investitor:
**OBČINA BOVEC**
**Trg golobarskih žrtev 8,**
**5230 Bovec**

naziv gradnje:
# Dom za starejše občane Jezerca Bovec

vrsta projektne dokumentacije:
## PZI - dokumentacija za izvedbo gradnje

naziv načrta:
## 2/1 – Načrt gradbenih konstrukcij stavbe

| | |
|---|---|
| zvezek: | **1 / 2** |
| št. projekta: | **11826** |
| št. načrta: | **11826_2-1** |
| datum: | **december 2021** |

PROJEKT

podjetje za inženiring , geodezijo, urbanizem in projektiranje
Kidričeva ulica 9a, 5000 Nova Gorica, Slovenija

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**PRILOGA 1B**

# NASLOVNA STRAN NAČRTA

# 2 Načrt s področja gradbeništva
# 2/1 Načrt gradbenih konstrukcij stavbe

| **OSNOVNI PODATKI O GRADNJI** | |
|---|---|
| naziv gradnje | **Dom za starejše občane Jezerca Bovec** |
| kratek opis gradnje | **Predviden objekt DSO se bo izvajal na nepozidanem zemljišču, v bližini obstoječega zdravstvenega doma in lekarne. Objekt je zasnovan iz dveh podolgovatih pravokotnih traktov, ki sta medsebojno povezana z osrednjim delom v pritličju in 1.nadstropju. Zahodni trakt je etažnosti P+1, vzhodni trakt je etažnosti P+2, povezovalni del etažnosti P+1, na strehi so umeščene klimatske naprave, ki tvorijo tehnično etažo. Predvidi se ustrezne nove priključke na GJI, obstoječ priključek na lokalno cesto se ustrezno prilagodi oz razširi. Vzdolž severnega roba območja se predvidi podporni zid.** |
| VRSTE GRADNJE | **NOVOGRADNJA - NOVOZGRAJEN OBJEKT** |

| **DOKUMENTACIJA** | |
|---|---|
| vrsta dokumentacije | **PZI (projektna dokumentacija za izvedbo gradnje)** |
| | ☐ **sprememba dokumentacije** |
| številka projekta | **11826** |
| **PODATKI O NAČRTU** | |
| strokovno področje načrta | **2 Načrt s področja gradbeništva** |
| številka in naziv načrta | **2/1 Načrt gradbenih konstrukcij stavbe** |
| številka načrta | **11826_2-1** |
| datum izdelave | **december 2021** |
| **PODATKI O IZDELOVALCU NAČRTA** | |
| ime in priimek pooblaščenega arhitekta, pooblaščenega inženirja ali druge osebe | **Vilko Šuligoj, univ. dipl. inž. grad.** |
| identifikacijska številka | **IZS G-0711** |

podpis pooblaščenega arhitekta, pooblaščenega inženirja ali druge osebe

| | |
|---|---|
| ime in priimek pooblaščenega arhitekta, pooblaščenega inženirja ali druge osebe | **dr. Peter Kante, univ. dipl. inž. grad.** |
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podpis pooblaščenega arhitekta, pooblaščenega inženirja ali druge osebe

| **PODATKI O PROJEKTANTU** | |
|---|---|
| projektant (naziv družbe) | **PROJEKT d.d. Nova Gorica** |
| sedež družbe | **Kidričeva 9a, 5000 Nova Gorica** |
| vodja projekta | **Teja Savelli, univ.dipl.inž.arh.** |
| identifikacijska številka | **ZAPS-1389** |

podpis vodje projekta

| | |
|---|---|
| odgovorna oseba projektanta | **Vladimir Durcik, univ.dipl.inž.grad.** |

podpis odgovorne osebe projektanta

# SEZNAM SODELAVCEV

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- Matej Jan, univ. dipl. inž. grad.
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- Ingrid Kante, grad. teh.
- Aljaž Petrič, mag. inž. stavb.
- Vanja Marš, univ. dipl. inž. grad.

# 2.2 KAZALO VSEBINE NAČRTA

**ZVEZEK: 1 / 2**


| | |
|---|---|
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| 2.2 | Kazalo vsebine načrta |
| 2.3 | Tehnično poročilo |
| 2.4 | Statični izračun |
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# 1. UVOD

## 1.1. Splošno

Predviden objekt doma starejših občanov se bo gradil na zemljiščih s parc. št. 954, 955, 956, 957/1, 982, 983/2 in 991/4, vse k.o Bovec, na lokaciji imenovani »Jezerca« v Bovcu.

Predvidene parcele za gradnjo stojijo na rahlo vzpenjajočemu terenu na JZ delu naselja Bovec, tik ob obstoječem zdravstvenem domu in lekarni. Na severnem delu se parcele rahlo dvigujejo. Gradbena parcela je nepravilne oblike in je neformirana. Vzhodno se objekt navezuje na obstoječe parkirišče ob objektu zdravstvenega doma.

Stavba je zasnovana kot AB stenasta konstrukcija. Predvidena je klasična armiranobetonska konstrukcija. Za predelne stene se večinoma uporabljajo mavčno-kartonske oz. opečne. Stavba je temeljena na temeljni plošči z ojačitvami, ki je postavljena na AB vodnjake. Stavba je zasnovana iz dveh podolgovati pravokotnih traktov, ki sta medsebojno povezana z osrednjim delom v pritličju in 1.nadstropju.

Zahodni trakt (zahodna dilatacijska enota) je etažnosti P+1, na ravni strehi so umeščene klimatske naprave za potrebe prezračevanja oddelkov, ki jih prekriva lesena konstrukcija in pločevinasta kritina. Od pritličja do tehnične etaže vodi AB stopnišče. Vzhodni trakt (vzhodna dilatacijska enota) je etažnosti P+2. Na ravni strehi so tudi tukaj umeščene klimatske naprave, ki jih pred vremenskimi vplivi ščiti lesena konstrukcija in pločevinasta kritina. Od pritličja do strehe vodi centralno stopnišče v AB izvedbi. V vzhodni lameli sta tudi dva betonska dvigalna jaška v neposredni bližini glavnega stopnišča. Povezovalni del (centralna dilatacijska enota) je sestavljen iz pritličja in 1. nadstropja. Streha nad povezovalnim delom je ravna armiranobetonska.

**Predmet tega načrta s področja gradbeništva so samo gradbene (nosilne) konstrukcije stavbe iz armiranega betona, ki je sestavljena iz treh (3) dilatacijskih enot, in konstrukcija dveh lesenih nadstreškov nad tehničnima etažama na dveh dilatacijskih enotah. Zato je potrebno načrt gledati kot celota skupaj z ostalimi načrti, ki so del skupnega projekta.**

## 1.2. Arhitekturna zasnova

Objekt doma je zasnovan v dveh oziroma deloma treh etažah. Tlorisno je sestavljen iz dveh pravokotnih traktov, kjer so urejene predvsem nastanitvene enote za varovance in pripadajoči servisi, ter osrednjega povezovalnega dela, kjer so združeni vsi skupni prostori in skupni programi doma.

Na severni strani objekta je urejeno servisno dvorišče ter parkirišče za zaposlene in obiskovalce. Vhod v dom je orientiran proti mestu, oziroma zdravstvenemu domu in lekarni. Na južni strani objekta je urejen park oziroma zelene površine, ki so namenjanje stanovalcem za preživljanje prostega časa, rekreacijo ali druge dejavnosti na prostem. Del te ureditve je ločen in zaprt, saj je namenjen stanovalcem v dementnem oddelku. Na osrednji vrt gleda tudi skupna jedilnica, pred katero je predvidena ureditev terase, ki je deloma pokrita. Za preživljanje prostega časa zunaj, tudi v primeru slabega vremena, je v južnem delu vzhodnega trakta predvidena pokrita površina, kjer se lahko postavijo klopi in mize.

**Pritličje** objekta je namenjeno skupnim in pol javnim vsebinam, ki so nanizane v vzhodnem traktu. Vhod v objekt je obrnjen proti glavni dostopni poti do objekta. Ob vhodu so preko internega hodnika organizirani prostori uprave in socialne delavke. Vhod za zaposlene se vrši preko ločenega vhoda mino upravnega dela. Neposredno ob vhodu je recepcija in sprejemna avla s prostorom za obiskovalce in srečanja s svojci. Ob avli in z neposrednim dostopom tudi iz južnega pokritega vhoda so nanizani še javni programi frizerja, centra za socialno delo in društva upokojencev. V osrednjem delu vzhodnega trakta, v navezavi z osrednjim povezovalnim delom, je predvideno glavno komunikacijsko jedro s stopniščem in dvema dvigaloma, ki povezujejo vse etaže objekta.

V osrednjem delu je urejen skupni večnamenski prostor oziroma jedilnica, ki se proti jugu odpira na notranji vrt. Na severni strani je predvidena kuhinja, ki lahko dnevno pripravi obroke za vse varovance in zaposlene ter po potrebi tudi nekaj za zunanje uporabnike. Ob kuhinji sta še prostora za zbiranje umazanega perila in shranjevanje čistega perila ter ločen gospodarski vhod za dostavo. Vsi gospodarski prostori so nanizani ob gospodarskem dvorišču. V pritličju je urejen tudi prostor za umrlega, ki ima neposreden izhod na prosto in dostop do bolniškega dvigala.

Preko osrednjega dela se dostopa do zaprtega dementnega oddelka. Na oddelku je urejenih 8 sob za do 12 oskrbovancev. Vsaka soba ima svojo kopalnico s sanitarijami in tušem, vse prilagojeno potrebam osebe na invalidskem vozičku. Ob vhodu v oddelek je sprejemni pult, ki služi tudi kot sestrska soba, z navezavo na prostor za sanitetni material in zdravila. V bližini pulta je urejen tudi večji skupni prostor z jedilnico in čajno kuhinjo, preko katerega se lahko dostopa na pokrito ložo in naprej na dementni vrt. Poleg omenjenih prostorov je na oddelku predvidena skupna negovalna kopalnica, etažni prostor za čisto perilo ter prostor za čistila in umazano perilo. V zaprtem hodniku je drugo stopnišče, ki povezuje pritličje s 1. nadstropjem, ki pa ni predvideno za stanovalce, pač pa le za osebje in v primeru evakuacije. Ob stopnišču so predvideni prostori za vzdrževalce, kot so garderoba s sanitarijami ter pisarna, ki ima preko notranjega hodnika dostop na gospodarsko dvorišče. V skrajnem severnem delu zahodnega trakta so urejeni tehnični prostori; kotlovnica, toplotna postaja, prostor za diesel agregat, delavnica za vzdrževalce, skladišče orodja in opreme ter arhiv. Vhod v tehnične prostore se vrši neposredno iz gospodarskega dvorišča in je zaščiten z nadstreškom.

**V prvem nadstropju** je v vzhodnem traktu urejen standarden nastanitveni oddelek z 9 sobami za do 16 varovancev. Oddelek deluje kot funkcionalna celota. Dostopen je preko osrednjega komunikacijskega jedra. Poleg sob, ki so orientirane na jugovzhod je na oddelku še skupni prostor z dnevno sobo, jedilnico in čajno kuhinjo, skupna negovalna kopalnica, etažni prostor za čisto perilo, prostor za sanitetni material in zdravila ter prostor za čistila in umazano perilo. Vsaka soba ima svojo kopalnico s sanitarijami in tušem. Iz dnevne sobe je možno dostopati na pokrito ložo ja južni strani, kjer lahko varovanci prebijejo nekaj časa na svežem zraku. V zahodnem traktu je urejen negovalni oddelek z 12 sobami za do 20 vzdrževancev. Njegova organizacija je praktično enaka dementnemu oddelku v pritličju, z razliko, da je v tem oddelku več sob. V osrednjem delu prvega nadstropja je umeščen celoten zdravstveni program. Ob osrednjem komunikacijskem jedru so ob ločenem hodniku nanizani prostori za zaposlene, kot so garderobe za ženske, garderobe za moške, skupni prostor/sejna soba/prostor za počitek s čajno kuhinjo ter pisarna glavne sestre s hodnikom do ordinacije zdravnika. Vsi zdravstveni delavci vstopajo preko službenega vhoda v pritličju, nato preko glavnega komunikacijskega jedra do 1. nadstropja ter nato v interni hodnik ob zgoraj navedenih garderobnih in sanitarnih prostorih za

zaposlene ter naprej po oddelkih oziroma do zdravniške ordinacije. Ordinacija zdravnika tvori skupaj s sestrsko sobo/ sprejemom in domsko lekarno zdravstveni del. Zdravnik ima ob svoji ordinaciji lastno garderobo in sanitarije. Pred vstopom v sestrsko sobo/sprejem pa je urejena dovolj prostorna čakalnica. Zdravstveni del je tako organiziran, da se lahko odda tudi zunanjemu koncesionarju. Ob čakalnici je predvidena tudi domska previjalnica.

Na drugi strani hodnika, ki povezuje oba trakta in prečka celoten povezovalni del so na južni strani urejeni skupni prostori za dejavnosti varovancev; prostor za fizioterapijo s kabinetom, prostor za delovno terapijo s kabinetom, prostor za druženje ter prostor za duhovno oskrbo. °

**V drugem nadstropju** se v zahodnem traktu ponovi še en nastanitveni oddelek z 9 sobami za do 16 varovancev z identičnim tlorisom kot oddelek nadstropje niže. Vse sobe na vseh oddelkih so zasnovane tako, da se lahko v njim uredi eno ali dvoposteljna soba. Dimenzionirane so po pravilniku za nastanitev dveh oseb. Nad zahodnim traktom je na ravni strehi ob drugem stopnišču urejen prostor za klimatske naprave, preko katerega je izvedena jeklena konstrukcija in pločevinasta kritina oziroma fasadne ploskve v naklonu, ki povzemajo obliko dvokapnice s čopastim zaključkom strehe. Tako je streha v manjšem delu (samo prostor za klimate) oblikovana kot nakazana dvokapnica s čopom, ki predstavlja avtohtono arhitekturno rešitev. Ostali del strehe je raven.

**Na strehi** drugega nadstropja vzhodnega trakta se nahaja tehnična etaža- prostor kjer so postavljeni klimati, preko njih pa lesena konstrukcija in prav tako fasadne ploskve v naklonu oziroma nakazana dvokapnica s čopom, ostali del strehe je raven.

## 1.3. Podloge za projektiranje

[1] Geološko-geotehnično poročilo o raziskavah za objekt »Dom starejših občanov Bovec«, št. DN 2003902, GI ZRMK d.o.o. Ljubljana, november 2010.

[2] PZI vodilni načrt arhitekture, št. 11826_0/1, PROJEKT d.d. Nova Gorica, december 2021.

## 1.4. Predpisi in standardi

[1] Gradbeni zakon (GZ).

[2] Tehnični standardi za gradbene konstrukcije SIST EN (Eurocode), in sicer SIST EN 1990, SIST EN 1991 in SIST EN 1998-1 za zunanje vplive, SIST EN 1992-1 za beton, SIST EN 1993-1 za jeklo, SIST EN 1997-1 za geomehanske vplive ter SIST EN 1998-1 za dinamične in seizmične vplive. Upoštevani so bilo tudi vsi povezani standarde, dopolnila in nacionalni dodatki.

[3] Vsi ostali v Republiki Sloveniji veljavni zakoni, tehnični predpisi, standardi in smernice, ki obravnavajo projektiranje in izgradnjo stavb.

## 1.5. Geološko-geotehnični pogoji

Za potrebe izdelave projektne dokumentacije rekonstrukcije objekta je bilo v letu 2010 izdelano Geološko-geotehnično poročilo (*GI ZRMK d.o.o. Ljubljana, št. DN 2003902, november 2010*). V nadaljevanju je pripravljen povzetek z geološkim opisom temeljnih tal in geotehničnih razmerah.

### *1.5.1. Geološko-geomehanski model*

Raziskovano območje po tolmaču geološke karte za list Beljak in Ponteba iz leta 1987 pod kvartarnimi sedimenti gradijo klastične plasti v turbiditnem (flišnem) razvoju. Skupna debelina zgomjekrednih klastičnih sedimentov Bovške kotline znaša po B. Jurkovšku (1987) 500 m. Flišne kamnine, ki smo jih prevrtali v vrtinah BOV-2 in BOV-5 tvorijo kotanjasto podlago nad katero so se odložili sprva bolj peščeni, nato pa glinasti do meljasti apnenčevi prodi, ki jih je odložila reka Soča. Najmlajše sedimente sestavljajo meljne in peščene gline, mestoma pa tudi glinast pesek. V glinah so pogosto koščki flišnih kamnin.

Geološko - geomehanski model je bil izdelan na podlagi rezultatov preiskav v vrtinah BOV-1 do BOV-5. Podatki o vrtinah so podani v prilogah GG poročila. Glede na to, da so kvartarni zasipi heterogene sestave, smo jih ločevali tudi s pomočjo podatkov iz SPT preiskav.

Območje novogradnje Doma starejših občanov Bovec smo razdelili v naslednje geomehanske plast:

**1. Gline, melji in peski (CL/ML/SC)**. Vrhnji sloj sestavljajo meljna do peščena glina, peščen melj in glinast pesek. Vsi sedimenti pogosto vsebujejo koščke flišnih kamnin. Zemljine so srednje do težko gnetne konsistence.

*Vrednosti materialnih karakteristik tega sloja so sledeče:*

- *naravna vlaga: W = 26 do 41 %*
- *prostorninska teža: ρ = 1,8 do 2 Mg/m$^3$*
- *strižne lastnosti: φ = 34 ° (SPT)*

**2. Glina ($CL_1$).** Peščena glina s koščki flišnih kamnin poltrdne do trdne konsistence se pojavlja na območjih nad flišnimi kamninami. Sloj lahko predstavlja vrhnji del močno preperele flišne hribine.

*Vrednosti materialnih karakteristik tega sloja so sledeče:*

- *naravna vlaga: W = 25 %*
- *prostorninska teža: ρ = 2 Mg/m$^3$*
- *modul stisljivosti: $M_v$ = 7200 kPa (pri obremenitvi 100 kPa)*

**3. Glina ($CL_2$).** Meljna glina srednje do težko gnetne konsistence se pojavlja v lečah znotraj prodnega zasipa. Glina je bila prevrtana le v vrtini BOV-1, vendar se, glede na heterogenost kvartarnega zasipa, lahko pojavlja tudi v ostalih delih območja nameravane gradnje.

*Vrednosti materialnih karakteristik tega sloja so sledeče:*

- *naravna vlaga: W = 19 %*
- *prostorninska teža: ρ = 2,2 Mg/m3*
- *strižne lastnosti: φ = 26°, c = 18 kPa*
- *modul stisljivosti Mv= 6400 kPa (pri obremenitvi 100 kPa)*

**4. Prodni zasip (Q) - GC/GM/GP.** Prodni zasip se pojavlja nad flišno podlago. Sestavlja ga pretežno glinast in peščeno meljast slabo granuliran karbonatni prod in grušč flišnih kamnin Ø 5-50 mm s samicami do Ø 100 mm. Prodi so srednje gosti do gosti. V osrednjem delu (BOV-3) segajo prodi pod globino 13 m.

*Vrednosti materialnih karakteristik tega sloja so sledeče:*

- *strižne lastnosti: φ = 35°-37° (SPT)*
- *koeficient prepustnosti: k = 1x10-6 m/s (ocena)*

**5. Kredni fliš - lapor, peščenjak.** Flišne plasti sestavlja menjavanje laporja in peščenjaka. Lapornate plasti so srednje do visoko penetrabilne, medtem ko so plasti peščenjalca nizko penetrabilne. Enoosne tlačne trdnosti na peščenjaku lahko ocenimo na $q_u$ = 100 MPa (točkovna trdnost)

Ker so plasti heterogene, priporočamo, da se za izračune privzamejo najnižje vrednosti materialnih karakteristik.

**Kategorije izkopa**

Glede na razvrstitev zemljin in kamnin uvrščamo kvartarne zasipe (gline srednje gnetne do trdne konsistence, glinasti, meljasti in peščeni prodi in grušči) v 3. kategorijo (vezljiva in nevezljiva zrnata zemljina). Flišne plasti uvrščamo v 4. kategorijo (mehka kamnina). Način izkopa predvideva uporabo bagra s konico. (povzeto po knjigi IV - Dopolnila splošnih in tehničnih pogojev, Ljubljana 2001 ). Izkop bo potekal pretežno v glinenih in prodnatih zemljinah.

### *1.5.2. Hidrogeološke razmere*

Na območju nameravane novogradnje je bila ena od vrtin predvidena kot piezometrična vrtina. Glede na to, da so bili prodi, ki sestavljajo temeljna tla pod globino 2 m le vlažni in da pojavov talne vode nismo zasledili v nobeni vrtini, piezometer ni bil izveden. Glede na to, da je bil na območju nameravane izgradnje Večnamenskega objekta v Bovcu že izveden črpalni poizkus v podobnih kanminah, lahko v primeru pojavljanja talne vode ocenimo prepustnost meljasto peščenega in glinastega proda in grušča na k = lxl0-6 m/s. Večji problem predstavljajo na obravnavanem območju meteorne vode, ki zaradi kotanjastega terena in površinskih zelo slabo prepustnih glinenih plasti zastajajo in le počasi odtekajo. Občasno se na travniku po močnih deževjih pojavlja stoječa voda. Zato bo potrebna izvedba drenažnega sistema, ki bo odvajal površinsko vodo v obstoječo kanalizacijo oziroma ponikovalnico. Glede na to, da je za objekt predvidena podkletitev, se tudi tu izvede drenaža na koti temeljenja. Izvedba drenaže bo podana, ko bodo znani podatki o objektu.

### *1.5.3. Seizmičnost terena*

Območje lokacije Doma starejših občanov Bovec lahko glede na Seizmološko karto, ki jo je pripravila skupnost za seizmologijo SFRJ, Beograd 1987 in ki upošteva povratno dobo potresov 500 let, uvrstimo v 8. stopnjo seizmične intenzitete.

Na podlagi karte potresne nevarnosti Slovenije (MOP, uprava RS za geofiziko, l. 2001) velja za to območje projektni pospešek tal **$a_g$ = 0,225 g**, ki se nanaša na trdna tla (A po EC8).

Glede na slovenski standard SIST EN 1998-1 :2006 lahko uvrstimo glinasto prodnata tla v **tip tal E**.

### *1.5.4. Zaključki GG poročila*

Na območju nameravane novogradnje za Dom starejših občanov Bovec je bilo izvrtanih pet vrtin v skupni dolžini 60 m.

Geomehanske in terenske raziskave so potrdile slabšo nosilnost vrhnjih glineno meljastih plasti, debeline 2 do 6 m, in dobro nosilnost pretežno glinastih ter peščeno meljastih prodov, ki jih je odložila Soča. Debelina slednjih, med katerimi se pojavljajo tudi leče gline in melja, znaša v osrednjem delu najmanj 11 m.

Za podkleten objekt se predvideva izkop temeljnih tal približno 3,5 do 4 m pod koto sedanjega terena. S tem bi bili odstranjeni glineni sedimenti v osrednjem delu raziskovanega območja, manjše debeline poltrdne gline in morebiti preperelega fliša pa bi ostale na robovih.

Predlagamo, da se na tem delu izvede zamenjava materiala z drobljencem 0/32 mm, po potrebi pa tudi tanjšo gruščnato blazino vzdolž celotnih temeljnih tal. S tem bi preprečili nastajanje diferenčnih posedkov. Debelino nasipa se izvede na podlagi izmerjenega deformacijskega modula.

Na koti temeljenja se izvede meritve nosilnosti tal z dinamično obremenjeno krožno ploščo. Doseženi deformacijski modul naj znaša (izmerjen s krožno ploščo, na gruščnati blazini) $E_{vd}$ = 50 MPa, oziroma $E_{v2}$ = 100 MPa. Na temeljna tla se izvede plast podložnega betona. Temeljenje naj se izvede v sušnem razdobju.

Vzdolž temeljev objekta se izvede drenaža na način, ki preprečuje njeno zapolnjenje z drobnimi delci.

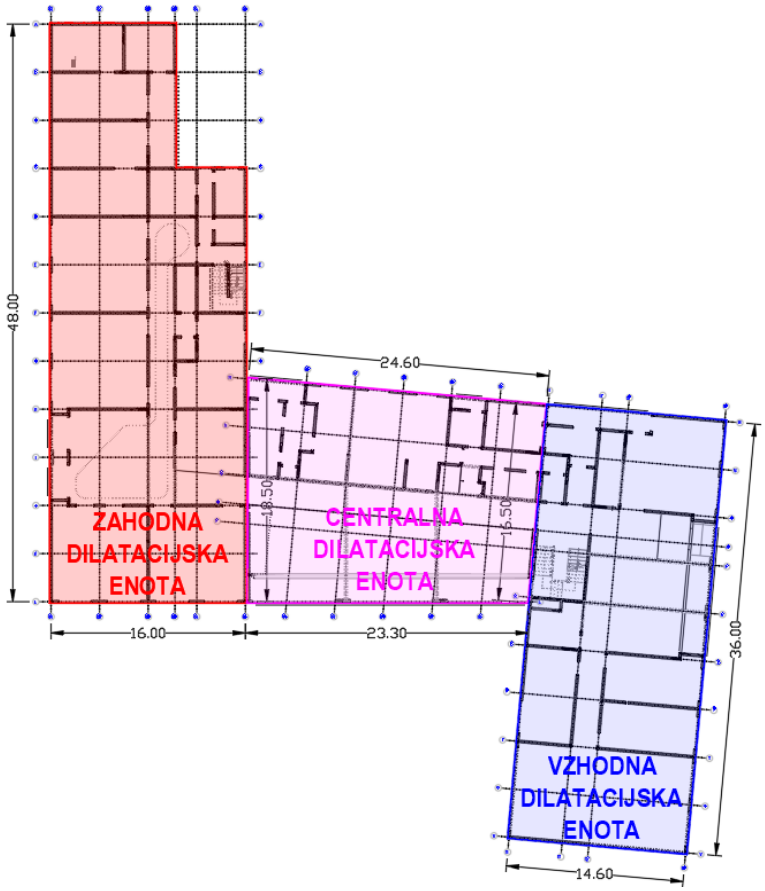
Pri izkopu temeljnih tal je nujna prisotnost geomehanika, ki bo podal ob pregledu temeljnih tal morebitna dodatna navodila za izvedbo temeljenja objekta.

*Opomba statika:*

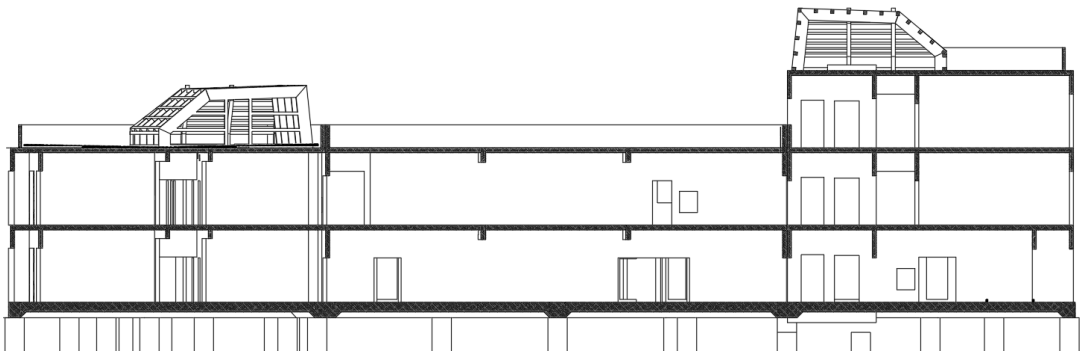
*GG poročilo, ki je bilo izdelano v letu 2010, je predvidevalo večje izkope po trenutnega terena, saj je bila verjetno predvidena kletna etaža, ki je v trenutni rešitvi stavbe ni. Glede na to dejstvo, smo v tem projektu predvideli dodatne AB vodnjake, da se z novo konstrukcijo doseže dobro nosilna temeljna tla in da se preprečijo morebitni diferenčni posedki objekta kot celote.*

# 2. OPIS KONSTRUKCIJE STAVBE

Obravnavana stavba je konstrukcijsko razdeljena na 3 dilatacijske enote, ki imajo določene skupne lastnosti in nekaj razlik glede na funkcionalnost posameznih prostorov v stavbi. Stavba je s stališča nosilne konstrukcije opredeljena kot stenasti konstrukcijski sistem, saj predstavljajo nove armiranobetonske stene glavnino vertikalnih elementov, ki omogočajo horizontalno togost objekta za prevzemanje zunanjih horizontalnih vplivov (potres, veter).




*Slika 1: Tloris stavbe z razdelitvijo na posamezne dilatacijske enote*



*Slika 2: Prečni prerez stavbe preko vseh dilatacijskih enot*

## 2.1. Temeljenje objekta in dilatacijske rege

Temeljenje objekta je tudi enotno in je povezano med seboj (brez dilatacijskih reg) na temeljni plošči, debeline 50 cm, ki je na robovih in v določenih vmesnih oseh odebeljena v debelini 80 cm (pasovni temelji). Glede na dostopne podatke o globini nosilnih temeljnih tal (GG poročilo; od 2 do 6 m pod koto obstoječega terena oz. nivoja nove temeljne plošče) in relativne neenakomernosti globine nosilnih temeljnih tal po tlorisu objekta smo predvideli pod temeljno ploščo AB vodnjake notranjega premera Ø80 cm dolžine od 3 do 5 m. Vodnjaki se izdelajo s pomočjo betonskih cevi Ø100 cm, ki se jih postavi na podložni beton v naprej izkopano jamo posameznega vodnjaka, v le-te se ustavi ustrezna armatura in zalije s svežo betonsko mešanico. Vodnjaki v končni fazi preprečujejo morebitne diferenčne posedke po površini temeljne plošče.

Dilatacijske rege med posameznimi dilatacijskimi enotami so 50 mm, kar je glede na izračunane horizontalne pomike zaradi potresa zadostno (glej statični izračun). Za premoščanje reg v prostorih stavbe se uporabijo ustrezni dilataciji profili npr. *DEFLEX 322-050* (za stene in stropove) oz. *DEFLEX 446/b-065* (v tlakih), ki omogočajo pomike v vseh smereh z maksimalnim skupnim pomikom vsaj 30 mm (±15 mm).

V nadaljevanju so podani opisi za ostale armiranobetonske konstrukcijske elemente stavbe nad temelji po posameznih dilatacijskih enotah.

## 2.2. Zahodna dilatacijska enota

Zahodna dilatacijska enota stavbe je dvo-etažni (P+1) objekt, tlorisnih dimenzij 48,5 m × 16,5 m. Višina dela stavbe (od kote ±0,00 do zg. roba atike) je cca 9,3 m. Bruto etažna višina je cca 4 m. Streha objekta je ravna z minimalnimi nakloni. Na delu strešne AB plošče (17 m x 8 m) je predvidena tehnična etaža, ki je pokrita z nadstreškom iz lesene konstrukcije, ki dejansko predstavlja streho in stene tehnične etaže. Lesena konstrukcija nadstreška je opisana v ločenem poglavju v nadaljevanju.

Armiranobetonske (AB) stene so po tlorisu objekta razporejene relativno enakomerno v prečni smeri v maks. rastru 8 m, oziroma na S strani tlorisa stavbe je raster manjši (do 4 m). V vzdolžni smeri so AB stene postavljene v obeh linijah fasad ter v dveh oseh ob centralnem vzdolžnem hodniku, da je raster med vzdolžnimi stenami nekako v sledečem razmerju 8 m+2 m+6 m z manjšimi anomalijami. Nekaj manjših vzdolžnih AB sten je postavljenih na manjših rastrih na območju stopnišča in drugih prostorov ob stopnišču. Nekatere AB stene imajo odprtine druge so brez njih, tako, da imamo dejansko v obeh prečnih smereh kombinacijo polnih sten in sten z odprtinami. Debelina AB sten je 20 cm. Na območju večnamenskih prostorov na južni strani so z razponom cca 8 m v oseh vzdolžnih sten predvideni nosilci s skupno višino (vključno s AB ploščo) 70 cm. Širina teh nosilcev je 20-30 cm.

Etažna plošča in strešna plošča se izvedeta v enotni debelini 25 cm. Etažna plošča in strešna plošča imata na določenih delih predvidene različno velike preboje zaradi strojnih in elektro inštalacij, ki so razvidni v tehničnih prikazih načrta. Večje preboje smo upoštevali v statičnih izračunih. V strešni plošči na območju oboda tehnične etaže so predvidene ojačitve (odebelitve) plošče z dodatno višino 15 cm nad zgornjim robom plošče v širini 60 cm, da je možna kasnejša pritrditev lesene konstrukcije nadstreška tehnične etaže.

Atični AB parapeti, debeline 15 cm in višine cca 120 cm, so zamaknjeni iz ravnine fasade in postavljeni na strešno ploščo.

Stopnišče je izvedeno iz podestov in stopniščnih ram v debelini 16 cm, pri čemer so na stopniščnih ramah dodane nastopne ploskve iz betona.

## 2.3. Centralna dilatacijska enota

Centralna dilatacijska enota stavbe je prav tako, kot zahodna, dvo-etažni (P+1) objekt, tlorisnih dimenzij 23,0 m × 17,0-19,0 m (trapezna oblika). Višina dela stavbe (od kote ±0,00 do zg. roba atike) je cca 9,3 m. Bruto etažna višina je cca 4 m. Streha objekta je ravna z minimalnimi nakloni. Ta del stavbe je glede funkcionalnosti namenjen jedilnici in kuhinji, zato so v tem delu nekoliko večji razponi, ki se jih premošča z AB nosilci.

Armiranobetonske (AB) stene so po tlorisu objekta razporejene po celotnem obodu stavbe in deloma tudi v notranjosti v vzdolžni smeri po sredini objekta in nekaj več manjših sten v vzdolžni in prečni smeri na severni polovici stavbe (območje kuhinje). Maksimalni razponi med dvema nosilnima stenama (območje jedilnice) je od 9 m do 10 m, kjer so v prečni smeri na nosilni steni predvideni AB nosilci na cca 1/2 in 2/3 dolžine objekta. Nosilci z razponom od 9 m do 10 m na območju jedilnice so skupne višine 75 cm (skupaj s ploščo debeline 25 cm) v debelini 30 cm. Krajša nosilca na območju kuhinje pa sta skupne višine 55 cm (skupaj s ploščo debeline 25 cm) v debelini 20 cm. Nekatere AB stene imajo odprtine druge so brez njih, tako, da imamo dejansko v obeh prečnih smereh kombinacijo polnih sten in sten z odprtinami. Na južni fasadi in na meji z vzhodno dilatacijsko enoto je en vogal stavbe dejansko nepodprt oz. izveden konzolno. Dejansko gre za kombinacijo krajše konzolne stene brez večjih odprtin v prečni smeri, na katero se naslanja južna zunanja stena z večjim številom odprtin in nekoliko daljšo konzolo proti temu vogalu. Debelina AB sten je 20 cm.

Etažna plošča in strešna plošča se izvedeta v enotni debelini 25 cm.

Atični AB parapeti, debeline 15 cm in višine cca 120 cm, so v vzdolžni smeri zamaknjeni iz ravnine fasade in postavljeni na strešno ploščo, v prečni smeri so pa postavljeni kot podaljški zunanjih prečnih sten.

## 2.4. Vzhodna dilatacijska enota

Vzhodna dilatacijska enota stavbe je tri-etažni (P+2) objekt, tlorisnih dimenzij 36,5 m × 15,2 m. Višina dela stavbe (od kote ±0,00 do zg. roba atike) je cca 13,3 m. Bruto etažna višina je cca 4 m. Streha objekta je ravna z minimalnimi nakloni. Na delu strešne AB plošče (18 m x 8 m) je predvidena tehnična etaža, ki je pokrita z nadstreškom iz lesene konstrukcije, ki dejansko predstavlja streho in stene tehnične etaže. Lesena konstrukcija nadstreška je opisana v ločenem poglavju v nadaljevanju.

Armiranobetonske (AB) stene so po tlorisu objekta razporejene relativno enakomerno v prečni smeri v maks. rastru 8 m, oziroma na določenih delih tlorisa stavbe je raster tudi manjši (do 4 m). V vzdolžni smeri so AB stene postavljene v obeh linijah fasad ter v dveh oseh ob centralnem vzdolžnem hodniku, da je raster med vzdolžnimi stenami nekako v sledečem razmerju 4,5 m+2 m+8 m z manjšimi anomalijami. Nekaj manjših vzdolžnih in prečnih AB sten je postavljenih na manjših rastrih na območju

stopnišča in dvigal na SZ delu te dilatacijske enote. Nekatere AB stene imajo odprtine druge so brez njih, tako, da imamo dejansko v obeh prečnih smereh kombinacijo polnih sten in sten z odprtinami. Debelina AB sten je 20 cm. Na območju vhoda (centralni del dela stavbe) in na južnem strani so z razponom cca 8 m do 10 m v osi vzdolžne stene ob hodniku in v eni osi prečnih sten predvideni nosilci s skupno višino (vključno s AB ploščo) 80 cm oz. 70 cm. Širina teh nosilcev je 20-30 cm.

Etažna plošča in strešna plošča se izvedeta v enotni debelini 25 cm. Etažna plošča in strešna plošča imata na določenih delih predvidene različno velike preboje zaradi strojnih in elektro inštalacij, ki so razvidni v tehničnih prikazih načrta. Večje preboje smo upoštevali v statičnih izračunih. V strešni plošči na območju oboda tehnične etaže so predvidene ojačitve (odebelitve) plošče z dodatno višino 15 cm nad zgornjim robom plošče v širini 60 cm oz. v eni prečni smeri gre za kombinacijo dodatne ojačitve strešne plošče z zgornje in spodnje strani, da je možna kasnejša pritrditev lesene konstrukcije nadstreška tehnične etaže.

Atični AB parapeti, debeline 15 cm in višine cca 120 cm, so zamaknjeni iz ravnine fasade in postavljeni na strešno ploščo.

Stopnišče je izvedeno iz podestov in stopniščnih ram v debelini 16 cm, pri čemer so na stopniščnih ramah dodane nastopne ploskve iz betona.

## 2.5. Leseni nadstrešnici nad tehničnima etažama

Konstrukcija novih nadstrešnic nad tehničnima etažama na strešni ploščo zahodne in vzhodne dilatacijske enote stavbe je iz lesenih primarnih okvirjev oz. nosilcev iz lepljenega lesa in povezovalnih sekundarnih nosilcev iz klasičnega lesa. Glavni leseni okvirji so členkasto pritrjeni v strešno ploščo (ojačitve) v različnih razmikih (rastrih) med seboj v večini primerov do 3,8 m oz. v primeru enega polja do 4,8 m. Prečna dimenzija primarnih nosilcev (okvirja) je 60/20 cm. Sekundarni nosilci so 20/16 cm oz. 22/18 cm (v primeru polja do 4,8 m). Predvideno je dodatno portalno zavetrovanje s pomočjo diagonalnih palic premera Ø16 mm v predzadnjem polju (razpon 3,8 m), ki ga je potrebno izvesti. Diagonale se namesti na poševnem in ravnem delu strehe ter na vertikalni fasadi tega polja.

# 3. STATIČNI IZRAČUNI

Podrobnejše statične in dinamične (seizmične) analize konstrukcij posameznih delov stavbe so bile izvedene s pomočjo prostorskih računskih modelov iz lupinastih in linijskih končnih elementov v programu SOFiSTiK FEM ver. 2018. Podrobnejši opisi predpostavk in ugotovitev so razvidni v posameznih statičnih izračunih, ki so podani v nadaljevanju načrta v poglavju »*2.4 STATIČNI IZRAČUN*«.

Vsi elementi so dimenzionirani v skladu s standardi Evrokod, in sicer SIST EN 1992 za beton, SIST EN 1993 za jeklo, SIST EN 1995 za les, SIST EN 1997 za geomehanske vplive ter SIST EN 1998 za dinamične in seizmične učinke.

Za požarno odpornost R30 po SIST EN 1992-1-2 (armirani beton) je merodajen zaščitni sloj betona, ki mora biti vsaj 2,5 cm. Projektirana oziroma dejanska debelina zaščitnega sloja v statiki je večja od 3,0 cm. Za požarno odpornost R30 po SIST EN 1995-1-1 (les) se je zagotovila z ustreznim dimenzioniranjem, ki je bilo tudi ustrezno dokazano v dodatnem statičnem izračunu.

# 4. ZUNANJI VPLIVI

Pri projektiranju so bili upoštevani vplivi na konstrukcije kot jih določa standard SIST EN 1991 in SIST EN 1998 ob upoštevanju delnih faktorjev obtežbe v skladu s standardom SIST EN 1990.

V statičnih izračunih je poleg lastne teže upoštevana stalna obtežba na etažnih in ostalih ploščah glede sestave tal, ki smo jih prejeli od arhitekta oz. glede na dostopne podatke. Koristna obtežba na etažnih ploščah večinoma znaša q=2,5 kN/m$^2$ (kategorija C1), na strehi pa znaša q = 0,8 kN/m$^2$ (kategorija H) za popravila in vzdrževanje. Vpliv snega na tleh je upoštevan z vrednostjo $s_k$ = 2,67 kN/m$^2$. Za potresno obremenitev je upoštevan projektni pospešek tal $a_g$ = 0,225g na trdnih tleh, kategorija tal E (faktor tem. tal S = 1,7) ob faktorju pomebnosti stavbe $\gamma_I$ = 1,0 (II. kategorija pomembnosti objekta). Za vse tri dilatacijske enote stavbe smo upoštevali redukcijski faktorji q=2,0 zaradi pričakovanega torzijsko podajnega obnašanja konstrukcije. Predpostavljen razreda duktilnosti konstrukcije DC M.

Zunanji vplivi so podrobneje prikazani v nadaljevanju načrta v začetku statičnega izračuna (pod naslovom »*Analiza zunanjih vplivov*«). Statični izračuni so priloženi v nadaljevanju v poglavju *»2.4 STATIČNI IZRAČUNI«*.

Pooblaščeni inženir s področja gradbeništva (statik) mora biti obveščen o kakršnikoli težki opremi, ki se bo namestila v objekte stavbe in ni bila upoštevana v statični analizi konstrukcije. Vsaka oprema, težja od 2,00 kN/m$^2$, se smatra za težko.

# 5. POMIKI IN POVESI

## 5.1. Vodoravni in etažni pomiki

Da se izognemo poškodbam nekonstrukcijskih elementov in opreme v stavbi, je treba omejiti etažne pomike. Te omejitve so navedene v SIST EN 1990 in SIST EN 1998-1, vendar se investitor lahko odloči tudi za strožje zahteve.

Po SIST EN 1990 A101 so etažni pomiki večnadstropnih stavb omejeni na največ $H_i/300$ (kjer je $H_i$ višina i-tega nadstropja). Celoten vodoravni pomik konstrukcije ne sme biti večji od $H/500$ (kjer je H višina celotne stavbe). Obema pogojema mora biti zadoščeno za karakteristično obtežno kombinacijo. Omejitve etažnih pomikov po SIST EN 1998-1 so povzete v spodnji preglednici.

*Preglednica 1: Omejitve etažnih pomikov po SIST EN 1998-1*

| vrsta stavbe | največji dovoljeni etažni pomik |
|---|---|
| stavbe, ki imajo na konstrukcijo pritrjene nekonstrukcijske elemente iz krhkih materialov | $0{,}0050 H_i$ |
| stavbe z duktilnimi nekonstrukcijskimi elementi | $0{,}0075 H_i$ |
| stavbe, pri katerih so nekonstrukcijski elementi pritrjeni na konstrukcijo tako, da deformacije konstrukcije nanje ne vplivajo | $0{,}0100 H_i$ |

$H_i$ ... višina nadstropja $i$

## 5.2. Povesi

Omejitve povesov po SIST EN 1990 A101 so povzete v spodnji preglednici.

*Preglednica 2: Omejitve povesov po SIST EN 1990 A101*

| del konstrukcije | mejne vrednosti povesov (1) | |
|---|---|---|
| | zaradi koristne obtežbe | celoten poves |
| strehe na splošno | $L/200$ | $L/250$ |
| pohodne strehe (ne le pri vzdrževanju) | $L/250$ | $L/300$ |
| stropovi na splošno | $L/250$ | $L/300$ |
| strehe in stropovi, ki nosijo krhke obloge (npr. mavec) in zelo toge predelne stene | $L/300$ | $L/350$ |
| stropovi, ki podpirajo stebre, razen v primerih, kjer so ti pomiki izračunani pri celoviti analizi konstrukcije | $L/400$ | $L/500$ |
| kjer je pomik pomemben za videz konstrukcije | $L/250$ | – |

$L$ ... razpon med podporama oziroma dvojna dolžina konzole

(1) pri karakteristični obtežni kombinaciji

# 6. KOMBINACIJE VPLIVOV

Projektne obtežne kombinacije za mejni stanji nosilnosti in uporabnosti so skupaj z ustreznimi varnostnimi in kombinacijskimi faktorji definirane v SIST EN 1990. V nadaljevanju so $G_{k,j}$ in $Q_{k,i}$ karakteristične vrednosti stalne in koristne obtežbe, P je vpliv prednapetja, $A_d$ predstavlja nezgodni vpliv, $A_{Ed}$ pa potresno obtežbo.

## 6.1. Mejno stanje nosilnosti

Stalna in začasna projektna stanja:

$$\sum_{j\geq 1} \gamma_{G,j} G_{k,j} + \gamma_P P + \gamma_{Q,1} Q_{k,1} + \sum_{i>1} \gamma_{Q,i} \psi_{0,i} Q_{k,i}$$

Nezgodna projektna stanja:

$$\sum_{j\geq 1} G_{k,j} + P + A_d + (\psi_{1,1} \text{ali } \psi_{2,1}) Q_{k,1} + \sum_{i>1} \gamma_{Q,i} \psi_{2,i} Q_{k,i}$$

Potresna projektna stanja:

$$\sum_{j\geq 1} G_{k,j} + P + A_{Ed} + \sum_{i\geq 1} \psi_{2,i} Q_{k,i}$$

## 6.2. Mejno stanje uporabnosti

Karakteristična kombinacija:

$$\sum_{j\geq 1} G_{k,j} + P + Q_{k,1} + \sum_{i>1} \psi_{0,i} Q_{k,i}$$

Pogosta kombinacija:

$$\sum_{j\geq 1} G_{k,j} + P + \psi_{1,1} Q_{k,1} + \sum_{i>1} \psi_{2,i} Q_{k,i}$$

Navidezno stalna kombinacija:

$$\sum_{j\geq 1} G_{k,j} + P + \sum_{i\geq 1} \psi_{2,i} Q_{k,i}$$

## 6.3. Varnostni faktorji

*Preglednica 3: Varnostni faktorji za obtežbo*

| | | | |
|---|---|---|---|
| EQU | *stalna in začasna projektna stanja* | | |
| | neugodna | $\gamma_{G,sup}$ | 1˙10 |
| | ugodna | $\gamma_{G,inf}$ | 0˙90 |
| | *spremenljivi vplivi* | | |
| | neugodna | $\gamma_{Q}$ | 1˙50 |
| | ugodna | $\gamma_{Q}$ | 0˙00 |
| STR | *stalna in začasna projektna stanja* | | |
| | neugodna | $\gamma_{G,sup}$ | 1˙35 |
| | ugodna | $\gamma_{G,inf}$ | 1˙00 |
| | *spremenljivi vplivi* | | |
| | neugodna | $\gamma_{Q}$ | 1˙50 |
| | ugodna | $\gamma_{Q}$ | 0˙00 |
| GEO | *stalna in začasna projektna stanja* | | |
| | neugodna | $\gamma_{G,sup}$ | 1˙00 |
| | ugodna | $\gamma_{G,inf}$ | 1˙00 |
| | *spremenljivi vplivi* | | |
| | neugodna | $\gamma_{Q}$ | 1˙30 |
| | ugodna | $\gamma_{Q}$ | 0˙00 |

## 6.4. Kombinacijski faktorji

*Preglednica 4: Kombinacijski faktorji za stavbe*

| vpliv | $\psi_0$ | $\psi_1$ | $\psi_2$ |
|---|---|---|---|
| kategorija A: bivalni prostori | 0˙70 | 0˙50 | 0˙30 |
| kategorija B: pisarne | 0˙70 | 0˙50 | 0˙30 |
| kategorija C: stavbe, kjer se zbirajo ljudje | 0˙70 | 0˙70 | 0˙60 |
| kategorija D: trgovine | 0˙70 | 0˙70 | 0˙60 |
| kategorija E: skladišča | 1˙00 | 0˙90 | 0˙80 |
| kategorija F: prometne površine (teža vozila do 30 kN) | 0˙70 | 0˙70 | 0˙60 |
| kategorija G: prometne površine (teža vozila med 30 kN in 160 kN) | 0˙70 | 0˙50 | 0˙30 |
| kategorija H: strehe | 0˙00 | 0˙00 | 0˙00 |
| sneg (nadmorska višina nad 1000 m) | 0˙70 | 0˙50 | 0˙20 |
| sneg (nadmorska višina pod 1000 m) | 0˙50 | 0˙20 | 0˙00 |
| veter | 0˙60 | 0˙20 | 0˙00 |
| temperarurne spremembe (ne pri požaru) | 0˙60 | 0˙50 | 0˙00 |

# 7. MATERIALI

Izbrani materiali v objektu zagotavljajo uporabnost, nosilnost in trajnost za projektirano življenjsko dobo.

*Preglednica 5: Tabela vgrajenih materialov za nosilne betonske elemente*

| Element: | Kvaliteta betona: | Razred izpostavljenosti: | Dmax [mm] | Krovni sloj [mm] | Kvaliteta armature: |
|---|---|---|---|---|---|
| Podložni beton | C 16/20 | XC0 | 32 | / | / |
| Vodnjaki | C 25/30 | XC2, PV-II | 32 | 50 | B 500B |
| Temeljna plošča | C 30/37 | XC2, PV-II | 32 | 50 | B 500B |
| Vkopane stene | C 30/37 | XC2, PV-II | 22 | 50 | B 500B |
| Etažne in strešne plošče | C 30/37 | XC1, PV-I | 22 | 30 | B 500B |
| Stene in nosilci | C 30/37 | XC1, PV-I | 22 | 30 | B 500B |

Lesena konstrukcija nadstreška nad tehnično etažo mora biti iz primerno obdelanega in sušenega (vlažnost do 15%, sekan pozimi) lesa minimalne kvalitete C24 (smreka) za sekundarne nosilce in minimalne kvaliteta GL24h (lepljeni nosilci) za primarne nosilce.

# 8. POGOJI ZA IZVEDBO

## 8.1. Zagotavljanje in kontrola kvalitete

Zahteva se stalen strokovni nadzor. Izvajalec je pred pričetkom del dolžan pripraviti program tekoče kontrole izdelave, ki mora predpisati vrsto in pogostost preiskav. Program potrdi tehnična služba investitorja ali nadzora.

## 8.2. Armiranobetonski elementi konstrukcije

1) Armiranobetonska konstrukcija se mora izvajati v skladu s standardom SIST EN 13670, medtem ko mora biti betonska mešanica v skladu s SIST EN 206-1 in SIST 1026.
2) Pred pričetkom del na objektu je treba pripraviti projekt betona, ki mora upoštevati veljavne standarde in tehnične normative. Vsebovati mora vsaj naslednje:

   - sestavo betonskih mešanic, vključno s količinami in tehničnimi zahtevami za projektirane kakovostne razrede betona,
   - podatke o dodatkih k betonom, če so potrebni,
   - posebne zahteve (za vidne betonske površine, glede vodotesnosti ipd.),
   - načrt betoniranja in organizacije gradbišča ter podatke o potrebni opremi,
   - podatke o načinu transporta in vgrajevanja betonske mešanice,
   - navodila glede negovanja vgrajenega betona,
   - program kontrolnih preiskav sestavin betona,
   - program kontrole kvalitete betona, odvzemanja vzorcev in preiskav betonske mešanice ter betona po partijah,
   - načrt montaže elementov ter projekt odrov in podpornih stolpov.

3) Samo pri izdelavi etažnih plošč se lahko uporabi delno montažni sistem izvedbe plošč z monolitizacijo na licu mesta (npr. sistem z »*Omnia ploščami*«), pri čemer mora izvajalec izdelati podroben delavniški načrt in ga uskladi z odgovornim projektantom konstrukcije, ki ga tudi potrjuje. Detajli polaganja montažnih plošč morajo biti takšni, da se debeline nosilnih sten ne zmanjšujejo na nivoju etažnih plošč. Spremenjena tehnologija izvedbe etažnih plošč mora omogočati izvedbo horizontalnih vezi (skritih nosilcev) v obeh horizontalnih smereh znotraj debeline etažnih plošč z ustrezno širino vezi (vsaj 25 do 30 cm).

## 8.3. Leseni elementi konstrukcije

### *8.3.1. Zaščitni premazi*

Zaščita lesa pred vlago s kemičnimi sredstvi: Uporabijo se lahko pokrivne pigmentne barve, lazurne barve ali brezbarvni laki (po arhitekturi). V času nanosa zaščitnega premaza vlaga lesa ne sme biti večja od 12-15%, kar je odvisno od zaščitnega sredstva, ki ga nanašamo. Trajnost zaščitnih sredstev

naj bo minimalno 2 leti. Poleg zaščite lesa pred vlago z kemičnimi sredstvi, je potrebno les tudi mehansko ščititi. Predvsem je potrebno zagotoviti ustrezno zračenje lesa (lesene lege, stropovi, opaži na stenah…). Potrebno je zagotoviti čim boljšo mehansko zaščito lesa pred vodo, kakor tudi pred kapilarno vodo, ki se dviga iz temeljev. Pri stikovanju vseh lesnih elementov je potrebno zagotoviti minimalne odmike veznih sredstev. Za vezna sredstva pa uporabiti nerjaveče elemente (vroče cinkano).

Zaščita lesa pred insekti se izvede z fungicidnimi in insekticidnimi sredstvi, ki so lahko organskega ali anorganskega izvora. Tovrstna zaščita se izvede vsaj enkrat v življenjski dobi konstrukcije (prva zaščita se izvede pred vgradnjo lesa v objekt). Pred zaščito lesa mora biti les popolnoma obdelan. Po impregnaciji lesa z zaščitnim sredstvom dodatna obdelava ni več dovoljena. Čelne strani lesa je dovoljeno premazati samo s sredstvi, ki ne preprečujejo zračenja lesa iz strani.

### *8.3.2. Požarna zaščita*

Poleg tega mora biti lesena konstrukcija nadstreška tudi ustrezno protipožarno zaščitena oz. dimenzionirana skladno s požarnim elaboratom (R 30). Protipožarna zaščita se je zagotovila z ustreznim dimenzioniranjem, ki je bilo tudi ustrezno dokazano v dodatnem statičnem izračunu v primeru požara R 30 (dodatna debelina 2 cm na vseh straneh prečnega prereza zaradi zoglenitve sloja med požarom; predpostavka: 0,67 mm/minuto; =0,67 x 30 = 20,1 mm).

# 9. ZAKLJUČNE OPOMBE

V primeru kakršnih koli odstopanj, ki so navedene v tem projektu, se je potrebno predhodno posvetovati s pooblaščenim inženirjem s področja gradbeništva - statikom.

Predvideno je, da si delavniške načrte lesene konstrukcije nadstreška izdela izvajalec le-te glede na predvideno tehnologijo izdelave.

Pred začetkom izvedbe temeljev oz. pri izkopu temeljnih tal je na gradbišču nujna prisotnost geomehanika, ki bo ob pregledu temeljnih tal podal morebitna dodatna navodila za izvedbo temeljenja objekta oz. prilagoditve dolžine posameznih vodnjakov glede na dejansko globino do nosilnih temeljnih tal.

V Novi Gorici, december 2021

Pooblaščena inženirja s področja gradbeništva - statika:

Vilko Šuligoj, univ. dipl. inž. grad.

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# 2.4 STATIČNI IZRAČUN

# STATIČNI IZRAČUN

**DSO Bovec**

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# 1 ANALIZA ZUNANJIH VPLIVOV

## 1.1 Vpliv lastne teže konstrukcije

Specifične teže materialov, uporabljenih pri analizi obstoječega stanja oz. gradnji novih konstrukcijskih elementov, so navedene v standardu SIST EN 1991-1-1. Lastna teža konstrukcije je določena ob upoštevanju specifične teže, navedenih spodaj.

*Preglednica 1: Specifične teže materialov, uporabljenih za izračun lastne teže konstrukcije*

| Material | γ [kN/m$^3$] |
|---|---|
| beton | 24,0 |
| armiran beton | 25,0 |
| opečni zid iz polne opeke | 18,0 |
| opečni zid iz votlakov | 15,0 |
| smrekov les | 5,0 |
| jeklo | 78,3 |

## 1.2 Vpliv stalne teže

### 1.2.1 Obloge tal in stropov

Velikost stalne obtežbe konstrukcije, ki je posledica finalnih oblog, je razvidna v spodnjih tabelah.

***Ravna strešna plošča (naklon 0°)***

| Sloj | *d* [cm] | *γ* [kN/m$^3$] | $g_k$ [kN/m$^2$] |
|---|---|---|---|
| bitumenski trakovi (2 x 5 mm) | 1,00 | 24,0 | 0,25 |
| toplotna izolacija (PIR pena + EPS; skupna debelina: 32-36 cm) | 34,00 | 0,8 | 0,30 |
| parna zapora na bitumenskem premazu | | | |
| inštalacije in spuščen strop | | | 0,25 |
| ***dejansko upoštevana obtežba*** | | | ***1,00*** |

***Etažna plošča***

| sloj | *d* [cm] | *γ* [kN/m$^3$] | $g_k$ [kN/m$^2$] |
|---|---|---|---|
| betonski estrih (do 11,5 cm) s končnim tlakom (do 1,5 cm) | 13,00 | 24,0 | 3,10 |
| PE folija in zvočna izolacija | 3,00 | 0,8 | 0,10 |
| inštalacije in spuščen strop | | | 0,25 |
| ***dejansko upoštevana obtežba*** | | | ***3,50*** |

***Talna/temeljna plošča***

| sloj | *d* [cm] | *γ* [kN/m$^3$] | $g_k$ [kN/m$^2$] |
|---|---|---|---|
| betonski estrih (do 11,5 cm) s končnim tlakom (do 1,5 cm) | 13,00 | 24,0 | 3,10 |
| PE folija in zvočna izolacija | 3,00 | 0,8 | 0,10 |
| ***dejansko upoštevana obtežba*** | | | ***3,30*** |

***Obloga nad lesenim nadstreškom tehnične etaže***

| Sloj | *d* [cm] | *γ* [kN/m$^3$] | $g_k$ [kN/m$^2$] |
|---|---|---|---|
| Strešna pločevina | 0,30 | 78,3 | 0,23 |
| OSB plošče (2 x 22 mm) | 4,40 | 7,0 | 0,30 |
| toplotna izolacija (debelina: 16-20 cm) | 20,00 | 0,8 | 0,15 |
| parna zapora | | | |
| obloga iz mavčnih plošč (debelina 25 mm) | 2,50 | 9,0 | 0,22 |
| inštalacije | | | 0,10 |
| ***dejansko upoštevana obtežba*** | | | ***1,00*** |

### 1.2.2 Težke predelne stene

Velikost stalne obtežbe konstrukcije, ki je posledica težjih predelnih sten, je sledeča:

$$G_{predelne} = 0{,}15 \times 3{,}8 \times 15{,}0 = \mathbf{9{,}0\ kN/m'},$$

kjer je predpostavljena višina predelnih sten 3,8 m in debeline 0,15 m s specifično težo 15 kN/m$^3$.

### 1.2.3 Leseni nadstrešek nad tehnično etažo

Velikost lastne in stalne obtežbe lesenega nadstreška, ki je nameščena na območju tehnične etaže na strehi stavbe, je sledeča:

$$G_{lesen\text{-}nadstrešek} = 2{,}5 \times 4{,}0 = \mathbf{10{,}0\ kN/m'},$$

kjer je predpostavljena teža lesene konstrukcije vključno z oblogami **250 kg/m$^2$** na predpostavljeni površini **8,0 m x 17,0 m** in vplivno širino **B=4,0 m** za izračun linijske obtežbe vpliva. Lokacija upoštevana vpliva je razvidna v izpisih računskega modela.

### 1.2.4 Klimati na AB proti vibracijskih ploščah

Velikost stalne obtežbe klimatov vključno z AB proti vibracijskimi ploščami je sledeča:

$$g_{klimati} = 14{,}0 / 4{,}0 + 0{,}20 \times 25{,}0 = 3{,}5 + 5{,}0 = \mathbf{8{,}5\ kN/m^2},$$

kjer je predpostavljena maksimalna teža klimata **1400 kg** z velikostjo **1,0 m x 4,0 m** in dodatna AB proti vibracijska plošča pod njim v debelini **20 cm**. Lokacija upoštevanega vpliva je razvidna v izpisih računskega modela.

### 1.2.5 Fasada

Velikost stalne obtežbe fasade je sledeča:

$$G_{fasada} = 1{,}50 \times 4{,}0 = \mathbf{6{,}0\ kN/m'},$$

kjer je predpostavljena višina etaže 4,0 m in teža fasade 1,50 kN/m$^2$.

## 1.3 Vpliv koristne obtežbe

Nivo koristne obtežbe določa standard SIST EN 1991-1-1. Investitor se lahko odloči za večje obremenitve, vendar mora o tem pisno obvestiti projektanta gradbenih konstrukcij. Obremenitve, manjše od tistih, ki jih določa standard, niso dopustne. V preglednici spodaj so povzete koristne obremenitve glede na namen uporabe prostorov.

*Preglednica 2: Koristna obtežba*

| opis uporabe | kategorija | $q_k$ [kN/m$^2$] | $Q_k$ [kN] |
|---|---|---|---|
| sobe in kopalnice, hodniki, večnamenski prostori | C1 | **2,5** | 3,0 |
| stopniščne rame in podesti | C1 | **3,0** | 4,0 |
| strehe dostopne le za normalno vzdrževanje in popravila, tehnična etaža na strehi brez opreme | H | **0,8** | 1,0 |

### 1.3.1 Lahke predelne stene

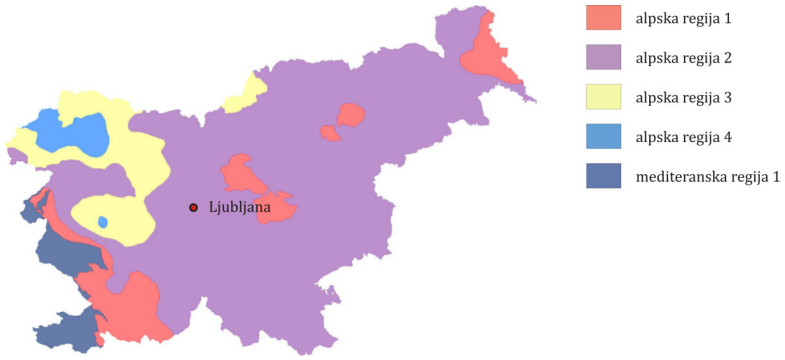
Lastna teža lahkih predelnih sten se upošteva kot razporejena koristna obtežba, v kolikor gre za elemente lažje od 3,0 kN/m. V nasprotnem primeru se jih upošteva kot stalno obtežbo z dejansko vrednostjo in položajem.

Pri analizi konstrukcije so bile predelne stene upoštevane kot koristna obtežba **1,20 kN/m$^2$**.

## 1.4 Vplivi snega

Po standardu SIST EN 1991-1-3 se stavba nahaja v coni A3 (Bovec), in sicer na 450 m nadmorske višine. Karakteristična obtežba snega na ravnih tleh tako znaša

$$s_k = 1{,}935\left[1+\left(\frac{A}{728}\right)^2\right] = 1{,}935\left[1+\left(\frac{450}{728}\right)^2\right] = 2{,}67\ \mathrm{kN/m^2}.$$



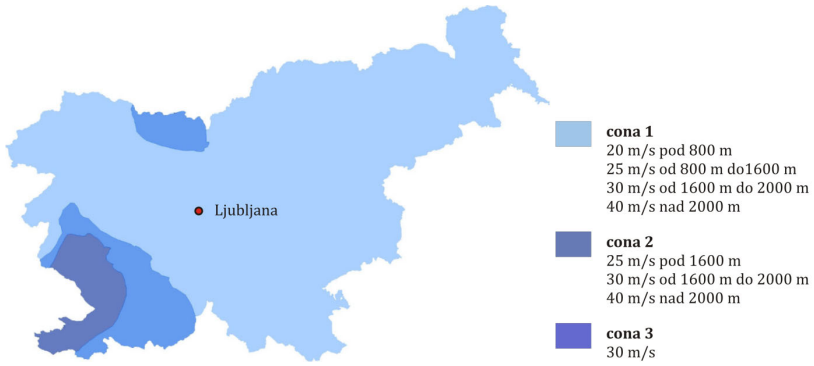

*Slika 1: Regije za določitev obtežbe zaradi snega*

Za ravno streho (α = 0°):

$$s = \mu_1(\alpha = 0°)C_eC_ts_k = 0{,}8 \times 1{,}0 \times 1{,}0 \times 2{,}67 = \mathbf{2{,}14\ kN/m^2}$$

## 1.5 Vplivi vetra

Po standardu SIST EN 1991-1-4 se stavba nahaja v coni 1 (Bovec), in sicer na 450 m nadmorske višine. Referenčna hitrost vetra tako znaša $v_{b,0} = 20$ m/s.




*Slika 2: Cone za določitev obtežbe zaradi vetra*

Globalna analiza konstrukcije je pokazala, da veter ne v mejnem stanju uporabnosti ne v mejnem stanju nosilnosti ni merodajna vodoravna obtežba.

Za račun lesene konstrukcije nadstreška tehnične etaže je bil vpliv vetra upoštevan po spodnjih predpostavkah:

- višina lokacije lesenega nadstreška z = 15,0 m
- osnovna hitrost vetra $v_b = C_{dir}C_{season}v_{b,0} = 1.0 \times 1.0 \times 20 = 20\ m/s$
- III. kategorija terena
- osnovni tlak vetra $q_0 = \frac{1}{2}\rho v_b^2 = 0{,}5 \times 1{,}25 \times 20^2 = 0{,}25\ kN/m^2$
- faktor izpostavljenosti $c_e(z) = 2{,}0$
- tlak pri največji hitrosti ob sunkih vetra $q_p(z) = c_e(z)q_0 = 2{,}0 \times 0{,}250 = 0{,}500\ kN/m^2$

a.) Streha nadstreška (ravni del; α=0°; ostri kapni rob)

$w_{e,G,F,H,I}$ = 0,50×(-2,0) = **-1,00 *kN/m²***

b.) Streha nadstreška (poševni del; α=45°)

θ=0°:

$w_{e,G,F,H,I}$ = 0,50×(+0,7) = **+0,30 *kN/m²*** *(tlak na privetrni strani)*

θ=180°:

$w_{e,G,F,H,I}$ = 0,50×(-1,0) = **-0,50 *kN/m²*** *(srk na zavetrni strani)*

(θ=90°):

$w_{e,G,F,H,I}$ = 0,50×(-2,0) = **-1,00 *kN/m²*** *(srk v vzdolžni smeri)*

c.) Vertikalne stene nadstreška:

$w_{e,D}$ = 0,50×(1,0) = **+0,50 *kN/m²*** *(tlak na privetrni strani)*

$w_{e,E}$ = 0,50×(-0,7) =**-0,35 *kN/m²*** *(srk na zavetrni strani)*

$w_{e,A}$ = 0,50×(-1,4) =**-0,70 *kN/m²*** *(srk na pravokotnih fasadah)*

## 1.6 Reološki vplivi

Reološki vplivi (krčenje in lezenje betona) so bili upoštevani. Izračun reoloških vplivov lezenja in krčenja je izračunan s programom SOFiSTiK v globalnem računskem modelu v skladu s standardom SIST EN 1992-1-1 za tri faze:

- 1.faza: 38 dni po izvedenih vseh betonskih delih
- 2.faza: 100 dni po obremenitvi s stalno obtežbo
- 3.faza: preko 80 let (neskončno stanje) – za določitev končnega vpliva lezenja

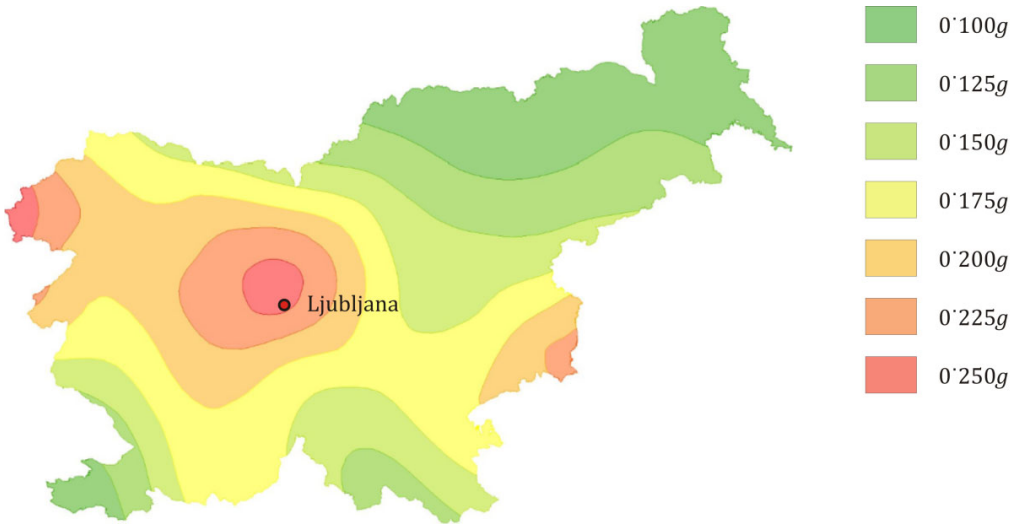
**Vhodni parametri izračuna:**

- kvaliteta betona: C 30/37
- srednja relativna vlažnost okolja: RH = 70%
- temperatura okolja 20°C
- cement razreda N (normalno strjevanje cementa)

## 1.7 Potresni vplivi

Za obravnavano stavbo v Bovcu smo upoštevali naslednje predpostavke za potresne vplive: temeljna tla smo prevzeli takšna, da jih glede na SIST EN 1998-1, lahko razvrstimo v kategorijo E (glede na GG poročilo), projektni pospešek temeljnih tal ob upoštevanju II. kategorije pomembnosti stavbe ($\gamma_{\mathrm{I}} = 1{,}0$) in faktorja tal $S = 1{,}7$ tako znaša

$$a_{\mathrm{g}} = \gamma_{\mathrm{I}} a_I S = 1{,}0 \times 0{,}225g \times 1{,}7 = \mathbf{0,38}\boldsymbol{g}.$$




*Slika 3: Karta projektnih pospeškov temeljnih tal za povratno dobo 475 let*

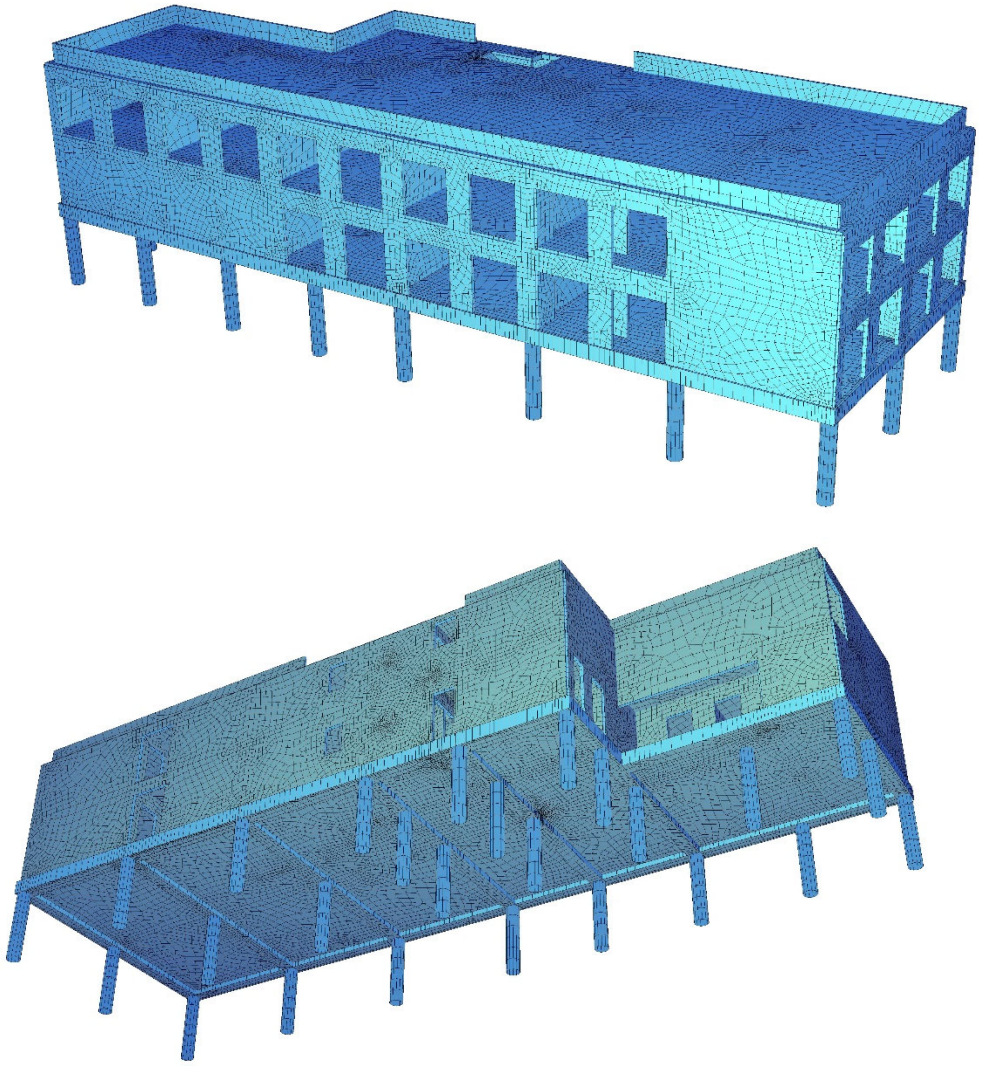
Za obe horizontalni smeri delovanja potresne obtežbe smo predpostavili faktor obnašanja q = 2,0 (torzijsko podajen stenasti konstrukcijski sistem; srednji razred duktilnosti »DCM«). Pri računu mas, sta bili poleg lastne in stalne teže, upoštevani tudi koristna obtežba. Koristna obtežba (večinoma kategorija C) je bila upoštevana s faktorjem $\gamma_{Q,C} = \phi \times \Psi_{2,C} = 0{,}8 \times 0{,}6 = 0{,}50$.

# 2 Statična in dinamična analiza

## 2.1 ZAHODNA DILATACIJSKA ENOTA STAVBE

### 2.1.1 Predpostavke globalnega računskega modela – zahodna dil. enota

Statična in dinamična (seizmična) analiza konstrukcije **zahodne dilatacijske enote stavbe** je bila izvedena s pomočjo prostorskega računskega modela iz lupinastih in linijskih končnih elementov v programu *SOFiSTiK FEM ver.2018*. Konstrukcijski nosilni sistem je stenasti iz armiranega betona. Opravljena je bila analiza po teoriji prvega reda. Globalni računski model sestavljajo: AB vodnjaki povezani s temeljno ploščo z odebelitvami, armiranobetonske (AB) stene in plošče. Stavba je etažnosti P+N (2-etažna stavba; + tehnična etaža na delu tlorisa strehe). Predpostavljene etažne višine do 4,0 m. Horizontalne dimenzije računskega modela so 16,5 m × 48,5 m. Tipičen raster med stenami je 8,0 m oz. 4,0 m. Upoštevana debelina etažne in strešne plošče je 25 cm. Upoštevana debelina sten je 20 cm in debelina atičnih nosilcev 15 cm ter višina 120 cm. Predpostavljena debelina temeljne plošče je 50 cm z odebelitvami (pasovnimi temelji) višine 80 cm in širini 60 cm (robni) oz. 80 cm (vmesni).



*Slika 4: Globalni računski model v SOFiSTiKu – zahodna dilatacijska enota stavbe*

Vpliv potresa na konstrukcijo je bil določen z modalno analizo s spektri odziva z uporabo linearno-elastičnega modela konstrukcije. Izbrano je bilo duktilno obnašanje konstrukcije (stopnja DCM) z redukcijskim faktorjem duktilnosti q=2,0 (stenasti AB konstrukcijski sistem; torzijsko podajen) za obe horizontalni smeri vpliva potresa. Pri modalni analizi konstrukcije so bili upoštevani razpokani prerezi za vse obstoječe armiranobetonske elemente. Razpokanost prerezov v programu *SOFiSTiK FEM ver. 2018* se za modalno analizo določi tako, da se za posamezne elemente preko t.i. grup elementov določi faktor zmanjšanja togosti, za katerega se običajno prevzame, da je enak 0,5 (polovična togost nosilnih elementov).

Mase v računskem modelu so bile upoštevane po pravilu SIST EN 1991-1, točka 3.2.4 (2)P. Upošteva se le del mase, ki izhaja iz koristne obtežbe (glede na koeficiente za kombinacijo $\psi_{E,i}$ za različne kategorije koristne obtežbe), in celotna masa, ki izhaja iz lastne in stalne obtežbe na objektu. Koeficienti za kombinacijo $\psi_{E,i}$ upoštevajo verjetnost, da v času potresa koristna obtežba ni prisotna po celotni konstrukciji. Koristna obtežba (kategorija C) je bila upoštevana s faktorjem $\gamma_{Q,C} = \phi \times \Psi_{2,C} = 0,8 \times 0,6 = 0,50$.

Vpliv naključne torzije (SIST EN 1998-1, točka 4.3.2 (1)P), ki jo je potrebno pri seizmični analizi računskega modela objekta upoštevati zaradi negotovosti, povezanih s položajem mas in s prostorskim spreminjanjem potresnega gibanja, se v računalniškem programu SOFiSTiK izvede avtomatično, s posebnim postopkom: projektni spekter za horizontalne potresne vplive se definira v štirih smereh (X+, Y-, Y+, Y-) tako, da se za vsako smer po posameznih etažah definira slučajno ekscentričnost (glede na formulo št. 4.3 v 4. poglavju SIST EN 1998-1), ki vpliva na premaknitev masnega središča v vsaki etaži iz nazivne lege. V nadaljevanju program SOFiSTiK avtomatsko izračuna potresne sile v vozliščih (iz mas v vozliščih in podanih pospeškov iz projektnega spektra), ki vključujejo vpliv naključne torzije.

Vpliv nihajnih oblik je upoštevan s popolno kvadratno kombinacijo (CQC), pri čemer naj bi vsota efektivnih modalnih mas znašala več kot 90% celotne mase konstrukcije (upoštevanih je bilo 50 lastnih nihajnih oblik modela, pri čemer smo se približali temu pogoju; s povečevanjem števila nihajnih oblik do 150 se odstotek bistveno ni spremenil; lahko bi kvečjemu lastno težo sten upoštevali kot obtežbo s čimer bi se izognili lokalnemu nihanju le-teh). Za kombinacijo vodoravnih komponent potresnega vpliva (kombiniranje smeri X in Y) učinek obeh vodoravnih komponent potresnega vpliva upoštevamo tako, da predpostavimo, da potres deluje 100% v eni in 30% v drugi smeri ter obratno (po principu $E_{Edx}$"+"$0.3E_{Edy}$ oz. $0.3E_{Edx}$"+"$E_{Edy}$ iz SIST EN 1998-1 točka 4.3.3.5.1 (3)).

V računskem modelu je bila modelirani tudi armiranobetonska temeljna plošča in AB vodnjaki s premerom Ø80 cm. Za novogradnjo objekta je bilo izdelano GG poročilo (*št. DN 2003902, GI ZRMK d.o.o. Ljubljana, 22.11.2010*), v katerem ni predpisanih modulov reakcije temeljnih tal. Glede na sestavo tal smo predpostavili modula reakcije temeljnih tal pod temeljno ploščo v vrednosti $k_v$ = 10.000 kN/m$^3$ in $k_h$ = 0,7 x 10.000 = 7.000 kN/m$^3$. Vertikalni modul reakcije temeljnih tal pod vodnjaki pa smo predpostavili v vrednosti $k_{v,vodnjaki}$ = 40.000 kN/m$^3$. Predpostavljena je bila višina vodnjakov 5,0 m.

Dimenzioniranje računske armature v armiranobetonskih elementih je bilo izvedeno s pomočjo programa SOFiSTiK za mejni stanji nosilnosti (MSN in MSN-Potres). Rezultati so priloženi v nadaljevanju.

### 2.1.2 Osnovni obtežni slučaji v globalnem rač. modelu

*Preglednica 3: Osnovni obtežni slučaji v globalnem računskem modelu*

| | Obtežni slučaj | OPIS |
|---|---|---|
| ***G*** | 1 | Lastna teža konstrukcije (razen temeljev) |
| | 2 | Stalna obtežba – obloge tal in stropov |
| | 3 | Stalna obtežba – predelne stene |
| | 4 | Stalna obtežba – fasada |
| | 9 | Lastna teža temeljev * |
| ***Q*** | 11 | Koristna obtežba (kategorija C) |
| | 12 | Koristna obtežba (kategorija H) |
| ***S*** | 21 | Sneg |
| ***E*** | 601, 611 | Potresna obt. (projektni spekter) v horizontalnih smereh X in Y brez slučajne torzije |
| | 701, 711 | Potresna obt. (elastični spekter) v horizontalnih smereh X in Y brez slučajne torzije |
| | 801, 802, 811, 812 | Potresna obt. (projektni spekter) v horizontalnih smereh X in Y s slučajno torzijo |
| | 901, 902, 911, 912 | Potresna obt. (elastični spekter) v horizontalnih smereh X in Y s slučajno torzijo |

** Lastna teža temeljev (temeljna plošča in pasovni temelji) je podana z obtežbo, da jo je možno izklopiti v primeru modalne analize za izračun lastnega nihanja konstrukcije.*

### 2.1.3 Grupe elementov v globalnem računskem modelu

*Preglednica 4: Grupe elementov v globalnem računskem modelu*

| **GRUPE** | **OPIS** |
|---|---|
| 100 | Temelji (temeljna plošča in pasovni temelji) |
| 101 | Vodnjaki |
| 110 | Etažna plošča (nad pritličjem) |
| 120 | Strešna plošča (nad nadstropjem) |
| 105, 115 | Stopniščne rame in podesti |
| od 201 do 213 | Stene v prečni smeri |
| od 251 do 257 | Stene in nosilci v vzdolžni smeri |
| od 301 do 302 | Atični nosilci v prečni smeri |
| od 351 do 352 | Atični nosilci v vzdolžni smeri |

## 2.1.4 Rezultati analize lastnega nihanja

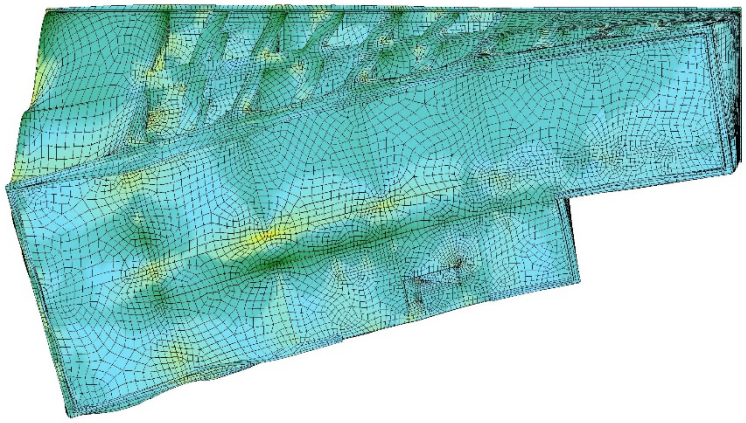
*Preglednica 5: Lastne nihajne dobe za analizo potresnih vplivov*

| Nihajna oblika | *T* [s] | Angažiranost mase - X smer [%] | Angažiranost mase - Y smer [%] | Efektivna masa - X smer [%] | Efektivna masa - Y smer [%] |
|---|---|---|---|---|---|
| **1** | **0,129** | 54,52 | 0,55 | **54,52** | **0,55** |
| **2** | **0,104** | 68,14 | 33,44 | **13,62** | **32,89** |
| **3** | **0,083** | 73,64 | 79,08 | **5,50** | **45,64** |
| 4 | 0,059 | 73,65 | 79,09 | 0,01 | 0,01 |
| 5 | 0,054 | 73,82 | 79,18 | 0,17 | 0,09 |
| 6 | 0,052 | 73,84 | 79,18 | 0,02 | 0,00 |
| 7 | 0,052 | 73,85 | 79,18 | 0,01 | 0,00 |
| 8 | 0,052 | 73,85 | 79,34 | 0,00 | 0,16 |
| 9 | 0,052 | 73,87 | 79,34 | 0,02 | 0,00 |
| 10 | 0,051 | 73,90 | 79,34 | 0,03 | 0,00 |
| 11 | 0,050 | 73,91 | 79,34 | 0,01 | 0,00 |
| 12 | 0,049 | 73,92 | 79,34 | 0,01 | 0,00 |
| 13 | 0,048 | 74,16 | 79,34 | 0,24 | 0,00 |
| 14 | 0,047 | 74,22 | 79,34 | 0,06 | 0,00 |
| 15 | 0,046 | 74,23 | 79,37 | 0,01 | 0,03 |
| 16 | 0,044 | 74,25 | 79,38 | 0,02 | 0,01 |
| 17 | 0,044 | 74,31 | 79,41 | 0,06 | 0,03 |
| 18 | 0,043 | 75,50 | 79,57 | 1,19 | 0,16 |
| 19 | 0,042 | 76,99 | 79,67 | 1,49 | 0,10 |
| 20 | 0,041 | 76,99 | 79,73 | 0,00 | 0,06 |
| 21 | 0,040 | 76,99 | 79,73 | 0,00 | 0,00 |
| 22 | 0,038 | 76,99 | 79,74 | 0,00 | 0,01 |
| 23 | 0,038 | 76,99 | 79,74 | 0,00 | 0,00 |
| 24 | 0,038 | 76,99 | 79,80 | 0,00 | 0,06 |
| 25 | 0,038 | 76,99 | 80,00 | 0,00 | 0,20 |
| 26 | 0,037 | 76,99 | 80,01 | 0,00 | 0,01 |
| 27 | 0,037 | 76,99 | 80,02 | 0,00 | 0,01 |
| 28 | 0,036 | 77,02 | 80,06 | 0,03 | 0,04 |
| 29 | 0,036 | 77,04 | 80,07 | 0,02 | 0,01 |
| 30 | 0,036 | 77,05 | 80,57 | 0,01 | 0,50 |
| 31 | 0,036 | 77,08 | 80,67 | 0,03 | 0,10 |
| 32 | 0,035 | 77,16 | 80,92 | 0,08 | 0,25 |
| 33 | 0,034 | 77,25 | 80,92 | 0,09 | 0,00 |
| 34 | 0,034 | 77,36 | 80,94 | 0,11 | 0,02 |
| 35 | 0,034 | 77,53 | 80,97 | 0,17 | 0,03 |
| 36 | 0,034 | 77,53 | 81,53 | 0,00 | 0,56 |
| 37 | 0,034 | 77,60 | 83,05 | 0,07 | 1,52 |
| 38 | 0,034 | 77,60 | 83,07 | 0,00 | 0,02 |
| 39 | 0,033 | 77,61 | 83,08 | 0,01 | 0,01 |
| 40 | 0,033 | 77,75 | 83,17 | 0,14 | 0,09 |
| 41 | 0,033 | 77,82 | 83,45 | 0,07 | 0,28 |
| 42 | 0,033 | 77,83 | 83,59 | 0,01 | 0,14 |
| 43 | 0,032 | 77,85 | 83,72 | 0,02 | 0,13 |
| 44 | 0,032 | 77,94 | 84,34 | 0,09 | 0,62 |

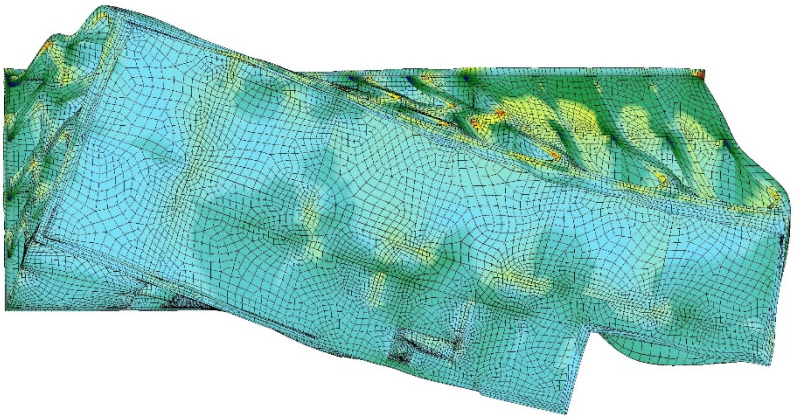
| | | | | | |
|---|---|---|---|---|---|
| 45 | 0,031 | 77,94 | 84,62 | 0,00 | 0,28 |
| 46 | 0,031 | 77,95 | 84,63 | 0,01 | 0,01 |
| 47 | 0,030 | 77,99 | 84,96 | 0,04 | 0,33 |
| 48 | 0,030 | 78,05 | 85,12 | 0,06 | 0,16 |
| 49 | 0,030 | 78,09 | 85,20 | 0,04 | 0,08 |
| **50** | 0,029 | **78,40** | **85,46** | 0,31 | 0,26 |

S prvimi 50 nihajnimi oblikami nismo popolnoma zadostili pogoju vsote efektivnih modalnih mas (angažiranost mas) nad več kot 90% celotne mase konstrukcije, vendar smo se le-temu zelo približali. Prve tri nihajne oblike so prikazane v nadaljevanju (prva in tretja sta pretežno translacijski obliki, druga pa je torzijska; zato smo redukcijski faktor q omejili na vrednost 2.0).

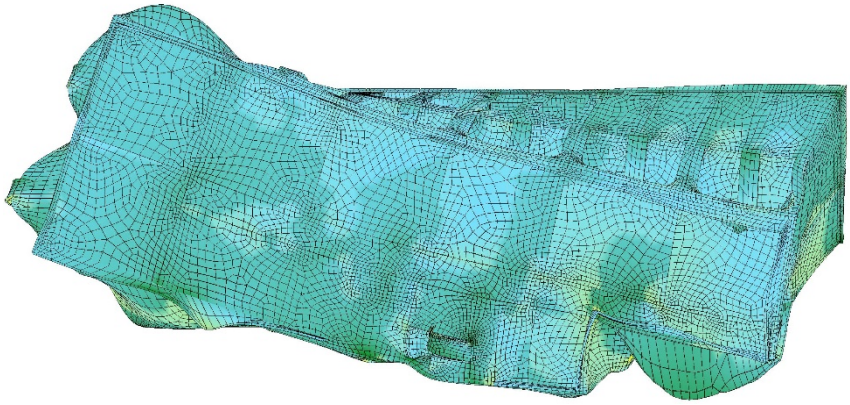
1. nihajna oblika



2. nihajna oblika



3. nihajna oblika



*Slika 5: Glavne tri globalne nihajne oblike*

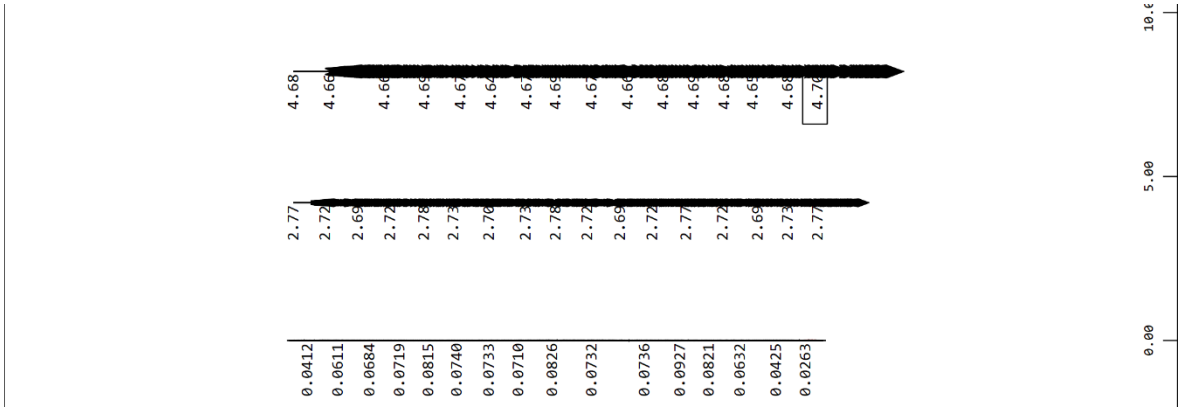
## 2.1.5 Kontrola horizontalnih etažnih zamikov konstrukcije

Za kontrolo etažnih pomikov konstrukcije v primeru potresne obtežbe (elastičen spekter) je bil upoštevan najstrožji kriterij po SIST EN 1998-1, ki predvideva, da so na konstrukcijo pritrjeni nekonstrukcijski elementi iz krhkih materialov.

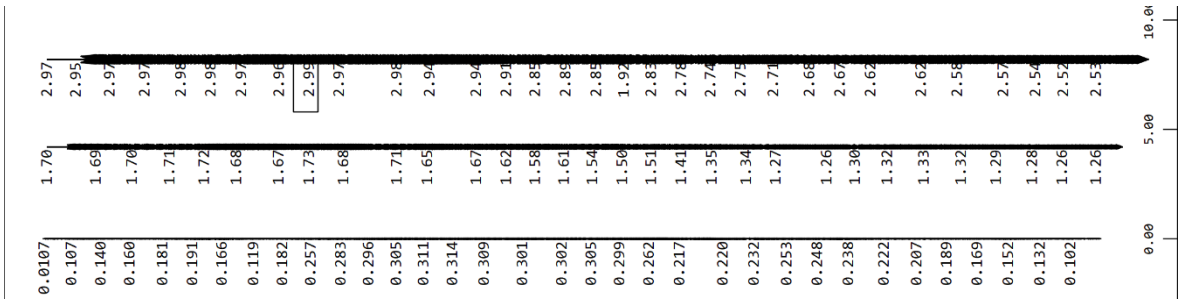
*Preglednica 6: Kontrola horizontalnih etažnih zamikov konstrukcije*

| etaža | $H$ [m] | $h$ [m] | $d_X$ [mm] | $d_Y$ [mm] | $d_{r,X}$ [mm] | $d_{r,Y}$ [mm] | **$d_{r,X}$ [%]** | **$d_{r,Y}$ [%]** | $d_{r,max}$ [%] |
|---|---|---|---|---|---|---|---|---|---|
| P | 0,00 | | 0,0 | 0,0 | | | | | |
| 1N | 4,00 | 4,00 | 2,8 | 1,7 | 2,8 | 1,7 | **0,07** | **0,04** | ≤ 1,00 |
| ST | 8,00 | 4,00 | 4,7 | 3,0 | 4,7 | 3,0 | **0,12** | **0,08** | ≤ 1,00 |

$H$ … absolutna višinska kota, $h$ … višina etaže, $d_X$ … pomik v smeri X, $d_Y$ … pomik v smeri Y, $d_{r,X}$ … etažni pomik v smeri X, $d_{r,Y}$ … etažni pomik v smeri Y, $d_{r,max}$ ... največji dovoljeni etažni pomik po SIST EN 1998-1

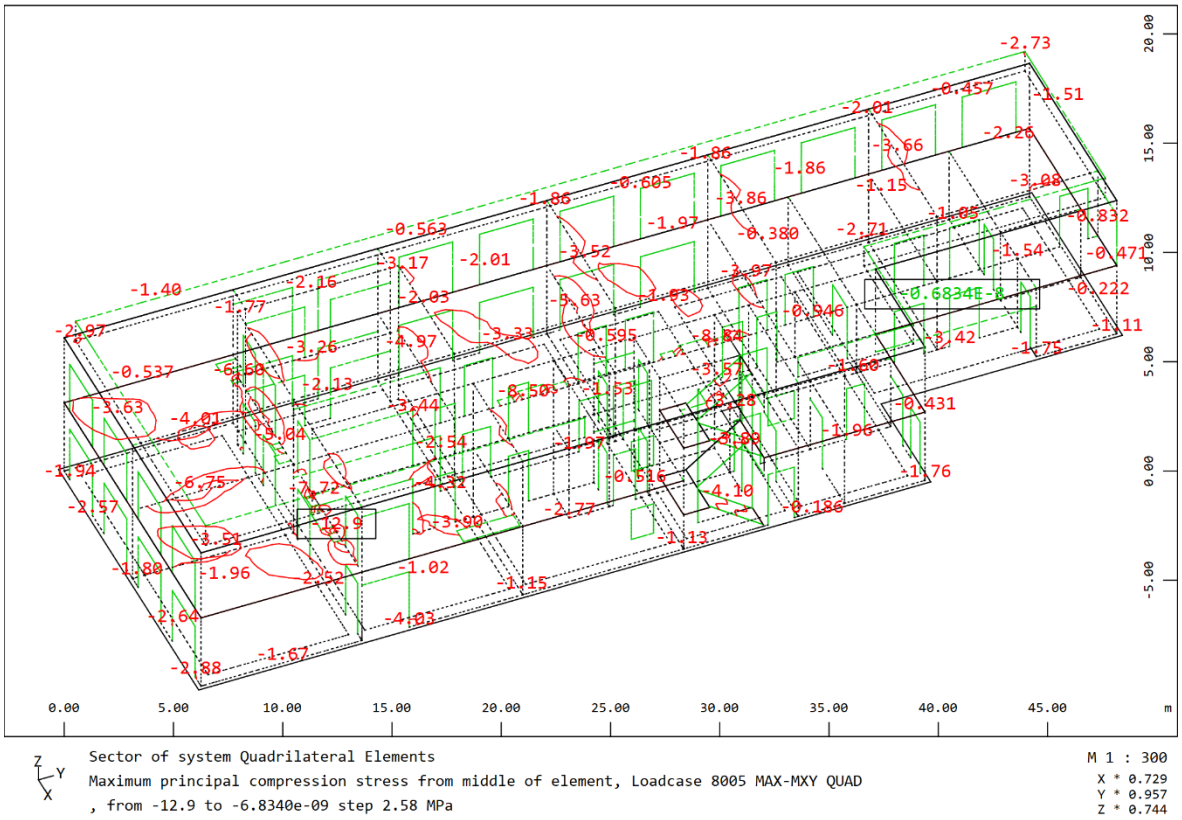



*Slika 6: Maksimalni horizontalni pomiki v X smeri zaradi potresa v X smeri*




*Slika 7: Maksimalni horizontalni pomiki v Y smeri zaradi potresa v Y smeri*

## 2.1.6 Kontrola maks. tlač. napetosti v betonu za mejno stanje uporabnosti



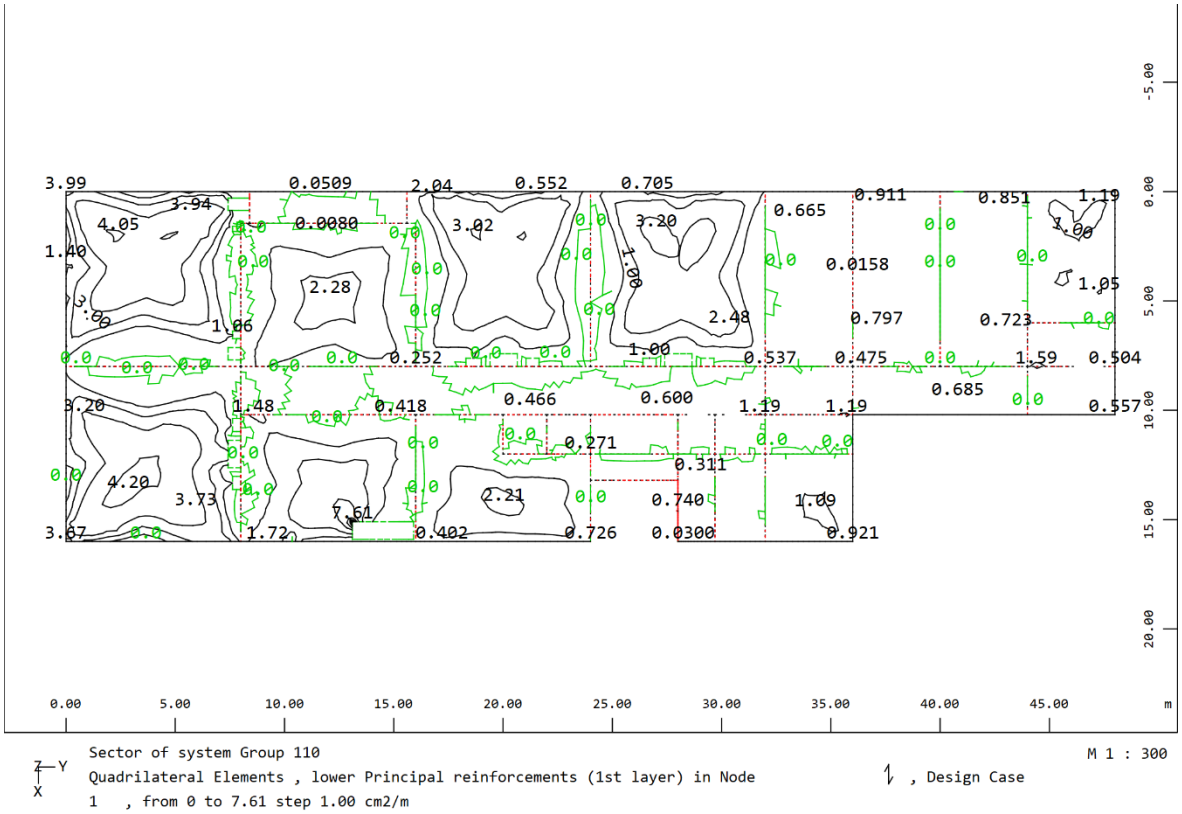

*Slika 8: Maksimalne tlačne napetosti v betonu v AB elementih (MSU-kar)*

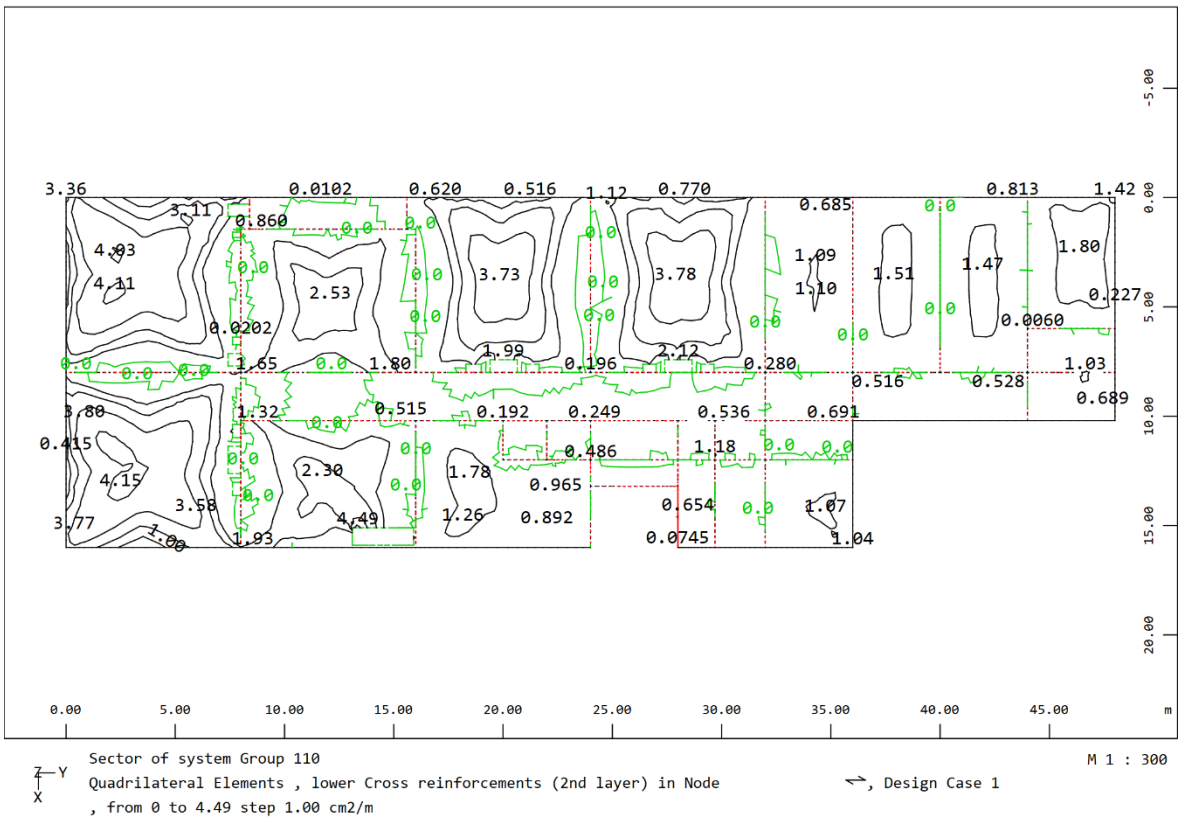
**Kontrola:**

Kvaliteta betona: C 30/37

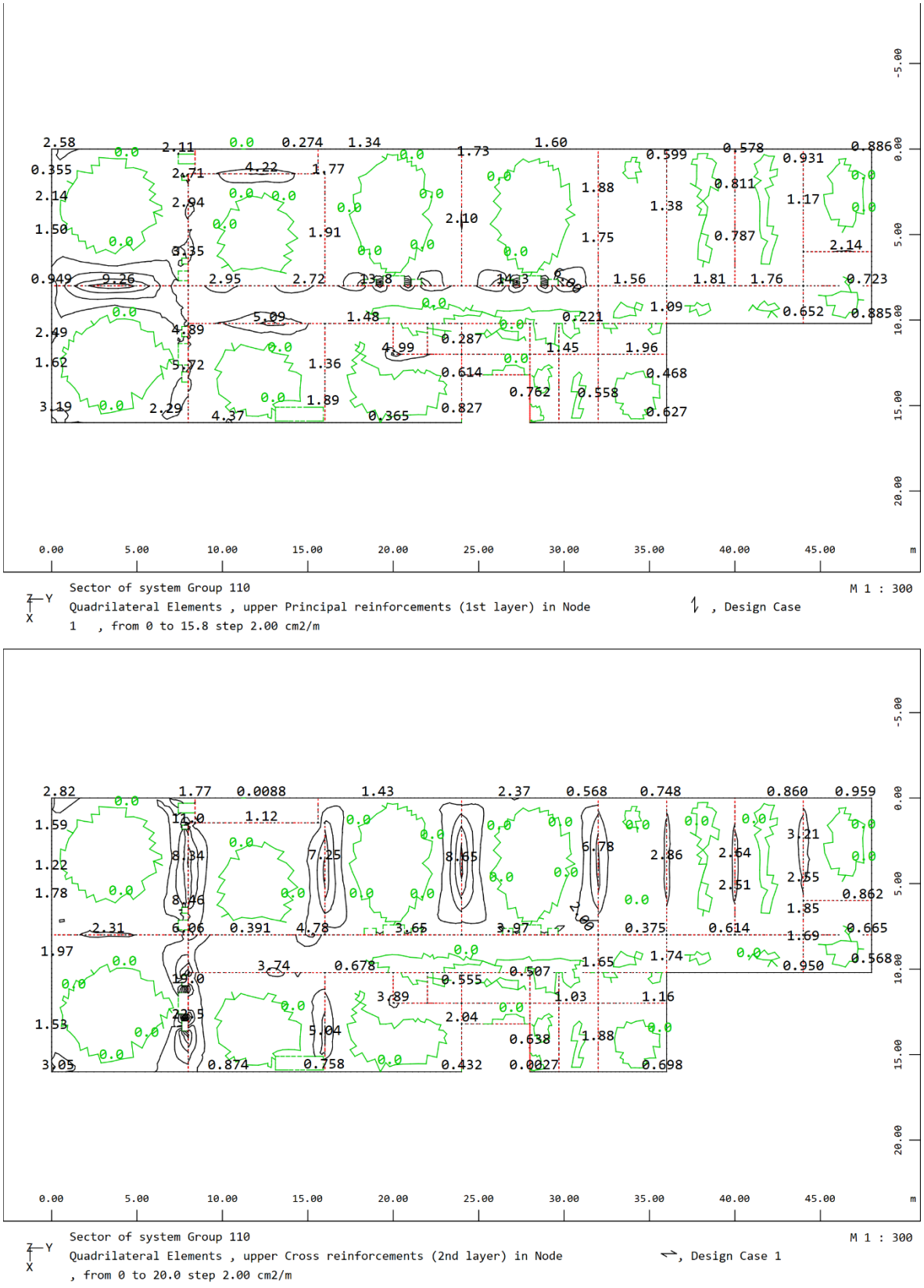
Kontrola: $\sigma_{sc,max,karakt}$ =**12,9 MPa** < 0,6×$f_{ck}$ = 0,6×30,0 = **18,0 MPa** ✓

## 2.1.7 Računsko potrebna armatura v AB elementih

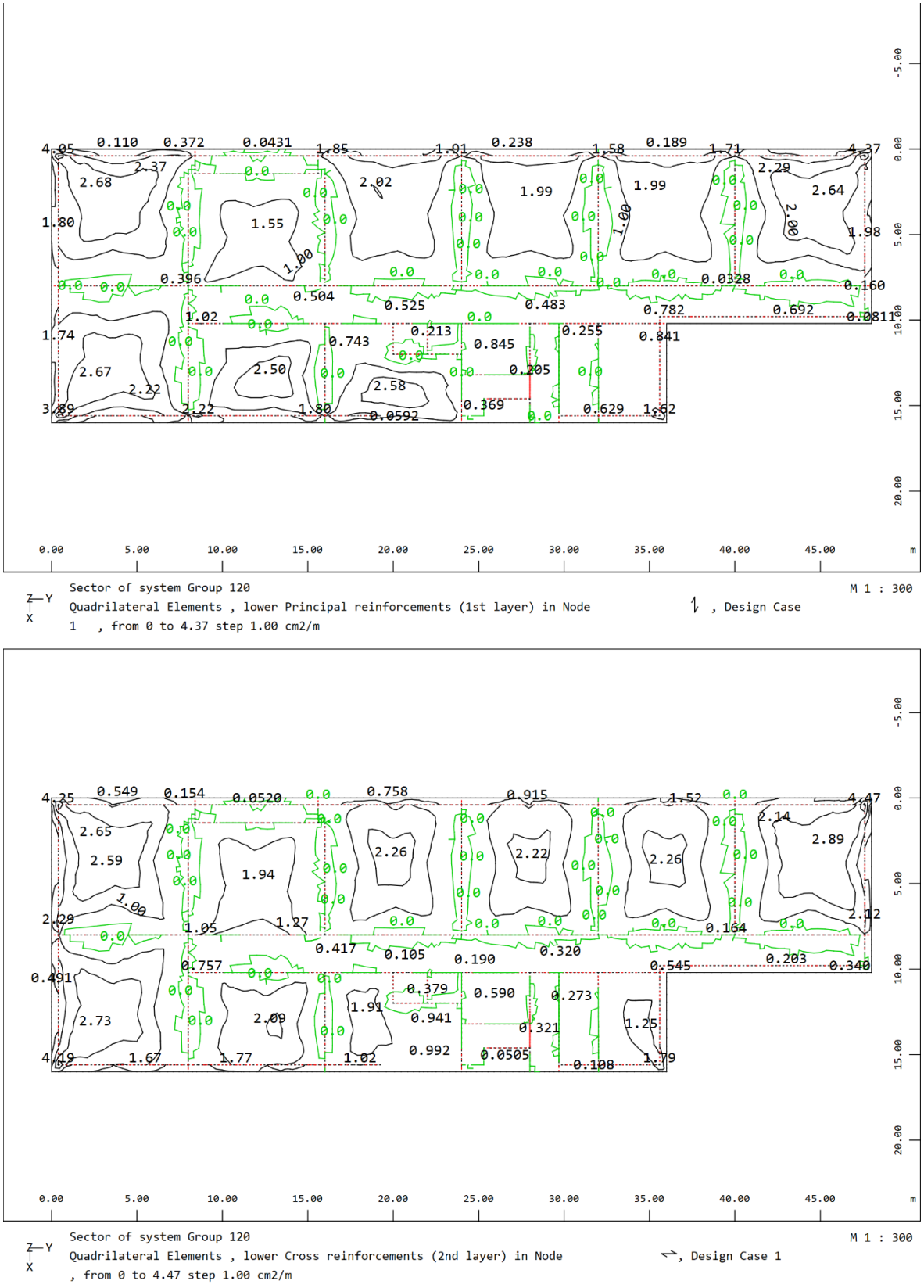


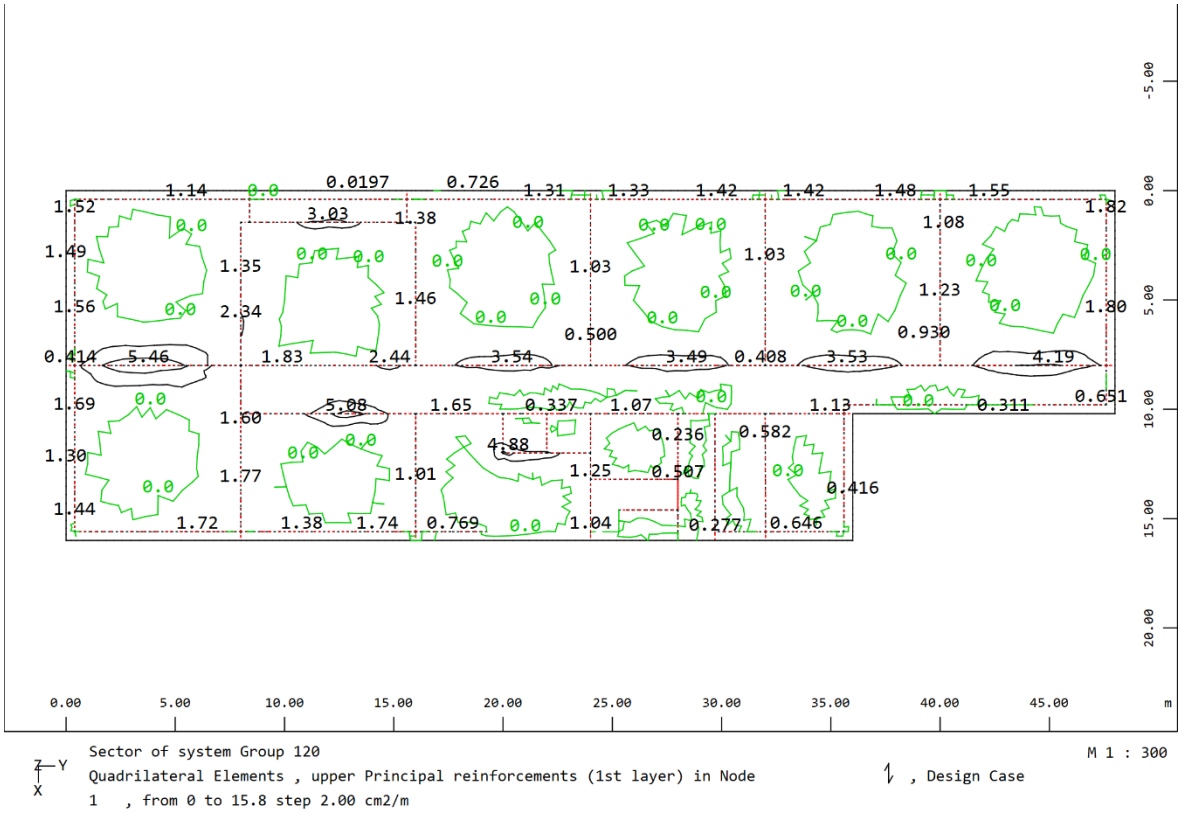

*Slika 9: Ovojnica računske armature etažne plošče – spodnja armatura*

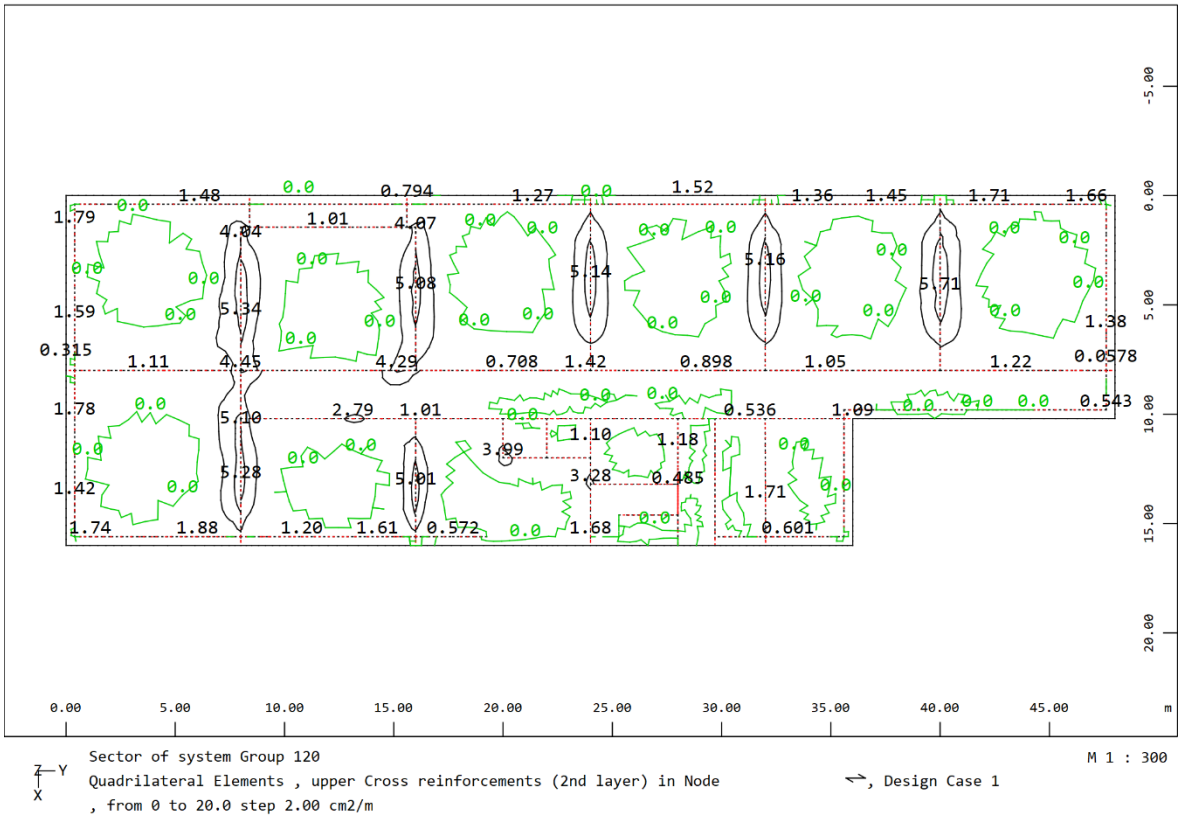



*Slika 10: Ovojnica računske armature etažne plošče – zgornja armatura*

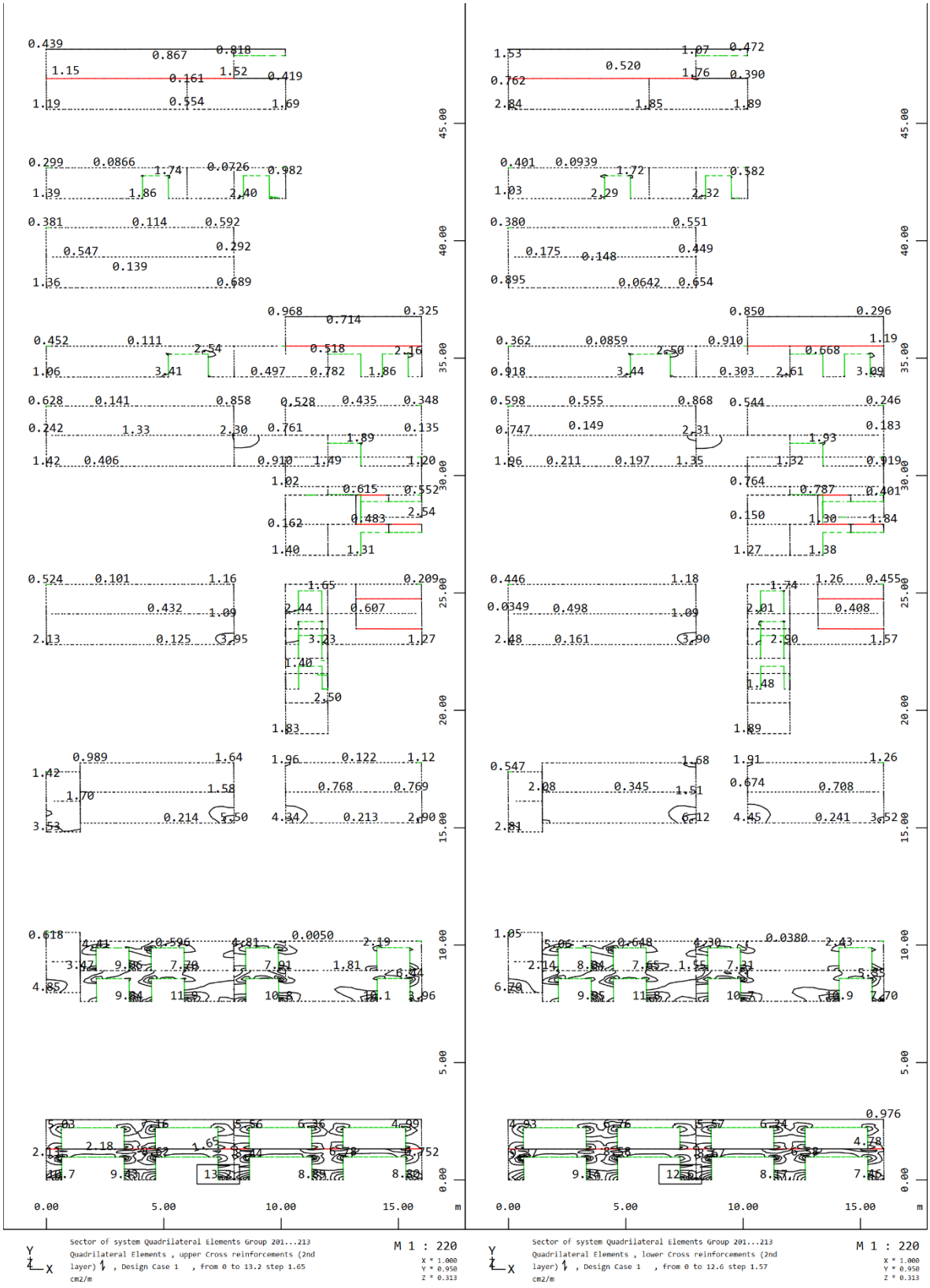



*Slika 11: Ovojnica računske armature strešne plošče – spodnja armatura*

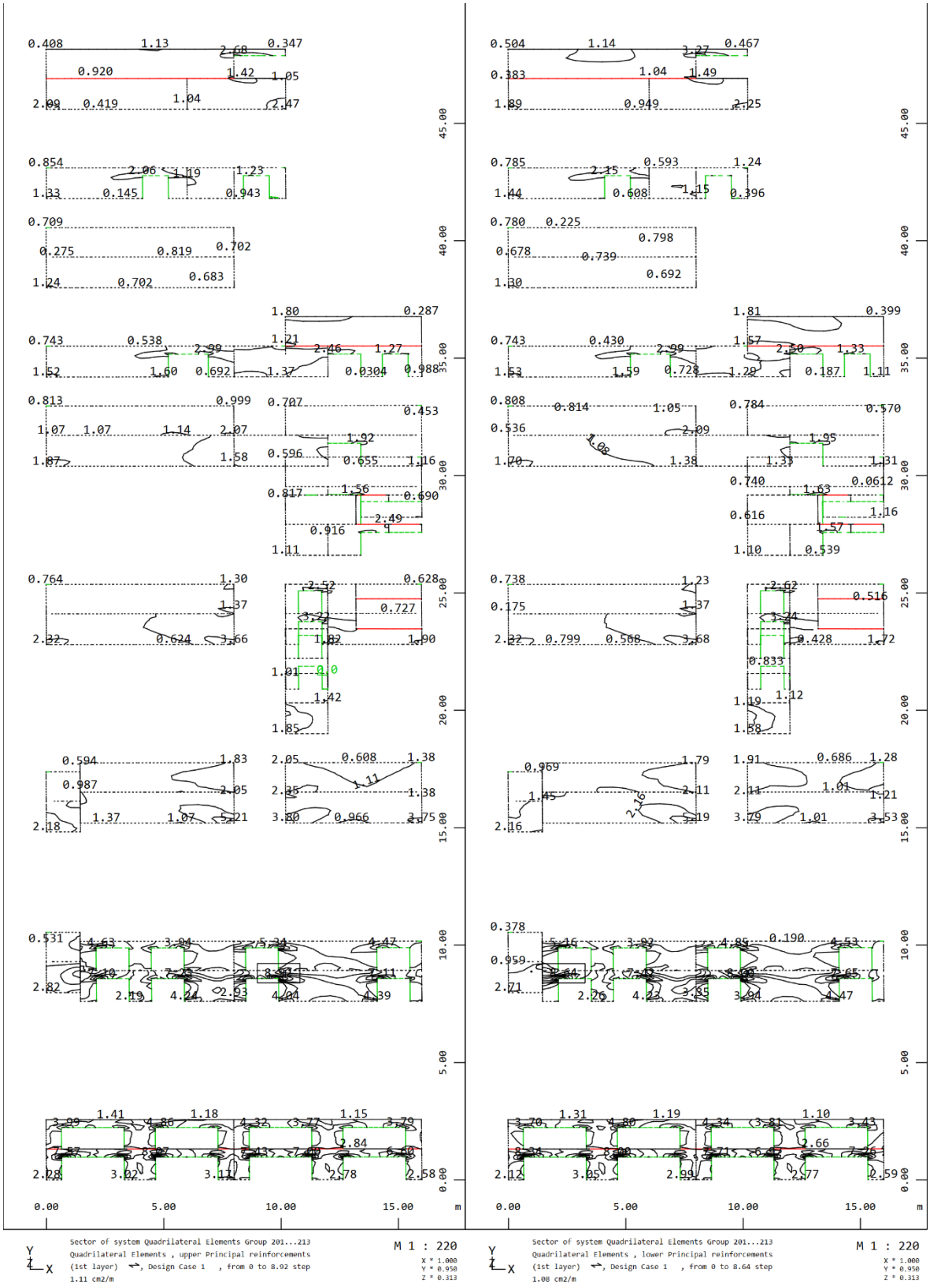


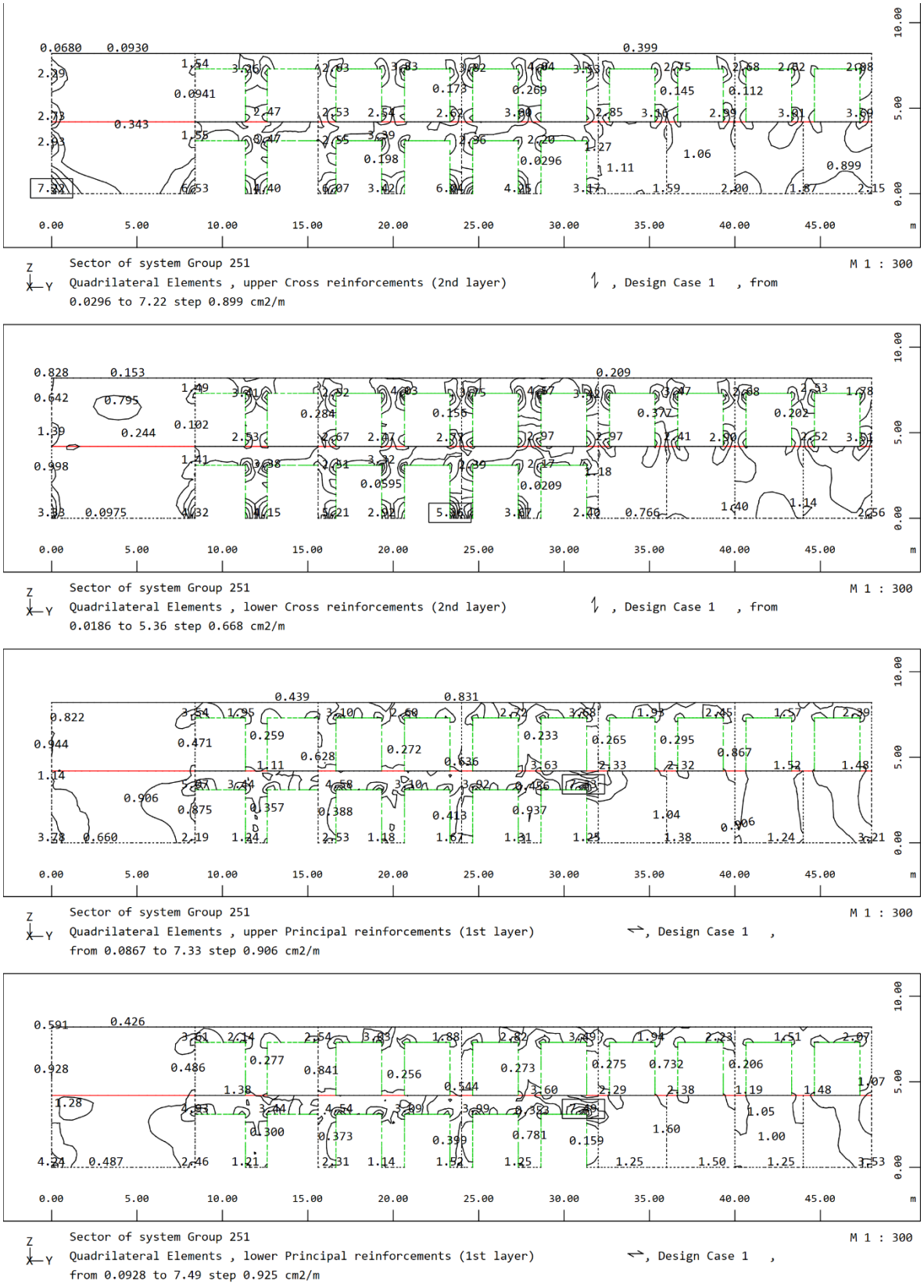

*Slika 12: Ovojnica računske armature strešne plošče – zgornja armatura*



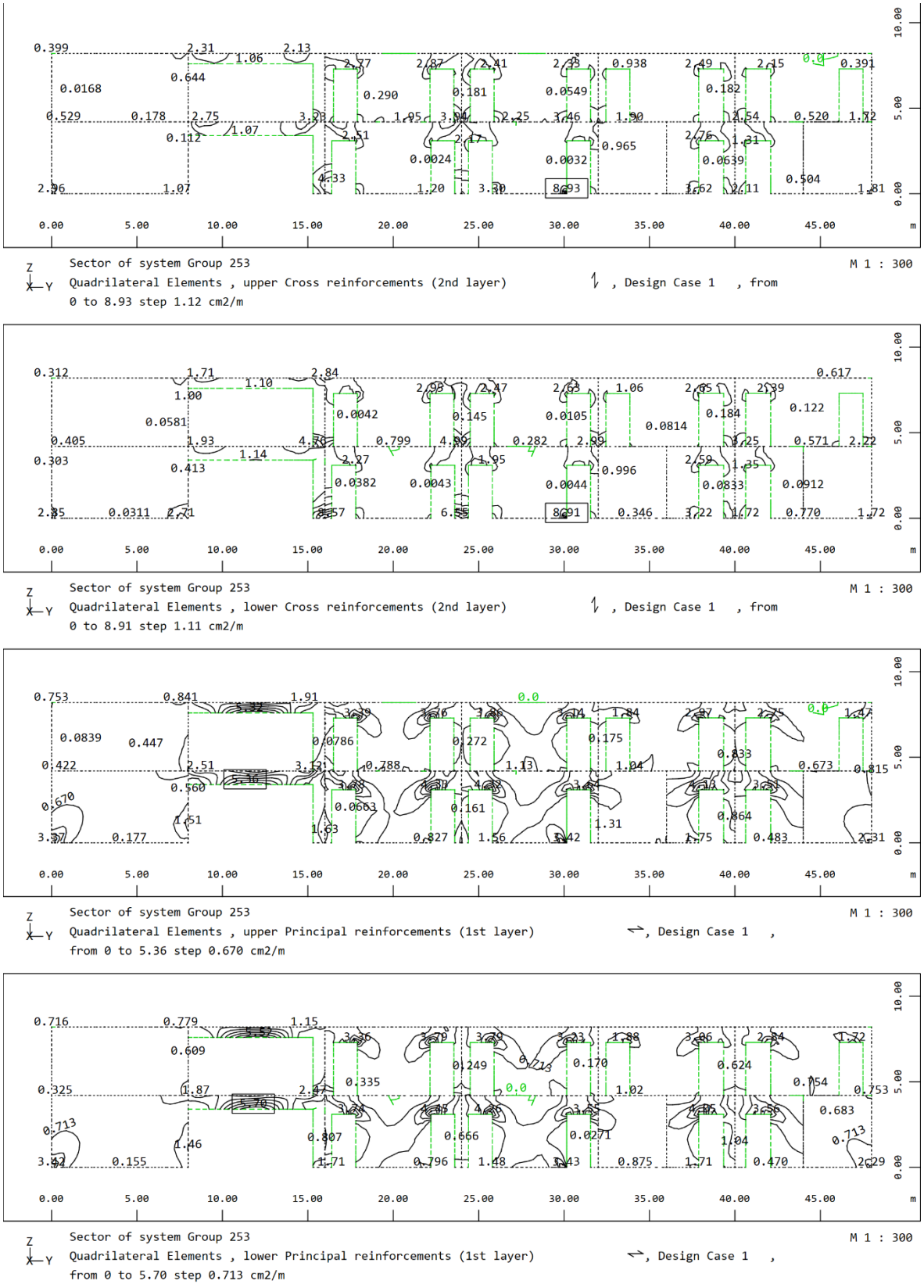

*Slika 13: Ovojnica računske armature v prečnih stenah – vertikalna armatura*



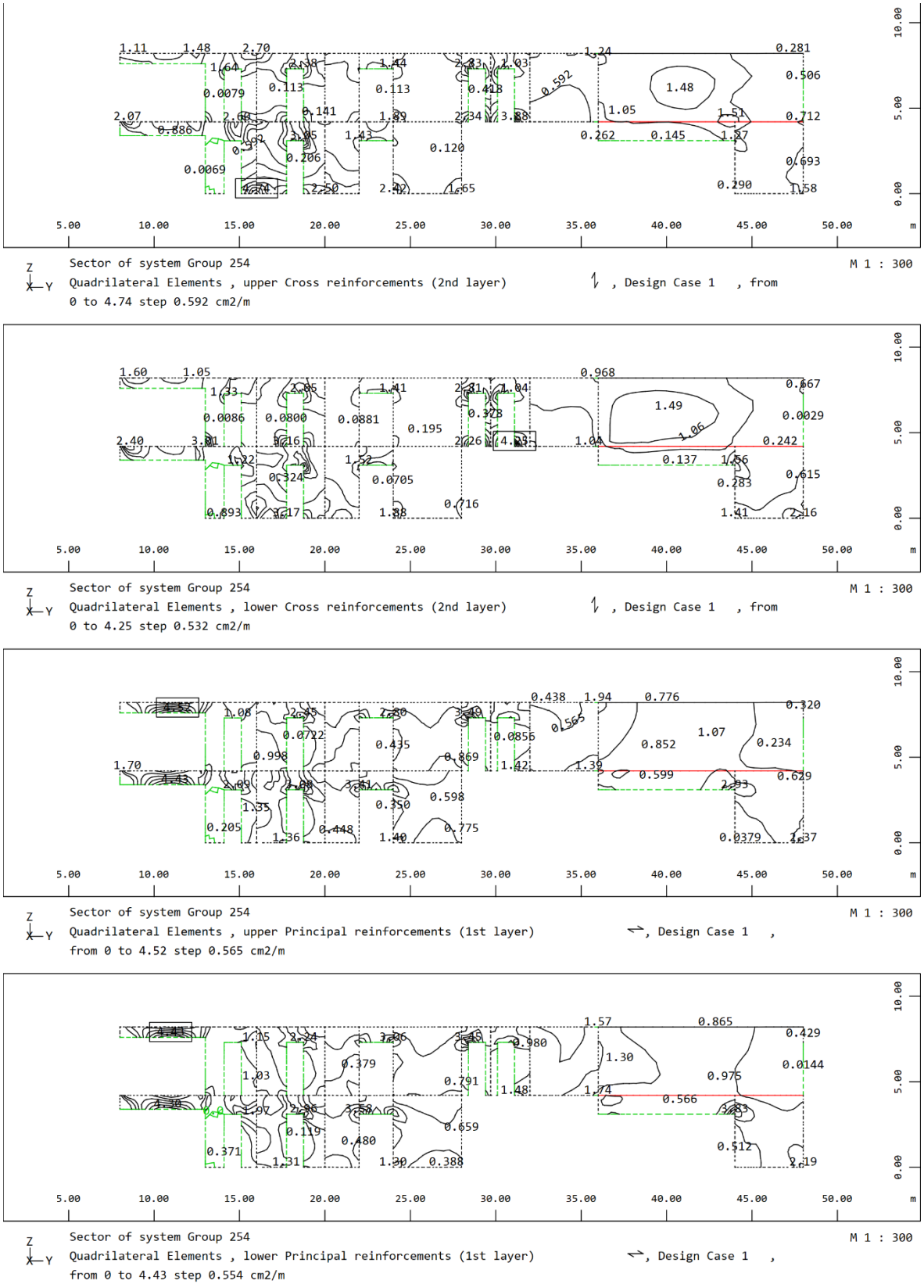

*Slika 14: Ovojnica računske armature v prečnih stenah – horizontalna armatura*



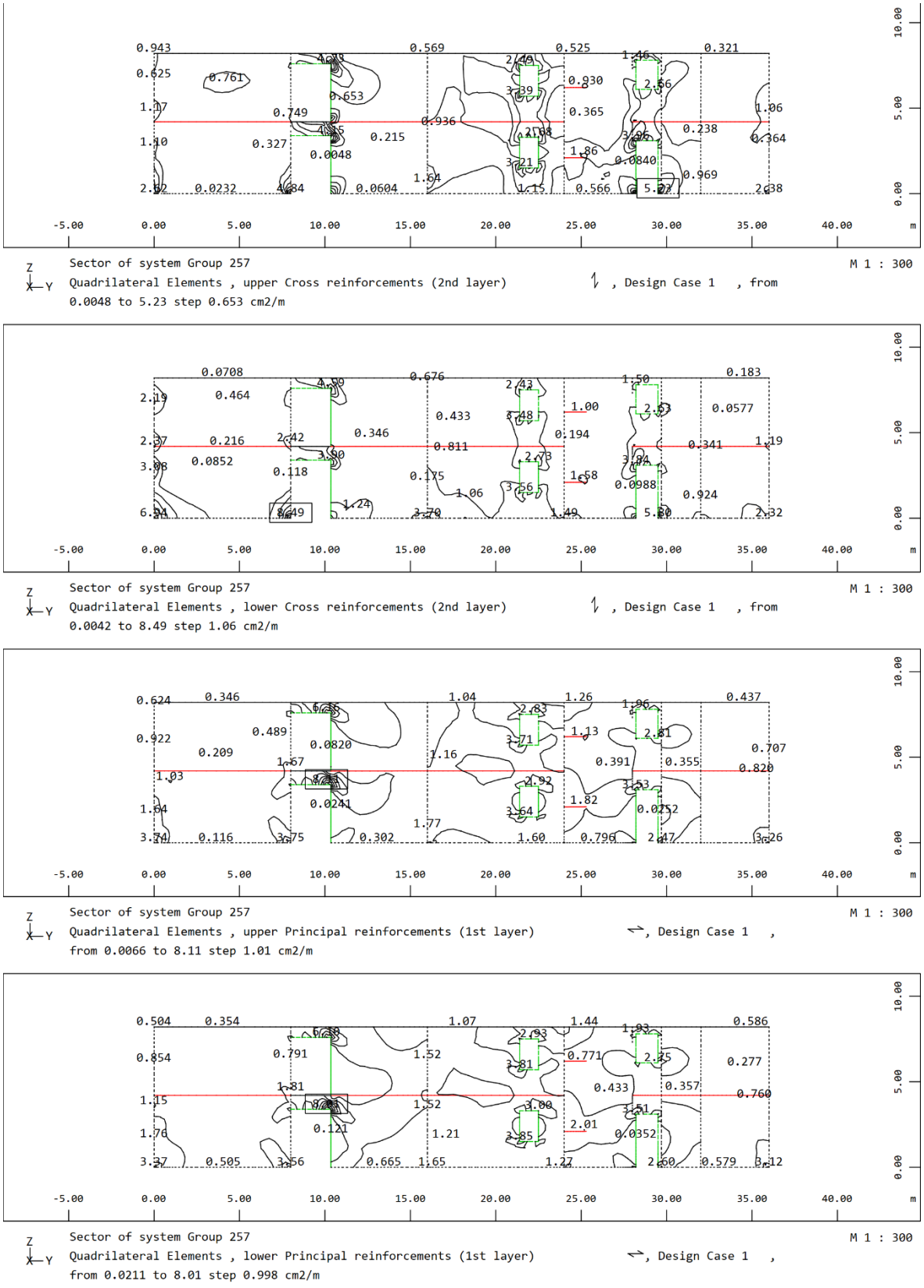

*Slika 15: Ovojnica računske armature v vzdolžnih stenah – v osi 1 (vertikalna, horizontalna)*



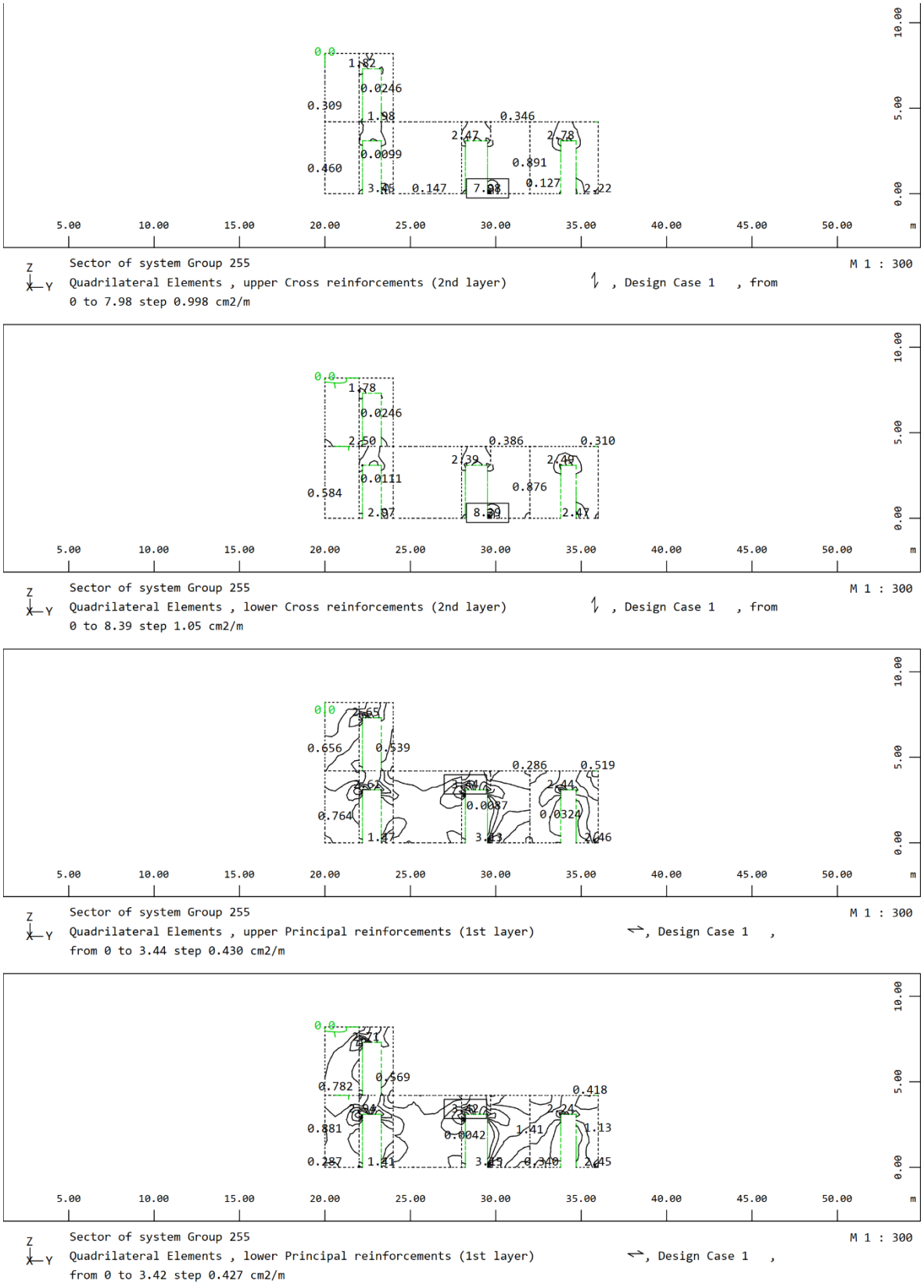

*Slika 16: Ovojnica računske armature v vzdolžnih stenah – v osi 3' (vertikalna, horizontalna)*



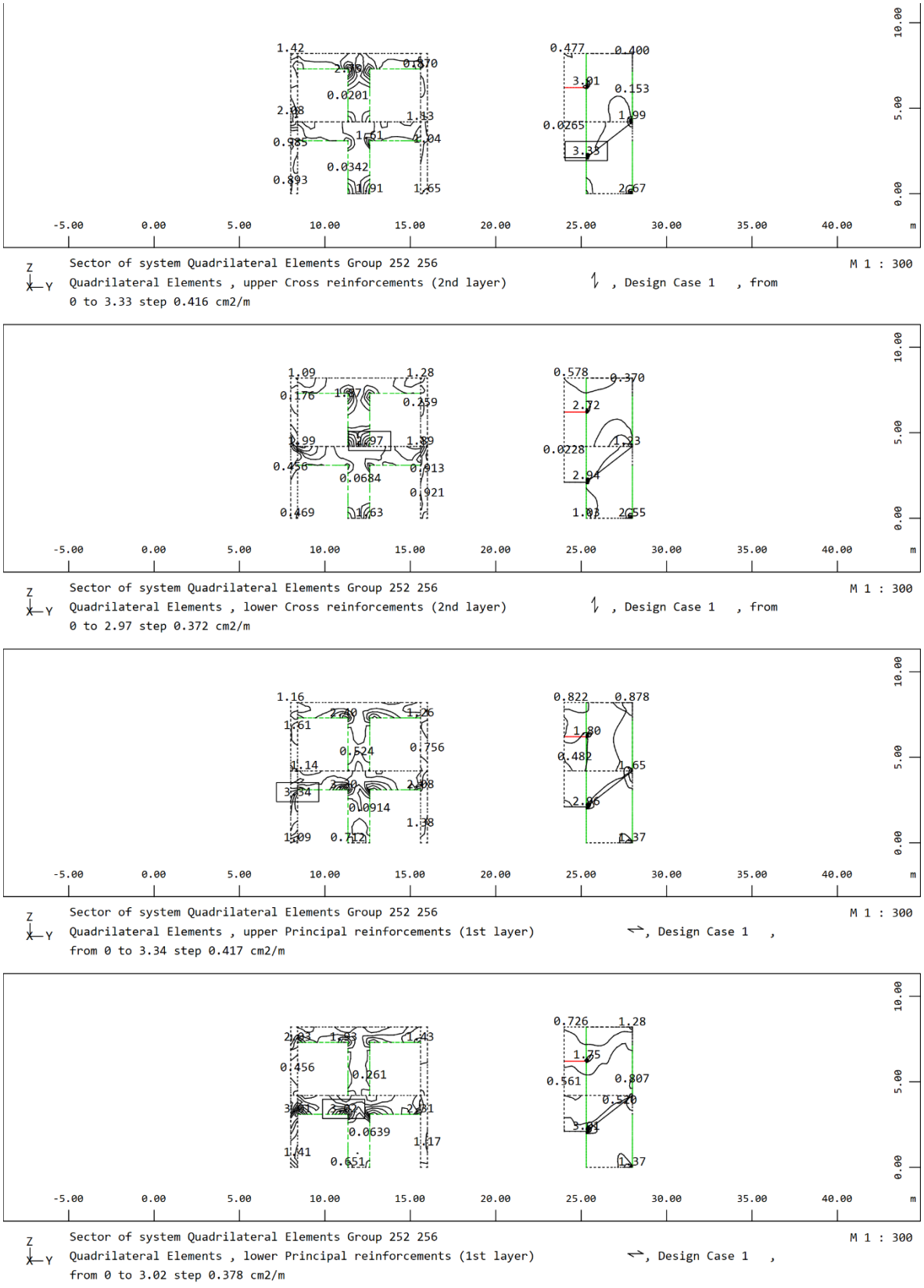

*Slika 17: Ovojnica računske armature v vzdolžnih stenah – v osi 3 (vertikalna, horizontalna)*




*Slika 18: Ovojnica računske armature v vzdolžnih stenah – v osi 5 (vertikalna, horizontalna)*




*Slika 19: Ovojnica računske armature v vzdolžnih stenah – v osi 4 (vertikalna, horizontalna)*

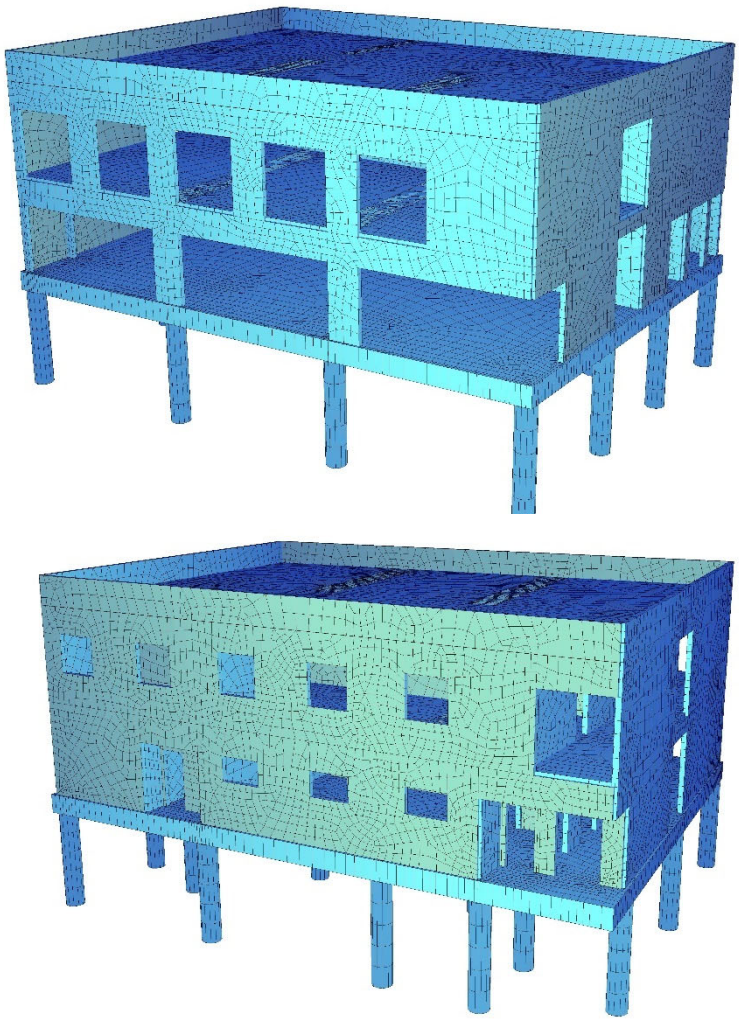



*Slika 20: Ovojnica računske armature v vzdolžnih stenah – ostale (vertikalna, horizontalna)*

## 2.2 CENTRALNA DILATACIJSKA ENOTA STAVBE

### 2.2.1 Predpostavke globalnega rač. modela - centralna dil. enota

Statična in dinamična (seizmična) analiza konstrukcije **centralne dilatacijske enote stavbe** je bila izvedena s pomočjo prostorskega računskega modela iz lupinastih in linijskih končnih elementov v programu *SOFiSTiK FEM ver.2018*. Konstrukcijski nosilni sistem je stenasti iz armiranega betona. Opravljena je bila analiza po teoriji prvega reda. Globalni računski model sestavljajo: AB vodnjaki povezani s temeljno ploščo z odebelitvami, armiranobetonske (AB) stene ter plošče z nosilci. Stavba je etažnosti P+N (2-etažna stavba). Predpostavljene etažne višine do 4,0 m. Horizontalne dimenzije računskega modela so 23,0 m × 17,0 m. Tipičen raster med stenami je 9,0 m oz. 4,0 m. Upoštevana debelina etažne in strešne plošče je 25 cm. Upoštevana debelina sten je 20 cm in debelina atičnih nosilcev 15 cm ter višina 120 cm. Predpostavljena debelina temeljne plošče je 50 cm z odebelitvami (pasovnimi temelji) višine 80 cm in širini 60 cm (robni) oz. 80 cm (vmesni). Na območju kuhinje je debelina temeljne plošče zaradi tehnologije kuhinje stanjšana na 40 cm (z zgornje strani).



*Slika 21: Globalni računski model v SOFiSTiKu – centralna dilatacijska enota stavbe*

Vpliv potresa na konstrukcijo je bil določen z modalno analizo s spektri odziva z uporabo linearno-elastičnega modela konstrukcije. Izbrano je bilo duktilno obnašanje konstrukcije (stopnja DCM) z redukcijskim faktorjem duktilnosti q=2,0 (stenasti AB konstrukcijski sistem; torzijsko podajen) za obe horizontalni smeri vpliva potresa. Pri modalni analizi konstrukcije so bili upoštevani razpokani prerezi za vse obstoječe armiranobetonske elemente. Razpokanost prerezov v programu *SOFiSTiK FEM ver. 2018* se za modalno analizo določi tako, da se za posamezne elemente preko t.i. grup elementov določi faktor zmanjšanja togosti, za katerega se običajno prevzame, da je enak 0,5 (polovična togost nosilnih elementov).

Mase v računskem modelu so bile upoštevane po pravilu SIST EN 1991-1, točka 3.2.4 (2)P. Upošteva se le del mase, ki izhaja iz koristne obtežbe (glede na koeficiente za kombinacijo $\psi_{E,i}$ za različne kategorije koristne obtežbe), in celotna masa, ki izhaja iz lastne in stalne obtežbe na objektu. Koeficienti za kombinacijo $\psi_{E,i}$ upoštevajo verjetnost, da v času potresa koristna obtežba ni prisotna po celotni konstrukciji. Koristna obtežba (kategorija C) je bila upoštevana s faktorjem $\gamma_{Q,C} = \phi \times \Psi_{2,C} = 0,8 \times 0,6 = 0,50$.

Vpliv naključne torzije (SIST EN 1998-1, točka 4.3.2 (1)P), ki jo je potrebno pri seizmični analizi računskega modela objekta upoštevati zaradi negotovosti, povezanih s položajem mas in s prostorskim spreminjanjem potresnega gibanja, se v računalniškem programu SOFiSTiK izvede avtomatično, s posebnim postopkom: projektni spekter za horizontalne potresne vplive se definira v štirih smereh (X+, Y-, Y+, Y-) tako, da se za vsako smer po posameznih etažah definira slučajno ekscentričnost (glede na formulo št. 4.3 v 4. poglavju SIST EN 1998-1), ki vpliva na premaknitev masnega središča v vsaki etaži iz nazivne lege. V nadaljevanju program SOFiSTiK avtomatsko izračuna potresne sile v vozliščih (iz mas v vozliščih in podanih pospeškov iz projektnega spektra), ki vključujejo vpliv naključne torzije.

Vpliv nihajnih oblik je upoštevan s popolno kvadratno kombinacijo (CQC), pri čemer naj bi vsota efektivnih modalnih mas znašala več kot 90% celotne mase konstrukcije (upoštevanih je bilo 50 lastnih nihajnih oblik modela, pri čemer smo se približali temu pogoju; s povečevanjem števila nihajnih oblik do 150 se odstotek bistveno ni spremenil; lahko bi kvečjemu lastno težo sten upoštevali kot obtežbo s čimer bi se izognili lokalnemu nihanju le-teh). Za kombinacijo vodoravnih komponent potresnega vpliva (kombiniranje smeri X in Y) učinek obeh vodoravnih komponent potresnega vpliva upoštevamo tako, da predpostavimo, da potres deluje 100% v eni in 30% v drugi smeri ter obratno (po principu $E_{Edx}$"+"$0.3E_{Edy}$ oz. $0.3E_{Edx}$"+"$E_{Edy}$ iz SIST EN 1998-1 točka 4.3.3.5.1 (3)).

V računskem modelu je bila modelirani tudi armiranobetonska temeljna plošča in AB vodnjaki s premerom Ø80 cm. Za novogradnjo objekta je bilo izdelano GG poročilo (*št. DN 2003902, GI ZRMK d.o.o. Ljubljana, 22.11.2010*), v katerem ni predpisanih modulov reakcije temeljnih tal. Glede na sestavo tal smo predpostavili modula reakcije temeljnih tal pod temeljno ploščo v vrednosti $k_v$ = 10.000 kN/m$^3$ in $k_h$ = 0,7 x 10.000 = 7.000 kN/m$^3$. Vertikalni modul reakcije temeljnih tal pod vodnjaki pa smo predpostavili v vrednosti $k_{v,vodnjaki}$ = 40.000 kN/m$^3$. Predpostavljena je bila višina vodnjakov 5,0 m.

Dimenzioniranje računske armature v armiranobetonskih elementih je bilo izvedeno s pomočjo programa SOFiSTiK za mejni stanji nosilnosti (MSN in MSN-Potres). Rezultati so priloženi v nadaljevanju.

### 2.2.2 Osnovni obtežni slučaji v glob. rač. modelu

*Preglednica 7: Osnovni obtežni slučaji v globalnem računskem modelu*

| | Obtežni slučaj | OPIS |
|---|---|---|
| ***G*** | 1 | Lastna teža konstrukcije (razen temeljev) |
| | 2 | Stalna obtežba – obloge tal in stropov |
| | 4 | Stalna obtežba – fasada |
| | 9 | Lastna teža temeljev * |
| ***Q*** | 11 | Koristna obtežba (kategorija C) |
| | 12 | Koristna obtežba (kategorija H) |
| ***S*** | 21 | Sneg |
| ***E*** | 601, 611 | Potresna obt. (projektni spekter) v horizontalnih smereh X in Y brez slučajne torzije |
| | 701, 711 | Potresna obt. (elastični spekter) v horizontalnih smereh X in Y brez slučajne torzije |
| | 801, 802, 811, 812 | Potresna obt. (projektni spekter) v horizontalnih smereh X in Y s slučajno torzijo |
| | 901, 902, 911, 912 | Potresna obt. (elastični spekter) v horizontalnih smereh X in Y s slučajno torzijo |

** Lastna teža temeljev (temeljna plošča in pasovni temelji) je podana z obtežbo, da jo je možno izklopiti v primeru modalne analize za izračun lastnega nihanja konstrukcije.*

### 2.2.3 Grupe elementov v globalnem računskem modelu

*Preglednica 8: Grupe elementov v globalnem računskem modelu*

| **GRUPE** | **OPIS** |
|---|---|
| 100 | Temelji (temeljna plošča in pasovni temelji) |
| 101 | Vodnjaki |
| 110 | Etažna plošča (nad pritličjem) |
| 120 | Strešna plošča (nad nadstropjem) |
| od 201 do 207 | Stene in nosilci v vzdolžni smeri |
| od 251 do 258 | Stene in nosilci v prečni smeri |
| od 301 do 302 | Atični nosilci v vzdolžni smeri |
| od 351 do 352 | Atični nosilci v prečni smeri |

## 2.2.4 Rezultati analize lastnega nihanja

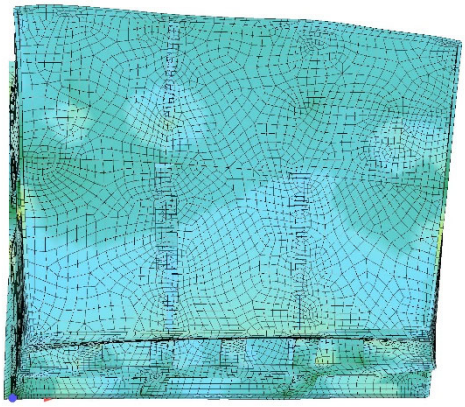
*Preglednica 9: Lastne nihajne dobe za analizo potresnih vplivov*

| Nihajna oblika | *T* [s] | Angažiranost mase - X smer [%] | Angažiranost mase - Y smer [%] | Efektivna masa - X smer [%] | Efektivna masa - Y smer [%] |
|---|---|---|---|---|---|
| **1** | **0,130** | 2,69 | 69,52 | **2,69** | **69,52** |
| **2** | **0,106** | 55,96 | 72,04 | **53,27** | **2,52** |
| 3 | 0,078 | 55,97 | 72,06 | 0,01 | 0,02 |
| 4 | 0,075 | 76,41 | 72,44 | **20,44** | **0,38** |
| 5 | 0,066 | 76,45 | 72,44 | 0,04 | 0,00 |
| 6 | 0,061 | 76,45 | 72,44 | 0,00 | 0,00 |
| 7 | 0,057 | 76,48 | 72,44 | 0,03 | 0,00 |
| 8 | 0,056 | 76,49 | 72,44 | 0,01 | 0,00 |
| 9 | 0,050 | 76,54 | 72,44 | 0,05 | 0,00 |
| 10 | 0,047 | 76,54 | 72,45 | 0,00 | 0,01 |
| 11 | 0,047 | 76,54 | 72,48 | 0,00 | 0,03 |
| 12 | 0,046 | 76,55 | 72,54 | 0,01 | 0,06 |
| 13 | 0,045 | 76,57 | 74,34 | 0,02 | 1,80 |
| 14 | 0,042 | 76,57 | 74,45 | 0,00 | 0,11 |
| 15 | 0,041 | 76,59 | 74,49 | 0,02 | 0,04 |
| 16 | 0,039 | 76,71 | 75,06 | 0,12 | 0,57 |
| 17 | 0,039 | 76,83 | 79,64 | 0,12 | 4,58 |
| 18 | 0,038 | 77,09 | 79,64 | 0,26 | 0,00 |
| 19 | 0,036 | 77,27 | 79,94 | 0,18 | 0,30 |
| 20 | 0,036 | 78,58 | 79,94 | 1,31 | 0,00 |
| 21 | 0,036 | 79,30 | 80,38 | 0,72 | 0,44 |
| 22 | 0,035 | 79,30 | 80,50 | 0,00 | 0,12 |
| 23 | 0,034 | 80,50 | 80,50 | 1,20 | 0,00 |
| 24 | 0,033 | 81,28 | 80,51 | 0,78 | 0,01 |
| 25 | 0,033 | 81,46 | 80,69 | 0,18 | 0,18 |
| 26 | 0,032 | 81,58 | 80,69 | 0,12 | 0,00 |
| 27 | 0,032 | 81,63 | 80,69 | 0,05 | 0,00 |
| 28 | 0,031 | 81,63 | 80,70 | 0,00 | 0,01 |
| 29 | 0,031 | 81,64 | 80,71 | 0,01 | 0,01 |
| 30 | 0,030 | 81,66 | 80,73 | 0,02 | 0,02 |
| 31 | 0,030 | 81,66 | 80,73 | 0,00 | 0,00 |
| 32 | 0,029 | 81,66 | 80,74 | 0,00 | 0,01 |
| 33 | 0,028 | 81,67 | 80,75 | 0,01 | 0,01 |
| 34 | 0,028 | 81,69 | 80,76 | 0,02 | 0,01 |
| 35 | 0,028 | 81,69 | 80,76 | 0,00 | 0,00 |
| 36 | 0,028 | 81,70 | 80,85 | 0,01 | 0,09 |
| 37 | 0,028 | 81,70 | 80,86 | 0,00 | 0,01 |
| 38 | 0,028 | 81,70 | 80,86 | 0,00 | 0,00 |
| 39 | 0,027 | 81,70 | 80,87 | 0,00 | 0,01 |
| 40 | 0,027 | 81,76 | 80,89 | 0,06 | 0,02 |
| 41 | 0,027 | 81,77 | 80,89 | 0,01 | 0,00 |
| 42 | 0,027 | 81,78 | 80,91 | 0,01 | 0,02 |
| 43 | 0,026 | 81,79 | 80,91 | 0,01 | 0,00 |
| 44 | 0,026 | 81,81 | 80,91 | 0,02 | 0,00 |

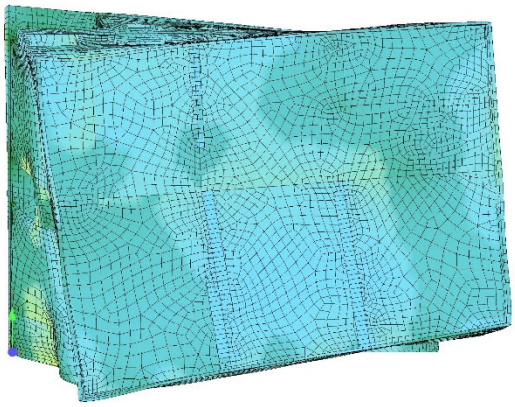
| | | | | | |
|---|---|---|---|---|---|
| 45 | 0,026 | 81,83 | 80,93 | 0,02 | 0,02 |
| 46 | 0,026 | 81,84 | 80,94 | 0,01 | 0,01 |
| 47 | 0,025 | 81,89 | 80,97 | 0,05 | 0,03 |
| 48 | 0,025 | 81,89 | 80,99 | 0,00 | 0,02 |
| 49 | 0,025 | 81,90 | 80,99 | 0,01 | 0,00 |
| **50** | 0,025 | **81,90** | **81,01** | 0,00 | 0,02 |

S prvimi 50 nihajnimi oblikami nismo popolnoma zadostili pogoju vsote efektivnih modalnih mas (angažiranost mas) nad več kot 90% celotne mase konstrukcije, vendar smo se le-temu zelo približali. Prve tri glavne nihajne oblike so prikazane v nadaljevanju (prva je pretežno translacijska oblika, druga in četrta pa sta torzijski; zato smo redukcijski faktor q omejili na vrednost 2.0).

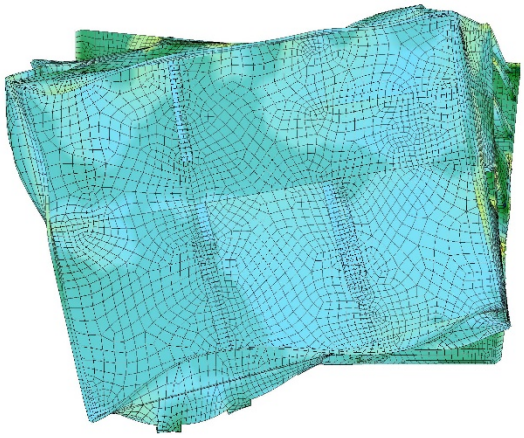
1. nihajna oblika



2. nihajna oblika



4. nihajna oblika



*Slika 22: Glavne tri globalne nihajne oblike*

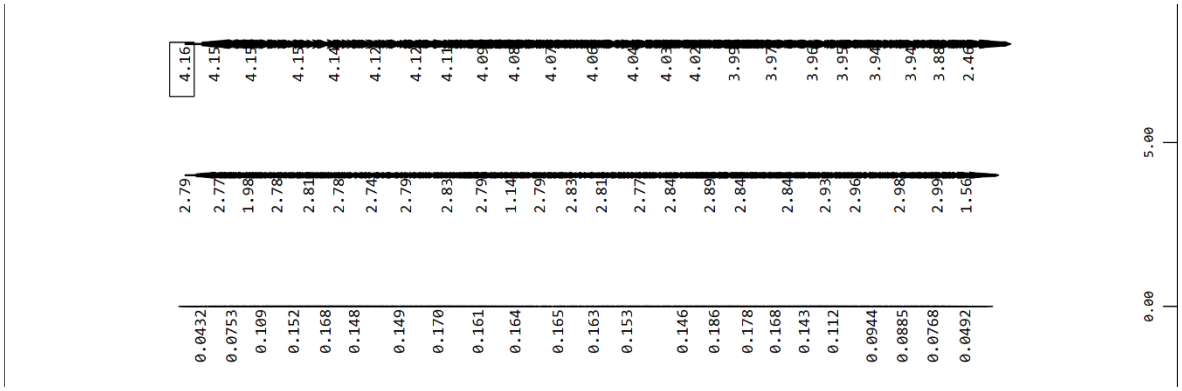
## 2.2.5 Kontrola horizontalnih etažnih zamikov konstrukcije

Za kontrolo etažnih pomikov konstrukcije v primeru potresne obtežbe (elastičen spekter) je bil upoštevan najstrožji kriterij po SIST EN 1998-1, ki predvideva, da so na konstrukcijo pritrjeni nekonstrukcijski elementi iz krhkih materialov.

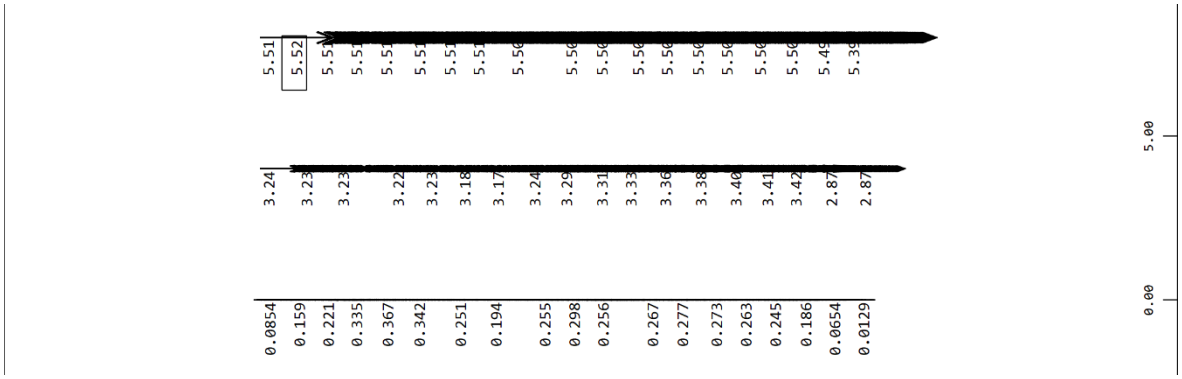
*Preglednica 10: Kontrola horizontalnih etažnih zamikov konstrukcije*

| etaža | $H$ [m] | $h$ [m] | $d_X$ [mm] | $d_Y$ [mm] | $d_{r,X}$ [mm] | $d_{r,Y}$ [mm] | $\boldsymbol{d_{r,X}}$ **[%]** | $\boldsymbol{d_{r,Y}}$ **[%]** | $d_{r,max}$ [%] |
|---|---|---|---|---|---|---|---|---|---|
| P | 0,00 | | 0,0 | 0,0 | | | | | |
| 1N | 4,00 | 4,00 | 2,8 | 3,2 | 2,8 | 3,2 | **0,07** | **0,08** | ≤ 1,00 |
| ST | 8,00 | 4,00 | 4,2 | 5,5 | 4,2 | 5,5 | **0,11** | **0,14** | ≤ 1,00 |

$H$ … absolutna višinska kota, $h$ … višina etaže, $d_X$ … pomik v smeri X, $d_Y$ … pomik v smeri Y, $d_{r,X}$ … etažni pomik v smeri X, $d_{r,Y}$ … etažni pomik v smeri Y, $d_{r,max}$ ... največji dovoljeni etažni pomik po SIST EN 1998-1

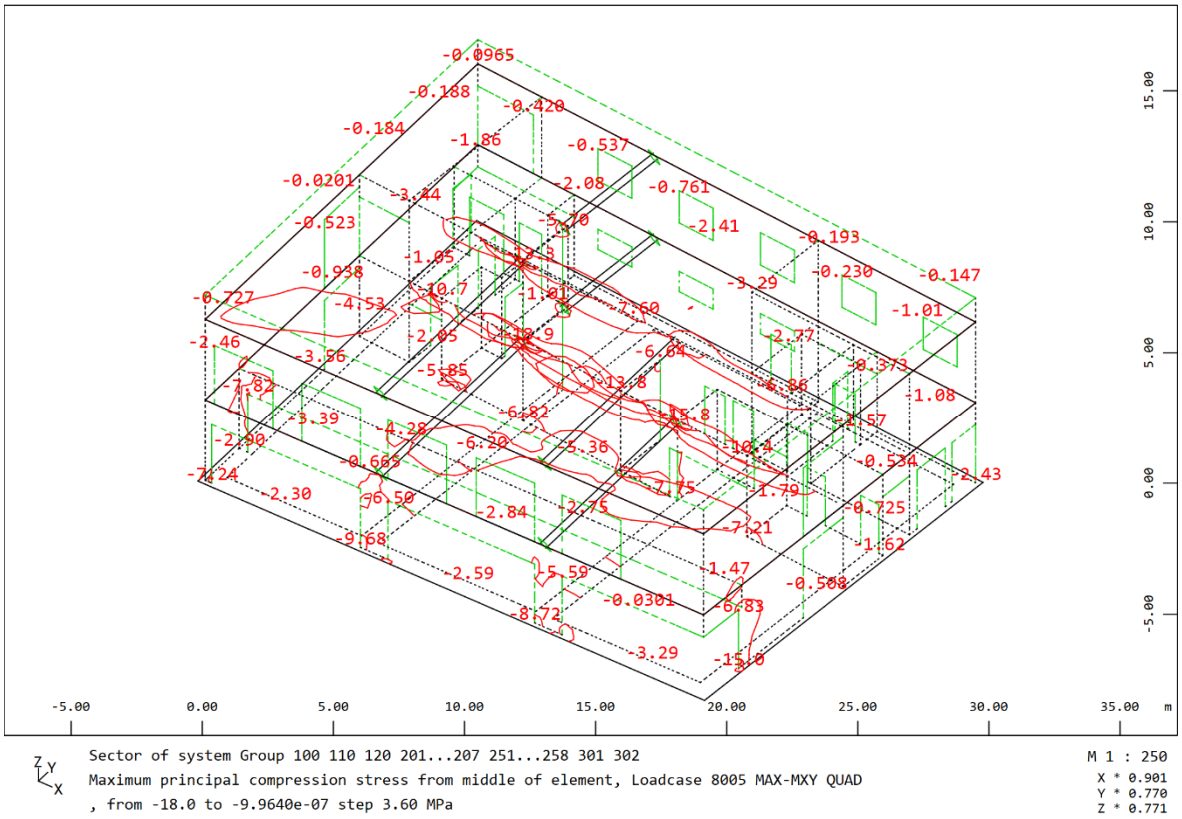



*Slika 23: Maksimalni horizontalni pomiki v X smeri zaradi potresa v X smeri*




*Slika 24: Maksimalni horizontalni pomiki v Y smeri zaradi potresa v Y smeri*

## 2.2.6 Kontrola maks. tlač. nap. v betonu v AB elementih za mejno stanje uporabnosti



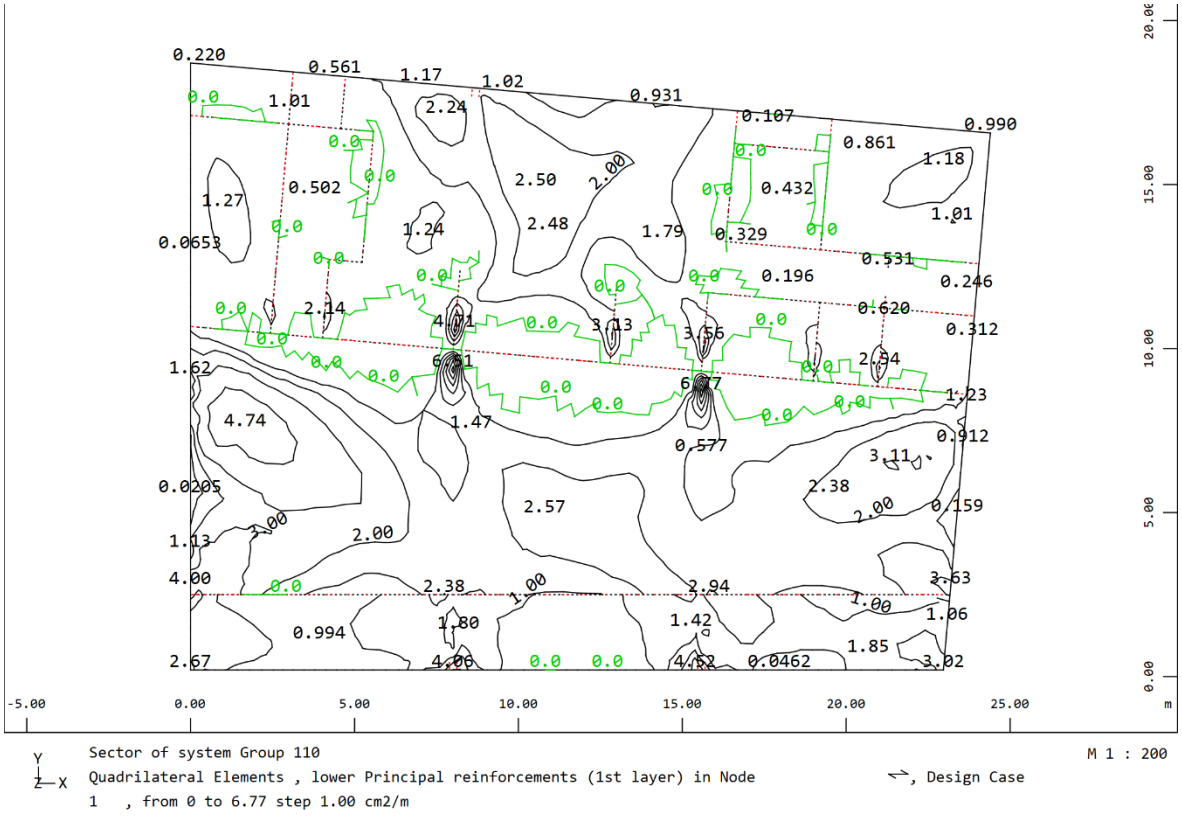

*Slika 25: Maksimalne tlačne napetosti v betonu v AB elementih (MSU-kar)*

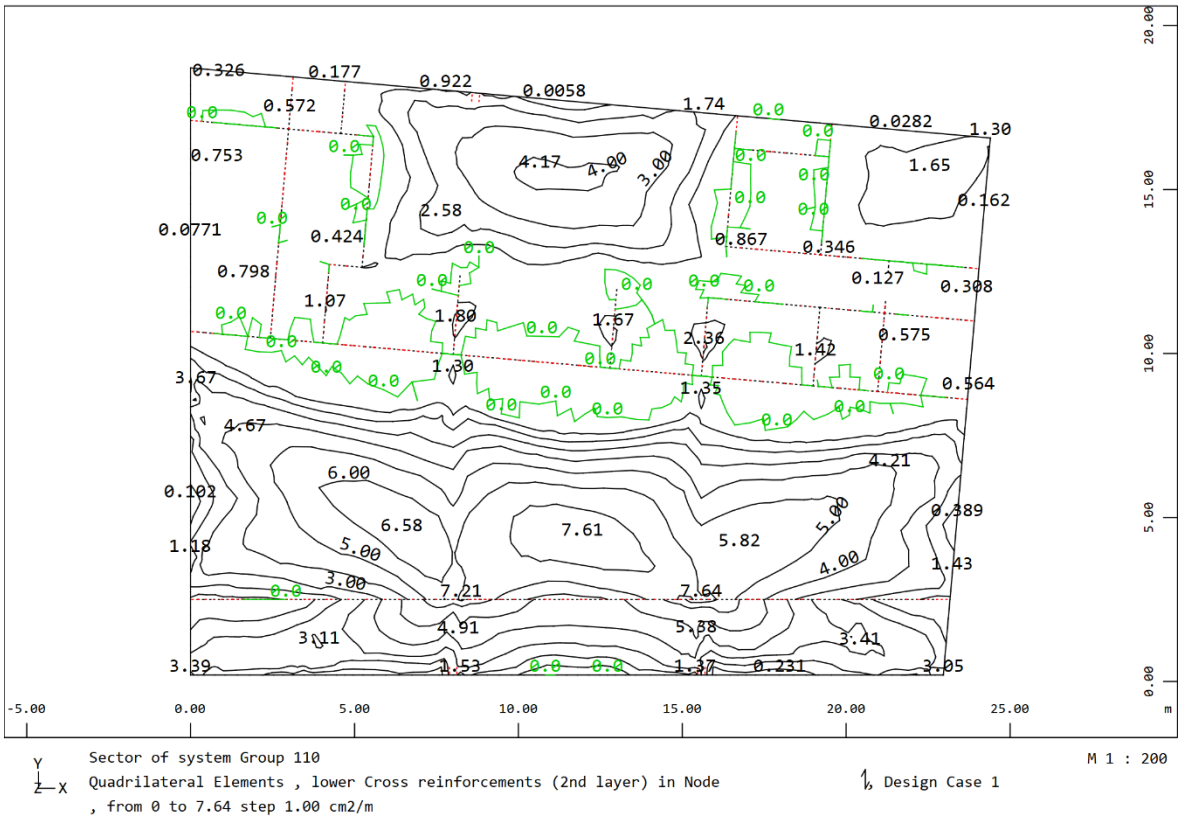
**Kontrola:**

Kvaliteta betona: C30/37

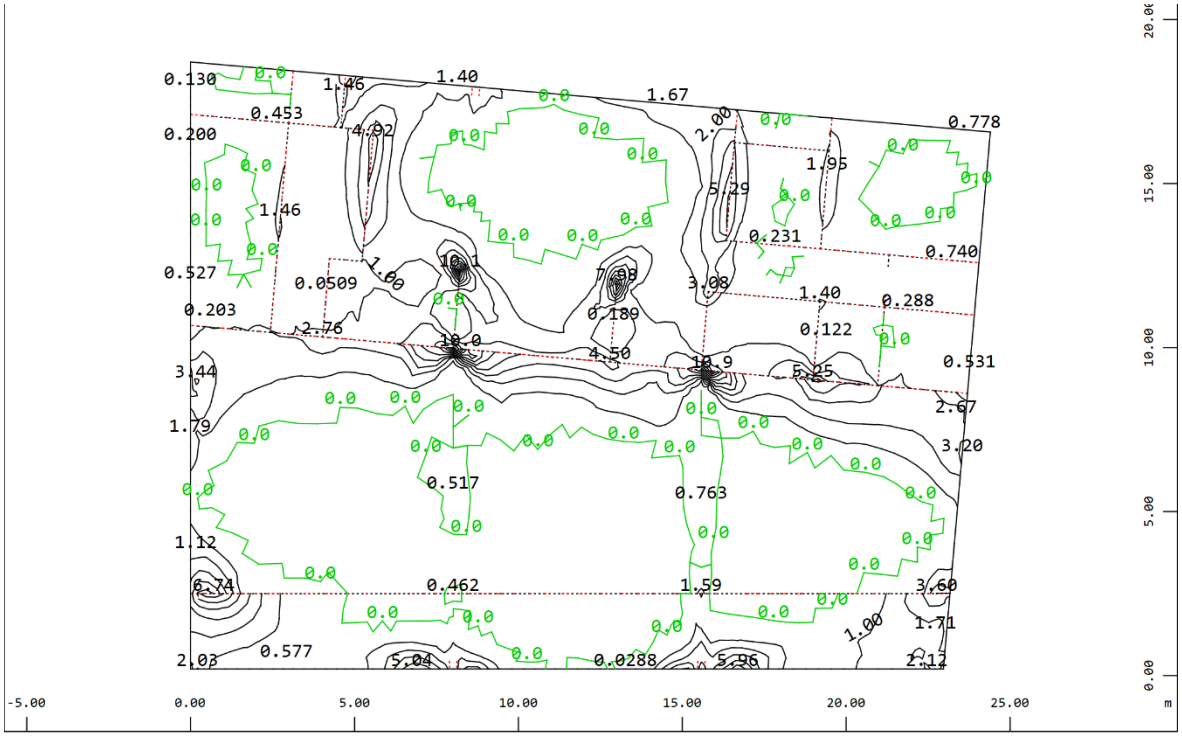
Kontrola: $\sigma_{sc,max,karakt}$ =**16,9 MPa** < 0,6×$f_{ck}$ = 0,6×30,0 = **18,0 MPa** ✓

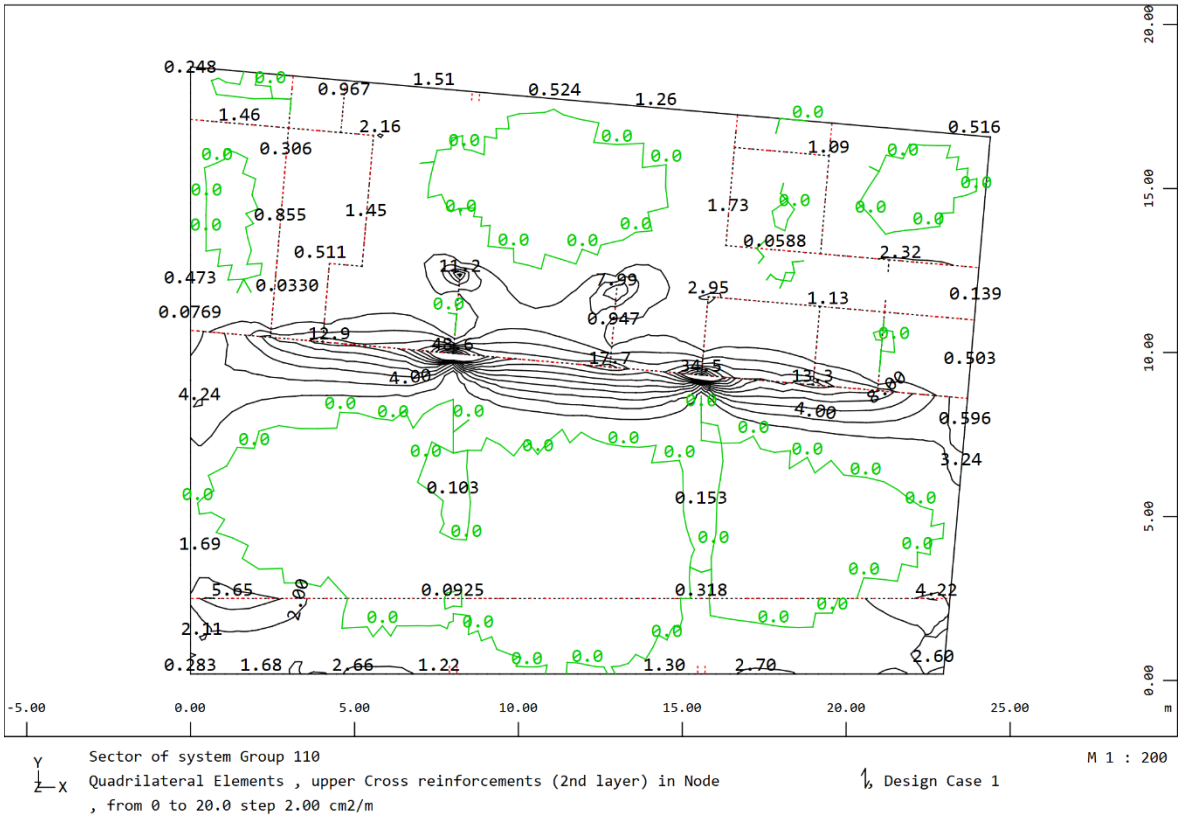
## 2.2.7 Računsko potrebna armatura AB elementov



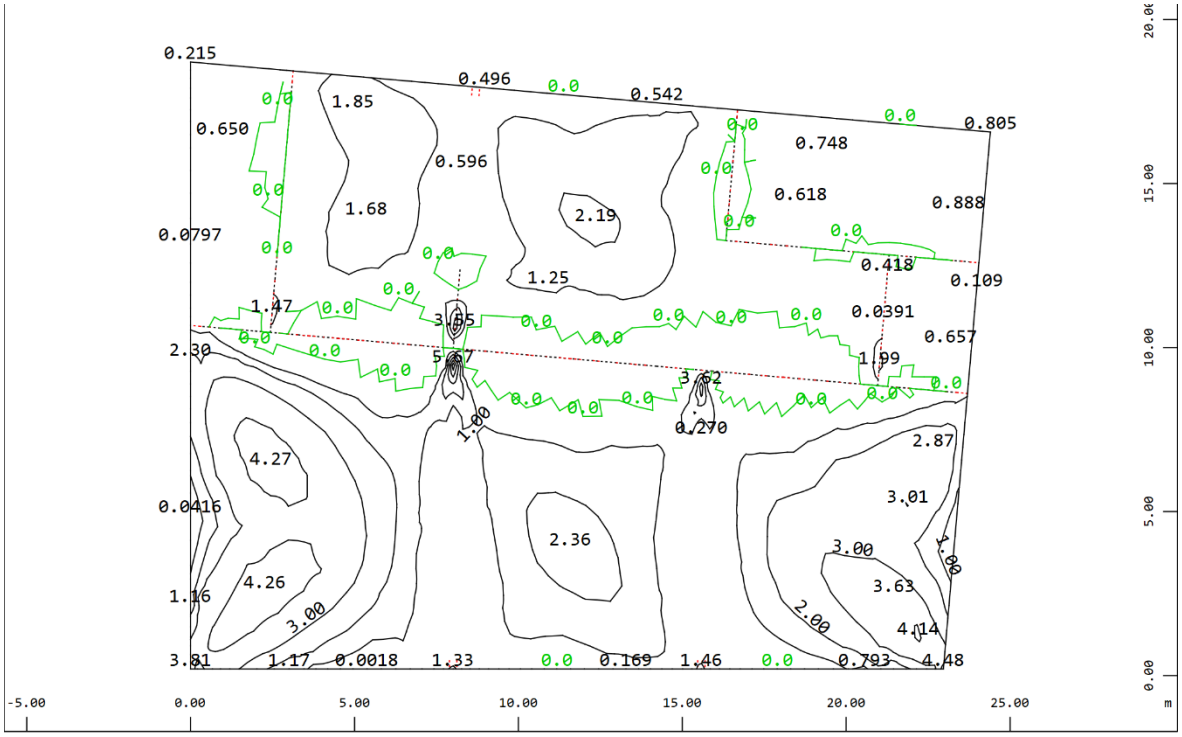



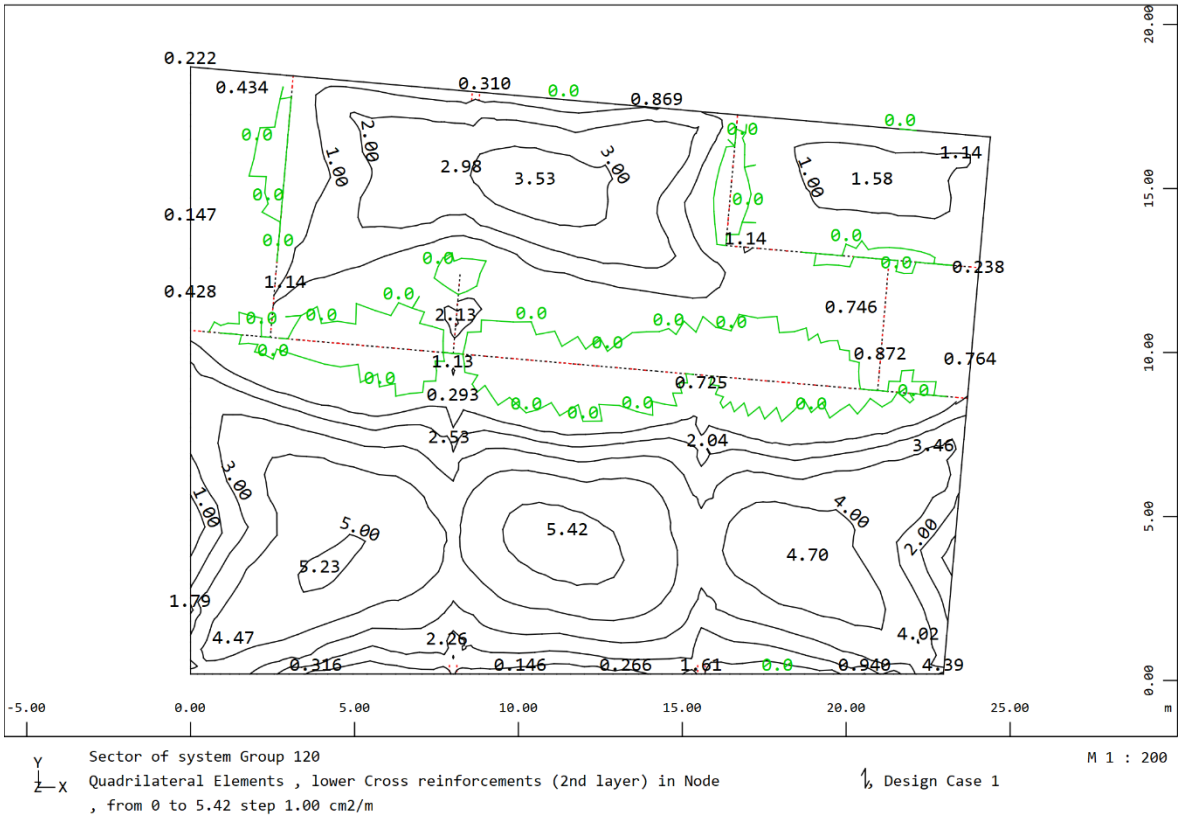

*Slika 26: Ovojnica računske armature etažne plošče – spodnja armatura*



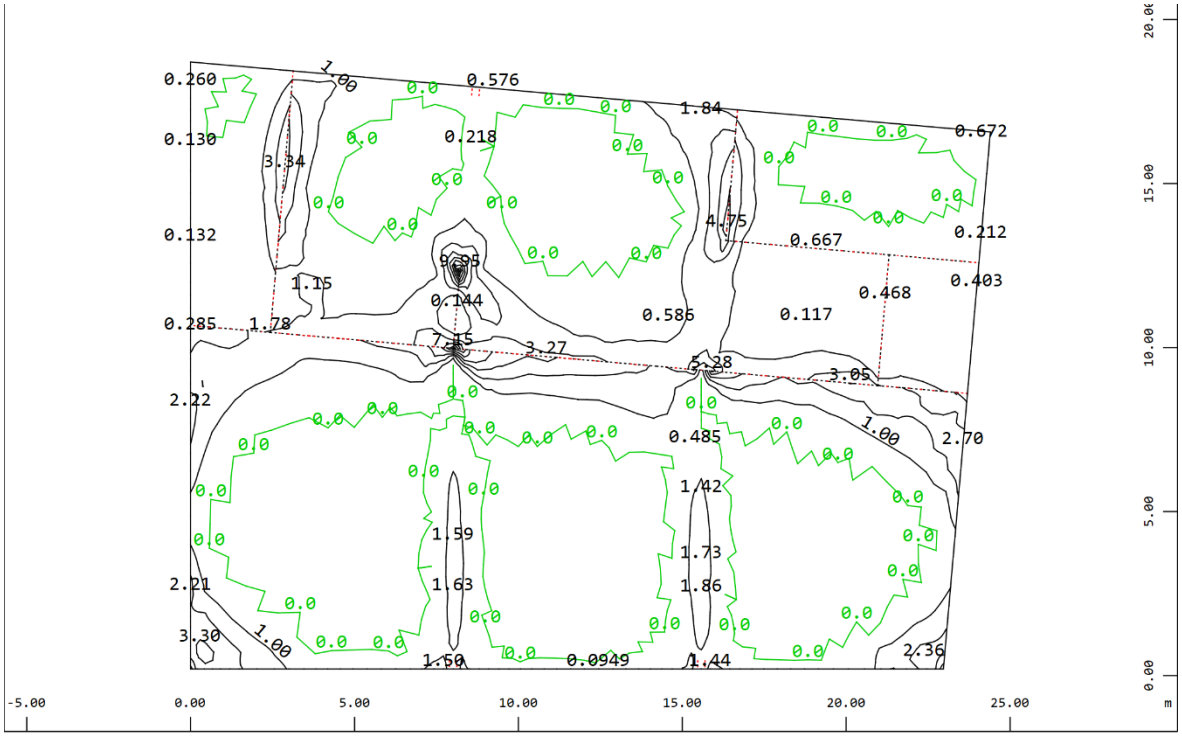



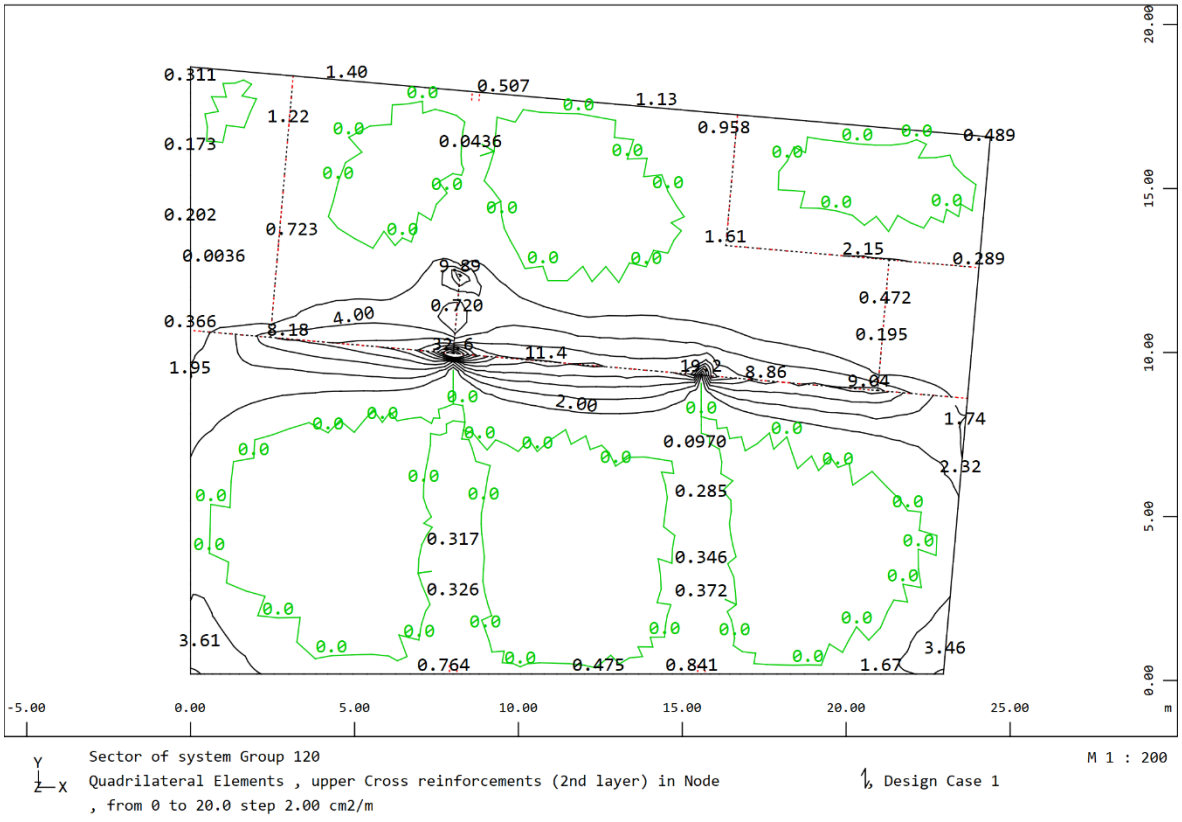

*Slika 27: Ovojnica računske armature etažne plošče – zgornja armatura*



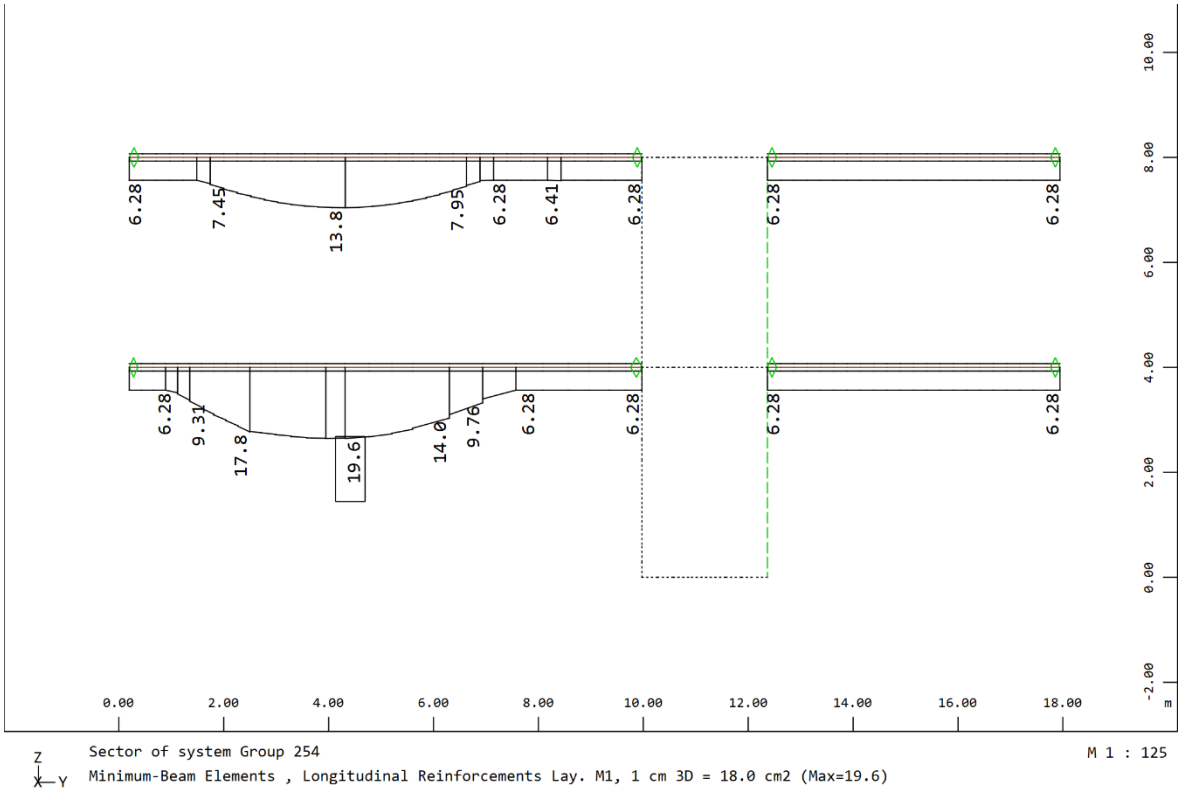



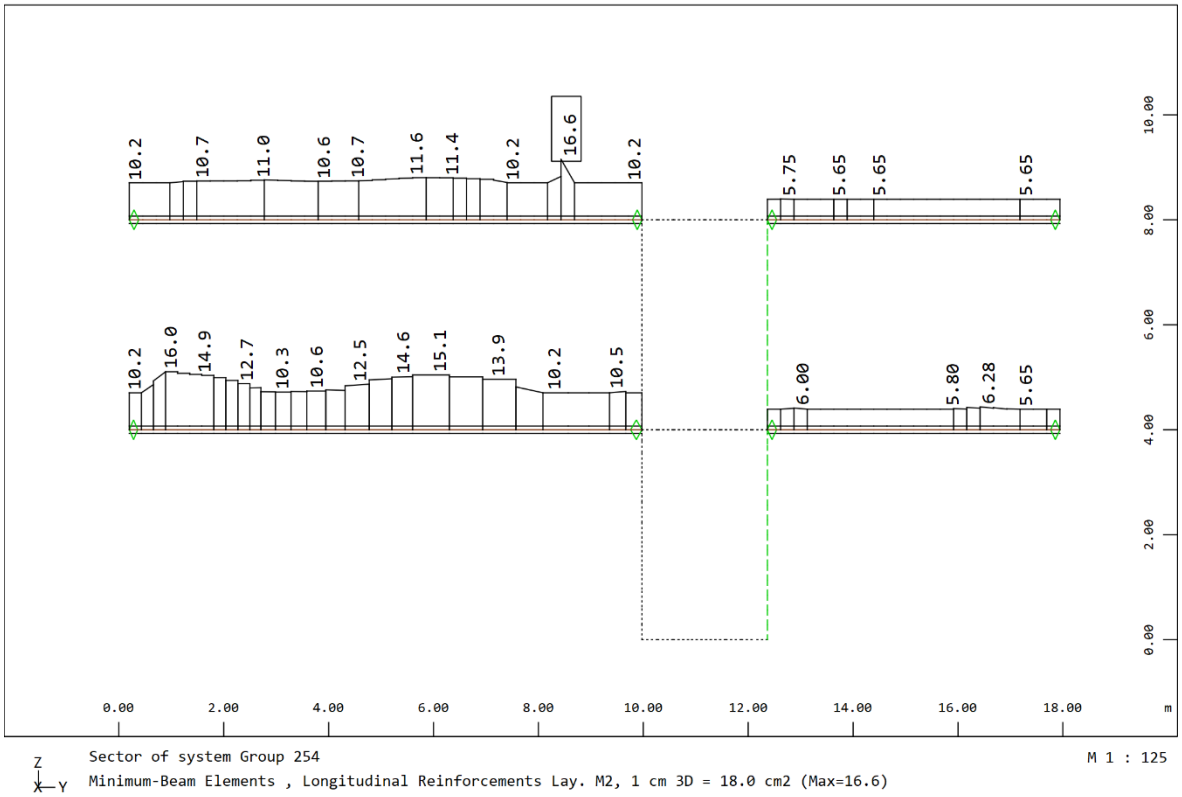

*Slika 28: Ovojnica računske armature strešne plošče – spodnja armatura*



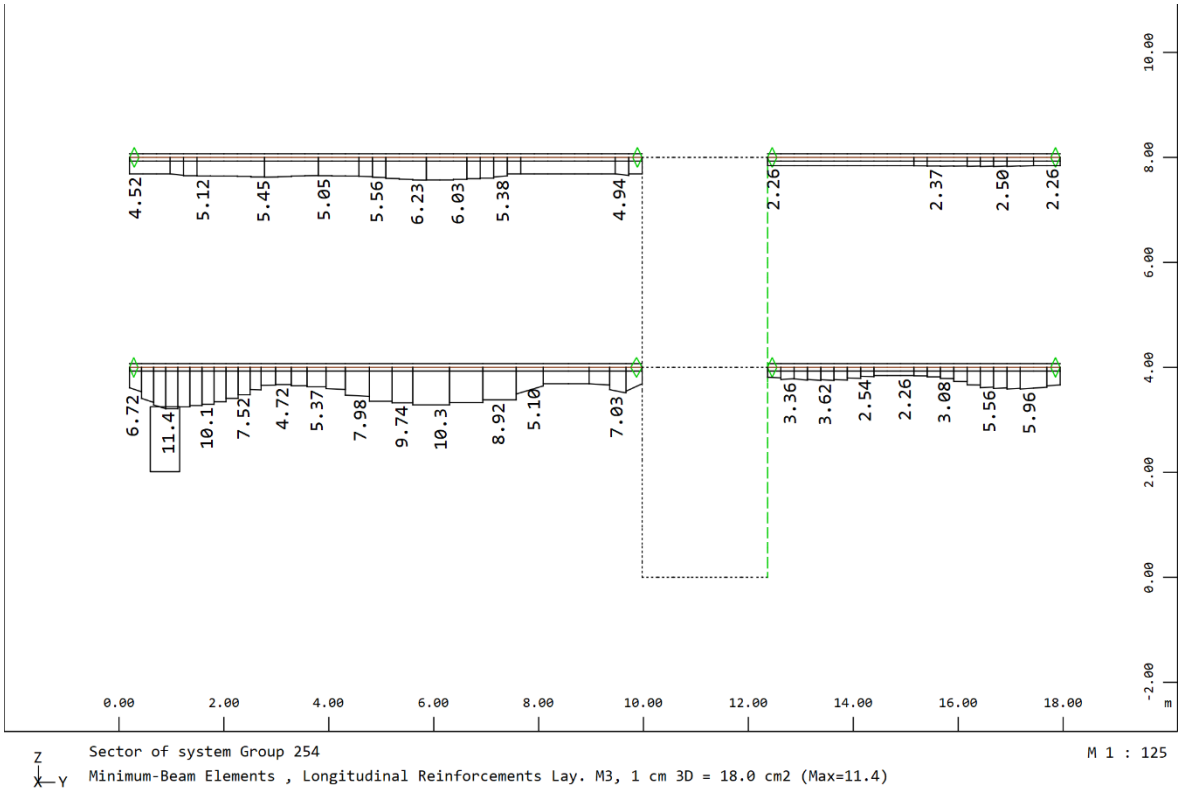



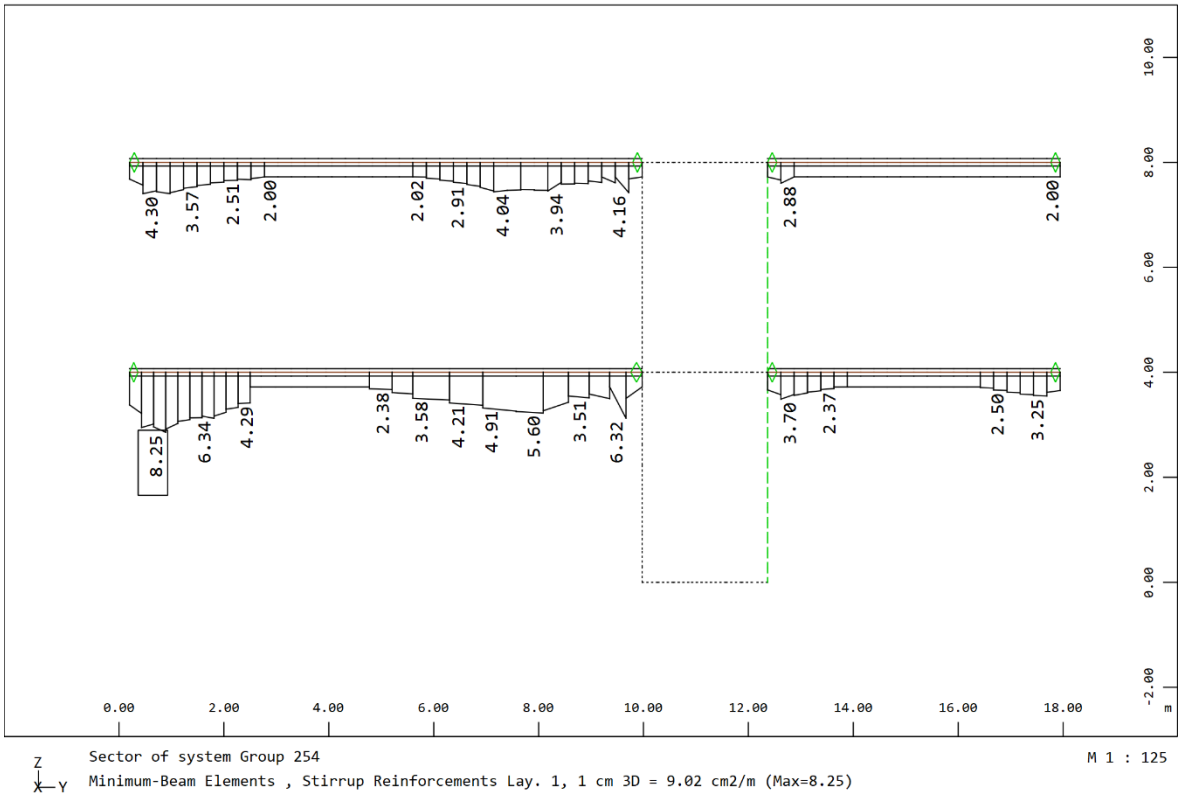

*Slika 29: Ovojnica računske armature strešne plošče – zgornja armatura*



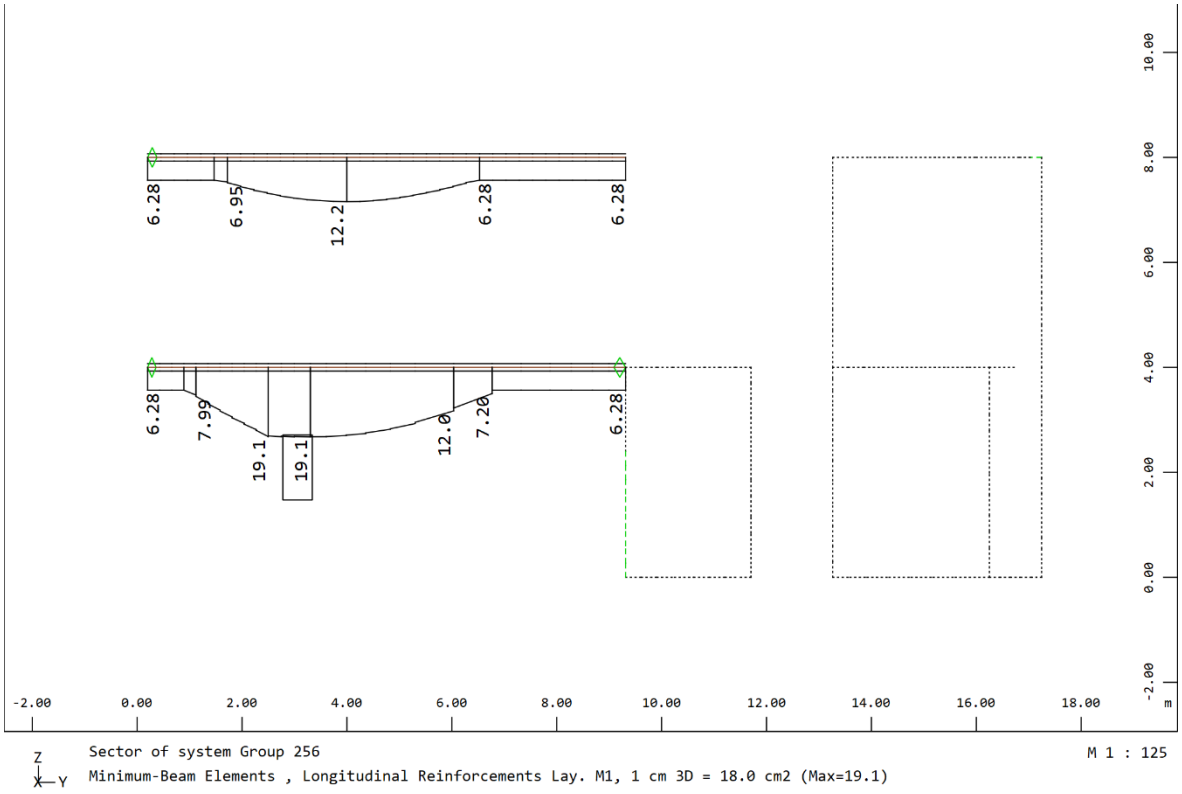



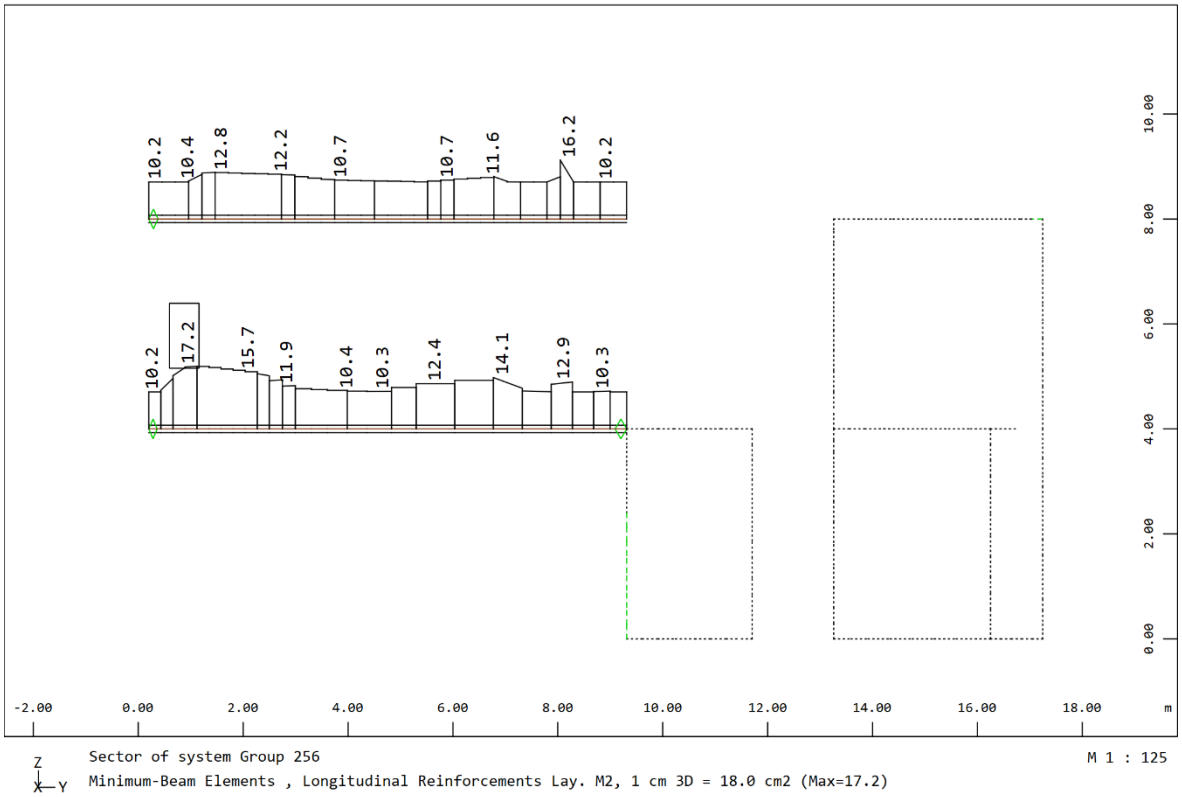

*Slika 30: Ovojnica računske armature nosilcev v osi 7 – spodnja in zgornja armatura*



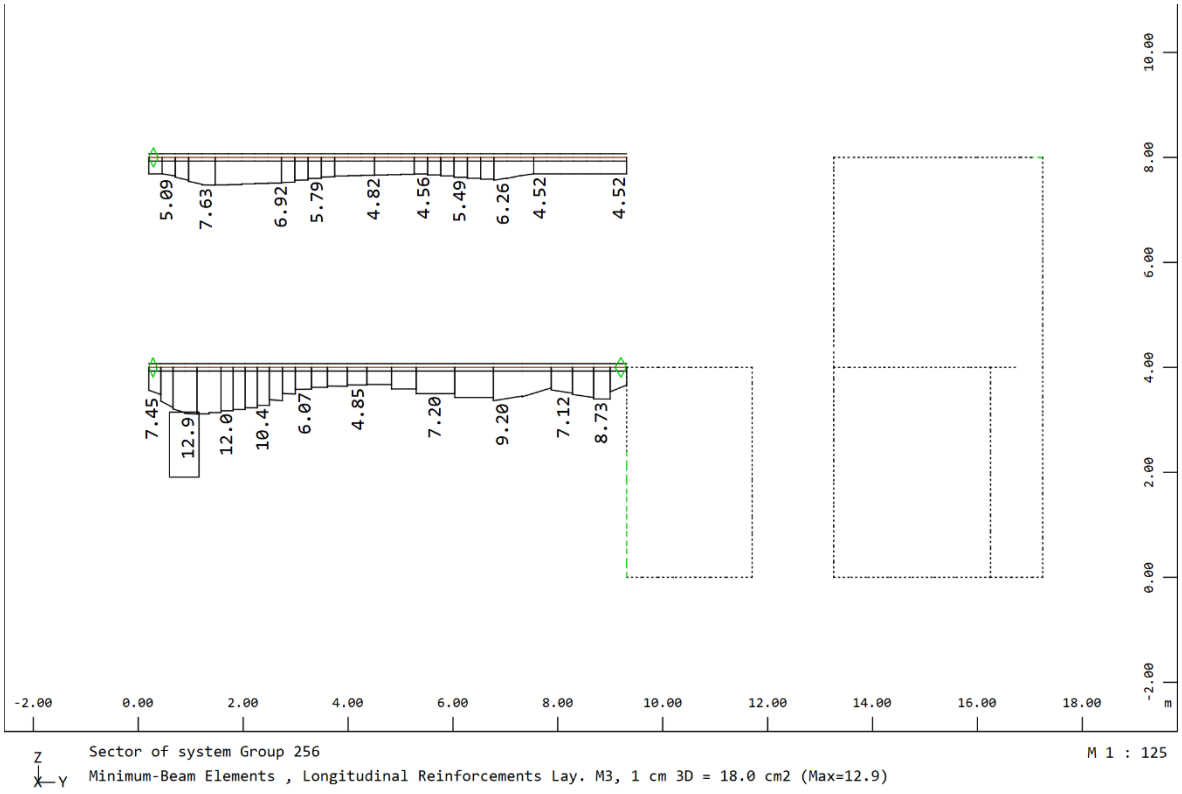



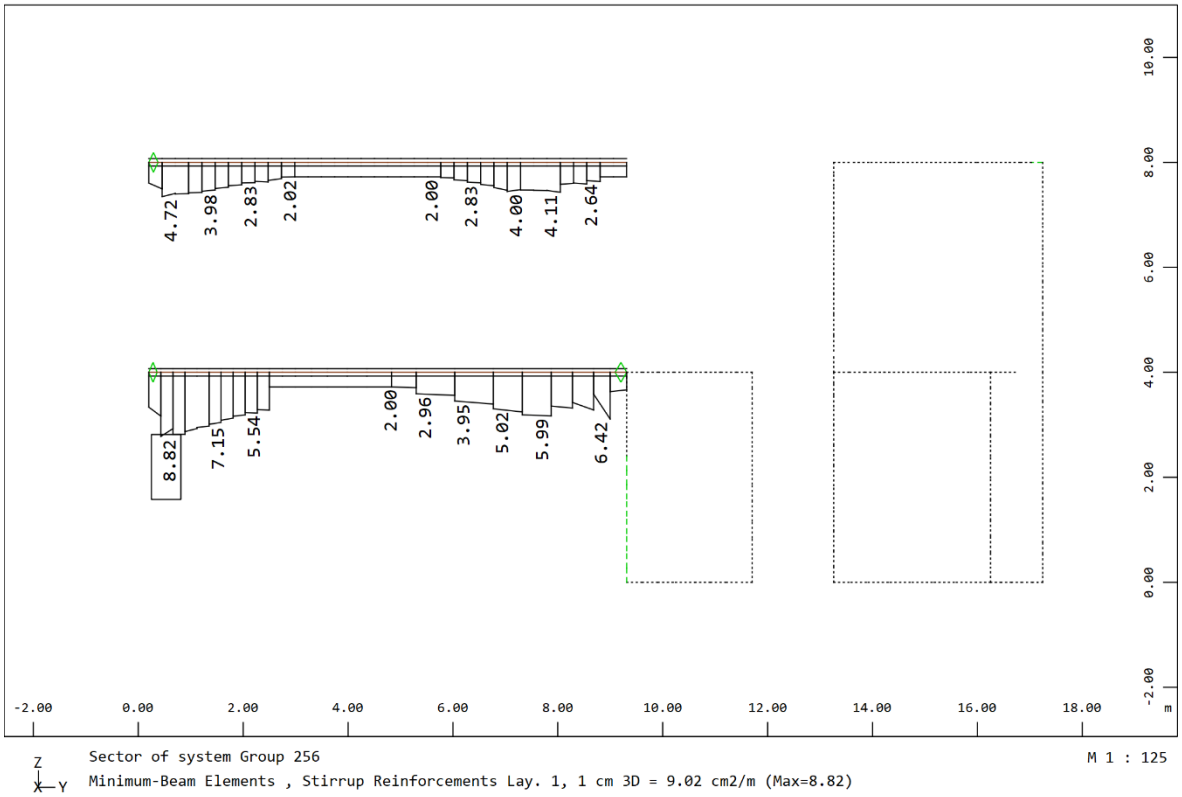

*Slika 31: Ovojnica računske armature nosilcev v osi 7 – bočna in strižna armatura*



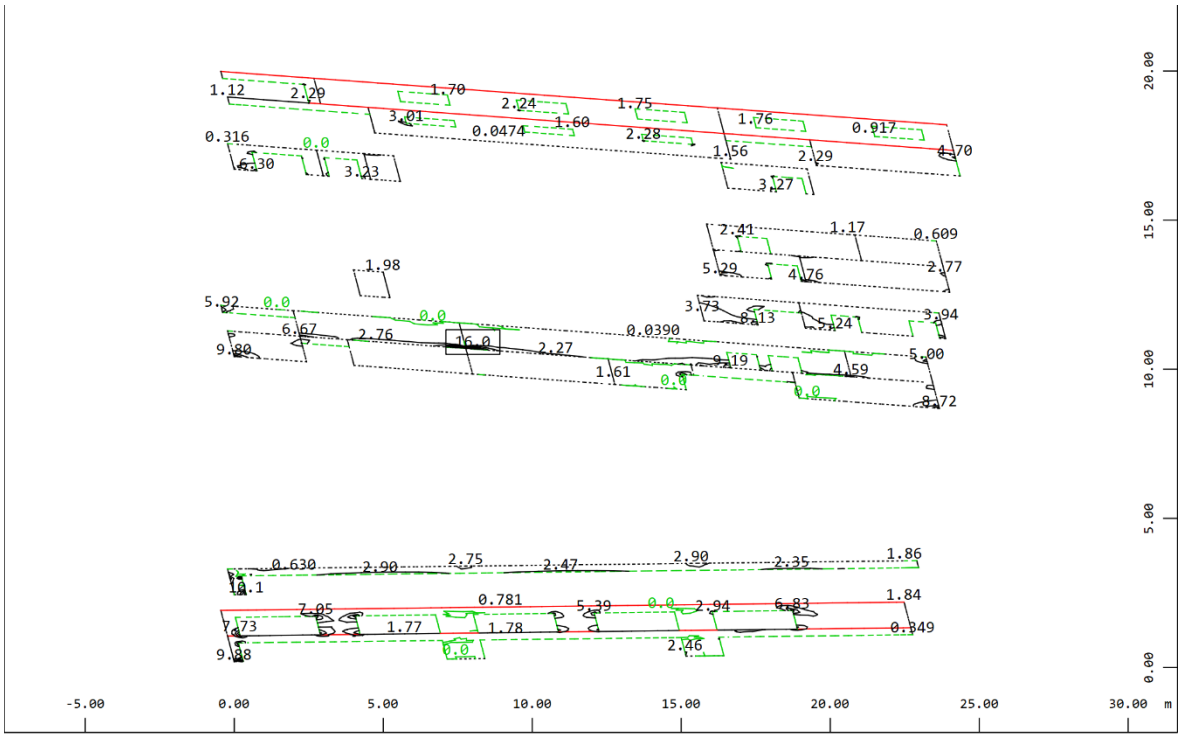



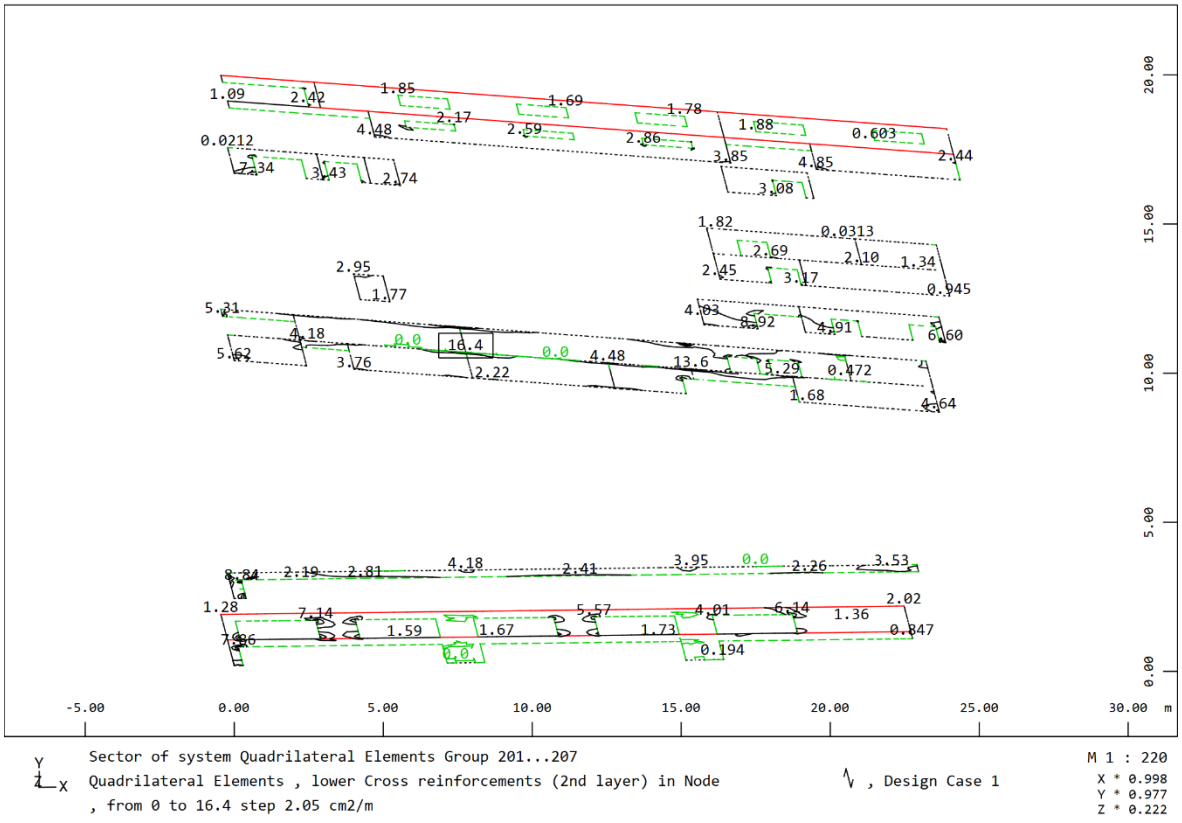

*Slika 32: Ovojnica računske armature nosilca v osi 9 – spodnja in zgornja armatura*



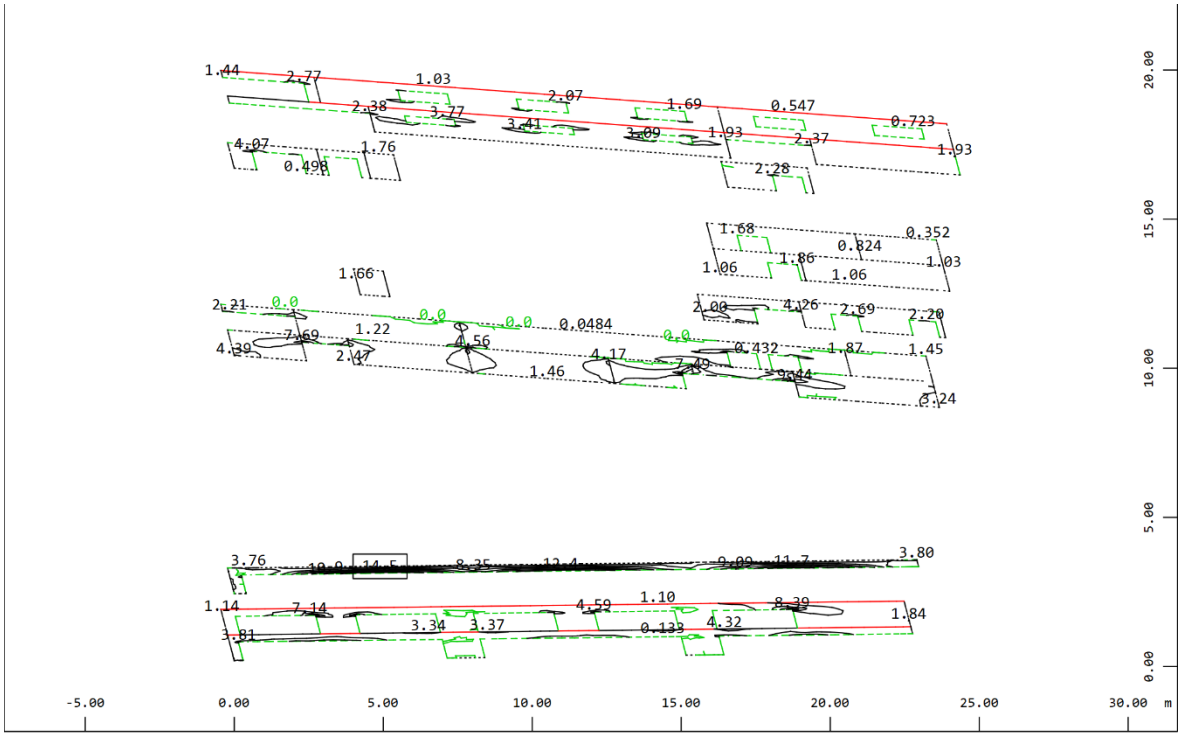



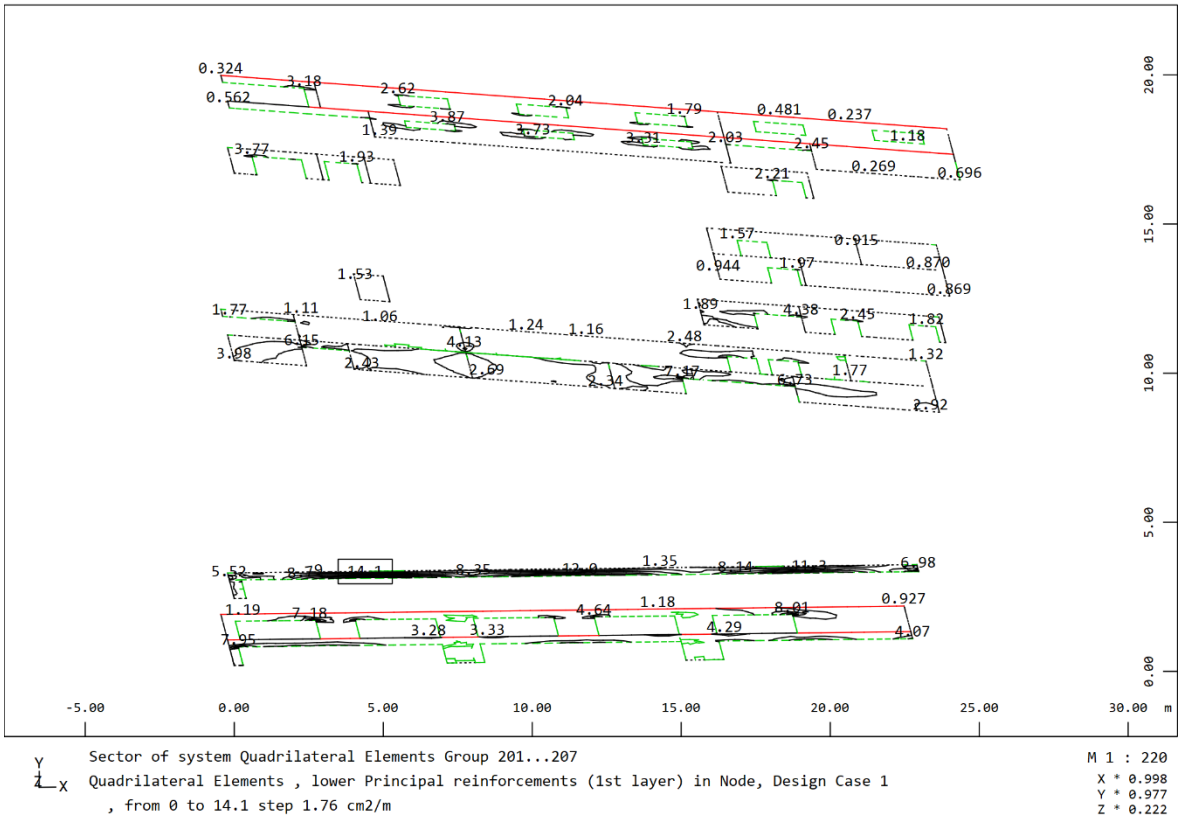

*Slika 33: Ovojnica računske armature nosilca v osi 9 – bočna in strižna armatura*



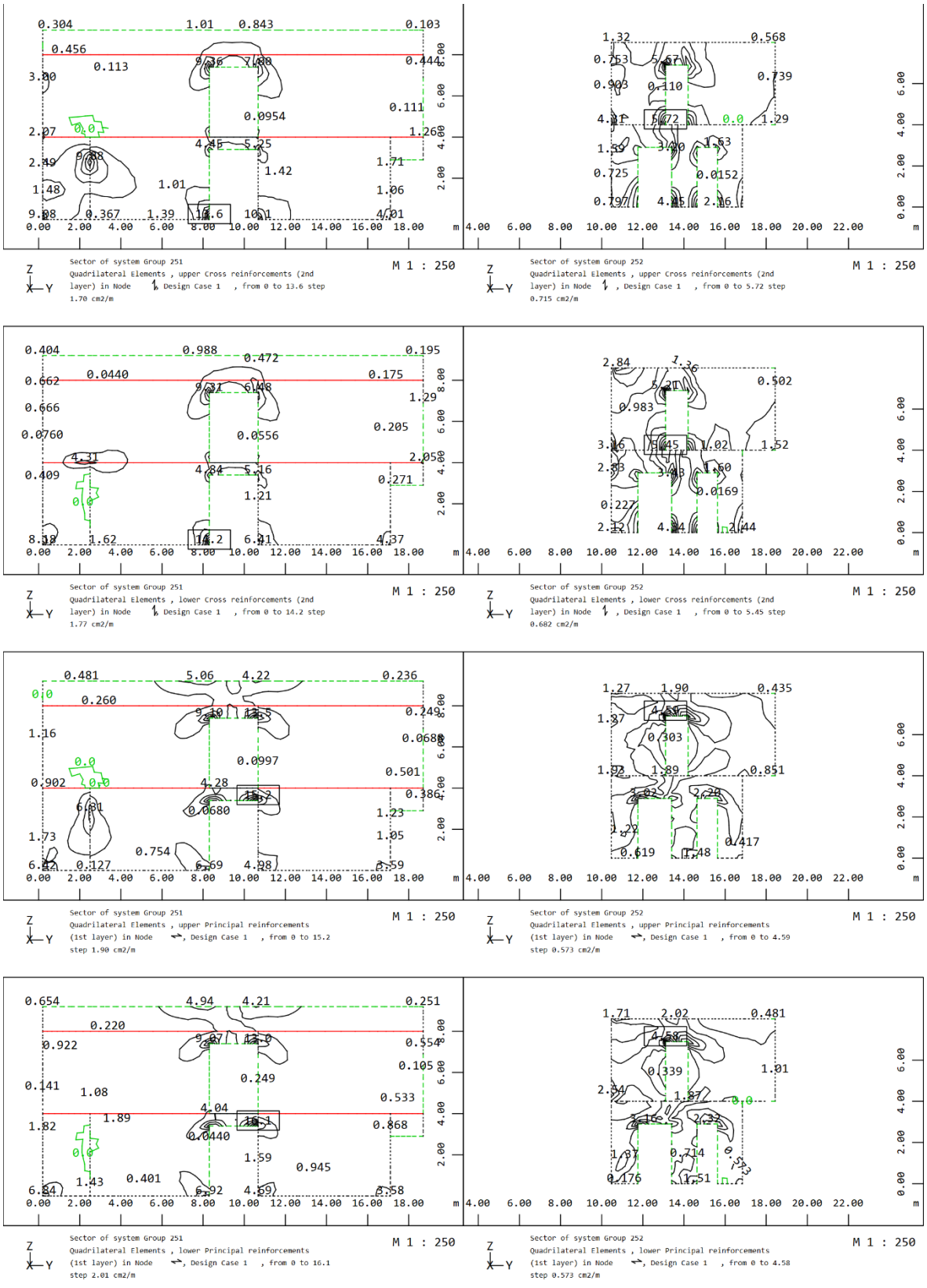




*Slika 34: Ovojnica računske armature v vzdolžnih stenah – vertikalna armatura*

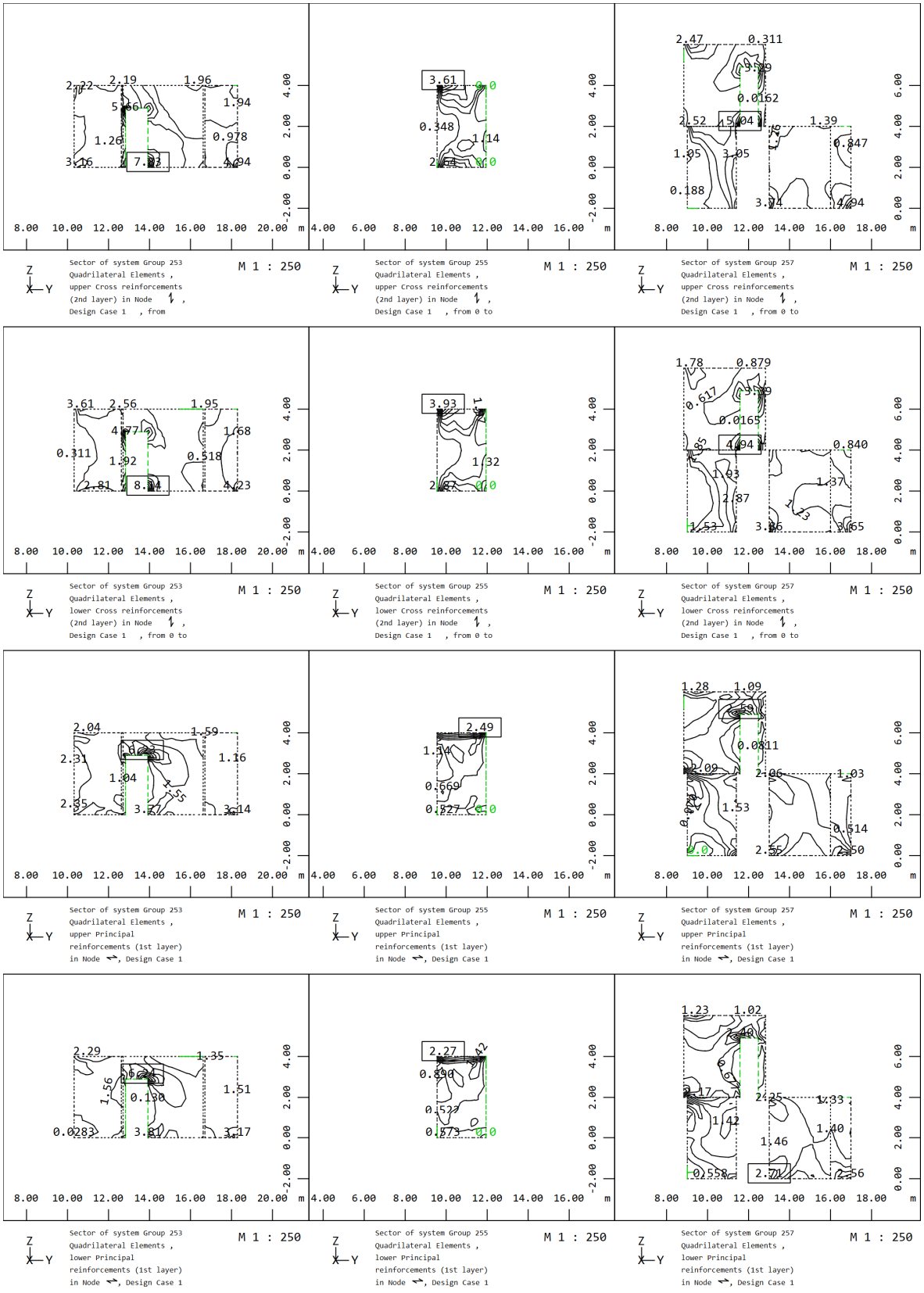


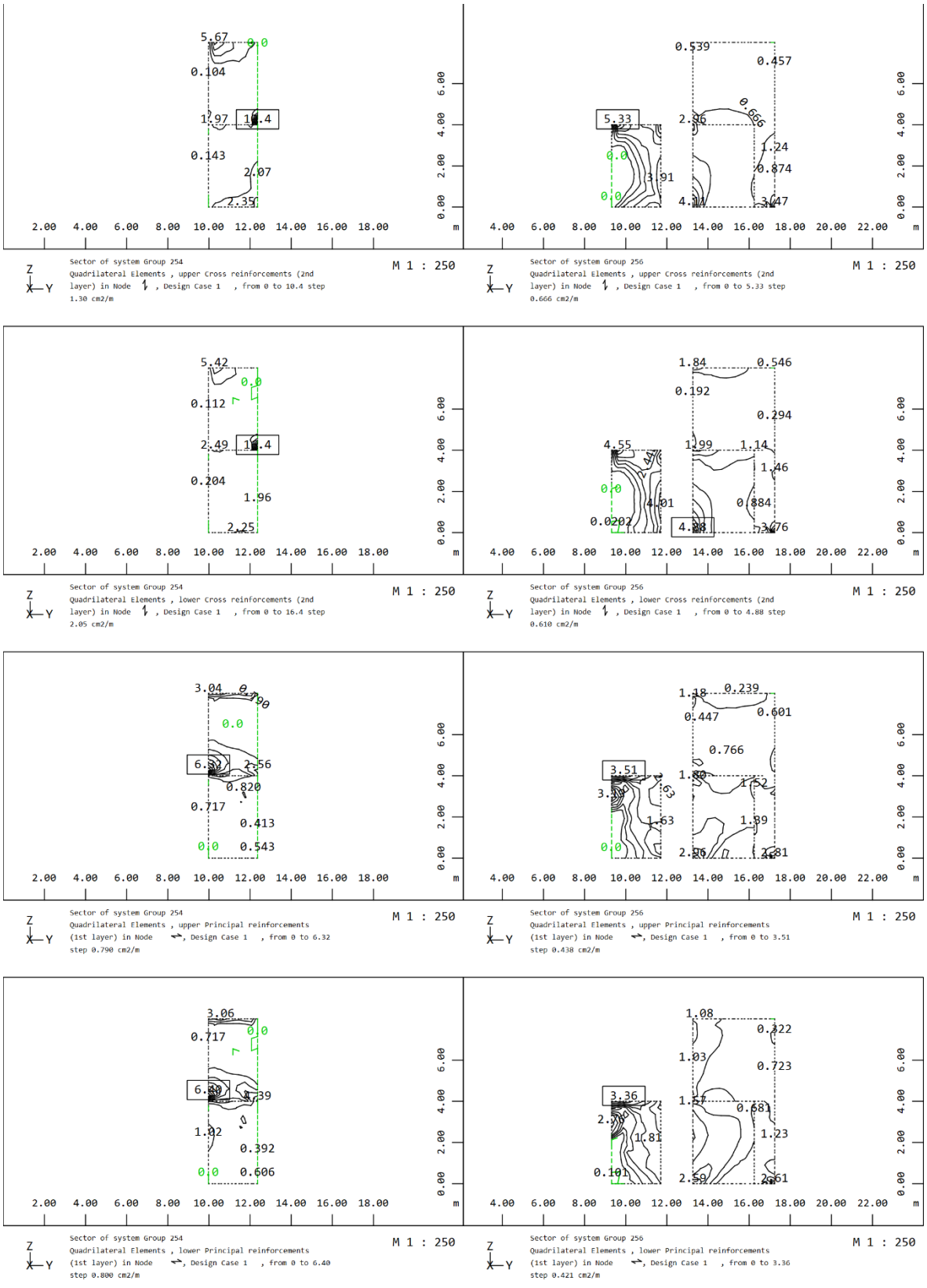

*Slika 35: Ovojnica računske armature v vzdolžnih stenah – horizontalna armatura*



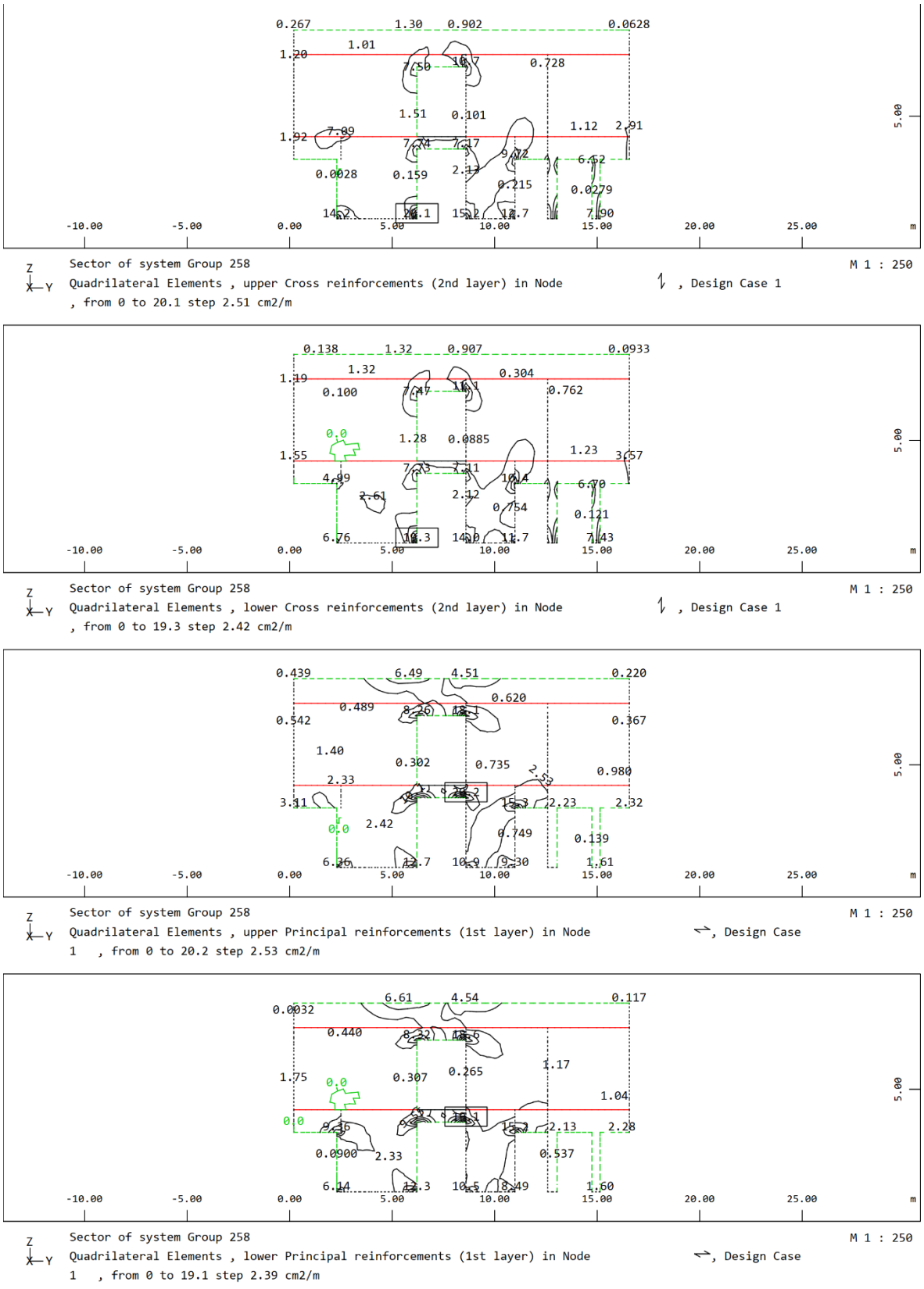

*Slika 36: Ovojnica računske armature v prečnih stenah v oseh 5 in 5-6 – vertikalna in horizontalna armatura*




*Slika 37: Ovojnica računske armature v prečnih stenah v oseh 6, 8 in 10 – vertikalna in horizontalna armatura*




*Slika 38: Ovojnica računske armature v prečnih stenah v oseh 7 in 9 – vertikalna in horizontalna armatura*

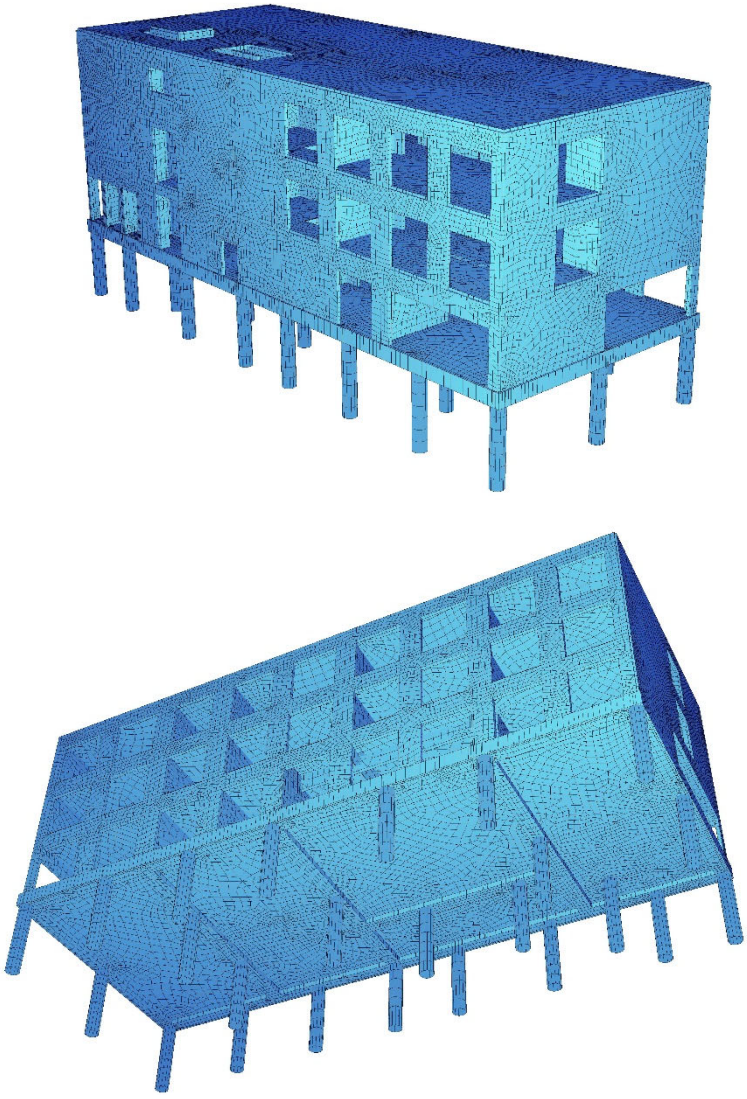



*Slika 39: Ovojnica računske armature v prečnih stenah v osi 11 – vertikalna in horizontalna armatura*

## 2.3 VZHODNA DILATACIJSKA ENOTA STAVBE

### 2.3.1 Predpostavke globalnega računskega modela - vzhodna dil. enota

Statična in dinamična (seizmična) analiza konstrukcije **vzhodna dilatacijske enote stavbe** je bila izvedena s pomočjo prostorskega računskega modela iz lupinastih in linijskih končnih elementov v programu *SOFiSTiK FEM ver.2018*. Konstrukcijski nosilni sistem je stenasti iz armiranega betona. Opravljena je bila analiza po teoriji prvega reda. Globalni računski model sestavljajo: AB vodnjaki povezani s temeljno ploščo z odebelitvami, armiranobetonske (AB) stene in plošče. Stavba je etažnosti P+1N+2N (3-etažna stavba; + tehnična etaža na delu tlorisa strehe). Predpostavljene etažne višine do 4,0 m. Horizontalne dimenzije računskega modela so 15,0 m × 36,0 m. Tipičen raster med stenami je 8,0 m oz. 4,0 m. Upoštevana debelina etažne in strešne plošče je 25 cm. Upoštevana debelina sten je 20 cm in debelina atičnih nosilcev 15 cm (*v globalnem modelu so upoštevani samo kot obtežba*) ter višina 120 cm. Predpostavljena debelina temeljne plošče je 50 cm z odebelitvami (pasovnimi temelji) višine 80 cm in širini 60 cm (robni) oz. 80 cm (vmesni).



*Slika 40: Globalni računski model v SOFiSTiKu – vzhodna dilatacijska enota stavbe*

Vpliv potresa na konstrukcijo je bil določen z modalno analizo s spektri odziva z uporabo linearno-elastičnega modela konstrukcije. Izbrano je bilo duktilno obnašanje konstrukcije (stopnja DCM) z redukcijskim faktorjem duktilnosti q=2,0 (stenasti AB konstrukcijski sistem; torzijsko podajen) za obe horizontalni smeri vpliva potresa. Pri modalni analizi konstrukcije so bili upoštevani razpokani prerezi za vse obstoječe armiranobetonske elemente. Razpokanost prerezov v programu *SOFiSTiK FEM ver. 2018* se za modalno analizo določi tako, da se za posamezne elemente preko t.i. grup elementov določi faktor zmanjšanja togosti, za katerega se običajno prevzame, da je enak 0,5 (polovična togost nosilnih elementov).

Mase v računskem modelu so bile upoštevane po pravilu SIST EN 1991-1, točka 3.2.4 (2)P. Upošteva se le del mase, ki izhaja iz koristne obtežbe (glede na koeficiente za kombinacijo $\psi_{E,i}$ za različne kategorije koristne obtežbe), in celotna masa, ki izhaja iz lastne in stalne obtežbe na objektu. Koeficienti za kombinacijo $\psi_{E,i}$ upoštevajo verjetnost, da v času potresa koristna obtežba ni prisotna po celotni konstrukciji. Koristna obtežba (kategorija C) je bila upoštevana s faktorjem $\gamma_{Q,C} = \phi \times \Psi_{2,C} = 0,8 \times 0,6 = 0,50$.

Vpliv naključne torzije (SIST EN 1998-1, točka 4.3.2 (1)P), ki jo je potrebno pri seizmični analizi računskega modela objekta upoštevati zaradi negotovosti, povezanih s položajem mas in s prostorskim spreminjanjem potresnega gibanja, se v računalniškem programu SOFiSTiK izvede avtomatično, s posebnim postopkom: projektni spekter za horizontalne potresne vplive se definira v štirih smereh (X+, Y-, Y+, Y-) tako, da se za vsako smer po posameznih etažah definira slučajno ekscentričnost (glede na formulo št. 4.3 v 4. poglavju SIST EN 1998-1), ki vpliva na premaknitev masnega središča v vsaki etaži iz nazivne lege. V nadaljevanju program SOFiSTiK avtomatsko izračuna potresne sile v vozliščih (iz mas v vozliščih in podanih pospeškov iz projektnega spektra), ki vključujejo vpliv naključne torzije.

Vpliv nihajnih oblik je upoštevan s popolno kvadratno kombinacijo (CQC), pri čemer naj bi vsota efektivnih modalnih mas znašala več kot 90% celotne mase konstrukcije (upoštevanih je bilo 50 lastnih nihajnih oblik modela, pri čemer smo se približali temu pogoju; s povečevanjem števila nihajnih oblik do 150 se odstotek bistveno ni spremenil; lahko bi kvečjemu lastno težo sten upoštevali kot obtežbo s čimer bi se izognili lokalnemu nihanju le-teh). Za kombinacijo vodoravnih komponent potresnega vpliva (kombiniranje smeri X in Y) učinek obeh vodoravnih komponent potresnega vpliva upoštevamo tako, da predpostavimo, da potres deluje 100% v eni in 30% v drugi smeri ter obratno (po principu $E_{Edx}$"+"$0.3E_{Edy}$ oz. $0.3E_{Edx}$"+"$E_{Edy}$ iz SIST EN 1998-1 točka 4.3.3.5.1 (3)).

V računskem modelu je bila modelirani tudi armiranobetonska temeljna plošča in AB vodnjaki s premerom Ø80 cm. Za novogradnjo objekta je bilo izdelano GG poročilo (*št. DN 2003902, GI ZRMK d.o.o. Ljubljana, 22.11.2010*), v katerem ni predpisanih modulov reakcije temeljnih tal. Glede na sestavo tal smo predpostavili modula reakcije temeljnih tal pod temeljno ploščo v vrednosti $k_v$ = 10.000 kN/m$^3$ in $k_h$ = 0,7 x 10.000 = 7.000 kN/m$^3$. Vertikalni modul reakcije temeljnih tal pod vodnjaki pa smo predpostavili v vrednosti $k_{v,vodnjaki}$ = 40.000 kN/m$^3$. Predpostavljena je bila višina vodnjakov 5,0 m.

Dimenzioniranje računske armature v armiranobetonskih elementih je bilo izvedeno s pomočjo programa SOFiSTiK za mejni stanji nosilnosti (MSN in MSN-Potres). Rezultati so priloženi v nadaljevanju.

## 2.3.2 Osnovni obtežni slučaji v globalnem rač. modelu

*Preglednica 11: Osnovni obtežni slučaji v globalnem računskem modelu*

| | Obtežni slučaj | OPIS |
|---|---|---|
| ***G*** | 1 | Lastna teža konstrukcije (razen temeljev) |
| | 2 | Stalna obtežba – obloge tal in stropov |
| | 3 | Stalna obtežba – predelne stene |
| | 4 | Stalna obtežba – fasada |
| | 9 | Lastna teža temeljev * |
| ***Q*** | 11 | Koristna obtežba (kategorija C) |
| | 12 | Koristna obtežba (kategorija H) |
| ***S*** | 21 | Sneg |
| ***E*** | 601, 611 | Potresna obt. (projektni spekter) v horizontalnih smereh X in Y brez slučajne torzije |
| | 701, 711 | Potresna obt. (elastični spekter) v horizontalnih smereh X in Y brez slučajne torzije |
| | 801, 802, 811, 812 | Potresna obt. (projektni spekter) v horizontalnih smereh X in Y s slučajno torzijo |
| | 901, 902, 911, 912 | Potresna obt. (elastični spekter) v horizontalnih smereh X in Y s slučajno torzijo |

** Lastna teža temeljev (temeljna plošča in pasovni temelji) je podana z obtežbo, da jo je možno izklopiti v primeru modalne analize za izračun lastnega nihanja konstrukcije.*

## 2.3.3 Grupe elementov v globalnem računskem modelu

*Preglednica 12: Grupe elementov v globalnem računskem modelu*

| **GRUPE** | **OPIS** |
|---|---|
| 100 | Temelji (temeljna plošča in pasovni temelji) |
| 101 | Vodnjaki |
| 110 | Etažna plošča (nad pritličjem) |
| 110 | Etažna plošča (nad 1. nadstropjem) |
| 130 | Strešna plošča (nad 2. nadstropjem) |
| 105, 115, 125 | Stopniščne rame in podesti (po etažah) |
| od 201 do 211 | Stene in nosilci v prečni smeri |
| od 251 do 256 | Stene in nosilci v vzdolžni smeri |

## 2.3.4 Rezultati analize lastnega nihanja

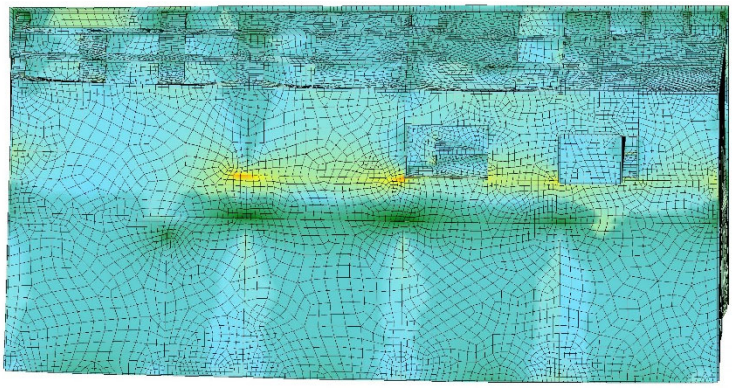
*Preglednica 13: Lastne nihajne dobe za analizo potresnih vplivov*

| Nihajna oblika | *T* [s] | Angažiranost mase - X smer [%] | Angažiranost mase - Y smer [%] | Efektivna masa - X smer [%] | Efektivna masa - Y smer [%] |
|---|---|---|---|---|---|
| **1** | **0,191** | 73,04 | 0,86 | **73,04** | **0,86** |
| **2** | **0,180** | 74,14 | 53,85 | **1,10** | **52,99** |
| **3** | **0,133** | 74,14 | 80,47 | **0,00** | **26,62** |
| 4 | 0,061 | 74,22 | 80,49 | 0,08 | 0,02 |
| 5 | 0,057 | 74,24 | 87,15 | 0,02 | 6,66 |
| 6 | 0,055 | 74,27 | 87,15 | 0,03 | 0,00 |
| 7 | 0,054 | 74,29 | 87,63 | 0,02 | 0,48 |
| 8 | 0,054 | 74,77 | 87,63 | 0,48 | 0,00 |
| 9 | 0,054 | 74,88 | 87,88 | 0,11 | 0,25 |
| 10 | 0,052 | 74,91 | 87,88 | 0,03 | 0,00 |
| 11 | 0,052 | 74,91 | 88,30 | 0,00 | 0,42 |
| 12 | 0,052 | 74,99 | 88,32 | 0,08 | 0,02 |
| 13 | 0,050 | 74,99 | 88,56 | 0,00 | 0,24 |
| 14 | 0,049 | 75,05 | 88,60 | 0,06 | 0,04 |
| 15 | 0,049 | 75,85 | 88,60 | 0,80 | 0,00 |
| 16 | 0,045 | 84,96 | 88,64 | 9,11 | 0,04 |
| 17 | 0,044 | 84,96 | 88,93 | 0,00 | 0,29 |
| 18 | 0,043 | 85,55 | 88,95 | 0,59 | 0,02 |
| 19 | 0,043 | 86,58 | 89,10 | 1,03 | 0,15 |
| 20 | 0,042 | 86,68 | 89,10 | 0,10 | 0,00 |
| 21 | 0,042 | 86,84 | 89,12 | 0,16 | 0,02 |
| 22 | 0,041 | 86,91 | 89,34 | 0,07 | 0,22 |
| 23 | 0,041 | 86,91 | 89,43 | 0,00 | 0,09 |
| 24 | 0,038 | 86,91 | 89,50 | 0,00 | 0,07 |
| 25 | 0,037 | 86,92 | 89,52 | 0,01 | 0,02 |
| 26 | 0,037 | 86,92 | 89,53 | 0,00 | 0,01 |
| 27 | 0,037 | 86,94 | 89,53 | 0,02 | 0,00 |
| 28 | 0,036 | 86,94 | 89,54 | 0,00 | 0,01 |
| 29 | 0,036 | 86,98 | 89,56 | 0,04 | 0,02 |
| 30 | 0,036 | 86,98 | 89,79 | 0,00 | 0,23 |
| 31 | 0,035 | 86,98 | 89,81 | 0,00 | 0,02 |
| 32 | 0,035 | 87,00 | 89,95 | 0,02 | 0,14 |
| 33 | 0,035 | 87,02 | 89,96 | 0,02 | 0,01 |
| 34 | 0,034 | 87,05 | 89,97 | 0,03 | 0,01 |
| 35 | 0,034 | 87,05 | 89,98 | 0,00 | 0,01 |
| 36 | 0,034 | 87,10 | 89,98 | 0,05 | 0,00 |
| 37 | 0,034 | 87,10 | 89,98 | 0,00 | 0,00 |
| 38 | 0,033 | 87,10 | 89,98 | 0,00 | 0,00 |
| 39 | 0,033 | 87,10 | 89,98 | 0,00 | 0,00 |
| 40 | 0,033 | 87,10 | 89,98 | 0,00 | 0,00 |
| 41 | 0,033 | 87,12 | 89,98 | 0,02 | 0,00 |
| 42 | 0,032 | 87,13 | 90,00 | 0,01 | 0,02 |
| 43 | 0,032 | 87,17 | 90,00 | 0,04 | 0,00 |
| 44 | 0,032 | 87,17 | 90,01 | 0,00 | 0,01 |

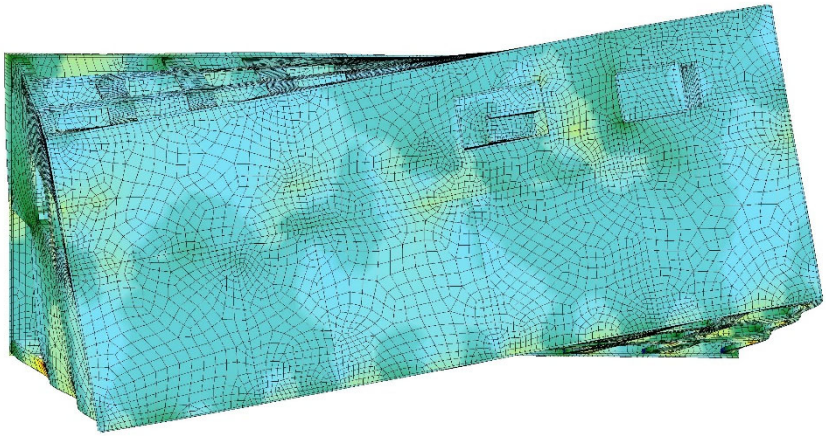
| | | | | | |
|---|---|---|---|---|---|
| 45 | 0,032 | 87,19 | 90,01 | 0,02 | 0,00 |
| 46 | 0,031 | 87,20 | 90,05 | 0,01 | 0,04 |
| 47 | 0,030 | 87,29 | 90,06 | 0,09 | 0,01 |
| 48 | 0,030 | 87,31 | 90,07 | 0,02 | 0,01 |
| 49 | 0,030 | 87,32 | 90,08 | 0,01 | 0,01 |
| **50** | 0,029 | **87,36** | **90,10** | 0,04 | 0,02 |

S prvimi 50 nihajnimi oblikami nismo popolnoma zadostili pogoju vsote efektivnih modalnih mas (angažiranost mas) nad več kot 90% celotne mase konstrukcije, vendar smo se le-temu zelo približali. Prve tri nihajne oblike so prikazane v nadaljevanju (prva je pretežno translacijska, druga in tretja pa sta torzijski).

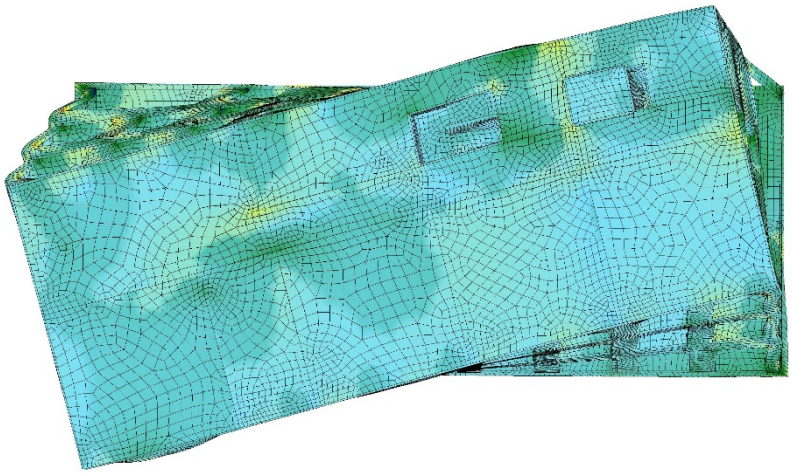
1. nihajna oblika



2. nihajna oblika



3. nihajna oblika



*Slika 41: Glavne tri globalne nihajne oblike*

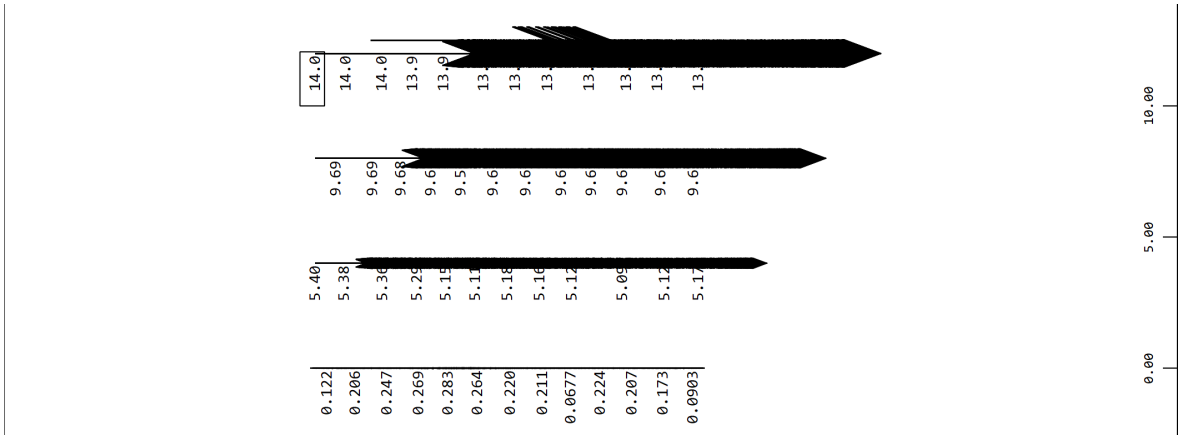
## 2.3.5 Kontrola horizontalnih etažnih zamikov konstrukcije

Za kontrolo etažnih pomikov konstrukcije v primeru potresne obtežbe (elastičen spekter) je bil upoštevan najstrožji kriterij po SIST EN 1998-1, ki predvideva, da so na konstrukcijo pritrjeni nekonstrukcijski elementi iz krhkih materialov.

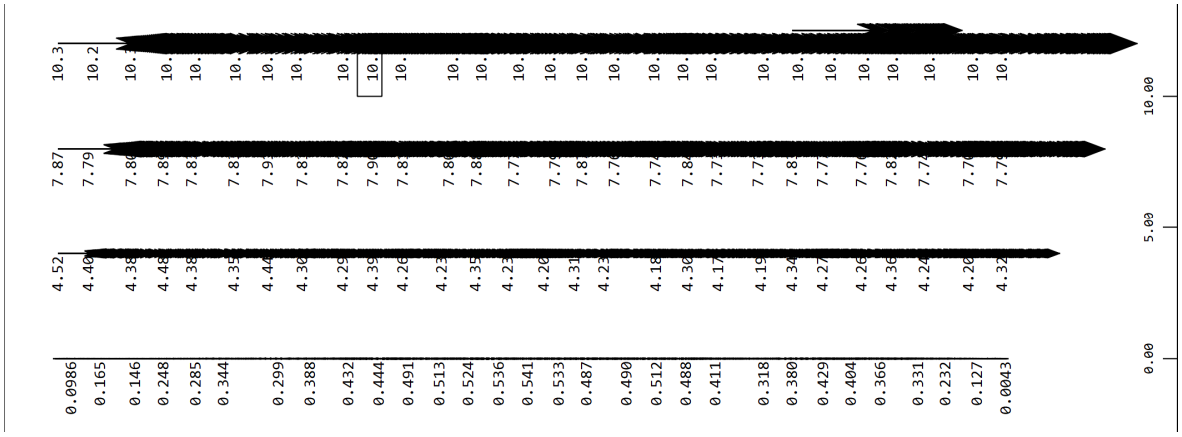
*Preglednica 14: Kontrola horizontalnih etažnih zamikov konstrukcije*

| etaža | $H$ [m] | $h$ [m] | $d_X$ [mm] | $d_Y$ [mm] | $d_{r,X}$ [mm] | $d_{r,Y}$ [mm] | $\boldsymbol{d_{r,X}}$ **[%]** | $\boldsymbol{d_{r,Y}}$ **[%]** | $d_{r,max}$ [%] |
|---|---|---|---|---|---|---|---|---|---|
| K | 0,00 | | 0,0 | 0,0 | | | | | |
| P | 4,00 | 4,00 | 5,4 | 4,5 | 5,4 | 4,5 | **0,14** | **0,11** | ≤ 1,00 |
| 1N | 8,00 | 4,00 | 9,7 | 7,9 | 9,7 | 7,9 | **0,24** | **0,20** | ≤ 1,00 |
| ST | 12,00 | 4,00 | 14,0 | 10,3 | 4,3 | 2,4 | **0,11** | **0,06** | ≤ 1,00 |

$H$ … absolutna višinska kota, $h$ … višina etaže, $d_X$ … pomik v smeri X, $d_Y$ … pomik v smeri Y, $d_{r,X}$ … etažni pomik v smeri X, $d_{r,Y}$ … etažni pomik v smeri Y, $d_{r,max}$ ... največji dovoljeni etažni pomik po SIST EN 1998-1

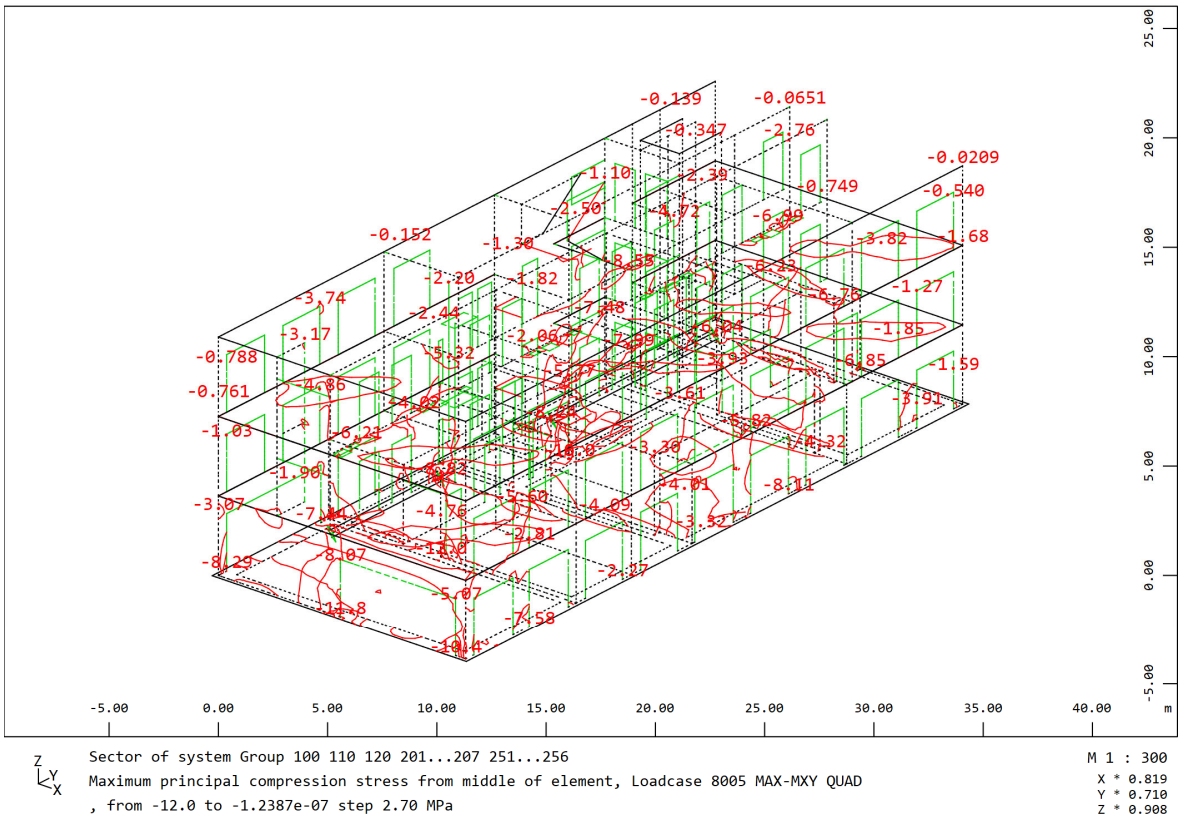



*Slika 42: Maksimalni horizontalni pomiki v X smeri zaradi potresa v X smeri*




*Slika 43: Maksimalni horizontalni pomiki v Y smeri zaradi potresa v Y smeri*

## 2.3.6 Kontrola maks. tlač. napetosti v betonu za mejno stanje uporabnosti



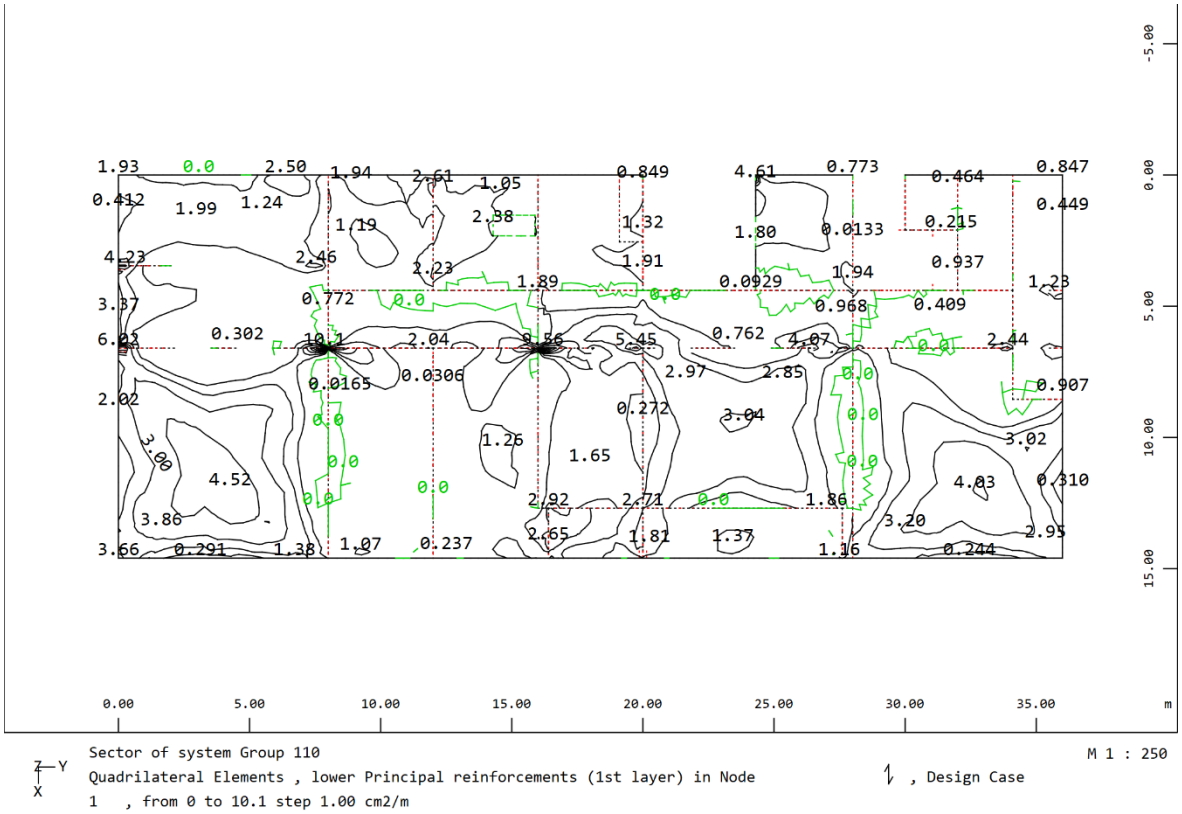

*Slika 44: Maksimalne tlačne napetosti v betonu v AB elementih (MSU-kar)*

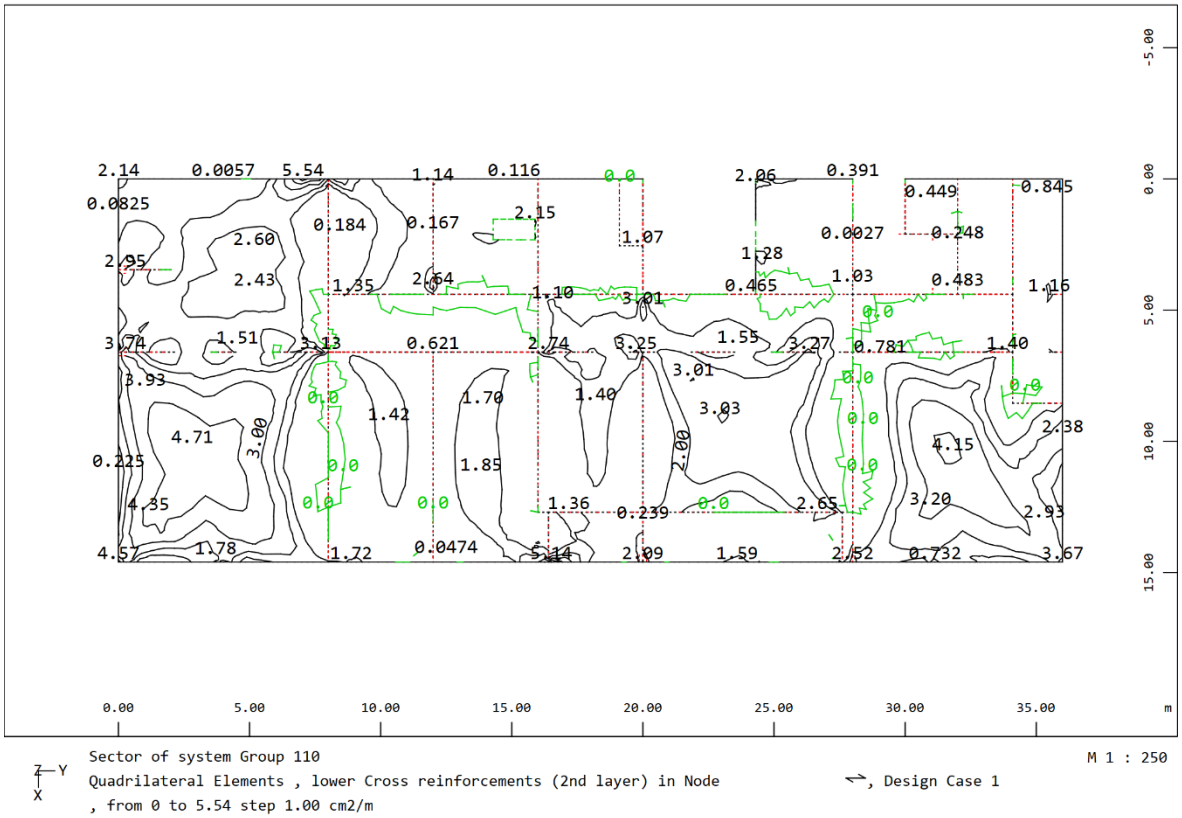
**Kontrola:**

Kvaliteta betona: C30/37

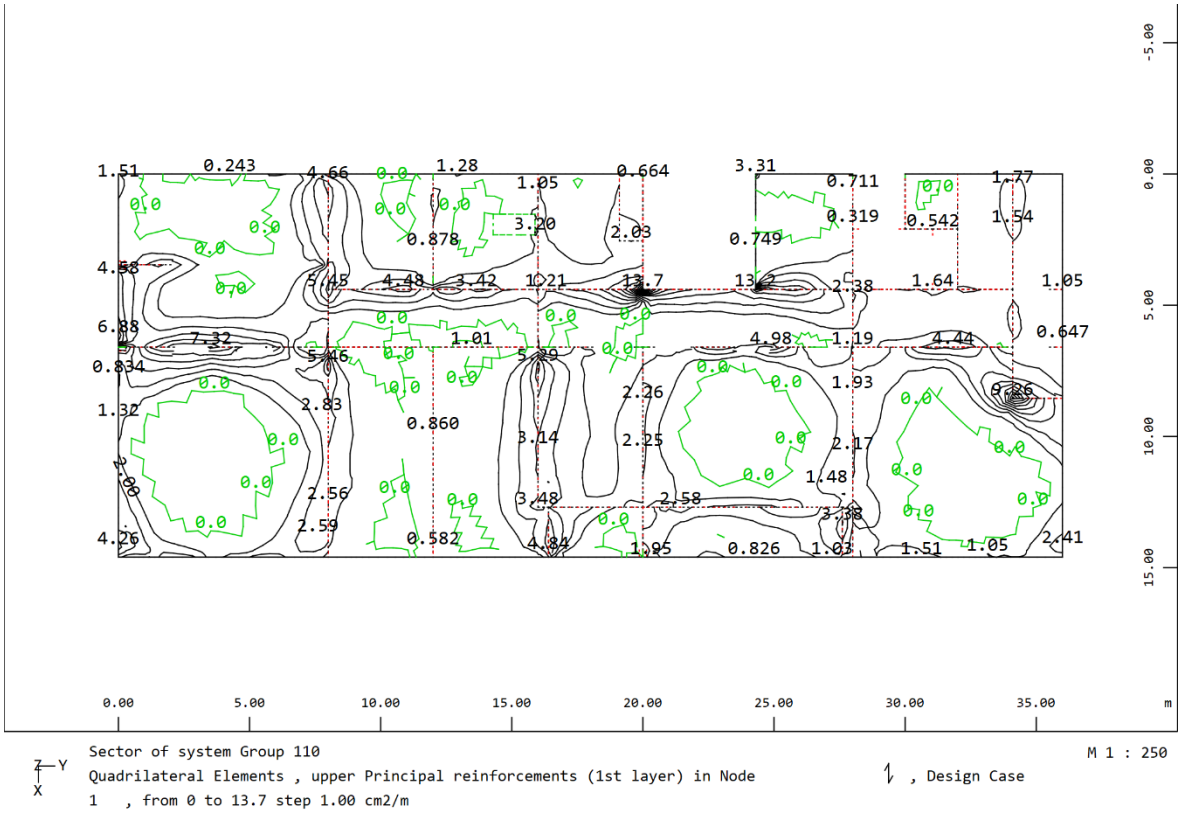
Kontrola: $\sigma_{sc,max,karakt}$ **=11,8 MPa** < 0,6×$f_{ck}$ = 0,6×30,0 = **18,0 MPa** ✓

## 2.3.7 Računsko potrebna armatura AB elementov

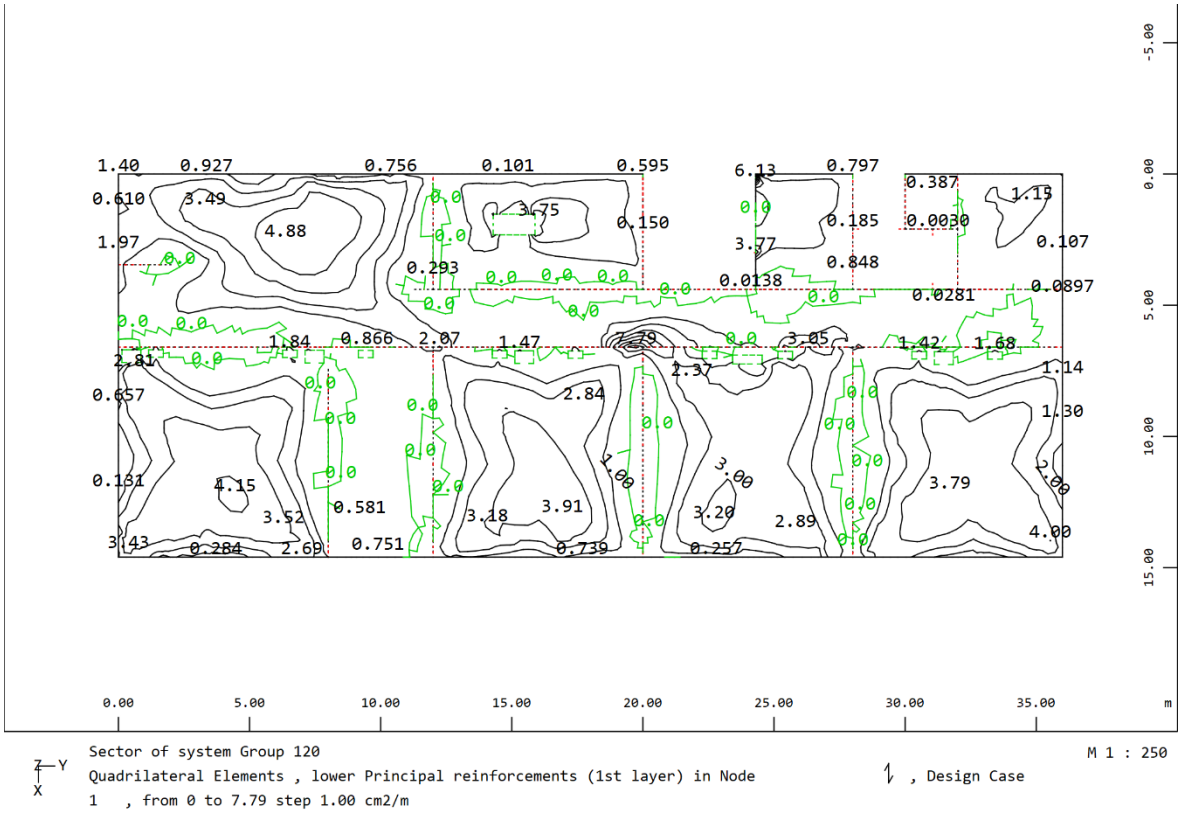


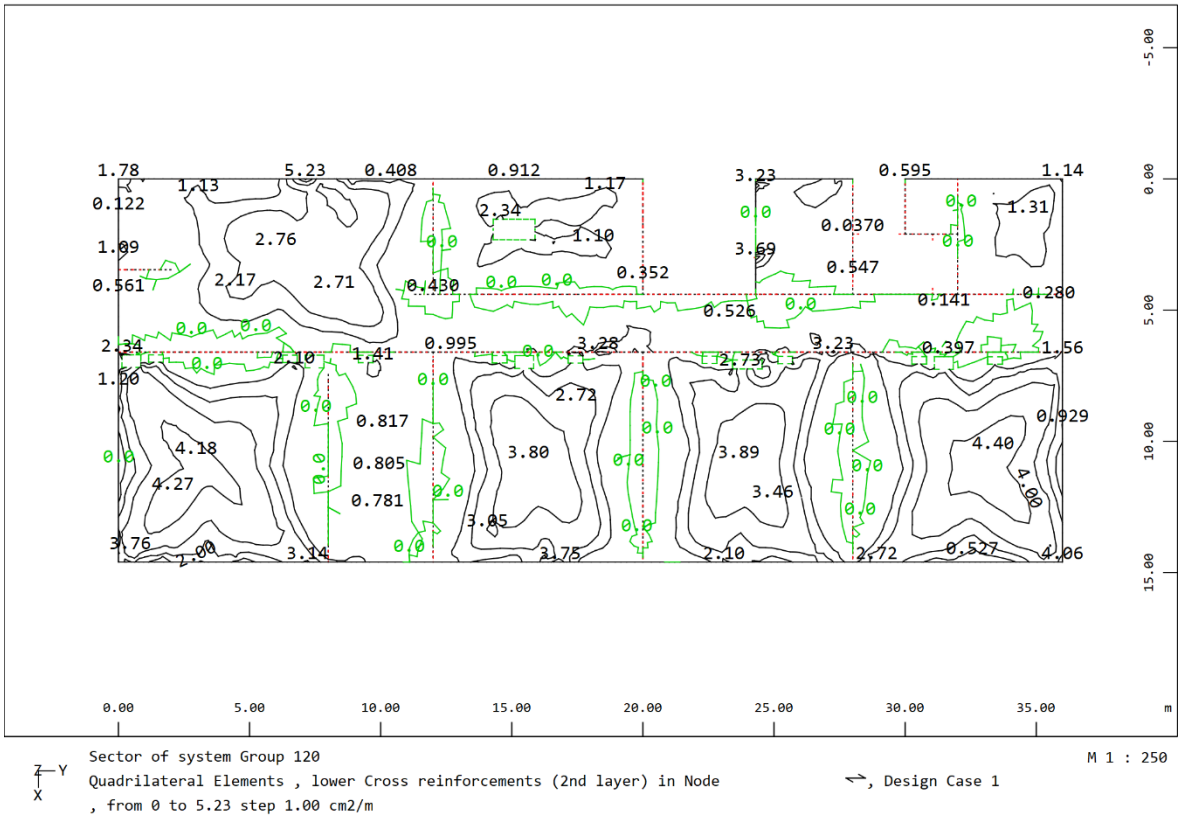




*Slika 45: Ovojnica računske armature etažne plošče nad P – spodnja armatura*

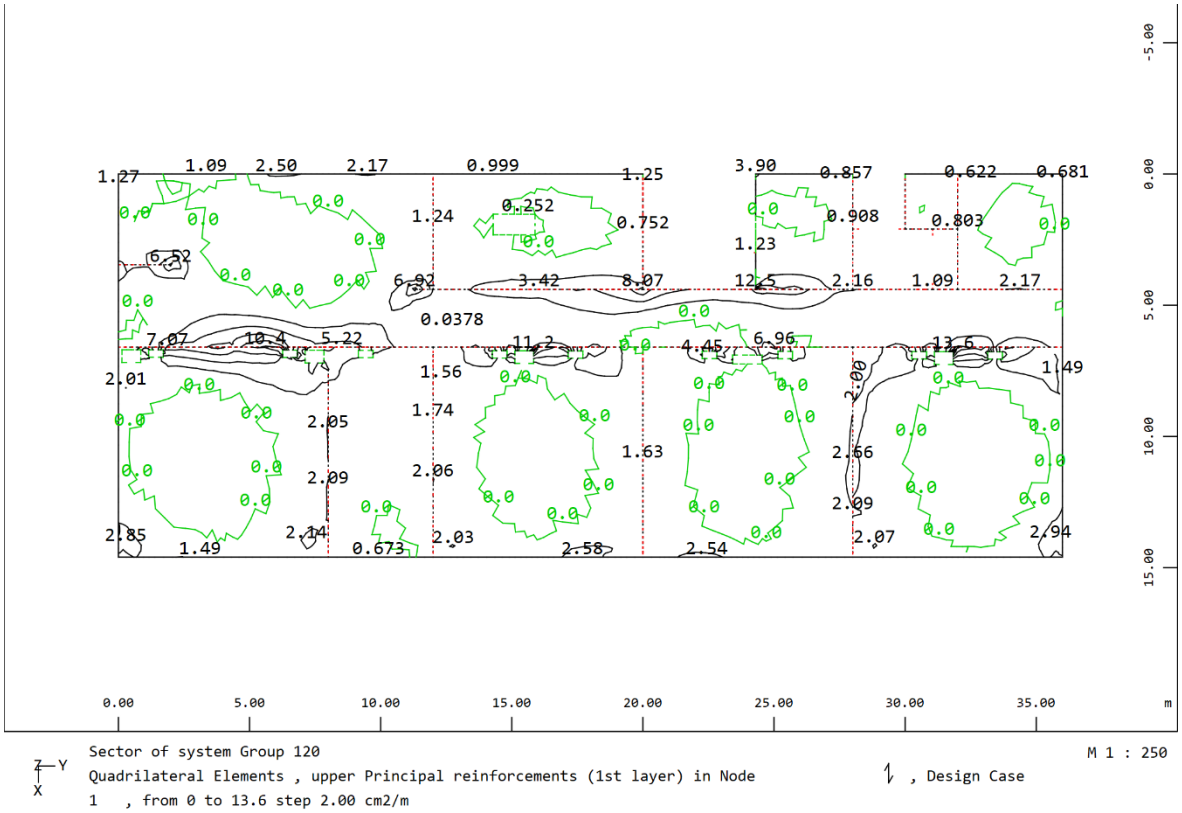


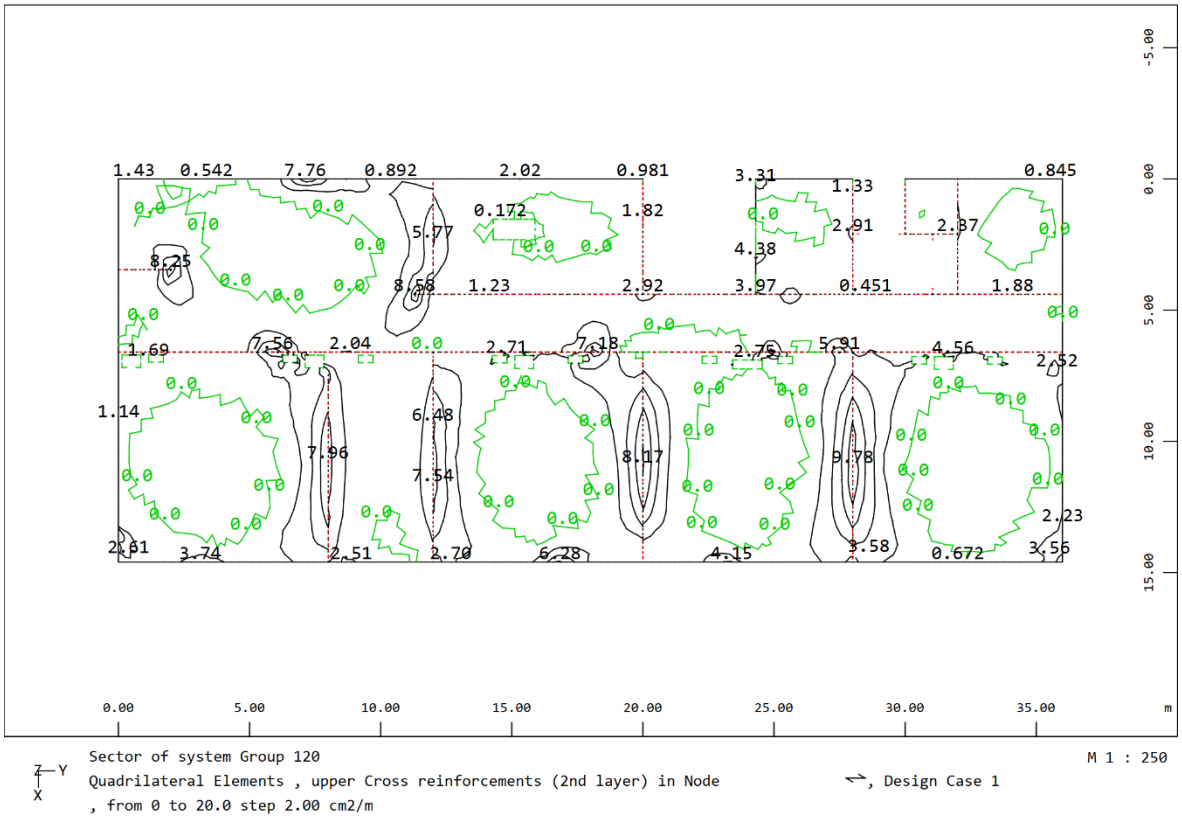

*Slika 46: Ovojnica računske armature etažne plošče nad P – zgornja armatura*



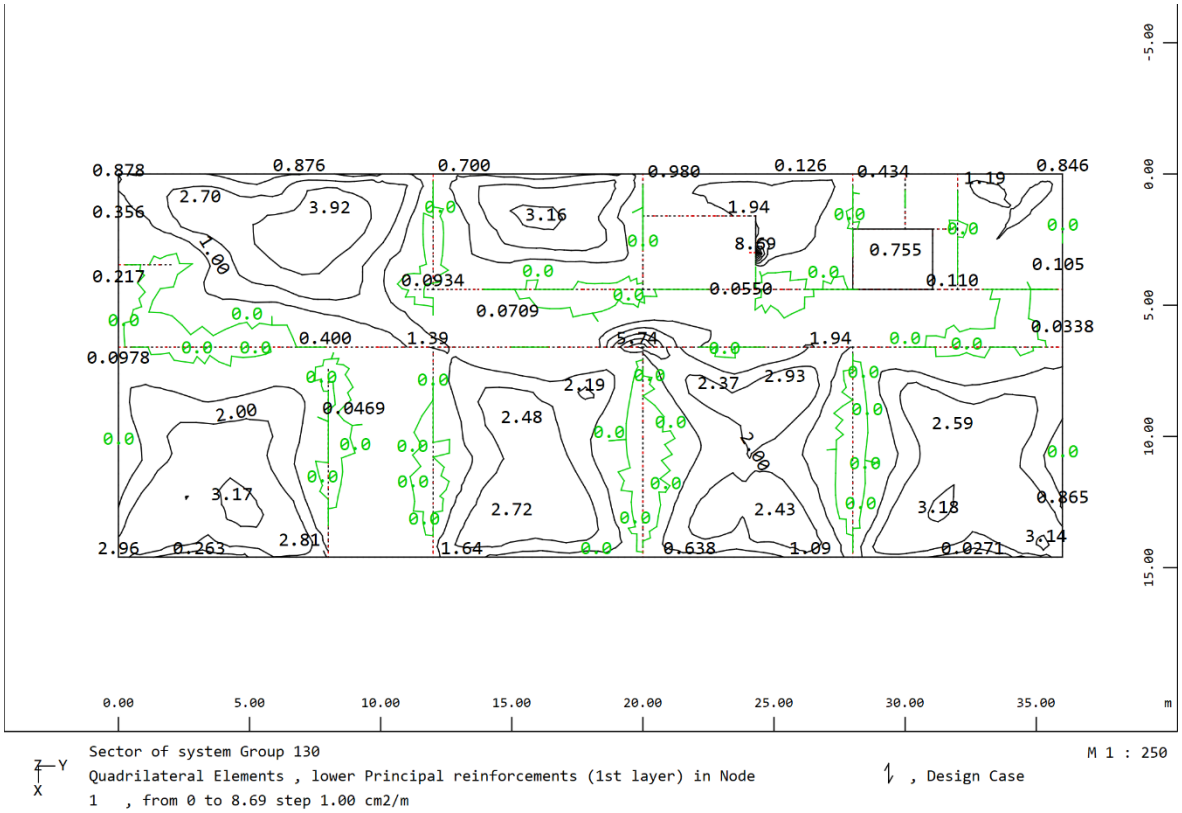




*Slika 47: Ovojnica računske armature etažne plošče nad N – spodnja armatura*

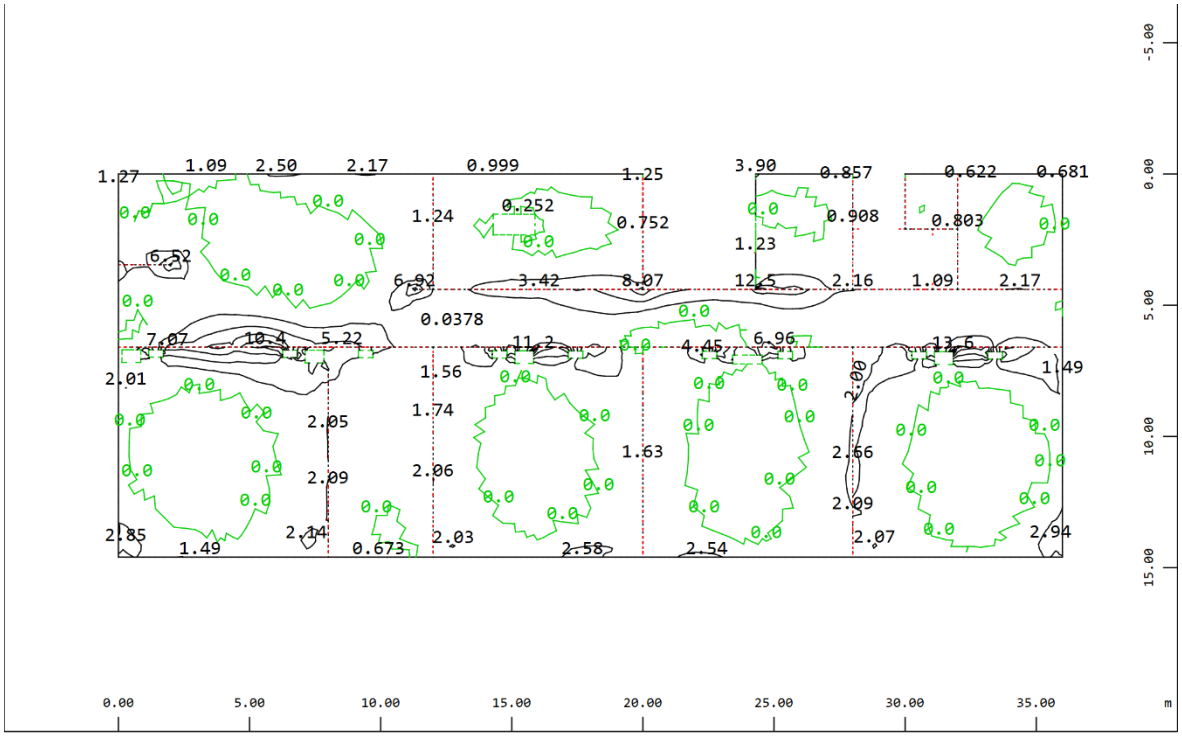


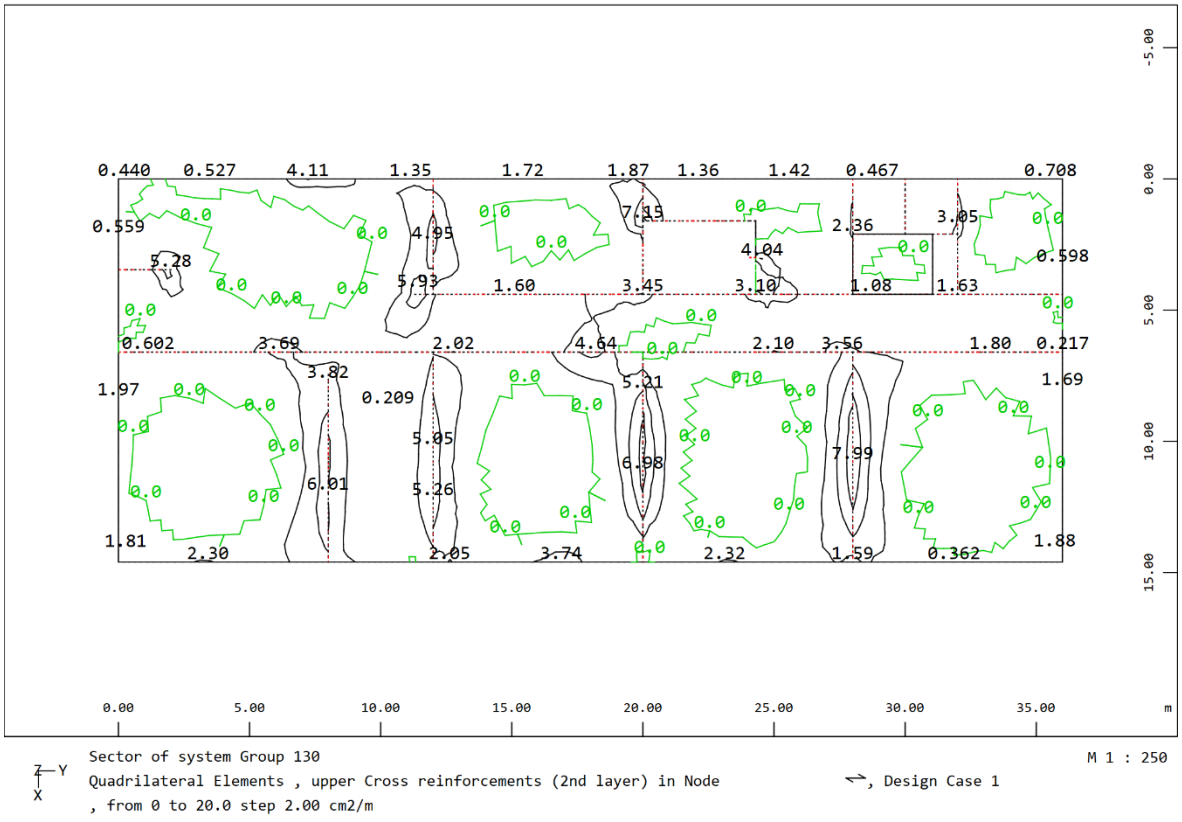




*Slika 48: Ovojnica računske armature etažne plošče nad N – zgornja armatura*

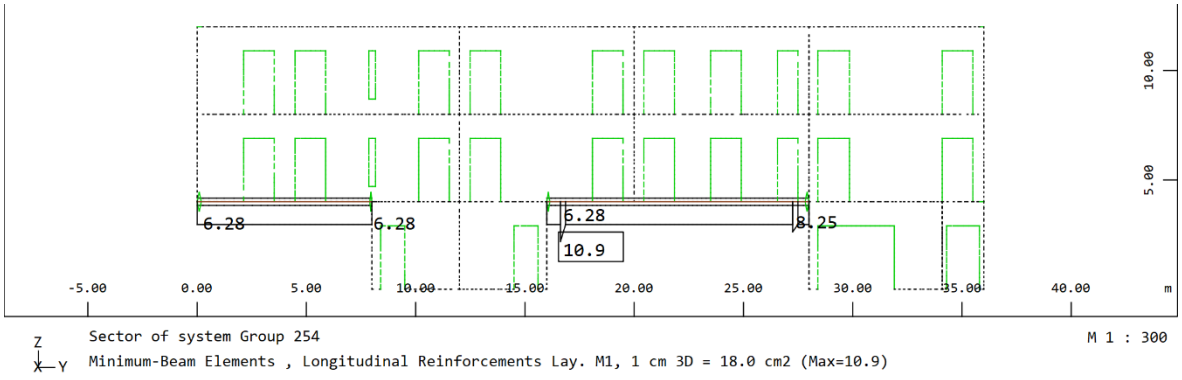


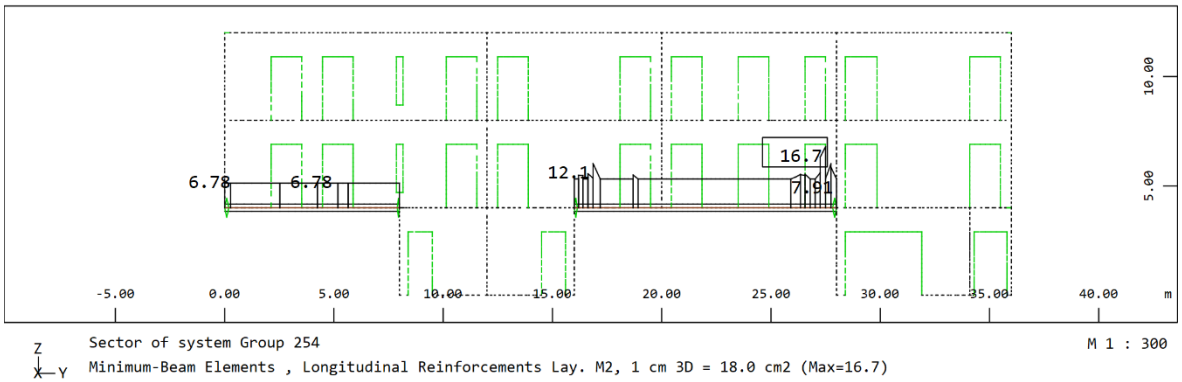

*Slika 49: Ovojnica računske armature strešne plošče – spodnja armatura*

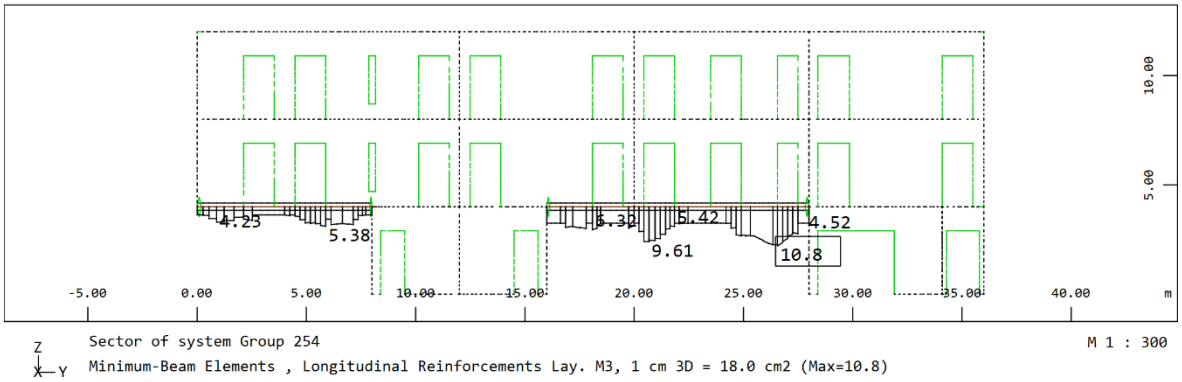


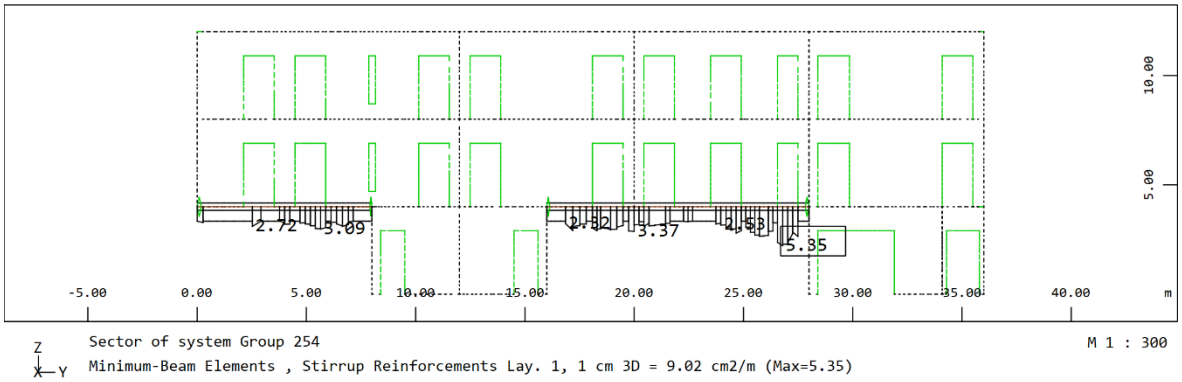




*Slika 50: Ovojnica računske armature strešne plošče – zgornja armatura*

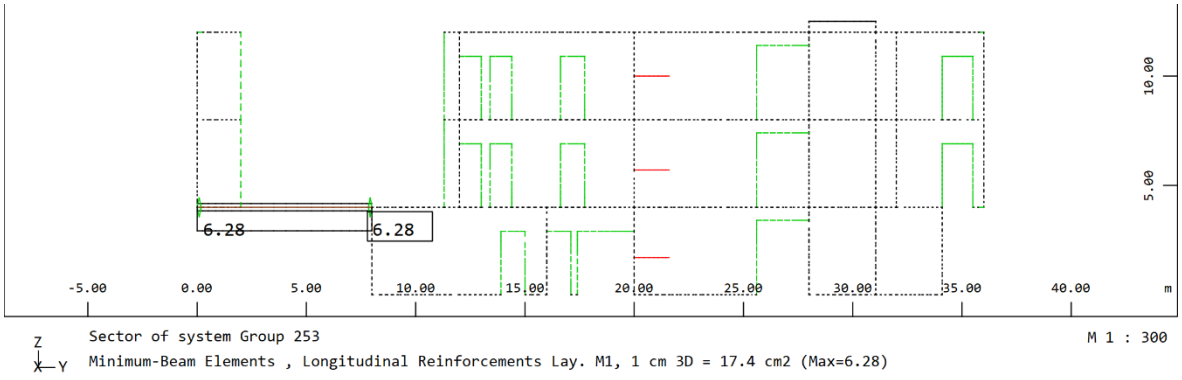


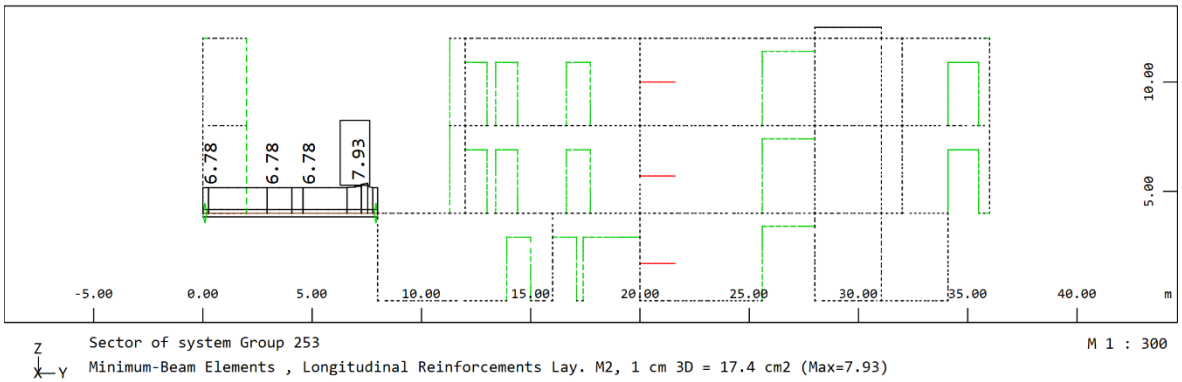



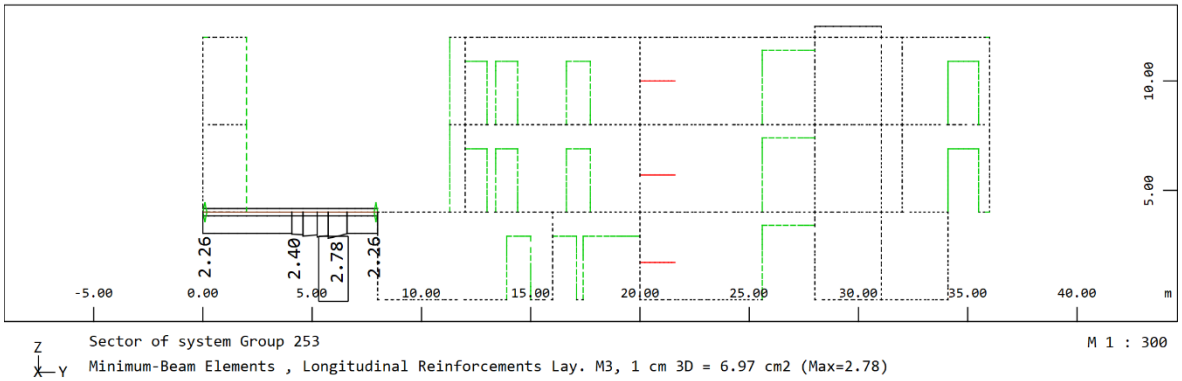

*Slika 51: Ovojnica računske armature nosilcev v osi 12 – armatura*



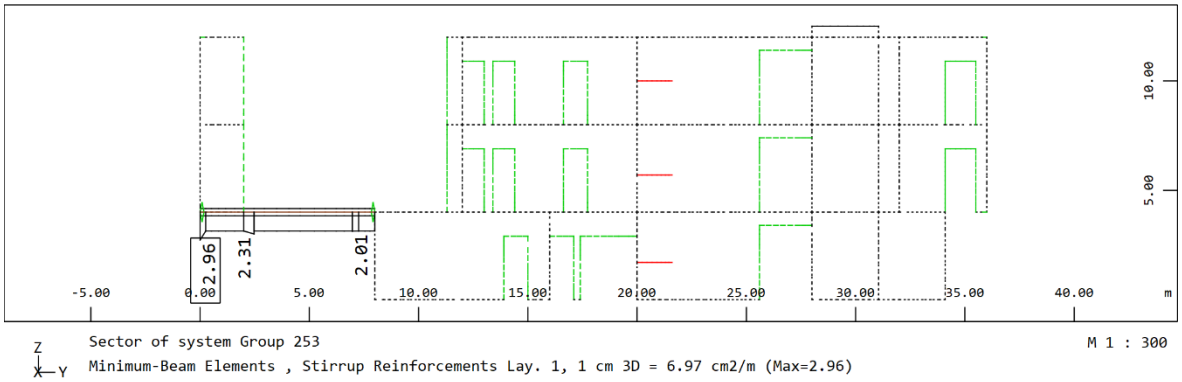

Sector of system Group 253 M 1 : 300
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M1, 1 cm 3D = 17.4 cm2 (Max=6.28)




Sector of system Group 253 M 1 : 300
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M2, 1 cm 3D = 17.4 cm2 (Max=7.93)

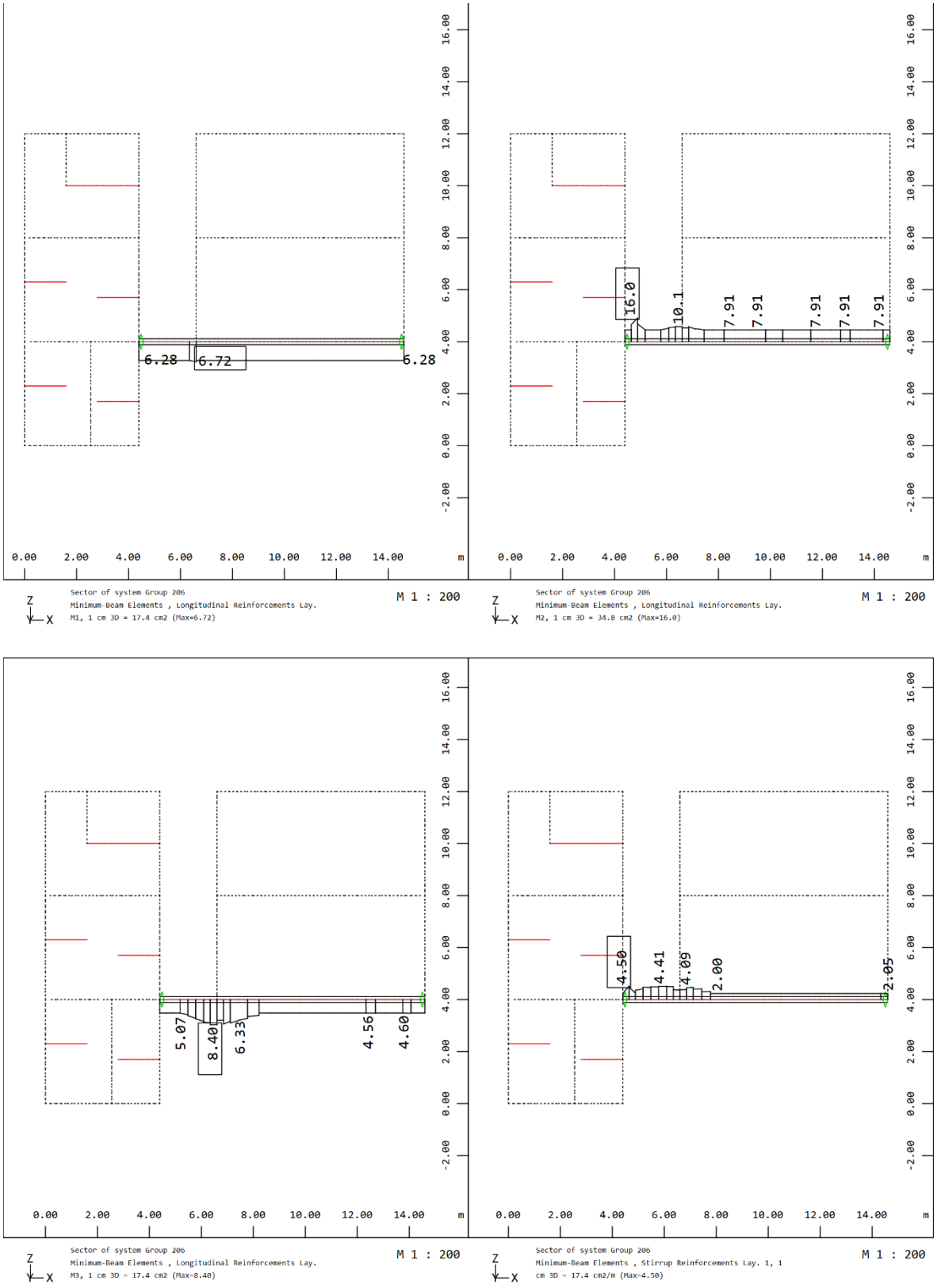



Sector of system Group 253 M 1 : 300
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M3, 1 cm 3D = 6.97 cm2 (Max=2.78)

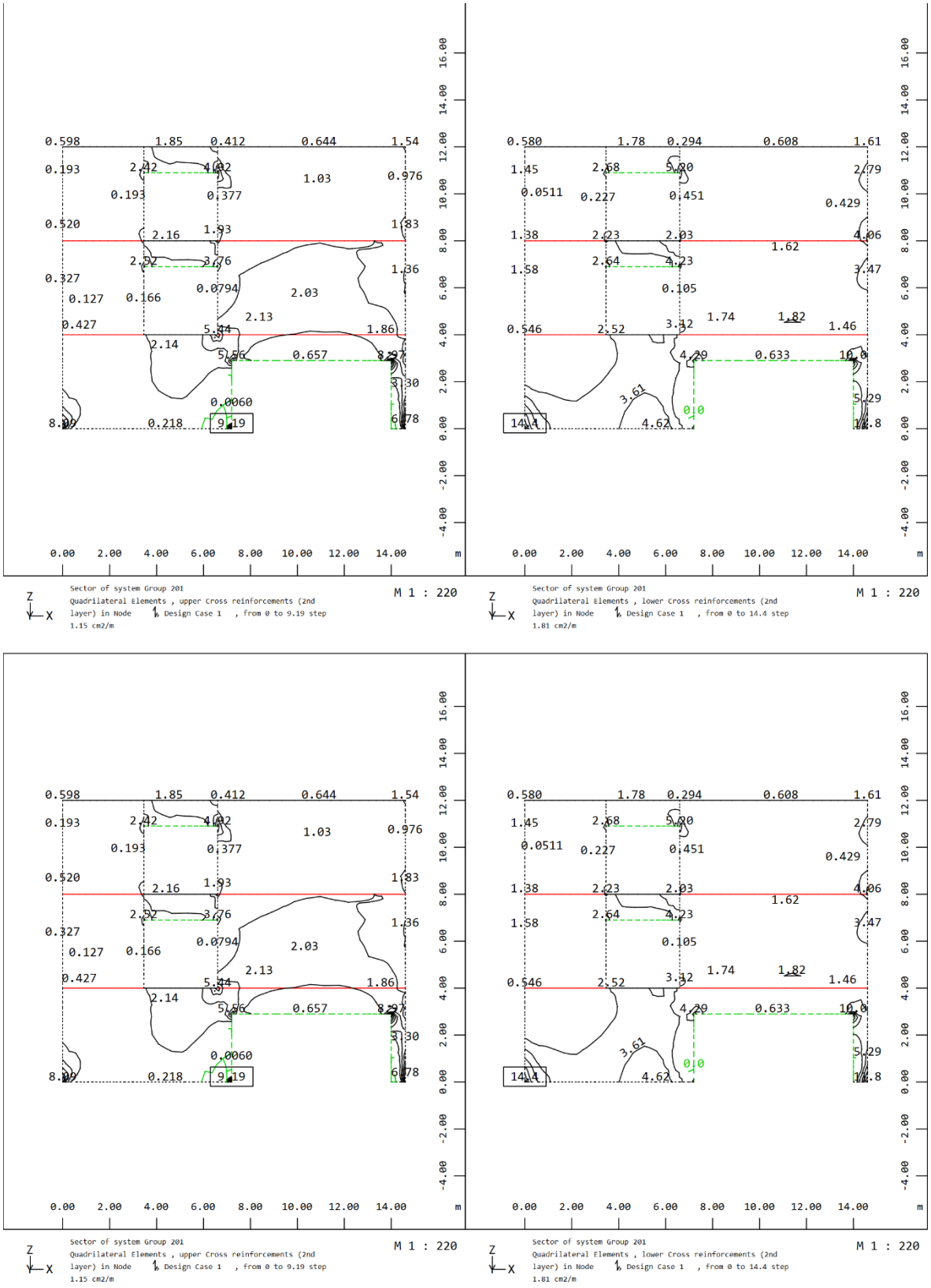



Sector of system Group 253 M 1 : 300
Minimum-Beam Elements , Stirrup Reinforcements Lay. 1, 1 cm 3D = 6.97 cm2/m (Max=2.96)

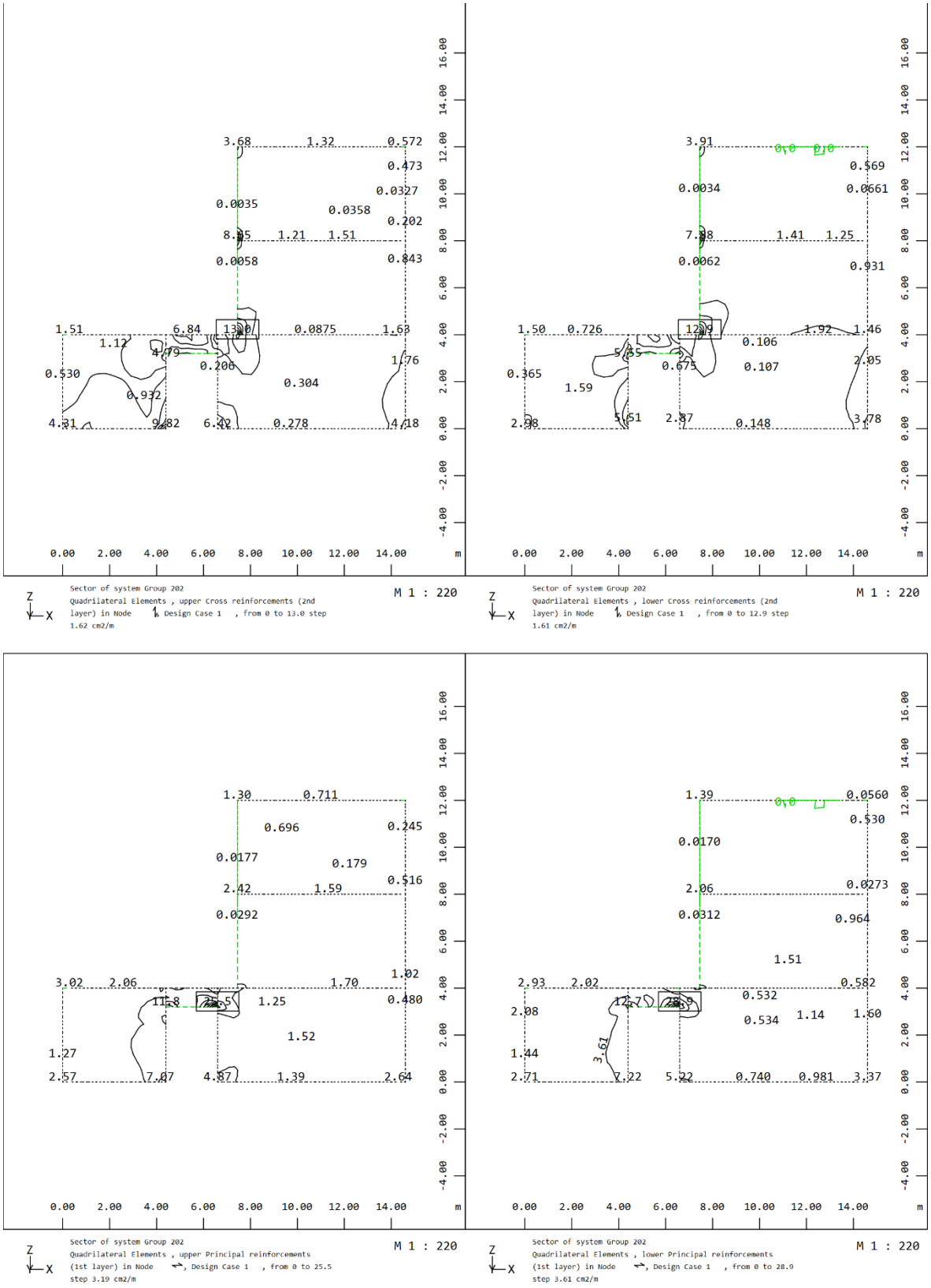
*Slika 52: Ovojnica računske armature nosilcev v osi 11 – armatura*



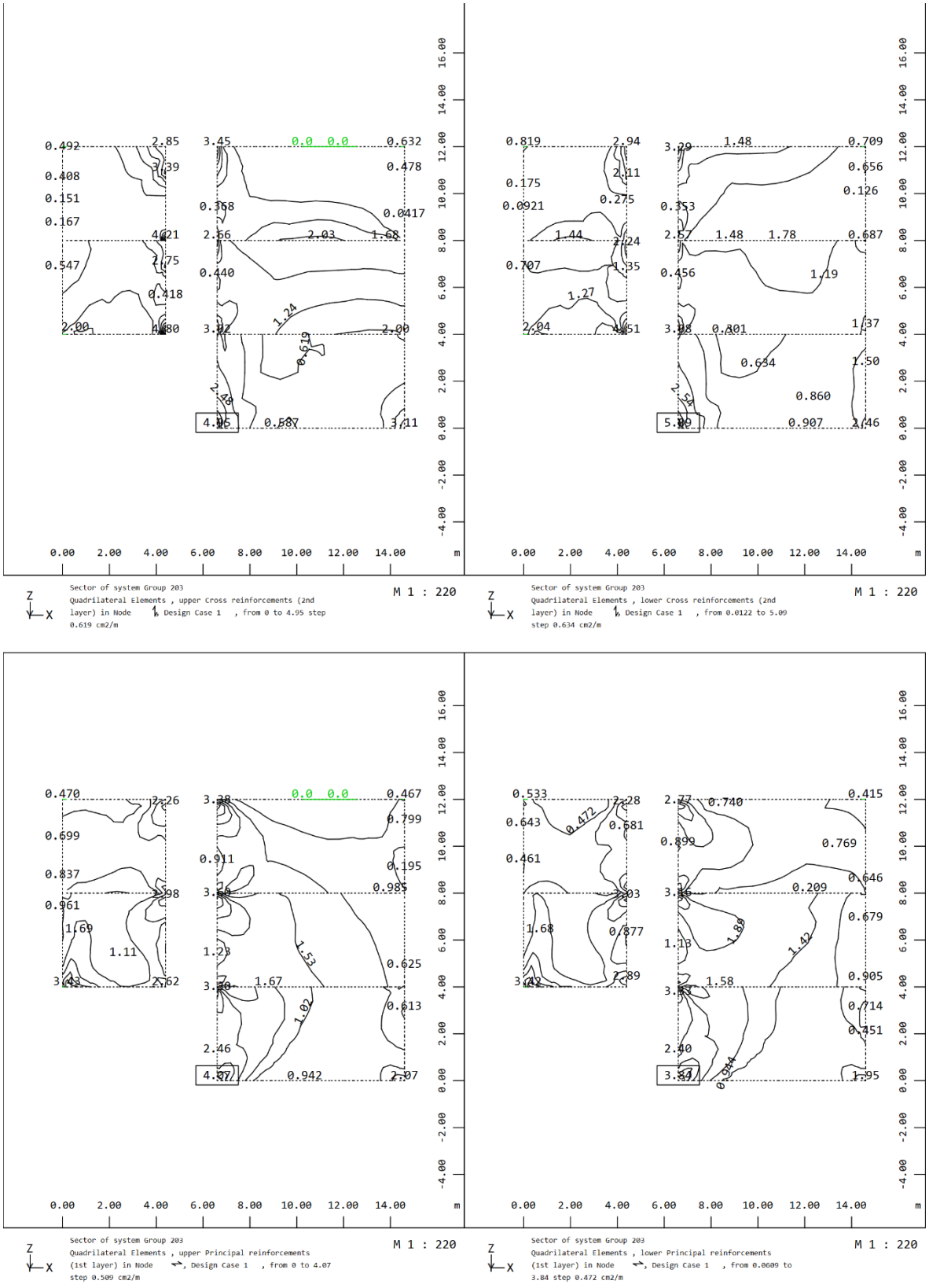

*Slika 53: Ovojnica računske armature nosilcev v osi R – armatura*



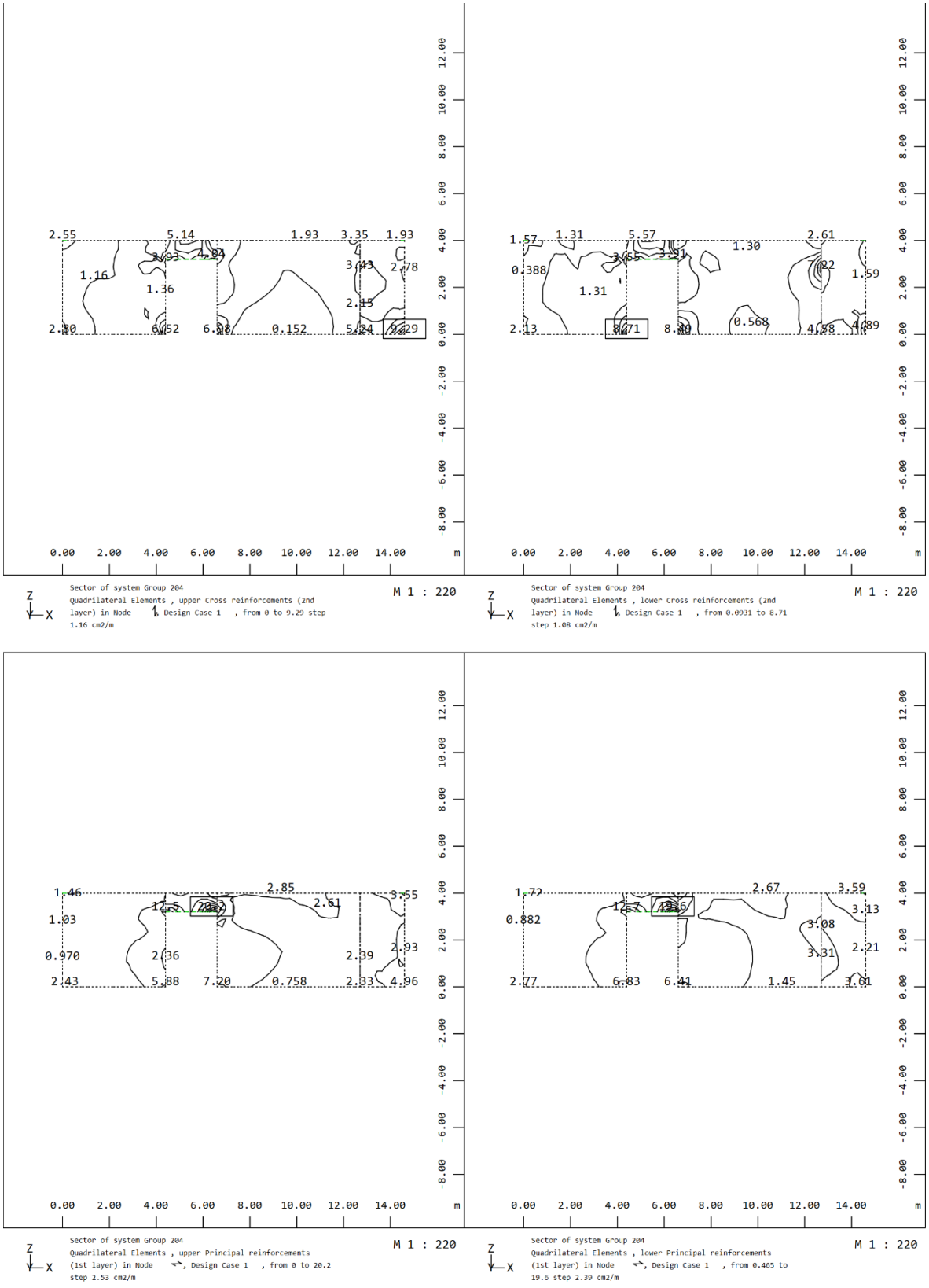

*Slika 54: Ovojnica računske armature v prečnih stenah v osi V – vertikalna in horizontalna armatura*



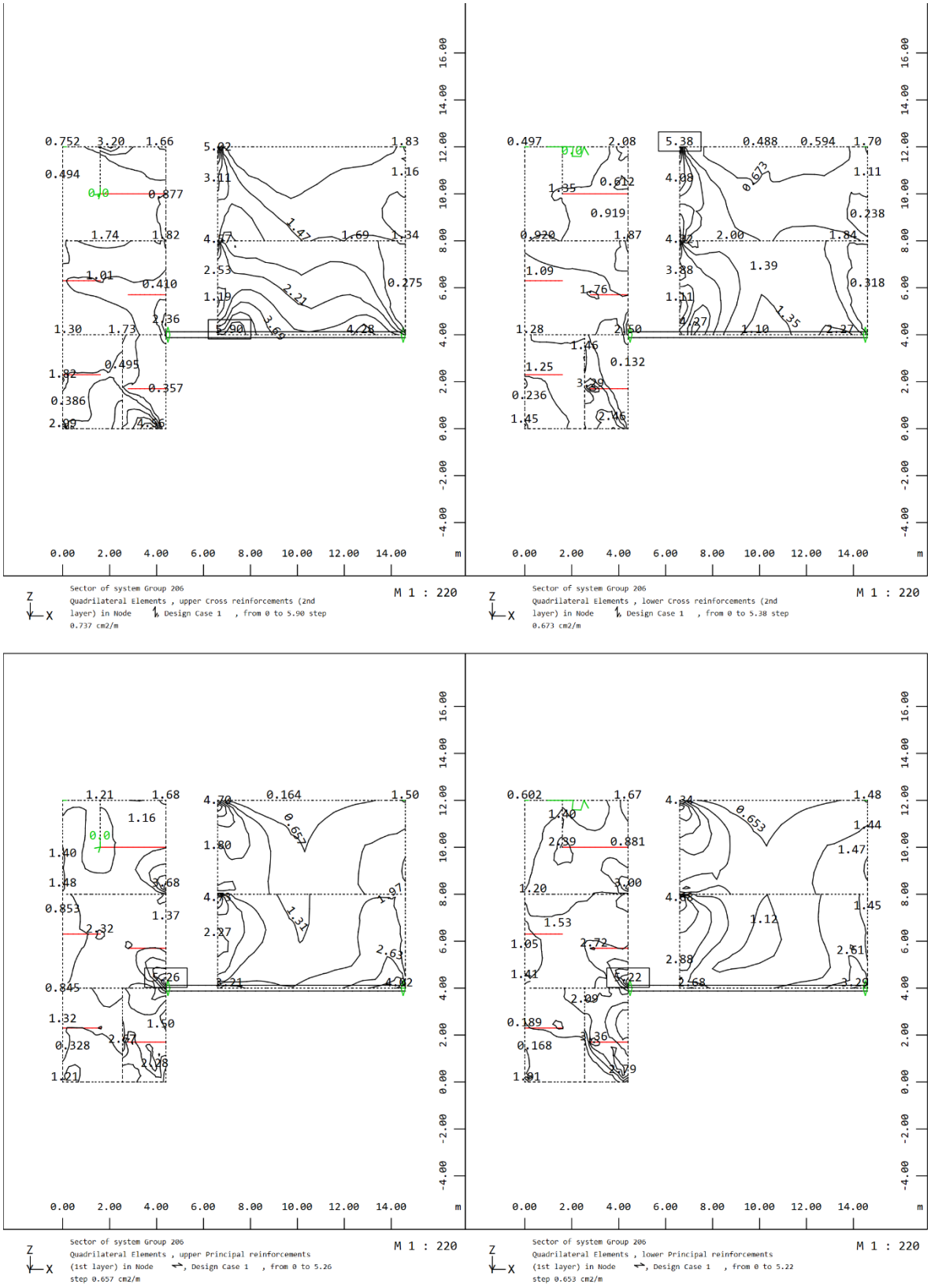

*Slika 55: Ovojnica računske armature v prečnih stenah v osi T – vertikalna in horizontalna armatura*



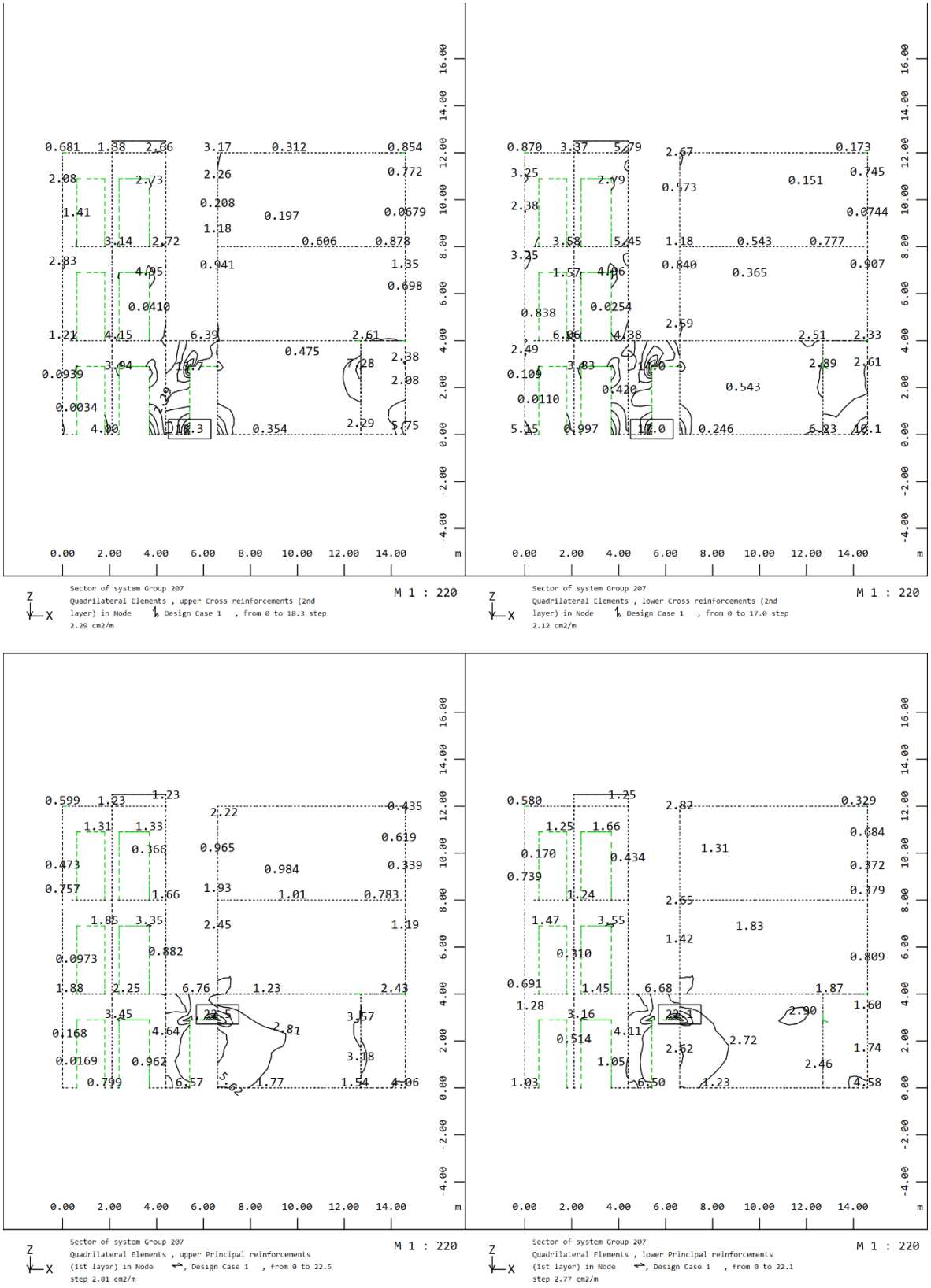

*Slika 56: Ovojnica računske armature v prečnih stenah v osi Š – vertikalna in horizontalna armatura*



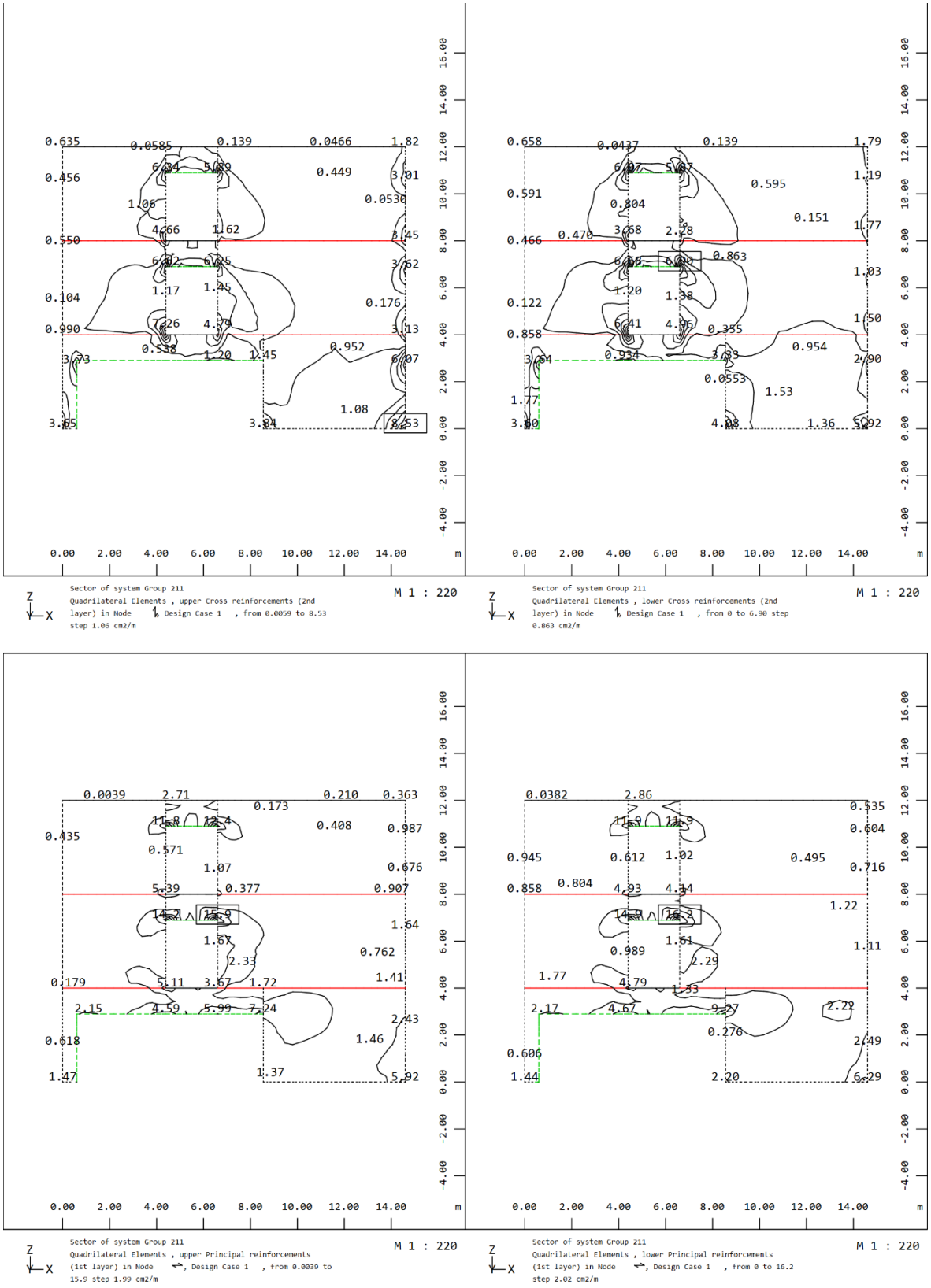

*Slika 57: Ovojnica računske armature v prečnih stenah v osi S – vertikalna in horizontalna armatura*



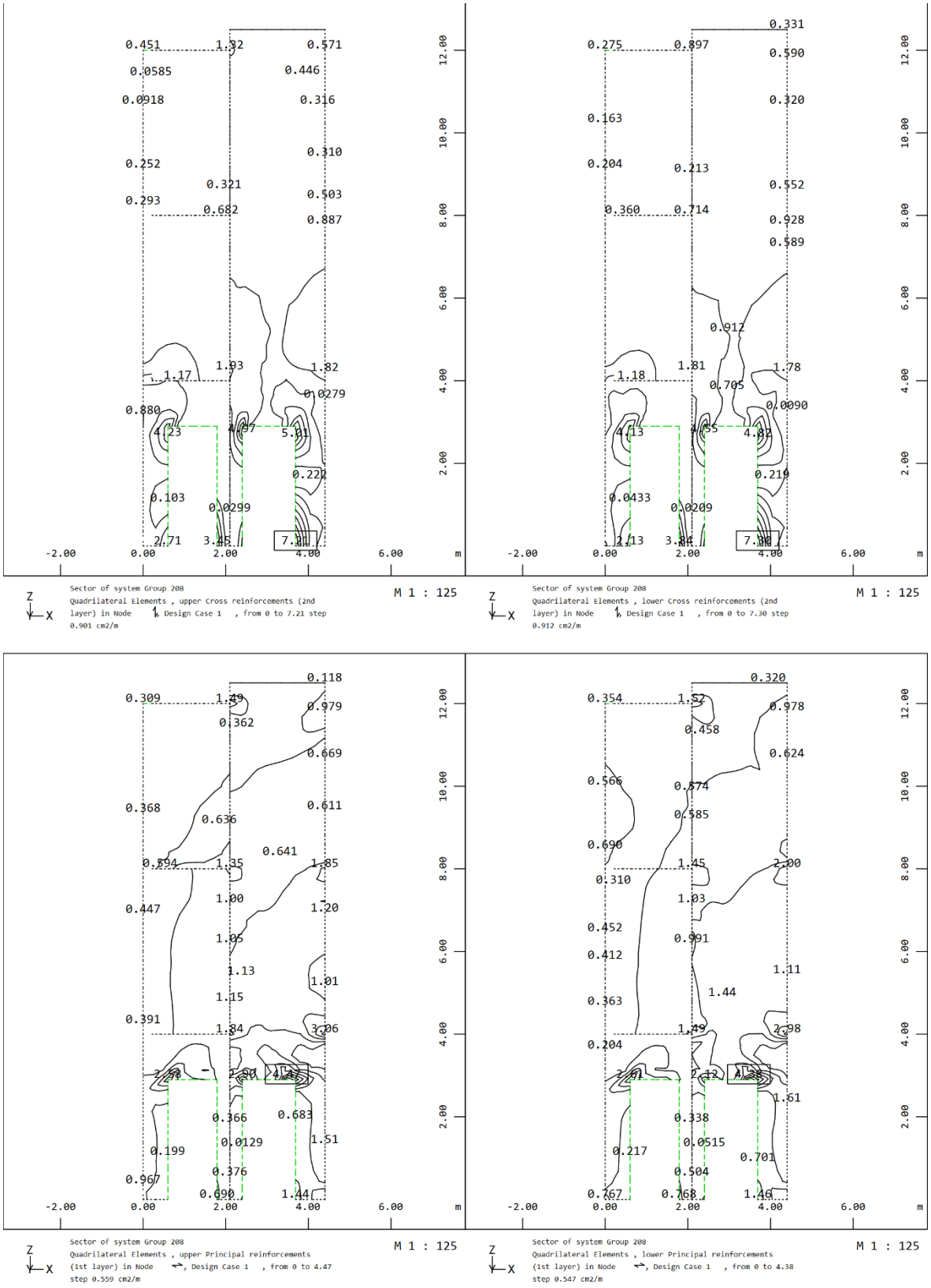

*Slika 58: Ovojnica računske armature v prečnih stenah v osi R – vertikalna in horizontalna armatura*



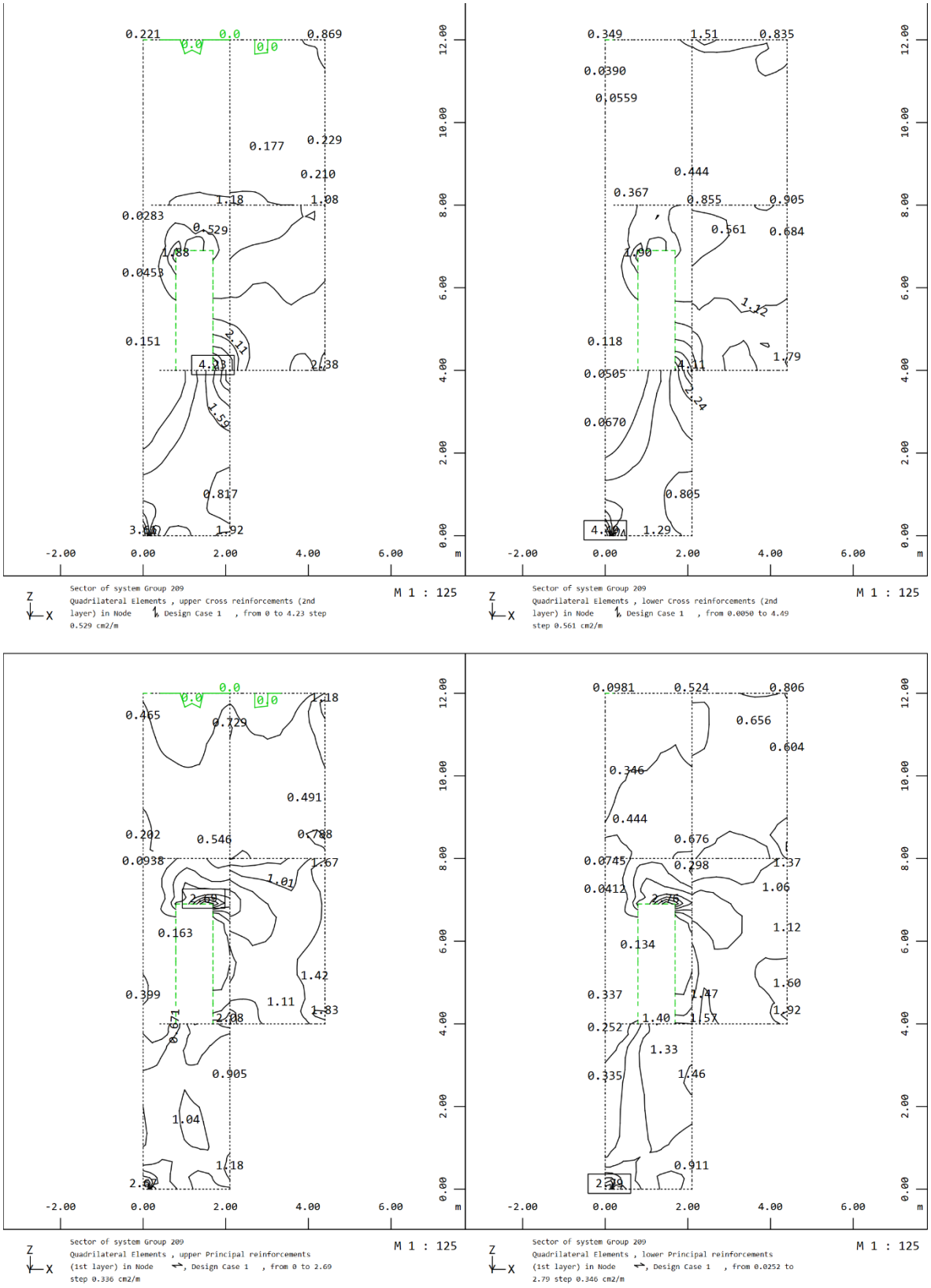

*Slika 59: Ovojnica računske armature v prečnih stenah v osi O – vertikalna in horizontalna armatura*



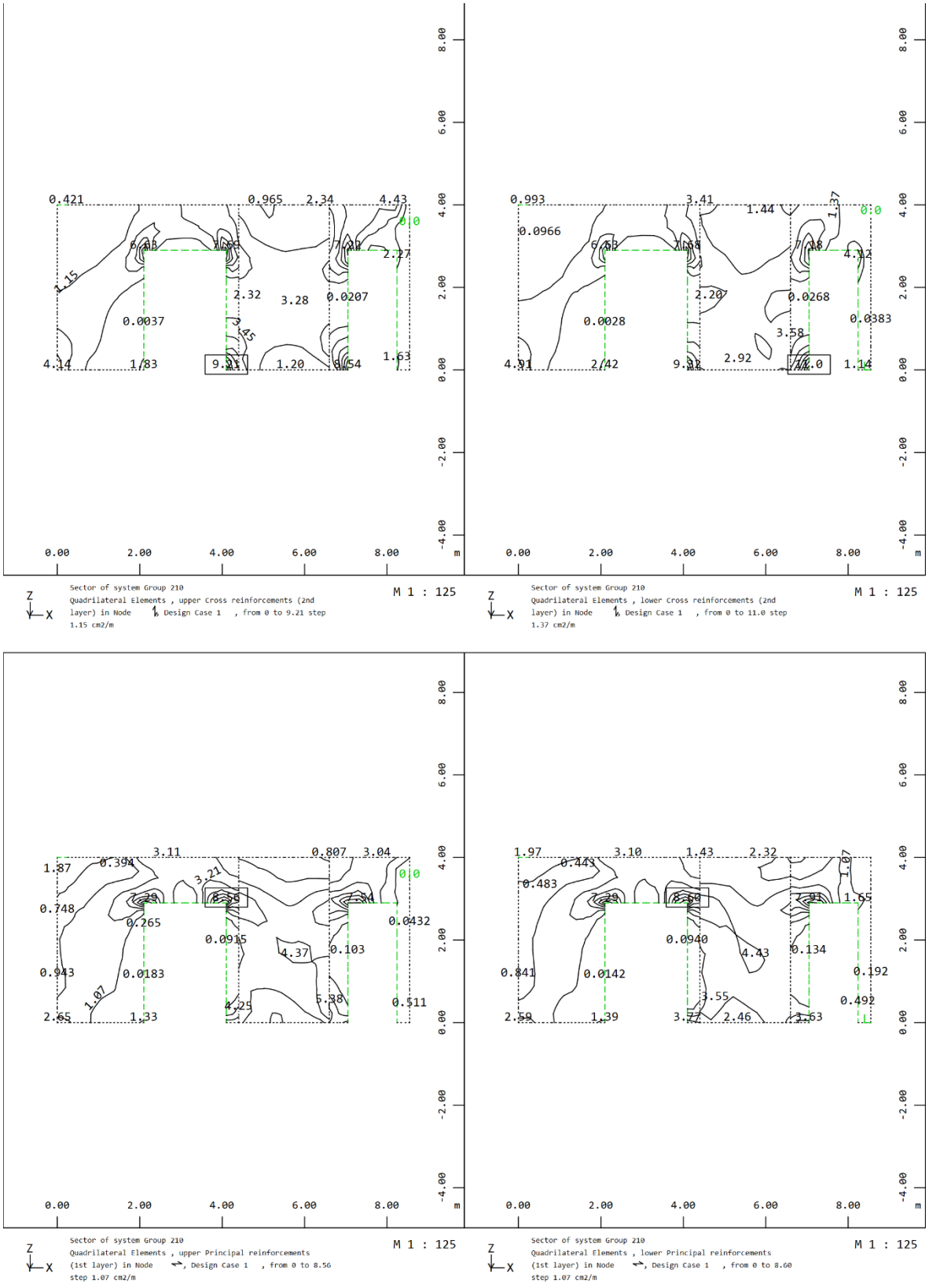

*Slika 60: Ovojnica računske armature v prečnih stenah v osi M – vertikalna in horizontalna armatura*



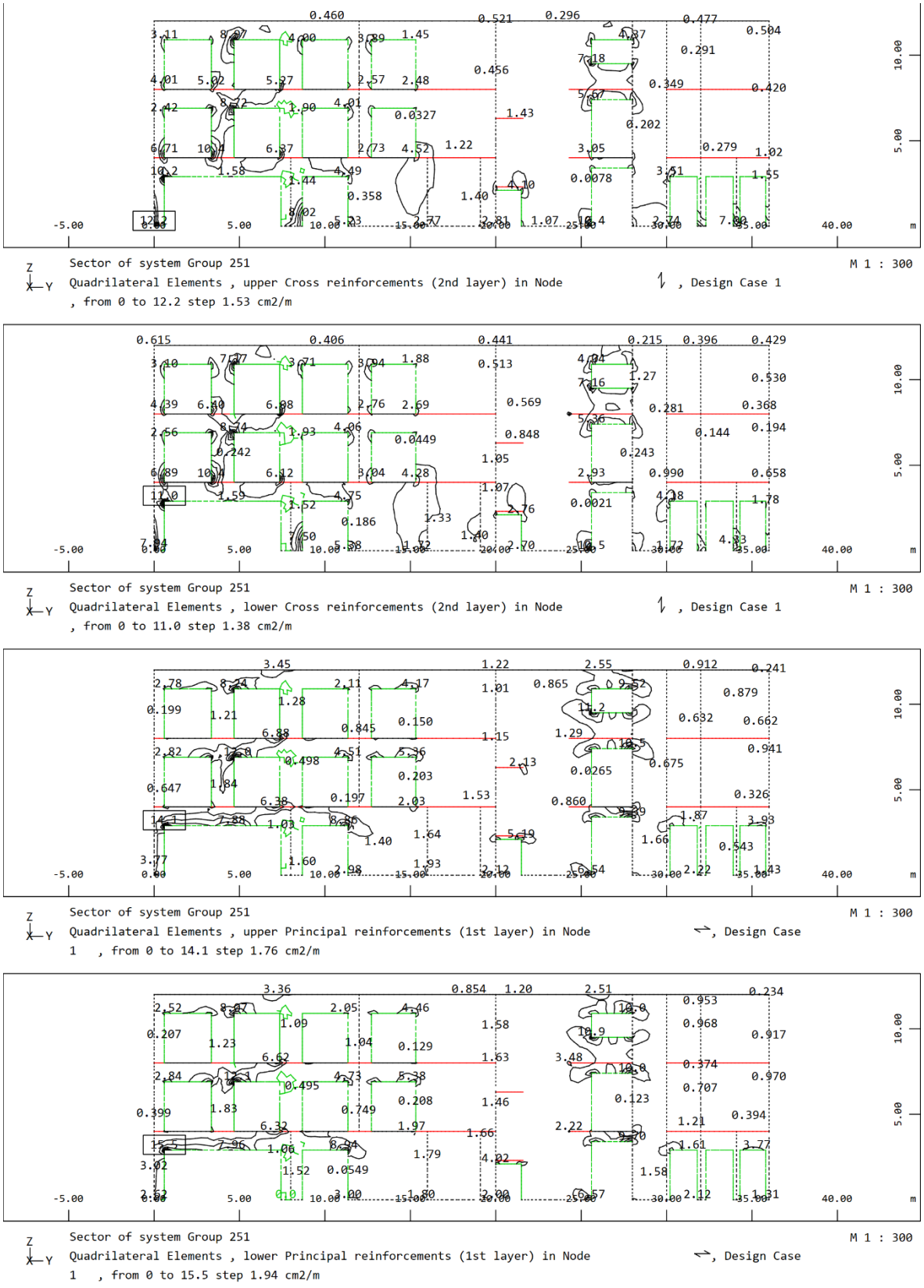

*Slika 61: Ovojnica računske armature v prečnih stenah v osi N – vertikalna in horizontalna armatura*



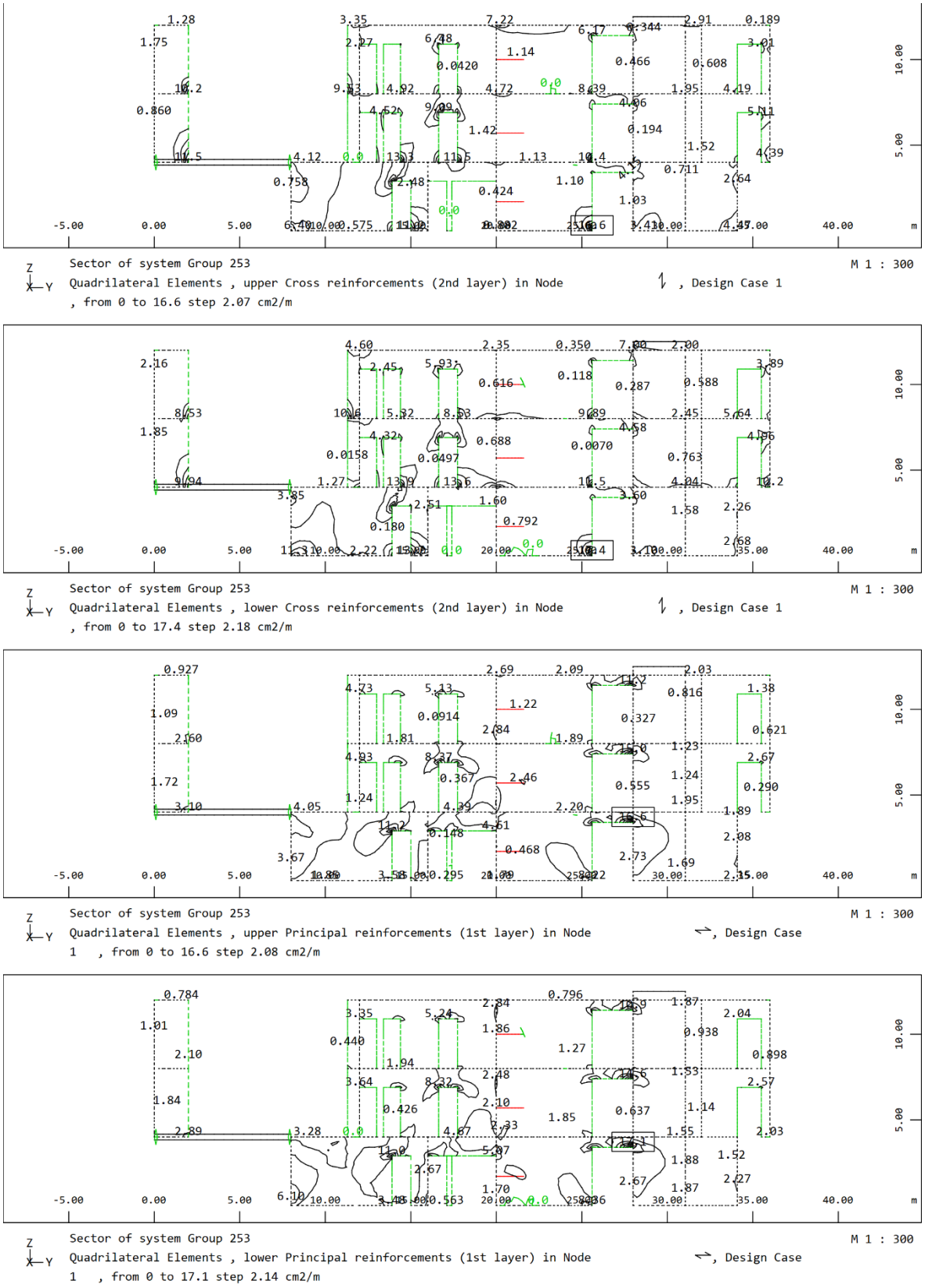

*Slika 62: Ovojnica računske armature v prečnih stenah ob osi N – vertikalna in horizontalna armatura*



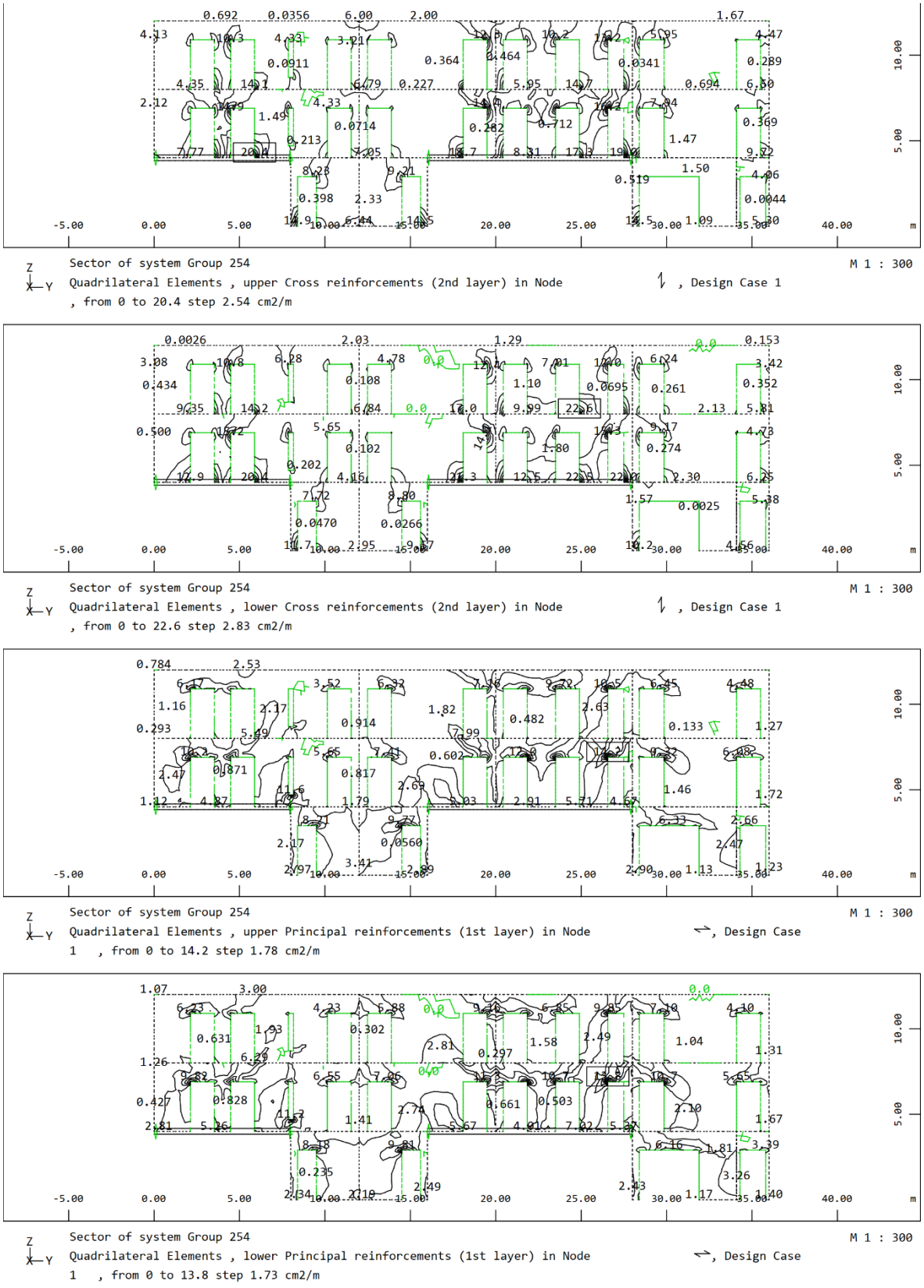

*Slika 63: Ovojnica računske armature v prečnih stenah ob osi N – vertikalna in horizontalna armatura*



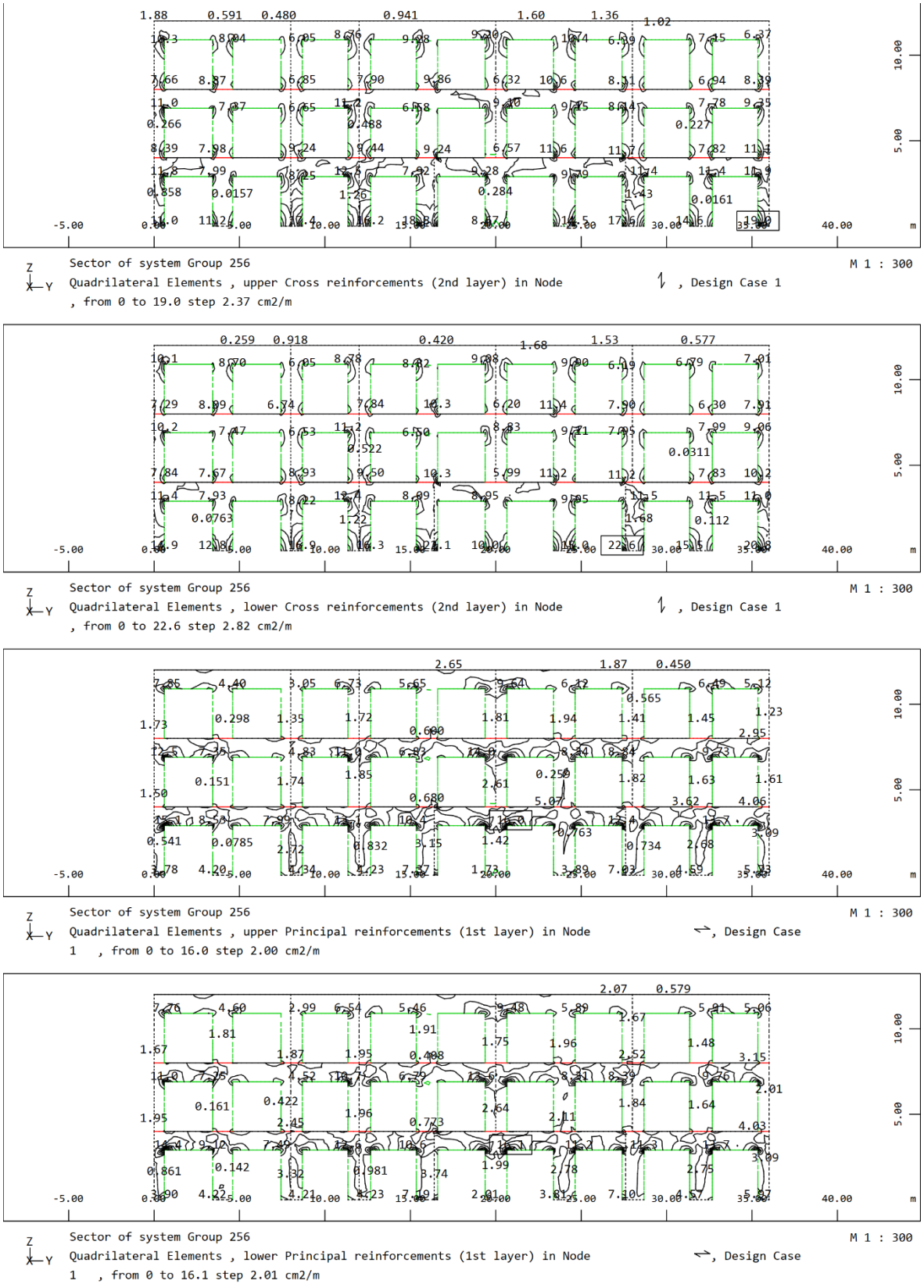

*Slika 64: Ovojnica računske armature v vzdolžnih stenah v osi 11 – vertikalna in horizontalna armatura*



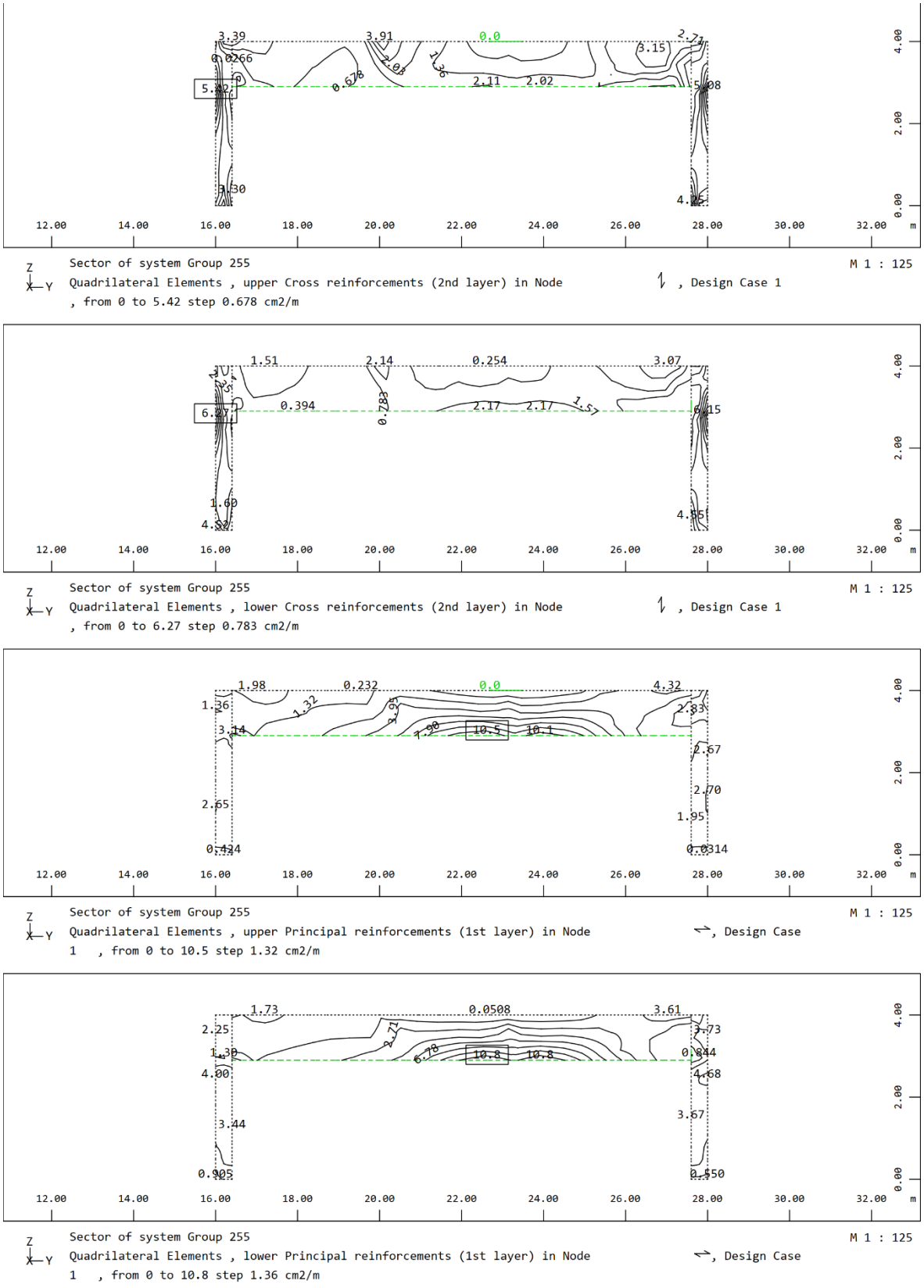

*Slika 65: Ovojnica računske armature v vzdolžnih stenah v osi 11 – vertikalna in horizontalna armatura*



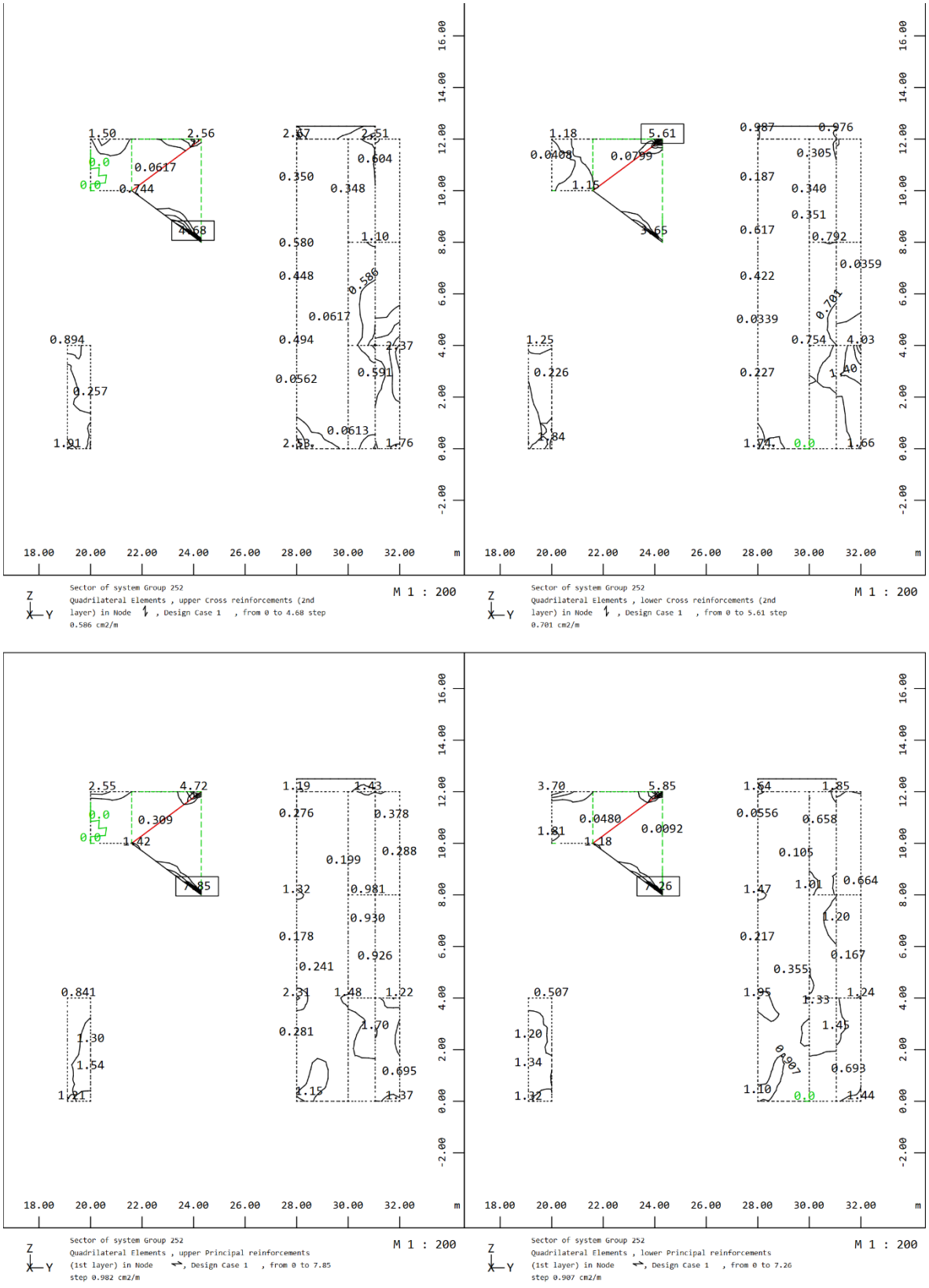

*Slika 66: Ovojnica računske armature v vzdolžnih stenah v osi 12 – vertikalna in horizontalna armatura*




*Slika 67: Ovojnica računske armature v vzdolžnih stenah v osi 13 – vertikalna in horizontalna armatura*




*Slika 68: Ovojnica računske armature v nosilcu v osi 13 – vertikalna in horizontalna armatura*



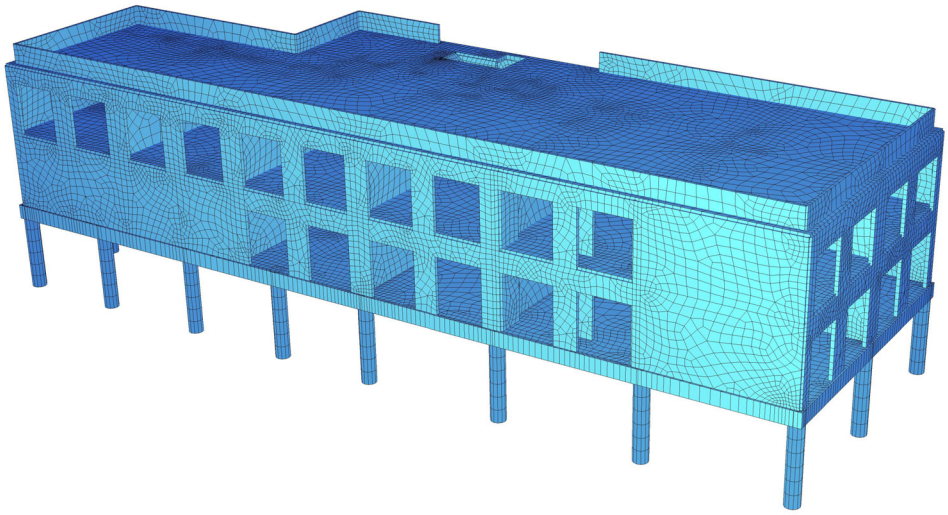

*Slika 69: Ovojnica računske armature v stenah med osmi 11 in 11' – vertikalna in horizontalna armatura*

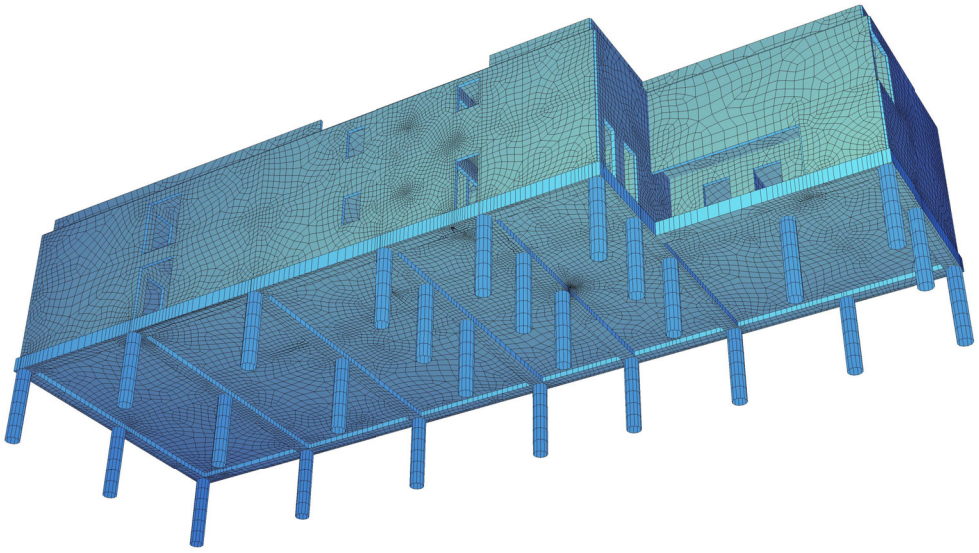
## 2.4 IZPISI GLOBALNIH RAČ. MODELOV iz programa SOFiSTiK

V nadaljevanju so prikazani **izpisi iz računalniškega programa SOFiSTiK** za posamezne globalne računske modele posameznih dilatacijskih enot stavbe:

- **Statična in dinamična analiza zahodne dilatacijske enote** (*73 strani*)
- **Statična in dinamična analiza centralne dilatacijske enote** (*86 strani*)
- **Statična in dinamična analiza vzhodne dilatacijske enote** (*83 strani*)

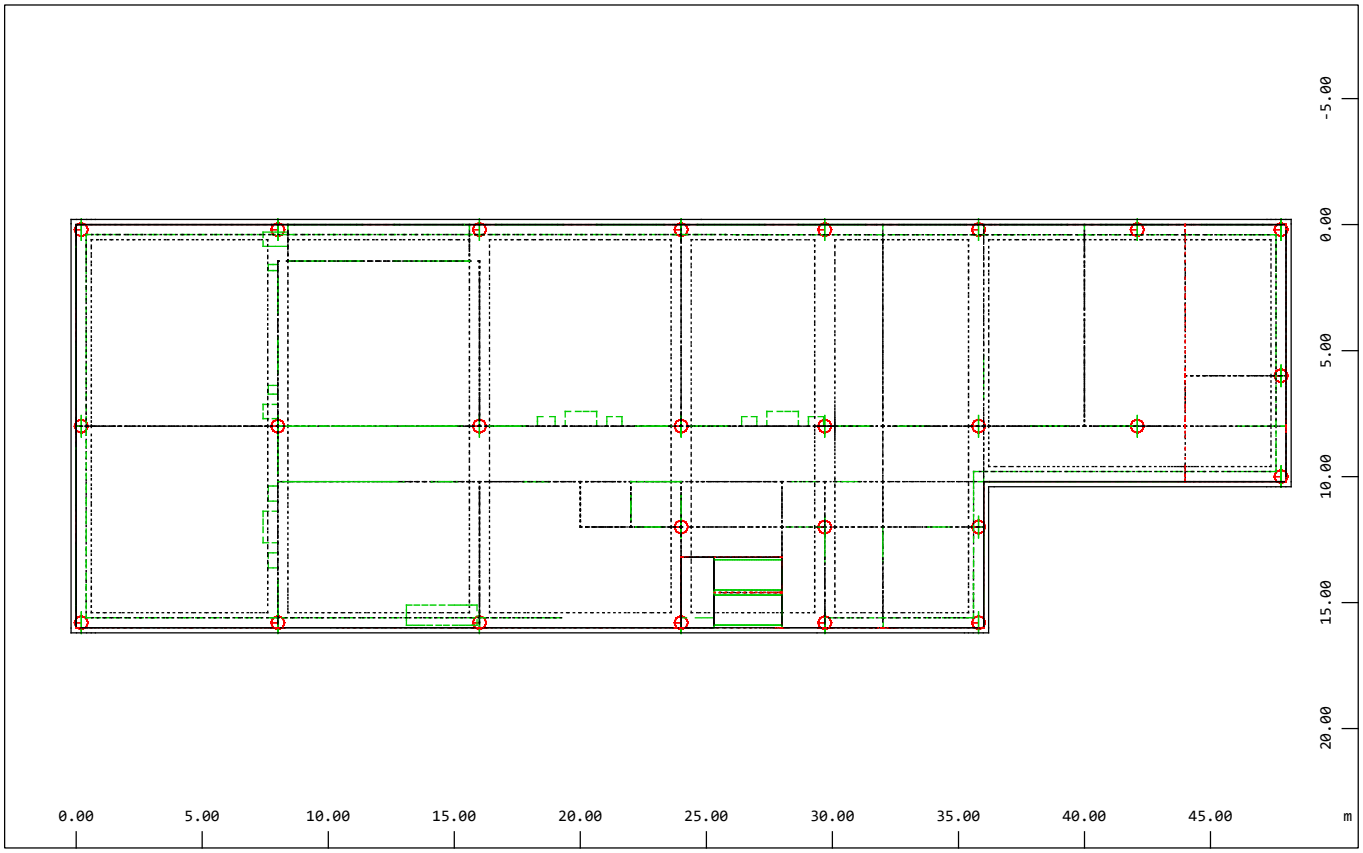
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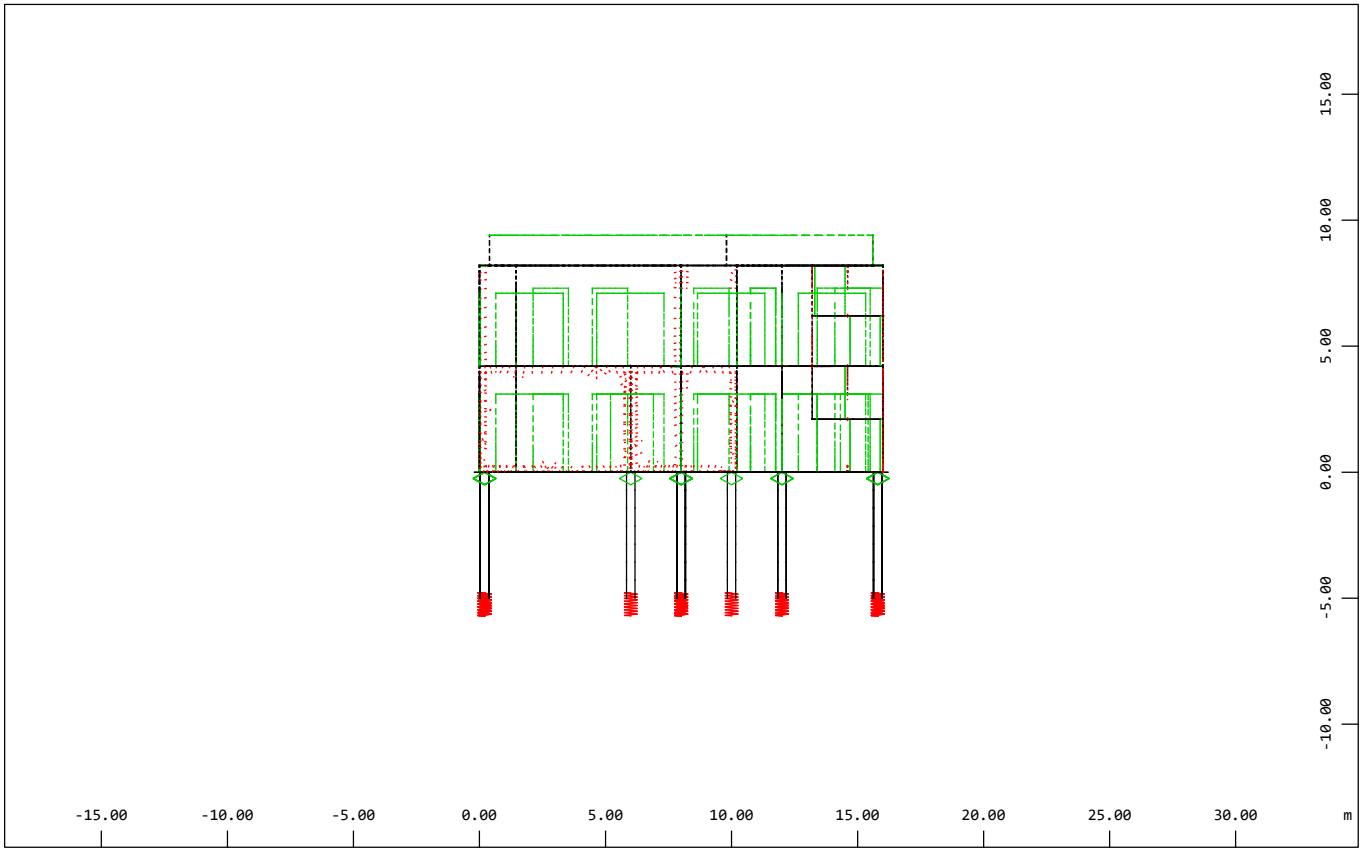


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Geometrija modela



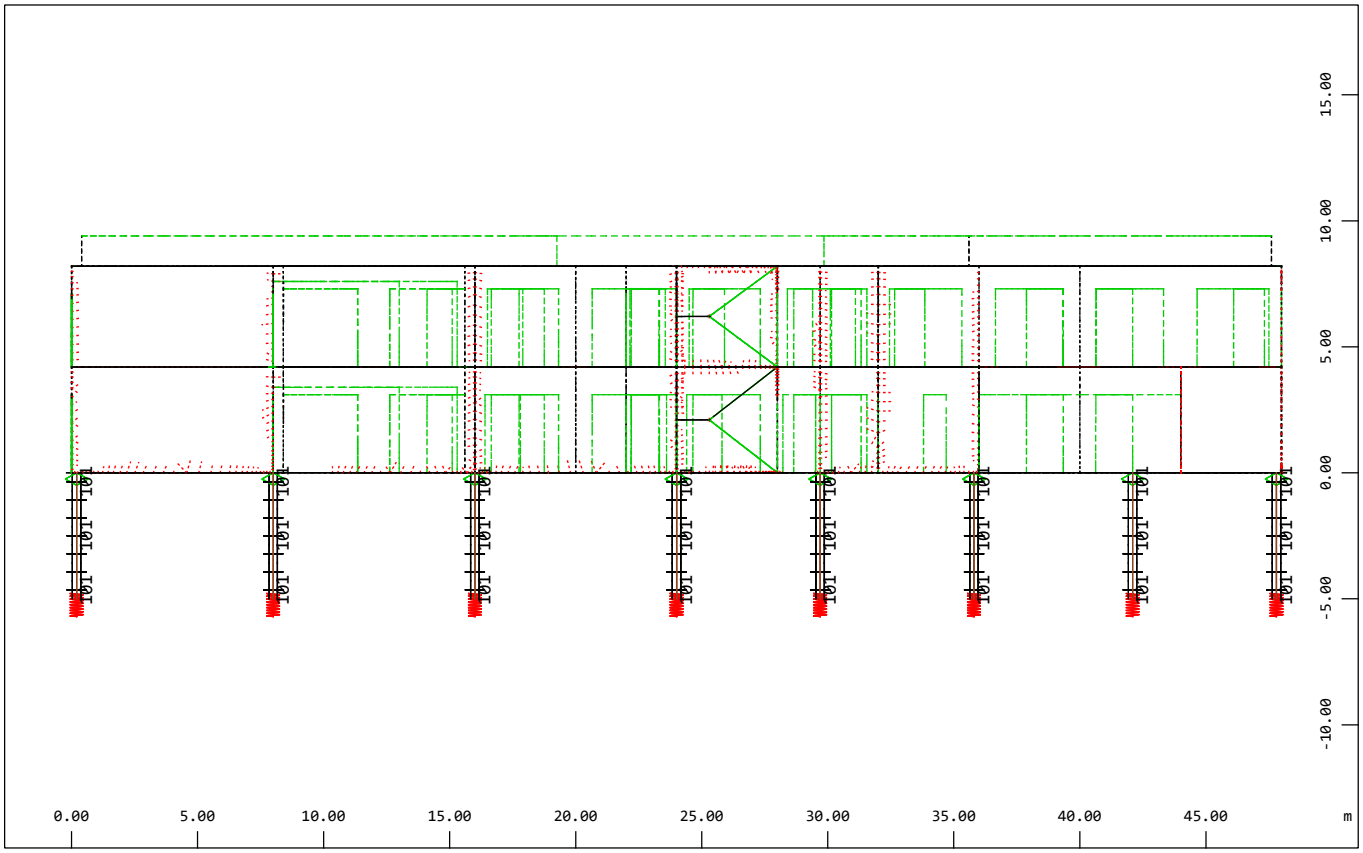

Sector of system Group 100 101 105 110 115 120 201...211 251...255 301 302 351 352 M 1 : 300
Contour



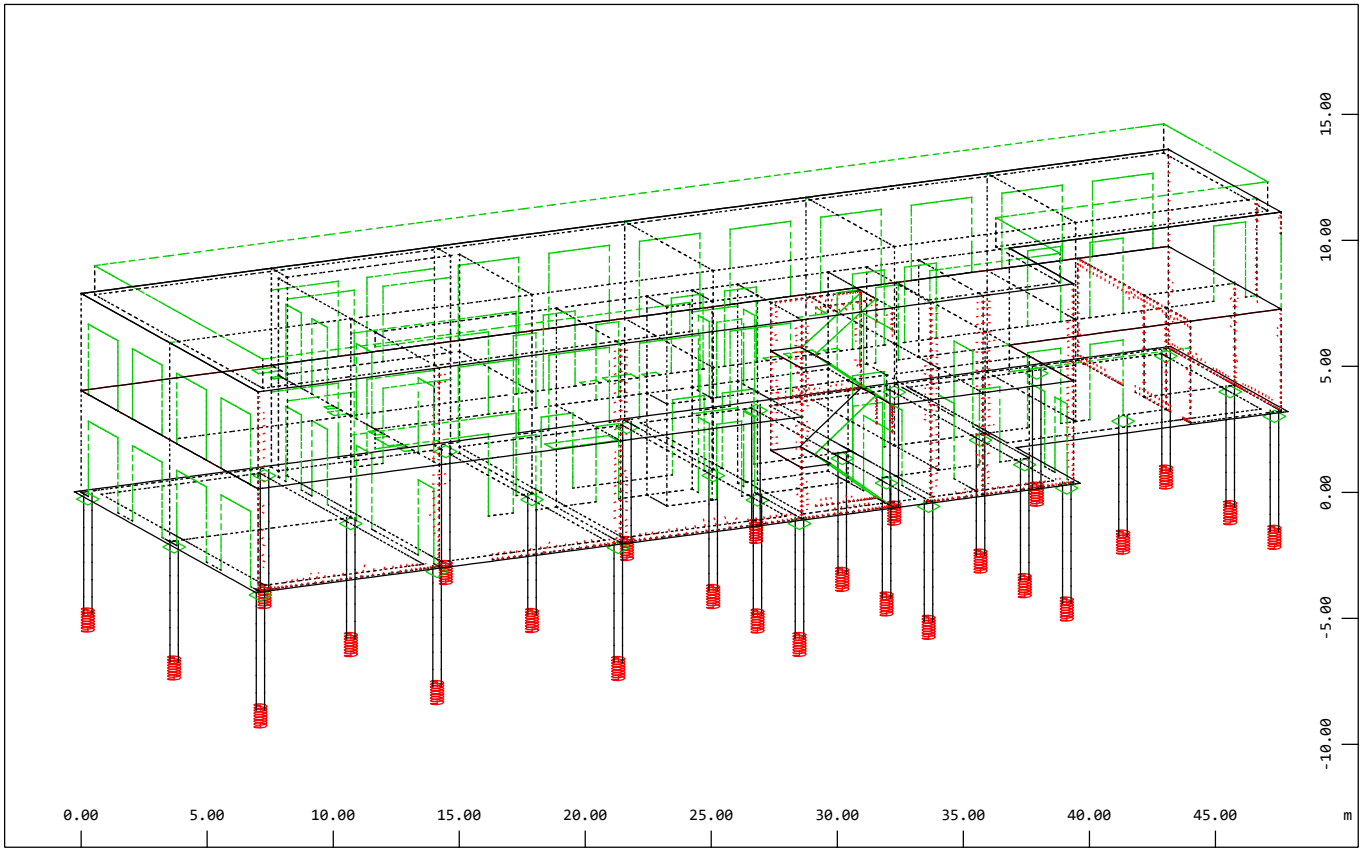

Sector of system Group 100 101 105 110 115 120 201...211 251...255 301 302 351 352 M 1 : 300
Contour

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Geometrija modela



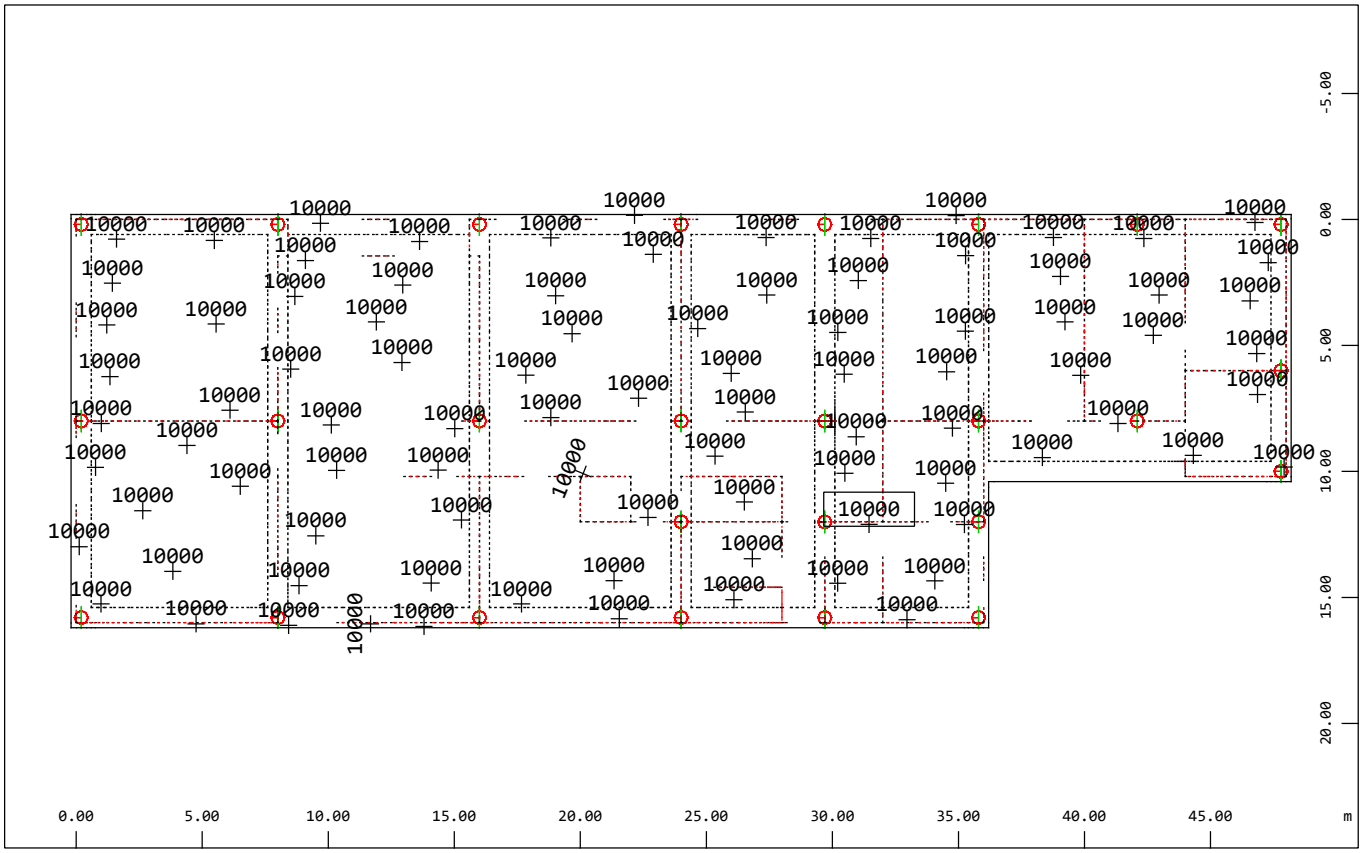

Z
X Y
Sector of system Group 100 101 105 110 115 120 201...211 251...255 301 302 351 352
Contour
Beam Elements , Contour of Cross section
M 1 : 300



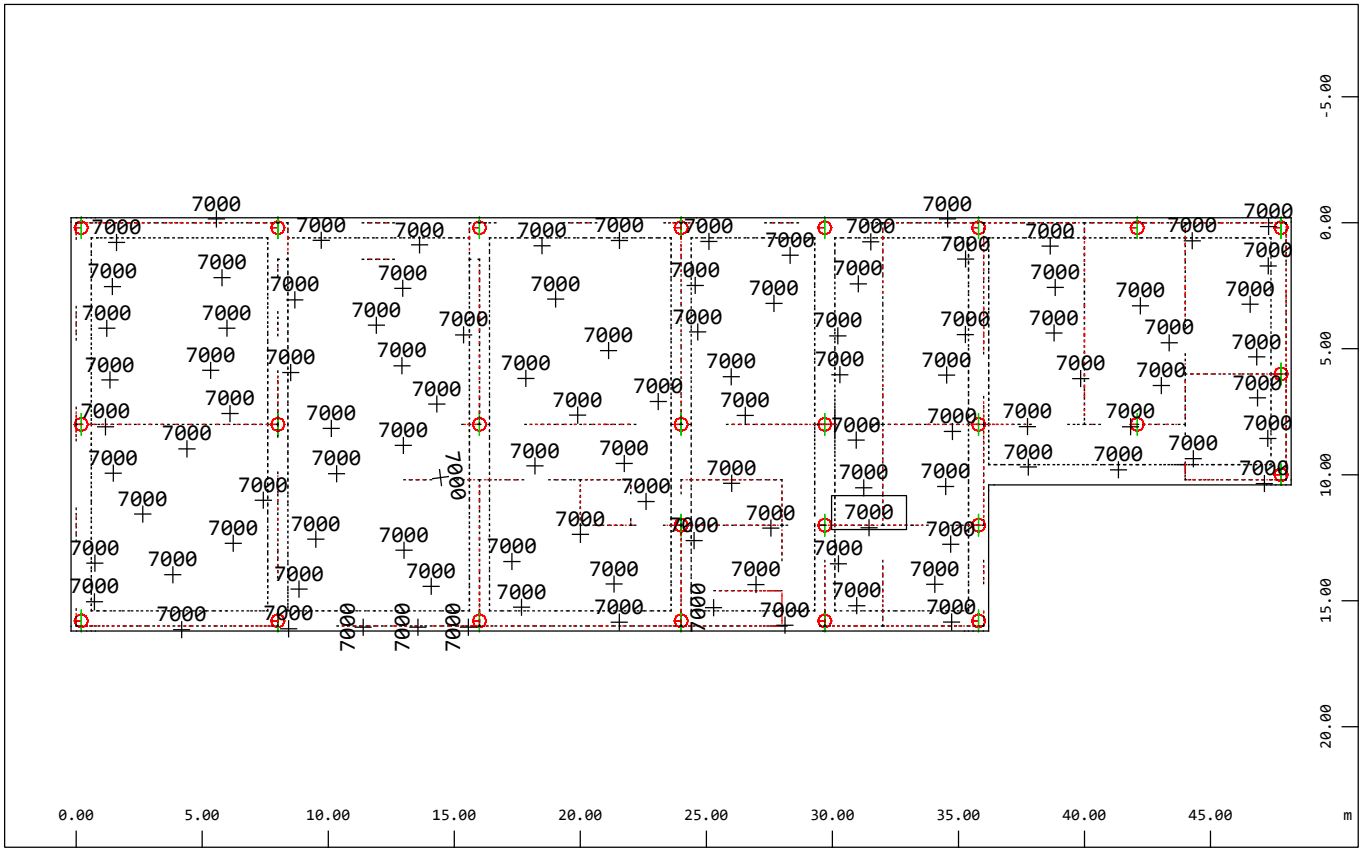

Z
X Y
Sector of system Group 100 101 105 110 115 120 201...211 251...255 301 302 351 352
Contour
M 1 : 300
X * 0.502
Y * 0.906
Z * 0.962

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Geometrija modela (modul reakcije tal pod temelno plosco)



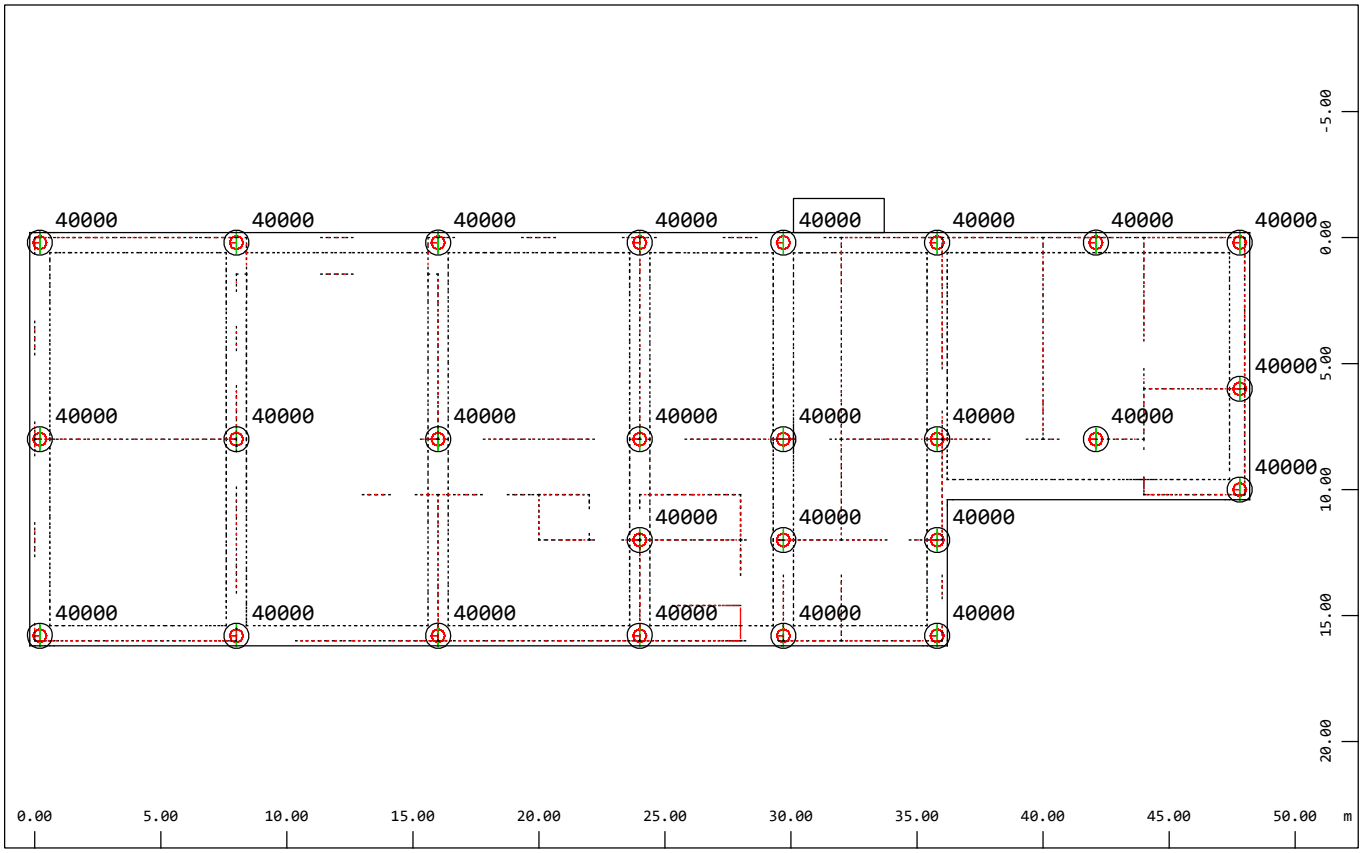

Sector of system Group 100 101
Elastic bedding in Element in kN/m3 (Max=10000.)
M 1 : 300




Sector of system Group 100 101
Tangential elastic bedding in Element in kN/m3 (Max=7000.)
M 1 : 300

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Geometrija modela (modul reakcije tal za vodnjake v vertikalni smeri)




Sector of system Group 100 101 M 1 : 300
Spring constant, 1 cm 3D = 86563. kN/m (Max=40000.)

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11826 DSO Bovec - zahodna dilat. enota stavbe
Materials

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Structure and Tab.7.1N: AN (Buildings)

**Materials**

| Mat | Classification |
|---|---|
| 1 | C 30/37 N (EN 1992) |
| 2 | B 500 B (EN 1992) |
| 99 | C 30/37 N - brez G |

**Mat 1 C 30/37 N (EN 1992)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Young's modulus | E | 32837 | [N/mm2] | Safetyfactor | | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength | fc | 30.00 | [MPa] |
| Shear modulus | G | 13682 | [N/mm2] | Nominal strength | fck | 30.00 | [MPa] |
| Compression modulus | K | 18243 | [N/mm2] | Tensile strength | fctm | 2.90 | [MPa] |
| Nominal Weight | γ | 25.0 | [kN/m3] | Tensile strength | fctk,05 | 2.03 | [MPa] |
| Mean density | ρ | 2400.0 | [kg/m3] | Tensile strength | fctk,95 | 3.77 | [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | fbd | 3.04 | [MPa] |
| | | | | Service strength | fcm | 38.00 | [MPa] |
| | | | | Fatigue strength | fcd,fat | 14.96 | [MPa] |
| | | | | Tensile strength | fctd | 1.35 | [MPa] |
| | | | | Tensile failure energy | Gf | 0.14 | [N/mm] |

| Stress-Strain for serviceability | ε[o/oo] | σ-m[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 0.000 | 0.00 | 34478 |
| stress range | -0.540 | -16.42 | 26234 |
| | -1.081 | -28.31 | 17746 |
| | -1.621 | -35.55 | 9005 |
| | -2.162 | -38.00 | 0 |
| | -3.500 | -22.47 | -23499 |
| | Safetyfactor | | 1.50 |

| Stress-Strain for ultimate load | ε[o/oo] | σ-u[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 0.000 | 0.00 | 30000 |
| stress range | -2.000 | -30.00 | 0 |
| | -3.500 | -30.00 | 0 |
| | Safetyfactor | | 1.50 |

| Stress-Strain of calc. mean values | ε[o/oo] | σ-r[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 0.000 | 0.00 | 28732 |
| stress range | -0.540 | -11.19 | 14403 |
| | -1.081 | -16.78 | 7018 |
| | -1.621 | -19.32 | 2720 |
| | -2.162 | -20.00 | 0 |
| | -3.500 | -17.25 | -3601 |
| | Safetyfactor | | ( 1.50) |

**Mat 2 B 500 B (EN 1992)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Young's modulus | E | 200000 | [N/mm2] | Safetyfactor | | 1.15 | [-] |
| Poisson's ratio | μ | 0.30 | [-] | Yield stress | fy | 500.00 | [MPa] |
| Shear modulus | G | 76923 | [N/mm2] | Compressive yield | fyc | 500.00 | [MPa] |
| Compression modulus | K | 166667 | [N/mm2] | Tensile strength | ft | 540.00 | [MPa] |
| Nominal Weight | γ | 78.5 | [kN/m3] | Compressive strength | fc | 540.00 | [MPa] |
| Mean density | ρ | 7850.0 | [kg/m3] | Ultimate strain | | 50.00 | [o/oo] |
| Elongation coefficient | α | 1.20E-05 | [1/K] | relative bond coeff. | | 1.00 | [-] |
| max. thickness | t-max | 32.00 | [mm] | EN 1992 bond coeff. | k1 | 0.80 | [-] |
| | | | | Hardening modulus | Eh | 0.00 | [MPa] |
| | | | | Proportional limit | fp | 500.00 | [MPa] |
| | | | | Dynamic allowance | σ-dyn | 152.17 | [MPa] |

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Materials

| Stress-Strain for serviceability | ε[o/oo] | σ-m[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is also extended beyond the | 1000.000 | 540.00 | 0 |
| defined stress range | 50.000 | 540.00 | 0 |
| | 2.500 | 500.00 | 842 |
| | 0.000 | 0.00 | 200000 |
| | -2.500 | -500.00 | 842 |
| | -50.000 | -540.00 | 0 |
| | -1000.000 | -540.00 | 0 |
| | Safetyfactor | | 1.15 |

| Stress-Strain for ultimate load | ε[o/oo] | σ-u[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is also extended beyond the | 1000.000 | 469.57 | 0 |
| defined stress range | 50.000 | 469.57 | 0 |
| | 2.174 | 434.78 | 727 |
| | 0.000 | 0.00 | 200000 |
| | -2.174 | -434.78 | 727 |
| | -50.000 | -469.57 | 0 |
| | -1000.000 | -469.57 | 0 |
| | Safetyfactor | | ( 1.15) |

| Stress-Strain of calc. mean values | ε[o/oo] | σ-r[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is also extended beyond the | 1000.000 | 469.57 | 0 |
| defined stress range | 50.000 | 469.57 | 0 |
| | 2.174 | 434.78 | 727 |
| | 0.000 | 0.00 | 200000 |
| | -2.174 | -434.78 | 727 |
| | -50.000 | -469.57 | 0 |
| | -1000.000 | -469.57 | 0 |
| | Safetyfactor | | ( 1.15) |

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**Mat 99 C 30/37 N - brez G**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Young's modulus | E | 32837 | [N/mm2] | Safetyfactor | | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength | fc | 30.00 | [MPa] |
| Shear modulus | G | 13682 | [N/mm2] | Nominal strength | fck | 30.00 | [MPa] |
| Compression modulus | K | 18243 | [N/mm2] | Tensile strength | fctm | 2.90 | [MPa] |
| Nominal Weight | γ | 0.0 | [kN/m3] | Tensile strength | fctk,05 | 2.03 | [MPa] |
| Mean density | ρ | 0.0 | [kg/m3] | Tensile strength | fctk,95 | 3.77 | [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | fbd | 3.04 | [MPa] |
| | | | | Service strength | fcm | 38.00 | [MPa] |
| | | | | Fatigue strength | fcd,fat | 14.96 | [MPa] |
| | | | | Tensile strength | fctd | 1.35 | [MPa] |
| | | | | Tensile failure energy | Gf | 0.14 | [N/mm] |

| Stress-Strain for serviceability | ε[o/oo] | σ-m[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 0.000 | 0.00 | 34478 |
| stress range | -0.540 | -16.42 | 26234 |
| | -1.081 | -28.31 | 17746 |
| | -1.621 | -35.55 | 9005 |
| | -2.162 | -38.00 | 0 |
| | -3.500 | -22.47 | -23500 |
| | Safetyfactor | | 1.50 |

| Stress-Strain for ultimate load | ε[o/oo] | σ-u[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 0.000 | 0.00 | 30000 |
| stress range | -2.000 | -30.00 | 0 |
| | -3.500 | -30.00 | 0 |
| | Safetyfactor | | 1.50 |

11826 DSO Bovec - zahodna dilat. enota stavbe
Materials

| Stress-Strain of calc. mean values | ε[o/oo] | σ-r[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 0.000 | 0.00 | 28732 |
| stress range | -0.540 | -11.19 | 14403 |
| | -1.081 | -16.78 | 7018 |
| | -1.621 | -19.32 | 2720 |
| | -2.162 | -20.00 | 0 |
| | -3.500 | -17.25 | -3601 |
| | Safetyfactor | | ( 1.50) |

**Thermal material constants**

| Mat | T[°C] | S[kJ/K/m3] | Kxx[W/K/m] | Kyy[W/K/m] | Kzz[W/K/m] | |
|---|---|---|---|---|---|---|
| 1 | AUTO | 2.16E+03 | 1.951E+00 | | | C 30/37 N (EN 1992) |
| 2 | AUTO | 3.45E+03 | 5.333E+01 | | | B 500 B (EN 1992) |
| 99 | AUTO | 2.16E+03 | 1.951E+00 | | | C 30/37 N - brez G |

Mat material number S[kJ/K/m3] Heat capacity
T[°C] Temperature Kxx[W/K/m],Kyy[W/K/m],Kzz[W/K/m] Heat conductivity

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11826 DSO Bovec - zahodna dilat. enota stavbe
Sections

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018 Structure and Tab.7.1N: AN (Buildings)

**Materials**

| Mat | Classification |
|---|---|
| 1 | C 30/37 N (EN 1992) |
| 2 | B 500 B (EN 1992) |
| 99 | C 30/37 N - brez G |

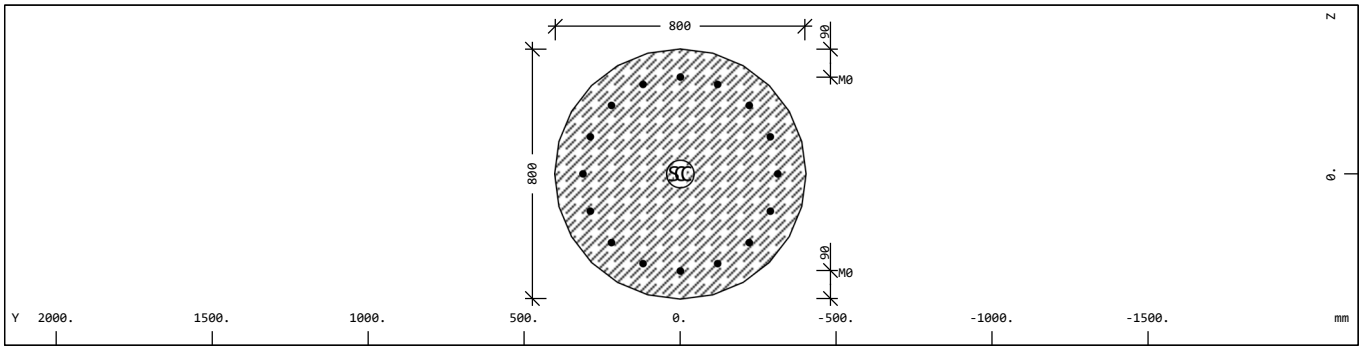
**Cross-sections static properties**

| SNo | Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|---|
| | MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 11 | 99 | 5.0265E-01 | 4.524E-01 | 2.011E-02 | 0.0 | 0.0 | 32837 | 0.0 | |
| | 2 | 4.021E-02 | 4.524E-01 | 2.011E-02 | 0.0 | 0.0 | 13682 | (COMPR) | |
| | = VODNJAK DN80 cm | | | | | | | | |
| | = VODNJAK DN80 cm | | | | | | | | |

| | | | |
|---|---|---|---|
| SNo | section number | yc[mm],zc[mm] | ordinate of elastic centroid |
| Mat | material number | ysc[mm],zsc[mm] | ordinate of shear centre |
| A[m2] | sectional area | E[N/mm2] | Young's modulus |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | g[kg/m] | weight per length |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | | |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |
| MRf | reinforcement material number | | |
| It[m4] | torsional moment of inertia | | |
| G[N/mm2] | Shear modulus | | |

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**Cross section No. 11 - VODNJAK DN80 cm**




Cross section No. 11 - VODNJAK DN80 cm

**Static properties of cross section**

| Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|
| MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 99 | 5.0265E-01 | 4.524E-01 | 2.011E-02 | 0.0 | 0.0 | 32837 | 0.0 | |
| 2 | 4.021E-02 | 4.524E-01 | 2.011E-02 | 0.0 | 0.0 | 13682 | (COMPR) | |

| | | | |
|---|---|---|---|
| Mat | material number | yc[mm],zc[mm] | ordinate of elastic centroid |
| A[m2] | sectional area | ysc[mm],zsc[mm] | ordinate of shear centre |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | E[N/mm2] | Young's modulus |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | g[kg/m] | weight per length |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |
| MRf | reinforcement material number | | |
| It[m4] | torsional moment of inertia | | |
| G[N/mm2] | Shear modulus | | |

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] | zmin[mm] | hymin[mm] | AK[m2] | MRs | 1/WT[1/m3] | 1/WVy[1/m2] |
|---|---|---|---|---|---|---|---|
| | ymax[mm] | zmax[mm] | hzmin[mm] | AB[m2] | | 1/WT2[1/m3] | 1/WVz[1/m2] |
| 1.0E-05 | -400.0 | -400.0 | 471.2 | 3.019E-01 | 2 | 9.947E+00 | 2.653E+00 |
| | 400.0 | 400.0 | 471.2 | 5.027E-01 | | | 2.653E+00 |

| | |
|---|---|
| α-T[1/K] | Elongation coefficient |
| ymin[mm],zmin[mm],ymax[mm],zmax[mm] | extreme coordinates relative to centroid |
| hymin[mm],hzmin[mm] | minimum value for internal lever |
| AK[m2] | torsional equivalent area (Bredt) |
| MRs | transverse reinforcements material number |
| 1/WT[1/m3],1/WT2[1/m3] | torsional resistance |

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Sections

| | |
|---|---|
| 1/WVy[1/m2],1/WVz[1/m2] | shear force resistance |
| AB[m2] | gross concrete area |

**Circular/annular cross section**

| Ra[mm] | Ri[mm] | Rsa[mm] | Rsi[mm] | Asa[cm2] | Asi[cm2] | D[mm] | a[mm] | Ass[cm2/m] |
|---|---|---|---|---|---|---|---|---|
| 400.0 | | 310.0 | | 50.24 | | 20 | | |

| | | | |
|---|---|---|---|
| Ra[mm],Ri[mm] | radius | D[mm] | bar diameter |
| Rsa[mm],Rsi[mm] | radius of reinforcement | a[mm] | distance of bars |
| Asa[cm2],Asi[cm2] | reinforcement area | Ass[cm2/m] | area of transverse reinforcements |

**Additional design data**

| Mat | periphery-O/-I [m2/m] | [m2/m] | deff [mm] | t-min [mm] | t-max [mm] | thet-p [kgm2/m] | thet-y [kgm2/m] | thet-z [kgm2/m] | thet-yz [kgm2/m] | yg [mm] | zg [mm] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2.513 | | | 400.0 | 400.0 | 0.000 | | | | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Mat | material number | t-min,t-max | thickness |
| periphery-O/-I | peripheral area per length | thet-p,thet-y,thet-z,thet-yz | rotational mass |
| deff | effective depth | yg,zg | ordinate of the mass centre |

**Reinforcement global values**

| Layer | Mref | Mat | As [cm2] | As-min [cm2] | As-max [cm2] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M0 | 99 | 2 | 50.24 | 50.24 | | 20 | 0.0 | 0.0 | 1947.8 | | | |

| | | | |
|---|---|---|---|
| Layer | layer of reinforcement | D | bar diameter |
| Mref | embedding reference material | yr,zr | ordinate of elastic centroid |
| Mat | material number | L-tors | torsional effective length |
| As | reinforcement area | N-p | prestress normal force |
| As-min | minimum reinforcement area | My-p,Mz-p | prestress bending moment |
| As-max | maximum reinforcement area | | |

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Generation of Node and Element Loads

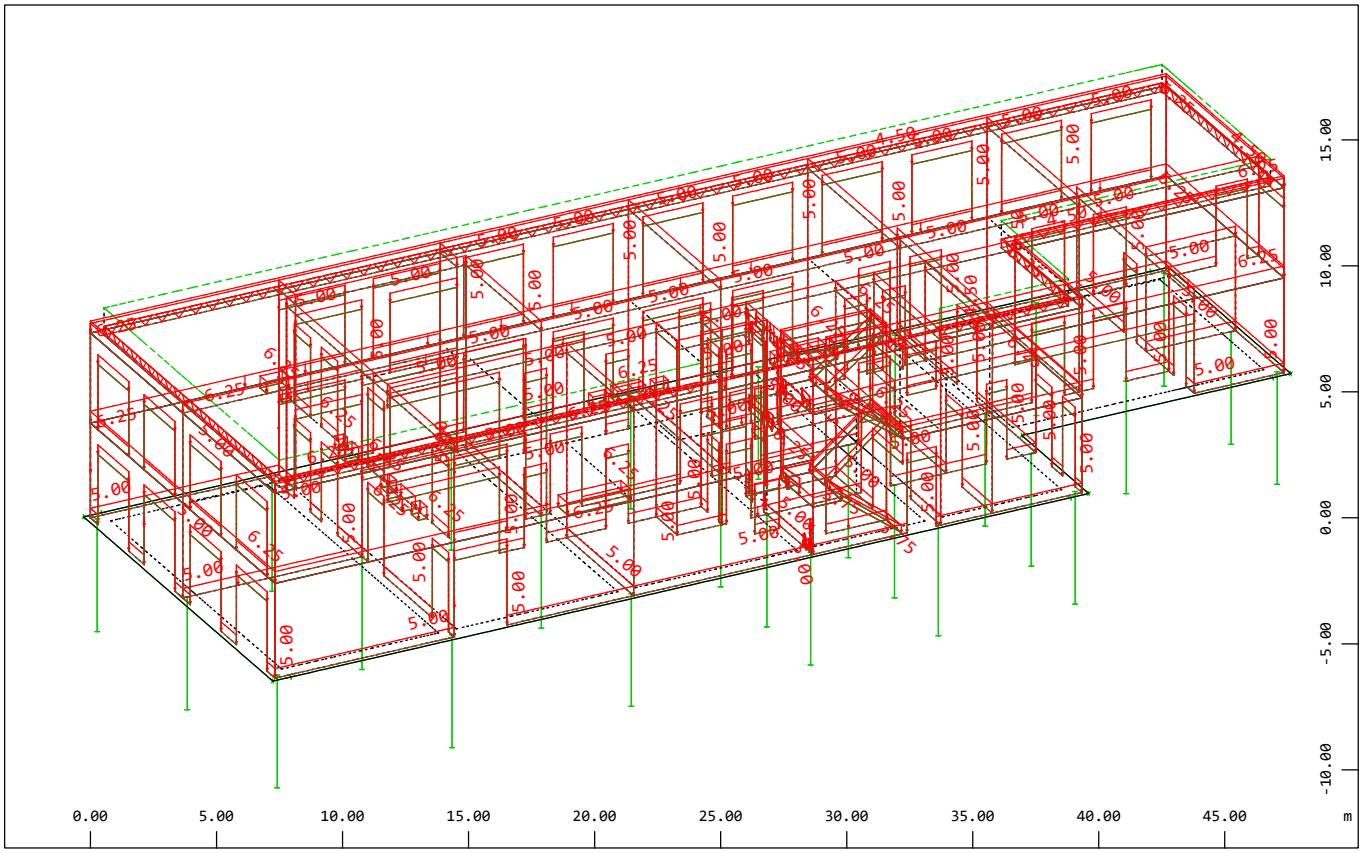
**Actions**

| type | part | sup | Designation | γ-u | γ-f | γ-a | $\psi_0$ | $\psi_1$ | $\psi_2$ | $\psi_1$inf |
|---|---|---|---|---|---|---|---|---|---|---|
| G_1 | G | perm | dead load g1 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | | 1 | Lastna | | | | | | | |
| | | 9 | Lastna-temelji | | | | | | | |
| G_2 | G | perm | dead load g2 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | | 2 | Stalna | | | | | | | |
| | | 3 | Stalna-predelne | | | | | | | |
| | | 4 | Stalna-fasade | | | | | | | |
| | | 5 | Stalna-klimati | | | | | | | |
| | | 6 | Stalna-streha-les | | | | | | | |
| C | P | perm | creep + shrinkage | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Q_A | Q | cond | Pay load residential cat. A | 1.50 | 0.00 | 1.00 | 0.70 | 0.50 | 0.30 | 1.00 |
| Q_C | Q | cond | Pay load assembling cat. C | 1.50 | 0.00 | 1.00 | 0.70 | 0.70 | 0.60 | 1.00 |
| | | 11 | Koristna C | | | | | | | |
| Q_H | Q | excl | Live load on roofs cat. H | 1.50 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | 12 | Koristna H | | | | | | | |
| S | Q | cond | snow loading | 1.50 | 0.00 | 1.00 | 0.50 | 0.20 | 0.00 | 0.20 |
| | | 21 | Sneg | | | | | | | |
| E | E | usex | seismic loading | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | | | Reliability factor Kfi | 1.000 | | | | | | |
| | | | Reduction factor xsi | 0.850 | | | | | | |

type action γ-u,γ-f,γ-a partial safety factors for unfavourable/favourable/accidental
part partition of the action $\psi_0,\psi_1,\psi_2,\psi_1$inf combination coefficients
sup superposition type

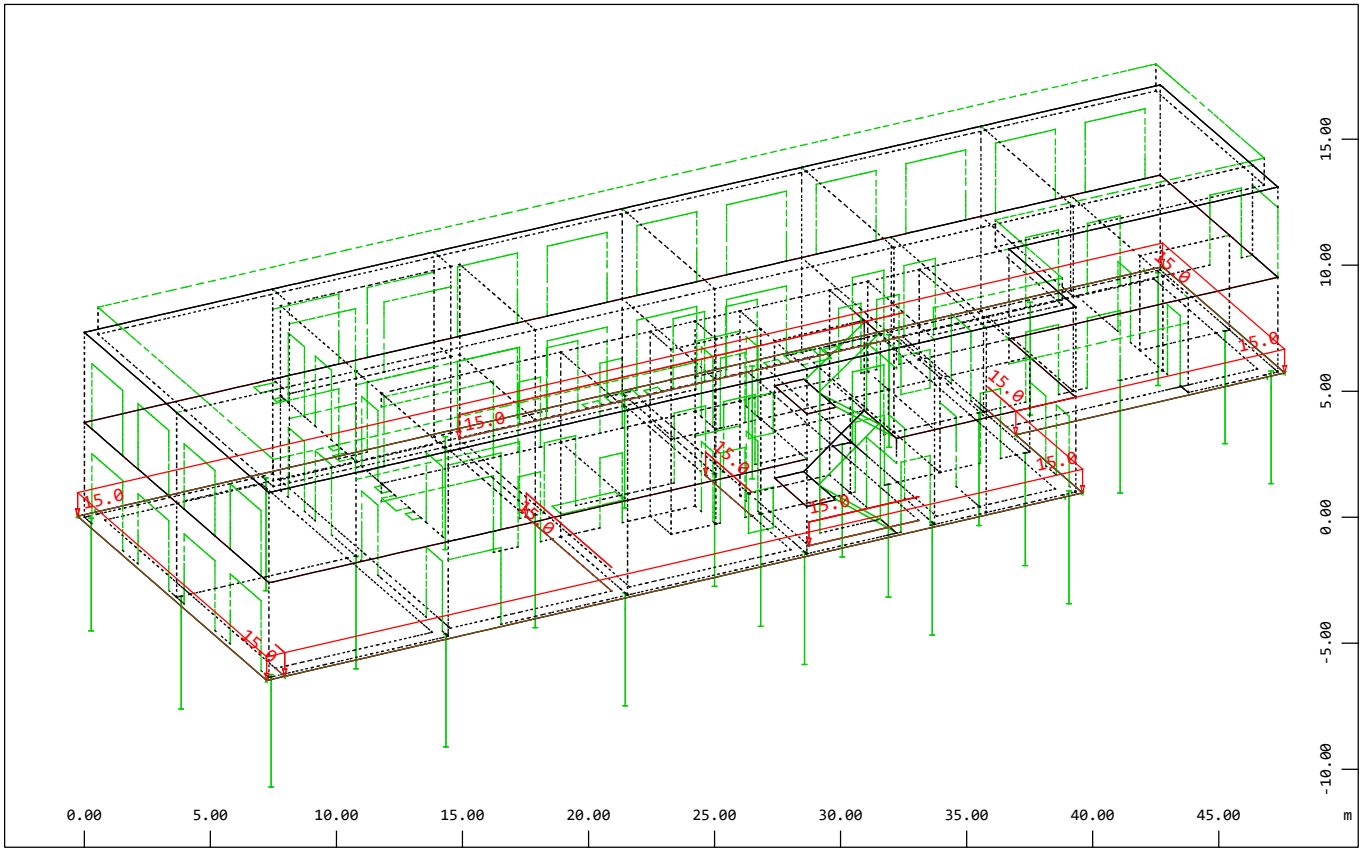
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11826 DSO Bovec - zahodna dilat. enota stavbe
Obtezba: lastna, lastna-temelji




Z Y X
Sector of system Group 100 105 110 115 120 201...213 251...257 301 302 351 352
All loads, Loadcase 1 Lastna , (1 cm 3D = unit) QUAD-Area dead load in global Z in
Element (Unit=35.6 kN/m2,Min=-6.25 Max=-3.75 ), Free line load (force) in global Z

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

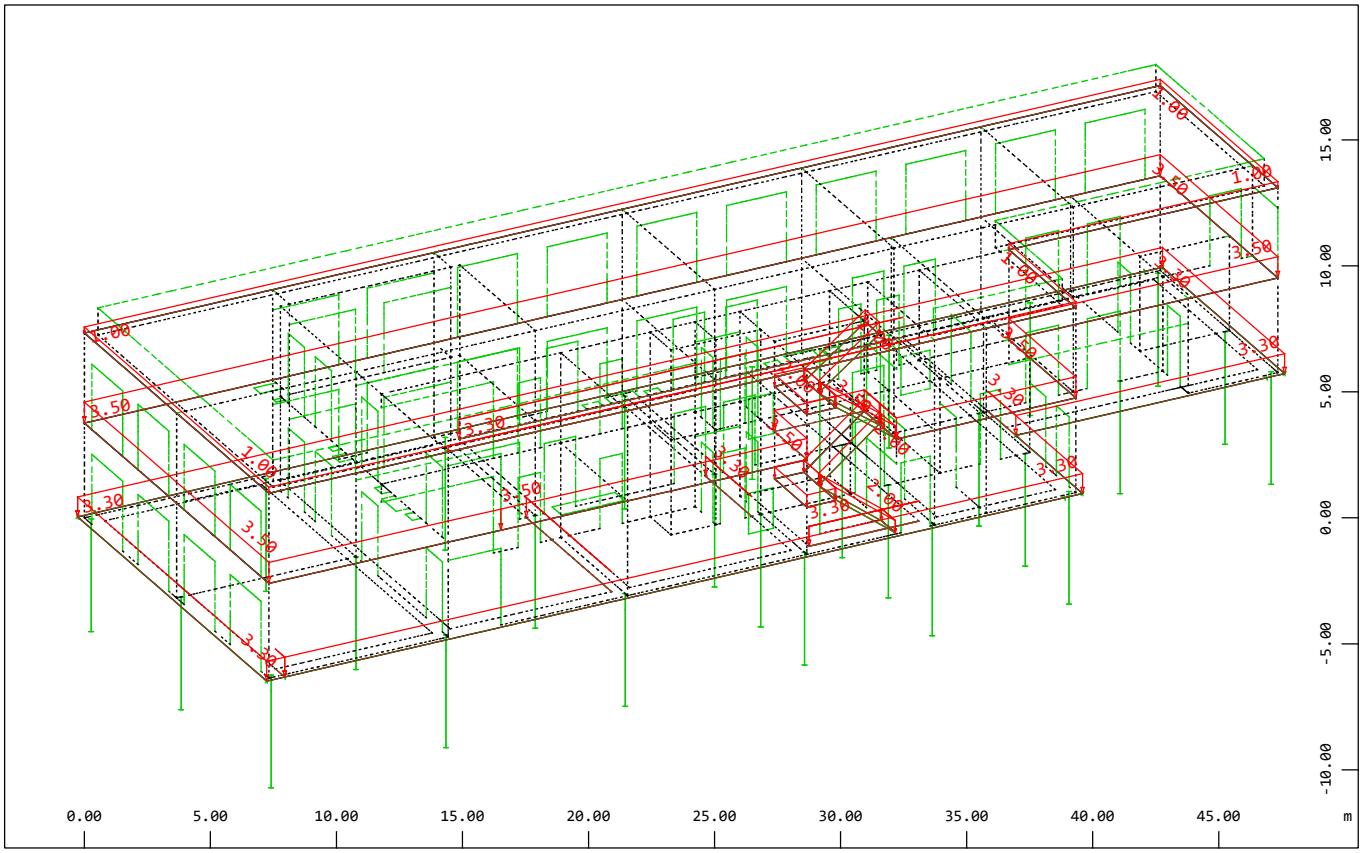



Z Y X
Sector of system Group 100 105 110 115 120 201...213 251...257 301 302 351 352
All loads, Loadcase 9 Lastna-temelji , (1 cm 3D = unit) Free area load (force) in global
Z (Unit=42.8 kN/m2 ) (Min=-30.0) (Max=-15.0)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

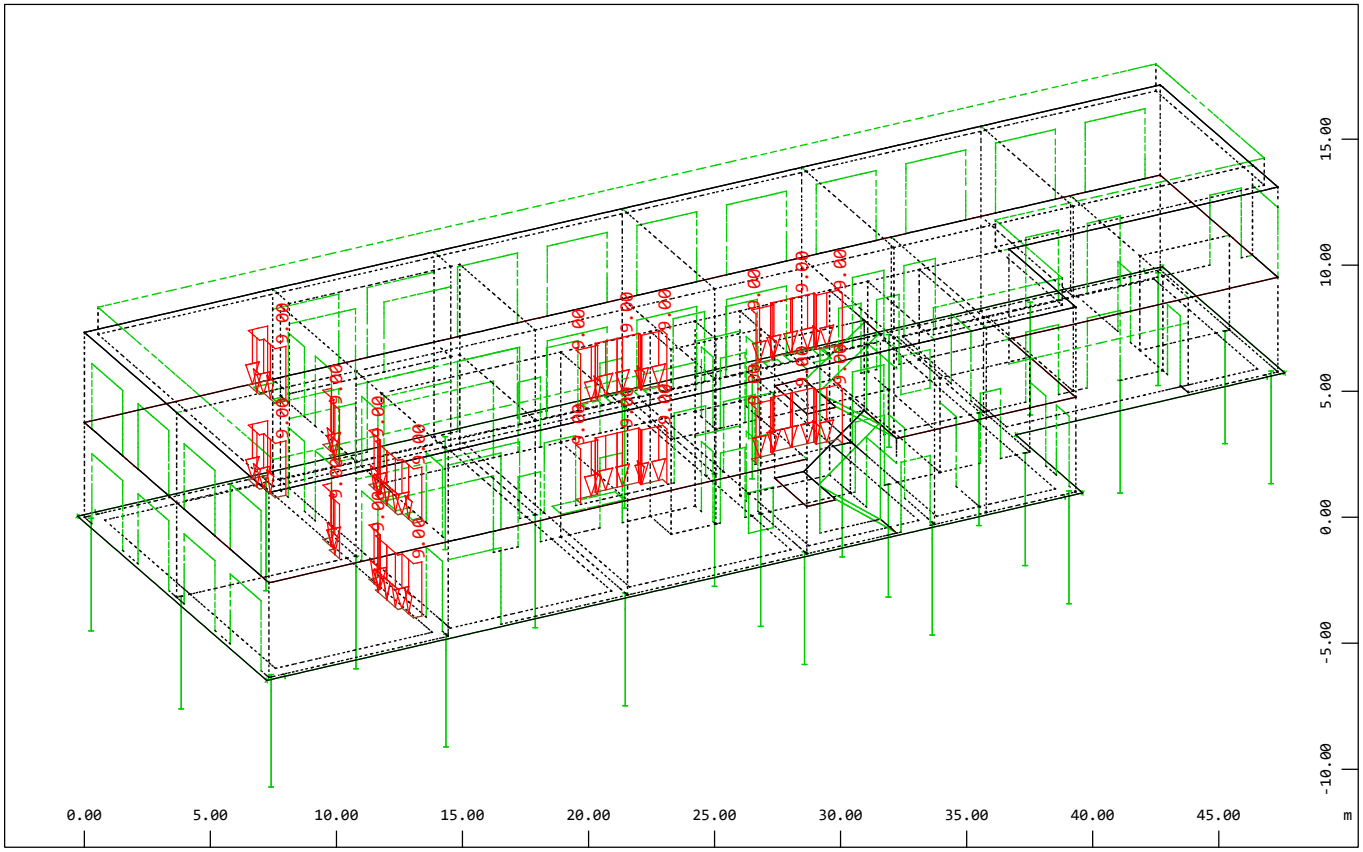
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11826 DSO Bovec - zahodna dilat. enota stavbe
Obtezba: stalna, stalna-predelne




Z Y X
Sector of system Group 100 105 110 115 120 201...213 251...257 301 302 351 352
All loads, Loadcase 2 Stalna , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=11.2 kN/m2 ) (Min=-6.60) (Max=-1.00)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

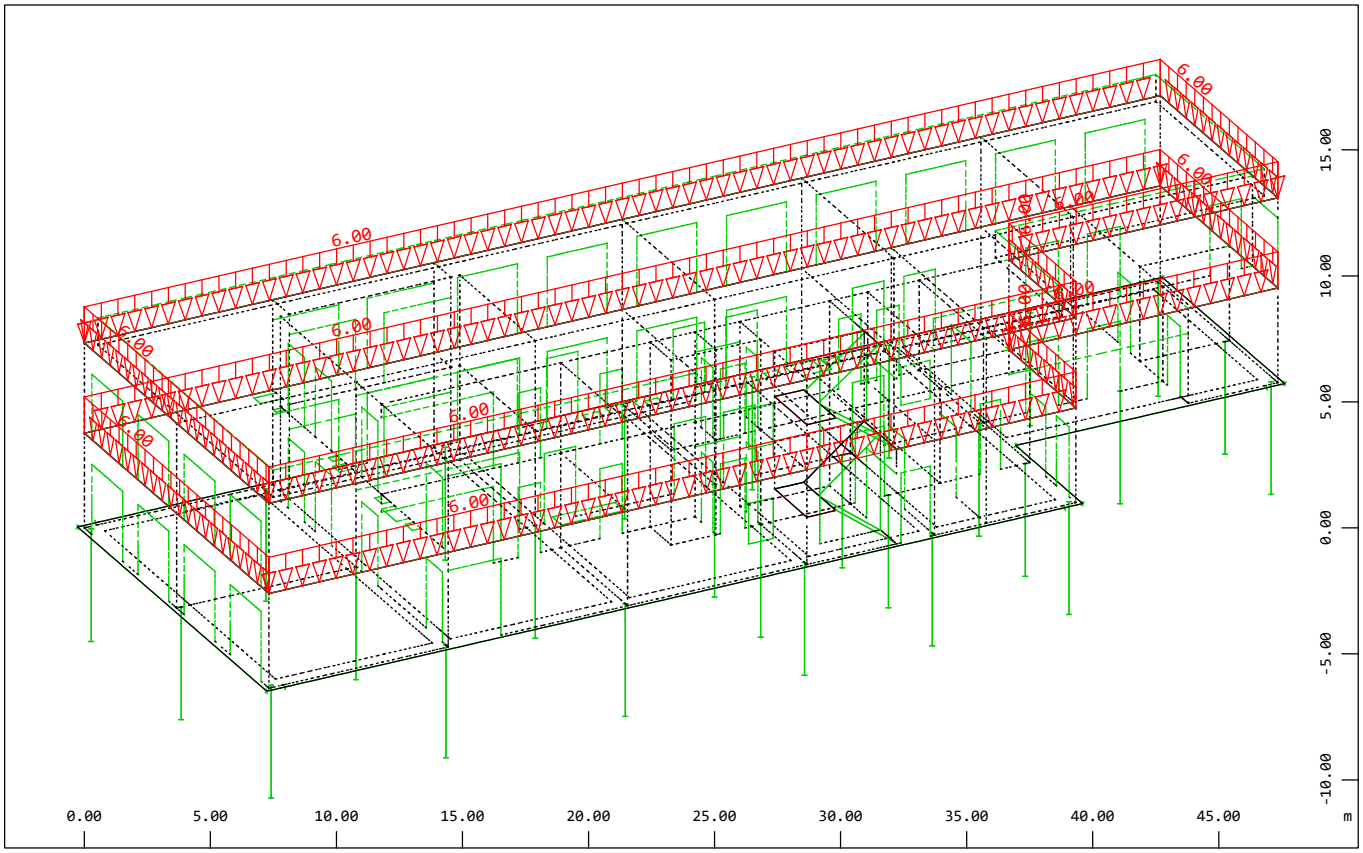



Z Y X
Sector of system Group 100 105 110 115 120 201...213 251...257 301 302 351 352
All loads, Loadcase 3 Stalna-predelne , (1 cm 3D = unit) Free line load (force) in
global Z (Unit=11.2 kN/m ) (Min=-9.00) (Max=-9.00)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

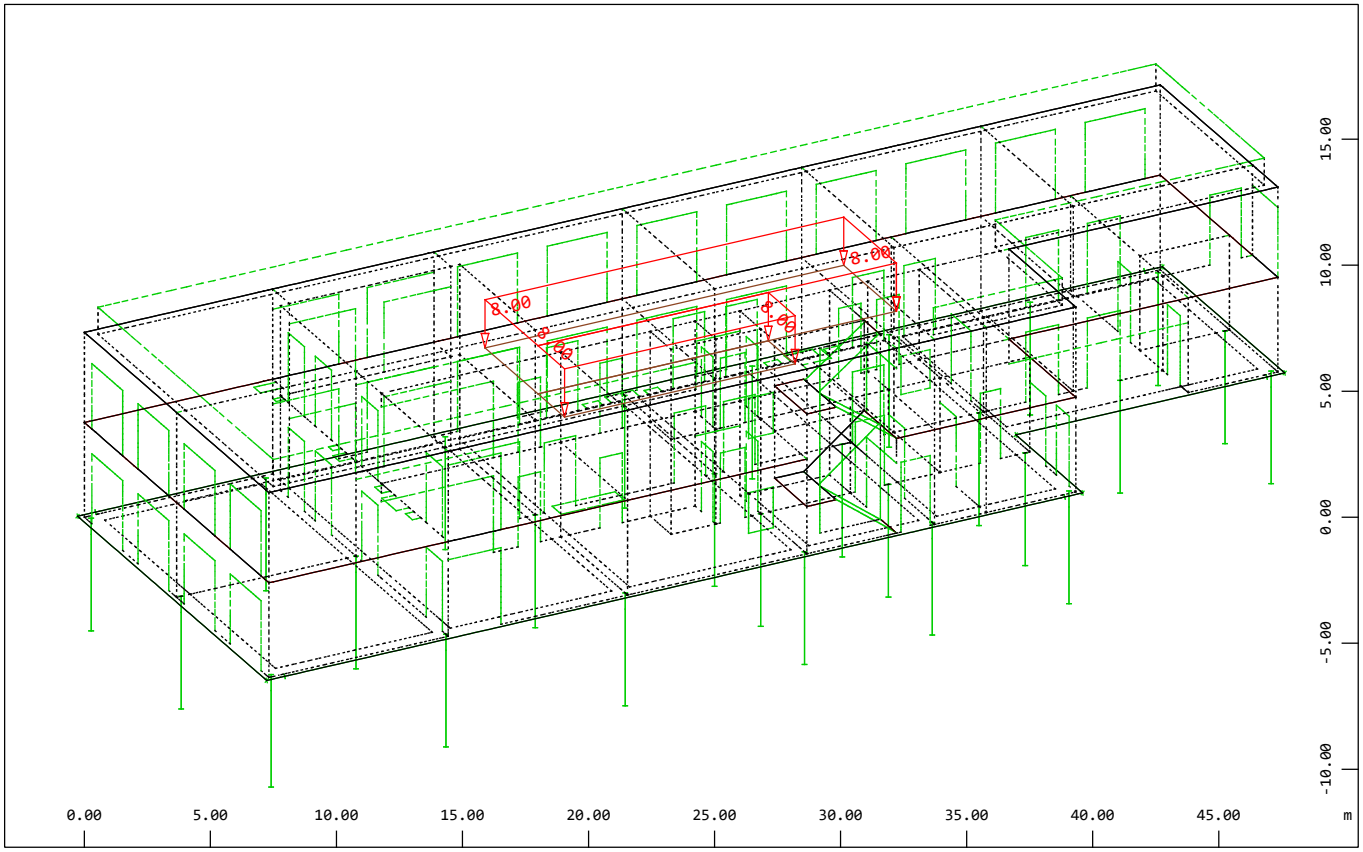
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11826 DSO Bovec - zahodna dilat. enota stavbe
Obtezba: stalna-fasada, stalna-klimati




Z Y X
Sector of system Group 100 105 110 115 120 201...213 251...257 301 302 351 352
All loads, Loadcase 4 Stalna-fasade , (1 cm 3D = unit) Free line load (force) in global
Z (Unit=11.2 kN/m ) (Min=-6.00) (Max=-6.00)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

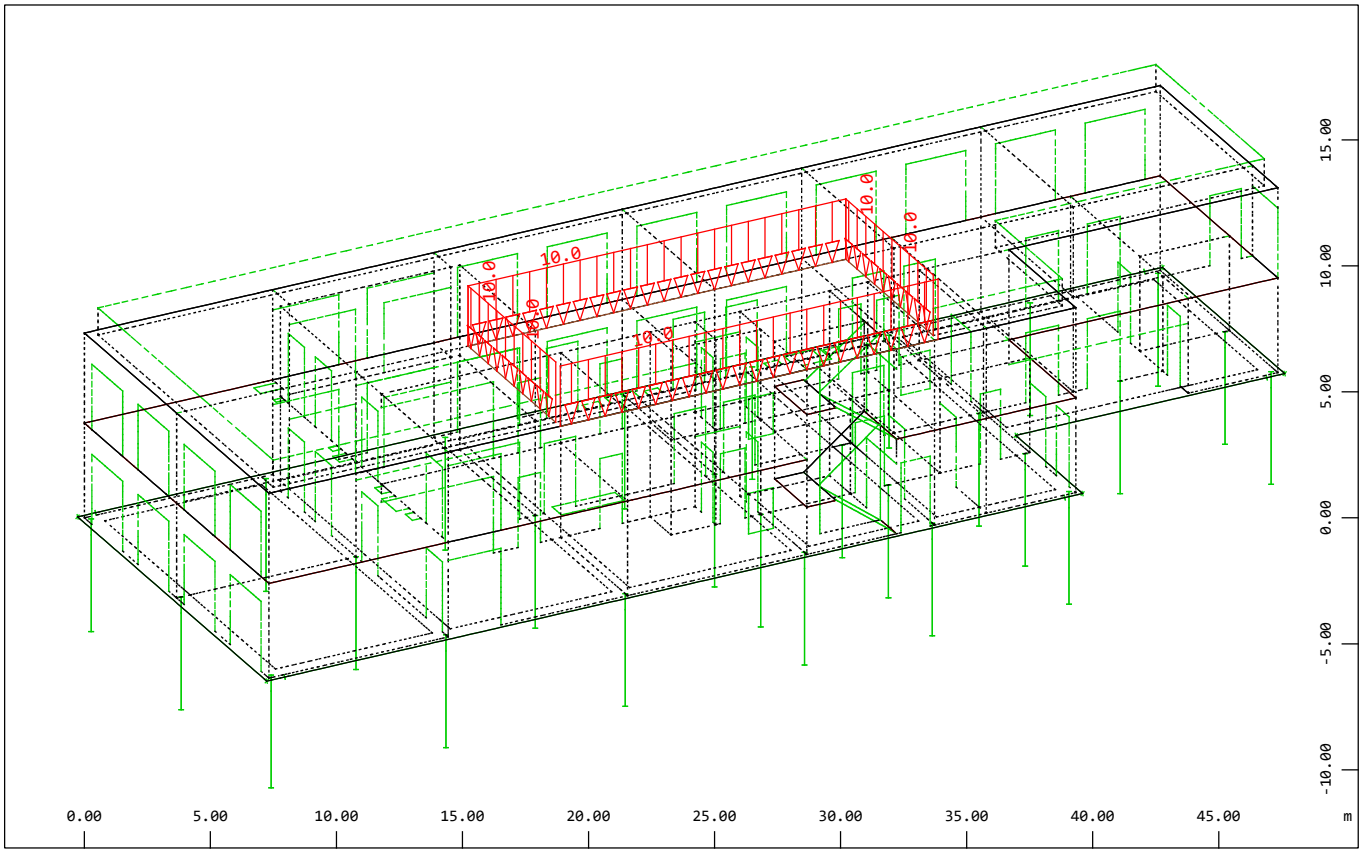



Z Y X
Sector of system Group 100 105 110 115 120 201...213 251...257 301 302 351 352
All loads, Loadcase 5 Stalna-klimati , (1 cm 3D = unit) Free area load (force) in global
Z (Unit=11.2 kN/m2 ) (Min=-8.00) (Max=-8.00)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

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11826 DSO Bovec - zahodna dilat. enota stavbe
Obtezba: stalna-jeklena streha



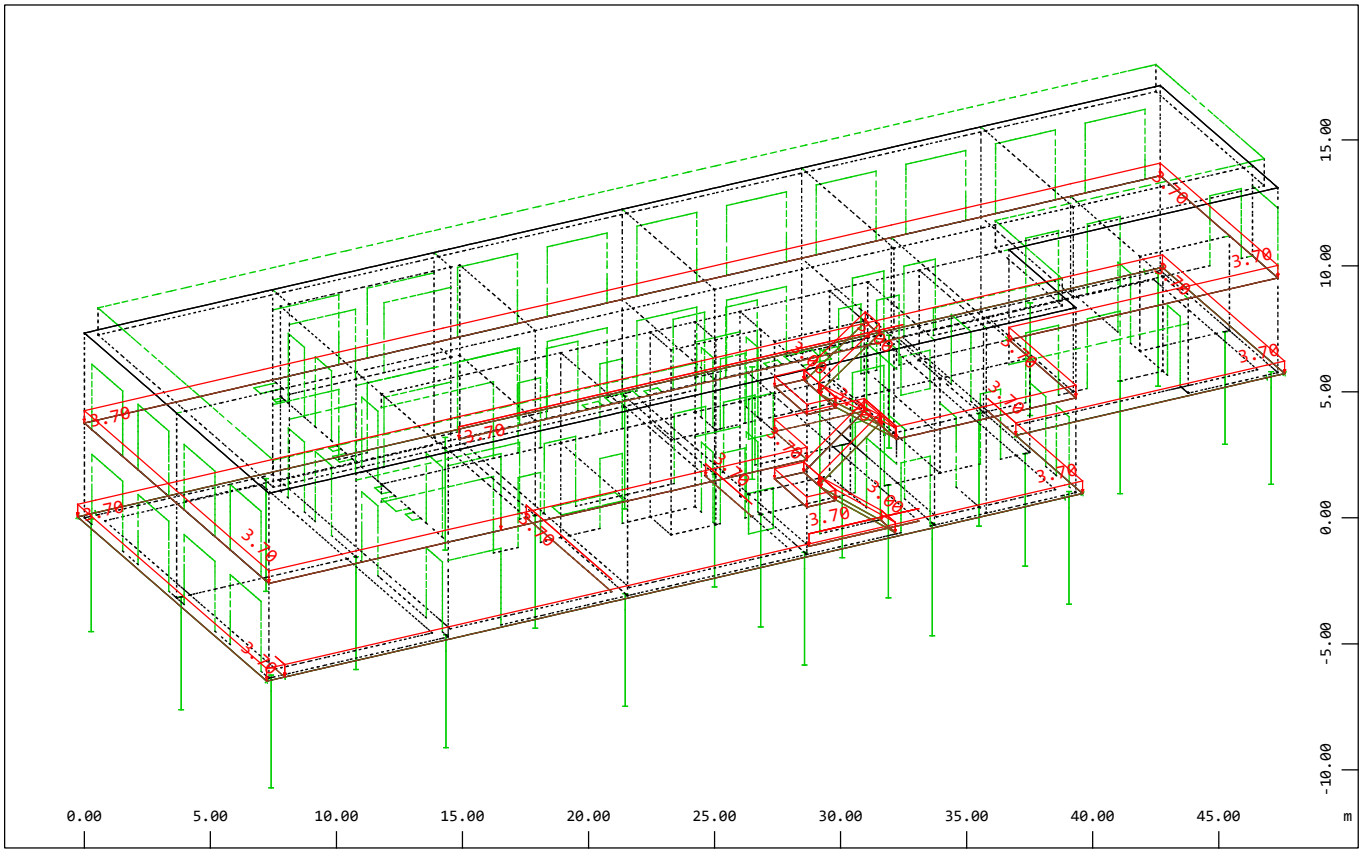

Z
Y
X

Sector of system Group 100 105 110 115 120 201...213 251...257 301 302 351 352
All loads, Loadcase 6 Stalna-streha-les , (1 cm 3D = unit) Free line load (force) in
global Z (Unit=11.2 kN/m ) (Min=-10.0) (Max=-10.0)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

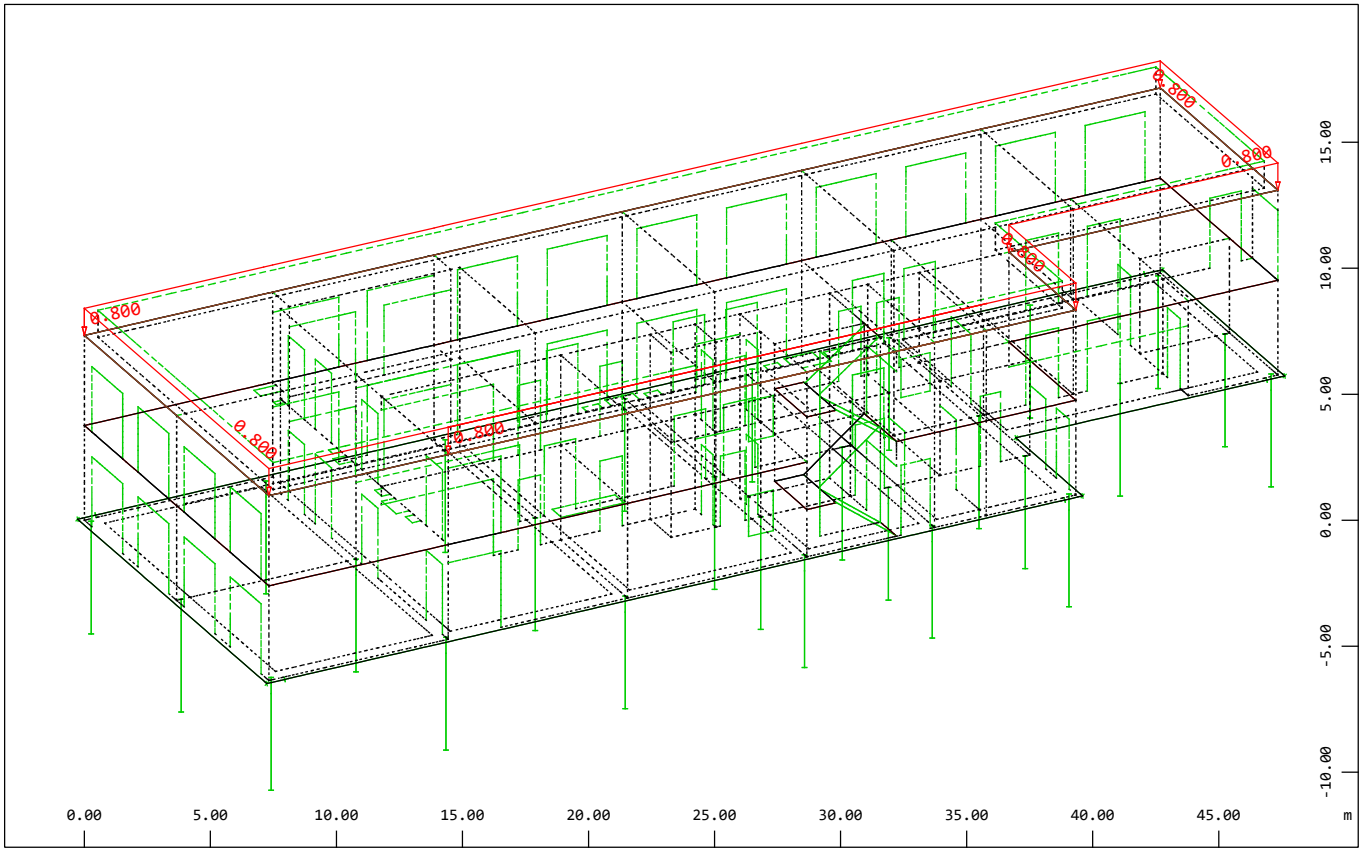
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11826 DSO Bovec - zahodna dilat. enota stavbe
Obtezba: koristna C in H




Z Y X
Sector of system Group 100 105 110 115 120 201...213 251...257 301 302 351 352
All loads, Loadcase 11 Koristna C , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=20.0 kN/m2 ) (Min=-7.40) (Max=-3.00)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

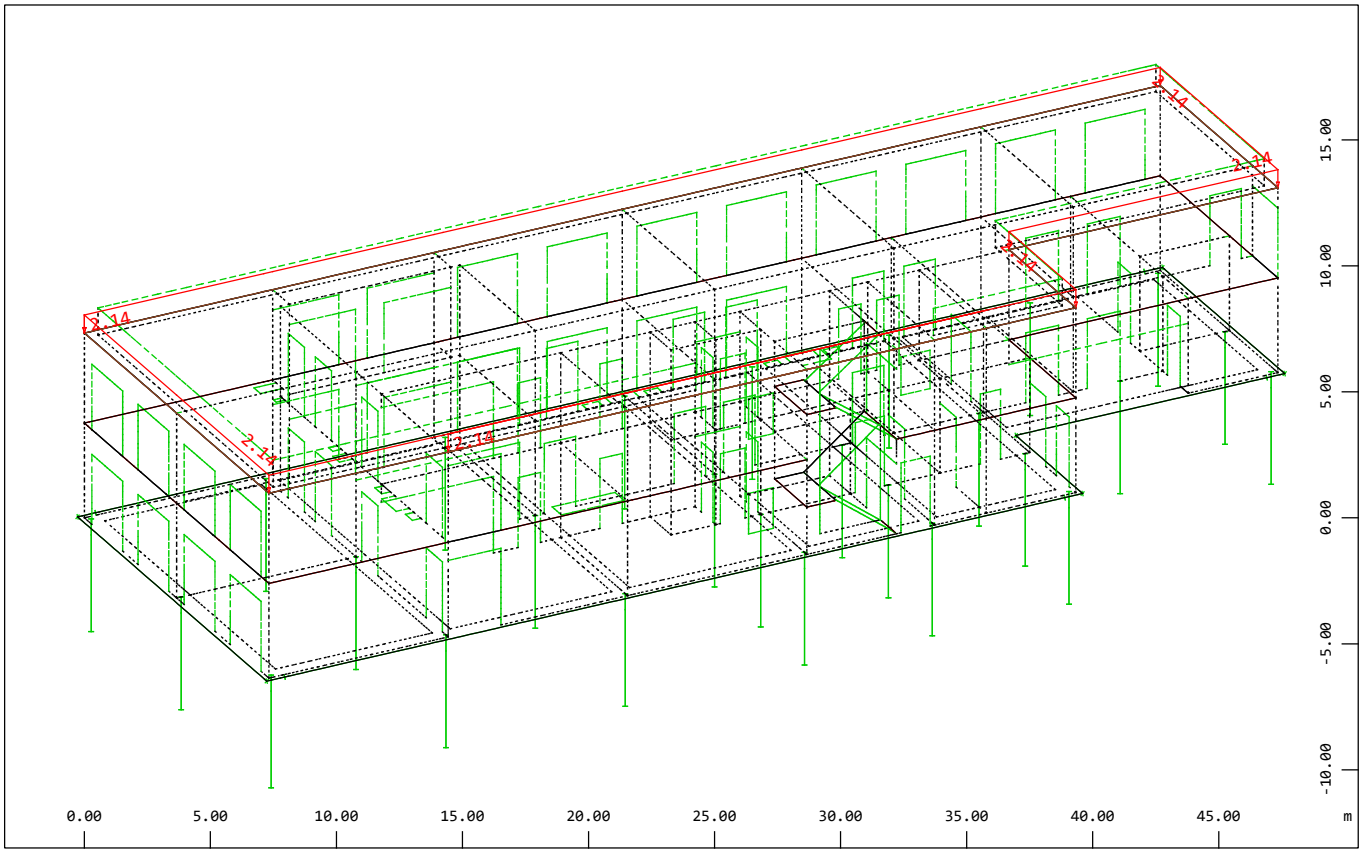



Z Y X
Sector of system Group 100 105 110 115 120 201...213 251...257 301 302 351 352
All loads, Loadcase 12 Koristna H , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=2.00 kN/m2 ) (Min=-0.800) (Max=-0.800)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

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11826 DSO Bovec - zahodna dilat. enota stavbe
Obtezba: sneg




Z
Y
X

Sector of system Group 100 105 110 115 120 201...213 251...257 301 302 351 352
All loads, Loadcase 21 Sneg , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=8.00 kN/m2 ) (Min=-2.14) (Max=-2.14)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

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11826 DSO Bovec - zahodna dilat. enota stavbe
Reologija (CSM)

**Global Settings**

Dead load of elements is automatically activated.
Creep and shrinkage values are calculated in advance in CSM.
Creep values are calculated individually for each stage load part (backward creeping).

**Construction Stages**

| CS | Type | t [d] | RH [%] | T [°C] | laun_1 [m] | laun_2 [m] | Designation |
|---|---|---|---|---|---|---|---|
| 10 | G_1 | | | | | | G_1 |
| 15 | C_1 | 10 | 70 | 20 | | | Creepstep |
| 25 | C_1 | 28 | 70 | 20 | | | Creep til g_2 |
| 30 | G_2 | | | | | | G_2 |
| 35 | C_1 | 100 | 70 | 20 | | | Creep til opening |
| 40 | ZC | | | | | | Part of Q load for C+S |
| 45 | C_2 | 30000 | 70 | 20 | | | Creep til t-infinite |

CS number of the construction stage
Type type of the action
t effective duration of creep interval
RH relative humidity
T temperature in creep interval
laun_1 launching distance of this construction stage for launching from side 1
laun_2 launching distance of this construction stage for launching from side 2

**Group Properties**

| Grp | active from CS | active until CS | deadload from CS | Hfix from | Bedd from | Deck from | ASTI until | t0 [d] | ts [d] | FAC1 | PHIF | QUEA | QEMX | FACD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 10 | 9999 | 10 | | | | | 100 | 3 | | 1.00 | | | |
| 101 | 10 | 9999 | 10 | | | | | 100 | 3 | | 1.00 | | | |
| 105 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 110 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 115 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 120 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 201 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 202 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 203 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 204 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 205 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 206 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 207 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 208 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 209 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 210 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 211 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 212 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 213 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 251 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 252 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 253 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 254 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 255 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 256 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 257 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 301 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 302 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 351 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 352 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |

Grp group number
active active from / until construction stage number
deadload construction stage number from which the dead load of a group is activated
Hfix construction stage number at which hinges are fixed
Bedd construction stage number from which QUAD bedding is activated
Deck construction stage number from which the in situ concrete load of a AQUA CS is activated
ASTI stiffness active till construction stage number
t0 age of concrete at time of loading
ts start time of drying (from t0-ts shrinkage without effect)
FAC1 stiffness factor for first activation (e.g. cable prestress)
PHIF factor for creep of springs and beddings

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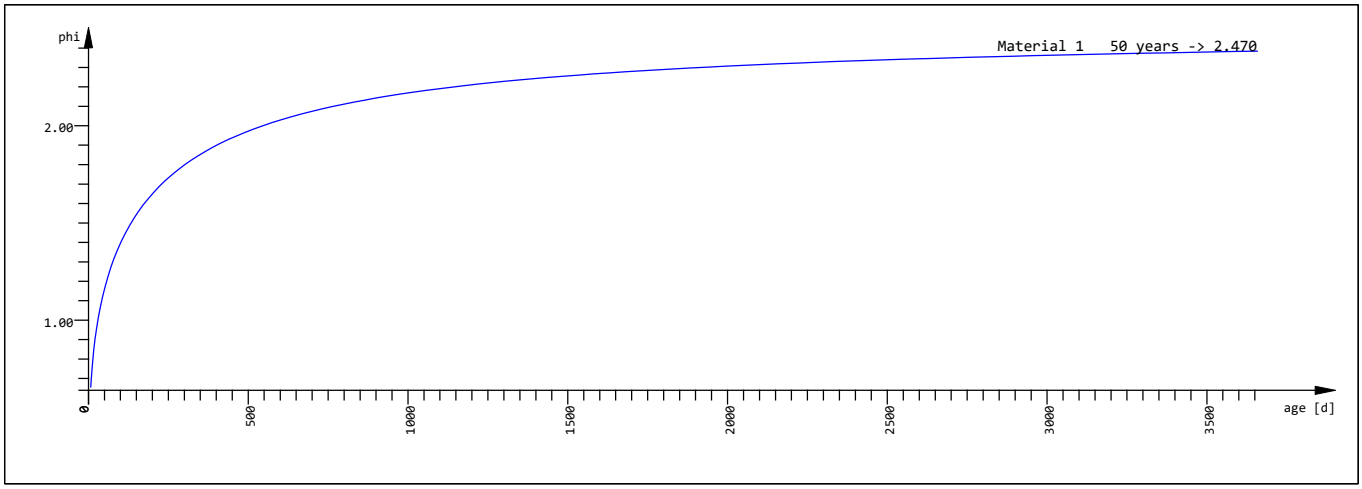
11826 DSO Bovec - zahodna dilat. enota stavbe
Reologija (CSM)

| | |
|---|---|
| QUEA | component of the normal force stiffness of QUAD elements |
| QEMX | factor of Young's modulus of QUAD elements in local x direction |
| FACD | factor dead load |

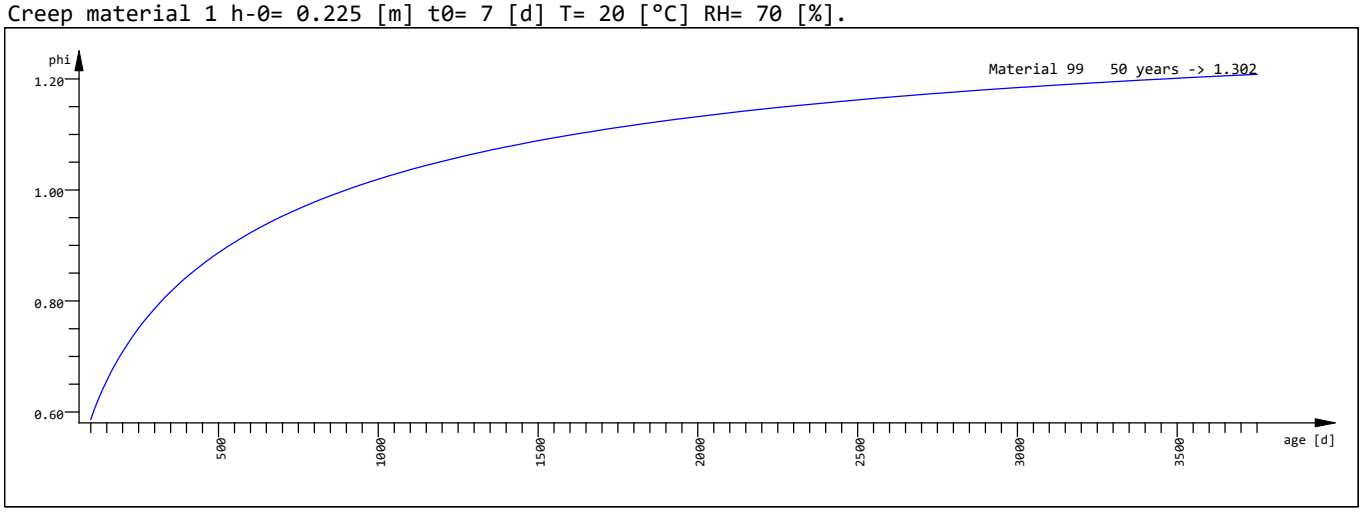
**Additional Loads**

| LC | active from CS | active until CS | factor | |
|---|---|---|---|---|
| 2 | 30 | 9999 | 1.000000 | |
| 3 | 30 | 9999 | 1.000000 | |
| 4 | 30 | 9999 | 1.000000 | |
| 5 | 30 | 9999 | 1.000000 | |
| 6 | 30 | 9999 | 1.000000 | |
| 9 | 10 | 9999 | 1.000000 | |
| 11 | 40 | 9999 | 0.600000 | |

LC load case
active active from / until construction stage number



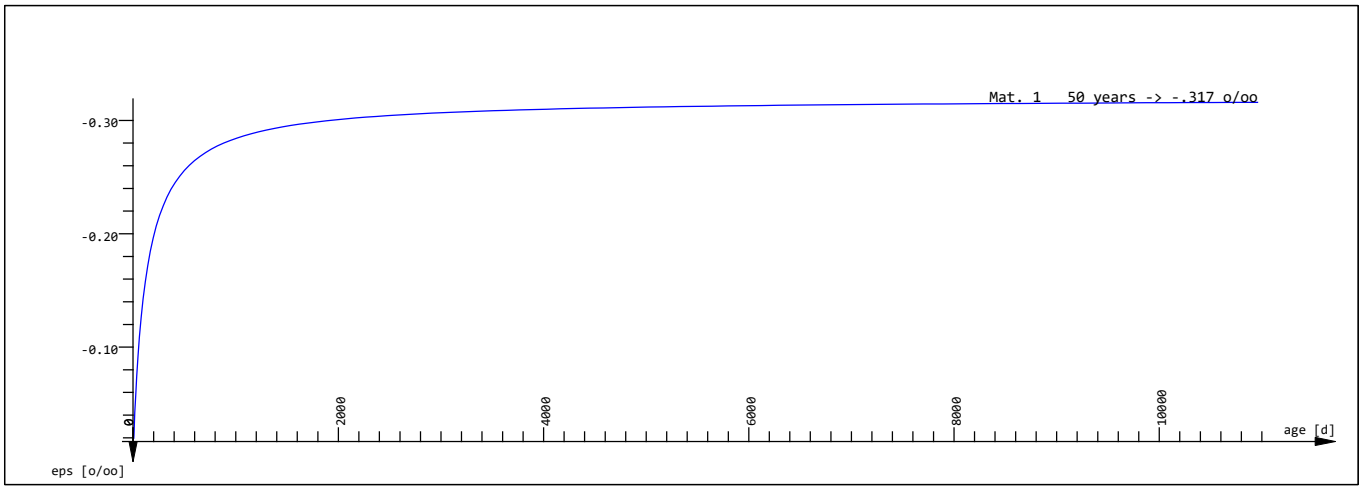

Creep material 1 h-0= 0.225 [m] t0= 7 [d] T= 20 [°C] RH= 70 [%].



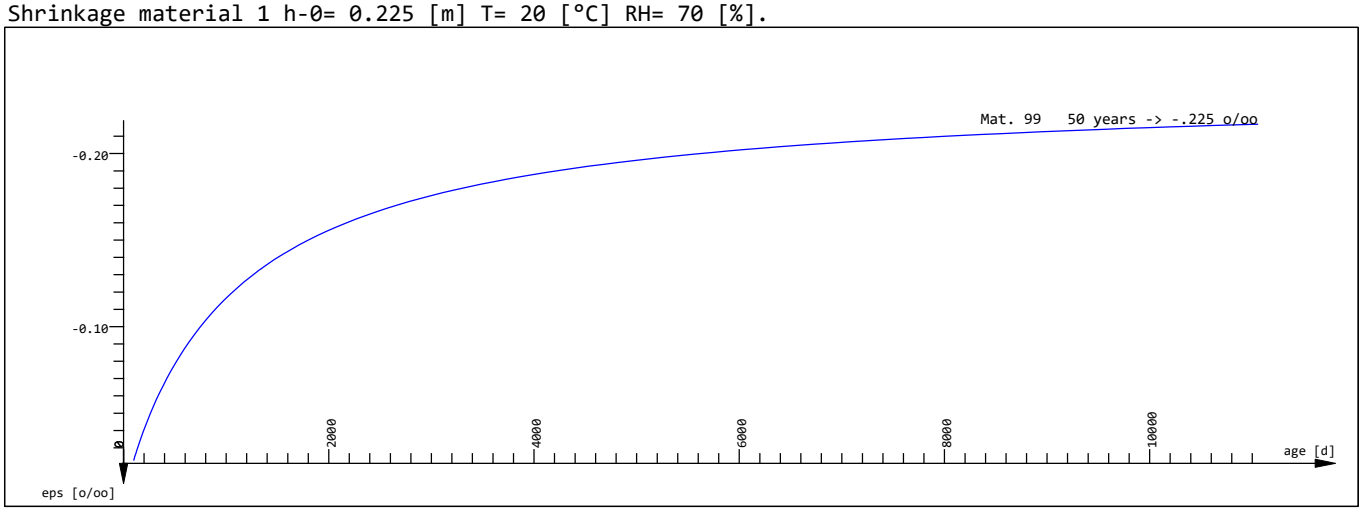

Creep material 99 h-0= 0.860 [m] t0= 100 [d] T= 20 [°C] RH= 70 [%].

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11826 DSO Bovec - zahodna dilat. enota stavbe
Reologija (CSM)




Shrinkage material 1 h-0= 0.225 [m] T= 20 [°C] RH= 70 [%].




Shrinkage material 99 h-0= 0.860 [m] T= 20 [°C] RH= 70 [%].

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Analysis of creep and shrinkage according to EN 1992-1-1:2004+AC:2010/EN 1992-2:2005+AC:2008
RCRE creep values of later acting load parts are not printed (ECHO RCRE).

**Creep Values**

| Grp | Mat | h-0 [mm] | t0 [d] | CS 15 | CS 25 | CS 35 | CS 45 | total φ-eff |
|---|---|---|---|---|---|---|---|---|
| | | t[d] | ---> | 10 | 28 | 100 | 30000 | 30138 |
| | | RH[%] | ---> | 70 | 70 | 70 | 70 | |
| | | T[°C] | ---> | 20 | 20 | 20 | 20 | |
| 100 | 99 | 860.0 | 100 | 0.30 | 0.14 | 0.20 | 0.67 | 1.31 / 1.05¹ |
| 101 | 99 | 400.0 | 100 | 0.37 | 0.18 | 0.23 | 0.63 | 1.41 / 1.05¹ |
| 105 | 1 | 225.0 | 7 | 0.73 | 0.34 | 0.44 | 0.97 | 2.48 / 1.05¹ |
| 110 | 1 | 350.0 | 7 | 0.64 | 0.31 | 0.40 | 1.02 | 2.37 / 1.05¹ |
| 115 | 1 | 231.0 | 7 | 0.72 | 0.34 | 0.44 | 0.97 | 2.47 / 1.05¹ |
| 120 | 1 | 350.0 | 7 | 0.64 | 0.31 | 0.40 | 1.02 | 2.37 / 1.05¹ |
| 201 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 202 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 203 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 204 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 205 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 206 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 207 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 208 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 209 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 210 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 211 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |

11826 DSO Bovec - zahodna dilat. enota stavbe
Reologija (CSM)

**Creep Values**

| Grp | Mat | h-0 [mm] | t0 [d] | CS 15 | CS 25 | CS 35 | CS 45 | total φ-eff |
|---|---|---|---|---|---|---|---|---|
| 212 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 213 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 251 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 252 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 253 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 254 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 255 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 256 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 257 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 301 | 99 | 210.0 | 7 | 0.74 | 0.35 | 0.44 | 0.96 | 2.50 / 1.05¹ |
| 302 | 99 | 210.0 | 7 | 0.74 | 0.35 | 0.44 | 0.96 | 2.50 / 1.05¹ |
| 351 | 99 | 210.0 | 7 | 0.74 | 0.35 | 0.44 | 0.96 | 2.50 / 1.05¹ |
| 352 | 99 | 210.0 | 7 | 0.74 | 0.35 | 0.44 | 0.96 | 2.50 / 1.05¹ |

¹ In AQB and ASE the creep values will be devided by the printed factor due to the problem of the reference E-modulus [Ec/Ecm]
Please refer to basic document EN 1992-1-1 Eq.3.14

Grp group number
h-0 notional size (2A/U)
t0 age of concrete at time of loading
CS construction stage creep part Δφ-eff
φ-eff sum construction stage creep parts
t effective duration creep interval
RH relative humidity
T temperature in creep interval

**Shrinkage Values *10^-6**

| Grp | Mat | h-0 [mm] | ts [d] | CS 15 | CS 25 | CS 35 | CS 45 | total ε-cs |
|---|---|---|---|---|---|---|---|---|
| | | t[d] | ---> | 10 | 28 | 100 | 30000 | 30138 |
| | | RH[%] | ---> | 70 | 70 | 70 | 70 | |
| | | T[°C] | ---> | 20 | 20 | 20 | 20 | |
| 100 | 99 | 860.0 | 3 | -2.7 | -7.0 | -20.5 | -200. | -230. |
| 101 | 99 | 400.0 | 3 | -5.3 | -13.5 | -35.8 | -151. | -205. |
| 105 | 1 | 225.0 | 3 | -27.0 | -51.7 | -90.8 | -149. | -318. |
| 110 | 1 | 350.0 | 3 | -17.1 | -32.2 | -65.5 | -175. | -290. |
| 115 | 1 | 231.0 | 3 | -26.2 | -50.2 | -89.4 | -151. | -316. |
| 120 | 1 | 350.0 | 3 | -17.1 | -32.2 | -65.5 | -175. | -290. |
| 201 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 202 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 203 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 204 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 205 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 206 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 207 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 208 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 209 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 210 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 211 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 212 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 213 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 251 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 252 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 253 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 254 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 255 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 256 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 257 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 301 | 99 | 210.0 | 3 | -29.2 | -55.5 | -94.3 | -144. | -323. |
| 302 | 99 | 210.0 | 3 | -29.2 | -55.5 | -94.3 | -144. | -323. |
| 351 | 99 | 210.0 | 3 | -29.2 | -55.5 | -94.3 | -144. | -323. |
| 352 | 99 | 210.0 | 3 | -29.2 | -55.5 | -94.3 | -144. | -323. |

Grp group number
h-0 notional size (2A/U)
ts start time of drying
ε-cs sum of construction stage parts
t effective duration creep interval
RH relative humidity

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11826 DSO Bovec - zahodna dilat. enota stavbe
Reologija (CSM)

| CS construction stage shrinkage part Δε-cs | T temperature in creep interval |
|---|---|

In case of ts lower t0, shrinkage from ts-t0 is not taken into account!
(Losses due to shrinkage are calculated starting at time t0)

**Overview loadcases. (see also CSM manual chapter 2 loadcases)**

| | | |
|---|---|---|
| Total CS displacements and forces starting | at loadcase number. | 4000 |
| Difference displacements and forces starting | at loadcase number. | 5000 |
| AQB inner stresses from creep and shrinkage | at loadcase number. | 6000 |
| Stress results of the AQB-LCST-evaluation | at loadcase number. | 7000 |

[to check prestress normal force after creep and shrinkage :
-> WINGRAF beam normal force LC 7000ff ]

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**Sum of Masses**

| | TM-X[t] | TM-Y[t] | TM-Z[t] | RM-X[tm2] | RM-Y[tm2] | RM-Z[tm2] |
|---|---|---|---|---|---|---|
| total | 3002.287 | 3002.287 | 0.000 | 0.000 | 0.000 | 0.000 |
| activ | 2999.412 | 3001.420 | 0.000 | 0.000 | 0.000 | 0.000 |

**Eigenfrequencies**

Using Lanczos Method
Iterationsvectors 100

| No. | LC | Eigenvalue [1/Sec2] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|---|---|---|---|---|---|---|
| 1 | 1001 | 2.38116E+03 | 2.43E-19 | 7.766 | 0.128761 | 0.00000 |
| 2 | 1002 | 3.61847E+03 | 2.20E-19 | 9.574 | 0.104452 | 0.00000 |
| 3 | 1003 | 5.67879E+03 | 2.67E-18 | 11.994 | 0.083378 | 0.00000 |
| 4 | 1004 | 1.15101E+04 | 1.14E-17 | 17.075 | 0.058565 | 0.00000 |
| 5 | 1005 | 1.36212E+04 | 4.63E-18 | 18.575 | 0.053836 | 0.00000 |
| 6 | 1006 | 1.43801E+04 | 4.26E-19 | 19.085 | 0.052396 | 0.00000 |
| 7 | 1007 | 1.44259E+04 | 1.84E-18 | 19.116 | 0.052313 | 0.00000 |
| 8 | 1008 | 1.46010E+04 | 5.43E-18 | 19.231 | 0.051998 | 0.00000 |
| 9 | 1009 | 1.47878E+04 | 9.46E-19 | 19.354 | 0.051669 | 0.00000 |
| 10 | 1010 | 1.50987E+04 | 1.60E-17 | 19.556 | 0.051134 | 0.00000 |
| 11 | 1011 | 1.57435E+04 | 1.06E-17 | 19.970 | 0.050076 | 0.00000 |
| 12 | 1012 | 1.64316E+04 | 1.51E-17 | 20.401 | 0.049016 | 0.00000 |
| 13 | 1013 | 1.69067E+04 | 1.27E-17 | 20.694 | 0.048323 | 0.00000 |
| 14 | 1014 | 1.77558E+04 | 3.30E-18 | 21.208 | 0.047153 | 0.00000 |
| 15 | 1015 | 1.83906E+04 | 9.65E-18 | 21.583 | 0.046332 | 0.00000 |
| 16 | 1016 | 2.02964E+04 | 3.31E-17 | 22.674 | 0.044103 | 0.00000 |
| 17 | 1017 | 2.08303E+04 | 1.97E-17 | 22.970 | 0.043534 | 0.00000 |
| 18 | 1018 | 2.17808E+04 | 2.51E-17 | 23.489 | 0.042574 | 0.00000 |
| 19 | 1019 | 2.25488E+04 | 2.29E-17 | 23.899 | 0.041843 | 0.00000 |
| 20 | 1020 | 2.39187E+04 | 4.89E-17 | 24.614 | 0.040627 | 0.00000 |
| 21 | 1021 | 2.51399E+04 | 1.54E-17 | 25.235 | 0.039628 | 0.00000 |
| 22 | 1022 | 2.67924E+04 | 1.31E-16 | 26.051 | 0.038386 | 0.00000 |
| 23 | 1023 | 2.70502E+04 | 7.50E-15 | 26.176 | 0.038203 | 0.00000 |
| 24 | 1024 | 2.74314E+04 | 9.79E-15 | 26.360 | 0.037936 | 0.00000 |
| 25 | 1025 | 2.79117E+04 | 7.81E-14 | 26.590 | 0.037609 | 0.00000 |
| 26 | 1026 | 2.86236E+04 | 3.37E-12 | 26.927 | 0.037138 | 0.00000 |
| 27 | 1027 | 2.91400E+04 | 1.37E-10 | 27.168 | 0.036807 | 0.00000 |
| 28 | 1028 | 2.96683E+04 | 1.80E-07 | 27.414 | 0.036478 | 0.00000 |
| 29 | 1029 | 3.00560E+04 | 2.52E-09 | 27.592 | 0.036242 | 0.00000 |
| 30 | 1030 | 3.05396E+04 | 1.38E-08 | 27.813 | 0.035954 | 0.00000 |
| 31 | 1031 | 3.12639E+04 | 5.70E-08 | 28.141 | 0.035535 | 0.00000 |
| 32 | 1032 | 3.18661E+04 | 6.47E-07 | 28.411 | 0.035198 | 0.00000 |
| 33 | 1033 | 3.34982E+04 | 2.53E-03 | 29.129 | 0.034330 | 0.00000 |
| 34 | 1034 | 3.36822E+04 | 1.80E-02 | 29.209 | 0.034236 | 0.00000 |
| 35 | 1035 | 3.38037E+04 | 1.75E-02 | 29.262 | 0.034174 | 0.00000 |
| 36 | 1036 | 3.43011E+04 | 4.02E-02 | 29.476 | 0.033925 | 0.00000 |
| 37 | 1037 | 3.43954E+04 | 1.85E-02 | 29.517 | 0.033879 | 0.00000 |
| 38 | 1038 | 3.49192E+04 | 2.59E-02 | 29.741 | 0.033624 | 0.00000 |
| 39 | 1039 | 3.55065E+04 | 1.88E-02 | 29.990 | 0.033345 | 0.00000 |
| 40 | 1040 | 3.63224E+04 | 4.69E-02 | 30.332 | 0.032968 | 0.00000 |
| 41 | 1041 | 3.68679E+04 | 4.40E-02 | 30.559 | 0.032723 | 0.00000 |
| 42 | 1042 | 3.72913E+04 | 4.70E-02 | 30.734 | 0.032537 | 0.00000 |
| 43 | 1043 | 3.76824E+04 | 2.91E-02 | 30.895 | 0.032368 | 0.00000 |
| 44 | 1044 | 3.91775E+04 | 3.47E-03 | 31.502 | 0.031744 | 0.00000 |
| 45 | 1045 | 4.05032E+04 | 1.35E-02 | 32.031 | 0.031220 | 0.00000 |
| 46 | 1046 | 4.12471E+04 | 1.94E-02 | 32.323 | 0.030937 | 0.00000 |
| 47 | 1047 | 4.25021E+04 | 3.84E-02 | 32.811 | 0.030477 | 0.00000 |
| 48 | 1048 | 4.32199E+04 | 4.05E-02 | 33.087 | 0.030223 | 0.00000 |
| 49 | 1049 | 4.45507E+04 | 4.22E-02 | 33.593 | 0.029768 | 0.00000 |
| 50 | 1050 | 4.53840E+04 | 3.90E-02 | 33.906 | 0.029494 | 0.00000 |

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| No. | LC | Eigenvalue [1/Sec2] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|---|---|---|---|---|---|---|
| 51 | | 4.68837E+04 | 3.68E-02 | 34.461 | 0.029018 | |
| 52 | | 4.81404E+04 | 2.79E-02 | 34.920 | 0.028637 | |
| 53 | | 4.95195E+04 | 5.60E-02 | 35.417 | 0.028235 | |
| 54 | | 5.12735E+04 | 3.04E-02 | 36.038 | 0.027748 | |
| 55 | | 5.35761E+04 | 7.59E-02 | 36.839 | 0.027145 | |
| 56 | | 5.44647E+04 | 7.00E-02 | 37.143 | 0.026923 | |
| 57 | | 5.68080E+04 | 3.41E-02 | 37.934 | 0.026362 | |
| 58 | | 5.90496E+04 | 7.88E-02 | 38.675 | 0.025857 | |
| 59 | | 6.16007E+04 | 3.03E-02 | 39.501 | 0.025316 | |
| 60 | | 6.56767E+04 | 1.04E-01 | 40.787 | 0.024517 | |
| 61 | | 6.75017E+04 | 1.10E-01 | 41.350 | 0.024184 | |
| 62 | | 7.09359E+04 | 5.98E-02 | 42.389 | 0.023591 | |
| 63 | | 7.44748E+04 | 1.06E-01 | 43.433 | 0.023024 | |
| 64 | | 7.69893E+04 | 8.62E-02 | 44.161 | 0.022645 | |
| 65 | | 8.05840E+04 | 1.08E-01 | 45.180 | 0.022134 | |
| 66 | | 8.50110E+04 | 8.46E-02 | 46.404 | 0.021550 | |
| 67 | | 9.05838E+04 | 7.25E-02 | 47.901 | 0.020876 | |
| 68 | | 9.60264E+04 | 1.11E-01 | 49.319 | 0.020276 | |
| 69 | | 1.01152E+05 | 1.18E-01 | 50.618 | 0.019756 | |
| 70 | | 1.06250E+05 | 8.30E-02 | 51.878 | 0.019276 | |
| 71 | | 1.12426E+05 | 1.06E-01 | 53.365 | 0.018739 | |
| 72 | | 1.22163E+05 | 1.10E-01 | 55.628 | 0.017977 | |
| 73 | | 1.30427E+05 | 9.78E-02 | 57.478 | 0.017398 | |
| 74 | | 1.40980E+05 | 1.28E-01 | 59.758 | 0.016734 | |
| 75 | | 1.46397E+05 | 1.66E-01 | 60.896 | 0.016422 | |
| 76 | | 1.63218E+05 | 1.62E-01 | 64.299 | 0.015552 | |
| 77 | | 1.77812E+05 | 1.92E-01 | 67.112 | 0.014900 | |
| 78 | | 1.92128E+05 | 1.26E-01 | 69.761 | 0.014335 | |
| 79 | | 2.08510E+05 | 1.77E-01 | 72.675 | 0.013760 | |
| 80 | | 2.28605E+05 | 1.66E-01 | 76.096 | 0.013141 | |
| 81 | | 2.53298E+05 | 1.79E-01 | 80.101 | 0.012484 | |
| 82 | | 2.78906E+05 | 2.18E-01 | 84.052 | 0.011897 | |
| 83 | | 3.10323E+05 | 2.09E-01 | 88.660 | 0.011279 | |
| 84 | | 3.47503E+05 | 2.63E-01 | 93.821 | 0.010659 | |
| 85 | | 3.97316E+05 | 2.12E-01 | 100.320 | 0.009968 | |
| 86 | | 4.59386E+05 | 2.28E-01 | 107.872 | 0.009270 | |
| 87 | | 5.30291E+05 | 2.94E-01 | 115.898 | 0.008628 | |
| 88 | | 6.22815E+05 | 3.23E-01 | 125.603 | 0.007962 | |
| 89 | | 7.43104E+05 | 2.95E-01 | 137.197 | 0.007289 | |
| 90 | | 8.73889E+05 | 3.95E-01 | 148.781 | 0.006721 | |
| 91 | | 1.05867E+06 | 4.13E-01 | 163.758 | 0.006107 | |
| 92 | | 1.33513E+06 | 5.29E-01 | 183.900 | 0.005438 | |
| 93 | | 1.74024E+06 | 6.29E-01 | 209.954 | 0.004763 | |
| 94 | | 2.33530E+06 | 6.18E-01 | 243.216 | 0.004112 | |
| 95 | | 3.26889E+06 | 7.48E-01 | 287.753 | 0.003475 | |
| 96 | | 4.93967E+06 | 8.87E-01 | 353.728 | 0.002827 | |
| 97 | | 8.41199E+06 | 1.21E+00 | 461.604 | 0.002166 | |
| 98 | | 1.64233E+07 | 1.59E+00 | 644.986 | 0.001550 | |
| 99 | | 3.91961E+07 | 2.32E+00 | 996.417 | 0.001004 | |
| 100 | | 1.33383E+08 | 3.81E+00 | 1838.102 | 0.000544 | |

**Modal masses - activated mass**

| No. | LC | frequency [Hertz] | effective modal Mass X[t] | Y[t] | Z[t] | factor X[%] | Y[%] | Z[%] | activated mass [%]* |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1001 | 7.766 | 1635 | 17 | 0 | 54.52 | 0.55 | 0.00 | 15.40141 |
| 2 | 1002 | 9.574 | 408 | 987 | 0 | 13.62 | 32.89 | 0.00 | 14.75083 |
| 3 | 1003 | 11.994 | 165 | 1370 | 0 | 5.50 | 45.64 | 0.00 | 17.47300 |
| 4 | 1004 | 17.075 | 0 | 0 | 0 | 0.01 | 0.01 | 0.00 | 0.78564 |

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**Modal masses - activated mass**

| No. | LC | frequency [Hertz] | effective modal Mass X[t] | Y[t] | Z[t] | factor X[%] | Y[%] | Z[%] | activated mass [%]* |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 1005 | 18.575 | 5 | 3 | 0 | 0.17 | 0.09 | 0.00 | 0.24808 |
| 6 | 1006 | 19.085 | 1 | 0 | 0 | 0.02 | 0.00 | 0.00 | 0.15267 |
| 7 | 1007 | 19.116 | 0 | 0 | 0 | 0.01 | 0.00 | 0.00 | 0.16350 |
| 8 | 1008 | 19.231 | 0 | 5 | 0 | 0.00 | 0.16 | 0.00 | 0.12795 |
| 9 | 1009 | 19.354 | 1 | 0 | 0 | 0.02 | 0.00 | 0.00 | 0.08070 |
| 10 | 1010 | 19.556 | 1 | 0 | 0 | 0.03 | 0.00 | 0.00 | 0.06403 |
| 11 | 1011 | 19.970 | 0 | 0 | 0 | 0.01 | 0.00 | 0.00 | 0.11377 |
| 12 | 1012 | 20.401 | 0 | 0 | 0 | 0.01 | 0.00 | 0.00 | 0.24114 |
| 13 | 1013 | 20.694 | 7 | 0 | 0 | 0.24 | 0.00 | 0.00 | 0.25781 |
| 14 | 1014 | 21.208 | 2 | 0 | 0 | 0.06 | 0.00 | 0.00 | 0.14738 |
| 15 | 1015 | 21.583 | 0 | 1 | 0 | 0.01 | 0.03 | 0.00 | 0.15137 |
| 16 | 1016 | 22.674 | 1 | 0 | 0 | 0.02 | 0.01 | 0.00 | 0.06840 |
| 17 | 1017 | 22.970 | 2 | 1 | 0 | 0.06 | 0.03 | 0.00 | 0.07363 |
| 18 | 1018 | 23.489 | 36 | 5 | 0 | 1.19 | 0.16 | 0.00 | 0.26201 |
| 19 | 1019 | 23.899 | 45 | 3 | 0 | 1.49 | 0.10 | 0.00 | 0.58087 |
| 20 | 1020 | 24.614 | 0 | 2 | 0 | 0.00 | 0.06 | 0.00 | 0.04782 |
| 21 | 1021 | 25.235 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.04564 |
| 22 | 1022 | 26.051 | 0 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.06038 |
| 23 | 1023 | 26.176 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.10227 |
| 24 | 1024 | 26.360 | 0 | 2 | 0 | 0.00 | 0.06 | 0.00 | 0.05362 |
| 25 | 1025 | 26.590 | 0 | 6 | 0 | 0.00 | 0.20 | 0.00 | 0.22457 |
| 26 | 1026 | 26.927 | 0 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.09211 |
| 27 | 1027 | 27.168 | 0 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.12326 |
| 28 | 1028 | 27.414 | 1 | 1 | 0 | 0.03 | 0.04 | 0.00 | 0.20286 |
| 29 | 1029 | 27.592 | 0 | 0 | 0 | 0.02 | 0.01 | 0.00 | 0.11428 |
| 30 | 1030 | 27.813 | 0 | 15 | 0 | 0.01 | 0.50 | 0.00 | 0.20570 |
| 31 | 1031 | 28.141 | 1 | 3 | 0 | 0.03 | 0.10 | 0.00 | 0.16202 |
| 32 | 1032 | 28.411 | 2 | 8 | 0 | 0.08 | 0.25 | 0.00 | 0.18812 |
| 33 | 1033 | 29.129 | 3 | 0 | 0 | 0.09 | 0.00 | 0.00 | 0.43562 |
| 34 | 1034 | 29.209 | 3 | 1 | 0 | 0.11 | 0.02 | 0.00 | 0.28326 |
| 35 | 1035 | 29.262 | 5 | 1 | 0 | 0.17 | 0.03 | 0.00 | 0.23688 |
| 36 | 1036 | 29.476 | 0 | 17 | 0 | 0.00 | 0.56 | 0.00 | 0.53351 |
| 37 | 1037 | 29.517 | 2 | 46 | 0 | 0.07 | 1.52 | 0.00 | 0.58140 |
| 38 | 1038 | 29.741 | 0 | 1 | 0 | 0.00 | 0.02 | 0.00 | 0.41005 |
| 39 | 1039 | 29.990 | 0 | 0 | 0 | 0.01 | 0.01 | 0.00 | 0.32907 |
| 40 | 1040 | 30.332 | 4 | 3 | 0 | 0.14 | 0.09 | 0.00 | 0.23712 |
| 41 | 1041 | 30.559 | 2 | 8 | 0 | 0.07 | 0.28 | 0.00 | 0.32296 |
| 42 | 1042 | 30.734 | 0 | 4 | 0 | 0.01 | 0.14 | 0.00 | 0.33047 |
| 43 | 1043 | 30.895 | 1 | 4 | 0 | 0.02 | 0.13 | 0.00 | 0.31924 |
| 44 | 1044 | 31.502 | 3 | 19 | 0 | 0.09 | 0.62 | 0.00 | 0.23804 |
| 45 | 1045 | 32.031 | 0 | 8 | 0 | 0.00 | 0.28 | 0.00 | 0.22632 |
| 46 | 1046 | 32.323 | 0 | 0 | 0 | 0.01 | 0.01 | 0.00 | 0.27738 |
| 47 | 1047 | 32.811 | 1 | 10 | 0 | 0.04 | 0.33 | 0.00 | 0.70501 |
| 48 | 1048 | 33.087 | 2 | 5 | 0 | 0.06 | 0.16 | 0.00 | 0.09103 |
| 49 | 1049 | 33.593 | 1 | 2 | 0 | 0.04 | 0.08 | 0.00 | 0.35604 |
| 50 | 1050 | 33.906 | 9 | 8 | 0 | 0.31 | 0.26 | 0.00 | 0.15767 |
| | | sum | 2352 | 2565 | 0 | 78.42 | 85.47 | 0.00 | |
| | | System activ | 2999 | 3001 | 0 | | | | |

The modal masses are evaluated for the global X, Y and Z direction,
the "activated mass" also includes torsional and opposite movements
without a global displacement (tuning fork):
 * activated mass in % = product u^2*M = displacement^2*mass, in relation to the
   sum of active mass, u scaled on a maximum displacement or rotation of 1.00.
(this activated mass is often also called generalized modal mass)

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Projektni spekter

**Load Case 601**

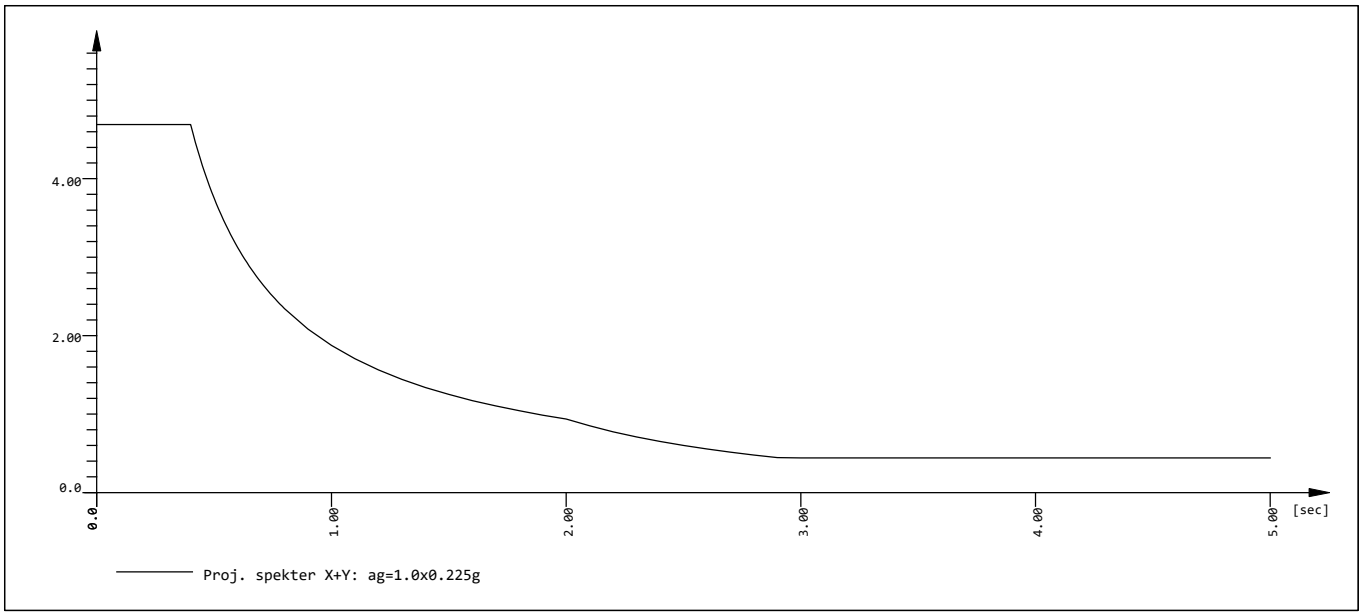
Factor forces and moments 1.000

**Response spectra Proj. spekter X+Y: ag=1.0x0.225g**

| D[-] | SA[-] | SB[-] | MIN[-] | TB[sec] | TC[sec] | TD[sec] | TE[sec] | K1[-] | K2[-] | A[m/sec2] |
|---|---|---|---|---|---|---|---|---|---|---|
| auto | Zone = | | | ah =* 1.000 | av =* 0.000 | | | | | 0.00 |

| Time [sec] | Factor [-] | Time [sec] | Factor [-] | Time [sec] | Factor [-] | Time [sec] | Factor [-] |
|---|---|---|---|---|---|---|---|
| 0.000 | 4.690 | 0.010 | 4.690 | 0.020 | 4.690 | 0.030 | 4.690 |
| 0.040 | 4.690 | 0.050 | 4.690 | 0.060 | 4.690 | 0.070 | 4.690 |
| 0.080 | 4.690 | 0.090 | 4.690 | 0.100 | 4.690 | 0.150 | 4.690 |
| 0.200 | 4.690 | 0.300 | 4.690 | 0.400 | 4.690 | 0.410 | 4.576 |
| 0.420 | 4.467 | 0.430 | 4.363 | 0.440 | 4.264 | 0.450 | 4.169 |
| 0.460 | 4.079 | 0.470 | 3.992 | 0.480 | 3.909 | 0.490 | 3.829 |
| 0.500 | 3.752 | 0.510 | 3.679 | 0.520 | 3.608 | 0.530 | 3.540 |
| 0.540 | 3.474 | 0.550 | 3.411 | 0.560 | 3.350 | 0.570 | 3.292 |
| 0.580 | 3.235 | 0.590 | 3.180 | 0.600 | 3.127 | 0.610 | 3.076 |
| 0.620 | 3.026 | 0.630 | 2.978 | 0.640 | 2.931 | 0.650 | 2.886 |
| 0.660 | 2.843 | 0.670 | 2.800 | 0.680 | 2.759 | 0.690 | 2.719 |
| 0.700 | 2.680 | 0.710 | 2.642 | 0.720 | 2.606 | 0.730 | 2.570 |
| 0.740 | 2.535 | 0.750 | 2.502 | 0.760 | 2.469 | 0.770 | 2.437 |
| 0.780 | 2.405 | 0.790 | 2.375 | 0.800 | 2.345 | 0.900 | 2.085 |
| 1.000 | 1.876 | 1.100 | 1.706 | 1.200 | 1.564 | 1.300 | 1.443 |
| 1.400 | 1.340 | 1.500 | 1.251 | 1.600 | 1.173 | 1.700 | 1.104 |
| 1.800 | 1.042 | 1.900 | 0.988 | 2.000 | 0.938 | 2.100 | 0.851 |
| 2.200 | 0.775 | 2.300 | 0.709 | 2.400 | 0.651 | 2.500 | 0.600 |
| 2.600 | 0.555 | 2.700 | 0.515 | 2.800 | 0.479 | 2.900 | 0.446 |
| 3.000 | 0.442 | 3.100 | 0.442 | 3.200 | 0.442 | 3.300 | 0.442 |
| 3.400 | 0.442 | 3.500 | 0.442 | 3.600 | 0.442 | 3.700 | 0.442 |
| 3.800 | 0.442 | 3.900 | 0.442 | 4.000 | 0.442 | 4.100 | 0.442 |
| 4.200 | 0.442 | 4.300 | 0.442 | 4.400 | 0.442 | 4.500 | 0.442 |
| 4.600 | 0.442 | 4.700 | 0.442 | 4.800 | 0.442 | 4.900 | 0.442 |
| 5.000 | 0.442 | | | | | | |

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**Loads acting on Nodes**

| Node | A-X [m/sec2] | A-Y [m/sec2] | A-Z [m/sec2] | A-XX [1/sec2] | A-YY [1/sec2] | A-ZZ [1/sec2] | ref-X [m] | ref-Y [m] | ref-Z [m] |
|---|---|---|---|---|---|---|---|---|---|
| Center | 1.00 | | | | | | 0.000 | 0.000 | 0.000 |

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Elasticni spekter

**Load Case 701**

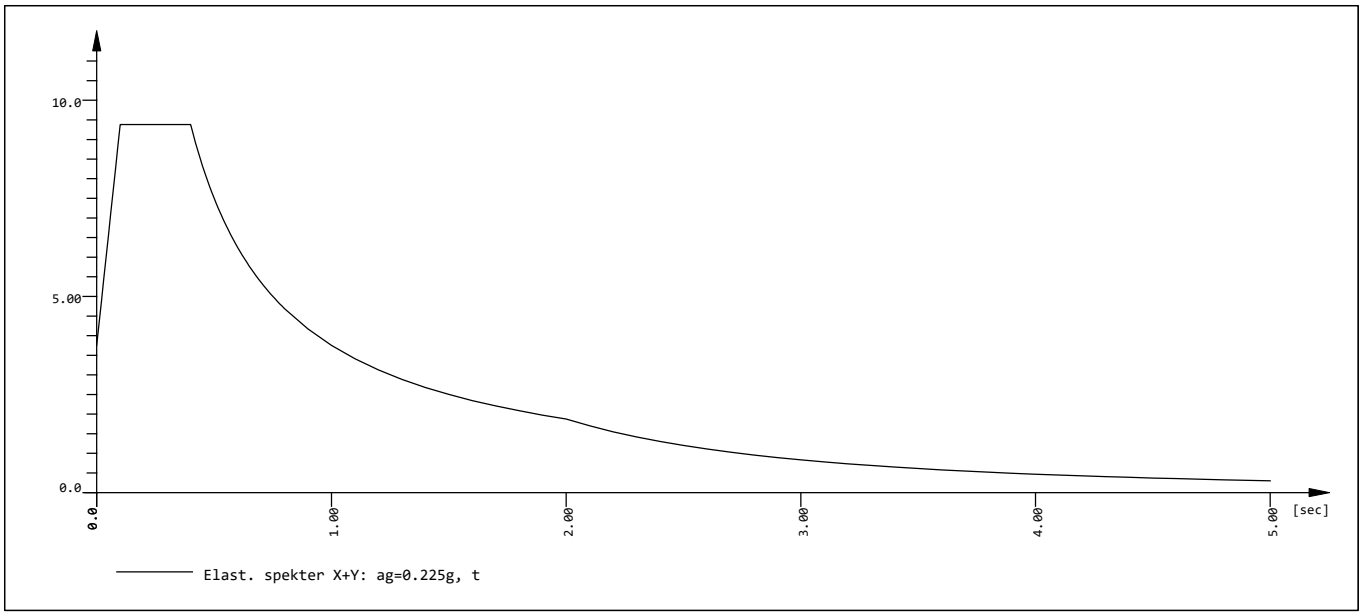
Factor forces and moments 1.000

**Response spectra Elast. spekter X+Y: ag=0.225g, t**

| D[-] | SA[-] | SB[-] | MIN[-] | TB[sec] | TC[sec] | TD[sec] | TE[sec] | K1[-] | K2[-] | A[m/sec2] |
|---|---|---|---|---|---|---|---|---|---|---|
| auto | Zone = | | | ah =* 1.000 | | av =* 0.000 | | | | 0.00 |

| Time [sec] | Factor [-] | Time [sec] | Factor [-] | Time [sec] | Factor [-] | Time [sec] | Factor [-] |
|---|---|---|---|---|---|---|---|
| 0.000 | 3.752 | 0.010 | 4.315 | 0.020 | 4.878 | 0.030 | 5.441 |
| 0.040 | 6.004 | 0.050 | 6.567 | 0.060 | 7.129 | 0.070 | 7.692 |
| 0.080 | 8.255 | 0.090 | 8.818 | 0.100 | 9.381 | 0.150 | 9.381 |
| 0.200 | 9.381 | 0.300 | 9.381 | 0.400 | 9.381 | 0.410 | 9.152 |
| 0.420 | 8.934 | 0.430 | 8.726 | 0.440 | 8.528 | 0.450 | 8.339 |
| 0.460 | 8.157 | 0.470 | 7.984 | 0.480 | 7.817 | 0.490 | 7.658 |
| 0.500 | 7.505 | 0.510 | 7.358 | 0.520 | 7.216 | 0.530 | 7.080 |
| 0.540 | 6.949 | 0.550 | 6.822 | 0.560 | 6.701 | 0.570 | 6.583 |
| 0.580 | 6.470 | 0.590 | 6.360 | 0.600 | 6.254 | 0.610 | 6.151 |
| 0.620 | 6.052 | 0.630 | 5.956 | 0.640 | 5.863 | 0.650 | 5.773 |
| 0.660 | 5.685 | 0.670 | 5.601 | 0.680 | 5.518 | 0.690 | 5.438 |
| 0.700 | 5.360 | 0.710 | 5.285 | 0.720 | 5.212 | 0.730 | 5.140 |
| 0.740 | 5.071 | 0.750 | 5.003 | 0.760 | 4.937 | 0.770 | 4.873 |
| 0.780 | 4.811 | 0.790 | 4.750 | 0.800 | 4.690 | 0.900 | 4.169 |
| 1.000 | 3.752 | 1.100 | 3.411 | 1.200 | 3.127 | 1.300 | 2.886 |
| 1.400 | 2.680 | 1.500 | 2.502 | 1.600 | 2.345 | 1.700 | 2.207 |
| 1.800 | 2.085 | 1.900 | 1.975 | 2.000 | 1.876 | 2.100 | 1.702 |
| 2.200 | 1.551 | 2.300 | 1.419 | 2.400 | 1.303 | 2.500 | 1.201 |
| 2.600 | 1.110 | 2.700 | 1.029 | 2.800 | 0.957 | 2.900 | 0.892 |
| 3.000 | 0.834 | 3.100 | 0.781 | 3.200 | 0.733 | 3.300 | 0.689 |
| 3.400 | 0.649 | 3.500 | 0.613 | 3.600 | 0.579 | 3.700 | 0.548 |
| 3.800 | 0.520 | 3.900 | 0.493 | 4.000 | 0.469 | 4.100 | 0.446 |
| 4.200 | 0.425 | 4.300 | 0.406 | 4.400 | 0.388 | 4.500 | 0.371 |
| 4.600 | 0.355 | 4.700 | 0.340 | 4.800 | 0.326 | 4.900 | 0.313 |
| 5.000 | 0.300 | | | | | | |

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**Loads acting on Nodes**

| Node | A-X [m/sec2] | A-Y [m/sec2] | A-Z [m/sec2] | A-XX [1/sec2] | A-YY [1/sec2] | A-ZZ [1/sec2] | ref-X [m] | ref-Y [m] | ref-Z [m] |
|---|---|---|---|---|---|---|---|---|---|
| Center | 1.00 | | | | | | 0.000 | 0.000 | 0.000 |

11826 DSO Bovec - zahodna dilat. enota stavbe
Earq: Analiza s spektri odziva X+ (pomiki)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 263141 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 3002.287 | 3002.287 | 1869.104 | 3.213E-04 | 3.213E-04 | 0.000E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.939 | 22.982 | 5.093 | 3.933E+05 | -8.69E+03 | -1.05E+04 | |
| | | | | -8.69E+03 | 5.463E+04 | -3.88E+04 | |
| | | | | -1.05E+04 | -3.88E+04 | 6.055E+05 | |
| active[1] | 2999.405 | 3001.413 | 1869.104 | 3.213E-04 | 3.213E-04 | 0.000E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.939 | 22.982 | 5.093 | 3.933E+05 | -8.70E+03 | -1.04E+04 | |
| | | | | -8.70E+03 | 5.470E+04 | -3.85E+04 | |
| | | | | -1.04E+04 | -3.85E+04 | 6.044E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Nodal Displacements, method CQC**

| Node | u-X [mm] | u-Y [mm] | u-Z [mm] |
|---|---|---|---|
| MAX | 7.416 | 2.323 | 2.443 |

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11826 DSO Bovec - zahodna dilat. enota stavbe
Earq: Analiza s spektri odziva Y+ (pomiki)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 263141 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 3002.287 | 3002.287 | 1869.104 | 3.213E-04 | 3.213E-04 | 0.000E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.939 | 22.982 | 5.093 | 3.933E+05 | -8.69E+03 | -1.05E+04 | |
| | | | | -8.69E+03 | 5.463E+04 | -3.88E+04 | |
| | | | | -1.05E+04 | -3.88E+04 | 6.055E+05 | |
| active[1] | 2999.405 | 3001.413 | 1869.104 | 3.213E-04 | 3.213E-04 | 0.000E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.939 | 22.982 | 5.093 | 3.933E+05 | -8.70E+03 | -1.04E+04 | |
| | | | | -8.70E+03 | 5.470E+04 | -3.85E+04 | |
| | | | | -1.04E+04 | -3.85E+04 | 6.044E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Nodal Displacements, method CQC**

| Node | u-X [mm] | u-Y [mm] | u-Z [mm] |
|---|---|---|---|
| MAX | 3.570 | 2.788 | 2.092 |

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11826 DSO Bovec - zahodna dilat. enota stavbe
Earq: Analiza s spektri odziva X+ (sile)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 263141 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 3002.287 | 3002.287 | 1869.104 | 3.213E-04 | 3.213E-04 | 0.000E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.939 | 22.982 | 5.093 | 3.933E+05 | -8.69E+03 | -1.05E+04 | |
| | | | | -8.69E+03 | 5.463E+04 | -3.88E+04 | |
| | | | | -1.05E+04 | -3.88E+04 | 6.055E+05 | |
| active[1] | 2999.405 | 3001.413 | 1869.104 | 3.213E-04 | 3.213E-04 | 0.000E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.939 | 22.982 | 5.093 | 3.933E+05 | -8.70E+03 | -1.04E+04 | |
| | | | | -8.70E+03 | 5.470E+04 | -3.85E+04 | |
| | | | | -1.04E+04 | -3.85E+04 | 6.044E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Maximum Forces and Moments**

| Type | LC-MAX | LC-MIN | STYP |
|---|---|---|---|
| Beam Elements | | | |
| N | 1211 | - | CQC |
| Vy | 1212 | - | CQC |
| Vz | 1213 | - | CQC |
| Mt | 1214 | - | CQC |
| My | 1215 | - | CQC |
| Mz | 1216 | - | CQC |
| Quadrilateral Elements | | | |
| m-xx | 1221 | - | CQC |
| m-yy | 1222 | - | CQC |
| m-xy | 1223 | - | CQC |
| v-x | 1224 | - | CQC |
| v-y | 1225 | - | CQC |
| n-xx | 1226 | - | CQC |
| n-yy | 1227 | - | CQC |
| n-xy | 1228 | - | CQC |

Type result type
LC-MAX,LC-MIN load case
STYP modal superposition type

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11826 DSO Bovec - zahodna dilat. enota stavbe
Earq: Analiza s spektri odziva Y+ (sile)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 263141 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 3002.287 | 3002.287 | 1869.104 | 3.213E-04 | 3.213E-04 | 0.000E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.939 | 22.982 | 5.093 | 3.933E+05 | -8.69E+03 | -1.05E+04 | |
| | | | | -8.69E+03 | 5.463E+04 | -3.88E+04 | |
| | | | | -1.05E+04 | -3.88E+04 | 6.055E+05 | |
| active[1] | 2999.405 | 3001.413 | 1869.104 | 3.213E-04 | 3.213E-04 | 0.000E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.939 | 22.982 | 5.093 | 3.933E+05 | -8.70E+03 | -1.04E+04 | |
| | | | | -8.70E+03 | 5.470E+04 | -3.85E+04 | |
| | | | | -1.04E+04 | -3.85E+04 | 6.044E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Maximum Forces and Moments**

| Type | LC-MAX | LC-MIN | STYP |
|---|---|---|---|
| Beam Elements | | | |
| N | 1411 | - | CQC |
| Vy | 1412 | - | CQC |
| Vz | 1413 | - | CQC |
| Mt | 1414 | - | CQC |
| My | 1415 | - | CQC |
| Mz | 1416 | - | CQC |
| Quadrilateral Elements | | | |
| m-xx | 1421 | - | CQC |
| m-yy | 1422 | - | CQC |
| m-xy | 1423 | - | CQC |
| v-x | 1424 | - | CQC |
| v-y | 1425 | - | CQC |
| n-xx | 1426 | - | CQC |
| n-yy | 1427 | - | CQC |
| n-xy | 1428 | - | CQC |

Type result type
LC-MAX,LC-MIN load case
STYP modal superposition type

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11826 DSO Bovec - zahodna dilat. enota stavbe
design parameter list

**Reinforcementparameter two layer reinforcement**

| Selection Grp elem no. no. | distance d1-u d1-l [mm] | 2.lay 2.lay [mm] | bar-diameter ds-u ds-l [mm] | 2.lay 2.lay [mm] | crackwidth wk-u wk-l [mm] | 2.lay 2.lay [mm] | steelstress sigsu sigsl [MPa] | 2.lay 2.lay [MPa] | min.reinf. asu asl [cm2/m] | 2.lay 2.lay [cm2/m] |
|---|---|---|---|---|---|---|---|---|---|---|
| default | - | - | - | - | - | - | - | - | - | - |
| 100 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 105 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 110 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 115 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 120 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 201 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 202 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 203 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 204 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 205 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 206 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 207 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 208 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 209 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 210 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 211 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 212 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 213 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 251 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 252 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 253 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 254 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 255 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 256 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 257 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 301 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 302 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |

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11826 DSO Bovec - zahodna dilat. enota stavbe
design parameter list

**Reinforcementparameter two layer reinforcement**

| Selection Grp elem no. no. | distance d1-u d1-l [mm] | 2.lay 2.lay [mm] | bar-diameter ds-u ds-l [mm] | 2.lay 2.lay [mm] | crackwidth wk-u wk-l [mm] | 2.lay 2.lay [mm] | steelstress sigsu sigsl [MPa] | 2.lay 2.lay [MPa] | min.reinf. asu asl [cm2/m] | 2.lay 2.lay [cm2/m] |
|---|---|---|---|---|---|---|---|---|---|---|
| 303 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 304 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 305 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 351 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 352 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 353 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |

| | |
|---|---|
| distance | upper / lower distance center of bar to surface |
| bar-diameter | upper / lower bar diameter |
| crackwidth | upper / lower required crack width |
| steelstress | upper / lower maximum steel stress in SLS check |
| min.reinf. | upper / lower minimum reinforcement |

The reinforcement directions relate to the local coordinate system of
the elements and have to be plotted graphically.
With the input of a steel stress sigsu... the 'crack design according tables'
uses this given stress sigsu for the corresponding layer. With this input, the check can
be done for bar distances instead of bar diameters, see legend SLS control parameters.

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ULS design

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Loadcases have been calculated in the Ultimate Limit State
In BEMESS no additional load safety factor is applied.
The design uses the Baumann method.

**Load Cases for the Design**

| Loadcase | factor | Designation | |
|---|---|---|---|
| 8001 | 1.000 | MAX-MXX QUAD | |
| 8002 | 1.000 | MIN-MXX QUAD | |
| 8003 | 1.000 | MAX-MYY QUAD | |
| 8004 | 1.000 | MIN-MYY QUAD | |
| 8005 | 1.000 | MAX-MXY QUAD | |
| 8006 | 1.000 | MIN-MXY QUAD | |
| 8007 | 1.000 | MAX-VX QUAD | |
| 8008 | 1.000 | MIN-VX QUAD | |
| 8009 | 1.000 | MAX-VY QUAD | |
| 8010 | 1.000 | MIN-VY QUAD | |
| 8011 | 1.000 | MAX-NXX QUAD | |
| 8012 | 1.000 | MIN-NXX QUAD | |
| 8013 | 1.000 | MAX-NYY QUAD | |
| 8014 | 1.000 | MIN-NYY QUAD | |
| 8015 | 1.000 | MAX-NXY QUAD | |
| 8016 | 1.000 | MIN-NXY QUAD | |
| 8017 | 1.000 | MAX-P QUAD | Bedding stresses for punching design |
| 8018 | 1.000 | MIN-P QUAD | Bedding stresses for punching design |
| 8051 | 1.000 | MAX-PX NODE | Nodal reaction punching design |
| 8052 | 1.000 | MIN-PX NODE | Nodal reaction punching design |
| 8053 | 1.000 | MAX-PY NODE | Nodal reaction punching design |
| 8054 | 1.000 | MIN-PY NODE | Nodal reaction punching design |
| 8055 | 1.000 | MAX-PZ NODE | Nodal reaction punching design |
| 8056 | 1.000 | MIN-PZ NODE | Nodal reaction punching design |
| 8057 | 1.000 | MAX-MX NODE | Nodal reaction punching design |
| 8058 | 1.000 | MIN-MX NODE | Nodal reaction punching design |
| 8059 | 1.000 | MAX-MY NODE | Nodal reaction punching design |
| 8060 | 1.000 | MIN-MY NODE | Nodal reaction punching design |
| 8061 | 1.000 | MAX-MZ NODE | Nodal reaction punching design |
| 8062 | 1.000 | MIN-MZ NODE | Nodal reaction punching design |

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**Material-safety-factors:**

| MAT | concr SC1 | SC2 | steel SS1 | SS2 |
|---|---|---|---|---|
| 1 | 1.50 | 1.50 | | |
| 2 | | | 1.15 | 1.15 |
| 99 | 1.50 | 1.50 | | |

MAT material number
concr material safety SC1/SC2 = bending/compression
steel material safety steel bending/compression

At direct supports the shear force is linear reduced from 1.0*d up to the face of the support to 70%.
The maximum shear capacity is checked at the face of the support without reduction.
Punching is checked only and must be designed separately.
For punching no reinforcement is increased. Only the mimimum bending moments over
columns are applied and may increase the longitudinal reinforcement [PUNC...MMOM].
Outside the punching area, the normal slab shear design may increase the
longitudinal reinforcement up to 0.20% [input CTRL...RO_V].

**Required Reinforcements acc. to EN 1992-1-1:2004**

| Grp | Element | t [m] | asu [cm2/m] | asu2 [cm2/m] | asu3 [cm2/m] | asl [cm2/m] | asl2 [cm2/m] | asl3 [cm2/m] | supp [-] | shear [-] | ass [cm2/m2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 1002200 | 0.800 | 0.04 | 0.01 | | 1.39 | 6.95 | | punc | punc | |
| 110 | 1101661 | 0.250 | 3.21 | 16.06 | | | | | 0.71 | 1 | |
| | 1101663 | 0.250 | 1.62 | 8.11 | | | | | | 2 | 10.32 |

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ULS design

**Required Reinforcements acc. to EN 1992-1-1:2004**

| Grp | Element | t [m] | asu [cm2/m] | asu2 [cm2/m] | asu3 [cm2/m] | asl [cm2/m] | asl2 [cm2/m] | asl3 [cm2/m] | supp [-] | shear [-] | ass [cm2/m2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 110 | 1103494 | 0.250 | 10.41 | 2.12 | | | | | 0.71 | 1 | |
| 253 | 2530531 | 0.200 | 5.28 | 1.06 | | 5.76 | 1.15 | | | 1 | |

Grp primary group number
Element element number
t plate thickness
asu Principal reinforcements (1st layer) Top
asu2 Cross reinforcements (2nd layer) Top
asu3 Third reinforcements Top
asl Principal reinforcements (1st layer) Bottom
asl2 Cross reinforcements (2nd layer) Bottom
asl3 Third reinforcements Bottom
supp reduction factor for the shear force near supports, punc=point in punching zone -> punching shear design
shear shear zone: 1=Ok, 1s=asu/l increased for shear, 1d=for punching, 2=required ass, 2m=minimum shear reinforcement
ass Shear reinforcement
Elements with maximum values are printed

**Required Reinforcements acc. to EN 1992-1-1:2004 at nodes**

| Grp | Node | t [m] | asu [cm2/m] | asu2 [cm2/m] | asu3 [cm2/m] | asl [cm2/m] | asl2 [cm2/m] | asl3 [cm2/m] | supp [-] | shear [-] | ass [cm2/m2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 2007 | 0.800 | | | | 1.55 | 7.75 | | punc | punc | |
| 110 | 1547 | 0.250 | 5.72 | 22.45 | | | | | 0.00 | 1 | |
| | 1585 | 0.250 | 14.29 | 3.97 | | | | | 0.00 | 1 | |
| | 2788 | 0.250 | 2.21 | 11.05 | | 0.32 | 0.06 | | 0.96 | 2 | 10.47 |
| 253 | 8277 | 0.200 | 7.48 | 1.50 | | 8.11 | 1.62 | | | 1 | |

Grp primary group number
Node Number
t plate thickness
asu Principal reinforcements (1st layer) Top
asu2 Cross reinforcements (2nd layer) Top
asu3 Third reinforcements Top
asl Principal reinforcements (1st layer) Bottom
asl2 Cross reinforcements (2nd layer) Bottom
asl3 Third reinforcements Bottom
supp reduction factor for the shear force near supports, punc=point in punching zone -> punching shear design
shear shear zone: 1=Ok, 1s=asu/l increased for shear, 1d=for punching, 2=required ass, 2m=minimum shear reinforcement
ass Shear reinforcement
Elements with maximum values are printed

At 498 punching-nodes the bending moments have been reduced (rounded)
At 18 column-nodes the slab-thickness for bending-design has been increased
with 1:3 starting at the column-edge (not at wall punching nodes)

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11826 DSO Bovec - zahodna dilat. enota stavbe
ACCI design

**Load Cases for the Design**

| Loadcase | factor | Designation |
|---|---|---|
| 8101 | 1.000 | MAXE-MXX QUAD |
| 8102 | 1.000 | MINE-MXX QUAD |
| 8103 | 1.000 | MAXE-MYY QUAD |
| 8104 | 1.000 | MINE-MYY QUAD |
| 8105 | 1.000 | MAXE-MXY QUAD |
| 8106 | 1.000 | MINE-MXY QUAD |
| 8107 | 1.000 | MAXE-VX QUAD |
| 8108 | 1.000 | MINE-VX QUAD |
| 8109 | 1.000 | MAXE-VY QUAD |
| 8110 | 1.000 | MINE-VY QUAD |
| 8111 | 1.000 | MAXE-NXX QUAD |
| 8112 | 1.000 | MINE-NXX QUAD |
| 8113 | 1.000 | MAXE-NYY QUAD |
| 8114 | 1.000 | MINE-NYY QUAD |
| 8115 | 1.000 | MAXE-NXY QUAD |
| 8116 | 1.000 | MINE-NXY QUAD |
| 8201 | 1.000 | MAXE-MXX QUAD |
| 8202 | 1.000 | MINE-MXX QUAD |
| 8203 | 1.000 | MAXE-MYY QUAD |
| 8204 | 1.000 | MINE-MYY QUAD |
| 8205 | 1.000 | MAXE-MXY QUAD |
| 8206 | 1.000 | MINE-MXY QUAD |
| 8207 | 1.000 | MAXE-VX QUAD |
| 8208 | 1.000 | MINE-VX QUAD |
| 8209 | 1.000 | MAXE-VY QUAD |
| 8210 | 1.000 | MINE-VY QUAD |
| 8211 | 1.000 | MAXE-NXX QUAD |
| 8212 | 1.000 | MINE-NXX QUAD |
| 8213 | 1.000 | MAXE-NYY QUAD |
| 8214 | 1.000 | MINE-NYY QUAD |
| 8215 | 1.000 | MAXE-NXY QUAD |
| 8216 | 1.000 | MINE-NXY QUAD |

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**Material-safety-factors: Accidential design combination**

| MAT | concr SC1 | SC2 | steel SS1 | SS2 |
|---|---|---|---|---|
| 1 | 1.20 | 1.20 | | |
| 2 | | | 1.00 | 1.00 |
| 99 | 1.20 | 1.20 | | |

MAT material number
concr material safety SC1/SC2 = bending/compression
steel material safety steel bending/compression

At direct supports the shear force is linear reduced from 1.0*d up to the face of the support to 70%.
The maximum shear capacity is checked at the face of the support without reduction.
For punching design, the longitudinal reinforcement will be increased up to 1.50%
to avoid shear reinforcement [input PUNC...RO_V].
Outside the punching area, the normal slab shear design may increase the
longitudinal reinforcement up to 0.20% [input CTRL...RO_V].

**Required Reinforcements acc. to EN 1992-1-1:2004**

| Grp | Element | t [m] | asu [cm2/m] | asu2 [cm2/m] | asu3 [cm2/m] | asl [cm2/m] | asl2 [cm2/m] | asl3 [cm2/m] | supp [-] | shear [-] | ass [cm2/m2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1000707 | 0.800 | 19.12 | 16.15 | | 3.06 | 3.03 | | 0.73 | 2 | 5.09 |
| | 1004192 | 0.800 | 0.02 | | | 18.54 | 7.45 | | 0.73 | 2m | 4.64 |
| | 1004320 | 0.800 | 6.47 | 2.24 | | 8.46 | 17.90 | | 0.70 | 2m | 4.64 |
| | 1006765 | 0.500 | 0.01 | 0.07 | | 5.27 | 2.64 | | 0.75 | 2 | 5.97 |

Grp primary group number
Element element number
t plate thickness
asu Principal reinforcements (1st layer) Top
asu3 Third reinforcements Top
asl Principal reinforcements (1st layer) Bottom
asl2 Cross reinforcements (2nd layer) Bottom
asl3 Third reinforcements Bottom

11826 DSO Bovec - zahodna dilat. enota stavbe
ACCI design

asu2 Cross reinforcements (2nd layer) Top
supp reduction factor for the shear force near supports, punc=point in punching zone -> punching shear design
shear shear zone: 1=Ok, 1s=asu/l increased for shear, 1d=for punching, 2=required ass, 2m=minimum shear reinforcement
ass Shear reinforcement
Elements with maximum values are printed

**Required Reinforcements acc. to EN 1992-1-1:2004 at nodes**

| Grp | Node | t [m] | asu [cm2/m] | asu2 [cm2/m] | asu3 [cm2/m] | asl [cm2/m] | asl2 [cm2/m] | asl3 [cm2/m] | supp [-] | shear [-] | ass [cm2/m2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 2303 | 0.800 | 3.12 | 8.27 | | 3.34 | 0.67 | | 0.74 | 2 | 4.93 |
| | 2371 | 0.800 | 15.80 | 9.36 | | 3.17 | 2.21 | | 0.75 | 2m | 4.64 |
| | 42336 | 0.800 | 2.46 | 0.49 | | 17.09 | 8.29 | | 0.74 | 2m | 4.64 |
| 201 | 1916 | 0.200 | 5.08 | 18.32 | | 5.04 | 17.97 | | 0.00 | 1s | |

Grp primary group number
Node Number
t plate thickness
asu Principal reinforcements (1st layer) Top
asu2 Cross reinforcements (2nd layer) Top
asu3 Third reinforcements Top
asl Principal reinforcements (1st layer) Bottom
asl2 Cross reinforcements (2nd layer) Bottom
asl3 Third reinforcements Bottom
supp reduction factor for the shear force near supports, punc=point in punching zone -> punching shear design
shear shear zone: 1=Ok, 1s=asu/l increased for shear, 1d=for punching, 2=required ass, 2m=minimum shear reinforcement
ass Shear reinforcement
Elements with maximum values are printed

At 415 punching-nodes the bending moments have been reduced (rounded)
At 13 column-nodes the slab-thickness for bending-design has been increased
with 1:3 starting at the column-edge (not at wall punching nodes)

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11826 DSO Bovec - zahodna dilat. enota stavbe
DIM-MSN-Potres-beams

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Structure and Tab.7.1N: AN (Buildings)

**Selected Beam Elements**

| Selection | NoA | NoE | x[m] | Type |
|---|---|---|---|---|
| Grp 101 | 1010001 | | | |

NoA,NoE range of element numbers
x[m] x-ordinate of beam section or station on axis
Type element type

Reinforcement will be accounted for sectional values as defined in AQUA
Reinforcements saved as Design case No. 1
Reinforcements are superposed with existing minimum reinforcements

**Considered Load Cases**

| LC | ACT | REF | CS | Designation |
|---|---|---|---|---|
| 8121 | (E) | | | MAXE-N BEAM |
| 8122 | (E) | | | MINE-N BEAM |
| 8123 | (E) | | | MAXE-VY BEAM |
| 8124 | (E) | | | MINE-VY BEAM |
| 8125 | (E) | | | MAXE-VZ BEAM |
| 8126 | (E) | | | MINE-VZ BEAM |
| 8127 | (E) | | | MAXE-MT BEAM |
| 8128 | (E) | | | MINE-MT BEAM |
| 8129 | (E) | | | MAXE-MY BEAM |
| 8130 | (E) | | | MINE-MY BEAM |
| 8131 | (E) | | | MAXE-MZ BEAM |
| 8132 | (E) | | | MINE-MZ BEAM |
| 8221 | (E) | | | MAXE-N BEAM |
| 8222 | (E) | | | MINE-N BEAM |
| 8223 | (E) | | | MAXE-VY BEAM |
| 8224 | (E) | | | MINE-VY BEAM |
| 8225 | (E) | | | MAXE-VZ BEAM |
| 8226 | (E) | | | MINE-VZ BEAM |
| 8227 | (E) | | | MAXE-MT BEAM |
| 8228 | (E) | | | MINE-MT BEAM |
| 8229 | (E) | | | MAXE-MY BEAM |
| 8230 | (E) | | | MINE-MY BEAM |
| 8231 | (E) | | | MAXE-MZ BEAM |
| 8232 | (E) | | | MINE-MZ BEAM |

LC load case REF reference point for forces and moments
ACT action CS section the load case is acting on

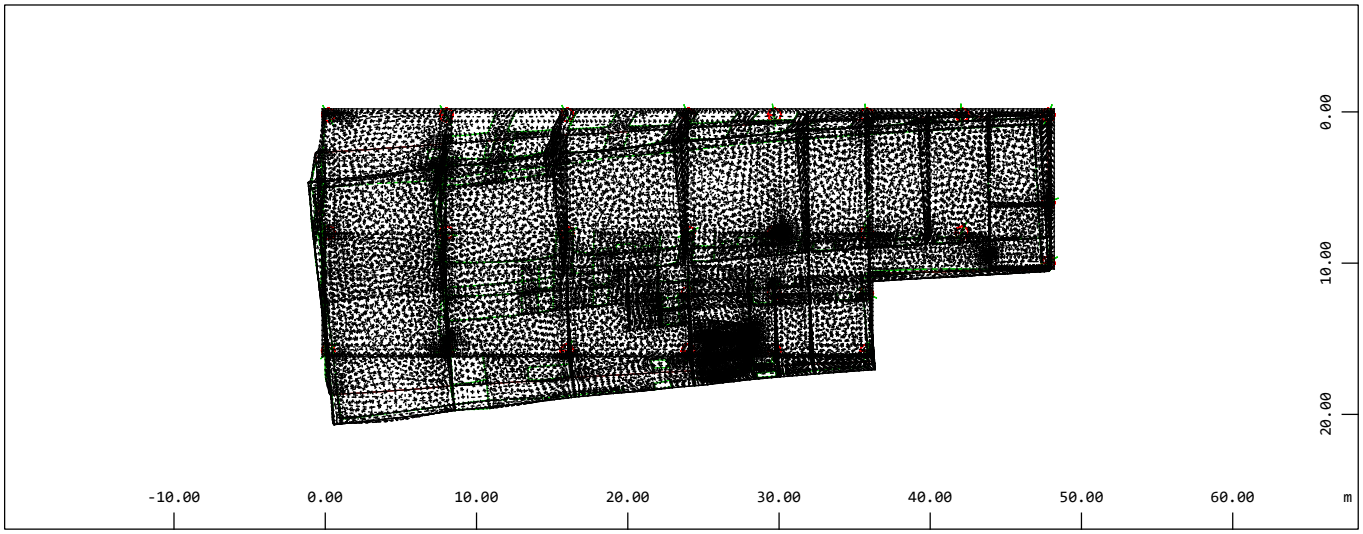
**Maximum Utilisation Level**

| | N | Vy | Vz | My | Mz | Mtp | Mts | Mb | Ncr | SCL | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | σ-x | σ+x | τ | σ-v | σ-s | σ-dyn | As-l | As-v | crack | c/t | |
| Section 11 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.019 |
| VODNJAK DN80 cm | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.019 | - | - | - | |

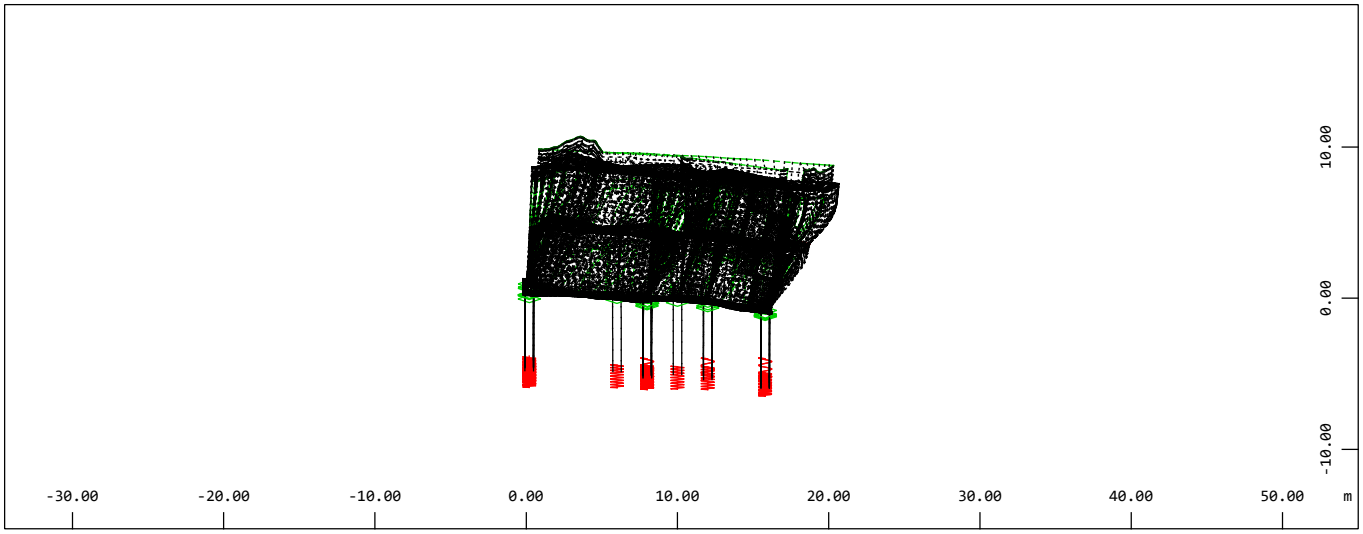
N normal force
Vy,Vz shear force
My,Mz bending
Mtp,Mts torsion (p)rimary and (s)econdary
Mb warping moment
Ncr flexural buckling
SCL cross-section class
σ-x longitud. compressive stress
σ+x longitud. tensile stress
τ shear stress
σ-v von Mises stress
σ-s stress in reinforcements
σ-dyn stress range
As-l longitudinal reinforcements
As-v transverse reinforcements
crack crack width
c/t stress dependant utilisation level (see AQB Manual 2.3.2)
Total most unfavorable utilisation for all checks

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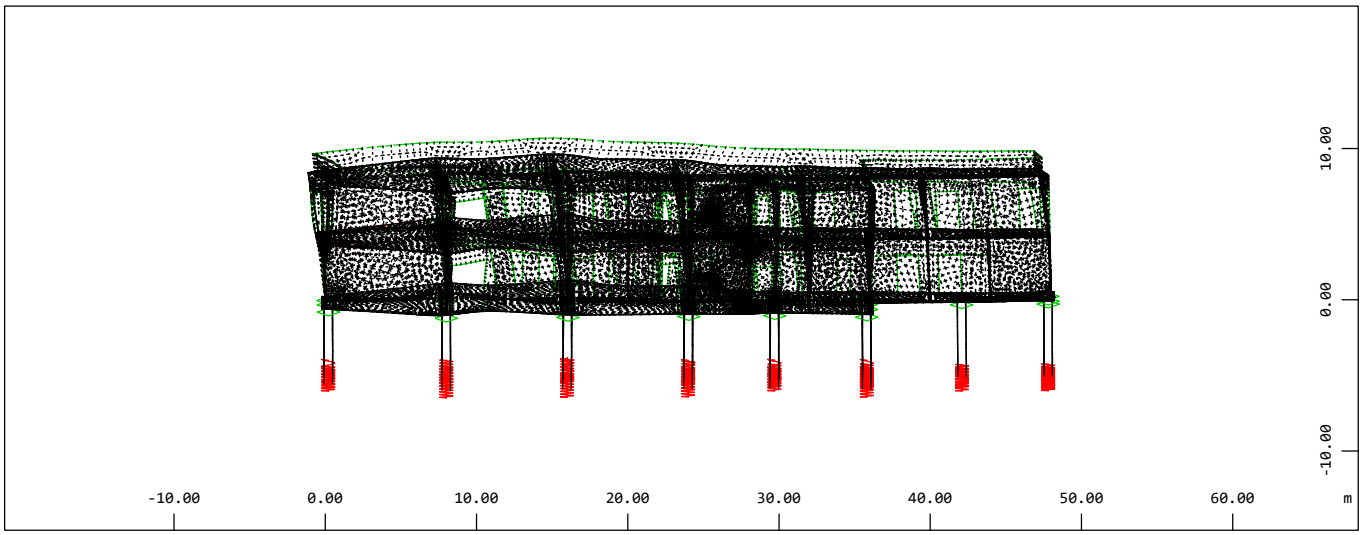
11826 DSO Bovec - zahodna dilat. enota stavbe
1. nihajna oblika




Sector of system Beam Elements,Spring Elements,Quadrilateral Elements M 1 : 500
Deformed Structure from LC 1001 Eigenform 1 7.77 Hz Enlarged by 100.0



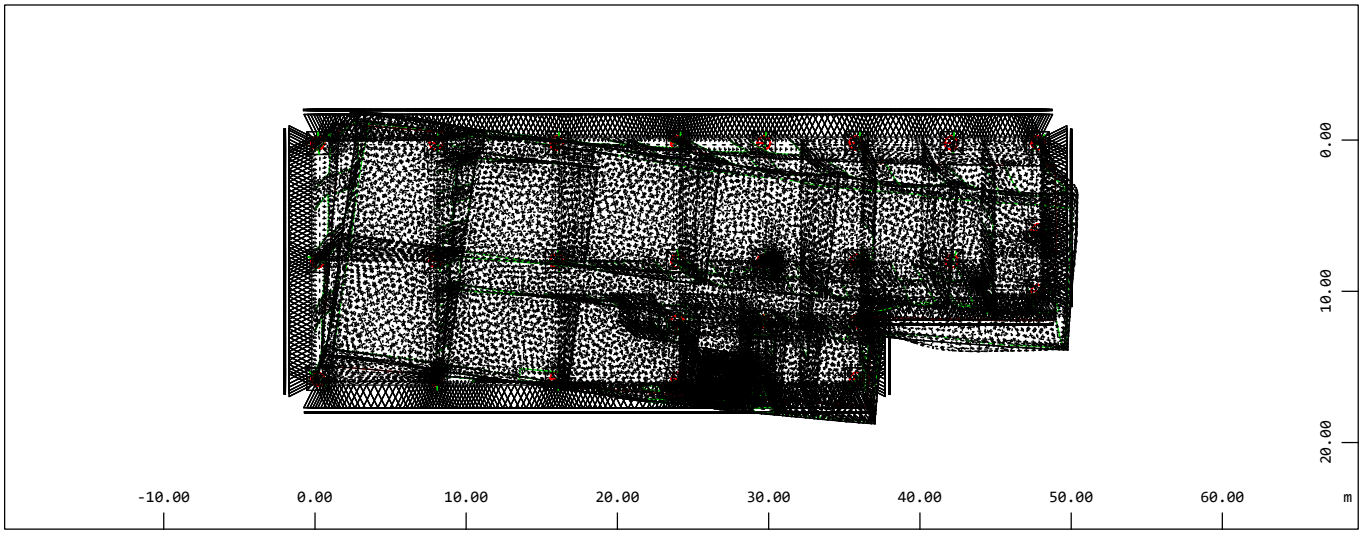

Sector of system Beam Elements,Spring Elements,Quadrilateral Elements M 1 : 500
Deformed Structure from LC 1001 Eigenform 1 7.77 Hz Enlarged by 100.0



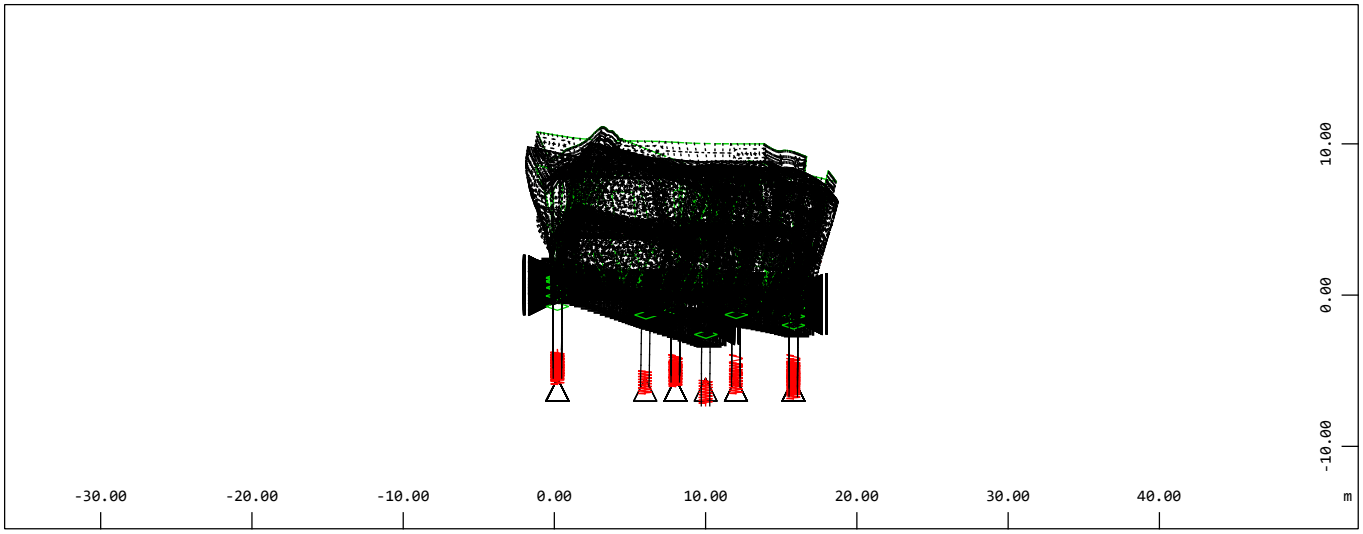

Sector of system Beam Elements,Spring Elements,Quadrilateral Elements M 1 : 500
Deformed Structure from LC 1001 Eigenform 1 7.77 Hz Enlarged by 100.0

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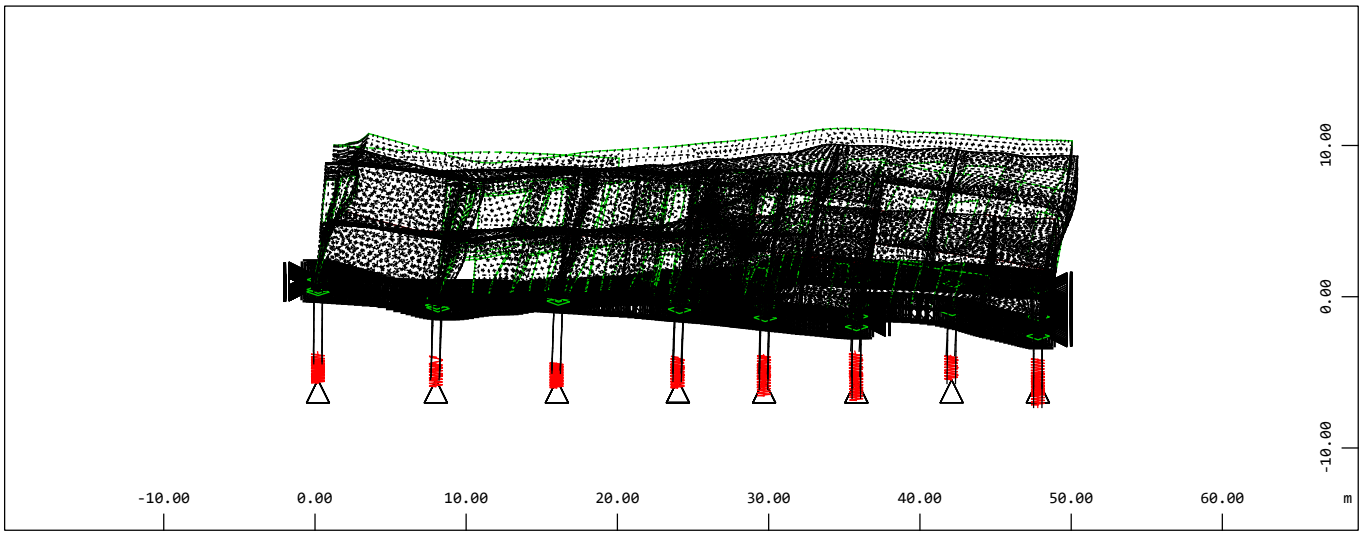
11826 DSO Bovec - zahodna dilat. enota stavbe
1. nihajna oblika




Sector of system Beam Elements,Spring Elements,Quadrilateral Elements M 1 : 500
Deformed Structure from LC 1002 Eigenform 2 9.57 Hz Enlarged by 100.0



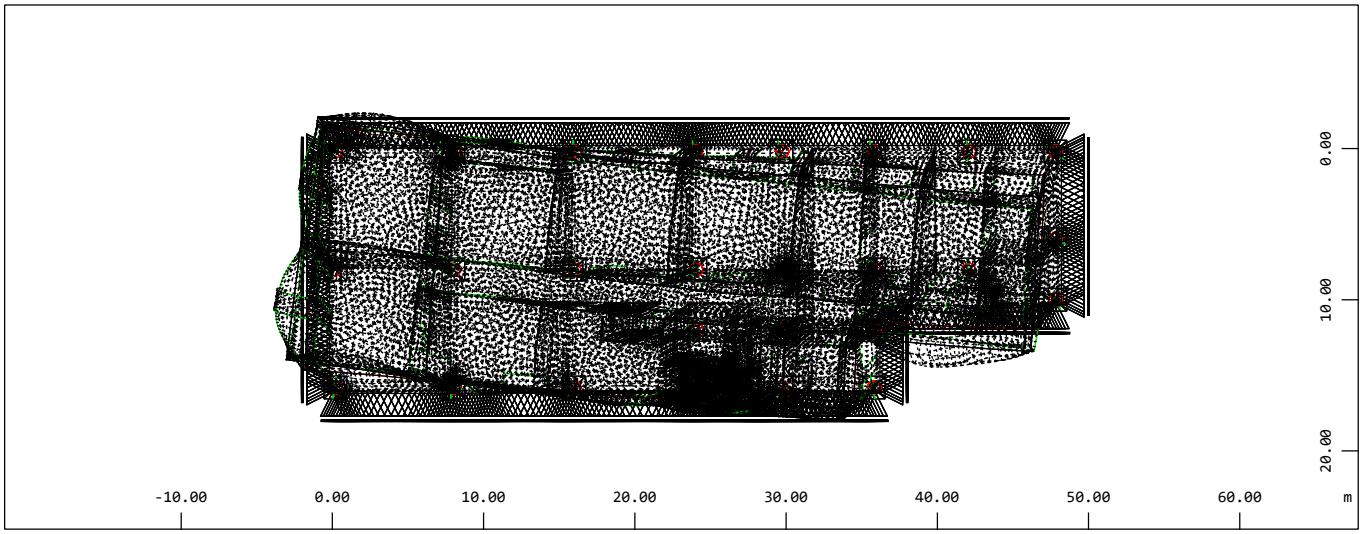

Sector of system Beam Elements,Spring Elements,Quadrilateral Elements M 1 : 500
Deformed Structure from LC 1002 Eigenform 2 9.57 Hz Enlarged by 100.0



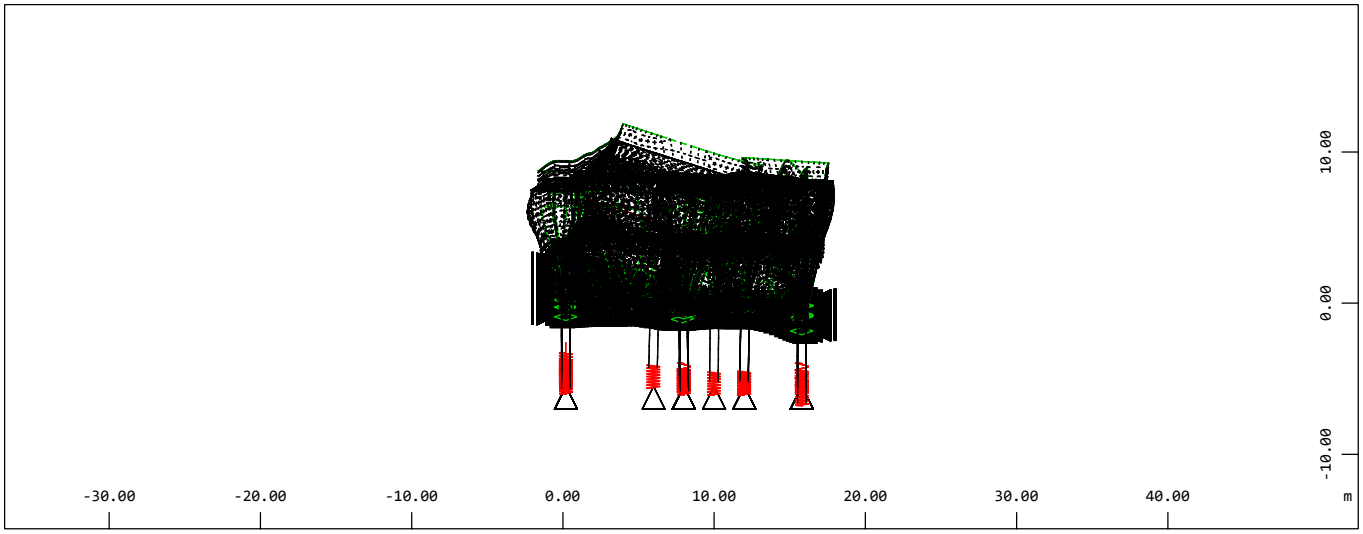

Sector of system Beam Elements,Spring Elements,Quadrilateral Elements M 1 : 500
Deformed Structure from LC 1002 Eigenform 2 9.57 Hz Enlarged by 100.0

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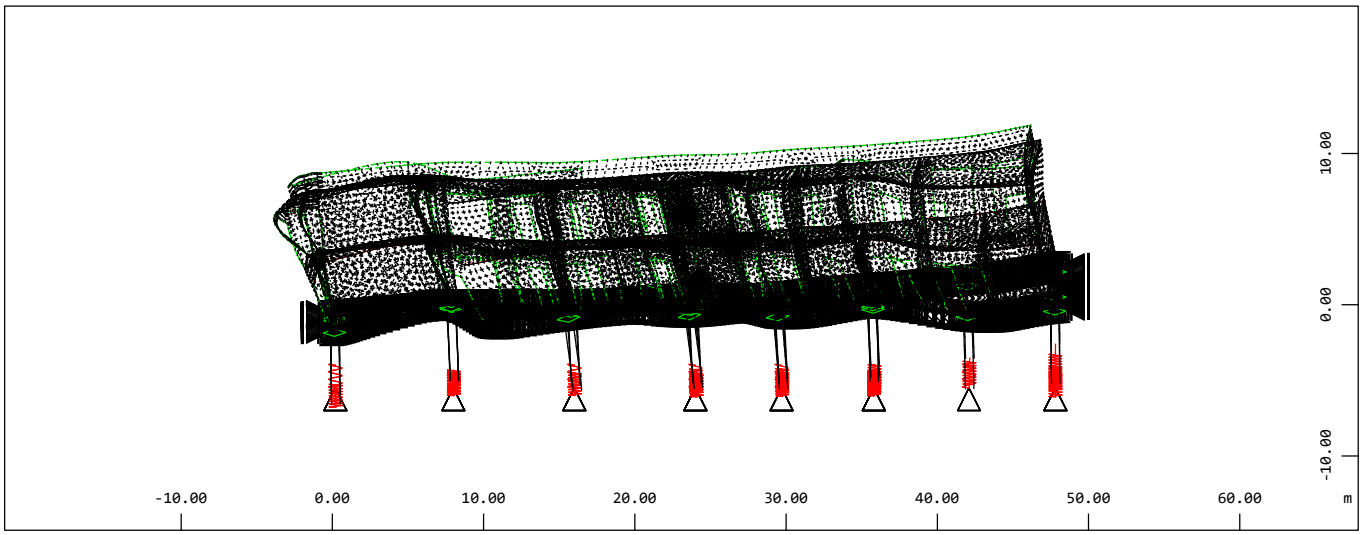
11826 DSO Bovec - zahodna dilat. enota stavbe
1. nihajna oblika




Sector of system Beam Elements,Spring Elements,Quadrilateral Elements M 1 : 500
Z Y X
Deformed Structure from LC 1003 Eigenform 3 11.99 Hz Enlarged by 100.0



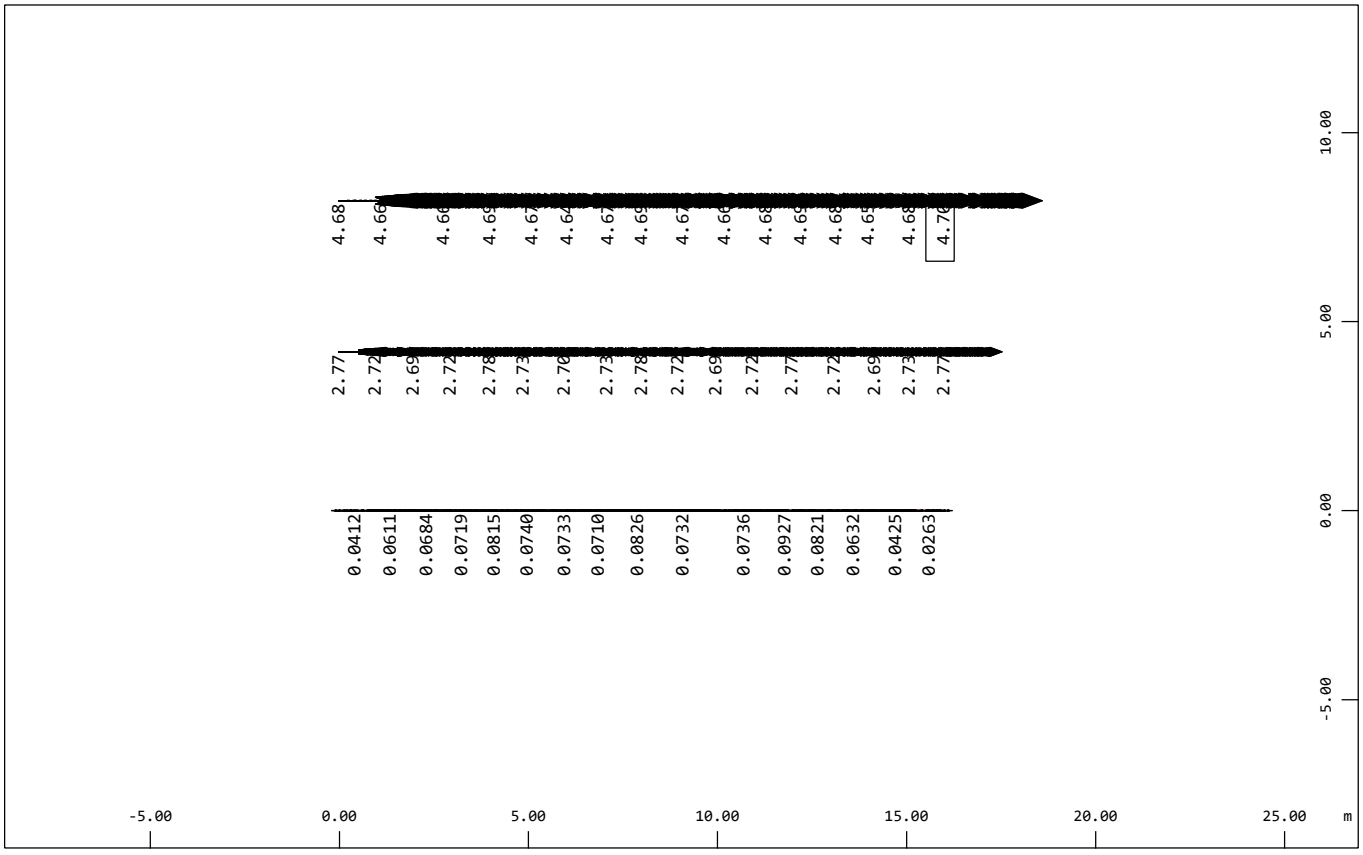

Sector of system Beam Elements,Spring Elements,Quadrilateral Elements M 1 : 500
Z Y X
Deformed Structure from LC 1003 Eigenform 3 11.99 Hz Enlarged by 100.0



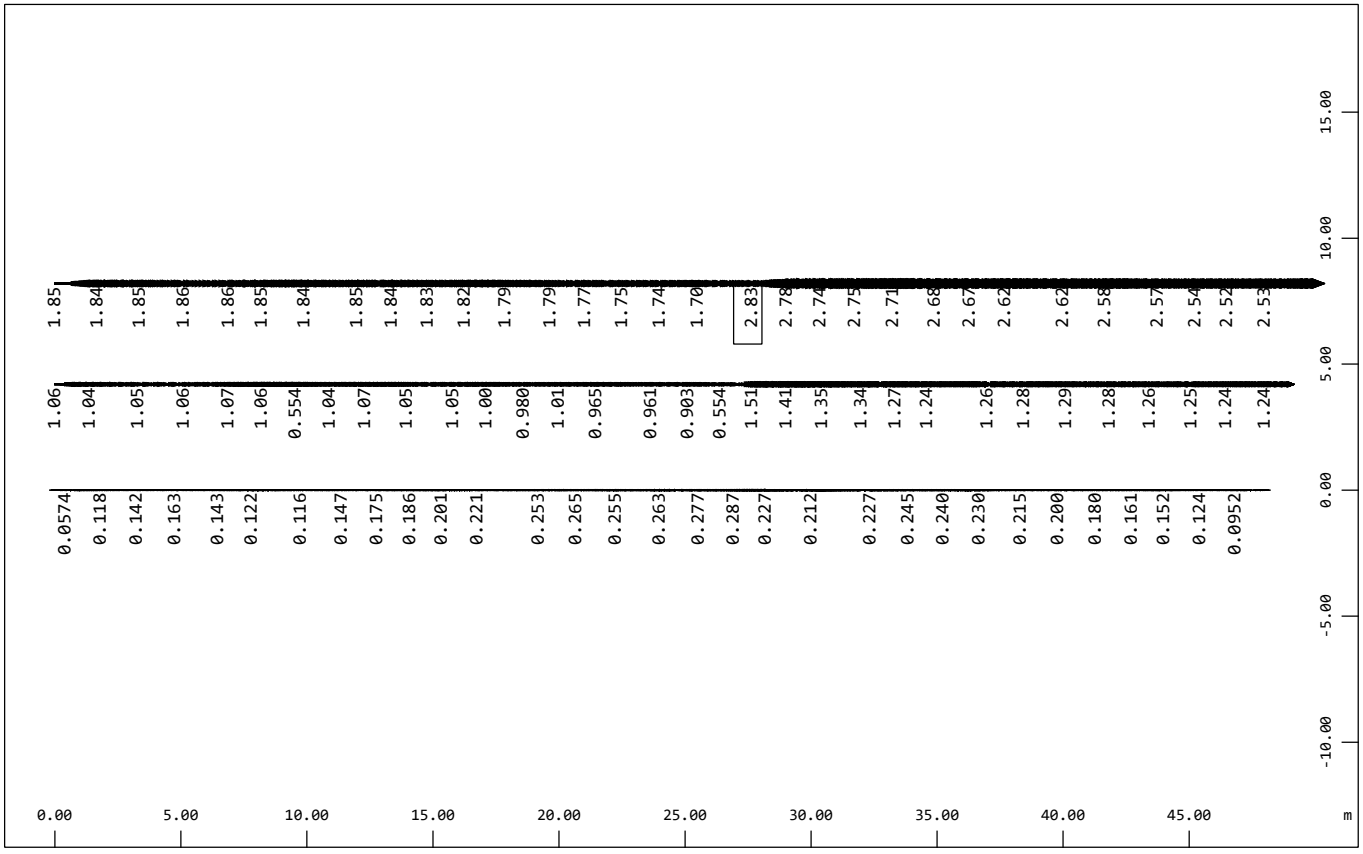

Sector of system Beam Elements,Spring Elements,Quadrilateral Elements M 1 : 500
Z X Y
Deformed Structure from LC 1003 Eigenform 3 11.99 Hz Enlarged by 100.0

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11826 DSO Bovec - zahodna dilat. enota stavbe
Ovoj. horiz. pomikov: max Ux, prip. Uy



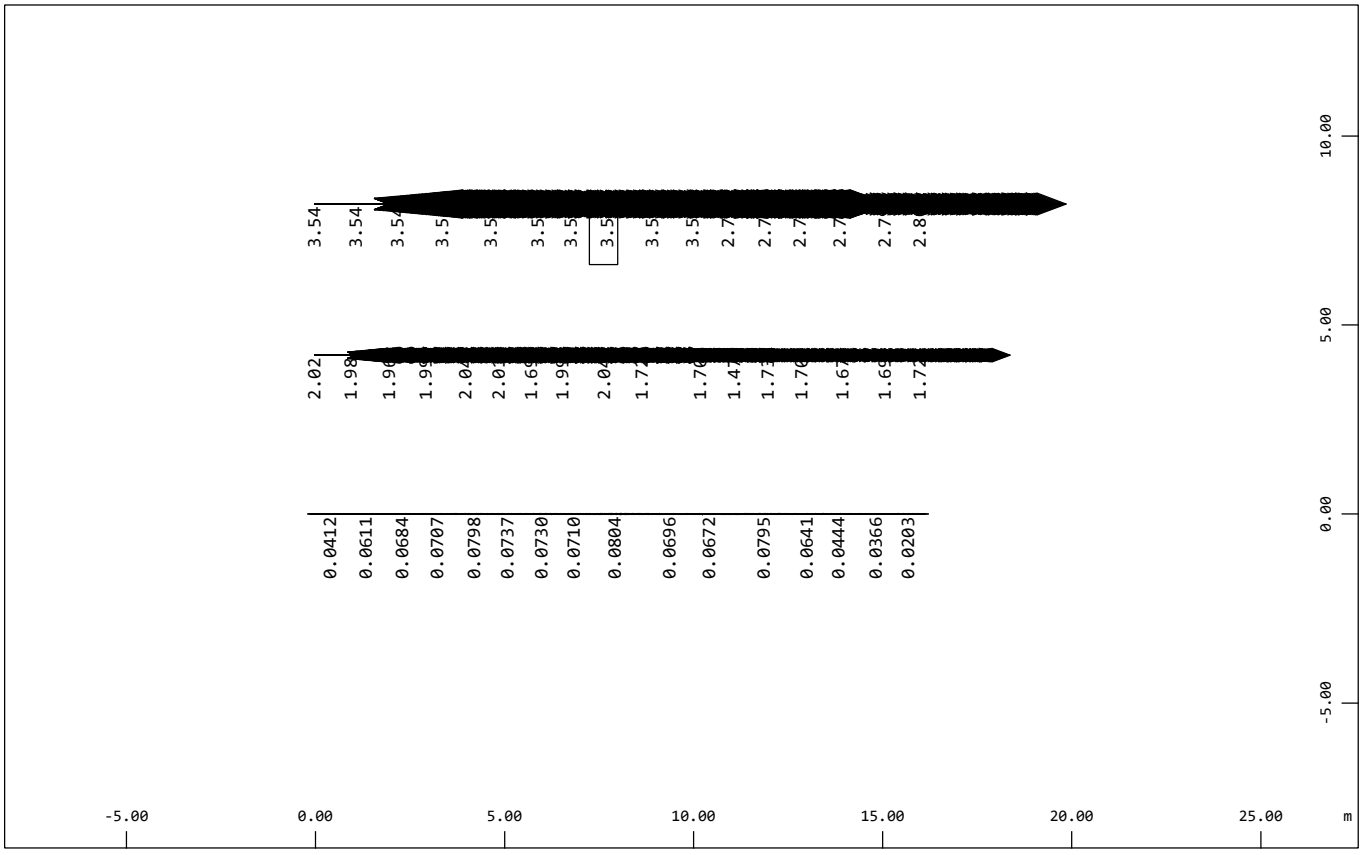

Z
X
Sector of system Quadrilateral Elements Group 100 110 120 M 1 : 200
Nodal displacement in global X, Loadcase 3571 QuakeXY-aT-Max-Ux , 1 cm 3D = 3.63 mm
(Max=4.70)



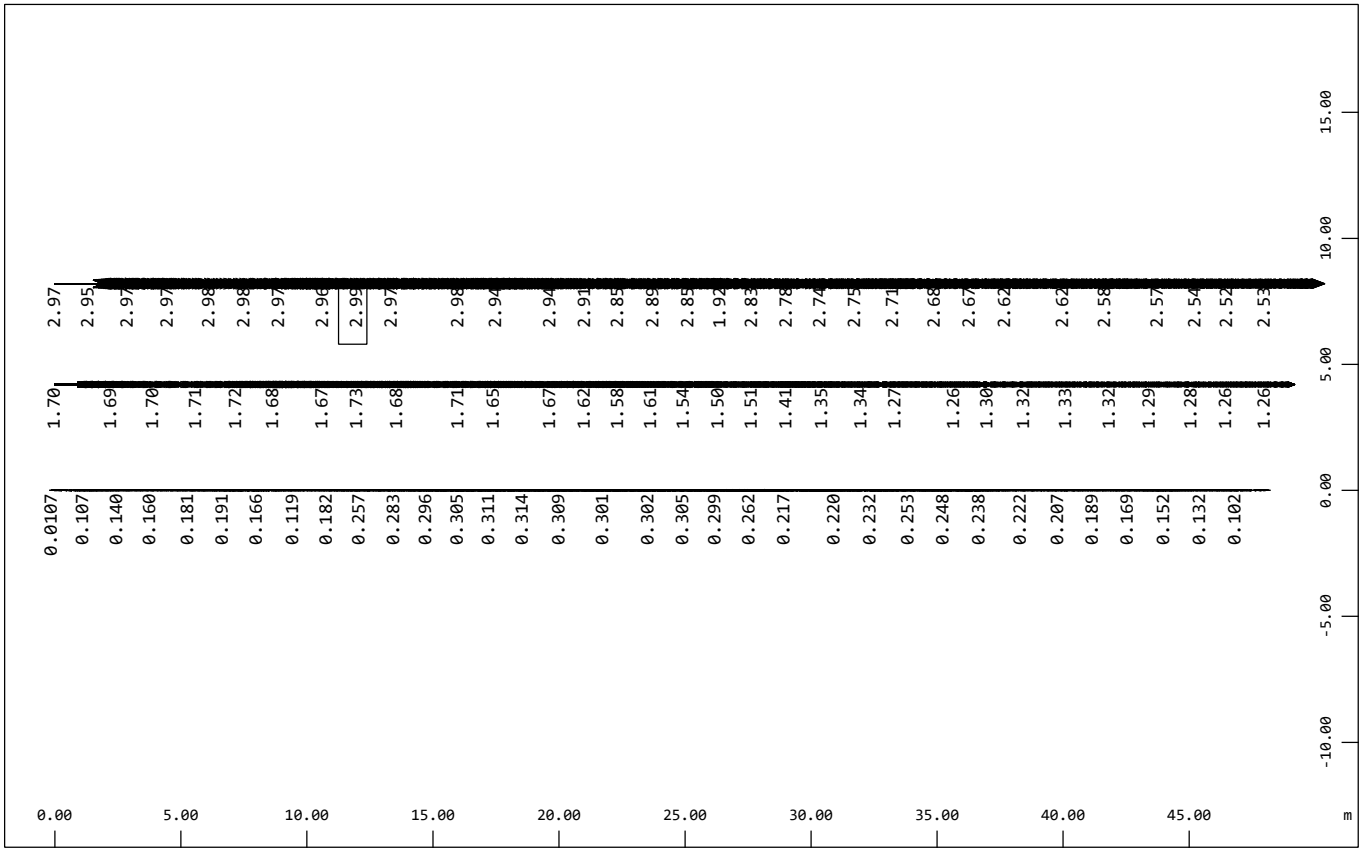

Z
X
Sector of system Quadrilateral Elements Group 100 110 120 M 1 : 300
Nodal displacement in global Y, Loadcase 3571 QuakeXY-aT-Max-Ux , 1 cm 3D = 3.20 mm
(Max=2.83)

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11826 DSO Bovec - zahodna dilat. enota stavbe
Ovoj. horiz. pomikov: prip. Ux, max. Uy



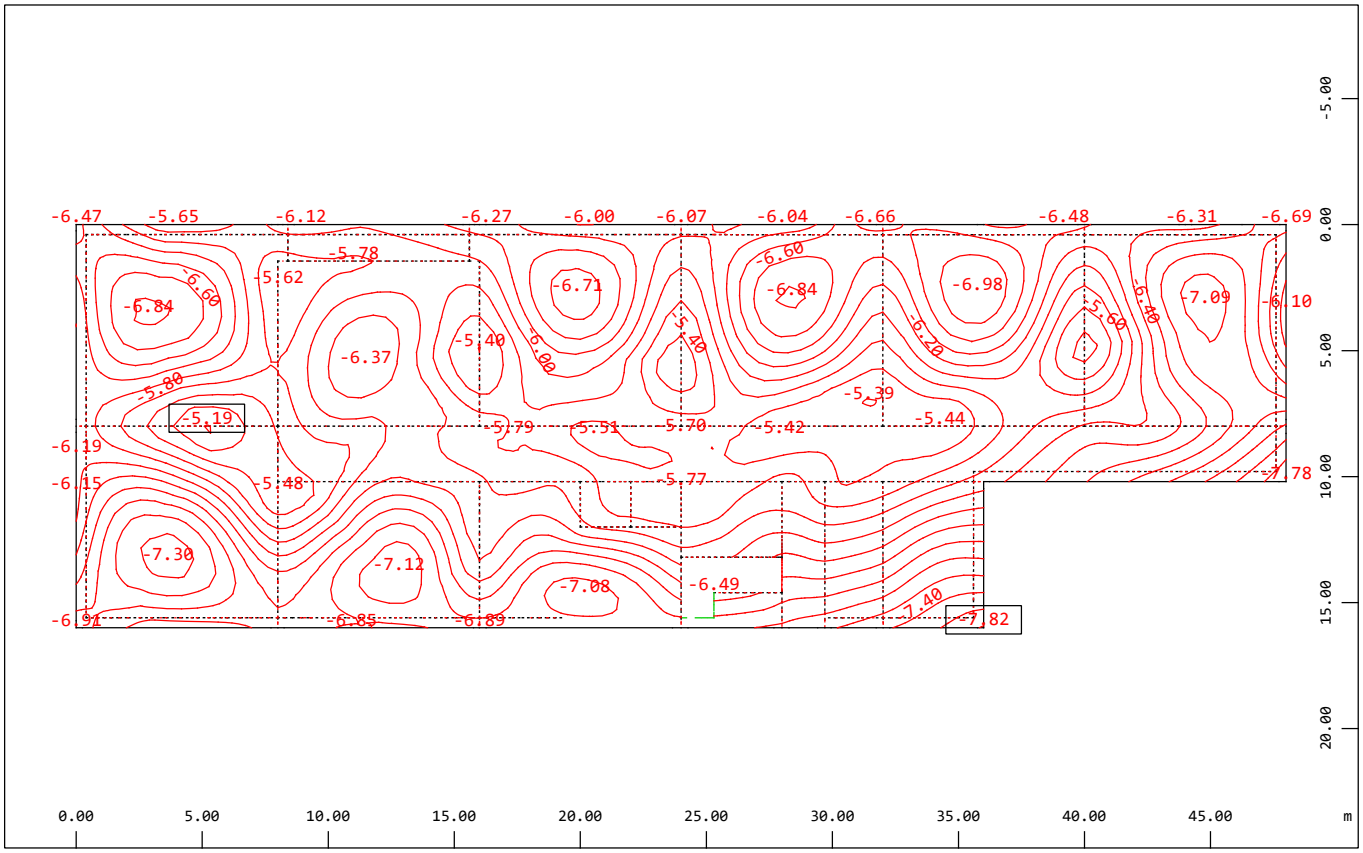

Z
X
Sector of system Quadrilateral Elements Group 100 110 120 M 1 : 200
Nodal displacement in global X, Loadcase 3573 QuakeXY-aT-Max-Uy , 1 cm 3D = 1.45 mm
(Max=3.59)



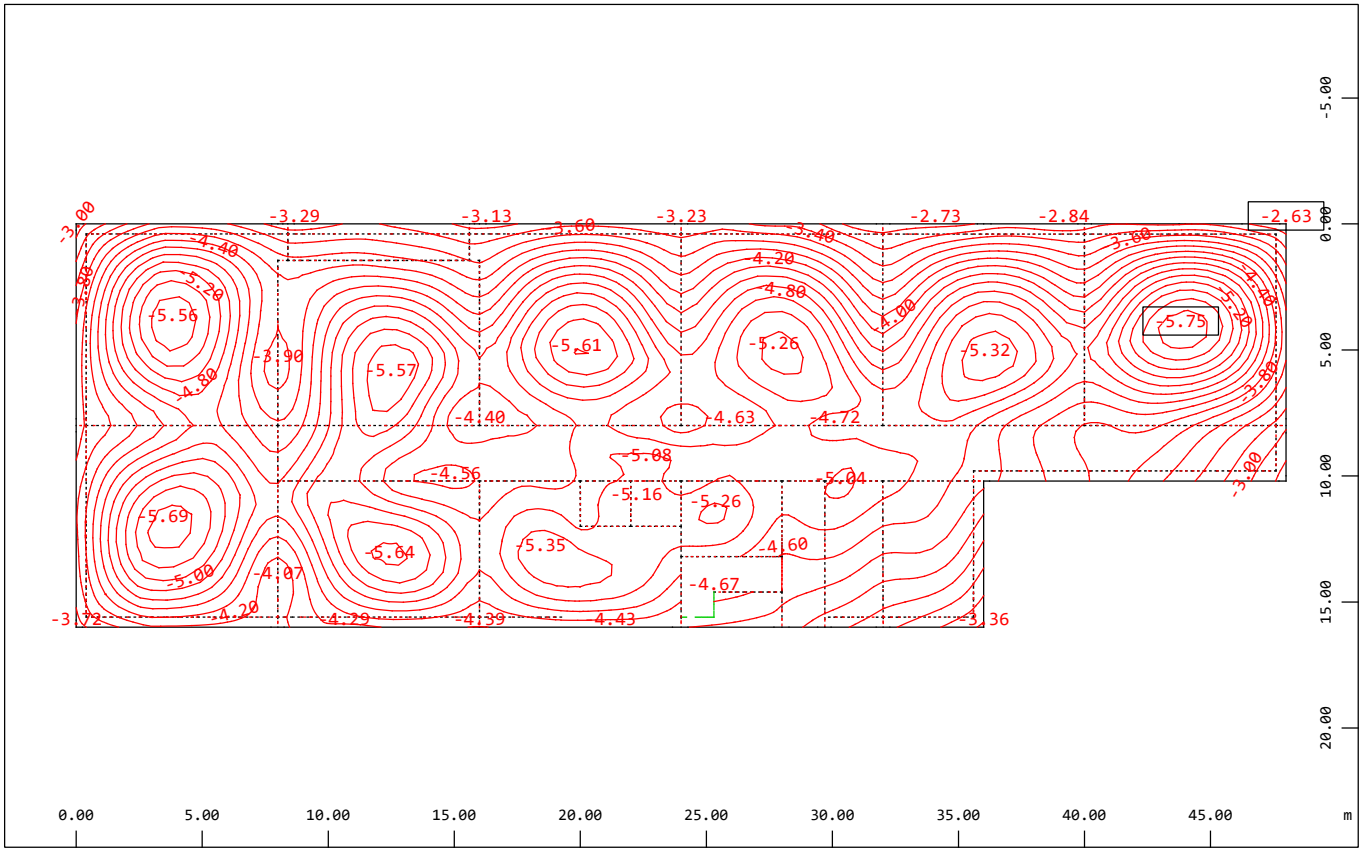

Z
X
Sector of system Quadrilateral Elements Group 100 110 120 M 1 : 300
Nodal displacement in global Y, Loadcase 3573 QuakeXY-aT-Max-Uy , 1 cm 3D = 3.20 mm
(Max=2.99)

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11826 DSO Bovec - zahodna dilat. enota stavbe
Ovoj.vert.pomikov plosc (MSU-perm): etazna plosca



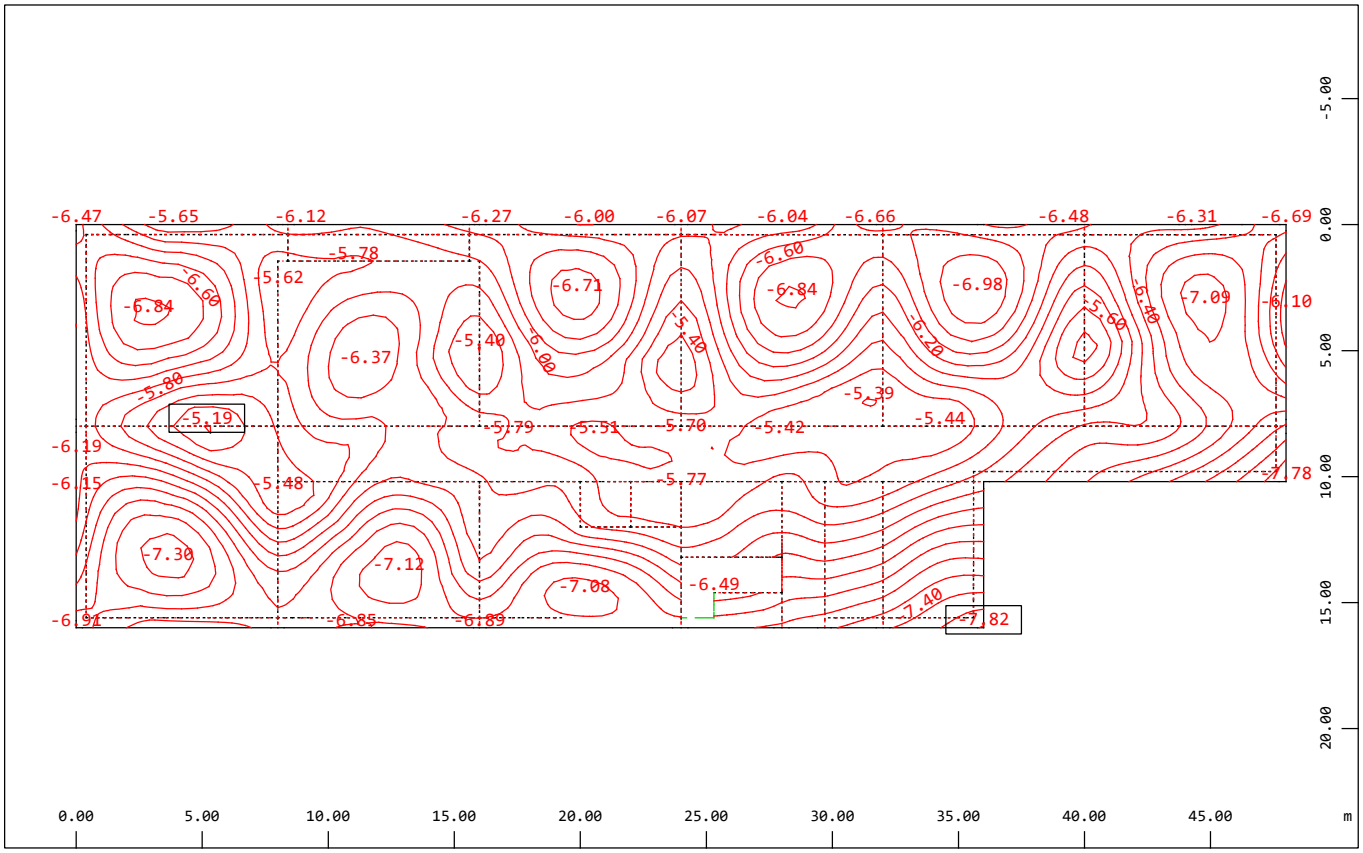

Sector of system Group 120 M 1 : 300
Z Y
X
Nodal displacement in global Z in Node , Loadcase 8276 MINE-UZ NODE , from -7.82 to
-5.19 step 0.200 mm



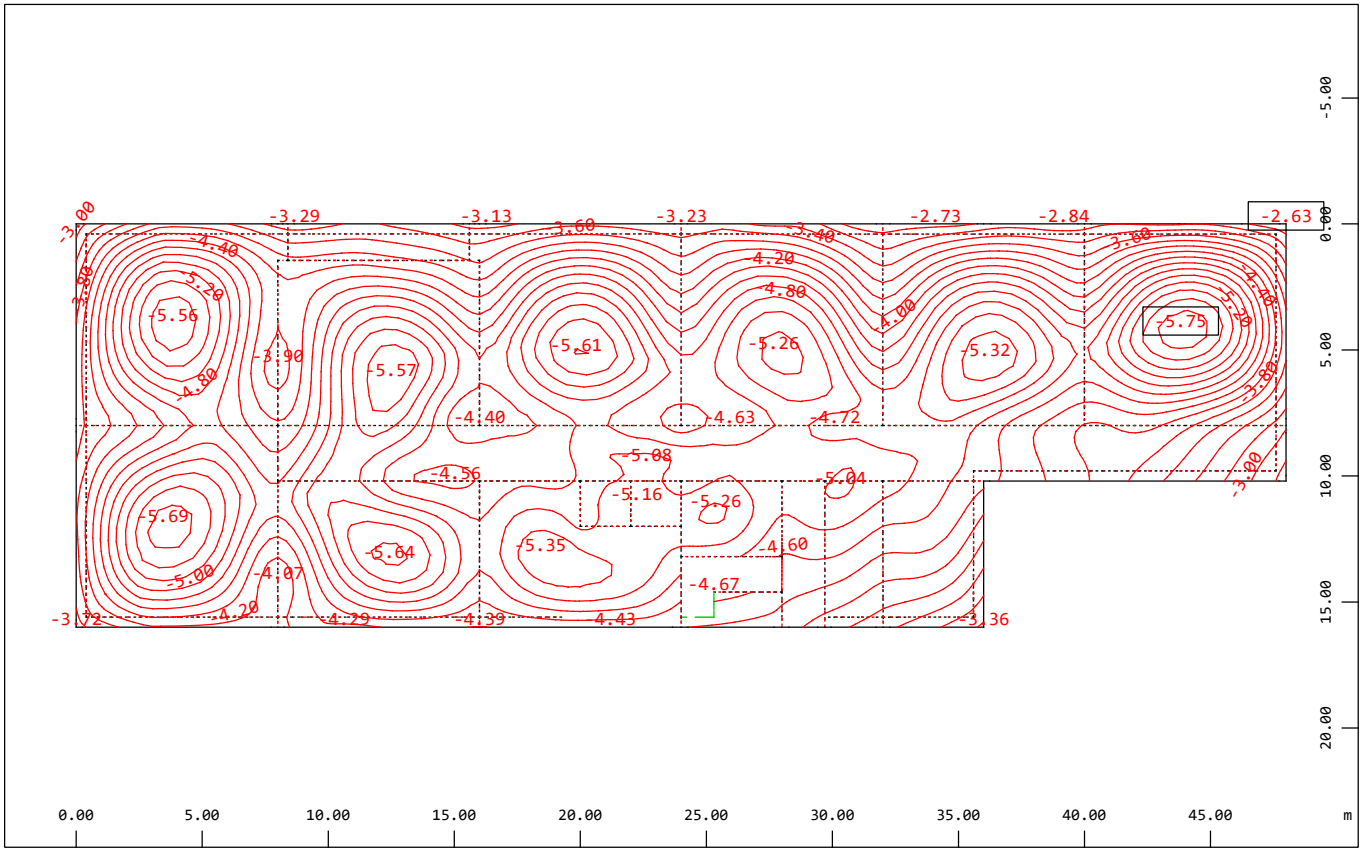

Sector of system Group 120 M 1 : 300
Z Y
X
Nodal displacement in global Z in Node , Loadcase 8275 MAXE-UZ NODE , from -5.75 to
-2.63 step 0.200 mm

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11826 DSO Bovec - zahodna dilat. enota stavbe
Ovoj.vert.pomikov plosc (MSU-perm): stresna plosca



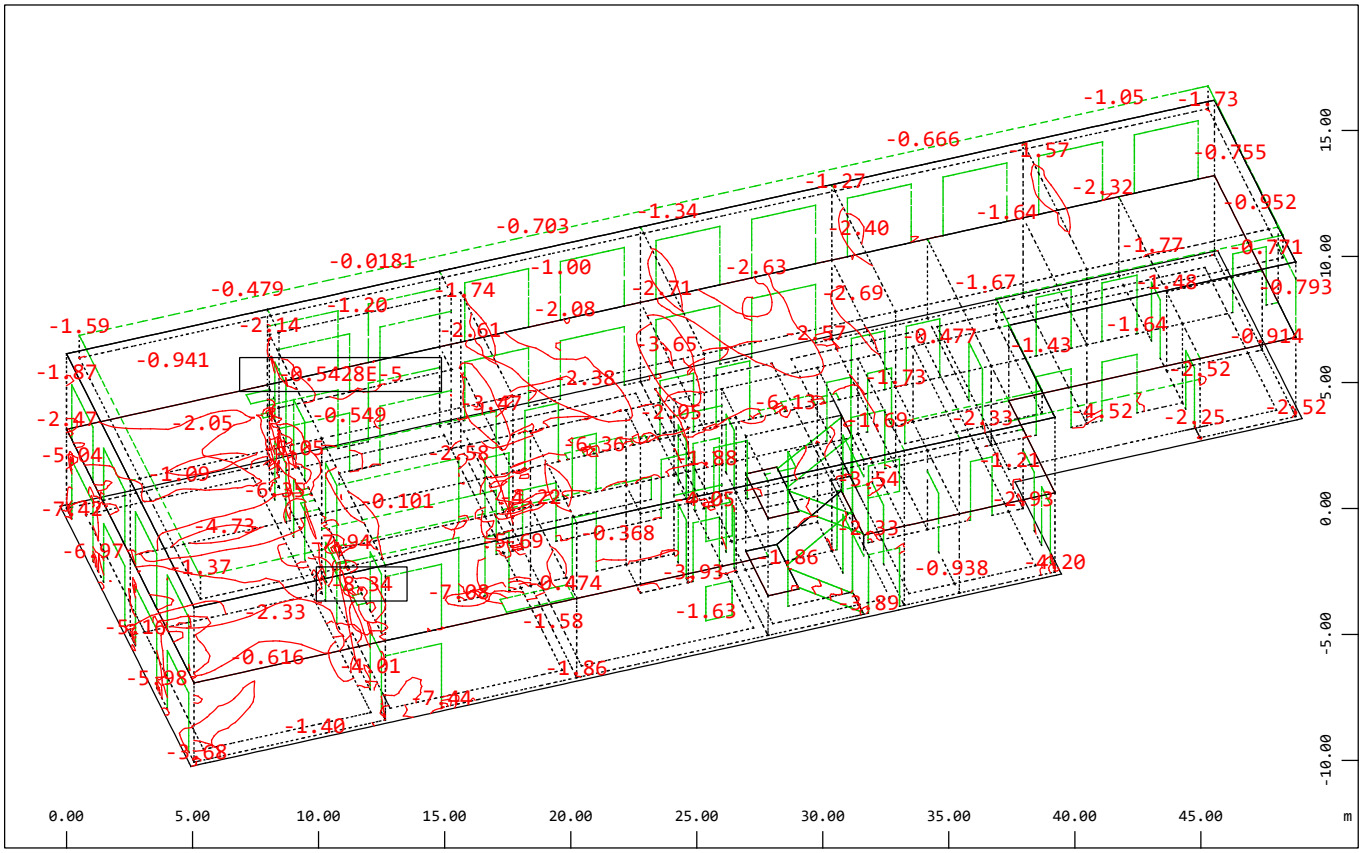

Sector of system Group 120 M 1 : 300
Nodal displacement in global Z in Node , Loadcase 8276 MINE-UZ NODE , from -7.82 to
-5.19 step 0.200 mm




Sector of system Group 120 M 1 : 300
Nodal displacement in global Z in Node , Loadcase 8275 MAXE-UZ NODE , from -5.75 to
-2.63 step 0.200 mm

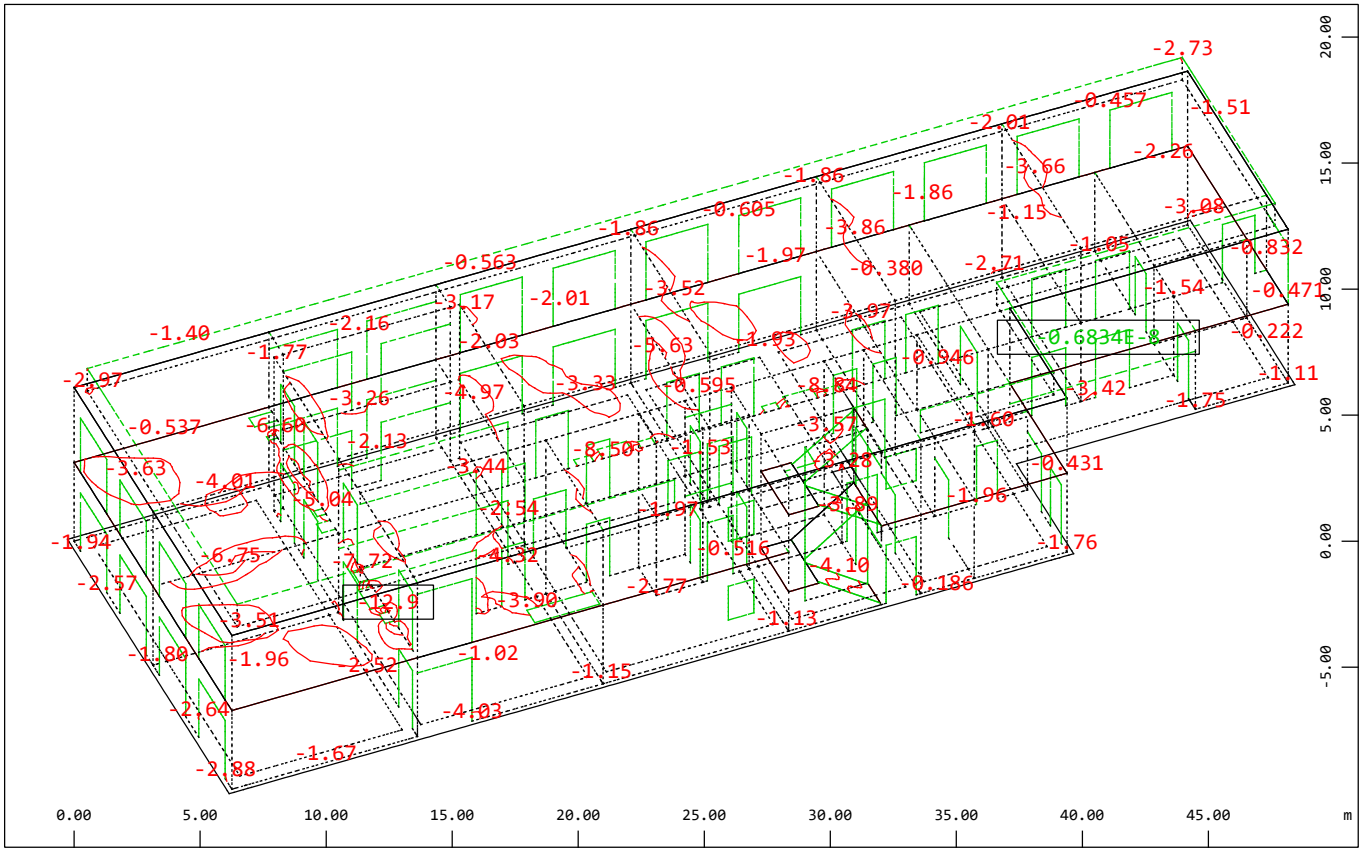
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11826 DSO Bovec - zahodna dilat. enota stavbe
Maks.tlacna napetost v betonu: MSU-perm (0,45.fck), MSU-rare (0,6.fck)




Z Y X
Sector of system Quadrilateral Elements
Maximum principal compression stress from middle of element, Loadcase 8205 MAXE-MXY QUAD
, from -8.34 to -5.4275e-06 step 1.67 MPa

M 1 : 300
X * 0.704
Y * 0.972
Z * 0.748

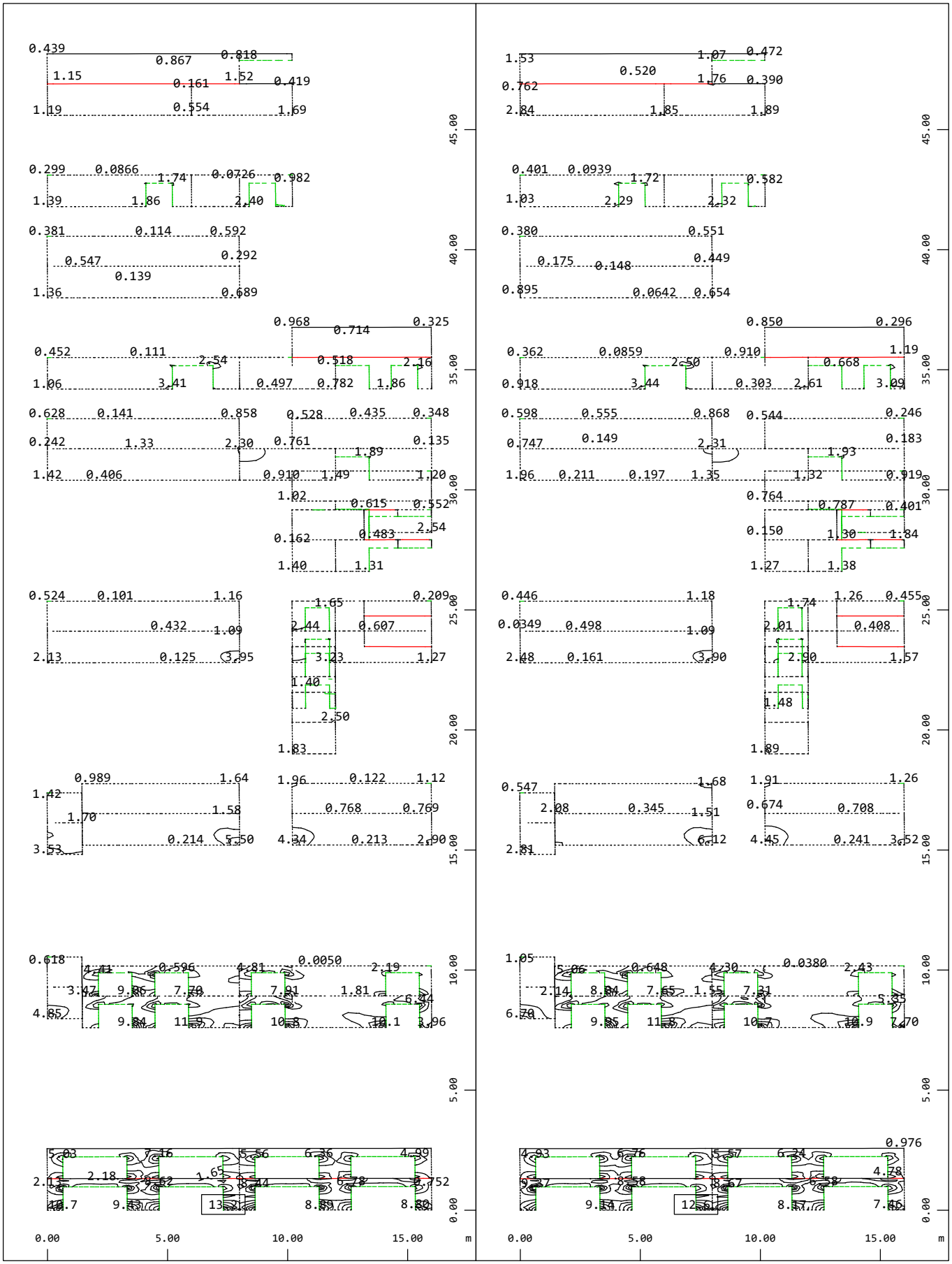



Z Y X
Sector of system Quadrilateral Elements
Maximum principal compression stress from middle of element, Loadcase 8005 MAX-MXY QUAD
, from -12.9 to -6.8340e-09 step 2.58 MPa

M 1 : 300
X * 0.729
Y * 0.957
Z * 0.744

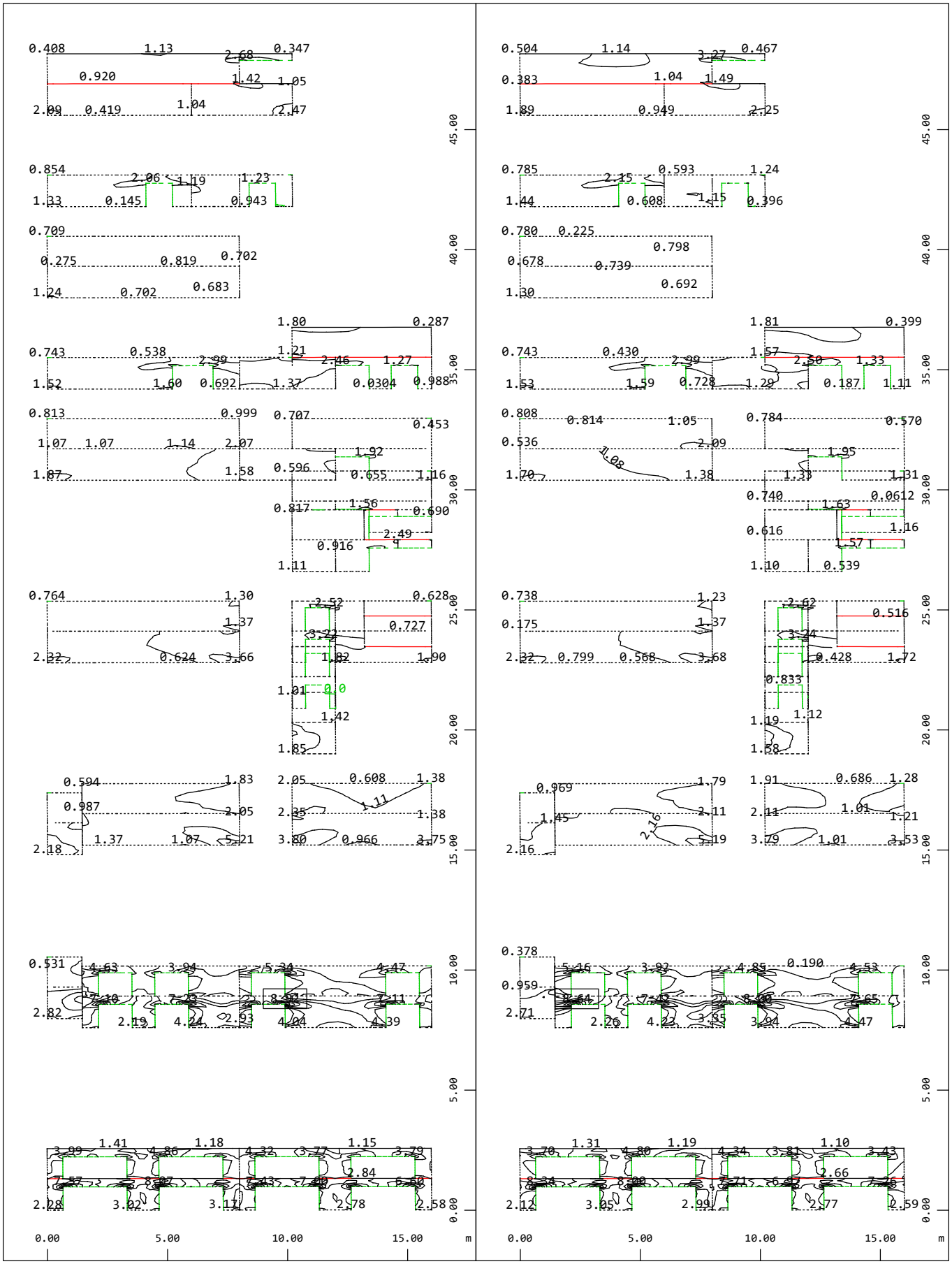
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11826 DSO Bovec - zahodna dilat. enota stavbe
Precne AB stene: armatura vertikalna



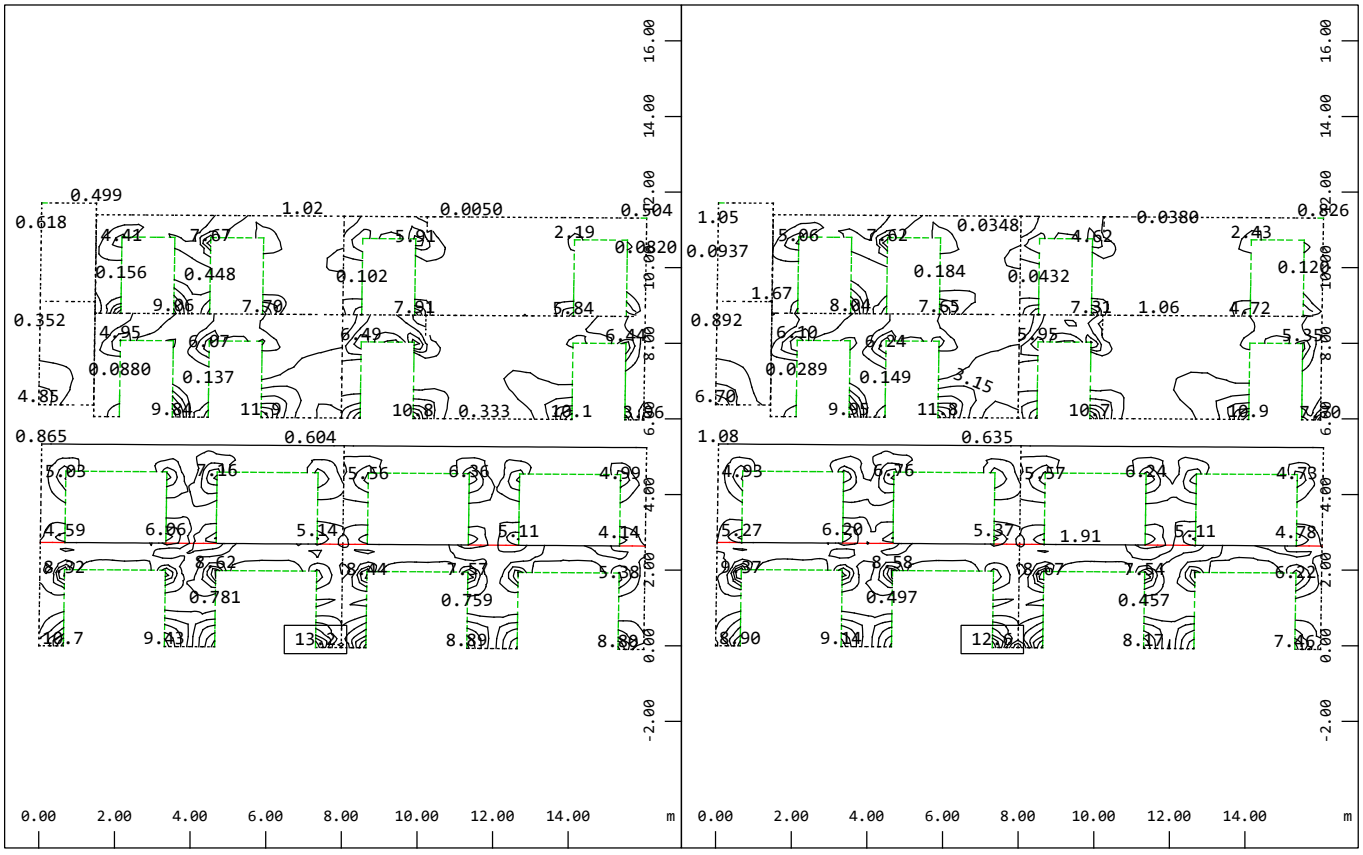

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11826 DSO Bovec - zahodna dilat. enota stavbe
Precne AB stene: armatura horizontalna




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11826 DSO Bovec - zahodna dilat. enota stavbe
Precne AB stene - os L in J: armatura vertikalna in horizontalna

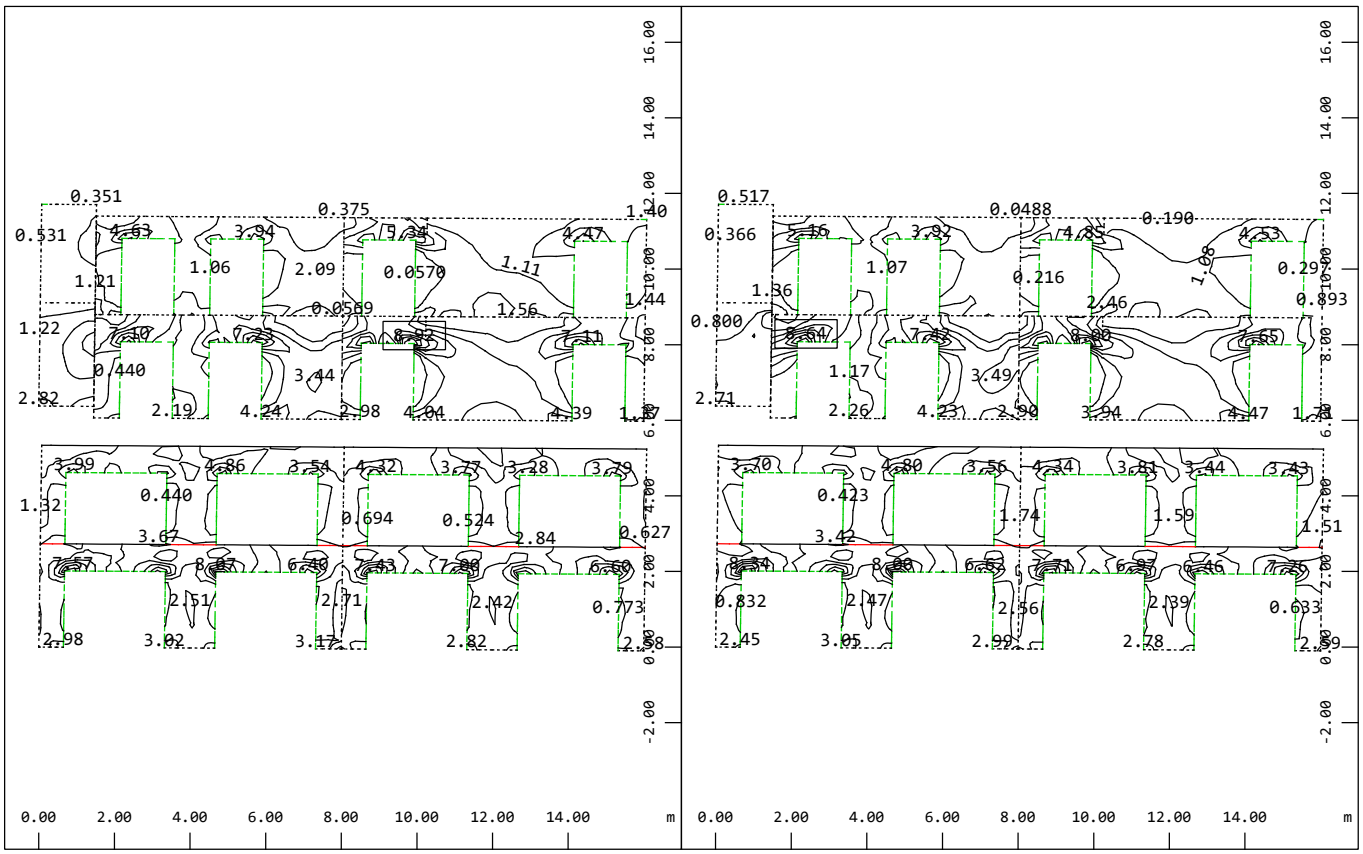



Sector of system Quadrilateral Elements Group 201 202
Quadrilateral Elements , upper Cross reinforcements (2nd layer) , Design Case 1 , from 0 to 13.2 step 1.65 cm2/m

M 1 : 200
X * 1.000
Y * 0.759
Z * 0.651

Sector of system Quadrilateral Elements Group 201 202
Quadrilateral Elements , lower Cross reinforcements (2nd layer) , Design Case 1 , from 0.0015 to 12.6 step 1.57 cm2/m

M 1 : 200
X * 1.000
Y * 0.759
Z * 0.651




Sector of system Quadrilateral Elements Group 201 202
Quadrilateral Elements , upper Principal reinforcements (1st layer) , Design Case 1 , from 0 to 8.92 step 1.11 cm2/m

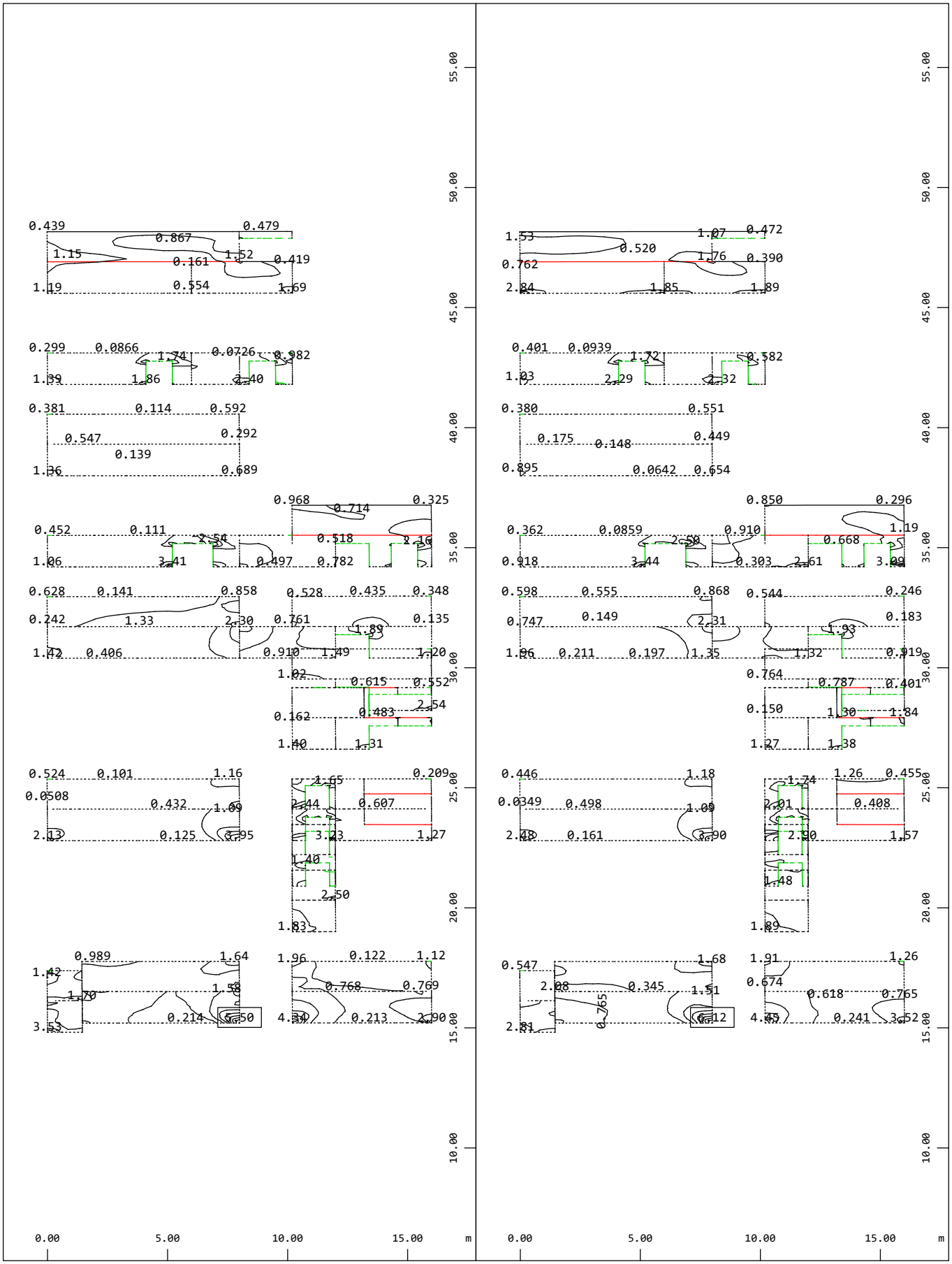
M 1 : 200
X * 1.000
Y * 0.759
Z * 0.651

Sector of system Quadrilateral Elements Group 201 202
Quadrilateral Elements , lower Principal reinforcements (1st layer) , Design Case 1 , from 0.0077 to 8.64 step 1.08 cm2/m

M 1 : 200
X * 1.000
Y * 0.759
Z * 0.651

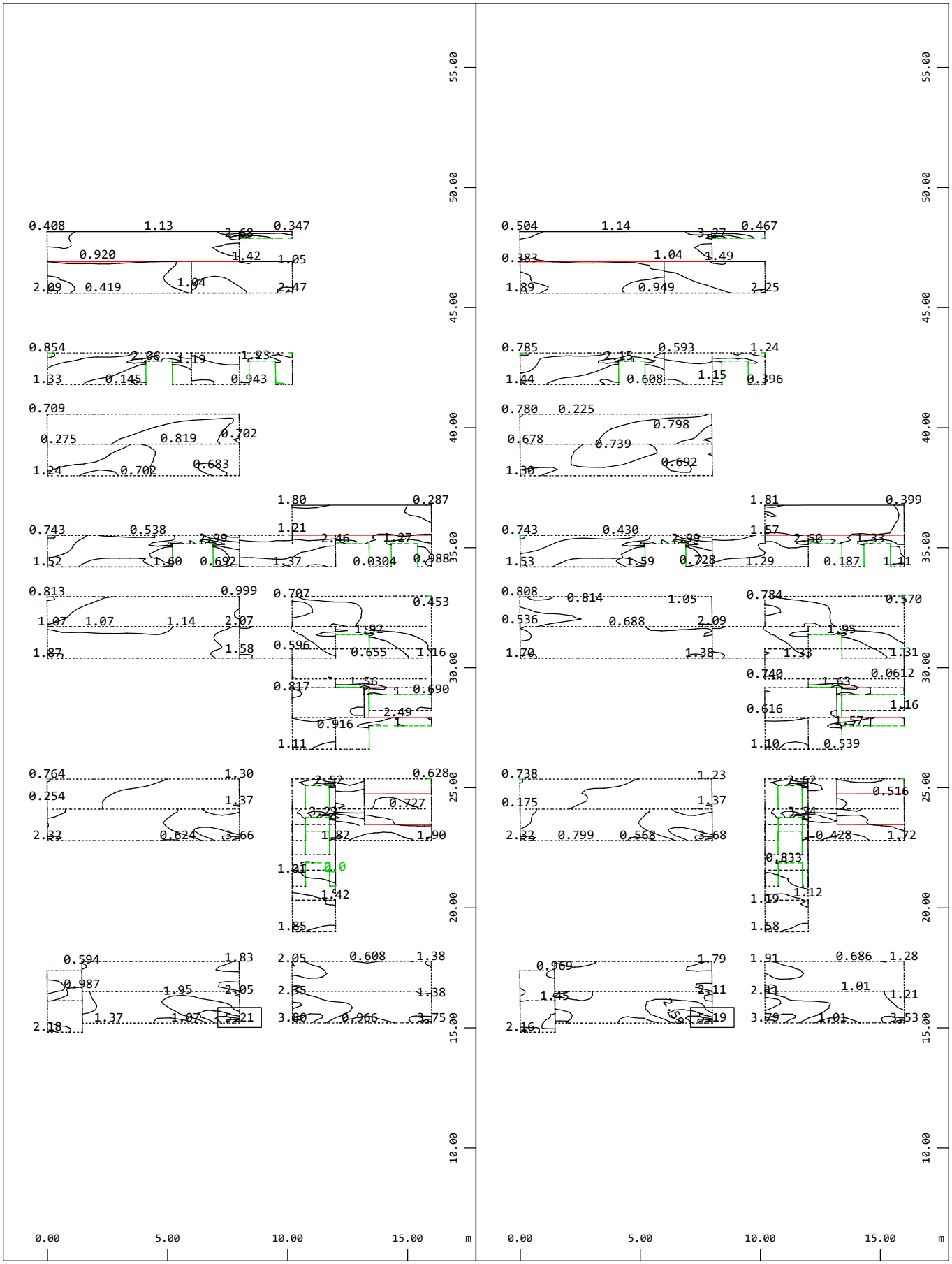
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11826 DSO Bovec - zahodna dilat. enota stavbe
Precne AB stene - ostale osi: armatura vertikalna



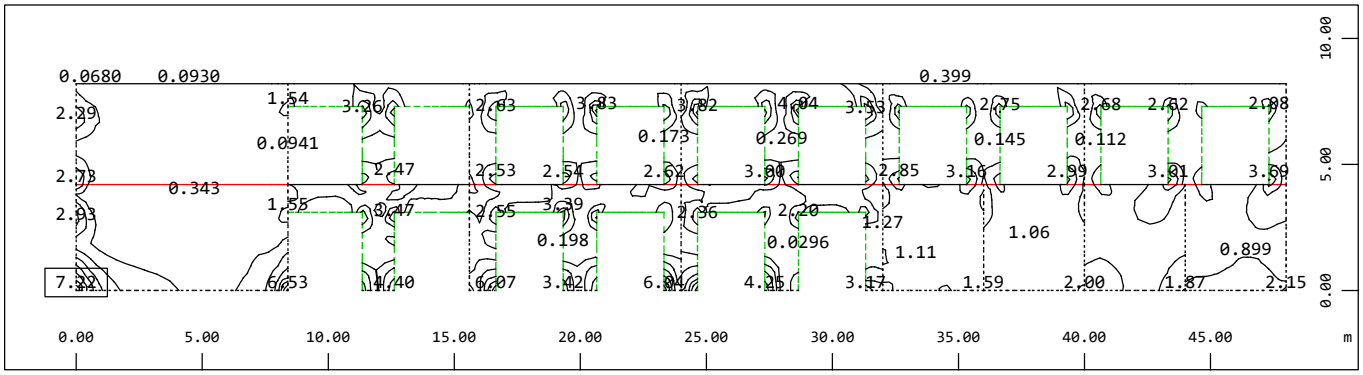

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11826 DSO Bovec - zahodna dilat. enota stavbe
Precne AB stene - ostale osi: armatura horizontalna

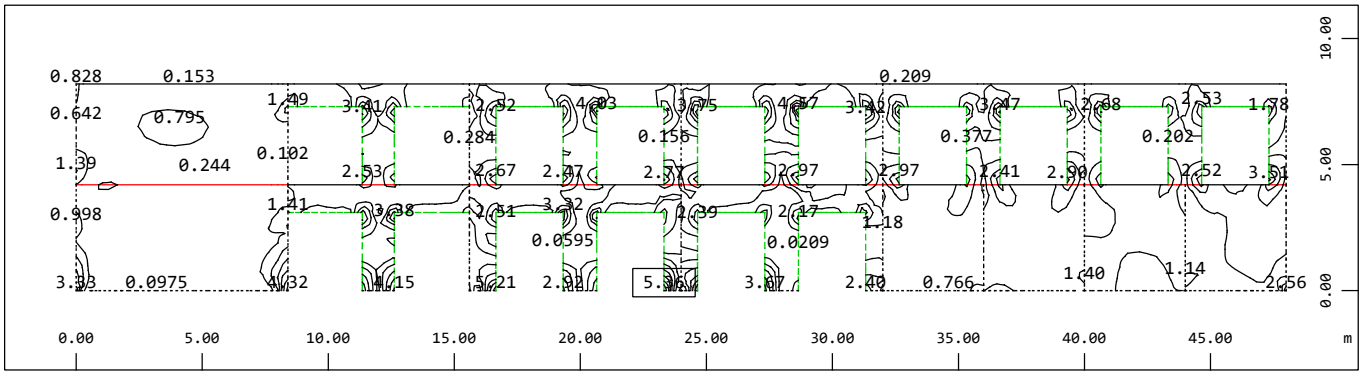



SOFiSTiK AG - www.sofistik.de

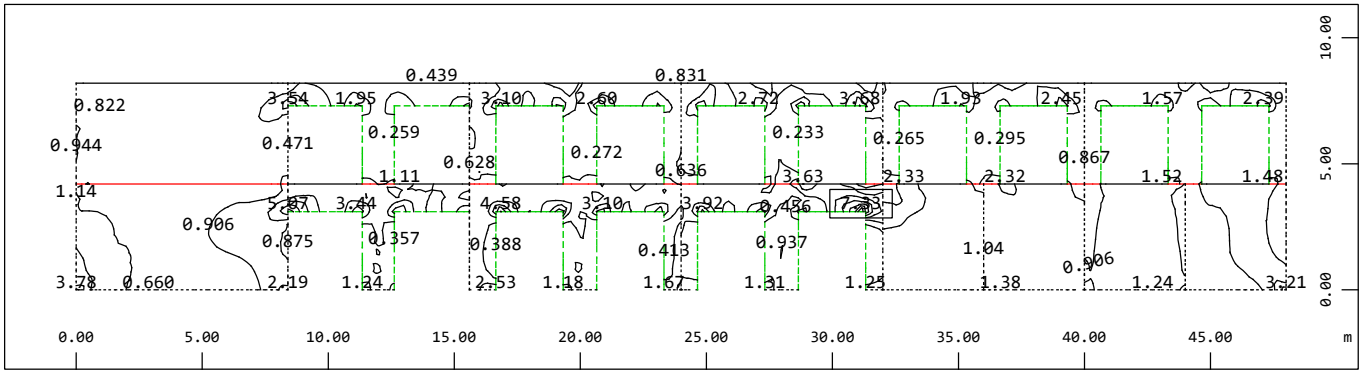
11826 DSO Bovec - zahodna dilat. enota stavbe
Vzdolzne AB stene - os 01: armatura vertikalna, horizontalna



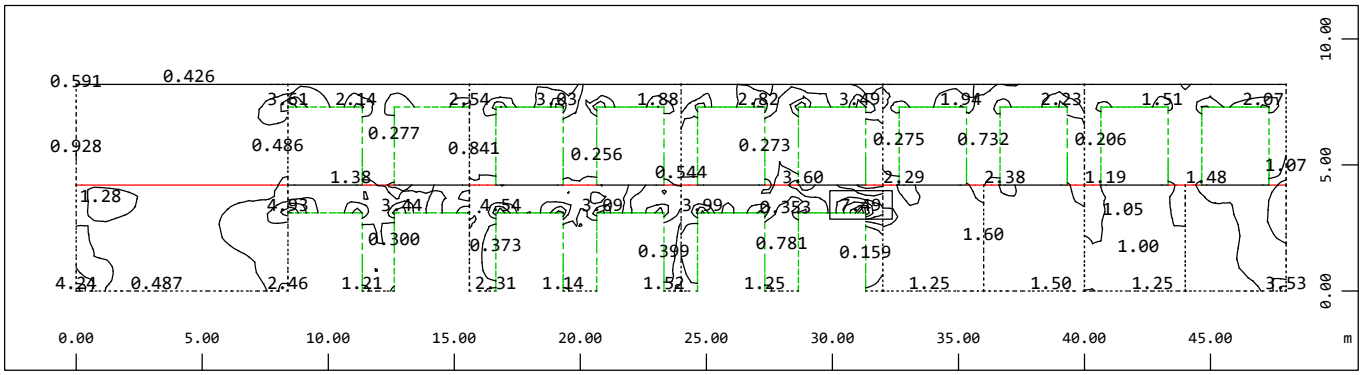

Sector of system Group 251 M 1 : 300
Quadrilateral Elements , upper Cross reinforcements (2nd layer) , Design Case 1 , from
0.0296 to 7.22 step 0.899 cm2/m




Sector of system Group 251 M 1 : 300
Quadrilateral Elements , lower Cross reinforcements (2nd layer) , Design Case 1 , from
0.0186 to 5.36 step 0.668 cm2/m



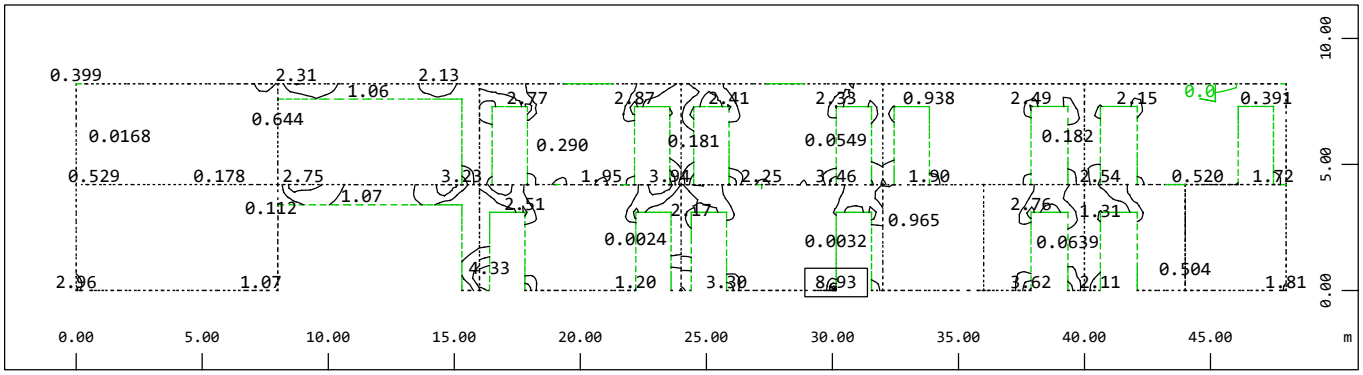

Sector of system Group 251 M 1 : 300
Quadrilateral Elements , upper Principal reinforcements (1st layer) , Design Case 1 ,
from 0.0867 to 7.33 step 0.906 cm2/m



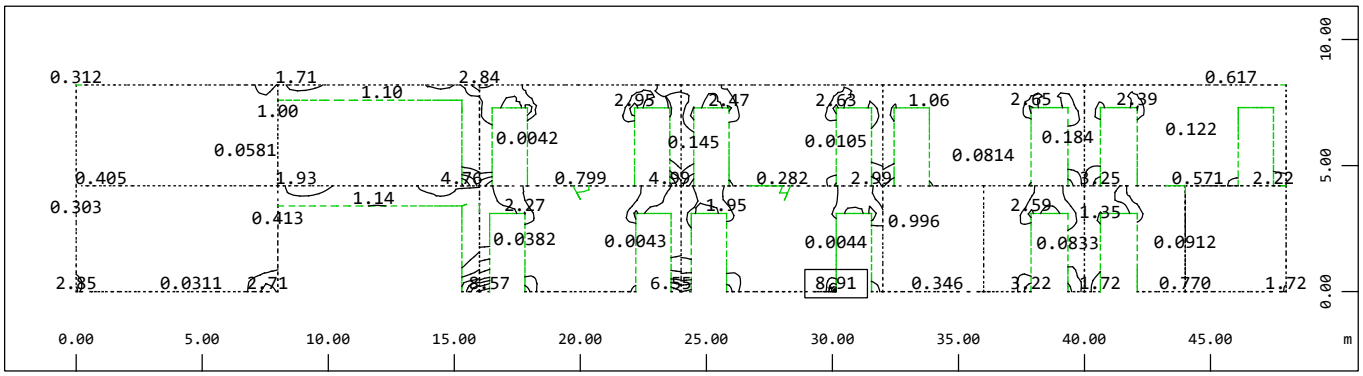

Sector of system Group 251 M 1 : 300
Quadrilateral Elements , lower Principal reinforcements (1st layer) , Design Case 1 ,
from 0.0928 to 7.49 step 0.925 cm2/m

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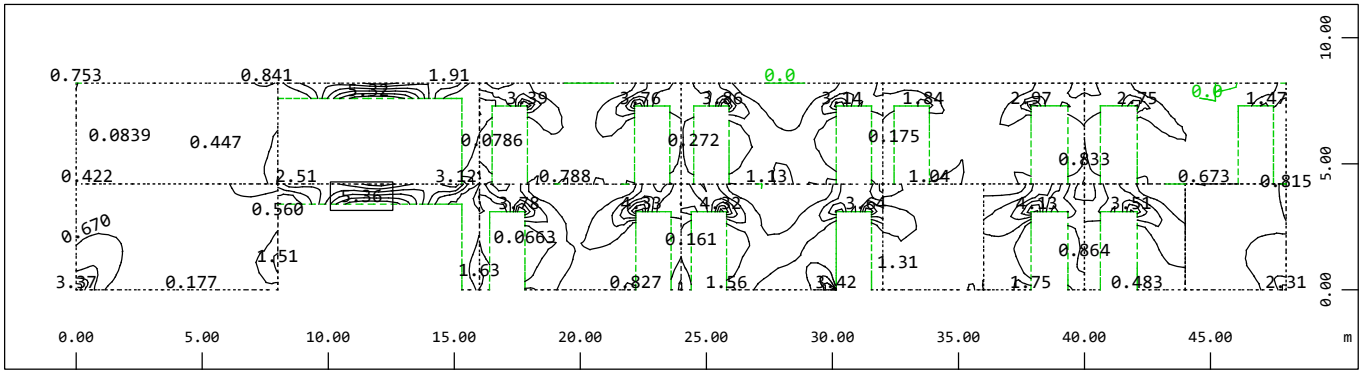
11826 DSO Bovec - zahodna dilat. enota stavbe
Vzdolzne AB stene - os 03: armatura vertikalna, horizontalna



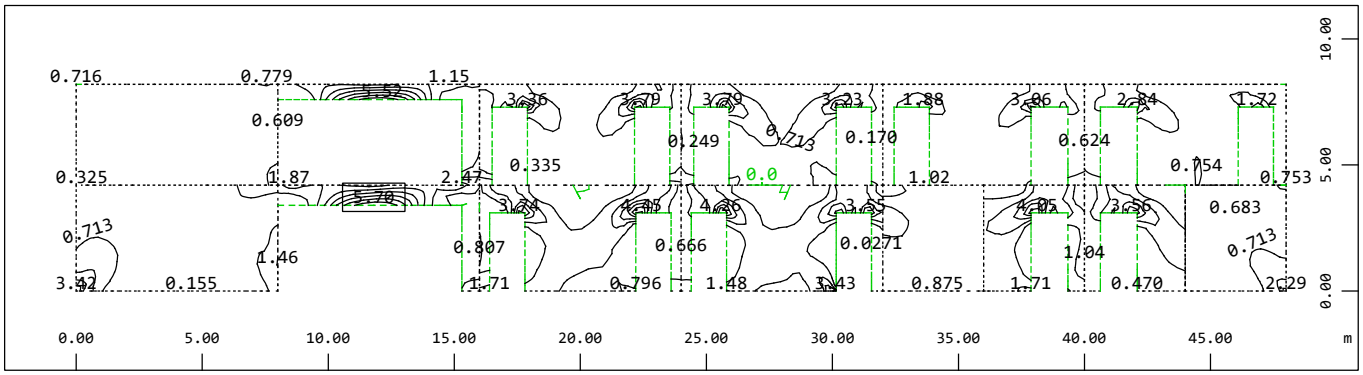

Z
X—Y Sector of system Group 253 M 1 : 300
Quadrilateral Elements , upper Cross reinforcements (2nd layer) , Design Case 1 , from
0 to 8.93 step 1.12 cm2/m




Z
X—Y Sector of system Group 253 M 1 : 300
Quadrilateral Elements , lower Cross reinforcements (2nd layer) , Design Case 1 , from
0 to 8.91 step 1.11 cm2/m



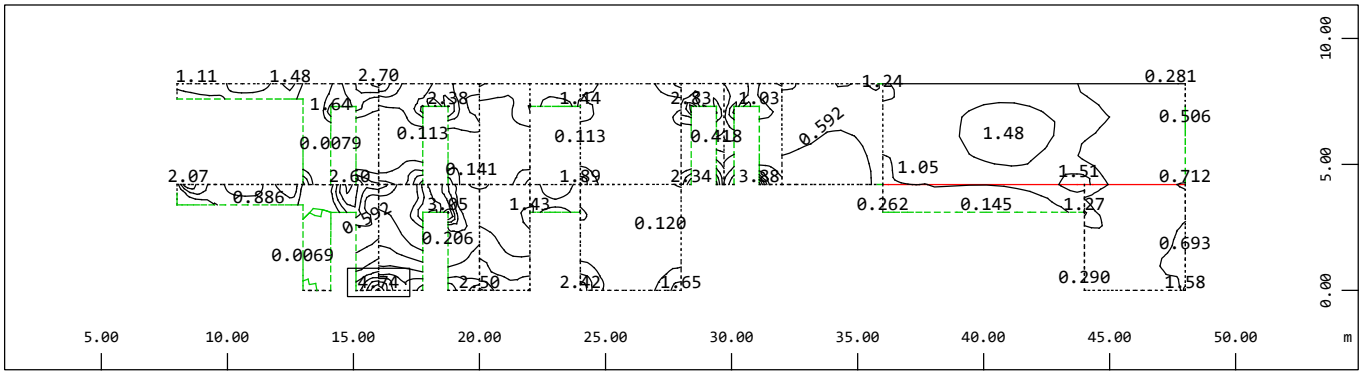

Z
X—Y Sector of system Group 253 M 1 : 300
Quadrilateral Elements , upper Principal reinforcements (1st layer) , Design Case 1 ,
from 0 to 5.36 step 0.670 cm2/m



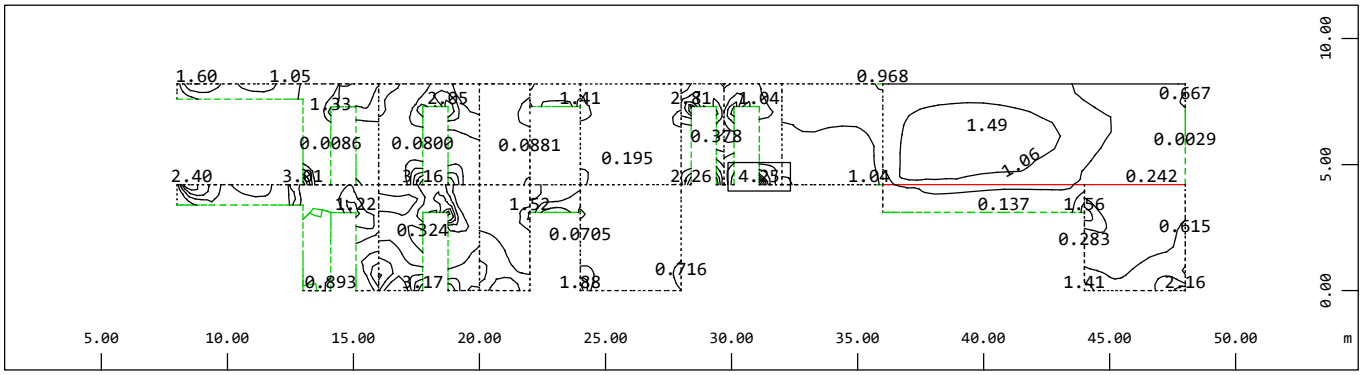

Z
X—Y Sector of system Group 253 M 1 : 300
Quadrilateral Elements , lower Principal reinforcements (1st layer) , Design Case 1 ,
from 0 to 5.70 step 0.713 cm2/m

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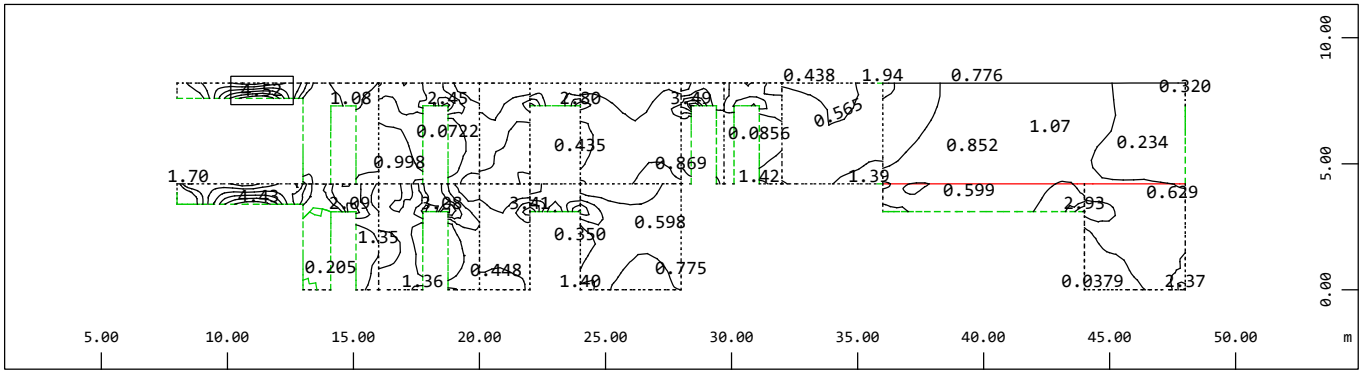
11826 DSO Bovec - zahodna dilat. enota stavbe
Vzdolzne AB stene - os 03: armatura vertikalna, horizontalna



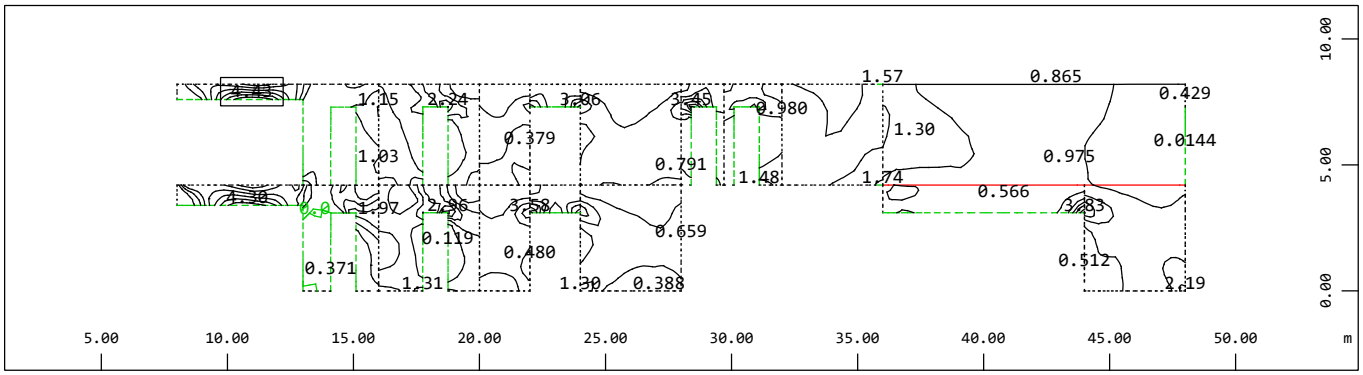

Sector of system Group 254 M 1 : 300
Quadrilateral Elements , upper Cross reinforcements (2nd layer) , Design Case 1 , from
0 to 4.74 step 0.592 cm2/m




Sector of system Group 254 M 1 : 300
Quadrilateral Elements , lower Cross reinforcements (2nd layer) , Design Case 1 , from
0 to 4.25 step 0.532 cm2/m



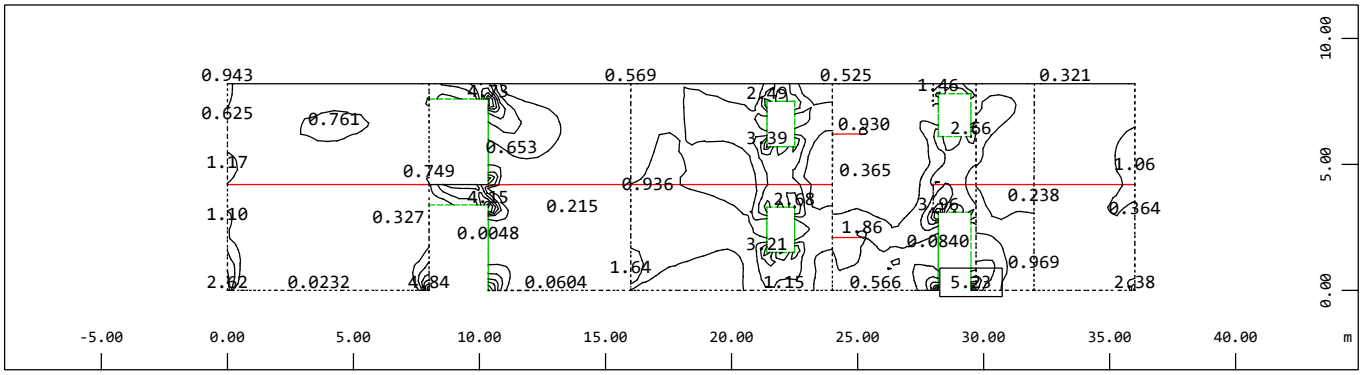

Sector of system Group 254 M 1 : 300
Quadrilateral Elements , upper Principal reinforcements (1st layer) , Design Case 1 ,
from 0 to 4.52 step 0.565 cm2/m



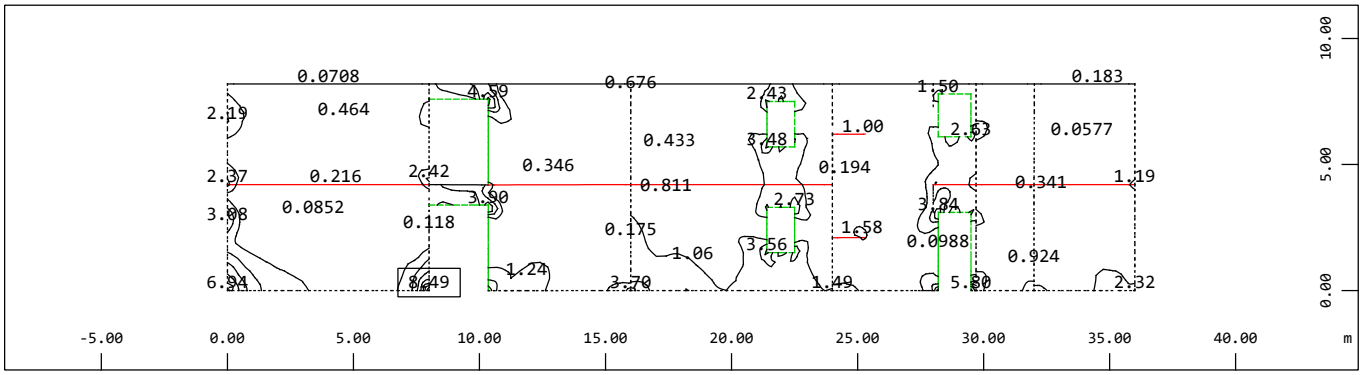

Sector of system Group 254 M 1 : 300
Quadrilateral Elements , lower Principal reinforcements (1st layer) , Design Case 1 ,
from 0 to 4.43 step 0.554 cm2/m

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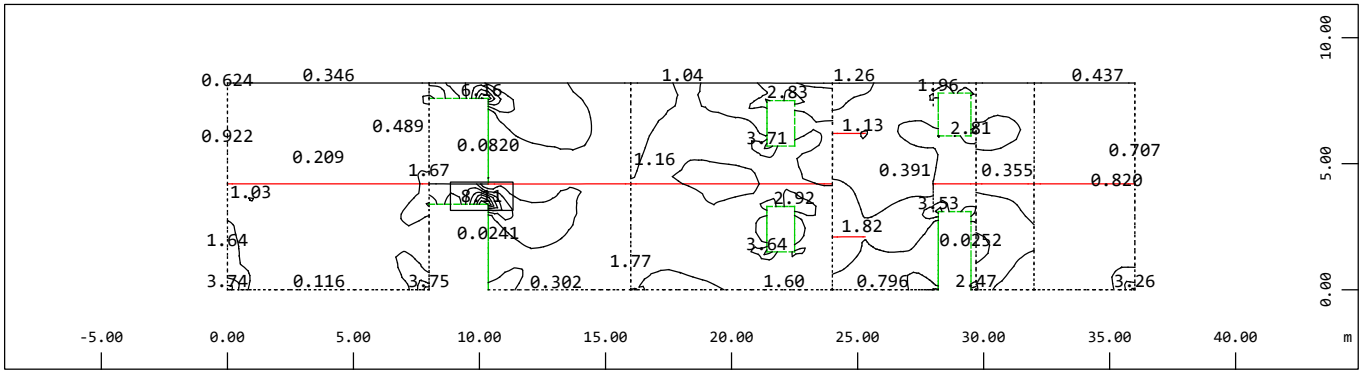
11826 DSO Bovec - zahodna dilat. enota stavbe
Vzdolzne AB stene - os 05: armatura vertikalna, horizontalna



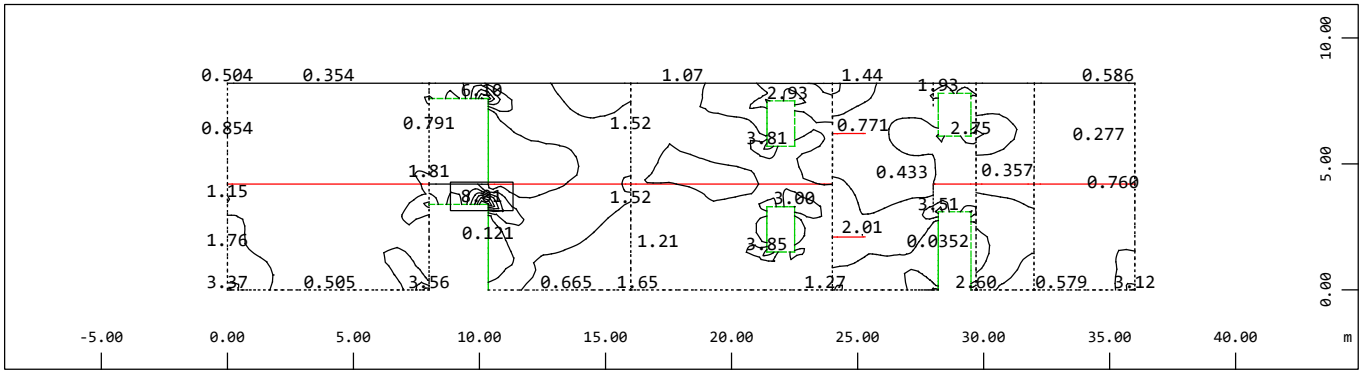

Z
X Y
Sector of system Group 257 M 1 : 300
Quadrilateral Elements , upper Cross reinforcements (2nd layer) , Design Case 1 , from
0.0048 to 5.23 step 0.653 cm2/m




Z
X Y
Sector of system Group 257 M 1 : 300
Quadrilateral Elements , lower Cross reinforcements (2nd layer) , Design Case 1 , from
0.0042 to 8.49 step 1.06 cm2/m



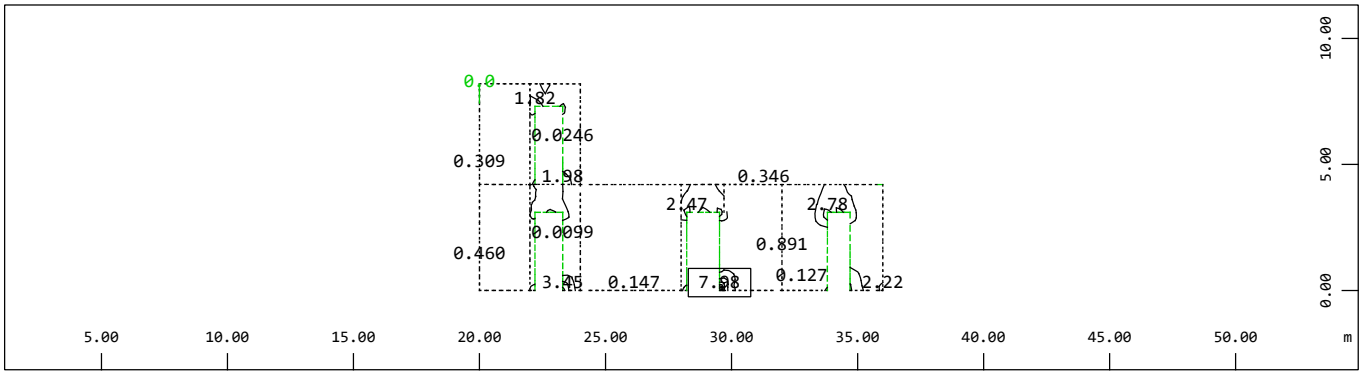

Z
X Y
Sector of system Group 257 M 1 : 300
Quadrilateral Elements , upper Principal reinforcements (1st layer) , Design Case 1 ,
from 0.0066 to 8.11 step 1.01 cm2/m



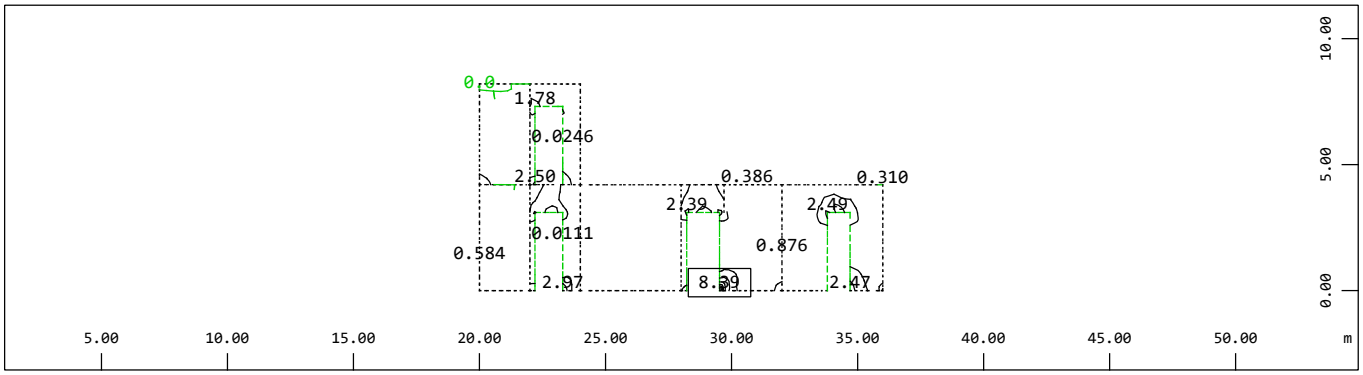

Z
X Y
Sector of system Group 257 M 1 : 300
Quadrilateral Elements , lower Principal reinforcements (1st layer) , Design Case 1 ,
from 0.0211 to 8.01 step 0.998 cm2/m

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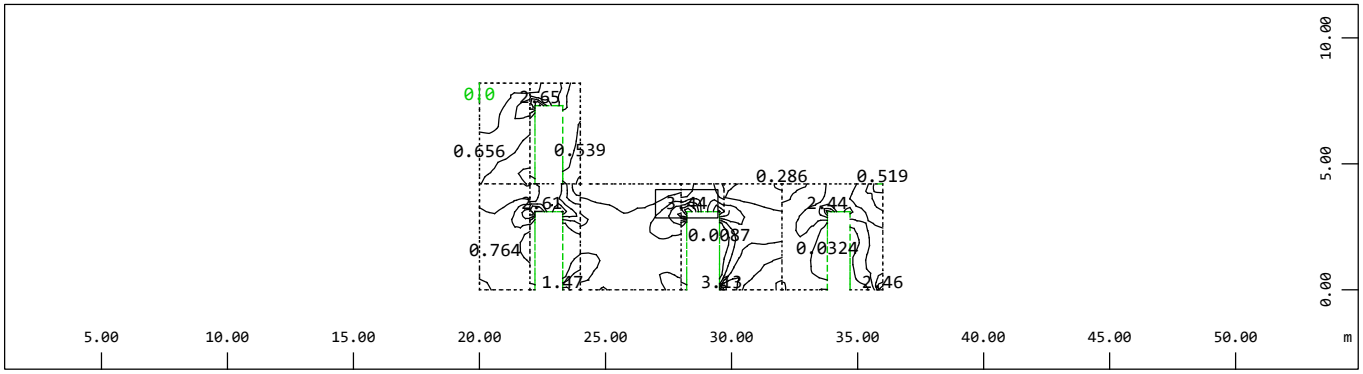
11826 DSO Bovec - zahodna dilat. enota stavbe
Vzdolzne AB stene - os 04: armatura vertikalna, horizontalna



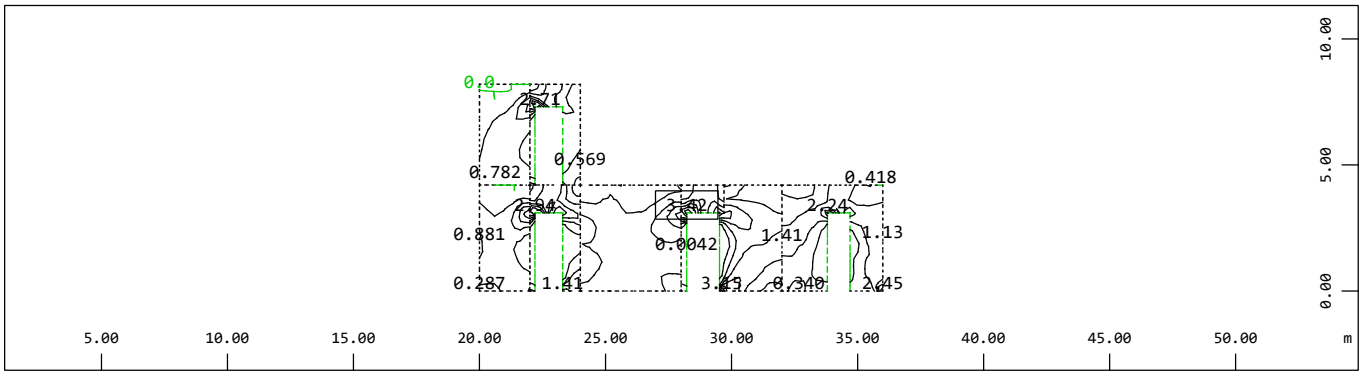

Z
X Y Sector of system Group 255 M 1 : 300
Quadrilateral Elements , upper Cross reinforcements (2nd layer) , Design Case 1 , from
0 to 7.98 step 0.998 cm2/m




Z
X Y Sector of system Group 255 M 1 : 300
Quadrilateral Elements , lower Cross reinforcements (2nd layer) , Design Case 1 , from
0 to 8.39 step 1.05 cm2/m



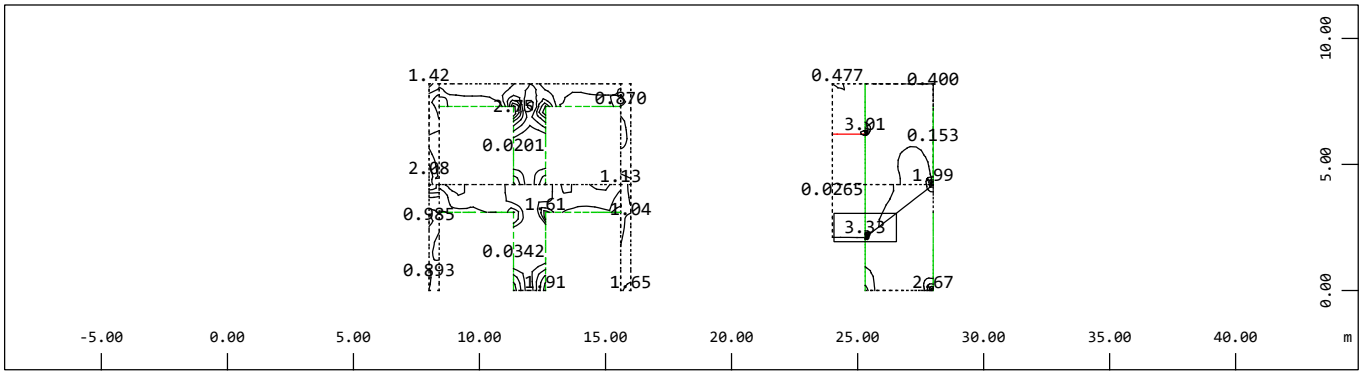

Z
X Y Sector of system Group 255 M 1 : 300
Quadrilateral Elements , upper Principal reinforcements (1st layer) , Design Case 1 ,
from 0 to 3.44 step 0.430 cm2/m



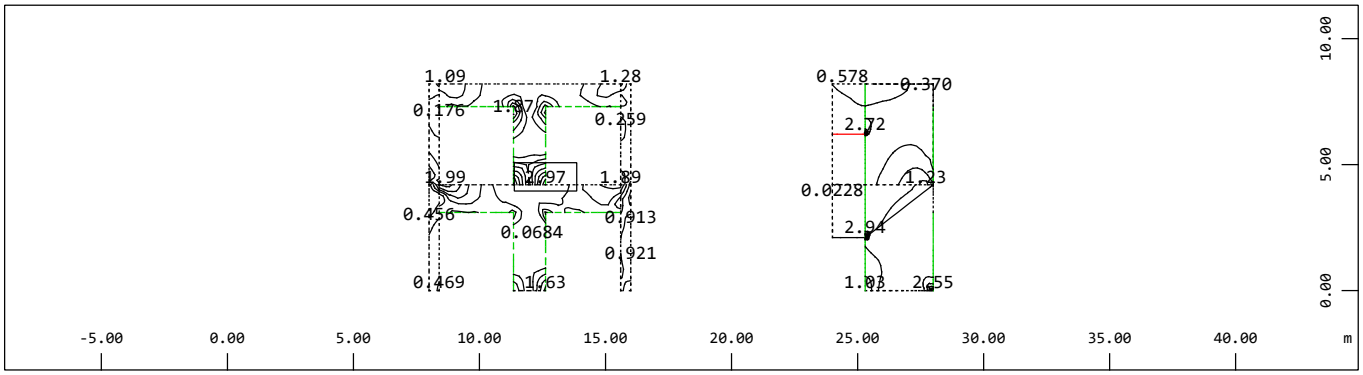

Z
X Y Sector of system Group 255 M 1 : 300
Quadrilateral Elements , lower Principal reinforcements (1st layer) , Design Case 1 ,
from 0 to 3.42 step 0.427 cm2/m

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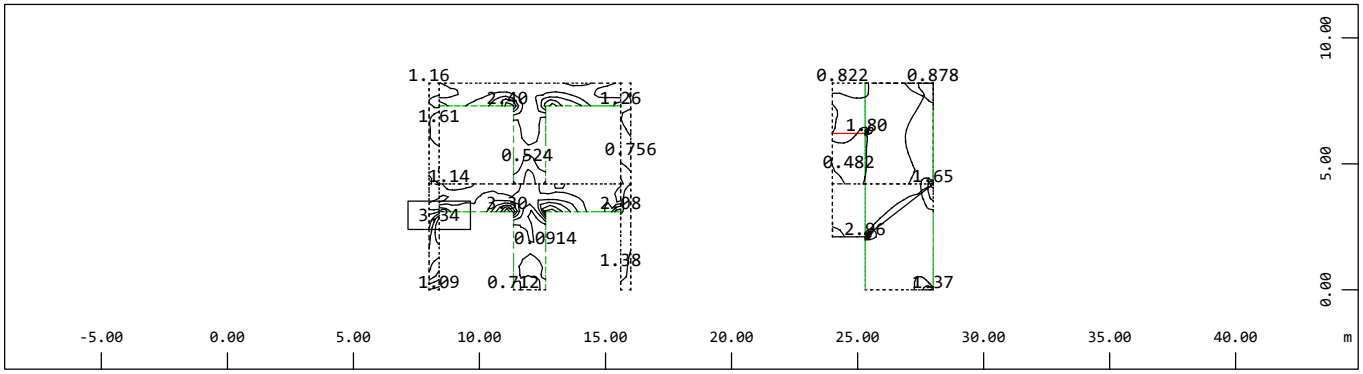
11826 DSO Bovec - zahodna dilat. enota stavbe
Vzdolzne AB stene - ostale: armatura vertikalna, horizontalna



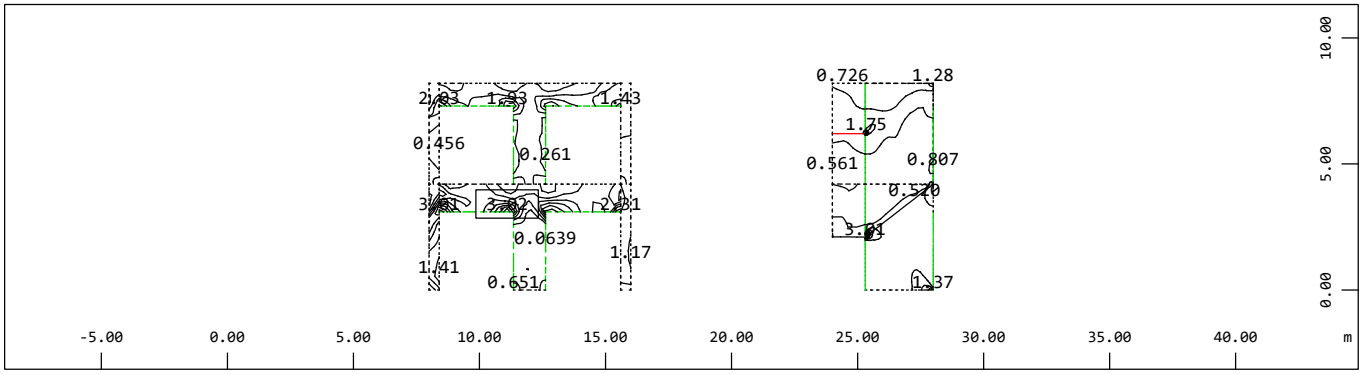

Z
X Y
Sector of system Quadrilateral Elements Group 252 256 M 1 : 300
Quadrilateral Elements , upper Cross reinforcements (2nd layer) , Design Case 1 , from
0 to 3.33 step 0.416 cm2/m




Z
X Y
Sector of system Quadrilateral Elements Group 252 256 M 1 : 300
Quadrilateral Elements , lower Cross reinforcements (2nd layer) , Design Case 1 , from
0 to 2.97 step 0.372 cm2/m



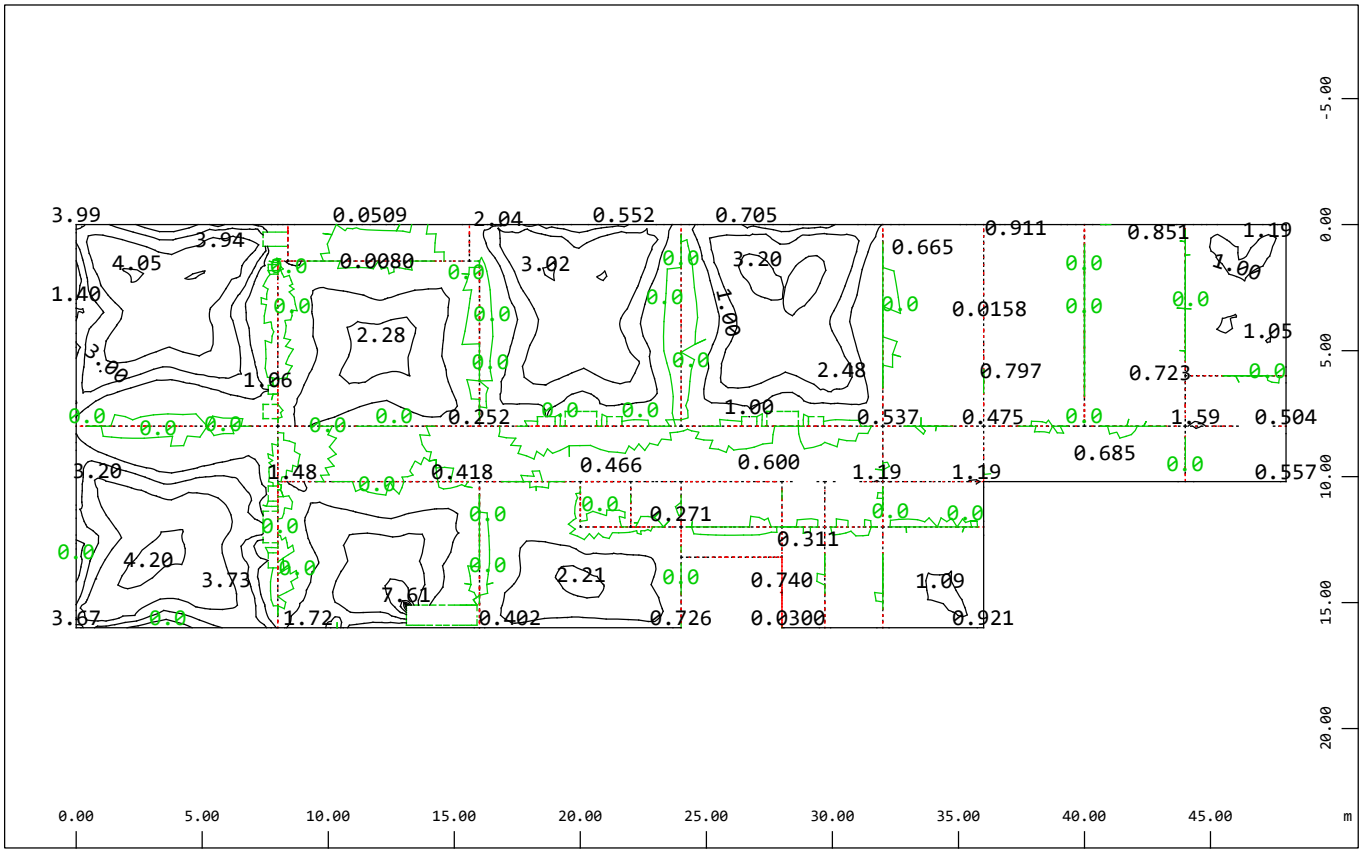

Z
X Y
Sector of system Quadrilateral Elements Group 252 256 M 1 : 300
Quadrilateral Elements , upper Principal reinforcements (1st layer) , Design Case 1 ,
from 0 to 3.34 step 0.417 cm2/m



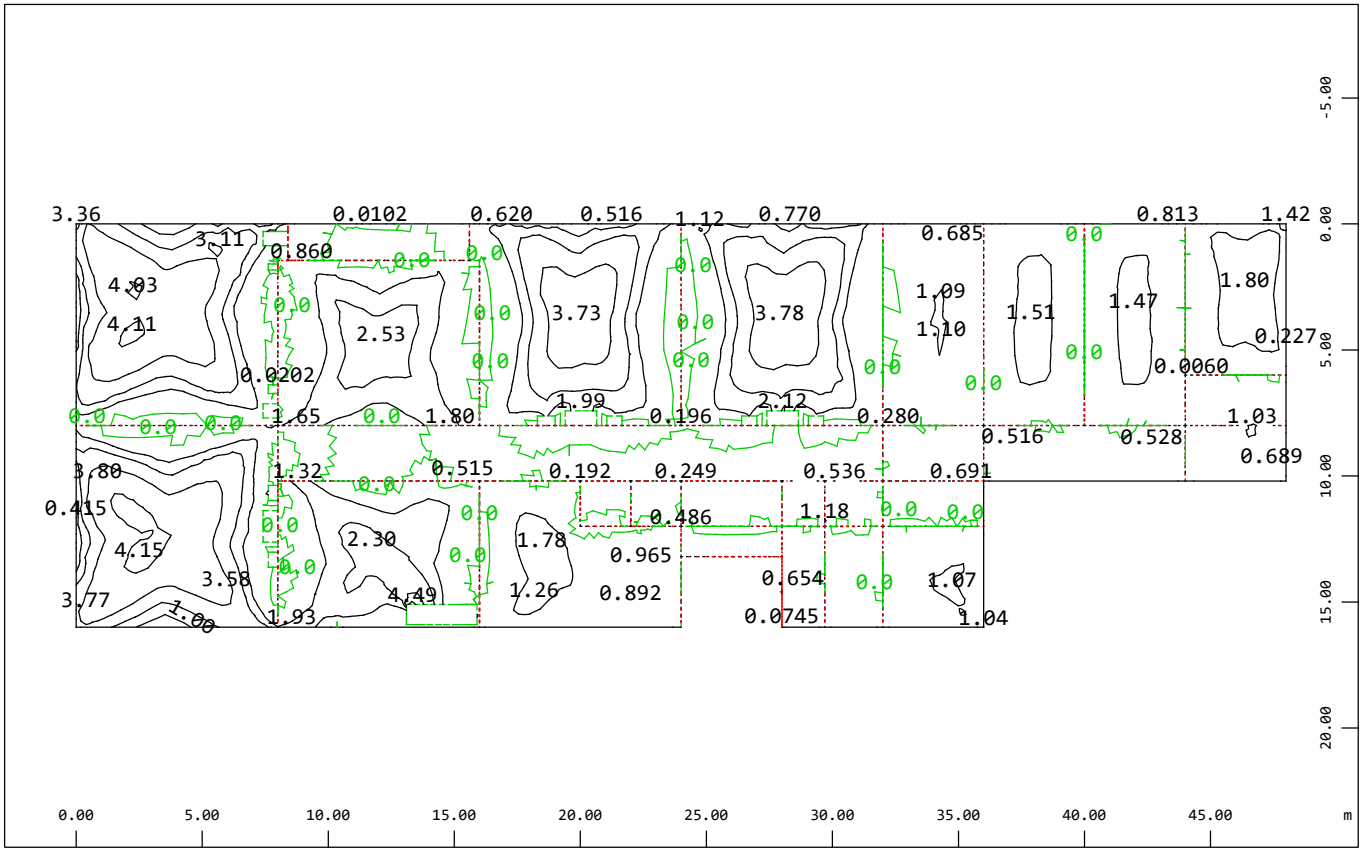

Z
X Y
Sector of system Quadrilateral Elements Group 252 256 M 1 : 300
Quadrilateral Elements , lower Principal reinforcements (1st layer) , Design Case 1 ,
from 0 to 3.02 step 0.378 cm2/m

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11826 DSO Bovec - zahodna dilat. enota stavbe
Etazna plosca: armatura spodnja



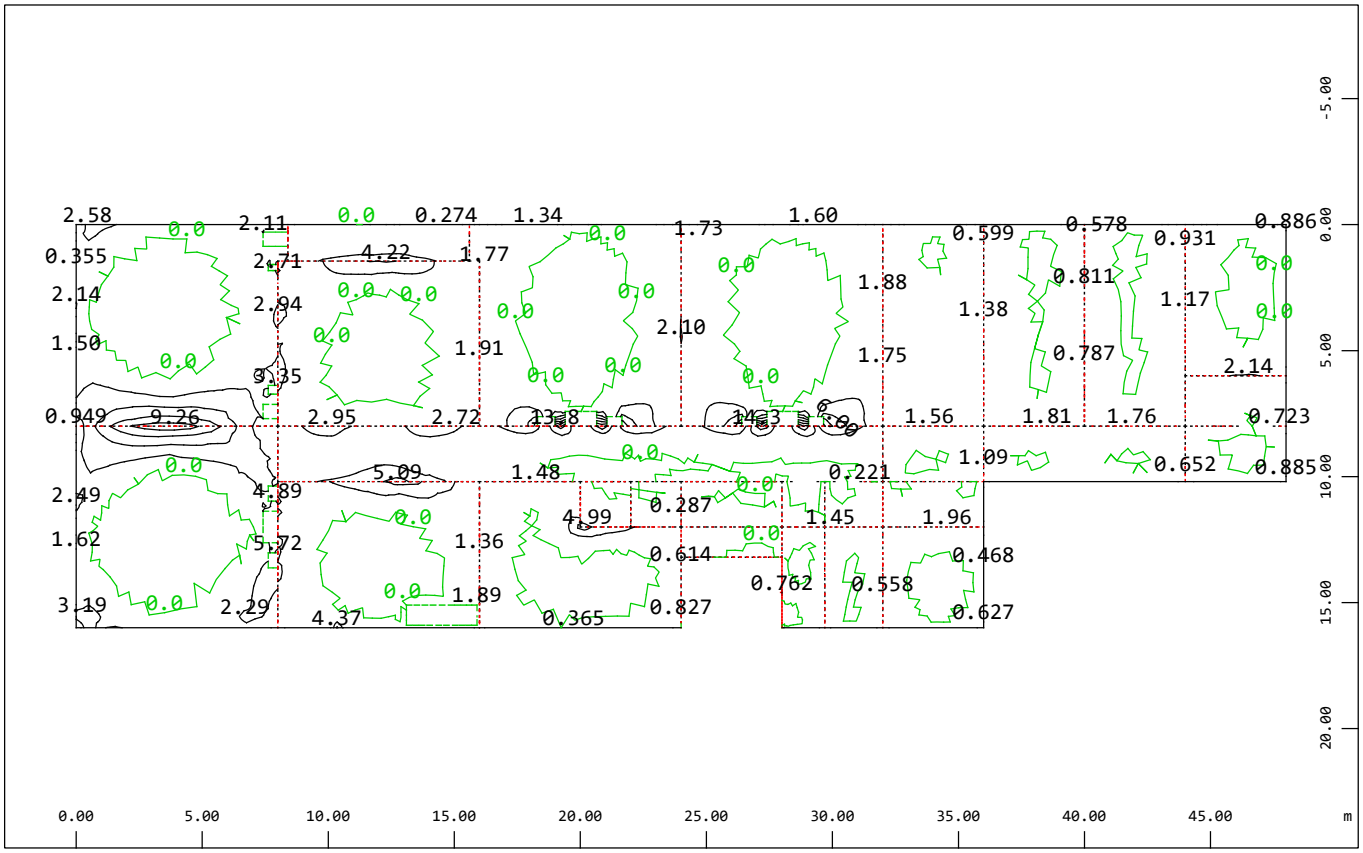

Sector of system Group 110 M 1 : 300
Z Y
X
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 7.61 step 1.00 cm2/m



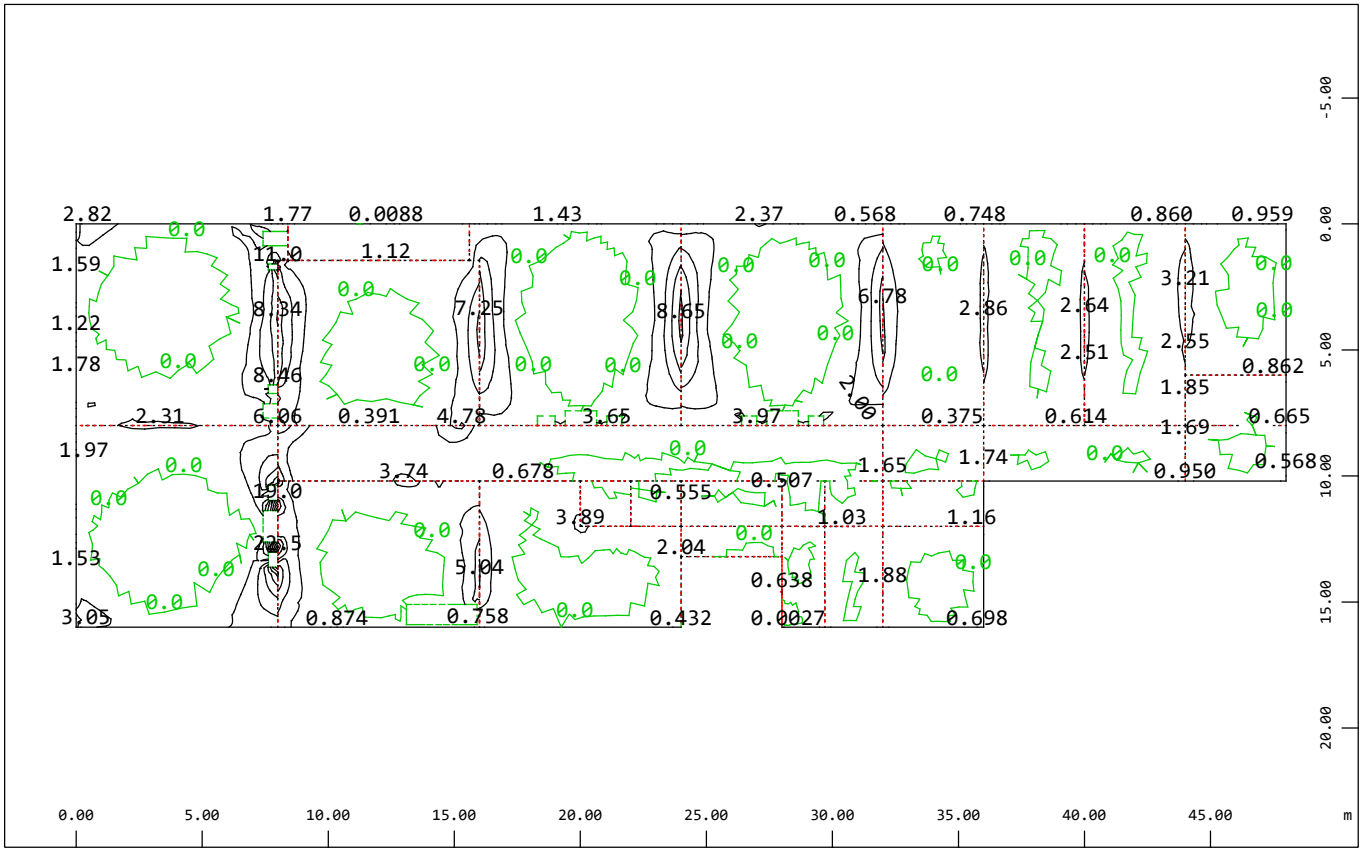

Sector of system Group 110 M 1 : 300
Z Y
X
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 4.49 step 1.00 cm2/m

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11826 DSO Bovec - zahodna dilat. enota stavbe
Etazna plosca: armatura zgornja



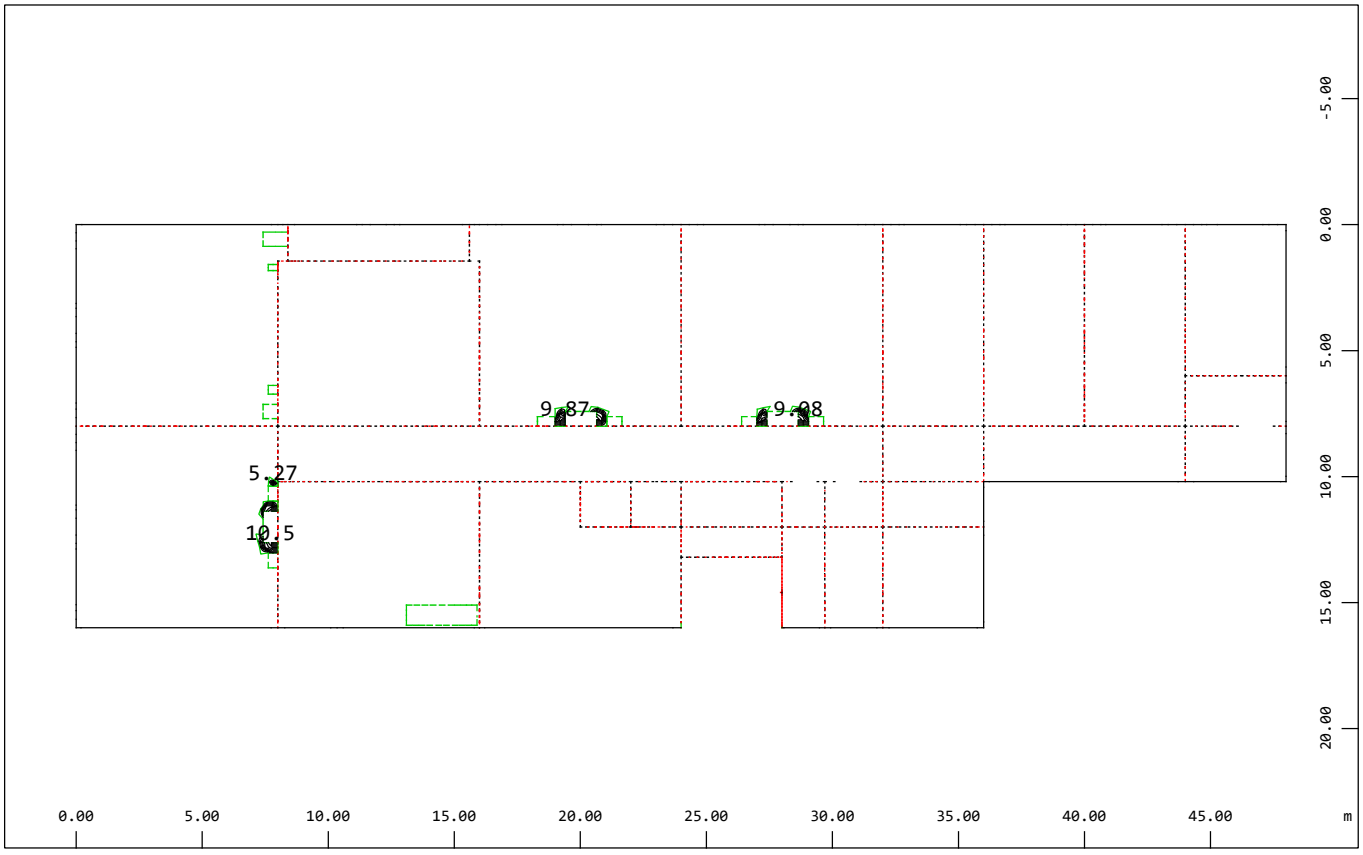

Sector of system Group 110 M 1 : 300
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 15.8 step 2.00 cm2/m




Sector of system Group 110 M 1 : 300
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 20.0 step 2.00 cm2/m

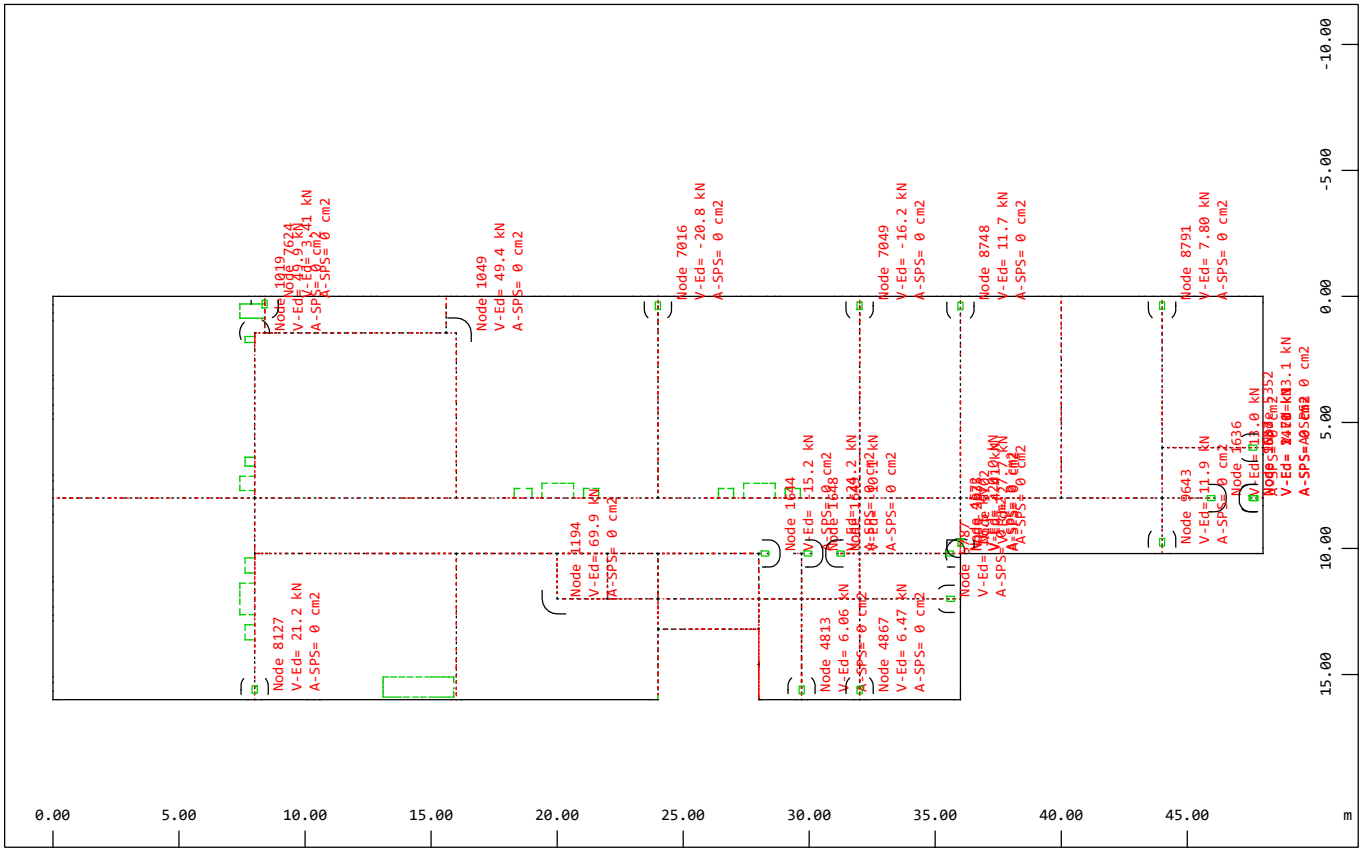
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11826 DSO Bovec - zahodna dilat. enota stavbe
Etazna plosca: armatura strizna in prebojna



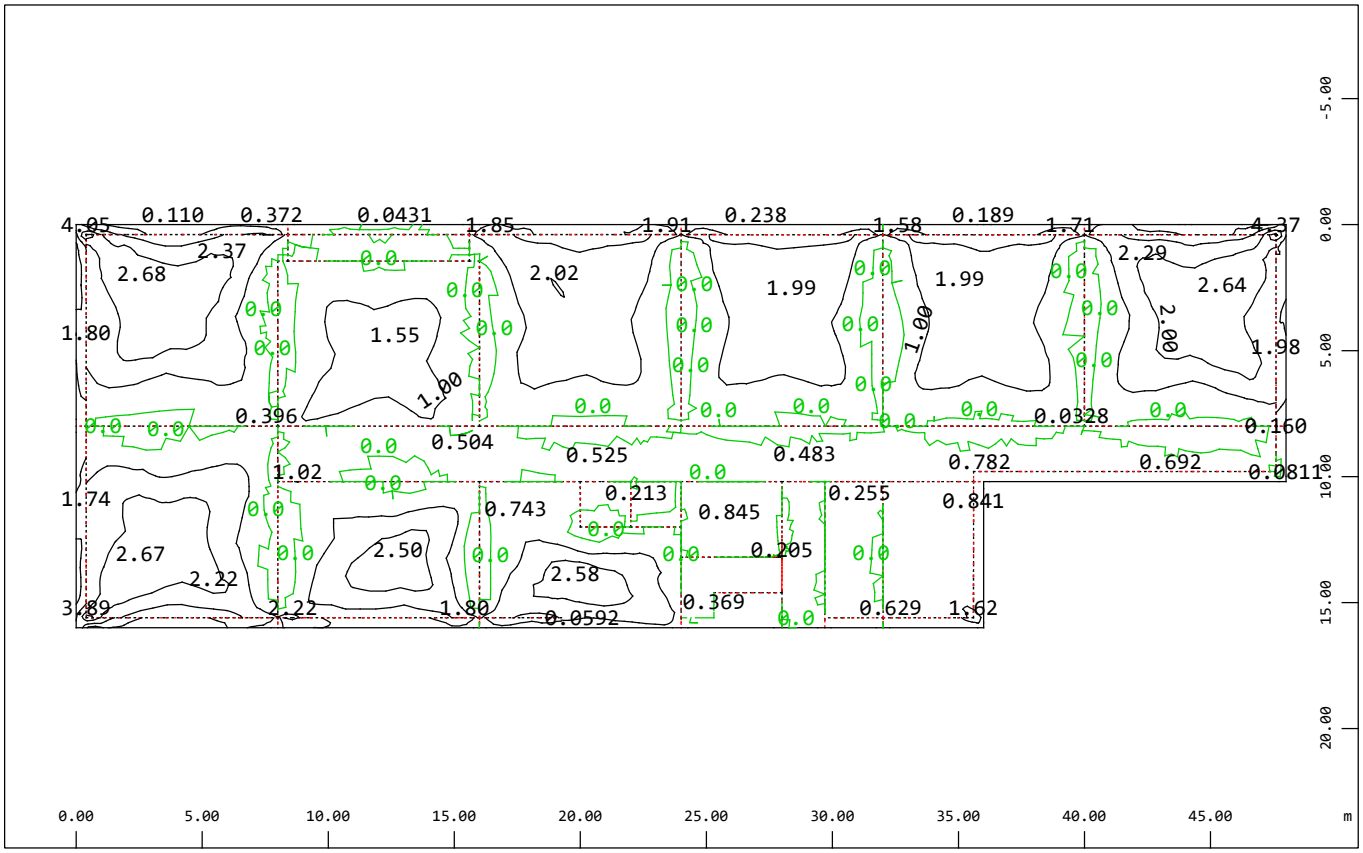

Sector of system Group 110 M 1 : 300
Quadrilateral Elements , Shear reinforcement in Node , Design Case 1 , from 0 to 10.5
step 1.31 cm2/m2

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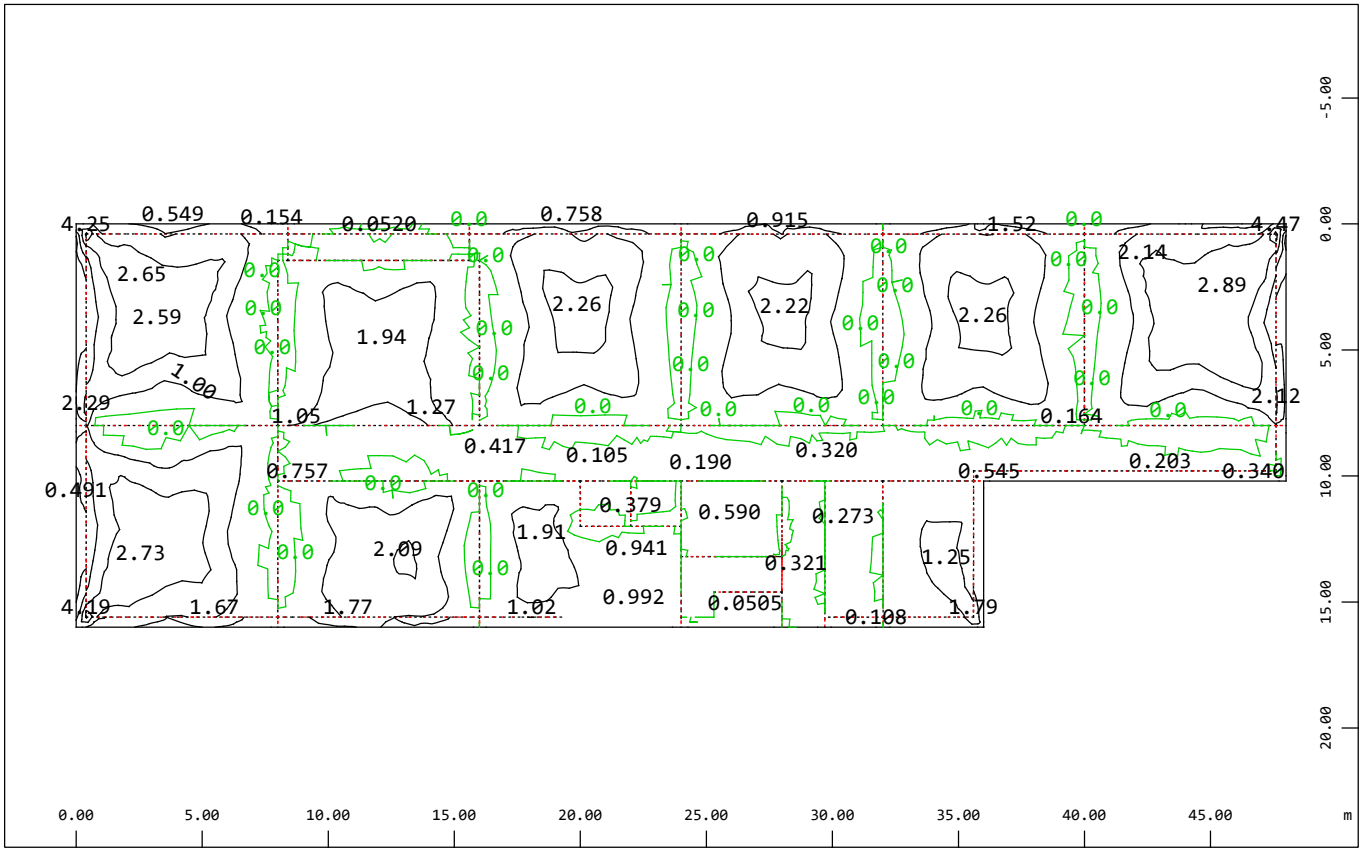



Sector of system Group 110 M 1 : 300
Punching in cm2/m2, Design Case 1 (Max=0)

11826 DSO Bovec - zahodna dilat. enota stavbe
Stresna plosca: armatura spodnja



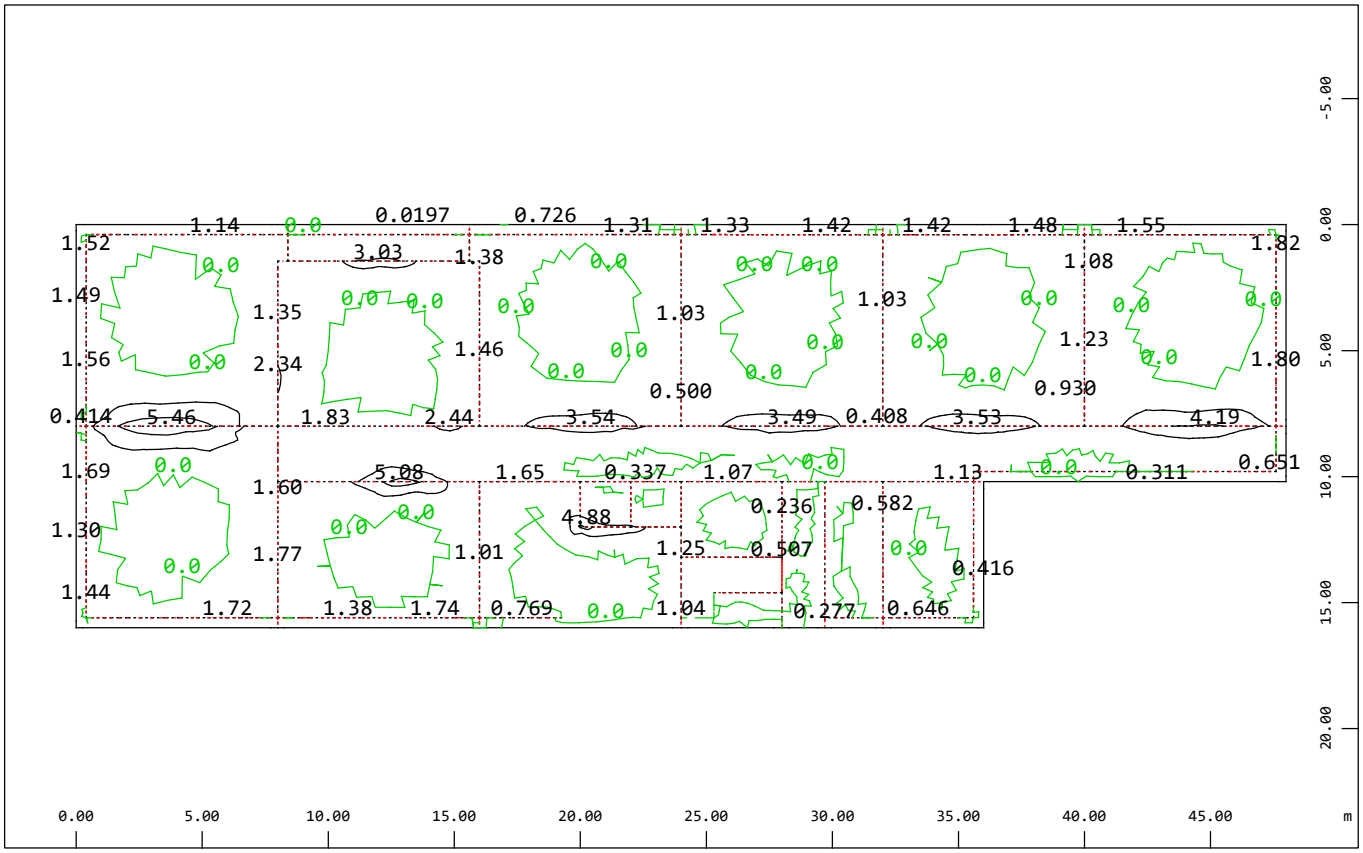

Sector of system Group 120 M 1 : 300
Z Y
X
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 4.37 step 1.00 cm2/m



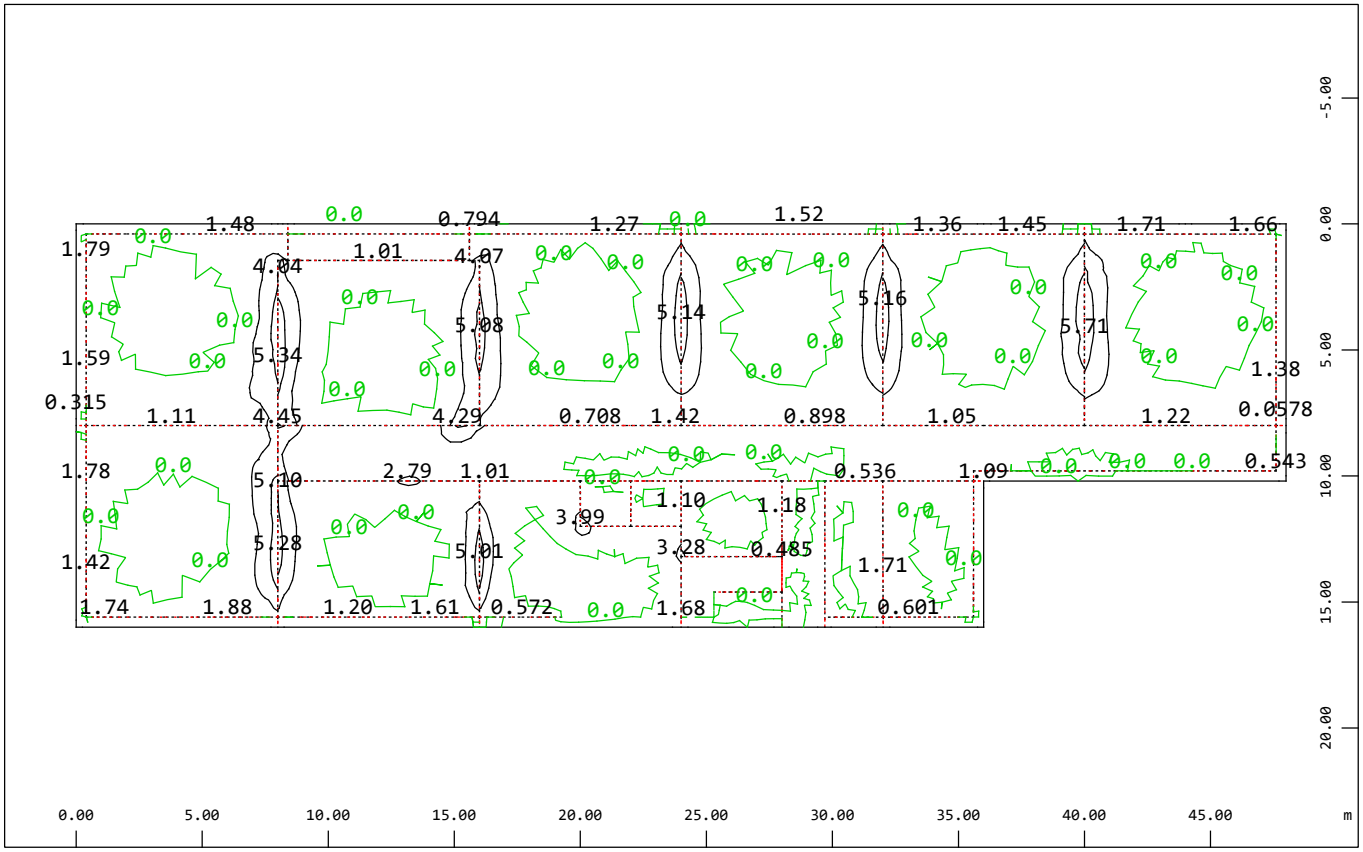

Sector of system Group 120 M 1 : 300
Z Y
X
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 4.47 step 1.00 cm2/m

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11826 DSO Bovec - zahodna dilat. enota stavbe
Stresna plosca: armatura zgornja



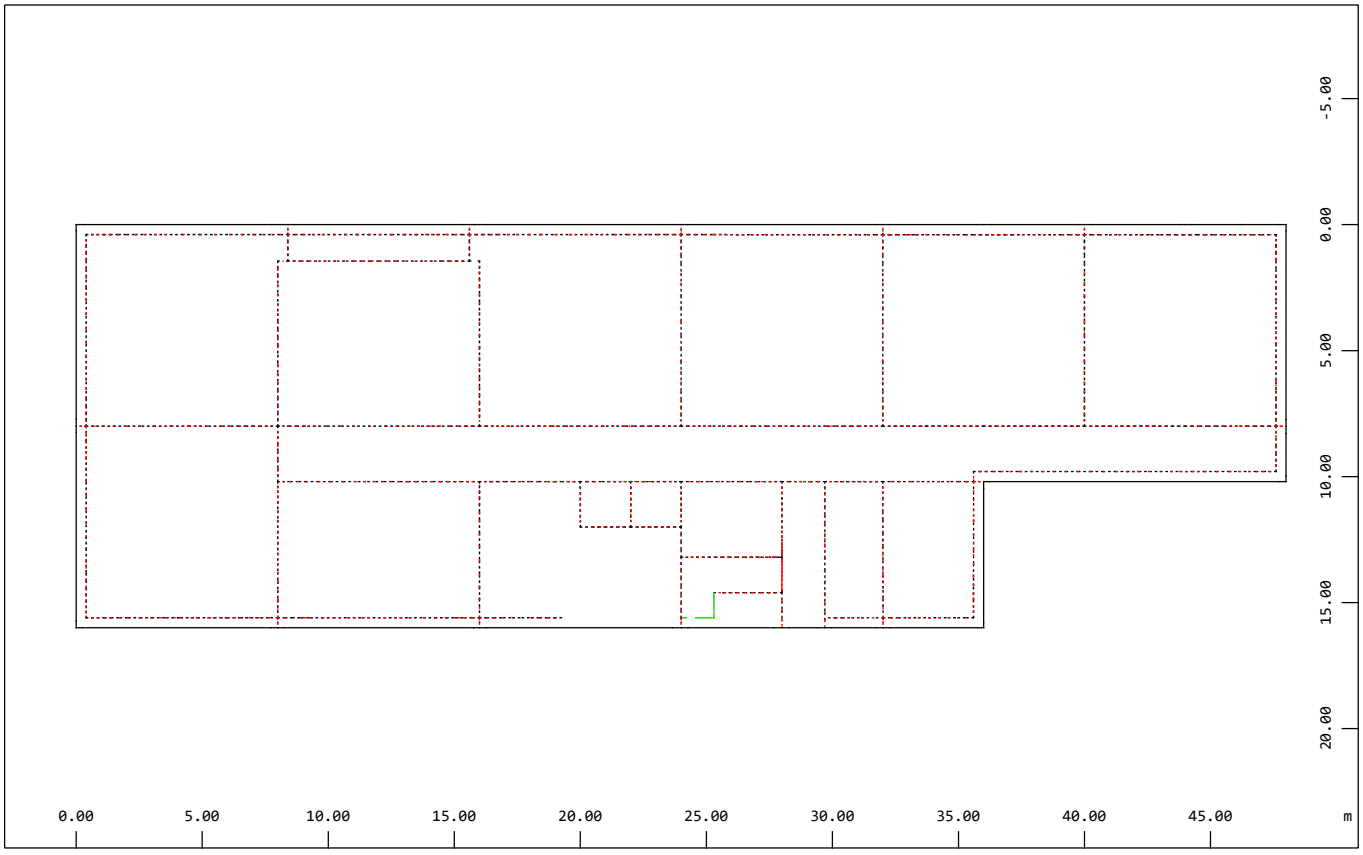

Sector of system Group 120 M 1 : 300
Z Y
X
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 15.8 step 2.00 cm2/m



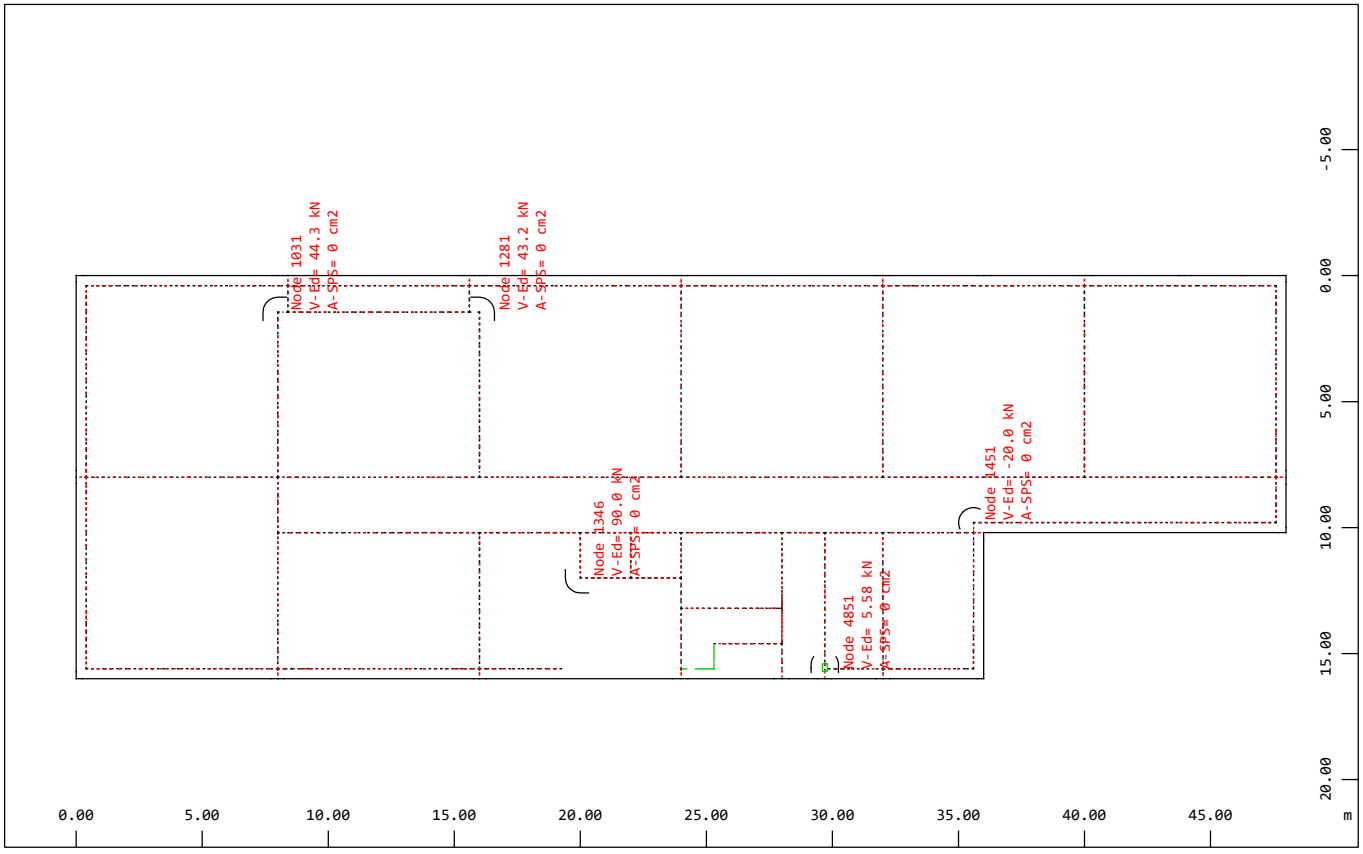

Sector of system Group 120 M 1 : 300
Z Y
X
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 20.0 step 2.00 cm2/m

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11826 DSO Bovec - zahodna dilat. enota stavbe
Stresna plosca: armatura strizna in prebojna



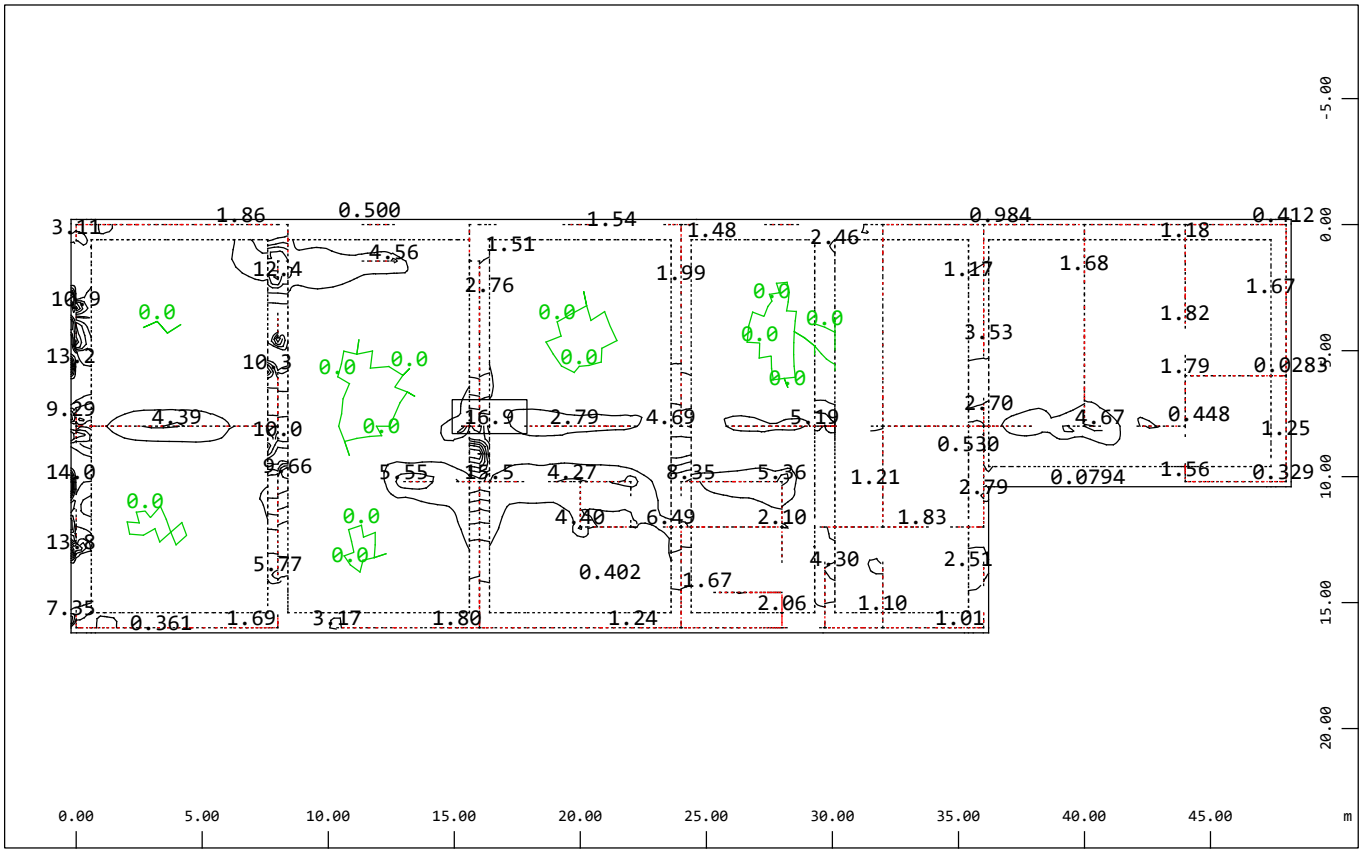

Sector of system Group 120 M 1 : 300
Z Y
X
Quadrilateral Elements , Shear reinforcement in Node , Design Case 1 , from 0 to 10.0
step 1.25 cm2/m2



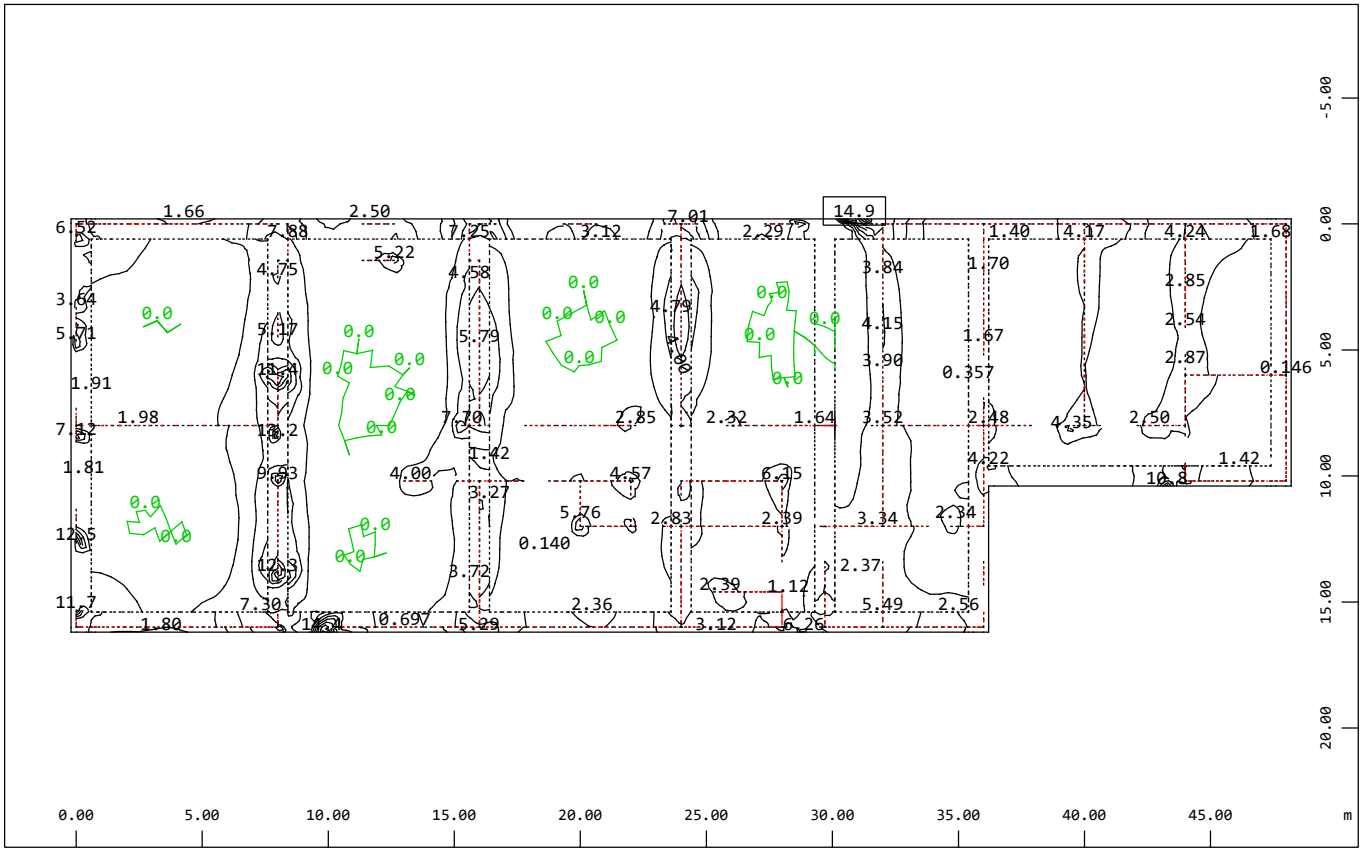

Sector of system Group 120 M 1 : 300
Z Y
X
Punching in cm2/m2, Design Case 1 (Max=0)

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11826 DSO Bovec - zahodna dilat. enota stavbe
Temelji in tem. plosca: armatura spodnja



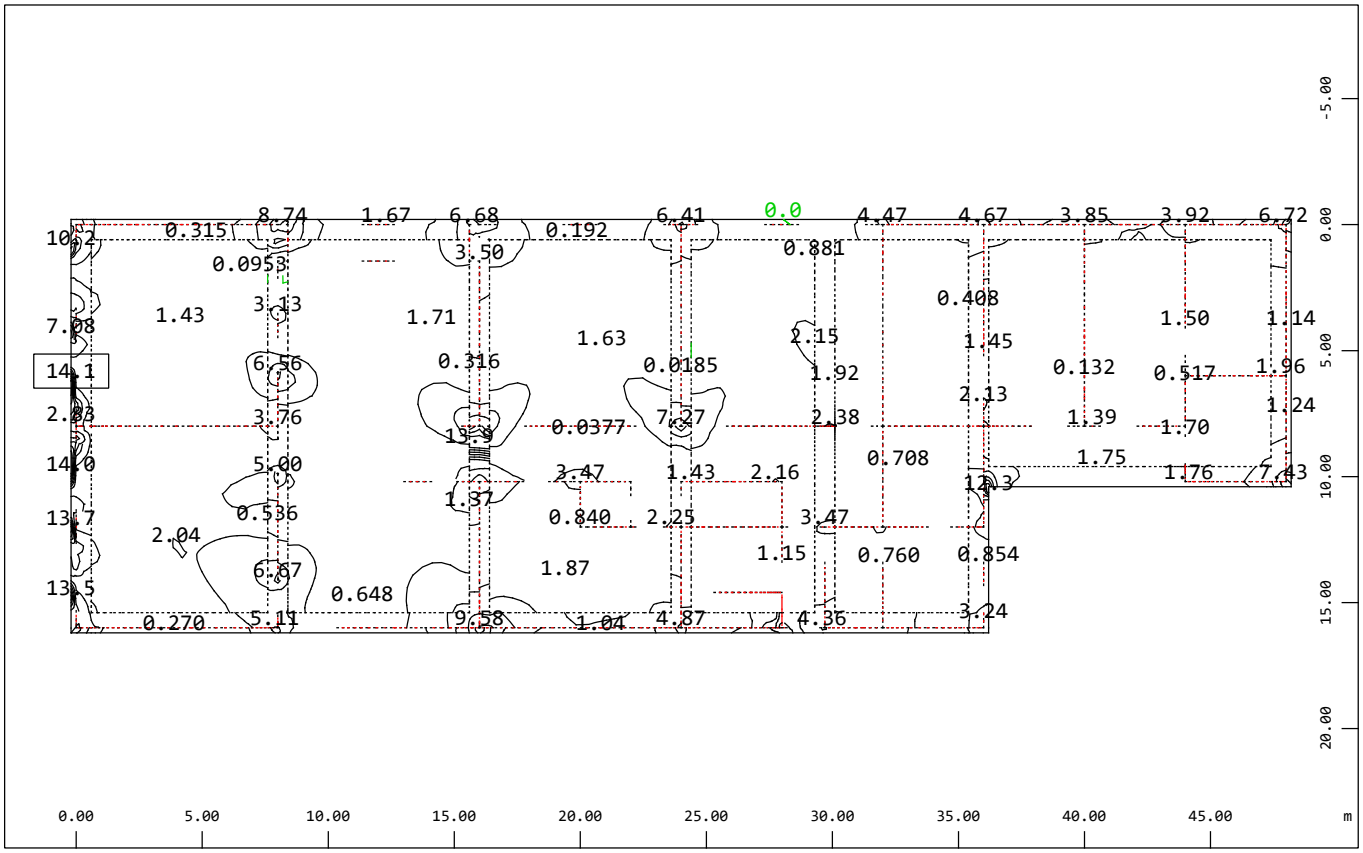

Sector of system Group 100 M 1 : 300
Z Y
X
Quadrilateral Elements , lower Principal reinforcements (1st layer) , Design Case 1 ,
from 0 to 16.9 step 2.00 cm2/m



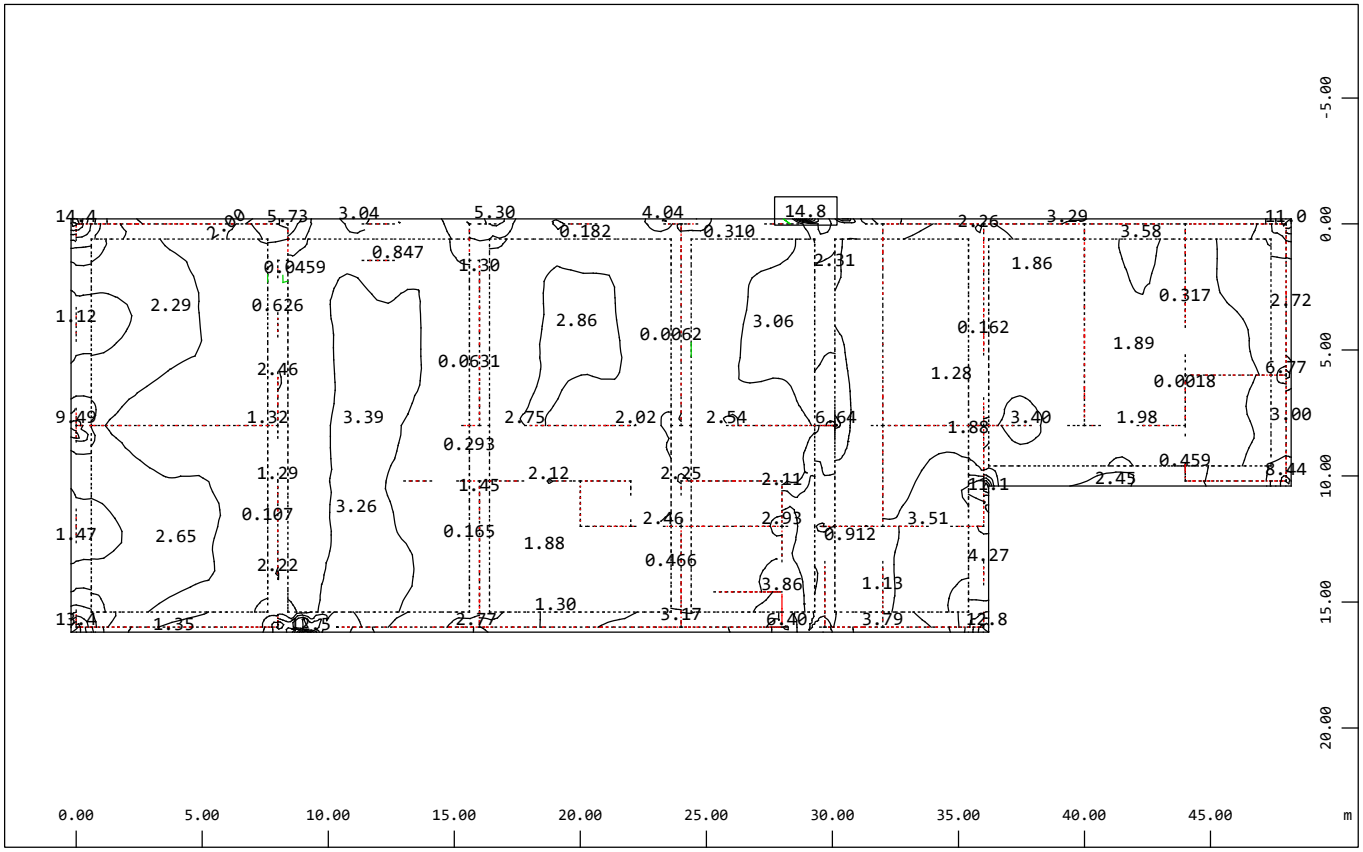

Sector of system Group 100 M 1 : 300
Z Y
X
Quadrilateral Elements , lower Cross reinforcements (2nd layer) , Design Case 1 , from
0 to 14.9 step 2.00 cm2/m

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11826 DSO Bovec - zahodna dilat. enota stavbe
Temelji in tem. plosca: armatura zgornja



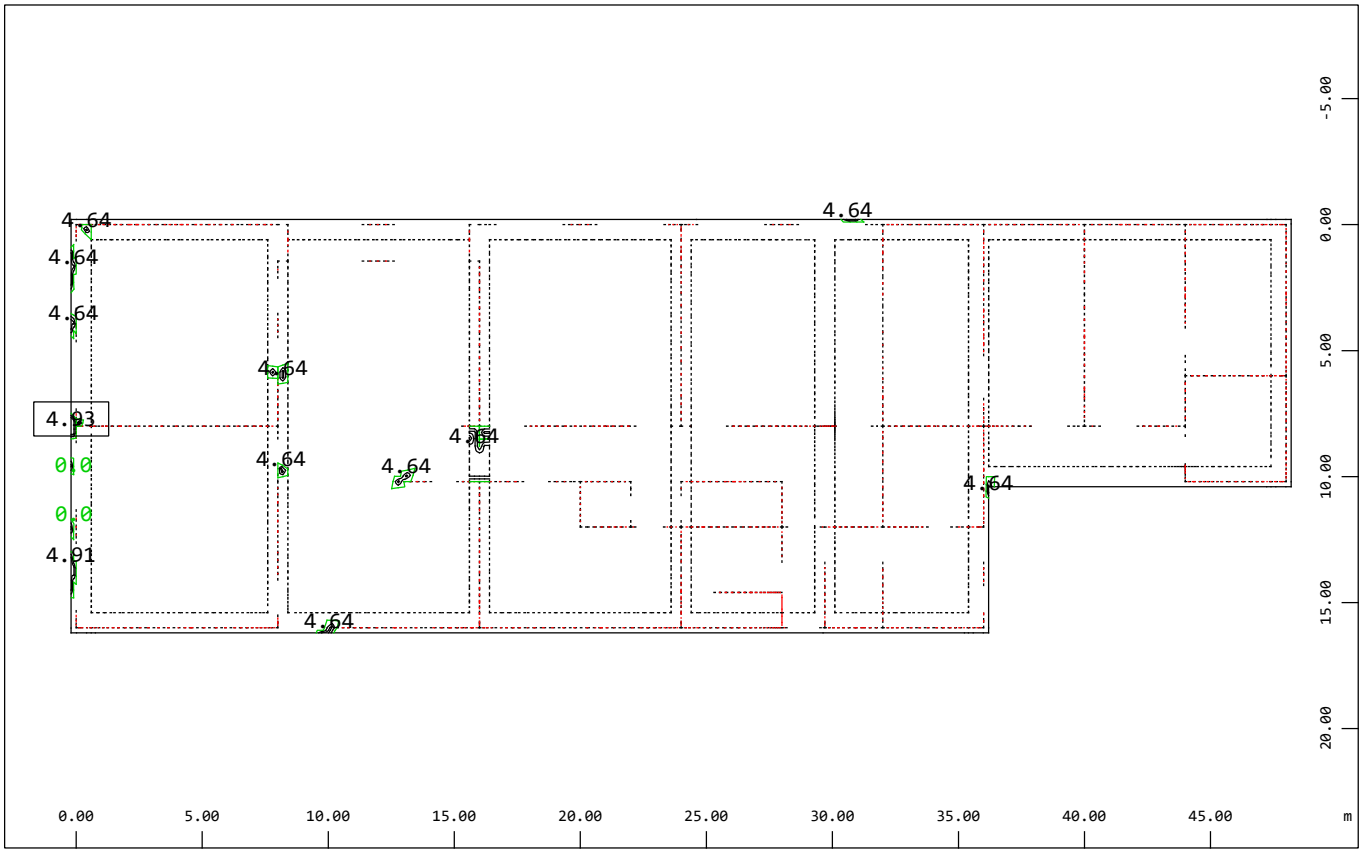

Sector of system Group 100 M 1 : 300
Quadrilateral Elements , upper Principal reinforcements (1st layer) , Design Case 1 ,
from 0 to 14.1 step 2.00 cm2/m




Sector of system Group 100 M 1 : 300
Quadrilateral Elements , upper Cross reinforcements (2nd layer) , Design Case 1 , from
0 to 14.8 step 2.00 cm2/m

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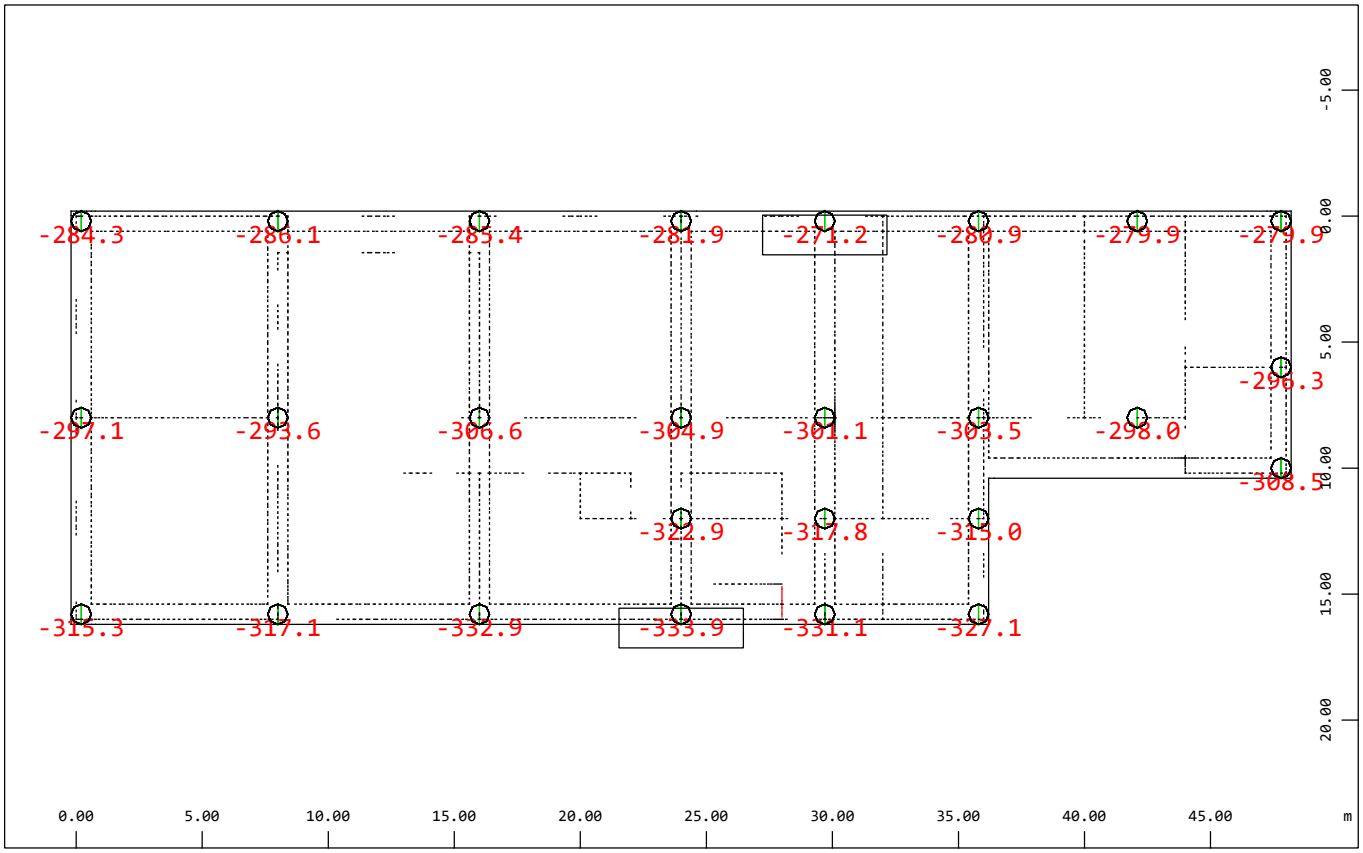
11826 DSO Bovec - zahodna dilat. enota stavbe
Temelji in tem. plosca: armatura strizna



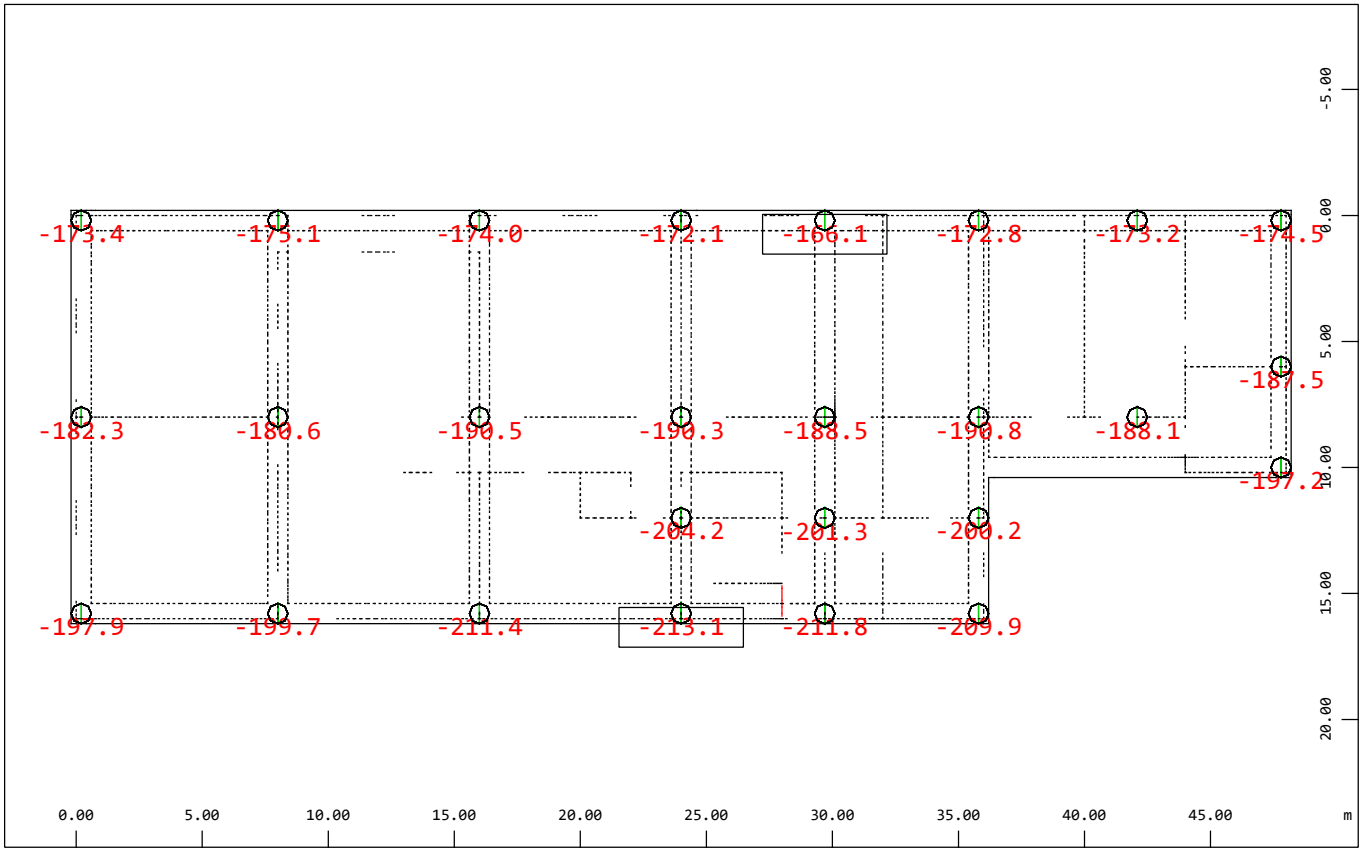

Sector of system Group 100 M 1 : 300
Quadrilateral Elements , Shear reinforcement in Node , Design Case 1 , from 0 to 4.93
step 2.00 cm2/m2

SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - zahodna dilat. enota stavbe
Ovoj. sil na vodnjakih pod plosco: MSN (faktorirano)



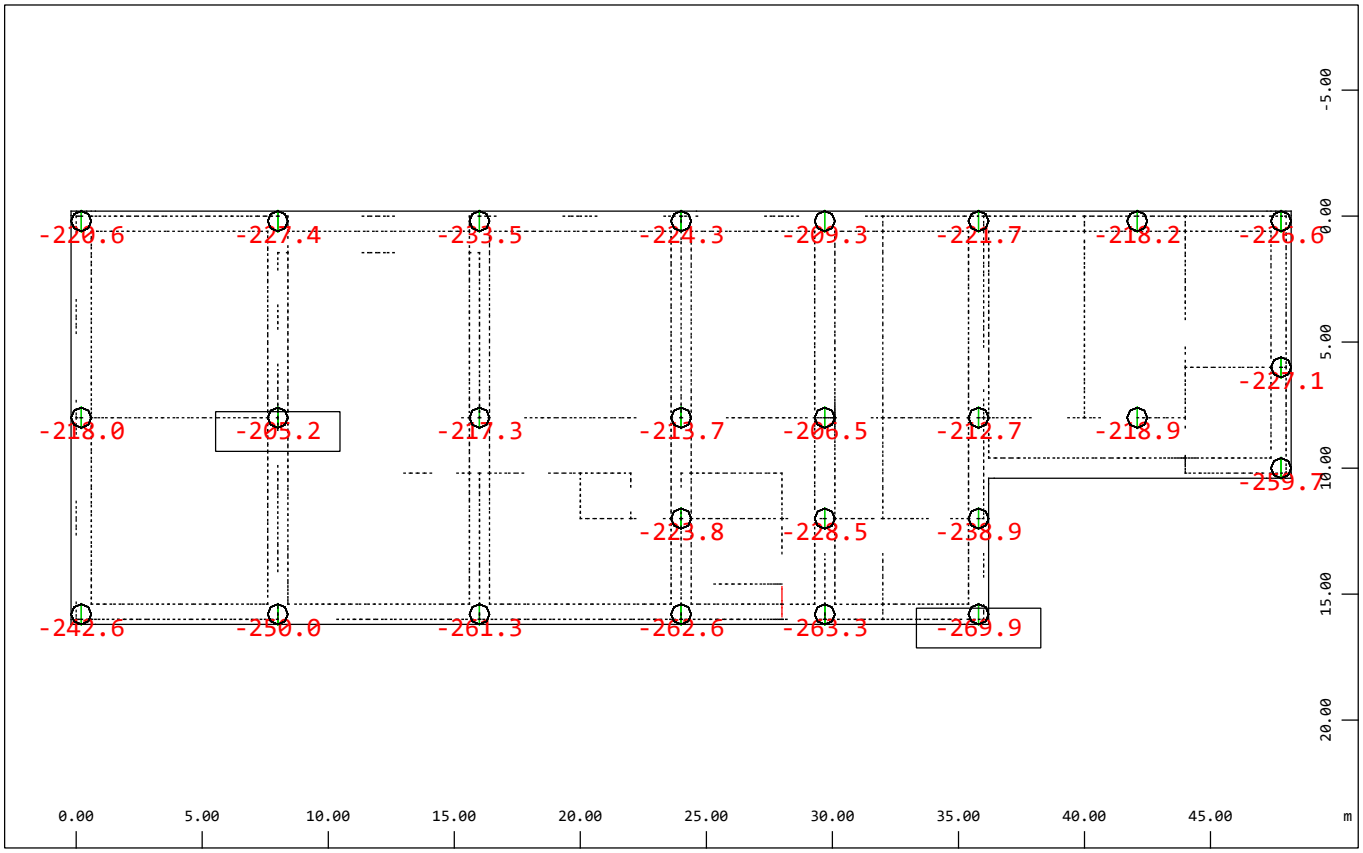

Sector of system Group 100 101 M 1 : 300
Beam Elements , Normal force Nx in kN, Loadcase 8022 MIN-N BEAM (Min=-333.9)
(Max=-271.2)



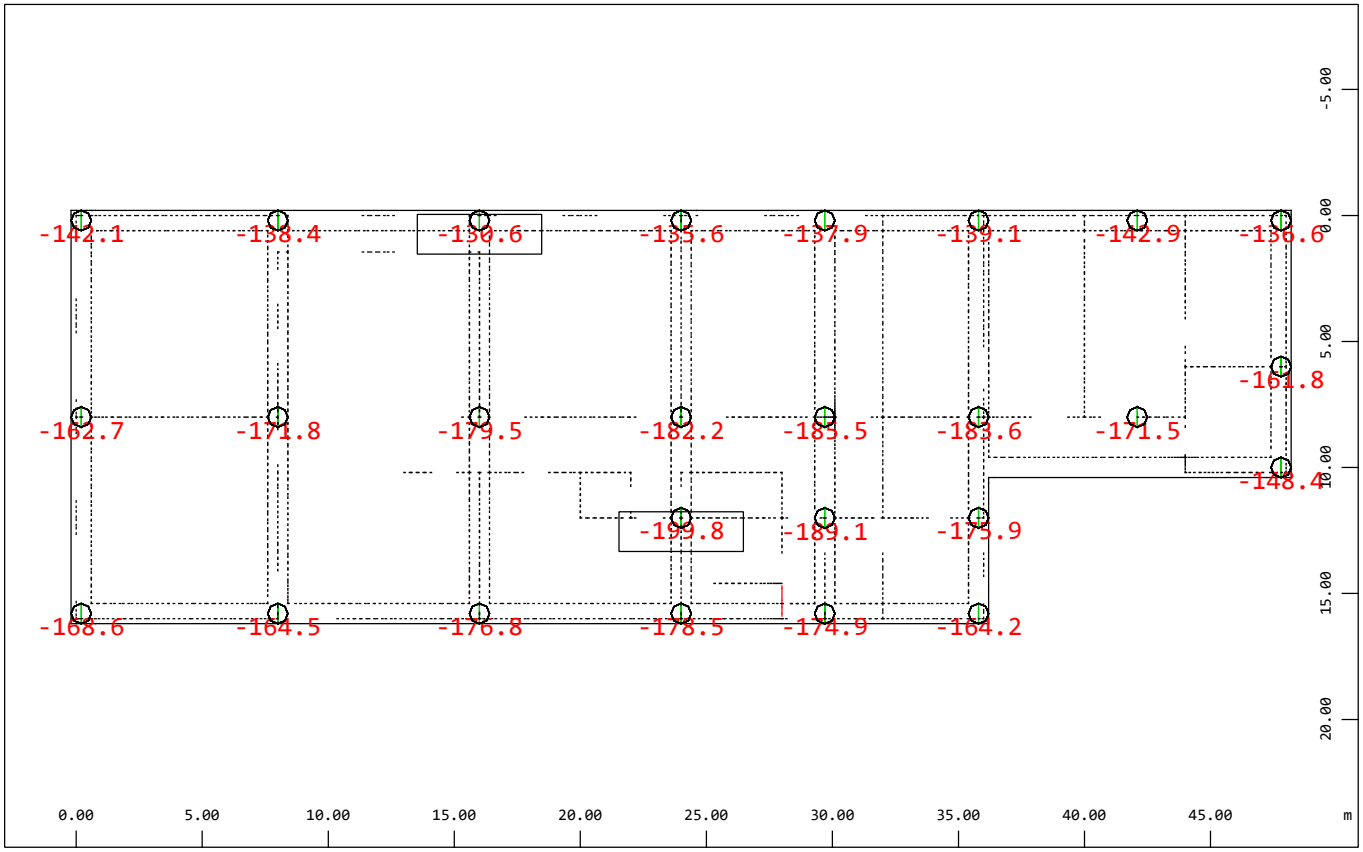

Sector of system Group 100 101 M 1 : 300
Beam Elements , Normal force Nx in kN, Loadcase 8021 MAX-N BEAM (Min=-213.1)
(Max=-166.1)

SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - zahodna dilat. enota stavbe
Ovoj. sil na vodnjakih pod plosco: MSN-potres



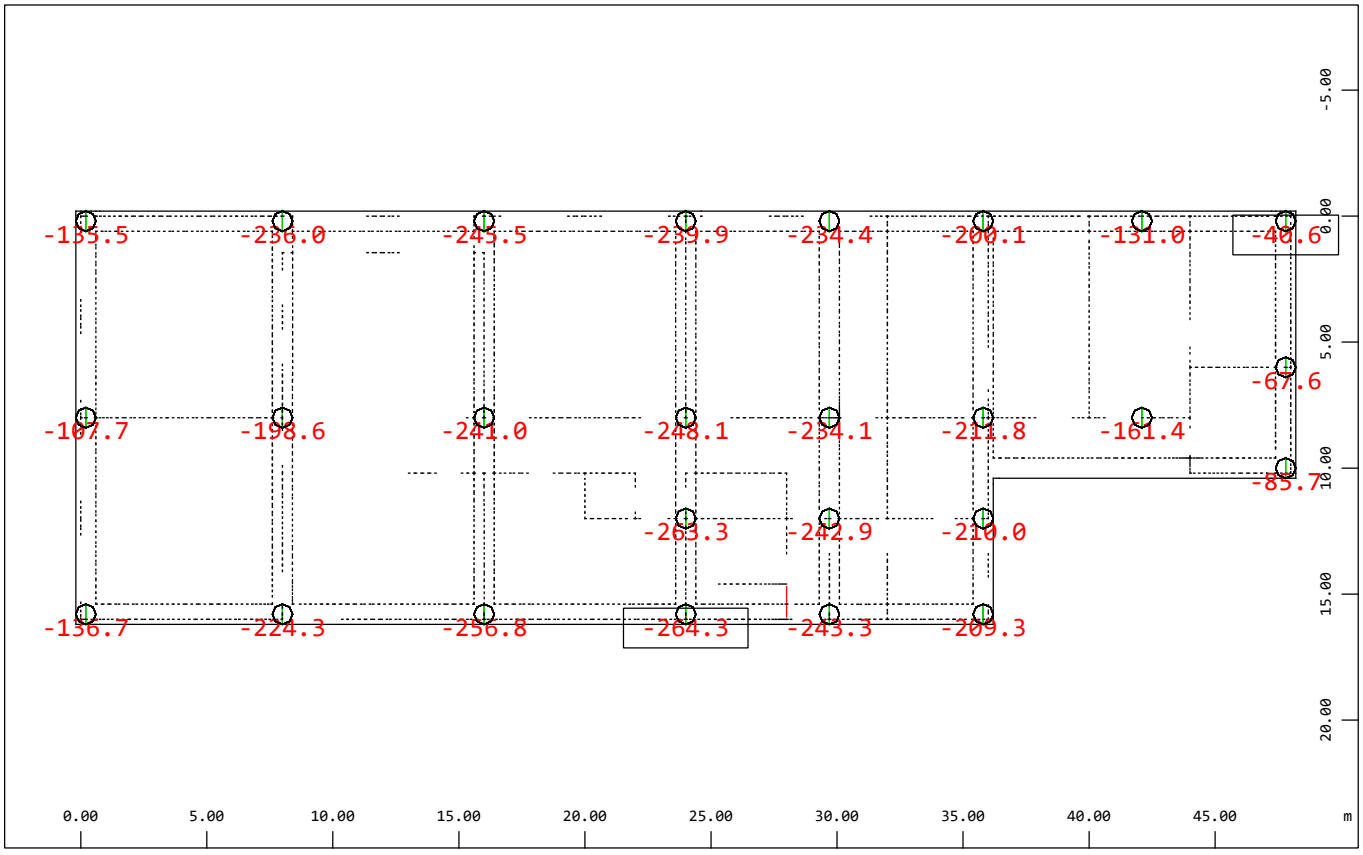

Sector of system Group 100 101 M 1 : 300
Beam Elements , Normal force Nx in kN, Loadcase 8222 MINE-N BEAM (Min=-269.9)
(Max=-205.2)



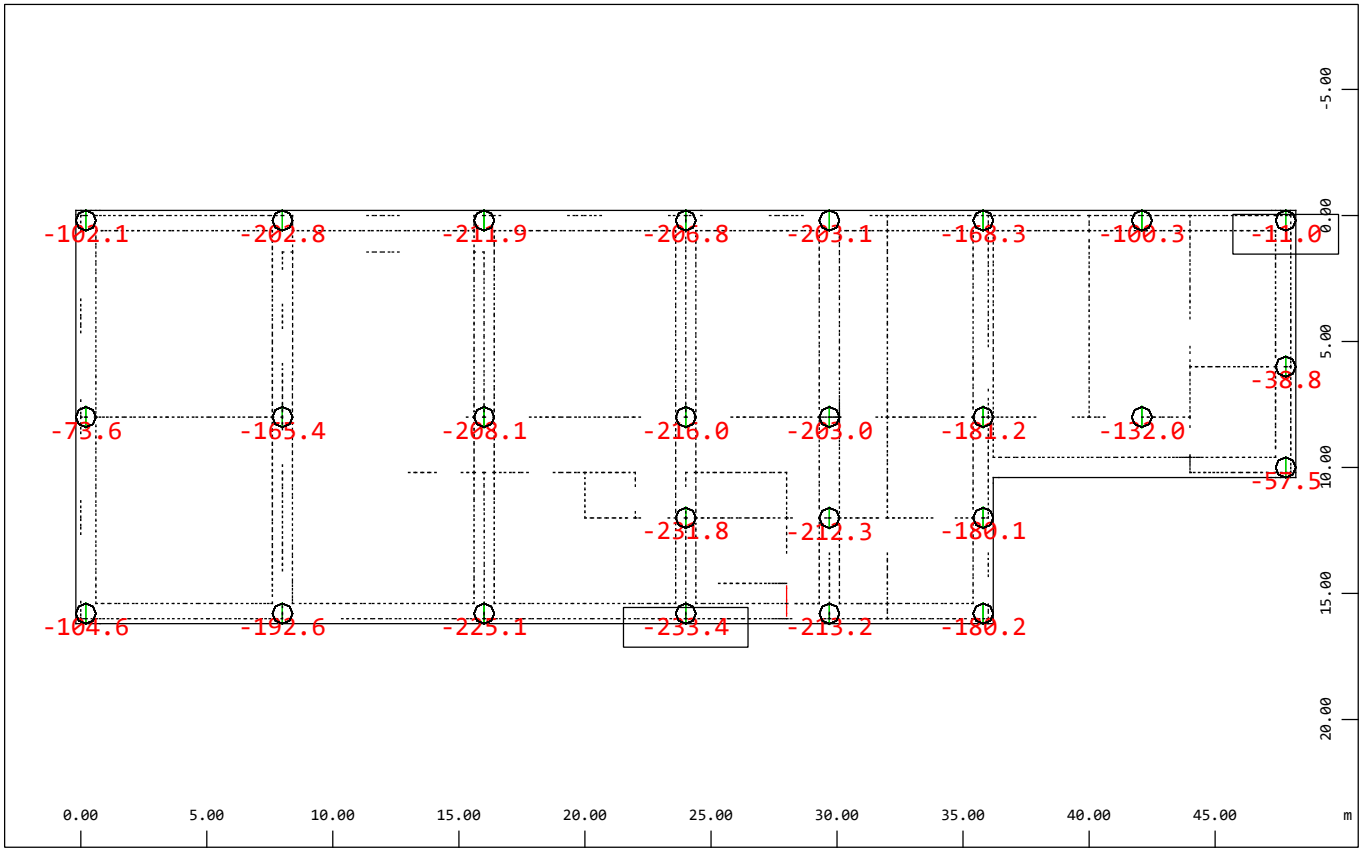

Sector of system Group 100 101 M 1 : 300
Beam Elements , Normal force Nx in kN, Loadcase 8221 MAXE-N BEAM (Min=-199.8)
(Max=-130.6)

SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - zahodna dilat. enota stavbe
Ovoj. sil na vodnjakih pod plosco: MSU-rare (nefaktorirano)



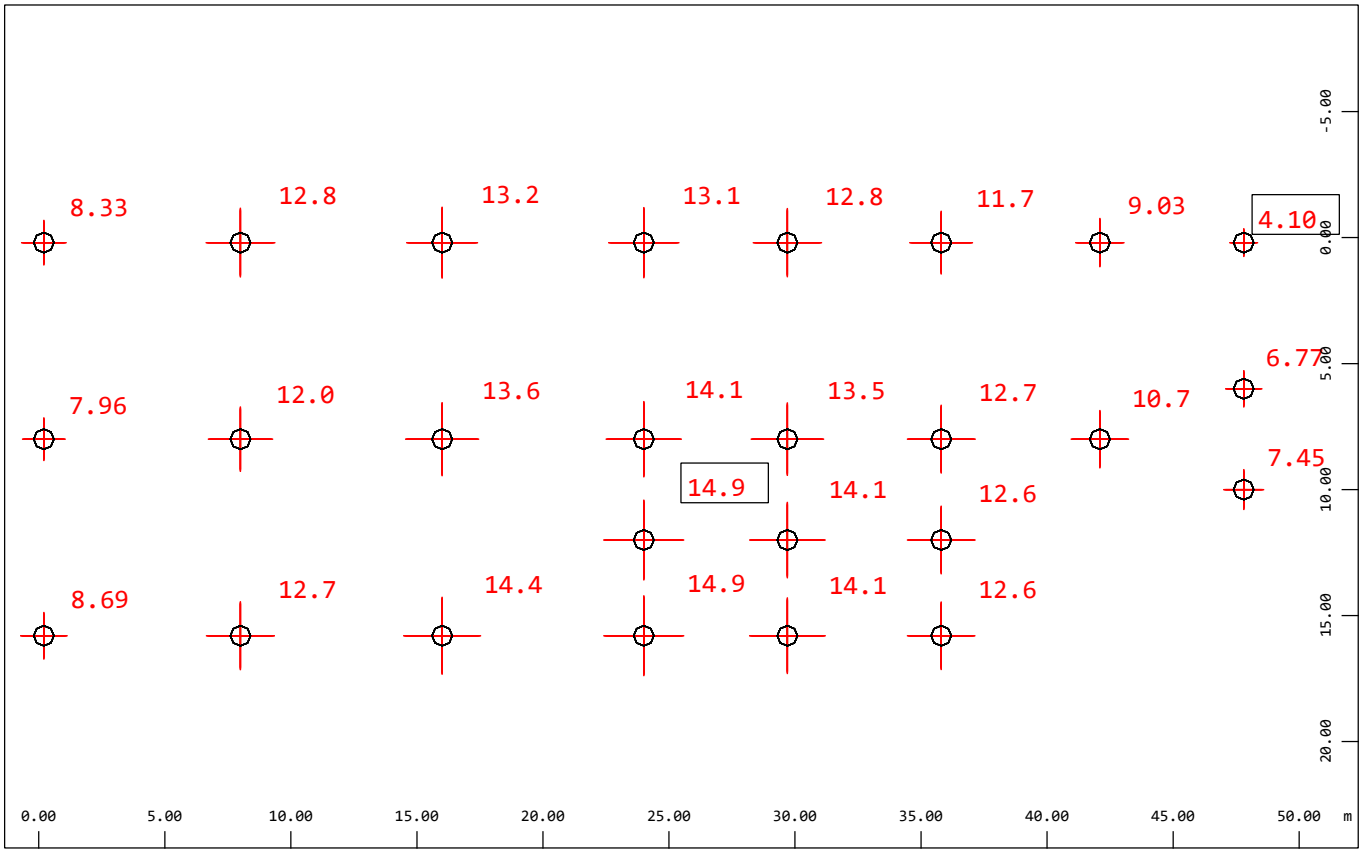

Sector of system Group 100 101 M 1 : 300
Beam Elements , Normal force Nx in kN, Loadcase 9022 MINR-N BEAM (Min=-264.3)
(Max=-40.6)



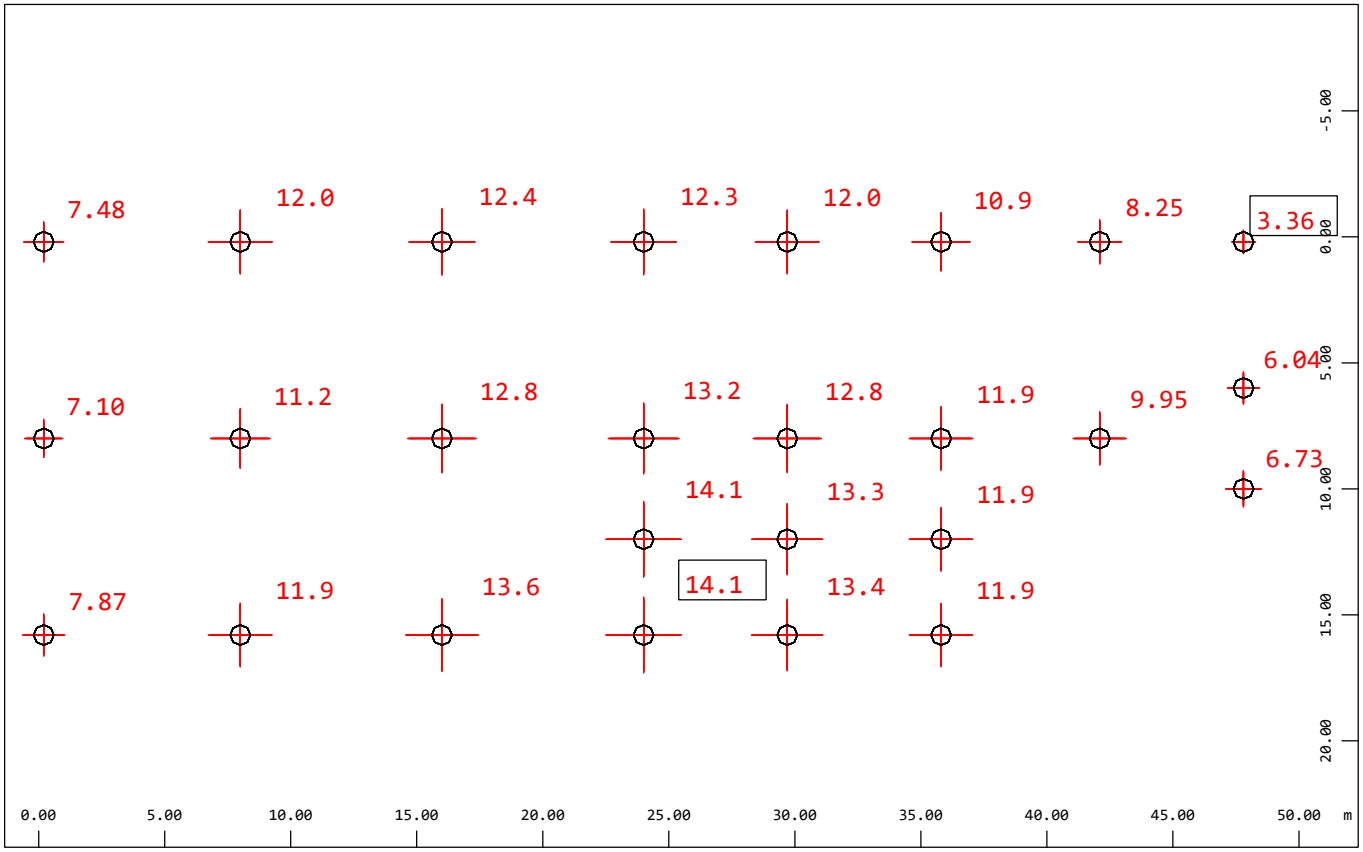

Sector of system Group 100 101 M 1 : 300
Beam Elements , Normal force Nx in kN, Loadcase 9021 MAXR-N BEAM (Min=-233.4)
(Max=-11.0)

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11826 DSO Bovec - zahodna dilat. enota stavbe
Ovoj. pomikov pod vodnjaki: MSU-rare (nefaktorirano)



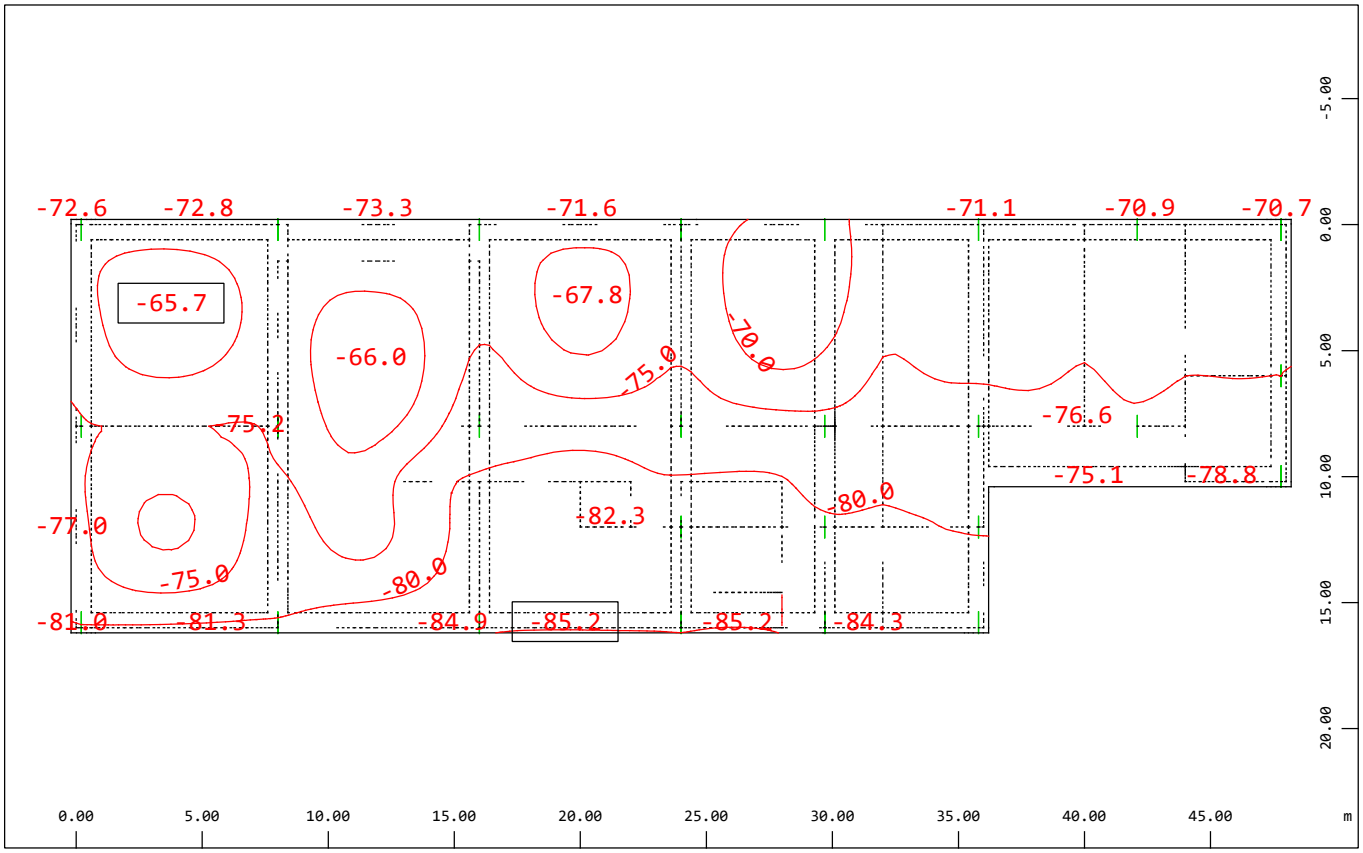

Sector of system Group 101
Nodal displacement in global Z, Loadcase 9076 MINR-UZ NODE , 1 cm 3D = 10.0 mm
(Min=-14.9) (Max=-4.10)
M 1 : 300



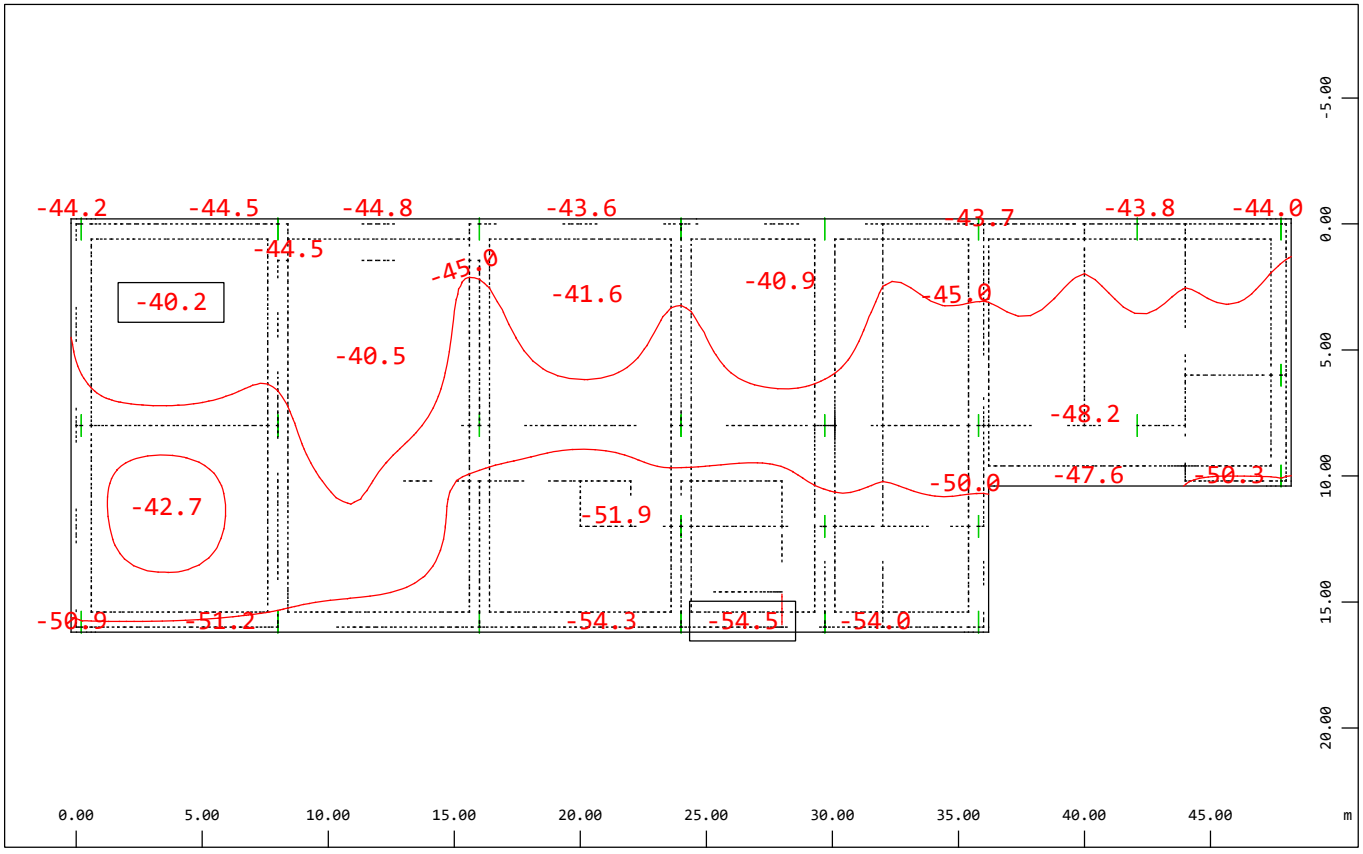

Sector of system Group 101
Nodal displacement in global Z, Loadcase 9075 MAXR-UZ NODE , 1 cm 3D = 10.0 mm
(Min=-14.1) (Max=-3.36)
M 1 : 300

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11826 DSO Bovec - zahodna dilat. enota stavbe
Ovoj. napetosti v tem. tleh pod plosco: MSN (faktorirano)



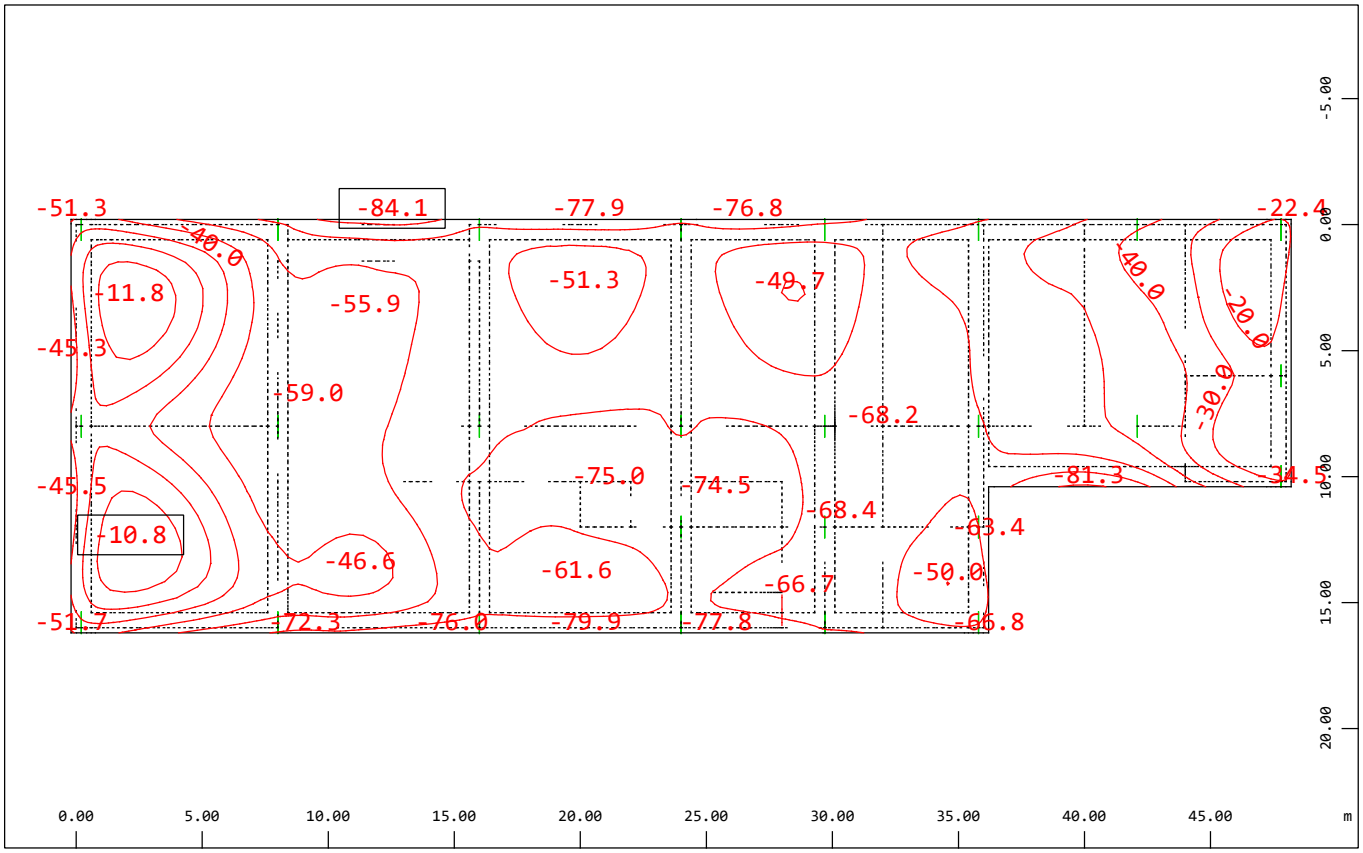

Sector of system Group 100 101 M 1 : 300
Bedding stress in Node ◯, Loadcase 8018 MIN-P QUAD , from -85.2 to -65.7 step 5.00 kN/m2



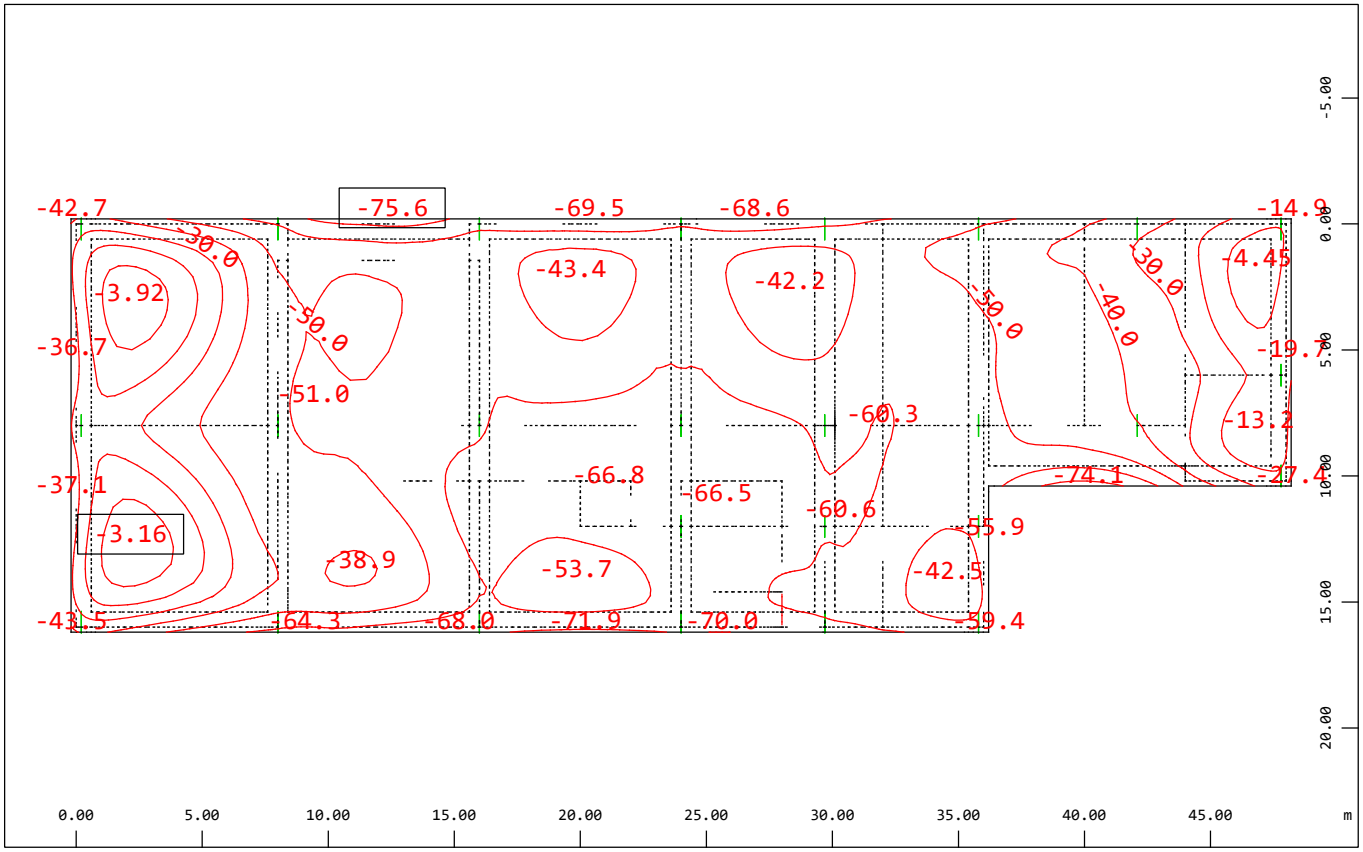

Sector of system Group 100 101 M 1 : 300
Bedding stress in Node ◯, Loadcase 8017 MAX-P QUAD , from -54.5 to -40.2 step 5.00 kN/m2

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11826 DSO Bovec - zahodna dilat. enota stavbe
Ovoj. napetosti v tem. tleh pod plosco: MSU-rare (nefaktorirano)



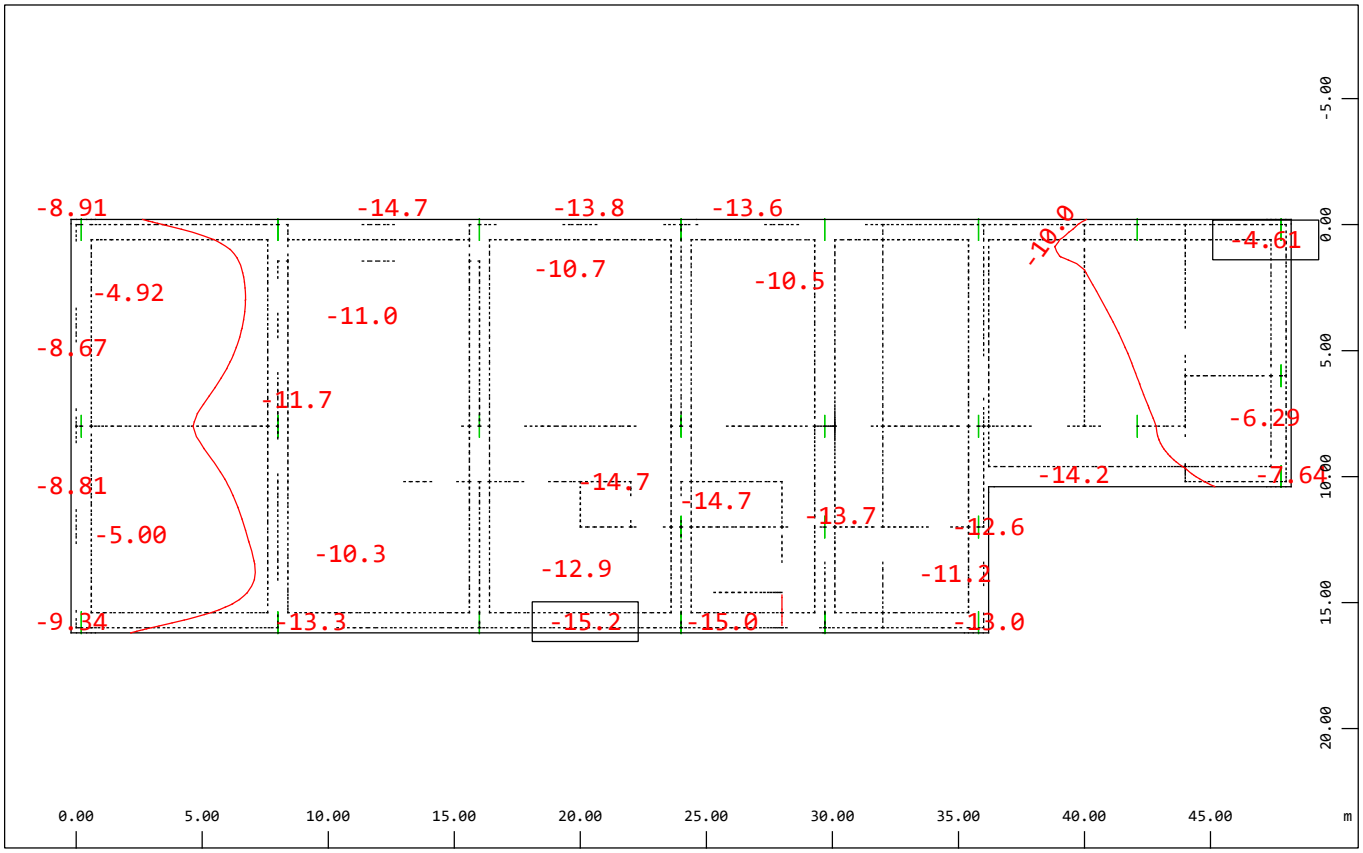

Sector of system Group 100 101 M 1 : 300
Bedding stress in Node ◯, Loadcase 9018 MINR-P QUAD , from -84.1 to -10.8 step 10.0 kN/m2



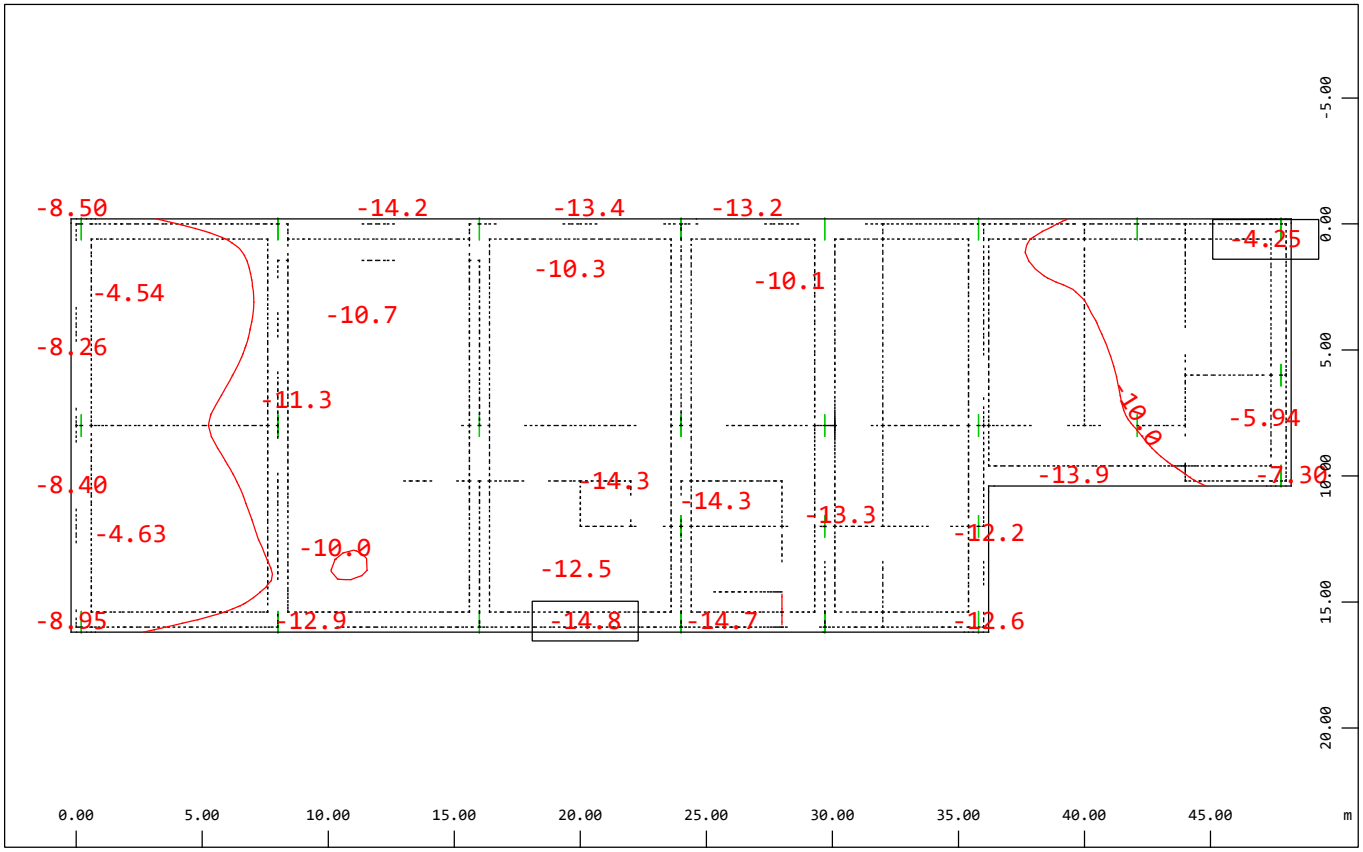

Sector of system Group 100 101 M 1 : 300
Bedding stress in Node ◯, Loadcase 9017 MAXR-P QUAD , from -75.6 to -3.16 step 10.0 kN/m2

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11826 DSO Bovec - zahodna dilat. enota stavbe
Ovoj. pomikov v tem. tleh pod plosco: MSU-rare (nefaktorirano)



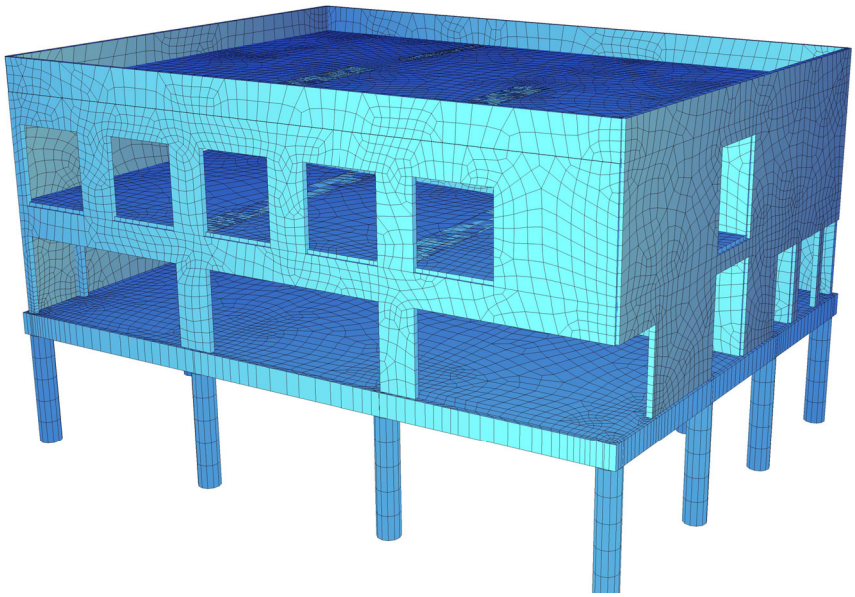

Sector of system Group 100 101 M 1 : 300
Z Y
X
Nodal displacement in global Z in Node , Loadcase 9276 MINP-UZ NODE , from -15.2 to
-4.61 step 10.0 mm

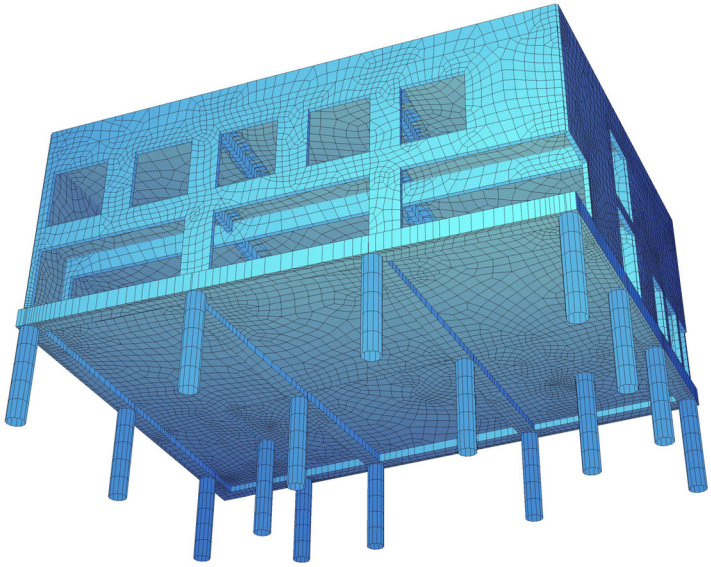



Sector of system Group 100 101 M 1 : 300
Z Y
X
Nodal displacement in global Z in Node , Loadcase 9275 MAXP-UZ NODE , from -14.8 to
-4.25 step 10.0 mm

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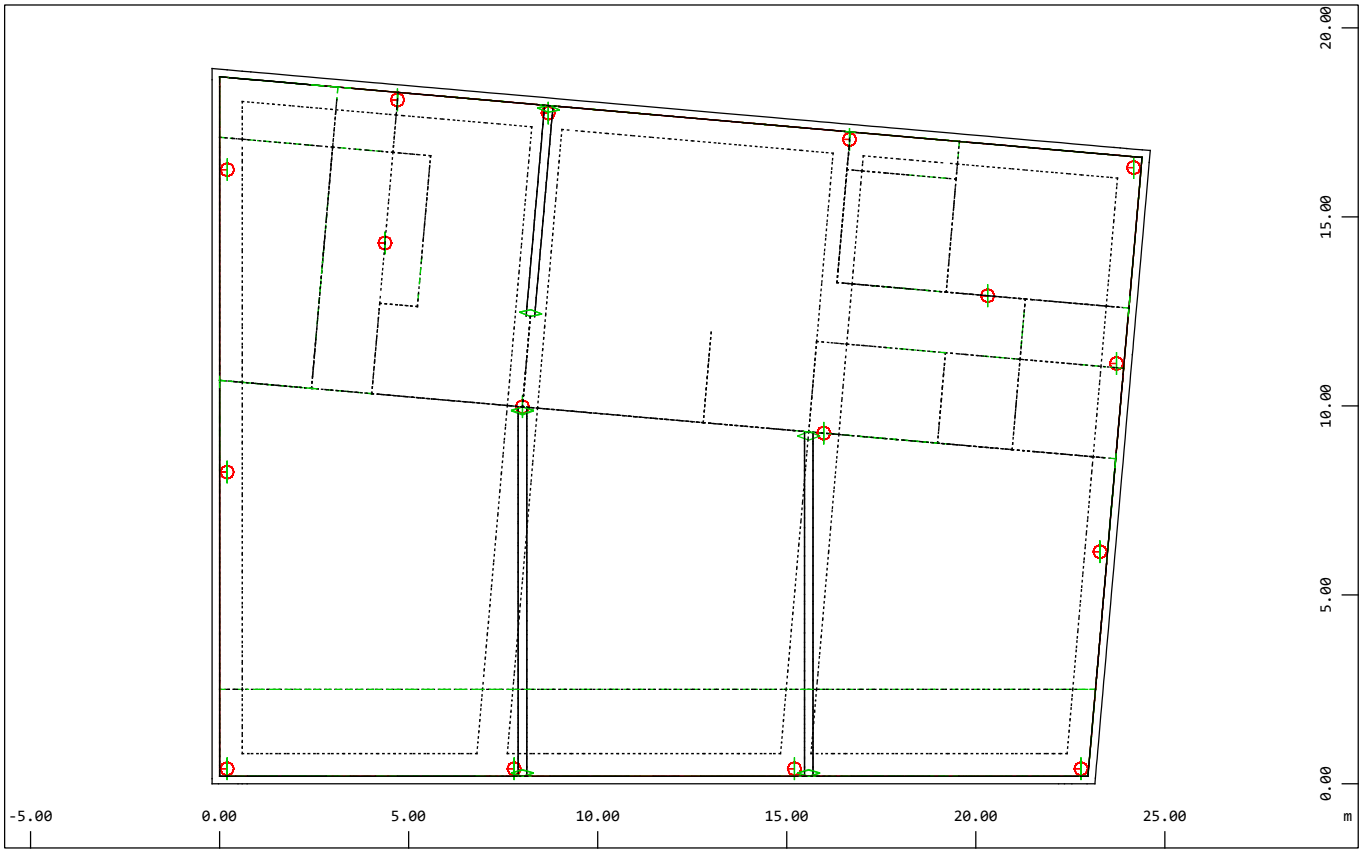
11826 DSO Bovec - centralna dilat. enota stavbe



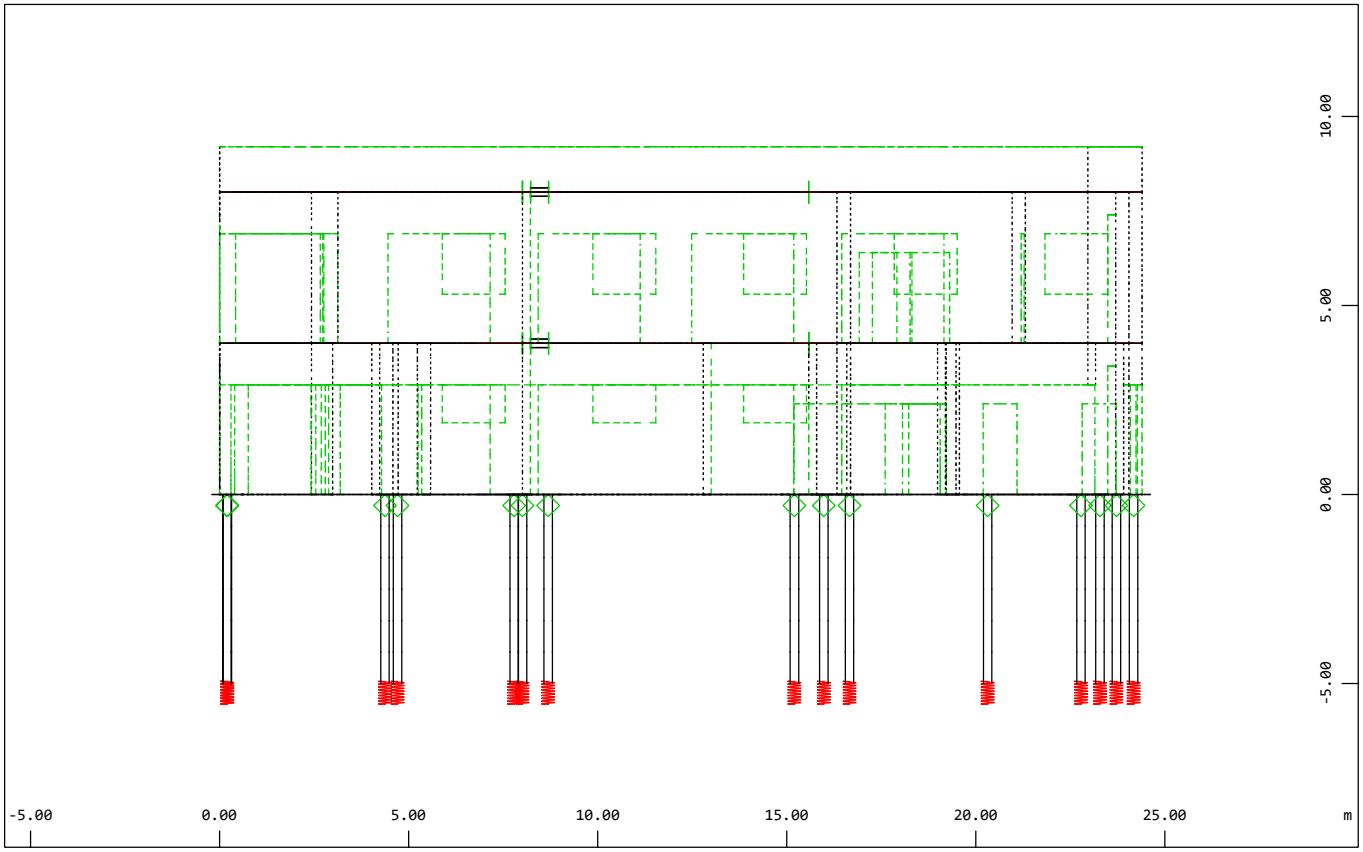


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11826 DSO Bovec - centralna dilat. enota stavbe
Geometrija modela



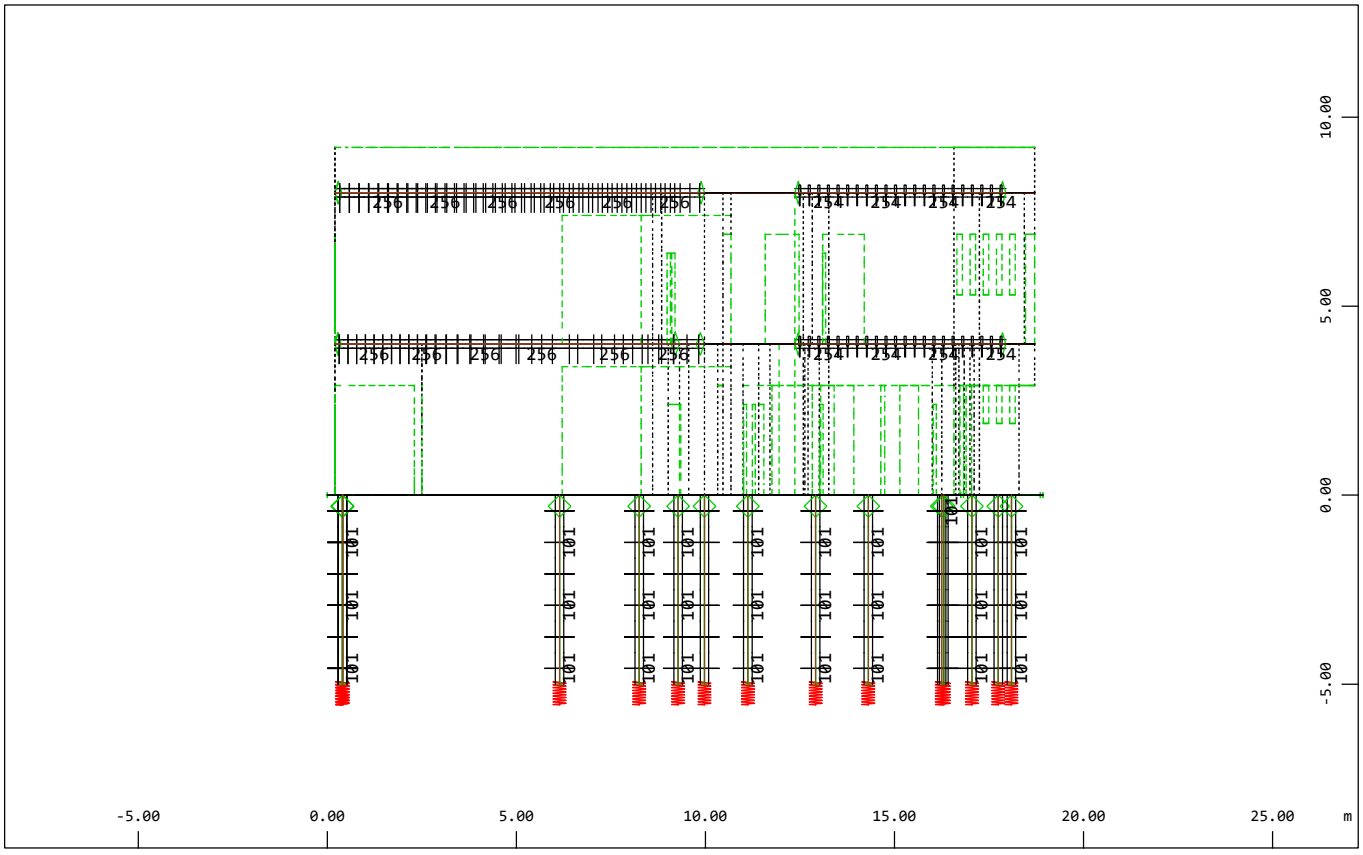

Y
Z X
Sector of system Beam Elements,Spring Elements,Quadrilateral Elements
Contour
M 1 : 200



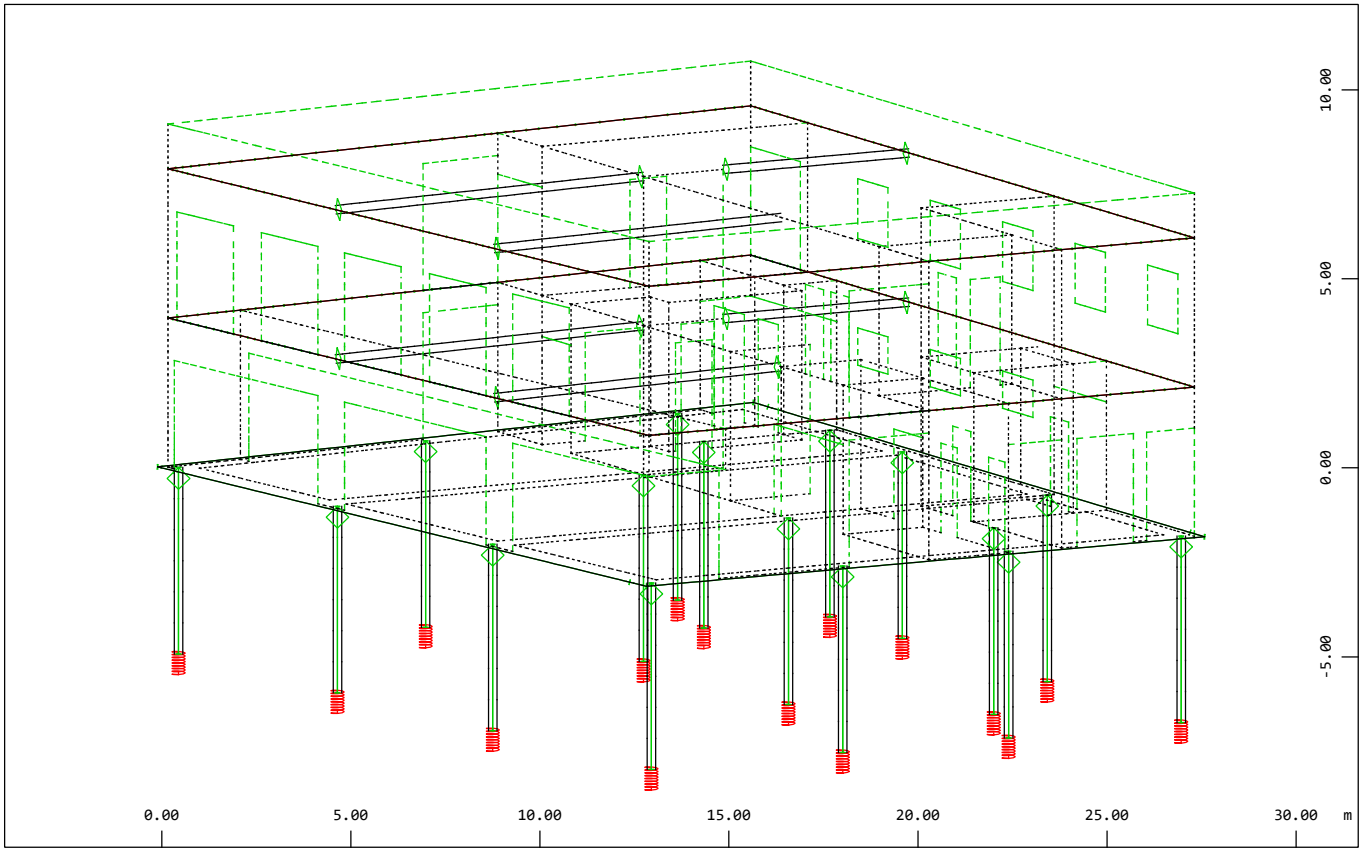

Z
Y X
Sector of system Beam Elements,Spring Elements,Quadrilateral Elements
Contour
M 1 : 200

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11826 DSO Bovec - centralna dilat. enota stavbe
Geometrija modela



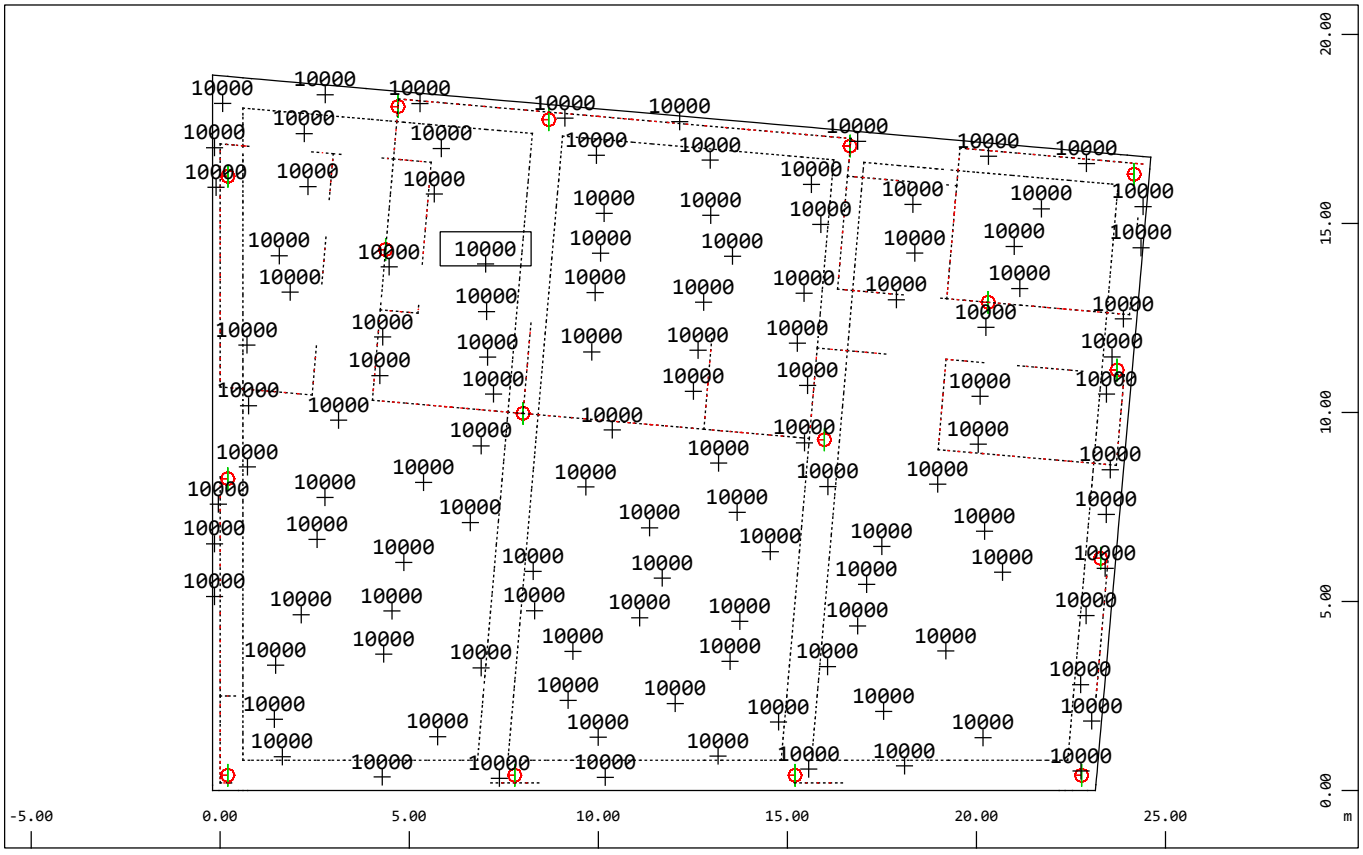

Z
X Y
Contour
Beam Elements , Contour of Cross section
Beam Elements , Number of group (Max=256)
M 1 : 200



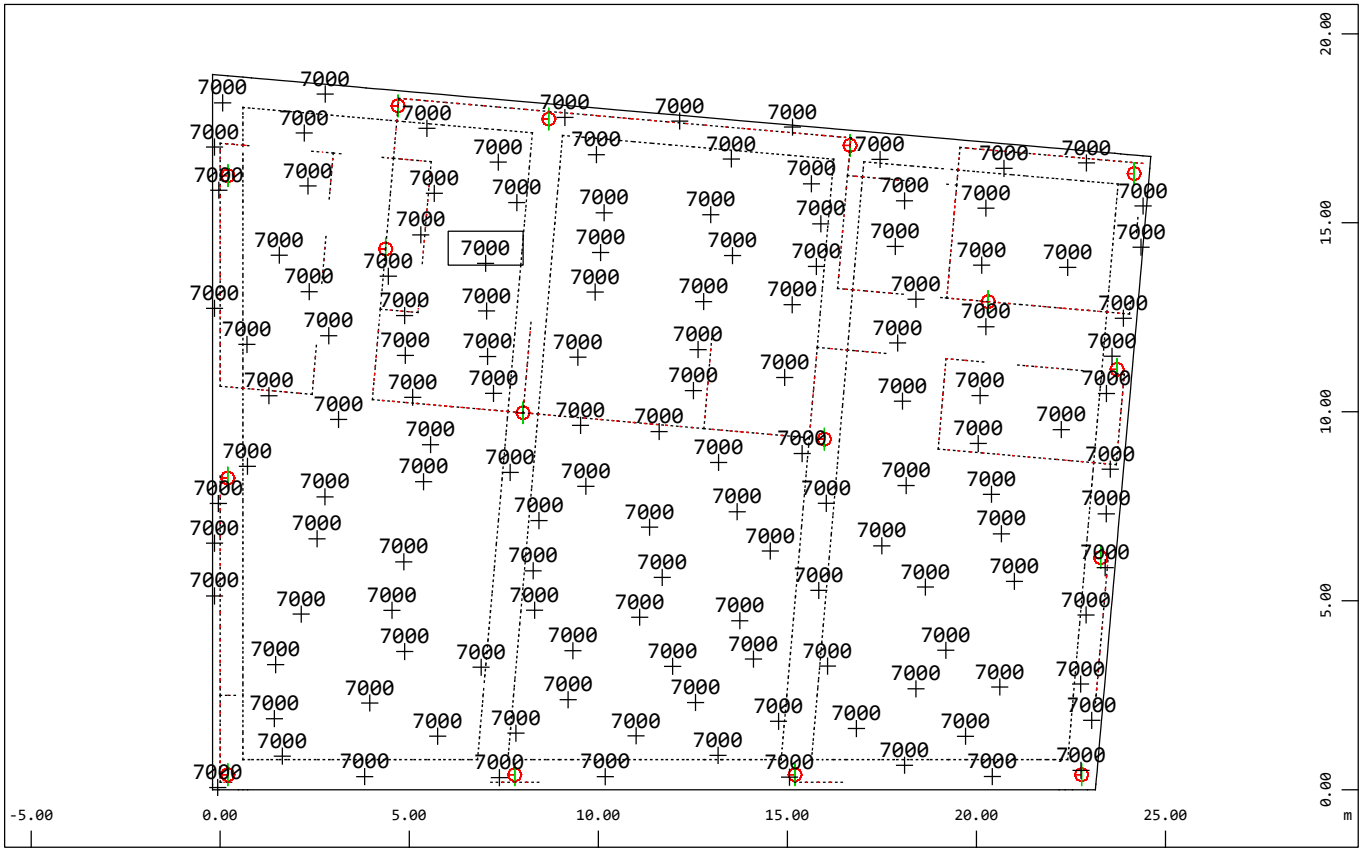

Z
X Y
Contour
M 1 : 200
X * 0.570
Y * 0.837
Z * 0.987

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11826 DSO Bovec - centralna dilat. enota stavbe
Geometrija modela (modul reakcije tal pod temelno plosco)



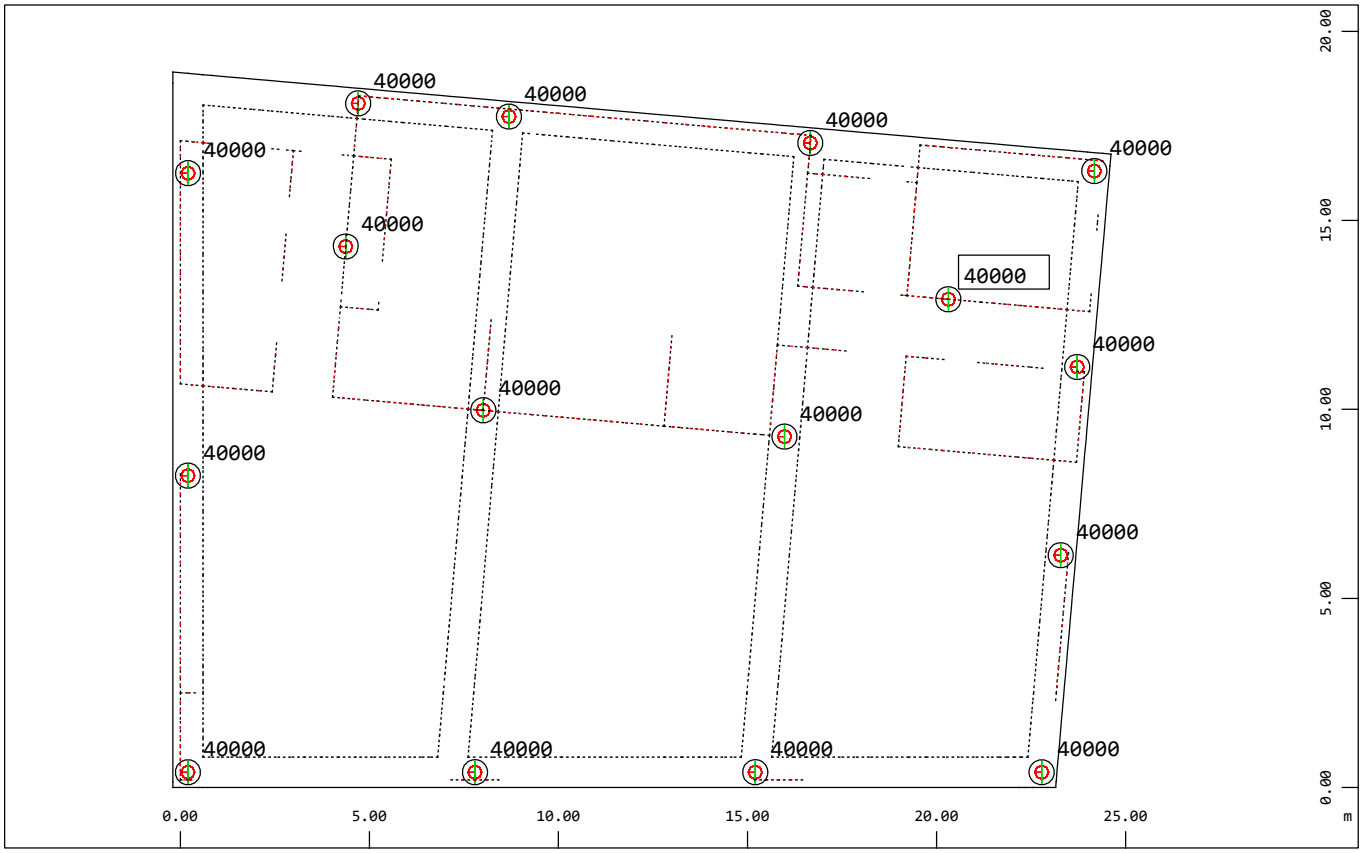

Y
Z—X
Sector of system Group 100 101
Elastic bedding in Element in kN/m3 (Max=10000.)
M 1 : 200




Y
Z—X
Sector of system Group 100 101
Tangential elastic bedding in Element in kN/m3 (Max=7000.)
M 1 : 200

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11826 DSO Bovec - centralna dilat. enota stavbe
Geometrija modela (modul reakcije tal za vodnjake v vertikalni smeri)




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11826 DSO Bovec - centralna dilat. enota stavbe
Materials

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Structure and Tab.7.1N: AN (Buildings)

**Materials**

| Mat | Classification |
|---|---|
| 1 | C 30/37 N (EN 1992) |
| 2 | B 500 B (EN 1992) |
| 99 | C 30/37 N - brez G |

**Thermal material constants**

| Mat | T[°C] | S[kJ/K/m3] | Kxx[W/K/m] | Kyy[W/K/m] | Kzz[W/K/m] | |
|---|---|---|---|---|---|---|
| 1 | AUTO | 2.16E+03 | 1.951E+00 | | | C 30/37 N (EN 1992) |
| 2 | AUTO | 3.45E+03 | 5.333E+01 | | | B 500 B (EN 1992) |
| 99 | AUTO | 2.16E+03 | 1.951E+00 | | | C 30/37 N - brez G |

| | | | |
|---|---|---|---|
| Mat | material number | S[kJ/K/m3] | Heat capacity |
| T[°C] | Temperature | Kxx[W/K/m],Kyy[W/K/m],Kzz[W/K/m] | Heat conductivity |

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11826 DSO Bovec - centralna dilat. enota stavbe
Sections

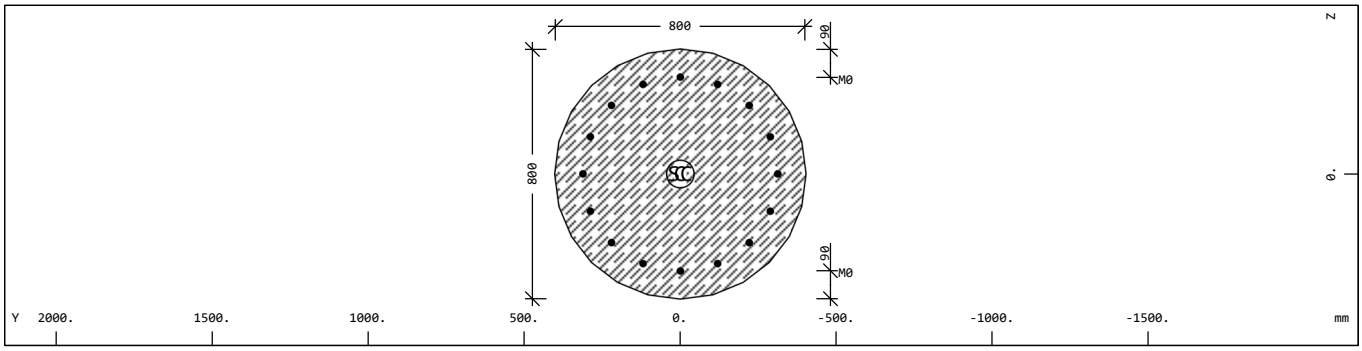
Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Structure and Tab.7.1N: AN (Buildings)

**Cross-sections static properties**

| SNo | Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|---|
| | MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 11 | 99 | 5.0265E-01 | 4.524E-01 | 2.011E-02 | 0.0 | 0.0 | 32837 | 0.0 | |
| | 2 | 4.021E-02 | 4.524E-01 | 2.011E-02 | 0.0 | 0.0 | 13682 | (COMPR) | |
| | = VODNJAK DN80 cm | | | | | | | | |
| | = VODNJAK DN80 cm | | | | | | | | |
| 21 | 1 | 4.2500E-01 | 2.500E-01 | 1.657E-02 | 0.0 | 0.0 | 32837 | 1062.5 | 3.665E-02 |
| | 2 | 8.515E-03 | 1.562E-01 | 3.665E-02 | 110.3 | 15.3 | 13682 | (BEAM) | 1.657E-02 |
| | = NOSILEC B/H=25/50+25 | | | | | | | | |
| | = NOSILEC B/H=25/50+25 | | | | | | | | |
| 22 | 1 | 2.1000E-01 | 1.250E-01 | 4.472E-03 | 0.0 | 0.0 | 32837 | 525.0 | 4.700E-03 |
| | 2 | 3.436E-03 | 9.167E-02 | 4.700E-03 | 78.6 | 25.7 | 13682 | (BEAM) | 4.472E-03 |
| | = NOSILEC B/H=20/30+25 | | | | | | | | |
| | = NOSILEC B/H=20/30+25 | | | | | | | | |

| | | | |
|---|---|---|---|
| SNo | section number | yc[mm],zc[mm] | ordinate of elastic centroid |
| Mat | material number | ysc[mm],zsc[mm] | ordinate of shear centre |
| A[m2] | sectional area | E[N/mm2] | Young's modulus |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | g[kg/m] | weight per length |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | | |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |
| MRf | reinforcement material number | | |
| It[m4] | torsional moment of inertia | | |
| G[N/mm2] | Shear modulus | | |

**Cross section No. 11 - VODNJAK DN80 cm**




Cross section No. 11 - VODNJAK DN80 cm

**Static properties of cross section**

| Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|
| MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 99 | 5.0265E-01 | 4.524E-01 | 2.011E-02 | 0.0 | 0.0 | 32837 | 0.0 | |
| 2 | 4.021E-02 | 4.524E-01 | 2.011E-02 | 0.0 | 0.0 | 13682 | (COMPR) | |

| | | | |
|---|---|---|---|
| Mat | material number | yc[mm],zc[mm] | ordinate of elastic centroid |
| A[m2] | sectional area | ysc[mm],zsc[mm] | ordinate of shear centre |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | E[N/mm2] | Young's modulus |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | g[kg/m] | weight per length |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |
| MRf | reinforcement material number | | |
| It[m4] | torsional moment of inertia | | |
| G[N/mm2] | Shear modulus | | |

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] | zmin[mm] | hymin[mm] | AK[m2] | MRs | 1/WT[1/m3] | 1/WVy[1/m2] |
|---|---|---|---|---|---|---|---|
| | ymax[mm] | zmax[mm] | hzmin[mm] | AB[m2] | | 1/WT2[1/m3] | 1/WVz[1/m2] |
| 1.0E-05 | -400.0 | -400.0 | 471.2 | 3.019E-01 | 2 | 9.947E+00 | 2.653E+00 |
| | 400.0 | 400.0 | 471.2 | 5.027E-01 | | | 2.653E+00 |

| | |
|---|---|
| α-T[1/K] | Elongation coefficient |
| ymin[mm],zmin[mm],ymax[mm],zmax[mm] | extreme coordinates relative to centroid |
| hymin[mm],hzmin[mm] | minimum value for internal lever |

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| | |
|---|---|
| AK[m2] | torsional equivalent area (Bredt) |
| MRs | transverse reinforcements material number |
| 1/WT[1/m3],1/WT2[1/m3] | torsional resistance |
| 1/WVy[1/m2],1/WVz[1/m2] | shear force resistance |
| AB[m2] | gross concrete area |

**Circular/annular cross section**

| Ra[mm] | Ri[mm] | Rsa[mm] | Rsi[mm] | Asa[cm2] | Asi[cm2] | D[mm] | a[mm] | Ass[cm2/m] |
|---|---|---|---|---|---|---|---|---|
| 400.0 | | 310.0 | | 50.24 | | 20 | | |

| | | | |
|---|---|---|---|
| Ra[mm],Ri[mm] | radius | D[mm] | bar diameter |
| Rsa[mm],Rsi[mm] | radius of reinforcement | a[mm] | distance of bars |
| Asa[cm2],Asi[cm2] | reinforcement area | Ass[cm2/m] | area of transverse reinforcements |

**Additional design data**

| Mat | periphery-O/-I [m2/m] | [m2/m] | deff [mm] | t-min [mm] | t-max [mm] | thet-p [kgm2/m] | thet-y [kgm2/m] | thet-z [kgm2/m] | thet-yz [kgm2/m] | yg [mm] | zg [mm] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2.513 | | | 400.0 | 400.0 | 0.000 | | | | 0.0 | 0.0 |

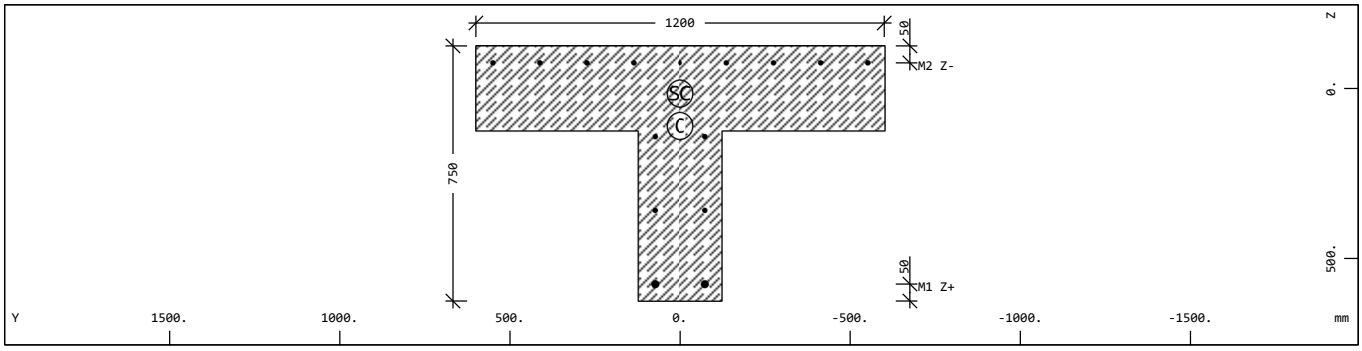
| | | | |
|---|---|---|---|
| Mat | material number | t-min,t-max | thickness |
| periphery-O/-I | peripheral area per length | thet-p,thet-y,thet-z,thet-yz | rotational mass |
| deff | effective depth | yg,zg | ordinate of the mass centre |

**Reinforcement global values**

| Layer | Mref | Mat | As [cm2] | As-min [cm2] | As-max [cm2] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M0 | 99 | 2 | 50.24 | 50.24 | | 20 | 0.0 | 0.0 | 1947.8 | | | |

| | | | |
|---|---|---|---|
| Layer | layer of reinforcement | D | bar diameter |
| Mref | embedding reference material | yr,zr | ordinate of elastic centroid |
| Mat | material number | L-tors | torsional effective length |
| As | reinforcement area | N-p | prestress normal force |
| As-min | minimum reinforcement area | My-p,Mz-p | prestress bending moment |
| As-max | maximum reinforcement area | | |

**Cross section No. 21 - NOSILEC B/H=25/50+25**




Cross section No. 21 - NOSILEC B/H=25/50+25

**Static properties of cross section**

| Mat / MRf | A[m2] / It[m4] | Ay[m2] / Az[m2] / Ayz[m2] | Iy[m4] / Iz[m4] / Iyz[m4] | yc[mm] / zc[mm] | ysc[mm] / zsc[mm] | E[N/mm2] / G[N/mm2] | g[kg/m] | I-1[m4] / I-2[m4] / α[°] |
|---|---|---|---|---|---|---|---|---|
| 1 | 4.2500E-01 | 2.500E-01 | 1.657E-02 | 0.0 | 0.0 | 32837 | 1062.5 | 3.665E-02 |
| 2 | 8.515E-03 | 1.562E-01 | 3.665E-02 | 110.3 | 15.3 | 13682 | (BEAM) | 1.657E-02 |

| | | | |
|---|---|---|---|
| Mat | material number | yc[mm],zc[mm] | ordinate of elastic centroid |
| A[m2] | sectional area | ysc[mm],zsc[mm] | ordinate of shear centre |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | E[N/mm2] | Young's modulus |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | g[kg/m] | weight per length |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |
| MRf | reinforcement material number | | |
| It[m4] | torsional moment of inertia | | |
| G[N/mm2] | Shear modulus | | |

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] / ymax[mm] | zmin[mm] / zmax[mm] | hymin[mm] / hzmin[mm] | AK[m2] / AB[m2] | MRs | 1/WT[1/m3] / 1/WT2[1/m3] | 1/WVy[1/m2] / 1/WVz[1/m2] |
|---|---|---|---|---|---|---|---|
| 1.0E-05 | -600.0 | -235.3 | 749.4 | 1.025E-01 | 2 | 5.201E+01 | 4.698E+00 |
| | 600.0 | 514.7 | 499.0 | 4.250E-01 | | | 7.985E+00 |

| | |
|---|---|
| α-T[1/K] | Elongation coefficient |
| ymin[mm],zmin[mm],ymax[mm],zmax[mm] | extreme coordinates relative to centroid |

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Sections

| | |
|---|---|
| hymin[mm],hzmin[mm] | minimum value for internal lever |
| AK[m2] | torsional equivalent area (Bredt) |
| MRs | transverse reinforcements material number |
| 1/WT[1/m3],1/WT2[1/m3] | torsional resistance |
| 1/WVy[1/m2],1/WVz[1/m2] | shear force resistance |
| AB[m2] | gross concrete area |

**Rectangular cross-section/T-beam**

| H[mm] | Ho[mm] | Aso[cm2] | Do[mm] | So[mm] | a[mm] | B-eff[mm] |
|---|---|---|---|---|---|---|
| B[mm] | Bo[mm] | Asu[cm2] | Du[mm] | Su[mm] | a-min[mm] | incl[°] |
| | | As-type | Ds[mm] | Ss[mm] | a-max[mm] | Ass[cm2/m] |
| 750.0 | 250.0 | 10.17 | 12 | 50.0 | 150.0 | 93.7 |
| 250.0 | 1200.0 | 6.28 | 20 | 50.0 | 40.0 | 90.0 |
| | | ASYM | 12 | 50.0 | 300.0 | 2.00 |

| | | | |
|---|---|---|---|
| H[mm] | height | B[mm] | width |
| Ho[mm] | upper height of section | Bo[mm] | upper width of section |
| Aso[cm2],Asu[cm2] | reinforcement area | a-min[mm] | minimum distance of bars |
| Do[mm],Du[mm],Ds[mm] | bar diameter | incl[°] | inclination of transverse reinforcements |
| So[mm],Su[mm],Ss[mm] | static distance | a-max[mm] | maximum distance of bars |
| a[mm] | distance of bars | Ass[cm2/m] | area of transverse reinforcements |
| B-eff[mm] | effective width | | |

**Additional design data**

| Mat | periphery-O/-I | | deff | t-min | t-max | thet-p | thet-y | thet-z | thet-yz | yg | zg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [m2/m] | [m2/m] | [mm] | [mm] | [mm] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [mm] | [mm] |
| | 3.900 | | 217.9 | 250.0 | 1200.0 | 133.064 | 41.437 | 91.628 | | 0.0 | 110.3 |

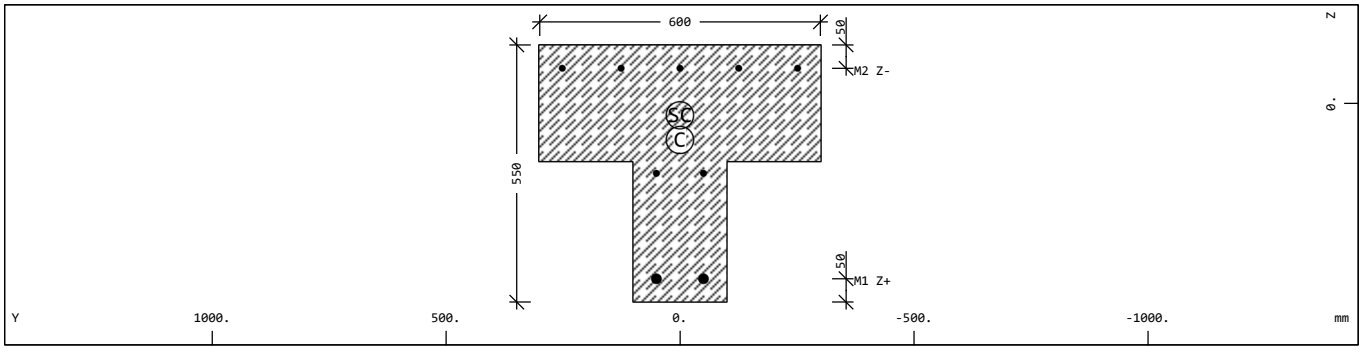
| | | | |
|---|---|---|---|
| Mat | material number | t-min,t-max | thickness |
| periphery-O/-I | peripheral area per length | thet-p,thet-y,thet-z,thet-yz | rotational mass |
| deff | effective depth | yg,zg | ordinate of the mass centre |

**Reinforcement global values**

| Layer | Mref | Mat | As [cm2] | As-min [cm2] | As-max [cm2] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M1 Z+ | 1 | 2 | 6.28 | 6.28 | | 20 | 0.0 | 575.0 | 150.0 | | | |
| M2 Z- | 1 | 2 | 10.17 | 10.17 | | 12 | 0.0 | -75.0 | 1100.0 | | | |
| M3 Y+- | 1 | 2 | 4.52 | 4.52 | 4.52 | 12 | 0.0 | 250.0 | 1300.0 | | | |

| | | | |
|---|---|---|---|
| Layer | layer of reinforcement | D | bar diameter |
| Mref | embedding reference material | yr,zr | ordinate of elastic centroid |
| Mat | material number | L-tors | torsional effective length |
| As | reinforcement area | N-p | prestress normal force |
| As-min | minimum reinforcement area | My-p,Mz-p | prestress bending moment |
| As-max | maximum reinforcement area | | |

**Cross section No. 22 - NOSILEC B/H=20/30+25**




Cross section No. 22 - NOSILEC B/H=20/30+25

**Static properties of cross section**

| Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|
| MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 1 | 2.1000E-01 | 1.250E-01 | 4.472E-03 | 0.0 | 0.0 | 32837 | 525.0 | 4.700E-03 |
| 2 | 3.436E-03 | 9.167E-02 | 4.700E-03 | 78.6 | 25.7 | 13682 | (BEAM) | 4.472E-03 |

| | | | |
|---|---|---|---|
| Mat | material number | yc[mm],zc[mm] | ordinate of elastic centroid |
| A[m2] | sectional area | ysc[mm],zsc[mm] | ordinate of shear centre |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | E[N/mm2] | Young's modulus |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | g[kg/m] | weight per length |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |

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Sections

| | |
|---|---|
| MRf | reinforcement material number |
| It[m4] | torsional moment of inertia |
| G[N/mm2] | Shear modulus |

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] | zmin[mm] | hymin[mm] | AK[m2] | MRs | 1/WT[1/m3] | 1/WVy[1/m2] |
|---|---|---|---|---|---|---|---|
| | ymax[mm] | zmax[mm] | hzmin[mm] | AB[m2] | | 1/WT2[1/m3] | 1/WVz[1/m2] |
| 1.0E-05 | -300.0 | -203.6 | 368.6 | 6.038E-02 | 2 | 1.129E+02 | 8.511E+00 |
| | 300.0 | 346.4 | 359.7 | 2.100E-01 | | | 1.318E+01 |

| | |
|---|---|
| α-T[1/K] | Elongation coefficient |
| ymin[mm],zmin[mm],ymax[mm],zmax[mm] | extreme coordinates relative to centroid |
| hymin[mm],hzmin[mm] | minimum value for internal lever |
| AK[m2] | torsional equivalent area (Bredt) |
| MRs | transverse reinforcements material number |
| 1/WT[1/m3],1/WT2[1/m3] | torsional resistance |
| 1/WVy[1/m2],1/WVz[1/m2] | shear force resistance |
| AB[m2] | gross concrete area |

**Rectangular cross-section/T-beam**

| H[mm] | Ho[mm] | Aso[cm2] | Do[mm] | So[mm] | a[mm] | B-eff[mm] |
|---|---|---|---|---|---|---|
| B[mm] | Bo[mm] | Asu[cm2] | Du[mm] | Su[mm] | a-min[mm] | incl[°] |
| | | As-type | Ds[mm] | Ss[mm] | a-max[mm] | Ass[cm2/m] |
| 550.0 | 250.0 | 5.65 | 12 | 50.0 | 150.0 | 73.3 |
| 200.0 | 600.0 | 6.28 | 20 | 50.0 | 40.0 | 90.0 |
| | | ASYM | 12 | 50.0 | 300.0 | 2.00 |

| | | | |
|---|---|---|---|
| H[mm] | height | B[mm] | width |
| Ho[mm] | upper height of section | Bo[mm] | upper width of section |
| Aso[cm2],Asu[cm2] | reinforcement area | a-min[mm] | minimum distance of bars |
| Do[mm],Du[mm],Ds[mm] | bar diameter | incl[°] | inclination of transverse reinforcements |
| So[mm],Su[mm],Ss[mm] | static distance | a-max[mm] | maximum distance of bars |
| a[mm] | distance of bars | Ass[cm2/m] | area of transverse reinforcements |
| B-eff[mm] | effective width | | |

**Additional design data**

| Mat | periphery-O/-I | | deff | t-min | t-max | thet-p | thet-y | thet-z | thet-yz | yg | zg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [m2/m] | [m2/m] | [mm] | [mm] | [mm] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [mm] | [mm] |
| | 2.300 | | 182.6 | 200.0 | 600.0 | 22.931 | 11.181 | 11.750 | | 0.0 | 78.6 |

| | | | |
|---|---|---|---|
| Mat | material number | t-min,t-max | thickness |
| periphery-O/-I | peripheral area per length | thet-p,thet-y,thet-z,thet-yz | rotational mass |
| deff | effective depth | yg,zg | ordinate of the mass centre |

**Reinforcement global values**

| Layer | Mref | Mat | As [cm2] | As-min [cm2] | As-max [cm2] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M1 Z+ | 1 | 2 | 6.28 | 6.28 | | 20 | 0.0 | 375.0 | 100.0 | | | |
| M2 Z- | 1 | 2 | 5.65 | 5.65 | | 12 | 0.0 | -75.0 | 500.0 | | | |
| M3 Y+- | 1 | 2 | 2.26 | 2.26 | 2.26 | 12 | 0.0 | 150.0 | 900.0 | | | |

| | | | |
|---|---|---|---|
| Layer | layer of reinforcement | D | bar diameter |
| Mref | embedding reference material | yr,zr | ordinate of elastic centroid |
| Mat | material number | L-tors | torsional effective length |
| As | reinforcement area | N-p | prestress normal force |
| As-min | minimum reinforcement area | My-p,Mz-p | prestress bending moment |
| As-max | maximum reinforcement area | | |

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Generation of Node and Element Loads

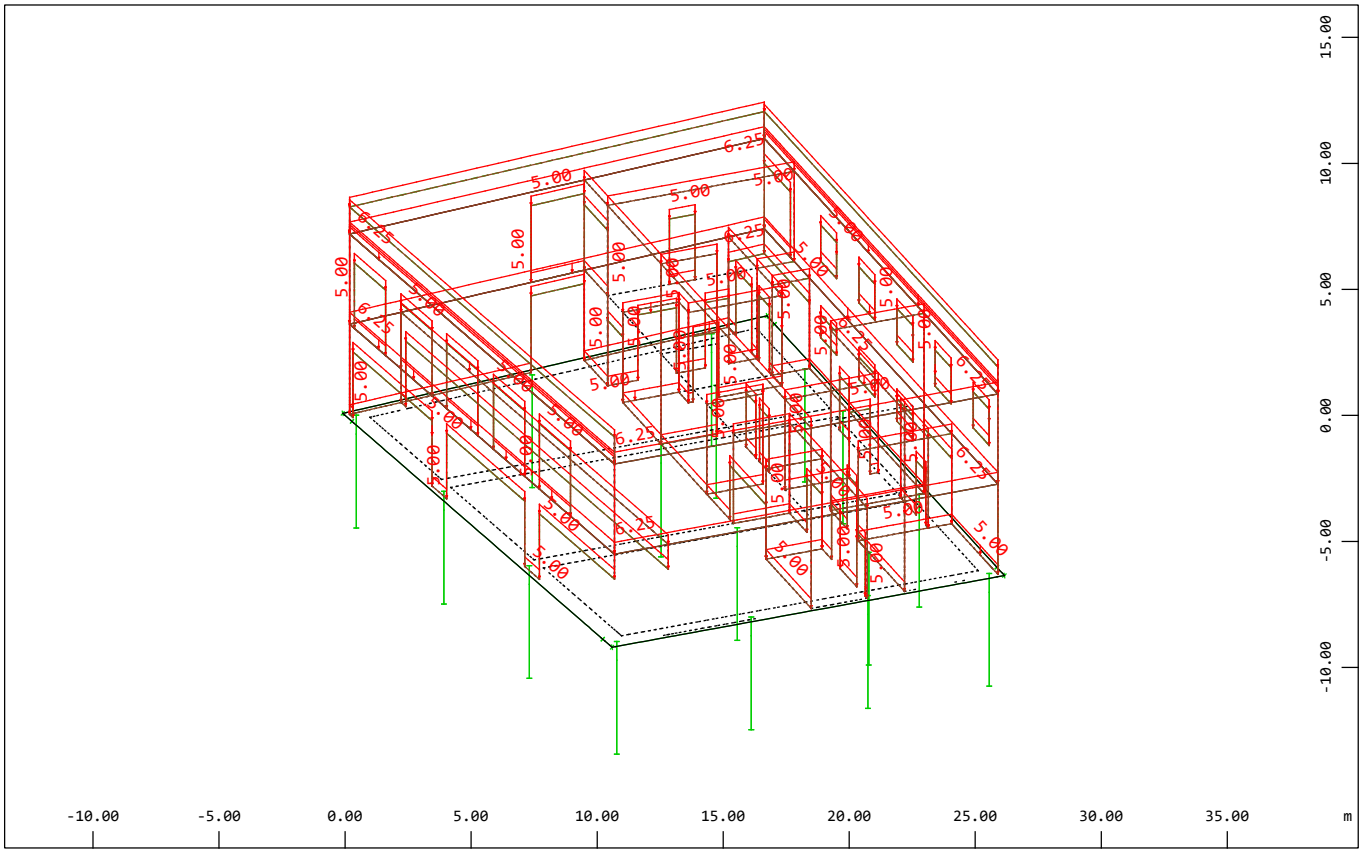
**Actions**

| type | part | sup | Designation | γ-u | γ-f | γ-a | $\psi_0$ | $\psi_1$ | $\psi_2$ | $\psi_1$inf |
|---|---|---|---|---|---|---|---|---|---|---|
| G_1 | G | perm | dead load g1 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | | 1 | Lastna | | | | | | | |
| | | 9 | Lastna-temelji | | | | | | | |
| G_2 | G | perm | dead load g2 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | | 2 | Stalna | | | | | | | |
| | | 3 | Stalna-predelne | | | | | | | |
| | | 4 | Stalna-fasade | | | | | | | |
| | | 5 | Stalna-klimati | | | | | | | |
| | | 6 | Stalna-streha-jeklo | | | | | | | |
| C | P | perm | creep + shrinkage | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Q_A | Q | cond | Pay load residential cat. A | 1.50 | 0.00 | 1.00 | 0.70 | 0.50 | 0.30 | 1.00 |
| Q_C | Q | cond | Pay load assembling cat. C | 1.50 | 0.00 | 1.00 | 0.70 | 0.70 | 0.60 | 1.00 |
| | | 11 | Koristna C | | | | | | | |
| Q_H | Q | excl | Live load on roofs cat. H | 1.50 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | 12 | Koristna H | | | | | | | |
| S | Q | cond | snow loading | 1.50 | 0.00 | 1.00 | 0.50 | 0.20 | 0.00 | 0.20 |
| | | 21 | Sneg | | | | | | | |
| E | E | usex | seismic loading | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | | | Reliability factor Kfi | 1.000 | | | | | | |
| | | | Reduction factor xsi | 0.850 | | | | | | |

type action γ-u,γ-f,γ-a partial safety factors for unfavourable/favourable/accidental
part partition of the action $\psi_0,\psi_1,\psi_2,\psi_1$inf combination coefficients
sup superposition type

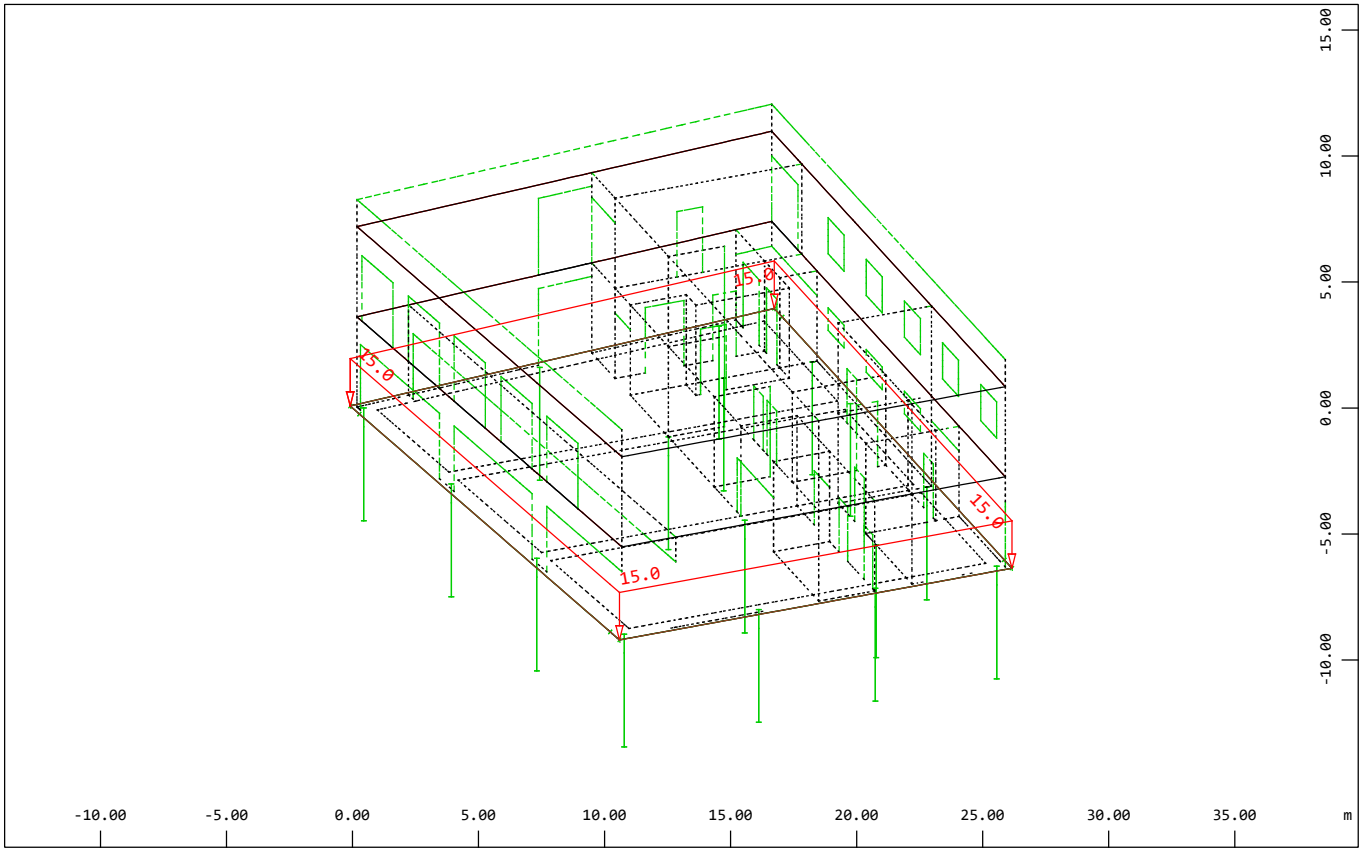
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Obtezba: lastna, lastna-temelji




Sector of system Group 100 110 120 201...207 251...257 301 302
All loads, Loadcase 1 Lastna , (1 cm 3D = unit) QUAD-Area dead load in global Z in
Element (Unit=35.6 kN/m2 ) (Min=-6.25) (Max=-3.75)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

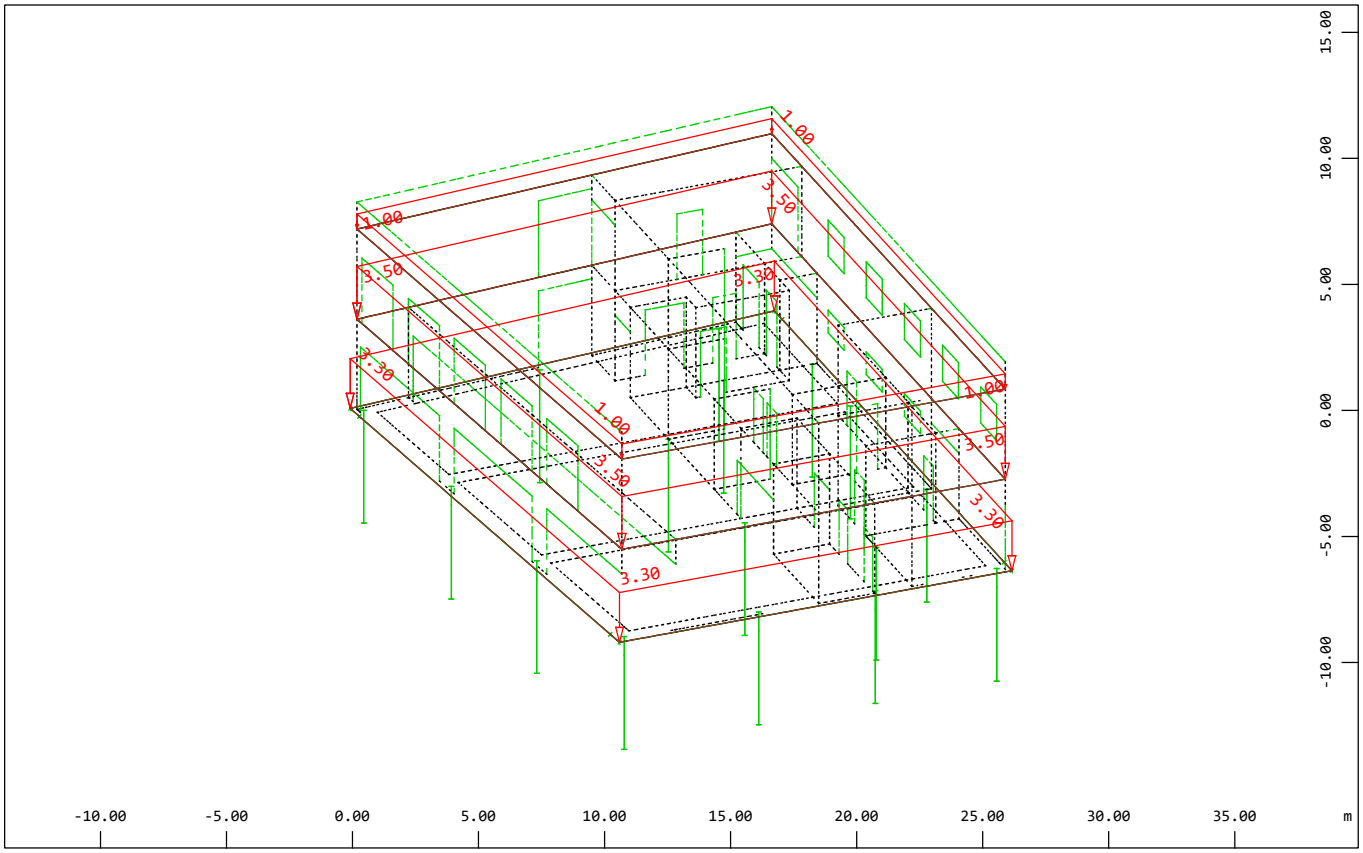



Sector of system Group 100 110 120 201...207 251...257 301 302
All loads, Loadcase 9 Lastna-temelji , (1 cm 3D = unit) Free area load (force) in global
Z (Unit=21.4 kN/m2 ) (Min=-15.0) (Max=-15.0)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

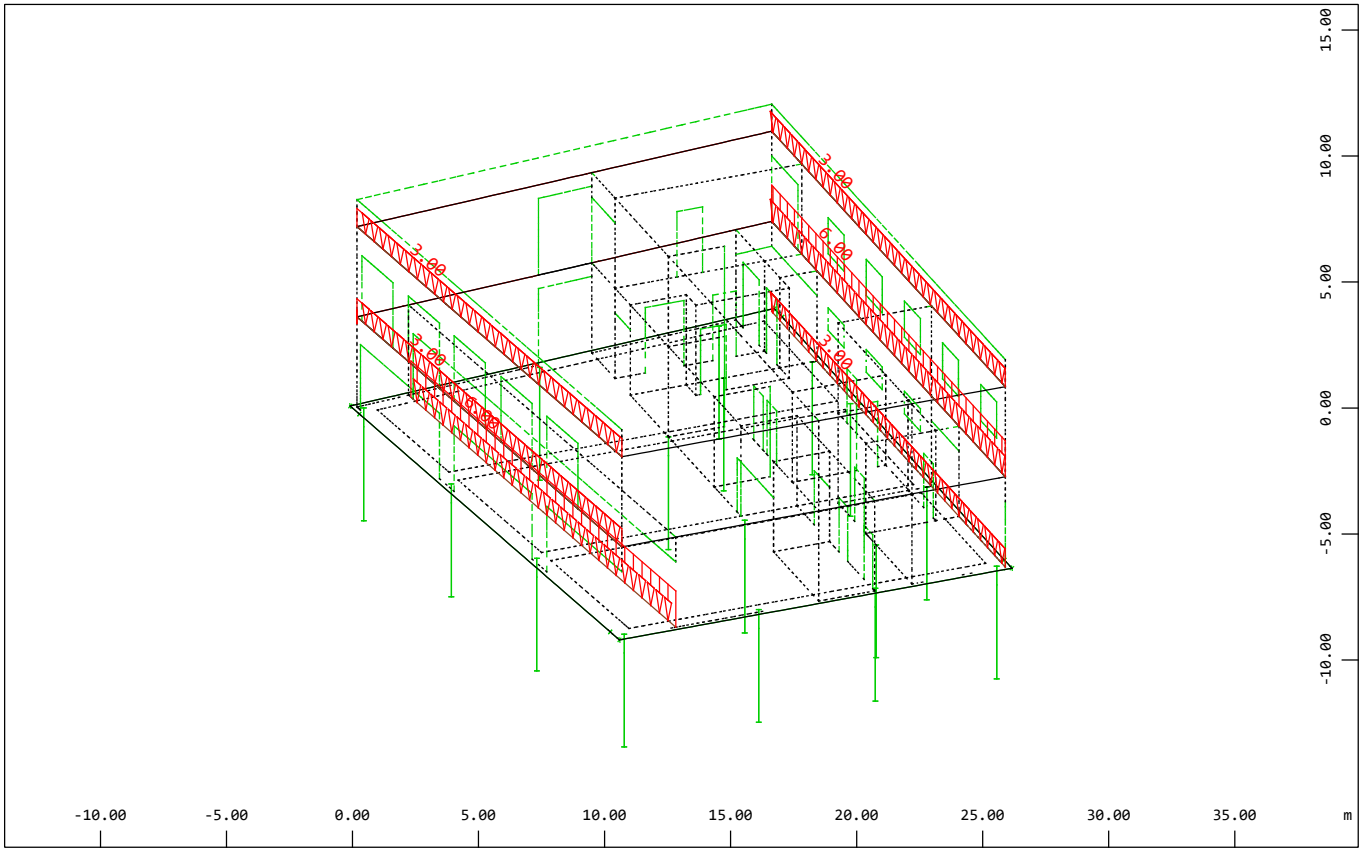
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11826 DSO Bovec - centralna dilat. enota stavbe
Obtezba: stalna, stalna-fasada




Sector of system Group 100 110 120 201...207 251...257 301 302
All loads, Loadcase 2 Stalna , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=4.48 kN/m2 ) (Min=-3.50) (Max=-1.00)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

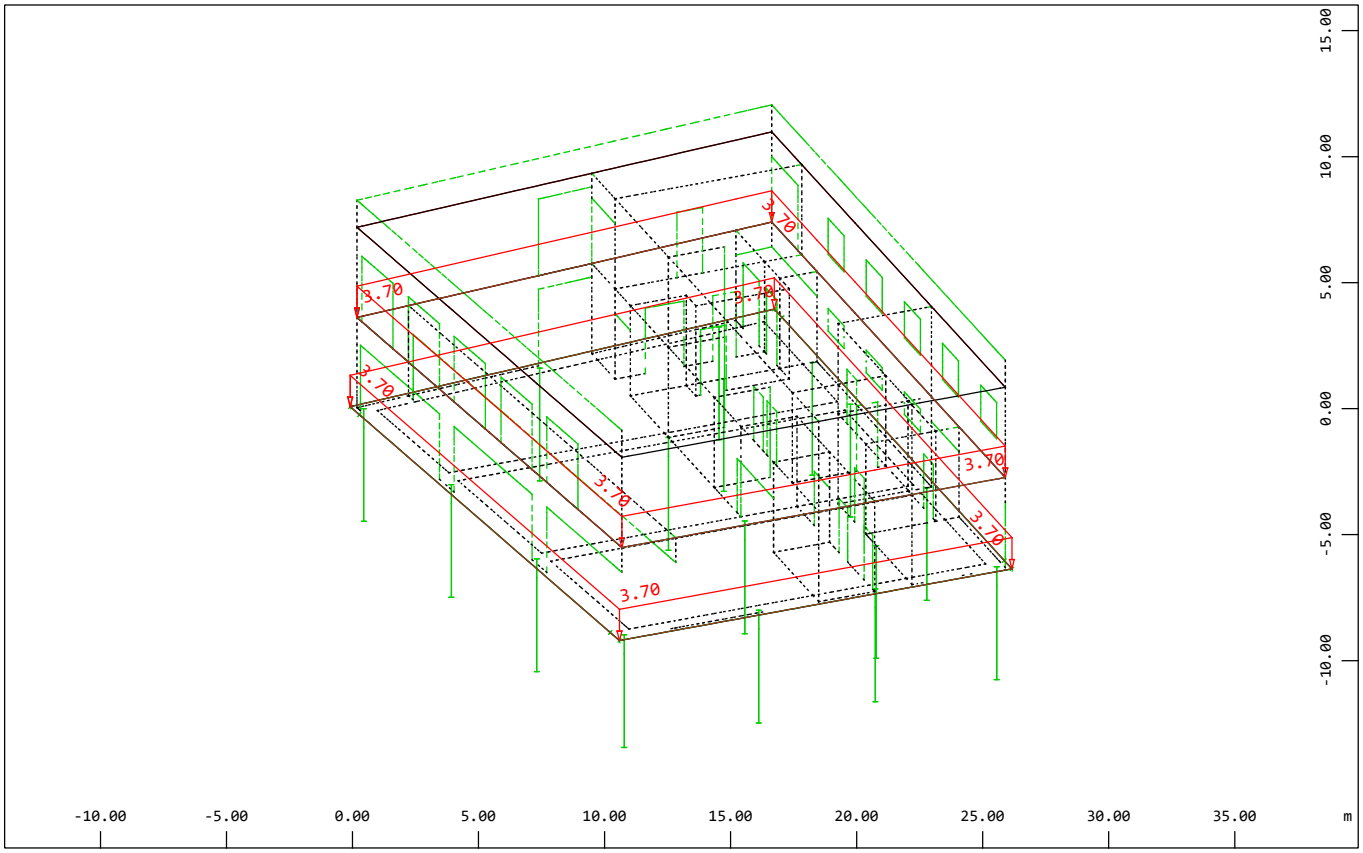



Sector of system Group 100 110 120 201...207 251...257 301 302
All loads, Loadcase 4 Stalna-fasade , (1 cm 3D = unit) Free line load (force) in global
Z (Unit=11.2 kN/m ) (Min=-6.00) (Max=-3.00)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

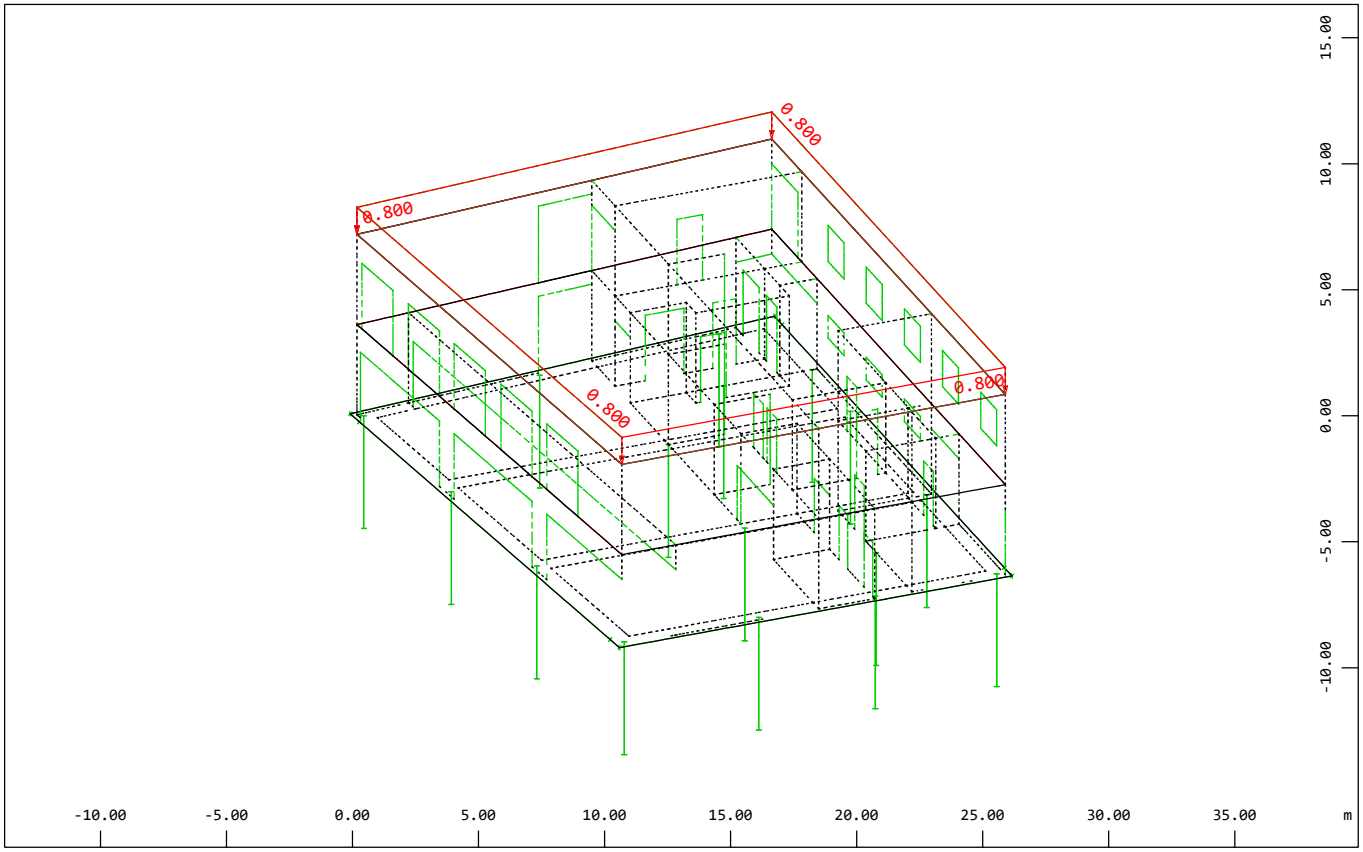
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11826 DSO Bovec - centralna dilat. enota stavbe
Obtezba: koristna C in H




Z Y X
Sector of system Group 100 110 120 201...207 251...257 301 302
All loads, Loadcase 11 Koristna C , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=8.00 kN/m2 ) (Min=-3.70) (Max=-3.70)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

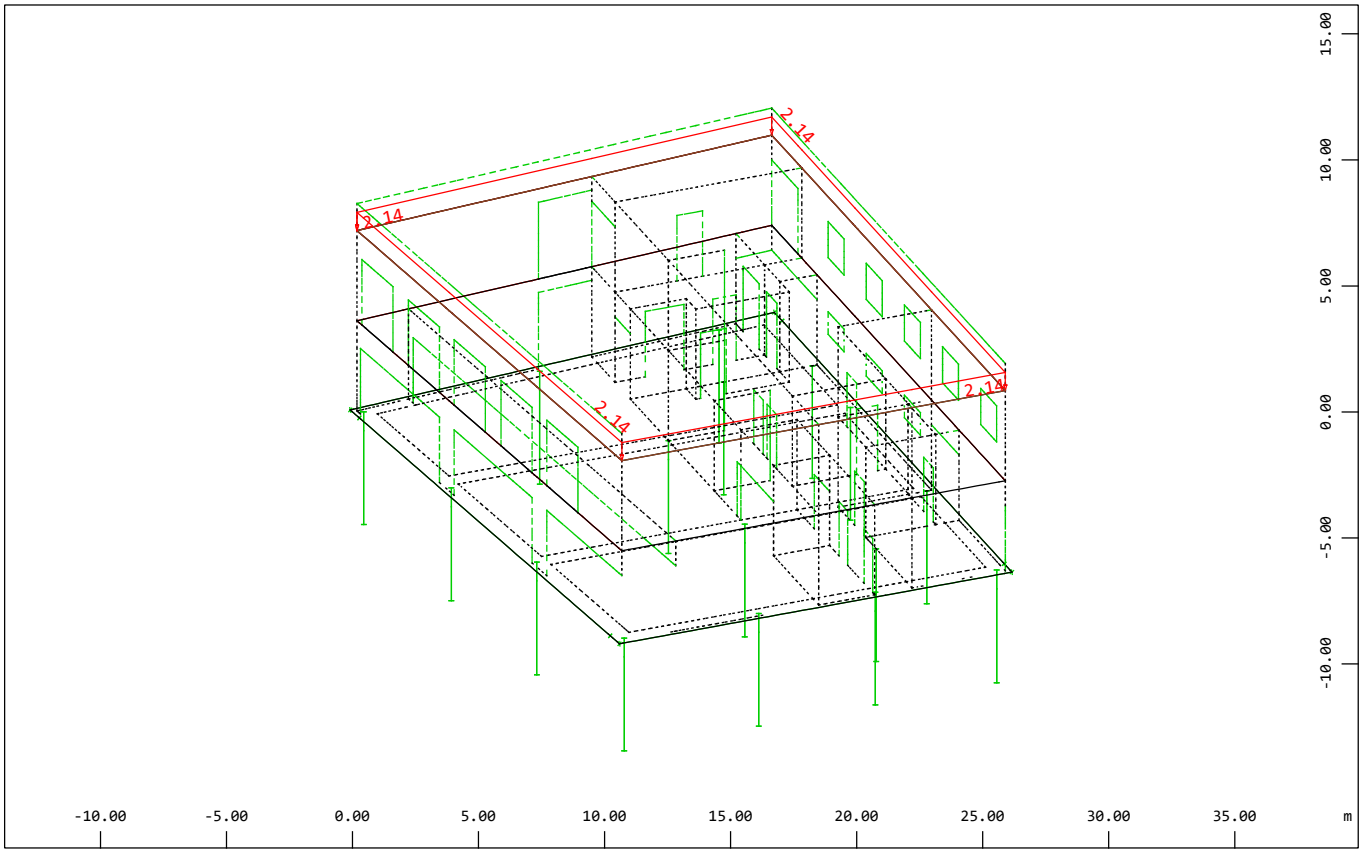



Z Y X
Sector of system Group 100 110 120 201...207 251...257 301 302
All loads, Loadcase 12 Koristna H , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=2.00 kN/m2 ) (Min=-0.800) (Max=-0.800)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

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Obtezba: sneg




Z
Y
X

Sector of system Group 100 110 120 201...207 251...257 301 302
All loads, Loadcase 21 Sneg , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=8.00 kN/m2 ) (Min=-2.14) (Max=-2.14)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

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Reologija (CSM)

**Global Settings**

Dead load of elements is automatically activated.
Creep and shrinkage values are calculated in advance in CSM.
Creep values are calculated individually for each stage load part (backward creeping).

**Construction Stages**

| CS | Type | t [d] | RH [%] | T [°C] | laun_1 [m] | laun_2 [m] | Designation |
|---|---|---|---|---|---|---|---|
| 10 | G_1 | | | | | | G_1 |
| 15 | C_1 | 10 | 70 | 20 | | | Creepstep |
| 25 | C_1 | 28 | 70 | 20 | | | Creep til g_2 |
| 30 | G_2 | | | | | | G_2 |
| 35 | C_1 | 100 | 70 | 20 | | | Creep til opening |
| 40 | ZC | | | | | | Part of Q load for C+S |
| 45 | C_2 | 30000 | 70 | 20 | | | Creep til t-infinite |

CS number of the construction stage
Type type of the action
t effective duration of creep interval
RH relative humidity
T temperature in creep interval
laun_1 launching distance of this construction stage for launching from side 1
laun_2 launching distance of this construction stage for launching from side 2

**Group Properties**

| Grp | active from CS | active until CS | deadload from CS | Hfix from | Bedd from | Deck from | ASTI until | t0 [d] | ts [d] | FAC1 | PHIF | QUEA | QEMX | FACD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 10 | 9999 | 10 | | | | | 100 | 3 | | 1.00 | | | |
| 101 | 10 | 9999 | 10 | | | | | 100 | 3 | | 1.00 | | | |
| 110 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 120 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 201 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 202 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 203 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 204 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 205 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 206 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 207 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 251 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 252 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 253 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 254 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 255 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 256 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 257 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 258 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 301 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 302 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |

Grp group number
active active from / until construction stage number
deadload construction stage number from which the dead load of a group is activated
Hfix construction stage number at which hinges are fixed
Bedd construction stage number from which QUAD bedding is activated
Deck construction stage number from which the in situ concrete load of a AQUA CS is activated
ASTI stiffness active till construction stage number
t0 age of concrete at time of loading
ts start time of drying (from t0-ts shrinkage without effect)
FAC1 stiffness factor for first activation (e.g. cable prestress)
PHIF factor for creep of springs and beddings
QUEA component of the normal force stiffness of QUAD elements
QEMX factor of Young's modulus of QUAD elements in local x direction
FACD factor dead load

**Additional Loads**

| LC | active from CS | active until CS | factor | |
|---|---|---|---|---|
| 2 | 30 | 9999 | 1.000000 | |
| 4 | 30 | 9999 | 1.000000 | |
| 9 | 10 | 9999 | 1.000000 | |

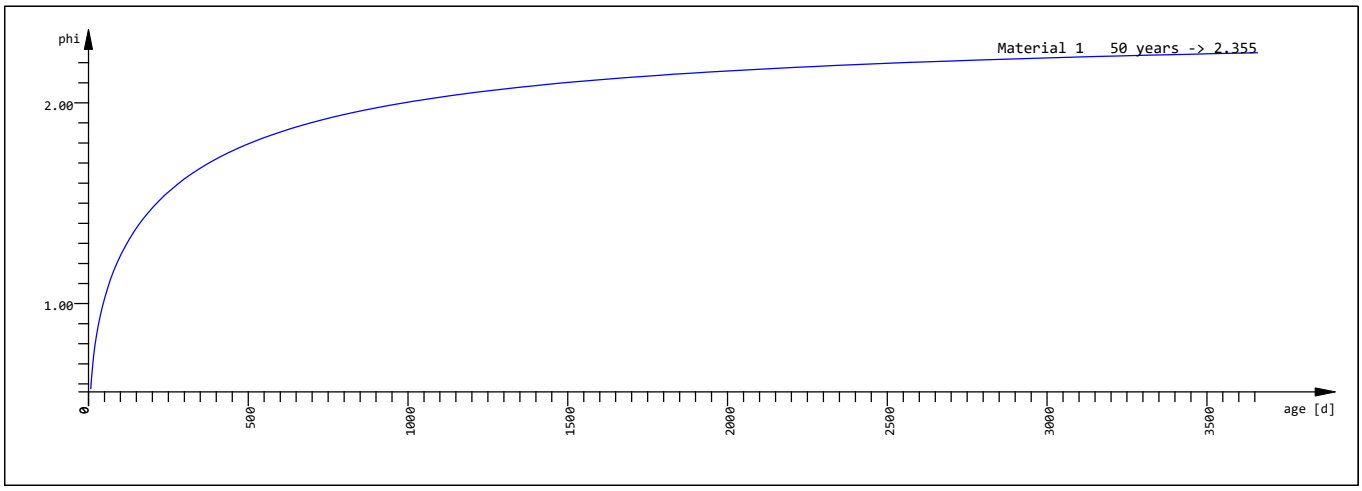
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Reologija (CSM)

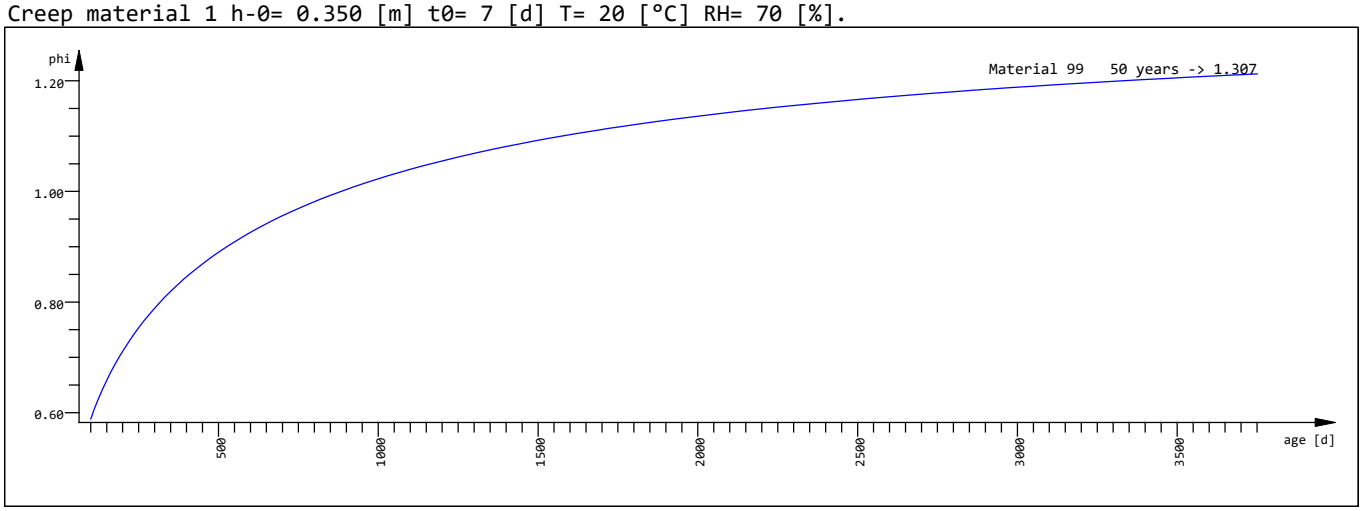
**Additional Loads**

| LC | active from CS | active until CS | factor | |
|---|---|---|---|---|
| 11 | 40 | 9999 | 0.600000 | |

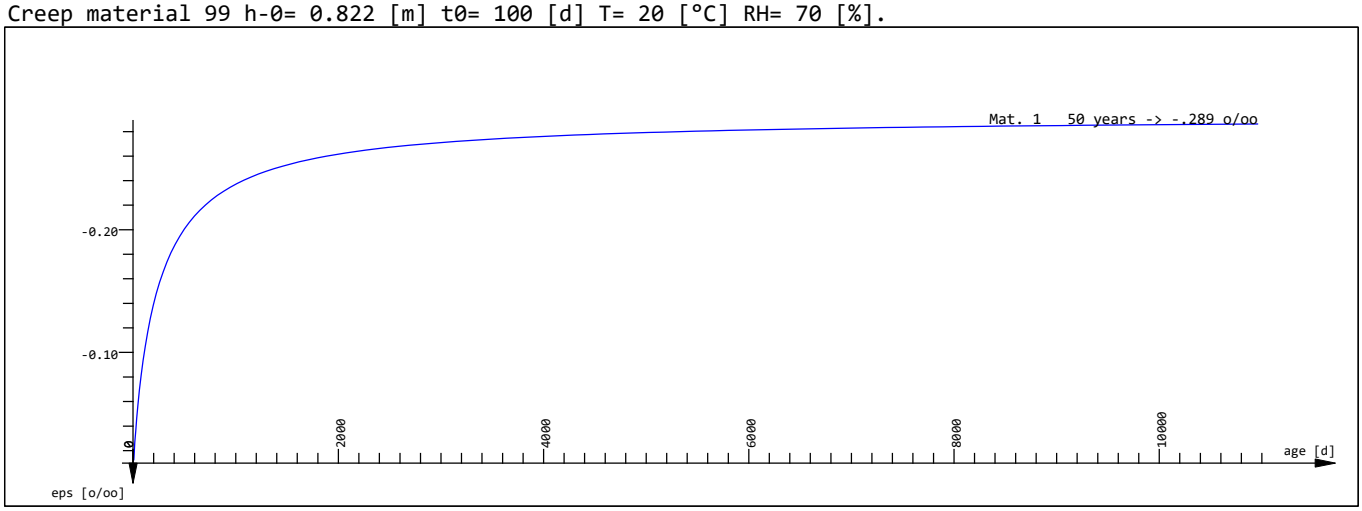
LC load case
active active from / until construction stage number




Creep material 1 h-0= 0.350 [m] t0= 7 [d] T= 20 [°C] RH= 70 [%].



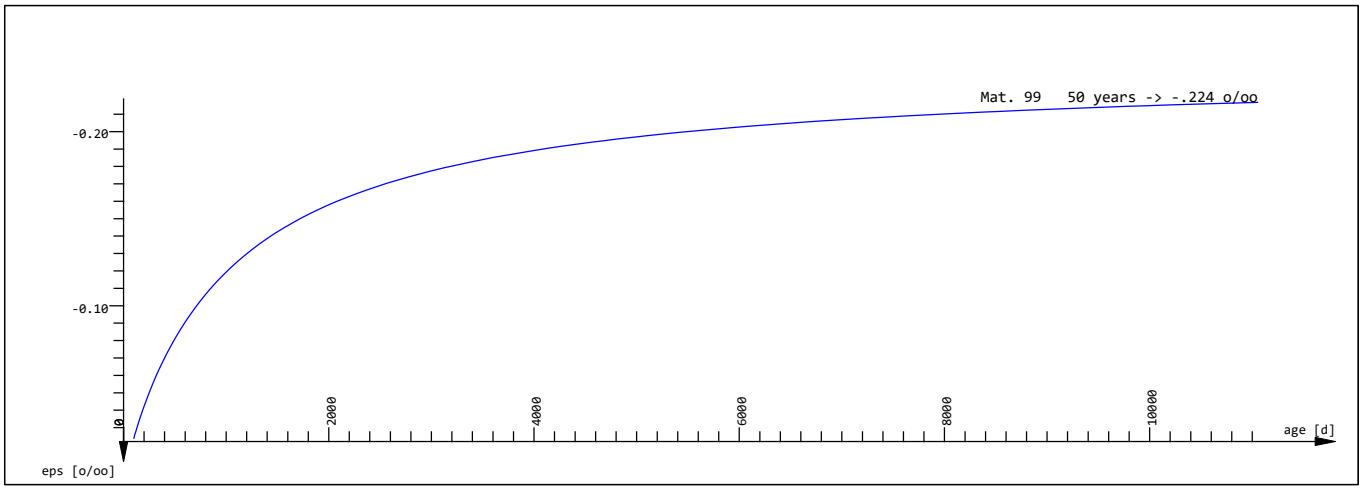

Creep material 99 h-0= 0.822 [m] t0= 100 [d] T= 20 [°C] RH= 70 [%].




Shrinkage material 1 h-0= 0.350 [m] T= 20 [°C] RH= 70 [%].

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Shrinkage material 99 h-0= 0.822 [m] T= 20 [°C] RH= 70 [%].

Analysis of creep and shrinkage according to EN 1992-1-1:2004+AC:2010/EN 1992-2:2005+AC:2008
RCRE creep values of later acting load parts are not printed (ECHO RCRE).

**Creep Values**

| Grp | Mat | h-0 [mm] | t0 [d] | CS 15 | CS 25 | CS 35 | CS 45 | total φ-eff |
|---|---|---|---|---|---|---|---|---|
| | | t[d] | ---> | 10 | 28 | 100 | 30000 | 30138 |
| | | RH[%] | ---> | 70 | 70 | 70 | 70 | |
| | | T[°C] | ---> | 20 | 20 | 20 | 20 | |
| 100 | 99 | 822.0 | 100 | 0.30 | 0.15 | 0.20 | 0.67 | 1.32 / 1.05¹ |
| 101 | 99 | 400.0 | 100 | 0.37 | 0.18 | 0.23 | 0.63 | 1.41 / 1.05¹ |
| 110 | 1 | 350.0 | 7 | 0.64 | 0.31 | 0.40 | 1.02 | 2.37 / 1.05¹ |
| 120 | 1 | 350.0 | 7 | 0.64 | 0.31 | 0.40 | 1.02 | 2.37 / 1.05¹ |
| 201 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 202 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 203 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 204 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 205 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 206 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 207 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 251 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 252 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 253 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 254 | 1 | 200.0 | 7 | 0.75 | 0.35 | 0.45 | 0.95 | 2.51 / 1.05¹ |
| 255 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 256 | 1 | 218.0 | 7 | 0.74 | 0.35 | 0.44 | 0.96 | 2.49 / 1.05¹ |
| 257 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 258 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05¹ |
| 301 | 1 | 210.0 | 7 | 0.74 | 0.35 | 0.44 | 0.96 | 2.50 / 1.05¹ |
| 302 | 1 | 210.0 | 7 | 0.74 | 0.35 | 0.44 | 0.96 | 2.50 / 1.05¹ |

¹ In AQB and ASE the creep values will be devided by the printed factor due to the problem of the reference E-modulus [Ec/Ecm]
Please refer to basic document EN 1992-1-1 Eq.3.14

| | | | |
|---|---|---|---|
| Grp | group number | φ-eff | sum construction stage creep parts |
| h-0 | notional size (2A/U) | t | effective duration creep interval |
| t0 | age of concrete at time of loading | RH | relative humidity |
| CS | construction stage creep part Δφ-eff | T | temperature in creep interval |

**Shrinkage Values *10^-6**

| Grp | Mat | h-0 [mm] | ts [d] | CS 15 | CS 25 | CS 35 | CS 45 | total ε-cs |
|---|---|---|---|---|---|---|---|---|
| | | t[d] | ---> | 10 | 28 | 100 | 30000 | 30138 |
| | | RH[%] | ---> | 70 | 70 | 70 | 70 | |
| | | T[°C] | ---> | 20 | 20 | 20 | 20 | |

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**Shrinkage Values *10^-6**

| Grp | Mat | h-0 [mm] | ts [d] | CS 15 | CS 25 | CS 35 | CS 45 | total ε-cs |
|---|---|---|---|---|---|---|---|---|
| 100 | 99 | 822.0 | 3 | -2.8 | -7.3 | -21.3 | -198. | -229. |
| 101 | 99 | 400.0 | 3 | -5.3 | -13.5 | -35.8 | -151. | -205. |
| 110 | 1 | 350.0 | 3 | -17.1 | -32.2 | -65.5 | -175. | -290. |
| 120 | 1 | 350.0 | 3 | -17.1 | -32.2 | -65.5 | -175. | -290. |
| 201 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 202 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 203 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 204 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 205 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 206 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 207 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 251 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 252 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 253 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 254 | 1 | 200.0 | 3 | -30.9 | -58.3 | -96.5 | -140. | -326. |
| 255 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 256 | 1 | 218.0 | 3 | -28.0 | -53.4 | -92.5 | -146. | -320. |
| 257 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 258 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 301 | 1 | 210.0 | 3 | -29.2 | -55.5 | -94.3 | -144. | -323. |
| 302 | 1 | 210.0 | 3 | -29.2 | -55.5 | -94.3 | -144. | -323. |

| | | | |
|---|---|---|---|
| Grp | group number | ε-cs | sum of construction stage parts |
| h-0 | notional size (2A/U) | t | effective duration creep interval |
| ts | start time of drying | RH | relative humidity |
| CS | construction stage shrinkage part Δε-cs | T | temperature in creep interval |

In case of ts lower t0, shrinkage from ts-t0 is not taken into account!
(Losses due to shrinkage are calculated starting at time t0)

**Overview loadcases. (see also CSM manual chapter 2 loadcases)**

---

Total CS displacements and forces starting at loadcase number. 4000
Difference displacements and forces starting at loadcase number. 5000
AQB inner stresses from creep and shrinkage at loadcase number. 6000
Stress results of the AQB-LCST-evaluation at loadcase number. 7000
[to check prestress normal force after creep and shrinkage :
-> WINGRAF beam normal force LC 7000ff ]

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Izracun nihajnih oblik v smereh X in Y

**Sum of Masses**

| | TM-X[t] | TM-Y[t] | TM-Z[t] | RM-X[tm2] | RM-Y[tm2] | RM-Z[tm2] |
|---|---|---|---|---|---|---|
| total | 1587.792 | 1587.792 | 0.000 | 0.497 | 1.857 | 1.092 |
| activ | 1586.769 | 1585.925 | 0.000 | 0.497 | 1.857 | 1.092 |

**Eigenfrequencies**

Using Lanczos Method
Iterationsvectors 100

| No. | LC | Eigenvalue [1/Sec2] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|---|---|---|---|---|---|---|
| 1 | 1001 | 2.35072E+03 | 2.59E-19 | 7.717 | 0.129592 | 0.00000 |
| 2 | 1002 | 3.52088E+03 | 5.51E-20 | 9.444 | 0.105890 | 0.00000 |
| 3 | 1003 | 6.46768E+03 | 5.30E-19 | 12.800 | 0.078128 | 0.00000 |
| 4 | 1004 | 7.03613E+03 | 5.27E-20 | 13.350 | 0.074905 | 0.00000 |
| 5 | 1005 | 9.03922E+03 | 1.16E-18 | 15.132 | 0.066087 | 0.00000 |
| 6 | 1006 | 1.06804E+04 | 5.76E-18 | 16.448 | 0.060798 | 0.00000 |
| 7 | 1007 | 1.21979E+04 | 7.82E-18 | 17.578 | 0.056890 | 0.00000 |
| 8 | 1008 | 1.24012E+04 | 7.04E-18 | 17.724 | 0.056422 | 0.00000 |
| 9 | 1009 | 1.59043E+04 | 1.22E-17 | 20.071 | 0.049822 | 0.00000 |
| 10 | 1010 | 1.77719E+04 | 2.30E-18 | 21.217 | 0.047132 | 0.00000 |
| 11 | 1011 | 1.79532E+04 | 2.21E-18 | 21.325 | 0.046893 | 0.00000 |
| 12 | 1012 | 1.82721E+04 | 5.50E-18 | 21.514 | 0.046482 | 0.00000 |
| 13 | 1013 | 1.98347E+04 | 7.01E-18 | 22.415 | 0.044614 | 0.00000 |
| 14 | 1014 | 2.21913E+04 | 2.01E-17 | 23.709 | 0.042178 | 0.00000 |
| 15 | 1015 | 2.39098E+04 | 1.68E-17 | 24.610 | 0.040634 | 0.00000 |
| 16 | 1016 | 2.56477E+04 | 1.07E-17 | 25.488 | 0.039233 | 0.00000 |
| 17 | 1017 | 2.62587E+04 | 1.18E-17 | 25.790 | 0.038774 | 0.00000 |
| 18 | 1018 | 2.78818E+04 | 8.30E-18 | 26.575 | 0.037629 | 0.00000 |
| 19 | 1019 | 3.05732E+04 | 1.02E-17 | 27.829 | 0.035934 | 0.00000 |
| 20 | 1020 | 3.08579E+04 | 7.17E-18 | 27.958 | 0.035768 | 0.00000 |
| 21 | 1021 | 3.11920E+04 | 2.20E-17 | 28.109 | 0.035576 | 0.00000 |
| 22 | 1022 | 3.24062E+04 | 9.45E-18 | 28.651 | 0.034903 | 0.00000 |
| 23 | 1023 | 3.45956E+04 | 2.01E-18 | 29.603 | 0.033781 | 0.00000 |
| 24 | 1024 | 3.62941E+04 | 2.20E-17 | 30.321 | 0.032981 | 0.00000 |
| 25 | 1025 | 3.68532E+04 | 3.89E-17 | 30.553 | 0.032730 | 0.00000 |
| 26 | 1026 | 3.79076E+04 | 2.15E-17 | 30.987 | 0.032271 | 0.00000 |
| 27 | 1027 | 3.97868E+04 | 6.87E-18 | 31.746 | 0.031500 | 0.00000 |
| 28 | 1028 | 4.06732E+04 | 1.17E-17 | 32.098 | 0.031155 | 0.00000 |
| 29 | 1029 | 4.23725E+04 | 7.29E-16 | 32.761 | 0.030524 | 0.00000 |
| 30 | 1030 | 4.37760E+04 | 1.88E-14 | 33.300 | 0.030030 | 0.00000 |
| 31 | 1031 | 4.52865E+04 | 5.22E-11 | 33.869 | 0.029525 | 0.00000 |
| 32 | 1032 | 4.61080E+04 | 6.02E-11 | 34.175 | 0.029261 | 0.00000 |
| 33 | 1033 | 4.90825E+04 | 3.09E-06 | 35.260 | 0.028361 | 0.00000 |
| 34 | 1034 | 4.92132E+04 | 7.66E-06 | 35.307 | 0.028323 | 0.00000 |
| 35 | 1035 | 5.02446E+04 | 2.23E-05 | 35.675 | 0.028031 | 0.00000 |
| 36 | 1036 | 5.10102E+04 | 8.42E-04 | 35.946 | 0.027820 | 0.00000 |
| 37 | 1037 | 5.15030E+04 | 1.08E-02 | 36.119 | 0.027686 | 0.00000 |
| 38 | 1038 | 5.18485E+04 | 2.05E-03 | 36.240 | 0.027594 | 0.00000 |
| 39 | 1039 | 5.27562E+04 | 5.02E-03 | 36.556 | 0.027355 | 0.00000 |
| 40 | 1040 | 5.32171E+04 | 5.96E-02 | 36.715 | 0.027237 | 0.00000 |
| 41 | 1041 | 5.45100E+04 | 1.48E-02 | 37.159 | 0.026912 | 0.00000 |
| 42 | 1042 | 5.49205E+04 | 2.10E-02 | 37.298 | 0.026811 | 0.00000 |
| 43 | 1043 | 5.62548E+04 | 2.37E-02 | 37.749 | 0.026491 | 0.00000 |
| 44 | 1044 | 5.69991E+04 | 1.37E-02 | 37.997 | 0.026318 | 0.00000 |
| 45 | 1045 | 5.80813E+04 | 1.25E-02 | 38.356 | 0.026071 | 0.00000 |
| 46 | 1046 | 5.98535E+04 | 2.49E-02 | 38.937 | 0.025682 | 0.00000 |
| 47 | 1047 | 6.14663E+04 | 2.44E-02 | 39.458 | 0.025343 | 0.00000 |
| 48 | 1048 | 6.22057E+04 | 3.97E-02 | 39.695 | 0.025192 | 0.00000 |
| 49 | 1049 | 6.41677E+04 | 4.01E-02 | 40.316 | 0.024804 | 0.00000 |
| 50 | 1050 | 6.53354E+04 | 5.48E-02 | 40.681 | 0.024581 | 0.00000 |

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Izracun nihajnih oblik v smereh X in Y

| No. | LC | Eigenvalue [1/Sec2] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|---|---|---|---|---|---|---|
| 51 | | 6.67739E+04 | 3.94E-02 | 41.127 | 0.024315 | |
| 52 | | 6.96573E+04 | 2.62E-02 | 42.005 | 0.023807 | |
| 53 | | 7.12314E+04 | 2.51E-02 | 42.477 | 0.023542 | |
| 54 | | 7.36073E+04 | 3.25E-02 | 43.180 | 0.023159 | |
| 55 | | 7.54145E+04 | 1.83E-02 | 43.707 | 0.022880 | |
| 56 | | 7.91040E+04 | 1.24E-02 | 44.763 | 0.022340 | |
| 57 | | 8.25632E+04 | 3.07E-02 | 45.731 | 0.021867 | |
| 58 | | 8.48377E+04 | 4.17E-02 | 46.357 | 0.021572 | |
| 59 | | 8.92936E+04 | 4.78E-02 | 47.559 | 0.021027 | |
| 60 | | 9.26439E+04 | 4.88E-02 | 48.443 | 0.020643 | |
| 61 | | 9.73977E+04 | 9.07E-02 | 49.670 | 0.020133 | |
| 62 | | 9.85769E+04 | 7.14E-02 | 49.970 | 0.020012 | |
| 63 | | 1.07167E+05 | 7.27E-02 | 52.102 | 0.019193 | |
| 64 | | 1.13031E+05 | 9.86E-02 | 53.508 | 0.018689 | |
| 65 | | 1.16953E+05 | 9.48E-02 | 54.428 | 0.018373 | |
| 66 | | 1.21079E+05 | 7.68E-02 | 55.380 | 0.018057 | |
| 67 | | 1.28735E+05 | 9.49E-02 | 57.104 | 0.017512 | |
| 68 | | 1.36826E+05 | 8.32E-02 | 58.872 | 0.016986 | |
| 69 | | 1.43824E+05 | 1.37E-01 | 60.358 | 0.016568 | |
| 70 | | 1.50121E+05 | 1.00E-01 | 61.665 | 0.016217 | |
| 71 | | 1.62728E+05 | 7.77E-02 | 64.202 | 0.015576 | |
| 72 | | 1.72870E+05 | 1.28E-01 | 66.173 | 0.015112 | |
| 73 | | 1.86424E+05 | 1.02E-01 | 68.718 | 0.014552 | |
| 74 | | 1.99345E+05 | 1.41E-01 | 71.060 | 0.014073 | |
| 75 | | 2.11254E+05 | 1.57E-01 | 73.151 | 0.013670 | |
| 76 | | 2.30177E+05 | 1.33E-01 | 76.357 | 0.013096 | |
| 77 | | 2.50275E+05 | 2.23E-01 | 79.621 | 0.012559 | |
| 78 | | 2.74850E+05 | 2.26E-01 | 83.439 | 0.011985 | |
| 79 | | 3.00782E+05 | 2.13E-01 | 87.286 | 0.011457 | |
| 80 | | 3.27595E+05 | 1.98E-01 | 91.094 | 0.010978 | |
| 81 | | 3.56710E+05 | 1.63E-01 | 95.056 | 0.010520 | |
| 82 | | 4.03136E+05 | 2.86E-01 | 101.052 | 0.009896 | |
| 83 | | 4.41307E+05 | 2.37E-01 | 105.728 | 0.009458 | |
| 84 | | 4.99963E+05 | 3.06E-01 | 112.535 | 0.008886 | |
| 85 | | 5.71548E+05 | 3.01E-01 | 120.322 | 0.008311 | |
| 86 | | 6.32071E+05 | 3.33E-01 | 126.533 | 0.007903 | |
| 87 | | 7.48155E+05 | 3.41E-01 | 137.663 | 0.007264 | |
| 88 | | 8.58248E+05 | 3.54E-01 | 147.444 | 0.006782 | |
| 89 | | 9.96349E+05 | 3.73E-01 | 158.864 | 0.006295 | |
| 90 | | 1.21569E+06 | 3.47E-01 | 175.482 | 0.005699 | |
| 91 | | 1.46440E+06 | 4.75E-01 | 192.598 | 0.005192 | |
| 92 | | 1.88017E+06 | 4.00E-01 | 218.232 | 0.004582 | |
| 93 | | 2.38589E+06 | 5.76E-01 | 245.836 | 0.004068 | |
| 94 | | 3.16509E+06 | 6.59E-01 | 283.148 | 0.003532 | |
| 95 | | 4.48784E+06 | 7.71E-01 | 337.162 | 0.002966 | |
| 96 | | 6.70910E+06 | 9.77E-01 | 412.242 | 0.002426 | |
| 97 | | 1.15738E+07 | 1.30E+00 | 541.449 | 0.001847 | |
| 98 | | 2.23518E+07 | 1.52E+00 | 752.448 | 0.001329 | |
| 99 | | 4.98683E+07 | 2.19E+00 | 1123.912 | 0.000890 | |
| 100 | | 1.46385E+08 | 3.36E+00 | 1925.607 | 0.000519 | |

**Modal masses - activated mass**

| No. | LC | frequency [Hertz] | effective modal Mass X[t] | Y[t] | Z[t] | factor X[%] | Y[%] | Z[%] | activated mass [%]* |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1001 | 7.717 | 43 | 1103 | 0 | 2.69 | 69.52 | 0.00 | 29.49820 |
| 2 | 1002 | 9.444 | 845 | 40 | 0 | 53.27 | 2.52 | 0.00 | 19.88303 |
| 3 | 1003 | 12.800 | 0 | 0 | 0 | 0.01 | 0.02 | 0.00 | 0.35895 |
| 4 | 1004 | 13.350 | 324 | 6 | 0 | 20.44 | 0.38 | 0.00 | 18.44581 |

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Izracun nihajnih oblik v smereh X in Y

**Modal masses - activated mass**

| No. | LC | frequency [Hertz] | effective modal Mass X[t] | Y[t] | Z[t] | factor X[%] | Y[%] | Z[%] | activated mass [%]* |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 1005 | 15.132 | 1 | 0 | 0 | 0.04 | 0.00 | 0.00 | 0.34504 |
| 6 | 1006 | 16.448 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.24812 |
| 7 | 1007 | 17.578 | 0 | 0 | 0 | 0.03 | 0.00 | 0.00 | 0.50028 |
| 8 | 1008 | 17.724 | 0 | 0 | 0 | 0.01 | 0.00 | 0.00 | 0.57440 |
| 9 | 1009 | 20.071 | 1 | 0 | 0 | 0.05 | 0.00 | 0.00 | 0.25706 |
| 10 | 1010 | 21.217 | 0 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.35960 |
| 11 | 1011 | 21.325 | 0 | 0 | 0 | 0.00 | 0.03 | 0.00 | 0.26760 |
| 12 | 1012 | 21.514 | 0 | 1 | 0 | 0.01 | 0.06 | 0.00 | 0.13374 |
| 13 | 1013 | 22.415 | 0 | 29 | 0 | 0.02 | 1.80 | 0.00 | 0.25803 |
| 14 | 1014 | 23.709 | 0 | 2 | 0 | 0.00 | 0.11 | 0.00 | 0.39766 |
| 15 | 1015 | 24.610 | 0 | 1 | 0 | 0.02 | 0.04 | 0.00 | 0.27784 |
| 16 | 1016 | 25.488 | 2 | 9 | 0 | 0.12 | 0.57 | 0.00 | 0.30641 |
| 17 | 1017 | 25.790 | 2 | 73 | 0 | 0.12 | 4.58 | 0.00 | 1.32967 |
| 18 | 1018 | 26.575 | 4 | 0 | 0 | 0.26 | 0.00 | 0.00 | 0.25735 |
| 19 | 1019 | 27.829 | 3 | 5 | 0 | 0.18 | 0.30 | 0.00 | 0.26752 |
| 20 | 1020 | 27.958 | 21 | 0 | 0 | 1.31 | 0.00 | 0.00 | 0.59476 |
| 21 | 1021 | 28.109 | 11 | 7 | 0 | 0.72 | 0.44 | 0.00 | 0.52426 |
| 22 | 1022 | 28.651 | 0 | 2 | 0 | 0.00 | 0.12 | 0.00 | 0.13548 |
| 23 | 1023 | 29.603 | 19 | 0 | 0 | 1.20 | 0.00 | 0.00 | 0.57442 |
| 24 | 1024 | 30.321 | 12 | 0 | 0 | 0.78 | 0.01 | 0.00 | 0.85577 |
| 25 | 1025 | 30.553 | 3 | 3 | 0 | 0.18 | 0.18 | 0.00 | 0.55685 |
| 26 | 1026 | 30.987 | 2 | 0 | 0 | 0.12 | 0.00 | 0.00 | 0.20710 |
| 27 | 1027 | 31.746 | 1 | 0 | 0 | 0.05 | 0.00 | 0.00 | 0.13787 |
| 28 | 1028 | 32.098 | 0 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.26009 |
| 29 | 1029 | 32.761 | 0 | 0 | 0 | 0.01 | 0.01 | 0.00 | 0.10950 |
| 30 | 1030 | 33.300 | 0 | 0 | 0 | 0.02 | 0.02 | 0.00 | 0.14300 |
| 31 | 1031 | 33.869 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.12759 |
| 32 | 1032 | 34.175 | 0 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.22467 |
| 33 | 1033 | 35.260 | 0 | 0 | 0 | 0.01 | 0.01 | 0.00 | 0.23559 |
| 34 | 1034 | 35.307 | 0 | 0 | 0 | 0.02 | 0.01 | 0.00 | 0.23774 |
| 35 | 1035 | 35.675 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.20523 |
| 36 | 1036 | 35.946 | 0 | 1 | 0 | 0.01 | 0.09 | 0.00 | 0.15575 |
| 37 | 1037 | 36.119 | 0 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.35112 |
| 38 | 1038 | 36.240 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.27971 |
| 39 | 1039 | 36.556 | 0 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.16649 |
| 40 | 1040 | 36.715 | 1 | 0 | 0 | 0.06 | 0.02 | 0.00 | 0.41897 |
| 41 | 1041 | 37.159 | 0 | 0 | 0 | 0.01 | 0.00 | 0.00 | 0.28646 |
| 42 | 1042 | 37.298 | 0 | 0 | 0 | 0.01 | 0.02 | 0.00 | 0.31695 |
| 43 | 1043 | 37.749 | 0 | 0 | 0 | 0.01 | 0.00 | 0.00 | 0.25627 |
| 44 | 1044 | 37.997 | 0 | 0 | 0 | 0.02 | 0.00 | 0.00 | 0.24604 |
| 45 | 1045 | 38.356 | 0 | 0 | 0 | 0.02 | 0.02 | 0.00 | 0.13970 |
| 46 | 1046 | 38.937 | 0 | 0 | 0 | 0.01 | 0.01 | 0.00 | 0.24002 |
| 47 | 1047 | 39.458 | 1 | 1 | 0 | 0.05 | 0.03 | 0.00 | 0.26073 |
| 48 | 1048 | 39.695 | 0 | 0 | 0 | 0.00 | 0.02 | 0.00 | 0.19139 |
| 49 | 1049 | 40.316 | 0 | 0 | 0 | 0.01 | 0.00 | 0.00 | 0.14463 |
| 50 | 1050 | 40.681 | 0 | 0 | 0 | 0.00 | 0.02 | 0.00 | 0.25635 |
| | | sum | 1299 | 1285 | 0 | 81.89 | 81.03 | 0.00 | |
| | | System activ | 1587 | 1586 | 0 | | | | |

The modal masses are evaluated for the global X, Y and Z direction,
the "activated mass" also includes torsional and opposite movements
without a global displacement (tuning fork):
 * activated mass in % = product u^2*M = displacement^2*mass, in relation to the
   sum of active mass, u scaled on a maximum displacement or rotation of 1.00.
(this activated mass is often also called generalized modal mass)

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Projektni spekter

**Load Case 601**

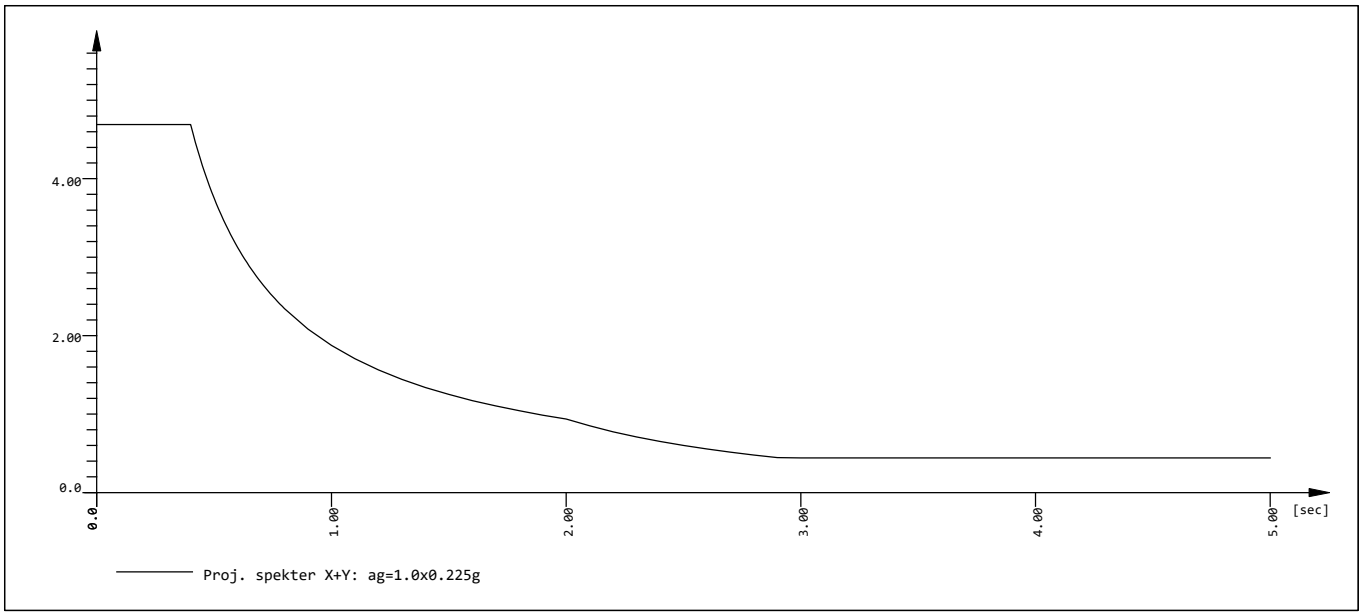
Factor forces and moments 1.000

**Response spectra Proj. spekter X+Y: ag=1.0x0.225g**

| D[-] | SA[-] | SB[-] | MIN[-] | TB[sec] | TC[sec] | TD[sec] | TE[sec] | K1[-] | K2[-] | A[m/sec2] |
|---|---|---|---|---|---|---|---|---|---|---|
| auto | Zone = | | | ah =* 1.000 | av =* 0.000 | | | | | 0.00 |

| Time [sec] | Factor [-] | Time [sec] | Factor [-] | Time [sec] | Factor [-] | Time [sec] | Factor [-] |
|---|---|---|---|---|---|---|---|
| 0.000 | 4.690 | 0.010 | 4.690 | 0.020 | 4.690 | 0.030 | 4.690 |
| 0.040 | 4.690 | 0.050 | 4.690 | 0.060 | 4.690 | 0.070 | 4.690 |
| 0.080 | 4.690 | 0.090 | 4.690 | 0.100 | 4.690 | 0.150 | 4.690 |
| 0.200 | 4.690 | 0.300 | 4.690 | 0.400 | 4.690 | 0.410 | 4.576 |
| 0.420 | 4.467 | 0.430 | 4.363 | 0.440 | 4.264 | 0.450 | 4.169 |
| 0.460 | 4.079 | 0.470 | 3.992 | 0.480 | 3.909 | 0.490 | 3.829 |
| 0.500 | 3.752 | 0.510 | 3.679 | 0.520 | 3.608 | 0.530 | 3.540 |
| 0.540 | 3.474 | 0.550 | 3.411 | 0.560 | 3.350 | 0.570 | 3.292 |
| 0.580 | 3.235 | 0.590 | 3.180 | 0.600 | 3.127 | 0.610 | 3.076 |
| 0.620 | 3.026 | 0.630 | 2.978 | 0.640 | 2.931 | 0.650 | 2.886 |
| 0.660 | 2.843 | 0.670 | 2.800 | 0.680 | 2.759 | 0.690 | 2.719 |
| 0.700 | 2.680 | 0.710 | 2.642 | 0.720 | 2.606 | 0.730 | 2.570 |
| 0.740 | 2.535 | 0.750 | 2.502 | 0.760 | 2.469 | 0.770 | 2.437 |
| 0.780 | 2.405 | 0.790 | 2.375 | 0.800 | 2.345 | 0.900 | 2.085 |
| 1.000 | 1.876 | 1.100 | 1.706 | 1.200 | 1.564 | 1.300 | 1.443 |
| 1.400 | 1.340 | 1.500 | 1.251 | 1.600 | 1.173 | 1.700 | 1.104 |
| 1.800 | 1.042 | 1.900 | 0.988 | 2.000 | 0.938 | 2.100 | 0.851 |
| 2.200 | 0.775 | 2.300 | 0.709 | 2.400 | 0.651 | 2.500 | 0.600 |
| 2.600 | 0.555 | 2.700 | 0.515 | 2.800 | 0.479 | 2.900 | 0.446 |
| 3.000 | 0.442 | 3.100 | 0.442 | 3.200 | 0.442 | 3.300 | 0.442 |
| 3.400 | 0.442 | 3.500 | 0.442 | 3.600 | 0.442 | 3.700 | 0.442 |
| 3.800 | 0.442 | 3.900 | 0.442 | 4.000 | 0.442 | 4.100 | 0.442 |
| 4.200 | 0.442 | 4.300 | 0.442 | 4.400 | 0.442 | 4.500 | 0.442 |
| 4.600 | 0.442 | 4.700 | 0.442 | 4.800 | 0.442 | 4.900 | 0.442 |
| 5.000 | 0.442 | | | | | | |

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**Loads acting on Nodes**

| Node | A-X [m/sec2] | A-Y [m/sec2] | A-Z [m/sec2] | A-XX [1/sec2] | A-YY [1/sec2] | A-ZZ [1/sec2] | ref-X [m] | ref-Y [m] | ref-Z [m] |
|---|---|---|---|---|---|---|---|---|---|
| Center | 1.00 | | | | | | 0.000 | 0.000 | 0.000 |

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Elasticni spekter

**Load Case 701**

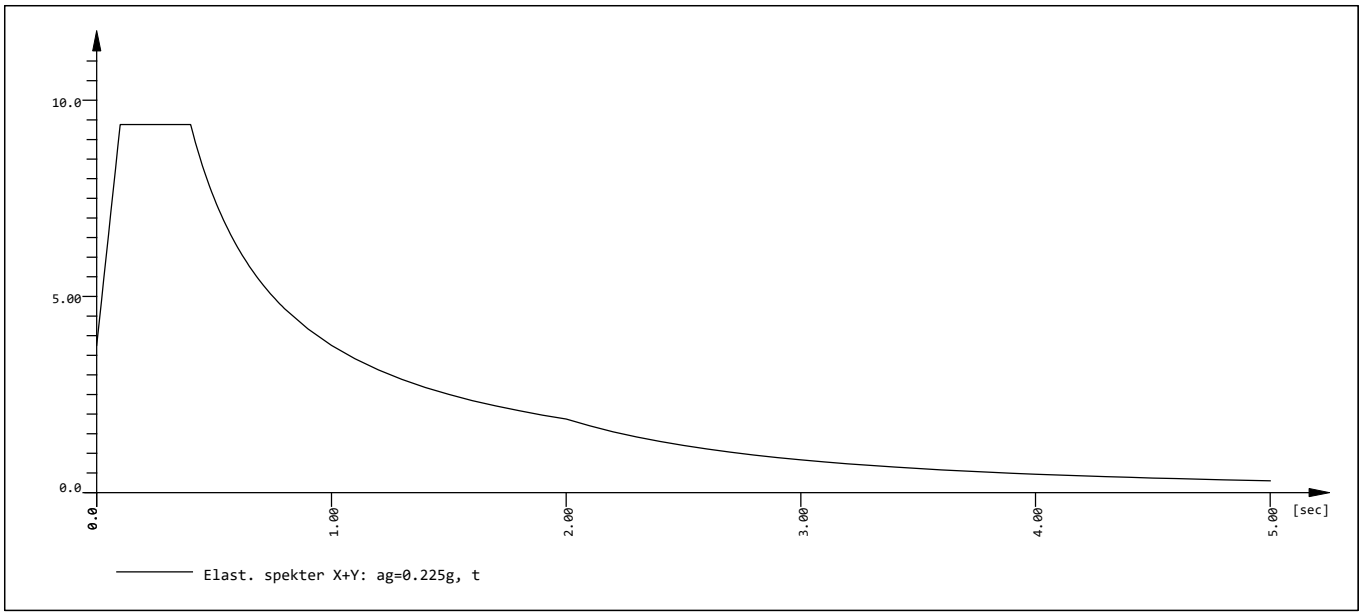
Factor forces and moments 1.000

**Response spectra Elast. spekter X+Y: ag=0.225g, t**

| D[-] | SA[-] | SB[-] | MIN[-] | TB[sec] | TC[sec] | TD[sec] | TE[sec] | K1[-] | K2[-] | A[m/sec2] |
|---|---|---|---|---|---|---|---|---|---|---|
| auto | Zone = | | | ah =* 1.000 | | av =* 0.000 | | | | 0.00 |

| Time [sec] | Factor [-] | Time [sec] | Factor [-] | Time [sec] | Factor [-] | Time [sec] | Factor [-] |
|---|---|---|---|---|---|---|---|
| 0.000 | 3.752 | 0.010 | 4.315 | 0.020 | 4.878 | 0.030 | 5.441 |
| 0.040 | 6.004 | 0.050 | 6.567 | 0.060 | 7.129 | 0.070 | 7.692 |
| 0.080 | 8.255 | 0.090 | 8.818 | 0.100 | 9.381 | 0.150 | 9.381 |
| 0.200 | 9.381 | 0.300 | 9.381 | 0.400 | 9.381 | 0.410 | 9.152 |
| 0.420 | 8.934 | 0.430 | 8.726 | 0.440 | 8.528 | 0.450 | 8.339 |
| 0.460 | 8.157 | 0.470 | 7.984 | 0.480 | 7.817 | 0.490 | 7.658 |
| 0.500 | 7.505 | 0.510 | 7.358 | 0.520 | 7.216 | 0.530 | 7.080 |
| 0.540 | 6.949 | 0.550 | 6.822 | 0.560 | 6.701 | 0.570 | 6.583 |
| 0.580 | 6.470 | 0.590 | 6.360 | 0.600 | 6.254 | 0.610 | 6.151 |
| 0.620 | 6.052 | 0.630 | 5.956 | 0.640 | 5.863 | 0.650 | 5.773 |
| 0.660 | 5.685 | 0.670 | 5.601 | 0.680 | 5.518 | 0.690 | 5.438 |
| 0.700 | 5.360 | 0.710 | 5.285 | 0.720 | 5.212 | 0.730 | 5.140 |
| 0.740 | 5.071 | 0.750 | 5.003 | 0.760 | 4.937 | 0.770 | 4.873 |
| 0.780 | 4.811 | 0.790 | 4.750 | 0.800 | 4.690 | 0.900 | 4.169 |
| 1.000 | 3.752 | 1.100 | 3.411 | 1.200 | 3.127 | 1.300 | 2.886 |
| 1.400 | 2.680 | 1.500 | 2.502 | 1.600 | 2.345 | 1.700 | 2.207 |
| 1.800 | 2.085 | 1.900 | 1.975 | 2.000 | 1.876 | 2.100 | 1.702 |
| 2.200 | 1.551 | 2.300 | 1.419 | 2.400 | 1.303 | 2.500 | 1.201 |
| 2.600 | 1.110 | 2.700 | 1.029 | 2.800 | 0.957 | 2.900 | 0.892 |
| 3.000 | 0.834 | 3.100 | 0.781 | 3.200 | 0.733 | 3.300 | 0.689 |
| 3.400 | 0.649 | 3.500 | 0.613 | 3.600 | 0.579 | 3.700 | 0.548 |
| 3.800 | 0.520 | 3.900 | 0.493 | 4.000 | 0.469 | 4.100 | 0.446 |
| 4.200 | 0.425 | 4.300 | 0.406 | 4.400 | 0.388 | 4.500 | 0.371 |
| 4.600 | 0.355 | 4.700 | 0.340 | 4.800 | 0.326 | 4.900 | 0.313 |
| 5.000 | 0.300 | | | | | | |

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**Loads acting on Nodes**

| Node | A-X [m/sec2] | A-Y [m/sec2] | A-Z [m/sec2] | A-XX [1/sec2] | A-YY [1/sec2] | A-ZZ [1/sec2] | ref-X [m] | ref-Y [m] | ref-Z [m] |
|---|---|---|---|---|---|---|---|---|---|
| Center | 1.00 | | | | | | 0.000 | 0.000 | 0.000 |

11826 DSO Bovec - centralna dilat. enota stavbe
Earq: Analiza s spektri odziva X+ (pomiki)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 115044 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 1617.674 | 1617.674 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.754 | 9.475 | 5.235 | 3.474E+04 | 2.084E+03 | -1.66E+04 | |
| | | | | 2.084E+03 | 6.267E+04 | -1.44E+04 | |
| | | | | -1.66E+04 | -1.44E+04 | 1.368E+05 | |
| active[1] | 1616.651 | 1615.808 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.755 | 9.471 | 5.235 | 3.486E+04 | 2.118E+03 | -1.65E+04 | |
| | | | | 2.118E+03 | 6.267E+04 | -1.43E+04 | |
| | | | | -1.65E+04 | -1.43E+04 | 1.369E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Nodal Displacements, method CQC**

| Node | u-X [mm] | u-Y [mm] | u-Z [mm] |
|---|---|---|---|
| MAX | 3.941 | 2.703 | 2.220 |

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11826 DSO Bovec - centralna dilat. enota stavbe
Earq: Analiza s spektri odziva Y+ (pomiki)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 115044 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 1617.674 | 1617.674 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.754 | 9.475 | 5.235 | 3.474E+04 | 2.084E+03 | -1.66E+04 | |
| | | | | 2.084E+03 | 6.267E+04 | -1.44E+04 | |
| | | | | -1.66E+04 | -1.44E+04 | 1.368E+05 | |
| active[1] | 1616.651 | 1615.808 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.755 | 9.471 | 5.235 | 3.486E+04 | 2.118E+03 | -1.65E+04 | |
| | | | | 2.118E+03 | 6.267E+04 | -1.43E+04 | |
| | | | | -1.65E+04 | -1.43E+04 | 1.369E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Nodal Displacements, method CQC**

| Node | u-X [mm] | u-Y [mm] | u-Z [mm] |
|---|---|---|---|
| MAX | 1.835 | 6.125 | 3.270 |

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11826 DSO Bovec - centralna dilat. enota stavbe
Earq: Analiza s spektri odziva X+ (sile)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 115044 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 1617.674 | 1617.674 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.754 | 9.475 | 5.235 | 3.474E+04 | 2.084E+03 | -1.66E+04 | |
| | | | | 2.084E+03 | 6.267E+04 | -1.44E+04 | |
| | | | | -1.66E+04 | -1.44E+04 | 1.368E+05 | |
| active[1] | 1616.651 | 1615.808 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.755 | 9.471 | 5.235 | 3.486E+04 | 2.118E+03 | -1.65E+04 | |
| | | | | 2.118E+03 | 6.267E+04 | -1.43E+04 | |
| | | | | -1.65E+04 | -1.43E+04 | 1.369E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Maximum Forces and Moments**

| Type | LC-MAX | LC-MIN | STYP |
|---|---|---|---|
| Beam Elements | | | |
| N | 1211 | - | CQC |
| Vy | 1212 | - | CQC |
| Vz | 1213 | - | CQC |
| Mt | 1214 | - | CQC |
| My | 1215 | - | CQC |
| Mz | 1216 | - | CQC |
| Quadrilateral Elements | | | |
| m-xx | 1221 | - | CQC |
| m-yy | 1222 | - | CQC |
| m-xy | 1223 | - | CQC |
| v-x | 1224 | - | CQC |
| v-y | 1225 | - | CQC |
| n-xx | 1226 | - | CQC |
| n-yy | 1227 | - | CQC |
| n-xy | 1228 | - | CQC |

Type result type
LC-MAX,LC-MIN load case
STYP modal superposition type

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Earq: Analiza s spektri odziva Y+ (sile)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 115044 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 1617.674 | 1617.674 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.754 | 9.475 | 5.235 | 3.474E+04 | 2.084E+03 | -1.66E+04 | |
| | | | | 2.084E+03 | 6.267E+04 | -1.44E+04 | |
| | | | | -1.66E+04 | -1.44E+04 | 1.368E+05 | |
| active[1] | 1616.651 | 1615.808 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.755 | 9.471 | 5.235 | 3.486E+04 | 2.118E+03 | -1.65E+04 | |
| | | | | 2.118E+03 | 6.267E+04 | -1.43E+04 | |
| | | | | -1.65E+04 | -1.43E+04 | 1.369E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Maximum Forces and Moments**

| Type | LC-MAX | LC-MIN | STYP |
|---|---|---|---|
| Beam Elements | | | |
| N | 1411 | - | CQC |
| Vy | 1412 | - | CQC |
| Vz | 1413 | - | CQC |
| Mt | 1414 | - | CQC |
| My | 1415 | - | CQC |
| Mz | 1416 | - | CQC |
| Quadrilateral Elements | | | |
| m-xx | 1421 | - | CQC |
| m-yy | 1422 | - | CQC |
| m-xy | 1423 | - | CQC |
| v-x | 1424 | - | CQC |
| v-y | 1425 | - | CQC |
| n-xx | 1426 | - | CQC |
| n-yy | 1427 | - | CQC |
| n-xy | 1428 | - | CQC |

Type result type
LC-MAX,LC-MIN load case
STYP modal superposition type

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11826 DSO Bovec - centralna dilat. enota stavbe
Earq_ATors: Analiza s spektri odziva X+ (pomiki)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 115044 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 1617.674 | 1617.674 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.754 | 9.475 | 5.235 | 3.474E+04 | 2.084E+03 | -1.66E+04 | |
| | | | | 2.084E+03 | 6.267E+04 | -1.44E+04 | |
| | | | | -1.66E+04 | -1.44E+04 | 1.368E+05 | |
| active[1] | 1616.651 | 1615.808 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.755 | 9.471 | 5.235 | 3.486E+04 | 2.118E+03 | -1.65E+04 | |
| | | | | 2.118E+03 | 6.267E+04 | -1.43E+04 | |
| | | | | -1.65E+04 | -1.43E+04 | 1.369E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Nodal Displacements, method CQC**

| Node | u-X [mm] | u-Y [mm] | u-Z [mm] |
|---|---|---|---|
| MAX | 1.917 | 1.370 | 1.081 |

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11826 DSO Bovec - centralna dilat. enota stavbe
Earq_ATors: Analiza s spektri odziva X- (pomiki)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 115044 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 1617.674 | 1617.674 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.754 | 9.475 | 5.235 | 3.474E+04 | 2.084E+03 | -1.66E+04 | |
| | | | | 2.084E+03 | 6.267E+04 | -1.44E+04 | |
| | | | | -1.66E+04 | -1.44E+04 | 1.368E+05 | |
| active[1] | 1616.651 | 1615.808 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.755 | 9.471 | 5.235 | 3.486E+04 | 2.118E+03 | -1.65E+04 | |
| | | | | 2.118E+03 | 6.267E+04 | -1.43E+04 | |
| | | | | -1.65E+04 | -1.43E+04 | 1.369E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Nodal Displacements, method CQC**

| Node | u-X [mm] | u-Y [mm] | u-Z [mm] |
|---|---|---|---|
| MAX | 2.146 | 1.460 | 1.208 |

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11826 DSO Bovec - centralna dilat. enota stavbe
Earq_ATors: Analiza s spektri odziva Y+ (pomiki)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 115044 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 1617.674 | 1617.674 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.754 | 9.475 | 5.235 | 3.474E+04 | 2.084E+03 | -1.66E+04 | |
| | | | | 2.084E+03 | 6.267E+04 | -1.44E+04 | |
| | | | | -1.66E+04 | -1.44E+04 | 1.368E+05 | |
| active[1] | 1616.651 | 1615.808 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.755 | 9.471 | 5.235 | 3.486E+04 | 2.118E+03 | -1.65E+04 | |
| | | | | 2.118E+03 | 6.267E+04 | -1.43E+04 | |
| | | | | -1.65E+04 | -1.43E+04 | 1.369E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Nodal Displacements, method CQC**

| Node | u-X [mm] | u-Y [mm] | u-Z [mm] |
|---|---|---|---|
| MAX | 1.859 | 6.339 | 3.379 |

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11826 DSO Bovec - centralna dilat. enota stavbe
Earq_ATors: Analiza s spektri odziva Y- (pomiki)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 115044 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 1617.674 | 1617.674 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.754 | 9.475 | 5.235 | 3.474E+04 | 2.084E+03 | -1.66E+04 | |
| | | | | 2.084E+03 | 6.267E+04 | -1.44E+04 | |
| | | | | -1.66E+04 | -1.44E+04 | 1.368E+05 | |
| active[1] | 1616.651 | 1615.808 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.755 | 9.471 | 5.235 | 3.486E+04 | 2.118E+03 | -1.65E+04 | |
| | | | | 2.118E+03 | 6.267E+04 | -1.43E+04 | |
| | | | | -1.65E+04 | -1.43E+04 | 1.369E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Nodal Displacements, method CQC**

| Node | u-X [mm] | u-Y [mm] | u-Z [mm] |
|---|---|---|---|
| MAX | 1.947 | 6.236 | 3.361 |

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11826 DSO Bovec - centralna dilat. enota stavbe
Earq_ATors: Analiza s spektri odziva X+ (sile)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 115044 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 1617.674 | 1617.674 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.754 | 9.475 | 5.235 | 3.474E+04 | 2.084E+03 | -1.66E+04 | |
| | | | | 2.084E+03 | 6.267E+04 | -1.44E+04 | |
| | | | | -1.66E+04 | -1.44E+04 | 1.368E+05 | |
| active[1] | 1616.651 | 1615.808 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.755 | 9.471 | 5.235 | 3.486E+04 | 2.118E+03 | -1.65E+04 | |
| | | | | 2.118E+03 | 6.267E+04 | -1.43E+04 | |
| | | | | -1.65E+04 | -1.43E+04 | 1.369E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Maximum Forces and Moments**

| Type | LC-MAX | LC-MIN | STYP |
|---|---|---|---|
| Beam Elements | | | |
| N | 2111 | - | CQC |
| Vy | 2112 | - | CQC |
| Vz | 2113 | - | CQC |
| Mt | 2114 | - | CQC |
| My | 2115 | - | CQC |
| Mz | 2116 | - | CQC |
| Quadrilateral Elements | | | |
| m-xx | 2121 | - | CQC |
| m-yy | 2122 | - | CQC |
| m-xy | 2123 | - | CQC |
| v-x | 2124 | - | CQC |
| v-y | 2125 | - | CQC |
| n-xx | 2126 | - | CQC |
| n-yy | 2127 | - | CQC |
| n-xy | 2128 | - | CQC |

Type result type
LC-MAX,LC-MIN load case
STYP modal superposition type

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11826 DSO Bovec - centralna dilat. enota stavbe
Earq_ATors: Analiza s spektri odziva X- (sile)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 115044 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 1617.674 | 1617.674 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.754 | 9.475 | 5.235 | 3.474E+04 | 2.084E+03 | -1.66E+04 | |
| | | | | 2.084E+03 | 6.267E+04 | -1.44E+04 | |
| | | | | -1.66E+04 | -1.44E+04 | 1.368E+05 | |
| active[1] | 1616.651 | 1615.808 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.755 | 9.471 | 5.235 | 3.486E+04 | 2.118E+03 | -1.65E+04 | |
| | | | | 2.118E+03 | 6.267E+04 | -1.43E+04 | |
| | | | | -1.65E+04 | -1.43E+04 | 1.369E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Maximum Forces and Moments**

| Type | LC-MAX | LC-MIN | STYP |
|---|---|---|---|
| Beam Elements | | | |
| N | 2311 | - | CQC |
| Vy | 2312 | - | CQC |
| Vz | 2313 | - | CQC |
| Mt | 2314 | - | CQC |
| My | 2315 | - | CQC |
| Mz | 2316 | - | CQC |
| Quadrilateral Elements | | | |
| m-xx | 2321 | - | CQC |
| m-yy | 2322 | - | CQC |
| m-xy | 2323 | - | CQC |
| v-x | 2324 | - | CQC |
| v-y | 2325 | - | CQC |
| n-xx | 2326 | - | CQC |
| n-yy | 2327 | - | CQC |
| n-xy | 2328 | - | CQC |

Type result type
LC-MAX,LC-MIN load case
STYP modal superposition type

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11826 DSO Bovec - centralna dilat. enota stavbe
Earq_ATors: Analiza s spektri odziva Y+ (sile)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 115044 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 1617.674 | 1617.674 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.754 | 9.475 | 5.235 | 3.474E+04 | 2.084E+03 | -1.66E+04 | |
| | | | | 2.084E+03 | 6.267E+04 | -1.44E+04 | |
| | | | | -1.66E+04 | -1.44E+04 | 1.368E+05 | |
| active[1] | 1616.651 | 1615.808 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.755 | 9.471 | 5.235 | 3.486E+04 | 2.118E+03 | -1.65E+04 | |
| | | | | 2.118E+03 | 6.267E+04 | -1.43E+04 | |
| | | | | -1.65E+04 | -1.43E+04 | 1.369E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Maximum Forces and Moments**

| Type | LC-MAX | LC-MIN | STYP |
|---|---|---|---|
| Beam Elements | | | |
| N | 2211 | - | CQC |
| Vy | 2212 | - | CQC |
| Vz | 2213 | - | CQC |
| Mt | 2214 | - | CQC |
| My | 2215 | - | CQC |
| Mz | 2216 | - | CQC |
| Quadrilateral Elements | | | |
| m-xx | 2221 | - | CQC |
| m-yy | 2222 | - | CQC |
| m-xy | 2223 | - | CQC |
| v-x | 2224 | - | CQC |
| v-y | 2225 | - | CQC |
| n-xx | 2226 | - | CQC |
| n-yy | 2227 | - | CQC |
| n-xy | 2228 | - | CQC |

Type result type
LC-MAX,LC-MIN load case
STYP modal superposition type

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11826 DSO Bovec - centralna dilat. enota stavbe
Earq_ATors: Analiza s spektri odziva Y- (sile)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 115044 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 1617.674 | 1617.674 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.754 | 9.475 | 5.235 | 3.474E+04 | 2.084E+03 | -1.66E+04 | |
| | | | | 2.084E+03 | 6.267E+04 | -1.44E+04 | |
| | | | | -1.66E+04 | -1.44E+04 | 1.368E+05 | |
| active[1] | 1616.651 | 1615.808 | 1076.359 | 1.552E+00 | 5.282E+00 | 3.366E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 11.755 | 9.471 | 5.235 | 3.486E+04 | 2.118E+03 | -1.65E+04 | |
| | | | | 2.118E+03 | 6.267E+04 | -1.43E+04 | |
| | | | | -1.65E+04 | -1.43E+04 | 1.369E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

**Results**
**Maximum Forces and Moments**

| Type | LC-MAX | LC-MIN | STYP |
|---|---|---|---|
| Beam Elements | | | |
| N | 2411 | - | CQC |
| Vy | 2412 | - | CQC |
| Vz | 2413 | - | CQC |
| Mt | 2414 | - | CQC |
| My | 2415 | - | CQC |
| Mz | 2416 | - | CQC |
| Quadrilateral Elements | | | |
| m-xx | 2421 | - | CQC |
| m-yy | 2422 | - | CQC |
| m-xy | 2423 | - | CQC |
| v-x | 2424 | - | CQC |
| v-y | 2425 | - | CQC |
| n-xx | 2426 | - | CQC |
| n-yy | 2427 | - | CQC |
| n-xy | 2428 | - | CQC |

Type result type
LC-MAX,LC-MIN load case
STYP modal superposition type

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11826 DSO Bovec - centralna dilat. enota stavbe
design parameter list

**Reinforcementparameter two layer reinforcement**

| Selection Grp elem no. no. | distance d1-u 2.lay d1-l 2.lay [mm] | | bar-diameter ds-u 2.lay ds-l 2.lay [mm] | | crackwidth wk-u 2.lay wk-l 2.lay [mm] | | steelstress sigsu 2.lay sigsl 2.lay [MPa] | | min.reinf. asu 2.lay asl 2.lay [cm2/m] | |
|---|---|---|---|---|---|---|---|---|---|---|
| default | - | - | - | - | - | - | - | - | - | - |
| 100 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 110 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 120 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 201 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 202 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 203 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 204 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 205 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 206 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 207 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 251 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 252 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 253 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 254 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 255 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 256 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 257 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 258 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 301 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 302 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |

| | |
|---|---|
| distance | upper / lower distance center of bar to surface |
| bar-diameter | upper / lower bar diameter |
| crackwidth | upper / lower required crack width |
| steelstress | upper / lower maximum steel stress in SLS check |
| min.reinf. | upper / lower minimum reinforcement |

The reinforcement directions relate to the local coordinate system of
the elements and have to be plotted graphically.
With the input of a steel stress sigsu... the 'crack design according tables'
uses this given stress sigsu for the corresponding layer. With this input, the check can
be done for bar distances instead of bar diameters, see legend SLS control parameters.

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11826 DSO Bovec - centralna dilat. enota stavbe
ULS design

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Loadcases have been calculated in the Ultimate Limit State
In BEMESS no additional load safety factor is applied.
The design uses the Baumann method.

**Load Cases for the Design**

| Loadcase | factor | Designation | |
|---|---|---|---|
| 8001 | 1.000 | MAX-MXX QUAD | |
| 8002 | 1.000 | MIN-MXX QUAD | |
| 8003 | 1.000 | MAX-MYY QUAD | |
| 8004 | 1.000 | MIN-MYY QUAD | |
| 8005 | 1.000 | MAX-MXY QUAD | |
| 8006 | 1.000 | MIN-MXY QUAD | |
| 8007 | 1.000 | MAX-VX QUAD | |
| 8008 | 1.000 | MIN-VX QUAD | |
| 8009 | 1.000 | MAX-VY QUAD | |
| 8010 | 1.000 | MIN-VY QUAD | |
| 8011 | 1.000 | MAX-NXX QUAD | |
| 8012 | 1.000 | MIN-NXX QUAD | |
| 8013 | 1.000 | MAX-NYY QUAD | |
| 8014 | 1.000 | MIN-NYY QUAD | |
| 8015 | 1.000 | MAX-NXY QUAD | |
| 8016 | 1.000 | MIN-NXY QUAD | |
| 8017 | 1.000 | MAX-P QUAD | Bedding stresses for punching design |
| 8018 | 1.000 | MIN-P QUAD | Bedding stresses for punching design |
| 8051 | 1.000 | MAX-PX NODE | Nodal reaction punching design |
| 8052 | 1.000 | MIN-PX NODE | Nodal reaction punching design |
| 8053 | 1.000 | MAX-PY NODE | Nodal reaction punching design |
| 8054 | 1.000 | MIN-PY NODE | Nodal reaction punching design |
| 8055 | 1.000 | MAX-PZ NODE | Nodal reaction punching design |
| 8056 | 1.000 | MIN-PZ NODE | Nodal reaction punching design |
| 8057 | 1.000 | MAX-MX NODE | Nodal reaction punching design |
| 8058 | 1.000 | MIN-MX NODE | Nodal reaction punching design |
| 8059 | 1.000 | MAX-MY NODE | Nodal reaction punching design |
| 8060 | 1.000 | MIN-MY NODE | Nodal reaction punching design |
| 8061 | 1.000 | MAX-MZ NODE | Nodal reaction punching design |
| 8062 | 1.000 | MIN-MZ NODE | Nodal reaction punching design |

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**Material-safety-factors:**

| MAT | concr SC1 | SC2 | steel SS1 | SS2 |
|---|---|---|---|---|
| 1 | 1.50 | 1.50 | | |
| 2 | | | 1.15 | 1.15 |
| 99 | 1.50 | 1.50 | | |

MAT material number
concr material safety SC1/SC2 = bending/compression
steel material safety steel bending/compression

At direct supports the shear force is linear reduced from 1.0*d up to the face of the support to 70%.
The maximum shear capacity is checked at the face of the support without reduction.
Punching is checked only and must be designed separately.
For punching no reinforcement is increased. Only the mimimum bending moments over
columns are applied and may increase the longitudinal reinforcement [PUNC...MMOM].
Outside the punching area, the normal slab shear design may increase the
longitudinal reinforcement up to 0.20% [input CTRL...RO_V].

**Required Reinforcements acc. to EN 1992-1-1:2004**

| Grp | Element | t [m] | asu [cm2/m] | asu2 [cm2/m] | asu3 [cm2/m] | asl [cm2/m] | asl2 [cm2/m] | asl3 [cm2/m] | supp [-] | shear [-] | ass [cm2/m2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 1001194 | 0.800 | | | | 12.43 | 2.49 | | punc | punc | |
| | 1002335 | 0.800 | | | | 5.38 | 26.89 | | punc | punc | |
| 110 | 1101724 | 0.250 | 5.54 | 27.70 | | | | | 0.00 | 1 | |

11826 DSO Bovec - centralna dilat. enota stavbe
ULS design

**Required Reinforcements acc. to EN 1992-1-1:2004**

| Grp | Element | t [m] | asu [cm2/m] | asu2 [cm2/m] | asu3 [cm2/m] | asl [cm2/m] | asl2 [cm2/m] | asl3 [cm2/m] | supp [-] | shear [-] | ass [cm2/m2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 110 | 1101727 | 0.250 | 7.26 | 24.74 | | | | | | 2 | 21.09 |
| 202 | 2020016 | 0.200 | 10.42 | 2.08 | | 9.81 | 1.96 | | | 2m | 4.64 |

Grp primary group number
Element element number
t plate thickness
asu Principal reinforcements (1st layer) Top
asu2 Cross reinforcements (2nd layer) Top
asu3 Third reinforcements Top
asl Principal reinforcements (1st layer) Bottom
asl2 Cross reinforcements (2nd layer) Bottom
asl3 Third reinforcements Bottom
supp reduction factor for the shear force near supports, punc=point in punching zone -> punching shear design
shear shear zone: 1=Ok, 1s=asu/l increased for shear, 1d=for punching, 2=required ass, 2m=minimum shear reinforcement
ass Shear reinforcement
Elements with maximum values are printed

**Required Reinforcements acc. to EN 1992-1-1:2004 at nodes**

| Grp | Node | t [m] | asu [cm2/m] | asu2 [cm2/m] | asu3 [cm2/m] | asl [cm2/m] | asl2 [cm2/m] | asl3 [cm2/m] | supp [-] | shear [-] | ass [cm2/m2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 1282 | 0.800 | | | | 5.45 | 27.26 | | punc | punc | |
| | | 0.800 | | | | 5.79 | 28.94 | | punc | punc | |
| 110 | 1046 | 0.250 | 9.72 | 48.62 | | | | | 0.00 | 1 | |
| | 15265 | 0.250 | 5.20 | 15.13 | | | | | | 2 | 19.88 |
| 202 | 4071 | 0.200 | 14.50 | 2.90 | | 13.94 | 2.79 | | | 2m | 4.64 |
| | 4072 | 0.200 | 14.20 | 2.84 | | 14.07 | 2.81 | | | 2m | 4.64 |

Grp primary group number
Node Number
t plate thickness
asu Principal reinforcements (1st layer) Top
asu2 Cross reinforcements (2nd layer) Top
asu3 Third reinforcements Top
asl Principal reinforcements (1st layer) Bottom
asl2 Cross reinforcements (2nd layer) Bottom
asl3 Third reinforcements Bottom
supp reduction factor for the shear force near supports, punc=point in punching zone -> punching shear design
shear shear zone: 1=Ok, 1s=asu/l increased for shear, 1d=for punching, 2=required ass, 2m=minimum shear reinforcement
ass Shear reinforcement
Elements with maximum values are printed

At 288 punching-nodes the bending moments have been reduced (rounded)
At 8 column-nodes the slab-thickness for bending-design has been increased
with 1:3 starting at the column-edge (not at wall punching nodes)

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11826 DSO Bovec - centralna dilat. enota stavbe
ACCI design

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Loadcases have been calculated in the Ultimate Limit State
In BEMESS no additional load safety factor is applied.
The design uses the Baumann method.

**Load Cases for the Design**

| Loadcase | factor | Designation |
|---|---|---|
| 8101 | 1.000 | MAXE-MXX QUAD |
| 8102 | 1.000 | MINE-MXX QUAD |
| 8103 | 1.000 | MAXE-MYY QUAD |
| 8104 | 1.000 | MINE-MYY QUAD |
| 8105 | 1.000 | MAXE-MXY QUAD |
| 8106 | 1.000 | MINE-MXY QUAD |
| 8107 | 1.000 | MAXE-VX QUAD |
| 8108 | 1.000 | MINE-VX QUAD |
| 8109 | 1.000 | MAXE-VY QUAD |
| 8110 | 1.000 | MINE-VY QUAD |
| 8111 | 1.000 | MAXE-NXX QUAD |
| 8112 | 1.000 | MINE-NXX QUAD |
| 8113 | 1.000 | MAXE-NYY QUAD |
| 8114 | 1.000 | MINE-NYY QUAD |
| 8115 | 1.000 | MAXE-NXY QUAD |
| 8116 | 1.000 | MINE-NXY QUAD |
| 8201 | 1.000 | MAXE-MXX QUAD |
| 8202 | 1.000 | MINE-MXX QUAD |
| 8203 | 1.000 | MAXE-MYY QUAD |
| 8204 | 1.000 | MINE-MYY QUAD |
| 8205 | 1.000 | MAXE-MXY QUAD |
| 8206 | 1.000 | MINE-MXY QUAD |
| 8207 | 1.000 | MAXE-VX QUAD |
| 8208 | 1.000 | MINE-VX QUAD |
| 8209 | 1.000 | MAXE-VY QUAD |
| 8210 | 1.000 | MINE-VY QUAD |
| 8211 | 1.000 | MAXE-NXX QUAD |
| 8212 | 1.000 | MINE-NXX QUAD |
| 8213 | 1.000 | MAXE-NYY QUAD |
| 8214 | 1.000 | MINE-NYY QUAD |
| 8215 | 1.000 | MAXE-NXY QUAD |
| 8216 | 1.000 | MINE-NXY QUAD |

**Material-safety-factors: Accidential design combination**

| MAT | concr SC1 | SC2 | steel SS1 | SS2 |
|---|---|---|---|---|
| 1 | 1.20 | 1.20 | | |
| 2 | | | 1.00 | 1.00 |
| 99 | 1.20 | 1.20 | | |

MAT material number
concr material safety SC1/SC2 = bending/compression
steel material safety steel bending/compression

At direct supports the shear force is linear reduced from 1.0*d up to the face of the support to 70%.
The maximum shear capacity is checked at the face of the support without reduction.
For punching design, the longitudinal reinforcement will be increased up to 1.50%
to avoid shear reinforcement [input PUNC...RO_V].
Outside the punching area, the normal slab shear design may increase the
longitudinal reinforcement up to 0.20% [input CTRL...RO_V].

**Required Reinforcements acc. to EN 1992-1-1:2004**

| Grp | Element | t [m] | asu [cm2/m] | asu2 [cm2/m] | asu3 [cm2/m] | asl [cm2/m] | asl2 [cm2/m] | asl3 [cm2/m] | supp [-] | shear [-] | ass [cm2/m2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1000982 | 0.800 | 15.37 | 8.16 | | 2.37 | 0.47 | | 0.82 | 1s | |
| | 1001054 | 0.800 | | | | 18.49 | 9.42 | | 0.71 | 1s | |

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11826 DSO Bovec - centralna dilat. enota stavbe
ACCI design

**Required Reinforcements acc. to EN 1992-1-1:2004**

| Grp | Element | t [m] | asu [cm2/m] | asu2 [cm2/m] | asu3 [cm2/m] | asl [cm2/m] | asl2 [cm2/m] | asl3 [cm2/m] | supp [-] | shear [-] | ass [cm2/m2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1001473 | 0.800 | 2.62 | 11.27 | | 2.76 | 13.79 | | 0.71 | 2 | 10.81 |
| | 1001553 | 0.800 | 4.42 | 22.10 | | 3.41 | 6.70 | | 0.71 | 2 | 6.94 |
| | 1002335 | 0.800 | 0.13 | 0.03 | | 5.38 | 26.89 | | 0.70 | 1 | |

Grp primary group number
Element element number
t plate thickness
asu Principal reinforcements (1st layer) Top
asu2 Cross reinforcements (2nd layer) Top
asu3 Third reinforcements Top
asl Principal reinforcements (1st layer) Bottom
asl2 Cross reinforcements (2nd layer) Bottom
asl3 Third reinforcements Bottom
supp reduction factor for the shear force near supports, punc=point in punching zone -> punching shear design
shear shear zone: 1=Ok, 1s=asu/l increased for shear, 1d=for punching, 2=required ass, 2m=minimum shear reinforcement
ass Shear reinforcement
Elements with maximum values are printed

**Required Reinforcements acc. to EN 1992-1-1:2004 at nodes**

| Grp | Node | t [m] | asu [cm2/m] | asu2 [cm2/m] | asu3 [cm2/m] | asl [cm2/m] | asl2 [cm2/m] | asl3 [cm2/m] | supp [-] | shear [-] | ass [cm2/m2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 1282 | 0.800 | 1.87 | 0.37 | | 5.45 | 27.26 | | 0.00 | 1 | |
| | | 0.800 | | | | 5.79 | 28.94 | | 0.00 | 1 | |
| | 1760 | 0.800 | | | | 1.39 | 0.28 | | | 2m | 10.17 |
| 258 | 1330 | 0.200 | 12.66 | 20.09 | | 12.33 | 19.34 | | 0.00 | 1 | |
| | 1331 | 0.200 | 20.23 | 7.17 | | 19.09 | 7.11 | | 0.00 | 1s | |

Grp primary group number
Node Number
t plate thickness
asu Principal reinforcements (1st layer) Top
asu2 Cross reinforcements (2nd layer) Top
asu3 Third reinforcements Top
asl Principal reinforcements (1st layer) Bottom
asl2 Cross reinforcements (2nd layer) Bottom
asl3 Third reinforcements Bottom
supp reduction factor for the shear force near supports, punc=point in punching zone -> punching shear design
shear shear zone: 1=Ok, 1s=asu/l increased for shear, 1d=for punching, 2=required ass, 2m=minimum shear reinforcement
ass Shear reinforcement
Elements with maximum values are printed

At 238 punching-nodes the bending moments have been reduced (rounded)
At 5 column-nodes the slab-thickness for bending-design has been increased
with 1:3 starting at the column-edge (not at wall punching nodes)

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11826 DSO Bovec - centralna dilat. enota stavbe
DIM-MSN-beams

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Structure and Tab.7.1N: AN (Buildings)

**Selected Beam Elements**

| Selection | NoA | NoE | x[m] | Type |
|---|---|---|---|---|
| Grp 101 | 1010001 | | | |
| Grp 254 | 2540001 | | | |
| Grp 256 | 2560001 | | | |

NoA,NoE range of element numbers
x[m] x-ordinate of beam section or station on axis
Type element type

Reinforcement will be accounted for sectional values as defined in AQUA
Reinforcements saved as Design case No. 1
Reinforcements become minimum reinforcements

**Considered Load Cases**

| LC | ACT | REF | CS | Designation |
|---|---|---|---|---|
| 8021 | (D) | | | MAX-N BEAM |
| 8022 | (D) | | | MIN-N BEAM |
| 8023 | (D) | | | MAX-VY BEAM |
| 8024 | (D) | | | MIN-VY BEAM |
| 8025 | (D) | | | MAX-VZ BEAM |
| 8026 | (D) | | | MIN-VZ BEAM |
| 8027 | (D) | | | MAX-MT BEAM |
| 8028 | (D) | | | MIN-MT BEAM |
| 8029 | (D) | | | MAX-MY BEAM |
| 8030 | (D) | | | MIN-MY BEAM |
| 8031 | (D) | | | MAX-MZ BEAM |
| 8032 | (D) | | | MIN-MZ BEAM |

LC load case REF reference point for forces and moments
ACT action CS section the load case is acting on

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**Maximum Utilisation Level**

| | N | Vy | Vz | My | Mz | Mtp | Mts | Mb | Ncr | SCL | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | σ-x | σ+x | τ | σ-v | σ-s | σ-dyn | As-l | As-v | crack | c/t | |
| Section 11 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.027 |
| VODNJAK DN80 cm | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.027 | - | - | - | |
| Section 21 | 0.000 | 0.000 | 0.741 | 0.000 | 0.000 | 0.307 | 0.000 | 0.000 | - | - | 1.000 |
| NOSILEC B/H=25/50+25 | 0.000 | 0.000 | 0.000 | 0.998 | - | - | 1.000 | 1.000 | - | - | |
| Section 22 | 0.000 | 0.000 | 0.388 | 0.000 | 0.000 | 0.267 | 0.000 | 0.000 | - | - | 1.000 |
| NOSILEC B/H=20/30+25 | 0.000 | 0.000 | 0.000 | 0.552 | - | - | 1.000 | 1.000 | - | - | |
| Total | 0.000 | 0.000 | 0.741 | 0.000 | 0.000 | 0.307 | 0.000 | 0.000 | - | - | 1.000 |
| | 0.000 | 0.000 | 0.000 | 0.998 | - | - | 1.000 | 1.000 | - | - | |

N normal force
Vy,Vz shear force
My,Mz bending
Mtp,Mts torsion (p)rimary and (s)econdary
Mb warping moment
Ncr flexural buckling
SCL cross-section class
σ-x longitud. compressive stress
σ+x longitud. tensile stress
τ shear stress
σ-v von Mises stress
σ-s stress in reinforcements
σ-dyn stress range
As-l longitudinal reinforcements
As-v transverse reinforcements
crack crack width
c/t stress dependant utilisation level (see AQB Manual 2.3.2)
Total most unfavorable utilisation for all checks

11826 DSO Bovec - centralna dilat. enota stavbe
DIM-MSN-Potres-beams

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Structure and Tab.7.1N: AN (Buildings)

**Selected Beam Elements**

| Selection | NoA | NoE | x[m] | Type |
|---|---|---|---|---|
| Grp 101 | 1010001 | | | |
| Grp 254 | 2540001 | | | |
| Grp 256 | 2560001 | | | |

NoA,NoE range of element numbers
x[m] x-ordinate of beam section or station on axis
Type element type

Reinforcement will be accounted for sectional values as defined in AQUA
Reinforcements saved as Design case No. 1
Reinforcements are superposed with existing minimum reinforcements

**Considered Load Cases**

| LC | ACT | REF | CS | Designation |
|---|---|---|---|---|
| 8121 | (E) | | | MAXE-N BEAM |
| 8122 | (E) | | | MINE-N BEAM |
| 8123 | (E) | | | MAXE-VY BEAM |
| 8124 | (E) | | | MINE-VY BEAM |
| 8125 | (E) | | | MAXE-VZ BEAM |
| 8126 | (E) | | | MINE-VZ BEAM |
| 8127 | (E) | | | MAXE-MT BEAM |
| 8128 | (E) | | | MINE-MT BEAM |
| 8129 | (E) | | | MAXE-MY BEAM |
| 8130 | (E) | | | MINE-MY BEAM |
| 8131 | (E) | | | MAXE-MZ BEAM |
| 8132 | (E) | | | MINE-MZ BEAM |
| 8221 | (E) | | | MAXE-N BEAM |
| 8222 | (E) | | | MINE-N BEAM |
| 8223 | (E) | | | MAXE-VY BEAM |
| 8224 | (E) | | | MINE-VY BEAM |
| 8225 | (E) | | | MAXE-VZ BEAM |
| 8226 | (E) | | | MINE-VZ BEAM |
| 8227 | (E) | | | MAXE-MT BEAM |
| 8228 | (E) | | | MINE-MT BEAM |
| 8229 | (E) | | | MAXE-MY BEAM |
| 8230 | (E) | | | MINE-MY BEAM |
| 8231 | (E) | | | MAXE-MZ BEAM |
| 8232 | (E) | | | MINE-MZ BEAM |

LC load case REF reference point for forces and moments
ACT action CS section the load case is acting on

**Maximum Utilisation Level**

| | N | Vy | Vz | My | Mz | Mtp | Mts | Mb | Ncr | SCL | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | σ-x | σ+x | τ | σ-v | σ-s | σ-dyn | As-l | As-v | crack | c/t | |
| Section 11 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.019 |
| VODNJAK DN80 cm | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.019 | - | - | - | |
| Section 21 | 0.000 | 0.000 | 0.401 | 0.000 | 0.000 | 0.224 | 0.000 | 0.000 | - | - | 1.000 |
| NOSILEC B/H=25/50+25 | 0.000 | 0.000 | 0.000 | 0.618 | - | - | 1.000 | 0.794 | - | - | |
| Section 22 | 0.000 | 0.000 | 0.239 | 0.000 | 0.000 | 0.150 | 0.000 | 0.000 | - | - | 0.785 |
| NOSILEC B/H=20/30+25 | 0.000 | 0.000 | 0.000 | 0.314 | - | - | 0.628 | 0.785 | - | - | |
| Total | 0.000 | 0.000 | 0.401 | 0.000 | 0.000 | 0.224 | 0.000 | 0.000 | - | - | 1.000 |
| | 0.000 | 0.000 | 0.000 | 0.618 | - | - | 1.000 | 0.794 | - | - | |

N normal force
Vy,Vz shear force
My,Mz bending
Mtp,Mts torsion (p)rimary and (s)econdary
Mb warping moment
Ncr flexural buckling
SCL cross-section class
σ-x longitud. compressive stress
τ shear stress
σ-v von Mises stress
σ-s stress in reinforcements
σ-dyn stress range
As-l longitudinal reinforcements
As-v transverse reinforcements
crack crack width
c/t stress dependant utilisation level (see AQB Manual 2.3.2)

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11826 DSO Bovec - centralna dilat. enota stavbe
DIM-MSN-Potres-beams

| | | | |
|---|---|---|---|
| σ+x | longitud. tensile stress | Total | most unfavorable utilisation for all checks |

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11826 DSO Bovec - centralna dilat. enota stavbe
SLS stress check - permanent

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Structure and Tab.7.1N: AN (Buildings)

**Selected Beam Elements**

| Selection | NoA | NoE | x[m] | Type |
|---|---|---|---|---|
| BEAM | all elements | | | |

NoA,NoE range of element numbers
x[m] x-ordinate of beam section or station on axis
Type element type

Reinforcement will be accounted for sectional values as defined in AQUA
Reinforcements saved as Design case No. 1

**Considered Load Cases**

| LC | ACT | REF | CS | Designation |
|---|---|---|---|---|
| 9221 | (P) | | | MAXP-N BEAM |
| 9222 | (P) | | | MINP-N BEAM |
| 9223 | (P) | | | MAXP-VY BEAM |
| 9224 | (P) | | | MINP-VY BEAM |
| 9225 | (P) | | | MAXP-VZ BEAM |
| 9226 | (P) | | | MINP-VZ BEAM |
| 9227 | (P) | | | MAXP-MT BEAM |
| 9228 | (P) | | | MINP-MT BEAM |
| 9229 | (P) | | | MAXP-MY BEAM |
| 9230 | (P) | | | MINP-MY BEAM |
| 9231 | (P) | | | MAXP-MZ BEAM |
| 9232 | (P) | | | MINP-MZ BEAM |

LC load case REF reference point for forces and moments
ACT action CS section the load case is acting on

**Nonlinear Stresses**

**Maximum Stresses and Checked Limits**

| Mat | Check or Criterion | | Value | Limit | Unit | Level | LC | Beam | x[m] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Longitud. compressive stress | σ-x | -12.82 | -18.00 | MPa | 0.712 | 9222 | 2540027 | 0.309 |
| | Longitud. tensile stress | σ+x | 0.00 | | MPa | | 9221 | 2540001 | 0.230 |
| 2 | Longitud. compressive stress | σ-x | -61.10 | -400.00 | MPa | 0.153 | 9222 | 2540027 | 0.309 |
| | Longitud. tensile stress | σ+x | 363.02 | 400.00 | MPa | 0.908 | 9221 | 2540012 | 0.000 |
| 99 | Longitud. compressive stress | σ-x | -0.73 | -18.00 | MPa | 0.040 | 9222 | 1010025 | 0.833 |
| | Longitud. tensile stress | σ+x | 0.00 | | MPa | | 9221 | 1010043 | 0.833 |

Check for stress limits passed✓

Stiffness is not saved in database

**Maximum Utilisation Level**

| | N | Vy | Vz | My | Mz | Mtp | Mts | Mb | Ncr | SCL | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | σ-x | σ+x | τ | σ-v | σ-s | σ-dyn | As-l | As-v | crack | c/t | |
| Section 11 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.000 |
| VODNJAK DN80 cm | 0.040 | 0.987 | 0.000 | 0.000 | - | - | - | - | - | - | |
| Section 21 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.000 |
| NOSILEC B/H=25/50+25 | 0.712 | 1.000 | 0.000 | 0.000 | - | - | - | - | - | - | |
| Section 22 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.000 |
| NOSILEC B/H=20/30+25 | 0.313 | 1.000 | 0.000 | 0.000 | - | - | - | - | - | - | |
| Total | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.000 |
| | 0.712 | 1.000 | 0.000 | 0.000 | - | - | - | - | - | - | |

N normal force
Vy,Vz shear force
My,Mz bending
Mtp,Mts torsion (p)rimary and (s)econdary
Mb warping moment
Ncr flexural buckling
SCL cross-section class
σ-x longitud. compressive stress
σ+x longitud. tensile stress
τ shear stress
σ-v von Mises stress
σ-s stress in reinforcements
σ-dyn stress range
As-l longitudinal reinforcements
As-v transverse reinforcements
crack crack width
c/t stress dependant utilisation level (see AQB Manual 2.3.2)
Total most unfavorable utilisation for all checks

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11826 DSO Bovec - centralna dilat. enota stavbe
SLS stress check - rare

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Structure and Tab.7.1N: AN (Buildings)

**Selected Beam Elements**

| Selection | NoA | NoE | x[m] | Type |
|---|---|---|---|---|
| BEAM | all elements | | | |

NoA,NoE range of element numbers
x[m] x-ordinate of beam section or station on axis
Type element type

Reinforcement will be accounted for sectional values as defined in AQUA
Reinforcements saved as Design case No. 1

**Considered Load Cases**

| LC | ACT | REF | CS | Designation |
|---|---|---|---|---|
| 9021 | (R) | | | MAXR-N BEAM |
| 9022 | (R) | | | MINR-N BEAM |
| 9023 | (R) | | | MAXR-VY BEAM |
| 9024 | (R) | | | MINR-VY BEAM |
| 9025 | (R) | | | MAXR-VZ BEAM |
| 9026 | (R) | | | MINR-VZ BEAM |
| 9027 | (R) | | | MAXR-MT BEAM |
| 9028 | (R) | | | MINR-MT BEAM |
| 9029 | (R) | | | MAXR-MY BEAM |
| 9030 | (R) | | | MINR-MY BEAM |
| 9031 | (R) | | | MAXR-MZ BEAM |
| 9032 | (R) | | | MINR-MZ BEAM |

LC load case REF reference point for forces and moments
ACT action CS section the load case is acting on

**Nonlinear Stresses**

**Maximum Stresses and Checked Limits**

| Mat | Check or Criterion | | Value | Limit | Unit | Level | LC | Beam | x[m] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Longitud. compressive stress | σ-x | -14.02 | -18.00 | MPa | 0.779 | 9022 | 2540027 | 0.309 |
| | Longitud. tensile stress | σ+x | 0.00 | | MPa | | 9021 | 2540001 | 0.230 |
| 2 | Longitud. compressive stress | σ-x | -67.29 | -400.00 | MPa | 0.168 | 9022 | 2540027 | 0.309 |
| | Longitud. tensile stress | σ+x | 398.60 | 400.00 | MPa | 0.997 | 9021 | 2540012 | 0.000 |
| 99 | Longitud. compressive stress | σ-x | -0.76 | -18.00 | MPa | 0.042 | 9022 | 1010025 | 0.833 |
| | Longitud. tensile stress | σ+x | 0.00 | | MPa | | 9021 | 1010043 | 0.833 |

Check for stress limits passed✓

Stiffness is not saved in database

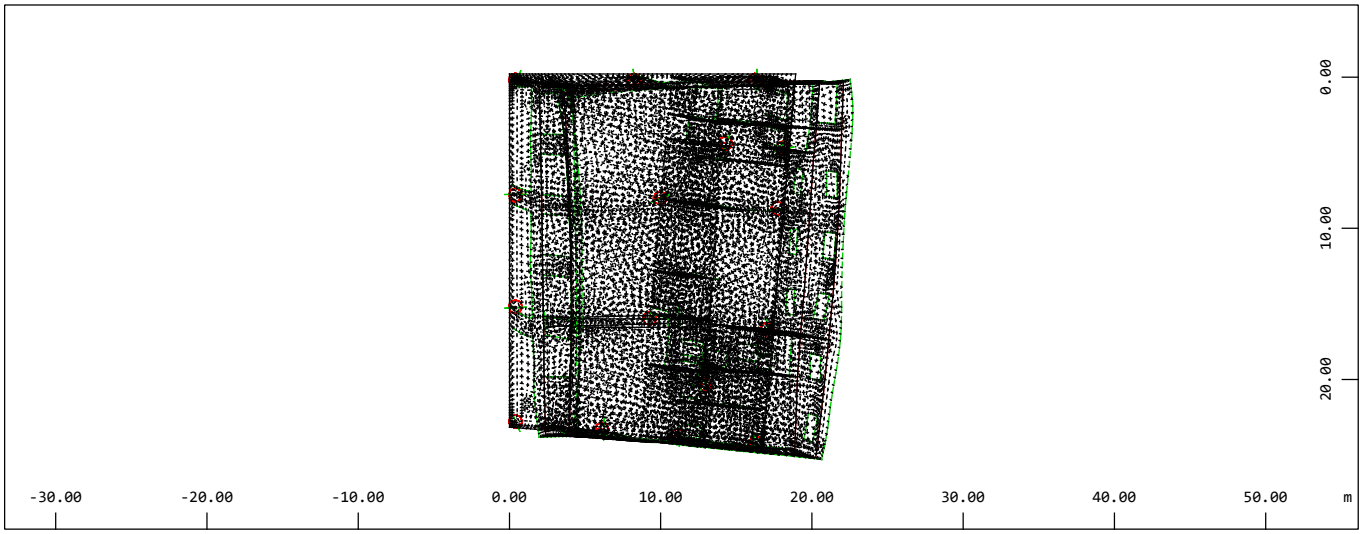
**Maximum Utilisation Level**

| | N | Vy | Vz | My | Mz | Mtp | Mts | Mb | Ncr | SCL | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | σ-x | σ+x | τ | σ-v | σ-s | σ-dyn | As-l | As-v | crack | c/t | |
| Section 11 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.000 |
| VODNJAK DN80 cm | 0.042 | 0.987 | 0.000 | 0.000 | - | - | - | - | - | - | |
| Section 21 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.000 |
| NOSILEC B/H=25/50+25 | 0.779 | 1.000 | 0.000 | 0.000 | - | - | - | - | - | - | |
| Section 22 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.000 |
| NOSILEC B/H=20/30+25 | 0.355 | 1.000 | 0.000 | 0.000 | - | - | - | - | - | - | |
| Total | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.000 |
| | 0.779 | 1.000 | 0.000 | 0.000 | - | - | - | - | - | - | |

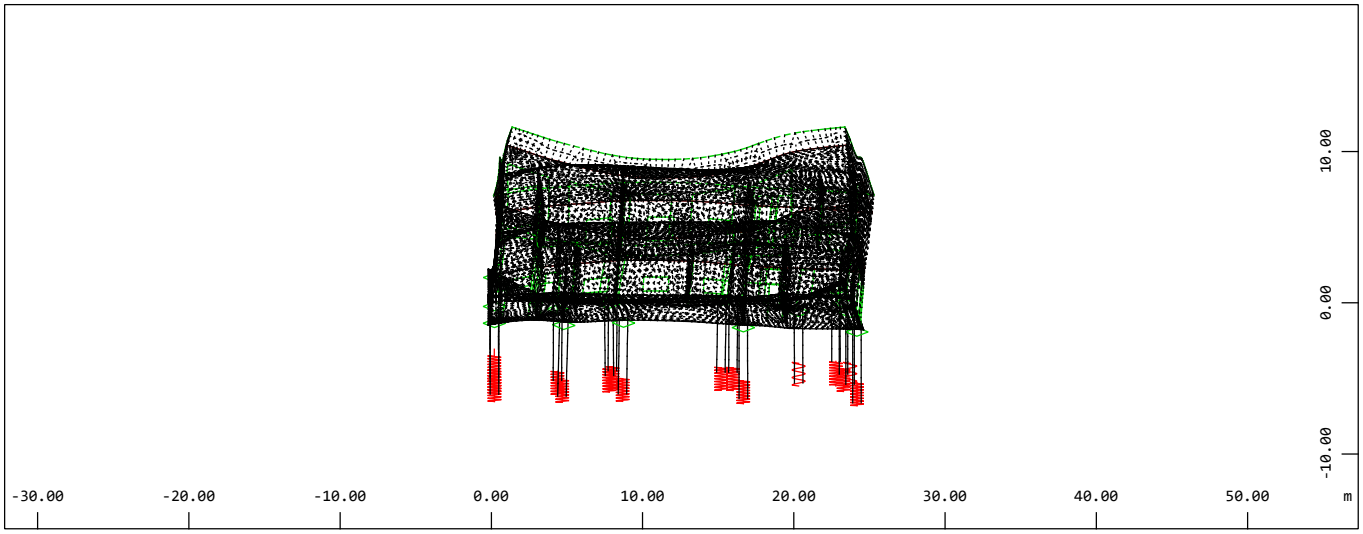
N normal force
Vy,Vz shear force
My,Mz bending
Mtp,Mts torsion (p)rimary and (s)econdary
Mb warping moment
Ncr flexural buckling
SCL cross-section class
σ-x longitud. compressive stress
σ+x longitud. tensile stress
τ shear stress
σ-v von Mises stress
σ-s stress in reinforcements
σ-dyn stress range
As-l longitudinal reinforcements
As-v transverse reinforcements
crack crack width
c/t stress dependant utilisation level (see AQB Manual 2.3.2)
Total most unfavorable utilisation for all checks

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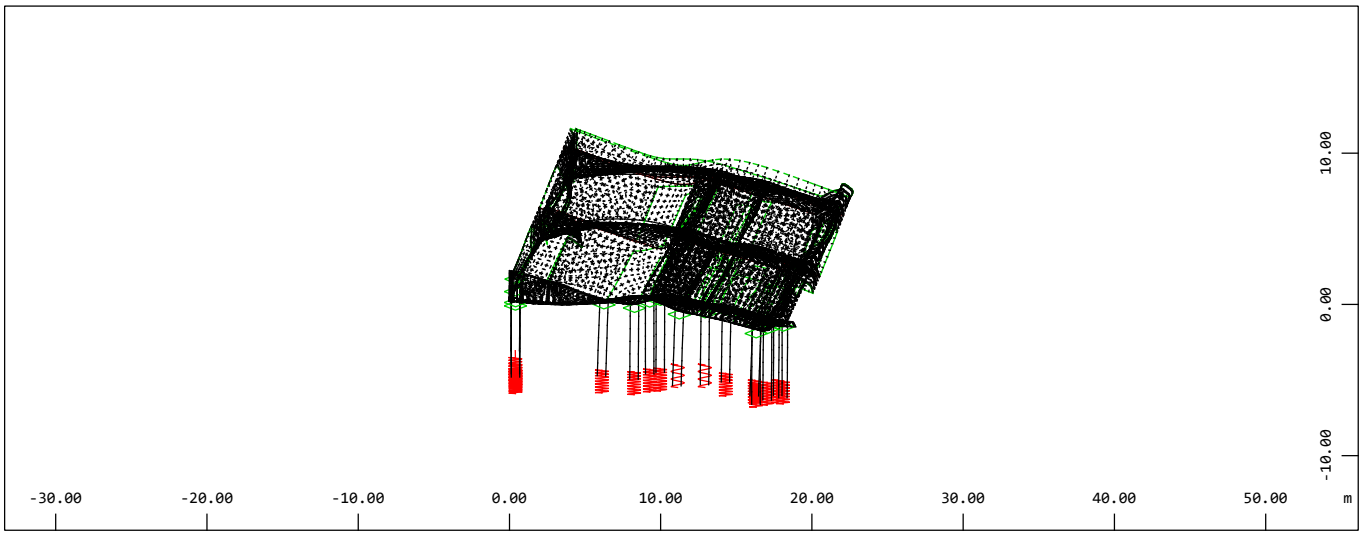
11826 DSO Bovec - centralna dilat. enota stavbe
1. nihajna oblika




Sector of system Group 100 101 110 120 201...207 251...258 301 302 M 1 : 500
Deformed Structure from LC 1001 Eigenform 1 7.72 Hz Enlarged by 100.0



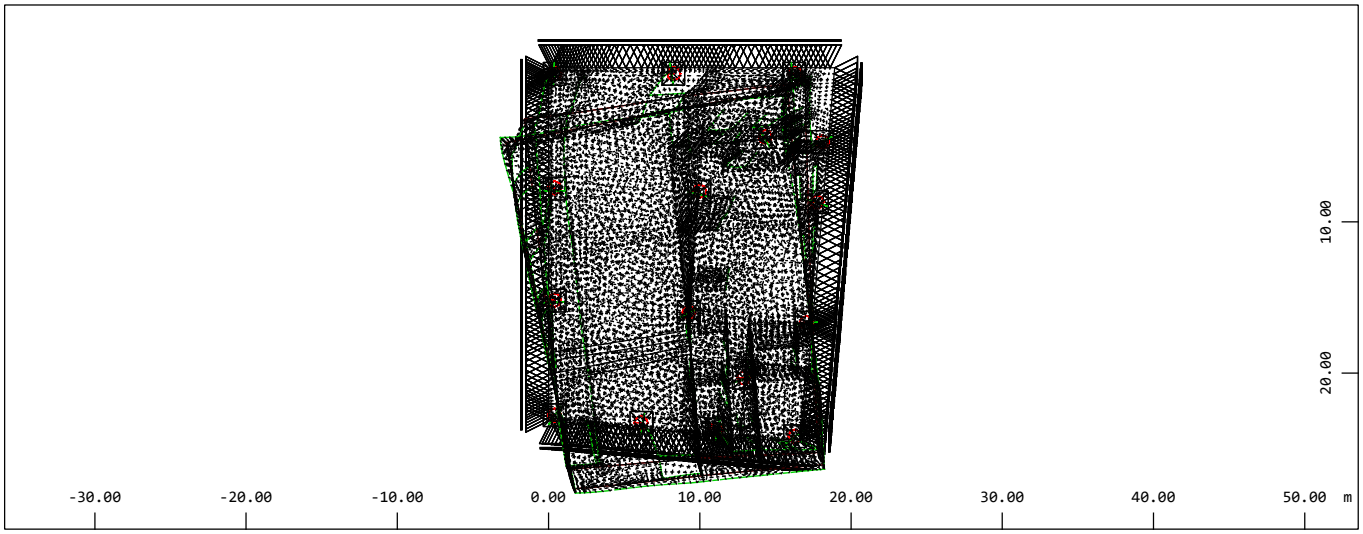

Sector of system Group 100 101 110 120 201...207 251...258 301 302 M 1 : 500
Deformed Structure from LC 1001 Eigenform 1 7.72 Hz Enlarged by 100.0



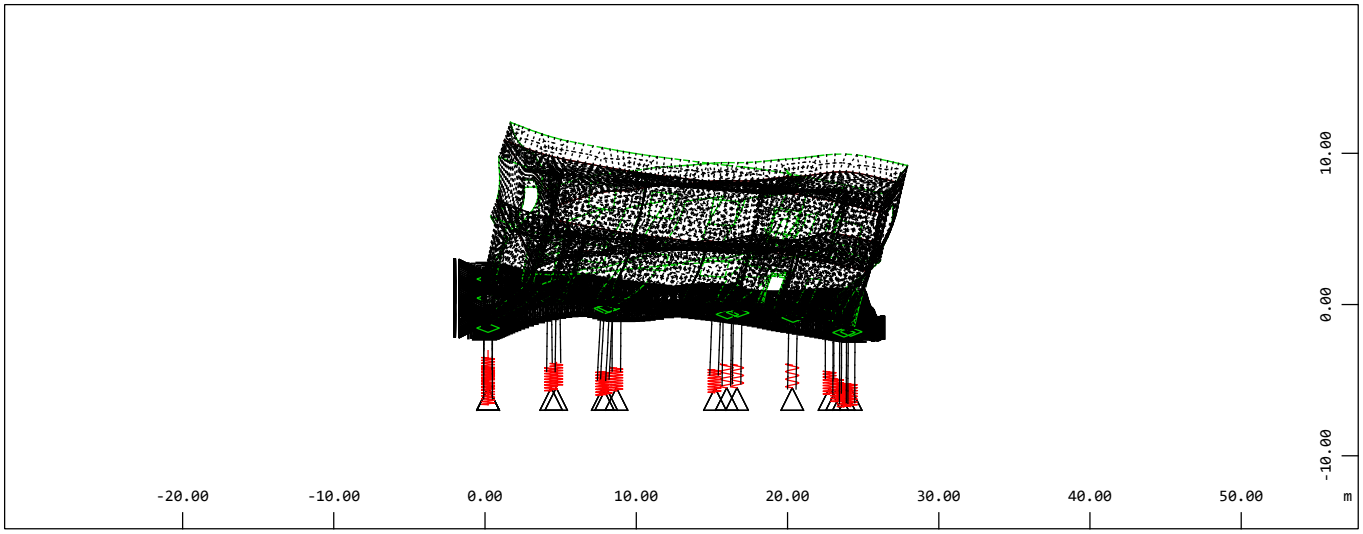

Sector of system Group 100 101 110 120 201...207 251...258 301 302 M 1 : 500
Deformed Structure from LC 1001 Eigenform 1 7.72 Hz Enlarged by 100.0

SOFiSTiK AG - www.sofistik.de

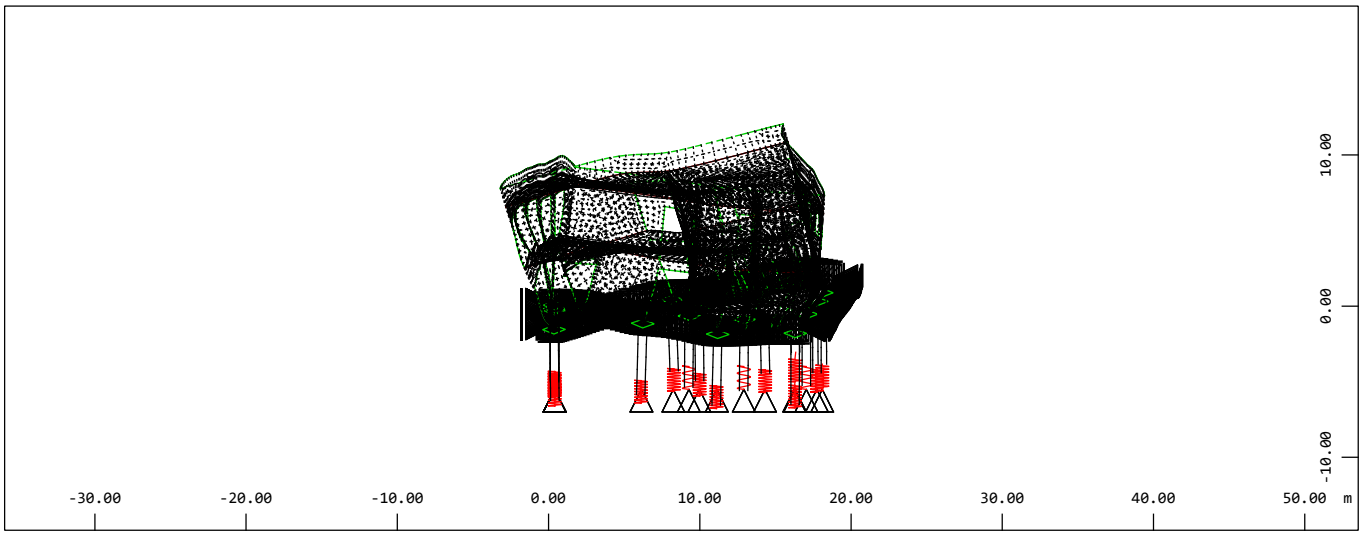
11826 DSO Bovec - centralna dilat. enota stavbe
1. nihajna oblika




Sector of system Group 100 101 110 120 201...207 251...258 301 302 M 1 : 500
Deformed Structure from LC 1002 Eigenform 2 9.44 Hz Enlarged by 100.0



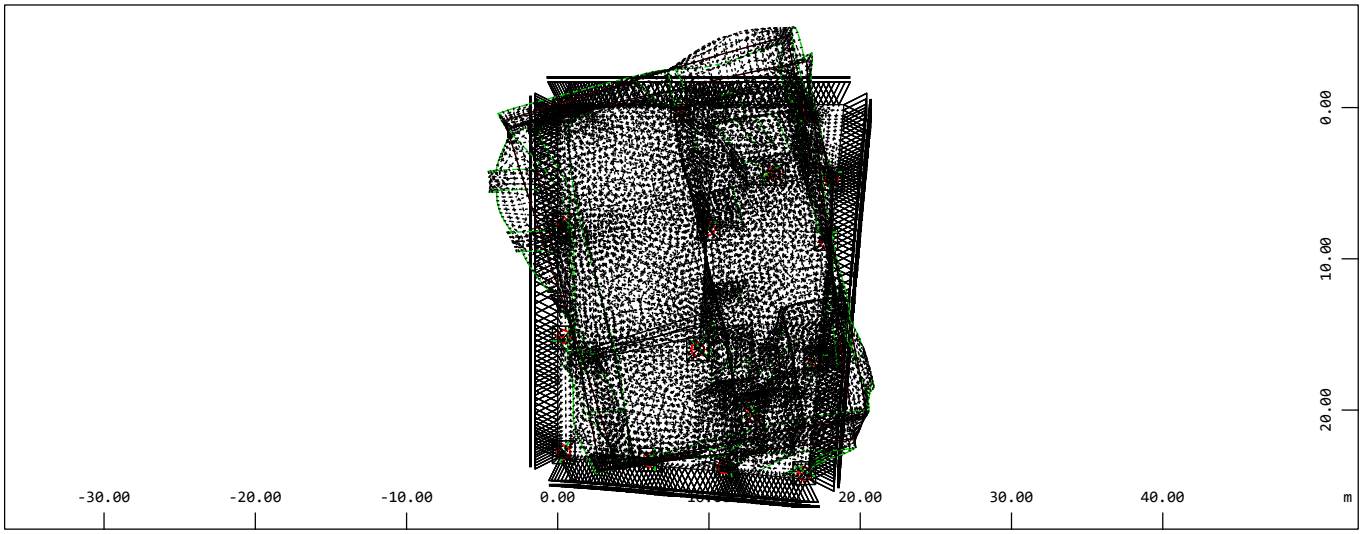

Sector of system Group 100 101 110 120 201...207 251...258 301 302 M 1 : 500
Deformed Structure from LC 1002 Eigenform 2 9.44 Hz Enlarged by 100.0



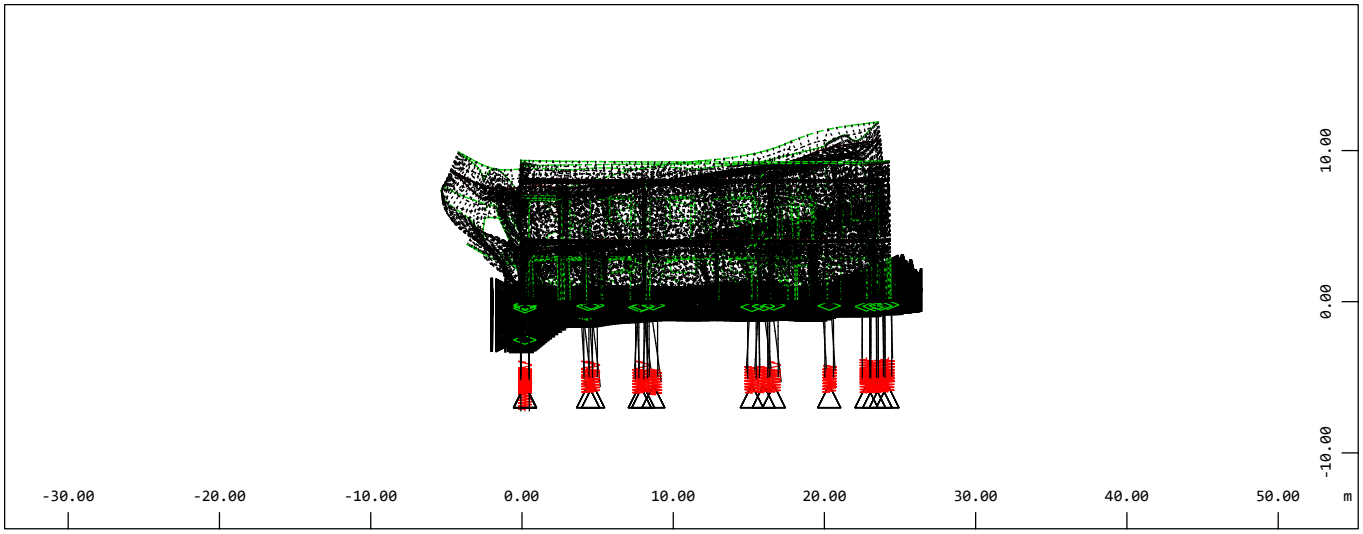

Sector of system Group 100 101 110 120 201...207 251...258 301 302 M 1 : 500
Deformed Structure from LC 1002 Eigenform 2 9.44 Hz Enlarged by 100.0

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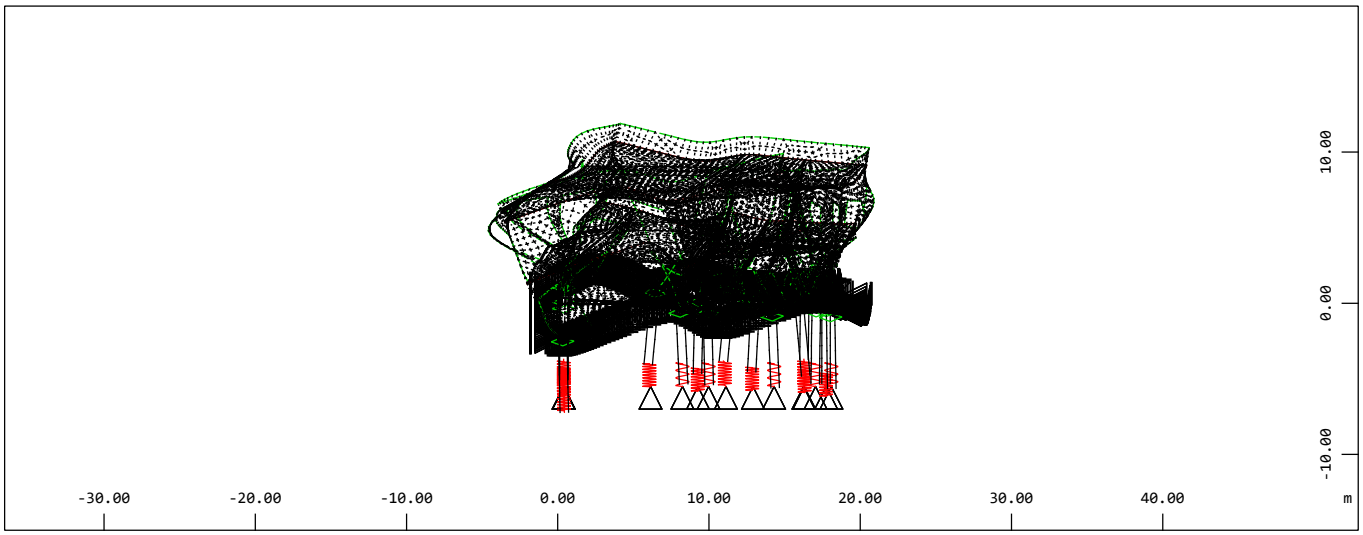
11826 DSO Bovec - centralna dilat. enota stavbe
1. nihajna oblika




Sector of system Group 100 101 110 120 201...207 251...258 301 302 M 1 : 500
Z Y X
Deformed Structure from LC 1004 Eigenform 4 13.35 Hz Enlarged by 100.0



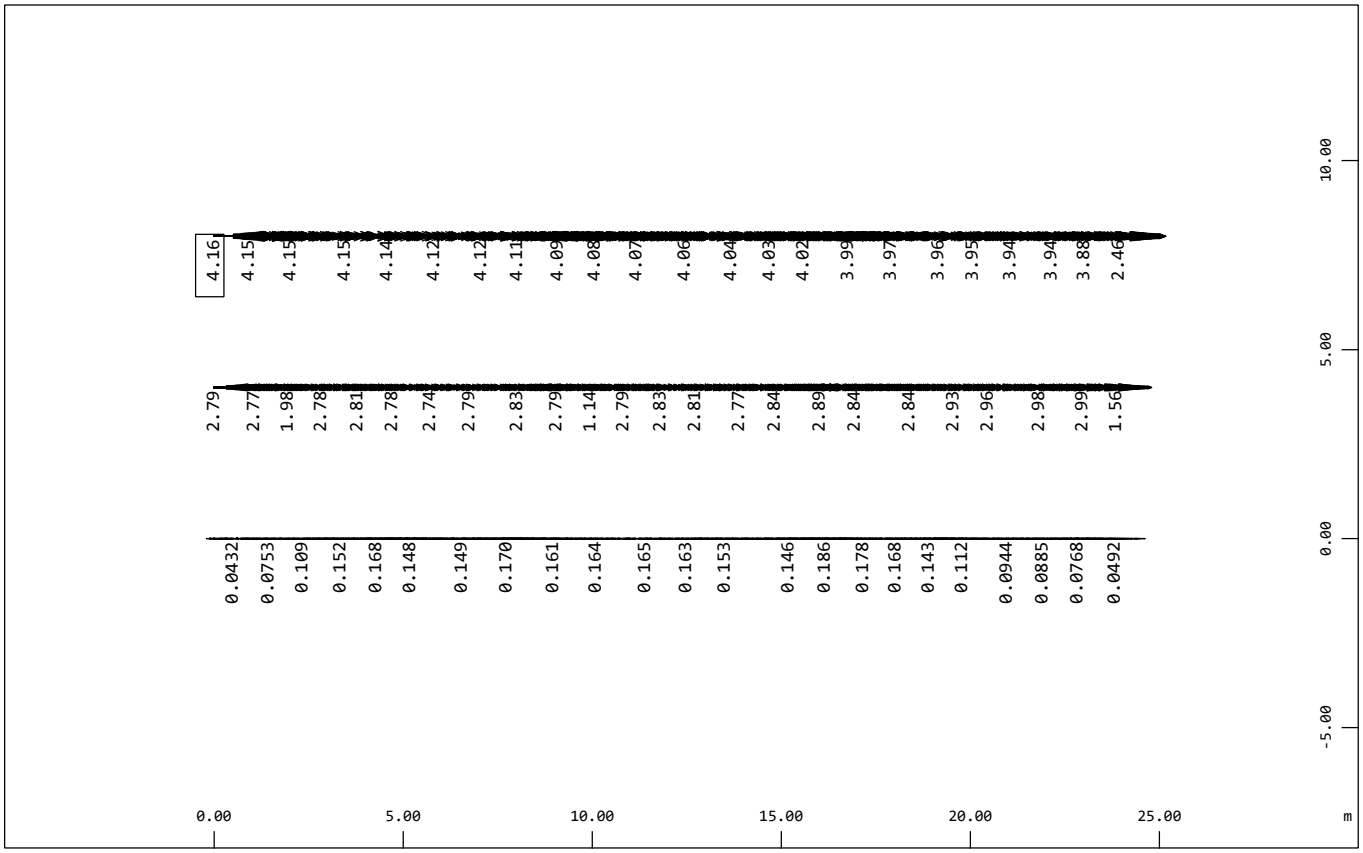

Sector of system Group 100 101 110 120 201...207 251...258 301 302 M 1 : 500
Z Y X
Deformed Structure from LC 1004 Eigenform 4 13.35 Hz Enlarged by 100.0



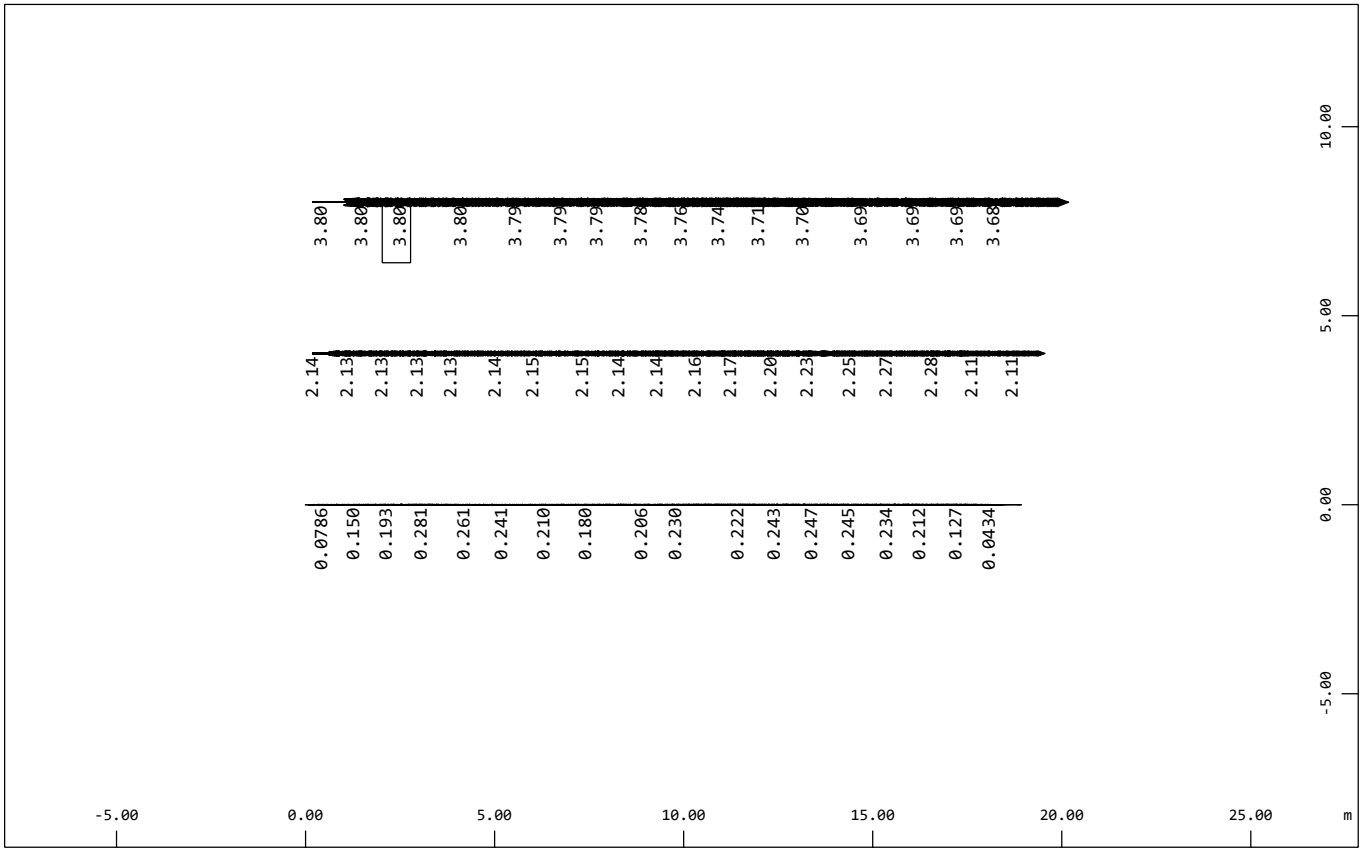

Sector of system Group 100 101 110 120 201...207 251...258 301 302 M 1 : 500
Z X Y
Deformed Structure from LC 1004 Eigenform 4 13.35 Hz Enlarged by 100.0

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11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj. horiz. pomikov: max Ux, prip. Uy



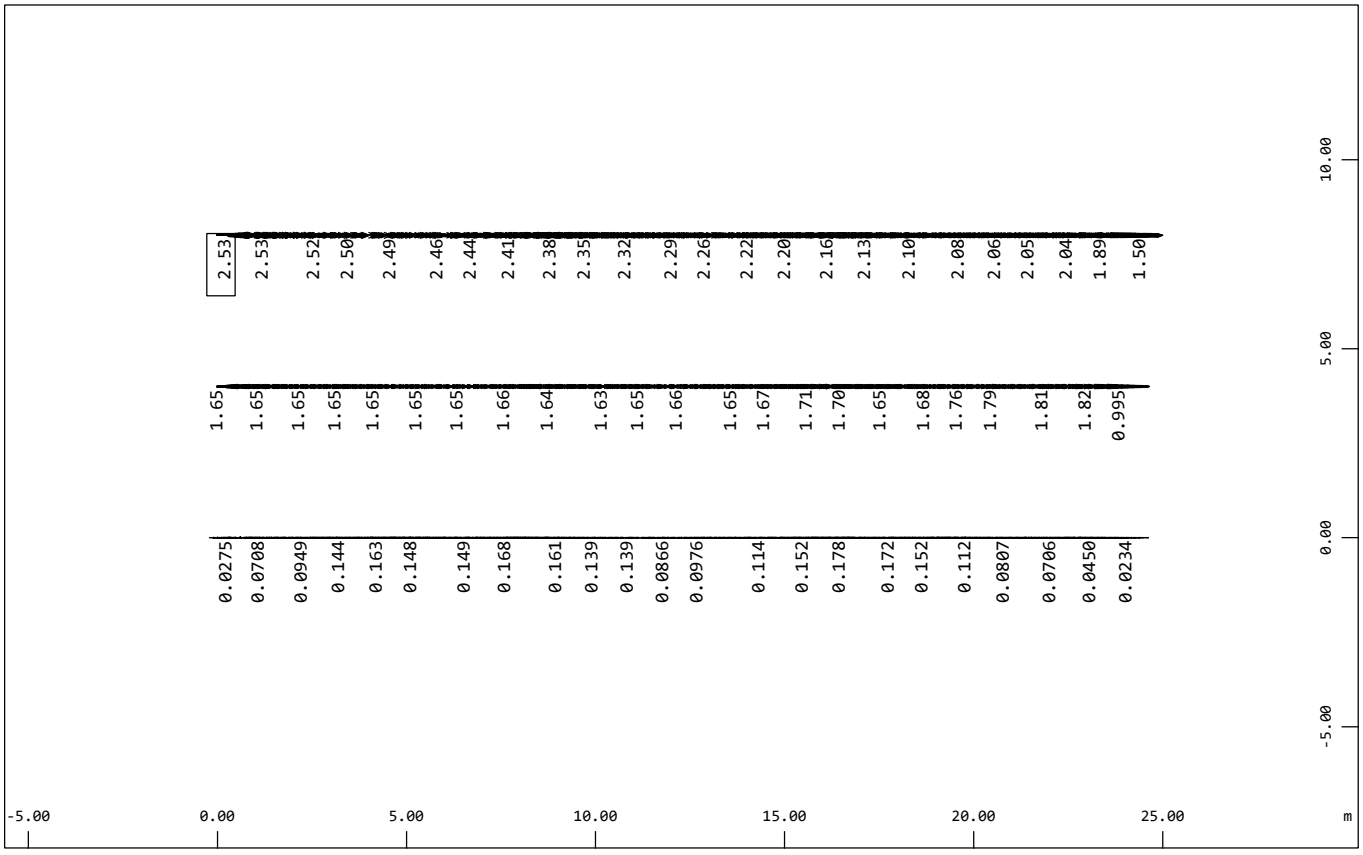

Z
Y X
Sector of system Quadrilateral Elements Group 100 110 120
Nodal displacement in global X, Loadcase 3071 QuakeXY-Max-Ux , 1 cm 3D = 5.00 mm
(Max=4.16)
M 1 : 200

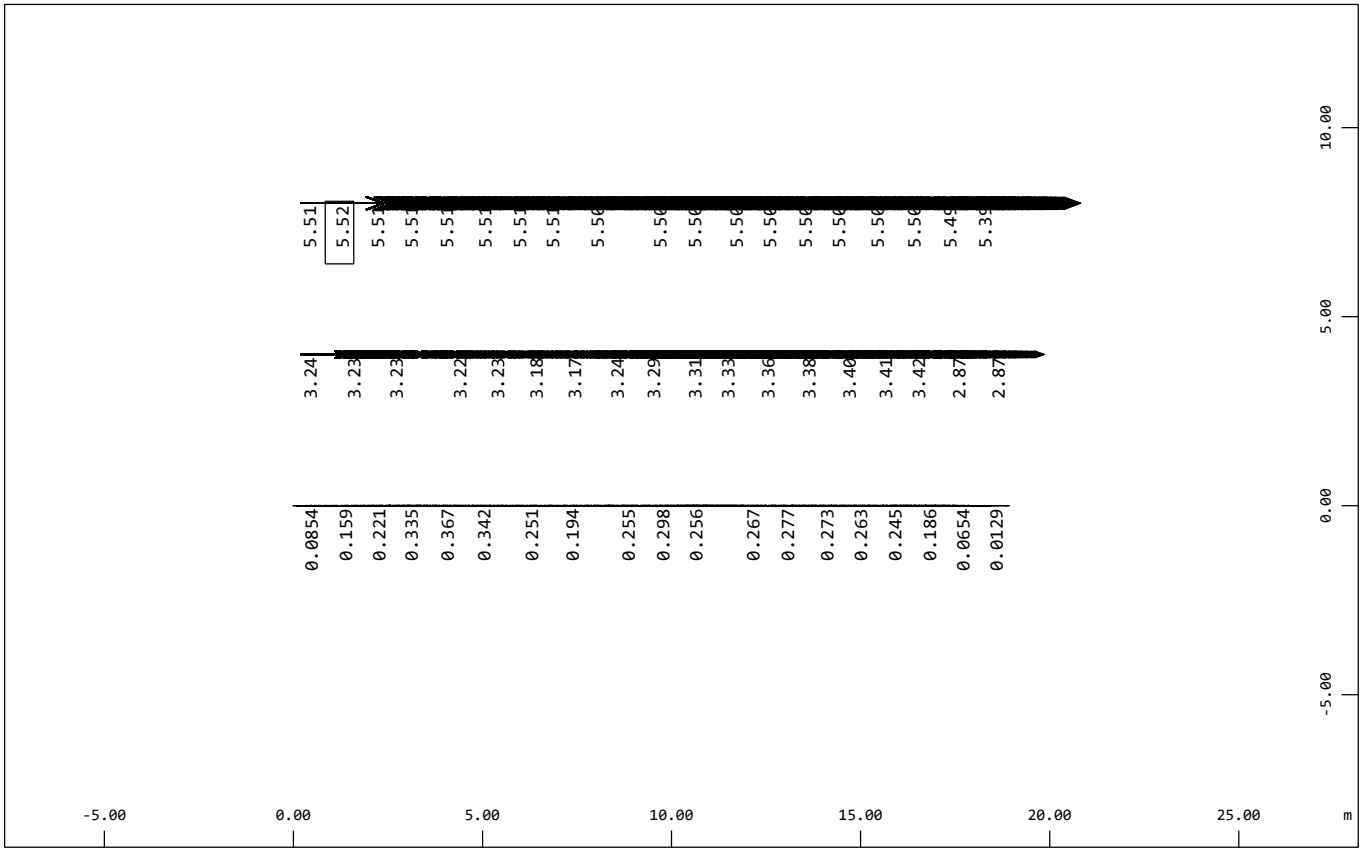



Z
X Y
Sector of system Quadrilateral Elements Group 100 110 120
Nodal displacement in global Y, Loadcase 3071 QuakeXY-Max-Ux , 1 cm 3D = 5.00 mm
(Max=3.80)
M 1 : 200

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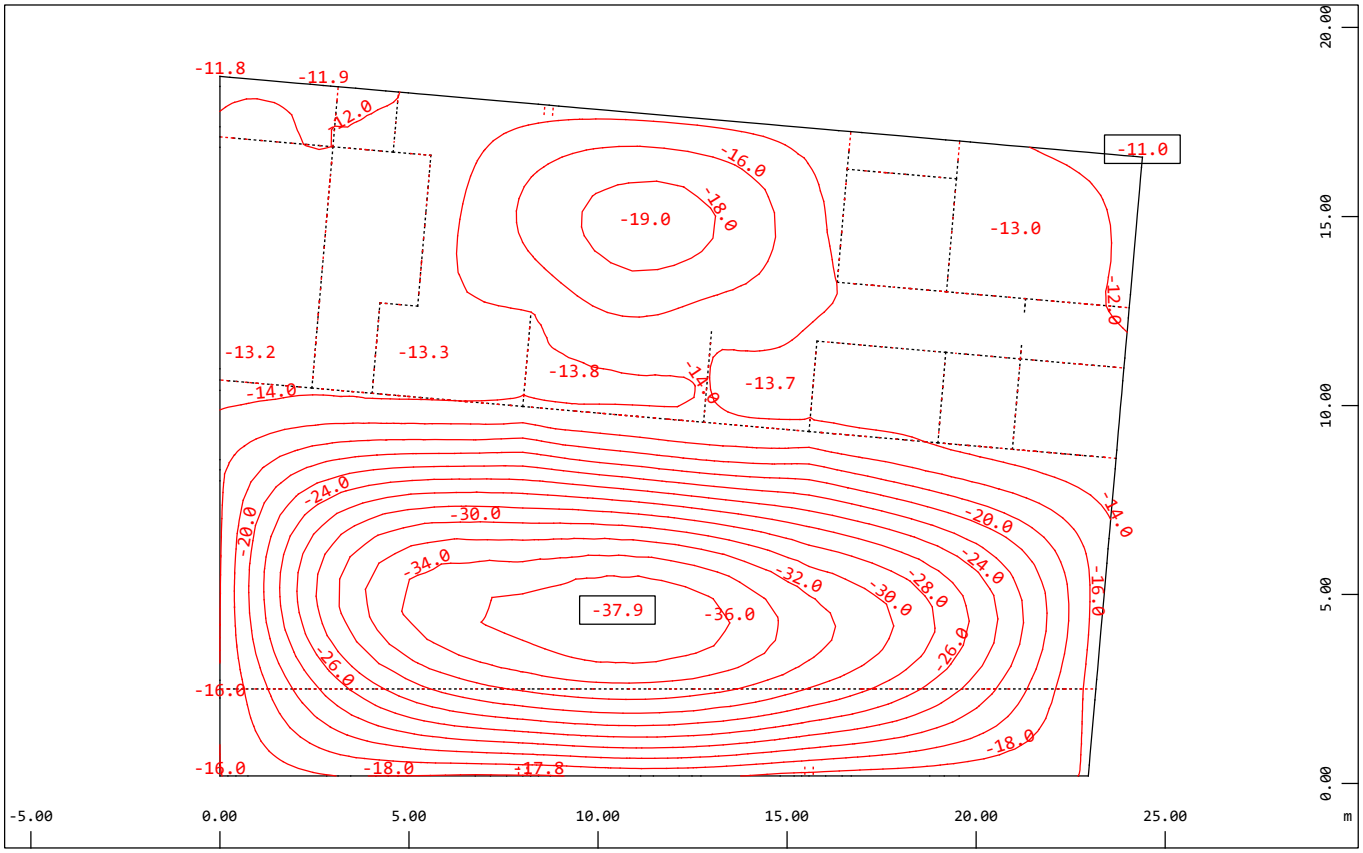
11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj. horiz. pomikov: prip. Ux, max. Uy



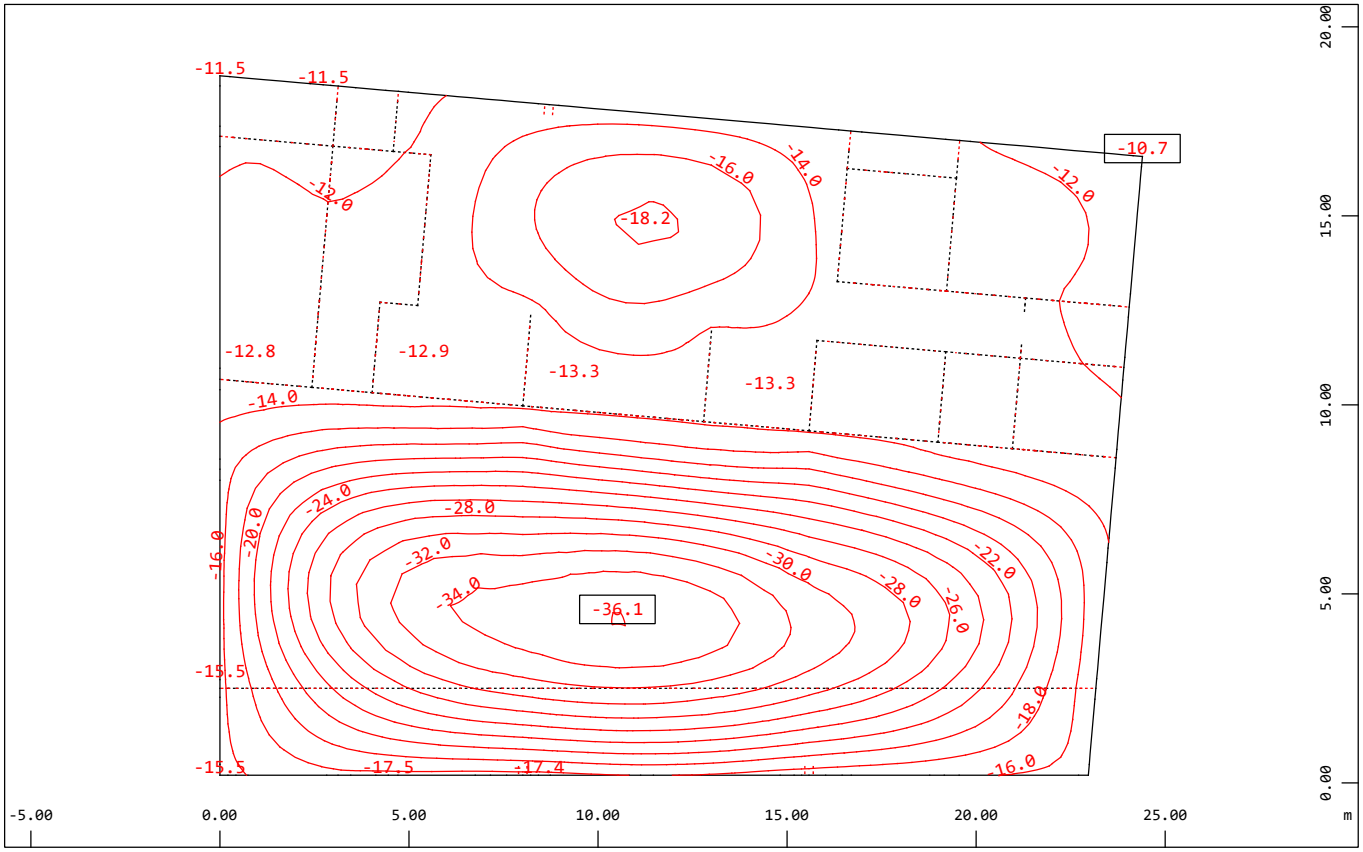




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11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj.vert.pomikov plosc (MSU-perm): etazna plosca



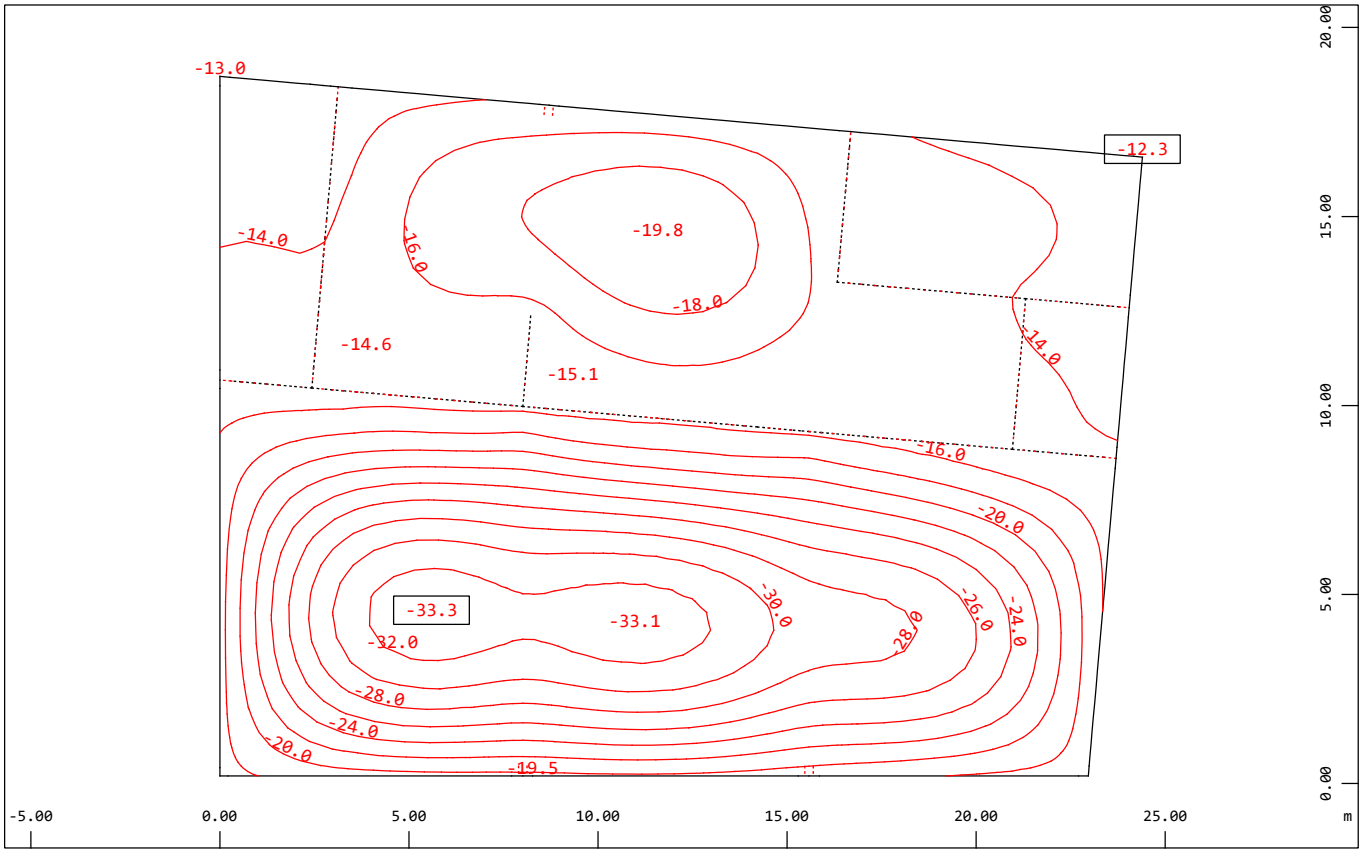

Y
Z—X
Sector of system Group 110
Nodal displacement in global Z in Node , Loadcase 9276 MINP-UZ NODE , from -37.9 to -11.0 step 2.00 mm
M 1 : 200



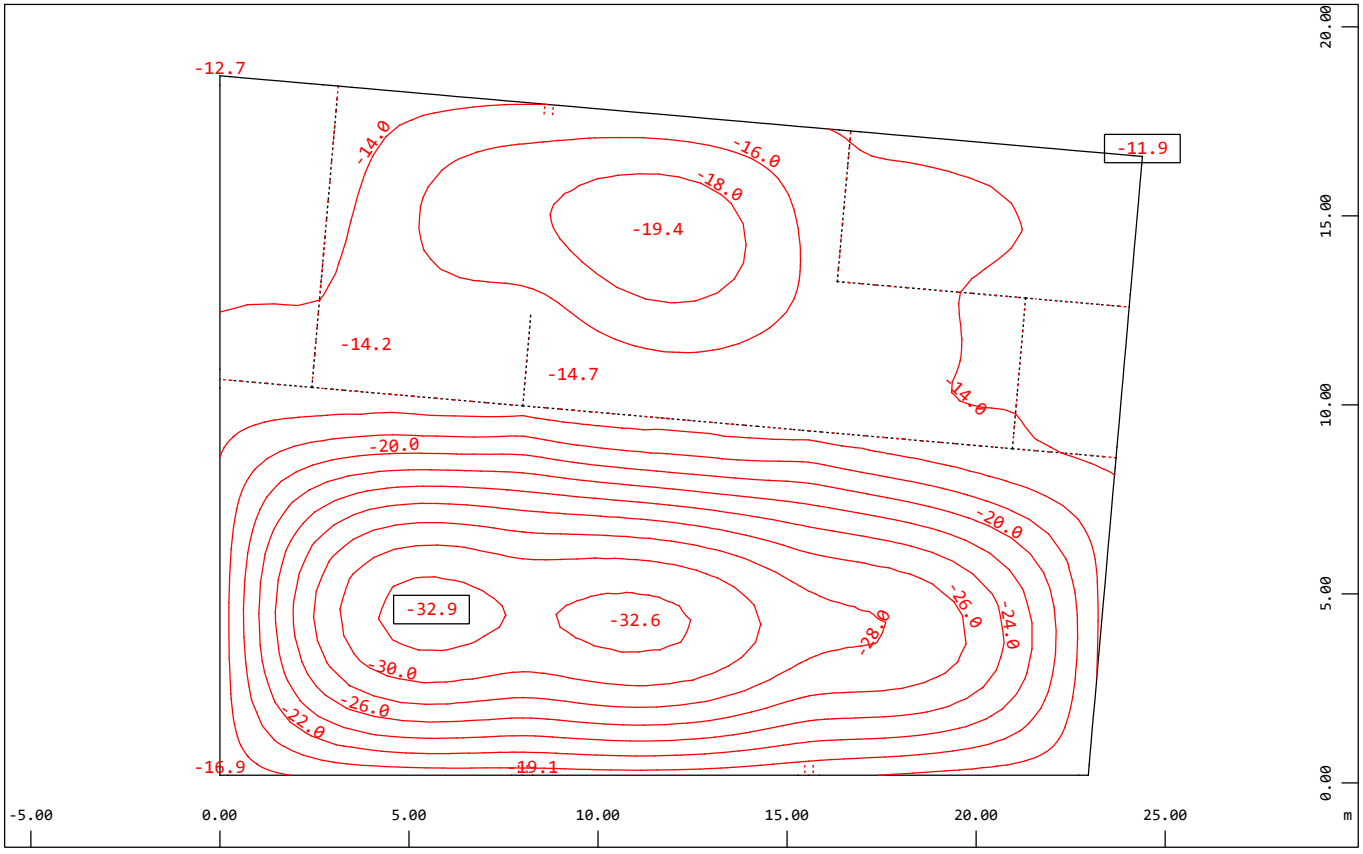

Y
Z—X
Sector of system Group 110
Nodal displacement in global Z in Node , Loadcase 9275 MAXP-UZ NODE , from -36.1 to -10.7 step 2.00 mm
M 1 : 200

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11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj.vert.pomikov plosc (MSU-perm): stresna plosca



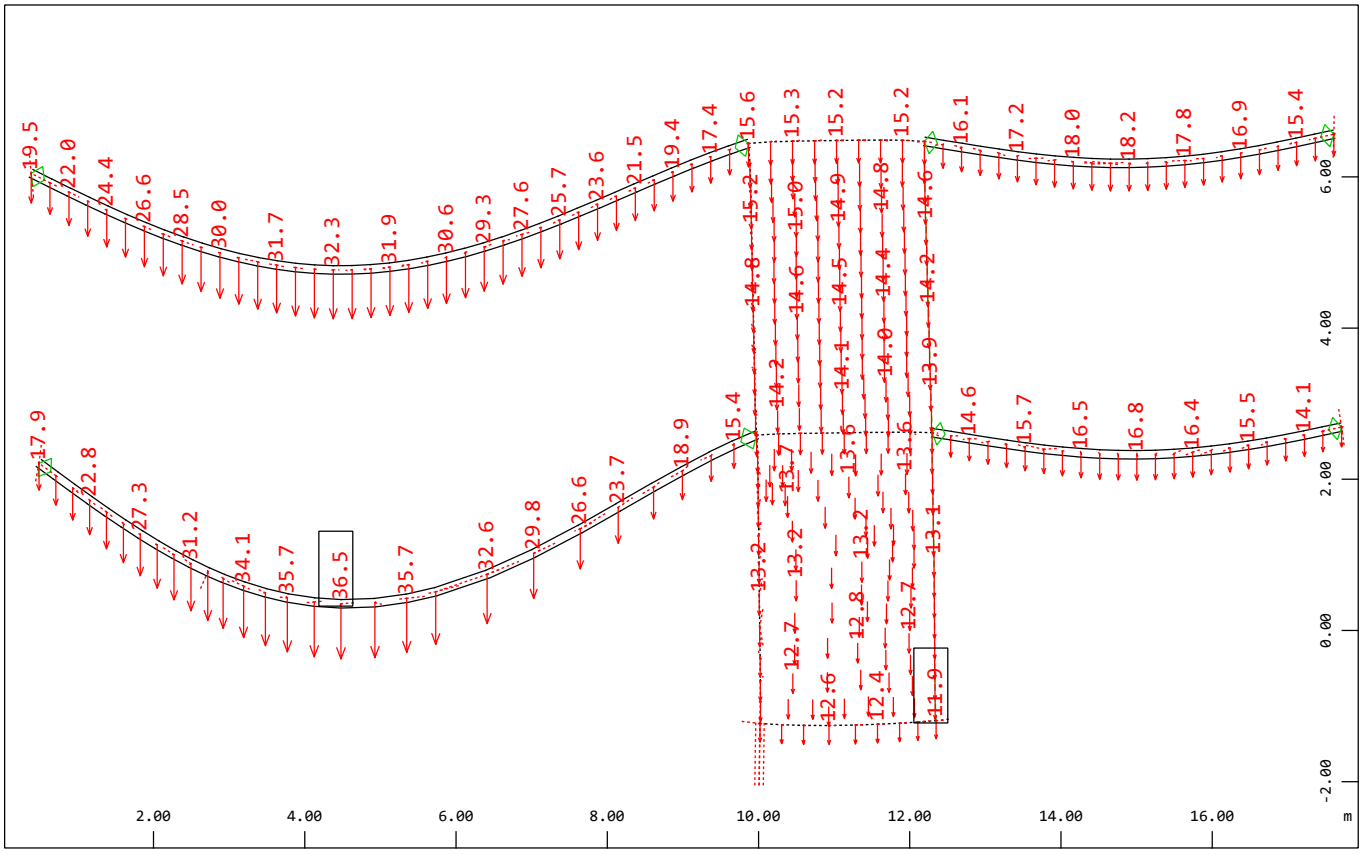

Y
Z—X
Sector of system Group 120
Nodal displacement in global Z in Node , Loadcase 9276 MINP-UZ NODE , from -33.3 to -12.3 step 2.00 mm
M 1 : 200




Y
Z—X
Sector of system Group 120
Nodal displacement in global Z in Node , Loadcase 9275 MAXP-UZ NODE , from -32.9 to -11.9 step 2.00 mm
M 1 : 200

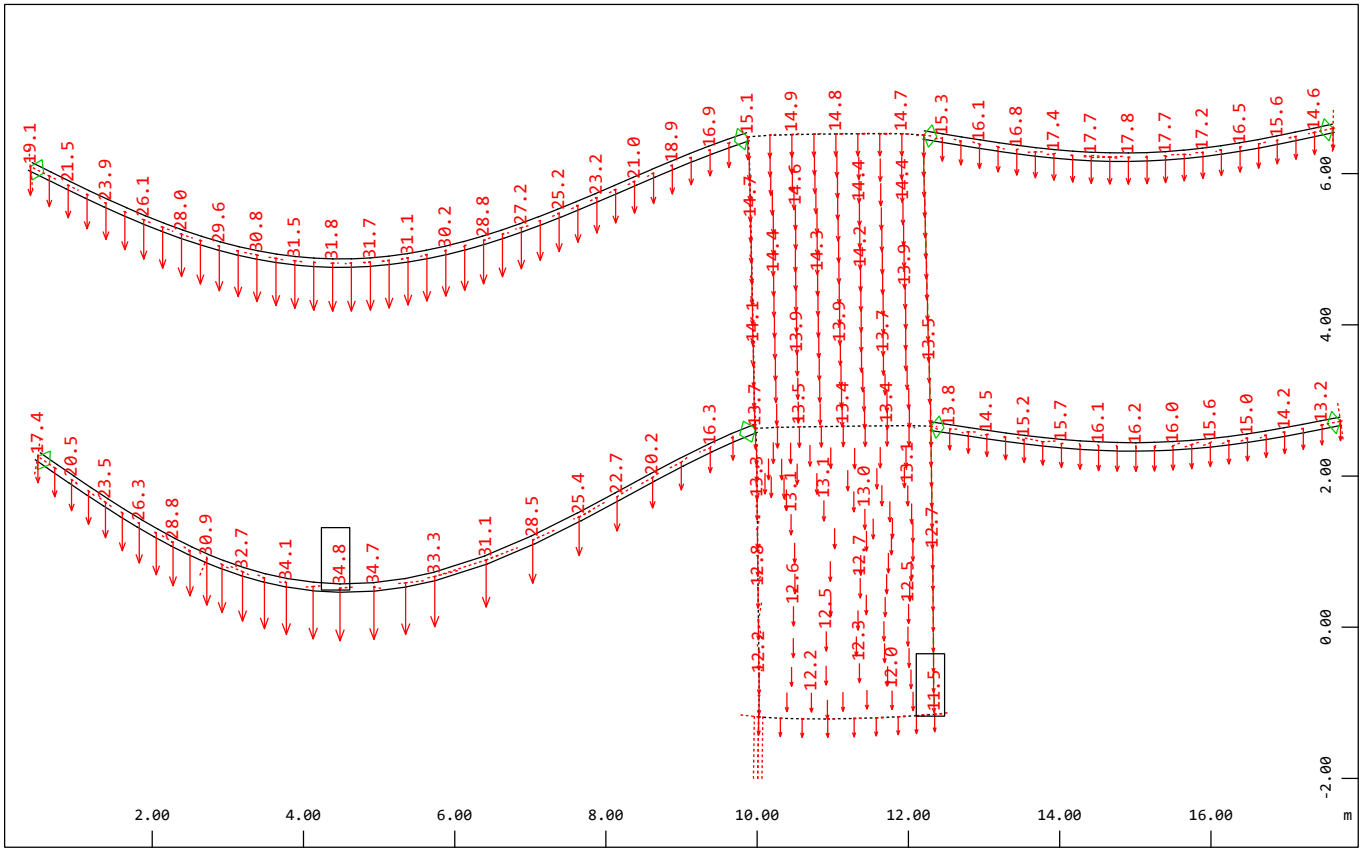
SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj. vert. pomikov MSU (navidezno-stalna): Nosilci v osi 7




Z
X Y

Sector of system Group 254 M 1 : 100
Deformed Structure from LC 9276 MINP-UZ NODE Enlarged by 100.0
Nodal displacement in global Z, Loadcase 9276 MINP-UZ NODE , 1 cm 3D = 50.0 mm

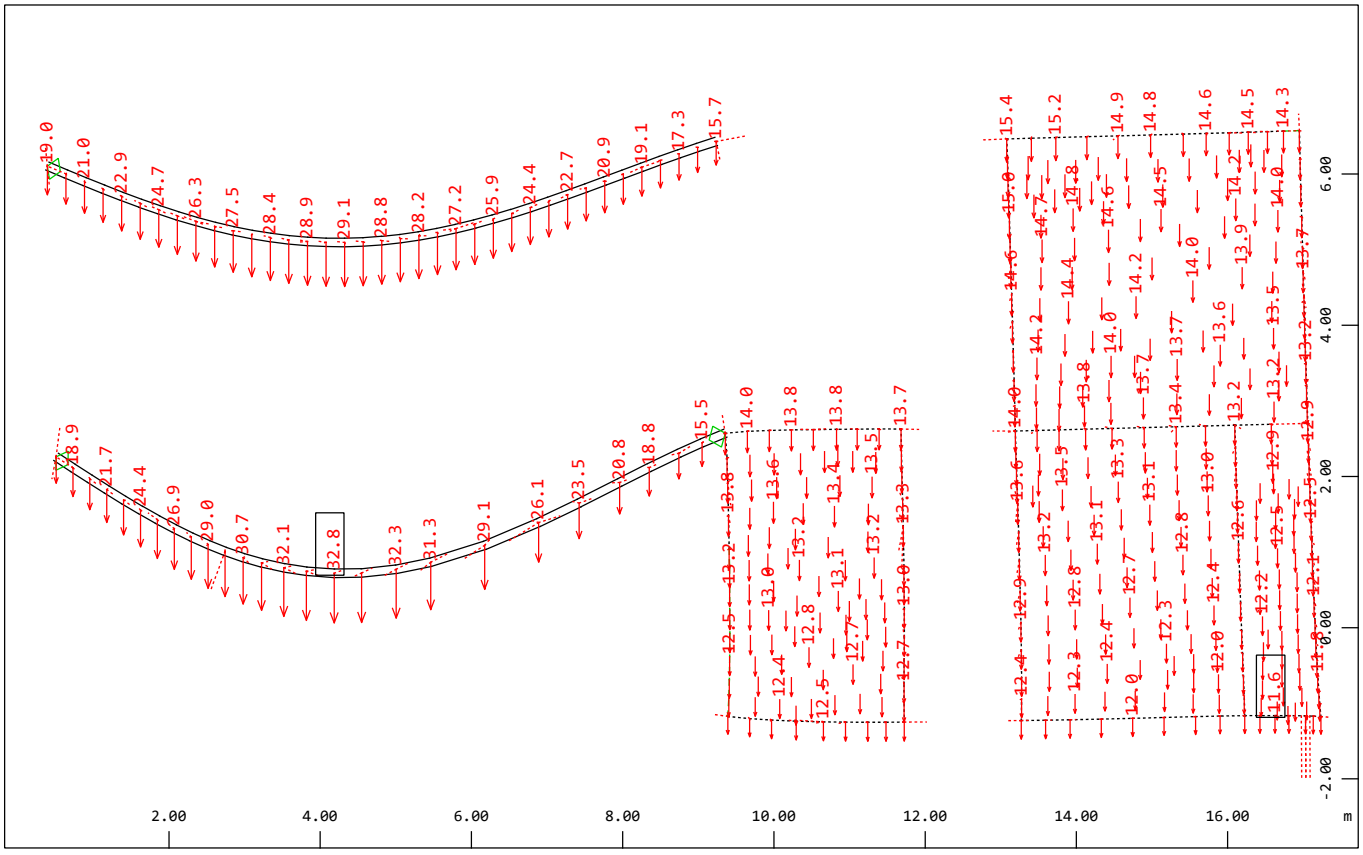



Z
X Y

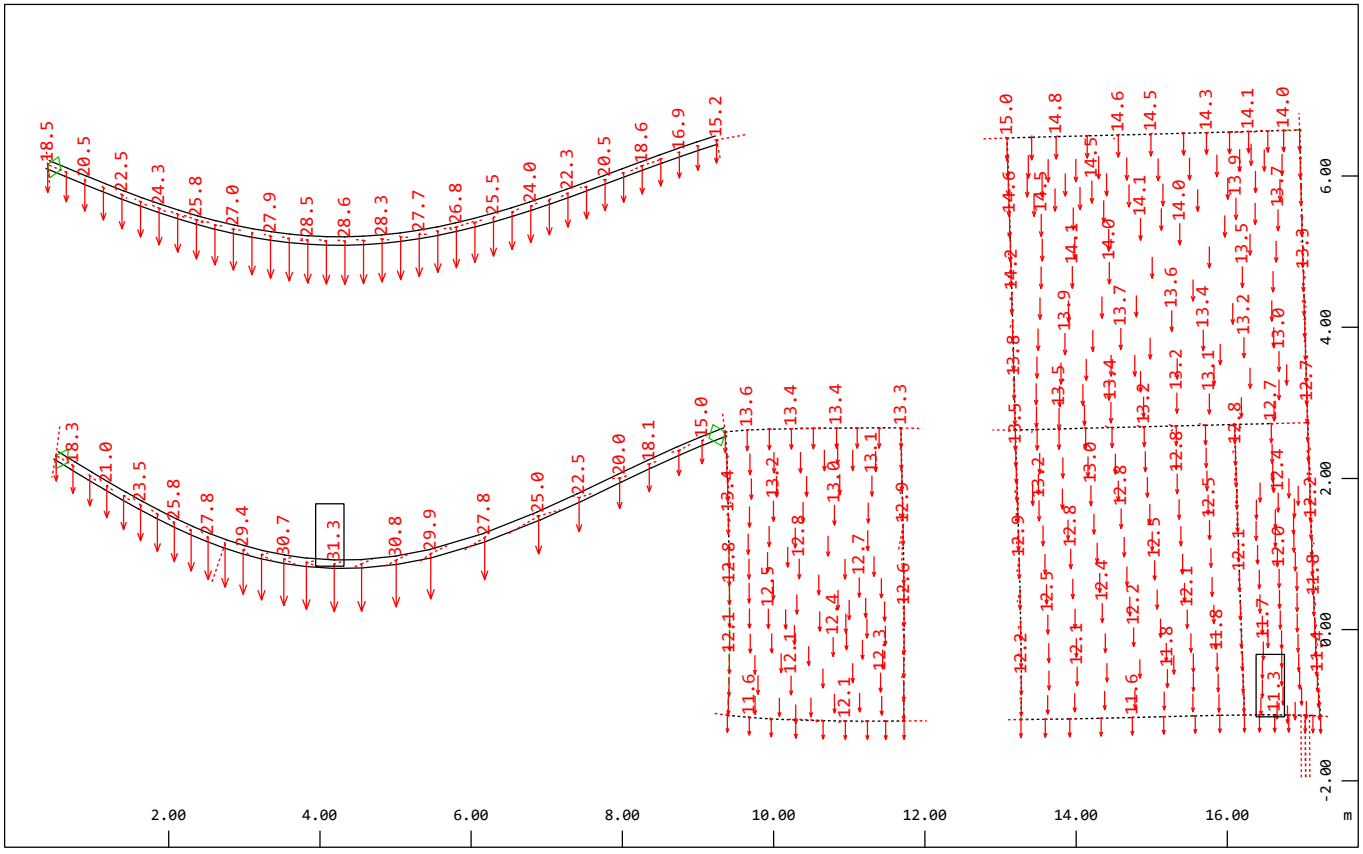
Sector of system Group 254 M 1 : 100
Deformed Structure from LC 9275 MAXP-UZ NODE Enlarged by 100.0
Nodal displacement in global Z, Loadcase 9275 MAXP-UZ NODE , 1 cm 3D = 50.0 mm

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11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj. vert. pomikov MSU (navidezno-stalna): Nosilci v osi 9



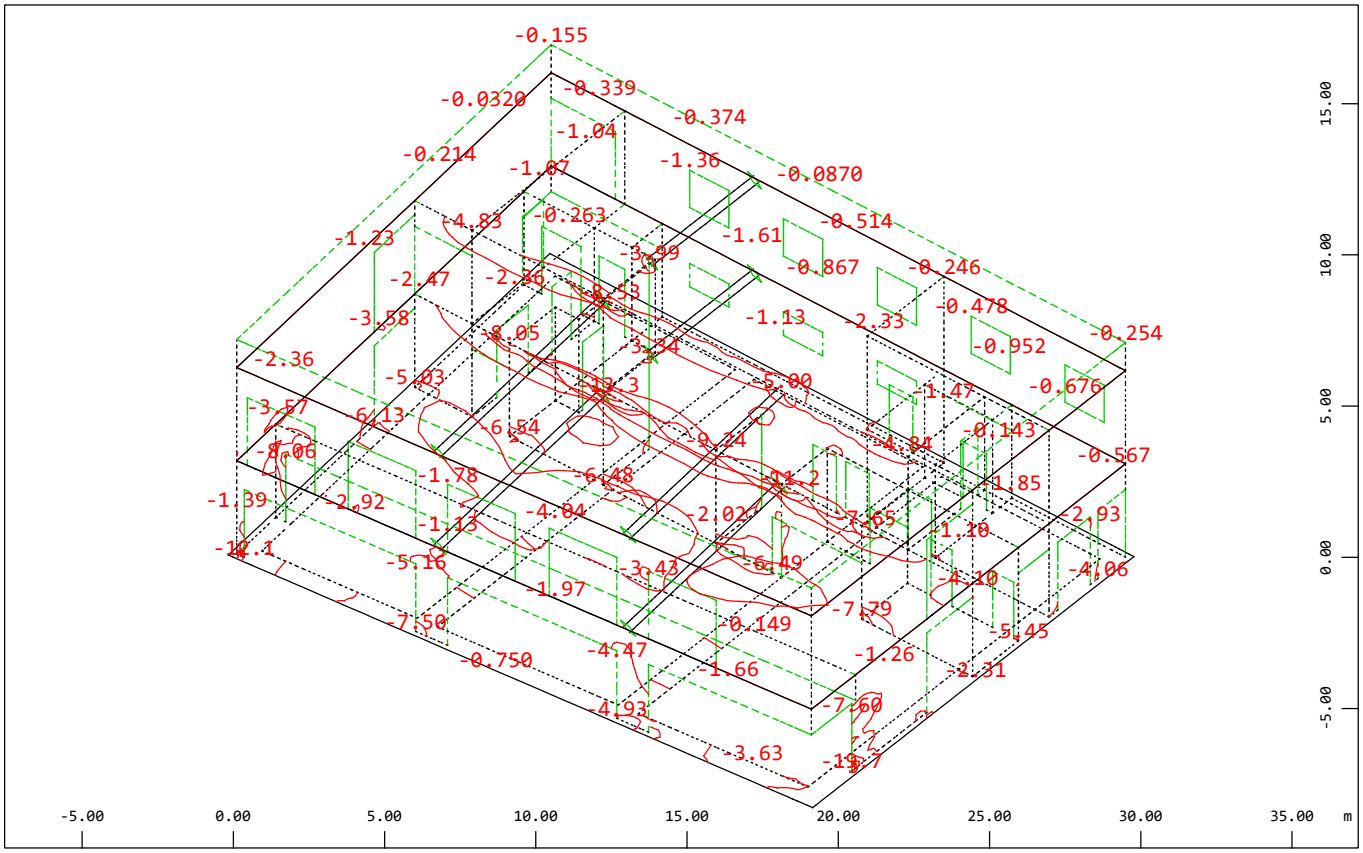

Z
X Y
Sector of system Group 256
Deformed Structure from LC 9276 MINP-UZ NODE Enlarged by 100.0
Nodal displacement in global Z, Loadcase 9276 MINP-UZ NODE , 1 cm 3D = 50.0 mm
M 1 : 100




Z
X Y
Sector of system Group 256
Deformed Structure from LC 9275 MAXP-UZ NODE Enlarged by 100.0
Nodal displacement in global Z, Loadcase 9275 MAXP-UZ NODE , 1 cm 3D = 50.0 mm
M 1 : 100

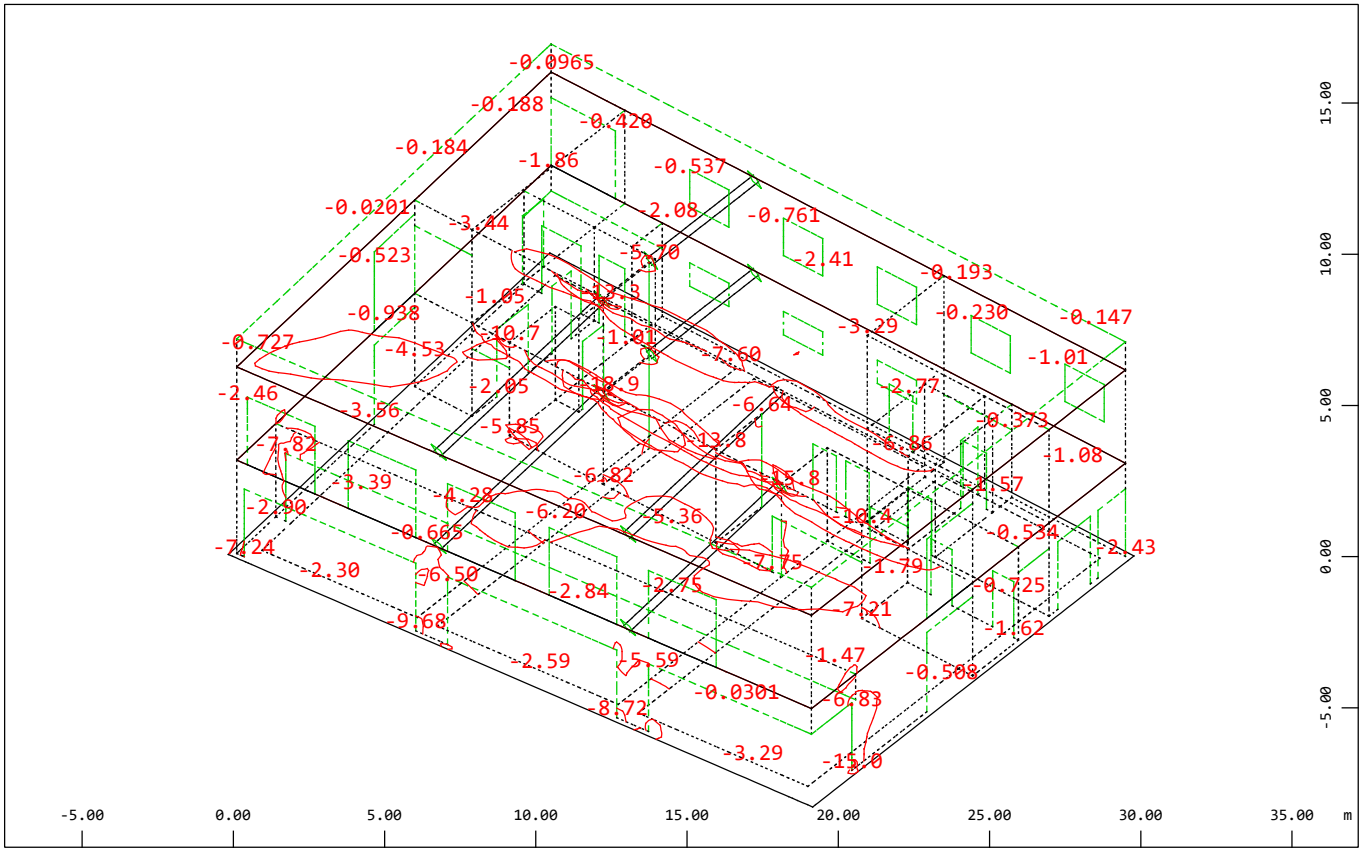
SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - centralna dilat. enota stavbe
Maks.tlacna napetost v betonu: MSU-perm (0,45.fck), MSU-rare (0,6.fck)




Sector of system Group 100 110 120 201...207 251...258 301 302
Maximum principal compression stress from middle of element, Loadcase 8205 MAXE-MXY QUAD
, from -13.5 to -2.9155e-06 step 2.70 MPa

M 1 : 250
X * 0.901
Y * 0.770
Z * 0.771

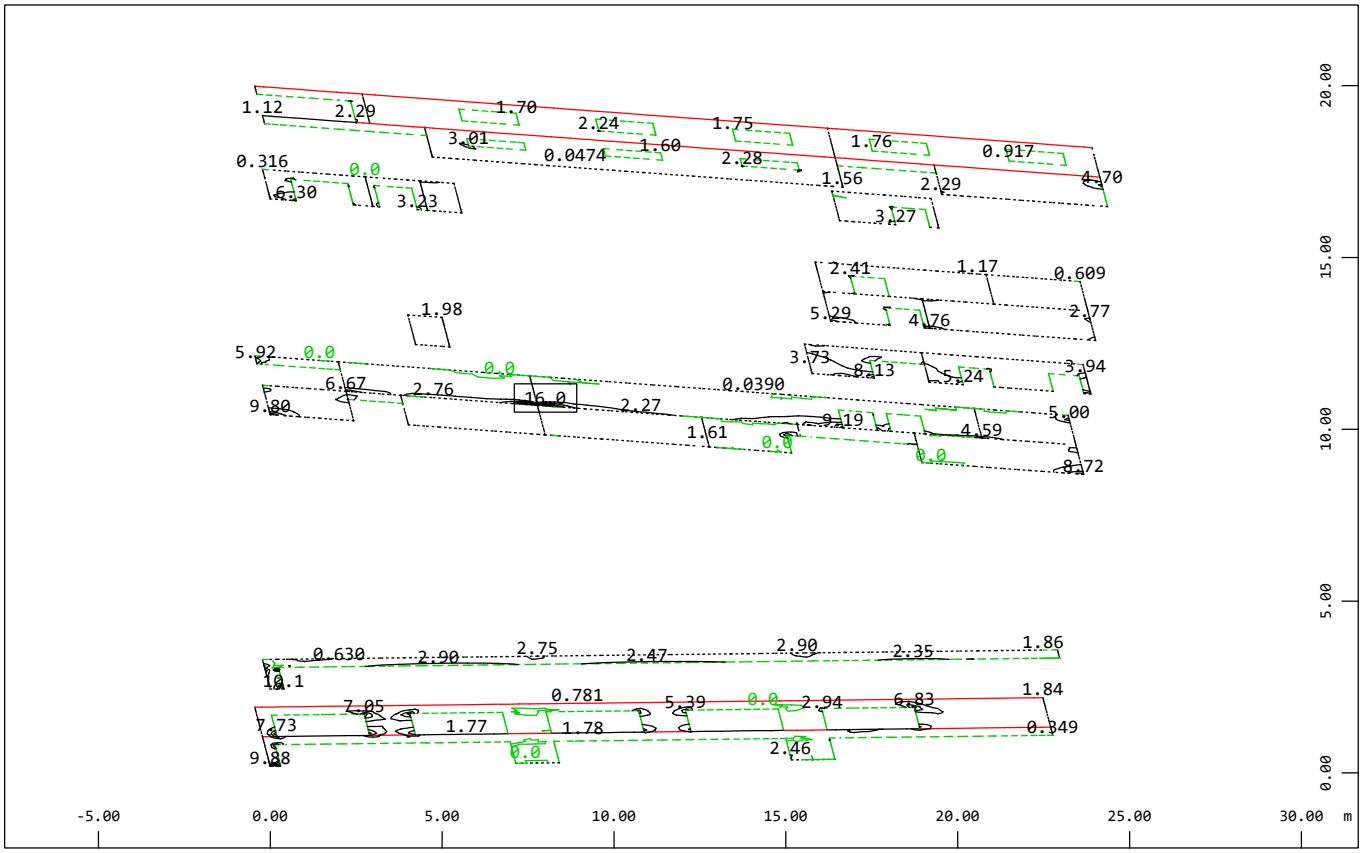



Sector of system Group 100 110 120 201...207 251...258 301 302
Maximum principal compression stress from middle of element, Loadcase 8005 MAX-MXY QUAD
, from -18.0 to -9.9640e-07 step 3.60 MPa

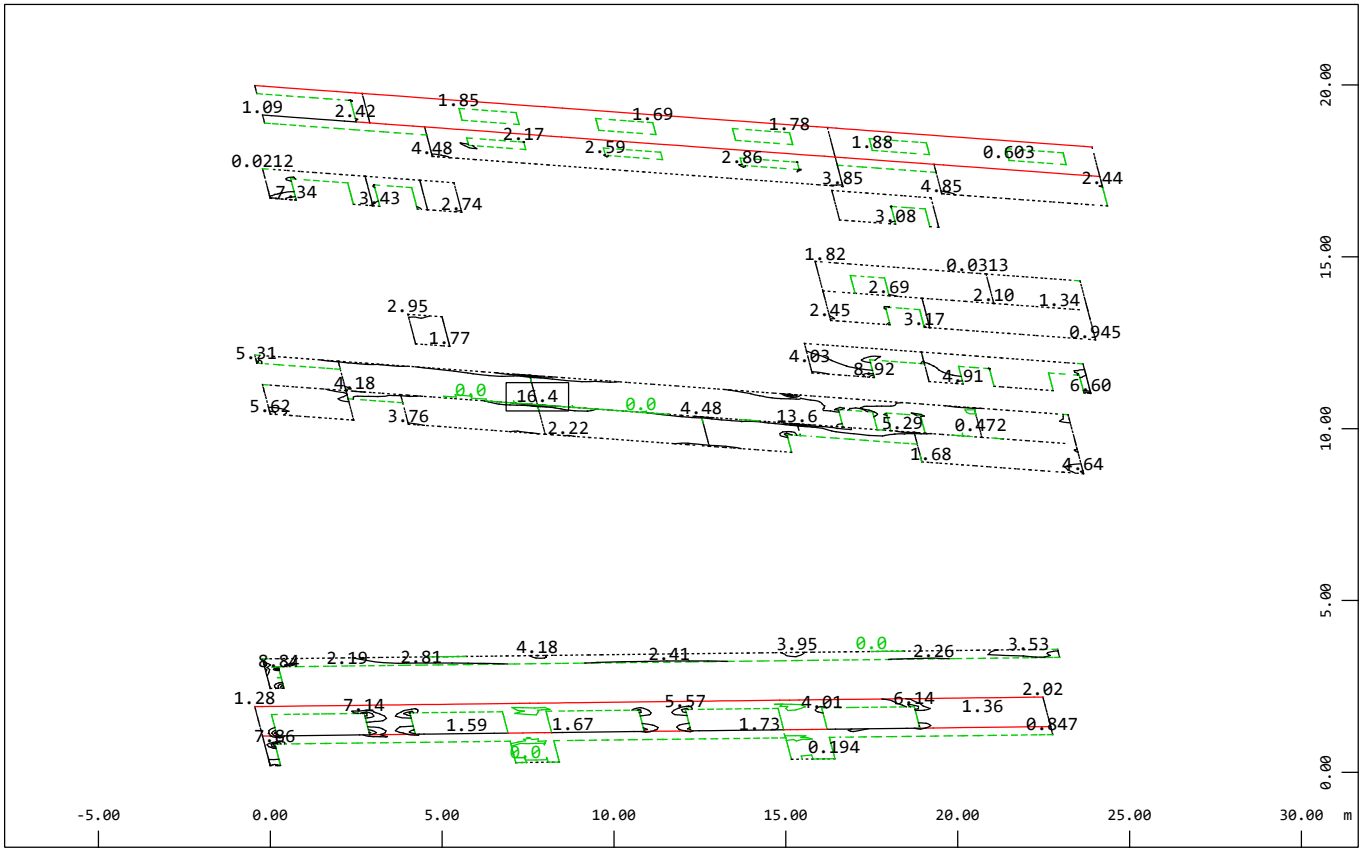
M 1 : 250
X * 0.901
Y * 0.770
Z * 0.771

SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - centralna dilat. enota stavbe
Vzdolzne AB stene: armatura vertikalna



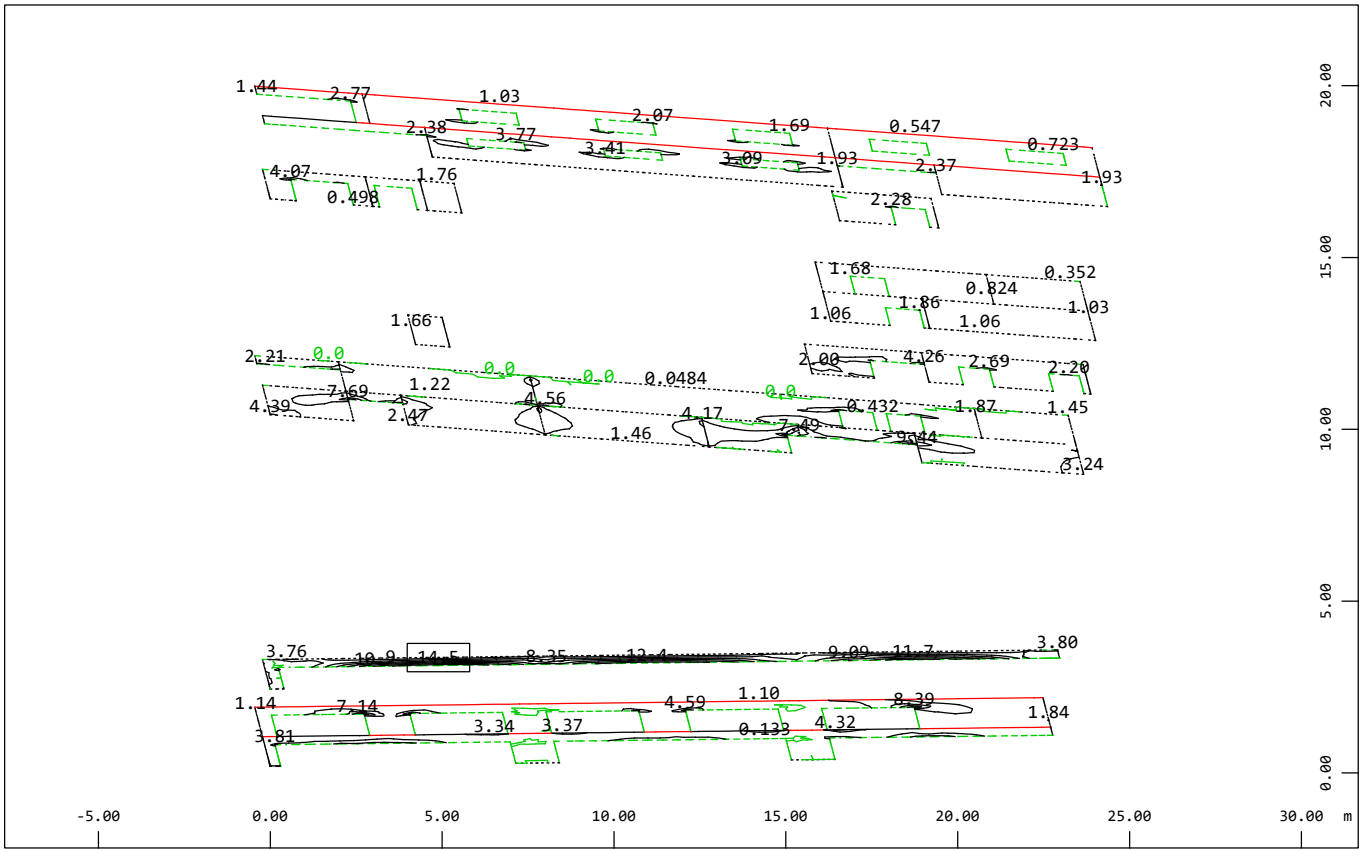

Y
Z X Sector of system Quadrilateral Elements Group 201...207
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node
, from 0 to 16.0 step 2.00 cm2/m
, Design Case 1
M 1 : 220
X * 0.998
Y * 0.977
Z * 0.222




Y
Z X Sector of system Quadrilateral Elements Group 201...207
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node
, from 0 to 16.4 step 2.05 cm2/m
, Design Case 1
M 1 : 220
X * 0.998
Y * 0.977
Z * 0.222

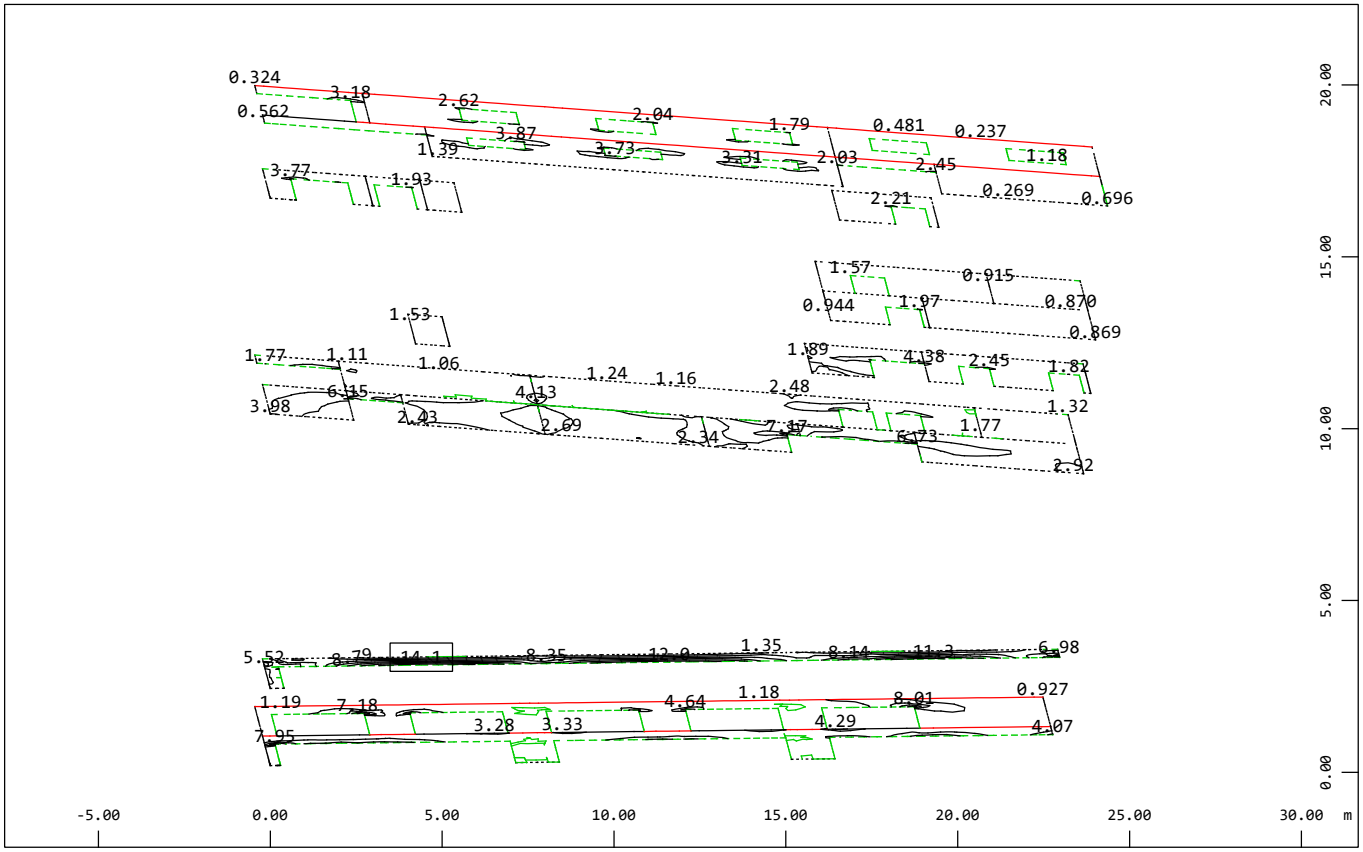
SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - centralna dilat. enota stavbe
Vzdolzne AB stene: armatura horizontalna




Y
Z X Sector of system Quadrilateral Elements Group 201...207
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node, Design Case 1
, from 0 to 14.5 step 1.81 cm2/m

M 1 : 220
X * 0.998
Y * 0.977
Z * 0.222

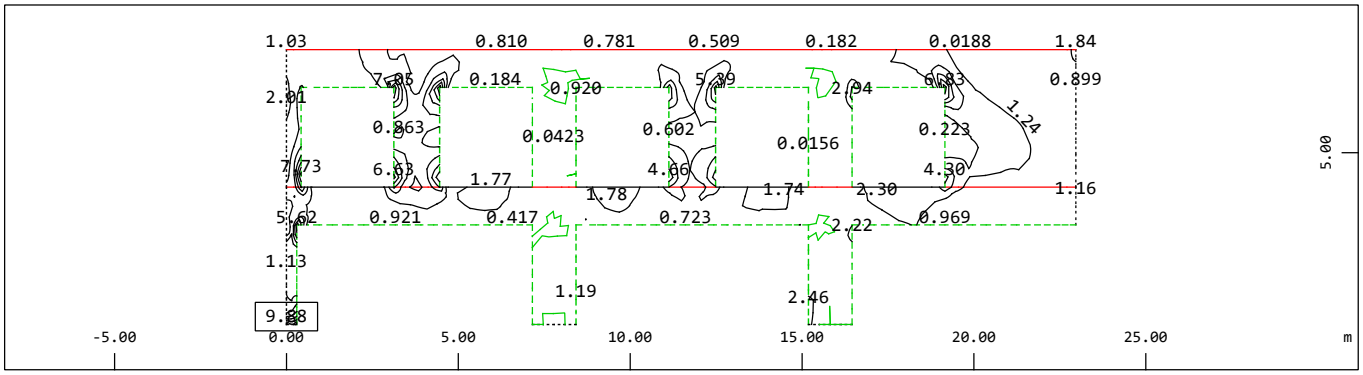



Y
Z X Sector of system Quadrilateral Elements Group 201...207
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node, Design Case 1
, from 0 to 14.1 step 1.76 cm2/m

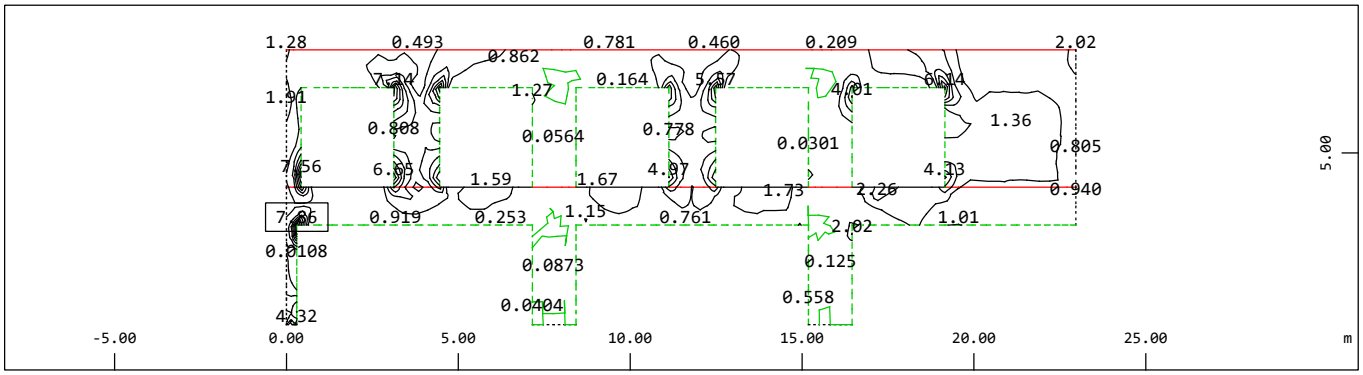
M 1 : 220
X * 0.998
Y * 0.977
Z * 0.222

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11826 DSO Bovec - centralna dilat. enota stavbe
Vzdolzna AB stena v osi L: armatura vert + horiz.

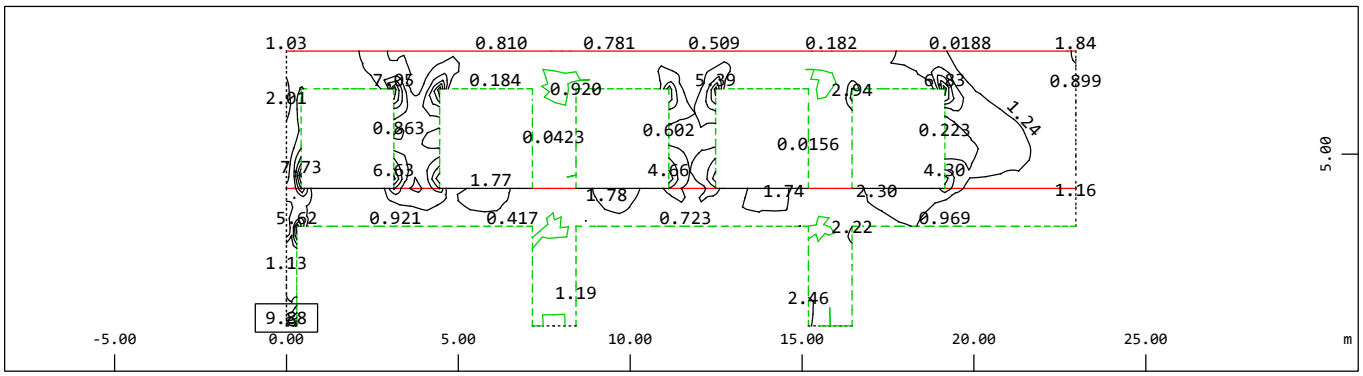



Z
X
Sector of system Group 201 M 1 : 220
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node Design Case 1
, from 0 to 9.88 step 1.24 cm2/m

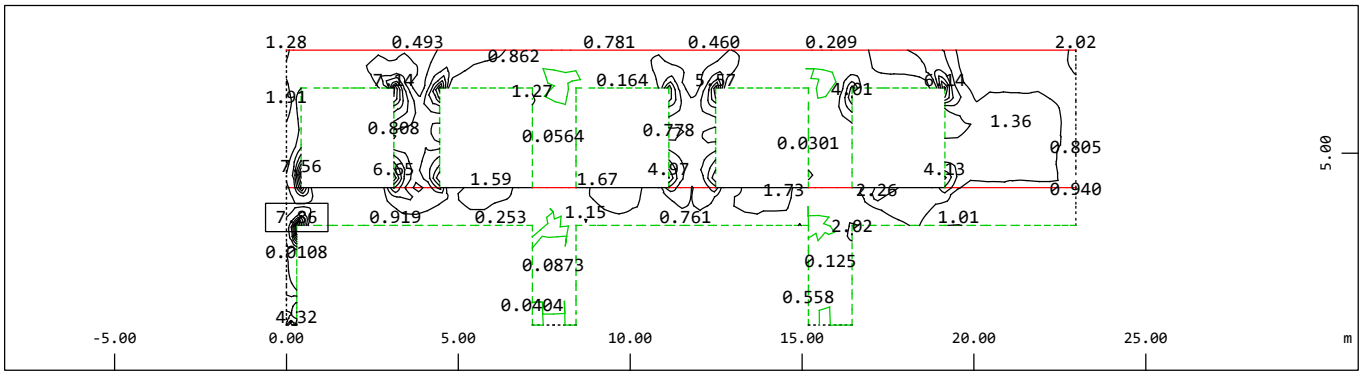



Z
X
Sector of system Group 201 M 1 : 220
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node Design Case 1
, from 0 to 7.86 step 0.982 cm2/m

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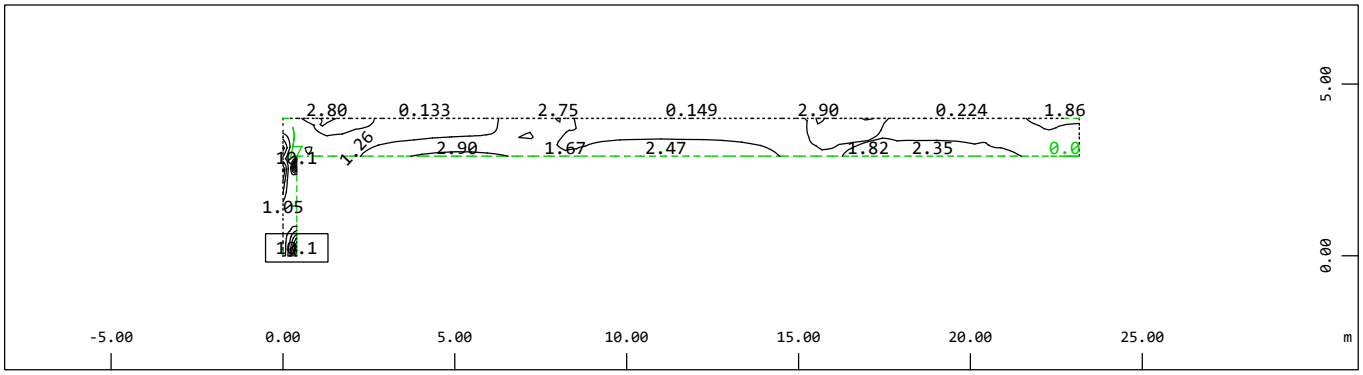



Z
X
Sector of system Group 201 M 1 : 220
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node Design Case 1
, from 0 to 9.88 step 1.24 cm2/m

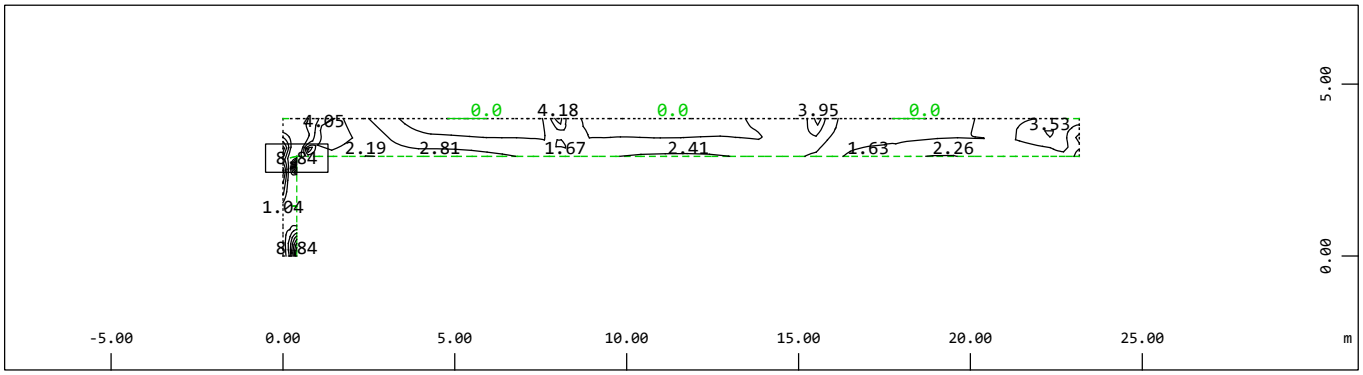



Z
X
Sector of system Group 201 M 1 : 220
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node Design Case 1
, from 0 to 7.86 step 0.982 cm2/m

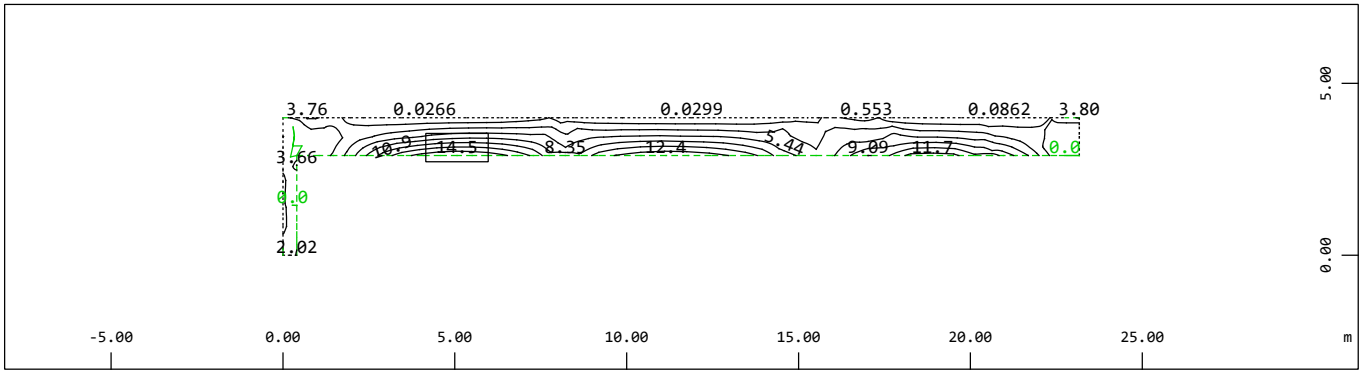
11826 DSO Bovec - centralna dilat. enota stavbe
Vzdolzni AB sten. nosilec ob osi L: armatura vert + horiz.



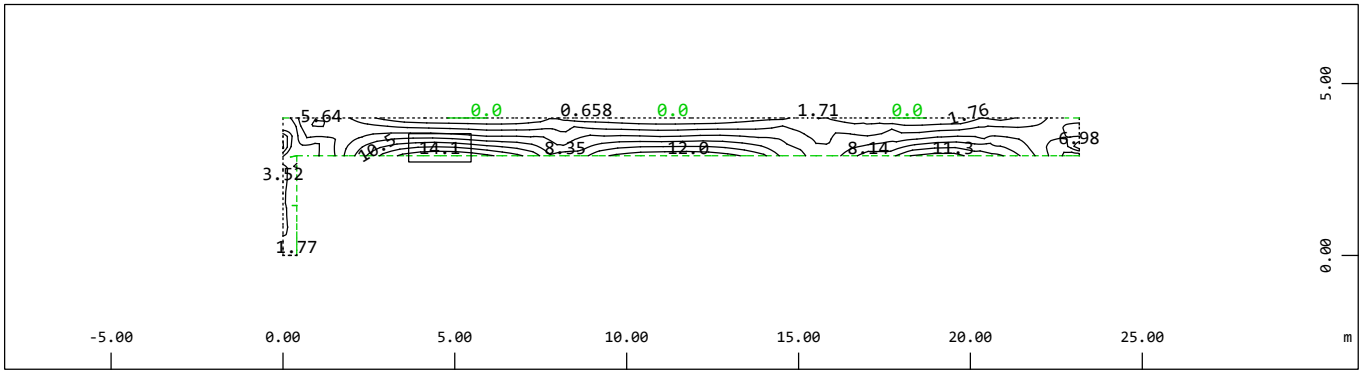

Z
X
Sector of system Group 202 M 1 : 220
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 10.1 step 1.26 cm2/m




Z
X
Sector of system Group 202 M 1 : 220
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 8.84 step 1.10 cm2/m



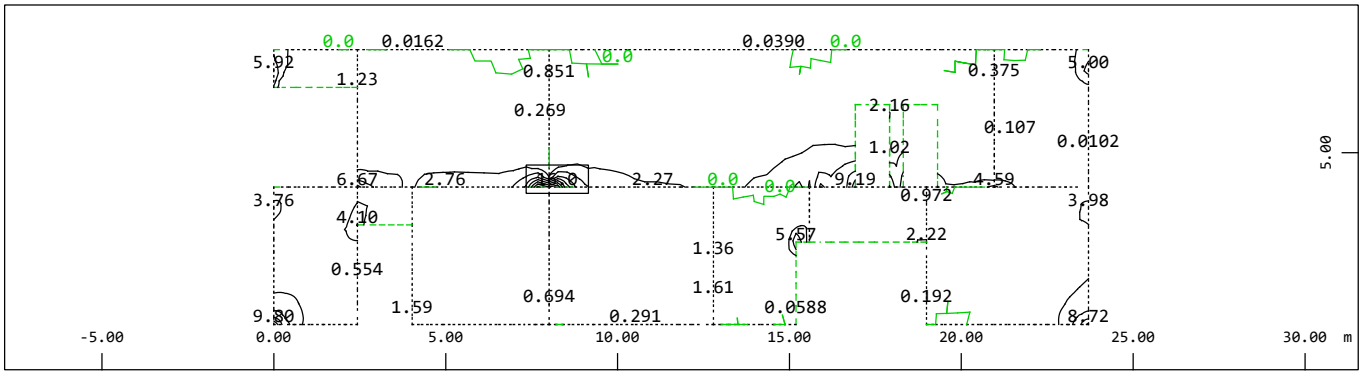

Z
X
Sector of system Group 202 M 1 : 220
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 14.5 step 1.81 cm2/m



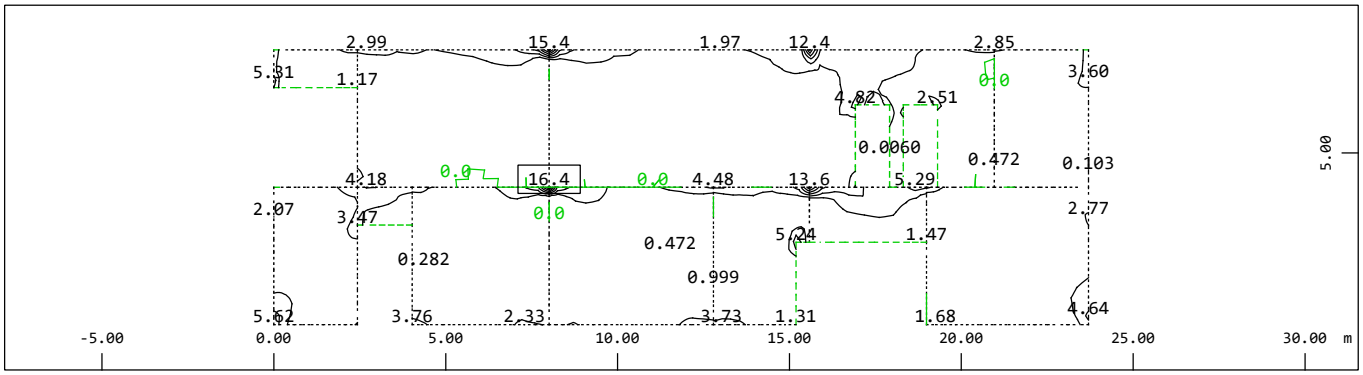

Z
X
Sector of system Group 202 M 1 : 220
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 14.1 step 1.76 cm2/m

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11826 DSO Bovec - centralna dilat. enota stavbe
Vzdolzni AB nosilec ob osi O: armatura vert + horiz.

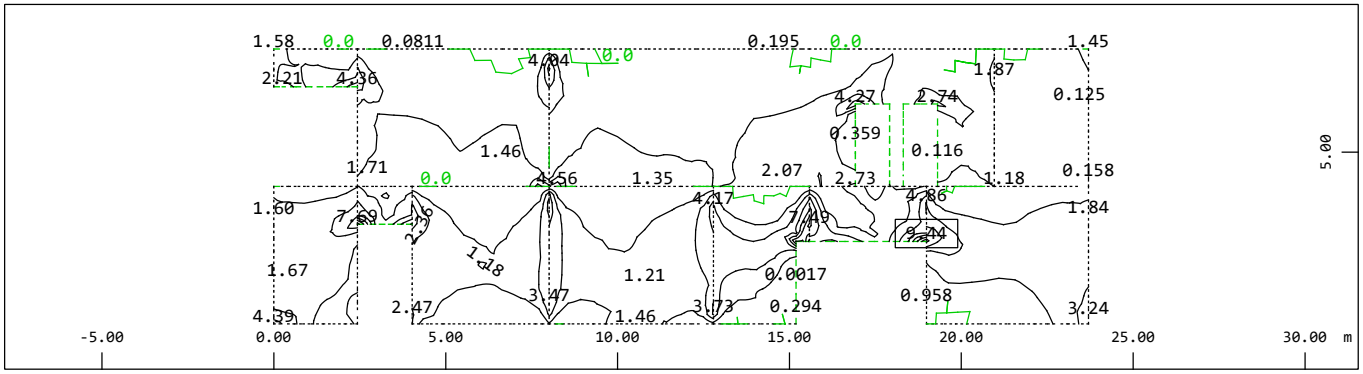



Z
X
Sector of system Group 203 M 1 : 220
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 16.0 step 2.00 cm2/m

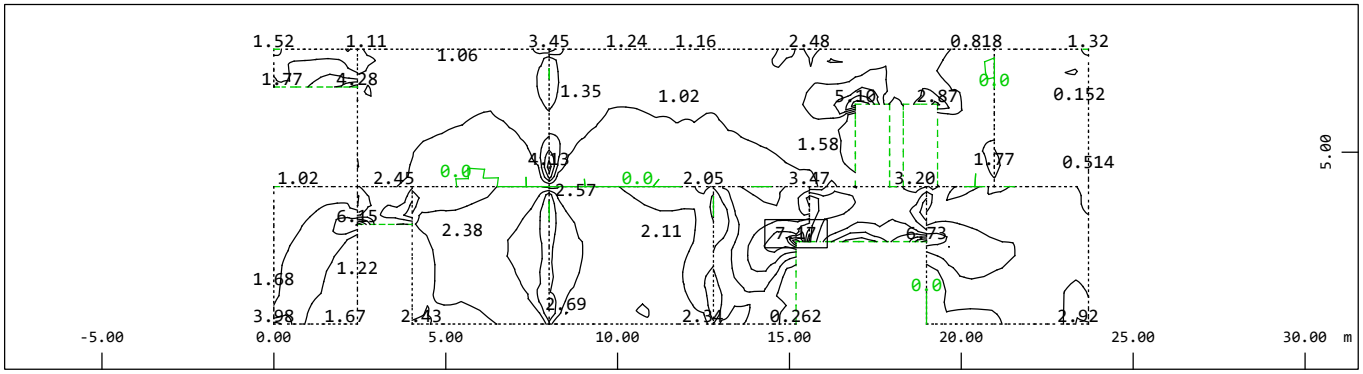



Z
X
Sector of system Group 203 M 1 : 220
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 16.4 step 2.05 cm2/m

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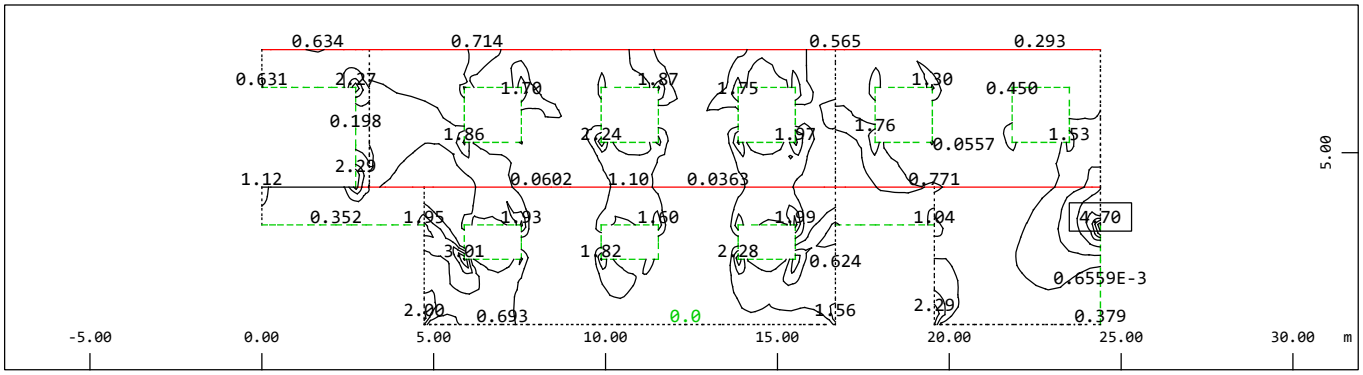



Z
X
Sector of system Group 203 M 1 : 220
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 9.44 step 1.18 cm2/m

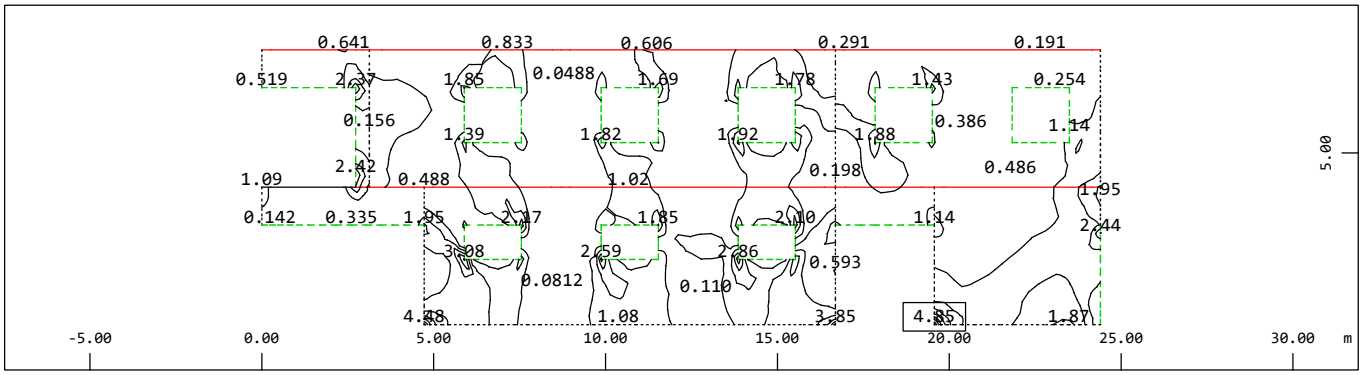



Z
X
Sector of system Group 203 M 1 : 220
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 7.17 step 0.896 cm2/m

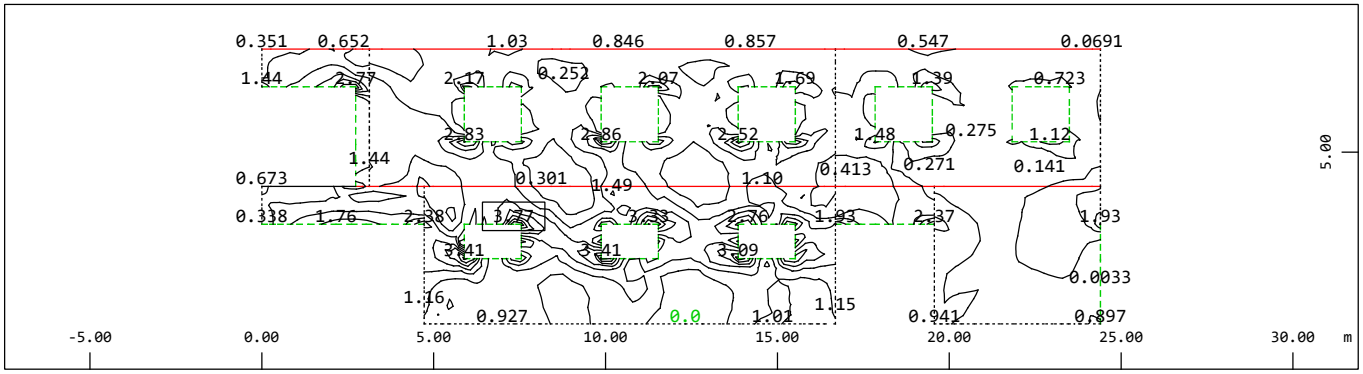
11826 DSO Bovec - centralna dilat. enota stavbe
Vzdolzni AB nosilec ob osi O: armatura vert + horiz.



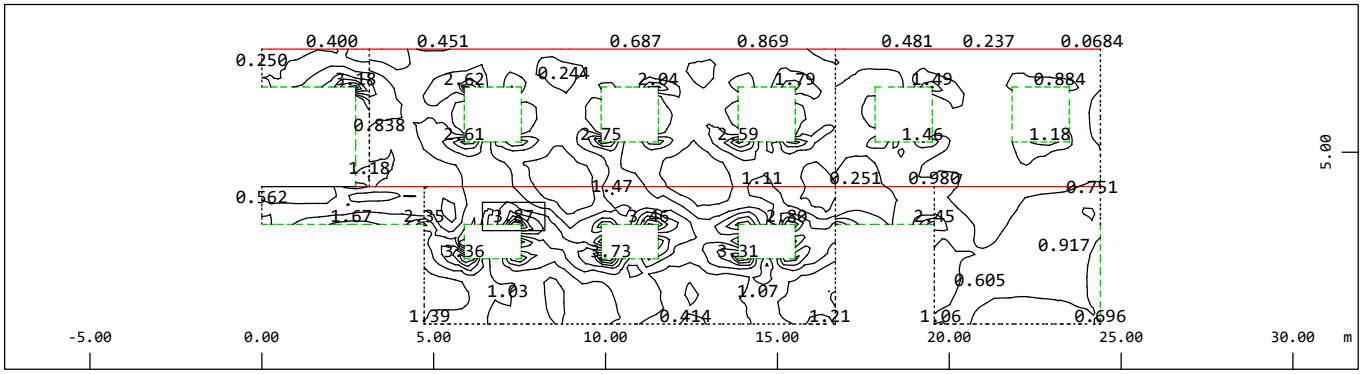

Sector of system Group 207 M 1 : 220
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 4.70 step 0.587 cm2/m




Sector of system Group 207 M 1 : 220
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0.0028 to 4.85 step 0.606 cm2/m



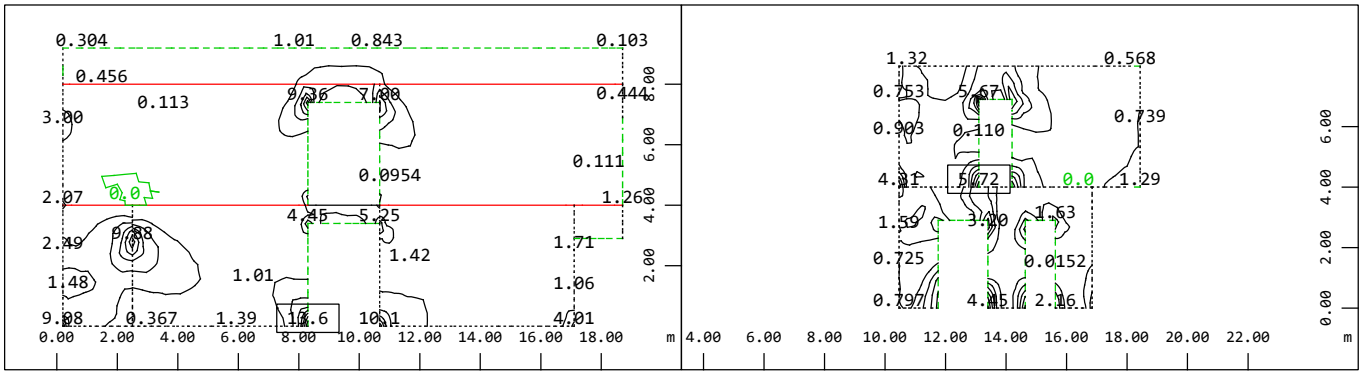

Sector of system Group 207 M 1 : 220
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 3.77 step 0.471 cm2/m




Sector of system Group 207 M 1 : 220
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0.0138 to 3.87 step 0.482 cm2/m

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11826 DSO Bovec - centralna dilat. enota stavbe
Precne AB stene - oseh 5 in 5-6: armatura vertikalna, horizontalna

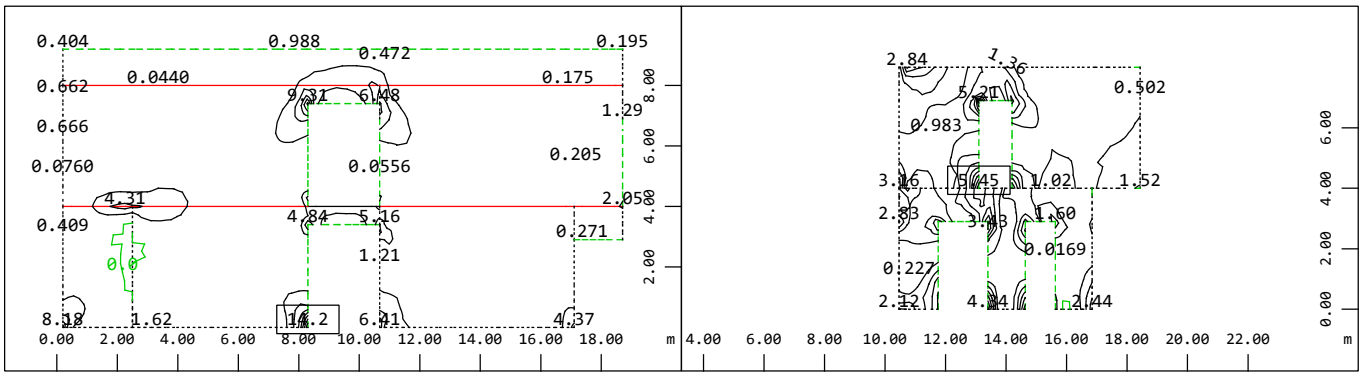



Sector of system Group 251
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 13.6 step 1.70 cm2/m

M 1 : 250

Sector of system Group 252
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 5.72 step 0.715 cm2/m

M 1 : 250

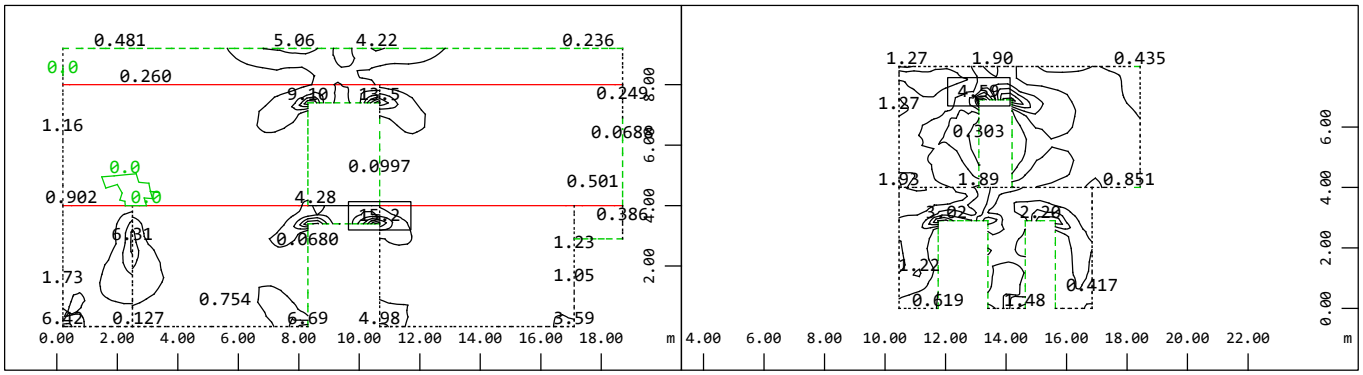



Sector of system Group 251
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 14.2 step 1.77 cm2/m

M 1 : 250

Sector of system Group 252
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 5.45 step 0.682 cm2/m

M 1 : 250

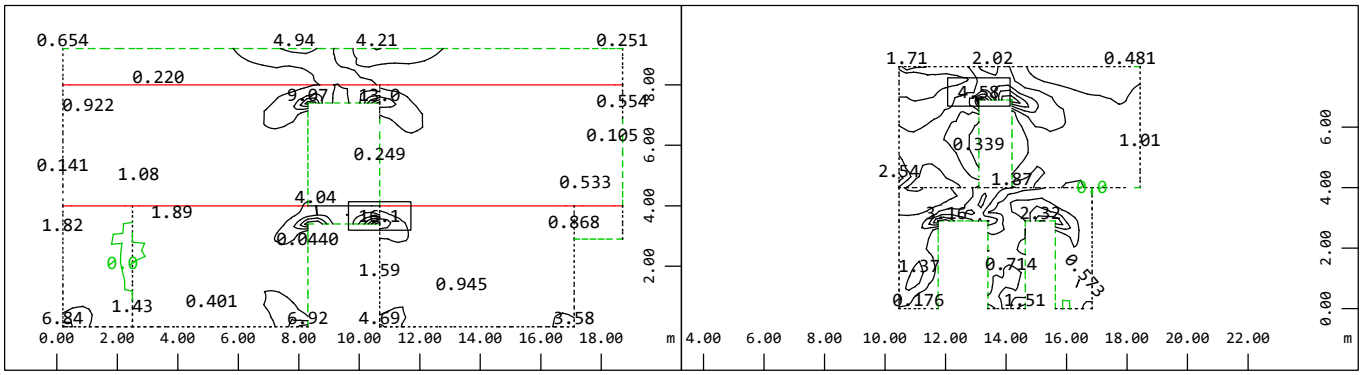



Sector of system Group 251
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 15.2 step 1.90 cm2/m

M 1 : 250

Sector of system Group 252
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 4.59 step 0.573 cm2/m

M 1 : 250




Sector of system Group 251
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 16.1 step 2.01 cm2/m

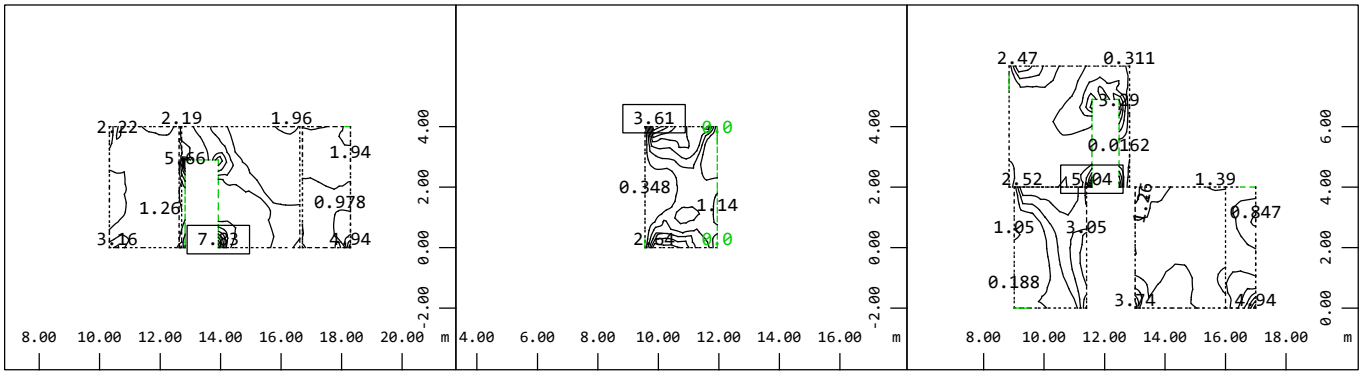
M 1 : 250

Sector of system Group 252
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 4.58 step 0.573 cm2/m

M 1 : 250

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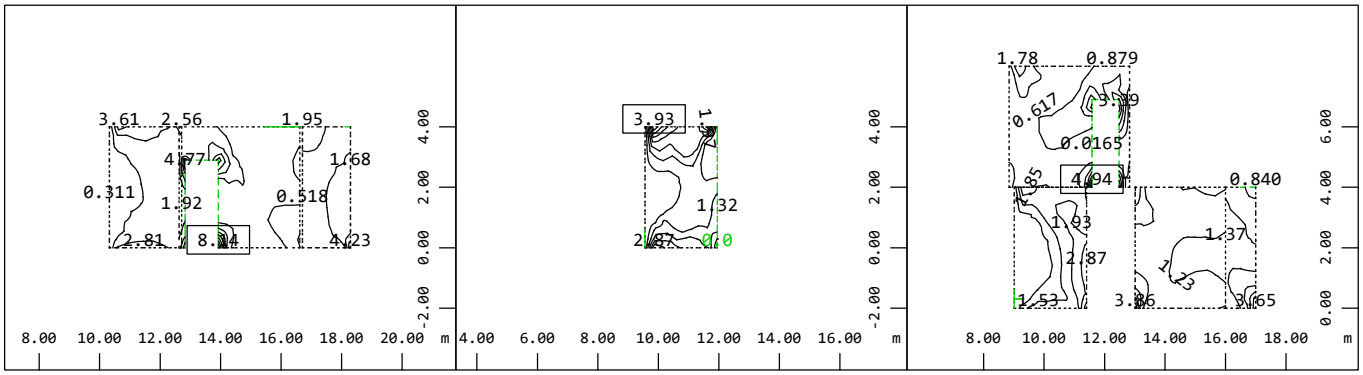
11826 DSO Bovec - centralna dilat. enota stavbe
Precne AB stene - oseh 6, 8, 10: armatura vert. / horiz.




Sector of system Group 253
Quadrilateral Elements ,
upper Cross reinforcements
(2nd layer) in Node , ,
Design Case 1 , from

Sector of system Group 255
Quadrilateral Elements ,
upper Cross reinforcements
(2nd layer) in Node , ,
Design Case 1 , from 0 to

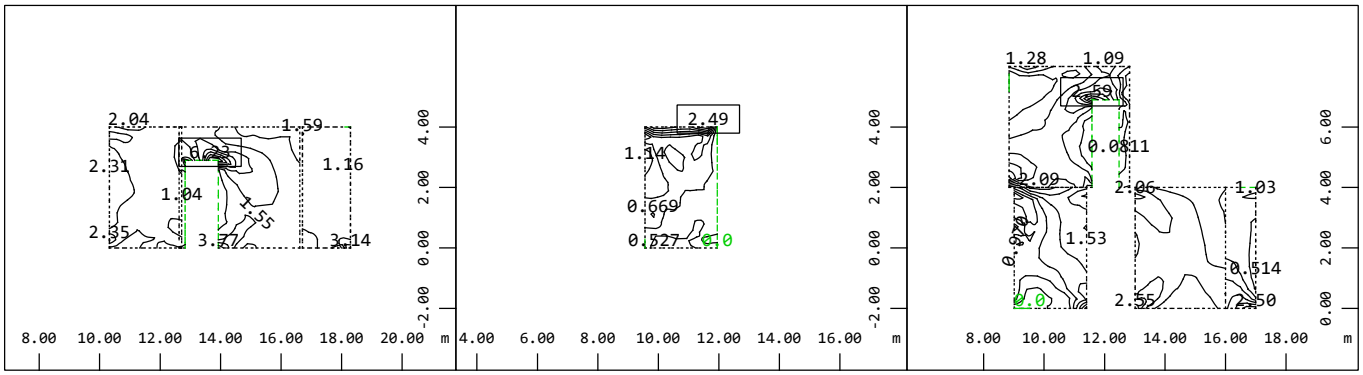
Sector of system Group 257
Quadrilateral Elements ,
upper Cross reinforcements
(2nd layer) in Node , ,
Design Case 1 , from 0 to




Sector of system Group 253
Quadrilateral Elements ,
lower Cross reinforcements
(2nd layer) in Node , ,
Design Case 1 , from 0 to

Sector of system Group 255
Quadrilateral Elements ,
lower Cross reinforcements
(2nd layer) in Node , ,
Design Case 1 , from 0 to

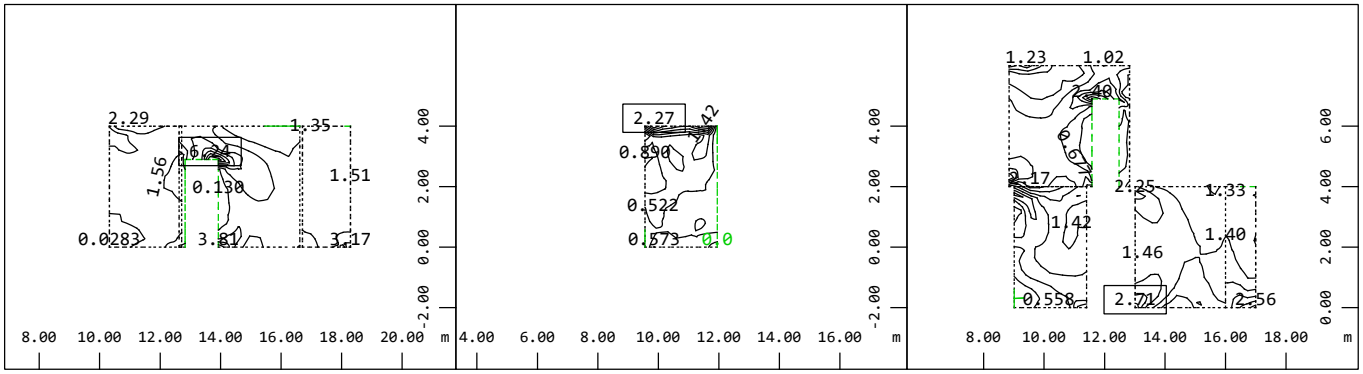
Sector of system Group 257
Quadrilateral Elements ,
lower Cross reinforcements
(2nd layer) in Node , ,
Design Case 1 , from 0 to




Sector of system Group 253
Quadrilateral Elements ,
upper Principal
reinforcements (1st layer)
in Node , Design Case 1

Sector of system Group 255
Quadrilateral Elements ,
upper Principal
reinforcements (1st layer)
in Node , Design Case 1

Sector of system Group 257
Quadrilateral Elements ,
upper Principal
reinforcements (1st layer)
in Node , Design Case 1



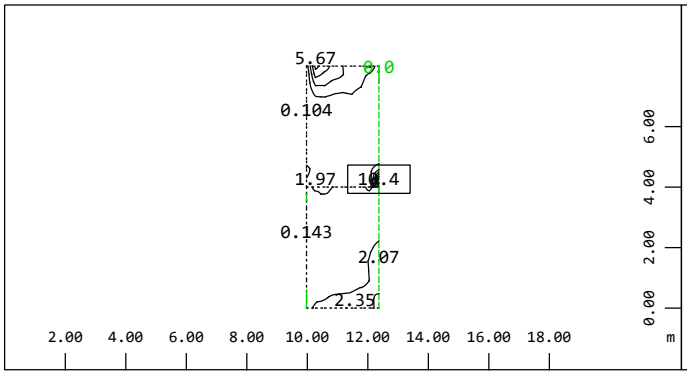

Sector of system Group 253
Quadrilateral Elements ,
lower Principal
reinforcements (1st layer)
in Node , Design Case 1

Sector of system Group 255
Quadrilateral Elements ,
lower Principal
reinforcements (1st layer)
in Node , Design Case 1

Sector of system Group 257
Quadrilateral Elements ,
lower Principal
reinforcements (1st layer)
in Node , Design Case 1

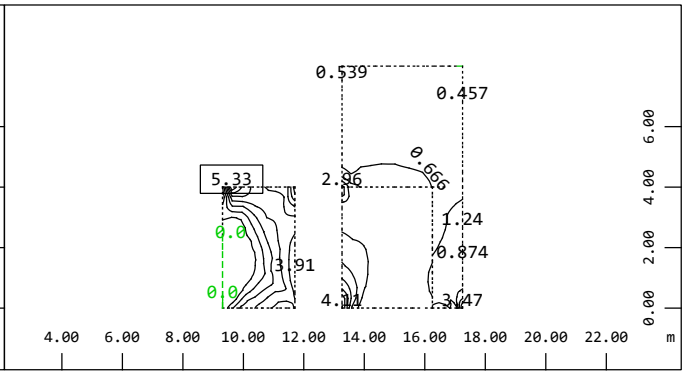
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11826 DSO Bovec - centralna dilat. enota stavbe
Precne AB stene/nosilci - osi 7 in 9: armatura vert., horiz.



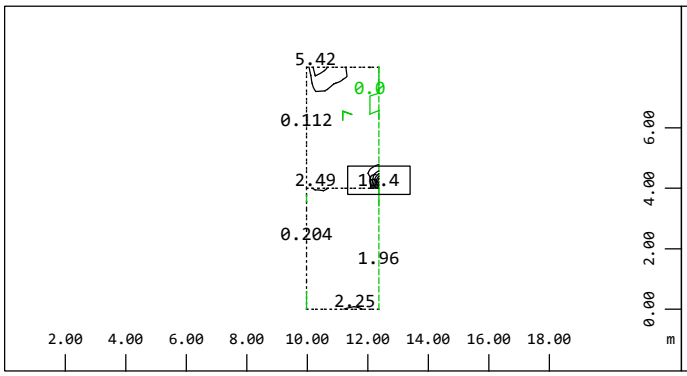

Sector of system Group 254
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 10.4 step 1.30 cm2/m

M 1 : 250



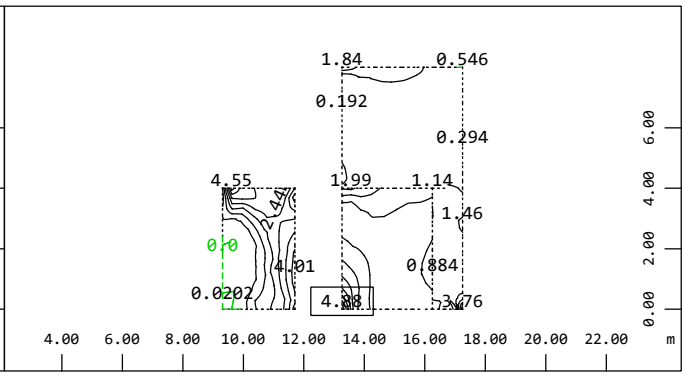

Sector of system Group 256
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 5.33 step 0.666 cm2/m

M 1 : 250



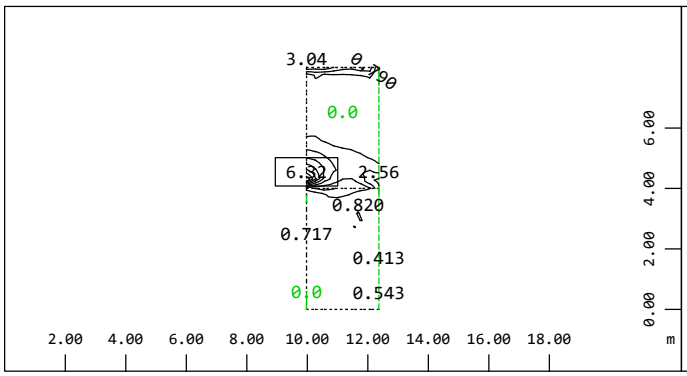

Sector of system Group 254
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 16.4 step 2.05 cm2/m

M 1 : 250



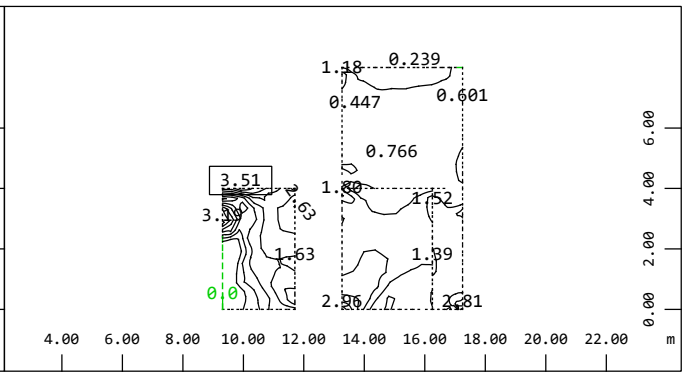

Sector of system Group 256
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 4.88 step 0.610 cm2/m

M 1 : 250



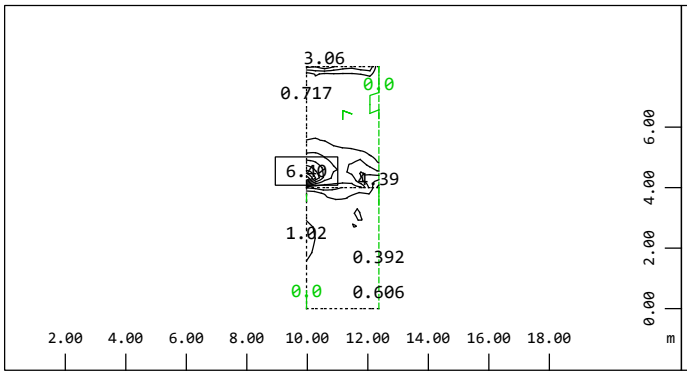

Sector of system Group 254
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 6.32 step 0.790 cm2/m

M 1 : 250



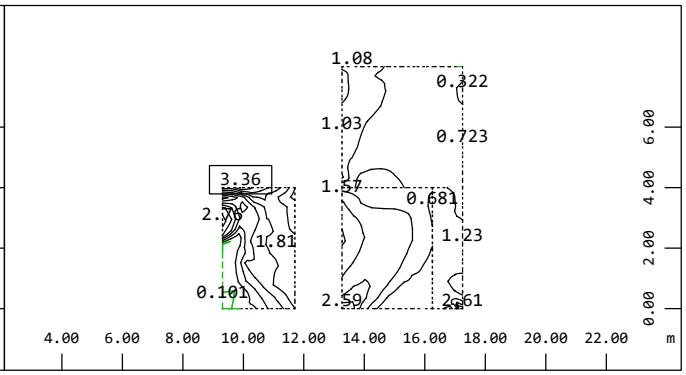

Sector of system Group 256
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 3.51 step 0.438 cm2/m

M 1 : 250




Sector of system Group 254
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 6.40 step 0.800 cm2/m

M 1 : 250

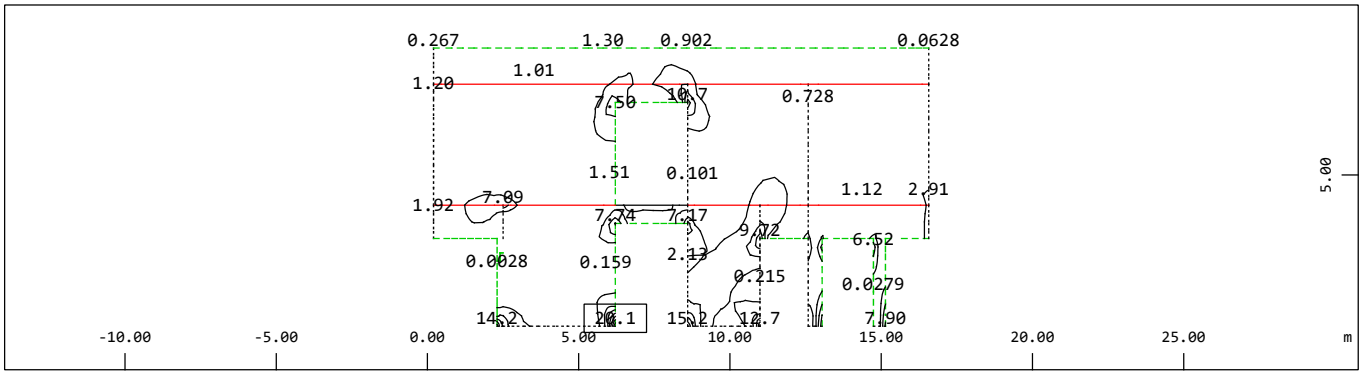



Sector of system Group 256
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 3.36 step 0.421 cm2/m

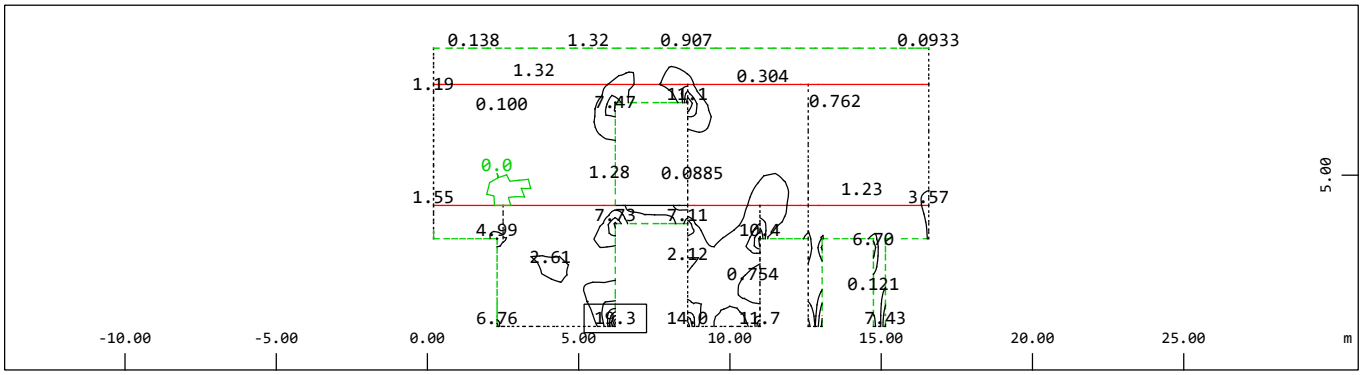
M 1 : 250

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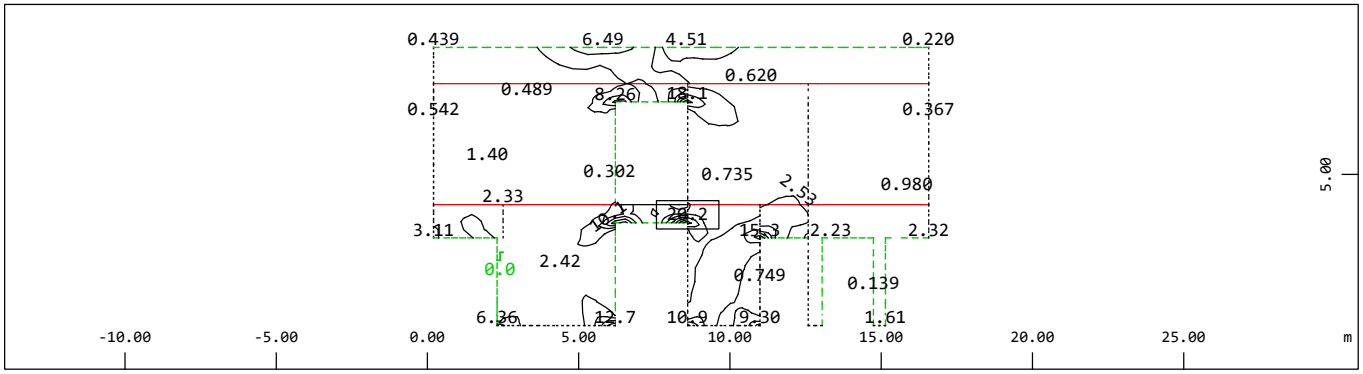
11826 DSO Bovec - centralna dilat. enota stavbe
Precne AB stene/nosilci - os 11: armatura vertikalna, horizontalna



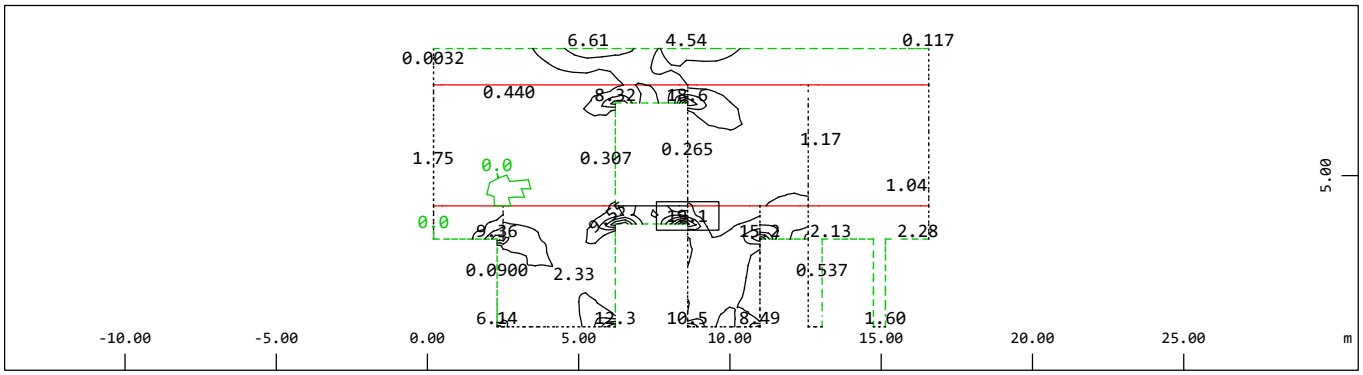

Z
X Y
Sector of system Group 258 M 1 : 250
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 20.1 step 2.51 cm2/m




Z
X Y
Sector of system Group 258 M 1 : 250
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 19.3 step 2.42 cm2/m



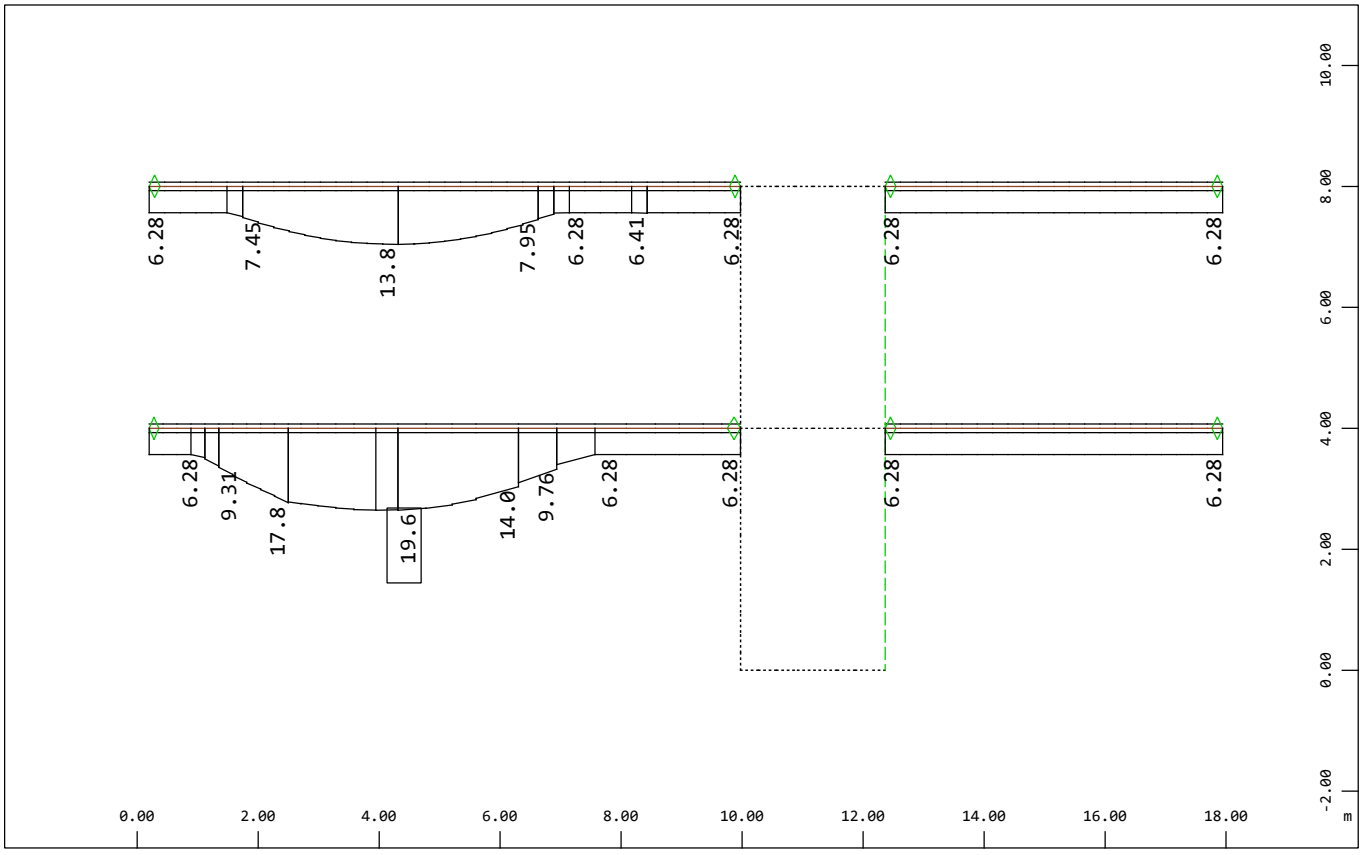

Z
X Y
Sector of system Group 258 M 1 : 250
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 20.2 step 2.53 cm2/m



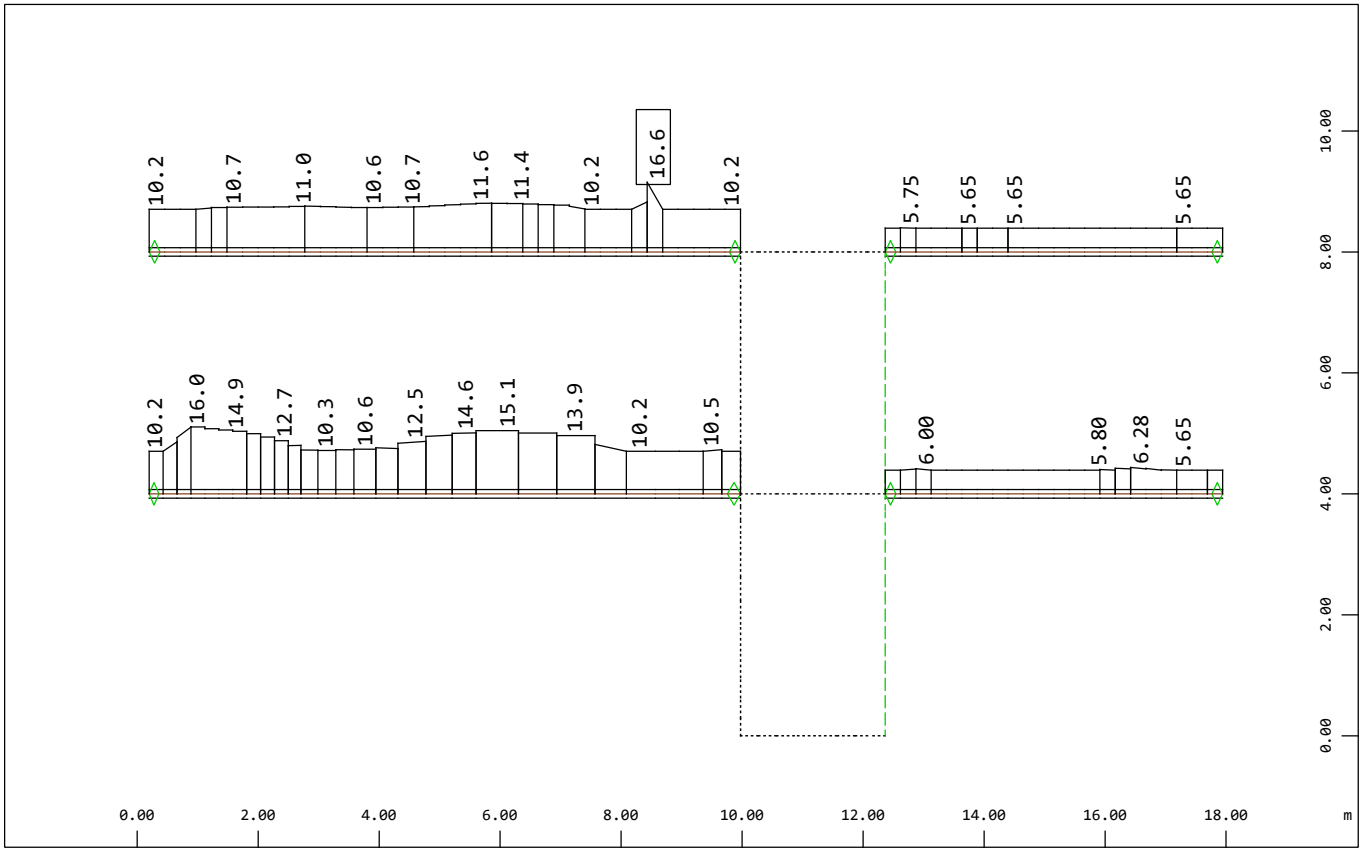

Z
X Y
Sector of system Group 258 M 1 : 250
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 19.1 step 2.39 cm2/m

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11826 DSO Bovec - centralna dilat. enota stavbe
AB nosilci v osi 7: armatura spodnja, zgornja



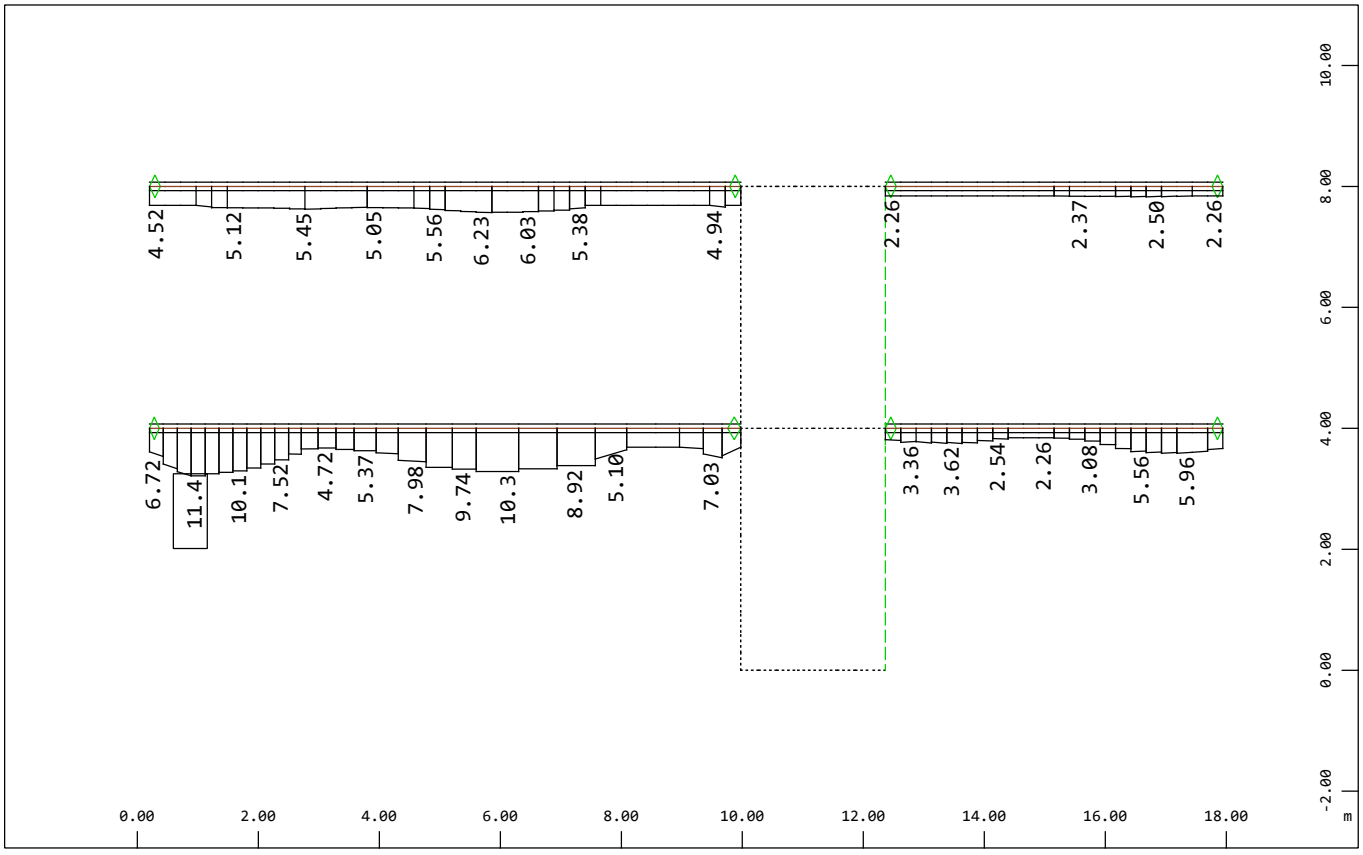

Sector of system Group 254 M 1 : 125
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M1, 1 cm 3D = 18.0 cm2 (Max=19.6)



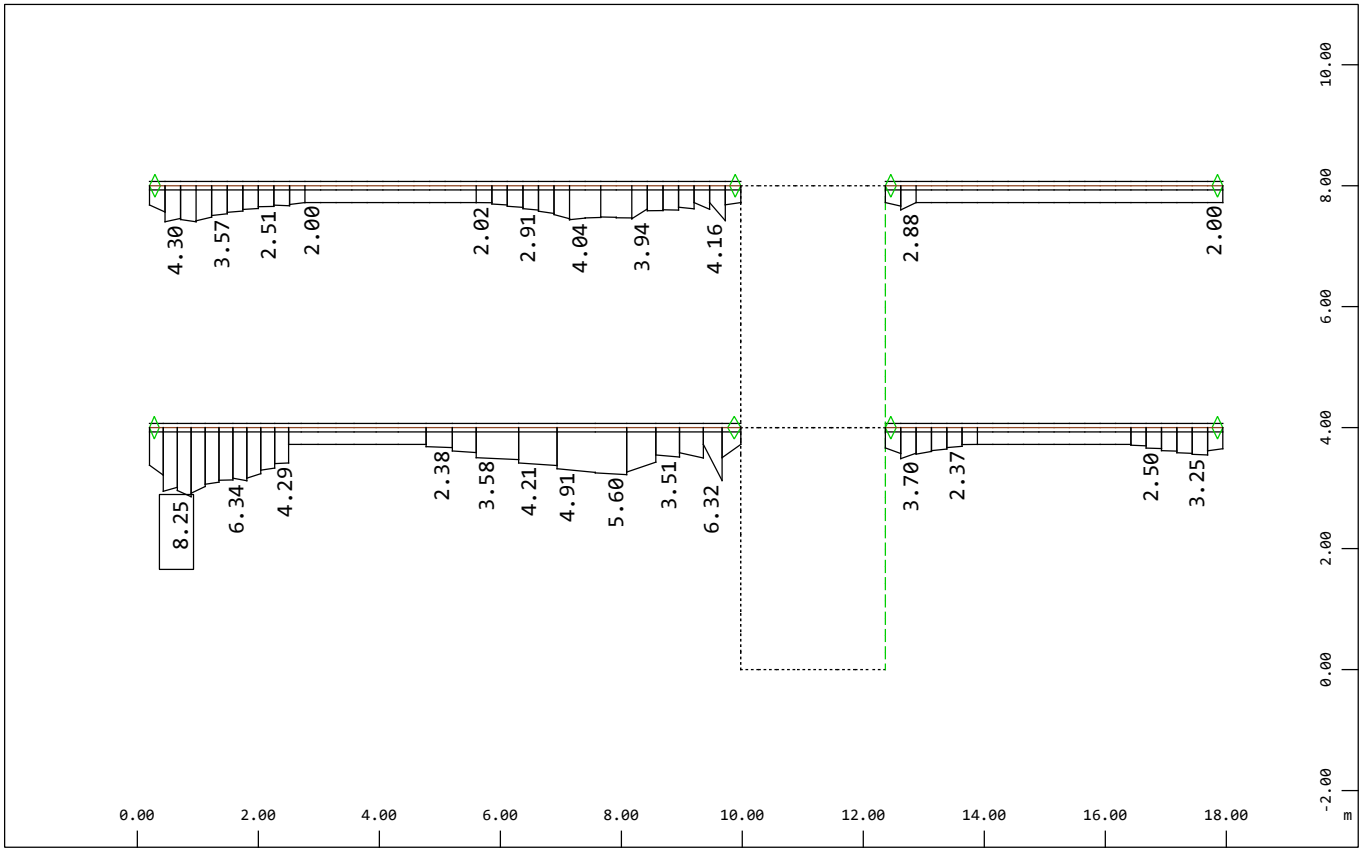

Sector of system Group 254 M 1 : 125
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M2, 1 cm 3D = 18.0 cm2 (Max=16.6)

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11826 DSO Bovec - centralna dilat. enota stavbe
AB nosilci v osi 7: armatura bocna, strizna-stremena



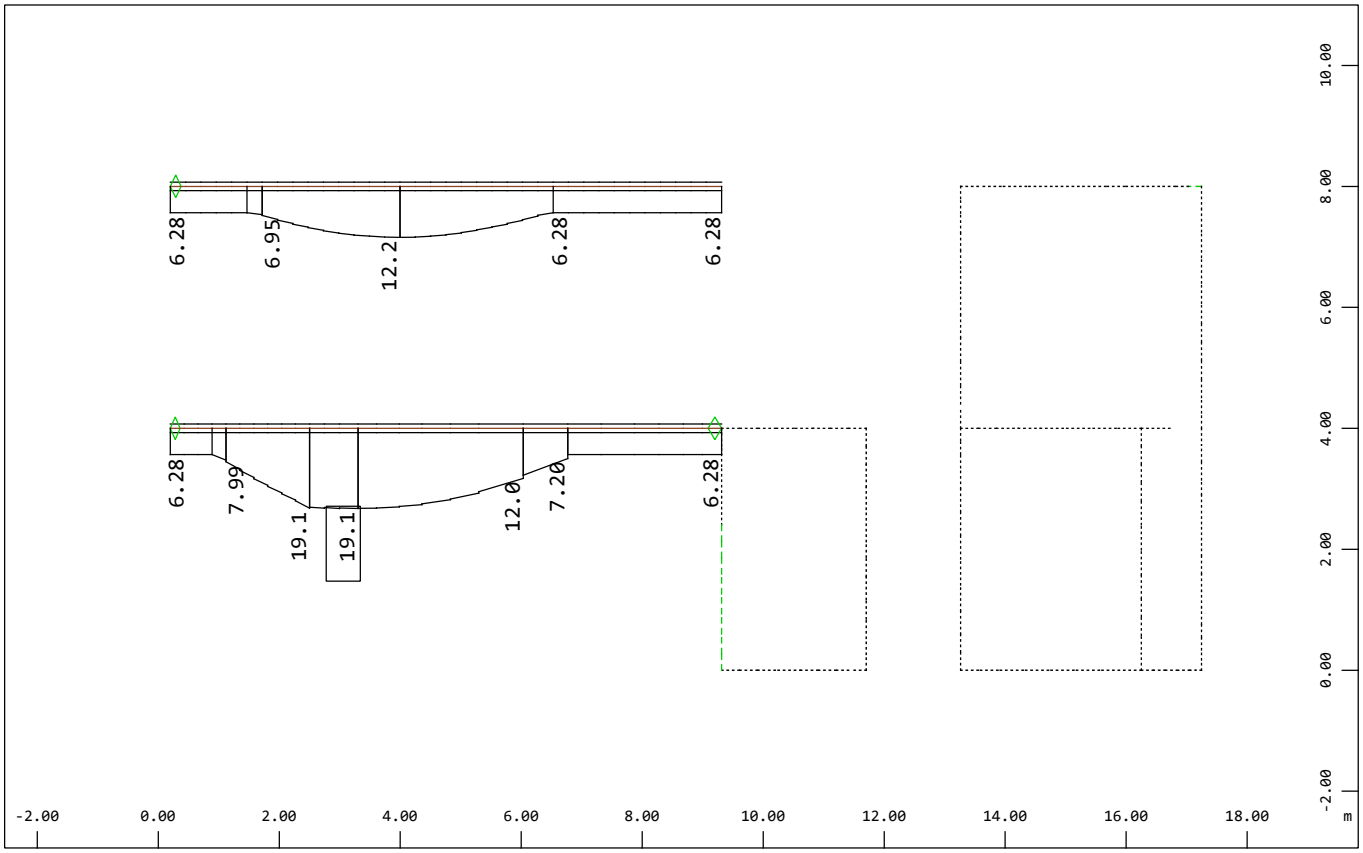

Z
X Y Sector of system Group 254 M 1 : 125
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M3, 1 cm 3D = 18.0 cm2 (Max=11.4)



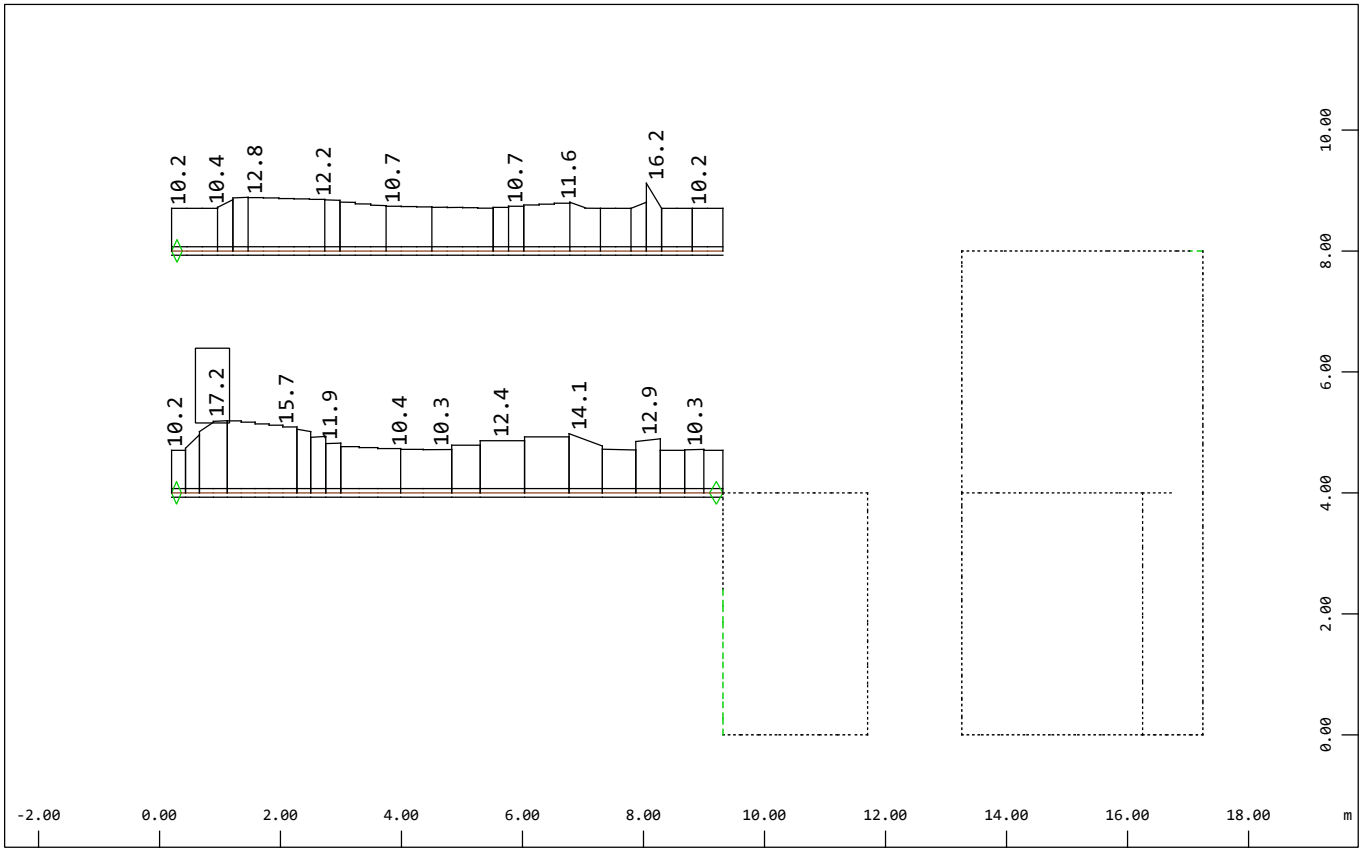

Z
X Y Sector of system Group 254 M 1 : 125
Minimum-Beam Elements , Stirrup Reinforcements Lay. 1, 1 cm 3D = 9.02 cm2/m (Max=8.25)

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11826 DSO Bovec - centralna dilat. enota stavbe
AB nosilci v osi 9: armatura spodnja, zgornja



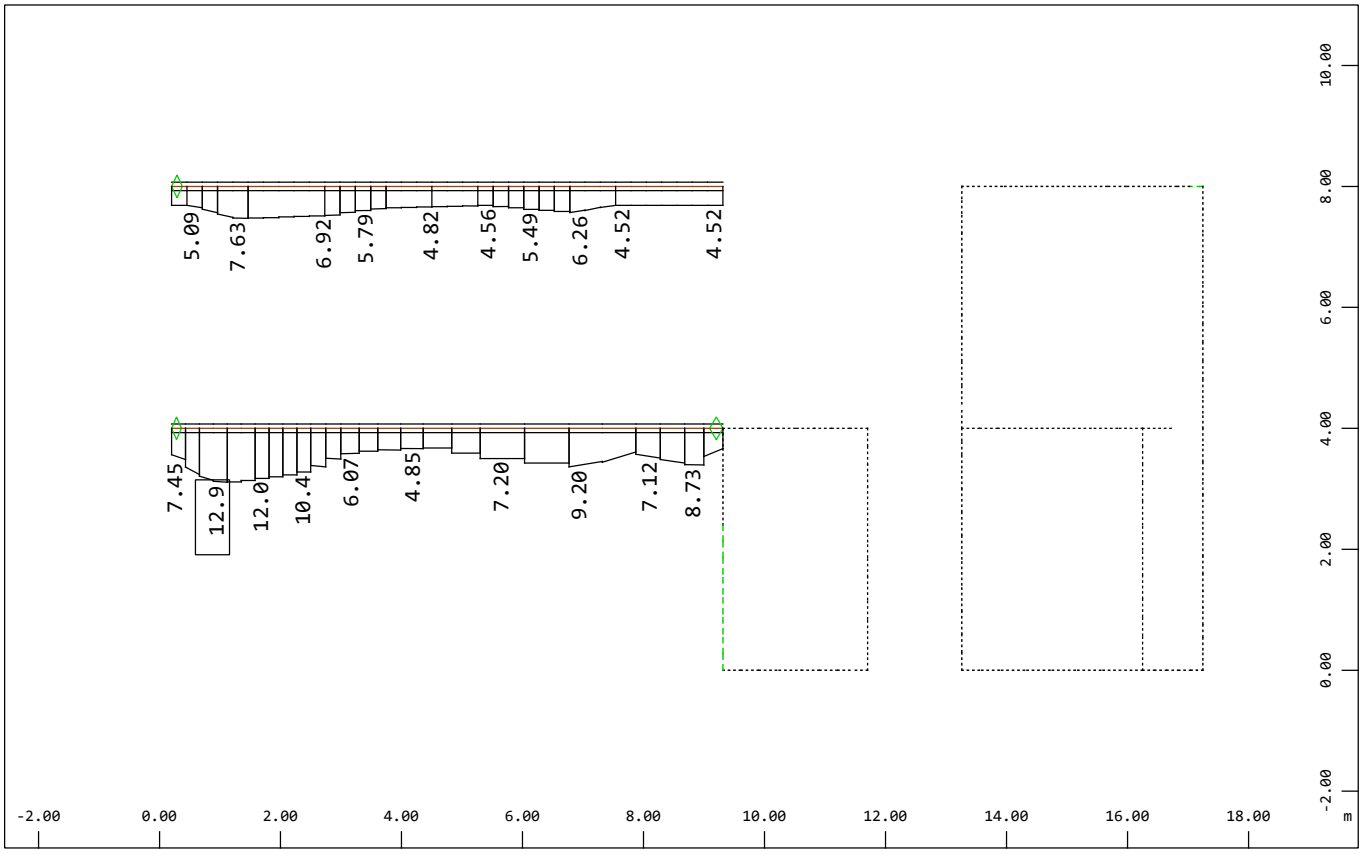

Sector of system Group 256 M 1 : 125
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M1, 1 cm 3D = 18.0 cm2 (Max=19.1)



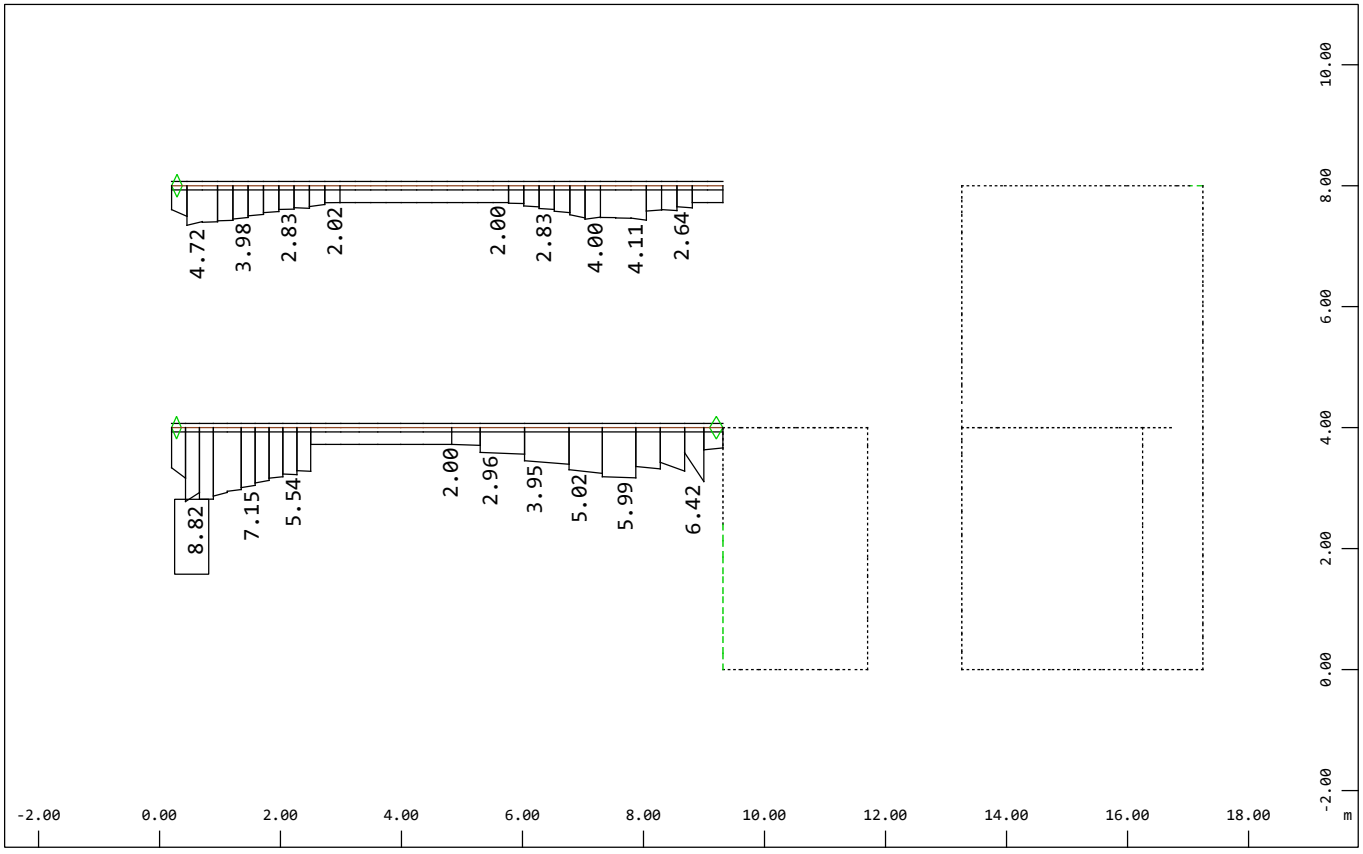

Sector of system Group 256 M 1 : 125
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M2, 1 cm 3D = 18.0 cm2 (Max=17.2)

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11826 DSO Bovec - centralna dilat. enota stavbe
AB nosilci v osi 9: armatura bocna, strizna-stremena



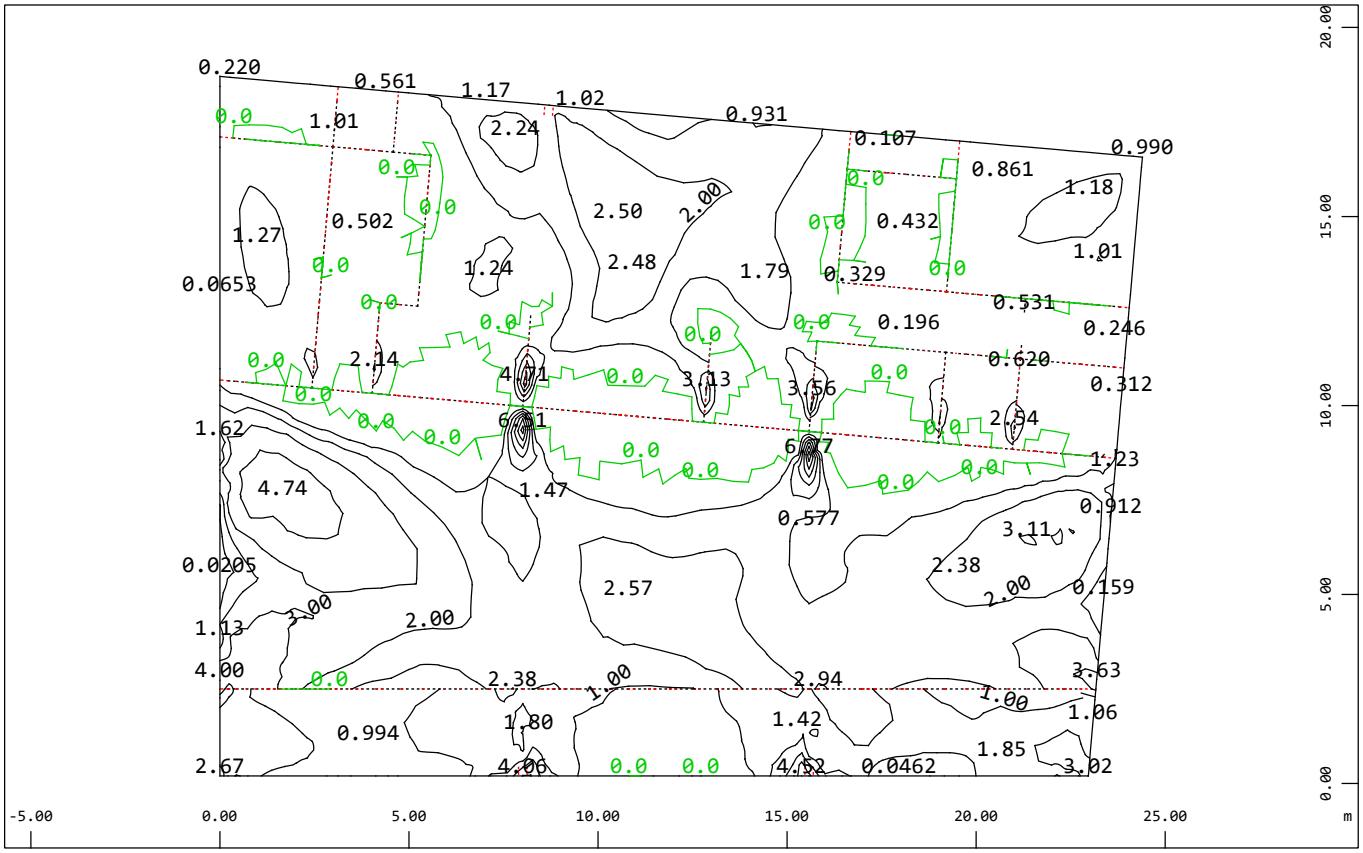

Z
X Y
Sector of system Group 256 M 1 : 125
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M3, 1 cm 3D = 18.0 cm2 (Max=12.9)



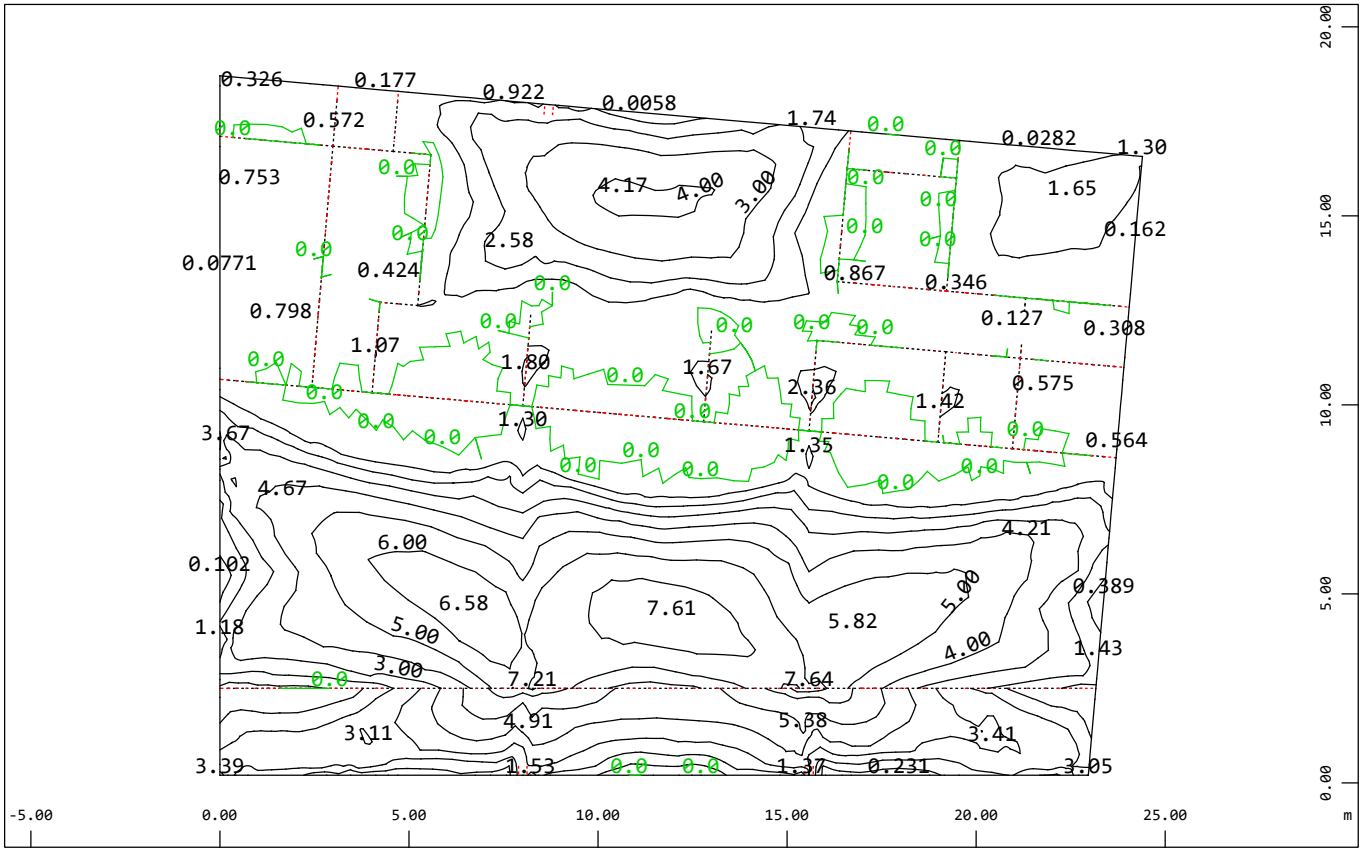

Z
X Y
Sector of system Group 256 M 1 : 125
Minimum-Beam Elements , Stirrup Reinforcements Lay. 1, 1 cm 3D = 9.02 cm2/m (Max=8.82)

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11826 DSO Bovec - centralna dilat. enota stavbe
Etazna plosca: armatura spodnja



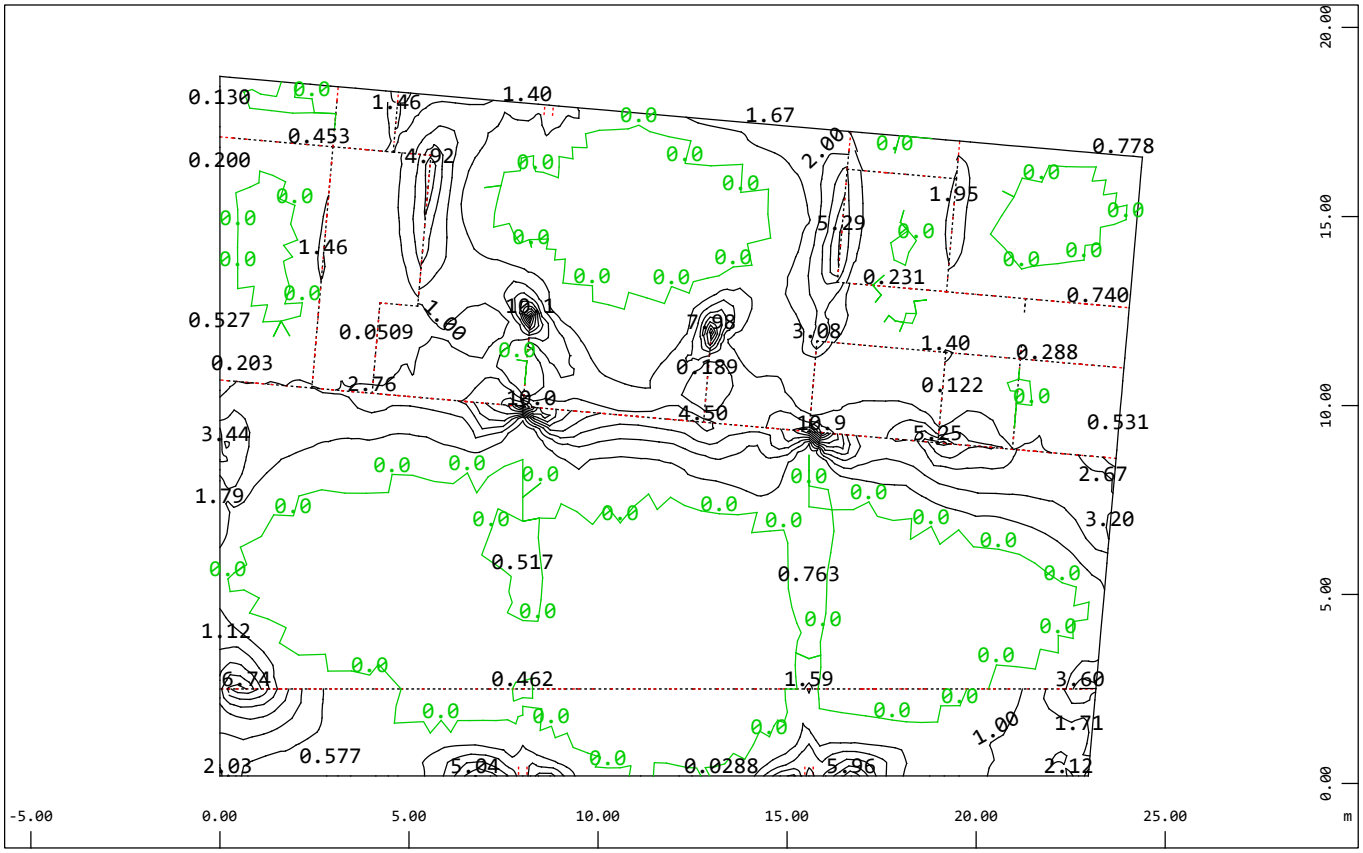

Sector of system Group 110 M 1 : 200
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 6.77 step 1.00 cm2/m



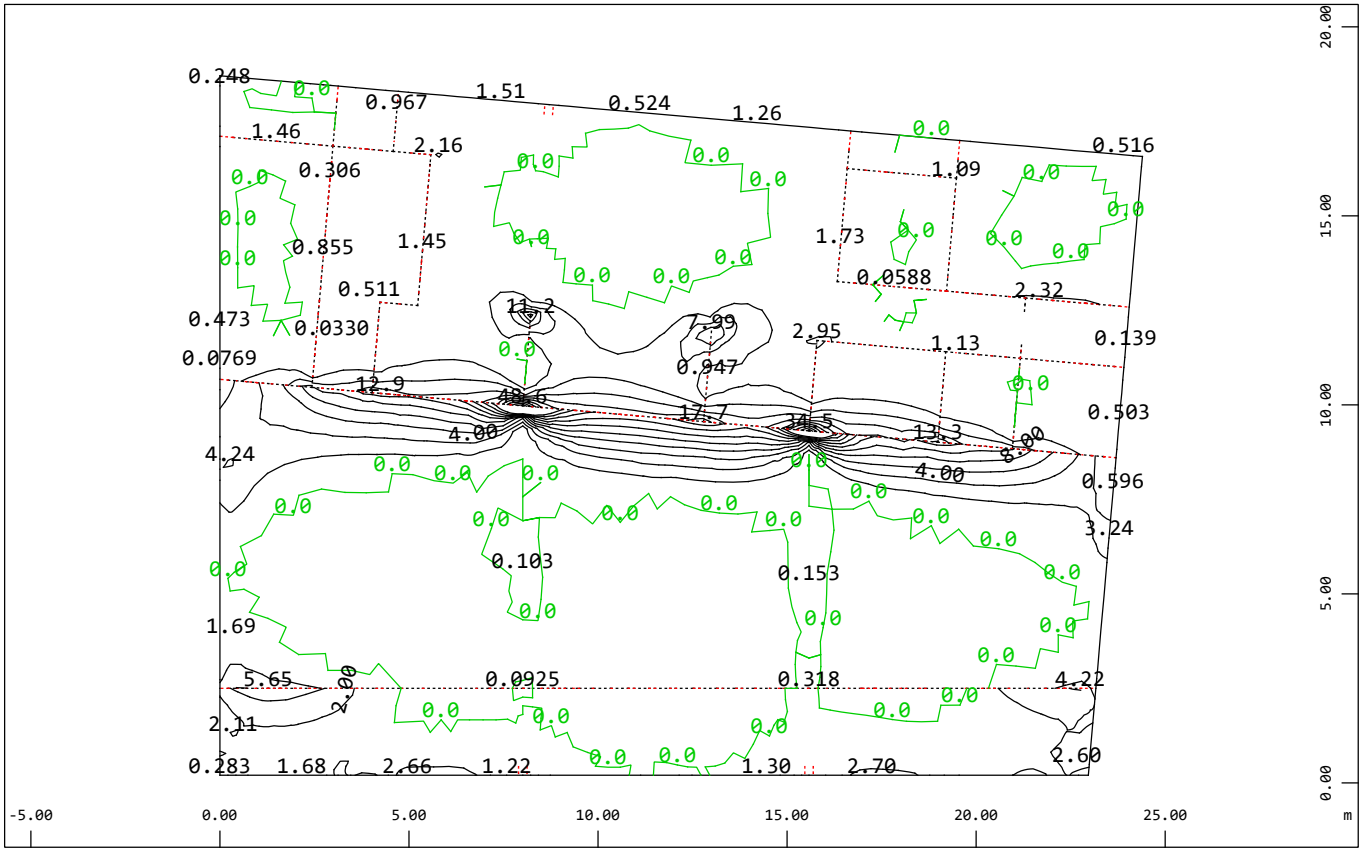

Sector of system Group 110 M 1 : 200
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 7.64 step 1.00 cm2/m

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11826 DSO Bovec - centralna dilat. enota stavbe
Etazna plosca: armatura zgoraj



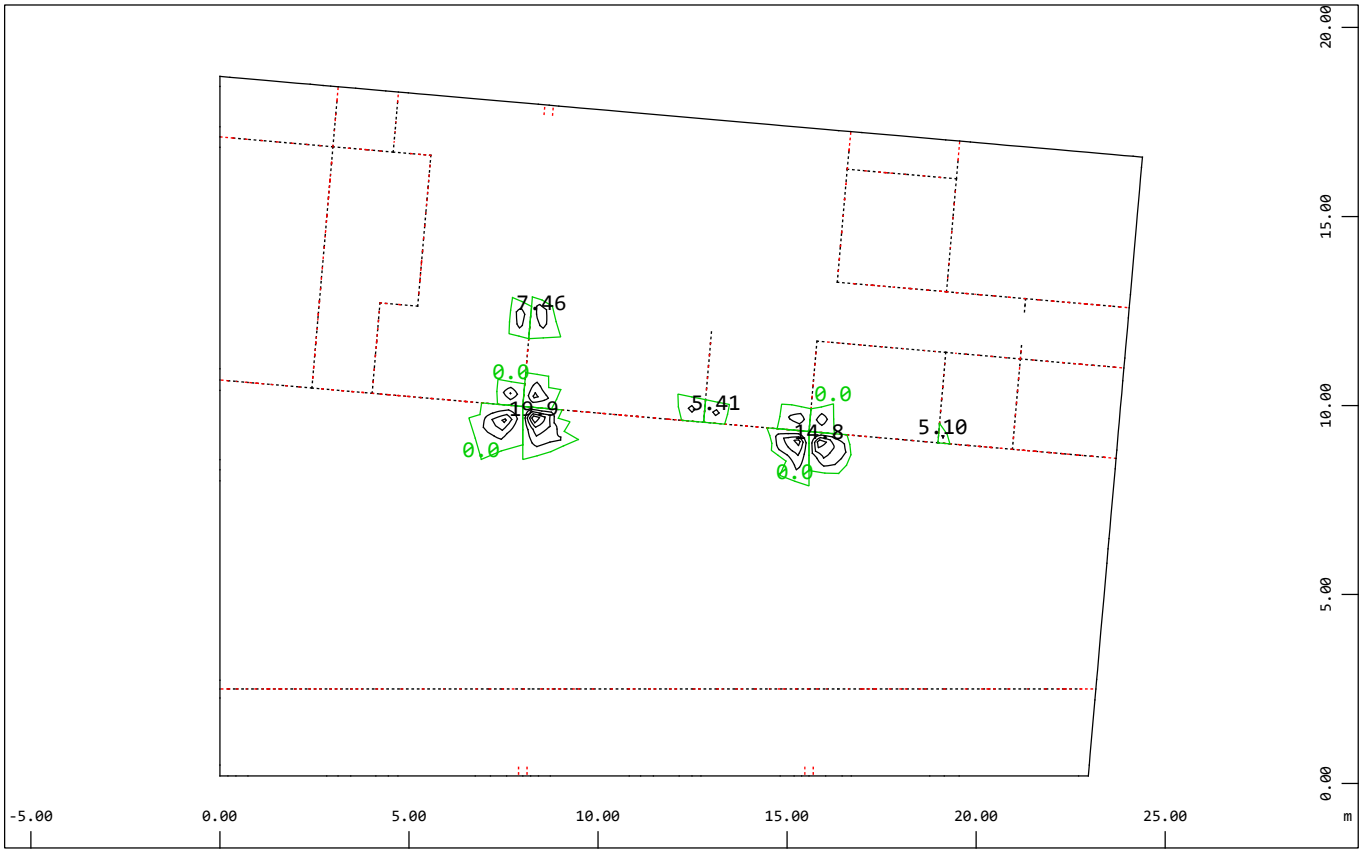

Sector of system Group 110 M 1 : 200
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 10.9 step 1.00 cm2/m



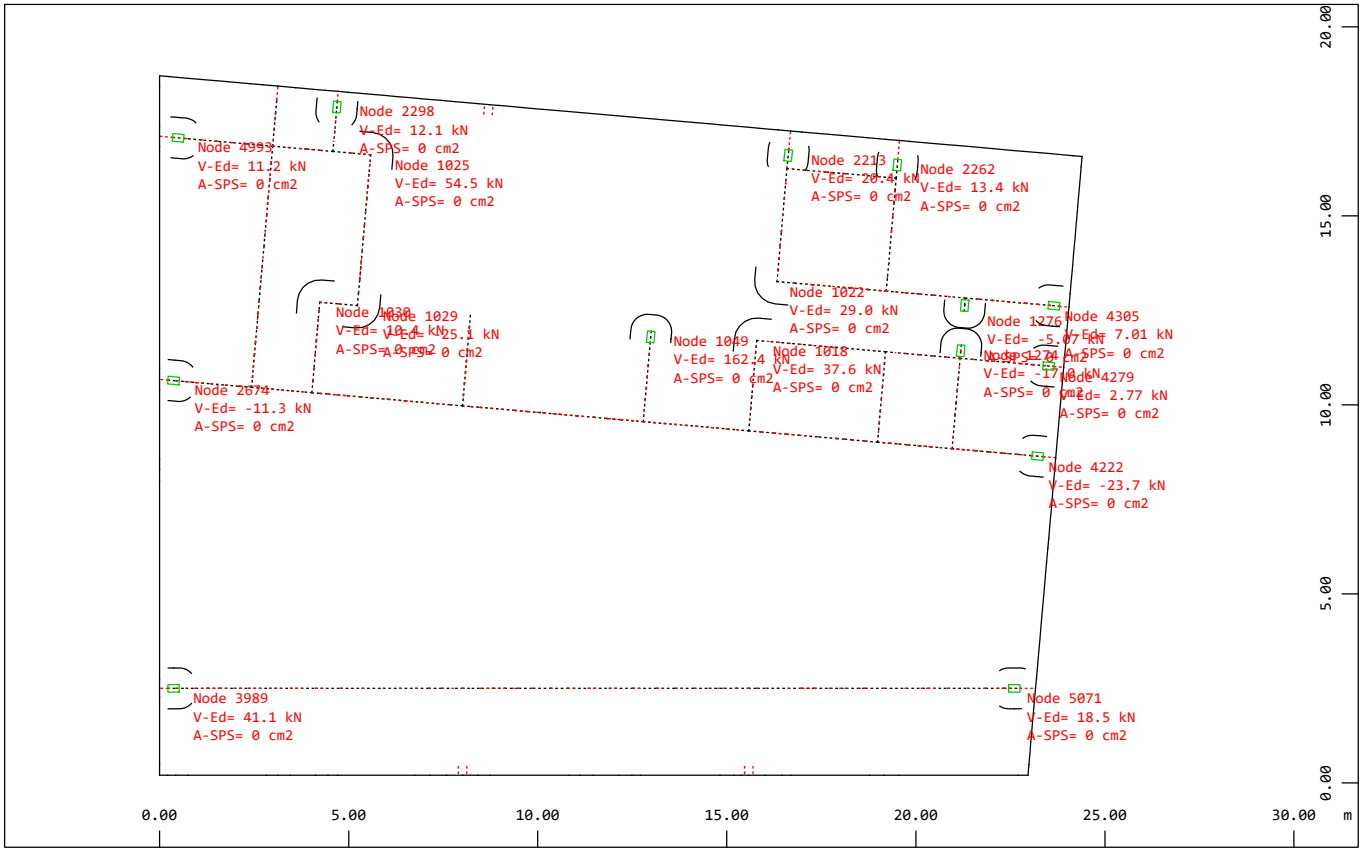

Sector of system Group 110 M 1 : 200
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 20.0 step 2.00 cm2/m

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11826 DSO Bovec - centralna dilat. enota stavbe
Etazna plosca: armatura strizna in prebojna



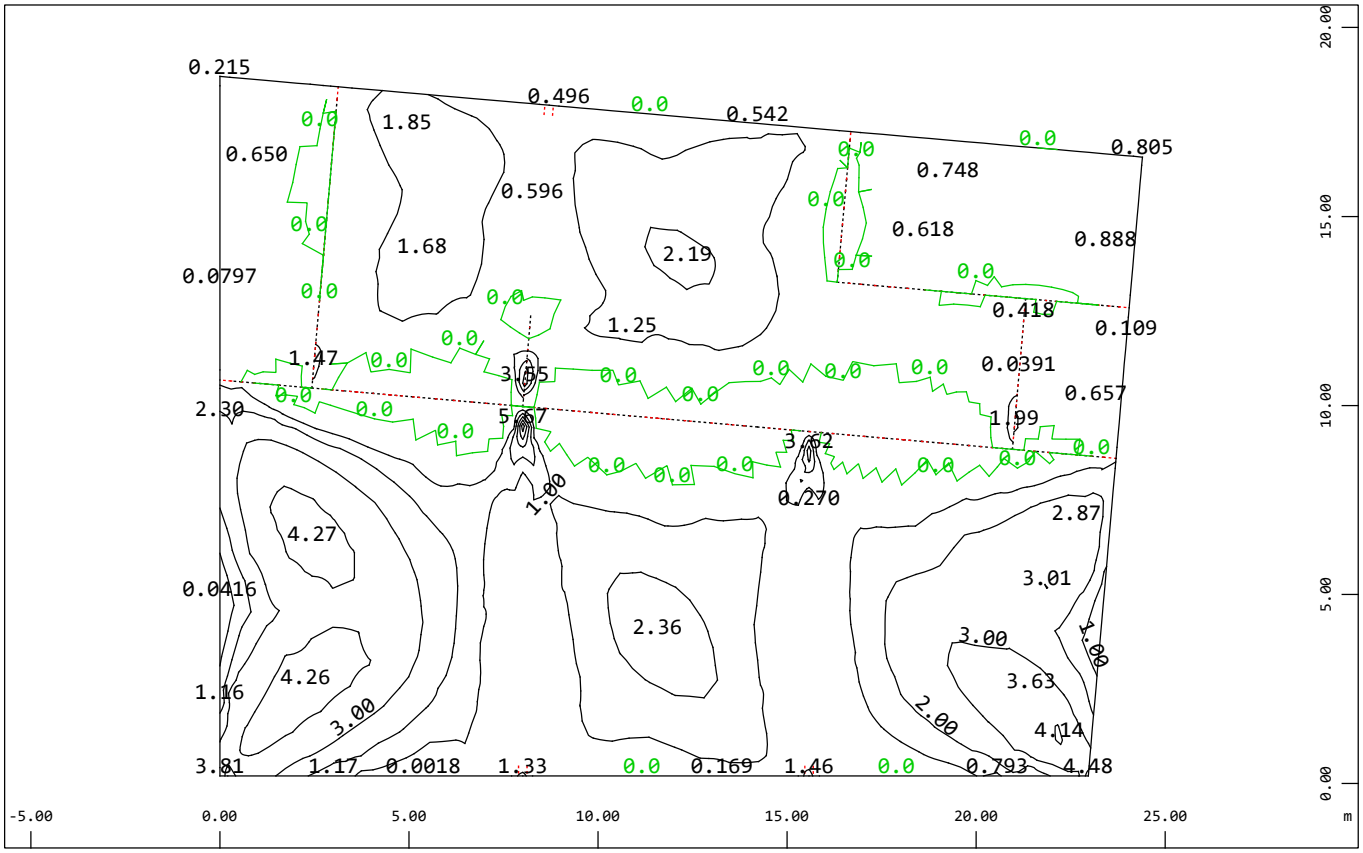

Y
Z—X
Sector of system Group 110
Quadrilateral Elements , Shear reinforcement in Node , Design Case 1 , from 0 to 19.9
step 4.00 cm2/m2
M 1 : 200



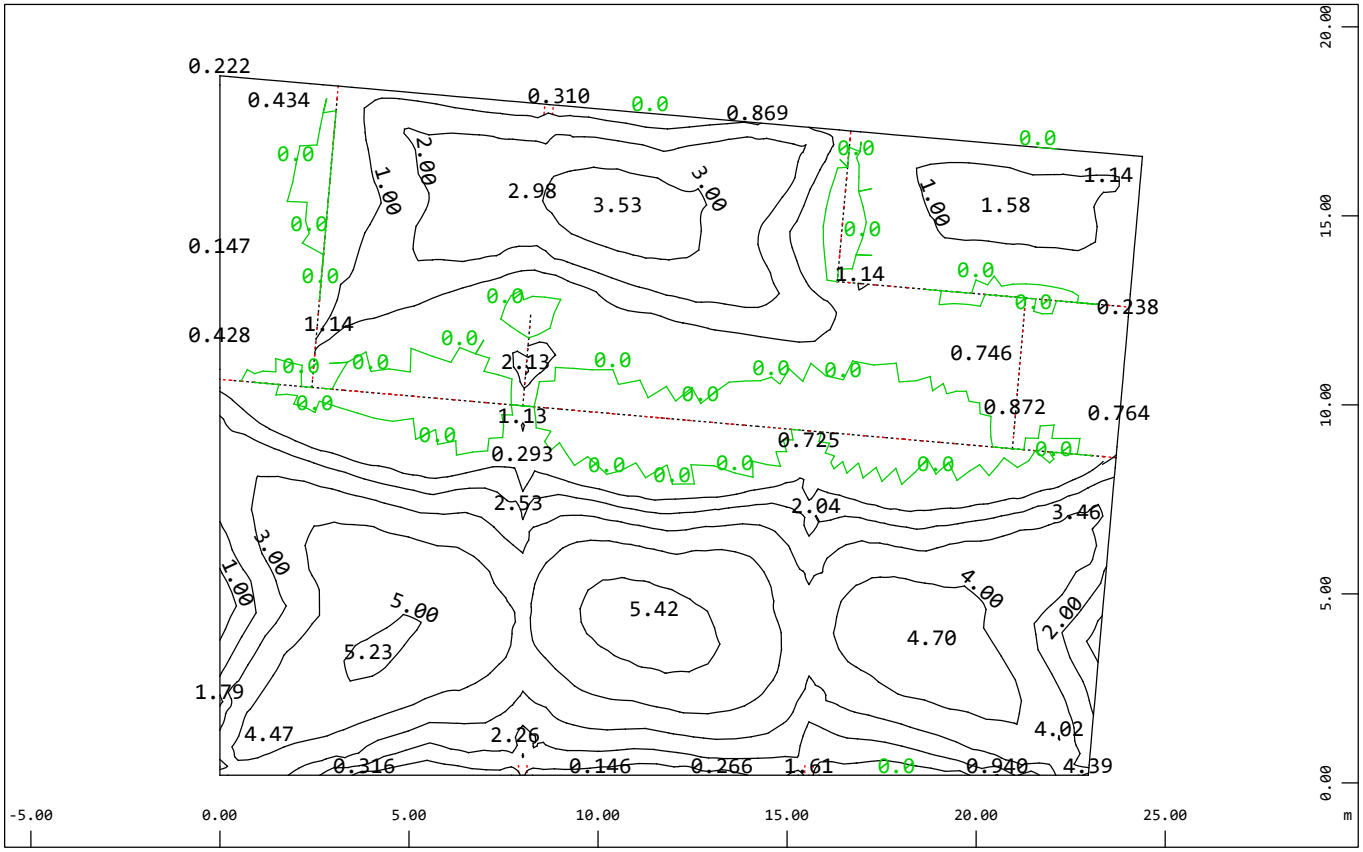

Y
Z—X
Sector of system Group 110
Punching in cm2/m2, Design Case 1 (Max=0)
M 1 : 200

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11826 DSO Bovec - centralna dilat. enota stavbe
Stresna plosca: armatura spodnja



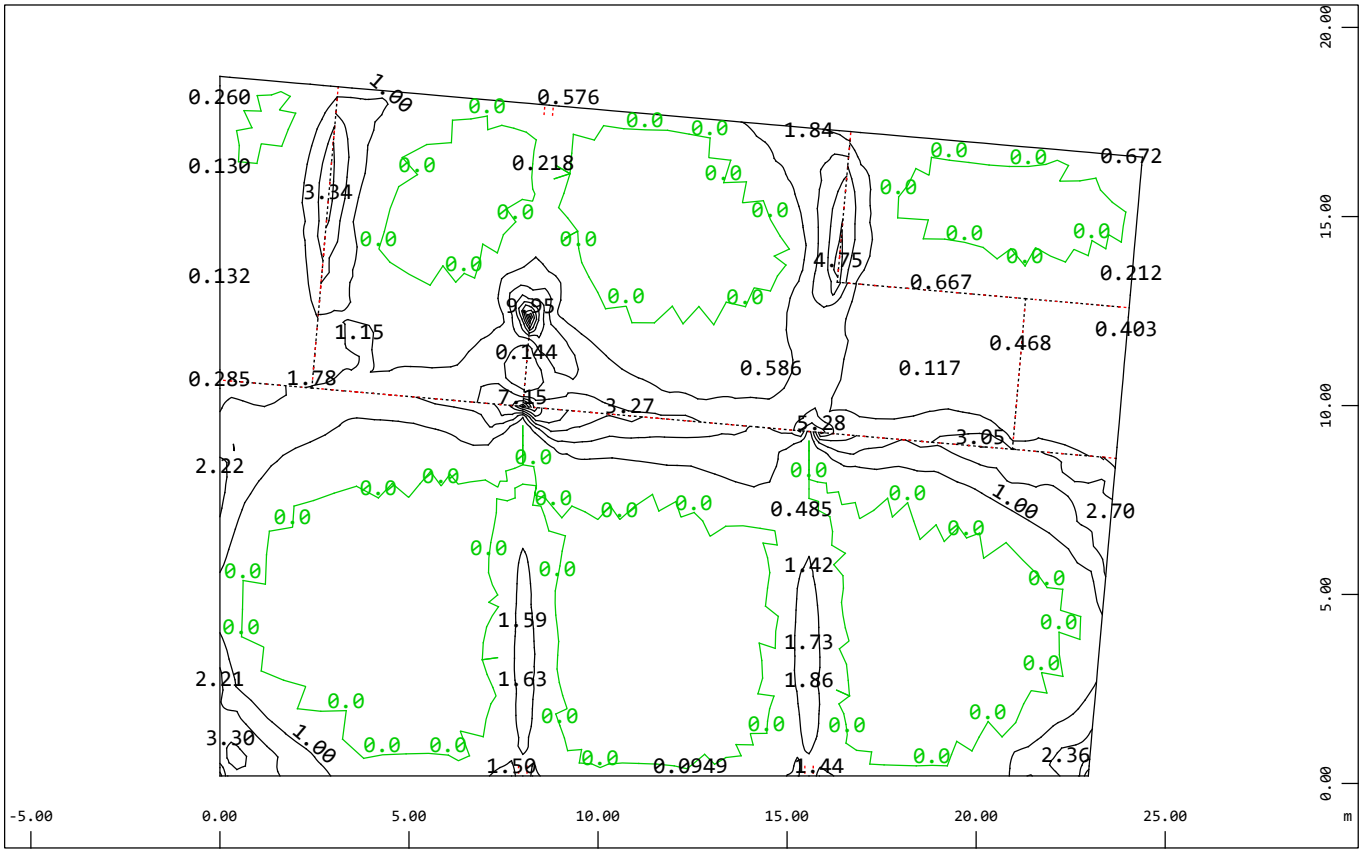

Sector of system Group 120 M 1 : 200
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 5.67 step 1.00 cm2/m



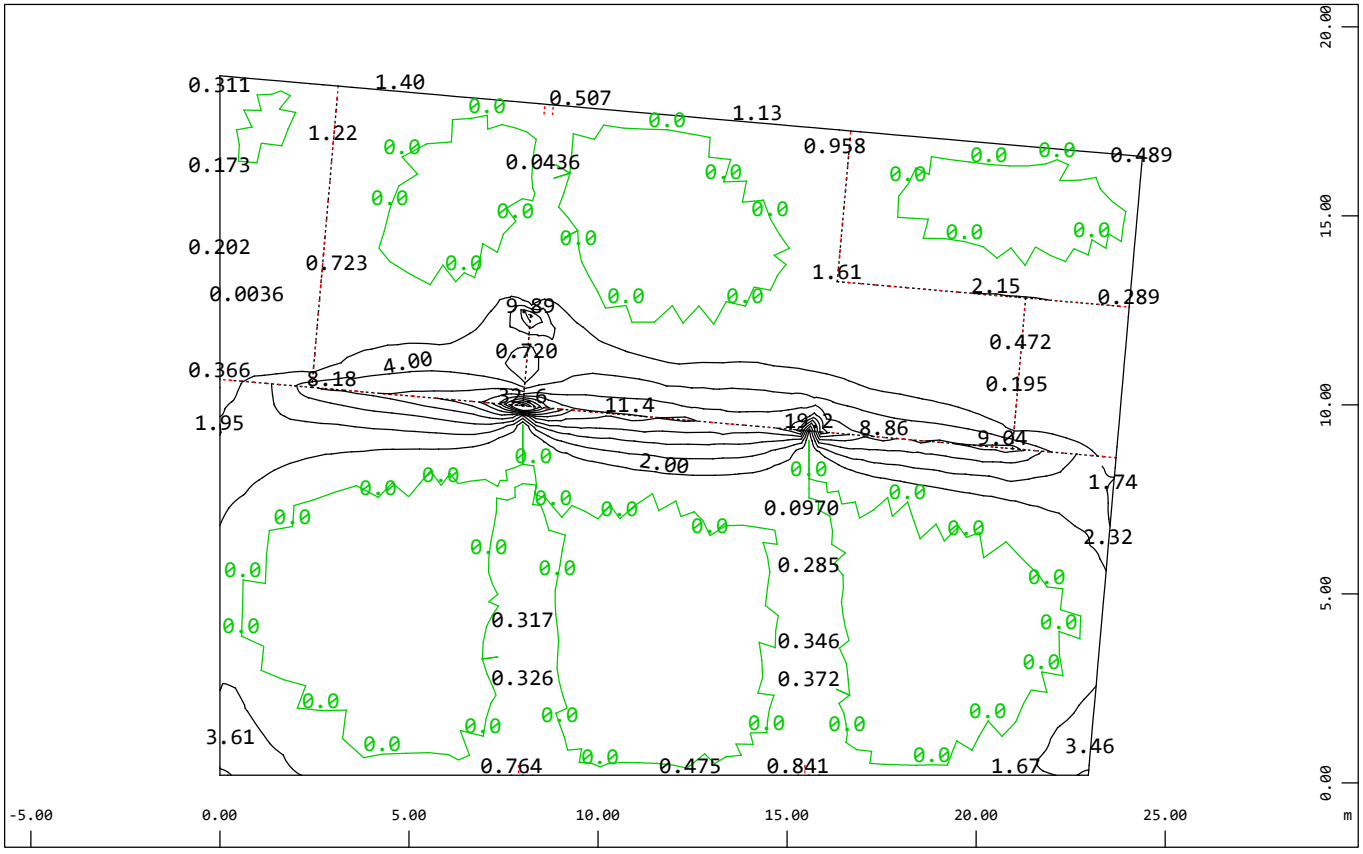

Sector of system Group 120 M 1 : 200
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 5.42 step 1.00 cm2/m

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11826 DSO Bovec - centralna dilat. enota stavbe
Stresna plosca: armatura zgoraj



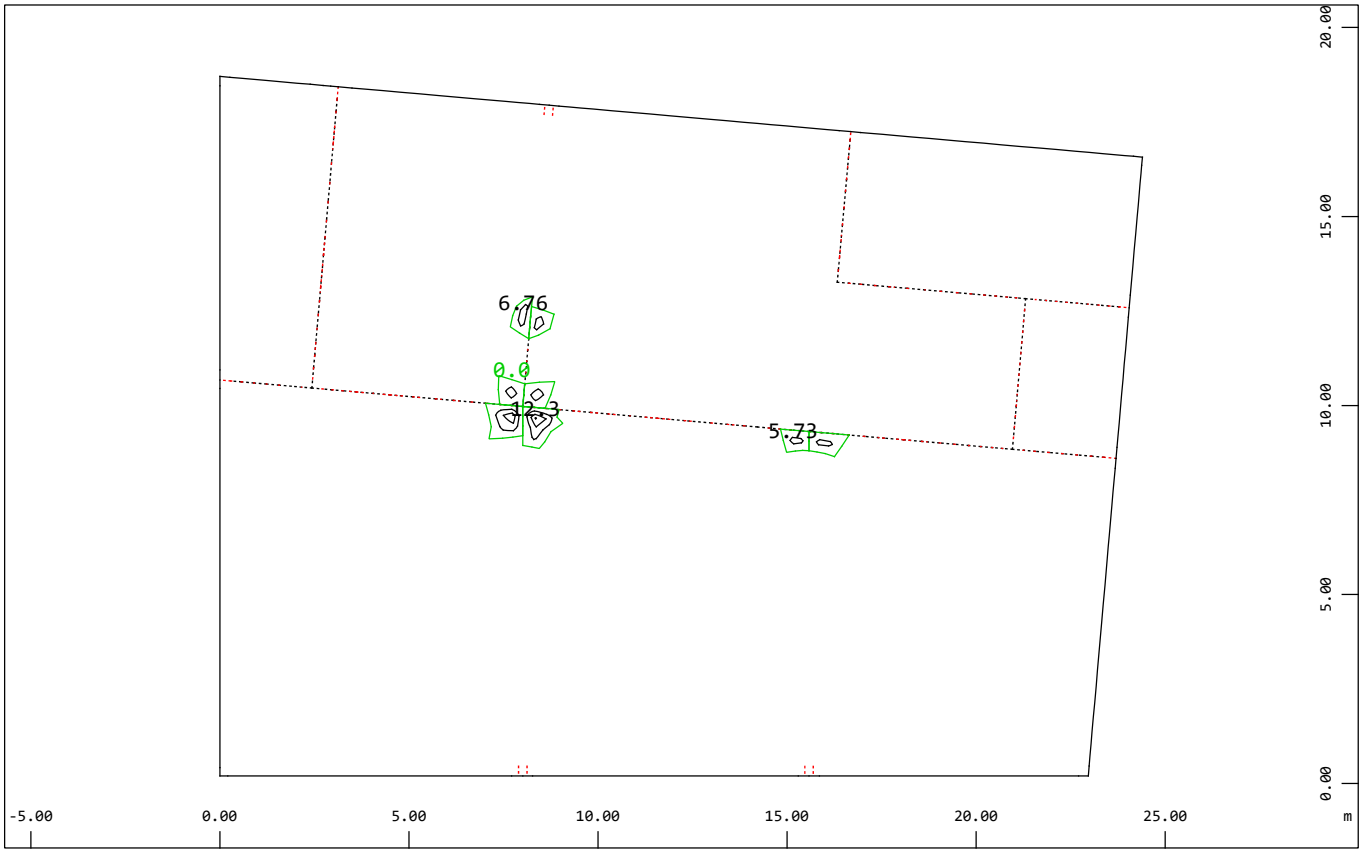

Sector of system Group 120 M 1 : 200
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 9.95 step 1.00 cm2/m



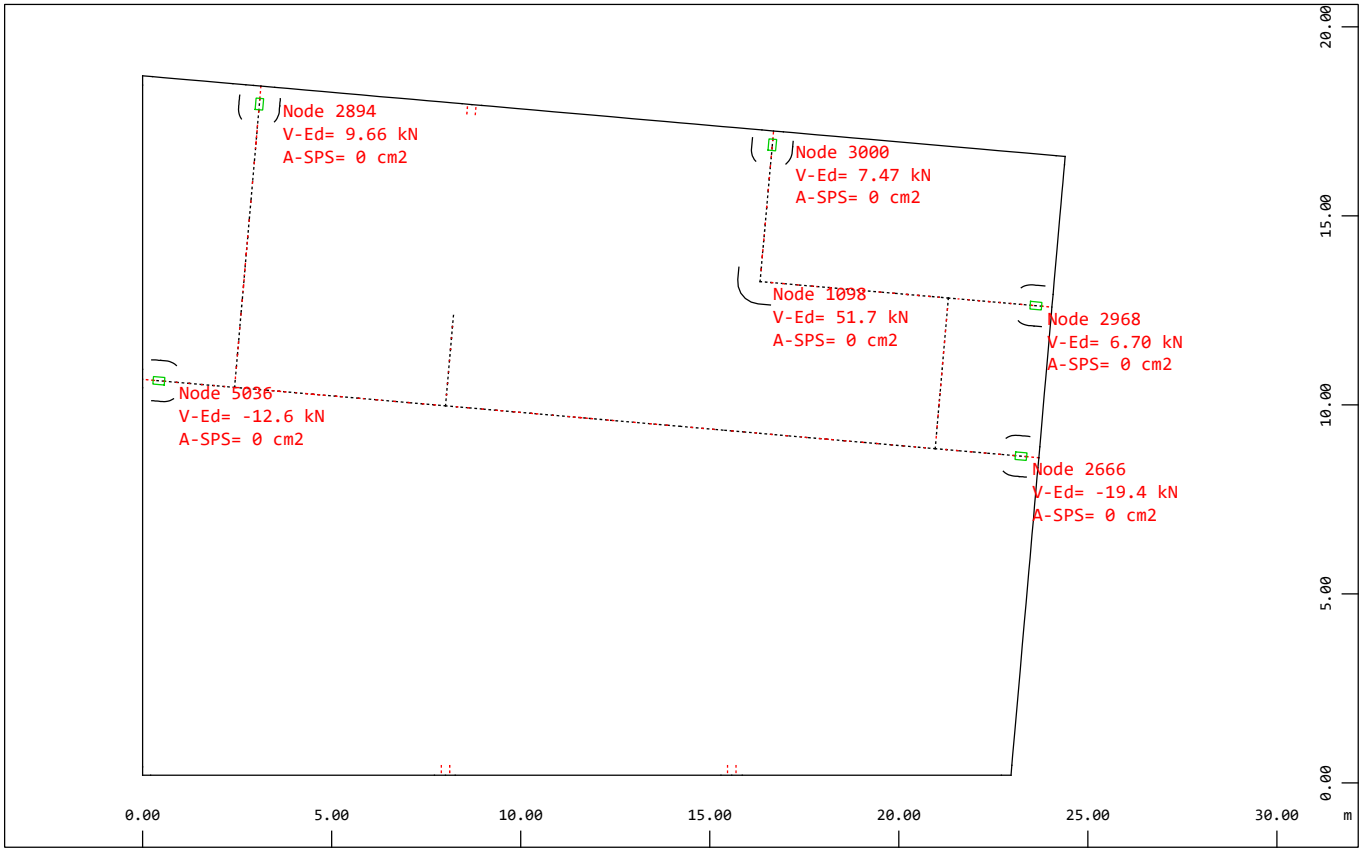

Sector of system Group 120 M 1 : 200
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 20.0 step 2.00 cm2/m

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11826 DSO Bovec - centralna dilat. enota stavbe
Stresna plosca: armatura strizna in prebojna



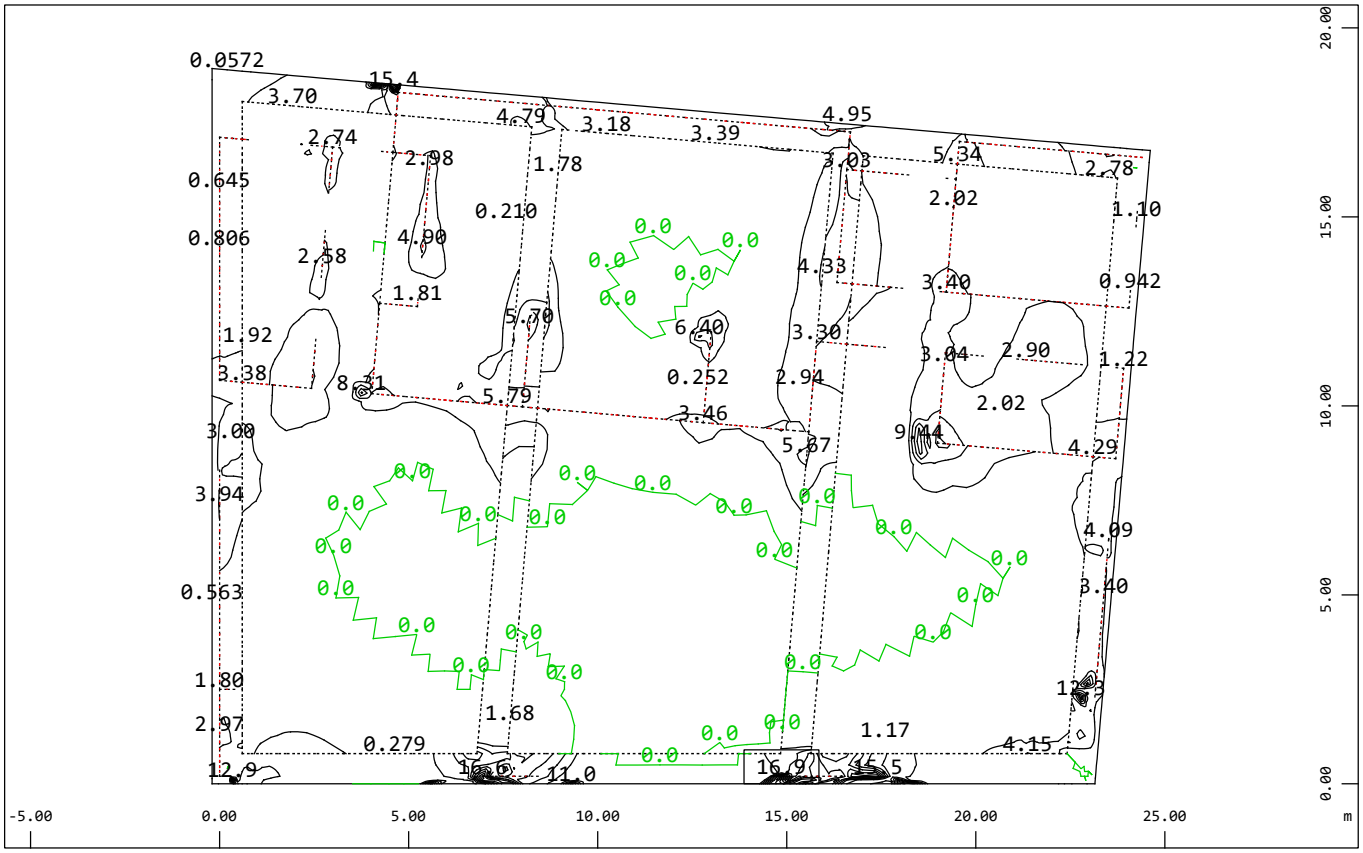

Y
Z—X
Sector of system Group 120
Quadrilateral Elements , Shear reinforcement in Node , Design Case 1 , from 0 to 12.3
step 4.00 cm2/m2
M 1 : 200



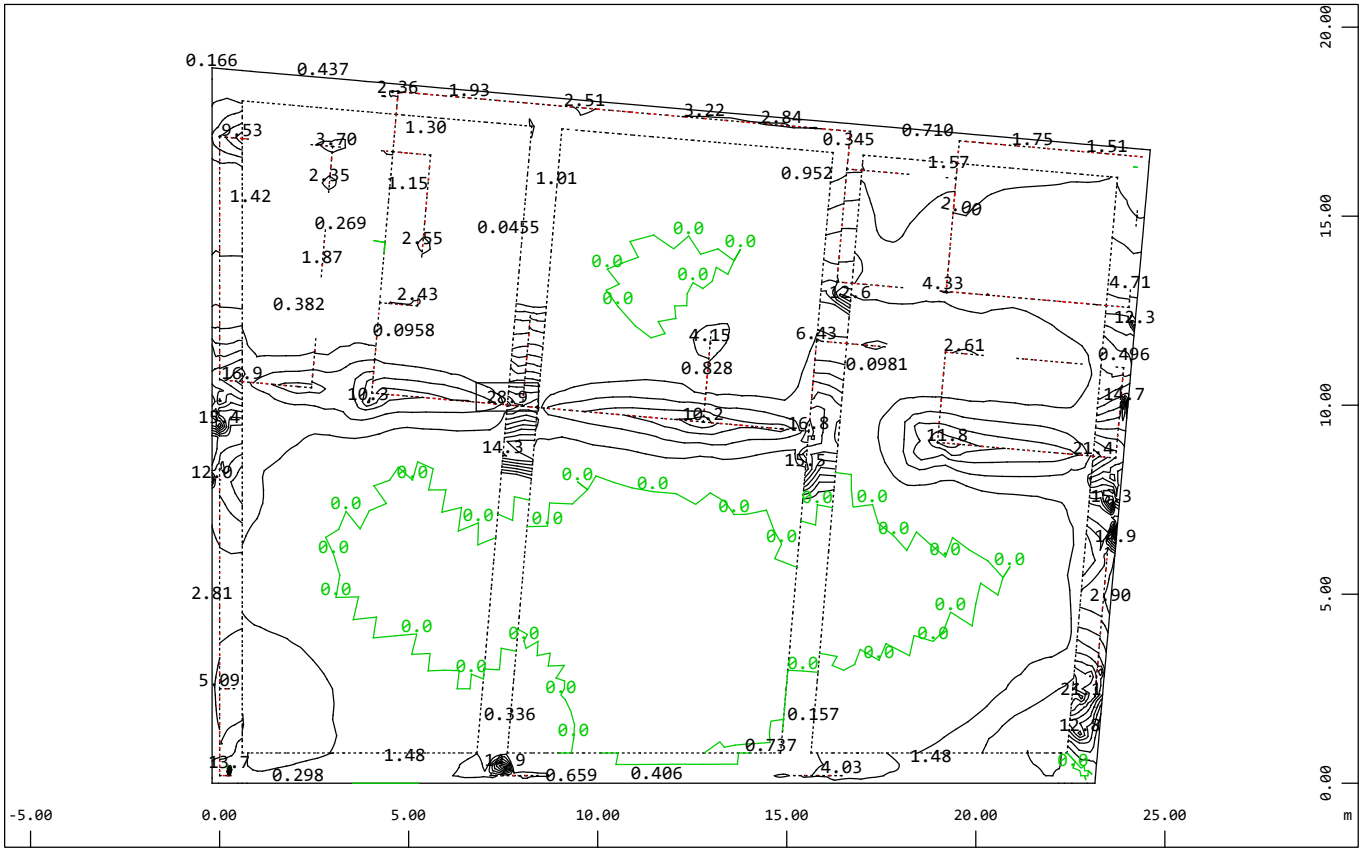

Y
Z—X
Sector of system Group 120
Punching in cm2/m2, Design Case 1 (Max=0)
M 1 : 200

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11826 DSO Bovec - centralna dilat. enota stavbe
Temelji in tem. plosca: armatura spodnja



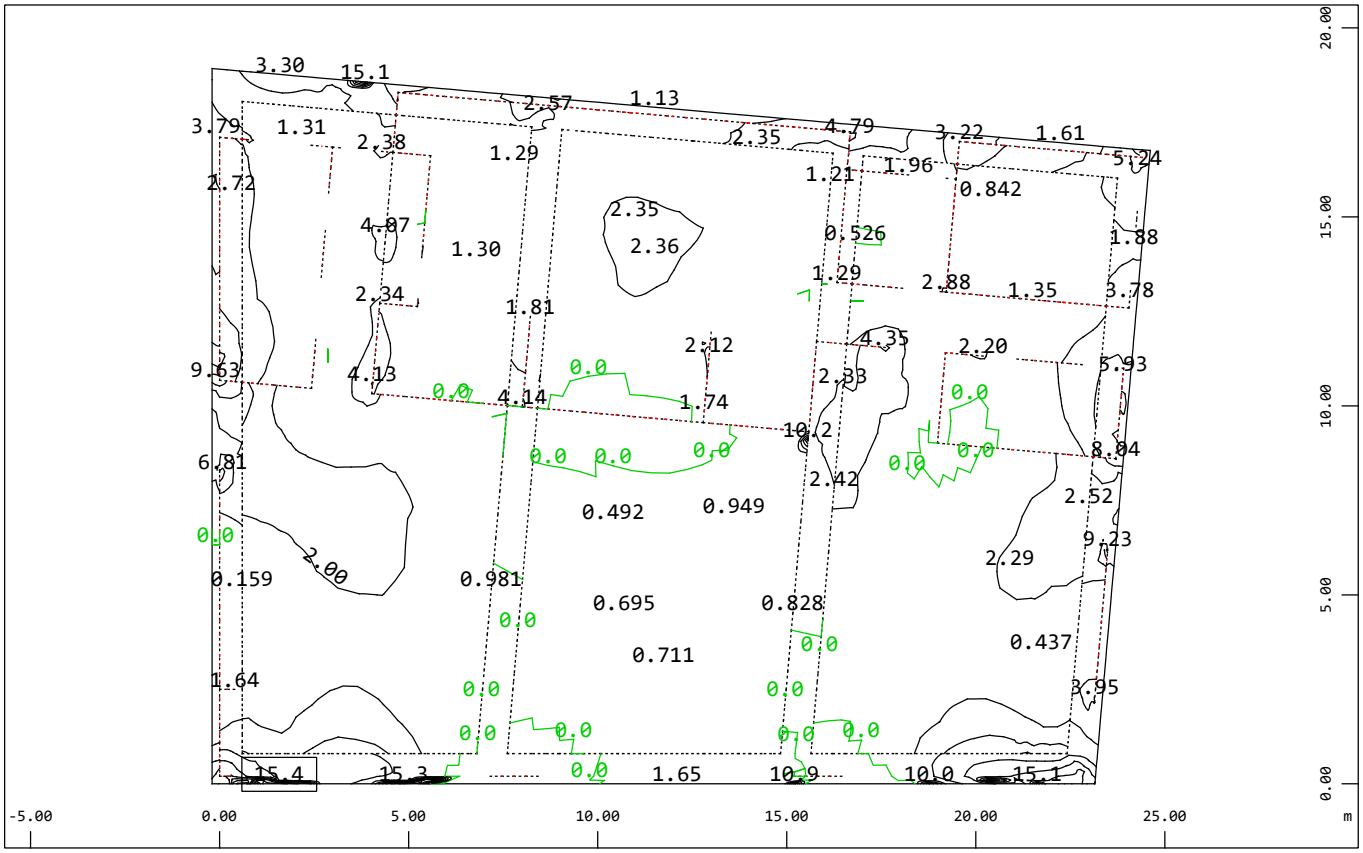

Y
Z—X
Sector of system Group 100
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node
1 , from 0 to 16.9 step 2.00 cm2/m
, Design Case
M 1 : 200



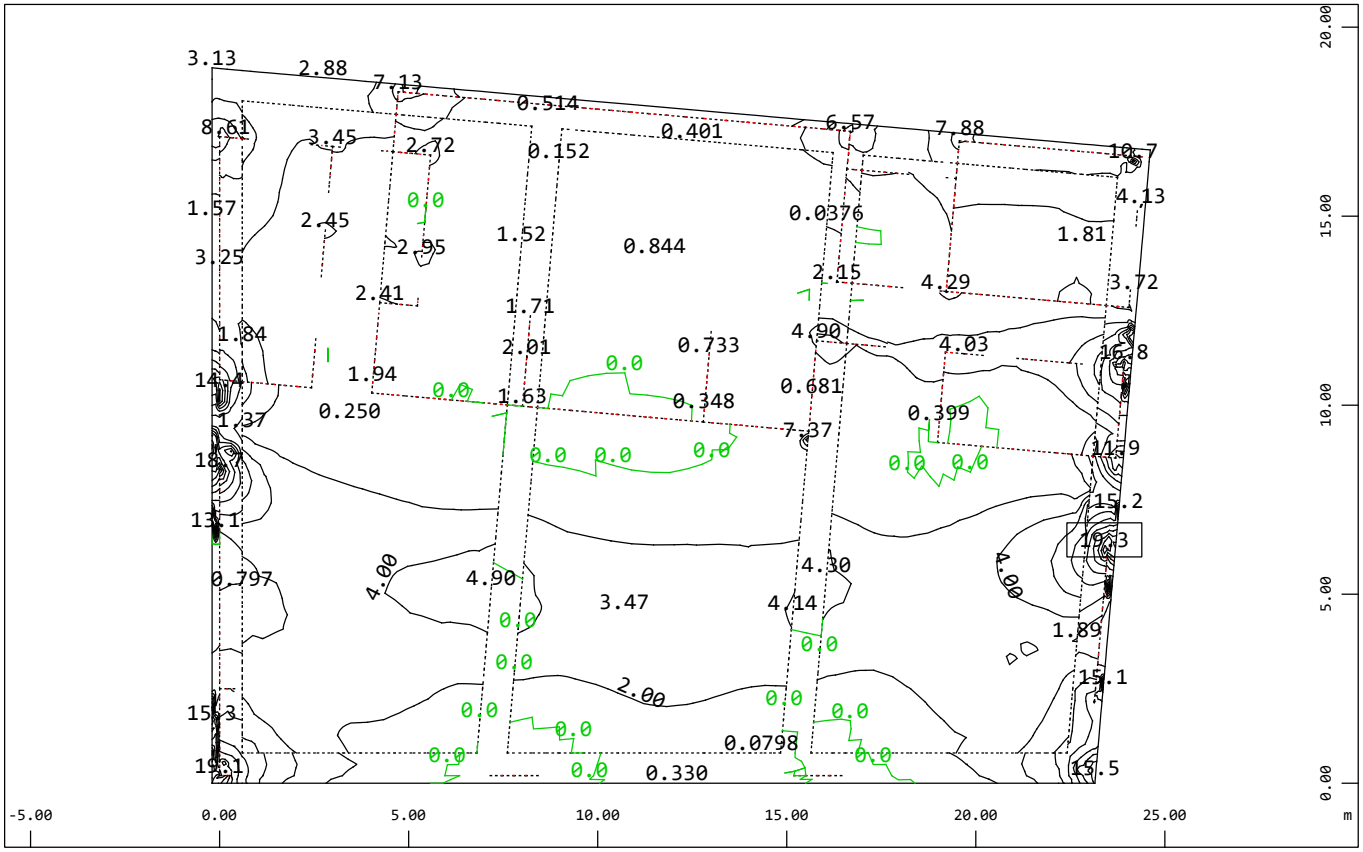

Y
Z—X
Sector of system Group 100
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node
, from 0 to 28.9 step 2.00 cm2/m
, Design Case 1
M 1 : 200

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11826 DSO Bovec - centralna dilat. enota stavbe
Temelji in tem. plosca: armatura zgornja



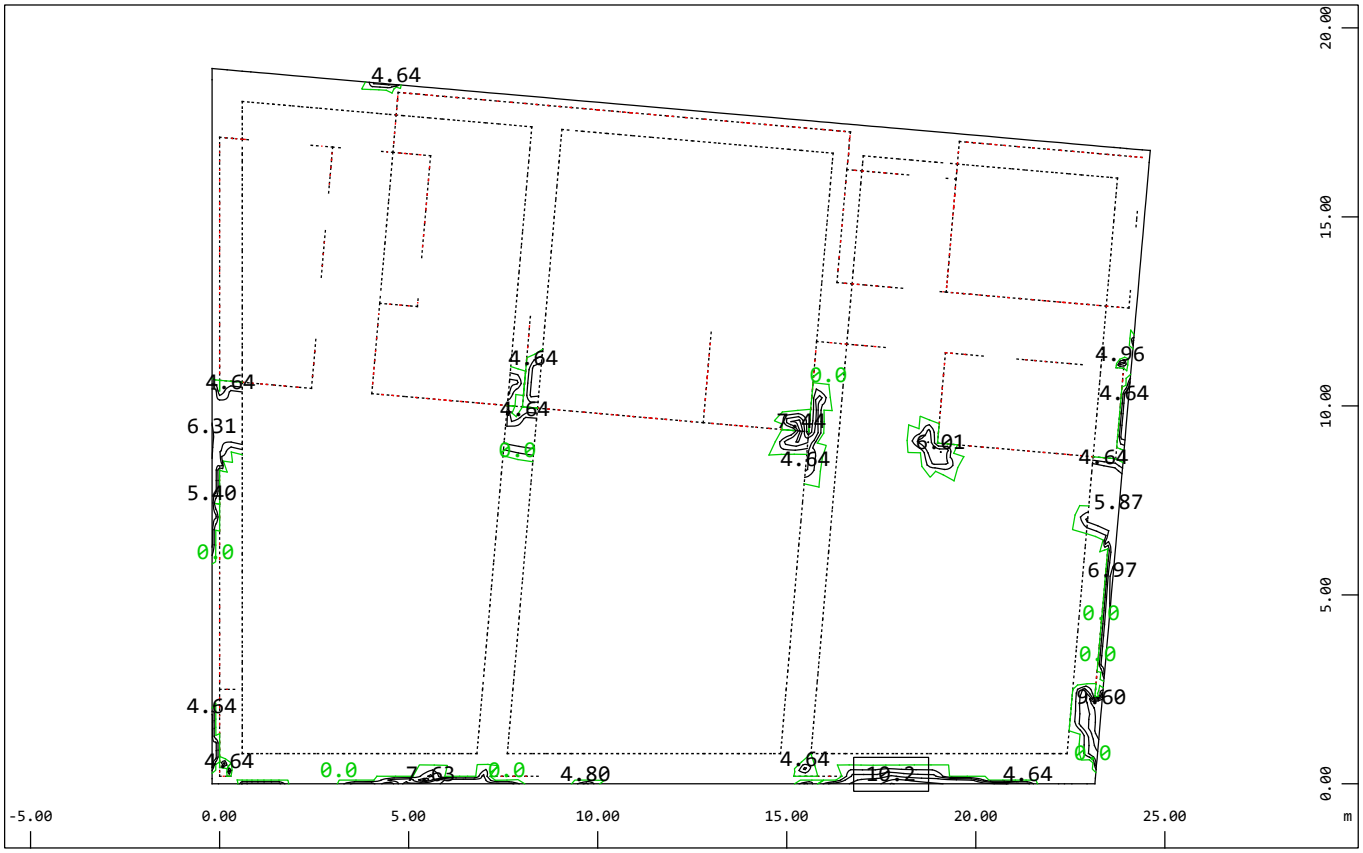

Y
Z—X
Sector of system Group 100
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node
1 , from 0 to 15.4 step 2.00 cm2/m
M 1 : 200
, Design Case




Y
Z—X
Sector of system Group 100
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node
, from 0 to 19.3 step 2.00 cm2/m
M 1 : 200
, Design Case 1

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11826 DSO Bovec - centralna dilat. enota stavbe
Temelji in tem. plosca: armatura strizna



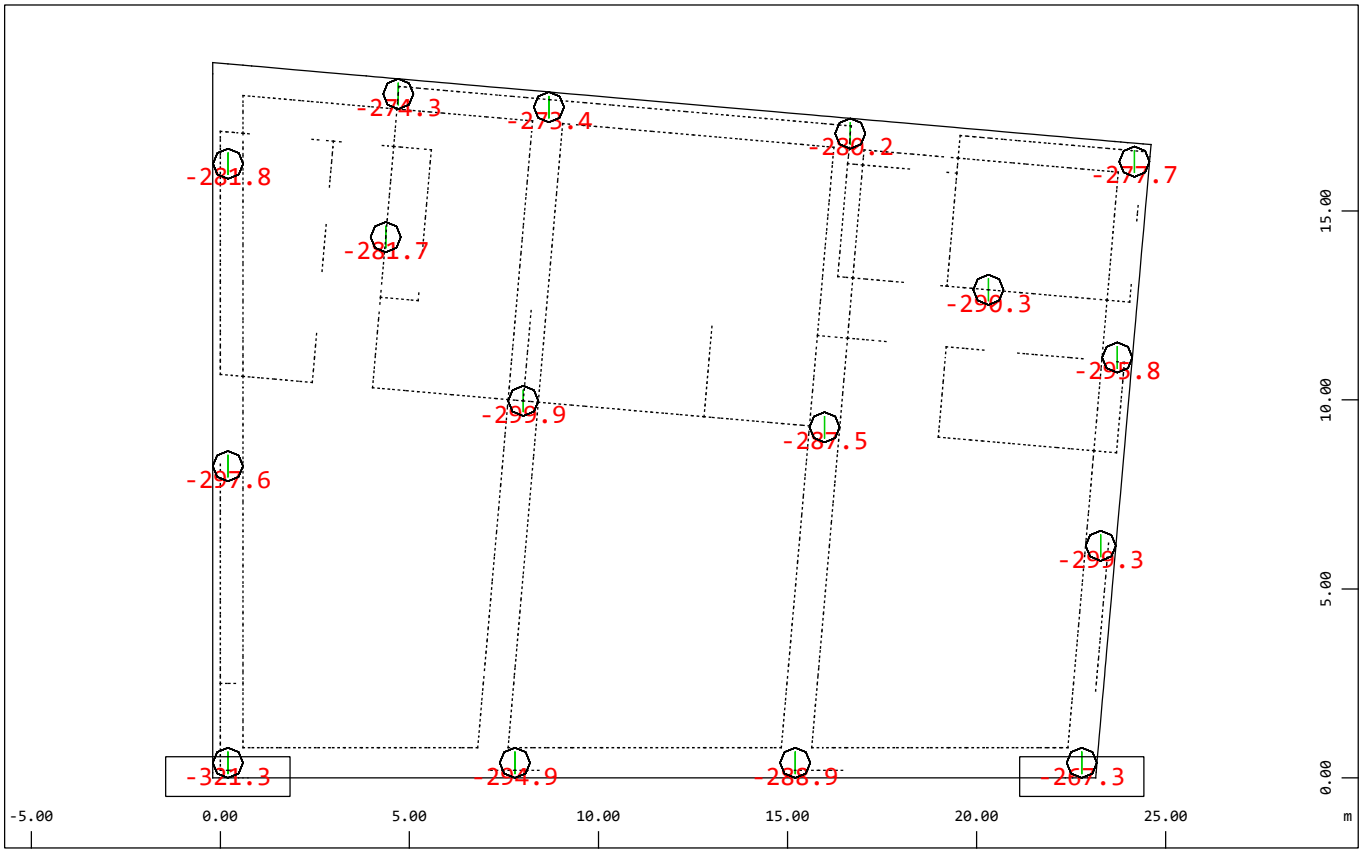

Y
Z X

Sector of system Group 100
Quadrilateral Elements , Shear reinforcement in Node , Design Case 1 , from 0 to 10.2
step 2.00 cm2/m2

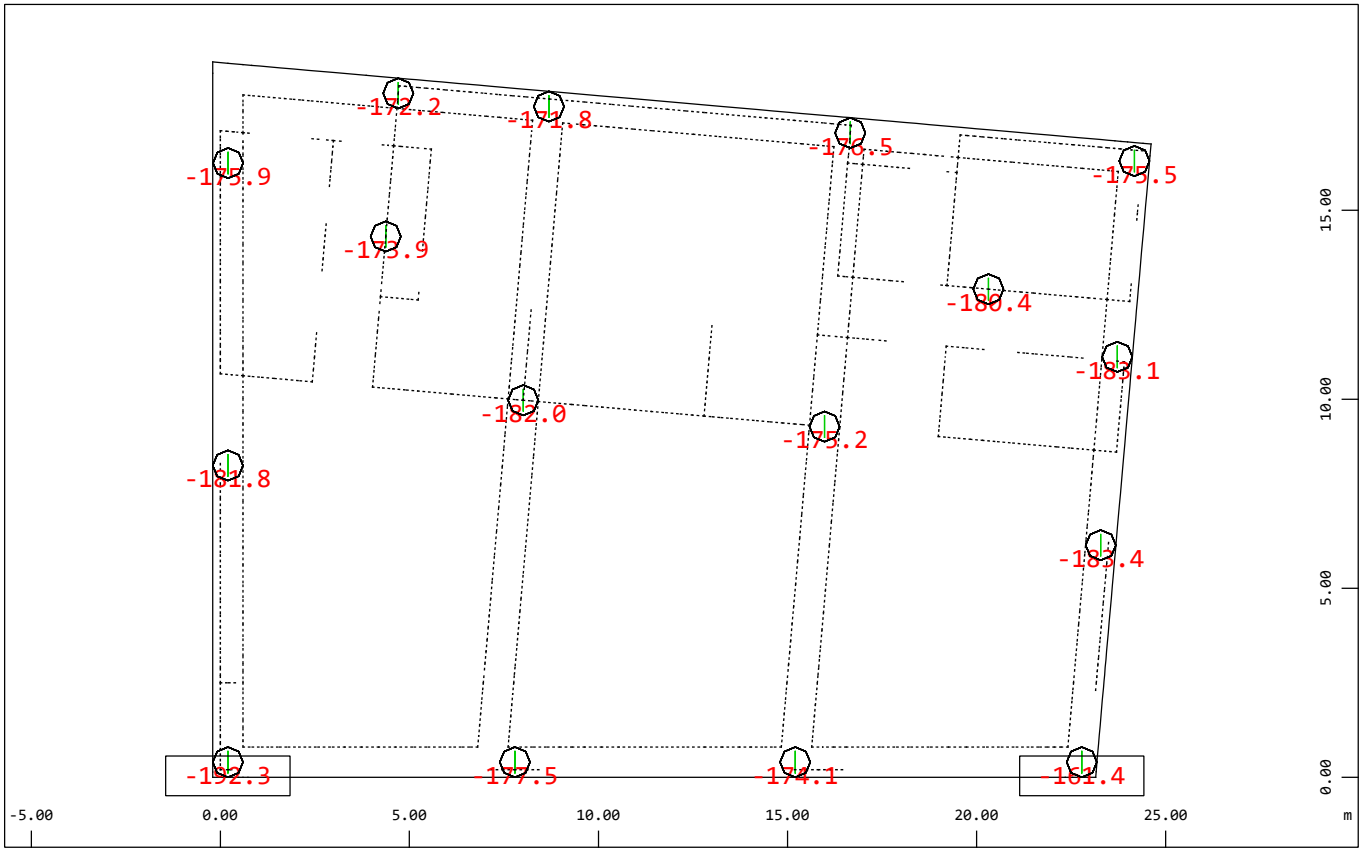
M 1 : 200

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11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj. sil na vodnjakih pod plosco: MSN (faktorirano)



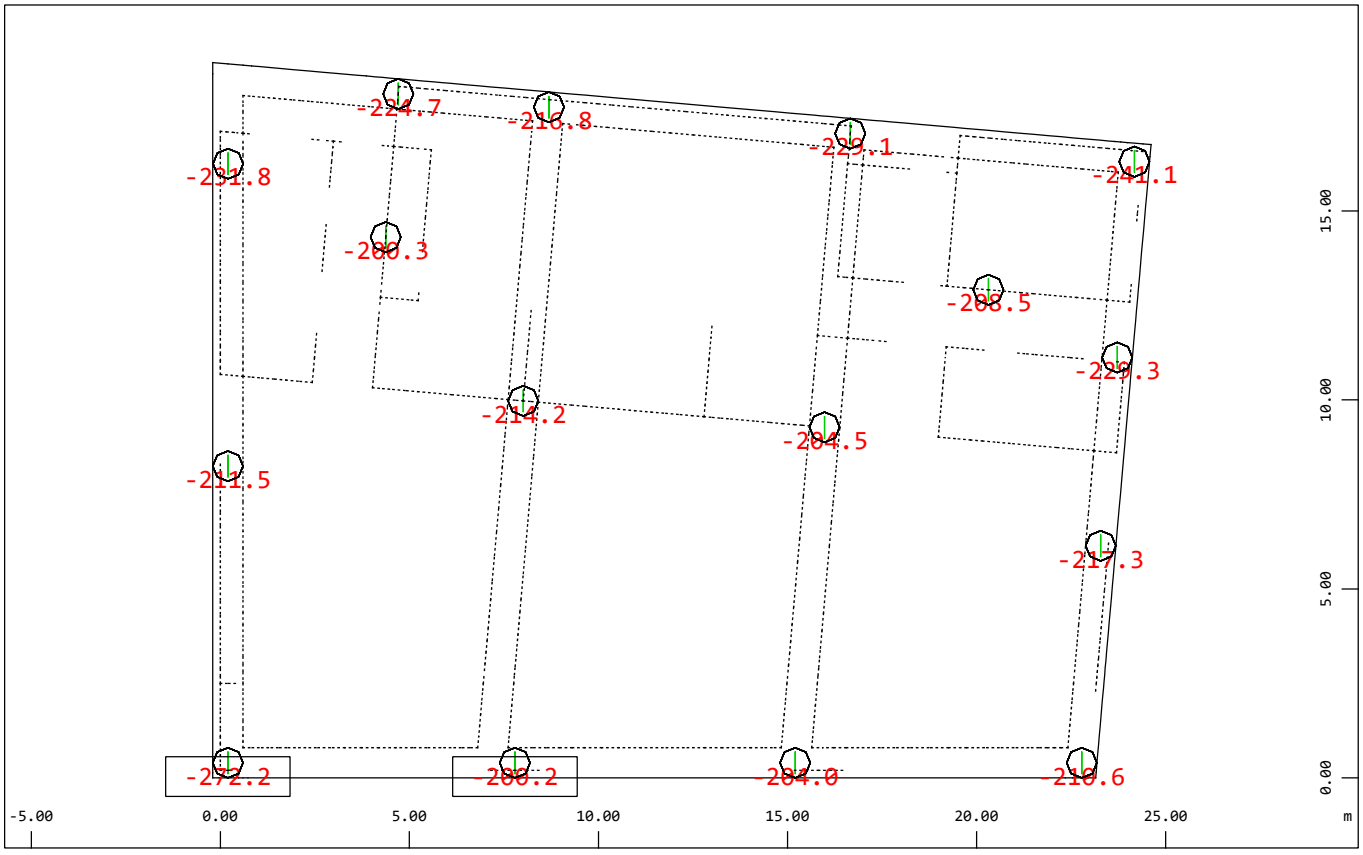

Y
Z—X
Sector of system Group 100 101 M 1 : 200
Beam Elements , Normal force Nx in kN, Loadcase 8022 MIN-N BEAM (Min=-321.3)
(Max=-267.3)



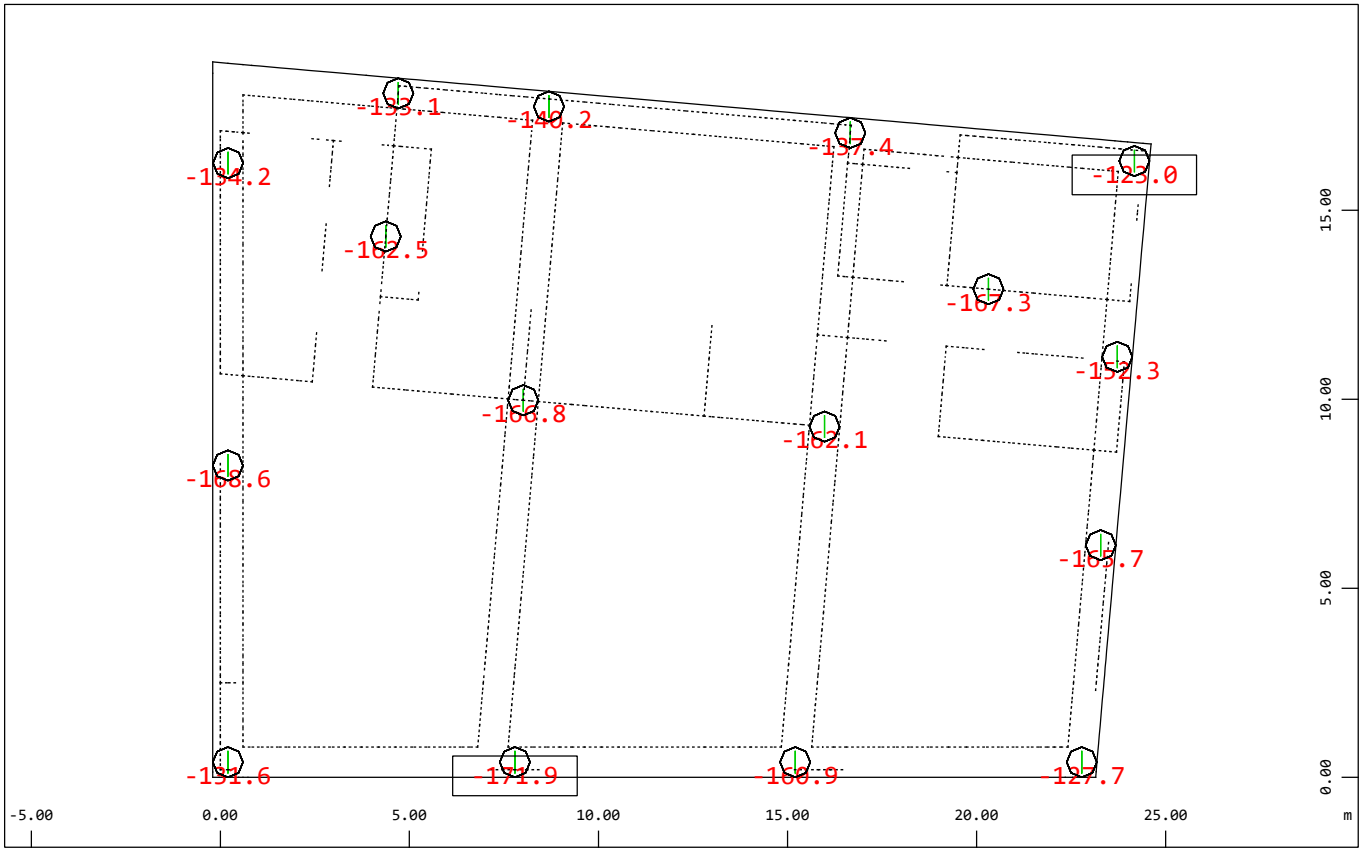

Y
Z—X
Sector of system Group 100 101 M 1 : 200
Beam Elements , Normal force Nx in kN, Loadcase 8021 MAX-N BEAM (Min=-192.3)
(Max=-161.4)

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11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj. sil na vodnjakih pod plosco: MSN-potres



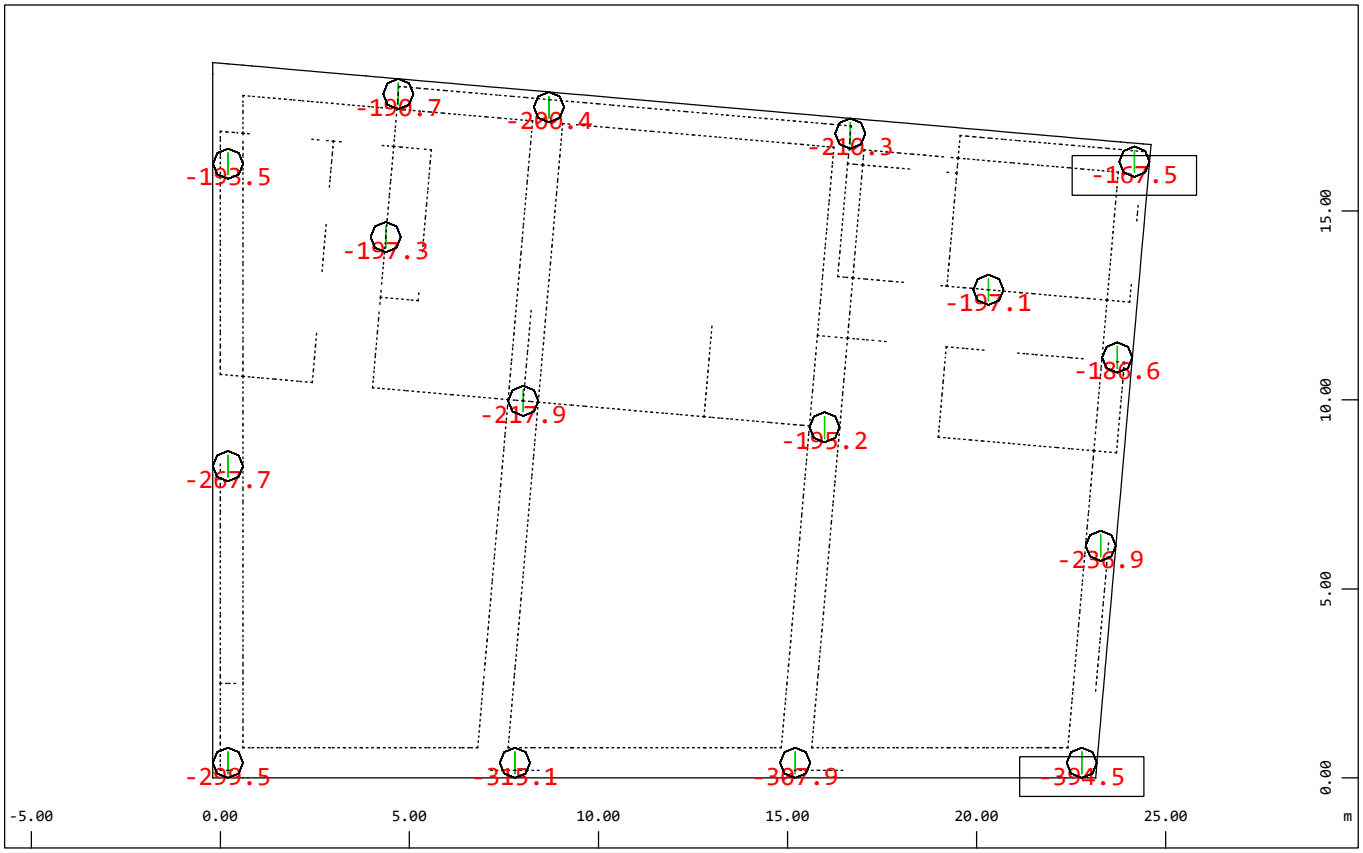

Y
Z—X
Sector of system Group 100 101
Beam Elements , Normal force Nx in kN, Loadcase 8222 MINE-N BEAM (Min=-272.2)
(Max=-200.2)
M 1 : 200



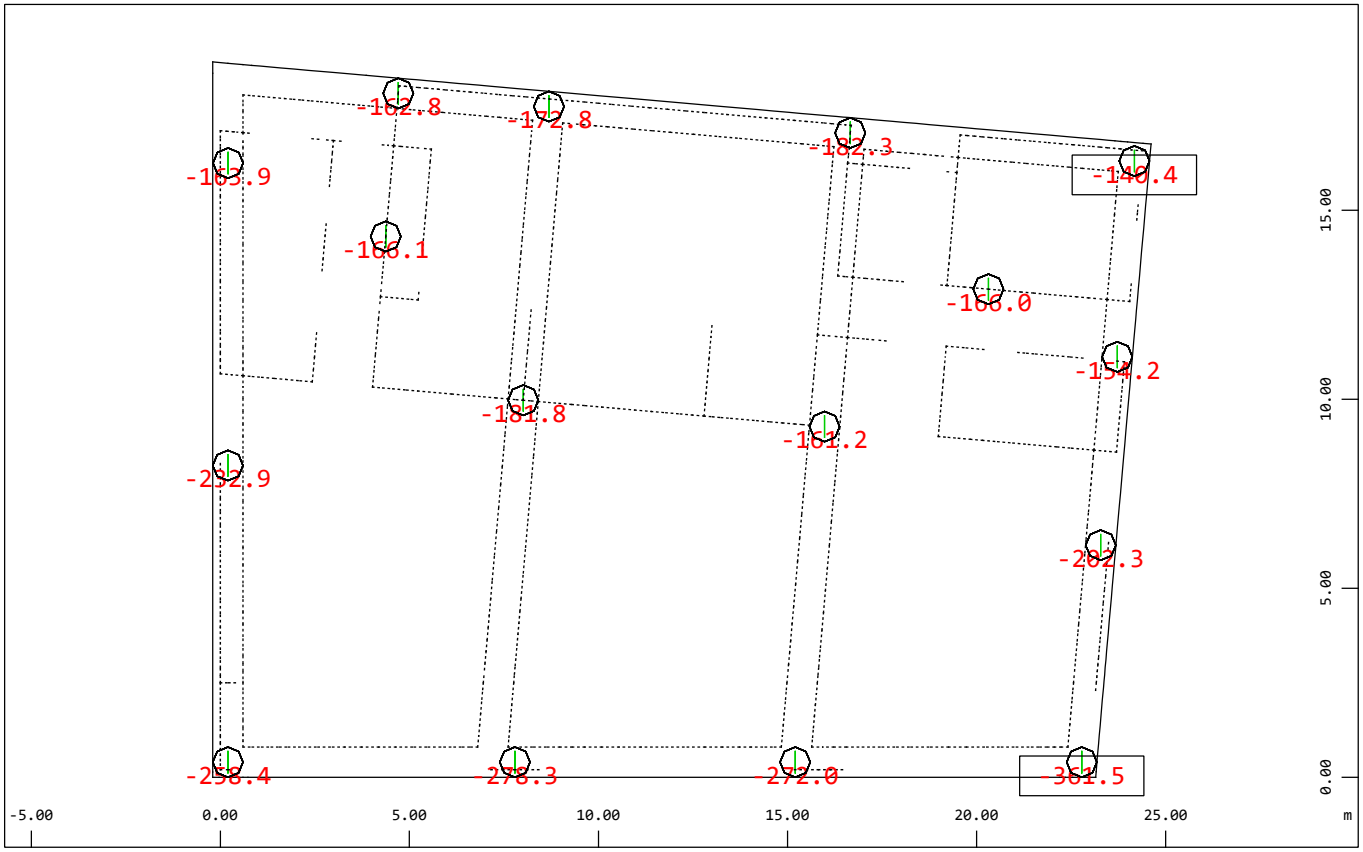

Y
Z—X
Sector of system Group 100 101
Beam Elements , Normal force Nx in kN, Loadcase 8221 MAXE-N BEAM (Min=-171.9)
(Max=-123.0)
M 1 : 200

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11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj. sil na vodnjakih pod plosco: MSU-rare (nefaktorirano)



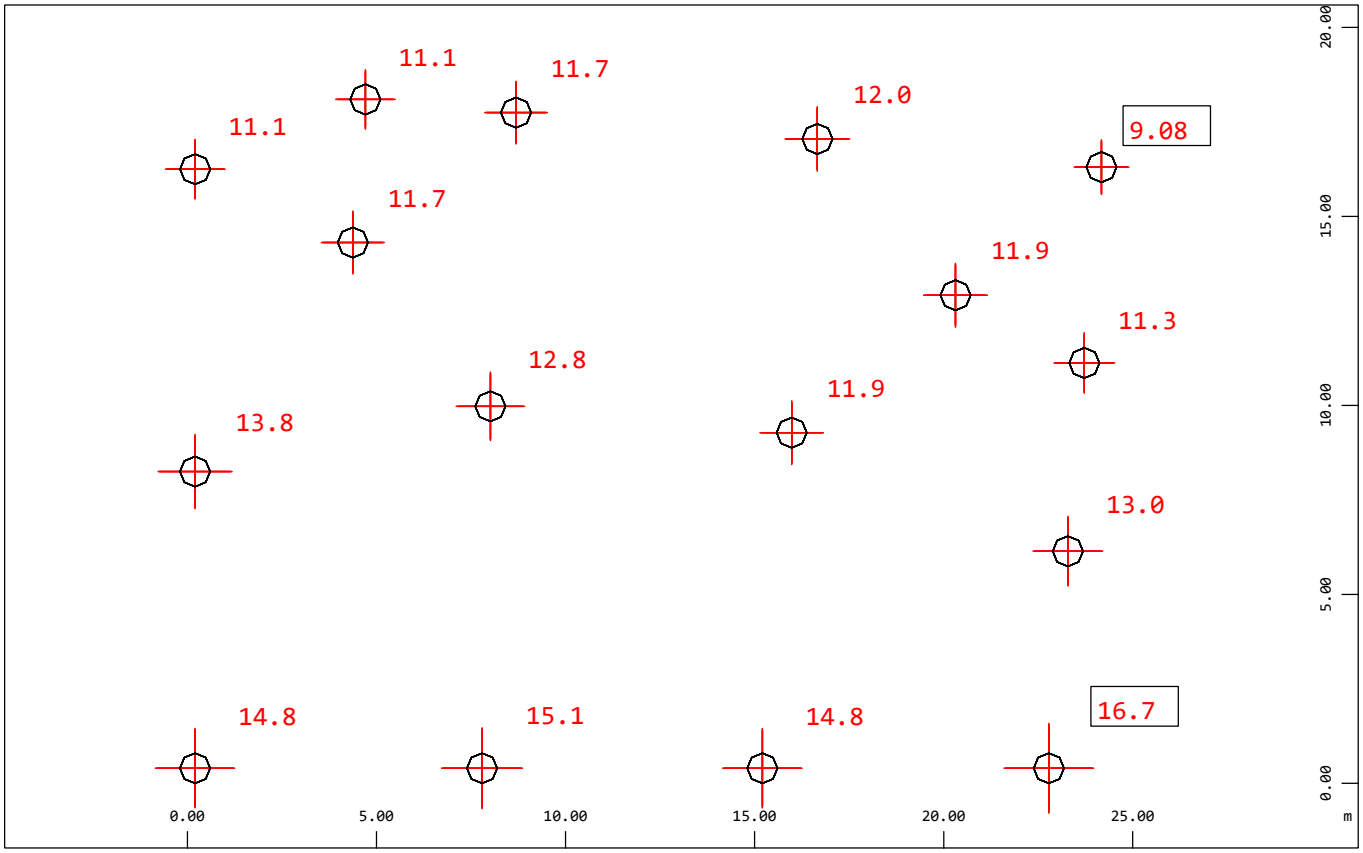

Sector of system Group 100 101 M 1 : 200
Beam Elements , Normal force Nx in kN, Loadcase 9022 MINR-N BEAM (Min=-394.5)
(Max=-167.5)



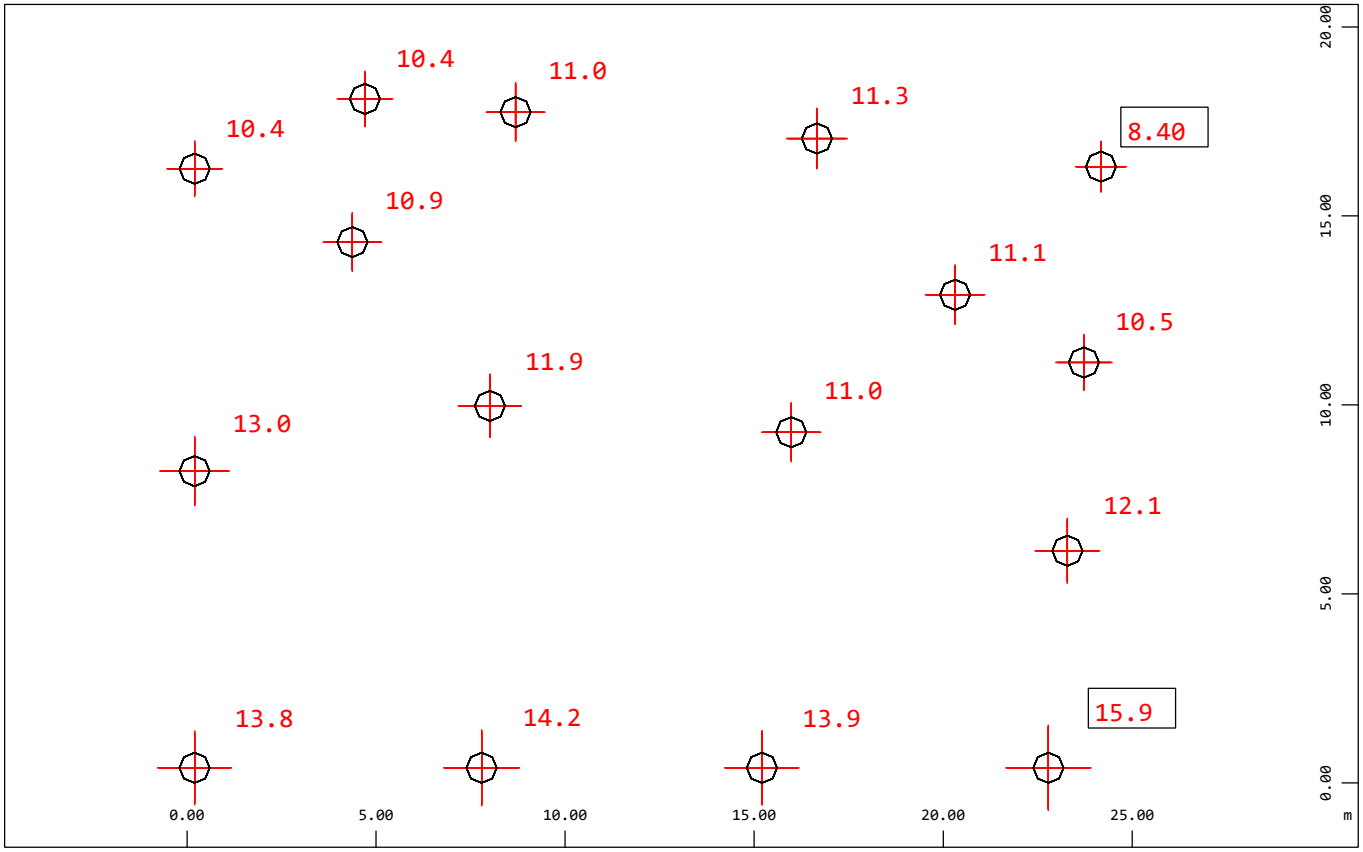

Sector of system Group 100 101 M 1 : 200
Beam Elements , Normal force Nx in kN, Loadcase 9021 MAXR-N BEAM (Min=-361.5)
(Max=-140.4)

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11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj. pomikov pod vodnjaki: MSU-rare (nefaktorirano)



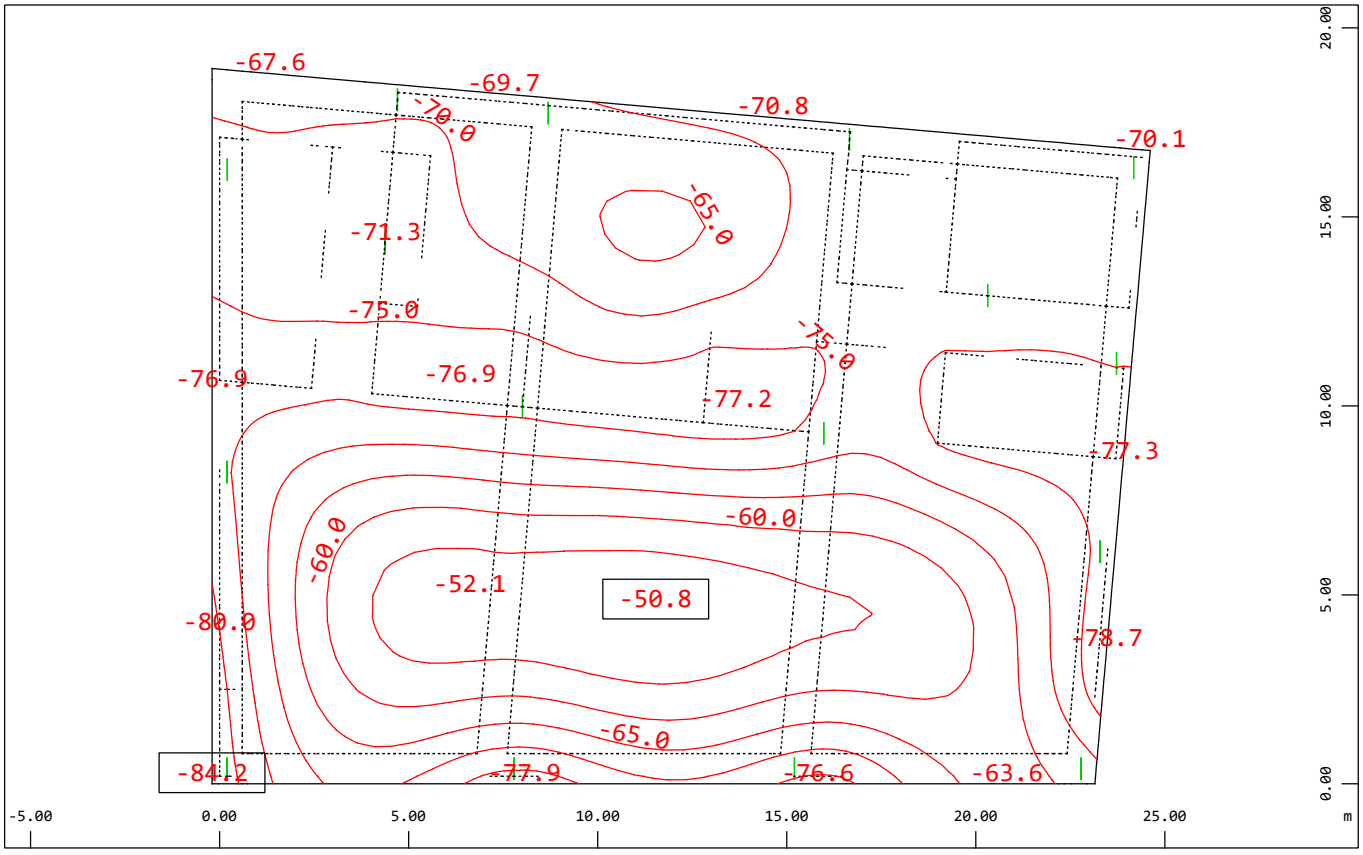

Y
Z—X
Sector of system Group 101
Nodal displacement in global Z, Loadcase 9076 MINR-UZ NODE , 1 cm 3D = 10.0 mm
(Min=-16.7) (Max=-9.08)
M 1 : 200




Y
Z—X
Sector of system Group 101
Nodal displacement in global Z, Loadcase 9075 MAXR-UZ NODE , 1 cm 3D = 10.0 mm
(Min=-15.9) (Max=-8.40)
M 1 : 200

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11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj. napetosti v tem. tleh pod plosco: MSN (faktorirano)



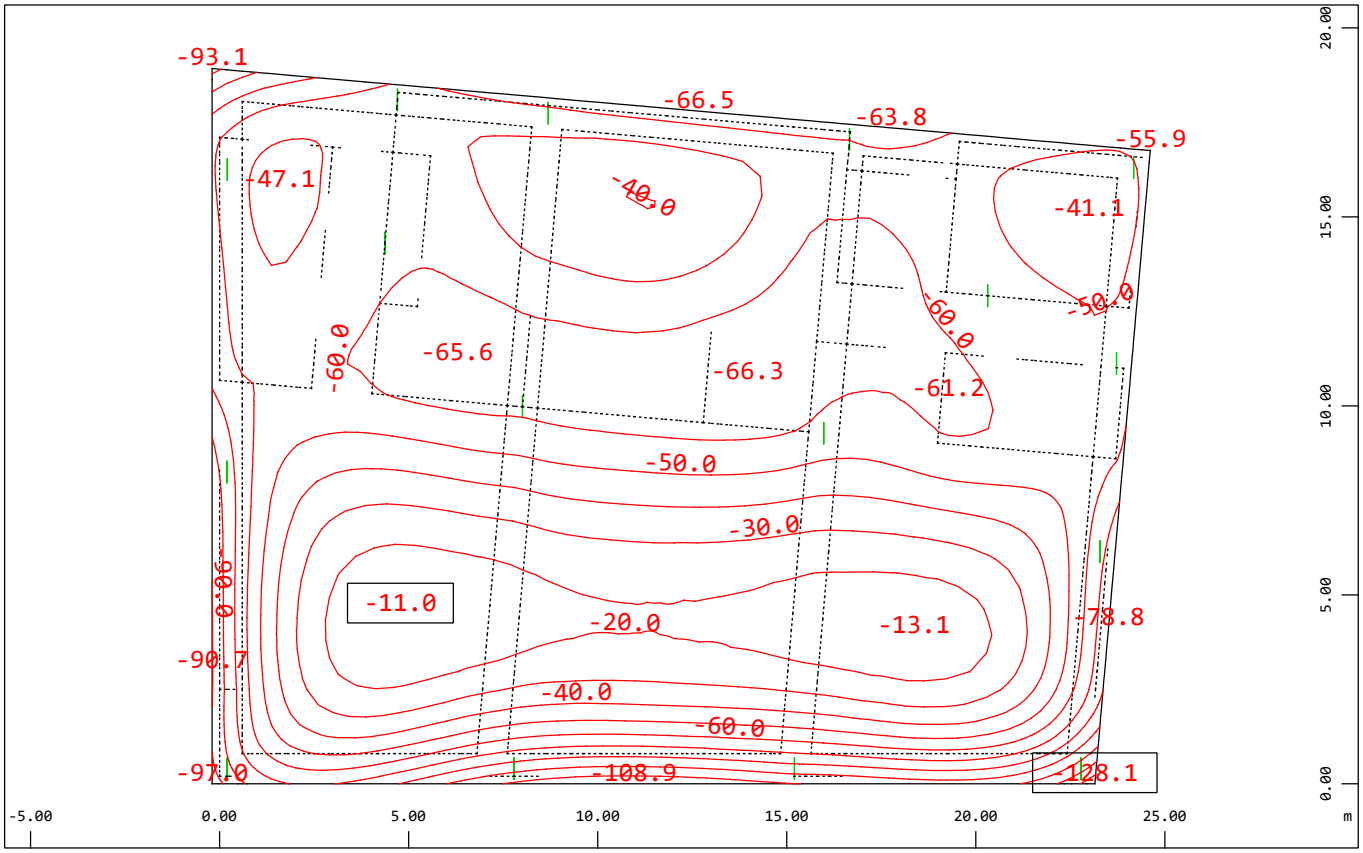

Sector of system Group 100 101 M 1 : 200
Bedding stress in Node ○, Loadcase 8018 MIN-P QUAD , from -84.2 to -50.8 step 5.00 kN/m2



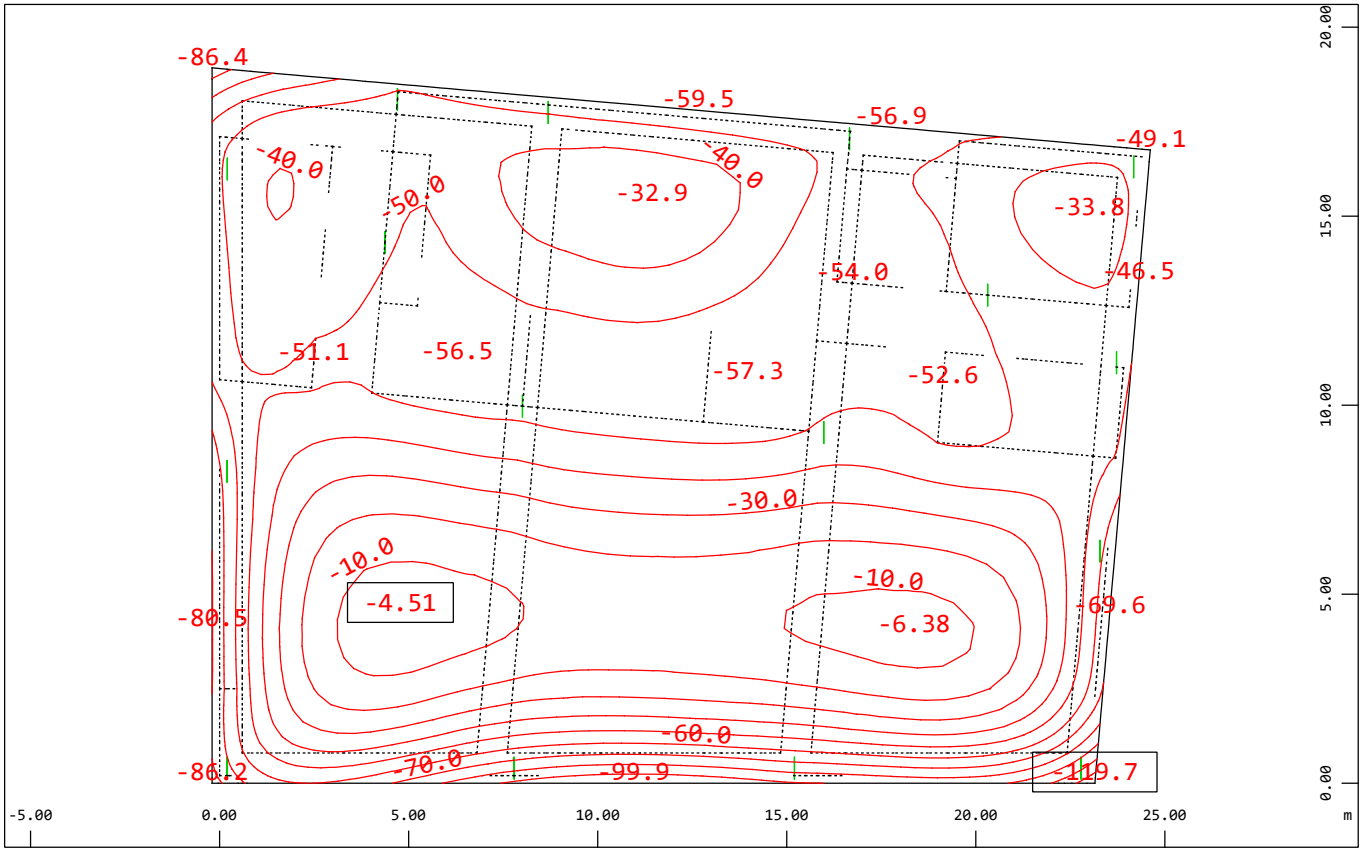

Sector of system Group 100 101 M 1 : 200
Bedding stress in Node ○, Loadcase 8017 MAX-P QUAD , from -50.3 to -30.8 step 5.00 kN/m2

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11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj. napetosti v tem. tleh pod plosco: MSU-rare (nefaktorirano)



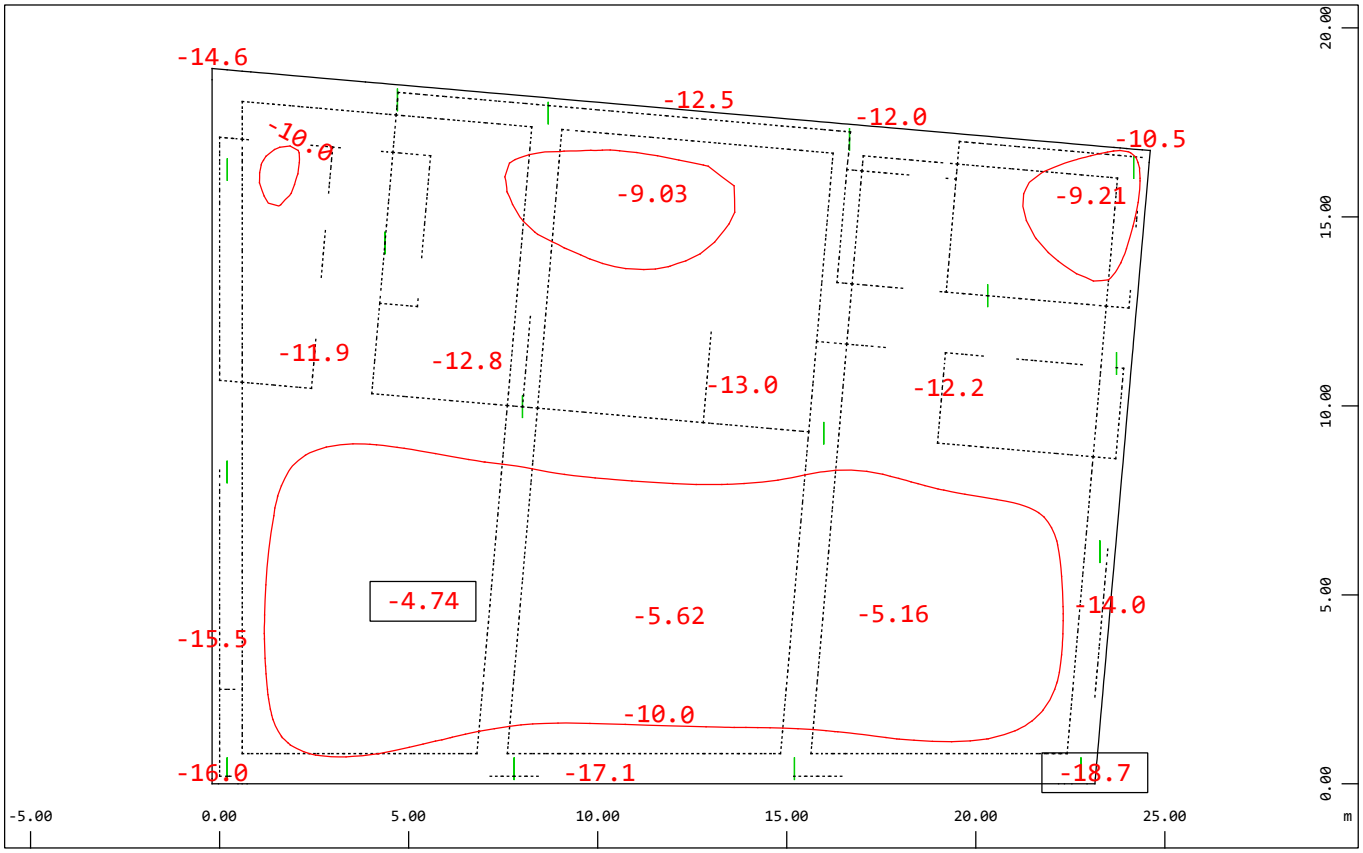

Y
Z—X
Sector of system Group 100 101 M 1 : 200
Bedding stress in Node ◯, Loadcase 9018 MINR-P QUAD , from -128.1 to -11.0 step 10.0
kN/m2



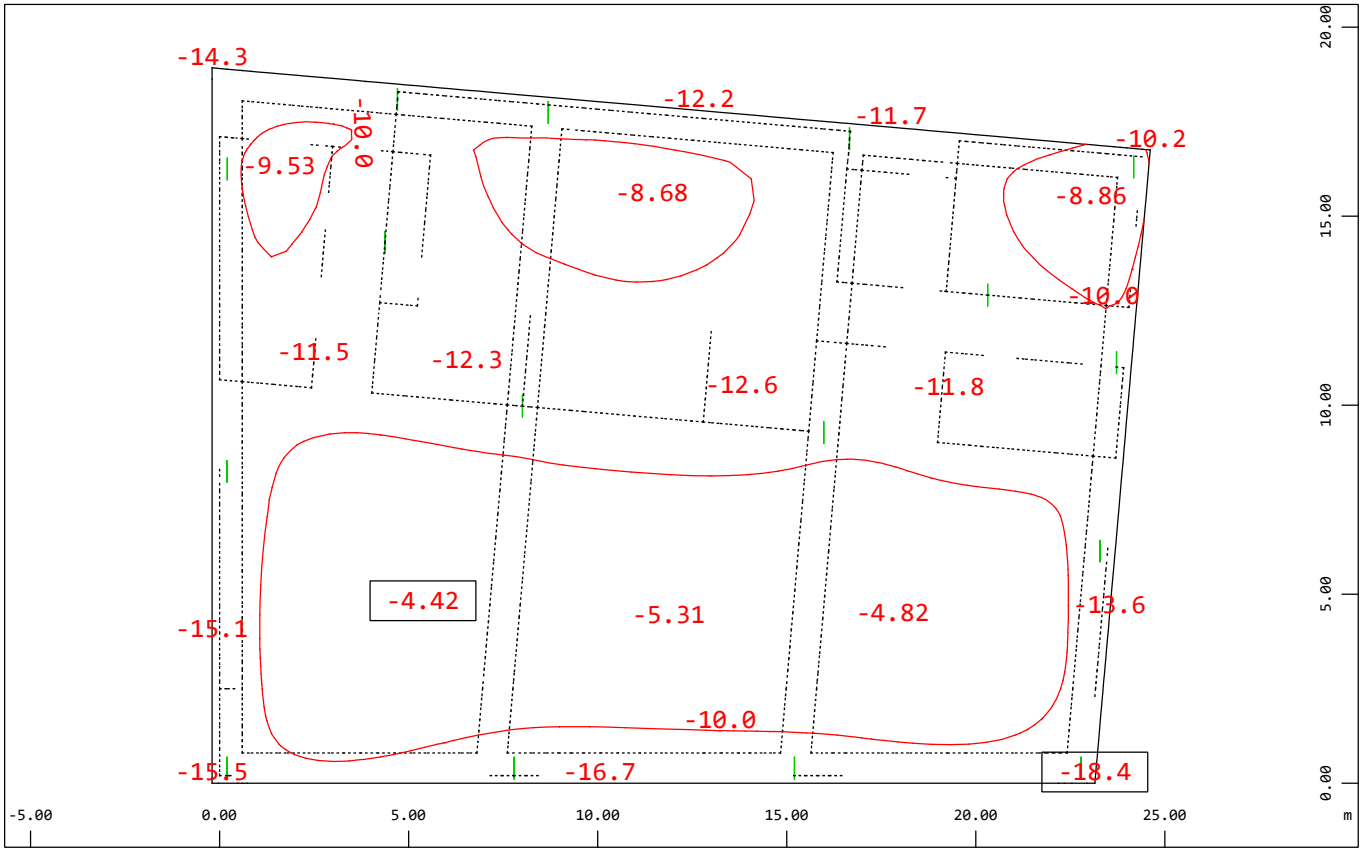

Y
Z—X
Sector of system Group 100 101 M 1 : 200
Bedding stress in Node ◯, Loadcase 9017 MAXR-P QUAD , from -119.7 to -4.51 step 10.0
kN/m2

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11826 DSO Bovec - centralna dilat. enota stavbe
Ovoj. pomikov v tem. tleh pod plosco: MSU-rare (nefaktorirano)



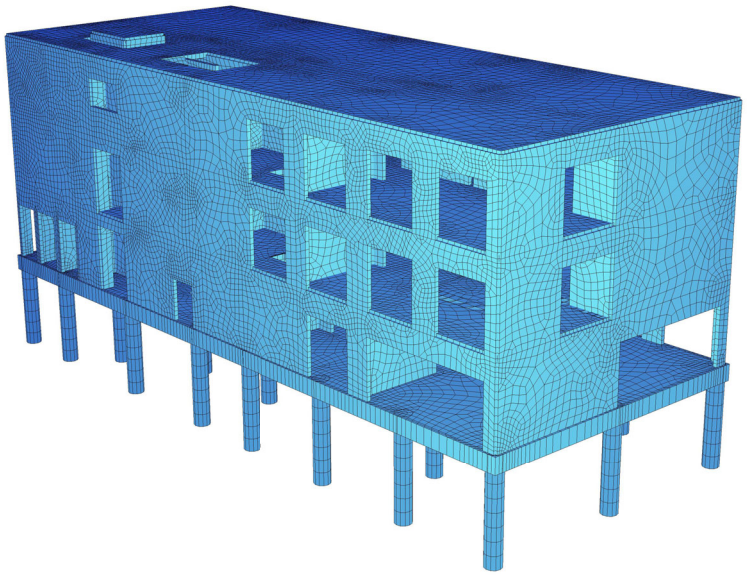

Y
Z—X
Sector of system Group 100 101
Nodal displacement in global Z in Node , Loadcase 9276 MINP-UZ NODE , from -18.7 to -4.74 step 10.0 mm
M 1 : 200

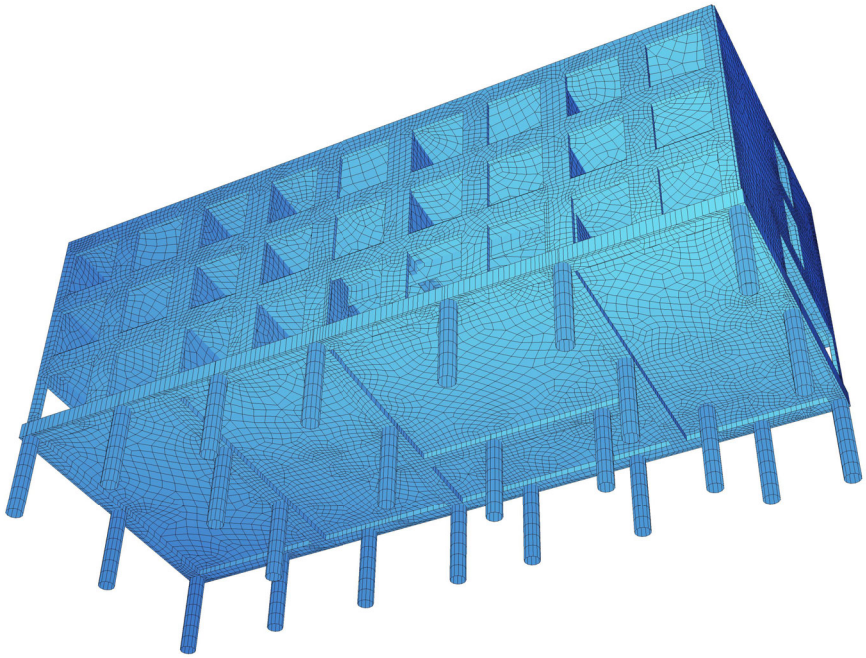



Y
Z—X
Sector of system Group 100 101
Nodal displacement in global Z in Node , Loadcase 9275 MAXP-UZ NODE , from -18.4 to -4.42 step 10.0 mm
M 1 : 200

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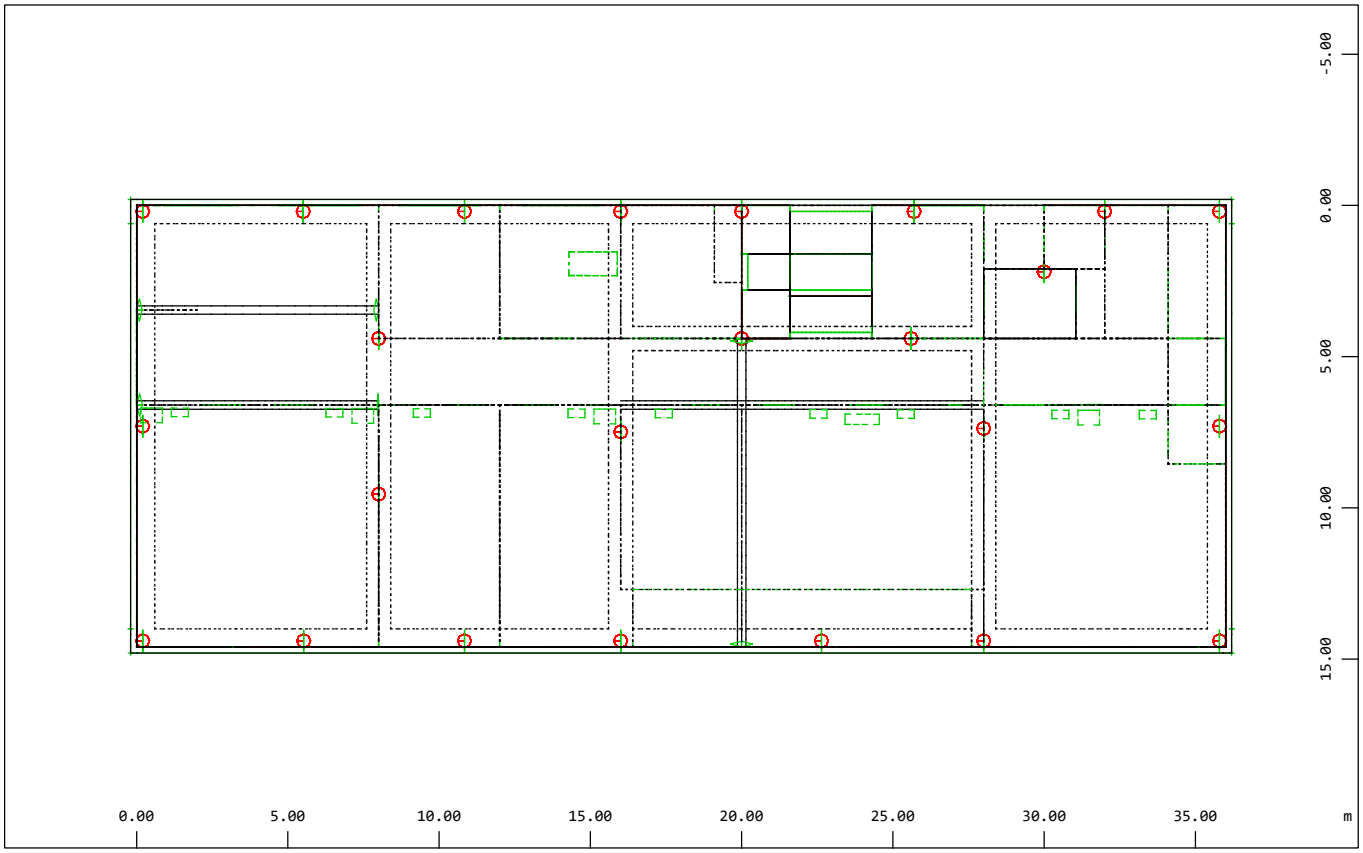
11826 DSO Bovec - vzhodna dilat. enota stavbe

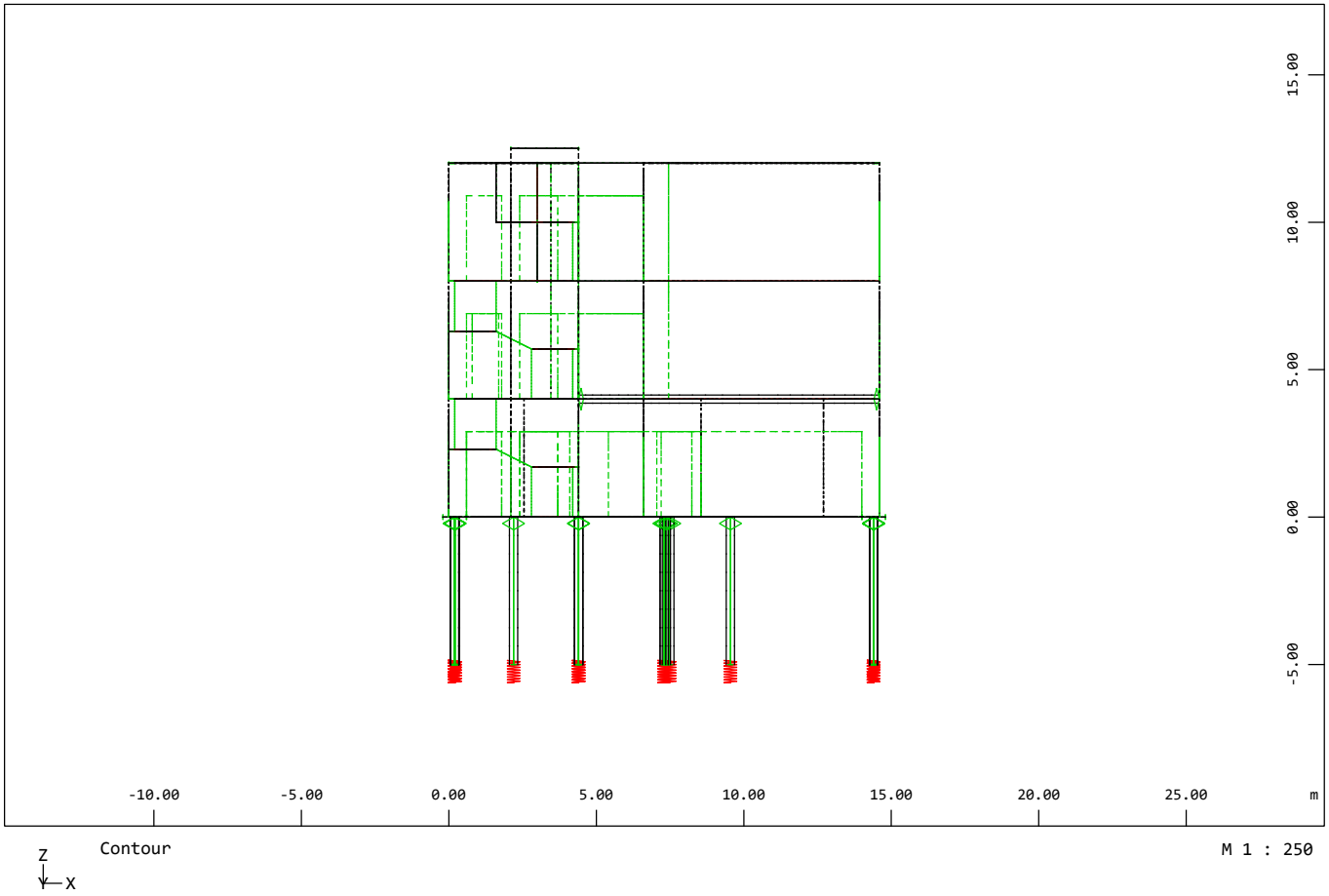




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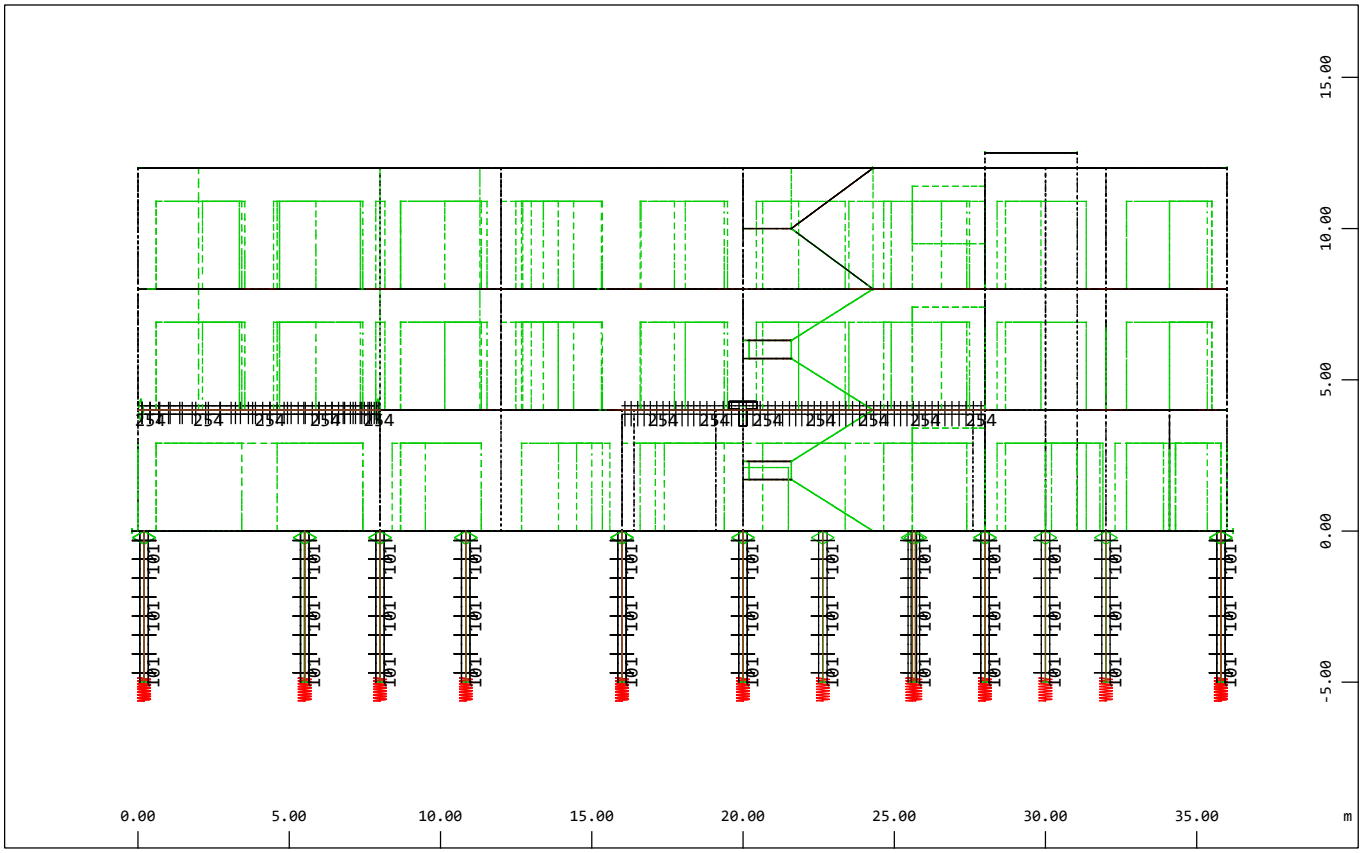
11826 DSO Bovec - vzhodna dilat. enota stavbe
Geometrija modela



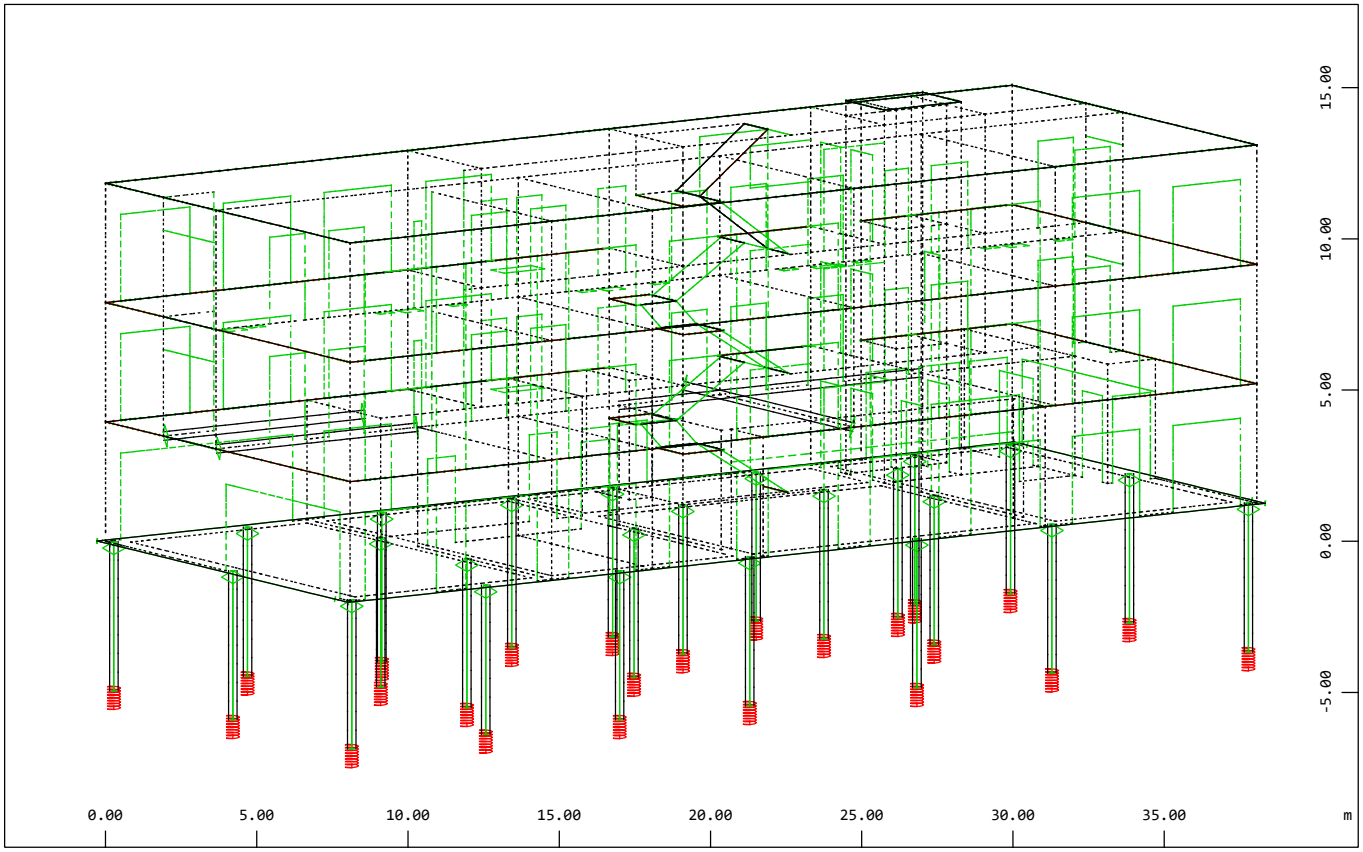

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Geometrija modela




Z
X Y
Contour
Beam Elements , Contour of Cross section
Beam Elements , Number of group (Max=254)

M 1 : 250

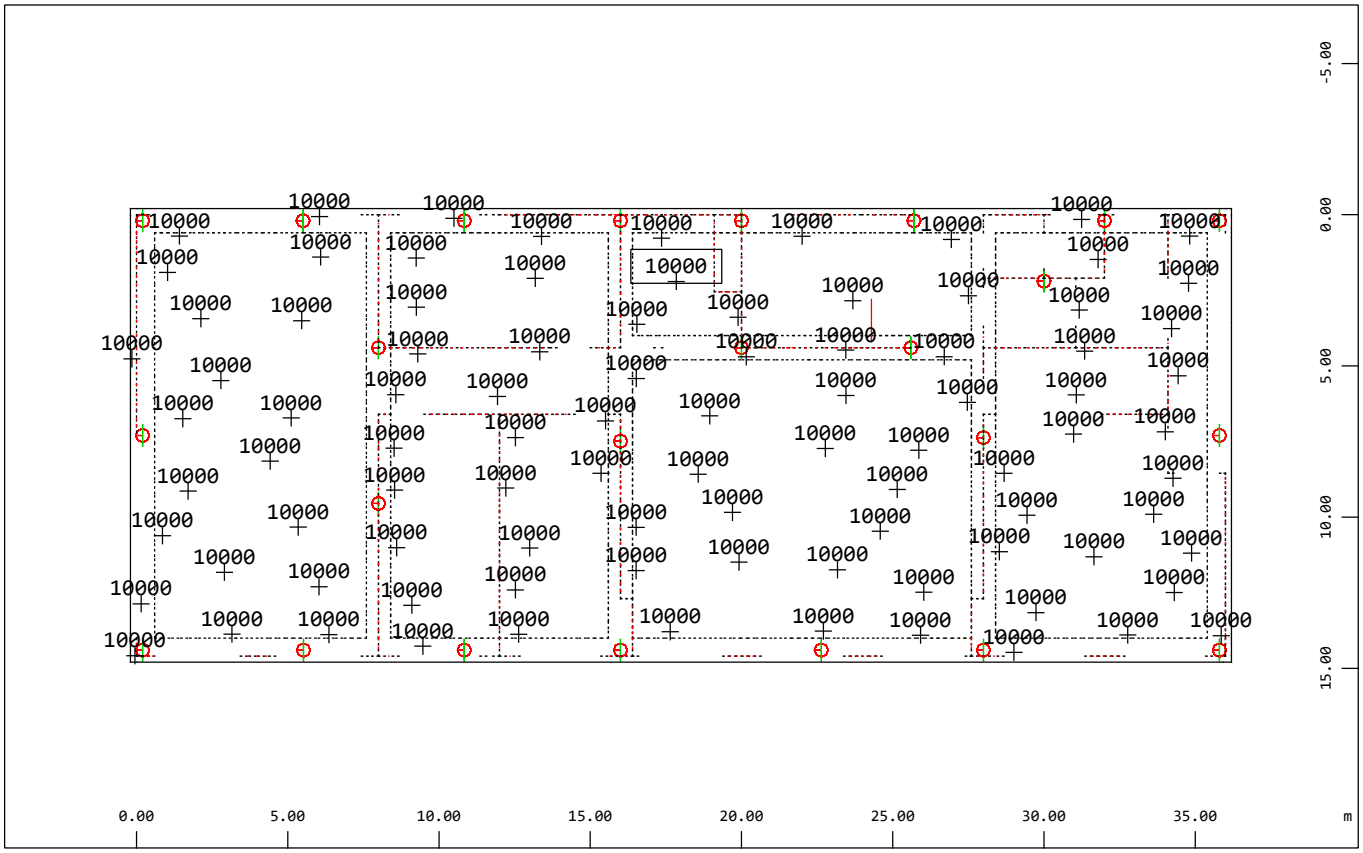



Z
X Y
Contour

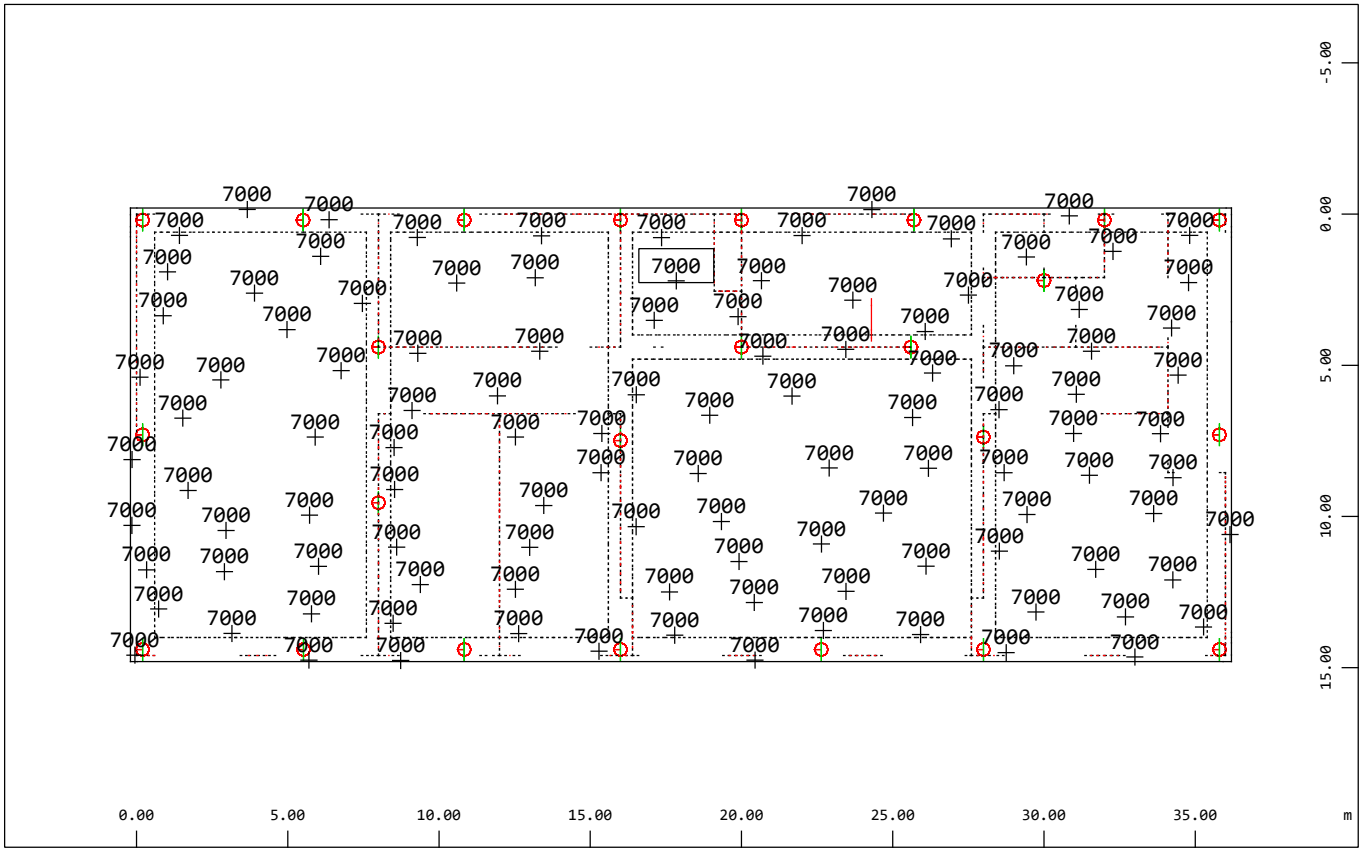
M 1 : 250
X * 0.570
Y * 0.837
Z * 0.987

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Geometrija modela (modul reakcije tal pod temelno plosco)



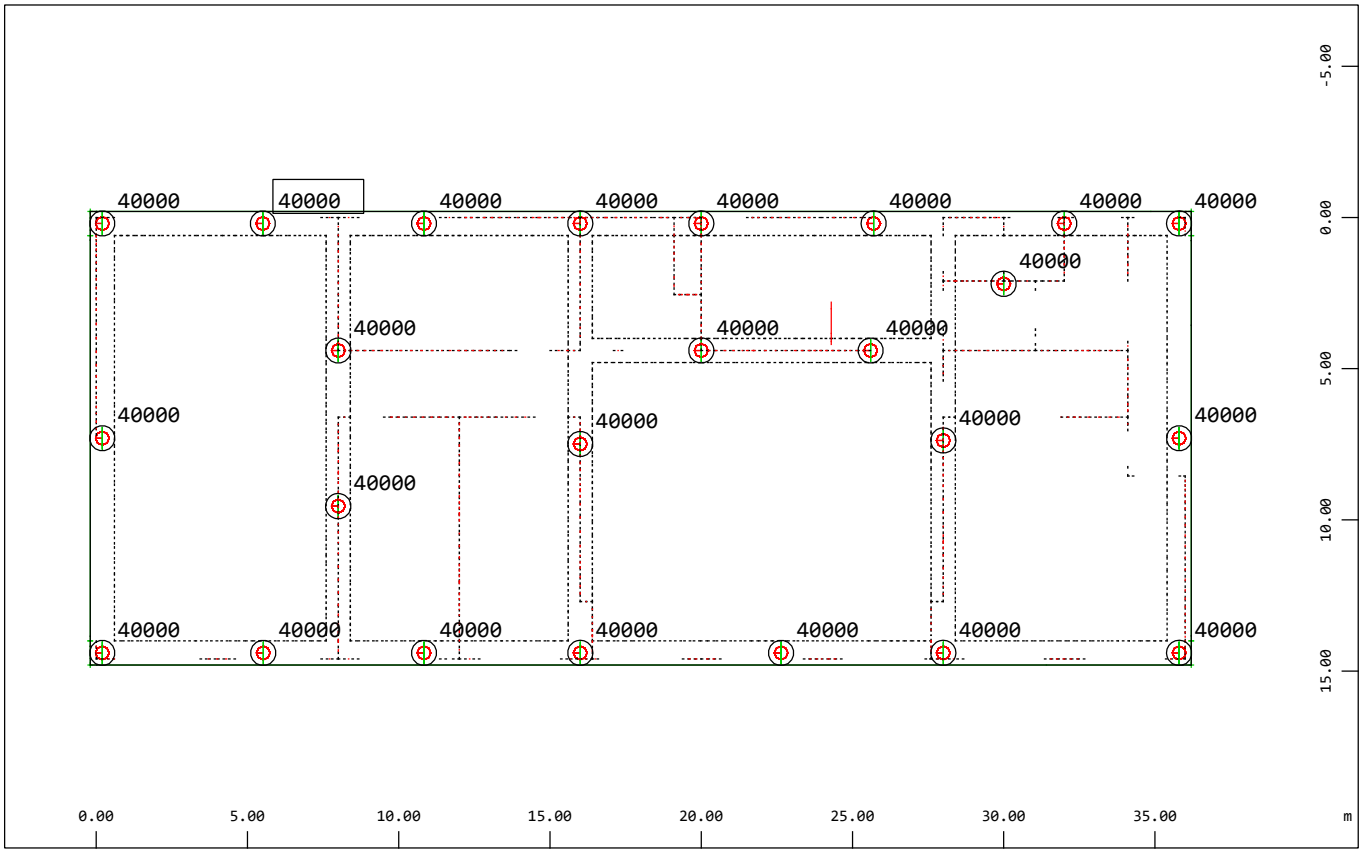

Sector of system Group 100 101
Elastic bedding in Element in kN/m3 (Max=10000.)
M 1 : 250




Sector of system Group 100 101
Tangential elastic bedding in Element in kN/m3 (Max=7000.)
M 1 : 250

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Geometrija modela (modul reakcije tal za vodnjake v vertikalni smeri)




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11826 DSO Bovec - vzhodna dilat. enota stavbe
Materials

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Structure and Tab.7.1N: AN (Buildings)

**Materials**

| Mat | Classification |
|---|---|
| 1 | C 30/37 N (EN 1992) |
| 2 | B 500 B (EN 1992) |
| 99 | C 30/37 N - brez G |

**Mat 1 C 30/37 N (EN 1992)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Young's modulus | E | 32837 | [N/mm2] | Safetyfactor | | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength | fc | 30.00 | [MPa] |
| Shear modulus | G | 13682 | [N/mm2] | Nominal strength | fck | 30.00 | [MPa] |
| Compression modulus | K | 18243 | [N/mm2] | Tensile strength | fctm | 2.90 | [MPa] |
| Nominal Weight | γ | 25.0 | [kN/m3] | Tensile strength | fctk,05 | 2.03 | [MPa] |
| Mean density | ρ | 2400.0 | [kg/m3] | Tensile strength | fctk,95 | 3.77 | [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | fbd | 3.04 | [MPa] |
| | | | | Service strength | fcm | 38.00 | [MPa] |
| | | | | Fatigue strength | fcd,fat | 14.96 | [MPa] |
| | | | | Tensile strength | fctd | 1.35 | [MPa] |
| | | | | Tensile failure energy | Gf | 0.14 | [N/mm] |

| Stress-Strain for serviceability | ε[o/oo] | σ-m[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 0.000 | 0.00 | 34478 |
| stress range | -0.540 | -16.42 | 26234 |
| | -1.081 | -28.31 | 17746 |
| | -1.621 | -35.55 | 9005 |
| | -2.162 | -38.00 | 0 |
| | -3.500 | -22.47 | -23499 |
| | Safetyfactor | | 1.50 |

| Stress-Strain for ultimate load | ε[o/oo] | σ-u[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 0.000 | 0.00 | 30000 |
| stress range | -2.000 | -30.00 | 0 |
| | -3.500 | -30.00 | 0 |
| | Safetyfactor | | 1.50 |

| Stress-Strain of calc. mean values | ε[o/oo] | σ-r[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 0.000 | 0.00 | 28732 |
| stress range | -0.540 | -11.19 | 14403 |
| | -1.081 | -16.78 | 7018 |
| | -1.621 | -19.32 | 2720 |
| | -2.162 | -20.00 | 0 |
| | -3.500 | -17.25 | -3601 |
| | Safetyfactor | | ( 1.50) |

**Mat 2 B 500 B (EN 1992)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Young's modulus | E | 200000 | [N/mm2] | Safetyfactor | | 1.15 | [-] |
| Poisson's ratio | μ | 0.30 | [-] | Yield stress | fy | 500.00 | [MPa] |
| Shear modulus | G | 76923 | [N/mm2] | Compressive yield | fyc | 500.00 | [MPa] |
| Compression modulus | K | 166667 | [N/mm2] | Tensile strength | ft | 540.00 | [MPa] |
| Nominal Weight | γ | 78.5 | [kN/m3] | Compressive strength | fc | 540.00 | [MPa] |
| Mean density | ρ | 7850.0 | [kg/m3] | Ultimate strain | | 50.00 | [o/oo] |
| Elongation coefficient | α | 1.20E-05 | [1/K] | relative bond coeff. | | 1.00 | [-] |
| max. thickness | t-max | 32.00 | [mm] | EN 1992 bond coeff. | k1 | 0.80 | [-] |
| | | | | Hardening modulus | Eh | 0.00 | [MPa] |
| | | | | Proportional limit | fp | 500.00 | [MPa] |
| | | | | Dynamic allowance | σ-dyn | 152.17 | [MPa] |

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Materials

| Stress-Strain for serviceability | ε[o/oo] | σ-m[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is also extended beyond the | 1000.000 | 540.00 | 0 |
| defined stress range | 50.000 | 540.00 | 0 |
| | 2.500 | 500.00 | 842 |
| | 0.000 | 0.00 | 200000 |
| | -2.500 | -500.00 | 842 |
| | -50.000 | -540.00 | 0 |
| | -1000.000 | -540.00 | 0 |
| | Safetyfactor | | 1.15 |

| Stress-Strain for ultimate load | ε[o/oo] | σ-u[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is also extended beyond the | 1000.000 | 469.57 | 0 |
| defined stress range | 50.000 | 469.57 | 0 |
| | 2.174 | 434.78 | 727 |
| | 0.000 | 0.00 | 200000 |
| | -2.174 | -434.78 | 727 |
| | -50.000 | -469.57 | 0 |
| | -1000.000 | -469.57 | 0 |
| | Safetyfactor | | ( 1.15) |

| Stress-Strain of calc. mean values | ε[o/oo] | σ-r[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is also extended beyond the | 1000.000 | 469.57 | 0 |
| defined stress range | 50.000 | 469.57 | 0 |
| | 2.174 | 434.78 | 727 |
| | 0.000 | 0.00 | 200000 |
| | -2.174 | -434.78 | 727 |
| | -50.000 | -469.57 | 0 |
| | -1000.000 | -469.57 | 0 |
| | Safetyfactor | | ( 1.15) |

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**Mat 99 C 30/37 N - brez G**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Young's modulus | E | 32837 | [N/mm2] | Safetyfactor | | 1.50 | [-] |
| Poisson's ratio | μ | 0.20 | [-] | Strength | fc | 30.00 | [MPa] |
| Shear modulus | G | 13682 | [N/mm2] | Nominal strength | fck | 30.00 | [MPa] |
| Compression modulus | K | 18243 | [N/mm2] | Tensile strength | fctm | 2.90 | [MPa] |
| Nominal Weight | γ | 0.0 | [kN/m3] | Tensile strength | fctk,05 | 2.03 | [MPa] |
| Mean density | ρ | 0.0 | [kg/m3] | Tensile strength | fctk,95 | 3.77 | [MPa] |
| Elongation coefficient | α | 1.00E-05 | [1/K] | Bond strength | fbd | 3.04 | [MPa] |
| | | | | Service strength | fcm | 38.00 | [MPa] |
| | | | | Fatigue strength | fcd,fat | 14.96 | [MPa] |
| | | | | Tensile strength | fctd | 1.35 | [MPa] |
| | | | | Tensile failure energy | Gf | 0.14 | [N/mm] |

| Stress-Strain for serviceability | ε[o/oo] | σ-m[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 0.000 | 0.00 | 34478 |
| stress range | -0.540 | -16.42 | 26234 |
| | -1.081 | -28.31 | 17746 |
| | -1.621 | -35.55 | 9005 |
| | -2.162 | -38.00 | 0 |
| | -3.500 | -22.47 | -23500 |
| | Safetyfactor | | 1.50 |

| Stress-Strain for ultimate load | ε[o/oo] | σ-u[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 0.000 | 0.00 | 30000 |
| stress range | -2.000 | -30.00 | 0 |
| | -3.500 | -30.00 | 0 |
| | Safetyfactor | | 1.50 |

11826 DSO Bovec - vzhodna dilat. enota stavbe
Materials

| Stress-Strain of calc. mean values | ε[o/oo] | σ-r[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 0.000 | 0.00 | 28732 |
| stress range | -0.540 | -11.19 | 14403 |
| | -1.081 | -16.78 | 7018 |
| | -1.621 | -19.32 | 2720 |
| | -2.162 | -20.00 | 0 |
| | -3.500 | -17.25 | -3601 |
| | Safetyfactor | | ( 1.50) |

**Thermal material constants**

| Mat | T[°C] | S[kJ/K/m3] | Kxx[W/K/m] | Kyy[W/K/m] | Kzz[W/K/m] | |
|---|---|---|---|---|---|---|
| 1 | AUTO | 2.16E+03 | 1.951E+00 | | | C 30/37 N (EN 1992) |
| 2 | AUTO | 3.45E+03 | 5.333E+01 | | | B 500 B (EN 1992) |
| 99 | AUTO | 2.16E+03 | 1.951E+00 | | | C 30/37 N - brez G |

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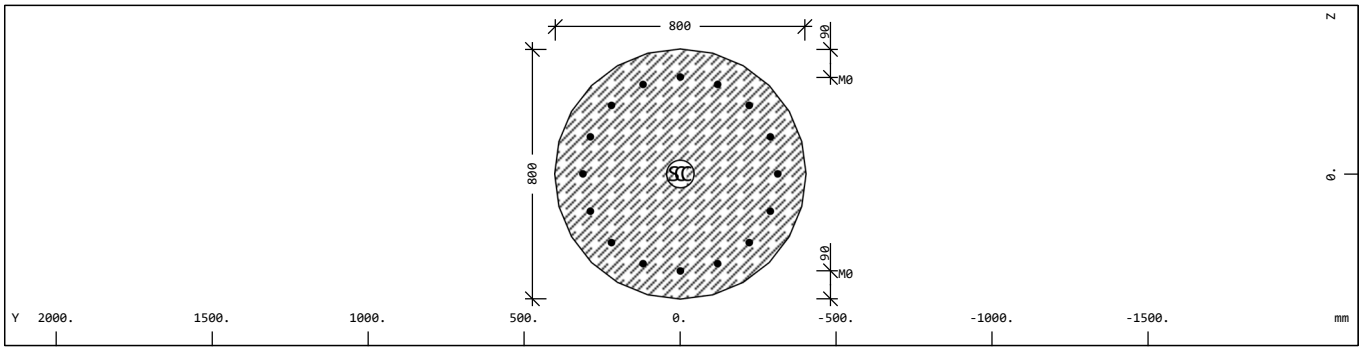
11826 DSO Bovec - vzhodna dilat. enota stavbe
Sections

Default design code is EuroNorm EN 1992-1-1:2004 Concrete Structures (Slowenija) V 2018
Structure and Tab.7.1N: AN (Buildings)

**Cross-sections static properties**

| SNo | Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|---|
| | MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 11 | 99 | 5.0265E-01 | 4.524E-01 | 2.011E-02 | 0.0 | 0.0 | 32837 | 0.0 | |
| | 2 | 4.021E-02 | 4.524E-01 | 2.011E-02 | 0.0 | 0.0 | 13682 | (COMPR) | |
| | = VODNJAK DN80 cm | | | | | | | | |
| | = VODNJAK DN80 cm | | | | | | | | |
| 21 | 1 | 3.6250E-01 | 1.875E-01 | 1.829E-02 | 0.0 | 0.0 | 32837 | 906.3 | |
| | 2 | 7.213E-03 | 1.667E-01 | 1.590E-02 | 151.7 | 32.9 | 13682 | (BEAM) | |
| | = NOSILEC B/H=25/55+25 | | | | | | | | |
| | = NOSILEC B/H=25/55+25 | | | | | | | | |
| 22 | 1 | 3.1250E-01 | 1.667E-01 | 1.176E-02 | 0.0 | 0.0 | 32837 | 781.3 | |
| | 2 | 6.172E-03 | 1.458E-01 | 1.125E-02 | 126.0 | 33.8 | 13682 | (BEAM) | |
| | = NOSILEC B/H=20/45+25 | | | | | | | | |
| | = NOSILEC B/H=20/45+25 | | | | | | | | |

**Cross section No. 11 - VODNJAK DN80 cm**




Cross section No. 11 - VODNJAK DN80 cm

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**Static properties of cross section**

| Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|
| MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 99 | 5.0265E-01 | 4.524E-01 | 2.011E-02 | 0.0 | 0.0 | 32837 | 0.0 | |
| 2 | 4.021E-02 | 4.524E-01 | 2.011E-02 | 0.0 | 0.0 | 13682 | (COMPR) | |

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] | zmin[mm] | hymin[mm] | AK[m2] | MRs | 1/WT[1/m3] | 1/WVy[1/m2] |
|---|---|---|---|---|---|---|---|
| | ymax[mm] | zmax[mm] | hzmin[mm] | AB[m2] | | 1/WT2[1/m3] | 1/WVz[1/m2] |
| 1.0E-05 | -400.0 | -400.0 | 471.2 | 3.019E-01 | 2 | 9.947E+00 | 2.653E+00 |
| | 400.0 | 400.0 | 471.2 | 5.027E-01 | | | 2.653E+00 |

**Circular/annular cross section**

| Ra[mm] | Ri[mm] | Rsa[mm] | Rsi[mm] | Asa[cm2] | Asi[cm2] | D[mm] | a[mm] | Ass[cm2/m] |
|---|---|---|---|---|---|---|---|---|
| 400.0 | | 310.0 | | 50.24 | | 20 | | |

**Additional design data**

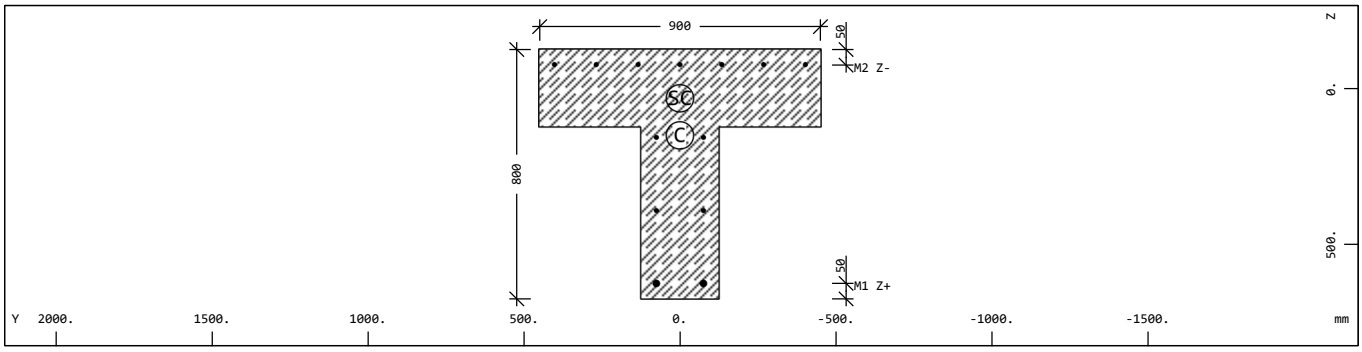
| Mat | periphery-O/-I | | deff | t-min | t-max | thet-p | thet-y | thet-z | thet-yz | yg | zg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [m2/m] | [m2/m] | [mm] | [mm] | [mm] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [mm] | [mm] |
| | 2.513 | | | 400.0 | 400.0 | 0.000 | | | | 0.0 | 0.0 |

**Reinforcement global values**

| Layer | Mref | Mat | As | As-min | As-max | D | yr | zr | L-tors | N-p | My-p | Mz-p |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | [cm2] | [cm2] | [cm2] | [mm] | [mm] | [mm] | [mm] | [kN] | [kNm] | [kNm] |
| M0 | 99 | 2 | 50.24 | 50.24 | | 20 | 0.0 | 0.0 | 1947.8 | | | |

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Sections

**Cross section No. 21 - NOSILEC B/H=25/55+25**




Cross section No. 21 - NOSILEC B/H=25/55+25

**Static properties of cross section**

| Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|
| MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 1 | 3.6250E-01 | 1.875E-01 | 1.829E-02 | 0.0 | 0.0 | 32837 | 906.3 | |
| 2 | 7.213E-03 | 1.667E-01 | 1.590E-02 | 151.7 | 32.9 | 13682 | (BEAM) | |

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] | zmin[mm] | hymin[mm] | AK[m2] | MRs | 1/WT[1/m3] | 1/WVy[1/m2] |
|---|---|---|---|---|---|---|---|
| | ymax[mm] | zmax[mm] | hzmin[mm] | AB[m2] | | 1/WT2[1/m3] | 1/WVz[1/m2] |
| 1.0E-05 | -450.0 | -276.7 | 537.1 | 1.091E-01 | 2 | 4.813E+01 | 5.875E+00 |
| | 450.0 | 523.3 | 534.5 | 3.625E-01 | | | 7.484E+00 |

**Rectangular cross-section/T-beam**

| H[mm] | Ho[mm] | Aso[cm2] | Do[mm] | So[mm] | a[mm] | B-eff[mm] |
|---|---|---|---|---|---|---|
| B[mm] | Bo[mm] | Asu[cm2] | Du[mm] | Su[mm] | a-min[mm] | incl[°] |
| | | As-type | Ds[mm] | Ss[mm] | a-max[mm] | Ass[cm2/m] |
| 800.0 | 250.0 | 7.91 | 12 | 50.0 | 150.0 | 95.2 |
| 250.0 | 900.0 | 6.28 | 20 | 50.0 | 40.0 | 90.0 |
| | | ASYM | 12 | 50.0 | 300.0 | 2.00 |

**Additional design data**

| Mat | periphery-O/-I | | deff | t-min | t-max | thet-p | thet-y | thet-z | thet-yz | yg | zg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [m2/m] | [m2/m] | [mm] | [mm] | [mm] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [mm] | [mm] |
| | 3.400 | | 213.2 | 250.0 | 900.0 | 85.492 | 45.733 | 39.759 | | 0.0 | 151.7 |

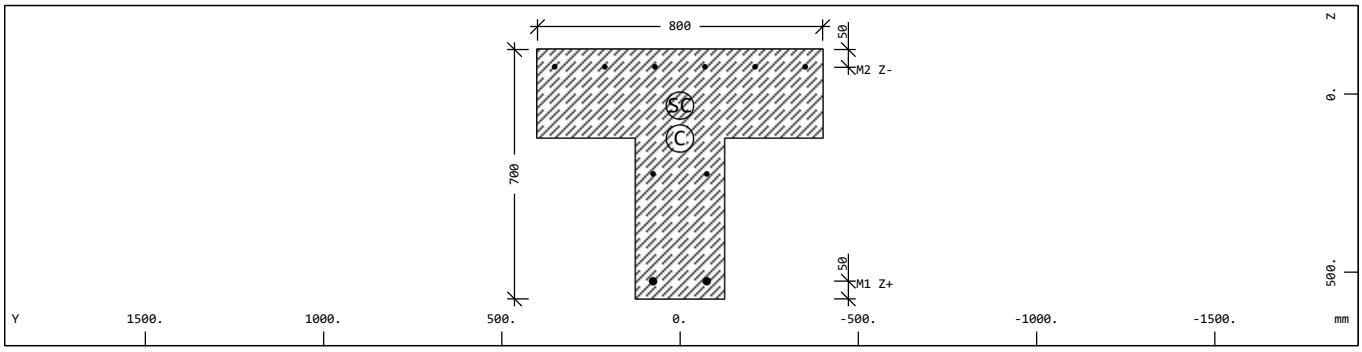
**Reinforcement global values**

| Layer | Mref | Mat | As | As-min | As-max | D | yr | zr | L-tors | N-p | My-p | Mz-p |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | [cm2] | [cm2] | [cm2] | [mm] | [mm] | [mm] | [mm] | [kN] | [kNm] | [kNm] |
| M1 Z+ | 1 | 2 | 6.28 | 6.28 | | 20 | 0.0 | 625.0 | 150.0 | | | |
| M2 Z- | 1 | 2 | 7.91 | 7.91 | | 12 | 0.0 | -75.0 | 800.0 | | | |
| M3 Y+- | 1 | 2 | 4.52 | 4.52 | 4.52 | 12 | 0.0 | 275.0 | 1400.0 | | | |

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Sections

**Cross section No. 22 - NOSILEC B/H=20/45+25**




Cross section No. 22 - NOSILEC B/H=20/45+25

**Static properties of cross section**

| Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|
| MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 1 | 3.1250E-01 | 1.667E-01 | 1.176E-02 | 0.0 | 0.0 | 32837 | 781.3 | |
| 2 | 6.172E-03 | 1.458E-01 | 1.125E-02 | 126.0 | 33.8 | 13682 | (BEAM) | |

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] | zmin[mm] | hymin[mm] | AK[m2] | MRs | 1/WT[1/m3] | 1/WVy[1/m2] |
|---|---|---|---|---|---|---|---|
| | ymax[mm] | zmax[mm] | hzmin[mm] | AB[m2] | | 1/WT2[1/m3] | 1/WVz[1/m2] |
| 1.0E-05 | -400.0 | -251.0 | 478.5 | 9.598E-02 | 2 | 5.656E+01 | 6.415E+00 |
| | 400.0 | 449.0 | 466.7 | 3.125E-01 | | | 8.571E+00 |

**Rectangular cross-section/T-beam**

| H[mm] | Ho[mm] | Aso[cm2] | Do[mm] | So[mm] | a[mm] | B-eff[mm] |
|---|---|---|---|---|---|---|
| B[mm] | Bo[mm] | Asu[cm2] | Du[mm] | Su[mm] | a-min[mm] | incl[°] |
| | | As-type | Ds[mm] | Ss[mm] | a-max[mm] | Ass[cm2/m] |
| 700.0 | 250.0 | 6.78 | 12 | 50.0 | 150.0 | 92.1 |
| 250.0 | 800.0 | 6.28 | 20 | 50.0 | 40.0 | 90.0 |
| | | ASYM | 12 | 50.0 | 300.0 | 2.00 |

**Additional design data**

| Mat | periphery-O/-I | | deff | t-min | t-max | thet-p | thet-y | thet-z | thet-yz | yg | zg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [m2/m] | [m2/m] | [mm] | [mm] | [mm] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [mm] | [mm] |
| | 3.000 | | 208.3 | 250.0 | 800.0 | 57.532 | 29.400 | 28.132 | | 0.0 | 126.0 |

**Reinforcement global values**

| Layer | Mref | Mat | As [cm2] | As-min [cm2] | As-max [cm2] | D [mm] | yr [mm] | zr [mm] | L-tors [mm] | N-p [kN] | My-p [kNm] | Mz-p [kNm] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M1 Z+ | 1 | 2 | 6.28 | 6.28 | | 20 | 0.0 | 525.0 | 150.0 | | | |
| M2 Z- | 1 | 2 | 6.78 | 6.78 | | 12 | 0.0 | -75.0 | 700.0 | | | |
| M3 Y+- | 1 | 2 | 2.26 | 2.26 | 2.26 | 12 | 0.0 | 225.0 | 1200.0 | | | |

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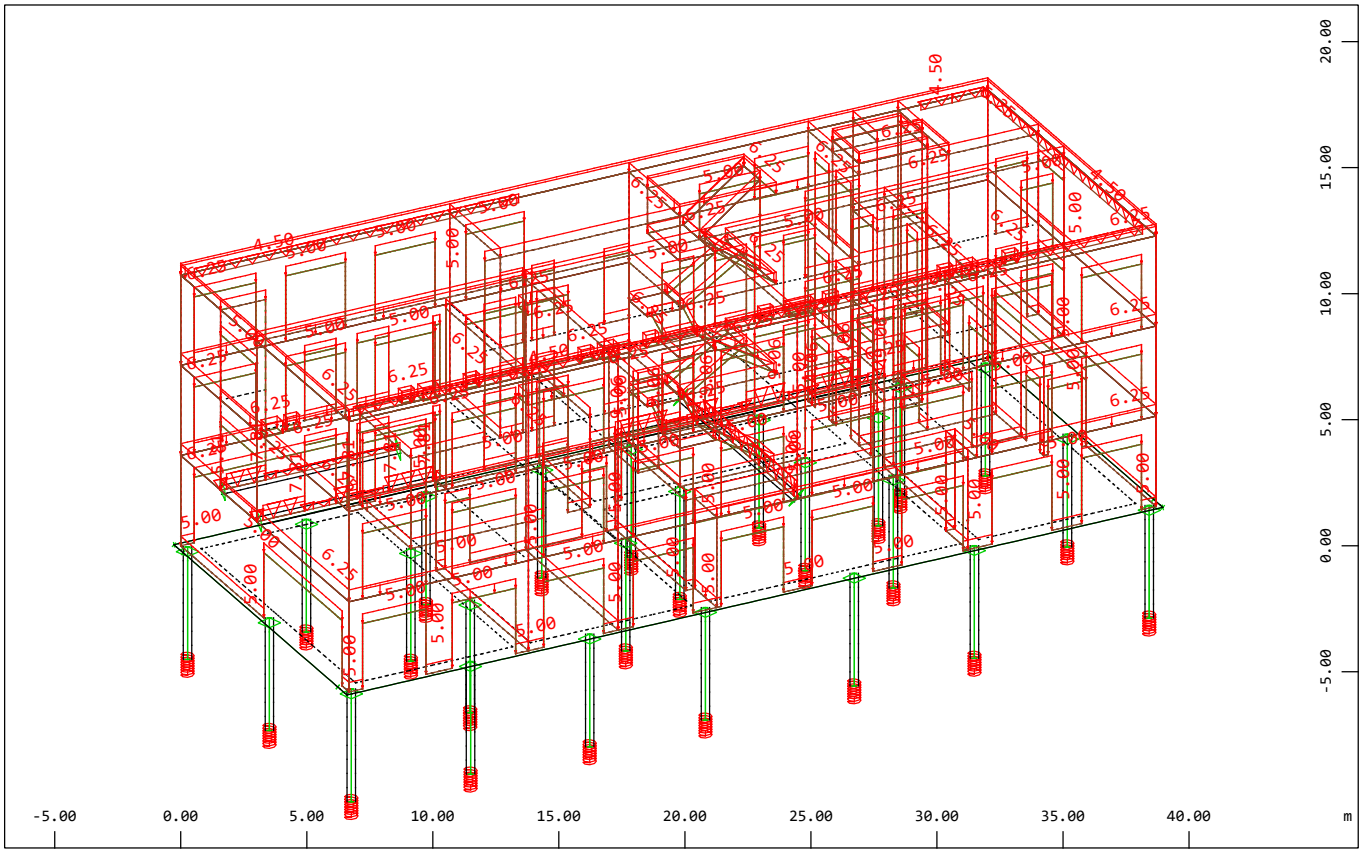
11826 DSO Bovec - vzhodna dilat. enota stavbe
Generation of Node and Element Loads

**Actions**

| type | part | sup | Designation | γ-u | γ-f | γ-a | $\psi_0$ | $\psi_1$ | $\psi_2$ | $\psi_1$inf |
|---|---|---|---|---|---|---|---|---|---|---|
| G_1 | G | perm | dead load g1 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | | 1 | Lastna | | | | | | | |
| | | 9 | Lastna-temelji | | | | | | | |
| G_2 | G | perm | dead load g2 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | | 2 | Stalna | | | | | | | |
| | | 3 | Stalna-predelne | | | | | | | |
| | | 4 | Stalna-fasade | | | | | | | |
| | | 5 | Stalna-klimati | | | | | | | |
| | | 6 | Stalna-streha-les | | | | | | | |
| C | P | perm | creep + shrinkage | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Q_A | Q | cond | Pay load residential cat. A | 1.50 | 0.00 | 1.00 | 0.70 | 0.50 | 0.30 | 1.00 |
| Q_C | Q | cond | Pay load assembling cat. C | 1.50 | 0.00 | 1.00 | 0.70 | 0.70 | 0.60 | 1.00 |
| | | 11 | Koristna C | | | | | | | |
| Q_H | Q | excl | Live load on roofs cat. H | 1.50 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | 12 | Koristna H | | | | | | | |
| S | Q | cond | snow loading | 1.50 | 0.00 | 1.00 | 0.50 | 0.20 | 0.00 | 0.20 |
| | | 21 | Sneg | | | | | | | |
| E | E | usex | seismic loading | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | | | Reliability factor Kfi | 1.000 | | | | | | |
| | | | Reduction factor xsi | 0.850 | | | | | | |

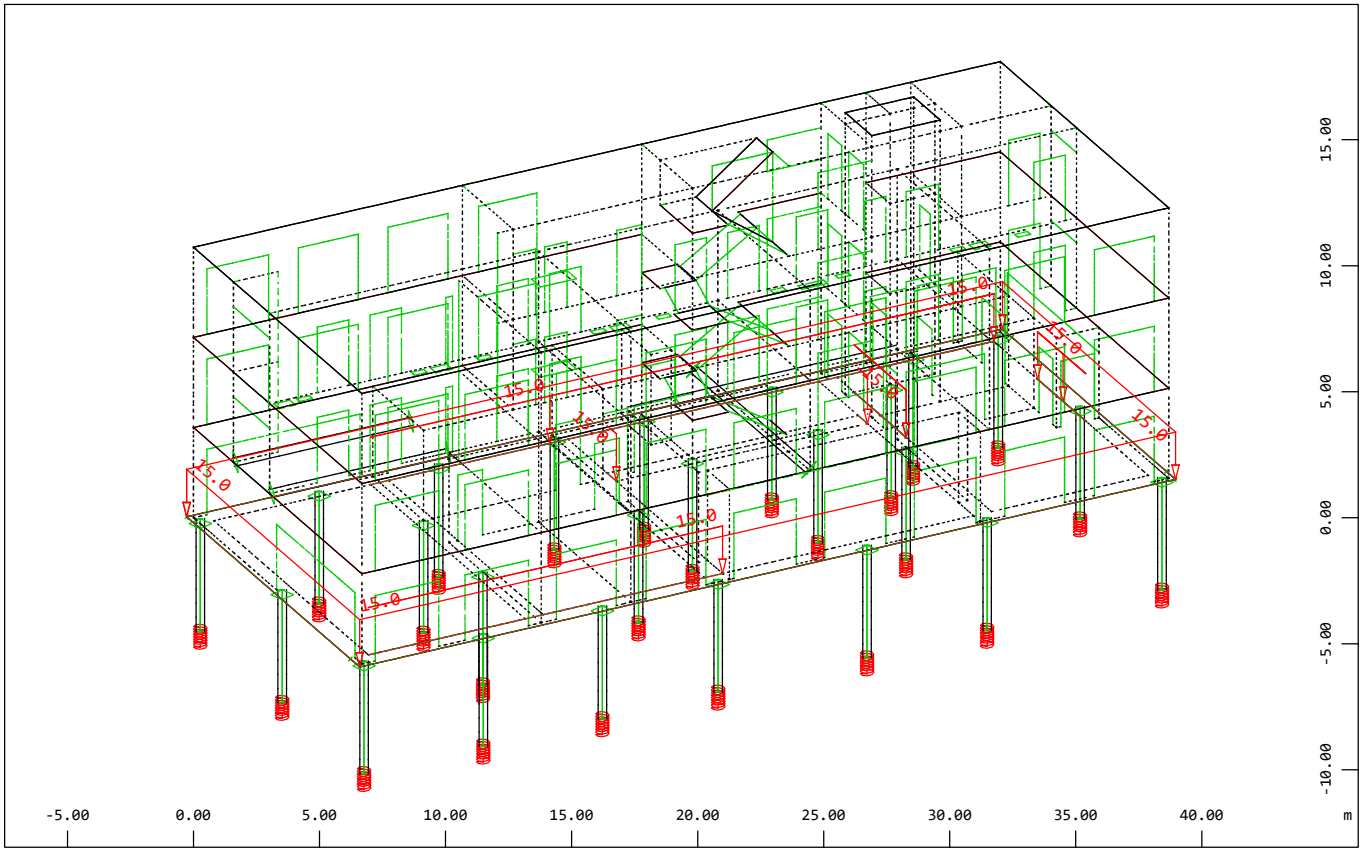
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11826 DSO Bovec - vzhodna dilat. enota stavbe
Obtezba: lastna, lastna-temelji




Z Y X
All loads, Loadcase 1 Lastna , (1 cm 3D = unit) QUAD-Area dead load in global Z in Element (Unit=35.6 kN/m2,Min=-6.25 Max=-4.50 ), Beam dead load in global Z (Unit=35.6 kN/m,Min=-9.06 Max=-2.81 ), Free line load (force) in global Z (Unit=35.6

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

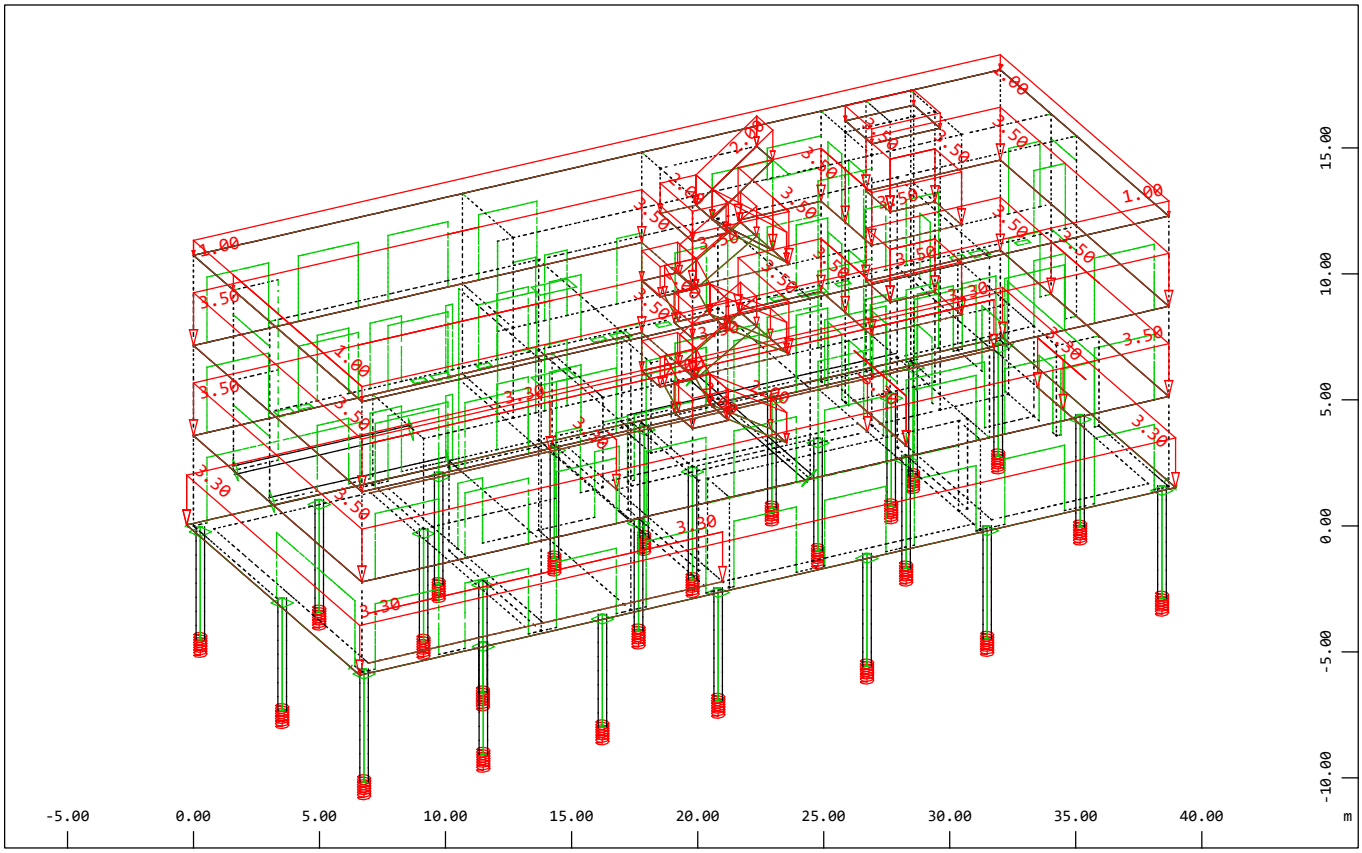



Z Y X
All loads, Loadcase 9 Lastna-temelji , (1 cm 3D = unit) Free area load (force) in global Z (Unit=21.4 kN/m2 ) (Min=-15.0) (Max=-15.0)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

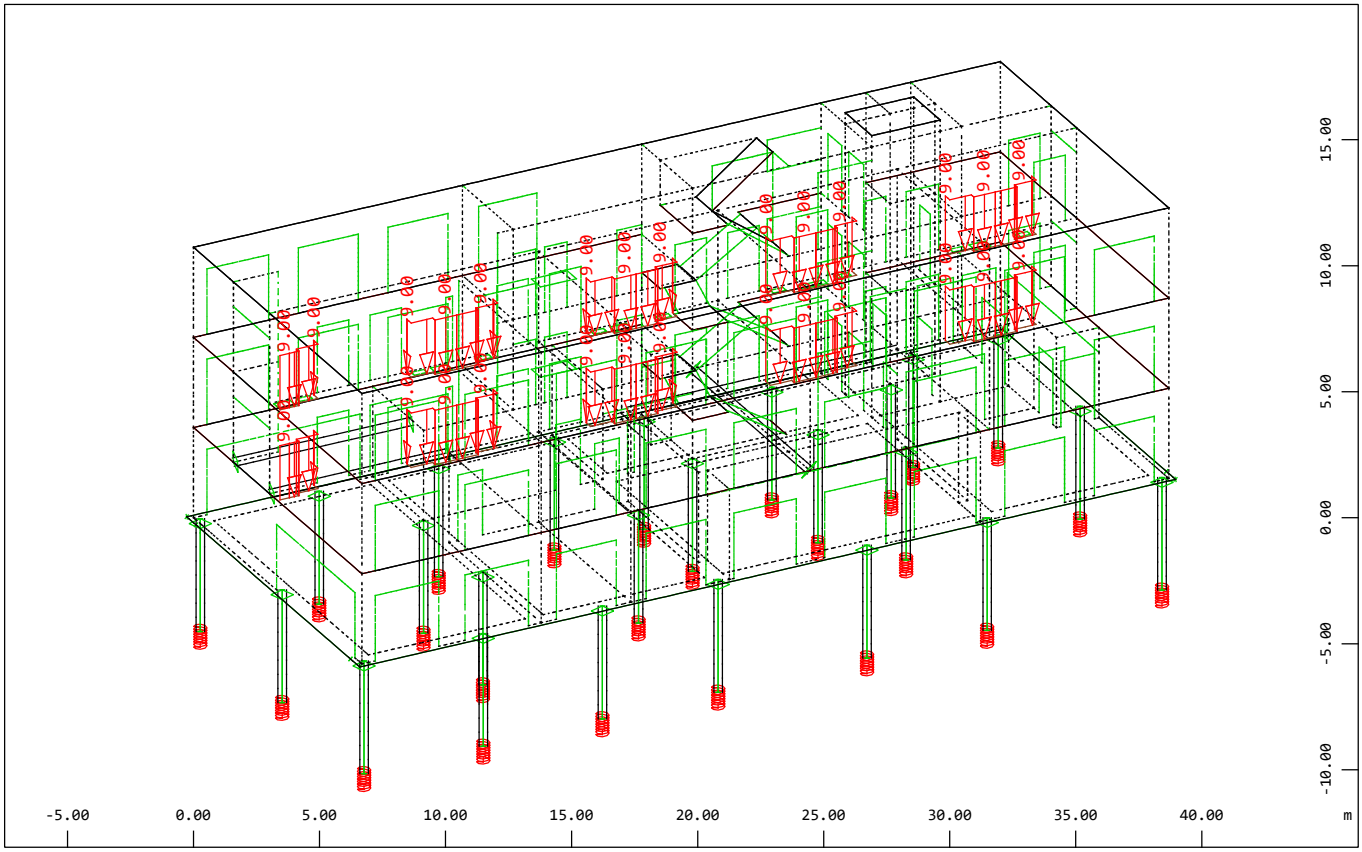
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11826 DSO Bovec - vzhodna dilat. enota stavbe
Obtezba: stalna, stalna-predelne




Z Y X
All loads, Loadcase 2 Stalna , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=4.48 kN/m2 ) (Min=-3.50) (Max=-1.00)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

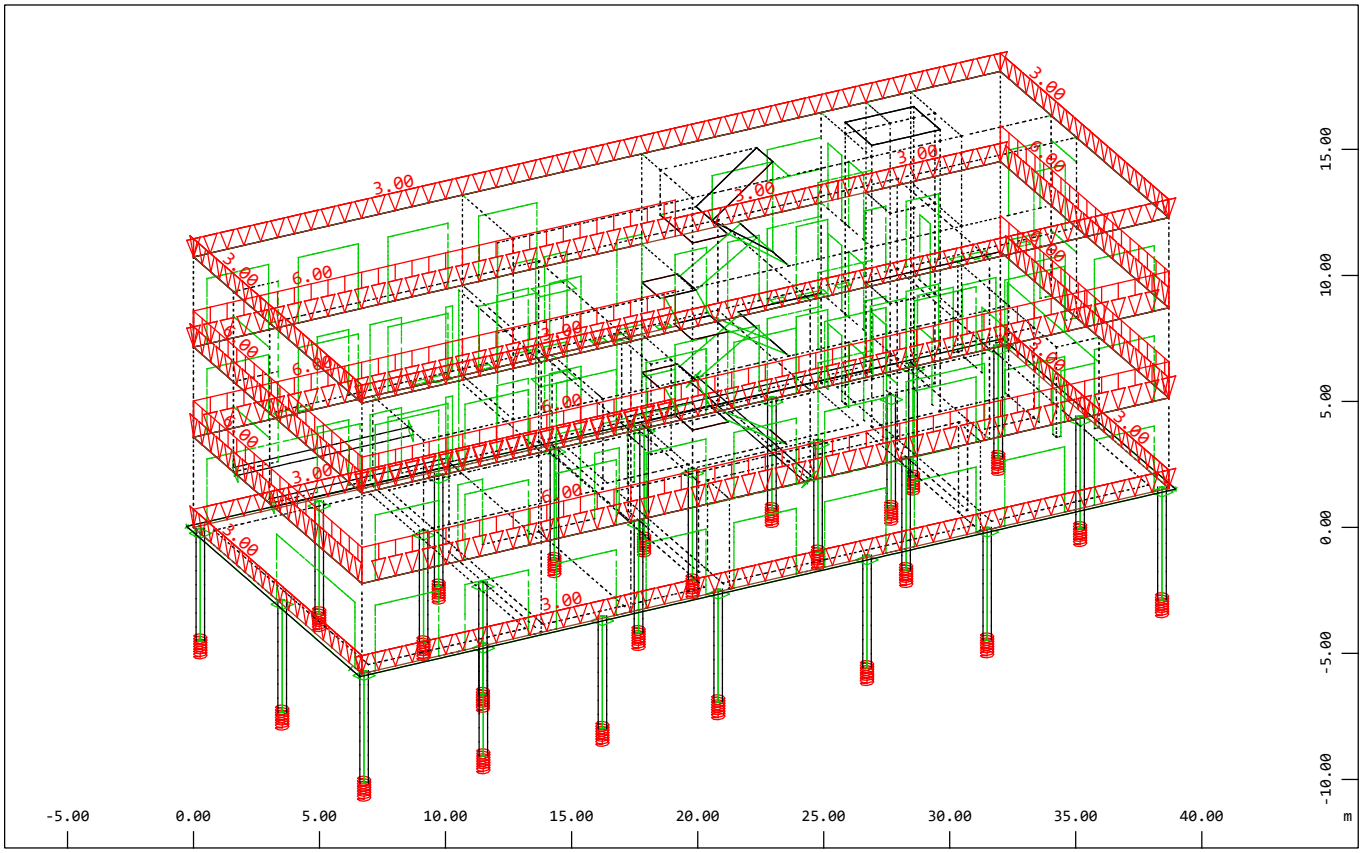



Z Y X
All loads, Loadcase 3 Stalna-predelne , (1 cm 3D = unit) Free line load (force) in
global Z (Unit=11.2 kN/m ) (Min=-9.00) (Max=-9.00)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

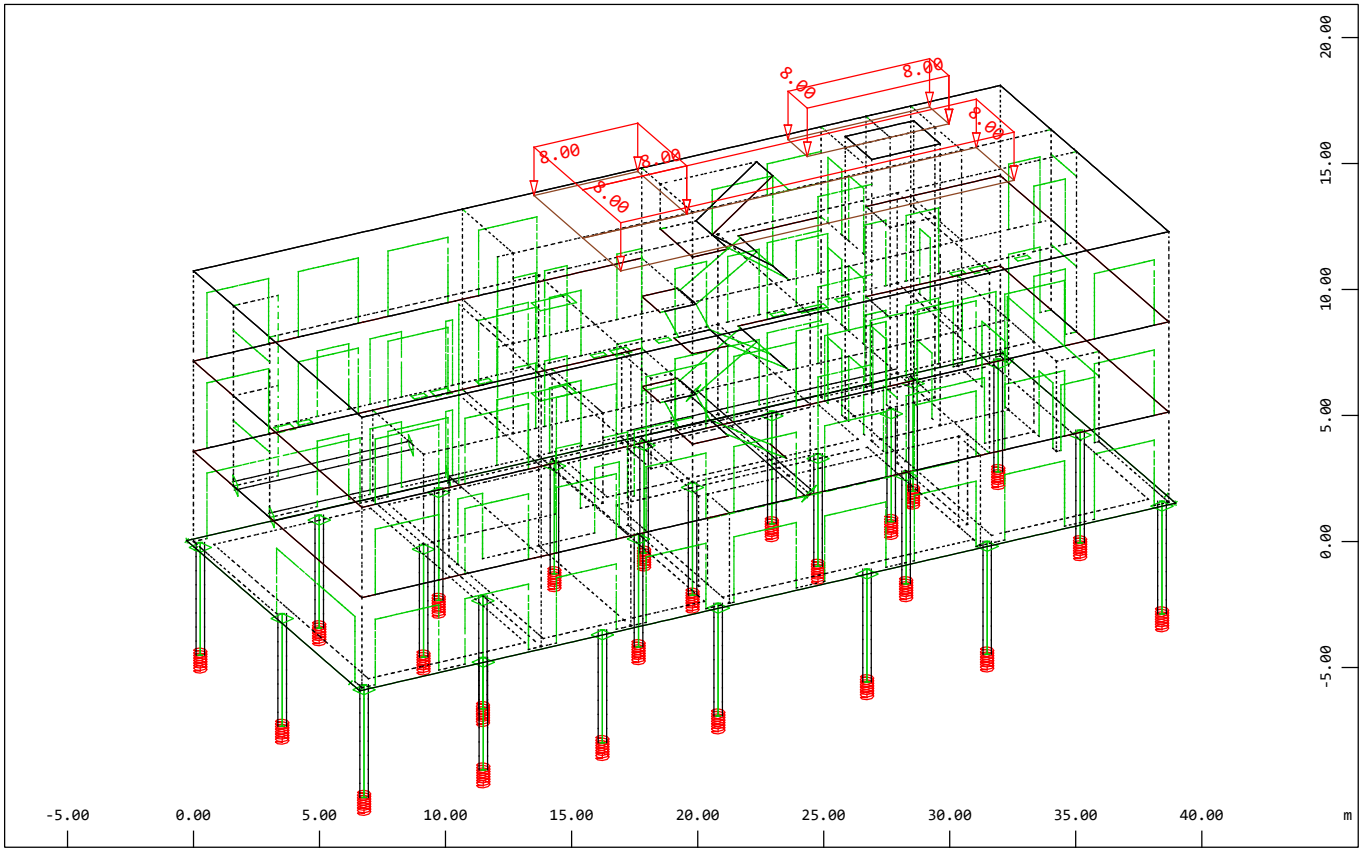
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11826 DSO Bovec - vzhodna dilat. enota stavbe
Obtezba: stalna-fasada, stalna-klimati




Z
Y
X
All loads, Loadcase 4 Stalna-fasade , (1 cm 3D = unit) Free line load (force) in global
Z (Unit=11.2 kN/m ) (Min=-6.00) (Max=-3.00)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

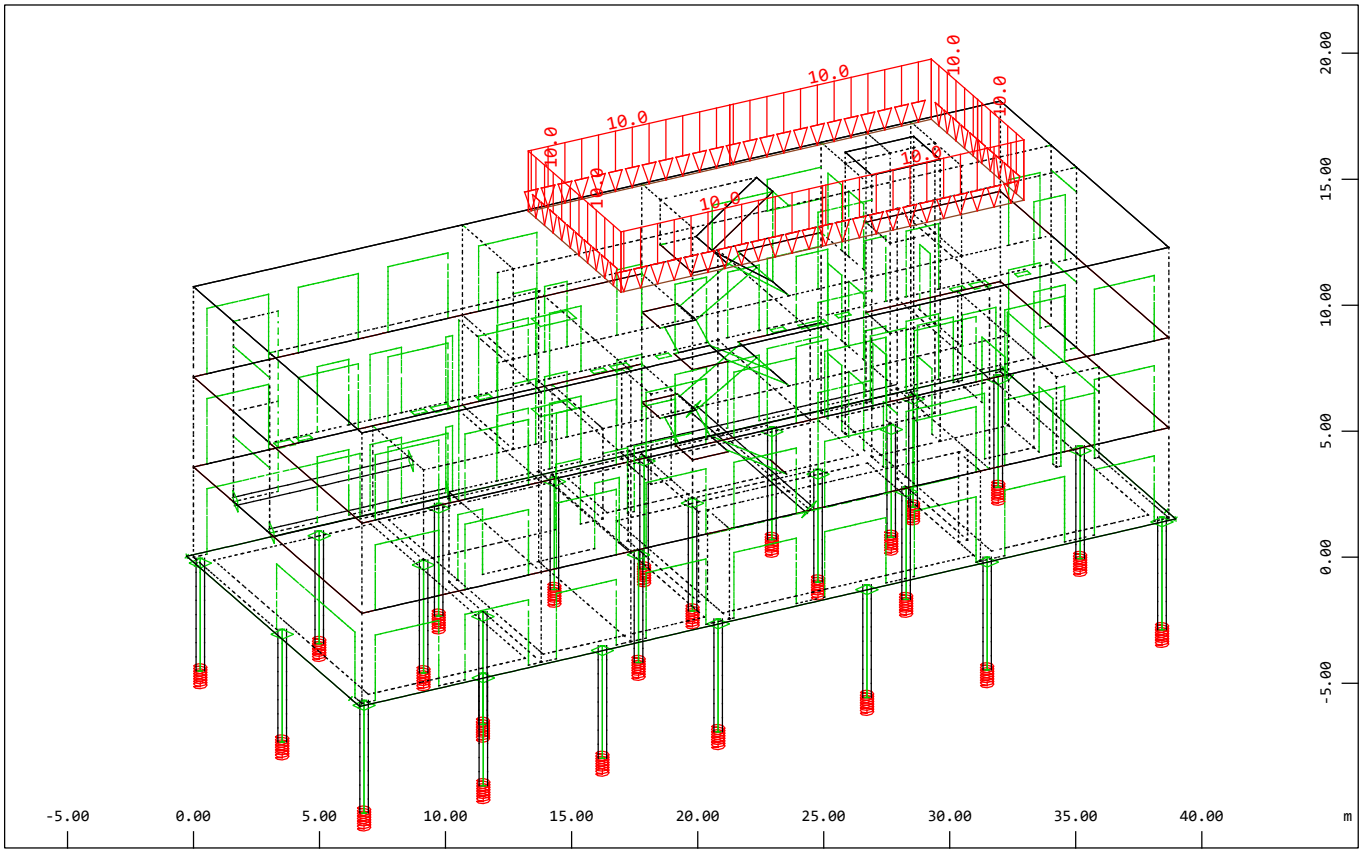



Z
Y
X
All loads, Loadcase 5 Stalna-klimati , (1 cm 3D = unit) Free area load (force) in global
Z (Unit=11.2 kN/m2 ) (Min=-8.00) (Max=-8.00)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Obtezba: stalna-jeklena streha



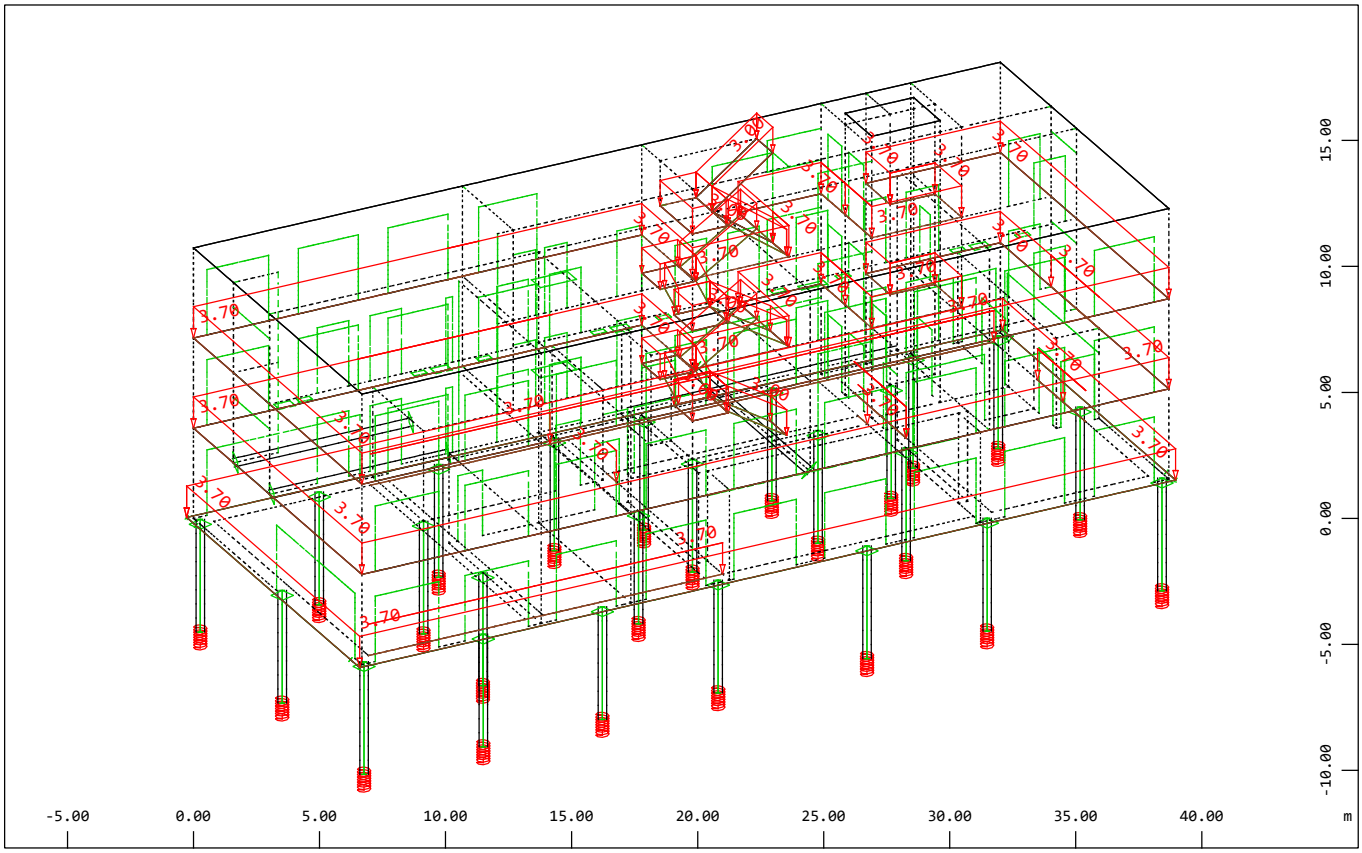

Z
Y
X

All loads, Loadcase 6 Stalna-streha-les , (1 cm 3D = unit) Free line load (force) in
global Z (Unit=11.2 kN/m ) (Min=-10.0) (Max=-10.0)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

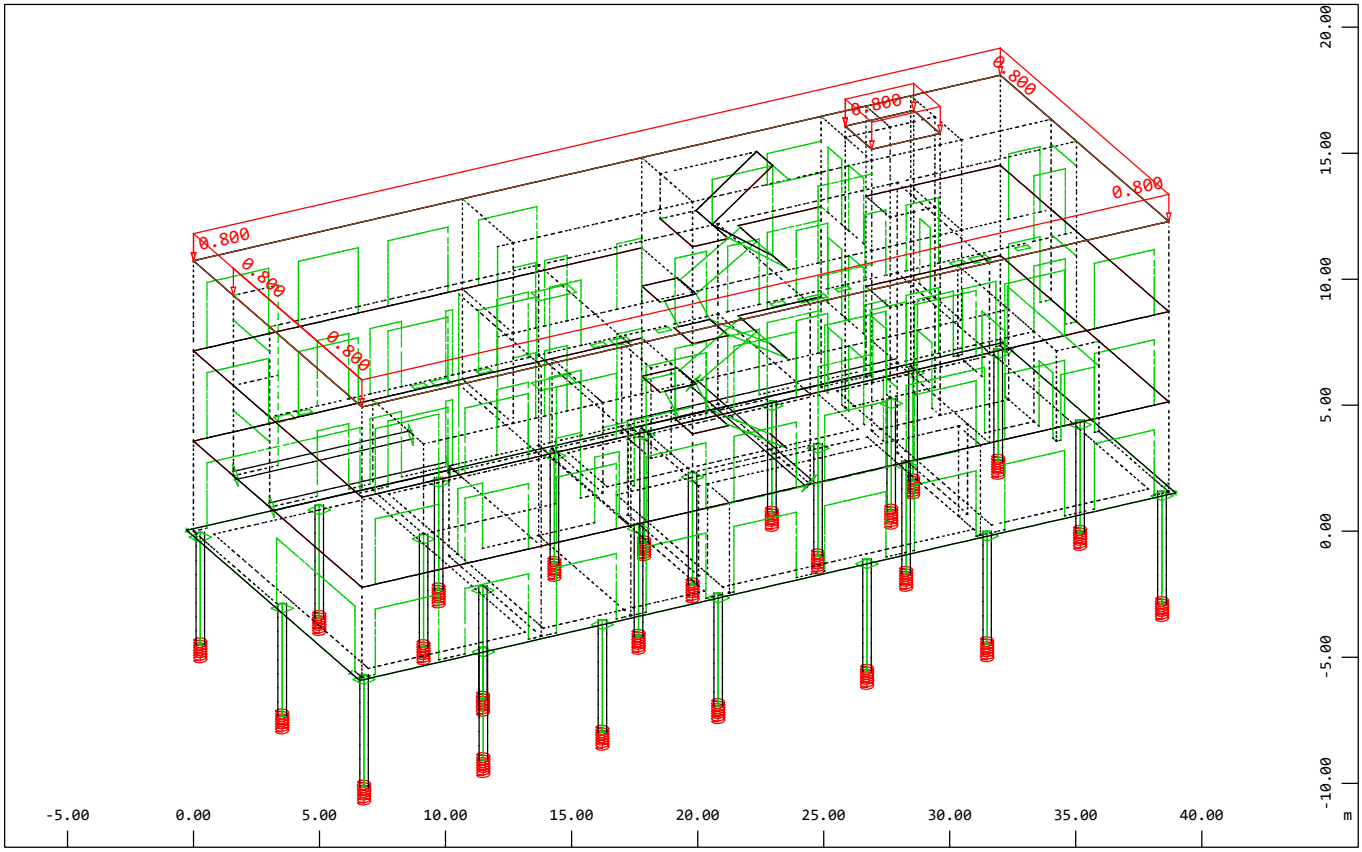
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11826 DSO Bovec - vzhodna dilat. enota stavbe
Obtezba: koristna C in H




Z Y X
All loads, Loadcase 11 Koristna C , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=8.00 kN/m2 ) (Min=-3.70) (Max=-3.00)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

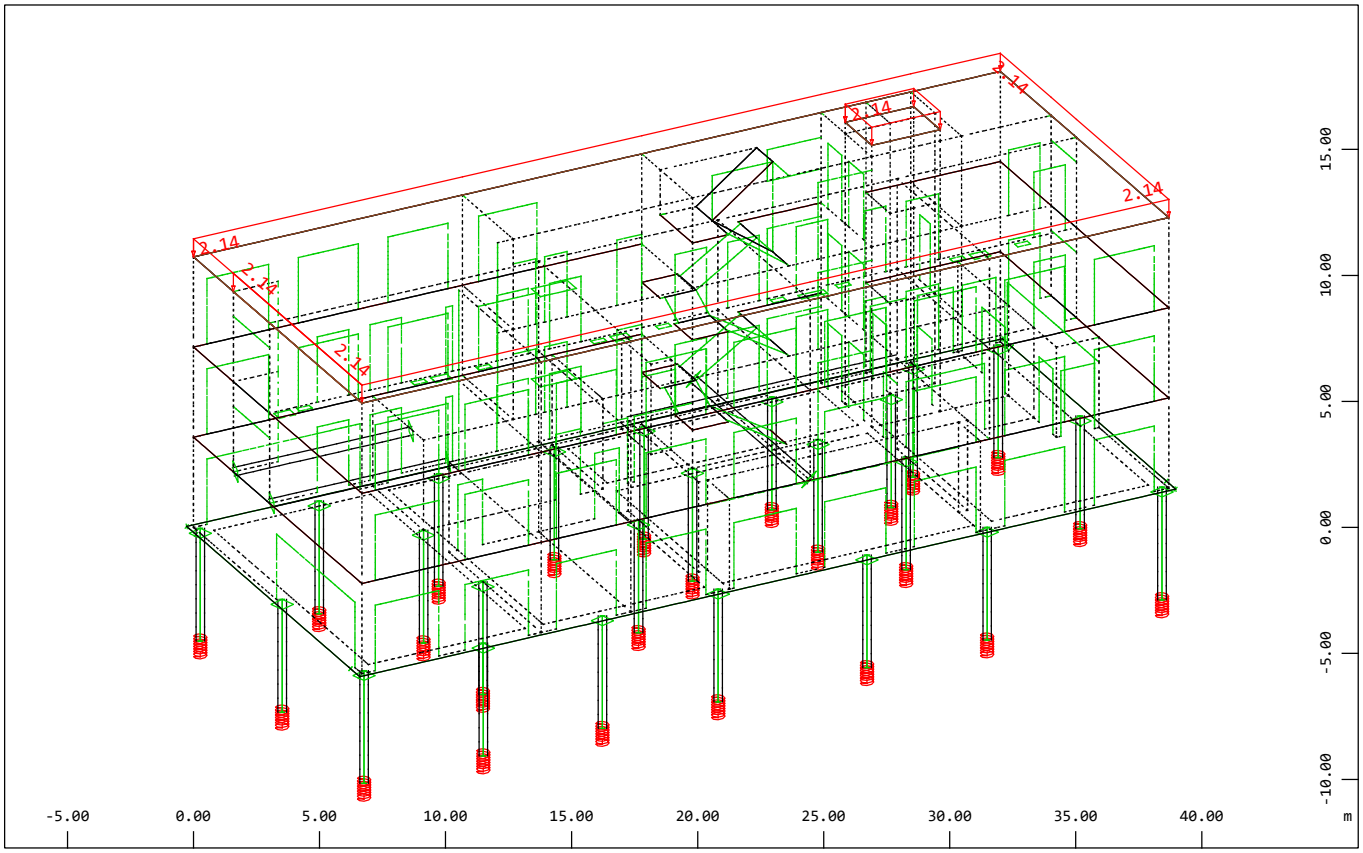



Z Y X
All loads, Loadcase 12 Koristna H , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=2.00 kN/m2 ) (Min=-0.800) (Max=-0.800)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Obtezba: sneg




Z
Y
X
All loads, Loadcase 21 Sneg , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=8.00 kN/m2 ) (Min=-2.14) (Max=-2.14)

M 1 : 300
X * 0.606
Y * 0.912
Z * 0.895

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Reologija (CSM)

**Global Settings**

Dead load of elements is automatically activated.
Creep and shrinkage values are calculated in advance in CSM.
Creep values are calculated individually for each stage load part (backward creeping).

**Construction Stages**

| CS | Type | t [d] | RH [%] | T [°C] | laun_1 [m] | laun_2 [m] | Designation |
|---|---|---|---|---|---|---|---|
| 10 | G_1 | | | | | | G_1 |
| 15 | C_1 | 10 | 70 | 20 | | | Creepstep |
| 25 | C_1 | 28 | 70 | 20 | | | Creep til g_2 |
| 30 | G_2 | | | | | | G_2 |
| 35 | C_1 | 100 | 70 | 20 | | | Creep til opening |
| 40 | ZC | | | | | | Part of Q load for C+S |
| 45 | C_2 | 30000 | 70 | 20 | | | Creep til t-infinite |

**Group Properties**

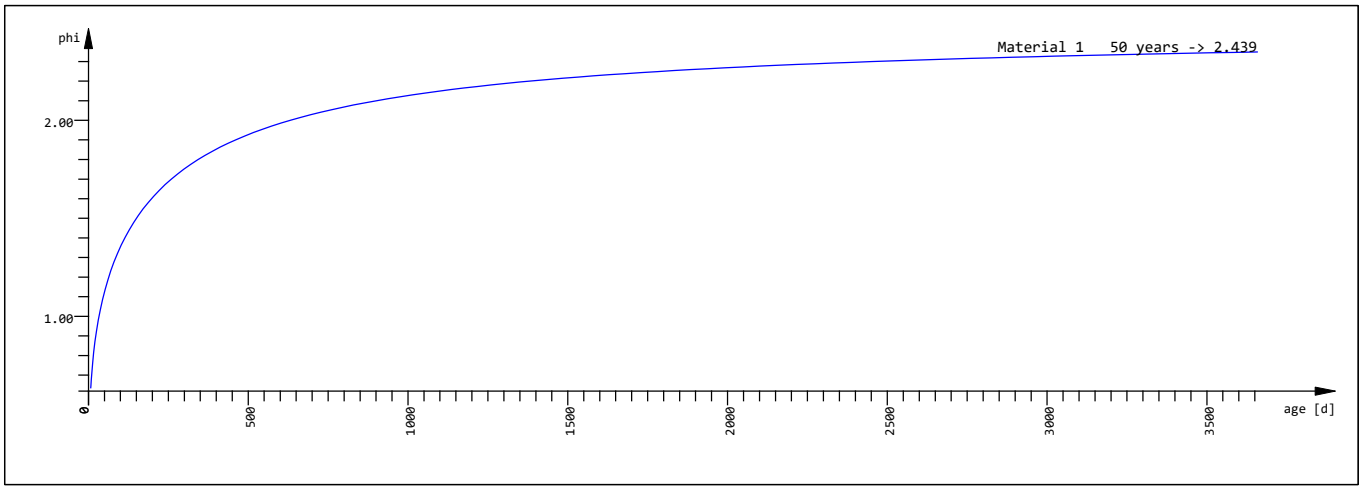
| Grp | active from CS | active until CS | deadload from CS | Hfix from | Bedd from | Deck from | ASTI until | t0 [d] | ts [d] | FAC1 | PHIF | QUEA | QEMX | FACD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 10 | 9999 | 10 | | | | | 100 | 3 | | 1.00 | | | |
| 101 | 10 | 9999 | 10 | | | | | 100 | 3 | | 1.00 | | | |
| 105 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 110 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 115 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 120 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 125 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 130 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 201 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 202 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 203 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 204 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 205 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 206 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 207 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 208 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 209 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 210 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 211 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 251 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 252 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 253 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 254 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 255 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |
| 256 | 10 | 9999 | 10 | | | | | 7 | 3 | | 1.00 | | | |

**Additional Loads**

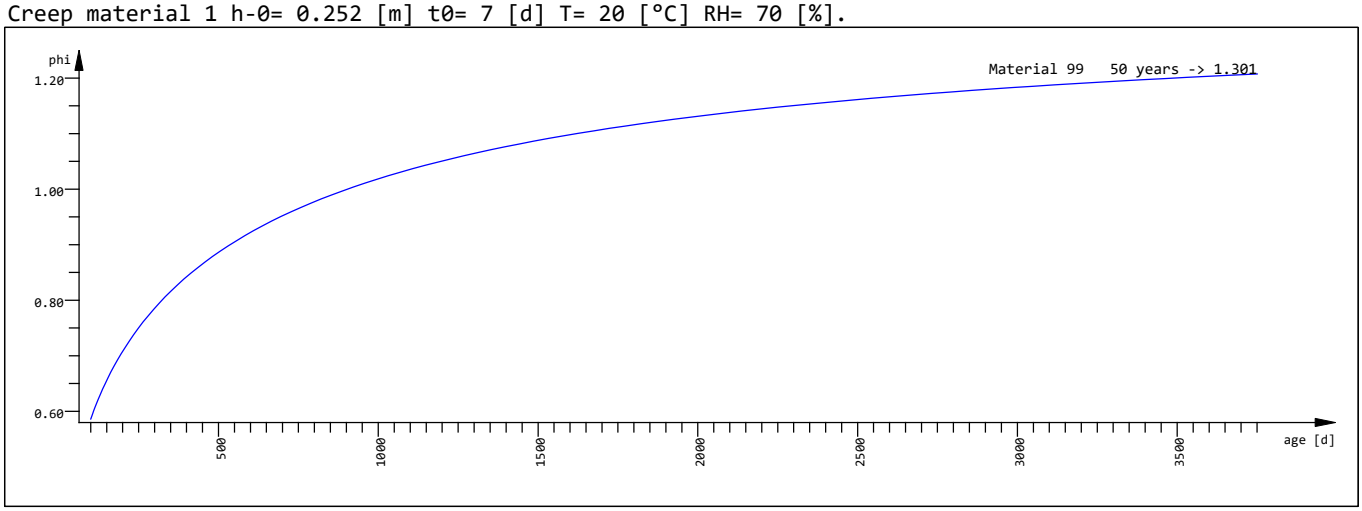
| LC | active from CS | active until CS | factor | |
|---|---|---|---|---|
| 2 | 30 | 9999 | 1.000000 | |
| 3 | 30 | 9999 | 1.000000 | |
| 4 | 30 | 9999 | 1.000000 | |
| 5 | 30 | 9999 | 1.000000 | |
| 6 | 30 | 9999 | 1.000000 | |
| 9 | 10 | 9999 | 1.000000 | |
| 11 | 40 | 9999 | 0.600000 | |

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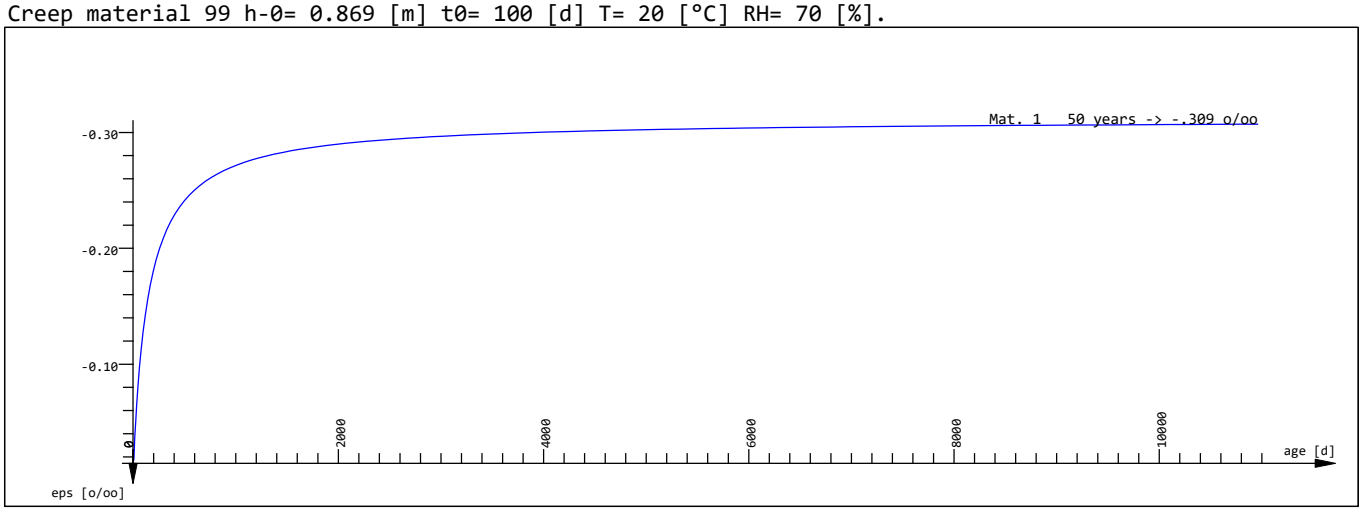
11826 DSO Bovec - vzhodna dilat. enota stavbe
Reologija (CSM)




Creep material 1 h-0= 0.252 [m] t0= 7 [d] T= 20 [°C] RH= 70 [%].



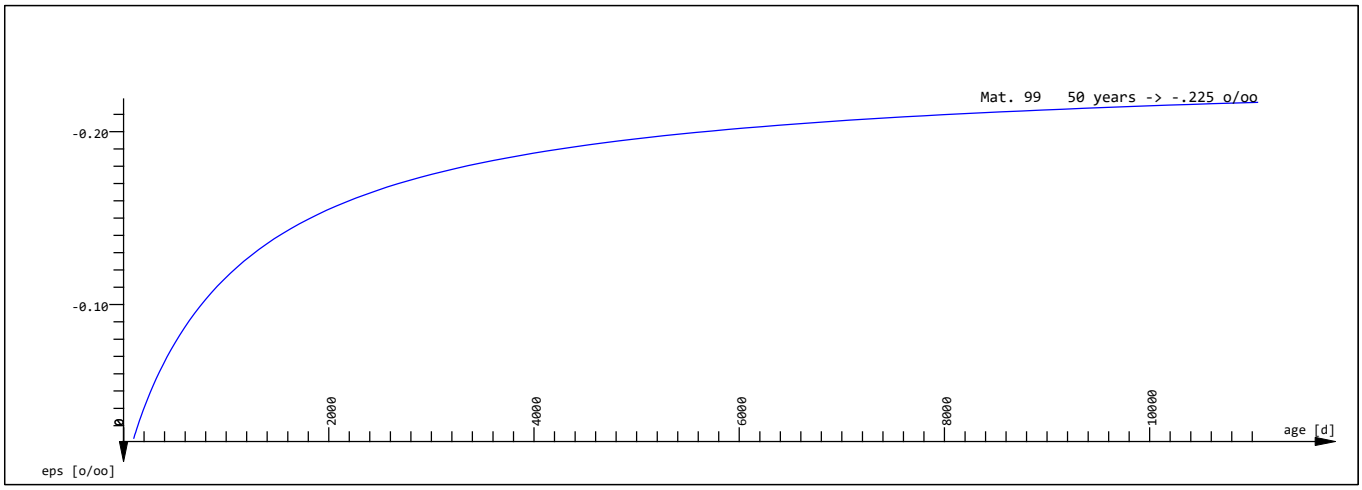

Creep material 99 h-0= 0.869 [m] t0= 100 [d] T= 20 [°C] RH= 70 [%].




Shrinkage material 1 h-0= 0.252 [m] T= 20 [°C] RH= 70 [%].

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Reologija (CSM)




Shrinkage material 99 h-0= 0.869 [m] T= 20 [°C] RH= 70 [%].

Analysis of creep and shrinkage according to EN 1992-1-1:2004+AC:2010/EN 1992-2:2005+AC:2008
RCRE creep values of later acting load parts are not printed (ECHO RCRE).

**Creep Values**

| Grp | Mat | h-0 [mm] | t0 [d] | CS 15 | CS 25 | CS 35 | CS 45 | total φ-eff |
|---|---|---|---|---|---|---|---|---|
| | | t[d] | ---> | 10 | 28 | 100 | 30000 | 30138 |
| | | RH[%] | ---> | 70 | 70 | 70 | 70 | |
| | | T[°C] | ---> | 20 | 20 | 20 | 20 | |
| 100 | 99 | 869.0 | 100 | 0.30 | 0.14 | 0.20 | 0.67 | 1.31 / 1.05[1] |
| 101 | 99 | 400.0 | 100 | 0.37 | 0.18 | 0.23 | 0.63 | 1.41 / 1.05[1] |
| 105 | 1 | 252.0 | 7 | 0.71 | 0.33 | 0.43 | 0.98 | 2.45 / 1.05[1] |
| 110 | 1 | 350.0 | 7 | 0.64 | 0.31 | 0.40 | 1.02 | 2.37 / 1.05[1] |
| 115 | 1 | 252.0 | 7 | 0.71 | 0.33 | 0.43 | 0.98 | 2.45 / 1.05[1] |
| 120 | 1 | 350.0 | 7 | 0.64 | 0.31 | 0.40 | 1.02 | 2.37 / 1.05[1] |
| 125 | 1 | 252.0 | 7 | 0.71 | 0.33 | 0.43 | 0.98 | 2.45 / 1.05[1] |
| 130 | 1 | 350.0 | 7 | 0.64 | 0.31 | 0.40 | 1.02 | 2.37 / 1.05[1] |
| 201 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 202 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 203 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 204 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 205 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 206 | 1 | 213.0 | 7 | 0.74 | 0.35 | 0.44 | 0.96 | 2.49 / 1.05[1] |
| 207 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 208 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 209 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 210 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 211 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 251 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 252 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 253 | 1 | 208.0 | 7 | 0.75 | 0.35 | 0.45 | 0.96 | 2.50 / 1.05[1] |
| 254 | 1 | 210.0 | 7 | 0.74 | 0.35 | 0.44 | 0.96 | 2.50 / 1.05[1] |
| 255 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |
| 256 | 1 | 280.0 | 7 | 0.69 | 0.33 | 0.42 | 0.99 | 2.42 / 1.05[1] |

[1] In AQB and ASE the creep values will be devided by the printed factor due to the problem of the reference E-modulus [Ec/Ecm] Please refer to basic document EN 1992-1-1 Eq.3.14

**Shrinkage Values *10^-6**

| Grp | Mat | h-0 [mm] | ts [d] | CS 15 | CS 25 | CS 35 | CS 45 | total ε-cs |
|---|---|---|---|---|---|---|---|---|
| | | t[d] | ---> | 10 | 28 | 100 | 30000 | 30138 |
| | | RH[%] | ---> | 70 | 70 | 70 | 70 | |

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Reologija (CSM)

**Shrinkage Values *10^-6**

| Grp | Mat | h-0 [mm] | ts [d] | CS 15 | CS 25 | CS 35 | CS 45 | total ε-cs |
|---|---|---|---|---|---|---|---|---|
| | | T[°C] | ---> | 20 | 20 | 20 | 20 | |
| 100 | 99 | 869.0 | 3 | -2.7 | -6.9 | -20.3 | -200. | -230. |
| 101 | 99 | 400.0 | 3 | -5.3 | -13.5 | -35.8 | -151. | -205. |
| 105 | 1 | 252.0 | 3 | -23.7 | -45.7 | -84.3 | -156. | -310. |
| 110 | 1 | 350.0 | 3 | -17.1 | -32.2 | -65.5 | -175. | -290. |
| 115 | 1 | 252.0 | 3 | -23.7 | -45.7 | -84.3 | -156. | -310. |
| 120 | 1 | 350.0 | 3 | -17.1 | -32.2 | -65.5 | -175. | -290. |
| 125 | 1 | 252.0 | 3 | -23.7 | -45.7 | -84.3 | -156. | -310. |
| 130 | 1 | 350.0 | 3 | -17.1 | -32.2 | -65.5 | -175. | -290. |
| 201 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 202 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 203 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 204 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 205 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 206 | 1 | 213.0 | 3 | -28.8 | -54.7 | -93.6 | -145. | -322. |
| 207 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 208 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 209 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 210 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 211 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 251 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 252 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 253 | 1 | 208.0 | 3 | -29.6 | -56.0 | -94.8 | -143. | -323. |
| 254 | 1 | 210.0 | 3 | -29.2 | -55.5 | -94.3 | -144. | -323. |
| 255 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |
| 256 | 1 | 280.0 | 3 | -21.1 | -40.5 | -77.7 | -161. | -301. |

In case of ts lower t0, shrinkage from ts-t0 is not taken into account!
(Losses due to shrinkage are calculated starting at time t0)

**Overview loadcases. (see also CSM manual chapter 2 loadcases)**

```
-------------------------------------------------------------------------
Total CS displacements and forces starting   at loadcase number.  4000
Difference displacements and forces starting at loadcase number.  5000
AQB inner stresses from creep and shrinkage  at loadcase number.  6000
Stress results of the AQB-LCST-evaluation    at loadcase number.  7000
  [to check prestress normal force after creep and shrinkage :
   -> WINGRAF beam normal force LC 7000ff                      ]
```

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**Sum of Masses**

| | TM-X[t] | TM-Y[t] | TM-Z[t] | RM-X[tm2] | RM-Y[tm2] | RM-Z[tm2] |
|---|---|---|---|---|---|---|
| total | 3204.625 | 3204.625 | 0.000 | 1.487 | 1.852 | 0.896 |
| activ | 3202.746 | 3203.849 | 0.000 | 1.487 | 1.852 | 0.896 |

**Eigenfrequencies**

Using Lanczos Method
Iterationsvectors 100

| No. | LC | Eigenvalue [1/Sec2] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|---|---|---|---|---|---|---|
| 1 | 1001 | 1.06203E+03 | 4.44E-19 | 5.187 | 0.192802 | 0.00000 |
| 2 | 1002 | 1.21597E+03 | 1.84E-19 | 5.550 | 0.180185 | 0.00000 |
| 3 | 1003 | 2.23033E+03 | 1.26E-18 | 7.516 | 0.133044 | 0.00000 |
| 4 | 1004 | 1.04422E+04 | 5.19E-19 | 16.264 | 0.061487 | 0.00000 |
| 5 | 1005 | 1.21229E+04 | 3.15E-18 | 17.524 | 0.057066 | 0.00000 |
| 6 | 1006 | 1.32279E+04 | 4.01E-18 | 18.305 | 0.054630 | 0.00000 |
| 7 | 1007 | 1.34546E+04 | 8.16E-18 | 18.461 | 0.054168 | 0.00000 |
| 8 | 1008 | 1.36179E+04 | 6.75E-18 | 18.573 | 0.053842 | 0.00000 |
| 9 | 1009 | 1.36729E+04 | 7.58E-18 | 18.610 | 0.053734 | 0.00000 |
| 10 | 1010 | 1.44433E+04 | 1.19E-17 | 19.127 | 0.052281 | 0.00000 |
| 11 | 1011 | 1.46503E+04 | 9.21E-18 | 19.264 | 0.051911 | 0.00000 |
| 12 | 1012 | 1.48605E+04 | 1.83E-17 | 19.402 | 0.051542 | 0.00000 |
| 13 | 1013 | 1.59978E+04 | 1.62E-17 | 20.130 | 0.049676 | 0.00000 |
| 14 | 1014 | 1.61263E+04 | 1.36E-17 | 20.211 | 0.049478 | 0.00000 |
| 15 | 1015 | 1.65245E+04 | 8.93E-18 | 20.459 | 0.048878 | 0.00000 |
| 16 | 1016 | 1.92470E+04 | 1.52E-17 | 22.080 | 0.045290 | 0.00000 |
| 17 | 1017 | 2.07469E+04 | 2.51E-17 | 22.924 | 0.043622 | 0.00000 |
| 18 | 1018 | 2.12713E+04 | 4.15E-18 | 23.212 | 0.043081 | 0.00000 |
| 19 | 1019 | 2.15881E+04 | 3.72E-17 | 23.384 | 0.042763 | 0.00000 |
| 20 | 1020 | 2.22259E+04 | 1.98E-17 | 23.727 | 0.042145 | 0.00000 |
| 21 | 1021 | 2.26124E+04 | 1.21E-17 | 23.933 | 0.041784 | 0.00000 |
| 22 | 1022 | 2.30181E+04 | 2.35E-17 | 24.147 | 0.041414 | 0.00000 |
| 23 | 1023 | 2.39220E+04 | 5.05E-18 | 24.616 | 0.040624 | 0.00000 |
| 24 | 1024 | 2.75219E+04 | 6.30E-17 | 26.403 | 0.037874 | 0.00000 |
| 25 | 1025 | 2.90397E+04 | 1.27E-13 | 27.122 | 0.036871 | 0.00000 |
| 26 | 1026 | 2.94712E+04 | 9.77E-12 | 27.322 | 0.036600 | 0.00000 |
| 27 | 1027 | 2.95950E+04 | 2.70E-11 | 27.380 | 0.036523 | 0.00000 |
| 28 | 1028 | 3.02902E+04 | 4.47E-10 | 27.699 | 0.036102 | 0.00000 |
| 29 | 1029 | 3.04900E+04 | 1.00E-09 | 27.791 | 0.035983 | 0.00000 |
| 30 | 1030 | 3.10578E+04 | 4.49E-08 | 28.048 | 0.035653 | 0.00000 |
| 31 | 1031 | 3.22001E+04 | 5.58E-06 | 28.559 | 0.035015 | 0.00000 |
| 32 | 1032 | 3.27244E+04 | 1.49E-05 | 28.791 | 0.034733 | 0.00000 |
| 33 | 1033 | 3.29481E+04 | 1.22E-04 | 28.889 | 0.034615 | 0.00000 |
| 34 | 1034 | 3.33008E+04 | 2.83E-04 | 29.043 | 0.034431 | 0.00000 |
| 35 | 1035 | 3.34870E+04 | 6.87E-03 | 29.124 | 0.034335 | 0.00000 |
| 36 | 1036 | 3.36928E+04 | 2.54E-03 | 29.214 | 0.034230 | 0.00000 |
| 37 | 1037 | 3.48040E+04 | 8.63E-04 | 29.692 | 0.033679 | 0.00000 |
| 38 | 1038 | 3.56574E+04 | 2.19E-03 | 30.053 | 0.033274 | 0.00000 |
| 39 | 1039 | 3.58407E+04 | 9.86E-03 | 30.131 | 0.033189 | 0.00000 |
| 40 | 1040 | 3.66533E+04 | 7.73E-03 | 30.470 | 0.032819 | 0.00000 |
| 41 | 1041 | 3.72195E+04 | 3.29E-02 | 30.705 | 0.032568 | 0.00000 |
| 42 | 1042 | 3.75723E+04 | 4.15E-02 | 30.850 | 0.032415 | 0.00000 |
| 43 | 1043 | 3.84548E+04 | 3.18E-02 | 31.210 | 0.032041 | 0.00000 |
| 44 | 1044 | 3.91611E+04 | 2.50E-02 | 31.495 | 0.031751 | 0.00000 |
| 45 | 1045 | 3.95329E+04 | 2.44E-02 | 31.645 | 0.031601 | 0.00000 |
| 46 | 1046 | 4.20983E+04 | 3.12E-02 | 32.655 | 0.030623 | 0.00000 |
| 47 | 1047 | 4.30535E+04 | 2.54E-02 | 33.024 | 0.030281 | 0.00000 |
| 48 | 1048 | 4.38824E+04 | 3.02E-02 | 33.340 | 0.029994 | 0.00000 |
| 49 | 1049 | 4.47424E+04 | 4.19E-02 | 33.665 | 0.029704 | 0.00000 |
| 50 | 1050 | 4.58963E+04 | 2.88E-02 | 34.096 | 0.029329 | 0.00000 |

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| No. | LC | Eigenvalue [1/Sec2] | Relativ error | frequency [Hertz] | Period [sec] | modal damping |
|---|---|---|---|---|---|---|
| 51 | | 4.74531E+04 | 2.21E-02 | 34.670 | 0.028843 | |
| 52 | | 4.87840E+04 | 1.14E-01 | 35.153 | 0.028447 | |
| 53 | | 4.99741E+04 | 7.59E-02 | 35.579 | 0.028107 | |
| 54 | | 5.18192E+04 | 4.93E-02 | 36.230 | 0.027602 | |
| 55 | | 5.33713E+04 | 1.02E-01 | 36.768 | 0.027197 | |
| 56 | | 5.57120E+04 | 5.69E-02 | 37.566 | 0.026620 | |
| 57 | | 5.73320E+04 | 6.10E-02 | 38.108 | 0.026241 | |
| 58 | | 5.95860E+04 | 1.04E-01 | 38.850 | 0.025740 | |
| 59 | | 6.15494E+04 | 1.25E-01 | 39.485 | 0.025326 | |
| 60 | | 6.41800E+04 | 6.10E-02 | 40.320 | 0.024802 | |
| 61 | | 6.68627E+04 | 1.01E-01 | 41.154 | 0.024299 | |
| 62 | | 7.05752E+04 | 1.00E-01 | 42.281 | 0.023651 | |
| 63 | | 7.38481E+04 | 9.08E-02 | 43.250 | 0.023121 | |
| 64 | | 7.75008E+04 | 8.16E-02 | 44.307 | 0.022570 | |
| 65 | | 8.00606E+04 | 7.85E-02 | 45.033 | 0.022206 | |
| 66 | | 8.41900E+04 | 8.67E-02 | 46.180 | 0.021655 | |
| 67 | | 8.96850E+04 | 1.42E-01 | 47.663 | 0.020981 | |
| 68 | | 9.48971E+04 | 5.81E-02 | 49.028 | 0.020396 | |
| 69 | | 1.02247E+05 | 9.02E-02 | 50.892 | 0.019650 | |
| 70 | | 1.06545E+05 | 9.38E-02 | 51.950 | 0.019249 | |
| 71 | | 1.13672E+05 | 1.05E-01 | 53.659 | 0.018636 | |
| 72 | | 1.20244E+05 | 1.17E-01 | 55.189 | 0.018120 | |
| 73 | | 1.28979E+05 | 8.01E-02 | 57.158 | 0.017495 | |
| 74 | | 1.38304E+05 | 1.23E-01 | 59.189 | 0.016895 | |
| 75 | | 1.51136E+05 | 1.47E-01 | 61.873 | 0.016162 | |
| 76 | | 1.61209E+05 | 1.45E-01 | 63.902 | 0.015649 | |
| 77 | | 1.77666E+05 | 1.98E-01 | 67.084 | 0.014907 | |
| 78 | | 1.90250E+05 | 1.47E-01 | 69.420 | 0.014405 | |
| 79 | | 2.10525E+05 | 1.80E-01 | 73.025 | 0.013694 | |
| 80 | | 2.27602E+05 | 1.97E-01 | 75.929 | 0.013170 | |
| 81 | | 2.49260E+05 | 2.61E-01 | 79.460 | 0.012585 | |
| 82 | | 2.74635E+05 | 2.15E-01 | 83.406 | 0.011990 | |
| 83 | | 3.09587E+05 | 2.17E-01 | 88.555 | 0.011292 | |
| 84 | | 3.50661E+05 | 2.63E-01 | 94.246 | 0.010611 | |
| 85 | | 4.02503E+05 | 3.02E-01 | 100.973 | 0.009904 | |
| 86 | | 4.52753E+05 | 2.98E-01 | 107.090 | 0.009338 | |
| 87 | | 5.29006E+05 | 3.04E-01 | 115.758 | 0.008639 | |
| 88 | | 6.09895E+05 | 3.45E-01 | 124.293 | 0.008045 | |
| 89 | | 7.24509E+05 | 3.50E-01 | 135.470 | 0.007382 | |
| 90 | | 8.65940E+05 | 4.27E-01 | 148.103 | 0.006752 | |
| 91 | | 1.04967E+06 | 4.17E-01 | 163.060 | 0.006133 | |
| 92 | | 1.30280E+06 | 4.86E-01 | 181.660 | 0.005505 | |
| 93 | | 1.68744E+06 | 5.89E-01 | 206.745 | 0.004837 | |
| 94 | | 2.38084E+06 | 6.40E-01 | 245.576 | 0.004072 | |
| 95 | | 3.18298E+06 | 8.09E-01 | 283.947 | 0.003522 | |
| 96 | | 4.72287E+06 | 9.20E-01 | 345.878 | 0.002891 | |
| 97 | | 8.19434E+06 | 1.20E+00 | 455.593 | 0.002195 | |
| 98 | | 1.65527E+07 | 1.59E+00 | 647.523 | 0.001544 | |
| 99 | | 4.01299E+07 | 2.28E+00 | 1008.217 | 0.000992 | |
| 100 | | 1.25217E+08 | 3.59E+00 | 1780.950 | 0.000561 | |

**Modal masses - activated mass**

| No. | LC | frequency [Hertz] | effective modal Mass X[t] | Y[t] | Z[t] | factor X[%] | Y[%] | Z[%] | activated mass [%]* |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1001 | 5.187 | 2361 | 17 | 0 | 73.72 | 0.52 | 0.00 | 37.26528 |
| 2 | 1002 | 5.550 | 17 | 1699 | 0 | 0.53 | 53.02 | 0.00 | 18.68060 |
| 3 | 1003 | 7.516 | 1 | 861 | 0 | 0.03 | 26.86 | 0.00 | 15.25917 |
| 4 | 1004 | 16.264 | 3 | 1 | 0 | 0.08 | 0.02 | 0.00 | 0.12902 |

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**Modal masses - activated mass**

| No. | LC | frequency [Hertz] | effective modal Mass X[t] | Y[t] | Z[t] | factor X[%] | Y[%] | Z[%] | activated mass [%]* |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 1005 | 17.524 | 1 | 216 | 0 | 0.02 | 6.74 | 0.00 | 2.50148 |
| 6 | 1006 | 18.305 | 1 | 0 | 0 | 0.03 | 0.00 | 0.00 | 0.22521 |
| 7 | 1007 | 18.461 | 1 | 15 | 0 | 0.02 | 0.47 | 0.00 | 0.14941 |
| 8 | 1008 | 18.573 | 16 | 0 | 0 | 0.49 | 0.00 | 0.00 | 0.22939 |
| 9 | 1009 | 18.610 | 3 | 8 | 0 | 0.10 | 0.25 | 0.00 | 0.18846 |
| 10 | 1010 | 19.127 | 1 | 0 | 0 | 0.03 | 0.00 | 0.00 | 0.22535 |
| 11 | 1011 | 19.264 | 0 | 13 | 0 | 0.00 | 0.41 | 0.00 | 0.35939 |
| 12 | 1012 | 19.402 | 3 | 1 | 0 | 0.09 | 0.02 | 0.00 | 0.07730 |
| 13 | 1013 | 20.130 | 0 | 7 | 0 | 0.00 | 0.21 | 0.00 | 0.20299 |
| 14 | 1014 | 20.211 | 2 | 2 | 0 | 0.07 | 0.06 | 0.00 | 0.09747 |
| 15 | 1015 | 20.459 | 26 | 0 | 0 | 0.82 | 0.00 | 0.00 | 0.09716 |
| 16 | 1016 | 22.080 | 288 | 1 | 0 | 8.99 | 0.05 | 0.00 | 1.18999 |
| 17 | 1017 | 22.924 | 1 | 9 | 0 | 0.03 | 0.28 | 0.00 | 0.17560 |
| 18 | 1018 | 23.212 | 14 | 1 | 0 | 0.44 | 0.03 | 0.00 | 0.25035 |
| 19 | 1019 | 23.384 | 35 | 5 | 0 | 1.11 | 0.15 | 0.00 | 0.54227 |
| 20 | 1020 | 23.727 | 3 | 0 | 0 | 0.10 | 0.00 | 0.00 | 0.19684 |
| 21 | 1021 | 23.933 | 4 | 1 | 0 | 0.13 | 0.03 | 0.00 | 0.24198 |
| 22 | 1022 | 24.147 | 3 | 7 | 0 | 0.08 | 0.21 | 0.00 | 0.30977 |
| 23 | 1023 | 24.616 | 0 | 3 | 0 | 0.00 | 0.10 | 0.00 | 0.26703 |
| 24 | 1024 | 26.403 | 0 | 3 | 0 | 0.00 | 0.08 | 0.00 | 0.27275 |
| 25 | 1025 | 27.122 | 0 | 1 | 0 | 0.01 | 0.02 | 0.00 | 0.14402 |
| 26 | 1026 | 27.322 | 0 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.03894 |
| 27 | 1027 | 27.380 | 0 | 0 | 0 | 0.01 | 0.00 | 0.00 | 0.02788 |
| 28 | 1028 | 27.699 | 0 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.07919 |
| 29 | 1029 | 27.791 | 1 | 1 | 0 | 0.04 | 0.02 | 0.00 | 0.18354 |
| 30 | 1030 | 28.048 | 0 | 8 | 0 | 0.00 | 0.25 | 0.00 | 0.52704 |
| 31 | 1031 | 28.559 | 0 | 1 | 0 | 0.00 | 0.02 | 0.00 | 0.19075 |
| 32 | 1032 | 28.791 | 1 | 4 | 0 | 0.02 | 0.12 | 0.00 | 0.20398 |
| 33 | 1033 | 28.889 | 0 | 1 | 0 | 0.01 | 0.02 | 0.00 | 0.35085 |
| 34 | 1034 | 29.043 | 1 | 0 | 0 | 0.03 | 0.01 | 0.00 | 0.16689 |
| 35 | 1035 | 29.124 | 0 | 0 | 0 | 0.00 | 0.01 | 0.00 | 0.13388 |
| 36 | 1036 | 29.214 | 2 | 0 | 0 | 0.05 | 0.00 | 0.00 | 0.10325 |
| 37 | 1037 | 29.692 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.24159 |
| 38 | 1038 | 30.053 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.11653 |
| 39 | 1039 | 30.131 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.47552 |
| 40 | 1040 | 30.470 | 0 | 0 | 0 | 0.01 | 0.00 | 0.00 | 0.15785 |
| 41 | 1041 | 30.705 | 1 | 0 | 0 | 0.02 | 0.00 | 0.00 | 0.26275 |
| 42 | 1042 | 30.850 | 0 | 0 | 0 | 0.01 | 0.01 | 0.00 | 1.01337 |
| 43 | 1043 | 31.210 | 1 | 1 | 0 | 0.02 | 0.02 | 0.00 | 0.53270 |
| 44 | 1044 | 31.495 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.16001 |
| 45 | 1045 | 31.645 | 1 | 0 | 0 | 0.03 | 0.00 | 0.00 | 0.78650 |
| 46 | 1046 | 32.655 | 0 | 0 | 0 | 0.01 | 0.01 | 0.00 | 0.31224 |
| 47 | 1047 | 33.024 | 2 | 0 | 0 | 0.06 | 0.01 | 0.00 | 0.30184 |
| 48 | 1048 | 33.340 | 1 | 0 | 0 | 0.03 | 0.00 | 0.00 | 0.10449 |
| 49 | 1049 | 33.665 | 0 | 0 | 0 | 0.01 | 0.01 | 0.00 | 0.54732 |
| 50 | 1050 | 34.096 | 1 | 1 | 0 | 0.04 | 0.02 | 0.00 | 0.39956 |
| | | sum | 2797 | 2886 | 0 | 87.34 | 90.08 | 0.00 | |
| | | System activ | 3203 | 3204 | 0 | | | | |

The modal masses are evaluated for the global X, Y and Z direction,
the "activated mass" also includes torsional and opposite movements
without a global displacement (tuning fork):
 * activated mass in % = product u^2*M = displacement^2*mass, in relation to the
   sum of active mass, u scaled on a maximum displacement or rotation of 1.00.
(this activated mass is often also called generalized modal mass)

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Projektni spekter

**Load Case 601**

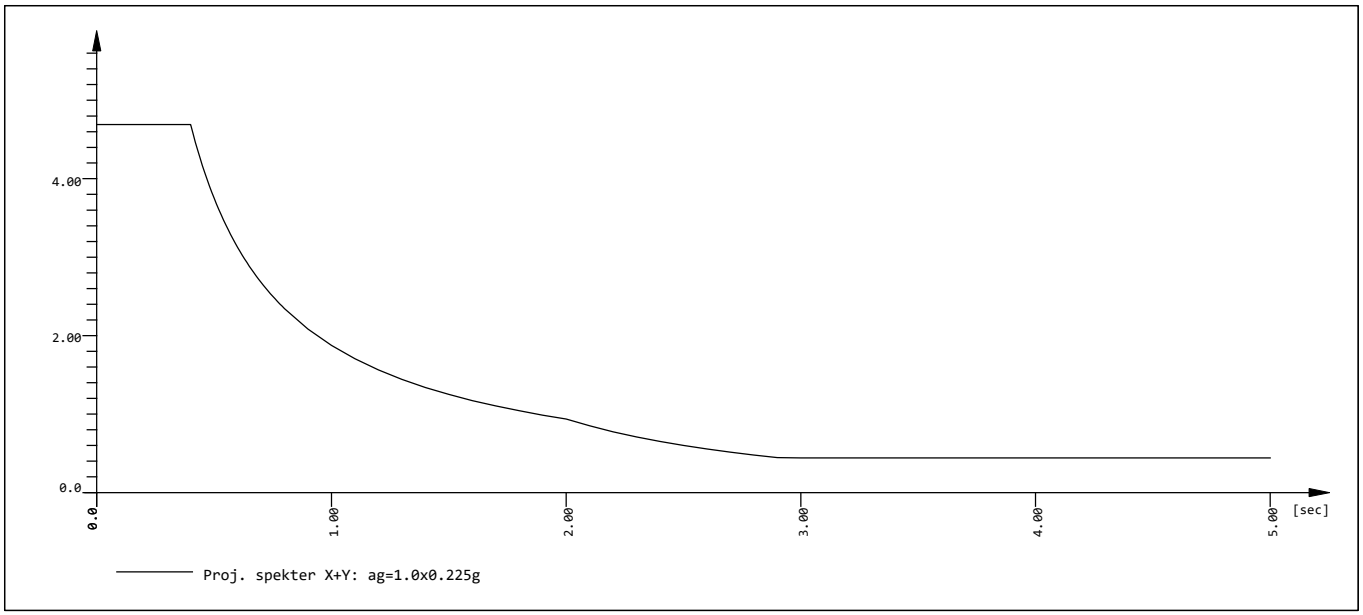
Factor forces and moments 1.000

**Response spectra Proj. spekter X+Y: ag=1.0x0.225g**

| D[-] | SA[-] | SB[-] | MIN[-] | TB[sec] | TC[sec] | TD[sec] | TE[sec] | K1[-] | K2[-] | A[m/sec2] |
|---|---|---|---|---|---|---|---|---|---|---|
| auto | Zone = | | | ah =* 1.000 | av =* 0.000 | | | | | 0.00 |

| Time [sec] | Factor [-] | Time [sec] | Factor [-] | Time [sec] | Factor [-] | Time [sec] | Factor [-] |
|---|---|---|---|---|---|---|---|
| 0.000 | 4.690 | 0.010 | 4.690 | 0.020 | 4.690 | 0.030 | 4.690 |
| 0.040 | 4.690 | 0.050 | 4.690 | 0.060 | 4.690 | 0.070 | 4.690 |
| 0.080 | 4.690 | 0.090 | 4.690 | 0.100 | 4.690 | 0.150 | 4.690 |
| 0.200 | 4.690 | 0.300 | 4.690 | 0.400 | 4.690 | 0.410 | 4.576 |
| 0.420 | 4.467 | 0.430 | 4.363 | 0.440 | 4.264 | 0.450 | 4.169 |
| 0.460 | 4.079 | 0.470 | 3.992 | 0.480 | 3.909 | 0.490 | 3.829 |
| 0.500 | 3.752 | 0.510 | 3.679 | 0.520 | 3.608 | 0.530 | 3.540 |
| 0.540 | 3.474 | 0.550 | 3.411 | 0.560 | 3.350 | 0.570 | 3.292 |
| 0.580 | 3.235 | 0.590 | 3.180 | 0.600 | 3.127 | 0.610 | 3.076 |
| 0.620 | 3.026 | 0.630 | 2.978 | 0.640 | 2.931 | 0.650 | 2.886 |
| 0.660 | 2.843 | 0.670 | 2.800 | 0.680 | 2.759 | 0.690 | 2.719 |
| 0.700 | 2.680 | 0.710 | 2.642 | 0.720 | 2.606 | 0.730 | 2.570 |
| 0.740 | 2.535 | 0.750 | 2.502 | 0.760 | 2.469 | 0.770 | 2.437 |
| 0.780 | 2.405 | 0.790 | 2.375 | 0.800 | 2.345 | 0.900 | 2.085 |
| 1.000 | 1.876 | 1.100 | 1.706 | 1.200 | 1.564 | 1.300 | 1.443 |
| 1.400 | 1.340 | 1.500 | 1.251 | 1.600 | 1.173 | 1.700 | 1.104 |
| 1.800 | 1.042 | 1.900 | 0.988 | 2.000 | 0.938 | 2.100 | 0.851 |
| 2.200 | 0.775 | 2.300 | 0.709 | 2.400 | 0.651 | 2.500 | 0.600 |
| 2.600 | 0.555 | 2.700 | 0.515 | 2.800 | 0.479 | 2.900 | 0.446 |
| 3.000 | 0.442 | 3.100 | 0.442 | 3.200 | 0.442 | 3.300 | 0.442 |
| 3.400 | 0.442 | 3.500 | 0.442 | 3.600 | 0.442 | 3.700 | 0.442 |
| 3.800 | 0.442 | 3.900 | 0.442 | 4.000 | 0.442 | 4.100 | 0.442 |
| 4.200 | 0.442 | 4.300 | 0.442 | 4.400 | 0.442 | 4.500 | 0.442 |
| 4.600 | 0.442 | 4.700 | 0.442 | 4.800 | 0.442 | 4.900 | 0.442 |
| 5.000 | 0.442 | | | | | | |

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**Loads acting on Nodes**

| Node | A-X [m/sec2] | A-Y [m/sec2] | A-Z [m/sec2] | A-XX [1/sec2] | A-YY [1/sec2] | A-ZZ [1/sec2] | ref-X [m] | ref-Y [m] | ref-Z [m] |
|---|---|---|---|---|---|---|---|---|---|
| Center | 1.00 | | | | | | 0.000 | 0.000 | 0.000 |

11826 DSO Bovec - vzhodna dilat. enota stavbe
Elasticni spekter

**Load Case 701**

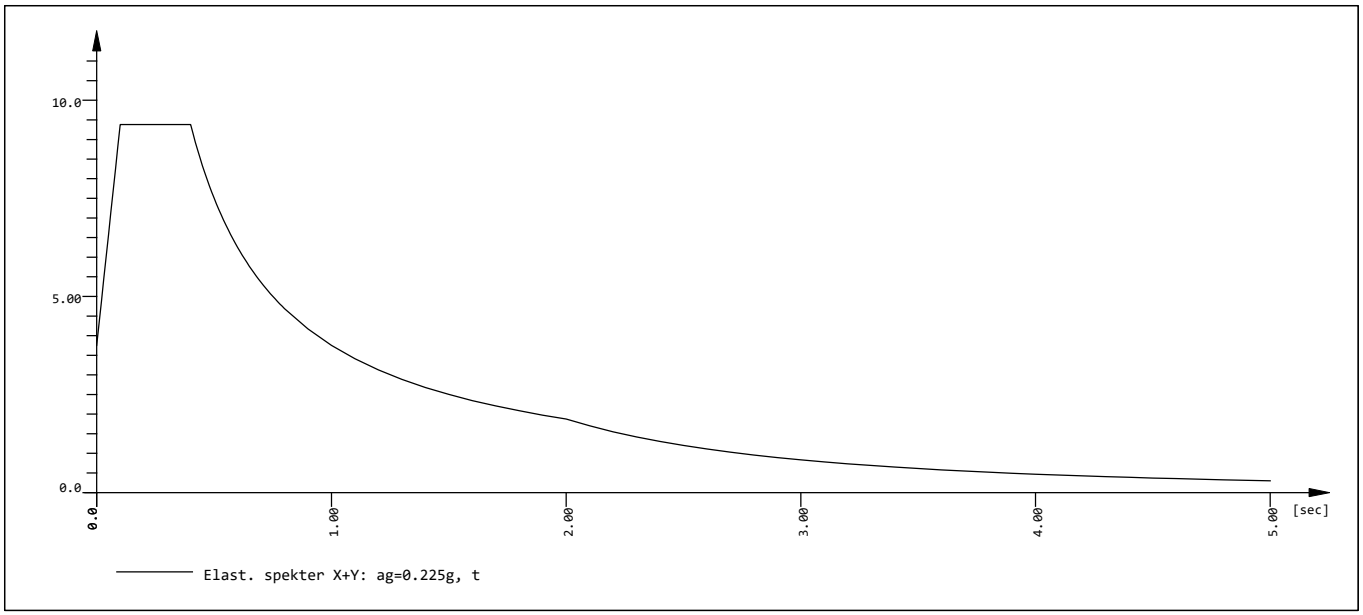
Factor forces and moments 1.000

**Response spectra Elast. spekter X+Y: ag=0.225g, t**

| D[-] | SA[-] | SB[-] | MIN[-] | TB[sec] | TC[sec] | TD[sec] | TE[sec] | K1[-] | K2[-] | A[m/sec2] |
|---|---|---|---|---|---|---|---|---|---|---|
| auto | Zone = | | | ah =* 1.000 | | av =* 0.000 | | | | 0.00 |

| Time [sec] | Factor [-] | Time [sec] | Factor [-] | Time [sec] | Factor [-] | Time [sec] | Factor [-] |
|---|---|---|---|---|---|---|---|
| 0.000 | 3.752 | 0.010 | 4.315 | 0.020 | 4.878 | 0.030 | 5.441 |
| 0.040 | 6.004 | 0.050 | 6.567 | 0.060 | 7.129 | 0.070 | 7.692 |
| 0.080 | 8.255 | 0.090 | 8.818 | 0.100 | 9.381 | 0.150 | 9.381 |
| 0.200 | 9.381 | 0.300 | 9.381 | 0.400 | 9.381 | 0.410 | 9.152 |
| 0.420 | 8.934 | 0.430 | 8.726 | 0.440 | 8.528 | 0.450 | 8.339 |
| 0.460 | 8.157 | 0.470 | 7.984 | 0.480 | 7.817 | 0.490 | 7.658 |
| 0.500 | 7.505 | 0.510 | 7.358 | 0.520 | 7.216 | 0.530 | 7.080 |
| 0.540 | 6.949 | 0.550 | 6.822 | 0.560 | 6.701 | 0.570 | 6.583 |
| 0.580 | 6.470 | 0.590 | 6.360 | 0.600 | 6.254 | 0.610 | 6.151 |
| 0.620 | 6.052 | 0.630 | 5.956 | 0.640 | 5.863 | 0.650 | 5.773 |
| 0.660 | 5.685 | 0.670 | 5.601 | 0.680 | 5.518 | 0.690 | 5.438 |
| 0.700 | 5.360 | 0.710 | 5.285 | 0.720 | 5.212 | 0.730 | 5.140 |
| 0.740 | 5.071 | 0.750 | 5.003 | 0.760 | 4.937 | 0.770 | 4.873 |
| 0.780 | 4.811 | 0.790 | 4.750 | 0.800 | 4.690 | 0.900 | 4.169 |
| 1.000 | 3.752 | 1.100 | 3.411 | 1.200 | 3.127 | 1.300 | 2.886 |
| 1.400 | 2.680 | 1.500 | 2.502 | 1.600 | 2.345 | 1.700 | 2.207 |
| 1.800 | 2.085 | 1.900 | 1.975 | 2.000 | 1.876 | 2.100 | 1.702 |
| 2.200 | 1.551 | 2.300 | 1.419 | 2.400 | 1.303 | 2.500 | 1.201 |
| 2.600 | 1.110 | 2.700 | 1.029 | 2.800 | 0.957 | 2.900 | 0.892 |
| 3.000 | 0.834 | 3.100 | 0.781 | 3.200 | 0.733 | 3.300 | 0.689 |
| 3.400 | 0.649 | 3.500 | 0.613 | 3.600 | 0.579 | 3.700 | 0.548 |
| 3.800 | 0.520 | 3.900 | 0.493 | 4.000 | 0.469 | 4.100 | 0.446 |
| 4.200 | 0.425 | 4.300 | 0.406 | 4.400 | 0.388 | 4.500 | 0.371 |
| 4.600 | 0.355 | 4.700 | 0.340 | 4.800 | 0.326 | 4.900 | 0.313 |
| 5.000 | 0.300 | | | | | | |

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**Loads acting on Nodes**

| Node | A-X [m/sec2] | A-Y [m/sec2] | A-Z [m/sec2] | A-XX [1/sec2] | A-YY [1/sec2] | A-ZZ [1/sec2] | ref-X [m] | ref-Y [m] | ref-Z [m] |
|---|---|---|---|---|---|---|---|---|---|
| Center | 1.00 | | | | | | 0.000 | 0.000 | 0.000 |

11826 DSO Bovec - vzhodna dilat. enota stavbe
Earq: Analiza s spektri odziva X+ (pomiki)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 277351 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 3210.893 | 3210.893 | 2010.519 | 1.820E+00 | 2.364E+00 | 1.200E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.010 | 18.525 | 7.075 | 2.663E+05 | -8.02E+03 | -1.52E+04 | |
| | | | | -8.02E+03 | 6.071E+04 | -3.10E+04 | |
| | | | | -1.52E+04 | -3.10E+04 | 4.356E+05 | |
| active[1] | 3209.007 | 3210.110 | 2010.519 | 1.820E+00 | 2.364E+00 | 1.200E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.010 | 18.525 | 7.075 | 2.664E+05 | -8.02E+03 | -1.51E+04 | |
| | | | | -8.02E+03 | 6.081E+04 | -3.08E+04 | |
| | | | | -1.51E+04 | -3.08E+04 | 4.354E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

**Results**
**Nodal Displacements, method CQC**

| Node | u-X [mm] | u-Y [mm] | u-Z [mm] |
|---|---|---|---|
| MAX | 12.258 | 0.983 | 5.868 |

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Earq: Analiza s spektri odziva Y+ (pomiki)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 277351 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 3210.893 | 3210.893 | 2010.519 | 1.820E+00 | 2.364E+00 | 1.200E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.010 | 18.525 | 7.075 | 2.663E+05 | -8.02E+03 | -1.52E+04 | |
| | | | | -8.02E+03 | 6.071E+04 | -3.10E+04 | |
| | | | | -1.52E+04 | -3.10E+04 | 4.356E+05 | |
| active[1] | 3209.007 | 3210.110 | 2010.519 | 1.820E+00 | 2.364E+00 | 1.200E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.010 | 18.525 | 7.075 | 2.664E+05 | -8.02E+03 | -1.51E+04 | |
| | | | | -8.02E+03 | 6.081E+04 | -3.08E+04 | |
| | | | | -1.51E+04 | -3.08E+04 | 4.354E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

**Results**
**Nodal Displacements, method CQC**

| Node | u-X [mm] | u-Y [mm] | u-Z [mm] |
|---|---|---|---|
| MAX | 8.879 | 10.260 | 4.753 |

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Earq: Analiza s spektri odziva X+ (sile)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 277351 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 3210.893 | 3210.893 | 2010.519 | 1.820E+00 | 2.364E+00 | 1.200E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.010 | 18.525 | 7.075 | 2.663E+05 | -8.02E+03 | -1.52E+04 | |
| | | | | -8.02E+03 | 6.071E+04 | -3.10E+04 | |
| | | | | -1.52E+04 | -3.10E+04 | 4.356E+05 | |
| active[1] | 3209.007 | 3210.110 | 2010.519 | 1.820E+00 | 2.364E+00 | 1.200E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.010 | 18.525 | 7.075 | 2.664E+05 | -8.02E+03 | -1.51E+04 | |
| | | | | -8.02E+03 | 6.081E+04 | -3.08E+04 | |
| | | | | -1.51E+04 | -3.08E+04 | 4.354E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

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**Results**
**Maximum Forces and Moments**

| Type | LC-MAX | LC-MIN | STYP |
|---|---|---|---|
| Beam Elements | | | |
| N | 1211 | - | CQC |
| Vy | 1212 | - | CQC |
| Vz | 1213 | - | CQC |
| Mt | 1214 | - | CQC |
| My | 1215 | - | CQC |
| Mz | 1216 | - | CQC |
| Quadrilateral Elements | | | |
| m-xx | 1221 | - | CQC |
| m-yy | 1222 | - | CQC |
| m-xy | 1223 | - | CQC |
| v-x | 1224 | - | CQC |
| v-y | 1225 | - | CQC |
| n-xx | 1226 | - | CQC |
| n-yy | 1227 | - | CQC |
| n-xy | 1228 | - | CQC |

11826 DSO Bovec - vzhodna dilat. enota stavbe
Earq: Analiza s spektri odziva Y+ (sile)

**System- and Control Information**
**Control Information**

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Number of unknowns 277351 (Pure modal analysis)
unknowns per node 6
Number eigenvalues 50

**Sum of masses and mass moments of inertia**

| Node | TM | | | RM | | | RMB |
|---|---|---|---|---|---|---|---|
| | X[t] | Y[t] | Z[t] | X[tm2] | Y[tm2] | Z[tm2] | [tm2] |
| total[1] | 3210.893 | 3210.893 | 2010.519 | 1.820E+00 | 2.364E+00 | 1.200E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.010 | 18.525 | 7.075 | 2.663E+05 | -8.02E+03 | -1.52E+04 | |
| | | | | -8.02E+03 | 6.071E+04 | -3.10E+04 | |
| | | | | -1.52E+04 | -3.10E+04 | 4.356E+05 | |
| active[1] | 3209.007 | 3210.110 | 2010.519 | 1.820E+00 | 2.364E+00 | 1.200E+00 | - |
| | S[m][2] | | | RM(S)[3] | | | |
| | 7.010 | 18.525 | 7.075 | 2.664E+05 | -8.02E+03 | -1.51E+04 | |
| | | | | -8.02E+03 | 6.081E+04 | -3.08E+04 | |
| | | | | -1.51E+04 | -3.08E+04 | 4.354E+05 | |

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity

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**Results**
**Maximum Forces and Moments**

| Type | LC-MAX | LC-MIN | STYP |
|---|---|---|---|
| Beam Elements | | | |
| N | 1411 | - | CQC |
| Vy | 1412 | - | CQC |
| Vz | 1413 | - | CQC |
| Mt | 1414 | - | CQC |
| My | 1415 | - | CQC |
| Mz | 1416 | - | CQC |
| Quadrilateral Elements | | | |
| m-xx | 1421 | - | CQC |
| m-yy | 1422 | - | CQC |
| m-xy | 1423 | - | CQC |
| v-x | 1424 | - | CQC |
| v-y | 1425 | - | CQC |
| n-xx | 1426 | - | CQC |
| n-yy | 1427 | - | CQC |
| n-xy | 1428 | - | CQC |

11826 DSO Bovec - vzhodna dilat. enota stavbe
design parameter list

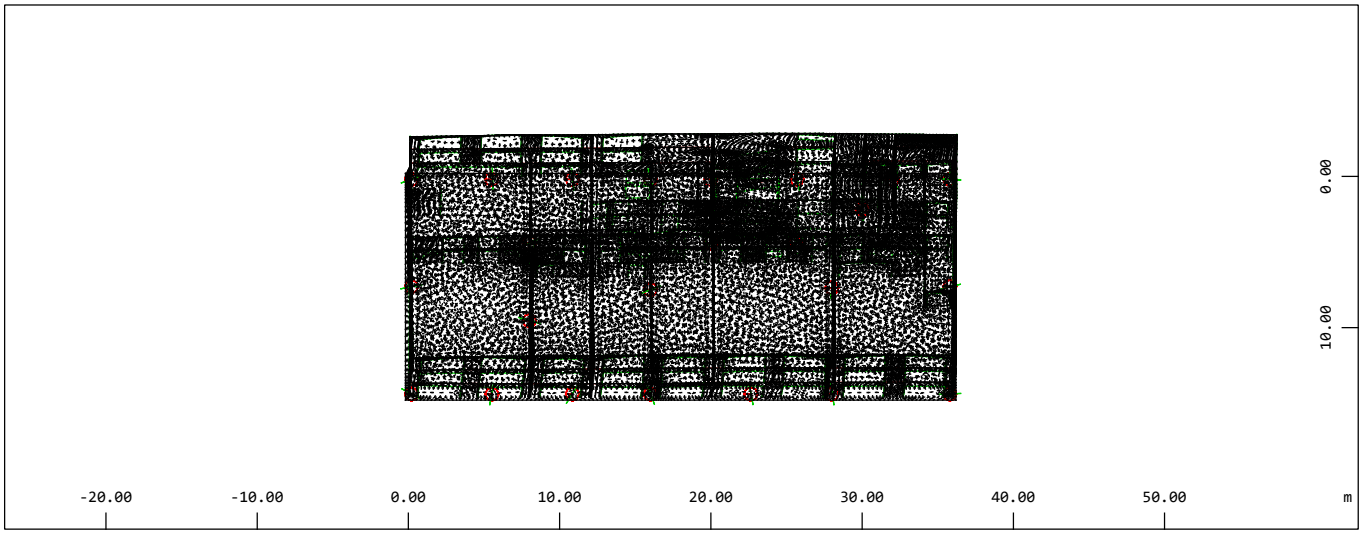
**Reinforcementparameter two layer reinforcement**

| Selection Grp elem no. no. | distance d1-u d1-l [mm] | 2.lay 2.lay [mm] | bar-diameter ds-u ds-l [mm] | 2.lay 2.lay [mm] | crackwidth wk-u wk-l [mm] | 2.lay 2.lay [mm] | steelstress sigsu sigsl [MPa] | 2.lay 2.lay [MPa] | min.reinf. asu asl [cm2/m] | 2.lay 2.lay [cm2/m] |
|---|---|---|---|---|---|---|---|---|---|---|
| default | - | - | - | - | - | - | - | - | - | - |
| 100 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 105 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 110 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 115 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 120 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 125 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 130 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 201 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 202 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 203 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 204 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 205 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 206 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 207 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 208 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 209 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 210 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 211 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 251 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 252 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 253 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 254 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 255 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| 256 | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |
| | 25.0 | 35.0 | 10 | 10 | - | - | - | - | - | - |

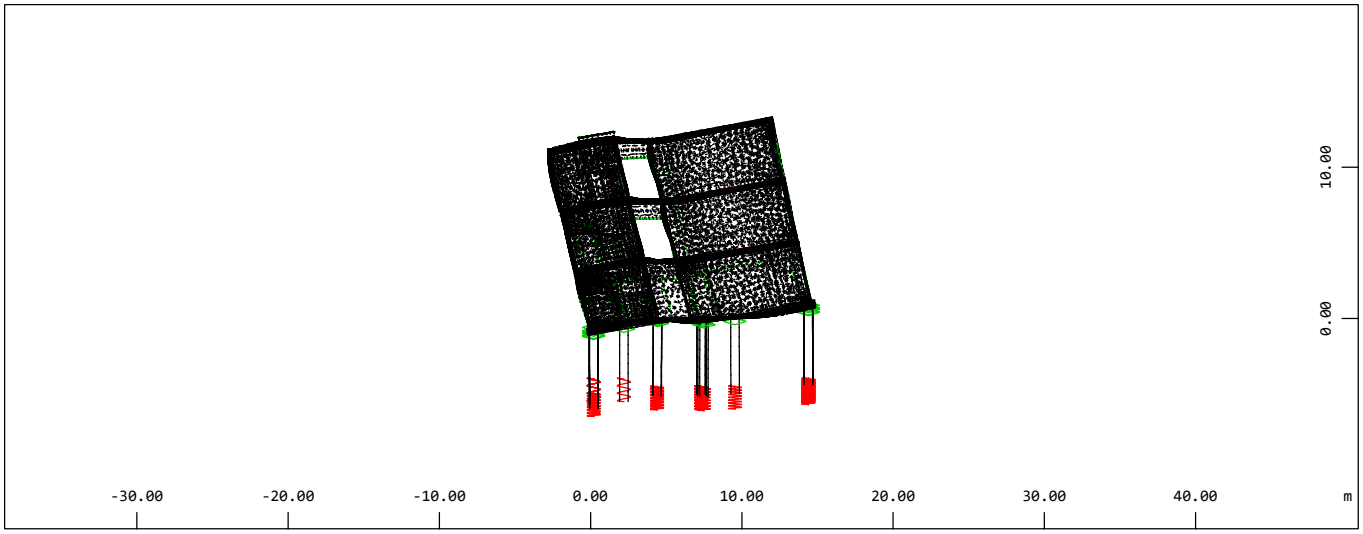
The reinforcement directions relate to the local coordinate system of
the elements and have to be plotted graphically.
With the input of a steel stress sigsu... the 'crack design according tables'
uses this given stress sigsu for the corresponding layer. With this input, the check can
be done for bar distances instead of bar diameters, see legend SLS control parameters.

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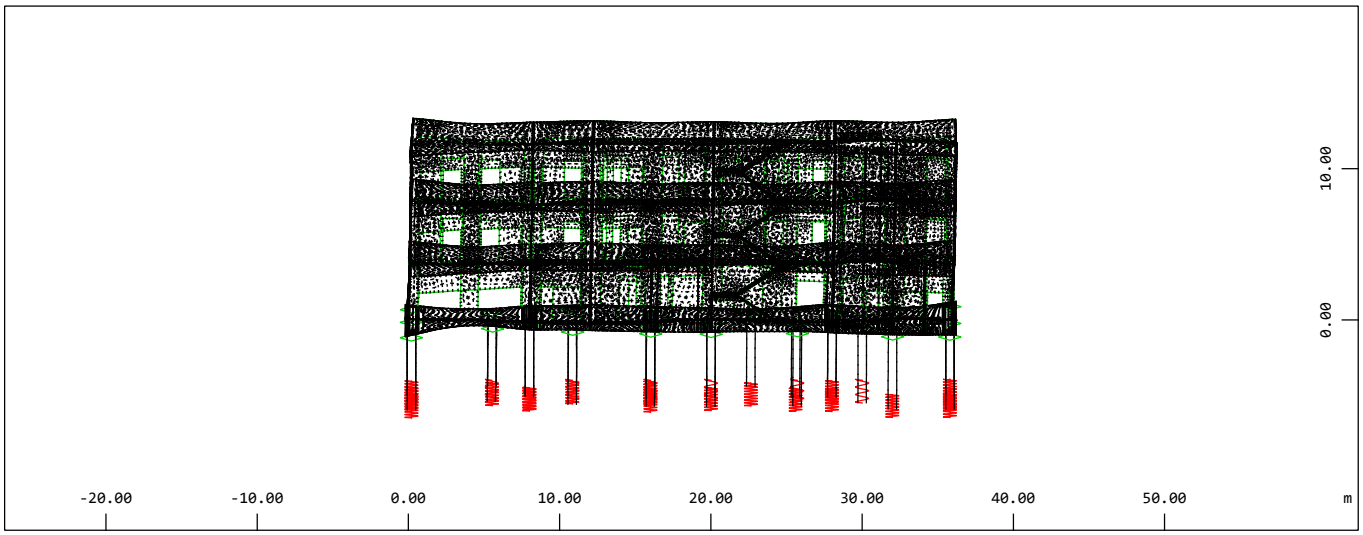
11826 DSO Bovec - vzhodna dilat. enota stavbe
1. nihajna oblika




Sector of system Group 100 101 105 110 115 120 125 130 201...211 251...256 M 1 : 500
Z Y X
Deformed Structure from LC 1001 Eigenform 1 5.19 Hz Enlarged by 100.0



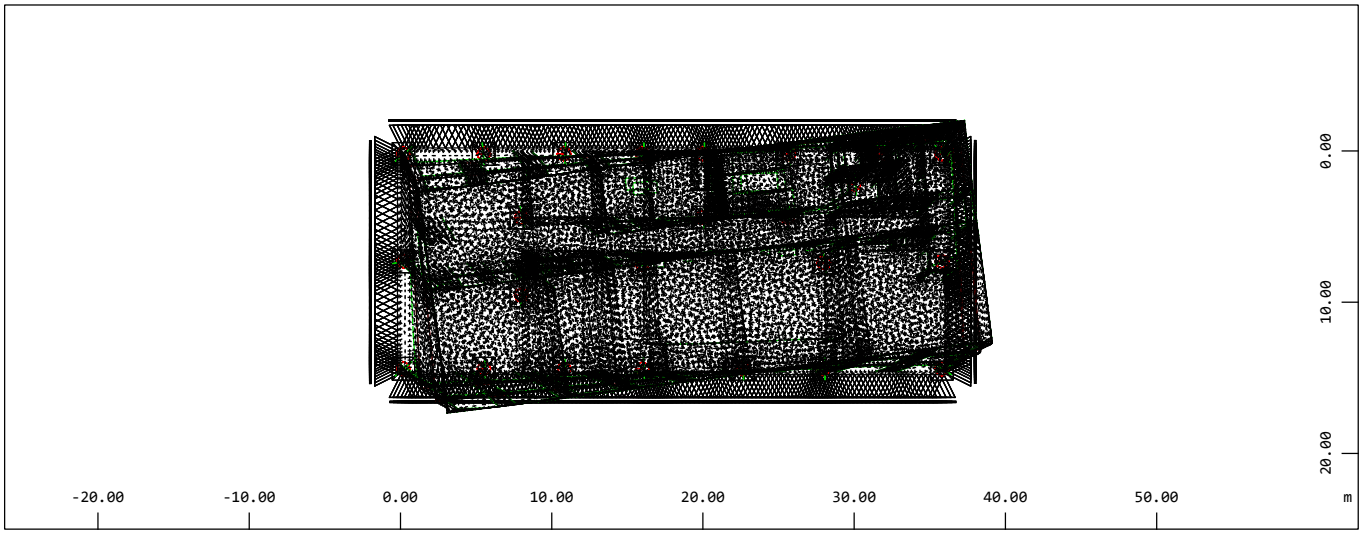

Sector of system Group 100 101 105 110 115 120 125 130 201...211 251...256 M 1 : 500
Z Y X
Deformed Structure from LC 1001 Eigenform 1 5.19 Hz Enlarged by 100.0



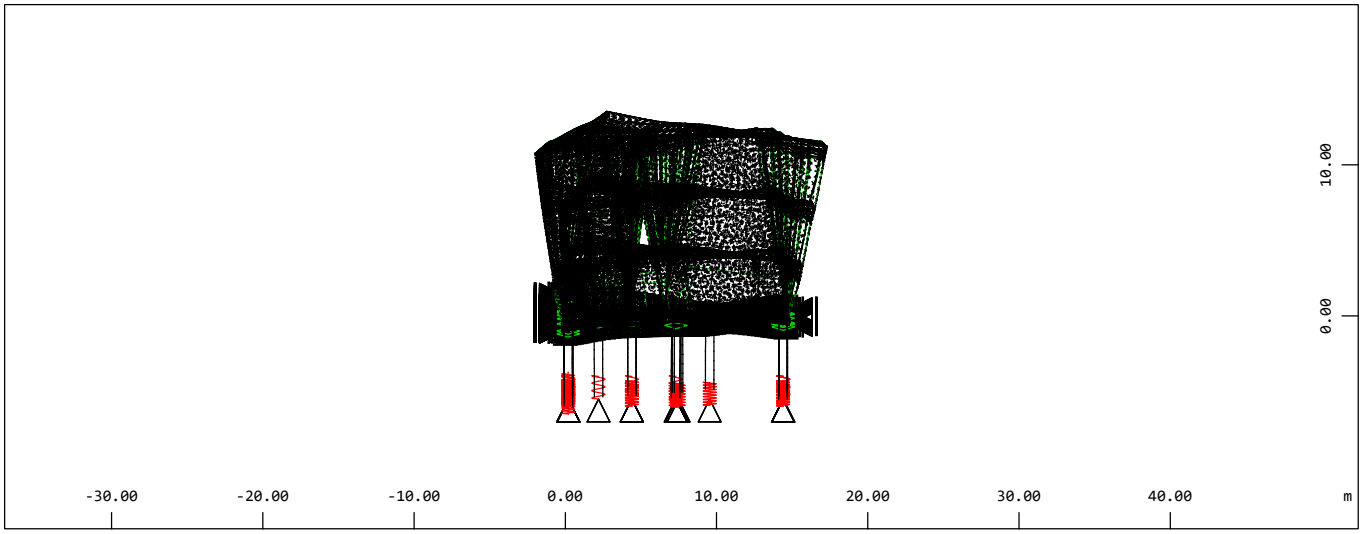

Sector of system Group 100 101 105 110 115 120 125 130 201...211 251...256 M 1 : 500
Z Y X
Deformed Structure from LC 1001 Eigenform 1 5.19 Hz Enlarged by 100.0

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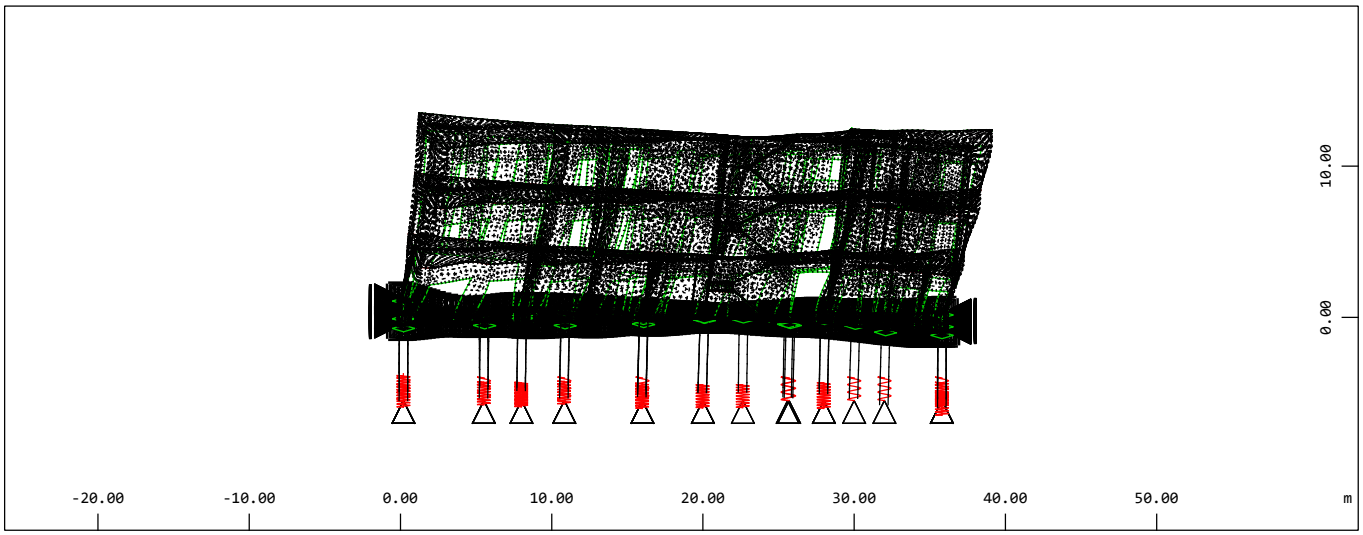
11826 DSO Bovec - vzhodna dilat. enota stavbe
1. nihajna oblika




Sector of system Group 100 101 105 110 115 120 125 130 201...211 251...256 M 1 : 500
Z Y X
Deformed Structure from LC 1002 Eigenform 2 5.55 Hz Enlarged by 100.0



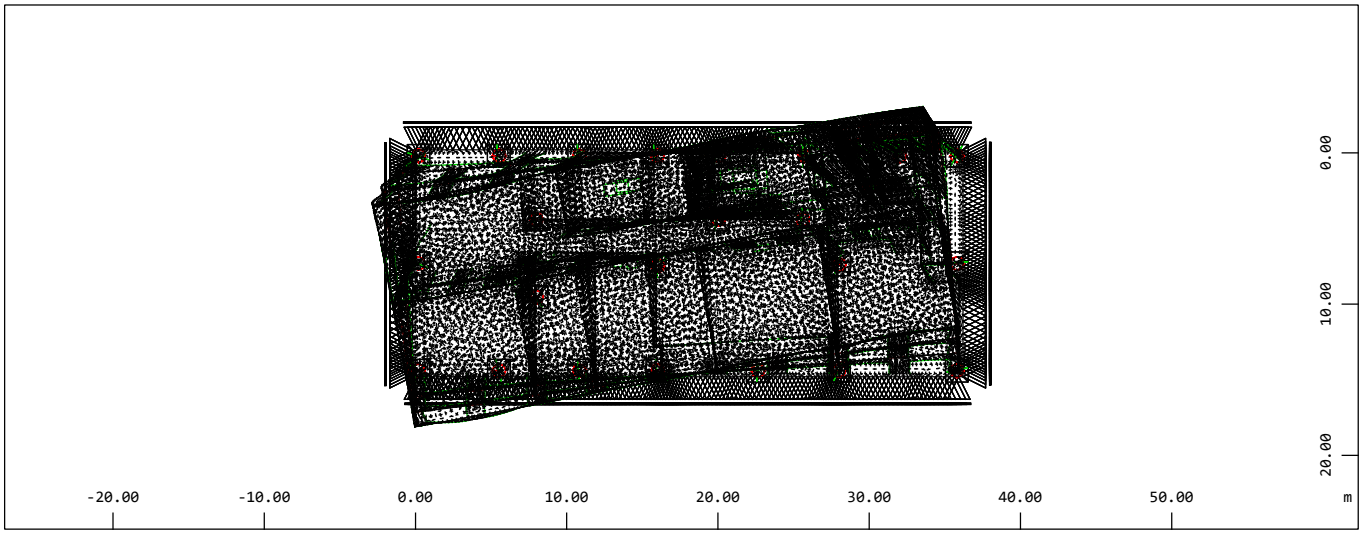

Sector of system Group 100 101 105 110 115 120 125 130 201...211 251...256 M 1 : 500
Z Y X
Deformed Structure from LC 1002 Eigenform 2 5.55 Hz Enlarged by 100.0



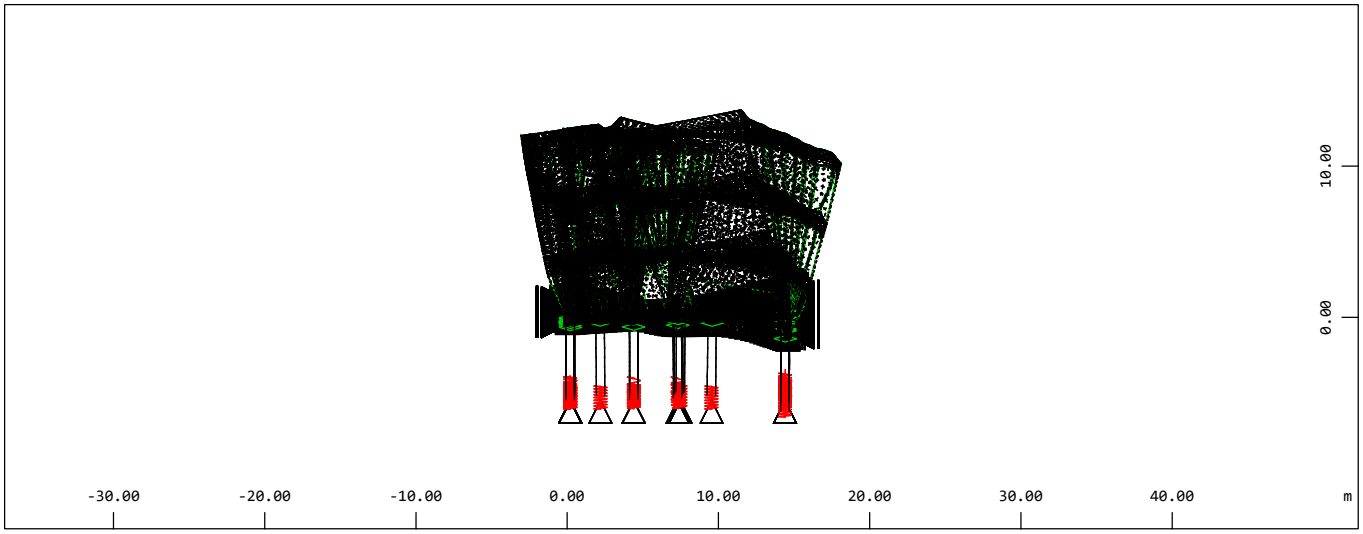

Sector of system Group 100 101 105 110 115 120 125 130 201...211 251...256 M 1 : 500
Z X Y
Deformed Structure from LC 1002 Eigenform 2 5.55 Hz Enlarged by 100.0

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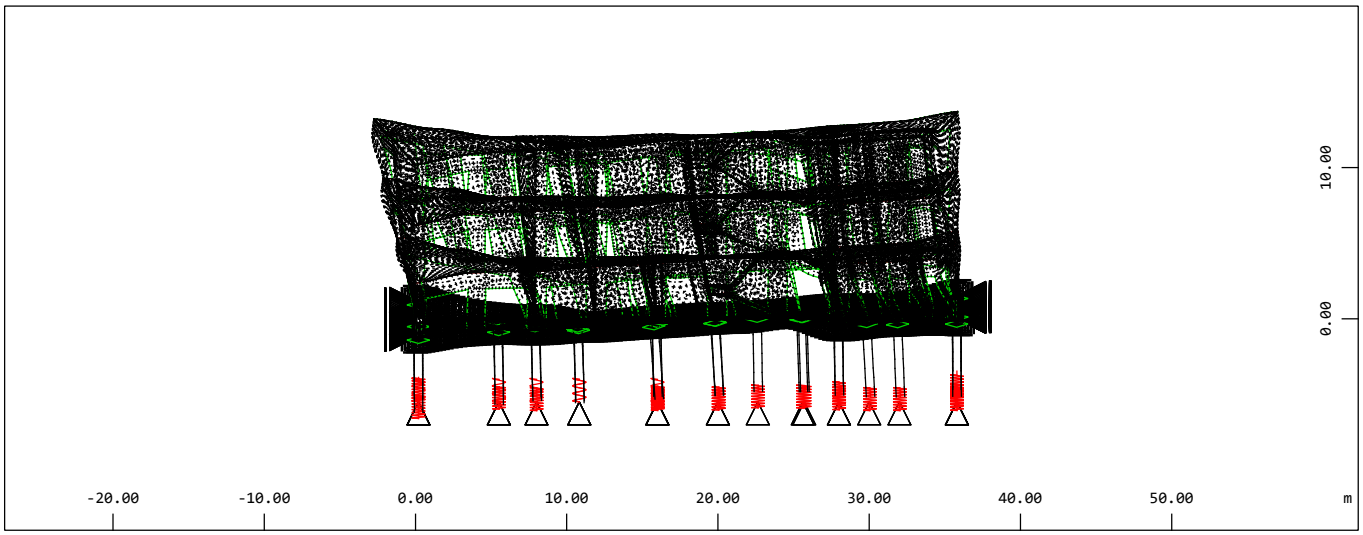
11826 DSO Bovec - vzhodna dilat. enota stavbe
1. nihajna oblika




Sector of system Group 100 101 105 110 115 120 125 130 201...211 251...256 M 1 : 500
Z Y X
Deformed Structure from LC 1003 Eigenform 3 7.52 Hz Enlarged by 100.0



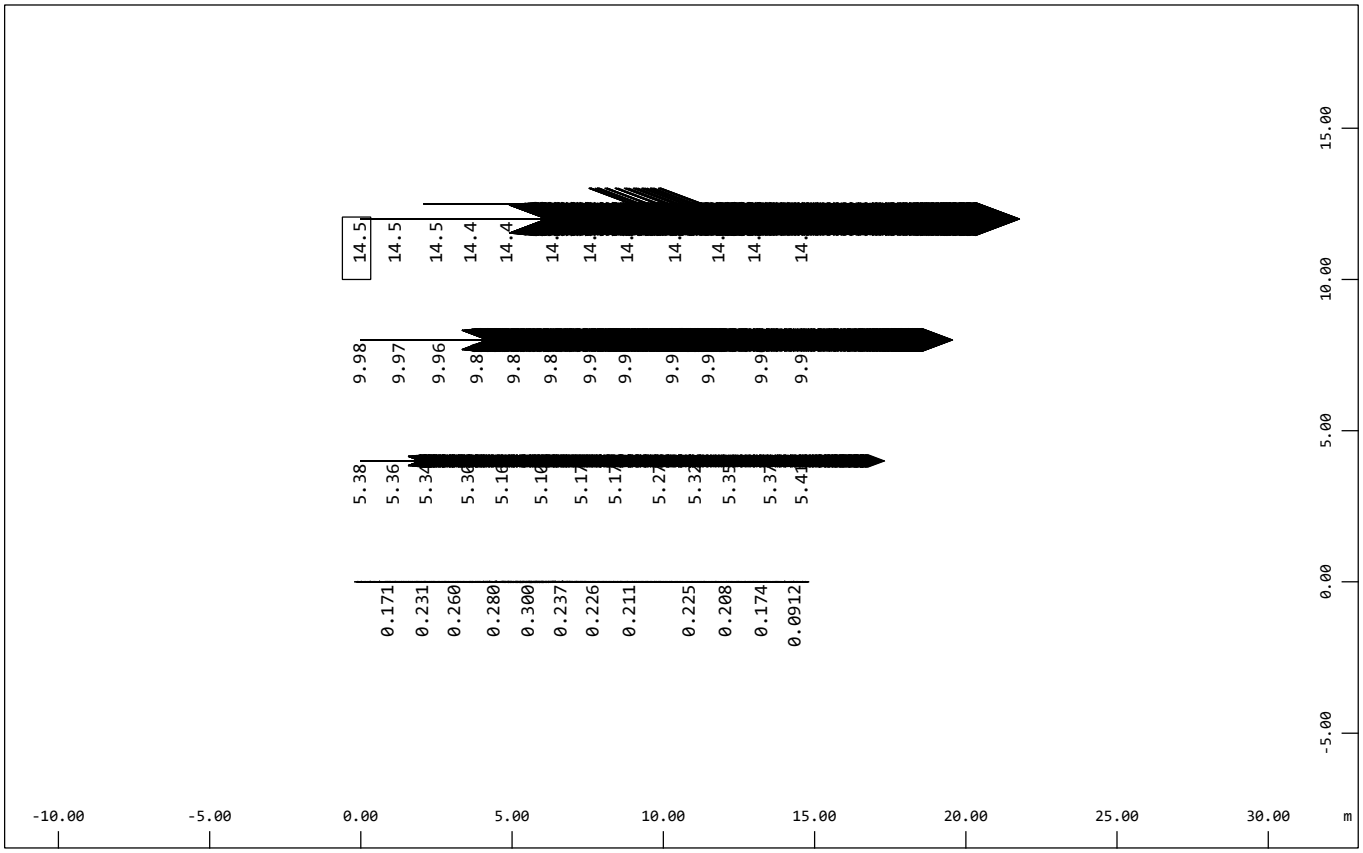

Z Y X
Sector of system Group 100 101 105 110 115 120 125 130 201...211 251...256 M 1 : 500
Deformed Structure from LC 1003 Eigenform 3 7.52 Hz Enlarged by 100.0



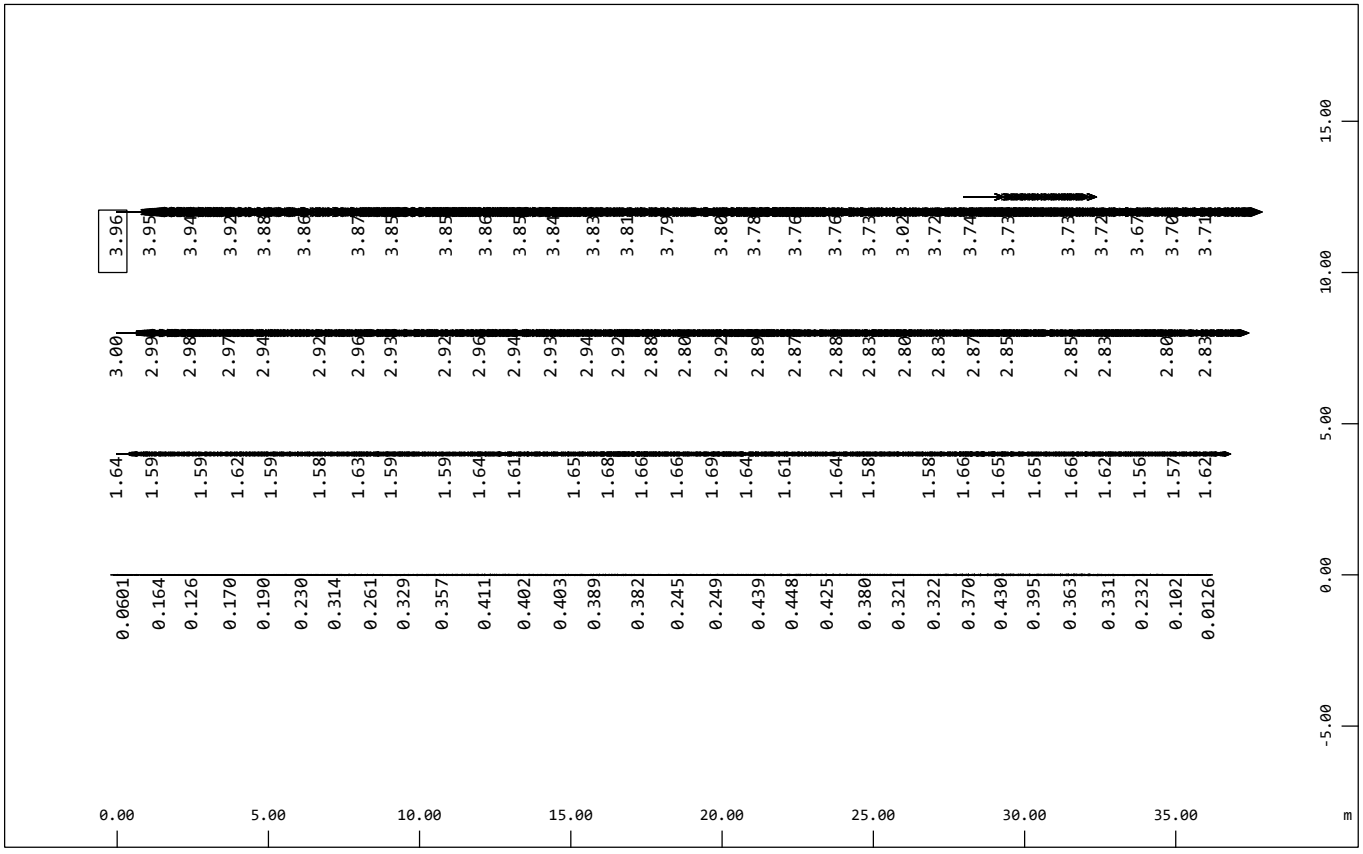

Z X Y
Sector of system Group 100 101 105 110 115 120 125 130 201...211 251...256 M 1 : 500
Deformed Structure from LC 1003 Eigenform 3 7.52 Hz Enlarged by 100.0

SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj. horiz. pomikov: max Ux, prip. Uy



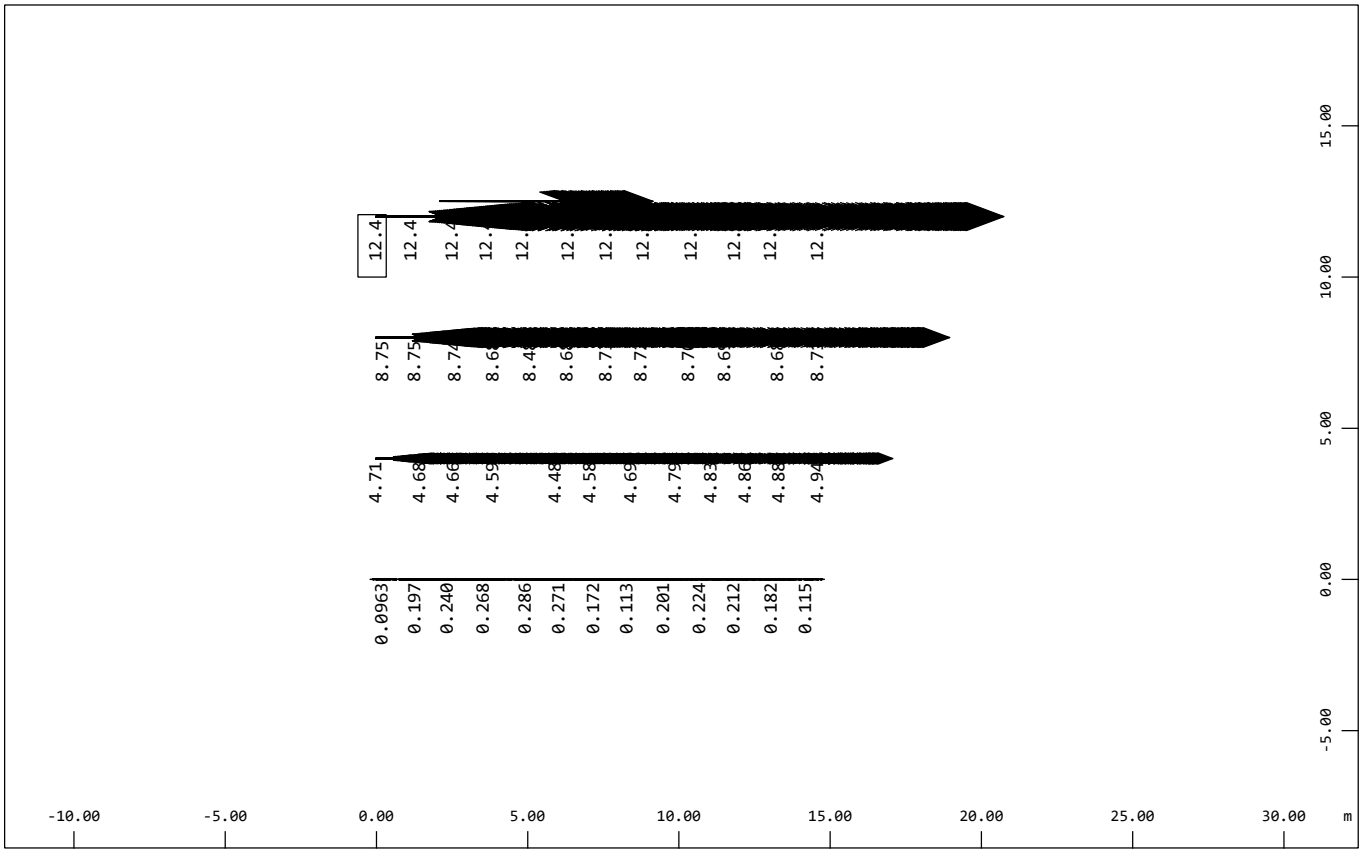

Z
X
Sector of system Quadrilateral Elements Group 100 110 120 130
Nodal displacement in global X, Loadcase 3071 QuakeXY-Max-Ux , 1 cm 3D = 5.00 mm
(Max=14.5)
M 1 : 250



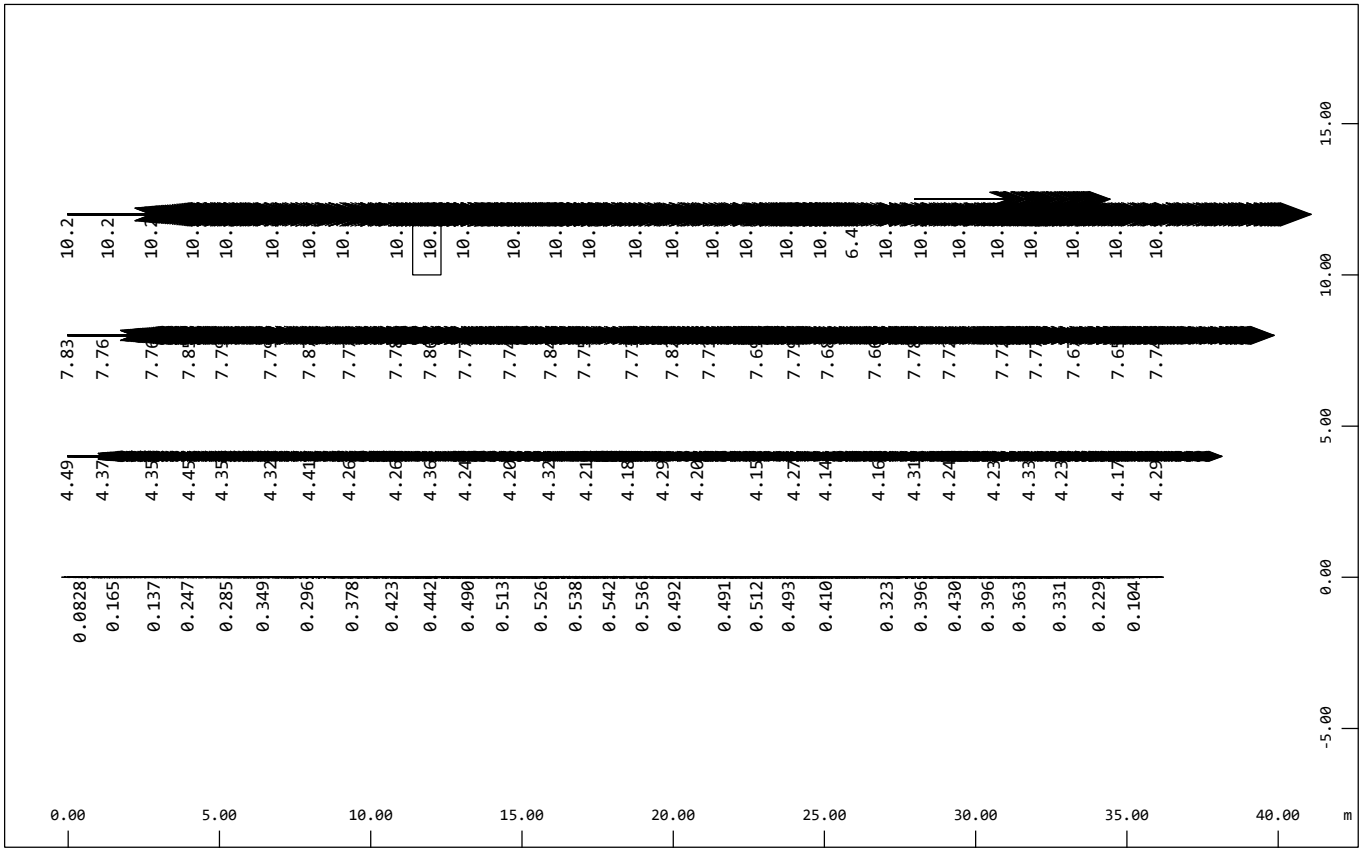

Z
X
Y
Sector of system Quadrilateral Elements Group 100 110 120 130
Nodal displacement in global Y, Loadcase 3071 QuakeXY-Max-Ux , 1 cm 3D = 5.00 mm
(Max=3.96)
M 1 : 250

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj. horiz. pomikov: prip. Ux, max. Uy



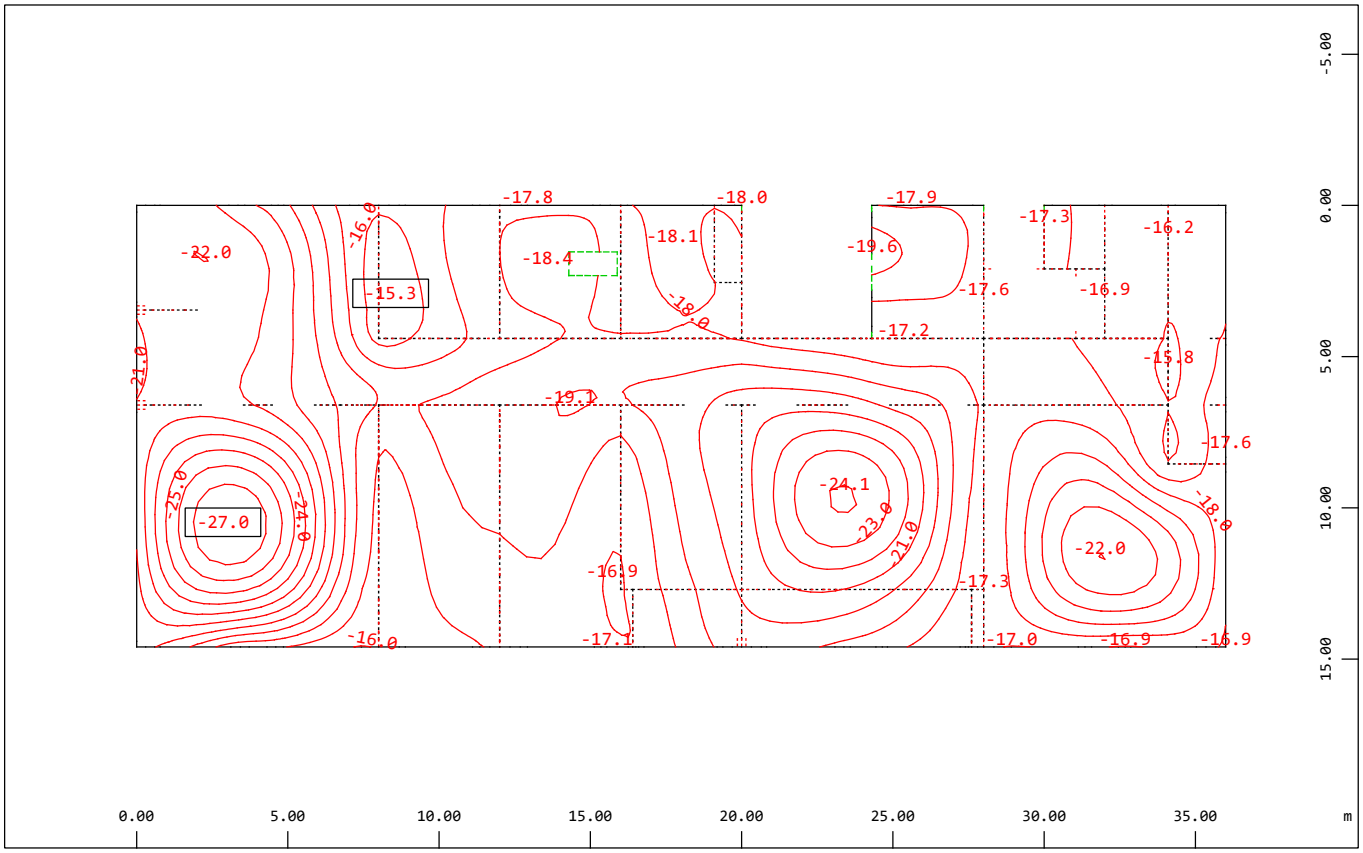

Sector of system Quadrilateral Elements Group 100 110 120 130 M 1 : 250
Nodal displacement in global X, Loadcase 3073 QuakeXY-Max-Uy , 1 cm 3D = 5.00 mm
(Max=12.4)



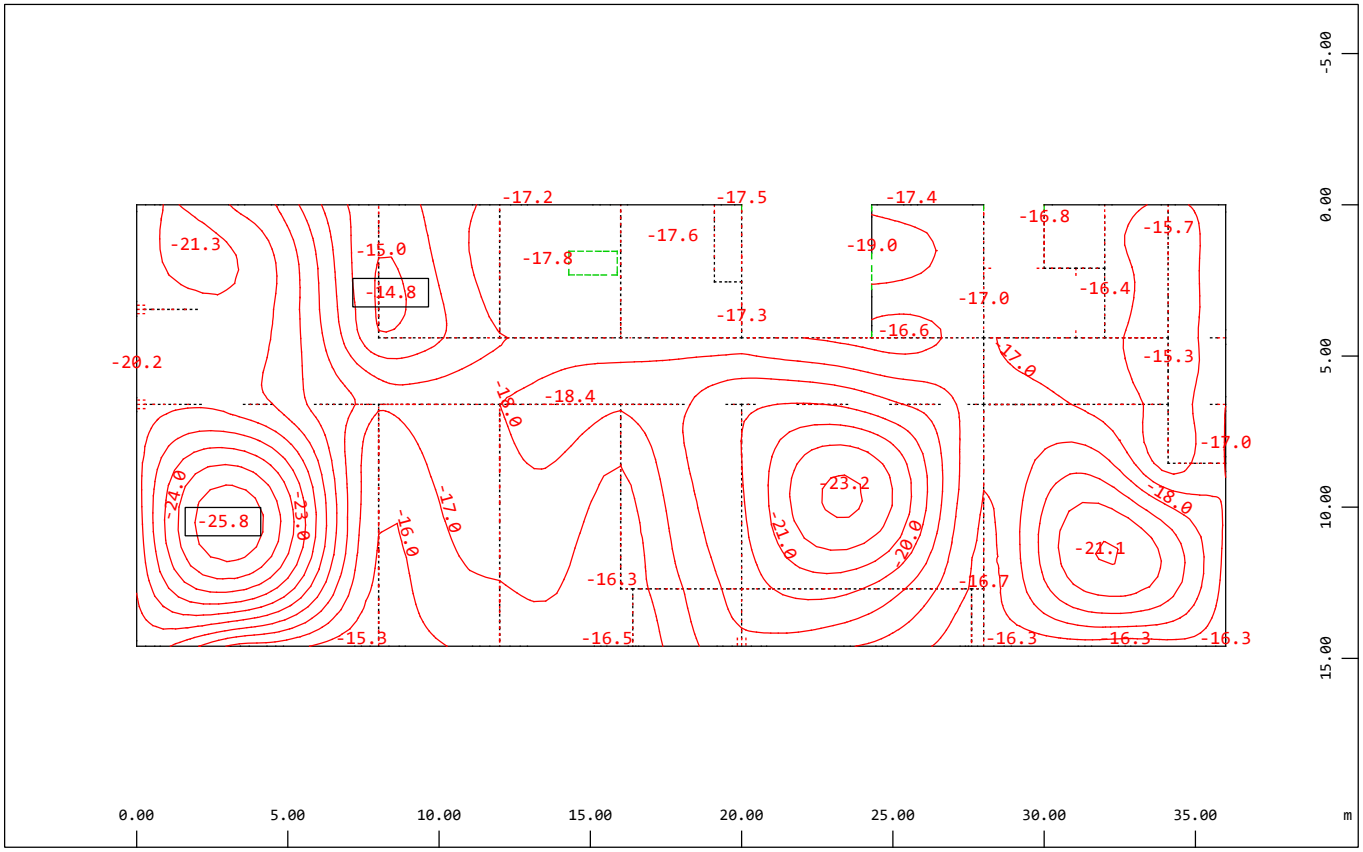

Sector of system Quadrilateral Elements Group 100 110 120 130 M 1 : 250
Nodal displacement in global Y, Loadcase 3073 QuakeXY-Max-Uy , 1 cm 3D = 5.00 mm
(Max=10.3)

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj.vert.pomikov plosc (MSU-perm): etazna plosca nad P



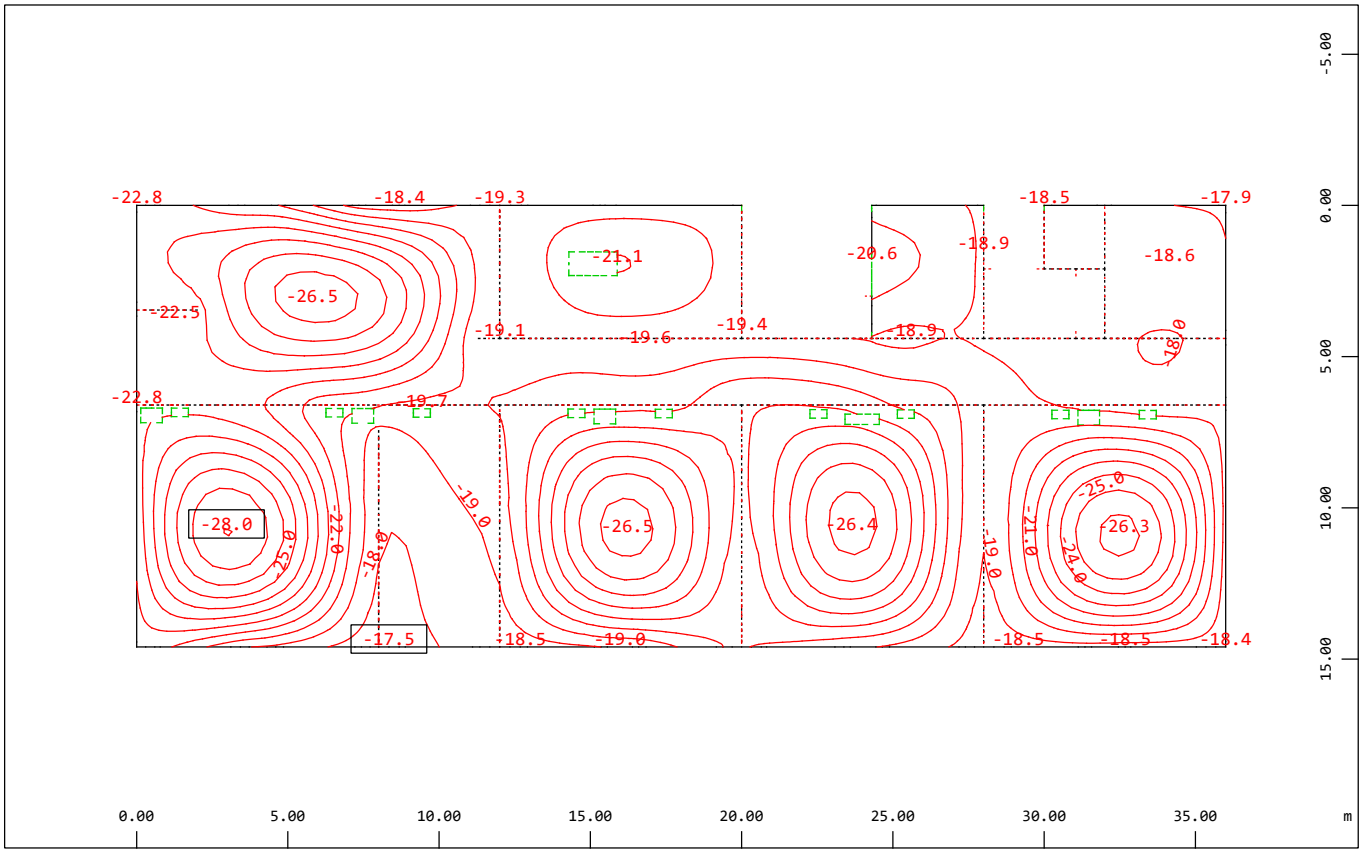

Sector of system Group 110 M 1 : 250
Nodal displacement in global Z in Node , Loadcase 9276 MINP-UZ NODE , from -27.0 to
-15.3 step 1.00 mm



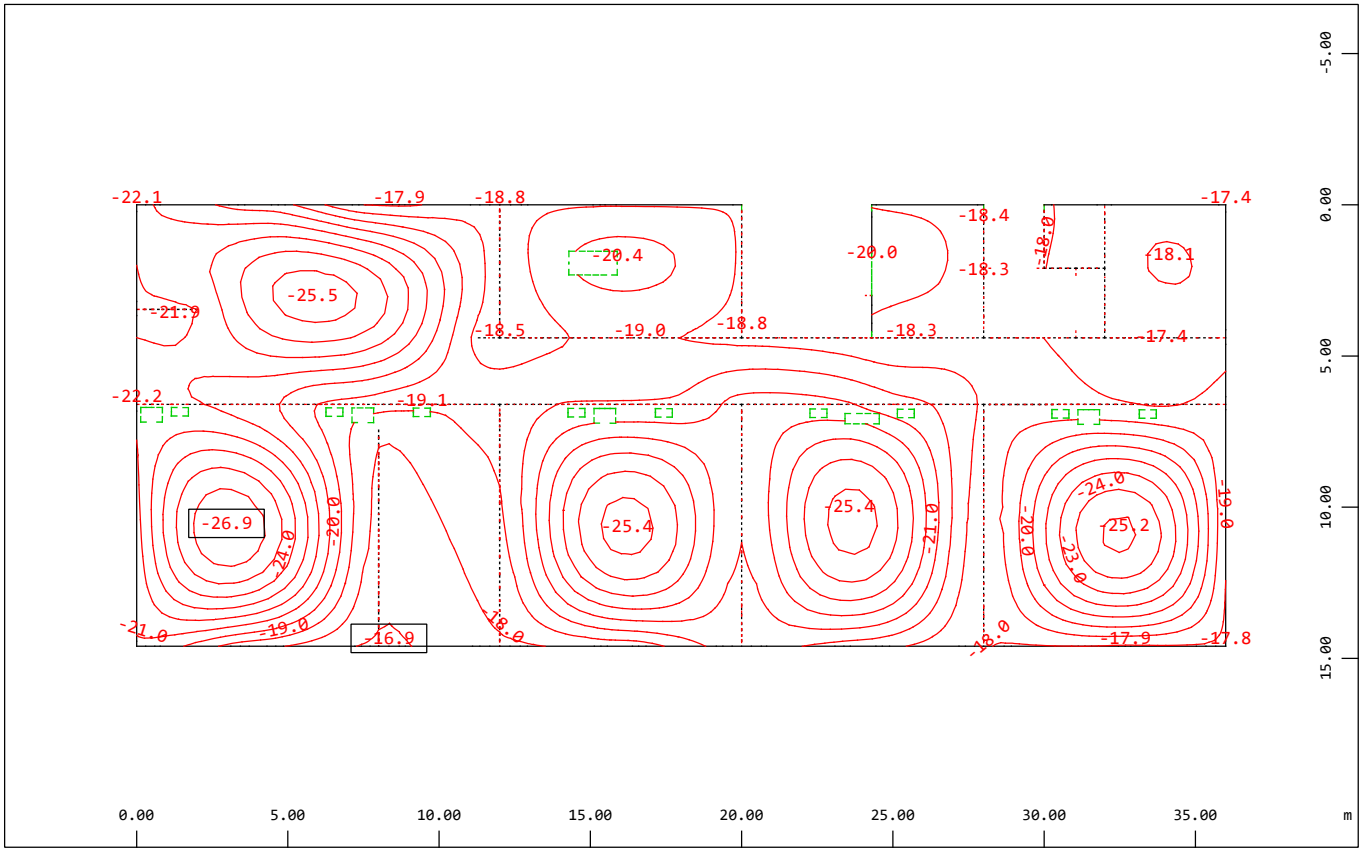

Sector of system Group 110 M 1 : 250
Nodal displacement in global Z in Node , Loadcase 9275 MAXP-UZ NODE , from -25.8 to
-14.8 step 1.00 mm

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj.vert.pomikov plosc (MSU-perm): etazna plosca nad N



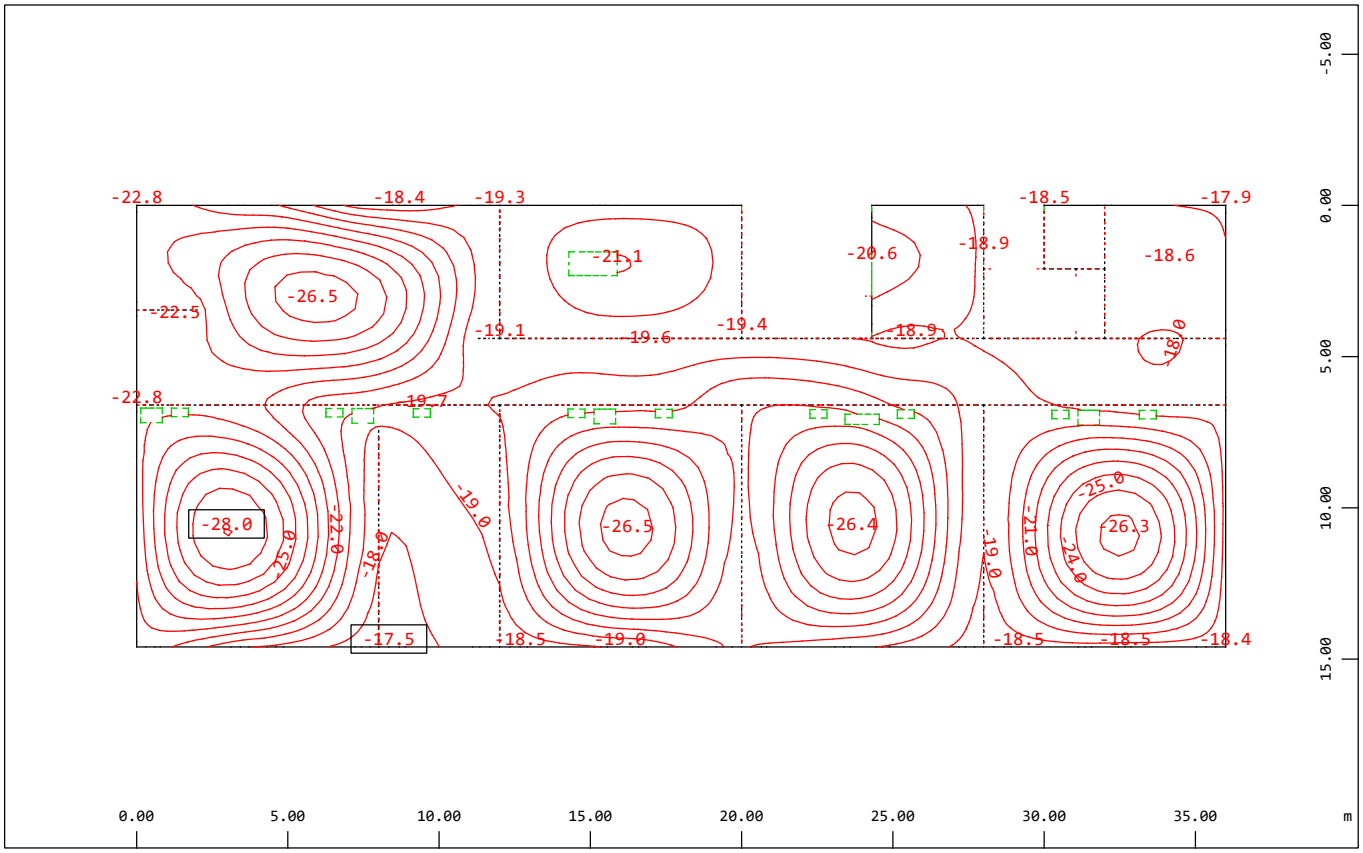

Sector of system Group 120 M 1 : 250
Z Y
X
Nodal displacement in global Z in Node , Loadcase 9276 MINP-UZ NODE , from -28.0 to
-17.5 step 1.00 mm



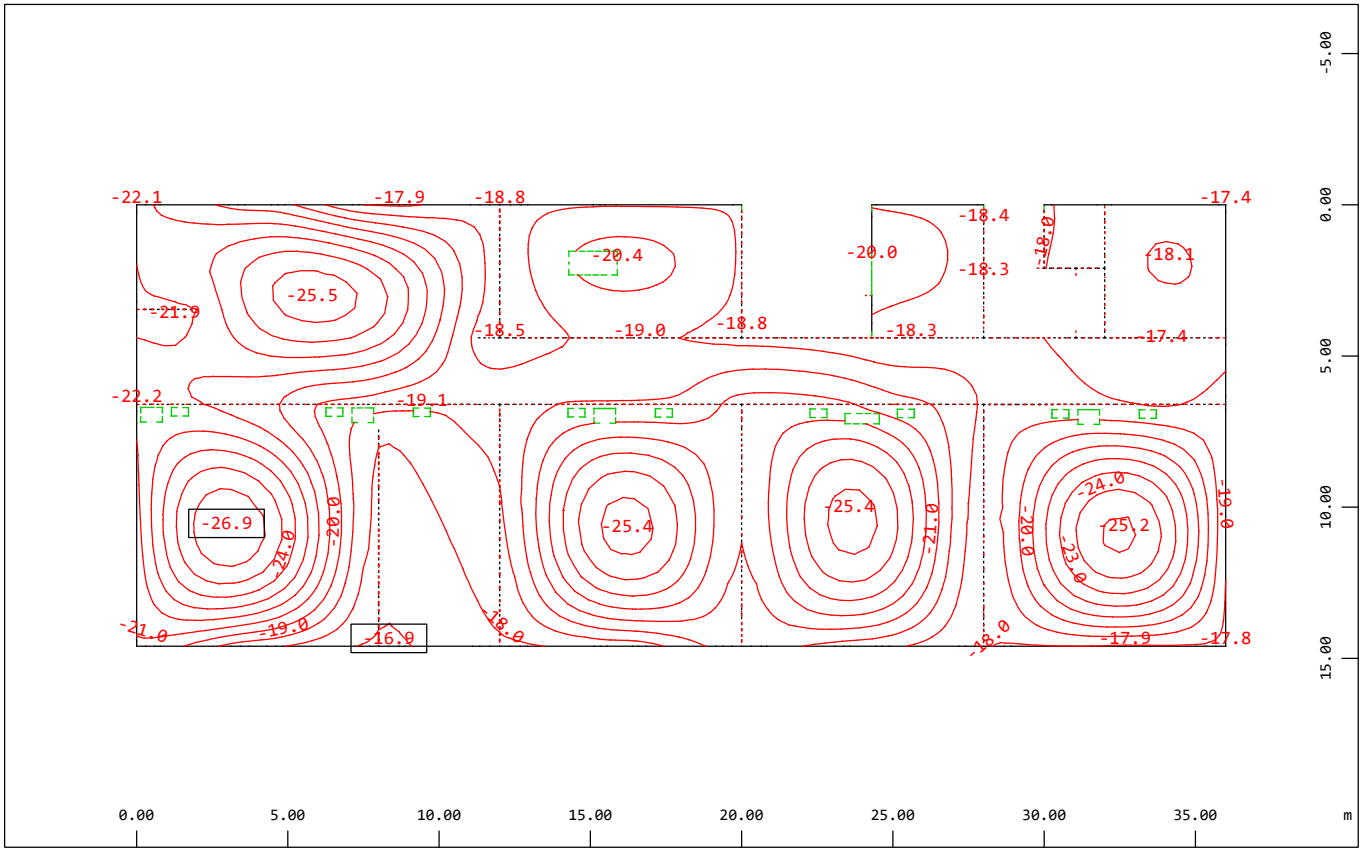

Sector of system Group 120 M 1 : 250
Z Y
X
Nodal displacement in global Z in Node , Loadcase 9275 MAXP-UZ NODE , from -26.9 to
-16.9 step 1.00 mm

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj.vert.pomikov plosc (MSU-perm): stresna plosca



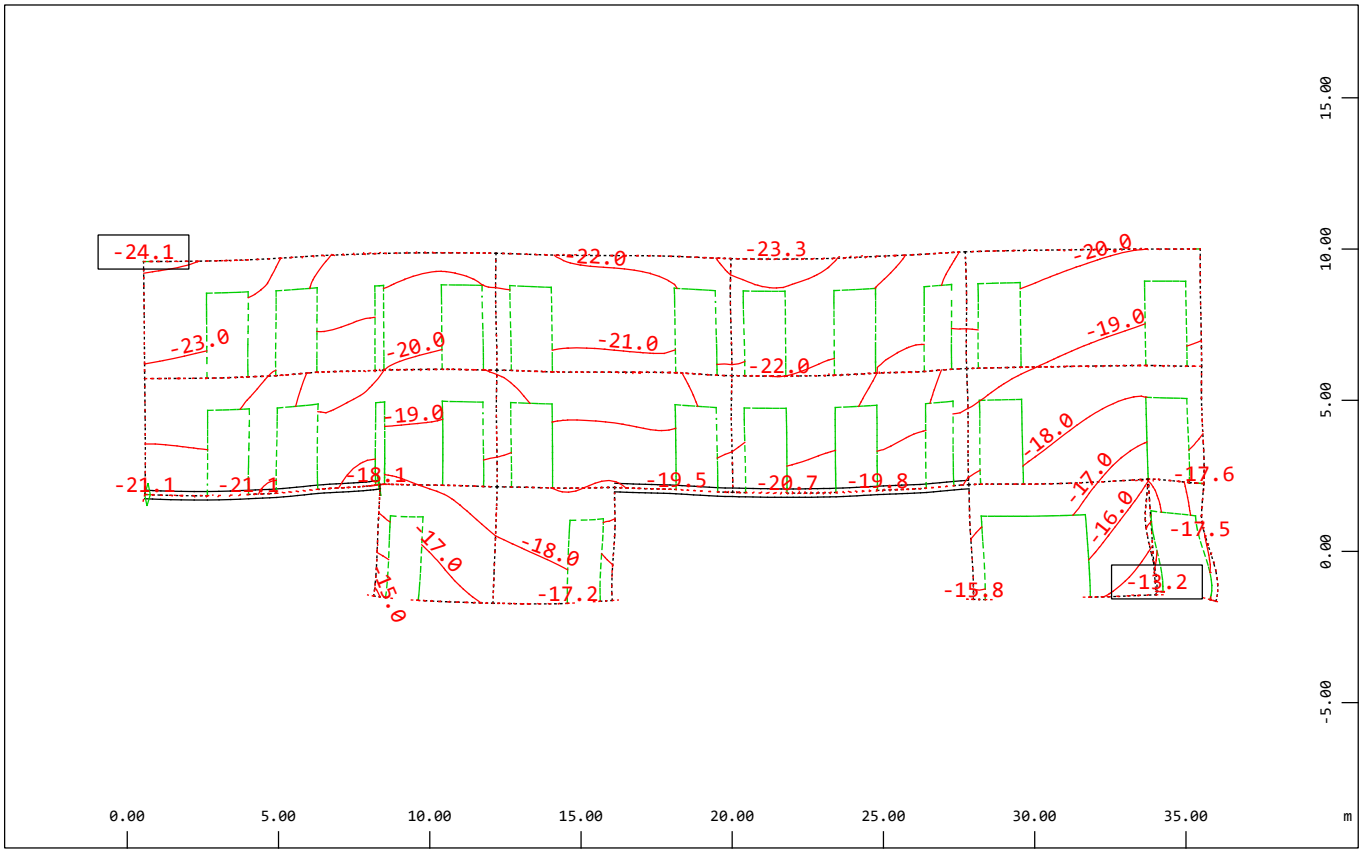

Sector of system Group 120 M 1 : 250
Nodal displacement in global Z in Node , Loadcase 9276 MINP-UZ NODE , from -28.0 to
-17.5 step 1.00 mm



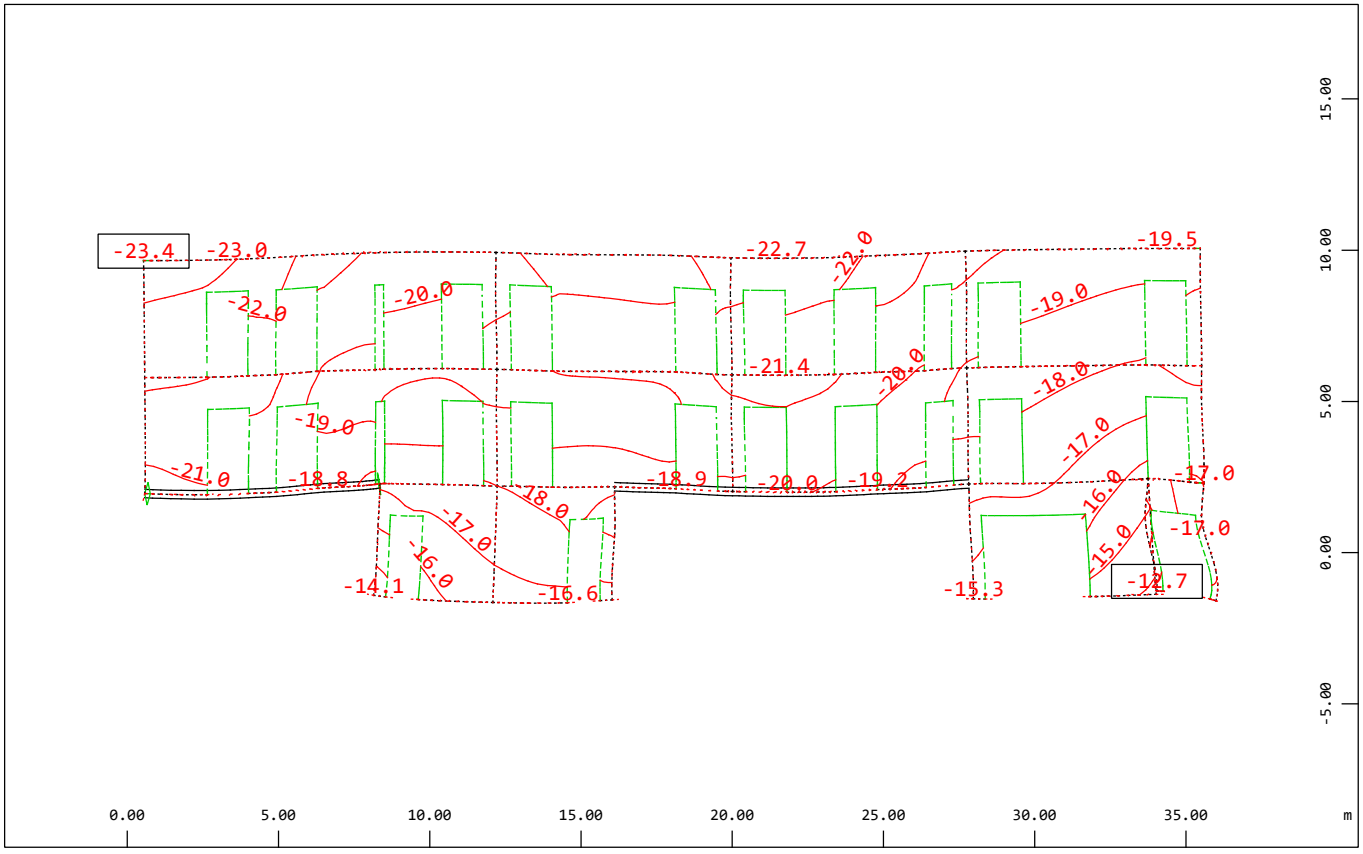

Sector of system Group 120 M 1 : 250
Nodal displacement in global Z in Node , Loadcase 9275 MAXP-UZ NODE , from -26.9 to
-16.9 step 1.00 mm

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj. vert. pomikov MSU (navidezno-stalna): Nosilci v osi 12



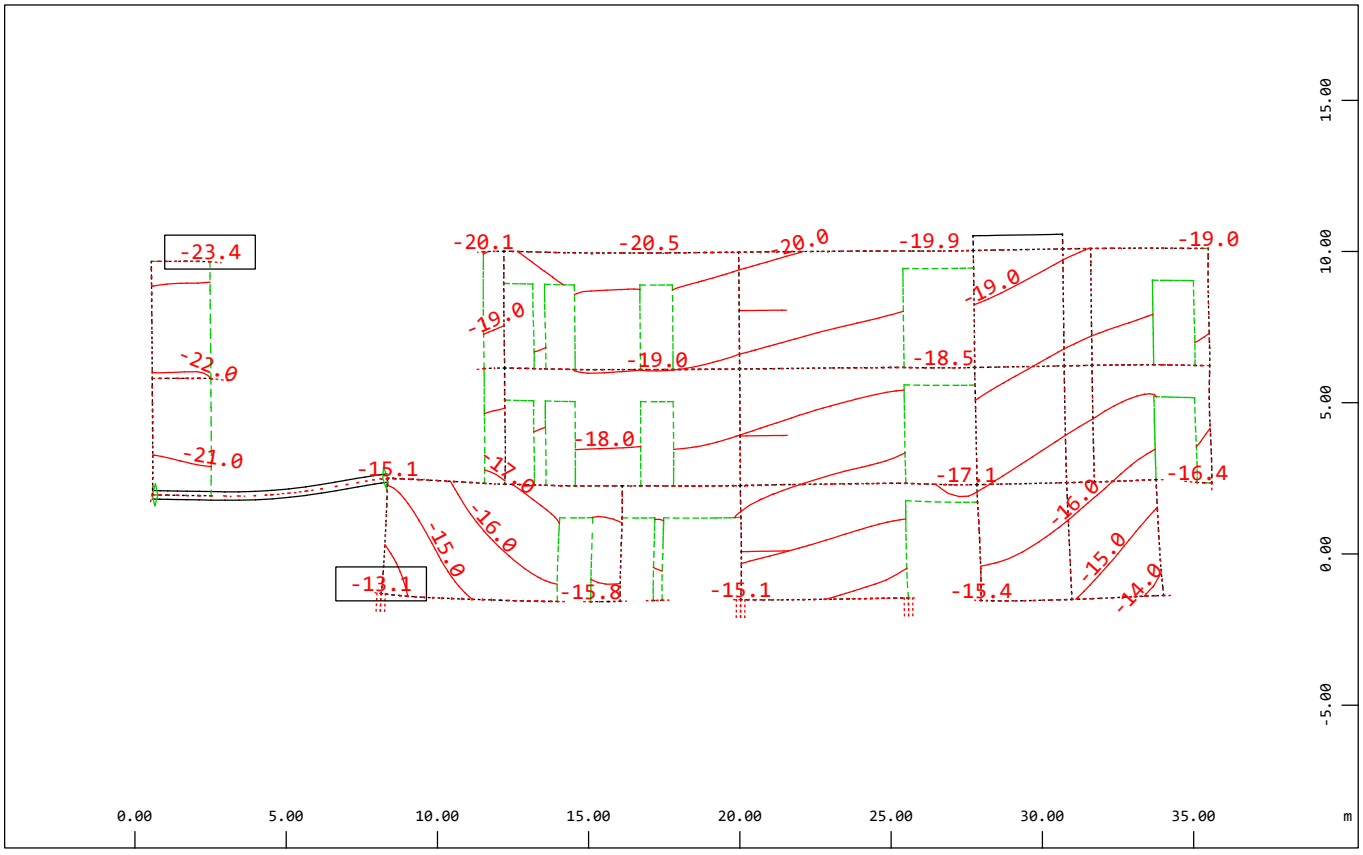

Sector of system Group 254 M 1 : 250
Deformed Structure from LC 9276 MINP-UZ NODE Enlarged by 100.0
Nodal displacement in global Z in Node , Loadcase 9276 MINP-UZ NODE , from -24.1 to



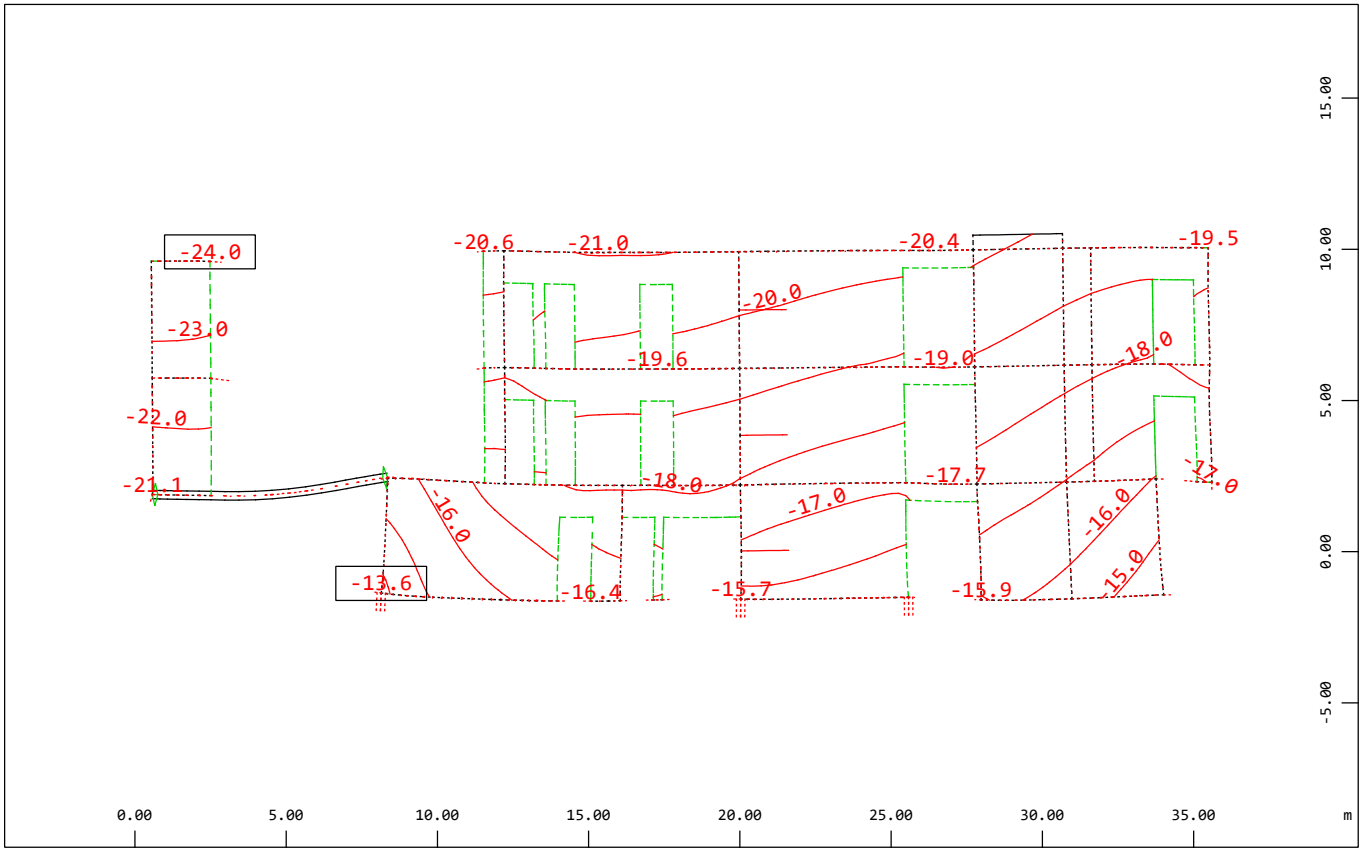

Sector of system Group 254 M 1 : 250
Deformed Structure from LC 9275 MAXP-UZ NODE Enlarged by 100.0
Nodal displacement in global Z in Node , Loadcase 9275 MAXP-UZ NODE , from -23.4 to

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj. vert. pomikov MSU (navidezno-stalna): Nosilec v osi 11



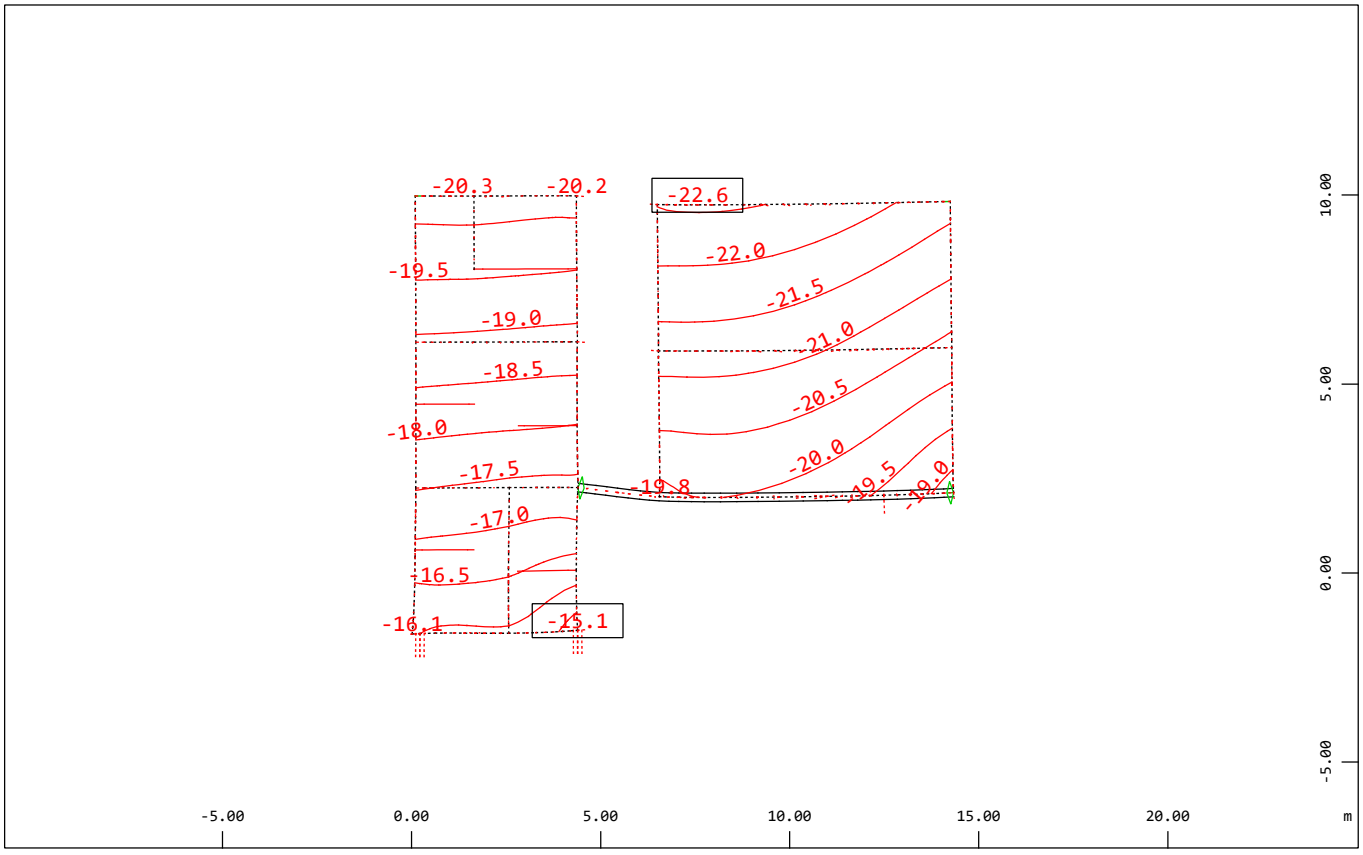

Z
Y
Sector of system Group 253 M 1 : 250
Deformed Structure from LC 9275 MAXP-UZ NODE Enlarged by 100.0
Nodal displacement in global Z in Node ↕ , Loadcase 9275 MAXP-UZ NODE , from -23.4 to



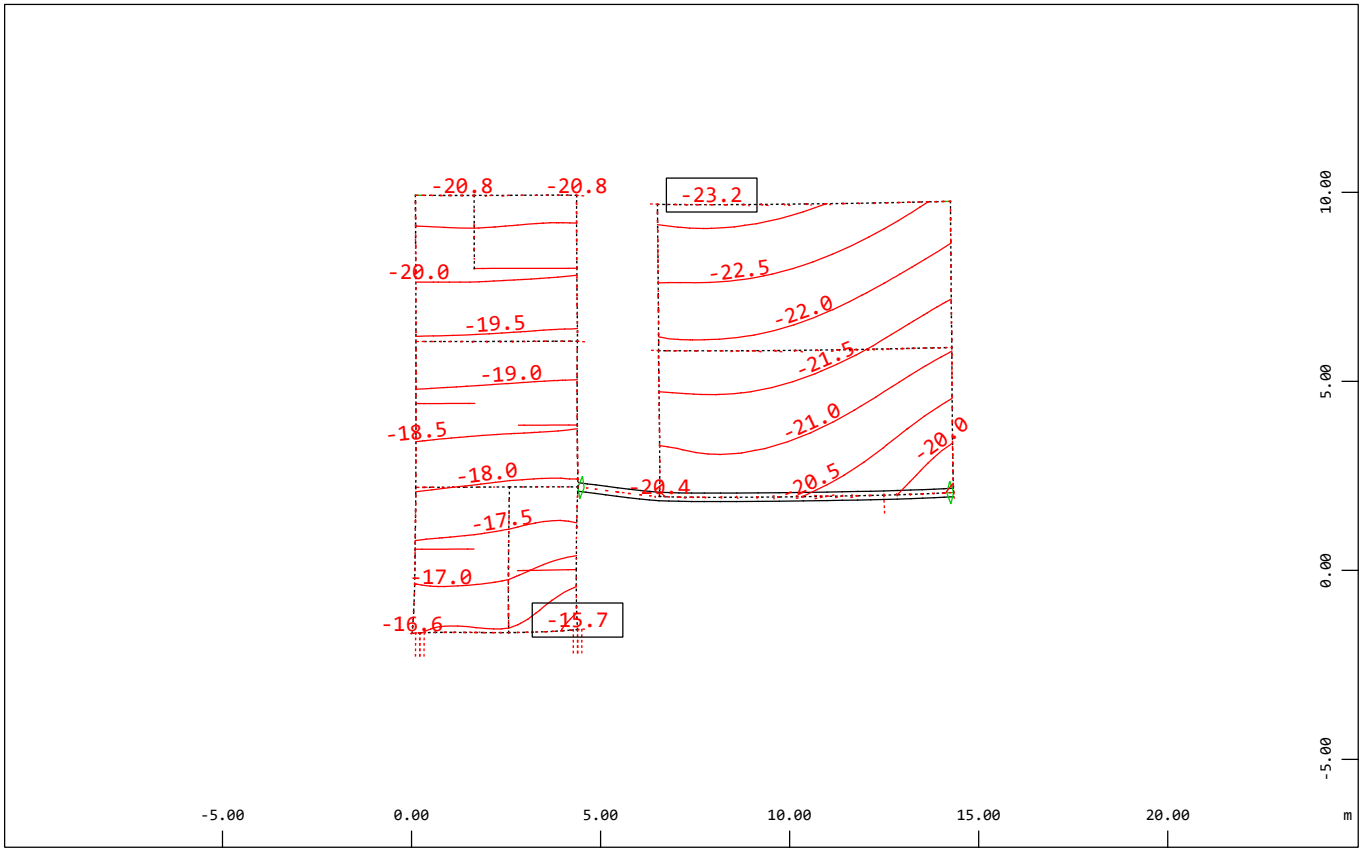

Z
Y
Sector of system Group 253 M 1 : 250
Deformed Structure from LC 9276 MINP-UZ NODE Enlarged by 100.0
Nodal displacement in global Z in Node ↕ , Loadcase 9276 MINP-UZ NODE , from -24.0 to

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj. vert. pomikov MSU (navidezno-stalna): Nosilec v osi R



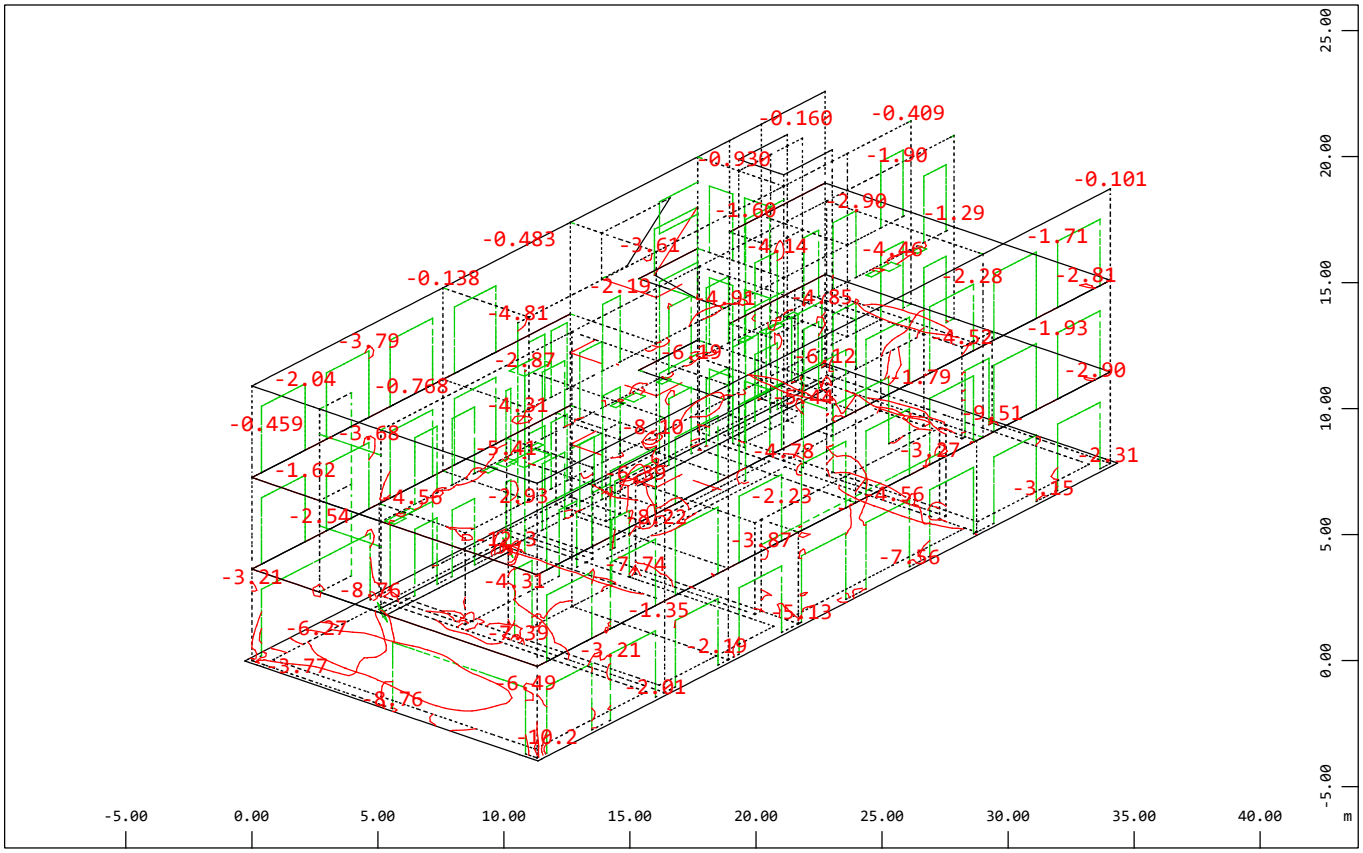

Z
X
Sector of system Group 206 M 1 : 200
Deformed Structure from LC 9275 MAXP-UZ NODE Enlarged by 100.0
Nodal displacement in global Z in Node ⇕ , Loadcase 9275 MAXP-UZ NODE , from -22.6 to




Z
X
Sector of system Group 206 M 1 : 200
Deformed Structure from LC 9276 MINP-UZ NODE Enlarged by 100.0
Nodal displacement in global Z in Node ⇕ , Loadcase 9276 MINP-UZ NODE , from -23.2 to

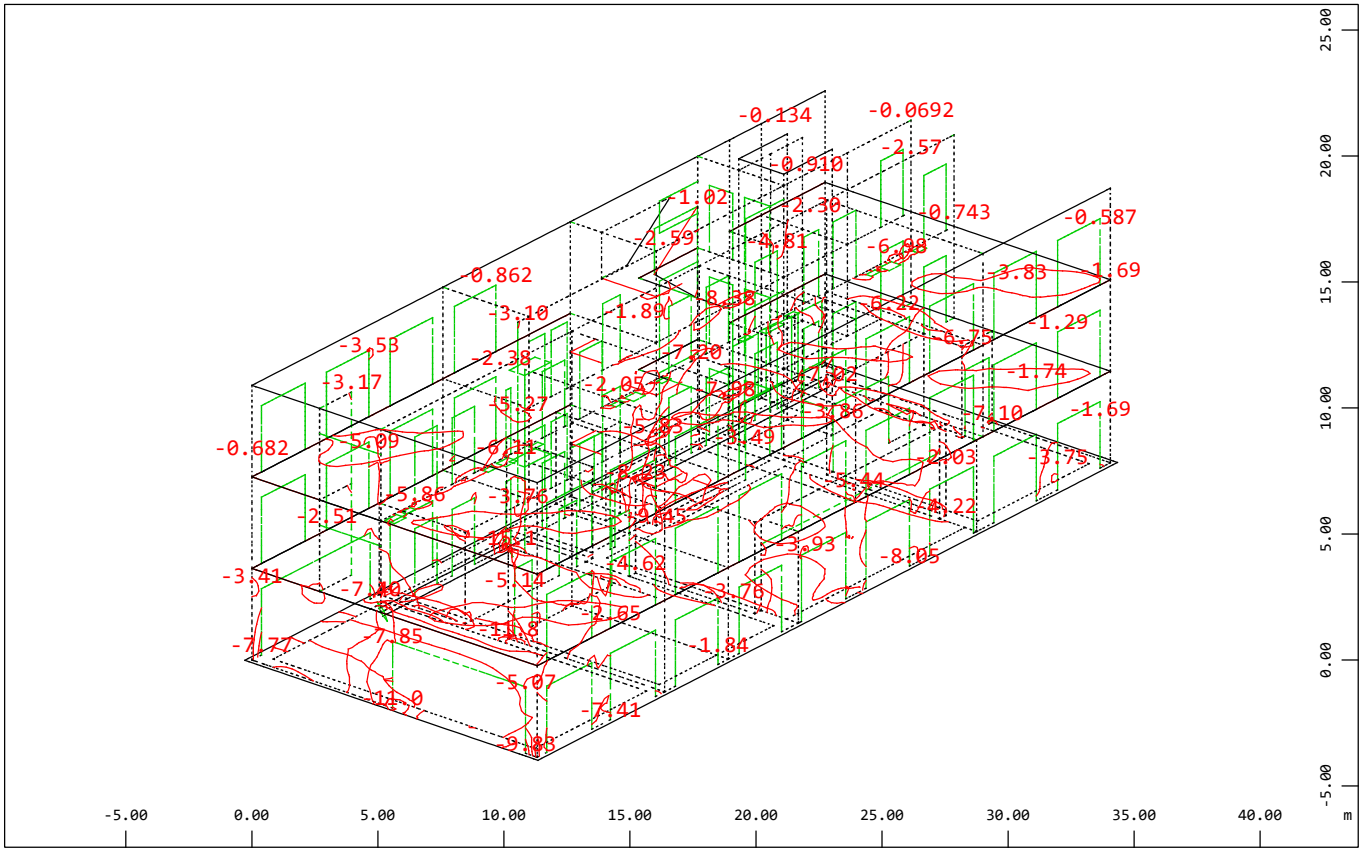
SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - vzhodna dilat. enota stavbe
Maks.tlacna napetost v betonu: MSU-perm (0,45.fck), MSU-rare (0,6.fck)




Sector of system Group 100 110 120 201...207 251...256
Maximum principal compression stress from middle of element, Loadcase 8205 MAXE-MXY QUAD
, from -12.3 to -5.3073e-06 step 2.70 MPa

M 1 : 300
X * 0.819
Y * 0.710
Z * 0.908

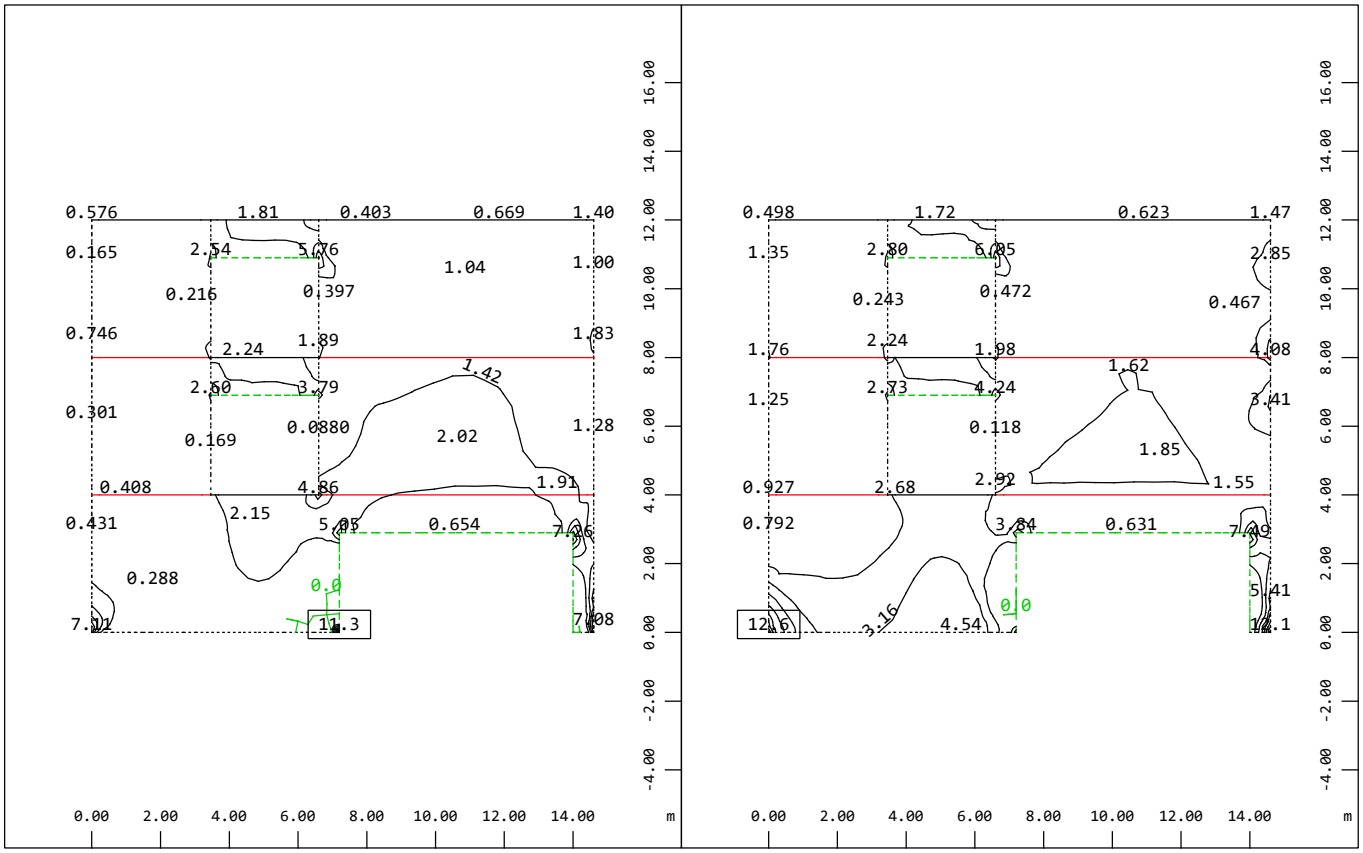



Sector of system Group 100 110 120 201...207 251...256
Maximum principal compression stress from middle of element, Loadcase 8005 MAX-MXY QUAD
, from -13.5 to -1.3653e-07 step 2.70 MPa

M 1 : 300
X * 0.819
Y * 0.710
Z * 0.908

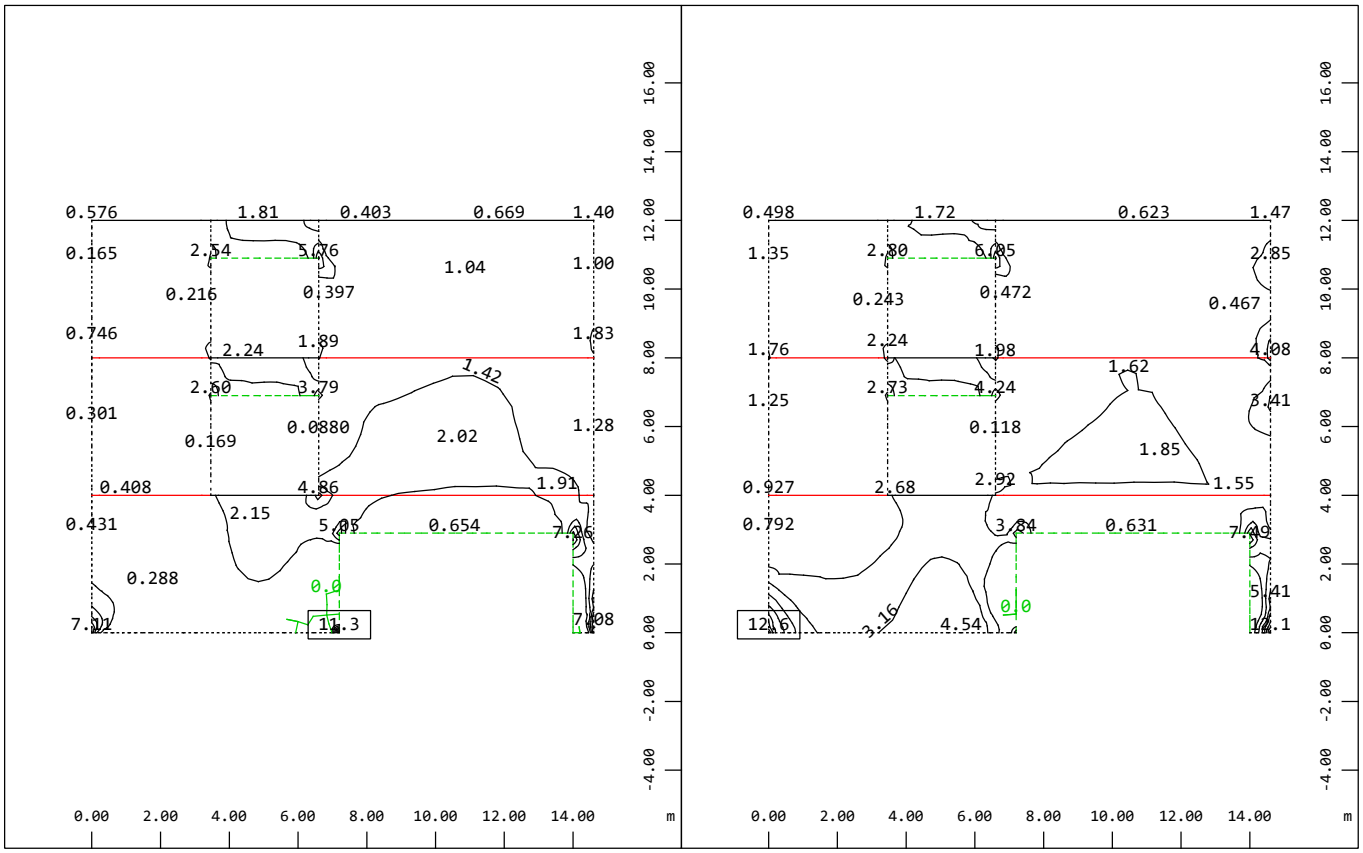
SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - vzhodna dilat. enota stavbe
Precne AB stene v osi V: armatura vert + horiz.







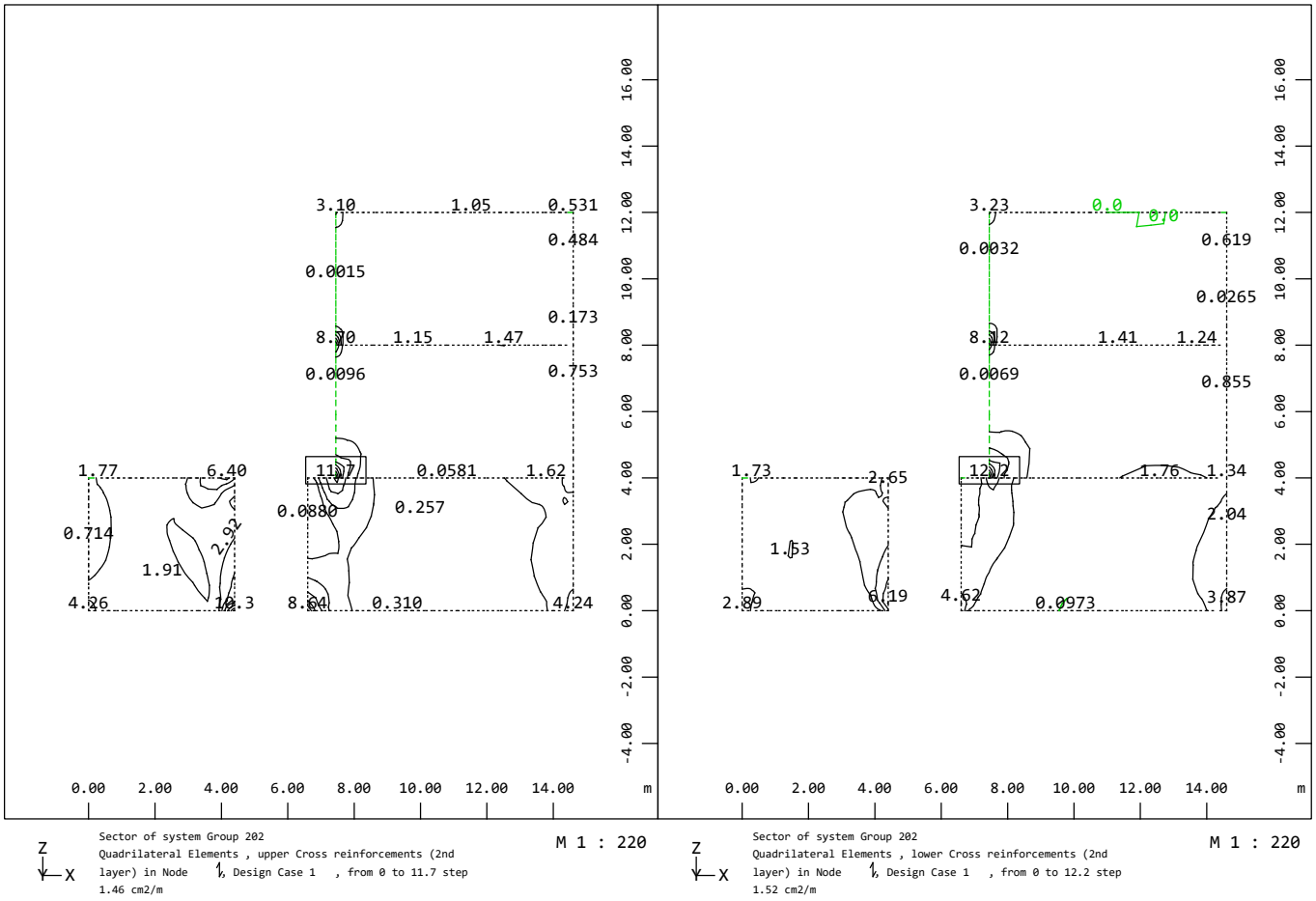


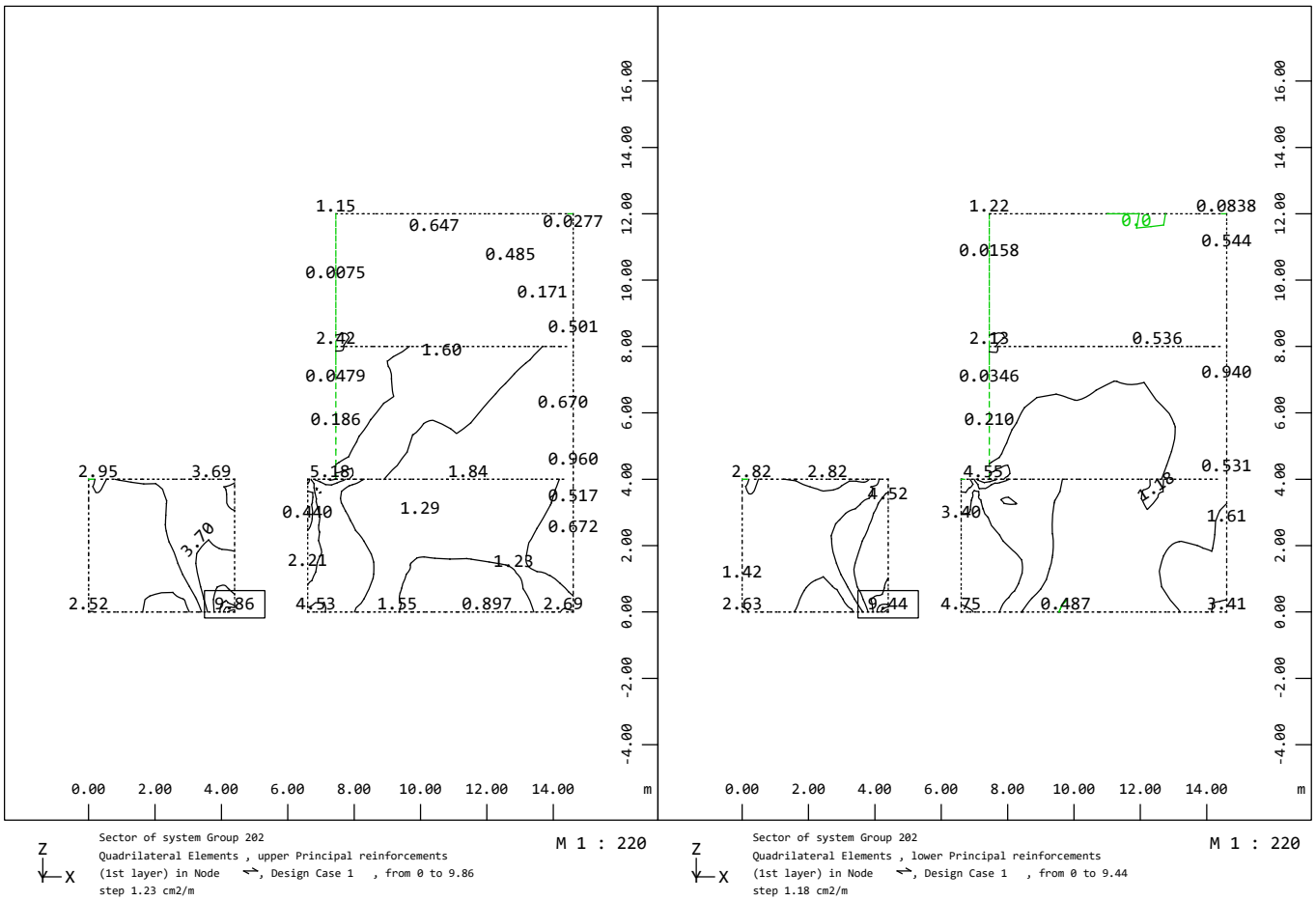




SOFiSTiK AG - www.sofistik.de

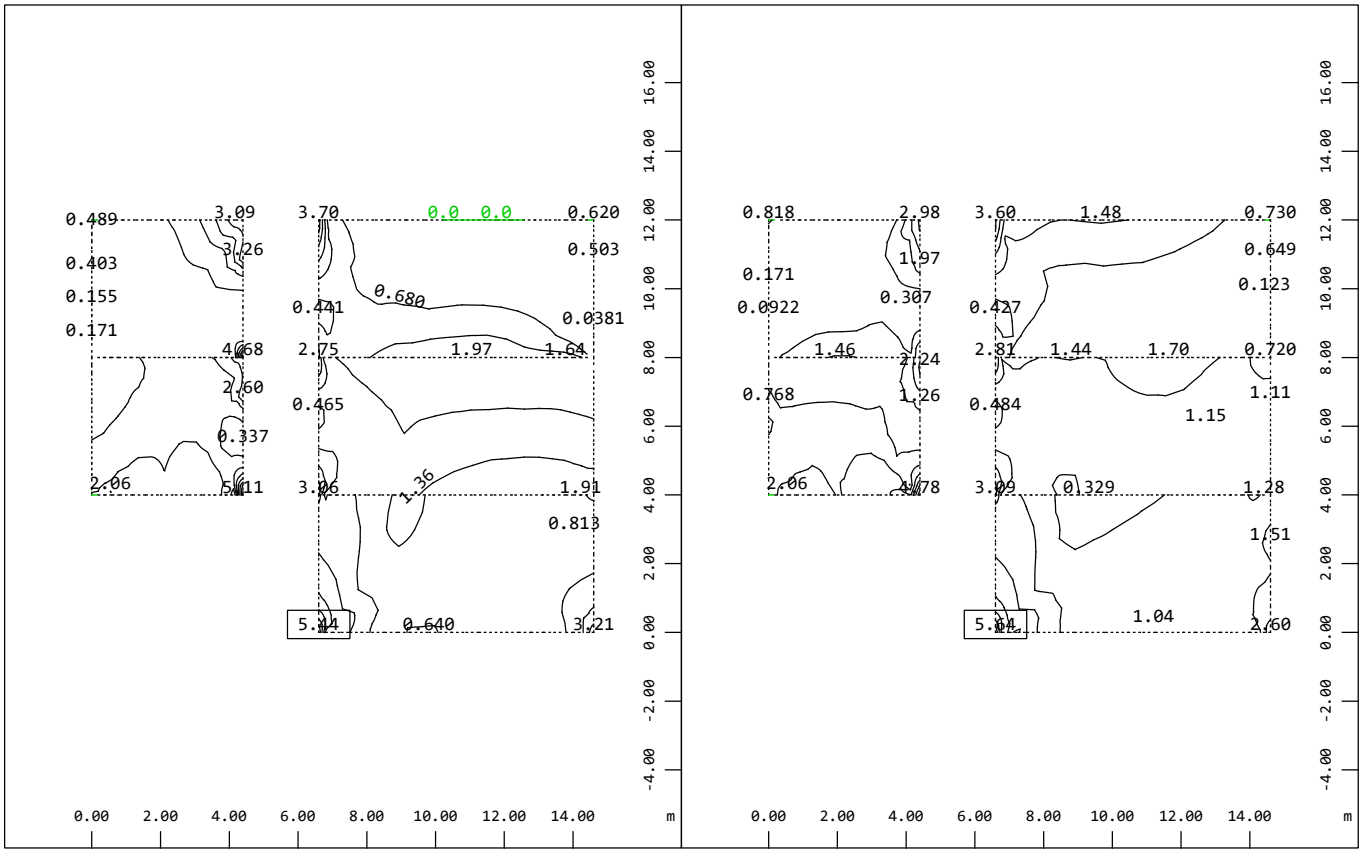
11826 DSO Bovec - vzhodna dilat. enota stavbe
Precne AB stene v osi T: armatura vert + horiz.

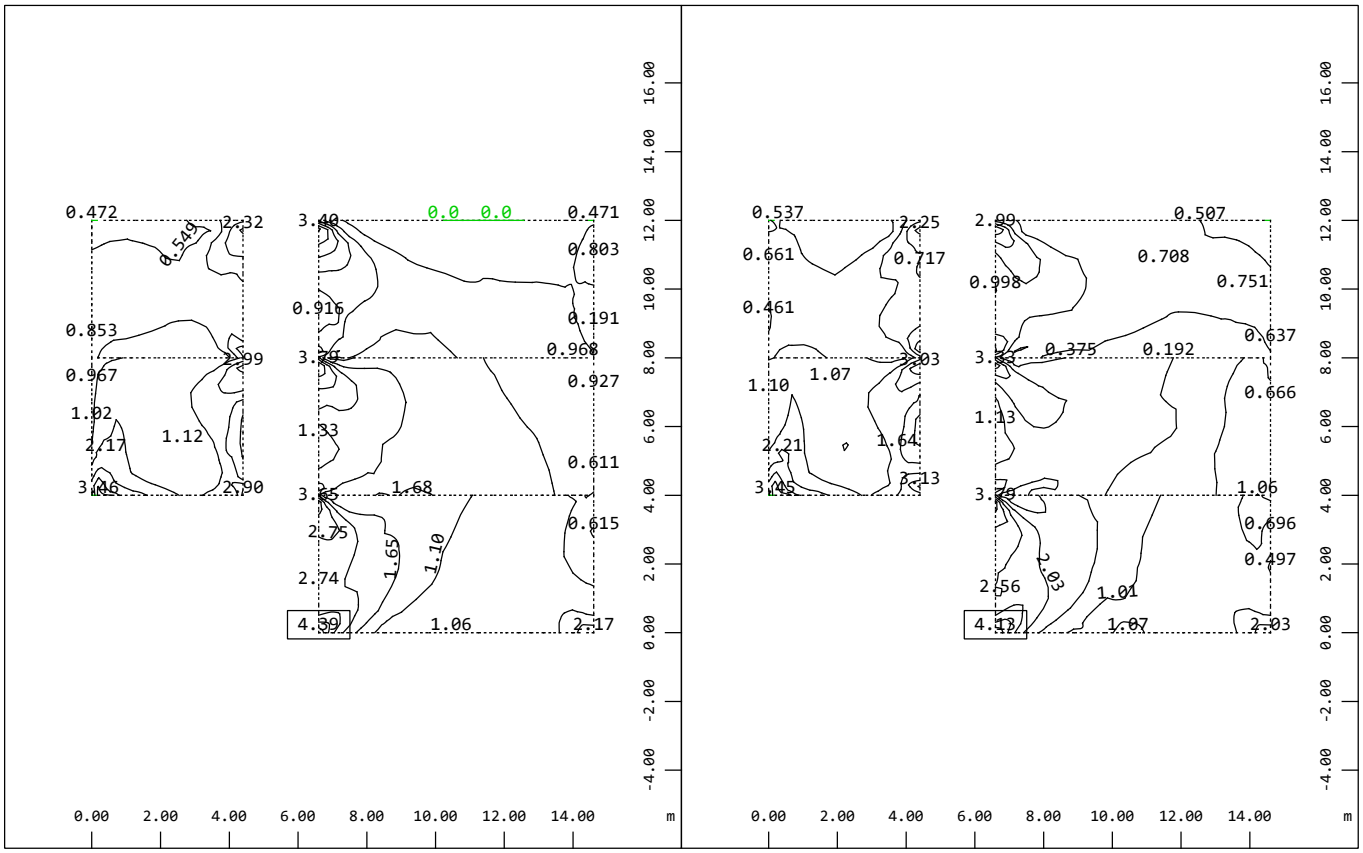



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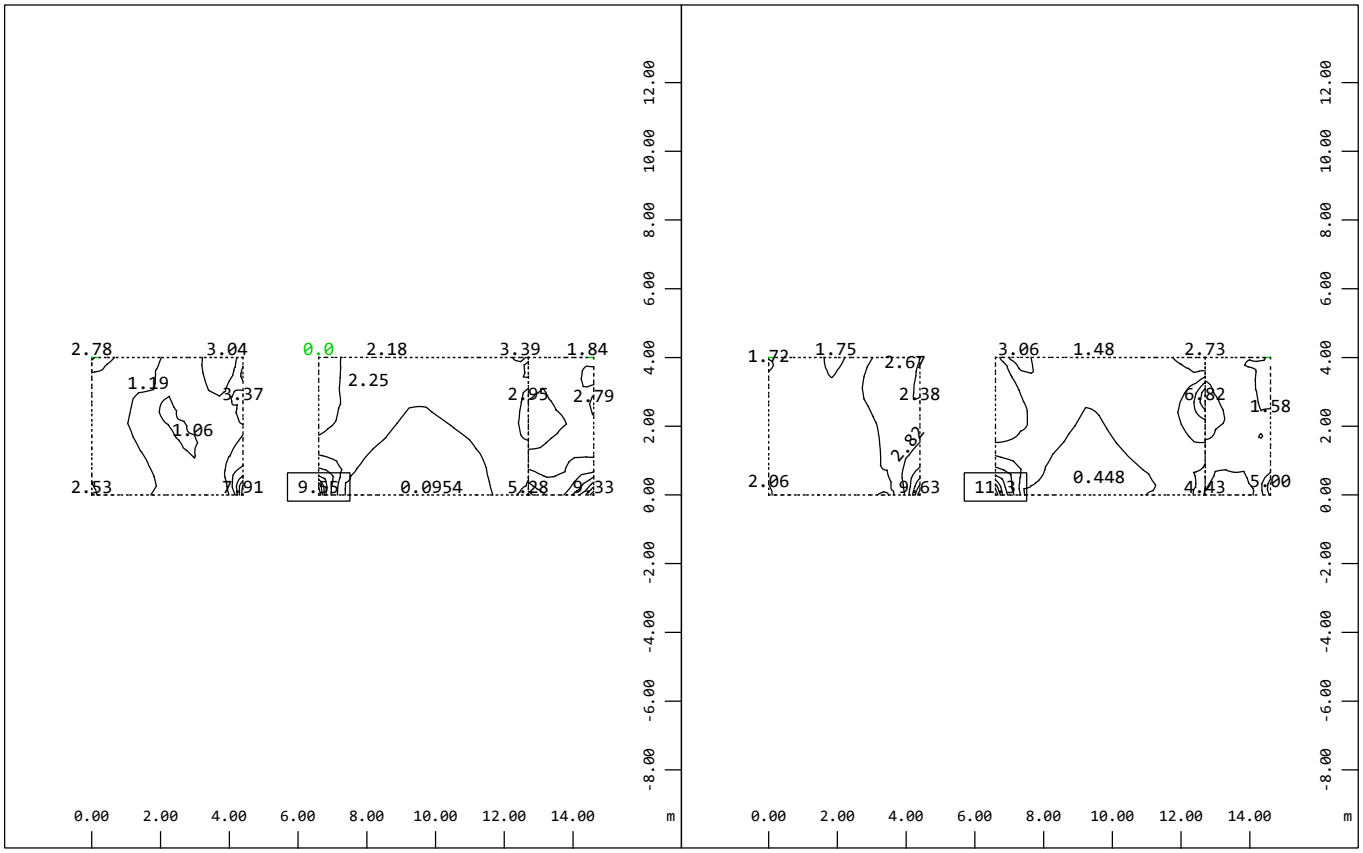
11826 DSO Bovec - vzhodna dilat. enota stavbe
Precne AB stene v osi Š: armatura vert + horiz.

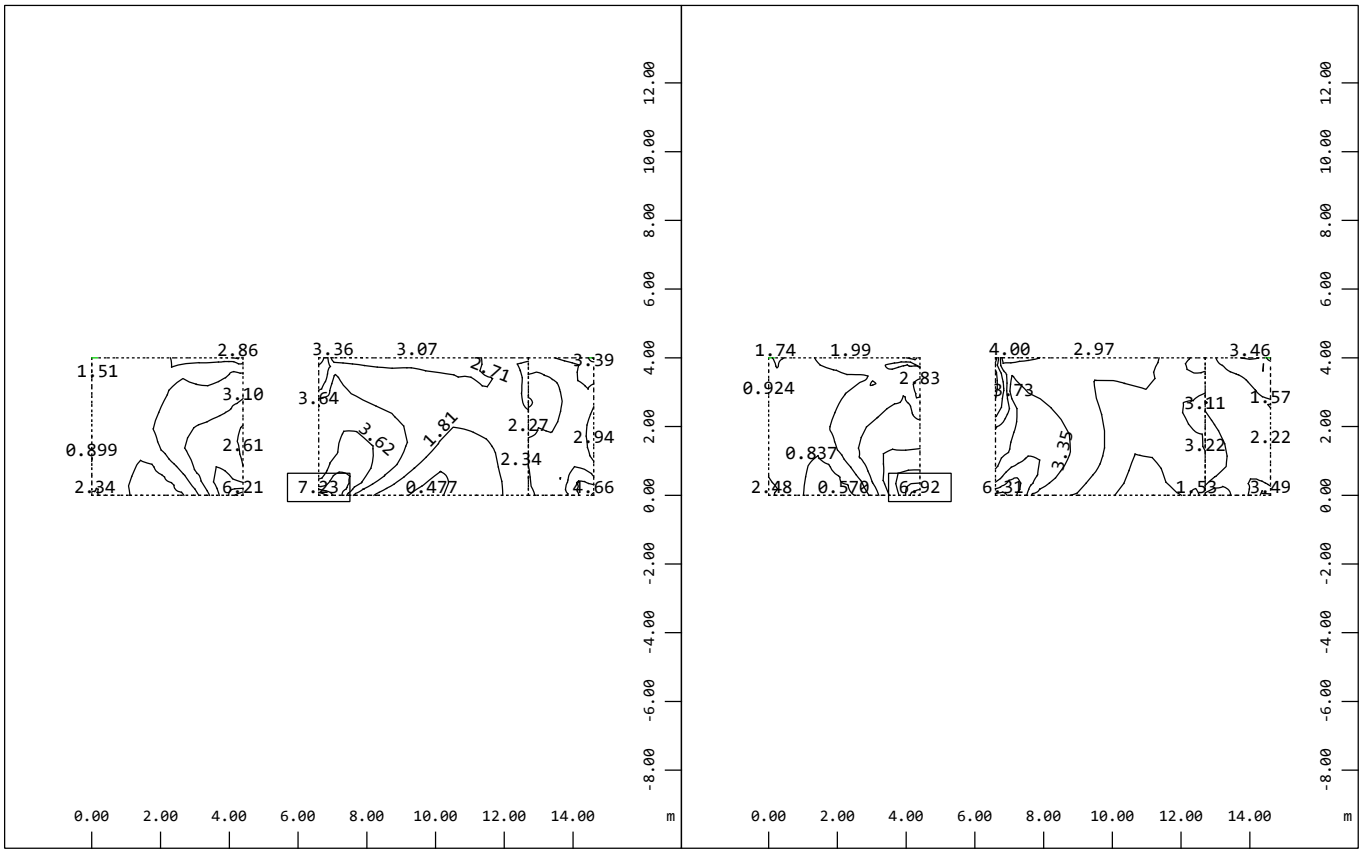



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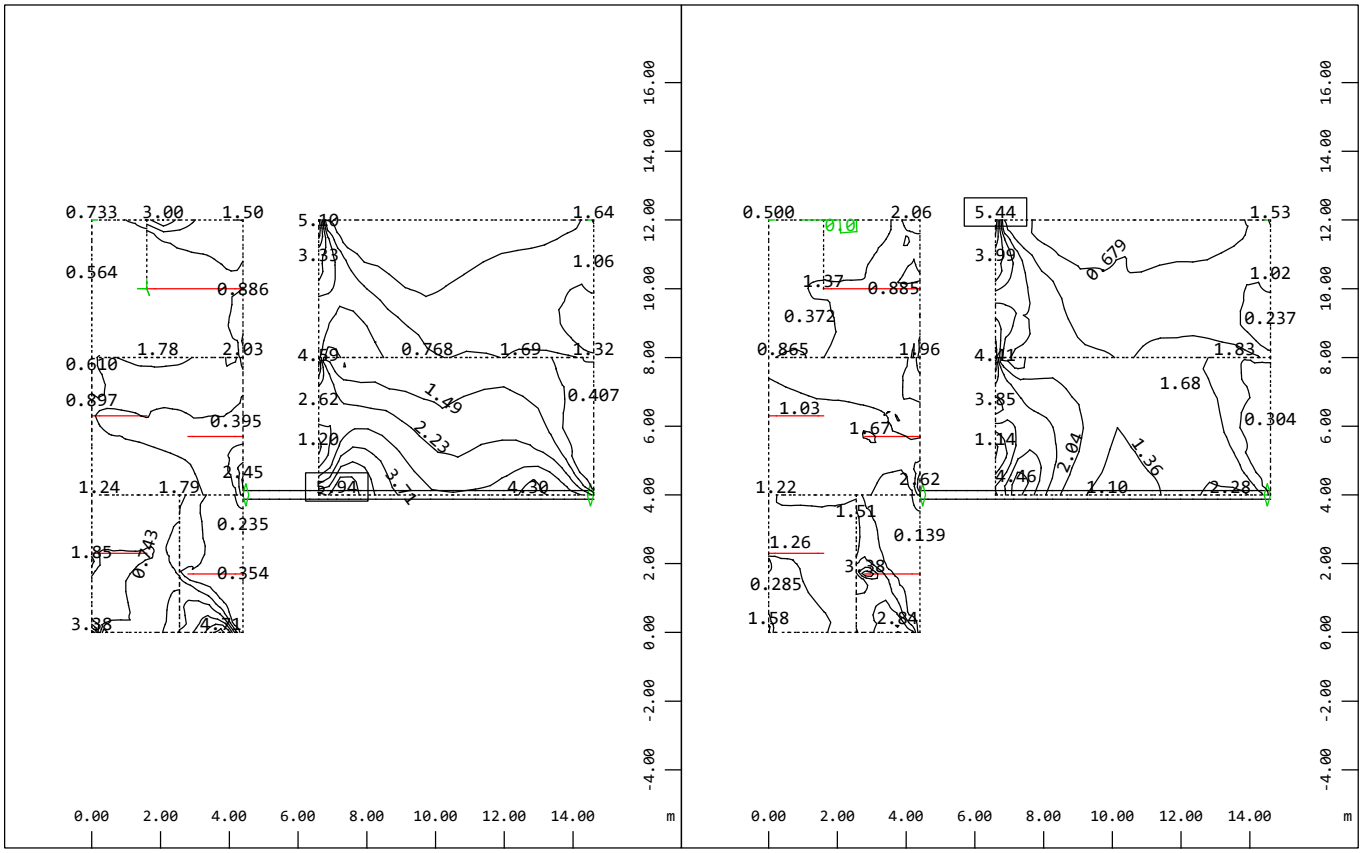
11826 DSO Bovec - vzhodna dilat. enota stavbe
Precne AB stene v osi S: armatura vert + horiz.

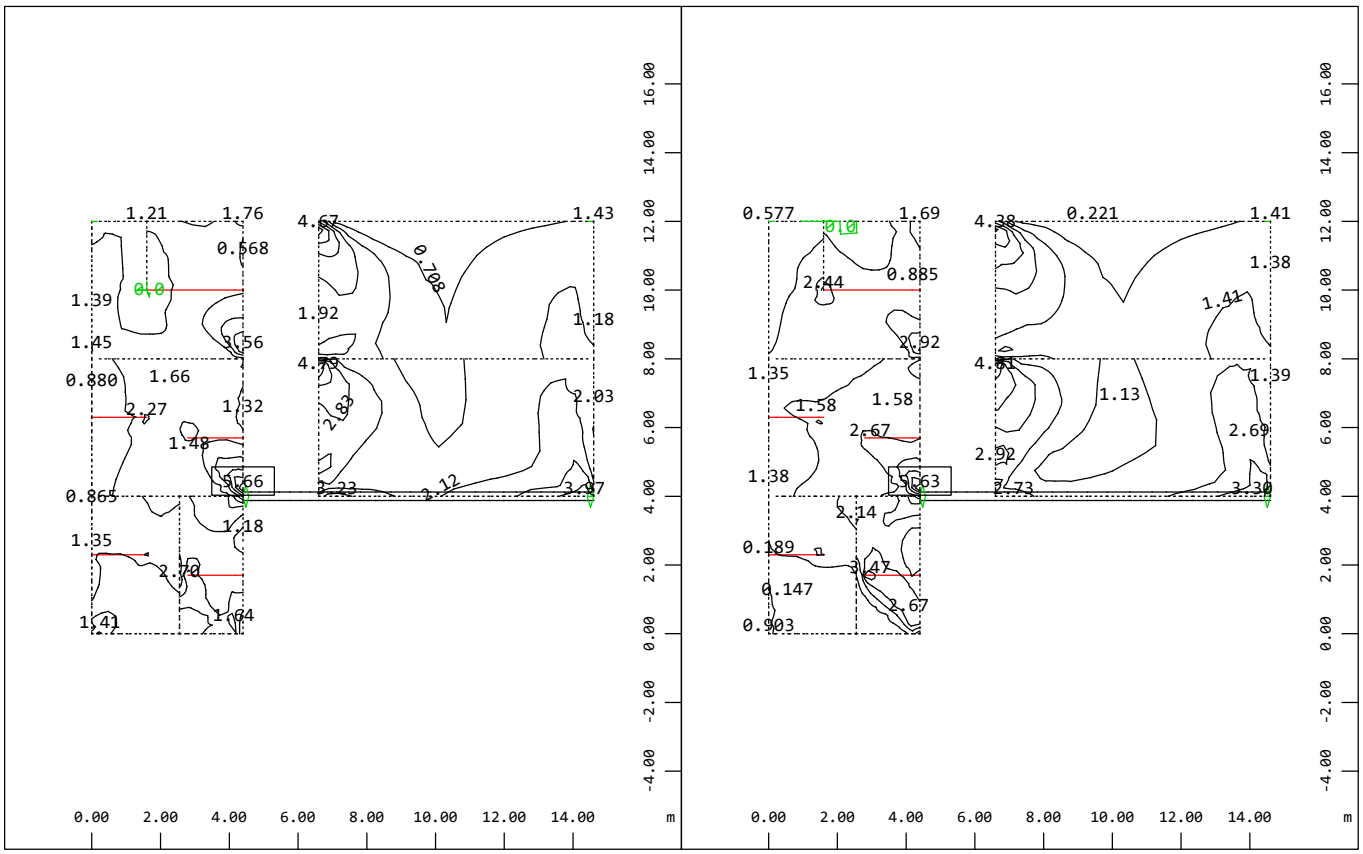



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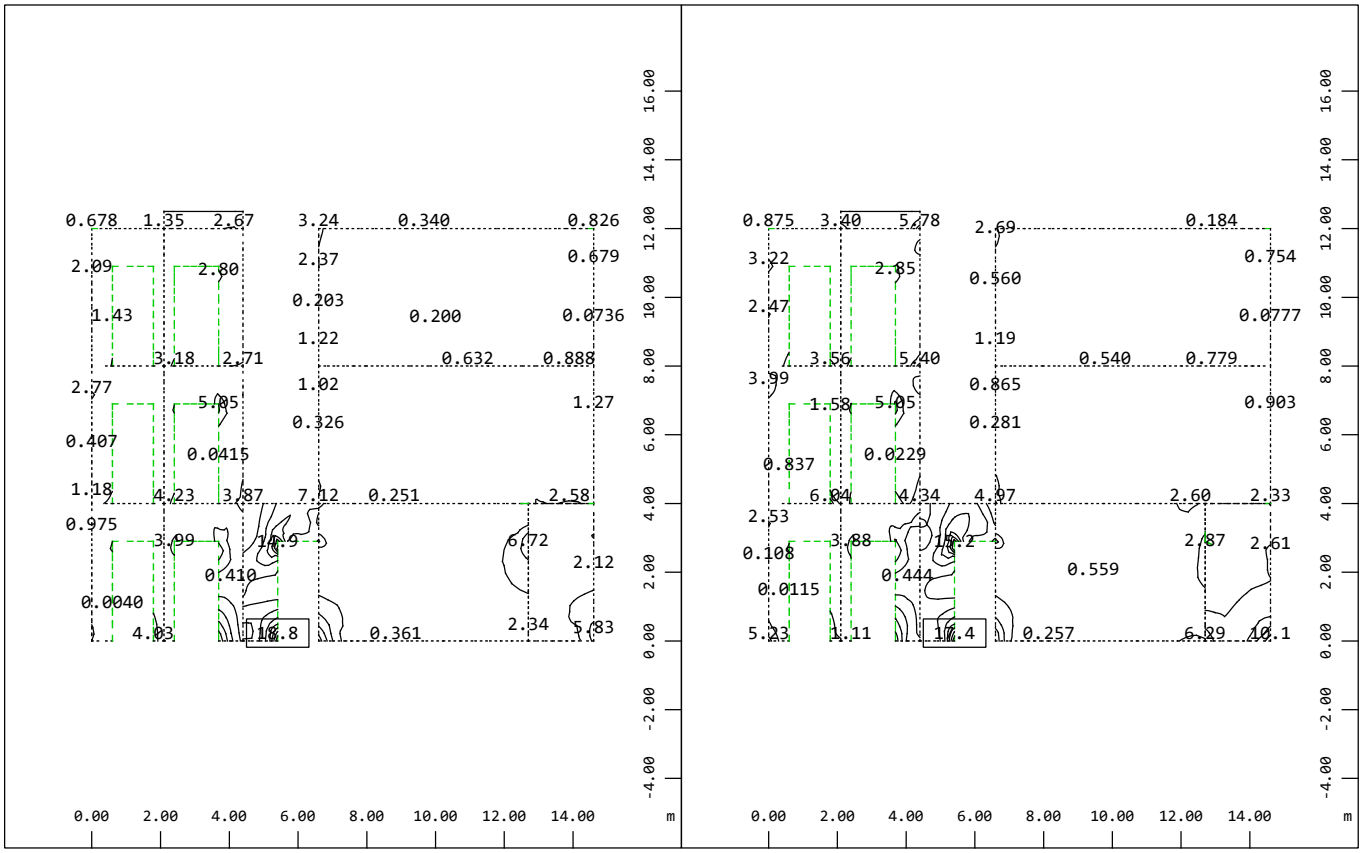
11826 DSO Bovec - vzhodna dilat. enota stavbe
Precne AB stene v osi R: armatura vert + horiz.

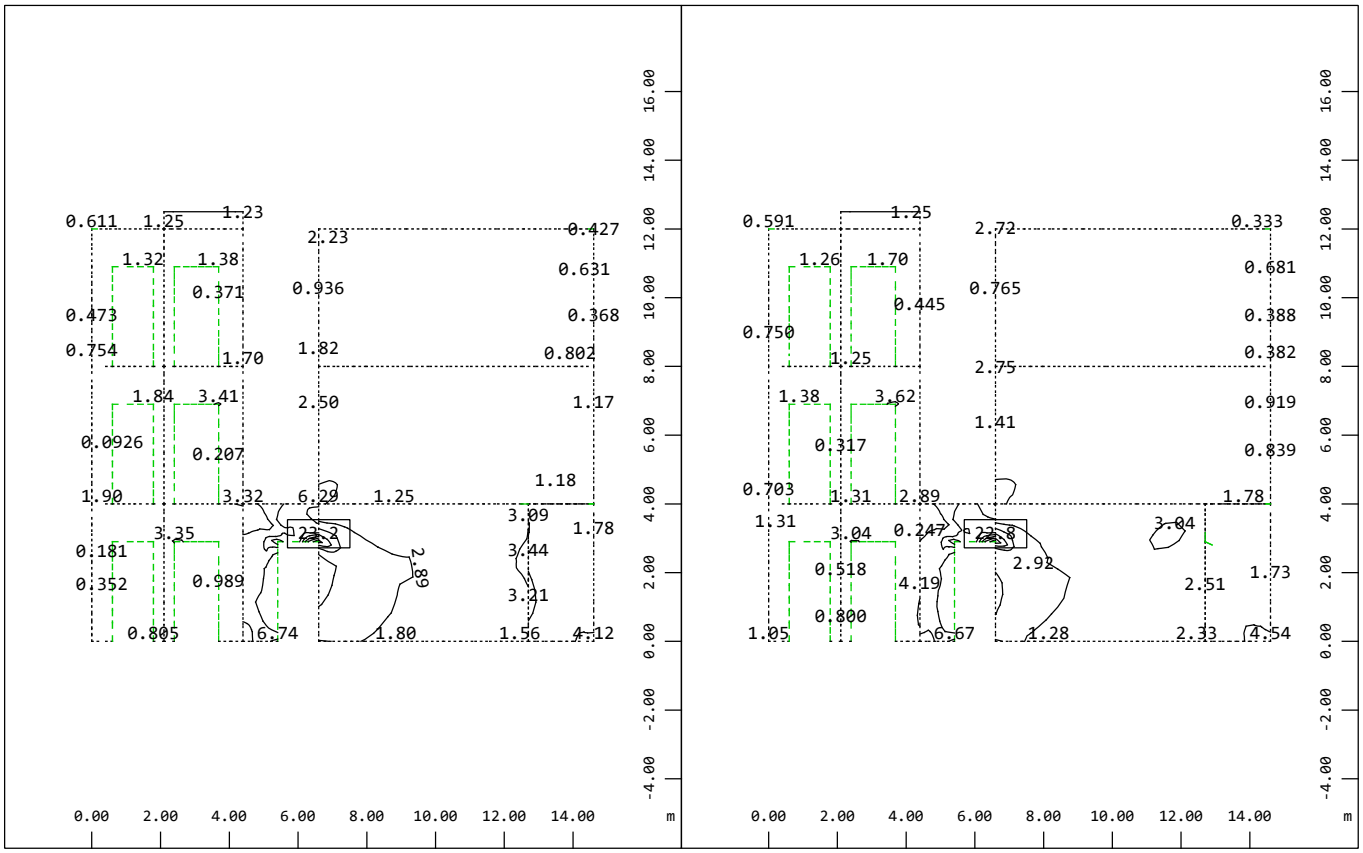



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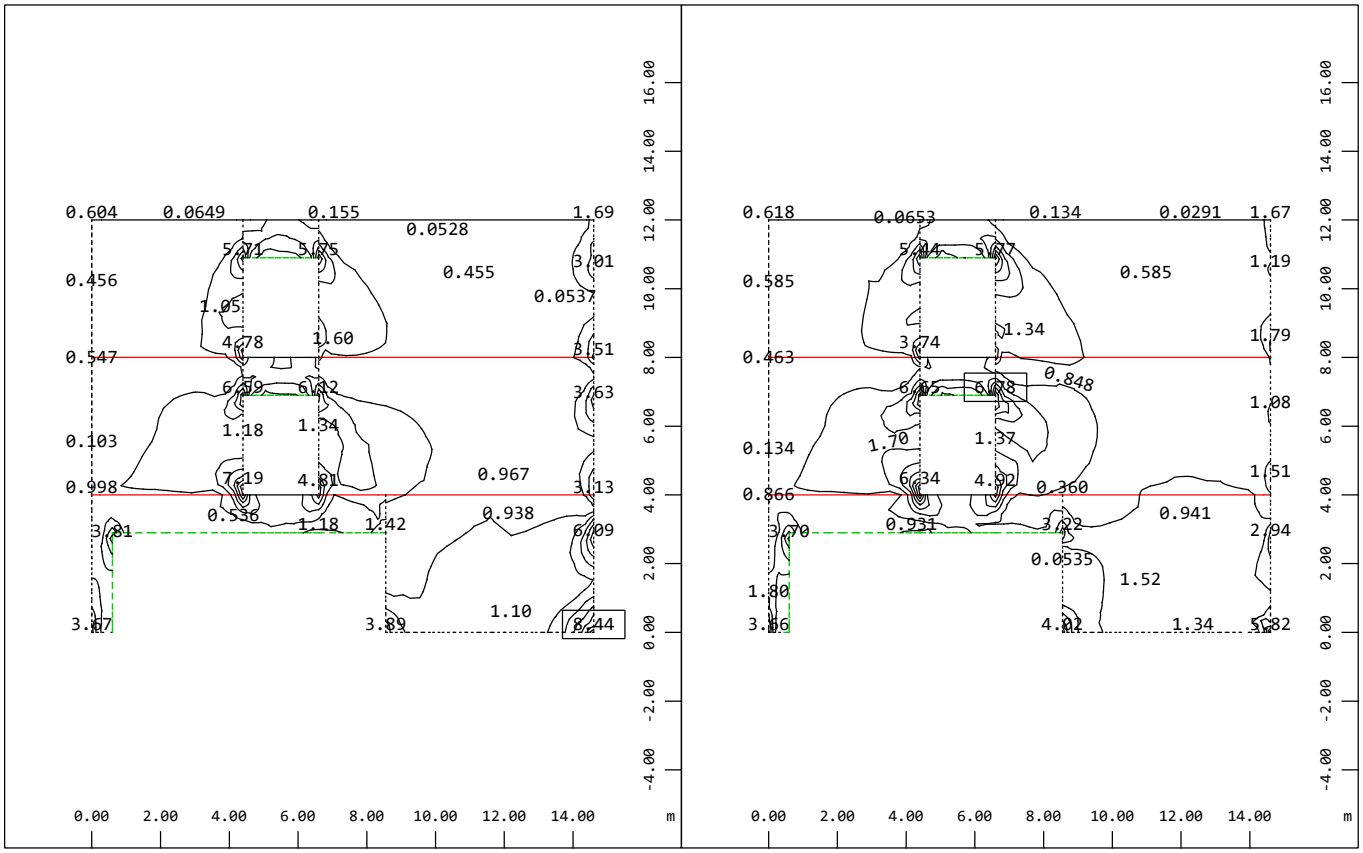
11826 DSO Bovec - vzhodna dilat. enota stavbe
Precne AB stene ob osi O: armatura vert + horiz.



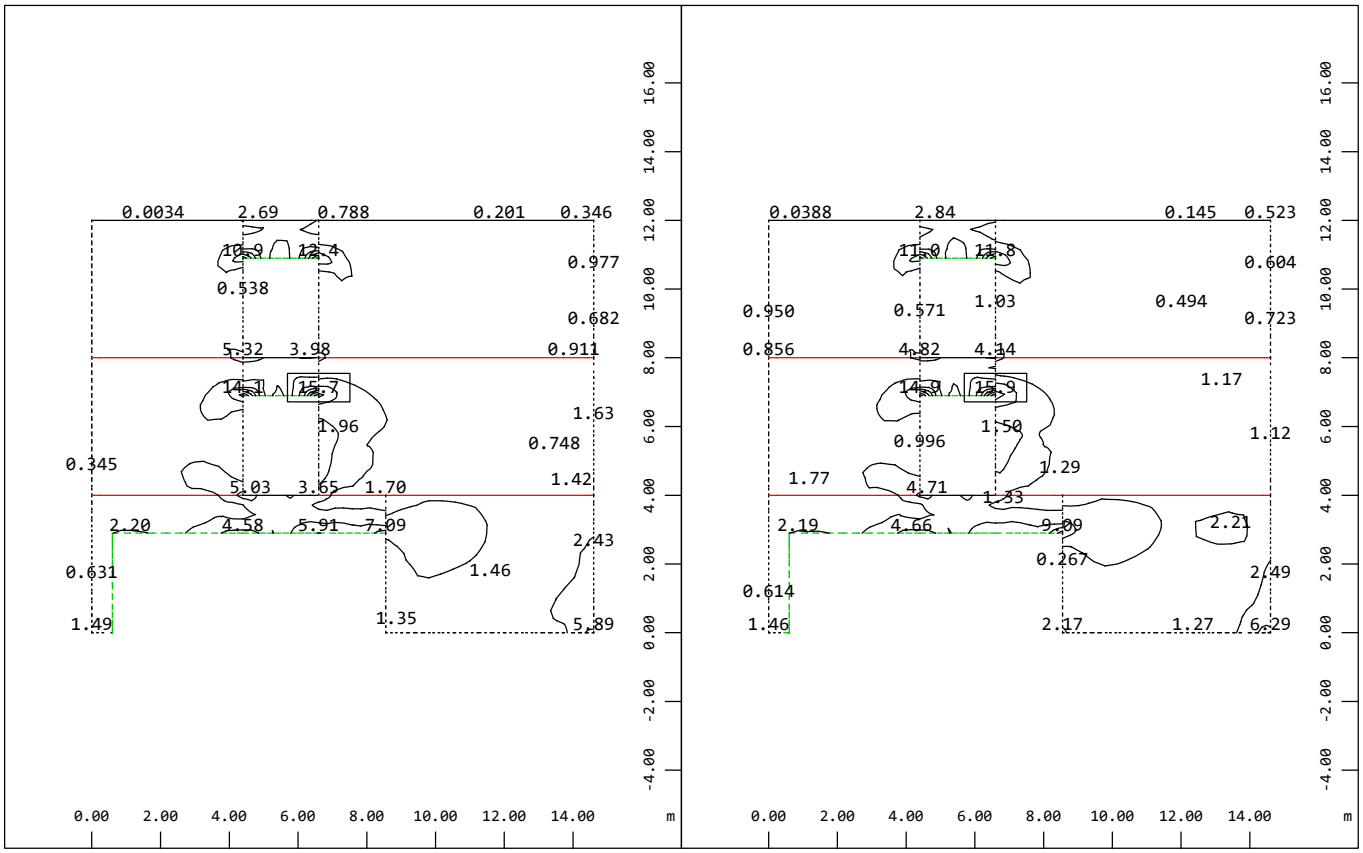

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Precne AB stene ob osi M: armatura vert + horiz.







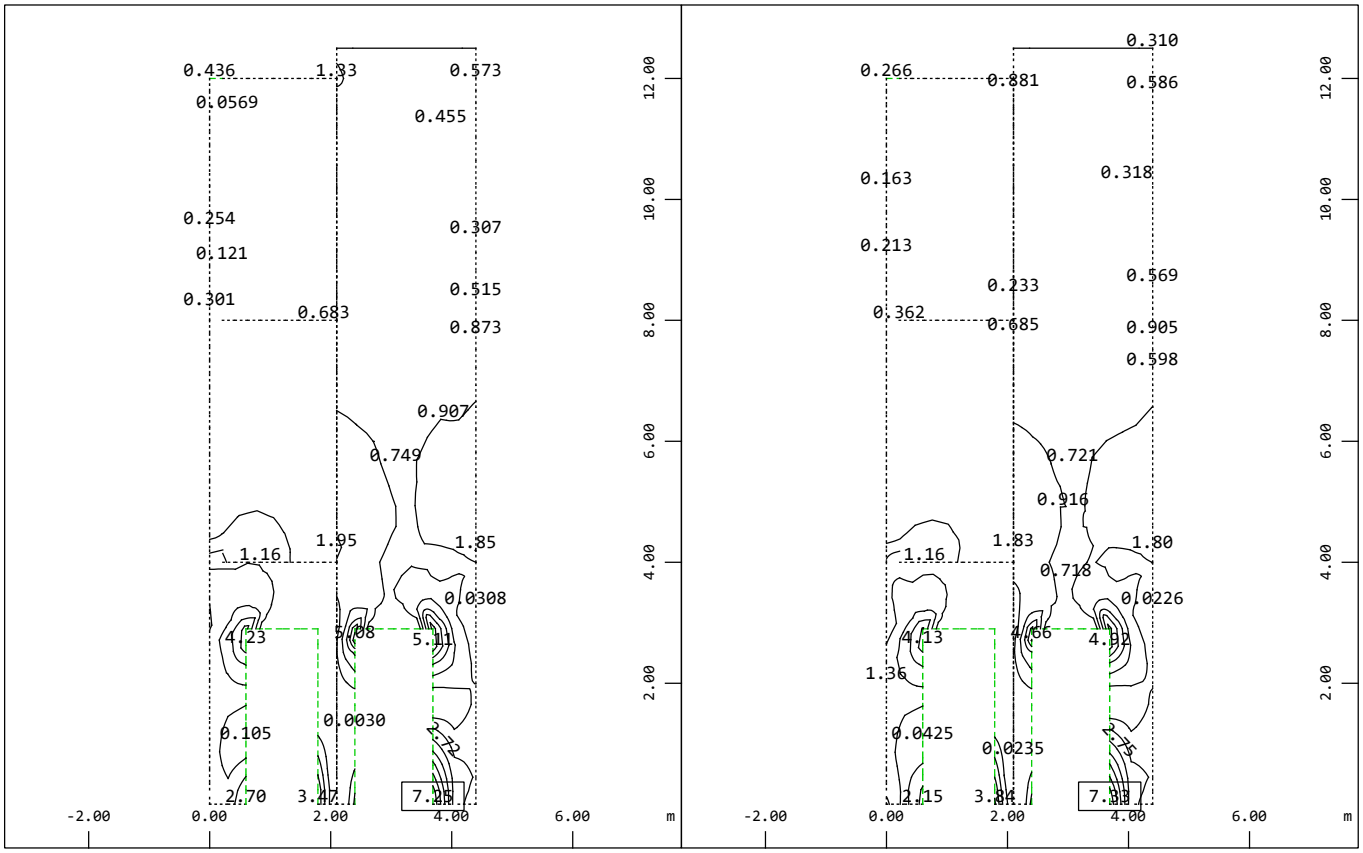






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11826 DSO Bovec - vzhodna dilat. enota stavbe
Precne AB stene ob osi N: armatura vert + horiz.



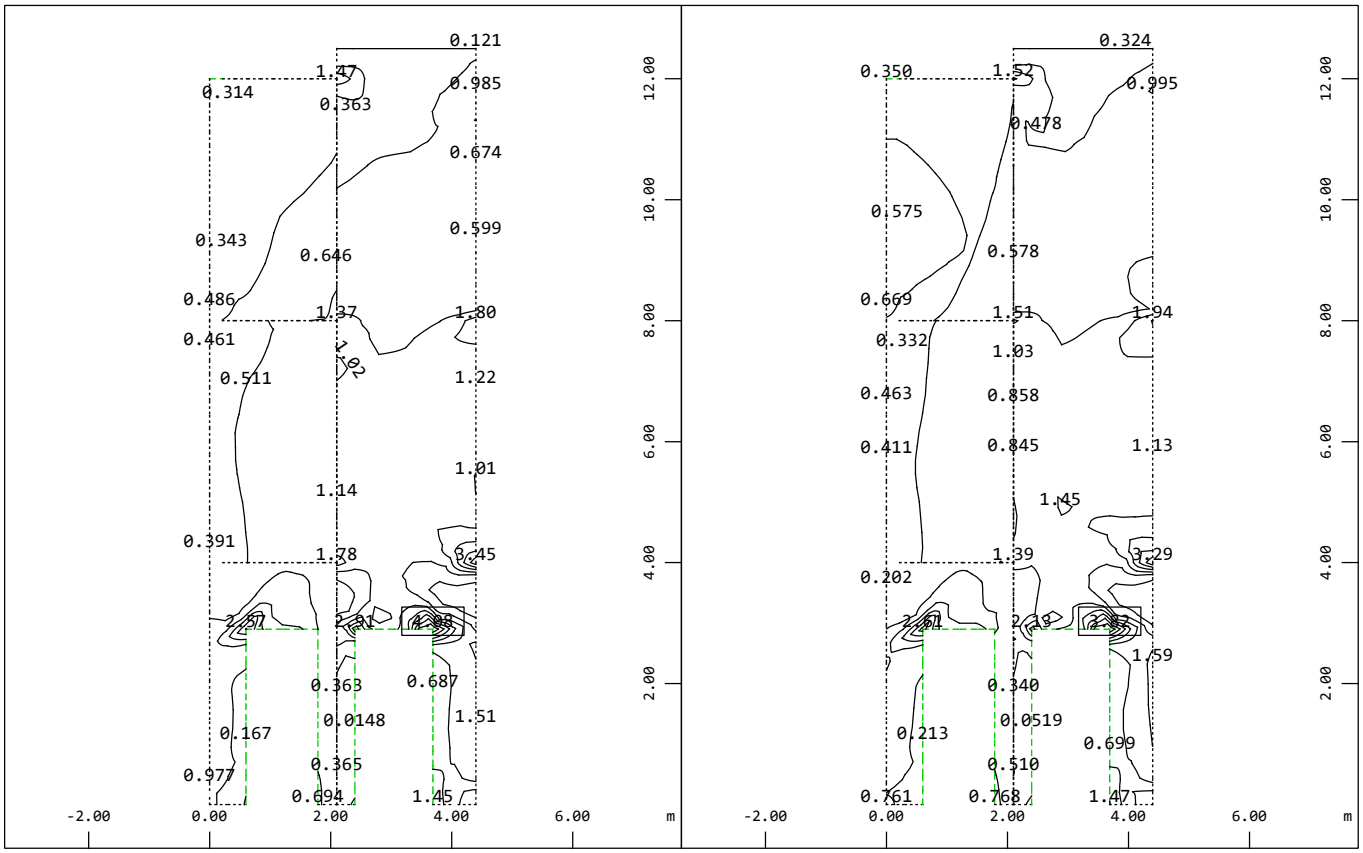

Sector of system Group 208
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 7.25 step 0.907 cm2/m

M 1 : 125




Sector of system Group 208
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 7.33 step 0.916 cm2/m

M 1 : 125




Sector of system Group 208
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 4.08 step 0.511 cm2/m

M 1 : 125

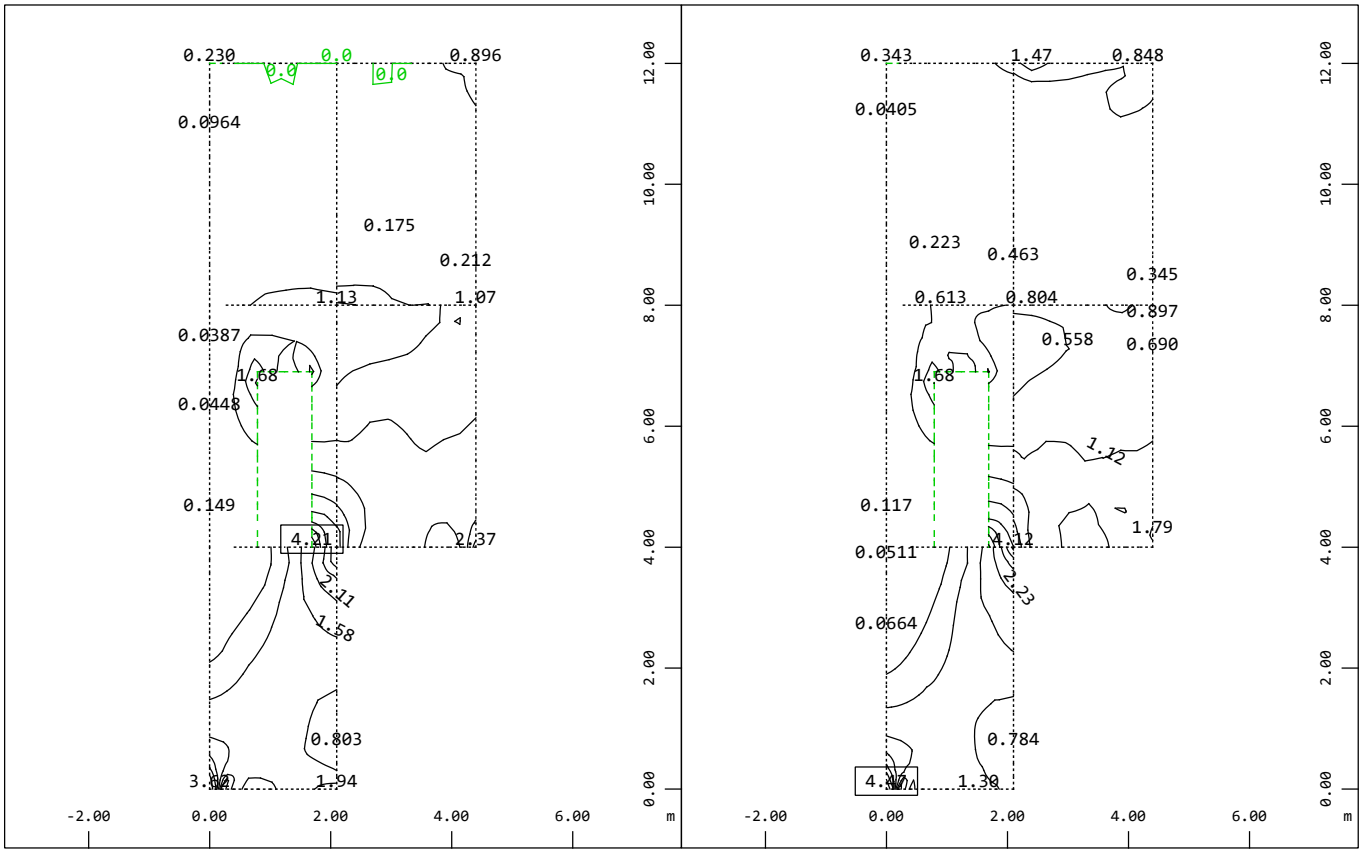



Sector of system Group 208
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 3.82 step 0.478 cm2/m

M 1 : 125

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Precne AB stene ob osi N: armatura vert + horiz.

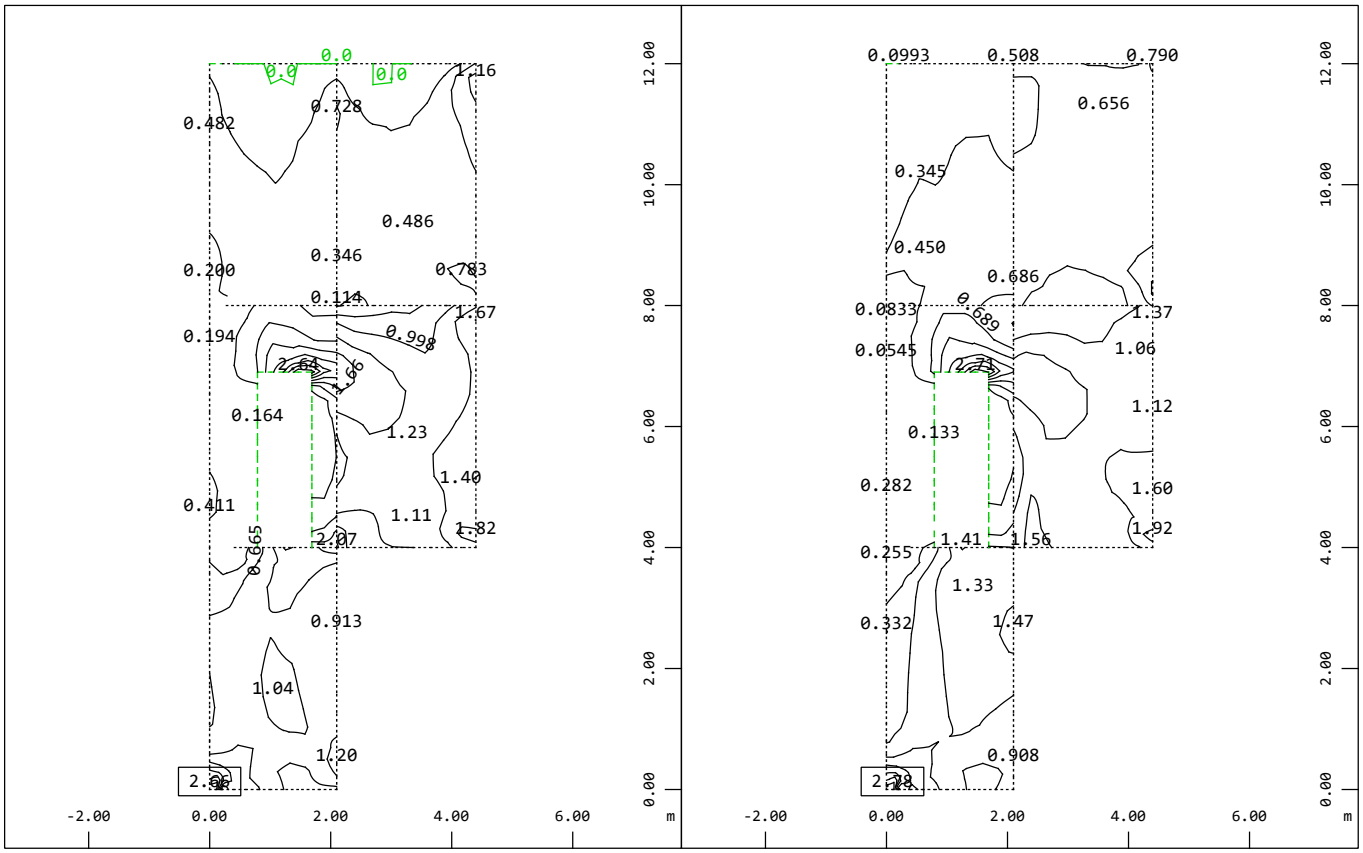



Sector of system Group 209
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 4.21 step 0.527 cm2/m

M 1 : 125

Sector of system Group 209
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0.0051 to 4.47 step 0.558 cm2/m

M 1 : 125




Sector of system Group 209
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 2.66 step 0.333 cm2/m

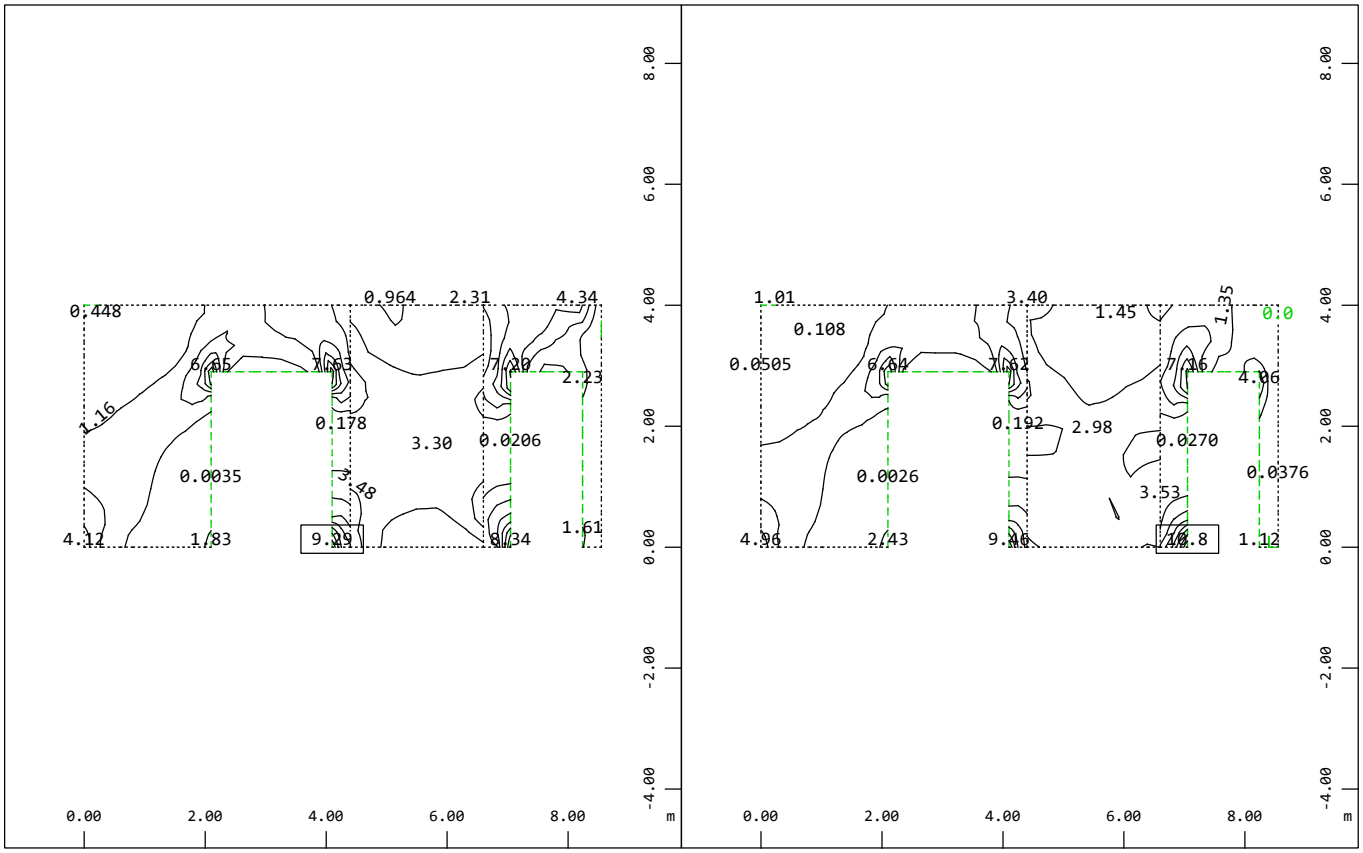
M 1 : 125

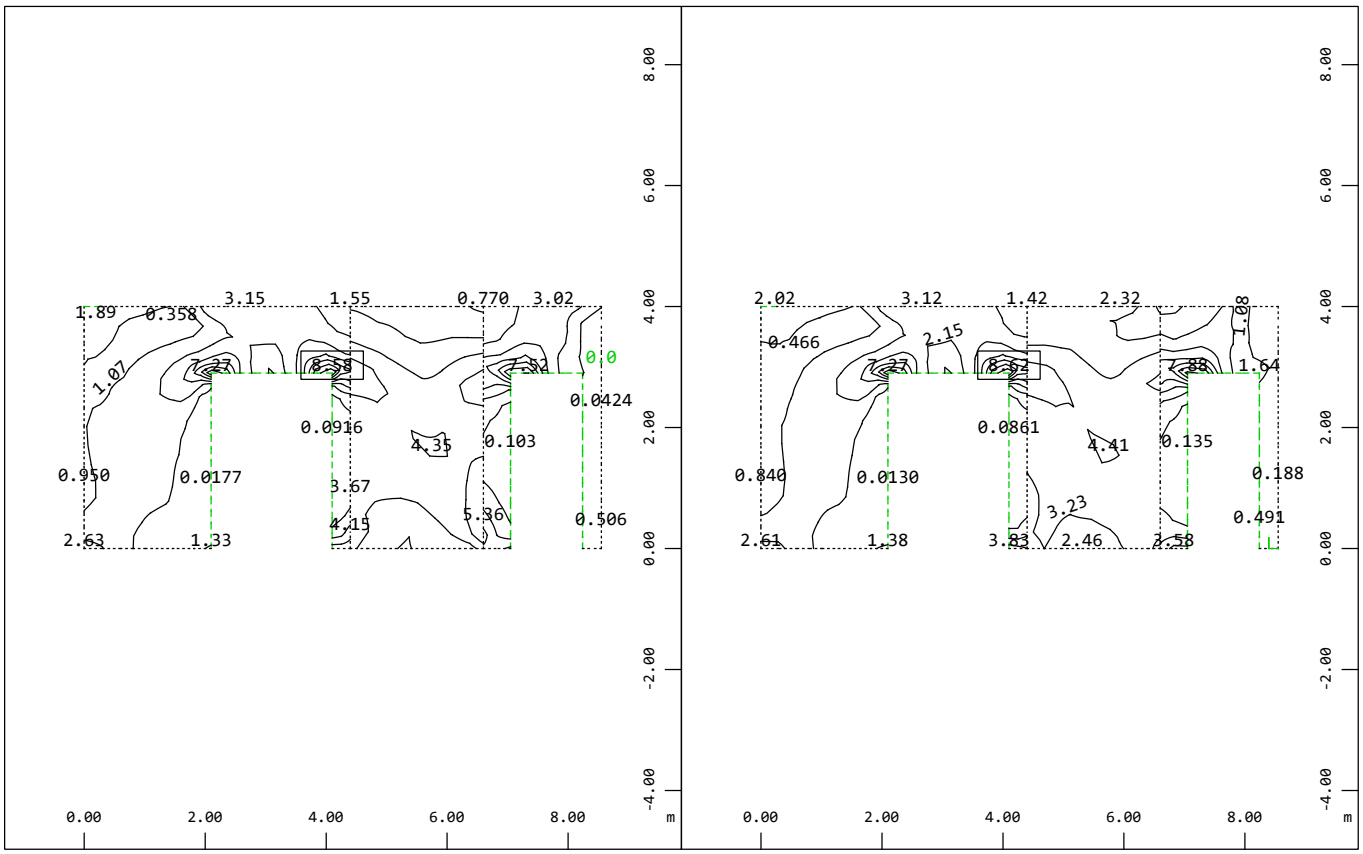
Sector of system Group 209
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case 1 , from 0.0257 to 2.78 step 0.345 cm2/m

M 1 : 125

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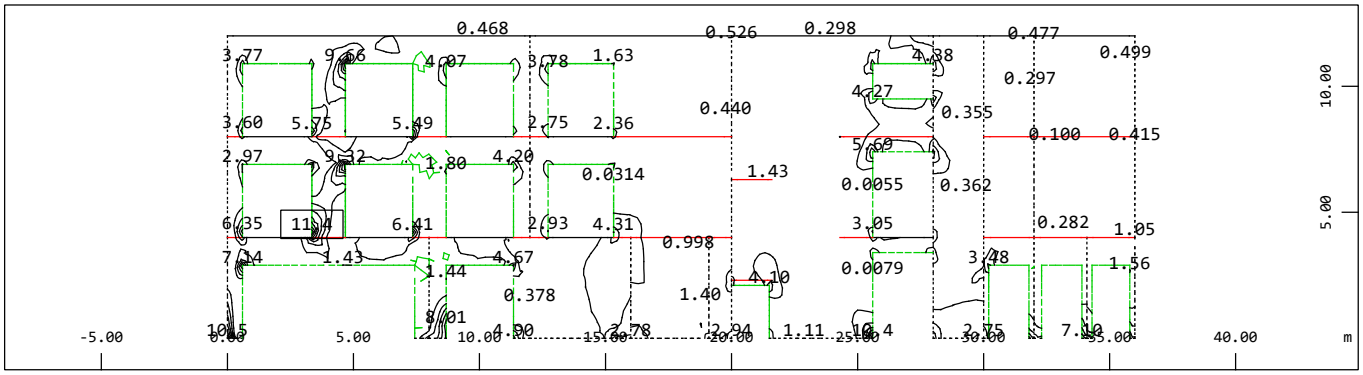
11826 DSO Bovec - vzhodna dilat. enota stavbe
Precne AB stene ob osi N: armatura vert + horiz.



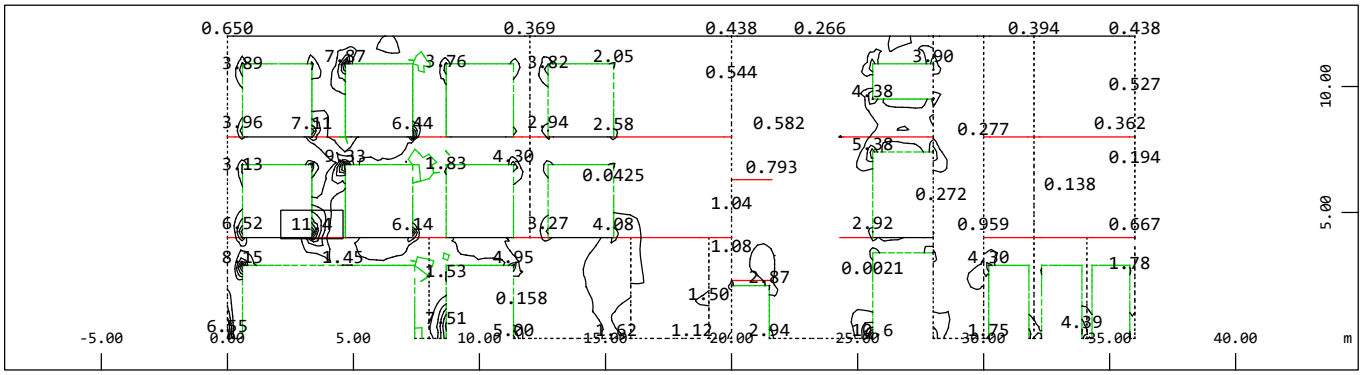




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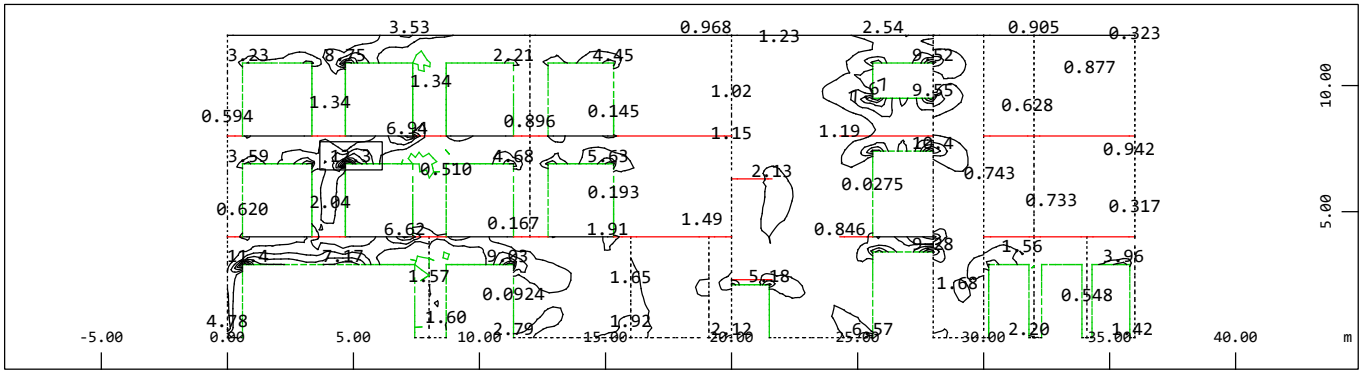
11826 DSO Bovec - vzhodna dilat. enota stavbe
Vzdolzne AB stene v osi 11: armatura vert., horiz.



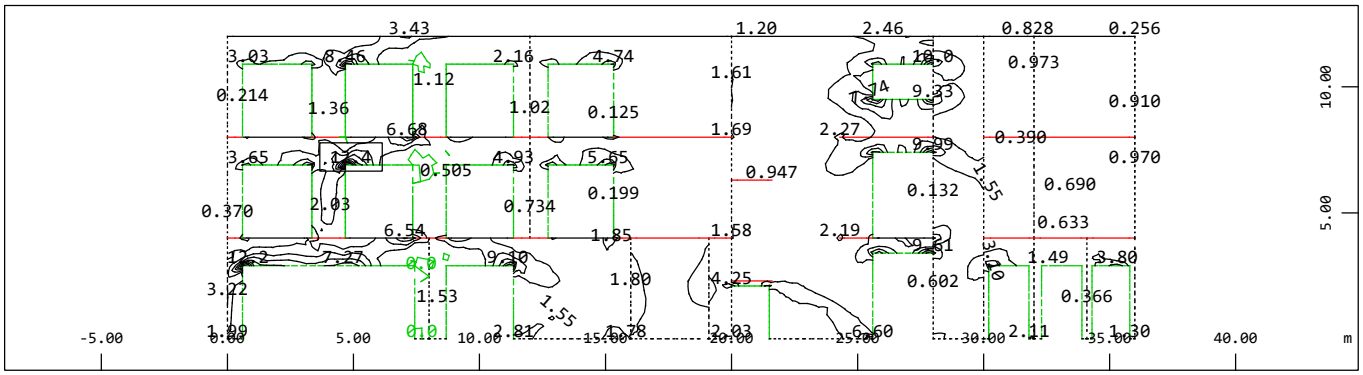
Sector of system Group 251 M 1 : 300
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 11.4 step 1.43 cm2/m



Sector of system Group 251 M 1 : 300
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 11.4 step 1.43 cm2/m



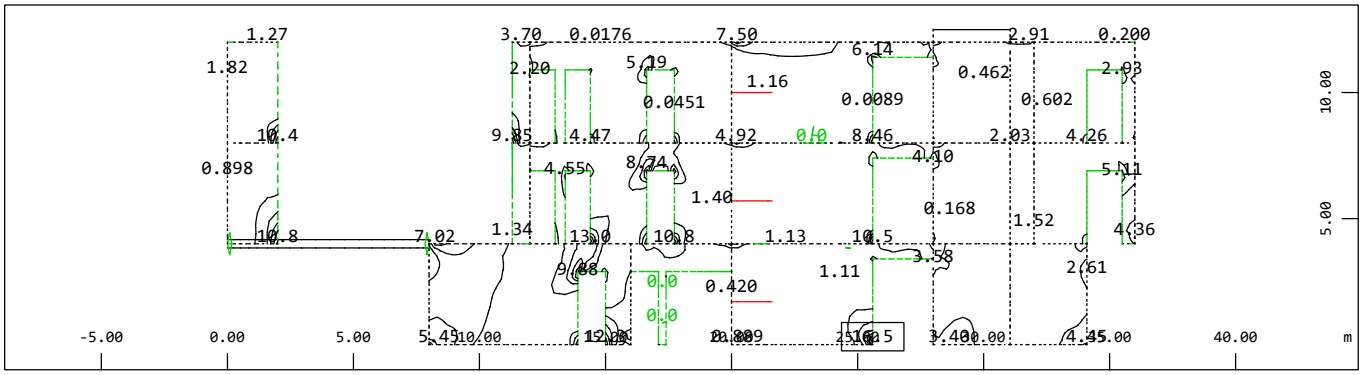
Sector of system Group 251 M 1 : 300
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 12.3 step 1.53 cm2/m



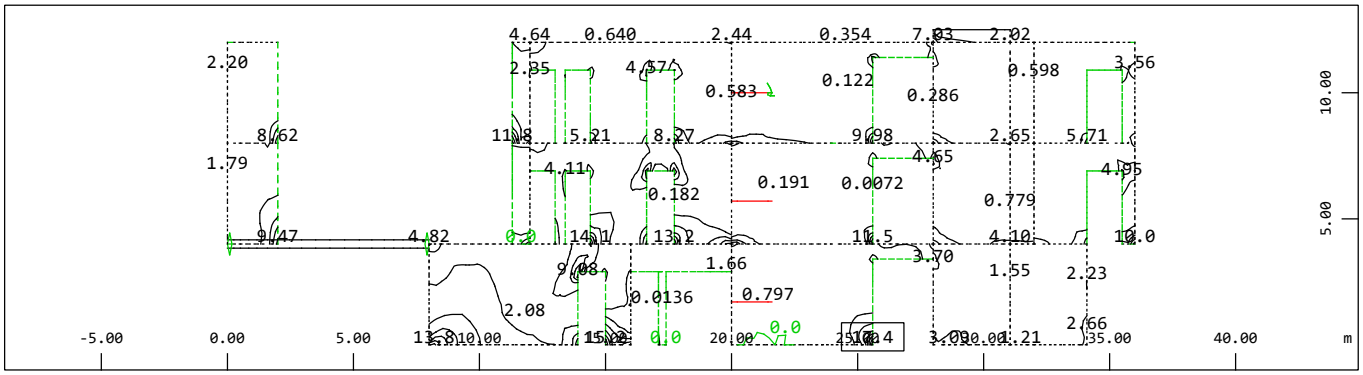
Sector of system Group 251 M 1 : 300
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 12.4 step 1.55 cm2/m

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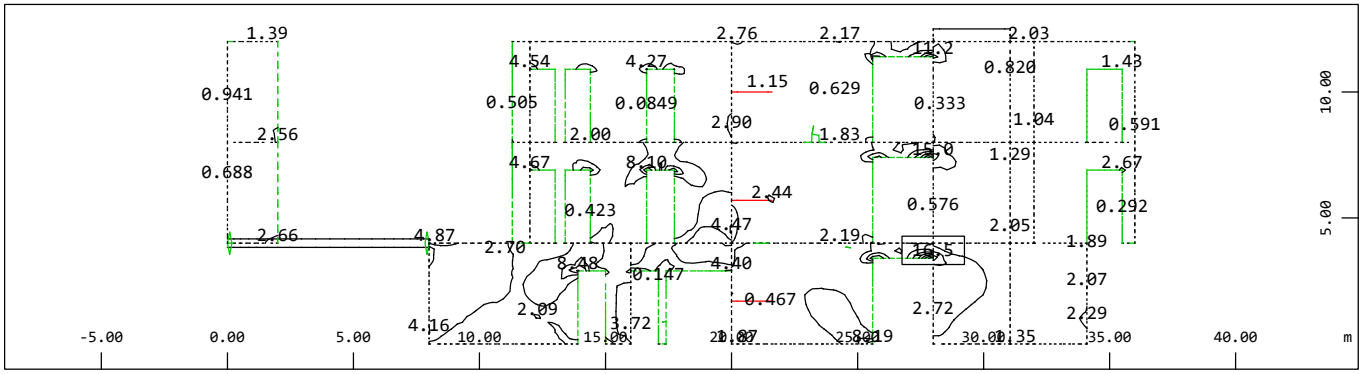
11826 DSO Bovec - vzhodna dilat. enota stavbe
Vzdolzne AB stene v osi 11: armatura vert., horiz.



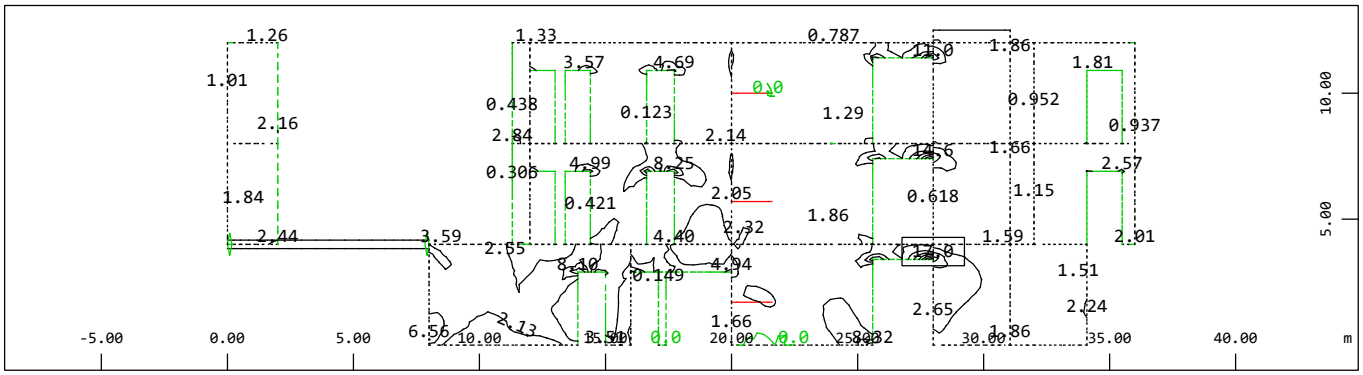

Z
X Y
Sector of system Group 253 M 1 : 300
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 16.5 step 2.06 cm2/m




Z
X Y
Sector of system Group 253 M 1 : 300
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 17.4 step 2.17 cm2/m



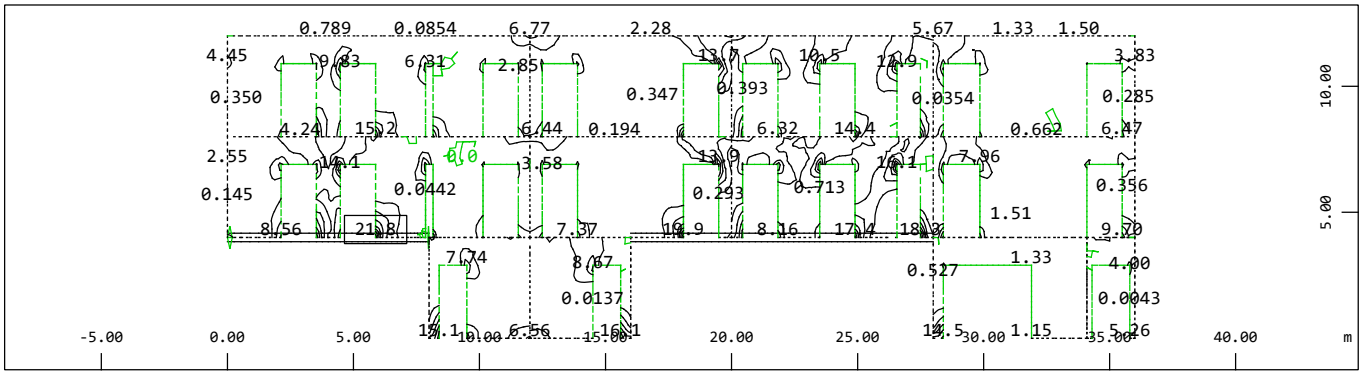

Z
X Y
Sector of system Group 253 M 1 : 300
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 16.5 step 2.06 cm2/m



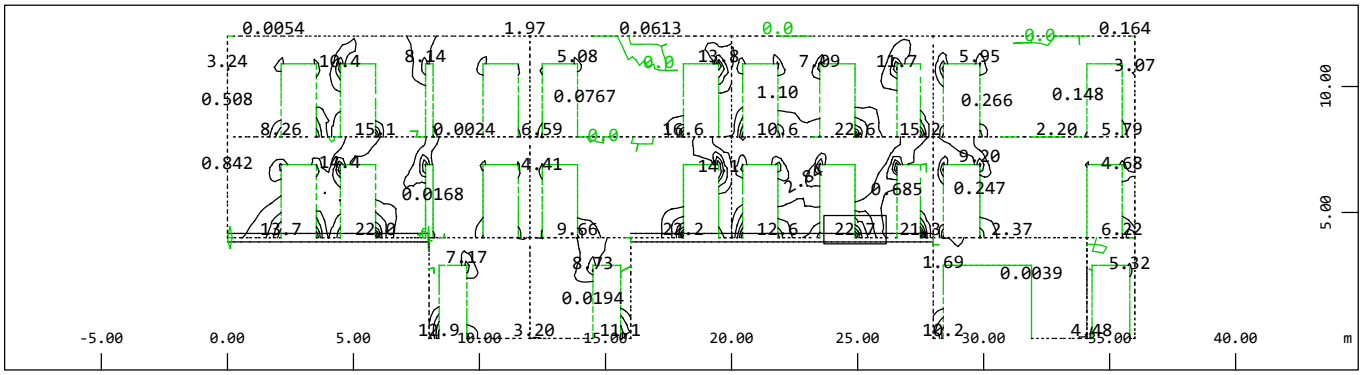

Z
X Y
Sector of system Group 253 M 1 : 300
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 17.0 step 2.13 cm2/m

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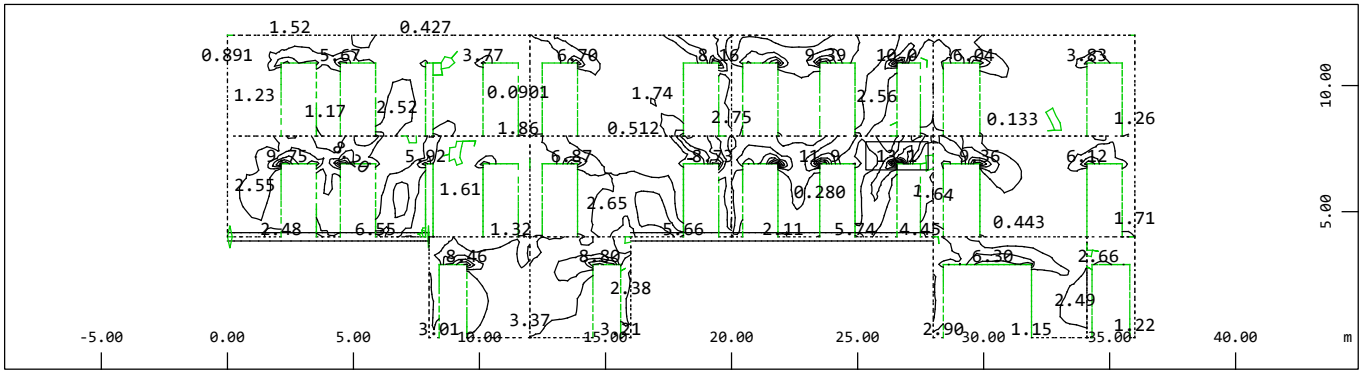
11826 DSO Bovec - vzhodna dilat. enota stavbe
Vzdolzne AB stene v osi 12: armatura vert., horiz.



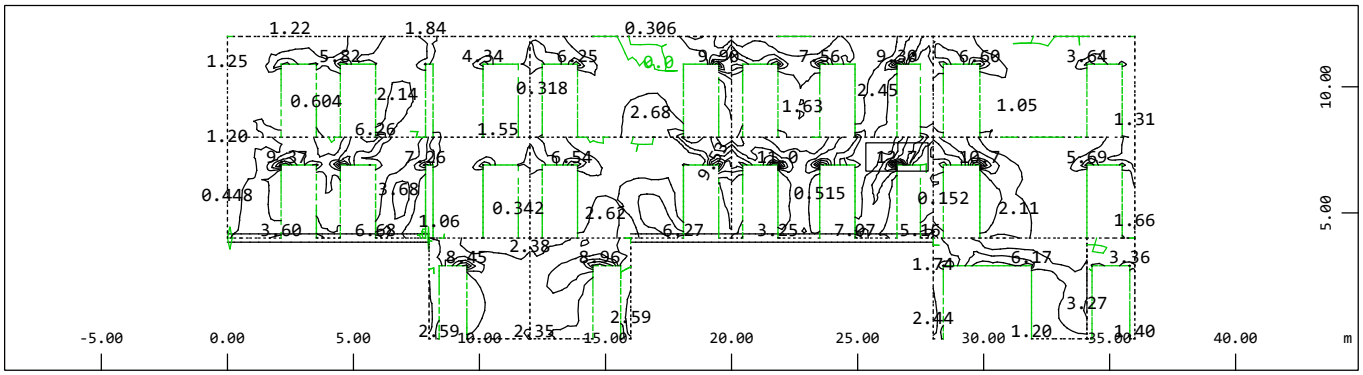

Z
X Y
Sector of system Group 254 M 1 : 300
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 21.8 step 2.73 cm2/m




Z
X Y
Sector of system Group 254 M 1 : 300
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 22.7 step 2.84 cm2/m



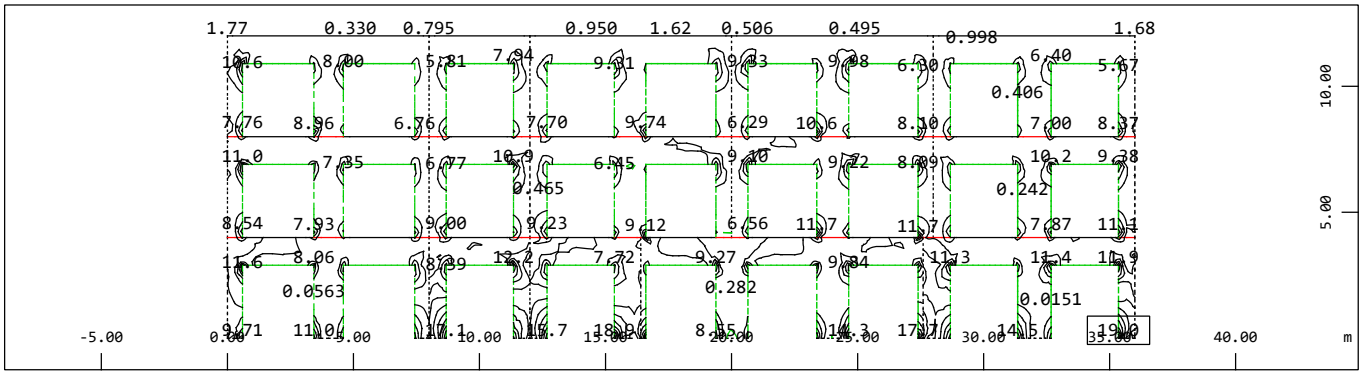

Z
X Y
Sector of system Group 254 M 1 : 300
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 13.1 step 1.64 cm2/m



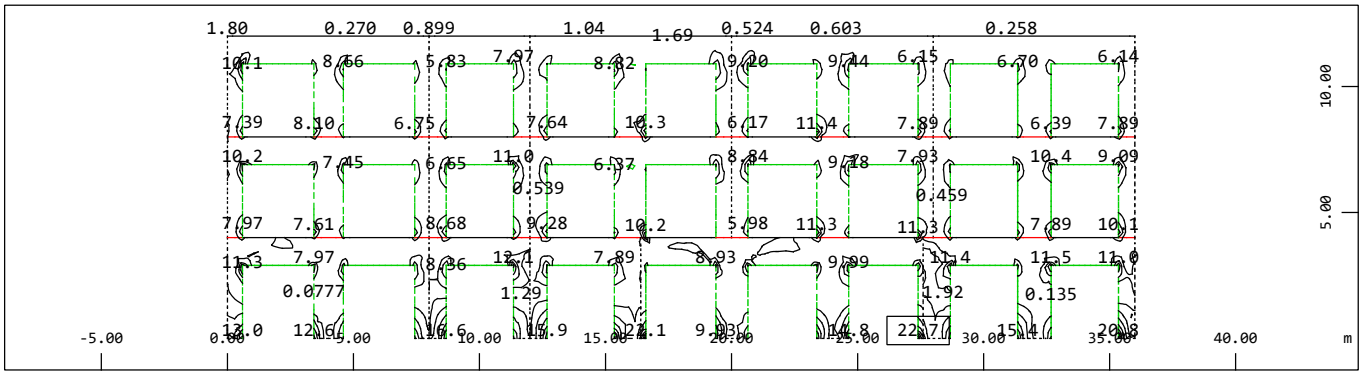

Z
X Y
Sector of system Group 254 M 1 : 300
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 12.7 step 1.59 cm2/m

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Vzdolzne AB stene v osi 13: armatura vert., horiz.

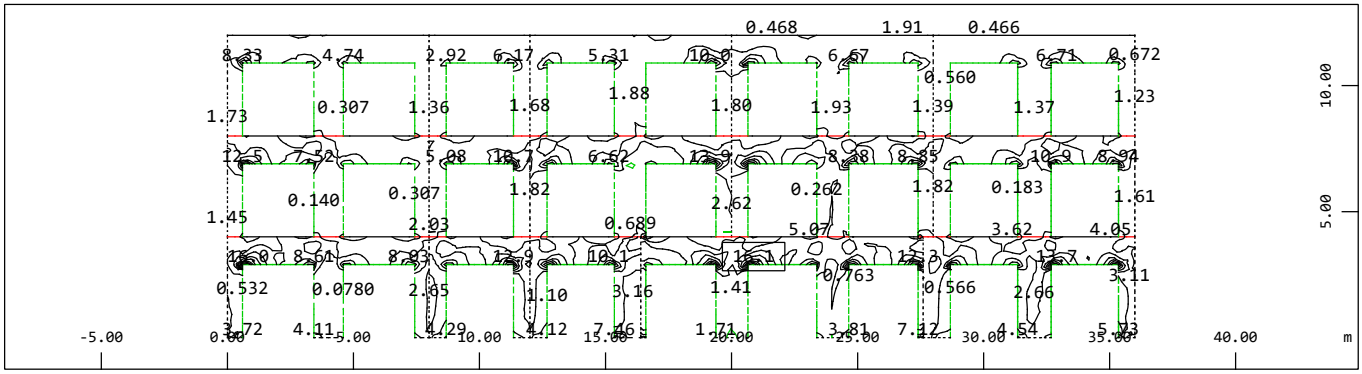



Z
X Y Sector of system Group 256 M 1 : 300
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 19.0 step 2.38 cm2/m

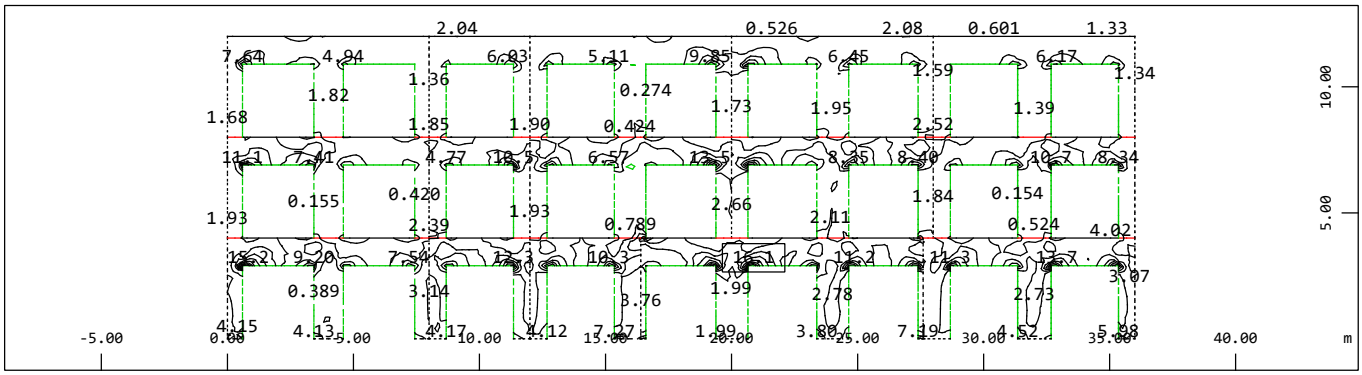



Z
X Y Sector of system Group 256 M 1 : 300
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 22.7 step 2.83 cm2/m

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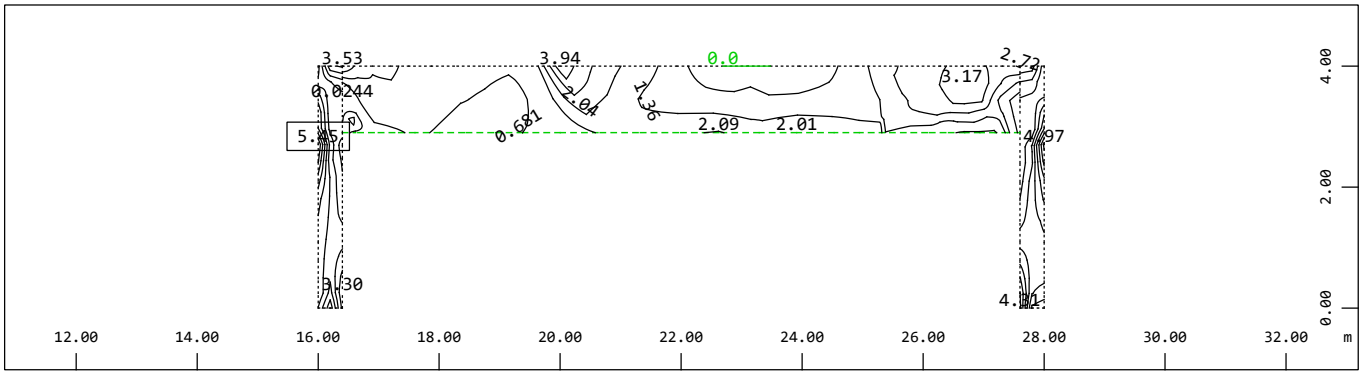



Z
X Y Sector of system Group 256 M 1 : 300
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 16.1 step 2.01 cm2/m

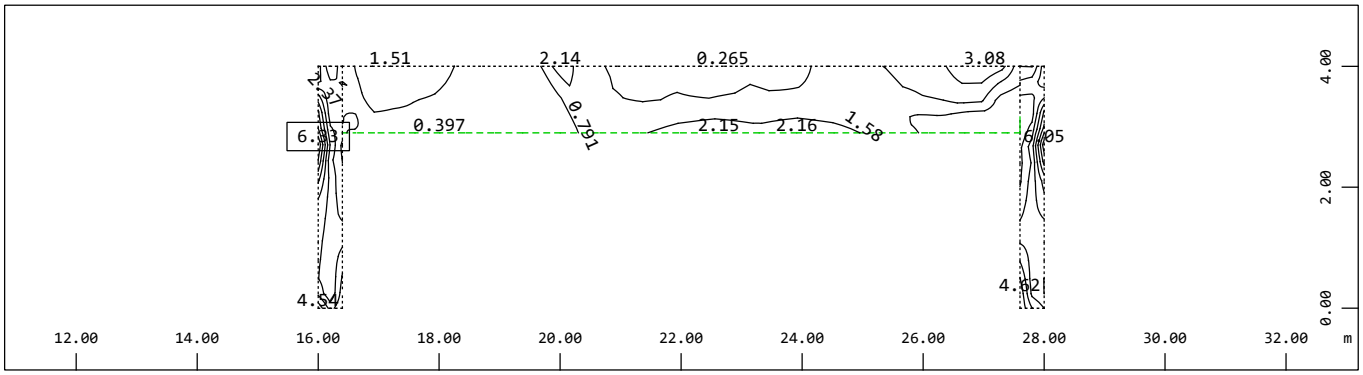



Z
X Y Sector of system Group 256 M 1 : 300
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 16.1 step 2.02 cm2/m

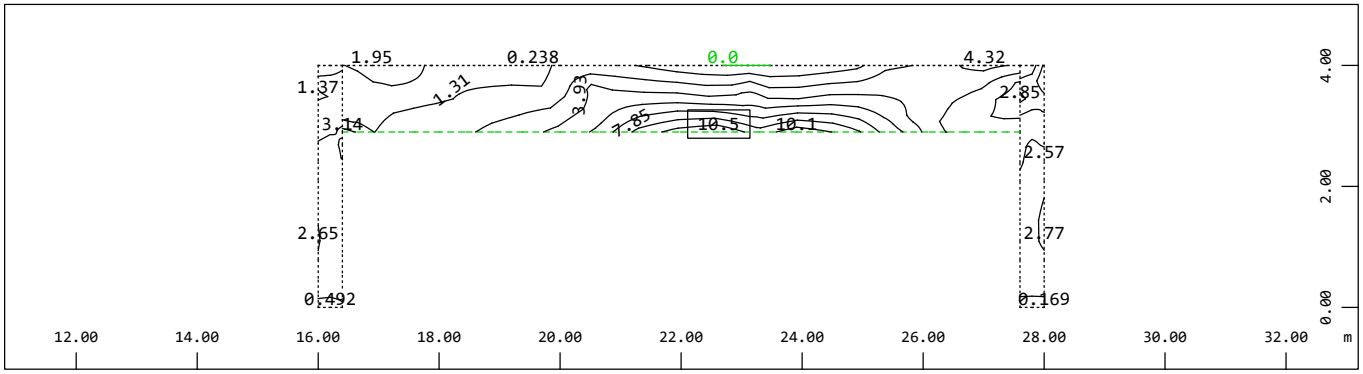
11826 DSO Bovec - vzhodna dilat. enota stavbe
Vzdolzni AB nosilec ob osi 13: armatura vert., horiz.



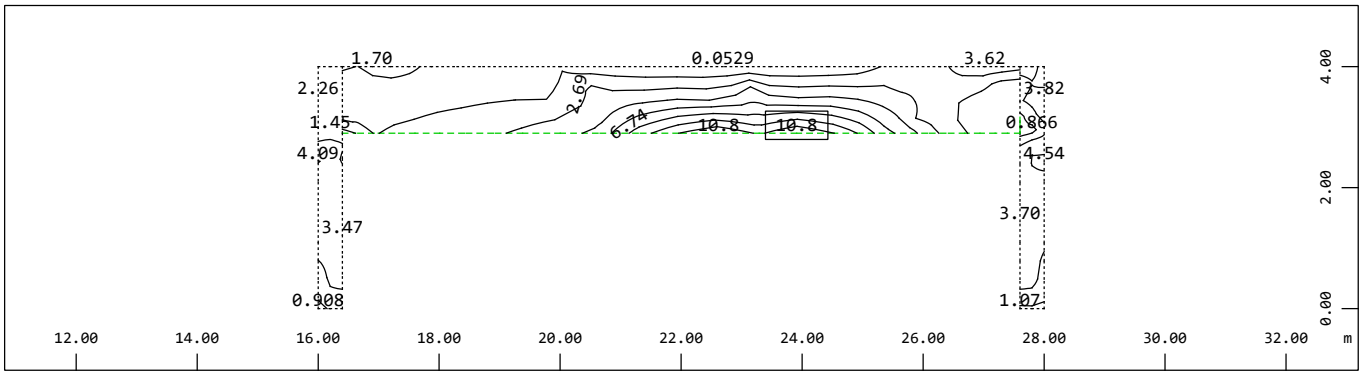

Sector of system Group 255 M 1 : 125
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 5.45 step 0.681 cm2/m




Sector of system Group 255 M 1 : 125
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 6.33 step 0.791 cm2/m



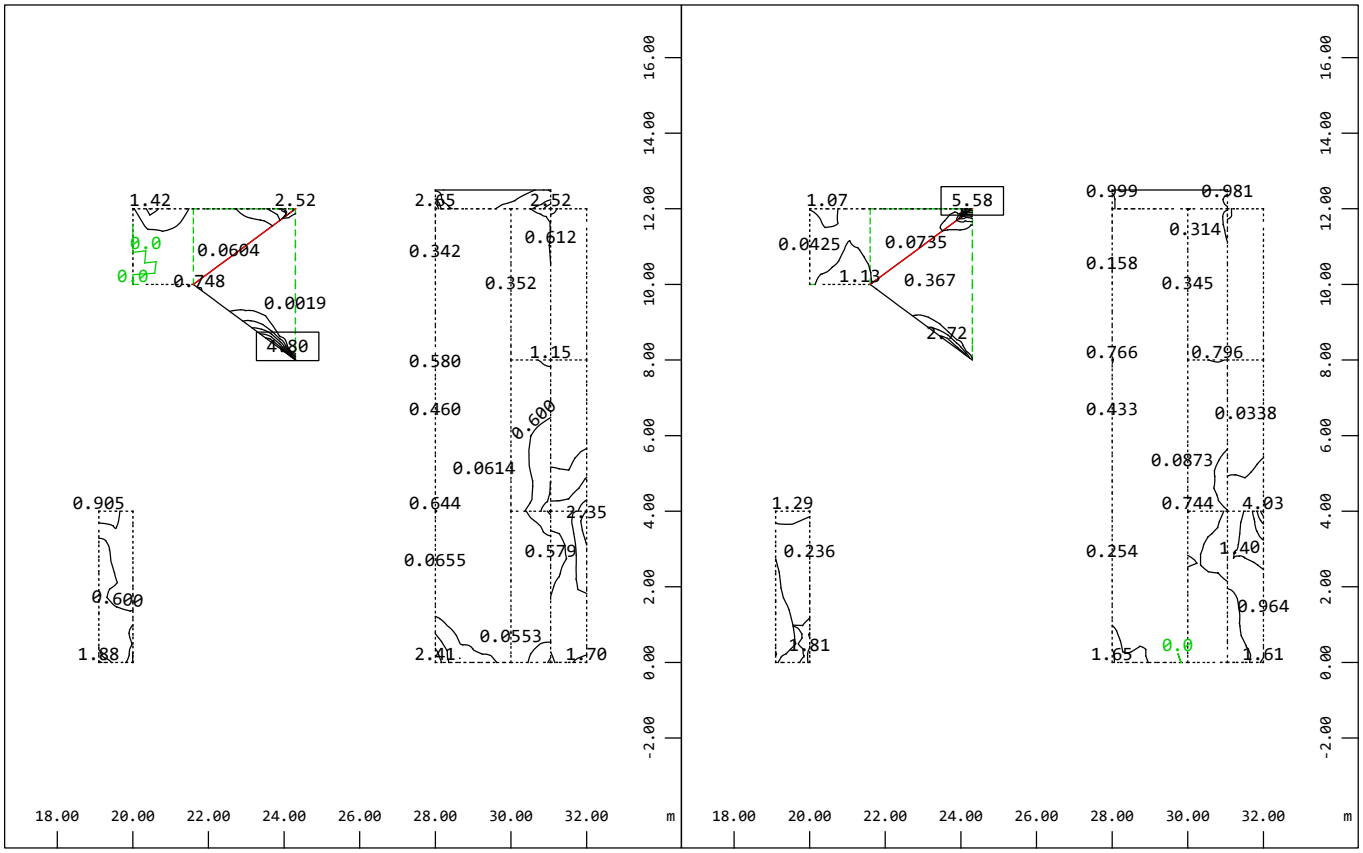

Sector of system Group 255 M 1 : 125
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 10.5 step 1.31 cm2/m




Sector of system Group 255 M 1 : 125
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 10.8 step 1.35 cm2/m

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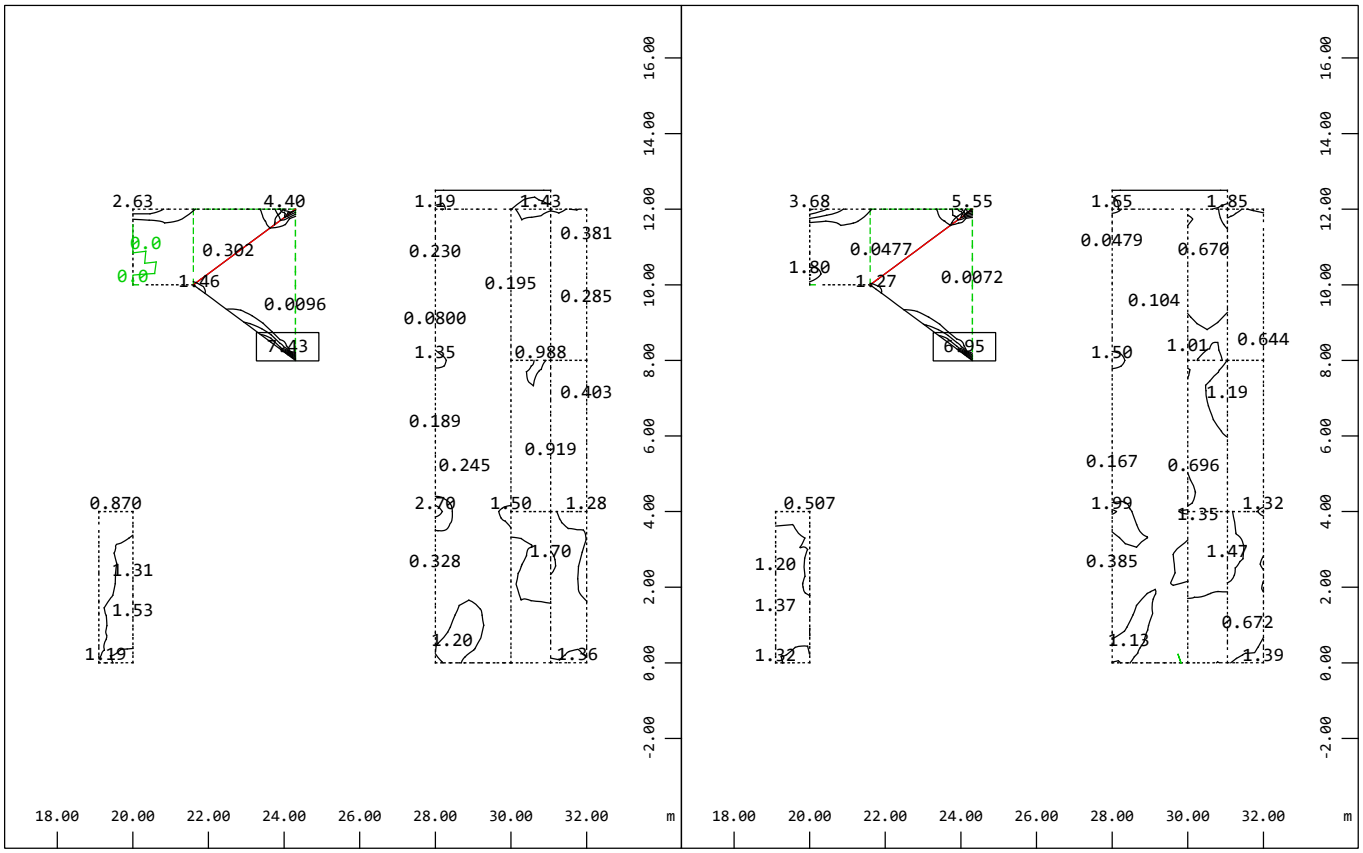
11826 DSO Bovec - vzhodna dilat. enota stavbe
Vzdolzne AB stene med osmi 11in 11: armatura vert., horiz.




Sector of system Group 252
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 4.80 step 0.600 cm2/m




Sector of system Group 252
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1 , from 0 to 5.58 step 0.698 cm2/m



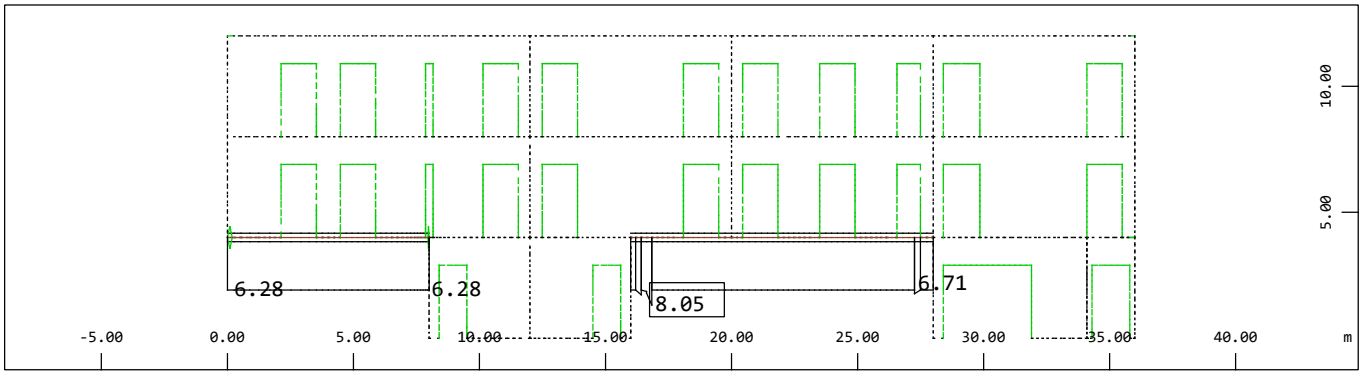

Sector of system Group 252
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 7.43 step 0.928 cm2/m



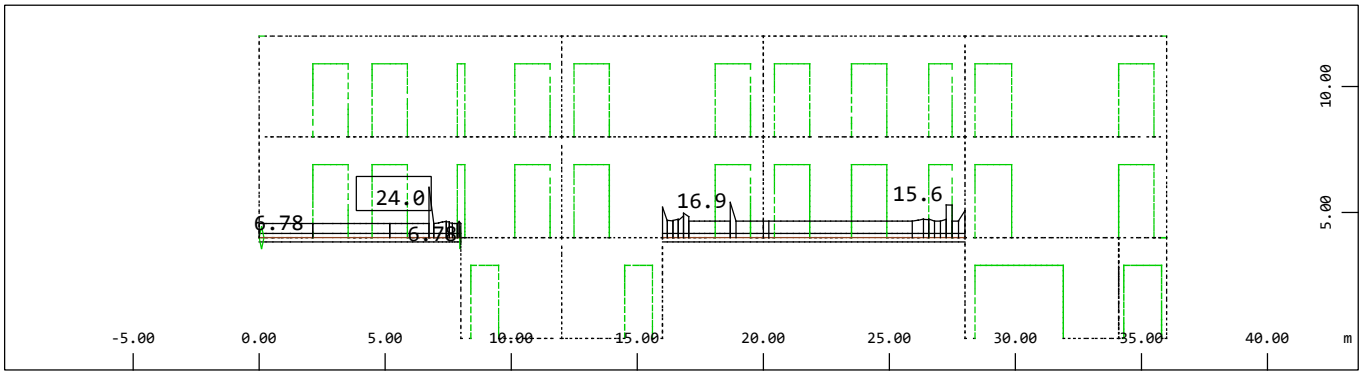

Sector of system Group 252
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case 1 , from 0 to 6.95 step 0.868 cm2/m

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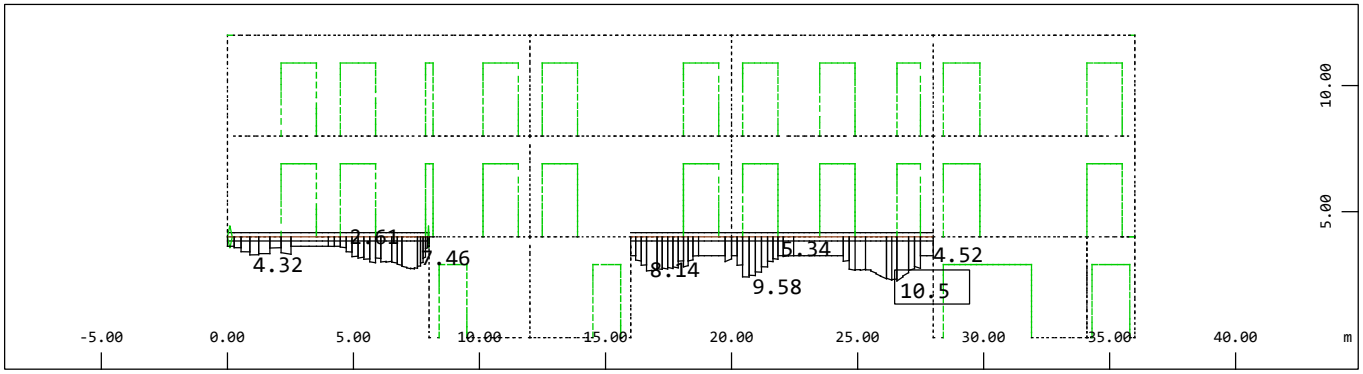
11826 DSO Bovec - vzhodna dilat. enota stavbe
AB nosilci v osi 12: armatura spodnja, zgornja, bocna, strizna



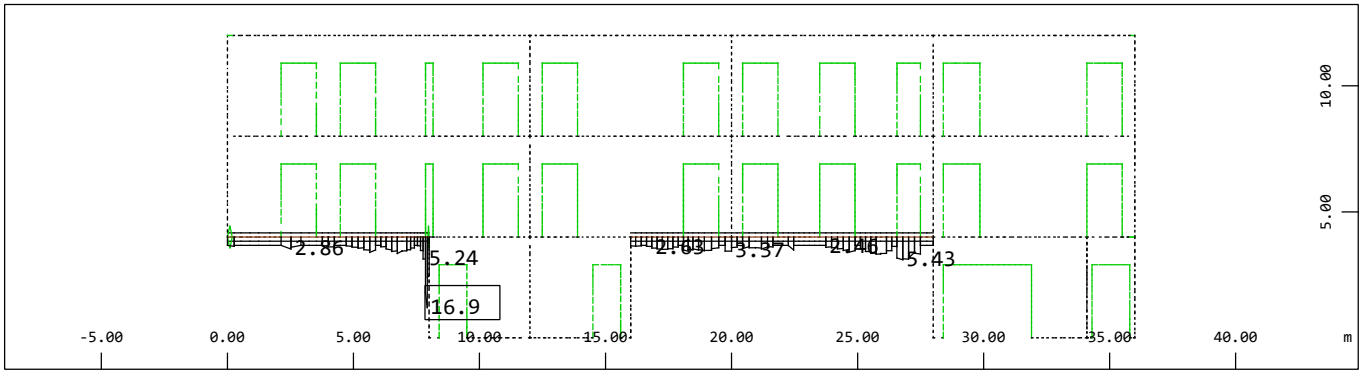

Z
X Y
Sector of system Group 254 M 1 : 300
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M1, 1 cm 3D = 9.02 cm2 (Max=8.05)




Z
X Y
Sector of system Group 254 M 1 : 300
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M2, 1 cm 3D = 36.1 cm2 (Max=24.0)



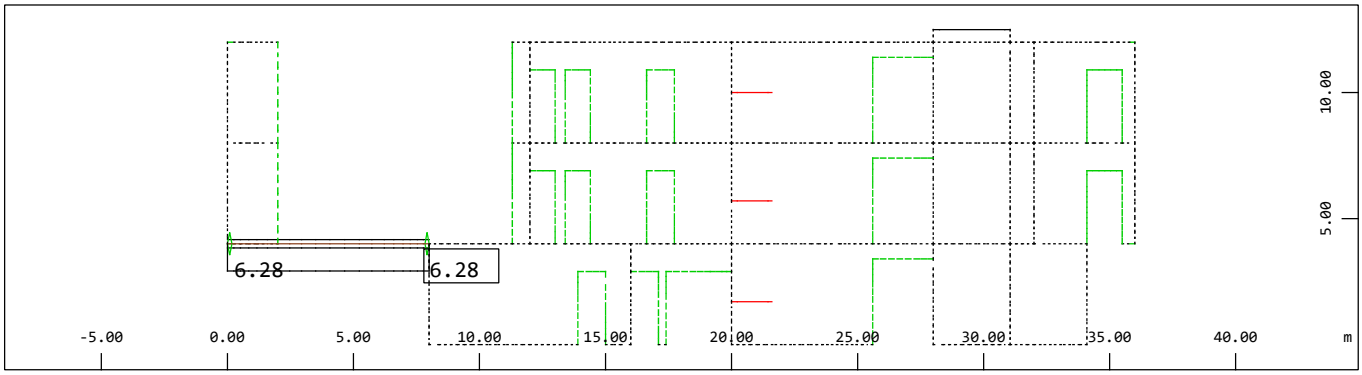

Z
X Y
Sector of system Group 254 M 1 : 300
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M3, 1 cm 3D = 18.0 cm2 (Max=10.5)



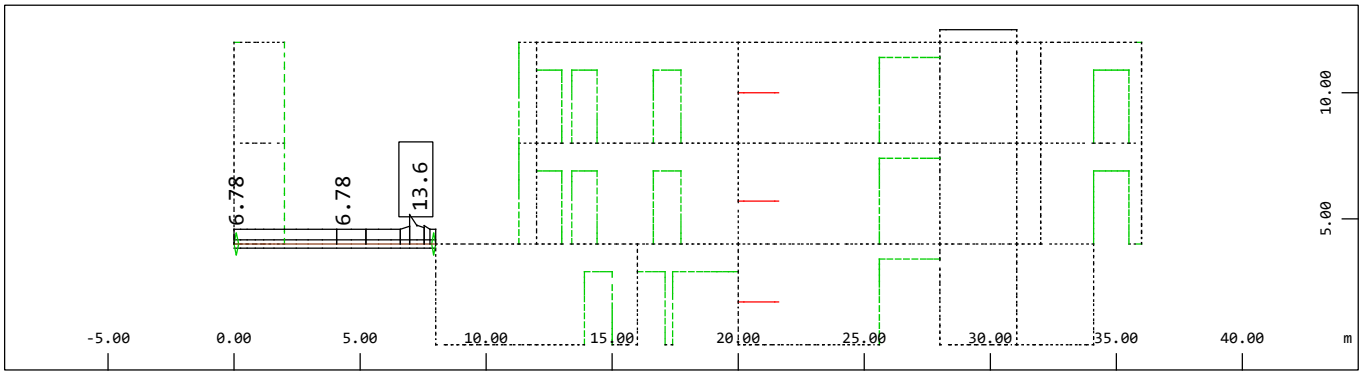

Z
X Y
Sector of system Group 254 M 1 : 300
Minimum-Beam Elements , Stirrup Reinforcements Lay. 1, 1 cm 3D = 18.0 cm2/m (Max=16.9)

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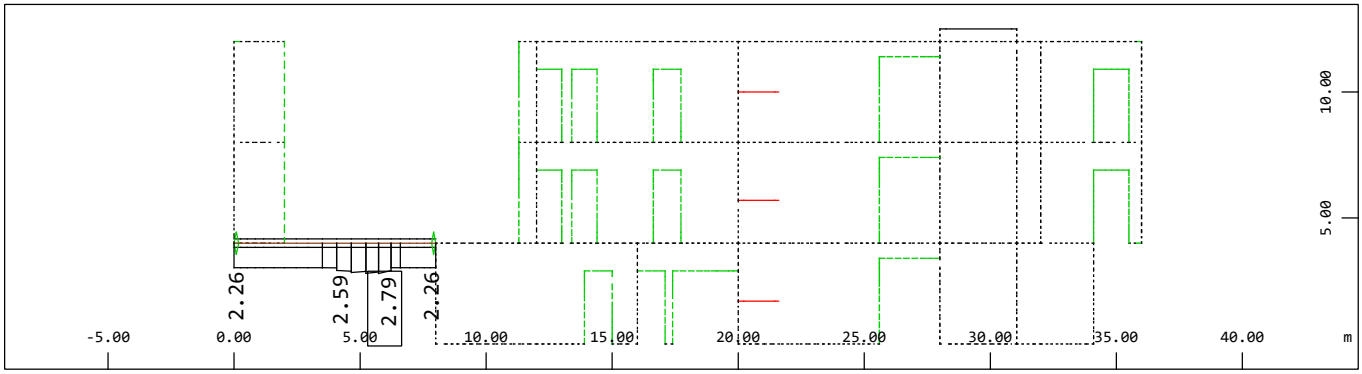
11826 DSO Bovec - vzhodna dilat. enota stavbe
AB nosilci v osi 11: armatura spodnja, zgornja, bocna, strizna



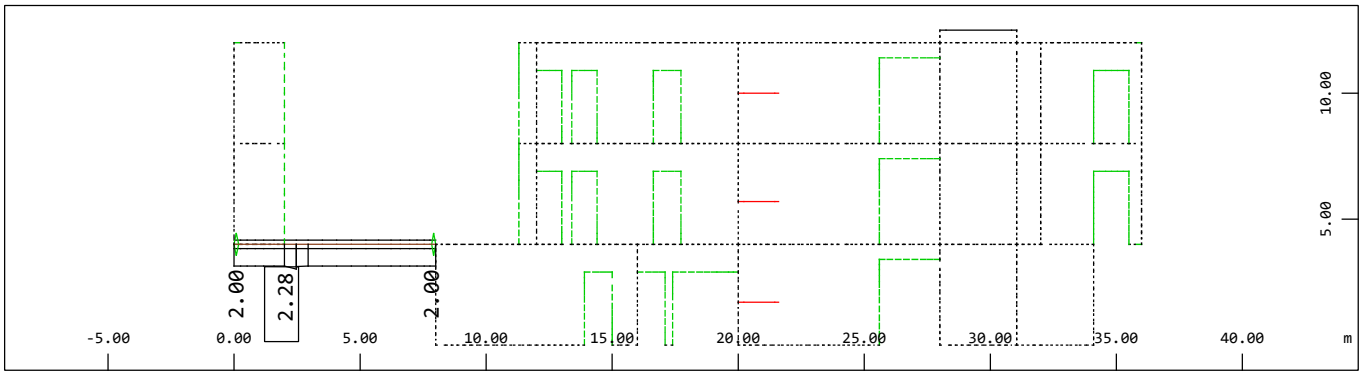

Sector of system Group 253 M 1 : 300
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M1, 1 cm 3D = 17.4 cm2 (Max=6.28)




Sector of system Group 253 M 1 : 300
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M2, 1 cm 3D = 34.8 cm2 (Max=13.6)



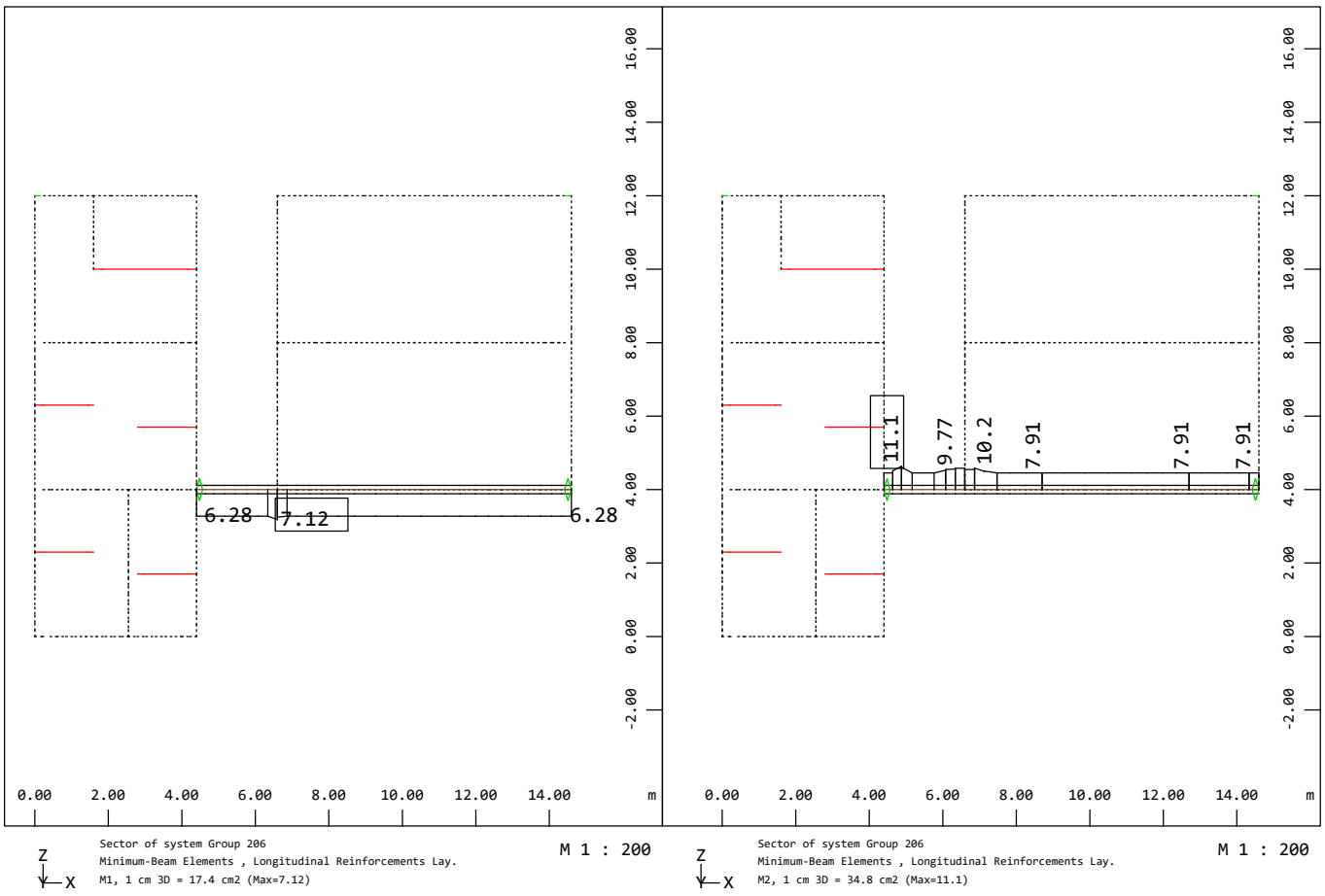

Sector of system Group 253 M 1 : 300
Minimum-Beam Elements , Longitudinal Reinforcements Lay. M3, 1 cm 3D = 6.97 cm2 (Max=2.79)




Sector of system Group 253 M 1 : 300
Minimum-Beam Elements , Stirrup Reinforcements Lay. 1, 1 cm 3D = 6.97 cm2/m (Max=2.28)

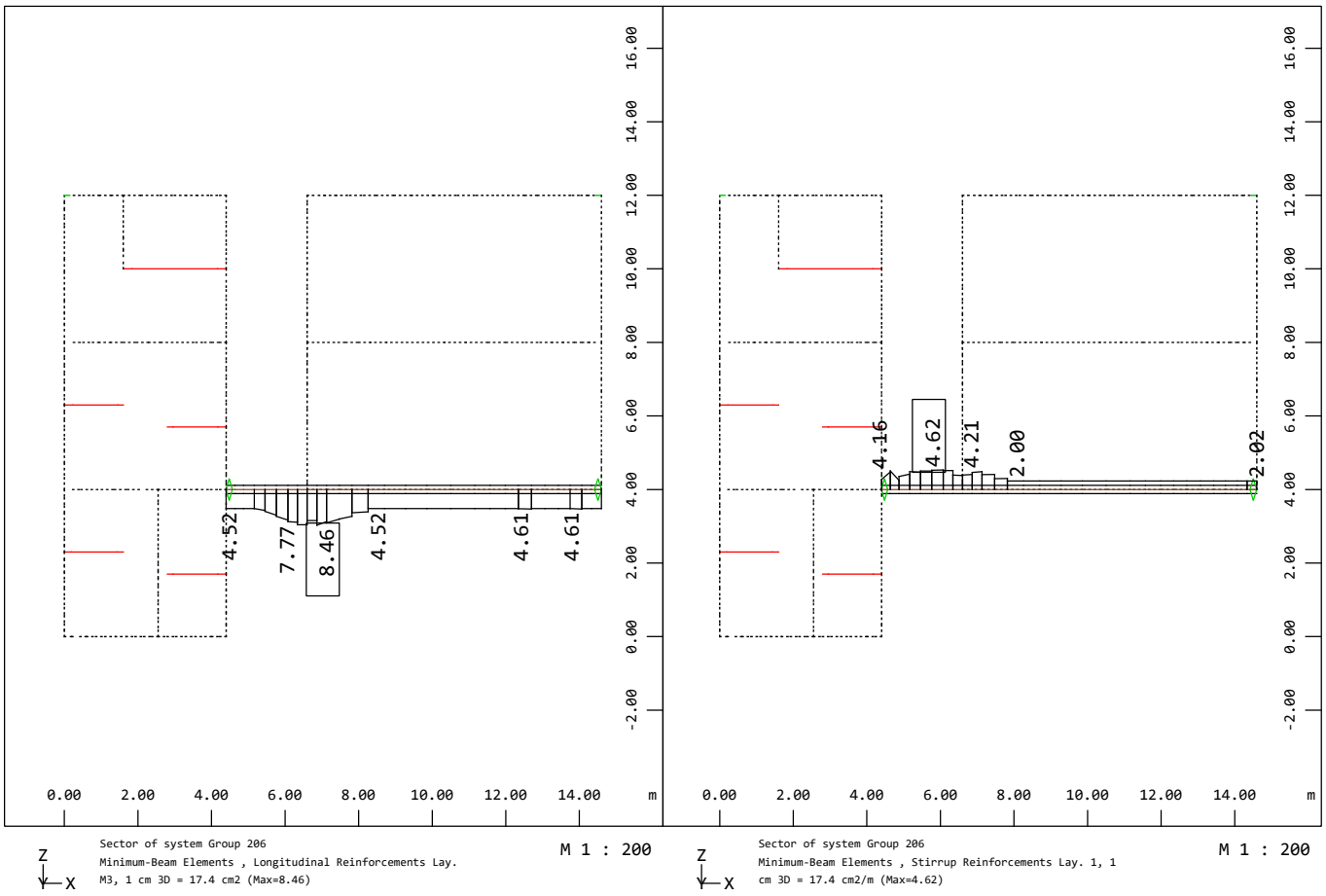
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11826 DSO Bovec - vzhodna dilat. enota stavbe
AB nosilec v osi R: armatura spodnja, zgornja, bocna, strizna







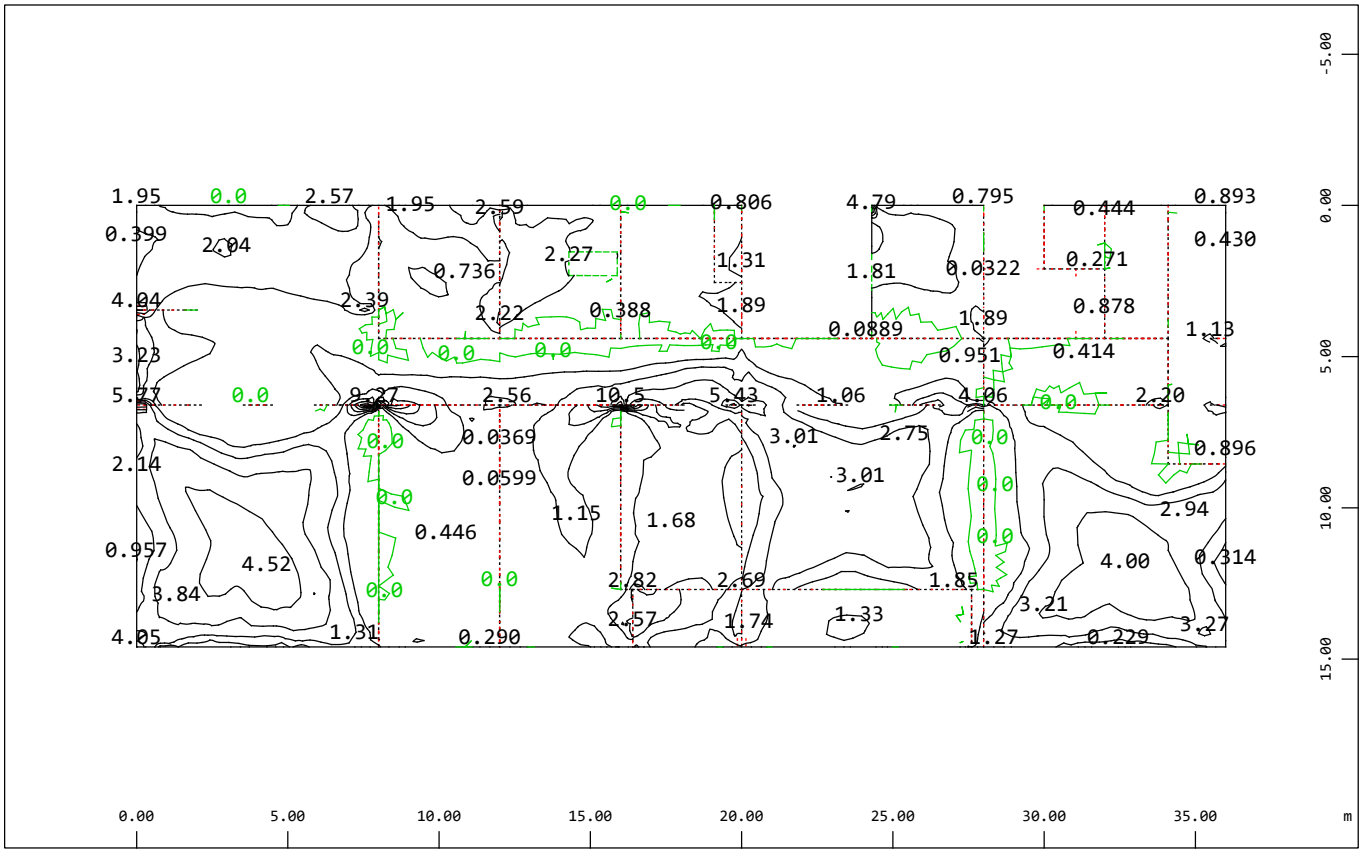




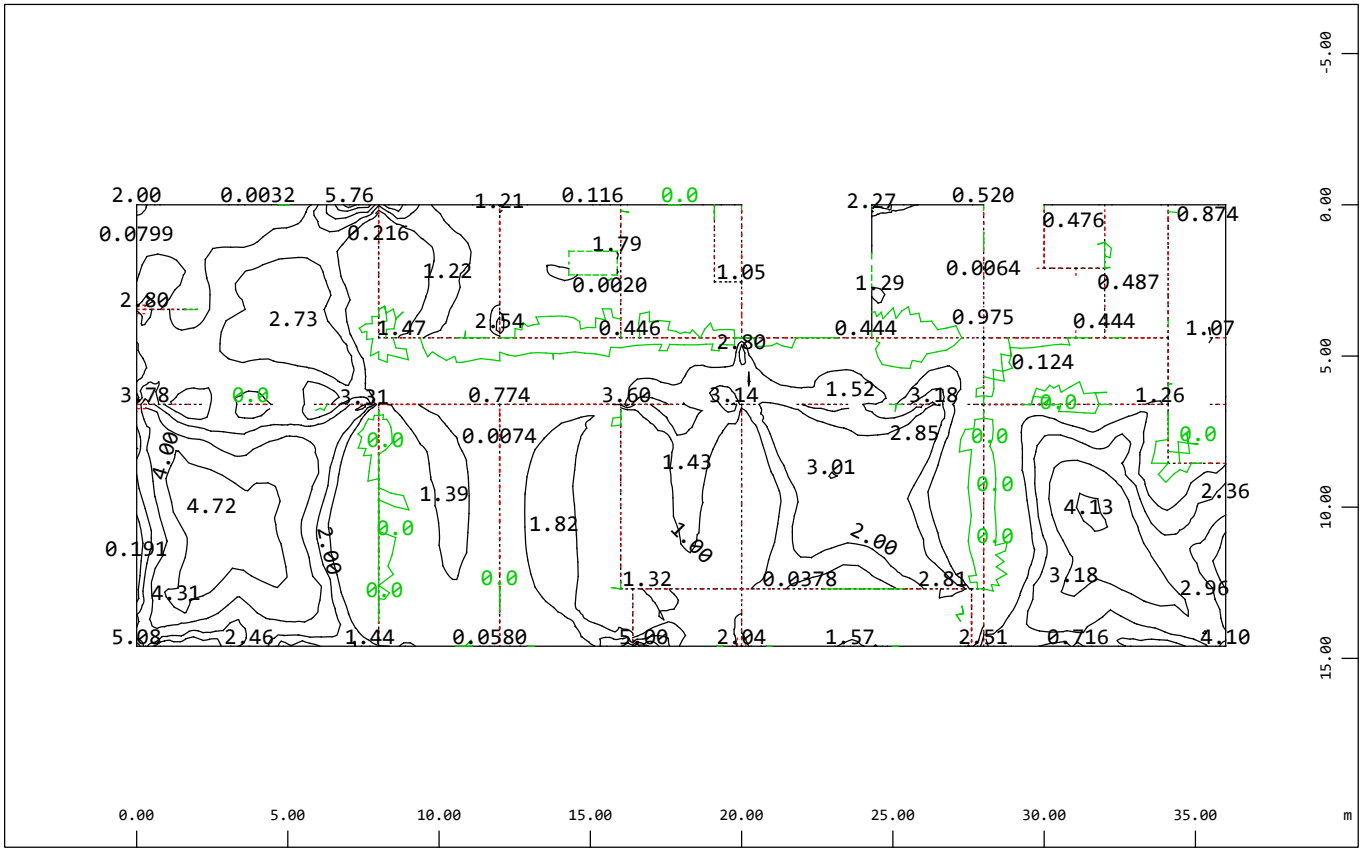


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11826 DSO Bovec - vzhodna dilat. enota stavbe
Etazna plosca nad P: armatura spodnja



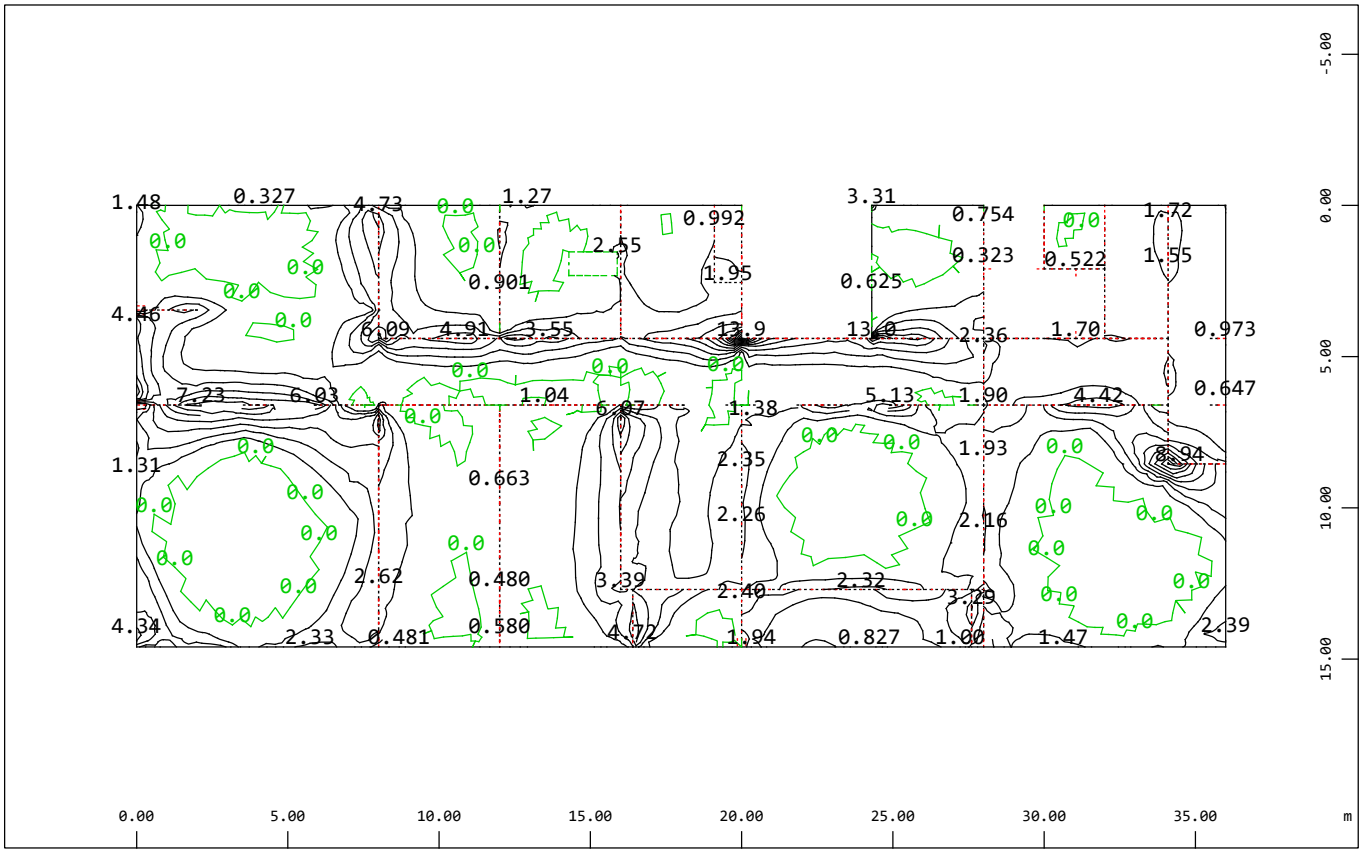

Sector of system Group 110 M 1 : 250
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 10.5 step 1.00 cm2/m



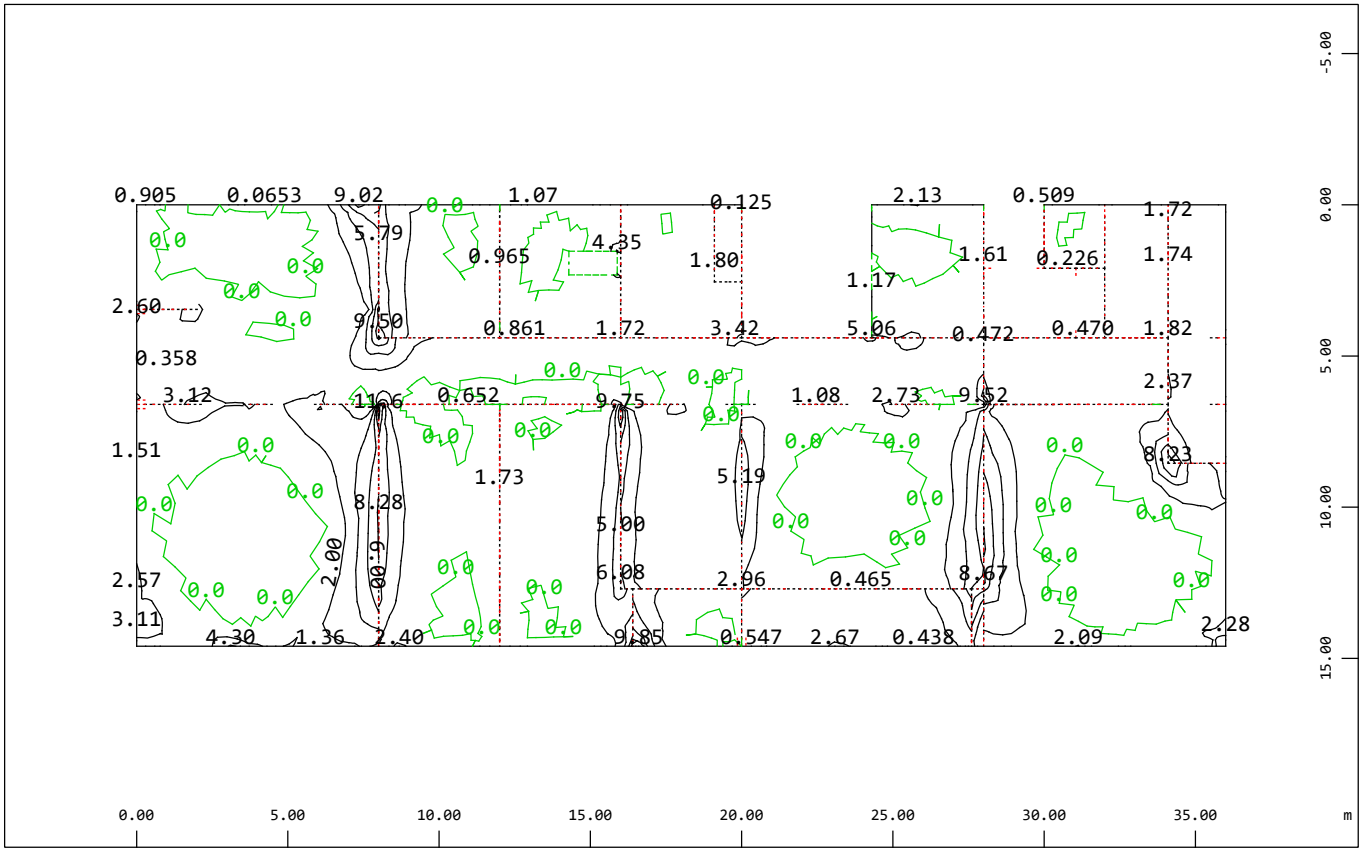

Sector of system Group 110 M 1 : 250
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 5.76 step 1.00 cm2/m

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Etazna plosca nad P: armatura zgoraj



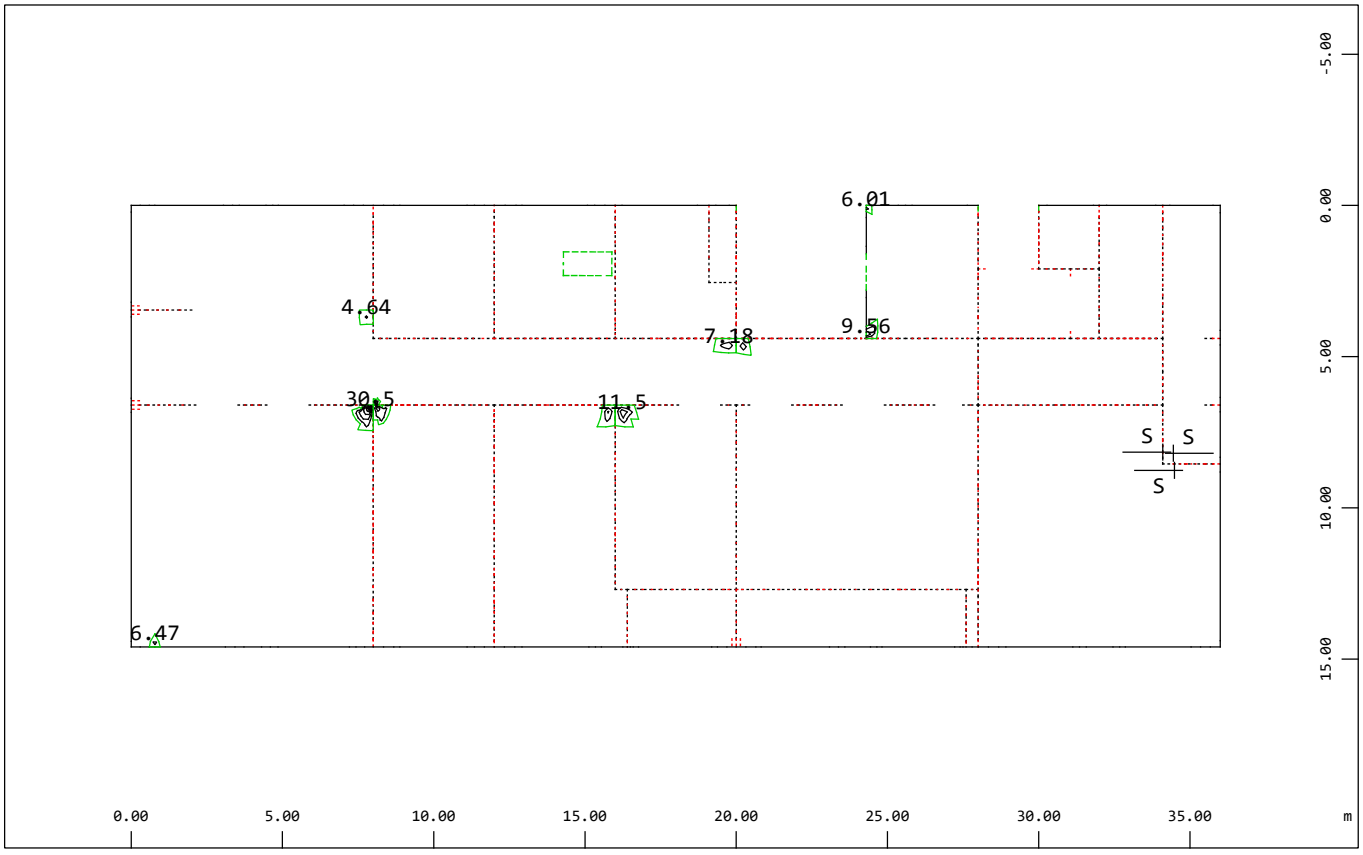

Sector of system Group 110 M 1 : 250
Z Y
X
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 13.9 step 1.00 cm2/m



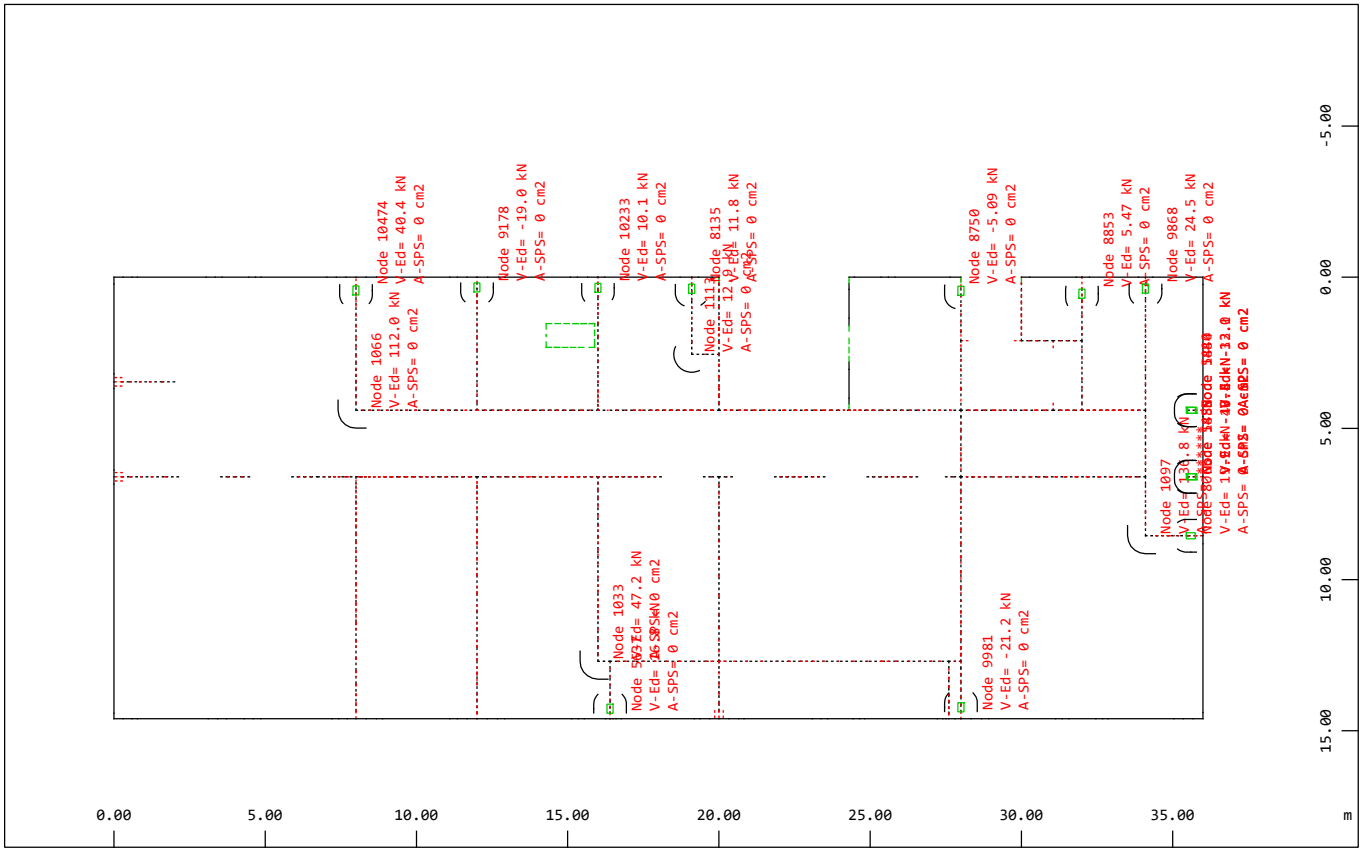

Sector of system Group 110 M 1 : 250
Z Y
X
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 20.0 step 2.00 cm2/m

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Etazna plosca nad P: armatura strizna in prebojna



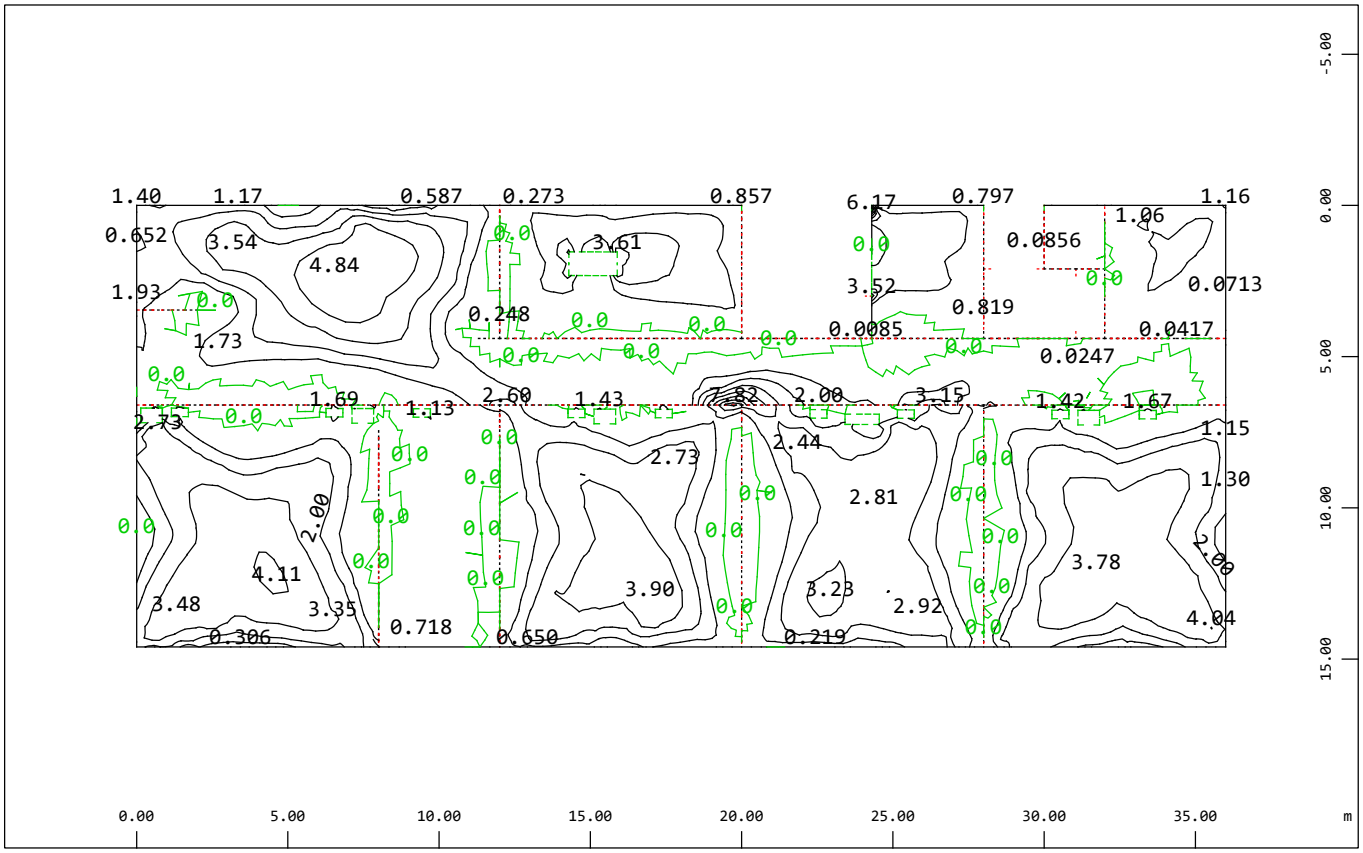

Sector of system Group 110 M 1 : 250
Quadrilateral Elements , Shear reinforcement , Design Case 1 , Shear reinforcement in
Node(Max=30.5cm2/m2), Design error shear problem (=S) in Node, from 0 to 30.5 step 4.00



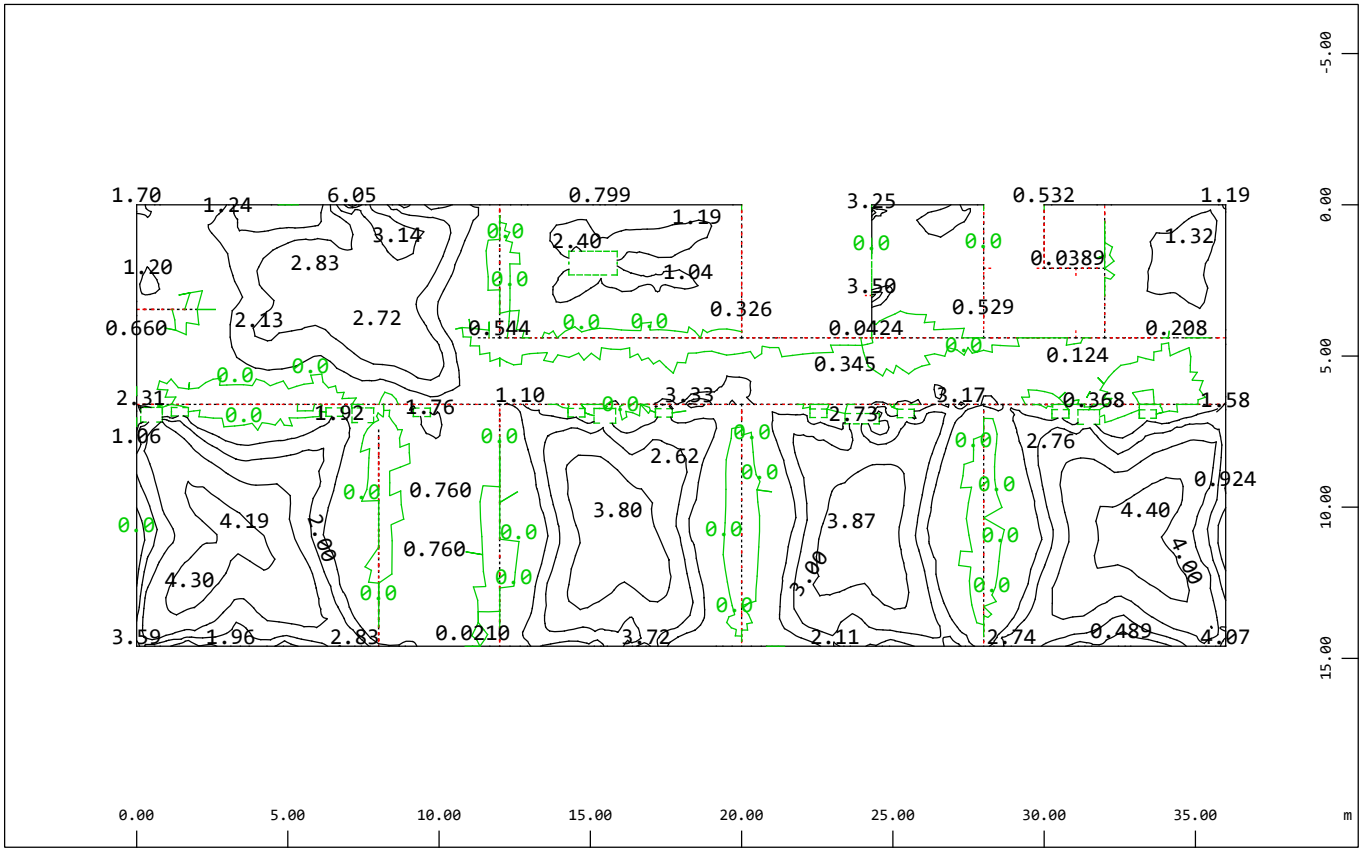

Sector of system Group 110 M 1 : 250
Punching in cm2/m2, Design Case 1 (Max=0)

SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - vzhodna dilat. enota stavbe
Etazna plosca nad N: armatura spodnja



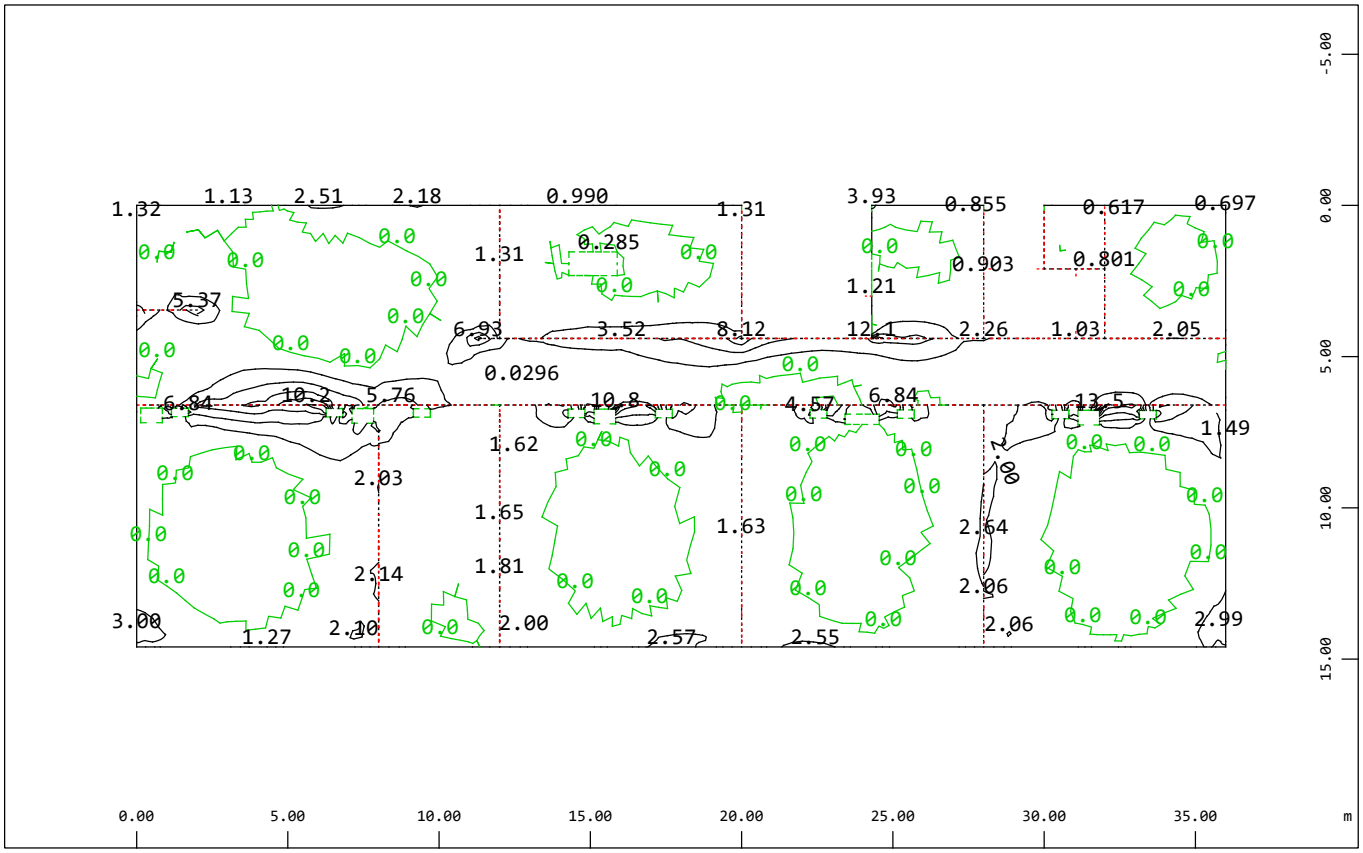

Sector of system Group 120 M 1 : 250
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 7.82 step 1.00 cm2/m



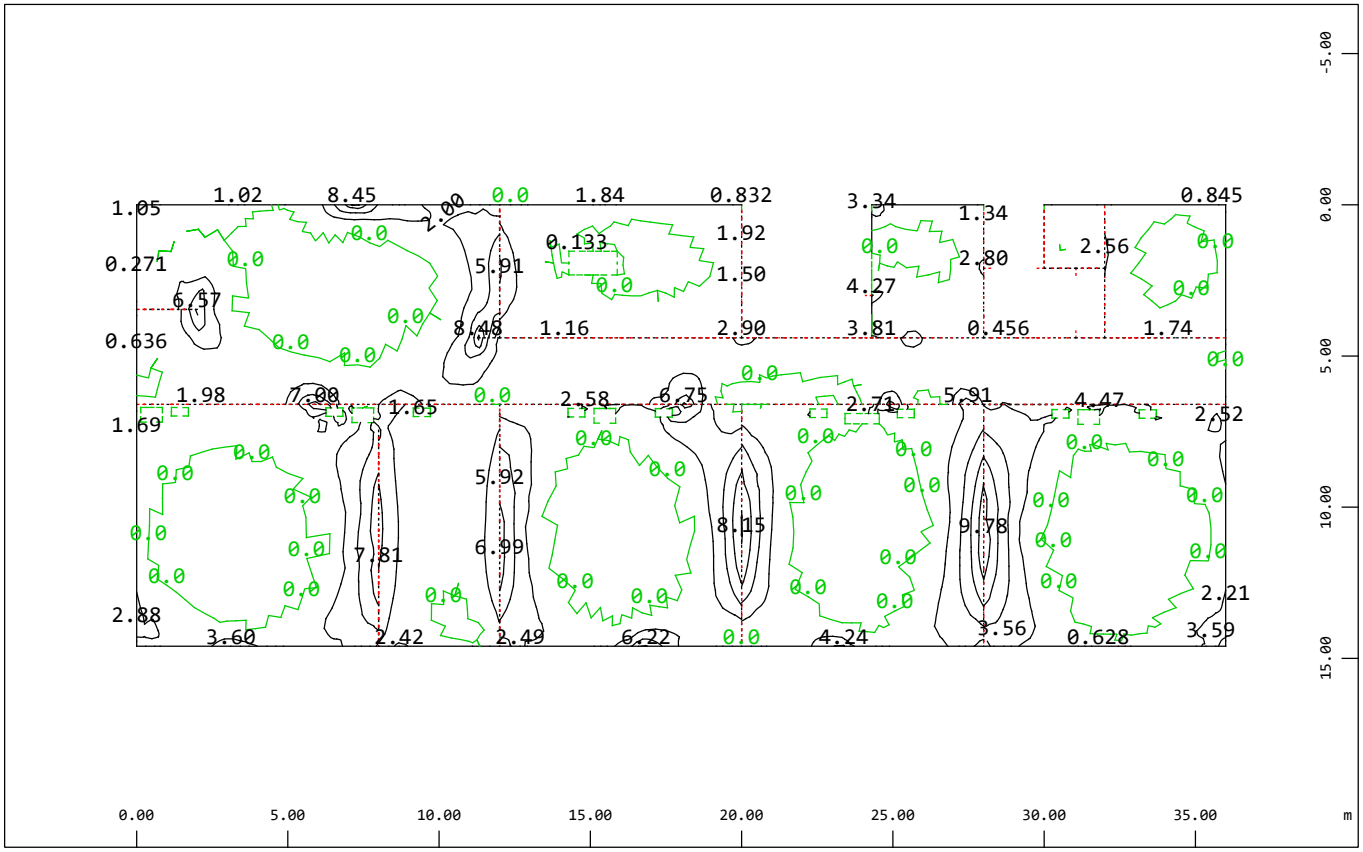

Sector of system Group 120 M 1 : 250
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 6.05 step 1.00 cm2/m

SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - vzhodna dilat. enota stavbe
Etazna plosca nad N: armatura zgoraj



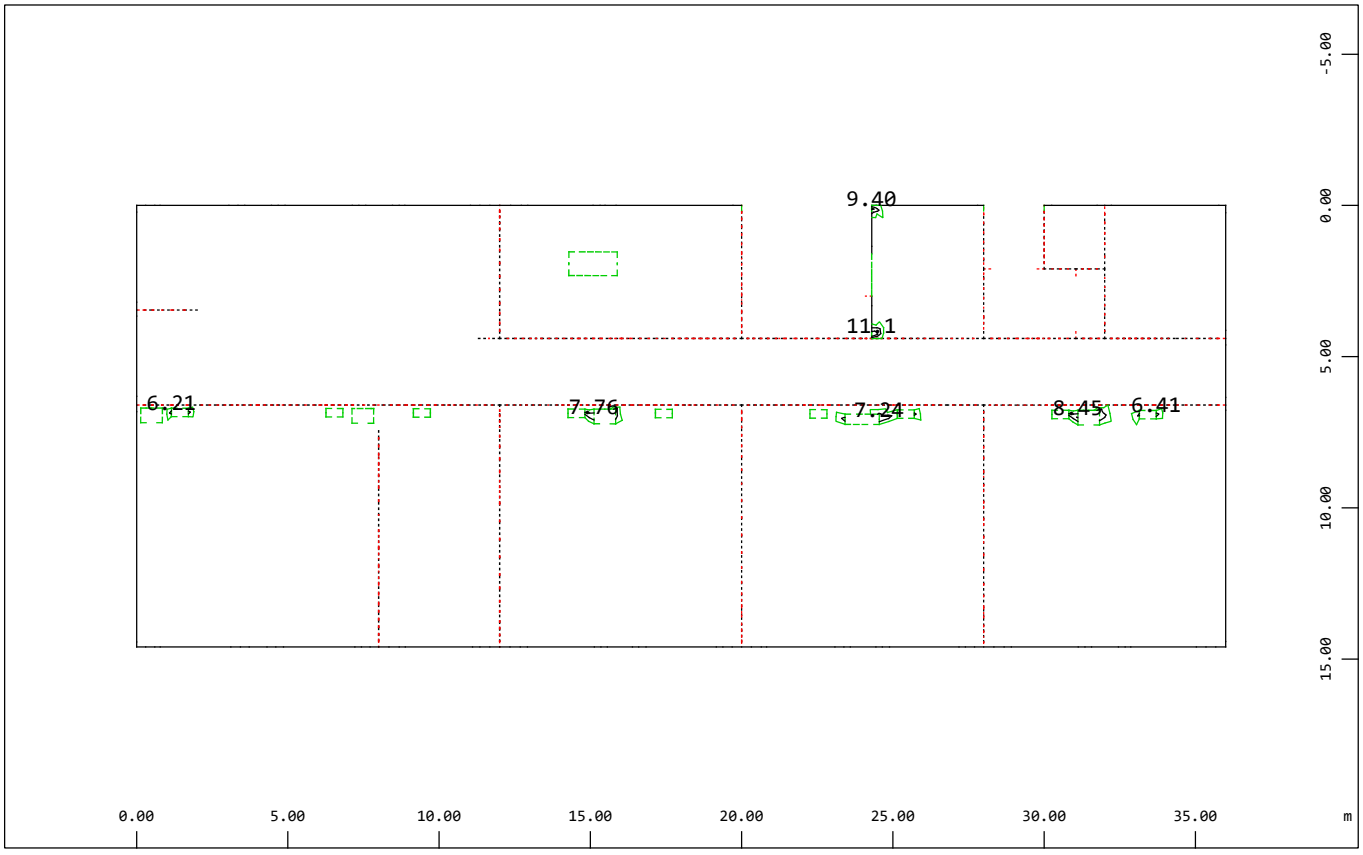

Sector of system Group 120 M 1 : 250
Z Y
X
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 13.5 step 2.00 cm2/m



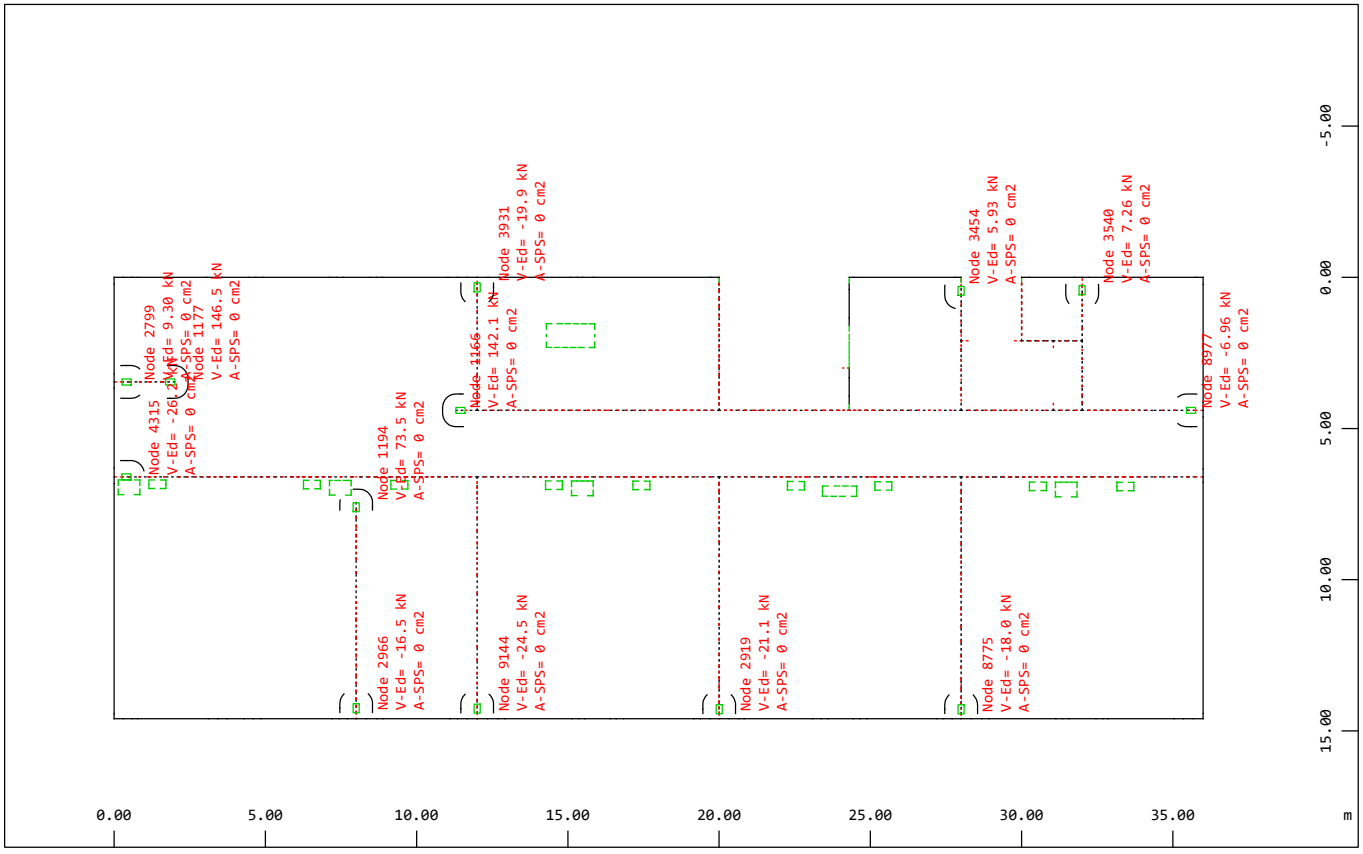

Sector of system Group 120 M 1 : 250
Z Y
X
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 20.0 step 2.00 cm2/m

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Etazna plosca nad P: armatura strizna in prebojna



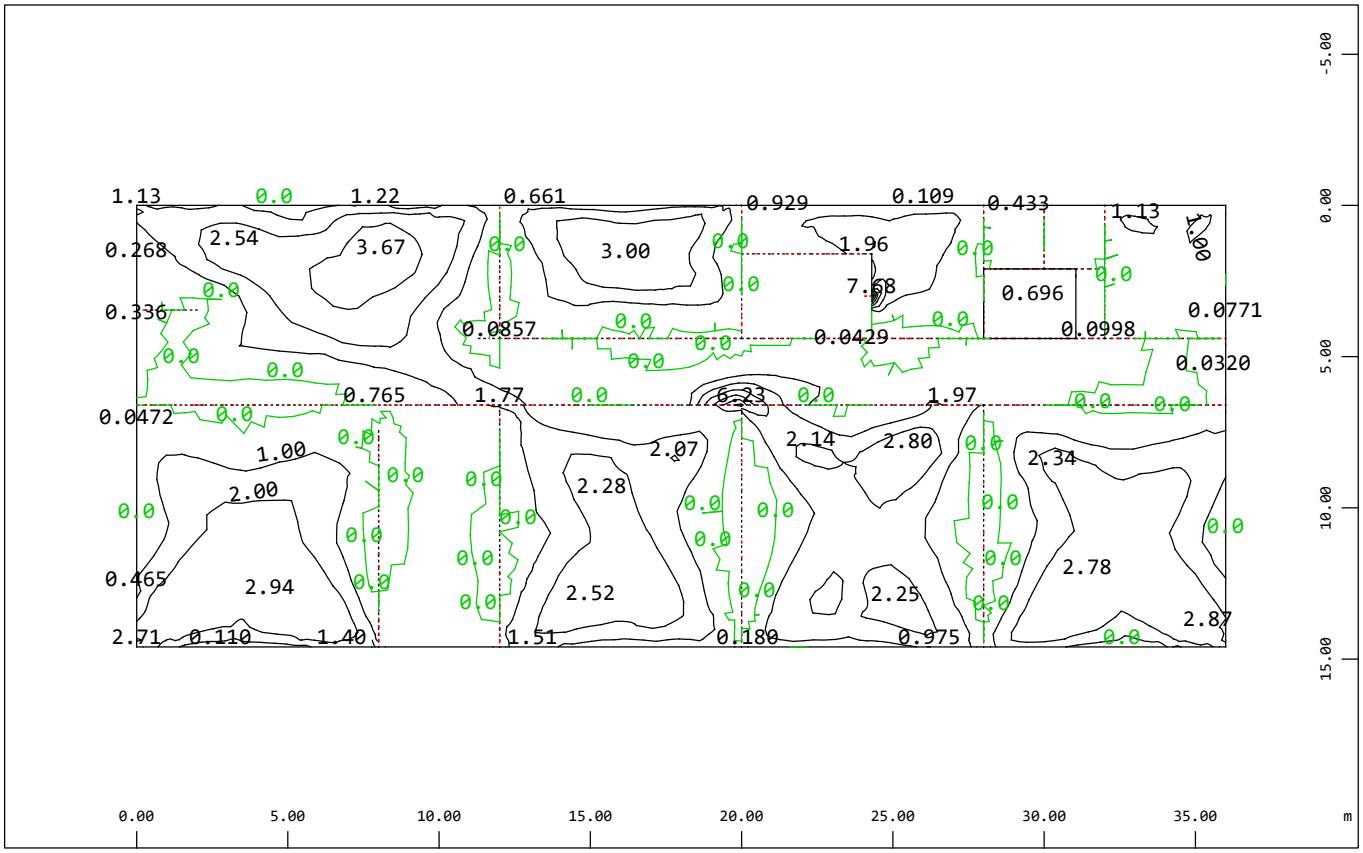

Sector of system Group 120 M 1 : 250
Quadrilateral Elements , Shear reinforcement in Node , Design Case 1 , from 0 to 11.1
step 4.00 cm2/m2



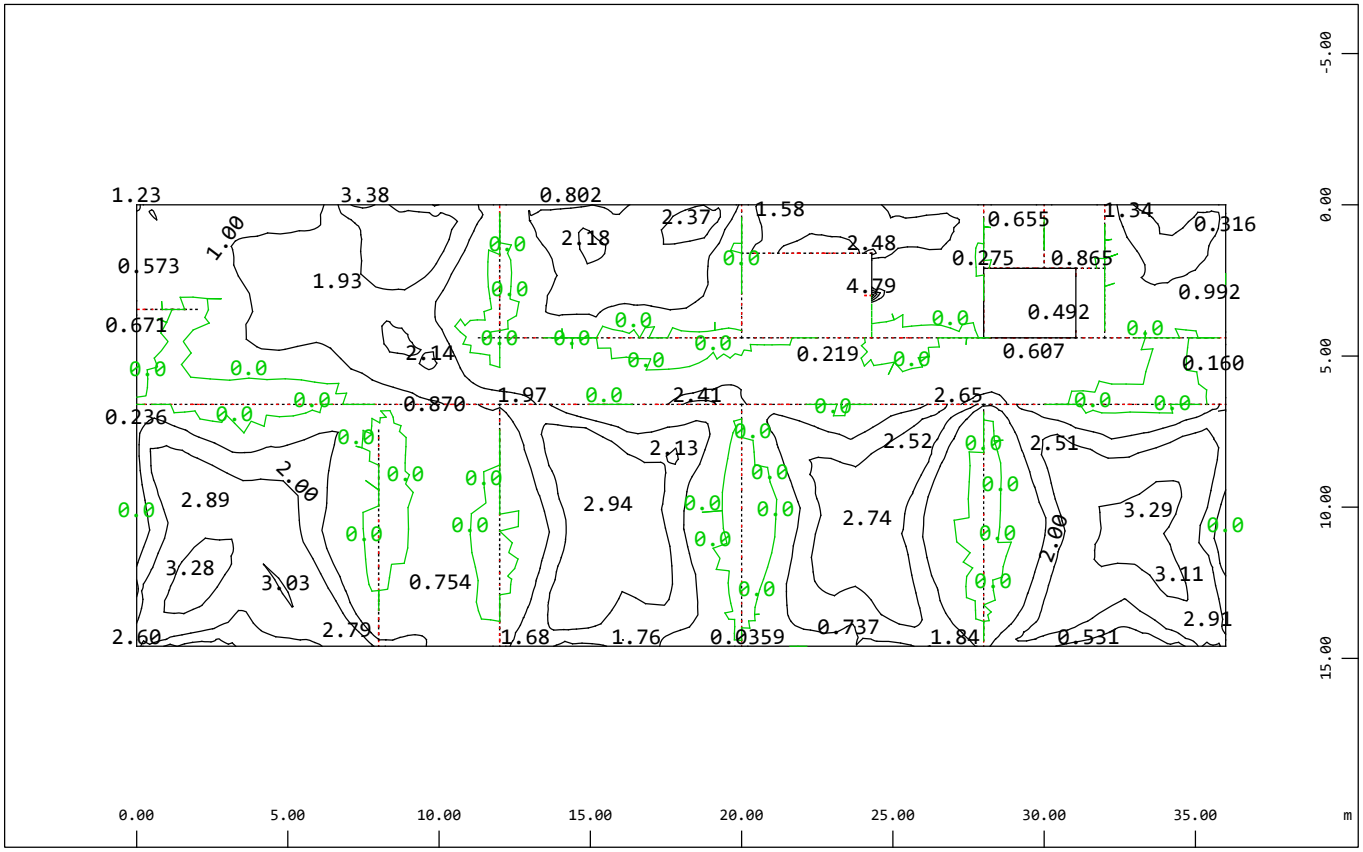

Sector of system Group 120 M 1 : 250
Punching in cm2/m2, Design Case 1 (Max=0)

SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - vzhodna dilat. enota stavbe
Stresna plosca: armatura spodnja



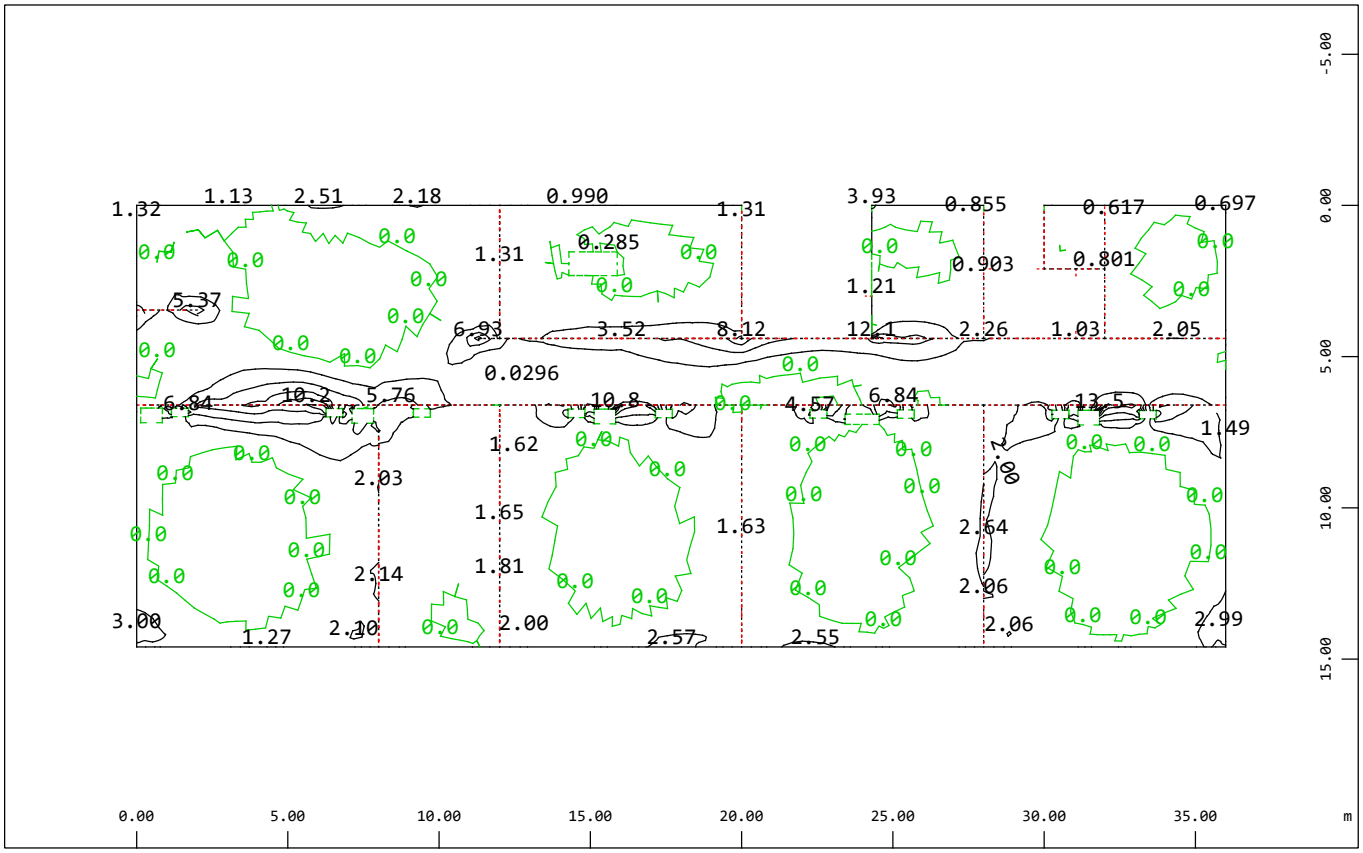

Sector of system Group 130 M 1 : 250
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 7.68 step 1.00 cm2/m



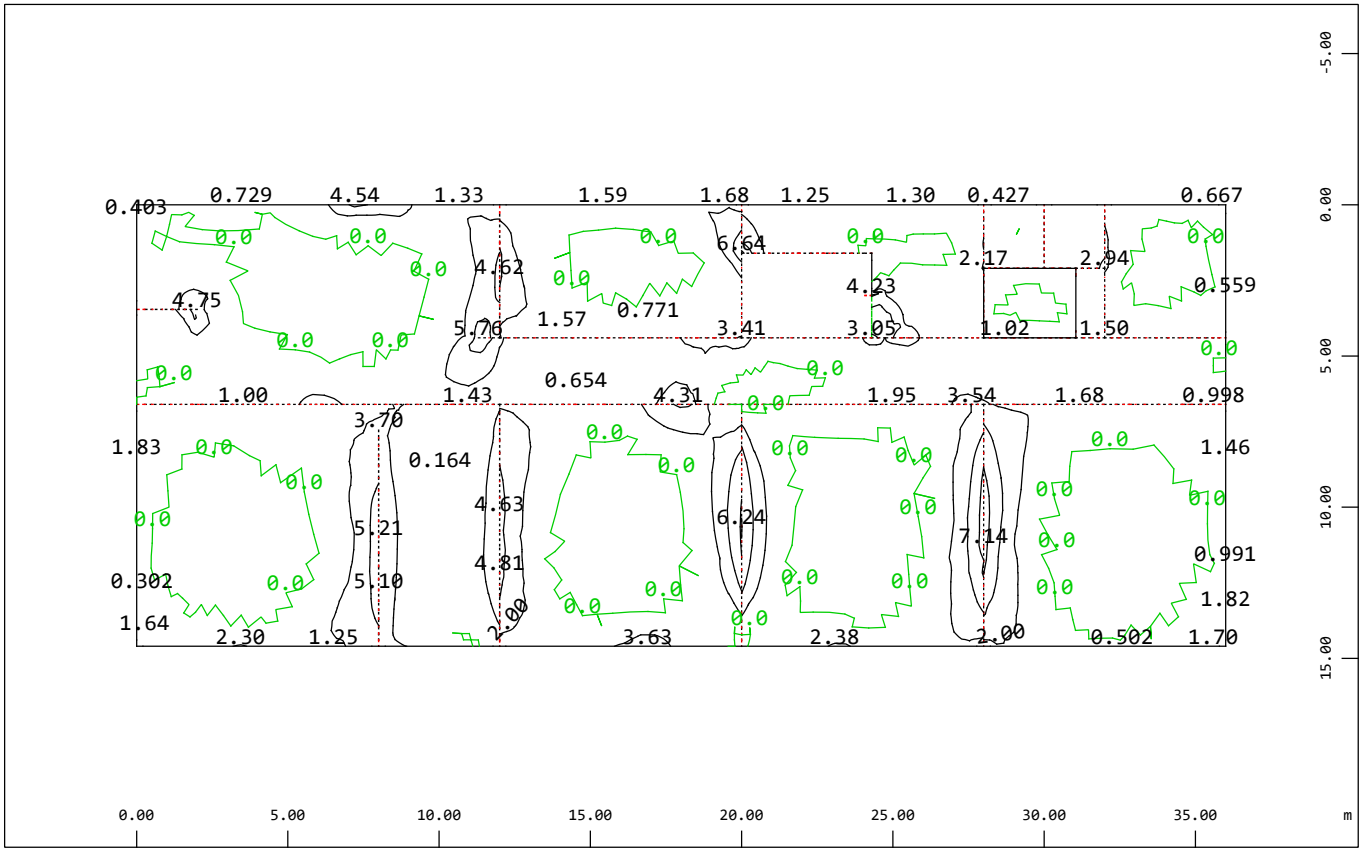

Sector of system Group 130 M 1 : 250
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 4.79 step 1.00 cm2/m

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Stresna plosca: armatura zgoraj



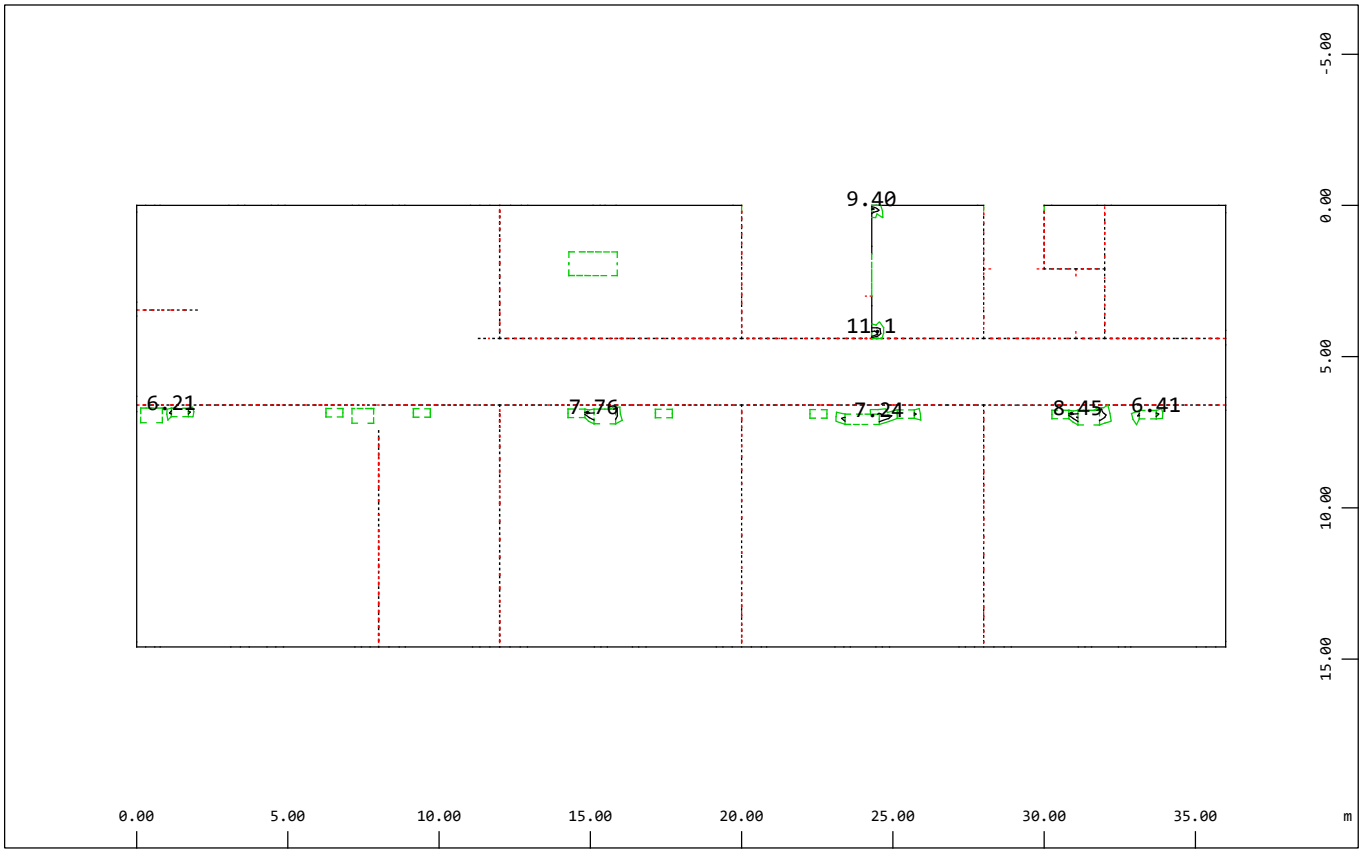

Sector of system Group 120 M 1 : 250
Z Y X
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 13.5 step 2.00 cm2/m



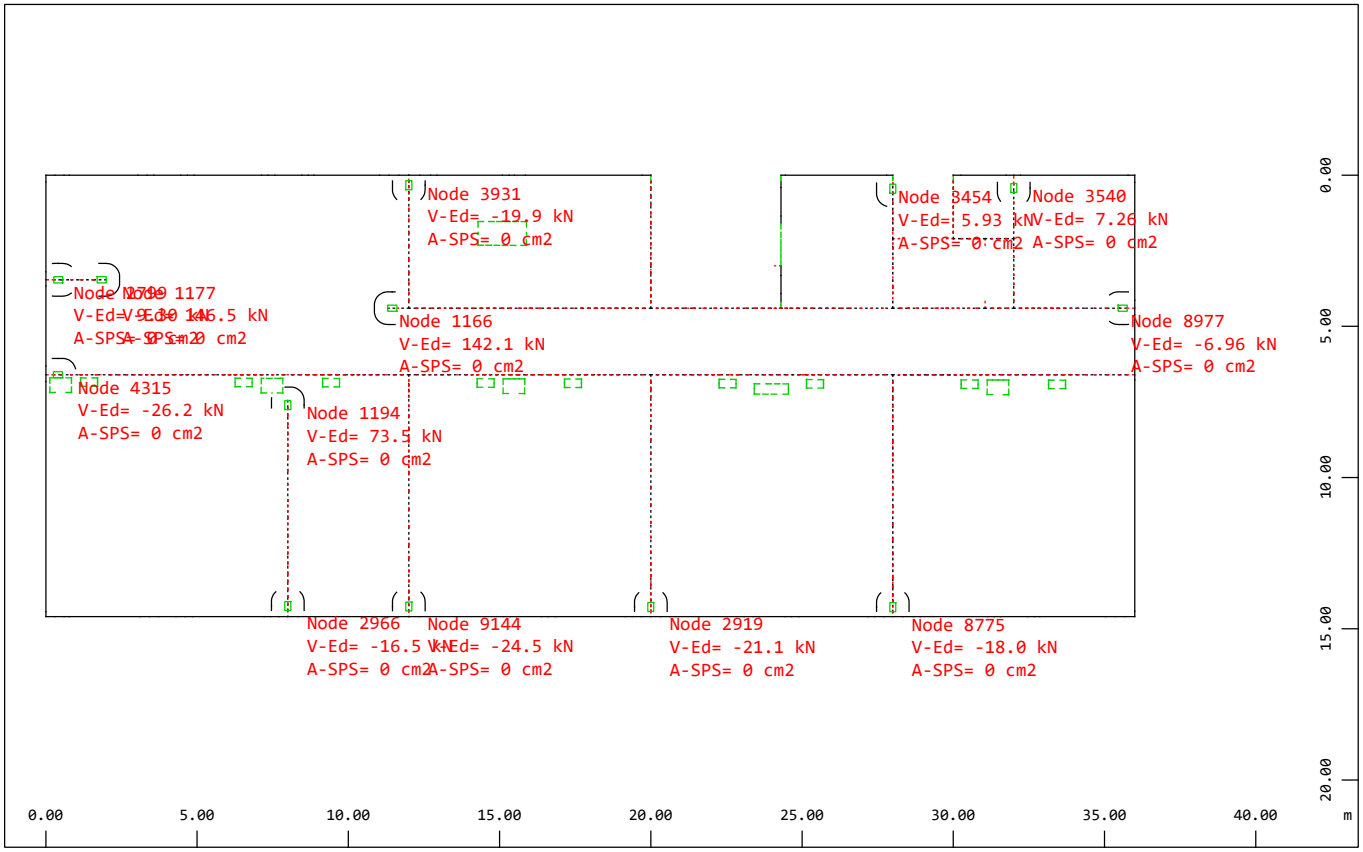

Sector of system Group 130 M 1 : 250
Z Y X
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 20.0 step 2.00 cm2/m

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Stresna plosca: armatura strizna in prebojna



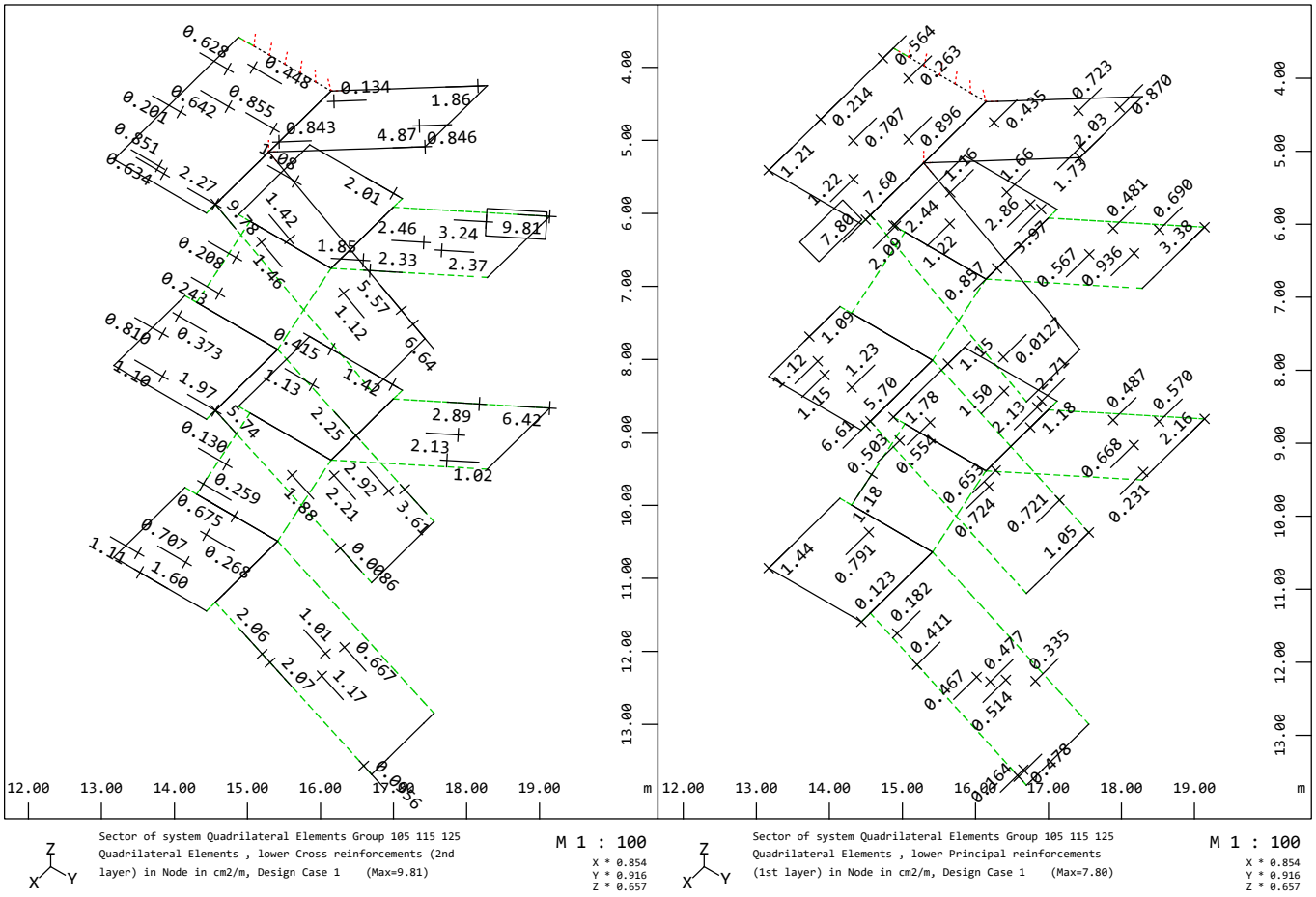

Sector of system Group 120 M 1 : 250
Quadrilateral Elements , Shear reinforcement in Node , Design Case 1 , from 0 to 11.1
step 4.00 cm2/m2




Sector of system Group 120 M 1 : 250
Punching in cm2/m2, Design Case 1 (Max=0)

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Stopnice: armatura spodnja, zgornja

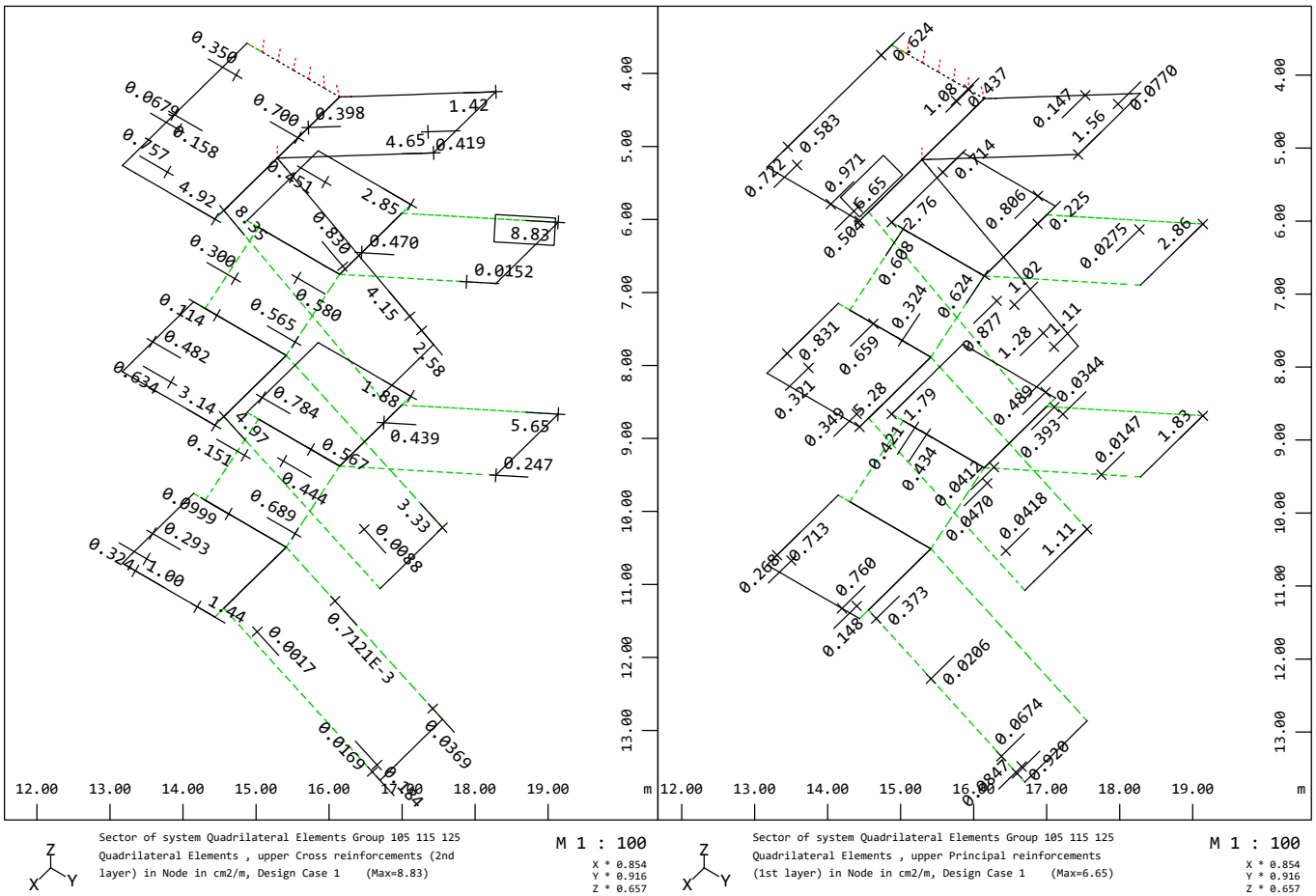



Sector of system Quadrilateral Elements Group 105 115 125
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node in cm2/m, Design Case 1 (Max=9.81)

M 1 : 100
X * 0.854
Y * 0.916
Z * 0.657

Sector of system Quadrilateral Elements Group 105 115 125
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node in cm2/m, Design Case 1 (Max=7.80)

M 1 : 100
X * 0.854
Y * 0.916
Z * 0.657




Sector of system Quadrilateral Elements Group 105 115 125
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node in cm2/m, Design Case 1 (Max=8.83)

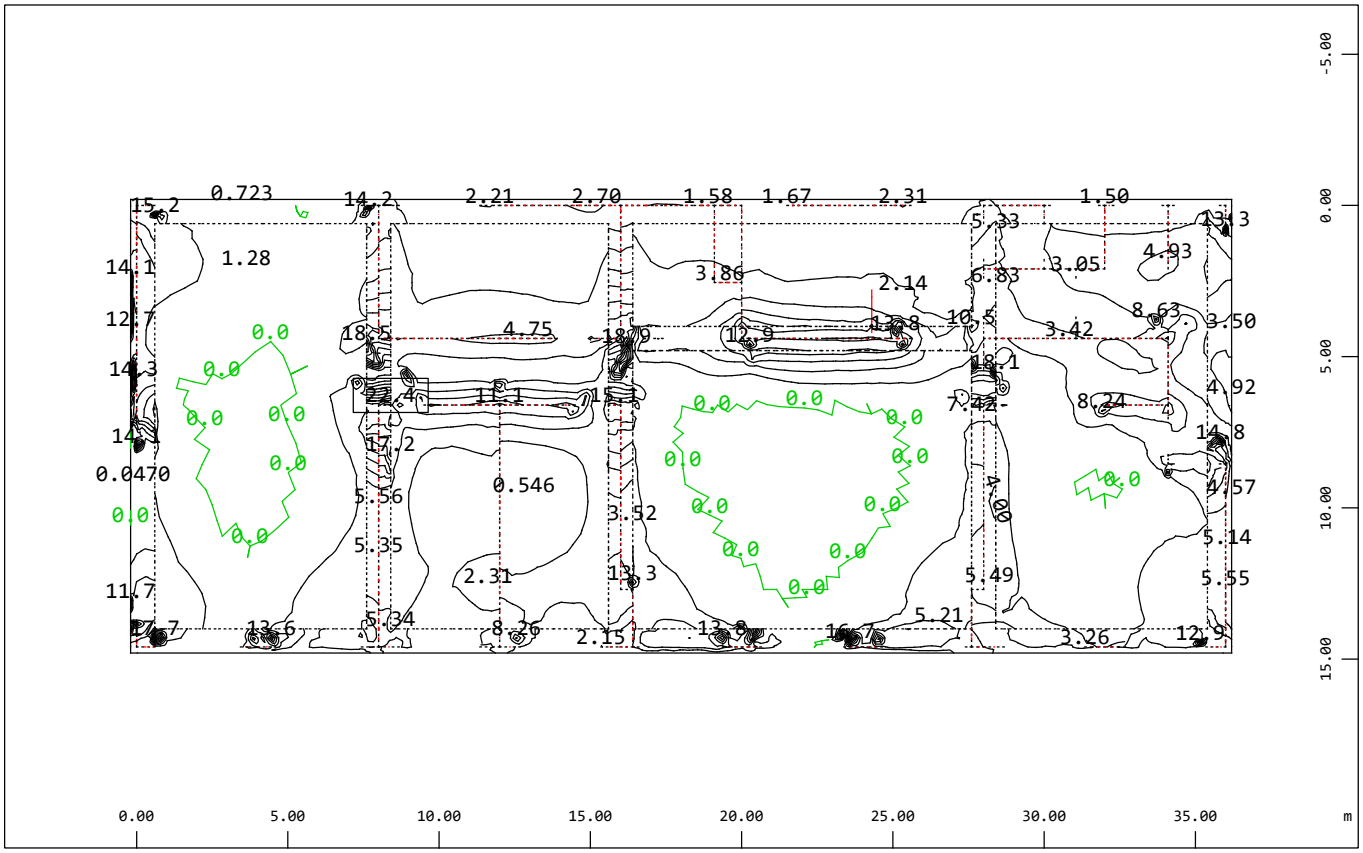
M 1 : 100
X * 0.854
Y * 0.916
Z * 0.657

Sector of system Quadrilateral Elements Group 105 115 125
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node in cm2/m, Design Case 1 (Max=6.65)

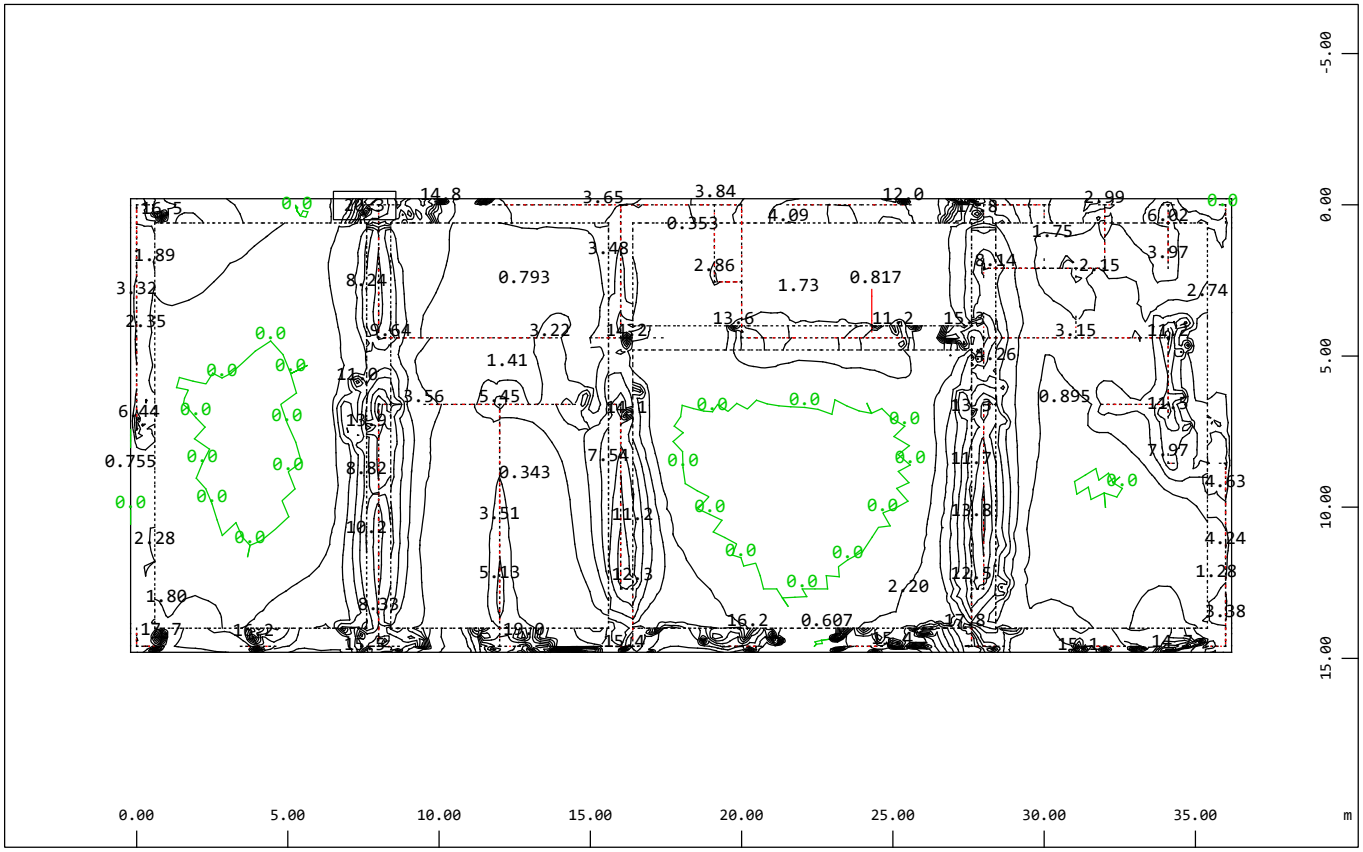
M 1 : 100
X * 0.854
Y * 0.916
Z * 0.657

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Temelji in tem. plosca: armatura spodnja



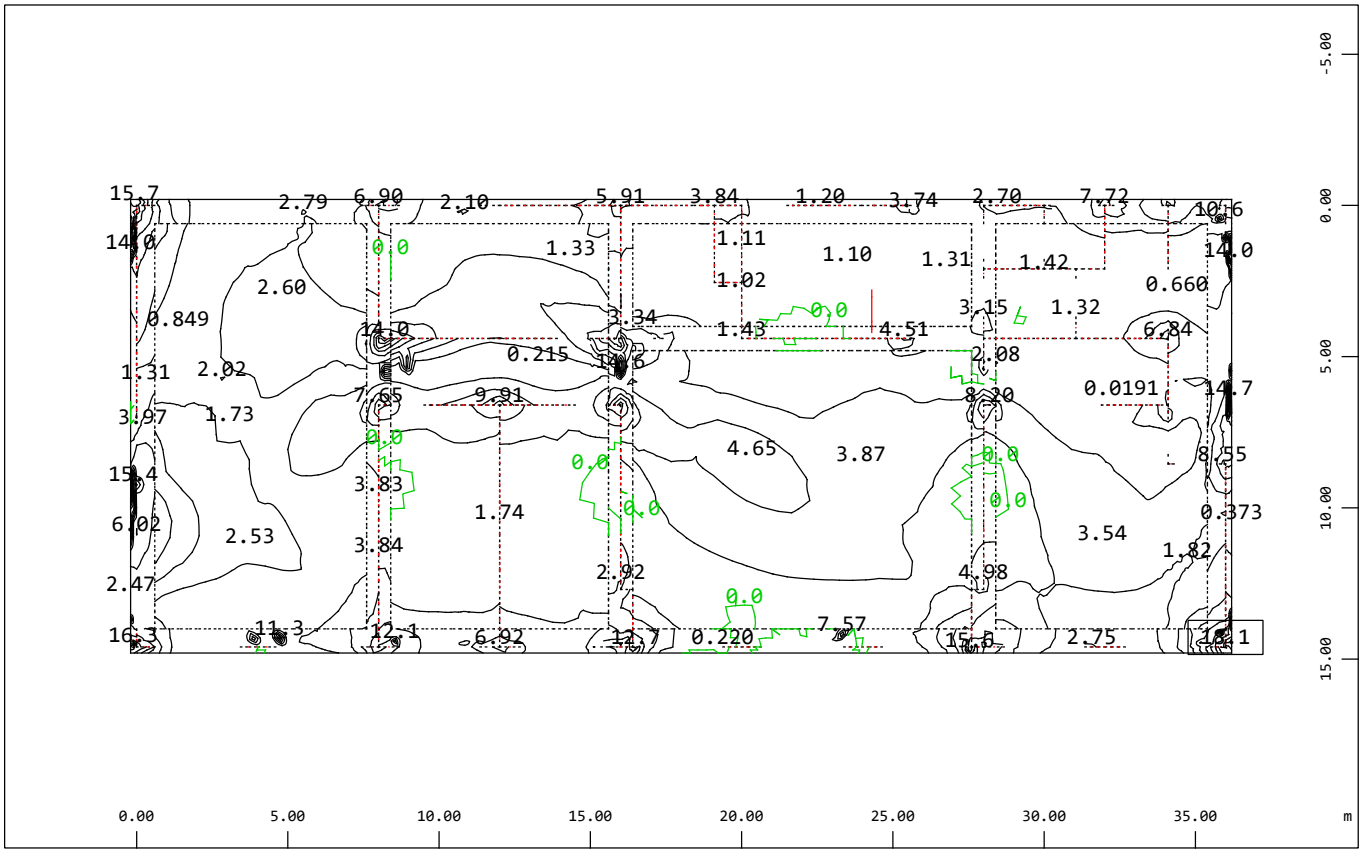

Sector of system Group 100 M 1 : 250
Z Y
X
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 22.4 step 2.00 cm2/m



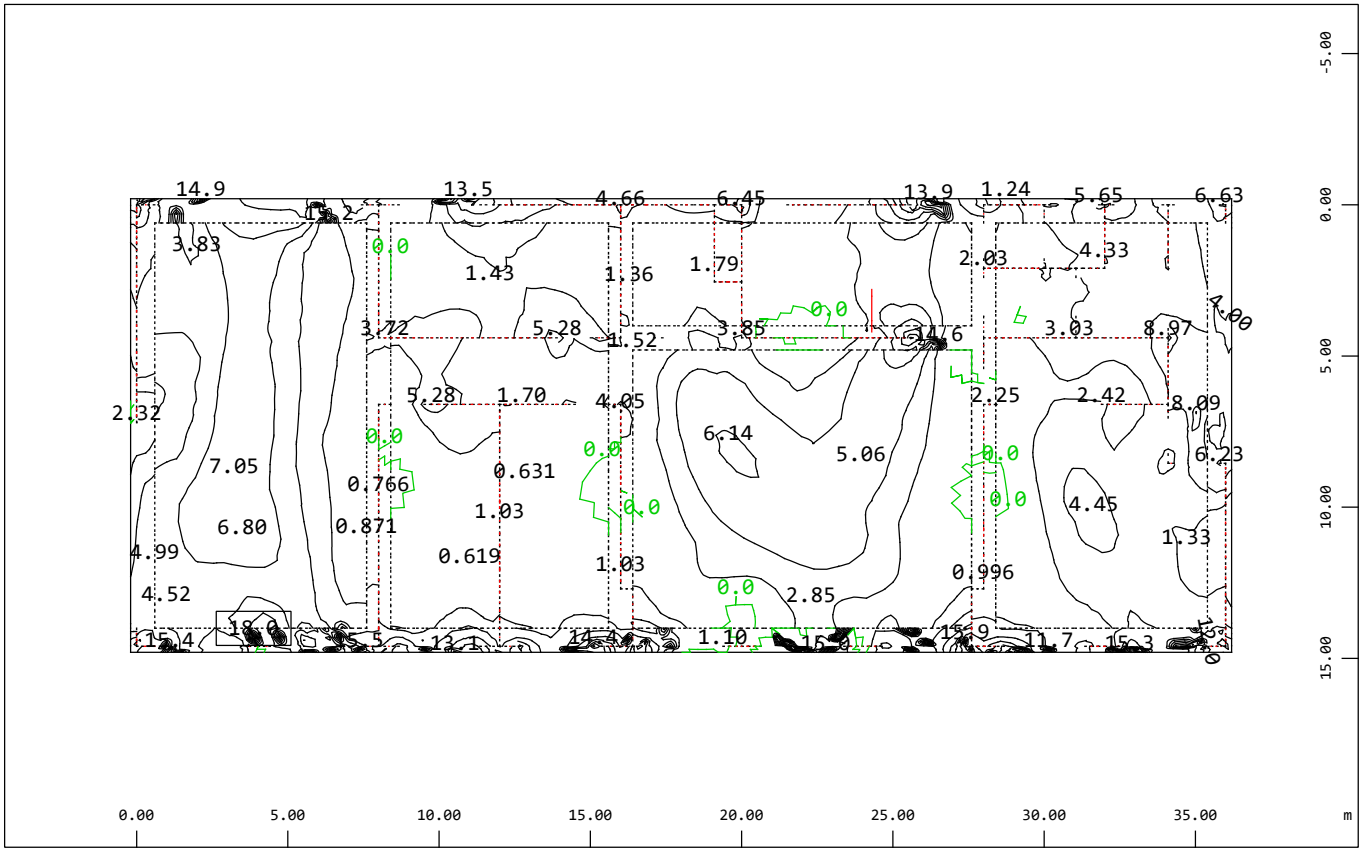

Sector of system Group 100 M 1 : 250
Z Y
X
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 20.3 step 2.00 cm2/m

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Temelji in tem. plosca: armatura zgornja



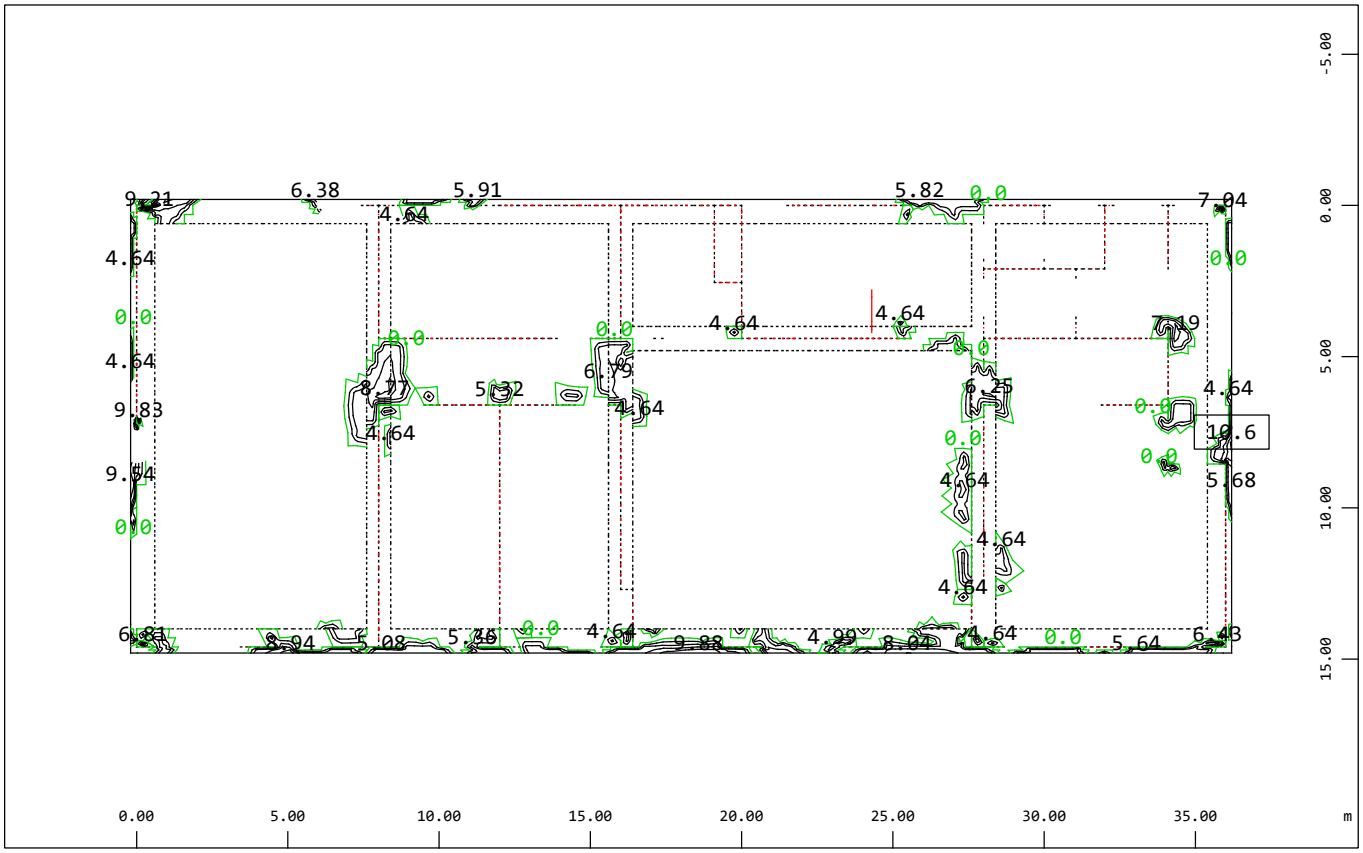

Sector of system Group 100 M 1 : 250
Quadrilateral Elements , upper Principal reinforcements (1st layer) in Node , Design Case
1 , from 0 to 18.1 step 2.00 cm2/m




Sector of system Group 100 M 1 : 250
Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Node , Design Case 1
, from 0 to 18.0 step 2.00 cm2/m

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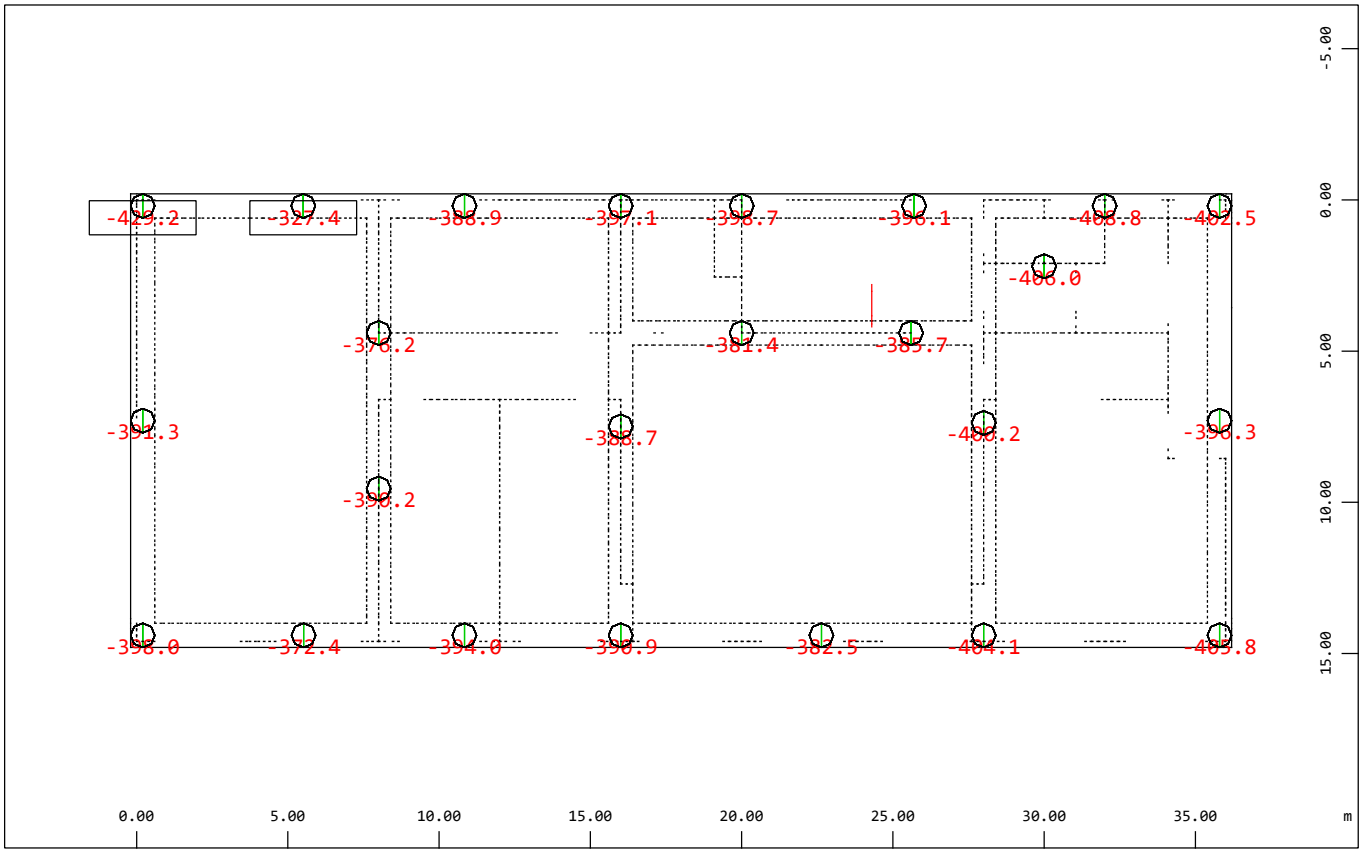
11826 DSO Bovec - vzhodna dilat. enota stavbe
Temelji in tem. plosca: armatura strizna



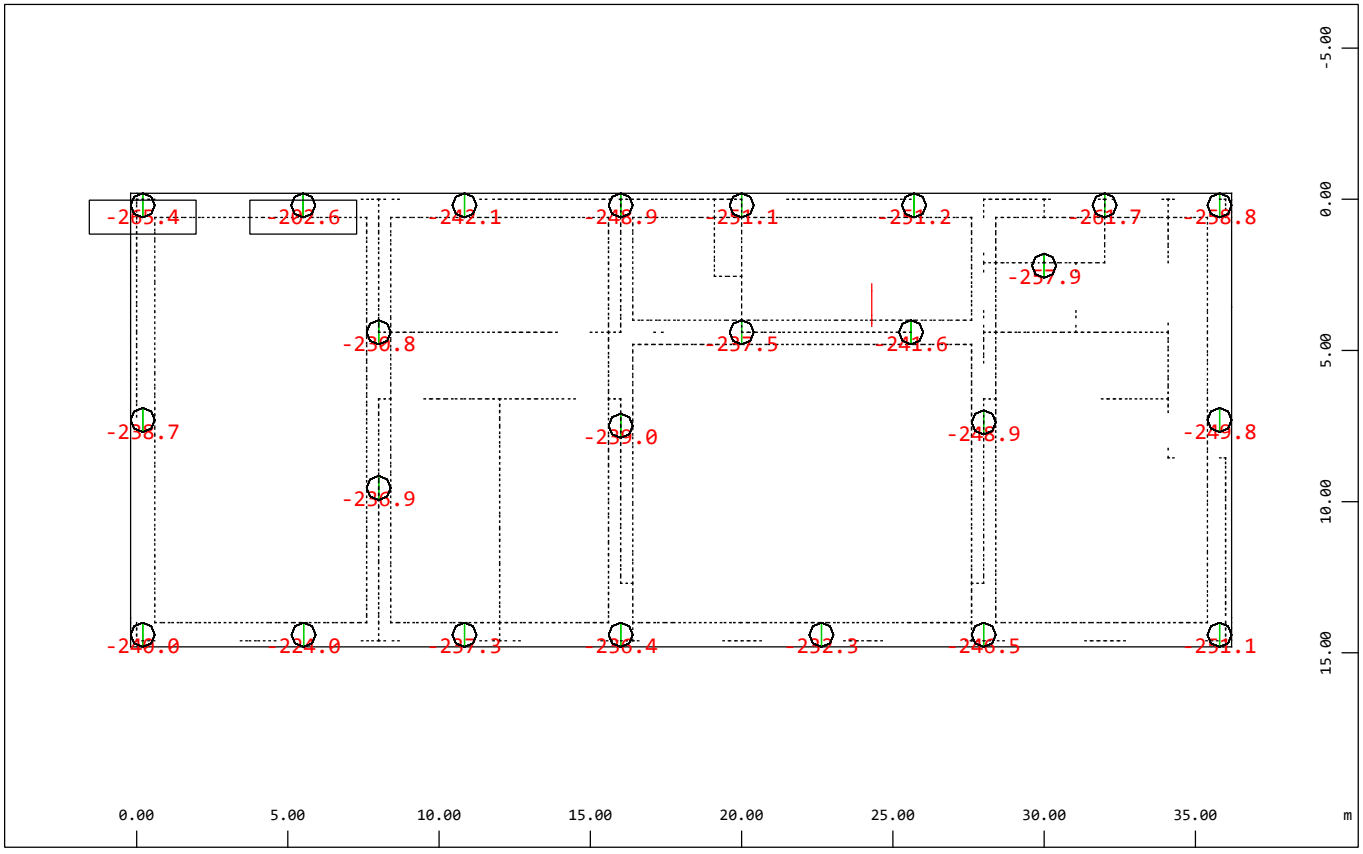

Sector of system Group 100 M 1 : 250
Quadrilateral Elements , Shear reinforcement in Node , Design Case 1 , from 0 to 10.6
step 2.00 cm2/m2

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj. sil na vodnjakih pod plosco: MSN (faktorirano)



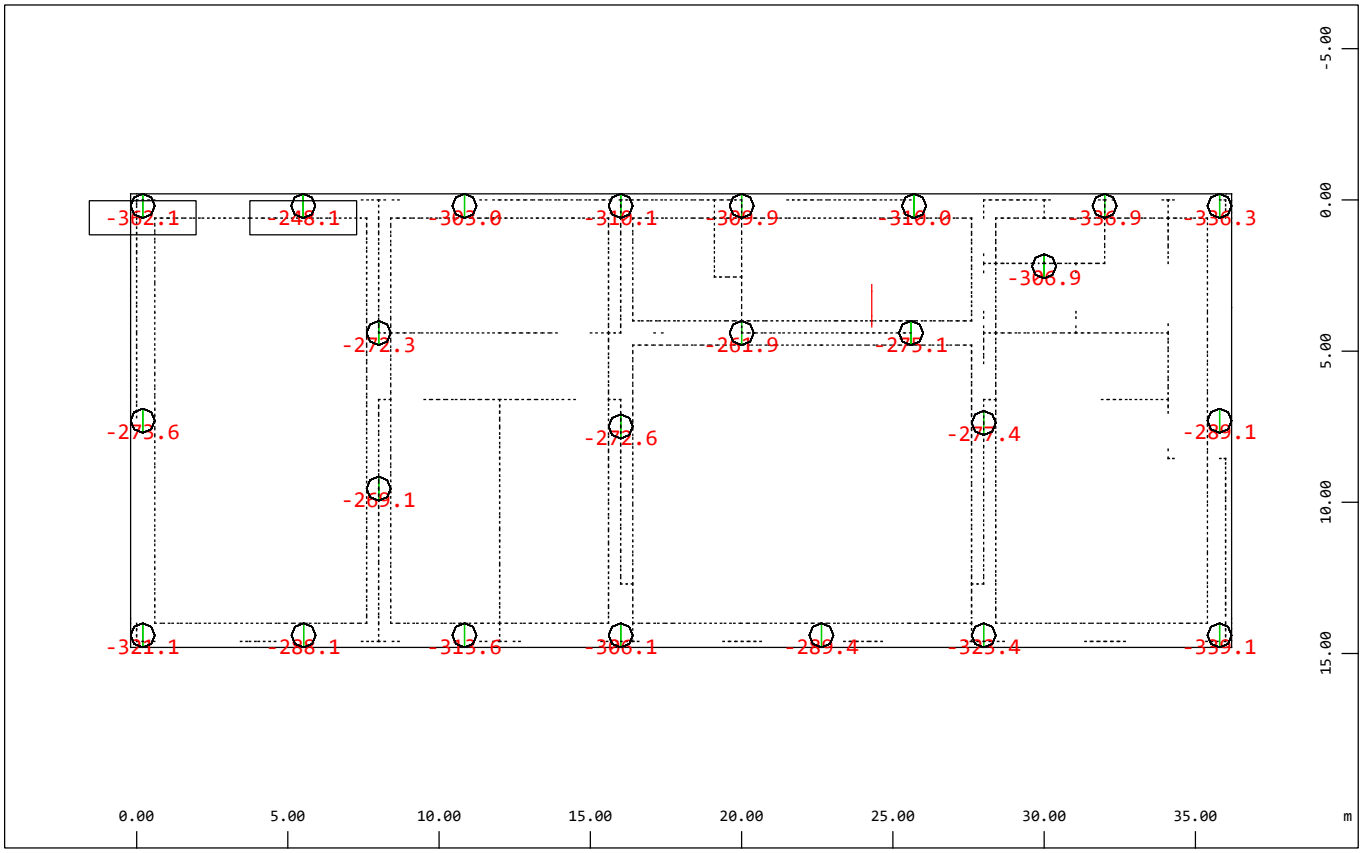

Sector of system Group 100 101 M 1 : 250
Beam Elements , Normal force Nx in kN, Loadcase 8022 MIN-N BEAM (Min=-429.2)
(Max=-327.4)



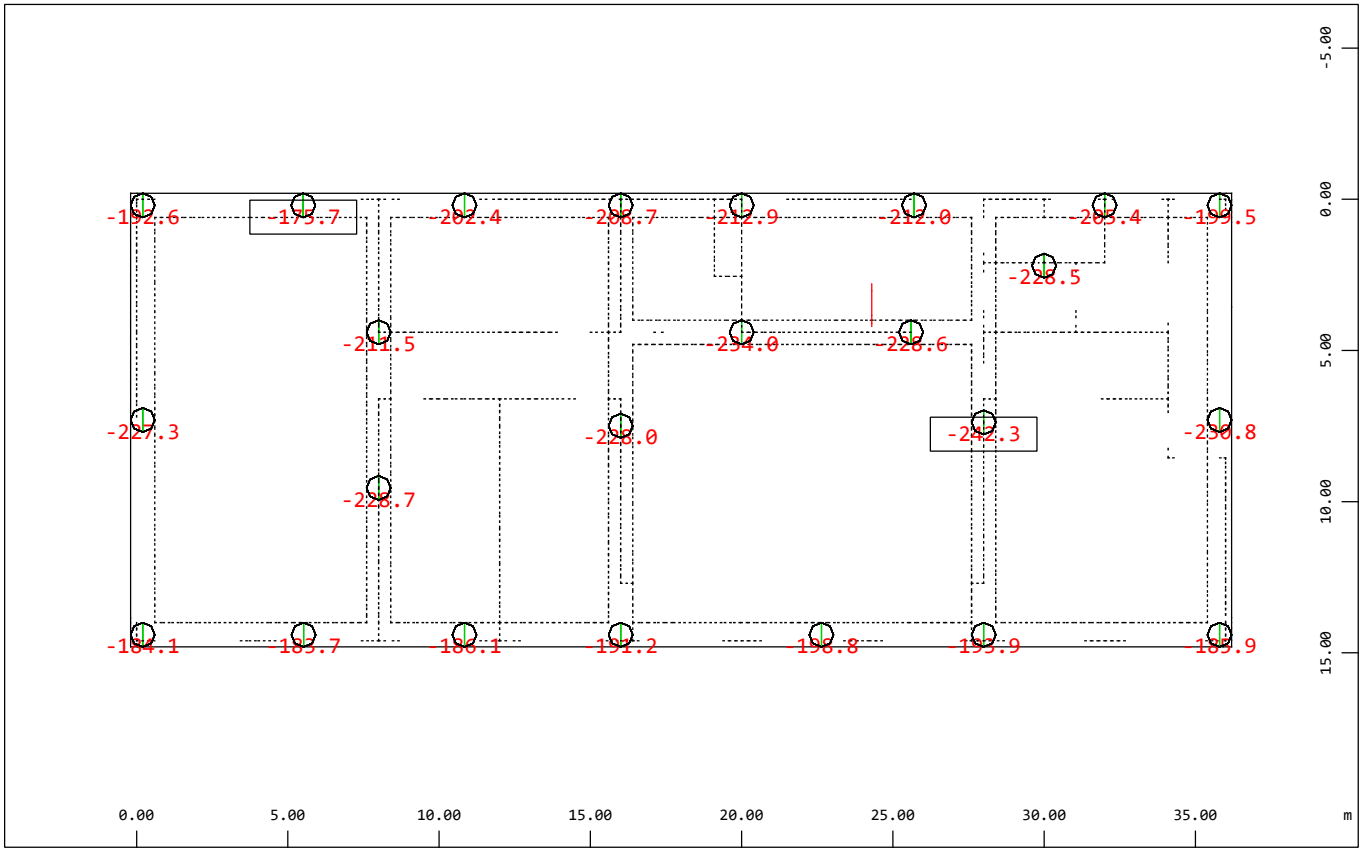

Sector of system Group 100 101 M 1 : 250
Beam Elements , Normal force Nx in kN, Loadcase 8021 MAX-N BEAM (Min=-265.4)
(Max=-202.6)

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj. sil na vodnjakih pod plosco: MSN-potres



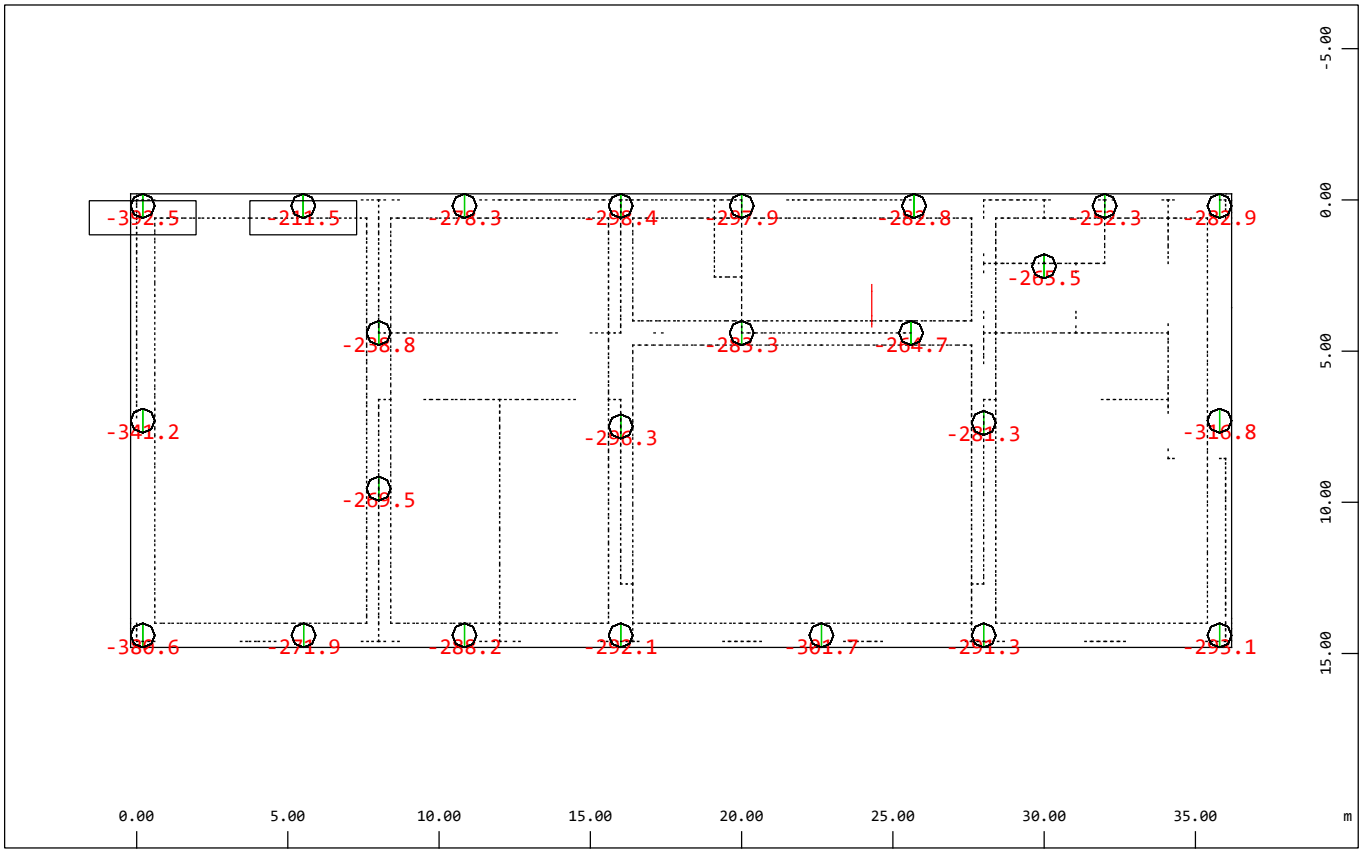

Sector of system Group 100 101 M 1 : 250
Beam Elements , Normal force Nx in kN, Loadcase 8222 MINE-N BEAM (Min=-362.1)
(Max=-248.1)



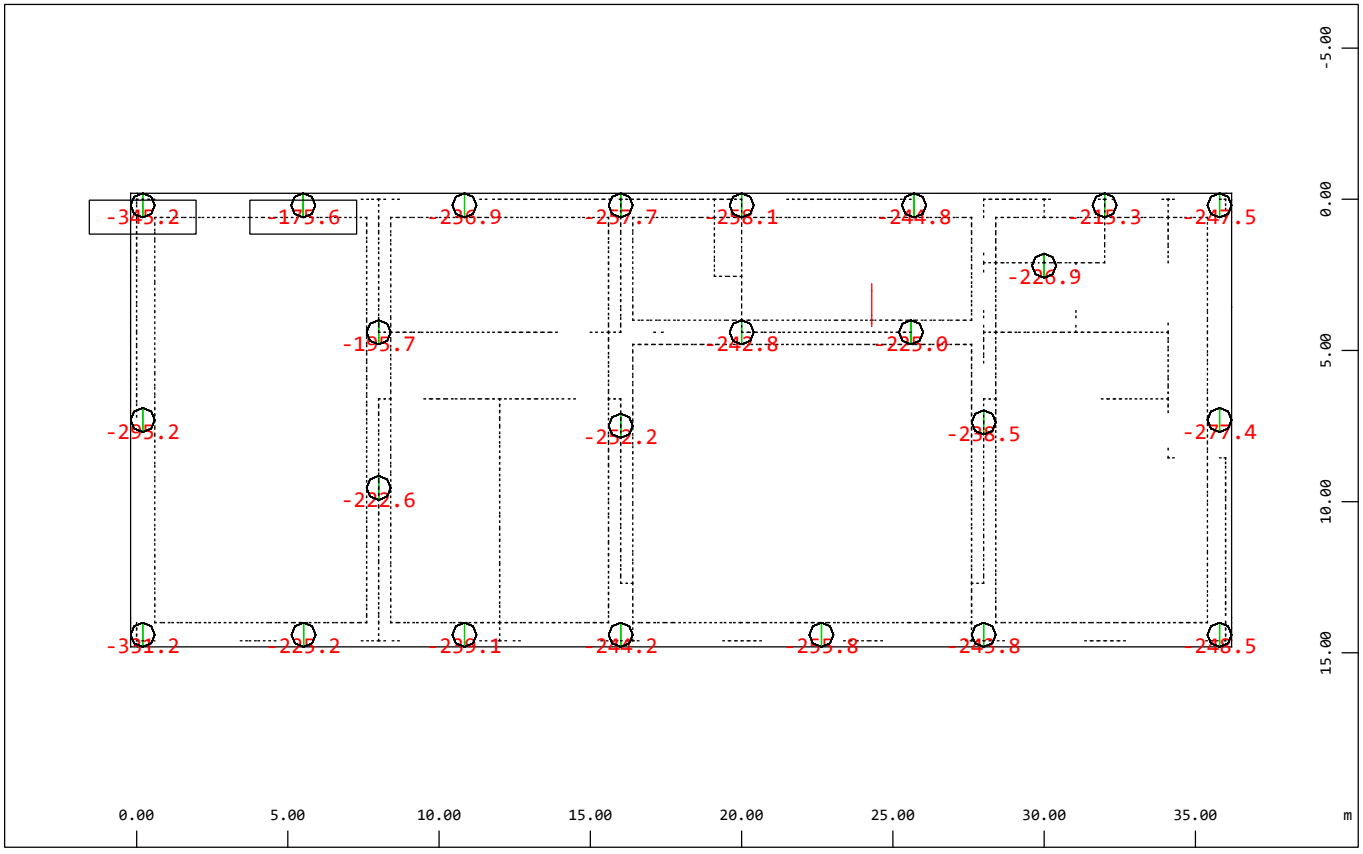

Sector of system Group 100 101 M 1 : 250
Beam Elements , Normal force Nx in kN, Loadcase 8221 MAXE-N BEAM (Min=-242.3)
(Max=-175.7)

SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj. sil na vodnjakih pod plosco: MSU-rare (nefaktorirano)



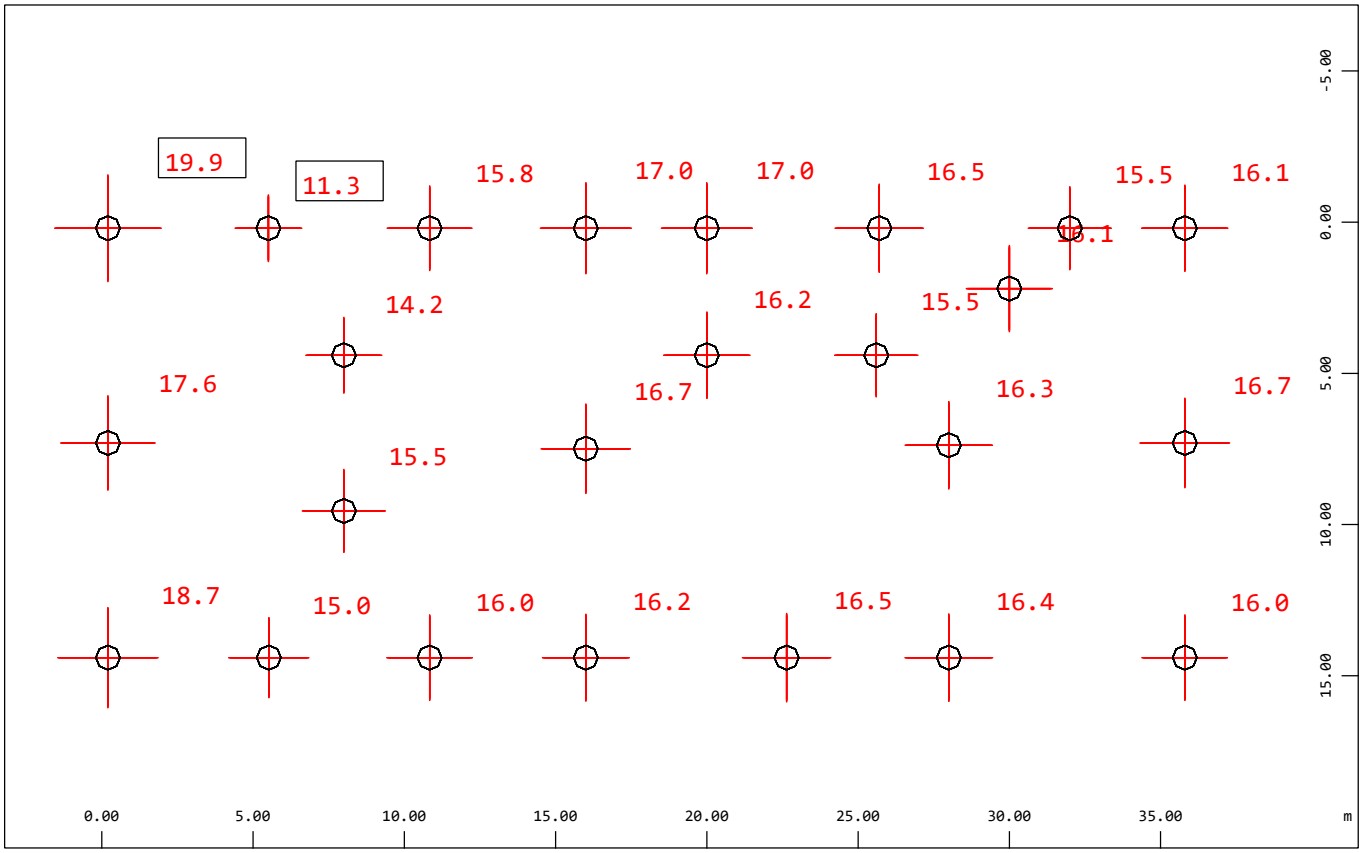

Sector of system Group 100 101 M 1 : 250
Beam Elements , Normal force Nx in kN, Loadcase 9022 MINR-N BEAM (Min=-392.5)
(Max=-211.5)



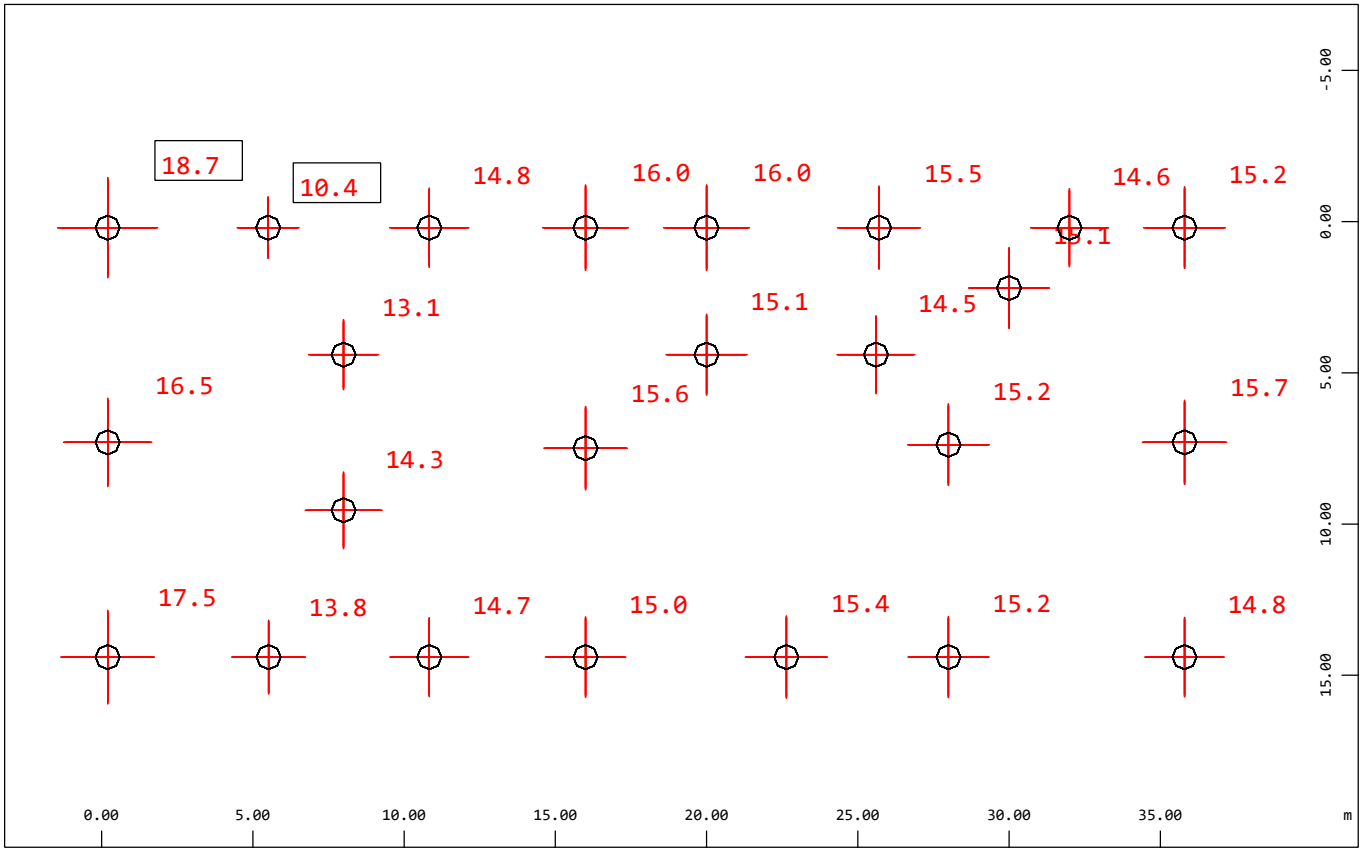

Sector of system Group 100 101 M 1 : 250
Beam Elements , Normal force Nx in kN, Loadcase 9021 MAXR-N BEAM (Min=-345.2)
(Max=-175.6)

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj. pomikov pod vodnjaki: MSU-rare (nefaktorirano)



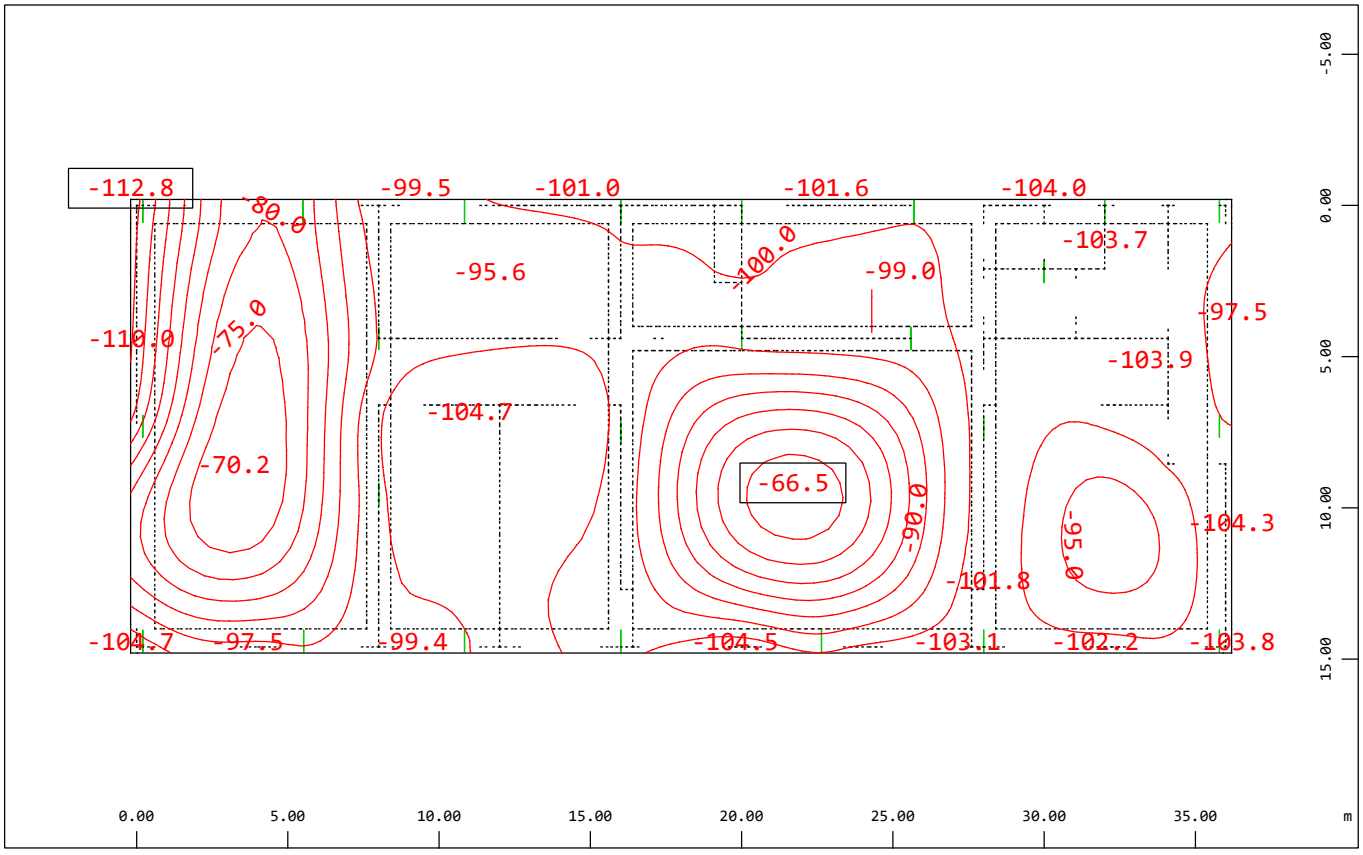

Sector of system Group 101
Nodal displacement in global Z, Loadcase 9076 MINR-UZ NODE , 1 cm 3D = 10.0 mm
(Min=-19.9) (Max=-11.3)
M 1 : 250



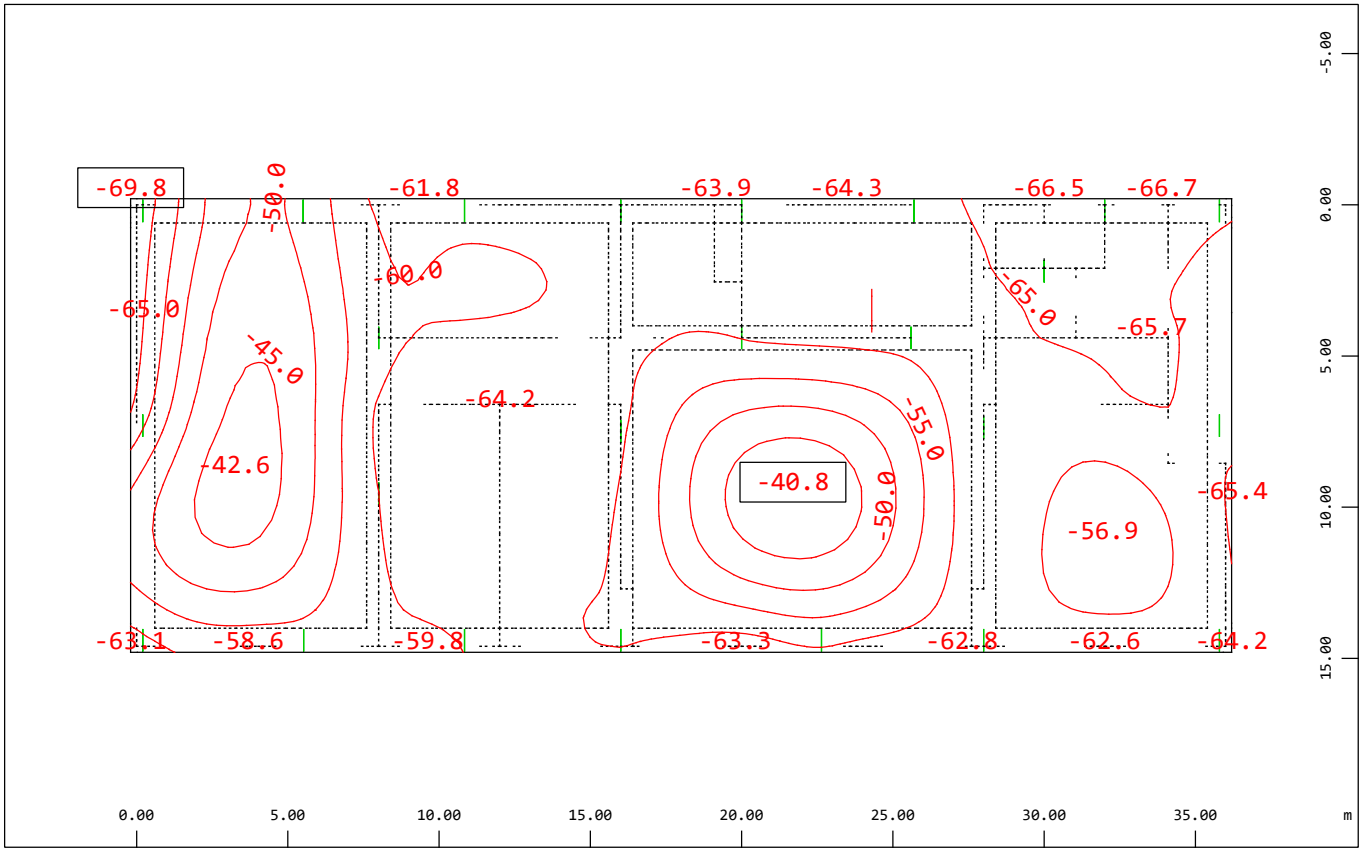

Sector of system Group 101
Nodal displacement in global Z, Loadcase 9075 MAXR-UZ NODE , 1 cm 3D = 10.0 mm
(Min=-18.7) (Max=-10.4)
M 1 : 250

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj. napetosti v tem. tleh pod plosco: MSN (faktorirano)



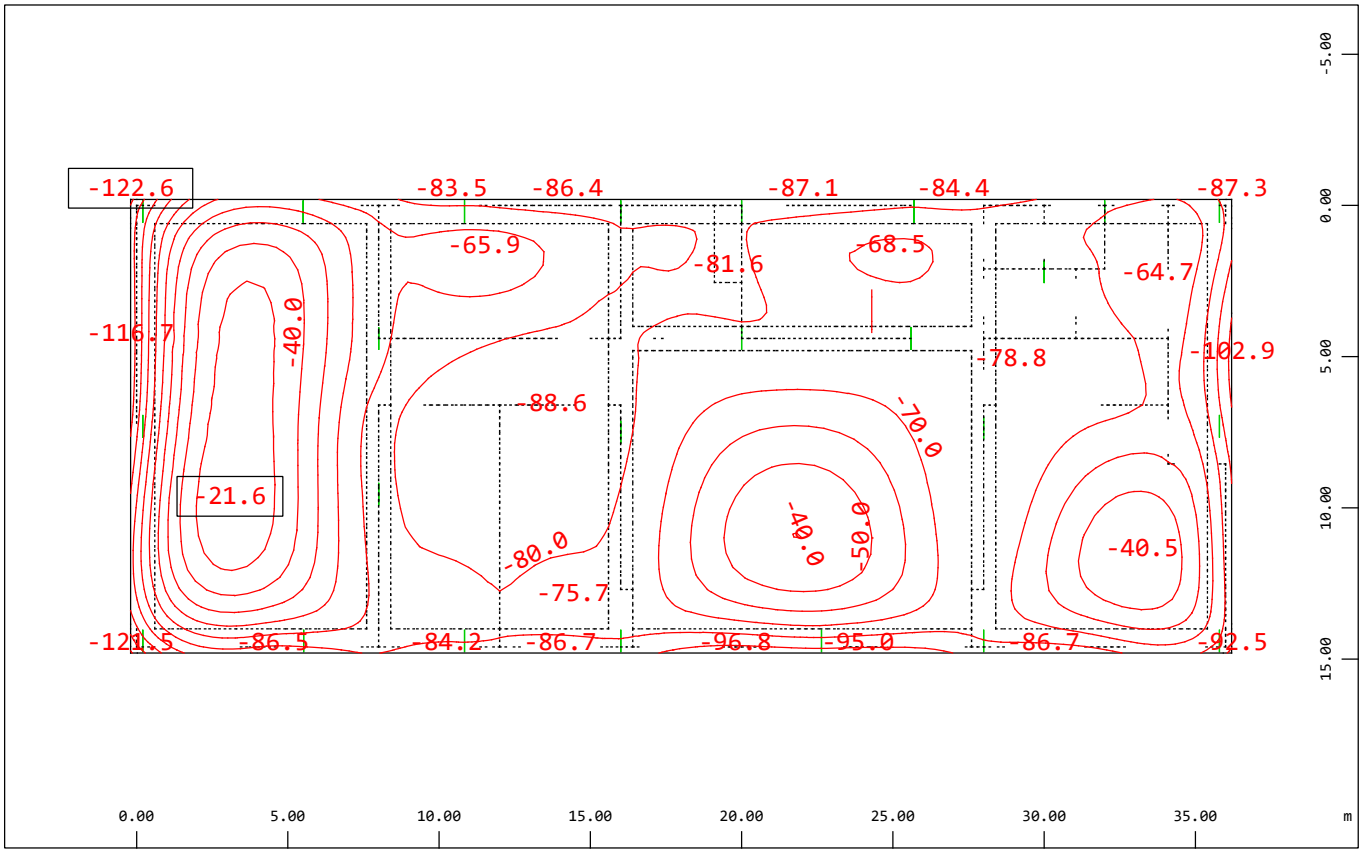

Sector of system Group 100 101 M 1 : 250
Bedding stress in Node ◯, Loadcase 8018 MIN-P QUAD , from -112.8 to -66.5 step 5.00 kN/m2



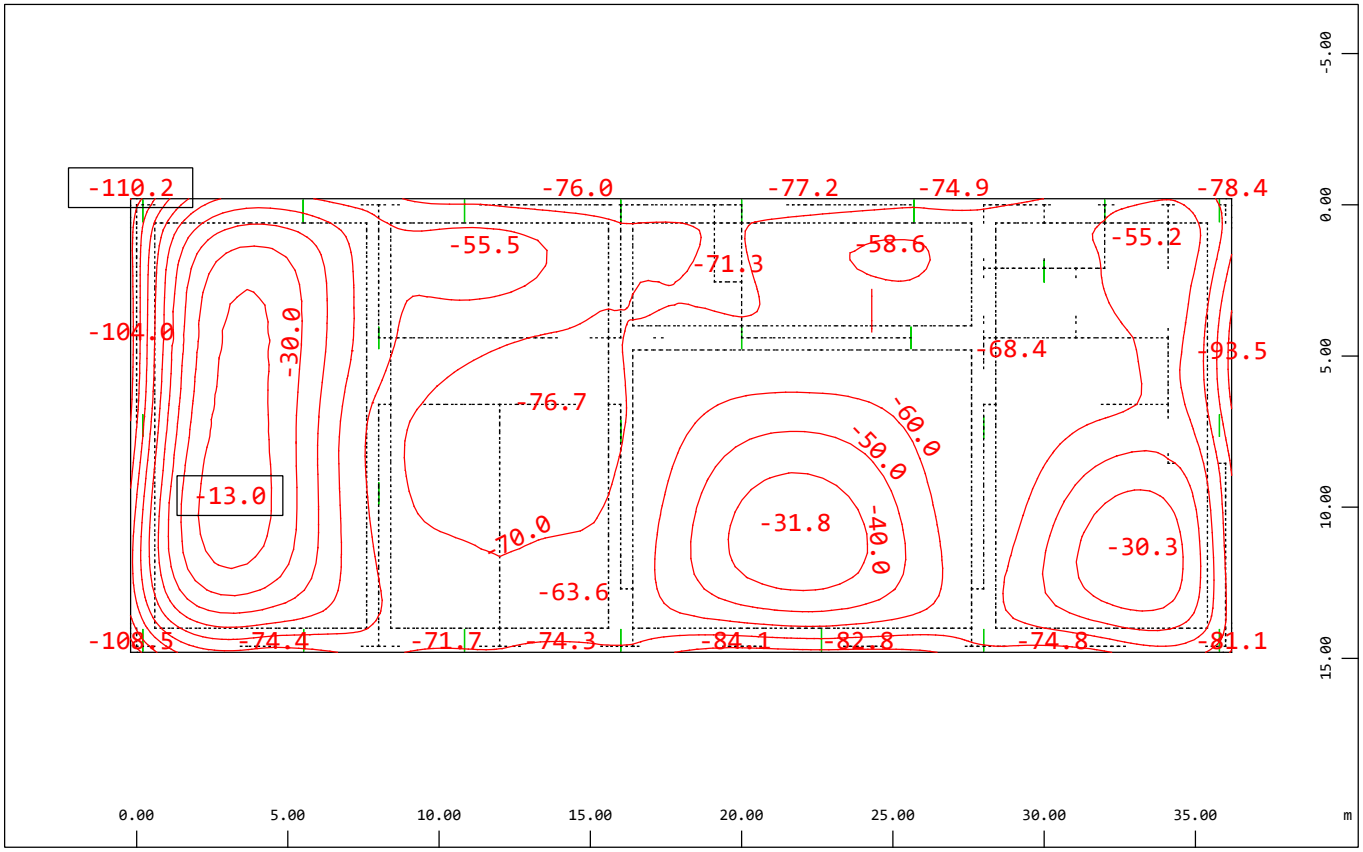

Sector of system Group 100 101 M 1 : 250
Bedding stress in Node ◯, Loadcase 8017 MAX-P QUAD , from -69.8 to -40.8 step 5.00 kN/m2

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj. napetosti v tem. tleh pod plosco: MSU-rare (nefaktorirano)



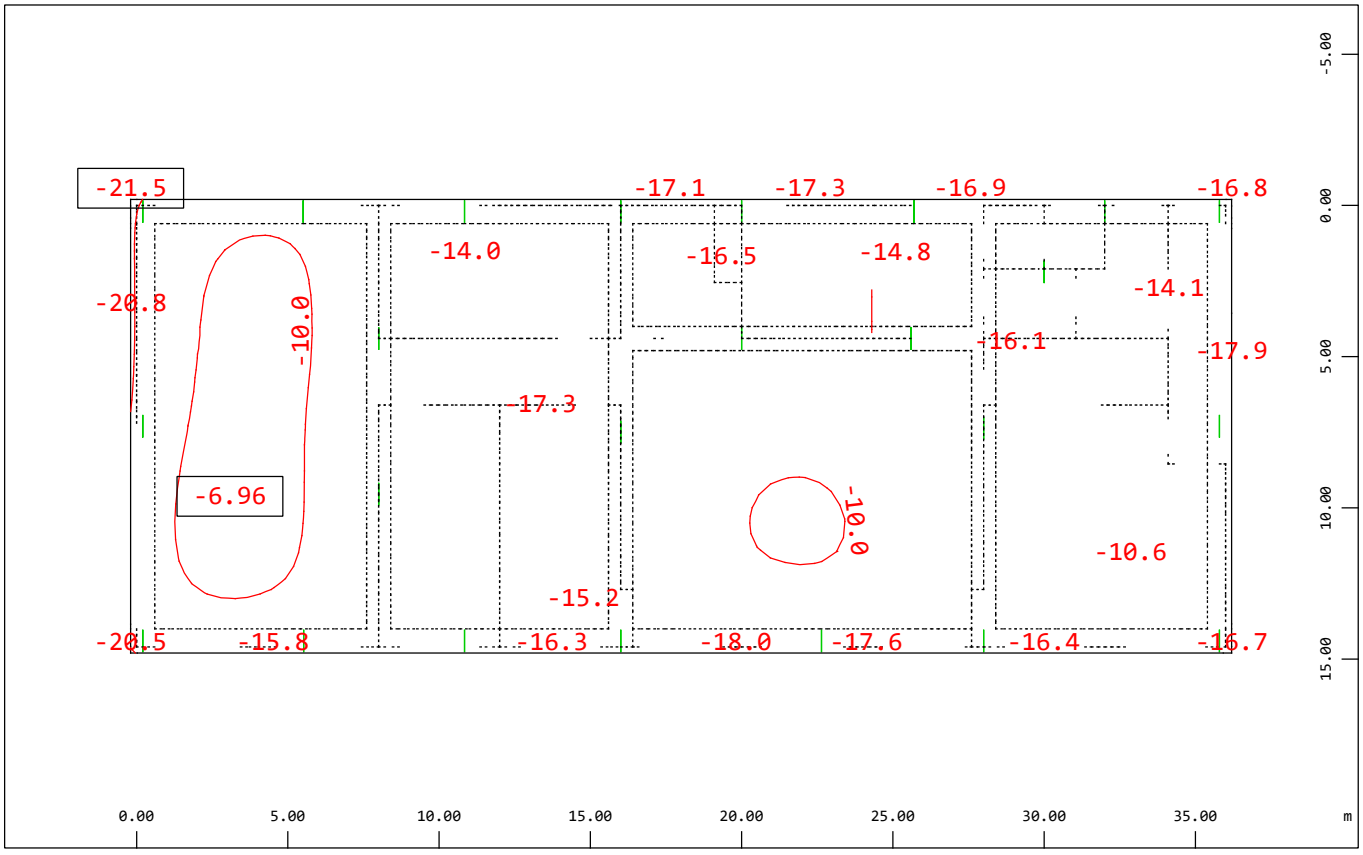

Sector of system Group 100 101 M 1 : 250
Bedding stress in Node ○, Loadcase 9018 MINR-P QUAD , from -122.6 to -21.6 step 10.0
kN/m2



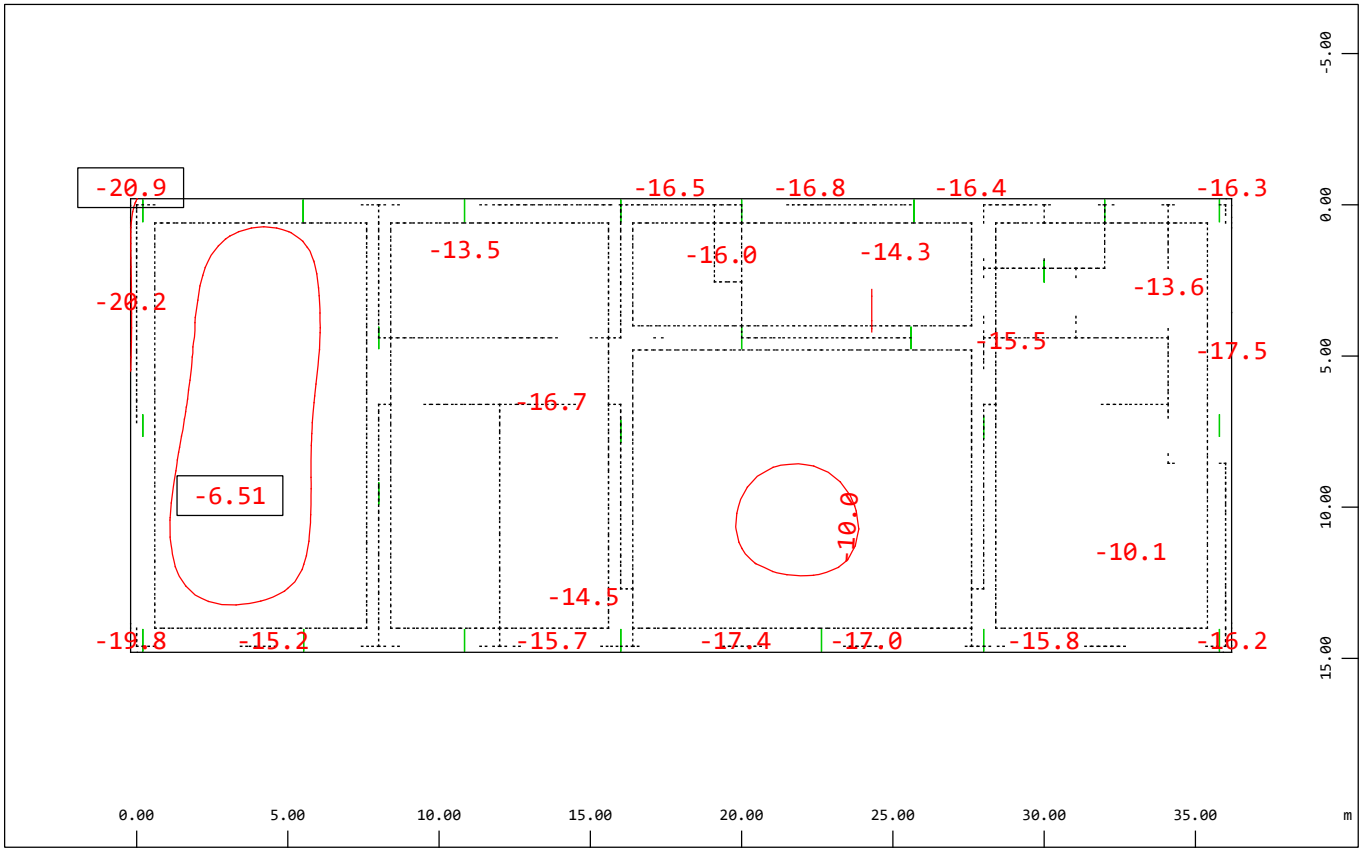

Sector of system Group 100 101 M 1 : 250
Bedding stress in Node ○, Loadcase 9017 MAXR-P QUAD , from -110.2 to -13.0 step 10.0
kN/m2

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11826 DSO Bovec - vzhodna dilat. enota stavbe
Ovoj. pomikov v tem. tleh pod plosco: MSU-rare (nefaktorirano)




Sector of system Group 100 101 M 1 : 250
Nodal displacement in global Z in Node , Loadcase 9276 MINP-UZ NODE , from -21.5 to
-6.96 step 10.0 mm



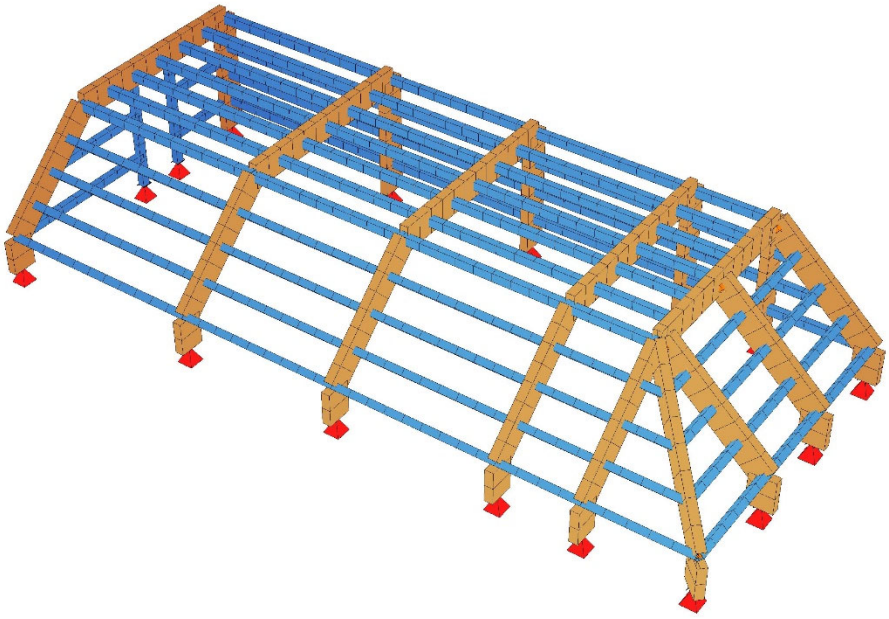

Sector of system Group 100 101 M 1 : 250
Nodal displacement in global Z in Node , Loadcase 9275 MAXP-UZ NODE , from -20.9 to
-6.51 step 10.0 mm

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## 2.5 LESENI NADSTREŠEK TEHNIČNE ETAŽE

### 2.5.1 Predpostavke lokalnega računskega modela

Statična analiza konstrukcije lesenega nadstreška tehnične etaže je bila izvedena s pomočjo prostorskega računskega modela iz linijskih končnih elementov v programu *SOFiSTiK FEM ver.2018*. Konstrukcijski nosilni sistem so glavni ravninski leseni okviri povezami s sekundarnimi nosilci med seboj. Opravljena je bila analiza po teoriji prvega reda. Poleg osnovne statične analize za normalna stanja je bila izvedena tudi dodatna statična analiza v primeru požara R30, kjer smo zmanjšali prečne prereze lesenih nosilcev z vseh strani za 20 mm (zogleneli del lesa) in upoštevali obtežno kombinacijo za stalne vplive brez dodatnega faktorja za obtežbo (1.0), saj gre za pri požaru za obtežno kombinacijo v primeru izrednega dogodka (angl. *»accidental combination«*). V računskem modelu ni bilo upoštevano dodatno portalno zavetrovanje s pomočjo diagonalnih palic premera Ø16mm v predzadnjem polju (razpon 3,8 m), ki ga je potrebno izvesti. Diagonale se namesti na poševnem in ravnem delu strehe ter na vertikalni fasadi tega polja.



*Slika 70: Lokalni računski model lesenega nadstreška tehnične etaže v SOFiSTiKu*

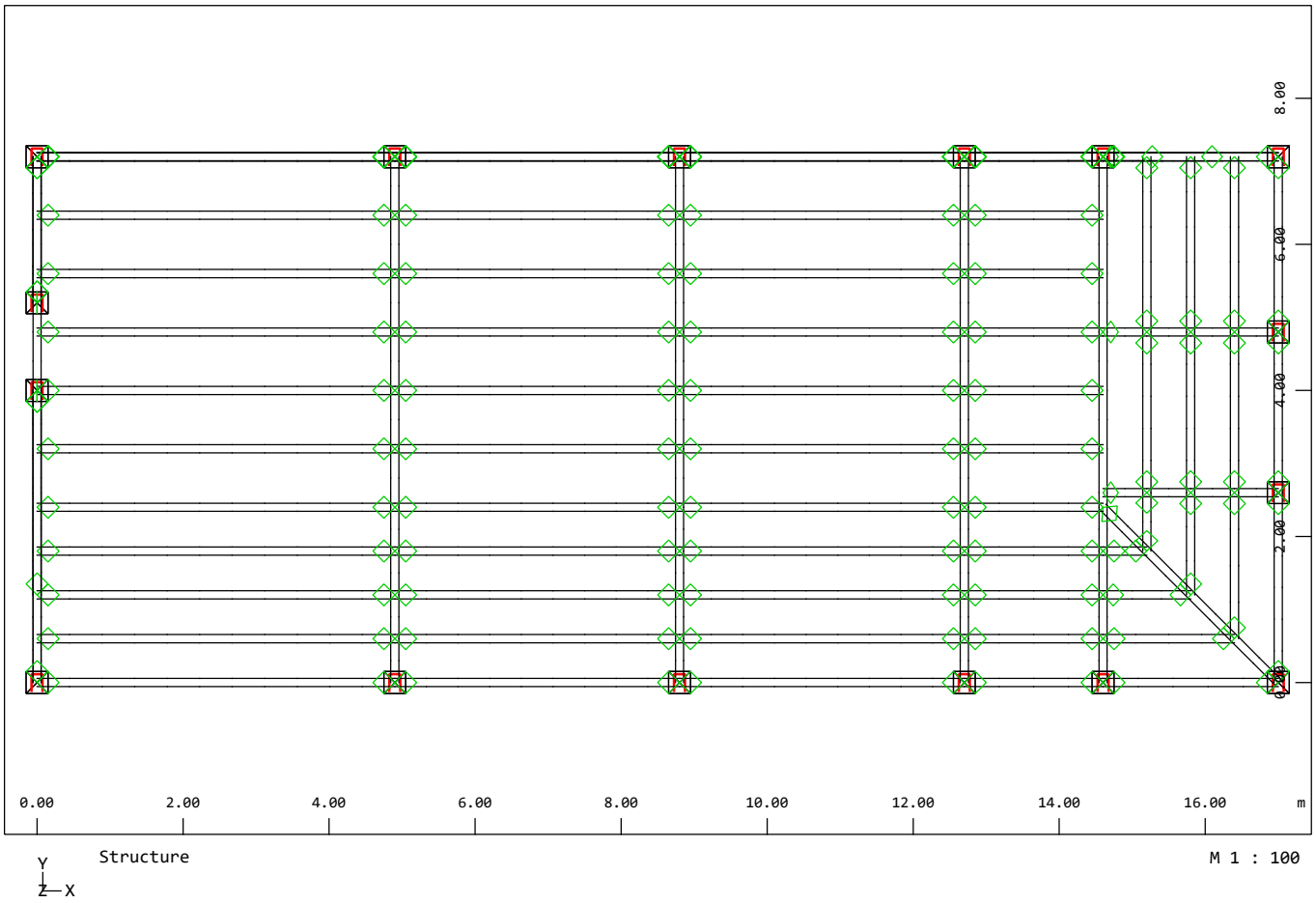
Dimenzioniranje lesenih elementov je bilo izvedeno s pomočjo programa SOFiSTiK za mejno stanje nosilnosti (MSN). Rezultati so priloženi v nadaljevanju.

### 2.5.2 Izpisi rezultatov lokalnega rač. modela v programu SOFiSTiK

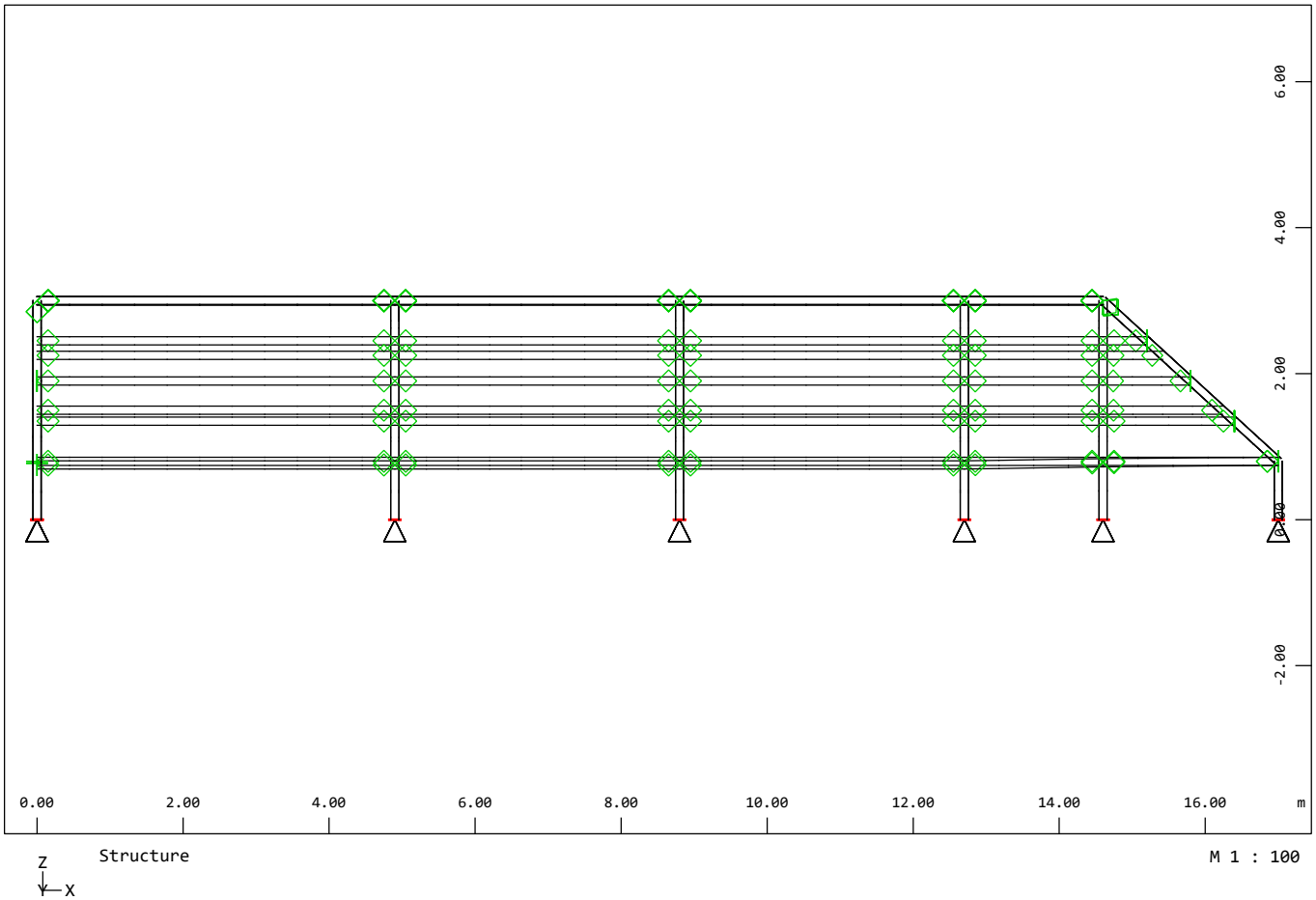
V nadaljevanju so prikazani izpisi iz računalniškega programa SOFiSTiK:

- Osnovna statična analiza za normalna stanja (*38 strani*)
- Dodatna statična analiza za požar R30 (*20 strani*)

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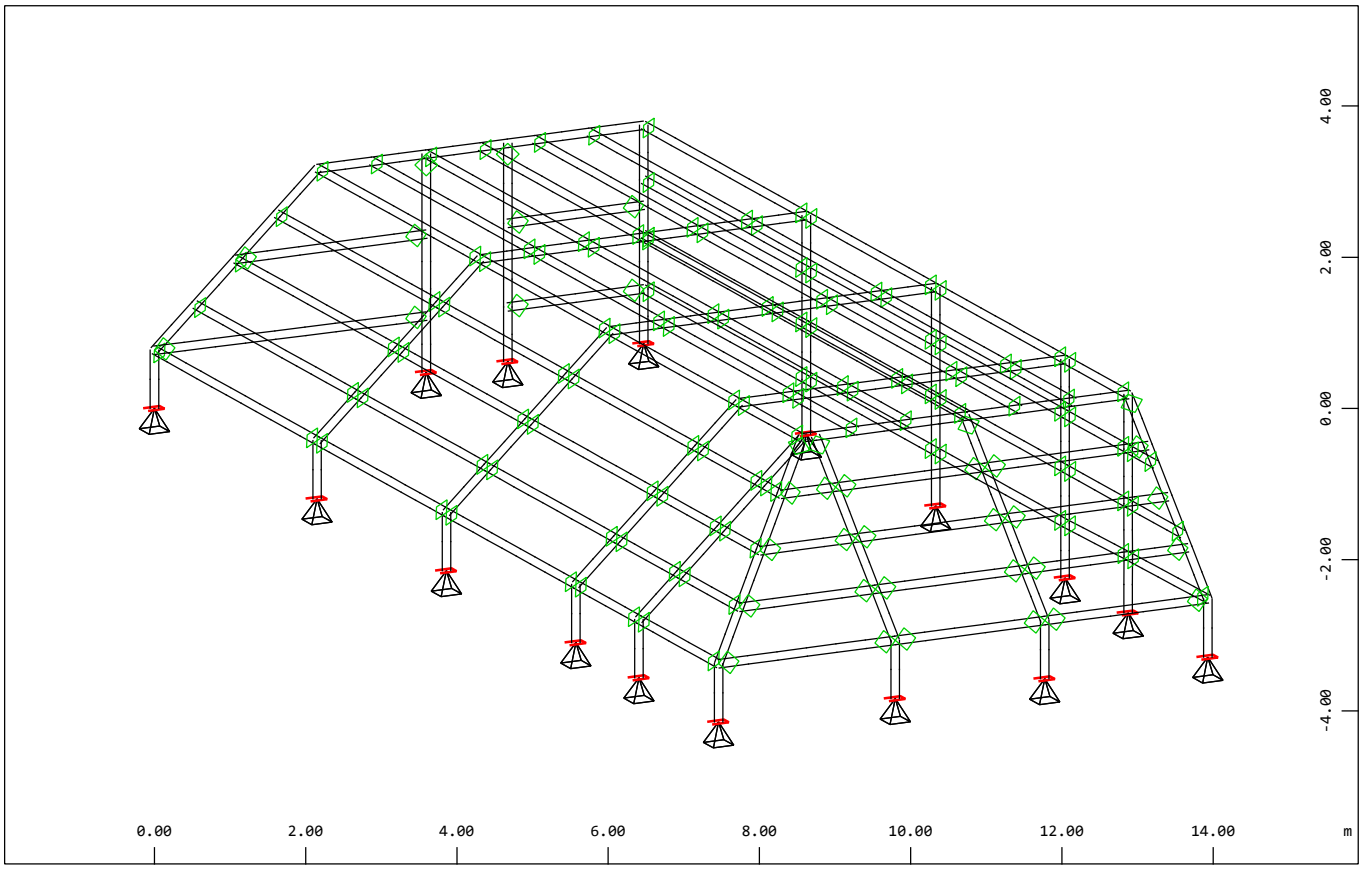

Structure M 1 : 100

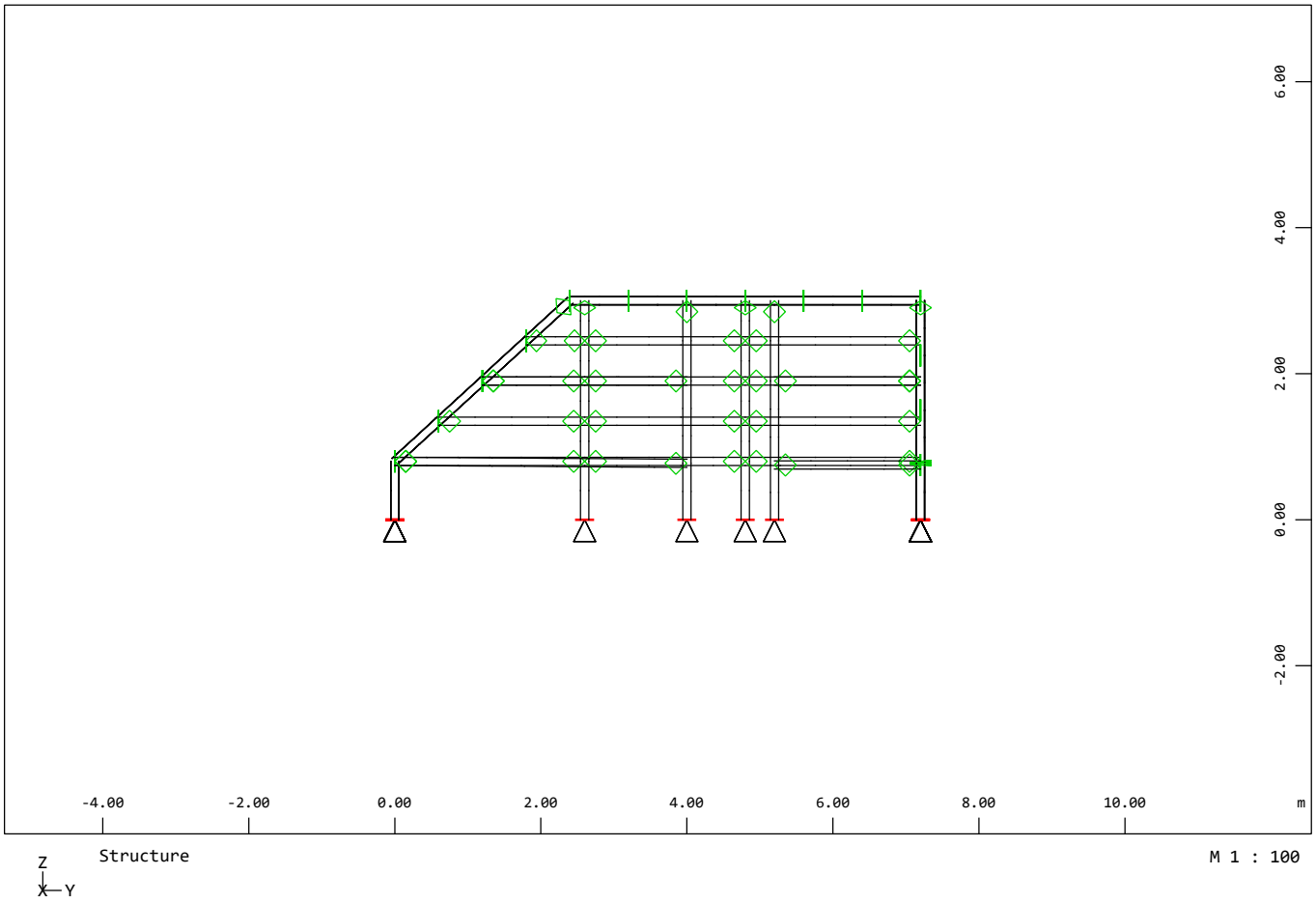



Structure M 1 : 100

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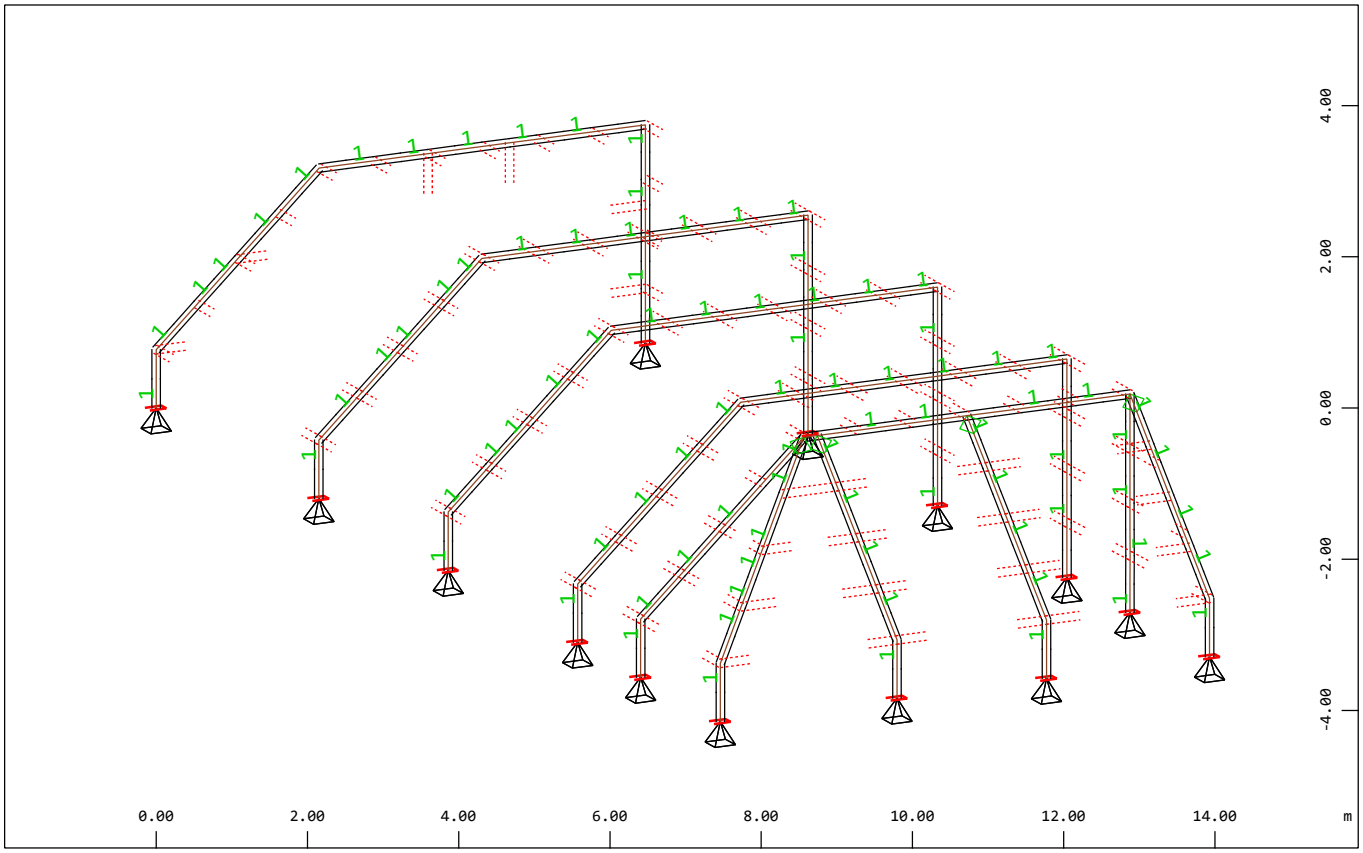
11826 DSO Bovec - nadstresek tehnicne etaze



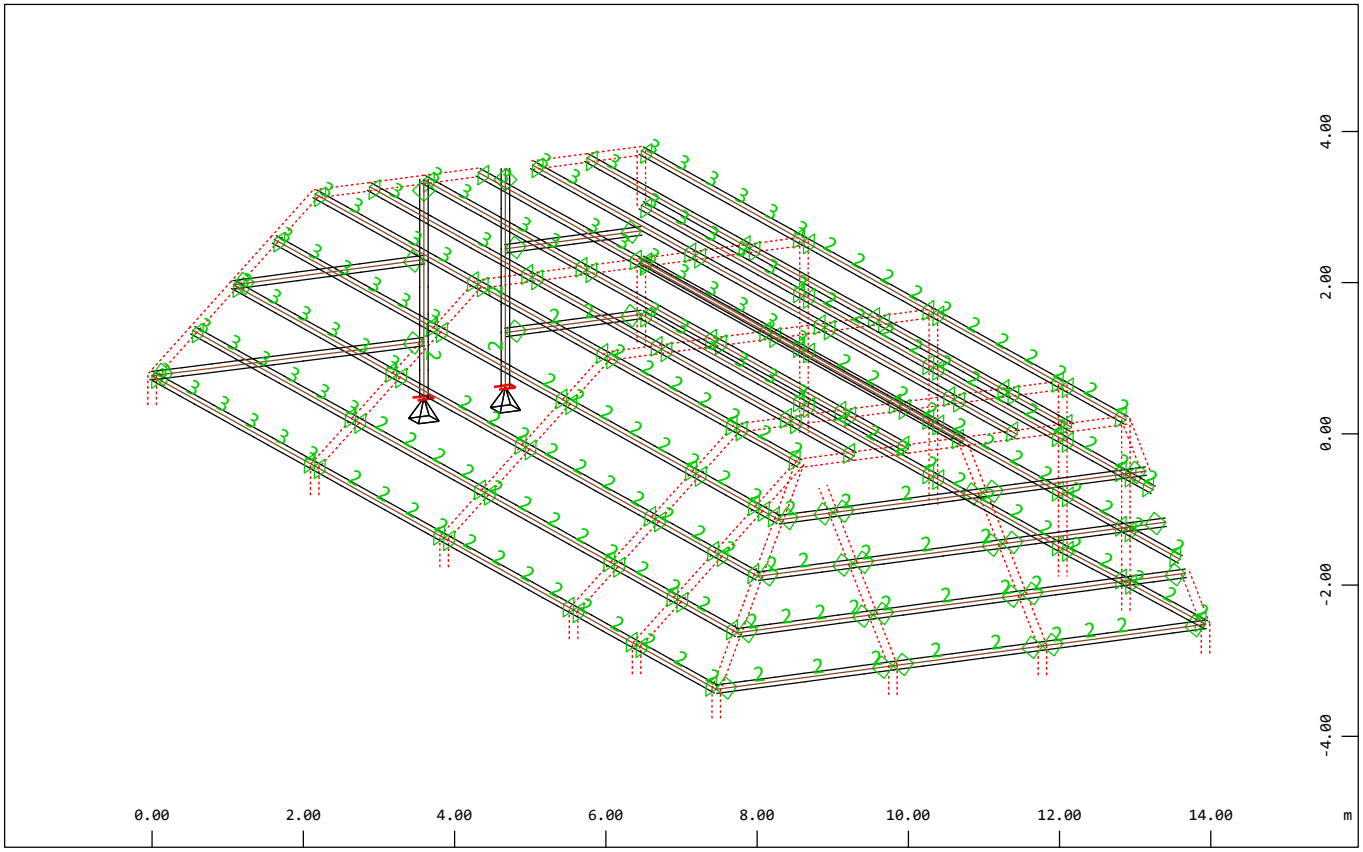

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Precni prerezi: glavni in sekundarni nosilci




Z
Y
X
Sector of system Beam Elements Group 1 2
Beam Elements , Numbers of cross section (Max=1)

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962

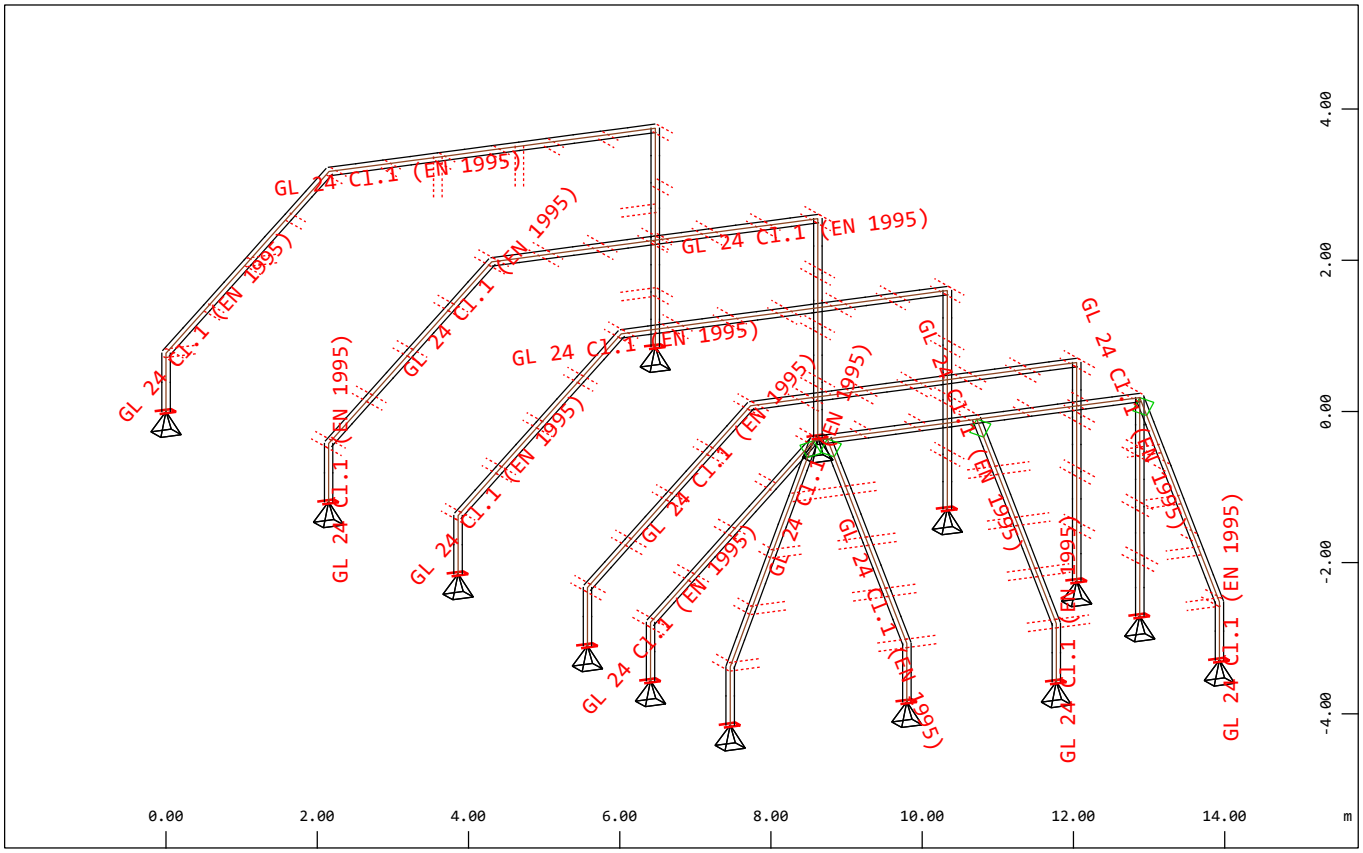



Z
Y
X
Sector of system Beam Elements Group 11...13
Beam Elements , Numbers of cross section (Max=3)

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962

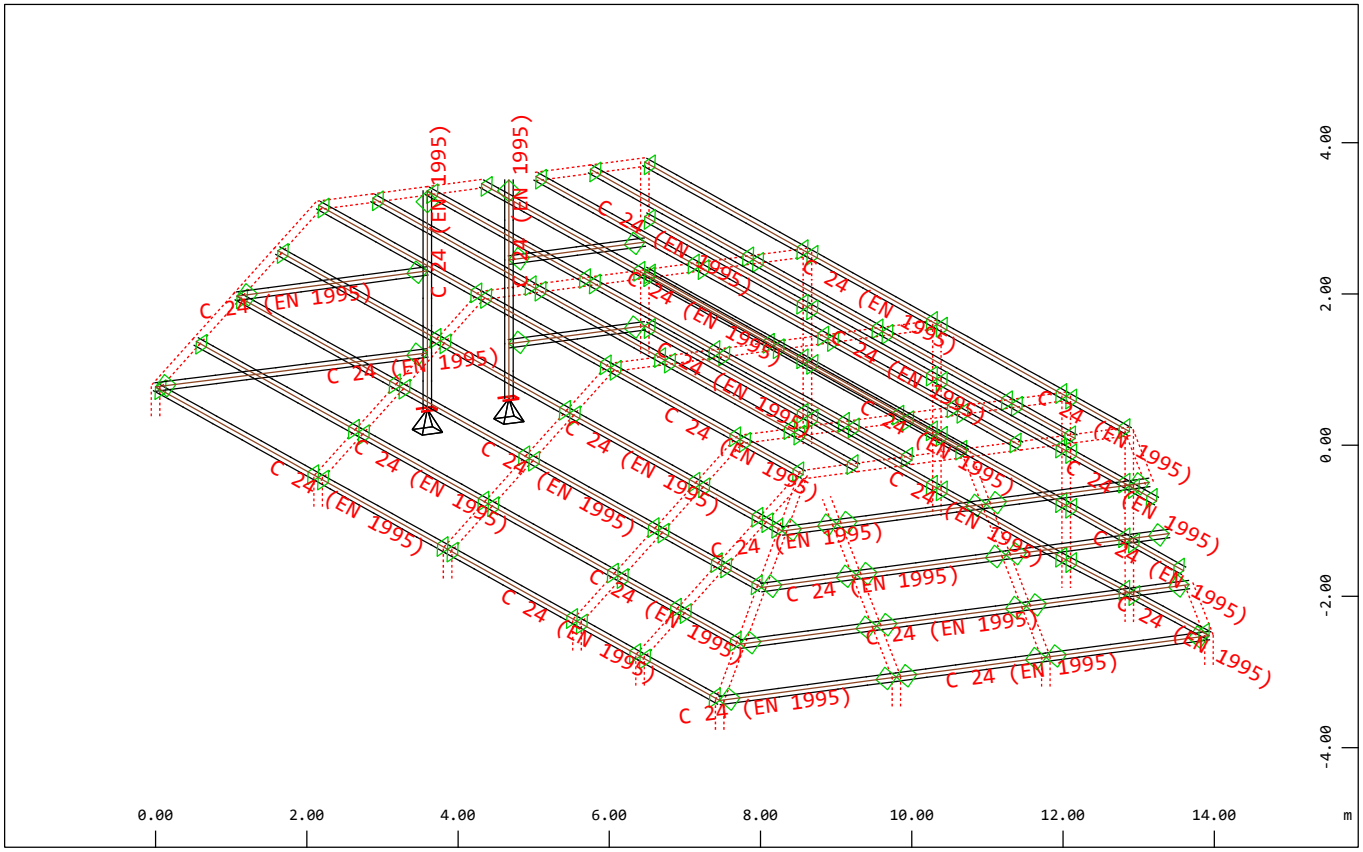
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11826 DSO Bovec - nadstresek tehnicne etaze
Materiali: glavni in sekundarni nosilci




Z
Y
X
Sector of system Beam Elements Group 1 2
Material designations, Beam Elements

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962

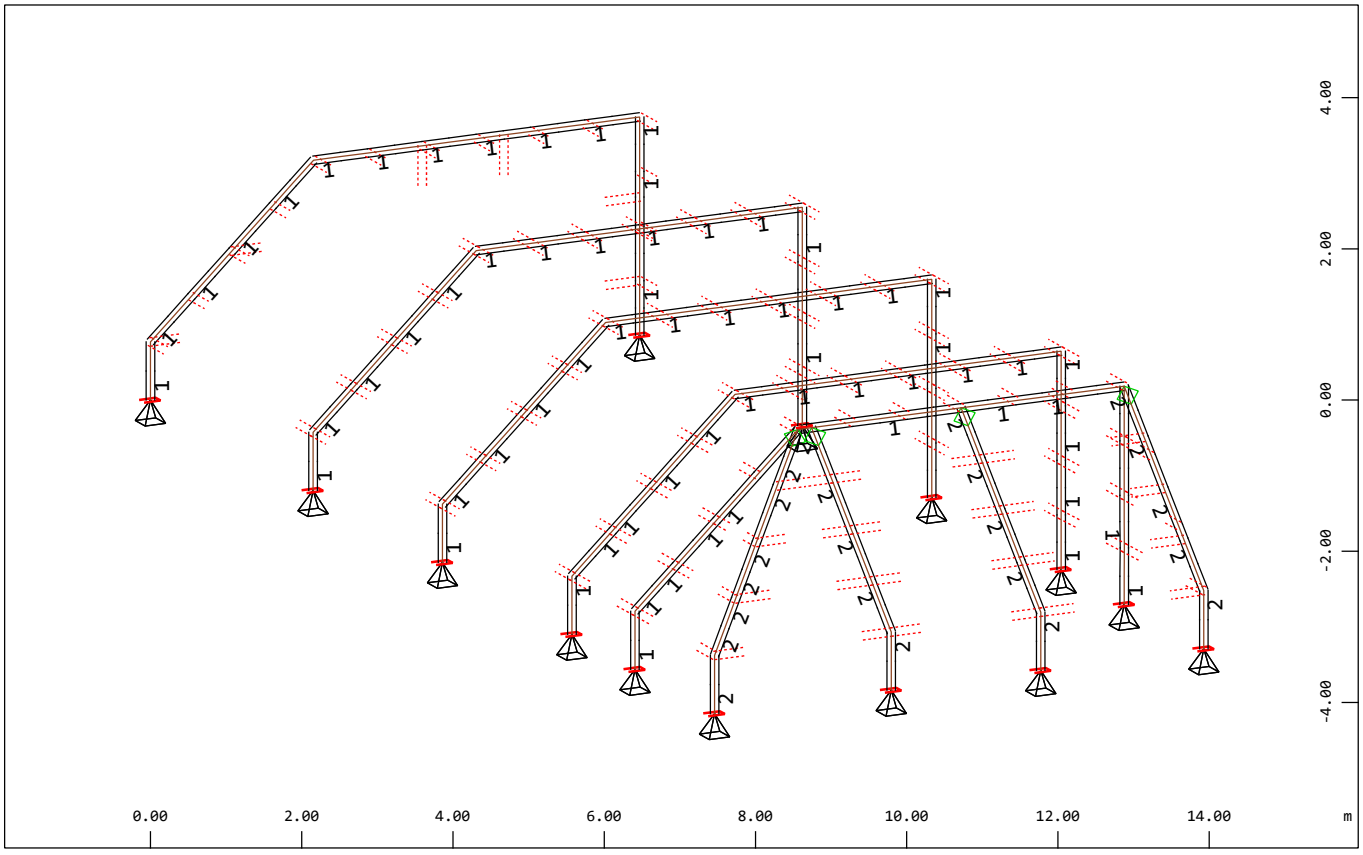



Z
Y
X
Sector of system Beam Elements Group 11...13
Material designations, Beam Elements

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962

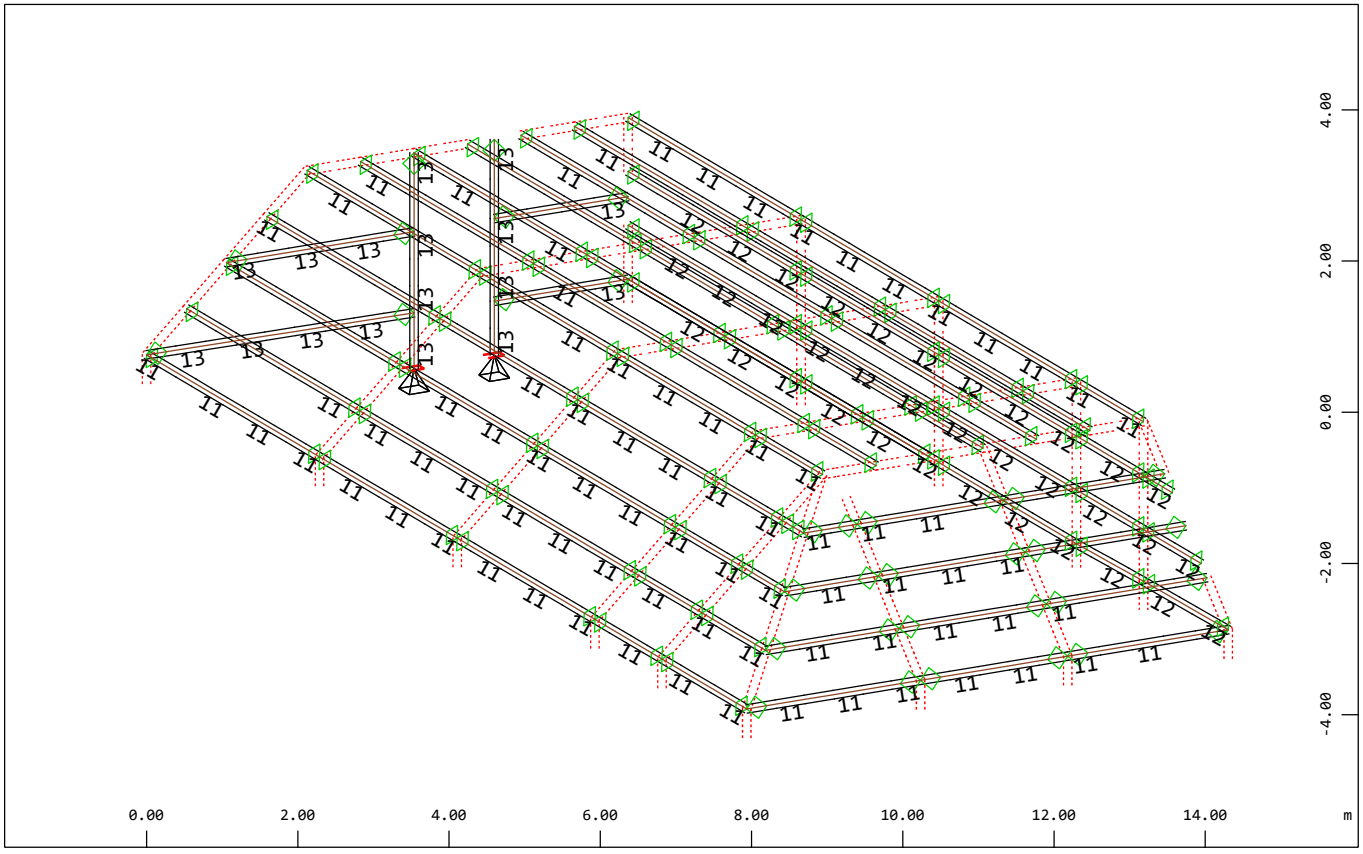
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11826 DSO Bovec - nadstresek tehnicne etaze
Grupe: glavni in sekundarni nosilci




Z
Y
X
Sector of system Beam Elements Group 1 2
Beam Elements , Number of group (Max=2)

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X
Sector of system Beam Elements Group 11...13
Beam Elements , Number of group (Max=13)

M 1 : 100
X * 0.542
Y * 0.896
Z * 0.950

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Materials

Default design code is EuroNorm EN 1995-1-1:2004 Timber Structures (Europe) V 2018
Serviceclass: 2
Snow load zone : 1

**Materials**

| Mat | Classification |
|---|---|
| 1 | C 24 (EN 1995) |
| 2 | GL 24 Cl.1 (EN 1995) |

**Mat 1 C 24 (EN 1995)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Young's modulus | E | 11000 | [N/mm2] | Safetyfactor | | 1.30 | [-] |
| Poisson's ratio | μ | 0.00 | [-] | Bending strength | fm,0 | 24.00 | [MPa] |
| Shear modulus | G | 690 | [N/mm2] | Bending strength | fm,90 | 24.00 | [MPa] |
| Compression modulus | K | 123 | [N/mm2] | Tensile strength | ft,0 | 14.50 | [MPa] |
| Nominal Weight | γ | 4.2 | [kN/m3] | Tensile strength | ft,90 | 0.40 | [MPa] |
| Mean density | ρ | 350.0 | [kg/m3] | Compress. strength | fc,0 | 21.00 | [MPa] |
| Elongation coefficient | α | 0.00E+00 | [1/K] | Compress. strength | fc,90 | 2.50 | [MPa] |
| Young's modulus | E-90 | 370 | [N/mm2] | Shear strength | fv | 2.67 | [MPa] |
| Shear modulus | G-90 | 690 | [N/mm2] | Shear strength | fv,T | 4.00 | [MPa] |
| Deformation coefficient | kdef | 0.80 | [-] | Shear strength | fv,pl | 2.67 | [MPa] |
| Permanent combination | kmod | 0.60 | [-] | | | | |
| Long term combination | | 0.70 | [-] | | | | |
| Middle term combination | | 0.80 | [-] | | | | |
| Short term combination | | 0.90 | [-] | | | | |
| Very short term combination | | 1.10 | [-] | | | | |

| Stress-Strain for ultimate load | ε[o/oo] | σ-u[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 1.318 | 14.50 | 11000 |
| stress range | 0.000 | 0.00 | 11000 |
| | -1.909 | -21.00 | 0 |
| | -1000.000 | -21.00 | 0 |
| | Safetyfactor | | 1.30 |

**Mat 2 GL 24 Cl.1 (EN 1995)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Young's modulus | E | 11500 | [N/mm2] | Safetyfactor | | 1.25 | [-] |
| Poisson's ratio | μ | 0.00 | [-] | Bending strength | fm,0 | 24.00 | [MPa] |
| Shear modulus | G | 650 | [N/mm2] | Bending strength | fm,90 | 24.00 | [MPa] |
| Compression modulus | K | 100 | [N/mm2] | Tensile strength | ft,0 | 19.20 | [MPa] |
| Nominal Weight | γ | 4.2 | [kN/m3] | Tensile strength | ft,90 | 0.50 | [MPa] |
| Mean density | ρ | 385.0 | [kg/m3] | Compress. strength | fc,0 | 24.00 | [MPa] |
| Elongation coefficient | α | 0.00E+00 | [1/K] | Compress. strength | fc,90 | 2.50 | [MPa] |
| Young's modulus | E-90 | 300 | [N/mm2] | Shear strength | fv | 2.33 | [MPa] |
| Shear modulus | G-90 | 650 | [N/mm2] | Shear strength | fv,T | 3.50 | [MPa] |
| Deformation coefficient | kdef | 0.60 | [-] | Shear strength | fv,pl | 2.33 | [MPa] |
| Permanent combination | kmod | 0.60 | [-] | | | | |
| Long term combination | | 0.70 | [-] | | | | |
| Middle term combination | | 0.80 | [-] | | | | |
| Short term combination | | 0.90 | [-] | | | | |
| Very short term combination | | 1.10 | [-] | | | | |

| Stress-Strain for ultimate load | ε[o/oo] | σ-u[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 1.670 | 19.20 | 11500 |
| stress range | 0.000 | 0.00 | 11500 |
| | -2.087 | -24.00 | 0 |
| | -1000.000 | -24.00 | 0 |
| | Safetyfactor | | 1.25 |

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Sections

Default design code is EuroNorm EN 1995-1-1:2004 Timber Structures (Europe) V 2018
Serviceclass: 2
Snow load zone : 1

**Materials**

| Mat | Classification |
|---|---|
| 1 | C 24 (EN 1995) |
| 2 | GL 24 Cl.1 (EN 1995) |

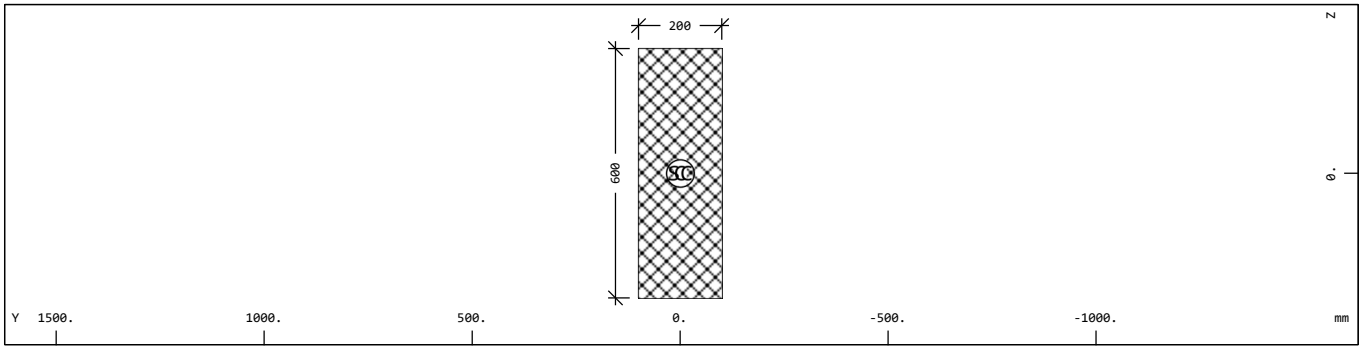
**Cross-sections static properties**

| SNo | Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|---|
| | MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 1 | 2 | 1.2000E-01 | 1.000E-01 | 3.600E-03 | 0.0 | 0.0 | 11500 | 50.4 | |
| | | 1.264E-03 | 1.000E-01 | 4.000E-04 | 0.0 | 0.0 | 650 | (CENTR) | |
| | = GLAVNI NOSILEC 60/20 cm | | | | | | | | |
| | = GLAVNI NOSILEC 60/20 cm | | | | | | | | |
| 2 | 1 | 3.2000E-02 | 2.667E-02 | 1.067E-04 | 0.0 | 0.0 | 11000 | 13.4 | |
| | | 1.407E-04 | 2.667E-02 | 6.827E-05 | 0.0 | 0.0 | 690 | (CENTR) | |
| | = SEKUNDARNI NOSILEC 20/16 cm | | | | | | | | |
| | = SEKUNDARNI NOSILEC 20/16 cm | | | | | | | | |
| 3 | 1 | 3.9600E-02 | 3.300E-02 | 1.597E-04 | 0.0 | 0.0 | 11000 | 16.6 | |
| | | 2.164E-04 | 3.300E-02 | 1.069E-04 | 0.0 | 0.0 | 690 | (CENTR) | |
| | = SEKUNDARNI NOSILEC 22/18 cm | | | | | | | | |
| | = SEKUNDARNI NOSILEC 22/18 cm | | | | | | | | |

| | | | |
|---|---|---|---|
| SNo | section number | yc[mm],zc[mm] | ordinate of elastic centroid |
| Mat | material number | ysc[mm],zsc[mm] | ordinate of shear centre |
| A[m2] | sectional area | E[N/mm2] | Young's modulus |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | g[kg/m] | weight per length |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | | |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |
| MRf | reinforcement material number | | |
| It[m4] | torsional moment of inertia | | |
| G[N/mm2] | Shear modulus | | |

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**Cross section No. 1 - GLAVNI NOSILEC 60/20 cm**




Cross section No. 1 - GLAVNI NOSILEC 60/20 cm

**Static properties of cross section**

| Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|
| MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 2 | 1.2000E-01 | 1.000E-01 | 3.600E-03 | 0.0 | 0.0 | 11500 | 50.4 | |
| | 1.264E-03 | 1.000E-01 | 4.000E-04 | 0.0 | 0.0 | 650 | (CENTR) | |

| | | | |
|---|---|---|---|
| Mat | material number | yc[mm],zc[mm] | ordinate of elastic centroid |
| A[m2] | sectional area | ysc[mm],zsc[mm] | ordinate of shear centre |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | E[N/mm2] | Young's modulus |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | g[kg/m] | weight per length |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |
| MRf | reinforcement material number | | |
| It[m4] | torsional moment of inertia | | |
| G[N/mm2] | Shear modulus | | |

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Sections

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] | zmin[mm] | hymin[mm] | AK[m2] | MRs | 1/WT[1/m3] | 1/WVy[1/m2] |
|---|---|---|---|---|---|---|---|
| | ymax[mm] | zmax[mm] | hzmin[mm] | AB[m2] | | 1/WT2[1/m3] | 1/WVz[1/m2] |
| | -100.0 | -300.0 | 133.3 | 1.200E-01 | | 1.559E+02 | 1.250E+01 |
| | 100.0 | 300.0 | 400.0 | | | | 1.250E+01 |

| | |
|---|---|
| α-T[1/K] | Elongation coefficient |
| ymin[mm],zmin[mm],ymax[mm],zmax[mm] | extreme coordinates relative to centroid |
| hymin[mm],hzmin[mm] | minimum value for internal lever |
| AK[m2] | torsional equivalent area (Bredt) |
| MRs | transverse reinforcements material number |
| 1/WT[1/m3],1/WT2[1/m3] | torsional resistance |
| 1/WVy[1/m2],1/WVz[1/m2] | shear force resistance |
| AB[m2] | gross concrete area |

**Section values for warping**

| Wmin[m2] | Wmax[m2] | CM[m6] | CMS[m4] | ASwyy[m6] | ASwzz[m6] | ry[mm] | rz[mm] |
|---|---|---|---|---|---|---|---|
| -0.0191 | 0.0191 | 7.634E-06 | 0.000 | 0.000E+00 | 0.000E+00 | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Wmin[m2],Wmax[m2] | unit warping | ASwyy[m6],ASwzz[m6] | warping sectional value |
| CM[m6] | warping resistance | ry[mm],rz[mm] | sectional distance |
| CMS[m4] | warping shear resistance | | |

**Rectangular cross-section/T-beam**

| H[mm] | Ho[mm] | Aso[cm2] | Do[mm] | So[mm] | a[mm] | B-eff[mm] |
|---|---|---|---|---|---|---|
| B[mm] | Bo[mm] | Asu[cm2] | Du[mm] | Su[mm] | a-min[mm] | incl[°] |
| | | As-type | Ds[mm] | Ss[mm] | a-max[mm] | Ass[cm2/m] |
| 600.0 | | | 10 | 50.0 | | |
| 200.0 | | | 20 | 50.0 | | |

| | | | |
|---|---|---|---|
| H[mm] | height | B[mm] | width |
| Ho[mm] | upper height of section | Bo[mm] | upper width of section |
| Aso[cm2],Asu[cm2] | reinforcement area | a-min[mm] | minimum distance of bars |
| Do[mm],Du[mm],Ds[mm] | bar diameter | incl[°] | inclination of transverse reinforcements |
| So[mm],Su[mm],Ss[mm] | static distance | a-max[mm] | maximum distance of bars |
| a[mm] | distance of bars | Ass[cm2/m] | area of transverse reinforcements |
| B-eff[mm] | effective width | | |

**Additional design data**

| Mat | periphery-O/-I | | deff | t-min | t-max | thet-p | thet-y | thet-z | thet-yz | yg | zg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [m2/m] | [m2/m] | [mm] | [mm] | [mm] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [mm] | [mm] |
| | 1.600 | | 150.0 | 200.0 | 600.0 | 1.680 | 1.512 | 0.168 | | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Mat | material number | t-min,t-max | thickness |
| periphery-O/-I | peripheral area per length | thet-p,thet-y,thet-z,thet-yz | rotational mass |
| deff | effective depth | yg,zg | ordinate of the mass centre |

**Design forces and moments**

| | N[kN] | Vy[kN] | Vz[kN] | Mt[kNm] | Mt2[kNm] | Mb[kNm2] | My[kNm] | Mz[kNm] | y[mm] | z[mm] | BUCK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E¹ | 2304.0 | 886.81 | 886.81 | 71.09 | | 7.65 | 230.40 | 76.80 | 0.0 | 0.0 | -, e, e |
| E¹ | -2880.0 | 1108.51 | 1108.51 | 88.86 | | -9.57 | -230.40 | -76.80 | 0.0 | 0.0 | |
| F¹ | 1843.2 | 709.45 | 709.45 | 56.87 | | 6.12 | 184.32 | 61.44 | 0.0 | 0.0 | |
| F¹ | -2304.0 | 886.81 | 886.81 | 71.09 | | -7.65 | -184.32 | -61.44 | 0.0 | 0.0 | |

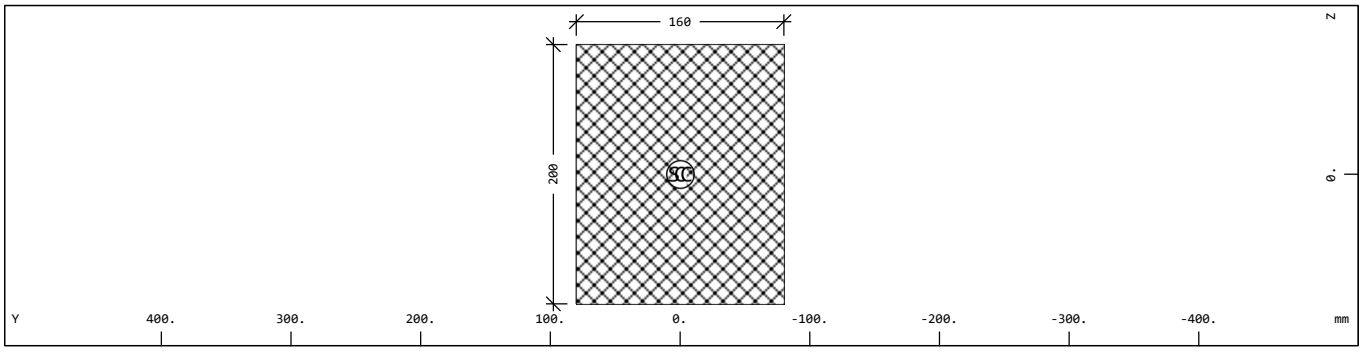
¹ E/F = elastic characteristic/design values (maximum strain reaches yield limit)

| | | | |
|---|---|---|---|
| N[kN] | normal force | Mb[kNm2] | warping moment |
| Vy[kN],Vz[kN] | shear force | My[kNm],Mz[kNm] | bending moment |
| Mt[kNm] | primary torsional moment | y[mm],z[mm] | ordinate of plastic centre |
| Mt2[kNm] | secondary torsional moment | BUCK | buckling curve (LTB, y-y, z-z) |

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Sections

**Cross section No. 2 - SEKUNDARNI NOSILEC 20/16 cm**




Cross section No. 2 - SEKUNDARNI NOSILEC 20/16 cm

**Static properties of cross section**

| Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|
| MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 1 | 3.2000E-02 | 2.667E-02 | 1.067E-04 | 0.0 | 0.0 | 11000 | 13.4 | |
| | 1.407E-04 | 2.667E-02 | 6.827E-05 | 0.0 | 0.0 | 690 | (CENTR) | |

| | | | |
|---|---|---|---|
| Mat | material number | yc[mm],zc[mm] | ordinate of elastic centroid |
| A[m2] | sectional area | ysc[mm],zsc[mm] | ordinate of shear centre |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | E[N/mm2] | Young's modulus |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | g[kg/m] | weight per length |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |
| MRf | reinforcement material number | | |
| It[m4] | torsional moment of inertia | | |
| G[N/mm2] | Shear modulus | | |

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] | zmin[mm] | hymin[mm] | AK[m2] | MRs | 1/WT[1/m3] | 1/WVy[1/m2] |
|---|---|---|---|---|---|---|---|
| | ymax[mm] | zmax[mm] | hzmin[mm] | AB[m2] | | 1/WT2[1/m3] | 1/WVz[1/m2] |
| | -80.0 | -100.0 | 106.7 | 3.200E-02 | | 8.829E+02 | 4.687E+01 |
| | 80.0 | 100.0 | 133.3 | | | | 4.687E+01 |

| | |
|---|---|
| α-T[1/K] | Elongation coefficient |
| ymin[mm],zmin[mm],ymax[mm],zmax[mm] | extreme coordinates relative to centroid |
| hymin[mm],hzmin[mm] | minimum value for internal lever |
| AK[m2] | torsional equivalent area (Bredt) |
| MRs | transverse reinforcements material number |
| 1/WT[1/m3],1/WT2[1/m3] | torsional resistance |
| 1/WVy[1/m2],1/WVz[1/m2] | shear force resistance |
| AB[m2] | gross concrete area |

**Section values for warping**

| Wmin[m2] | Wmax[m2] | CM[m6] | CMS[m4] | ASwyy[m6] | ASwzz[m6] | ry[mm] | rz[mm] |
|---|---|---|---|---|---|---|---|
| -0.0013 | 0.0013 | 1.496E-08 | 0.000 | 0.000E+00 | 0.000E+00 | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Wmin[m2],Wmax[m2] | unit warping | ASwyy[m6],ASwzz[m6] | warping sectional value |
| CM[m6] | warping resistance | ry[mm],rz[mm] | sectional distance |
| CMS[m4] | warping shear resistance | | |

**Rectangular cross-section/T-beam**

| H[mm] | Ho[mm] | Aso[cm2] | Do[mm] | So[mm] | a[mm] | B-eff[mm] |
|---|---|---|---|---|---|---|
| B[mm] | Bo[mm] | Asu[cm2] | Du[mm] | Su[mm] | a-min[mm] | incl[°] |
| | | As-type | Ds[mm] | Ss[mm] | a-max[mm] | Ass[cm2/m] |
| 200.0 | | | 10 | 50.0 | | |
| 160.0 | | | 20 | 50.0 | | |

| | | | |
|---|---|---|---|
| H[mm] | height | B[mm] | width |
| Ho[mm] | upper height of section | Bo[mm] | upper width of section |
| Aso[cm2],Asu[cm2] | reinforcement area | a-min[mm] | minimum distance of bars |
| Do[mm],Du[mm],Ds[mm] | bar diameter | incl[°] | inclination of transverse reinforcements |
| So[mm],Su[mm],Ss[mm] | static distance | a-max[mm] | maximum distance of bars |
| a[mm] | distance of bars | Ass[cm2/m] | area of transverse reinforcements |
| B-eff[mm] | effective width | | |

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**Additional design data**

| Mat | periphery-O/-I | | deff | t-min | t-max | thet-p | thet-y | thet-z | thet-yz | yg | zg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [m2/m] | [m2/m] | [mm] | [mm] | [mm] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [mm] | [mm] |
| | 0.720 | | 88.9 | 160.0 | 200.0 | 0.073 | 0.045 | 0.029 | | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Mat | material number | t-min,t-max | thickness |
| periphery-O/-I | peripheral area per length | thet-p,thet-y,thet-z,thet-yz | rotational mass |
| deff | effective depth | yg,zg | ordinate of the mass centre |

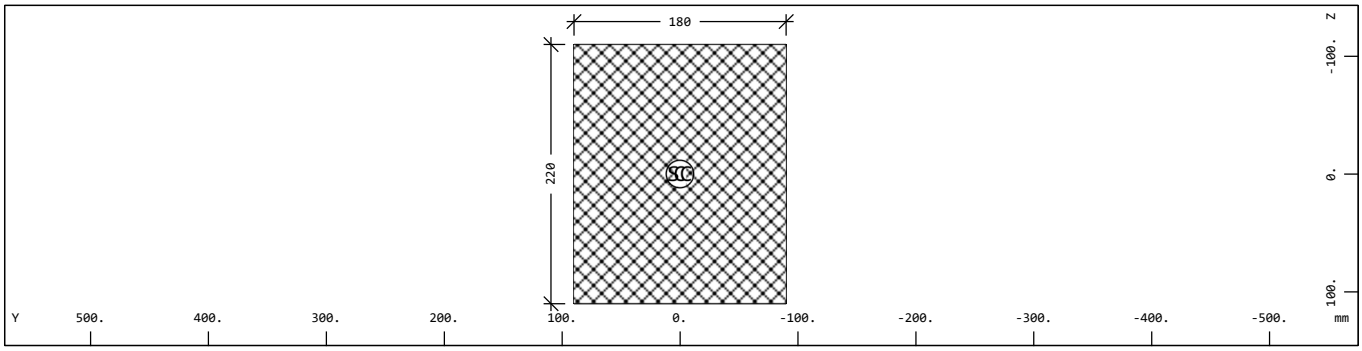
**Design forces and moments**

| | N[kN] | Vy[kN] | Vz[kN] | Mt[kNm] | Mt2[kNm] | Mb[kNm2] | My[kNm] | Mz[kNm] | y[mm] | z[mm] | BUCK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E¹ | 464.0 | 178.59 | 178.59 | 9.48 | | 0.17 | 15.47 | 12.37 | 0.0 | 0.0 | -, e, e |
| E¹ | -672.0 | 258.65 | 258.65 | 13.73 | | -0.24 | -15.47 | -12.37 | 0.0 | 0.0 | |
| F¹ | 356.9 | 137.38 | 137.38 | 7.29 | | 0.13 | 11.90 | 9.52 | 0.0 | 0.0 | |
| F¹ | -516.9 | 198.96 | 198.96 | 10.56 | | -0.18 | -11.90 | -9.52 | 0.0 | 0.0 | |

¹ E/F = elastic characteristic/design values (maximum strain reaches yield limit)

| | | | |
|---|---|---|---|
| N[kN] | normal force | Mb[kNm2] | warping moment |
| Vy[kN],Vz[kN] | shear force | My[kNm],Mz[kNm] | bending moment |
| Mt[kNm] | primary torsional moment | y[mm],z[mm] | ordinate of plastic centre |
| Mt2[kNm] | secondary torsional moment | BUCK | buckling curve (LTB, y-y, z-z) |

**Cross section No. 3 - SEKUNDARNI NOSILEC 22/18 cm**




Cross section No. 3 - SEKUNDARNI NOSILEC 22/18 cm

**Static properties of cross section**

| Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|
| MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 1 | 3.9600E-02 | 3.300E-02 | 1.597E-04 | 0.0 | 0.0 | 11000 | 16.6 | |
| | 2.164E-04 | 3.300E-02 | 1.069E-04 | 0.0 | 0.0 | 690 | (CENTR) | |

| | | | |
|---|---|---|---|
| Mat | material number | yc[mm],zc[mm] | ordinate of elastic centroid |
| A[m2] | sectional area | ysc[mm],zsc[mm] | ordinate of shear centre |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | E[N/mm2] | Young's modulus |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | g[kg/m] | weight per length |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |
| MRf | reinforcement material number | | |
| It[m4] | torsional moment of inertia | | |
| G[N/mm2] | Shear modulus | | |

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] | zmin[mm] | hymin[mm] | AK[m2] | MRs | 1/WT[1/m3] | 1/WVy[1/m2] |
|---|---|---|---|---|---|---|---|
| | ymax[mm] | zmax[mm] | hzmin[mm] | AB[m2] | | 1/WT2[1/m3] | 1/WVz[1/m2] |
| | -90.0 | -110.0 | 120.0 | 3.960E-02 | | 6.378E+02 | 3.788E+01 |
| | 90.0 | 110.0 | 146.7 | | | | 3.788E+01 |

| | |
|---|---|
| α-T[1/K] | Elongation coefficient |
| ymin[mm],zmin[mm],ymax[mm],zmax[mm] | extreme coordinates relative to centroid |
| hymin[mm],hzmin[mm] | minimum value for internal lever |
| AK[m2] | torsional equivalent area (Bredt) |
| MRs | transverse reinforcements material number |
| 1/WT[1/m3],1/WT2[1/m3] | torsional resistance |
| 1/WVy[1/m2],1/WVz[1/m2] | shear force resistance |
| AB[m2] | gross concrete area |

**Section values for warping**

| Wmin[m2] | Wmax[m2] | CM[m6] | CMS[m4] | ASwyy[m6] | ASwzz[m6] | ry[mm] | rz[mm] |
|---|---|---|---|---|---|---|---|
| -0.0015 | 0.0015 | 2.462E-08 | 0.000 | 0.000E+00 | 0.000E+00 | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Wmin[m2],Wmax[m2] | unit warping | ASwyy[m6],ASwzz[m6] | warping sectional value |
| CM[m6] | warping resistance | ry[mm],rz[mm] | sectional distance |

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| | |
|---|---|
| CMS[m4] | warping shear resistance |

**Rectangular cross-section/T-beam**

| H[mm] | Ho[mm] | Aso[cm2] | Do[mm] | So[mm] | a[mm] | B-eff[mm] |
|---|---|---|---|---|---|---|
| B[mm] | Bo[mm] | Asu[cm2] | Du[mm] | Su[mm] | a-min[mm] | incl[°] |
| | | As-type | Ds[mm] | Ss[mm] | a-max[mm] | Ass[cm2/m] |
| 220.0 | | | 10 | 50.0 | | |
| 180.0 | | | 20 | 50.0 | | |

| | | | |
|---|---|---|---|
| H[mm] | height | B[mm] | width |
| Ho[mm] | upper height of section | Bo[mm] | upper width of section |
| Aso[cm2],Asu[cm2] | reinforcement area | a-min[mm] | minimum distance of bars |
| Do[mm],Du[mm],Ds[mm] | bar diameter | incl[°] | inclination of transverse reinforcements |
| So[mm],Su[mm],Ss[mm] | static distance | a-max[mm] | maximum distance of bars |
| a[mm] | distance of bars | Ass[cm2/m] | area of transverse reinforcements |
| B-eff[mm] | effective width | | |

**Additional design data**

| Mat | periphery-O/-I | | deff | t-min | t-max | thet-p | thet-y | thet-z | thet-yz | yg | zg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [m2/m] | [m2/m] | [mm] | [mm] | [mm] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [mm] | [mm] |
| | 0.800 | | 99.0 | 180.0 | 220.0 | 0.112 | 0.067 | 0.045 | | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Mat | material number | t-min,t-max | thickness |
| periphery-O/-I | peripheral area per length | thet-p,thet-y,thet-z,thet-yz | rotational mass |
| deff | effective depth | yg,zg | ordinate of the mass centre |

**Design forces and moments**

| | N[kN] | Vy[kN] | Vz[kN] | Mt[kNm] | Mt2[kNm] | Mb[kNm2] | My[kNm] | Mz[kNm] | y[mm] | z[mm] | BUCK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E¹ | 574.2 | 221.01 | 221.01 | 13.13 | | 0.24 | 21.05 | 17.23 | 0.0 | 0.0 | -, e, e |
| E¹ | -831.6 | 320.08 | 320.08 | 19.01 | | -0.35 | -21.05 | -17.23 | 0.0 | 0.0 | |
| F¹ | 441.7 | 170.01 | 170.01 | 10.10 | | 0.19 | 16.20 | 13.25 | 0.0 | 0.0 | |
| F¹ | -639.7 | 246.22 | 246.22 | 14.62 | | -0.27 | -16.20 | -13.25 | 0.0 | 0.0 | |

¹ E/F = elastic characteristic/design values (maximum strain reaches yield limit)

| | | | |
|---|---|---|---|
| N[kN] | normal force | Mb[kNm2] | warping moment |
| Vy[kN],Vz[kN] | shear force | My[kNm],Mz[kNm] | bending moment |
| Mt[kNm] | primary torsional moment | y[mm],z[mm] | ordinate of plastic centre |
| Mt2[kNm] | secondary torsional moment | BUCK | buckling curve (LTB, y-y, z-z) |

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Generation of Node and Element Loads

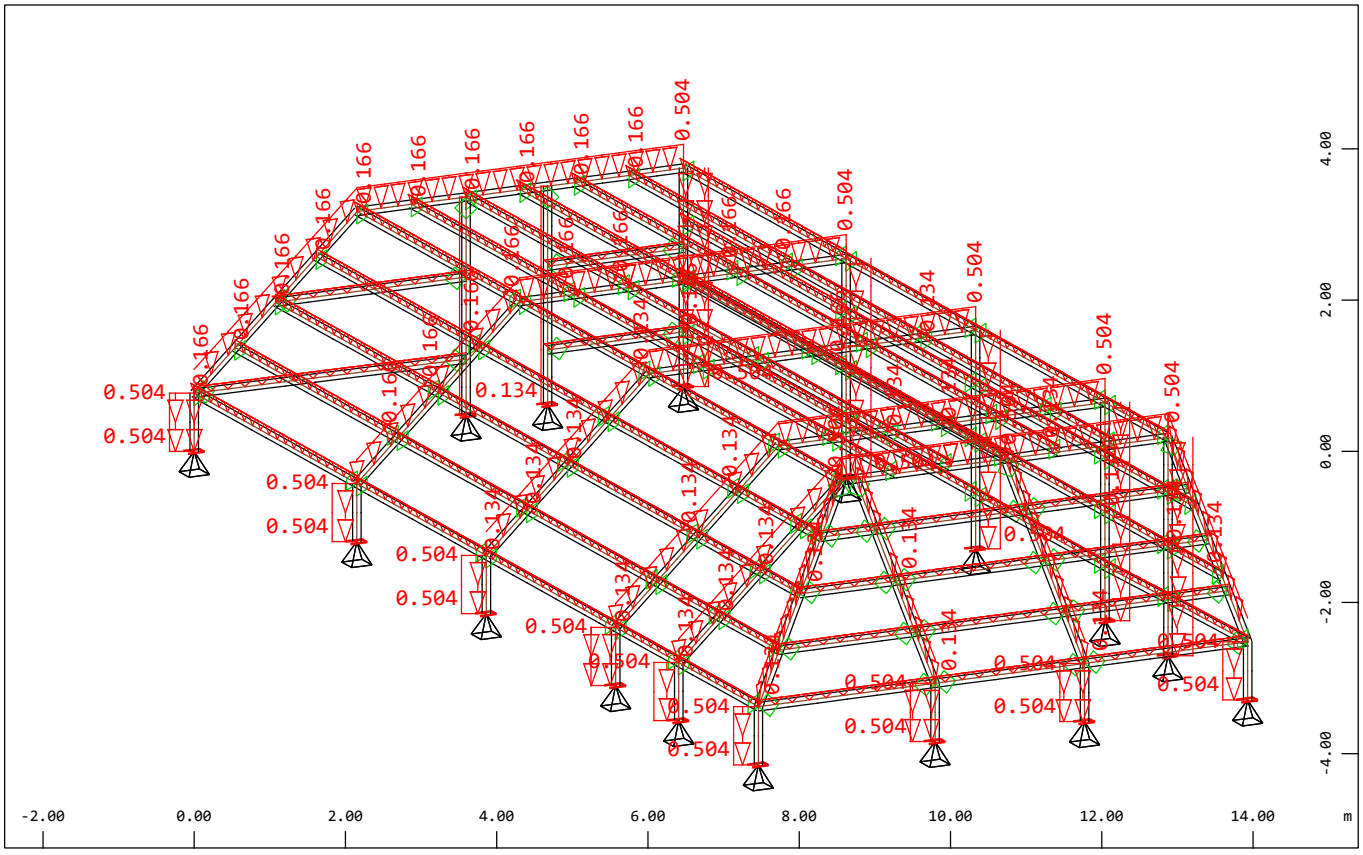
**Actions**

| type | part | sup | Designation | γ-u | γ-f | γ-a | $\psi_0$ | $\psi_1$ | $\psi_2$ | $\psi_1$inf |
|---|---|---|---|---|---|---|---|---|---|---|
| G_1 | G | perm | dead load g1 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | | 1 | Lastna | | | | | | | |
| G_2 | G | perm | dead load g2 | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | | 2 | Stalna | | | | | | | |
| Q_H | Q | exex | Live load on roofs cat. H | 1.50 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | 12 | Koristna | | | | | | | |
| S | Q | cond | snow loading | 1.50 | 0.00 | 1.00 | 0.50 | 0.20 | 0.00 | 0.20 |
| | | 21 | Sneg | | | | | | | |
| W | Q | excl | wind loading | 1.50 | 0.00 | 1.00 | 0.60 | 0.50 | 0.00 | 0.60 |
| | | 31 | Veter_X+ | | | | | | | |
| | | 32 | Veter_X- | | | | | | | |
| | | 33 | Veter_Y+ | | | | | | | |
| | | 34 | Veter_Y- | | | | | | | |
| | | | Reliability factor Kfi | 1.000 | | | | | | |
| | | | Reduction factor xsi | 0.850 | | | | | | |

type action γ-u,γ-f,γ-a partial safety factors for unfavourable/favourable/accidental
part partition of the action $\psi_0,\psi_1,\psi_2,\psi_1$inf combination coefficients
sup superposition type

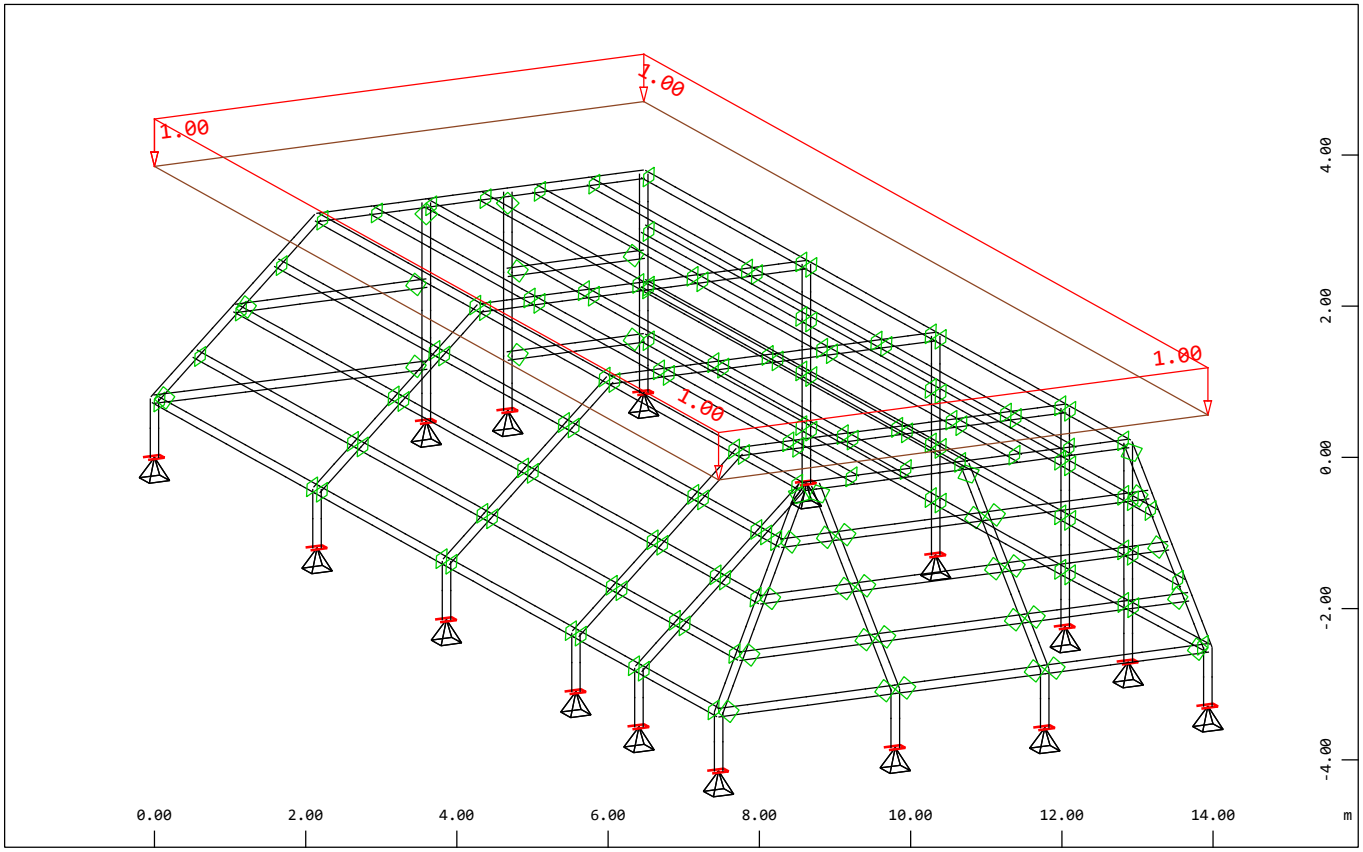
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Obtezba (lastna, stalna)




Z
Y X
All loads, Loadcase 1 Lastna , (1 cm 3D = unit) Beam dead load in global Z (Unit=1.54 kN/m ) (Min=-0.504) (Max=-0.134)

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962

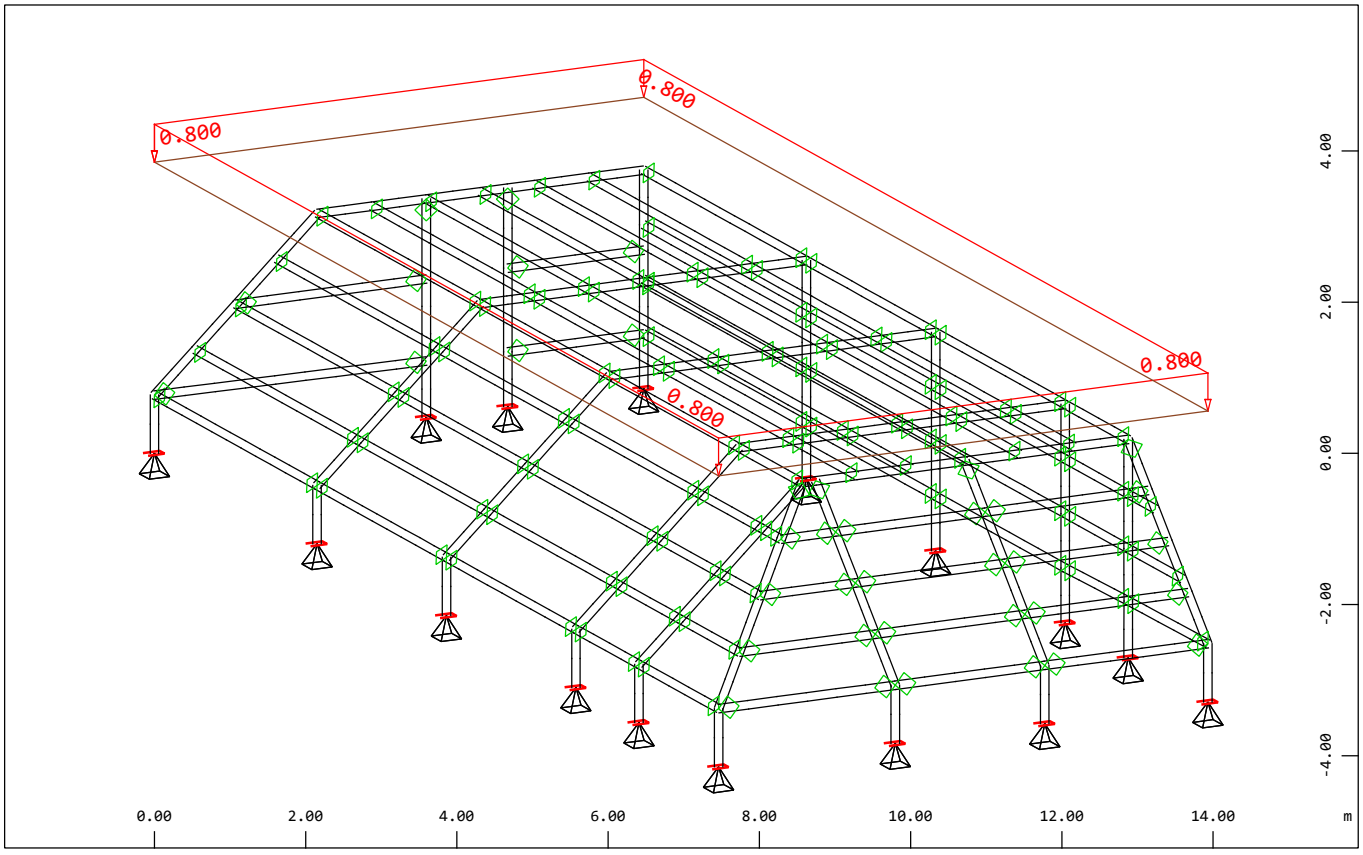



Z
Y X
All loads, Loadcase 2 Stalna , (1 cm 3D = unit) Free area load (force) in global Z (Unit=1.54 kN/m2 ) (Min=-1.00) (Max=-1.00)

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962

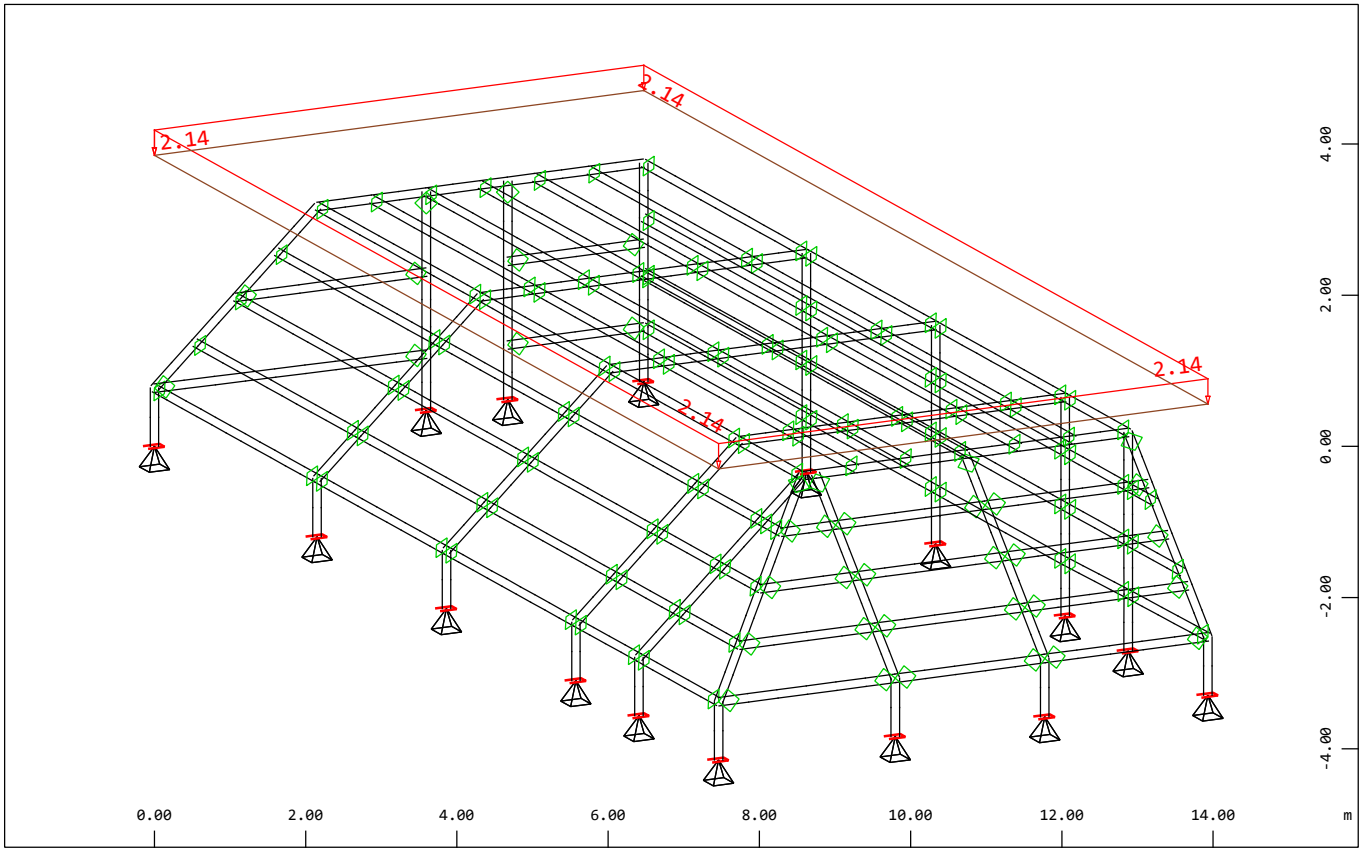
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11826 DSO Bovec - nadstresek tehnicne etaze
Obtezba (koristna, sneg)




Z
Y X
All loads, Loadcase 12 Koristna , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=1.54 kN/m2 ) (Min=-0.800) (Max=-0.800)

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962

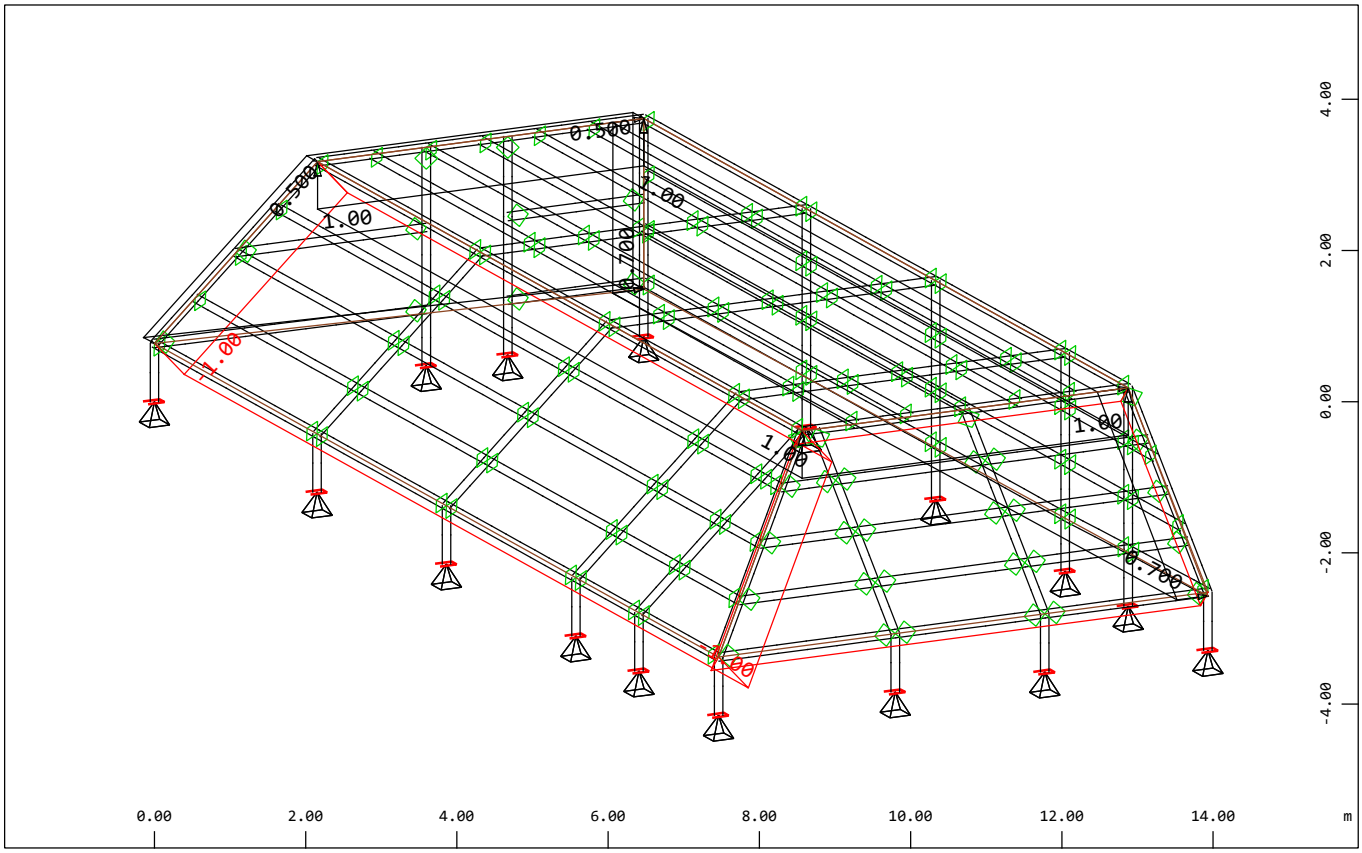



Z
Y X
All loads, Loadcase 21 Sneg , (1 cm 3D = unit) Free area load (force) in global Z
(Unit=6.16 kN/m2 ) (Min=-2.14) (Max=-2.14)

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962

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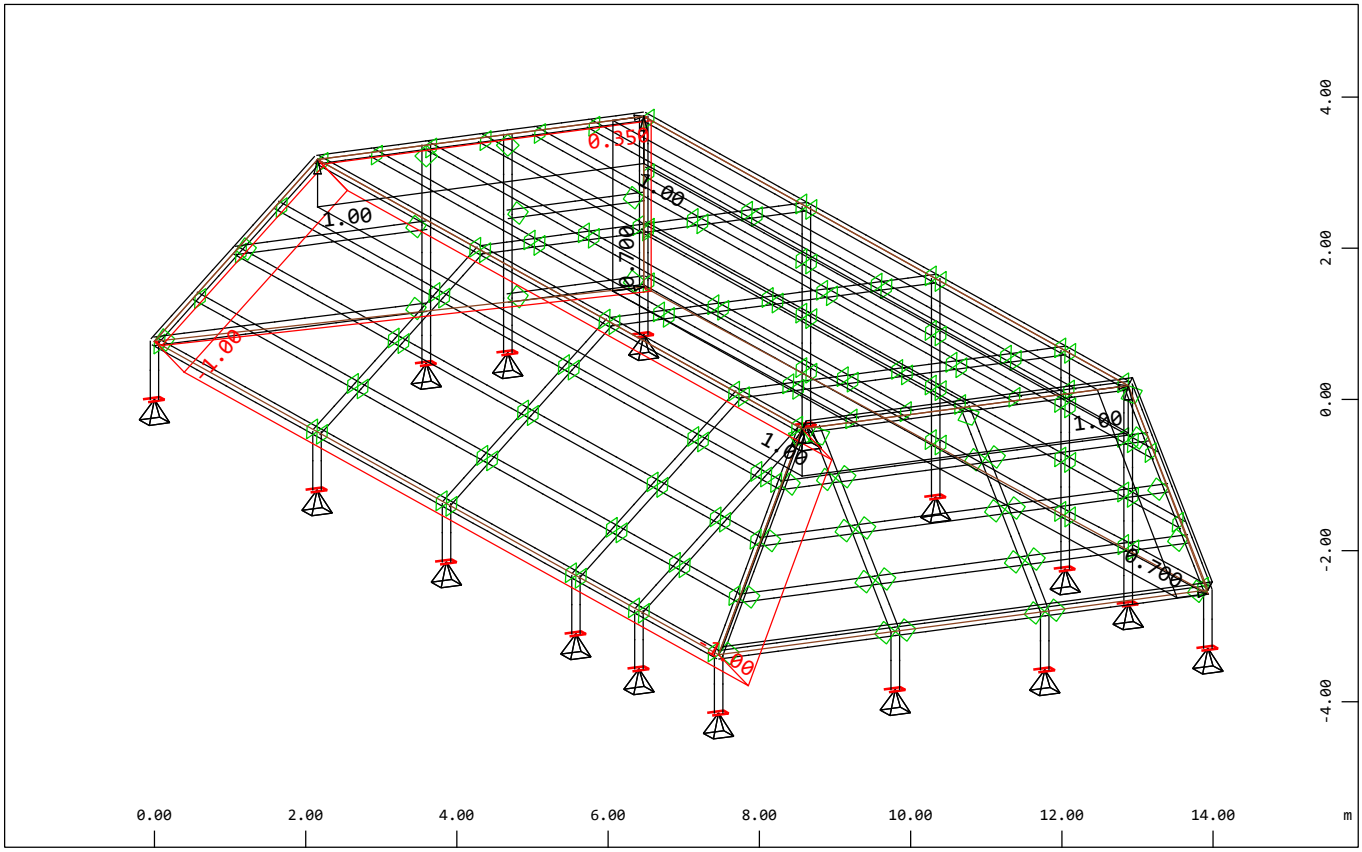
11826 DSO Bovec - nadstresek tehnicne etaze
Obtezba (veter X)




Z
Y
X

All loads, Loadcase 31 Veter_X+ , (1 cm 3D = unit) Free area load (force) in local z
(Unit=1.54 kN/m2,Min=-1.00 Max=-0.500), Free area load (force) in global X (Unit=1.54
kN/m2,Max=0.500 ), Free area load (force) in global Y (Unit=1.54

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962



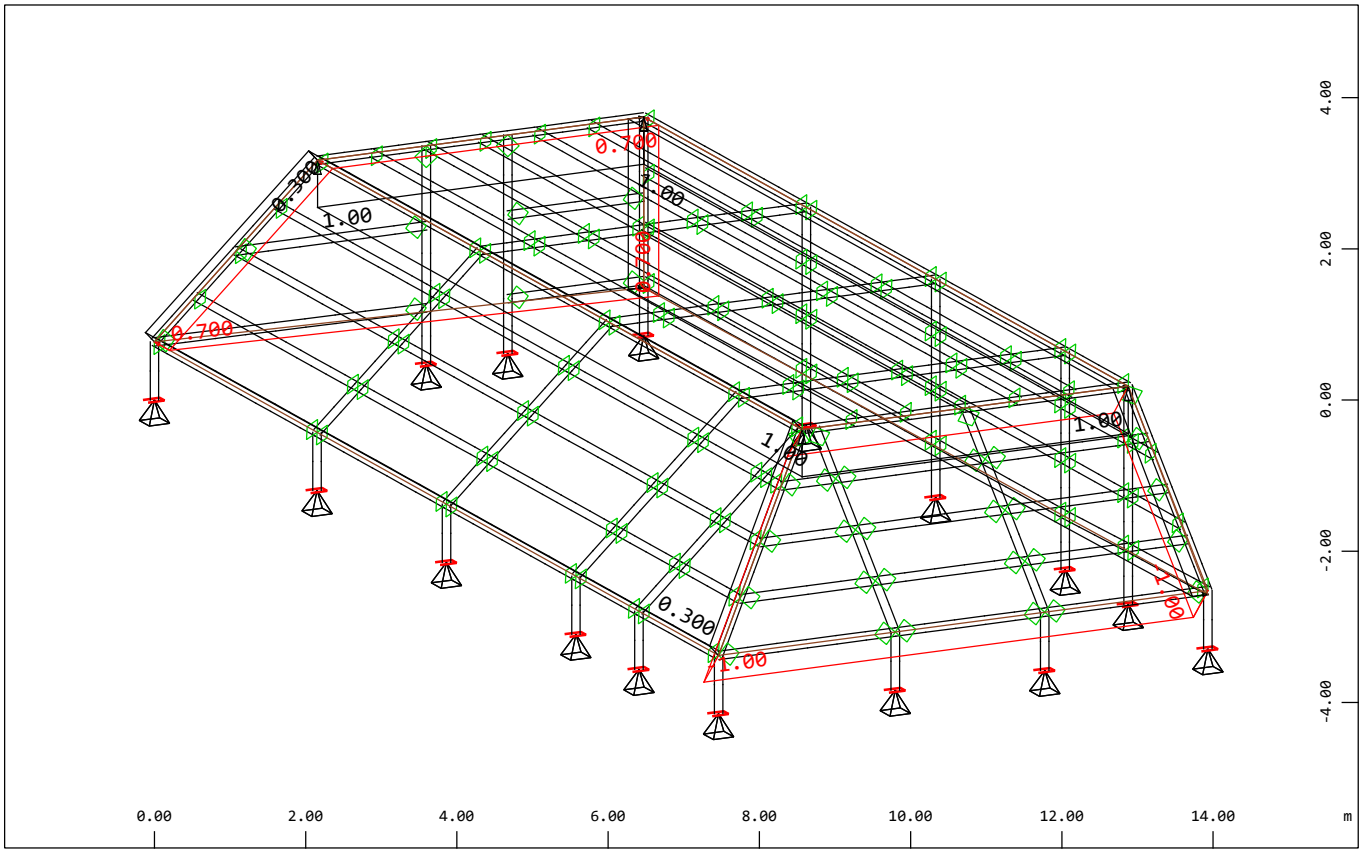

Z
Y
X

All loads, Loadcase 32 Veter_X- , (1 cm 3D = unit) Free area load (force) in local z
(Unit=1.54 kN/m2,Min=-1.00 Max=0.300), Free area load (force) in global X (Unit=1.54
kN/m2,Min=-0.350 Max=-0.350 ), Free area load (force) in global Y (Unit=1.54

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962

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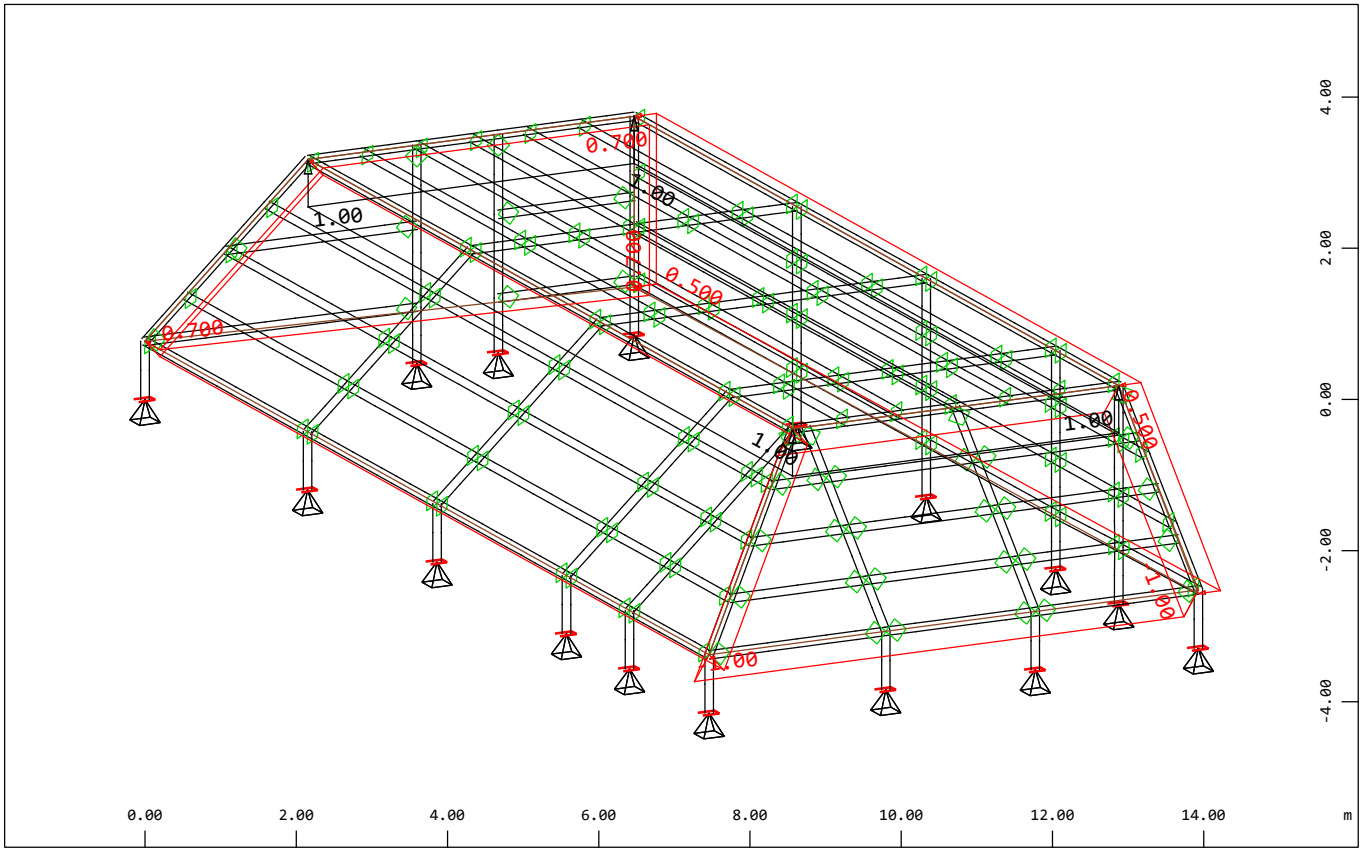
11826 DSO Bovec - nadstresek tehnicne etaze
Obtezba (veter Y)




Z
Y
X

All loads, Loadcase 33 Veter_Y+ , (1 cm 3D = unit) Free area load (force) in local z
(Unit=1.54 kN/m2,Min=-1.00 Max=0.300), Free area load (force) in global X (Unit=1.54
kN/m2,Min=-0.700 Max=-0.700 ), Free area load (force) in global Y (Unit=1.54

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962




Z
Y
X

All loads, Loadcase 34 Veter_Y- , (1 cm 3D = unit) Free area load (force) in local z
(Unit=1.54 kN/m2,Min=-1.00 Max=-0.500), Free area load (force) in global X (Unit=1.54
kN/m2,Min=-0.700 Max=-0.700 ), Free area load (force) in global Y (Unit=1.54

M 1 : 100
X * 0.502
Y * 0.906
Z * 0.962

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**Superposition according to EuroNorm EN 1995-1-1:2004 Timber Structures**

**Combination rule Number 100**

Permanent combination

Superposition according to manual MAXIMA formula 2.1

$$E_d = E\left\{\sum_{j\geq 1}\gamma_{G,j}\cdot G_{k,j} \oplus \gamma_P \cdot P_k \oplus \gamma_{Q,1}\cdot Q_{k,1} \oplus \sum_{i>1}\gamma_{Q,i}\cdot\psi_{0,i}\cdot Q_{k,i}\right\}$$

Resulting Load Cases type Permanent combination

**Load Case selection and Actions**

| Act | Part | Superposition Factors γ-u | γ-f | γ-a | $\psi_0$ | $\psi_1$ | $\psi_2$ | $\psi_1$inf | | | Designation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LC | | | | | | | | Fact | Type | |
| G_1 | G | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | dead load g1 |
| | 1 | | | | | | | | 1.00 | PERM | Lastna |
| G_2 | G | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | dead load g2 |
| | 2 | | | | | | | | 1.00 | PERM | Stalna |

| | |
|---|---|
| Act | action |
| Part | partition of the action |
| γ-u,γ-f,γ-a | partial safety factors for unfavourable/favourable/accidental |
| $\psi_0,\psi_1,\psi_2,\psi_1$inf | combination coefficients |
| LC | number of the load case |
| Fact | factor for load case |
| Type | type of the load case |
| PERM | permanent load grouped in actions |

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**Combination rule Number 102**

Middle term combination

Superposition according to manual MAXIMA formula 2.1

$$E_d = E\left\{\sum_{j\geq 1}\gamma_{G,j}\cdot G_{k,j} \oplus \gamma_P \cdot P_k \oplus \gamma_{Q,1}\cdot Q_{k,1} \oplus \sum_{i>1}\gamma_{Q,i}\cdot\psi_{0,i}\cdot Q_{k,i}\right\}$$

Resulting Load Cases type Middle term combination

**Load Case selection and Actions**

| Act | Part | Superposition Factors γ-u | γ-f | γ-a | $\psi_0$ | $\psi_1$ | $\psi_2$ | $\psi_1$inf | | | Designation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LC | | | | | | | | Fact | Type | |
| G_1 | G | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | dead load g1 |
| | 1 | | | | | | | | 1.00 | PERM | Lastna |
| G_2 | G | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | dead load g2 |
| | 2 | | | | | | | | 1.00 | PERM | Stalna |

| | |
|---|---|
| Act | action |
| Part | partition of the action |
| γ-u,γ-f,γ-a | partial safety factors for unfavourable/favourable/accidental |
| $\psi_0,\psi_1,\psi_2,\psi_1$inf | combination coefficients |
| LC | number of the load case |
| Fact | factor for load case |
| Type | type of the load case |
| PERM | permanent load grouped in actions |

**Combination rule Number 103**

Short term combination

Superposition according to manual MAXIMA formula 2.1

$$E_d = E\left\{\sum_{j\geq 1}\gamma_{G,j}\cdot G_{k,j} \oplus \gamma_P \cdot P_k \oplus \gamma_{Q,1}\cdot Q_{k,1} \oplus \sum_{i>1}\gamma_{Q,i}\cdot\psi_{0,i}\cdot Q_{k,i}\right\}$$

Resulting Load Cases type Short term combination

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**Load Case selection and Actions**

| Act | Part | Superposition Factors γ-u | γ-f | γ-a | $\psi_0$ | $\psi_1$ | $\psi_2$ | $\psi_1$inf | Fact | Type | Designation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LC | | | | | | | | | | |
| G_1 | G | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | dead load g1 |
| | 1 | | | | | | | | 1.00 | PERM | Lastna |
| G_2 | G | 1.35 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | dead load g2 |
| | 2 | | | | | | | | 1.00 | PERM | Stalna |
| Q_H | Q | 1.50 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | Live load on roofs cat. H |
| | 12 | | | | | | | | 1.00 | A8 | Koristna |
| S | Q | 1.50 | 0.00 | 1.00 | 0.50 | 0.20 | 0.00 | 0.20 | | | snow loading |
| | 21 | | | | | | | | 1.00 | COND | Sneg |
| W | Q | 1.50 | 0.00 | 1.00 | 0.60 | 0.50 | 0.00 | 0.60 | | | wind loading |
| | 31 | | | | | | | | 1.00 | A10 | Veter_X+ |
| | 32 | | | | | | | | 1.00 | A10 | Veter_X- |
| | 33 | | | | | | | | 1.00 | A10 | Veter_Y+ |
| | 34 | | | | | | | | 1.00 | A10 | Veter_Y- |

| | | | |
|---|---|---|---|
| Act | action | Fact | factor for load case |
| Part | partition of the action | Type | type of the load case |
| γ-u,γ-f,γ-a | partial safety factors for unfavourable/favourable/accidental | PERM | permanent load grouped in actions |
| $\psi_0$,$\psi_1$,$\psi_2$,$\psi_1$inf | combination coefficients | COND | conditional load |
| LC | number of the load case | A | exclusive load |

**Generated Load Cases**

| Number | Combination | Designation |
|---|---|---|
| 2121 | 100 | MAX-N BEAM Forces in Beam Elements |
| 2122 | 100 | MIN-N BEAM Forces in Beam Elements |
| 2123 | 100 | MAX-VY BEAM Forces in Beam Elements |
| 2124 | 100 | MIN-VY BEAM Forces in Beam Elements |
| 2125 | 100 | MAX-VZ BEAM Forces in Beam Elements |
| 2126 | 100 | MIN-VZ BEAM Forces in Beam Elements |
| 2127 | 100 | MAX-MT BEAM Forces in Beam Elements |
| 2128 | 100 | MIN-MT BEAM Forces in Beam Elements |
| 2129 | 100 | MAX-MY BEAM Forces in Beam Elements |
| 2130 | 100 | MIN-MY BEAM Forces in Beam Elements |
| 2131 | 100 | MAX-MZ BEAM Forces in Beam Elements |
| 2132 | 100 | MIN-MZ BEAM Forces in Beam Elements |
| 2133 | 100 | MAX-MB BEAM Forces in Beam Elements |
| 2134 | 100 | MIN-MB BEAM Forces in Beam Elements |
| 2135 | 100 | MAX-MT2 BEAM Forces in Beam Elements |
| 2136 | 100 | MIN-MT2 BEAM Forces in Beam Elements |
| 2171 | 100 | MAX-UX NODE Nodal Displacements |
| 2172 | 100 | MIN-UX NODE Nodal Displacements |
| 2173 | 100 | MAX-UY NODE Nodal Displacements |
| 2174 | 100 | MIN-UY NODE Nodal Displacements |
| 2175 | 100 | MAX-UZ NODE Nodal Displacements |
| 2176 | 100 | MIN-UZ NODE Nodal Displacements |
| 2177 | 100 | MAX-URX NODE Nodal Displacements |
| 2178 | 100 | MIN-URX NODE Nodal Displacements |
| 2179 | 100 | MAX-URY NODE Nodal Displacements |
| 2180 | 100 | MIN-URY NODE Nodal Displacements |
| 2181 | 100 | MAX-URZ NODE Nodal Displacements |
| 2182 | 100 | MIN-URZ NODE Nodal Displacements |
| 2183 | 100 | MAX-URB NODE Nodal Displacements |
| 2184 | 100 | MIN-URB NODE Nodal Displacements |
| 2151 | 100 | MAX-PX NODE Supporting Forces in Nodes |
| 2152 | 100 | MIN-PX NODE Supporting Forces in Nodes |
| 2153 | 100 | MAX-PY NODE Supporting Forces in Nodes |
| 2154 | 100 | MIN-PY NODE Supporting Forces in Nodes |
| 2155 | 100 | MAX-PZ NODE Supporting Forces in Nodes |
| 2156 | 100 | MIN-PZ NODE Supporting Forces in Nodes |
| 2157 | 100 | MAX-MX NODE Supporting Forces in Nodes |
| 2158 | 100 | MIN-MX NODE Supporting Forces in Nodes |

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**Generated Load Cases**

| Number | Combination | Designation |
|---|---|---|
| 2159 | 100 | MAX-MY NODE Supporting Forces in Nodes |
| 2160 | 100 | MIN-MY NODE Supporting Forces in Nodes |
| 2161 | 100 | MAX-MZ NODE Supporting Forces in Nodes |
| 2162 | 100 | MIN-MZ NODE Supporting Forces in Nodes |
| 2321 | 102 | MAX-N BEAM Forces in Beam Elements |
| 2322 | 102 | MIN-N BEAM Forces in Beam Elements |
| 2323 | 102 | MAX-VY BEAM Forces in Beam Elements |
| 2324 | 102 | MIN-VY BEAM Forces in Beam Elements |
| 2325 | 102 | MAX-VZ BEAM Forces in Beam Elements |
| 2326 | 102 | MIN-VZ BEAM Forces in Beam Elements |
| 2327 | 102 | MAX-MT BEAM Forces in Beam Elements |
| 2328 | 102 | MIN-MT BEAM Forces in Beam Elements |
| 2329 | 102 | MAX-MY BEAM Forces in Beam Elements |
| 2330 | 102 | MIN-MY BEAM Forces in Beam Elements |
| 2331 | 102 | MAX-MZ BEAM Forces in Beam Elements |
| 2332 | 102 | MIN-MZ BEAM Forces in Beam Elements |
| 2333 | 102 | MAX-MB BEAM Forces in Beam Elements |
| 2334 | 102 | MIN-MB BEAM Forces in Beam Elements |
| 2335 | 102 | MAX-MT2 BEAM Forces in Beam Elements |
| 2336 | 102 | MIN-MT2 BEAM Forces in Beam Elements |
| 2371 | 102 | MAX-UX NODE Nodal Displacements |
| 2372 | 102 | MIN-UX NODE Nodal Displacements |
| 2373 | 102 | MAX-UY NODE Nodal Displacements |
| 2374 | 102 | MIN-UY NODE Nodal Displacements |
| 2375 | 102 | MAX-UZ NODE Nodal Displacements |
| 2376 | 102 | MIN-UZ NODE Nodal Displacements |
| 2377 | 102 | MAX-URX NODE Nodal Displacements |
| 2378 | 102 | MIN-URX NODE Nodal Displacements |
| 2379 | 102 | MAX-URY NODE Nodal Displacements |
| 2380 | 102 | MIN-URY NODE Nodal Displacements |
| 2381 | 102 | MAX-URZ NODE Nodal Displacements |
| 2382 | 102 | MIN-URZ NODE Nodal Displacements |
| 2383 | 102 | MAX-URB NODE Nodal Displacements |
| 2384 | 102 | MIN-URB NODE Nodal Displacements |
| 2351 | 102 | MAX-PX NODE Supporting Forces in Nodes |
| 2352 | 102 | MIN-PX NODE Supporting Forces in Nodes |
| 2353 | 102 | MAX-PY NODE Supporting Forces in Nodes |
| 2354 | 102 | MIN-PY NODE Supporting Forces in Nodes |
| 2355 | 102 | MAX-PZ NODE Supporting Forces in Nodes |
| 2356 | 102 | MIN-PZ NODE Supporting Forces in Nodes |
| 2357 | 102 | MAX-MX NODE Supporting Forces in Nodes |
| 2358 | 102 | MIN-MX NODE Supporting Forces in Nodes |
| 2359 | 102 | MAX-MY NODE Supporting Forces in Nodes |
| 2360 | 102 | MIN-MY NODE Supporting Forces in Nodes |
| 2361 | 102 | MAX-MZ NODE Supporting Forces in Nodes |
| 2362 | 102 | MIN-MZ NODE Supporting Forces in Nodes |
| 2391 | 102 | MAX-MB NODE Supporting Forces in Nodes |
| 2392 | 102 | MIN-MB NODE Supporting Forces in Nodes |
| 2451 | 103 | MAX-PX NODE Supporting Forces in Nodes |
| 2452 | 103 | MIN-PX NODE Supporting Forces in Nodes |
| 2453 | 103 | MAX-PY NODE Supporting Forces in Nodes |
| 2454 | 103 | MIN-PY NODE Supporting Forces in Nodes |
| 2455 | 103 | MAX-PZ NODE Supporting Forces in Nodes |
| 2456 | 103 | MIN-PZ NODE Supporting Forces in Nodes |
| 2457 | 103 | MAX-MX NODE Supporting Forces in Nodes |
| 2458 | 103 | MIN-MX NODE Supporting Forces in Nodes |
| 2459 | 103 | MAX-MY NODE Supporting Forces in Nodes |
| 2460 | 103 | MIN-MY NODE Supporting Forces in Nodes |
| 2461 | 103 | MAX-MZ NODE Supporting Forces in Nodes |

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**Generated Load Cases**

| Number | Combination | Designation |
|---|---|---|
| 2462 | 103 | MIN-MZ NODE Supporting Forces in Nodes |
| 2491 | 103 | MAX-MB NODE Supporting Forces in Nodes |
| 2492 | 103 | MIN-MB NODE Supporting Forces in Nodes |
| 2421 | 103 | MAX-N BEAM Forces in Beam Elements |
| 2422 | 103 | MIN-N BEAM Forces in Beam Elements |
| 2423 | 103 | MAX-VY BEAM Forces in Beam Elements |
| 2424 | 103 | MIN-VY BEAM Forces in Beam Elements |
| 2425 | 103 | MAX-VZ BEAM Forces in Beam Elements |
| 2426 | 103 | MIN-VZ BEAM Forces in Beam Elements |
| 2427 | 103 | MAX-MT BEAM Forces in Beam Elements |
| 2428 | 103 | MIN-MT BEAM Forces in Beam Elements |
| 2429 | 103 | MAX-MY BEAM Forces in Beam Elements |
| 2430 | 103 | MIN-MY BEAM Forces in Beam Elements |
| 2431 | 103 | MAX-MZ BEAM Forces in Beam Elements |
| 2432 | 103 | MIN-MZ BEAM Forces in Beam Elements |
| 2433 | 103 | MAX-MB BEAM Forces in Beam Elements |
| 2434 | 103 | MIN-MB BEAM Forces in Beam Elements |
| 2435 | 103 | MAX-MT2 BEAM Forces in Beam Elements |
| 2436 | 103 | MIN-MT2 BEAM Forces in Beam Elements |
| 2471 | 103 | MAX-UX NODE Nodal Displacements |
| 2472 | 103 | MIN-UX NODE Nodal Displacements |
| 2473 | 103 | MAX-UY NODE Nodal Displacements |
| 2474 | 103 | MIN-UY NODE Nodal Displacements |
| 2475 | 103 | MAX-UZ NODE Nodal Displacements |
| 2476 | 103 | MIN-UZ NODE Nodal Displacements |
| 2477 | 103 | MAX-URX NODE Nodal Displacements |
| 2478 | 103 | MIN-URX NODE Nodal Displacements |
| 2479 | 103 | MAX-URY NODE Nodal Displacements |
| 2480 | 103 | MIN-URY NODE Nodal Displacements |
| 2481 | 103 | MAX-URZ NODE Nodal Displacements |
| 2482 | 103 | MIN-URZ NODE Nodal Displacements |
| 2483 | 103 | MAX-URB NODE Nodal Displacements |
| 2484 | 103 | MIN-URB NODE Nodal Displacements |

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Dim - perm

Default design code is EuroNorm EN 1995-1-1:2004 Timber Structures (Europe) V 2018
Serviceclass: 2

**Stresses and Resistance of Sections**

**Combinations of Load Cases**

Results are saved for load cases 2121 2122 2123 2124 2125 2126 2127
Results are saved for load cases 2128 2129 2130 2131 2132 2133 2134
Results are saved for load cases 2135 2136
Maximum results are saved to load case 601 GlobalMAX SIGMA

**Maximum Stresses and Checked Limits**

| Mat | Check or Criterion | | Value | Limit | Unit | Level | LC | Beam | x[m] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Centric compression | σ-n,c | 0.77 | 16.15 | MPa | 0.047 | 2122 | 130031 | 0.000 |
| | Centric tension | σ-n,t | 0.13 | 11.15 | MPa | 0.012 | 2121 | 110344 | 0.000 |
| | Uniaxial bending compression | σz-,z+ | 4.50 | 18.46 | MPa | 0.244 | 2121 | 110060 | 0.445 |
| | factor for centric parts | 1.14 | | | | | | | |
| | Uniaxial bending tension | σz-,z+ | 4.51 | 18.46 | MPa | 0.244 | 2121 | 110060 | 0.445 |
| | factor for centric parts | 1.66 | | | | | | | |
| | Longitud. compressive stress | σ-x | 4.86 | 18.46 | MPa | 0.263 | 2122 | 110104 | 0.445 |
| | factor for centric parts | 1.14 | | | | | | | |
| | Longitud. tensile stress | σ+x | 4.86 | 18.46 | MPa | 0.263 | 2122 | 110104 | 0.445 |
| | factor for centric parts | 1.66 | | | | | | | |
| | Shear stress | τ | 0.21 | 2.05 | MPa | 0.102 | 2122 | 110045 | 0.000 |
| | Torsion incl. Shearforce parts | | 0.33 | 3.08 | MPa | 0.108 | 2122 | 110045 | 0.000 |
| | Used safety factor | γ-m | | 1.30 | [-] | | | | |
| 2 | Centric compression | σ-n,c | 0.45 | 19.20 | MPa | 0.024 | 2122 | 10059 | 0.375 |
| | Centric tension | σ-n,t | 0.19 | 15.36 | MPa | 0.013 | 2121 | 20039 | 0.506 |
| | Uniaxial bending compression | σz-,z+ | 4.28 | 19.20 | MPa | 0.223 | 2122 | 10052 | 0.400 |
| | Uniaxial bending tension | σz-,z+ | 4.28 | 19.20 | MPa | 0.223 | 2122 | 10052 | 0.400 |
| | factor for centric parts | 1.25 | | | | | | | |
| | Longitud. compressive stress | σ-x | 4.31 | 19.20 | MPa | 0.224 | 2122 | 10052 | 0.400 |
| | Longitud. tensile stress | σ+x | 4.31 | 19.20 | MPa | 0.224 | 2122 | 10052 | 0.400 |
| | factor for centric parts | 1.25 | | | | | | | |
| | Shear stress | τ | 0.51 | 1.86 | MPa | 0.272 | 2122 | 10052 | 0.400 |
| | Torsion incl. Shearforce parts | | 0.77 | 2.80 | MPa | 0.275 | 2122 | 10052 | 0.400 |
| | Used safety factor | γ-m | | 1.25 | [-] | | | | |

Check for stress limits passed✓

**Maximum Utilisation Level**

| | N<br>σ-x | Vy<br>σ+x | Vz<br>τ | My<br>σ-v | Mz<br>σ-s | Mtp<br>σ-dyn | Mts<br>As-l | Mb<br>As-v | Ncr<br>crack | SCL<br>c/t | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Section 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.276 |
| GLAVNI NOSILEC 60/20 c | 0.224 | 0.224 | 0.276 | 0.000 | - | - | - | - | - | - | |
| Section 2 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.226 |
| SEKUNDARNI NOSILEC 20/ | 0.226 | 0.226 | 0.098 | 0.000 | - | - | - | - | - | - | |
| Section 3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.263 |
| SEKUNDARNI NOSILEC 22/ | 0.263 | 0.263 | 0.111 | 0.000 | - | - | - | - | - | - | |
| Total | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.276 |
| | 0.263 | 0.263 | 0.276 | 0.000 | - | - | - | - | - | - | |

| | | | |
|---|---|---|---|
| N | normal force | τ | shear stress |
| Vy,Vz | shear force | σ-v | von Mises stress |
| My,Mz | bending | σ-s | stress in reinforcements |
| Mtp,Mts | torsion (p)rimary and (s)econdary | σ-dyn | stress range |
| Mb | warping moment | As-l | longitudinal reinforcements |
| Ncr | flexural buckling | As-v | transverse reinforcements |
| SCL | cross-section class | crack | crack width |
| σ-x | longitud. compressive stress | c/t | stress dependant utilisation level (see AQB Manual 2.3.2) |
| σ+x | longitud. tensile stress | Total | most unfavorable utilisation for all checks |

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11826 DSO Bovec - nadstresek tehnicne etaze
Dim - mittel

Default design code is EuroNorm EN 1995-1-1:2004 Timber Structures (Europe) V 2018
Serviceclass: 2

**Stresses and Resistance of Sections**

**Combinations of Load Cases**

Results are saved for load cases 2321 2322 2323 2324 2325 2326 2327
Results are saved for load cases 2328 2329 2330 2331 2332 2333 2334
Results are saved for load cases 2335 2336
Maximum results are saved to load case 701 GlobalMAX SIGMA

**Maximum Stresses and Checked Limits**

| Mat | Check or Criterion | | Value | Limit | Unit | Level | LC | Beam | x[m] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Centric compression | σ-n,c | 0.58 | 16.15 | MPa | 0.036 | 2322 | 130031 | 0.000 |
| | Centric tension | σ-n,t | 0.10 | 11.15 | MPa | 0.009 | 2321 | 110344 | 0.000 |
| | Uniaxial bending compression | σz-,z+ | 3.37 | 18.46 | MPa | 0.183 | 2321 | 110060 | 0.445 |
| | factor for centric parts | 1.14 | | | | | | | |
| | Uniaxial bending tension | σz-,z+ | 3.39 | 18.46 | MPa | 0.183 | 2321 | 110060 | 0.445 |
| | factor for centric parts | 1.66 | | | | | | | |
| | Longitud. compressive stress | σ-x | 3.65 | 18.46 | MPa | 0.198 | 2322 | 110104 | 0.445 |
| | factor for centric parts | 1.14 | | | | | | | |
| | Longitud. tensile stress | σ+x | 3.65 | 18.46 | MPa | 0.198 | 2322 | 110104 | 0.445 |
| | factor for centric parts | 1.66 | | | | | | | |
| | Shear stress | τ | 0.16 | 2.05 | MPa | 0.076 | 2322 | 110045 | 0.000 |
| | Torsion incl. Shearforce parts | | 0.25 | 3.08 | MPa | 0.081 | 2322 | 110045 | 0.000 |
| | Used safety factor | γ-m | | 1.30 | [-] | | | | |
| 2 | Centric compression | σ-n,c | 0.34 | 19.20 | MPa | 0.018 | 2322 | 10059 | 0.000 |
| | Centric tension | σ-n,t | 0.15 | 15.36 | MPa | 0.010 | 2321 | 20040 | 0.506 |
| | Uniaxial bending compression | σz-,z+ | 3.21 | 19.20 | MPa | 0.167 | 2322 | 10052 | 0.400 |
| | Uniaxial bending tension | σz-,z+ | 3.21 | 19.20 | MPa | 0.167 | 2322 | 10052 | 0.400 |
| | factor for centric parts | 1.25 | | | | | | | |
| | Longitud. compressive stress | σ-x | 3.23 | 19.20 | MPa | 0.168 | 2322 | 10052 | 0.400 |
| | Longitud. tensile stress | σ+x | 3.23 | 19.20 | MPa | 0.168 | 2322 | 10052 | 0.400 |
| | factor for centric parts | 1.25 | | | | | | | |
| | Shear stress | τ | 0.38 | 1.86 | MPa | 0.204 | 2322 | 10052 | 0.400 |
| | Torsion incl. Shearforce parts | | 0.58 | 2.80 | MPa | 0.206 | 2322 | 10052 | 0.400 |
| | Used safety factor | γ-m | | 1.25 | [-] | | | | |

Check for stress limits passed✓

**Maximum Utilisation Level**

| | N<br>σ-x | Vy<br>σ+x | Vz<br>τ | My<br>σ-v | Mz<br>σ-s | Mtp<br>σ-dyn | Mts<br>As-l | Mb<br>As-v | Ncr<br>crack | SCL<br>c/t | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Section 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.207 |
| GLAVNI NOSILEC 60/20 c | 0.168 | 0.168 | 0.207 | 0.000 | - | - | - | - | - | - | |
| Section 2 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.170 |
| SEKUNDARNI NOSILEC 20/ | 0.170 | 0.170 | 0.073 | 0.000 | - | - | - | - | - | - | |
| Section 3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.198 |
| SEKUNDARNI NOSILEC 22/ | 0.198 | 0.198 | 0.083 | 0.000 | - | - | - | - | - | - | |
| Total | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.207 |
| | 0.198 | 0.198 | 0.207 | 0.000 | - | - | - | - | - | - | |

| | | | |
|---|---|---|---|
| N | normal force | τ | shear stress |
| Vy,Vz | shear force | σ-v | von Mises stress |
| My,Mz | bending | σ-s | stress in reinforcements |
| Mtp,Mts | torsion (p)rimary and (s)econdary | σ-dyn | stress range |
| Mb | warping moment | As-l | longitudinal reinforcements |
| Ncr | flexural buckling | As-v | transverse reinforcements |
| SCL | cross-section class | crack | crack width |
| σ-x | longitud. compressive stress | c/t | stress dependant utilisation level (see AQB Manual 2.3.2) |
| σ+x | longitud. tensile stress | Total | most unfavorable utilisation for all checks |

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Dim - kurz

Default design code is EuroNorm EN 1995-1-1:2004 Timber Structures (Europe) V 2018
Serviceclass: 2

**Stresses and Resistance of Sections**

**Combinations of Load Cases**

Results are saved for load cases 2421 2422 2423 2424 2425 2426 2427
Results are saved for load cases 2428 2429 2430 2431 2432 2433 2434
Results are saved for load cases 2435 2436
Maximum results are saved to load case 801 GlobalMAX SIGMA

**Maximum Stresses and Checked Limits**

| Mat | Check or Criterion | | Value | Limit | Unit | Level | LC | Beam | x[m] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Centric compression | σ-n,c | 1.27 | 16.15 | MPa | 0.079 | 2422 | 130031 | 0.000 |
| | Centric tension | σ-n,t | 0.23 | 11.15 | MPa | 0.020 | 2421 | 110344 | 0.000 |
| | Uniaxial bending compression | σz-,z+ | 8.92 | 18.46 | MPa | 0.483 | 2425 | 110060 | 0.445 |
| | factor for centric parts | 1.14 | | | | | | | |
| | Uniaxial bending tension | σz-,z+ | 8.94 | 18.46 | MPa | 0.484 | 2425 | 110060 | 0.445 |
| | factor for centric parts | 1.66 | | | | | | | |
| | Longitud. compressive stress | σ-x | 9.66 | 18.46 | MPa | 0.523 | 2425 | 110104 | 0.445 |
| | factor for centric parts | 1.14 | | | | | | | |
| | Longitud. tensile stress | σ+x | 9.66 | 18.46 | MPa | 0.523 | 2425 | 110104 | 0.445 |
| | factor for centric parts | 1.66 | | | | | | | |
| | Shear stress | τ | 0.41 | 2.05 | MPa | 0.202 | 2425 | 110045 | 0.000 |
| | Torsion incl. Shearforce parts | | 0.66 | 3.08 | MPa | 0.214 | 2425 | 110045 | 0.000 |
| | Used safety factor | γ-m | | 1.30 | [-] | | | | |
| 2 | Centric compression | σ-n,c | 0.76 | 19.20 | MPa | 0.040 | 2422 | 10059 | 0.000 |
| | Centric tension | σ-n,t | 0.30 | 15.36 | MPa | 0.019 | 2421 | 20039 | 0.000 |
| | Uniaxial bending compression | σz-,z+ | 7.88 | 19.20 | MPa | 0.410 | 2422 | 10053 | 0.000 |
| | Uniaxial bending tension | σz-,z+ | 7.85 | 19.20 | MPa | 0.409 | 2422 | 10052 | 0.400 |
| | factor for centric parts | 1.25 | | | | | | | |
| | Longitud. compressive stress | σ-x | 7.90 | 19.20 | MPa | 0.411 | 2422 | 10052 | 0.400 |
| | Longitud. tensile stress | σ+x | 7.89 | 19.20 | MPa | 0.411 | 2422 | 10052 | 0.400 |
| | factor for centric parts | 1.25 | | | | | | | |
| | Shear stress | τ | 0.93 | 1.86 | MPa | 0.501 | 2422 | 10052 | 0.400 |
| | Torsion incl. Shearforce parts | | 1.41 | 2.80 | MPa | 0.505 | 2422 | 10052 | 0.400 |
| | Used safety factor | γ-m | | 1.25 | [-] | | | | |

Check for stress limits passed✓

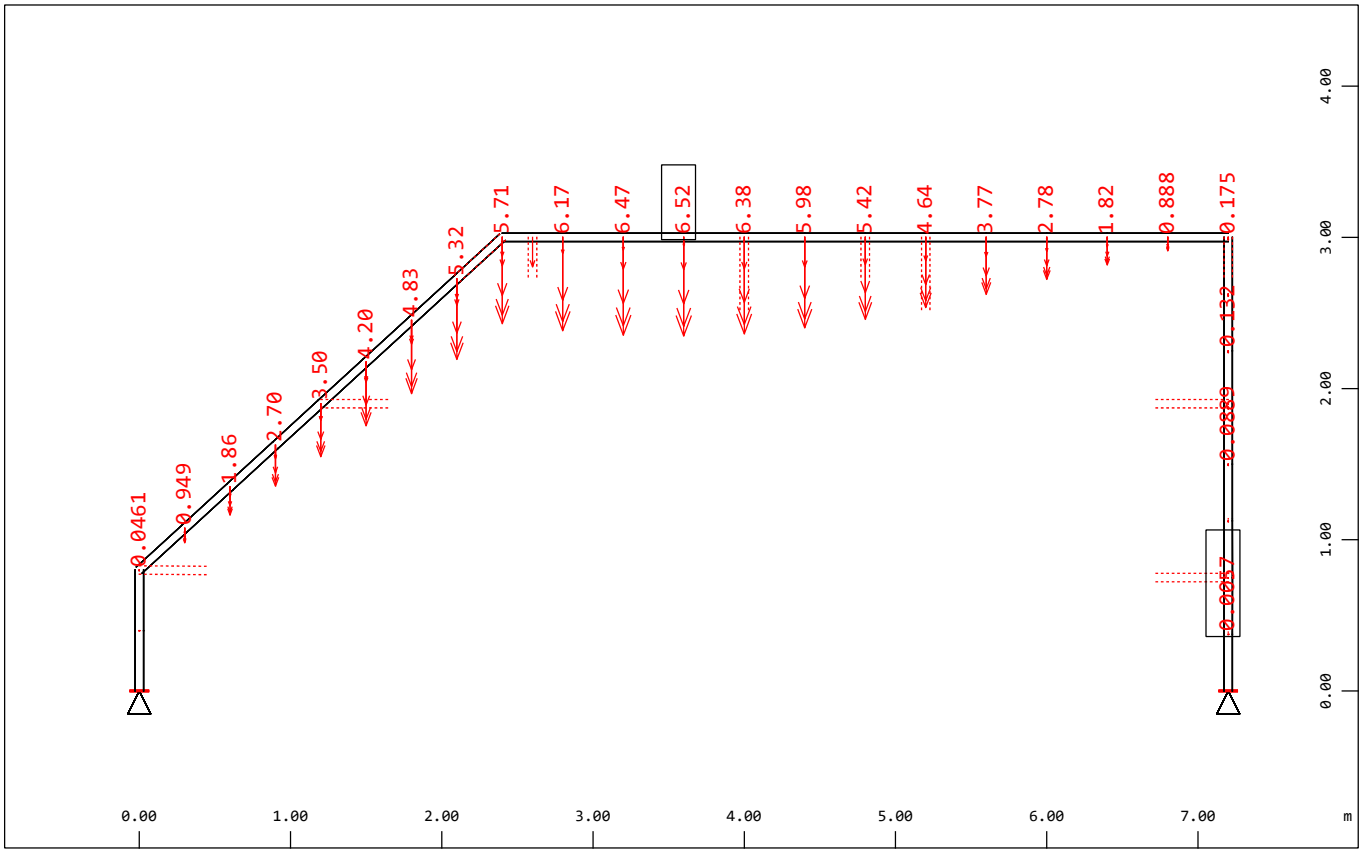
**Maximum Utilisation Level**

| | N<br>σ-x | Vy<br>σ+x | Vz<br>τ | My<br>σ-v | Mz<br>σ-s | Mtp<br>σ-dyn | Mts<br>As-l | Mb<br>As-v | Ncr<br>crack | SCL<br>c/t | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Section 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.506 |
| GLAVNI NOSILEC 60/20 c | 0.411 | 0.411 | 0.506 | 0.000 | - | - | - | - | - | - | |
| Section 2 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.463 |
| SEKUNDARNI NOSILEC 20/ | 0.463 | 0.463 | 0.198 | 0.000 | - | - | - | - | - | - | |
| Section 3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.523 |
| SEKUNDARNI NOSILEC 22/ | 0.523 | 0.523 | 0.220 | 0.000 | - | - | - | - | - | - | |
| Total | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.523 |
| | 0.523 | 0.523 | 0.506 | 0.000 | - | - | - | - | - | - | |

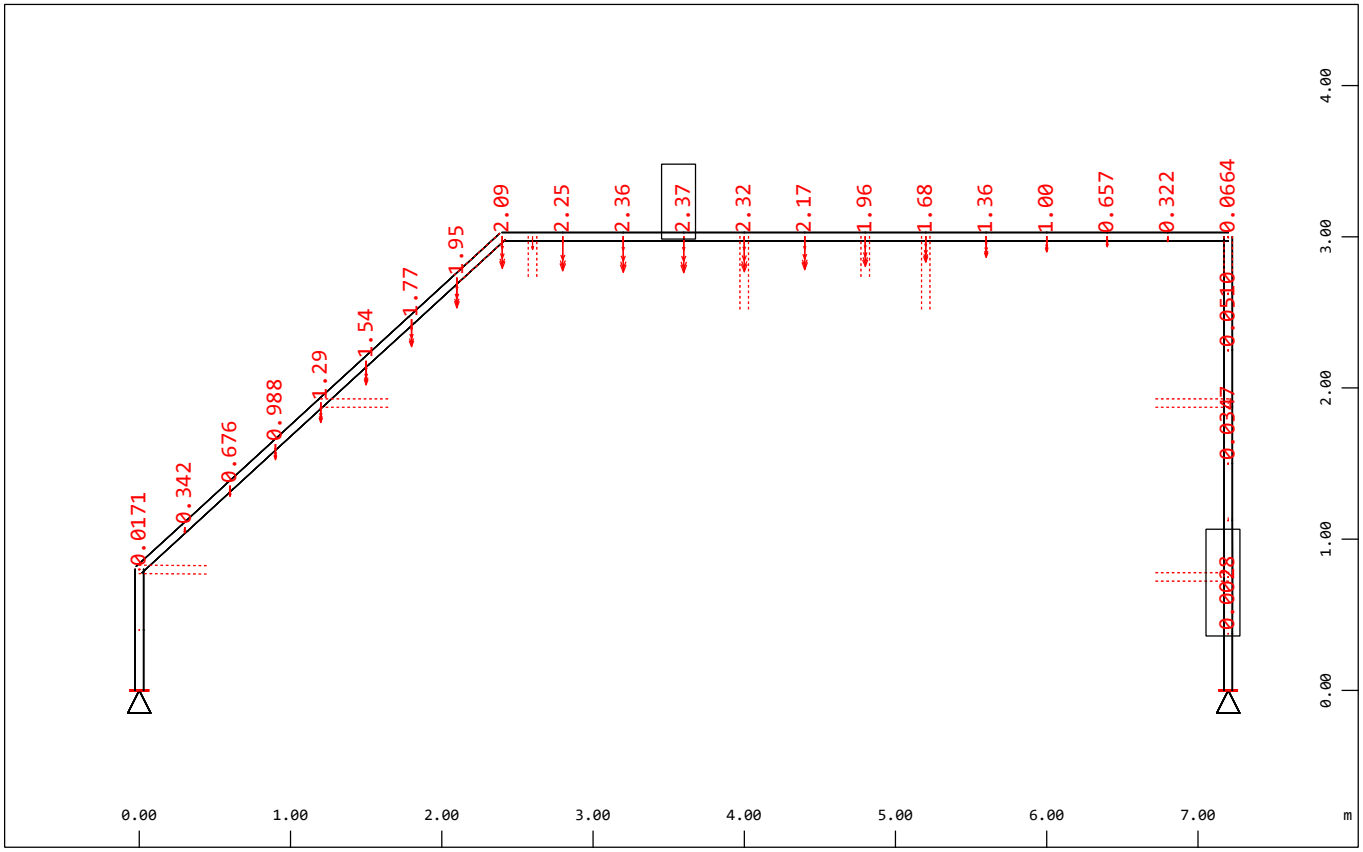
| | | | |
|---|---|---|---|
| N | normal force | τ | shear stress |
| Vy,Vz | shear force | σ-v | von Mises stress |
| My,Mz | bending | σ-s | stress in reinforcements |
| Mtp,Mts | torsion (p)rimary and (s)econdary | σ-dyn | stress range |
| Mb | warping moment | As-l | longitudinal reinforcements |
| Ncr | flexural buckling | As-v | transverse reinforcements |
| SCL | cross-section class | crack | crack width |
| σ-x | longitud. compressive stress | c/t | stress dependant utilisation level (see AQB Manual 2.3.2) |
| σ+x | longitud. tensile stress | Total | most unfavorable utilisation for all checks |

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11826 DSO Bovec - nadstresek tehnicne etaze
Povesi - primarni nosilci (kratkotrajna komb. / stalna komb.)



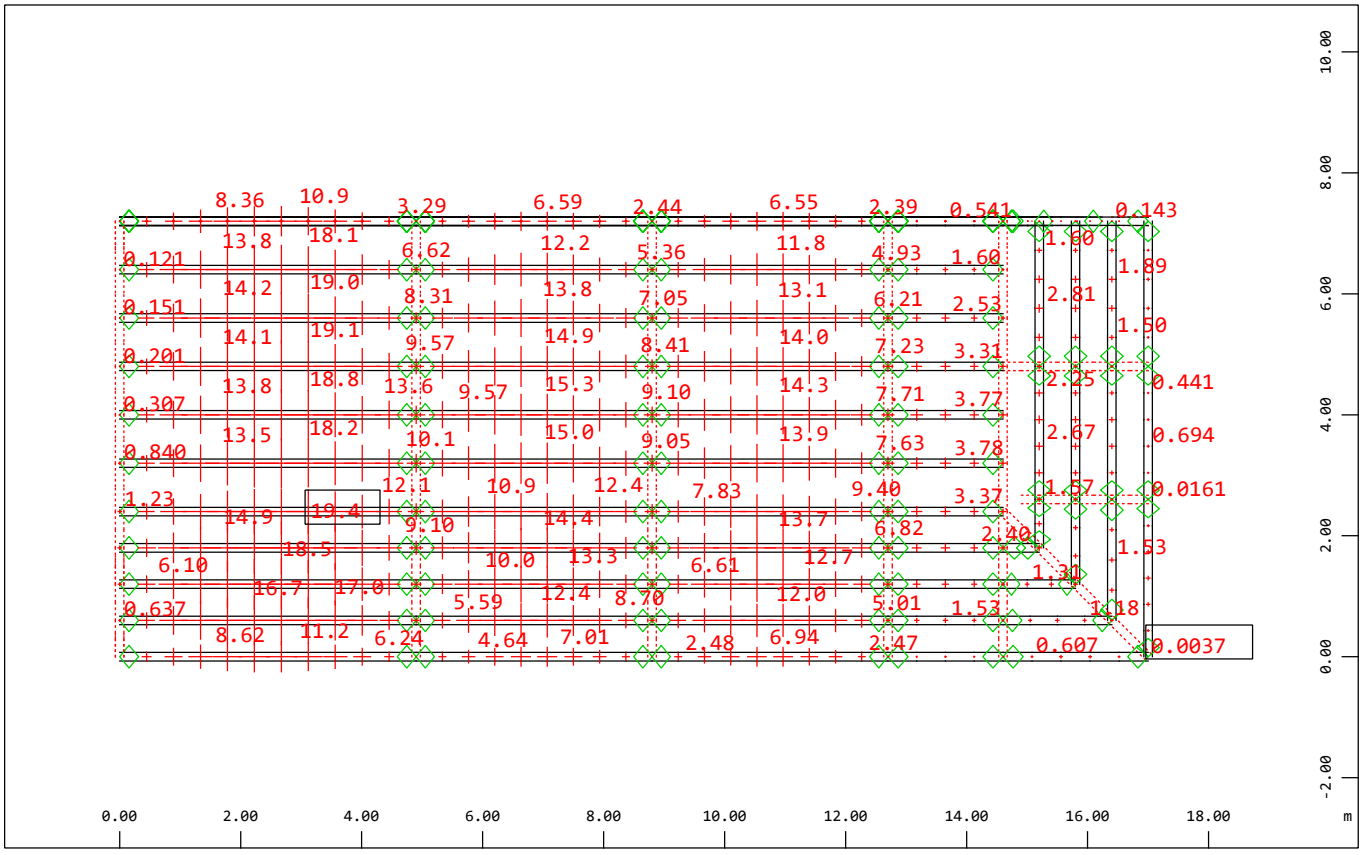

Sector of system Group 1 M 1 : 50
Nodal displacement in global Z, Loadcase 2476 MIN-UZ NODE Nodal Displacements , 1 cm 3D =
5.00 mm (Min=-6.52) (Max=0)



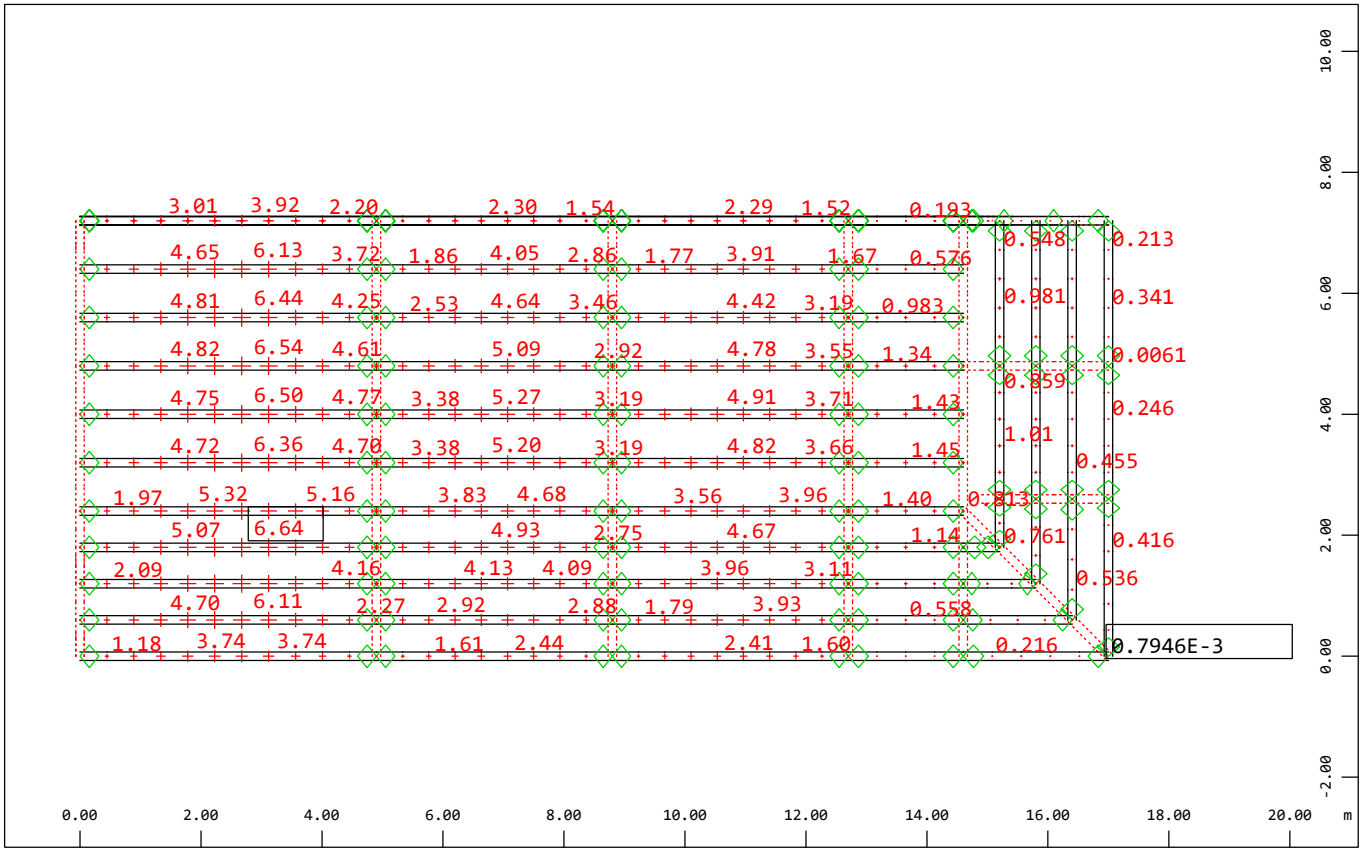

Sector of system Group 1 M 1 : 50
Nodal displacement in global Z, Loadcase 2176 MIN-UZ NODE Nodal Displacements , 1 cm 3D =
5.00 mm (Min=-2.37) (Max=0)

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11826 DSO Bovec - nadstresek tehnicne etaze
Povesi - sekundarni nosilci (kratkotrajna komb. / stalna komb.)



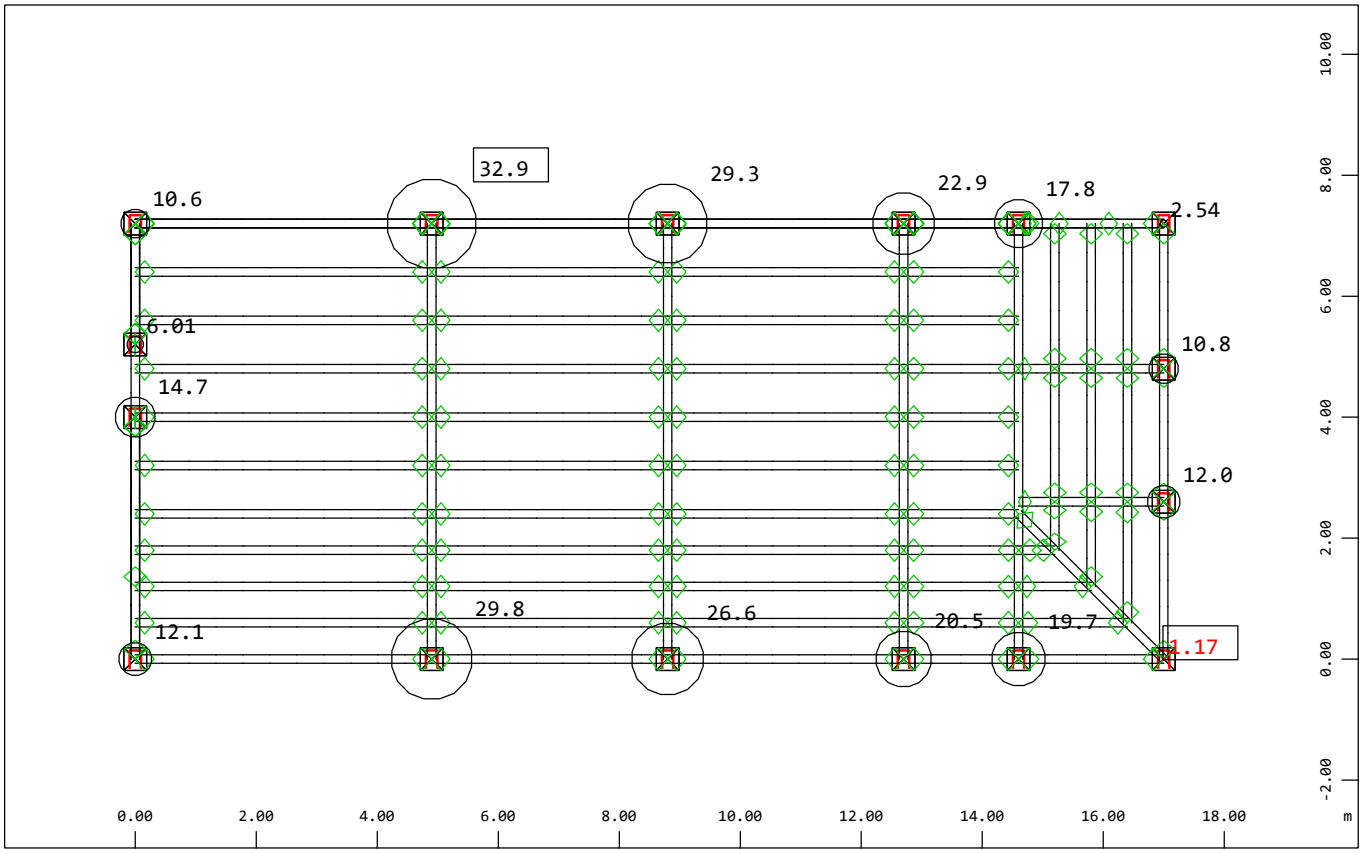

Y
Z—X
Sector of system Beam Elements Group 11 12
M 1 : 125
Nodal displacement in global Z, Loadcase 2476 MIN-UZ NODE Nodal Displacements , 1 cm 3D
= 20.0 mm (Min=-19.4) (Max=-0.0037)



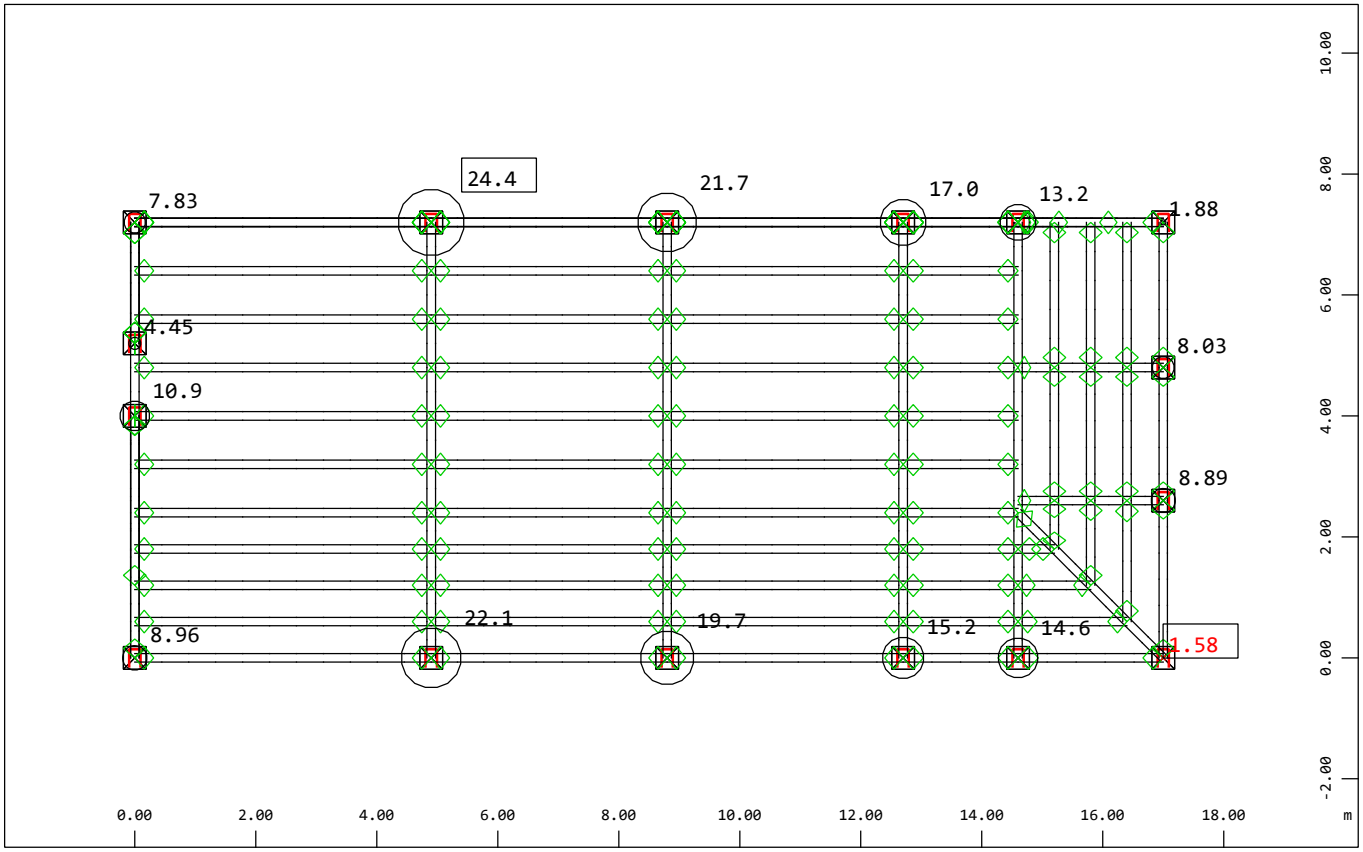

Y
Z—X
Sector of system Beam Elements Group 11 12
M 1 : 125
Nodal displacement in global Z, Loadcase 2176 MIN-UZ NODE Nodal Displacements , 1 cm 3D
= 20.0 mm (Min=-6.64) (Max= 7.9460e-04)

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11826 DSO Bovec - nadstresek tehnicne etaze
Ovoj. vert. reakcij - MSN-perm



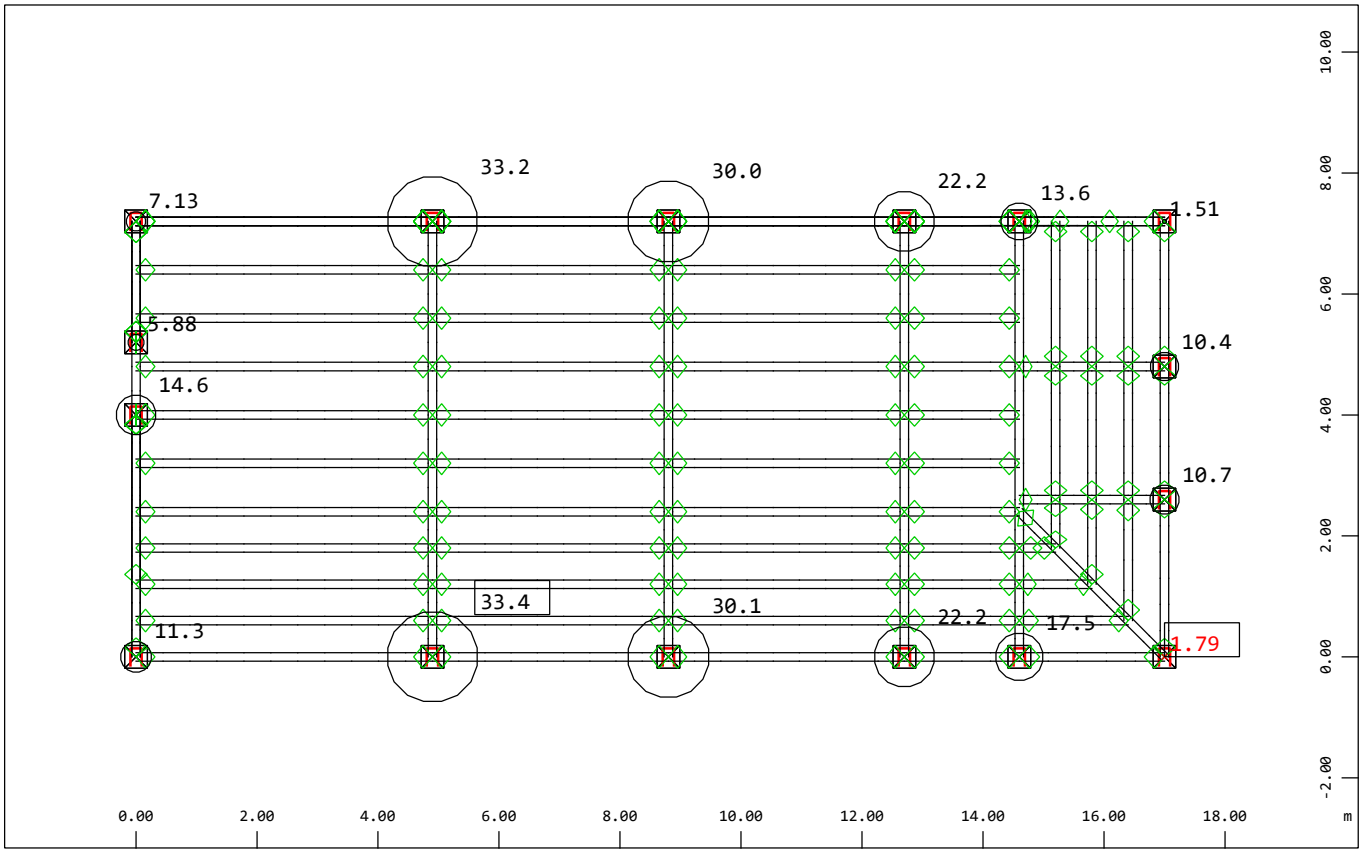

Nodes , Support force in global Z, Loadcase 2155 MAX-PZ NODE Supporting Forces in , 1 cm M 1 : 125
3D = 20.0 kN (Min=-1.17) (Max=32.9) (total: 267.2)



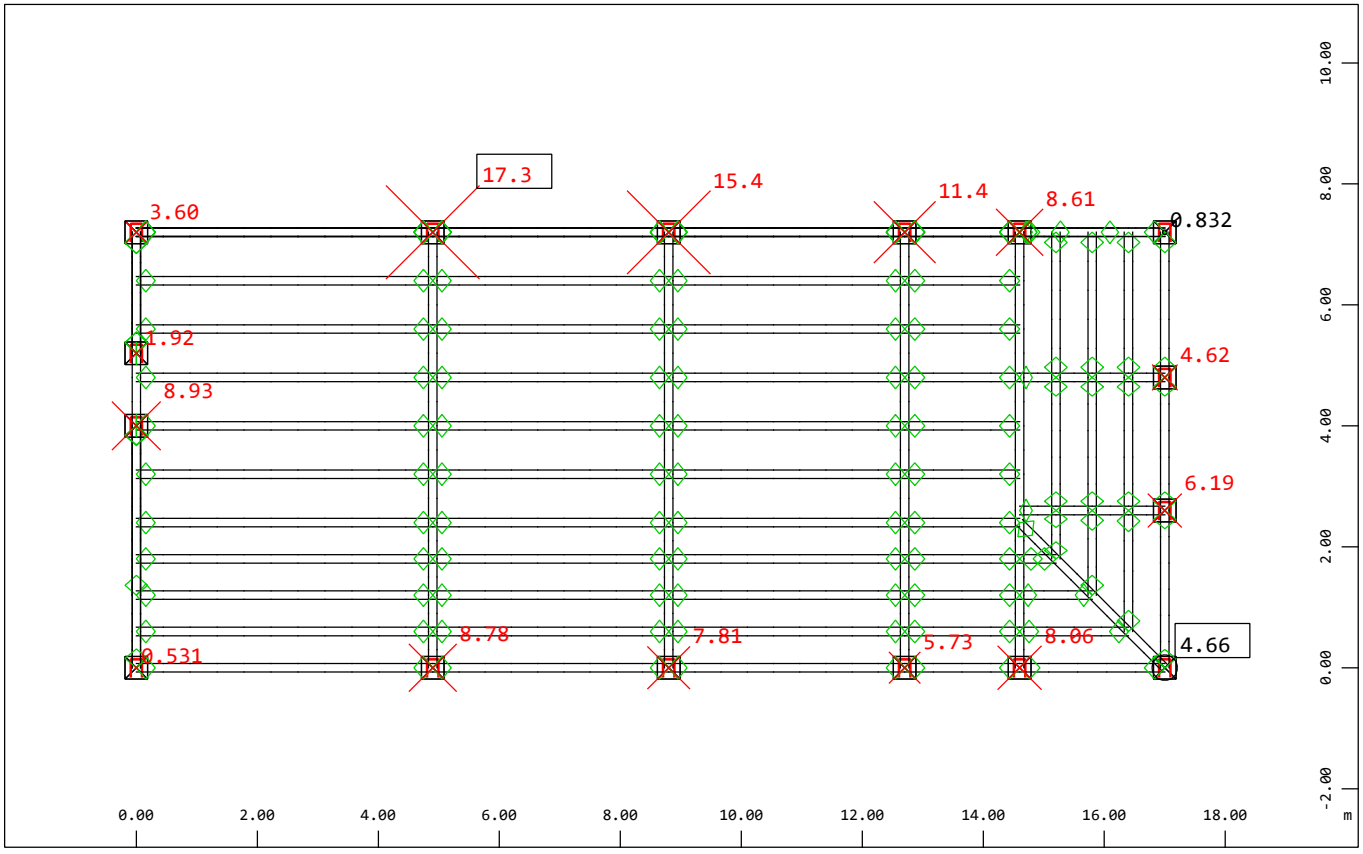

Nodes , Support force in global Z, Loadcase 2156 MIN-PZ NODE Supporting Forces in , 1 cm M 1 : 125
3D = 20.0 kN (Min=-1.58) (Max=24.4) (total: 197.2)

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11826 DSO Bovec - nadstresek tehnicne etaze
Maks. vert. reakcije - sneg, veter



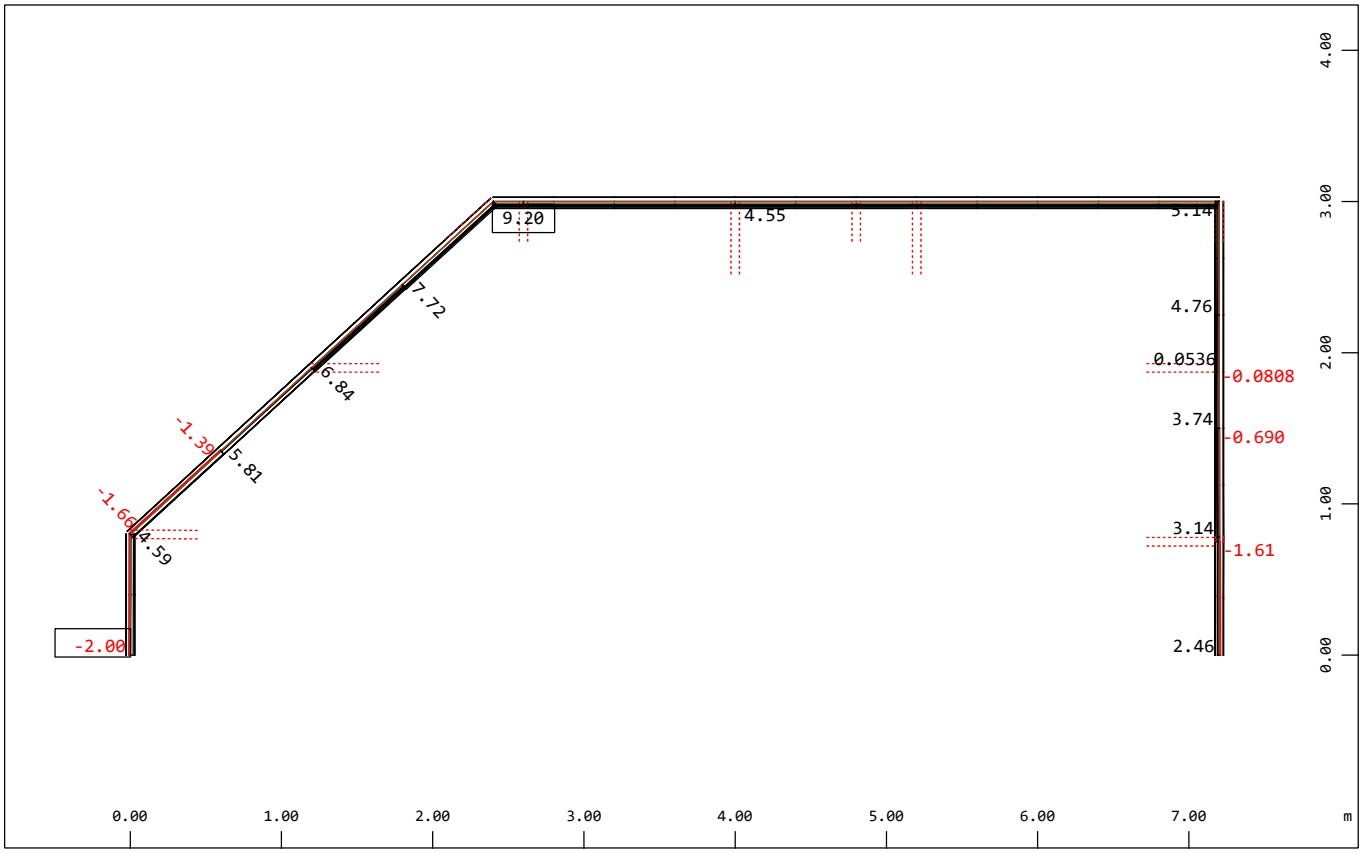

Y
Z—X
Nodes , Support force in global Z, Loadcase 21 Sneg , 1 cm 3D = 20.0 kN
(Min=-1.79) (Max=33.4) (total: 261.9)
M 1 : 125



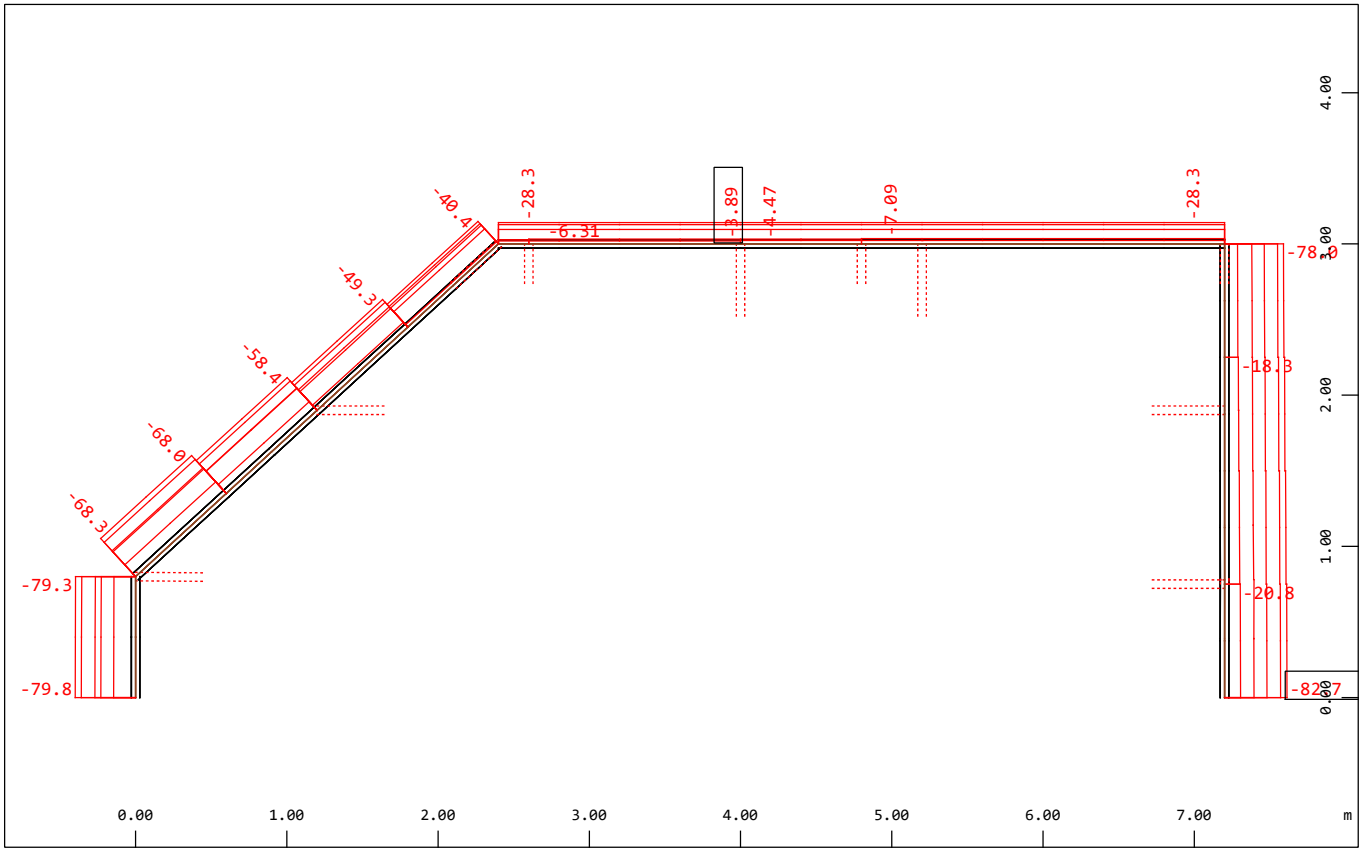

Y
Z—X
Nodes , Support force in global Z, Loadcase 34 Veter_Y- , 1 cm 3D = 10.0 kN
(Min=-17.3) (Max=4.66) (total: -103.4)
M 1 : 125

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11826 DSO Bovec - nadstresek tehnicne etaze
Ovoj. notranjih sil - MSN-short term: primarni nosilci



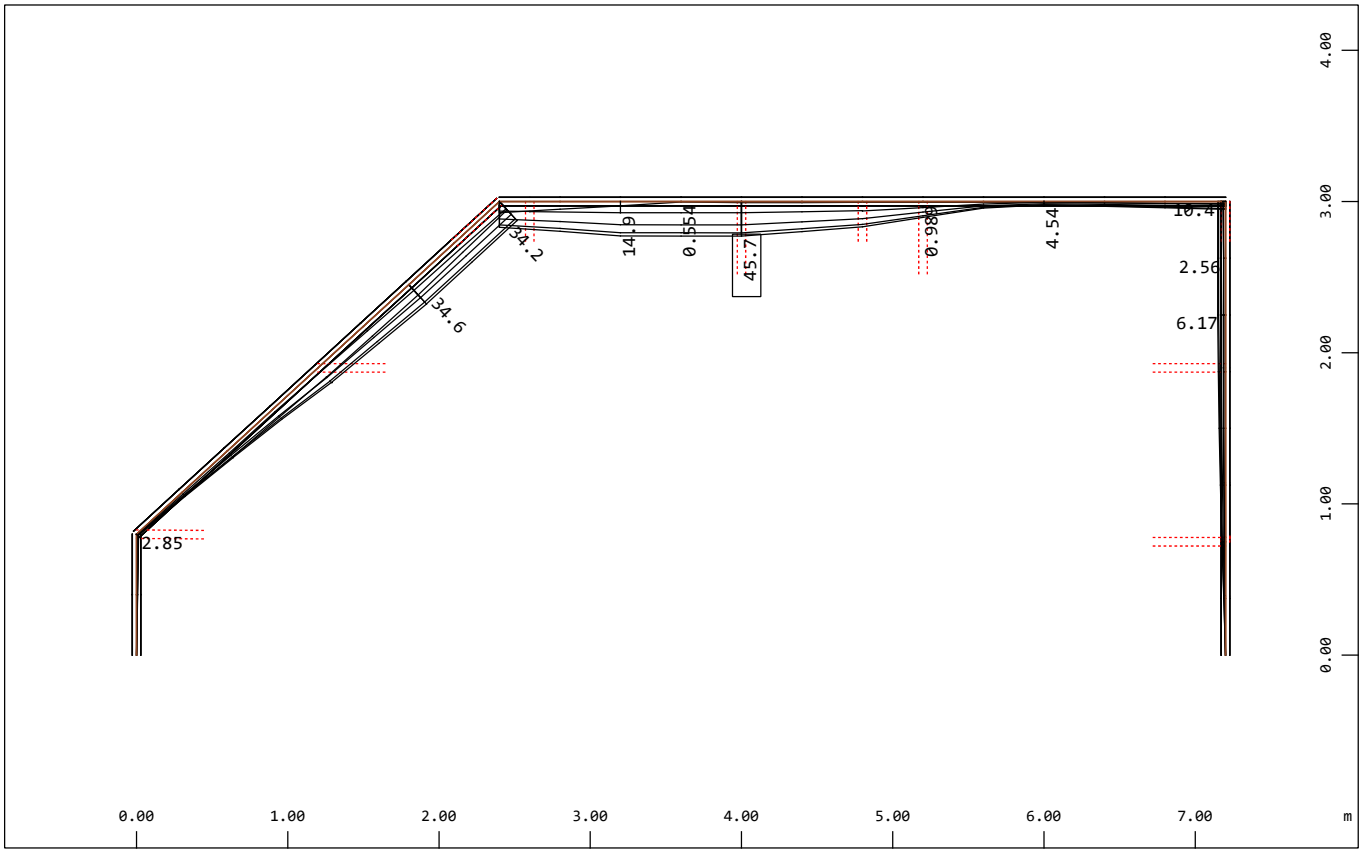

Sector of system Group 1 M 1 : 50
Beam Elements , Normal force Nx, Loadcase 2421 MAX-N BEAM Forces in Beam Elemen , 1 cm 3D
= 100.0 kN (Min=-2.00) (Max=9.20)



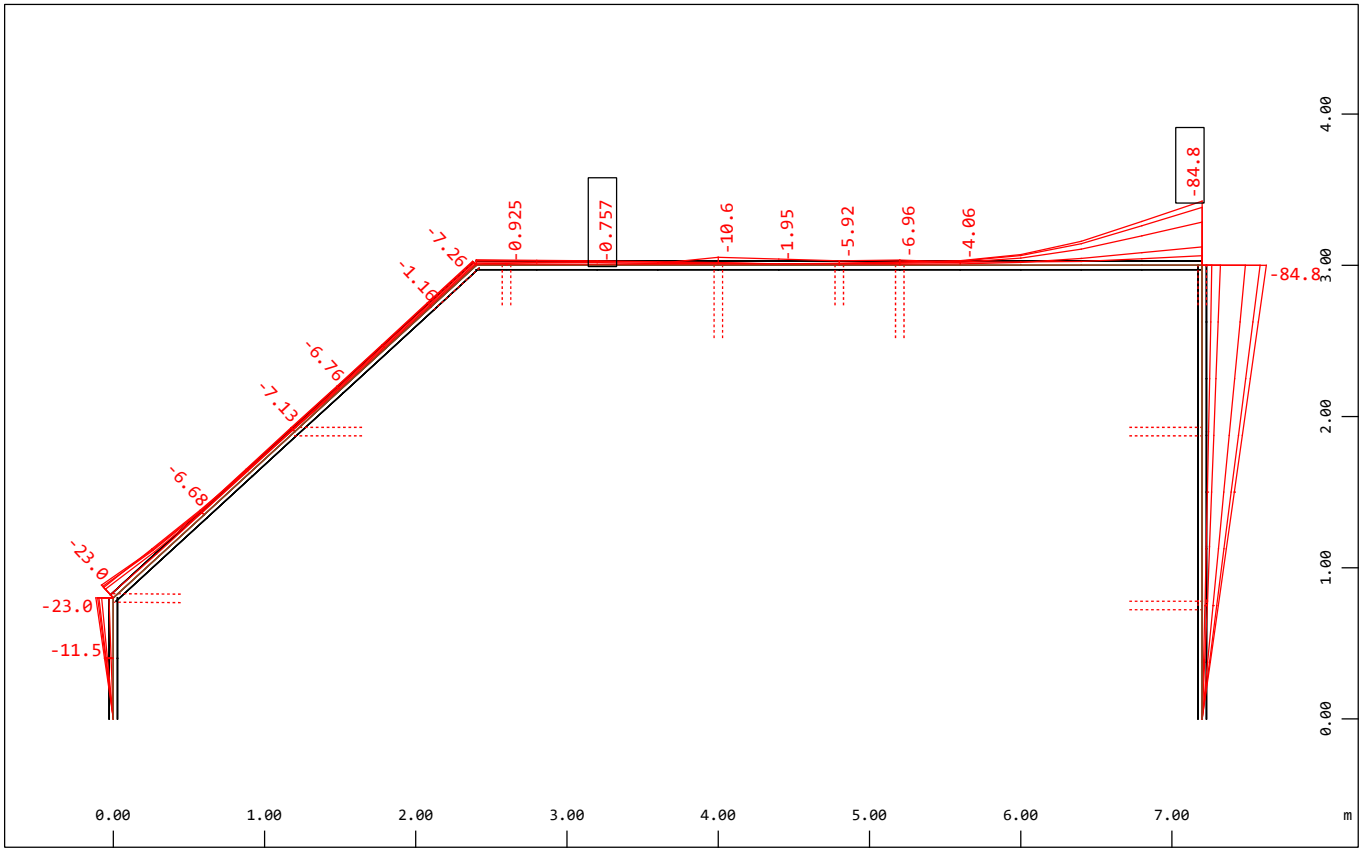

Sector of system Group 1 M 1 : 50
Beam Elements , Normal force Nx, Loadcase 2422 MIN-N BEAM Forces in Beam Elemen , 1 cm =
100.0 kN (Min=-82.7) (Max=-3.89)

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11826 DSO Bovec - nadstresek tehnicne etaze
Ovoj. notranjih sil - MSN-short term: primarni nosilci



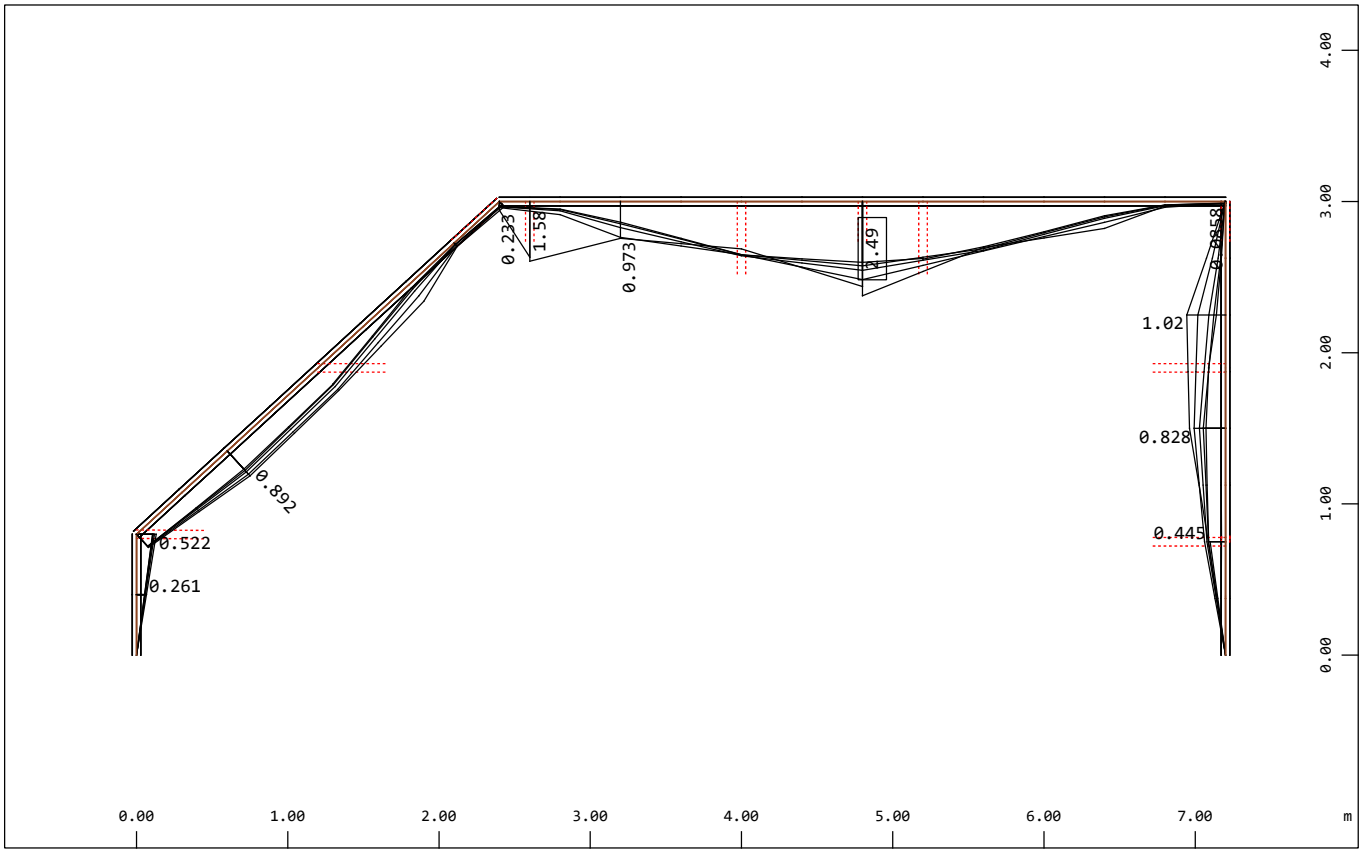

Z
X Y
Sector of system Group 1 M 1 : 50
Beam Elements , Bending moment My, Loadcase 2429 MAX-MY BEAM Forces in Beam Eleme , 1 cm
= 100.0 kNm (Min=-1.7764e-14) (Max=45.7)




Z
X Y
Sector of system Group 1 M 1 : 50
Beam Elements , Bending moment My, Loadcase 2430 MIN-MY BEAM Forces in Beam Eleme , 1 cm
= 100.0 kNm (Min=-84.8) (Max= 1.4211e-14)

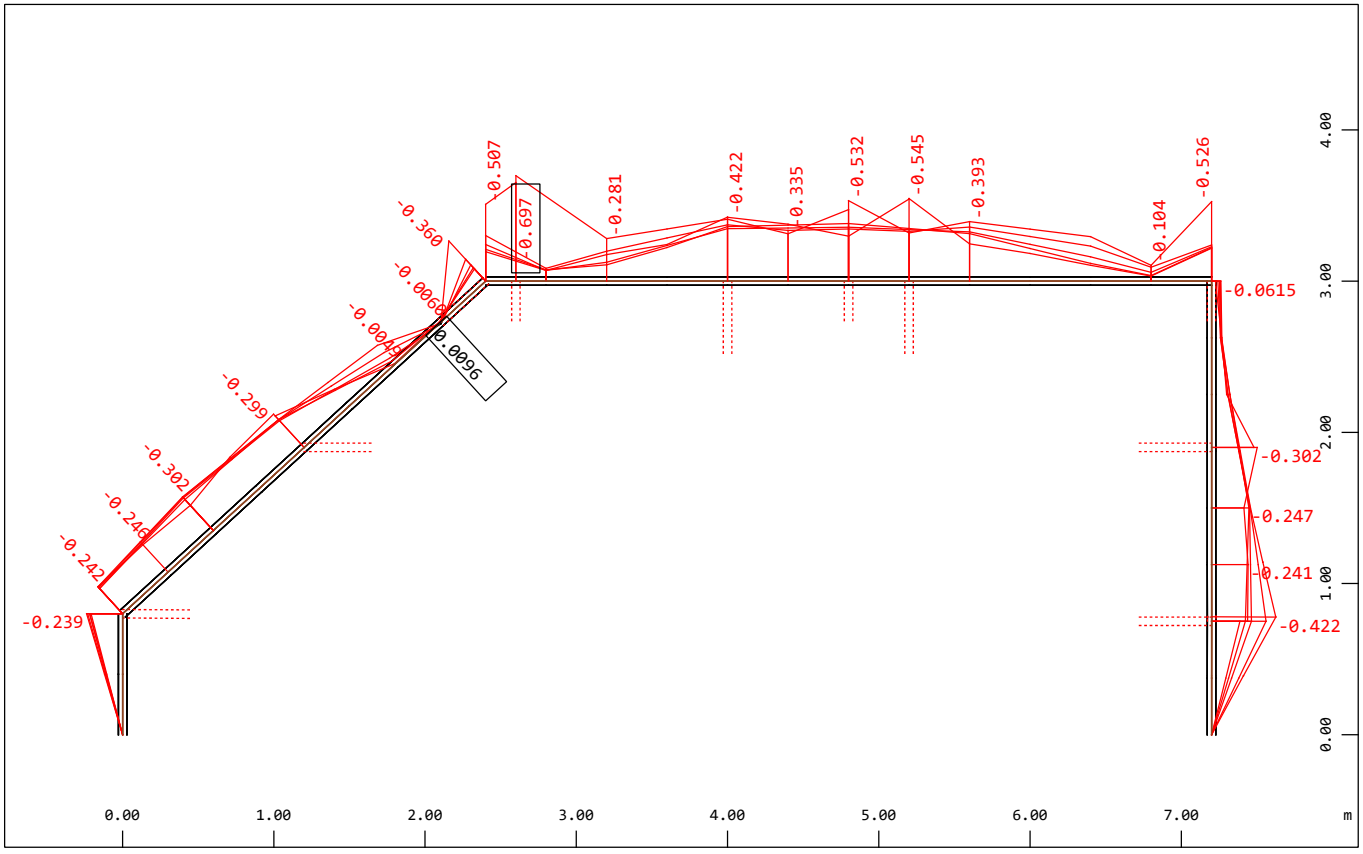
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11826 DSO Bovec - nadstresek tehnicne etaze
Ovoj. notranjih sil - MSN-short term: primarni nosilci




Z
X Y

Sector of system Group 1 M 1 : 50
Beam Elements , Bending moment Mz, Loadcase 2431 MAX-MZ BEAM Forces in Beam Eleme , 1 cm
= 2.00 kNm (Min=-3.3307e-16) (Max=2.49)

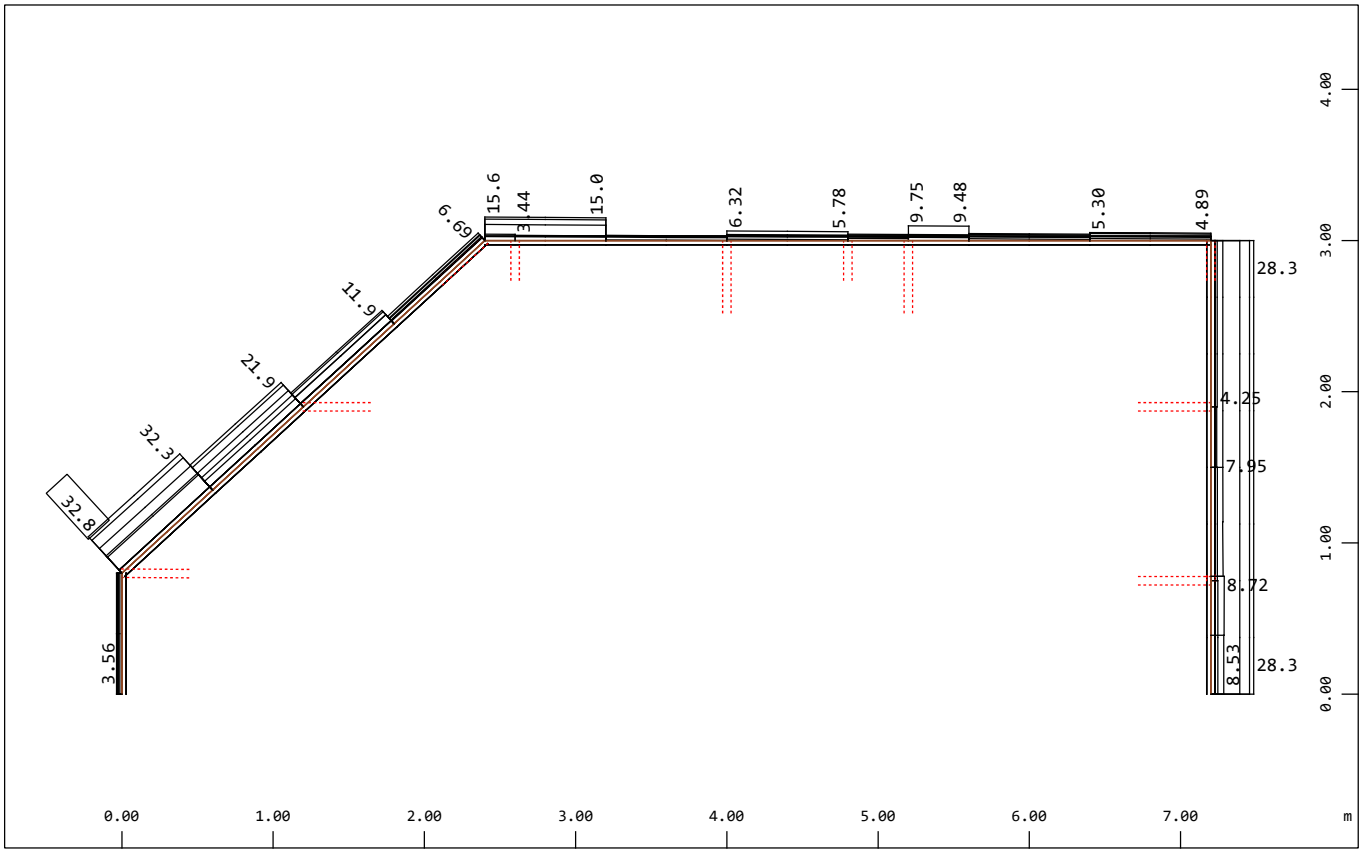



Z
X Y

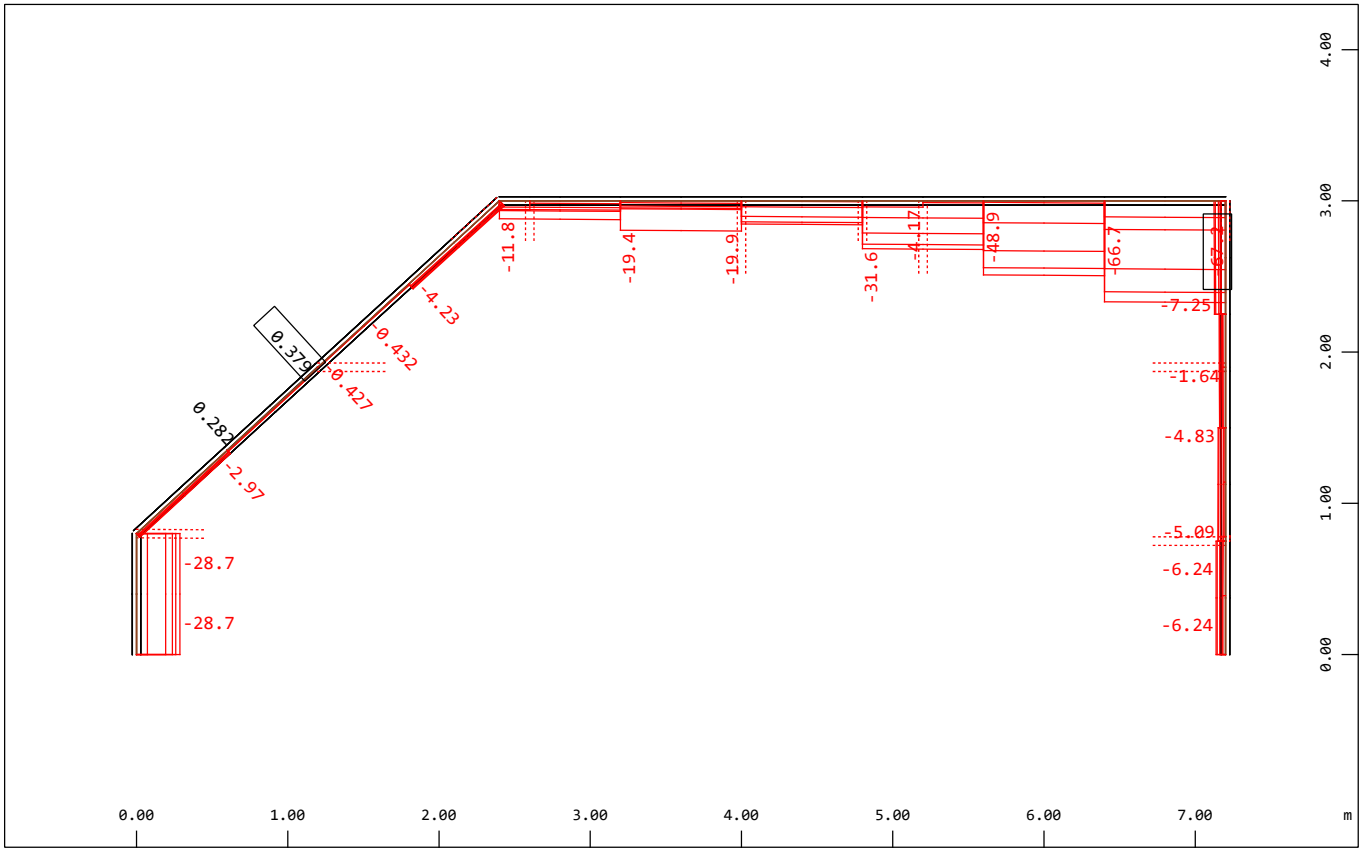
Sector of system Group 1 M 1 : 50
Beam Elements , Bending moment Mz, Loadcase 2432 MIN-MZ BEAM Forces in Beam Eleme , 1 cm
= 0.500 kNm (Min=-0.697) (Max=0.0096)

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11826 DSO Bovec - nadstresek tehnicne etaze
Ovoj. notranjih sil - MSN-short term: primarni nosilci



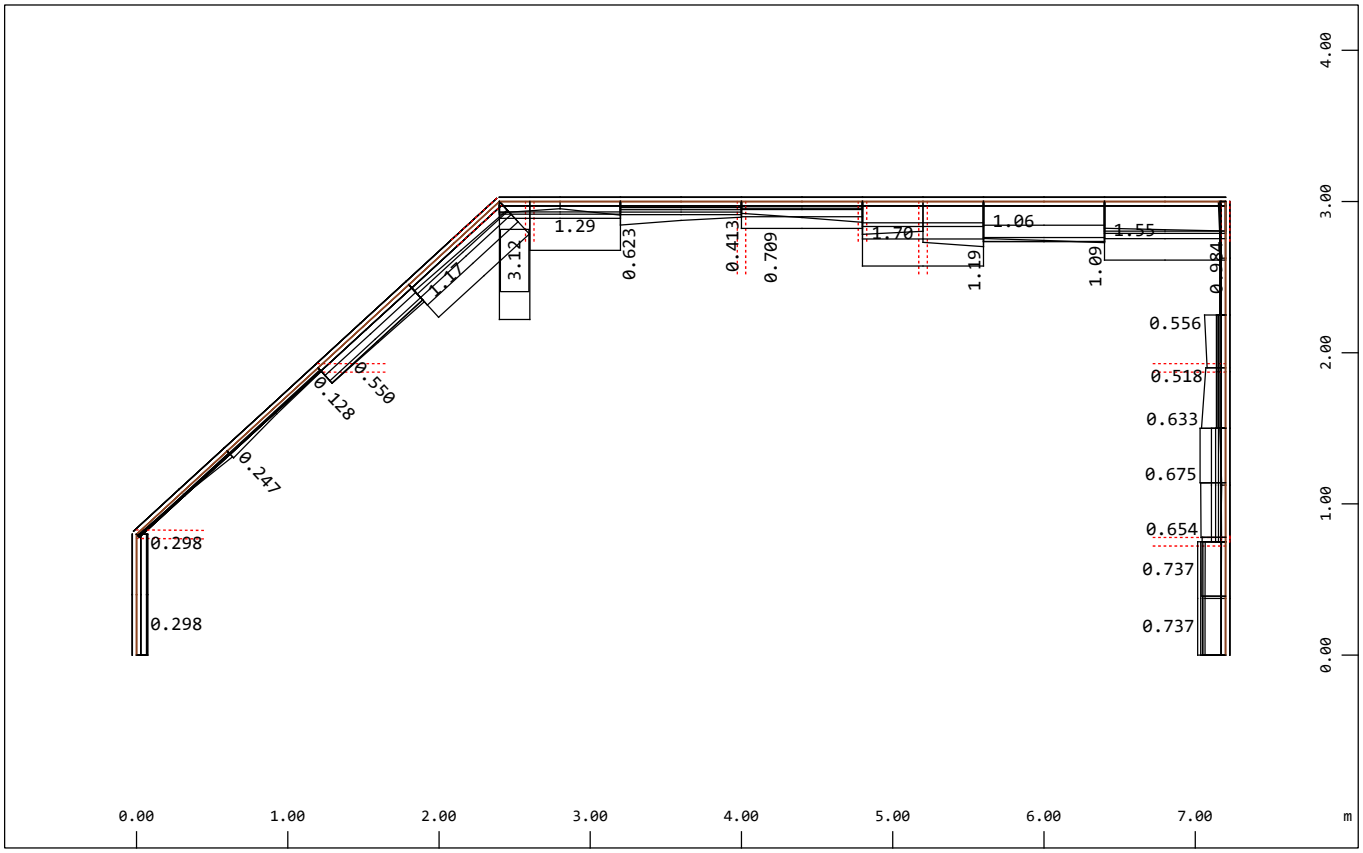

Z
X Y
Sector of system Group 1 M 1 : 50
Beam Elements , Shear force Vz, Loadcase 2425 MAX-VZ BEAM Forces in Beam Eleme , 1 cm =
50.0 kN (Max=32.8)



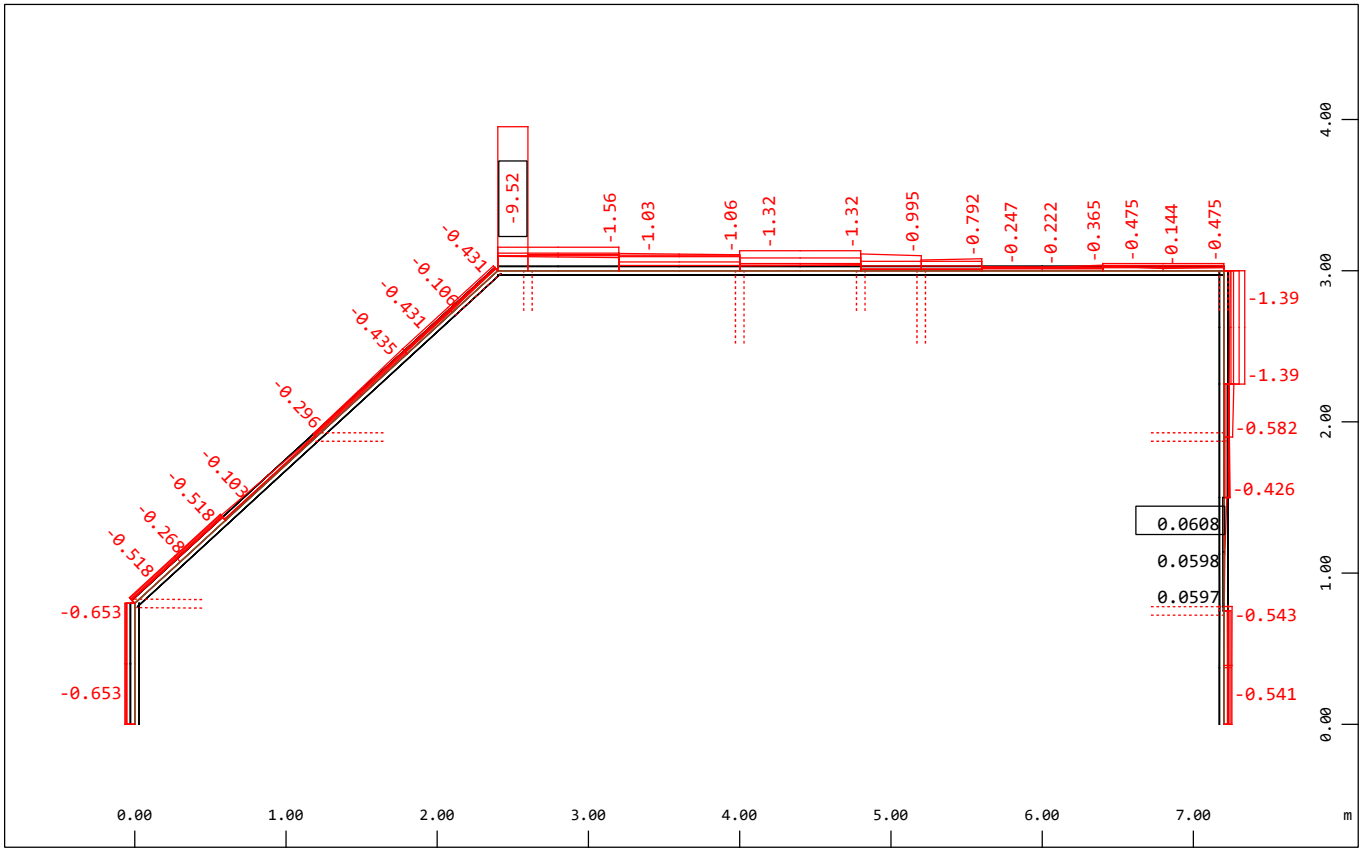

Z
X Y
Sector of system Group 1 M 1 : 50
Beam Elements , Shear force Vz, Loadcase 2426 MIN-VZ BEAM Forces in Beam Eleme , 1 cm =
50.0 kN (Min=-67.2) (Max=0.379)

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11826 DSO Bovec - nadstresek tehnicne etaze
Ovoj. notranjih sil - MSN-short term: primarni nosilci



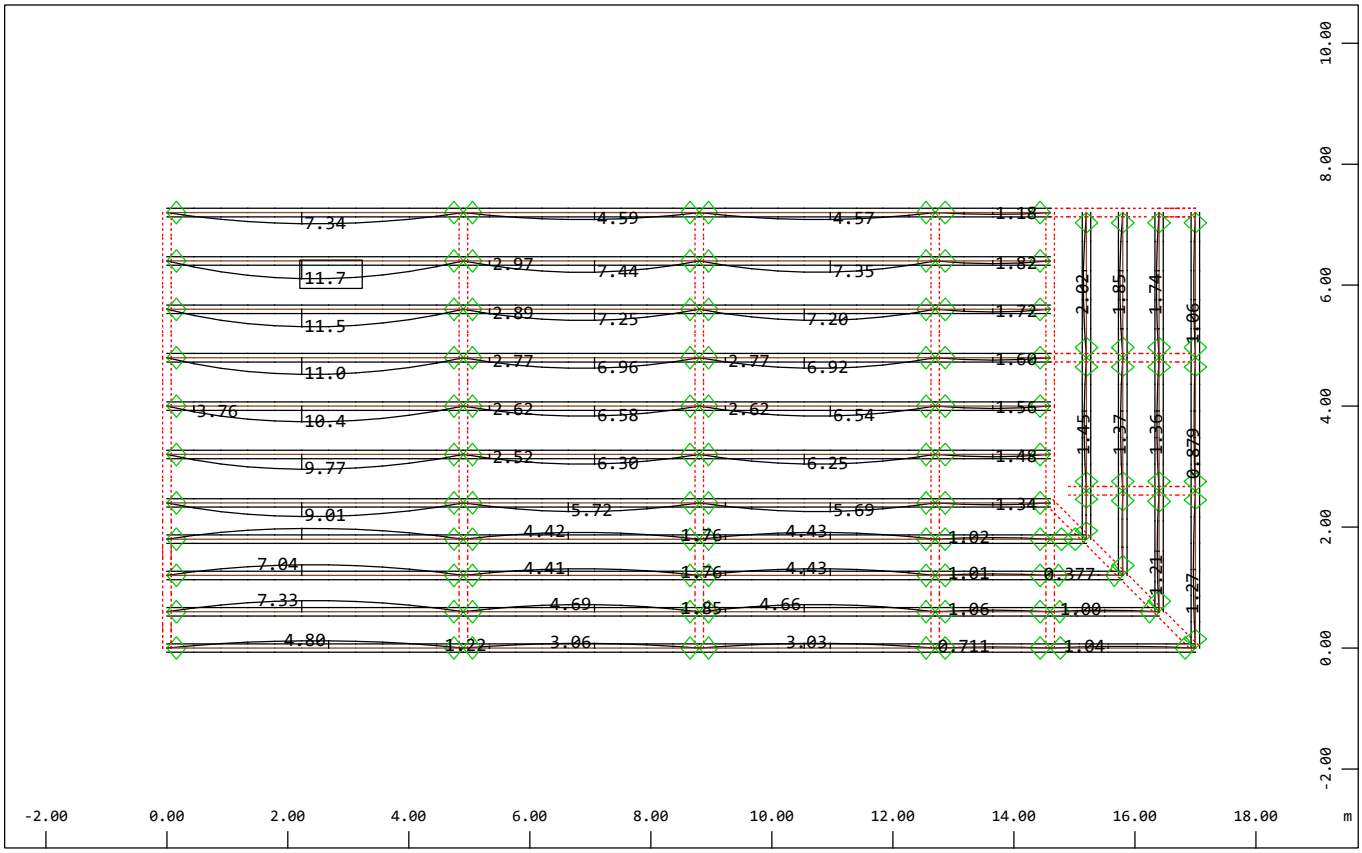

Z
X Y
Sector of system Group 1 M 1 : 50
Beam Elements , Shear force Vy, Loadcase 2423 MAX-VY BEAM Forces in Beam Eleme , 1 cm =
2.00 kN (Max=3.12)



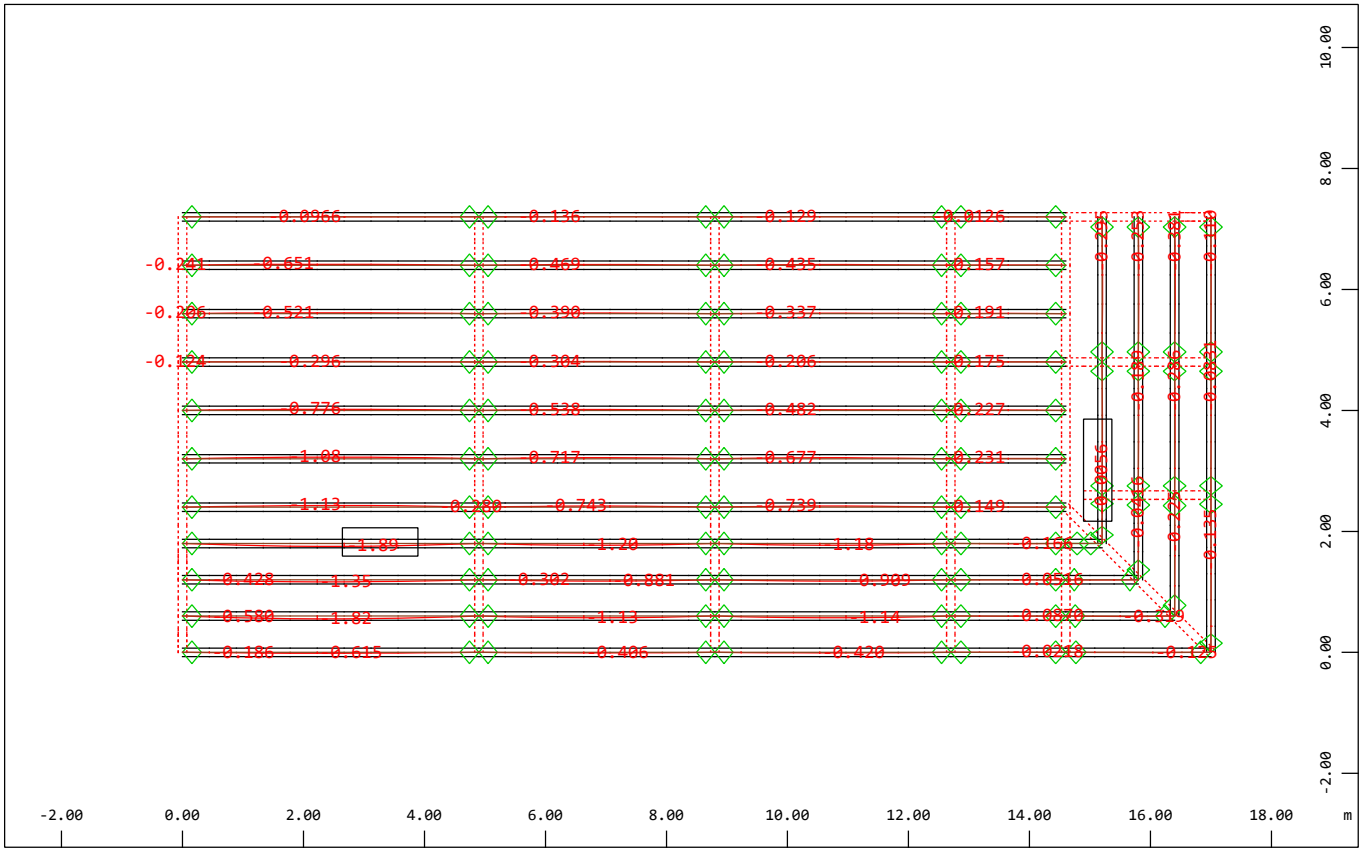

Z
X Y
Sector of system Group 1 M 1 : 50
Beam Elements , Shear force Vy, Loadcase 2424 MIN-VY BEAM Forces in Beam Eleme , 1 cm =
5.00 kN (Min=-9.52) (Max=0.0608)

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11826 DSO Bovec - nadstresek tehnicne etaze
Ovoj. notranjih sil - MSN-short term: sekundarni nosilci



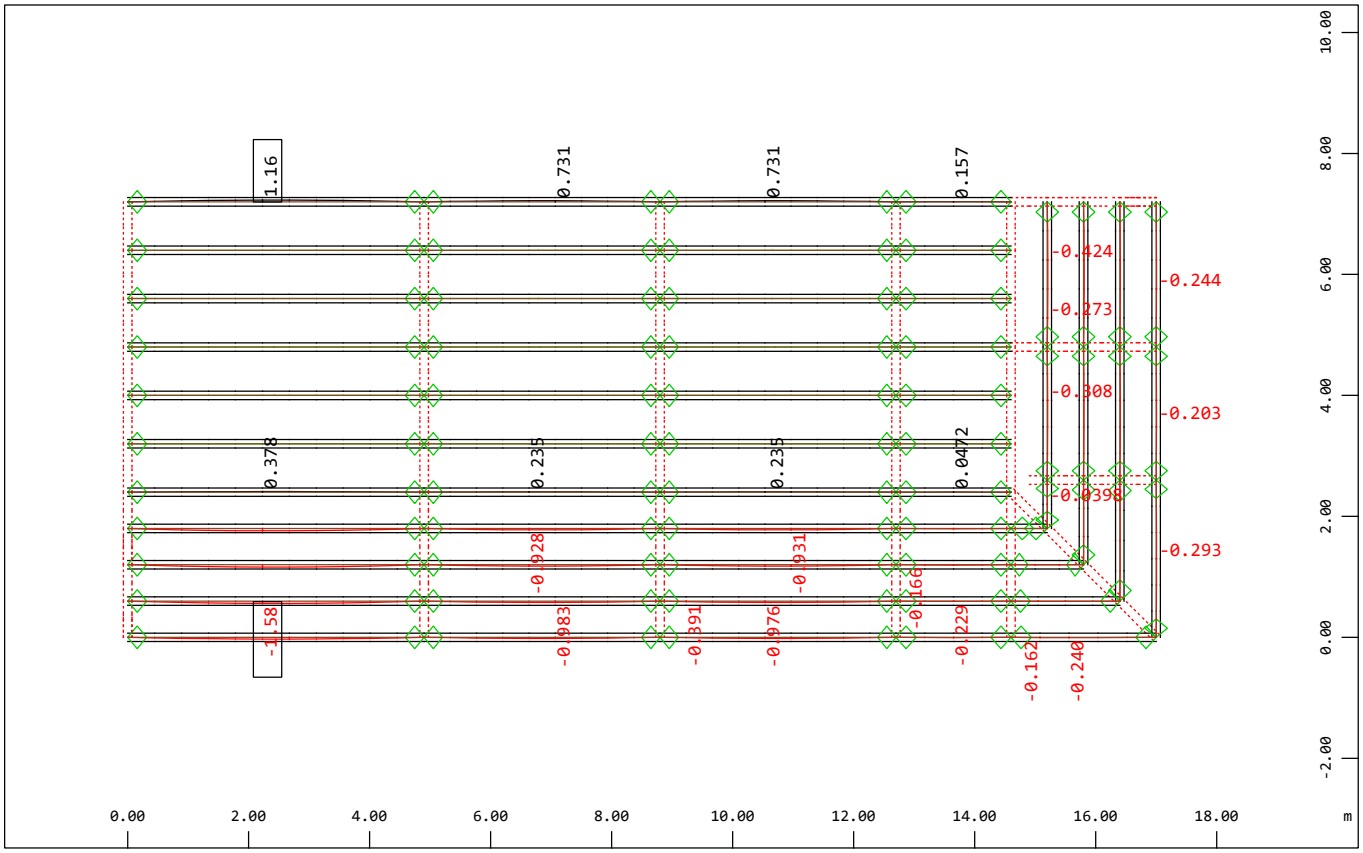

Y
Z—X
Sector of system Group 11 M 1 : 125
Beam Elements , Bending moment My, Loadcase 2429 MAX-MY BEAM Forces in Beam Eleme , 1 cm
= 50.0 kNm (Min=-2.2551e-17) (Max=11.7)



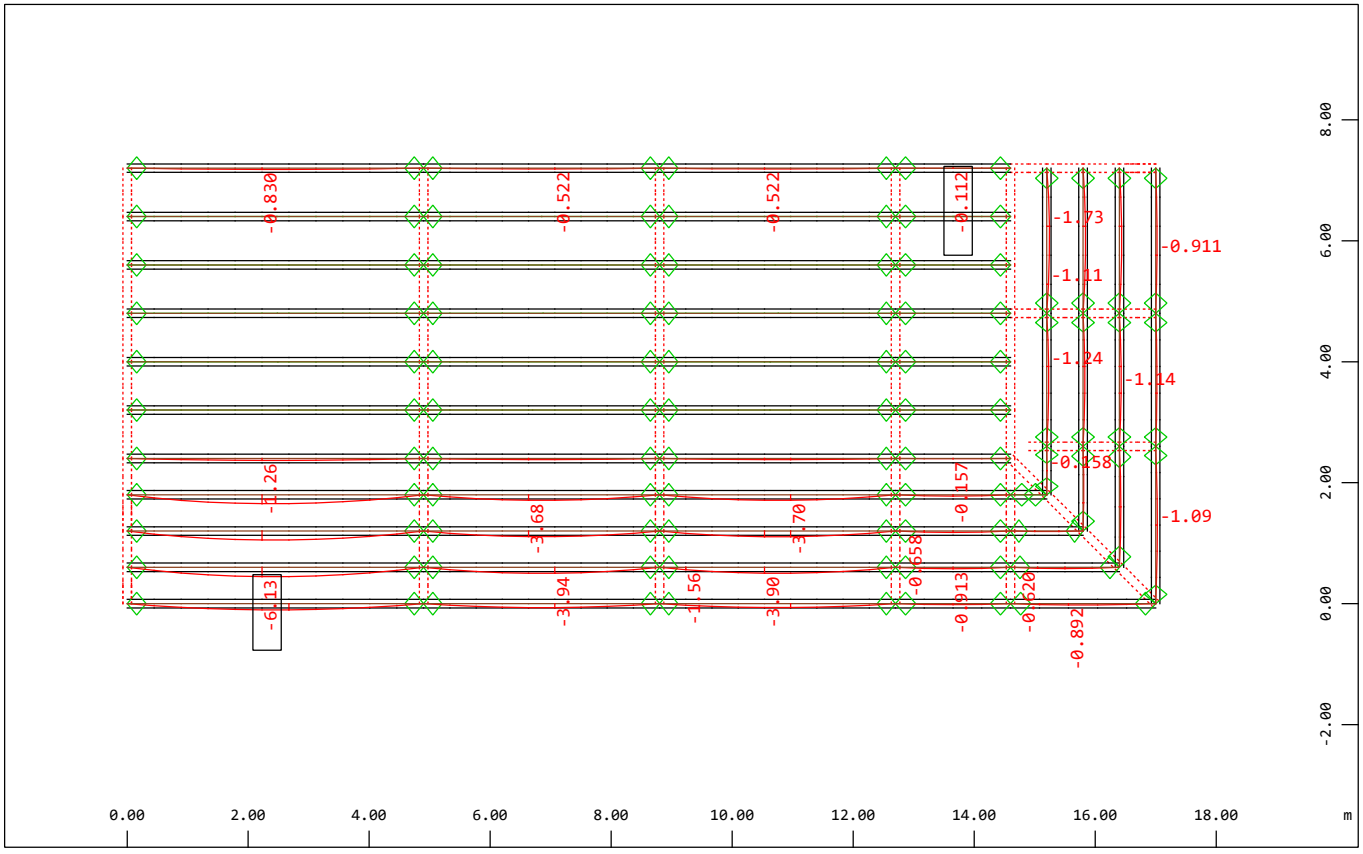

Y
Z—X
Sector of system Group 11 M 1 : 125
Beam Elements , Bending moment My, Loadcase 2430 MIN-MY BEAM Forces in Beam Eleme , 1 cm
= 50.0 kNm (Min=-1.89) (Max= 3.2960e-17)

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11826 DSO Bovec - nadstresek tehnicne etaze
Ovoj. notranjih sil - MSN-short term: sekundarni nosilci



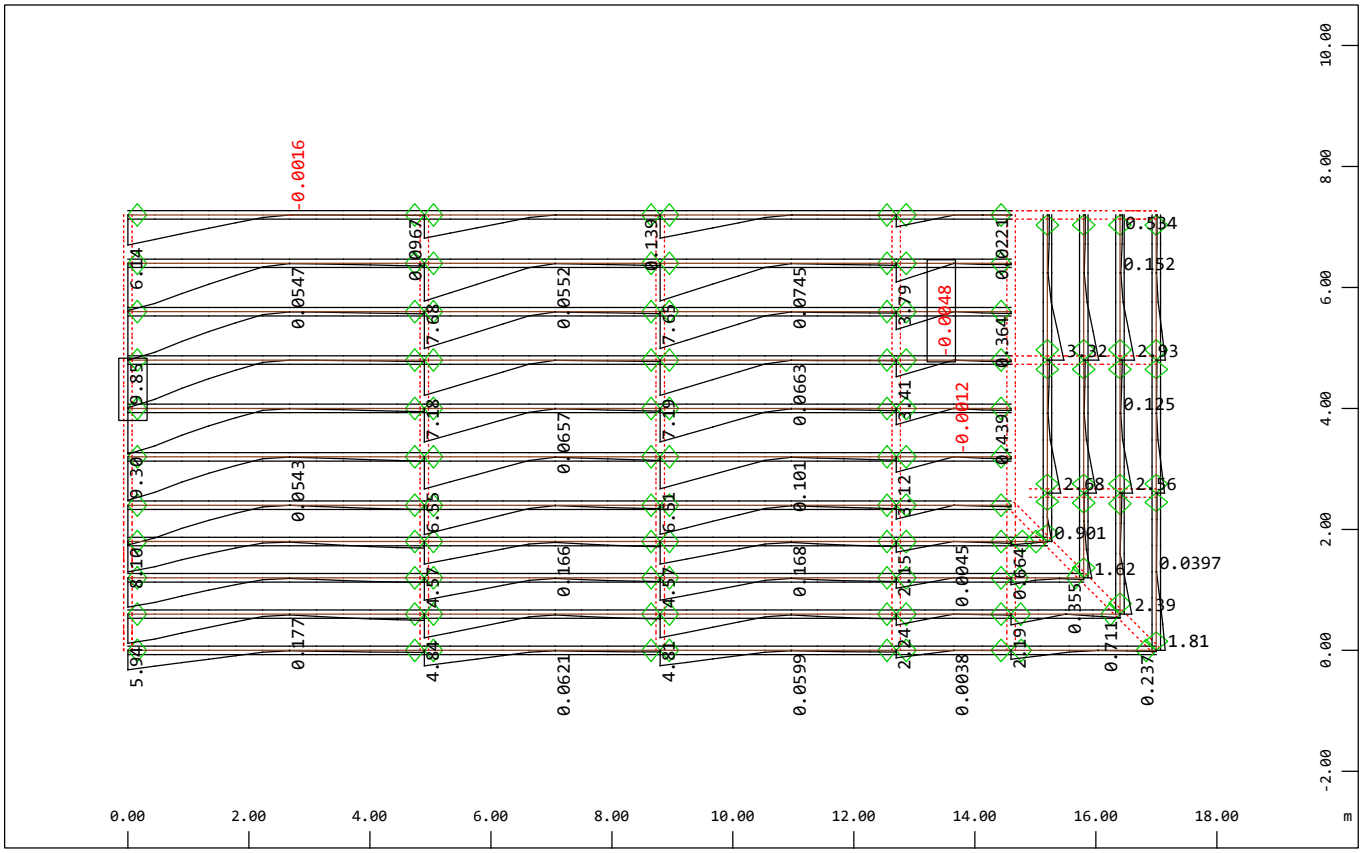

Sector of system Group 11 M 1 : 125
Beam Elements , Bending moment Mz, Loadcase 2431 MAX-MZ BEAM Forces in Beam Eleme , 1 cm
= 50.0 kNm (Min=-1.58) (Max=1.16)



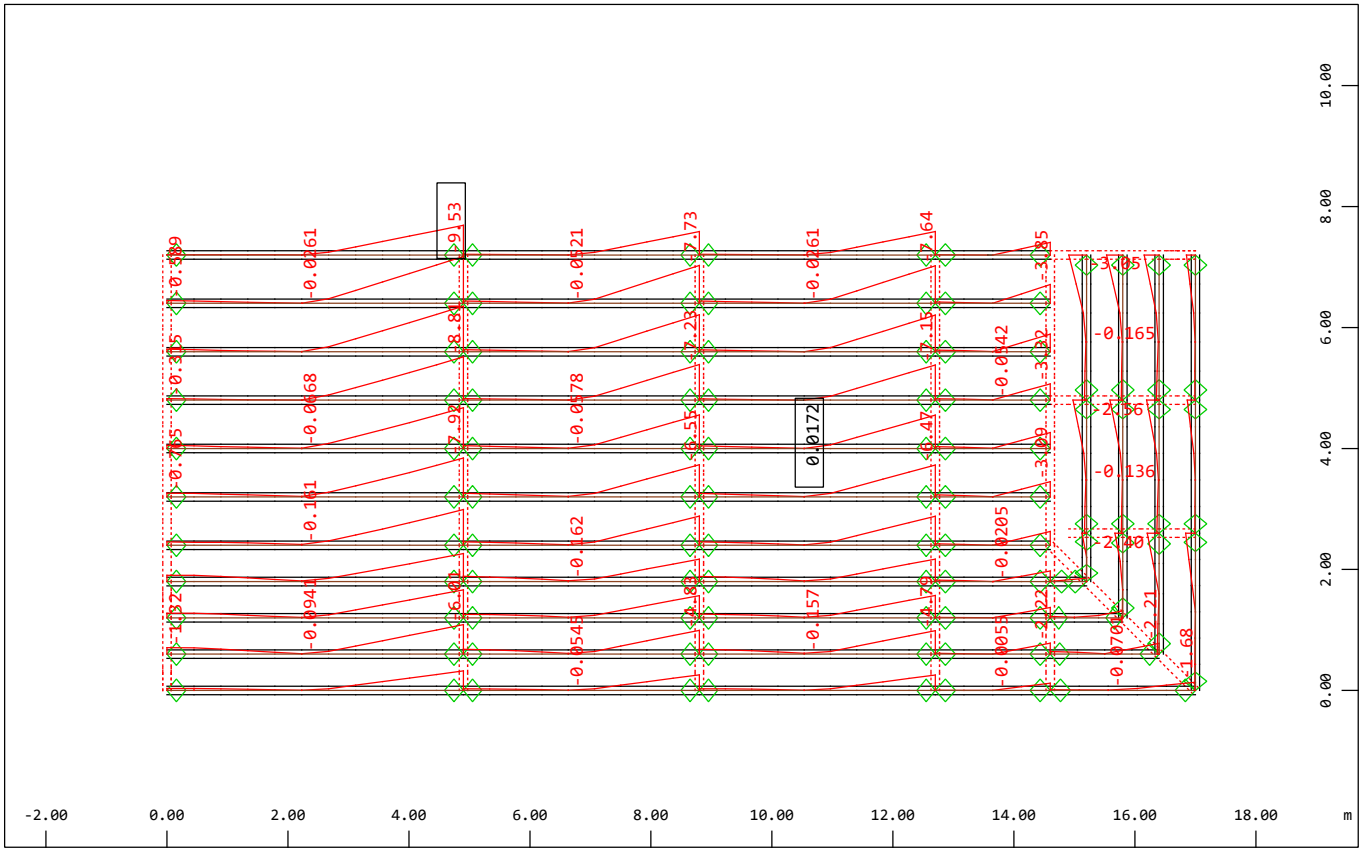

Sector of system Group 11 M 1 : 125
Beam Elements , Bending moment Mz, Loadcase 2432 MIN-MZ BEAM Forces in Beam Eleme , 1 cm
= 50.0 kNm (Min=-6.13) (Max= 7.8228e-11)

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11826 DSO Bovec - nadstresek tehnicne etaze
Ovoj. notranjih sil - MSN-short term: sekundarni nosilci



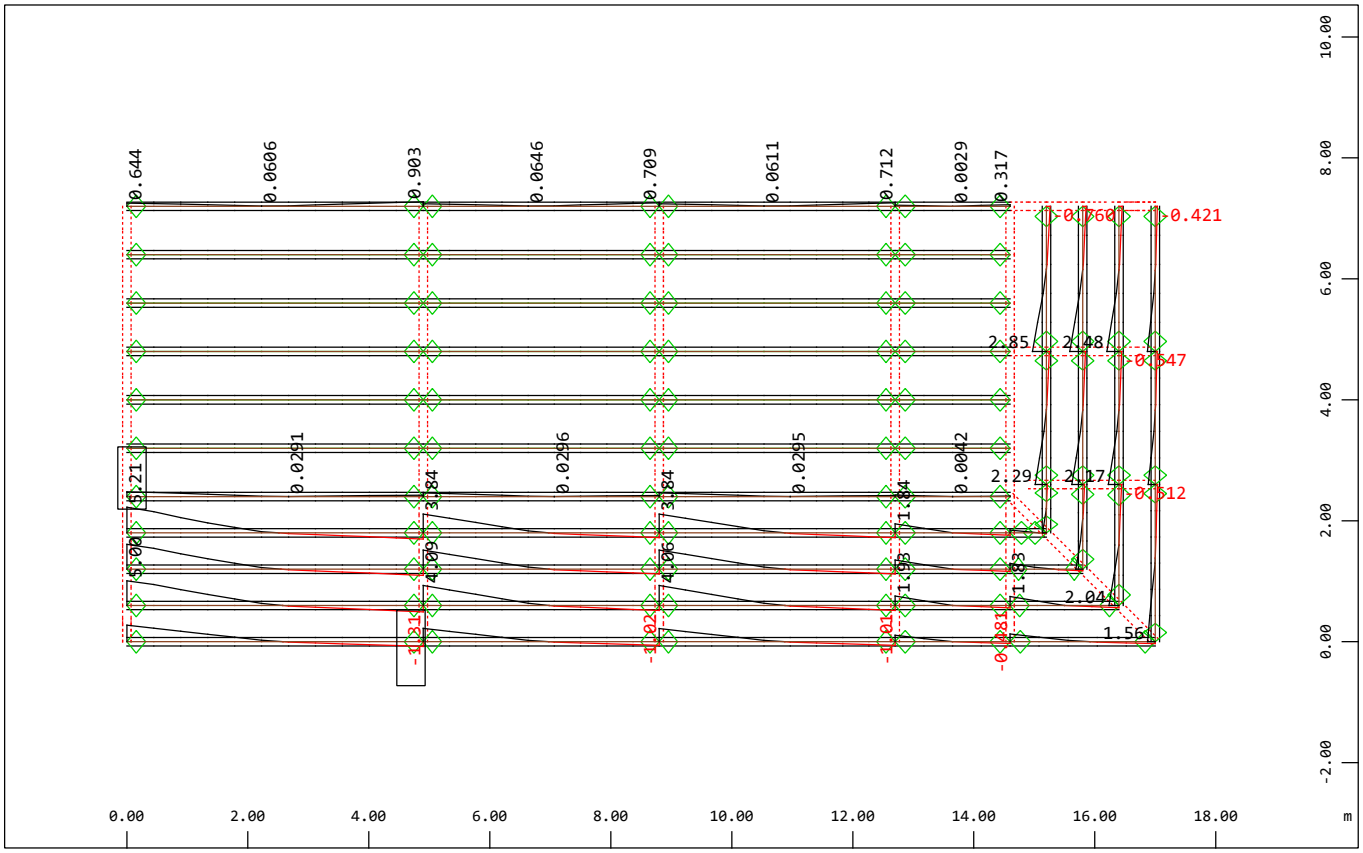

Sector of system Group 11 M 1 : 125
Beam Elements , Shear force Vz, Loadcase 2425 MAX-VZ BEAM Forces in Beam Eleme , 1 cm =
15.4 kN (Min=-0.0048) (Max=9.85)



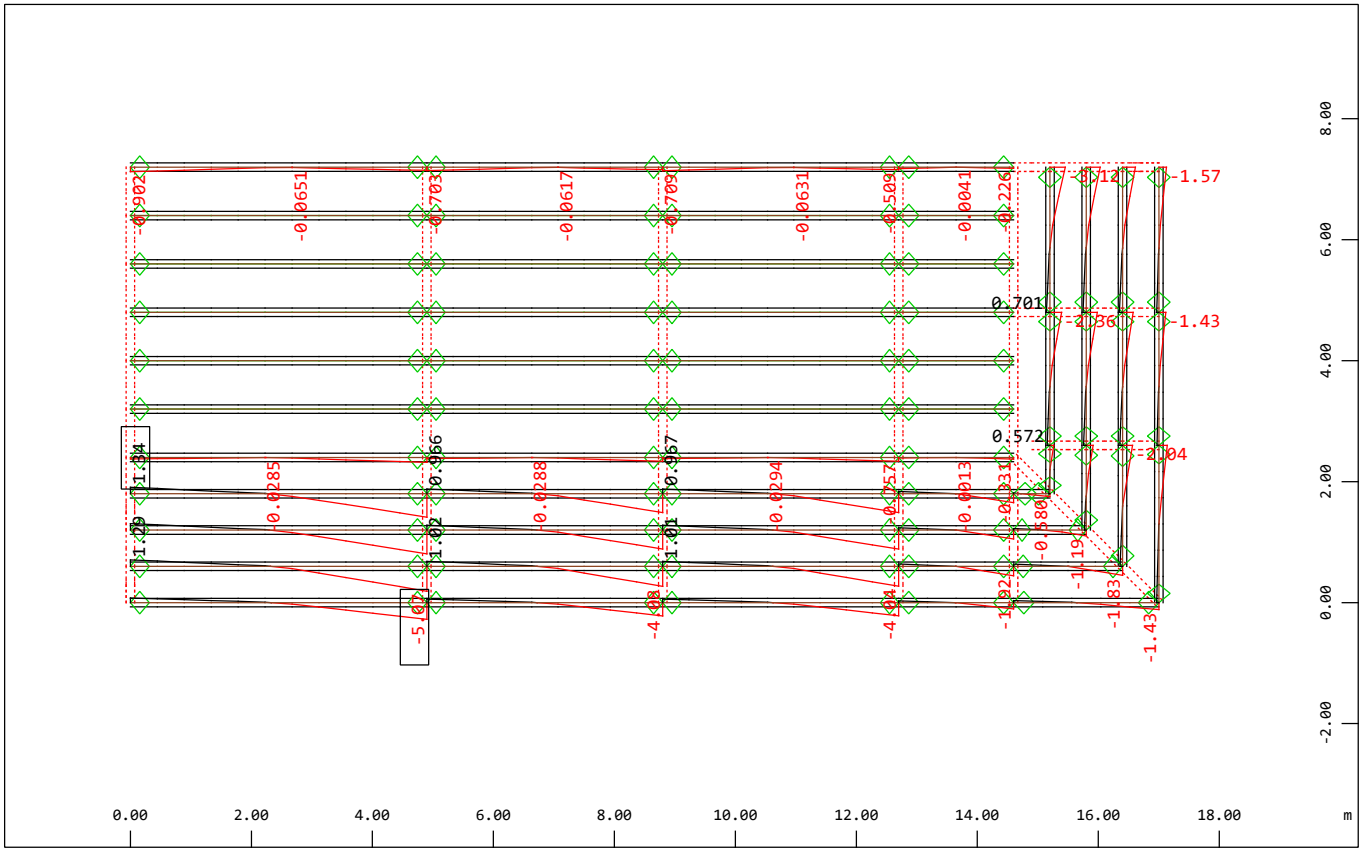

Sector of system Group 11 M 1 : 125
Beam Elements , Shear force Vz, Loadcase 2426 MIN-VZ BEAM Forces in Beam Eleme , 1 cm =
15.4 kN (Min=-9.53) (Max=0.0172)

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11826 DSO Bovec - nadstresek tehnicne etaze
Ovoj. notranjih sil - MSN-short term: sekundarni nosilci



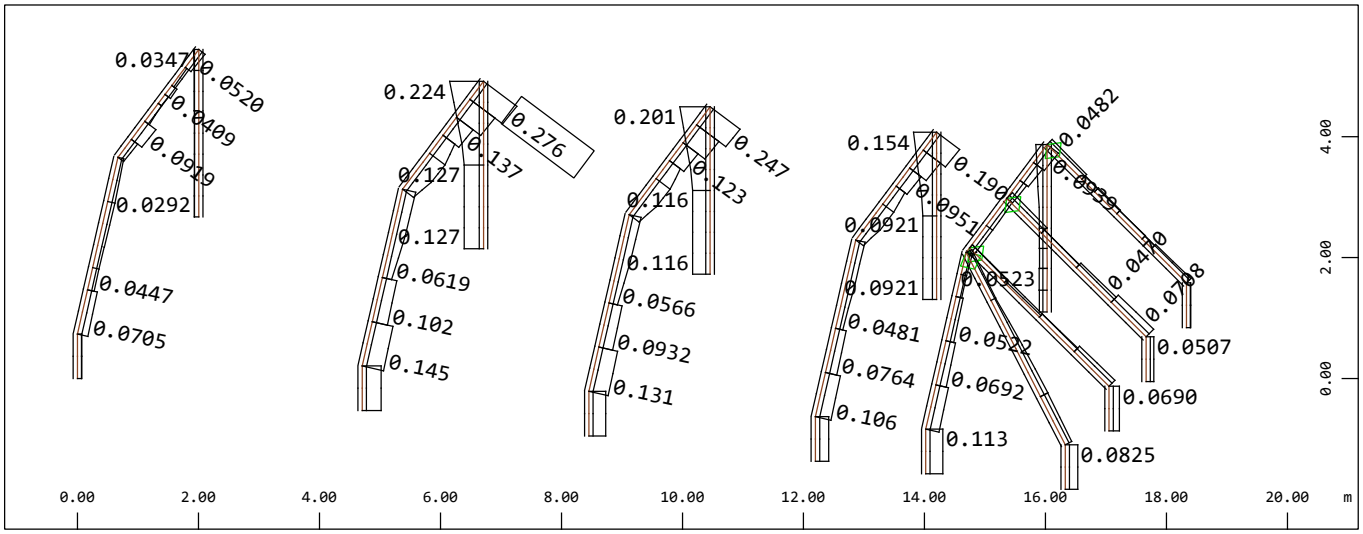

Sector of system Group 11 M 1 : 125
Beam Elements , Shear force Vy, Loadcase 2423 MAX-VY BEAM Forces in Beam Eleme , 1 cm =
15.4 kN (Min=-1.31) (Max=5.21)




Sector of system Group 11 M 1 : 125
Beam Elements , Shear force Vy, Loadcase 2424 MIN-VY BEAM Forces in Beam Eleme , 1 cm =
15.4 kN (Min=-5.07) (Max=1.34)

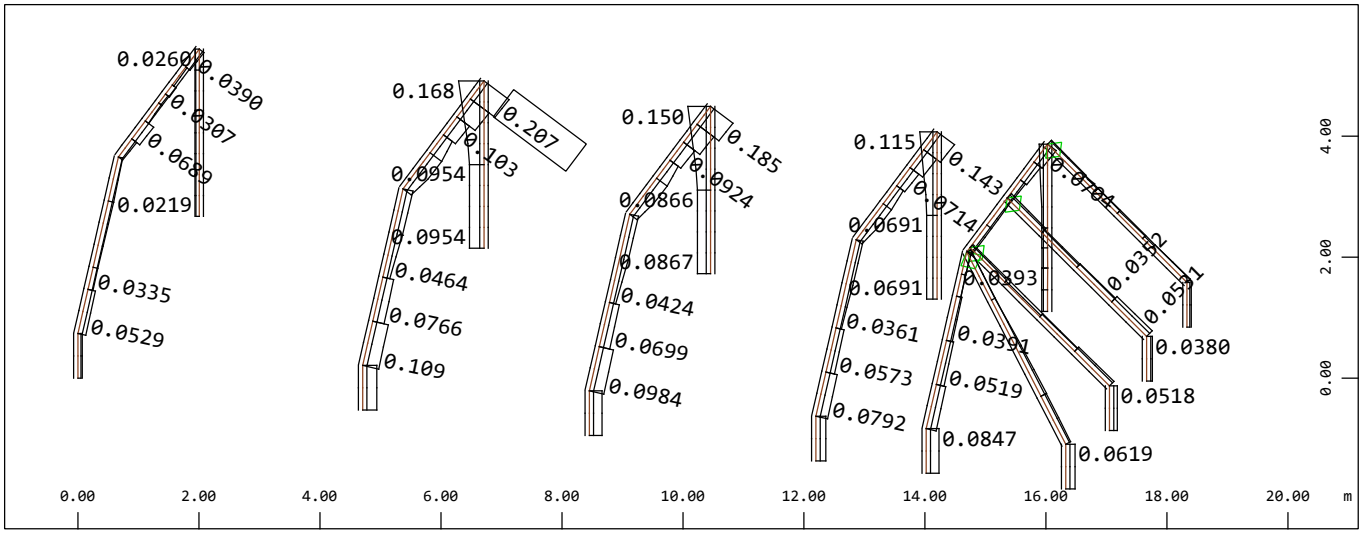
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11826 DSO Bovec - nadstresek tehnicne etaze
Izkoriscenosti - primarni nosilci (perm, mittel, short)



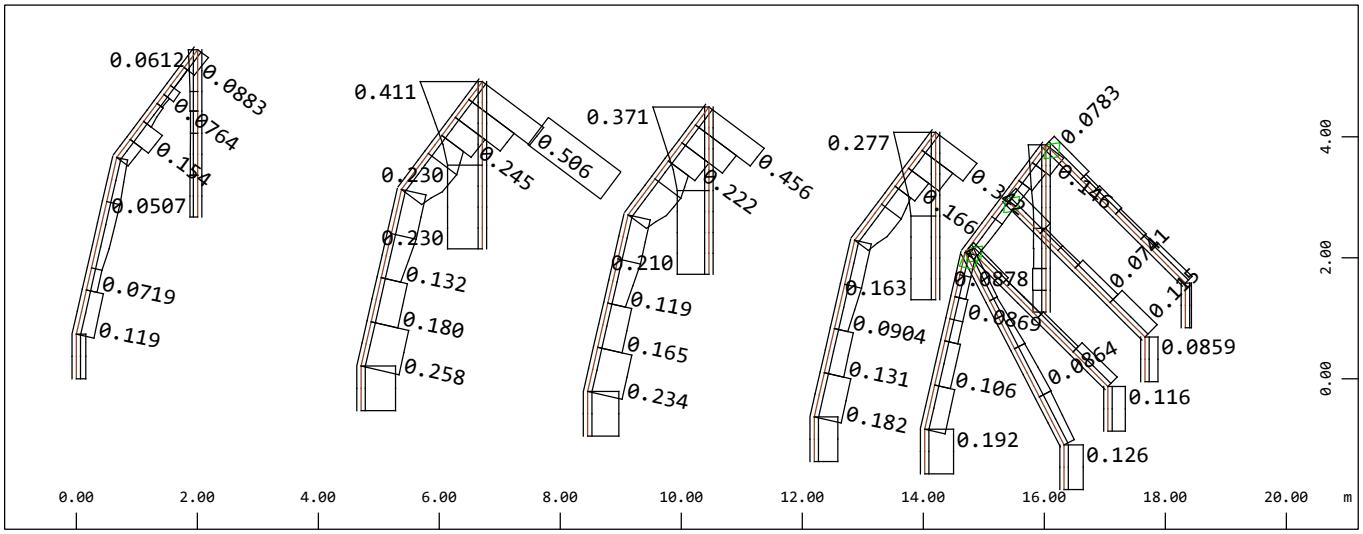

Sector of system Beam Elements Group 1 2
Beam Elements , Utilisation level Decisive - Total, Design Case 601 GlobalMAX SIGMA , 1
cm 3D = 0.500 (Max=0.276)

M 1 : 125
X * 0.966
Y * 0.464
Z * 0.922




Sector of system Beam Elements Group 1 2
Beam Elements , Utilisation level Decisive - Total, Design Case 701 GlobalMAX SIGMA , 1
cm 3D = 0.500 (Max=0.207)

M 1 : 125
X * 0.966
Y * 0.464
Z * 0.922

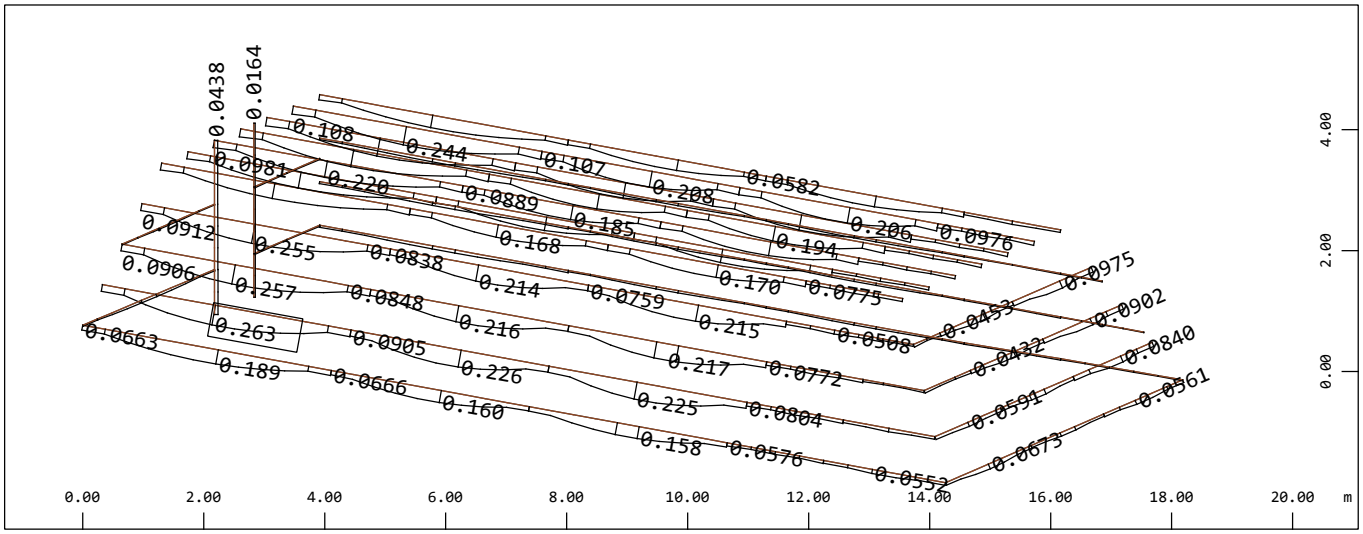



Sector of system Beam Elements Group 1 2
Beam Elements , Utilisation level Decisive - Total, Design Case 801 GlobalMAX SIGMA , 1
cm 3D = 0.500 (Max=0.506)

M 1 : 125
X * 0.966
Y * 0.464
Z * 0.922

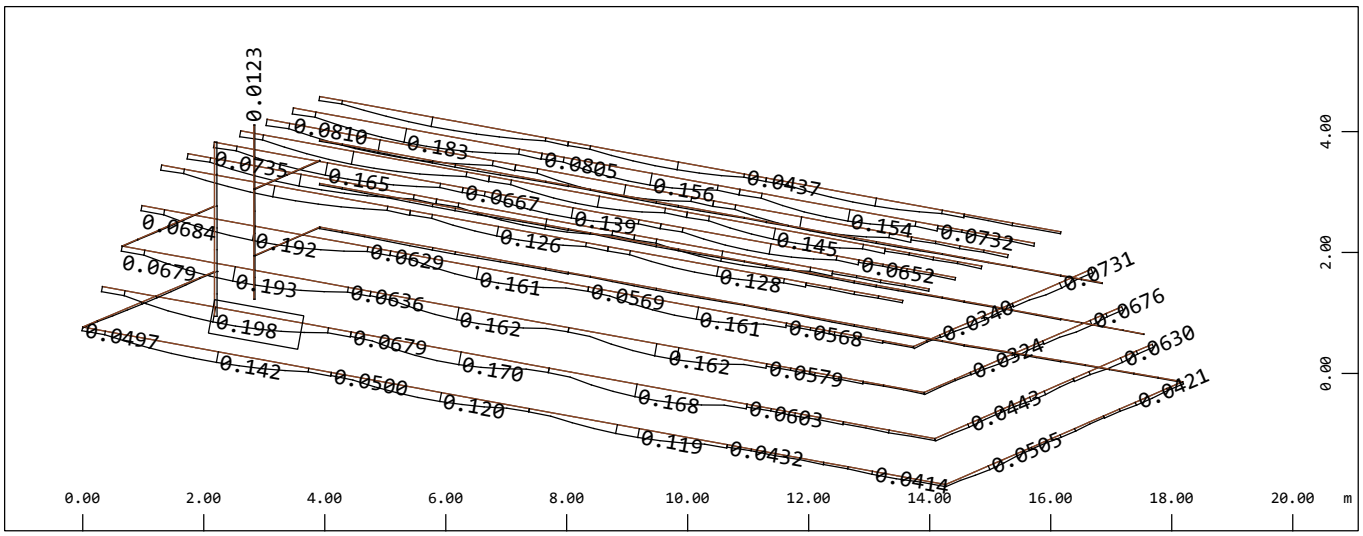
SOFiSTiK AG - www.sofistik.de

11826 DSO Bovec - nadstresek tehnicne etaze
Izkoriscenosti - sekundarni nosilci (perm, mittel, short)



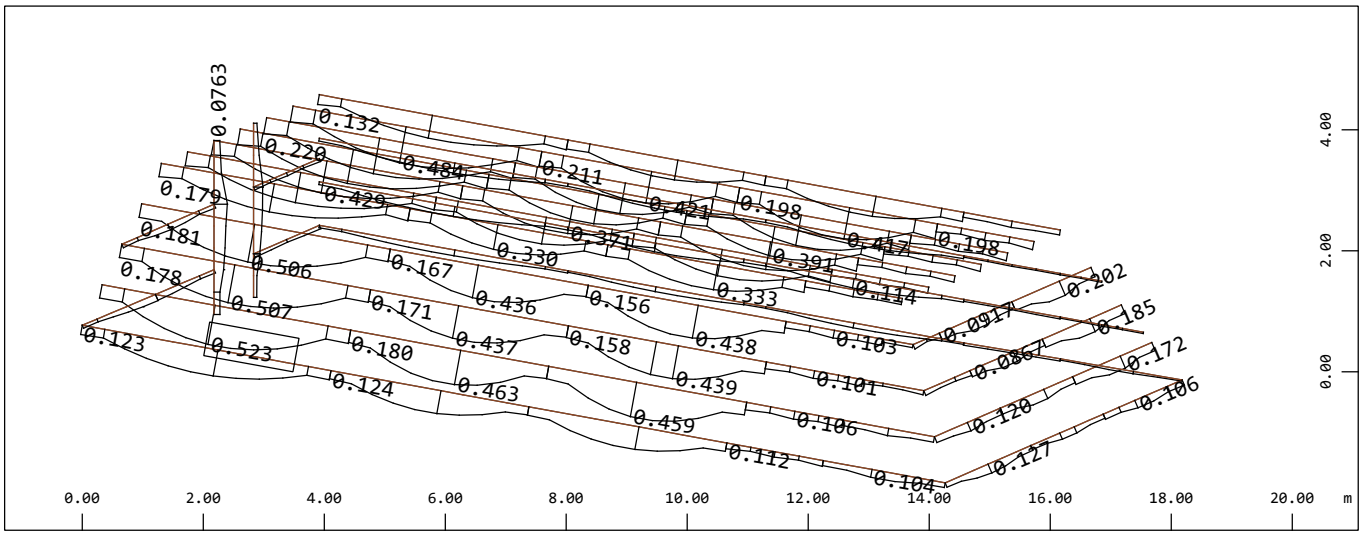

Sector of system Beam Elements Group 11...13
Beam Elements , Utilisation level Decisive - Total, Design Case 601 GlobalMAX SIGMA , 1
cm 3D = 1.00 (Max=0.263)

M 1 : 125
X * 0.853
Y * 0.593
Z * 0.960




Sector of system Beam Elements Group 11...13
Beam Elements , Utilisation level Decisive - Total, Design Case 701 GlobalMAX SIGMA , 1
cm 3D = 1.00 (Max=0.198)

M 1 : 125
X * 0.853
Y * 0.593
Z * 0.960




Sector of system Beam Elements Group 11...13
Beam Elements , Utilisation level Decisive - Total, Design Case 801 GlobalMAX SIGMA , 1
cm 3D = 1.00 (Max=0.523)

M 1 : 125
X * 0.853
Y * 0.593
Z * 0.960

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11826 DSO Bovec - nadstresek tehnicne etaze (dodatna analiza za pozar R30)
Materials

Default design code is EuroNorm EN 1995-1-1:2004 Timber Structures (Europe) V 2018
Serviceclass: 2
Snow load zone : 1

**Materials**

| Mat | Classification |
|---|---|
| 1 | C 24 (EN 1995) |
| 2 | GL 24 Cl.1 (EN 1995) |

**Mat 1 C 24 (EN 1995)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Young's modulus | E | 11000 | [N/mm2] | Safetyfactor | | 1.30 | [-] |
| Poisson's ratio | μ | 0.00 | [-] | Bending strength | fm,0 | 24.00 | [MPa] |
| Shear modulus | G | 690 | [N/mm2] | Bending strength | fm,90 | 24.00 | [MPa] |
| Compression modulus | K | 123 | [N/mm2] | Tensile strength | ft,0 | 14.50 | [MPa] |
| Nominal Weight | γ | 4.2 | [kN/m3] | Tensile strength | ft,90 | 0.40 | [MPa] |
| Mean density | ρ | 350.0 | [kg/m3] | Compress. strength | fc,0 | 21.00 | [MPa] |
| Elongation coefficient | α | 0.00E+00 | [1/K] | Compress. strength | fc,90 | 2.50 | [MPa] |
| Young's modulus | E-90 | 370 | [N/mm2] | Shear strength | fv | 2.67 | [MPa] |
| Shear modulus | G-90 | 690 | [N/mm2] | Shear strength | fv,T | 4.00 | [MPa] |
| Deformation coefficient | kdef | 0.80 | [-] | Shear strength | fv,pl | 2.67 | [MPa] |
| Permanent combination | kmod | 0.60 | [-] | | | | |
| Long term combination | | 0.70 | [-] | | | | |
| Middle term combination | | 0.80 | [-] | | | | |
| Short term combination | | 0.90 | [-] | | | | |
| Very short term combination | | 1.10 | [-] | | | | |

| Stress-Strain for ultimate load | ε[o/oo] | σ-u[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 1.318 | 14.50 | 11000 |
| stress range | 0.000 | 0.00 | 11000 |
| | -1.909 | -21.00 | 0 |
| | -1000.000 | -21.00 | 0 |
| | Safetyfactor | | 1.30 |

**Mat 2 GL 24 Cl.1 (EN 1995)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Young's modulus | E | 11500 | [N/mm2] | Safetyfactor | | 1.25 | [-] |
| Poisson's ratio | μ | 0.00 | [-] | Bending strength | fm,0 | 24.00 | [MPa] |
| Shear modulus | G | 650 | [N/mm2] | Bending strength | fm,90 | 24.00 | [MPa] |
| Compression modulus | K | 100 | [N/mm2] | Tensile strength | ft,0 | 19.20 | [MPa] |
| Nominal Weight | γ | 4.2 | [kN/m3] | Tensile strength | ft,90 | 0.50 | [MPa] |
| Mean density | ρ | 385.0 | [kg/m3] | Compress. strength | fc,0 | 24.00 | [MPa] |
| Elongation coefficient | α | 0.00E+00 | [1/K] | Compress. strength | fc,90 | 2.50 | [MPa] |
| Young's modulus | E-90 | 300 | [N/mm2] | Shear strength | fv | 2.33 | [MPa] |
| Shear modulus | G-90 | 650 | [N/mm2] | Shear strength | fv,T | 3.50 | [MPa] |
| Deformation coefficient | kdef | 0.60 | [-] | Shear strength | fv,pl | 2.33 | [MPa] |
| Permanent combination | kmod | 0.60 | [-] | | | | |
| Long term combination | | 0.70 | [-] | | | | |
| Middle term combination | | 0.80 | [-] | | | | |
| Short term combination | | 0.90 | [-] | | | | |
| Very short term combination | | 1.10 | [-] | | | | |

| Stress-Strain for ultimate load | ε[o/oo] | σ-u[MPa] | E-t[N/mm2] |
|---|---|---|---|
| Is only valid within the defined | 1.670 | 19.20 | 11500 |
| stress range | 0.000 | 0.00 | 11500 |
| | -2.087 | -24.00 | 0 |
| | -1000.000 | -24.00 | 0 |
| | Safetyfactor | | 1.25 |

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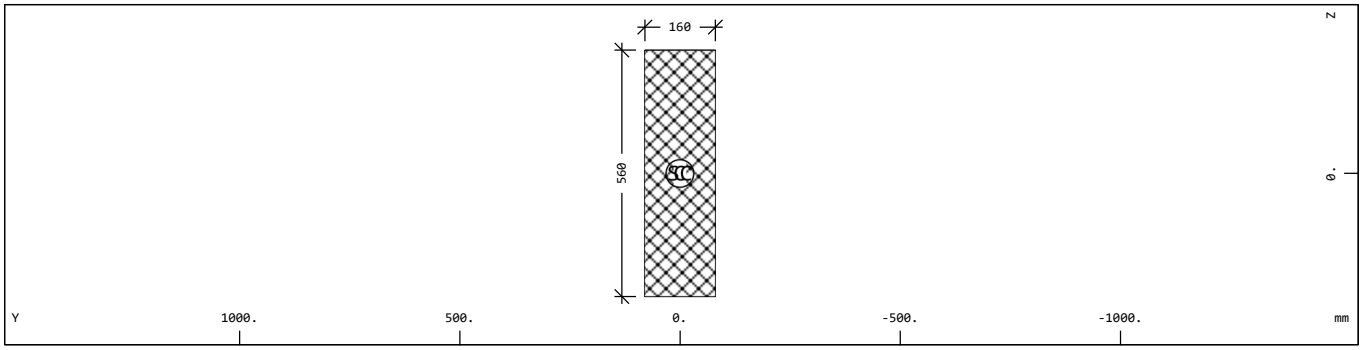
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Sections

**Cross-sections static properties**

| SNo | Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|---|
| | MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 1 | 2 | 8.9600E-02 | 7.467E-02 | 2.342E-03 | 0.0 | 0.0 | 11500 | 37.6 | |
| | | 6.269E-04 | 7.467E-02 | 1.911E-04 | 0.0 | 0.0 | 650 | (CENTR) | |
| | = GL. NOS. 60/20 - zmanjsan 56/16 | | | | | | | | |
| | = GL. NOS. 60/20 - zmanjsan 56/16 | | | | | | | | |
| 2 | 1 | 1.9200E-02 | 1.600E-02 | 4.096E-05 | 0.0 | 0.0 | 11000 | 8.1 | |
| | | 4.989E-05 | 1.600E-02 | 2.304E-05 | 0.0 | 0.0 | 690 | (CENTR) | |
| | = SEK.NOS. 20/16 - zmanjsan 16/12 | | | | | | | | |
| | = SEK.NOS. 20/16 - zmanjsan 16/12 | | | | | | | | |
| 3 | 1 | 2.5200E-02 | 2.100E-02 | 6.804E-05 | 0.0 | 0.0 | 11000 | 10.6 | |
| | | 8.672E-05 | 2.100E-02 | 4.116E-05 | 0.0 | 0.0 | 690 | (CENTR) | |
| | = SEK.NOS. 22/18 - zmanjsan 18/14 | | | | | | | | |
| | = SEK.NOS. 22/18 - zmanjsan 18/14 | | | | | | | | |

| | | | |
|---|---|---|---|
| SNo | section number | yc[mm],zc[mm] | ordinate of elastic centroid |
| Mat | material number | ysc[mm],zsc[mm] | ordinate of shear centre |
| A[m2] | sectional area | E[N/mm2] | Young's modulus |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | g[kg/m] | weight per length |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | | |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |
| MRf | reinforcement material number | | |
| It[m4] | torsional moment of inertia | | |
| G[N/mm2] | Shear modulus | | |

**Cross section No. 1 - GL. NOS. 60/20 - zmanjsan 56/16**




Cross section No. 1 - GL. NOS. 60/20 - zmanjsan 56/16

**Static properties of cross section**

| Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|
| MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 2 | 8.9600E-02 | 7.467E-02 | 2.342E-03 | 0.0 | 0.0 | 11500 | 37.6 | |
| | 6.269E-04 | 7.467E-02 | 1.911E-04 | 0.0 | 0.0 | 650 | (CENTR) | |

| | | | |
|---|---|---|---|
| Mat | material number | yc[mm],zc[mm] | ordinate of elastic centroid |
| A[m2] | sectional area | ysc[mm],zsc[mm] | ordinate of shear centre |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | E[N/mm2] | Young's modulus |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | g[kg/m] | weight per length |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |
| MRf | reinforcement material number | | |
| It[m4] | torsional moment of inertia | | |
| G[N/mm2] | Shear modulus | | |

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] | zmin[mm] | hymin[mm] | AK[m2] | MRs | 1/WT[1/m3] | 1/WVy[1/m2] |
|---|---|---|---|---|---|---|---|
| | ymax[mm] | zmax[mm] | hzmin[mm] | AB[m2] | | 1/WT2[1/m3] | 1/WVz[1/m2] |
| | -80.0 | -280.0 | 106.7 | 8.960E-02 | | 2.535E+02 | 1.674E+01 |
| | 80.0 | 280.0 | 373.3 | | | | 1.674E+01 |

| | |
|---|---|
| α-T[1/K] | Elongation coefficient |
| ymin[mm],zmin[mm],ymax[mm],zmax[mm] | extreme coordinates relative to centroid |
| hymin[mm],hzmin[mm] | minimum value for internal lever |
| AK[m2] | torsional equivalent area (Bredt) |
| MRs | transverse reinforcements material number |
| 1/WT[1/m3],1/WT2[1/m3] | torsional resistance |
| 1/WVy[1/m2],1/WVz[1/m2] | shear force resistance |

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| | |
|---|---|
| AB[m2] | gross concrete area |

**Section values for warping**

| Wmin[m2] | Wmax[m2] | CM[m6] | CMS[m4] | ASwyy[m6] | ASwzz[m6] | ry[mm] | rz[mm] |
|---|---|---|---|---|---|---|---|
| -0.0155 | 0.0155 | 3.571E-06 | 0.000 | 0.000E+00 | 0.000E+00 | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Wmin[m2],Wmax[m2] | unit warping | ASwyy[m6],ASwzz[m6] | warping sectional value |
| CM[m6] | warping resistance | ry[mm],rz[mm] | sectional distance |
| CMS[m4] | warping shear resistance | | |

**Rectangular cross-section/T-beam**

| H[mm] | Ho[mm] | Aso[cm2] | Do[mm] | So[mm] | a[mm] | B-eff[mm] |
|---|---|---|---|---|---|---|
| B[mm] | Bo[mm] | Asu[cm2] | Du[mm] | Su[mm] | a-min[mm] | incl[°] |
| | | As-type | Ds[mm] | Ss[mm] | a-max[mm] | Ass[cm2/m] |
| 560.0 | | | 10 | 50.0 | | |
| 160.0 | | | 20 | 50.0 | | |

| | | | |
|---|---|---|---|
| H[mm] | height | B[mm] | width |
| Ho[mm] | upper height of section | Bo[mm] | upper width of section |
| Aso[cm2],Asu[cm2] | reinforcement area | a-min[mm] | minimum distance of bars |
| Do[mm],Du[mm],Ds[mm] | bar diameter | incl[°] | inclination of transverse reinforcements |
| So[mm],Su[mm],Ss[mm] | static distance | a-max[mm] | maximum distance of bars |
| a[mm] | distance of bars | Ass[cm2/m] | area of transverse reinforcements |
| B-eff[mm] | effective width | | |

**Additional design data**

| Mat | periphery-O/-I | | deff | t-min | t-max | thet-p | thet-y | thet-z | thet-yz | yg | zg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [m2/m] | [m2/m] | [mm] | [mm] | [mm] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [mm] | [mm] |
| | 1.440 | | 124.4 | 160.0 | 560.0 | 1.064 | 0.983 | 0.080 | | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Mat | material number | t-min,t-max | thickness |
| periphery-O/-I | peripheral area per length | thet-p,thet-y,thet-z,thet-yz | rotational mass |
| deff | effective depth | yg,zg | ordinate of the mass centre |

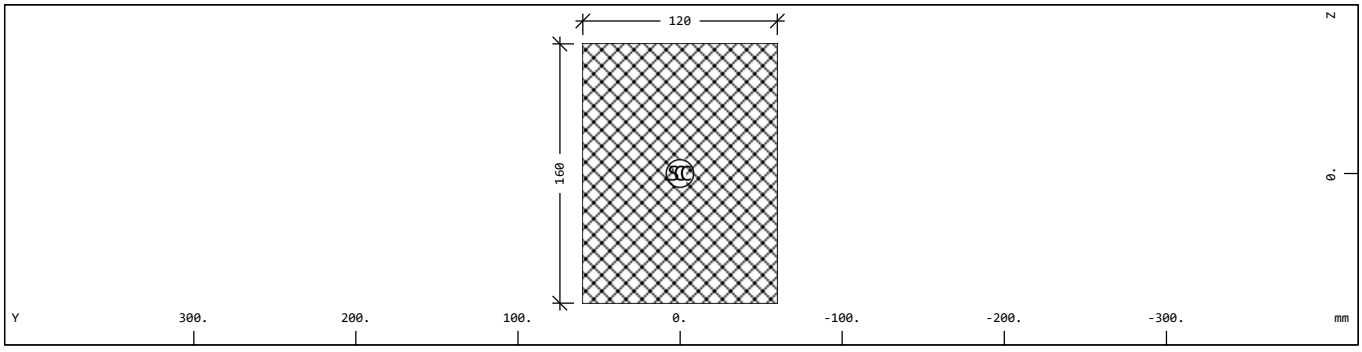
**Design forces and moments**

| | N[kN] | Vy[kN] | Vz[kN] | Mt[kNm] | Mt2[kNm] | Mb[kNm2] | My[kNm] | Mz[kNm] | y[mm] | z[mm] | BUCK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E¹ | 1720.3 | 662.15 | 662.15 | 43.72 | | 4.44 | 160.56 | 45.88 | 0.0 | 0.0 | -, e, e |
| E¹ | -2150.4 | 827.69 | 827.69 | 54.66 | | -5.55 | -160.56 | -45.88 | 0.0 | 0.0 | |
| F¹ | 1376.3 | 529.72 | 529.72 | 34.98 | | 3.55 | 128.45 | 36.70 | 0.0 | 0.0 | |
| F¹ | -1720.3 | 662.15 | 662.15 | 43.72 | | -4.44 | -128.45 | -36.70 | 0.0 | 0.0 | |

¹ E/F = elastic characteristic/design values (maximum strain reaches yield limit)

| | | | |
|---|---|---|---|
| N[kN] | normal force | Mb[kNm2] | warping moment |
| Vy[kN],Vz[kN] | shear force | My[kNm],Mz[kNm] | bending moment |
| Mt[kNm] | primary torsional moment | y[mm],z[mm] | ordinate of plastic centre |
| Mt2[kNm] | secondary torsional moment | BUCK | buckling curve (LTB, y-y, z-z) |

**Cross section No. 2 - SEK.NOS. 20/16 - zmanjsan 16/12**




Cross section No. 2 - SEK.NOS. 20/16 - zmanjsan 16/12

**Static properties of cross section**

| Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|
| MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 1 | 1.9200E-02 | 1.600E-02 | 4.096E-05 | 0.0 | 0.0 | 11000 | 8.1 | |
| | 4.989E-05 | 1.600E-02 | 2.304E-05 | 0.0 | 0.0 | 690 | (CENTR) | |

| | | | |
|---|---|---|---|
| Mat | material number | yc[mm],zc[mm] | ordinate of elastic centroid |
| A[m2] | sectional area | ysc[mm],zsc[mm] | ordinate of shear centre |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | E[N/mm2] | Young's modulus |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | g[kg/m] | weight per length |

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| | |
|---|---|
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes |
| MRf | reinforcement material number |
| It[m4] | torsional moment of inertia |
| G[N/mm2] | Shear modulus |

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] | zmin[mm] | hymin[mm] | AK[m2] | MRs | 1/WT[1/m3] | 1/WVy[1/m2] |
|---|---|---|---|---|---|---|---|
| | ymax[mm] | zmax[mm] | hzmin[mm] | AB[m2] | | 1/WT2[1/m3] | 1/WVz[1/m2] |
| | -60.0 | -80.0 | 80.0 | 1.920E-02 | | 1.931E+03 | 7.813E+01 |
| | 60.0 | 80.0 | 106.7 | | | | 7.813E+01 |

| | |
|---|---|
| α-T[1/K] | Elongation coefficient |
| ymin[mm],zmin[mm],ymax[mm],zmax[mm] | extreme coordinates relative to centroid |
| hymin[mm],hzmin[mm] | minimum value for internal lever |
| AK[m2] | torsional equivalent area (Bredt) |
| MRs | transverse reinforcements material number |
| 1/WT[1/m3],1/WT2[1/m3] | torsional resistance |
| 1/WVy[1/m2],1/WVz[1/m2] | shear force resistance |
| AB[m2] | gross concrete area |

**Section values for warping**

| Wmin[m2] | Wmax[m2] | CM[m6] | CMS[m4] | ASwyy[m6] | ASwzz[m6] | ry[mm] | rz[mm] |
|---|---|---|---|---|---|---|---|
| -0.0010 | 0.0010 | 4.660E-09 | 0.000 | 0.000E+00 | 0.000E+00 | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Wmin[m2],Wmax[m2] | unit warping | ASwyy[m6],ASwzz[m6] | warping sectional value |
| CM[m6] | warping resistance | ry[mm],rz[mm] | sectional distance |
| CMS[m4] | warping shear resistance | | |

**Rectangular cross-section/T-beam**

| H[mm] | Ho[mm] | Aso[cm2] | Do[mm] | So[mm] | a[mm] | B-eff[mm] |
|---|---|---|---|---|---|---|
| B[mm] | Bo[mm] | Asu[cm2] | Du[mm] | Su[mm] | a-min[mm] | incl[°] |
| | | As-type | Ds[mm] | Ss[mm] | a-max[mm] | Ass[cm2/m] |
| 160.0 | | | 10 | 50.0 | | |
| 120.0 | | | 20 | 50.0 | | |

| | | | |
|---|---|---|---|
| H[mm] | height | B[mm] | width |
| Ho[mm] | upper height of section | Bo[mm] | upper width of section |
| Aso[cm2],Asu[cm2] | reinforcement area | a-min[mm] | minimum distance of bars |
| Do[mm],Du[mm],Ds[mm] | bar diameter | incl[°] | inclination of transverse reinforcements |
| So[mm],Su[mm],Ss[mm] | static distance | a-max[mm] | maximum distance of bars |
| a[mm] | distance of bars | Ass[cm2/m] | area of transverse reinforcements |
| B-eff[mm] | effective width | | |

**Additional design data**

| Mat | periphery-O/-I | | deff | t-min | t-max | thet-p | thet-y | thet-z | thet-yz | yg | zg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [m2/m] | [m2/m] | [mm] | [mm] | [mm] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [kgm2/m] | [mm] | [mm] |
| | 0.560 | | 68.6 | 120.0 | 160.0 | 0.027 | 0.017 | 0.010 | | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Mat | material number | t-min,t-max | thickness |
| periphery-O/-I | peripheral area per length | thet-p,thet-y,thet-z,thet-yz | rotational mass |
| deff | effective depth | yg,zg | ordinate of the mass centre |

**Design forces and moments**

| | N[kN] | Vy[kN] | Vz[kN] | Mt[kNm] | Mt2[kNm] | Mb[kNm2] | My[kNm] | Mz[kNm] | y[mm] | z[mm] | BUCK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E¹ | 278.4 | 107.16 | 107.16 | 4.33 | | 0.07 | 7.42 | 5.57 | 0.0 | 0.0 | -, e, e |
| E¹ | -403.2 | 155.19 | 155.19 | 6.28 | | -0.10 | -7.42 | -5.57 | 0.0 | 0.0 | |
| F¹ | 214.2 | 82.43 | 82.43 | 3.33 | | 0.05 | 5.71 | 4.28 | 0.0 | 0.0 | |
| F¹ | -310.2 | 119.38 | 119.38 | 4.83 | | -0.08 | -5.71 | -4.28 | 0.0 | 0.0 | |

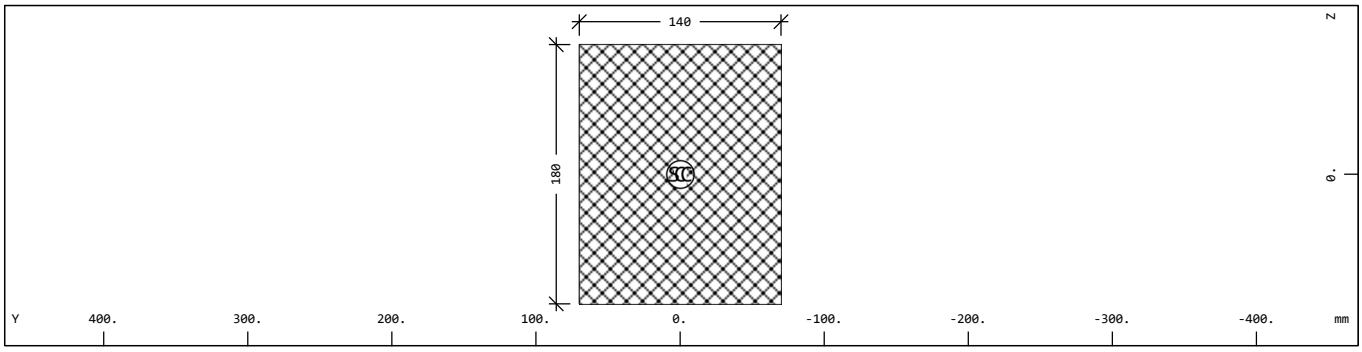
¹ E/F = elastic characteristic/design values (maximum strain reaches yield limit)

| | | | |
|---|---|---|---|
| N[kN] | normal force | Mb[kNm2] | warping moment |
| Vy[kN],Vz[kN] | shear force | My[kNm],Mz[kNm] | bending moment |
| Mt[kNm] | primary torsional moment | y[mm],z[mm] | ordinate of plastic centre |
| Mt2[kNm] | secondary torsional moment | BUCK | buckling curve (LTB, y-y, z-z) |

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Sections

**Cross section No. 3 - SEK.NOS. 22/18 - zmanjsan 18/14**




Cross section No. 3 - SEK.NOS. 22/18 - zmanjsan 18/14

**Static properties of cross section**

| Mat | A[m2] | Ay[m2] | Iy[m4] | yc[mm] | ysc[mm] | E[N/mm2] | g[kg/m] | I-1[m4] |
|---|---|---|---|---|---|---|---|---|
| MRf | It[m4] | Az[m2] | Iz[m4] | zc[mm] | zsc[mm] | G[N/mm2] | | I-2[m4] |
| | | Ayz[m2] | Iyz[m4] | | | | | α[°] |
| 1 | 2.5200E-02 | 2.100E-02 | 6.804E-05 | 0.0 | 0.0 | 11000 | 10.6 | |
| | 8.672E-05 | 2.100E-02 | 4.116E-05 | 0.0 | 0.0 | 690 | (CENTR) | |

| | | | |
|---|---|---|---|
| Mat | material number | yc[mm],zc[mm] | ordinate of elastic centroid |
| A[m2] | sectional area | ysc[mm],zsc[mm] | ordinate of shear centre |
| Ay[m2],Az[m2],Ayz[m2] | transverse shear deformation area | E[N/mm2] | Young's modulus |
| Iy[m4],Iz[m4],Iyz[m4] | bending moment of inertia | g[kg/m] | weight per length |
| I-1[m4],I-2[m4],α[°] | principal moments of inertia and angle of the principal axes | | |
| MRf | reinforcement material number | | |
| It[m4] | torsional moment of inertia | | |
| G[N/mm2] | Shear modulus | | |

**Additional static properties of cross section**

| α-T[1/K] | ymin[mm] | zmin[mm] | hymin[mm] | AK[m2] | MRs | 1/WT[1/m3] | 1/WVy[1/m2] |
|---|---|---|---|---|---|---|---|
| | ymax[mm] | zmax[mm] | hzmin[mm] | AB[m2] | | 1/WT2[1/m3] | 1/WVz[1/m2] |
| | -70.0 | -90.0 | 93.3 | 2.520E-02 | | 1.272E+03 | 5.952E+01 |
| | 70.0 | 90.0 | 120.0 | | | | 5.952E+01 |

| | |
|---|---|
| α-T[1/K] | Elongation coefficient |
| ymin[mm],zmin[mm],ymax[mm],zmax[mm] | extreme coordinates relative to centroid |
| hymin[mm],hzmin[mm] | minimum value for internal lever |
| AK[m2] | torsional equivalent area (Bredt) |
| MRs | transverse reinforcements material number |
| 1/WT[1/m3],1/WT2[1/m3] | torsional resistance |
| 1/WVy[1/m2],1/WVz[1/m2] | shear force resistance |
| AB[m2] | gross concrete area |

**Section values for warping**

| Wmin[m2] | Wmax[m2] | CM[m6] | CMS[m4] | ASwyy[m6] | ASwzz[m6] | ry[mm] | rz[mm] |
|---|---|---|---|---|---|---|---|
| -0.0012 | 0.0012 | 8.631E-09 | 0.000 | 0.000E+00 | 0.000E+00 | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Wmin[m2],Wmax[m2] | unit warping | ASwyy[m6],ASwzz[m6] | warping sectional value |
| CM[m6] | warping resistance | ry[mm],rz[mm] | sectional distance |
| CMS[m4] | warping shear resistance | | |

**Rectangular cross-section/T-beam**

| H[mm] | Ho[mm] | Aso[cm2] | Do[mm] | So[mm] | a[mm] | B-eff[mm] |
|---|---|---|---|---|---|---|
| B[mm] | Bo[mm] | Asu[cm2] | Du[mm] | Su[mm] | a-min[mm] | incl[°] |
| | | As-type | Ds[mm] | Ss[mm] | a-max[mm] | Ass[cm2/m] |
| 180.0 | | | 10 | 50.0 | | |
| 140.0 | | | 20 | 50.0 | | |

| | | | |
|---|---|---|---|
| H[mm] | height | B[mm] | width |
| Ho[mm] | upper height of section | Bo[mm] | upper width of section |
| Aso[cm2],Asu[cm2] | reinforcement area | a-min[mm] | minimum distance of bars |
| Do[mm],Du[mm],Ds[mm] | bar diameter | incl[°] | inclination of transverse reinforcements |
| So[mm],Su[mm],Ss[mm] | static distance | a-max[mm] | maximum distance of bars |
| a[mm] | distance of bars | Ass[cm2/m] | area of transverse reinforcements |
| B-eff[mm] | effective width | | |

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Sections

**Additional design data**

| Mat | periphery-O/-I [m2/m] | [m2/m] | deff [mm] | t-min [mm] | t-max [mm] | thet-p [kgm2/m] | thet-y [kgm2/m] | thet-z [kgm2/m] | thet-yz [kgm2/m] | yg [mm] | zg [mm] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.640 | | 78.8 | 140.0 | 180.0 | 0.046 | 0.029 | 0.017 | | 0.0 | 0.0 |

| | | | |
|---|---|---|---|
| Mat | material number | t-min,t-max | thickness |
| periphery-O/-I | peripheral area per length | thet-p,thet-y,thet-z,thet-yz | rotational mass |
| deff | effective depth | yg,zg | ordinate of the mass centre |

**Design forces and moments**

| | N[kN] | Vy[kN] | Vz[kN] | Mt[kNm] | Mt2[kNm] | Mb[kNm2] | My[kNm] | Mz[kNm] | y[mm] | z[mm] | BUCK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E¹ | 365.4 | 140.64 | 140.64 | 6.58 | | 0.11 | 10.96 | 8.53 | 0.0 | 0.0 | -, e, e |
| E¹ | -529.2 | 203.69 | 203.69 | 9.53 | | -0.16 | -10.96 | -8.53 | 0.0 | 0.0 | |
| F¹ | 281.1 | 108.19 | 108.19 | 5.06 | | 0.08 | 8.43 | 6.56 | 0.0 | 0.0 | |
| F¹ | -407.1 | 156.68 | 156.68 | 7.33 | | -0.12 | -8.43 | -6.56 | 0.0 | 0.0 | |

¹ E/F = elastic characteristic/design values (maximum strain reaches yield limit)

| | | | |
|---|---|---|---|
| N[kN] | normal force | Mb[kNm2] | warping moment |
| Vy[kN],Vz[kN] | shear force | My[kNm],Mz[kNm] | bending moment |
| Mt[kNm] | primary torsional moment | y[mm],z[mm] | ordinate of plastic centre |
| Mt2[kNm] | secondary torsional moment | BUCK | buckling curve (LTB, y-y, z-z) |

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**Superposition according to EuroNorm EN 1995-1-1:2004 Timber Structures**

**Combination rule Number 1**

Permanent comb - fire

Superposition according to manual MAXIMA formula 2.1

$$E_d = E\left\{\sum_{j\geq 1}\gamma_{G,j}\cdot G_{k,j} \oplus \gamma_P \cdot P_k \oplus \gamma_{Q,1}\cdot Q_{k,1} \oplus \sum_{i>1}\gamma_{Q,i}\cdot\psi_{0,i}\cdot Q_{k,i}\right\}$$

Resulting Load Cases type Permanent combination

**Load Case selection and Actions**

| | | Superposition Factors | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Act | Part | γ-u | γ-f | γ-a | $\psi_0$ | $\psi_1$ | $\psi_2$ | $\psi_1$inf | | | Designation |
| | LC | | | | | | | | Fact | Type | |
| G_1 | G | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | dead load g1 |
| | 1 | | | | | | | | 1.00 | PERM | Lastna |
| G_2 | G | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | dead load g2 |
| | 2 | | | | | | | | 1.00 | PERM | Stalna |

| | |
|---|---|
| Act | action |
| Part | partition of the action |
| γ-u,γ-f,γ-a | partial safety factors for unfavourable/favourable/accidental |
| $\psi_0$,$\psi_1$,$\psi_2$,$\psi_1$inf | combination coefficients |
| LC | number of the load case |
| Fact | factor for load case |
| Type | type of the load case |
| PERM | permanent load grouped in actions |

**Generated Load Cases**

| Number | Combination | Designation |
|---|---|---|
| 2071 | 1 | MAX-UX NODE Nodal Displacements |
| 2072 | 1 | MIN-UX NODE Nodal Displacements |
| 2073 | 1 | MAX-UY NODE Nodal Displacements |
| 2074 | 1 | MIN-UY NODE Nodal Displacements |
| 2075 | 1 | MAX-UZ NODE Nodal Displacements |
| 2076 | 1 | MIN-UZ NODE Nodal Displacements |
| 2077 | 1 | MAX-URX NODE Nodal Displacements |
| 2078 | 1 | MIN-URX NODE Nodal Displacements |
| 2079 | 1 | MAX-URY NODE Nodal Displacements |
| 2080 | 1 | MIN-URY NODE Nodal Displacements |
| 2081 | 1 | MAX-URZ NODE Nodal Displacements |
| 2082 | 1 | MIN-URZ NODE Nodal Displacements |
| 2083 | 1 | MAX-URB NODE Nodal Displacements |
| 2084 | 1 | MIN-URB NODE Nodal Displacements |
| 2051 | 1 | MAX-PX NODE Supporting Forces in Nodes |
| 2052 | 1 | MIN-PX NODE Supporting Forces in Nodes |
| 2053 | 1 | MAX-PY NODE Supporting Forces in Nodes |
| 2054 | 1 | MIN-PY NODE Supporting Forces in Nodes |
| 2055 | 1 | MAX-PZ NODE Supporting Forces in Nodes |
| 2056 | 1 | MIN-PZ NODE Supporting Forces in Nodes |
| 2057 | 1 | MAX-MX NODE Supporting Forces in Nodes |
| 2058 | 1 | MIN-MX NODE Supporting Forces in Nodes |
| 2059 | 1 | MAX-MY NODE Supporting Forces in Nodes |
| 2060 | 1 | MIN-MY NODE Supporting Forces in Nodes |
| 2061 | 1 | MAX-MZ NODE Supporting Forces in Nodes |
| 2062 | 1 | MIN-MZ NODE Supporting Forces in Nodes |
| 2091 | 1 | MAX-MB NODE Supporting Forces in Nodes |
| 2092 | 1 | MIN-MB NODE Supporting Forces in Nodes |
| 2021 | 1 | MAX-N BEAM Forces in Beam Elements |
| 2022 | 1 | MIN-N BEAM Forces in Beam Elements |
| 2023 | 1 | MAX-VY BEAM Forces in Beam Elements |
| 2024 | 1 | MIN-VY BEAM Forces in Beam Elements |

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**Generated Load Cases**

| Number | Combination | Designation |
|---|---|---|
| 2025 | 1 | MAX-VZ BEAM Forces in Beam Elements |
| 2026 | 1 | MIN-VZ BEAM Forces in Beam Elements |
| 2027 | 1 | MAX-MT BEAM Forces in Beam Elements |
| 2028 | 1 | MIN-MT BEAM Forces in Beam Elements |
| 2029 | 1 | MAX-MY BEAM Forces in Beam Elements |
| 2030 | 1 | MIN-MY BEAM Forces in Beam Elements |
| 2031 | 1 | MAX-MZ BEAM Forces in Beam Elements |
| 2032 | 1 | MIN-MZ BEAM Forces in Beam Elements |
| 2033 | 1 | MAX-MB BEAM Forces in Beam Elements |
| 2034 | 1 | MIN-MB BEAM Forces in Beam Elements |
| 2035 | 1 | MAX-MT2 BEAM Forces in Beam Elements |
| 2036 | 1 | MIN-MT2 BEAM Forces in Beam Elements |

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Dim - acc - fire

Default design code is EuroNorm EN 1995-1-1:2004 Timber Structures (Europe) V 2018
Serviceclass: 2

**Stresses and Resistance of Sections**

**Combinations of Load Cases**

Results are saved for load cases 2021 2022 2023 2024 2025 2026 2027
Results are saved for load cases 2028 2029 2030 2031 2032 2033 2034
Results are saved for load cases 2035 2036
Maximum results are saved to load case 501 GlobalMAX SIGMA

**Maximum Stresses and Checked Limits**

| Mat | Check or Criterion | | Value | Limit | Unit | Level | LC | Beam | x[m] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Centric compression | σ-n,c | 0.80 | 16.15 | MPa | 0.050 | 2021 | 130031 | 0.000 |
| | Centric tension | σ-n,t | 0.13 | 11.15 | MPa | 0.011 | 2021 | 110344 | 0.000 |
| | Uniaxial bending compression | σz-,z+ | 8.63 | 18.46 | MPa | 0.467 | 2021 | 110060 | 0.445 |
| | factor for centric parts | 1.14 | | | | | | | |
| | Uniaxial bending tension | σz-,z+ | 8.64 | 18.46 | MPa | 0.468 | 2021 | 110060 | 0.445 |
| | factor for centric parts | 1.66 | | | | | | | |
| | Longitud. compressive stress | σ-x | 9.61 | 18.46 | MPa | 0.520 | 2021 | 110104 | 0.445 |
| | factor for centric parts | 1.14 | | | | | | | |
| | Longitud. tensile stress | σ+x | 9.61 | 18.46 | MPa | 0.520 | 2021 | 110104 | 0.445 |
| | factor for centric parts | 1.66 | | | | | | | |
| | Shear stress | τ | 0.29 | 2.05 | MPa | 0.142 | 2021 | 110045 | 0.000 |
| | Torsion incl. Shearforce parts | | 0.45 | 3.08 | MPa | 0.146 | 2021 | 110045 | 0.000 |
| | Used safety factor | γ-m | | 1.30 | [-] | | | | |
| 2 | Centric compression | σ-n,c | 0.38 | 19.20 | MPa | 0.020 | 2021 | 10057 | 0.375 |
| | Centric tension | σ-n,t | 0.16 | 15.36 | MPa | 0.011 | 2021 | 20039 | 0.506 |
| | Uniaxial bending compression | σz-,z+ | 4.11 | 19.20 | MPa | 0.214 | 2021 | 10052 | 0.400 |
| | Uniaxial bending tension | σz-,z+ | 4.10 | 19.20 | MPa | 0.214 | 2021 | 10052 | 0.400 |
| | factor for centric parts | 1.25 | | | | | | | |
| | Longitud. compressive stress | σ-x | 4.13 | 19.20 | MPa | 0.215 | 2021 | 10052 | 0.400 |
| | Longitud. tensile stress | σ+x | 4.13 | 19.20 | MPa | 0.215 | 2021 | 10052 | 0.400 |
| | factor for centric parts | 1.25 | | | | | | | |
| | Shear stress | τ | 0.45 | 1.86 | MPa | 0.243 | 2021 | 10052 | 0.400 |
| | Torsion incl. Shearforce parts | | 0.69 | 2.80 | MPa | 0.245 | 2021 | 10052 | 0.400 |
| | Used safety factor | γ-m | | 1.25 | [-] | | | | |

Check for stress limits passed✓

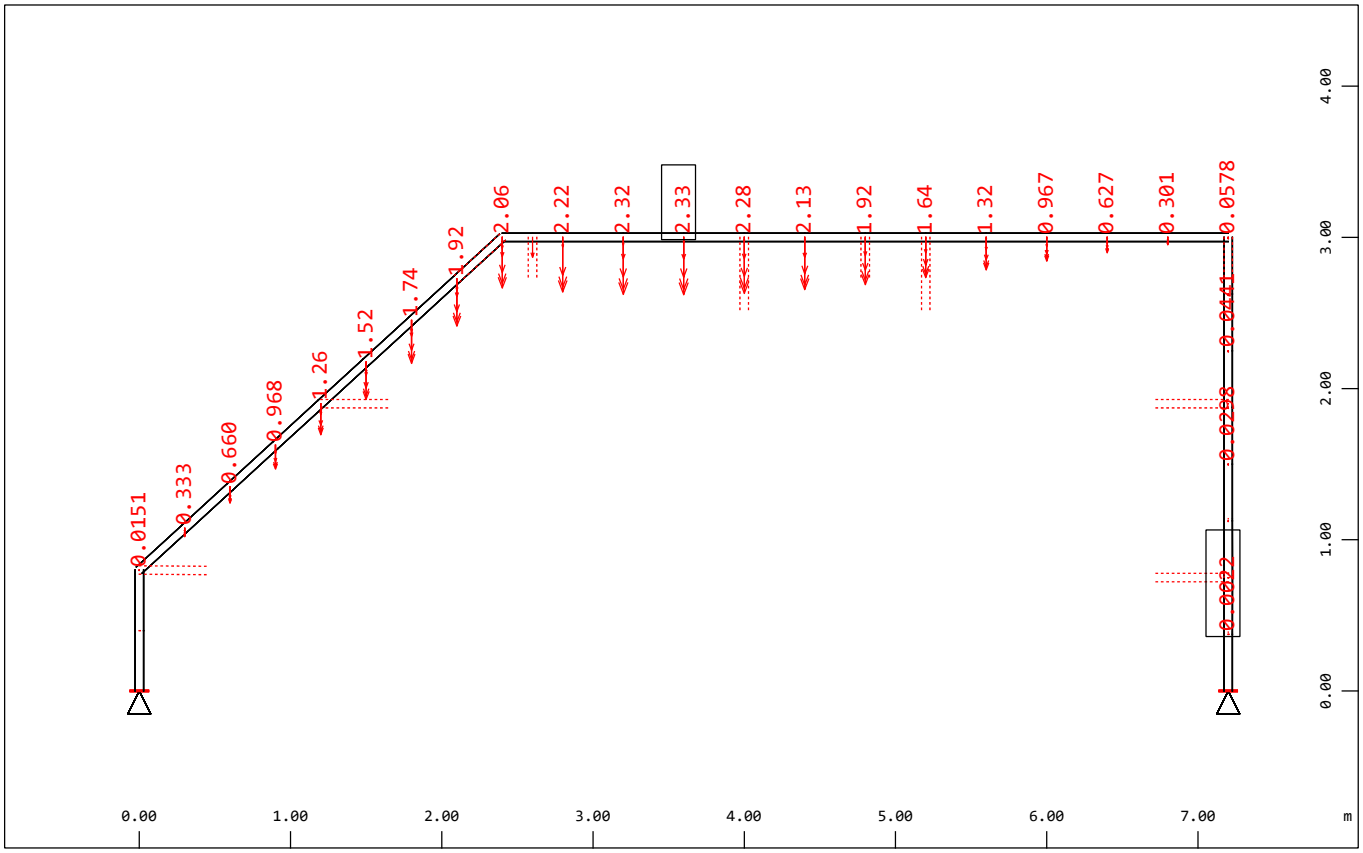
**Maximum Utilisation Level**

| | N | Vy | Vz | My | Mz | Mtp | Mts | Mb | Ncr | SCL | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | σ-x | σ+x | τ | σ-v | σ-s | σ-dyn | As-l | As-v | crack | c/t | |
| Section 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.245 |
| GLAVNI NOS. 60/20 - zm | 0.215 | 0.215 | 0.245 | 0.000 | - | - | - | - | - | - | |
| Section 2 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.520 |
| SEKUND. NOSILEC 20/16 | 0.520 | 0.520 | 0.149 | 0.000 | - | - | - | - | - | - | |
| Total | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | 0.520 |
| | 0.520 | 0.520 | 0.245 | 0.000 | - | - | - | - | - | - | |

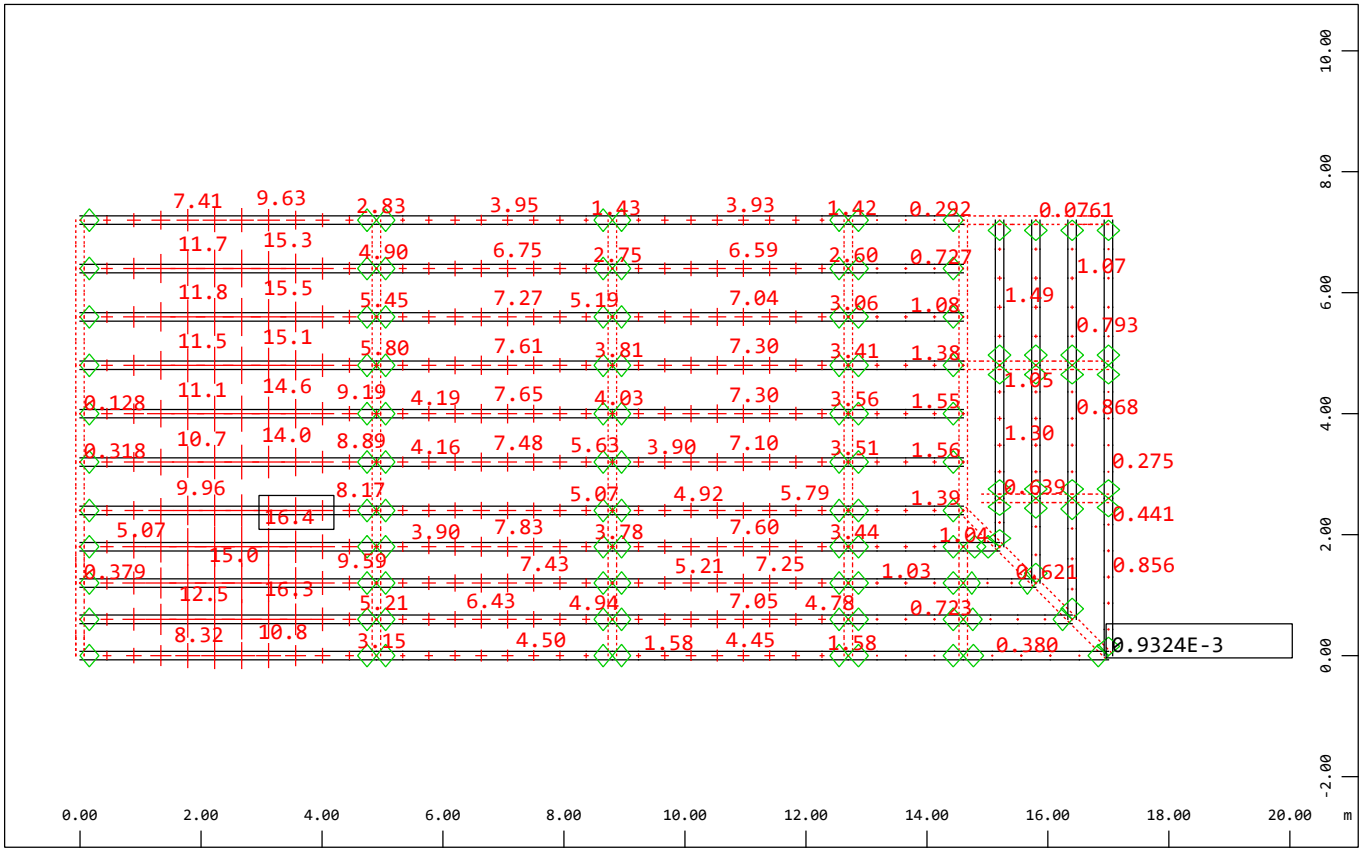
| | | | |
|---|---|---|---|
| N | normal force | τ | shear stress |
| Vy,Vz | shear force | σ-v | von Mises stress |
| My,Mz | bending | σ-s | stress in reinforcements |
| Mtp,Mts | torsion (p)rimary and (s)econdary | σ-dyn | stress range |
| Mb | warping moment | As-l | longitudinal reinforcements |
| Ncr | flexural buckling | As-v | transverse reinforcements |
| SCL | cross-section class | crack | crack width |
| σ-x | longitud. compressive stress | c/t | stress dependant utilisation level (see AQB Manual 2.3.2) |
| σ+x | longitud. tensile stress | Total | most unfavorable utilisation for all checks |

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Povesi - primarni nosilci (po pozaru R30)



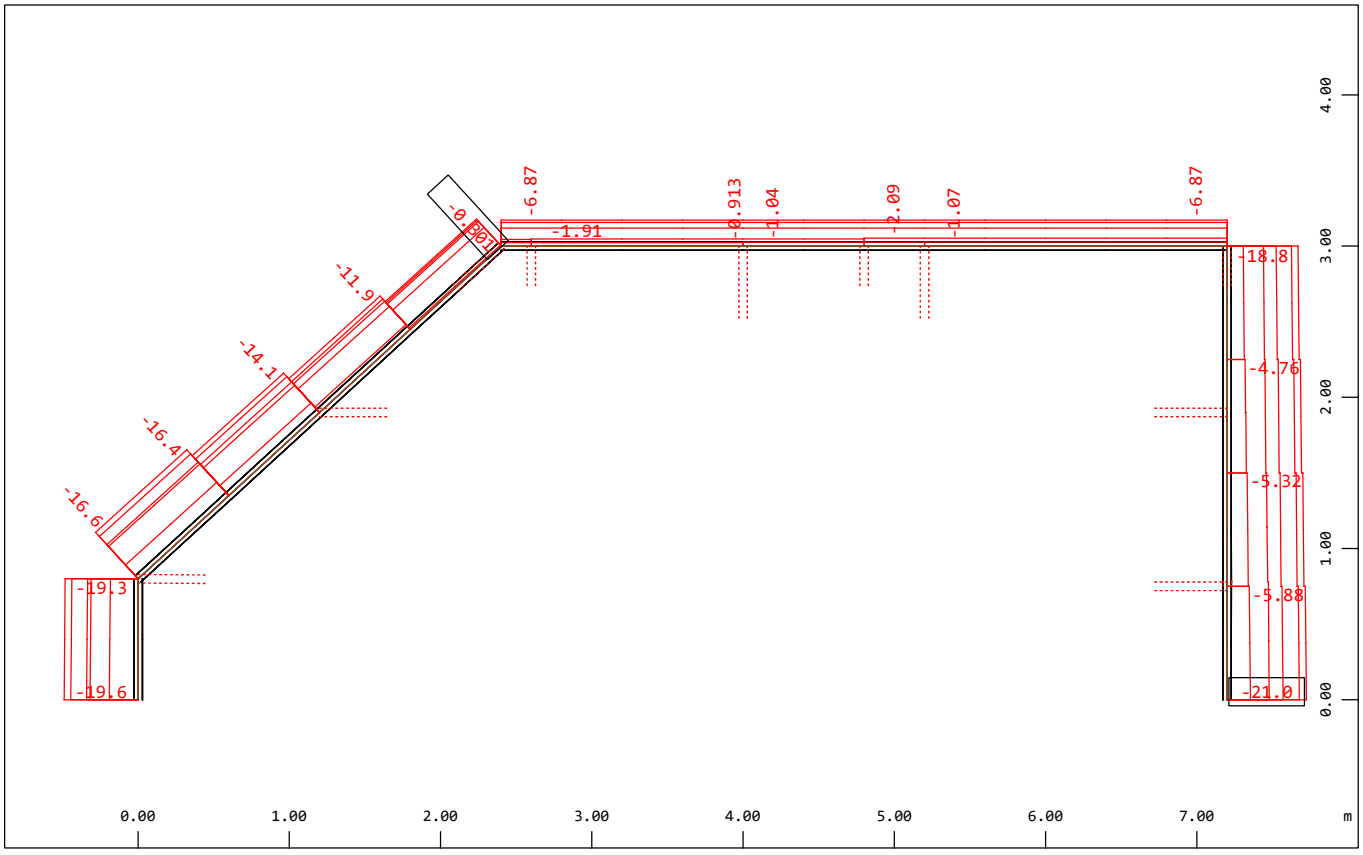

Z
X—Y
Sector of system Group 1
M 1 : 50
Nodal displacement in global Z, Loadcase 2076 MIN-UZ NODE Nodal Displacements , 1 cm 3D = 3.08 mm (Min=-2.33) (Max=0)




Y
Z—X
Sector of system Group 11
M 1 : 125
Nodal displacement in global Z, Loadcase 2076 MIN-UZ NODE Nodal Displacements , 1 cm 3D = 22.4 mm (Min=-16.4) (Max= 9.3241e-04)

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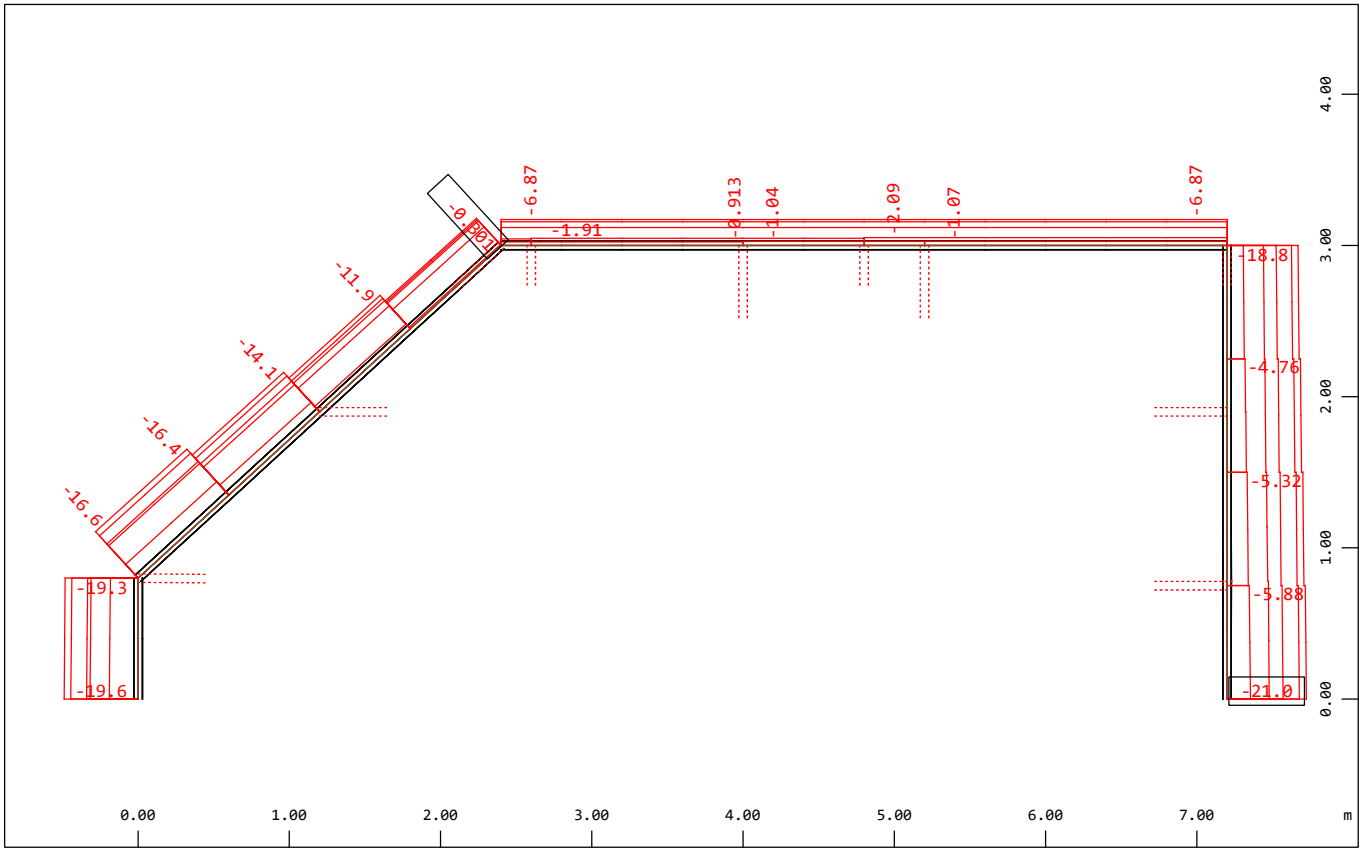
11826 DSO Bovec - nadstresek tehnicne etaze (dodatna analiza za pozar R30)
Ovoj. notranjih sil - MSN-long term: primarni nosilci




Z
X Y

Sector of system Group 1
Beam Elements , Normal force Nx, Loadcase 2021 MAX-N BEAM Forces in Beam Elemen , 1 cm 3D
= 20.0 kN (Min=-21.0) (Max=-0.301)

M 1 : 50



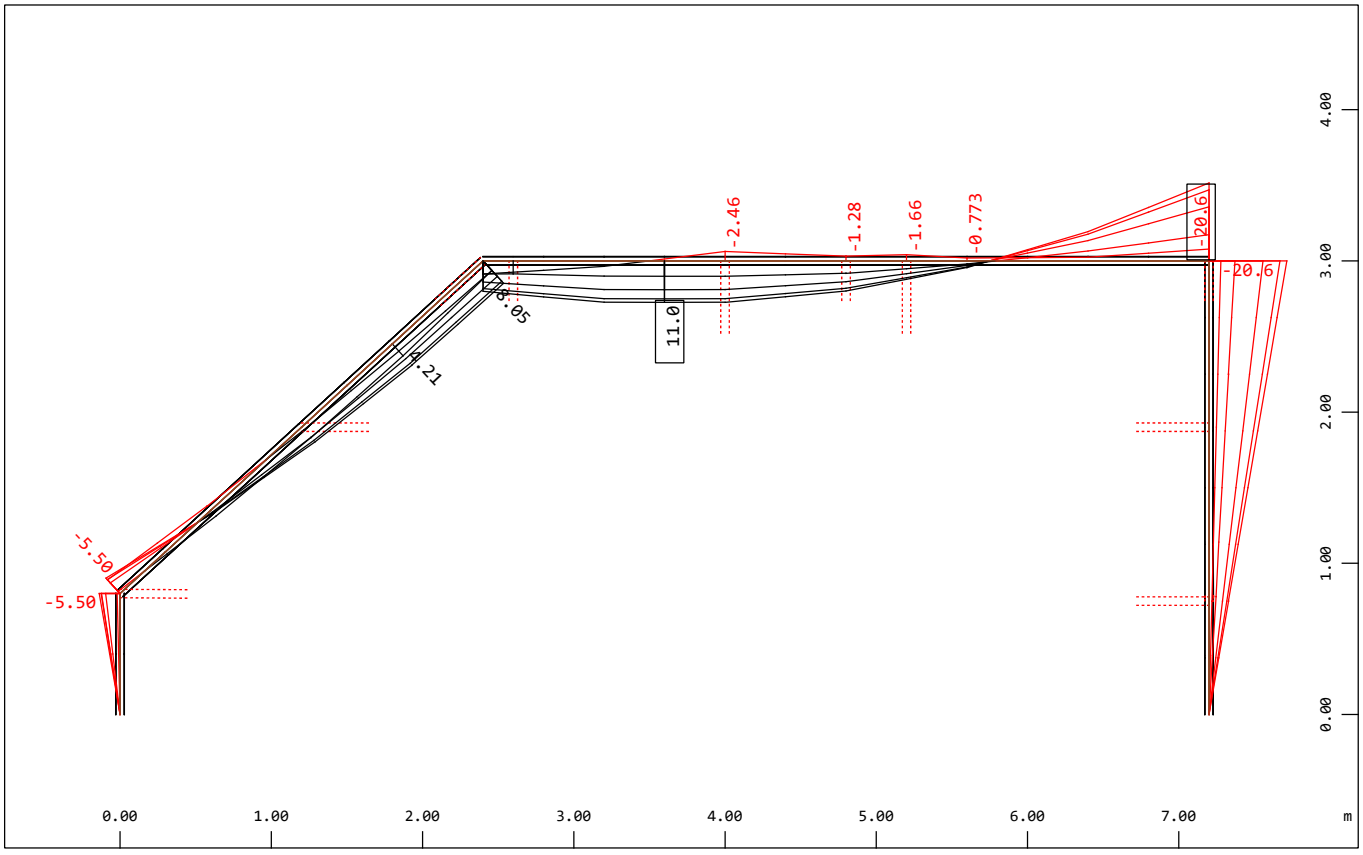

Z
X Y

Sector of system Group 1
Beam Elements , Normal force Nx, Loadcase 2022 MIN-N BEAM Forces in Beam Elemen , 1 cm =
20.0 kN (Min=-21.0) (Max=-0.301)

M 1 : 50

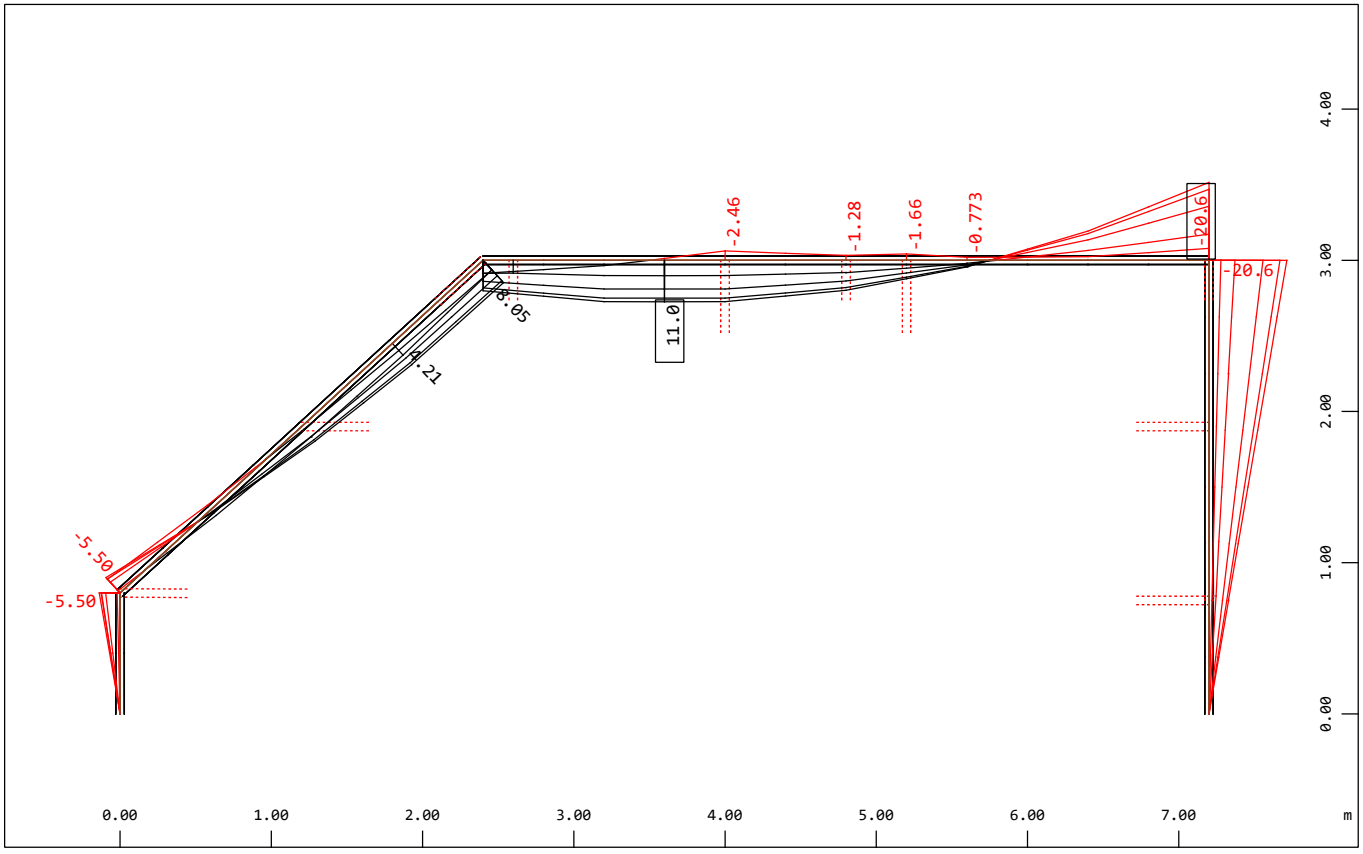
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11826 DSO Bovec - nadstresek tehnicne etaze (dodatna analiza za pozar R30)
Ovoj. notranjih sil - MSN-long term: primarni nosilci




Z
X Y

Sector of system Group 1 M 1 : 50
Beam Elements , Bending moment My, Loadcase 2029 MAX-MY BEAM Forces in Beam Eleme , 1 cm
= 20.0 kNm (Min=-20.6) (Max=11.0)

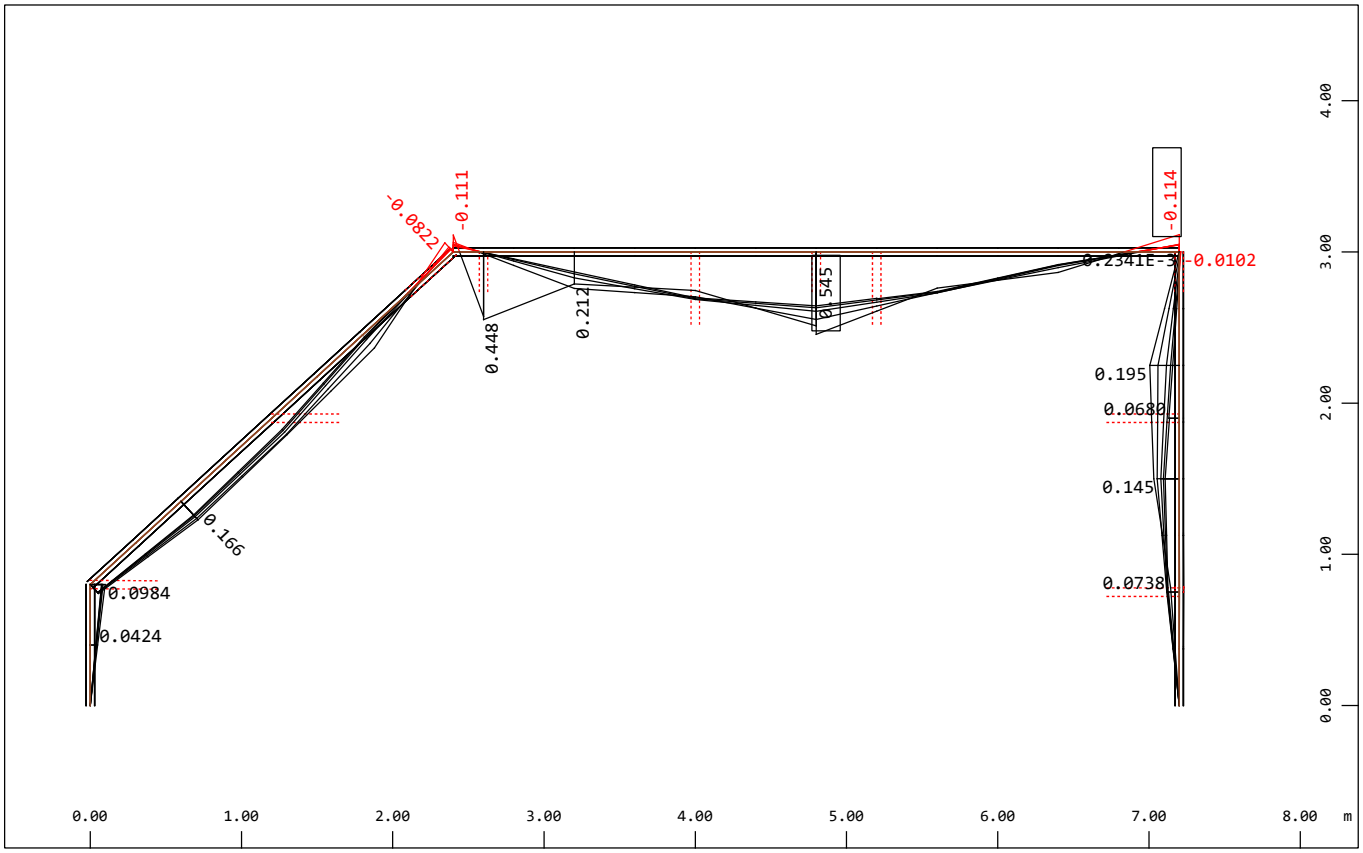



Z
X Y

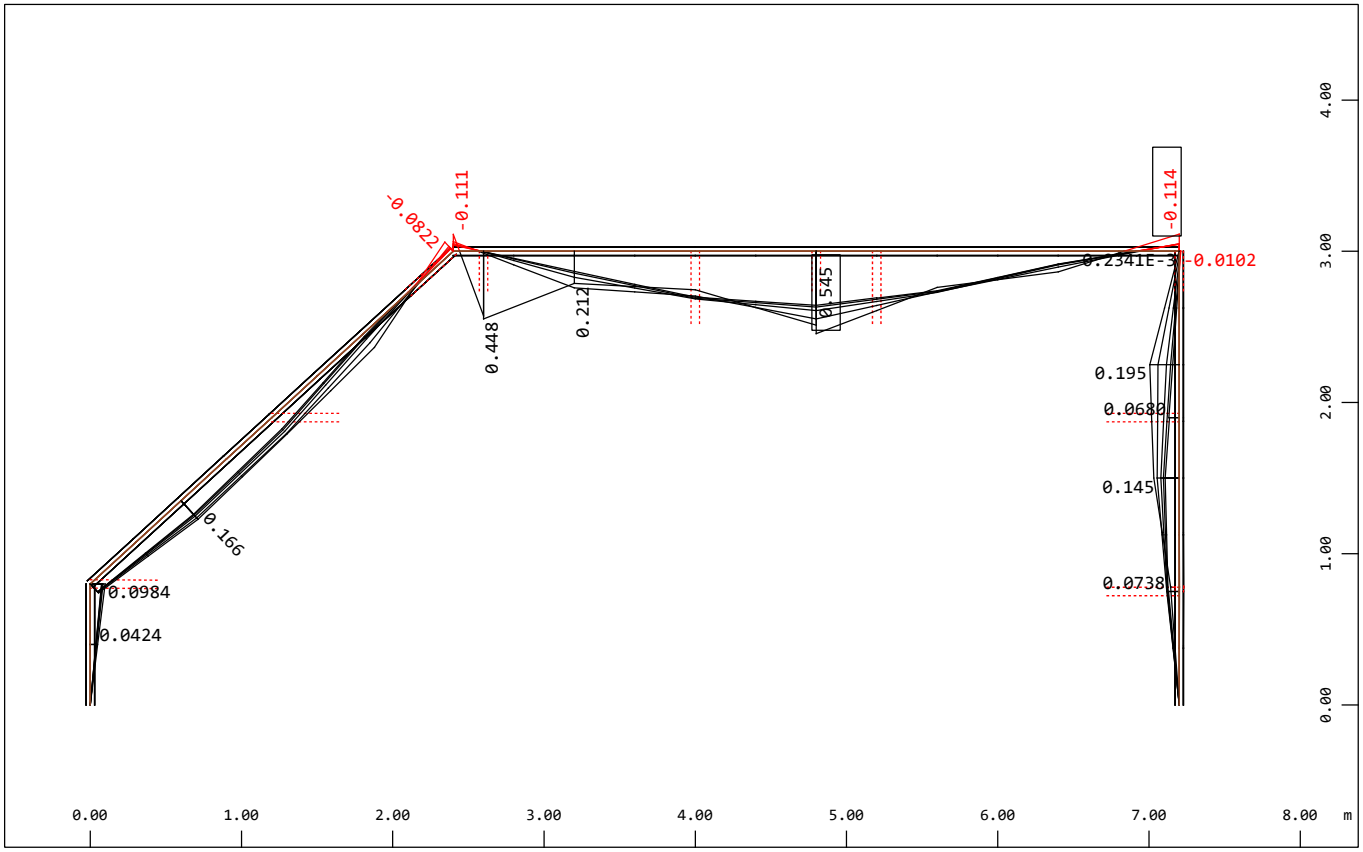
Sector of system Group 1 M 1 : 50
Beam Elements , Bending moment My, Loadcase 2030 MIN-MY BEAM Forces in Beam Eleme , 1 cm
= 20.0 kNm (Min=-20.6) (Max=11.0)

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Ovoj. notranjih sil - MSN-long term: primarni nosilci



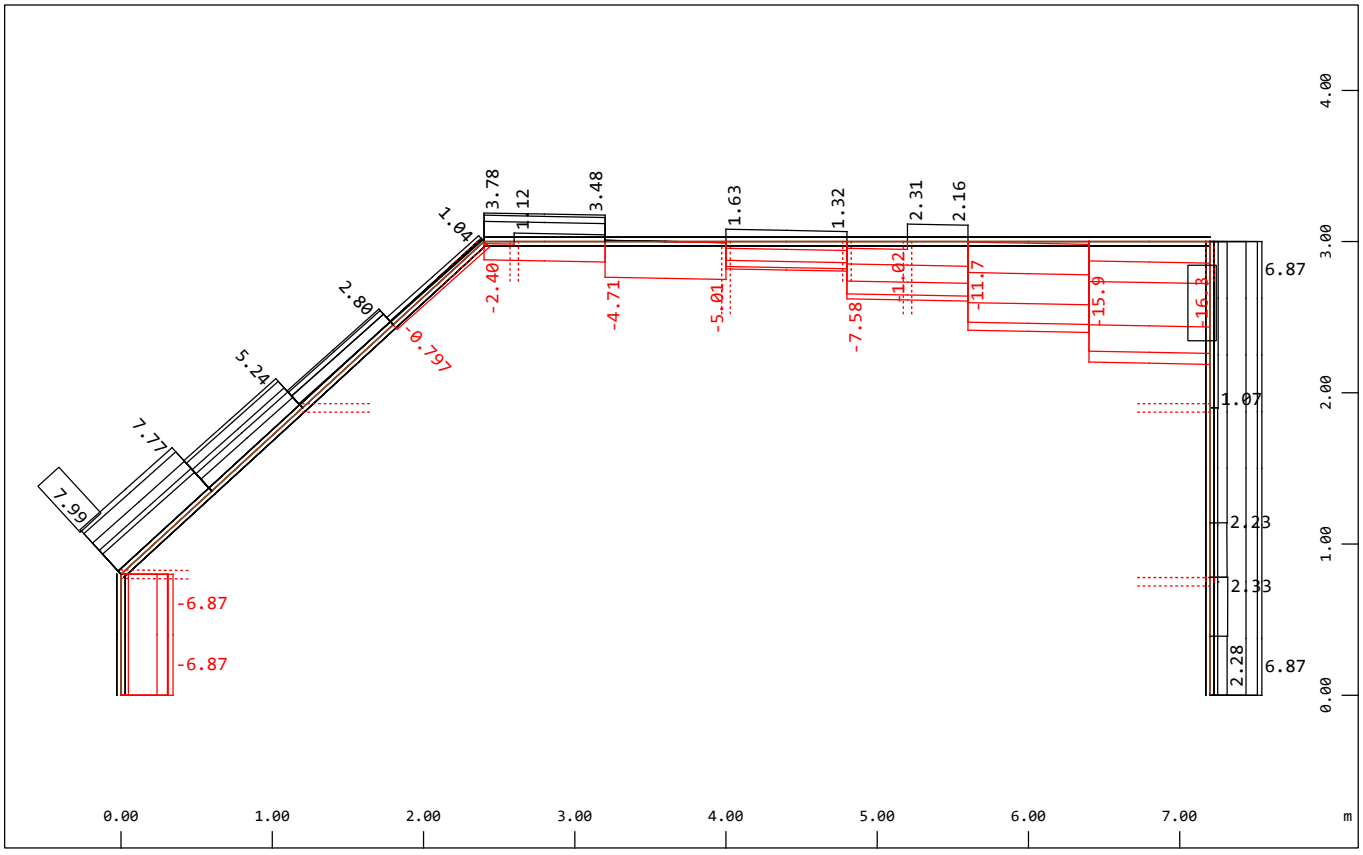

Sector of system Group 1 M 1 : 50
Beam Elements , Bending moment Mz, Loadcase 2031 MAX-MZ BEAM Forces in Beam Eleme , 1 cm
= 0.500 kNm (Min=-0.114) (Max=0.545)



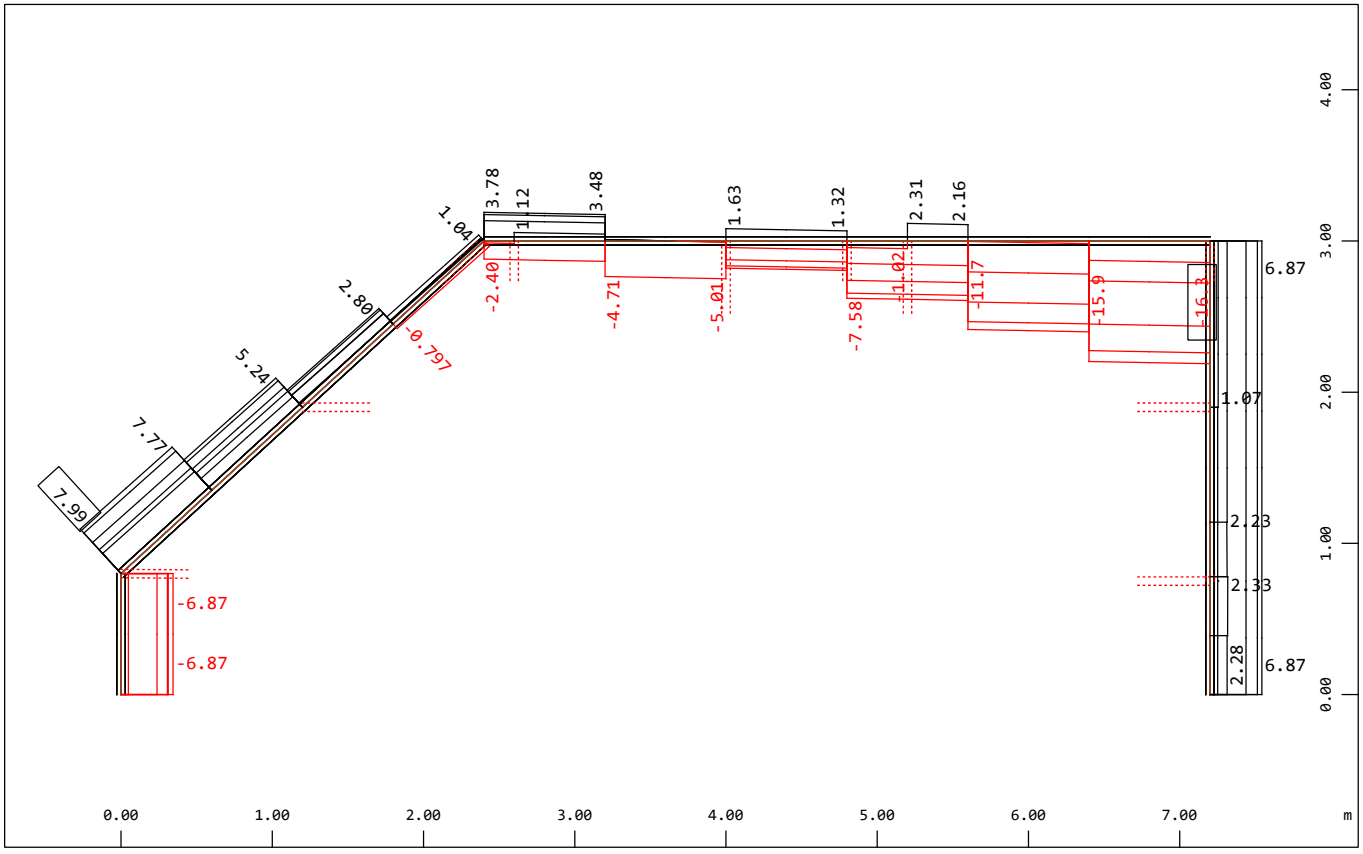

Sector of system Group 1 M 1 : 50
Beam Elements , Bending moment Mz, Loadcase 2032 MIN-MZ BEAM Forces in Beam Eleme , 1 cm
= 0.500 kNm (Min=-0.114) (Max=0.545)

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11826 DSO Bovec - nadstresek tehnicne etaze (dodatna analiza za pozar R30)
Ovoj. notranjih sil - MSN-long term: primarni nosilci



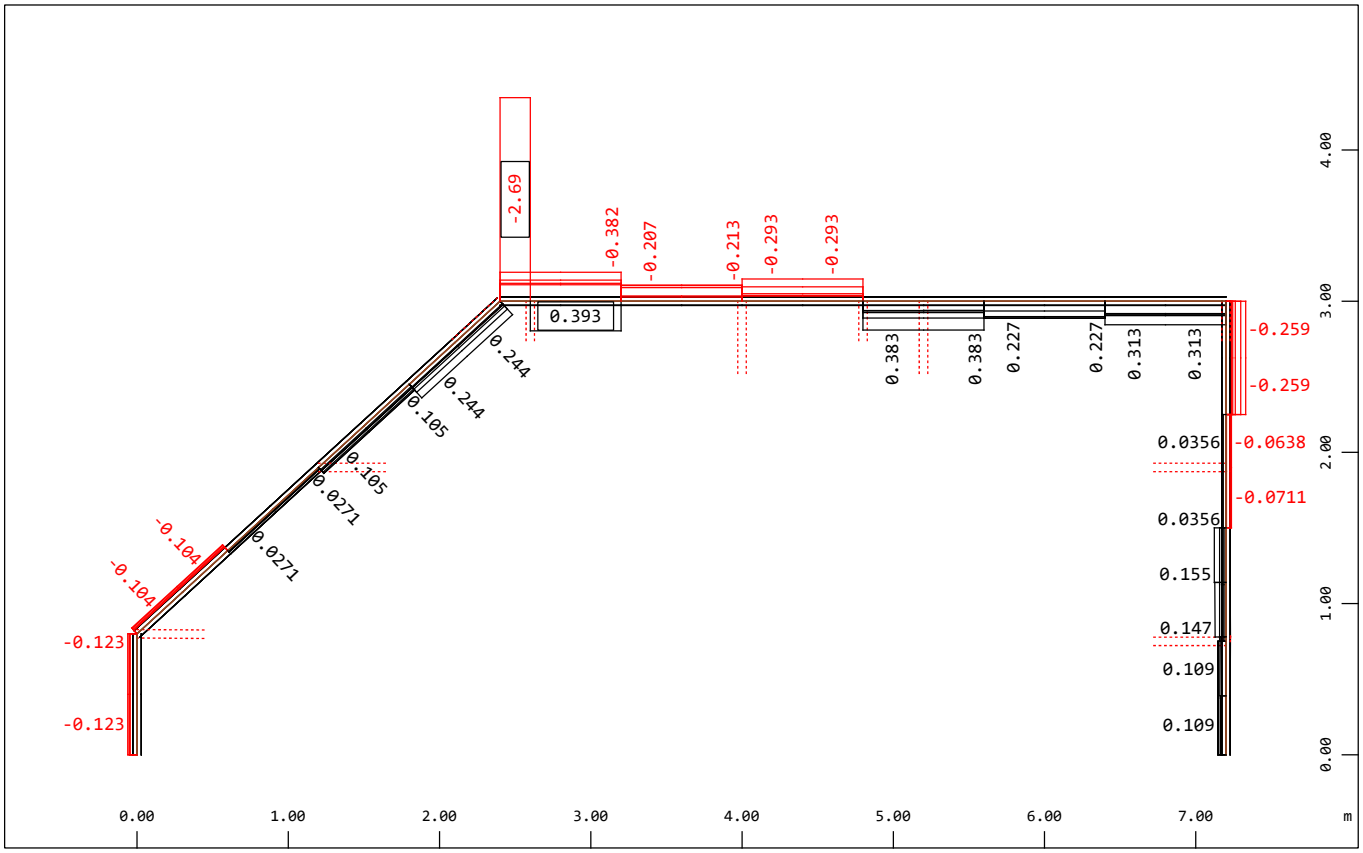

Sector of system Group 1 M 1 : 50
Beam Elements , Shear force Vz, Loadcase 2025 MAX-VZ BEAM Forces in Beam Eleme , 1 cm =
10.0 kN (Min=-16.3) (Max=7.99)



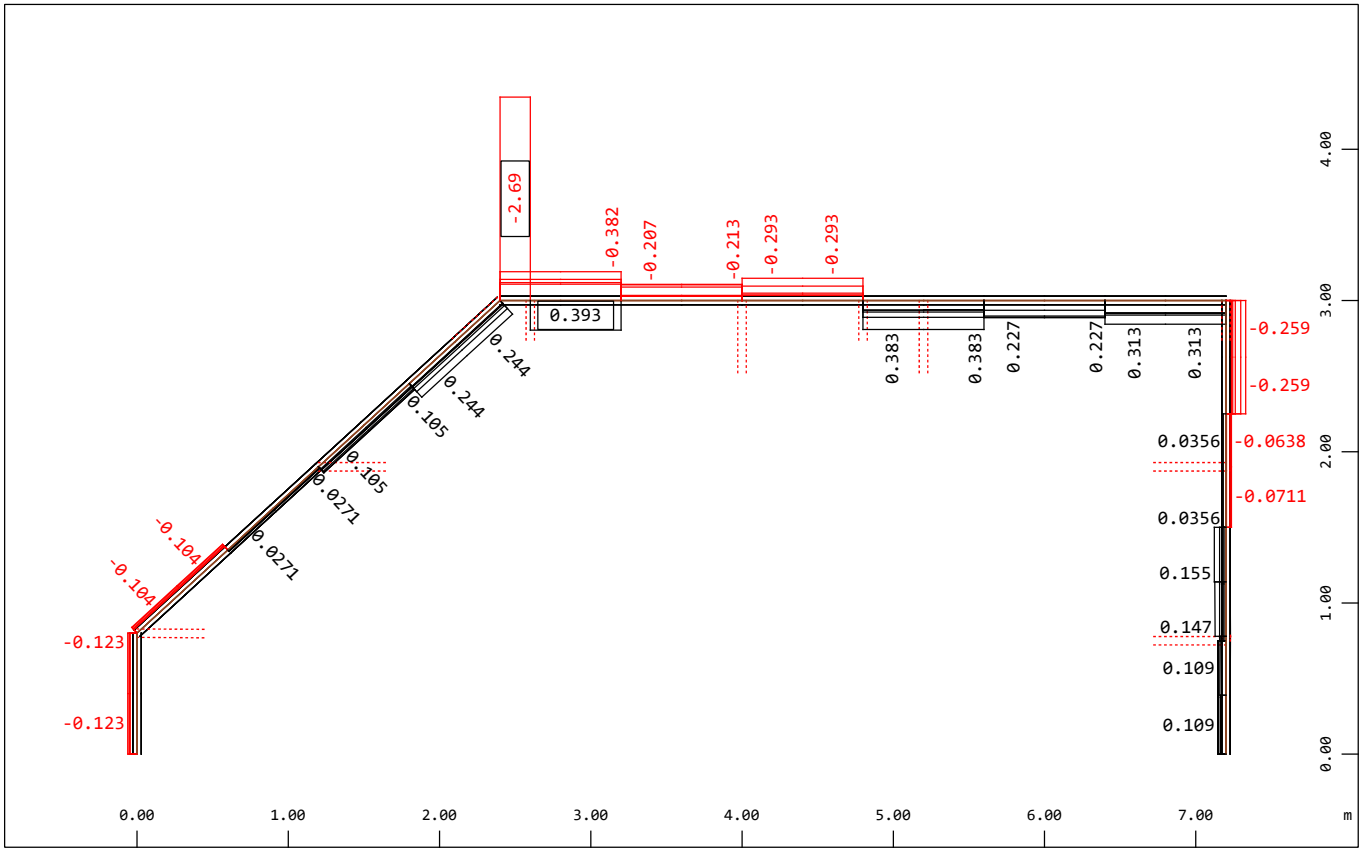

Sector of system Group 1 M 1 : 50
Beam Elements , Shear force Vz, Loadcase 2026 MIN-VZ BEAM Forces in Beam Eleme , 1 cm =
10.0 kN (Min=-16.3) (Max=7.99)

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11826 DSO Bovec - nadstresek tehnicne etaze (dodatna analiza za pozar R30)
Ovoj. notranjih sil - MSN-long term: primarni nosilci



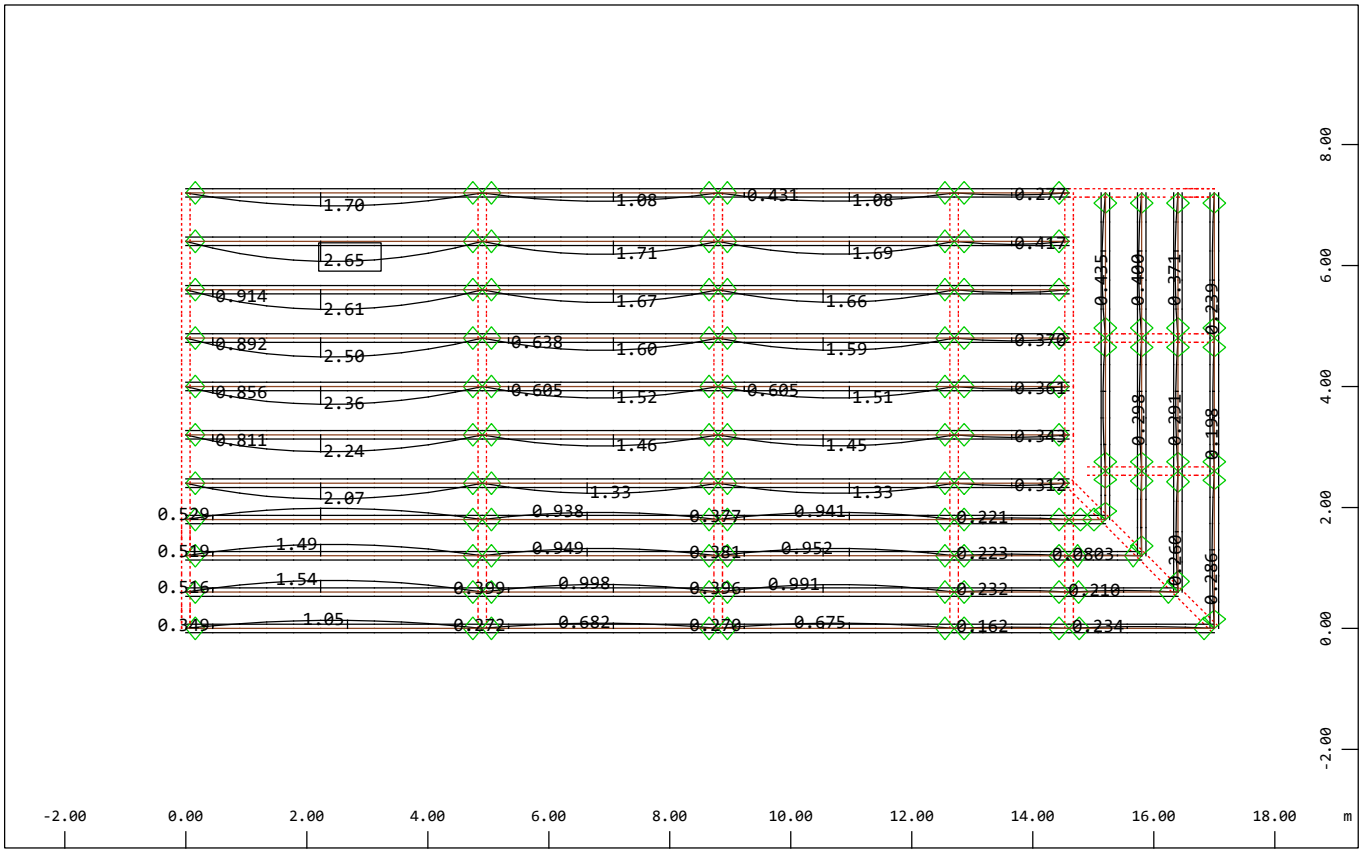

Sector of system Group 1 M 1 : 50
Beam Elements , Shear force Vy, Loadcase 2023 MAX-VY BEAM Forces in Beam Eleme , 1 cm =
1.00 kN (Min=-2.69) (Max=0.393)




Sector of system Group 1 M 1 : 50
Beam Elements , Shear force Vy, Loadcase 2024 MIN-VY BEAM Forces in Beam Eleme , 1 cm =
1.00 kN (Min=-2.69) (Max=0.393)

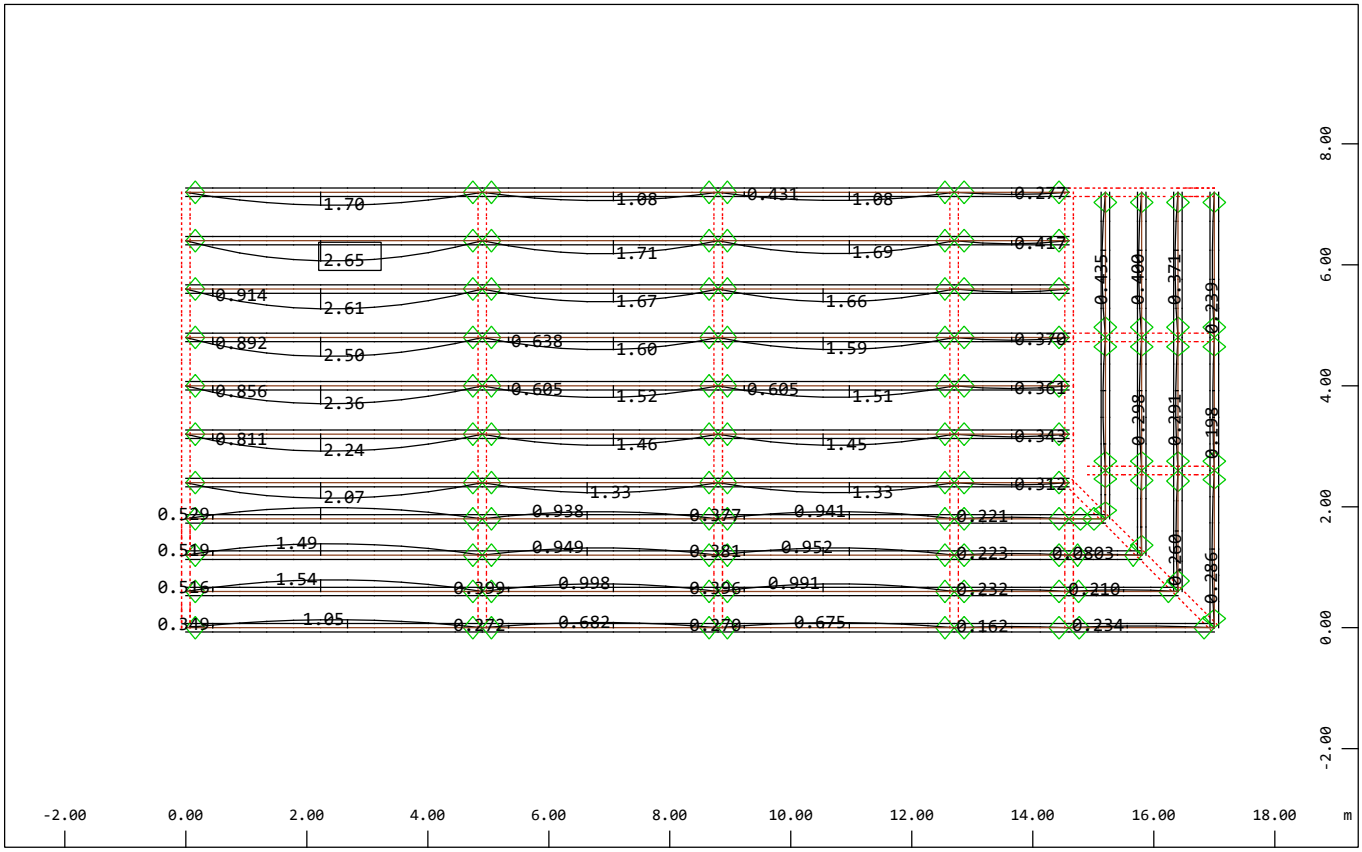
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11826 DSO Bovec - nadstresek tehnicne etaze (dodatna analiza za pozar R30)
Ovoj. notranjih sil - MSN-long term: sekundarni nosilci




Y
Z—X

Sector of system Group 11 M 1 : 125
Beam Elements , Bending moment My, Loadcase 2029 MAX-MY BEAM Forces in Beam Eleme , 1 cm
= 10.0 kNm (Min=-4.4556e-16) (Max=2.65)

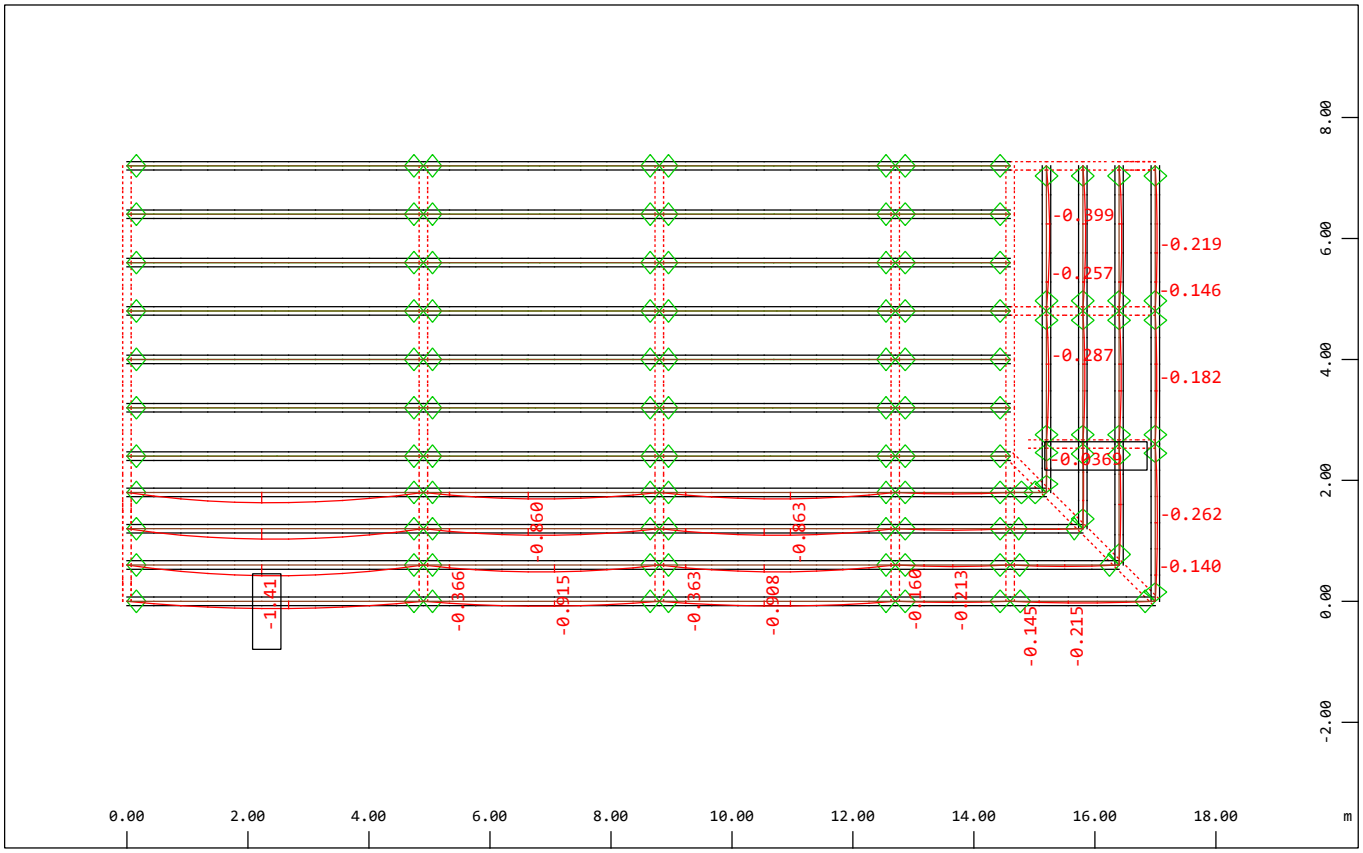



Y
Z—X

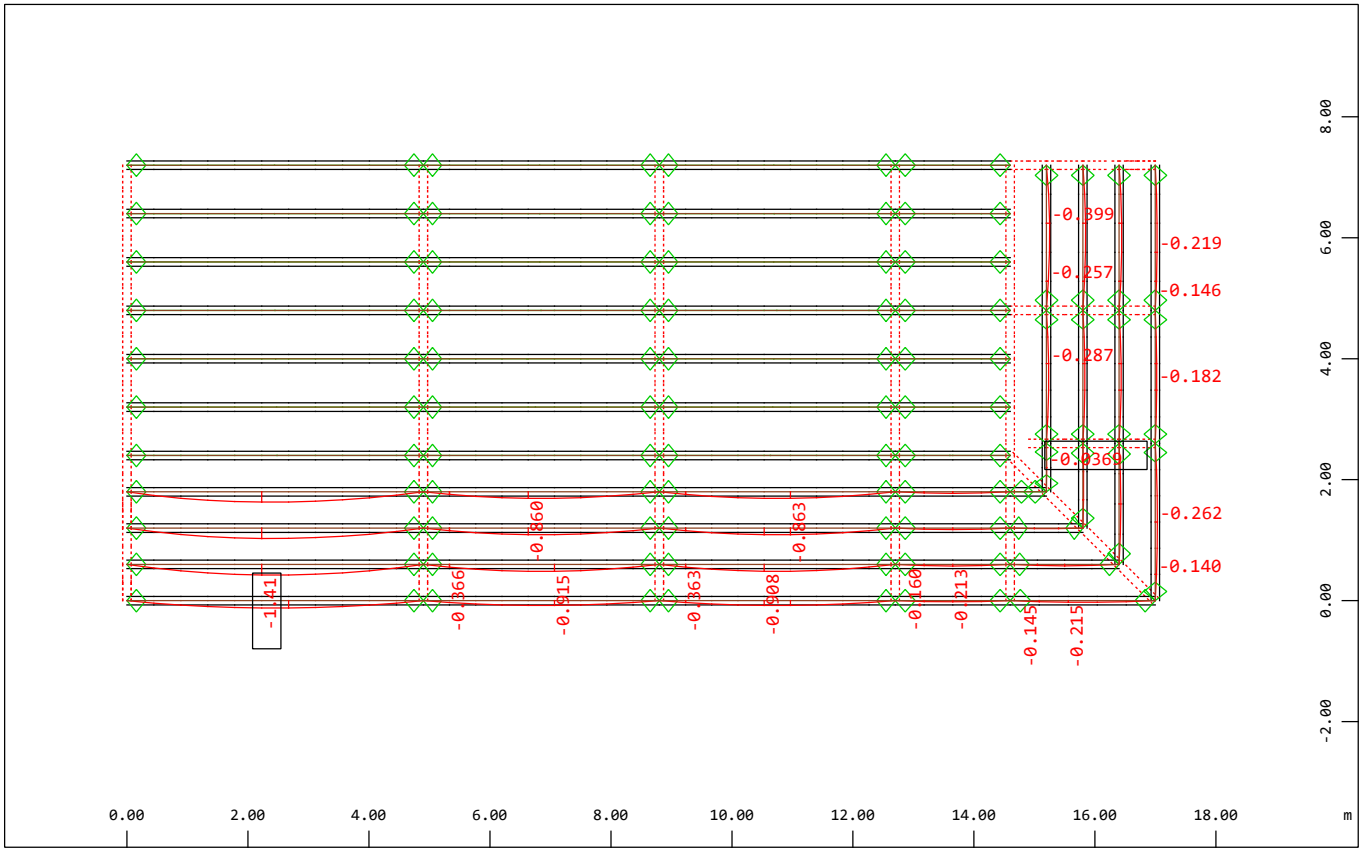
Sector of system Group 11 M 1 : 125
Beam Elements , Bending moment My, Loadcase 2030 MIN-MY BEAM Forces in Beam Eleme , 1 cm
= 10.0 kNm (Min=-4.4556e-16) (Max=2.65)

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11826 DSO Bovec - nadstresek tehnicne etaze (dodatna analiza za pozar R30)
Ovoj. notranjih sil - MSN-long term: sekundarni nosilci



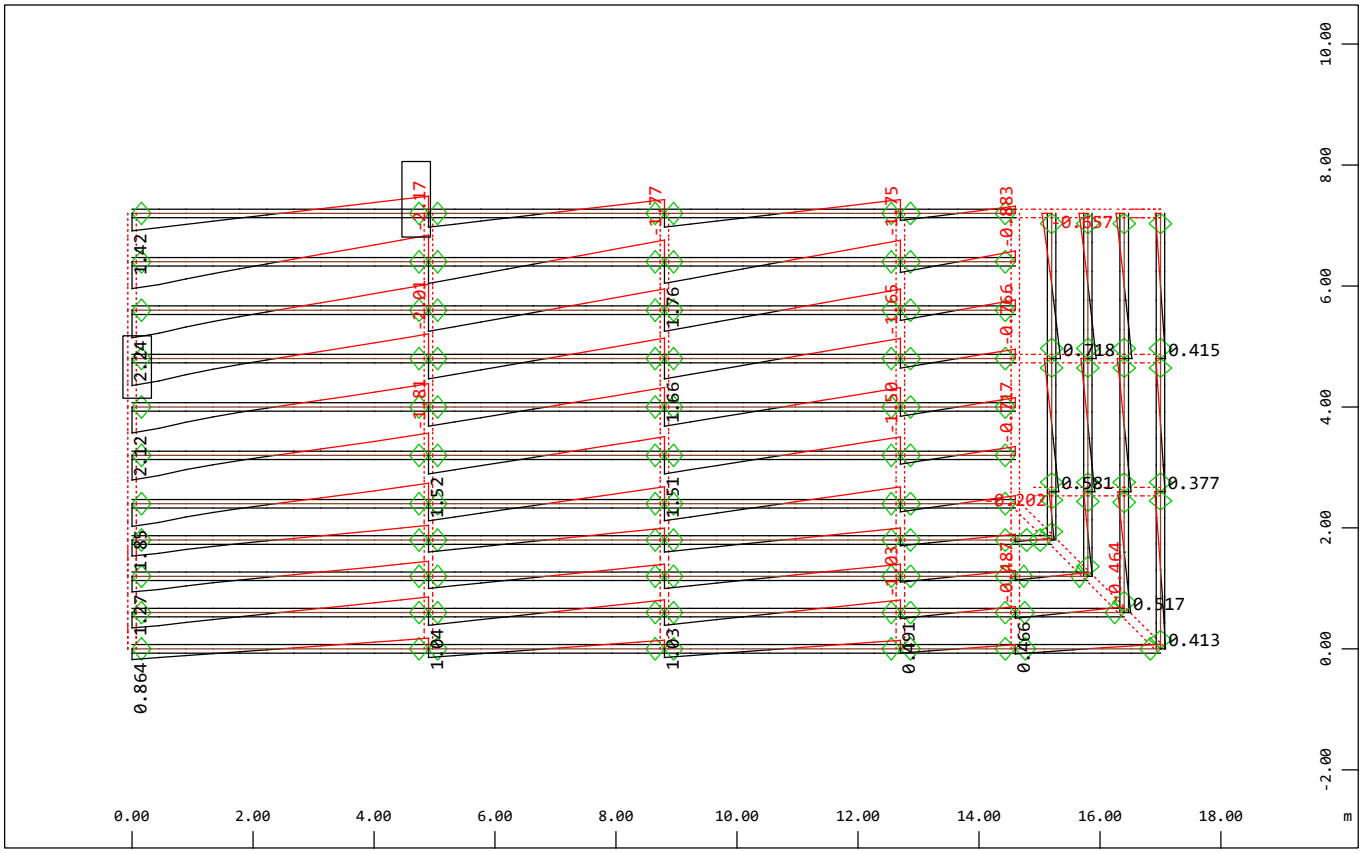

Y
Z—X
Sector of system Group 11 M 1 : 125
Beam Elements , Bending moment Mz, Loadcase 2031 MAX-MZ BEAM Forces in Beam Eleme , 1 cm
= 10.0 kNm (Min=-1.41) (Max= 5.3759e-11)



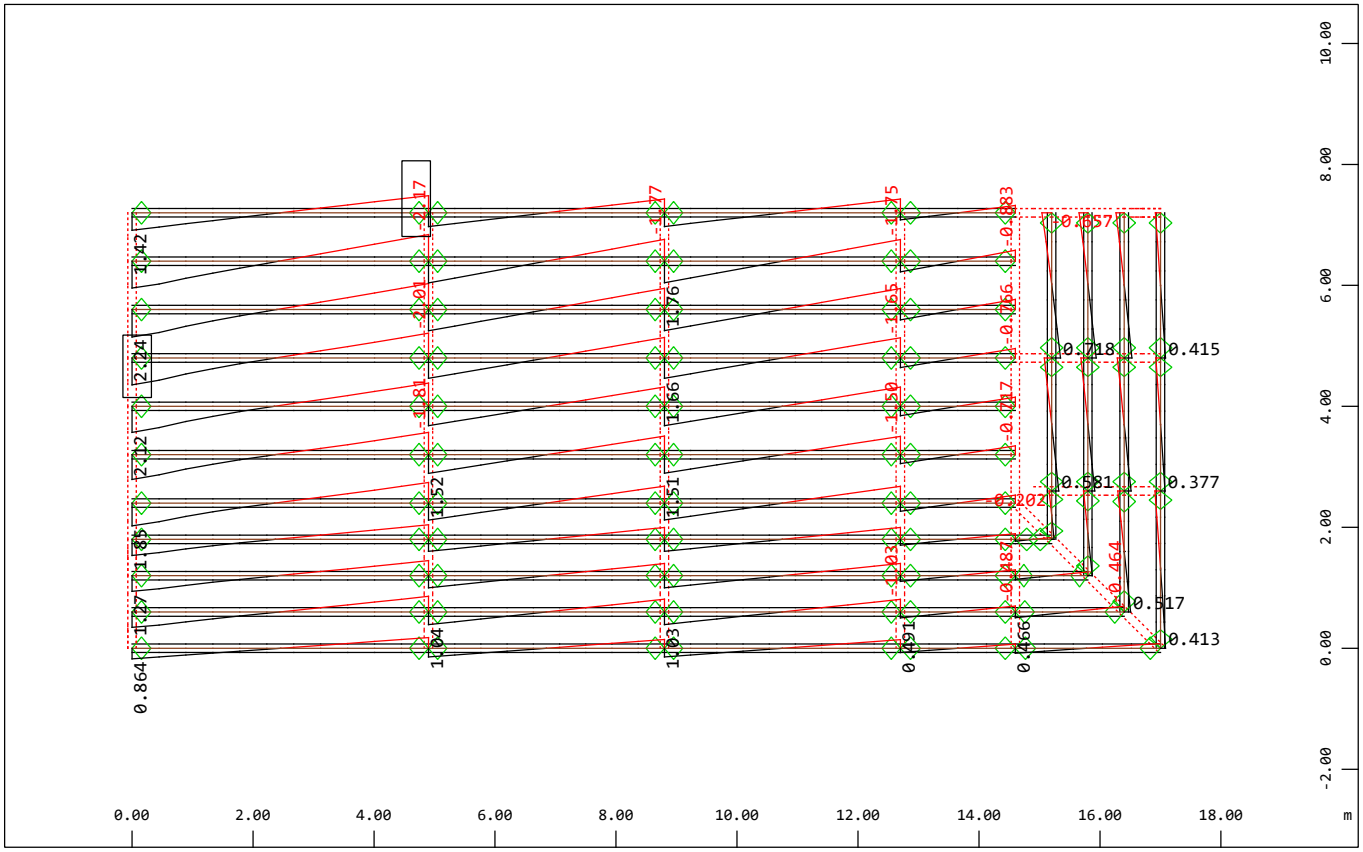

Y
Z—X
Sector of system Group 11 M 1 : 125
Beam Elements , Bending moment Mz, Loadcase 2032 MIN-MZ BEAM Forces in Beam Eleme , 1 cm
= 10.0 kNm (Min=-1.41) (Max= 5.3759e-11)

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11826 DSO Bovec - nadstresek tehnicne etaze (dodatna analiza za pozar R30)
Ovoj. notranjih sil - MSN-long term: sekundarni nosilci



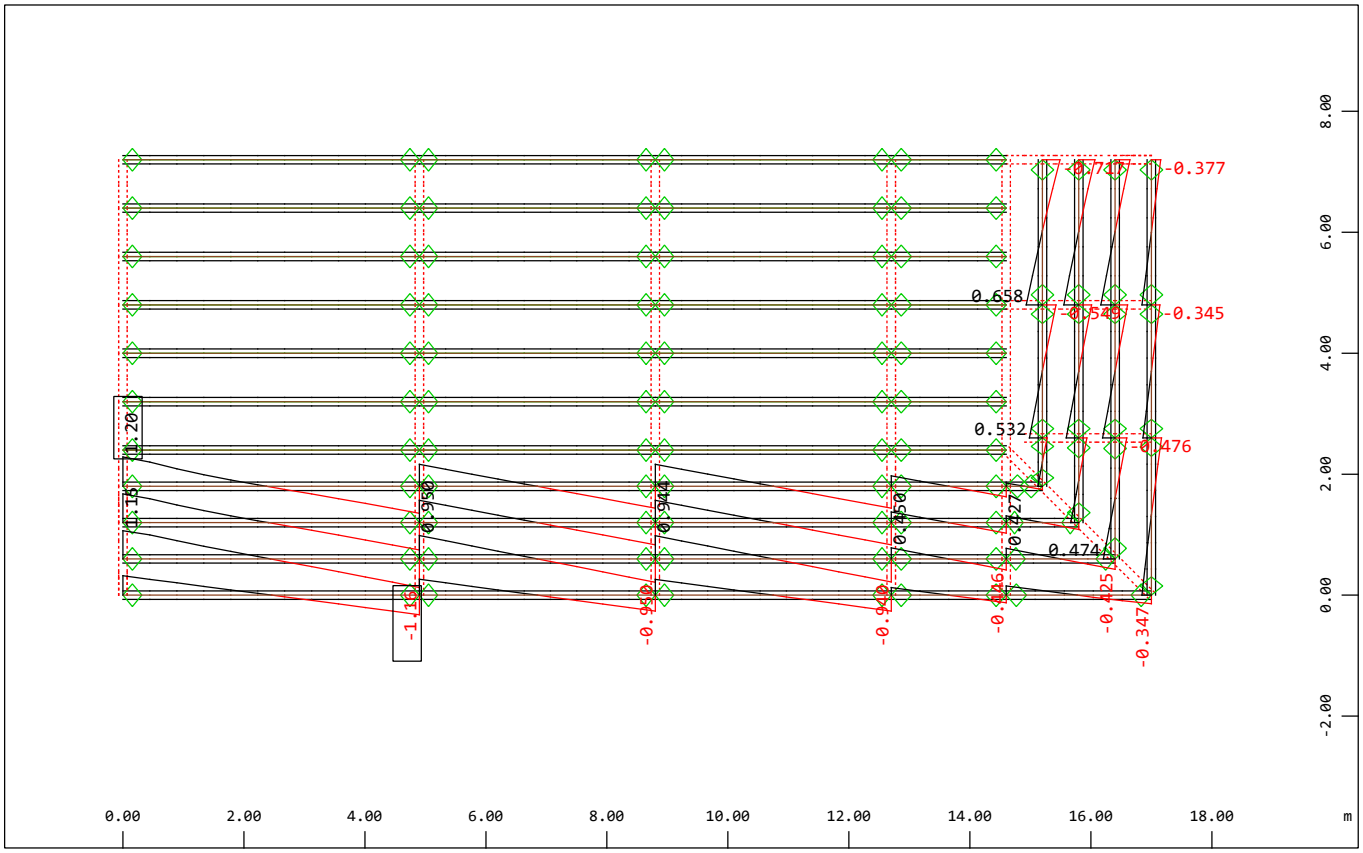

Sector of system Group 11 M 1 : 125
Beam Elements , Shear force Vz, Loadcase 2025 MAX-VZ BEAM Forces in Beam Eleme , 1 cm =
6.16 kN (Min=-2.17) (Max=2.24)



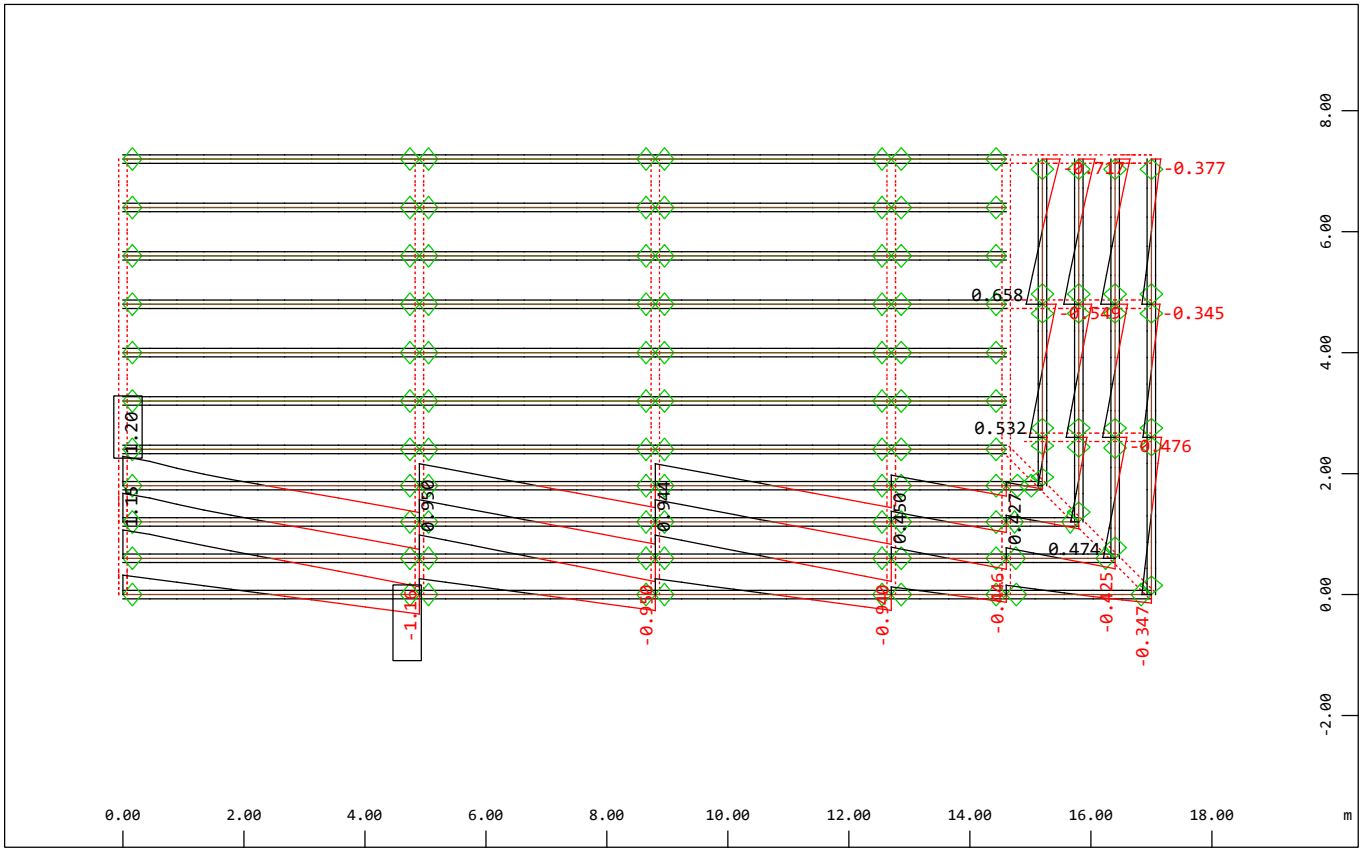

Sector of system Group 11 M 1 : 125
Beam Elements , Shear force Vz, Loadcase 2026 MIN-VZ BEAM Forces in Beam Eleme , 1 cm =
6.16 kN (Min=-2.17) (Max=2.24)

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11826 DSO Bovec - nadstresek tehnicne etaze (dodatna analiza za pozar R30)
Ovoj. notranjih sil - MSN-long term: sekundarni nosilci



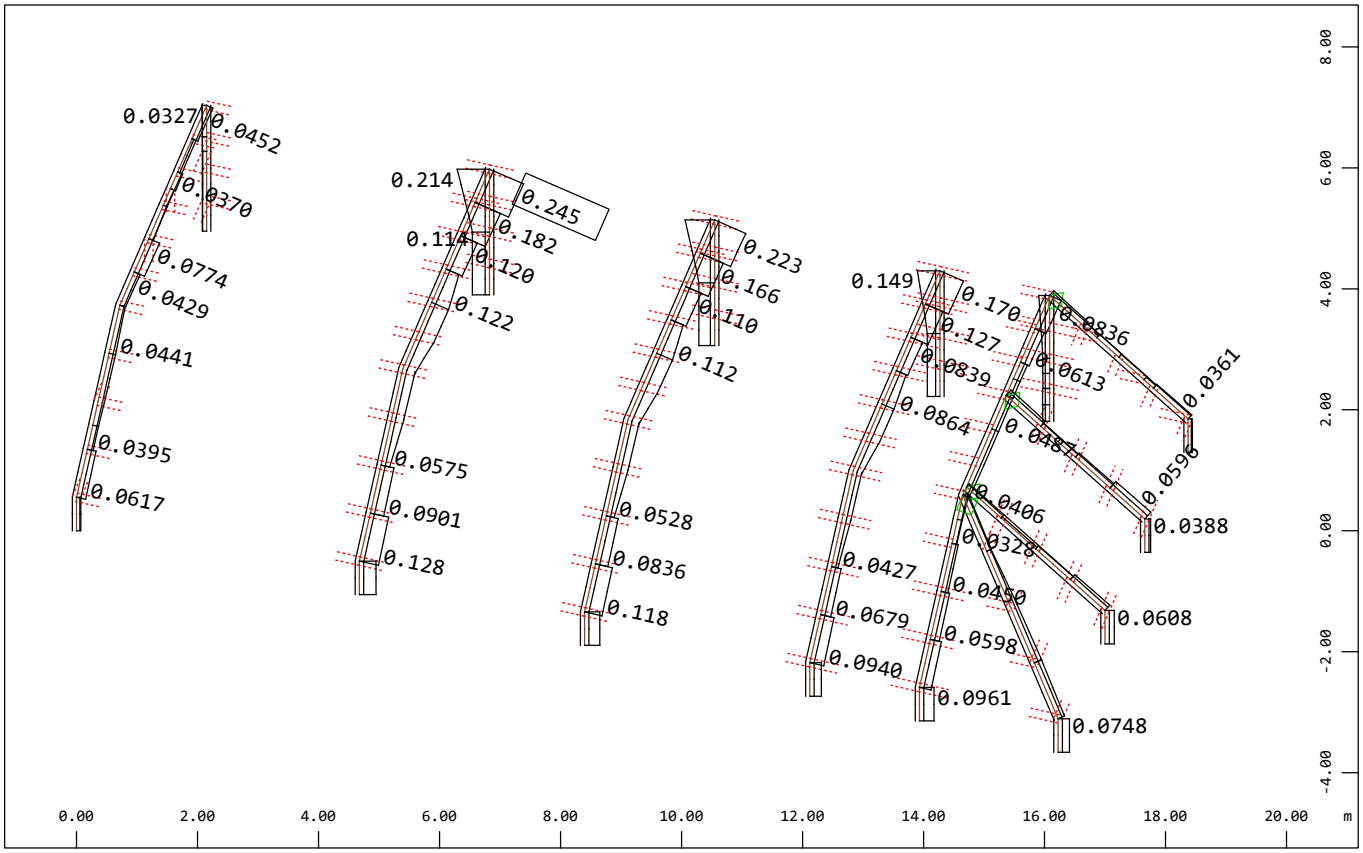

Sector of system Group 11 M 1 : 125
Beam Elements , Shear force Vy, Loadcase 2023 MAX-VY BEAM Forces in Beam Eleme , 1 cm =
3.08 kN (Min=-1.16) (Max=1.20)




Sector of system Group 11 M 1 : 125
Beam Elements , Shear force Vy, Loadcase 2024 MIN-VY BEAM Forces in Beam Eleme , 1 cm =
3.08 kN (Min=-1.16) (Max=1.20)

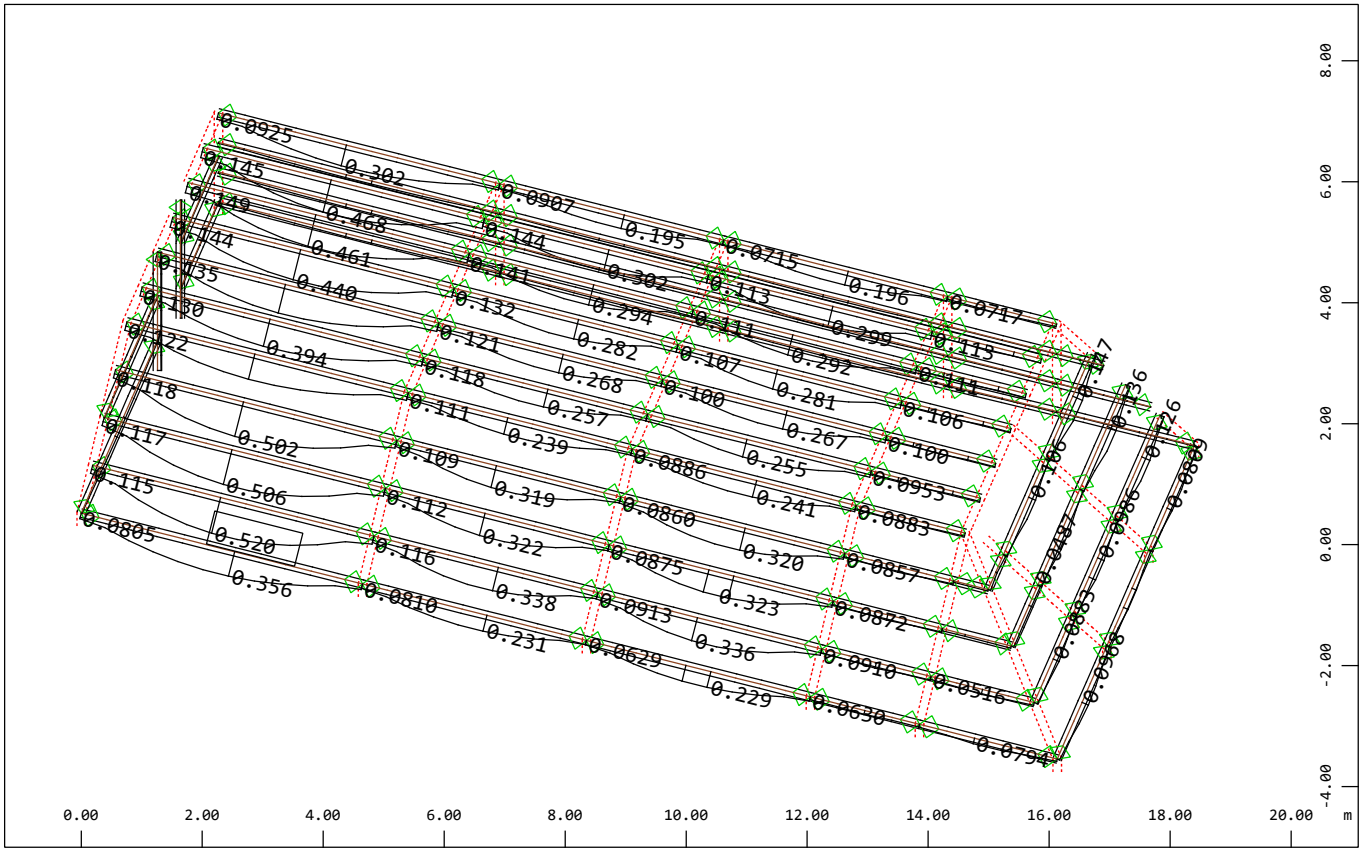
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11826 DSO Bovec - nadstresek tehnicne etaze (dodatna analiza za pozar R30)
Izkoriscenosti - primarni in sekundarni nosilci (perm - fire comb)




Sector of system Beam Elements Group 1 2
Beam Elements , Utilisation level Decisive - Total, Design Case 501 GlobalMAX SIGMA , 1
cm 3D = 0.500 (Max=0.245)

M 1 : 125
X * 0.978
Y * 0.750
Z * 0.693




Sector of system Beam Elements Group 11...13
Beam Elements , Utilisation level Decisive - Total, Design Case 501 GlobalMAX SIGMA , 1
cm 3D = 1.07 (Max=0.520)

M 1 : 125
X * 0.979
Y * 0.786
Z * 0.651

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