PRILOGA 1C

NASLOVNA STRAN NAČRTA

PODATKI O GRADNJI		
naziv gradnje		**OŠ ROJE V DOMŽALAH**
kratek opis gradnje		**Občine Domžale, Lukovica, Mengeš, Moravče in Trzin, nameravajo k obstoječi Osnovni šoli Roje v Domžalah prizidati dodatne prostore. Prizidava bo obsegala nadzidavo vzhodnega kraka ter dozidavo drugega stopnišča in osebnega dvigala. Obenem bodo rekonstruirani nekateri šolski prostori v obstoječem objektu. Vsi priključki na komunalno oskrbo in priključki na infrastrukturo ostanejo obstoječi in se ne spreminjajo.**
VRSTE GRADNJE	☑	**NOVOGRADNJA - NOVOZGRAJEN OBJEKT**
označiti vse ustrezne vrste gradnje	☐	**NOVOGRADNJA - PRIZIDAVA**
	☑	**REKONSTRUKCIJA**
	☐	**SPREMEMBA NAMEMBNOSTI**
	☐	**ODSTRANITEV CELOTNEGA OBJEKTA**
	☐	**LEGALIZACIJA**
	☐	**MANJŠA REKONSTRUKCIJA**
PODATKI O PROJEKTNI DOKUMENTACIJI		
vrsta dokumentacije		**PZI - projektna dokumentacija za izvedbo gradnje**
številka projekta		**A - 057/21**
PODATKI O NAČRTU		
strokovno področje načrta		**2 Načrt gradbeništva**
naziv načrta		**Zvezek 1 - statični izračun**
številka načrta		**1016/2023**
datum izdelave		**september 2023**
datum spremembe		
PODATKI O PROJEKTANTU NAČRTA		
projektant načrta (naziv družbe)		**STATICON IB d.o.o.**
naslov		**Lokarjev drevored 1, 5270 Ajdovščina**
odgovorna oseba projektanta načrta		**Bogomir Ipavec**
podpis odgovorne osebe projektanta načrta		
PODATKI O IZDELOVALCU NAČRTA		
ime in priimek pooblaščenega arhitekta, pooblaščenega inženirja		**Bogomir Ipavec, univ.dipl.inž.grad.**
identifikacijska številka		**IZS G-0250**
podpis pooblaščenega arhitekta, pooblaščenega inženirja		

2.2 KAZALO VSEBINE NAČRTA št. 1016/2023 – zvezek 1

1.	Naslovna stran načrta
2.	Kazalo vsebine načrta
2C.	Izjava projektanta načrta in pooblaščenega strokovnjaka, ki je izdelal načrt v PZI in PID
3.	Tehnično poročilo
4.	Statični račun
5.	Risbe

PRILOGA 2C

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

PROJEKTANT NAČRTA	
projektant načrta (naziv družbe)	**STATICON IB d.o.o.**
naslov	**Lokarjev drevored 1, 5270 Ajdovščina**
odgovorna oseba projektanta načrta	**Bogomir Ipavec**

IN POOBLAŠČENI STROKOVNJAK, KI JE IZDELAL NAČRT	
pooblaščeni strokovnjak	**Bogomir Ipavec, univ.dipl.inž.grad.**

IZJAVLJAVA:

da načrt

vrsta dokumentacije	**PZI - projektna dokumentacija za izvedbo gradnje**
strokovno področje načrta	**2 Načrt gradbeništva**
naziv načrta	**Zvezek 1 - statični izračun**
številka načrta	**1016/2023**
datum izdelave	**september 2023**

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

pooblaščeni strokovnjak	**Bogomir Ipavec, univ.dipl.inž.grad.**
identifikacijska številka	**IZS G-0250**
podpis pooblaščenega strokovnjaka	
odgovorna oseba projektanta načrta	**Bogomir Ipavec**
podpis odgovorne osebe projektanta načrta	

2.3 TEHNIČNO POROČILO

1.0 SPLOŠNO

Občine Domžale, Lukovica, Mengeš, Moravče in Trzin, nameravajo k obstoječi Osnovni šoli Roje v Domžalah prizidati dodatne prostore. Prizidava bo obsegala nadzidavo vzhodnega kraka ter dozidavo drugega stopnišča in osebnega dvigala. Obenem bodo rekonstruirani nekateri šolski prostori v obstoječem objektu. Rušitvena dela niso predmete tega načrta.

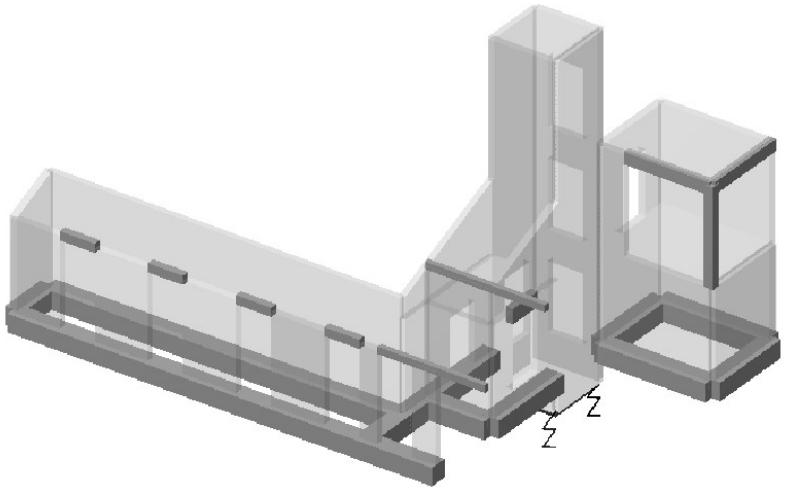
Med osmi 2-7 se prizida dvigalni jašek, strojnico dvigala in pokrije vetrolov. Med osmi 19-21 se prizida stopnišče, dvigalni jašek, garažo, prostore ravnatelja, tajništva in učilnico. Nad osrednjim delom med osmi 10-19 se nadzida učilnice in pomožne prostore, v končni fazi imamo objekt etažnosti P+1N+2N. Streha objekta ima dvokapno obliko, naklona 22 stopinj, katera je tlorisno razgibana.

Prizidava oz. nadzidava je armiranobetonske monolitne izvedbe in se navezuje na obstoječe AB elemente, katere se glede na obremenitve in njihovo stanje mestoma ojačuje s karbonskimi lamelami, tkaninami oz. obetoniranjem. Del konstrukcije se izvede na novih pasovnih temeljih, stenah, etažnih ploščah. Ostrešje je lesene izvedbe. Vertikalna komunikacija v objektu poteka s pomočjo dvo ramnih stopnic z vmesnimi podesti ter dvigalom.

2.0 ZASNOVA KONSTRUKCIJE

PRIZIDAVA MED OSMI 2 IN 7

Konstrukcija je zasnovana kot stenast sistem, katere vertikalno nosilno konstrukcijo predstavljajo armiranobetonske stene, horizontalno armiranobetonske plošče, ostrešje pa je lesene izvedbe. Temeljenje je predvideno na pasovnih temeljih.

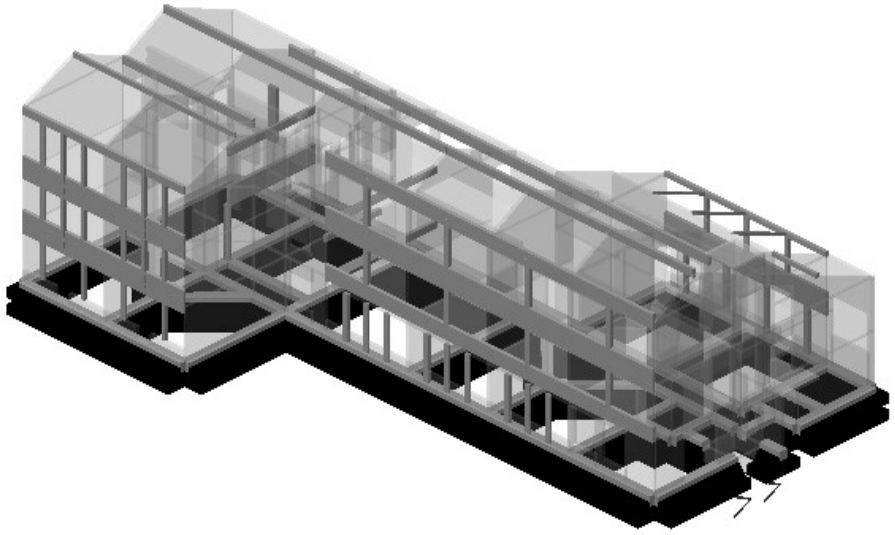


model prizidka med osmi 2 in 7

Vertikalno nosilno konstrukcijo tvorijo nove armiranobetonske stene debeline 25cm in obstoječe armiranobetonske stene debeline 20cm, na katere se navezuje konstrukcija. Plošča strojnice dvigala in prostora za umirjanje sta armiranobetonske izvedbe. Debelina plošče je 20cm in nalega na vertikalne AB stene. V osi F imamo nad stenami AB nosilec dimenzij 25/30cm. Ostrešje je lesene izvedbe in ga sestavljajo špirovci dimenzij 14/16cm na osnem rastru 90cm, kapne oz. vmesne podprte lege dimenzij 16/16cm, ter dve konzolni legi dimenzij 20/24cm. Na novo zgrajeni pasovni temelji so dimenzij 60/60cm. Temeljna plošča dvigalnega jaška je debeline 25cm, strešna pa 15cm.

PRIZIDAVA IN NADZIDAVA MED OSMI 10 IN 21

Konstrukcija je zasnovana kot stenast sistem, vertikalno nosilno konstrukcijo predstavljajo armiranobetonske stene, horizontalno armiranobetonske plošče, ostrešje je lesene izvedbe. Temeljenje je predvideno na pasovnih temeljih in posameznih točkovnih temeljih.



model prizidka med osmi 10 in 12

Vertikalni nosilni elementi

Vertikalno nosilno konstrukcijo tvorijo nove armiranobetonske stene debeline 25cm, obstoječe armiranobetonske stene debeline 20cm, ter AB stebri 20/30cm (obstoječi), 25/30cm (novi), ter AB slopi. V presečišču osi C-10, v pritličju, se obstoječi krožni AB steber premera 40cm, ojača in sicer s karbonsko tkanino (izvedba po navodilih proizvajalca tkanine). Obstoječe stebričke 20/30cm, med okni v oseh G in B, je potrebno pred izvedbo preveriti ali so AB izvedbe, ali so le kot polnilo. V primeru polnila bo potrebno obstoječe stebre ojačati.

Glavne prečne stene (večinoma nove, delno stare), v oseh 10, 12, 13, 15, 17, 19 se na nivoju ostrešja poveže z vzdolžnim AB nosilcem 25/60cm (med osjo D-E). Novozgrajene stene se v prečni smeri poveže z zunanjo steno v osi E. Steni v osi 13, se na nivoju plošče 2 nadstropja, dodatno izvede AB nosilec dimenzij 25/50cm, obrnjen navzdol, ki ga povežemo s steno v osi E (s tem želimo dodatno razbremenimo del sile ki obremenjuje spodnjo ploščo, oz. spodnji nosilec). Omenjeno steno v osi 13, se na nivoju pritličja (nad jedinico), dodatno podpre z novim AB nosilcem dimenzij 30/40cm, kateri se naslanja na nova robna slopa dimenzij 30/35cm. Podobna slopa dimenzij 25/35cm oz. 25/40cm se izvede med osmi G in F (v učilnici in zbornici), kateri podpira vzdolžni nosilec 25/140cm.

Plošča nad pritličjem

Nova nosilna konstrukcija plošče nad pritličjem, je izvedena kot armiranobetonska monolitna plošča debeline 20 cm. Plošča nalega na obstoječe in nove vertikalne nosilne AB sten, AB stebre in je ojačana z AB nosilci. V fazi izvedbe se točno ugotovi v kakšnem tlorisnem obsegu je potrebno obstoječo ploščo zamenjati z novo (ali tudi nad gospodinjsko učilnico in učilnico 1 razreda).

Obstoječo ploščo je potrebno v osi 13 ojačati z nosilcem dimenzij cca 30/40cm, nosilec se naslanja na AB slop 30/35cm in podpira zgornjo nosilno steno. V osi 10 je potrebno novo nastali vendar obstoječi nosilec preveriti, če zadošča podanim obremenitvam, zaradi novonastalih odprtin. V osi B imamo robni nosilec dimenzij 25/145cm (mestoma je kombiniran z obstoječim nosilcem).

V območju med osmi 10 in 19 bo potrebno obstoječo ploščo ojačati s karbonskimi lamelami, debeline 1,2mm, širina lamele 10cm (ocenjena poraba lamel 4 tekoče m/m2). Točno stanje plošče, se izvede pred izvedbo (obenem je potrebno preveriti trdnost betona, če leta dopušča ojačevanje s karbonskimi lamelami).

Plošča nad nadstropjem

Nova nosilna konstrukcija plošče nad nadstropjem, je izvedena kot armiranobetonska monolitna plošča debeline 20 cm. Plošča nalega na obstoječe in nove vertikalne nosilne AB sten, AB stebre in je ojačana z AB nosilci. Nova plošča poteka predvidoma med osmi 11 do 21. Plošča je v osi 13 ojačana z omenjenim nosilcem 25/50cm, katerega naslonimo na os E. Med osjo F in G (nad zbornico) imamo navzgor obrnjenim nosilcem dimenzij 25/140cm, na katerega naslonimo tudi strešne špirovce preko kapne lege.

Nosilec se naslanja na nova krajna stebra dimenzij 25/35cm oz. 25/40cm. V osi B imamo robni nosilec dimenzij 25/145cm. V osi E, med osmi 19 in 20A imamo AB nosilec dimenzij 25/40cm, kateri podpira zgodnjo AB steno, ki pade delno na odprtino.

Strešna konstrukcija

Ostrešje objekta je lesene izvedbe, dvokapne oblike naklona 22stopinj, predvideno je prekritje z zarezniki. Strešno konstrukcijo sestavljajo:

- špirovci dimenzij 14/22cm ali 14/16cm (od slemena, proti osi B), na osnem rastu 100 cm. Špirovci se naslanjajo na slemensko lego in kapno lego
- špirovci dimenzij 14/22cm (od slemena, proti osi E), na osnem rastu 100 cm. Špirovci se naslanjajo na slemensko lego, vmesni AB nosilec in kapno lego. Špirovci potekajo preko dveh polj.
- špirovci dimenzij 16/22cm (od osi E proti G), na osnem rastu 100 in 110 cm, zaradi strešnih oken. Špirovci se naslanjajo na kapno lego, AB nosilec, na delu stopnišča pa na vmesno lego dimenzij 20/28cm. V tem delu je predpostavljeno da so špirovci prostoležeči, preko enega polja, tlorisnega razpona 4,05m.
- špirovci dimenzij 14/16cm (med osjo G in H), na osnem rastu 110 cm. Špirovci se naslanjajo na kapno lego, posledično pa na AB nosilec.
- slemenska lega dimenzij 20/48cm, izvedena iz lepljenega lesa kvalitete GL24h. Naslanja se na nove oz. obstoječe AB stene. Osni razpon lege je 6,32m oz. 6,0m, v primeru da poteka preko enega polja.
- škarje dimenzij 2x5/25cm, katere povezujejo vsak drugi špirovec pod slemenom
- kapna lega dimenzij 18/22cm, poteka v osi H in se naslanja na AB krožne stebre.
- vmesna lega dimenzij 20/28cm, poteka nad novim stopnišče, naslanje se na zunanjo in notranjo AB steno
- AB nosilec dimenzij 25/60cm, kateri poteka med prečnimi nosilnimi stenami

Leseni elementi se izvedejo iz klasičnega masivnega lesa kvalitete C24, razen slemenski nosilec, kateri je iz lepljenega lesa kvalitete GL24h.

Stopnišče in dvigalo

Vertikalna komunikacija z dostopom do vseh etaž poteka z osebnim dvigalom in stopniščem z vmesnimi podesti. Stopnišče je dvo ramno, z vmesnimi podesti. Stopnice in podesti se izvedejo kot klasična monolitna AB plošča debeline 20cm. Stopnišče se opira na podest, temeljno ploščo in etažno ploščo, podest pa na vertikalne AB stene. Stopnišče in podeste se zvočno izolira od konstrukcije, s pomočjo Schock Tronsol elementov.

Dvigalni jašek sestavljajo AB stene debeline 25cm, temeljna plošča debeline 25cm in strešna plošča debeline 15.

Temelji

Predvideno je plitvo temeljenje objekta. Vsi novi deli konstrukcije se temeljijo na pasovnih temeljih dimenzij 60/60cm, posamezni novi slopi (v osi 13, ter med osmi F-G) pa na točkovnih razširitvah dimenzij cca 1,0m x 1,5m in 1,0m x 1,2m.

Pri izvedbi temeljenja je potrebno paziti na lokalno in globalno stabilnost teren. V primeru slabših nosilnih zemljin, oz. neutrjenih plasti je potrebno lete odstraniti in poboljšati temeljna tla, s kamnito gredo in peščeno prodnato blazino (tampon), ki mora biti ustrezno zbita in zgoščena. Sanacija se lahko izvede tudi s pustim betonom. Pri izkopu in zasipu moramo zagotoviti, da bo na celotnem tlorisu temeljev enaka sestava materiala (nosilnost in zbitost), da ne pride do diferenčnih posedkov na objektu. V primeru, da bo prišlo pri izkopu do razlik v sestavi materiala, naj se izvede poglobitev - stopničenje.

Ker v času projektiranja niso bili znani podatki o nosilnosti in sestavi tal, je bila izkustveno določena projektna nosilnost temeljnih tal 350kPa. Izračunani maksimalni kontaktni tlaki pod pasovnimi temelji znašajo 320,0 kPa (za del med osmi 10-21), ter 240kPa (za del med osmi 2-7). V izračunu je bil predpostavljen modul reakcije tal $k=20.000 kN/m^2$, ki obnašanje tal obravnava kot linearno elastično vzmet.

Temeljna tla naj pred izdelavo temeljev in ob odprtju gradbišča pregleda geomehanik. Obstoječe temelje se bo dodatno obremenilo, zato naj se preveri stanje in spodobnost temeljev prevzema dodanih obremenitev. Med gradnjo naj se upoštevajo smernice in pogoje temeljenja, podane s strani geomehanika. V kolikor geomehanik ugotovi manjšo nosilnost od privzete, oz. morebitne druge težave temeljnih tal, naj obvesti odgovornega projektanta, kateri bo podal nadaljnja navodila.

V kolikor se v fazi izkopa ugotovi podtalna ali zaledna voda, je potrebno leto kontrolirano odvajati izven območja objekta. Na kontaktu med raščenimi tlemi in tamponskim nasutjem naj se izdela kvalitetna drenaža.

3.0 MATERIALI

Armiranobetonski elementi so naslednje predvidene kvalitete:

Element		**Beton**	**Armatura**
Pasovni in točkovni temelji	vsi temelji	C 30/37; XC2; Cl 0.2, D_{max}=16 mm	B 500B
AB stebri	vsi stebri	C 30/37; XC2; Cl 0.2, D_{max}=16 mm	B 500B
AB etažne plošče z AB nosilci	vse plošče	C 30/37; XC2; Cl 0.2, D_{max}=16 mm	B 500B
AB stene in slopi	vse stene	C 30/37; XC2; Cl 0.2, D_{max}=16 mm	B 500B
Stopnice	vse stopnice	C 30/37; XC2; Cl 0.2, D_{max}=16 mm	B 500B

Izvajalec mora pred začetkom betonskih del izdelati projekt betona, s katerim se določijo sestave betonske mešanice, predpišejo konsistence betona v betonarni, med in po transportu in pred vgrajevanjem, predpišejo načini in najdaljši možni čas vgrajevanja betona, temperature vgrajevanja in temperatura vgrajevanega betona, prekinitve betoniranja, nega betona in vsi ostali ukrepi in kontrole. Lastnosti betona morajo ustrezati standardoma SIST 1026 in SIST EN 206, lastnosti armature standardu SIST EN 10080, lastnosti konstrukcijskega jekla pa standardom SIST EN 10025, EN 10113, EN 10137, EN 10155 in SIST EN 10164. Vsi armiranobetonski elementi morajo biti armirani z rebrastim armaturnim jeklom kvalitete B500B. Uporabljati se sme le visoko duktilno jeklo razreda B ali C (po SIST EN 1992-1- 1, Dodatek C, tabela C1). Armatura mora biti pred vgrajevanjem očiščena umazanije in rje, ki se lušči z armature. Sidrne dolžine in preklopi armature se določajo po pravilih SIST EN 1992.

Za opaženje se lahko uporabljajo samo gladki, nepoškodovani opaži. Opaži se pred uporabo očistijo in premažejo. Za premaze se lahko uporabljajo samo sredstva, ki so namenjena mazanju opažev.

Lepljeni lesene elementi strešne konstrukcije so naslednje predvidene kvalitete:

Element	**Trdnostni razred lesa**
Špirovci, vmesne in kapne lege	C24 - masivni smrekov les
Slemenska lega	GL24h - lepljen les

Les je glede na predvideno vlažnost prostorov uvrščen v drugi razred uporabnosti. Pri izvedbi lesene konstrukcije je potrebno upoštevati določila standarda SIST EN 1995-1-1, poglavje 10.

Kovinski čevlji slemenske lege se izvede iz jekla kvalitete S235. Izvedba in montaža jeklenega dela v skladu s SIST EN 1090-2, EXC2. Vezna sredstva so trdnostnega razreda 8.8.. Vsi kovinski elementi morajo biti ustrezno protikorozijsko zaščiteni, z vročim cinkanjem, z upoštevanjem določil skupine standardov SIST EB ISO 12944 – Protikorozijska zaščita jeklenih konstrukcij z zaščitnimi premazanimi sistemi in v skladu z zahtevami investitorja in projektanta. Če v nadaljnjih fazah ne bo drugače določeno, je potrebno upoštevati kategorijo korozijske zaščite C3, s srednjo trajnostjo (razred M), v skladu z EN ISO 12944-5, Tabela A.4 (glej tudi EN ISO 12944-1).

Vsi vgrajeni materiali, kot tudi zaščita in izvedba mora ustrezati veljavnim standardom in predpisom.

4.0 STATIČNI IZRAČUN

Globalna statična in dinamična (seizmična) analiza konstrukcije je bila izvedena s pomočjo prostorskega računskega modela iz lupinastih in linijskih končnih elementov v programu Tower – 3D Model Builder 8.4 (Radimpex Srbija). Podrobnejši podatki o izračunih so podani v poglavju »2.4 STATIČNI IZRAČUN« načrta gradbenih konstrukcij.

5.0 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. Zunanji vplivi so prikazani na začetku poglavja »2.4 STATIČNI IZRAČUN« načrta gradbenih konstrukcij. Projektant gradbenih konstrukcij mora biti obveščen o kakršnikoli težki opremi, ki se bo namestila v stavbo in ni bila upoštevana v analizi konstrukcije. Vsaka oprema, težja od 2,00kN/m^2, se smatra za težko. V splošnem so bile upoštevane sledeče obtežbe:

LASTNA IN STALNA OBTEŽBA:

VETER: - Cona vetra 1: v_{ref}=20m/s ,kat. terena II

SNEG: - Cona snega A2: nadmorska višina=310m

KORISTNA OBTEŽBA:

- streha dvorane, kat. H nepohodna streha q=0.40 kN/m^2
- etažna plošča (strojnica dvigala), kat. C-E q=5,00 kN/m^2
- etažna plošča (učilnice,..), kat. C1 q=3,00 kN/m^2
- stopnišče, kat. C3 q=5,00 kN/m2

SEIZMIČNA OBTEŽBA:

- projektni pospešek tal ag=0.225*g
- kvaliteta temeljnih tal (predpostavimo) tip B
- kategorija pomena III (γ=1.2)
- faktor obnašanja konstrukcije q=2,0 (mešana konstrukcija, DCM)

6.0 ZAKLJUČEK

Vsa zemeljska dela pri gradnji objekta, se morajo izvajati pod stalnim nadzorom geomehanika. Geomehanik mora pred izvedbo pregledati obstoječe stanje temeljev in možnost dodatnega obremenjevanje letih, ter podati navodila in smernice za temeljenje novih temeljev. Če bi dejanske geomehanske lastnosti odstopale od predvidenih, se mora o tem obvestiti projektanta, ki bo po smernicah geomehanika, podal nadaljnja navodila.

Pred izvedbo je potrebno pridobiti izvedbene (armaturne) načrte obstoječe konstrukcije, da se lahko preveri stanje in sposobnost obremenjevanja elementov. V primeru da letih ni mogoče pridobiti, je potrebno opravi skenerski pregled armature v betonu na ključnih mestih. Mogoče so tudi manjše destruktivne metode (ki v času obratovanja objekta niso mogoče). Obenem je potrebno pridobiti oz. opraviti preizkus tlačni trdnosti obstoječega betona.

Rušitvena dela in varovanje obstoječe šole oz. drugih morebitnih sosednjih objektov ob rušenju niso predmet načrta. Ruševine se sproti odstranjujejo in ne nalagajo na konstrukcijo. Rušenje naj poteka počasi in previdno, pod stalnim nadzorom, ter ob začasnim podpiranjem konstrukcijskih elementov.

Pred izvedbo posameznih elementov objekta je treba obvezno uskladiti arhitekturne, gradbene in instalacijske načrte, da se izdela vse potrebne odprtine in preboje, ter točno določi višine.

Investitor je med gradnjo objekta dolžan zagotoviti strokovni nadzor in kontrolo izdelave z vsemi ustreznimi meritvami vgrajenega materiala po veljavnih predpisih in standardih.

Izvajalec je dolžan pred pričetkom gradnje izdelati elaborat postopka gradnje, vključno z vsemi varnostnimi ukrepi. Med gradnjo mora voditi vso po veljavnih predpisih zahtevano dokumentacijo, ki se nanaša na dokazovanje kvalitete vgrajenih materialov in tehnoloških postopkov posameznih faz gradnje. Vsi vgrajeni produkti morajo imeti ustrezna tehnična soglasja oz. certifikate. Ves vgrajen, dodajni in spojni material mora biti opremljen v skladu z Zakonom o gradbenih proizvodih (ZGPro) oziroma Direktivo EU o gradbenih proizvodih (DGP), z izjavami o skladnosti proizvoda oz. certifikati o skladnosti proizvoda in mora biti vgrajen po veljavnih predpisih in standardih. Vsak vgrajen material mora biti označen in sledljiv.

Izvajalec je dolžen pred začetkom izvedbe oz. gradnje izdelati naslednje dokumente:

- Načrt zagotavljanja kakovosti del,
- Elaborat varstva pri delu,

Pri delu je potrebno upoštevati ustrezne predpis iz varstva pri delu. Dokumenti morajo biti pregledani s strani strokovnega nadzora investitorja.

Za ostrešje je potrebno izdelati delavniške načrte, glede na znanje in tehnologijo izdelovalca lesene konstrukcije. Vse delavniške risbe in detajle je potrebno poslati projektantu v pregled in potrditev.

Izdelavo betonskih delov konstrukcije je potrebno izvesti v skladu s SIST EN 13670. Pri geometrijski natančnosti je poleg SIST EN 1090 potrebno upoštevati arhitekturne zahteve.

Pri izvedbi je potrebno paziti na trenutno stabilnost posameznih elementov objekta. Lahko si pomagamo z začasnim in priročnim premoščanjem in podpiranjem, katero mora biti dodatno zavarovano. Pri montaži nosilcev je potrebno upoštevati pogoje gradbišča in pozicije ter sposobnosti nosilnih elementov konstrukcije objekta, ki ji lahko začasno obremenimo.

Investitor objekta je dolžan poskrbeti za vizualne kontrole in preglede nosilnih delov konstrukcije (tekoči pregledi, redni glavni pregledi v časovnih razdobjih po 5 let). Na konstrukciji je potrebno pregledati in evidentirati pojav eventualnih deformacij in razpok, ki bi lahko povzročile večjo škodo na objektu. V primeru, da se pri vizualnem pregledu ugotovi večje poškodbe, je potrebno opraviti točnejše meritve in ugotoviti dejanske vrednosti poškodb, ter označiti njihovo lokacijo.

Vzdrževanje in nadzorovanje nosilnih delov objekta mora biti tako, da bo objekt varen in funkcionalen, ter bo s tem odgovarjal namenu, kateremu je predviden.

V primeru nenavadne izjemne zasnežitve je potrebno sneg odstranjevati s strešne konstrukcije. Vzdrževanje mora potekati tudi v skladu z navodili izvajalca konstrukcije.

V kolikor nastanejo pri izvedbi odstopanja od projekta (spremembe v nosilni konstrukciji), je potrebno konstrukcijo ponovno analizirati in o tem obvestiti odgovornega projektanta.

Naknadno prebijanje nosilnih elementov konstrukcije ni dovoljeno brez soglasja pooblaščenega projektanta.

2.4 STATIČNI RAČUN

Statični izračuni:

- analiza vplivov na objekt »OŠ Roje v Domžalah«
- poz 100: konstrukcija med osmi 2 in 7
- poz 101: dimenzioniranje špirovcev ob osi 4
- poz 102: dimenzioniranje špirovcev ob osi 2A
- poz 200: konstrukcija med osmi 10 in 21
- poz 201: plošča nad pritličjem in nad nadstropjem (ločen izračun)
- poz 202: dimenzioniranje špirovcev ob osi 14 - desno, daljši 5.15m, preko dveh polj
- poz 203: dimenzioniranje špirovcev ob osi 14 – levo, krajši 3.0m
- poz 204: dimenzioniranje špirovcev ob osi 17 – desno, 4.05m
- poz 205: slemenska lega
- poz 206: dimenzioniranje špirovcev ob osi 17 med H in G
- poz 207: kapna lega v osi H
- poz 208: vmesna lega med osmi 20-21 pri stopnišču
- poz 300: dimenzioniranje stopnic
- poz 301: dimenzioniranje podesta

ANALIZA VPLIVOV NA OBJEKT "OŠ ROJE V DOMŽALAH"

1. VPLIV LASTNE TEŽE

Za vse konstrukcijske elemente je lastna teža v izračunu upoštevana avtomatsko (računalniški program Tower) s pripadajočo prostorninski težo elementa.

2. VPLIV STALNE OBTEŽBE

Strešna konstrukcija nad strojnico dvigala

- zareznik	$g_{zar} = 0.60 kN \cdot m^{-2}$
- vzdolžne in kotra letve	$g_{let} = 0.05 kN \cdot m^{-2}$
-paroprepustna folija	$g_{fol} = 0.02 kN \cdot m^{-2}$
- OSB plošča deb.20mm	$g_{osb} = 0.13 kN \cdot m^{-2}$
- špirovci	$g_{špi} = 0.15 kN \cdot m^{-2}$
- toplotna izolacija deb16cm med špirovci	$g_{ti} = 0.12 kN \cdot m^{-2}$
- toplotna izolacija deb 10cm, pod špirovci	$g_{ti2} = 0.08 kN \cdot m^{-2}$
- MK plošče	$g_{mk} = 0.25 kN \cdot m^{-2}$

strešna konstrukcija nad strojnico dvigala = $g_{st.sk1} = 1.40 \cdot kN \cdot m^{-2}$

Plošča strojnice dvigala

- finalni tlak, epoksi premaz in izravnalna masa	$g_{ft} = 0.35 kN \cdot m^{-2}$	
- cementni estrih 5,0cm	$g_{es} = 1.75 kN \cdot m^{-2}$	
- PE folija	$g_{pe} = 0.02 kN \cdot m^{-2}$	
- toplotna izolacija deb.4cm	$g_{ti3} = 0.05 kN \cdot m^{-2}$	
- AB plošča deb.20cm	$g_{AB3} = 0.00 kN \cdot m^{-2}$	... avtomatski izračun
- omet	$g_{om} = 0.40 kN \cdot m^{-2}$	

plošča strojnice dvigala = $g_{sk.plo1} = 2.57 \cdot kN \cdot m^{-2}$

Strešna plošča dvigala

- alu strešna kritina $g_{str} = 0.20 kN \cdot m^{-2}$

- tesnilna membrana $g_{mem} = 0.15 kN \cdot m^{-2}$

- strešni opaž, deske $g_{op} = 0.10 kN \cdot m^{-2}$

- prezračevanje + folija $g_{fo} = 0.02 kN \cdot m^{-2}$

- strešni opaž, deske $g_{op2} = 0.10 kN \cdot m^{-2}$

- morali 6/20cm, toplotna izolacija 20cm $g_{ti4} = 0.20 kN \cdot m^{-2}$

- naklonski stiropor 5-8cm $g_{ti5} = 0.10 kN \cdot m^{-2}$

- parna zapora $g_{pz} = 0.02 kN \cdot m^{-2}$

- AB plošča deb.15cm $g_{AB4} = 0.00 kN \cdot m^{-2}$ ... avtomatski izračun

---

strešna plošča dvigala = $g_{sk.plo2} = 0.89 \cdot kN \cdot m^{-2}$

Etažna plošča (učilnice)

- finalni tlak, epoksi premaz in izravnalna masa $g_{ft1} = 0.35 kN \cdot m^{-2}$

- cementni estrih 5,0cm $g_{es1} = 1.75 kN \cdot m^{-2}$

- PE folija $g_{pe1} = 0.02 kN \cdot m^{-2}$

- toplotna izolacija deb.4cm $g_{ti6} = 0.05 kN \cdot m^{-2}$

- AB plošča deb.20cm $g_{AB5} = 0.00 kN \cdot m^{-2}$ ... avtomatski izračun

- omet $g_{om1} = 0.40 kN \cdot m^{-2}$

- predelna stene $g_{pst} = 0.80 kN \cdot m^{-2}$

---

etažna plošča (učilnice) = $g_{sk.plo3} = 3.37 \cdot kN \cdot m^{-2}$

Strešna konstrukcija nad učilnicami

- zareznik	$g_{zar1} = 0.60 kN \cdot m^{-2}$
- vzdolžne in kotra letve	$g_{let1} = 0.05 kN \cdot m^{-2}$
-paroprepustna folija	$g_{fol1} = 0.02 kN \cdot m^{-2}$
-toplotna izolacija deb. 10cm	$g_{ti7} = 0.10 kN \cdot m^{-2}$
- OSB plošča deb.22mm	$g_{osb1} = 0.15 kN \cdot m^{-2}$
- špirovci	$g_{špi1} = 0.15 kN \cdot m^{-2}$
- toplotna izolacija deb16cm med špirovci	$g_{ti8} = 0.12 kN \cdot m^{-2}$
- toplotna izolacija deb 5cm, pod špirovci	$g_{ti9} = 0.05 kN \cdot m^{-2}$
- parna zapora	$g_{pz2} = 0.02 kN \cdot m^{-2}$
- MK plošče	$g_{mk1} = 0.25 kN \cdot m^{-2}$

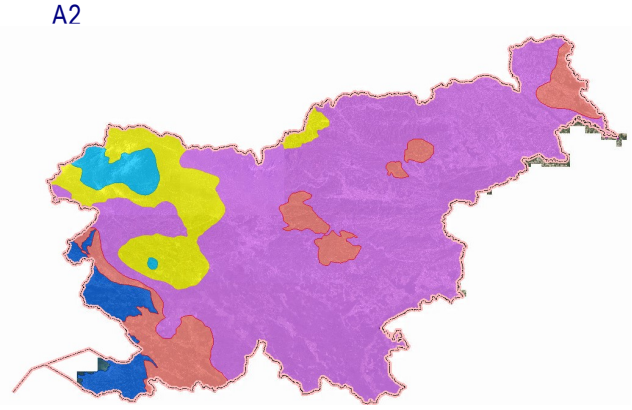
strešna konstrukcija nad strojnico dvigala = $g_{st.sk2} = 1.51 \cdot kN \cdot m^{-2}$

3. SPREMENLJIVI VPLIVI

Streha	- nepoh. streha, kat. H	$q_{sk.st} = 0.4 kN \cdot m^{-2}$
Etažna plošča (strojnica dvigala)	- kat. C-E	$q_{sk.pl1} = 5.0 kN \cdot m^{-2}$
Etažna plošča (učilnice)	- kat. C1	$q_{sk.pl2} = 3.0 kN \cdot m^{-2}$
Stopnišče	- kat. C3	$q_{sk.pl6} = 5.0 kN \cdot m^{-2}$

4. VPLIV SNEGA

- nadmorska višina: visina = 310m ... Domžale, OŠ Roje
- cona: A2



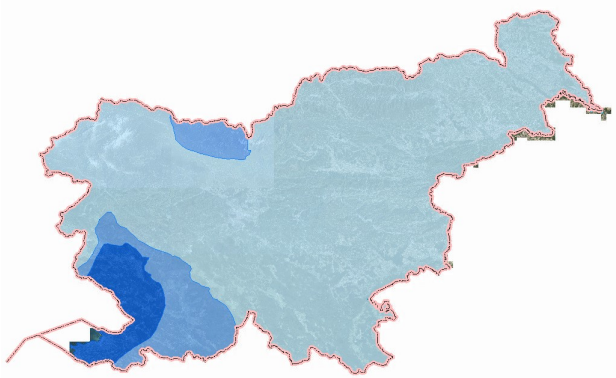
V primeru nenavadne izjemne zasnežitve je potrebno sneg ostranjevati s strešne konstrukcije.

Izračun vpliva snega je izveden v nadaljevanju.

5. VPLIV VETRA

Večinoma dvokapna streha naklona 22stopinj

- cone z enakimi vrednostmi osnovne hitrosti vetra $v_{b.0}$:



- cona: 1
- osnovna hitrost vetra: $v_b = 20 m \cdot s^{-1}$ ... Domžale, OŠ Roje
- osnovni tlak vetra: $q_{ref} = 0.25 \cdot kN \cdot m^{-2}$
- kategorija terena: II

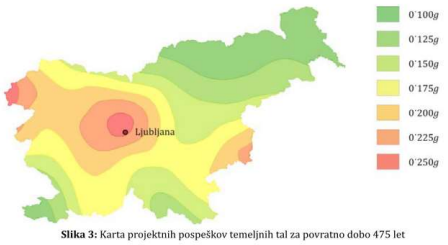
Izračun vpliva vetra je izveden v nadaljevanju.

6. POTRESI VPLIV

Objekt je lociran na območju, za katerega je predviden horizontalni pospešek tal ag=0,225g.

- projektni pospešek tem. tal: ag= 0.225g
- kvaliteta temeljnih tal (predpostavimo): B
- kategorija pomembnosti za stavbe: III

Karta potresne nevarnosti:



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

V nadaljevanju sledi izračun posameznih konstrukcijskih elementov objekta.

Item: Obtežba snega in vetra

Wind and Snow Loads (x64) LWS+ 01/23D (FRILO R-2023-1/P04)

System

Base values

Country	Europe
Snow-code	EN 1991-1-3:2010-12
Wind-code	EN 1991-1-4:2010-12

Town			-
Altitude of terrain	hMSL	=	310.00 m
Climatic region			Alpine region
Snow region			2

Category of terrain CategoryII
(A community assignment is not legally binding regulated in the snow and wind standards!)

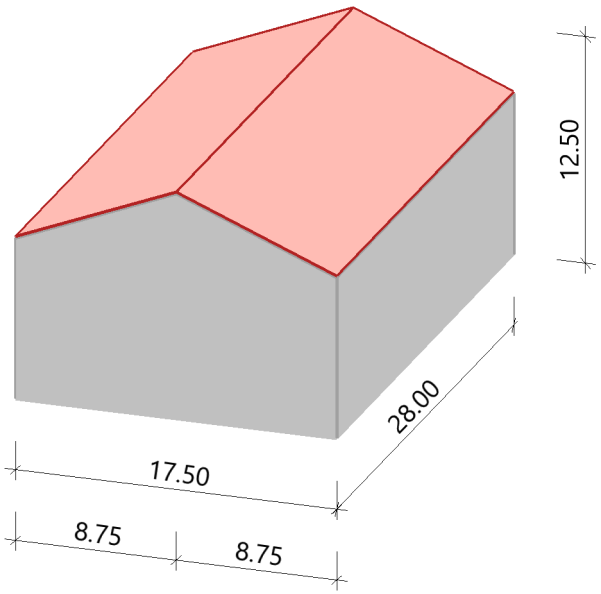
Factors

Factor snow load on eaves k = 3.00

Geometry Pitched roof

Building height	h	=	12.50	m			
Building length	l	=	28.00	m			
Building width	b	=	17.50	m			
	b_{le}	=	8.75	m	b_{ri}	=	8.75 m
using Pitched roof							
Slope	α_{le}	=	22.0	°	α_{ri}	=	22.0 °
Overhang	ov_{le}	=	0.00	m	ov_{ri}	=	0.00 m
Overhang	ov_1	=	0.00	m	ov_2	=	0.00 m
Roof width/length	dx	=	17.50	m	dy	=	28.00 m
Distance snow guard ridge	a_{le}	=	0.00	m	a_{ri}	=	0.00 m

Graphics



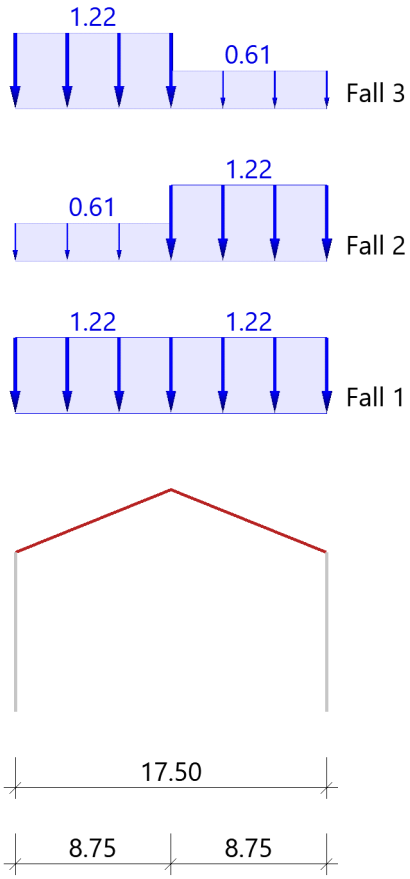
Loads

Ground snow load	sk	=	1.53	kN/m²
Basic wind speed	vb0	=	20.0	m/s
Basic speed pressure	qb0	=	0.25	kN/m²
Reference height	z_e	=	12.50	m
Velocity impounded pressure	qp,0(h)	=	0.62	kN/m²
Velocity impounded pressure	qp,90(h)	=	0.62	kN/m²

Results

Snow

Graphics, Cross-section

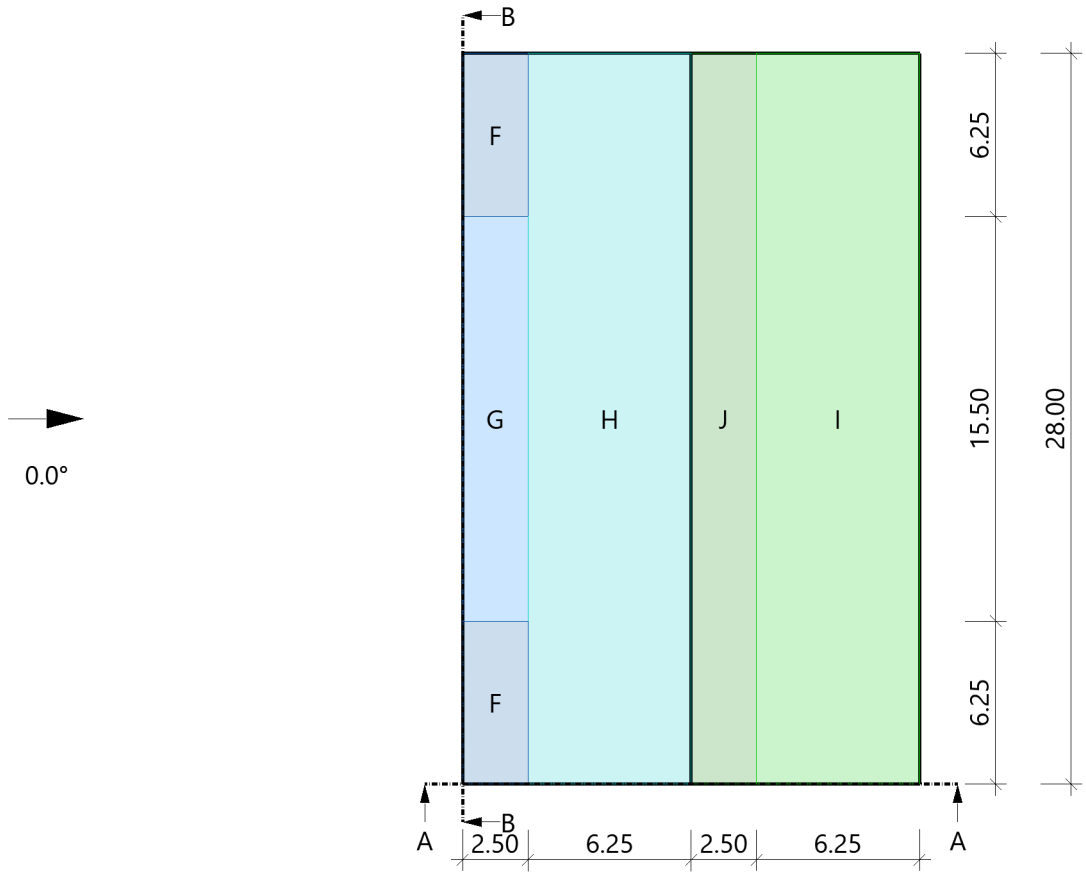


Table, Cross-section

Sit	μ_{le}	μ_{ri}	μ_{le}*	μ_{ri}*	Case (I) s_{le} [kN/m^2]	s_{ri} [kN/m^2]	Case (II) s_{le} [kN/m^2]	s_{ri} [kN/m^2]	Case (III) s_{le} [kN/m^2]	s_{ri} [kN/m^2]	$S_{e,le}$ [kN/m]	$F_{s,le}$ [kN/m]	$S_{e,ri}$ [kN/m]	$F_{s,ri}$ [kN/m]
P/T	0.80	0.80	0.80	0.80	1.22	1.22	0.61	1.22	1.22	0.61				
All values are characteristic ones. Sit: P/T=persistent/transient, excp=exceptional														

Wind

Graphics, 0°, Top view



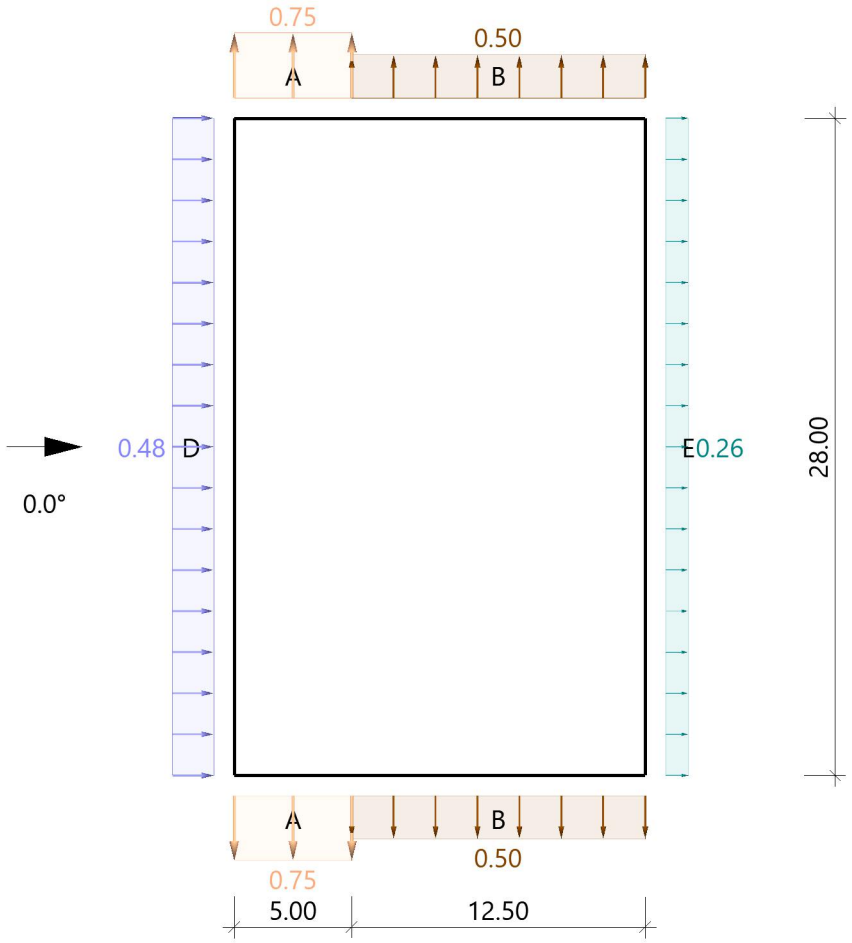
Table, 0°, Top view

Reference influence width e = 25.00 m

Region	structural component	$c_{pe,10+}$	$c_{pe,10-}$	$c_{pe,1+}$	$c_{pe,1-}$	$w_{e,10+}$ [kN/m²]	$w_{e,10-}$ [kN/m²]	$w_{e,1+}$ [kN/m²]	$w_{e,1-}$ [kN/m²]	l_x [m]	l_y [m]
F	DF links	0.43	-0.71	0.43	-1.77	0.27	-0.45	0.27	-1.10	2.50	6.25
G	DF links	0.43	-0.66	0.43	-1.50	0.27	-0.41	0.27	-0.94	2.50	15.50
H	DF links	0.29	-0.25	0.29	-0.25	0.18	-0.16	0.18	-0.16	6.25	28.00
J	DF rechts	0.00	-0.77	0.00	-1.03	0.00	-0.48	0.00	-0.64	2.50	28.00
I	DF rechts	0.00	-0.40	0.00	-0.40	0.00	-0.25	0.00	-0.25	6.25	28.00

All values are characteristic ones.

Graphics, 0°, Section wall



Reference wind area for graphics = 10.00 m ^{2}

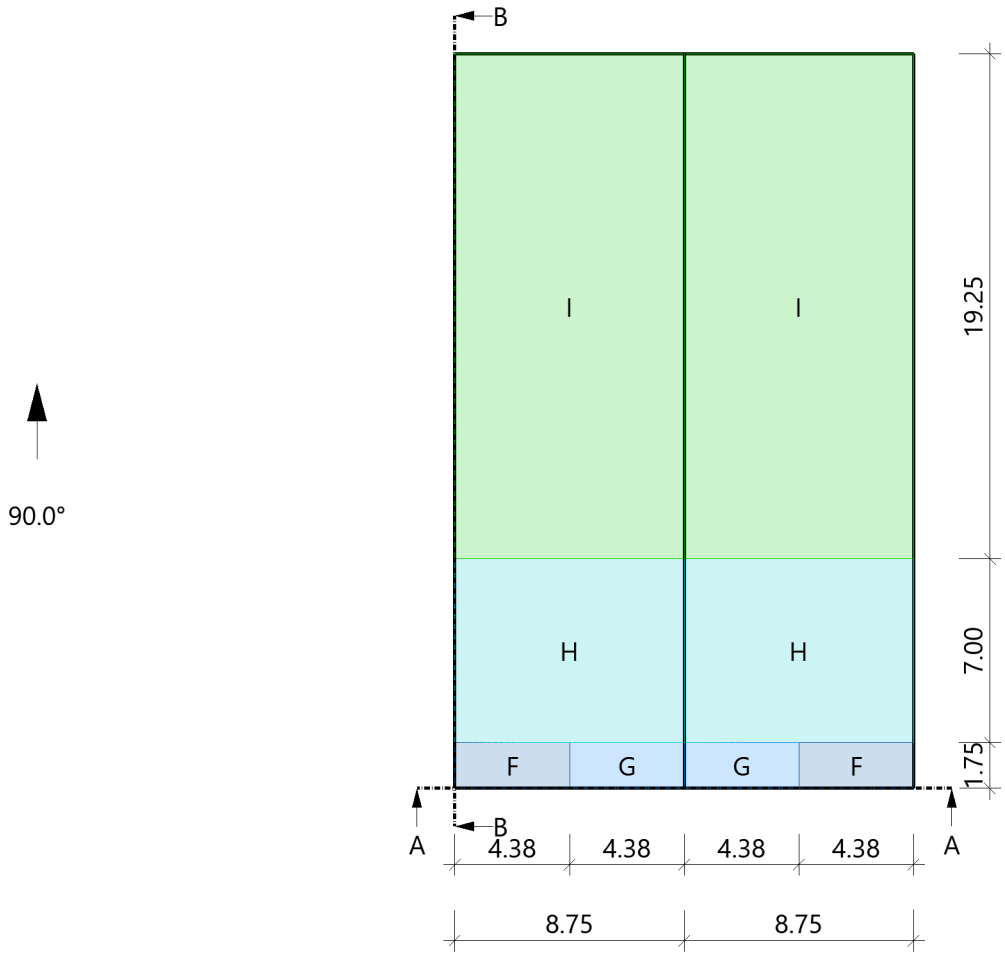
Table, 0°, Section wall

Reference influence width e = 25.00 m
Ratio h/d = 0.714 h/b = 0.446 d/b = 0.625

Region	structural component	$c_{pe,10+}$	$c_{pe,10-}$	$c_{pe,1+}$	$c_{pe,1-}$	$w_{e,10+}$ [kN/m^2]	$w_{e,10-}$ [kN/m^2]	$w_{e,1+}$ [kN/m^2]	$w_{e,1-}$ [kN/m^2]	l_x [m]	l_y [m]
D [1]	Wand links	0.76	0.00	1.00	0.00	0.48	0.00	0.62	0.00		28.00
E	Wand rechts	0.00	-0.42	0.00	-0.42	0.00	-0.26	0.00	-0.26		28.00
A	Wand vorne [2]	0.00	-1.20	0.00	-1.40	0.00	-0.75	0.00	-0.87	5.00	
B	Wand vorne [2]	0.00	-0.80	0.00	-1.10	0.00	-0.50	0.00	-0.69	12.50	
All values are characteristic ones.											

1 : the reference height ze acc. to Figure 7.4 applies to the windward wall
2 : Wand hinten contains the same values

Graphics, 90°, Top view



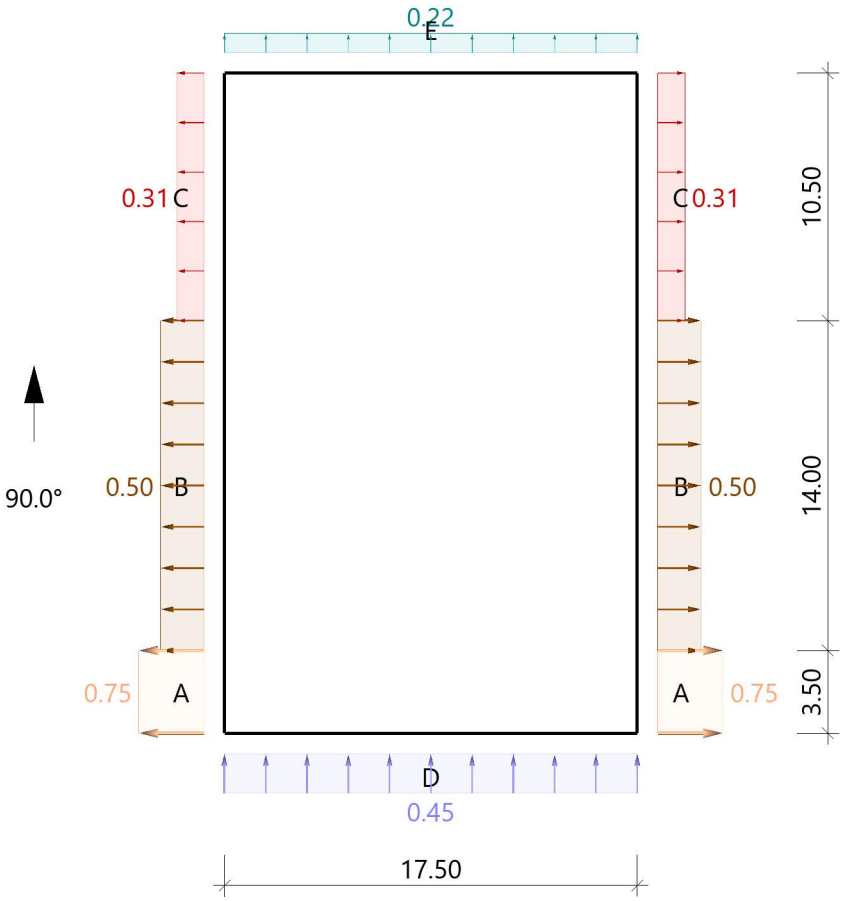
Table, 90°, Top view

Reference influence width e = 17.50 m

Region	structural component	$c_{pe,10+}$	$c_{pe,10-}$	$c_{pe,1+}$	$c_{pe,1-}$	$w_{e,10+}$ [kN/m²]	$w_{e,10-}$ [kN/m²]	$w_{e,1+}$ [kN/m²]	$w_{e,1-}$ [kN/m²]	l_x [m]	l_y [m]
F	DF links	0.00	-1.21	0.00	-1.77	0.00	-0.75	0.00	-1.10	4.38	1.75
G	DF links	0.00	-1.35	0.00	-2.00	0.00	-0.84	0.00	-1.25	4.38	1.75
H	DF links	0.00	-0.69	0.00	-1.20	0.00	-0.43	0.00	-0.75	8.75	7.00
I	DF links	0.00	-0.50	0.00	-0.50	0.00	-0.31	0.00	-0.31	8.75	19.25
F	DF rechts	0.00	-1.21	0.00	-1.77	0.00	-0.75	0.00	-1.10	4.38	1.75
G	DF rechts	0.00	-1.35	0.00	-2.00	0.00	-0.84	0.00	-1.25	4.38	1.75
H	DF rechts	0.00	-0.69	0.00	-1.20	0.00	-0.43	0.00	-0.75	8.75	7.00
I	DF rechts	0.00	-0.50	0.00	-0.50	0.00	-0.31	0.00	-0.31	8.75	19.25

All values are characteristic ones.

Graphics, 90°, Section wall



Reference wind area for graphics = 10.00 m ^{2}

Table, 90°, Section wall

Reference influence width e = 17.50 m
Ratio h/d = 0.446 h/b = 0.714 d/b = 1.600

Region	structural component	$c_{pe,10+}$	$c_{pe,10-}$	$c_{pe,1+}$	$c_{pe,1-}$	$w_{e,10+}$ [kN/m^2]	$w_{e,10-}$ [kN/m^2]	$w_{e,1+}$ [kN/m^2]	$w_{e,1-}$ [kN/m^2]	l_x [m]	l_y [m]
D [1]	Wand vorne	0.73	0.00	1.00	0.00	0.45	0.00	0.62	0.00	17.50	
E	Wand hinten	0.00	-0.35	0.00	-0.35	0.00	-0.22	0.00	-0.22	17.50	
A	Wand links [2]	0.00	-1.20	0.00	-1.40	0.00	-0.75	0.00	-0.87		3.50
B	Wand links [2]	0.00	-0.80	0.00	-1.10	0.00	-0.50	0.00	-0.69		14.00
C	Wand links [2]	0.00	-0.50	0.00	-0.50	0.00	-0.31	0.00	-0.31		10.50

All values are characteristic ones.

1 : the reference height ze acc. to Figure 7.4 applies to the windward wall
2 : Wand rechts contains the same values

Vhodni podatki - Konstrukcija

Shema nivojev

Naziv	z [m]	h [m]
strešna plošča dvigala	10.30	3.70
nova AB plošča	6.60	3.30
plošča strojnice dvigala	3.30	3.30

Naziv	z [m]	h [m]
pasovni temelji	0.00	1.00
dno dvigalnega jaška	-1.00	

Tabele materialov

No	Naziv materiala	E[kN/m2]	μ	γ[kN/m3]	αt[1/C]	Em[kN/m2]	μm
1	C 25/30	3.100e+7	0.20	25.00	1.000e-5	3.100e+7	0.20
2	C 20/25	3.000e+7	0.20	25.00	1.000e-5	3.000e+7	0.20
3	Masiven les-C24	1.100e+7	0.20	4.20	1.000e-5	1.100e+7	0.20

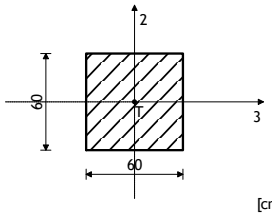
Seti plošč

No	d[m]	e[m]	Material	Tip preračuna	Ortotropija	E2[kN/m2]	G[kN/m2]	α
<1>	0.250	0.125	1	Tanka plošča	Izotropna			
<2>	0.200	0.100	1	Tanka plošča	Izotropna			
<3>	0.150	0.075	1	Tanka plošča	Izotropna			
<6>	0.200	0.100	2	Tanka plošča	Izotropna			

Seti gred

Set: 1 Prerez: b/d=60/60, Fiktivna ekscentričnost

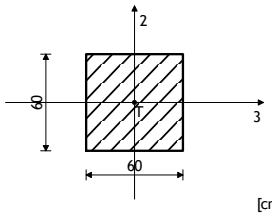
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	3.600e-1	3.000e-1	3.000e-1	1.825e-2	1.080e-2	1.080e-2



[cm]

Set: 2 Prerez: b/d=60/60, Fiktivna ekscentričnost

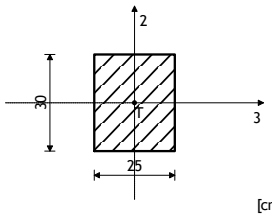
Mat.	A1	A2	A3	I1	I2	I3
2 - C 20/25	3.600e-1	3.000e-1	3.000e-1	1.825e-2	1.080e-2	1.080e-2



[cm]

Set: 3 Prerez: b/d=25/30, Fiktivna ekscentričnost

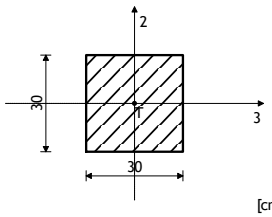
Mat.	A1	A2	A3	I1	I2	I3
2 - C 20/25	7.500e-2	6.250e-2	6.250e-2	7.752e-4	3.906e-4	5.625e-4



[cm]

Set: 4 Prerez: b/d=30/30, Fiktivna ekscentričnost

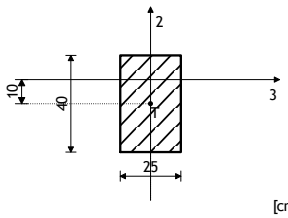
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	9.000e-2	7.500e-2	7.500e-2	1.141e-3	6.750e-4	6.750e-4



[cm]

Set: 5 Prerez: b/d=25/40, Fiktivna ekscentričnost

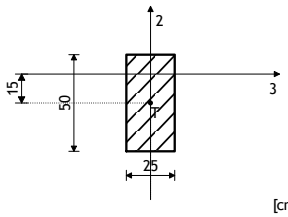
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.000e-1	8.333e-2	8.333e-2	1.273e-3	5.208e-4	1.333e-3



[cm]

Set: 6 Prerez: b/d=25/50, Fiktivna ekscentričnost

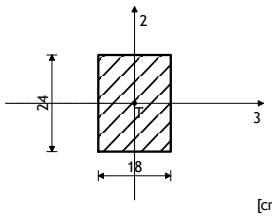
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.250e-1	1.042e-1	1.042e-1	1.788e-3	6.510e-4	2.604e-3



[cm]

Set: 7 Prerez: b/d=18/24, Fiktivna ekscentričnost

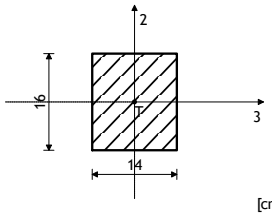
Mat.	A1	A2	A3	I1	I2	I3
3 - Masiven les-C24	4.320e-2	3.600e-2	3.600e-2	2.519e-4	1.166e-4	2.074e-4



[cm]

Set: 8 Prerez: b/d=14/16, Fiktivna ekscentričnost

Mat.	A1	A2	A3	I1	I2	I3
3 - Masiven les-C24	2.240e-2	1.867e-2	1.867e-2	6.961e-5	3.659e-5	4.779e-5



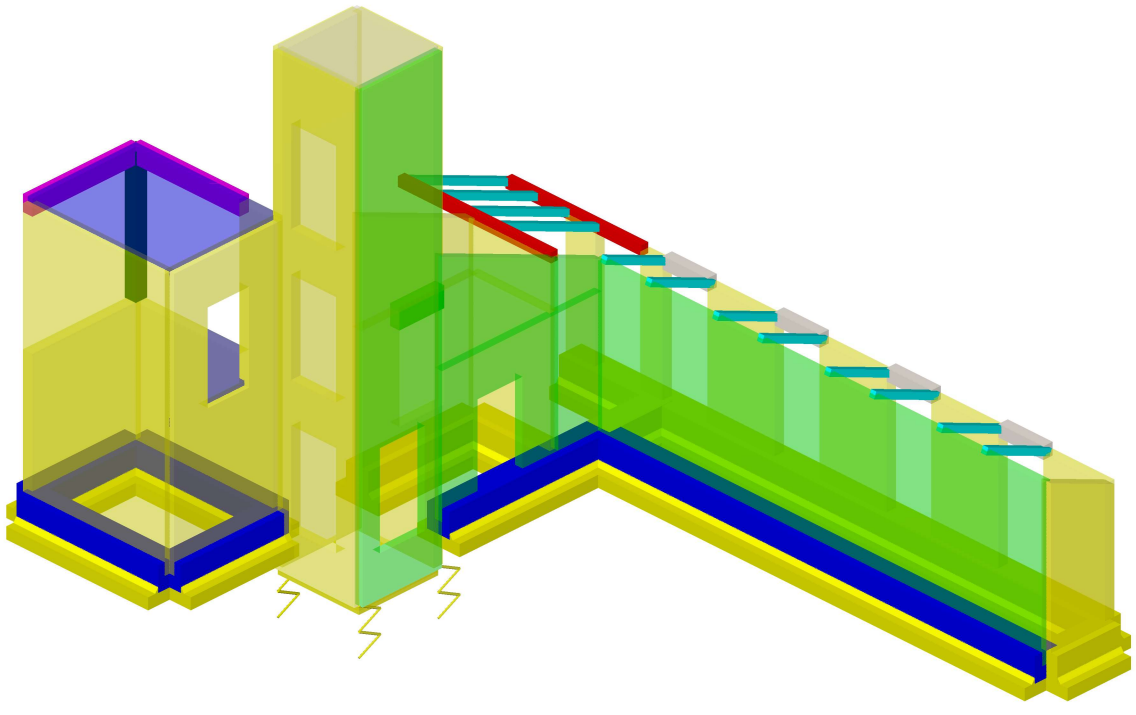
[cm]

Seti površinskih podpor

Set	K,R1	K,R2	K,R3
1	1.200e+4	1.200e+4	2.000e+4

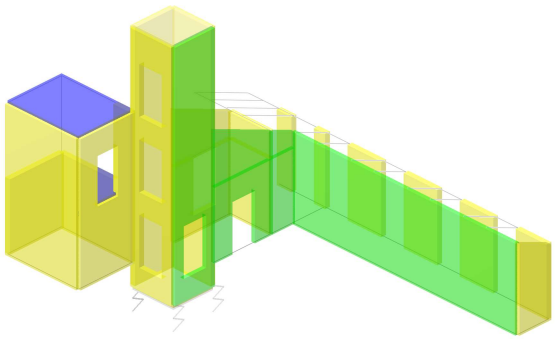
Seti linijskih podpor

Set	K,R1	K,R2	K,R3	K,M1	Tla [m]
1	1.200e+4	2.000e+4	1.200e+4		0.600



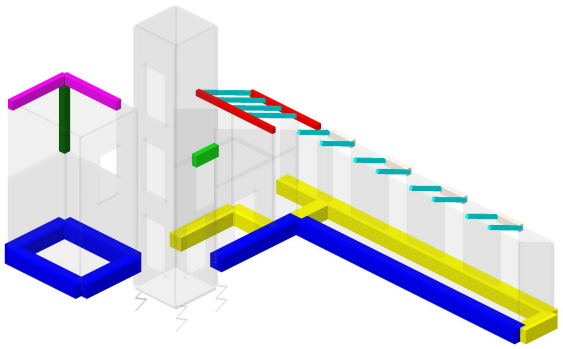
Izometrija

Plošča / Zid
1. d = 0.25 m
2. d = 0.20 m
3. d = 0.15 m
6. d = 0.20 m



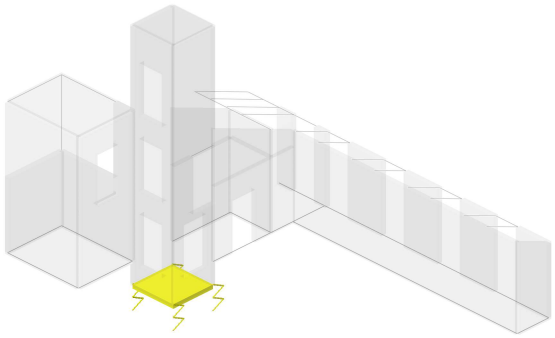
Seti numeričnih podatkov
Plošča / Zid (1-3,6)

Greda
1. b/d=60/60
2. b/d=60/60
3. b/d=25/30
4. b/d=30/30
5. b/d=25/40
6. b/d=25/50
7. b/d=18/24
8. b/d=14/16



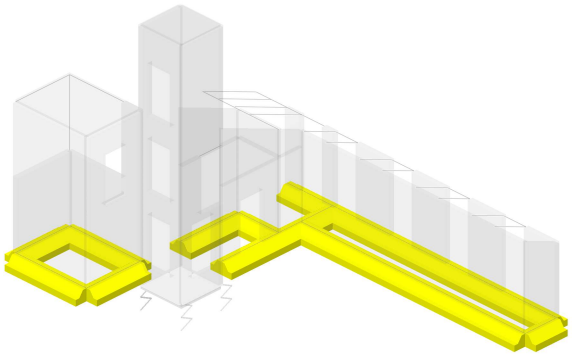
Seti numeričnih podatkov
Greda (1-8)

Površinska podpora
1. R1 R2 R3

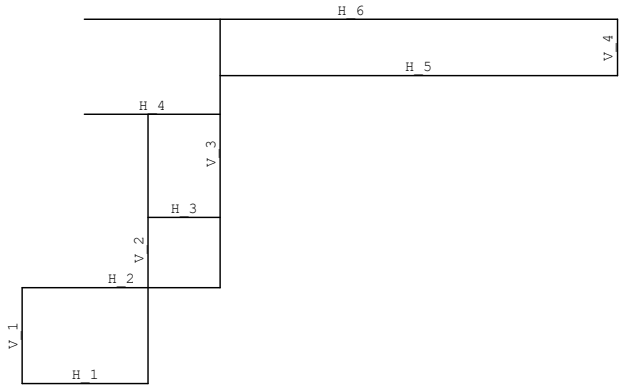


Seti numeričnih podatkov
Površinska podpora (1)

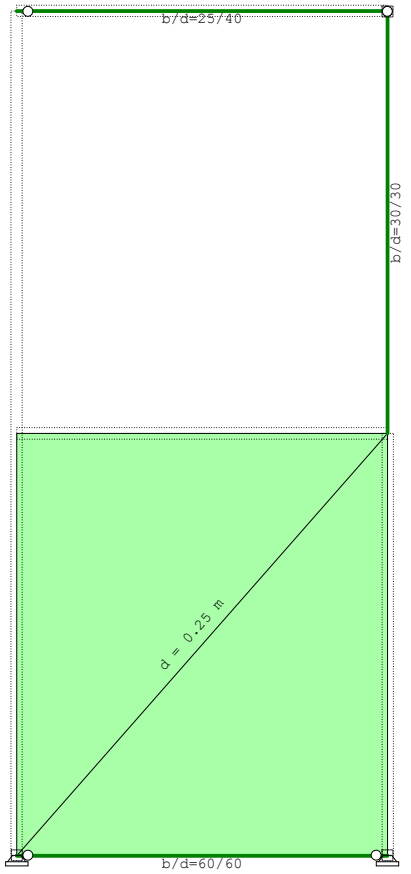
Linijska podpora
1. R1 R2 R3 Tla



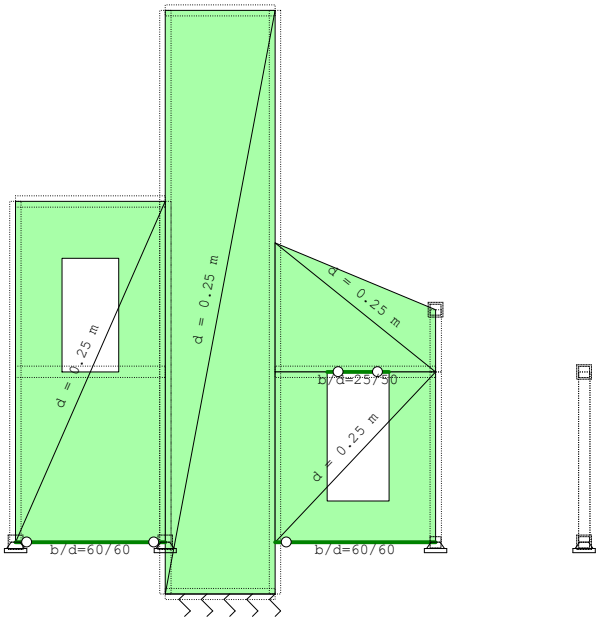
Seti numeričnih podatkov
Linijska podpora (1)



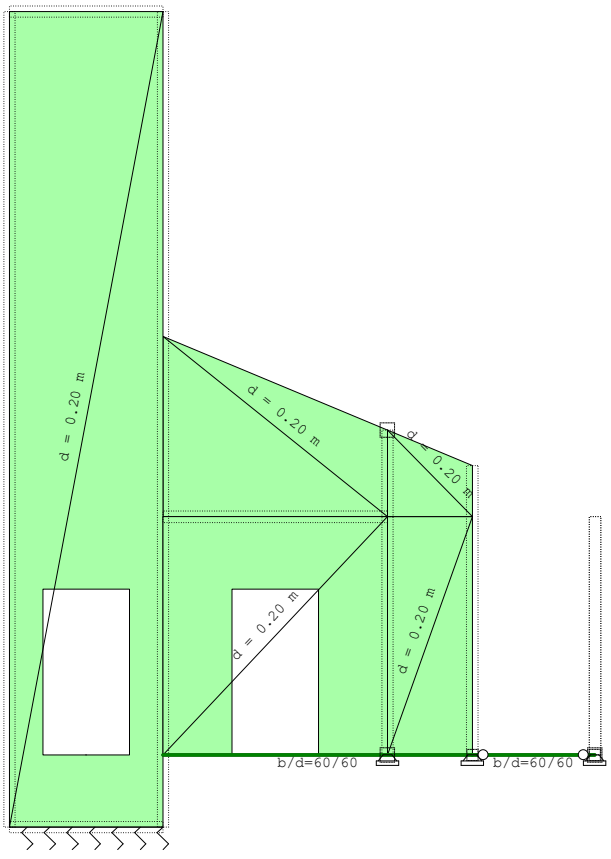
Dispozicija okvirjev



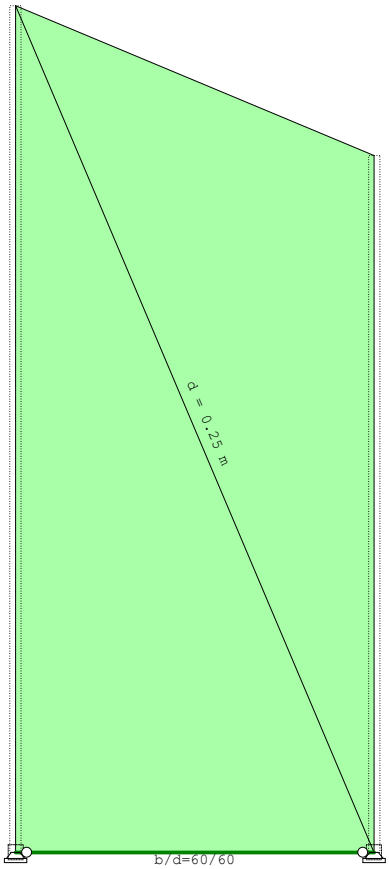
Okvir: V_1



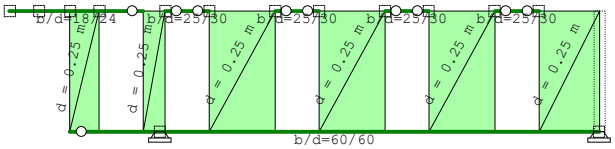
Okvir: V_2



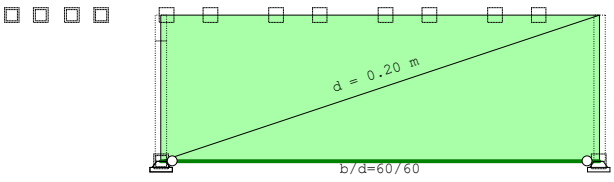
Okvir: V_3



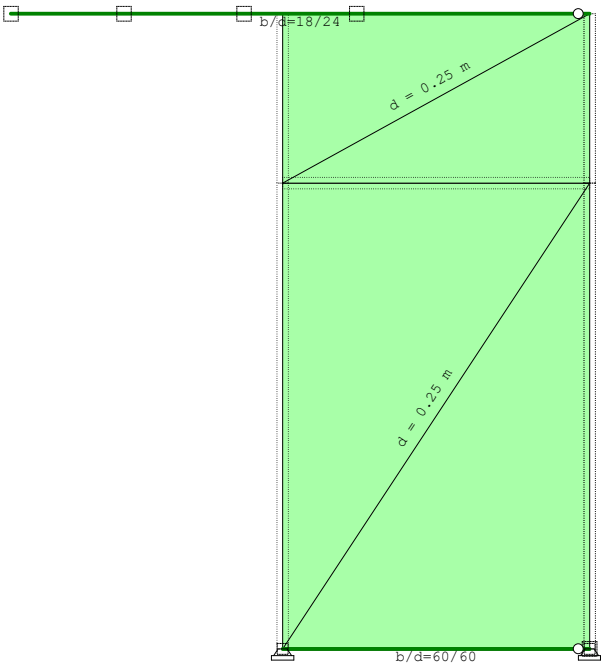
Okvir: V_4



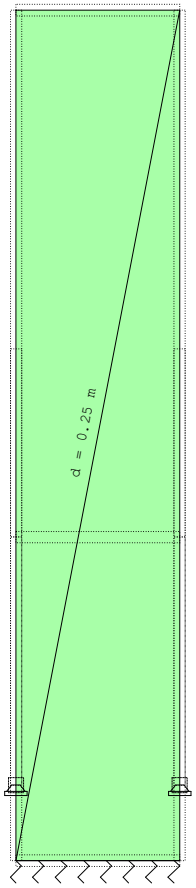
Okvir: H_6



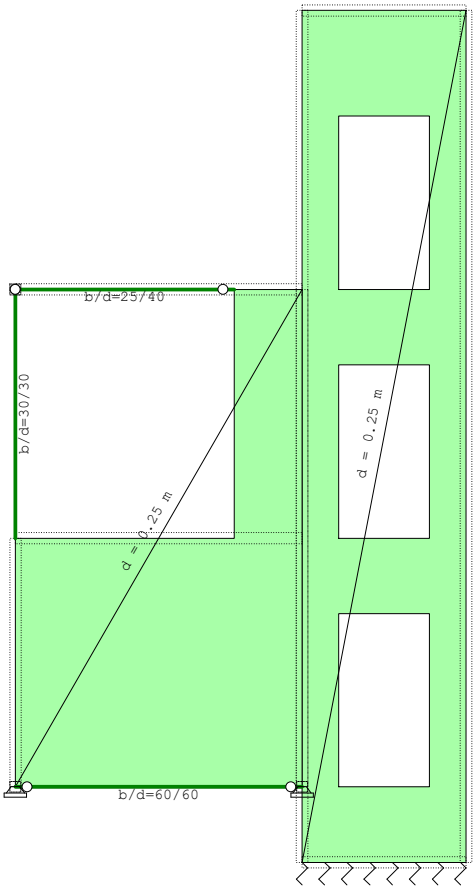
Okvir: H_5



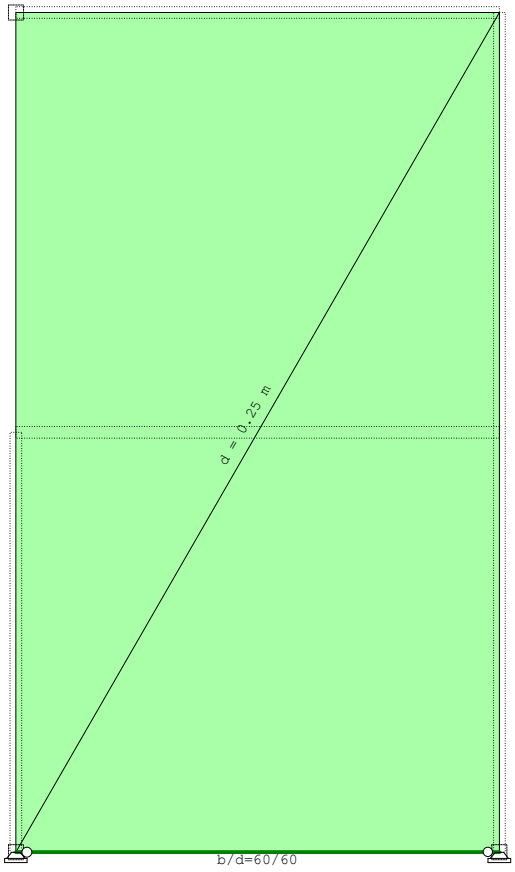
Okvir: H_4



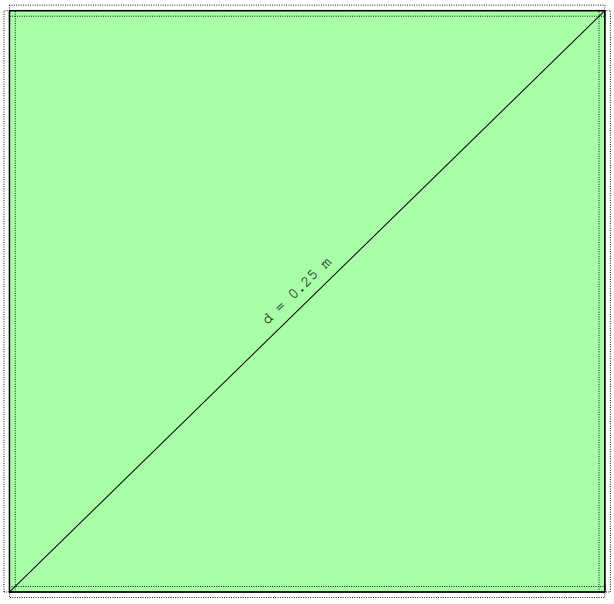
Okvir: H_3



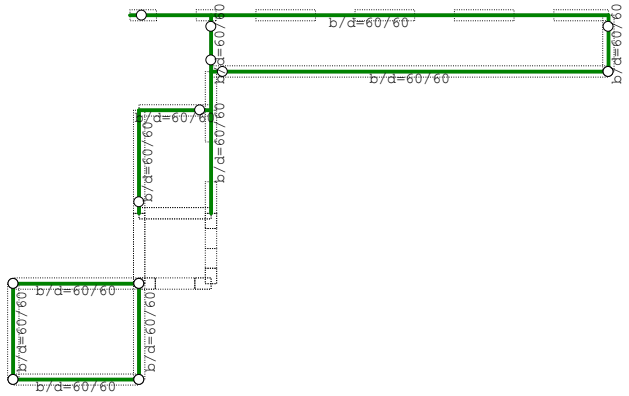
Okvir: H_2



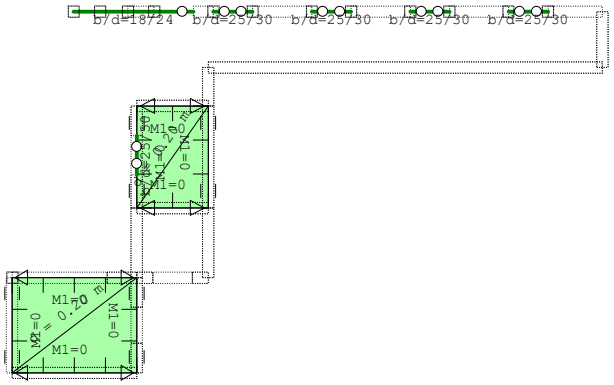
Okvir: H_1



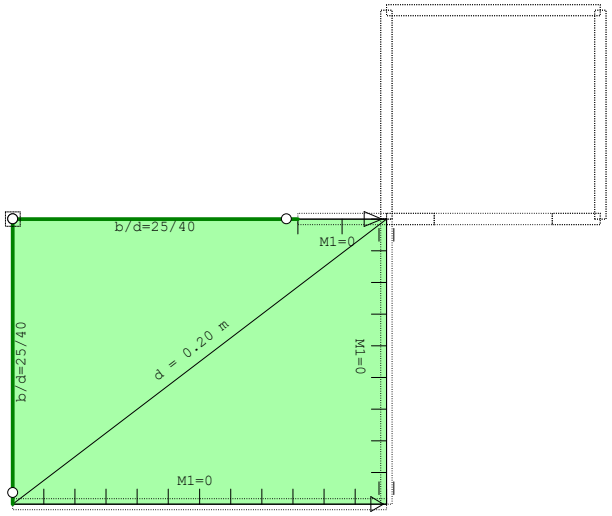
Nivo: dno dvigalnega jaška [-1.00 m]



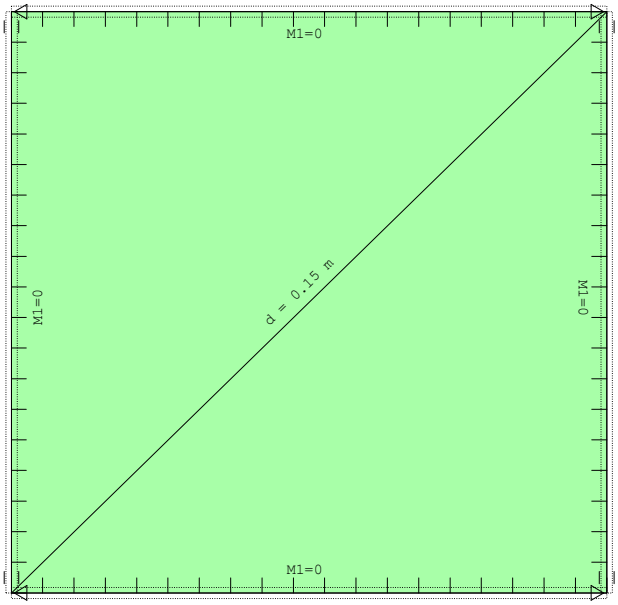
Nivo: pasovni temelji [0.00 m]



Nivo: plošča strojnice dvigala [3.30 m]



Nivo: nova AB plošča [6.60 m]



Nivo: strešna plošča dvigala [10.30 m]

Vhodni podatki - Obtežba

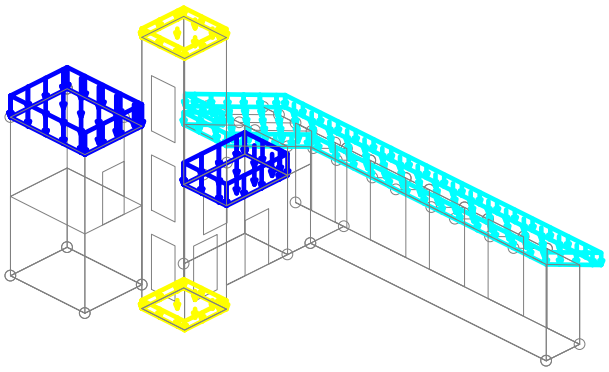
Lista obtežnih primerov

LC	Naziv
1	lastna+stalna (g)
2	koristna čez celo
3	sneg
4	veter tlak
5	veter Y
6	veter X
7	potres X (+e)
8	potres X (-e)
9	potres Y (+e)
10	potres Y (-e)
11	Komb.: I
12	Komb.: I+II
13	Komb.: I+III
14	Komb.: I+VI
15	Komb.: I+V
16	Komb.: I+VI
17	Komb.: I+II+III
18	Komb.: I+II+IV
19	Komb.: I+II+V
20	Komb.: I+II+VI
21	Komb.: I+II+III+0.6xIV
22	Komb.: I+II+III+0.6xV
23	Komb.: I+II+III+0.6xVI
24	Komb.: I+II+0.5xIII+IV
25	Komb.: I+II+0.5xIII+V
26	Komb.: I+II+0.5xV+VI
27	Komb.: I+VII
28	Komb.: I+VIII
29	Komb.: I+IX
30	Komb.: I+X
31	Komb.: 1.35xI+1.05xII+1.5xIII+0.9xVI
32	Komb.: 1.35xI+1.05xII+1.5xIII+0.9xV
33	Komb.: 1.35xI+1.05xII+1.5xIII+0.9xIV
34	Komb.: 1.35xI+1.05xII+0.75xIII+1.5xVI
35	Komb.: 1.35xI+1.05xII+0.75xIII+1.5xV
36	Komb.: 1.35xI+1.05xII+0.75xIII+1.5xIV
37	Komb.: 1.35xI+1.5xII+0.75xIII+0.9xVI
38	Komb.: 1.35xI+1.5xII+0.75xIII+0.9xV
39	Komb.: 1.35xI+1.5xII+0.75xIII+0.9xIV
40	Komb.: I+1.05xII+1.5xIII+0.9xVI
41	Komb.: I+1.05xII+1.5xIII+0.9xV
42	Komb.: I+1.05xII+1.5xIII+0.9xIV
43	Komb.: I+1.05xII+0.75xIII+1.5xVI
44	Komb.: I+1.05xII+0.75xIII+1.5xV
45	Komb.: I+1.05xII+0.75xIII+1.5xIV
46	Komb.: I+1.5xII+0.75xIII+0.9xVI
47	Komb.: I+1.5xII+0.75xIII+0.9xV
48	Komb.: I+1.5xII+0.75xIII+0.9xIV
49	Komb.: 1.35xI+1.05xII+1.5xVI
50	Komb.: 1.35xI+1.05xII+1.5xV
51	Komb.: 1.35xI+1.05xII+1.5xIV
52	Komb.: 1.35xI+1.05xII+1.5xIII

LC	Naziv
53	Komb.: 1.35xI+1.5xIII+0.9xVI
54	Komb.: 1.35xI+1.5xIII+0.9xV
55	Komb.: 1.35xI+1.5xIII+0.9xIV
56	Komb.: 1.35xI+1.5xII+0.9xVI
57	Komb.: 1.35xI+1.5xII+0.9xV
58	Komb.: 1.35xI+1.5xII+0.9xIV
59	Komb.: 1.35xI+0.75xIII+1.5xVI
60	Komb.: 1.35xI+0.75xIII+1.5xV
61	Komb.: 1.35xI+0.75xIII+1.5xIV
62	Komb.: 1.35xI+1.5xII+0.75xIII
63	Komb.: I+1.05xII+1.5xVI
64	Komb.: I+1.05xII+1.5xV
65	Komb.: I+1.05xII+1.5xIV
66	Komb.: I+1.05xII+1.5xIII
67	Komb.: I+1.5xIII+0.9xVI
68	Komb.: I+1.5xIII+0.9xV
69	Komb.: I+1.5xIII+0.9xIV
70	Komb.: I+1.5xII+0.9xVI
71	Komb.: I+1.5xII+0.9xV
72	Komb.: I+1.5xII+0.9xIV
73	Komb.: I+0.75xIII+1.5xVI
74	Komb.: I+0.75xIII+1.5xV
75	Komb.: I+0.75xIII+1.5xIV
76	Komb.: I+1.5xII+0.75xIII
77	Komb.: 1.35xI+1.5xVI
78	Komb.: 1.35xI+1.5xV
79	Komb.: 1.35xI+1.5xIV
80	Komb.: 1.35xI+1.5xIII
81	Komb.: 1.35xI+1.5xII
82	Komb.: I+0.6xII-1xVII
83	Komb.: I+0.6xII-1xVIII
84	Komb.: I+0.6xII-1xIX
85	Komb.: I+0.6xII-1xX
86	Komb.: I+0.6xII+X
87	Komb.: I+0.6xII+IX
88	Komb.: I+0.6xII+VIII
89	Komb.: I+0.6xII+VII
90	Komb.: I+1.5xVI
91	Komb.: I+1.5xV
92	Komb.: I+1.5xIV
93	Komb.: I+1.5xIII
94	Komb.: I+1.5xII
95	Komb.: I-1xVII
96	Komb.: I-1xVIII
97	Komb.: I-1xIX
98	Komb.: I-1xX
99	Komb.: I+X
100	Komb.: I+IX
101	Komb.: I+VIII
102	Komb.: I+VII
103	Komb.: 1.35xI
104	Komb.: I

Obt. 1: lastna+stalna (g)

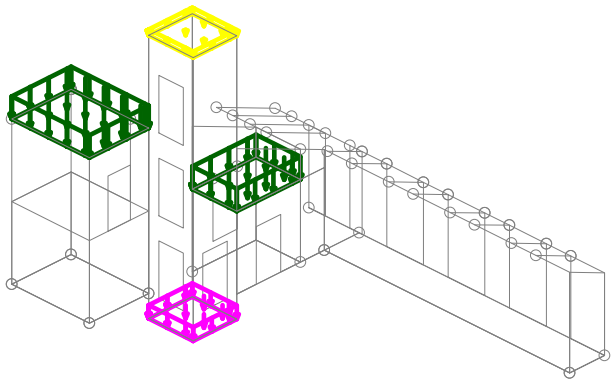
Površinska obtežba
1. p=-1.00 kN/m²
2. p=-2.50 kN/m²
3. p=-1.40 kN/m²



Seti numeričnih podatkov
Površinska obtežba (1-3)

Obt. 2: koristna čez celo

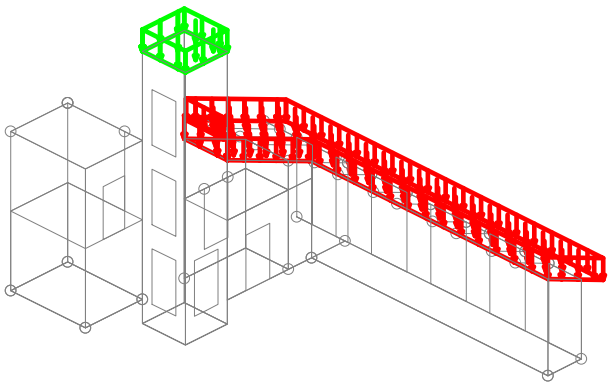
Površinska obtežba
1. p=-1.00 kN/m²
4. p=-5.00 kN/m²
5. p=-3.00 kN/m²



Seti numeričnih podatkov
Površinska obtežba (1,4,5)

Obt. 3: sneg

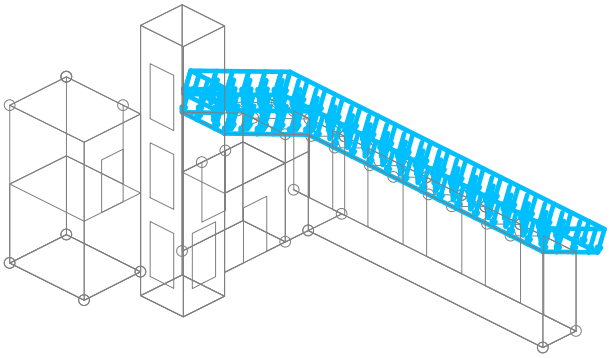
Površinska obtežba
6. p=-1.25 kN/m²
7. p=-1.25 kN/m²



Seti numeričnih podatkov
Površinska obtežba (6,7)

Obt. 4: veter tlak

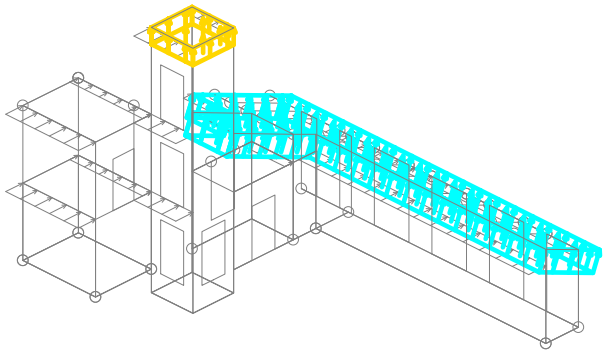
Površinska obtežba
12. p=-0.30 kN/m²



Seti numeričnih podatkov
Površinska obtežba (12)

Obt. 5: veter Y

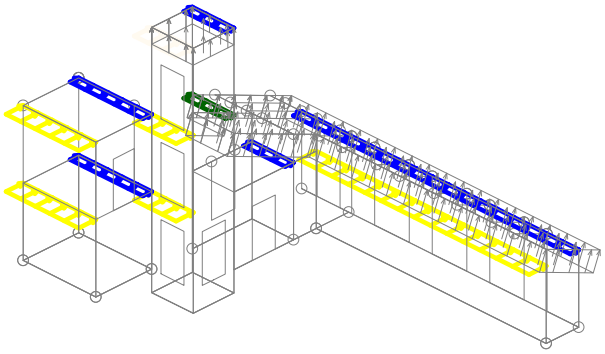
Površinska obtežba
8. p=0.50 kN/m²
10. p=0.40 kN/m²



Seti numeričnih podatkov
Površinska obtežba (8,10)

Obt. 5: veter Y

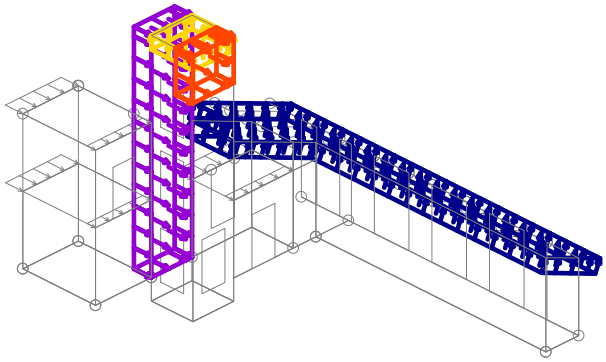
Linijska obtežba
1. p = 2.00 kN/m
2. p = 1.00 kN/m
3. p = -2.00 kN/m
4. p = -1.00 kN/m



Seti numeričnih podatkov
Linijska obtežba (1-4)

Obt. 6: veter X

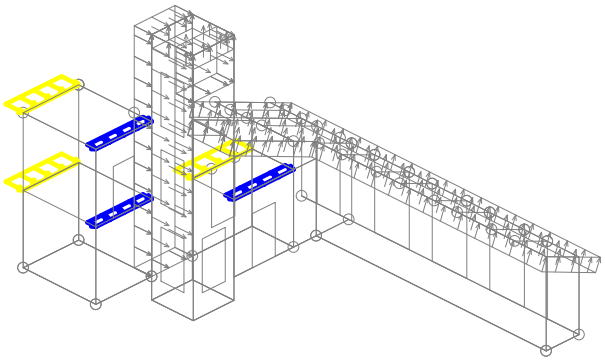
Površinska obtežba
9. p=0.40 kN/m²
10. p=0.40 kN/m²
11. p=0.60 kN/m²
13. p=0.60 kN/m²



Seti numeričnih podatkov
Površinska obtežba (9-11,13)

Obt. 6: veter X

Linijska obtežba
1. p = 2.00 kN/m
2. p = 1.00 kN/m



Seti numeričnih podatkov
Linijska obtežba (1,2)

Modalna analiza

Napredne opcije seizmičnega preračuna:

Mase grupirane v nivojih izbranih etaž
Plošče - redukcija togosti na upogib: 0.500
Grede - redukcija togosti na upogib: 0.500
Zidovi - redukcija togosti na upogib: 0.500
Zidovi - redukcija osne togosti: 0.500
Stebri - redukcija upogibne togosti: 0.500
Stebri - redukcija osne togosti: 0.500
Preprečeno nihanje v Z smeri

Faktorji obtežb za preračun mas

No	Naziv	Koeficient
1	lastna+stalna (g)	1.00
2	koristna čez celo	0.60
3	sneg	0.00
4	veter tlak	0.00
5	veter Y	0.00
6	veter X	0.00

Razporeditev mas po višini objekta

Nivo	Z [m]	X [m]	Y [m]	Masa [T]	T/m²
strešna plošča dvigala	10.30	2.97	-7.01	12.26	2.65
nova AB plošča	6.60	1.40	-8.98	37.96	3.45
plošča strojnice dvigala	3.30	4.95	-4.63	207.68	11.68
Skupno:	4.12	4.33	-5.39	257.90	

Položaj centra togosti po višini objekta (približna metoda)

Nivo	Z [m]	X [m]	Y [m]
strešna plošča dvigala	10.30	2.88	-7.05
nova AB plošča	6.60	2.47	-9.57
plošča strojnice dvigala	3.30	3.17	-2.15

Ekscentriciteta po višini objekta (približna metoda)

Nivo	Z [m]	eox [m]	eoy [m]
strešna plošča dvigala	10.30	0.09	0.04
nova AB plošča	6.60	1.07	0.59
plošča strojnice dvigala	3.30	1.78	2.49

Nihajne dobe konstrukcije

No	T [s]	f [Hz]
1	0.5068	1.9731
2	0.4355	2.2961
3	0.2464	4.0586
4	0.2140	4.6734
5	0.1481	6.7501
6	0.1434	6.9724
7	0.1238	8.0798
8	0.1068	9.3634
9	0.0989	10.1094
10	0.0972	10.2850

Seizmični preračun

Seizmični preračun: EC8 (EN 1998) SLO	
Kategorija tal:	B
Kategorija pomena:	III (γ=1.2)
Razmerje agR/g:	0.225
Koeficient dušenja:	0.05
Slučajna ekscentričnost mase etaže:	ei = ± 0.050 x Li

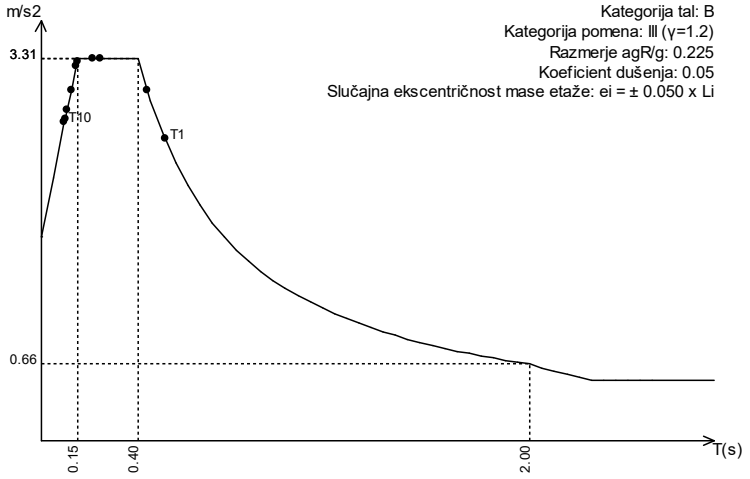
Faktorji smeri potresa:

Obtežni primer	Kot α[°]	k,α	k,α+90°	kz	Faktor O.
potres X	0	1.000	0.300	0.000	2.000
potres Y	90	1.000	0.300	0.000	2.000

Tip spektra

Obtežni primer	S	Tb	Tc	Td	avg/ag
potres X	1.000	0.150	0.400	2.000	1.000
potres Y	1.000	0.150	0.400	2.000	1.000

Projektni spekter



S=1.00, Tb=0.15, Tc=0.40, Td=2.00

Razporeditev potresnih sil po višini objekta - potres X (+e)

Nivo	Z [m]	Ton 1			Ton 2			Ton 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	5.11	-4.44	-0.53	32.14	-17.13	-3.50	13.56	18.32	-0.18
nova AB plošča	6.60	10.65	-9.15	-1.80	68.18	-35.61	-6.49	31.03	40.04	12.29
plošča strojnice dvigala	3.30	19.17	-56.07	-0.17	121.09	56.90	-0.10	41.55	96.58	2.20
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	34.93	-69.66	-2.51	221.42	4.15	-10.10	86.14	154.94	14.30

Nivo	Z [m]	Ton 4			Ton 5			Ton 6		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	11.51	16.16	-0.16	1.70	2.19	0.27	7.00	-3.20	0.31
nova AB plošča	6.60	28.03	34.85	10.95	3.04	5.71	2.35	-6.15	7.08	0.85
plošča strojnice dvigala	3.30	44.80	67.07	3.64	9.44	-2.50	0.66	14.78	3.06	1.37
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	84.34	118.08	14.43	14.18	5.40	3.28	15.62	6.93	2.53

Nivo	Z [m]	Ton 7			Ton 8			Ton 9		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	-7.70	0.93	1.47	-0.54	1.33	0.54	0.21	-0.58	0.22
nova AB plošča	6.60	-4.48	-6.25	1.77	0.47	2.05	2.00	-2.61	-0.66	0.10
plošča strojnice dvigala	3.30	210.58	15.70	-2.15	11.73	4.16	2.59	6.32	5.04	1.15
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	198.40	10.38	1.09	11.66	7.54	5.13	3.92	3.79	1.47

Nivo	Z [m]	Ton 10		
		Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	-1.32	0.86	0.56
nova AB plošča	6.60	-1.12	0.76	1.30
plošča strojnice dvigala	3.30	12.27	1.69	1.19
pasovni temelji	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00
	Σ=	9.83	3.31	3.04

Razporeditev potresnih sil po višini objekta - potres X (-e)

Nivo	Z [m]	Ton 1			Ton 2			Ton 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	5.11	-4.44	-0.53	32.14	-17.13	-3.50	13.56	18.32	-0.18
nova AB plošča	6.60	10.65	-9.15	-1.80	68.18	-35.61	-6.49	31.03	40.04	12.29
plošča strojnice dvigala	3.30	19.17	-56.07	-0.17	121.09	56.90	-0.10	41.55	96.58	2.20
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	34.93	-69.66	-2.51	221.42	4.15	-10.10	86.14	154.94	14.30

Nivo	Z [m]	Ton 4			Ton 5			Ton 6		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	11.51	16.16	-0.16	1.70	2.19	0.27	7.00	-3.20	0.31
nova AB plošča	6.60	28.03	34.85	10.95	3.04	5.71	2.35	-6.15	7.08	0.85
plošča strojnice dvigala	3.30	44.80	67.07	3.64	9.44	-2.50	0.66	14.78	3.06	1.37
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	84.34	118.08	14.43	14.18	5.40	3.28	15.62	6.93	2.53

Nivo	Z [m]	Ton 7			Ton 8			Ton 9		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	-7.70	0.93	1.47	-0.54	1.33	0.54	0.21	-0.58	0.22
nova AB plošča	6.60	-4.48	-6.25	1.77	0.47	2.05	2.00	-2.61	-0.66	0.10
plošča strojnice dvigala	3.30	210.58	15.70	-2.15	11.73	4.16	2.59	6.32	5.04	1.15
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	198.40	10.38	1.09	11.66	7.54	5.13	3.92	3.79	1.47

Nivo	Z [m]	Ton 10		
		Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	-1.32	0.86	0.56
nova AB plošča	6.60	-1.12	0.76	1.30
plošča strojnice dvigala	3.30	12.27	1.69	1.19
pasovni temelji	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00
	Σ=	9.83	3.31	3.04

Razporeditev potresnih sil po višini objekta - potres Y (+e)

Nivo	Z [m]	Ton 1			Ton 2			Ton 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	-29.17	25.36	3.04	-8.99	4.79	0.98	13.20	17.83	-0.18
nova AB plošča	6.60	-60.83	52.23	10.27	-19.07	9.96	1.82	30.21	38.98	11.96
plošča strojnice dvigala	3.30	-109.46	320.16	0.99	-33.86	-15.91	0.03	40.45	94.01	2.14
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	-199.47	397.75	14.31	-61.92	-1.16	2.82	83.85	150.82	13.92

Nivo	Z [m]	Ton 4			Ton 5			Ton 6		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	8.92	12.52	-0.12	0.12	0.16	0.02	0.89	-0.41	0.04
nova AB plošča	6.60	21.71	27.00	8.48	0.22	0.41	0.17	-0.78	0.90	0.11
plošča strojnice dvigala	3.30	34.71	51.96	2.82	0.68	-0.18	0.05	1.88	0.39	0.17
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	65.34	91.48	11.18	1.03	0.39	0.24	1.98	0.88	0.32

Nivo	Z [m]	Ton 7			Ton 8			Ton 9		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	1.88	-0.23	-0.36	-0.16	0.39	0.16	0.11	-0.30	0.11
nova AB plošča	6.60	1.09	1.52	-0.43	0.14	0.60	0.58	-1.35	-0.34	0.05
plošča strojnice dvigala	3.30	-51.35	-3.83	0.52	3.40	1.21	0.75	3.27	2.60	0.59
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	-48.39	-2.53	-0.26	3.38	2.19	1.49	2.03	1.96	0.76

Nivo	Z [m]	Ton 10		
		Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	-0.04	0.03	0.02
nova AB plošča	6.60	-0.04	0.03	0.04
plošča strojnice dvigala	3.30	0.42	0.06	0.04
pasovni temelji	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00
	Σ=	0.33	0.11	0.10

Razporeditev potresnih sil po višini objekta - potres Y (-e)

Nivo	Z [m]	Ton 1			Ton 2			Ton 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	-29.17	25.36	3.04	-8.99	4.79	0.98	13.20	17.83	-0.18
nova AB plošča	6.60	-60.83	52.23	10.27	-19.07	9.96	1.82	30.21	38.98	11.96
plošča strojnice dvigala	3.30	-109.46	320.16	0.99	-33.86	-15.91	0.03	40.45	94.01	2.14
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	-199.47	397.75	14.31	-61.92	-1.16	2.82	83.85	150.82	13.92

Nivo	Z [m]	Ton 4			Ton 5			Ton 6		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	8.92	12.52	-0.12	0.12	0.16	0.02	0.89	-0.41	0.04
nova AB plošča	6.60	21.71	27.00	8.48	0.22	0.41	0.17	-0.78	0.90	0.11
plošča strojnice dvigala	3.30	34.71	51.96	2.82	0.68	-0.18	0.05	1.88	0.39	0.17

pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	65.34	91.48	11.18	1.03	0.39	0.24	1.98	0.88	0.32

		Ton 7			Ton 8			Ton 9		
Nivo	Z [m]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	1.88	-0.23	-0.36	-0.16	0.39	0.16	0.11	-0.30	0.11
nova AB plošča	6.60	1.09	1.52	-0.43	0.14	0.60	0.58	-1.35	-0.34	0.05
plošča strojnice dvigala	3.30	-51.35	-3.83	0.52	3.40	1.21	0.75	3.27	2.60	0.59
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	-48.39	-2.53	-0.26	3.38	2.19	1.49	2.03	1.96	0.76

		Ton 10		
Nivo	Z [m]	Px [kN]	Py [kN]	Pz [kN]
strešna plošča dvigala	10.30	-0.04	0.03	0.02
nova AB plošča	6.60	-0.04	0.03	0.04
plošča strojnice dvigala	3.30	0.42	0.06	0.04
pasovni temelji	0.00	0.00	0.00	0.00
dno dvigalnega jaška	-1.00	0.00	0.00	0.00
	Σ=	0.33	0.11	0.10

Faktorji participacije - relativno sodelovanje

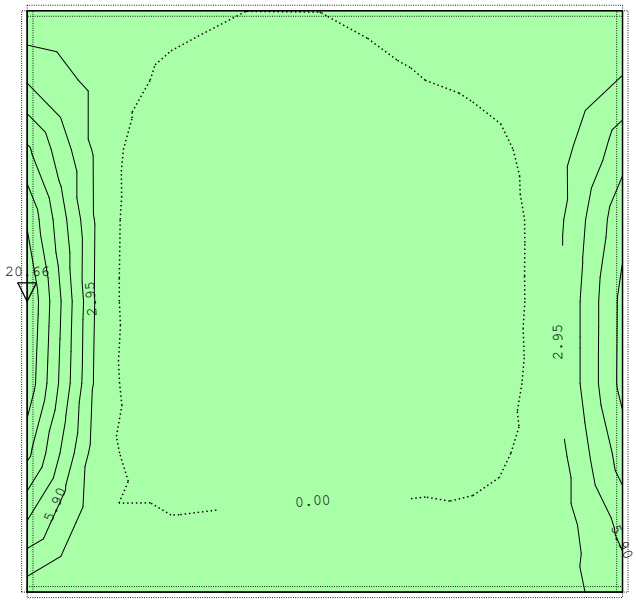
Ton \ Naziv	1. potres X (	2. potres X (	3. potres Y (	4. potres Y (
1	0.019	0.019	0.666	0.666
2	0.295	0.295	0.025	0.025
3	0.176	0.176	0.183	0.183
4	0.159	0.159	0.105	0.105
5	0.021	0.021	0.000	0.000
6	0.023	0.023	0.000	0.000
7	0.267	0.267	0.017	0.017
8	0.018	0.018	0.002	0.002
9	0.007	0.007	0.002	0.002
10	0.014	0.014	0.000	0.000

Faktorji participacije - angažiranje mase

Ton	U [α=0°]	U [α=90°]
1	13.32	52.96
2	29.15	0.01
3	7.15	23.14
4	7.45	14.61
5	1.55	0.22
6	1.69	0.33

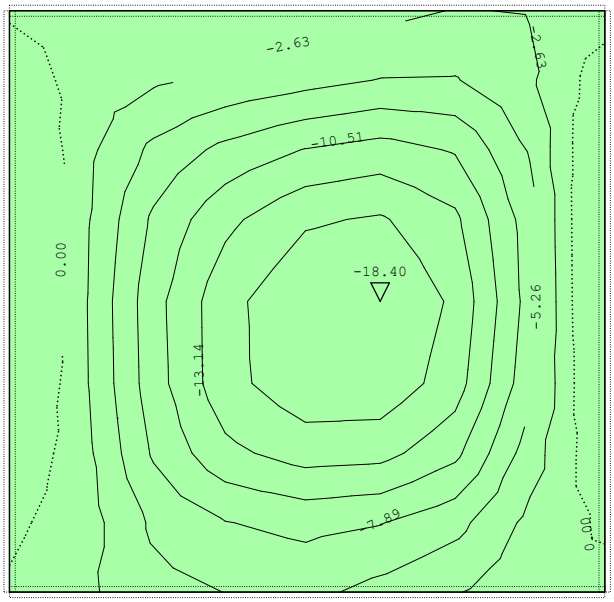
Ton	U [α=0°]	U [α=90°]
7	28.21	0.08
8	1.37	0.57
9	0.43	0.41
10	1.30	0.15
ΣU (%)	91.62	92.48

Obt. 106: [MSN] 31-104



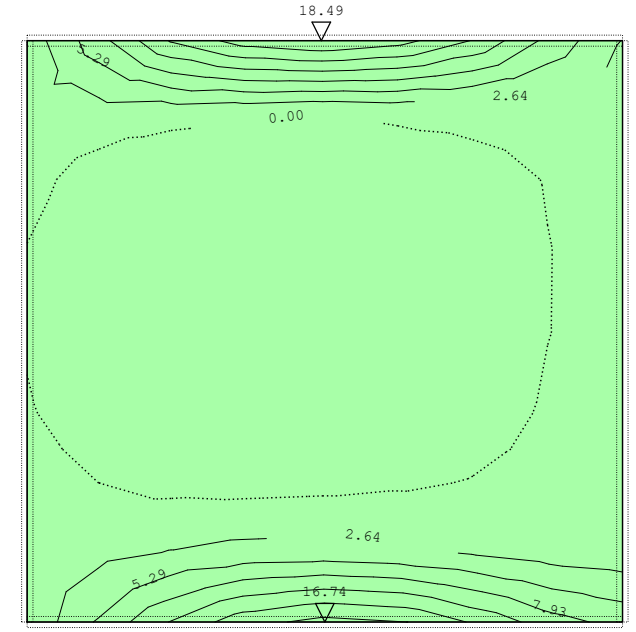
Nivo: dno dvigalnega jaška [-1.00 m]
Vplivi v plošči: max Mx= 20.66 / min Mx= 0.00 kNm/m

Obt. 106: [MSN] 31-104



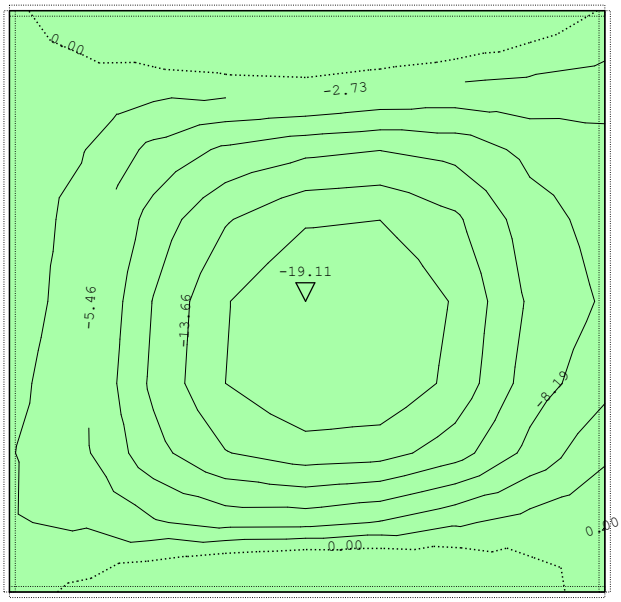
Nivo: dno dvigalnega jaška [-1.00 m]
Vplivi v plošči: max Mx= 0.00 / min Mx= -18.40 kNm/m

Obt. 106: [MSN] 31-104



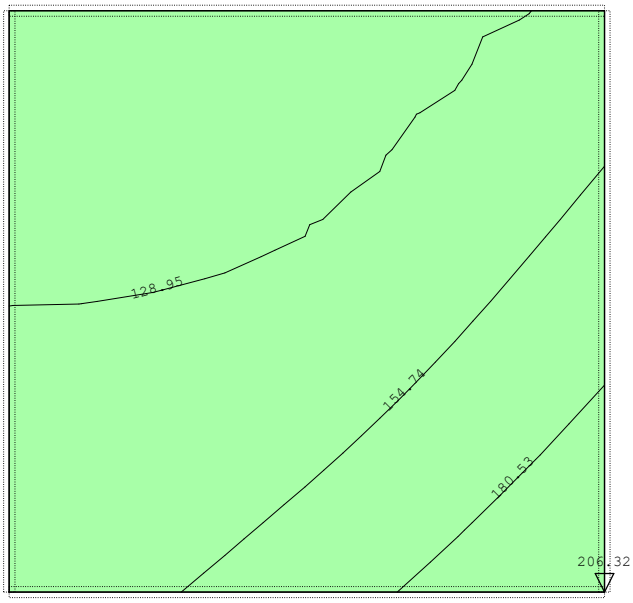
Nivo: dno dvigalnega jaška [-1.00 m]
Vplivi v plošči: max My= 18.49 / min My= 0.00 kNm/m

Obt. 106: [MSN] 31-104



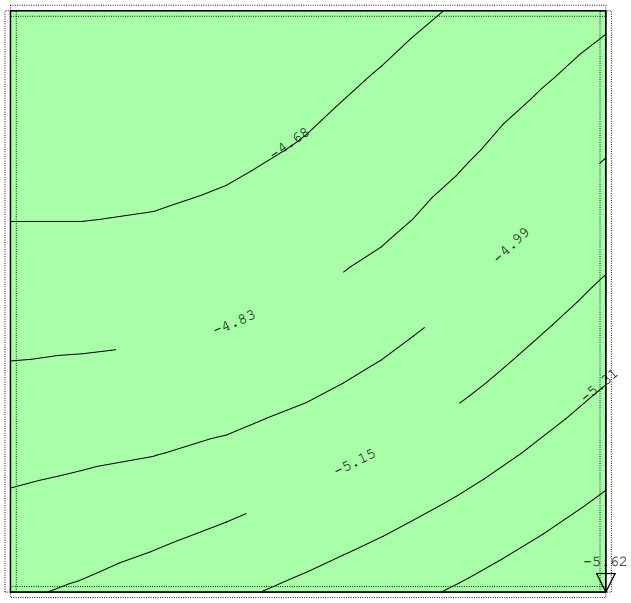
Nivo: dno dvigalnega jaška [-1.00 m]
Vplivi v plošči: max My= 0.00 / min My= -19.11 kNm/m

Obt. 106: [MSN] 31-104



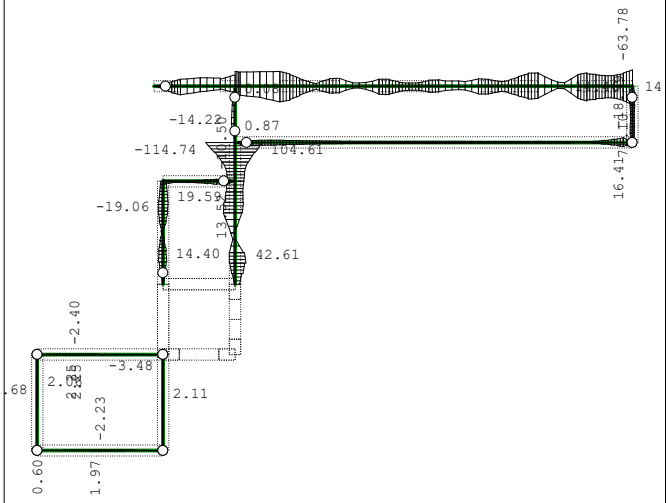
Nivo: dno dvigalnega jaška [-1.00 m]
Vplivi v pov.podpori: max σ,tal= 206.32 / min σ,tal= 0.00 kN/m²

Obt. 105: [U.elas] 11-25



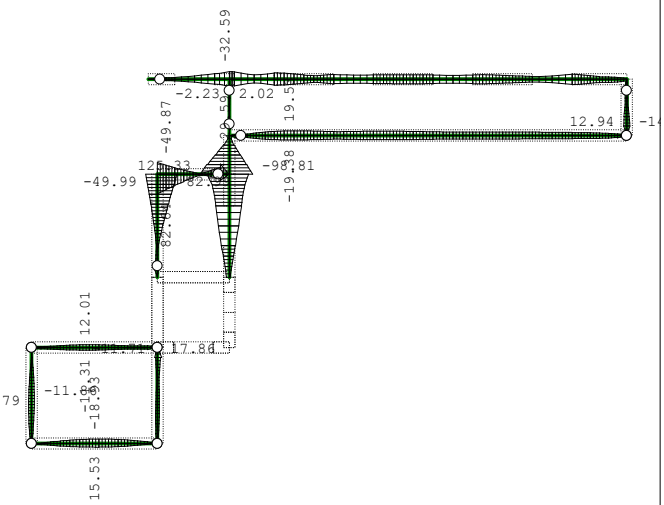
Nivo: dno dvigalnega jaška [-1.00 m]
Vplivi v plošči: max Zp= -4.52 / min Zp= -5.62 m / 1000

Obt. 106: [MSN] 31-104



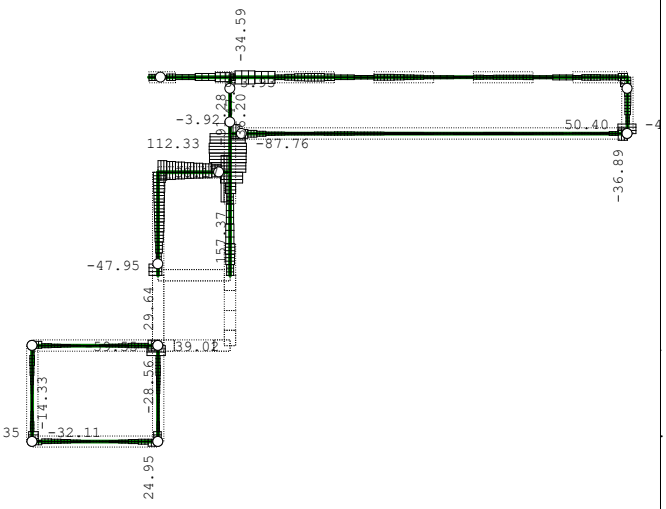
Nivo: pasovni temelji [0.00 m]
Vplivi v gredi: max M3= 104.61 / min M3= -114.74 kNm

Obt. 106: [MSN] 31-104



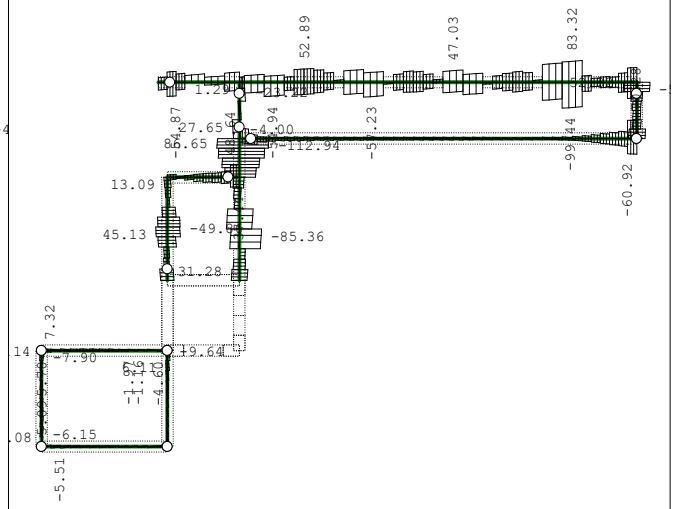
Nivo: pasovni temelji [0.00 m]
Vplivi v gredi: max M2= 125.33 / min M2= -98.81 kNm

Obt. 106: [MSN] 31-104



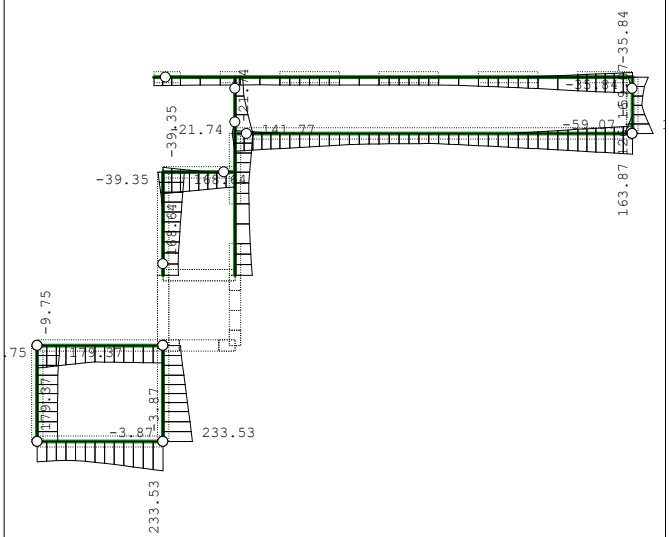
Nivo: pasovni temelji [0.00 m]
Vplivi v gredi: max T3= 157.37 / min T3= -91.28 kN

Obt. 106: [MSN] 31-104



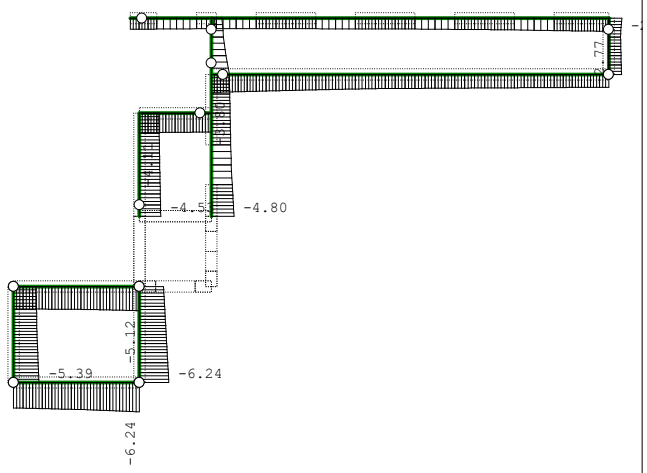
Nivo: pasovni temelji [0.00 m]
Vplivi v gredi: max T2= 86.65 / min T2= -112.94 kN

Obt. 106: [MSN] 31-104



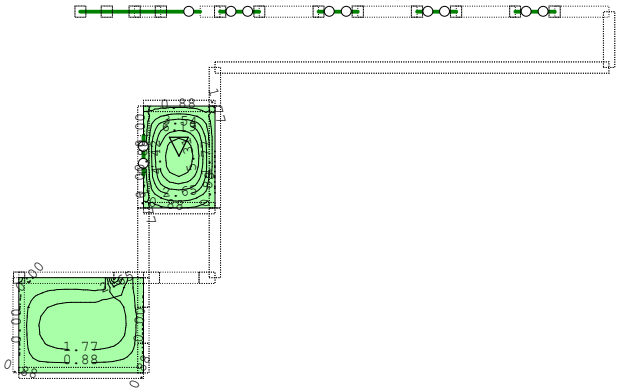
Nivo: pasovni temelji [0.00 m]
Vplivi v lin. podpori: max σ,tal= 233.53 / min σ,tal= -59.07 kN/m²

Obt. 105: [U.elas] 11-25



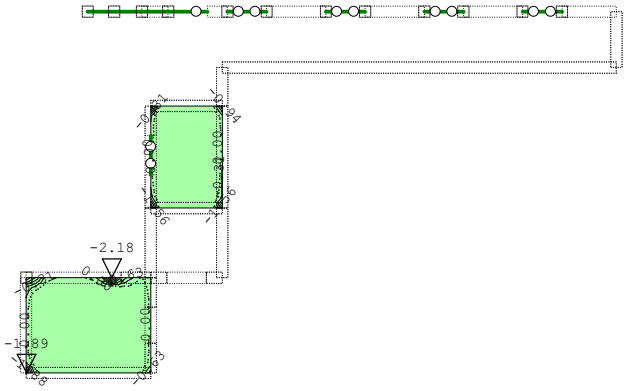
Nivo: pasovni temelji [0.00 m]
Vplivi v gredi: max Zp= -1.53 / min Zp= -6.24 m / 1000

Obt. 106: [MSN] 31-104



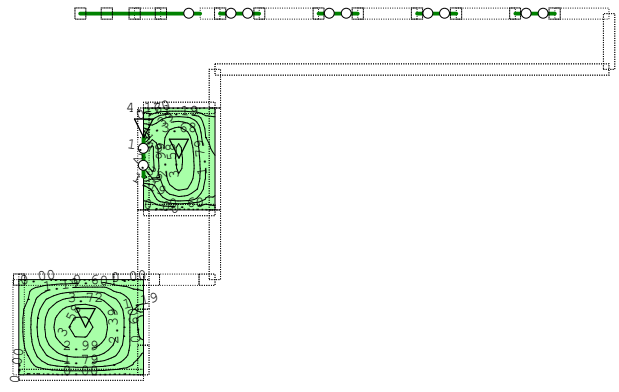
Nivo: plošča strojnice dvigala [3.30 m]
Vplivi v plošči: max Mx= 6.19 / min Mx= 0.00 kNm/m

Obt. 106: [MSN] 31-104



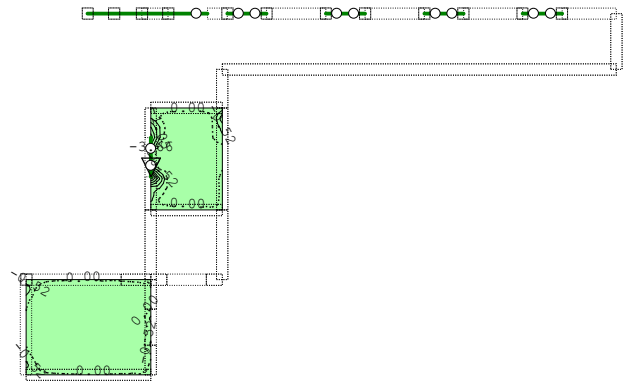
Nivo: plošča strojnice dvigala [3.30 m]
Vplivi v plošči: max Mx= 0.00 / min Mx= -2.18 kNm/m

Obt. 106: [MSN] 31-104



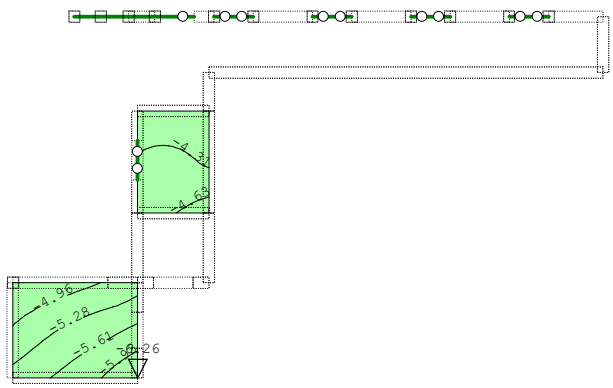
Nivo: plošča strojnice dvigala [3.30 m]
Vplivi v plošči: max My= 4.17 / min My= 0.00 kNm/m

Obt. 106: [MSN] 31-104



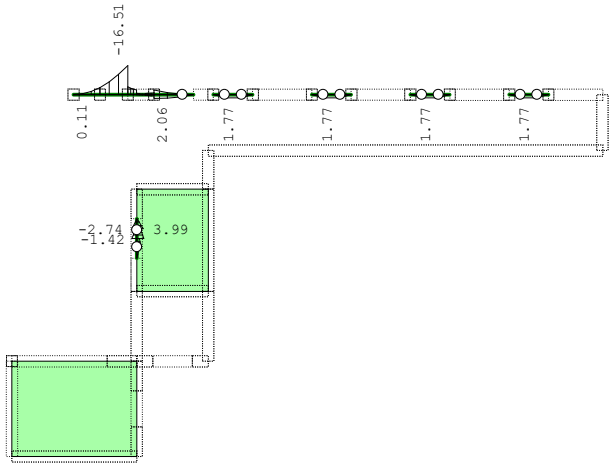
Nivo: plošča strojnice dvigala [3.30 m]
Vplivi v plošči: max My= 0.00 / min My= -3.66 kNm/m

Obt. 105: [U.elas] 11-25



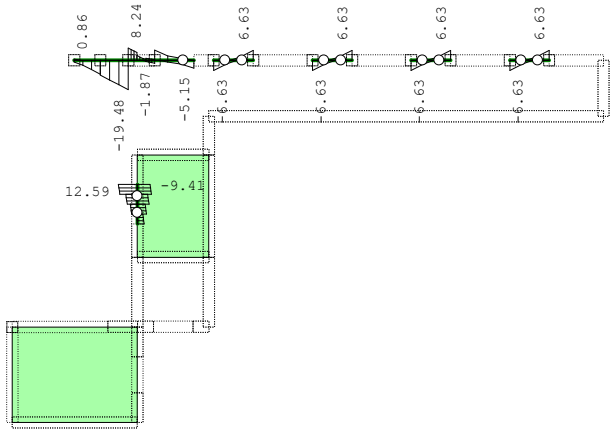
Nivo: plošča strojnice dvigala [3.30 m]
Vplivi v plošči: max Zp= -3.99 / min Zp= -6.26 m / 1000

Obt. 106: [MSN] 31-104



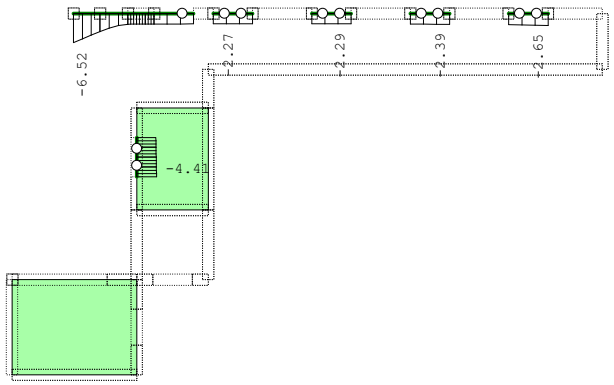
Nivo: plošča strojnice dvigala [3.30 m]
Vplivi v gredi: max M3= 3.99 / min M3= -16.51 kNm

Obt. 106: [MSN] 31-104



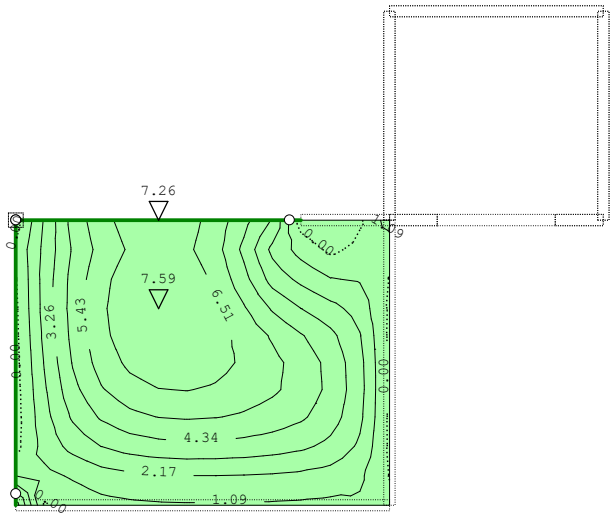
Nivo: plošča strojnice dvigala [3.30 m]
Vplivi v gredi: max T2= 12.59 / min T2= -19.48 kN

Obt. 105: [U.elas] 11-25



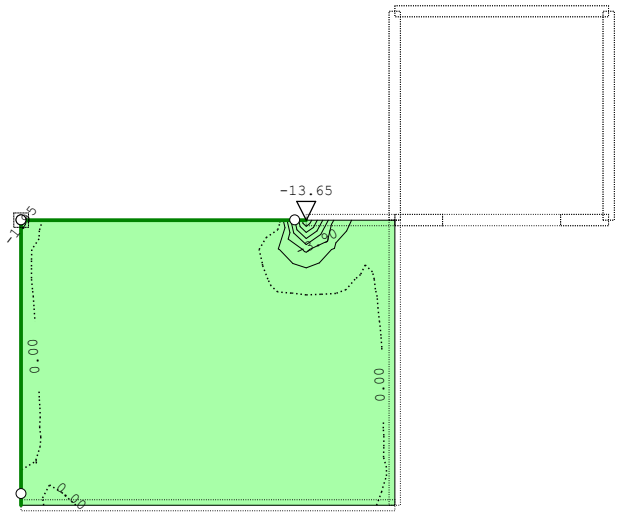
Nivo: plošča strojnice dvigala [3.30 m]
Vplivi v gredi: max Zp= -1.54 / min Zp= -6.52 m / 1000

Obt. 106: [MSN] 31-104



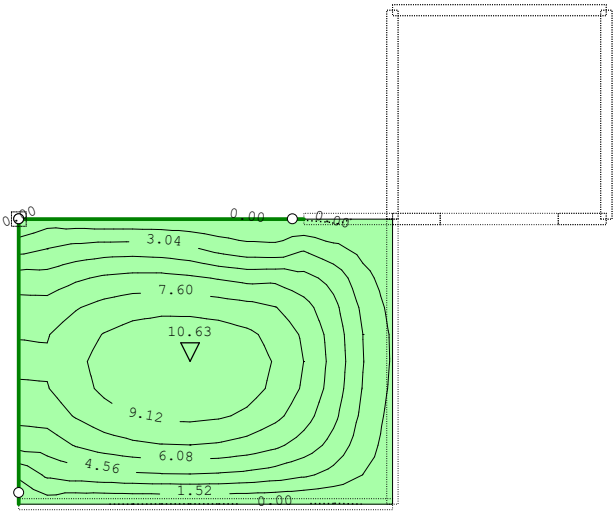
Nivo: nova AB plošča [6.60 m]
Vplivi v plošči: max Mx= 7.59 / min Mx= 0.00 kNm/m

Obt. 106: [MSN] 31-104



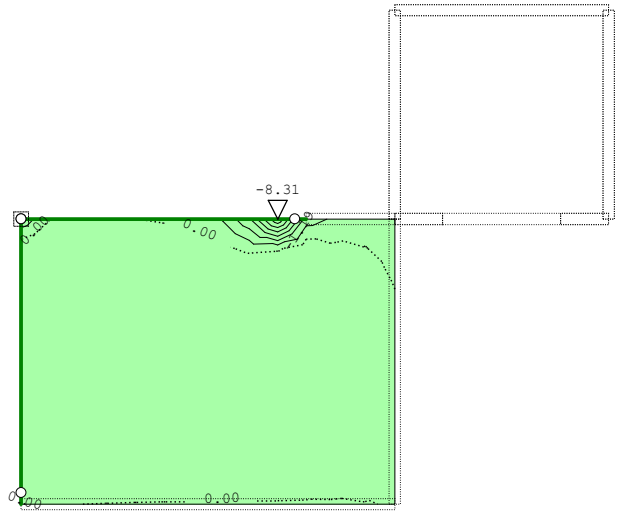
Nivo: nova AB plošča [6.60 m]
Vplivi v plošči: max Mx= 0.00 / min Mx= -13.65 kNm/m

Obt. 106: [MSN] 31-104



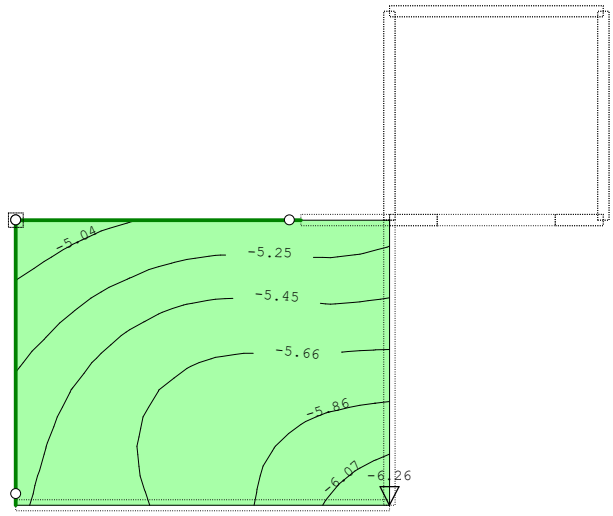
Nivo: nova AB plošča [6.60 m]
Vplivi v plošči: max My= 10.63 / min My= 0.00 kNm/m

Obt. 106: [MSN] 31-104



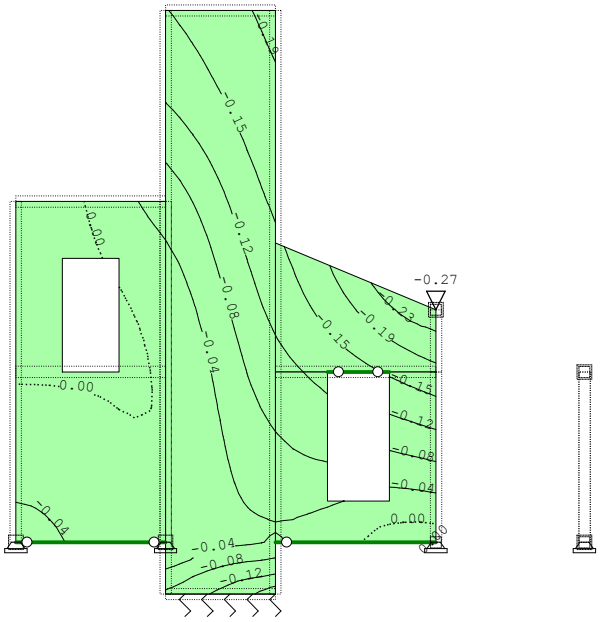
Nivo: nova AB plošča [6.60 m]
Vplivi v plošči: max My= 0.00 / min My= -8.31 kNm/m

Obt. 105: [U.elas] 11-25



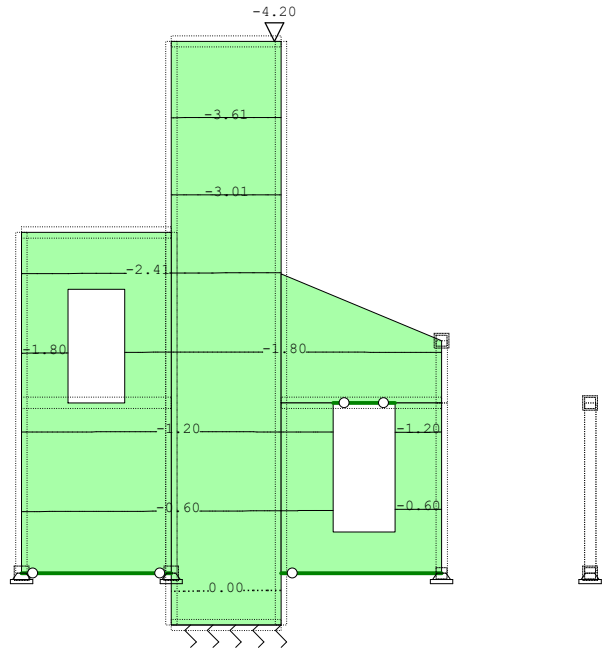
Nivo: nova AB plošča [6.60 m]
Vplivi v plošči: max Zp= -4.85 / min Zp= -6.26 m / 1000

Obt. 105: [U.elas] 11-25



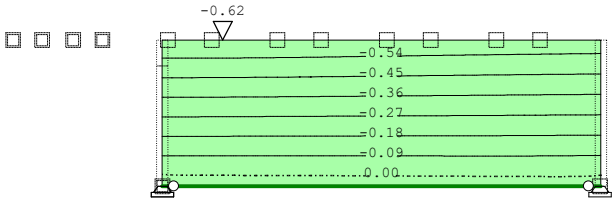
Okvir: V_2
Vplivi v plošči: max Xp= 0.00 / min Xp= -0.27 m / 1000

Obt. 105: [U.elas] 11-25



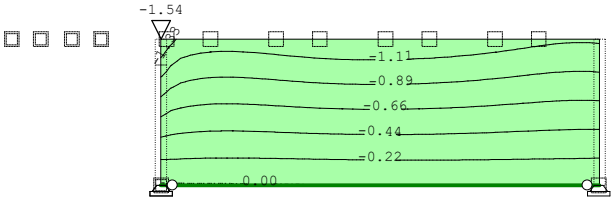
Okvir: V_2
Vplivi v plošči: max Yp= 0.00 / min Yp= -4.20 m / 1000

Obt. 105: [U.elas] 11-25



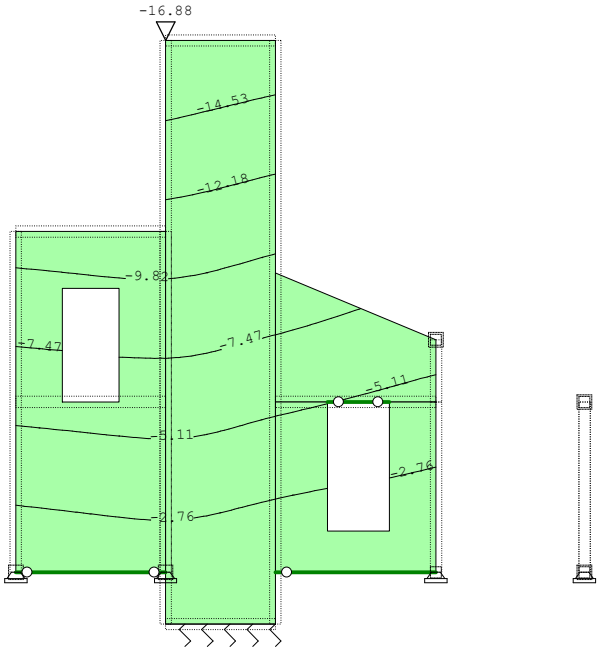
Okvir: H_5
Vplivi v plošči: max Xp= 0.00 / min Xp= -0.62 m / 1000

Obt. 105: [U.elas] 11-25



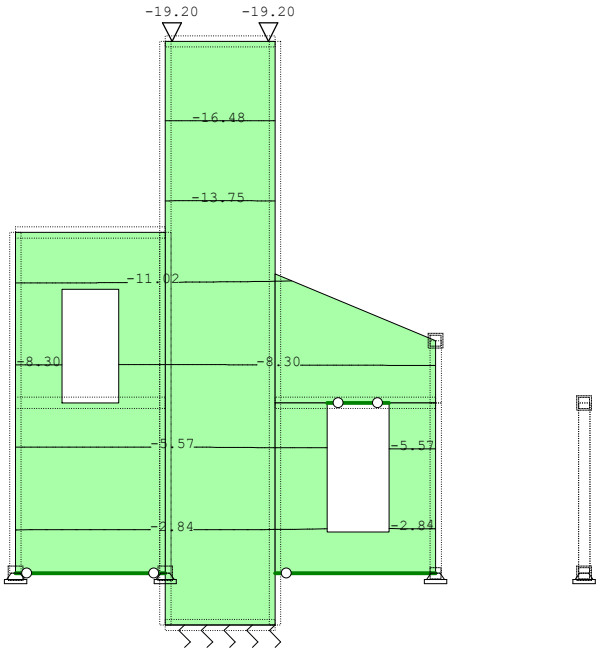
Okvir: H_5
Vplivi v plošči: max Yp= 0.00 / min Yp= -1.54 m / 1000

Obt. 107: [U.potres] 27-30



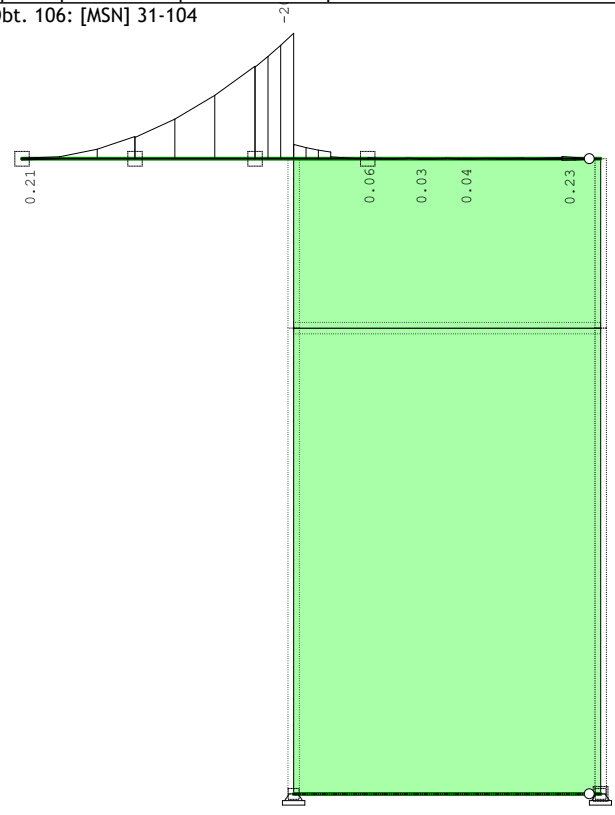
Okvir: V_2
Vplivi v plošči: max Xp= -0.41 / min Xp= -16.88 m / 1000

Obt. 107: [U.potres] 27-30



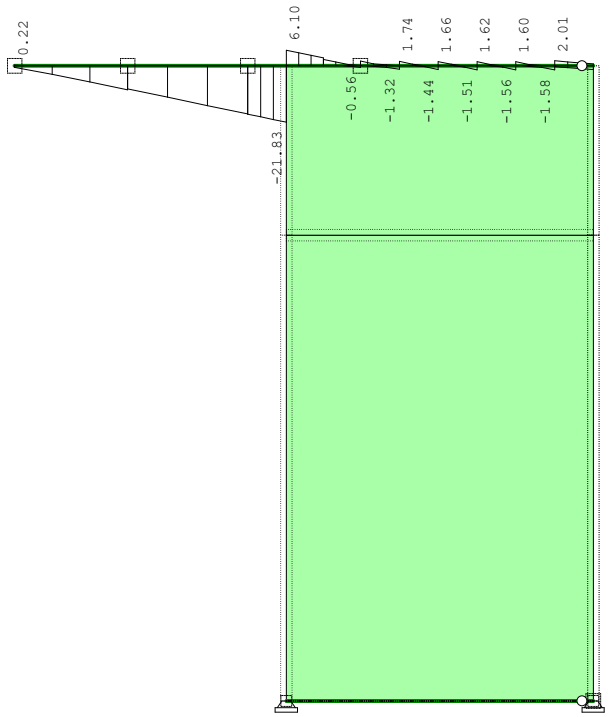
Okvir: V_2
Vplivi v plošči: max Yp= -0.12 / min Yp= -19.20 m / 1000

Obt. 106: [MSN] 31-104



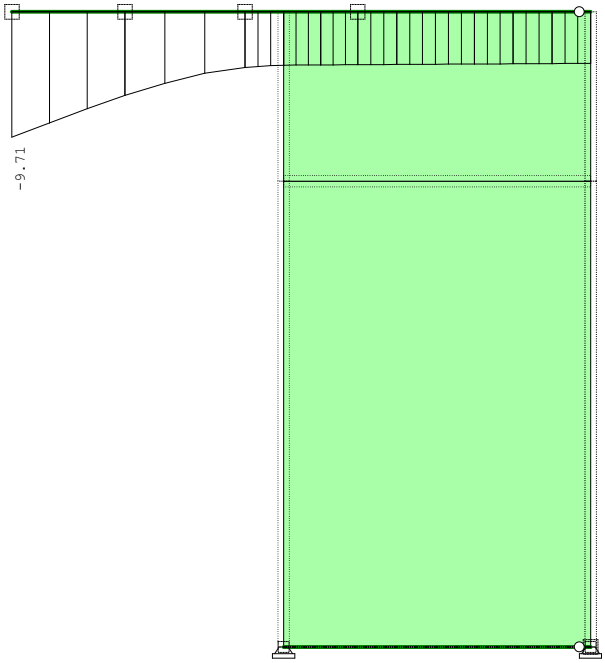
Okvir: H_4
Vplivi v gredi: max M3= 13.52 / min M3= -20.65 kNm

Obt. 106: [MSN] 31-104



Okvir: H_4
Vplivi v gredi: max T2= 48.64 / min T2= -37.44 kN

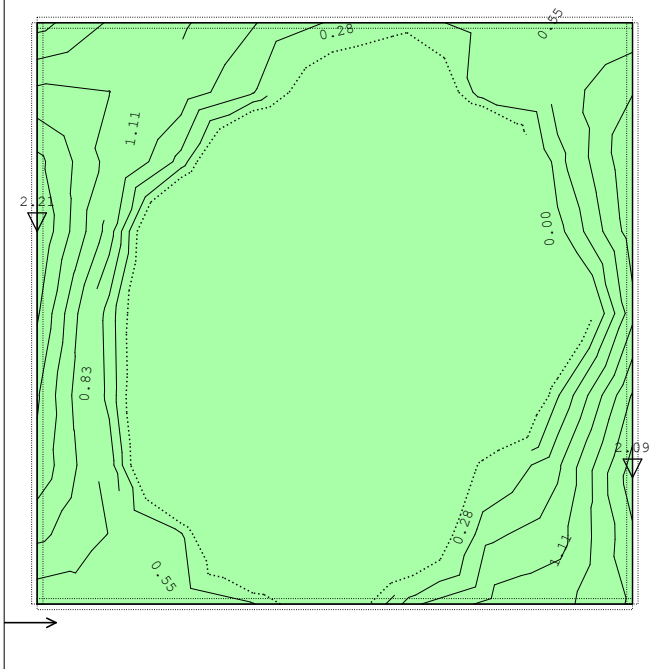
Obt. 105: [U.elas] 11-25



Okvir: H_4
Vplivi v gredi: max Zp= -2.92 / min Zp= -9.71 m / 1000

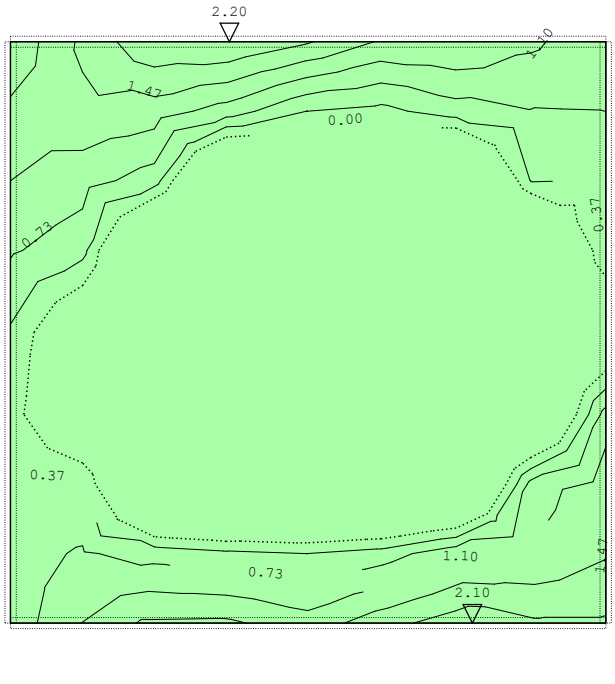
Dimenzioniranje (beton)

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 30, S500N, a=6.00 cm



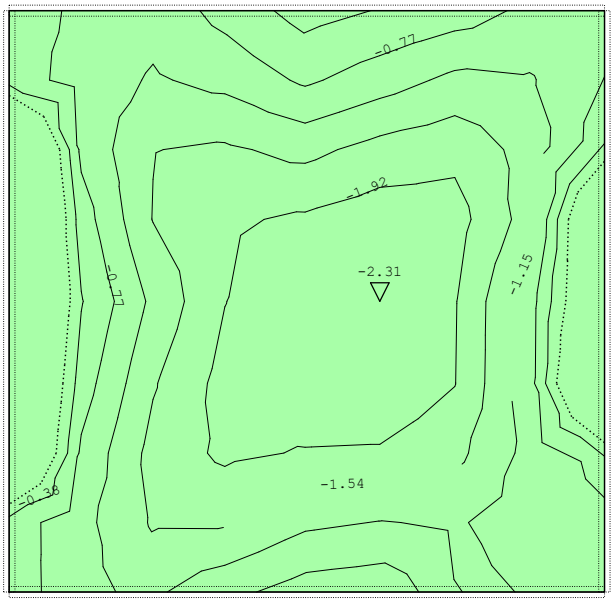
Nivo: dno dvigalnega jaška [-1.00 m]
Aa - sp.cona - Smer 1 - max Aa1,s= 2.21 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 30, S500N, a=6.00 cm



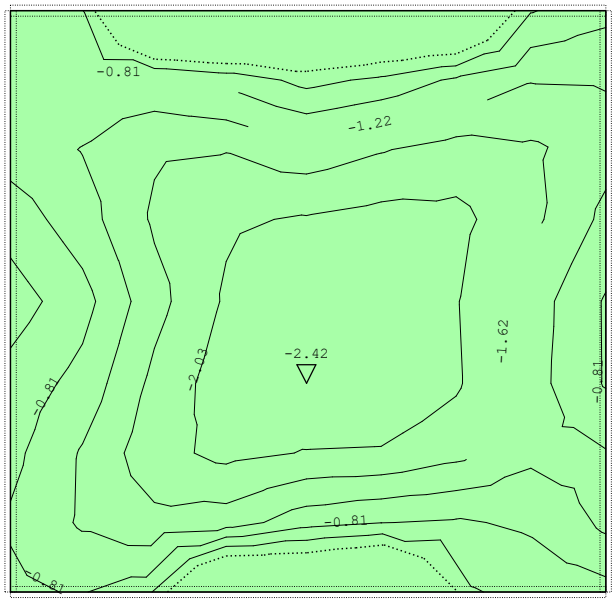
Nivo: dno dvigalnega jaška [-1.00 m]
Aa - sp.cona - Smer 2 - max Aa2,s= 2.20 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 30, S500N, a=6.00 cm



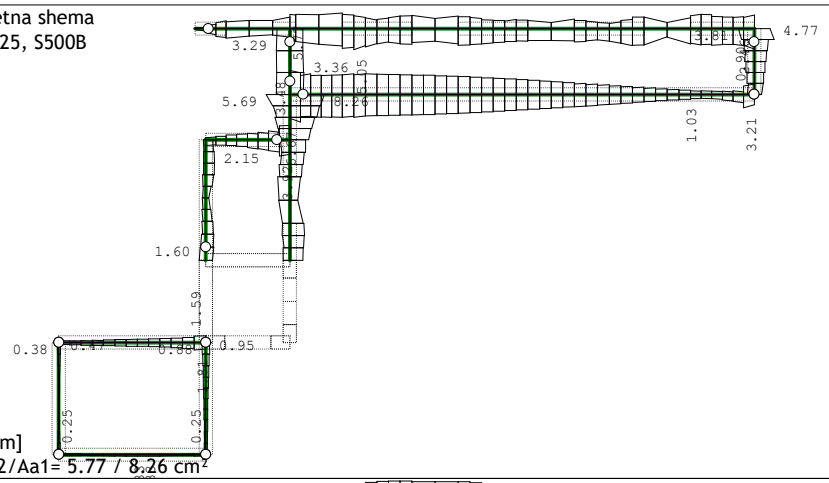
Nivo: dno dvigalnega jaška [-1.00 m]
Aa - zg.cona - Smer 1 - max Aa1,z= -2.31 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 30, S500N, a=6.00 cm



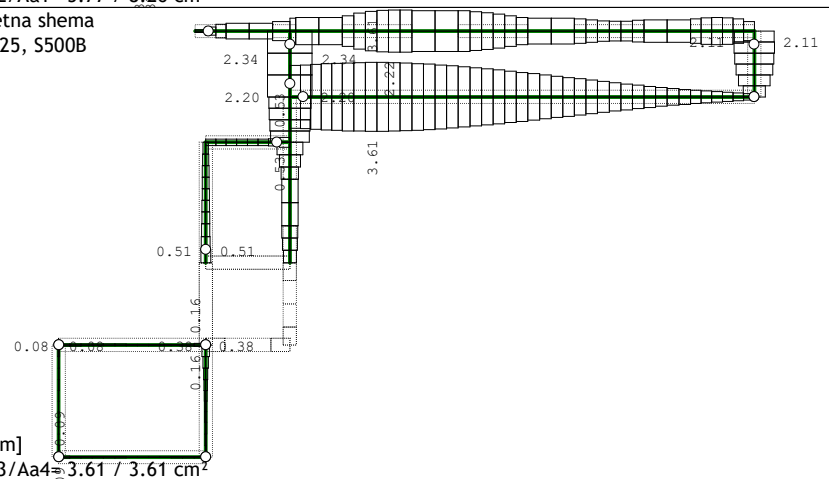
Nivo: dno dvigalnega jaška [-1.00 m]
Aa - zg.cona - Smer 2 - max Aa2,z= -2.42 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500B



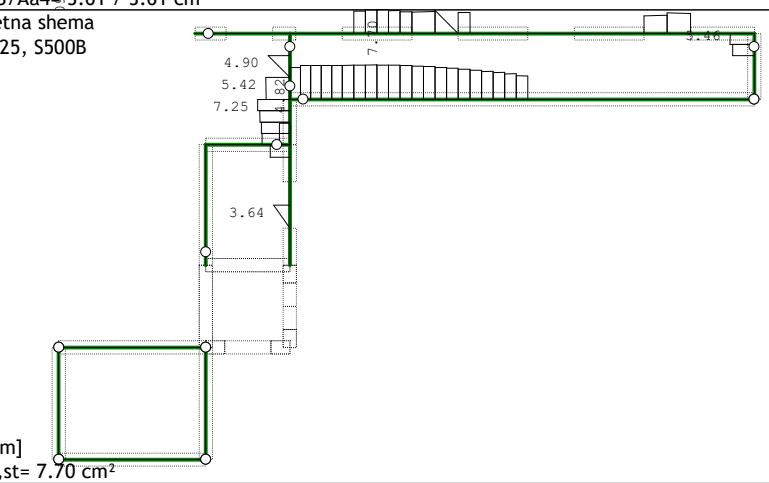
Nivo: pasovni temelji [0.00 m]
Armatura v gredah: max Aa2/Aa1= 5.77 / 8.26 cm²

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500B



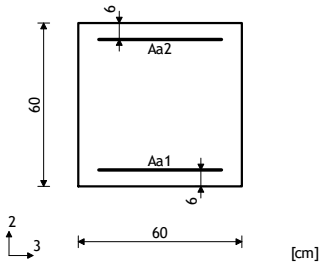
Nivo: pasovni temelji [0.00 m]
Armatura v gredah: max Aa3/Aa4= 3.61 / 3.61 cm²

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500B



Nivo: pasovni temelji [0.00 m]
Armatura v gredah: max Aa,st= 7.70 cm²

Greda 2163-4041
EC 2 (EN 1992-1-1:2004)
C 25 (γC = 1.50, γS = 1.15) [SP]
S500B
Kompletna obtežna shema



[cm]

Prerez 1-1 x = 3.80m
Merodajna kombinacija za upogib:
1.00xI+0.60xII+1.00xIX
N1ed = 21.85 kN
M2ed = 0.00 kNm
M3ed = 60.64 kNm

Merodajna kombinacija za torzijo:
1.00xI+0.60xII-1.00xVII
M1ed = -52.35 kNm

Merodajna kombinacija za strig:
1.00xI+0.60xII-1.00xVIII
V2ed = -49.54 kN
V3ed = -14.40 kN
M1ed = -52.28 kNm

Vrd,max,2 = 1312.20 kN
Vrd,max,3 = 1312.20 kN
εb/εa = -1.469/25.000 ‰

Aa1 =	2.76	+	1.43`	=	4.19 cm²
Aa2 =	2.31	+	1.43`	=	3.74 cm²
Aa3 =	0.00	+	1.43`	=	1.43 cm²
Aa4 =	0.00	+	1.43`	=	1.43 cm²

Aa,st = 0.00 cm²/m (m=2)
`) - dodatna vzdolžna armatura za prevzem torzije.

Prerez 2-2 x = 4.10m
Merodajna kombinacija za upogib:
1.00xI-1.00xX
N1ed = -42.21 kN
M2ed = 0.00 kNm
M3ed = -44.07 kNm

Merodajna kombinacija za torzijo:
1.00xI+0.60xII-1.00xIX
M1ed = -69.02 kNm

Merodajna kombinacija za strig:
1.00xI+0.60xII-1.00xIX
V2ed = -48.12 kN
V3ed = -13.91 kN
M1ed = -69.02 kNm

Vrd,max,2 = 1312.20 kN
Vrd,max,3 = 1312.20 kN
εb/εa = -1.558/25.000 ‰
Aa1 = 3.17 + 1.88` = 5.05 cm²
Aa2 = 1.20 + 1.88` = 3.08 cm²
Aa3 = 0.00 + 1.88` = 1.88 cm²
Aa4 = 0.00 + 1.88` = 1.88 cm²
Aa,st = 5.06 cm²/m (m=2)

Prerez 3-3 x = 5.00m
Merodajna kombinacija za upogib:
1.00xI+1.00xIX
N1ed = 52.00 kN
M2ed = 0.00 kNm
M3ed = 8.76 kNm

Merodajna kombinacija za torzijo:
1.00xI+0.60xII-1.00xIX
M1ed = -79.44 kNm

Merodajna kombinacija za strig:
1.00xI+1.00xIX
V2ed = 41.49 kN
V3ed = 18.77 kN
M1ed = 77.23 kNm

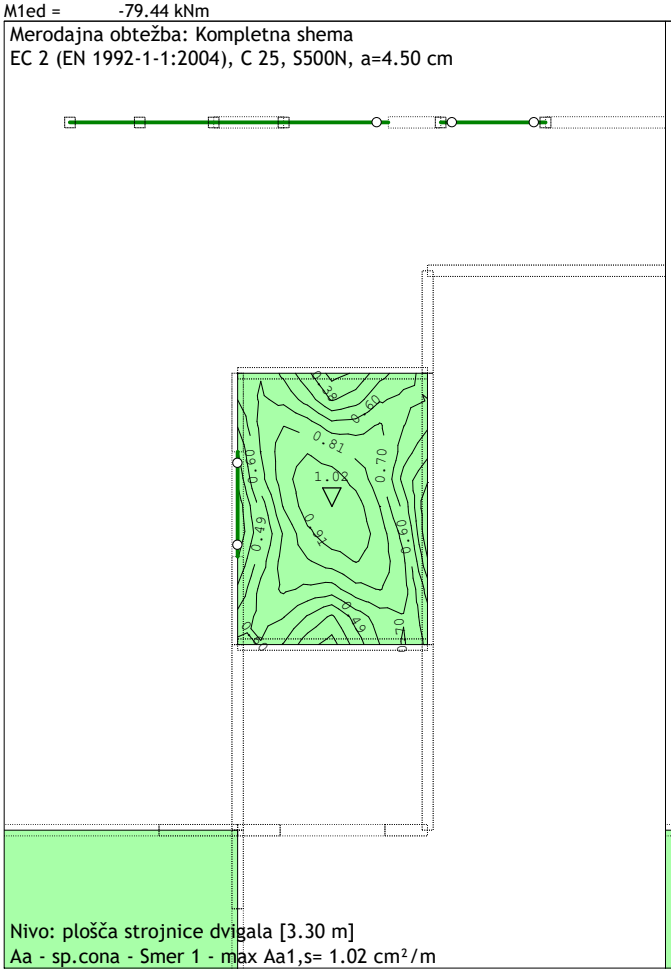
Vrd,max,2 = 1312.20 kN
Vrd,max,3 = 1312.20 kN
εb/εa = -0.276/25.000 ‰
Aa1 = 1.00 + 2.17` = 3.16 cm²
Aa2 = 0.38 + 2.17` = 2.54 cm²
Aa3 = 0.00 + 2.17` = 2.17 cm²
Aa4 = 0.00 + 2.17` = 2.17 cm²
Aa,st = 5.37 cm²/m (m=2)

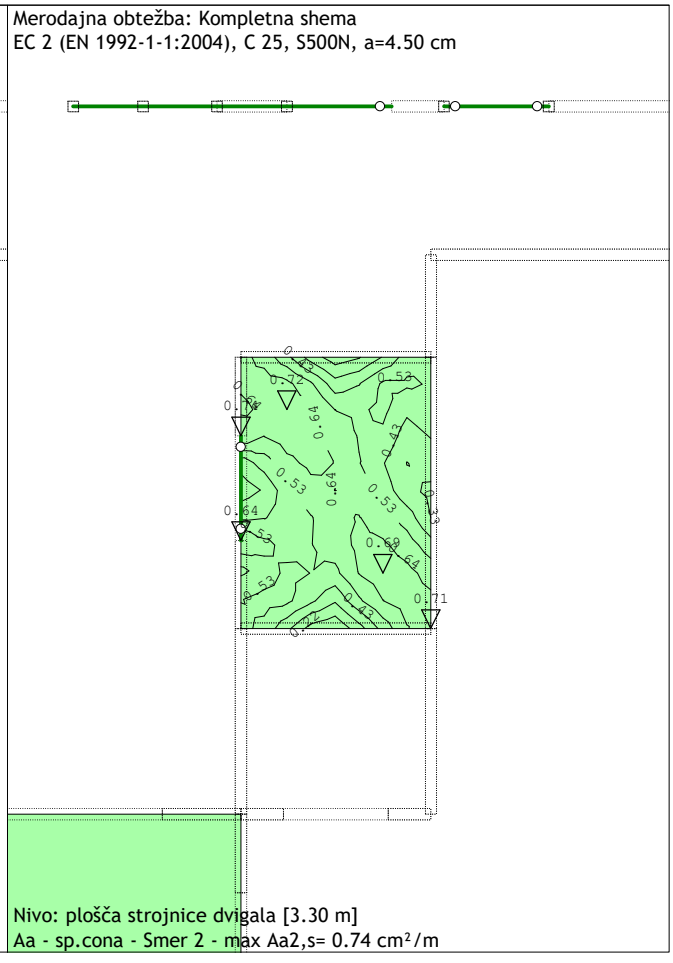
Prerez 3-3 x = 5.00m
Merodajna kombinacija za upogib:
1.00xI+1.00xVIII
N1ed = 25.31 kN
M2ed = 0.00 kNm
M3ed = 17.17 kNm

Merodajna kombinacija za torzijo:
1.00xI+0.60xII-1.00xIX
M1ed = -81.32 kNm

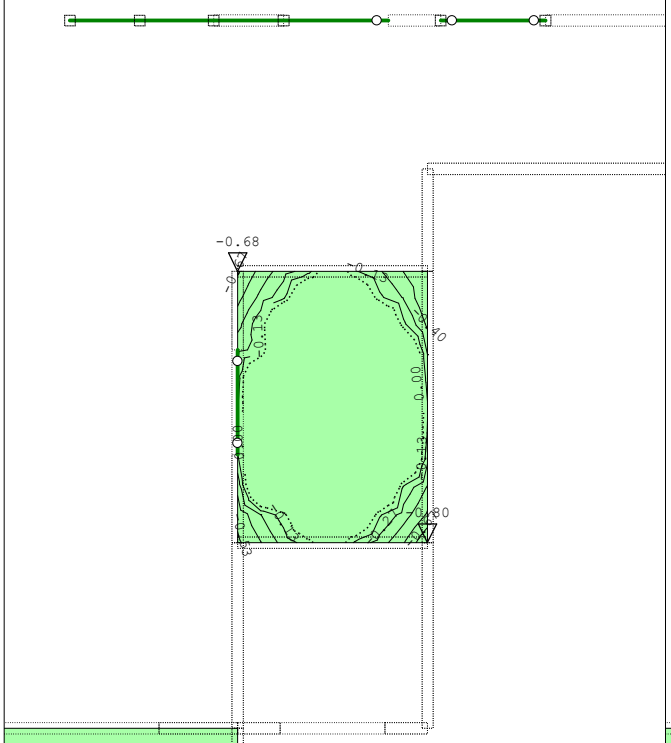
Merodajna kombinacija za strig:
1.00xI+1.00xIX
V2ed = 24.90 kN
V3ed = 19.46 kN
M1ed = 79.54 kNm

Vrd,max,2 = 1312.20 kN
Vrd,max,3 = 1312.20 kN
εb/εa = -0.615/25.000 ‰
Aa1 = 1.02 + 2.22` = 3.24 cm²
Aa2 = 0.39 + 2.22` = 2.60 cm²
Aa3 = 0.00 + 2.22` = 2.22 cm²
Aa4 = 0.00 + 2.22` = 2.22 cm²
Aa,st = 5.11 cm²/m (m=2)



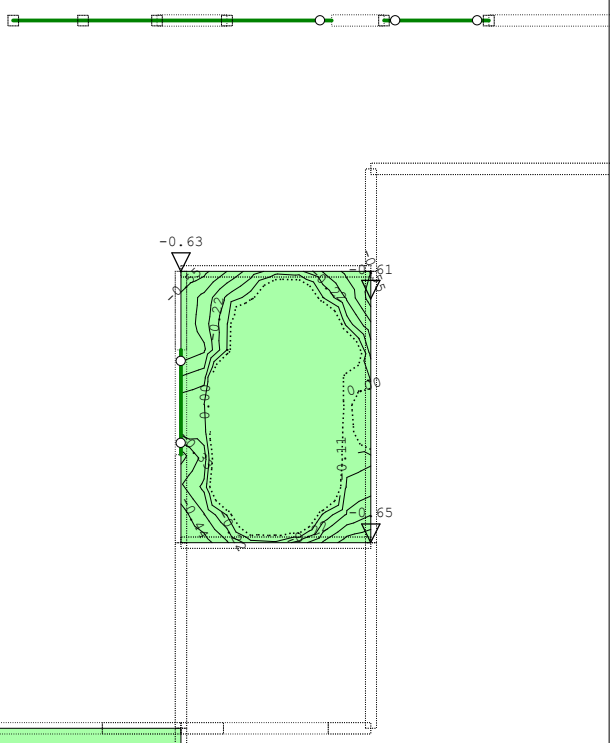


Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



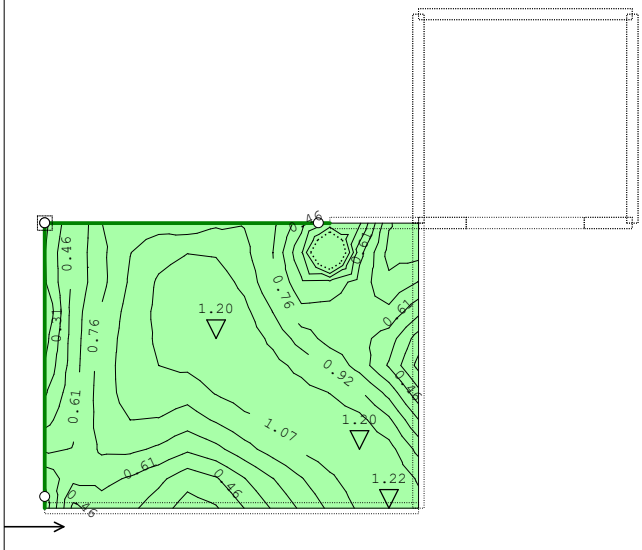
Nivo: plošča strojnice dvigala [3.30 m]
Aa - zg.cona - Smer 1 - max Aa1,z= -0.80 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



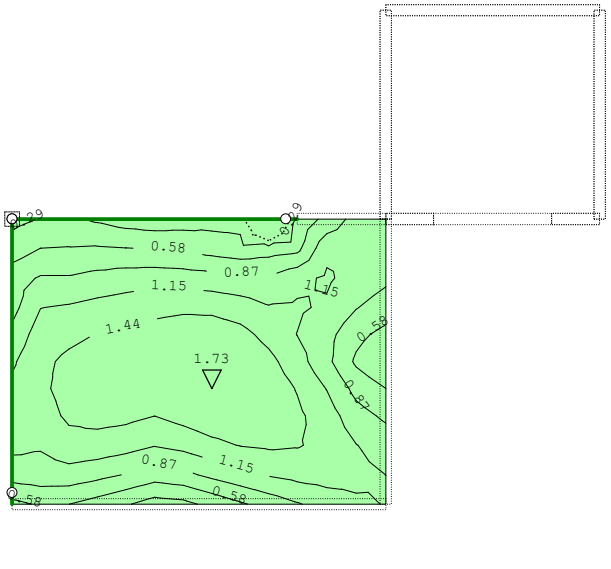
Nivo: plošča strojnice dvigala [3.30 m]
Aa - zg.cona - Smer 2 - max Aa2,z= -0.65 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 30, S500N, a=4.50 cm



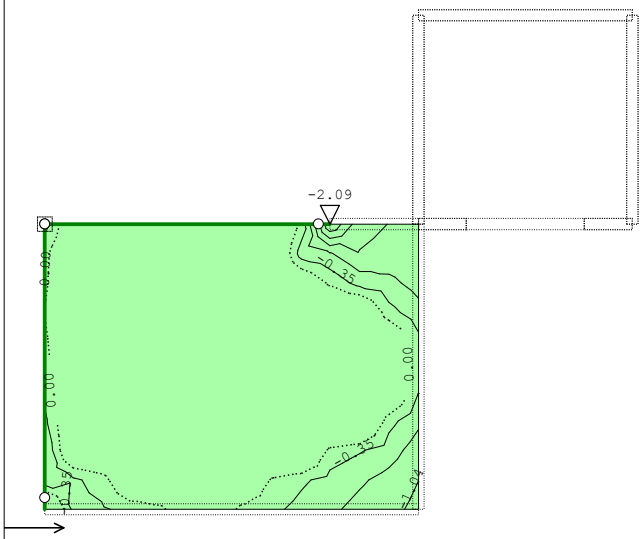
Nivo: nova AB plošča [6.60 m]
Aa - sp.cona - Smer 1 - max Aa1,s= 1.22 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 30, S500N, a=4.50 cm



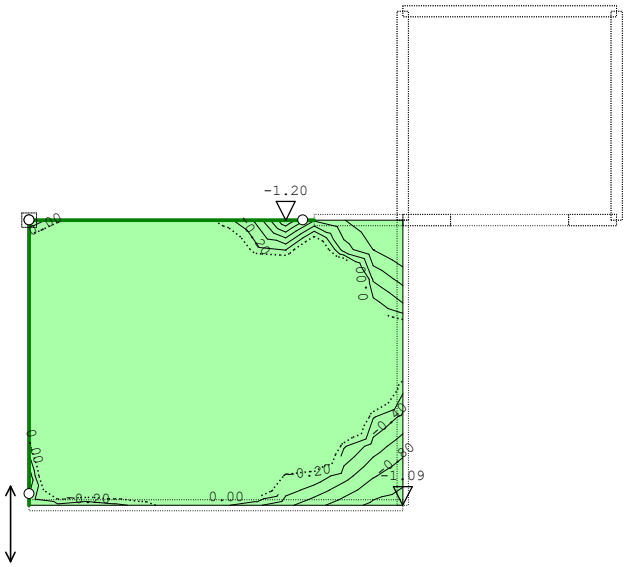
Nivo: nova AB plošča [6.60 m]
Aa - sp.cona - Smer 2 - max Aa2,s= 1.73 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 30, S500N, a=4.50 cm



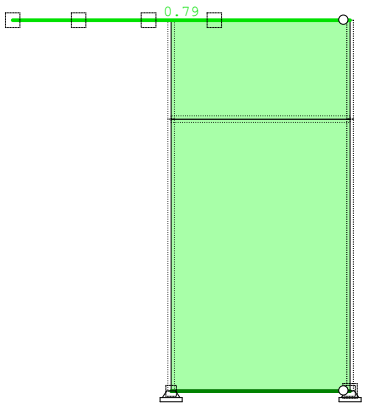
Nivo: nova AB plošča [6.60 m]
Aa - zg.cona - Smer 1 - max Aa1,z= -2.09 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 30, S500N, a=4.50 cm



Nivo: nova AB plošča [6.60 m]
Aa - zg.cona - Smer 2 - max Aa2,z= -1.20 cm²/m

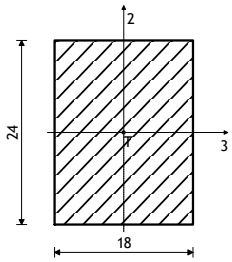
Dimenzioniranje (les)



Okvir: H_4
Kontrola stabilnosti

PALICA 3078-2158

Monoliten les - iglavci in mehki listavci - C24
Eksploatacijski razred 2
EUROCODE (EN 1995-1-1)



[cm]

FAKTORJI IZKORIŠČENOSTI PO KOMBINACIJAH OBTEŽB

52. γ=0.79	80. γ=0.79	55. γ=0.77
33. γ=0.77	66. γ=0.69	93. γ=0.69
42. γ=0.67	69. γ=0.67	36. γ=0.64
61. γ=0.64	53. γ=0.63	31. γ=0.63
54. γ=0.61	32. γ=0.61	62. γ=0.61
39. γ=0.60	103. γ=0.56	75. γ=0.55
45. γ=0.55	67. γ=0.54	40. γ=0.54
68. γ=0.52	41. γ=0.52	48. γ=0.51
76. γ=0.50	37. γ=0.48	79. γ=0.48
51. γ=0.48	59. γ=0.47	34. γ=0.47
38. γ=0.46	35. γ=0.44	60. γ=0.44
58. γ=0.43	81. γ=0.42	104. γ=0.41
46. γ=0.39	73. γ=0.38	43. γ=0.38
65. γ=0.38	92. γ=0.38	96. γ=0.37
83. γ=0.37	47. γ=0.37	74. γ=0.35
44. γ=0.35	72. γ=0.34	56. γ=0.33
77. γ=0.32	49. γ=0.32	85. γ=0.31
98. γ=0.31	82. γ=0.31	95. γ=0.31
94. γ=0.31	57. γ=0.31	88. γ=0.30
101. γ=0.30	78. γ=0.29	50. γ=0.29
99. γ=0.27	86. γ=0.27	97. γ=0.27
84. γ=0.27	89. γ=0.26	102. γ=0.26
70. γ=0.24	90. γ=0.23	100. γ=0.23
87. γ=0.23	63. γ=0.23	71. γ=0.22
91. γ=0.20	64. γ=0.20	

KONTROLA NORMALNIH NAPETOSTI
(obtežni primer 52, na 217.5 cm od začetka palice)

Prečna sila v smeri osi 2	V2ed =	-20.738 kN
Prečna sila v smeri osi 3	V3ed =	0.701 kN
Upogibni moment okoli osi 2	M2ed =	0.880 kNm
Upogibni moment okoli osi 3	M3ed =	19.449 kNm

KONTROLA NAPETOSTI - UPOGIB
Vrsta obtežbe: osnovno - srednjetrajno

Korekcijski koeficient	Kmod =	0.800
Parcialni koef. za karakteristike materiala	γm =	1.300
Dodatek za elemente z malimi dimenzijami - os 2	Kh_2 =	1.000
Dodatek za elemente z malimi dimenzijami - os 3	Kh_3 =	1.000
Faktor oblik (za pravokotni prerez)	km =	0.700
Karakteristična upogibna trdnost	fm,k =	24.000 MPa
Računska upogibna trdnost	fm,d =	14.769 MPa
Odpornostni moment	W2 =	1296.0 cm3
Normalna upogibna napetost okoli osi 2	σm2,d =	0.679 MPa
Odpornostni moment	W3 =	1728.0 cm3
Normalna upogibna napetost okoli osi 3	σm3,d =	11.255 MPa

km x (σm3,d / fm,3,d) + σm2,d / fm,2,d <= 1 (0.579 <= 1)

Izkoriščenost prereza je 57.9%

σm3,d / fm,3,d + km x (σm2,d / fm,2,d) <= 1 (0.794 <= 1)

Izkoriščenost prereza je 79.4%

KONTROLA STRIŽNIH NAPETOSTI
(obtežni primer 80, na 217.5 cm od začetka palice)

Prečna sila v smeri osi 2	V2ed =	-20.756 kN
Prečna sila v smeri osi 3	V3ed =	0.657 kN
Upogibni moment okoli osi 2	M2ed =	0.868 kNm
Upogibni moment okoli osi 3	M3ed =	19.458 kNm

KONTROLA NAPETOSTI - STRIG
Vrsta obtežbe: osnovno - srednjetrajno

Korekcijski koeficient	Kmod =	0.800
Parcialni koef. za karakteristike materiala	γm =	1.300
Karakteristična strižna napetost	fv,k =	4.000 MPa
Računska strižna trdnost	fv,d =	2.462 MPa
Površina prečnega prereza	A =	432.00 cm2
Dejanska strižna napetost(os 2)	τ2,d =	0.721 MPa
Dejanska strižna napetost(os 3)	τ3,d =	0.023 MPa
Superpozicija vplivov prečne sile		
(2)	τ2,d / fv,d =	0.293
(3)	τ3,d / fv,d =	0.009

$(2)^2 + (3)^2$ <= 1 (0.088 <= 1)

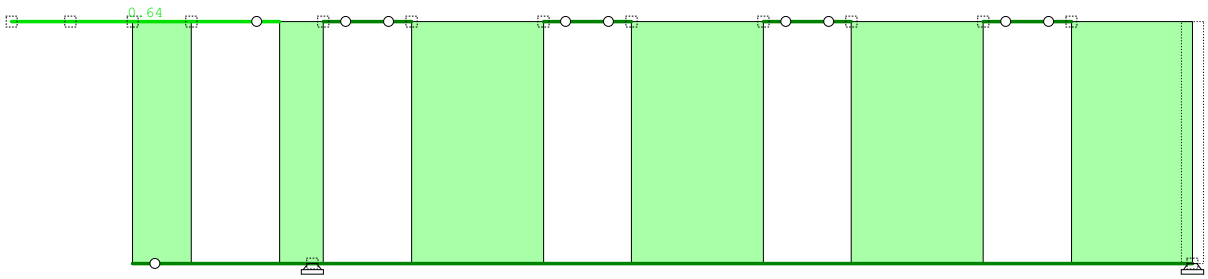
Izkoriščenost prereza je 8.8%

DOKAZ BOČNE STABILNOSTI
Vrsta obtežbe: osnovno - srednjetrajno

Korekcijski koeficient	Kmod =	0.800
Parcialni koef. za karakteristike materiala	γm =	1.300
Razmak pridržanih točk pravokotno na smer osi 2	lef =	410.00 cm
5% fraktil modula E paralelno z vlakni	E0.05 =	7400.0 MPa
5% fraktil strižnega modula G	G0.05 =	460.00 MPa
Torzijski vztrajnostni moment	Itor =	25050 cm4
Vztrajnostni moment	I2 =	11664 cm4
Odpornostni moment	W3 =	1728.0 cm3
Kritična napetost uklona	σm,crit =	139.84 MPa
Relativna vitkost za uklon	λrel =	0.414
Koeficient	k_krit =	1.000
Normalna upogibna napetost okoli osi 3	σm3,d =	11.260 MPa

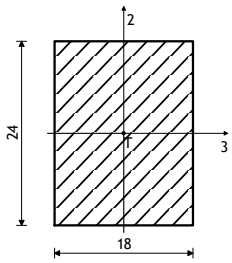
σm,3,d <= k_krit x fm,3,d (11.260 <= 14.769)

Izkoriščenost prereza je 76.2%



Okvir: H_6
Kontrola stabilnosti

PALICA 3278-2553
Monoliten les - iglavci in mehki listavci - C24
Eksploatacijski razred 2
EUROCODE (EN 1995-1-1)



[cm]

FAKTORJI IZKORIŠČENOSTI PO KOMBINACIJAH OBTEŽB

52. γ=0.64	80. γ=0.64	33. γ=0.58
55. γ=0.58	66. γ=0.55	93. γ=0.55
31. γ=0.54	53. γ=0.54	32. γ=0.54
54. γ=0.54	42. γ=0.51	69. γ=0.51
62. γ=0.49	61. γ=0.47	36. γ=0.47
67. γ=0.46	40. γ=0.46	68. γ=0.46
41. γ=0.46	39. γ=0.45	103. γ=0.45
37. γ=0.41	38. γ=0.41	75. γ=0.40
45. γ=0.40	76. γ=0.40	59. γ=0.39
34. γ=0.39	60. γ=0.39	35. γ=0.39
48. γ=0.37	79. γ=0.35	51. γ=0.35
81. γ=0.34	96. γ=0.33	83. γ=0.33
104. γ=0.33	46. γ=0.33	47. γ=0.33
58. γ=0.32	43. γ=0.31	73. γ=0.31
95. γ=0.31	82. γ=0.31	74. γ=0.31
44. γ=0.31	92. γ=0.28	65. γ=0.28
56. γ=0.27	57. γ=0.27	77. γ=0.26
49. γ=0.26	78. γ=0.25	50. γ=0.25
72. γ=0.25	94. γ=0.25	85. γ=0.25
98. γ=0.25	97. γ=0.22	84. γ=0.22
86. γ=0.20	99. γ=0.20	70. γ=0.20
71. γ=0.20	88. γ=0.19	101. γ=0.19
89. γ=0.19	102. γ=0.19	63. γ=0.18
90. γ=0.18	64. γ=0.18	91. γ=0.18
87. γ=0.17	100. γ=0.17	

KONTROLA NORMALNIH IN STRIŽNIH NAPETOSTI
(obtežni primer 52, na 200.0 cm od začetka palice)

Prečna sila v smeri osi 2	V2ed =	-18.372 kN
Prečna sila v smeri osi 3	V3ed =	-1.134 kN
Upogibni moment okoli osi 2	M2ed =	-0.753 kNm
Upogibni moment okoli osi 3	M3ed =	15.574 kNm

KONTROLA NAPETOSTI - UPOGIB
Vrsta obtežbe: osnovno - srednjetrajno

Korekcijski koeficient	Kmod =	0.800
Parcialni koef. za karakteristike materiala	γm =	1.300
Dodatek za elemente z malimi dimenzijami - os 2	Kh_2 =	1.000
Dodatek za elemente z malimi dimenzijami - os 3	Kh_3 =	1.000
Faktor oblik (za pravokotni prerez)	km =	0.700
Karakteristična upogibna trdnost	fm,k =	24.000 MPa
Računska upogibna trdnost	fm,d =	14.769 MPa
Odpornostni moment	W2 =	1296.0 cm3
Normalna upogibna napetost okoli osi 2	σm2,d =	0.581 MPa
Odpornostni moment	W3 =	1728.0 cm3
Normalna upogibna napetost okoli osi 3	σm3,d =	9.013 MPa

km x (σm3,d / fm,3,d) + σm2,d / fm,2,d <= 1 (0.467 <= 1)
Izkoriščenost prereza je 46.7%

σm3,d / fm,3,d + km x (σm2,d / fm,2,d) <= 1 (0.638 <= 1)
Izkoriščenost prereza je 63.8%

KONTROLA NAPETOSTI - STRIG
Vrsta obtežbe: osnovno - srednjetrajno

Korekcijski koeficient	Kmod =	0.800
Parcialni koef. za karakteristike materiala	γm =	1.300
Karakteristična strižna napetost	fv,k =	4.000 MPa
Računska strižna trdnost	fv,d =	2.462 MPa
Površina prečnega prereza	A =	432.00 cm2
Dejanska strižna napetost(os 2)	τ2,d =	0.638 MPa
Dejanska strižna napetost(os 3)	τ3,d =	0.039 MPa
Superpozicija vplivov prečne sile		
(2)	τ2,d / fv,d =	0.259
(3)	τ3,d / fv,d =	0.016

$(2)^2 + (3)^2$ <= 1 (0.071 <= 1)
Izkoriščenost prereza je 7.1%

DOKAZ BOČNE STABILNOSTI
Vrsta obtežbe: osnovno - srednjetrajno

Korekcijski koeficient	Kmod =	0.800
Parcialni koef. za karakteristike materiala	γm =	1.300
Razmak pridržanih točk pravokotno na smer osi 2	lef =	365.00 cm
5% fraktil modula E paralelno z vlakni	E0.05 =	7400.0 MPa
5% fraktil strižnega modula G	G0.05 =	460.00 MPa
Torzijski vztrajnostni moment	Itor =	25050 cm4
Vztrajnostni moment	I2 =	11664 cm4
Odpornostni moment	W3 =	1728.0 cm3
Kritična napetost uklona	σm,crit =	157.09 MPa
Relativna vitkost za uklon	λrel =	0.391
Koeficient	k_krit =	1.000
Normalna upogibna napetost okoli osi 3	σm3,d =	9.013 MPa

σm,3,d <= k_krit x fm,3,d (9.013 <= 14.769)
Izkoriščenost prereza je 61.0%

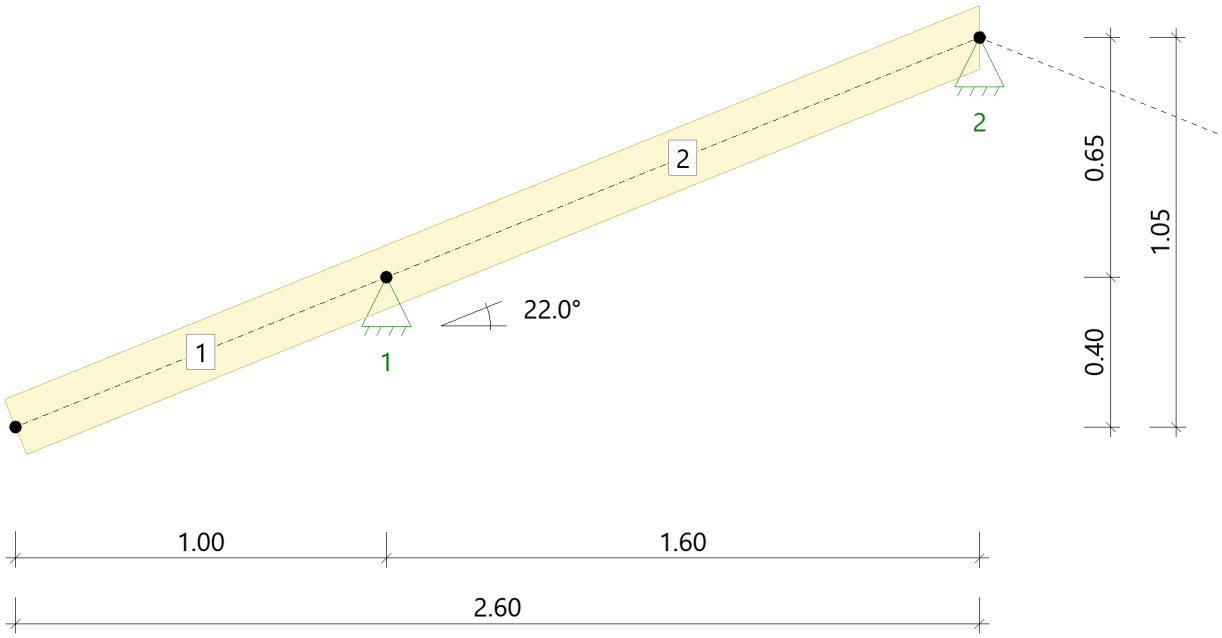
Item: poz 101 - dimenzioniranje špirovcev ob osi 4

Design of Roofs (x64) Dach+ 01/23C (FRILO R-2023-1/P04)

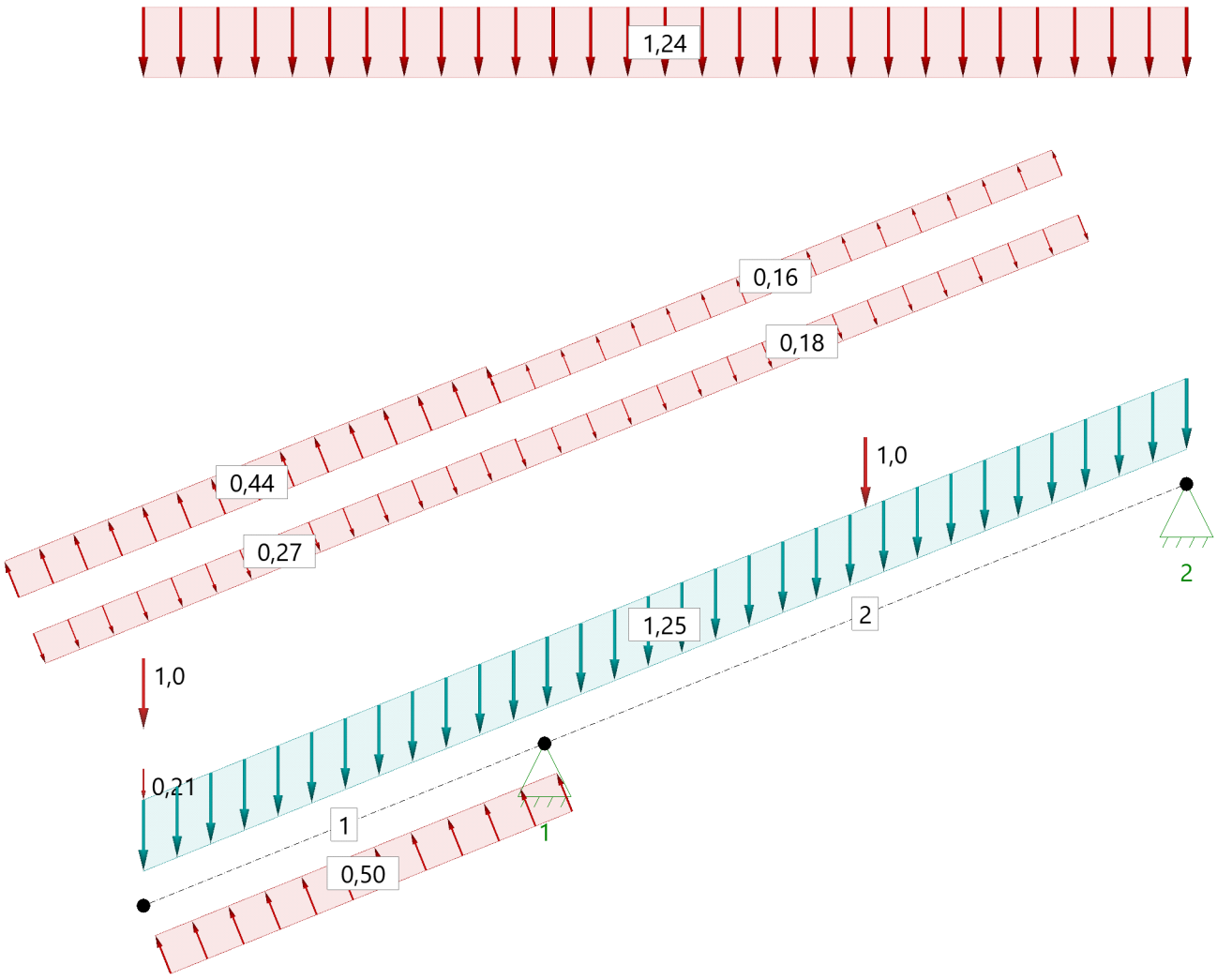
System

Softwood C24, Service class roofed, open; AH<85%; BMC<20%, CC 2

System Graphics



Load graphics



Material

Material values Timber

Softwood C24 acc.to EN 338:2016 $E_{0,mean}$ = 11000 N/mm² ρ_k = 350 kg/m³
G_{mean} = 690 N/mm²

Material Characteristics

$f_{m,k}$ $f_{v,k}$ N/mm²	$f_{t,0,k}$ $f_{c,0,k}$ N/mm²	$f_{t,90,k}$ $f_{c,90,k}$ N/mm²	$E_{0,mean}$ $E_{0,05}$ N/mm²	$E_{90,mean}$ $E_{90,05}$ N/mm²	G_{mean} G_{05} N/mm²	ρ_k ρ_m kg/m³	γ kN/m³
24.00 4.00	14.50 21.00	0.40 2.50	11000 7400	370 247	690 460	350 420	6.00

Geometry

Rafter Spacing e = 90.0 cm Total ridge height h = 6.00 m
Length of Roof b,Roof = 20.00 m Building length b, Wall = 20.00 m

Rafter

Span	Length BAR [m]	Length RAR [m]	Page	Slope [°]	Cross-section [cm]
Cantilever bottom 1	1.00 1.60	1.08 1.73	left left	22.0 22.0	14.0/16.0 14.0/16.0

Support

No.	Member	Cx [kN/m]	Cz [kN/m]	Depth of birds mouth t [cm]
1	Rafter left	Rigid	Rigid	0.0
2	Rafter left	Rigid	Rigid	0.0

Tilt-/ Buckling-Lengths

Rafter left

Buckling in plane: Member length
Buckling out of plane: Member Length
Tilting: Member Length

Calculation Rules

The rod length is always used as the reference length for the total deflection verification.
Caution! If bars are connected without a support, their bar lengths are added up.
Wind loads from undergrate blast are assumed to be dependent.
Load cases with loads whose expected deformations are opposite are not included.
Combinations of load cases whose expected deformations are opposite are not used.
The stiffness should be reduced as a result of creep from permanent and quasi-permanent load components.
kmod wird bei Wind als Mittelwert von kurz und sehr kurz angesetzt.

Loads

Load Pre-settings

Rafter

Roofing g1 = 1.25 kN/m² Act = 99
Construction g2 = 0.00 kN/m²
Loft conversion g3 = 0.00 kN/m²
Loft Conversion bottom gb = 0.00 kN/m²
With dead weight of members, γ = 6.00 kN/m³
Roofload Cat.H Q = 1.0 kN Act = 8

Boundary conditions

Total ridge height h = 6.00 m
Length of Roof b,Roof = 20.00 m
Building length b, Wall = 20.00 m
Building width on the right br = 0.00 m

Snow / wind loads for the calculation - User-defined value

DIN EN 1991-1-3:2019, DIN EN 1991-1-4:2010
Terrain elevation Altitude = 0.00 m
Ground Snow Load sk = 1.55 kN/m²
Wind pressure qp,0(h) = 0.62 kN/m²
Wind pressure qp,90(h) = 0.62 kN/m²

Auxiliary values

Wind reference length (Roof) e_0 = 12.00 m e_{90} = 2.60 m
Wind reference length (Wall) e_0 = 12.00 m e_{90} = 1.60 m
h/d = 3.750 h/b = 0.300 d/b = 0.080

Classification of Actions

No.	Name	γ_{sup}	γ_{inf}	ψ_0	ψ_1	ψ_2	KLED
99	Permanent loads	1.35	1.00	1.00	1.00	1.00	permanent
8	Cat. H: roofs	1.50	0.00	0.00	0.00	0.00	short-term
9	Wind loads	1.50	0.00	0.60	0.20	0.00	short-term
10	Snow loads H < 1000 m	1.50	0.00	0.50	0.20	0.00	short-term

Load values

Snow load

Name	Page	μ	Load value	(according to standard)	
Roof load	left	0.80	1.24	1.24	kN/m²
Non-blown portion (for blown load cases)	left	0.80	1.24	1.24	kN/m²
Blown portion (for blown load cases)	left	0.80	0.62	0.62	kN/m²
Eave load	left		0.21	0.21	kN/m

Wind loads

Name	Page	Pressure [kN/m²]	Suction [kN/m²]	Pressure (Standard) [kN/m²]	Suction (Standard) [kN/m²]
F	from left	0.27	-0.44	0.27	-0.44
G	from left	0.27	-0.41	0.27	-0.41
H	from left	0.18	-0.16	0.18	-0.16
D	from left	0.50	0.00	0.50	0.00
E	from left	0.00	-0.31	0.00	-0.31
I	from the right	0.00	-0.25	0.00	-0.25
J	from the right	0.00	-0.48	0.00	-0.48
D	from the right	0.50	0.00	0.50	0.00
E	from the right	0.00	-0.31	0.00	-0.31

Combinations

LC Combinations

No.	Name		Sit	KLED
1	1.35*g	ULS[1]	p/t[2]	1[3]
2	1.35*g+1.50*FmCl	ULS[1]	p/t[2]	4[4]
5	1.35*g+1.50*(wrLee-)+(wULee)	ULS[1]	p/t[2]	6[5]
6	1.35*g+1.50*s	ULS[1]	p/t[2]	4[4]
7	1.35*g+1.50*s+0.90*(wlLuv+)+(wULuv)	ULS[1]	p/t[2]	6[5]
16	1.35*g+1.50*(s+Se)	ULS[1]	p/t[2]	4[4]
19	1.35*g+1.50*(s+Se)+0.90*(wrLee-)+(wULee)	ULS[1]	p/t[2]	6[5]
21	1.00*g	SLS[6]	char[7]	1[3]
22	1.00*g+1.00*(wlLuv+)+(wULuv)	SLS[6]	char[7]	6[5]
23	1.00*g+1.00*(wrLee-)+(wULee)	SLS[6]	char[7]	6[5]
24	1.00*g+1.00*s	SLS[6]	char[7]	4[4]
26	1.00*g+0.50*s+1.00*(wlLuv+)+(wULuv)	SLS[6]	char[7]	6[5]
27	1.00*g+1.00*s+0.60*(wrLee-)+(wULee)	SLS[6]	char[7]	6[5]
32	1.00*g+1.00*Se+0.60*(wrLee-)+(wULee)	SLS[6]	char[7]	6[5]
33	1.00*g+0.50*Se+1.00*(wrLee-)+(wULee)	SLS[6]	char[7]	6[5]
34	1.00*g+1.00*(s+Se)	SLS[6]	char[7]	4[4]
37	1.00*g+1.00*(s+Se)+0.60*(wrLee-)+(wULee)	SLS[6]	char[7]	6[5]

The assignment of the short case names can be found in the table of load cases.

1 : ULS=Structural failure
2 : p/t=persistent/transient (Persistent/Transient Situation)
3 : Load duration class:1=permanent
4 : Load duration class:4=short-term
5 : Load duration class:6=short/instant
6 : SLS=Serviceability
7 : char=characteristic (Characteristic Situation)

Results

Rafter left 14.0/16.0 e = 90.0 cm

ULS acc.to DIN EN 1995:2013, based on EN 1995:2014, Consequence class 2

Checks in Persistent/Transient Situation

Combi	Sit	Check	$N_{x,d}$ [kN]	$M_{y,d}$ [kNm]	$V_{z,d}$ [kN]	$\sigma_{n,d}$ [N/mm²]	$\sigma_{m,y,d}$ [N/mm²]	τ_d [N/mm²]	η	s_{ky} [m]	s_{kz} [m]	s_b [m]
2	p/t [1]	Stress (Span)	1.2	-2.09	-2.9	0.05	-3.50		**0.22**			
2	p/t [1]	Stress (Column)	1.2	-2.42	-3.1	0.06	-4.05		**0.25**			
2	p/t [1]	Stability	-0.5	-2.42	0.0	-0.02	-4.05		**0.25**	2.80	1.73	1.73
16	p/t [1]	Shear	-1.1	-2.03	3.8			0.25	**0.18**			

The composition of the load case combinations can be found in the table of load case combinations.

1 : p/t=persistent/transient (Persistent/Transient Situation)

SLS checks acc.to DIN EN 1995:2013, based on EN 1995:2014, Consequence class 2

Combi	Check		Beam	x [m]	$w_{G,inst}$ [cm]	$w_{G,fin}$ [cm]	$w_{Q,inst,char}$ [cm]	$w_{Q,inst,qprm}$ [cm]	$w_{Q,fin}$ [cm]	w_{tot} [cm]		w_{lim} [cm]	L/..	η
37	w_{inst} [1]	local	2	0.43	0.0		-0.01			|-0.01|	<	0.6	300	**0.02**
37	w_{inst} [1]	global	1 [2]	0.00	0.1		0.1			0.2	<	0.7	150	**0.23**
21	w_{net} [3]	local	1 [2]	0.65	(-0.01)	-0.01			(0.0)	0.0	|-0.01|	<	0.9	125	**0.01**
21	w_{net} [3]	global	1 [2]	0.00	(0.1)	0.1			(0.0)	0.0	0.1	<	0.9	125	**0.14**
37	w_{fin} [4]	local	2	0.43	(0.0)	0.0	(-0.01)			-0.01	|-0.02|	<	0.7	250	**0.02**
37	w_{fin} [4]	global	1 [2]	0.00	(0.1)	0.1	(0.1)			0.1	0.2	<	0.9	125	**0.25**

Values in () are only informative.
The rod length is always used as the reference length for the total deflection verification.
For the local deflection verification, the member length is always used as the reference length.
Member lengths of members that are connected to each other without support are added up.

1 : $w_{inst} = w_{G,inst} + w_{Q,inst,char}$
2 : Cantilever
3 : $w_{net} = w_{G,fin} + w_{Q,fin,qprm} - w_c$
4 : $w_{fin} = w_{G,fin} + w_{Q,fin,char}$

Support

Support Reactions per Act

Act		Support 1 max [kN/m]	min [kN/m]	Support 2 max [kN/m]	min [kN/m]
99	vertical	3.12[1]	3.12[1]	0.80[1]	0.80[1]
	horizontal	-0.16[1]	-0.16[1]	0.16[1]	0.16[1]
8	vertical	1.71[2]	0.56[3]	0.56[3]	-0.60[2]
	horizontal	0.00[3]	-0.24[2]	0.24[2]	0.00[3]
9	vertical	0.41[4]	-1.41[5]	0.22[8]	-0.39[9]
	horizontal	0.57[5]	-0.16[4]	0.16[9]	-0.09[8]
10	vertical	2.88[6]	0.32[7]	0.66[10]	-0.11[7]
	horizontal	-0.04[7]	-0.18[6]	0.18[6]	0.04[7]

all values are characteristic values

1 : Load Cases:g
10 : Load Cases:s
2 : Load Cases:FmCl
3 : Load Cases:FmL1
4 : Load Cases:(wrLee+)+(wULee)
5 : Load Cases:(wlLuv-)+(wULuv)
6 : Load Cases:(s+Se)
7 : Load Cases:Se
8 : Load Cases:(wlLuv+)+(wULuv)
9 : Load Cases:(wrLee-)+(wULee)

Connection Forces at Ridge

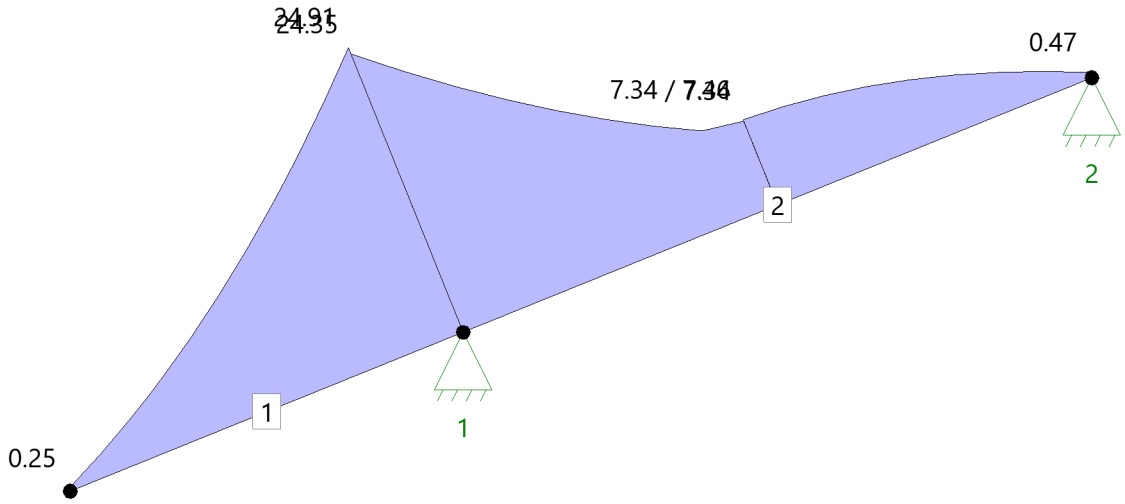
Max/min Connection forces at Ridge

left LcComb	N_d [kN]	V_d [kN]	$F_{Z,d}$ [kN]	$F_{X,d}$ [kN]
LfK.7	1.1	-1.8	-2.0	0.3

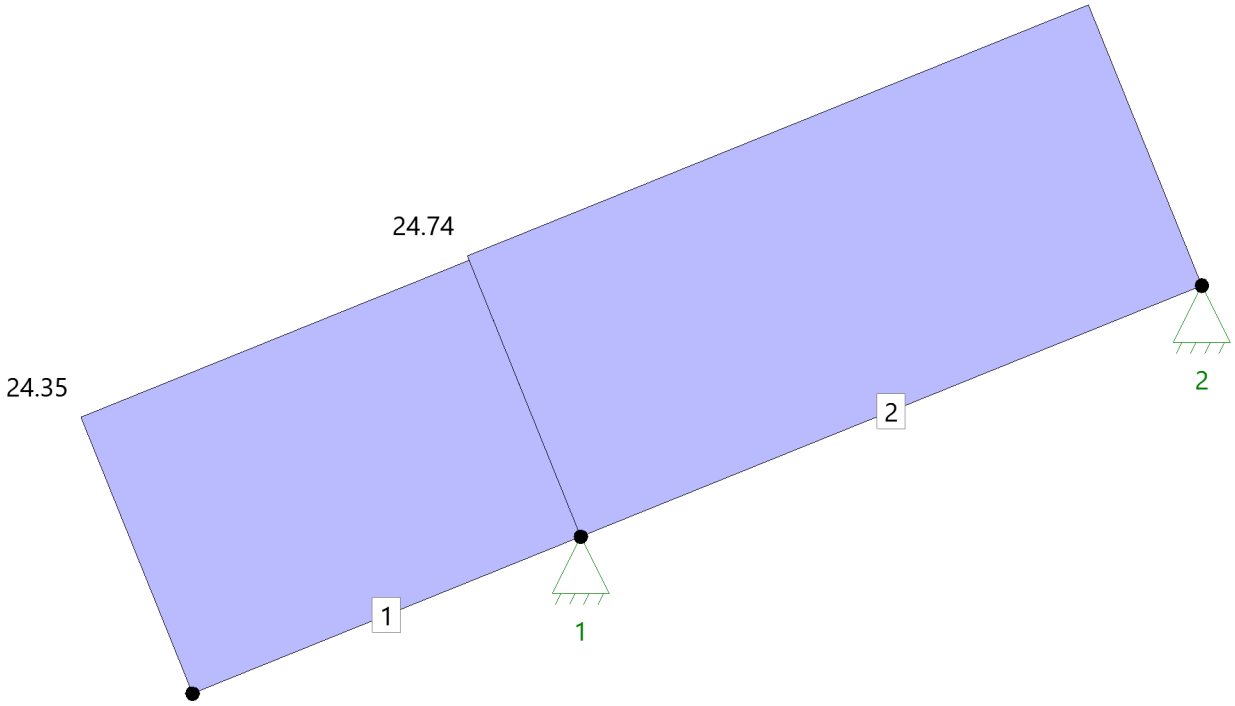
all values are design values

GraphicsLevel of Capacity

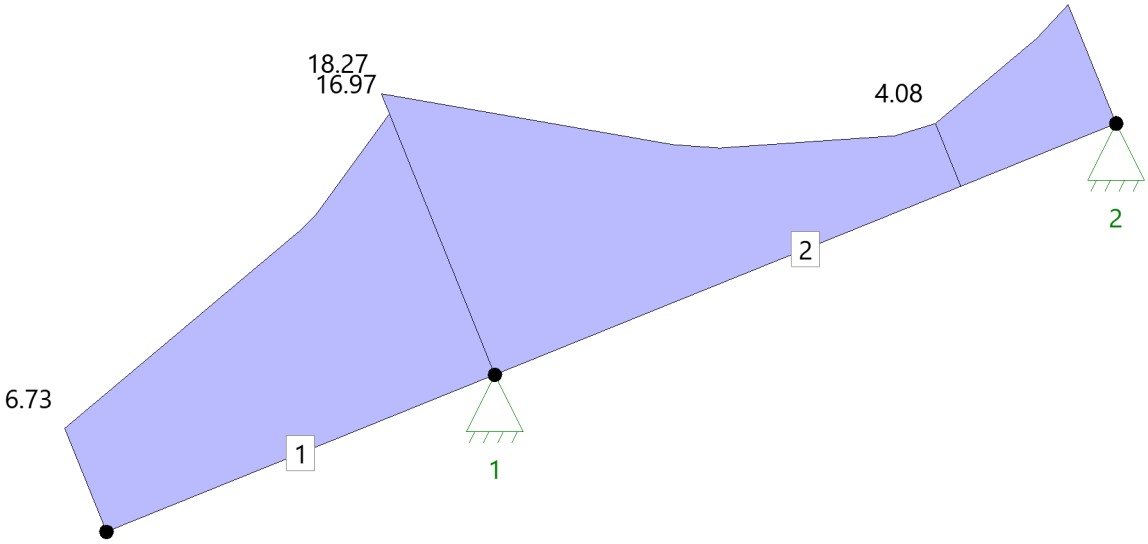
Envelope Eta Stress



Envelope Eta Stability



Envelope Eta Shear



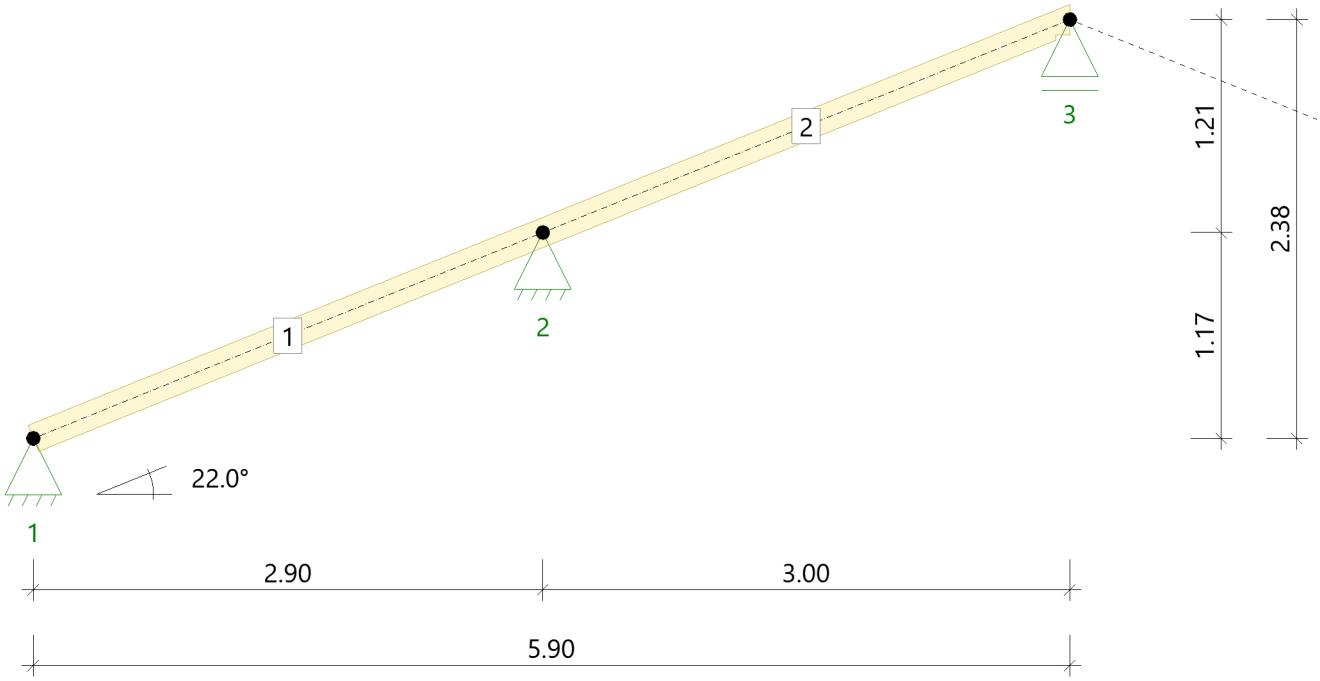
Item: poz 102 - dimenzioniranje špirovcev ob osi 2A

Design of Roofs (x64) Dach+ 01/23C (FRILO R-2023-1/P04)

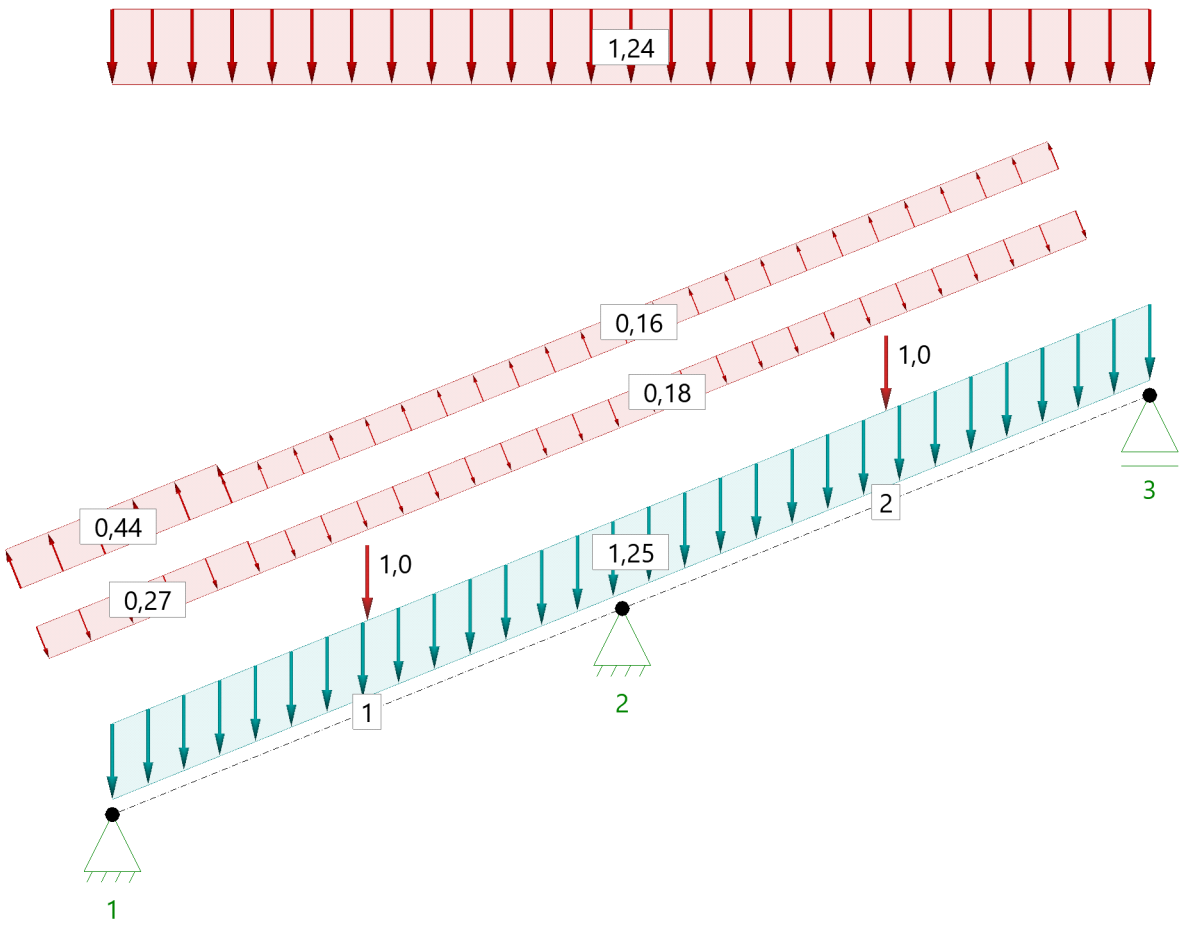
System

Softwood C24, Service class roofed, open; AH<85%; BMC<20%, CC 2

System Graphics



Load graphics



Material

Material values Timber

Softwood C24 acc.to EN 338:2016 $E_{0,mean}$ = 11000 N/mm² ρ_k = 350 kg/m³
G_{mean} = 690 N/mm²

Material Characteristics

$f_{m,k}$ $f_{v,k}$ N/mm²	$f_{t,0,k}$ $f_{c,0,k}$ N/mm²	$f_{t,90,k}$ $f_{c,90,k}$ N/mm²	$E_{0,mean}$ $E_{0,05}$ N/mm²	$E_{90,mean}$ $E_{90,05}$ N/mm²	G_{mean} G_{05} N/mm²	ρ_k ρ_m kg/m³	γ kN/m³
24.00 4.00	14.50 21.00	0.40 2.50	11000 7400	370 247	690 460	350 420	6.00

Geometry

Rafter Spacing e = 90.0 cm Total ridge height h = 6.00 m
Length of Roof b,Roof = 20.00 m Building length b, Wall = 20.00 m

Rafter

Span	Length BAR [m]	Length RAR [m]	Page	Slope [°]	Cross-section [cm]
1 2	2.90 3.00	3.13 3.24	left left	22.0 22.0	14.0/16.0 14.0/16.0

Support

No.	Member	Cx [kN/m]	Cz [kN/m]	Depth of birds mouth t [cm]
1	Rafter left	Rigid	Rigid	0.0
2	Rafter left	Rigid	Rigid	0.0
3	Rafter left	0.00	Rigid	3.0

Tilt-/ Buckling-Lengths

Rafter left

Buckling in plane: from eingenvalue limited to...0.90*L
Buckling out of plane: kept continuously
Tilting: kept continuously

Calculation Rules

The rod length is always used as the reference length for the total deflection verification.
Caution! If bars are connected without a support, their bar lengths are added up.
Wind loads from undergrate blast are assumed to be dependent.
Load cases with loads whose expected deformations are opposite are not included.
Combinations of load cases whose expected deformations are opposite are not used.
The stiffness should be reduced as a result of creep from permanent and quasi-permanent load components.
kmod wird bei Wind als Mittelwert von kurz und sehr kurz angesetzt.

Loads

Load Pre-settings

Rafter

Roofing g1 = 1.25 kN/m² Act = 99
Construction g2 = 0.00 kN/m²
Loft conversion g3 = 0.00 kN/m²
Loft Conversion bottom gb = 0.00 kN/m²
With dead weight of members, γ = 6.00 kN/m³
Roofload Cat.H Q = 1.0 kN Act = 8

Boundary conditions

Total ridge height h = 6.00 m
Length of Roof b,Roof = 20.00 m
Building length b, Wall = 20.00 m
Building width on the right br = 0.00 m

Snow / wind loads for the calculation - User-defined value

DIN EN 1991-1-3:2019, DIN EN 1991-1-4:2010
Terrain elevation Altitude = 0.00 m
Ground Snow Load sk = 1.55 kN/m²
Wind pressure qp,0(h) = 0.62 kN/m²
Wind pressure qp,90(h) = 0.62 kN/m²

Auxiliary values

Wind reference length (Roof) e_0 = 12.00 m e_{90} = 5.90 m
Wind reference length (Wall) e_0 = 12.00 m e_{90} = 5.90 m
h/d = 1.017 h/b = 0.300 d/b = 0.295

Classification of Actions

No.	Name	γ_{sup}	γ_{inf}	ψ_0	ψ_1	ψ_2	KLED
99	Permanent loads	1.35	1.00	1.00	1.00	1.00	permanent
8	Cat. H: roofs	1.50	0.00	0.00	0.00	0.00	short-term
9	Wind loads	1.50	0.00	0.60	0.20	0.00	short-term
10	Snow loads H < 1000 m	1.50	0.00	0.50	0.20	0.00	short-term

Load values

Snow load

Name	Page	μ	Load value	(according to standard)	
Roof load	left	0.80	1.24	1.24	kN/m²
Non-blown portion (for blown load cases)	left	0.80	1.24	1.24	kN/m²
Blown portion (for blown load cases)	left	0.80	0.62	0.62	kN/m²

Wind loads

Name	Page	Pressure [kN/m²]	Suction [kN/m²]	Pressure (Standard) [kN/m²]	Suction (Standard) [kN/m²]
F	from left	0.27	-0.44	0.27	-0.44
G	from left	0.27	-0.41	0.27	-0.41
H	from left	0.18	-0.16	0.18	-0.16
D	from left	0.50	0.00	0.50	0.00
E	from left	0.00	-0.31	0.00	-0.31
I	from the right	0.00	-0.25	0.00	-0.25
J	from the right	0.00	-0.48	0.00	-0.48
D	from the right	0.50	0.00	0.50	0.00
E	from the right	0.00	-0.31	0.00	-0.31

Combinations

LC Combinations

No.	Name		Sit	KLED
1	1.35*g+1.50*s	ULS[1]	p/t[2]	4[3]
2	1.35*g+1.50*s+0.90*(wlLuv+)	ULS[1]	p/t[2]	6[4]
4	1.35*g+1.50*s+0.90*(wlLuv-)	ULS[1]	p/t[2]	6[4]
6	1.35*g+1.50*s+0.90*(wrLee-)	ULS[1]	p/t[2]	6[4]
13	1.35*g+1.50*(wrLee-)	ULS[1]	p/t[2]	6[4]
14	1.00*g+1.00*s	SLS[5]	char[6]	4[3]
15	1.00*g+1.00*s+0.60*(wlLuv+)	SLS[5]	char[6]	6[4]

The assignment of the short case names can be found in the table of load cases.

1 : ULS=Structural failure
2 : p/t=persistent/transient (Persistent/Transient Situation)
3 : Load duration class:4=short-term
4 : Load duration class:6=short/instant
5 : SLS=Serviceability
6 : char=characteristic (Characteristic Situation)

Results

Rafter left 14.0/16.0 e = 90.0 cm

ULS acc.to DIN EN 1995:2013, based on EN 1995:2014, Consequence class 2

Checks in Persistent/Transient Situation

Combi	Sit	Check	$N_{x,d}$ [kN]	$M_{y,d}$ [kNm]	$V_{z,d}$ [kN]	$\sigma_{n,d}$ [N/mm²]	$\sigma_{m,y,d}$ [N/mm²]	τ_d [N/mm²]	η	s_{ky} [m]	s_{kz} [m]	s_b [m]
1	p/t [1]	Stress (Span)	1.7	-2.72	-5.3	0.07	-4.55		**0.28**			
1	p/t [1]	Stress (Column)	1.9	-3.82	-5.9	0.09	-6.39		**0.39**			
1	p/t [1]	Stability	-2.4	-3.82	0.0	-0.11	-6.39		**0.39**	1.32	0.00	0.00
1	p/t [1]	Shear	-2.4	-3.82	6.1			0.41	**0.29**			

The composition of the load case combinations can be found in the table of load case combinations.

1 : p/t=persistent/transient (Persistent/Transient Situation)

SLS checks acc.to DIN EN 1995:2013, based on EN 1995:2014, Consequence class 2

Combi	Check		Beam	x [m]	$w_{G,inst}$ [cm]	$w_{G,fin}$ [cm]	$w_{Q,inst,char}$ [cm]	$w_{Q,inst,qprm}$ [cm]	$w_{Q,fin}$ [cm]	w_{tot} [cm]		w_{lim} [cm]	L/..	η
15	w_{inst} [1]	local	2	1.82	0.1		0.1			0.3	<	1.1	300	**0.24**
15	w_{inst} [1]	global	2	1.82	0.1		0.1			0.3	<	1.1	300	**0.24**
14	w_{net} [2]	local	2	1.82	(0.1)	0.2		(0.0)	0.0	0.2	<	1.3	250	**0.19**
14	w_{net} [2]	global	2	1.82	(0.1)	0.2		(0.0)	0.0	0.2	<	1.3	250	**0.19**
15	w_{fin} [3]	local	2	1.82	(0.1)	0.2	(0.1)		0.1	0.4	<	1.3	250	**0.28**
15	w_{fin} [3]	global	2	1.82	(0.1)	0.2	(0.1)		0.1	0.4	<	1.3	250	**0.28**

Values in () are only informative.
The rod length is always used as the reference length for the total deflection verification.
For the local deflection verification, the member length is always used as the reference length.
Member lengths of members that are connected to each other without support are added up.

1 : $w_{inst} = w_{G,inst} + w_{Q,inst,char}$
2 : $w_{net} = w_{G,fin} + w_{Q,fin,qprm} - w_c$
3 : $w_{fin} = w_{G,fin} + w_{Q,fin,char}$

Support

Support Reactions per Act

Act		Support 1 max [kN/m]	min [kN/m]	Support 2 max [kN/m]	min [kN/m]	Support 3 max [kN/m]	min [kN/m]
99	vertical	1.70[1]	1.70[1]	5.49[1]	5.49[1]	1.72[1]	1.72[1]
	horizontal	0.20[1]	0.20[1]	-0.20[1]	-0.20[1]	0.00[1]	0.00[1]
8	vertical	0.47[2]	-0.09[3]	0.76[3]	0.74[2]	0.45[3]	-0.10[2]
	horizontal	0.04[3]	0.04[2]	-0.04[2]	-0.04[3]	0.00[2]	0.00[2]
9	vertical	0.27[4]	-0.42[5]	0.67[4]	-0.92[7]	0.24[4]	-0.57[7]
	horizontal	0.17[5]	-0.11[4]	0.60[7]	-0.37[4]	0.00[4]	0.00[4]
10	vertical	1.40[6]	1.40[6]	4.51[6]	4.51[6]	1.41[6]	1.41[6]
	horizontal	0.16[6]	0.16[6]	-0.16[6]	-0.16[6]	0.00[6]	0.00[6]

all values are characteristic values

1 : Load Cases:g
2 : Load Cases:FmL1
3 : Load Cases:FmL2
4 : Load Cases:(wlLuv+)
5 : Load Cases:(wlLuv-)
6 : Load Cases:s
7 : Load Cases:(wrLee-)

Connection Forces at Ridge

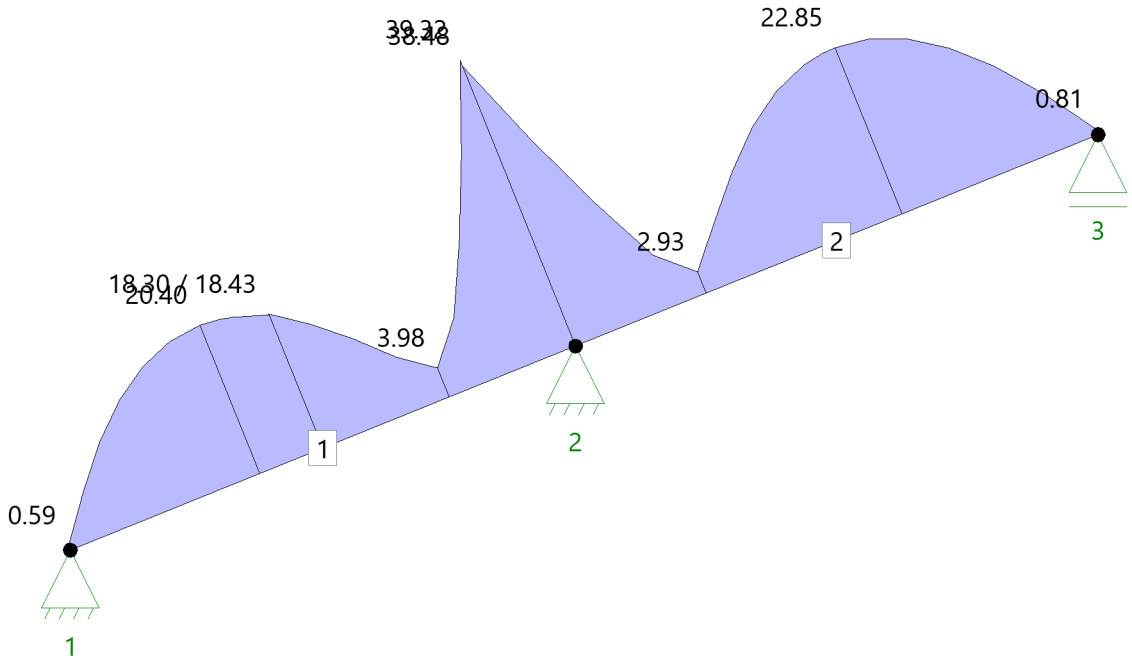
Max/min Connection forces at Ridge

left LcComb	N_d [kN]	V_d [kN]	$F_{Z,d}$ [kN]	$F_{X,d}$ [kN]
LfK.2	1.6	-3.9	-4.2	0.0

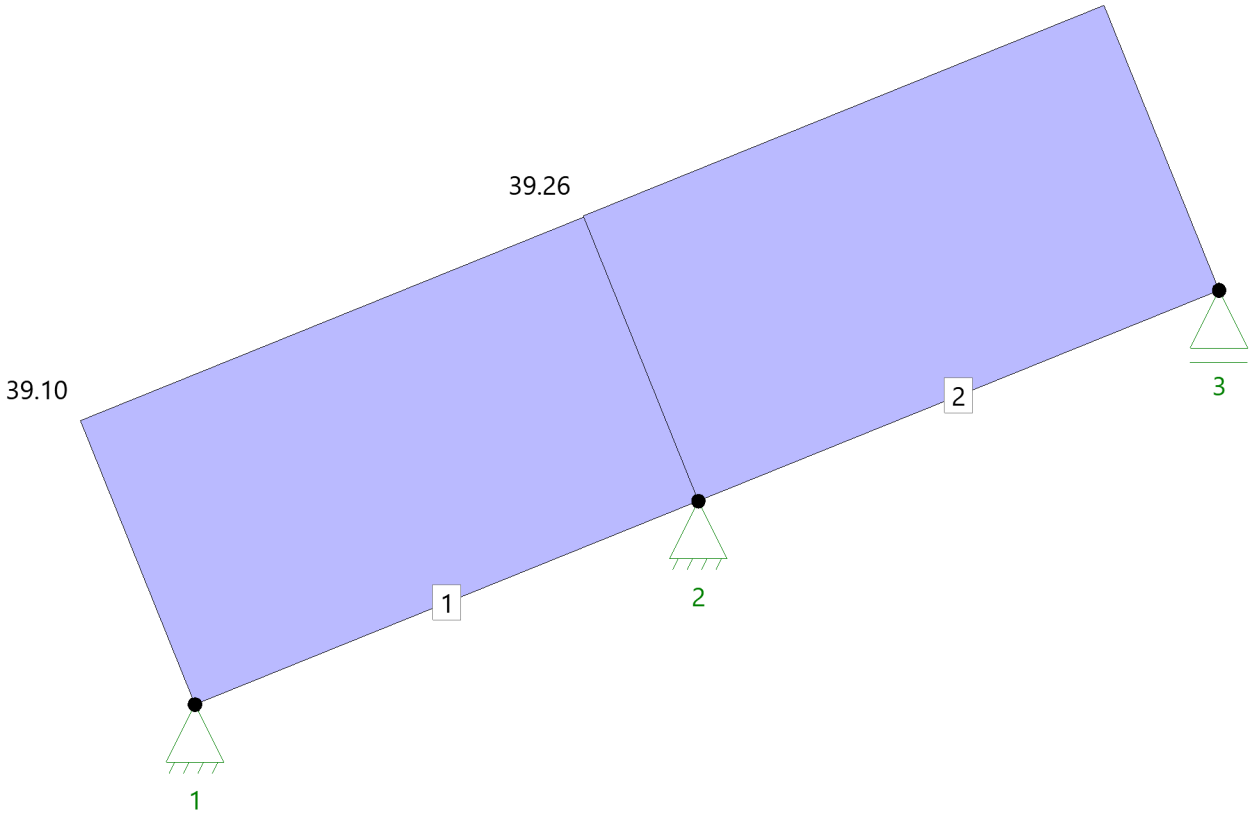
all values are design values

GraphicsLevel of Capacity

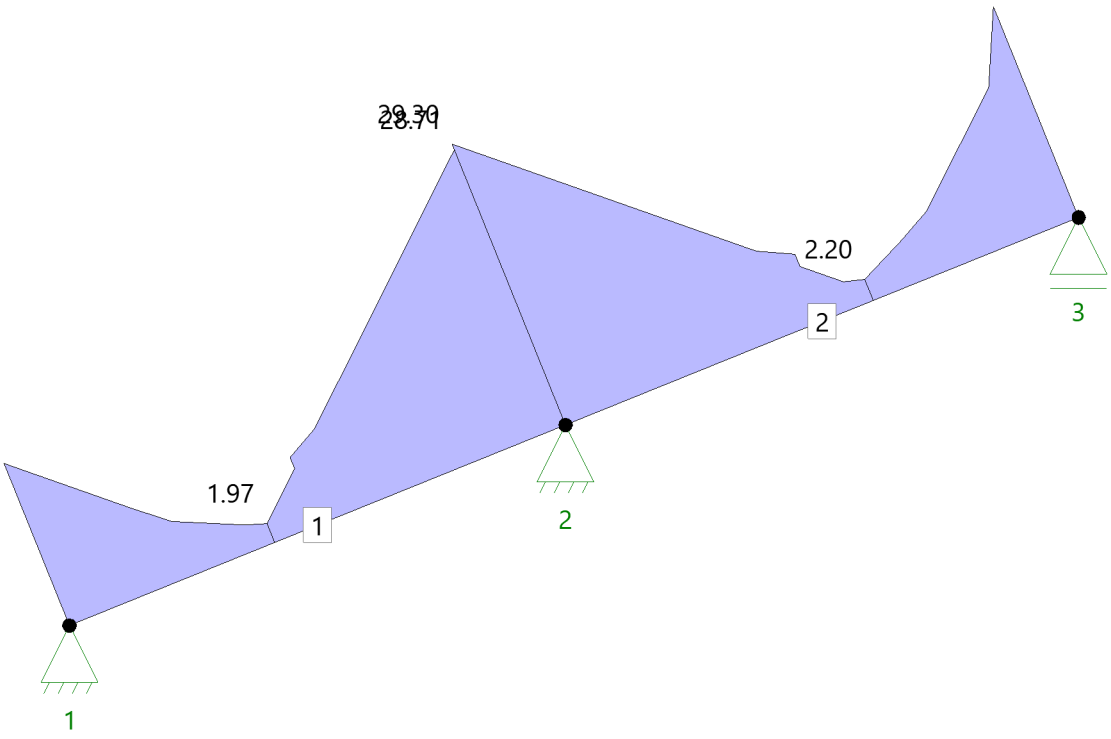
Envelope Eta Stress



Envelope Eta Stability



Envelope Eta Shear



Vhodni podatki - Konstrukcija

Shema nivojev

Naziv	z [m]	h [m]
nivo slemena	12.50	0.90
streha dvigala	11.60	0.80
nivo kapa	10.80	3.90
plošča nad nadstropjem	6.90	3.30

Naziv	z [m]	h [m]
plošča nad pritličjem	3.60	3.60
pasovni temelji	0.00	1.00
temelj dvigala	-1.00	

Tabele materialov

No	Naziv materiala	E[kN/m2]	μ	γ[kN/m3]	αt[1/C]	Em[kN/m2]	μm
1	C 25/30	3.100e+7	0.20	25.00	1.000e-5	3.100e+7	0.20
2	C 20/25	3.000e+7	0.20	25.00	1.000e-5	3.000e+7	0.20
3	Lamelirani-GL24h	1.160e+7	0.20	5.00	1.000e-5	1.160e+7	0.20
4	Masiven les-C24	1.100e+7	0.20	4.20	1.000e-5	1.100e+7	0.20

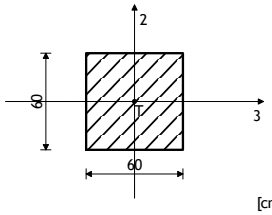
Seti plošč

No	d[m]	e[m]	Material	Tip preračuna	Ortotropija	E2[kN/m2]	G[kN/m2]	α
<1>	0.250	0.125	1	Tanka plošča	Izotropna			
<2>	0.200	0.100	1	Tanka plošča	Izotropna			
<3>	0.150	0.075	1	Tanka plošča	Izotropna			
<4>	0.200	0.100	2	Tanka plošča	Izotropna			

Seti gred

Set: 1 Prerez: b/d=60/60, Fiktivna ekscentričnost

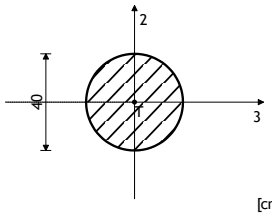
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	3.600e-1	3.000e-1	3.000e-1	1.825e-2	1.080e-2	1.080e-2



[cm]

Set: 2 Prerez: D=40, Fiktivna ekscentričnost

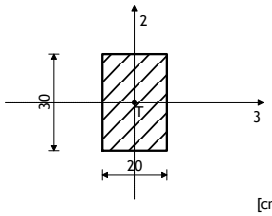
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.257e-1	1.131e-1	1.131e-1	2.513e-3	1.257e-3	1.257e-3



[cm]

Set: 3 Prerez: b/d=20/30, Fiktivna ekscentričnost

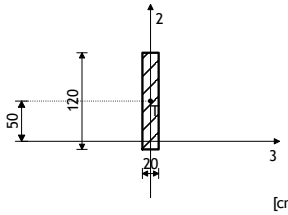
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	6.000e-2	5.000e-2	5.000e-2	4.695e-4	2.000e-4	4.500e-4



[cm]

Set: 4 Prerez: b/d=20/120, Fiktivna ekscentričnost

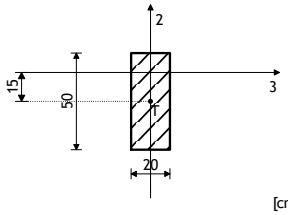
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	2.400e-1	2.000e-1	2.000e-1	2.864e-3	8.000e-4	2.880e-2



[cm]

Set: 5 Prerez: b/d=20/50, Fiktivna ekscentričnost

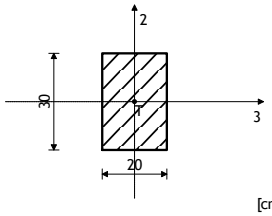
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.000e-1	8.333e-2	8.333e-2	9.981e-4	3.333e-4	2.083e-3



[cm]

Set: 6 Prerez: b/d=20/30, Fiktivna ekscentričnost

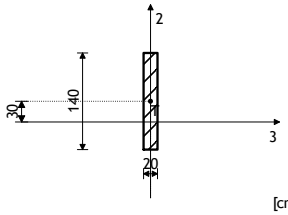
Mat.	A1	A2	A3	I1	I2	I3
2 - C 20/25	6.000e-2	5.000e-2	5.000e-2	4.695e-4	2.000e-4	4.500e-4



[cm]

Set: 7 Prerez: b/d=20/140, Fiktivna ekscentričnost

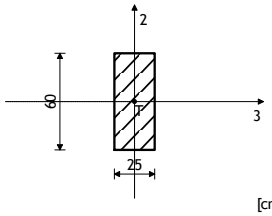
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	2.800e-1	2.333e-1	2.333e-1	3.397e-3	9.333e-4	4.573e-2



[cm]

Set: 8 Prerez: b/d=25/60, Fiktivna ekscentričnost

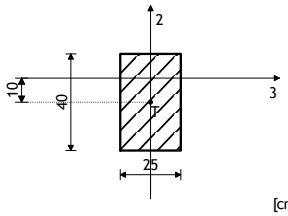
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.500e-1	1.250e-1	1.250e-1	2.307e-3	7.812e-4	4.500e-3



[cm]

Set: 9 Prerez: b/d=25/40, Fiktivna ekscentričnost

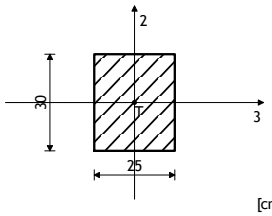
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.000e-1	8.333e-2	8.333e-2	1.273e-3	5.208e-4	1.333e-3



[cm]

Set: 10 Prerez: b/d=25/30, Fiktivna ekscentričnost

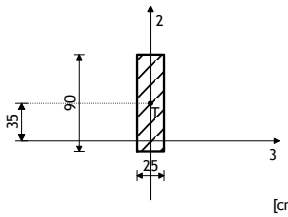
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	7.500e-2	6.250e-2	6.250e-2	7.752e-4	3.906e-4	5.625e-4



[cm]

Set: 11 Prerez: b/d=25/90, Fiktivna ekscentričnost

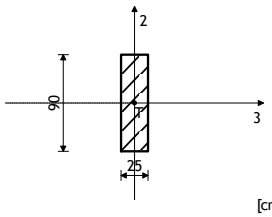
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	2.250e-1	1.875e-1	1.875e-1	3.868e-3	1.172e-3	1.519e-2



[cm]

Set: 12 Prerez: b/d=25/90, Fiktivna ekscentričnost

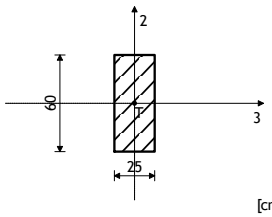
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	2.250e-1	1.875e-1	1.875e-1	3.868e-3	1.172e-3	1.519e-2



[cm]

Set: 13 Prerez: b/d=25/60, Fiktivna ekscentričnost

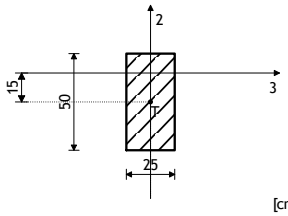
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.500e-1	1.250e-1	1.250e-1	2.307e-3	7.812e-4	4.500e-3



[cm]

Set: 14 Prerez: b/d=25/50, Fiktivna ekscentričnost

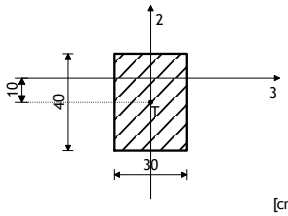
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.250e-1	1.042e-1	1.042e-1	1.788e-3	6.510e-4	2.604e-3



[cm]

Set: 15 Prerez: b/d=30/40, Fiktivna ekscentričnost

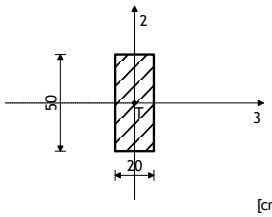
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.200e-1	1.000e-1	1.000e-1	1.944e-3	9.000e-4	1.600e-3



[cm]

Set: 16 Prerez: b/d=20/50, Fiktivna ekscentričnost

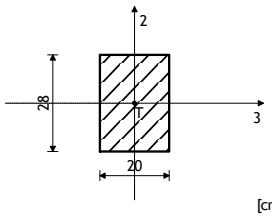
Mat.	A1	A2	A3	I1	I2	I3
3 - Lamelirani-GL24h	1.000e-1	8.333e-2	8.333e-2	9.981e-4	3.333e-4	2.083e-3



[cm]

Set: 17 Prerez: b/d=20/28, Fiktivna ekscentričnost

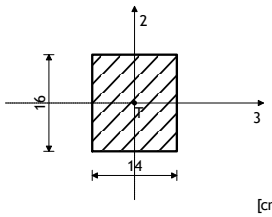
Mat.	A1	A2	A3	I1	I2	I3
4 - Masiven les-C24	5.600e-2	4.667e-2	4.667e-2	4.180e-4	1.867e-4	3.659e-4



[cm]

Set: 18 Prerez: b/d=14/16, Fiktivna ekscentričnost

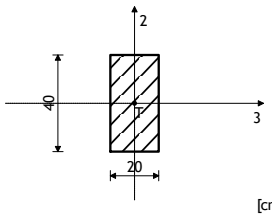
Mat.	A1	A2	A3	I1	I2	I3
4 - Masiven les-C24	2.240e-2	1.867e-2	1.867e-2	6.961e-5	3.659e-5	4.779e-5



[cm]

Set: 19 Prerez: b/d=20/40, Fiktivna ekscentričnost

Mat.	A1	A2	A3	I1	I2	I3
4 - Masiven les-C24	8.000e-2	6.667e-2	6.667e-2	7.324e-4	2.667e-4	1.067e-3



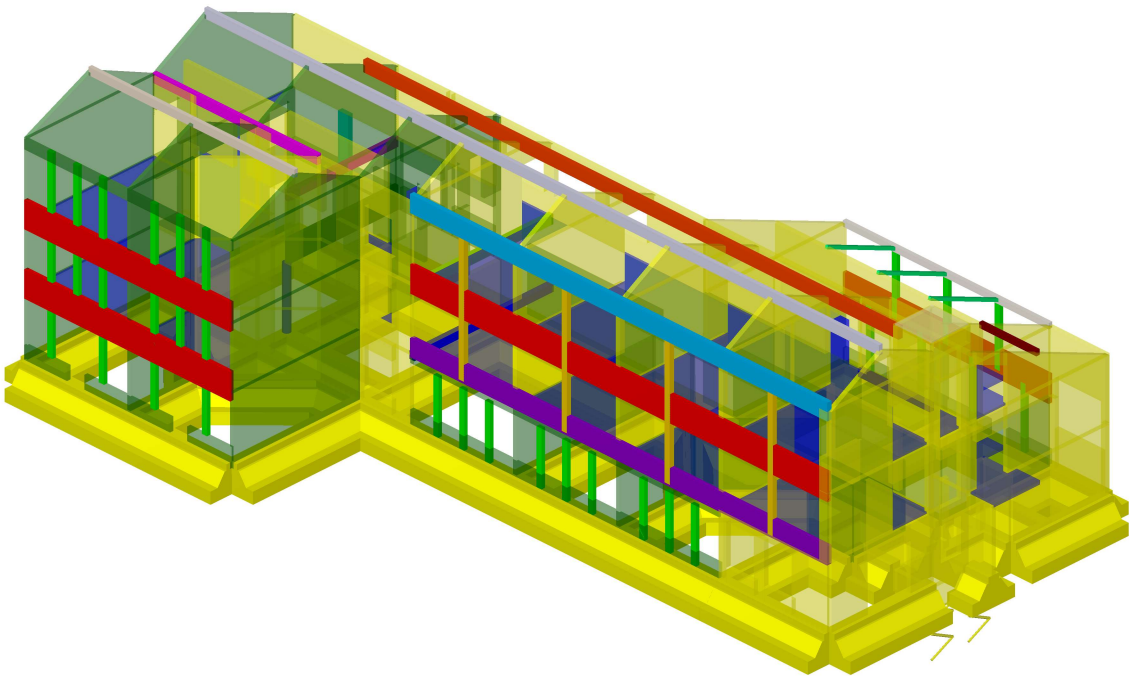
[cm]

Seti površinskih podpor

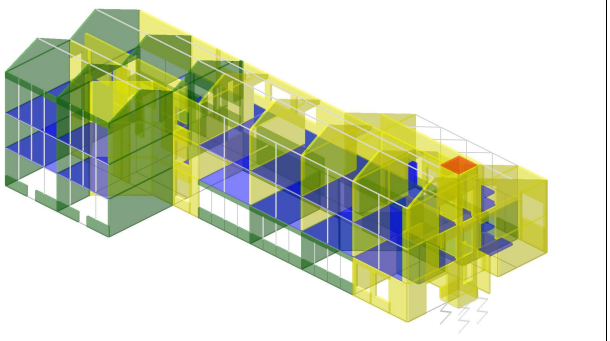
Set	K,R1	K,R2	K,R3
1	1.000e+4	1.000e+4	2.000e+4

Seti linijskih podpor

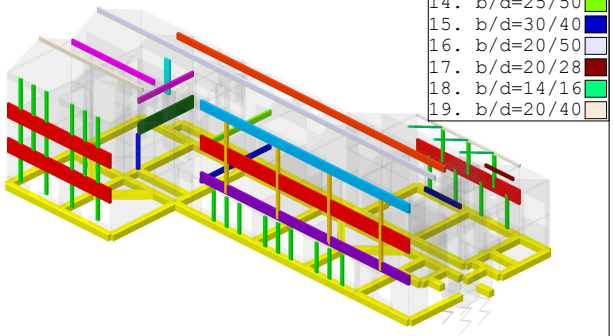
Set	K,R1	K,R2	K,R3	K,M1	Tla [m]
1	1.000e+4	2.000e+4	1.000e+4		0.600



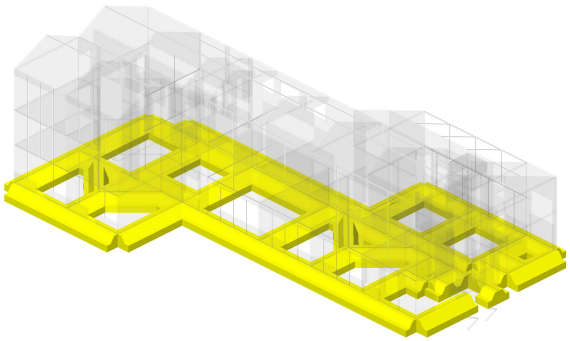
Izometrija



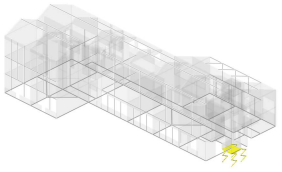
Seti numeričnih podatkov
Plošča / Zid (1-4)



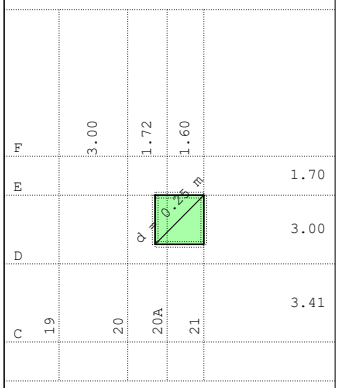
Seti numeričnih podatkov
Greda (1-19)



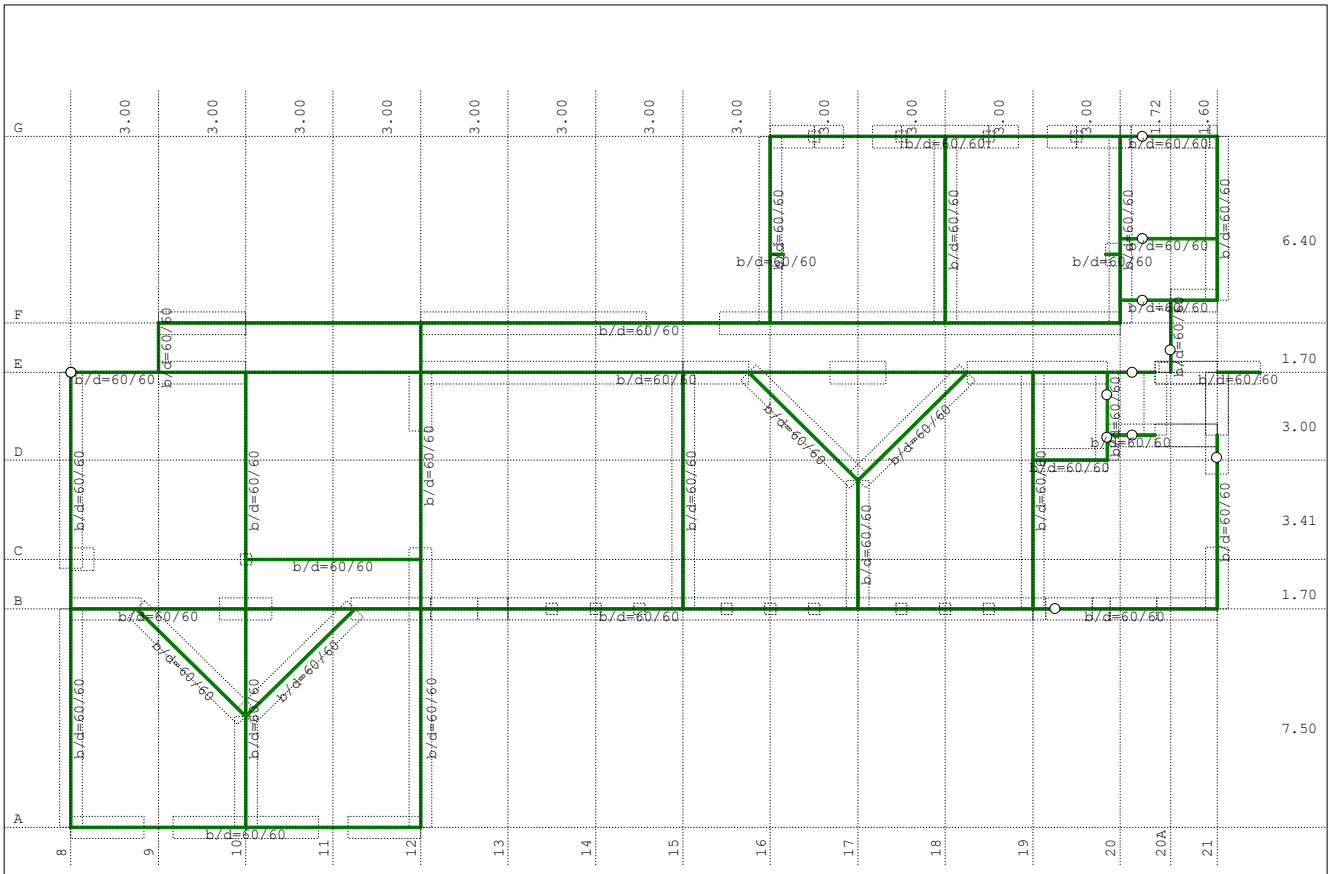
Seti numeričnih podatkov
Linijska podpora (1)



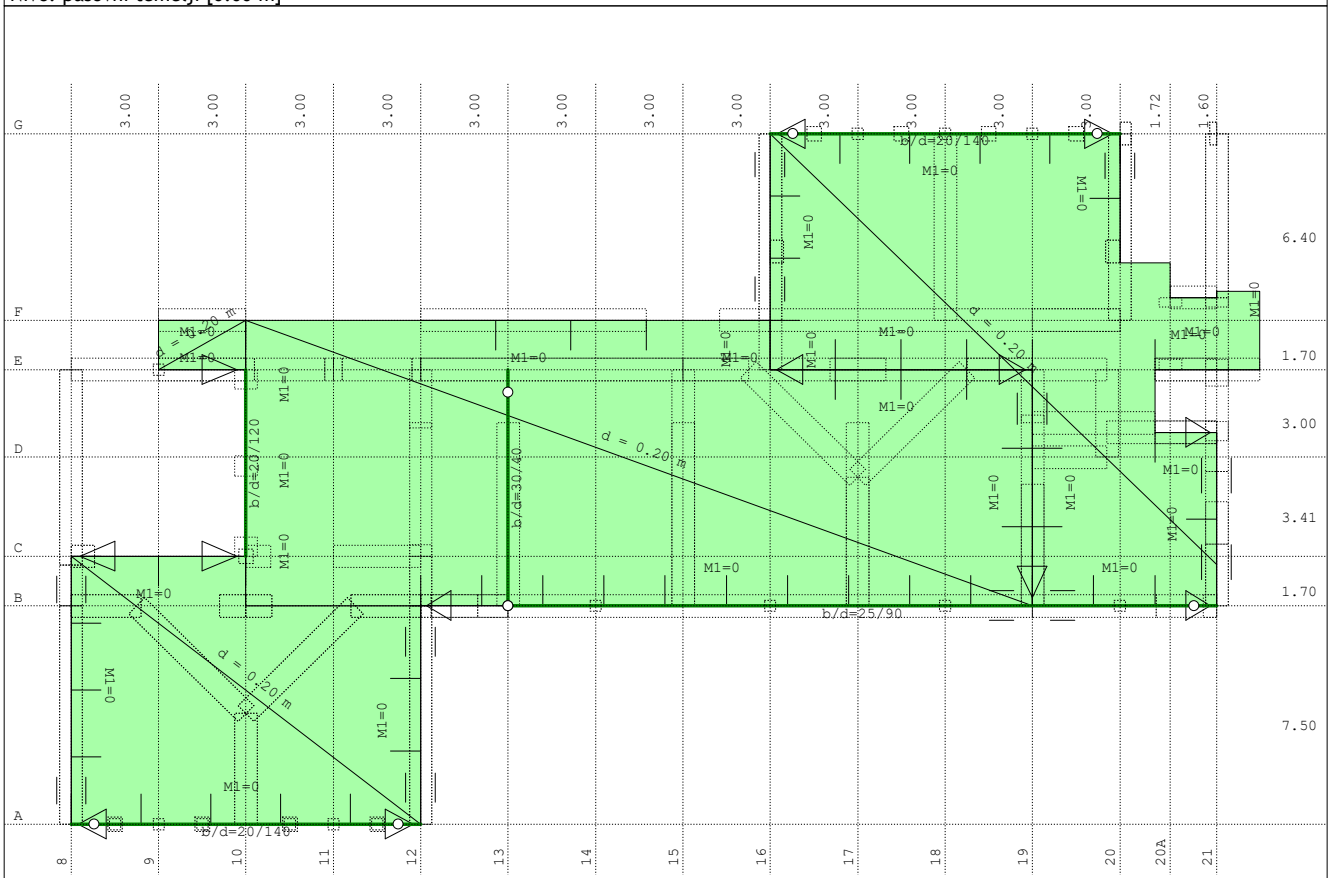
Seti numeričnih podatkov
Površinska podpora (1)



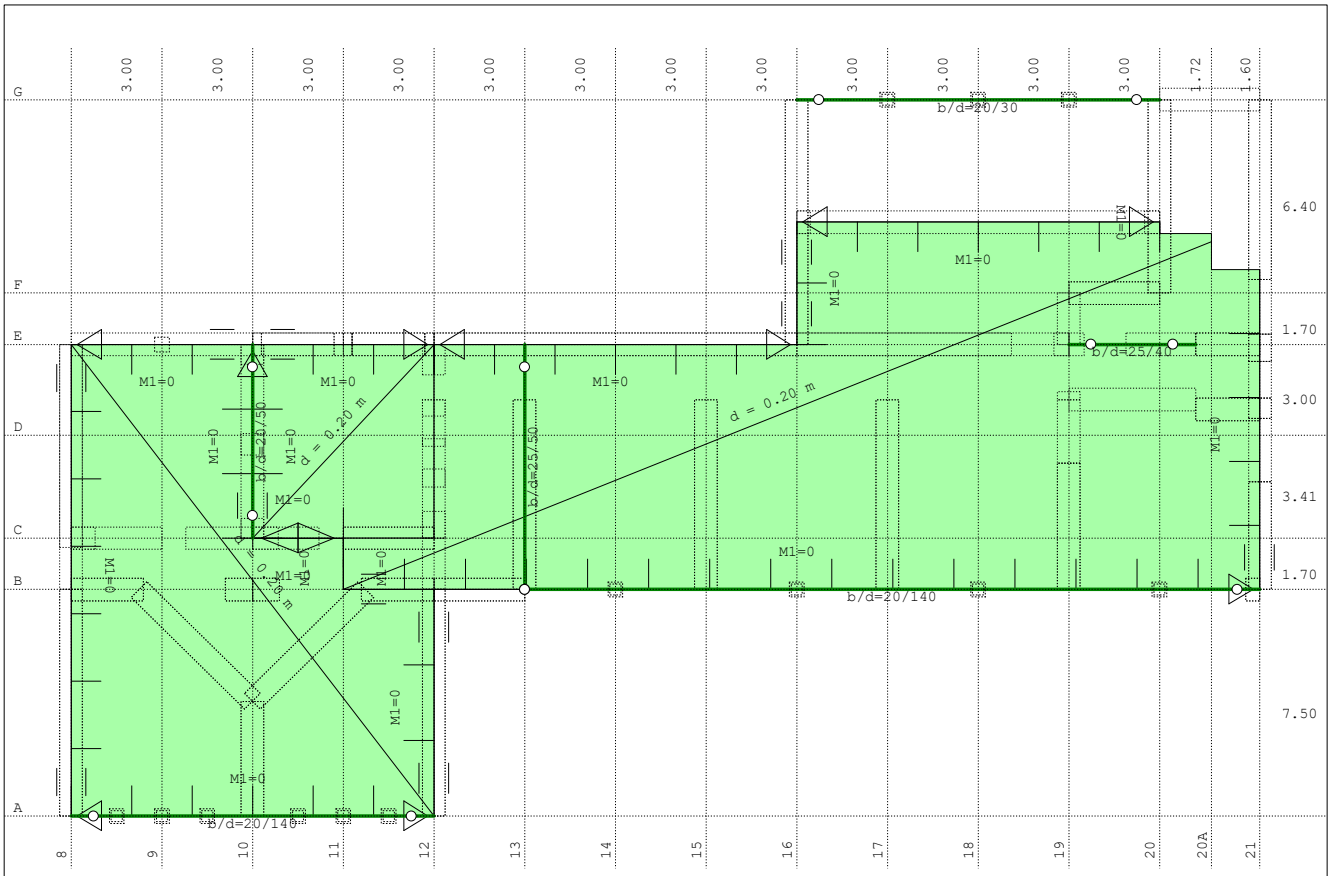
Nivo: temelj dvigala [-1.00 m]



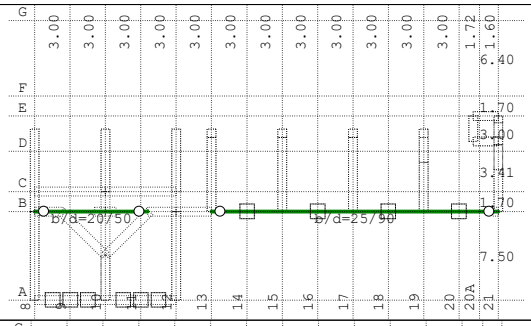
Nivo: pasovni temelji [0.00 m]



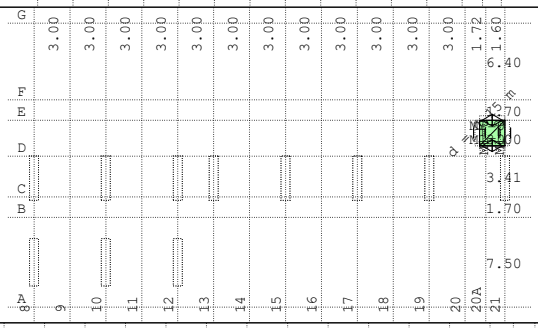
Nivo: plošča nad pritličjem [3.60 m]



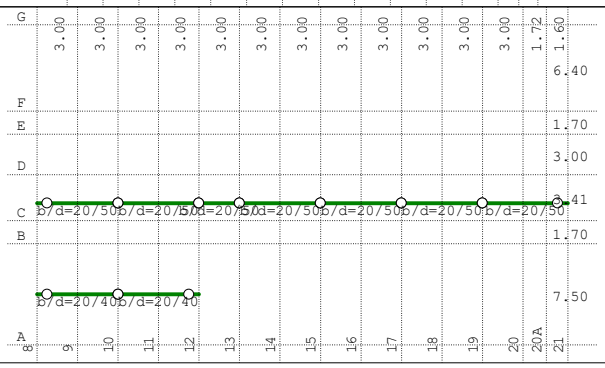
Nivo: plošča nad nadstropjem [6.90 m]



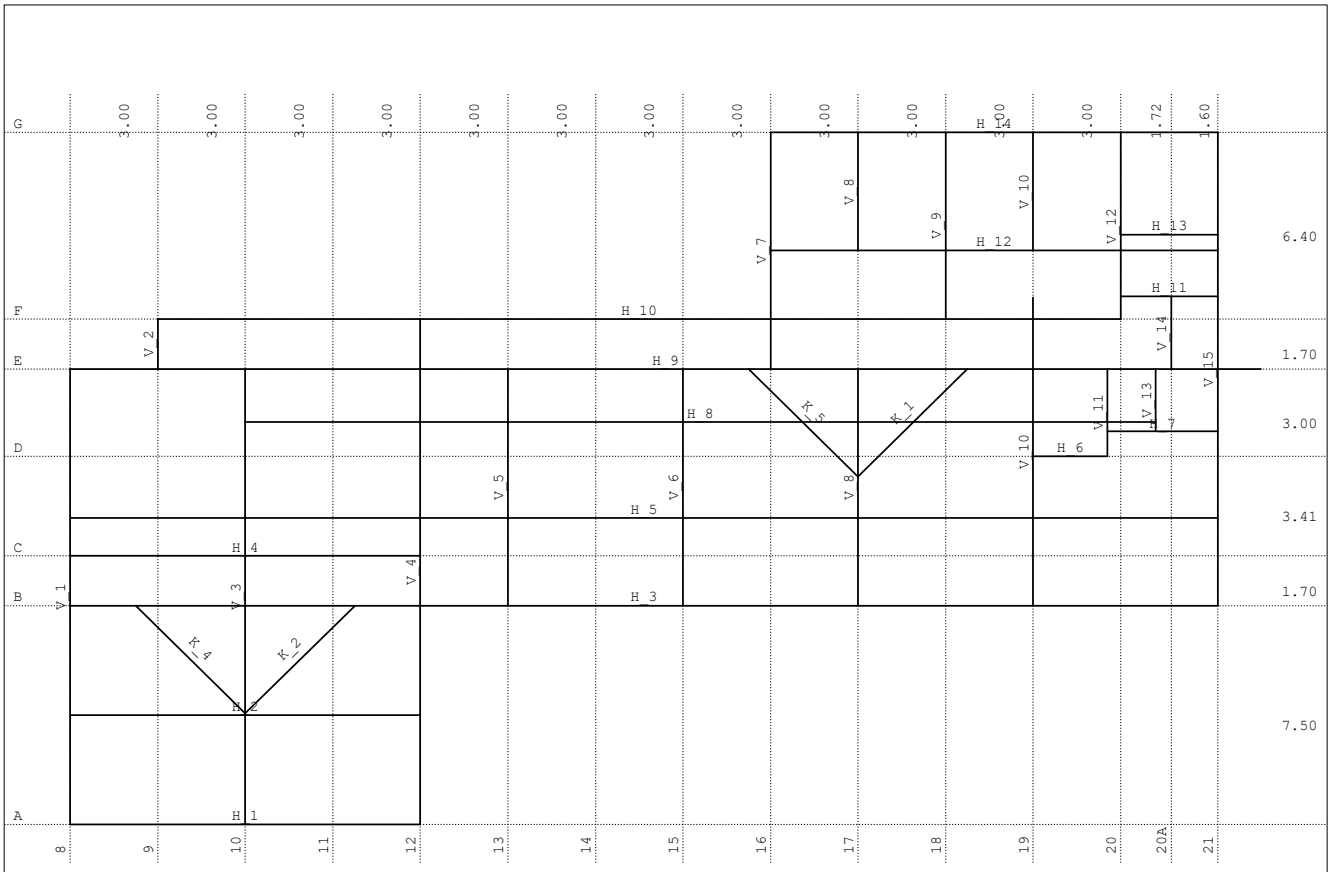
Nivo: nivo kapa [10.80 m]



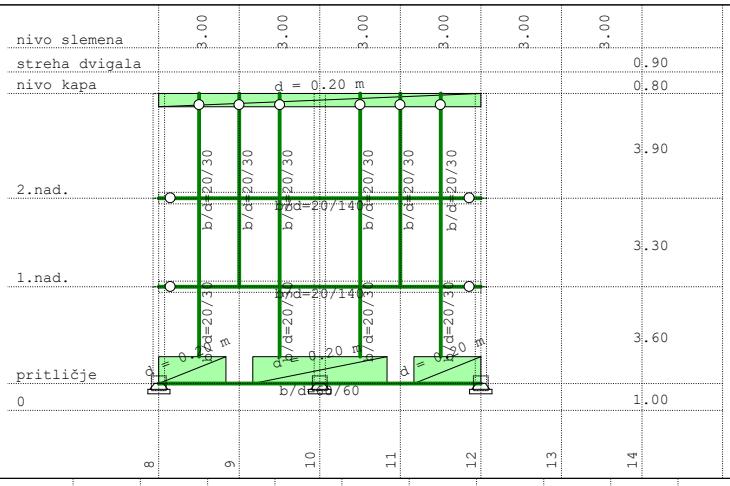
Nivo: streha dvigala [11.60 m]



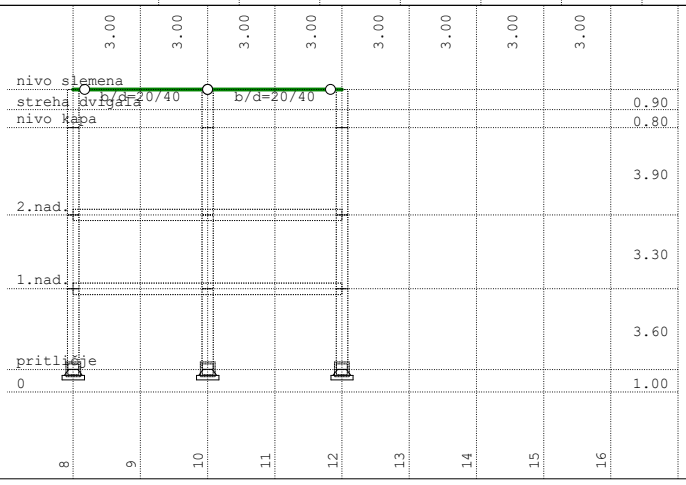
Nivo: nivo slemena [12.50 m]



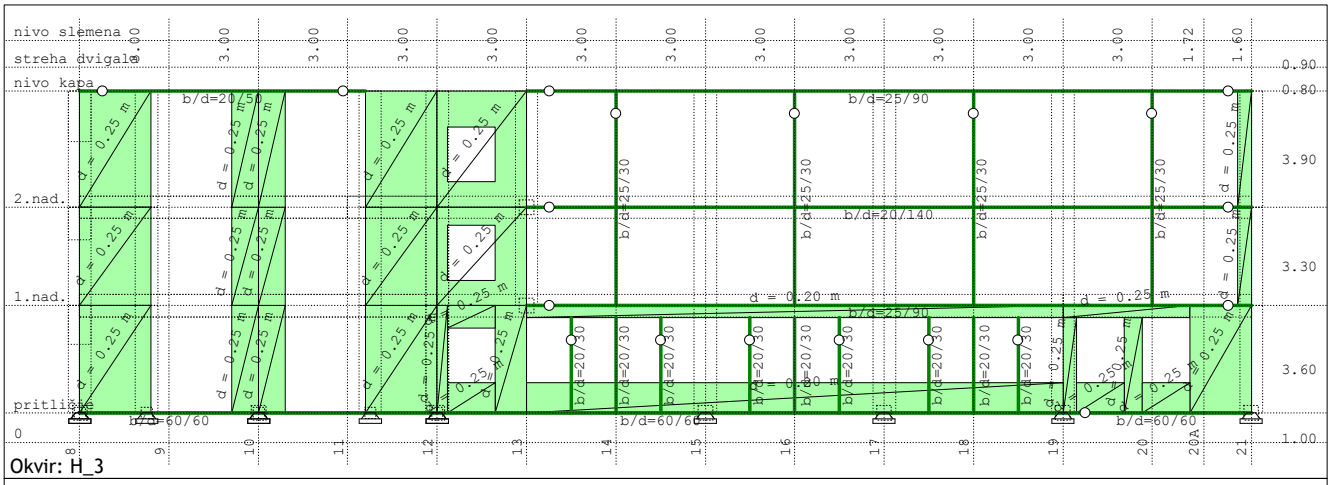
Dispozicija okvirjev



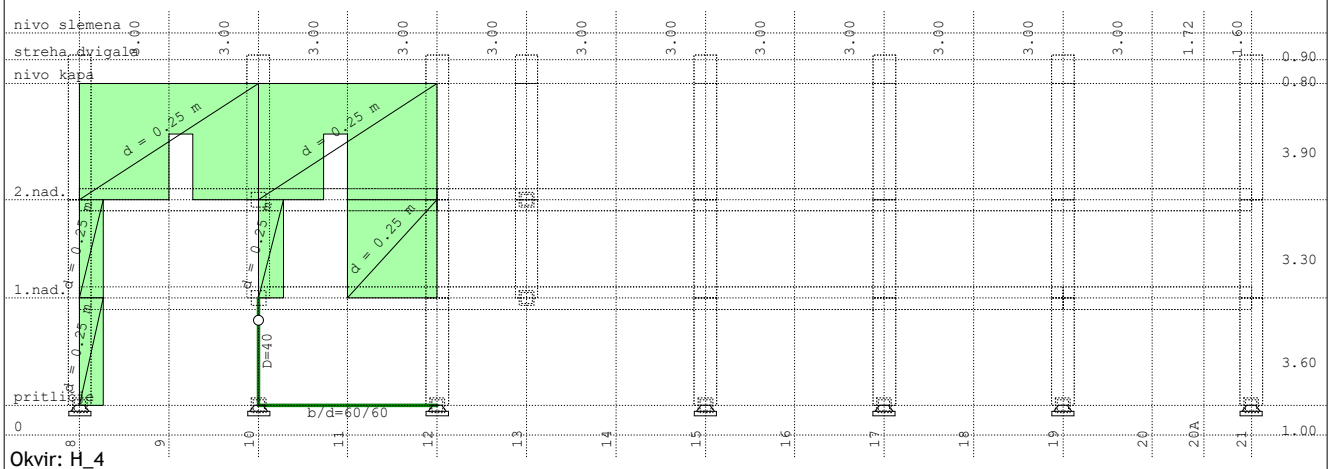
Okvir: H_1



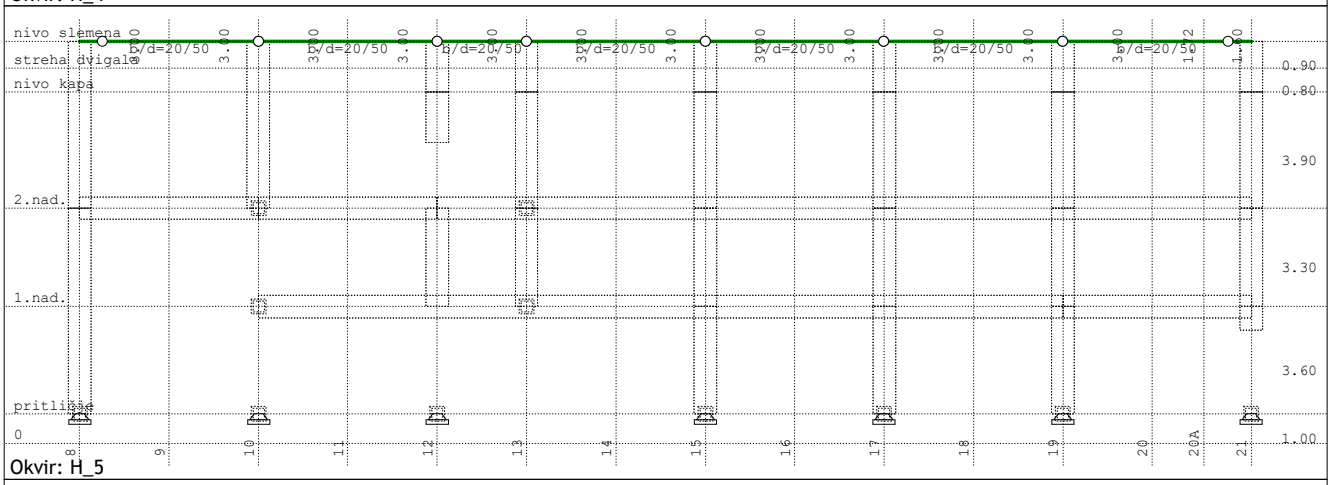
Okvir: H_2



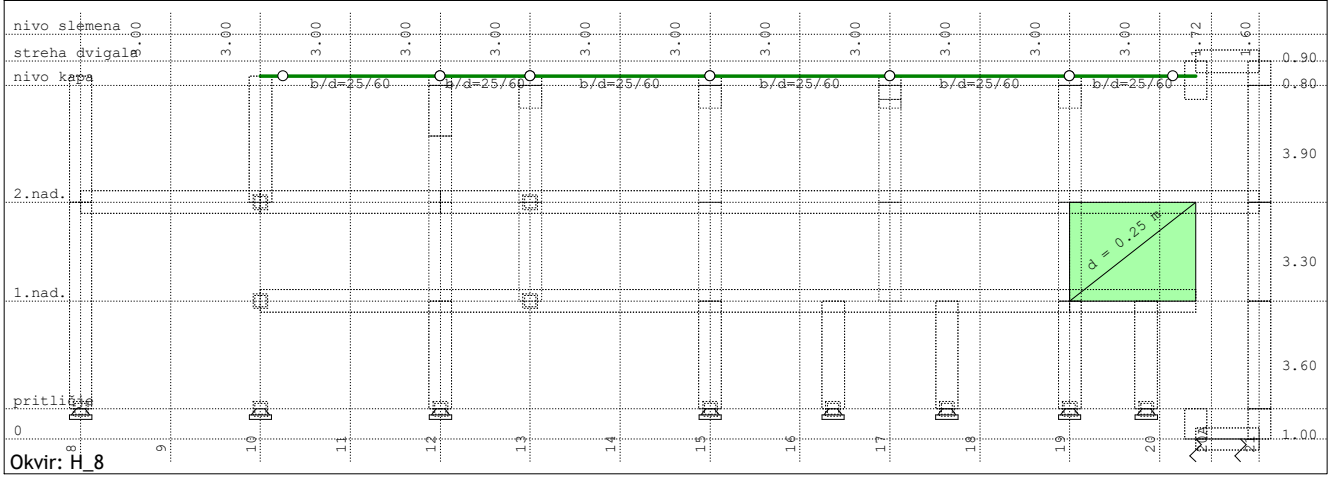
Okvir: H_3



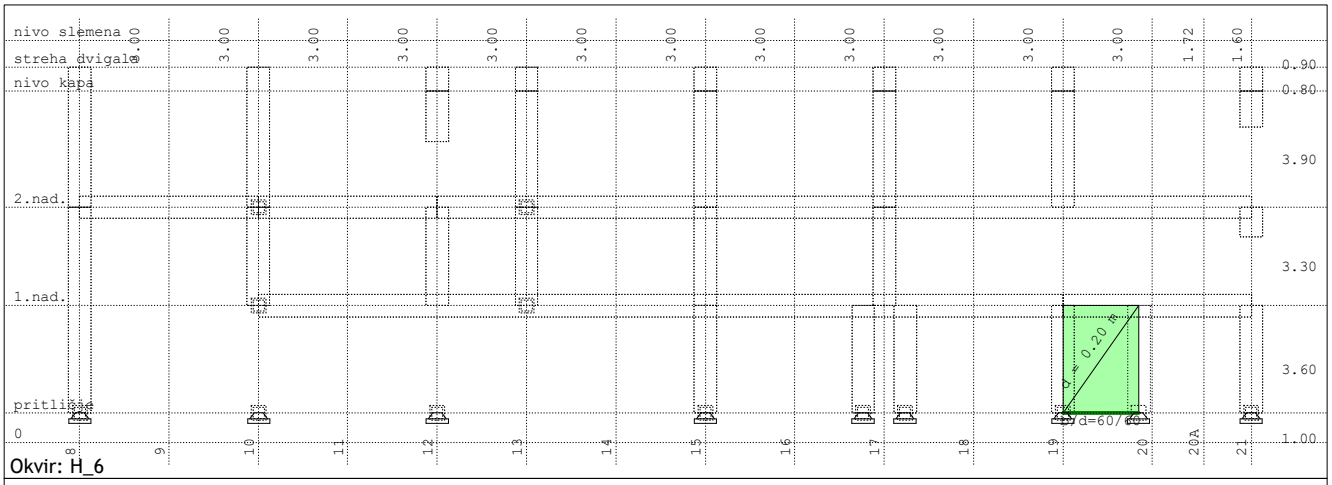
Okvir: H_4



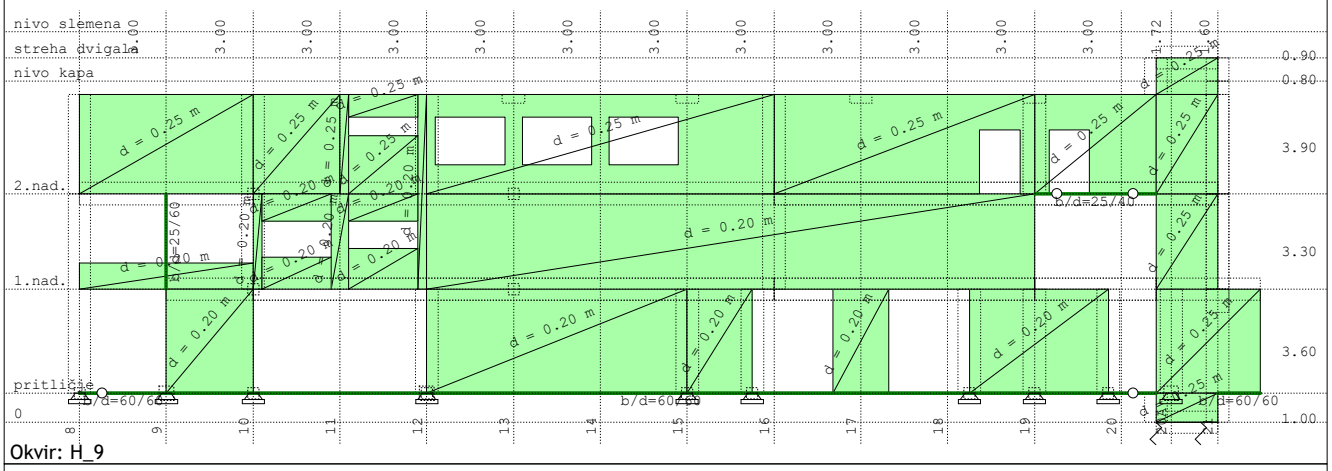
Okvir: H_5



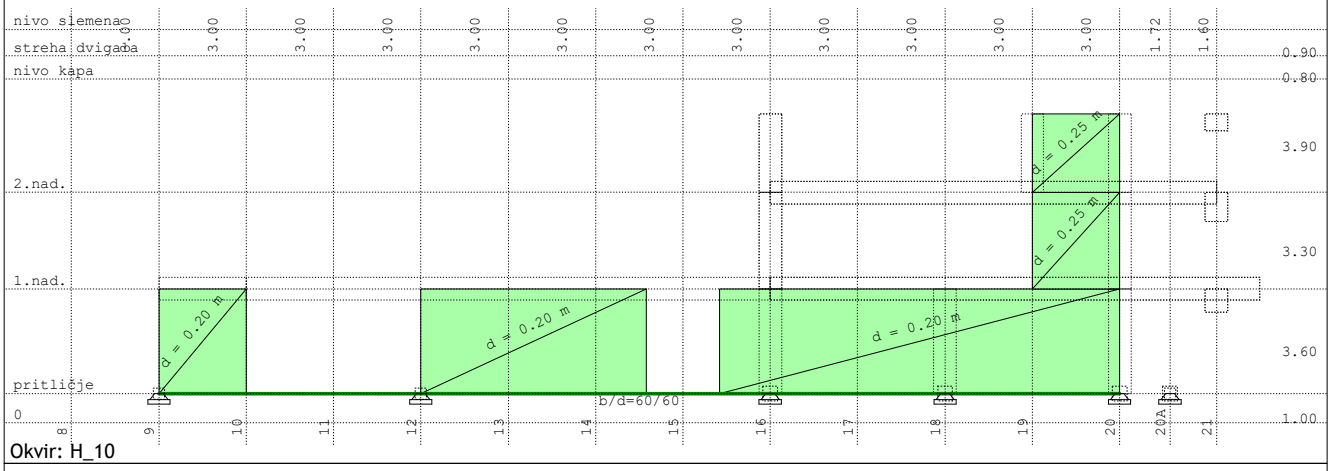
Okvir: H_8



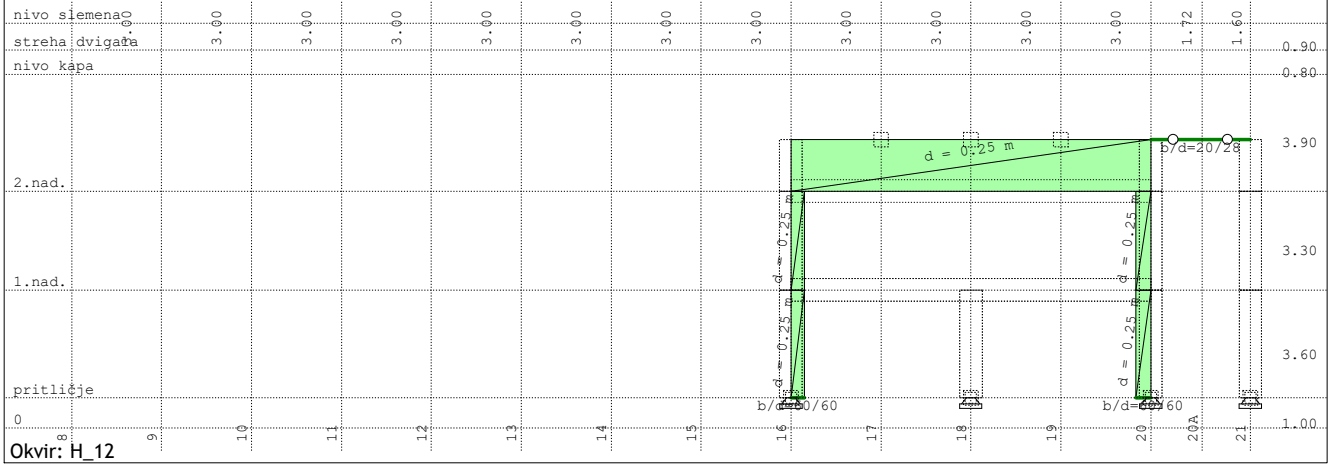
Okvir: H_6



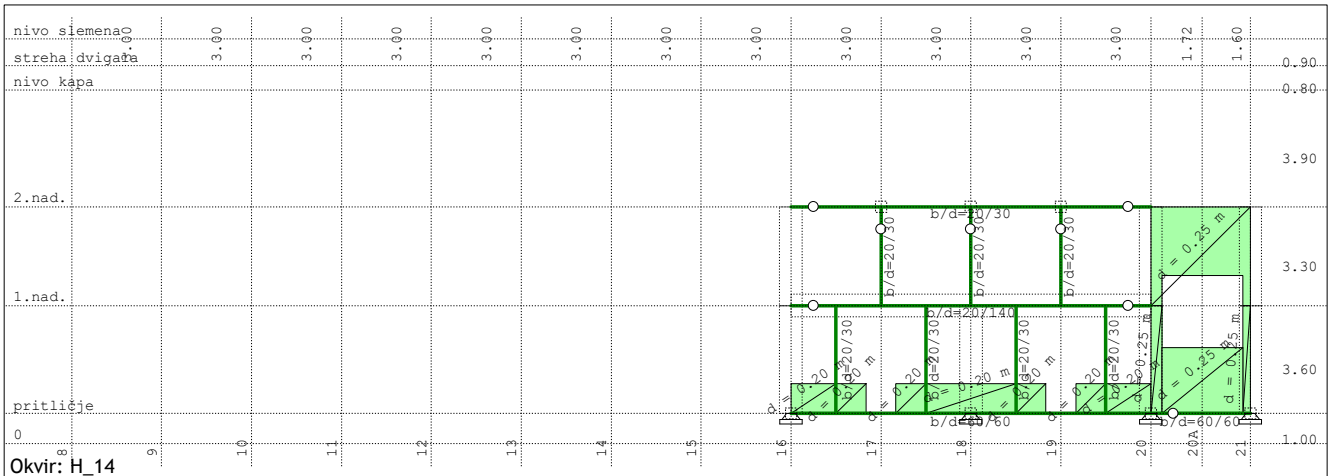
Okvir: H_9



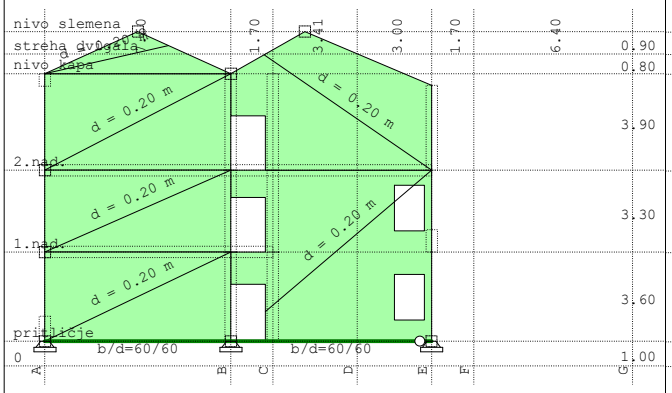
Okvir: H_10



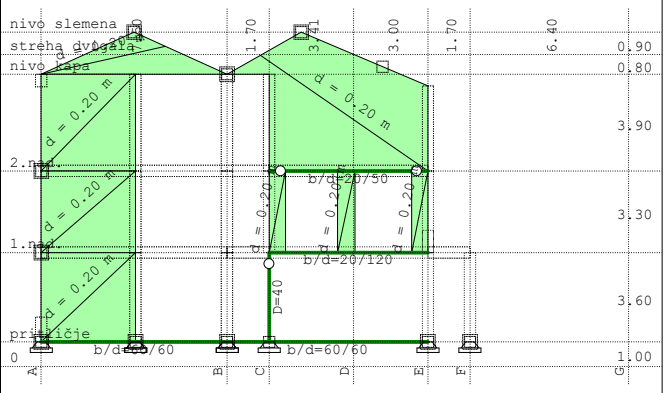
Okvir: H_12



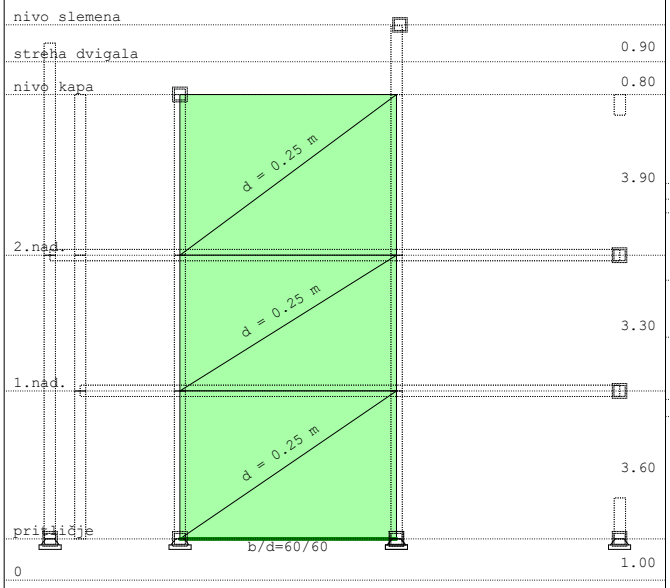
Okvir: H_14



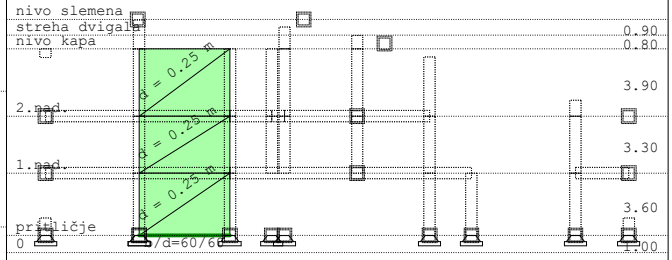
Okvir: V_1



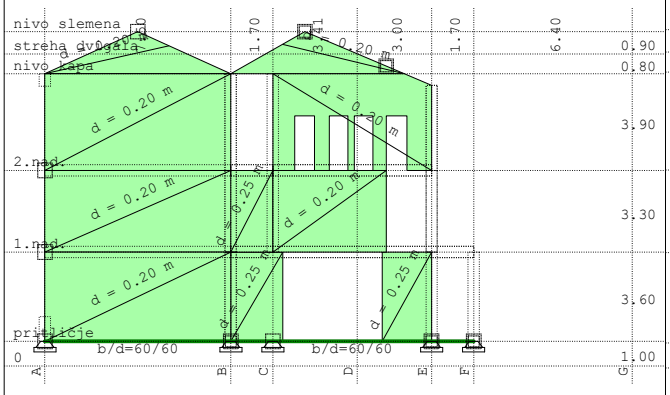
Okvir: V_3



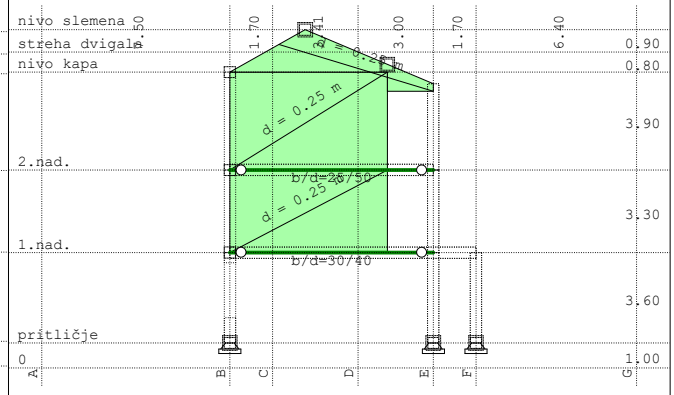
Okvir: K_4



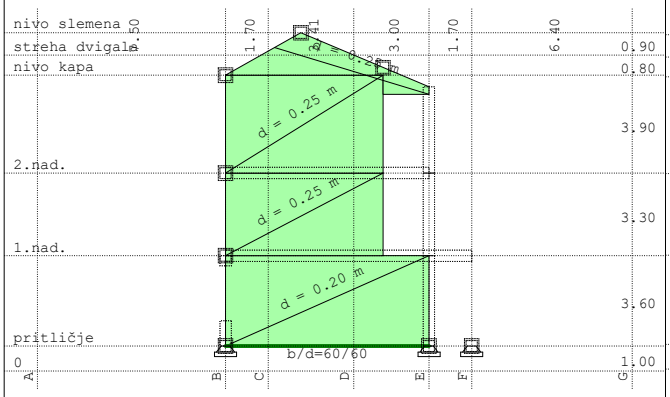
Okvir: K_2



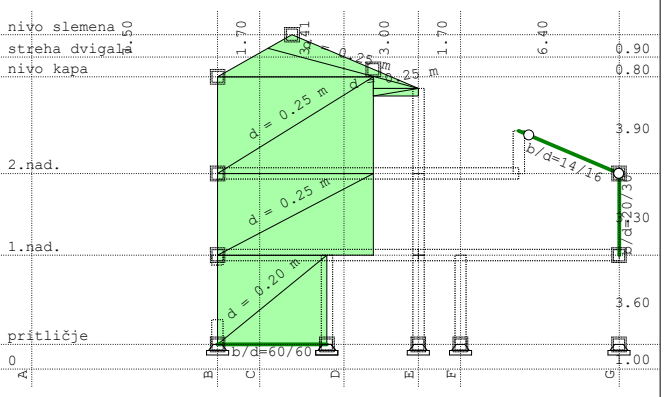
Okvir: V_4



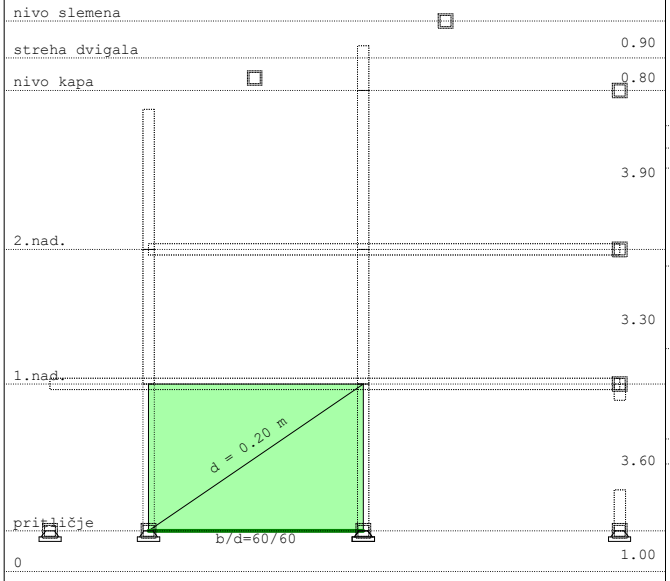
Okvir: V_5



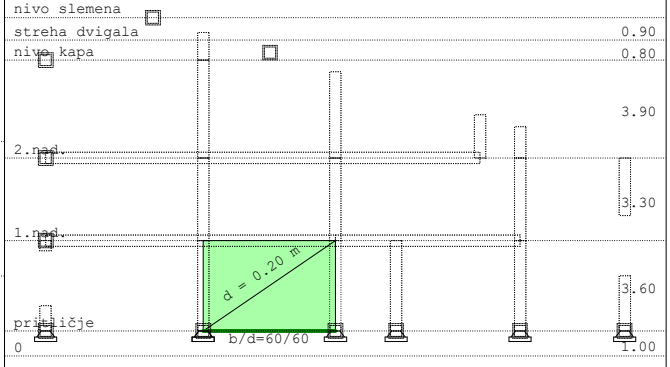
Okvir: V_6



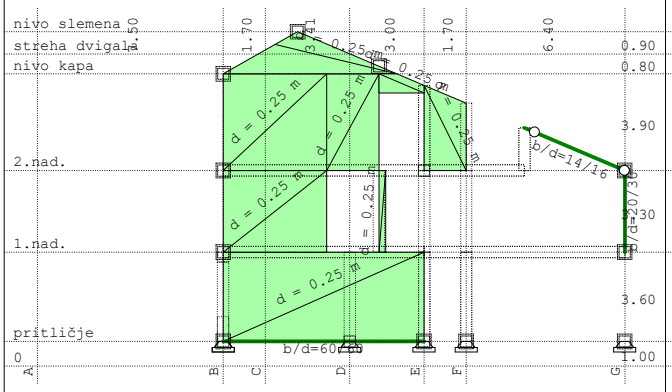
Okvir: V_8



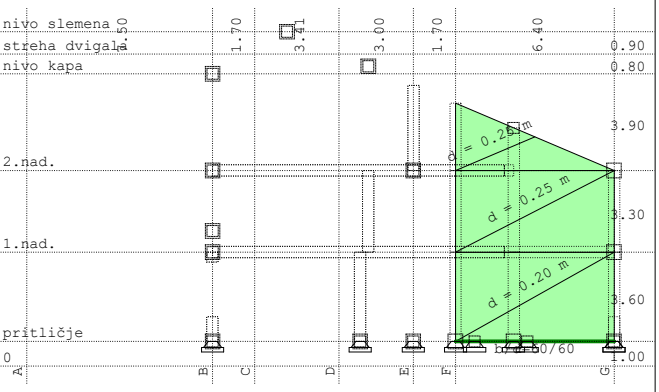
Okvir: K_5



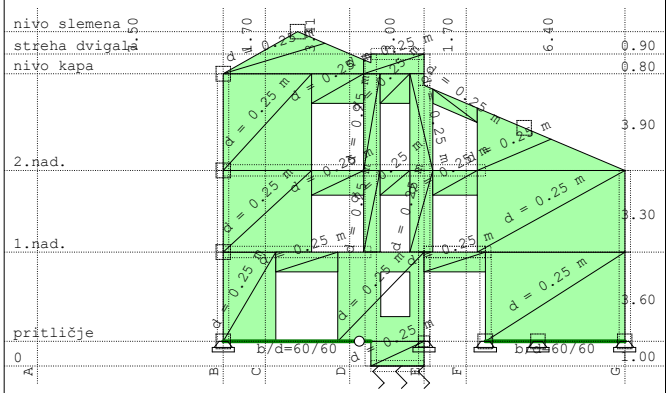
Okvir: K_1



Okvir: V_10



Okvir: V_12



Okvir: V_15

Vhodni podatki - Obtežba

Lista obtežnih primerov

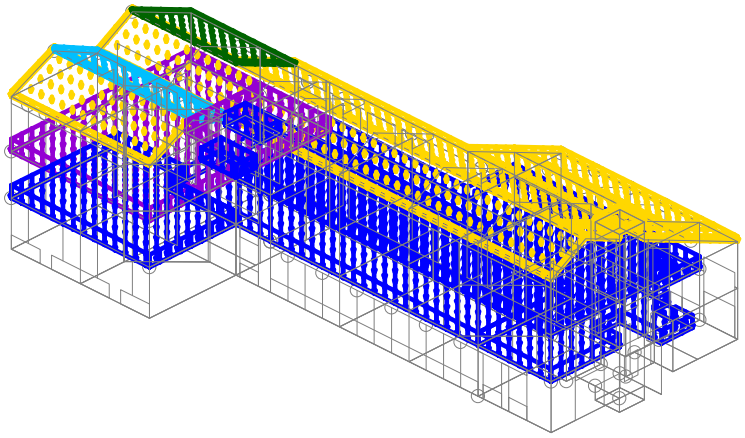
LC	Naziv
1	lastna+stalna (g)
2	koristna čez celo
3	koristna 1
4	koristna 2
5	sneg
6	veter +Y
7	veter -Y
8	potres X (+e)
9	potres X (-e)
10	potres Y (+e)
11	potres Y (-e)
12	Komb.: I
13	Komb.: I+II
14	Komb.: I+III
15	Komb.: I+IV
16	Komb.: I+V
17	Komb.: I+VI
18	Komb.: I+VII
19	Komb.: I+V+0.6xVI
20	Komb.: I+0.5xV+VI
21	Komb.: I+II+0.5xV
22	Komb.: I+II+0.5xV+0.6xVI
23	Komb.: I+0.7xII+V+0.6xVI
24	Komb.: I+0.7xII+0.5xV+VI
25	Komb.: 1.8xI
26	Komb.: 1.8xI+II
27	Komb.: 1.8xI+III
28	Komb.: 1.8xI+IV
29	Komb.: 1.8xI+V
30	Komb.: 1.8xI+VI
31	Komb.: 1.8xI+VII
32	Komb.: 1.8xI+V+0.6xVI
33	Komb.: 1.8xI+0.5xV+VI
34	Komb.: 3xI
35	Komb.: 3xI+II
36	Komb.: 3xI+III
37	Komb.: 3xI+IV
38	Komb.: 3xI+V
39	Komb.: 3xI+VI
40	Komb.: 3xI+VII
41	Komb.: 3xI+II+0.5xV+0.6xVI
42	Komb.: 3xI+0.7xII+V+0.6xVI
43	Komb.: 3xI+0.7xII+0.5xV+VI
44	Komb.: 3xI+III+0.5xV+0.6xVI
45	Komb.: 3xI+0.7xIII+V+0.6xVI
46	Komb.: 3xI+0.7xIII+0.5xV+VI
47	Komb.: 3xI+IV+0.5xV+0.6xVI
48	Komb.: 3xI+0.7xIV+V+0.6xVI
49	Komb.: 3xI+0.7xIV+0.5xV+VI
50	Komb.: I+VIII
51	Komb.: I+IX
52	Komb.: I+X
53	Komb.: I+XI
54	Komb.: 1.35xI+1.05xIV+1.5xV+0.9xVII
55	Komb.: 1.35xI+1.05xIV+1.5xV+0.9xVI
56	Komb.: 1.35xI+1.05xIII+1.5xV+0.9xVII
57	Komb.: 1.35xI+1.05xIII+1.5xV+0.9xVI
58	Komb.: 1.35xI+1.05xII+1.5xV+0.9xVII
59	Komb.: 1.35xI+1.05xII+1.5xV+0.9xVI
60	Komb.: 1.35xI+1.05xIV+0.75xV+1.5xVII
61	Komb.: 1.35xI+1.05xIV+0.75xV+1.5xVI
62	Komb.: 1.35xI+1.05xIII+0.75xV+1.5xVII
63	Komb.: 1.35xI+1.05xIII+0.75xV+1.5xVI
64	Komb.: 1.35xI+1.05xII+0.75xV+1.5xVII
65	Komb.: 1.35xI+1.05xII+0.75xV+1.5xVI
66	Komb.: 1.35xI+1.5xIV+0.75xV+0.9xVII
67	Komb.: 1.35xI+1.5xIV+0.75xV+0.9xVI
68	Komb.: 1.35xI+1.5xIII+0.75xV+0.9xVII
69	Komb.: 1.35xI+1.5xIII+0.75xV+0.9xVI
70	Komb.: 1.35xI+1.5xII+0.75xV+0.9xVII
71	Komb.: 1.35xI+1.5xII+0.75xV+0.9xVI
72	Komb.: I+1.05xIV+1.5xV+0.9xVII
73	Komb.: I+1.05xIV+1.5xV+0.9xVI
74	Komb.: I+1.05xIII+1.5xV+0.9xVII
75	Komb.: I+1.05xIII+1.5xV+0.9xVI
76	Komb.: I+1.05xII+1.5xV+0.9xVII
77	Komb.: I+1.05xII+1.5xV+0.9xVI
78	Komb.: I+1.05xIV+0.75xV+1.5xVII
79	Komb.: I+1.05xIV+0.75xV+1.5xVI
80	Komb.: I+1.05xIII+0.75xV+1.5xVII
81	Komb.: I+1.05xIII+0.75xV+1.5xVI
82	Komb.: I+1.05xII+0.75xV+1.5xVII
83	Komb.: I+1.05xII+0.75xV+1.5xVI
84	Komb.: I+1.5xIV+0.75xV+0.9xVII
85	Komb.: I+1.5xIV+0.75xV+0.9xVI
86	Komb.: I+1.5xIII+0.75xV+0.9xVII
87	Komb.: I+1.5xIII+0.75xV+0.9xVI
88	Komb.: I+1.5xII+0.75xV+0.9xVII
89	Komb.: I+1.5xII+0.75xV+0.9xVI

LC	Naziv
90	Komb.: 1.35xI+1.05xIV+1.5xVII
91	Komb.: 1.35xI+1.05xIV+1.5xVI
92	Komb.: 1.35xI+1.05xIV+1.5xV
93	Komb.: 1.35xI+1.05xIII+1.5xVII
94	Komb.: 1.35xI+1.05xIII+1.5xVI
95	Komb.: 1.35xI+1.05xIII+1.5xV
96	Komb.: 1.35xI+1.05xII+1.5xVII
97	Komb.: 1.35xI+1.05xII+1.5xVI
98	Komb.: 1.35xI+1.05xII+1.5xV
99	Komb.: 1.35xI+1.5xV+0.9xVII
100	Komb.: 1.35xI+1.5xV+0.9xVI
101	Komb.: 1.35xI+1.5xIV+0.9xVII
102	Komb.: 1.35xI+1.5xIV+0.9xVI
103	Komb.: 1.35xI+1.5xIII+0.9xVII
104	Komb.: 1.35xI+1.5xIII+0.9xVI
105	Komb.: 1.35xI+1.5xII+0.9xVII
106	Komb.: 1.35xI+1.5xII+0.9xVI
107	Komb.: 1.35xI+0.75xV+1.5xVII
108	Komb.: 1.35xI+0.75xV+1.5xVI
109	Komb.: 1.35xI+1.5xIV+0.75xV
110	Komb.: 1.35xI+1.5xIII+0.75xV
111	Komb.: 1.35xI+1.5xII+0.75xV
112	Komb.: I+1.05xIV+1.5xVII
113	Komb.: I+1.05xIV+1.5xVI
114	Komb.: I+1.05xIV+1.5xV
115	Komb.: I+1.05xIII+1.5xVII
116	Komb.: I+1.05xIII+1.5xVI
117	Komb.: I+1.05xIII+1.5xV
118	Komb.: I+1.05xII+1.5xVII
119	Komb.: I+1.05xII+1.5xVI
120	Komb.: I+1.05xII+1.5xV
121	Komb.: I+1.5xV+0.9xVII
122	Komb.: I+1.5xV+0.9xVI
123	Komb.: I+1.5xIV+0.9xVII
124	Komb.: I+1.5xIV+0.9xVI
125	Komb.: I+1.5xIII+0.9xVII
126	Komb.: I+1.5xIII+0.9xVI
127	Komb.: I+1.5xII+0.9xVII
128	Komb.: I+1.5xII+0.9xVI
129	Komb.: I+0.75xV+1.5xVII
130	Komb.: I+0.75xV+1.5xVI
131	Komb.: I+1.5xIV+0.75xV
132	Komb.: I+1.5xIII+0.75xV
133	Komb.: I+1.5xII+0.75xV
134	Komb.: 1.35xI+1.5xVII
135	Komb.: 1.35xI+1.5xVI
136	Komb.: 1.35xI+1.5xV
137	Komb.: 1.35xI+1.5xIV
138	Komb.: 1.35xI+1.5xIII
139	Komb.: 1.35xI+1.5xII
140	Komb.: I+0.6xIV-1xVIII
141	Komb.: I+0.6xIV-1xIX
142	Komb.: I+0.6xIV-1xX
143	Komb.: I+0.6xIV-1xXI
144	Komb.: I+0.6xIV+XI
145	Komb.: I+0.6xIV+X
146	Komb.: I+0.6xIV+IX
147	Komb.: I+0.6xIV+VIII
148	Komb.: I+0.6xIII-1xVIII
149	Komb.: I+0.6xIII-1xIX
150	Komb.: I+0.6xIII-1xX
151	Komb.: I+0.6xIII-1xXI
152	Komb.: I+0.6xIII+XI
153	Komb.: I+0.6xIII+X
154	Komb.: I+0.6xIII+IX
155	Komb.: I+0.6xIII+VIII
156	Komb.: I+0.6xII-1xVIII
157	Komb.: I+0.6xII-1xIX
158	Komb.: I+0.6xII-1xX
159	Komb.: I+0.6xII-1xXI
160	Komb.: I+0.6xII+XI
161	Komb.: I+0.6xII+X
162	Komb.: I+0.6xII+IX
163	Komb.: I+0.6xII+VIII
164	Komb.: I+1.5xVII
165	Komb.: I+1.5xVI
166	Komb.: I+1.5xV
167	Komb.: I+1.5xIV
168	Komb.: I+1.5xIII
169	Komb.: I+1.5xII
170	Komb.: I-1xVIII
171	Komb.: I-1xIX
172	Komb.: I-1xX
173	Komb.: I-1xXI
174	Komb.: I+XI
175	Komb.: I+X
176	Komb.: I+IX
177	Komb.: I+VIII
178	Komb.: 1.35xI

Lista obtežnih primerov

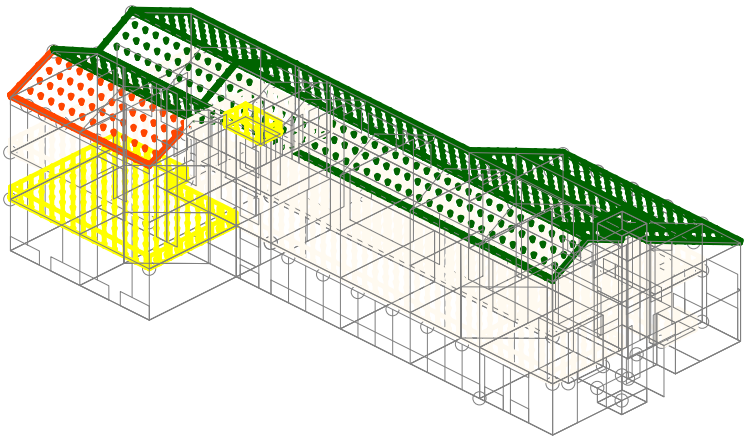
LC	Naziv
179	Komb.: I

Obt. 1: lastna+stalna (g)



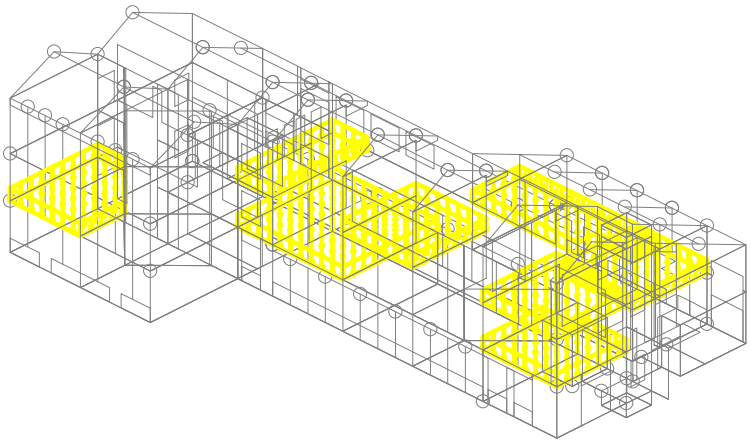
Seti numeričnih podatkov
Površinska obtežba (2,4,10-12)

Obt. 2: koristna čez celo



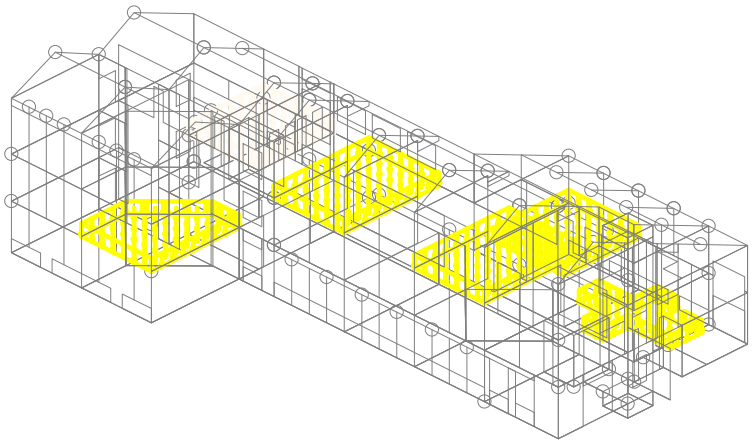
Seti numeričnih podatkov
Površinska obtežba (1,3,4,13)

Obt. 3: koristna 1



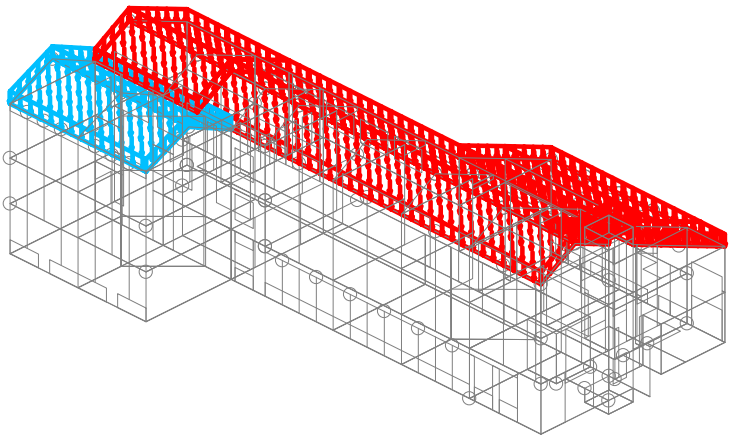
Seti numeričnih podatkov
Površinska obtežba (1)

Obt. 4: koristna 2



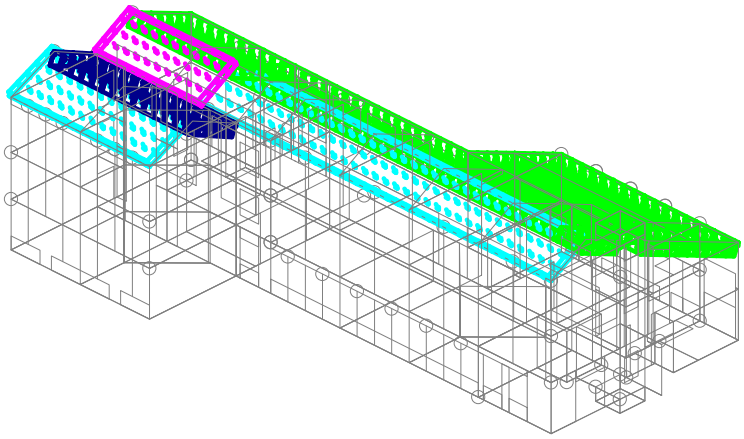
Seti numeričnih podatkov
Površinska obtežba (1,3)

Obt. 5: sneg



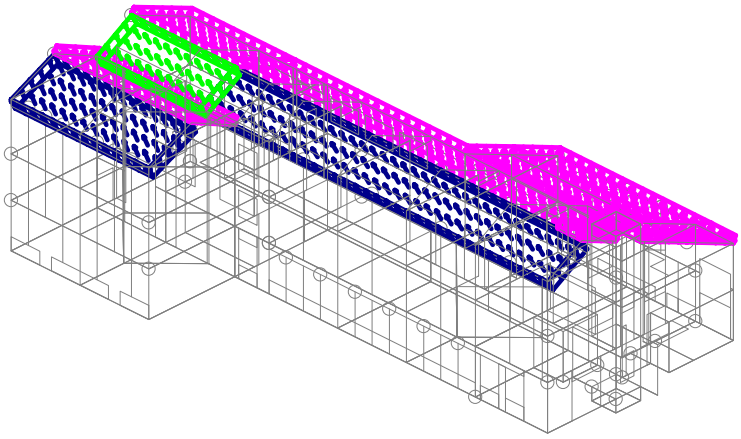
Seti numeričnih podatkov
Površinska obtežba (7,12)

Obt. 6: veter +Y



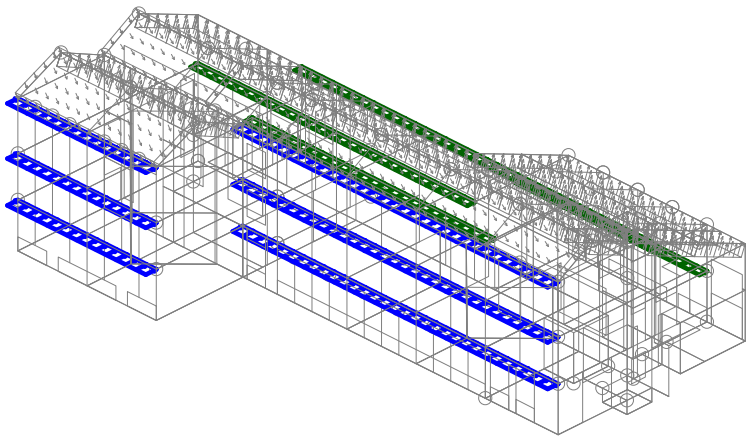
Seti numeričnih podatkov
Površinska obtežba (5,6,8,9)

Obt. 7: veter -Y



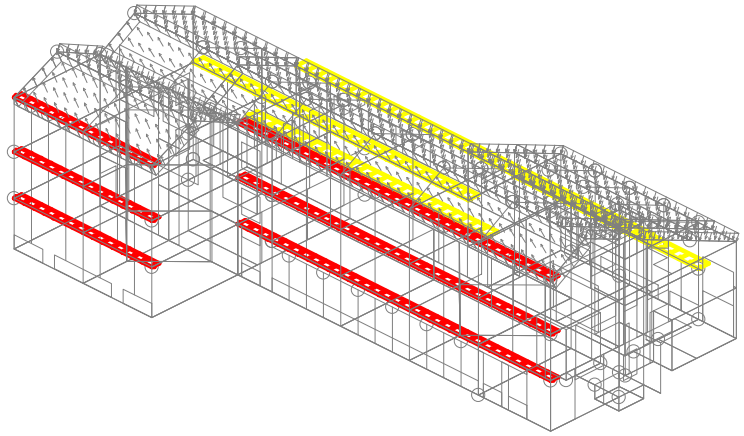
Seti numeričnih podatkov
Površinska obtežba (5,6,9)

Obt. 6: veter +Y



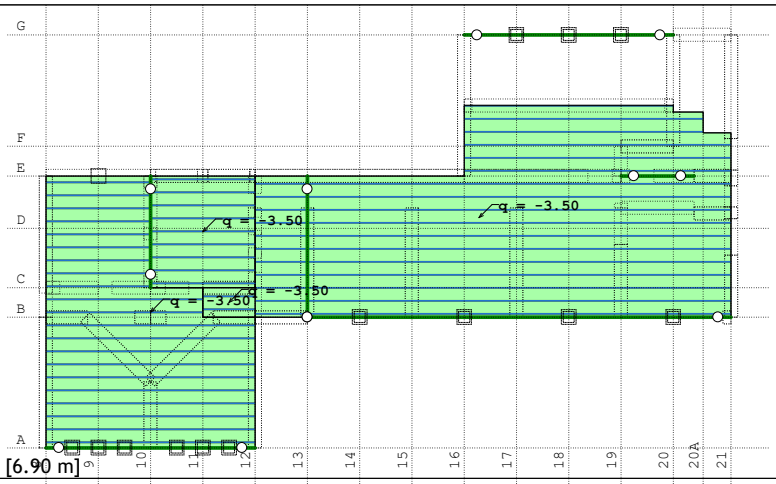
Seti numeričnih podatkov
Linijska obtežba (2,4)

Obt. 7: veter -Y



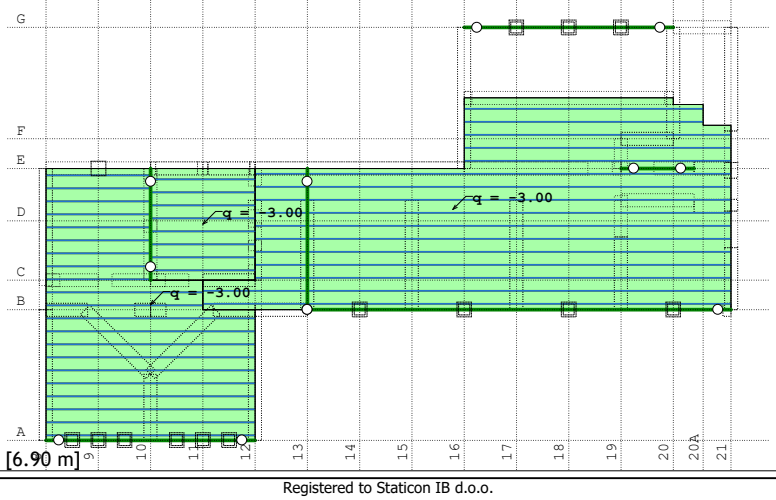
Seti numeričnih podatkov
Linijska obtežba (1,3)

Obt. 1: lastna+stalna (g)



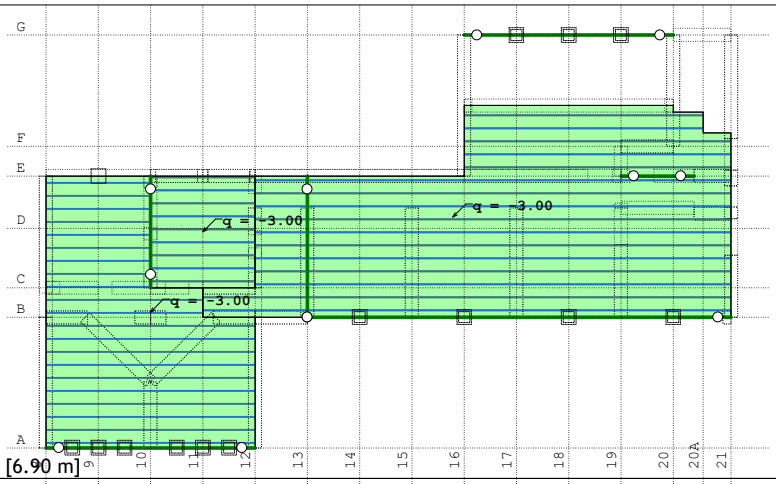
Nivo: plošča nad nadstropjem [6.90 m]

Obt. 2: koristna čez celo



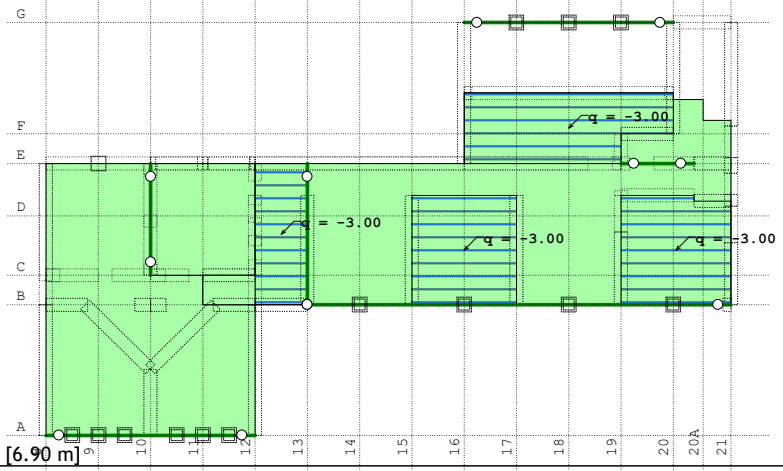
Nivo: plošča nad nadstropjem [6.90 m]

Obt. 2: koristna čez celo



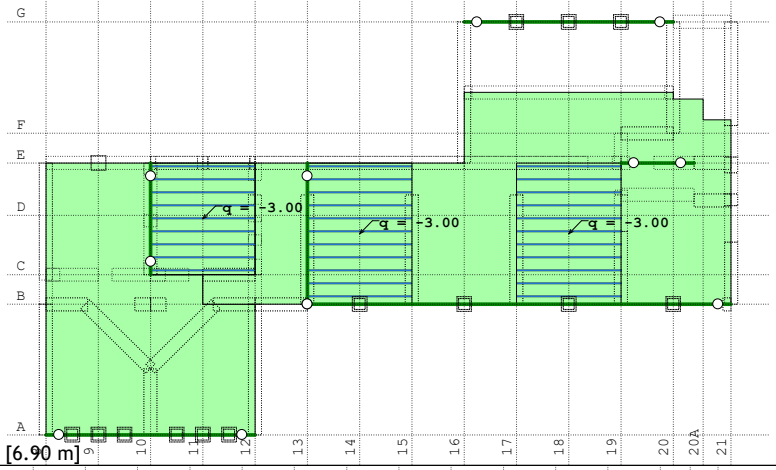
Nivo: plošča nad nadstropjem [6.90 m]

Obt. 3: koristna 1



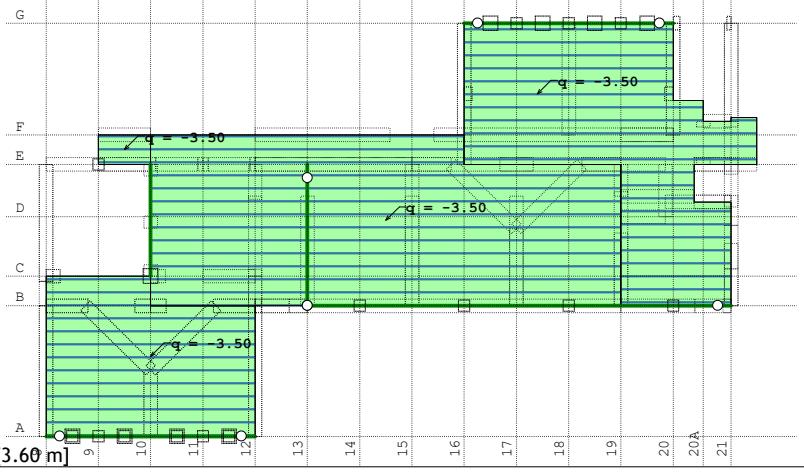
Nivo: plošča nad nadstropjem [6.90 m]

Obt. 4: koristna 2



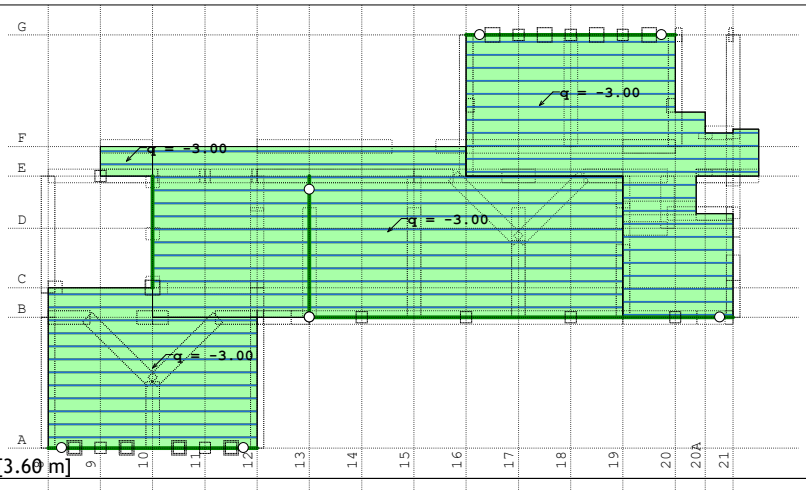
Nivo: plošča nad nadstropjem [6.90 m]

Obt. 1: lastna+stalna (g)



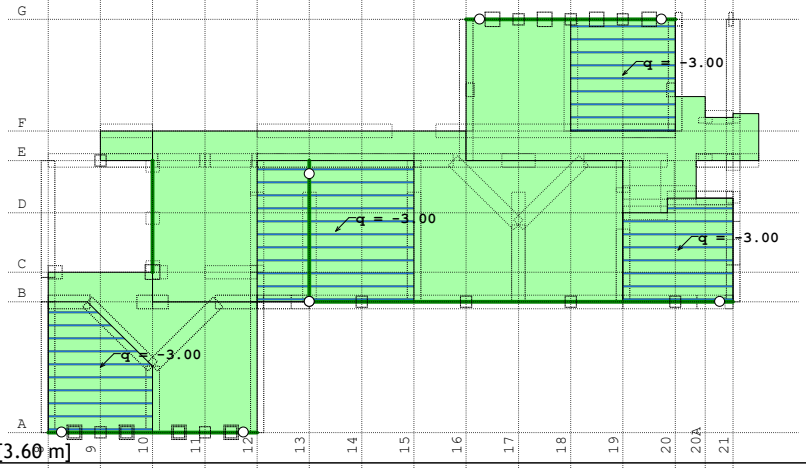
Nivo: plošča nad pritličjem [3.60 m]

Obt. 2: koristna čez celo



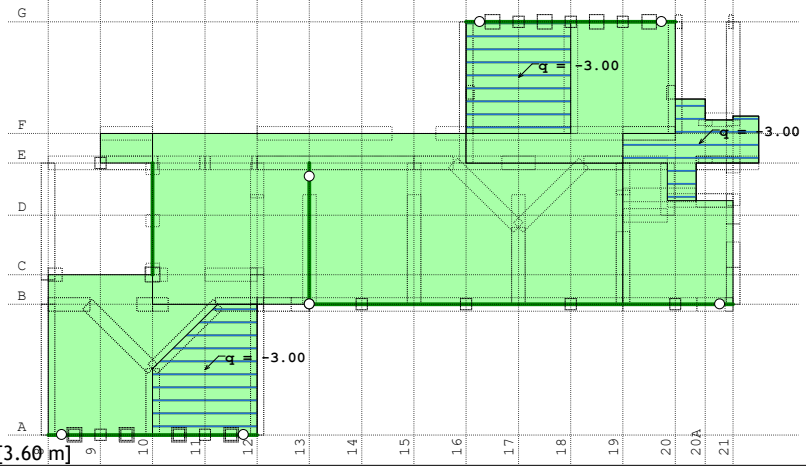
Nivo: plošča nad pritličjem [3.60 m]

Obt. 3: koristna 1



Nivo: plošča nad pritličjem [3.60 m]

Obt. 4: koristna 2



Nivo: plošča nad pritličjem [3.60 m]

Modalna analiza

Napredne opcije seizmičnega preračuna:

Mase grupirane v nivojih izbranih etaž
Plošče - redukcija togosti na upogib: 0.500
Grede - redukcija togosti na upogib: 0.500
Zidovi - redukcija togosti na upogib: 0.500
Zidovi - redukcija osne togosti: 0.500
Stebri - redukcija upogibne togosti: 0.500
Stebri - redukcija osne togosti: 0.500
Preprečeno nihanje v Z smeri

Faktorji obtežb za preračun mas

No	Naziv	Koeficient
1	lastna+stalna (g)	1.00
2	koristna čez celo	0.60
3	koristna 1	0.00
4	koristna 2	0.00
5	sneg	0.00
6	veter +Y	0.00
7	veter -Y	0.00

Razporeditev mas po višini objekta

Nivo	Z [m]	X [m]	Y [m]	Masa [T]	T/m²
nivo kapa	10.80	5.85	2.42	324.48	
plošča nad nadstropjem	6.90	7.03	3.85	883.60	1.89
plošča nad pritličjem	3.60	8.82	4.86	1386.94	2.70
Skupno:	5.62	7.84	4.21	2595.03	

Položaj centra togosti po višini objekta (približna metoda)

Nivo	Z [m]	X [m]	Y [m]
nivo kapa	10.80	2.15	-4.60
plošča nad nadstropjem	6.90	5.89	8.33
plošča nad pritličjem	3.60	7.89	5.73

Ekscentriciteta po višini objekta (približna metoda)

Nivo	Z [m]	eox [m]	eoy [m]
nivo kapa	10.80	3.70	7.01
plošča nad nadstropjem	6.90	1.14	4.48
plošča nad pritličjem	3.60	0.93	0.88

Nihajne dobe konstrukcije

No	T [s]	f [Hz]
1	0.3238	3.0883
2	0.2861	3.4955
3	0.2497	4.0047

Seizmični preračun

Seizmični preračun: EC8 (EN 1998) SLO	
Kategorija tal:	B
Kategorija pomena:	III (γ=1.2)
Razmerje agR/g:	0.225
Koeficient dušenja:	0.05
Slučajna ekscentričnost mase etaže:	ei = ± 0.050 x Li

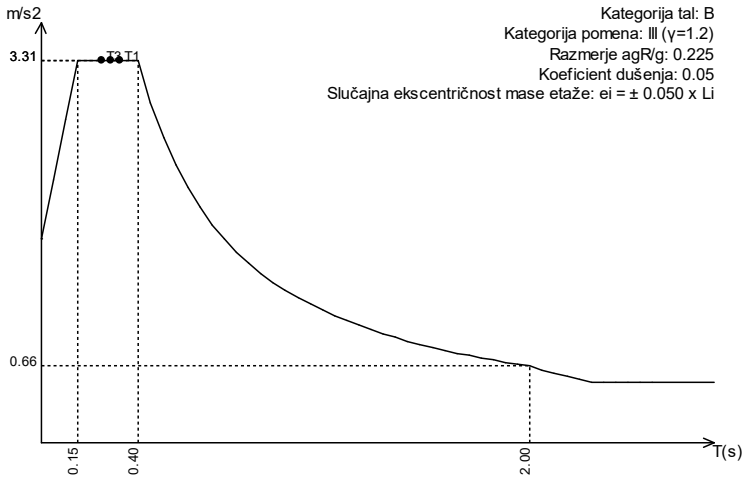
Faktorji smeri potresa:

Obtežni primer	Kot α[°]	k,α	k,α+90°	kz	Faktor O.
potres X	0	1.000	0.300	0.000	2.000
potres Y	90	1.000	0.300	0.000	2.000

Tip spektra

Obtežni primer	S	Tb	Tc	Td	avg/ag
potres X	1.000	0.150	0.400	2.000	1.000
potres Y	1.000	0.150	0.400	2.000	1.000

Projektni spekter



S=1.00, Tb=0.15, Tc=0.40, Td=2.00

Razporeditev potresnih sil po višini objekta - potres X (+e)

Nivo	Z [m]	Ton 1			Ton 2			Ton 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
nivo slemena	12.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
streha dvigala	11.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
nivo kapa	10.80	237.94	-316.37	-14.48	374.12	449.96	74.41	860.48	225.59	-12.08
plošča nad nadstropjem	6.90	392.06	-603.83	-13.53	595.35	1038.5	74.29	1618.0	417.23	1.38
plošča nad pritličjem	3.60	420.50	-603.89	-23.95	667.47	1330.2	26.33	2300.1	403.63	-4.77
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
temelj dvigala	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	1050.5	-1524.09	-51.95	1636.9	2818.6	175.03	4778.6	1046.4	-15.48

Razporeditev potresnih sil po višini objekta - potres X (-e)

Nivo	Z [m]	Ton 1			Ton 2			Ton 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
nivo slemena	12.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
streha dvigala	11.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
nivo kapa	10.80	237.94	-316.37	-14.48	374.12	449.96	74.41	860.48	225.59	-12.08
plošča nad nadstropjem	6.90	392.06	-603.83	-13.53	595.35	1038.5	74.29	1618.0	417.23	1.38
plošča nad pritličjem	3.60	420.50	-603.89	-23.95	667.47	1330.2	26.33	2300.1	403.63	-4.77
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
temelj dvigala	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	1050.5	-1524.09	-51.95	1636.9	2818.6	175.03	4778.6	1046.4	-15.48

Razporeditev potresnih sil po višini objekta - potres Y (+e)

Nivo	Z [m]	Ton 1			Ton 2			Ton 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
nivo slemena	12.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
streha dvigala	11.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
nivo kapa	10.80	-737.65	980.79	44.89	350.76	421.87	69.77	-65.41	-17.15	0.92
plošča nad nadstropjem	6.90	-1215.45	1871.9	41.93	558.18	973.66	69.65	-123.00	-31.72	-0.11
plošča nad pritličjem	3.60	-1303.60	1872.1	74.24	625.79	1247.1	24.69	-174.84	-30.68	0.36
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
temelj dvigala	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	-3256.70	4724.9	161.06	1534.7	2642.6	164.11	-363.25	-79.55	1.18

Razporeditev potresnih sil po višini objekta - potres Y (-e)

Nivo	Z [m]	Ton 1			Ton 2			Ton 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
nivo slemena	12.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
streha dvigala	11.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
nivo kapa	10.80	-737.65	980.79	44.89	350.76	421.87	69.77	-65.41	-17.15	0.92
plošča nad nadstropjem	6.90	-1215.45	1871.9	41.93	558.18	973.66	69.65	-123.00	-31.72	-0.11
plošča nad pritličjem	3.60	-1303.60	1872.1	74.24	625.79	1247.1	24.69	-174.84	-30.68	0.36
pasovni temelji	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
temelj dvigala	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Σ=	-3256.70	4724.9	161.06	1534.7	2642.6	164.11	-363.25	-79.55	1.18

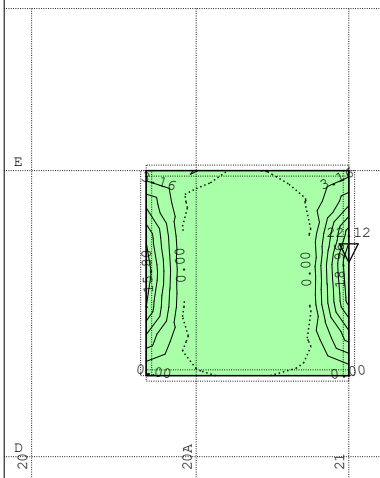
Faktorji participacije - relativno sodelovanje

Ton \ Naziv	1. potres X (	2. potres X (	3. potres Y (	4. potres Y (
1	0.073	0.073	0.721	0.721
2	0.304	0.304	0.276	0.276
3	0.623	0.623	0.004	0.004

Faktorji participacije - angažiranje mase

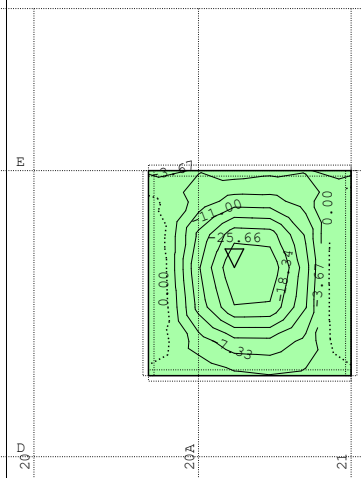
Ton	U [α=0°]	U [α=90°]
1	24.02	50.57
2	13.86	41.11
3	55.58	2.67
ΣU (%)	93.47	94.34

Obt. 183: [MSN] 54-179



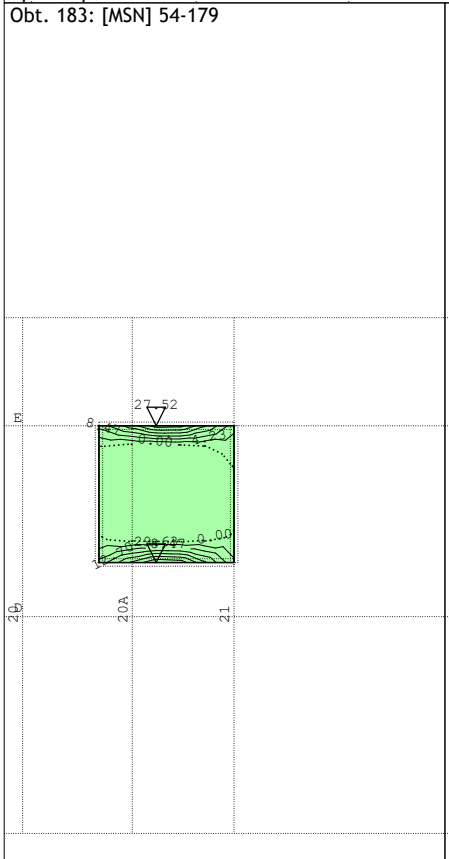
Nivo: temelj dvigala [-1.00 m]
Vplivi v plošči: max Mx= 22.12 / min Mx= 0.00 kNm/m

Obt. 183: [MSN] 54-179



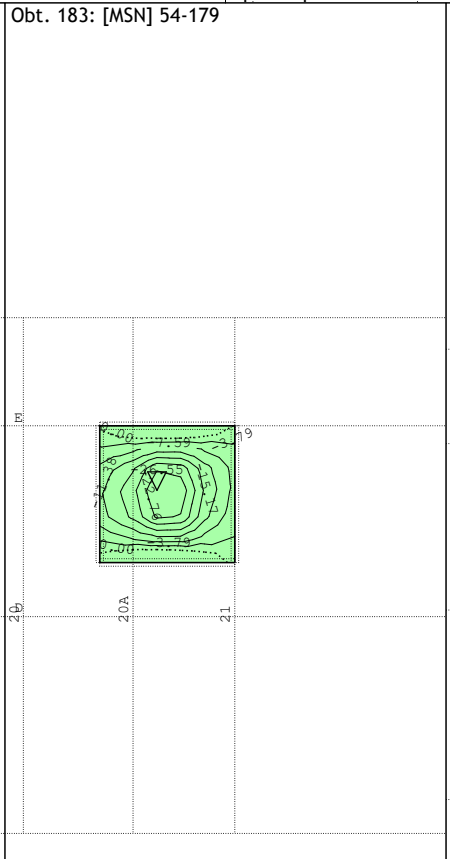
Nivo: temelj dvigala [-1.00 m]
Vplivi v plošči: max Mx= 0.00 / min Mx= -25.66 kNm/m

Obt. 183: [MSN] 54-179



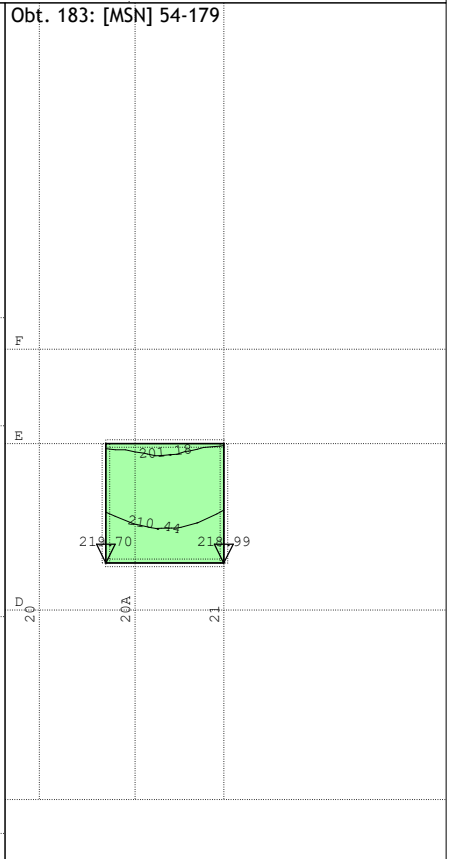
Nivo: temelj dvigala [-1.00 m]
Vplivi v plošči: max My= 29.63 / min My= 0.0...

Obt. 183: [MSN] 54-179



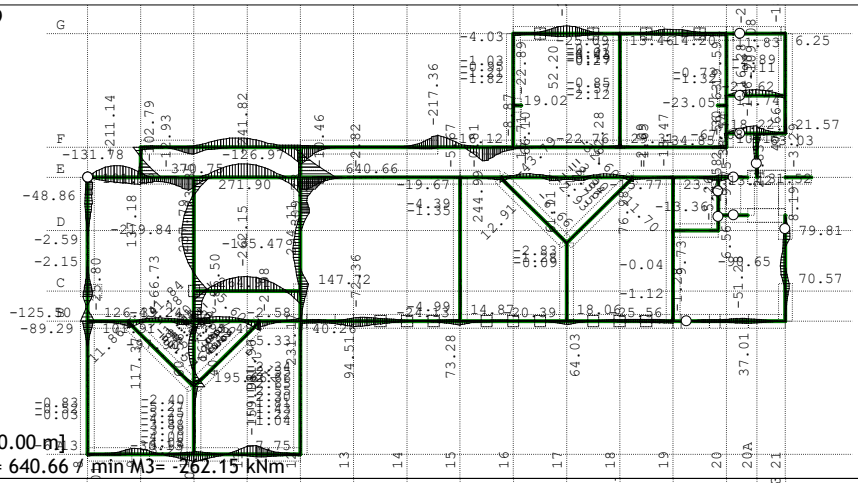
Nivo: temelj dvigala [-1.00 m]
Vplivi v plošči: max My= 0.00 / min My= -26.5...

Obt. 183: [MSN] 54-179



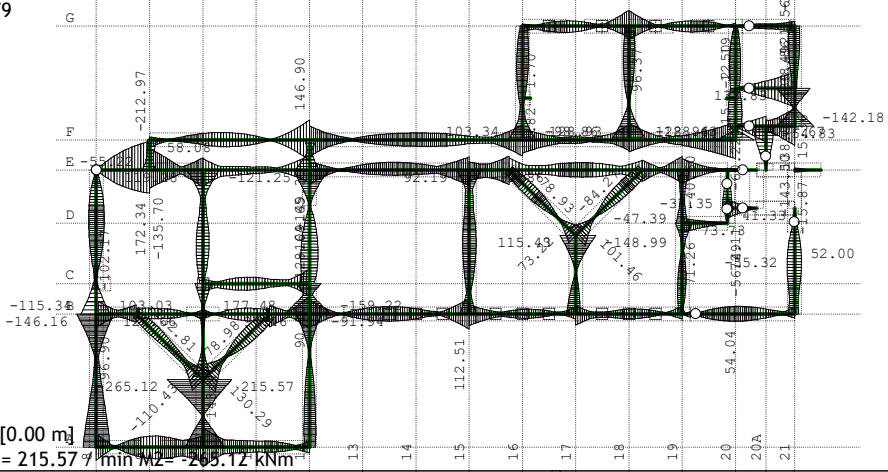
Nivo: temelj dvigala [-1.00 m]
Vplivi v pov.podpori: max σ,tal= 219.70 / min...

Obt. 183: [MSN] 54-179



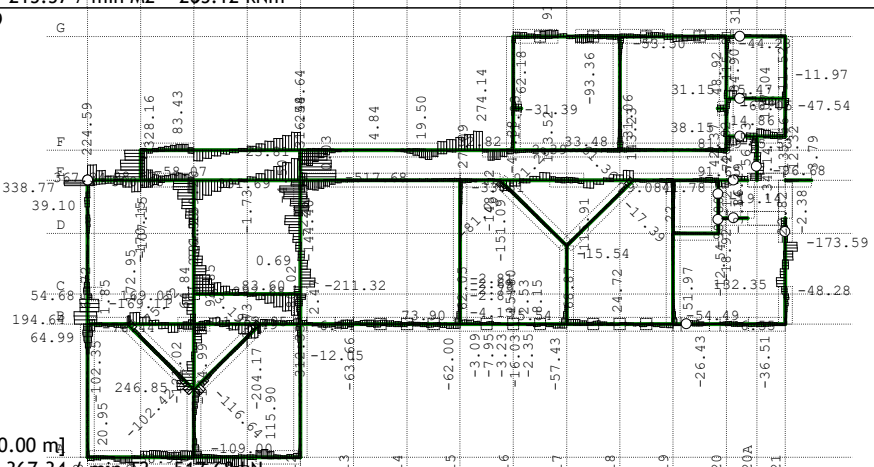
Nivo: pasovni temelji [0.00 m]
Vplivi v gredi: max M3= 640.66 / min M3= -262.15 kNm

Obt. 183: [MSN] 54-179



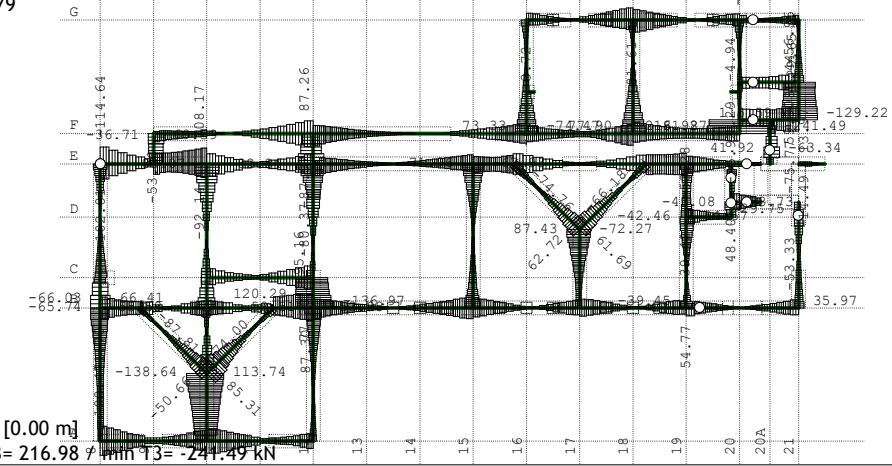
Nivo: pasovni temelji [0.00 m]
Vplivi v gredi: max M2= 215.57 / min M2= -265.12 kNm

Obt. 183: [MSN] 54-179



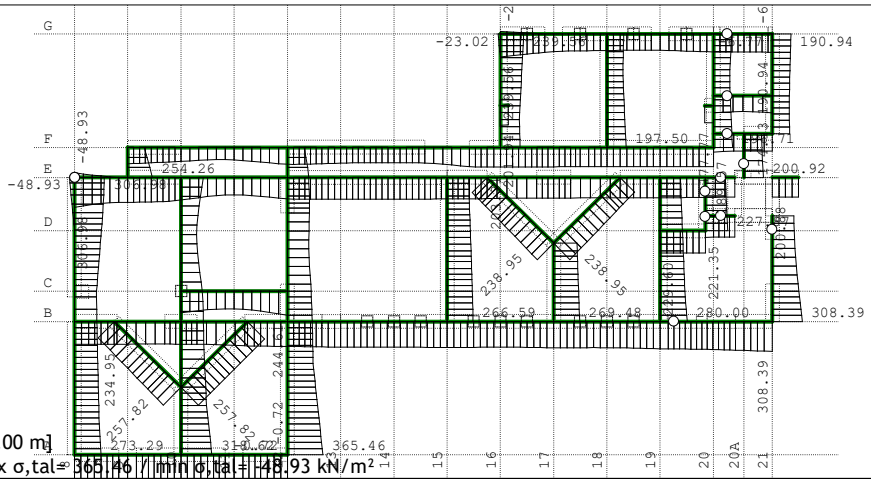
Nivo: pasovni temelji [0.00 m]
Vplivi v gredi: max T2= 367.34 / min T2= -517.68 kN

Obt. 183: [MSN] 54-179



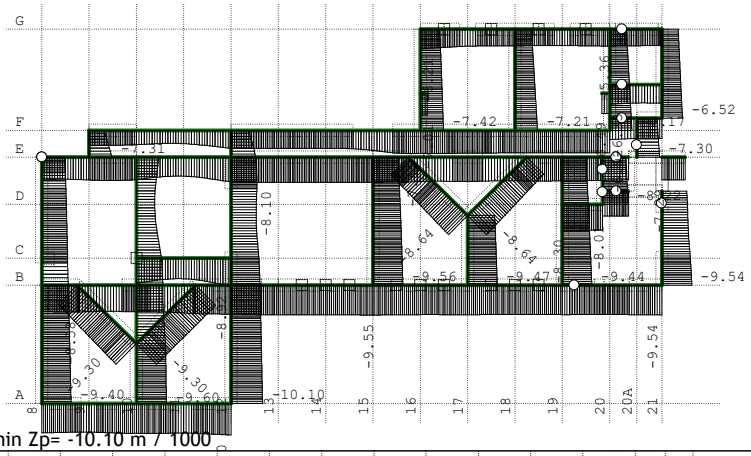
Nivo: pasovni temelji [0.00 m]
Vplivi v gredi: max T3= 216.98 / min T3= -244.49 kN

Obt. 183: [MSN] 54-179



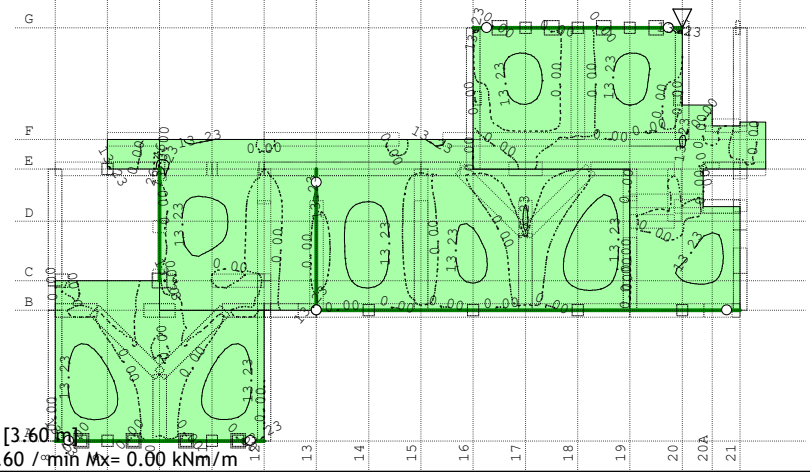
Nivo: pasovni temelji [0.00 m]
Vplivi v lin. podpori: max σ,tal= 365.46 / min σ,tal= -48.93 kN/m²

Obt. 180: [U.elas] 12-24



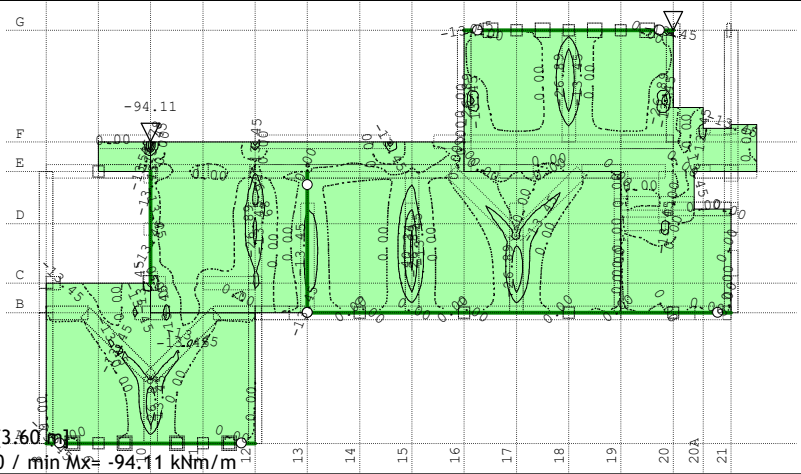
Nivo: pasovni temelji [0.00 m]
Vplivi v gredi: max Zp= -3.48 / min Zp= -10.10 m / 1000

Obt. 183: [MSN] 54-179



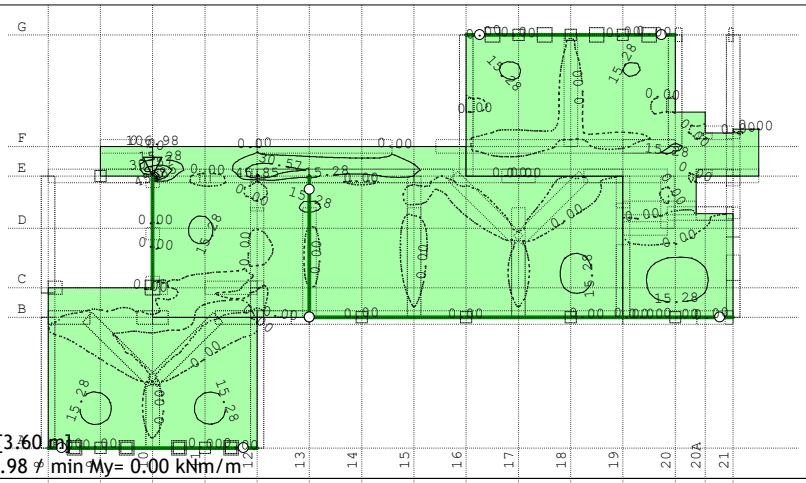
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v plošči: max Mx= 92.60 / min Mx= 0.00 kNm/m

Obt. 183: [MSN] 54-179



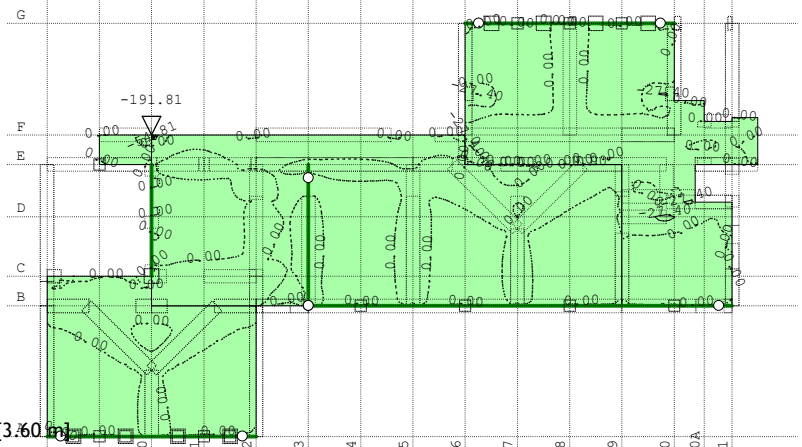
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v plošči: max Mx= 0.00 / min Mx= -94.11 kNm/m

Obt. 183: [MSN] 54-179



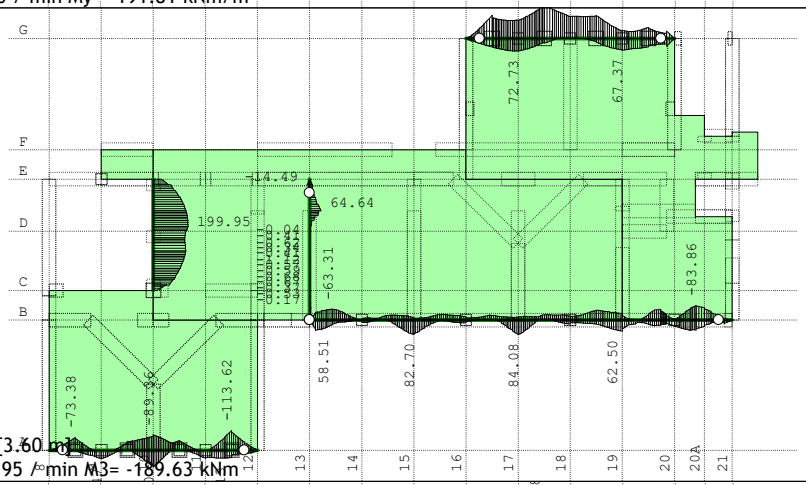
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v plošči: max My= 106.98 / min My= 0.00 kNm/m

Obt. 183: [MSN] 54-179



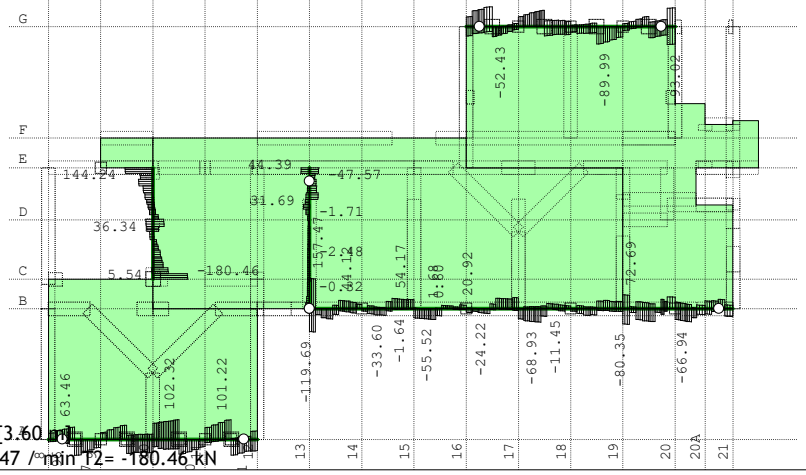
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v plošči: max My= 0.00 / min My= -191.81 kNm/m

Obt. 183: [MSN] 54-179



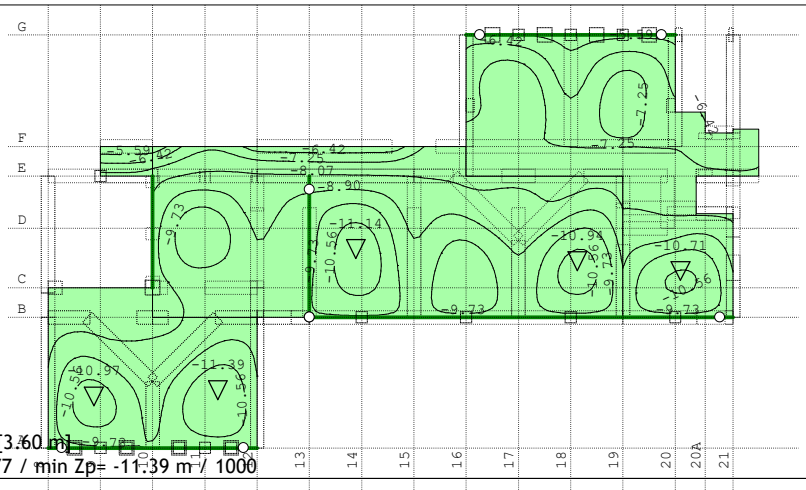
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v gredi: max M3= 199.95 / min M3= -189.63 kNm

Obt. 183: [MSN] 54-179



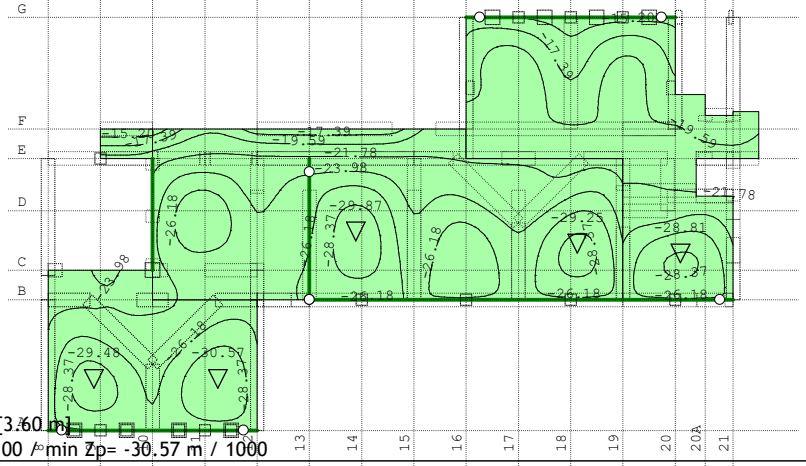
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v gredi: max T2= 157.47 / min T2= -180.46 kN

Obt. 180: [U.elas] 12-24



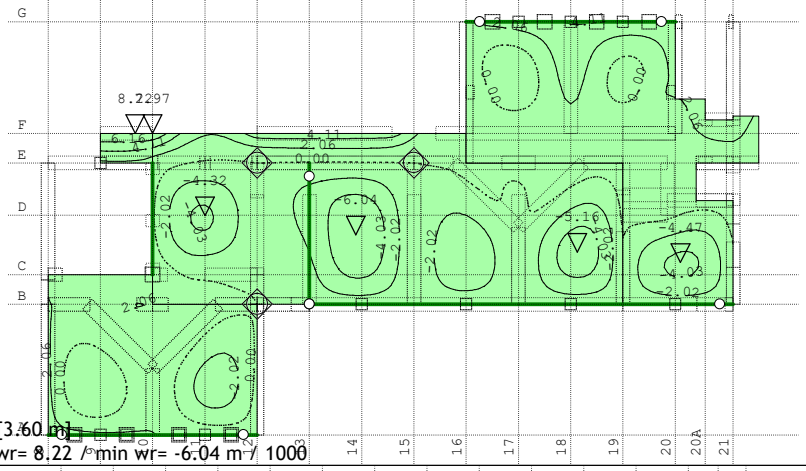
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v plošči: max Zp= -4.77 / min Zp= -11.39 m / 1000

Obt. 182: [Ureol] 34-49



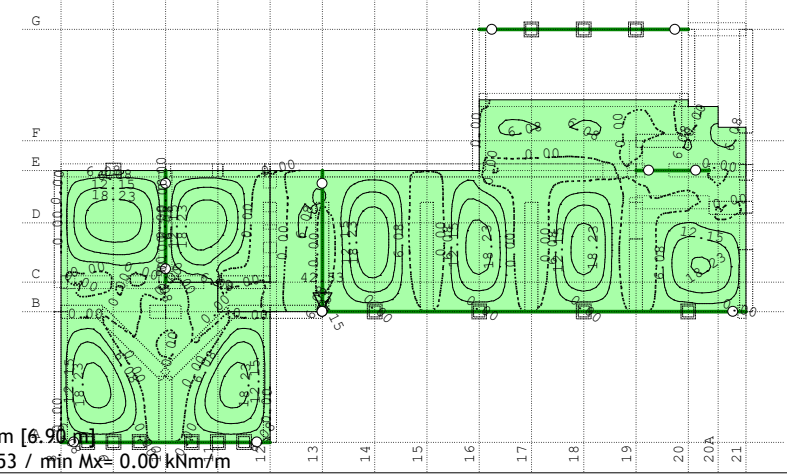
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v plošči: max Zp= -13.00 / min Zp= -30.57 m / 1000

Obt. 35: 3xI+II



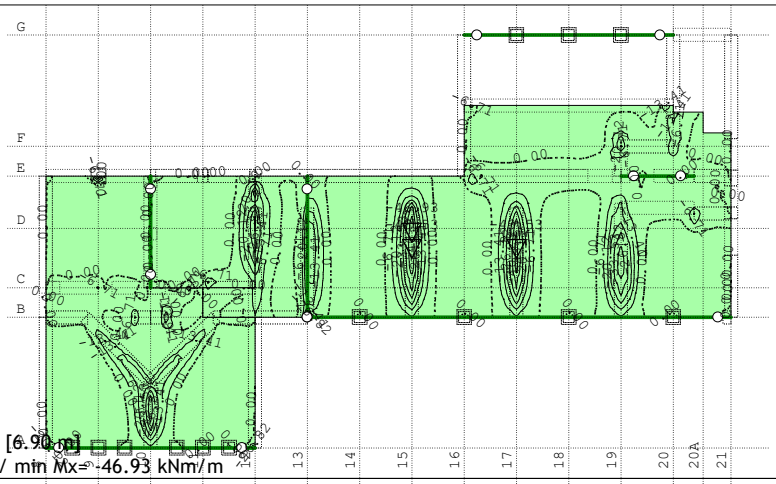
Nivo: plošča nad pritličjem [3.60 m]
Relativni pomik plošč: max wr= 8.22 / min wr= -6.04 m / 1000

Obt. 183: [MSN] 54-179



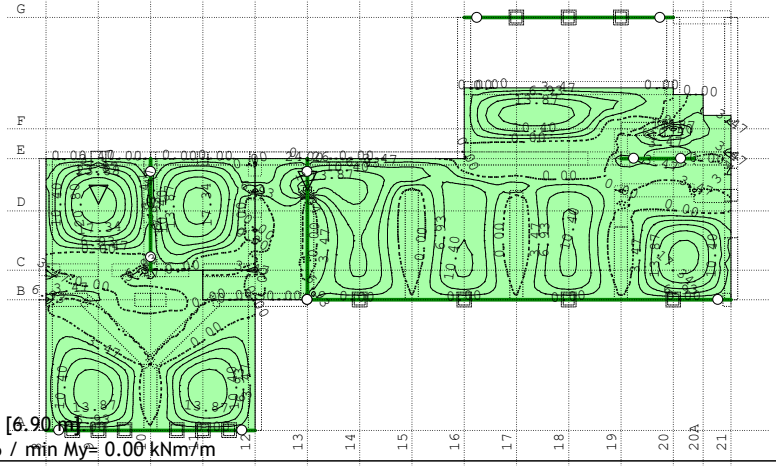
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v plošči: max Mx= 42.53 / min Mx= 0.00 kNm/m

Obt. 183: [MSN] 54-179



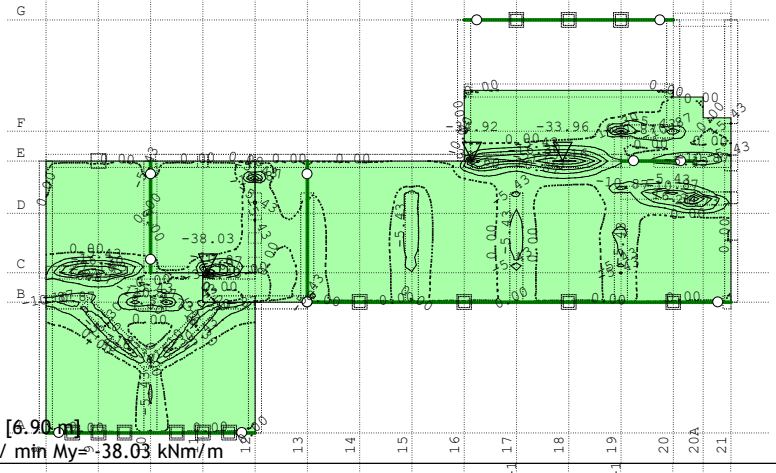
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v plošči: max Mx= 0.00 / min Mx= -46.93 kNm/m

Obt. 183: [MSN] 54-179



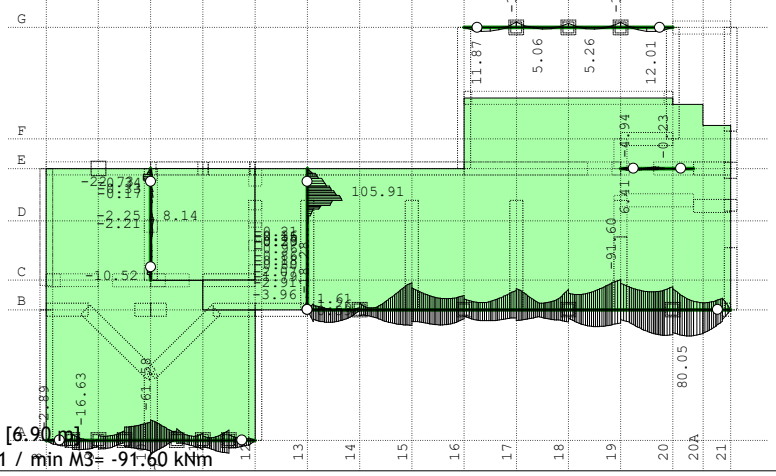
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v plošči: max My= 24.26 / min My= 0.00 kNm/m

Obt. 183: [MSN] 54-179



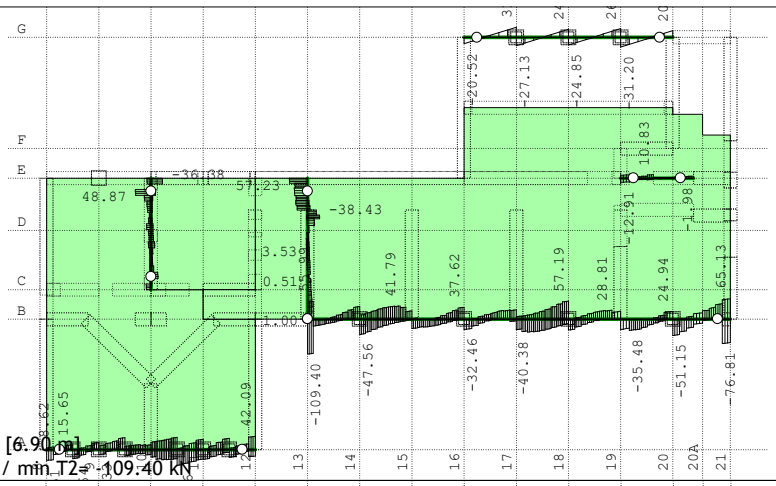
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v plošči: max My= 0.00 / min My= -38.03 kNm/m

Obt. 183: [MSN] 54-179



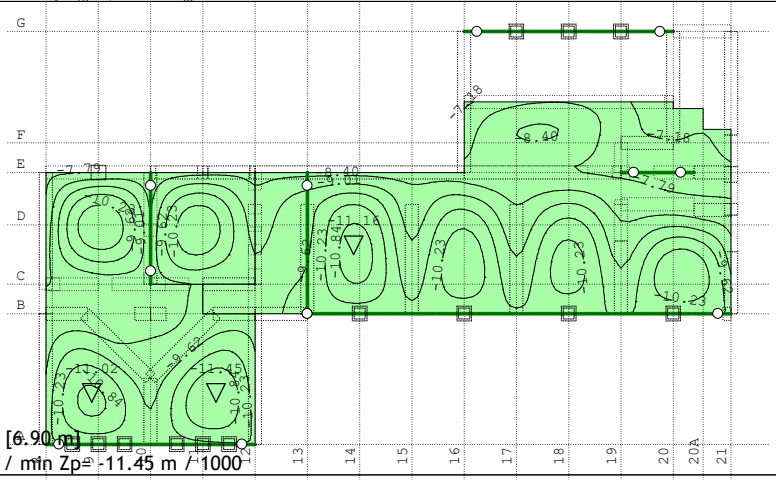
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v gredi: max M3= 105.91 / min M3= -91.60 kNm

Obt. 183: [MSN] 54-179



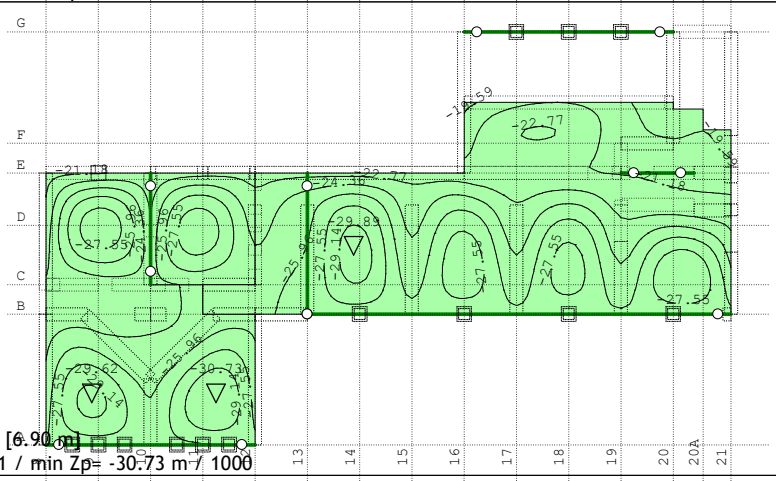
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v gredi: max T2= 65.13 / min T2= -109.40 kN

Obt. 180: [U.elas] 12-24



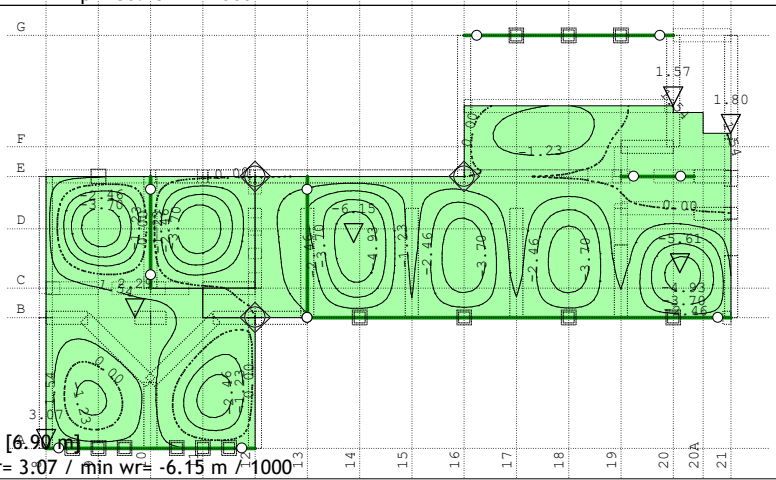
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v plošči: max Zp= -6.57 / min Zp= -11.45 m / 1000

Obt. 182: [Ureol] 34-49



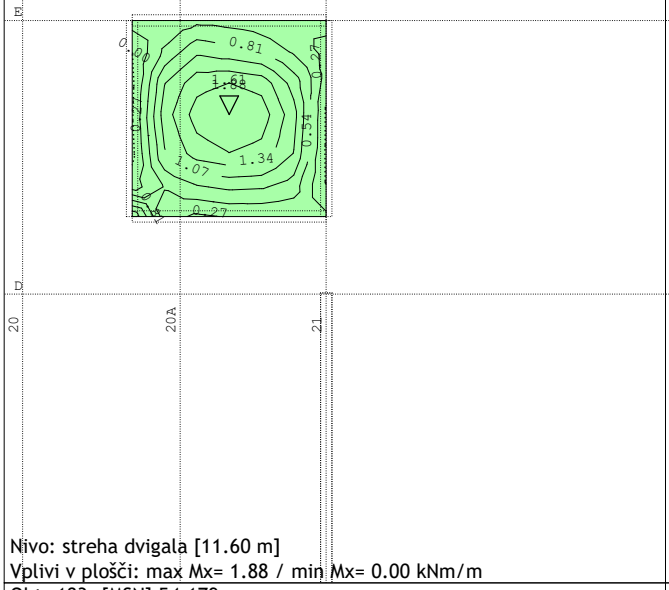
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v plošči: max Zp= -18.01 / min Zp= -30.73 m / 1000

Obt. 35: 3xI+II



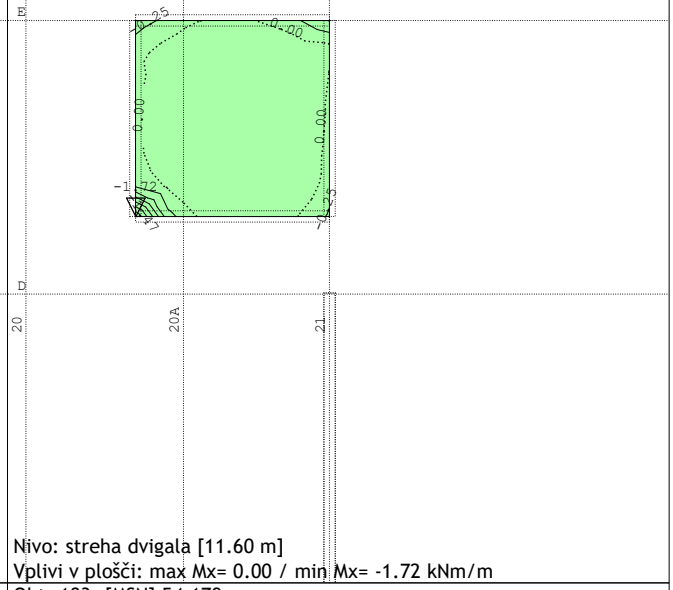
Nivo: plošča nad nadstropjem [6.90 m]
Relativni pomik plošč: max wr= 3.07 / min wr= -6.15 m / 1000

Obt. 183: [MSN] 54-179



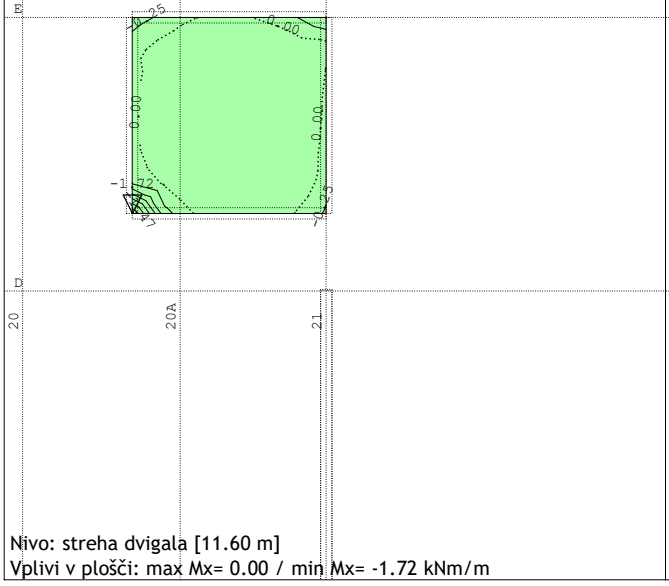
Nivo: streha dvigala [11.60 m]
Vplivi v plošči: max Mx= 1.88 / min Mx= 0.00 kNm/m

Obt. 183: [MSN] 54-179



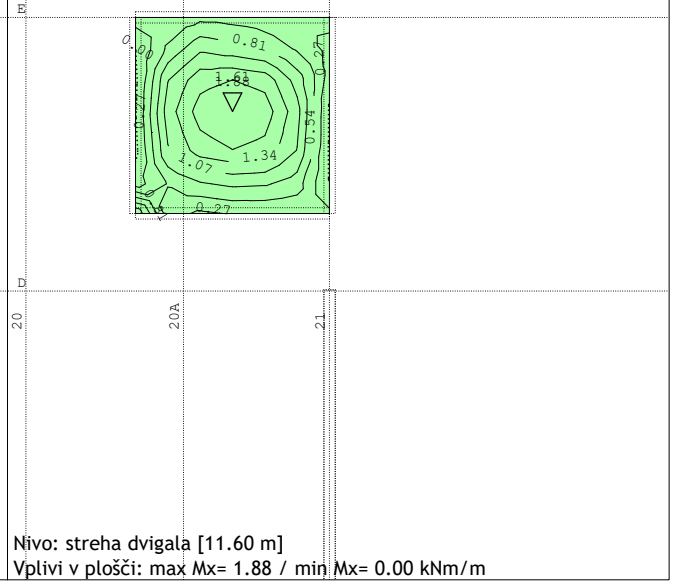
Nivo: streha dvigala [11.60 m]
Vplivi v plošči: max Mx= 0.00 / min Mx= -1.72 kNm/m

Obt. 183: [MSN] 54-179



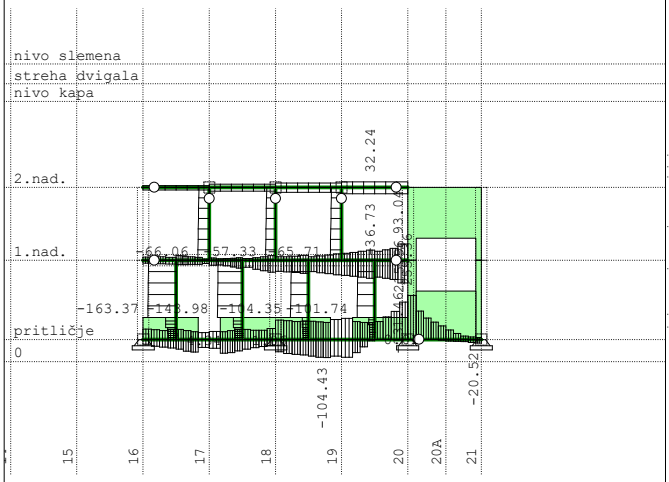
Nivo: streha dvigala [11.60 m]
Vplivi v plošči: max Mx= 0.00 / min Mx= -1.72 kNm/m

Obt. 183: [MSN] 54-179



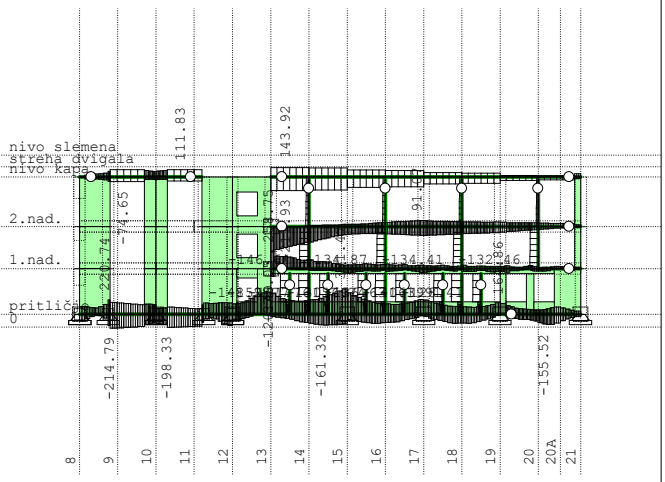
Nivo: streha dvigala [11.60 m]
Vplivi v plošči: max Mx= 1.88 / min Mx= 0.00 kNm/m

Obt. 183: [MSN] 54-179



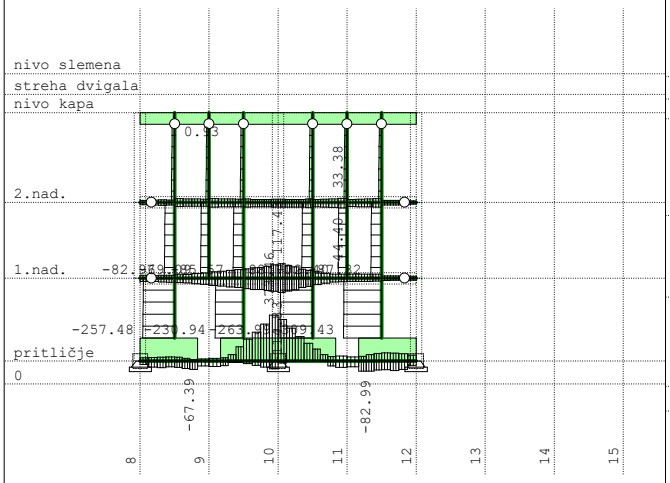
Okvir: H_14
Vplivi v gredi: max N1= 255.36 / min N1= -163.37 kN

Obt. 183: [MSN] 54-179



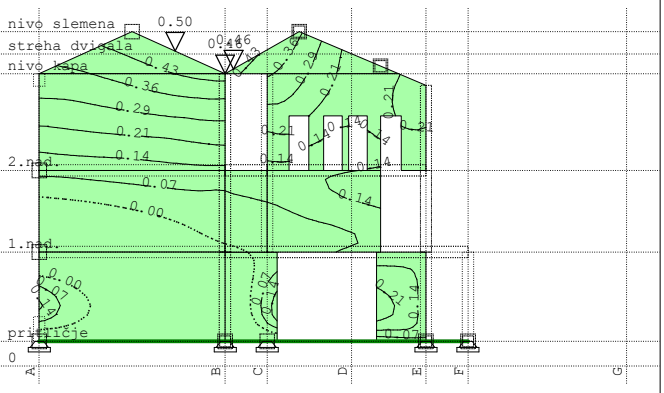
Okvir: H_3
Vplivi v gredi: max N1= 391.47 / min N1= -375.05 kN

Obt. 183: [MSN] 54-179



Okvir: H_1
Vplivi v gredi: max N1= 373.46 / min N1= -309.43 kN

Obt. 180: [U.elas] 12-24



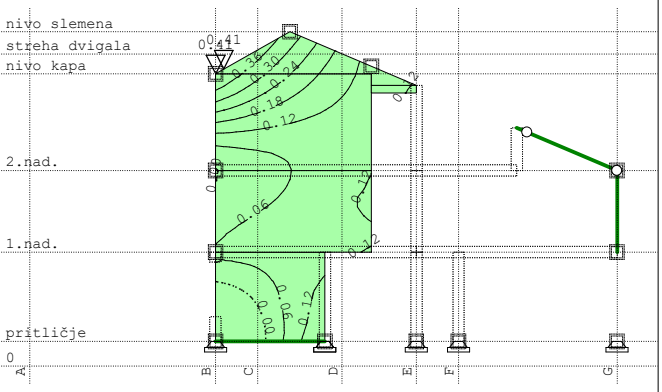
Okvir: V_4
Vplivi v plošči: max Xp= 0.50 / min Xp= 0.00 m / 1000

Obt. 180: [U.elas] 12-24



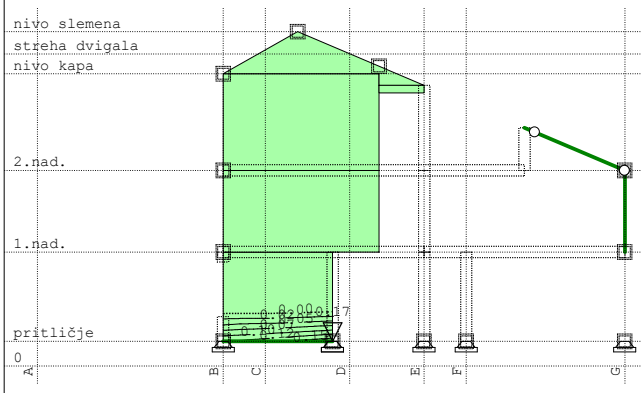
Okvir: V_4
Vplivi v plošči: max Yp= 0.23 / min Yp= 0.00 m / 1000

Obt. 180: [U.elas] 12-24



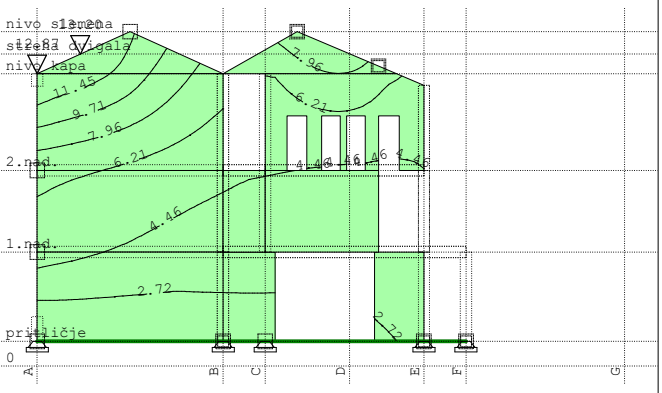
Okvir: V_8
Vplivi v plošči: max Xp= 0.41 / min Xp= 0.00 m / 1000

Obt. 180: [U.elas] 12-24



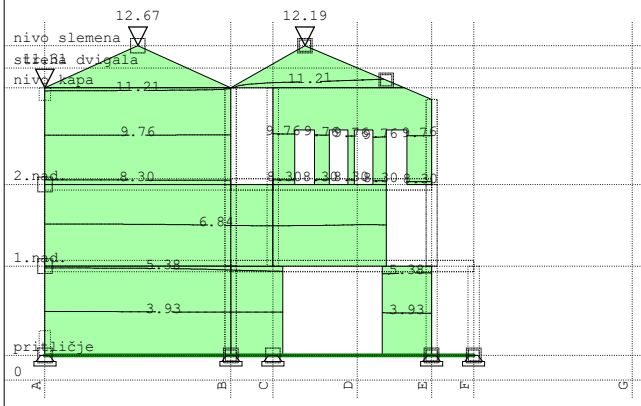
Okvir: V_8
Vplivi v plošči: max Yp= 0.17 / min Yp= 0.00 m / 1000

Obt. 184: [U.potres] 50-53



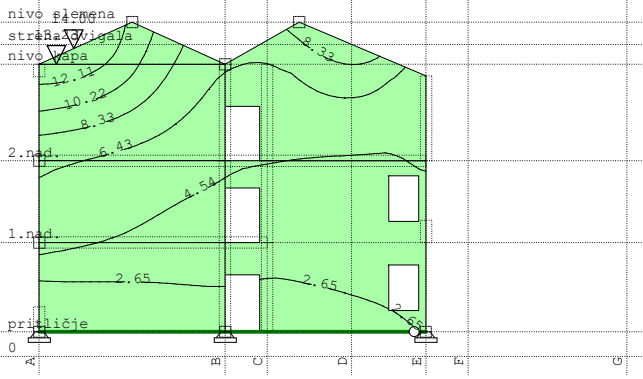
Okvir: V_4
Vplivi v plošči: max Xp= 13.20 / min Xp= 0.98 m / 1000

Obt. 184: [U.potres] 50-53



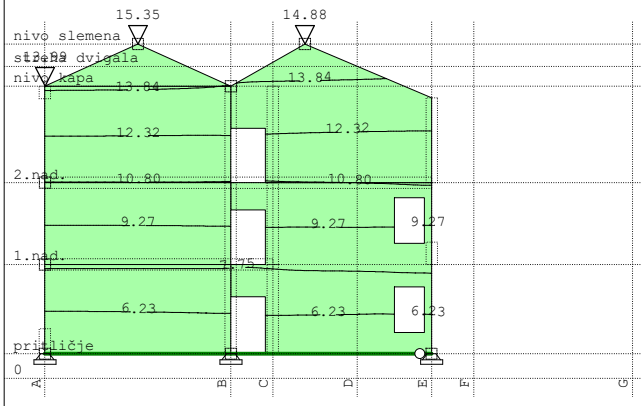
Okvir: V_4
Vplivi v plošči: max Yp= 12.67 / min Yp= 2.48 m / 1000

Obt. 184: [U.potres] 50-53



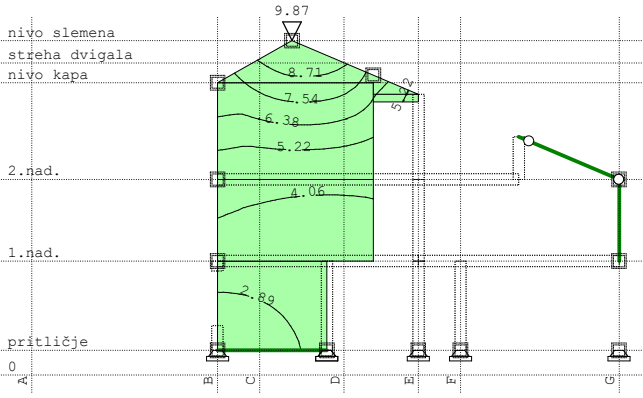
Okvir: V_1
Vplivi v plošči: max Xp= 14.00 / min Xp= 0.76 m / 1000

Obt. 184: [U.potres] 50-53



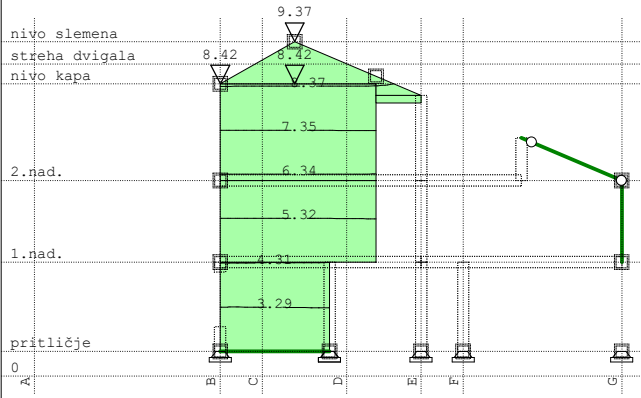
Okvir: V_1
Vplivi v plošči: max Yp= 15.35 / min Yp= 4.72 m / 1000

Obt. 184: [U.potres] 50-53



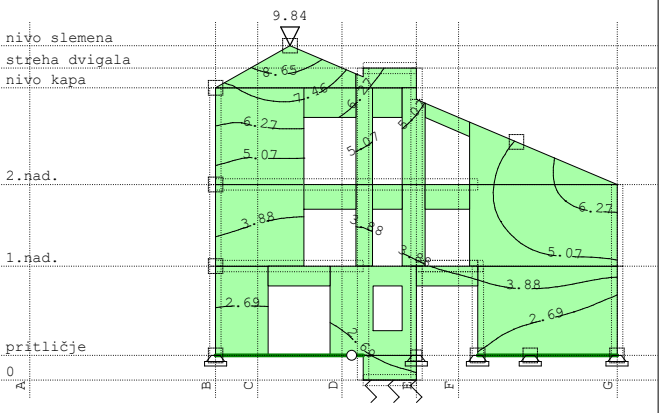
Okvir: V_8
Vplivi v plošči: max Xp= 9.87 / min Xp= 1.73 m / 1000

Obt. 184: [U.potres] 50-53



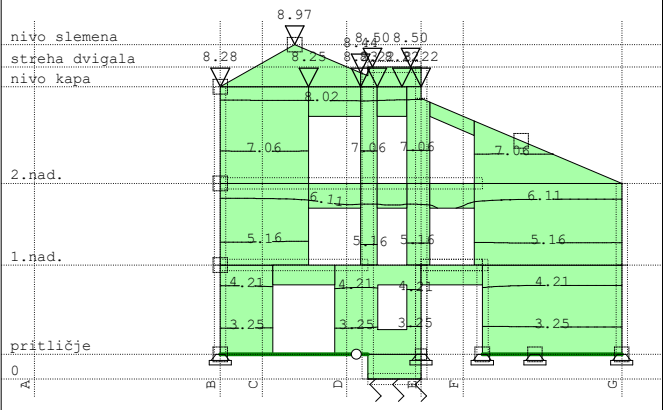
Okvir: V_8
Vplivi v plošči: max Yp= 9.37 / min Yp= 2.29 m / 1000

Obt. 184: [U.potres] 50-53



Okvir: V_15
Vplivi v plošči: max Xp= 9.84 / min Xp= 1.50 m / 1000

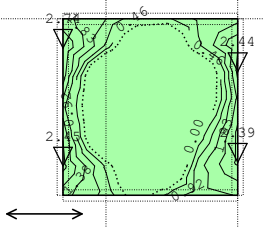
Obt. 184: [U.potres] 50-53



Okvir: V_15
Vplivi v plošči: max Yp= 8.97 / min Yp= 2.31 m / 1000

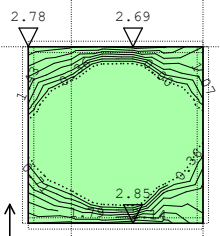
Dimenzioniranje (beton)

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=6.00 cm



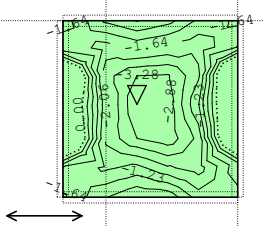
Nivo: temelj dvigala [-1.00 m]
Aa - sp.cona - Smer 1 - max Aa1,s= 2.74 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=6.00 cm



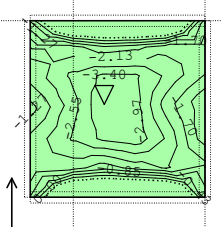
Nivo: temelj dvigala [-1.00 m]
Aa - sp.cona - Smer 2 - max Aa2,s= 2.85 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=6.00 cm



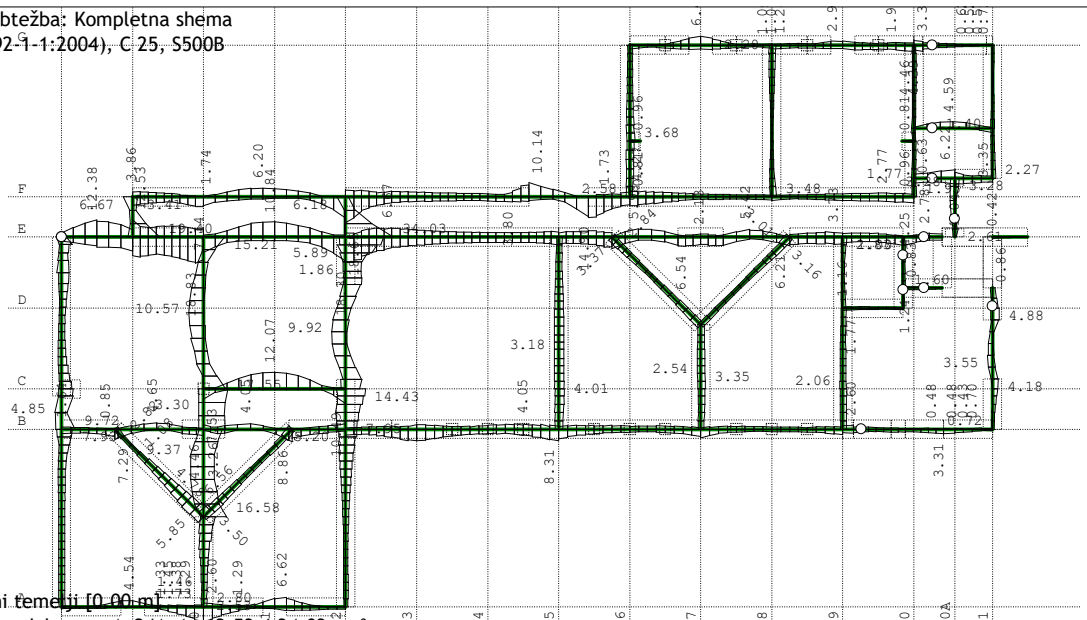
Nivo: temelj dvigala [-1.00 m]
Aa - zg.cona - Smer 1 - max Aa1,z= -3.28 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=6.00 cm



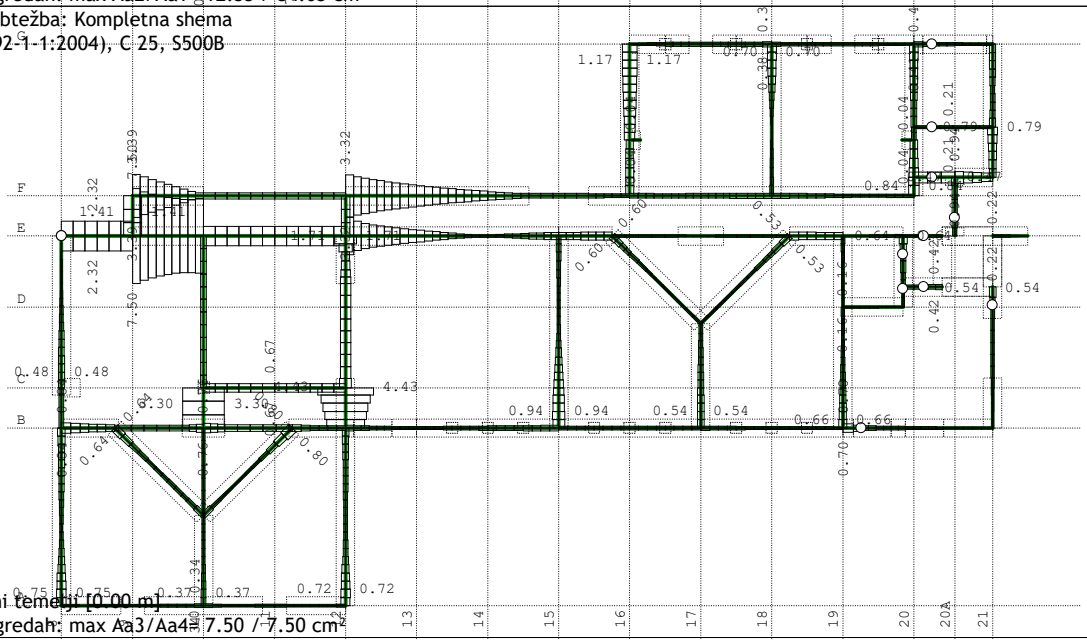
Nivo: temelj dvigala [-1.00 m]
Aa - zg.cona - Smer 2 - max Aa2,z= -3.40 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500B



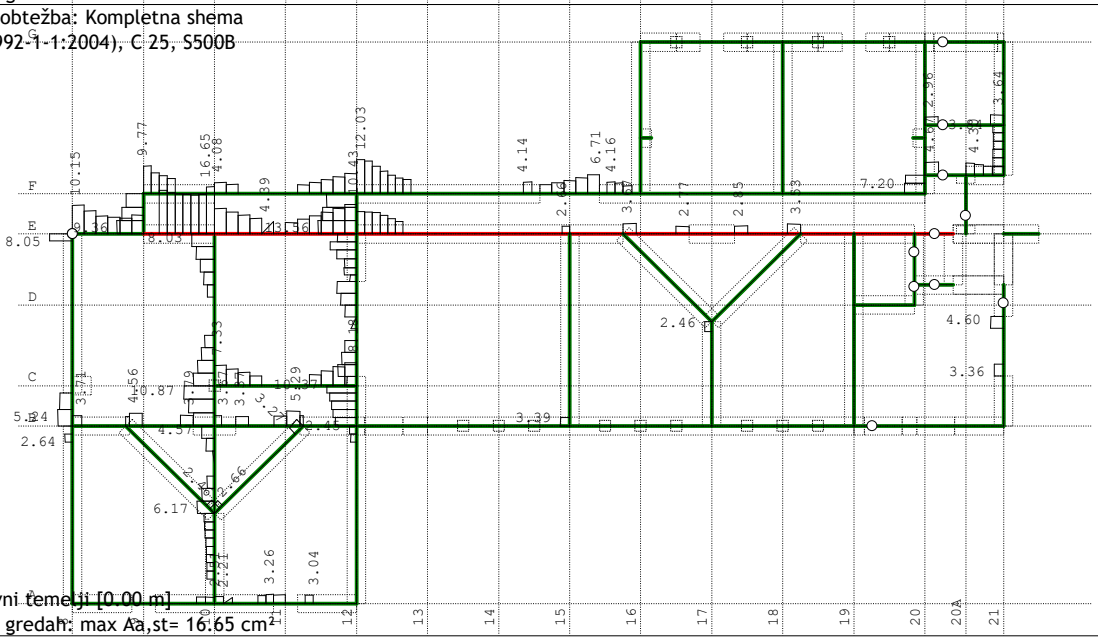
Nivo: pasovni temelji [0.00 m]
Armatura v gredah: max Aa2/Aa1= 12.53 / 34.03 cm²

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500B



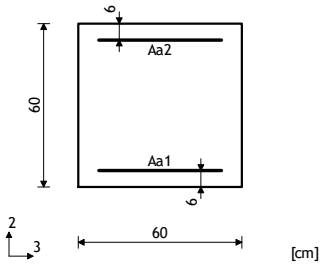
Nivo: pasovni temelji [0.00 m]
Armatura v gredah: max Aa3/Aa4= 7.50 / 7.50 cm²

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500B



Nivo: pasovni temelji [0.00 m]
Armatura v gredah: max Aa,st= 16.65 cm²

Greda 20597-4326
EC 2 (EN 1992-1-1:2004)
C 25 (γC = 1.50, γS = 1.15) [SP]
S500B
Kompletna obtežna shema



Prerez 1-1 x = 31.53m
Merodajna kombinacija za upogib:
1.00xI+0.60xII+1.00xXI
N1ed = 197.65 kN
M2ed = 0.00 kNm
M3ed = 237.79 kNm

Merodajna kombinacija za torzijo:
1.00xI+0.60xII-1.00xXI
M1ed = -215.39 kNm

Merodajna kombinacija za strig:
1.00xI+0.60xII-1.00xXI
V2ed = -183.59 kN
V3ed = -91.46 kN
M1ed = -215.39 kNm

Vrd,max,2 = 1312.20 kN
Vrd,max,3 = 1312.20 kN
εb/εa = -2.535/25.000 ‰
Aa1 = 12.95 + 5.87` = 18.83 cm²
Aa2 = 0.00 + 5.87` = 5.87 cm²
Aa3 = 0.00 + 5.87` = 5.87 cm²
Aa4 = 0.00 + 5.87` = 5.87 cm²
Aa,st = 16.58 cm²/m (m=2)
`) - dodatna vzdolžna armatura za prevzem torzije.

Prerez 2-2 x = 33.87m
Merodajna kombinacija za upogib:
1.00xI+0.60xII+1.00xIX
N1ed = 182.15 kN
M2ed = 0.00 kNm
M3ed = 110.04 kNm

Merodajna kombinacija za torzijo:
1.00xI+0.60xII-1.00xXI
M1ed = -274.95 kNm

Merodajna kombinacija za strig:
1.00xI+0.60xIV-1.00xXI
V2ed = -106.04 kN
V3ed = -71.34 kN
M1ed = -266.37 kNm

Vrd,max,2 = 1312.20 kN
Vrd,max,3 = 1312.20 kN
εb/εa = -1.243/25.000 ‰
Aa1 = 7.06 + 7.50` = 14.55 cm²
Aa2 = 0.00 + 7.50` = 7.50 cm²
Aa3 = 0.00 + 7.50` = 7.50 cm²
Aa4 = 0.00 + 7.50` = 7.50 cm²
Prerez ne dopušča

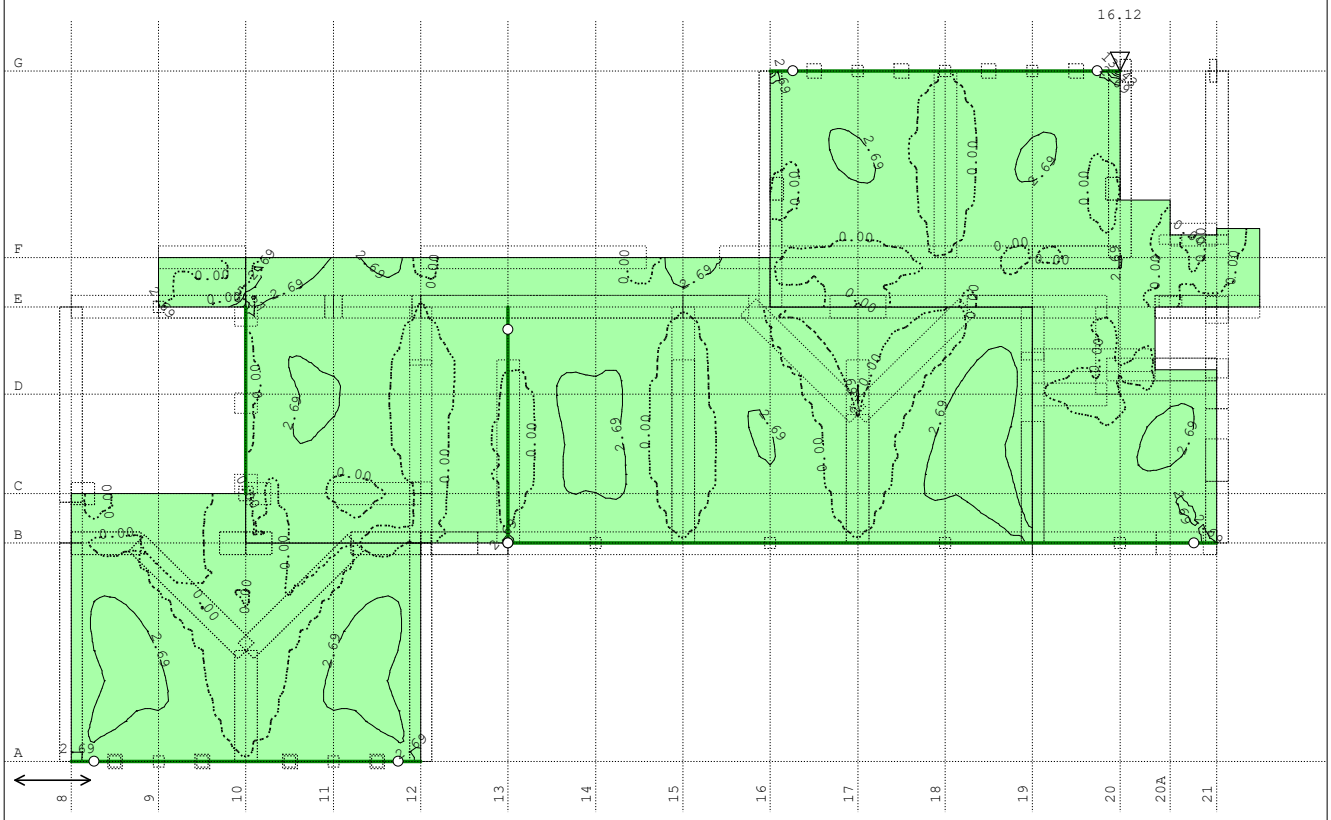
Prerez 3-3 x = 34.20m
Merodajna kombinacija za upogib:
1.00xI+0.60xII+1.00xIX
N1ed = 182.15 kN
M2ed = 0.00 kNm
M3ed = 91.90 kNm

Merodajna kombinacija za torzijo:
1.00xI+0.60xII-1.00xXI
M1ed = -274.95 kNm

Merodajna kombinacija za strig:
1.00xI+0.60xIV-1.00xXI
V2ed = -103.04 kN
V3ed = -71.34 kN
M1ed = -266.37 kNm

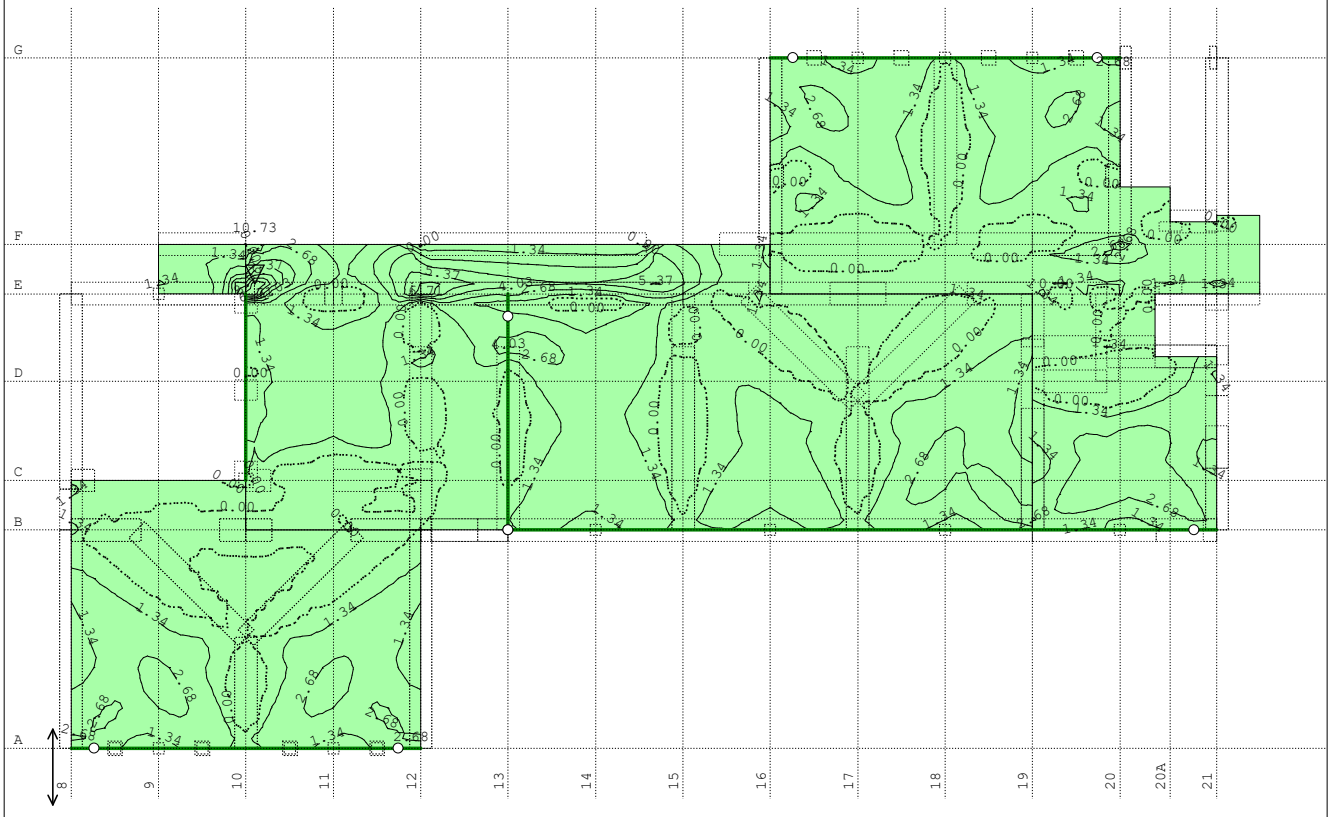
Vrd,max,2 = 1312.20 kN
Vrd,max,3 = 1312.20 kN
εb/εa = -1.692/25.000 ‰
Aa1 = 6.03 + 7.50` = 13.52 cm²
Aa2 = 5.03 + 7.50` = 12.53 cm²
Aa3 = 0.00 + 7.50` = 7.50 cm²
Aa4 = 0.00 + 7.50` = 7.50 cm²
Prerez ne dopušča

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



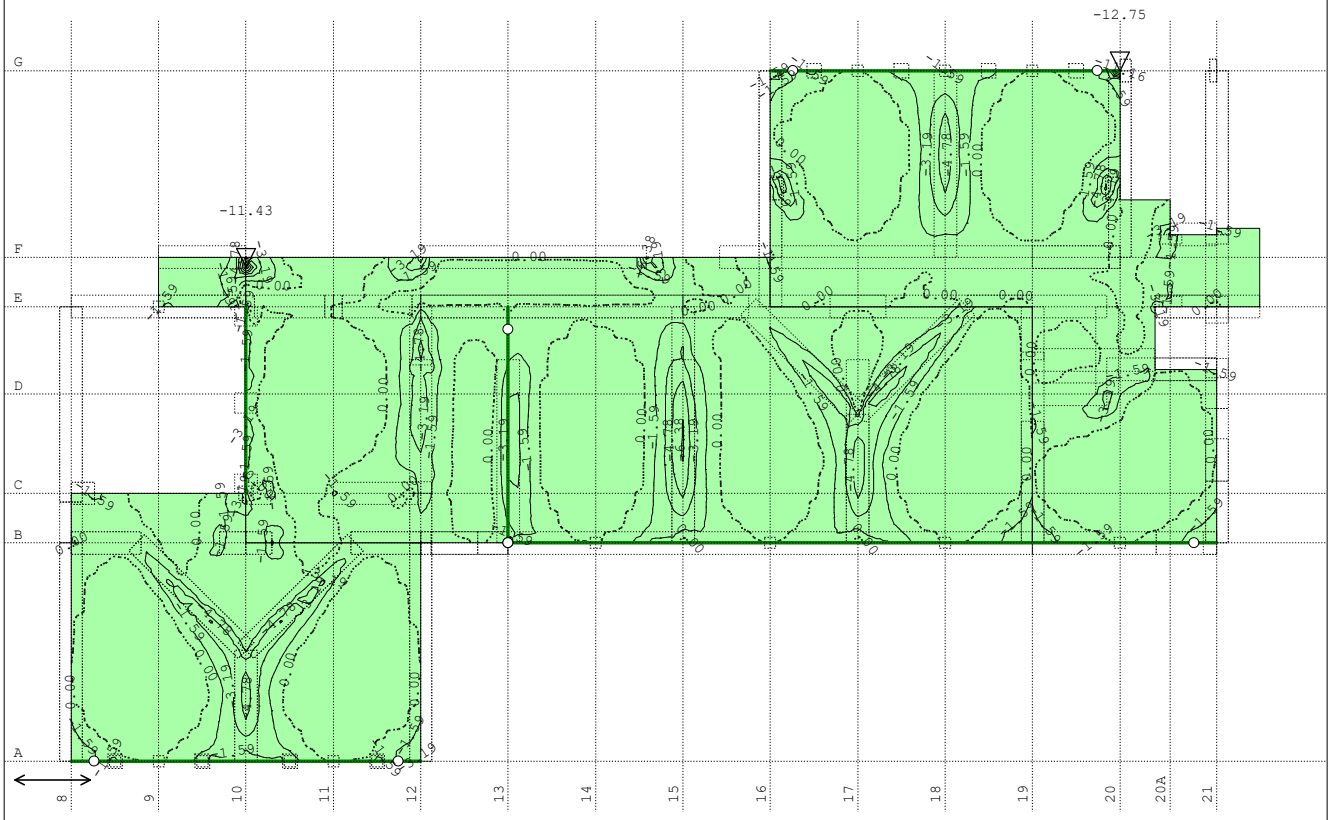
Nivo: plošča nad pritličjem [3.60 m]
Aa - sp.cona - Smer 1 - max Aa1,s= 16.12 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



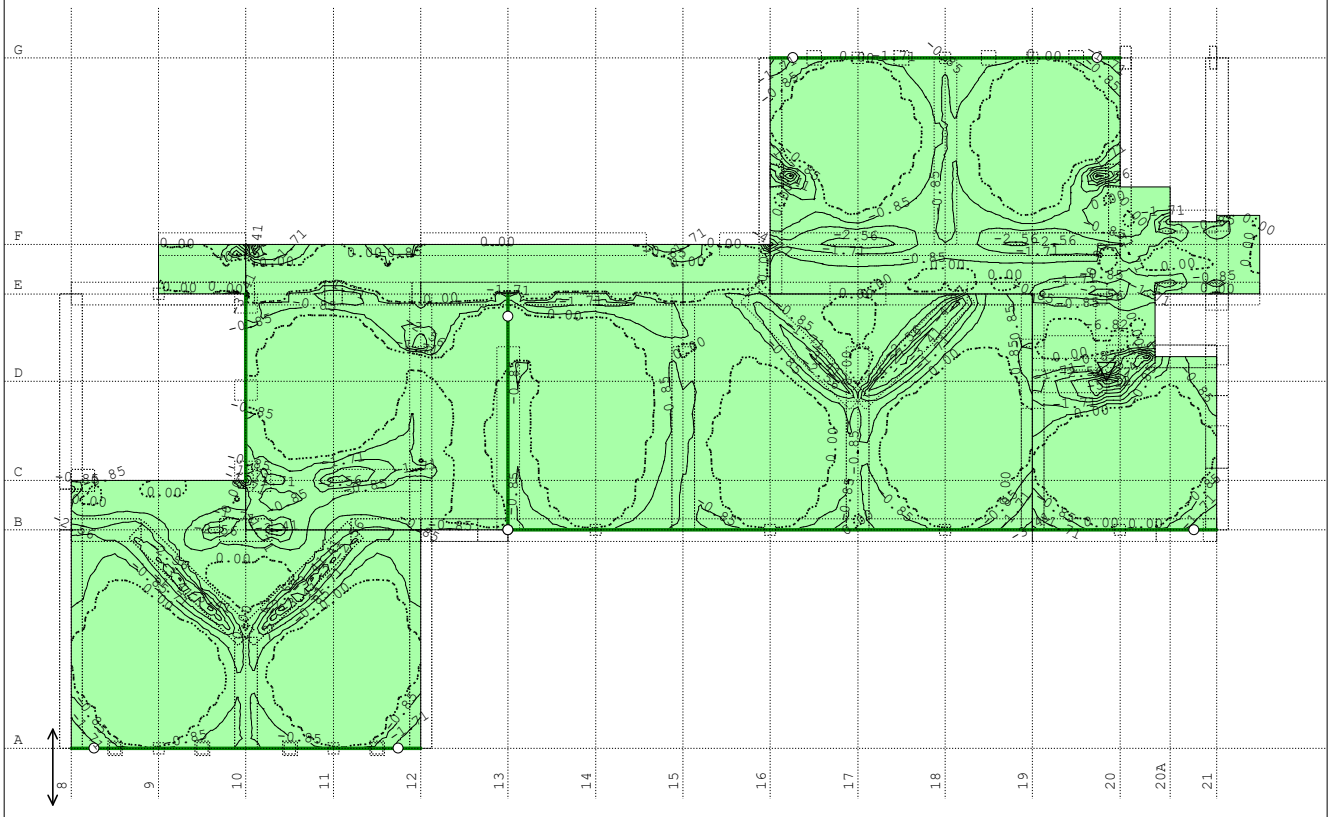
Nivo: plošča nad pritličjem [3.60 m]
Aa - sp.cona - Smer 2 - max Aa2,s= 10.73 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



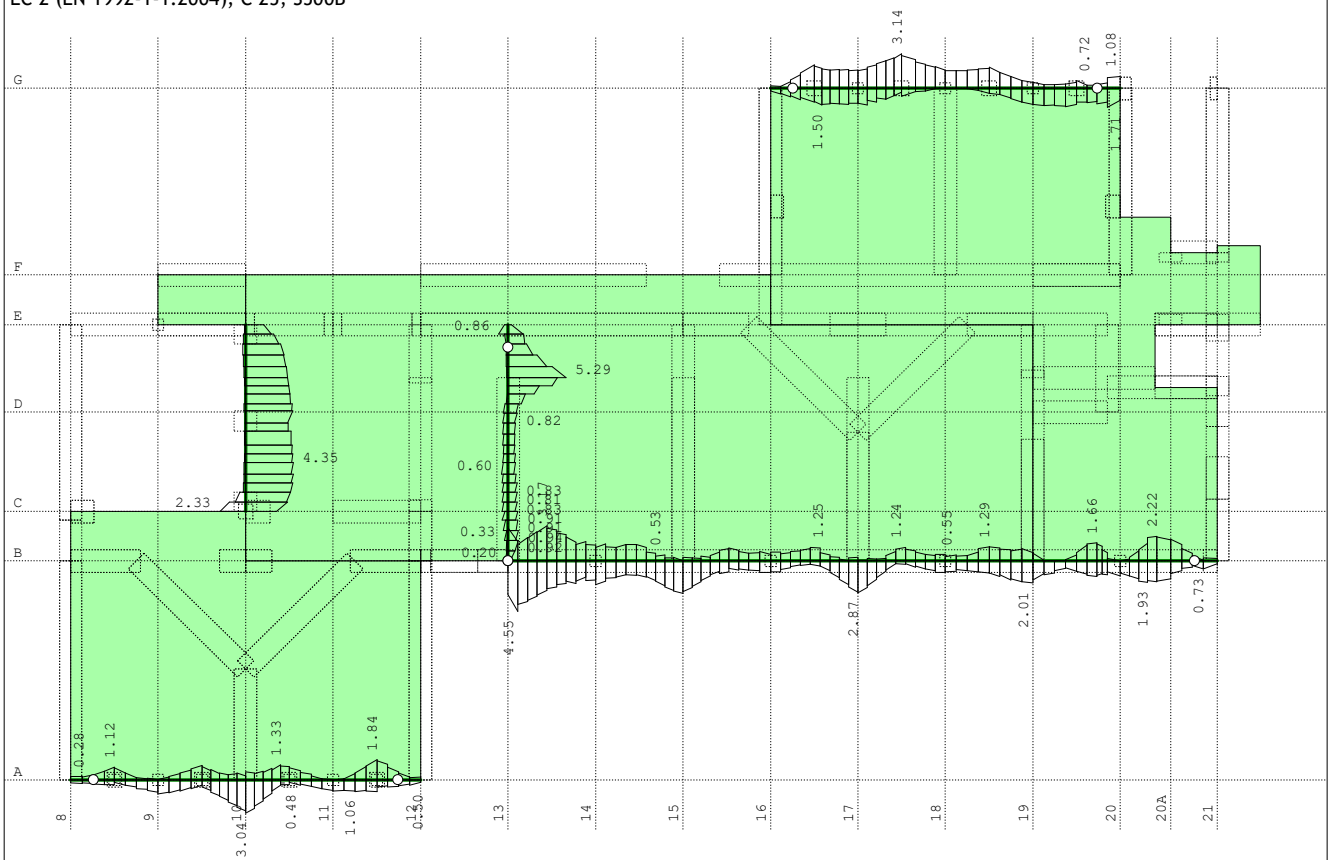
Nivo: plošča nad pritličjem [3.60 m]
Aa - zg.cona - Smer 1 - max Aa1,z= -12.75 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



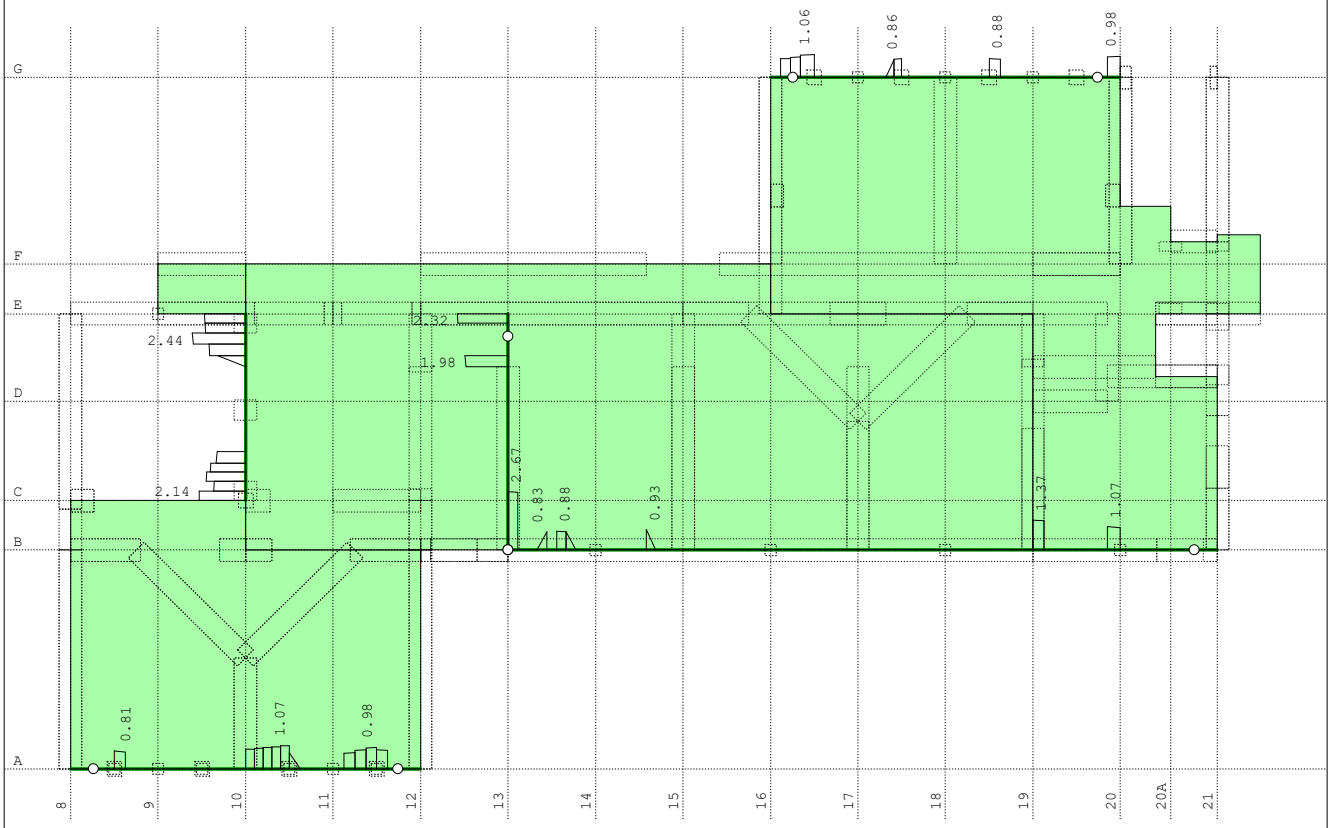
Nivo: plošča nad pritličjem [3.60 m]
Aa - zg.cona - Smer 2 - max Aa2,z= -6.82 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500B



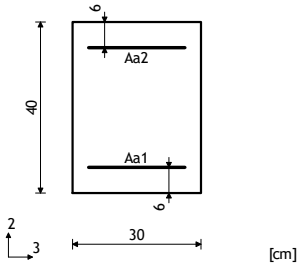
Nivo: plošča nad pritličjem [3.60 m]
Armatura v gredah: max Aa2/Aa1= 3.17 / 5.29 cm²

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500B



Nivo: plošča nad pritličjem [3.60 m]
Armatura v gredah: max Aa,st= 2.67 cm²

Greda 11656-8112
EC 2 (EN 1992-1-1:2004)
C 25 (γC = 1.50, γS = 1.15) [SP]
S500B
Kompletna obtežna shema



Prerez 1-1 x = 0.00m
Merodajna kombinacija za upogib:
1.00xI+0.60xII+1.00xVIII
N1ed = 15.74 kN
M2ed = 0.00 kNm
M3ed = 0.00 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xII+0.75xV+0.90xVI
M1ed = -3.62 kNm

Merodajna kombinacija za strig:
1.00xI+0.60xII-1.00xVIII
V2ed = -47.51 kN
V3ed = 0.53 kN
M1ed = -3.15 kNm

Vrd,max,2 = 413.10 kN
Vrd,max,3 = 437.40 kN
εb/εa = -0.008/25.000 ‰

Aa1 = 0.18 + 0.15` = 0.33 cm²
Aa2 = 0.18 + 0.15` = 0.33 cm²
Aa3 = 0.00 + 0.17` = 0.17 cm²
Aa4 = 0.00 + 0.17` = 0.17 cm²
Aa,st = 2.32 cm²/m (m=2)
`) - dodatna vzdolžna armatura za prevzem torzije.

Prerez 2-2 x = 0.33m
Merodajna kombinacija za upogib:
1.00xI+0.60xIV-1.00xVIII
N1ed = -8.84 kN
M2ed = 0.00 kNm
M3ed = -14.49 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xII+0.75xV+0.90xVI
M1ed = -3.62 kNm

Merodajna kombinacija za strig:
1.00xI+0.60xII-1.00xVIII
V2ed = -46.52 kN
V3ed = 0.53 kN
M1ed = -3.15 kNm

Vrd,max,2 = 413.10 kN
Vrd,max,3 = 437.40 kN
εb/εa = -2.154/25.000 ‰
Aa1 = 1.23 + 0.15` = 1.38 cm²
Aa2 = 0.71 + 0.15` = 0.86 cm²
Aa3 = 0.00 + 0.17` = 0.17 cm²
Aa4 = 0.00 + 0.17` = 0.17 cm²
Aa,st = 2.29 cm²/m (m=2)

Prerez 3-3 x = 0.66m
Merodajna kombinacija za upogib:
1.00xI+0.60xII+1.00xVIII
N1ed = 26.36 kN
M2ed = 0.00 kNm
M3ed = 16.77 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xIII+0.75xV+0.90xVI
M1ed = -4.55 kNm

Merodajna kombinacija za strig:
1.35xI+1.50xII+0.75xV+0.90xVI
V2ed = -24.22 kN
V3ed = 2.93 kN
M1ed = -4.52 kNm

Vrd,max,2 = 413.10 kN
Vrd,max,3 = 437.40 kN
εb/εa = -1.238/25.000 ‰
Aa1 = 1.51 + 0.19` = 1.69 cm²
Aa2 = 0.00 + 0.19` = 0.19 cm²
Aa3 = 0.00 + 0.22` = 0.22 cm²
Aa4 = 0.00 + 0.22` = 0.22 cm²
Aa,st = 0.00 cm²/m (m=2)

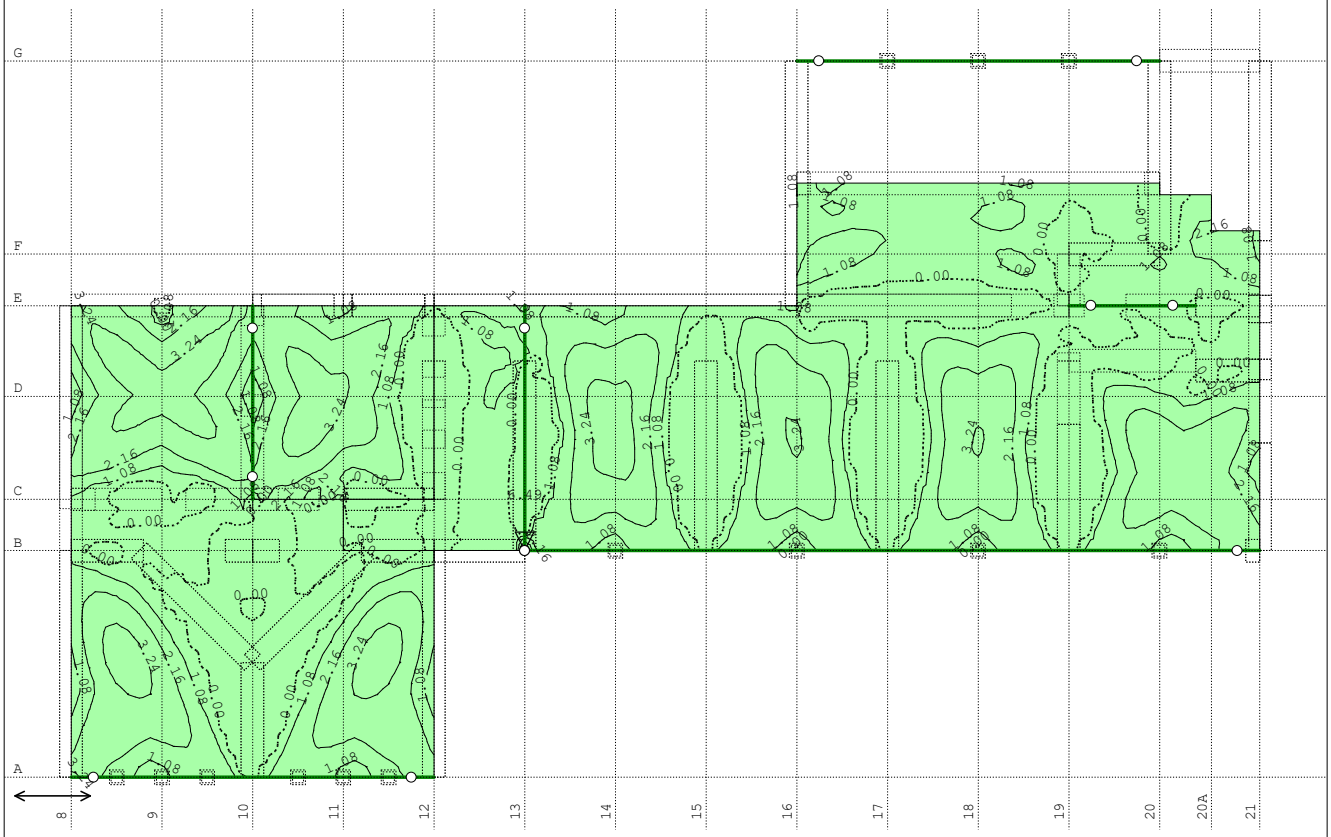
Prerez 4-4 x = 1.82m
Merodajna kombinacija za upogib:
1.00xI+0.60xII+1.00xVIII
N1ed = 42.96 kN
M2ed = 0.00 kNm
M3ed = 64.64 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xIII+0.75xV+0.90xVI
M1ed = -2.65 kNm

Merodajna kombinacija za strig:
1.00xI+0.60xII-1.00xVIII
V2ed = -43.46 kN
V3ed = -0.10 kN
M1ed = -1.74 kNm

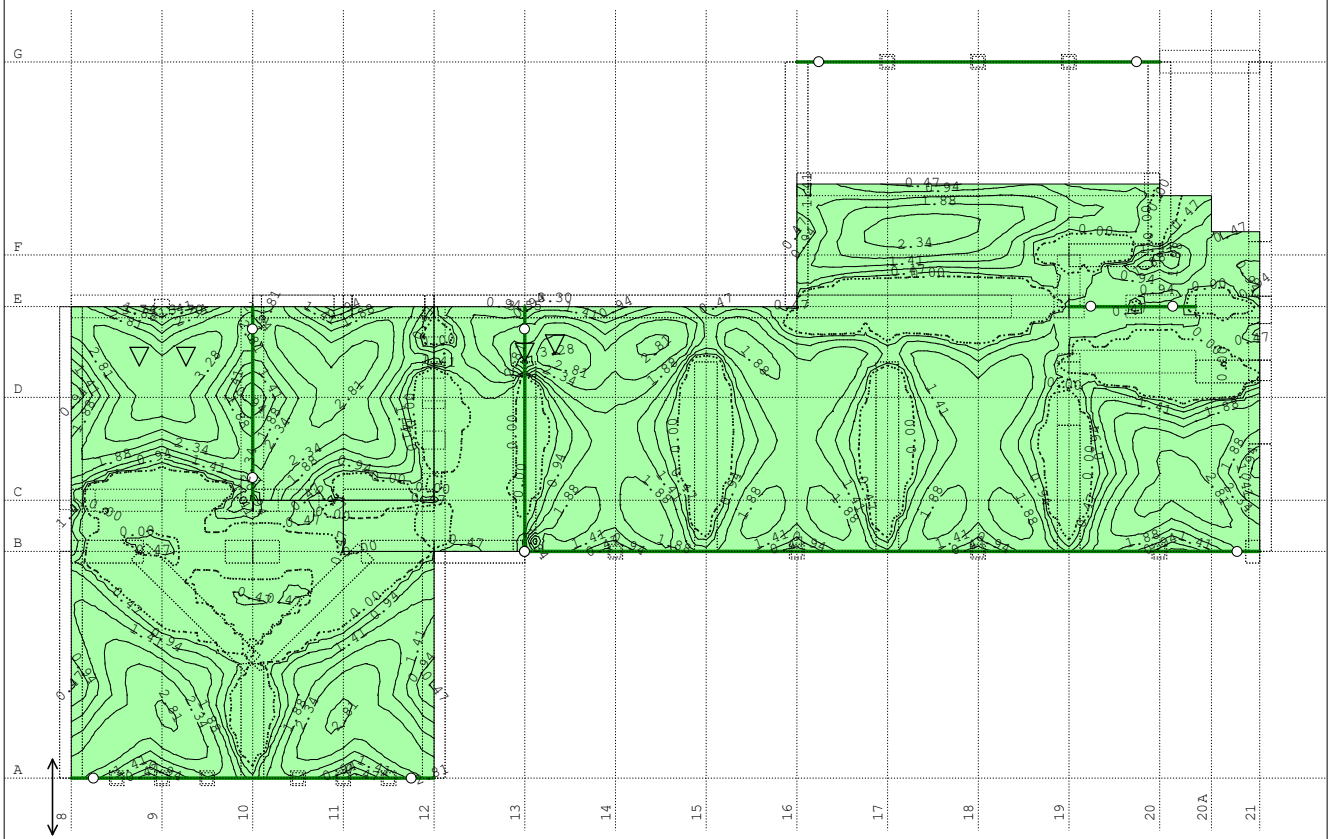
Vrd,max,2 = 413.10 kN
Vrd,max,3 = 437.40 kN
εb/εa = -3.500/22.814 ‰
Aa1 = 5.18 + 0.11` = 5.29 cm²
Aa2 = 0.00 + 0.11` = 0.11 cm²
Aa3 = 0.00 + 0.13` = 0.13 cm²
Aa4 = 0.00 + 0.13` = 0.13 cm²
Aa,st = 1.93 cm²/m (m=2)

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



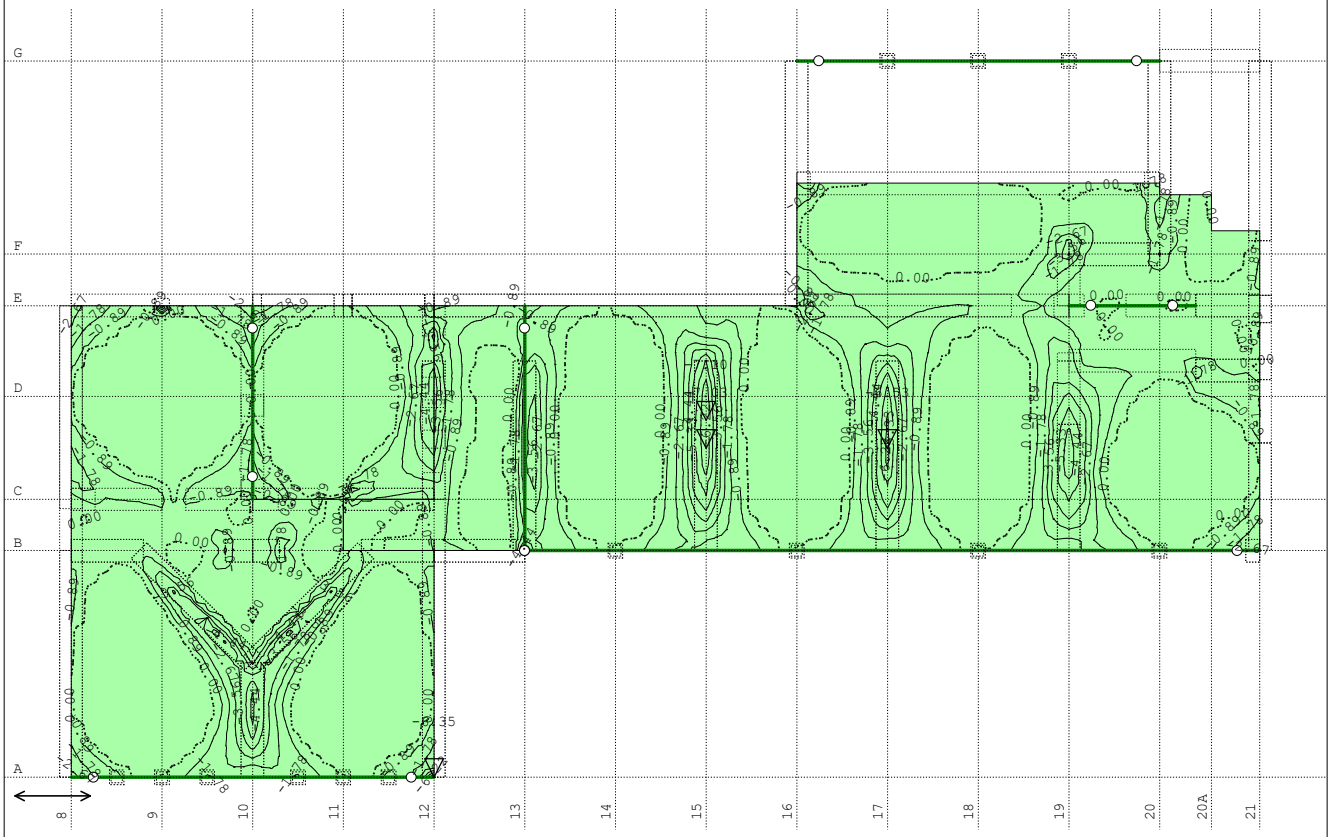
Nivo: plošča nad nadstropjem [6.90 m]
Aa - sp.cona - Smer 1 - max Aa1,s= 6.49 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



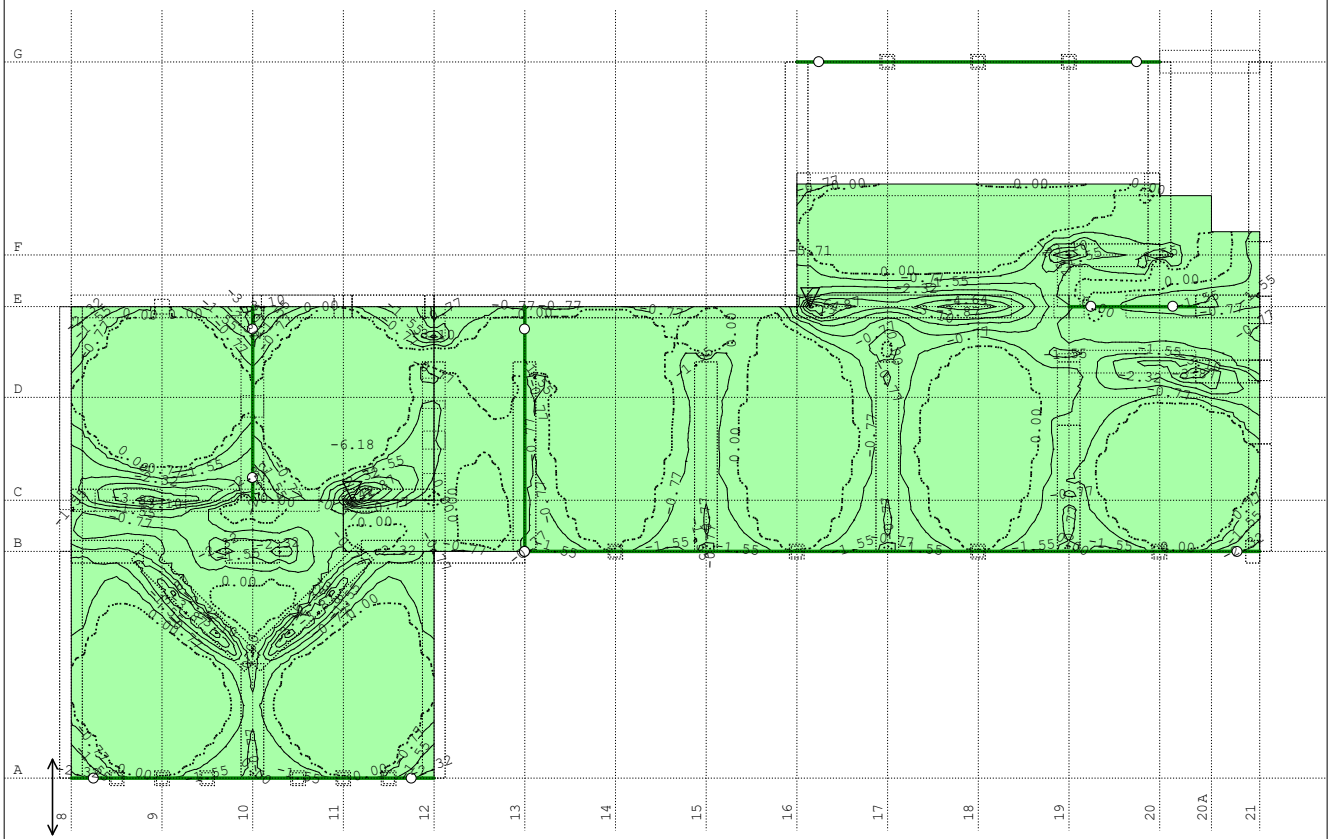
Nivo: plošča nad nadstropjem [6.90 m]
Aa - sp.cona - Smer 2 - max Aa2,s= 3.74 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



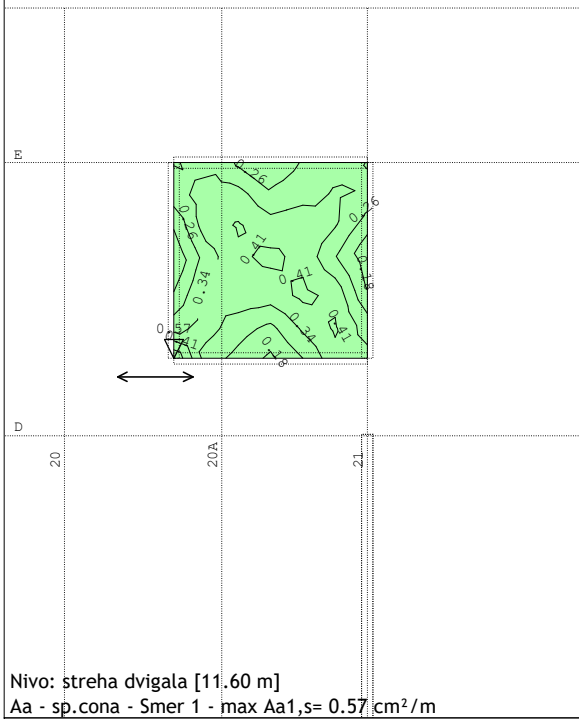
Nivo: plošča nad nadstropjem [6.90 m]
Aa - zg.cona - Smer 1 - max Aa1,z= -7.10 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



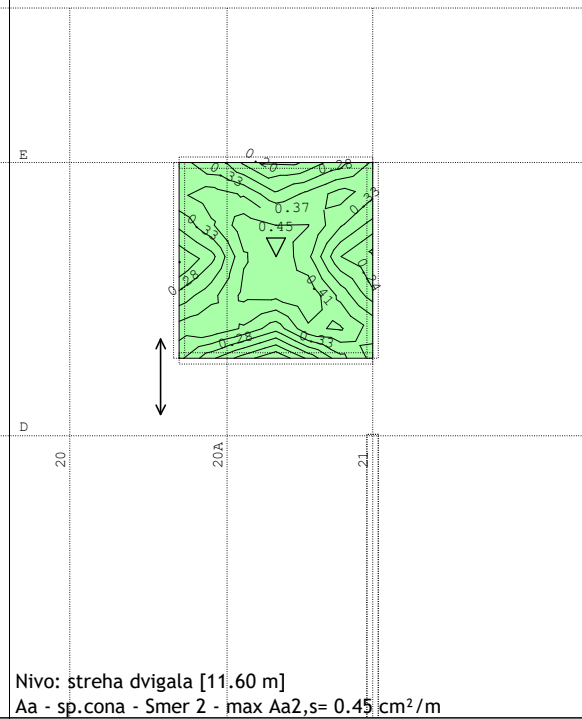
Nivo: plošča nad nadstropjem [6.90 m]
Aa - zg.cona - Smer 2 - max Aa2,z= -6.18 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



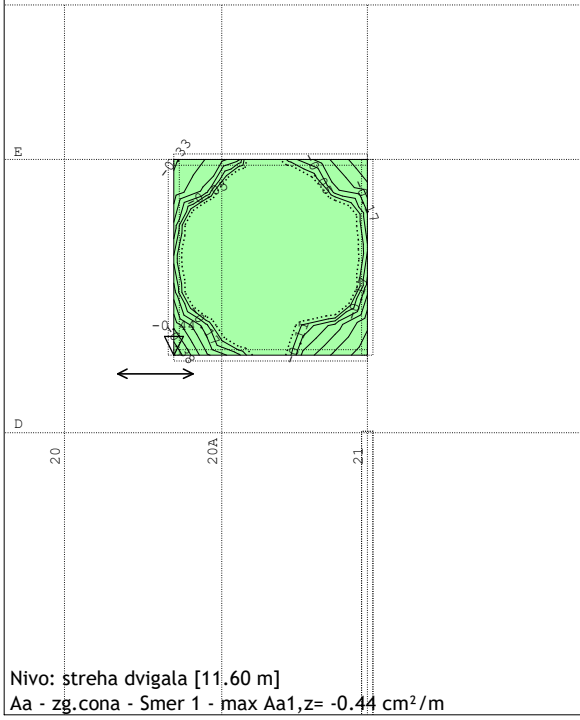
Nivo: streha dvigala [11.60 m]
Aa - sp.cona - Smer 1 - max Aa1,s= 0.57 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



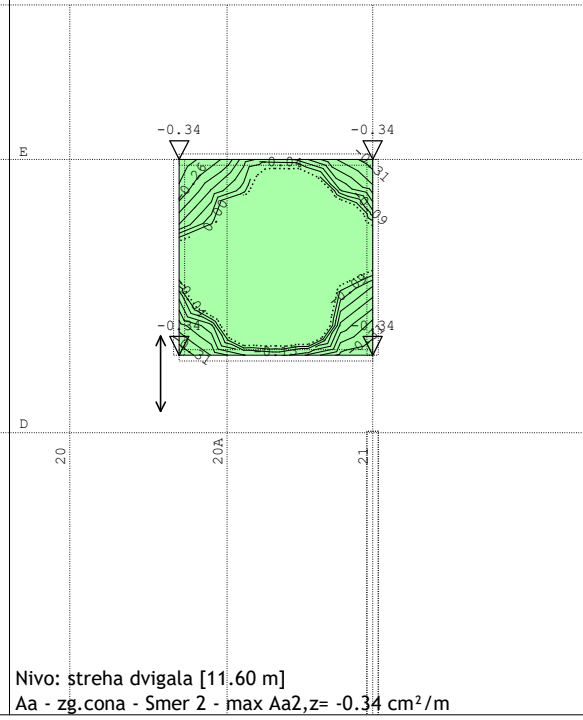
Nivo: streha dvigala [11.60 m]
Aa - sp.cona - Smer 2 - max Aa2,s= 0.45 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



Nivo: streha dvigala [11.60 m]
Aa - zg.cona - Smer 1 - max Aa1,z= -0.44 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



Nivo: streha dvigala [11.60 m]
Aa - zg.cona - Smer 2 - max Aa2,z= -0.34 cm²/m

Vhodni podatki - Konstrukcija

Shema nivojev

Naziv	z [m]	h [m]
nivo slemena	12.50	0.90
streha dvigala	11.60	0.80
nivo kapa	10.80	3.90
plošča nad nadstropjem	6.90	3.30

Naziv	z [m]	h [m]
plošča nad pritličjem	3.60	3.60
pasovni temelji	0.00	1.00
temelj dvigala	-1.00	

Tabele materialov

No	Naziv materiala	E[kN/m2]	μ	γ[kN/m3]	αt[1/C]	Em[kN/m2]	μm
1	C 25/30	3.100e+7	0.20	25.00	1.000e-5	3.100e+7	0.20
2	C 20/25	3.000e+7	0.20	25.00	1.000e-5	3.000e+7	0.20

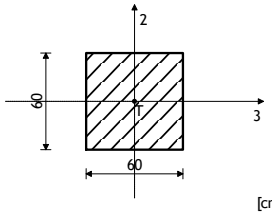
Seti plošč

No	d[m]	e[m]	Material	Tip preračuna	Ortotropija	E2[kN/m2]	G[kN/m2]	α
<1>	0.250	0.125	1	Tanka plošča	Izotropna			
<2>	0.200	0.100	1	Tanka plošča	Izotropna			
<3>	0.200	0.100	2	Tanka plošča	Izotropna			

Seti gred

Set: 1 Prerez: b/d=60/60, Fiktivna ekscentričnost

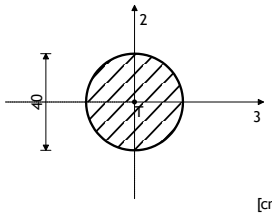
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	3.600e-1	3.000e-1	3.000e-1	1.825e-2	1.080e-2	1.080e-2



[cm]

Set: 2 Prerez: D=40, Fiktivna ekscentričnost

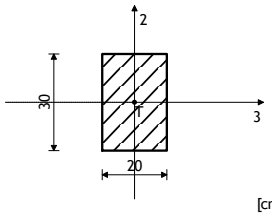
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.257e-1	1.131e-1	1.131e-1	2.513e-3	1.257e-3	1.257e-3



[cm]

Set: 3 Prerez: b/d=20/30, Fiktivna ekscentričnost

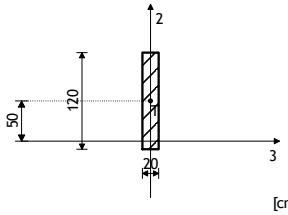
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	6.000e-2	5.000e-2	5.000e-2	4.695e-4	2.000e-4	4.500e-4



[cm]

Set: 4 Prerez: b/d=20/120, Fiktivna ekscentričnost

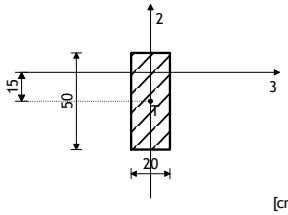
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	2.400e-1	2.000e-1	2.000e-1	2.864e-3	8.000e-4	2.880e-2



[cm]

Set: 5 Prerez: b/d=20/50, Fiktivna ekscentričnost

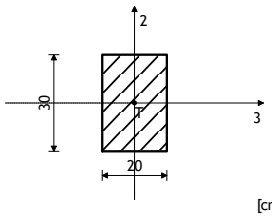
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.000e-1	8.333e-2	8.333e-2	9.981e-4	3.333e-4	2.083e-3



[cm]

Set: 6 Prerez: b/d=20/30, Fiktivna ekscentričnost

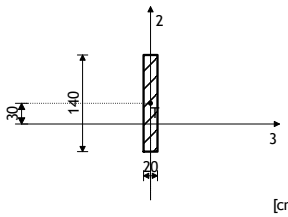
Mat.	A1	A2	A3	I1	I2	I3
2 - C 20/25	6.000e-2	5.000e-2	5.000e-2	4.695e-4	2.000e-4	4.500e-4



[cm]

Set: 7 Prerez: b/d=20/140, Fiktivna ekscentričnost

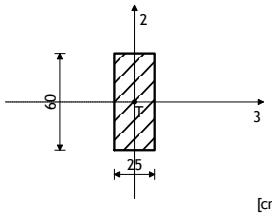
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	2.800e-1	2.333e-1	2.333e-1	3.397e-3	9.333e-4	4.573e-2



[cm]

Set: 8 Prerez: b/d=25/60, Fiktivna ekscentričnost

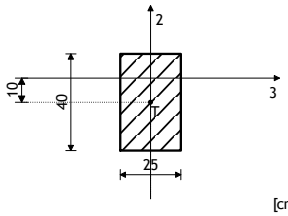
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.500e-1	1.250e-1	1.250e-1	2.307e-3	7.812e-4	4.500e-3



[cm]

Set: 9 Prerez: b/d=25/40, Fiktivna ekscentričnost

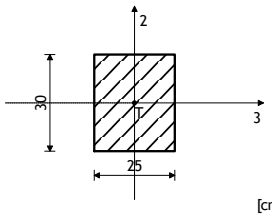
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.000e-1	8.333e-2	8.333e-2	1.273e-3	5.208e-4	1.333e-3



[cm]

Set: 10 Prerez: b/d=25/30, Fiktivna ekscentričnost

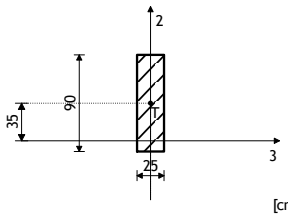
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	7.500e-2	6.250e-2	6.250e-2	7.752e-4	3.906e-4	5.625e-4



[cm]

Set: 11 Prerez: b/d=25/90, Fiktivna ekscentričnost

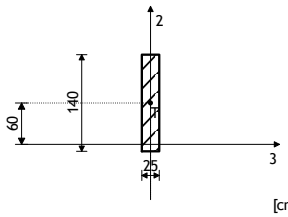
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	2.250e-1	1.875e-1	1.875e-1	3.868e-3	1.172e-3	1.519e-2



[cm]

Set: 12 Prerez: b/d=25/140, Fiktivna ekscentričnost

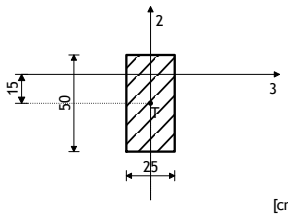
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	3.500e-1	2.917e-1	2.917e-1	6.471e-3	1.823e-3	5.717e-2



[cm]

Set: 13 Prerez: b/d=25/50, Fiktivna ekscentričnost

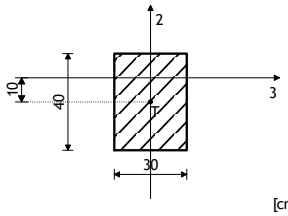
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.250e-1	1.042e-1	1.042e-1	1.788e-3	6.510e-4	2.604e-3



[cm]

Set: 14 Prerez: b/d=30/40, Fiktivna ekscentričnost

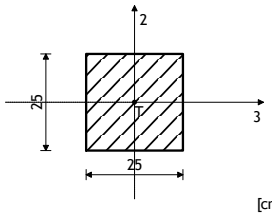
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.200e-1	1.000e-1	1.000e-1	1.944e-3	9.000e-4	1.600e-3



[cm]

Set: 15 Prerez: b/d=25/25, Fiktivna ekscentričnost

Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	6.250e-2	5.208e-2	5.208e-2	5.501e-4	3.255e-4	3.255e-4



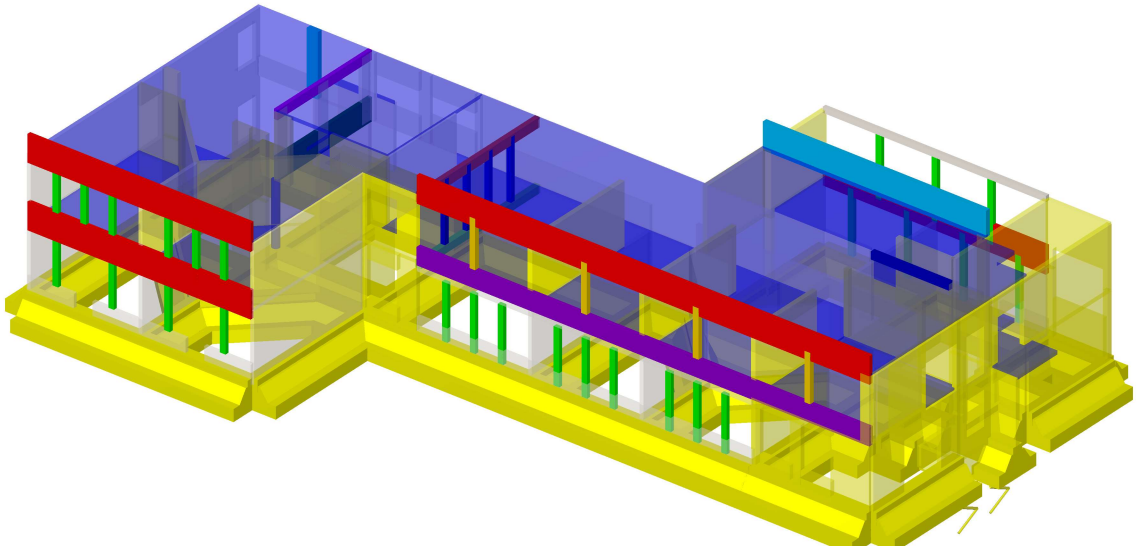
[cm]

Seti površinskih podpor

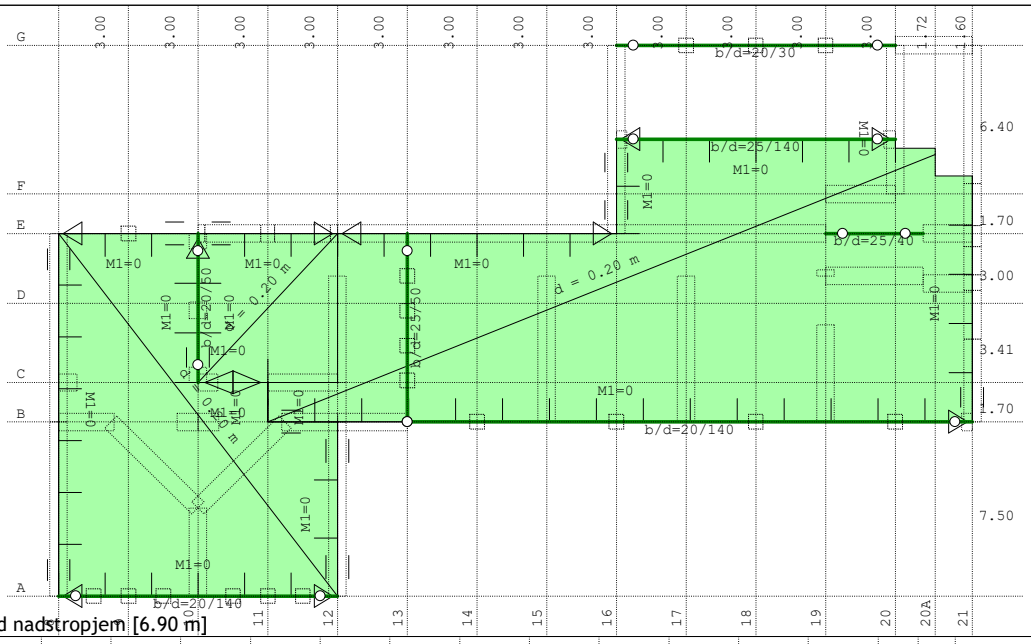
Set	K,R1	K,R2	K,R3
1	1.000e+4	1.000e+4	2.000e+4

Seti linijskih podpor

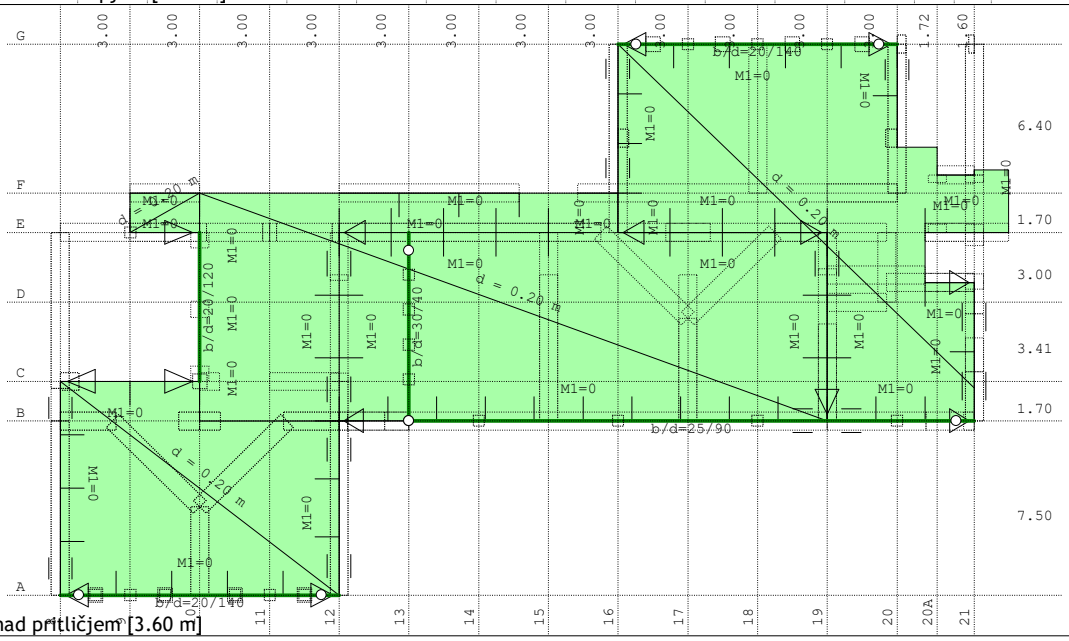
Set	K,R1	K,R2	K,R3	K,M1	Tla [m]
1	1.000e+4	2.000e+4	1.000e+4		0.600



Izometrija



Nivo: plošča nad nadstropjem [6.90 m]



Nivo: plošča nad pritličjem [3.60 m]

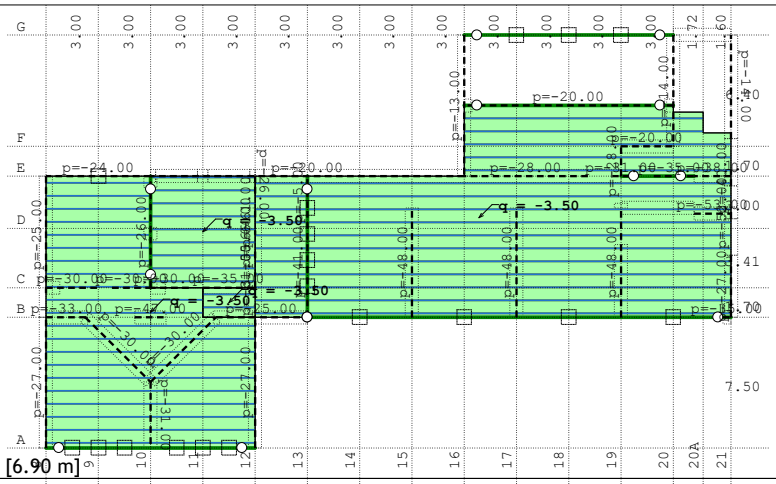
Vhodni podatki - Obtežba

Lista obtežnih primerov

LC	Naziv
1	lastna+stalna (g)
2	koristna čez celo
3	koristna 1
4	koristna 2
5	sneg
6	veter +Y
7	veter -Y
8	Komb.: I
9	Komb.: I+II
10	Komb.: I+III
11	Komb.: I+IV
12	Komb.: I+V
13	Komb.: I+VI
14	Komb.: I+VII
15	Komb.: I+V+0.6xVI
16	Komb.: I+0.5xV+VI
17	Komb.: I+II+0.5xV
18	Komb.: I+II+0.5xV+0.6xVI
19	Komb.: I+0.7xII+V+0.6xVI
20	Komb.: I+0.7xII+0.5xV+VI
21	Komb.: 1.8xI
22	Komb.: 1.8xI+II
23	Komb.: 1.8xI+III
24	Komb.: 1.8xI+IV
25	Komb.: 1.8xI+V
26	Komb.: 1.8xI+VI
27	Komb.: 1.8xI+VII
28	Komb.: 1.8xI+V+0.6xVI
29	Komb.: 1.8xI+0.5xV+VI
30	Komb.: 3xI
31	Komb.: 3xI+II
32	Komb.: 3xI+III
33	Komb.: 3xI+IV
34	Komb.: 3xI+V
35	Komb.: 3xI+VI
36	Komb.: 3xI+VII
37	Komb.: 3xI+II+0.5xV+0.6xVI
38	Komb.: 3xI+0.7xII+V+0.6xVI
39	Komb.: 3xI+0.7xII+0.5xV+VI
40	Komb.: 3xI+III+0.5xV+0.6xVI
41	Komb.: 3xI+0.7xIII+V+0.6xVI
42	Komb.: 3xI+0.7xIII+0.5xV+VI
43	Komb.: 3xI+IV+0.5xV+0.6xVI
44	Komb.: 3xI+0.7xIV+V+0.6xVI
45	Komb.: 3xI+0.7xIV+0.5xV+VI
46	Komb.: 1.35xI+1.05xIV+1.5xV+0.9xVII
47	Komb.: 1.35xI+1.05xIV+1.5xV+0.9xVI
48	Komb.: 1.35xI+1.05xIII+1.5xV+0.9xVII
49	Komb.: 1.35xI+1.05xIII+1.5xV+0.9xVI
50	Komb.: 1.35xI+1.05xII+1.5xV+0.9xVII
51	Komb.: 1.35xI+1.05xII+1.5xV+0.9xVI
52	Komb.: 1.35xI+1.05xIV+0.75xV+1.5xVII
53	Komb.: 1.35xI+1.05xIV+0.75xV+1.5xVI
54	Komb.: 1.35xI+1.05xIII+0.75xV+1.5xVII
55	Komb.: 1.35xI+1.05xIII+0.75xV+1.5xVI
56	Komb.: 1.35xI+1.05xII+0.75xV+1.5xVII
57	Komb.: 1.35xI+1.05xII+0.75xV+1.5xVI
58	Komb.: 1.35xI+1.5xIV+0.75xV+0.9xVII
59	Komb.: 1.35xI+1.5xIV+0.75xV+0.9xVI
60	Komb.: 1.35xI+1.5xIII+0.75xV+0.9xVII
61	Komb.: 1.35xI+1.5xIII+0.75xV+0.9xVI
62	Komb.: 1.35xI+1.5xII+0.75xV+0.9xVII
63	Komb.: 1.35xI+1.5xII+0.75xV+0.9xVI
64	Komb.: I+1.05xIV+1.5xV+0.9xVII
65	Komb.: I+1.05xIV+1.5xV+0.9xVI
66	Komb.: I+1.05xIII+1.5xV+0.9xVII
67	Komb.: I+1.05xIII+1.5xV+0.9xVI
68	Komb.: I+1.05xII+1.5xV+0.9xVII
69	Komb.: I+1.05xII+1.5xV+0.9xVI
70	Komb.: I+1.05xIV+0.75xV+1.5xVII

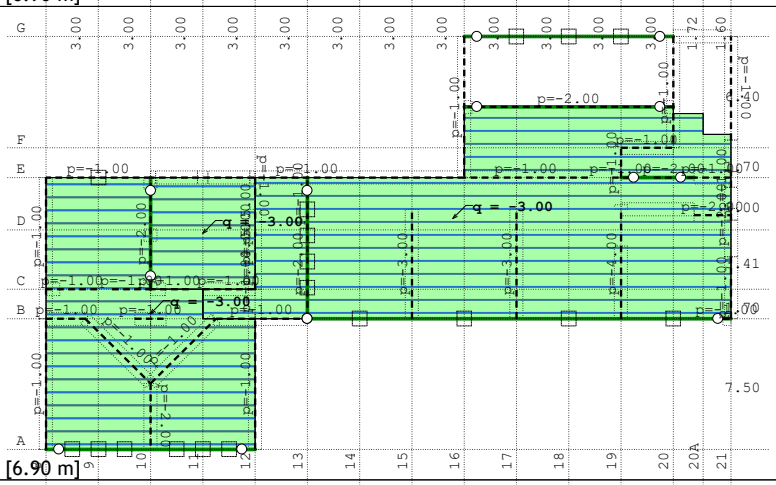
LC	Naziv
71	Komb.: I+1.05xIV+0.75xV+1.5xVI
72	Komb.: I+1.05xIII+0.75xV+1.5xVII
73	Komb.: I+1.05xIII+0.75xV+1.5xVI
74	Komb.: I+1.05xII+0.75xV+1.5xVII
75	Komb.: I+1.05xII+0.75xV+1.5xVI
76	Komb.: I+1.5xIV+0.75xV+0.9xVII
77	Komb.: I+1.5xIV+0.75xV+0.9xVI
78	Komb.: I+1.5xIII+0.75xV+0.9xVII
79	Komb.: I+1.5xIII+0.75xV+0.9xVI
80	Komb.: I+1.5xII+0.75xV+0.9xVII
81	Komb.: I+1.5xII+0.75xV+0.9xVI
82	Komb.: 1.35xI+1.05xIV+1.5xVII
83	Komb.: 1.35xI+1.05xIV+1.5xVI
84	Komb.: 1.35xI+1.05xIV+1.5xV
85	Komb.: 1.35xI+1.05xIII+1.5xVII
86	Komb.: 1.35xI+1.05xIII+1.5xVI
87	Komb.: 1.35xI+1.05xIII+1.5xV
88	Komb.: 1.35xI+1.05xII+1.5xVII
89	Komb.: 1.35xI+1.05xII+1.5xVI
90	Komb.: 1.35xI+1.05xII+1.5xV
91	Komb.: 1.35xI+1.5xV+0.9xVII
92	Komb.: 1.35xI+1.5xV+0.9xVI
93	Komb.: 1.35xI+1.5xIV+0.9xVII
94	Komb.: 1.35xI+1.5xIV+0.9xVI
95	Komb.: 1.35xI+1.5xIII+0.9xVII
96	Komb.: 1.35xI+1.5xIII+0.9xVI
97	Komb.: 1.35xI+1.5xII+0.9xVII
98	Komb.: 1.35xI+1.5xII+0.9xVI
99	Komb.: 1.35xI+0.75xV+1.5xVII
100	Komb.: 1.35xI+0.75xV+1.5xVI
101	Komb.: 1.35xI+1.5xIV+0.75xV
102	Komb.: 1.35xI+1.5xIII+0.75xV
103	Komb.: 1.35xI+1.5xII+0.75xV
104	Komb.: I+1.05xIV+1.5xVII
105	Komb.: I+1.05xIV+1.5xVI
106	Komb.: I+1.05xIV+1.5xV
107	Komb.: I+1.05xIII+1.5xVII
108	Komb.: I+1.05xIII+1.5xVI
109	Komb.: I+1.05xIII+1.5xV
110	Komb.: I+1.05xII+1.5xVII
111	Komb.: I+1.05xII+1.5xVI
112	Komb.: I+1.05xII+1.5xV
113	Komb.: I+1.5xV+0.9xVII
114	Komb.: I+1.5xV+0.9xVI
115	Komb.: I+1.5xIV+0.9xVII
116	Komb.: I+1.5xIV+0.9xVI
117	Komb.: I+1.5xIII+0.9xVII
118	Komb.: I+1.5xIII+0.9xVI
119	Komb.: I+1.5xII+0.9xVII
120	Komb.: I+1.5xII+0.9xVI
121	Komb.: I+0.75xV+1.5xVII
122	Komb.: I+0.75xV+1.5xVI
123	Komb.: I+1.5xIV+0.75xV
124	Komb.: I+1.5xIII+0.75xV
125	Komb.: I+1.5xII+0.75xV
126	Komb.: 1.35xI+1.5xVII
127	Komb.: 1.35xI+1.5xVI
128	Komb.: 1.35xI+1.5xV
129	Komb.: 1.35xI+1.5xIV
130	Komb.: 1.35xI+1.5xIII
131	Komb.: 1.35xI+1.5xII
132	Komb.: I+1.5xVII
133	Komb.: I+1.5xVI
134	Komb.: I+1.5xV
135	Komb.: I+1.5xIV
136	Komb.: I+1.5xIII
137	Komb.: I+1.5xII
138	Komb.: 1.35xI
139	Komb.: I

Obt. 1: lastna+stalna (g)



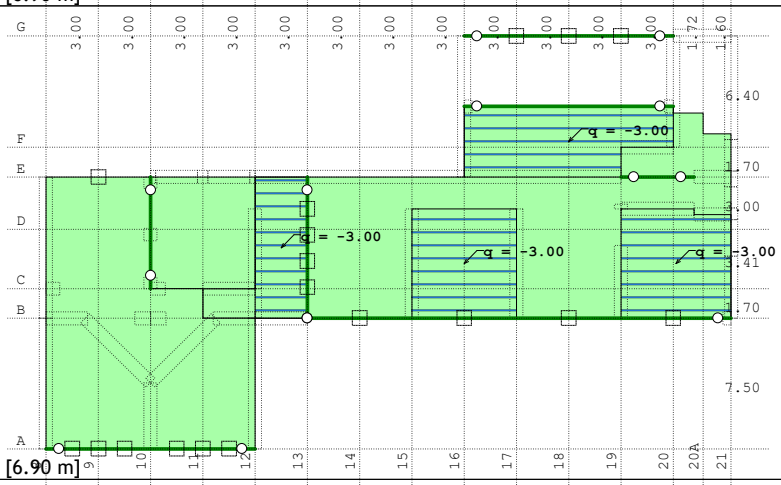
Nivo: plošča nad nadstropjem [6.90 m]

Obt. 2: koristna čez celo



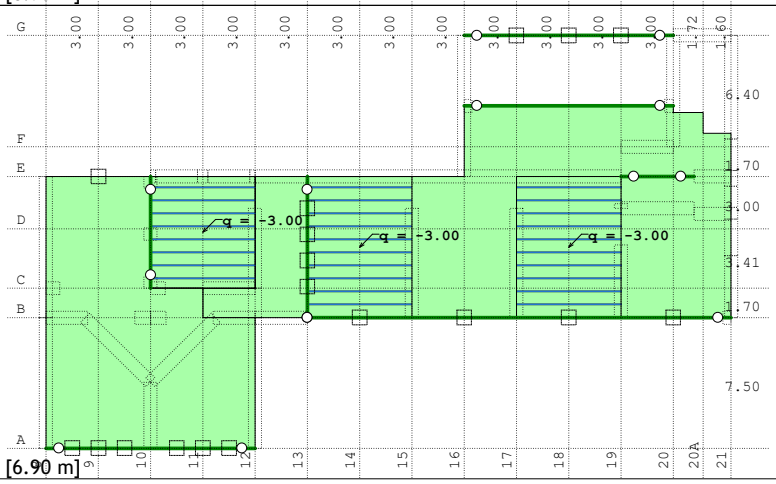
Nivo: plošča nad nadstropjem [6.90 m]

Obt. 3: koristna 1



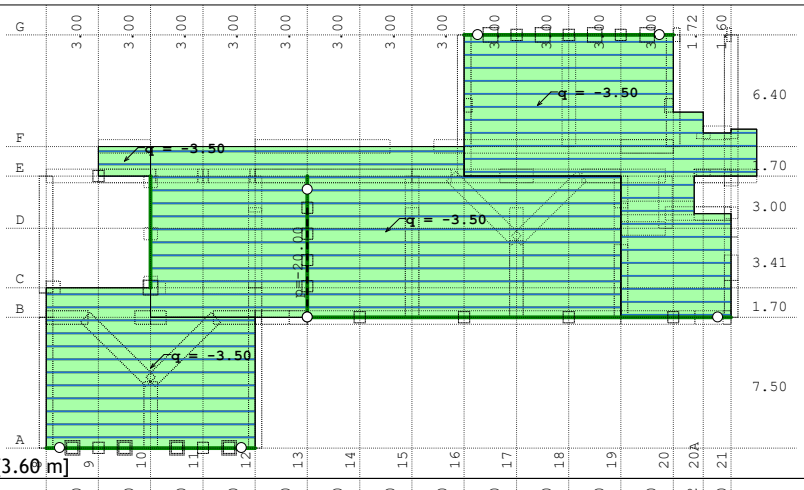
Nivo: plošča nad nadstropjem [6.90 m]

Obt. 4: koristna 2



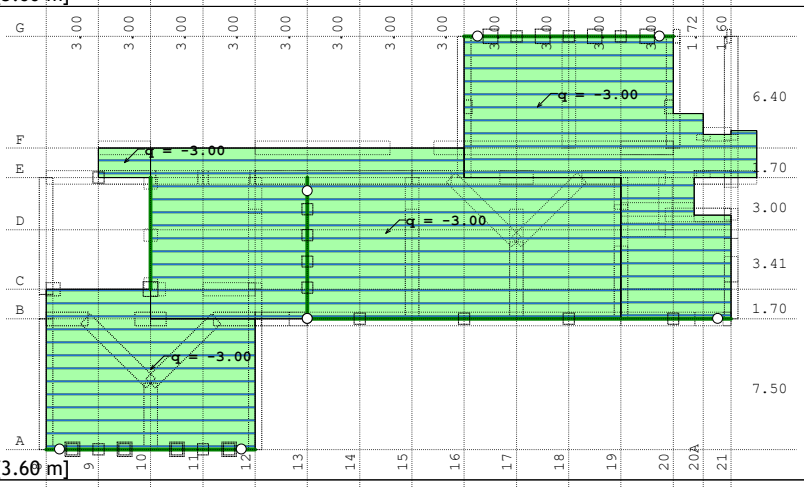
Nivo: plošča nad nadstropjem [6.90 m]

Obt. 1: lastna+stalna (g)



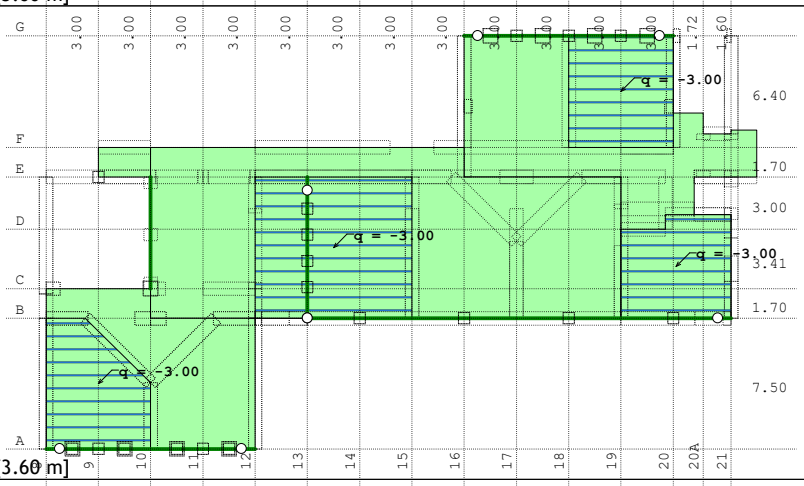
Nivo: plošča nad pritličjem [3.60 m]

Obt. 2: koristna čez celo



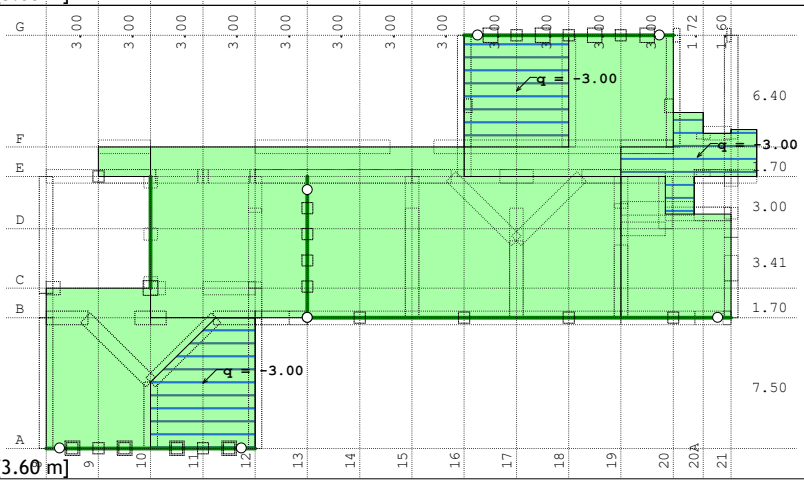
Nivo: plošča nad pritličjem [3.60 m]

Obt. 3: koristna 1



Nivo: plošča nad pritličjem [3.60 m]

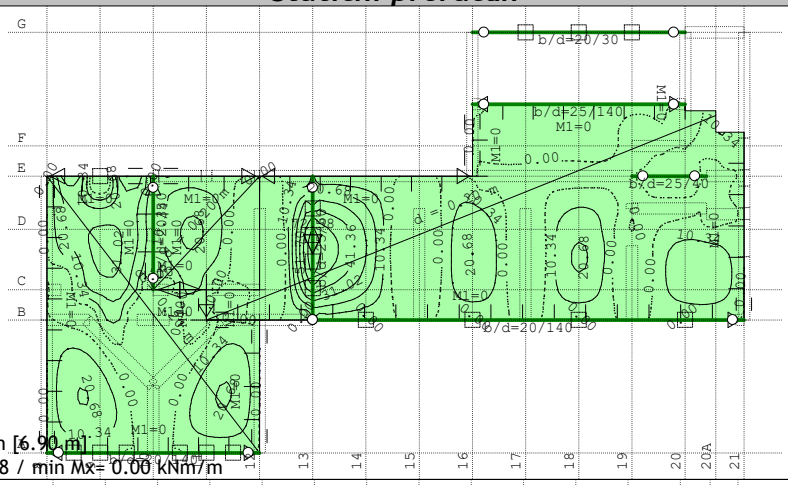
Obt. 4: koristna 2



Nivo: plošča nad pritličjem [3.60 m]

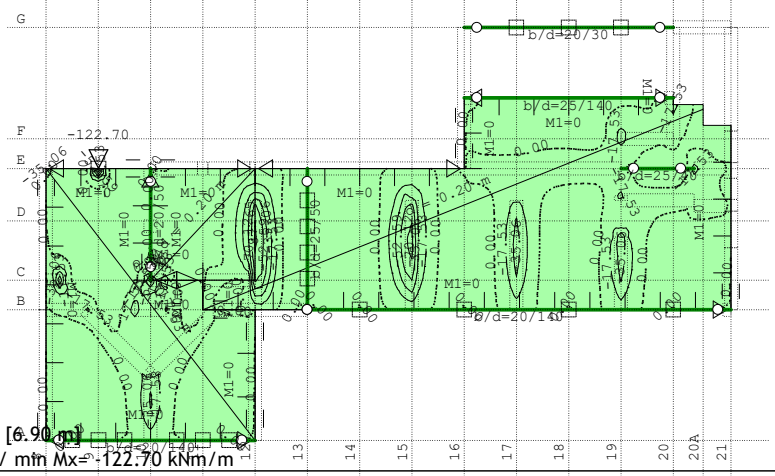
Statični preračun

Obt. 143: [MSN] 46-139



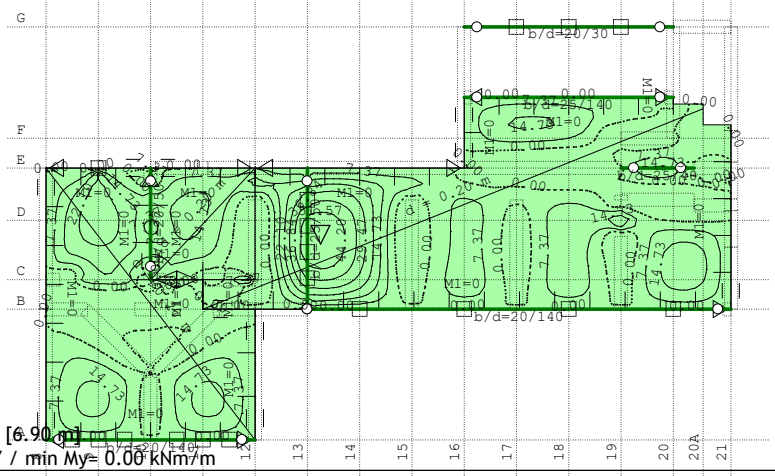
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v plošči: max Mx= 72.38 / min Mx= 0.00 kNm/m

Obt. 143: [MSN] 46-139



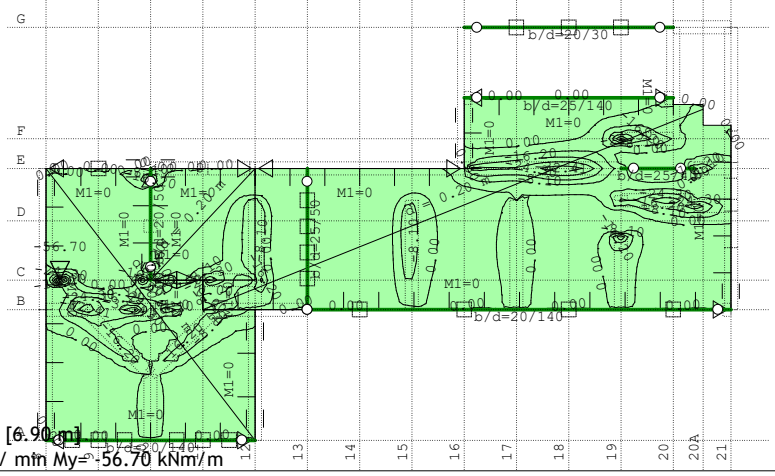
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v plošči: max Mx= 0.00 / min Mx= -122.70 kNm/m

Obt. 143: [MSN] 46-139



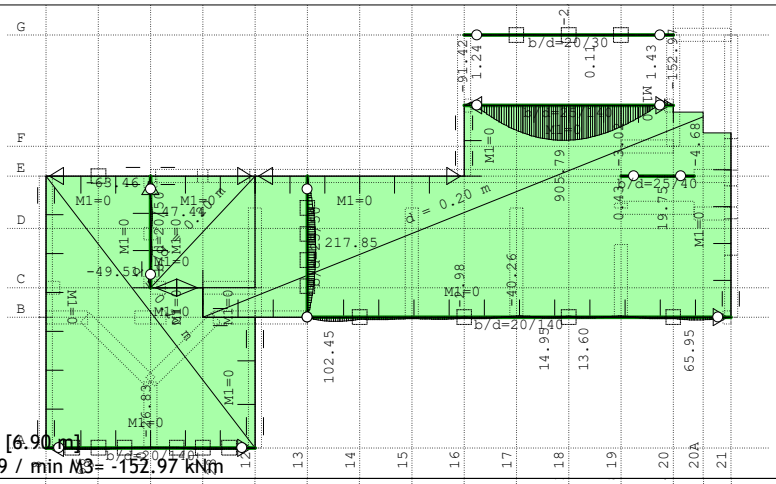
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v plošči: max My= 51.57 / min My= 0.00 kNm/m

Obt. 143: [MSN] 46-139



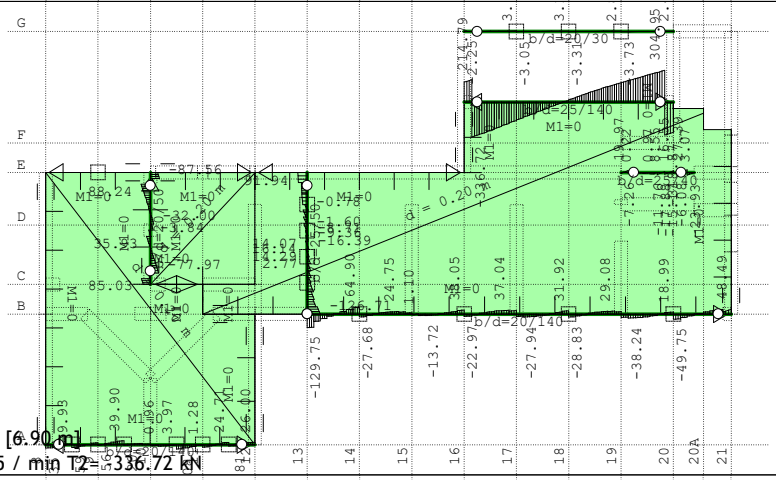
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v plošči: max My= 0.00 / min My= -56.70 kNm/m

Obt. 143: [MSN] 46-139



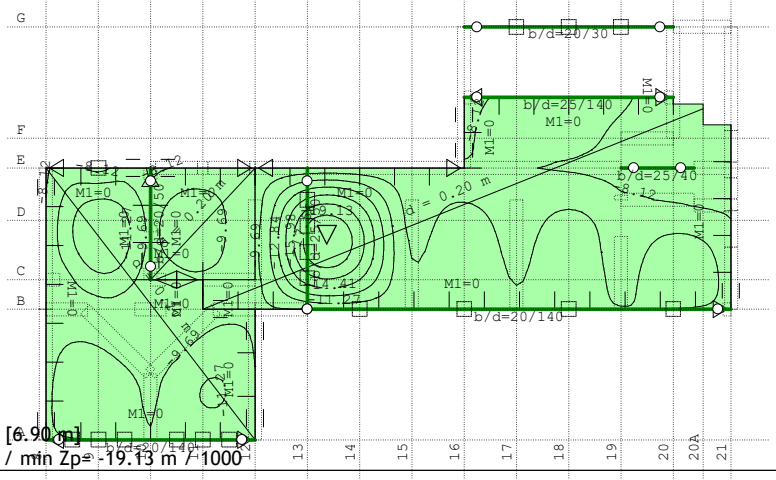
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v gredi: max M3= 905.79 / min M3= -152.97 kNm

Obt. 143: [MSN] 46-139



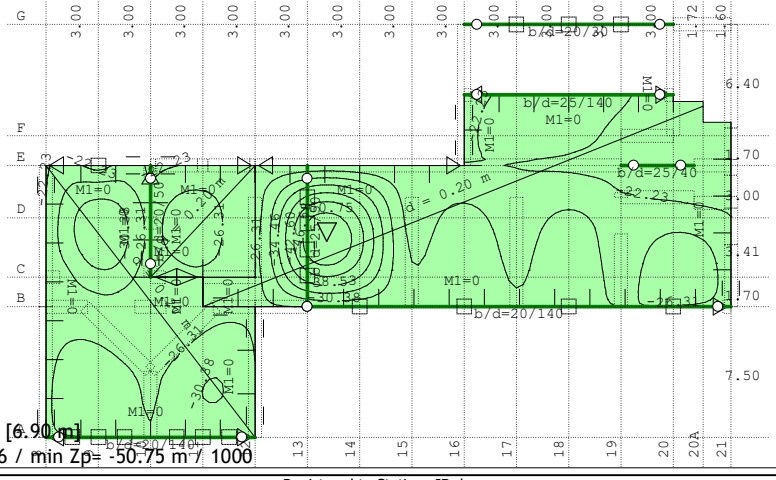
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v gredi: max T2= 304.95 / min T2= -336.72 kN

Obt. 140: [U.elas] 8-20



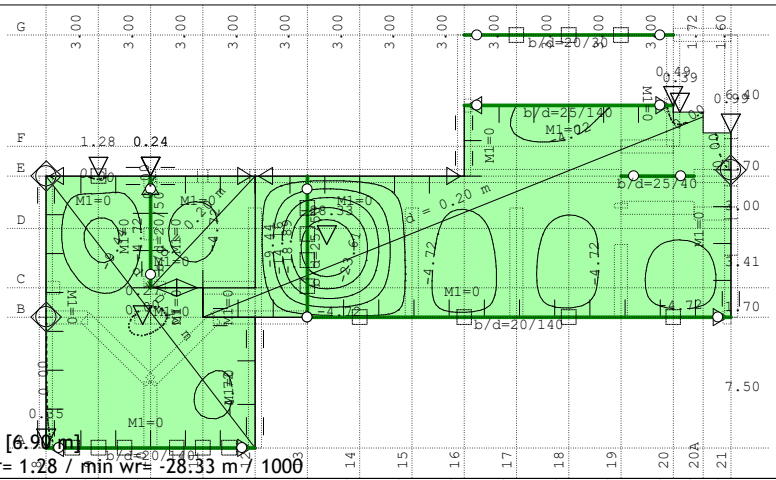
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v plošči: max Zp= -6.55 / min Zp= -19.13 m / 1000

Obt. 142: [Ureol] 30-45



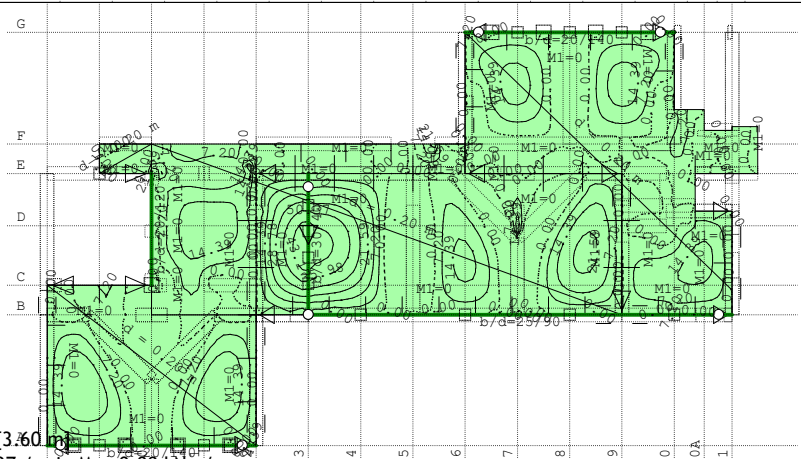
Nivo: plošča nad nadstropjem [6.90 m]
Vplivi v plošči: max Zp= -18.16 / min Zp= -50.75 m / 1000

Obt. 31: 3xI+II



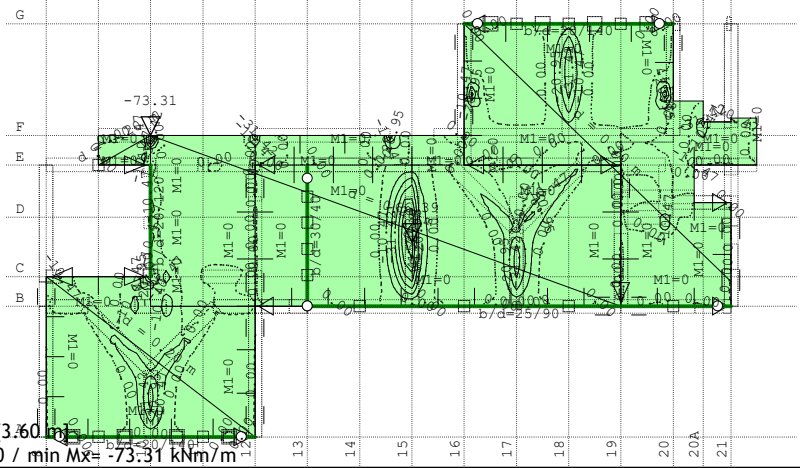
Nivo: plošča nad nadstropjem [6.90 m]
Relativni pomik plošč: max wr= 1.28 / min wr= -28.33 m / 1000

Obt. 143: [MSN] 46-139



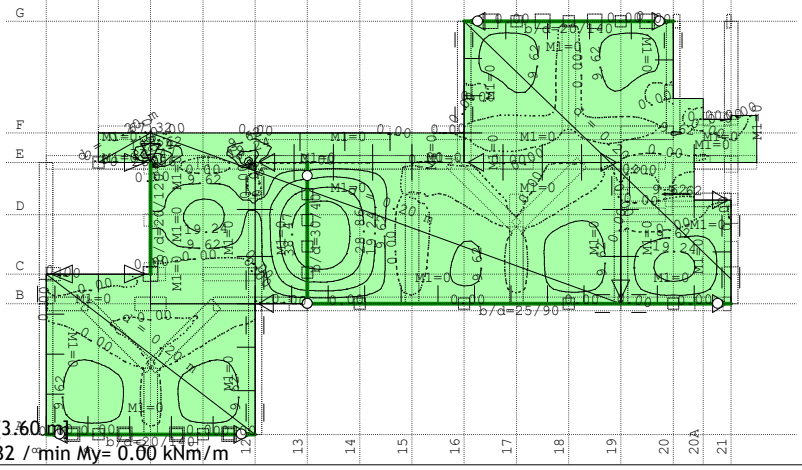
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v plošči: max Mx= 50.37 / min Mx= 0.00 kNm/m

Obt. 143: [MSN] 46-139



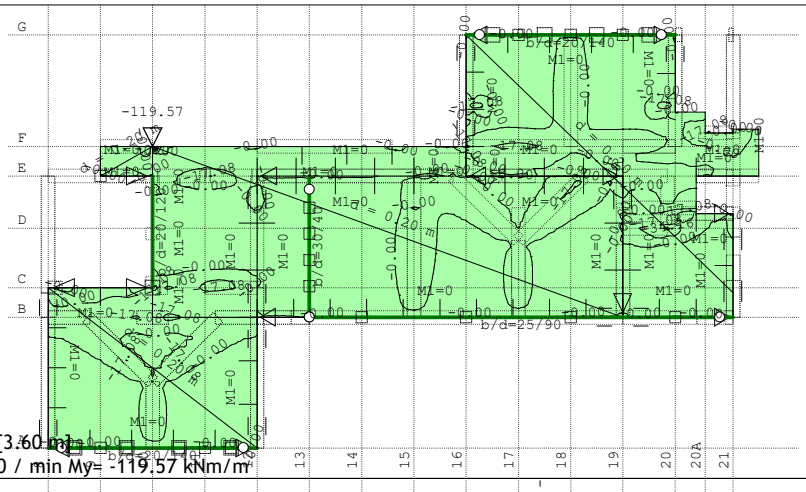
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v plošči: max Mx= 0.00 / min Mx= -73.31 kNm/m

Obt. 143: [MSN] 46-139



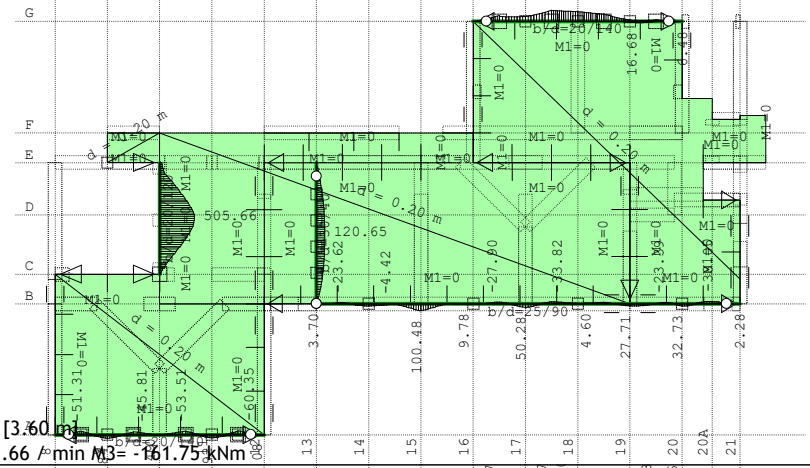
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v plošči: max My= 67.32 / min My= 0.00 kNm/m

Obt. 143: [MSN] 46-139



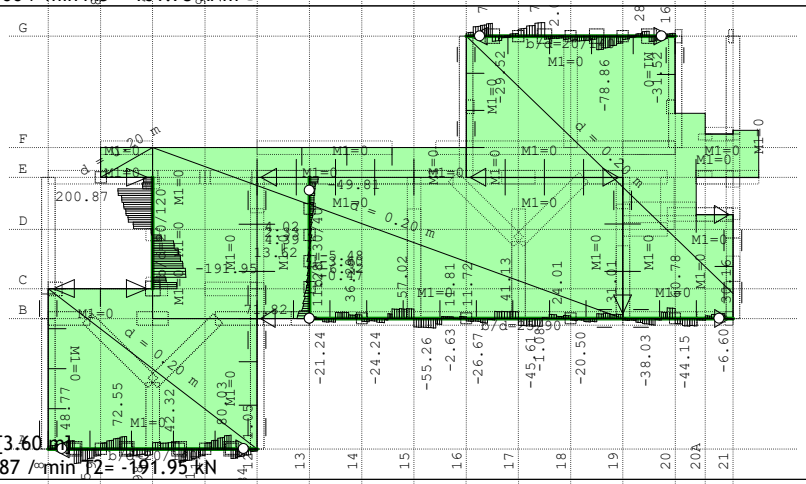
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v plošči: max My= 0.00 / min My= -119.57 kNm/m

Obt. 143: [MSN] 46-139



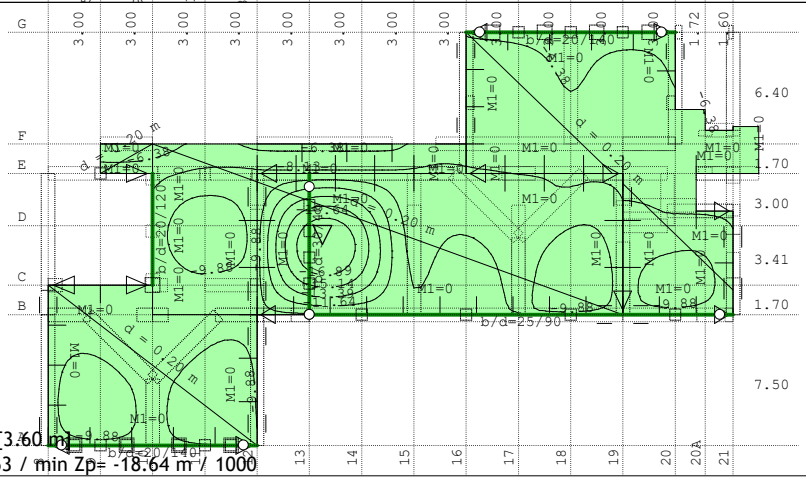
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v gredi: max M3= 505.66 / min M3= -161.75 kNm

Obt. 143: [MSN] 46-139



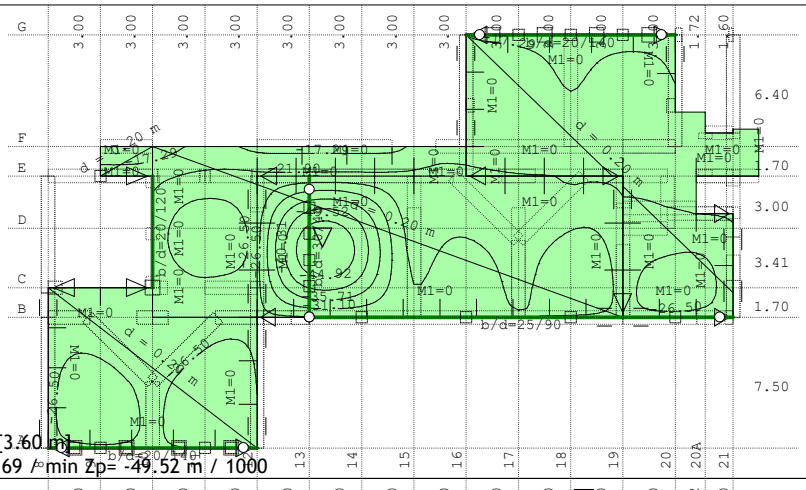
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v gredi: max T2= 200.87 / min T2= -191.95 kN

Obt. 140: [U.elas] 8-20



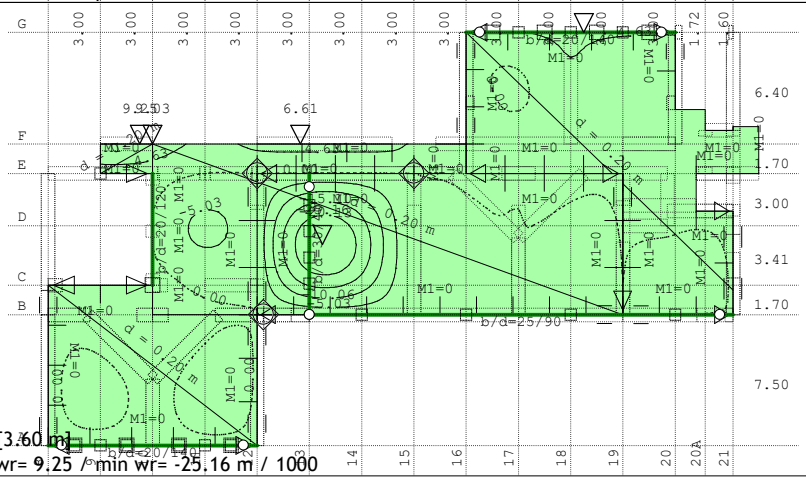
Nivo: plošča nad pritličjem [3.60 m]
Vplivi v plošči: max Zp= -4.63 / min Zp= -18.64 m / 1000

Obt. 142: [Ureol] 30-45



Nivo: plošča nad pritličjem [3.60 m]
Vplivi v plošči: max Zp= -12.69 / min Zp= -49.52 m / 1000

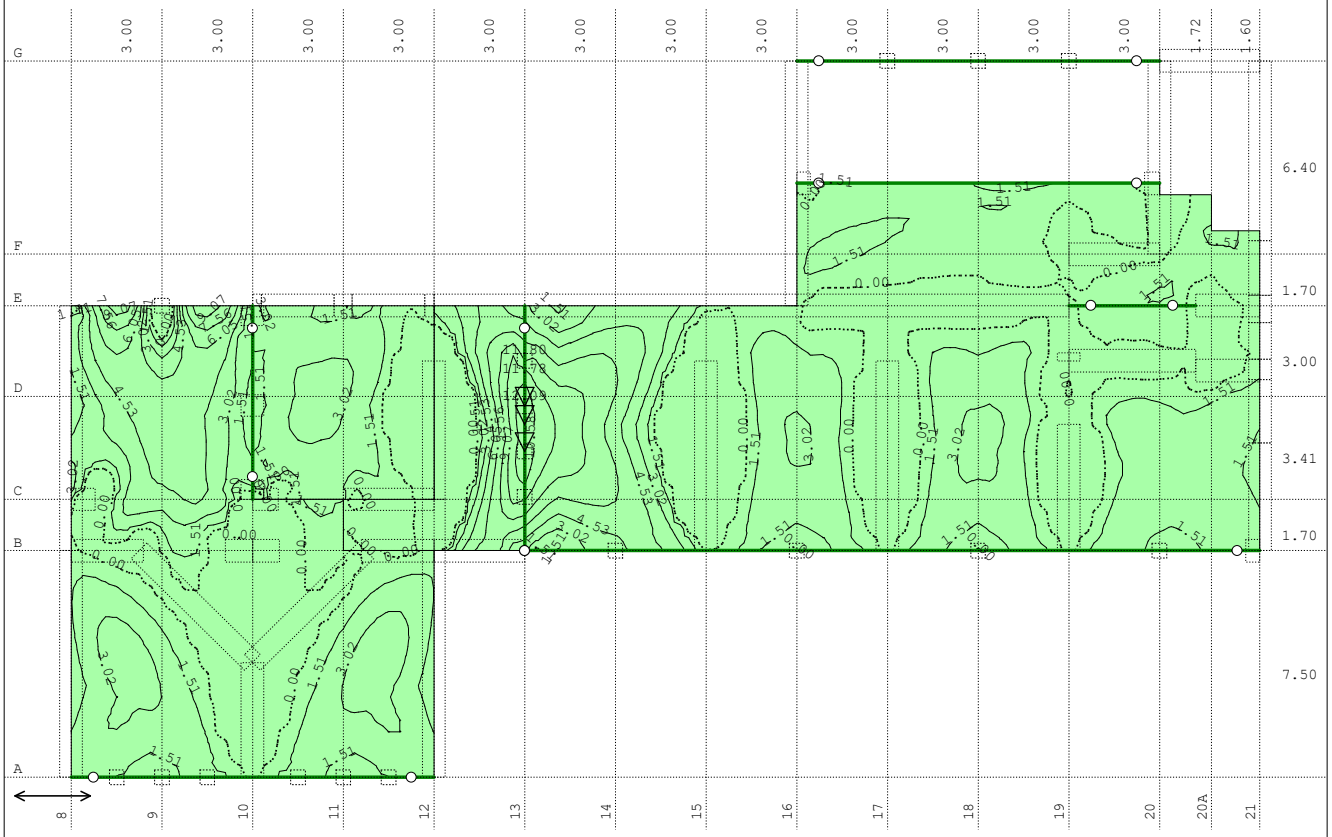
Obt. 31: 3xl+II



Nivo: plošča nad pritličjem [3.60 m]
Relativni pomik plošč: max wr= 9.25 / min wr= -25.16 m / 1000

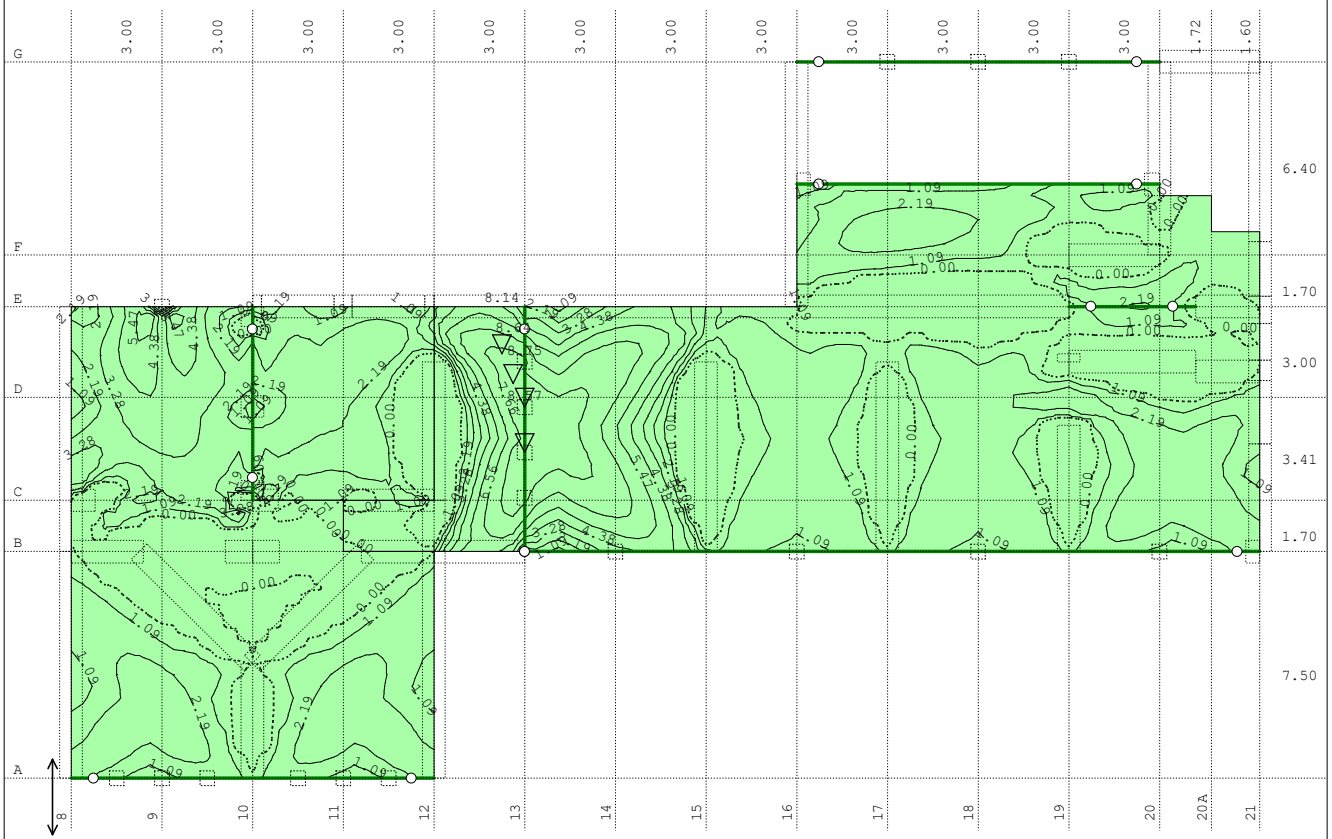
Dimenzioniranje (beton)

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



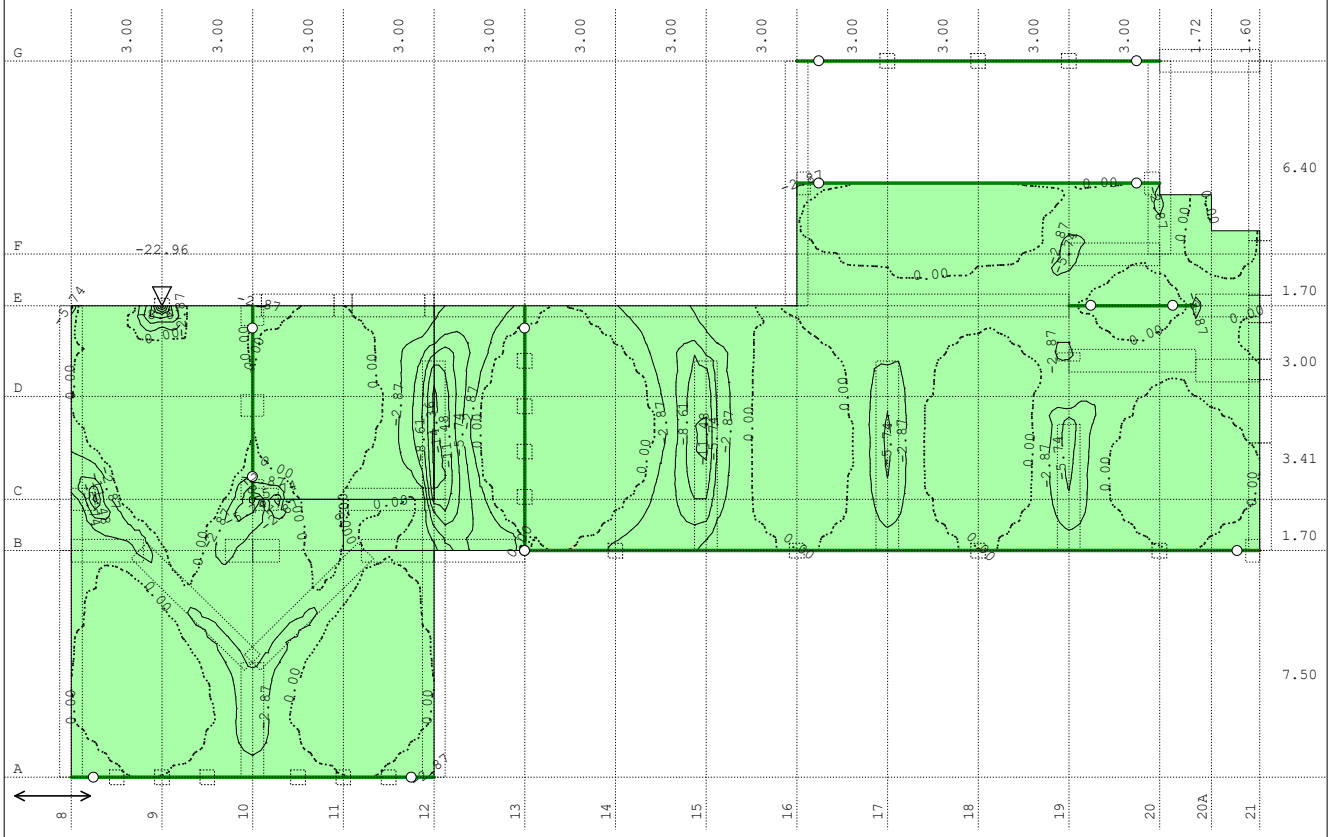
Nivo: plošča nad nadstropjem [6.90 m]
Aa - sp.cona - Smer 1 - max Aa1,s= 12.09 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



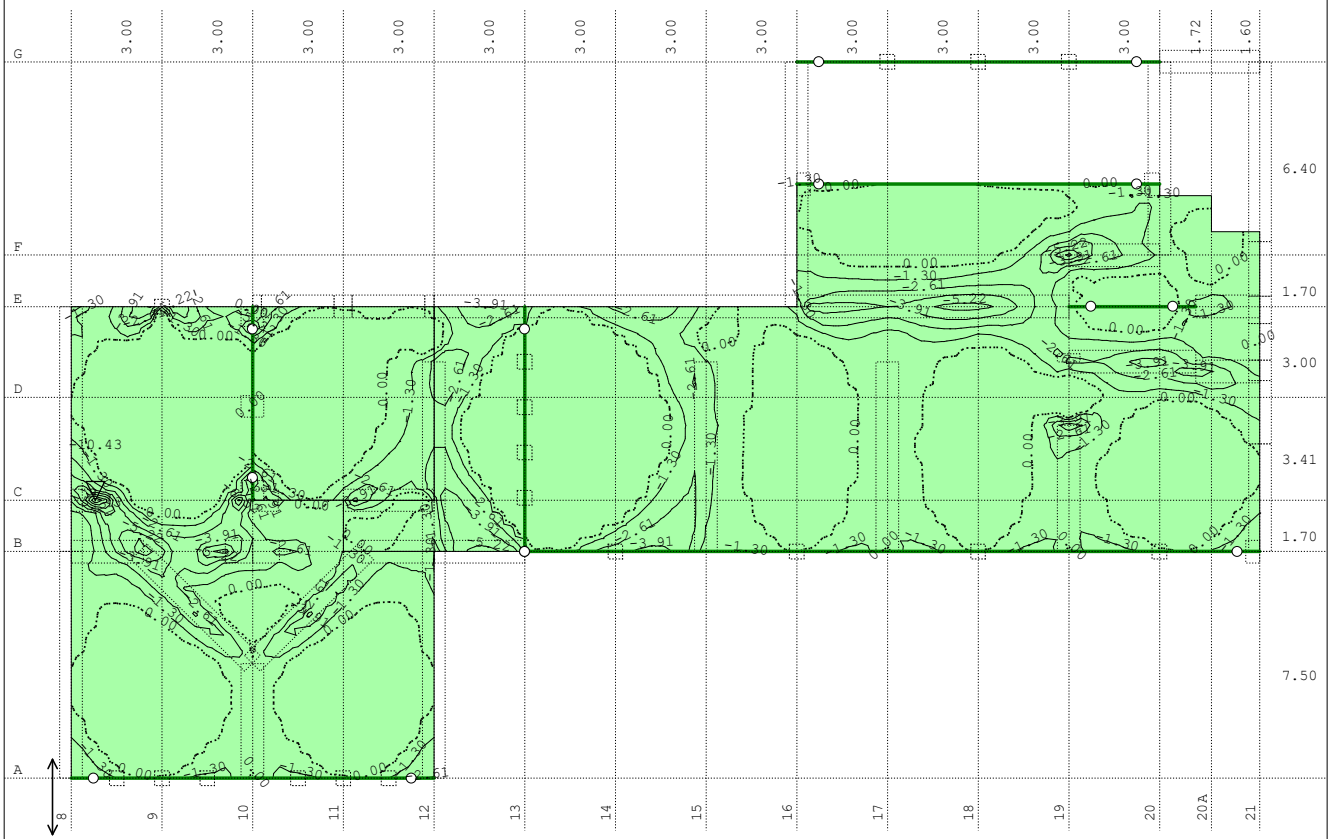
Nivo: plošča nad nadstropjem [6.90 m]
Aa - sp.cona - Smer 2 - max Aa2,s= 8.75 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



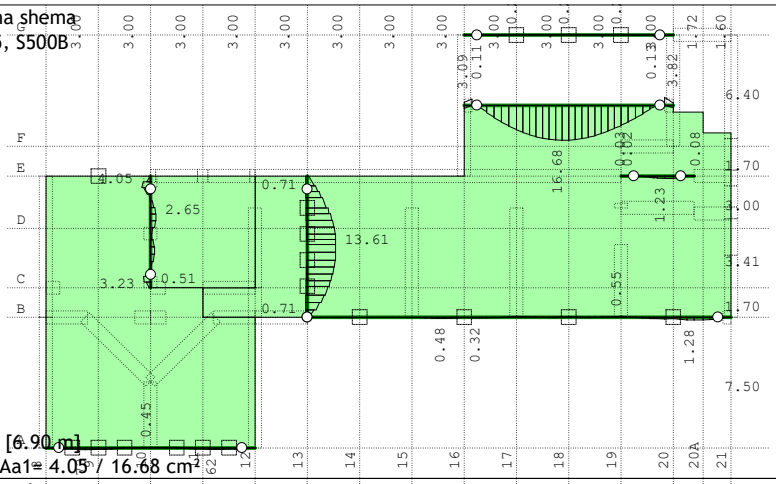
Nivo: plošča nad nadstropjem [6.90 m]
Aa - zg.cona - Smer 1 - max Aa1,z= -22.96 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



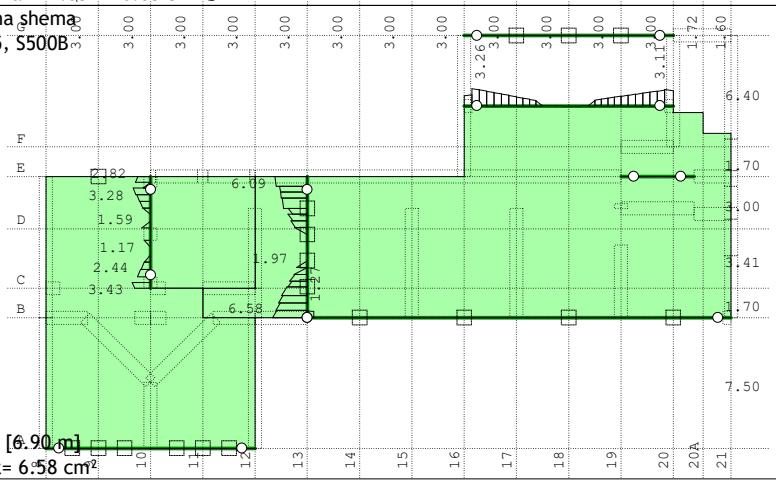
Nivo: plošča nad nadstropjem [6.90 m]
Aa - zg.cona - Smer 2 - max Aa2,z= -10.43 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500B



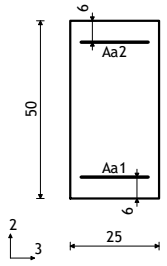
Nivo: plošča nad nadstropjem [6.90 m]
Armatura v gredah: max Aa2/Aa1= 4.05 / 16.68 cm²

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500B



Nivo: plošča nad nadstropjem [6.90 m]
Armatura v gredah: max Aa,st= 6.58 cm²

Greda 5742-7852
EC 2 (EN 1992-1-1:2004)
C 25 (γC = 1.50, γS = 1.15) [SP]
S500B
Kompletna obtežna shema



[cm]

Prerez 1-1 x = 0.00m
Merodajna kombinacija za upogib:
1.35xI+1.50xII+0.75xV+0.90xVI
N1ed = 11.14 kN
M2ed = 0.00 kNm
M3ed = 0.00 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xII+0.75xV+0.90xVI
M1ed = 17.54 kNm

Merodajna kombinacija za strig:
1.35xI+1.50xII+0.75xV+0.90xVII
V2ed = -126.71 kN
V3ed = -1.08 kN
M1ed = 17.54 kNm

Vrd,max,2 = 445.50 kN
Vrd,max,3 = 455.63 kN
εb/εa = -0.007/25.000 ‰
Aa1 = 0.13 + 0.58` = 0.71 cm²
Aa2 = 0.13 + 0.58` = 0.71 cm²
Aa3 = 0.00 + 1.10` = 1.10 cm²
Aa4 = 0.00 + 1.10` = 1.10 cm²
Aa,st = 6.58 cm²/m (m=2)
`) - dodatna vzdolžna armatura za prevzem torzije.

Prerez 2-2 x = 4.18m
Merodajna kombinacija za upogib:
1.35xI+1.50xII+0.75xV+0.90xVII
N1ed = -3.00 kN
M2ed = 0.00 kNm
M3ed = 216.08 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xII+0.75xV+0.90xVII
M1ed = -3.83 kNm

Merodajna kombinacija za strig:
1.35xI+1.50xII+0.75xV+0.90xVII
V2ed = -8.49 kN
V3ed = -7.57 kN
M1ed = -3.83 kNm

Vrd,max,2 = 445.50 kN
Vrd,max,3 = 455.63 kN
εb/εa = -3.500/5.362 ‰
Aa1 = 13.48 + 0.13` = 13.61 cm²
Aa2 = 0.00 + 0.13` = 0.13 cm²
Aa3 = 0.00 + 0.24` = 0.24 cm²
Aa4 = 0.00 + 0.24` = 0.24 cm²
Aa,st = 0.00 cm²/m (m=2)

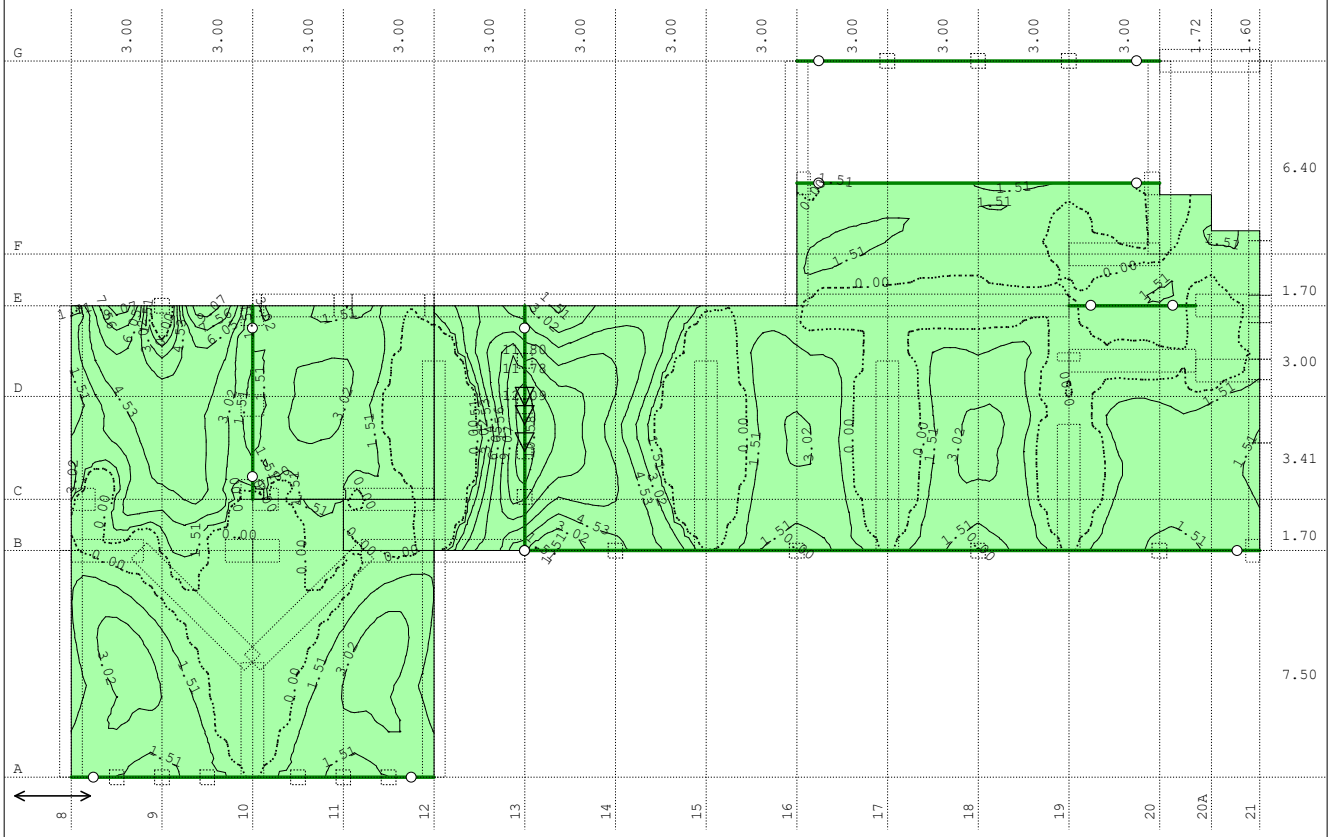
Prerez 3-3 x = 7.21m
Merodajna kombinacija za upogib:
1.35xI+1.50xII+0.75xV+0.90xVII
N1ed = -1.04 kN
M2ed = 0.00 kNm
M3ed = 78.60 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xII+0.75xV+0.90xVII
M1ed = -21.34 kNm

Merodajna kombinacija za strig:
1.35xI+1.50xII+0.75xV+0.90xVII
V2ed = 52.64 kN
V3ed = -3.89 kN
M1ed = -21.34 kNm

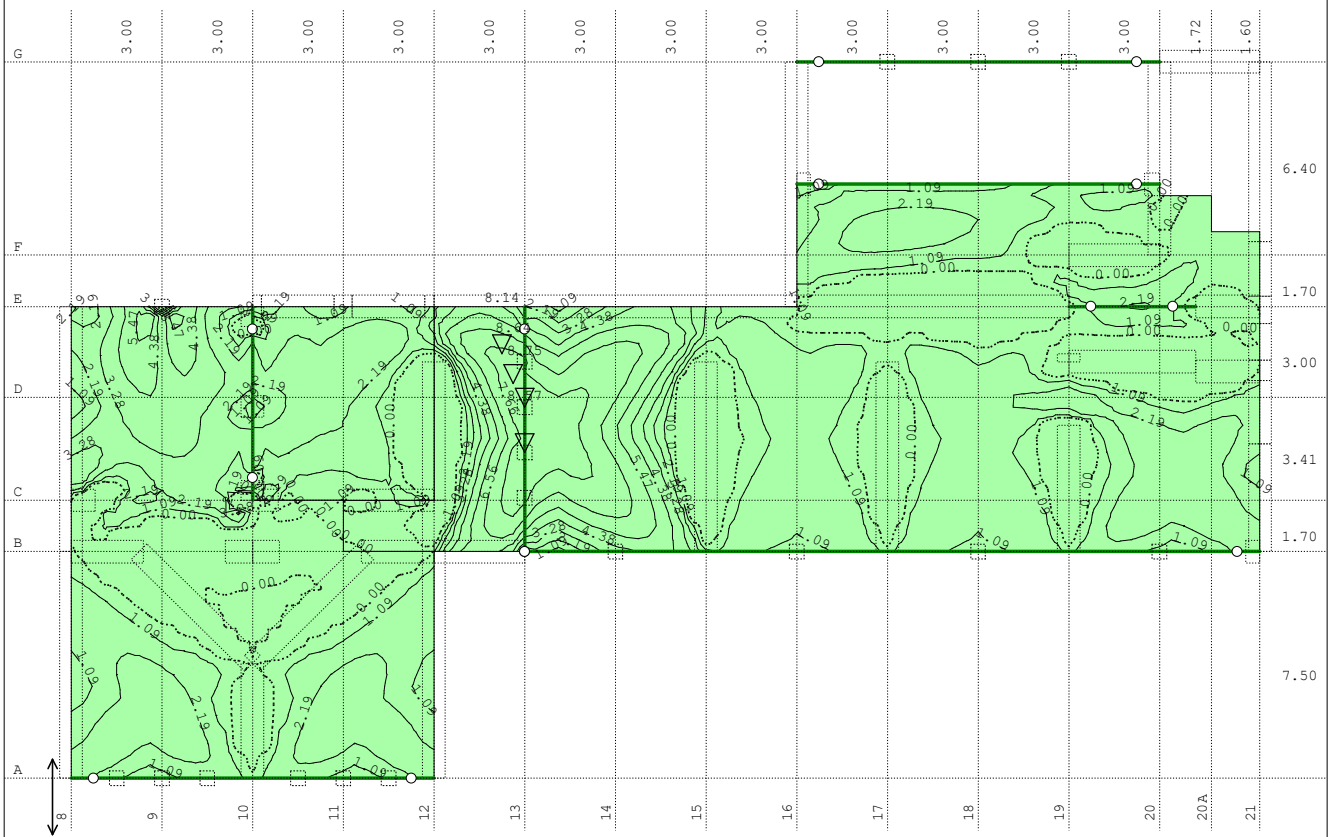
Vrd,max,2 = 445.50 kN
Vrd,max,3 = 455.63 kN
εb/εa = -3.500/23.953 ‰
Aa1 = 4.33 + 0.71` = 5.03 cm²
Aa2 = 0.00 + 0.71` = 0.71 cm²
Aa3 = 0.00 + 1.34` = 1.34 cm²
Aa4 = 0.00 + 1.34` = 1.34 cm²
Aa,st = 5.06 cm²/m (m=2)

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



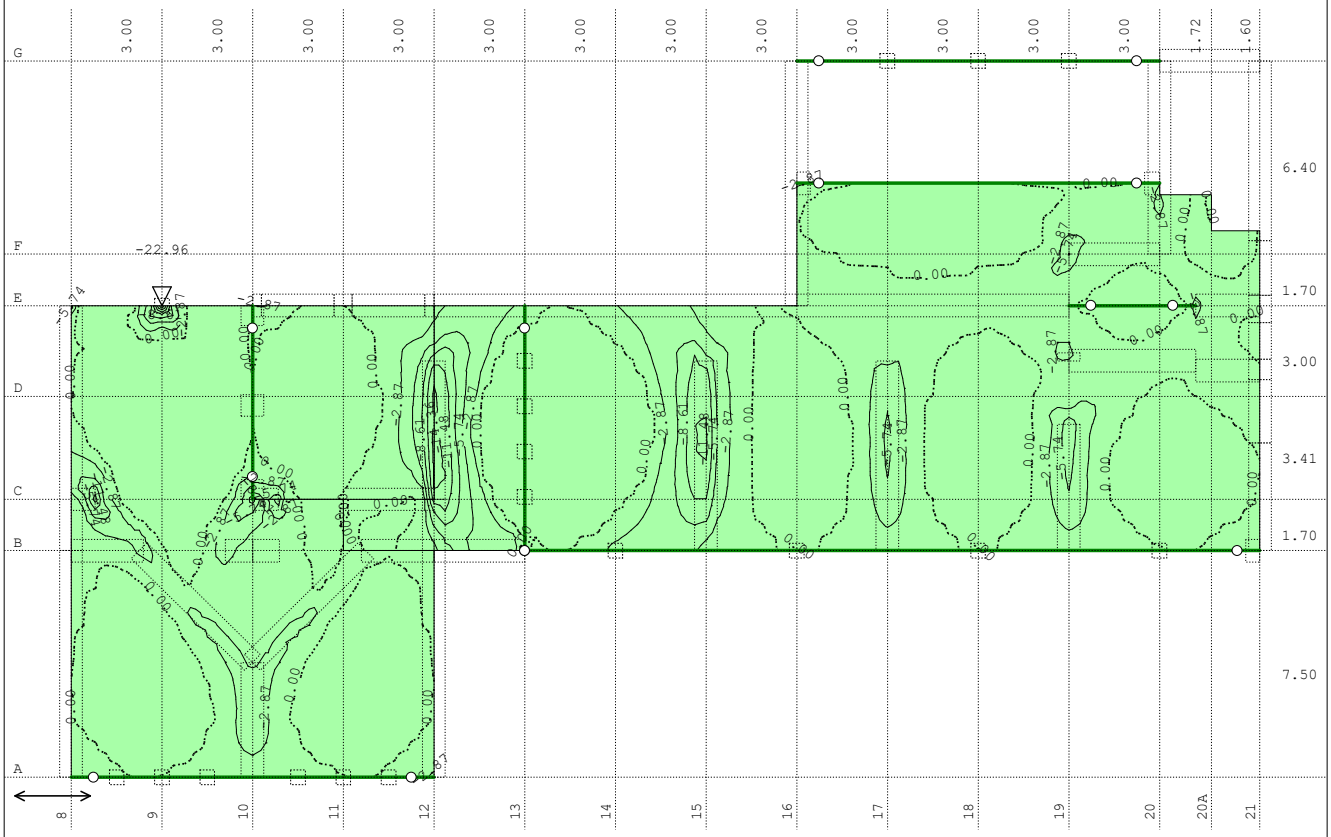
Nivo: plošča nad nadstropjem [6.90 m]
Aa - sp.cona - Smer 1 - max Aa1,s= 12.09 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



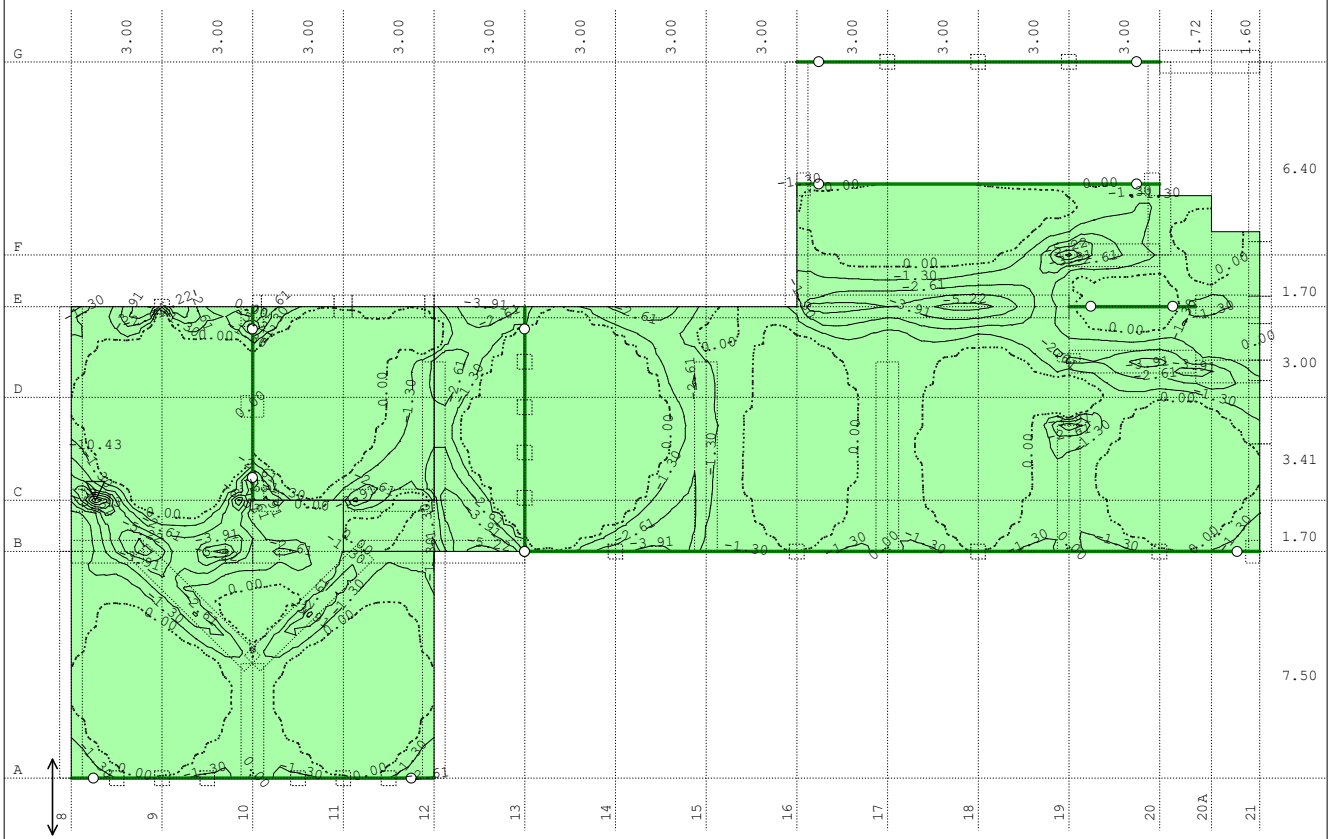
Nivo: plošča nad nadstropjem [6.90 m]
Aa - sp.cona - Smer 2 - max Aa2,s= 8.75 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



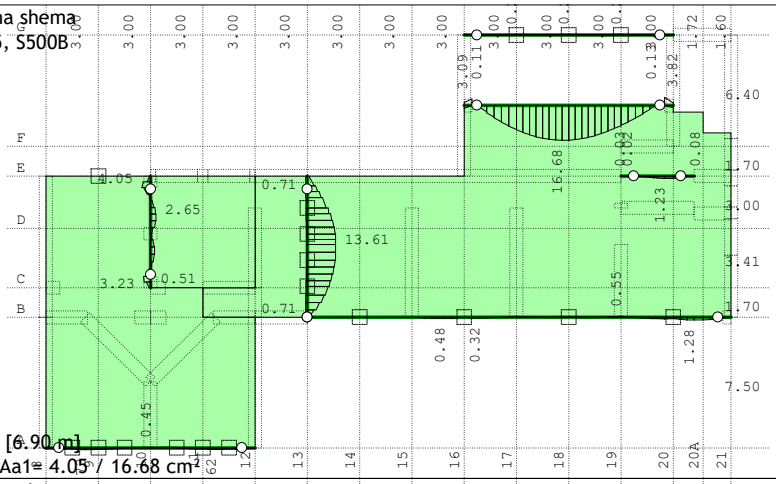
Nivo: plošča nad nadstropjem [6.90 m]
Aa - zg.cona - Smer 1 - max Aa1,z= -22.96 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500N, a=4.50 cm



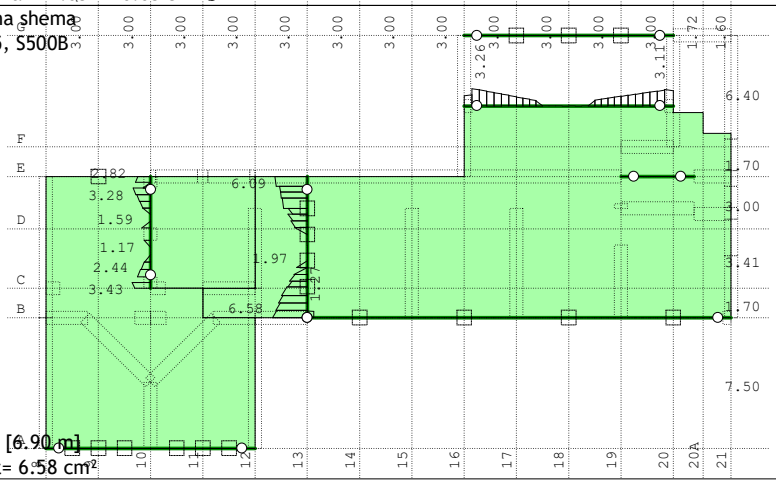
Nivo: plošča nad nadstropjem [6.90 m]
Aa - zg.cona - Smer 2 - max Aa2,z= -10.43 cm²/m

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500B



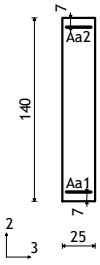
Nivo: plošča nad nadstropjem [6.90 m]
Armatura v gredah: max Aa2/Aa1= 4.05 / 16.68 cm²

Merodajna obtežba: Kompletna shema
EC 2 (EN 1992-1-1:2004), C 25, S500B



Nivo: plošča nad nadstropjem [6.90 m]
Armatura v gredah: max Aa,st= 6.58 cm²

Greda 11948-15367
EC 2 (EN 1992-1-1:2004)
C 25 (γC = 1.50, γS = 1.15) [SP]
S500B
Kompletna obtežna shema



[cm]

Prerez 1-1 x = 0.00m
Merodajna kombinacija za upogib:
1.35xI+1.05xII+1.50xV+0.90xVII
N1ed = 123.40 kN
M2ed = 0.00 kNm
M3ed = 0.00 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.05xIII+1.50xV+0.90xVII
M1ed = 1.01 kNm

Merodajna kombinacija za strig:
1.35xI+1.05xII+1.50xV+0.90xVII
V2ed = 191.52 kN
V3ed = -10.39 kN
M1ed = 1.00 kNm

Vrd,max,2 = 1346.63 kN
Vrd,max,3 = 1275.75 kN
εb/εa = 0.905/25.000 ‰
Aa1 = 1.42 + 0.00` = 1.42 cm²
Aa2 = 1.42 + 0.00` = 1.42 cm²
Aa3 = 0.00 + 0.08` = 0.08 cm²
Aa4 = 0.00 + 0.08` = 0.08 cm²
Aa,st = 1.90 cm²/m (m=2)
`) - dodatna vzdolžna armatura za prevzem torzije.

Prerez 2-2 x = 0.45m
Merodajna kombinacija za upogib:
1.35xI+1.50xII+0.75xV+0.90xVII
N1ed = -66.67 kN
M2ed = 0.00 kNm
M3ed = -67.10 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xII+0.75xV+0.90xVII
M1ed = 0.43 kNm

Merodajna kombinacija za strig:
1.35xI+1.05xII+1.50xV+0.90xVII
V2ed = -336.72 kN
V3ed = -3.87 kN
M1ed = 0.40 kNm

Vrd,max,2 = 1346.63 kN
Vrd,max,3 = 1275.75 kN
εb/εa = -0.963/25.000 ‰
Aa1 = 0.00 cm²
Aa2 = 0.38 cm²
Aa3 = 0.00 cm²
Aa4 = 0.00 cm²
Aa,st = 3.26 cm²/m (m=2)

Prerez 3-3 x = 5.63m
Merodajna kombinacija za upogib:
1.35xI+1.05xII+1.50xV+0.90xVI
N1ed = -10.32 kN
M2ed = 0.00 kNm
M3ed = 905.24 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xII+0.75xV+0.90xVII
M1ed = 0.42 kNm

Merodajna kombinacija za strig:
1.35xI+1.50xII+0.75xV+0.90xVII
V2ed = -7.41 kN
V3ed = 0.51 kN
M1ed = 0.42 kNm

Vrd,max,2 = 1346.63 kN
Vrd,max,3 = 1275.75 kN
εb/εa = -3.500/17.958 ‰
Aa1 = 16.68 cm²
Aa2 = 0.00 cm²
Aa3 = 0.00 cm²
Aa4 = 0.00 cm²
Aa,st = 0.00 cm²/m (m=2)

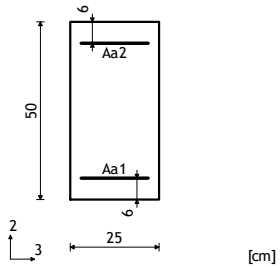
Prerez 4-4 x = 11.50m
Merodajna kombinacija za upogib:
1.35xI+1.05xII+1.50xV+0.90xVI
N1ed = 94.33 kN
M2ed = 0.00 kNm
M3ed = -152.97 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xII+0.90xVII
M1ed = 0.94 kNm

Merodajna kombinacija za strig:
1.35xI+1.05xII+1.50xV+0.90xVII
V2ed = -318.70 kN
V3ed = 14.34 kN
M1ed = 0.81 kNm

Vrd,max,2 = 1346.63 kN
Vrd,max,3 = 1275.75 kN
εb/εa = -0.884/25.000 ‰
Aa1 = 0.00 + 0.00` = 0.00 cm²
Aa2 = 3.81 + 0.00` = 3.81 cm²
Aa3 = 0.00 + 0.07` = 0.07 cm²
Aa4 = 0.00 + 0.07` = 0.07 cm²
Aa,st = 3.11 cm²/m (m=2)

Greda 5742-7852
EC 2 (EN 1992-1-1:2004)
C 25 (γC = 1.50, γS = 1.15) [SP]
S500B
Kompletna obtežna shema



[cm]

Prerez 5-5 x = 0.00m
Merodajna kombinacija za upogib:
1.35xI+1.50xII+0.75xV+0.90xVI
N1ed = 11.14 kN
M2ed = 0.00 kNm
M3ed = 0.00 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xII+0.75xV+0.90xVI
M1ed = 17.54 kNm

Merodajna kombinacija za strig:
1.35xI+1.50xII+0.75xV+0.90xVII
V2ed = -126.71 kN
V3ed = -1.08 kN
M1ed = 17.54 kNm

Vrd,max,2 = 445.50 kN
Vrd,max,3 = 455.63 kN
εb/εa = -0.007/25.000 ‰
Aa1 = 0.13 + 0.58` = 0.71 cm²
Aa2 = 0.13 + 0.58` = 0.71 cm²
Aa3 = 0.00 + 1.10` = 1.10 cm²
Aa4 = 0.00 + 1.10` = 1.10 cm²
Aa,st = 6.58 cm²/m (m=2)
`) - dodatna vzdolžna armatura za prevzem torzije.

Prerez 6-6 x = 4.18m
Merodajna kombinacija za upogib:
1.35xI+1.50xII+0.75xV+0.90xVII
N1ed = -3.00 kN
M2ed = 0.00 kNm
M3ed = 216.08 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xII+0.75xV+0.90xVII
M1ed = -3.83 kNm

Merodajna kombinacija za strig:
1.35xI+1.50xII+0.75xV+0.90xVII
V2ed = -8.49 kN
V3ed = -7.57 kN
M1ed = -3.83 kNm

Vrd,max,2 = 445.50 kN
Vrd,max,3 = 455.63 kN
εb/εa = -3.500/5.362 ‰
Aa1 = 13.48 + 0.13` = 13.61 cm²
Aa2 = 0.00 + 0.13` = 0.13 cm²
Aa3 = 0.00 + 0.24` = 0.24 cm²
Aa4 = 0.00 + 0.24` = 0.24 cm²
Aa,st = 0.00 cm²/m (m=2)

Prerez 7-7 x = 7.21m
Merodajna kombinacija za upogib:
1.35xI+1.50xII+0.75xV+0.90xVII
N1ed = -1.04 kN
M2ed = 0.00 kNm
M3ed = 78.60 kNm

Merodajna kombinacija za torzijo:
1.35xI+1.50xII+0.75xV+0.90xVII
M1ed = -21.34 kNm

Merodajna kombinacija za strig:
1.35xI+1.50xII+0.75xV+0.90xVII
V2ed = 52.64 kN
V3ed = -3.89 kN
M1ed = -21.34 kNm

Vrd,max,2 = 445.50 kN
Vrd,max,3 = 455.63 kN
εb/εa = -3.500/23.953 ‰
Aa1 = 4.33 + 0.71` = 5.03 cm²
Aa2 = 0.00 + 0.71` = 0.71 cm²
Aa3 = 0.00 + 1.34` = 1.34 cm²
Aa4 = 0.00 + 1.34` = 1.34 cm²
Aa,st = 5.06 cm²/m (m=2)

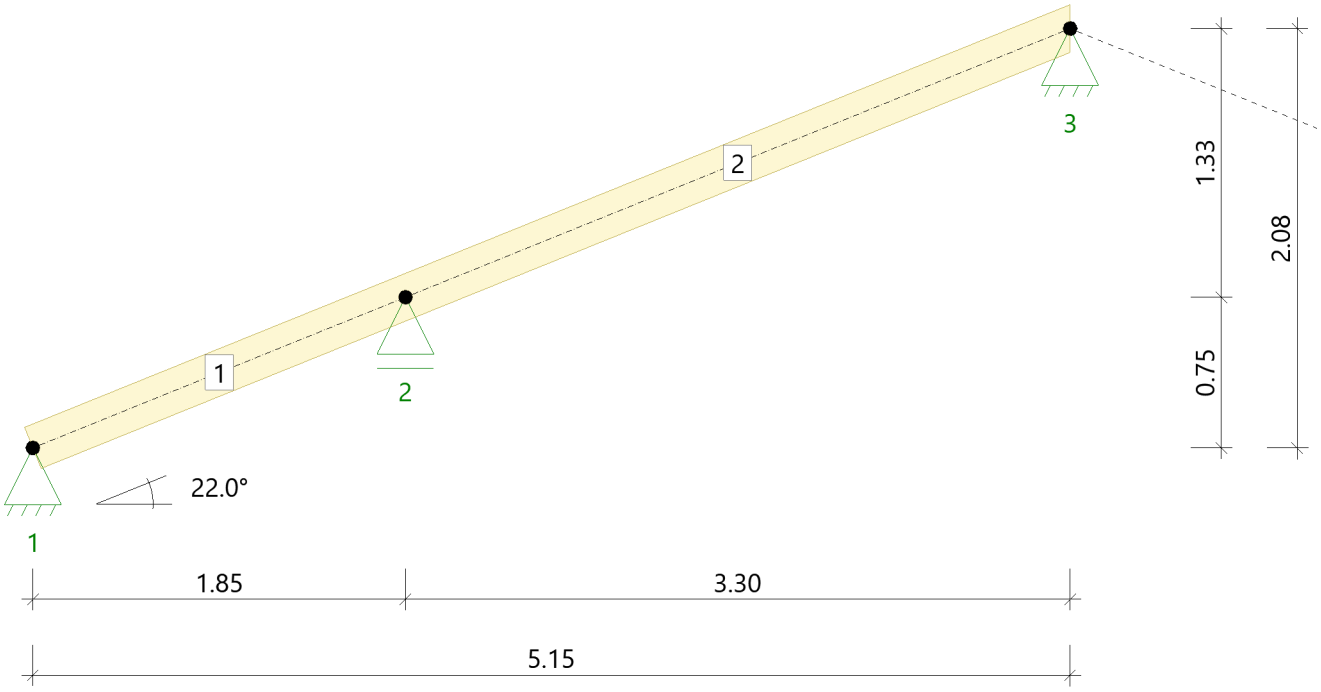
Item: poz 202 - dimenzioniranje špirovcev ob osi 14 - desno daljši 5.15m-preko dveh polj

Design of Roofs (x64) Dach+ 01/23C (FRILO R-2023-1/P04)

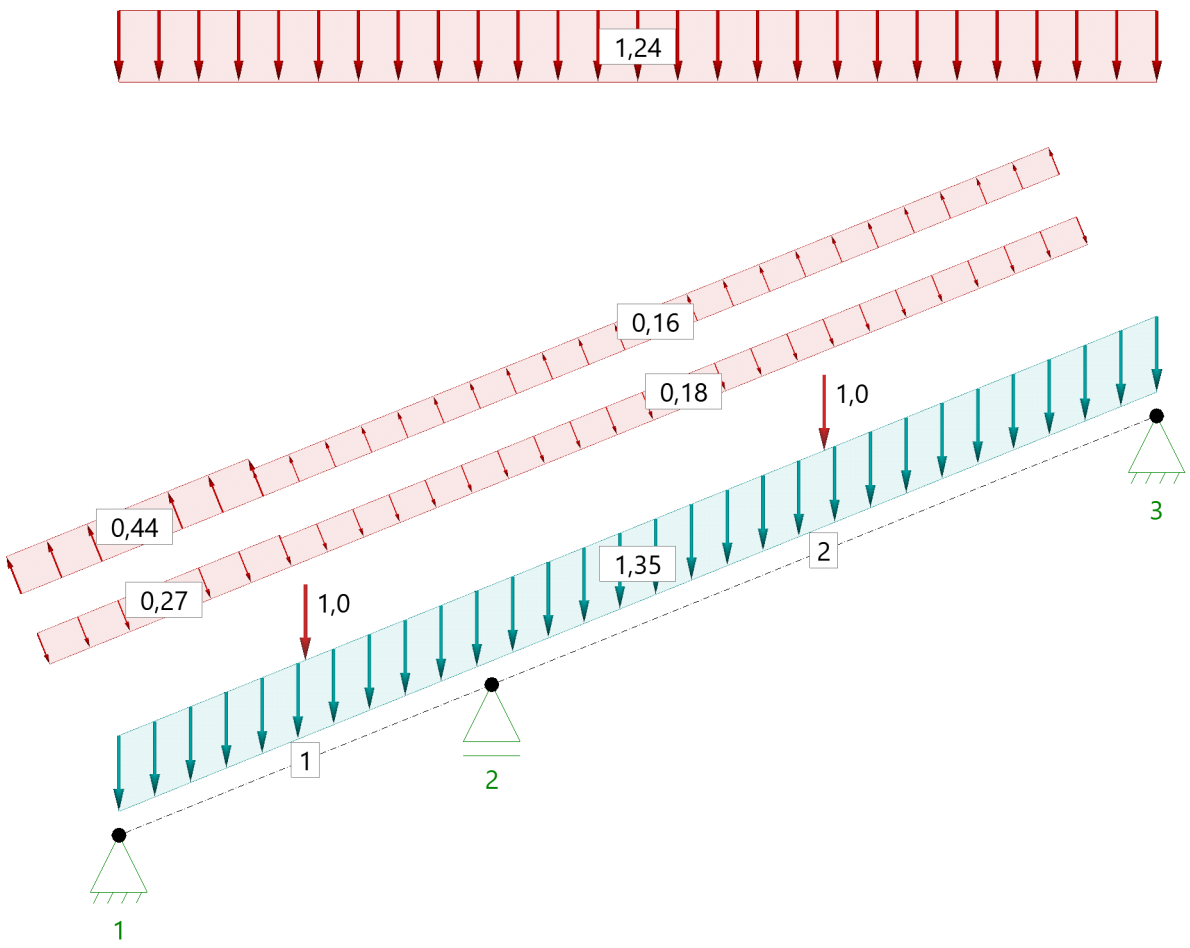
System

Softwood C24, Service class roofed, open; AH<85%; BMC<20%, CC 2

System Graphics



Load graphics



Material

Material values Timber

Softwood C24 acc.to EN 338:2016 $E_{0,mean}$ = 11000 N/mm² ρ_k = 350 kg/m³
G_{mean} = 690 N/mm²

Material Characteristics

$f_{m,k}$ $f_{v,k}$ N/mm²	$f_{t,0,k}$ $f_{c,0,k}$ N/mm²	$f_{t,90,k}$ $f_{c,90,k}$ N/mm²	$E_{0,mean}$ $E_{0,05}$ N/mm²	$E_{90,mean}$ $E_{90,05}$ N/mm²	G_{mean} G_{05} N/mm²	ρ_k ρ_m kg/m³	γ kN/m³
24.00 4.00	14.50 21.00	0.40 2.50	11000 7400	370 247	690 460	350 420	6.00

Geometry

Rafter Spacing e = 100.0 cm Total ridge height h = 6.00 m
Length of Roof b,Roof = 20.00 m Building length b, Wall = 20.00 m

Rafter

Span	Length BAR [m]	Length RAR [m]	Page	Slope [°]	Cross-section [cm]
1 2	1.85 3.30	2.00 3.56	left left	22.0 22.0	14.0/22.0 14.0/22.0

Support

No.	Member	Cx [kN/m]	Cz [kN/m]	Depth of birds mouth t [cm]
1	Rafter left	Rigid	Rigid	0.0
2	Rafter left	0.00	Rigid	0.0
3	Rafter left	Rigid	Rigid	0.0

Tilt-/ Buckling-Lengths

Rafter left

Buckling in plane: from eingenvalue limited to...0.90*L
Buckling out of plane: kept continuously
Tilting: kept continuously

Calculation Rules

Only positive deflections are taken into account on cantilevers.
The rod length is always used as the reference length for the total deflection verification.
Caution! If bars are connected without a support, their bar lengths are added up.
Wind loads from undergrate blast are assumed to be dependent.
Load cases with loads whose expected deformations are opposite are not included.
Combinations of load cases whose expected deformations are opposite are not used.
The stiffness should be reduced as a result of creep from permanent and quasi-permanent load components.
kmod wird bei Wind als Mittelwert von kurz und sehr kurz angesetzt.

Loads

Load Pre-settings

Rafter

Roofing g1 = 1.35 kN/m² Act = 99
Construction g2 = 0.00 kN/m²
Loft conversion g3 = 0.00 kN/m²
Loft Conversion bottom gb = 0.00 kN/m²
With dead weight of members, γ = 6.00 kN/m³
Roofload Cat.H Q = 1.0 kN Act = 8

Boundary conditions

Total ridge height h = 6.00 m
Length of Roof b,Roof = 20.00 m
Building length b, Wall = 20.00 m
Building width on the right br = 0.00 m

Snow / wind loads for the calculation - User-defined value

EN 1991-1-3:2010, EN 1991-1-4:2010
Terrain elevation Altitude = 0.00 m
Ground Snow Load sk = 1.55 kN/m²
Wind pressure qp,0(h) = 0.62 kN/m²
Wind pressure qp,90(h) = 0.62 kN/m²

Auxiliary values

Wind reference length (Roof) e_0 = 12.00 m e_{90} = 5.15 m
Wind reference length (Wall) e_0 = 12.00 m e_{90} = 5.15 m
h/d = 1.165 h/b = 0.300 d/b = 0.258

Classification of Actions

No.	Name	γ_{sup}	γ_{inf}	ψ_0	ψ_1	ψ_2	KLED
99	Permanent loads	1.35	1.00	1.00	1.00	1.00	permanent
8	Cat. H: roofs	1.50	0.00	0.00	0.00	0.00	short-term
9	Wind loads	1.50	0.00	0.60	0.20	0.00	short-term
10	Snow loads H < 1000 m	1.50	0.00	0.50	0.20	0.00	short-term

Load values

Snow load

Name	Page	μ	Load value	(according to standard)	
Roof load	left	0.80	1.24	1.24	kN/m²
Non-blown portion (for blown load cases)	left	0.80	1.24	1.24	kN/m²
Blown portion (for blown load cases)	left	0.80	0.62	0.62	kN/m²

Wind loads

Name	Page	Pressure [kN/m²]	Suction [kN/m²]	Pressure (Standard) [kN/m²]	Suction (Standard) [kN/m²]
F	from left	0.27	-0.44	0.27	-0.44
G	from left	0.27	-0.41	0.27	-0.41
H	from left	0.18	-0.16	0.18	-0.16
D	from left	0.50	0.00	0.50	0.00
E	from left	0.00	-0.32	0.00	-0.32
I	from the right	0.00	-0.25	0.00	-0.25
J	from the right	0.00	-0.48	0.00	-0.48
D	from the right	0.50	0.00	0.50	0.00
E	from the right	0.00	-0.32	0.00	-0.32

Combinations

LC Combinations

No.	Name		Sit	KLED
1	1.35*g+1.50*s	ULS[1]	p/t[2]	4[3]
2	1.35*g+1.50*s+0.90*(wlLuv+)	ULS[1]	p/t[2]	6[4]
6	1.35*g+1.50*s+0.90*(wrLee-)	ULS[1]	p/t[2]	6[4]
7	1.35*g+0.75*s+1.50*(wrLee-)	ULS[1]	p/t[2]	6[4]
12	1.35*g+1.50*(wlLuv-)	ULS[1]	p/t[2]	6[4]
13	1.35*g+1.50*(wrLee-)	ULS[1]	p/t[2]	6[4]
14	1.00*g+1.00*s	SLS[5]	char[6]	4[3]
15	1.00*g+1.00*s+0.60*(wlLuv+)	SLS[5]	char[6]	6[4]

The assignment of the short case names can be found in the table of load cases.

1 : ULS=Structural failure
2 : p/t=persistent/transient (Persistent/Transient Situation)
3 : Load duration class:4=short-term
4 : Load duration class:6=short/instant
5 : SLS=Serviceability
6 : char=characteristic (Characteristic Situation)

Results

Rafter left 14.0/22.0 e = 100.0 cm

ULS acc.to DIN EN 1995:2013, based on EN 1995:2014, Consequence class 2

Checks in Persistent/Transient Situation

Combi	Sit	Check	$N_{x,d}$ [kN]	$M_{y,d}$ [kNm]	$V_{z,d}$ [kN]	$\sigma_{n,d}$ [N/mm²]	$\sigma_{m,y,d}$ [N/mm²]	τ_d [N/mm²]	η	s_{ky} [m]	s_{kz} [m]	s_b [m]
1	p/t [1]	Stress (Span)	0.2	3.65	-0.4	0.01	3.23		**0.20**			
1	p/t [1]	Stress (Column)	2.3	-4.20	-5.6	0.07	-3.72		**0.23**			
1	p/t [1]	Stability	-3.0	-4.20	0.0	-0.10	-3.72		**0.23**	1.26	0.00	0.00
1	p/t [1]	Shear	-3.0	-4.20	7.4			0.36	**0.26**			

The composition of the load case combinations can be found in the table of load case combinations.

1 : p/t=persistent/transient (Persistent/Transient Situation)

SLS checks acc.to DIN EN 1995:2013, based on EN 1995:2014, Consequence class 2

Combi	Check		Beam	x [m]	$w_{G,inst}$ [cm]	$w_{G,fin}$ [cm]	$w_{Q,inst,char}$ [cm]	$w_{Q,inst,qprm}$ [cm]	$w_{Q,fin}$ [cm]	w_{tot} [cm]		w_{lim} [cm]	L/..	η
15	w_{inst} [1]	local	2	2.00	0.1		0.1			0.2	<	1.2	300	**0.18**
15	w_{inst} [1]	global	2	2.00	0.1		0.1			0.2	<	1.2	300	**0.18**
14	w_{net} [2]	local	2	2.00	(0.1)	0.2		(0.0)	0.0	0.2	<	1.4	250	**0.15**
14	w_{net} [2]	global	2	2.00	(0.1)	0.2		(0.0)	0.0	0.2	<	1.4	250	**0.15**
15	w_{fin} [3]	local	2	2.00	(0.1)	0.2	(0.1)		0.1	0.3	<	1.4	250	**0.22**
15	w_{fin} [3]	global	2	2.00	(0.1)	0.2	(0.1)		0.1	0.3	<	1.4	250	**0.22**

Values in () are only informative.
The rod length is always used as the reference length for the total deflection verification.
For the local deflection verification, the member length is always used as the reference length.
Member lengths of members that are connected to each other without support are added up.

1 : $w_{inst} = w_{G,inst} + w_{Q,inst,char}$
2 : $w_{net} = w_{G,fin} + w_{Q,fin,qprm} - w_c$
3 : $w_{fin} = w_{G,fin} + w_{Q,fin,char}$

Support

Support Reactions per Act

Act		Support 1 max [kN/m]	min [kN/m]	Support 2 max [kN/m]	min [kN/m]	Support 3 max [kN/m]	min [kN/m]
99	vertical	0.61[1]	0.61[1]	5.69[1]	5.69[1]	2.22[1]	2.22[1]
	horizontal	0.00[1]	0.00[1]	0.00[1]	0.00[1]	0.00[1]	0.00[1]
8	vertical	0.43[2]	-0.21[3]	0.83[3]	0.61[2]	0.38[3]	-0.04[2]
	horizontal	0.00[2]	0.00[3]	0.00[2]	0.00[2]	0.00[3]	0.00[2]
9	vertical	0.06[4]	-0.20[5]	0.78[4]	-1.10[7]	0.20[4]	-0.49[7]
	horizontal	0.29[5]	-0.23[4]	0.00[4]	0.00[4]	0.36[7]	-0.19[4]
10	vertical	0.46[6]	0.46[6]	4.27[6]	4.27[6]	1.66[6]	1.66[6]
	horizontal	0.00[6]	0.00[6]	0.00[6]	0.00[6]	0.00[6]	0.00[6]

all values are characteristic values

1 : Load Cases:g
2 : Load Cases:FmL1
3 : Load Cases:FmL2
4 : Load Cases:(wlLuv+)
5 : Load Cases:(wlLuv-)
6 : Load Cases:s
7 : Load Cases:(wrLee-)

Connection Forces at Ridge

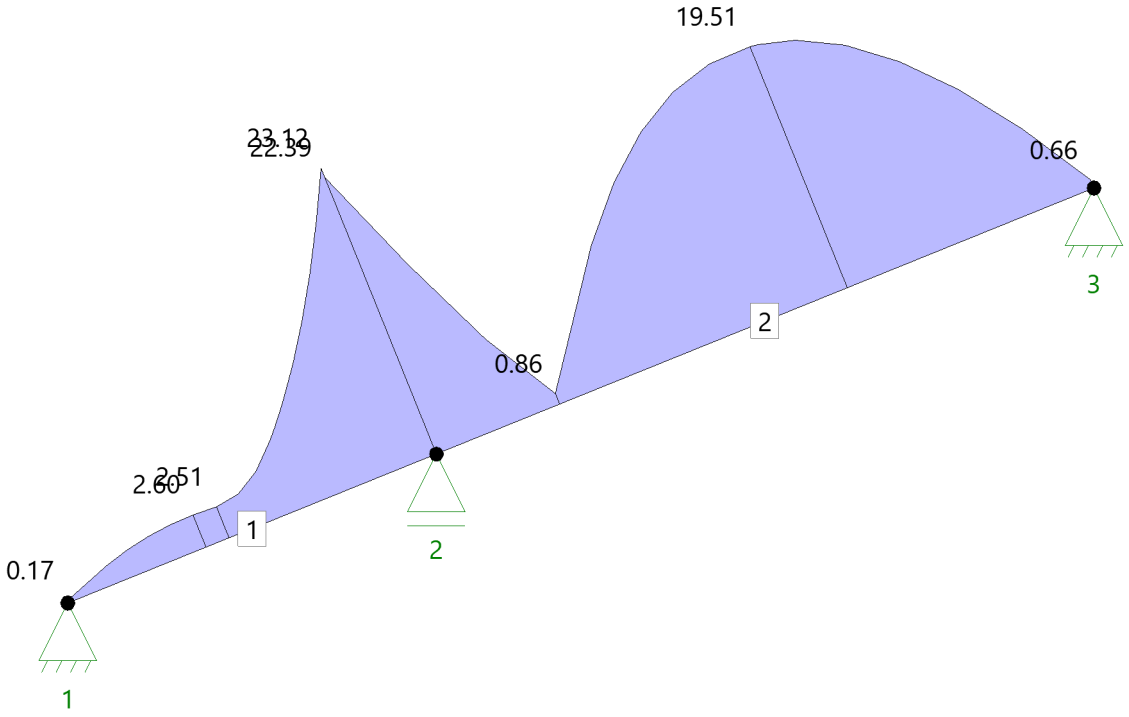
Max/min Connection forces at Ridge

left LcComb	N_d [kN]	V_d [kN]	$F_{Z,d}$ [kN]	$F_{X,d}$ [kN]
LfK.2	2.0	-5.3	-5.7	-0.2

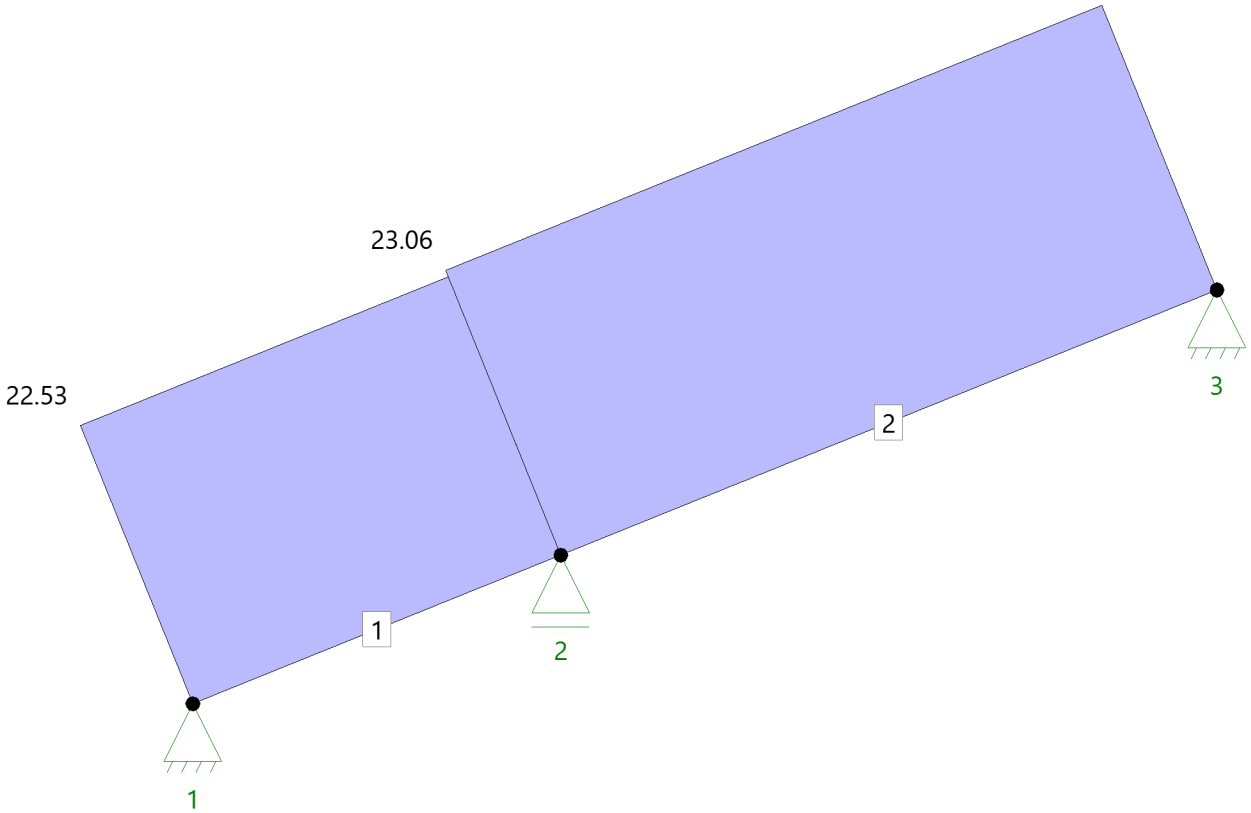
all values are design values

GraphicsLevel of Capacity

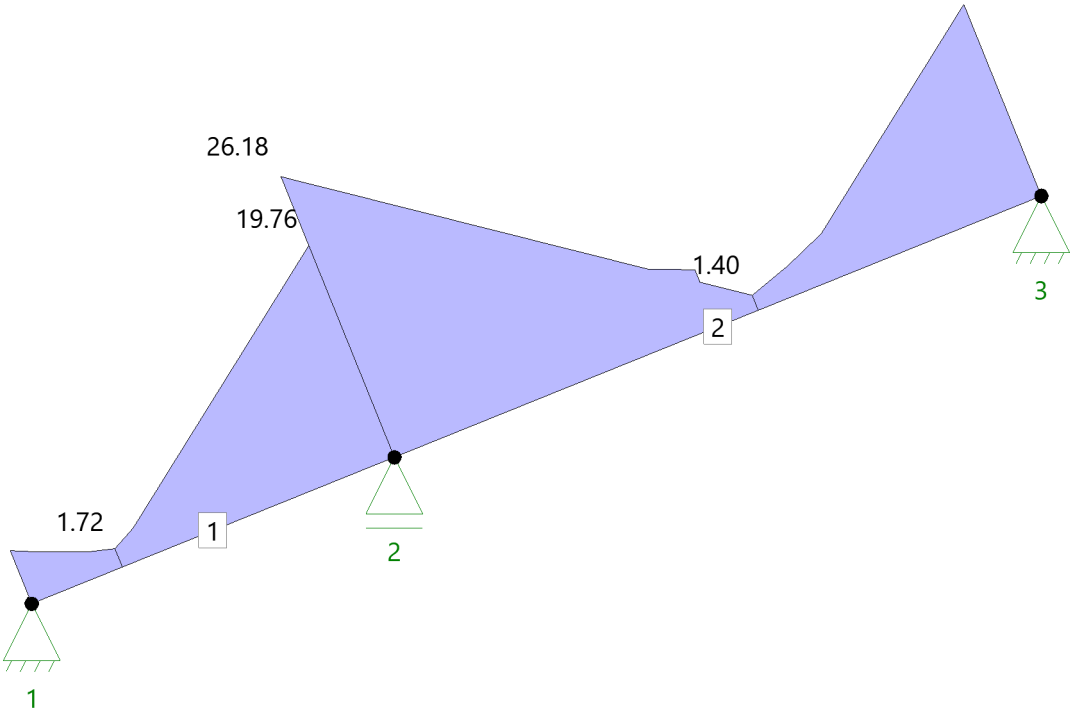
Envelope Eta Stress



Envelope Eta Stability



Envelope Eta Shear



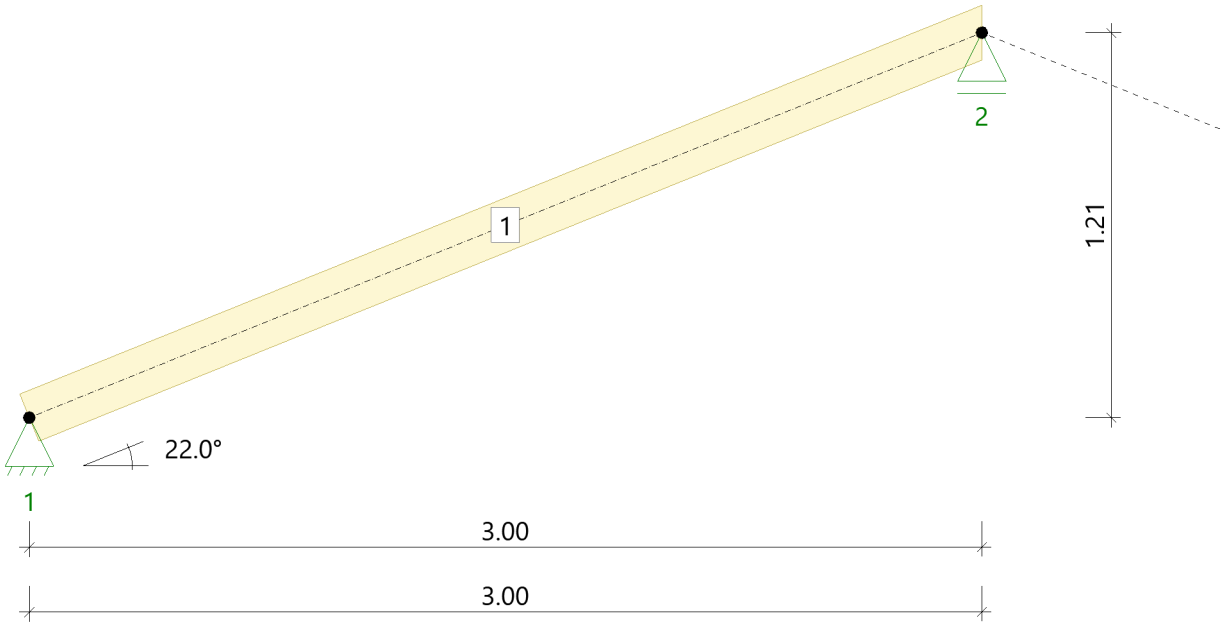
Item: poz 203 - dimenzioniranje špirovcev ob osi 14 - levo krajši 3.0m

Design of Roofs (x64) Dach+ 01/23C (FRILO R-2023-1/P04)

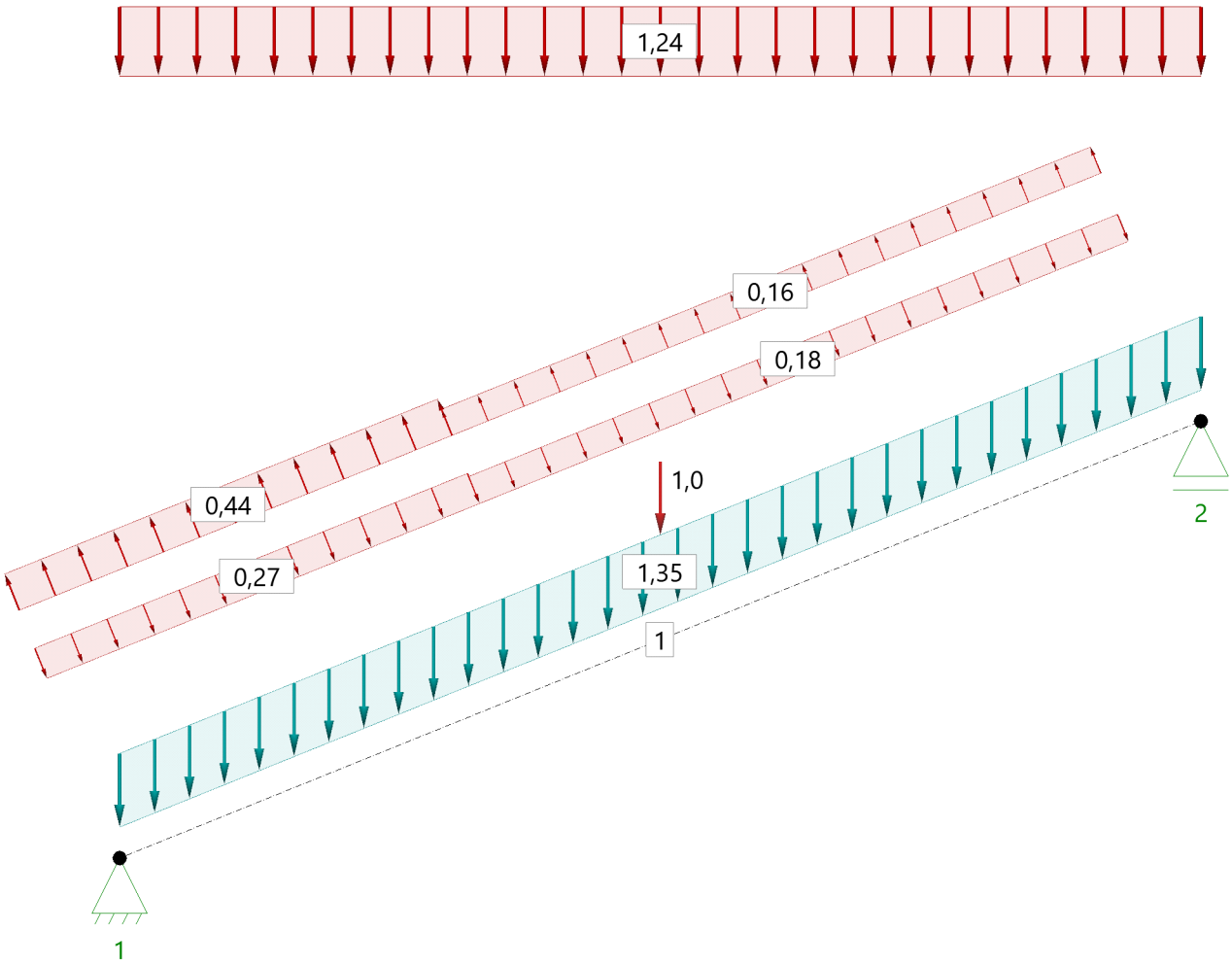
System

Softwood C24, Service class roofed, open; AH<85%; BMC<20%, CC 2

System Graphics



Load graphics



Material

Material values Timber

Softwood C24 acc.to EN 338:2016 $E_{0,mean}$ = 11000 N/mm² ρ_k = 350 kg/m³
G_{mean} = 690 N/mm²

Material Characteristics

$f_{m,k}$ $f_{v,k}$ N/mm²	$f_{t,0,k}$ $f_{c,0,k}$ N/mm²	$f_{t,90,k}$ $f_{c,90,k}$ N/mm²	$E_{0,mean}$ $E_{0,05}$ N/mm²	$E_{90,mean}$ $E_{90,05}$ N/mm²	G_{mean} G_{05} N/mm²	ρ_k ρ_m kg/m³	γ kN/m³
24.00 4.00	14.50 21.00	0.40 2.50	11000 7400	370 247	690 460	350 420	6.00

Geometry

Rafter Spacing e = 100.0 cm Total ridge height h = 6.00 m
Length of Roof b,Roof = 20.00 m Building length b, Wall = 20.00 m

Rafter

Span	Length BAR [m]	Length RAR [m]	Page	Slope [°]	Cross-section [cm]
1	3.00	3.24	left	22.0	14.0/16.0

Support

No.	Member	Cx [kN/m]	Cz [kN/m]	Depth of birds mouth t [cm]
1	Rafter left	Rigid	Rigid	0.0
2	Rafter left	0.00	Rigid	0.0

Tilt-/ Buckling-Lengths

Rafter left

Buckling in plane: from eingenvalue limited to...0.90*L
Buckling out of plane: kept continuously
Tilting: kept continuously

Calculation Rules

Only positive deflections are taken into account on cantilevers.
The rod length is always used as the reference length for the total deflection verification.
Caution! If bars are connected without a support, their bar lengths are added up.
Wind loads from undergrate blast are assumed to be dependent.
Load cases with loads whose expected deformations are opposite are not included.
Combinations of load cases whose expected deformations are opposite are not used.
The stiffness should be reduced as a result of creep from permanent and quasi-permanent load components.
kmod wird bei Wind als Mittelwert von kurz und sehr kurz angesetzt.

Loads

Load Pre-settings

Rafter

Roofing g1 = 1.35 kN/m² Act = 99
Construction g2 = 0.00 kN/m²
Loft conversion g3 = 0.00 kN/m²
Loft Conversion bottom gb = 0.00 kN/m²
With dead weight of members, γ = 6.00 kN/m³
Roofload Cat.H Q = 1.0 kN Act = 8

Boundary conditions

Total ridge height h = 6.00 m
Length of Roof b,Roof = 20.00 m
Building length b, Wall = 20.00 m
Building width on the right br = 0.00 m

Snow / wind loads for the calculation - User-defined value

EN 1991-1-3:2010, EN 1991-1-4:2010
Terrain elevation Altitude = 0.00 m
Ground Snow Load sk = 1.55 kN/m²
Wind pressure qp,0(h) = 0.62 kN/m²
Wind pressure qp,90(h) = 0.62 kN/m²

Auxiliary values

Wind reference length (Roof) e_0 = 12.00 m e_{90} = 3.00 m
Wind reference length (Wall) e_0 = 12.00 m e_{90} = 3.00 m
h/d = 2.000 h/b = 0.300 d/b = 0.150

Classification of Actions

No.	Name	γ_{sup}	γ_{inf}	ψ_0	ψ_1	ψ_2	KLED
99	Permanent loads	1.35	1.00	1.00	1.00	1.00	permanent
8	Cat. H: roofs	1.50	0.00	0.00	0.00	0.00	short-term
9	Wind loads	1.50	0.00	0.60	0.20	0.00	short-term
10	Snow loads H < 1000 m	1.50	0.00	0.50	0.20	0.00	short-term

Load values

Snow load

Name	Page	μ	Load value	(according to standard)	
Roof load	left	0.80	1.24	1.24	kN/m²
Non-blown portion (for blown load cases)	left	0.80	1.24	1.24	kN/m²
Blown portion (for blown load cases)	left	0.80	0.62	0.62	kN/m²

Wind loads

Name	Page	Pressure [kN/m²]	Suction [kN/m²]	Pressure (Standard) [kN/m²]	Suction (Standard) [kN/m²]
F	from left	0.27	-0.44	0.27	-0.44
G	from left	0.27	-0.41	0.27	-0.41
H	from left	0.18	-0.16	0.18	-0.16
D	from left	0.50	0.00	0.50	0.00
E	from left	0.00	-0.34	0.00	-0.34
I	from the right	0.00	-0.25	0.00	-0.25
J	from the right	0.00	-0.48	0.00	-0.48
D	from the right	0.50	0.00	0.50	0.00
E	from the right	0.00	-0.34	0.00	-0.34

Combinations

LC Combinations

No.	Name		Sit	KLED
1	1.35*g+1.50*s	ULS[1]	p/t[2]	4[3]
2	1.35*g+1.50*s+0.90*(wlLuv+)	ULS[1]	p/t[2]	6[4]
6	1.35*g+1.50*s+0.90*(wrLee-)	ULS[1]	p/t[2]	6[4]
11	1.35*g+1.50*(wrLee-)	ULS[1]	p/t[2]	6[4]
13	1.00*g+1.00*s	SLS[5]	char[6]	4[3]
14	1.00*g+1.00*s+0.60*(wlLuv+)	SLS[5]	char[6]	6[4]

The assignment of the short case names can be found in the table of load cases.

1 : ULS=Structural failure
2 : p/t=persistent/transient (Persistent/Transient Situation)
3 : Load duration class:4=short-term
4 : Load duration class:6=short/instant
5 : SLS=Serviceability
6 : char=characteristic (Characteristic Situation)

Results

Rafter left 14.0/16.0 e = 100.0 cm

ULS acc.to DIN EN 1995:2013, based on EN 1995:2014, Consequence class 2

Checks in Persistent/Transient Situation

Combi	Sit	Check	$N_{x,d}$ [kN]	$M_{y,d}$ [kNm]	$V_{z,d}$ [kN]	$\sigma_{n,d}$ [N/mm²]	$\sigma_{m,y,d}$ [N/mm²]	τ_d [N/mm²]	η	s_{ky} [m]	s_{kz} [m]	s_b [m]
1	p/t [1]	Stress (Span)	0.0	4.52	0.0	0.00	7.57		**0.46**			
1	p/t [1]	Stress (Column)	2.3	0.00	-5.6	0.10	0.00		**0.01**			
1	p/t [1]	Stability	-2.3	4.52	0.0	-0.10	7.57		**0.46**	1.54	0.00	0.00
1	p/t [1]	Shear	2.3	0.00	-5.6			-0.37	**0.27**			

The composition of the load case combinations can be found in the table of load case combinations.

1 : p/t=persistent/transient (Persistent/Transient Situation)

SLS checks acc.to DIN EN 1995:2013, based on EN 1995:2014, Consequence class 2

Combi	Check		Beam	x [m]	$w_{G,inst}$ [cm]	$w_{G,fin}$ [cm]	$w_{Q,inst,char}$ [cm]	$w_{Q,inst,qprm}$ [cm]	$w_{Q,fin}$ [cm]	w_{tot} [cm]		w_{lim} [cm]	L/..	η
14	w_{inst} [1]	local	1	1.62	0.4		0.3			0.7	<	1.1	300	**0.63**
14	w_{inst} [1]	global	1	1.62	0.4		0.3			0.7	<	1.1	300	**0.63**
13	w_{net} [2]	local	1	1.62	(0.4)	0.7		(0.0)	0.0	0.7	<	1.3	250	**0.52**
13	w_{net} [2]	global	1	1.62	(0.4)	0.7		(0.0)	0.0	0.7	<	1.3	250	**0.52**
14	w_{fin} [3]	local	1	1.62	(0.4)	0.7	(0.3)		0.3	1.0	<	1.3	250	**0.76**
14	w_{fin} [3]	global	1	1.62	(0.4)	0.7	(0.3)		0.3	1.0	<	1.3	250	**0.76**

Values in () are only informative.
The rod length is always used as the reference length for the total deflection verification.
For the local deflection verification, the member length is always used as the reference length.
Member lengths of members that are connected to each other without support are added up.

1 : $w_{inst} = w_{G,inst} + w_{Q,inst,char}$
2 : $w_{net} = w_{G,fin} + w_{Q,fin,qprm} - w_c$
3 : $w_{fin} = w_{G,fin} + w_{Q,fin,char}$

Support

Support Reactions per Act

Act		Support 1 max [kN/m]	min [kN/m]	Support 2 max [kN/m]	min [kN/m]
99	vertical	2.40[1]	2.40[1]	2.40[1]	2.40[1]
	horizontal	0.00[1]	0.00[1]	0.00[1]	0.00[1]
8	vertical	0.50[2]	0.50[2]	0.50[2]	0.50[2]
	horizontal	0.00[2]	0.00[2]	0.00[2]	0.00[2]
9	vertical	0.31[3]	-0.46[4]	0.34[3]	-0.69[5]
	horizontal	0.41[5]	-0.26[3]	0.00[3]	0.00[3]
10	vertical	1.86[6]	1.86[6]	1.86[6]	1.86[6]
	horizontal	0.00[6]	0.00[6]	0.00[6]	0.00[6]

all values are characteristic values

1 : Load Cases:g
2 : Load Cases:FmL1
3 : Load Cases:(wlLuv+)
4 : Load Cases:(wlLuv-)
5 : Load Cases:(wrLee-)
6 : Load Cases:s

Connection Forces at Ridge

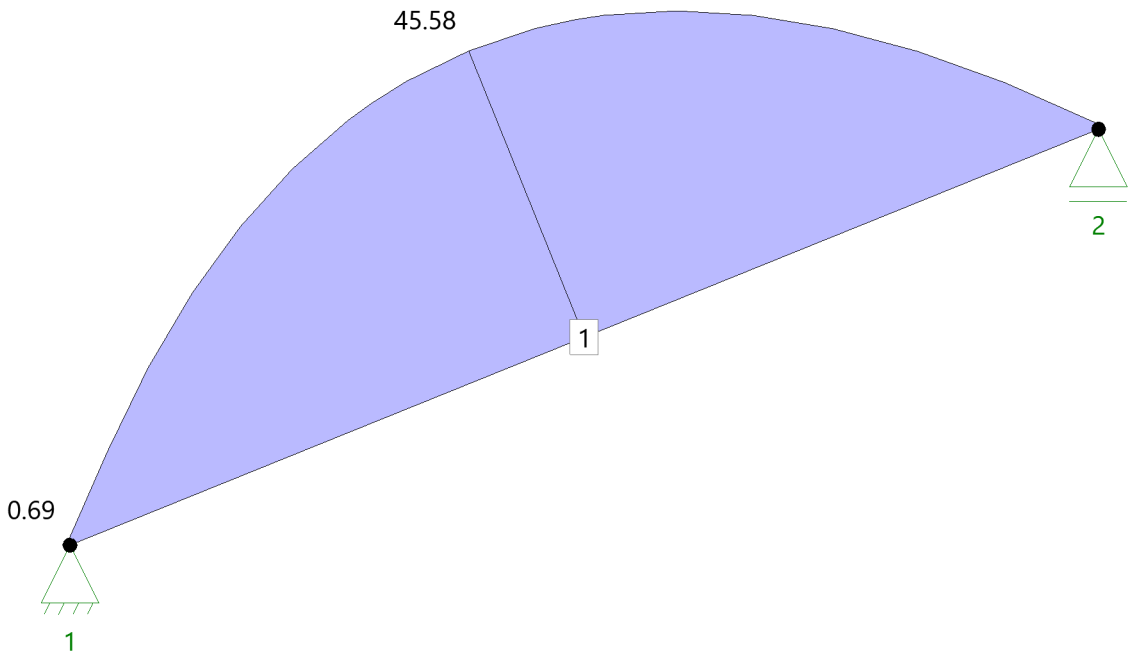
Max/min Connection forces at Ridge

left LcComb	N_d [kN]	V_d [kN]	$F_{Z,d}$ [kN]	$F_{X,d}$ [kN]
LfK.2	2.4	-5.9	-6.3	0.0

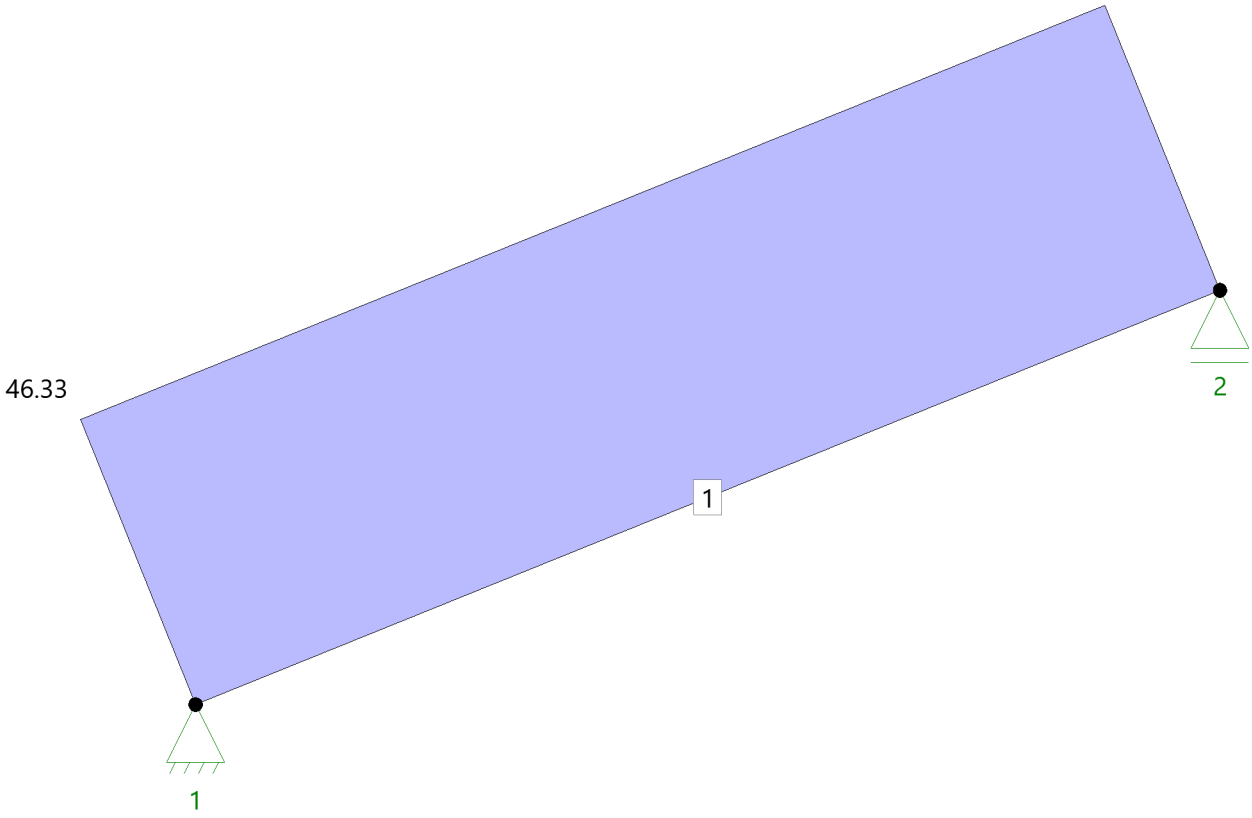
all values are design values

GraphicsLevel of Capacity

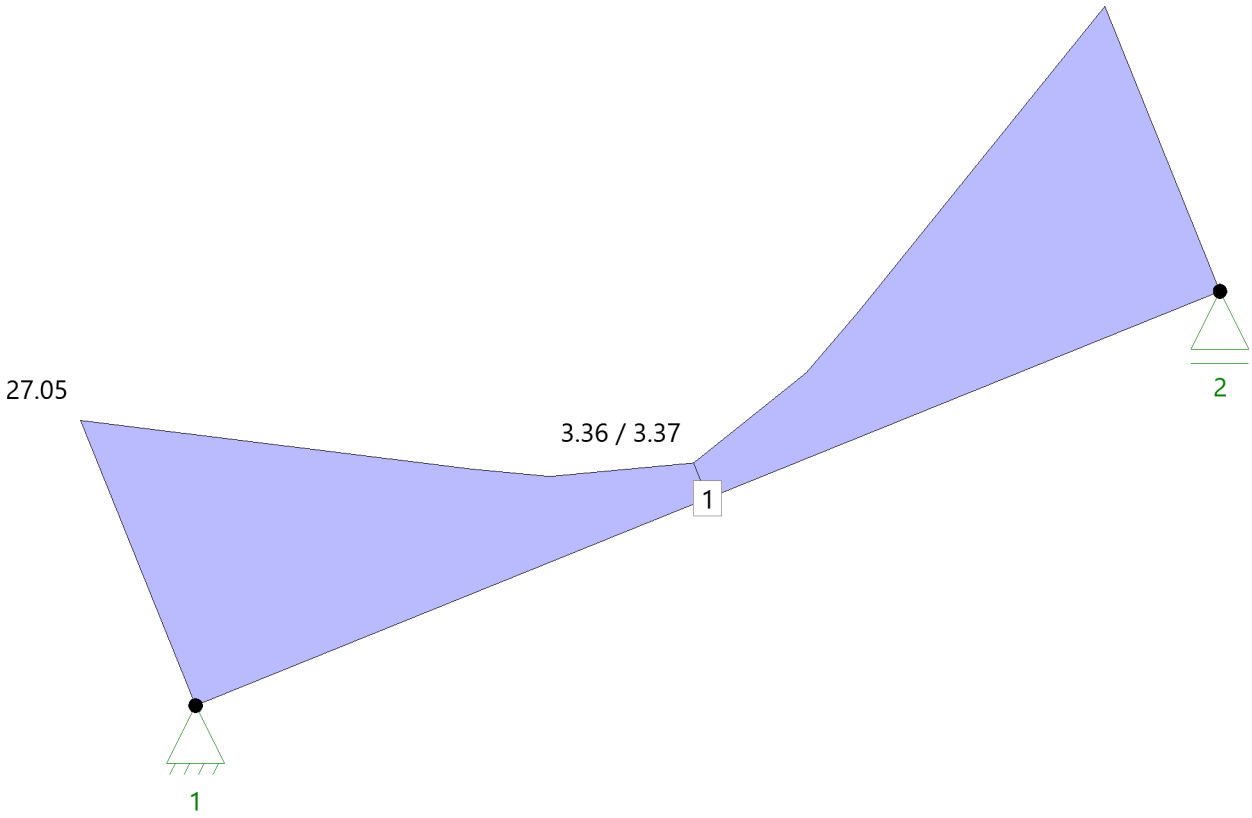
Envelope Eta Stress



Envelope Eta Stability



Envelope Eta Shear



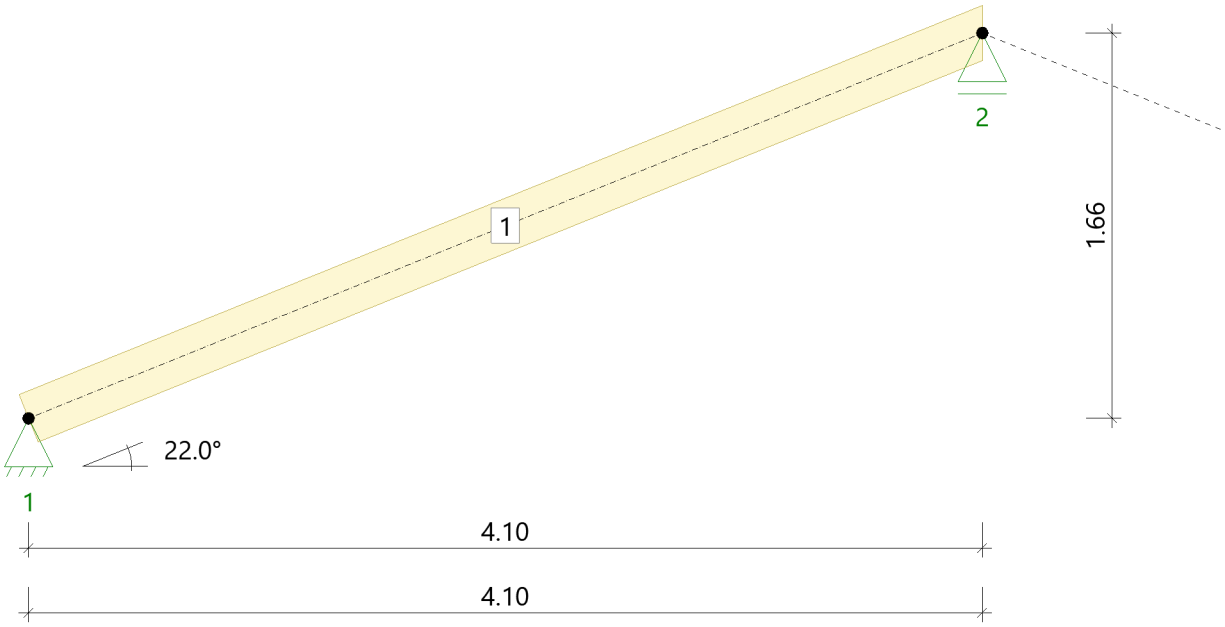
Item: poz 204 - dimenzioniranje špirovcev ob osi 17 - desno 4.1m

Design of Roofs (x64) Dach+ 01/23C (FRILO R-2023-1/P04)

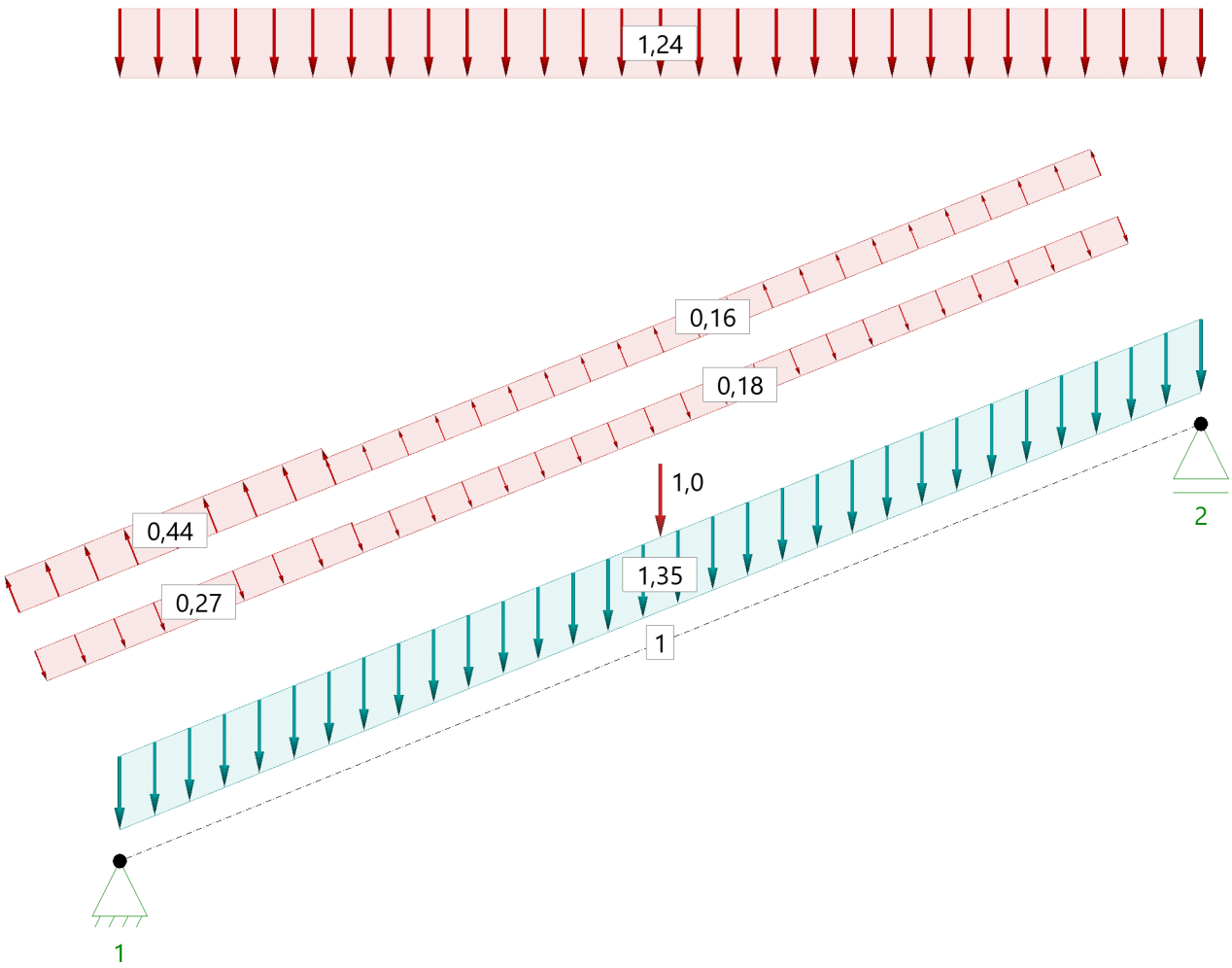
System

Softwood C24, Service class roofed, open; AH<85%; BMC<20%, CC 2

System Graphics



Load graphics



Material

Material values Timber

Softwood C24 acc.to EN 338:2016 $E_{0,mean}$ = 11000 N/mm² ρ_k = 350 kg/m³
G_{mean} = 690 N/mm²

Material Characteristics

$f_{m,k}$ $f_{v,k}$ N/mm²	$f_{t,0,k}$ $f_{c,0,k}$ N/mm²	$f_{t,90,k}$ $f_{c,90,k}$ N/mm²	$E_{0,mean}$ $E_{0,05}$ N/mm²	$E_{90,mean}$ $E_{90,05}$ N/mm²	G_{mean} G_{05} N/mm²	ρ_k ρ_m kg/m³	γ kN/m³
24.00 4.00	14.50 21.00	0.40 2.50	11000 7400	370 247	690 460	350 420	6.00

Geometry

Rafter Spacing e = 110.0 cm Total ridge height h = 6.00 m
Length of Roof b,Roof = 20.00 m Building length b, Wall = 20.00 m

Rafter

Span	Length BAR [m]	Length RAR [m]	Page	Slope [°]	Cross-section [cm]
1	4.10	4.42	left	22.0	16.0/22.0

Support

No.	Member	Cx [kN/m]	Cz [kN/m]	Depth of birds mouth t [cm]
1	Rafter left	Rigid	Rigid	0.0
2	Rafter left	0.00	Rigid	0.0

Tilt-/ Buckling-Lengths

Rafter left

Buckling in plane: from eingenvalue limited to...0.90*L
Buckling out of plane: kept continuously
Tilting: kept continuously

Calculation Rules

Only positive deflections are taken into account on cantilevers.
The rod length is always used as the reference length for the total deflection verification.
Caution! If bars are connected without a support, their bar lengths are added up.
Wind loads from undergrate blast are assumed to be dependent.
Load cases with loads whose expected deformations are opposite are not included.
Combinations of load cases whose expected deformations are opposite are not used.
The stiffness should be reduced as a result of creep from permanent and quasi-permanent load components.
kmod wird bei Wind als Mittelwert von kurz und sehr kurz angesetzt.

Loads

Load Pre-settings

Rafter

Roofing g1 = 1.35 kN/m² Act = 99
Construction g2 = 0.00 kN/m²
Loft conversion g3 = 0.00 kN/m²
Loft Conversion bottom gb = 0.00 kN/m²
With dead weight of members, γ = 6.00 kN/m³
Roofload Cat.H Q = 1.0 kN Act = 8

Boundary conditions

Total ridge height h = 6.00 m
Length of Roof b,Roof = 20.00 m
Building length b, Wall = 20.00 m
Building width on the right br = 0.00 m

Snow / wind loads for the calculation - User-defined value

EN 1991-1-3:2010, EN 1991-1-4:2010
Terrain elevation Altitude = 0.00 m
Ground Snow Load sk = 1.55 kN/m²
Wind pressure qp,0(h) = 0.62 kN/m²
Wind pressure qp,90(h) = 0.62 kN/m²

Auxiliary values

Wind reference length (Roof) e_0 = 12.00 m e_{90} = 4.10 m
Wind reference length (Wall) e_0 = 12.00 m e_{90} = 4.10 m
h/d = 1.463 h/b = 0.300 d/b = 0.205

Classification of Actions

No.	Name	γ_{sup}	γ_{inf}	ψ_0	ψ_1	ψ_2	KLED
99	Permanent loads	1.35	1.00	1.00	1.00	1.00	permanent
8	Cat. H: roofs	1.50	0.00	0.00	0.00	0.00	short-term
9	Wind loads	1.50	0.00	0.60	0.20	0.00	short-term
10	Snow loads H < 1000 m	1.50	0.00	0.50	0.20	0.00	short-term

Load values

Snow load

Name	Page	μ	Load value	(according to standard)	
Roof load	left	0.80	1.24	1.24	kN/m²
Non-blown portion (for blown load cases)	left	0.80	1.24	1.24	kN/m²
Blown portion (for blown load cases)	left	0.80	0.62	0.62	kN/m²

Wind loads

Name	Page	Pressure [kN/m²]	Suction [kN/m²]	Pressure (Standard) [kN/m²]	Suction (Standard) [kN/m²]
F	from left	0.27	-0.44	0.27	-0.44
G	from left	0.27	-0.41	0.27	-0.41
H	from left	0.18	-0.16	0.18	-0.16
D	from left	0.50	0.00	0.50	0.00
E	from left	0.00	-0.32	0.00	-0.32
I	from the right	0.00	-0.25	0.00	-0.25
J	from the right	0.00	-0.48	0.00	-0.48
D	from the right	0.50	0.00	0.50	0.00
E	from the right	0.00	-0.32	0.00	-0.32

Combinations

LC Combinations

No.	Name		Sit	KLED
1	1.35*g+1.50*s	ULS[1]	p/t[2]	4[3]
2	1.35*g+1.50*s+0.90*(wlLuv+)	ULS[1]	p/t[2]	6[4]
6	1.35*g+1.50*s+0.90*(wrLee-)	ULS[1]	p/t[2]	6[4]
11	1.35*g+1.50*(wrLee-)	ULS[1]	p/t[2]	6[4]
13	1.00*g+1.00*s	SLS[5]	char[6]	4[3]
14	1.00*g+1.00*s+0.60*(wlLuv+)	SLS[5]	char[6]	6[4]

The assignment of the short case names can be found in the table of load cases.

1 : ULS=Structural failure
2 : p/t=persistent/transient (Persistent/Transient Situation)
3 : Load duration class:4=short-term
4 : Load duration class:6=short/instant
5 : SLS=Serviceability
6 : char=characteristic (Characteristic Situation)

Results

Rafter left 16.0/22.0 e = 110.0 cm

ULS acc.to DIN EN 1995:2013, based on EN 1995:2014, Consequence class 2

Checks in Persistent/Transient Situation

Combi	Sit	Check	$N_{x,d}$ [kN]	$M_{y,d}$ [kNm]	$V_{z,d}$ [kN]	$\sigma_{n,d}$ [N/mm²]	$\sigma_{m,y,d}$ [N/mm²]	τ_d [N/mm²]	η	s_{ky} [m]	s_{kz} [m]	s_b [m]
1	p/t [1]	Stress (Span)	0.0	9.49	0.0	0.00	7.35		**0.44**			
1	p/t [1]	Stress (Column)	3.5	0.00	-8.6	0.10	0.00		**0.01**			
1	p/t [1]	Stability	-3.5	9.49	0.0	-0.10	7.35		**0.45**	3.98	0.00	0.00
1	p/t [1]	Shear	3.5	0.00	-8.6			-0.37	**0.26**			

The composition of the load case combinations can be found in the table of load case combinations.

1 : p/t=persistent/transient (Persistent/Transient Situation)

SLS checks acc.to DIN EN 1995:2013, based on EN 1995:2014, Consequence class 2

Combi	Check		Beam	x [m]	$w_{G,inst}$ [cm]	$w_{G,fin}$ [cm]	$w_{Q,inst,char}$ [cm]	$w_{Q,inst,qprm}$ [cm]	$w_{Q,fin}$ [cm]	w_{tot} [cm]		w_{lim} [cm]	L/..	η
14	w_{inst} [1]	local	1	2.21	0.5		0.4			0.9	<	1.5	300	**0.61**
14	w_{inst} [1]	global	1	2.21	0.5		0.4			0.9	<	1.5	300	**0.61**
13	w_{net} [2]	local	1	2.21	(0.5)	0.9		(0.0)	0.0	0.9	<	1.8	250	**0.51**
13	w_{net} [2]	global	1	2.21	(0.5)	0.9		(0.0)	0.0	0.9	<	1.8	250	**0.51**
14	w_{fin} [3]	local	1	2.21	(0.5)	0.9	(0.4)		0.4	1.3	<	1.8	250	**0.74**
14	w_{fin} [3]	global	1	2.21	(0.5)	0.9	(0.4)		0.4	1.3	<	1.8	250	**0.74**

Values in () are only informative.
The rod length is always used as the reference length for the total deflection verification.
For the local deflection verification, the member length is always used as the reference length.
Member lengths of members that are connected to each other without support are added up.

1 : $w_{inst} = w_{G,inst} + w_{Q,inst,char}$
2 : $w_{net} = w_{G,fin} + w_{Q,fin,qprm} - w_c$
3 : $w_{fin} = w_{G,fin} + w_{Q,fin,char}$

Support

Support Reactions per Act

Act		Support 1 max [kN/m]	min [kN/m]	Support 2 max [kN/m]	min [kN/m]
99	vertical	3.41[1]	3.41[1]	3.41[1]	3.41[1]
	horizontal	0.00[1]	0.00[1]	0.00[1]	0.00[1]
8	vertical	0.45[2]	0.45[2]	0.45[2]	0.45[2]
	horizontal	0.00[2]	0.00[2]	0.00[2]	0.00[2]
9	vertical	0.40[3]	-0.55[4]	0.45[3]	-0.86[5]
	horizontal	0.52[5]	-0.34[3]	0.00[3]	0.00[3]
10	vertical	2.54[6]	2.54[6]	2.54[6]	2.54[6]
	horizontal	0.00[6]	0.00[6]	0.00[6]	0.00[6]

all values are characteristic values

1 : Load Cases:g
2 : Load Cases:FmL1
3 : Load Cases:(wlLuv+)
4 : Load Cases:(wlLuv-)
5 : Load Cases:(wrLee-)
6 : Load Cases:s

Connection Forces at Ridge

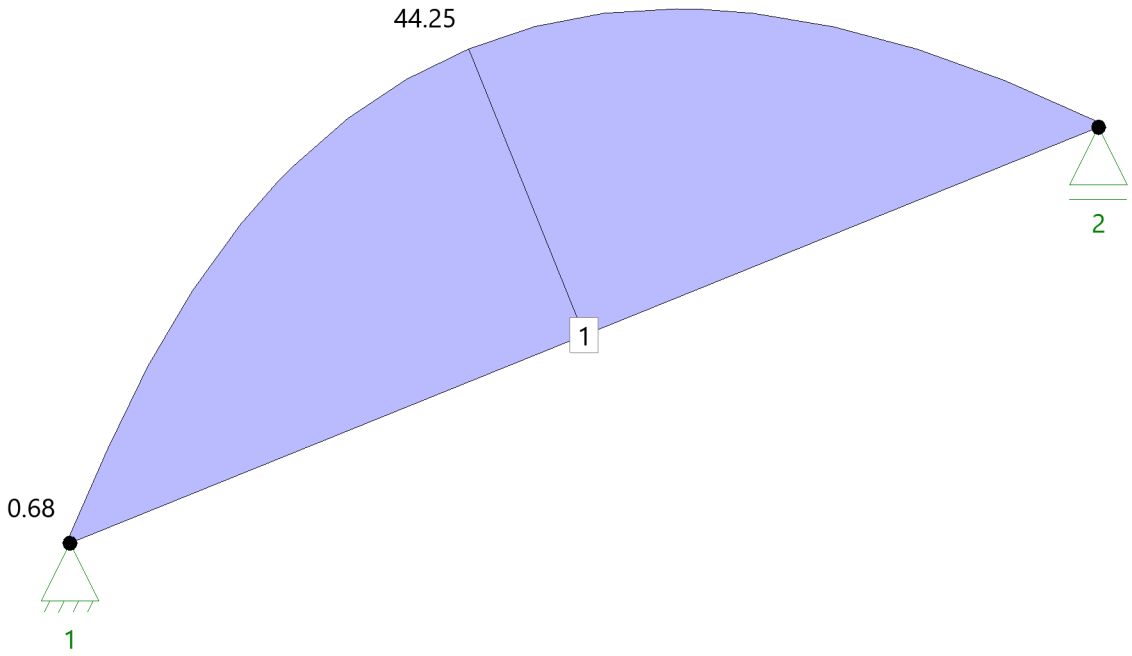
Max/min Connection forces at Ridge

left LcComb	N_d [kN]	V_d [kN]	$F_{Z,d}$ [kN]	$F_{X,d}$ [kN]
LfK.2	3.6	-9.0	-9.7	0.0

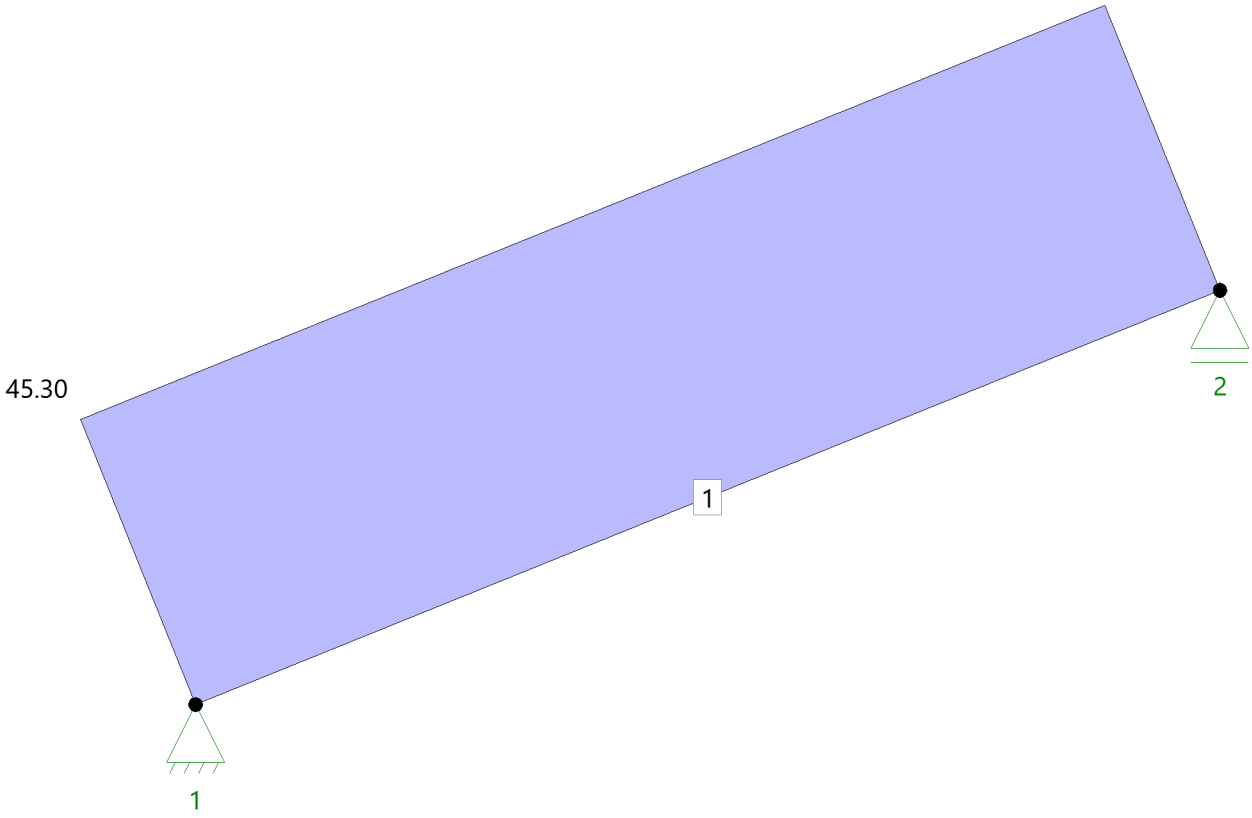
all values are design values

GraphicsLevel of Capacity

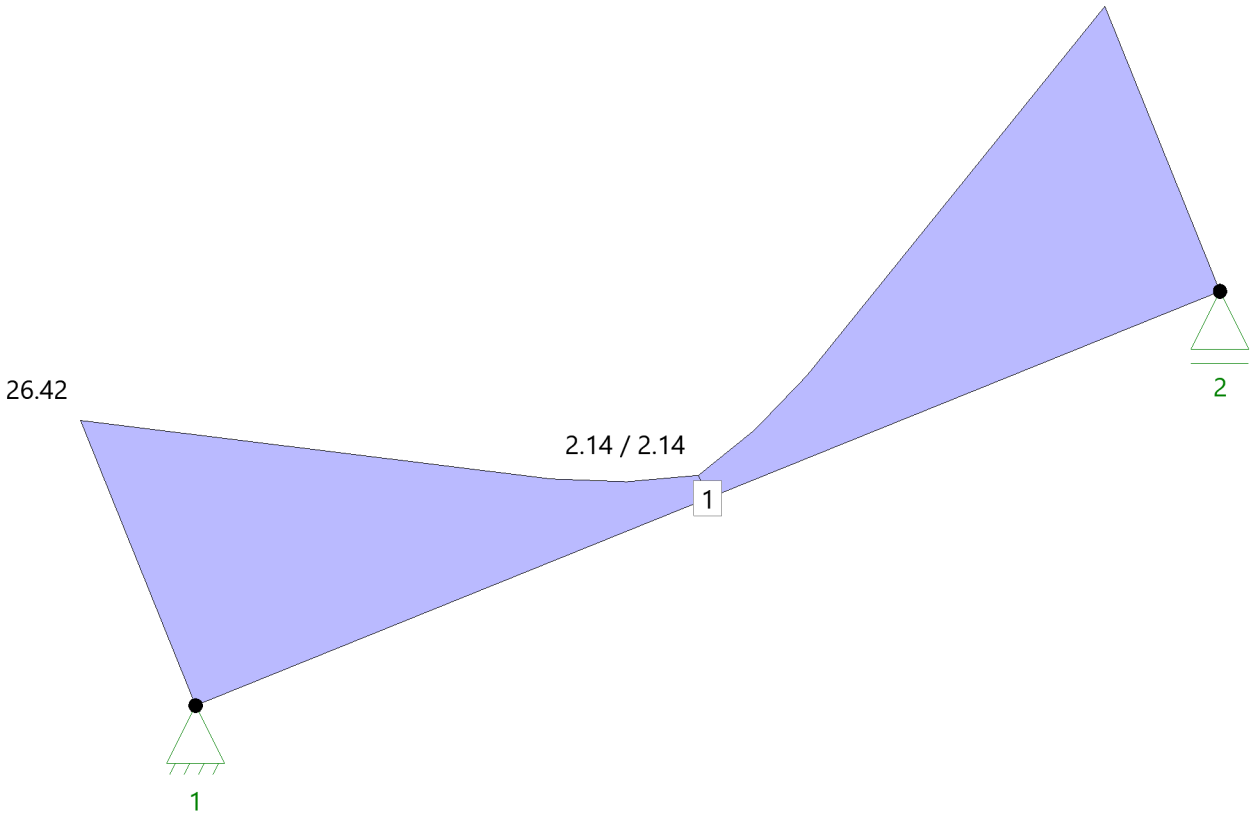
Envelope Eta Stress



Envelope Eta Stability



Envelope Eta Shear



Item: poz 205 - slemenska lega

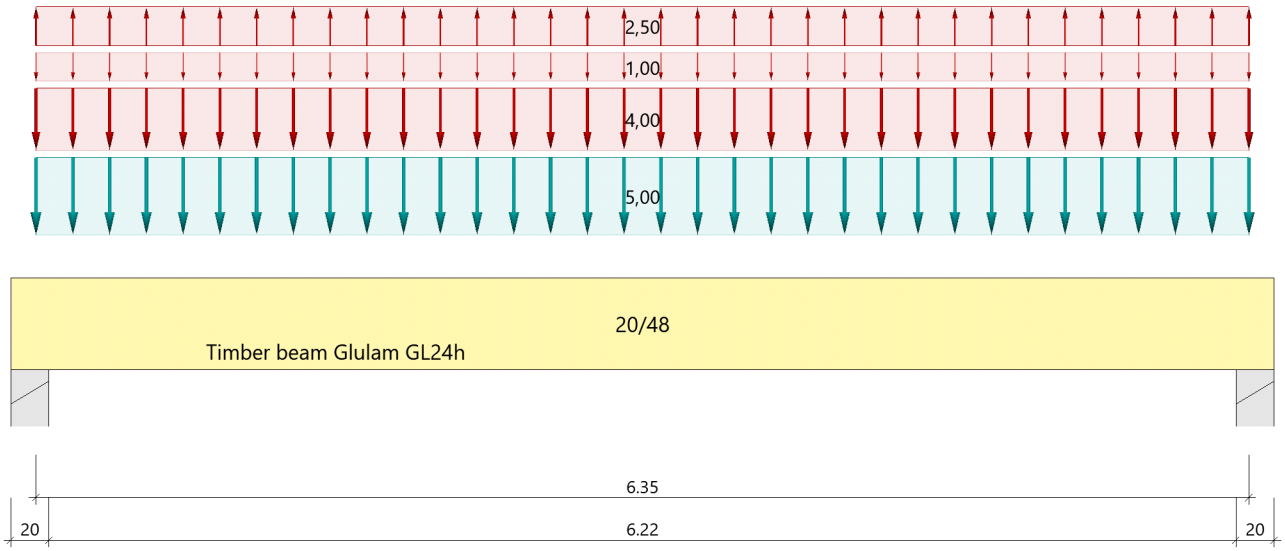
Continuous Beam Timber (x64) HTM+ 01/23D (FRILO R-2023-1/P04)

Basic Parameters

Timber beam Glulam GL24h (flat) DIN EN 1995-1-1/NA:2013-08

System

System Graphic



Material

Glulam GL24h (flat), acc.to EN 14080:2013

$f_{m,k}$ $f_{v,k}$ [N/mm²]	$f_{t,0,k}$ $f_{c,0,k}$ [N/mm²]	$f_{t,90,k}$ $f_{c,90,k}$ [N/mm²]	$E_{0,mean}$ $E_{0,05}$ [N/mm²]	$E_{90,mean}$ $E_{90,05}$ [N/mm²]	G_{mean} G_{05} [N/mm²]	ρ_k ρ_m [kg/m³]
24.00 3.50	19.20 24.00	0.50 2.50	11500 9600	300 250	650 540	385 420

$f_{m,k}$: characteristic value of bending strength
$f_{t,0,k}$: characteristic value of tensile strength parallel to grain
$f_{t,90,k}$: characteristic value of tensile strength perpendicular to the grain
$E_{0,mean}$: Average value of modulus of elasticity parallel to the fiber
$E_{90,mean}$: Average value of the modulus of elasticity perpendicular to the grain
G_{mean} : Average value of the shear modulus
ρ_k : Characteristic value of gross density
$f_{v,k}$: characteristic value of shear strength
$f_{c,0,k}$: characteristic value of compressive strength parallel to grain
$f_{c,90,k}$: characteristic value of compressive strength perpendicular to the grain
$E_{0,05}$: 5% fractile value of the modulus of elasticity parallel to grain
$E_{90,05}$: 5% fractile value of the modulus of elasticity perpendicular to the grain
G_{05} : 5% fractile value of the shear modulus
ρ_m : Average value of the density

Geometry

Cross-sections

Name	I_y [cm⁴]	I_z [cm⁴]	W_y [cm³]	W_z [cm³]	A [cm²]
20/48	184300	32000	7680	3200	960.0
Cross-section is constant over the entire length of the beam.					

Support (Bearing conditions)

No	x [m]	Width [cm]	Depth [cm]	k_{c90}	uy [kN/m]	uz [kN/m]	Rotations *) Φ_x [kNm/rad]	Φ_y [kNm/rad]	Φ_z [kNm/rad]
1	0.00	20.0	20.0	1.00	-1	-1	-1	0.0	0.0
2	6.35	20.0	20.0	1.00	-1	-1	0.0	0.0	0.0

*) -1 = fixed, 0 = free, > 0 = elastically restraint

Lateral support in y- direction: at bearings on top chord

Loads

Line loads

Reference	No	Type	A [m]	L1 [m]	L2 [m]	W1 [kN/m]	W2 [kN/m]	GF	Sim	Alt
System	1	GL		6.35		5.00		Permanent		
	2	GL		6.35		4.00		Snow (high)		
	3	GL		6.35		1.00		Wind		
	4	GL		6.35		-2.50		Wind		

Reference : System-related (front edge of beam) or span load
Type : 1 - uniformly distributed load (GL), 4 - trapezoidal load (TL), 5 - triangular load (DL)
A : Distance to the load from the beginning of the span or the front edge of the beam
GF : Load effect
Sim : Simultaneous group
Alt : Alternate group

Self-weight

Total weight = 256 kg taken into account with gamma = 4.20 kN/m^3.

Overview of the actions used

Actions

Designation	ψ_0	ψ_1	ψ_2	$\gamma_{F,inf}$	$\gamma_{F,sup}$	KLED
Permanent loads				1.00	1.35	
Wind loads	0.60	0.20	0.00		1.50	short/very short
Snow loads H > 1000 m	0.70	0.50	0.20		1.50	middle

Consequences class CC 2 according to EN 1990 Tab. B1 -> K_{Fi} = 1.0 Tab. B3

Results

Design parameter

Design code	:	DIN EN 1995-1-1/NA:2013-08
Basis	:	EN 1995-1-1/A2:2014
Safety concept / load combinatorics	:	DIN EN 1990/NA:2010-12
Consequence class	:	CC 2
Ψ_2 = 0.5 for snow (AE)	:	not considered
Permanent loads	:	all equal γ_F ($\gamma_{G,sup}$ or $\gamma_{G,inf}$)
CLED ati wind	:	Average of short and very short

Design parameter Timber

Service class		2 :	roofed, open Rel. air humidity ~ 85%	Equilibrium moisture content < 20%
Design situation serviceability		:	characteristic	
Shear stresses		=	Tau with red. Q	
Initial deflection	w_{inst}	=	l/300	
Final deflection	$w_{net,fin}$	=	l/250	
	w_{fin}	=	l/250	

Summary

Check	Design situation	$\eta_{Bending}$	η_{Shear}	$\eta_{c,90}$	η_{Stabi}	$\eta_{Deformation}$
Load capacity	persistent/transient	0.58	0.35	0.60	0.58	
Serviceability	characteristic					0.59

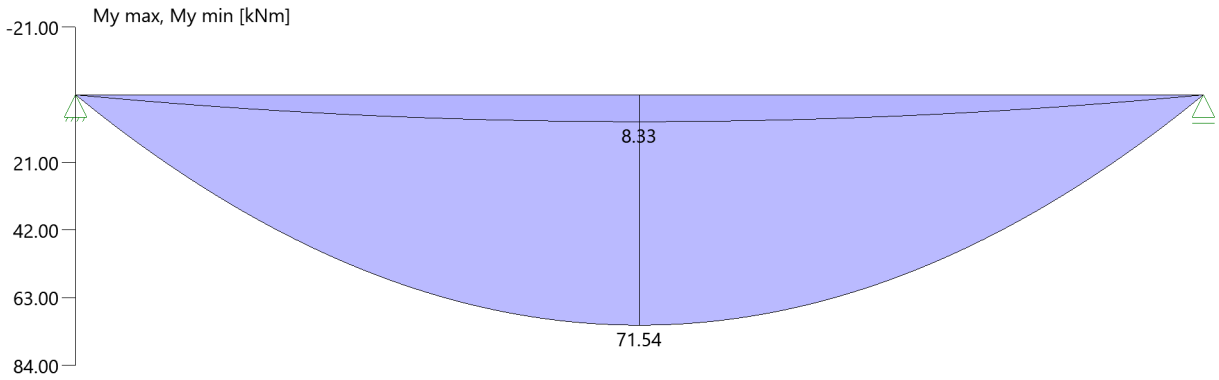
Structural safety per cross-section (compact)

Design situation	Cross-section	$V_{z,Ed}$ [kN]	$M_{y,Ed}$ [kNm]	η_{Shear}	$\eta_{Bending}$	η_{Stabi}
persistent/transient	20/48	34.9	67.01	0.35	0.58	0.58

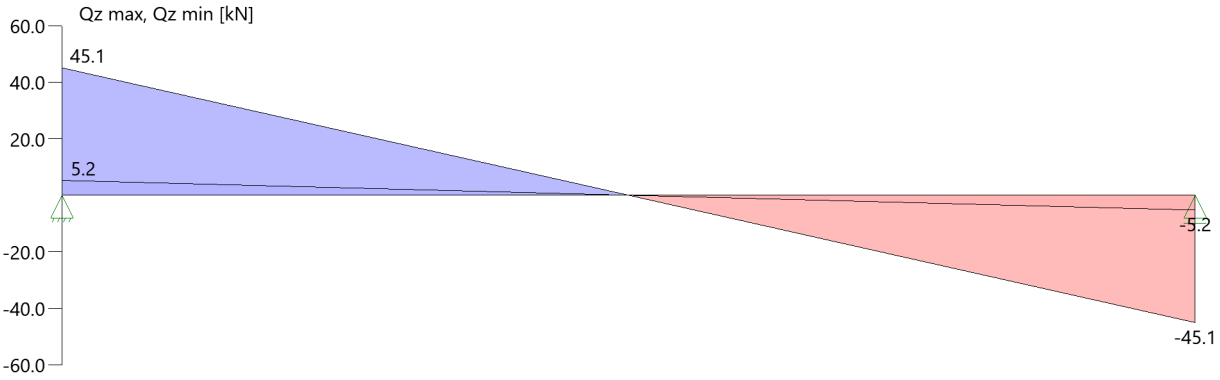
Structural safety - Load combination persistent/transient

Internal forces

Envelope of the moments



Envelope of the transverse forces



Internal forces

Span	x [m]	$M_{y,Ed}$ [kNm]	$V_{z,Ed}$ [kN]	Lcomb
Span 1	0.00	0.00	0.0	2
	0.55	22.52	34.9	1
	3.18	71.54	0.0	1
	5.80	67.01	-34.9	2
	6.35	0.00	0.0	2

Bending

Span	x [m]	$M_{y,d}$ [kNm]	σ_{myd} [N/mm^2]	$k_{crit,y}$	$k_{h,My}$	k_{mod}	$f_{m,y,d}$ [N/mm^2]	η	Lcomb
Span 1	3.18	67.01	8.72	1.00	1.02	0.80	15.10	0.58	2

Shear

Column [No]		x_{rel} [m]	x_{abs} [m]	$V_{z,d}$ [kN]	τ_d [N/mm²]	k_{mod}		$f_{v,z,d}$ [N/mm²]	η	Lcomb
1	right	0.55	0.55	34.9	0.55	0.80		2.15	0.35	2
2	left	0.55	5.80	-34.9	-0.55	0.80		2.15	0.35	2
EN 1995 6.1.7 : kcr = 0.71										

Support pressure

Column	b_{eff} [cm]	d_{eff} [cm]	max F [kN]	$\sigma_{c,90,d}$ [N/mm²]	k_{c90}	k_{mod}	$f_{c,90,d}$ [N/mm²]	η	Lcomb
1	23.0*	20.0	42.2	0.92	1.00	0.80	1.54	0.60	2
2	23.0*	20.0	42.2	0.92	1.00	0.80	1.54	0.60	2
* Contact area according to DIN EN 1995-1-1, Chapter 6.1.5 (1) P widened by 30mm per side									

Check of SLS

	l_{eff} [m]	Position [m]	typ		w_g [cm]	w_q [cm]	w [cm]	w_{lim}	η	Lk
Span 1	6.35	3.18	inst	z	0.5	0.5	1.0	2.1	0.47	4
	6.35	3.18	net,fin	z	1.0	0.1	1.1	2.5	0.44	6
	6.35	3.18	fin	z	1.0	0.5	1.5	2.5	0.59	5

l_{eff} : Effective length
Position : Position of the deformation
typ : Start-/End deformation (direction)
w_g : Deformation due to permanent load
w_q : Deformation due to variable load
w : Deformation total
w_{lim} : Permissible deformation
η : Degree of utilization
Lk : No. of the load combination

Support forces

Support forces per [m] - characteristic of each action

No	x [m]	Action	$R_{z,min}$ [kN/m]	$R_{z,max}$ [kN/m]	$M_{y,min}$ [kNm/m]	$M_{y,max}$ [kNm/m]
1	0.00	Permanent loads	17.16	17.16		
		Wind loads	-7.94	3.17		
		Snow loads H > 1000 m		12.70		
2	6.35	Permanent loads	17.16	17.16		
		Wind loads	-7.94	3.17		
		Snow loads H > 1000 m		12.70		

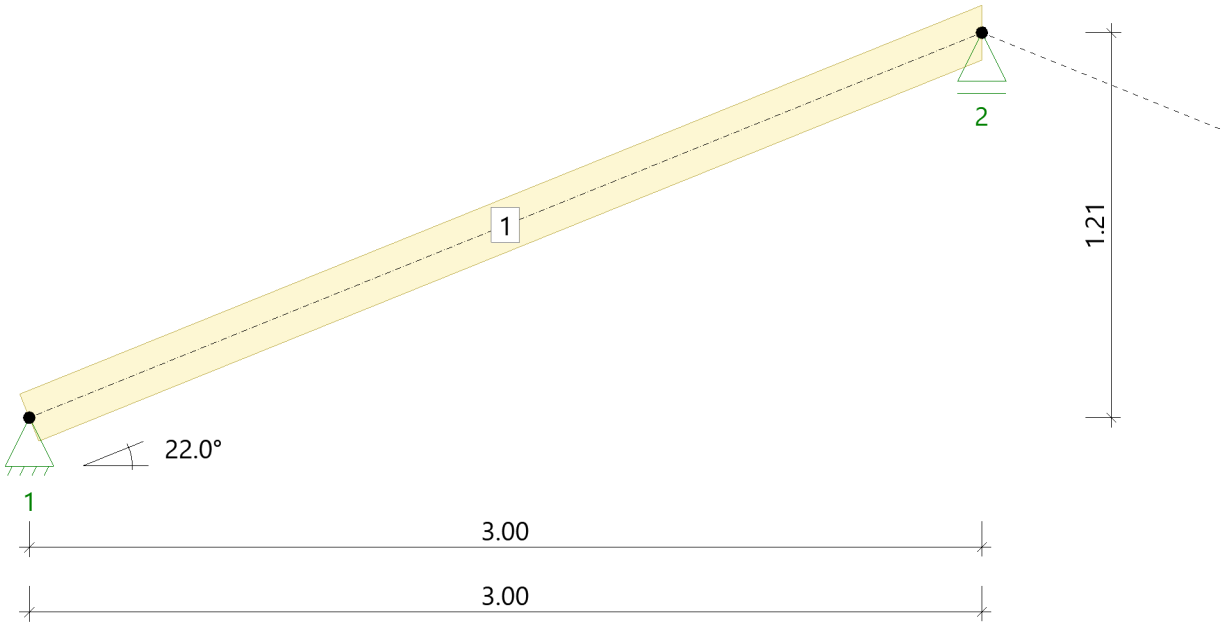
Item: poz 206 - dimenzioniranje špirovcev ob osi 17-med H-G

Design of Roofs (x64) Dach+ 01/23C (FRILO R-2023-1/P04)

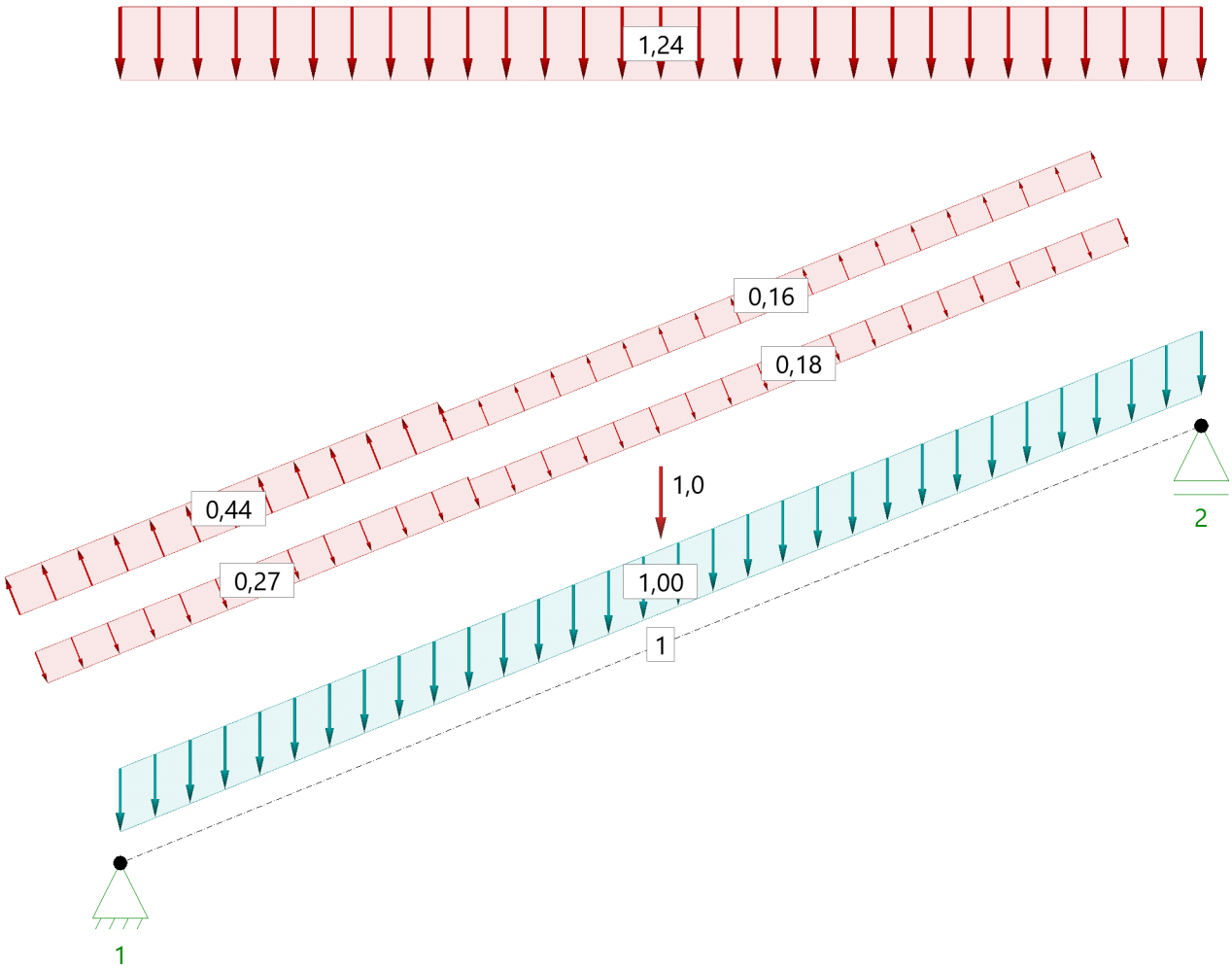
System

Softwood C24, Service class roofed, open; AH<85%; BMC<20%, CC 2

System Graphics



Load graphics



Material

Material values Timber

Softwood C24 acc.to EN 338:2016 $E_{0,mean}$ = 11000 N/mm² ρ_k = 350 kg/m³
G_{mean} = 690 N/mm²

Material Characteristics

$f_{m,k}$ $f_{v,k}$ N/mm²	$f_{t,0,k}$ $f_{c,0,k}$ N/mm²	$f_{t,90,k}$ $f_{c,90,k}$ N/mm²	$E_{0,mean}$ $E_{0,05}$ N/mm²	$E_{90,mean}$ $E_{90,05}$ N/mm²	G_{mean} G_{05} N/mm²	ρ_k ρ_m kg/m³	γ kN/m³
24.00 4.00	14.50 21.00	0.40 2.50	11000 7400	370 247	690 460	350 420	6.00

Geometry

Rafter Spacing e = 110.0 cm Total ridge height h = 6.00 m
Length of Roof b,Roof = 20.00 m Building length b, Wall = 20.00 m

Rafter

Span	Length BAR [m]	Length RAR [m]	Page	Slope [°]	Cross-section [cm]
1	3.00	3.24	left	22.0	14.0/16.0

Support

No.	Member	Cx [kN/m]	Cz [kN/m]	Depth of birds mouth t [cm]
1	Rafter left	Rigid	Rigid	0.0
2	Rafter left	0.00	Rigid	0.0

Tilt-/ Buckling-Lengths

Rafter left

Buckling in plane: from eingenvalue limited to...0.90*L
Buckling out of plane: kept continuously
Tilting: kept continuously

Calculation Rules

The rod length is always used as the reference length for the total deflection verification.
Caution! If bars are connected without a support, their bar lengths are added up.
Wind loads from undergrate blast are assumed to be dependent.
Load cases with loads whose expected deformations are opposite are not included.
Combinations of load cases whose expected deformations are opposite are not used.
The stiffness should be reduced as a result of creep from permanent and quasi-permanent load components.
kmod wird bei Wind als Mittelwert von kurz und sehr kurz angesetzt.

Loads

Load Pre-settings

Rafter

Roofing g1 = 1.00 kN/m² Act = 99
Construction g2 = 0.00 kN/m²
Loft conversion g3 = 0.00 kN/m²
Loft Conversion bottom gb = 0.00 kN/m²
With dead weight of members, γ = 6.00 kN/m³
Roofload Cat.H Q = 1.0 kN Act = 8

Boundary conditions

Total ridge height h = 6.00 m
Length of Roof b,Roof = 20.00 m
Building length b, Wall = 20.00 m
Building width on the right br = 0.00 m

Snow / wind loads for the calculation - User-defined value

DIN EN 1991-1-3:2019, DIN EN 1991-1-4:2010
Terrain elevation Altitude = 0.00 m
Ground Snow Load sk = 1.55 kN/m²
Wind pressure qp,0(h) = 0.62 kN/m²
Wind pressure qp,90(h) = 0.62 kN/m²

Auxiliary values

Wind reference length (Roof) e_0 = 12.00 m e_{90} = 3.00 m
Wind reference length (Wall) e_0 = 12.00 m e_{90} = 3.00 m
h/d = 2.000 h/b = 0.300 d/b = 0.150

Classification of Actions

No.	Name	γ_{sup}	γ_{inf}	ψ_0	ψ_1	ψ_2	KLED
99	Permanent loads	1.35	1.00	1.00	1.00	1.00	permanent
8	Cat. H: roofs	1.50	0.00	0.00	0.00	0.00	short-term
9	Wind loads	1.50	0.00	0.60	0.20	0.00	short-term
10	Snow loads H < 1000 m	1.50	0.00	0.50	0.20	0.00	short-term

Load values

Snow load

Name	Page	μ	Load value	(according to standard)	
Roof load	left	0.80	1.24	1.24	kN/m²
Non-blown portion (for blown load cases)	left	0.80	1.24	1.24	kN/m²
Blown portion (for blown load cases)	left	0.80	0.62	0.62	kN/m²

Wind loads

Name	Page	Pressure [kN/m²]	Suction [kN/m²]	Pressure (Standard) [kN/m²]	Suction (Standard) [kN/m²]
F	from left	0.27	-0.44	0.27	-0.44
G	from left	0.27	-0.41	0.27	-0.41
H	from left	0.18	-0.16	0.18	-0.16
D	from left	0.50	0.00	0.50	0.00
E	from left	0.00	-0.31	0.00	-0.31
I	from the right	0.00	-0.25	0.00	-0.25
J	from the right	0.00	-0.48	0.00	-0.48
D	from the right	0.50	0.00	0.50	0.00
E	from the right	0.00	-0.31	0.00	-0.31

Combinations

LC Combinations

No.	Name		Sit	KLED
1	1.35*g+1.50*s	ULS[1]	p/t[2]	4[3]
2	1.35*g+1.50*s+0.90*(wlLuv+)	ULS[1]	p/t[2]	6[4]
6	1.35*g+1.50*s+0.90*(wrLee-)	ULS[1]	p/t[2]	6[4]
11	1.35*g+1.50*(wrLee-)	ULS[1]	p/t[2]	6[4]
13	1.00*g+1.00*s	SLS[5]	char[6]	4[3]
14	1.00*g+1.00*s+0.60*(wlLuv+)	SLS[5]	char[6]	6[4]

The assignment of the short case names can be found in the table of load cases.

1 : ULS=Structural failure
2 : p/t=persistent/transient (Persistent/Transient Situation)
3 : Load duration class:4=short-term
4 : Load duration class:6=short/instant
5 : SLS=Serviceability
6 : char=characteristic (Characteristic Situation)

Results

Rafter left 14.0/16.0 e = 110.0 cm

ULS acc.to DIN EN 1995:2013, based on EN 1995:2014, Consequence class 2

Checks in Persistent/Transient Situation

Combi	Sit	Check	$N_{x,d}$ [kN]	$M_{y,d}$ [kNm]	$V_{z,d}$ [kN]	$\sigma_{n,d}$ [N/mm²]	$\sigma_{m,y,d}$ [N/mm²]	τ_d [N/mm²]	η	s_{ky} [m]	s_{kz} [m]	s_b [m]
1	p/t [1]	Stress (Span)	0.0	4.32	0.0	0.00	7.24		**0.44**			
1	p/t [1]	Stress (Column)	2.2	0.00	-5.3	0.10	0.00		**0.01**			
1	p/t [1]	Stability	-2.2	4.32	0.0	-0.10	7.24		**0.44**	1.52	0.00	0.00
1	p/t [1]	Shear	2.2	0.00	-5.3			-0.36	**0.26**			

The composition of the load case combinations can be found in the table of load case combinations.

1 : p/t=persistent/transient (Persistent/Transient Situation)

SLS checks acc.to DIN EN 1995:2013, based on EN 1995:2014, Consequence class 2

Combi	Check		Beam	x [m]	$w_{G,inst}$ [cm]	$w_{G,fin}$ [cm]	$w_{Q,inst,char}$ [cm]	$w_{Q,inst,qprm}$ [cm]	$w_{Q,fin}$ [cm]	w_{tot} [cm]		w_{lim} [cm]	L/..	η
14	w_{inst} [1]	local	1	1.62	0.3		0.3			0.7	<	1.1	300	**0.60**
14	w_{inst} [1]	global	1	1.62	0.3		0.3			0.7	<	1.1	300	**0.60**
13	w_{net} [2]	local	1	1.62	(0.3)	0.6		(0.0)	0.0	0.6	<	1.3	250	**0.43**
13	w_{net} [2]	global	1	1.62	(0.3)	0.6		(0.0)	0.0	0.6	<	1.3	250	**0.43**
14	w_{fin} [3]	local	1	1.62	(0.3)	0.6	(0.3)		0.3	0.9	<	1.3	250	**0.70**
14	w_{fin} [3]	global	1	1.62	(0.3)	0.6	(0.3)		0.3	0.9	<	1.3	250	**0.70**

Values in () are only informative.
The rod length is always used as the reference length for the total deflection verification.
For the local deflection verification, the member length is always used as the reference length.
Member lengths of members that are connected to each other without support are added up.

1 : $w_{inst} = w_{G,inst} + w_{Q,inst,char}$
2 : $w_{net} = w_{G,fin} + w_{Q,fin,qprm} - w_c$
3 : $w_{fin} = w_{G,fin} + w_{Q,fin,char}$

Support

Support Reactions per Act

Act		Support 1 max [kN/m]	min [kN/m]	Support 2 max [kN/m]	min [kN/m]
99	vertical	1.82[1]	1.82[1]	1.82[1]	1.82[1]
	horizontal	0.00[1]	0.00[1]	0.00[1]	0.00[1]
8	vertical	0.45[2]	0.45[2]	0.45[2]	0.45[2]
	horizontal	0.00[2]	0.00[2]	0.00[2]	0.00[2]
9	vertical	0.31[3]	-0.46[4]	0.34[3]	-0.69[5]
	horizontal	0.41[5]	-0.26[3]	0.00[3]	0.00[3]
10	vertical	1.86[6]	1.86[6]	1.86[6]	1.86[6]
	horizontal	0.00[6]	0.00[6]	0.00[6]	0.00[6]

all values are characteristic values

1 : Load Cases:g
2 : Load Cases:FmL1
3 : Load Cases:(wlLuv+)
4 : Load Cases:(wlLuv-)
5 : Load Cases:(wrLee-)
6 : Load Cases:s

Connection Forces at Ridge

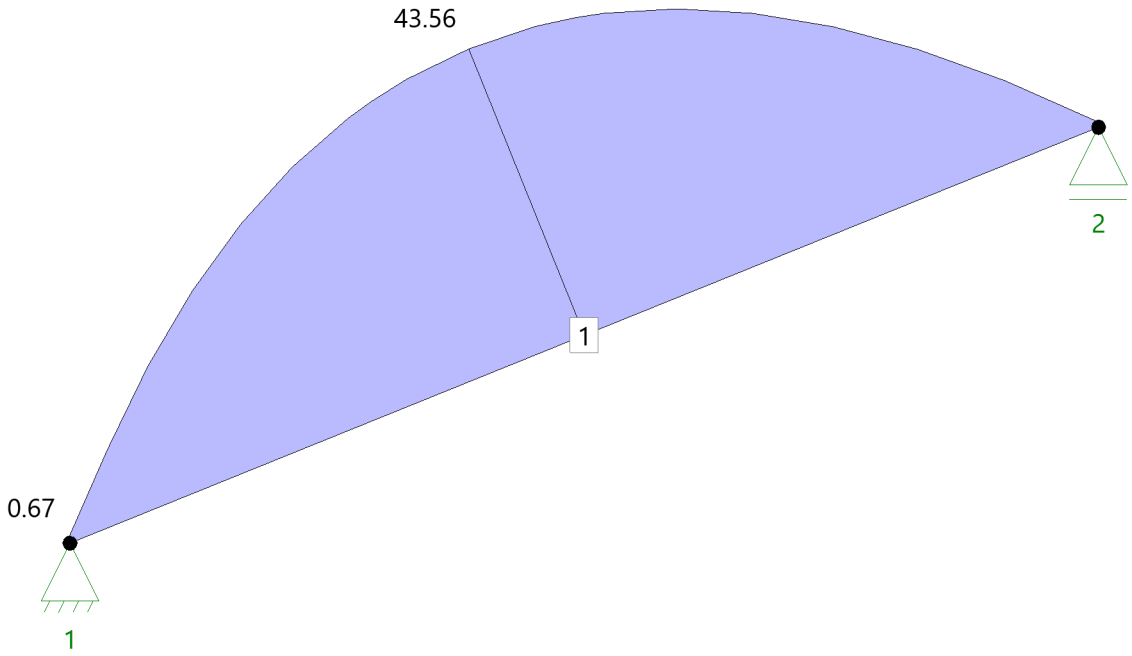
Max/min Connection forces at Ridge

left LcComb	N_d [kN]	V_d [kN]	$F_{Z,d}$ [kN]	$F_{X,d}$ [kN]
LfK.2	2.3	-5.7	-6.1	0.0

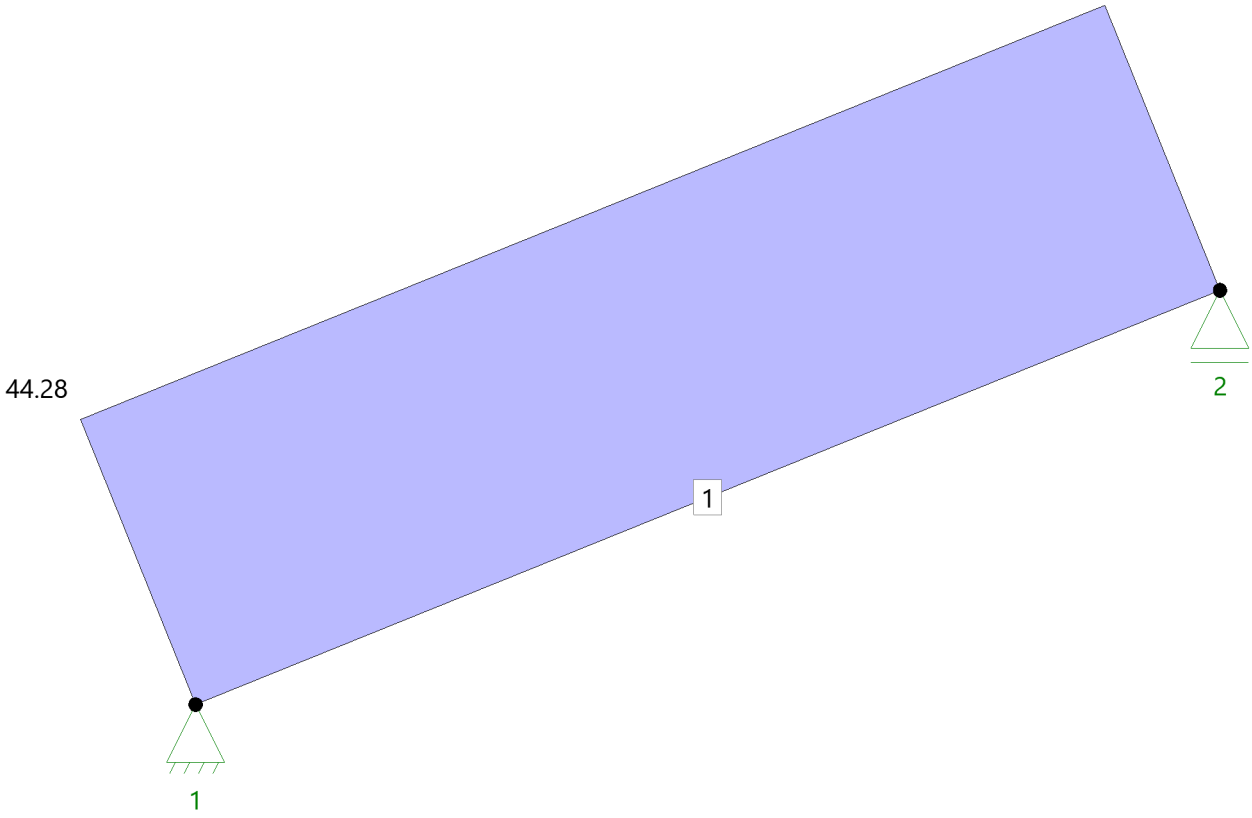
all values are design values

GraphicsLevel of Capacity

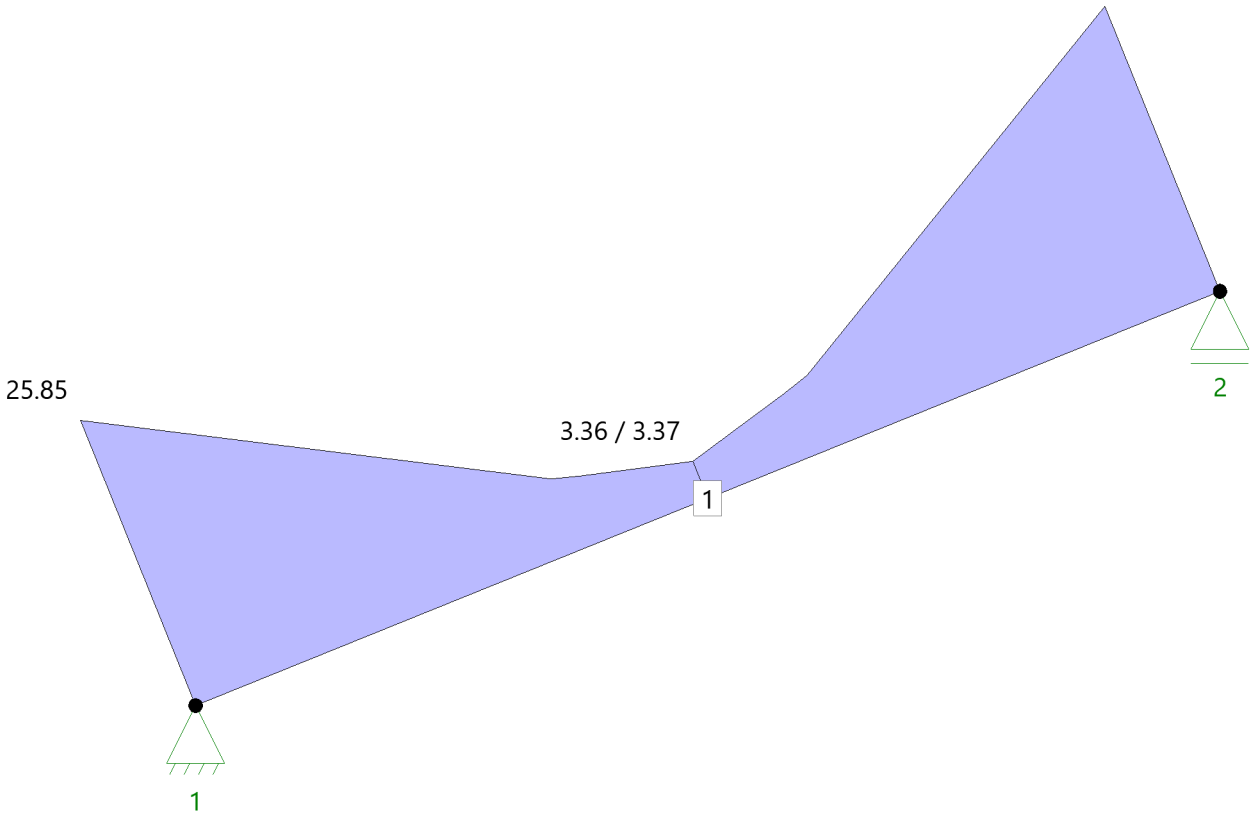
Envelope Eta Stress



Envelope Eta Stability



Envelope Eta Shear



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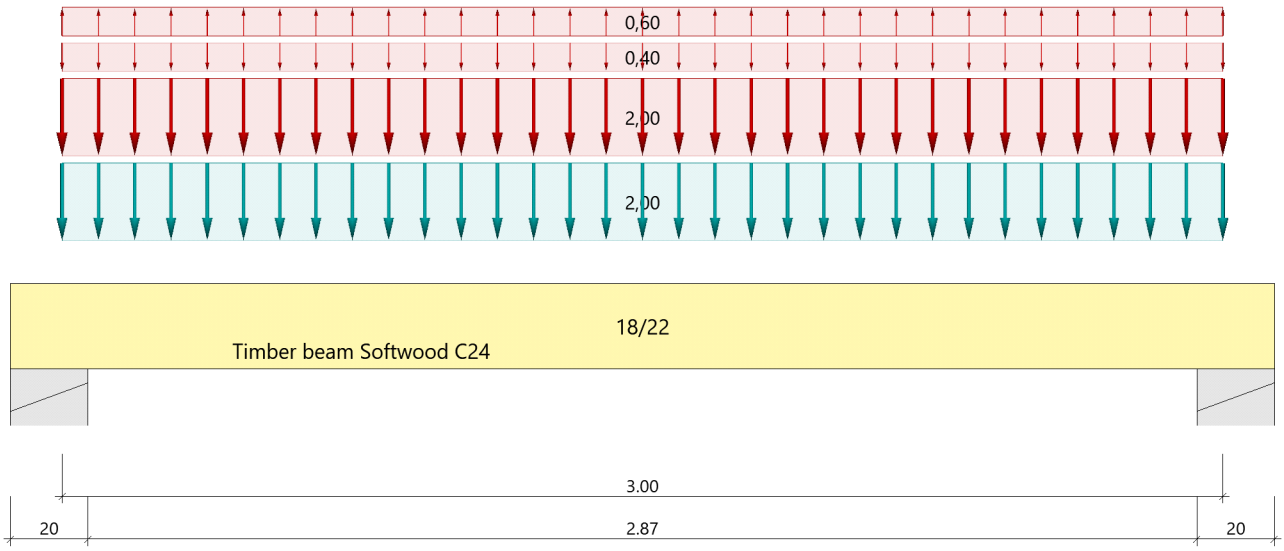
Continuous Beam Timber (x64) HTM+ 01/23D (FRILO R-2023-1/P04)

Basic Parameters

Timber beam Softwood C24 DIN EN 1995-1-1/NA:2013-08

System

System Graphic



Material

Softwood C24, acc.to EN 338:2016

$f_{m,k}$ $f_{v,k}$ [N/mm²]	$f_{t,0,k}$ $f_{c,0,k}$ [N/mm²]	$f_{t,90,k}$ $f_{c,90,k}$ [N/mm²]	$E_{0,mean}$ $E_{0,05}$ [N/mm²]	$E_{90,mean}$ $E_{90,05}$ [N/mm²]	G_{mean} G_{05} [N/mm²]	ρ_k ρ_m [kg/m³]
24.00 4.00	14.50 21.00	0.40 2.50	11000 7400	370 247	690 460	350 420

$f_{m,k}$: characteristic value of bending strength
$f_{t,0,k}$: characteristic value of tensile strength parallel to grain
$f_{t,90,k}$: characteristic value of tensile strength perpendicular to the grain
$E_{0,mean}$: Average value of modulus of elasticity parallel to the fiber
$E_{90,mean}$: Average value of the modulus of elasticity perpendicular to the grain
G_{mean} : Average value of the shear modulus
ρ_k : Characteristic value of gross density
$f_{v,k}$: characteristic value of shear strength
$f_{c,0,k}$: characteristic value of compressive strength parallel to grain
$f_{c,90,k}$: characteristic value of compressive strength perpendicular to the grain
$E_{0,05}$: 5% fractile value of the modulus of elasticity parallel to grain
$E_{90,05}$: 5% fractile value of the modulus of elasticity perpendicular to the grain
G_{05} : 5% fractile value of the shear modulus
ρ_m : Average value of the density

Geometry

Cross-sections

Name	I_y [cm⁴]	I_z [cm⁴]	W_y [cm³]	W_z [cm³]	A [cm²]
18/22	15970	10690	1452	1188	396.0

Cross-section is constant over the entire length of the beam.

Support (Bearing conditions)

No	x [m]	Width [cm]	Depth [cm]	k_{c90}	uy [kN/m]	uz [kN/m]	Rotations *) Φ_x [kNm/rad]	Φ_y [kNm/rad]	Φ_z [kNm/rad]
1	0.00	20.0	20.0	1.00	-1	-1	-1	0.0	0.0
2	3.00	20.0	20.0	1.00	-1	-1	0.0	0.0	0.0

*) -1 = fixed, 0 = free, > 0 = elastically restraint

Lateral support in y- direction: at bearings on top chord

Loads

Line loads

Reference	No	Type	A [m]	L1 [m]	L2 [m]	W1 [kN/m]	W2 [kN/m]	GF	Sim	Alt
System	1	GL		3.00		2.00		Permanent		
	2	GL		3.00		2.00		Snow (high)		
	3	GL		3.00		0.40		Wind		
	4	GL		3.00		-0.60		Wind		

Reference : System-related (front edge of beam) or span load
Type : 1 - uniformly distributed load (GL), 4 - trapezoidal load (TL), 5 - triangular load (DL)
A : Distance to the load from the beginning of the span or the front edge of the beam
GF : Load effect
Sim : Simultaneous group
Alt : Alternate group

Self-weight

Total weight = 50 kg taken into account with gamma = 4.20 kN/m^3.

Overview of the actions used

Actions

Designation	ψ_0	ψ_1	ψ_2	$\gamma_{F,inf}$	$\gamma_{F,sup}$	KLED
Permanent loads				1.00	1.35	
Wind loads	0.60	0.20	0.00		1.50	short/very short
Snow loads H > 1000 m	0.70	0.50	0.20		1.50	middle
Consequences class CC 2 according to EN 1990 Tab. B1 -> K_{Fi} = 1.0 Tab. B3						

Results

Design parameter

Design code	:	DIN EN 1995-1-1/NA:2013-08
Basis	:	EN 1995-1-1/A2:2014
Safety concept / load combinatorics	:	DIN EN 1990/NA:2010-12
Consequence class	:	CC 2
Ψ_2 = 0.5 for snow (AE)	:	not considered
Permanent loads	:	all equal γ_F ($\gamma_{G,sup}$ or $\gamma_{G,inf}$)
CLED ati wind	:	Average of short and very short

Design parameter Timber

Service class		2 :	roofed, open Rel. air humidity ~ 85%	Equilibrium moisture content < 20%
Design situation serviceability		:	characteristic	
Shear stresses		=	Tau with red. Q	
Initial deflection	w_{inst}	=	l/300	
Final deflection	$w_{net,fin}$	=	l/250	
	w_{fin}	=	l/250	

Summary

Check	Design situation	$\eta_{Bending}$	η_{Shear}	$\eta_{c,90}$	η_{Stabi}	$\eta_{Deformation}$
Load capacity	persistent/transient	0.31	0.22	0.14	0.31	
Serviceability	characteristic					0.32

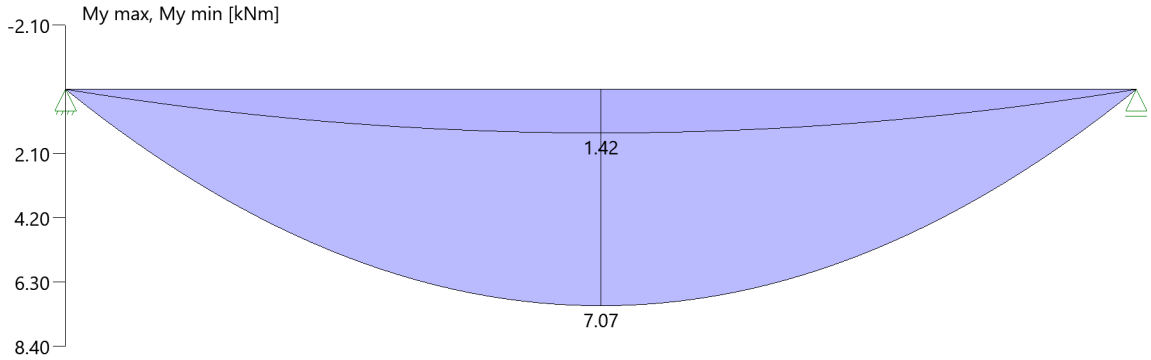
Structural safety per cross-section (compact)

Design situation	Cross-section	$V_{z,Ed}$ [kN]	$M_{y,Ed}$ [kNm]	η_{Shear}	$\eta_{Bending}$	η_{Stabi}
persistent/transient	18/22	-7.2	6.67	0.22	0.31	0.31

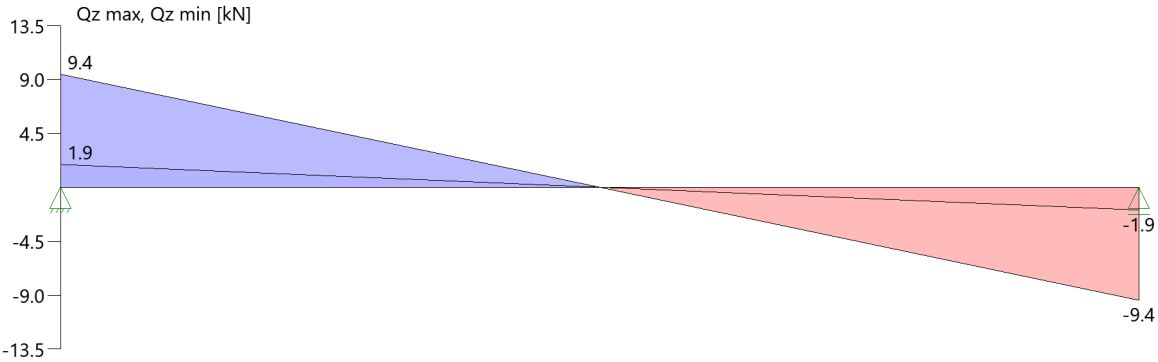
Structural safety - Load combination persistent/transient

Internal forces

Envelope of the moments



Envelope of the transverse forces



Internal forces

Span	x [m]	$M_{y,Ed}$ [kNm]	$V_{z,Ed}$ [kN]	Lcomb
Span 1	0.00	0.00	0.0	2
	0.29	2.44	7.2	1
	1.50	7.07	0.0	1
	2.71	6.67	-7.2	2
	3.00	0.00	0.0	1

Bending

Span	x [m]	$M_{y,d}$ [kNm]	σ_{myd} [N/mm²]	$k_{crit,y}$	k_{mod}	$f_{m,y,d}$ [N/mm²]	η	Lcomb
Span 1	1.50	6.67	4.59	1.00	0.80	14.77	0.31	2
The coefficient kh = 1.00 according to EN 1995 3.2 (3) is taken into account.								

Shear

Column [No]		x_{rel} [m]	x_{abs} [m]	$V_{z,d}$ [kN]	τ_d [N/mm²]	k_{mod}		$f_{v,z,d}$ [N/mm²]	η	Lcomb
1	right	0.29	0.29	7.2	0.27	0.80		2.46	0.22	2
2	left	0.29	2.71	-7.2	-0.27	0.80		2.46	0.22	2
EN 1995 6.1.7 : kcr = 0.50										

Support pressure

Column	b_{eff} [cm]	d_{eff} [cm]	max F [kN]	$\sigma_{c,90,d}$ [N/mm²]	k_{c90}	k_{mod}	$f_{c,90,d}$ [N/mm²]	η	Lcomb
1	23.0*	18.0	8.9	0.21	1.00	0.80	1.54	0.14	2
2	23.0*	18.0	8.9	0.21	1.00	0.80	1.54	0.14	2
* Contact area according to DIN EN 1995-1-1, Chapter 6.1.5 (1) P widened by 30mm per side									

Check of SLS

	l_{eff} [m]	Position [m]	typ		w_g [cm]	w_q [cm]	w [cm]	w_{lim} [cm]	η	Lk
Span 1	3.00	1.50	inst	z	0.1	0.1	0.3	1.0	0.26	4
	3.00	1.50	net,fin	z	0.2	0.04	0.3	1.2	0.23	6
	3.00	1.50	fin	z	0.2	0.2	0.4	1.2	0.32	5

l_{eff} : Effective length
Position : Position of the deformation
typ : Start-/End deformation (direction)
w_g : Deformation due to permanent load
w_q : Deformation due to variable load
w : Deformation total
w_{lim} : Permissible deformation
η : Degree of utilization
Lk : No. of the load combination

Support forces

Support forces per [m] - characteristic of each action

No	x [m]	Action	$R_{z,min}$ [kN/m]	$R_{z,max}$ [kN/m]	$M_{y,min}$ [kNm/m]	$M_{y,max}$ [kNm/m]
1	0.00	Permanent loads	3.25	3.25		
		Wind loads	-0.90	0.60		
		Snow loads H > 1000 m		3.00		
2	3.00	Permanent loads	3.25	3.25		
		Wind loads	-0.90	0.60		
		Snow loads H > 1000 m		3.00		

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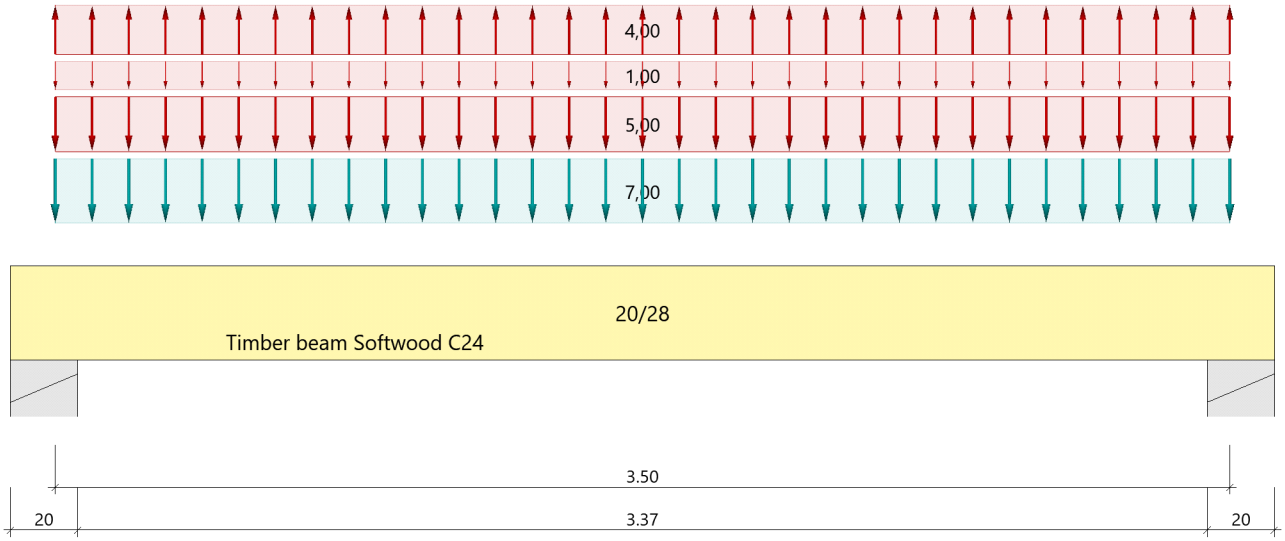
Continuous Beam Timber (x64) HTM+ 01/23D (FRILO R-2023-1/P04)

Basic Parameters

Timber beam Softwood C24 DIN EN 1995-1-1/NA:2013-08

System

System Graphic



Material

Softwood C24, acc.to EN 338:2016

$f_{m,k}$ $f_{v,k}$ [N/mm²]	$f_{t,0,k}$ $f_{c,0,k}$ [N/mm²]	$f_{t,90,k}$ $f_{c,90,k}$ [N/mm²]	$E_{0,mean}$ $E_{0,05}$ [N/mm²]	$E_{90,mean}$ $E_{90,05}$ [N/mm²]	G_{mean} G_{05} [N/mm²]	ρ_k ρ_m [kg/m³]
24.00 4.00	14.50 21.00	0.40 2.50	11000 7400	370 247	690 460	350 420

$f_{m,k}$	:	characteristic value of bending strength
$f_{t,0,k}$	:	characteristic value of tensile strength parallel to grain
$f_{t,90,k}$	:	characteristic value of tensile strength perpendicular to the grain
$E_{0,mean}$	:	Average value of modulus of elasticity parallel to the fiber
$E_{90,mean}$	:	Average value of the modulus of elasticity perpendicular to the grain
G_{mean}	:	Average value of the shear modulus
ρ_k	:	Characteristic value of gross density
$f_{v,k}$	:	characteristic value of shear strength
$f_{c,0,k}$	:	characteristic value of compressive strength parallel to grain
$f_{c,90,k}$	:	characteristic value of compressive strength perpendicular to the grain
$E_{0,05}$	:	5% fractile value of the modulus of elasticity parallel to grain
$E_{90,05}$	:	5% fractile value of the modulus of elasticity perpendicular to the grain
G_{05}	:	5% fractile value of the shear modulus
ρ_m	:	Average value of the density

Geometry

Cross-sections

Name	I_y [cm⁴]	I_z [cm⁴]	W_y [cm³]	W_z [cm³]	A [cm²]
20/28	36590	18670	2613	1867	560.0
Cross-section is constant over the entire length of the beam.					

Support (Bearing conditions)

No	x [m]	Width [cm]	Depth [cm]	k_{c90}	uy [kN/m]	uz [kN/m]	Rotations *) Φ_x [kNm/rad]	Φ_y [kNm/rad]	Φ_z [kNm/rad]
1	0.00	20.0	20.0	1.00	-1	-1	-1	0.0	0.0
2	3.50	20.0	20.0	1.00	-1	-1	0.0	0.0	0.0

*) -1 = fixed, 0 = free, > 0 = elastically restraint

Lateral support in y- direction: at bearings on top chord

Loads

Line loads

Reference	No	Type	A [m]	L1 [m]	L2 [m]	W1 [kN/m]	W2 [kN/m]	GF	Sim	Alt
System	1	GL		3.50		7.00		Permanent		
	2	GL		3.50		5.00		Snow (high)		
	3	GL		3.50		1.00		Wind		
	4	GL		3.50		-4.00		Wind		

Reference : System-related (front edge of beam) or span load
Type : 1 - uniformly distributed load (GL), 4 - trapezoidal load (TL), 5 - triangular load (DL)
A : Distance to the load from the beginning of the span or the front edge of the beam
GF : Load effect
Sim : Simultaneous group
Alt : Alternate group

Self-weight

Total weight = 82 kg taken into account with gamma = 4.20 kN/m ^{3}.

Overview of the actions used

Actions

Designation	ψ_0	ψ_1	ψ_2	$\gamma_{F,inf}$	$\gamma_{F,sup}$	KLED
Permanent loads				1.00	1.35	
Wind loads	0.60	0.20	0.00		1.50	short/very short
Snow loads H > 1000 m	0.70	0.50	0.20		1.50	middle

Consequences class CC 2 according to EN 1990 Tab. B1 -> K_{Fi} = 1.0 Tab. B3

Results

Design parameter

Design code	:	DIN EN 1995-1-1/NA:2013-08
Basis	:	EN 1995-1-1/A2:2014
Safety concept / load combinatorics	:	DIN EN 1990/NA:2010-12
Consequence class	:	CC 2
Ψ_2 = 0.5 for snow (AE)	:	not considered
Permanent loads	:	all equal γ_F ($\gamma_{G,sup}$ or $\gamma_{G,inf}$)
CLED ati wind	:	Average of short and very short

Design parameter Timber

Service class		2 :	roofed, open Rel. air humidity ~ 85%	Equilibrium moisture content < 20%
Design situation serviceability		:	characteristic	
Shear stresses		=	Tau with red. Q	
Initial deflection	w_{inst}	=	l/300	
Final deflection	$w_{net,fin}$	=	l/250	
	w_{fin}	=	l/250	

Summary

Check	Design situation	$\eta_{Bending}$	η_{Shear}	$\eta_{c,90}$	η_{Stabi}	$\eta_{Deformation}$
Load capacity	persistent/transient	0.69	0.53	0.43	0.69	
Serviceability	characteristic					0.67

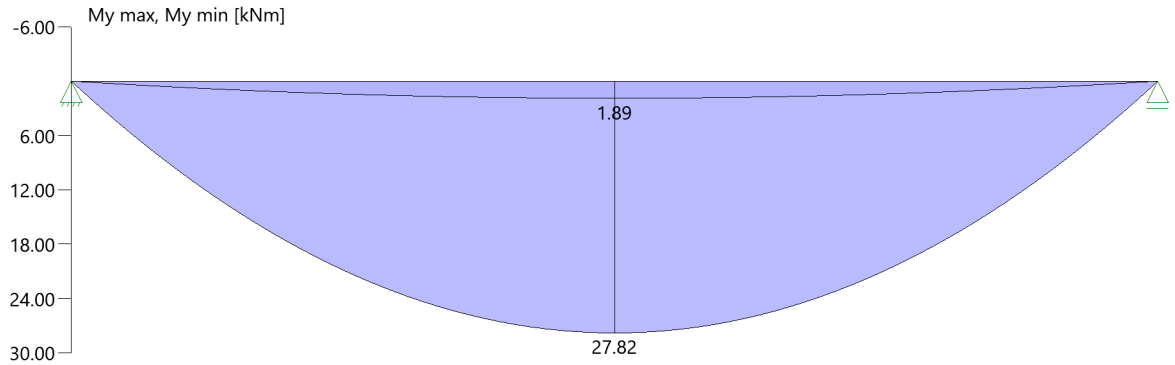
Structural safety per cross-section (compact)

Design situation	Cross-section	$V_{z,Ed}$ [kN]	$M_{y,Ed}$ [kNm]	η_{Shear}	$\eta_{Bending}$	η_{Stabi}
persistent/transient	20/28	24.2	26.44	0.53	0.69	0.69

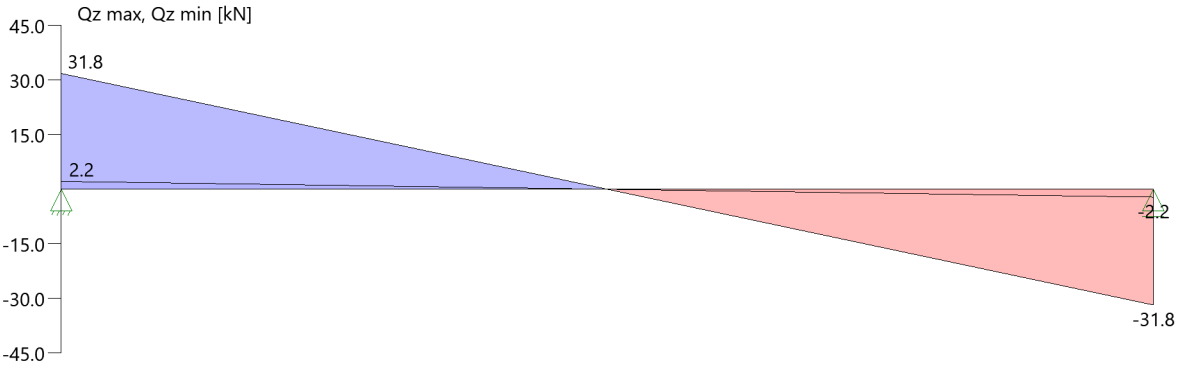
Structural safety - Load combination persistent/transient

Internal forces

Envelope of the moments



Envelope of the transverse forces



Internal forces

Span	x [m]	$M_{y,Ed}$ [kNm]	$V_{z,Ed}$ [kN]	Lcomb
Span 1	0.00	0.00	0.0	1
	0.35	9.93	24.2	1
	1.75	27.82	0.0	1
	3.15	26.44	-24.2	2
	3.50	0.00	0.0	1

Bending

Span	x [m]	$M_{y,d}$ [kNm]	σ_{myd} [N/mm²]	$k_{crit,y}$	k_{mod}	$f_{m,y,d}$ [N/mm²]	η	Lcomb
Span 1	1.75	26.44	10.12	1.00	0.80	14.77	0.69	2
The coefficient kh = 1.00 according to EN 1995 3.2 (3) is taken into account.								

Shear

Column [No]		x_{rel} [m]	x_{abs} [m]	$V_{z,d}$ [kN]	τ_d [N/mm²]	k_{mod}		$f_{v,z,d}$ [N/mm²]	η	Lcomb
1	right	0.35	0.35	24.2	0.65	0.80		2.46	0.53	2
2	left	0.35	3.15	-24.2	-0.65	0.80		2.46	0.53	2
EN 1995 6.1.7 : kcr = 0.50										

Support pressure

Column	b_{eff} [cm]	d_{eff} [cm]	max F [kN]	$\sigma_{c,90,d}$ [N/mm²]	k_{c90}	k_{mod}	$f_{c,90,d}$ [N/mm²]	η	Lcomb
1	23.0*	20.0	30.2	0.66	1.00	0.80	1.54	0.43	2
2	23.0*	20.0	30.2	0.66	1.00	0.80	1.54	0.43	2
* Contact area according to DIN EN 1995-1-1, Chapter 6.1.5 (1) P widened by 30mm per side									

Check of SLS

	l_{eff} [m]	Position [m]	typ		w_g [cm]	w_q [cm]	w [cm]	w_{lim} [cm]	η	Lk
Span 1	3.50	1.75	inst	z	0.4	0.3	0.6	1.2	0.53	4
	3.50	1.75	net,fin	z	0.6	0.1	0.7	1.4	0.51	6
	3.50	1.75	fin	z	0.6	0.3	0.9	1.4	0.67	5

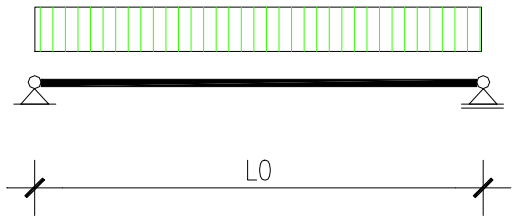
l_{eff} : Effective length
Position : Position of the deformation
typ : Start-/End deformation (direction)
w_g : Deformation due to permanent load
w_q : Deformation due to variable load
w : Deformation total
w_{lim} : Permissible deformation
η : Degree of utilization
Lk : No. of the load combination

Support forces

Support forces per [m] - characteristic of each action

No	x [m]	Action	$R_{z,min}$ [kN/m]	$R_{z,max}$ [kN/m]	$M_{y,min}$ [kNm/m]	$M_{y,max}$ [kNm/m]
1	0.00	Permanent loads	12.66	12.66		
		Wind loads	-7.00	1.75		
		Snow loads H > 1000 m		8.75		
2	3.50	Permanent loads	12.66	12.66		
		Wind loads	-7.00	1.75		
		Snow loads H > 1000 m		8.75		

DIMENZIONIRANJE STOPNIC poz 300



AB nosilec $b := 150\ cm$ $h := 20\ cm$ .. deb. stopnišča

$L0 := 5.00\ m$

$Lx := 1.00 \cdot L0$ $Lx = 5.00\ m$

obtežba:

		stalna obtežba	koristna obtežba
- teža nosilca	$g1 := b \cdot h \cdot 25.0 \cdot 10^{-4}$	$g1 = 7.50$ kN/m	
- teža stopnic	$g2 := 0.175 \cdot \frac{25}{2}$	$g2 = 2.19$ kN/m	
- obrabni sloj in ostalo	$g3 := 3.0$	$g3 = 3.00$ kN/m	
- koristna obtežba	$p1 := 5.0$		$p1 = 5.00$ kN/m

---

stalna obtežba skupaj:	$G := g1 + g2 + g3$	$G = 12.69$ kN/m'
koristna obtežba skupaj:	$P := p1$	$P = 5.00$ kN/m'
obtežba skupaj	$Q := G + P$	$Q = 17.69$ kN/m

---

obremenitev:

$Mg := 0.125 \cdot G \cdot Lx^2$ $Mg = 39.65$ kNm

$Ag := 0.500 \cdot G \cdot Lx$ $Ag = 31.72$ kN

$Mp := 0.125 \cdot P \cdot Lx^2$ $Mp = 15.63$ kNm

$Ap := 0.500 \cdot P \cdot Lx$ $Ap = 12.50$ kN

dimenzioniranje:

beton: C25/30

$f_{ck} := 2.5\ kN/cm^2$ → $f_{cd} := \frac{f_{ck}}{1.5}$ $f_{cd} = 1.67\ kN/cm^2$

$E_{cm} := 3100\ kN/cm^2$

$f_{ctm} := 0.26\ kN/cm^2$

armatura: S500-B

$f_{yk} := 50\ kN/cm^2$ → $f_{yd} := \frac{f_{yk}}{1.15}$ $f_{yd} = 43.48\ kN/cm^2$

$E_s := 20000\ kN/cm^2$

zaščitna plast betona

$c_{min} := 2.50\ cm$ $a_{potr} := c_{min} + 0.80 + \frac{1.40}{2}$ $a_{potr} = 4.00\ cm$

→ statična višina $d := h - a_{potr}$ $d = 16.00\ cm$

varnostni faktorji za obtežbo

$\gamma_{Gj} := 1.35$ $\gamma_{Qj} := 1.50$

MSN:

PROJEKTNE NOTRANJE SILE

$M_e := (\gamma_{Gj} \cdot Mg + \gamma_{Qj} \cdot Mp)$

$M_e = 76.96$ kNm

$N_e := 0$ kN

$Q_{ed} := (\gamma_{Gj} \cdot Ag + \gamma_{Qj} \cdot Ap)$

$Q_{ed} = 61.57$ kN

$z_s := \frac{\left(\frac{h}{2} - a_{potr}\right)}{100} = 0.06$ m

$M_{ed} := M_e - N_e \cdot z_s = 76.96$ kNm

Upogib

$k_d := \frac{M_{ed} \cdot 100}{b \cdot d^2 \cdot f_{cd}}$ $k_d = 0.120$

→ $\varepsilon_s := 5.00$ ‰ $\varepsilon_1 = 1.75$ ‰

→ $f_s = 1.105$

$k_x = 0.259$ $x := k_x \cdot d$ $x = 4.14$ cm

$A_{s_potr} := \frac{f_s \cdot M_{ed}}{f_{yd} \cdot d \cdot 10^{-2}} + \frac{N_e}{f_{yd}}$ $A_{s_potr} = 12.23$ cm²/m'... računsko potrebna armatura

Izberem $\Phi_{palice} := 14$ $n_{palic} := 10$ ... na tekoči meter

$A_{s_dej} = 15.39$ cm² **Izberem θ14/10cm - v spodnji coni**

Prečna sila - strig

Redukcija prečne sile ob podporah

$\Delta x := d + \left(\frac{0.15}{2}\right)$ $\Delta x = 16.07$ cm

$\Delta V_{ed.} := \frac{\Delta x}{100} \cdot (G \cdot \gamma_{Gj} + P \cdot \gamma_{Qj})$ $\Delta V_{ed} := 0$ kN - ni redukcije ob podpori

Minimalna strižna armatura

$\rho_{w_min} := \frac{0.08 \cdot \sqrt{f_{ck} \cdot 10}}{f_{yk} \cdot 10}$ $\rho_{w_min} = 0.0008$

$A_{sw_min} := \rho_{w_min} \cdot b \cdot 1.00 \cdot 100$ $A_{sw_min} = 12.00$ cm²/m

$A_{vzd} := 0.25 \cdot A_{s_dej} = 3.85$ cm²

Največja razdalja med stremeni

$s_{t_max} := 0.75 \cdot d$ $s_{t_max} = 12.00$ cm

$V_{ed} := Q_{ed}$ $V_{ed} = 61.57$ kN

$V_{ed_red} := V_{ed} - \Delta V_{ed}$ $V_{ed_red} = 61.57$ kN

Projektna strižna odpornost

$k := \min\left(2, 1 + \sqrt{\frac{200}{d \cdot 10}}\right)$ $k = 2.00$

$\rho_t := \min\left(0.02, \frac{A_{vzd}}{b \cdot d}\right)$ $\rho_t = 0.0016$

$\sigma_{cp} := 0.00$ $\alpha_{cw} := 1.00$

$k_1 := 0.15$

$C_{Rd_c} := \frac{0.18}{1.5}$ $C_{Rd_c} = 0.12$

$\upsilon_{min} := 0.035 \cdot k^{\frac{3}{2}} \cdot (f_{ck} \cdot 10)^{\frac{1}{2}}$ $\upsilon_{min} = 0.49$

$V_{Rd_cm} := (\upsilon_{min} + k_1 \cdot \sigma_{cp}) b \cdot d \cdot 10^{-1}$ $V_{Rd_cm} = 118.79$ *kN - najmanjša vrednost*

$V_{Rd_c1} := \left(C_{Rd_c} \cdot k \cdot \sqrt[3]{100 \rho_t \cdot f_{ck} \cdot 10} + k_1 \cdot \sigma_{cp}\right) \cdot b \cdot d \cdot 10^{-1}$ $V_{Rd_c1} = 91.50$ *kN*

$V_{Rd_c} := \max(V_{Rd_cm}, V_{Rd_c1})$ $V_{Rd_c} = 118.79$ *kN*

$f_{strizna_potrebna}$ = *"računsko strižna armatura ni potrebna!"*

MSU:

Elastični pomik pri karakteristični obtežni kombinaciji

$I_z := \frac{b \cdot h^3}{12}$ $I_z = 100000.00$ *cm4*

$u_G := \frac{5G \cdot (Lx \cdot 100)^4}{384 E_{cm} \cdot I_z \cdot 100}$ $u_G = 0.3331$ *cm ... pomik zaradi stalne obtežbe*

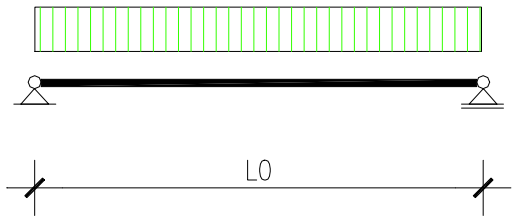
$u_Q := \frac{5P \cdot (Lx \cdot 100)^4}{384 E_{cm} \cdot I_z \cdot 100}$ $u_Q = 0.131$ *cm ... pomik zaradi koristne obtežbe*

$U_{el} := u_G + u_Q$ $U_{el} = 0.464$ *cm ... elastični pomik*

Pričakovan končni pomik

$U_{nesk.} := 3.0 \cdot u_G + u_Q$ $U_{nesk.} = 1.130$ *cm* $<$ $\frac{Lx \cdot 100}{250} = 2.00$ *cm*

DIMENZIONIRANJE PODESTA poz 301



AB nosilec $b := 160$ cm $h := 20$ cm .. deb. stopnišča

$L0 := 3.30$ m

$Lx := 1.00 \cdot L0$ $Lx = 3.30$ m

obtežba:

		stalna obtežba	koristna obtežba
- teža nosilca	$g1 := b \cdot h \cdot 25.0 \cdot 10^{-4}$	$g1 = 8.00$ kN/m	
- teža stopnic	$g2 := 0.175 \cdot \frac{25}{2}$	$g2 = 2.19$ kN/m	
- obrabni sloj in ostalo	$g3 := 3.0$	$g3 = 3.00$ kN/m	
- koristna obtežba	$p1 := 5.0$		$p1 = 5.00$ kN/m

---

stalna obtežba skupaj:	$G := g1 + g2 + g3$	$G = 13.19$ kN/m'
koristna obtežba skupaj:	$P := p1$	$P = 5.00$ kN/m'
obtežba skupaj	$Q := G + P$	$Q = 18.19$ kN/m

---

obremenitev:

$Mg := 0.125 \cdot G \cdot Lx^2$	$Mg = 17.95$	kNm
$Ag := 0.500 \cdot G \cdot Lx$	$Ag = 21.76$	kN
$Mp := 0.125 \cdot P \cdot Lx^2$	$Mp = 6.81$	kNm
$Ap := 0.500 \cdot P \cdot Lx$	$Ap = 8.25$	kN

dimenzioniranje:

beton: C25/30

$f_{ck} := 2.5$ kN/cm² → $f_{cd} := \frac{f_{ck}}{1.5}$ $f_{cd} = 1.67$ kN/cm²

$E_{cm} := 3100$ kN/cm²

$f_{ctm} := 0.26$ kN/cm²

armatura: S500-B

$f_{yk} := 50$ kN/cm² → $f_{yd} := \frac{f_{yk}}{1.15}$ $f_{yd} = 43.48$ kN/cm²

$E_s := 20000$ kN/cm²

zaščitna plast betona

$c_{min} := 2.50$ cm $a_{potr} := c_{min} + 0.80 + \frac{1.40}{2}$ $a_{potr} = 4.00$ cm

→ statična višina $d := h - a_{potr}$ $d = 16.00$ cm

varnostni faktorji za obtežbo

$\gamma_{Gj} := 1.35$ $\gamma_{Qj} := 1.50$

MSN:

PROJEKTNE NOTRANJE SILE

$M_e := (\gamma_{Gj} \cdot Mg + \gamma_{Qj} \cdot Mp)$ $\quad N_e := 0$ kN

$M_e = 34.44$ kNm

$Q_{ed} := (\gamma_{Gj} \cdot Ag + \gamma_{Qj} \cdot Ap)$ $\quad z_s := \frac{\left(\frac{h}{2} - a_{potr}\right)}{100} = 0.06$ m

$Q_{ed} = 41.75$ kN

$M_{ed} := M_e - N_e \cdot z_s = 34.44$ kNm

Upogib

$k_d := \frac{M_{ed} \cdot 100}{b \cdot d^2 \cdot f_{cd}}$ $\quad k_d = 0.050$

→ $\varepsilon_s := 5.00$ ‰ $\quad \varepsilon_1 = 1.00$ ‰

→ $f_s = 1.062$

$k_x = 0.167$ $\quad x := k_x \cdot d$ $\quad x = 2.67$ cm

$A_{s_potr} := \frac{f_s \cdot M_{ed}}{f_{yd} \cdot d \cdot 10^{-2}} + \frac{N_e}{f_{yd}}$ $\quad A_{s_potr} = 5.26$ cm²/m'... računsko potrebna armatura

Izberem $\Phi_{palice} := 12$ $\quad n_{palic} := 10$ ... na tekoči meter

$A_{s_dej} = 11.31$ cm² $\quad$ **Izberem θ14/10cm - v spodnji coni**

Prečna sila - strig

Redukcija prečne sile ob podporah

$\Delta x := d + \left(\frac{0.15}{2}\right)$ $\quad \Delta x = 16.07$ cm

$\Delta V_{ed.} := \frac{\Delta x}{100} \cdot (G \cdot \gamma_{Gj} + P \cdot \gamma_{Qj})$ $\quad \Delta V_{ed} := 0$ kN - ni redukcije ob podpori

Minimalna strižna armatura

$\rho_{w_min} := \frac{0.08 \cdot \sqrt{f_{ck} \cdot 10}}{f_{yk} \cdot 10}$ $\quad \rho_{w_min} = 0.0008$

$A_{sw_min} := \rho_{w_min} \cdot b \cdot 1.00 \cdot 100$ $\quad A_{sw_min} = 12.80$ cm²/m

$A_{vzd} := 0.25 \cdot A_{s_dej} = 2.83$ cm²

Največja razdalja med stremeni

$s_{t_max} := 0.75 \cdot d$ $\quad s_{t_max} = 12.00$ cm

$V_{ed} := Q_{ed}$ $\quad V_{ed} = 41.75$ kN

$V_{ed_red} := V_{ed} - \Delta V_{ed}$ $\quad V_{ed_red} = 41.75$ kN

Projektna strižna odpornost

$k := \min\left(2, 1 + \sqrt{\frac{200}{d \cdot 10}}\right)$ $\quad k = 2.00$

$\rho_t := \min\left(0.02, \frac{A_{vzd}}{b \cdot d}\right)$ $\quad \rho_t = 0.0011$

$\sigma_{cp} := 0.00$ $\quad \alpha_{cw} := 1.00$

$k_1 := 0.15$

$C_{Rd_c} := \frac{0.18}{1.5}$ $\quad C_{Rd_c} = 0.12$

$\upsilon_{min} := 0.035 \cdot k^{\frac{3}{2}} \cdot (f_{ck} \cdot 10)^{\frac{1}{2}}$ $\quad \upsilon_{min} = 0.49$

$V_{Rd_cm} := (\upsilon_{min} + k_1 \cdot \sigma_{cp}) b \cdot d \cdot 10^{-1}$ $\quad V_{Rd_cm} = 126.71$ *kN - najmanjša vrednost*

$V_{Rd_c1} := \left(C_{Rd_c} \cdot k \cdot \sqrt[3]{100 \rho_t \cdot f_{ck} \cdot 10} + k_1 \cdot \sigma_{cp}\right) \cdot b \cdot d \cdot 10^{-1}$ $\quad V_{Rd_c1} = 86.19$ *kN*

$V_{Rd_c} := \max(V_{Rd_cm}, V_{Rd_c1})$ $\quad V_{Rd_c} = 126.71$ *kN*

$f_{strizna_potrebna}$ = "računsko strižna armatura ni potrebna!"

MSU:

Elastični pomik pri karakteristični obtežni kombinaciji

$I_z := \frac{b \cdot h^3}{12}$ $\quad I_z = 106666.67$ *cm4*

$u_G := \frac{5G \cdot (Lx \cdot 100)^4}{384 E_{cm} \cdot I_z \cdot 100}$ $\quad u_G = 0.0616$ *cm ... pomik zaradi stalne obtežbe*

$u_Q := \frac{5P \cdot (Lx \cdot 100)^4}{384 E_{cm} \cdot I_z \cdot 100}$ $\quad u_Q = 0.023$ *cm ... pomik zaradi koristne obtežbe*

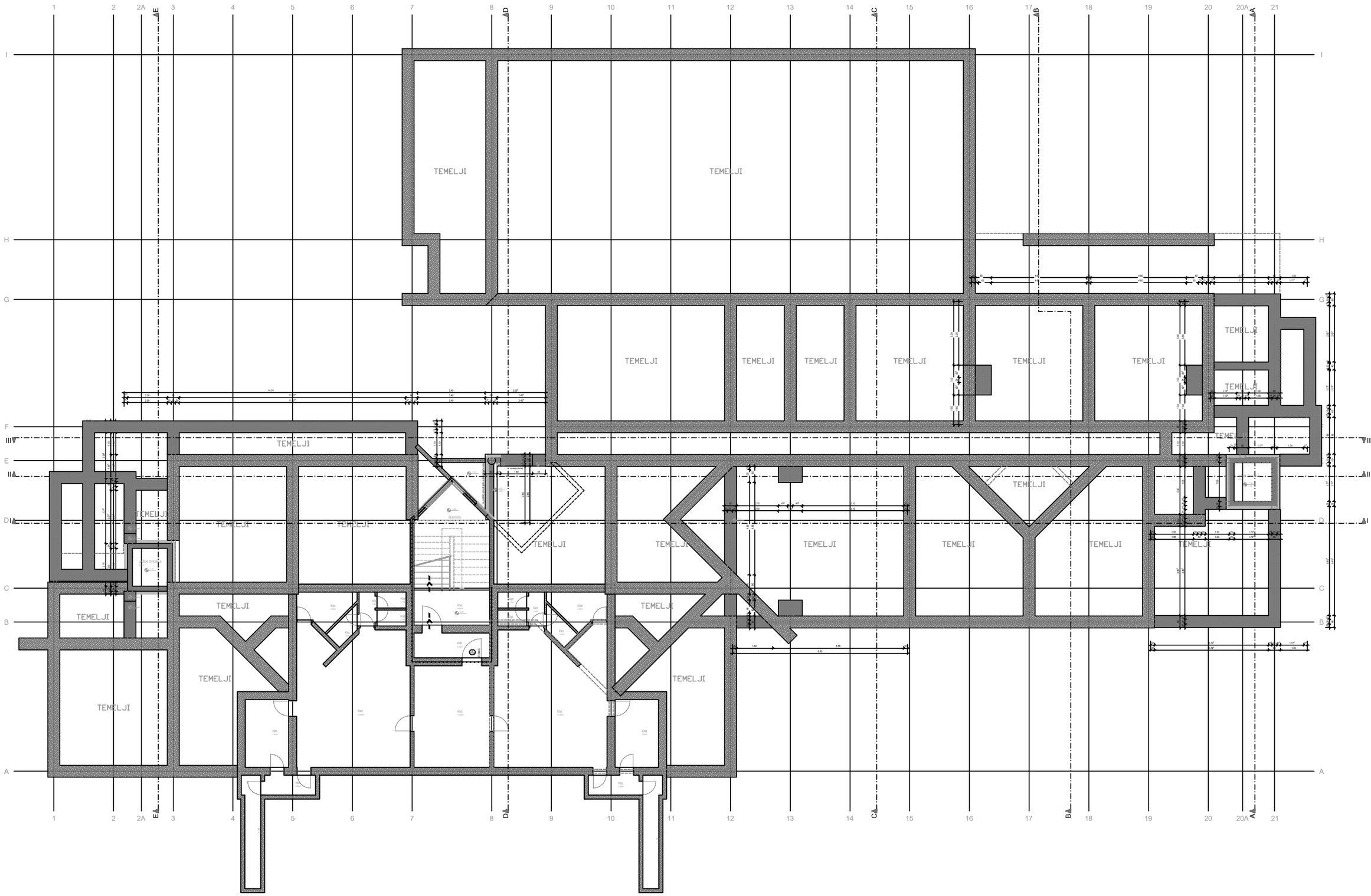
$U_{el} := u_G + u_Q$ $\quad U_{el} = 0.085$ *cm ... elastični pomik*

Pričakovan končni pomik

$U_{nesk.} := 3.0 \cdot u_G + u_Q$ $\quad U_{nesk.} = 0.208$ *cm* $<$ $\frac{Lx \cdot 100}{250} = 1.32$ *cm*

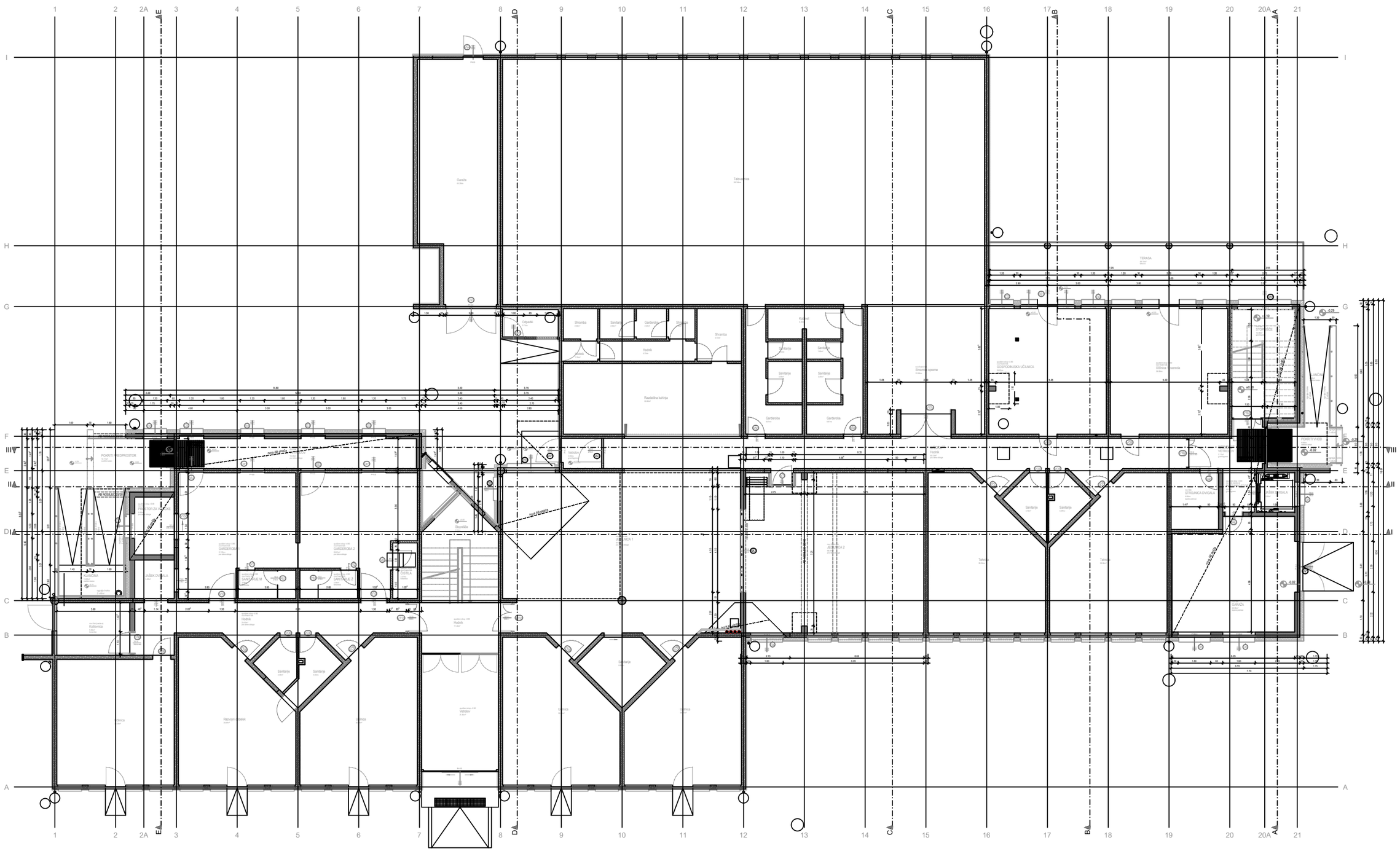
2.5. RISBE

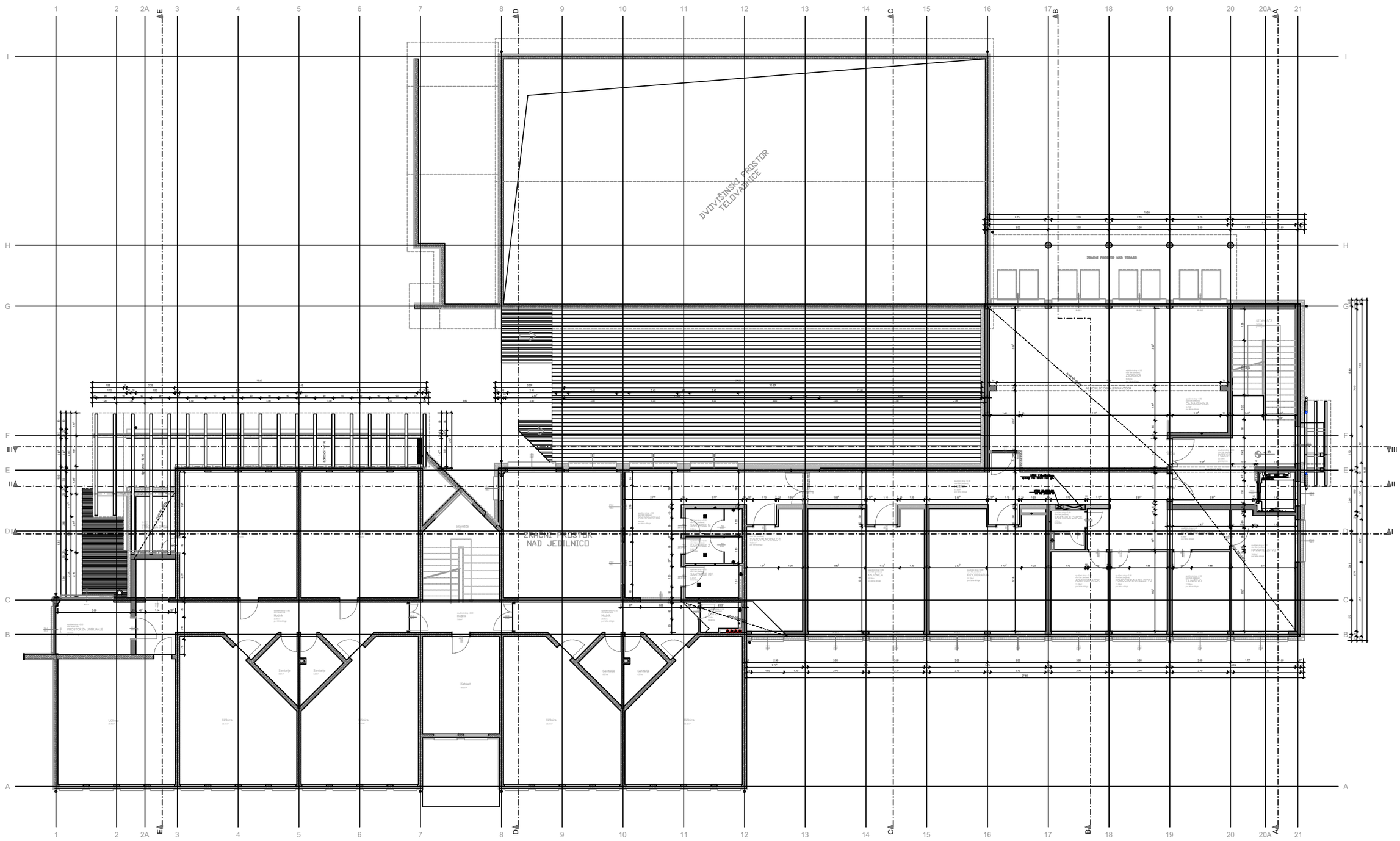
1.0 Tloris temeljev
2.0 Tloris pritličja
3.0 Tloris 1.nadstropja
4.0 Tloris 2.nadstropja
5.0 Tloris ostrešja
6.0 Prerez A-A
7.0 Prerez B-B
8.0 Prerez C-C
9.0 Prerez D-D
10.0 Prerez I
11.0 Prerez II
12.0 Prerez III



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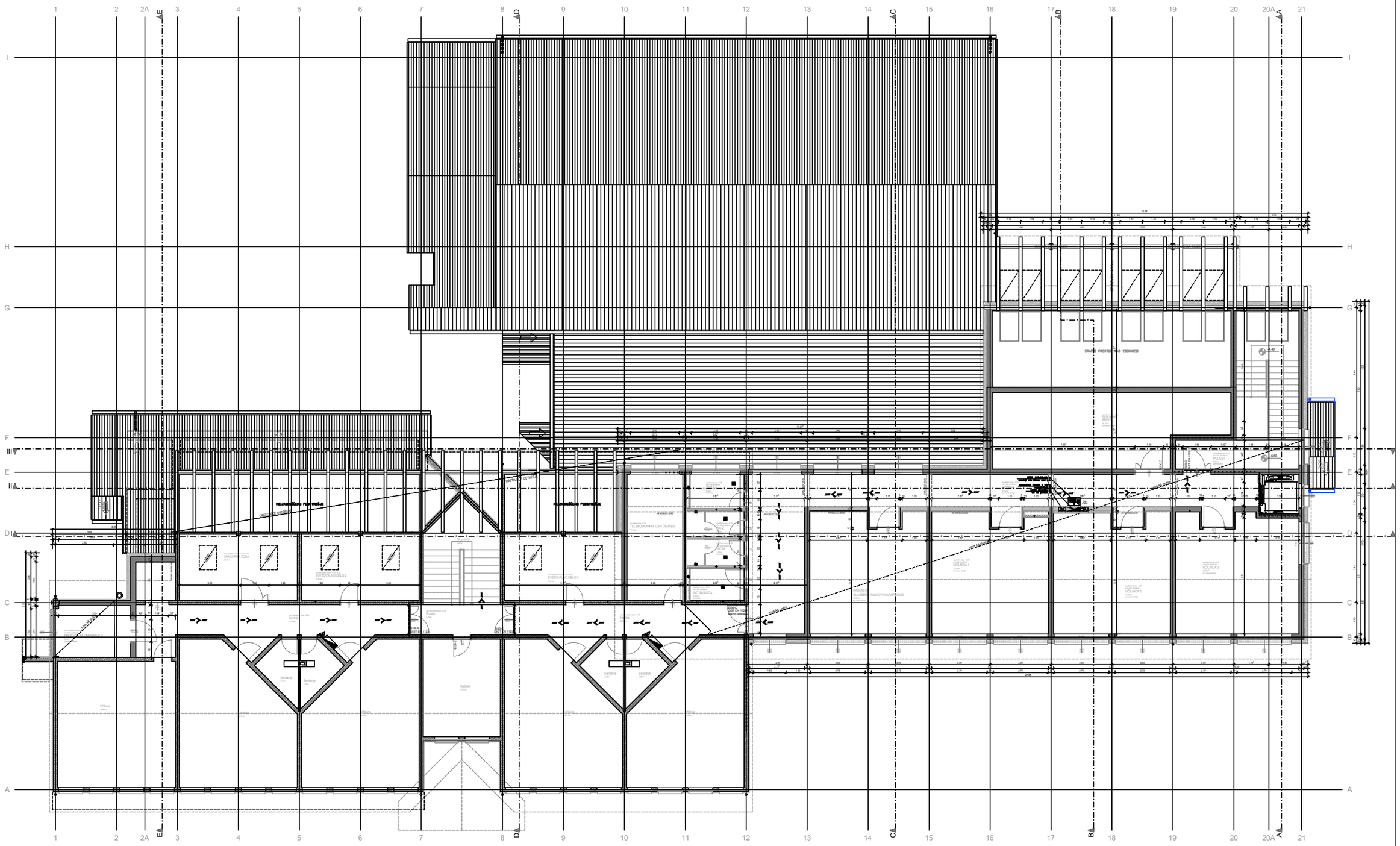
OBJEKT:	OŠ ROJE V DOMŽALAH	POZICIJA: **TLORIS TEMELJEV**
INVESTITOR:	OBČINA DOMŽALE, LUKOVICA, MENGEŠ, MORAVČE IN TRZIN	
ŠT.NAČRTA:	1016/2023	ŠT.LISTA: **1**

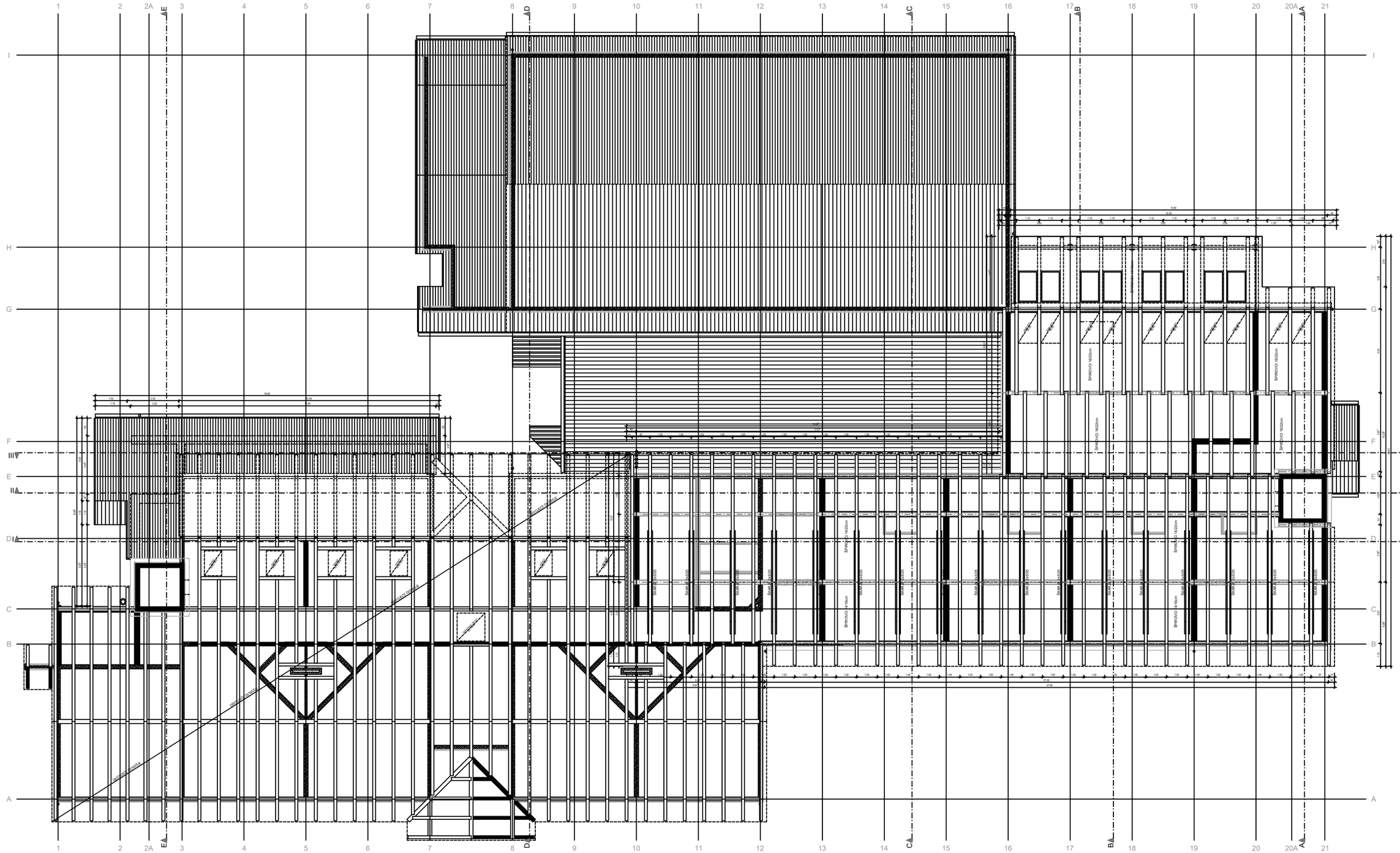

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Garaža
Telovadnica
Shramba
Sanitarije
Garderoba
Hodnik
Kabinet
Shramba športne opreme
Razdelilna kuhinja
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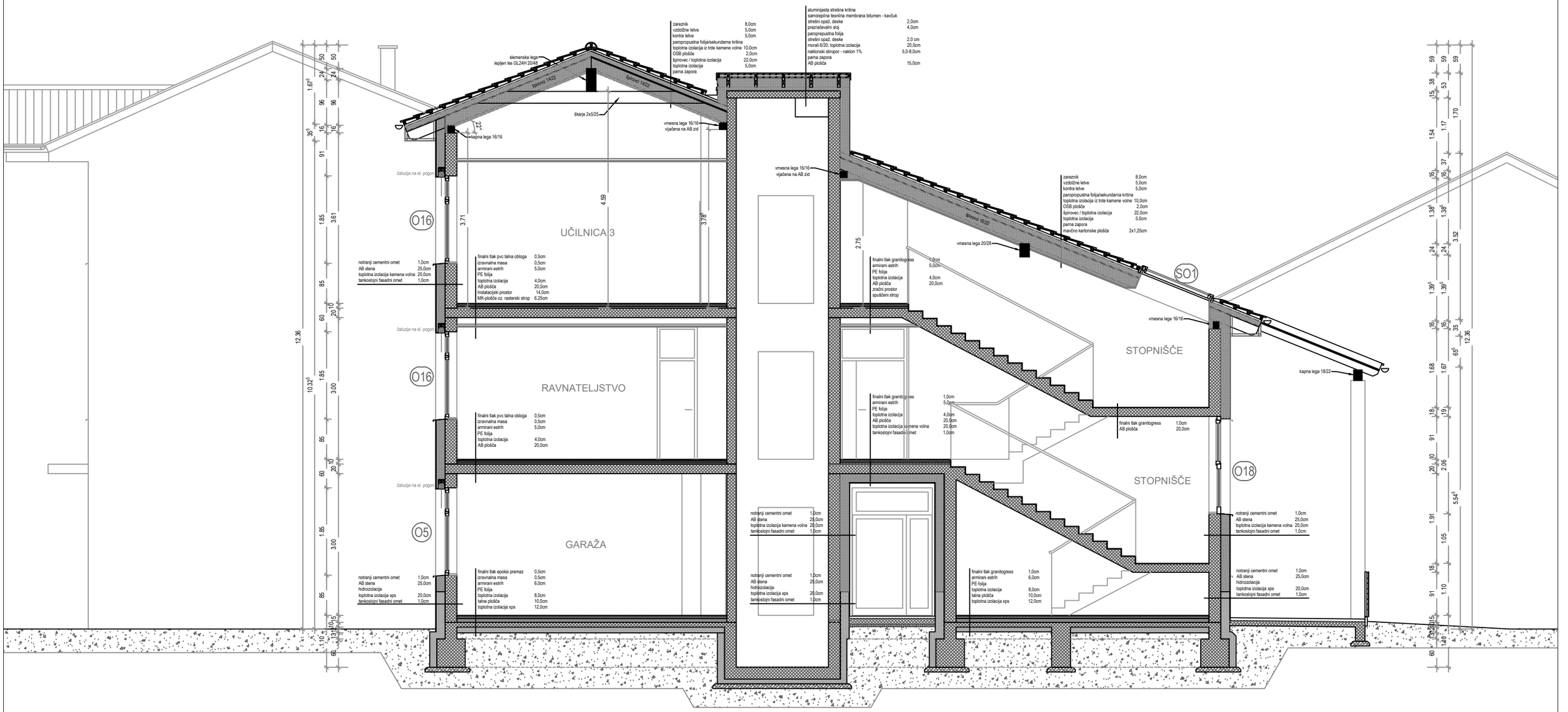
OBJEKT:	OŠ ROJE V DOMŽALAH	POZICIJA: **TLORIS 1.NADSTROPJA**
INVESTITOR:	OBČINA DOMŽALE, LUKOVICA, MENGEŠ, MORAVČE IN TRZIN	
ŠT.NAČRTA:	1016/2023	ŠT.LISTA: **3**


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KOMUNIKACIJSKO JEDRO 1
KOMUNIKACIJSKO JEDRO 2
SVETOVALNO DELO 1
SVETOVALNO DELO 2
SENZORNA SOBA
TELEKOMUNIKACIJSKI CENTER
WC INVALIDI
UČILNICA 1
UČILNICA 2
UČILNICA 3
PODEST
Kabinet
Garderoba
Garderoba
Garderoba



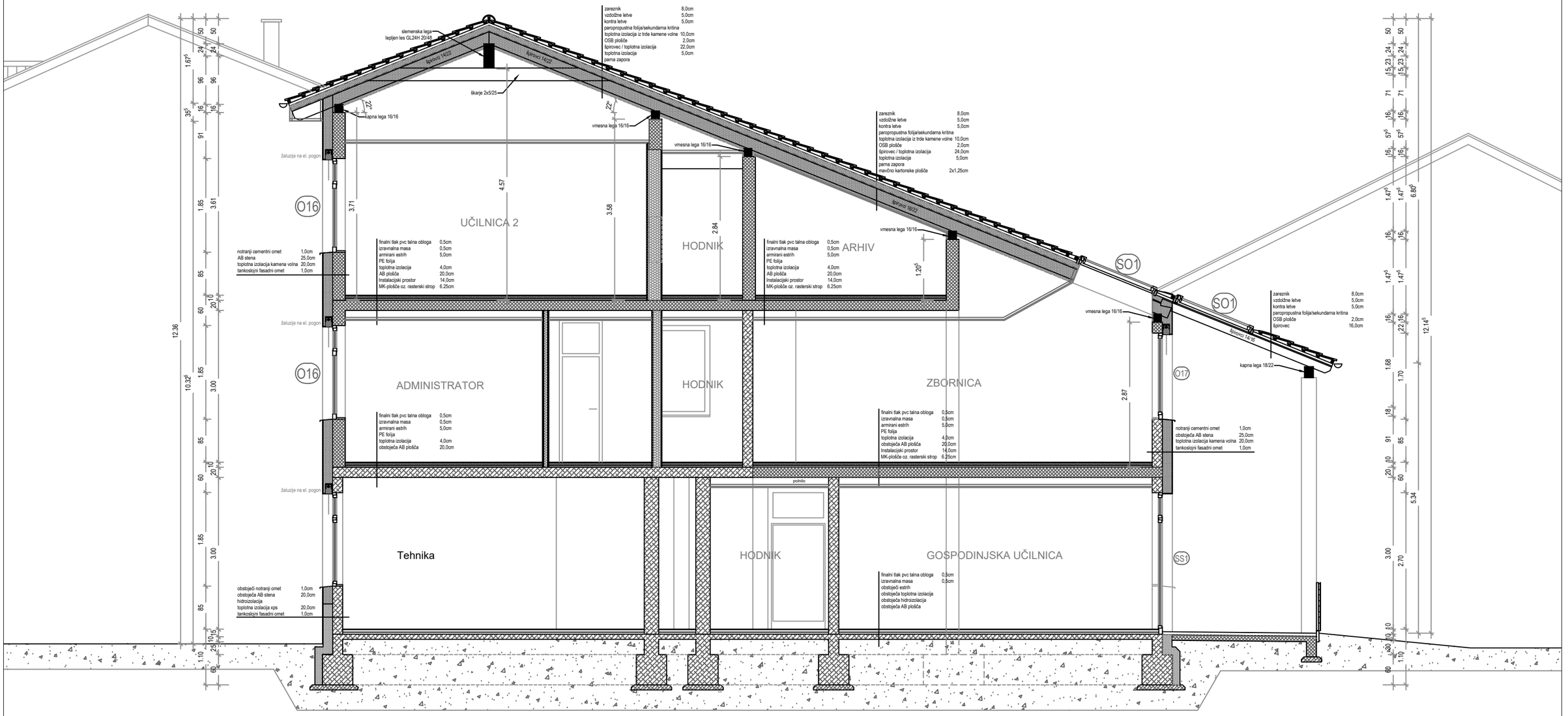
STATICON IB d.o.o., Lokarjev drevored 1, 5270 Ajdovščina, t + (0)5 99 66 290, e-mail bogomir.ipavec@staticon-ib.si

OBJEKT: OŠ ROJE V DOMŽALAH	POZICIJA: **TLORIS OSTREŠJA**
INVESTITOR: OBČINA DOMŽALE, LUKOVICA, MENGEŠ, MORAVČE IN TRZIN	
ŠT.NAČRTA: 1016/2023	ŠT.LISTA: **5**



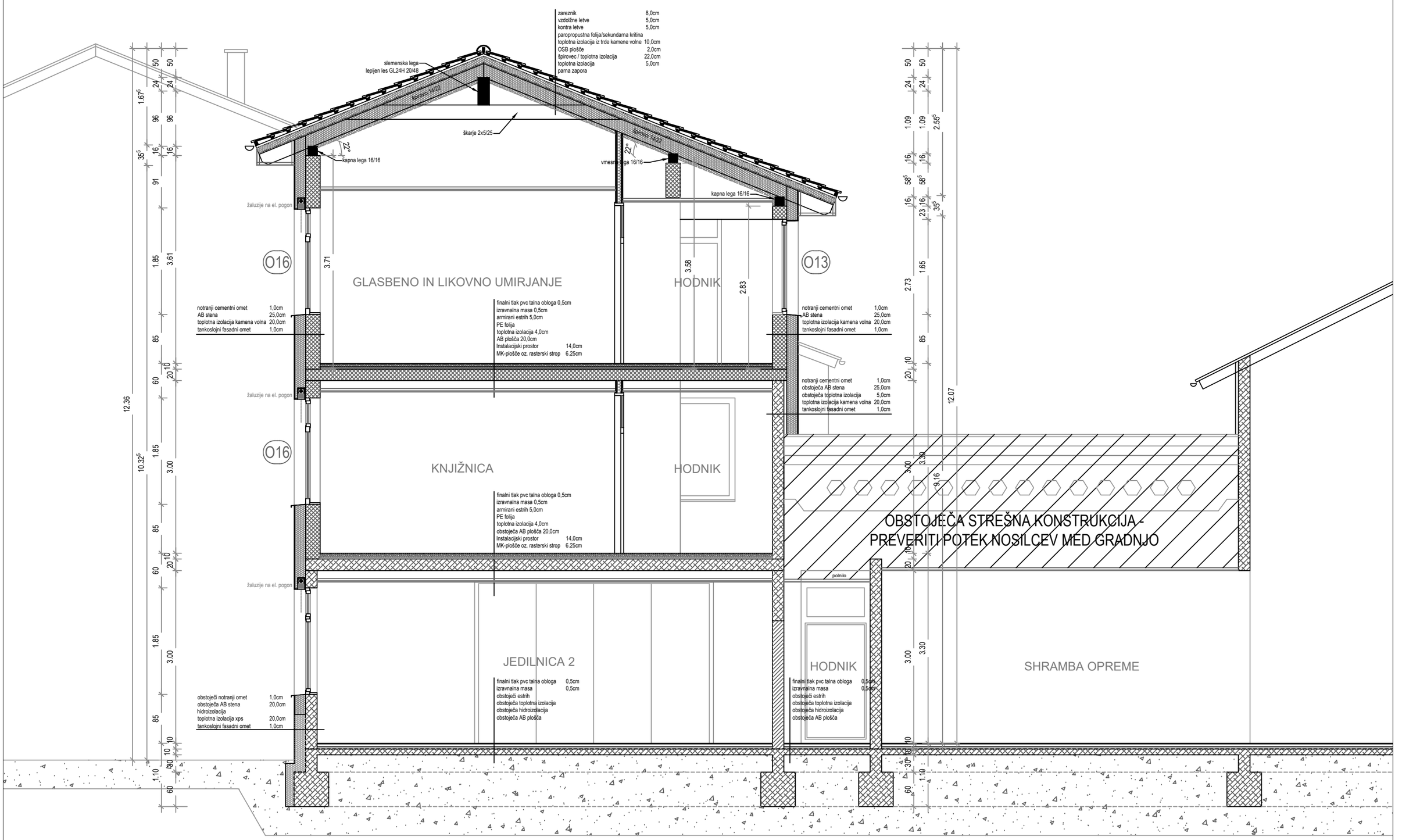
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OBJEKT: OŠ ROJE V DOMŽALAH	POZICIJA: **PREREZ A-A**
INVESTITOR: OBČINA DOMŽALE, LUKOVICA, MENGEŠ, MORAVČE IN TRZIN	
ŠT.NAČRTA: 1016/2023	ŠT.LISTA: **6**



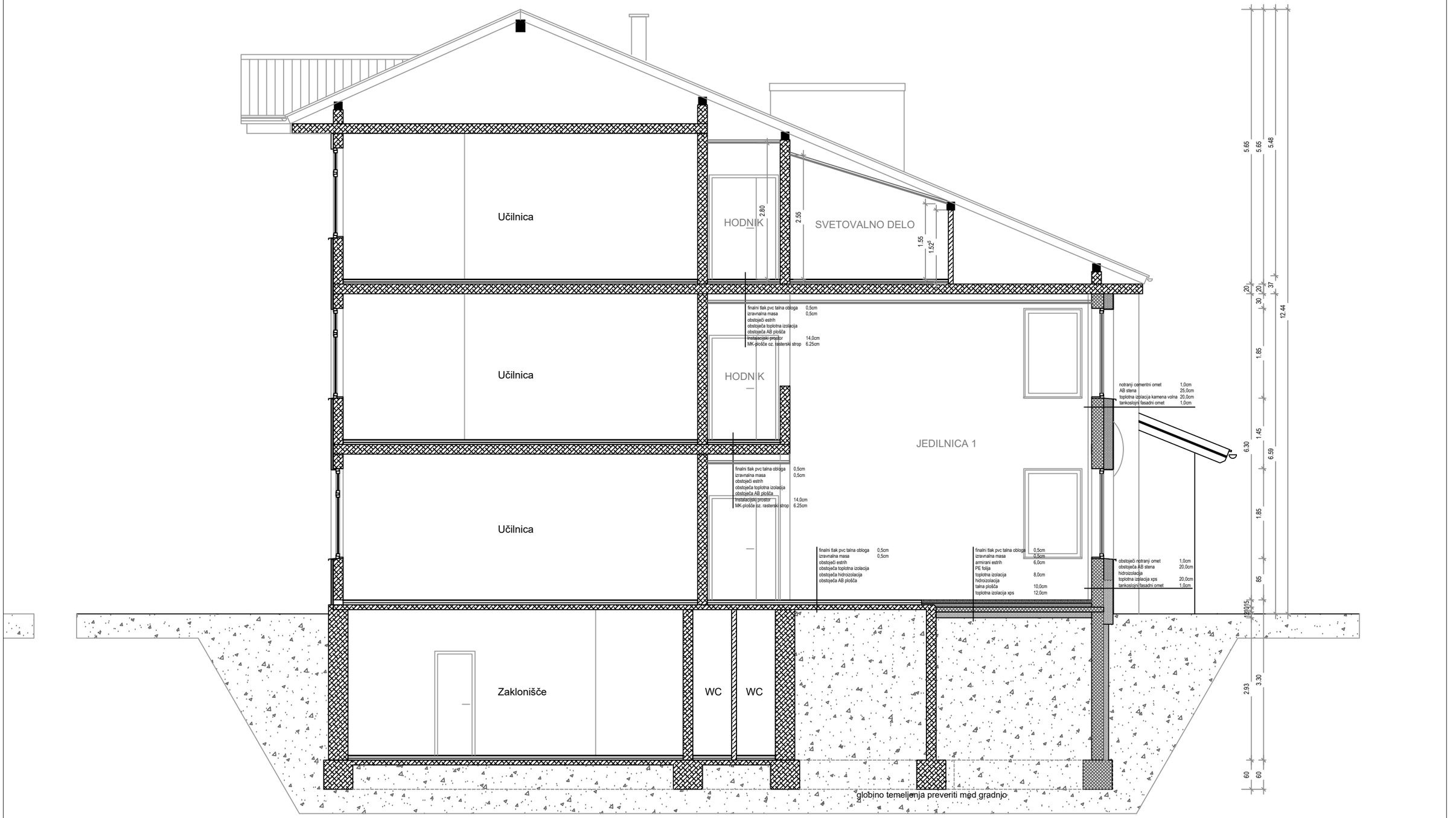
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OBJEKT: OŠ ROJE V DOMŽALAH	POZICIJA: **PREREZ B-B**
INVESTITOR: OBČINA DOMŽALE, LUKOVICA, MENGEŠ, MORAVČE IN TRZIN	
ŠT.NAČRTA: 1016/2023	ŠT.LISTA: **7**



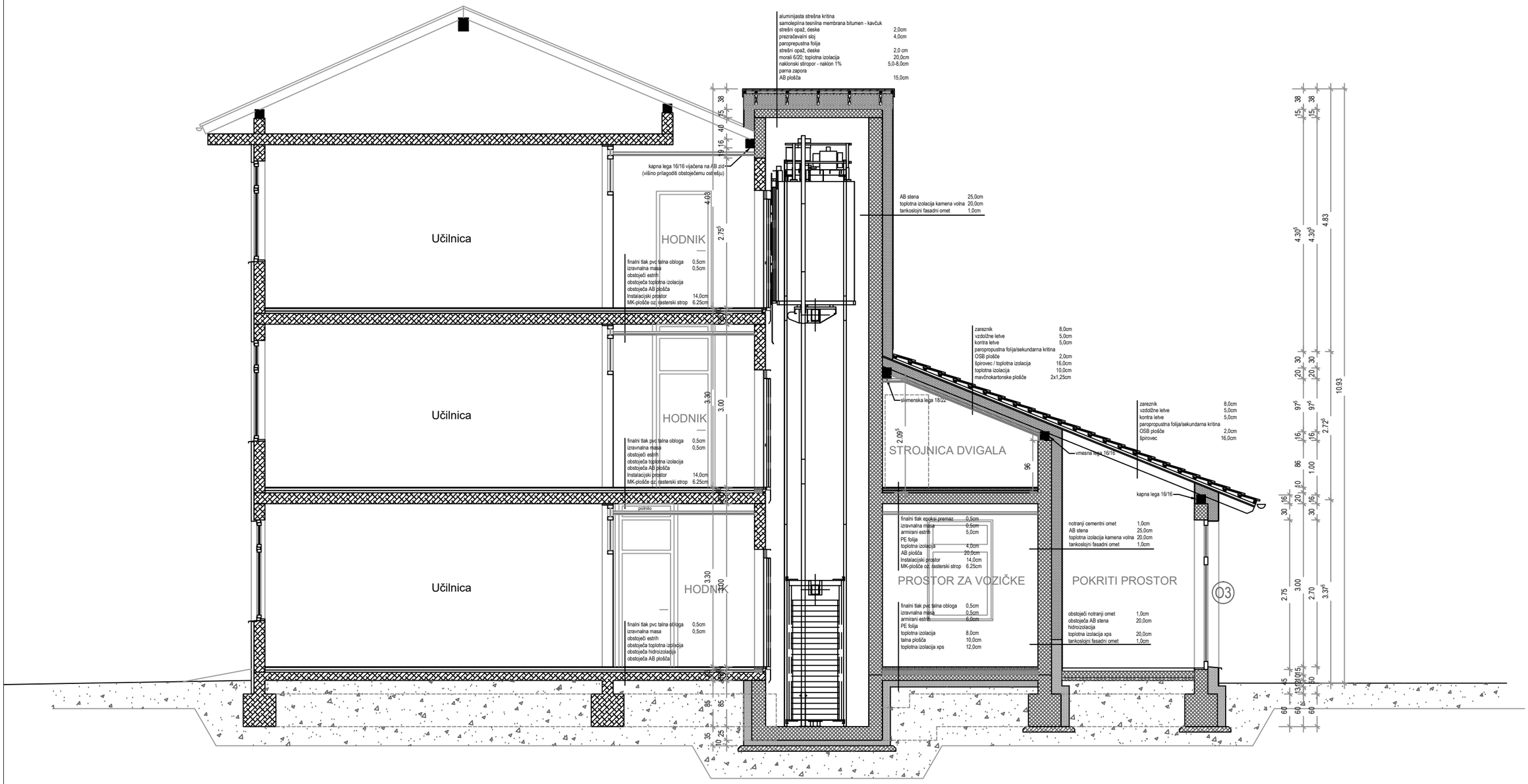
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OBJEKT: OŠ ROJE V DOMŽALAH	POZICIJA: **PREREZ C-C**
INVESTITOR: OBČINA DOMŽALE, LUKOVICA, MENGEŠ, MORAVČE IN TRZIN	
ŠT.NAČRTA: 1016/2023	ŠT.LISTA: **8**



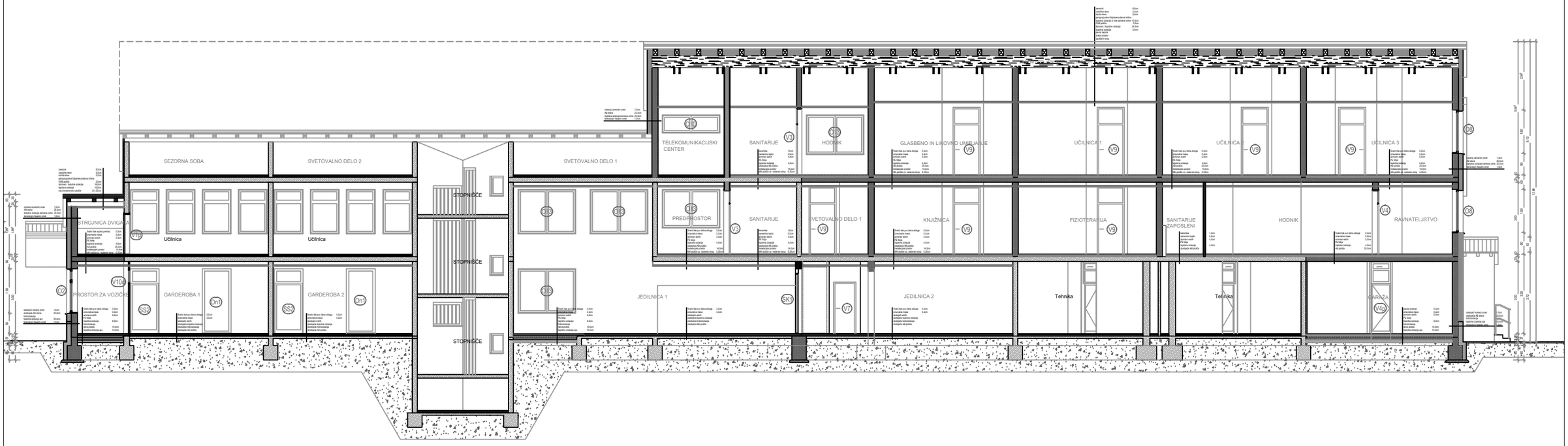
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OBJEKT: OŠ ROJE V DOMŽALAH	POZICIJA: **PREREZ D-D**
INVESTITOR: OBČINA DOMŽALE, LUKOVICA, MENGEŠ, MORAVČE IN TRZIN	
ŠT.NAČRTA: 1016/2023	ŠT.LISTA: **9**



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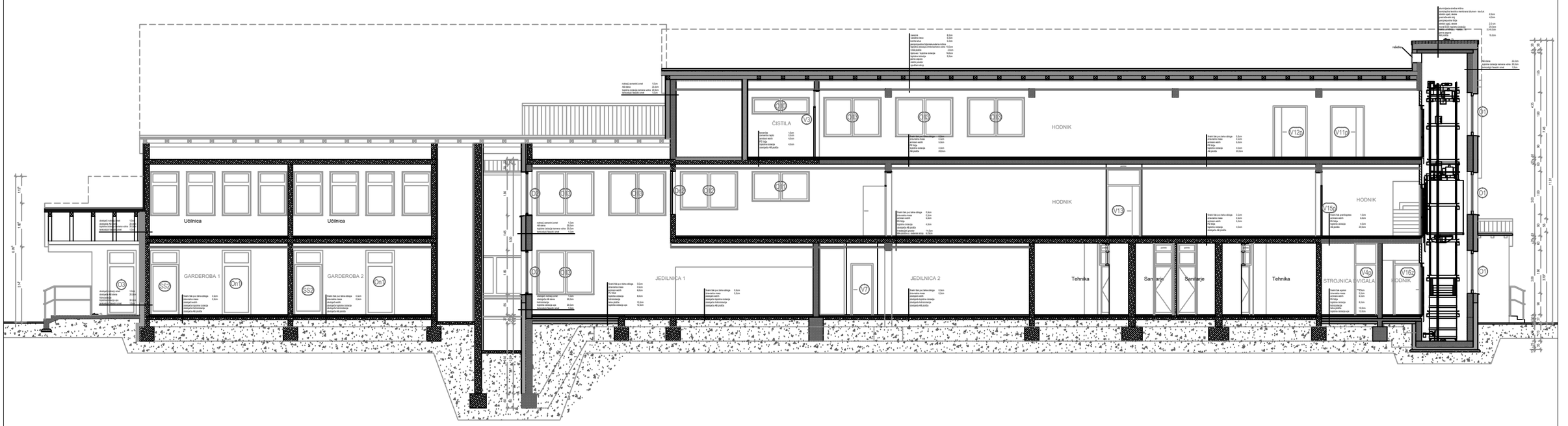
OBJEKT: OŠ ROJE V DOMŽALAH	POZICIJA: **PREREZ E-E**
INVESTITOR: OBČINA DOMŽALE, LUKOVICA, MENGEŠ, MORAVČE IN TRZIN	
ŠT.NAČRTA: 1016/2023	ŠT.LISTA: **10**



PREREZ I

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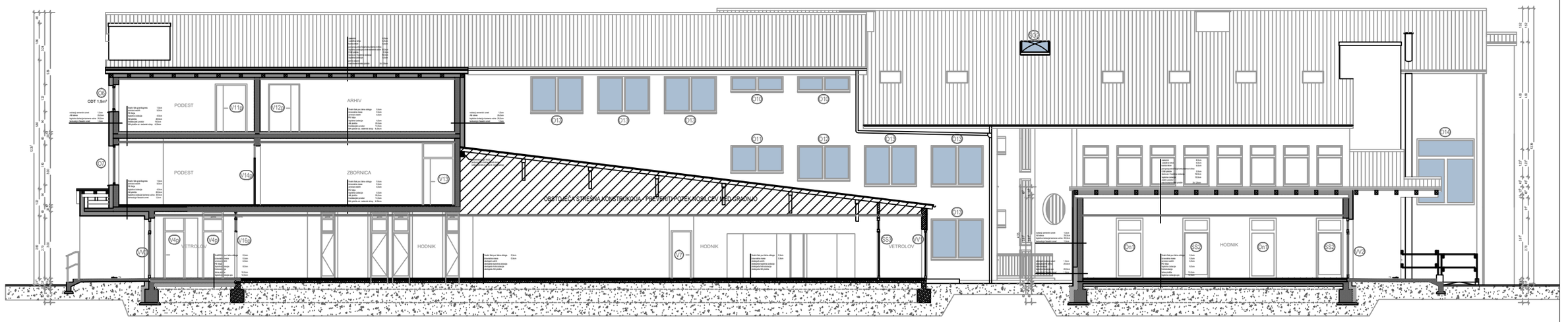
OBJEKT: OŠ ROJE V DOMŽALAH	POZICIJA: **PREREZ I**
INVESTITOR: OBČINA DOMŽALE, LUKOVICA, MENGEŠ, MORAVČE IN TRZIN	
ŠT.NAČRTA: 1016/2023	ŠT.LISTA: **11**



PREREZ II

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OBJEKT: OŠ ROJE V DOMŽALAH	POZICIJA: **PREREZ II**
INVESTITOR: OBČINA DOMŽALE, LUKOVICA, MENGEŠ, MORAVČE IN TRZIN	
ŠT.NAČRTA: 1016/2023	ŠT.LISTA: **12**



PREREZ III

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OBJEKT:	OŠ ROJE V DOMŽALAH	POZICIJA:	**PREREZ III**
INVESTITOR:	OBČINA DOMŽALE, LUKOVICA, MENGEŠ, MORAVČE IN TRZIN		
ŠT.NAČRTA:	1016/2023	ŠT.LISTA:	**13**