




Values: $A_{s,req,2}$-
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N3
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.





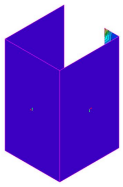


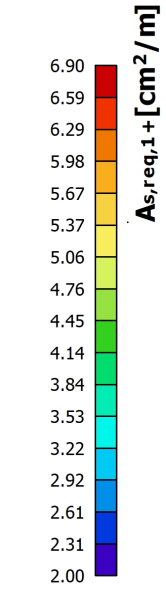


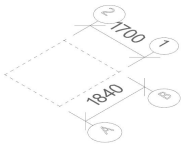
6.3.6.6. AB stene - dimenzioniranje - AB stene - N4

Name	Structural model only	Colour
AB stene - N4	×	

Values: $A_{s,req,1+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N4
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

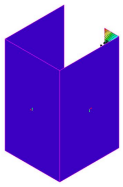


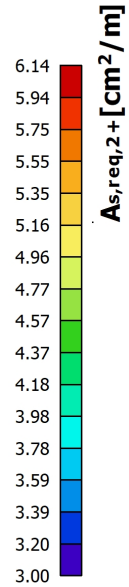


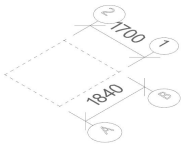




Values: $A_{s,req,2+}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N4
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

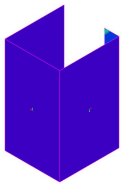


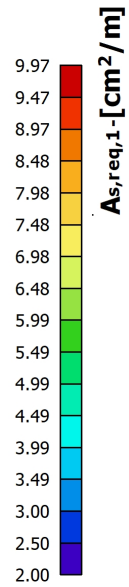


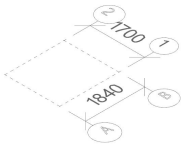




Values: $A_{s,req,1-}$
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N4
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.

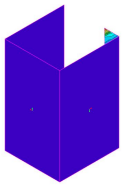


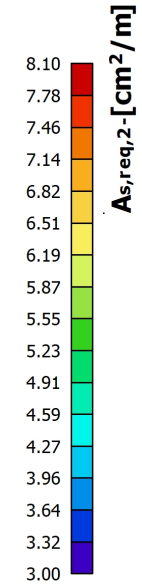


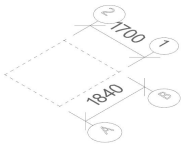




Values: $A_{s,req,2}$-
Linear calculation
Class: MSN+E
Extreme: Global
Selection: All
Filter: Layer = AB stene - N4
Location: In nodes avg. on macro.
System: LCS mesh element
Components of internal forces parallel with the rib are taken into account as zero within the effective width of the rib.









Project: SRZ - SAZU - dvigalni jašek
Project no:
Author: Miha Blatnik, mag. inž. grad.

IDEA StatiCa
Calculate yesterday's estimates

Project data

Project name	SRZ - SAZU - dvigalni jašek
Project number	
Author	Miha Blatnik, mag. inž. grad.
Description	Kratka konzola
Date	4. 04. 2025
Design code	EN

Materials

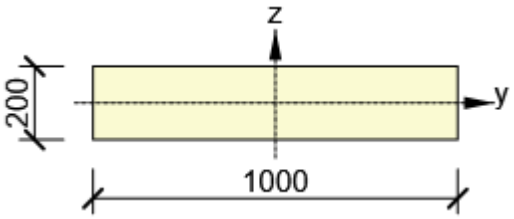
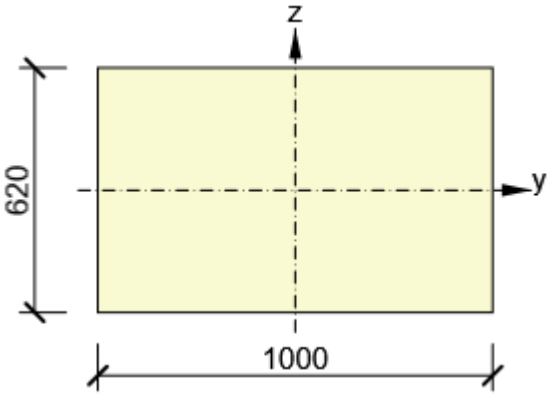
Concrete

Name	f_{ck} [MPa]	$f_{ctk,0.05}$ [MPa]	f_{ctm} [MPa]	E_{cm} [MPa]
C25/30	25.0	1.8	2.6	31475.8
	ε_{c2} = 20.0 1e-4, ε_{cu2} = 500.0 1e-4, Diagram type: Parabolic Creep coefficient: 2.50			

Reinforcement

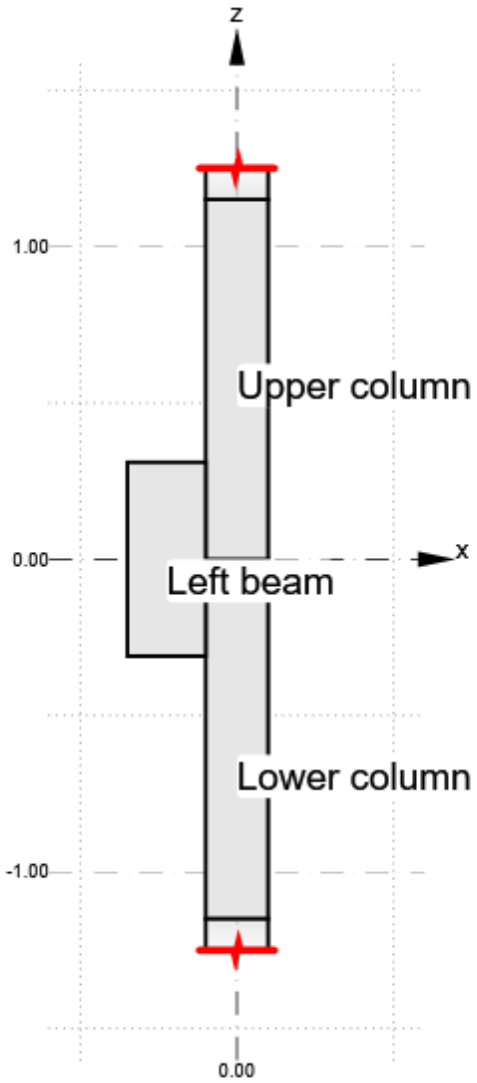
Name	f_{yk} [MPa]	k [-]	E_s [MPa]	Unit mass [kg/m^3]	ε_{uk} [1e-4]	Surface
B 500B	500.0	1.08	200000.0	7850	500.0	Ribbed
	ε_{st} = 500.0 1e-4, ε_{sc} = 500.0 1e-4,					

Cross-sections

Name	Material	Master	Picture
1 - Rectangle 200, 1000	C25/30	DRM1: FJ1	
3 - Rectangle 620, 1000	C25/30	DRM1: FJ1	

DRM1

Geometry

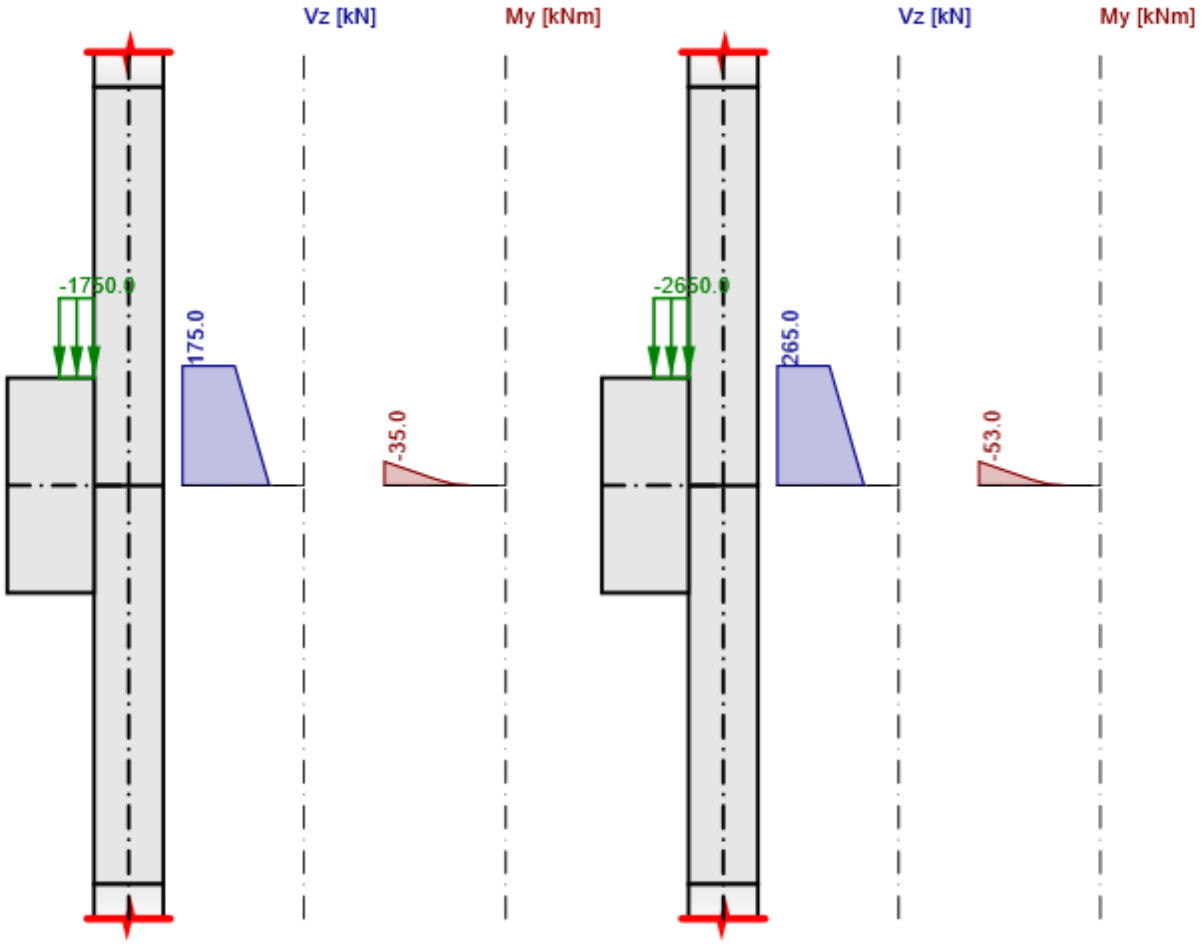


Overview table

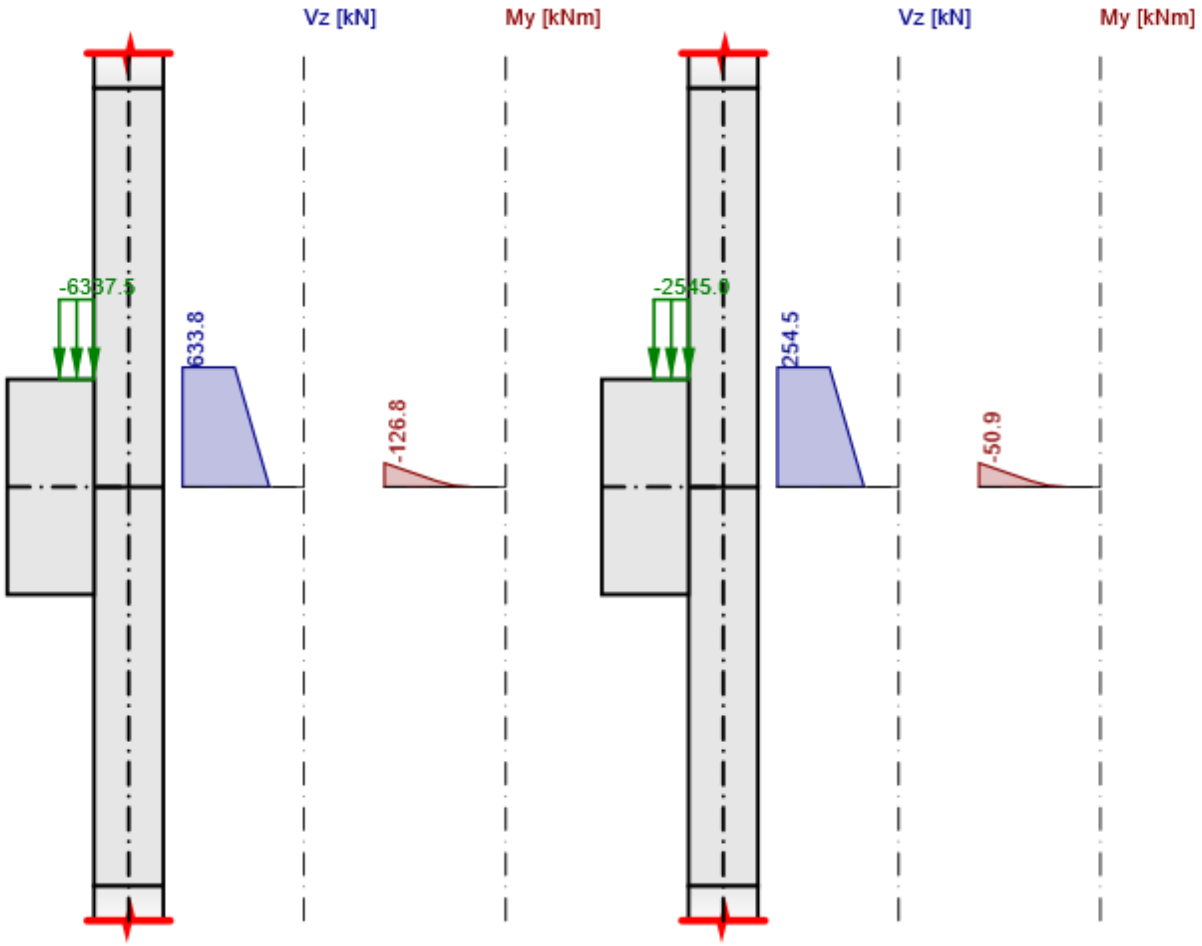
Name	Type	Properties	Position
FJ1	Frame joint	Cross joint; Left beam; L: 0.35 m; Cross-section: 3; ; Lower column; L: 1.25 m; Cross-section: 1; α: 90.0°; Trimmed at: Begin; Upper column; L: 1.25 m; Cross-section: 1; α: 90.0°; Trimmed at: End	

Loads

LC1, LC2



C1, C2



Load case LC1 - Permanent

Internal forces in supports or sections

Member	Position	N [kN]	Vz [kN]	My [kNm]
Lower column	1.25 m (Left)	0.0	0.0	0.0
Upper column	0.00 m (Right)	0.0	0.0	0.0
Left beam	0.35 m (Left)	0.0	0.0	0.0

Line loads

Name	Begin [kN]	End [kN]	Direction	Position	Length [m]
LI1	-1750.0	-1750.0	Global Z	Left beam: Edge 3 Position on edge: 0.00 m	0.10

Load case LC2 - Variable

Internal forces in supports or sections

Member	Position	N [kN]	Vz [kN]	My [kNm]
Lower column	1.25 m (Left)	0.0	0.0	0.0
Upper column	0.00 m (Right)	0.0	0.0	0.0
Left beam	0.35 m (Left)	0.0	0.0	0.0

Line loads

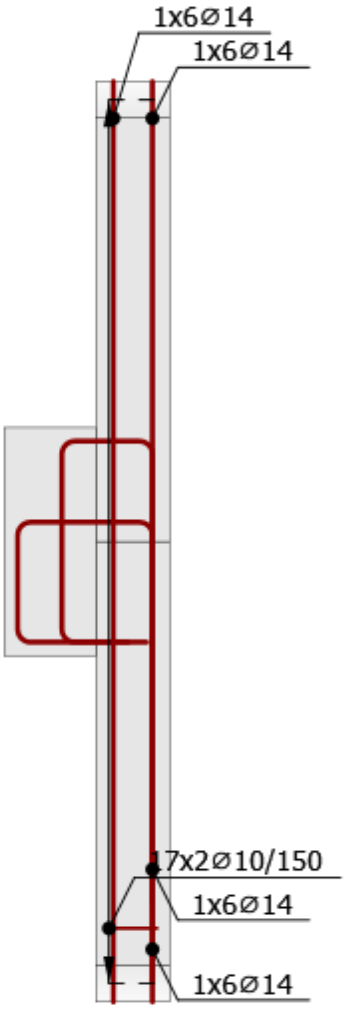
Name	Begin [kN]	End [kN]	Direction	Position	Length [m]
LI2	-2650.0	-2650.0	Global Z	Left beam: Edge 3 Position on edge: 0.00 m	0.10

Combination

Name	Type	Content
C1	ULS	1.35*LC1 + 1.50*LC2
C2	SLS - Quasi-permanent	LC1 + 0.30*LC2

Reinforcement

Scheme of reinforcement



Concrete: C25/30; Steel: B 500B

Results

Summary

Overview table

Check item	Combination	Increment	Item	
ULS	C1	G100.0%, V100.0%	Strength of reinforcement	✓

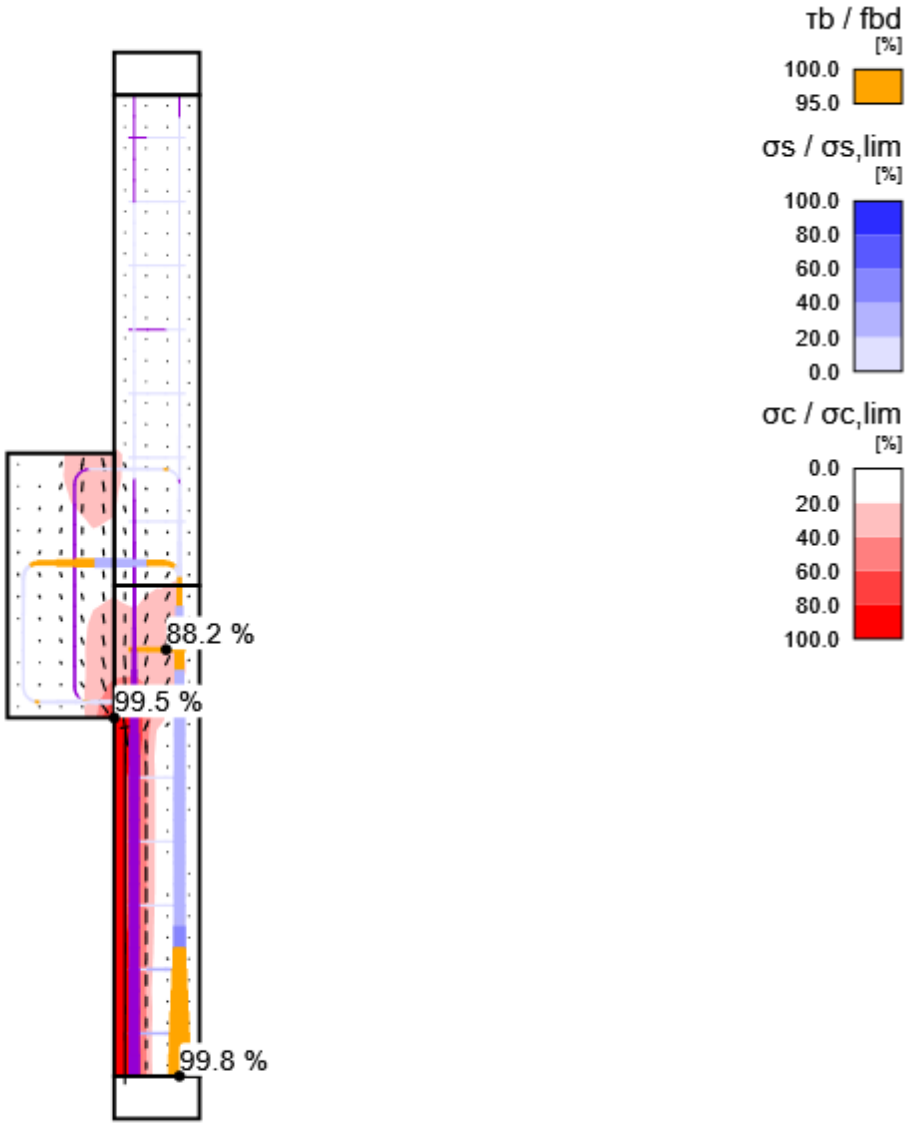
Check item	Item	Utilization	
Strength of concrete	Lower column	σc/σc,lim: 99.5%	✓
Strength of reinforcement	H1	εs/εs,lim: 20.4%, σs/σs,lim: 88.2%	✓
Anchorage length	ST4	τb/fbd: 99.8%	✓

SLS	C2 (ST)	G100.0%, V100.0%	Stress limitation	✓

Check item	Combination	Increment	Critical check	Item	Utilization	
Stress limitation	C2 (ST)	G100.0%, V100.0%	7.2(3)	Lower column	81.9%	✓
Crack width	C2 (LT)	G100.0%, V100.0%	w/wlim	H1	25.9%	✓

ULS - Summary

Stress flow



Above yield	Compression	Explanation
		Thickness proportional to force

Summary of reactions and applied loads: C1, Load increment: G100.0%, V100.0%

Type	F_x [kN]	F_z [kNm]	M_y [kNm]
Summary of reactions	0.0	254.5	-38.1
Summary of applied load	0.0	-254.5	38.2
Check of equilibrium	0.0	0.0	0.1

ULS - Strength

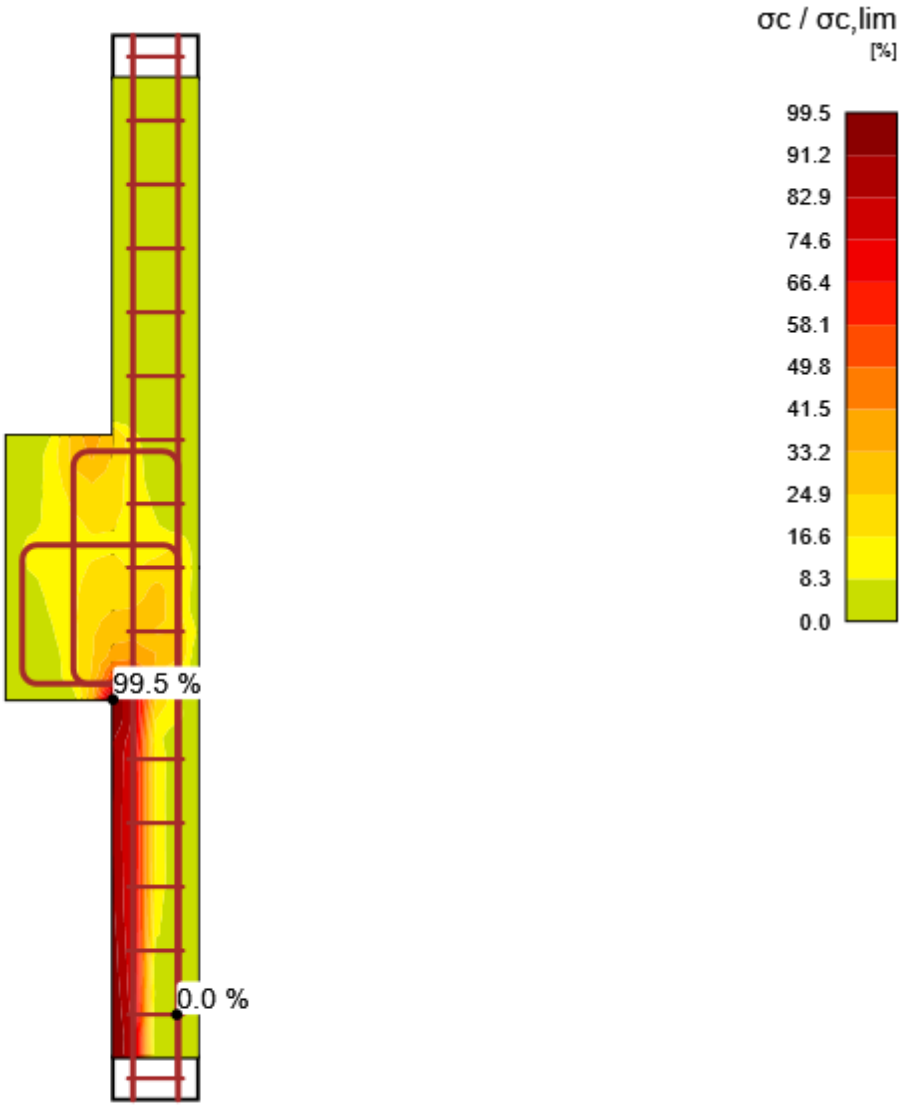
Detailed concrete strength results: C1, Load increment: G100.0%, V100.0%

Member	X [m]	Z [m]	σ_c [MPa]	ε_c [1e-4]	k_{c2} [-]	$\sigma_c/\sigma_{c,lim}$ [%]	
Lower column	-0.10	-0.31	-16.6	-31.0	1.00	99.5	OK
Left beam	-0.10	-0.31	-8.9	-6.3	1.00	53.2	OK
Upper column	-0.10	0.31	-3.4	-2.2	1.00	20.6	OK
Upper column	0.10	0.05	-0.4	-0.2	1.00	2.2	OK
Left beam	-0.30	-0.31	-0.1	-0.1	1.00	0.7	OK
Lower column	0.10	-1.00	0.0	0.0	0.64	0.0	OK

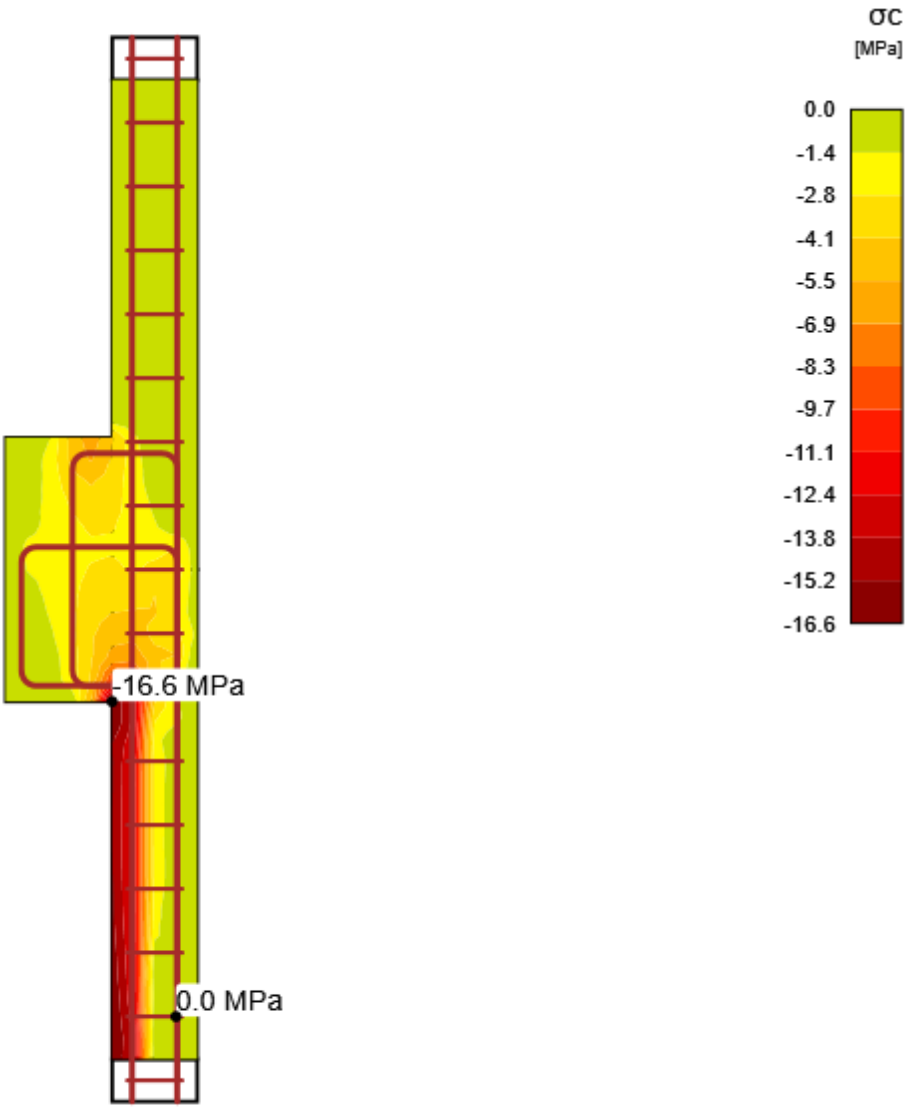
Detailed reinforcement strength results: C1, Load increment: G100.0%, V100.0%

Member	X [m]	Z [m]	σ_s [MPa]	ε_s [1e-4]	$\sigma_s/\sigma_{s,lim}$ [%]	$\varepsilon_s/\varepsilon_{s,lim}$ [%]	
H1	0.02	-0.15	414.0	8.6	88.2	20.4	OK
V1	0.05	-1.15	413.7	18.4	88.1	10.1	OK
ST4	0.05	-0.85	196.3	8.2	41.8	3.2	OK
ST2	0.05	-0.54	172.9	7.0	36.8	2.8	OK
V2	-0.05	-1.15	-185.2	-9.3	39.4	2.1	OK
V2	-0.05	0.30	8.3	0.0	1.8	0.0	OK

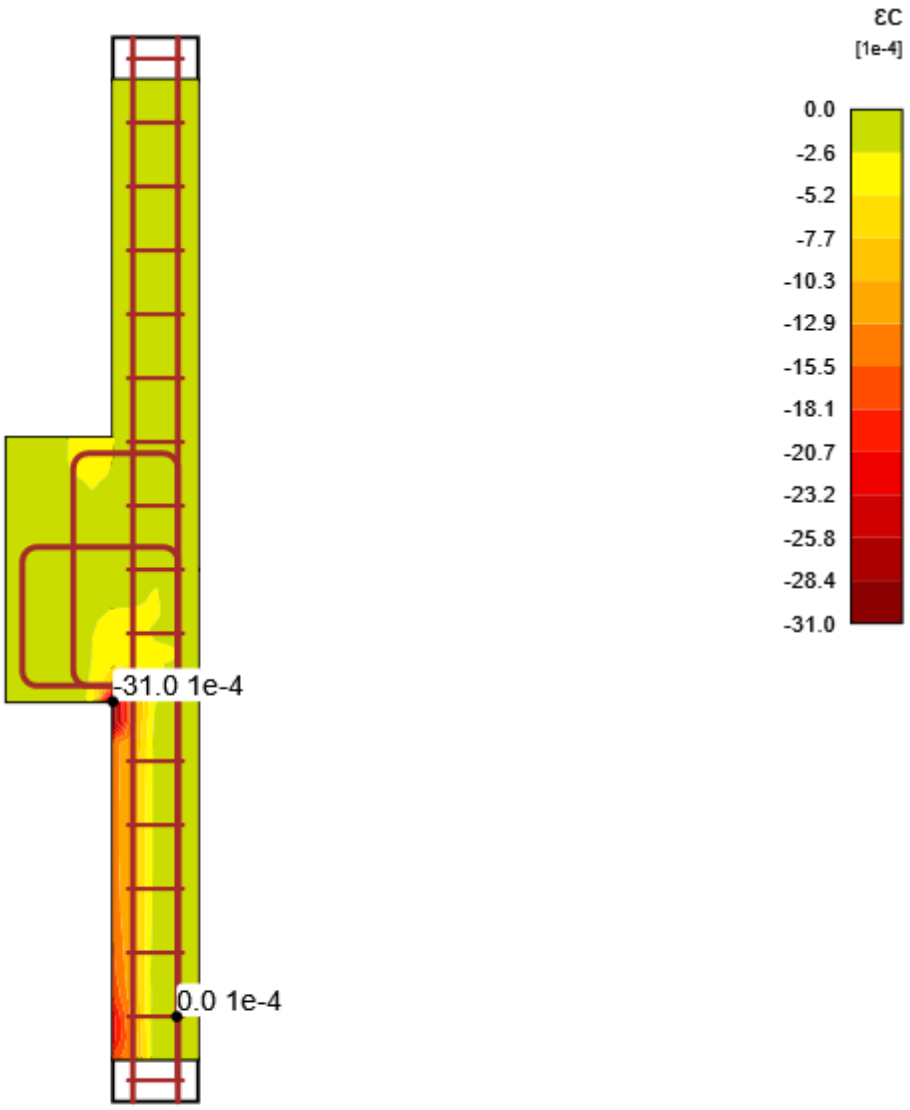
Concrete stress/strength ratio



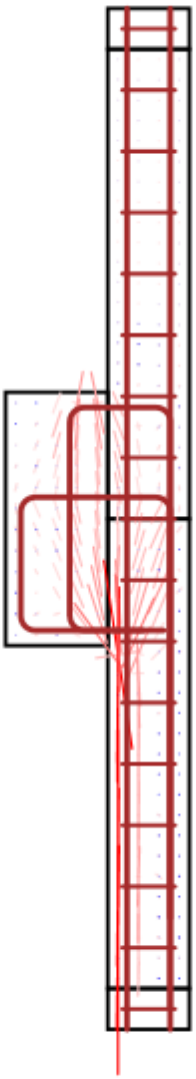
Concrete principal stress σ_c



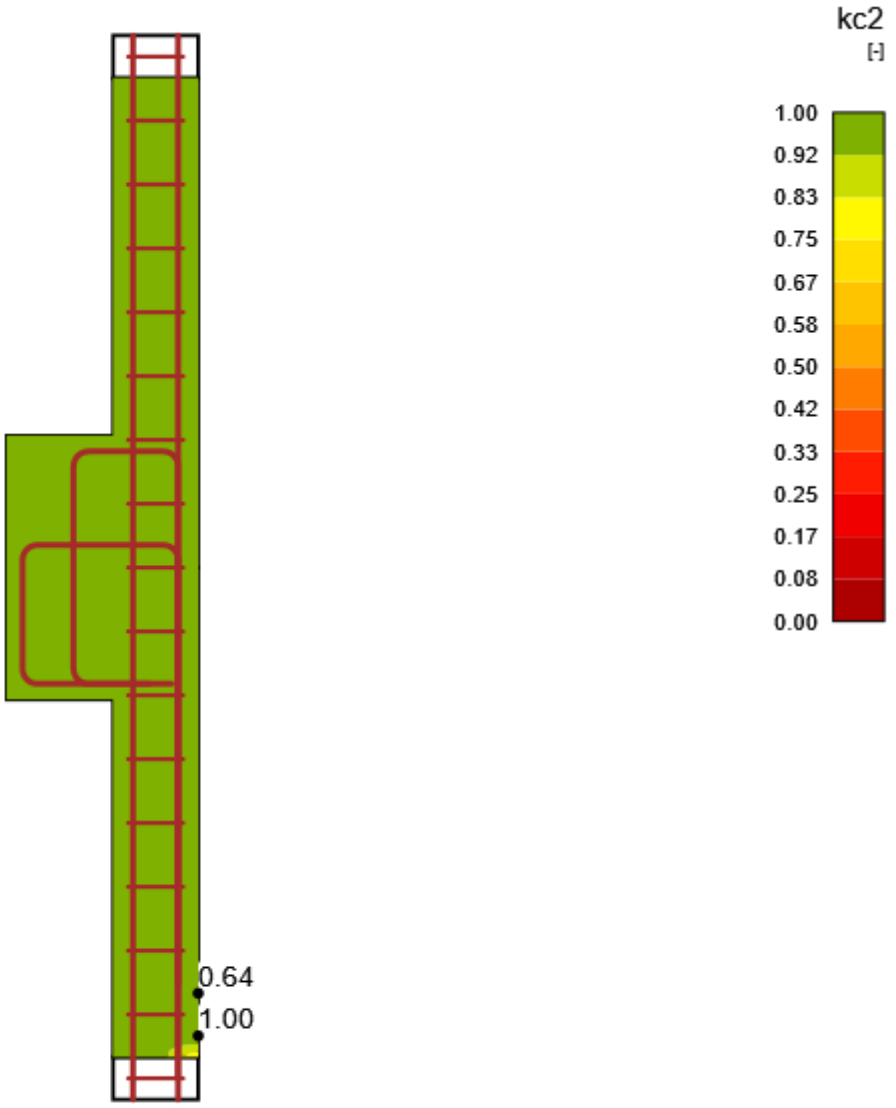
Concrete principal strain ε_c



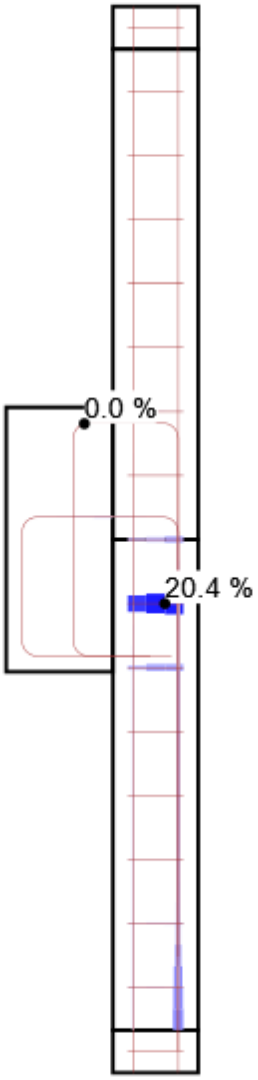
Directions of principal stresses



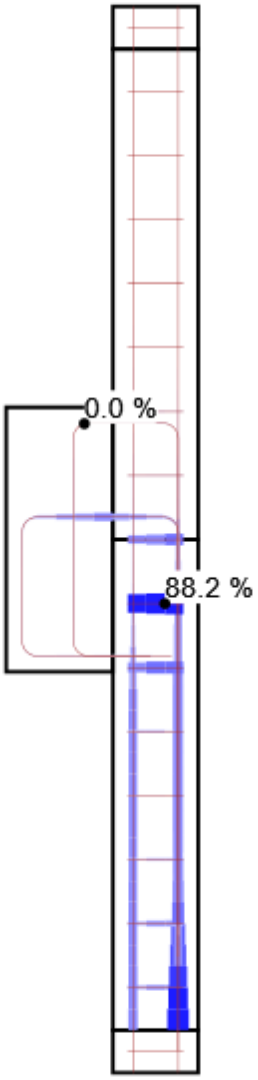
Compressive strength reduction factor kc2



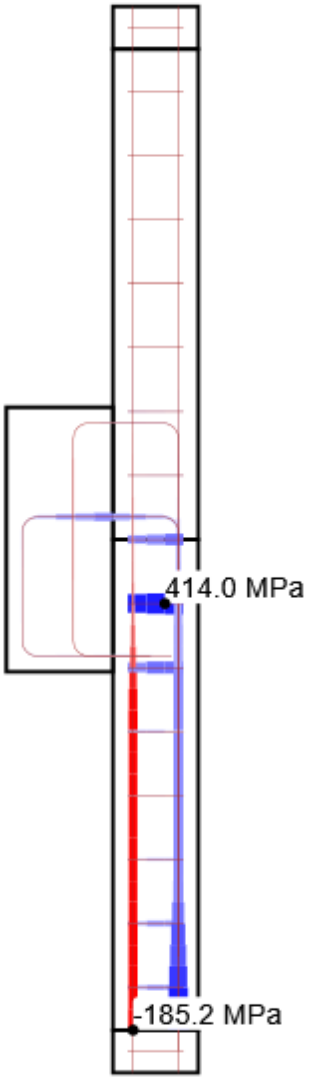
Reinforcement strain/limit strain ratio - $\varepsilon_s/\varepsilon_{s,lim}$ [%]



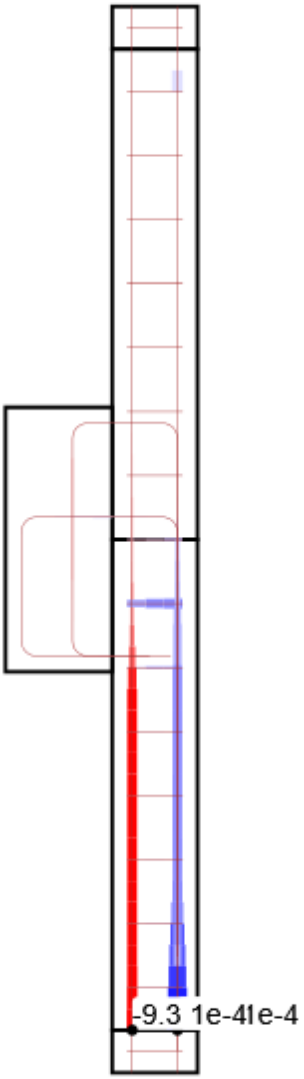
Reinforcement stress/strength ratio - $\sigma_s/\sigma_{s,lim}$ [%]



Reinforcement stress - σ_s [MPa]



Reinforcement strain - ε_s [1e-4]

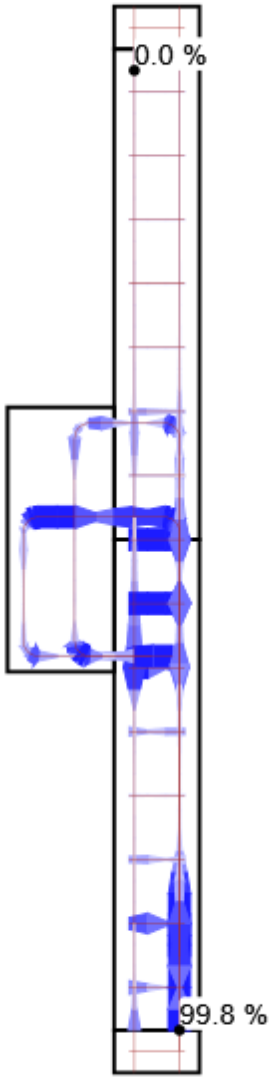


ULS - Anchorage

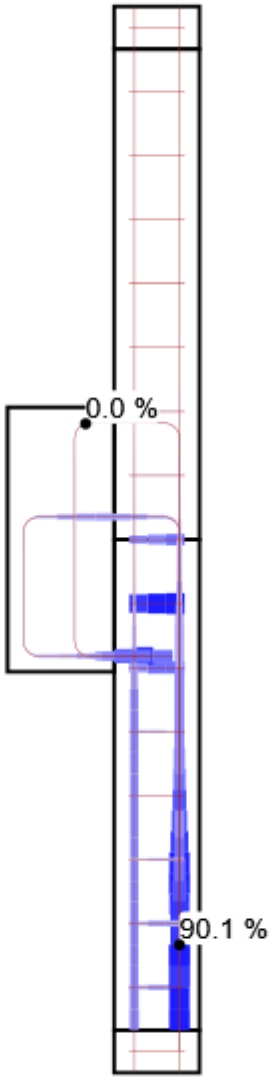
Detailed anchorage results: C1, Load increment: G100.0%, V100.0%

Member	X [m]	Z [m]	τ_b [MPa]	F_a [kN]	F_{tot} [kN]	F_{tot}/F_{lim} [%]	τ_b/f_{bd} [%]	
ST4	0.05	-1.15	-2.7	0.4	51.5	74.9	99.8	OK
ST4	-0.23	0.05	2.7	0.4	68.9	15.9	99.7	OK
ST4	0.05	-0.85	0.9	0.4	181.3	73.7	32.9	OK
ST4	0.04	-0.27	1.9	0.4	11.7	51.8	99.4	OK
ST4	0.05	-0.95	1.9	0.4	157.8	90.1	68.7	OK
ST2	0.05	-0.98	-2.7	0.4	17.7	51.2	99.7	OK
ST2	0.05	-0.15	2.7	0.4	99.4	22.9	99.7	OK
ST2	0.05	-0.54	0.0	0.4	159.7	51.2	0.3	OK
ST2	-0.19	0.10	-0.2	0.4	-24.4	5.6	5.6	OK
ST2	0.05	-0.78	-1.9	0.4	121.6	87.8	70.3	OK
V1	0.05	-1.00	-2.7	0.0	321.2	74.1	99.7	OK
V1	0.05	-0.35	0.7	0.0	157.8	36.4	26.5	OK
V1	0.05	-1.15	-2.7	0.0	382.1	88.1	99.7	OK
V1	0.05	1.10	0.0	0.0	0.0	0.0	0.0	OK
H1	-0.02	-0.30	2.7	63.6	30.6	41.5	99.7	OK
H1	0.07	-0.15	-1.9	63.6	65.0	88.2	99.4	OK
H1	0.02	-0.15	1.9	63.6	65.0	88.2	99.4	OK
H1	-0.07	0.60	0.0	63.6	0.0	0.0	0.9	OK
H1	-0.02	-0.15	1.9	63.6	57.2	77.5	99.4	OK
V2	-0.05	-0.30	2.7	0.0	-135.3	31.2	99.7	OK
V2	-0.05	-0.45	-0.2	0.0	-154.5	35.6	8.1	OK
V2	-0.05	0.30	0.5	0.0	7.7	1.8	17.1	OK
V2	-0.05	-1.15	1.5	0.0	-171.1	39.4	56.3	OK

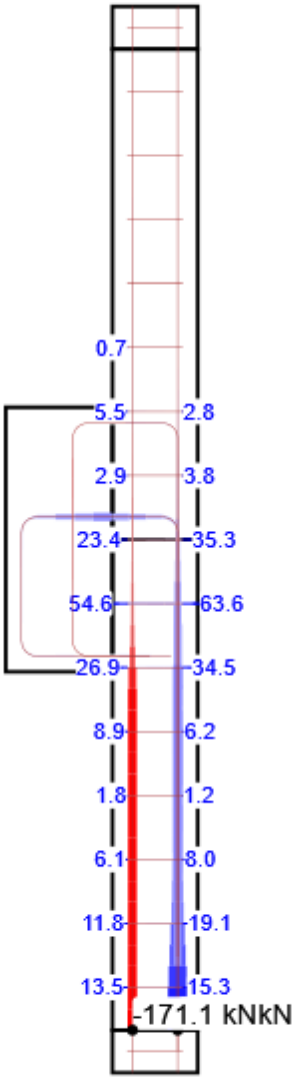
Bond stress check value - τ_b/f_{bd} [%]



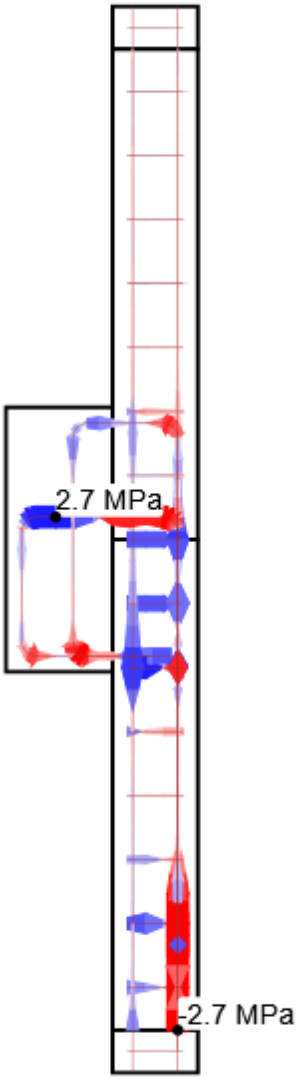
Force check value - F_{tot}/F_{lim} [%]



Total force in the bar - F_{tot} [kN]



Bond stress - τ_b [MPa]



Settings

Creep coefficient

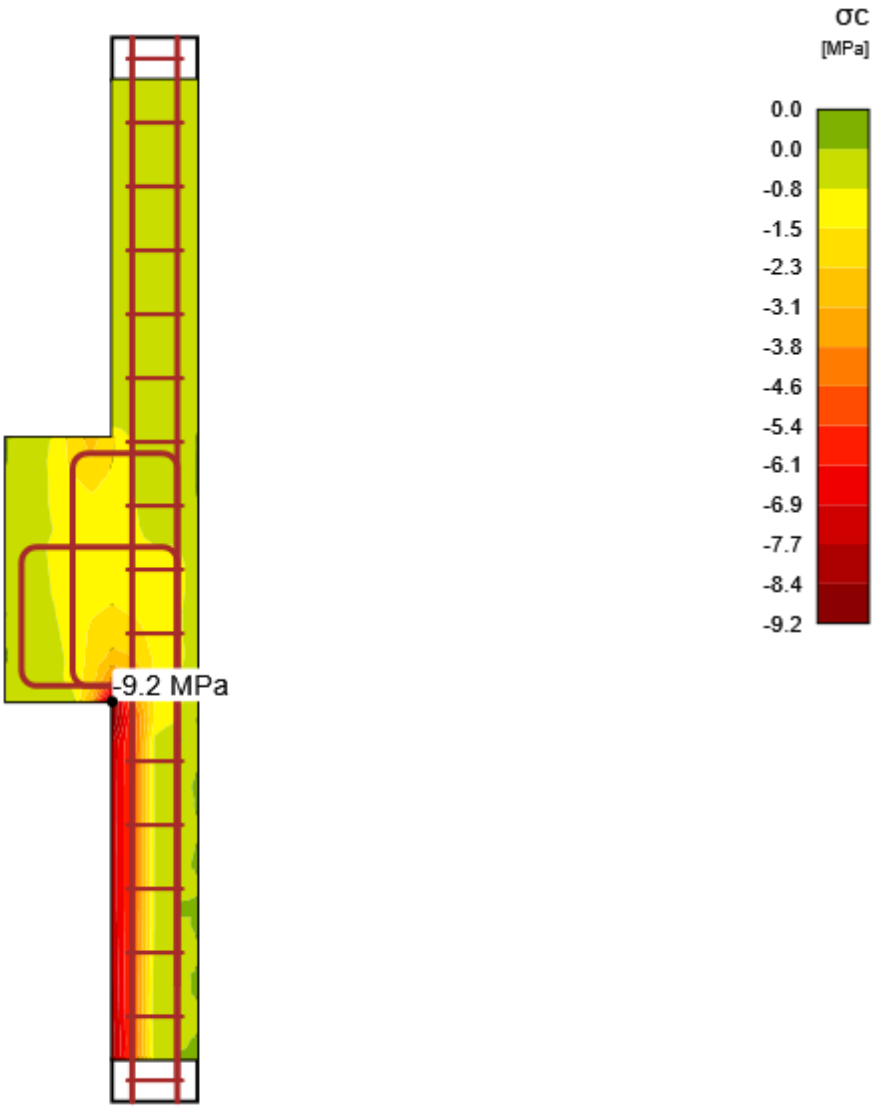
Type of input	Creep coefficient
Input by user	2.5

SLS - Stress

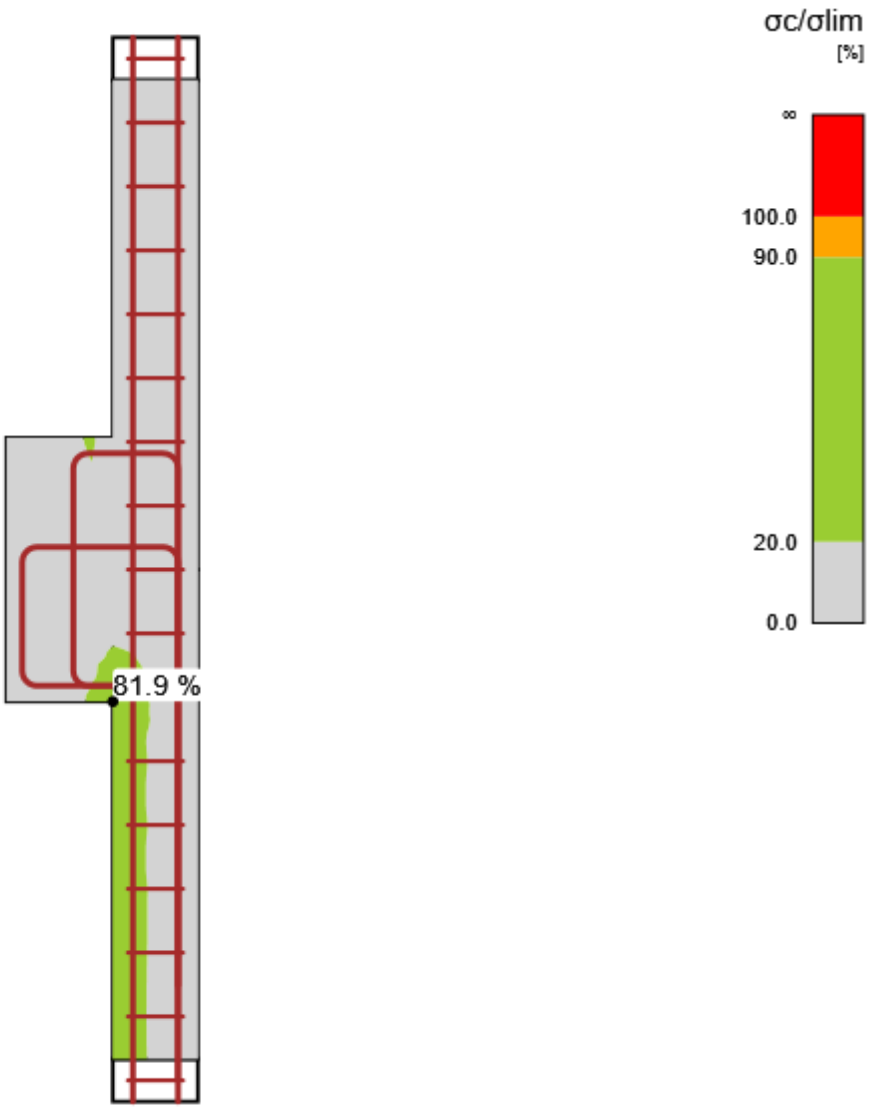
Detailed concrete stress results: C2, Load increment: G100.0%, V100.0%

Member	X [m]	Z [m]	Critical check	σ_c [MPa]	σ_{lim} [MPa]	σ_c/σ_{lim} [%]	
Lower column	-0.10	-0.31	7.2(3)	-9.2	11.3	81.9	OK
Upper column	-0.10	0.31	7.2(3)	-1.3	11.3	11.9	OK
Left beam	-0.10	-0.31	7.2(3)	-4.9	11.3	43.4	OK

Concrete stress



Concrete stress check



SLS - Crack

Detailed crack results: C2, Load increment: G100.0%, V100.0%, w_{lim}=0.300 mm

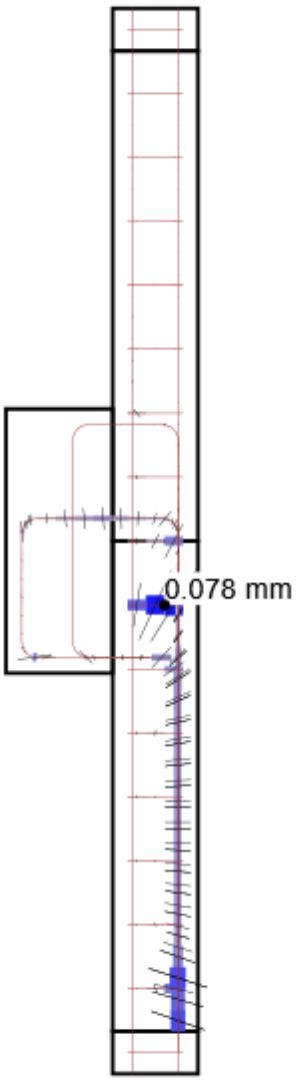
Member	X [m]	Z [m]	w [mm]	w/w_{lim} [%]	
H1	0.02	-0.15	0.078	25.9	OK
V1	0.05	-1.05	0.056	18.6	OK
ST4	0.05	-1.00	0.056	18.6	OK
ST2	0.05	-0.93	0.027	9.1	OK
V2	-0.05	0.35	0.001	0.4	OK

Intermediate crack results

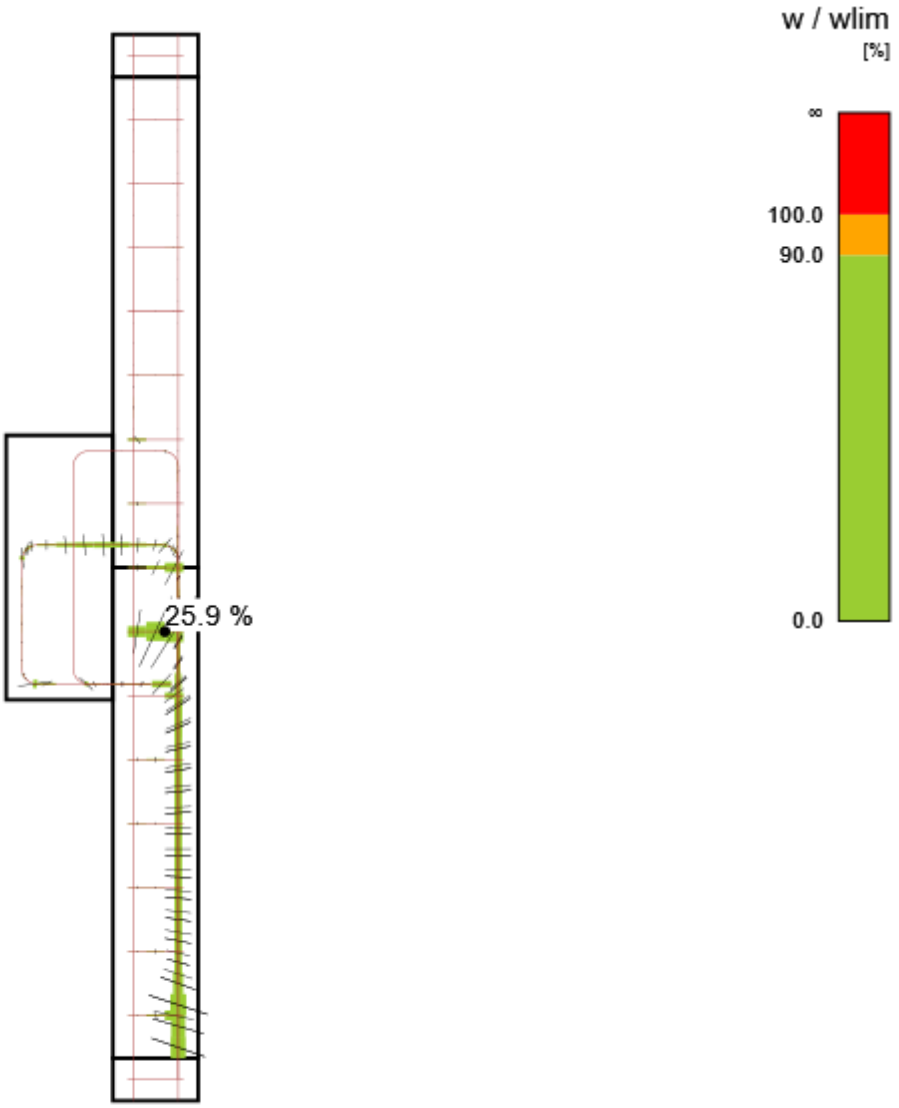
Member	ε_{cm} [1e-4]	ε_{m} [1e-4]	s_r [mm]	Φ [mm]	ρ_{eff} [%]	w_b [mm]	θ_r [-]	θ_b [-]
H1		1.2		10	0.98	0.066	1.01	0.00
V1	0.0	2.5	208	14	1.65	0.053	2.82	1.57
ST4	0.0	2.5	208	14	1.65	0.053	2.82	1.57
ST2	0.0	1.6	166	14	2.07	0.026	2.82	1.57
V2	0.0	0.0	334	14	1.04	0.000	1.93	1.57

Note: There are TCM intermediate values displayed in the table above. Adequate POM values are not available in current version of the program.

Crack width - w [mm]

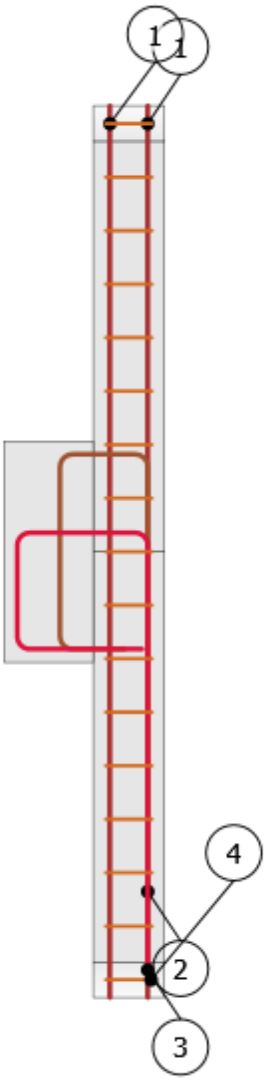


Crack width check



Bill of material

Items numbering



Brief reinforcement bar table

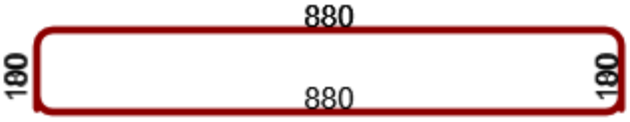
Index	Φ [mm]	Material	Items	Length [mm]	Weight [kg]	Total length [m]
1	14	B 500B	12	2500	3	30.00
2	14	B 500B	6	2176	3	13.06
3	14	B 500B	6	2246	3	13.48
4	10	B 500B	17	3236	2	55.01

Detailed reinforcement bar tables

Parameter	Value	Shape
Index	1	
Φ [mm]	14	
Material	B 500B	
Number of items	12	
Length [mm]	2500	
Weight [kg]	3	
Total length [m]	30.00	

Parameter	Value	Shape
Index	2	
Φ [mm]	14	
Material	B 500B	
Number of items	6	
Length [mm]	2176	
Weight [kg]	3	
Total length [m]	13.06	

Parameter	Value	Shape
Index	3	
Φ [mm]	14	
Material	B 500B	
Number of items	6	
Length [mm]	2246	
Weight [kg]	3	
Total length [m]	13.48	

Parameter	Value	Shape
Index	4	
Φ [mm]	10	
Material	B 500B	
Number of items	17	
Length [mm]	3236	
Weight [kg]	2	
Total length [m]	55.01	

Overview table

Φ [mm]	10	14
Total length of Φ [m]	55.01	56.54
Weight per meter of Φ [kg/m]	1	1
Total weight of Φ [kg]	34	68
Total weight of bars [kg]	102	
Volume of concrete [m3]	0.66	
Reinforcement weight per volume unit of concrete [kg/m3]	156	

Explanation

Symbol	Explanation
f_{ck}	Characteristic compressive cylinder strength of concrete at 28 days
$f_{ctk,0.05}$	Characteristic axial tensile strength of concrete 5% quantile
f_{ctm}	Mean value of axial tensile strength of concrete
E_{cm}	Secant modulus of elasticity of concrete
ε_c	Compressive strain in the concrete at the peak stress fc
ε_{cu}	Ultimate compressive strain in the concrete
f_{yk}	Characteristic yield strength of reinforcement
E_s	Modulus of elasticity of reinforcement steel
ε_{uk}	Characteristic strain of reinforcement or prestressing steel at maximum load
Properties	W - Width; H - Height; T - Thickness; L - Length; r - Radius; α - Inclination
Position	M - Master; MP - Master point; IP - Insert point
σ_c	The extreme value of compressive stress σc of concrete of selected subregion.
k_{c2}	Compressive strength reduction factor kc2
$\sigma_c/\sigma_{c,lim}$	The ratio of concrete stress and concrete strength. It presents the level of material utilization with respect to concrete strength.
σ_s	Maximum stress along the length of reinforcement bar.
ε_s	Maximum strain along the length of reinforcement bar.
$\sigma_s/\sigma_{s,lim}$	The ratio of stress and strength of the reinforcement. It presents the level of material utilization with respect to reinforcement strength.
$\varepsilon_s/\varepsilon_{s,lim}$	The ratio of strain and limit strain of the reinforcement. It presents the level of material utilization with respect to limit strain
τ_b	Bond stress on the surface of reinforcement bar.
F_a	The anchorage force. It is developed at the ends of the bars due to hooked anchorage.
F_{tot}	Total force developed along the length of the bar. It consists of the anchorage force due to hooked anchorage and bond force, which integrates bond stresses acting on the surface of the bar.
F_{tot}/F_{lim}	The ratio of total force in the bar and limit value of the force. It presents the level of utilization of the rebar. The limit value of the force is calculated as the minimum of two values: (a) the force calculated as the sum of ultimate anchorage force and the force developed from the end of the bar to the point of interest assuming ultimate bond strength, (b) the ultimate strength of the bar.
τ_b/f_{bd}	The ratio of bond stress and ultimate bond strength for selected (group of) bars and applied portion of the load. It shows the level of utilization with respect to ultimate bond strength between the rebar and adjacent concrete.
Creep coefficient	Final value of creep coefficient at time interval (t0 = 28 days, tinf = design working life)
w	Total crack width including effect of creep.
ε_{cm}	the mean strain in the concrete between cracks
ε_m	the mean strain in the reinforcement under relevant combination of loads, including the effect of imposed deformations and taking into account the effects of tension stiffening. Only the additional tensile strain beyond the state of zero strain of the concrete at the same level is considered
s_r	mean value of axial tensile strength of concrete
Φ	diameter of reinforcing bar
ρ_{eff}	effective reinforcement ratio
w_b	calculated crack width
θ_r	inclination of the cracks (the angle between the global coordinate system and the crack direction)
θ_b	bar inclination (the angle between the global coordinate system and the axis of reinforcement bar)

Calculation presumptions

- Minimum amount of reinforcement resisting at least the tensile stresses prior cracking has to be provided in cracked zones.
- It is assumed that a transverse rebar or adequate overlap is provided to enable full anchorage of the stirrups.

- The analysis and code checks are performed for support conditions as specified in the project. No change of supports in construction/service stages is considered.
- The crack width is checked in the vicinity of the reinforcement only. No control of cracking is performed in non-reinforced zones.
- The presentation of crack spacing is schematic only. It does not represent the crack spacing computed for the calculations.

P.3 – Analiza konstrukcije – kontrola obremenitev v obstoječem jeklenem okvirju zaradi predelave prve etaže

- Osnovno stanje
- Novo stanje

SAZU

O4 PRECNI OKVIR - OSNOVNO STANJE

Path: c:\projekti\2025\a2o2\sazu\sazu_osnovno_o4.ams

Comment:

O4 PRECNI OKVIR - OSNOVNO STANJE

SAZU

O4 PRECNI OKVIR - OSNOVNO STANJE

Zasnova okvirja, profilacija in obtezbe:

Povzeto po projektu iz leta 1997: Sanacija in adaptacija podstresja, statika strani 75-77.

Material: S235 JR

Geometry

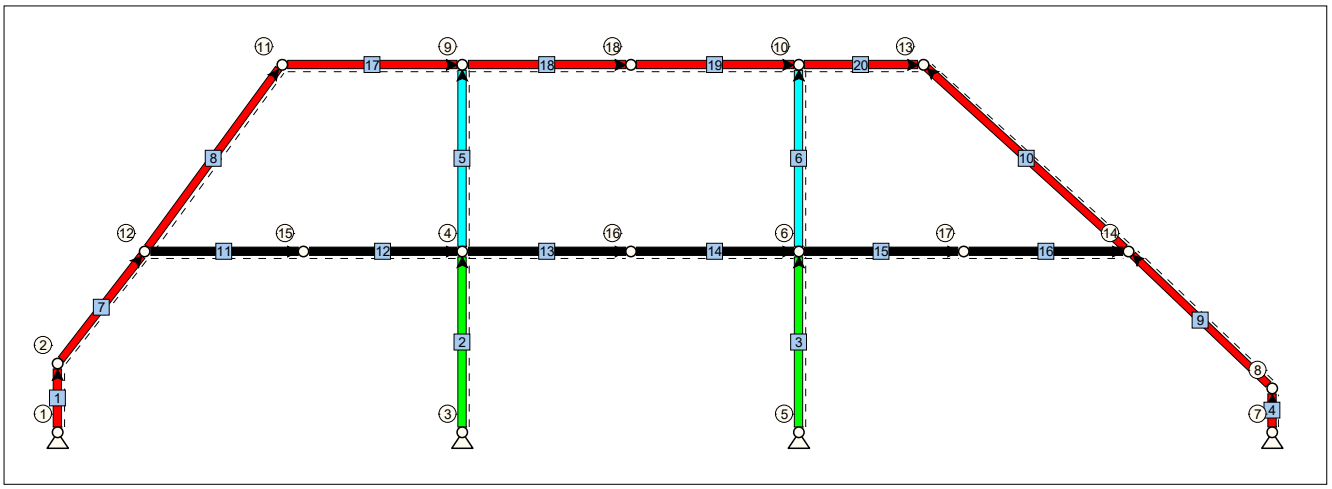


Table of elements

Index	Type	Node 1	Node 2	Cross-section	Material	Length [cm]	Rel. 1	Rel. 2
1:	Non-linear	1:	2:	2: HE 200 B	1: S 235	110.00	-	-
2:	Non-linear	3:	4:	3: 180x180 x 12.5	1: S 235	290.00	-	-
3:	Non-linear	5:	6:	3: 180x180 x 12.5	1: S 235	290.00	-	-
4:	Non-linear	7:	8:	2: HE 200 B	1: S 235	70.000	-	-
5:	Non-linear	4:	9:	4: 180x180 x 10	1: S 235	300.00	-	-
6:	Non-linear	6:	10:	4: 180x180 x 10	1: S 235	300.00	-	-
7:	Non-linear	2:	12:	2: HE 200 B	1: S 235	228.04	-	-
8:	Non-linear	12:	11:	2: HE 200 B	1: S 235	372.02	-	-
9:	Non-linear	8:	14:	2: HE 200 B	1: S 235	318.28	-	-
10:	Non-linear	14:	13:	2: HE 200 B	1: S 235	445.98	-	-
11:	Non-linear	12:	15:	1: HE 240 B	1: S 235	255.00	-	-
12:	Non-linear	15:	4:	1: HE 240 B	1: S 235	255.00	-	-
13:	Non-linear	4:	16:	1: HE 240 B	1: S 235	270.00	-	-
14:	Non-linear	16:	6:	1: HE 240 B	1: S 235	270.00	-	-
15:	Non-linear	6:	17:	1: HE 240 B	1: S 235	265.00	-	-
16:	Non-linear	17:	14:	1: HE 240 B	1: S 235	265.00	-	-
17:	Non-linear	11:	9:	2: HE 200 B	1: S 235	290.00	-	-

Table of elements

Index	Type	Node 1	Node 2	Cross-section	Material	Length [cm]	Rel. 1	Rel. 2
18:	Non-linear	9:	18:	2: HE 200 B	1: S 235	270.00	-	-
19:	Non-linear	18:	10:	2: HE 200 B	1: S 235	270.00	-	-
20:	Non-linear	10:	13:	2: HE 200 B	1: S 235	200.00	-	-

Table of Mateials

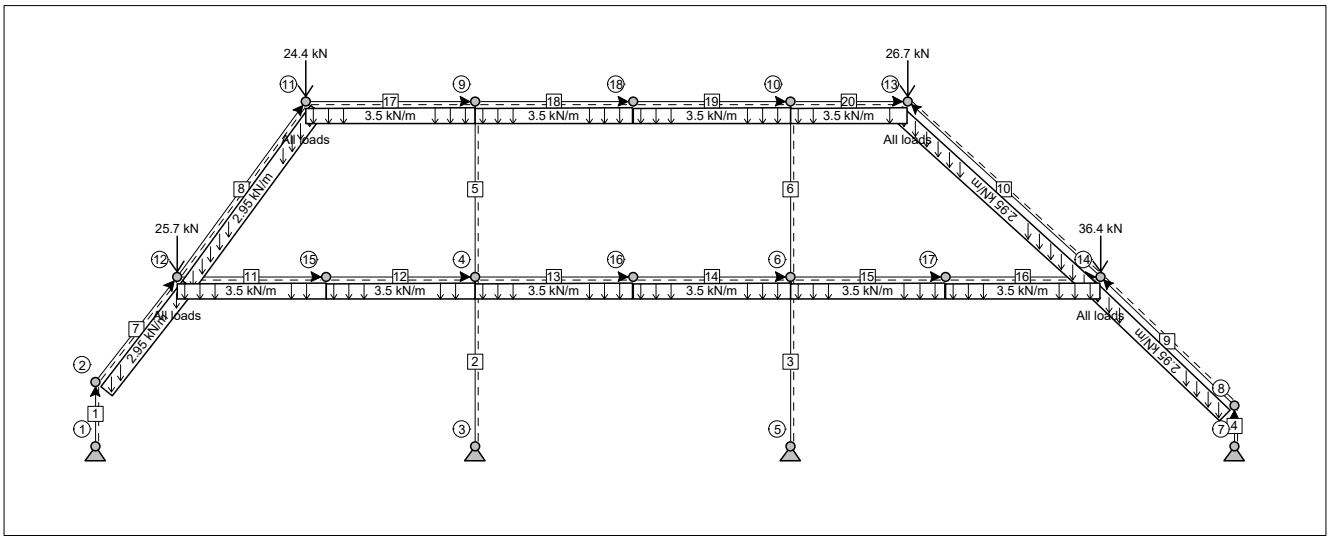
Index	Elastic Modulus [kN/cm2]	Coeff. of Thermal Exp. [1/d°C]
1: S 235	21000.	1.2000E-05

Table of Cross-sections

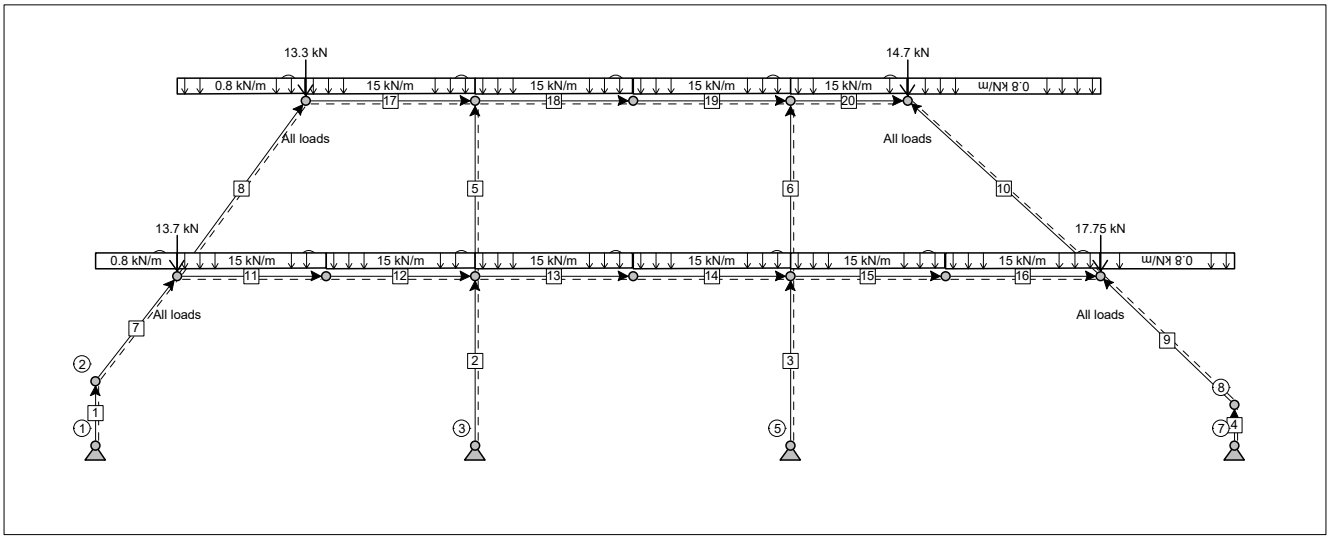
Index	A [cm2]	Iy [cm4]	Height [cm]
1: HE 240 B	106.00	11260.	24.000
2: HE 200 B	78.080	5696.0	20.000

Index	A [cm2]	Iy [cm4]	Height [cm]
3: 180x180 x 12.5	81.314	3753.8	18.000
4: 180x180 x 10	66.112	3141.5	18.000

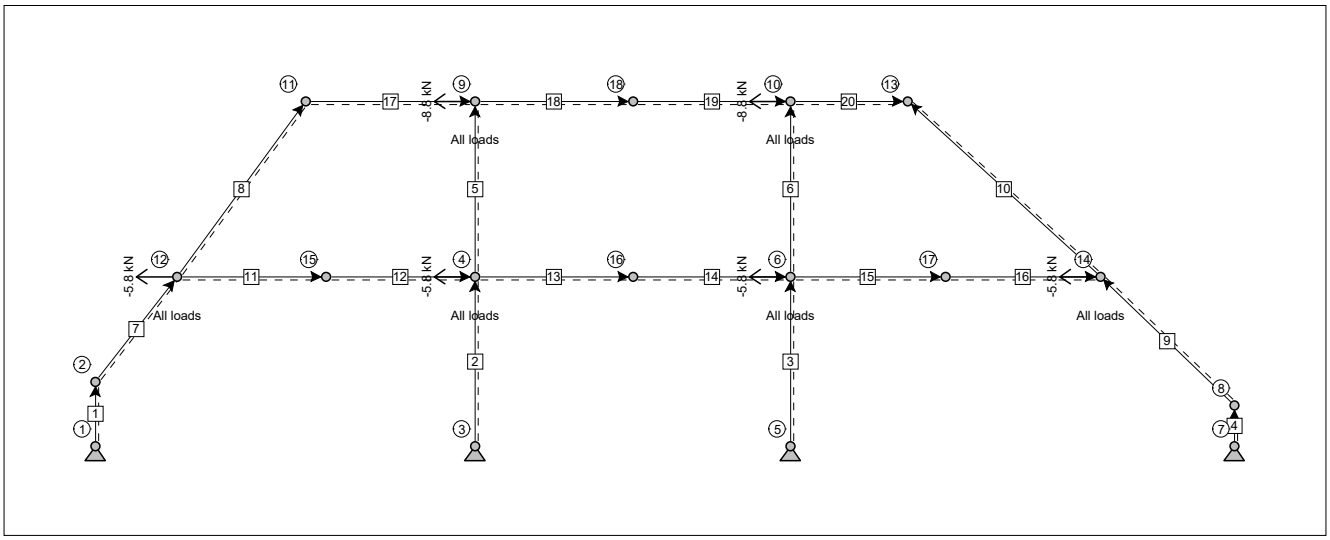
A1 : lastna+stalna



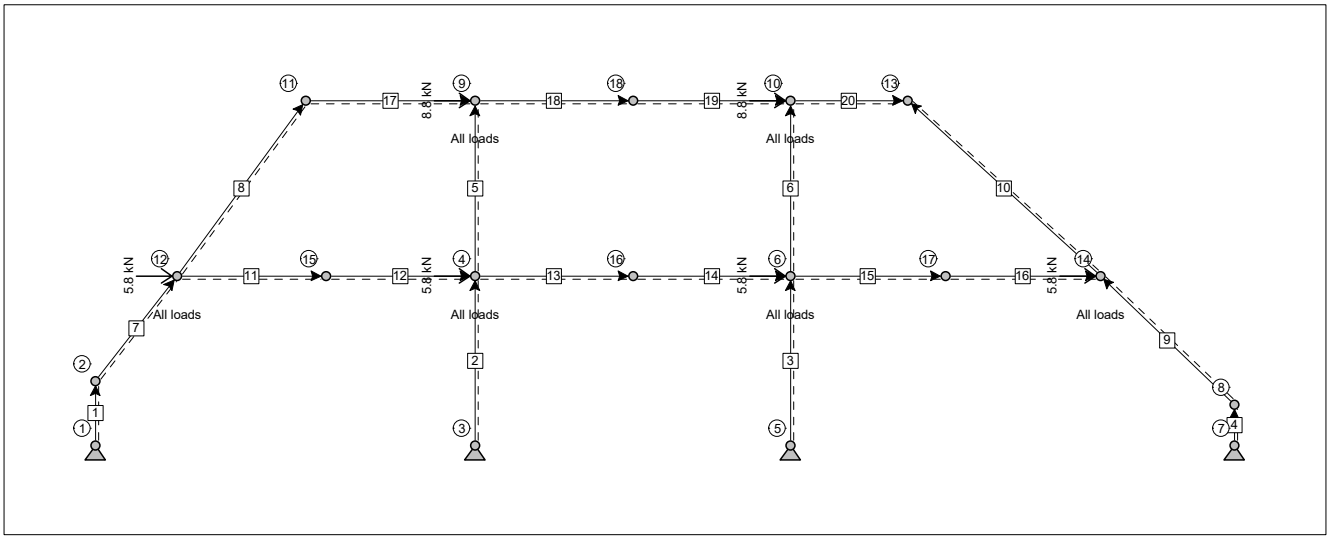
A2 : koristna



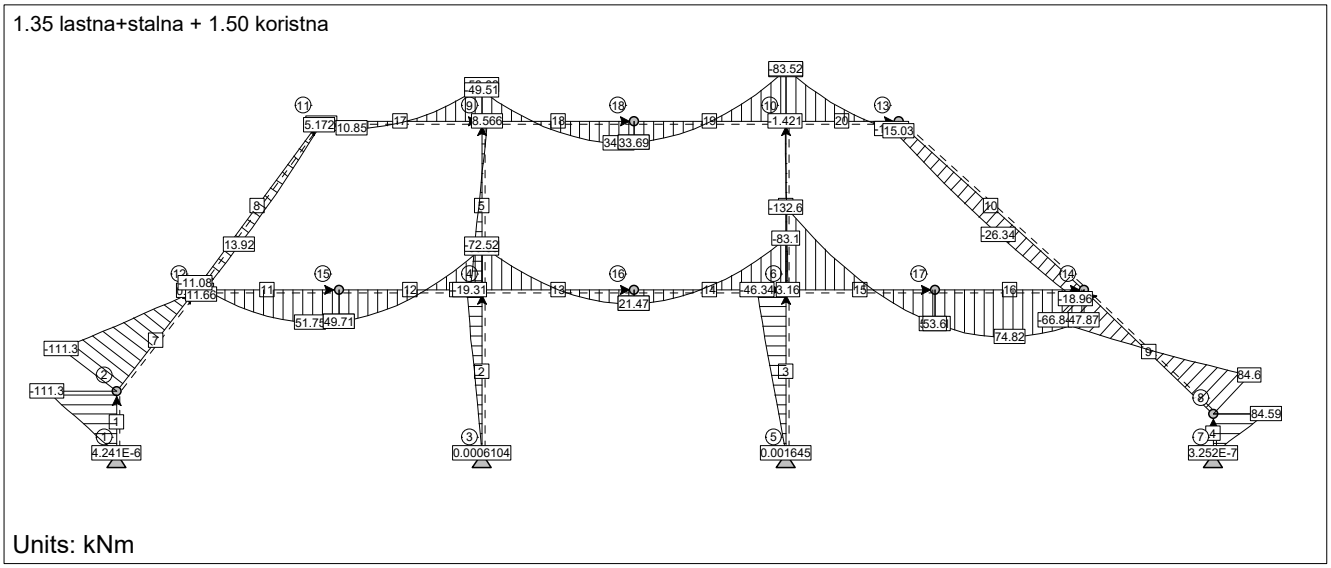
A3 : potres -x



A4 : potres+x

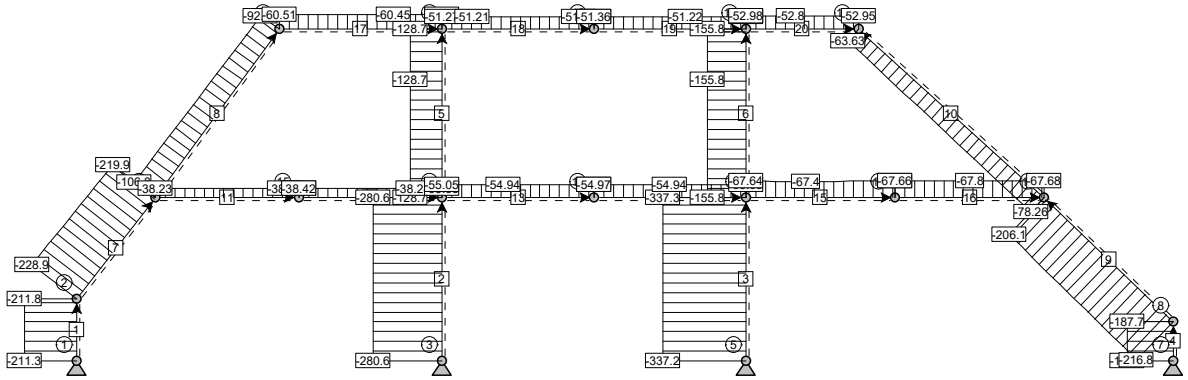


LC1: Load case 1: Bending Moments My



LC1: Load case 1: Axial Forces Fx

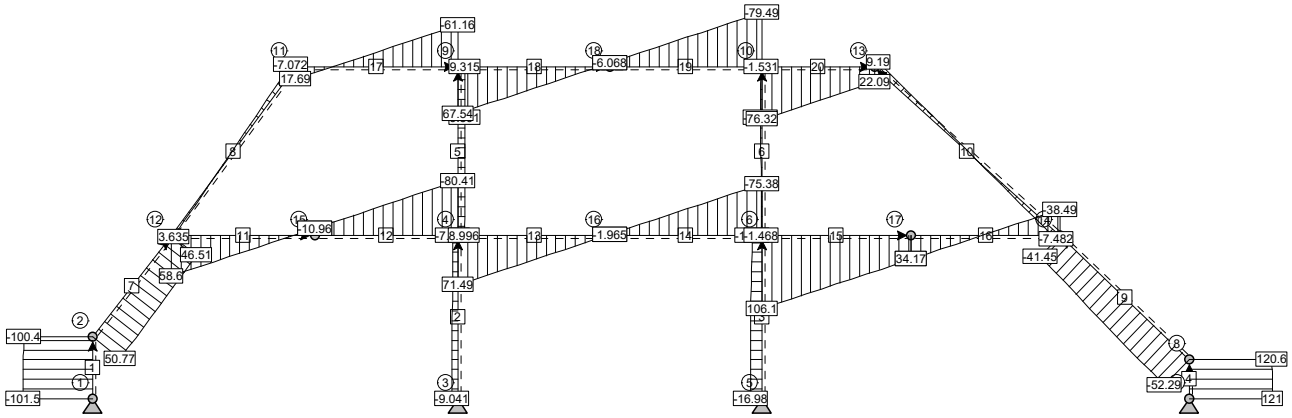
1.35 lastna+stalna + 1.50 koristna



Units: kN

LC1: Load case 1: Shear Forces Fz

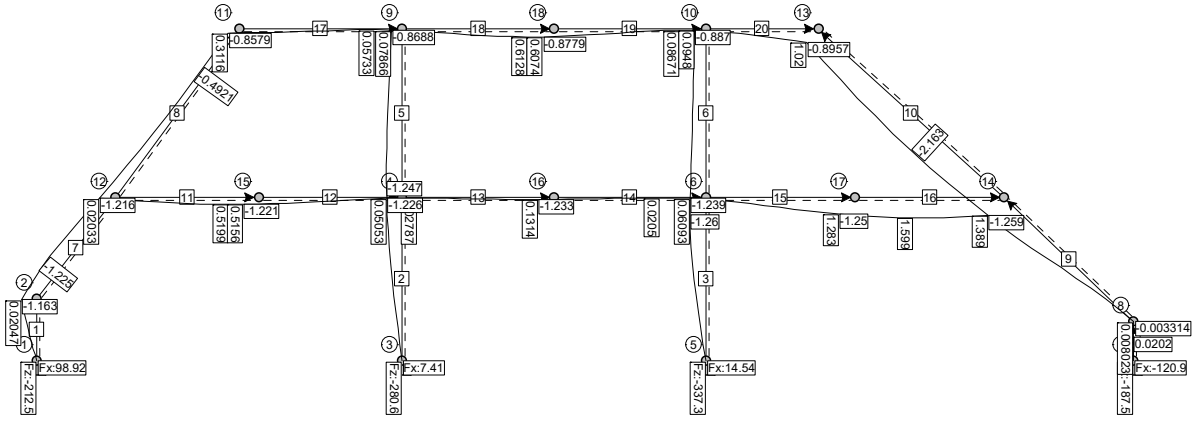
1.35 lastna+stalna + 1.50 koristna



Units: kN

LC1: Load case 1: Displacements and Reactions

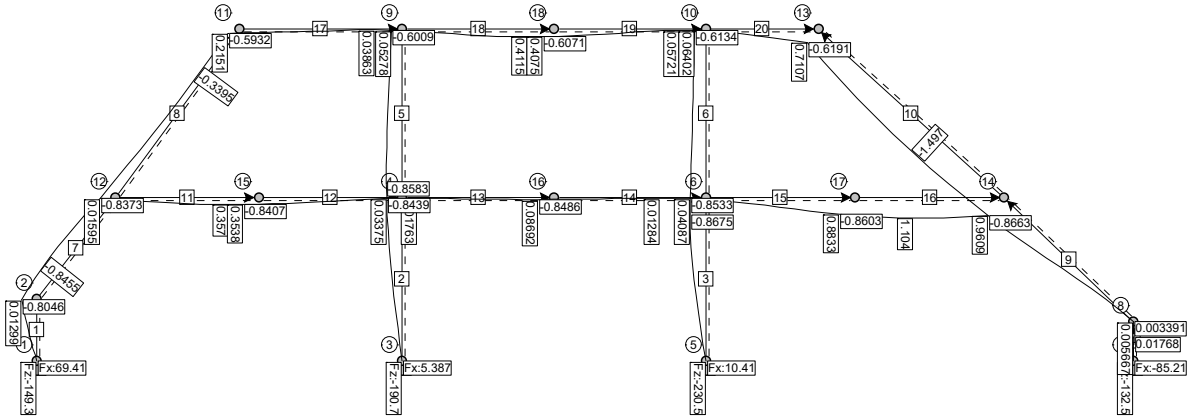
1.35 lastna+stalna + 1.50 koristna



Units: cm, kN, kNm

LC2: Load case 2: Displacements and Reactions

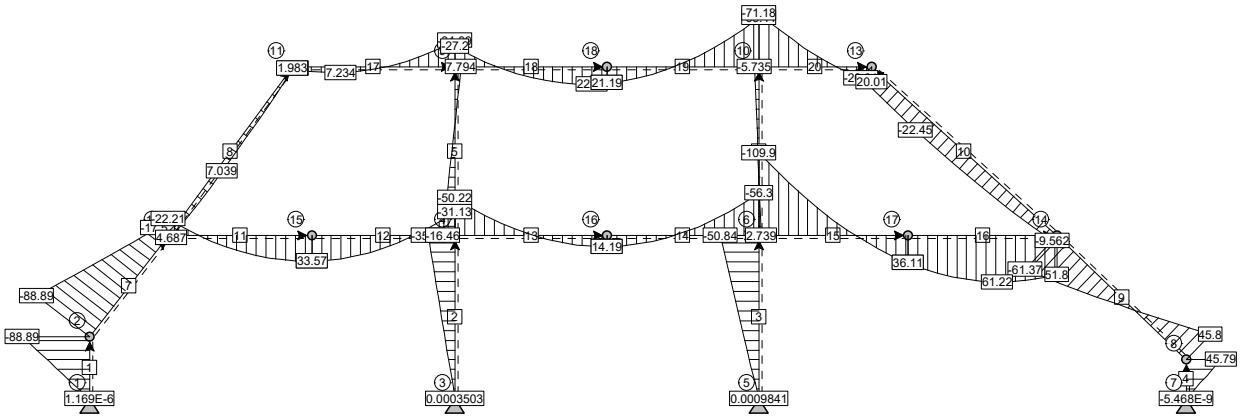
1.00 lastna+stalna + 1.00 koristna



Units: cm, kN, kNm

LC3: Load case: 3: Bending Moments My

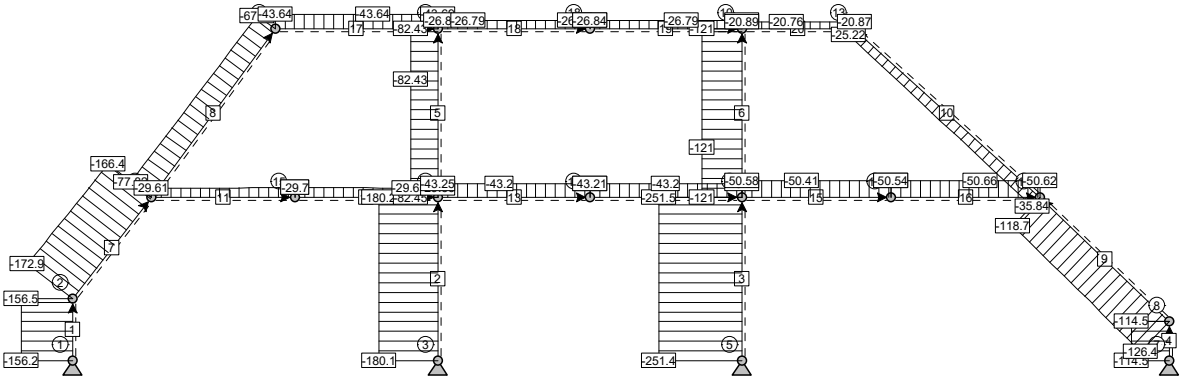
1.00 lastna+stalna + 1.00 koristna + 1.00 potres -x



Units: kNm

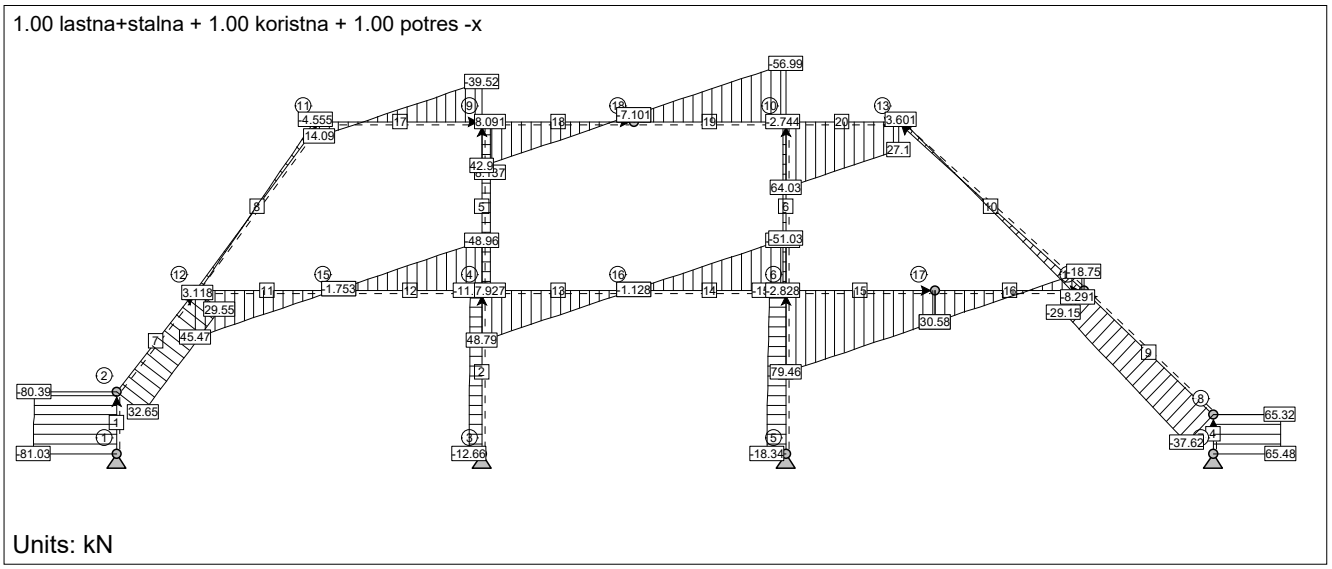
LC3: Load case: 3: Axial Forces Fx

1.00 lastna+stalna + 1.00 koristna + 1.00 potres -x

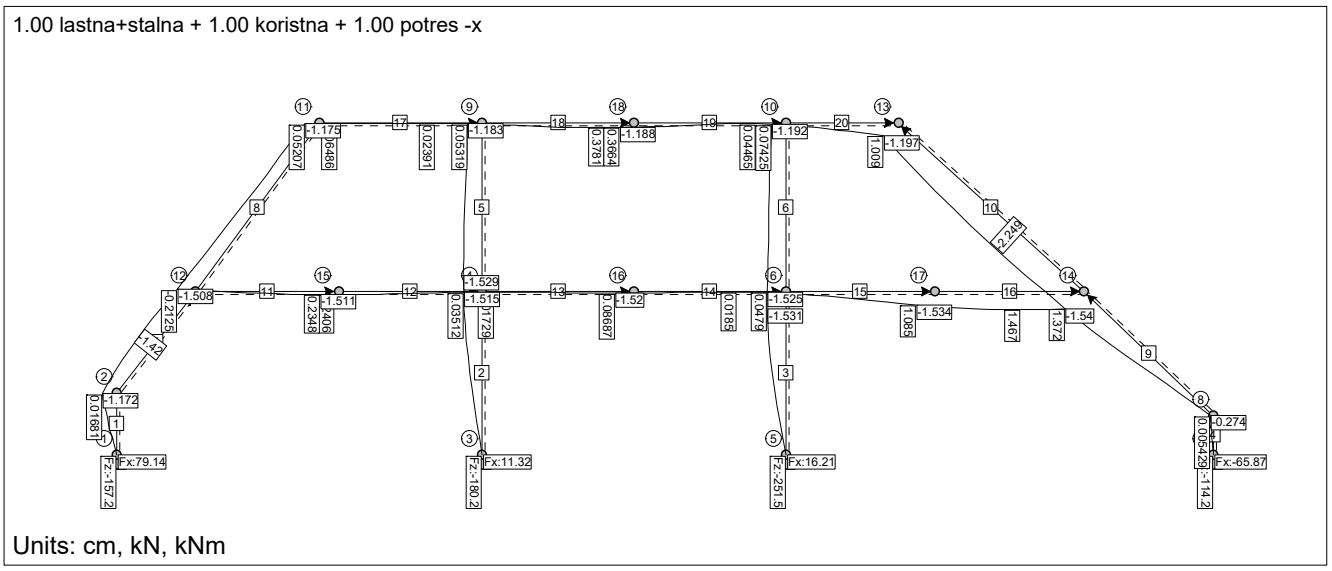


Units: kN

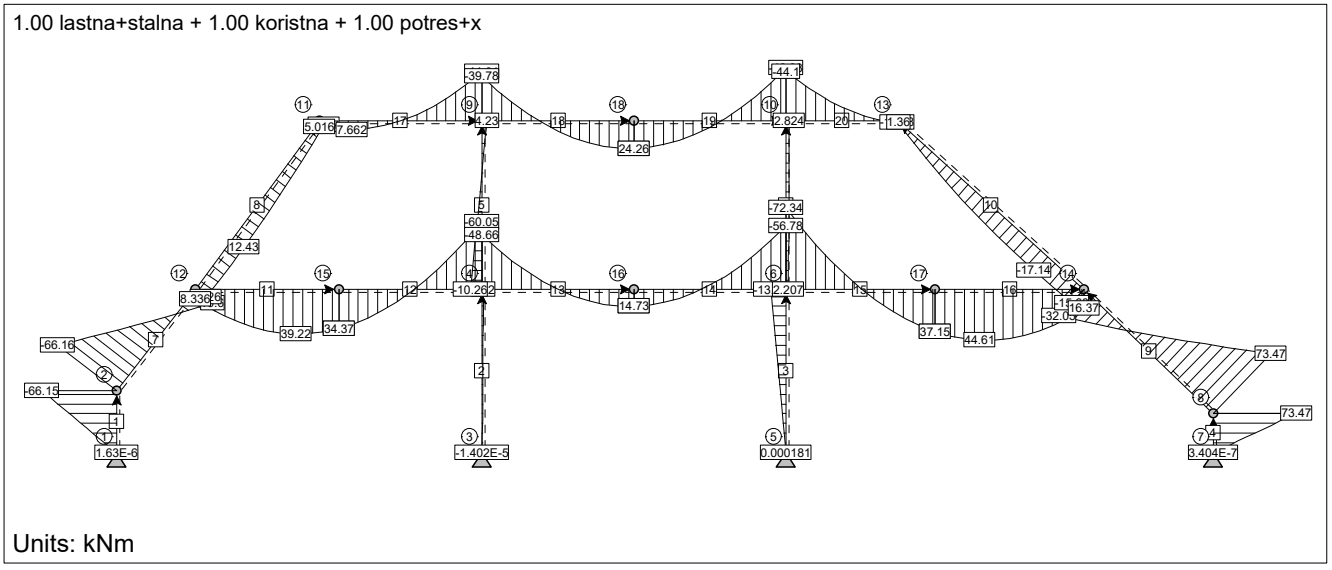
LC3: Load case: 3: Shear Forces Fz



LC3: Load case: 3: Displacements and Reactions

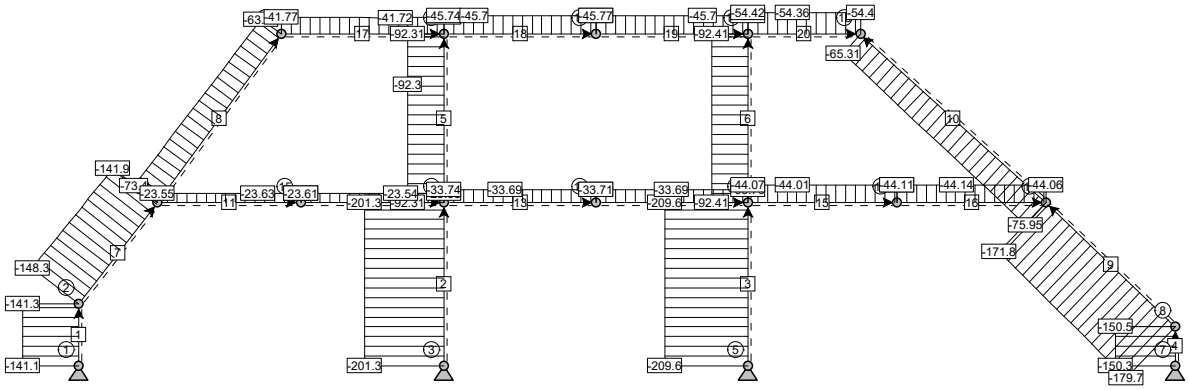


LC4: Load case: 4: Bending Moments My



LC4: Load case: 4: Axial Forces Fx

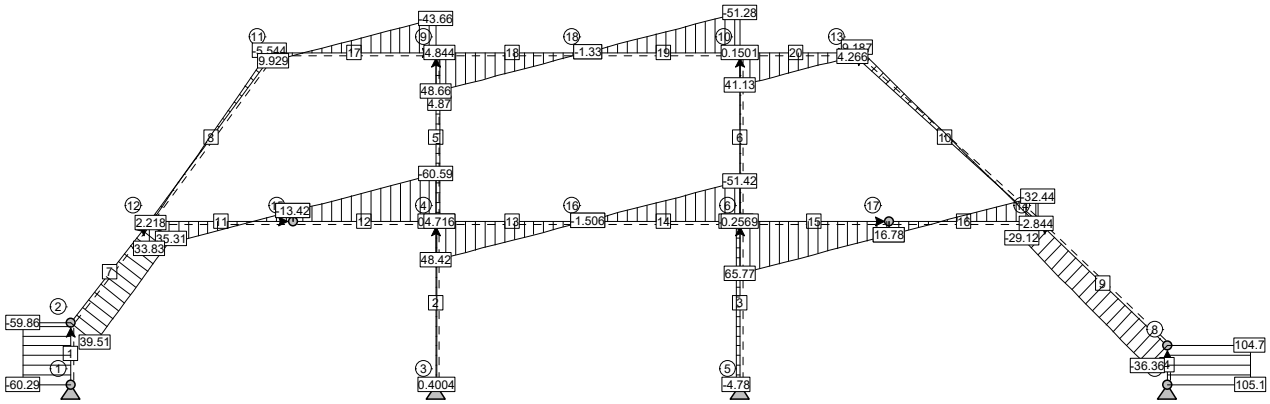
1.00 lastna+stalna + 1.00 koristna + 1.00 potres+x



Units: kN

LC4: Load case: 4: Shear Forces Fz

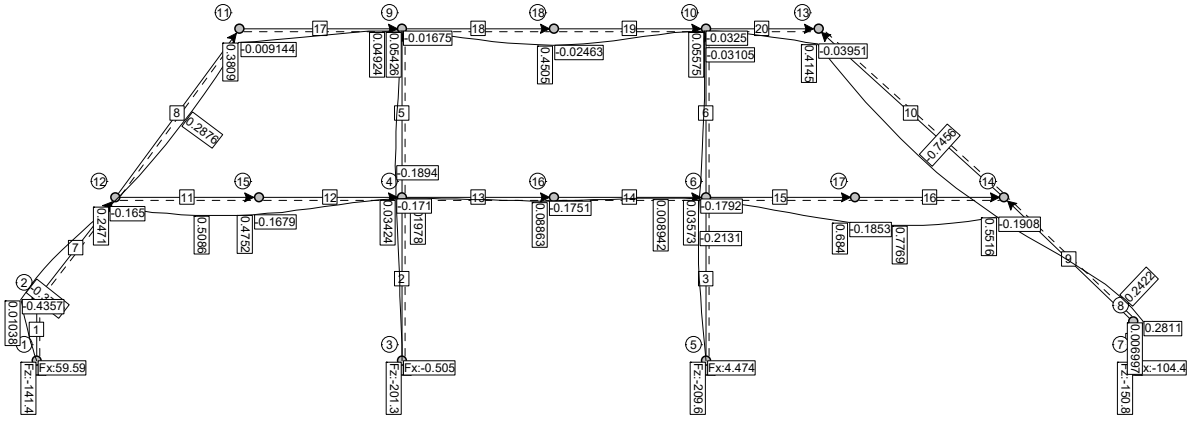
1.00 lastna+stalna + 1.00 koristna + 1.00 potres+x



Units: kN

LC4: Load case: 4: Displacements and Reactions

1.00 lastna+stalna + 1.00 koristna + 1.00 potres+x



Units: cm, kN, kNm

Element 1 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

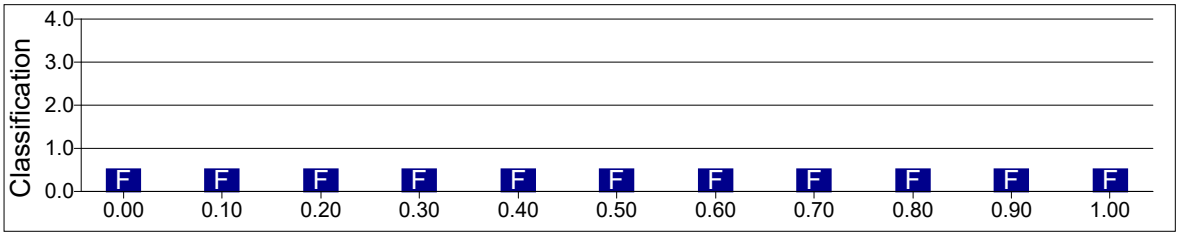
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

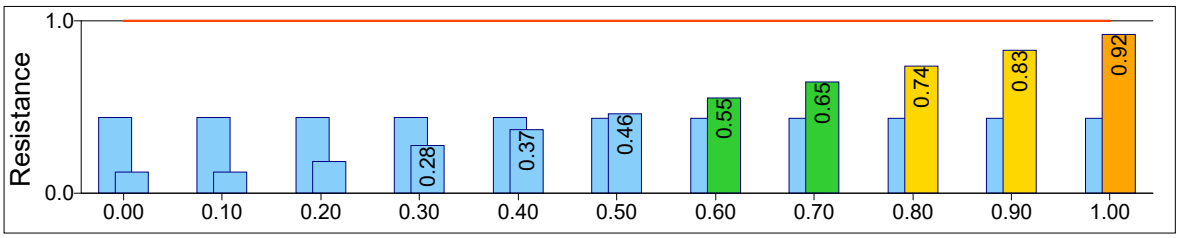
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.940 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 2 design results (Building code - EC3):

Cross-section [cm]
[180x180 x 12.5], h = 18.00, b = 18.00, t = 1.25, r = 1.76

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

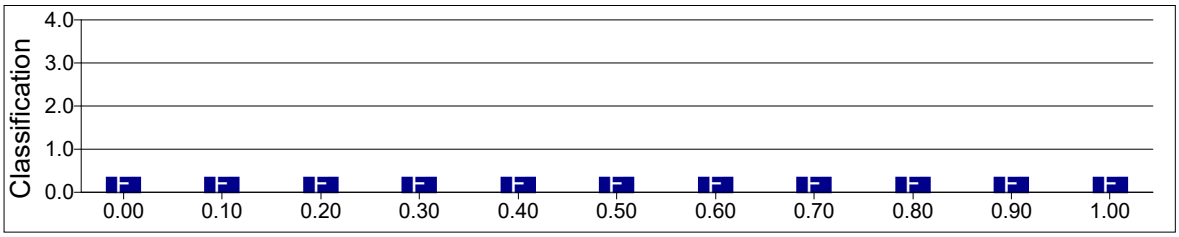
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

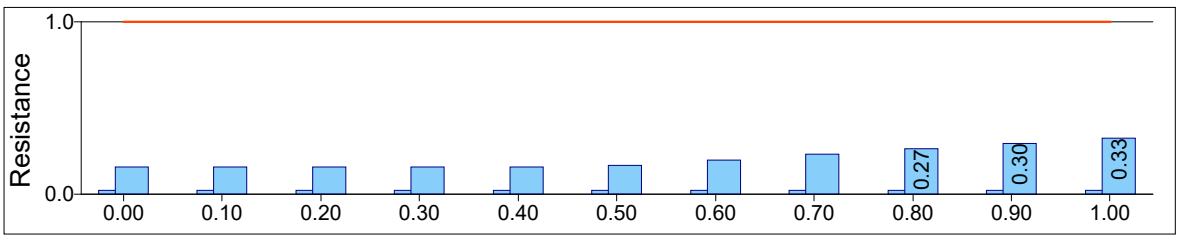
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and bending stability check [0.443 <= 1.0] in load case '[US] Load case: 3'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 3 design results (Building code - EC3):

Cross-section [cm]
[180x180 x 12.5], h = 18.00, b = 18.00, t = 1.25, r = 1.76

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

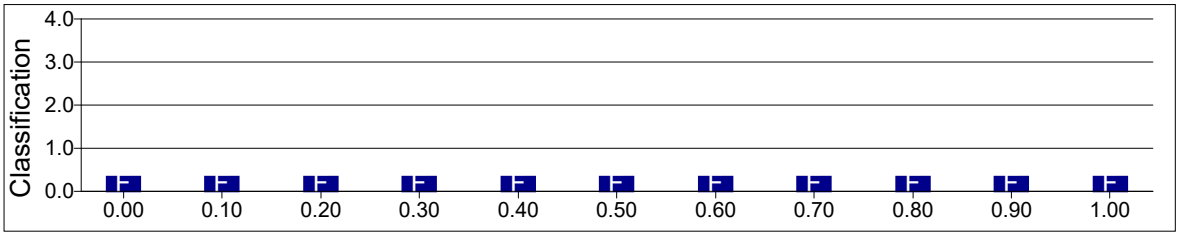
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

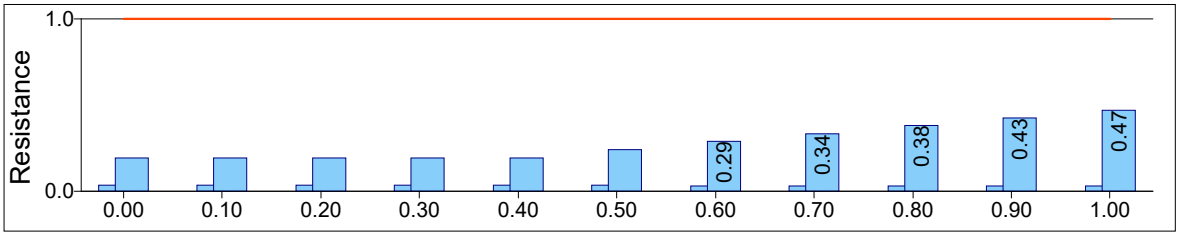
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and bending stability check [0.642 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 4 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

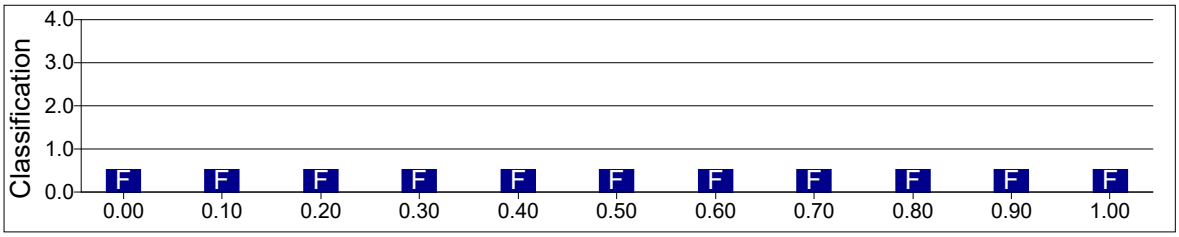
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

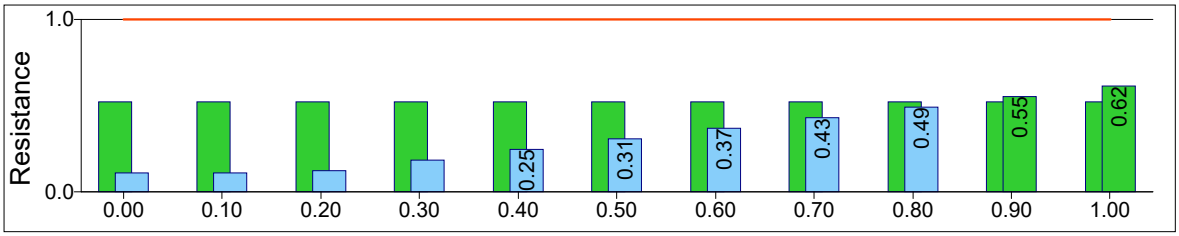
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.729 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 5 design results (Building code - EC3):

Cross-section [cm]
[180x180 x 10], h = 18.00, b = 18.00, t = 1.00, r = 1.60

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

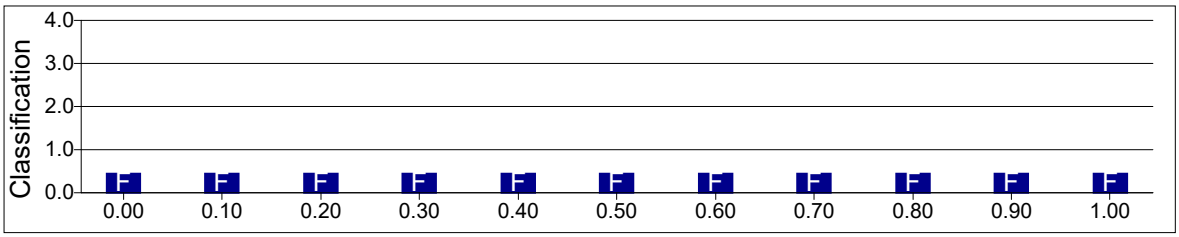
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

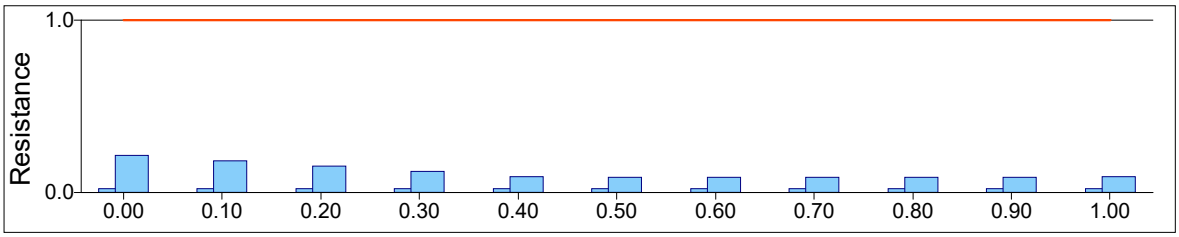
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and bending stability check [0.312 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 6 design results (Building code - EC3):

Cross-section [cm]
[180x180 x 10], h = 18.00, b = 18.00, t = 1.00, r = 1.60

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

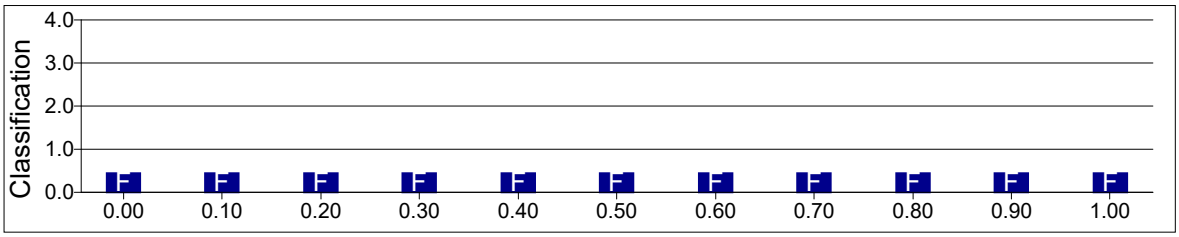
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

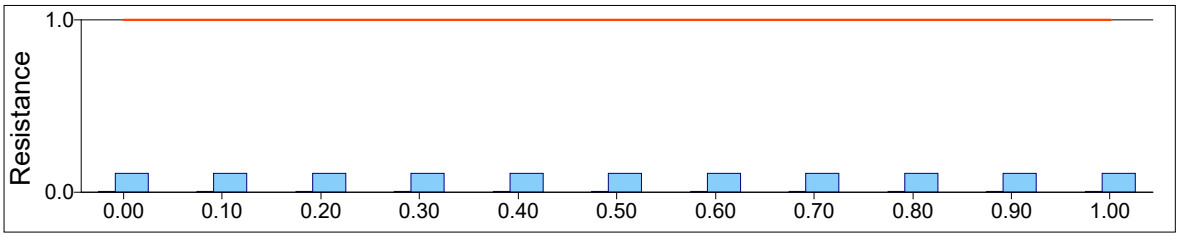
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and bending stability check [0.158 <= 1.0] in load case '[US] Load case: 3'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 7 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

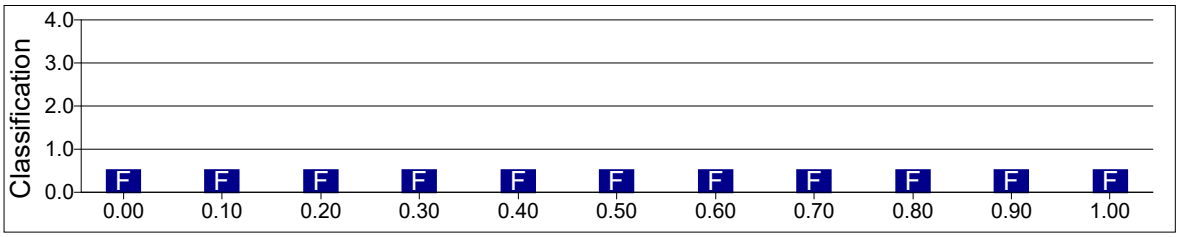
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

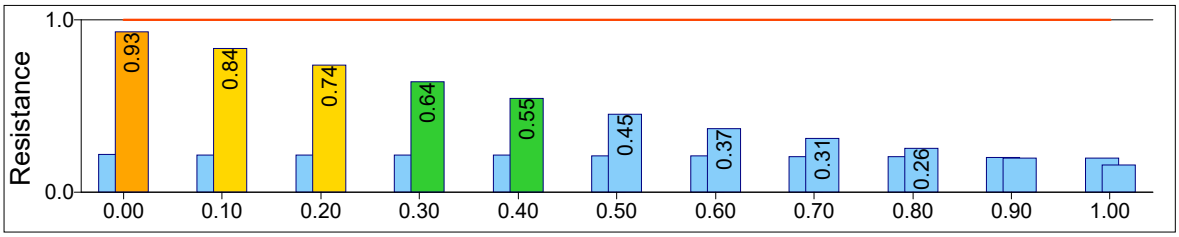
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.971 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 8 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

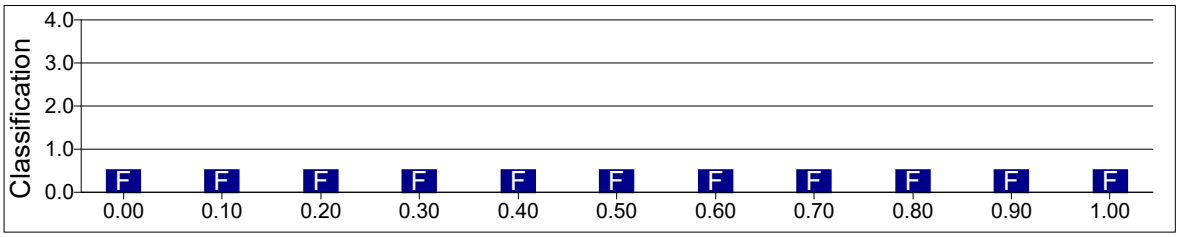
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

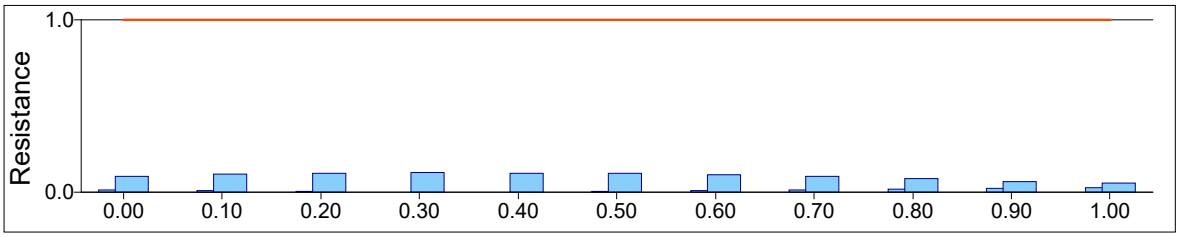
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.214 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 9 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

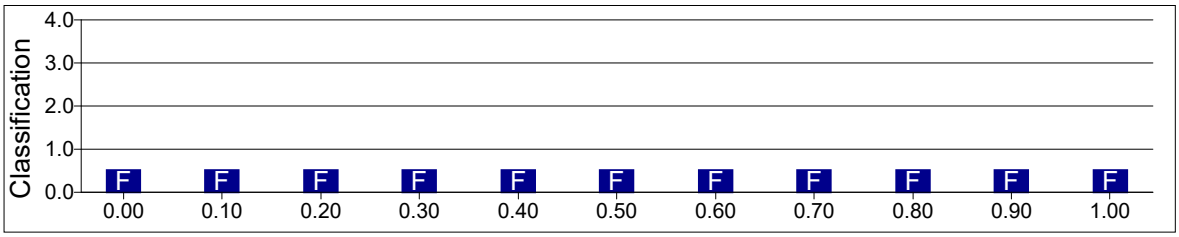
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

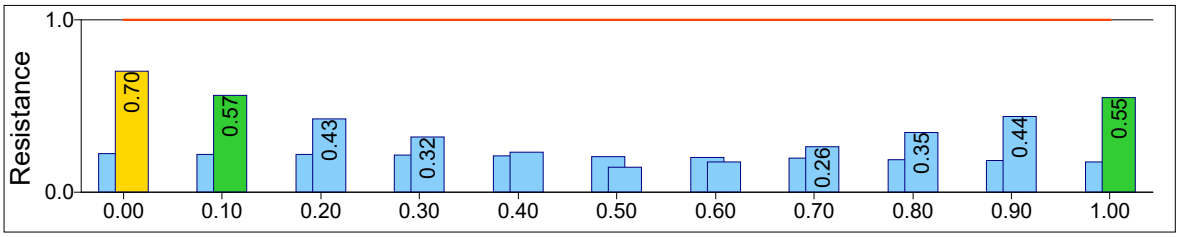
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.783 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 10 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

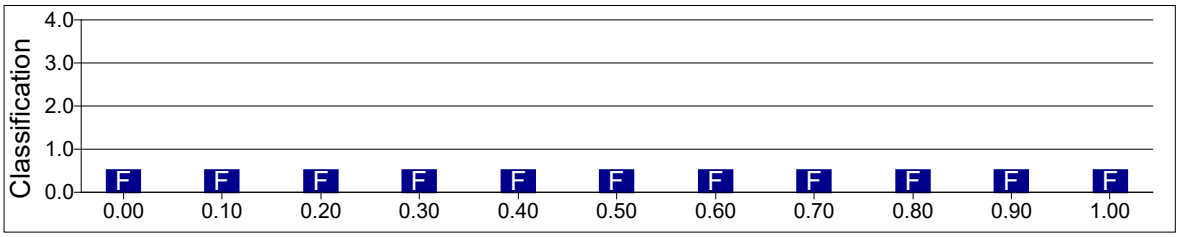
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

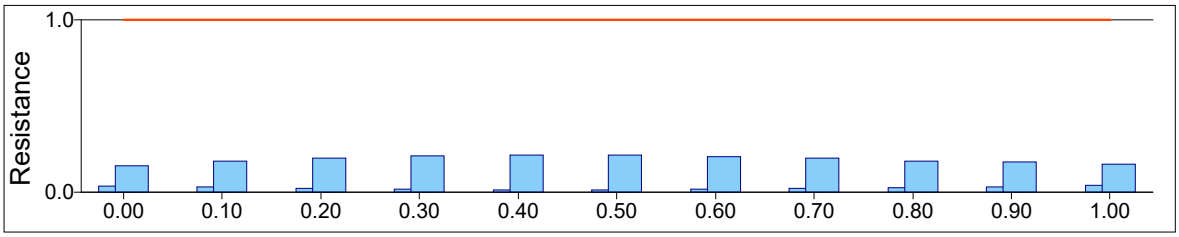
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.316 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 11 design results (Building code - EC3):

Cross-section [cm]
[HE 240 B], h = 24.00, b = 24.00, tw = 1.00, tf = 1.70, r = 2.10

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

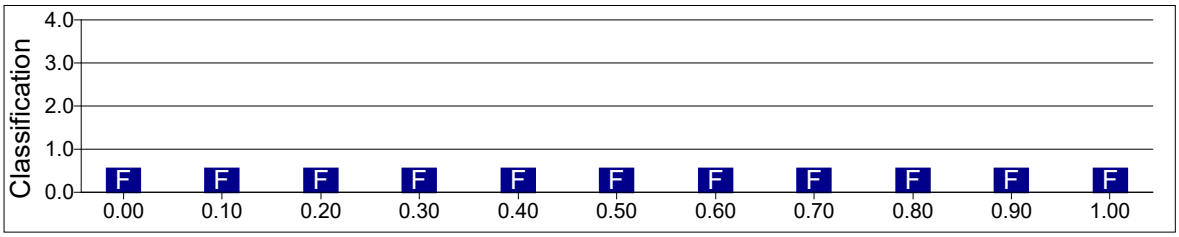
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

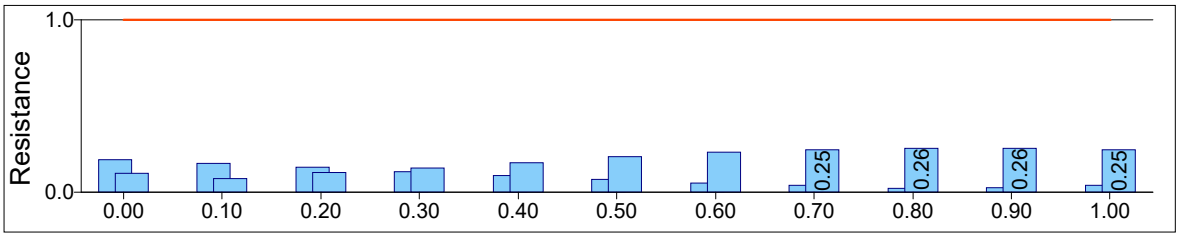
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.266 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 12 design results (Building code - EC3):

Cross-section [cm]
[HE 240 B], h = 24.00, b = 24.00, tw = 1.00, tf = 1.70, r = 2.10

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

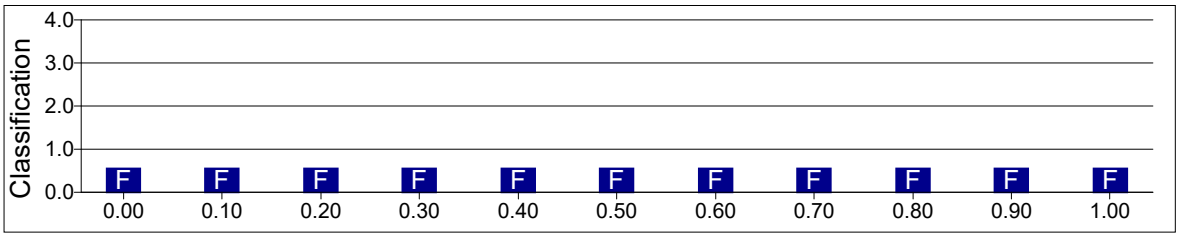
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

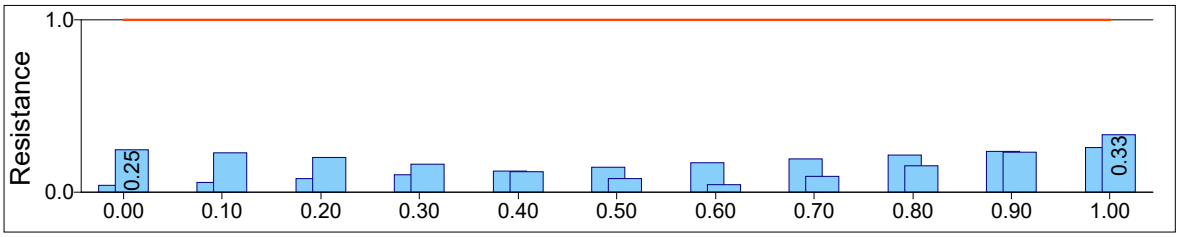
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.317 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 13 design results (Building code - EC3):

Cross-section [cm]
[HE 240 B], h = 24.00, b = 24.00, tw = 1.00, tf = 1.70, r = 2.10

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

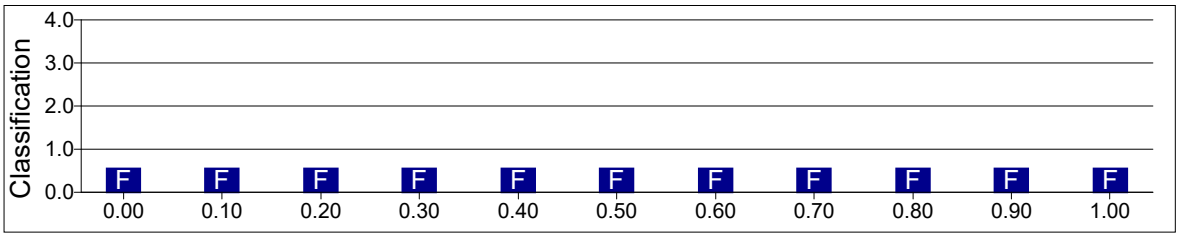
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

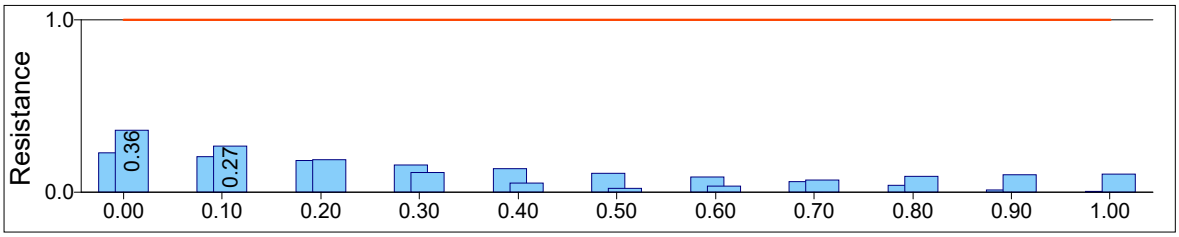
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.351 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 14 design results (Building code - EC3):

Cross-section [cm]
[HE 240 B], h = 24.00, b = 24.00, tw = 1.00, tf = 1.70, r = 2.10

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

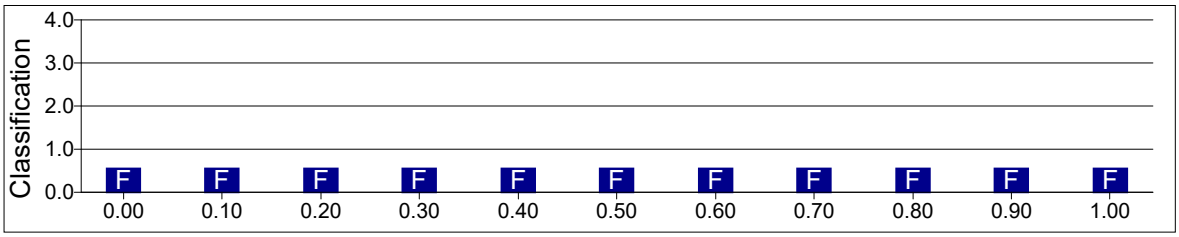
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

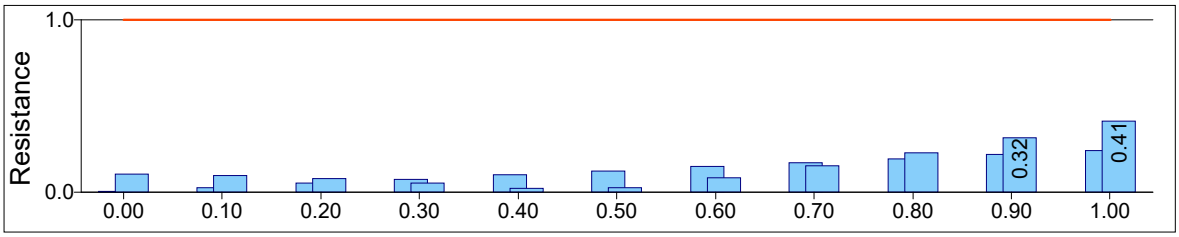
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.398 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 15 design results (Building code - EC3):

Cross-section [cm]
[HE 240 B], h = 24.00, b = 24.00, tw = 1.00, tf = 1.70, r = 2.10

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

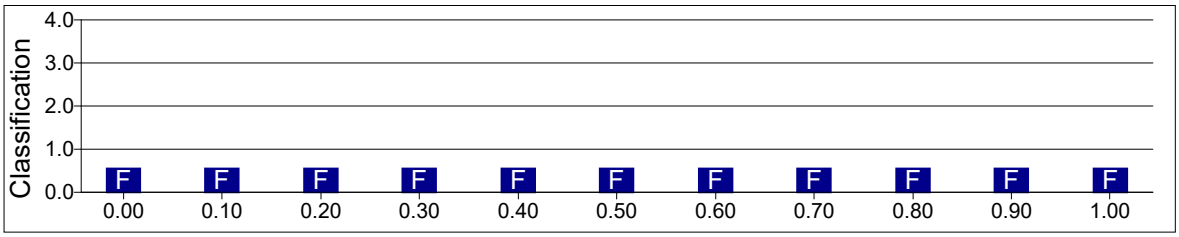
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

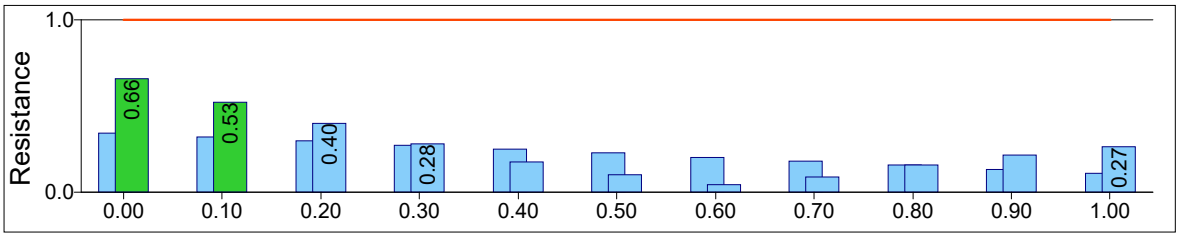
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.624 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 16 design results (Building code - EC3):

Cross-section [cm]
[HE 240 B], h = 24.00, b = 24.00, tw = 1.00, tf = 1.70, r = 2.10

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

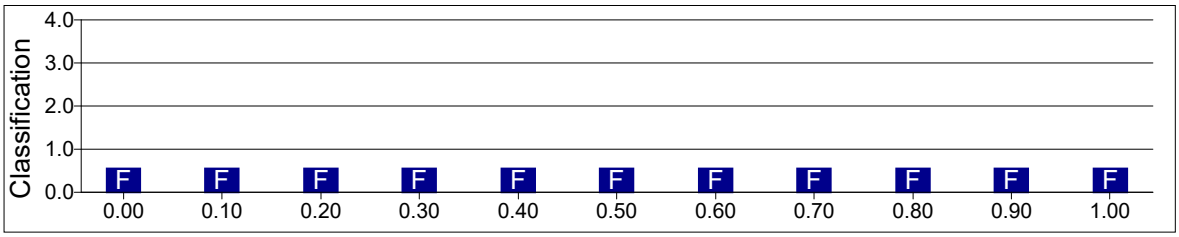
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

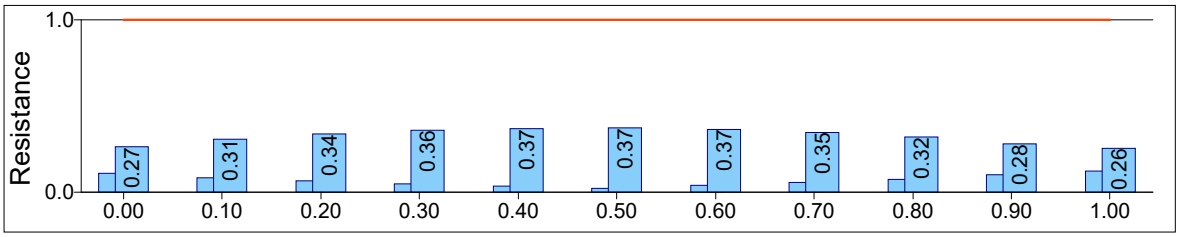
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.393 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 17 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

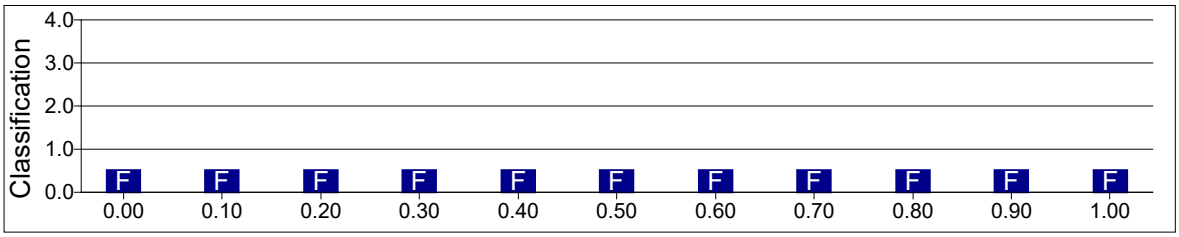
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

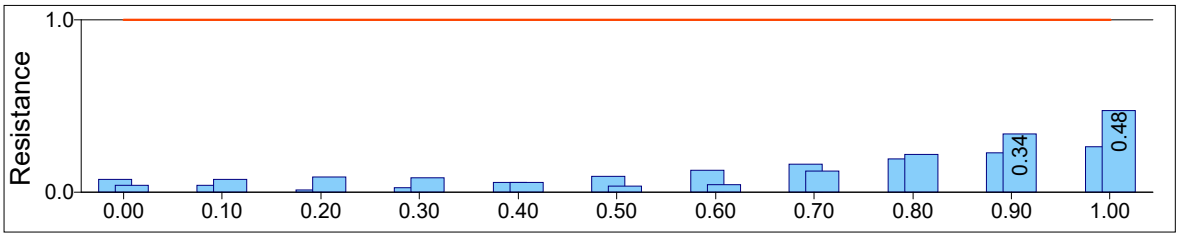
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and bending stability check [0.472 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 18 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

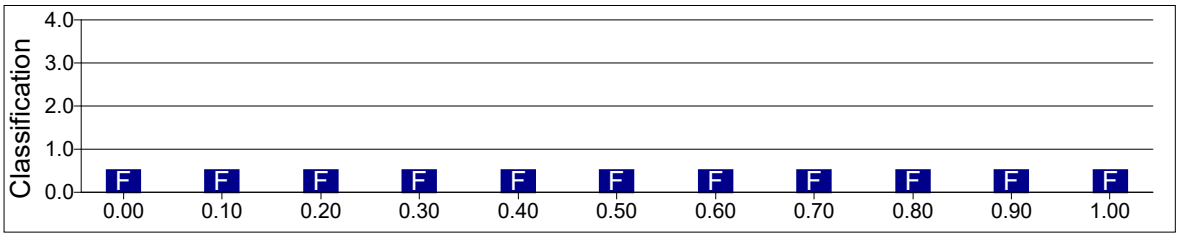
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

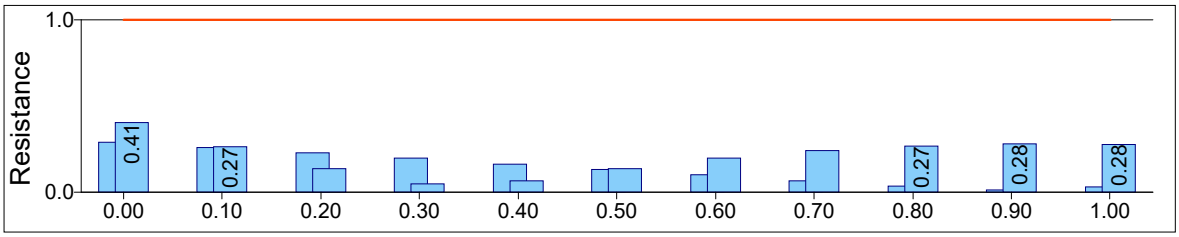
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.430 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 19 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

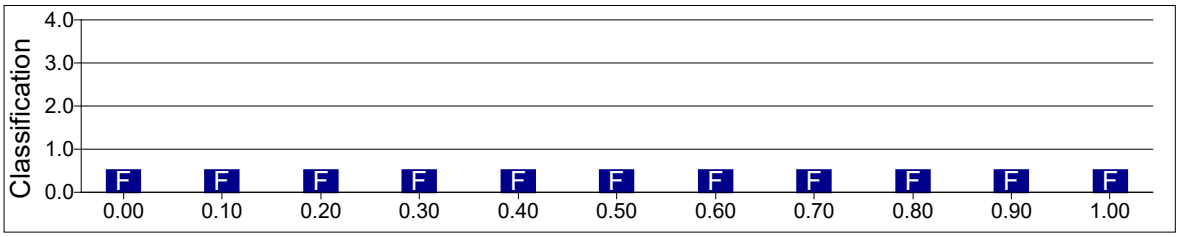
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

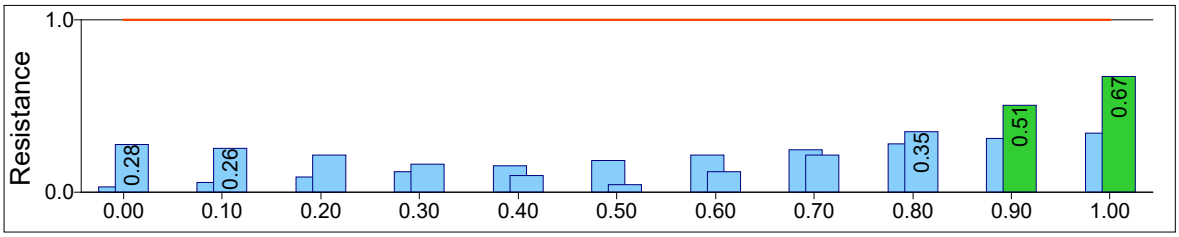
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.636 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 20 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

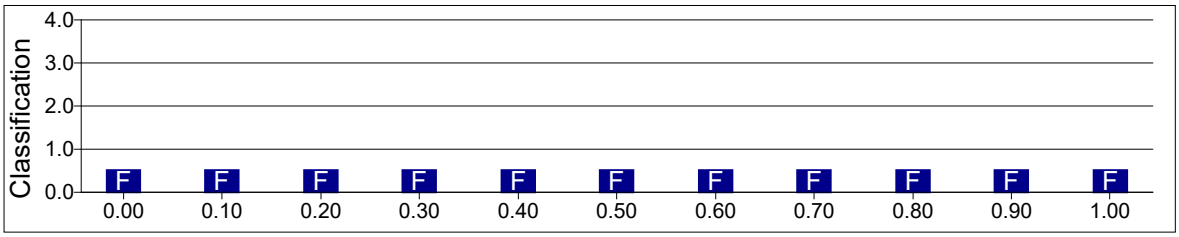
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

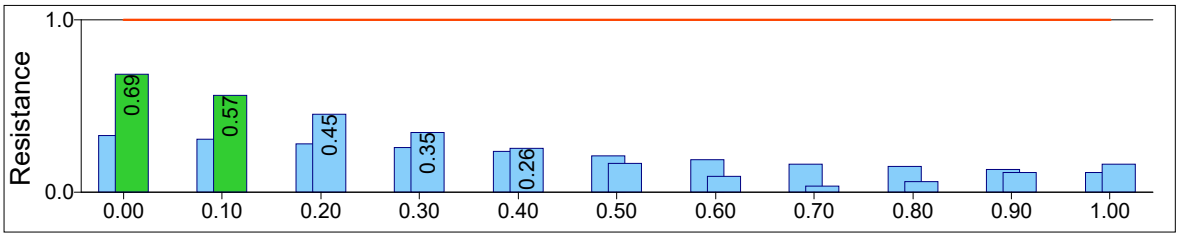
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.644 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

SAZU

04 PRECNI OKVIR -NOVO STANJE

Path: c:\projekti\2025\a2o2\sazu\sazu_novo_o4.ams

Comment:

04 PRECNI OKVIR -NOVO STANJE

SAZU

O4 PRECNI OKVIR - NOVO STANJE

Zasnova okvirja, profilacija in obtezbe:

Povzeto po projektu iz leta 1997: Sanacija in adaptacija podstresja, statika strani 75-77.

Material: S235 JR

Novo:
Precka etaze v prvem polju na poziciji dvigala odstranjena.
Dodana stebra v prvem polju v obeh etazah.

Geometry

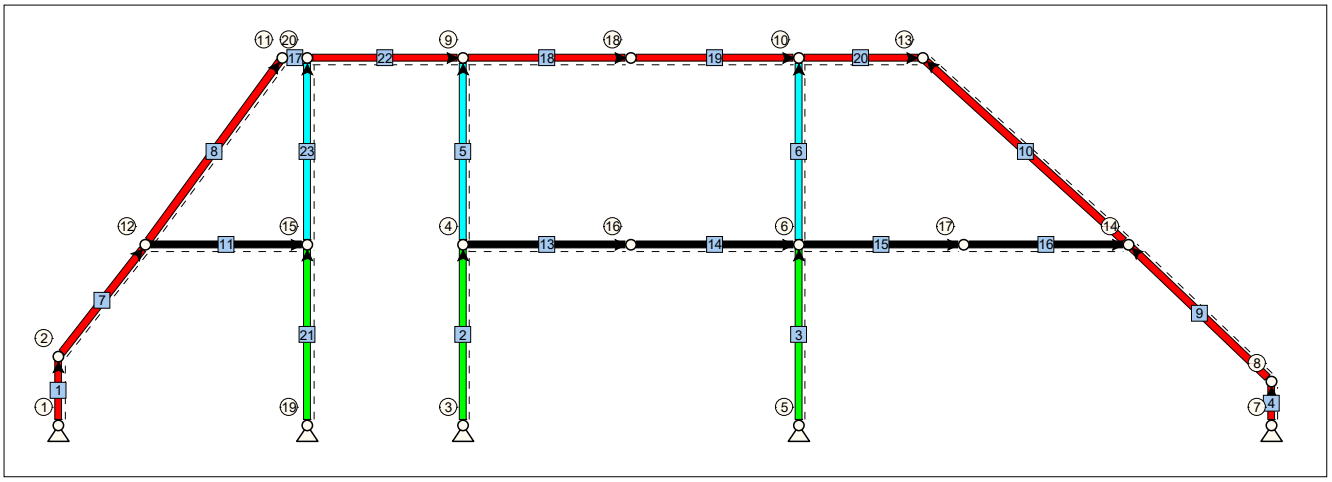


Table of elements

Index	Type	Node 1	Node 2	Cross-section	Material	Length [cm]	Rel. 1	Rel. 2
1:	Non-linear	1:	2:	2: HE 200 B	1: S 235	110.00	-	-
2:	Non-linear	3:	4:	3: 180x180 x 12.5	1: S 235	290.00	-	-
3:	Non-linear	5:	6:	3: 180x180 x 12.5	1: S 235	290.00	-	-
4:	Non-linear	7:	8:	2: HE 200 B	1: S 235	70.000	-	-
5:	Non-linear	4:	9:	4: 180x180 x 10	1: S 235	300.00	-	-
6:	Non-linear	6:	10:	4: 180x180 x 10	1: S 235	300.00	-	-
7:	Non-linear	2:	12:	2: HE 200 B	1: S 235	228.04	-	-
8:	Non-linear	12:	11:	2: HE 200 B	1: S 235	372.02	-	-
9:	Non-linear	8:	14:	2: HE 200 B	1: S 235	318.28	-	-
10:	Non-linear	14:	13:	2: HE 200 B	1: S 235	445.98	-	-
11:	Non-linear	12:	15:	1: HE 240 B	1: S 235	260.00	-	-
13:	Non-linear	4:	16:	1: HE 240 B	1: S 235	270.00	-	-
14:	Non-linear	16:	6:	1: HE 240 B	1: S 235	270.00	-	-
15:	Non-linear	6:	17:	1: HE 240 B	1: S 235	265.00	-	-

Table of elements

Index	Type	Node 1	Node 2	Cross-section	Material	Length [cm]	Rel. 1	Rel. 2
16:	Non-linear	17:	14:	1: HE 240 B	1: S 235	265.00	-	-
17:	Non-linear	11:	20:	2: HE 200 B	1: S 235	40.000	-	-
18:	Non-linear	9:	18:	2: HE 200 B	1: S 235	270.00	-	-
19:	Non-linear	18:	10:	2: HE 200 B	1: S 235	270.00	-	-
20:	Non-linear	10:	13:	2: HE 200 B	1: S 235	200.00	-	-
21:	Non-linear	19:	15:	3: 180x180 x 12.5	1: S 235	290.00	-	-
22:	Non-linear	20:	9:	2: HE 200 B	1: S 235	250.00	-	-
23:	Non-linear	15:	20:	4: 180x180 x 10	1: S 235	300.00	-	-

Table of Mateials

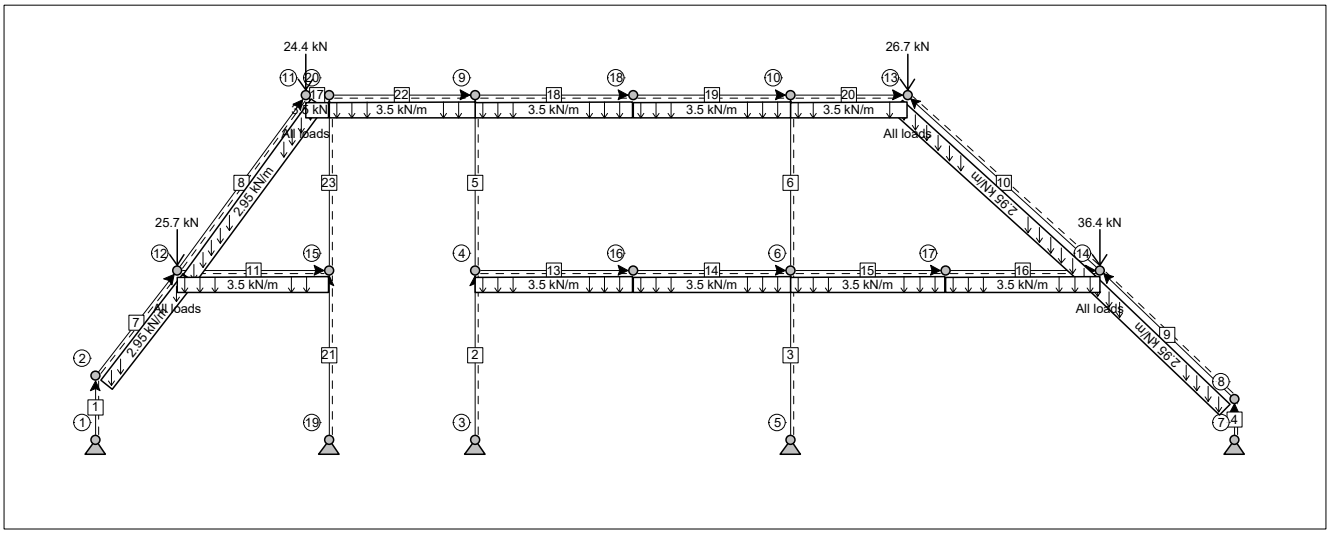
Index	Elastic Modulus [kN/cm2]	Coeff. of Thermal Exp. [1/d°C]
1: S 235	21000.	1.2000E-05

Table of Cross-sections

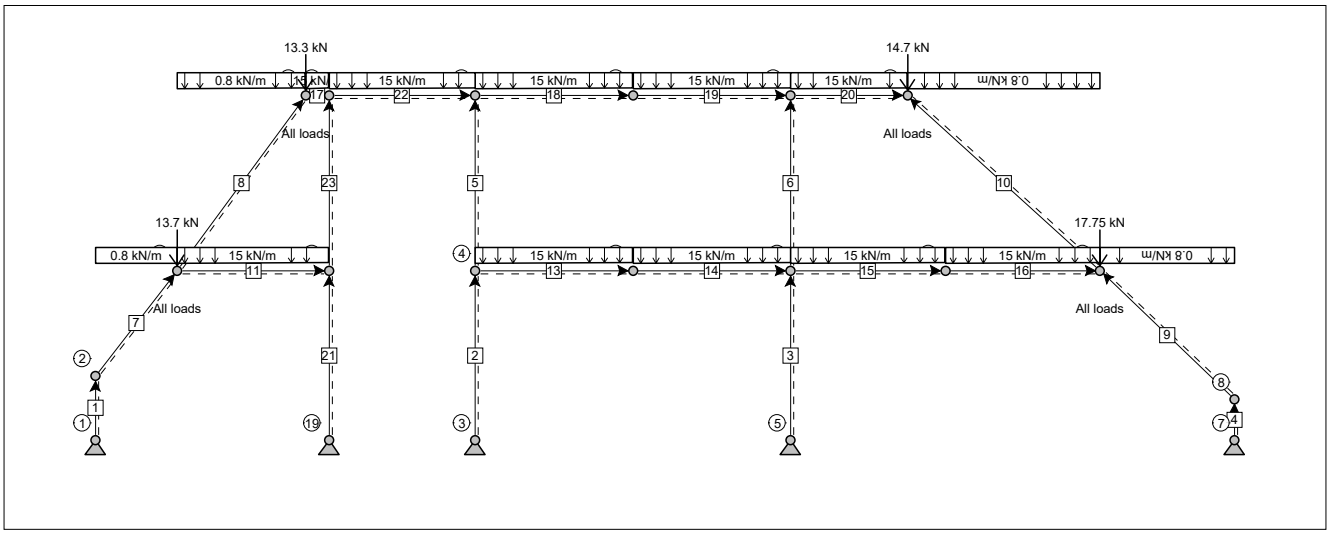
Index	A [cm2]	Iy [cm4]	Height [cm]
1: HE 240 B	106.00	11260.	24.000
2: HE 200 B	78.080	5696.0	20.000

Index	A [cm2]	Iy [cm4]	Height [cm]
3: 180x180 x 12.5	81.314	3753.8	18.000
4: 180x180 x 10	66.112	3141.5	18.000

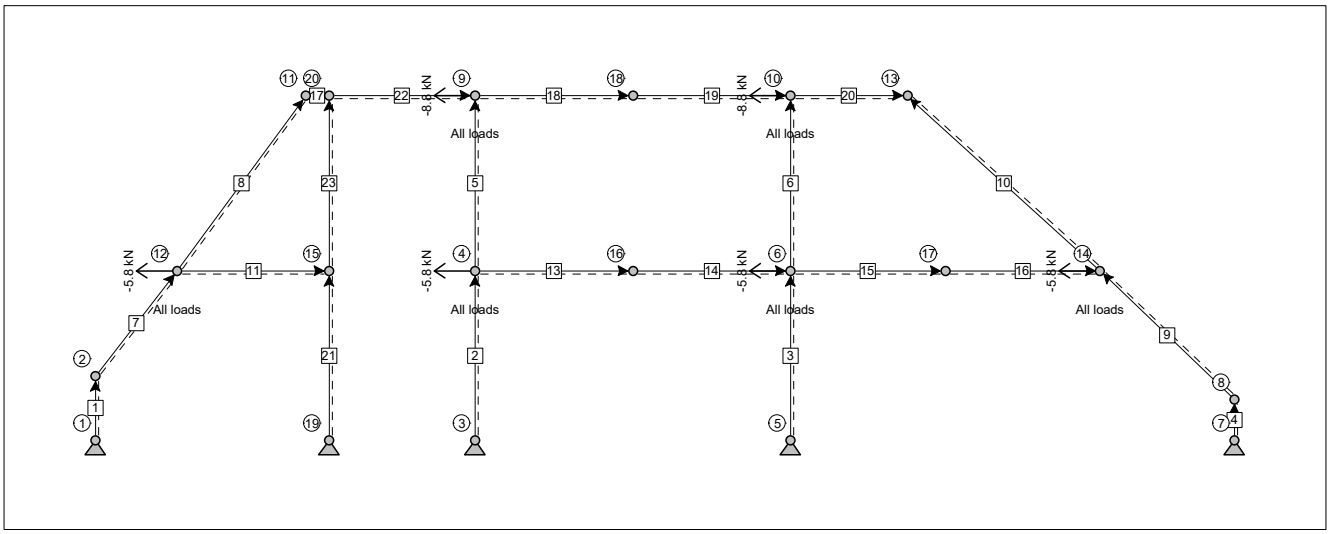
A1 : lastna+stalna



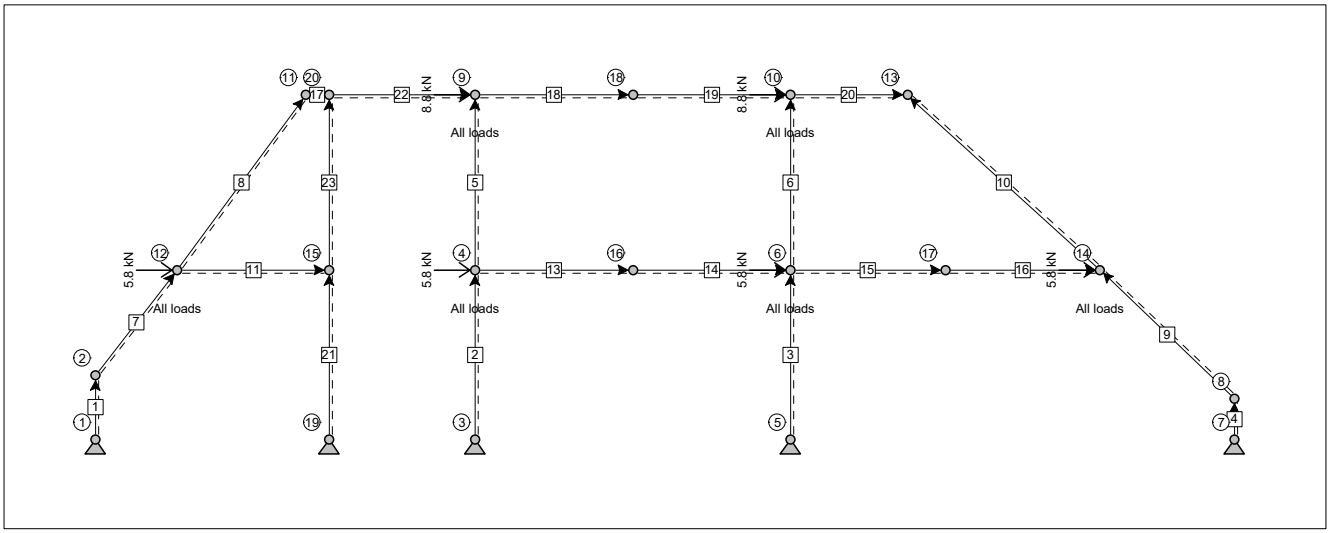
A2 : koristna



A3 : potres -x

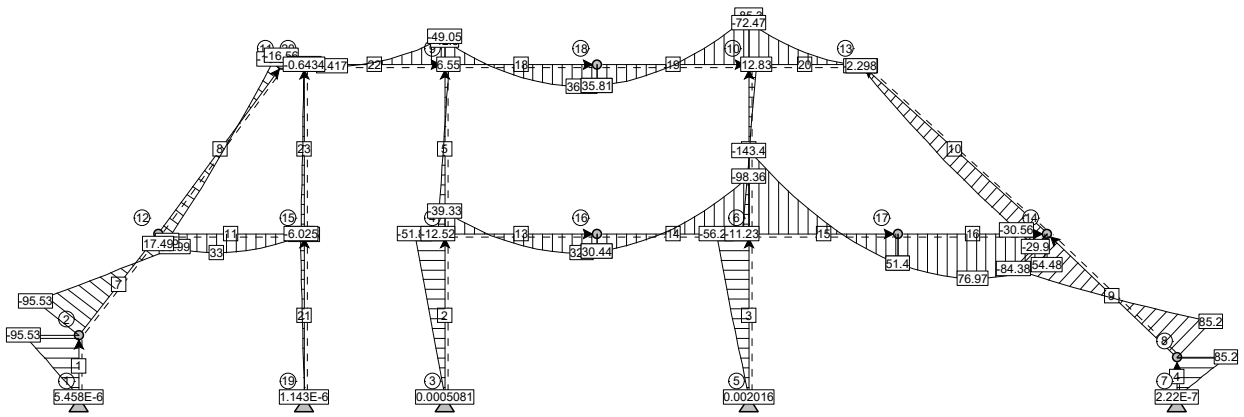


A4 : potres+x



LC1: Load case 1: Bending Moments My

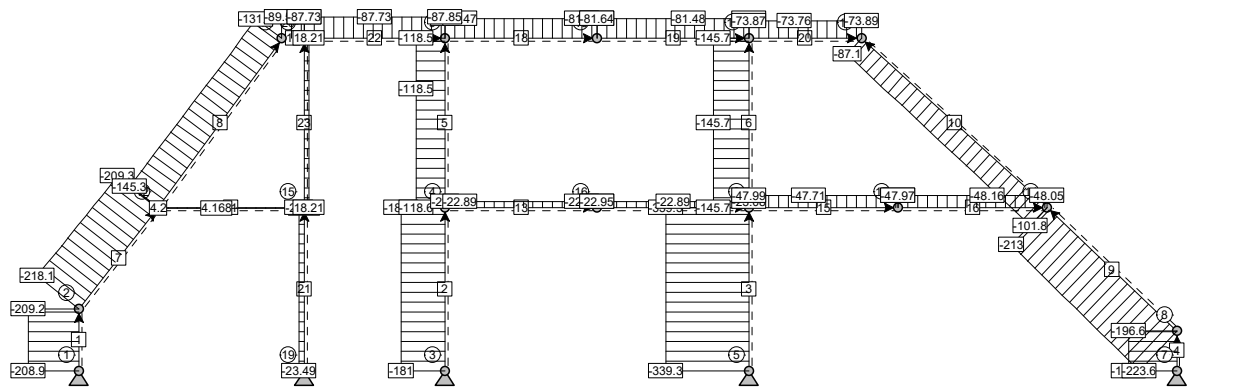
1.35 lastna+stalna + 1.50 koristna



Units: kNm

LC1: Load case 1: Axial Forces Fx

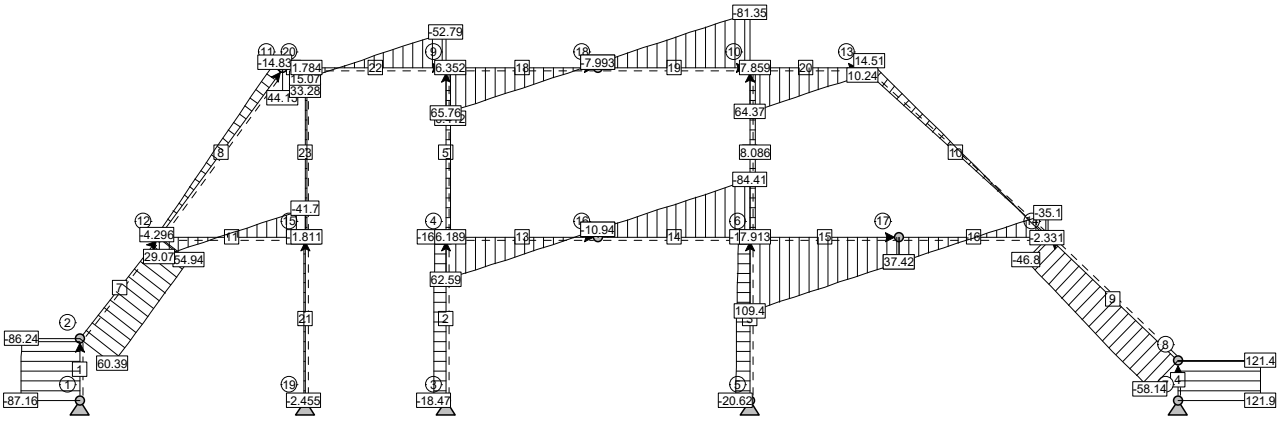
1.35 lastna+stalna + 1.50 koristna



Units: kN

LC1: Load case 1: Shear Forces Fz

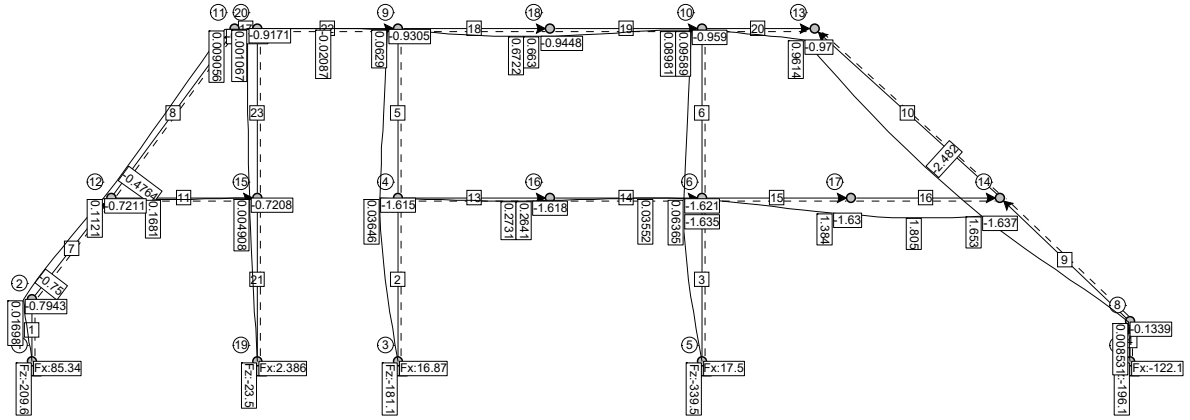
1.35 lastna+stalna + 1.50 koristna



Units: kN

LC1: Load case 1: Displacements and Reactions

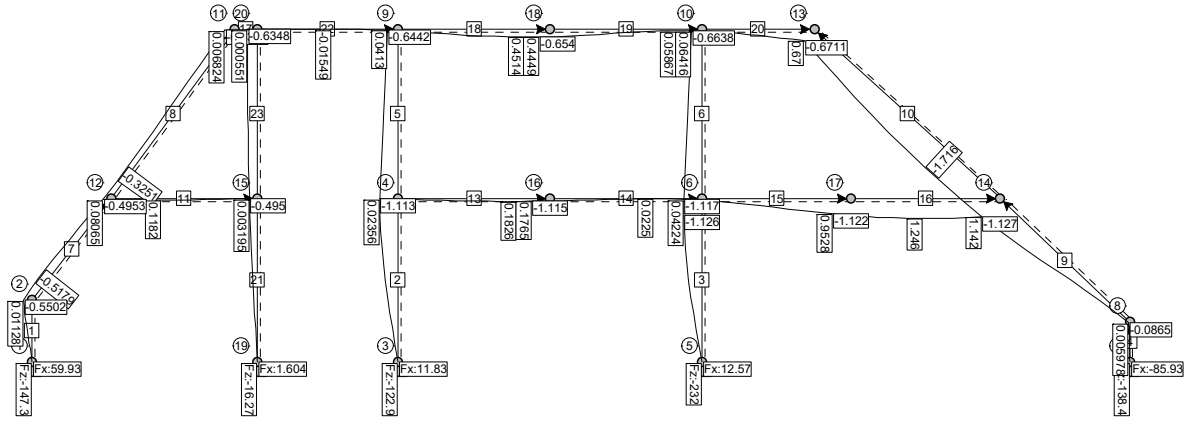
1.35 lastna+stalna + 1.50 koristna



Units: cm, kN, kNm

LC2: Load case 2: Displacements and Reactions

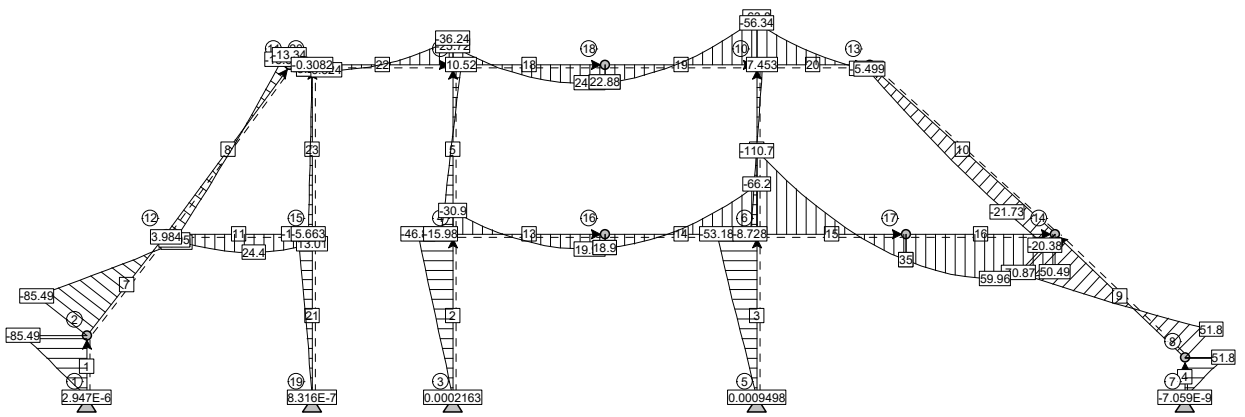
1.00 lastna+stalna + 1.00 koristna



Units: cm, kN, kNm

LC3: Load case: 3: Bending Moments My

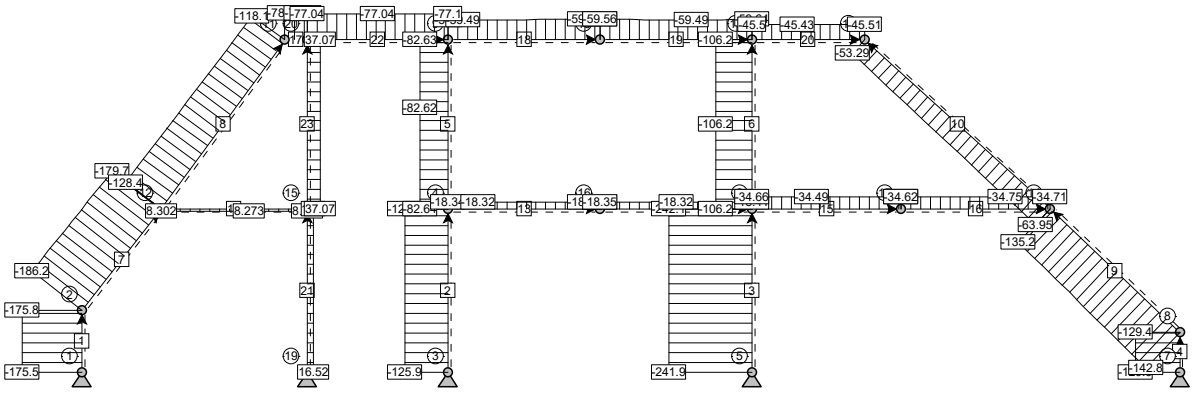
1.00 lastna+stalna + 1.00 koristna + 1.00 potres -x



Units: kNm

LC3: Load case: 3: Axial Forces Fx

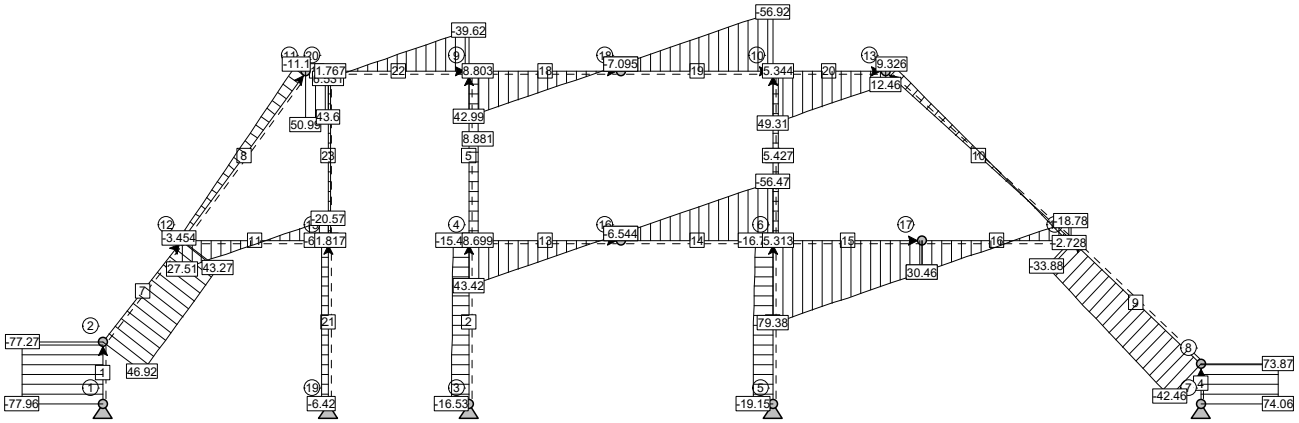
1.00 lastna+stalna + 1.00 koristna + 1.00 potres -x



Units: kN

LC3: Load case: 3: Shear Forces Fz

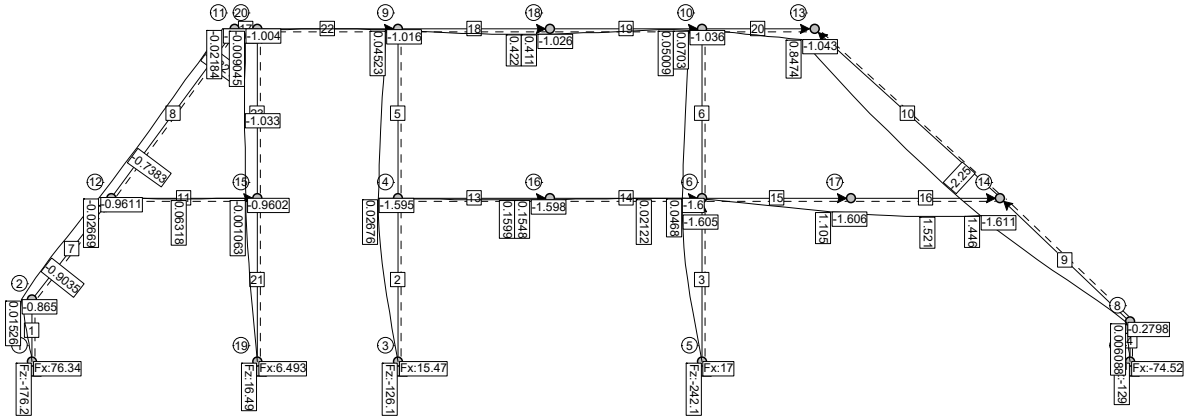
1.00 lastna+stalna + 1.00 koristna + 1.00 potres -x



Units: kN

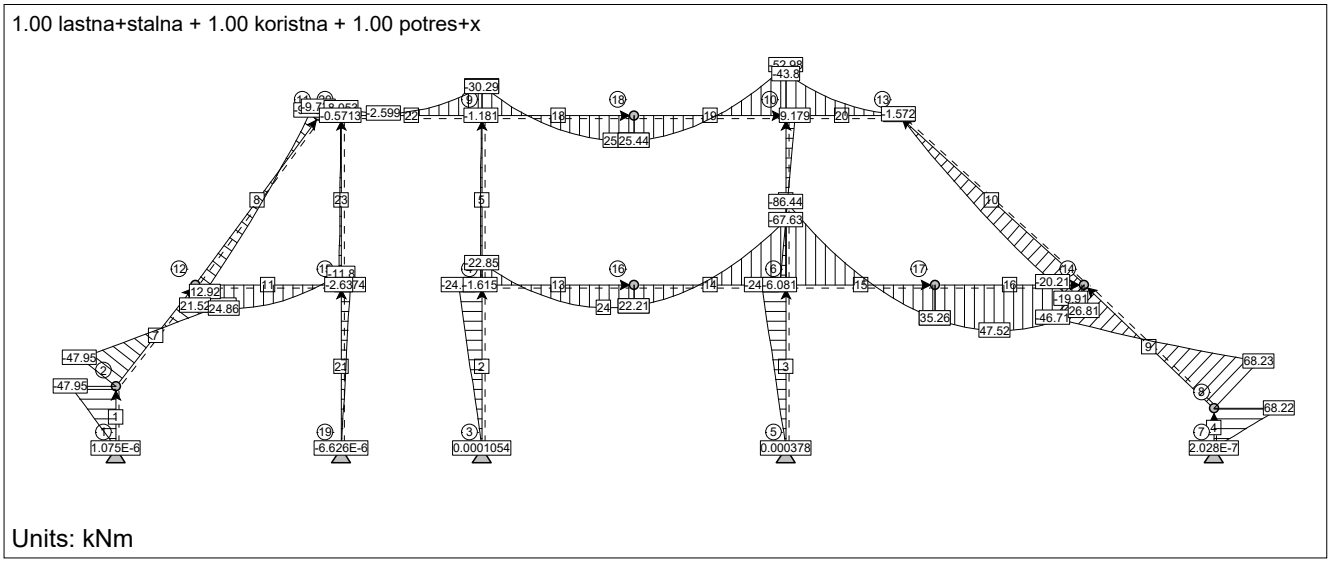
LC3: Load case: 3: Displacements and Reactions

1.00 lastna+stalna + 1.00 koristna + 1.00 potres -x

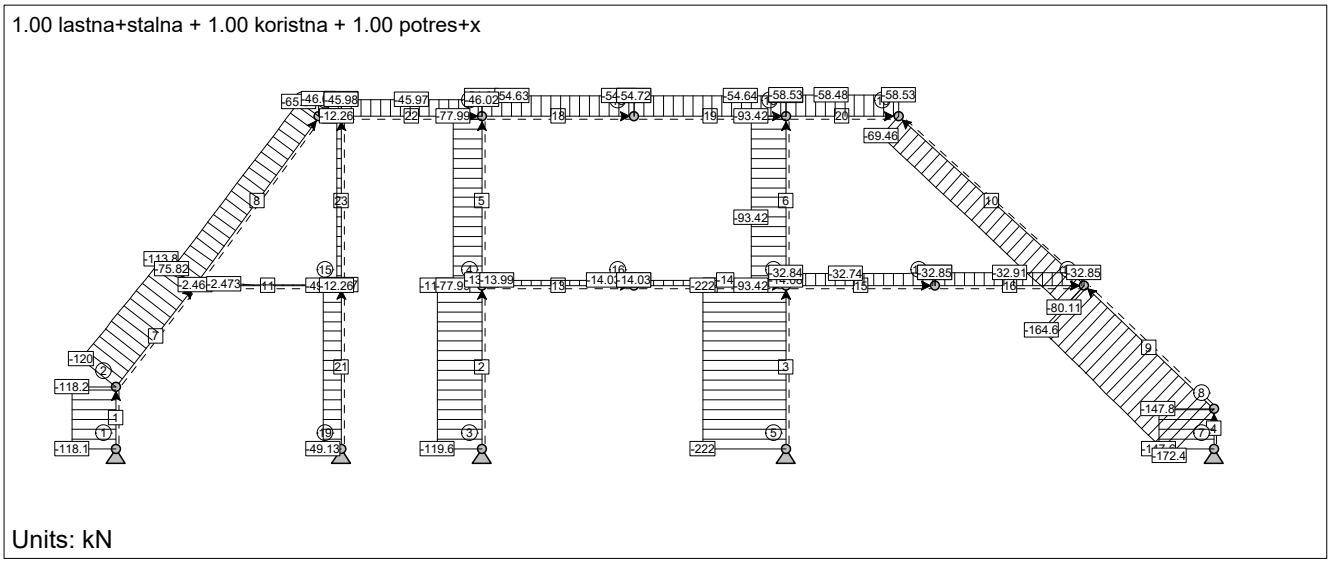


Units: cm, kN, kNm

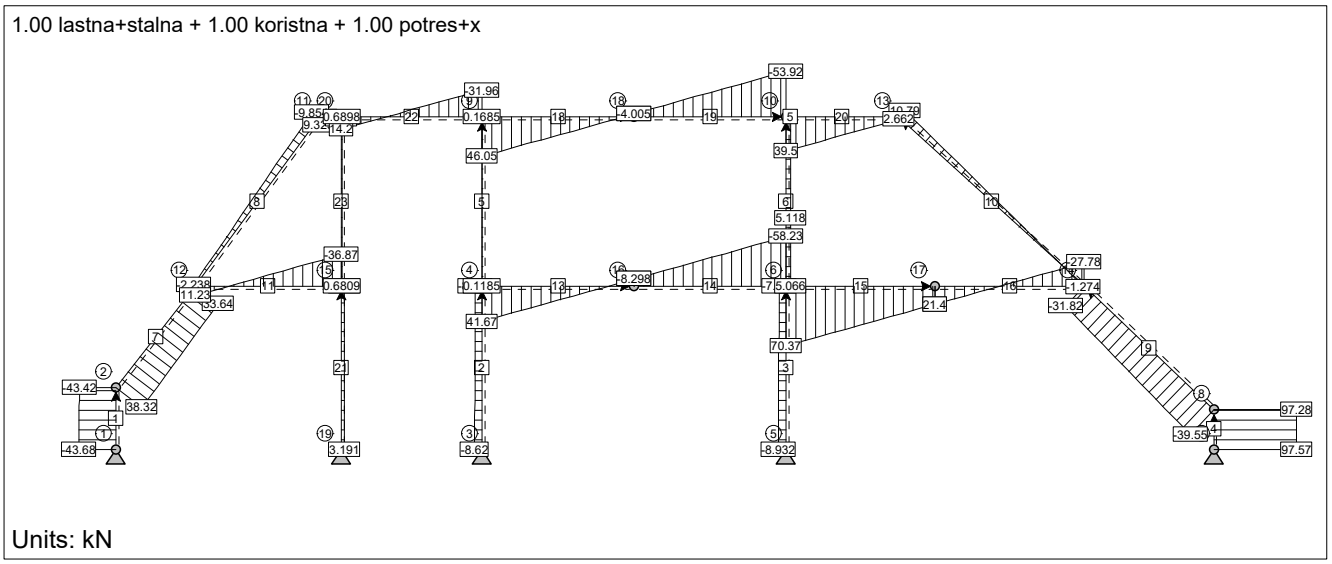
LC4: Load case: 4: Bending Moments My



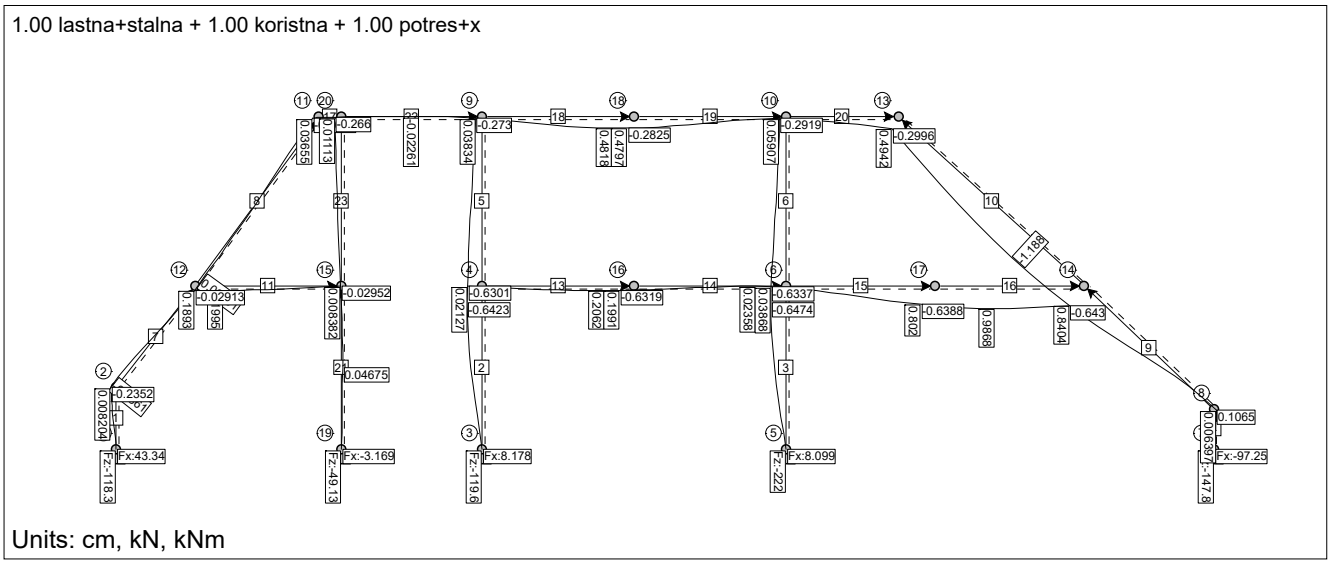
LC4: Load case: 4: Axial Forces Fx



LC4: Load case: 4: Shear Forces Fz



LC4: Load case: 4: Displacements and Reactions



Element 1 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

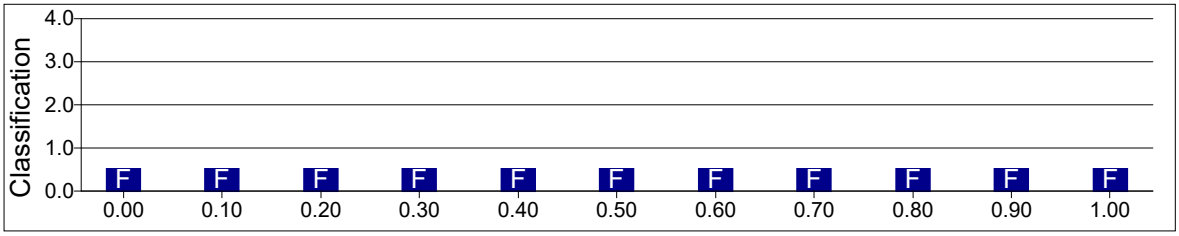
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

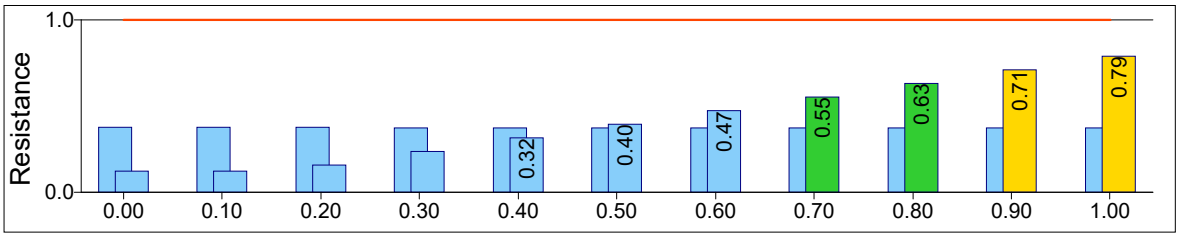
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.823 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 2 design results (Building code - EC3):

Cross-section [cm]
[180x180 x 12.5], h = 18.00, b = 18.00, t = 1.25, r = 1.76

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

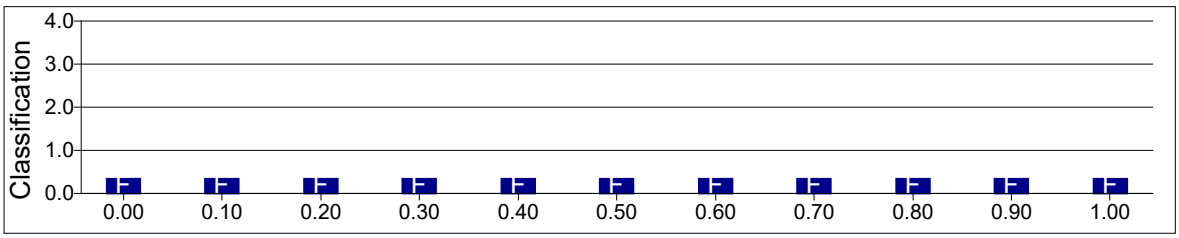
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

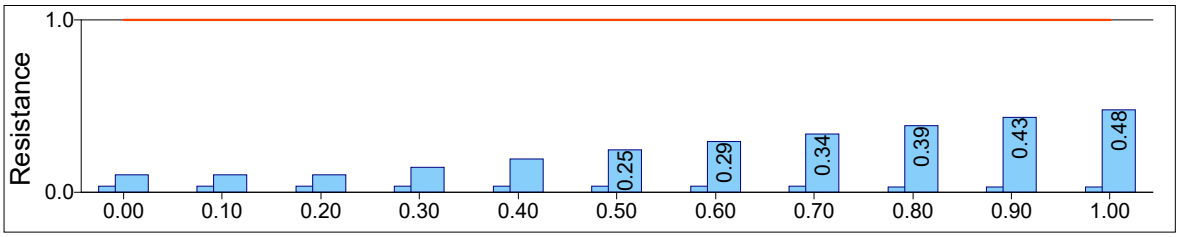
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and bending stability check [0.594 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 3 design results (Building code - EC3):

Cross-section [cm]
[180x180 x 12.5], h = 18.00, b = 18.00, t = 1.25, r = 1.76

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

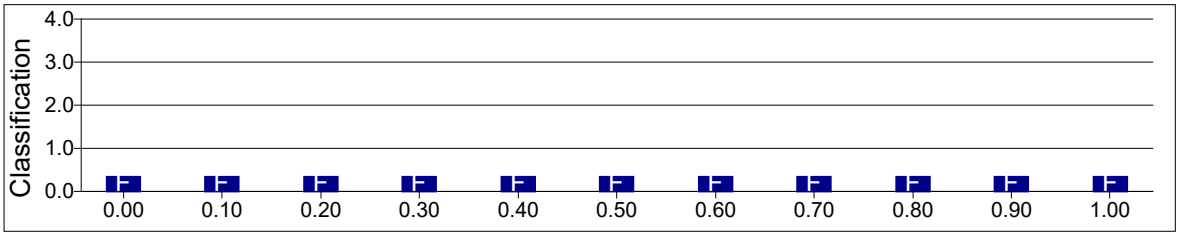
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

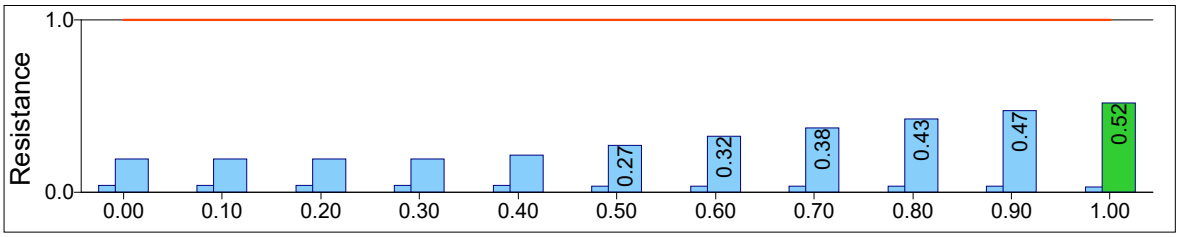
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and bending stability check [0.735 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 4 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

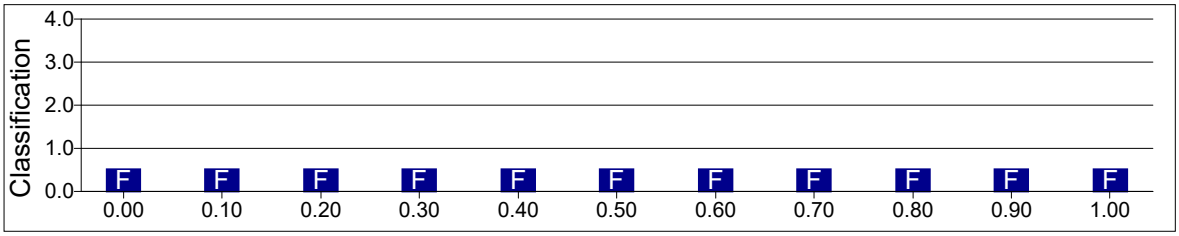
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

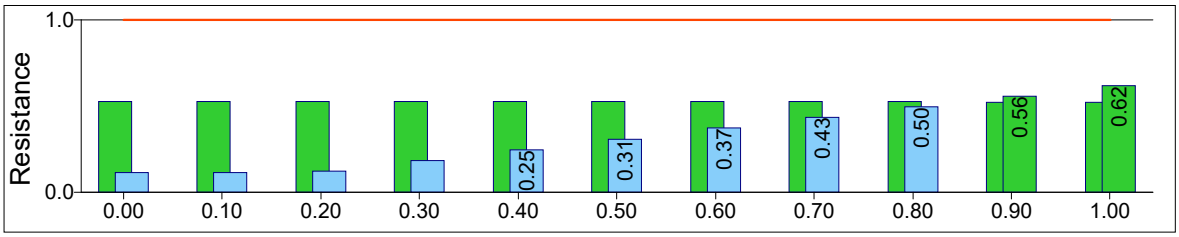
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.739 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 5 design results (Building code - EC3):

Cross-section [cm]
[180x180 x 10], h = 18.00, b = 18.00, t = 1.00, r = 1.60

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

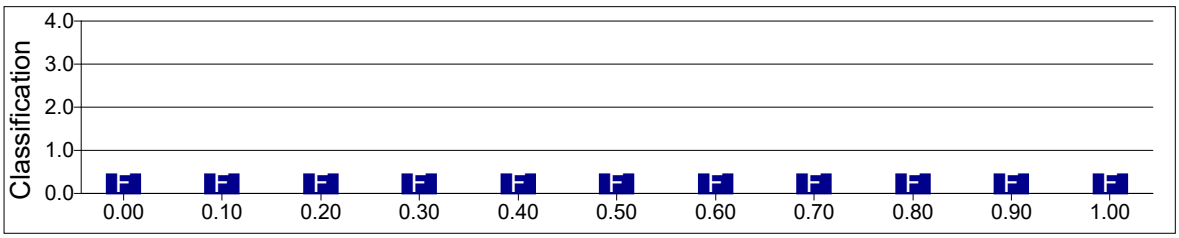
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

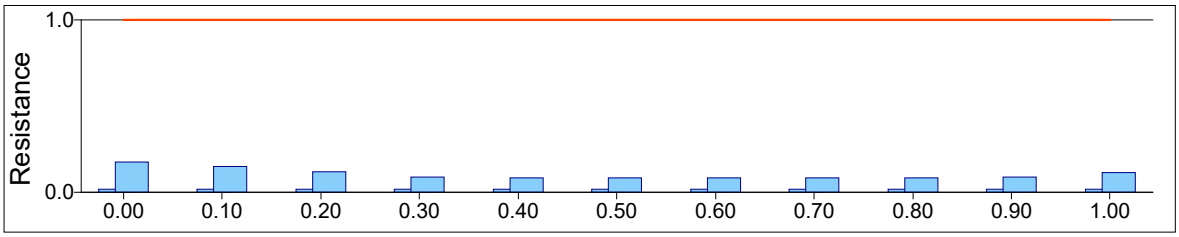
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and bending stability check [0.240 <= 1.0] in load case '[US] Load case: 3'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 6 design results (Building code - EC3):

Cross-section [cm]
[180x180 x 10], h = 18.00, b = 18.00, t = 1.00, r = 1.60

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

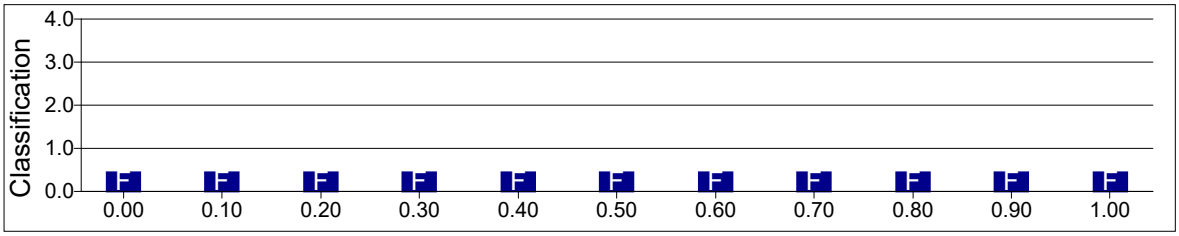
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

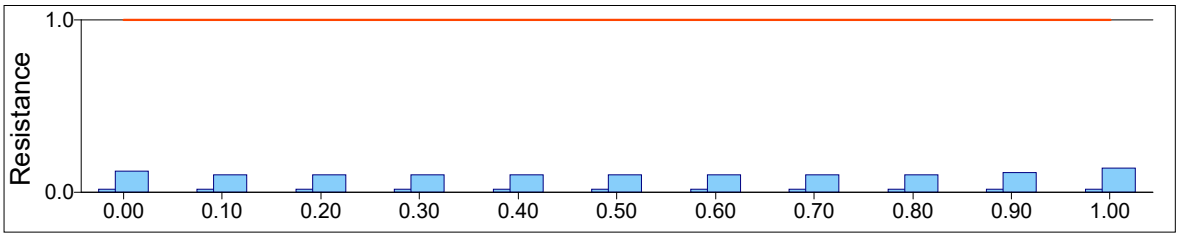
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and bending stability check [0.250 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 7 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

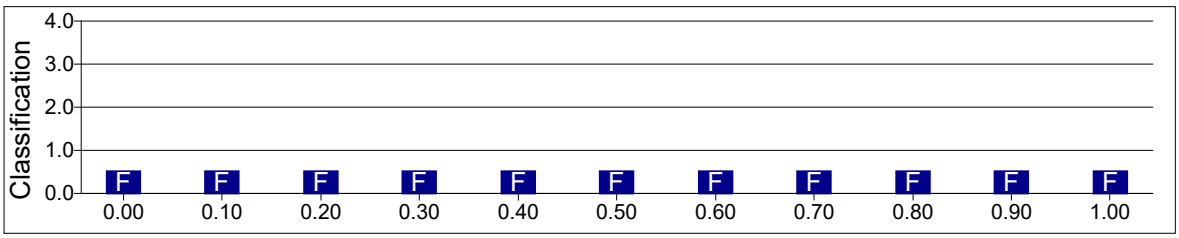
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

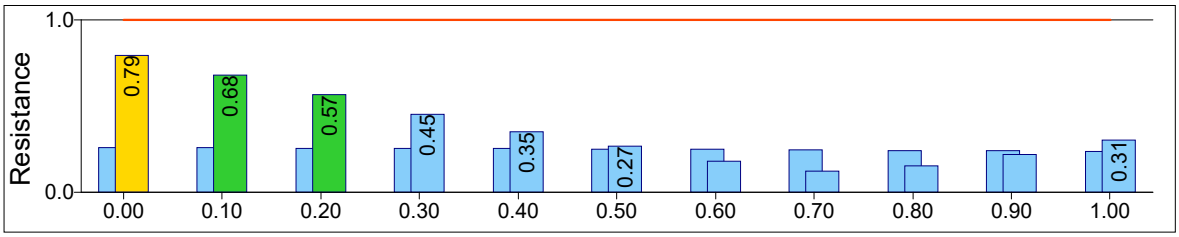
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.849 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 8 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

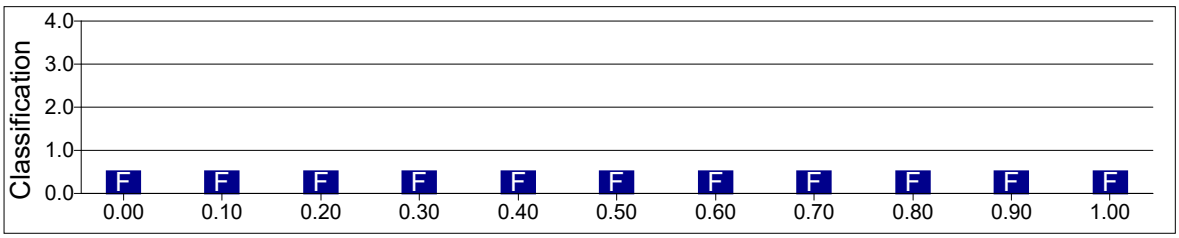
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

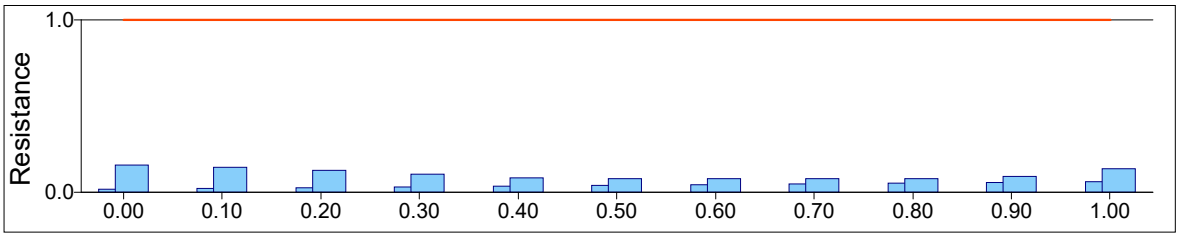
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.278 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 9 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

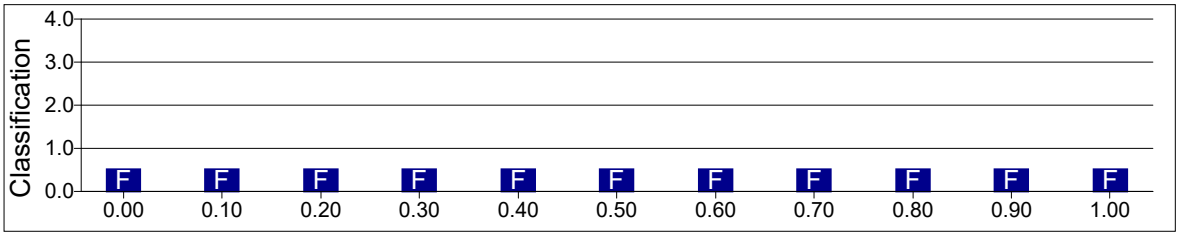
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

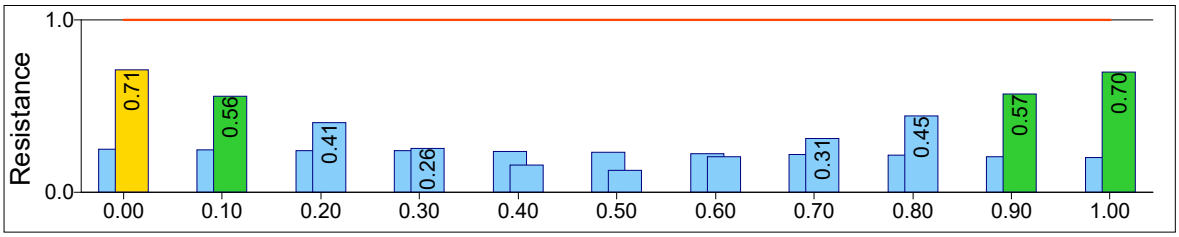
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.791 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 10 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

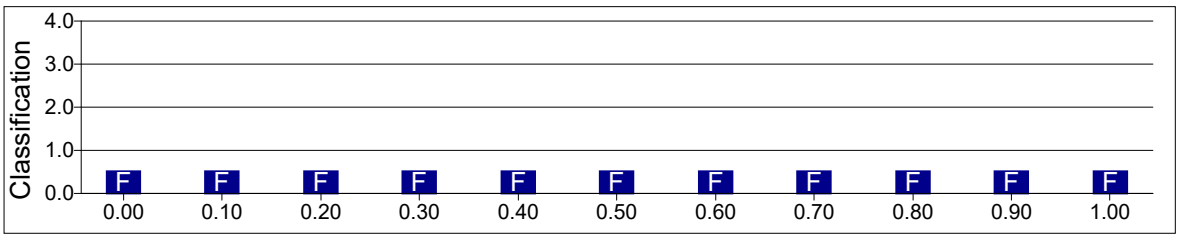
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

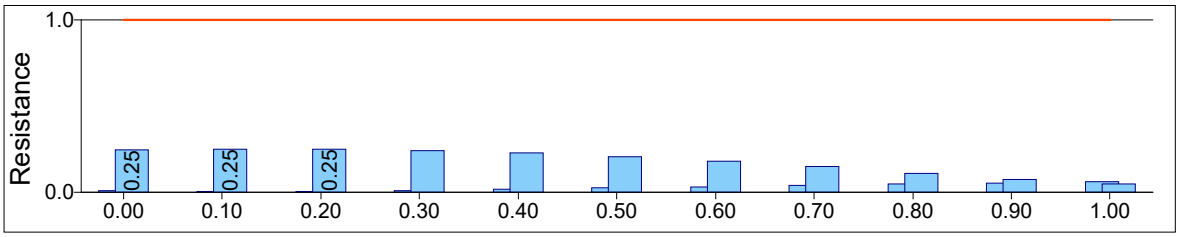
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.376 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 11 design results (Building code - EC3):

Cross-section [cm]
[HE 240 B], h = 24.00, b = 24.00, tw = 1.00, tf = 1.70, r = 2.10

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

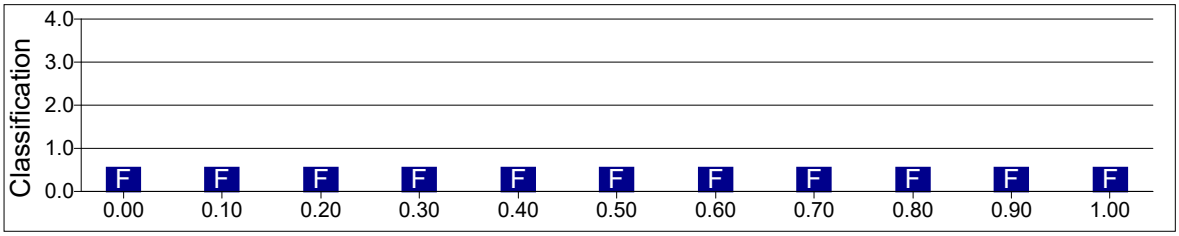
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

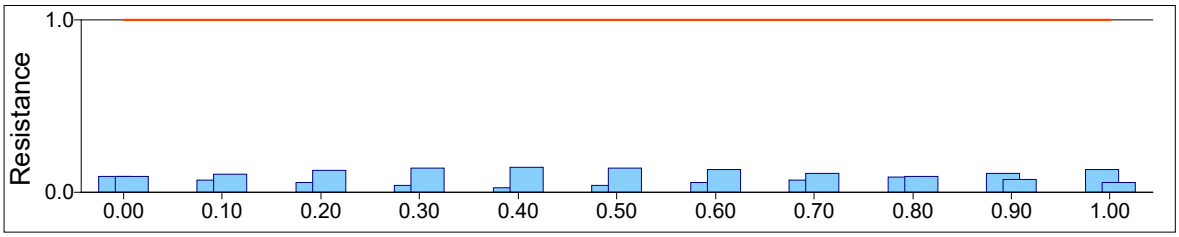
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is lateral-torsional stability check [0.156 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 13 design results (Building code - EC3):

Cross-section [cm]
[HE 240 B], h = 24.00, b = 24.00, tw = 1.00, tf = 1.70, r = 2.10

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

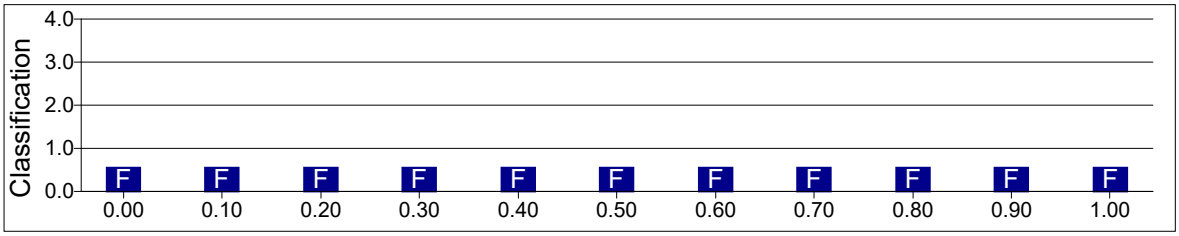
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

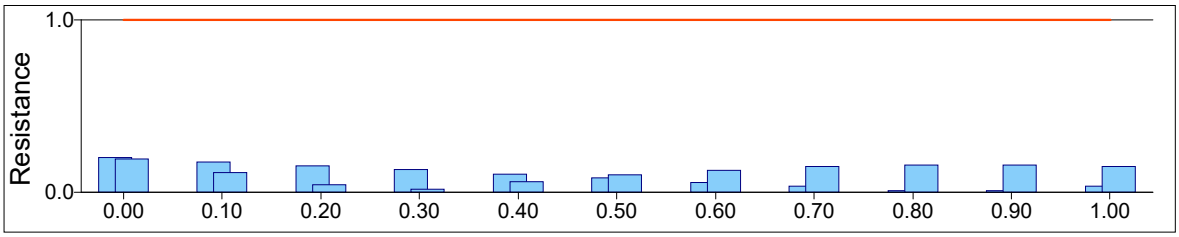
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.198 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 14 design results (Building code - EC3):

Cross-section [cm]
[HE 240 B], h = 24.00, b = 24.00, tw = 1.00, tf = 1.70, r = 2.10

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

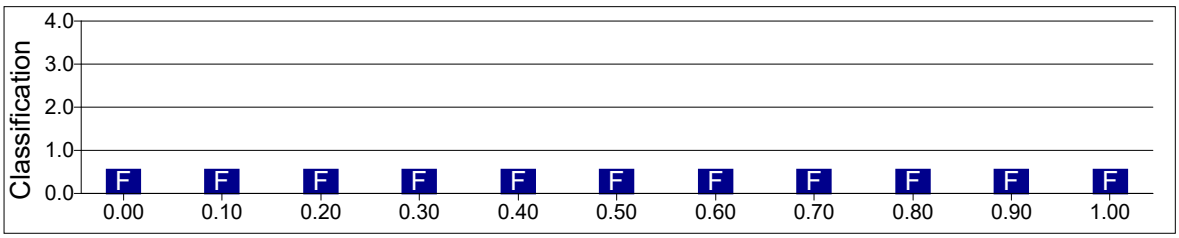
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

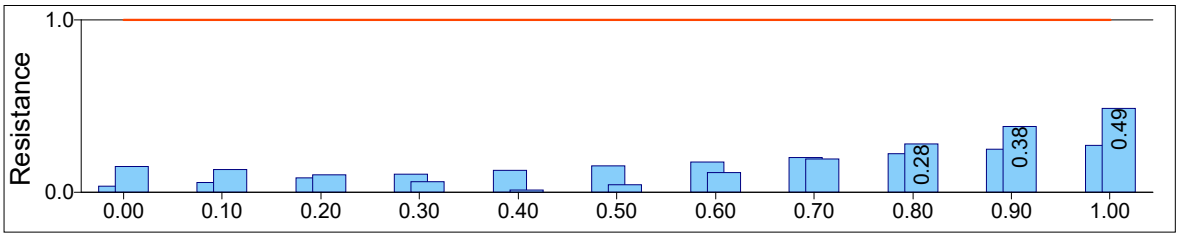
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.449 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 15 design results (Building code - EC3):

Cross-section [cm]
[HE 240 B], h = 24.00, b = 24.00, tw = 1.00, tf = 1.70, r = 2.10

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

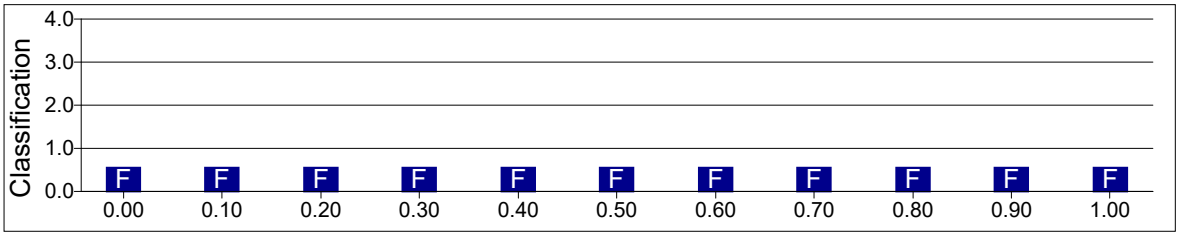
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

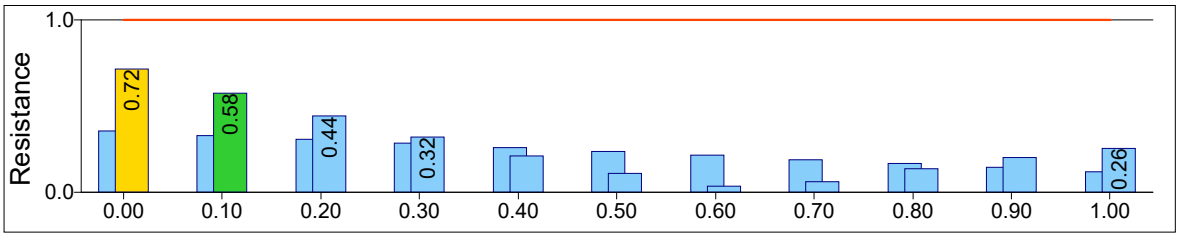
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.662 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 16 design results (Building code - EC3):

Cross-section [cm]
[HE 240 B], h = 24.00, b = 24.00, tw = 1.00, tf = 1.70, r = 2.10

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

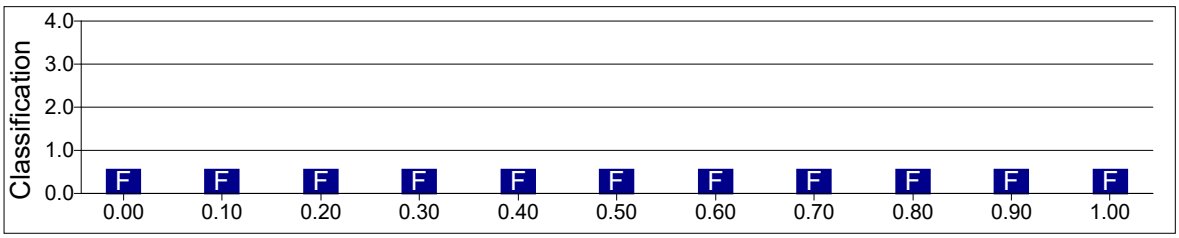
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

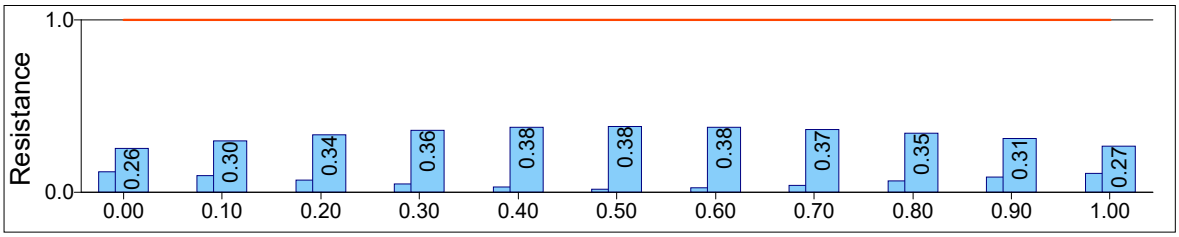
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.393 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 17 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

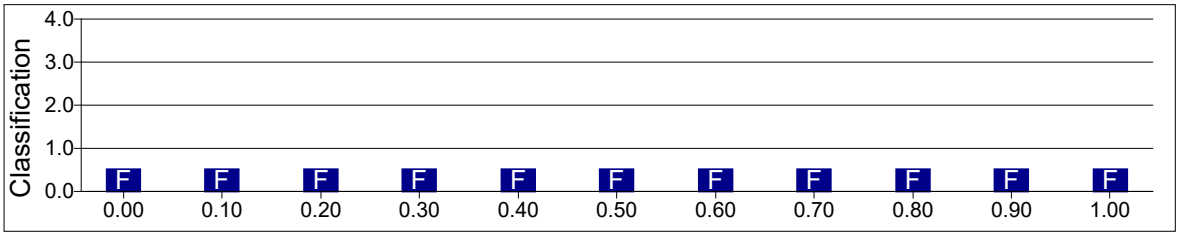
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

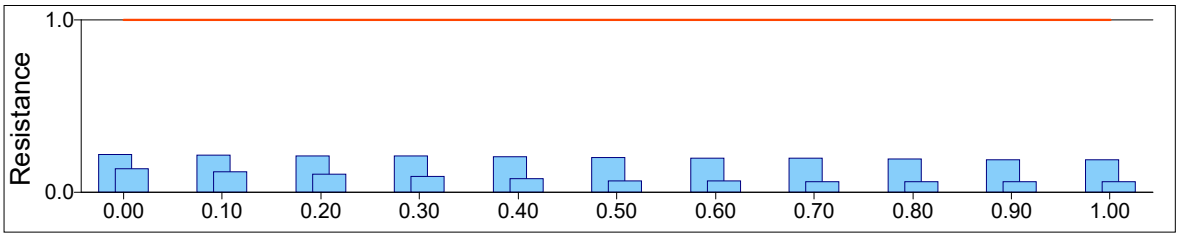
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.174 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 18 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

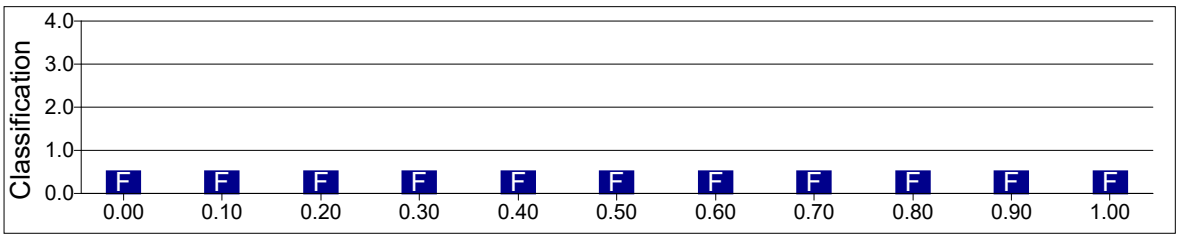
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

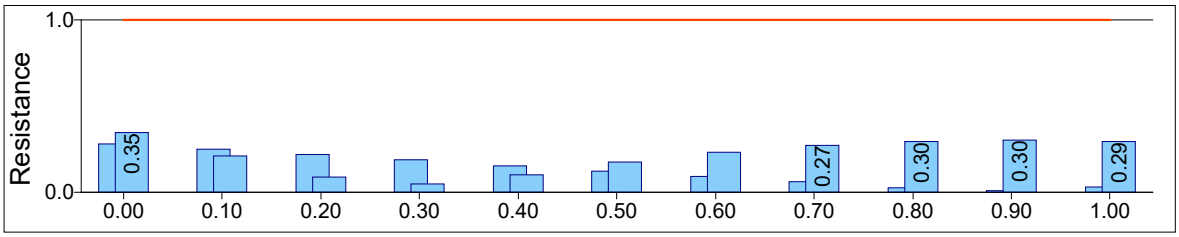
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.397 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 19 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

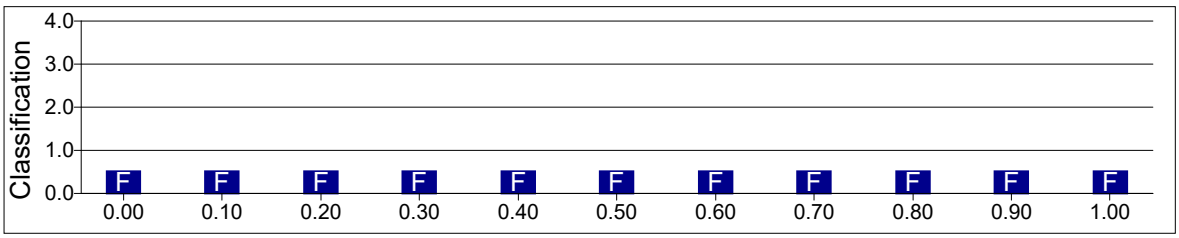
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

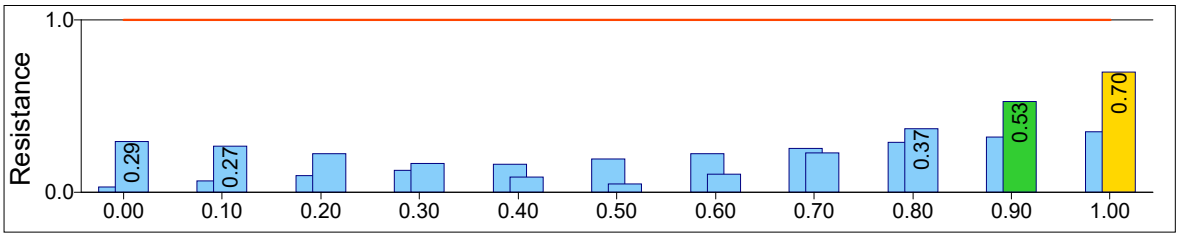
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and lateral-tolsional stability check [0.682 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 20 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

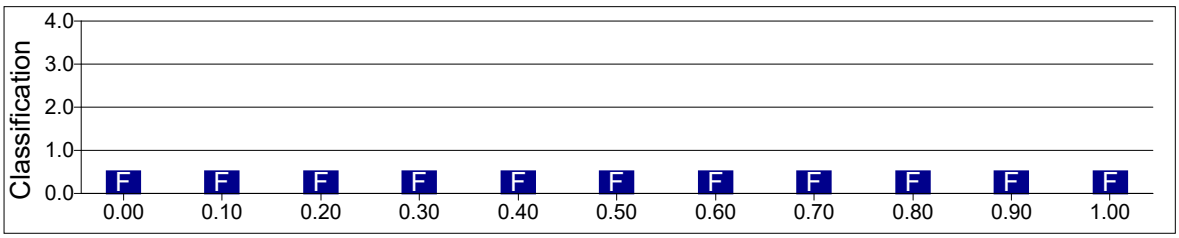
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

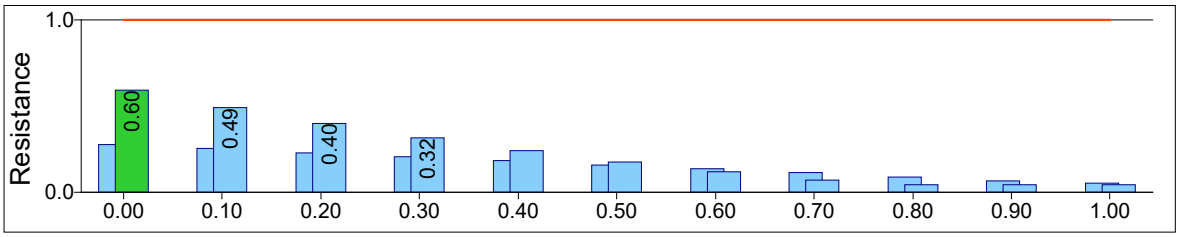
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and bending stability check [0.578 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 21 design results (Building code - EC3):

Cross-section [cm]
[180x180 x 12.5], h = 18.00, b = 18.00, t = 1.25, r = 1.76

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

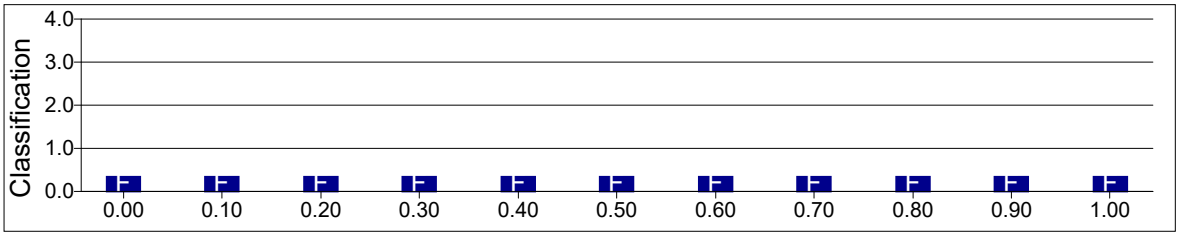
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

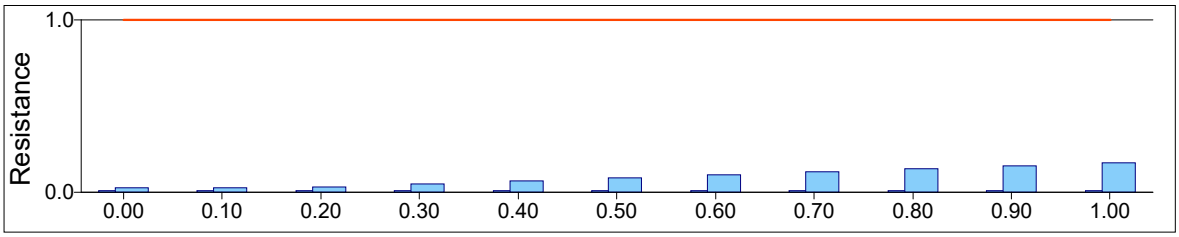
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and bending stability check [0.116 <= 1.0] in load case '[US] Load case: 4'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 22 design results (Building code - EC3):

Cross-section [cm]
[HE 200 B], h = 20.00, b = 20.00, tw = 0.90, tf = 1.50, r = 1.80

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

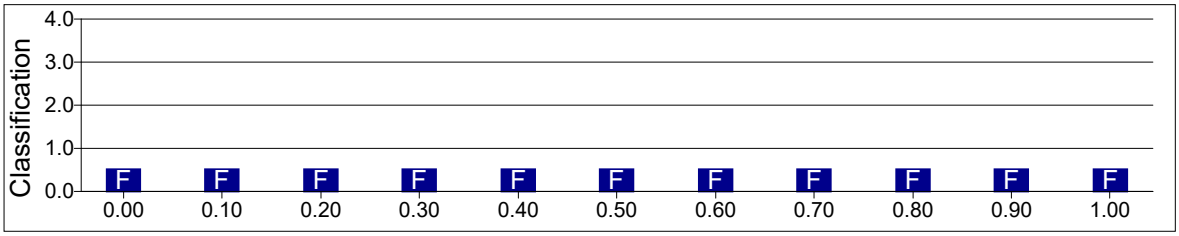
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

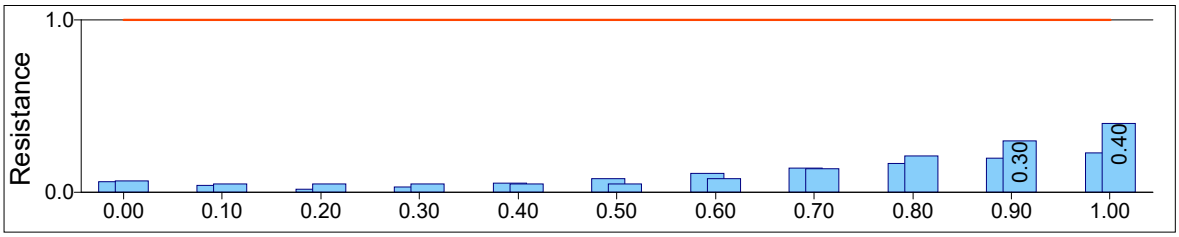
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



Element was classified into class 1. All stability checks have passed. The compentent check is axial compression and bending stability check [0.423 <= 1.0] in load case '[U] Load case 1'.

Serviceability Limit States

Serviceability limit states were not calculated.

Element 23 design results (Building code - EC3):

Cross-section [cm]
[180x180 x 10], h = 18.00, b = 18.00, t = 1.00, r = 1.60

Element supports width:
left = 0.00 cm,
right = 0.00 cm

Steel: S 235

Supports and buckling fields around y axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

Supports and buckling fields around z axis

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

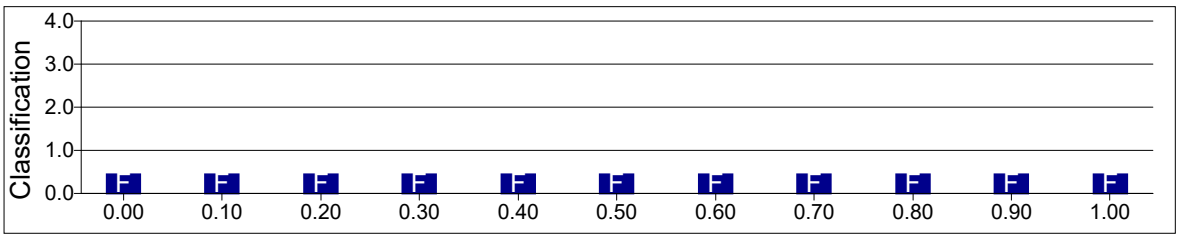
Lateral-torsional supports and buckling fields

Field	x start	x end	buckl. coeff.
1	0.000	1.000	1.000

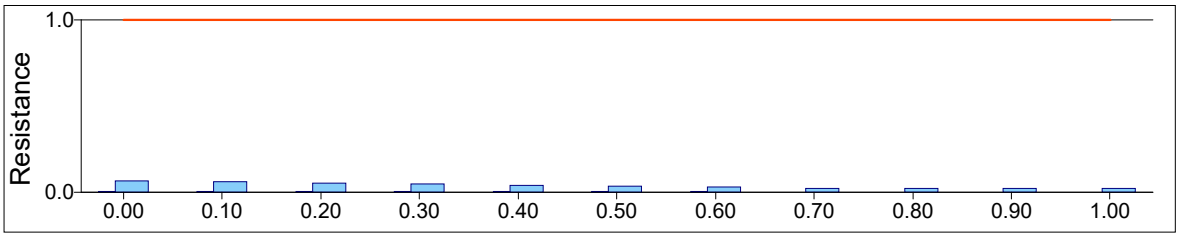
Relative load position used in LT calculation is -1.00 (unfavourable)

Ultimate Limit States

Cross-section classification



Cross-section resistance



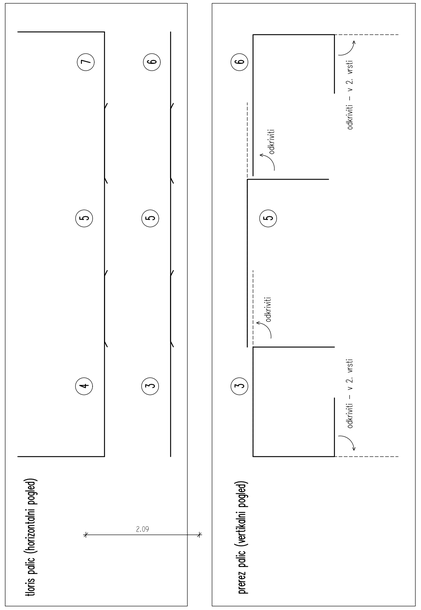
Element stability was not checked!

Serviceability Limit States

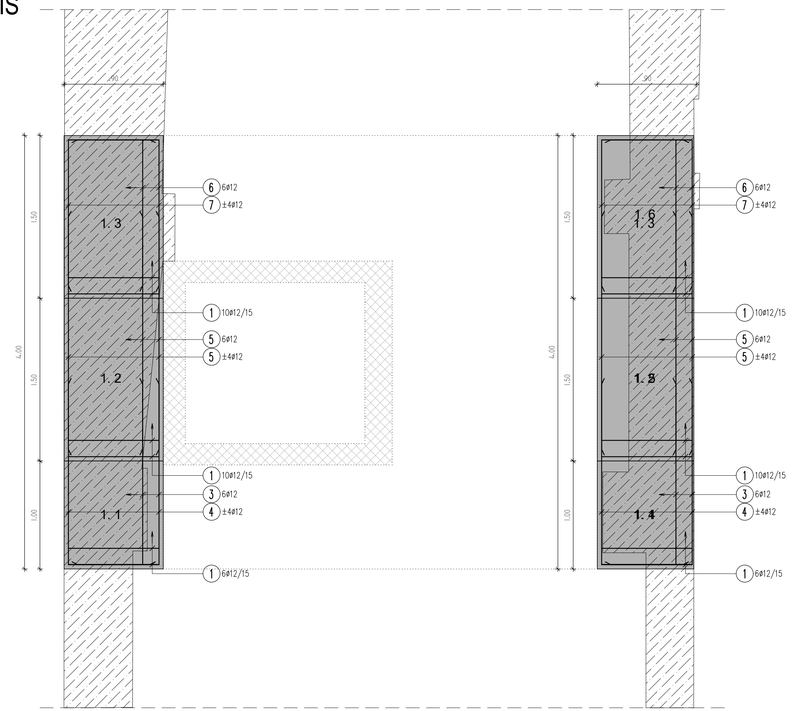
Serviceability limit states were not calculated.

PODBETONIRANJE PO KAMPADAH

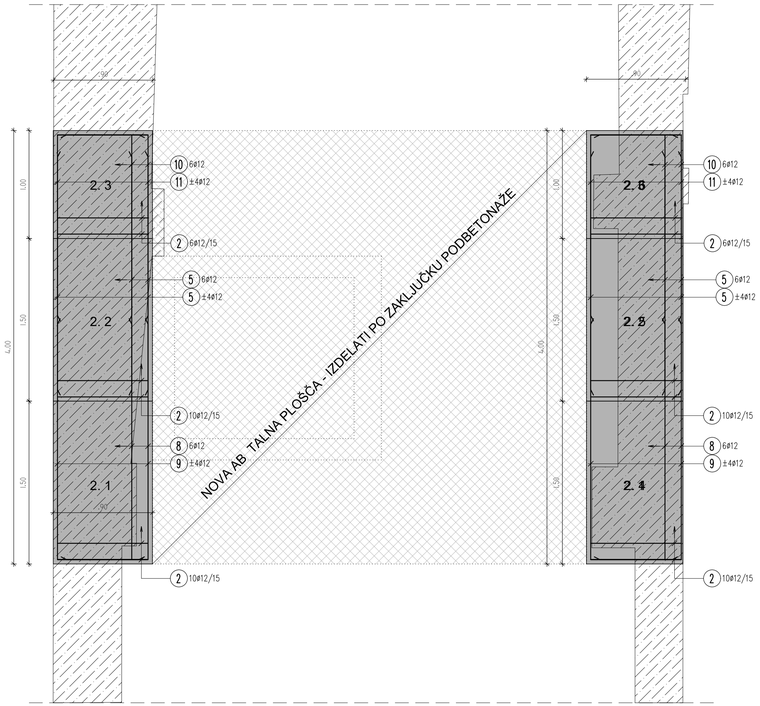
TLORIS



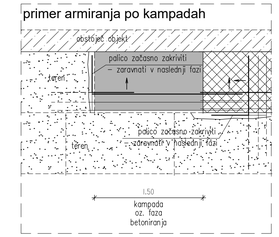
1. VRSTA



2. VRSTA

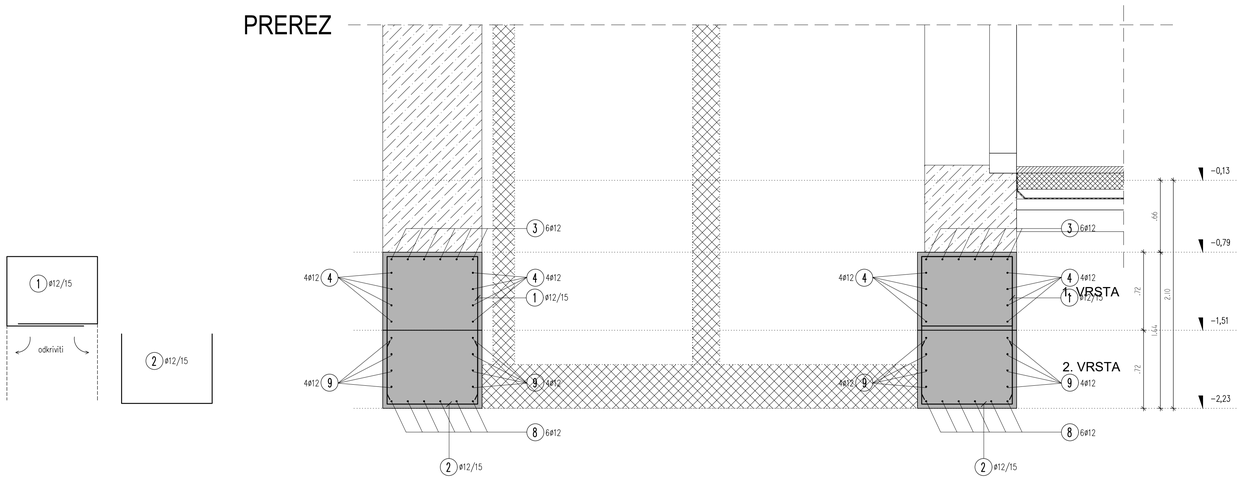


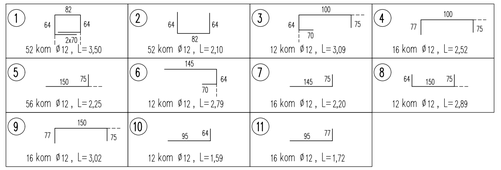
primer armiranja po kampadah



OPOMBA:
- VSO ARMATURO PRILAGODITI DEJANSKEMU STANJU IN MERAM OBJEKTA.

PREREZ





B 500 B - (rebrasta armatura)				SKUPAJ L (m) PO FROFILIH							
OZNAKA	KOSOV	⌀	L(m)	8	10	12	14	16	20	22	25
1	52	12	3,50			182,00					
2	52	12	2,10			109,20					
3	12	12	3,09			37,08					
4	16	12	2,52			40,32					
5	56	12	2,25			126,00					
6	12	12	2,79			33,48					
7	16	12	2,20			35,20					
8	12	12	2,89			34,68					
9	16	12	3,02			48,32					
10	12	12	1,59			19,08					
11	16	12	1,72			27,52					
Skupna dolžina po profilih (m):				0,00	0,00	692,88	0,00	0,00	0,00	0,00	0,00
Masa (kg/m):				0,405	0,633	0,911	1,240	1,620	2,531	3,062	3,955
Skupna masa po profilih:				0,00	0,00	631,30	0,00	0,00	0,00	0,00	0,00
Skupna masa ≤ ⌀12:						**631,30**					
Skupna masa > ⌀12:										**0,00**	
Skupna masa:											**631,30**

SKUPAJ:	**631,30**

ARMIRANOBETONSKE KONSTRUKCIJE

MASA ARMATURNIH PALIC
Masa armaturnih palic je povzeta po SIST EN 10080 (upoštevan nominalni premer palic). Dejanska masa je odvisna od proizvajalca armaturnega jekla in lahko odstopa od privzete v risbi.

MINIMALNI RADIJ KRIVLJENA REBRASTE ARMATURE

BETON (SIST EN 206-1)

KONSTRUKCIJSKI ELEMENT	TRDNOST	IZPOSTAVLJEN.	KLORIDI/ KONS.	VODO-TESNOST	VIDNI BETON	Dmax	KROVNI SLOJ [cm]		
							zunaj/ zgoraj	notr/ spodaj	bočno
PODLOŽNI BETON	C12/15	-	-	-	-	-	-	-	-
TEMELJNA PLOŠČA	C30/37	XC2	S4	PV-II	-	32	3,5	3,5	3,5
NOVO - STEBRI, STENE	C25/30	XC1	S4	-	-	32	3,0	3,0	3,0
NOVO - PLOŠČE, NOSILCI	C25/30	XC1	S4	-	-	32	3,0	3,0	3,0

ARMATURNO JEKLO - SIST EN 10080, SIST EN 1992-1-1

KONSTRUKCIJSKI ELEMENT	TRDNOST	RAZRED DUKTILNOSTI	f_{yk} [MPa]	f_{tk} / f_y	ε_{uk} [%]
ETAŽNE PLOŠČE	B500	B	500	≥1,08	≥5,0
TEMELJI, STENE, STEBRI, NOSILCI	B500	B	500	≥1,08	≥5,0

VIDNI ROBOVI POSNETI S TRIKOTNO LETVICO 2/2 CM.
IZVAJALEC MORA IZDELATI PROJEKT ZA IZVEDBO BETONSKIH KONSTRUKCIJ (PIBK).

IZVEDBENI RAZRED:
2. izvedbeni razred (EXC2) - izvedba betonskih konstrukcij v skladu s standardom SIST EN 13670.

SPLOŠNE OPOMBE
Ta načrt je potrebno brati skupaj s strojnim načrtom, elektro načrtom, načrtom arhitekture in ostalimi načrti gradbenih konstrukcij.
Ob bistvenem odstopanju od v projektu predvidenega stanja, mora izvajalec pred pričetkom del, v sodelovanju s projektantom preveriti in po potrebi dopolniti projektne rešitve.

Datum	Opis spremembe	Izdelal	Rev.

Projektant:
hiša niša
NAČRTOVANJE IN SVETOVANJE, D.O.O.
Verd 252, Vrhnika
hisa.nisa@gmail.com

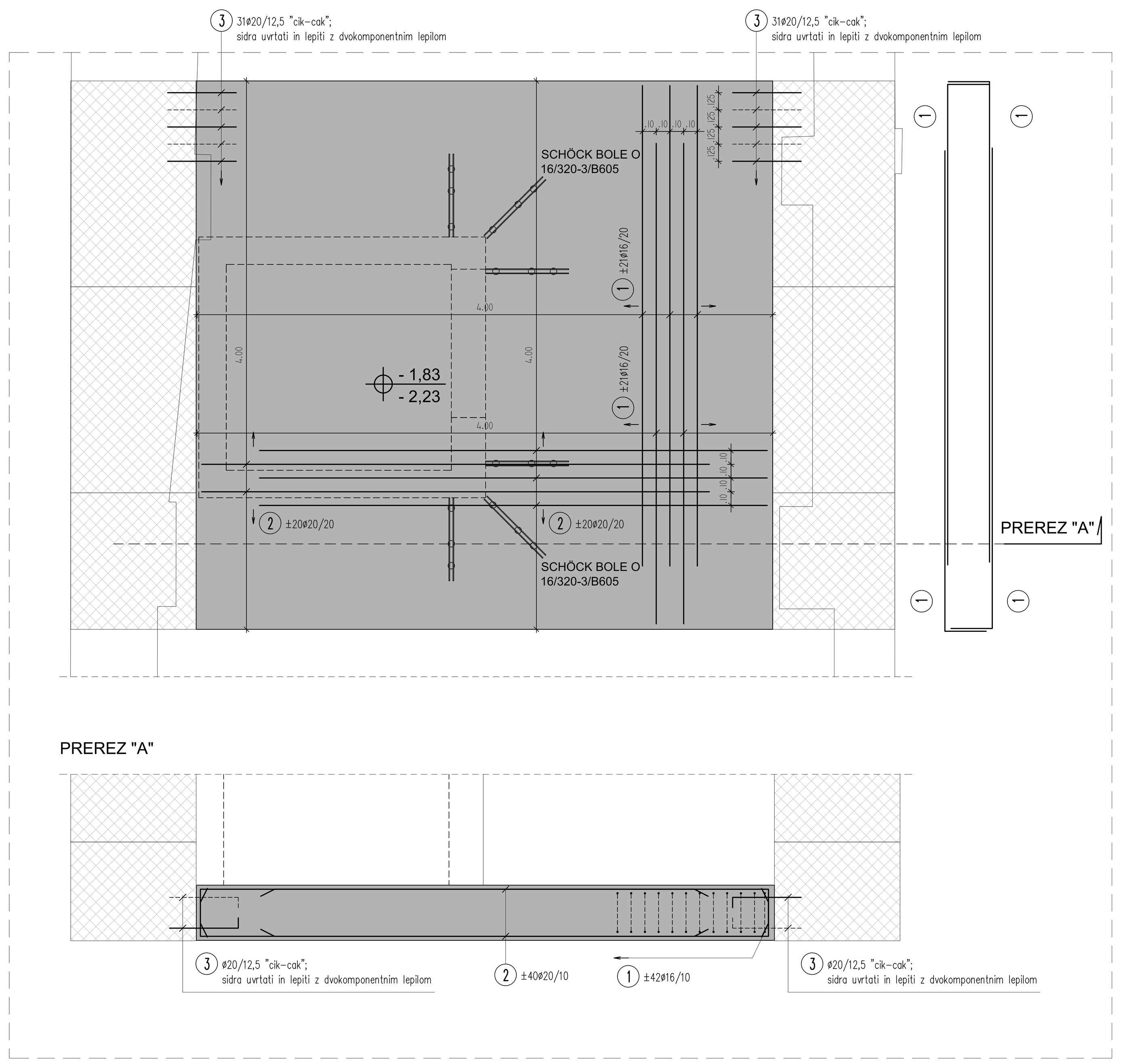
Investitor: ZRC SAZU
Novi trg 2, 1000 Ljubljana

odg.vodja projekta: Klara BOHINC, mag.inž.arh. ZAPS 2084
odg.projektant: mag. Tomaž HABIČ, univ.dipl.inž.grad. G-0332
obdelal: Nerina CEZAR, grad. teh.

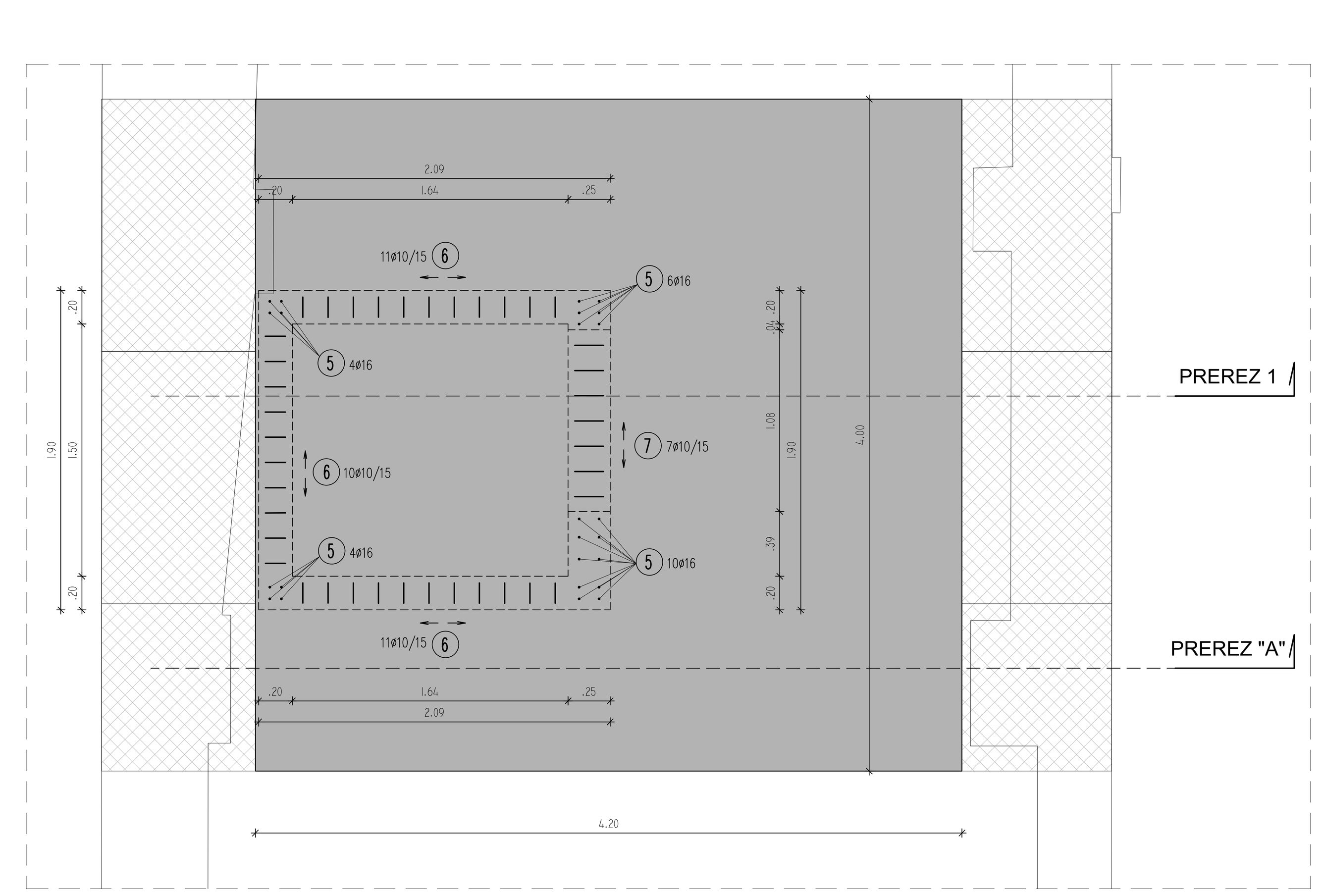
Objekt: ZRC SAZU
Vsebina: OPAŽNO-ARMATURNA RISBA: PODBETONIRANJE TEMELJEV

Vrsta načrta: 2 - NAČRT S PODROČJA GRADBENIŠTVA
Faza projekta: PZI
Merilo: 1:25
Št. projekta: 2023_20
Datum: marec 2025
Št. načrta: 2023_20_G
List: A-1

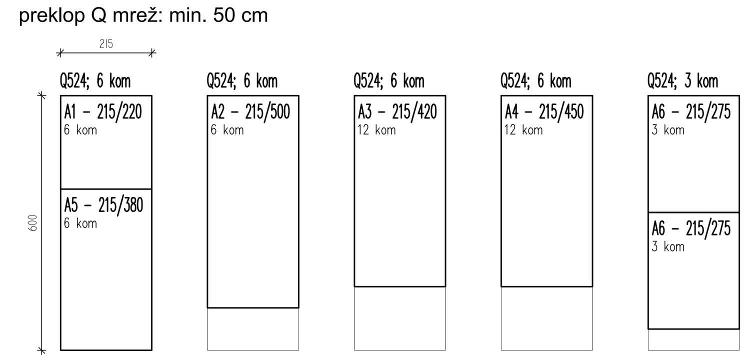
TLORIS temeljne plošče
m 1:25



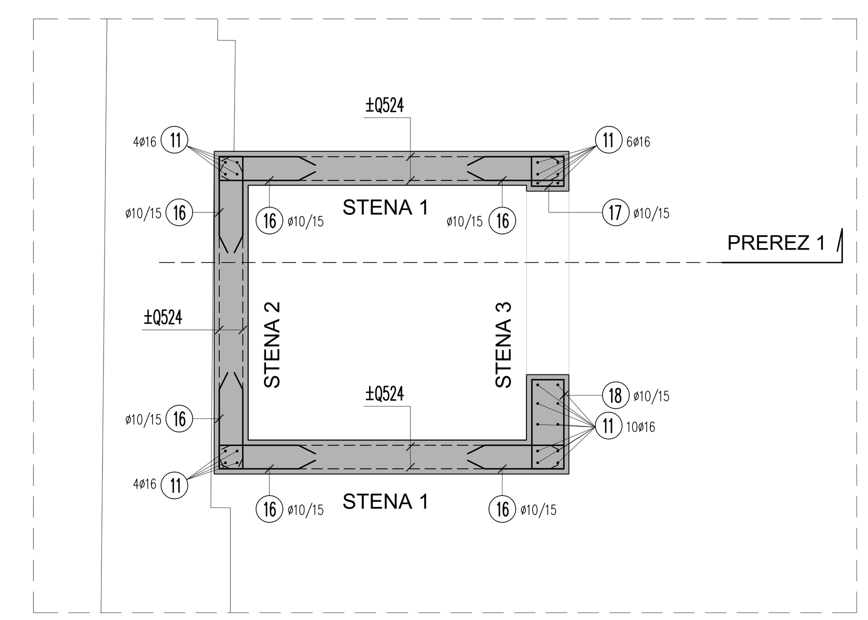
TLORIS temeljne plošče
m 1:25



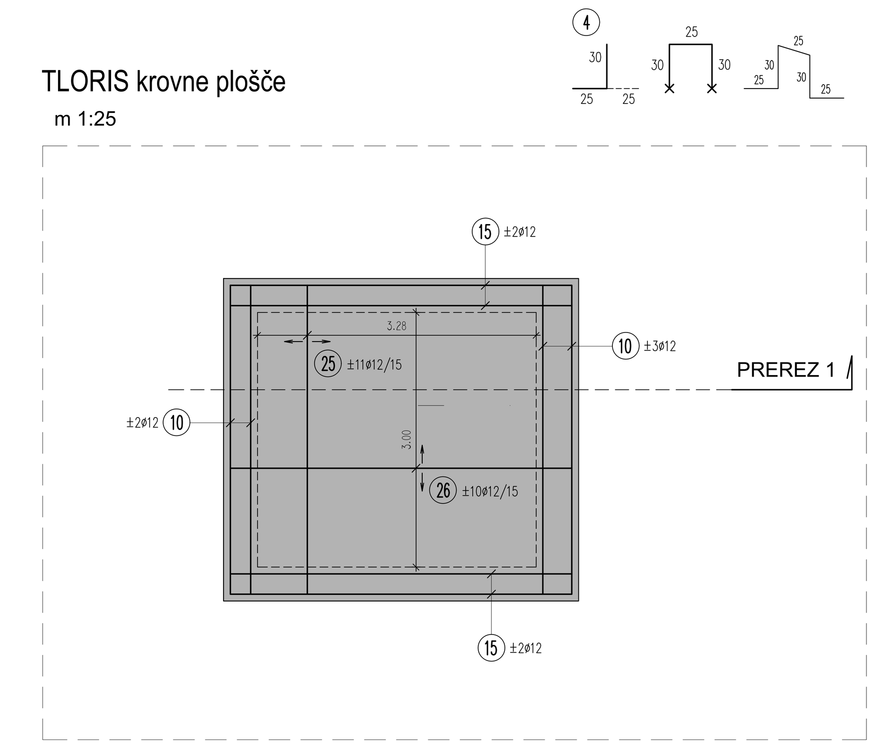
RAZREZ MREŽ
preklop Q mrež: min. 50 cm

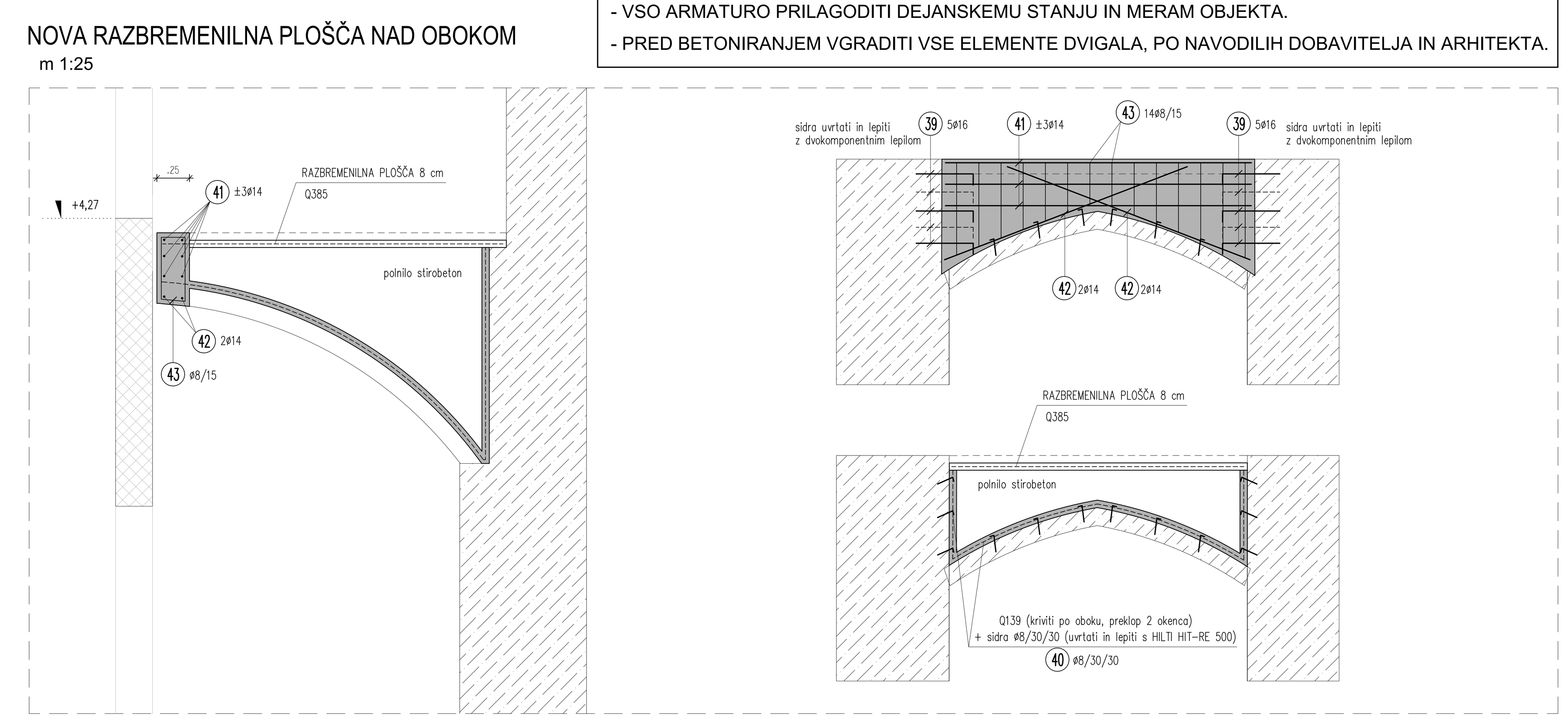


TLORIS sten v pritličju
m 1:25



TLORIS krovne plošče
m 1:25





OPOMBA:
- VSO ARMATURO PRILAGODITI DEJANSKEMU STANJU IN MERAM OBJEKTA.
- PRED BETONIRANJEM VGRADITI VSE ELEMENTE DVIGALA, PO NAVODILIH DOBAVITELJA IN ARHITEKTA.

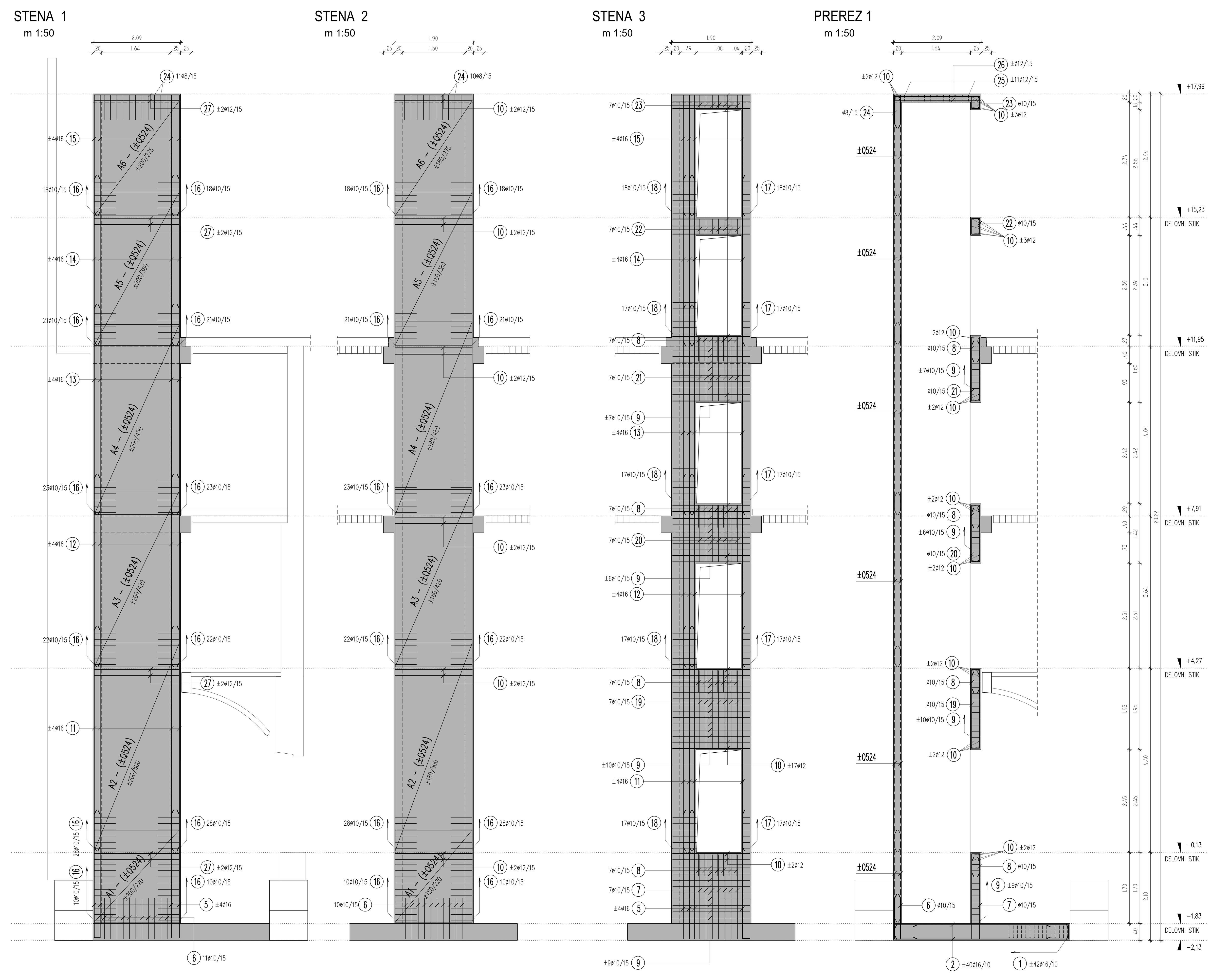
(1) 84 kom Ø16, L=3,80	(2) 80 kom Ø20, L=4,00	(3) 62 kom Ø20, L=0,80	(4) d. plošče 40 cm, 2 kom/m2; 8 kom Ø12, L=1,35
(5) 24 kom Ø16, L=3,50	(6) 32 kom Ø10, L=2,12	(7) 7 kom Ø10, L=4,17	(8) 28 kom Ø10, L=1,37
(9) 64 kom Ø10, L=2,68	(10) 62 kom Ø12, L=2,83	(11) 24 kom Ø16, L=5,40	(12) 24 kom Ø16, L=4,65
(13) 24 kom Ø16, L=5,05	(14) 24 kom Ø16, L=4,10	(15) 24 kom Ø16, L=3,05	(16) 738 kom Ø10, L=1,34
(17) 86 kom Ø10, L=1,04	(18) 86 kom Ø10, L=1,72	(19) 7 kom Ø10, L=3,95	(20) 7 kom Ø10, L=2,87
(21) 7 kom Ø10, L=3,25	(22) 7 kom Ø10, L=1,44	(23) 7 kom Ø10, L=1,32	(24) 32 kom Ø8, L=1,32
(25) 22 kom Ø12, L=2,77	(26) 20 kom Ø12, L=2,94	(27) 32 kom Ø12, L=2,96	(28) 88 kom Ø14, L=2,50
(29) 52 kom Ø14, L=2,06	(30) 36 kom Ø12, L=2,65	(31) 24 kom Ø14, L=2,66	(32) 18 kom Ø12, L=2,70
(33) 16 kom Ø10, L=2,82	(34) 8 kom Ø10, L=2,87	(35) stena 20cm, 2 kom/m2; 28 kom Ø10, L=0,26	(36) stena 25cm, 2 kom/m2; 14 kom Ø10, L=0,31
(37) 14 kom Ø14, L=1,50	(38) 14 kom Ø14, L=1,35	(39) 69 kom Ø14, L=2,40	(40) 200 kom Ø8, L=0,30
(41) 6 kom Ø14, L=2,10	(42) 4 kom Ø14, L=1,80	(43) izdelati na licu mesta; 14 kom Ø8, L=1,72	(44) stena 20cm, 2 kom/m2; 210 kom Ø8, L=0,26
(45) stena 25cm, 2 kom/m2; 40 kom Ø8, L=0,31	A MAG Q524; 27 kom; 215/600	B MAG Q139; 2 kom; 215/600	C MAG Q385; 2 kom; 215/600

B 500 B - (rebrasta armatura)				SKUPAJ L (m) PO PROFILIH							
OZNAKA	KOSOV	Φ	L(m)	8	10	12	14	16	20	22	25
1	84	16	3.80					319.20			
2	80	20	4.00						320.00		
3	62	20	0.80						49.60		
4	8	12	1.35			10.80					
5	24	16	3.50					84.00			
6	32	10	2.12		67.84						
7	7	10	4.17		29.19						
8	28	10	1.37		38.36						
9	64	10	2.68		171.52						
10	62	12	2.83			175.46					
11	24	16	5.40					129.60			
12	24	16	4.65					111.60			
13	24	16	5.05					121.20			
14	24	16	4.10					98.40			
15	24	16	3.05					73.20			
16	738	10	1.34		988.92						
17	86	10	1.04		89.44						
18	86	10	1.72		147.92						
19	7	10	3.95		27.65						
20	7	10	2.87		20.09						
21	7	10	3.25		22.75						
22	7	10	1.44		10.08						
23	7	10	1.32		9.24						
24	32	8	1.32	42.24							
25	22	12	2.77			60.94					
26	20	12	2.94			58.80					
27	32	12	2.96			94.72					
28	88	14	2.50				220.00				
29	52	14	2.06				107.12				
30	36	12	2.65			95.40					
31	24	14	2.66				63.84				
32	18	12	2.70			48.60					
33	16	10	2.82		45.12						
34	8	10	2.87		22.96						
35	28	10	0.26		7.28						
36	14	10	0.31		4.34						
37	14	14	1.50				21.00				
38	14	14	1.35				18.90				
39	69	14	2.40				165.60				
40	200	8	0.30	60.00							
41	6	14	2.10				12.60				
42	4	14	1.80				7.20				
43	14	8	1.72	24.08							
44	210	8	0.25	52.50							
45	40	8	0.31	12.40							
Skupna dolžina po profilih (m):				191.22	1702.70	544.72	616.26	937.20	369.60	0.00	0.00
Masa (kg/m):				0.405	0.633	0.911	1.240	1.620	2.531	3.062	3.955
Skupna masa po profilih:				77.43	1,077.34	496.30	764.25	1,518.05	935.42	0.00	0.00
Skupna masa ≤ ø12:					1,651.07						
Skupna masa > ø12:									3,217.71		
Skupna masa:											4,868.78

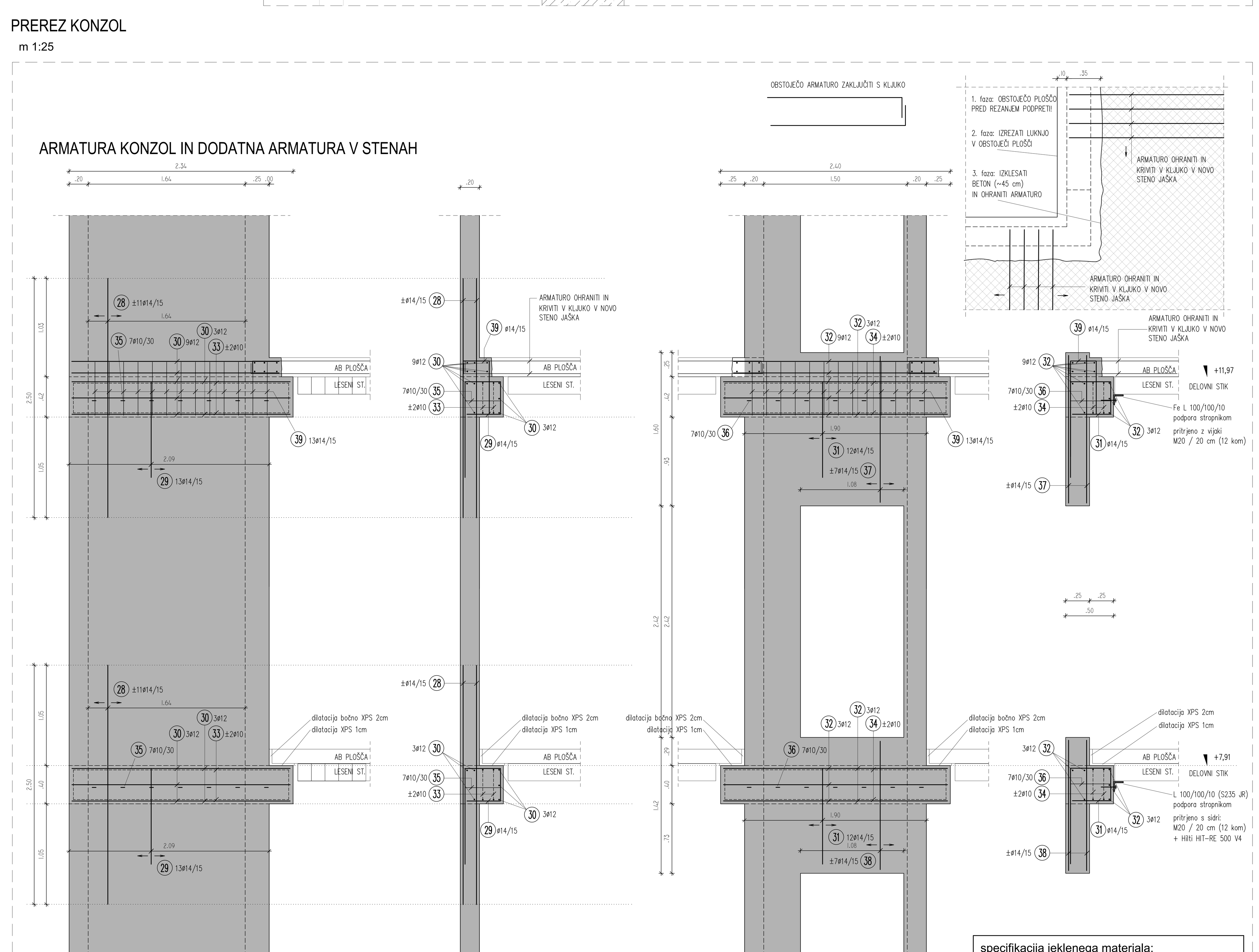
MREŽE:						
št.mreže	tip	dim.	kom.	m2	kg/m2	kg
A	Q524	215/600	27	348.30	8.418	2,931.99
B	Q139	215/600	2	25.80	1.838	47.42
C	Q385	215/600	2	25.80	6.11	157.64
			Skupna masa:			3,137.05

PALICE + MREŽE:
SKUPAJ: 8,005.83

STENA 1 / STENA 2 / STENA 3 / PREREZ 1
m 1:50



PREREZ KONZOL
m 1:25



specifikacija jeklenega materiala:
- L (100/100/10); 2x 2,40m; 71,60 kg (S235 JR)
- sidra M20; 24 kom

ARMIRANOBETONSKE KONSTRUKCIJE

MASA ARMATURNIH PALIC
Masa armaturnih palic je povzeta po SIST EN 10080 (upoštevan nominalni premer palic). Dejanska masa je odvisna od proizvajalca armaturnega jekla in lahko odstopa od privzete v risbi.

MINIMALNI RADIJ KRIVLJENJA REBRASTE ARMATURE
R1 diam.: 15Ø; R2 Ø palice [mm] ≤16 diam.: 4Ø; >16 diam.: 7Ø

BETON (SIST EN 206-1)

KONSTRUKCIJSKI ELEMENT	TRDNOST	IZPOSTAVLJEN.	KLORIDI/KONS.	VODO-TESNOST	VIDNI BETON	D_{max}	KROVNI SLOJ [cm] zunaj/zgoraj	notri/spodaj	bočno
PODLOŽNI BETON	C12/15	-	-	-	-	-	-	-	-
TEMELJNA PLOŠČA	C30/37	XC2	S4	PV-II	-	32	3,5	3,5	3,5
NOVO - STEBRI, STENE	C25/30	XC1	S4	-	-	32	3,0	3,0	3,0
NOVO - PLOŠČE, NOSILCI	C25/30	XC1	S4	-	-	32	3,0	3,0	3,0

ARMATURNO JEKLO - SIST EN 10080, SIST EN 1992-1-1

KONSTRUKCIJSKI ELEMENT	TRDNOST	RAZRED DUKTILNOSTI	f_{yk} [MPa]	f_{tk}/f_{yk}	ε_{uk} [%]
ETAŽNE PLOŠČE	B500	B	500	≥1,08	≥5,0
TEMELJI, STENE, STEBRI, NOSILCI	B500	B	500	≥1,08	≥5,0

VIDNI ROBOVI POSNETI S TRIKOTNO LETVICO 2/2 CM.
IZVAJALEC MORA IZDELATI PROJEKT ZA IZVEDBO BETONSKIH KONSTRUKCIJ (PIBK).

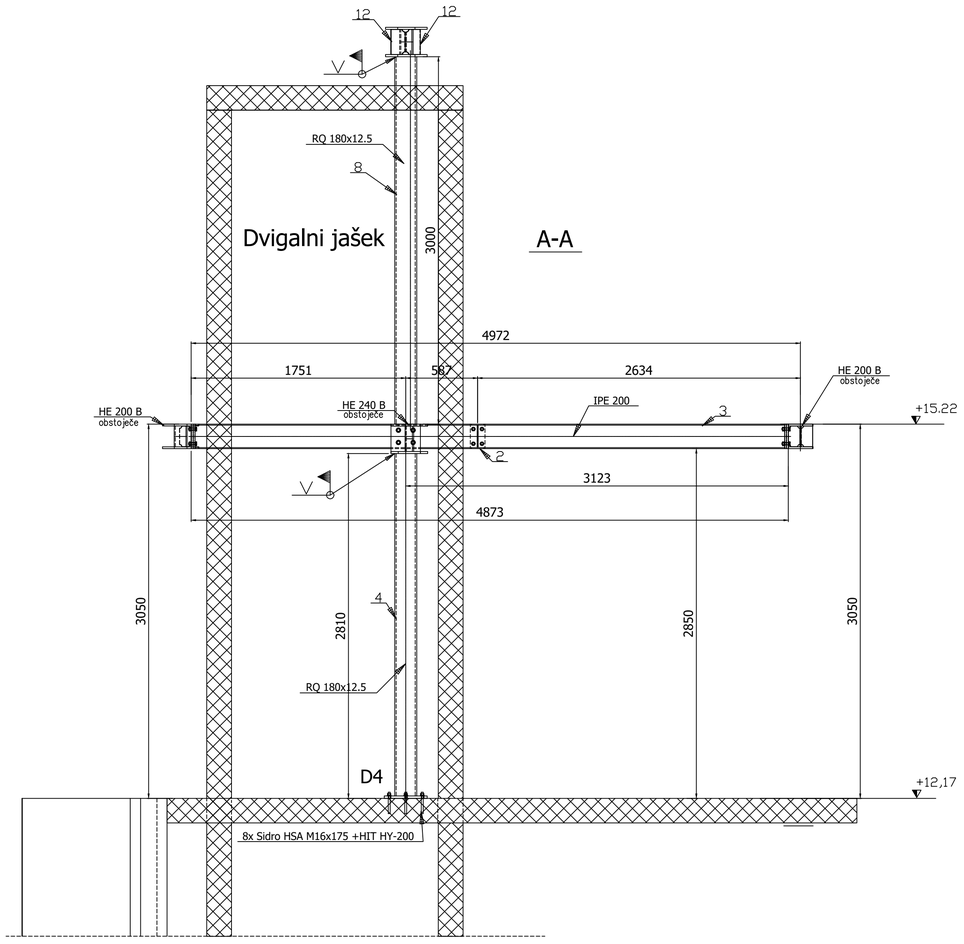
IZVEDBENI RAZRED:
2. izvedbeni razred (EXC2) - izvedba betonskih konstrukcij v skladu s standardom SIST EN 13670.

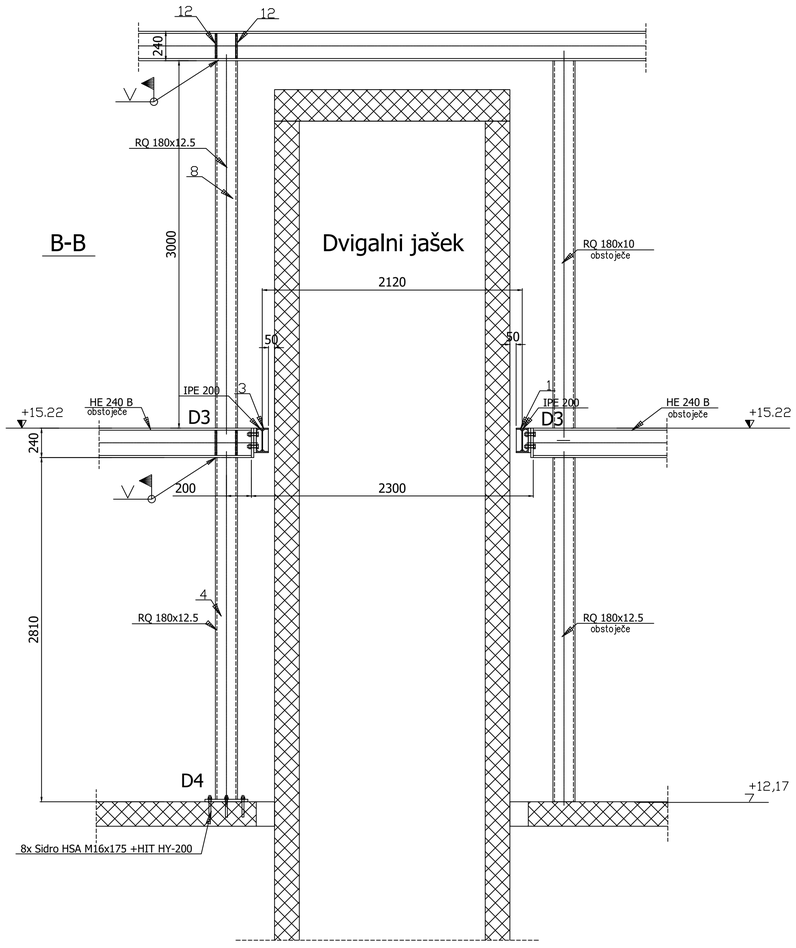
SPLOŠNE OPOMBE
Ta načrt je potrebno brati skupaj s strojnim načrtom, elektro načrtom, načrtom arhitekture in ostalimi načrti gradbenih konstrukcij.
Ob bistvenem odstopanju od v projektu predvidenega stanja, mora izvajalec pred pričetkom del, v sodelovanju s projektantom preveriti in po potrebi dopolniti projektne rešitve.

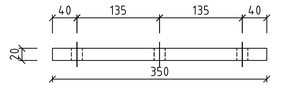
Datum	Opis spremembe	Izdelal	Rev.

Projektant: hiša niša, NAČRTOVANJE IN SVETOVANJE, D.O.O., Verd 252, Vrhnika, hisa.nisa@gmail.com
Investitor: ZRC SAZU, Novi trg 2, 1000 Ljubljana
odg.vodja projekta: Klara BOHINC, mag.inž.arh., ZAPS 2084
odg. projektant: mag. Tomaž HABIČ, univ.dipl.inž.grad., G-0332
obdelal: Nerina CEZAR, grad. teh.

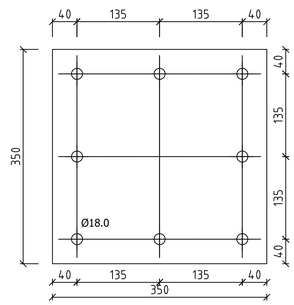
Objekt:	ZRC SAZU
Vsebina:	OPAŽNO-ARMATURNA RISBA: DVIGALNI JAŠEK
Vrsta načrta:	2 - NAČRT S PODROČJA GRADBENIŠTVA
Faza projekta:	PZI
Merilo:	1:50, 1:25
Št. projekta:	2023_20
Datum:	marec 2025
Št. načrta:	2023_20_G
List:	A-2



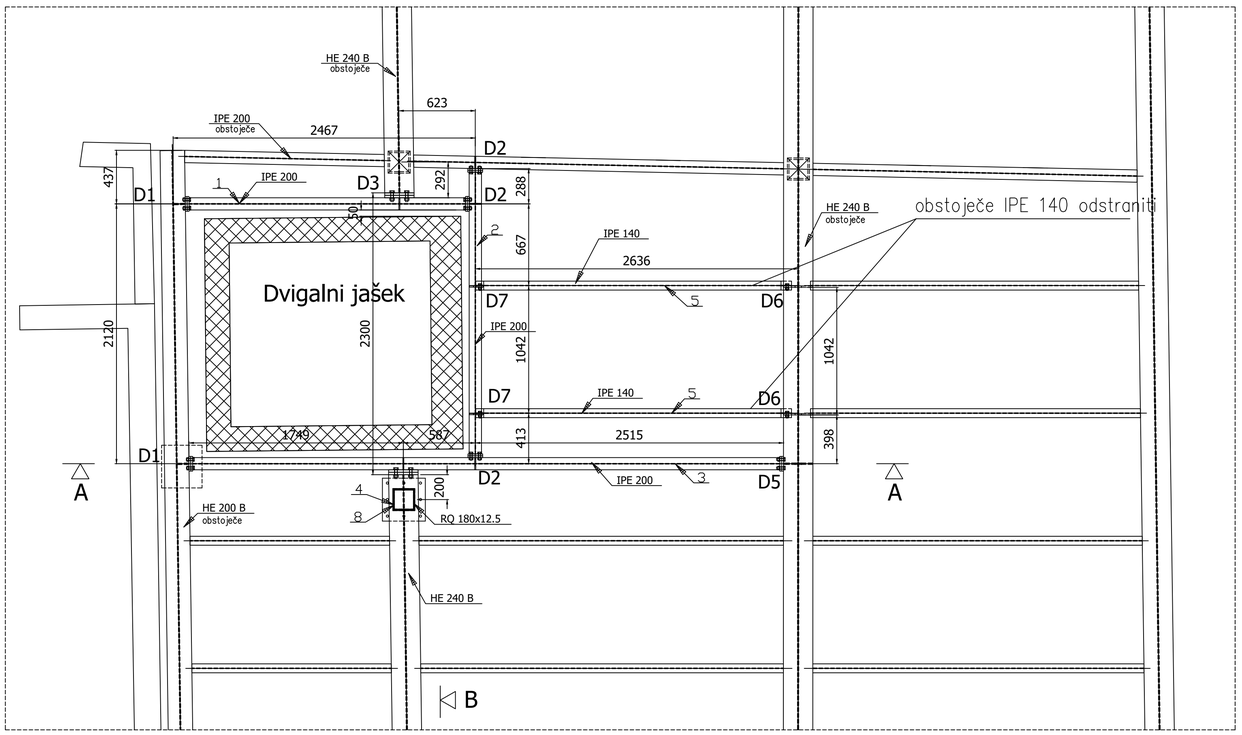




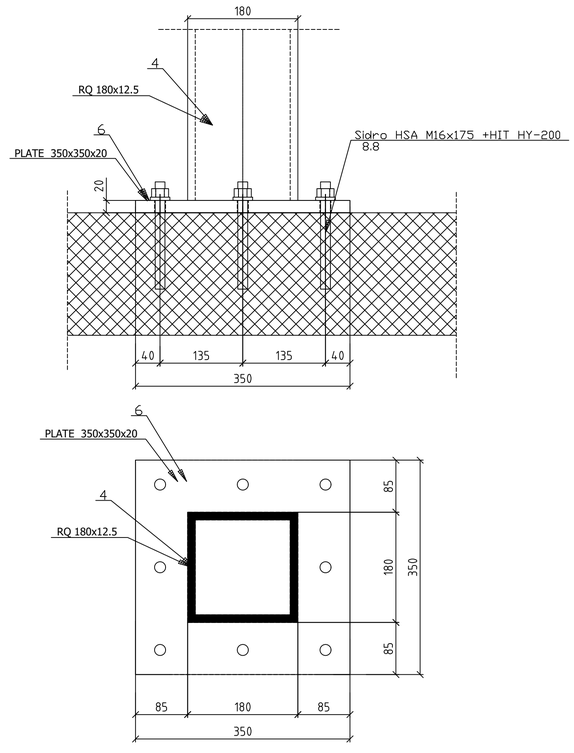
Pos. 6 (Sc1:5) (1 x)



B Nova jeklena konstrukcija-tloris



D4



OPOMBE:

- mere kontrolirati in po potrebi prilagoditi pri montaži na terenu
- pri izdelavi jeklene konstr. upoštevati tudi ostalo projektno dok. (arhitekturni načrti, načrti temeljenja, gradbeni načrti)
- izdelava in montaža nosilne jeklene konstrukcije mora biti v skladu z SIST EN 1090-2 : 2008
- Vsi sočelni zvari K, ▽, ▽....morajo biti izvedeni s prevaritvijo korena
- Varilne deformacije predvidi izvajalec
- vsi neoznačeni zvari so a=0,7 x tmin (tmin = tanjša pločevina v spoju)
- vsi neoznačeni zvari pri obojestranskem varjenju so a=0,5 x tmin (tmin = tanjša pločevina v spoju)

- Izvedbeni razred EXC2
- Konstrukcijsko jeklo S235 JR
- vijaki HV 10.9 K1 po SIST EN 14399-4
  - vse vijačne zveze izvesti z dvema podložkama 10.9
  - vse vijačne zveze prednapeti s 50% polne sile predna (50% Fp)
- vijaki 8.8 po SIST EN 15048-1
  - vse vijačne zveze izvesti z dvema podložkama 8.8
  - vse vijačne zveze čvrsto pritegniti
- Zagotoviti podpiranje obstoječe konstrukcije pred začetkom del
- Poskrbeti za požarno varnost

Pred izdelavo izvesti izmere obstoječega stanja in na podlagi izmer izdelati delavniško dokumentacijo.

Projektant:
n i š a n i š a
NAČRTOVANJE IN SVETOVANJE, D.O.O.
Verd 252, Vrhnika
nisa.nisa@gmail.com

Objekt: ZRC SAZU - dvigalo

Vsebina: Nova jeklena konstrukcija na koti +15,22m Tloris, Prerezi

Investitor: ZRC SAZU, Novi trg 2, 1000 Ljubljana

vodja projekta: Klara Bohinc m.i.a ZAPS-2084 PA

pooblaščeni inženir: mag. inž. arh. mag. Tomaž HABIČ G-0332 univ.dipl.inž.grad.

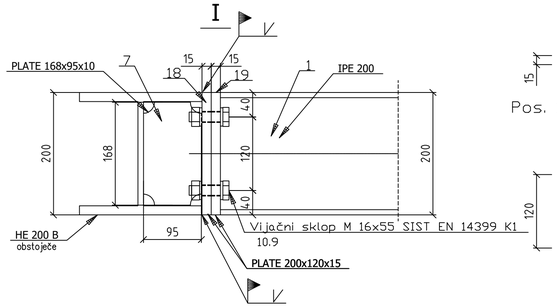
obdelal: Predrag Mijanović univ.dipl. inž. str.

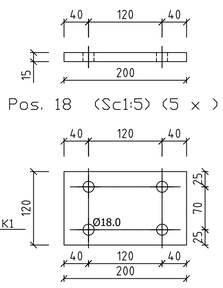
Vrsta načrta: 2 - NAČRT GRADBENIH KONSTRUKCIJ

Faza projekta: PZI Merilo: 1:25

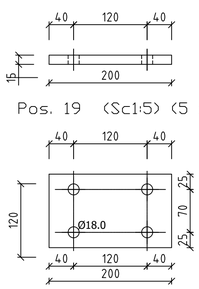
Št. projekta: 2023-20 Datum: marec 2025

Št. načrta: 2023-20-G List: J-1

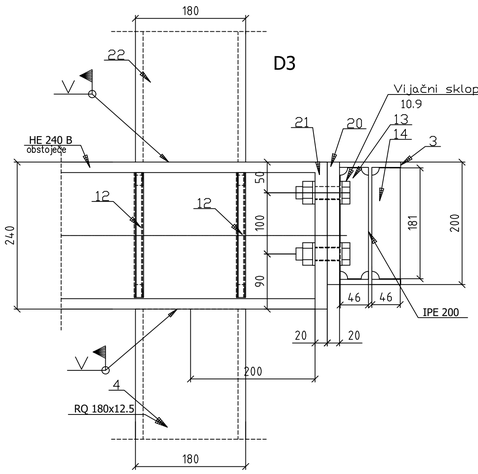


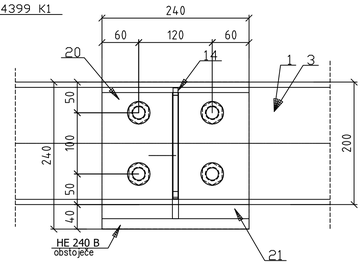


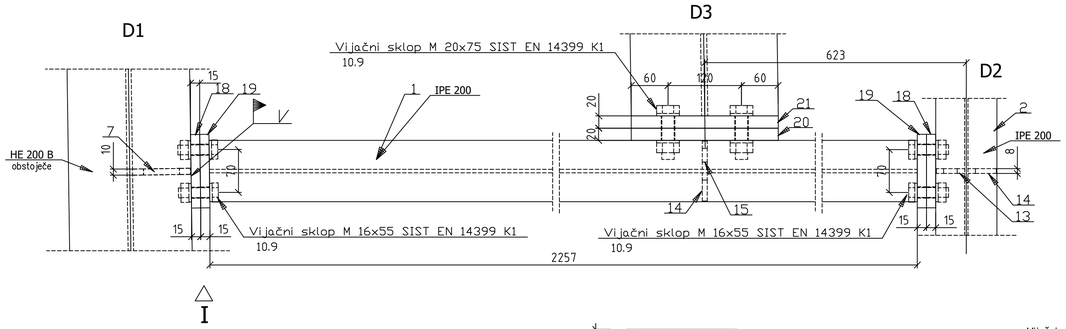
Pos. 18 (Sc1:5) (5 x)

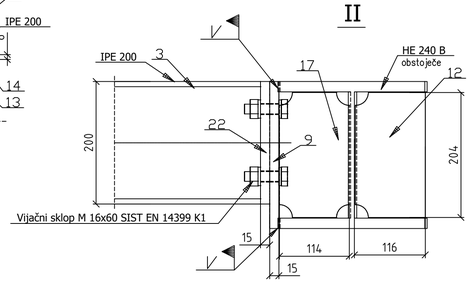


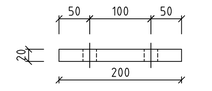
Pos. 19 (Sc1:5) (5 x)



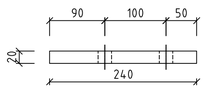




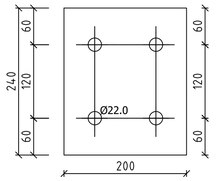


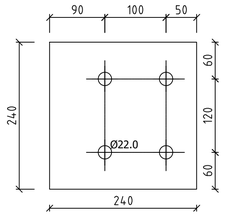


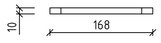
Pos. 20 (Sc1:5) (2 x)



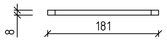
Pos. 21 (Sc1:5) (2 x)



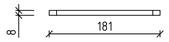




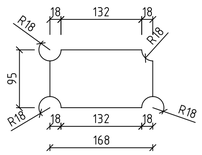
Pos. 7 (Sc1:5) (4 x)

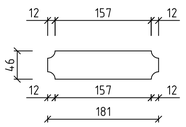


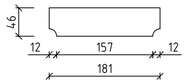
Pos. 13 (Sc1:5) (2 x)

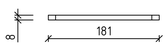


Pos. 14 (Sc1:5) (5 x)

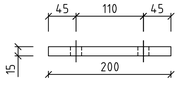




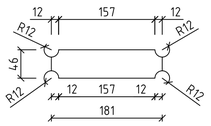


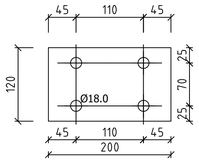


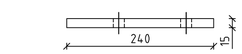
Pos. 15 (Sc1:5) (3 x)



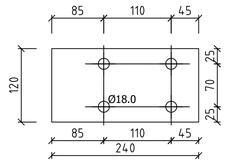
Pos. 22 (Sc1:5) (1 x)

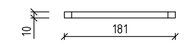




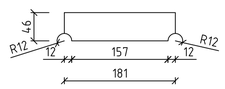


Pos. 9 (Sc1:5) (1 x)



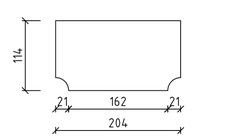


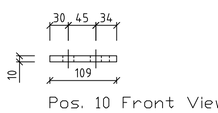
Pos. 11 (Sc1:5) (2 x)



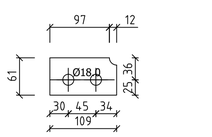


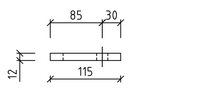
Pos. 12 Front View (Sc1:5) (11 x)



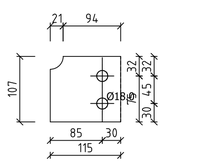


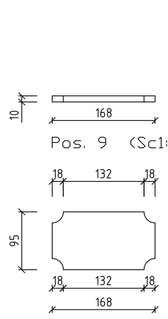
Pos. 10 Front View (Sc1:5) (2 x)





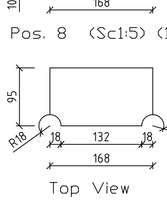
Pos. 16 Front View (Sc1:5) (2 x)





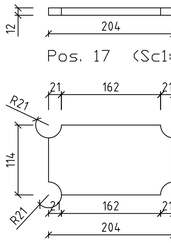
Top View

Pos. 9 (Sc1:5) (1 x)



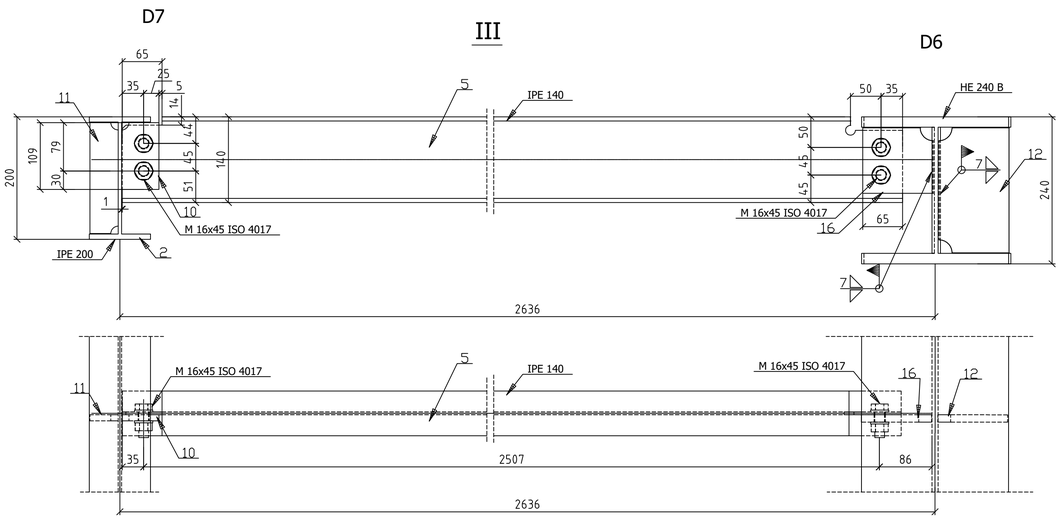
Pos. 8 (Sc1:5) (1 x)

Top View



Pos. 17 (Sc1:5) (1 x)

Top View



OPOMBE:

- mere kontrolirati in po potrebi prilagoditi pri montaži na terenu
- pri izdelavi jeklene konstr. upoštevati tudi ostalo projektno dok. (arhitekturni načrti, načrti temeljenja, gradbeni načrti)
- izdelava in montaža nosilne jeklene konstrukcije mora biti v skladu z SIST EN 1090-2 : 2008
- Vsi sočelni zvari K, ▽, ▽....morajo biti izvedeni s prevaritvijo korena
- Varilne deformacije predvidi izvajalec
- vsi neoznačeni zvari so a=0,7 x tmin (tmin = tanjša pločevina v spoju)
- vsi neoznačeni zvari pri obojestranskem varjenju so a=0,5 x tmin (tmin = tanjša pločevina v spoju)

- Izvedbeni razred EXC2
- Konstrukcijsko jeklo S235 JR
- vijaki HV 10.9 K1 po SIST EN 14399-4
  - vse vijačne zveze izvesti z dvema podložkama 10.9
  - vse vijačne zveze prednapeti s 50% polne sile predna (50% Fp)
- vijaki 8.8 po SIST EN 15048-1
  - vse vijačne zveze izvesti z dvema podložkama 8.8
  - vse vijačne zveze čvrsto pritegniti
- Zagotoviti podpiranje obstoječe konstrukcije pred začetkom del
- Poskrbeti za požarno varnost

Pred izdelavo izvesti izmere obstoječega stanja in na podlagi izmer izdelati delavniško dokumentacijo.

NAČRTOVANJE SVETOVANJE

Projektant:
hiša niša
NAČRTOVANJE IN SVETOVANJE, D.O.O.
Verd 252, Vrhnika
hisa.nisa@gmail.com

Investitor: ZRC SAZU
Novi trg 2, 1000 Ljubljana

vodja projekta: Klara Bohinc m.i.a ZAPS-2084 PA

pooblaščeni inženir: mag. inž. arh. mag. Tomaž HABIČ univ.dipl.inž.grad. G-0332

obdelal: Predrag Mijanović univ.dipl. inž. str.

Objekt: ZRC SAZU - dvigalo

Vsebina: Nova jeklena konstrukcija na koti +15,22m
Detajli, Polčevine

Vrsta načrta: 2 - NAČRT GRADBENIH KONSTRUKCIJ

Faza projekta: PZI Merilo: 1:5

Št. projekta: 2023-20 Datum: marec 2025

Št. načrta: 2023-20-G List: J-2