PRILOGA 1C

NASLOVNA STRAN NAČRTA

PODATKI O GRADNJI	
naziv gradnje	**DOM KRAJANOV / Male Žablje**
kratek opis gradnje	"Dom krajanov" bo predstavljal dopolnitev že zgrajenega rekreacijskega parka, kateremu bo dodana še stavba doma krajanov, otroško igrišče (enostaven objekt), za potrebe parkiranja obiskovalcev, pa bo na nasprotni strani javne ceste zgrajeno še parkirišče (nezahtevni objekt). Tako bodo objekti skupaj tvorili funkcionalni kompleks. Čakalnica avtobusnega postajališča in oporni zid kot enostavna objekta nista del kompleksa.
VRSTE GRADNJE *označiti vse ustrezne vrste gradnje*	☐ **NOVOGRADNJA - NOVOZGRAJEN OBJEKT** ☒ **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	**42/2024**
PODATKI O NAČRTU	
strokovno področje načrta	**2 Načrt s področja gradbeništva**
naziv načrta	**konstrukcija**
številka načrta	**1231/2025**
datum izdelave	**December 2025**
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	STATICON IB Družba za projektiranje, inženiring in svetovanje, d.o.o. Lokarjev drevored 1, 5270 Ajdovščina
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	BOGOMIR IPAVEC univ. dipl. inž. grad. IZS G-0250

2.2 KAZALO VSEBINE NAČRTA št. 131/2025

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

PRILOGA 2C

IZJAVA PROJEKTANTA NAČRTA IN POOBLAŠČENEGA STOKOVNJAKA, 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	**konstrukcija**
številka načrta	**1231/2025**
datum izdelave	**December 2025**

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	BOGOMIR IPAVEC univ. dipl. inž. grad. IZS G-0250
odgovorna oseba projektanta načrta	**Bogomir Ipavec**
podpis odgovorne osebe projektanta načrta	STATICON IB Družba za projektiranje, inženiring in svetovanje, d.o.o. Lokarjev drevored 1, 5270 Ajdovščina

STATICON IB
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2.4 TEHNIČNO POROČILO

TEHNIČNO POROČILO

1 SPLOŠNI OPIS

Investitor Občina Ajdovščina namerava v naselju Male Žablje zgraditi nov objekt. Gre za večnamenski objekt dom krajanov, ki bo deloma namenjen pisarnam, servisnim prostorom in deloma dvorani, kjer se lahko zbira večje število ljudi brez sedežev. V načrtu gradbeništva je izdelan statični in seizmični izračun objekta in izdelani opažno armaturni načrti. Konstrukcijsko celoten objekt sestavlja ena dilatacijska enota.

2 POVZETEK GEOLOŠKO GEOMEHANSKEGA POROČILA

Za potrebe izdelave projekta je bilo izdelano geološko geomehansko poročilo številka GP 16-2025, ki ga je izdelal Projektiranje in nadzor Anton Kosmačin s.p., Gortanova 22, 5000 Nova Gorica

Objekt ne bo podkleten, temeljen bo deloma na pasovnih temeljih in deloma na temeljni plošči.

Teren gradi fliš terciarne starosti, ki ga prekriva preperinski pokrov glin in meljev in sicer na obstoječem parkirnem prostoru ob bodočem Domu krajanov debeline 0,5 m, na lokaciji parkirišča pa 1,6m
Objekt Doma krajanov mora biti v celoti vkopani min 0,3 m v kompakten fliš. Okrog objekta mora biti v nivoju izkopa za temelje vkopana drenaža (drenažna cev Φ100, filc folija, drenažni zasip.

Za temeljenje izvedeno v flišu znaša dopustna obremenitev na $\sigma =$ 300 KN/m2.
Pri tako izvedenem temeljenju posedka ne bo.

Zemeljska dela naj se izvajajo v suhem vremenu in pod nadzorom geomehanika.

3 NOSILNA KONSTRUKCIJA

Nosilna konstrukcija doma krajanov je pretežno zasnovana kot monolitna zidana konstrukcija ojačana z vertikalnimi in horizontalnimi vezmi, plitvo temeljena na pasovnih temeljih in deloma na temeljni plošči. Deli vertikalne konstrukcije so izvedeni kot armiranobetonske stene. Strešna konstrukcija nad dvoranskim delom objekta je lesena na pritličnimi servisnimi prostori pa jeklena, ki prehaja v zunanji nadstrešek.

- Osnovni gabarit — 17.40 m x 10.60 m (glavni objekt)
- Etažnost objekta: — P + 1N
- Kota pritličja: — ±0,00 = 103.33 m n.v.
- Max. višina objekta: — +7.98 nad koto pritličja

Nosilno konstrukcijo sestavljajo:

- Povezani točkovni temelji, deloma pasovni temelji z vmesno ploščo in deloma temeljna plošča pod servisnimi prostori
- armiranobetonske stene

- Zidane stene ojačane z vertikalnimi in horizontalnimi vezmi
- Etažna plošča z nosilci
- Lesena strešna konstrukcija
- Jeklene strešne konstrukcija nad servisnimi prostori

- **Temeljna konstrukcija**: Objekt je v celoti temeljen plitvo deloma na pasovnih temeljih (dvorana) in deloma na temeljni plošči (servisni prostori). Podlaga za izvedbo temeljne plošče in pasovnih temeljev mora biti izvedena v skladu z navodili iz geološko geomehanskega elaborata. Temeljna tla mora prevzeti geomehanik

- **AB stene** : Del vertikalne konstrukcije predstavljajo armiranobetonske stene debeline 25 in 30cm

- **zidane stene** : Del vertikalne konstrukcije predstavljajo zidane stene iz mrežaste opeke, ojačane z vertikalnimi in horizontalnimi vezmi

- **Etažna plošča** je monolitne izvedbe, debeline 20cm in nalegajo na zunanje AB stene in nosilce. Nosilci so dimenzije 30/60cm nad ploščo

- **Strešna konstrukcija nad dvorano** Strešna konstrukcija nad dvorano je izvedena v celoti iz lesa. Tvorijo pa jo glavni prečni nosilci. Nosilci se izvedejo iz lepljenega lesa iglavcev. So dvokapne oblike z poševno in krožno spodnjo linijo. Nosilci so postavljeni na osnem razmaku 400cm, Kot sekundarna konstrukcija pa so preko nosilcev izvedeni še špirovci dimenzij 16/18cm

- **jeklena strešna konstrukcija** nad pritličnim delom se izvede jeklena strešna konstrukcija, ki je nad vhodom podaljšana v nadstrešek. Osnovno konstrukcijo tvorijo trije nosilci HEA 280, preko katerih je izvedena še sekundama jeklena konstrukcija iz škatlastih profilov

4 MATERIALI UPORABLJENI V NOSILNI KONSTRUKCIJI

BETON

V konstrukciji bodo uporabljeni betoni, ki so navedeni v nadaljevanju in katerih oznake in karakteristike so skladne s standardi SIST EN 206-1 in SIST 1026 ter SIST EN 1992-1-1.

Podložni betoni bodo ne armirani iz betona kvalitete C 8/10:

f_{ck} = 0.80 kN/cm^2 … karakteristična tlačna trdnost valja
$f_{ck,cube}$ = 1.00 kN/cm^2 … karakteristična tlačna trdnost kocke
E_{cm} = 2700 kN/cm^2 … modul elastičnosti

Določeni AB elementi objekta bodo iz betona kvalitete C 25/30: - temeljna konstrukcija in stene

f_{ck} = 2.50 kN/cm^2 … karakteristična tlačna trdnost valja
$f_{ck,cube}$ = 3.00 kN/cm^2 … karakteristična tlačna trdnost kocke
E_{cm} = 3100 kN/cm^2 … modul elastičnosti

Določeni AB elementi objekta bodo iz betona kvalitete C 30/37: plošča in nosilci

f_{ck} = 3.00 kN/cm^2 … karakteristična tlačna trdnost valja
$f_{ck,cube}$ = 3.70 kN/cm^2 … karakteristična tlačna trdnost kocke

E_{cm} = 3300 kN/cm^2 … modul elastičnosti

Kateri betoni so uporabljeni pri posameznem elementu, je razvidno iz statičnega računa posameznega dela objekta oz. posameznega elementa. Prav tako so tam prikazani varnostni faktorji za material in nato določene računske karakteristike materiala. Zahteve za beton so prav tako prikazane na vseh grafičnih prilogah in se pri dobavi in gradnji betona upošteva tam navedene zahteve za posamezni element.
Odpornostni razredi betonov so v večini primerov samo XC2.

JEKLO ZA ARMIRANJE

Jeklo, ki se uporablja za armiranje konstrukcij, mora ustrezati zahtevam standarda SIST EN 10080 in SIST EN 1992-1-1. Predvidena je uporaba jekla razreda B500 B tako za palice, kot za armaturne mreže.
Karakteristike tega jekla so sledeče:

B500B: f_{yk} = 50.0 kN/cm^2 … karakteristična meja elastičnosti
E_s = 20000 kN/cm^2 … modul elastičnosti

Pri statičnem računu posameznega elementa so prikazani varnostni faktorji za material in nato določene računske karakteristike materiala.

ZAŠČITNI SLOJ BETONA

Zaščitni sloji betona nad armaturo se določijo na podlagi pogojev okolja iz SIST EN 206-1 (lokacija posameznega elementa), minimalnega zaščitnega sloja po SIST EN 1992-1-1, ter ustrezne požarna odpornosti glede na SIST EN 1992-1-2 (glej nadaljevanje). Debeline posameznih zaščitnih slojev so določene pri posameznih elementih. Približni zaščitni sloji so sledeči:

preklade, vezi, plošče, stene (nadzemni del)	c_{min}	= 2.5 cm
plošče, stene, stebri (temeljna konstrukcija)	c_{min}	= 3.0 cm
elementi v stiku z zemljino (v primeru brez izolacije)	c_{min}	= 4.0 cm

JEKLENA KONSTRUKCIJA

Uporabljeni material za jekleno konstrukcijo je konstrukcijsko jeklo S235 J0

LESENA KONSTRUKCIJA

lesena konstrukcija je izvedena iz dveh materialov

- Glavni strešni nosilci so izvedeni iz lepljenega lesa iglavcev kategorije GL24C
- Sekundarni nosilci so iz lesa iglavcev kategorije C24

POŽARNA ODPORNOST KONSTRUKCIJE

Za obravnavani objekt je narejen »Načrt požarne varnosti „ ki ga je pod številko 084/25-NP izdelalo podjetje Lozej d.o.o., Ajdovščina

Za objekt je navedena minimalna požarna odpornost nosilnih konstrukcij – 30 minut oz. R 30.

Betonska konstrukcija
Zahteve za AB elemente (minimalna debelina in minimalni zaščitni sloj) so podane v SIST EN 1992-1-2.

Povzetek minimalnih dimenzij posameznih elementov iz omenjenega standarda je sledeč (za vsak posamezni element je za točno določitev odpornosti potrebno uporabiti pravo tabelo glede na razmerje dimenzij posameznega elementa):

plošče minimalna debelina plošče 8 cm, minimalna razdalja od roba elementa do težišča armature 1.5 cm – **pogoj je izpolnjen**
nosilci minimalna dimenzija nosilca 12 cm, minimalna razdalja od roba elementa do težišča armature 2.5 cm – **pogoj je izpolnjen**
stene minimalna debelina stene 14 cm, minimalna razdalja od roba elementa do težišča armature 1.0 cm – **pogoj je izpolnjen**
stebri minimalna dimenzija stebra 20 cm, minimalna razdalja od roba elementa do težišča armature 4.0 cm – **pogoj je izpolnjen**

Projektirane dimenzije elementov ustrezajo temu kriteriju.

Jeklena konstrukcija
Jeklena konstrukcija bo v celoti ščitena za požarno oblogo. Pri izvedbi obloge mora obloga ustrezati zahtevi R30, glede na uporabljeni material. Z požarno oblogo je zagotovljena ustrezna požarna odpornost konstrukcije.

Lesena konstrukcija
Dokaz požarne varnosti temelji na uporabi računskega modela konstrukcije, ki mora odražati pričakovano obnašanje le-te med požarom. Pri tem moramo dokazati, da za določen čas požarni izpostavljenosti konstrukcije velja:

$$E_{d,fi} \leqslant R_{d,t,fi}.$$

Pri tem je $E_{d,fi}$ projektni učinek vplivov v požarnem projektnem stanju, določen v skladu s SIST EN 1991-1-2:2004, $R_{d,t,fi}$ pa je pripadajoča projektna odpornost, prav tako v požarnem projektnem stanju. Zahtevo (1) lahko zapišemo tudi v časovnem območju in sicer:

$$t_{fi,requ} \leqslant t_{d,fi},$$

kjer je $t_{fi,requ}$ zahtevan čas požarne odpornosti, $t_{d,fi}$ pa je projektni čas požarne odpornosti.
Za lesene konstrukcije se lahko uporabljata dva principa:

- Poenostavljena metoda z zmanjšanjem prečnega prereza ali materialih karakteristik
- Napredne računske metode

Pri tem objektov je bila izbrana metoda z zmanjšanjem prečnega prereza

Kot je že omenjeno, se požarno odpornost lesenih elementov računa ob upoštevanju efektivnega prečnega prereza. Nosilni del prečnega prereza se med požarno izpostavljenostjo zmanjšuje, saj začne les ogleneti, zoglenela plast pa sama po sebi nima nobene trdnosti, zato se je v računu odpornosti prereza ne upošteva. Dodatno se predpostavi, da je tudi material blizu cone oglenenja brez togosti in trdnosti, tako da ne prispeva k nosilnosti prereza. Za preostali del prereza pa predpostavimo, da se trdnostne in togostne karakteristike ne spreminjajo in so enake kot pri sobni temperaturi.

Pri izračunu lesenih elementov je bilo upoštevano da je zmanjšanje prereza 0.8mm na minuto, kar pomeni, da se prerez v času 30minut zmanjša po posamezni ploskvi pa 24mm.
Dokaz odpornosti je podan pri izračunu elementov lesene konstrukcije.

5 POGOJI ZA IZVEDBO

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.

b) Način izdelave

V vsaki fazi izgradnje je potrebno biti pozoren na mehansko odpornost in stabilnost objekta in njegovih delov. Potrebno je izdelati plan montaže in elaborat sestave posameznih elementov, ter ga predložiti projektantu v odobritev.

d) Zahteve pri izvedbi

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 varstvenimi 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,
- Delavniško dokumentacijo jeklenih konstrukcij,
- Elaborat varstva pri delu,
- Elaborat protikorozijske in protipožarne zaščite (s točnimi navodili izvedbe in kontrole),
- Varilni načrt s planom sestave, delavniškega in montažnega varjenja, projekt montaže.

Dokumenti morajo biti pregledani s strani strokovnega nadzora investitorja. Konstrukcijo je potrebno v vseh fazah gradnje, s pravilnim vrstnim redom sestave in gradnje, varovati proti izgubi stabilnosti ali porušitvi. Med gradnjo je potrebno voditi vso potrebno kontrolno dokumentacijo, potrdila o kvaliteti osnovnega, dodajnega in spojnega materiala - skladno s SIST EN 1090-2 5.2, potrdila o usposobljenosti varilcev, skladnosti varilnih postopkov, merske protokole, rezultate kontrole zvarov. Montažo je potrebno izvajati v skladu s projektom montaže. Geometrijo konstrukcije je potrebno preverjati v vsaki fazi montaže in se držati predpisanih toleranc. Za vsako spremembo je potrebno pred njeno izvedbo pridobiti pisno soglasje projektanta in strokovnega nadzora.

Izkop za temeljenje mora kontrolirati pooblaščen geomehanik in ustreznost potrditi z vpisom v gradbeni dnevnik.

Načrt izkopa in načrt morebiti potrebne zaščite gradbene jame nista del tega načrta

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

ANTIKOROZIJSKA ZAŠČITA JEKLENE KONSTRUKCIJE

Konstrukcije je potrebno antikorozijsko zaščititi, v skladu z zahtevami investitorja in predpisi (EN ISO 12944, deli 1-8). Če v nadaljnjih fazah ne bo drugače določeno, je potrebno upoštevati kategorijo korozijske zaščite C3, z visoko trajnostjo (razred H), v skladu z EN ISO 12944-5, Tabela A.4 (glej tudi EN ISO 12944-1).

IZVEDBENI RAZRED JEKLENE KONSTRUKCIJE
Po standardu SIST EN 1090 spada konstrukcija v drugi izvedbeni razred EXEC 2.

6 ZAKONODAJA IN PREDPISI

Gradnja in projektiranje objektov je regulirana z Gradbenim zakonom (GZ) in pripadajočimi podzakonskimi akti. Projektno dokumentacijo je potrebno izdelati v skladu s "Pravilnikom o podrobnejši vsebini dokumentacije in obrazcih, povezanih z graditvijo objektov", Ur. l. RS št. 30/2023.

Gradbeno konstrukcijo objekta je potrebno projektirati v skladu s »Pravilnikom o mehanski odpornosti in stabilnosti objektov«, Ur. l. RS št. 101/2005 in »Odredbo o seznamu standardov, ob uporabi katerih se domneva skladnost z zahtevami Pravilnika o mehanski odpornosti in stabilnosti objektov«, Ur. l. RS št. 8/2011.

Pri izdelavi načrta gradbeništva v tej fazi projekta, so bili upoštevani vsi merodajni Evrokod standardi, ki so navedeni v prilogah v nadaljevanju.

Glede na določila 8. člena Pravilnika o mehanski odpornosti in stabilnosti objektov (Uradni list RS, št. 101/2005) navajamo, da so načrti s področja gradbeništva izdelani na podlagi pravil Evrokodov.

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2.4 STATIČNI RAČUN

1 ANALIZA ZUNANJIH VPLIVOV

1 Vpliv lastne teže

Za vse konstrukcijske elemente je lastna teža v izračunu upoštevana avtomatsko (računalniški program *Tower*) s prostorninsko težo
armiranega betona $\gamma_{bet} = 25\ kN/m^3$
jekla $\gamma_{jek} = 78.5 kN/m^3$
lesa $\gamma_{les} = 4\ kN/m^3$

2 Vpliv stalne teže

Glej tabelo na naslednjih straneh

STALNE OBTEŽBE

STREHA NAD DVORANO	d	gama	kN/m2
Kritina – korec			0,65
letve			0.08
kontraletve			0.08
sekundarna kritina	0,10	10,00	0,01
toplotna izolacije	18,00	2,00	0,36
toplotan izolacije	10,00	2,50	0,25
mavčnokartonske plošče	2,50	10,00	0,25
STREHA NAD DVORANO			
	Σ		**1,52**

ENOKAPNA STREHA	d	gama	kN/m2
Kritina – pločevinasti paneli			0,25
podkonstrukcija			
kontraletve			0,08
deske	0,10	10,00	0,15
toplotna izolacije	12,00	2,00	0,24
podkonstrukcija za mavčni strop			0,10
mavčnokartonske plošče	2,50	10,00	0,25
ENOKAPNA STREHA			
			1,07

ETAŽNA PLOŠČA	d	gama	kN/m2
finalna obloga	2,00	27,00	0,54
estrih	5,00	24,00	1,20
XPS izolacija	5,00	3,00	0,15
AB plošča	20,00	0,00	0,00
spuščen strop	0,00		0,25
predelen stene			1,00
ETAŽNA PLOŠČA			
			3,14

3 Spremenljivi vplivi (koristna obtežba)

- Strešna plošča

  nepohodna streha (kategorija H) **q = 0.40 kN/m²**

- Tipična etažna plošča

  Pisarne **q = 3.00 kN/m²**
  Dvorana (kategorija C4) q = 5.00 kN/m²

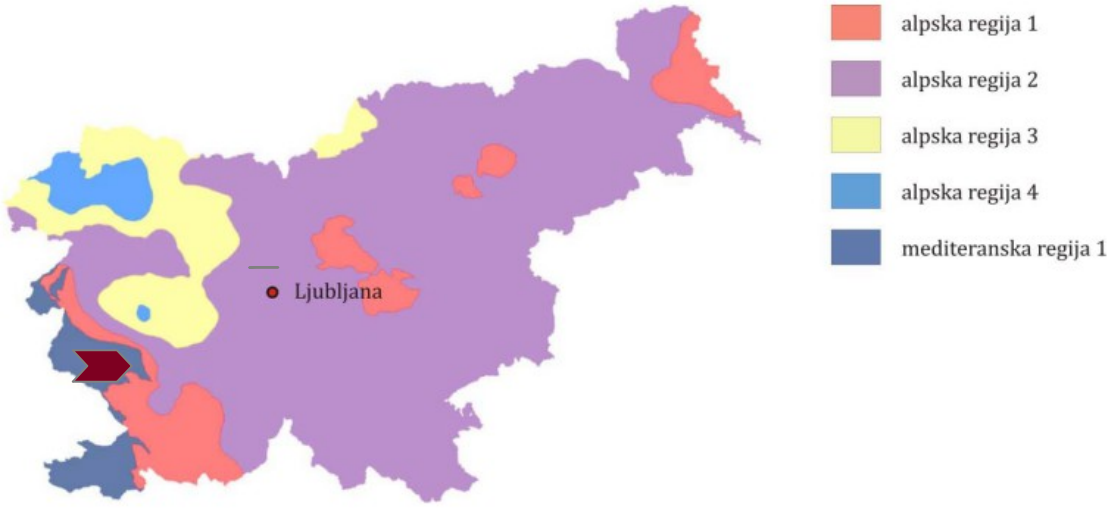
- Plošča na terenu

  Spremljajoči prostori **q = 3.00 kN/m²**

- Stopnice in podesti

  Q = 4.00 kN/m²

4 Vplivi snega

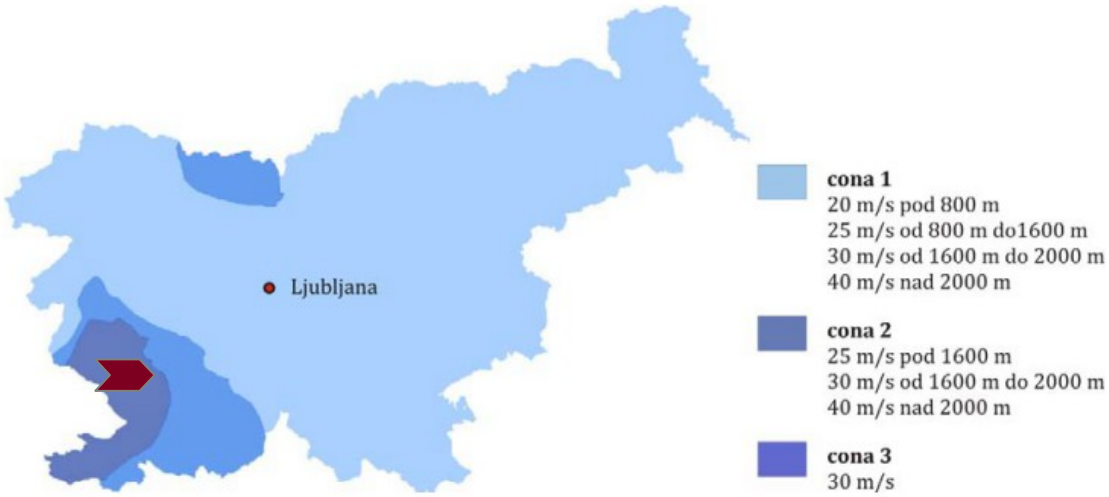


Slika 1: Regije za določitev obtežbe zaradi snega

Male Žablje – cona: M1, nadmorska višina: A=102 m,

Določitev ostalih prametrov glej nadaljevanje

5 Vplivi vetra



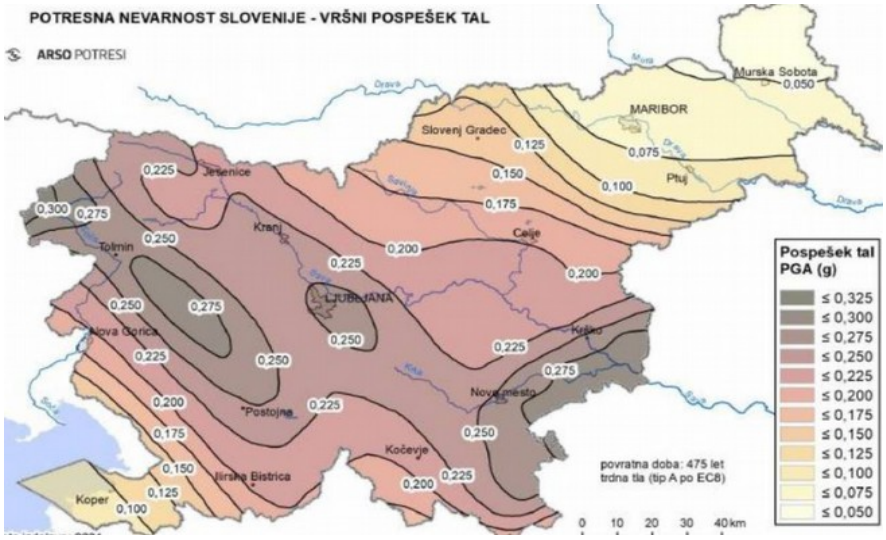
Slika 2: Cone za določitev obtežbe zaradi vetra

Male Žablje – cona: 3

Določitev ostalih prametrov glej nadaljevanje

6 Potresni vplivi

Račun učinkov potresnih vplivov na konstrukcijo je izveden s pomočjo modalne analize s projektnim spektrom odziva (projektni spekter tipa 1 po EC8) v obeh horizontalnih smereh. Vplivi različnih nihajnih oblik so kombinirani s pomočjo CQC metode, pri čemer vsota efektivnih modalnih mas znaša več kot 90% celotne mase konstrukcije (upoštevanih je bilo do 21 nihajnih). Učinki potresnih vplivov zaradi kombinacije horizontalnih komponent potresne obremenitve so bili izračunani po principu E_{Edx}"+"$0.3E_{Edy}$ oz. $0.3E_{Edx}$"+"E_{Edy}. Masa, ki je bila upoštevana v modalni analizi, je bila določena po principu: $1.0\times G_{lastna}$ "+" $1.0\times Gs_{talna}$ "+" $0.30\times Q_{koristna,streha}$ "+" $0.15\times Q_{koristna,ostale\ etaže}$. V primeru računa globalnega modela z modalno analizo s projektnim spektrom odziva je bila upoštevana polovična upogibna togost za vse vertikalne elemente modela (stebri, stene) in glavne nosilce. Upoštevan je bil tudi vpliv slučajne torzije skladno s standardom EC8.



Stavba se nahaja v Malih Žabljah. Temeljna gleda na na SIST EN 1998-1 lahko razvrstimo v kategorijo C. Projektni pospešek temeljnih tal znaša 0.225g. Upoštevana je kategorije pomembnosti stavbe III ($\gamma 1 = 1.0$) Glede na lastnosti konstrukcije je bil za obe smeri delovanja potresne obtežbe določen redukcijski faktor q = 3.00
Predpostavljen razred duktilnosti je DCM.

Lastnosti projektnega spektra po EC8:

- proj. pospešek tem. tal (Ajdovščina): **0.225 g**
- kvaliteta temeljnih tal: **C**
- faktor obnašanja konstrukcije (DCM): **q = 3.00**

Item: obtežba snega in vetra

Wind and Snow Loads (x64) LWS+ 02/25A (FRILO R-2025-2/P06)

System

Base values

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

Town			-
Altitude of terrain	hMSL	=	0.00 m
Climatic region			Mediterranean Region
Snow region			1

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

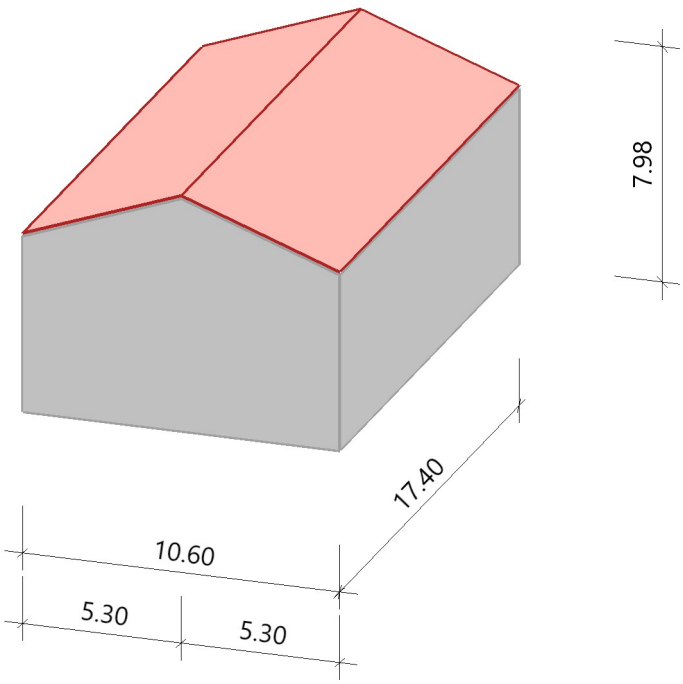
Factors

Factor snow load on eaves k = 3.00

Geometry Pitched roof

Building height	h	=	7.98 m				
Building length	l	=	17.40 m				
Building width	b	=	10.60 m				
	b_{le}	=	5.30 m		b_{ri}	=	5.30 m
using Pitched roof							
Slope	α_{le}	=	20.0 °		α_{ri}	=	20.0 °
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	=	10.60 m		dy	=	17.40 m
Distance snow guard ridge	a_{le}	=	0.00 m		a_{ri}	=	0.00 m

Graphic



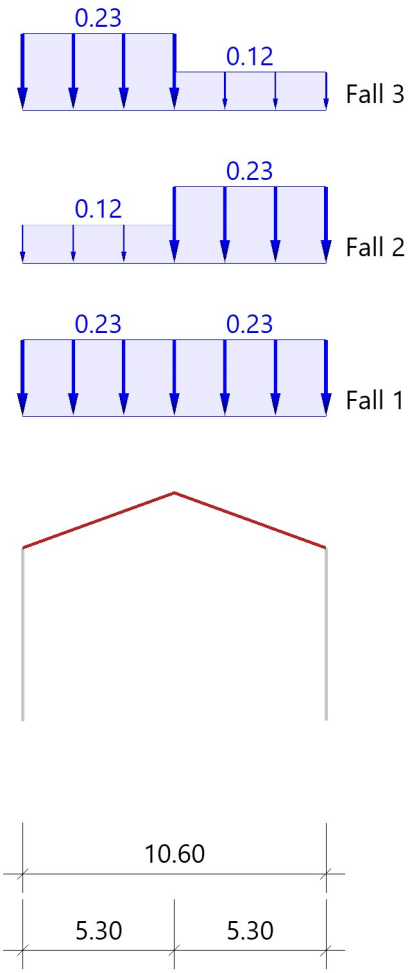
Loads

Ground snow load	sk	=	0.29 kN/m²
Basic wind speed	vb0	=	30.0 m/s
Basic speed pressure	qb0	=	0.56 kN/m²
Reference height	z_e	=	7.98 m
Velocity impounded pressure	qp,0(h)	=	1.24 kN/m²
Velocity impounded pressure	qp,90(h)	=	1.24 kN/m²

Results

Snow

Graphic, Cross-section



Table, Cross-section

Sit	μle	μri	μle*2	μri*2	Case (I)		Case (II) 1		Case (III)		Se,le	Fs,le	Se,ri	Fs,ri
					Sle [kN/m²]	Sri [kN/m²]	Sle [kN/m²]	Sri [kN/m²]	Sle [kN/m²]	Sri [kN/m²]	[kN/m]	[kN/m]	[kN/m]	[kN/m]
P/T	0.80	0.80	0.80	0.80	0.23	0.23	0.12	0.23	0.23	0.12				

All values are characteristic ones.
Sit: P/T=persistent/transient, excp=exceptional

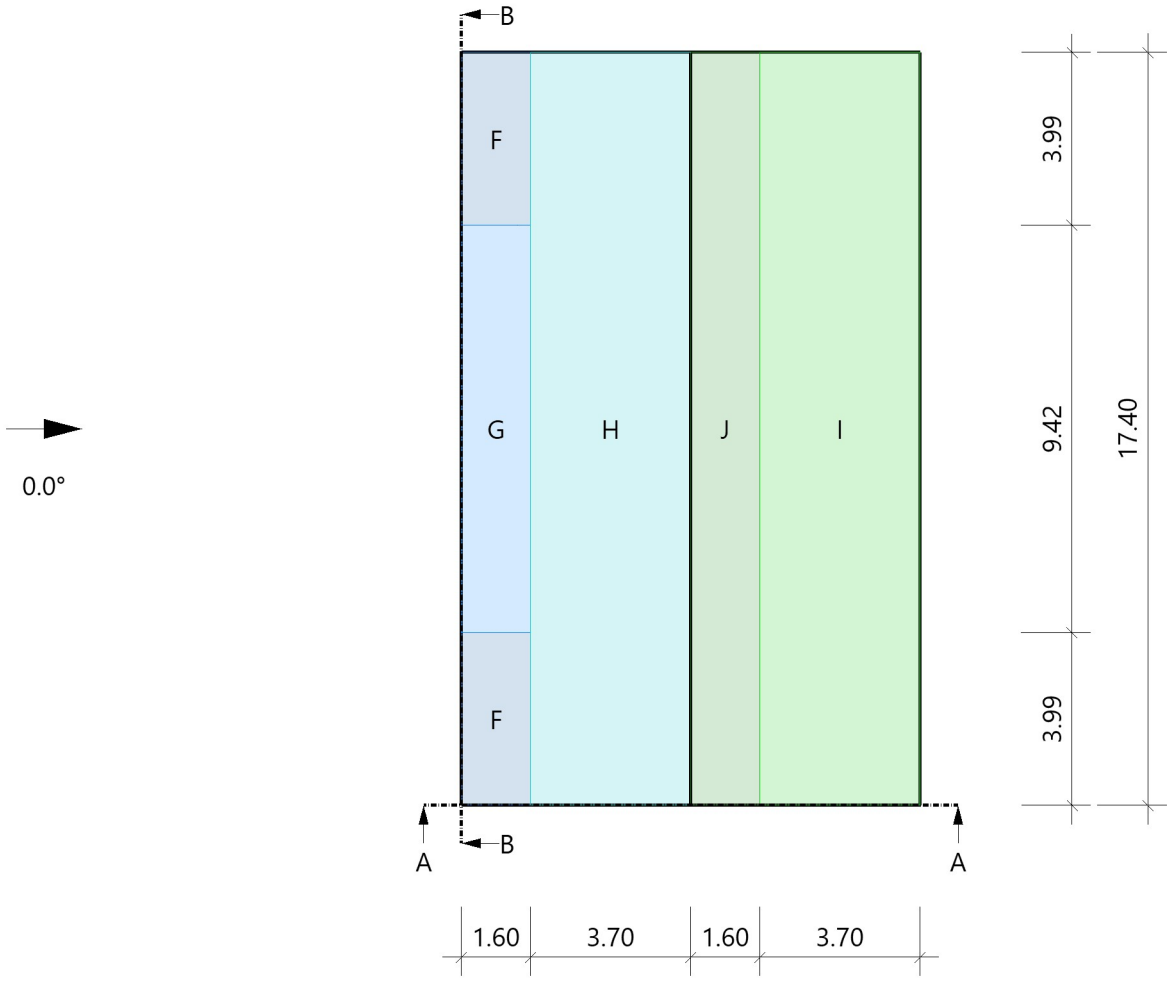
1 : verwehter Lastfall
2 : gilt für die verwehten Lastfälle

Wind

Hinweis

Die Windlasten werden immer auf Basis des Winddruckbeiwert-Verfahrens ermittelt.
Diese Windlasten sind für die Bauteilbemessung relevant!

Graphic, 0°, Top view



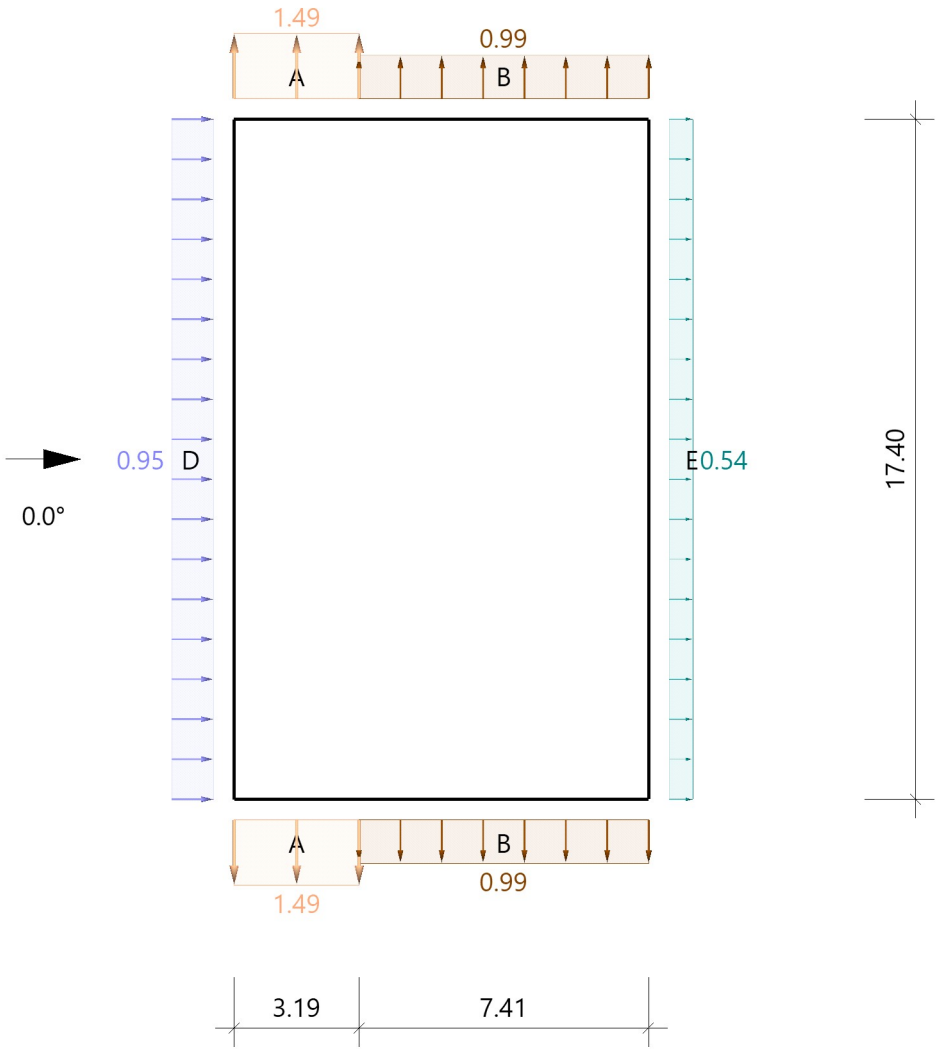
Table, 0°, Top view

Reference influence width e = 15.96 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	0.37	-0.77	0.37	-1.83	0.46	-0.95	0.46	-2.28	1.60	3.99
G	DF links	0.37	-0.70	0.37	-1.50	0.46	-0.87	0.46	-1.87	1.60	9.42
H	DF links	0.27	-0.27	0.27	-0.27	0.33	-0.33	0.33	-0.33	3.70	17.40
J	DF rechts	0.00	-0.83	0.00	-1.17	0.00	-1.04	0.00	-1.45	1.60	17.40
I	DF rechts	0.00	-0.40	0.00	-0.40	0.00	-0.50	0.00	-0.50	3.70	17.40

All values are characteristic ones.

Graphic, 0°, Section wall



Reference wind area for graphic = 10.00 m ²

Table, 0°, Section wall

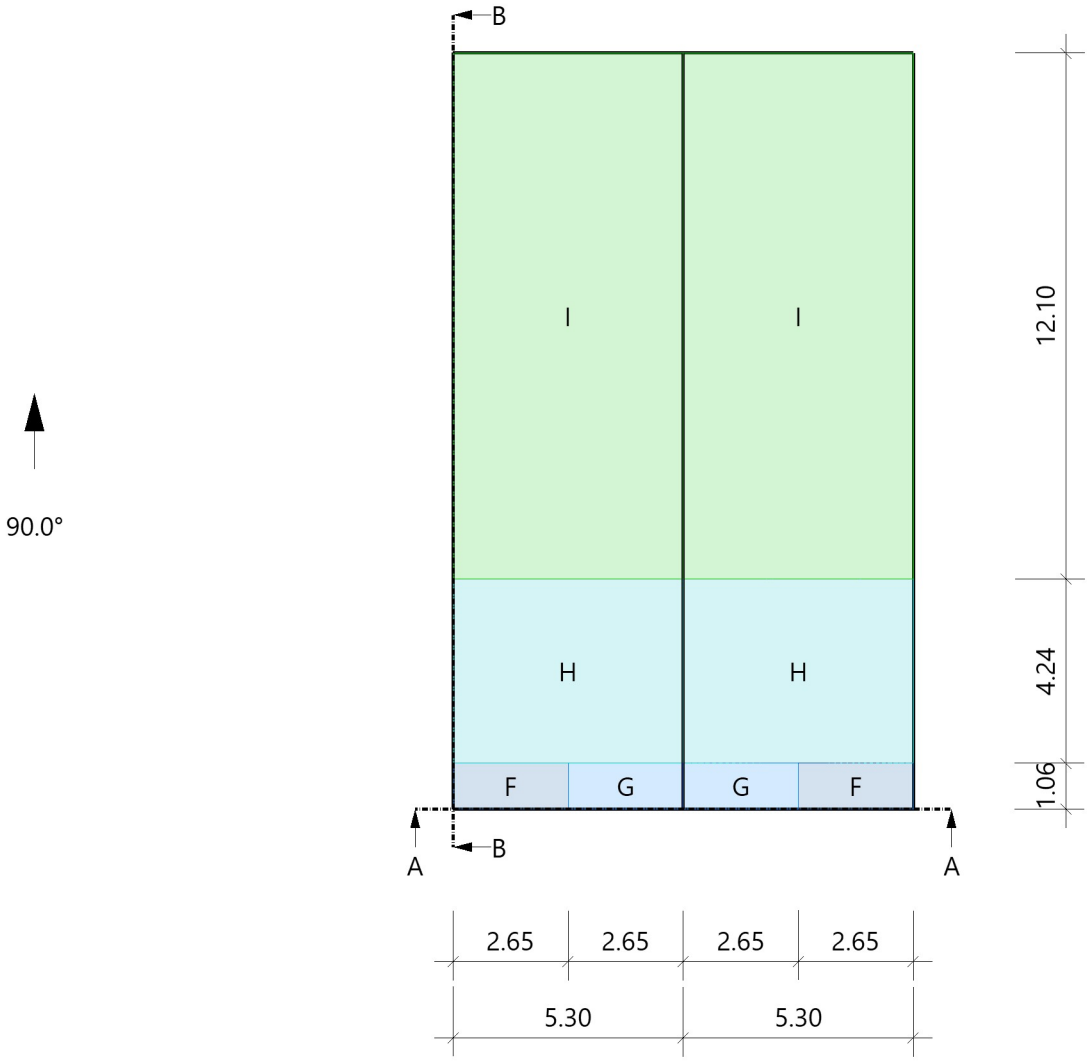
Reference influence width e = 15.96 m
Ratio h/d = 0.753 h/b = 0.459 d/b = 0.609

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]
D [1]	Wand links	0.77	0.00	1.00	0.00	0.95	0.00	1.24	0.00		17.40
E	Wand rechts	0.00	-0.43	0.00	-0.43	0.00	-0.54	0.00	-0.54		17.40
A	Wand vorne [2]	0.00	-1.20	0.00	-1.40	0.00	-1.49	0.00	-1.74	3.19	
B	Wand vorne [2]	0.00	-0.80	0.00	-1.10	0.00	-0.99	0.00	-1.37	7.41	

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

Graphic, 90°, Top view



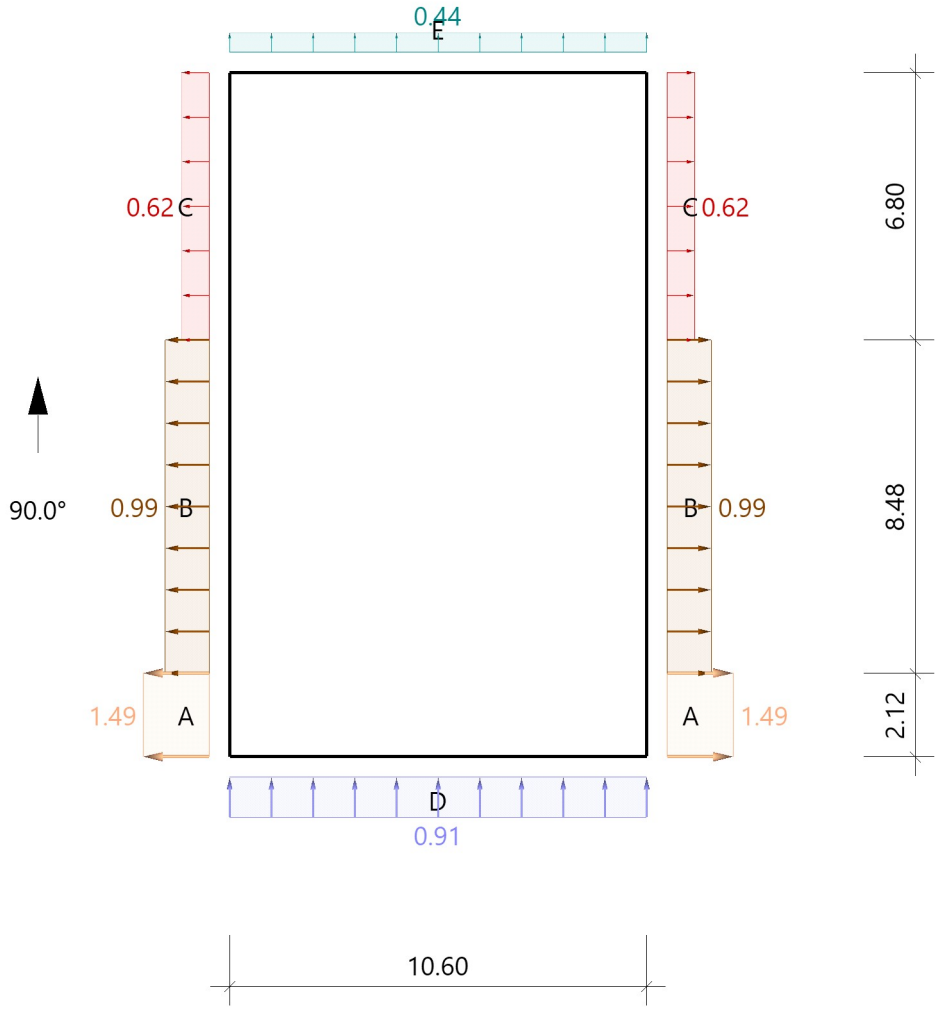
Table, 90°, Top view

Reference influence width e = 10.60 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	-1.23	0.00	-1.83	0.00	-1.53	0.00	-2.28	2.65	1.06
G	DF links	0.00	-1.33	0.00	-2.00	0.00	-1.66	0.00	-2.49	2.65	1.06
H	DF links	0.00	-0.67	0.00	-1.20	0.00	-0.83	0.00	-1.49	5.30	4.24
I	DF links	0.00	-0.50	0.00	-0.50	0.00	-0.62	0.00	-0.62	5.30	12.10
F	DF rechts	0.00	-1.23	0.00	-1.83	0.00	-1.53	0.00	-2.28	2.65	1.06
G	DF rechts	0.00	-1.33	0.00	-2.00	0.00	-1.66	0.00	-2.49	2.65	1.06
H	DF rechts	0.00	-0.67	0.00	-1.20	0.00	-0.83	0.00	-1.49	5.30	4.24
I	DF rechts	0.00	-0.50	0.00	-0.50	0.00	-0.62	0.00	-0.62	5.30	12.10

All values are characteristic ones.

Graphic, 90°, Section wall



Reference wind area for graphic = 10.00 m ²

Table, 90°, Section wall

Reference influence width e = 10.60 m
Ratio h/d = 0.459 h/b = 0.753 d/b = 1.642

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]
D [1]	Wand vorne	0.73	0.00	1.00	0.00	0.91	0.00	1.24	0.00	10.60	
E	Wand hinten	0.00	-0.36	0.00	-0.36	0.00	-0.44	0.00	-0.44	10.60	
A	Wand links [2]	0.00	-1.20	0.00	-1.40	0.00	-1.49	0.00	-1.74		2.12
B	Wand links [2]	0.00	-0.80	0.00	-1.10	0.00	-0.99	0.00	-1.37		8.48
C	Wand links [2]	0.00	-0.50	0.00	-0.50	0.00	-0.62	0.00	-0.62		6.80

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

Item: špirovci

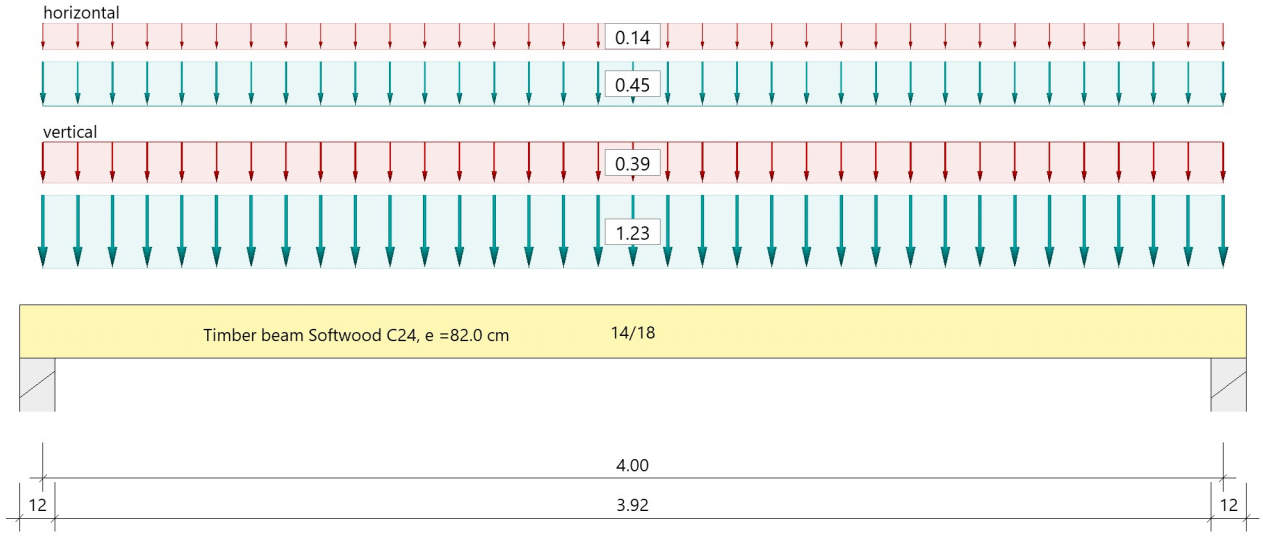
Continuous Beam Timber (x64) HTM+ 02/25 (FRILO R-2025-2/P06)

Basic parameters

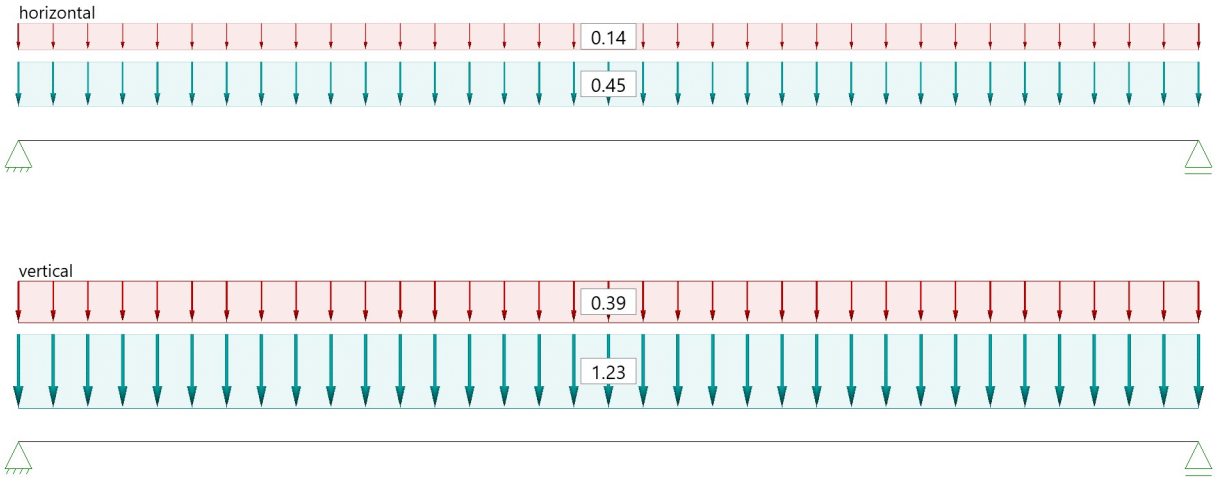
Timber beam (e = 82.0 cm) biaxial Softwood C24 DIN EN 1995-1-1/NA:2013-08

System

System image



Statikansicht



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

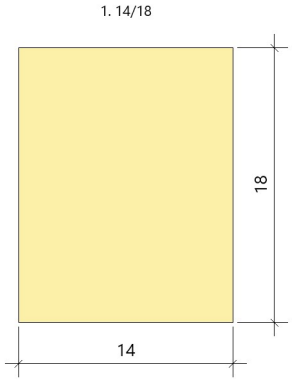
Geometry

Cross-sections

Name	I_y [cm⁴]	I_z [cm⁴]	W_y [cm³]	W_z [cm³]	A [cm²]
14/18	6804	4116	756	588	252.0

Cross-section is constant over the entire length of the beam.

used cross sections



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	12.0	12.0	1.00	-1	-1	-1	0.0	0.0
2	4.00	12.0	12.0	1.00	-1	-1	0.0	0.0	0.0

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

Loads

Line loads from distributed loads

Reference	No.	Type	A [m]	L1 [m]	L2 [m]	W1 [kN/m²]	W2 [kN/m²]	acting Span by span	GF	Sim	Alt	Phi
System	1	UDL		4.00		1.60		No	Permanent			20.00
	2	UDL		4.00		0.50		Yes	Snow			20.00

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 : Combined group
Alt : Alternate group

Lastbezeichnungen

Nr	Bezeichnung
1	20
2	Distance 0.82 m
The load values are multiplied internally by the girder spacing e = 0.82 m.	

Self-weight

Total weight = 42 kg taken into account with gamma = 4.20 kN/m^3..

Overview of the actions used

Actions

Description	ψ_0	ψ_1	ψ_2	$\gamma_{F,inf}$	$\gamma_{F,sup}$	KLED
Permanent loads				1.00	1.35	
Snow loads H < 1000 m	0.50	0.20	0.00		1.50	short
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%
Fire design		:	No specification	
Fire resistance class	R30		Charring below left right	
Charring rates acc.to code		=	0.80	mm/min
Shear stresses		=	Tau with red. Q	
Initial deflection	w_{inst}	=	l/300	
Final deflection	$w_{net,fin}$	=	l/300	
	w_{fin}	=	l/200	

Summary

Verification	Design situation	$\eta_{Bending}$	η_{Shear}	$\eta_{c,90}$	η_{Stabi}	$\eta_{Deformation}$
Bearing capacity	persistent/transient	0.56	0.22	0.17	1)	
Bearing capacity	fire	0.39	0.13	-	1)	
Serviceability	characteristic					0.80
1) Stability check was not carried out because the upper chord is held continuously.						

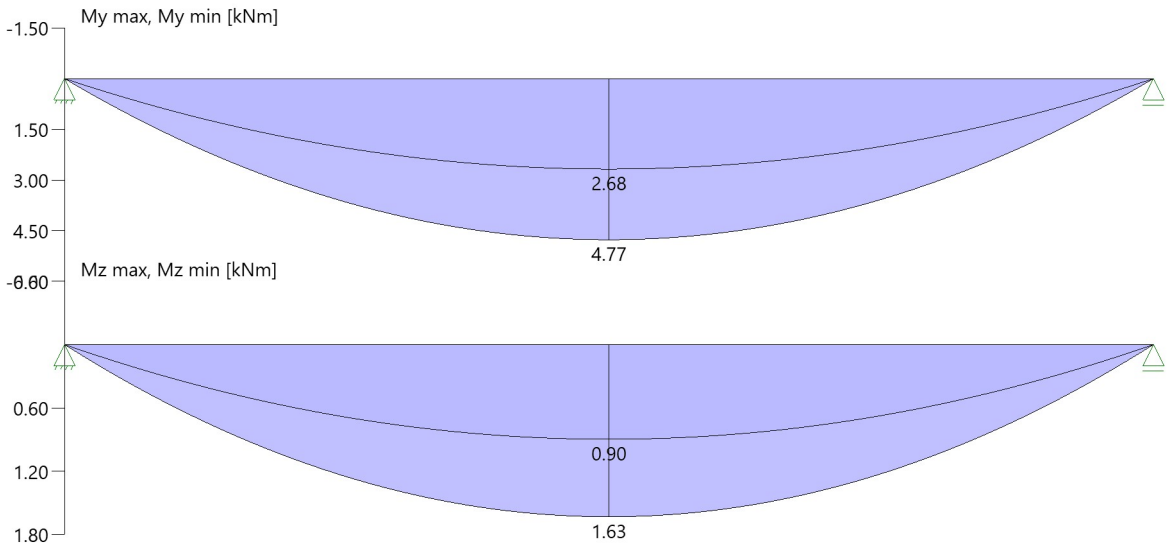
Structural safety per cross-section (compact)

Design situation	Cross-section	$V_{z,Ed}$ [kN]	$M_{y,Ed}$ [kNm]	$V_{y,Ed}$ [kN]	$M_{z,Ed}$ [kNm]	η_{Shear}	$\eta_{Bending}$	η_{Stabi}
persistent/transient	14/18	3.3	3.61	1.1	-1.21	0.22	0.56	
fire	14/18	2.4	2.68	0.8	-0.90	0.13	0.39	

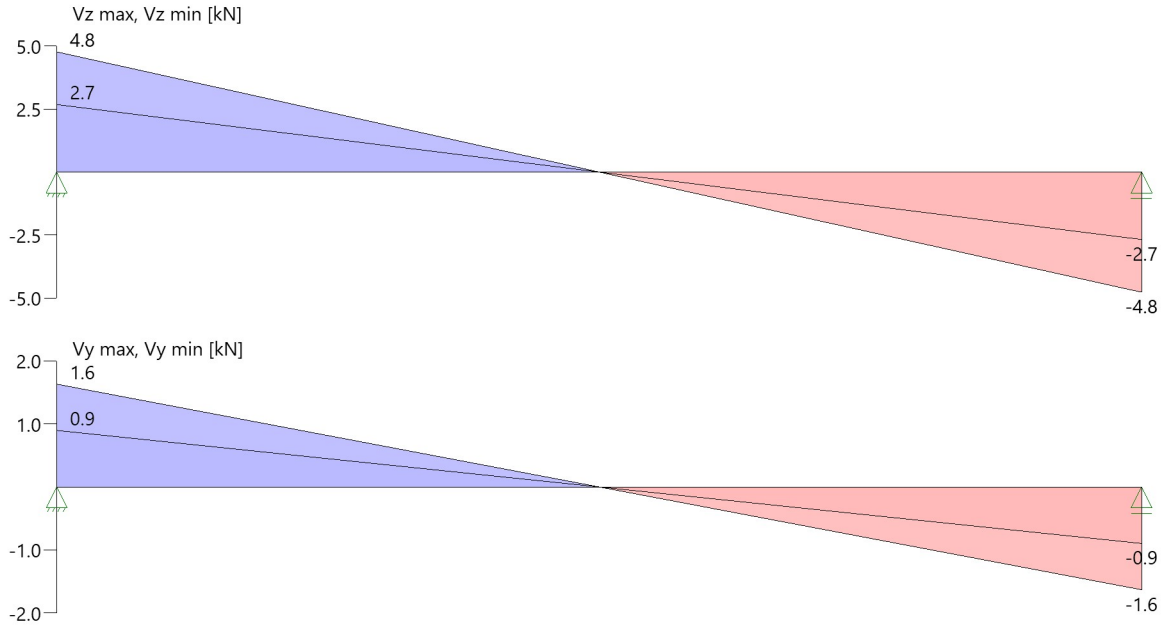
Structural safety - Load combination persistent/transient

Internal forces

Envelope of the moments



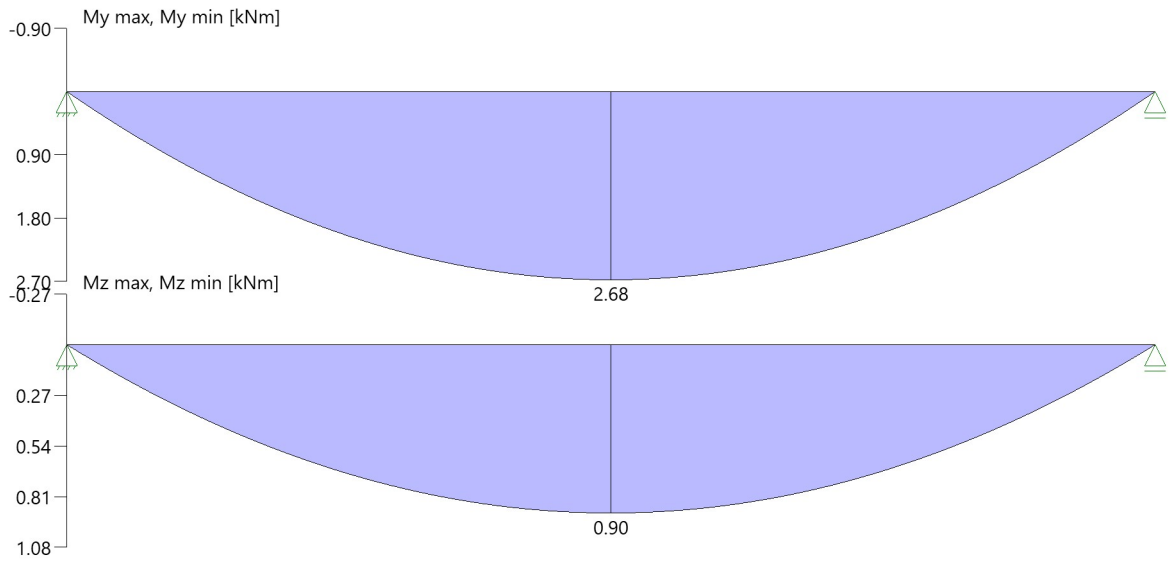
Envelope of the transverse forces



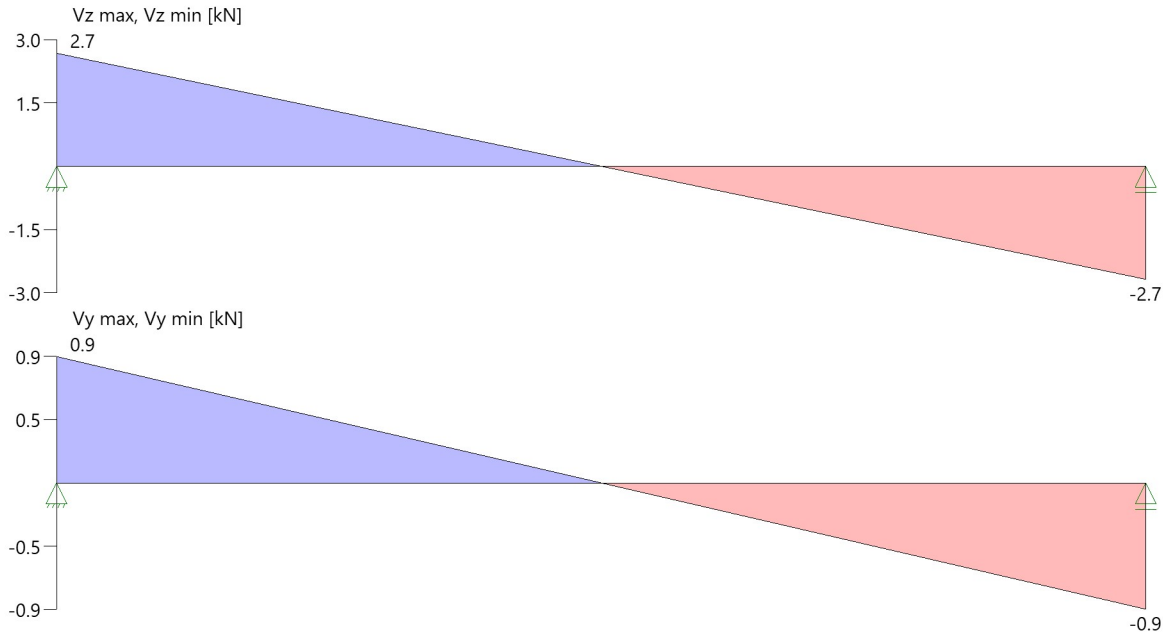
Structural safety - Load combination fire

Internal forces

Envelope of the moments



Envelope of the transverse forces



Support reactions

Support reactions pro [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]	$R_{y,min}$ [kN/m]	$R_{y,max}$ [kN/m]	$M_{z,min}$ [kNm/m]	$M_{z,max}$ [kNm/m]
1	0.00	Permanent loads Snow loads H < 1000 m	3.27	3.27 0.94			1.09	1.09 0.34		
2	4.00	Permanent loads Snow loads H < 1000 m	3.27	3.27 0.94			1.09	1.09 0.34		

Item: lesen strešni nosilec

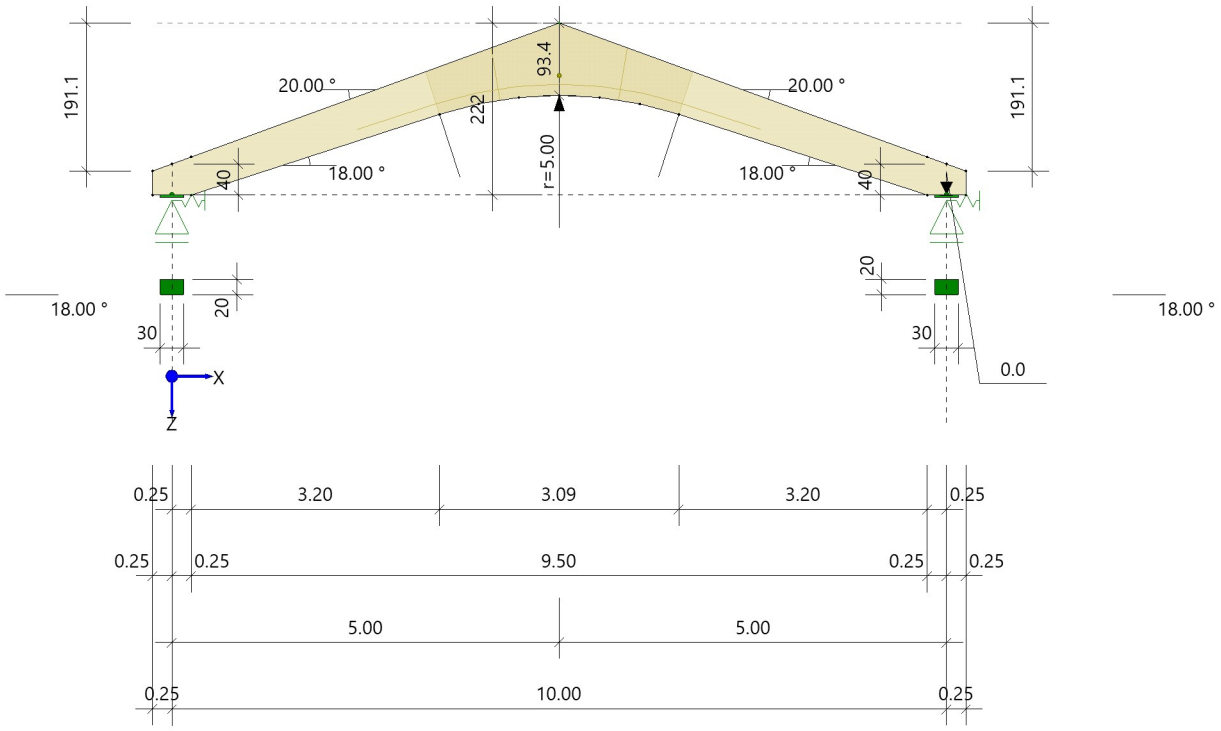
Glued Laminated Girder (x64) D10+ 02/2025 (FRILO R-2025-2/P06)

System

Codes

Code	DIN EN 1995-1-1/NA:2013-08
based on	EN 1995-1-1/A2:2014
Combinatorial Analysis	DIN EN 1990/NA:2010-12
Consequence class	CC 2
Service class	2

System Graphics



Gable roof bottom round GL24c Service class 2

Beam	Width	b	=	20.0	cm				Distance	a	= 4.00 m
Length	Left	L_1	=	5.00	m	Field	L	= 10.00 m	Right	L_2	= 5.00 m
Length cantilever	Left	L_{k1}	=	0.25	m				Right	L_{k2}	= 0.25 m
Support width	Left	a_{k1}	=	0.25	m	Field	a_1	= 0.25 m	Inclination	δ_1	= 0.0 °
Support width	Inclination	δ_2	=	0.0	°	Field	a_2	= 0.25 m	Right	a_{k2}	= 0.25 m
Roof slope	Left	δ_1	=	20.0	°				Right	δ_2	= 20.0 °
Inclination field bottom	Left	δ_1	=	18.0	°				Right	δ_2	= 18.0 °
Inclination cantilever btm	Left	δ_{k1}	=	18.0	°				Right	δ_{k2}	= 18.0 °
Height Support	Left	H_1	=	40.0	cm	Ridge	h_m	= 93.4 cm	Right	H_2	= 40.0 cm
Height Cantilever	Left	H_{k1}	=	30.9	cm				Right	H_{k2}	= 30.9 cm
Height Cantilever end	Left	H_{Ek1}	=	30.9	cm				Right	H_{Ek2}	= 30.9 cm
Curvature	Length	L_c	=	3.09	m	Radius	R	= 5.00 m			

Lamellas direction: Parallel lower edge - t = 2.0 cm
Ridge: Fixed ridge - hm = 93.4 cm
Radius / Lamina thickness: r/t = 250.0 > 221.9 = min r/t OK (EN 14080 Tab.2; (I.3))
min r/t = 250 / (1 + $f_{m,j,dc,k}$ / 150); (I.3) with $f_{m,j,dc,k}$ = $f_{m,j,k}$ = 19

Support: Direction X Both with low spring stiffness

Length	Left	L_x	=	30.0	cm	Clear A.	a	= 9.70 m	Right	L_x	= 30.0 cm
Width	Left	B_y	=	20.0	cm				Right	B_y	= 20.0 cm
Transverse pressure factor	Left	$k_{c,90}$	=	1.75					Right	$k_{c,90}$	= 1.75
Spring Direction x	Left	T_x	=	10.00	kN/m				Right	T_x	= 10.00 kN/m

Bracing: Bracing

Distance Cantilever	Left	a_{k1}	=	0.00	m	Field	a	= 0.00 m	Right	a_{k2}	= 0.00 m

Volume / Surface / Transport height

Beam Volume V = 1.246 m3 Surface A = 16.99 m2 Transport height H = 2.220 m

Material

Glulam GL24c, acc.to EN 14080:2013, Service class 2

f_{mk} f_{vk} [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]	γ_M K_{def}
24.00 3.50	17.00 21.50	0.50 2.50	11000.00 9100.00	300.00 250.00	650.00 540.00	365 400	4.00	1.30 0.80

CS properties

X [m]	B_y [cm]	H_z [cm]	I_y [cm⁴]	W_y [cm³]	S_y [cm³]	I_z [cm⁴]	W_z [cm³]	S_z [cm³]	A [cm²]
-0.25	20.0	30.4	46879	3083	2312	20275	2027	1521	608.2
0.00	20.0	39.4	101632	5164	3873	26240	2624	1968	787.2
0.15	20.0	44.7	149107	6668	5001	29817	2982	2236	894.5
0.25	20.0	47.5	178629	7521	5641	31667	3167	2375	950.0
1.85	20.0	52.4	239852	9154	6865	34936	3494	2620	1048.1
3.45	20.0	58.8	338952	11528	8646	39205	3920	2940	1176.1
3.96	20.0	64.4	444333	13808	10356	42907	4291	3218	1287.2
4.48	20.0	75.6	721114	19068	14301	50423	5042	3782	1512.7
4.91	20.0	89.9	1211586	26949	20212	59944	5994	4496	1798.3
5.00	20.0	93.4	1357068	29066	21799	62253	6225	4669	1867.6
5.09	20.0	89.9	1211586	26949	20212	59944	5994	4496	1798.3
5.52	20.0	75.6	721114	19068	14301	50423	5042	3782	1512.7
6.04	20.0	64.4	444333	13808	10356	42907	4291	3218	1287.2
6.55	20.0	58.8	338952	11528	8646	39205	3920	2940	1176.1
8.15	20.0	52.4	239852	9154	6865	34936	3494	2620	1048.1
9.75	20.0	47.5	178629	7521	5641	31667	3167	2375	950.0
9.85	20.0	44.7	149107	6668	5001	29817	2982	2236	894.5
10.00	20.0	39.4	101579	5162	3872	26236	2624	1968	787.1
10.25	20.0	30.4	46831	3081	2311	20268	2027	1520	608.0

X : X is related to the left support.
B_y : Width - Without deduction of the cross-sectional loss by connecting means.
H_z : Height - Without deduction of the cross-sectional loss by connecting means.

In case of fire: Fire resistance duration 30 min

Fire	Fire time	t_{req} =	30	min	Charming Rate	β_N =	0.70	mm/min
Addition Charring	Simplified Meth.	d_0 =	7.0	mm	Transverse tension	$d_{0,t90}$ =	20.0	mm
Fire Stress	Top	:	no		Bottom	:	yes	
	Left	:	yes		Right	:	yes	
Always calculate	Shear Check	:	yes		Simplified Meth.	:	no	

Loads

Automatically considered

Use self weight: Automatically
Beam spacing/Load influence width = 4.00 m; Continuity factor = 1.00
Length Lx = Distance facade left + Field + Distance facade right
Length Lx = 10.00 m (0.00 m + 10.00 m + 0.00 m)
Length Ly = 12.00 m (4 Beam = 3 * 4.00 m)
Area with increased wind suction: no

Wind- and Snow load

DIN EN 1991-1-3:2019 + DIN EN 1991-1-4:2010

Load

Ground height above sea level = 93 m

Terrain Category II					Wind zone 1			
Height of q	h =	7.82	m		Basic wind velocity	v_{b0} =	22.50	m/s
Velocity pressure	q(h) =	0.63	kN/m²		Base velocity pressure	q_{b0} =	0.32	kN/m²
Ground snow load	sk =	0.65	kN/m²		Snow region 1			
Shape coefficient	μ =	0.80						
	C_t =	1.000				C_e =	1.000	
Factor accidental	C_{esl} =	2.300						

Action groups

Id	Design situation	Name	γ_{sup}	γ_{inf}	ψ_0	ψ_1	ψ_2
99	persistent/transient	Permanent loads	1.35	1.00	1.00	1.00	1.00
9	persistent/transient	Wind loads	1.50	0.00	0.60	0.20	0.00
10	persistent/transient	Snow loads H < 1000 m	1.50	0.00	0.50	0.20	0.00

Standard - Load cases

LC	Description	Act	ALT	$c_{p,e}$ μ	Type	Direction	pi	pj	a [m]	L [m]	Member
1	Use self weight: Automatically										
2	Self weight roof	Permanent	0								
	Self weight roof g = 0.50 kN/m²				DL	vertical	2.00	2.00	0.00	10.50	Beam
3	Snow load	Snow	111								
	Beam			0.80	DL	v. projection	2.08	2.08	0.00	10.50	Beam
	Left			0.80	EL	vertical	0.1	0.0	0.00	0.00	Beam
	Right			0.80	EL	vertical	0.1	0.0	10.50	0.00	Beam
4	Snow load drifted at left	Snow	111								
	Left 1/2			0.80	TL	v. projection	1.04	1.04	0.00	5.25	Beam
	Right			0.80	TL	v. projection	2.08	2.08	5.25	5.25	Beam
	Left 1/2			0.80	EL	vertical	0.1	0.0	0.00	0.00	Beam
	Right			0.80	EL	vertical	0.1	0.0	10.50	0.00	Beam
5	Snow load drifted at right	Snow	111								
	Left			0.80	TL	v. projection	2.08	2.08	0.00	5.25	Beam
	Right 1/2			0.80	TL	v. projection	1.04	1.04	5.25	5.25	Beam
	Left			0.80	EL	vertical	0.1	0.0	0.00	0.00	Beam
	Right 1/2			0.80	EL	vertical	0.1	0.0	10.50	0.00	Beam
6	Wind from left:Suction	Wind	112								
	Suction Area G: q=-0.44 kN/m²			-0.70	TL	transverse	-1.77	-1.77	0.00	1.20	Beam
	Suction Area H: q=-0.17 kN/m²			-0.27	TL	transverse	-0.68	-0.68	1.20	4.05	Beam
	Suction Area J: q=-0.53 kN/m²			-0.83	TL	transverse	-2.11	-2.11	5.25	1.20	Beam
	Suction Area I: q=-0.25 kN/m²			-0.40	TL	transverse	-1.01	-1.01	6.45	4.05	Beam
	Compression Area D: q=-0.49 kN/m²			0.77	TL	transverse	-1.95	-1.95	0.00	0.25	Beam
	Suction Area E: q=0.28 kN/m²			-0.44	TL	transverse	1.12	1.12	10.25	0.25	Beam
7	Wind from left: Suction + alt. Pressure	Wind	112								
	Compression Area G: q=0.23 kN/m²			0.37	TL	transverse	0.93	0.93	0.00	1.20	Beam
	Compression Area H: q=0.17 kN/m²			0.27	TL	transverse	0.68	0.68	1.20	4.05	Beam
	Suction Area J: q=-0.53 kN/m²			-0.83	TL	transverse	-2.11	-2.11	5.25	1.20	Beam
	Suction Area I: q=-0.25 kN/m²			-0.40	TL	transverse	-1.01	-1.01	6.45	4.05	Beam
	Compression Area D: q=-0.49 kN/m²			0.77	TL	transverse	-1.95	-1.95	0.00	0.25	Beam
	Suction Area E: q=0.28 kN/m²			-0.44	TL	transverse	1.12	1.12	10.25	0.25	Beam
8	Wind from left: Pressure + alt. Suction	Wind	112								
	Compression Area G: q=0.23 kN/m²			0.37	TL	transverse	0.93	0.93	0.00	1.20	Beam
	Compression Area H: q=0.17 kN/m²			0.27	TL	transverse	0.68	0.68	1.20	4.05	Beam
	Suction Area J: q=-0.53 kN/m²			-0.83	TL	transverse	-2.11	-2.11	5.25	1.20	Beam
	Suction Area I: q=-0.25 kN/m²			-0.40	TL	transverse	-1.01	-1.01	6.45	4.05	Beam
	Compression Area D: q=-0.49 kN/m²			0.77	TL	transverse	-1.95	-1.95	0.00	0.25	Beam
	Suction Area E: q=0.28 kN/m²			-0.44	TL	transverse	1.12	1.12	10.25	0.25	Beam
9	Wind from left: only Pressure	Wind	112								
	Compression Area G: q=0.23 kN/m²			0.37	TL	transverse	0.93	0.93	0.00	1.20	Beam
	Compression Area H: q=0.17 kN/m²			0.27	TL	transverse	0.68	0.68	1.20	4.05	Beam
	Compression Area D: q=-0.49 kN/m²			0.77	TL	transverse	-1.95	-1.95	0.00	0.25	Beam
10	Wind from right:Suction	Wind	112								
	Suction Area J: q=-0.53 kN/m²			-0.83	TL	transverse	-2.11	-2.11	4.05	1.20	Beam
	Suction Area I: q=-0.25 kN/m²			-0.40	TL	transverse	-1.01	-1.01	0.00	4.05	Beam
	Suction Area G: q=-0.44 kN/m²			-0.70	TL	transverse	-1.77	-1.77	9.30	1.20	Beam
	Suction Area H: q=-0.17 kN/m²			-0.27	TL	transverse	-0.68	-0.68	5.25	4.05	Beam
	Suction Area E: q=0.28 kN/m²			-0.44	TL	transverse	1.12	1.12	0.00	0.25	Beam
	Compression Area D: q=-0.49 kN/m²			0.77	TL	transverse	-1.95	-1.95	10.25	0.25	Beam
11	Wind from right: Suction+ alt. Pressure	Wind	112								
	Suction Area J: q=-0.53 kN/m²			-0.83	TL	transverse	-2.11	-2.11	4.05	1.20	Beam
	Suction Area I: q=-0.25 kN/m²			-0.40	TL	transverse	-1.01	-1.01	0.00	4.05	Beam
	Compression Area G: q=0.23 kN/m²			0.37	TL	transverse	0.93	0.93	9.30	1.20	Beam
	Compression Area H: q=0.17 kN/m²			0.27	TL	transverse	0.68	0.68	5.25	4.05	Beam
	Suction Area E: q=0.28 kN/m²			-0.44	TL	transverse	1.12	1.12	0.00	0.25	Beam
	Compression Area D: q=-0.49 kN/m²			0.77	TL	transverse	-1.95	-1.95	10.25	0.25	Beam
12	Wind from right:Pressure + alt.Suction	Wind	112								
	Suction Area J: q=-0.53 kN/m²			-0.83	TL	transverse	-2.11	-2.11	4.05	1.20	Beam
	Suction Area I: q=-0.25 kN/m²			-0.40	TL	transverse	-1.01	-1.01	0.00	4.05	Beam
	Compression Area G: q=0.23 kN/m²			0.37	TL	transverse	0.93	0.93	9.30	1.20	Beam
	Compression Area H: q=0.17 kN/m²			0.27	TL	transverse	0.68	0.68	5.25	4.05	Beam

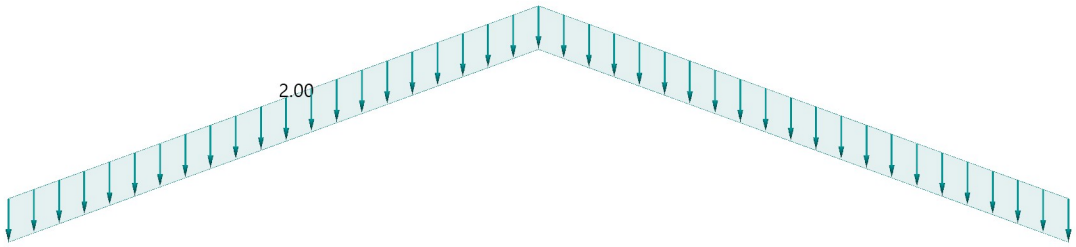
LC	Description	Act	ALT	$c_{p,e}$ μ	Type	Direction	pi	pj	a [m]	L [m]	Member
	Suction Area E: q=0.28 kN/m²			-0.44	TL	transverse	1.12	1.12	0.00	0.25	Beam
	Compression Area D: q=-0.49 kN/m²			0.77	TL	transverse	-1.95	-1.95	10.25	0.25	Beam
13	Wind from right: Only compression	Wind	112								
	Compression Area G: q=0.23 kN/m²			0.37	TL	transverse	0.93	0.93	9.30	1.20	Beam
	Compression Area H: q=0.17 kN/m²			0.27	TL	transverse	0.68	0.68	5.25	4.05	Beam
	Compression Area D: q=-0.49 kN/m²			0.77	TL	transverse	-1.95	-1.95	10.25	0.25	Beam
14	Wind ridge direction : suction	Wind	112								
	Suction Area H: q=-0.42 kN/m²			-0.67	TL	transverse	-1.69	-1.69	0.00	5.25	Beam
	Suction Area H: q=-0.42 kN/m²			-0.67	TL	transverse	-1.69	-1.69	5.25	5.25	Beam
	Suction Area B: q=0.51 kN/m²			-0.80	TL	transverse	2.03	2.03	0.00	0.25	Beam
	Suction Area B: q=0.51 kN/m²			-0.80	TL	transverse	2.03	2.03	10.25	0.25	Beam

Act : Actions
ALT : Load cases with the same alternative group> 0 do not work simultaneously
Type : DL: Uniformly distributed load; TL: Trapezoidal load; EL: Point load

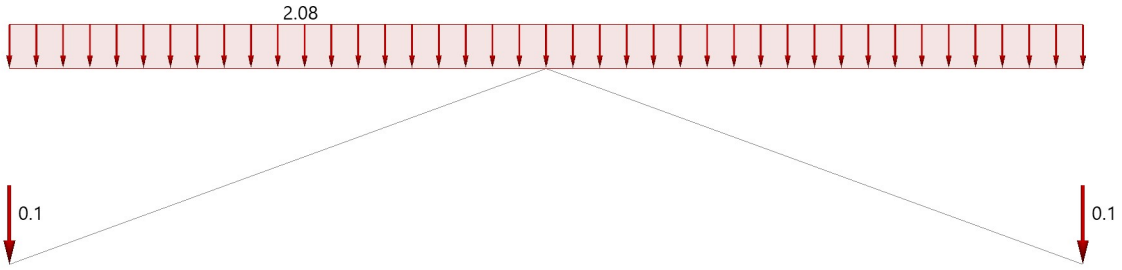
Load case graphics

LC 1: Use self weight: Automatically

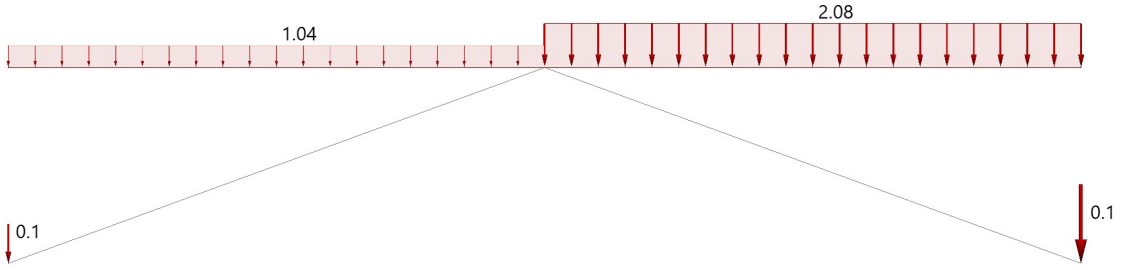
LC 2: Self weight roof - Permanent loads



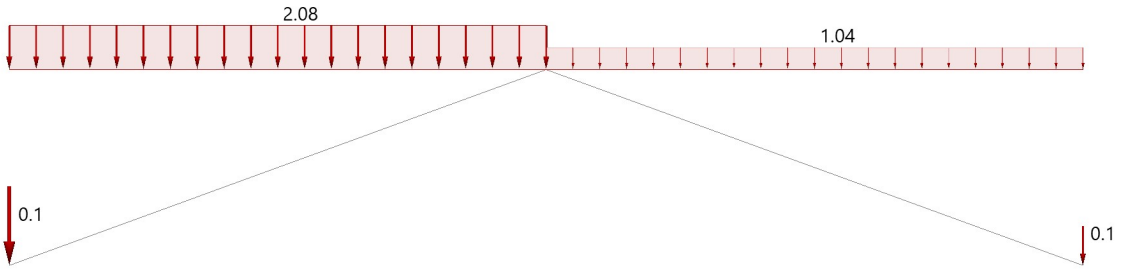
LC 3: Snow load - Snow loads H < 1000 m - ALT: 111



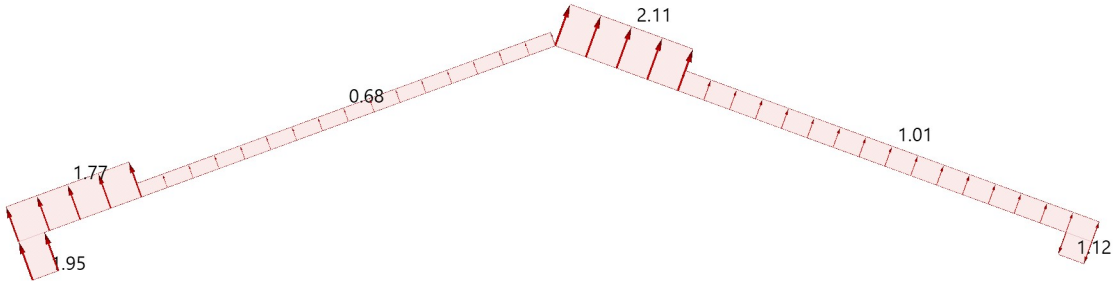
LC 4: Snow load drifted at left - Snow loads H < 1000 m - ALT: 111



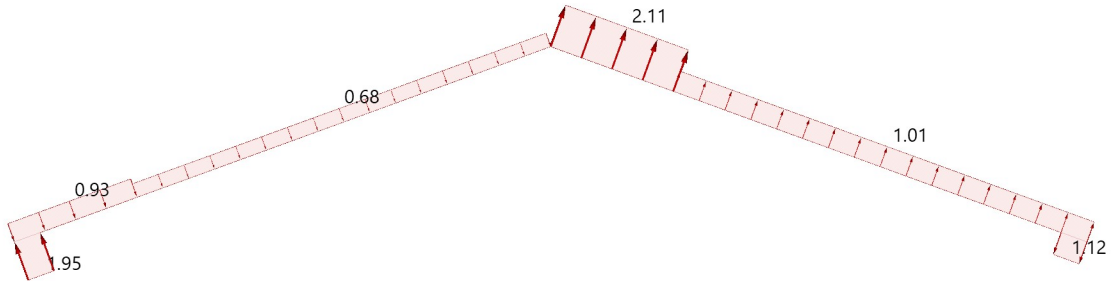
LC 5: Snow load drifted at right - Snow loads H < 1000 m - ALT: 111



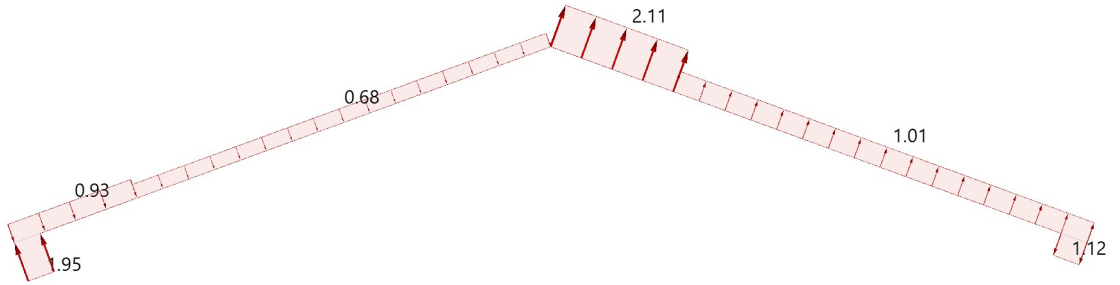
LC 6: Wind from left:Suction - ALT: 112



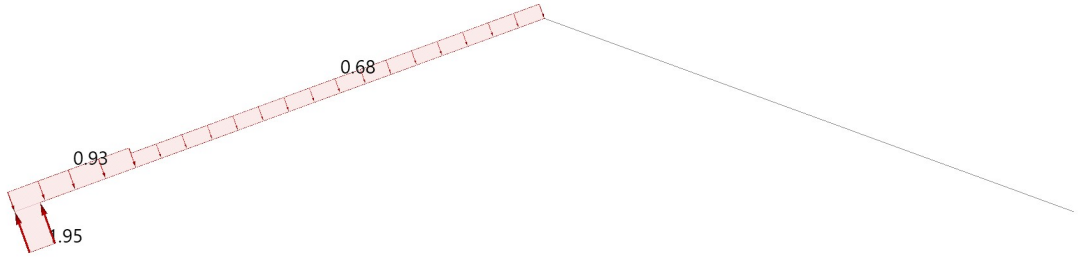
LC 7: Wind from left: Suction + alt. Pressure - ALT: 112



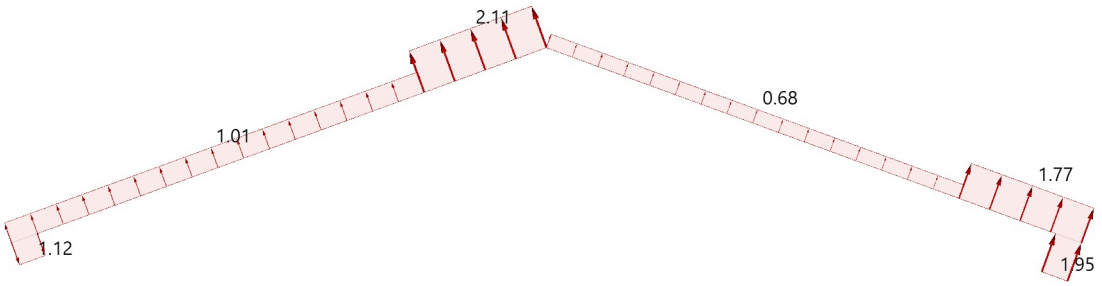
LC 8: Wind from left: Pressure + alt. Suction - ALT: 112



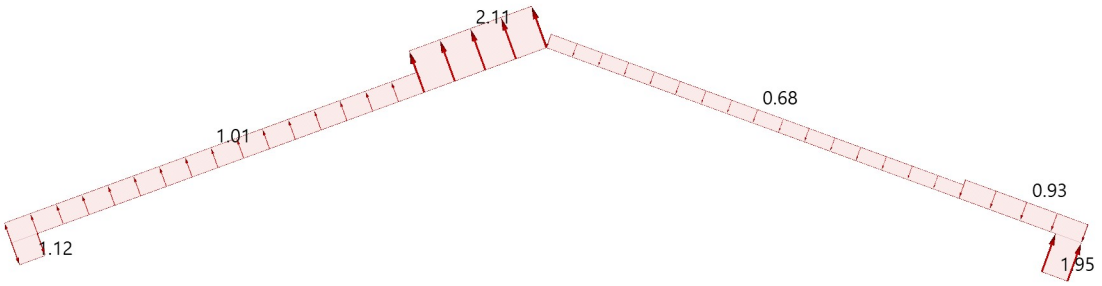
LC 9: Wind from left: only Pressure - ALT: 112



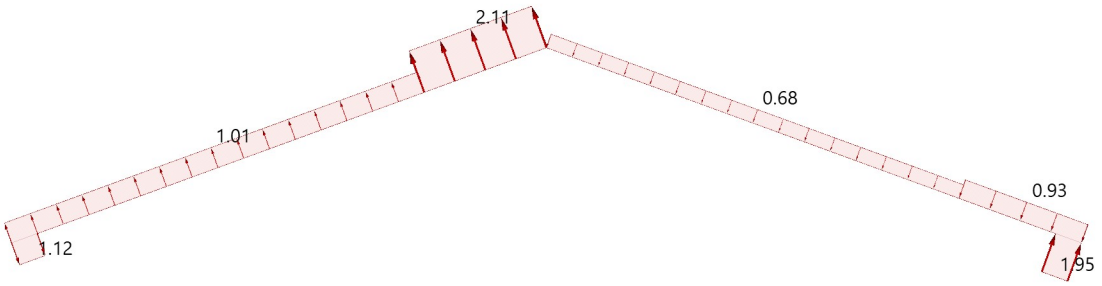
LC 10: Wind from right:Suction - ALT: 112



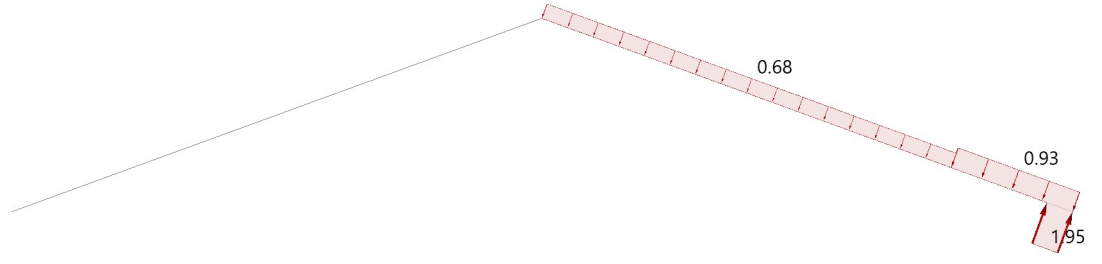
LC 11: Wind from right: Suction+ alt. Pressure - ALT: 112



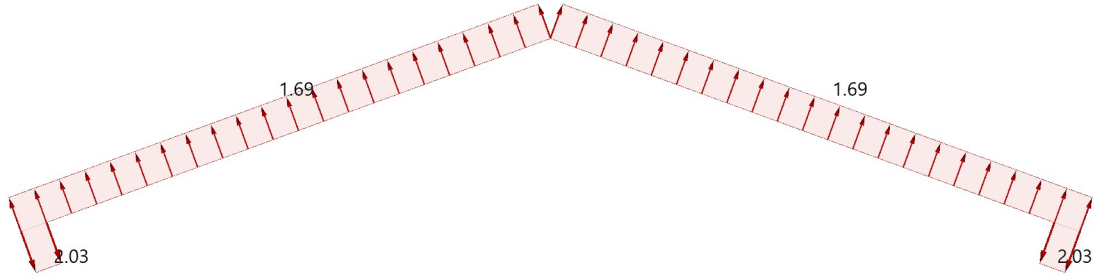
LC 12: Wind from right:Pressure + alt.Suction - ALT: 112



LC 13: Wind from right: Only compression - ALT: 112



LC 14: Wind ridge direction : suction - ALT: 112

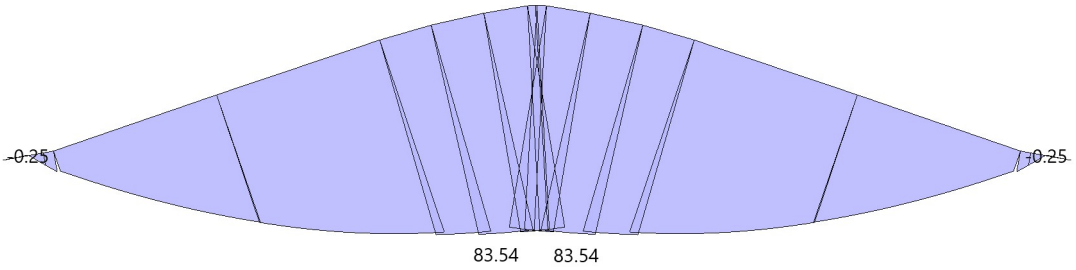


Results

Decisive internal forces Combination 11

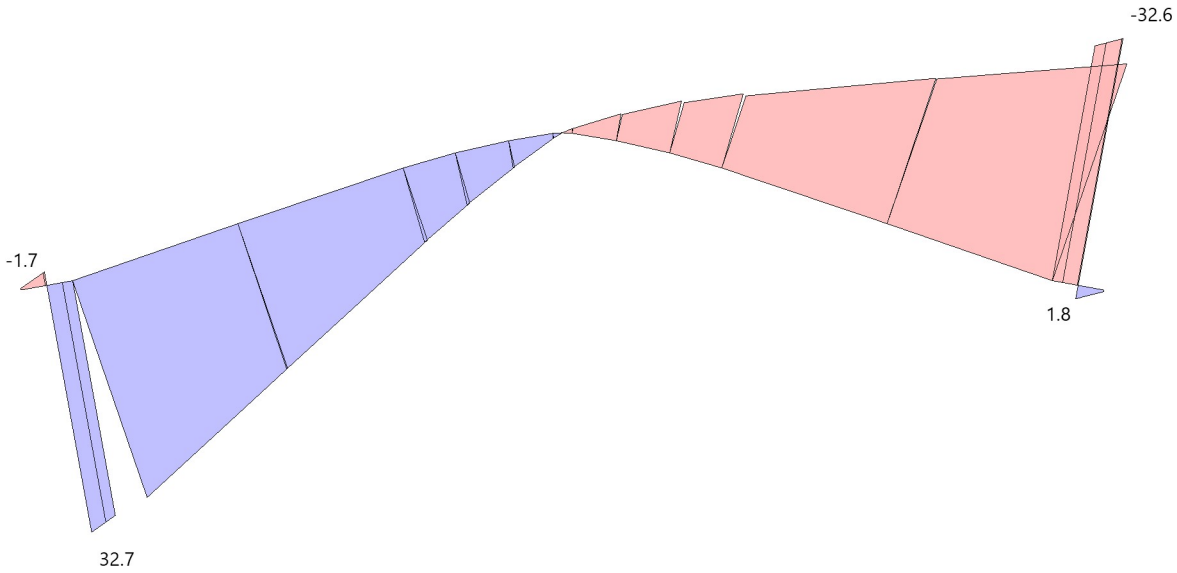
My[kNm]

Scale 1 : 75



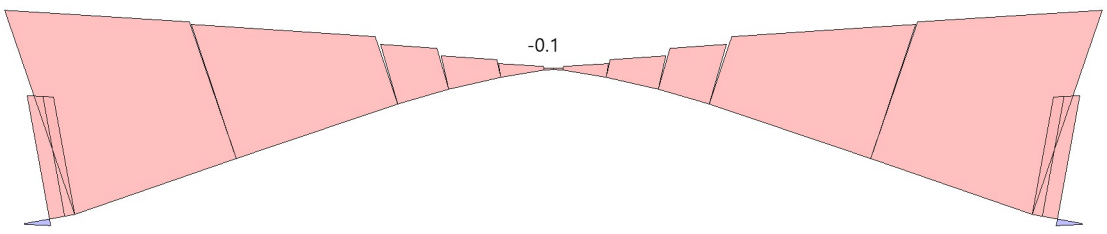
Vz[kN]

Scale 1 : 75



Nx[kN]

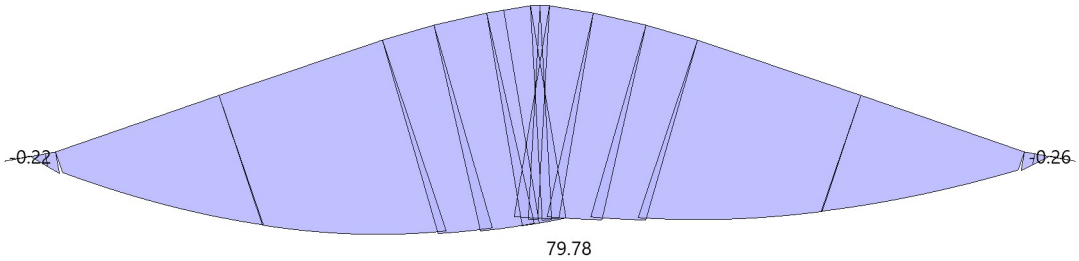
Scale 1 : 75



Decisive internal forces Combination 14

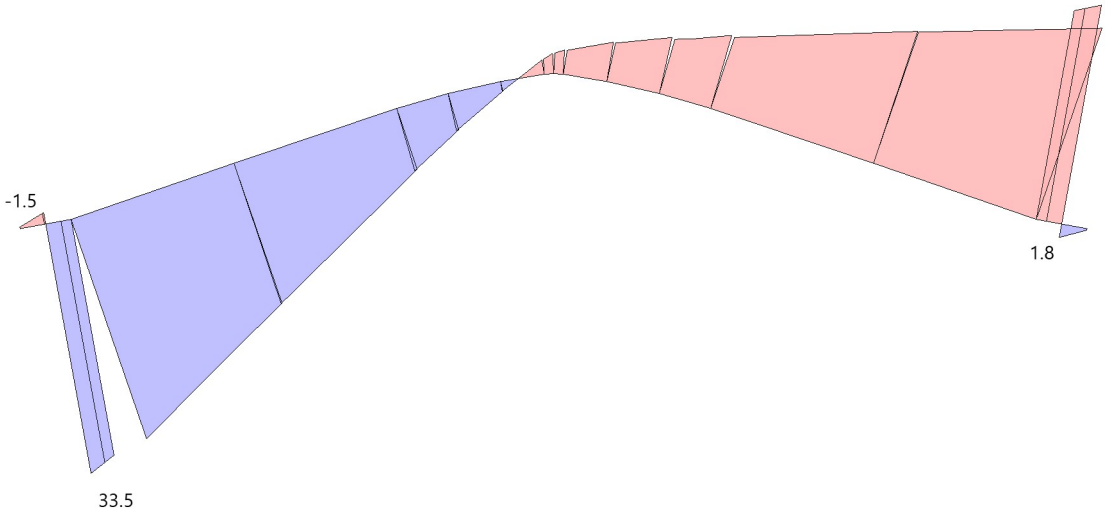
My[kNm]

Scale 1 : 75



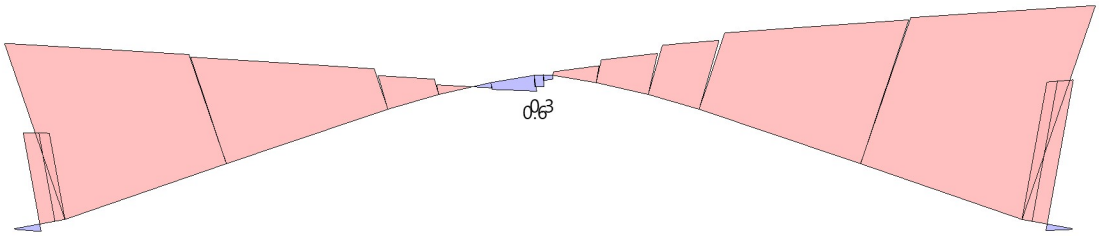
Vz[kN]

Scale 1 : 75



Nx[kN]

Scale 1 : 75



Decisive checks Design Resistance

Decisive checks Combination 11

Check	N,M,V [kN,kNm]	Factors	Factors	σ,τ [N/mm²]	f...d [N/mm²]	η
For all checks		K_{mod}=0.90	γ_M=1.30			
Stresses Field x=4.48 m b/h=20.0 cm/75.6 cm δ_u=6.0° δ_o=20.0° α_u=0.0° α_o=14.0° |G						1 2
M_y	82.60	$k_{m,y}$=1.00		4.33	16.62	0.26
M_y(o)	82.60	$k_{l,c}$=1.00	$k_{\alpha,c}$=0.61	-4.33	10.20	0.42
N_x, M_y(o)						0.42
M_y(u)	82.60	$k_{l,t}$=1.00	$k_{\alpha,t}$=1.00	4.33	16.62	0.26
N_x, M_y(u)						0.26
N, M			Eq. 6.38			**0.42**

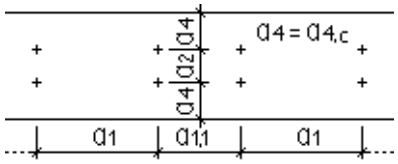
Check	N,M,V [kN,kNm]	Factors	Factors	σ,τ [N/mm²]	f...d [N/mm²]	η
Transverse tension Field x=5.00 m b/h=20.0 cm/93.4 cm						[1]
δ_u=0.0° δ_o=20.0° α_u=0.0° α_o=20.0° |SDK-F δ_u=18.0° δ_o=20.0° $V_{t,90}$=0.478 m3 r_{in}=5.00 m t_L=2.0 cm						[3]
M_y(Fq)	83.54	k_q(M)=0.00	k_r=0.00	0.25	0.39	0.64
N_x, M_y, V_z(Fq)						0.64
N_x, M_y, V_z(Fq)	EN 5[4]					0.93
N_x, M_y, V_z(MAX Fq)			Eq. NA.93	[5]		***0.64**
Stability Field x=3.45 m b/h=20.0 cm/58.8 cm						[1]
M_y	75.39	$k_{crit,y}$=1.00		6.54	16.65	0.39
N, M			Eq. 6.23			**0.40**
Shear Field x=10.00 m b/h=20.0 cm/39.4 cm						[1]
V_z	-32.7	k_{cr}=0.71		0.62	2.42	0.36
V, Mt			Eq. 6.13a			**0.36**

1 : CO 11: 1.35*LC1 + 1.35*LC2 + 1.50*LC3
2 : G: Straight beam
3 : SDK-F: Gable roof bot.edge curved - ridge
4 : Utilization according to EN 5 for design according to German annex
5 : The reinforcement is designed for climatically induced transverse tension. *
6 : Effective height: s_{ky}=10.00m s_{kz}=0.00m Tilting length: s_b=0.00m Slenderness ratio: λ_y=58.91 λ_z=0.00

Transverse tension

Structural reinforcement for climatically induced transverse tension required! No connection means selected. Selection and dimensioning must be done elsewhere!

Traction quarter		Outer left	Middle, inside	Outer right
$F_{t,90,d}$	kN/m	15.80	15.80	15.80
$\sigma_{t,90,d}$	N/mm²	0.08	0.08	0.08
K_{mod}		0.90	0.90	0.90
γ_M		1.30	1.30	1.30



Bearing stress

Support	CO[1]	$F_{c,\alpha,d}$ [kN]	l [cm]	l_{ef} [cm]	b_{ef} [cm]	A_{ef} [cm²]	$k_{c,90}$	K_{mod}	γ_M	α_1 [°]	$\sigma_{c,\alpha,d}$ [N/mm²]	$f_{c,\alpha,d}$ [N/mm²]	η
Left	11	-35.1	30.0	35.7	20.0	714.1	1.75	0.90	1.30	72.0	-0.49	-1.87	**0.15**
Right	11	-35.1	30.0	35.7	20.0	714.1	1.75	0.90	1.30	72.0	-0.49	-1.87	**0.15**

1 : Design situation persistent/transient. Generally ignored: fire, earthquake, accidental

Stabilization of the top edge of the beam in the field - Bracing qd

Design situation persistent/transient
x = 5.00 m l_{ef} = 10.00 m b = 20.0 cm h = 93.4 cm K_{mod} = 0.90
M_{yd} = 83.54 kNm N_{xd} = -5.1 kN $N_d(M_{yd})$ = -7.3 kN N_d = -12.4 kN γ_M = 1.30
k_l = 1.00 $k_{crit,y}$ = 0.92 **q_d = 0.04 kN/m**

Design situation fire
x = 5.00 m l_{ef} = 10.00 m b = 15.8 cm h = 91.3 cm K_{mod} = 0.93
M_{yd} = 33.92 kNm N_{xd} = -2.1 kN $N_d(M_{yd})$ = -8.4 kN N_d = -10.5 kN γ_M = 1.00
k_l = 1.00 $k_{crit,y}$ = 0.77 **q_d = 0.04 kN/m**

Torsional moments for the cross-sectional dimensioning in the support area

Imperfection horizontal L/ = 222 Altitude of bracing system e/h = 0.00 limλ_{ef} <225: Yes

The effect of the bracing load qd is only considered in the field. The bracing load qd is taken into account when calculating the torsional moment if the distance between the side fixing is less than 0.5 x the length of the field and e/lh is not 0.

Slenderness ratio

Design situation	$\lambda_{ef,K\text{-}le}$	$\lambda_{ef,Sp\text{-}Li}$	limλ_{ef}	$\lambda_{ef,F\text{-}ri}$	$\lambda_{ef,K\text{-}ri}$
persistent/transient	0.00[1]	0.00[1]	225.00	0.00[1]	0.00[1]
fire	0.00[1]	0.00[1]	225.00	0.00[1]	0.00[1]

1 : Limit value for omitting the Md/80 torsion: $\lambda_{ef} \le$ limλ_{ef} is fulfilled

Torsional moments for the design of the fork bearings

Design situation	$M_{Tor,d,le}$	$\gamma_{M,le}$	$K_{mod,le}$	$\gamma_{M,ri}$	$K_{mod,ri}$	$M_{Tor,d,ri}$
persistent/transient	±1.02 kNm	1.30	0.90	1.30	0.90	±1.02 kNm
fire	±0.42 kNm	1.00	0.93	1.00	0.93	±0.42 kNm

The effect of the load from the side qd is NOT considered.

Deflection check

Field		Check	x [m]	L [m]	w_{gz}[1] [cm]	w_{qz}[1] [cm]	w_z[1] [cm]	w_{lim} [L/]	w_{lim} [cm]	η
K-left	2	w_{inst}	-0.25	0.25	-0.1	-0.1	-0.1	150	0.2	**0.85**
K-left	3	$w_{net,fin}$	-0.25	0.25	-0.1	0.0	-0.1	150	0.2	0.82
K-left	4	w_{fin}	-0.25	0.25	-0.1	-0.1	-0.2	100	0.3	0.81
Field	2	w_{inst}	4.91	10.00	0.8	0.7	1.6	300	3.3	**0.47**
Field	3	$w_{net,fin}$	5.00	10.00	1.5	0.0	1.5	300	3.3	0.46
Field	4	w_{fin}	4.91	10.00	1.5	0.7	2.3	200	5.0	0.45
C-right	5	w_{inst}	0.25	0.25	-0.1	-0.1	-0.1	150	0.2	**0.85**
C-right	3	$w_{net,fin}$	0.25	0.25	-0.1	0.0	-0.1	150	0.2	0.82
C-right	6	w_{fin}	0.25	0.25	-0.1	-0.1	-0.2	100	0.3	0.81

1 : The axes x, y, z are the global axes
2 : w_{inst}: 1.00*LC1 + 1.00*LC2 + 1.00*LC3 + 0.60*LC9
3 : $w_{net,fin}$: 1.00*LC1 + 1.00*LC2 |net=> 1.80*LC1 + 1.80*LC2
4 : w_{fin}: 1.00*LC1 + 1.00*LC2 + 1.00*LC3 + 0.60*LC9 |fin=> 1.80*LC1 + 1.80*LC2 + 1.00*LC3 + 0.60*LC9
5 : w_{inst}: 1.00*LC1 + 1.00*LC2 + 1.00*LC3 + 0.60*LC13
6 : w_{fin}: 1.00*LC1+1.00*LC2+1.00*LC3+0.60*LC13 |fin=>1.80*LC1+1.80*LC2+1.00*LC3+0.60*LC13

Item: primarec nadstreška

Continuous Beam Steel (x64) STM+ 02/25 (FRILO R-2025-2/P06)

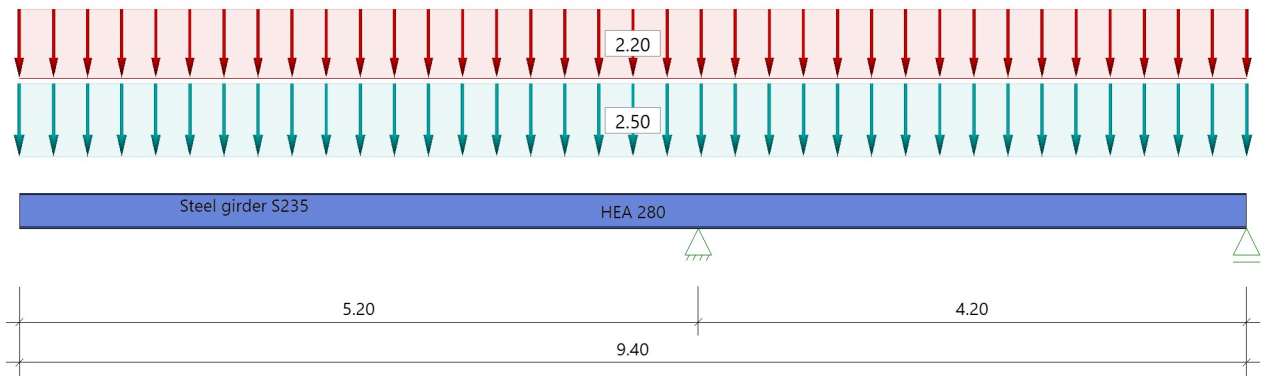
Basic parameters

Steel girder, DIN EN 1993-1-1/NA:2015-08

Steel grade:S235

System

System image



Material

Material S235

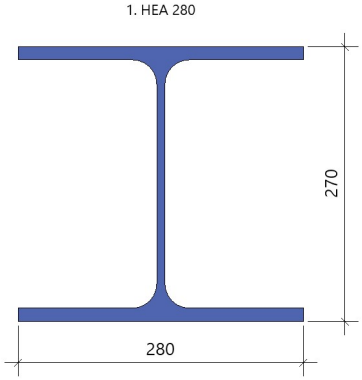
	E_k	=	210000	N/mm²	G_k	=	80769 N/mm²
	γ	=	78.50	kN/m³	μ	=	0.30
					β_W	=	0.80
Elastic limit	t	≤	40	mm	f_{yk}	=	235.00 N/mm²
Tensile strength	t	≤	40	mm	f_{uk}	=	360.00 N/mm²

Geometry

Cross-sections

Name	I_y [cm⁴]	I_z [cm⁴]	W_y [cm³]	W_z [cm³]	A [cm²]
HEA 280	13700.0	4760.0	1012.8	340.2	97.3
Cross-section is constant over the entire length of the beam.					

used cross sections



Support (Bearing conditions)

No	x [m]	uy [kN/m]	uz [kN/m]	Rotations*) Φx [kNm/rad]	Φy [kNm/rad]	Φz [kNm/rad]
1	5.20	-1	-1	-1	0.0	0.0
2	9.40	-1	-1	0.0	0.0	0.0

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

Loads

Line loads

Reference	No.	Type	A [m]	L1 [m]	L2 [m]	W1 [kN/m]	W2 [kN/m]	acting Span by span	GF	Sim	Alt
System	1	UDL		9.40		2.50		No	Permanent		
	2	UDL		9.40		2.20		Yes	Snow		

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 : Combined group
Alt : Alternate group

Self-weight

Total weight = 718 kg taken into account with gamma = 78.50 kN/m 3..

Overview of the actions used

Actions

Description	ψ0	ψ1	ψ2	γF,inf	γF,sup
Permanent loads				1.00	1.35
Snow loads H < 1000 m	0.50	0.20	0.00		1.50

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

Results

Design parameter

Design code	:	DIN EN 1993-1-1/NA:2015-08
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 $\gamma_{G,inf}$)
Check of cross-section	:	plastic
Stability	:	6.3.3 - annex B
Design situation serviceability	:	characteristic
Check of absolutely deformation	δ_{lim} =	5.0 cm
Check of relative deformation	δ_{lim} =	Cantilever l_{eff}/ 150
	δ_{lim} =	Spans l_{eff}/ 300

Summary

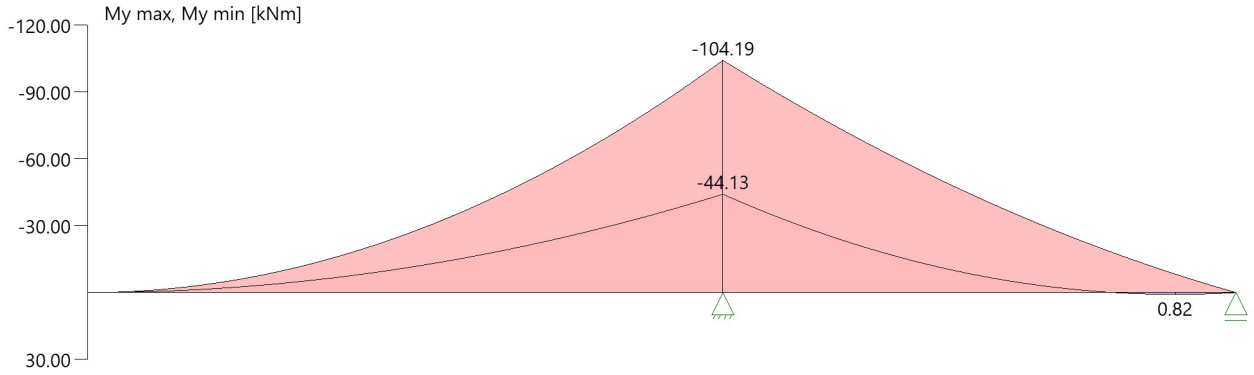
Verification	Design situation	ηCS	ηStabi	ηDeformation
Bearing capacity	persistent/transient	0.40	1)	
Serviceability	characteristic			0.99

1) Stability check was not carried out because the upper chord is held continuously.

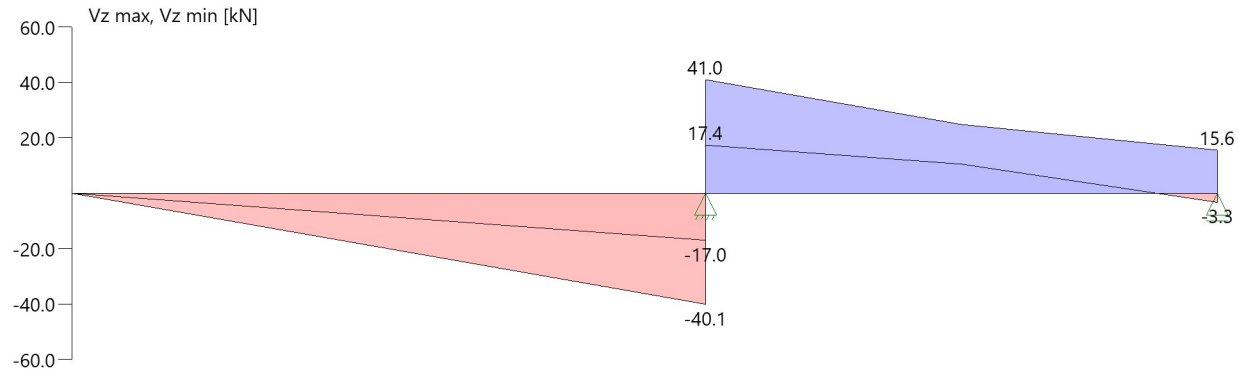
Structural safety - Load combination persistent/transient

Internal forces

Envelope of the moments



Envelope of the transverse forces



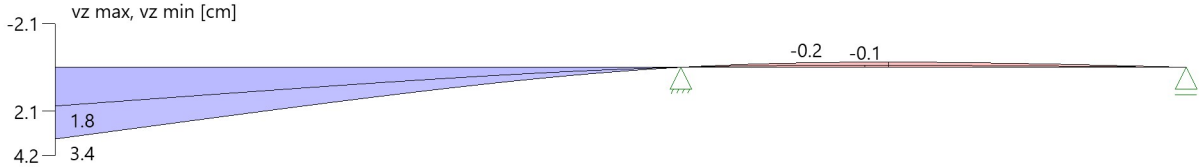
Cross-sectional bearing capacity

Internal forces/cross-section resistance according to DIN EN 1993-1-1/NA:2015-08 6.2.1(6.2) γ_{M0} = 1.00

Span	x [m]	Qkl	$V_{z,Ed}$ [kN]	η_{Vz}	$M_{y,Ed}$ [kNm]	η_{My}	η	LC
Cnt le	5.20	1	-40.1	0.09	-104.19	0.40	0.40	2
Span 1	5.20	1	34.1	0.08	-104.19	0.40	0.40	2
	9.40	1	15.6	0.04	0.00	0.00	0.04	2

Graphics Deformations

Envelope of the deformations - Serviceability



Serviceability - Load combination characteristic

Deflection check - Absolute deformations f_{Cd} = 5.0 cm

Span	x [m]	$f_{y,Ed}$ [cm]	$f_{z,Ed}$ [cm]	$f_{res,Ed}$ [cm]	η	Comb
Cnt le	0.00	0.0	3.4	3.4	0.68	5
Span 1	1.77	0.0	-0.2	0.2	0.05	5

Deformation analysis - Relative deflection in z Span: $f_{Cd} = l_{eff}/300$, Cantilever arm: $f_{Cd} = l_{eff}/150$

Span	x [m]	l_{eff} [m]	$l_{eff,x0}$ [m]	$l_{eff,x1}$ [m]	$f_{z,g}$ [cm]	$f_{z,Ed}$ [cm]	$f_{z,Cd}$ [cm]	η	Comb
Cnt le	0.00	5.20	0.00	5.20	0.1	3.4	3.5	0.99	0
Span 1	1.77	4.20	0.00	4.20		0.2	1.4	0.18	5

Span : Description
x : Coordinate X of the calculated position
l_{eff} : effective length of this section
$l_{eff,x0}$: Begin of effective length of this section (point of return in the bend line)
$l_{eff,x1}$: End of effective length of this section (point of return in the bend line)
$f_{z,g}$: constant portion of displacement
$f_{z,Ed}$: Design value of the displacement
$f_{z,Cd}$: permissible displacement from leff
η : largest utilization of the calculated position
Comb : Load case combination

Support reactions

Support reactions - characteristic of each action

No.	x [m]	Action	$R_{z,min}$ [kN]	$R_{z,max}$ [kN]	$M_{y,min}$ [kNm]	$M_{y,max}$ [kNm]
1	5.20	Permanent loads	34.3	34.3		
		Snow loads H < 1000 m		23.1		
2	9.40	Permanent loads	-3.7	-3.7		
		Snow loads H < 1000 m	-7.1	4.6		

Support reactions - Design values

Support	x [m]	LC	R_z [kN]	M_y [kNm]
1	5.20	Lc 4	81.1	
		Lc 1	34.3	
2	9.40	Lc 3	3.3	
		Lc 2	-15.6	

Decisive Combination

The following table shows the loads with the internal number. The subsequent
The table of the decisive combinations refers to these numbers.

generated load	Span	Act	orig. Load	W1	W2	A [m]	L [m]
L 1	*	Permanent	1	2.50	2.50	0.00	9.40
L 2	0	Snow	2	2.20	2.20	0.00	5.20
L 3	1	Snow	2	2.20	2.20	0.00	4.20

gen. Load	Lc 1	Lc 2	Lc 3	Lc 4	Lc 5
L 1	1.00	1.35	1.00	1.35	1.00
L 2		**1.50**		**1.50**	**1.00**
L 3			**1.50**	**1.50**	
Self-weight	1.00	1.35	1.00	1.35	1.00

Item: strešni nosilci

Single-span Steel Beam (x64) STT+ 02/2025 (FRILO R-2025-2/P06)

Basic Parameters

Design code and safety concept

Design code	:	DIN EN 1993-1-1/NA:2015-08
Safety concept / load combinatorics	:	DIN EN 1990/NA:2010-12
Ψ_2 for crane loads	:	9.00
Ψ_2 = 0.5 for snow (AE)	:	not considered
Permanent loads	:	all equal γ_F ($\gamma_{G,sup}$ or $\gamma_{G,inf}$)

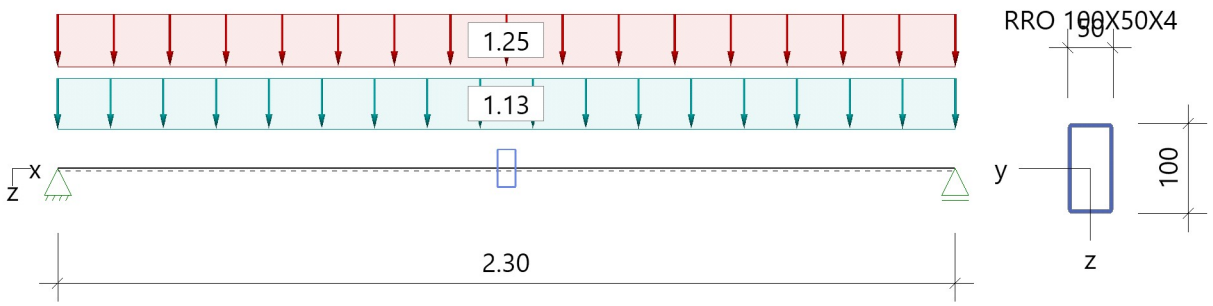
Settings for structural safety analysis

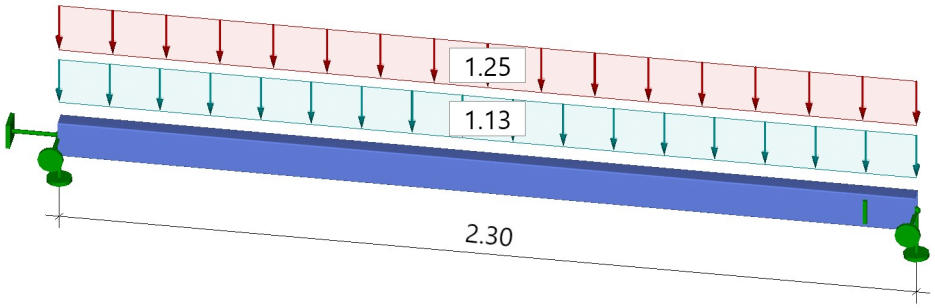
Check of cross-section	:	plastic
Stability	:	6.3.3 - annex B

Settings for serviceability analysis

Design situation serviceability	:	characteristic
Check of relative deformation	δ_{lim} =	l_{eff}/ 300

System





Girder: Length = 2.30 m

Material S235

	E_k	=	210000	N/mm²	G_k	=	80769 N/mm²
	γ	=	78.50	kN/m³	μ	=	0.30
					β_W	=	0.80
Elastic limit	t	≤	40	mm	f_{yk}	=	235.00 N/mm²
Tensile strength	t	≤	40	mm	f_{uk}	=	360.00 N/mm²

Cross-section - RRO 100X50X4

Section	h	=	100	mm	b	=	50	mm
web	s	=	4	mm				
Curvature	r	=	4	mm				
Manufacturing process			warm					
Area	A	=	11.2	cm²				
Static values	I_y	=	141.0	cm⁴	W_y	=	28.2	cm³
	I_z	=	46.6	cm⁴	W_z	=	18.6	cm³

Load

Actions(Act)

Id	Type	Design situation	Name	γ_{sup}	γ_{inf}	ψ_0	ψ_1	ψ_2
99	G	persistent/transient	Permanent loads	1.35	1.00	1.00	1.00	1.00
1	Q	persistent/transient	Cat. A: domestic, residental areas	1.50	0.00	0.70	0.50	0.30

Loads

Types of load

Type 2 = Uniformly distrib.load kN/m
The dead weight is automatically taken into account.

Standard loads cases and loads

Description	No.	Type	in/about	pi	a [m]	pj	l [m]	Act
0.45 kN/m2 × 2.50 m	1	2	in z-direction	1.13	-		-	99
0.50 kN/m2 × 2.50 m	2	2	in z-direction	1.25	-		-	1

Results

Summary

Design situation	Comb	Check	η
persistent/transient	1	Cross-section	0.28
persistent/transient	1	Stability	0.31
characteristic	5	Relative deflection	0.40

Bearing capacity persistent/transient

Internal forces - Comb 1

x [m]	N_{Ed} [kN]	$V_{z,Ed}$ [kN]	$M_{y,Ed}$ [kNm]	$V_{y,Ed}$ [kN]	$M_{z,Ed}$ [kNm]
0.00	0.0	4.0	0.00	0.0	0.00
1.15	0.0	0.0	2.32	0.0	0.00
2.30	0.0	-4.0	0.00	0.0	0.00

Cross-section capacity acc. to section 6.2 ff - Comb 1 γ_{M0} = 1.00

x [m]	Csc	η_N	η_{Vz}	η_{My}	η_{Vy}	η_{Mz}	η_{MyMz}	η
0.00	1	0.00	0.04	0.00	0.00	0.00	0.00	0.04
1.15	1	0.00	0.00	0.28	0.00	0.00	0.28	0.28
2.30	1	0.00	0.04	0.00	0.00	0.00	0.00	0.04

Check for maximum utilization at x = 1.15 m

N_{pld}	= 263.2 kN		N_{Rd}	= 263.2 kN	
N_{Ed}	= 0.0 kN		η_N	= 0.00	
$M_{y,pld}$	= 8.32 kNm		$M_{y,Rd}$	= 8.32 kNm	
$M_{y,Ed}$	= 2.32 kNm		η_{My}	= 0.28	
$V_{z,pld}$	= 101.3 kN		$V_{z,Rd}$	= 101.3 kN	
$V_{z,Ed}$	= 0.0 kN		η_{Vz}	= 0.00	
$M_{z,pld}$	= 5.07 kNm		$M_{z,Rd}$	= 5.07 kNm	
$M_{z,Ed}$	= 0.00 kNm		η_{Mz}	= 0.00	
$V_{y,pld}$	= 50.7 kN		$V_{y,Rd}$	= 50.7 kN	
$V_{y,Ed}$	= 0.0 kN		η_{Vy}	= 0.00	
			η	= **0.28**	

Stability check

x [m]	Csc	N_{Ed} [kN]	$M_{y,Ed}$ [kNm]	Eq	η	Comb
1.18	1	0.0	2.32	6.54	0.31	1

Stability check uniaxial Bending without Axial forces (Eq. 6.54)

$M_{y,Ed} / (\chi_{lt} * M_{y,Rd}) =$ **0.31**

$M_{y,Ed}$	=	2.32	kNm
M_{cr}	=	144.14	kNm
λ_{lt}	=	0.24	
χ_{lt}	=	1.00	
$M_{y,Rk}$	=	8.32	kNm
γ_{M1}	=	1.10	

Check for Comb 1 at x = 1.18 m acc. to Eq. (6.54) fulfilled.

Serviceability

Deflection check - Relative deformation in z $f_{Cd} = l_{eff}/300$

x [m]	l_{eff} [m]	$l_{eff,x0}$ [m]	$l_{eff,x1}$ [m]	$f_{z,Ed}$ [cm]	$f_{z,Cd}$ [cm]	η	Comb
1.15	2.30	0.00	2.30	0.3	0.8	0.40	5

Support Reactions

Supporting forces - characteristic per loadcase

Support	x [m]	Lc	Ew	R_x [kN]	R_z [kN]	M_y [kNm]	R_y [kN]	M_z [kNm]
Left	0.00	Self-weight	99	-	0.1	-	-	-
		0.45 kN/m? × 2.50 m	99	-	1.3	-	-	-
		0.50 kN/m? × 2.50 m	1	-	1.4	-	-	-
Right	2.30	Self-weight	99	-	0.1	-	-	-
		0.45 kN/m? × 2.50 m	99	-	1.3	-	-	-
		0.50 kN/m? × 2.50 m	1	-	1.4	-	-	-

Support reactions - characteristic per action

Bearing	x [m]	Ew	$R_{z,min}$ [kN]	$R_{z,max}$ [kN]	$R_{y,min}$ [kN]	$R_{y,max}$ [kN]
Left	0.00	99	-	1.4	-	-
		1	-	1.4	-	-
Right	2.30	99	-	1.4	-	-
		1	-	1.4	-	-

Overview of decisive load case combinations

Comb	Design situation	[Lastfall:Faktor]
1	persistent/transient	Self-weight:1.35 + 1:1.35 + 2:1.50
5	characteristic	Self-weight:1.00 + 1:1.00 + 2:1.00

Item: sekundarci

Continuous Beam Steel (x64) STM+ 02/25 (FRILO R-2025-2/P06)

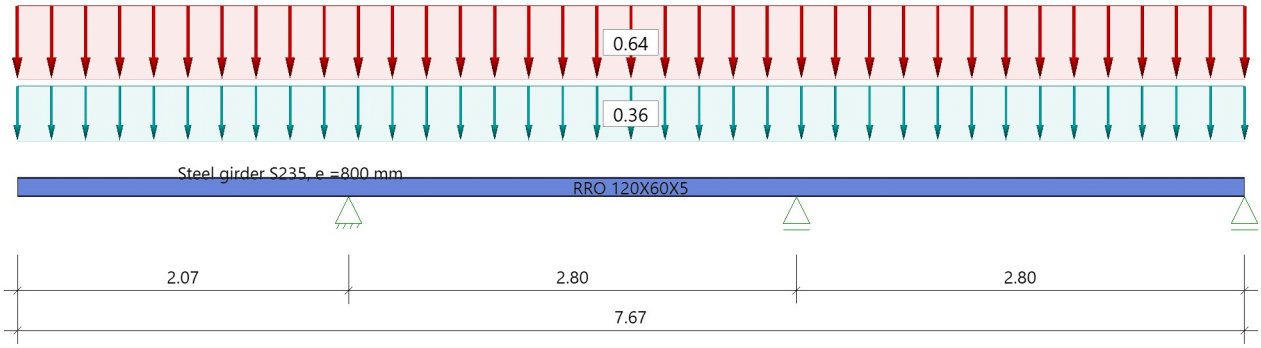
Basic parameters

Steel girder by 2 Spans (e = 80.0 cm) , DIN EN 1993-1-1/NA:2015-08

Steel grade:S235

System

System image



Material

Material S235

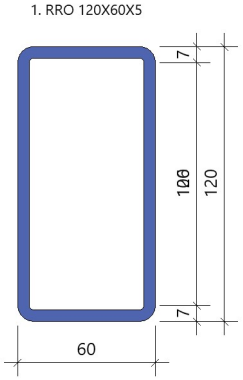
	E_k	=	210000	N/mm²	G_k =	80769 N/mm²
	γ	=	78.50	kN/m³	μ =	0.30
					β_W =	0.80
Elastic limit	t	≤	40	mm	f_{yk} =	235.00 N/mm²
Tensile strength	t	≤	40	mm	f_{uk} =	360.00 N/mm²

Geometry

Cross-sections

Name	I_y [cm⁴]	I_z [cm⁴]	W_y [cm³]	W_z [cm³]	A [cm²]
RRO 120X60X5	296.0	98.2	49.3	32.7	16.6
Cross-section is constant over the entire length of the beam.					

used cross sections



Support (Bearing conditions)

No	x [m]	uy [kN/m]	uz [kN/m]	Rotations*) Φx [kNm/rad]	Φy [kNm/rad]	Φz [kNm/rad]
1	2.07	-1	-1	-1	0.0	0.0
2	4.87	-1	-1	0.0	0.0	0.0
3	7.67	-1	-1	0.0	0.0	0.0

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

Loads

Line loads from distributed loads

Reference	No.	Type	A [m]	L1 [m]	L2 [m]	W1 [kN/m²]	W2 [kN/m²]	acting Span by span	GF	Sim	Alt
System	1	UDL		7.67		0.45		No	Permanent		
	2	UDL		7.67		0.80		Yes	Snow		

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 : Combined group
Alt : Alternate group

Lastbezeichnungen

Nr	Bezeichnung
1	Distance 0.80 m
2	Distance 0.80 m

The load values are multiplied internally by the girder spacing e = 0.80 m.

Self-weight

Total weight = 100 kg taken into account with gamma = 78.50 kN/m³..

Overview of the actions used

Actions

Description	ψ_0	ψ_1	ψ_2	$\gamma_{F,inf}$	$\gamma_{F,sup}$
Permanent loads				1.00	1.35
Snow loads H < 1000 m	0.50	0.20	0.00		1.50

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

Results

Design parameter

Design code	:	DIN EN 1993-1-1/NA:2015-08
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 $\gamma_{G,inf}$)
Check of cross-section	:	plastic
Stability	:	6.3.3 - annex B
Design situation serviceability	:	characteristic
Check of absolutely deformation	δ_{lim} =	5.0 cm
Check of relative deformation	δ_{lim} =	Cantilever l_{eff}/ 150
	δ_{lim} =	Spans l_{eff}/ 300

Summary

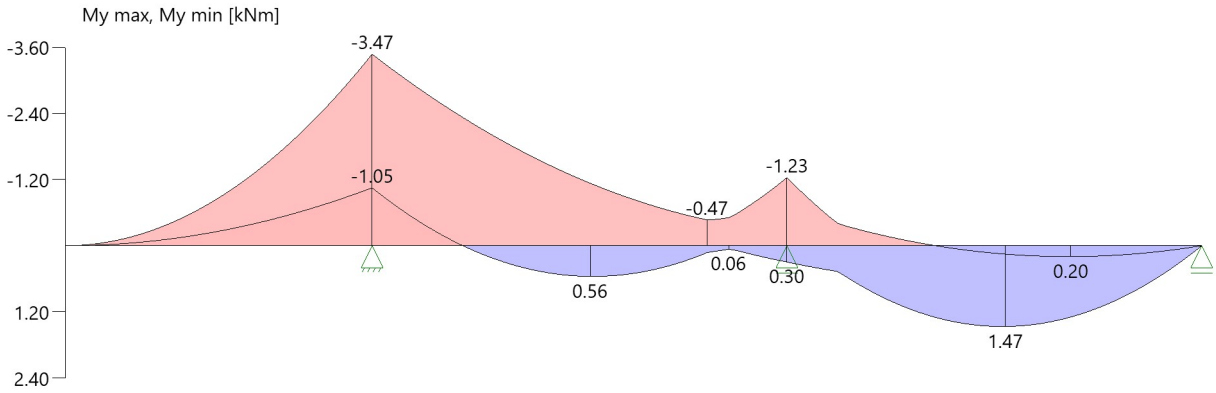
Verification	Design situation	η_{CS}	η_{Stabi}	$\eta_{Deformation}$
Bearing capacity	persistent/transient	0.24	1)	
Serviceability	characteristic			0.76

1) Stability check was not carried out because the upper chord is held continuously.

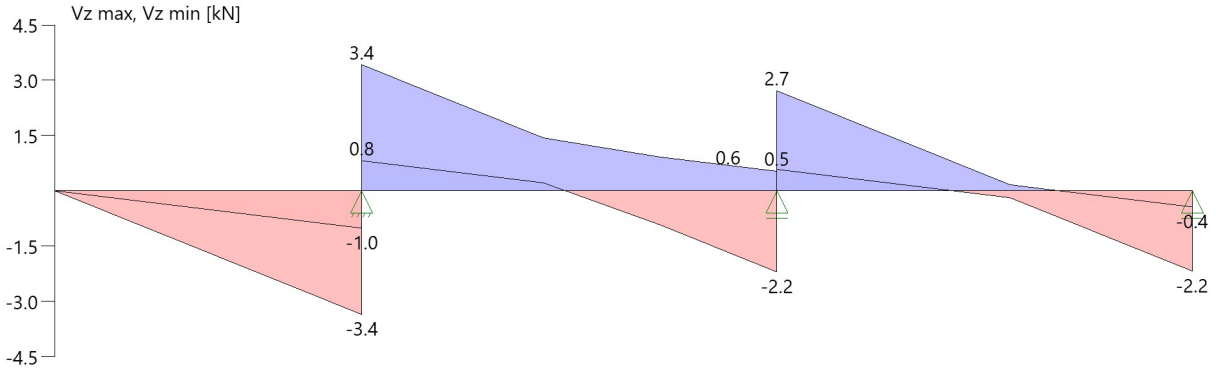
Structural safety - Load combination persistent/transient

Internal forces

Envelope of the moments



Envelope of the transverse forces



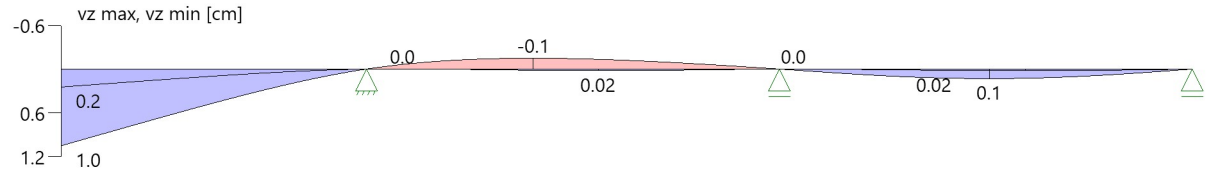
Cross-sectional bearing capacity

Internal forces/cross-section resistance according to DIN EN 1993-1-1/NA:2015-08 6.2.1(6.2) γ_{M0} = 1.00

Span	x [m]	Qkl	$V_{z,Ed}$ [kN]	η_{Vz}	$M_{y,Ed}$ [kNm]	η_{My}	η	LC
Cnt le	2.07	1	-3.4	0.02	-3.47	0.24	0.24	2
Span 1	2.07	1	2.1	0.01	-3.47	0.24	0.24	2
	4.87	1	-2.2	0.01	-1.23	0.08	0.08	4
Span 2	4.87	1	2.7	0.02	-1.23	0.08	0.08	4
	6.33	1	0.0	0.00	1.47	0.10	0.10	2
	7.67	1	-2.2	0.01	0.00	0.00	0.01	2

Graphics Deformations

Envelope of the deformations - Serviceability



Serviceability - Load combination characteristic

Deflection check - Absolute deformations f_{Cd} = 5.0 cm

Span	x [m]	$f_{y,Ed}$ [cm]	$f_{z,Ed}$ [cm]	$f_{res,Ed}$ [cm]	η	Comb
Cnt le	0.00	0.0	1.0	1.0	0.21	7
Span 1	1.18	0.0	-0.1	0.1	0.03	7
Span 2	1.40	0.0	0.1	0.1	0.03	7

Deformation analysis - Relative deflection in z Span: $f_{Cd} = l_{eff}/300$, Cantilever arm: $f_{Cd} = l_{eff}/150$

Span	x [m]	l_{eff} [m]	$l_{eff,x0}$ [m]	$l_{eff,x1}$ [m]	$f_{z,g}$ [cm]	$f_{z,Ed}$ [cm]	$f_{z,Cd}$ [cm]	η	Comb
Cnt le	0.00	2.07	0.00	2.07	0.04	1.0	1.4	0.76	0
Span 1	1.18	2.80	0.00	2.80	0.05	0.1	0.9	0.16	7
Span 2	1.40	2.80	0.00	2.80		0.1	0.9	0.14	7

Span : Description
x : Coordinate X of the calculated position
l_{eff} : effective length of this section
$l_{eff,x0}$: Begin of effective length of this section (point of return in the bend line)
$l_{eff,x1}$: End of effective length of this section (point of return in the bend line)
$f_{z,g}$: constant portion of displacement
$f_{z,Ed}$: Design value of the displacement
$f_{z,Cd}$: permissible displacement from leff
η : largest utilization of the calculated position
Comb : Load case combination

Support reactions

Support reactions - characteristic of each action

No.	x [m]	Action	$R_{z,min}$ [kN]	$R_{z,max}$ [kN]	$M_{y,min}$ [kNm]	$M_{y,max}$ [kNm]
1	2.07	Permanent loads	2.0	2.0		
		Snow loads H < 1000 m	-0.1	2.7		
2	4.87	Permanent loads	1.2	1.2		
		Snow loads H < 1000 m	-0.7	2.2		
3	7.67	Permanent loads	0.6	0.6		
		Snow loads H < 1000 m	-0.1	0.9		

Decisive Combination

The following table shows the loads with the internal number. The subsequent
The table of the decisive combinations refers to these numbers.

generated load	Span	Act	orig. Load	W1	W2	A [m]	L [m]
L 1	*	Permanent	1	0.36	0.36	0.00	7.67
L 2	0	Snow	2	0.64	0.64	0.00	2.07
L 3	1	Snow	2	0.64	0.64	0.00	2.80
L 4	2	Snow	2	0.64	0.64	0.00	2.80

gen. Load	Lc 2	Lc 4	Lc 7
L 1	1.35	1.35	1.00
L 2	**1.50**		**1.00**
L 3		**1.50**	
L 4	**1.50**	**1.50**	**1.00**
Self-weight	1.35	1.35	1.00

Podjetje:	Staticon IB d.o.o.	Stran:	1
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Projektiranje:	Concrete - 17. dec. 2025	Datum:	17. 12. 2025
Točka pritrjevanja:	sidranje konzolnega nadstreška v AB steno		

Komentar projektanta:

1 Vhodni podatki



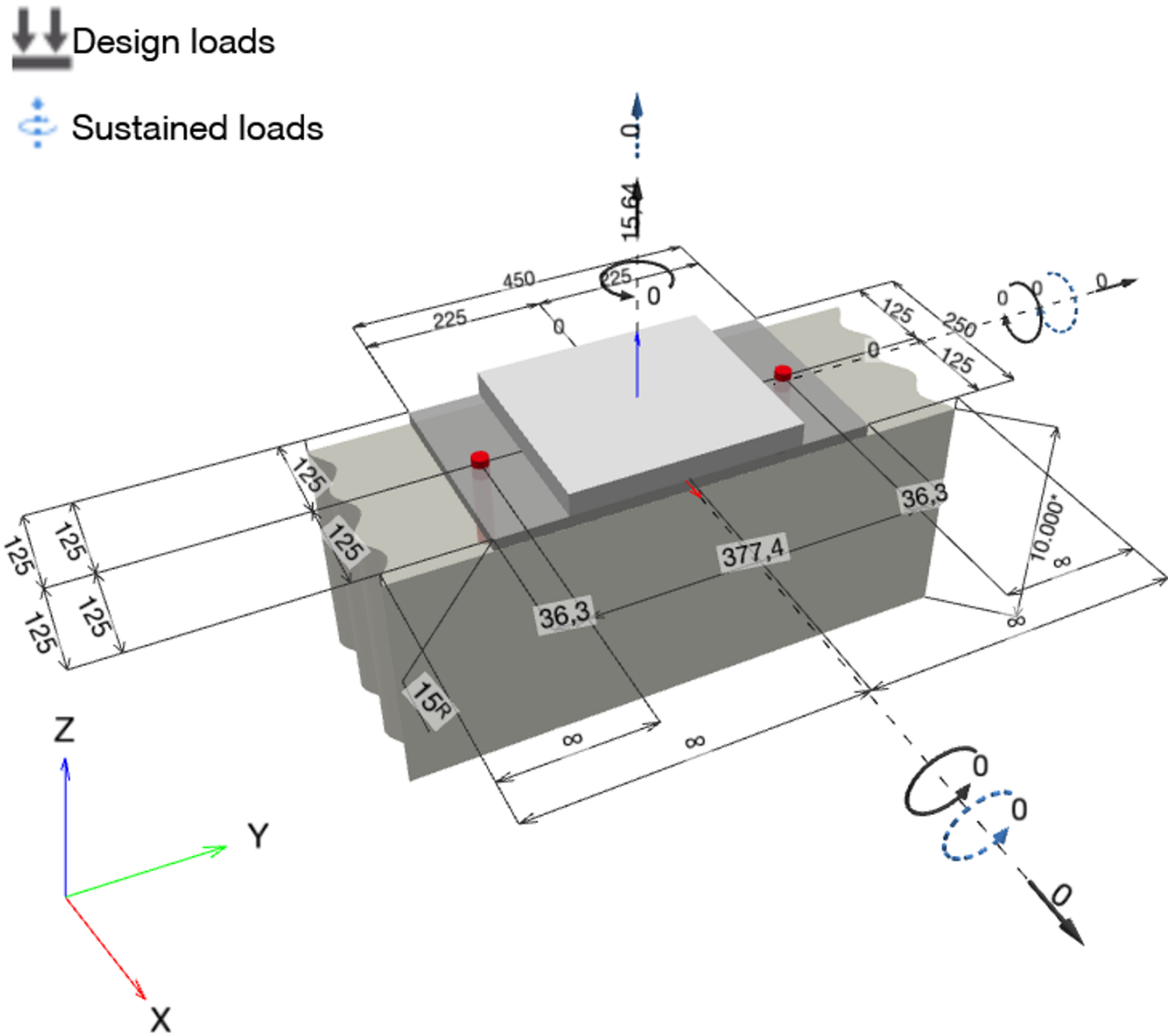
Tip in velikost sidra:	**HIT-RE 500 V4 + HAS Meter 8.8 M20**
Povratna doba (življenjska doba v letih):	50
Številka artikla:	2390169 HAS 8.8 M20x1000 (element) / 2287552 HIT-RE 500 V4 (kemično sidro)
Specification text:	Hilti AM 8.8 threaded rod with HIT-RE 500 V4 injection mortar with 90 mm embedment hef, M20, Steel galvanized, Hammer drill bit installation per ETA 20/0541
Efektivna sidrna globina:	$h_{ef,opti}$ = 90,0 mm ($h_{ef,limit}$ = 400,0 mm)
Material:	8.8
Tehnična ocena artikla:	ETA 20/0541
Izdano I Veljavno:	10. 09. 2025 | -
Kontrola:	Projektna metoda EN 1992-4, Kemično sidro
Vgradnja z nadvišanjem:	e_b = 0,0 mm (brez nadvišanja); t = 15,0 mm
Ležišča pločevina[R] :	l_x x l_y x t = 250,0 mm x 450,0 mm x 15,0 mm; (Priporočena debelina ležiščne pločevine: ni izračunano)
Profil:	Flat bar, ; (D x Š x V) = 250,0 mm x 280,0 mm
Osnovni material:	razpokan beton, C25/30, $f_{c,cyl}$ = 25,00 N/mm^2; h =10.000,0 mm, Temp. kratko./dolgo.: 0/0 °C, delni varnostni faktor materiala γ_c = 1,500; $\gamma_{c,seismic}$ = 1,500
Vgradnja:	**Hammer drilled hole, Pogoji vgradnje: Suho**
Ojačitev:	brez armature ali razmak med armaturo >= 150 mm (any Ø) or >= 100 mm (Ø <= 10 mm)
	brez vzdolžne armature po robu betona

[R] - Izdelan izračun je zasnovan ob predpostavki toge ležiščne pločevine

Vhodne podatke in rezultate je potrebno preveriti glede skladnosti z obstoječimi pogoji in verodostojnosti!
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Točka pritrjevanja:	sidranje konzolnega nadstreška v AB steno		

Geometrija [mm] & Obtežba [kN, kNm]



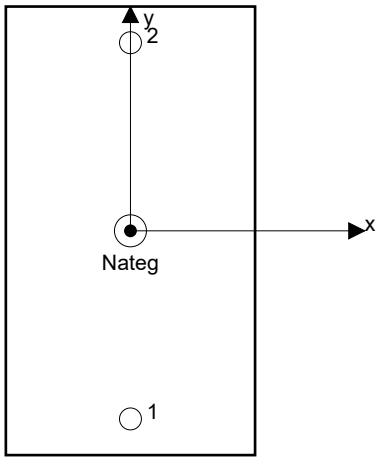
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Točka pritrjevanja:	sidranje konzolnega nadstreška v AB steno		

1.1 Obtežna kombinacija

Primer	Opis	Sile [kN] / Momenti [kNm]	Potresno	požar	Izkoriščenost [%]
1	Combination 1	N = 15,640; V_x = 0,000; V_y = 0,000; M_x = 0,000; M_y = 0,000; M_z = 0,000; N_{sus} = 0,000; $M_{x,sus}$ = 0,000; $M_{y,sus}$ = 0,000;	ne	ne	40

2 Obtežni primer/Rezultante sil v sidru



Reakcije v sidru [kN]
Natezna sila: (+Nateg, -Tlak)

Sidro	Natezna sila	Strižna sila	Strižna sila x	Strižna sila y
1	7,820	0,000	0,000	0,000
2	7,820	0,000	0,000	0,000

Max. concrete compressive strain: - [‰]
Max. concrete compressive stress: - [N/mm^2]
Resulting tension force in (x/y)=(0,0/−0,0): 15,640 [kN]
Resulting compression force in (x/y)=(-/-): 0,000 [kN]

Sile v sidrih so preračunane ob predpostavki toge ležiščne pločevine

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Točka pritrjevanja:	sidranje konzolnega nadstreška v AB steno		

3 Natezna obremenitev (EN 1992-4, Točka 7.2.1)

	Obtežba [kN]	Kapaciteta [kN]	Izkoriščenost β_N [%]	Status
Nosilnost jekla*	7,820	130,667	6	OK
Kombinacija izvleka sidra in betonskega konusa**	7,820	34,901	23	OK
Porušitev po konusu betona**	7,820	19,840	40	OK
Cepitev betona**	N/A	N/A	N/A	N/A

*najbolj obremenjeno sidro **skupina sider (natezno obremenjena sidra)

3.1 Nosilnost jekla

$$N_{Ed} \leq N_{Rd,s} = \frac{N_{Rk,s}}{\gamma_{Ms}}$$ EN 1992-4, Tabela 7.1

$N_{Rk,s}$ [kN]	γ_{Ms}	$N_{Rd,s}$ [kN]	N_{Ed} [kN]
196,000	1,500	130,667	7,820

Vhodne podatke in rezultate je potrebno preveriti glede skladnosti z obstoječimi pogoji in verodostojnosti!
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Točka pritrjevanja:	sidranje konzolnega nadstreška v AB steno		

3.2 Kombinacija izvleka sidra in betonskega konusa

$N_{Ed} \le N_{Rd,p} = \frac{N_{Rk,p}}{\gamma_{Mp}}$ EN 1992-4, Tabela 7.1

$N_{Rk,p} = N^0_{Rk,p} \cdot \frac{A_{p,N}}{A^0_{p,N}} \cdot \psi_{g,Np} \cdot \psi_{s,Np} \cdot \psi_{re,Np} \cdot \psi_{ec1,Np} \cdot \psi_{ec2,Np}$ EN 1992-4, Enačba (7.13)

$N^0_{Rk,p} = \psi_{sus} \cdot \tau_{Rk} \cdot \pi \cdot d \cdot h_{ef}$ EN 1992-4, Enačba (7.14)

$\psi_{sus} = 1$ EN 1992-4, Enačba (7.14a)

$s_{cr,Np} = 7{,}3 \cdot d \cdot \sqrt{\psi_{sus} \cdot \tau_{Rk}} \le 3 \cdot h_{ef}$ EN 1992-4, Enačba (7.15)

$\psi_{g,Np} = \psi^0_{g,Np} - \left(\frac{s}{s_{cr,Np}}\right)^{0,5} \cdot \left(\psi^0_{g,Np} - 1\right) \ge 1{,}00$ EN 1992-4, Enačba (7.17)

$\psi^0_{g,Np} = \sqrt{n} - (\sqrt{n} - 1) \cdot \left(\frac{\tau_{Rk}}{\tau_{Rk,c}}\right)^{1,5} \ge 1{,}00$ EN 1992-4, Enačba (7.18)

$\tau_{Rk,c} = \frac{k_3}{\pi \cdot d} \cdot \sqrt{h_{ef} \cdot f_{ck}}$ EN 1992-4, Enačba (7.19)

$\psi_{s,Np} = 0{,}7 + 0{,}3 \cdot \frac{c}{c_{cr,Np}} \le 1{,}00$ EN 1992-4, Enačba (7.20)

$\psi_{ec1,Np} = \frac{1}{1 + \left(\frac{2 \cdot e_{c1,N}}{s_{cr,Np}}\right)} \le 1{,}00$ EN 1992-4, Enačba (7.21)

$\psi_{ec2,Np} = \frac{1}{1 + \left(\frac{2 \cdot e_{c2,N}}{s_{cr,Np}}\right)} \le 1{,}00$ EN 1992-4, Enačba (7.21)

$A_{p,N}$ [mm²]	$A^0_{p,N}$ [mm²]	$\tau_{Rk,ucr,20}$ [N/mm²]	$s_{cr,Np}$ [mm]	$c_{cr,Np}$ [mm]	c_{min} [mm]	$f_{c,cyl}$ [N/mm²]
67.500	72.900	16,00	270,0	135,0	125,0	25,00

ψ_c	$\tau_{Rk,cr}$ [N/mm²]	k_3	$\tau_{Rk,c}$ [N/mm²]	$\psi^0_{g,Np}$	$\psi_{g,Np}$
1,023	10,23	7,700	5,81	1,000	1,000

$e_{c1,N}$ [mm]	$\psi_{ec1,Np}$	$e_{c2,N}$ [mm]	$\psi_{ec2,Np}$	$\psi_{s,Np}$	$\psi_{re,Np}$
0,0	1,000	0,0	1,000	0,978	1,000

ψ^0_{sus}	α_{sus}	ψ_{sus}
0,880	0,000	1,000

$N^0_{Rk,p}$ [kN]	$N_{Rk,p}$ [kN]	γ_{Mp}	$N_{Rd,p}$ [kN]	N_{Ed} [kN]
57,825	52,352	1,500	34,901	7,820

ID skupine sider
2

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Točka pritrjevanja:	sidranje konzolnega nadstreška v AB steno		

3.3 Porušitev po konusu betona

$N_{Ed} \le N_{Rd,c} = \frac{N_{Rk,c}}{\gamma_{Mc}}$ EN 1992-4, Tabela 7.1

$N_{Rk,c} = N^0_{Rk,c} \cdot \frac{A_{c,N}}{A^0_{c,N}} \cdot \psi_{s,N} \cdot \psi_{re,N} \cdot \psi_{ec1,N} \cdot \psi_{ec2,N} \cdot \psi_{M,N}$ EN 1992-4, Enačba (7.1)

$N^0_{Rk,c} = k_1 \cdot \sqrt{f_{ck}} \cdot h_{ef}^{1,5}$ EN 1992-4, Enačba (7.2)

$A^0_{c,N} = s_{cr,N} \cdot s_{cr,N}$ EN 1992-4, Enačba (7.3)

$\psi_{s,N} = 0,7 + 0,3 \cdot \frac{c}{c_{cr,N}} \le 1,00$ EN 1992-4, Enačba (7.4)

$\psi_{ec1,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{N,1}}{s_{cr,N}}\right)} \le 1,00$ EN 1992-4, Enačba (7.6)

$\psi_{ec2,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{N,2}}{s_{cr,N}}\right)} \le 1,00$ EN 1992-4, Enačba (7.6)

$\psi_{M,N} = 1$ EN 1992-4, Enačba (7.7)

$A_{c,N}$ [mm²]	$A^0_{c,N}$ [mm²]	$c_{cr,N}$ [mm]	$s_{cr,N}$ [mm]	$f_{c,cyl}$ [N/mm²]
67.500	72.900	135,0	270,0	25,00

$e_{c1,N}$ [mm]	$\psi_{ec1,N}$	$e_{c2,N}$ [mm]	$\psi_{ec2,N}$	$\psi_{s,N}$	$\psi_{re,N}$	z [mm]
0,0	1,000	0,0	1,000	0,978	1,000	0,0

$\psi_{M,N}$	k_1	$N^0_{Rk,c}$ [kN]	γ_{Mc}	$N_{Rd,c}$ [kN]	N_{Ed} [kN]
1,000	7,700	32,872	1,500	19,840	7,820

ID skupine sider
2

Vhodne podatke in rezultate je potrebno preveriti glede skladnosti z obstoječimi pogoji in verodostojnosti!
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Projektiranje:	Concrete - 17. dec. 2025	Datum:	17. 12. 2025
Točka pritrjevanja:	sidranje konzolnega nadstreška v AB steno		

4 Strižna obremenitev (EN 1992-4, Točka 7.2.2)

	Obtežba [kN]	Kapaciteta [kN]	Izkoriščenost β_V [%]	Status
Nosilnost jekla (brez nadvišanja)*	N/A	N/A	N/A	N/A
Porušitev po jeklu (z nadvišanjem)*	N/A	N/A	N/A	N/A
Nosilnost na iztrga betona*	N/A	N/A	N/A	N/A
Porušitev po robu betona v smeri **	N/A	N/A	N/A	N/A

*najbolj obremenjeno sidro **skupina sider (relevantna sidra)
When the input edge distance is set to "infinity", edge breakout verification is not performed in that direction

5 Pomik (najbolj obremenjeno sidro)

Kratkotrajna obremenitev

N_{Sk} = 5,793 [kN] δ_N = 0,1024 [mm]

V_{Sk} = 0,000 [kN] δ_V = 0,0000 [mm]

δ_{NV} = 0,1024 [mm]

Dolgotrajna obremenitev:

N_{Sk} = 5,793 [kN] δ_N = 0,1639 [mm]

V_{Sk} = 0,000 [kN] δ_V = 0,0000 [mm]

δ_{NV} = 0,1639 [mm]

Komentarji: Pomiki zaradi izvlečne sile veljajo, če je sidro pritegnjeno s polovico potrebnega priteznega momenta za nerazpokan beton! Pomiki zaradi strižne obremenitve ne upoštevajo trenja med betonom in ležiščno pločevino. V izračunu niso vključene tolerance vrzeli med premerom izvrtine in luknje v ležiščni plošči.

Sprejemljivi pomiki sidra so odvisni od pritrjene konstrukcije, ki jih mora definirati odgovorni projektant!

6 Opozorila

- Projektne metode v programski opremi PROFIS Engineering zahtevajo uporabo absolutno toge ležiščne pločevine v skladu z regulativami (ETAG 001/Annex C, EOTA TR029, itd.). To pomeni, da se porazdelitev obremenitve na sidra zaradi elastičnih deformacij sidrne plošče ne upošteva - predpostavlja se, da je ležiščna pločevina toga, da se ne deformira, v primeru delovanja projektne obtežbe. PROFIS Engineering izračuna najmanjšo potrebno debelino ležiščne pločevine s FEM metodo za omejitev napetosti v ležiščni pločevini na podlagi zgornjih predpostavk. PROFIS Engineering ne dokazuje, da je predpostavka o togi ležiščni pločevini pravilna. Vhodne podatke in rezultate je potrebno preveriti, da so v skladu z obstoječimi pogoji in verodostojnosti!
- The equations presented in this report are based on metric units. When inputs are displayed in imperial units, the user should be aware that the equations remain in their metric format.
- Potrebno je opraviti kontrolo prenosa obtežbe v osnovni material po EN 1992-4, Dodatek A!
- Izračun je veljaven samo v primeru, če luknja v ležiščni pločevini ni večja od vrednosti podane v Tabeli 6.1 of EN 1992-4!! Za večje premere izvrtin glej točko 6.2.2 of EN 1992-4!
- Seznam dodatne opreme v tem poročilu je samo za informacije uporabnika. V vsakem primeru je potrebno upoštevati navodila za uporabo, ki so priložena izdelku, da zagotovite pravilno vgradnjo.
- For the determination of the $\psi_{re,v}$ (concrete edge failure) the minimum concrete cover defined in the design settings is used as the concrete cover of the edge reinforcement.
- Karakteristična sprijena trdnost je odvisna od kratkotrajnih in dolgotrajnih temperaturnih obremenitev.
- Armiranje roba betona ni potrebno, da se izognemo cepitvi betona
- Karakteristična sprijemna trdnost je odvisna od povratne dobe (servisna doba v letih): 50

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Izbrano pritrjevanje ustreza projektnim pogojem!

Vhodne podatke in rezultate je potrebno preveriti glede skladnosti z obstoječimi pogoji in verodostojnosti!
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7 Podatki za vgradnjo

Ležiščna pločevina, jeklo: S 235; E = 210.000,00 N/mm^2; f_{yk} = 235,00 N/mm^2

Profil: Flat bar, ; (D x Š x V) = 250,0 mm x 280,0 mm

Premer luknje v ležiščni plošči (predmontirano) : d_f = 22,0 mm

Premer luknje v ležiščni plošči (skoznja montaža) : d_f = 24,0 mm

Debelina ležiščne pločevine (vnos): 15,0 mm

Priporočena debelina ležiščne pločevine: ni izračunano

Metoda vrtanja: Udarno vrtanje

Čiščenje: Potrebno je čiščenje izvrtine z uporabo stisnjenega zraka v skladu z navodili za uporabo.

Tip in velikost sidra: HIT-RE 500 V4 + HAS Meter 8.8 M20

Številka artikla: 2390169 HAS 8.8 M20x1000 (element) / 2287552 HIT-RE 500 V4 (kemično sidro)

Maximum installation torque: 150 Nm

Globina izvrtine v osnovnem materialu: 22,0 mm

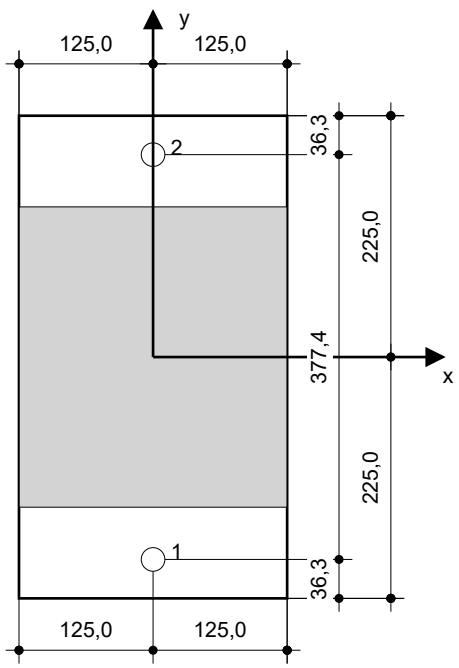
Globina izvrtine v osnovnem materialu: 90,0 mm

Minimalna debelina osnovnega materiala: 134,0 mm

Hilti AM 8.8 threaded rod with HIT-RE 500 V4 injection mortar with 90 mm embedment hef, M20, Steel galvanized, Hammer drill bit installation per ETA 20/0541

7.1 Priporočeni dodatki

Vrtanje	Čiščenje	Vgradnja
• Primerno vrtalno udarno kladivo • Ustrezen sveder	• Zahtevano izpihovanje s komprimiranim zrakom in ustreznimi pripomočki, za izpihovanje prahu iz dna izvrtine. • Okrogla jeklena ščetka ustreznega premera	• Dozirnik s kaseto in mešalcem • Momentni ključ



Koordinate sidra [mm]

Sidro	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	0,0	−188,7	125,0	125,0	-	-
2	0,0	188,7	125,0	125,0	-	-

Vhodne podatke in rezultate je potrebno preveriti glede skladnosti z obstoječimi pogoji in verodostojnosti!
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8 Opombe; Vaše dolžnosti sodelovanja

- Vse informacije in podatki, ki jih vsebuje programska oprema, se nanašajo izključno na uporabo izdelkov Hilti in temeljijo na načelih, formulah in varnostnih predpisih v skladu s tehničnimi navodili podjetja Hilti ter navodili za uporabo, montažo in montažo itd. ki jih mora uporabnik dosledno upoštevati. Vse vsebovane vrednosti so povprečne številke, zato je treba pred uporabo ustreznega izdelka Hilti opraviti preskuse, specifične za uporabo. Rezultati izračunov s programsko opremo v osnovi temeljijo na podatkih, ki jih vnesete. Zato prevzemate vso odgovornost za odsotnost napak, popolnost in ustreznost podatkov, ki jih morate vnesti. Poleg tega prevzemate vso odgovornost za to, da rezultate izračunov pregleda in popravi strokovnjak, zlasti glede skladnosti z veljavnimi normativi in dovoljenji, preden jih uporabite za svoj specifični objekt. Programska oprema služi le kot pomoč pri razlagi norm in dovoljenj brez kakršnega koli jamstva o odsotnosti napak, pravilnosti in ustreznosti rezultatov ali primernosti za določeno aplikacijo.
- Za preprečevanje ali omejitev škode, ki jo povzroča programska oprema, morate sprejeti vse potrebne in razumne ukrepe. Zlasti morate poskrbeti za redno varnostno kopiranje izračunov in podatkov ter po potrebi redno posodabljati programsko opremo, ki jo ponuja Hilti. Če ne uporabljate funkcije AutoUpdate programske opreme, morate z uporabo ročnih posodobitev prek spletnega mesta Hilti zagotoviti, da uporabljate trenutno in posodobljeno različico programske opreme. Hilti ne bo odgovoren za posledice, kot so obnovitev izgubljenih ali poškodovanih podatkov ali programov, ki so posledica krivdne kršitve dolžnosti.

Vhodne podatke in rezultate je potrebno preveriti glede skladnosti z obstoječimi pogoji in verodostojnosti!
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Basic model properties

Database:	dvorana.twp
Analysis date:	22.12.2025

Analysis type: 3D model

☒ Linear theory ☒ Modal Analysis ☐ Stability

☐ Non-linear theory ☒ Seismic analysis ☐ Stage Construction

☐ Non linear analysis

Model size

Number of nodes:	7257
Number of area elements:	7089
Number of beams:	358
Number of boundary elements:	23124
Number of primary load cases:	8
Number of load case combinations:	0

Units

Length:	m [cm,mm]
Force:	kN
Temperature:	Celsius

Input data - Structure

Level scheme

Name	z [m]	h [m]
	6.50	3.00
	3.50	2.90

Name	z [m]	h [m]
	0.60	0.60
	0.00	

Table of materials

No	Material name	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	Opeka/Blokovi	3.100e+7	0.20	25.00	1.000e-5	3.100e+7	0.20
3	C 30/37	3.300e+7	0.20	25.00	1.000e-5	3.300e+7	0.20
4	Les-Iglavci-Lamelirani	1.100e+7	0.20	5.00	1.000e-5	1.100e+7	0.20
5	Les-Iglavci-Masiven les	1.000e+7	0.20	5.00	1.000e-5	1.000e+7	0.20

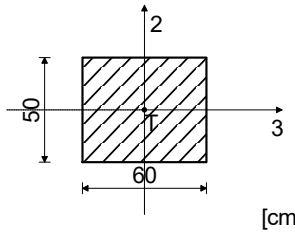
Slab sets

No	t[m]	e[m]	Material	Analysis type	Orthotropy	E2[kN/m2]	G[kN/m2]	α
<1>	0.200	0.100	1	Thin slab	Isotrophy			
<2>	0.300	0.150	2	Masonry	Isotrophy			
<3>	0.300	0.150	1	Thin slab	Isotrophy			
<4>	0.300	0.150	1	Thin slab	Isotrophy			
<5>	0.200	0.100	3	Thin slab	Isotrophy			
<6>	0.250	0.125	2	Masonry	Isotrophy			

Beam sets

Set: 1 Section: b/d=60/50, Approx. eccentricity

Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	3.000e-1	2.500e-1	2.500e-1	1.240e-2	9.000e-3	6.250e-3

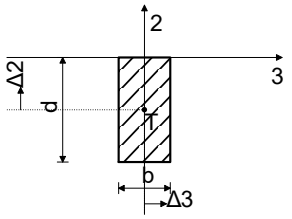


[cm]

Set: 2 Section: Spremenljiv, Approx. eccentricity

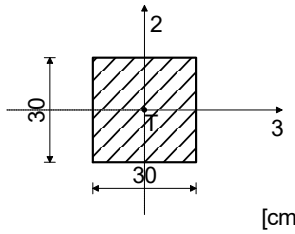
Mat.	Taper type
4 - Les-Iglavci-Lamel...	Relative Linear Taper.

No	dL	Δ3 [cm]	Δ2 [cm]	b [cm]	d [cm]		
S	0	0.00	-20.00	20.00	40.00		
E	1	0.00	-47.50	20.00	95.00		



Set: 3 Section: b/d=30/30, Approx. eccentricity

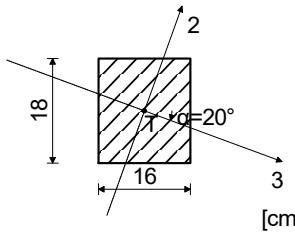
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	9.000e-2	7.500e-2	7.500e-2	1.141e-3	6.750e-4	6.750e-4



[cm]

Set: 4 Section: b/d=16/18, Approx. eccentricity

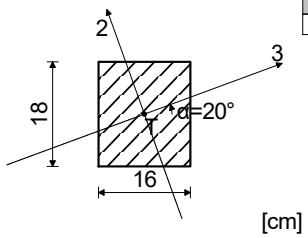
Mat.	A1	A2	A3	I1	I2	I3
5 - Les-Iglavci-M...	2.880e-2	2.400e-2	2.400e-2	1.153e-4	6.335e-5	7.585e-5



[cm]

Set: 5 Section: b/d=16/18, Approx. eccentricity

Mat.	A1	A2	A3	I1	I2	I3
5 - Les-Iglavci-M...	2.880e-2	2.400e-2	2.400e-2	1.153e-4	6.335e-5	7.585e-5



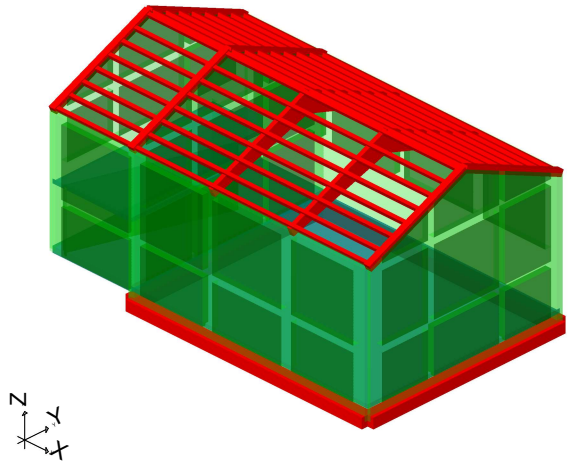
[cm]

Area support sets

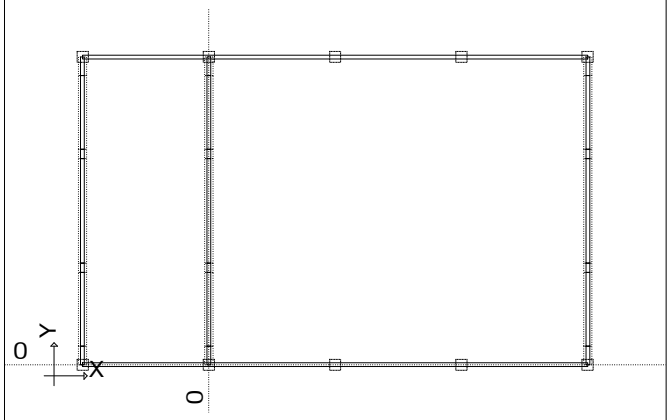
Set	K,R1	K,R2	K,R3
1	2.500e+4	2.500e+4	3.000e+4

Linear support sets

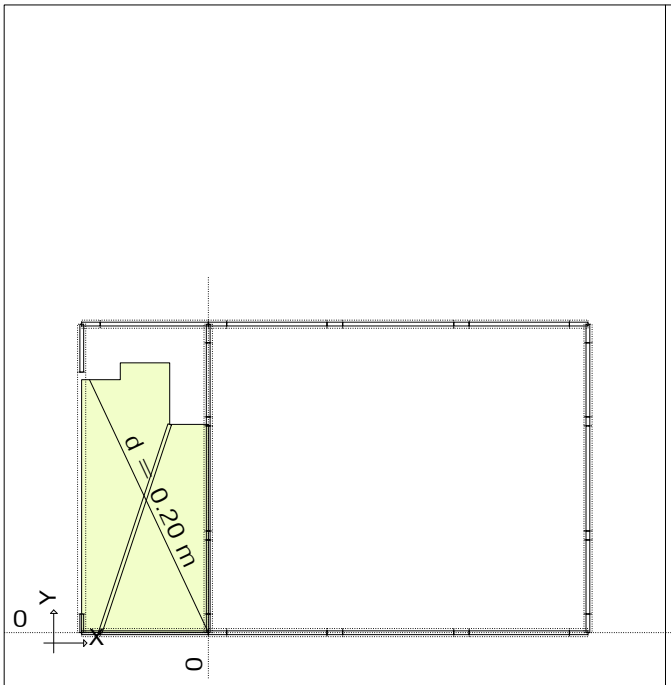
Set	K,R1	K,R2	K,R3	K,M1	Soil [m]
1	7.500e+4	7.500e+4	9.000e+4		0.600



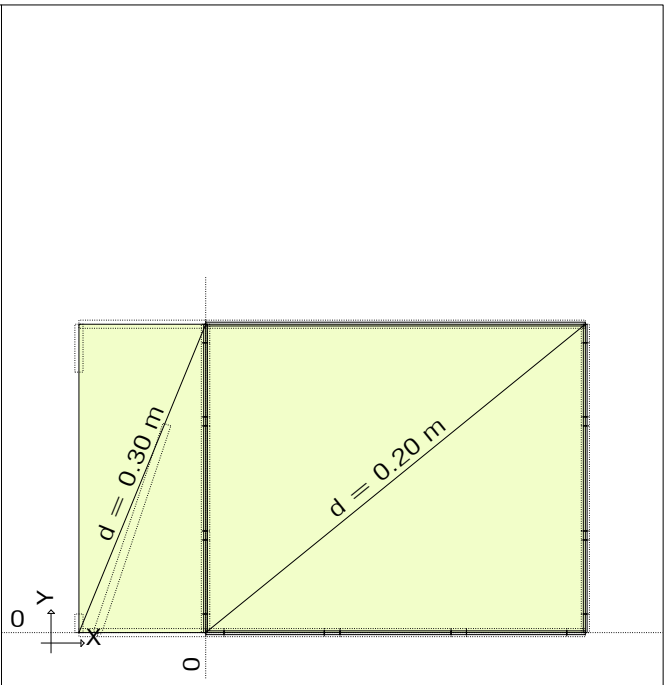
Isometric



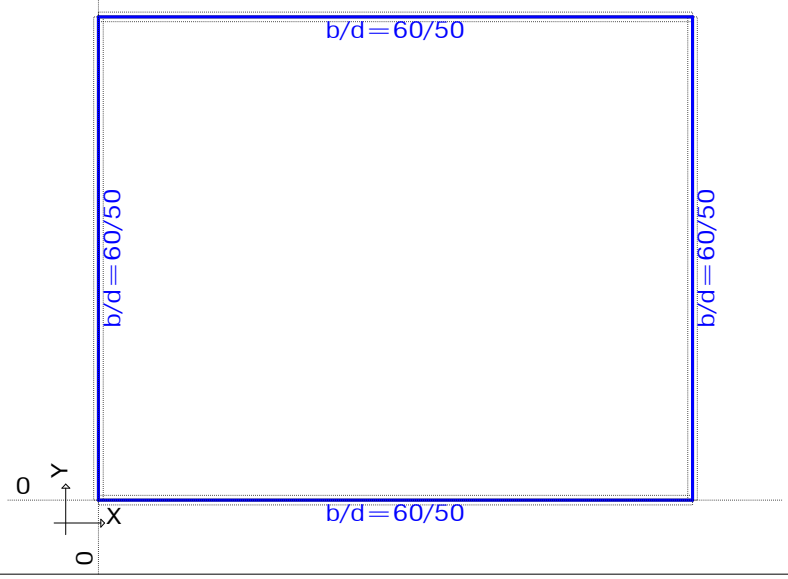
Level: [6.50 m]



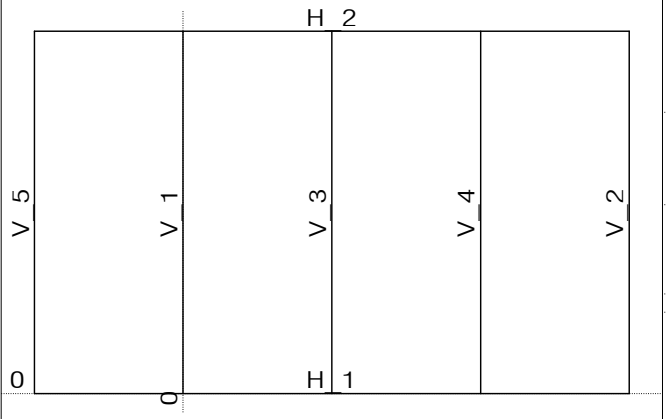
Level: [3.50 m]



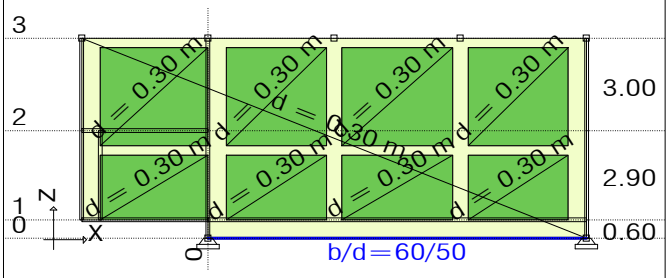
Level: [0.60 m]



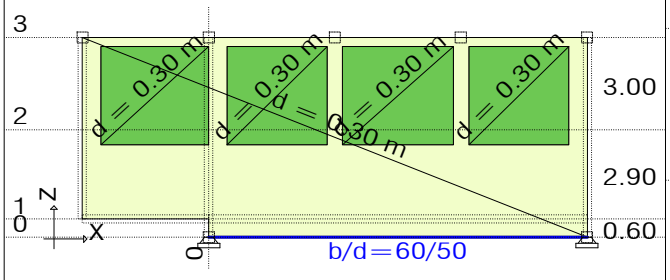
Level: [0.00 m]



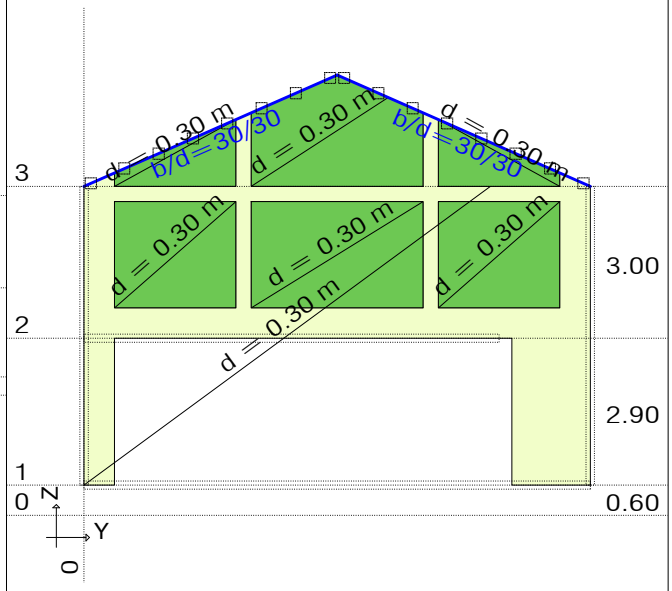
Frame disposition



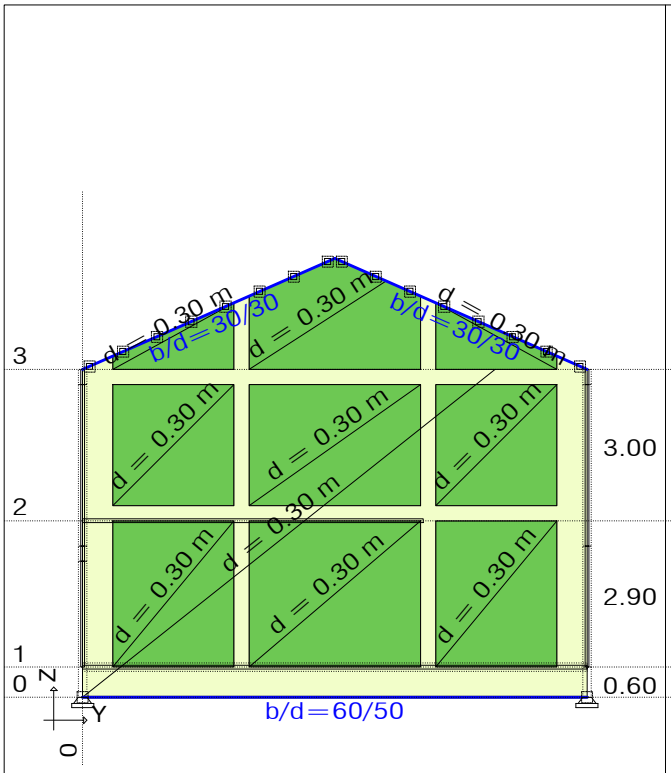
Frame: H_1



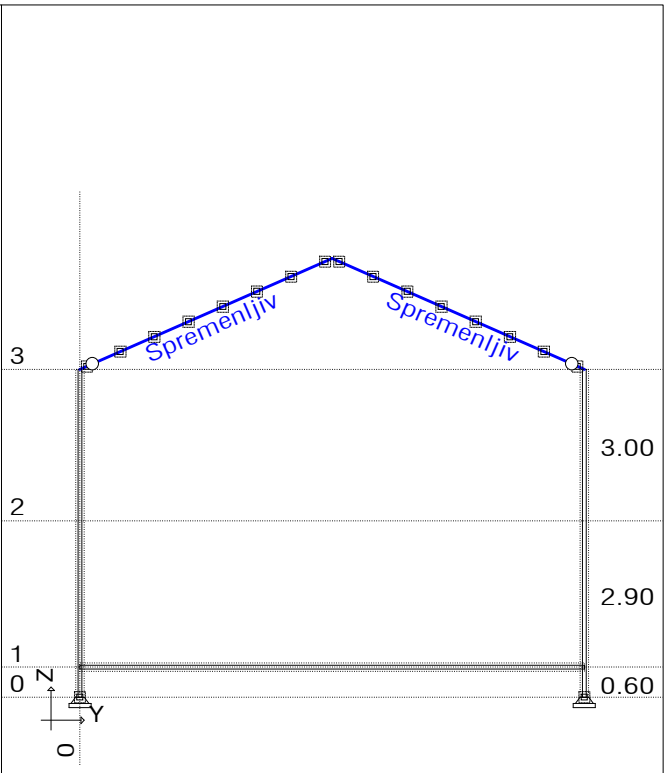
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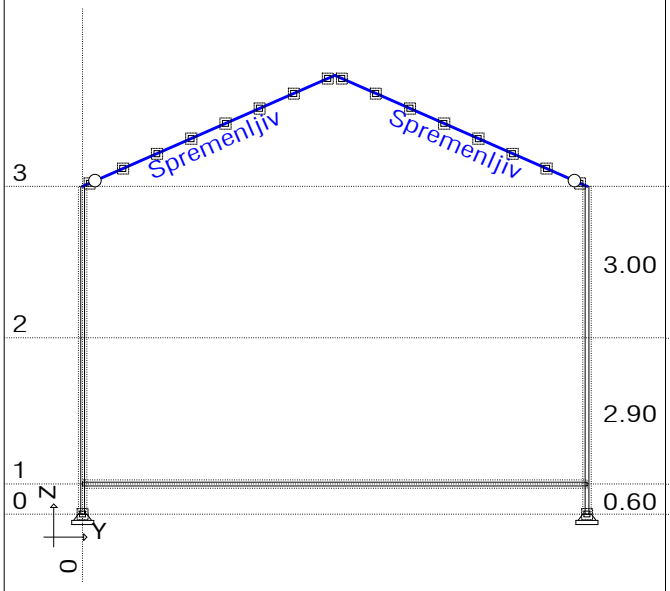
Frame: V_5



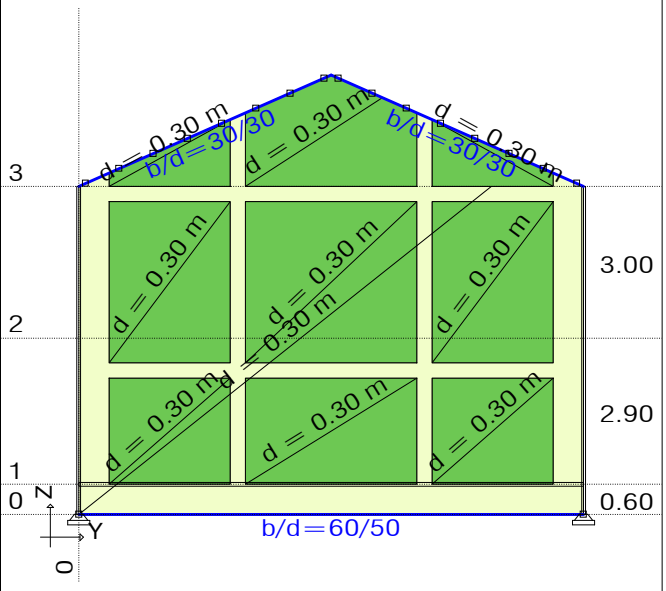
Frame: V_1



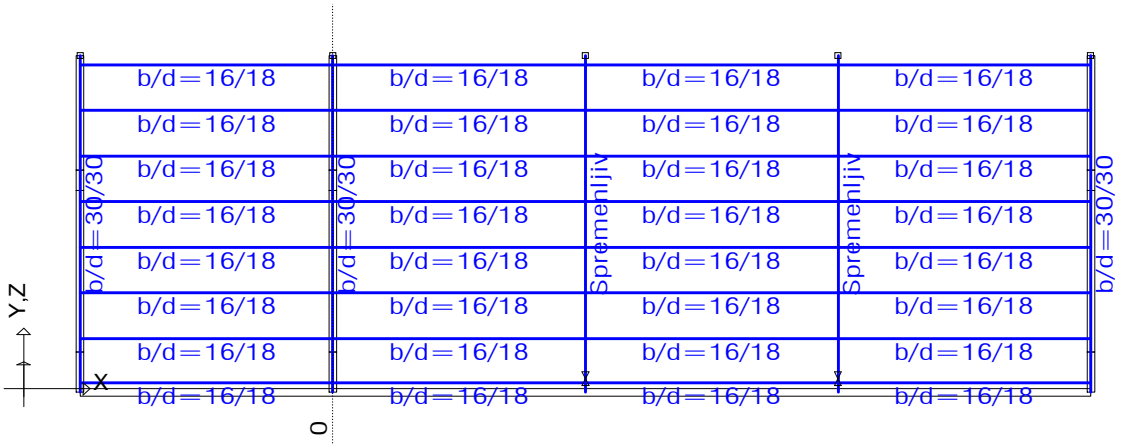
Frame: V_3



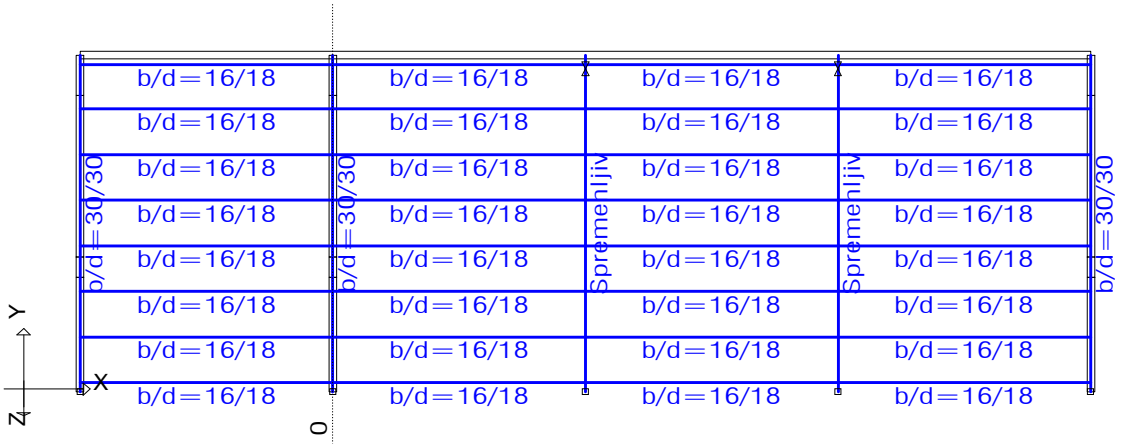
Frame: V_4



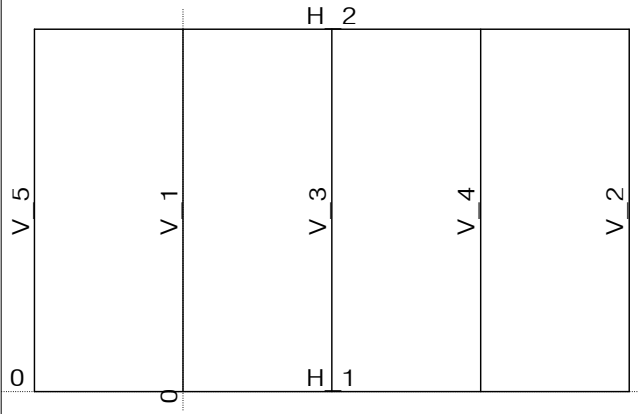
Frame: V_2



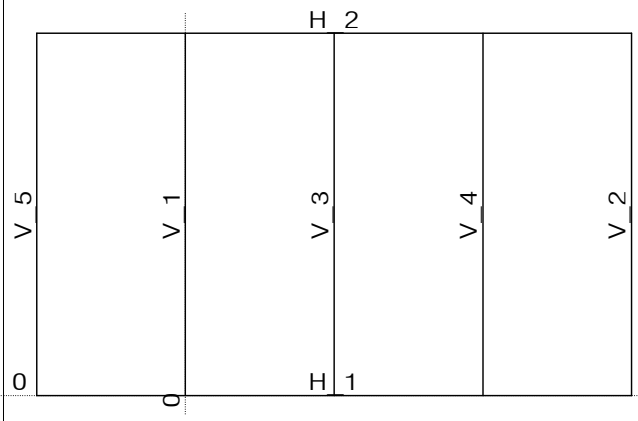
View: straha spredaj



View: streha zadaj

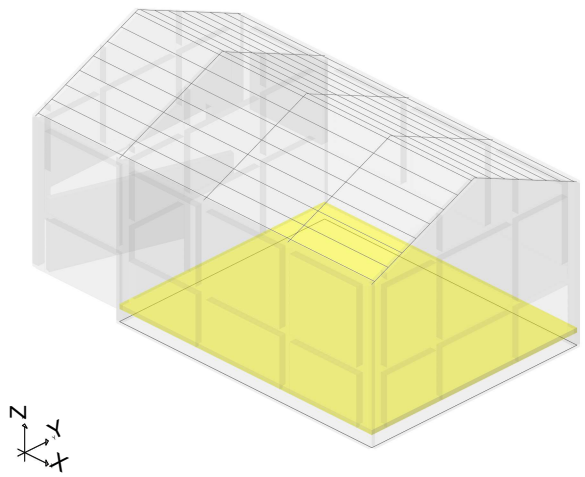


Frame disposition



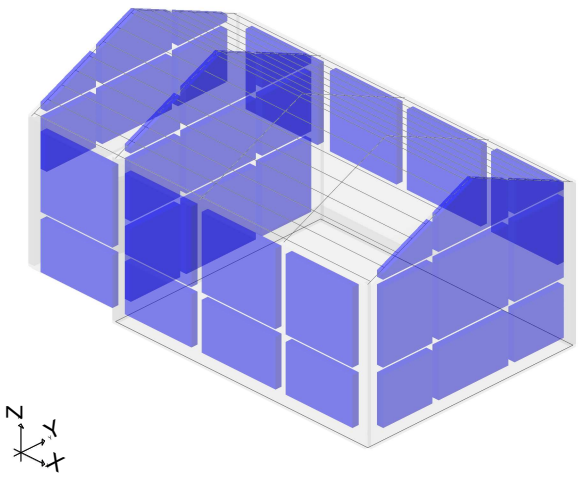
Frame disposition

Slab / Wall
1. d = 0.20 m



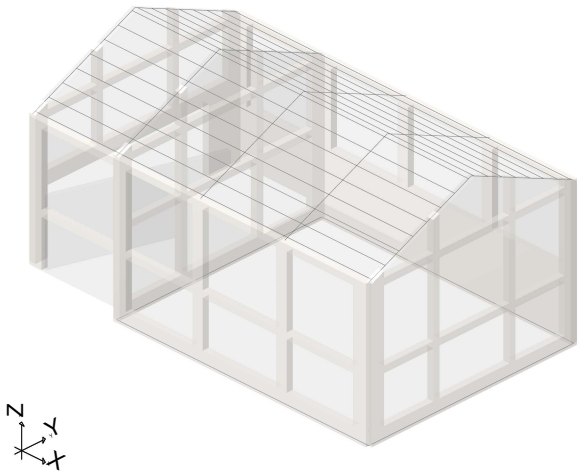
Numerical data set
Slab / Wall (1)

Slab / Wall
2. d = 0.30 m



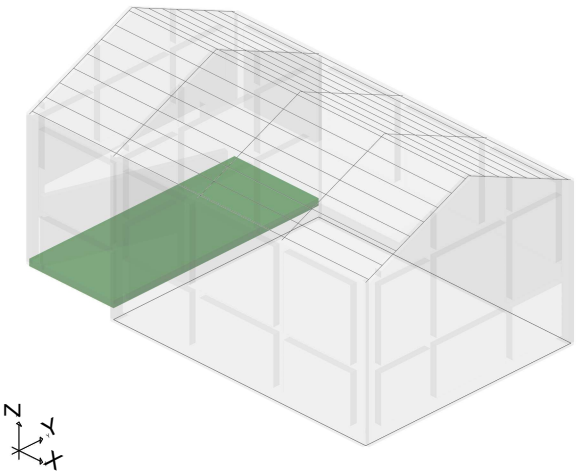
Numerical data set
Slab / Wall (2)

Slab / Wall
3. d = 0.30 m



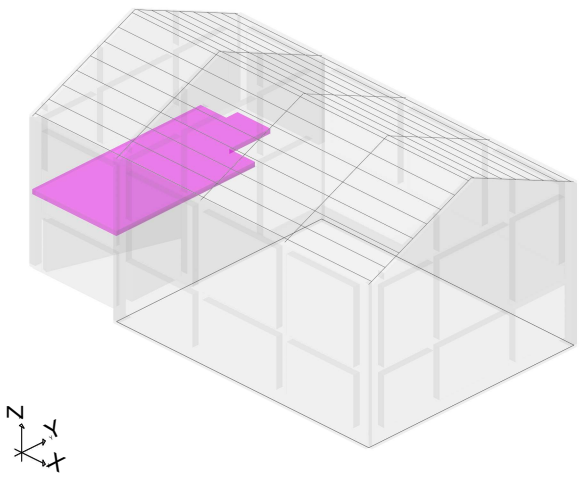
Numerical data set
Slab / Wall (3)

Slab / Wall
4. d = 0.30 m



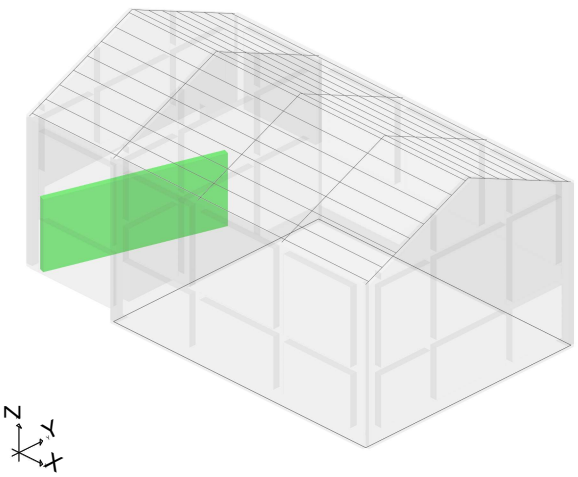
Numerical data set
Slab / Wall (4)

Slab / Wall
5. d = 0.20 m



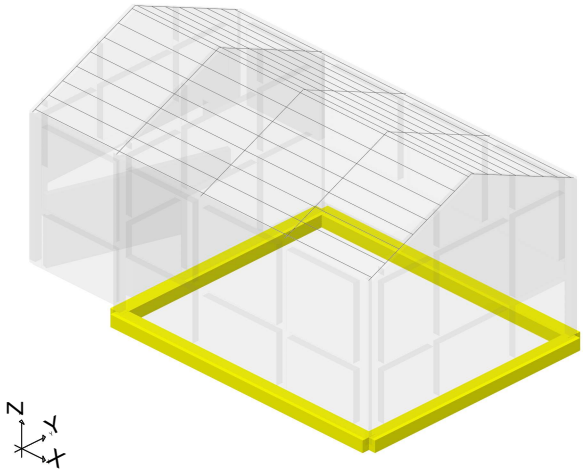
Numerical data set
Slab / Wall (5)

Slab / Wall
6. d = 0.25 m



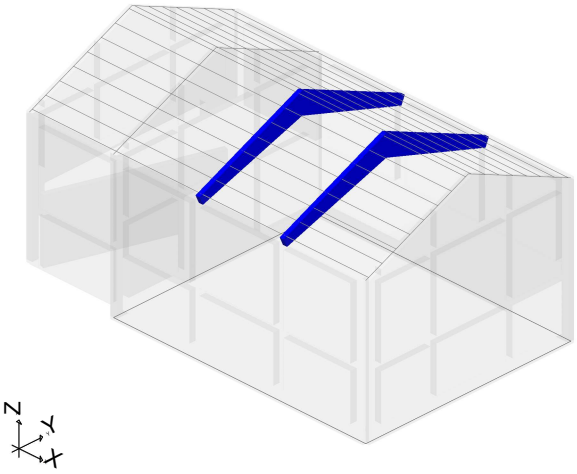
Numerical data set
Slab / Wall (6)

Beam
1. b/d=60/50



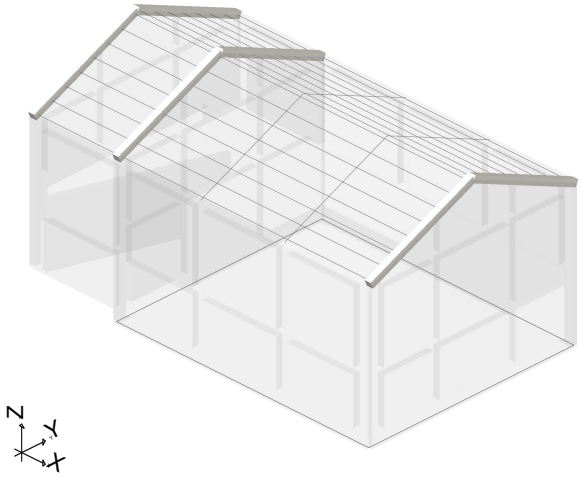
Numerical data set
Beam (1)

Beam
2. Spremenljiv



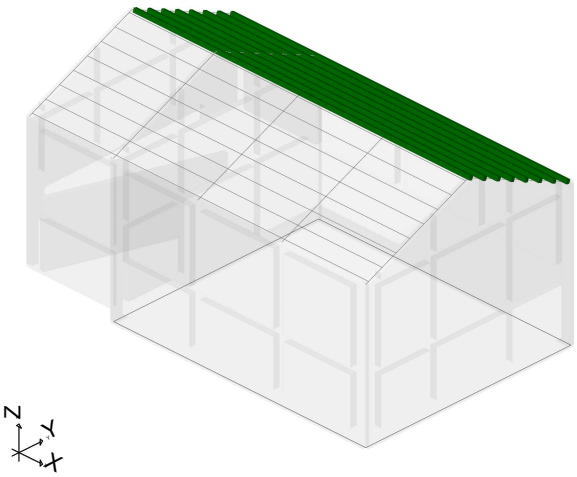
Numerical data set
Beam (2)

Beam
3. b/d=30/30

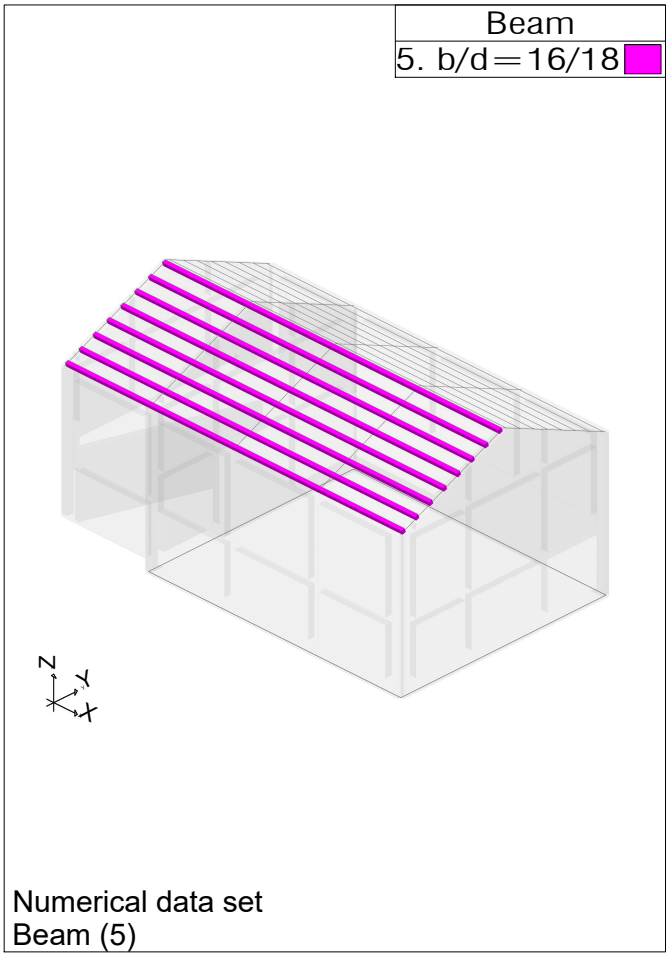


Numerical data set
Beam (3)

Beam
4. b/d=16/18



Numerical data set
Beam (4)



Numerical data set
Beam (5)

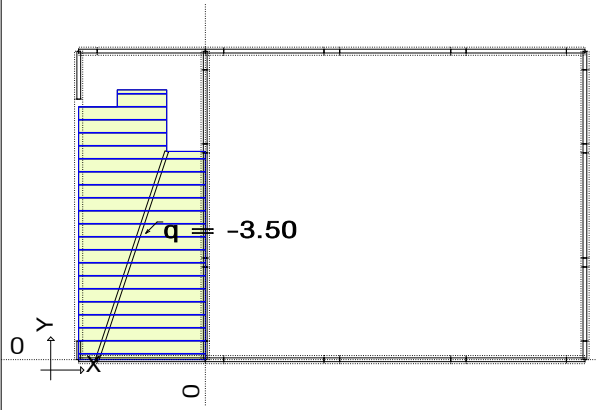
Input data - Load

Load cases list

LC	Name
1	lastna + stalna (g)
2	korisna v dvorani
3	sneg
4	koristna na strehi

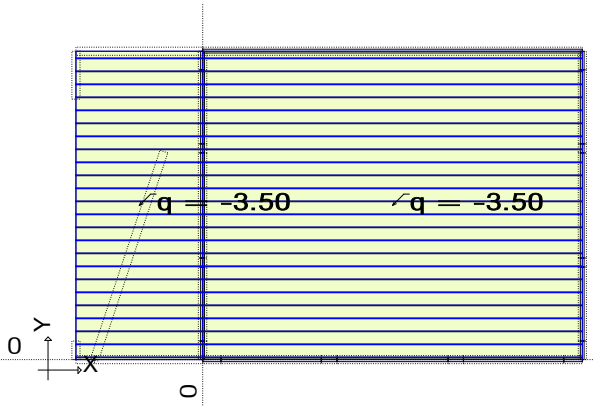
LC	Name
5	potres x (+e)
6	potres x (-e)
7	potres y (+e)
8	potres y (-e)

Load 1: lastna + stalna (g)



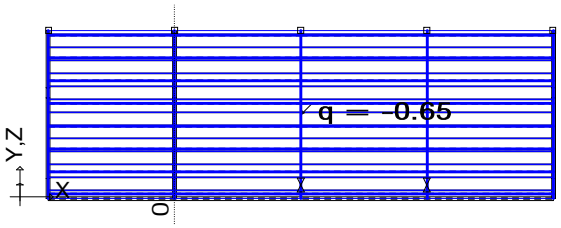
Level: [3.50 m]

Load 1: lastna + stalna (g)



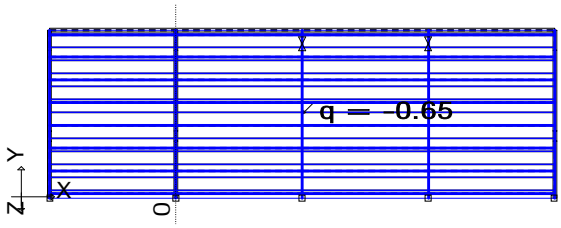
Level: [0.60 m]

Load 1: lastna + stalna (g)



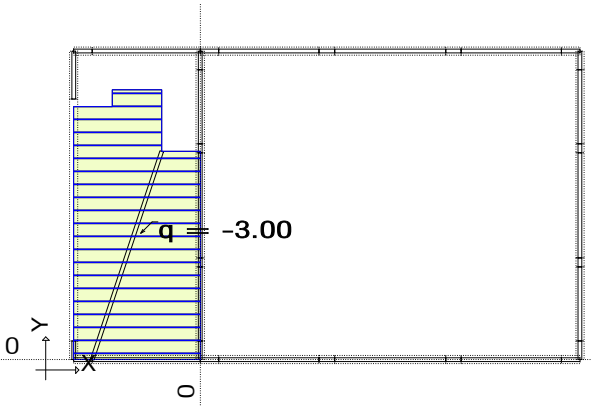
View: straha spredaj

Load 1: lastna + stalna (g)



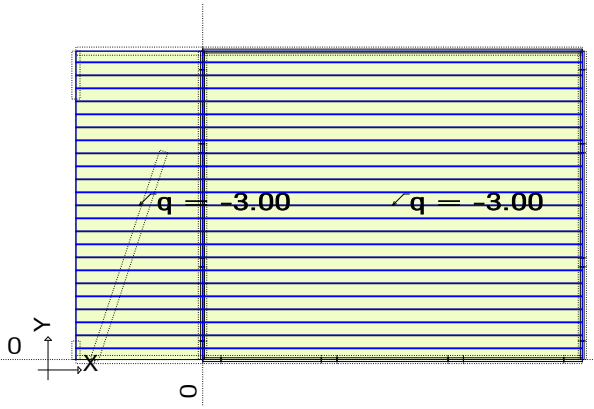
View: streha zadaj

Load 2: korisna v dvorani



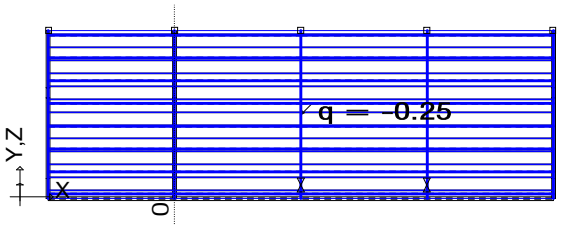
Level: [3.50 m]

Load 2: korisna v dvorani



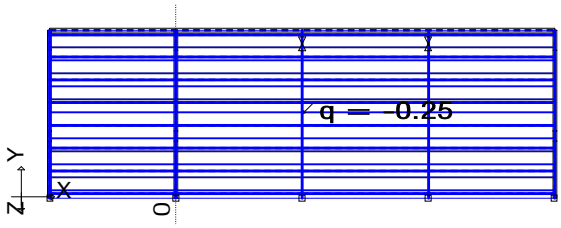
Level: [0.60 m]

Load 3: sneg



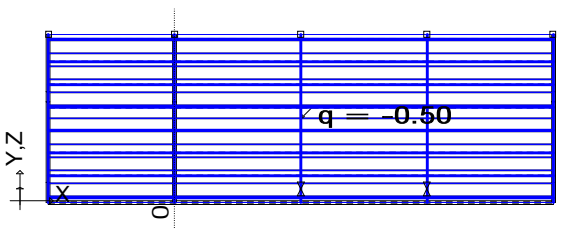
View: straha spredaj

Load 3: sneg



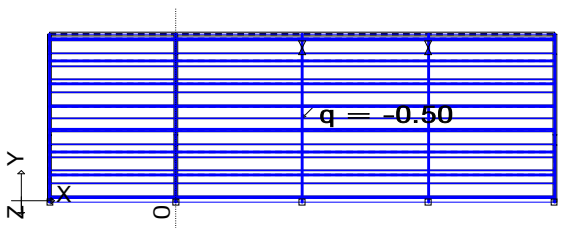
View: streha zadaj

Load 4: koristna na strehi



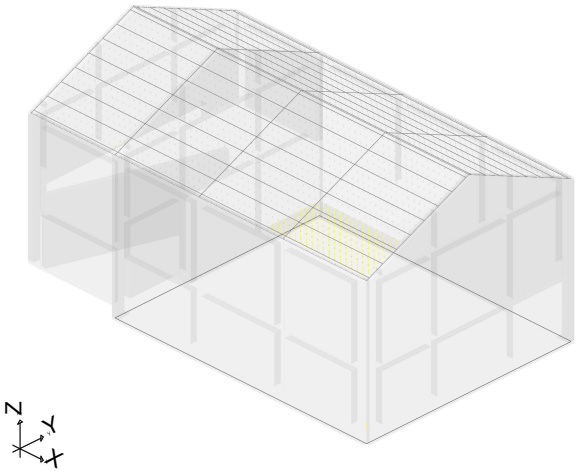
View: straha spredaj

Load 4: koristna na strehi



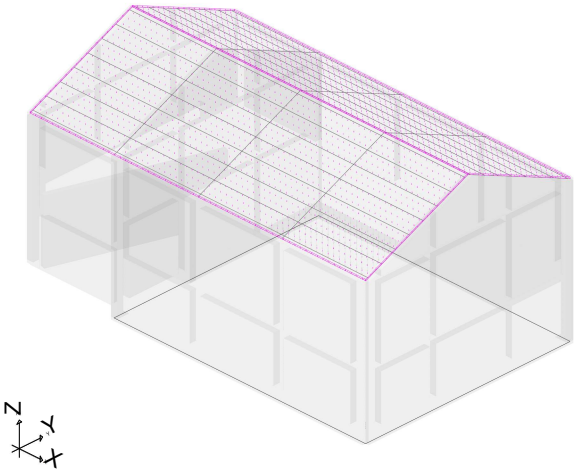
View: streha zadaj

Load 1: lastna + stalna (g) Area Load
1. p = -3.50 kN/m²



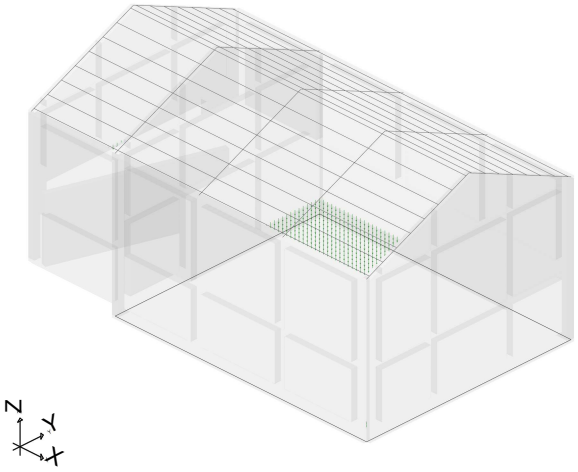
Numerical data set
Area Load (1)

Load 1: lastna + stalna (g) Area Load
5. p = -0.65 kN/m²



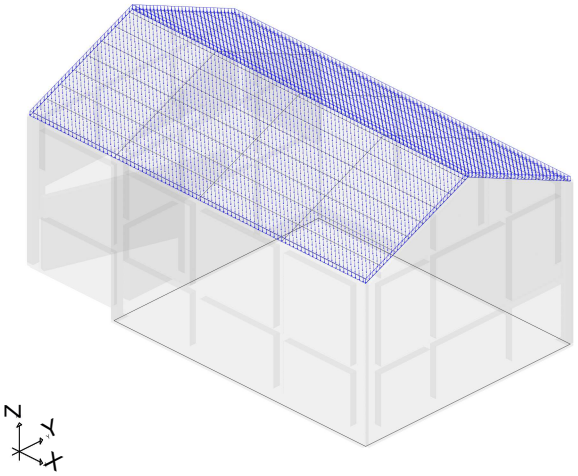
Numerical data set
Area Load (5)

Load 2: korisna v dvorani Area Load
4. p = -3.00 kN/m²



Numerical data set
Area Load (4)

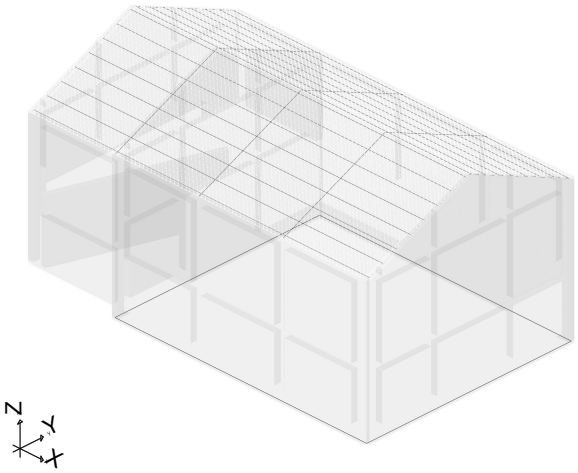
Load 3: sneg Area Load
2. p = -0.25 kN/m²



Numerical data set
Area Load (2)

Load 4: koristna na strehi

Area Load
3. p = -0.50 kN/m²



Numerical data set
Area Load (3)

Modal Analysis

Advanced options of seismic analysis	
Slabs - reduction of bending stiffness:	0.500
Beams - reduction of bending stiffness:	0.500
Columns - bending stiffness reduction:	0.500
Columns - axial stiffness reduction:	0.500
Suppres oscilation in Z direction	

Load factors for mass calculations

No	Name	Factor
1	lastna + stalna (g)	1.00
2	korisna v dvorani	0.00
3	sneg	0.00
4	koristna na strehi	0.00

Mass distribution per levels

Level	Z [m]	X [m]	Y [m]	Mass [T]	T/m²
	6.50	3.38	5.00	122.03	
	3.50	2.67	4.79	172.54	5.28
	0.60	3.89	4.97	225.69	1.38
	0.00	6.15	5.00	44.34	
Total:	2.71	3.58	4.93	564.61	

Position of rigidity centers (approximative)

Level	Z [m]	X [m]	Y [m]
	6.50	2.75	5.00
	3.50	-0.94	4.93
	0.60	1.87	9.28
	0.00	6.15	5.00

Eccentricity per levels (approximative)

Level	Z [m]	eox [m]	eoy [m]
	6.50	0.63	0.00
	3.50	3.61	0.14
	0.60	2.02	4.30
	0.00	0.00	0.00

Natural frequency of structure

No	T [s]	f [Hz]	No	T [s]	f [Hz]	No	T [s]	f [Hz]
1	0.1414	7.0708	5	0.0696	14.3694	9	0.0574	17.4118
2	0.1370	7.2983	6	0.0667	14.9858	10	0.0543	18.4002
3	0.0922	10.8499	7	0.0625	15.9933	11	0.0443	22.5499
4	0.0780	12.8192	8	0.0611	16.3583	12	0.0441	22.6878

Seismic analysis

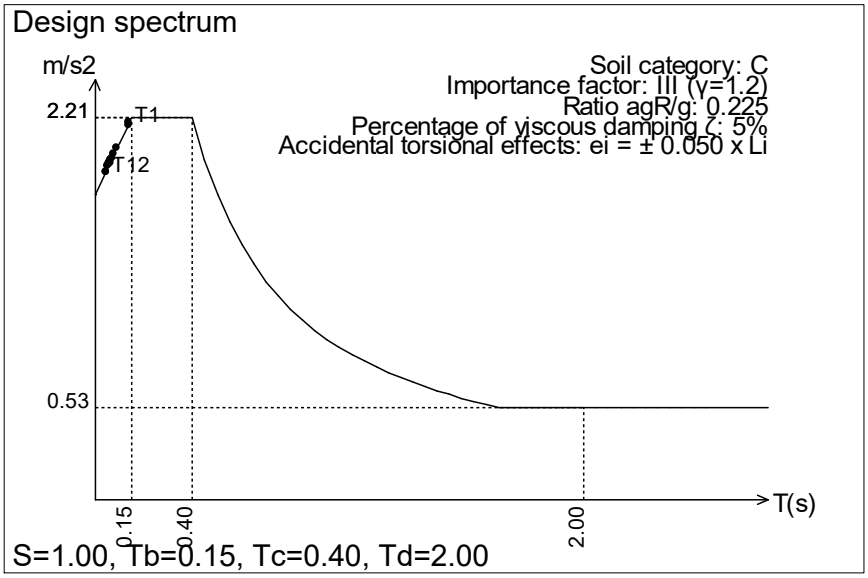
Seismic analysis: EC8 (SIST EN 1998)	
Soil category:	C
Importance factor:	III (γ=1.2)
Ratio agR/g:	0.225
Percentage of viscous damping ζ:	5%
Accidental torsional effects:	ei = ± 0.050 x Li

Earthquake directional factors:

Load case	Angle α[°]	k,α	k,α+90°	kz	q
potres x	0	1.000	0.300	0.000	3.000
potres y	90	1.000	0.300	0.000	3.000

Type of spectrum

Load case	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



Distribution of seismic forces along height of structure - potres x (+e)

Level	Z [m]	Mode 1			Mode 2			Mode 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	-2.45	40.13	-0.10	215.83	13.58	7.75	-2.19	17.71	-0.33
	3.50	-0.99	26.13	0.25	64.54	11.89	8.61	3.07	19.14	1.87
	0.60	-0.32	9.04	-0.01	26.07	3.53	4.72	0.13	10.42	0.27
	0.00	-0.03	0.26	0.02	2.64	0.16	-2.22	0.02	0.66	0.01
	Σ=	-3.80	75.56	0.17	309.09	29.15	18.85	1.03	47.92	1.82

Level	Z [m]	Mode 4			Mode 5			Mode 6		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	0.13	-0.05	-0.55	0.54	-6.54	-0.72	6.70	42.60	-1.02
	3.50	-0.03	-0.05	-0.05	7.77	-10.59	-0.48	59.95	44.90	1.95
	0.60	-0.00	-0.04	-0.00	4.30	-9.18	0.27	36.08	44.77	2.21
	0.00	0.01	-0.00	-0.02	0.50	-0.81	-0.25	4.43	5.03	-1.65
	Σ=	0.09	-0.15	-0.63	13.12	-27.12	-1.17	107.17	137.31	1.48

Level	Z [m]	Mode 7			Mode 8			Mode 9		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	17.13	-8.64	-3.57	1.45	0.46	0.91	35.86	-16.89	18.80
	3.50	93.16	-4.82	9.09	4.34	-0.65	1.89	76.31	-17.41	18.66
	0.60	71.96	-6.73	4.42	2.94	-3.37	0.49	72.85	-19.43	7.11
	0.00	8.00	-0.98	-3.19	0.47	0.24	-0.07	11.61	-3.76	-2.05
	Σ=	190.25	-21.17	6.75	9.19	-3.31	3.22	196.62	-57.48	42.52

Level	Z [m]	Mode 10			Mode 11			Mode 12		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	7.43	14.11	2.90	0.91	-0.34	-0.47	0.57	-0.12	0.06
	3.50	11.12	18.92	4.30	0.66	0.52	-0.66	-0.02	0.18	0.05
	0.60	14.80	19.22	1.61	3.26	1.10	0.21	1.66	0.59	0.14
	0.00	2.34	4.66	-0.46	0.52	0.11	-0.22	0.23	0.04	-0.08
	Σ=	35.70	56.91	8.34	5.35	1.39	-1.14	2.44	0.68	0.17

Distribution of seismic forces along height of structure - potres x (-e)

Level	Z [m]	Mode 1			Mode 2			Mode 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	-2.45	40.13	-0.10	215.83	13.58	7.75	-2.19	17.71	-0.33
	3.50	-0.99	26.13	0.25	64.54	11.89	8.61	3.07	19.14	1.87
	0.60	-0.32	9.04	-0.01	26.07	3.53	4.72	0.13	10.42	0.27
	0.00	-0.03	0.26	0.02	2.64	0.16	-2.22	0.02	0.66	0.01
	Σ=	-3.80	75.56	0.17	309.09	29.15	18.85	1.03	47.92	1.82

Level	Z [m]	Mode 4			Mode 5			Mode 6		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	0.13	-0.05	-0.55	0.54	-6.54	-0.72	6.70	42.60	-1.02
	3.50	-0.03	-0.05	-0.05	7.77	-10.59	-0.48	59.95	44.90	1.95
	0.60	-0.00	-0.04	-0.00	4.30	-9.18	0.27	36.08	44.77	2.21
	0.00	0.01	-0.00	-0.02	0.50	-0.81	-0.25	4.43	5.03	-1.65
	∑=	0.09	-0.15	-0.63	13.12	-27.12	-1.17	107.17	137.31	1.48

Level	Z [m]	Mode 7			Mode 8			Mode 9		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	17.13	-8.64	-3.57	1.45	0.46	0.91	35.86	-16.89	18.80
	3.50	93.16	-4.82	9.09	4.34	-0.65	1.89	76.31	-17.41	18.66
	0.60	71.96	-6.73	4.42	2.94	-3.37	0.49	72.85	-19.43	7.11
	0.00	8.00	-0.98	-3.19	0.47	0.24	-0.07	11.61	-3.76	-2.05
	∑=	190.25	-21.17	6.75	9.19	-3.31	3.22	196.62	-57.48	42.52

Level	Z [m]	Mode 10			Mode 11			Mode 12		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	7.43	14.11	2.90	0.91	-0.34	-0.47	0.57	-0.12	0.06
	3.50	11.12	18.92	4.30	0.66	0.52	-0.66	-0.02	0.18	0.05
	0.60	14.80	19.22	1.61	3.26	1.10	0.21	1.66	0.59	0.14
	0.00	2.34	4.66	-0.46	0.52	0.11	-0.22	0.23	0.04	-0.08
	∑=	35.70	56.91	8.34	5.35	1.39	-1.14	2.44	0.68	0.17

Distribution of seismic forces along height of structure - potres y (+e)

Level	Z [m]	Mode 1			Mode 2			Mode 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	-9.98	163.11	-0.39	-43.17	-2.72	-1.55	-6.76	54.72	-1.03
	3.50	-4.04	106.19	1.00	-12.91	-2.38	-1.72	9.49	59.13	5.78
	0.60	-1.29	36.75	-0.03	-5.21	-0.71	-0.94	0.41	32.19	0.85
	0.00	-0.12	1.05	0.09	-0.53	-0.03	0.44	0.05	2.03	0.03
	∑=	-15.43	307.10	0.67	-61.83	-5.83	-3.77	3.19	148.07	5.63

Level	Z [m]	Mode 4			Mode 5			Mode 6		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	-0.46	0.18	2.00	-3.40	40.79	4.47	4.75	30.20	-0.72
	3.50	0.13	0.20	0.20	-48.48	66.05	2.97	42.49	31.82	1.38
	0.60	0.02	0.15	0.01	-26.82	57.26	-1.70	25.58	31.74	1.57
	0.00	-0.02	0.01	0.08	-3.11	5.06	1.53	3.14	3.57	-1.17
	∑=	-0.34	0.54	2.29	-81.81	169.16	7.27	75.96	97.32	1.05

Level	Z [m]	Mode 7			Mode 8			Mode 9		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	-7.29	3.68	1.52	-1.07	-0.34	-0.67	-23.28	10.97	-12.20
	3.50	-39.64	2.05	-3.87	-3.21	0.48	-1.40	-49.55	11.30	-12.12
	0.60	-30.62	2.86	-1.88	-2.18	2.50	-0.36	-47.30	12.62	-4.62
	0.00	-3.40	0.42	1.36	-0.35	-0.18	0.05	-7.54	2.44	1.33
	∑=	-80.95	9.01	-2.87	-6.81	2.45	-2.39	-127.67	37.33	-27.61

Level	Z [m]	Mode 10			Mode 11			Mode 12		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	6.50	12.35	2.54	-0.03	0.01	0.02	-0.01	0.00	-0.00
	3.50	9.74	16.56	3.76	-0.02	-0.02	0.02	0.00	-0.00	-0.00
	0.60	12.96	16.83	1.41	-0.12	-0.04	-0.01	-0.03	-0.01	-0.00
	0.00	2.05	4.08	-0.41	-0.02	-0.00	0.01	-0.00	-0.00	0.00
	∑=	31.25	49.82	7.30	-0.20	-0.05	0.04	-0.05	-0.01	-0.00

Distribution of seismic forces along height of structure - potres y (-e)

Level	Z [m]	Mode 1			Mode 2			Mode 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	-9.98	163.11	-0.39	-43.17	-2.72	-1.55	-6.76	54.72	-1.03
	3.50	-4.04	106.19	1.00	-12.91	-2.38	-1.72	9.49	59.13	5.78
	0.60	-1.29	36.75	-0.03	-5.21	-0.71	-0.94	0.41	32.19	0.85
	0.00	-0.12	1.05	0.09	-0.53	-0.03	0.44	0.05	2.03	0.03
	∑=	-15.43	307.10	0.67	-61.83	-5.83	-3.77	3.19	148.07	5.63

Level	Z [m]	Mode 4			Mode 5			Mode 6		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	-0.46	0.18	2.00	-3.40	40.79	4.47	4.75	30.20	-0.72
	3.50	0.13	0.20	0.20	-48.48	66.05	2.97	42.49	31.82	1.38
	0.60	0.02	0.15	0.01	-26.82	57.26	-1.70	25.58	31.74	1.57
	0.00	-0.02	0.01	0.08	-3.11	5.06	1.53	3.14	3.57	-1.17
	∑=	-0.34	0.54	2.29	-81.81	169.16	7.27	75.96	97.32	1.05

Level	Z [m]	Mode 7			Mode 8			Mode 9		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	-7.29	3.68	1.52	-1.07	-0.34	-0.67	-23.28	10.97	-12.20
	3.50	-39.64	2.05	-3.87	-3.21	0.48	-1.40	-49.55	11.30	-12.12
	0.60	-30.62	2.86	-1.88	-2.18	2.50	-0.36	-47.30	12.62	-4.62
	0.00	-3.40	0.42	1.36	-0.35	-0.18	0.05	-7.54	2.44	1.33
	∑=	-80.95	9.01	-2.87	-6.81	2.45	-2.39	-127.67	37.33	-27.61

Level	Z [m]	Mode 10			Mode 11			Mode 12		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
	6.50	6.50	12.35	2.54	-0.03	0.01	0.02	-0.01	0.00	-0.00
	3.50	9.74	16.56	3.76	-0.02	-0.02	0.02	0.00	-0.00	-0.00
	0.60	12.96	16.83	1.41	-0.12	-0.04	-0.01	-0.03	-0.01	-0.00
	0.00	2.05	4.08	-0.41	-0.02	-0.00	0.01	-0.00	-0.00	0.00
	∑=	31.25	49.82	7.30	-0.20	-0.05	0.04	-0.05	-0.01	-0.00

Distribution factors - relative share				
Mode \ Name	1. potres x (+e)	2. potres x (-e)	3. potres y (+e)	4. potres y (-e)
1	0.020	0.020	0.349	0.349
2	0.339	0.339	0.014	0.014
3	0.016	0.016	0.165	0.165
4	0.000	0.000	0.001	0.001
5	0.005	0.005	0.217	0.217
6	0.158	0.158	0.083	0.083
7	0.196	0.196	0.037	0.037
8	0.009	0.009	0.005	0.005
9	0.191	0.191	0.085	0.085
10	0.056	0.056	0.045	0.045
11	0.006	0.006	0.000	0.000
12	0.003	0.003	0.000	0.000

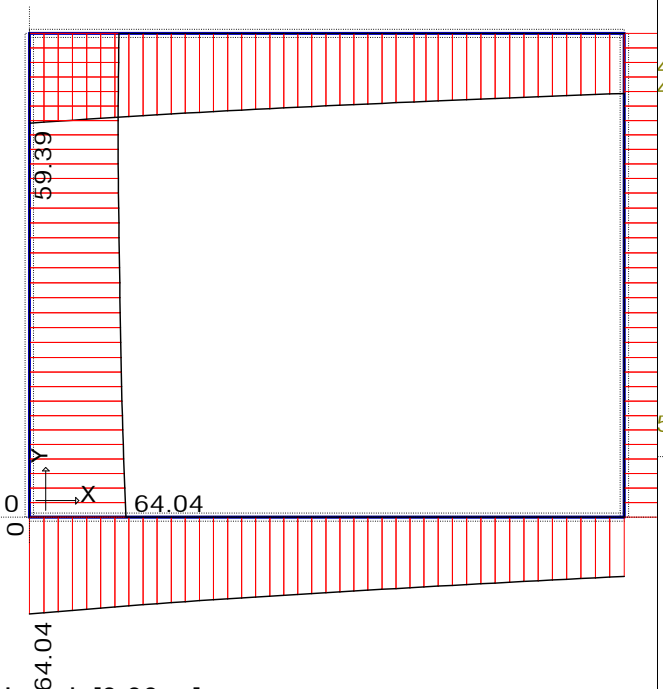
Distribution factors - mass involvement		
Mode	U [α=0°]	U [α=90°]
Only mass above foundations level is taken into account		
The level of foundation:	0.60 m	
Total mass above foundation:	350.45 T	
Total mass of the structure:	564.61 T	
1	0.09	34.82
2	35.63	0.31
3	0.01	20.35
4	0.03	0.06
5	3.59	14.32

Mode	U [α=0°]	U [α=90°]
6	7.31	11.56
7	15.88	0.21
8	0.89	0.01
9	18.69	1.78
10	1.82	5.82
11	0.15	0.01
12	0.09	0.00
ΣU (%)	84.18	89.24

Base shear forces [0.60 m]		
Load case	Angle α[°]	VtB[kN]
potres x	0	383.77
potres y	90	374.42

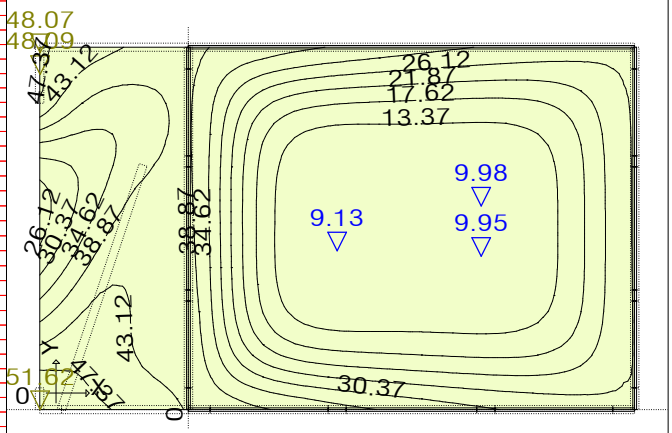
Structural analysis

Load 9: I+II+III+IV



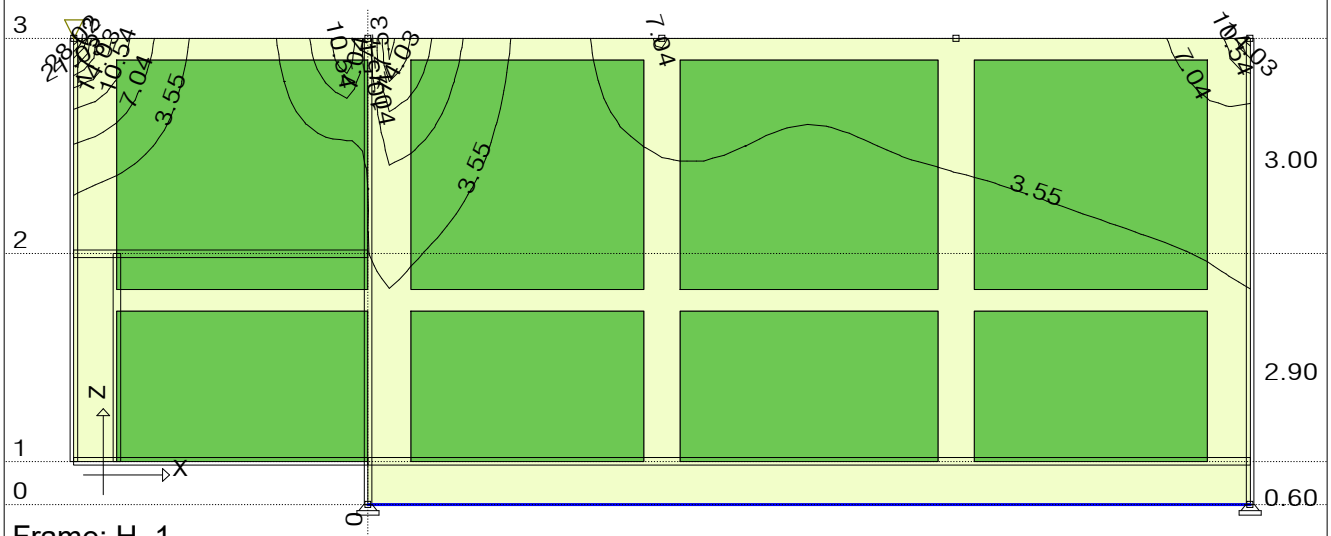
Level: [0.00 m]
Linear Support Results: max r2= 64.04 / min r...

Load 9: I+II+III+IV



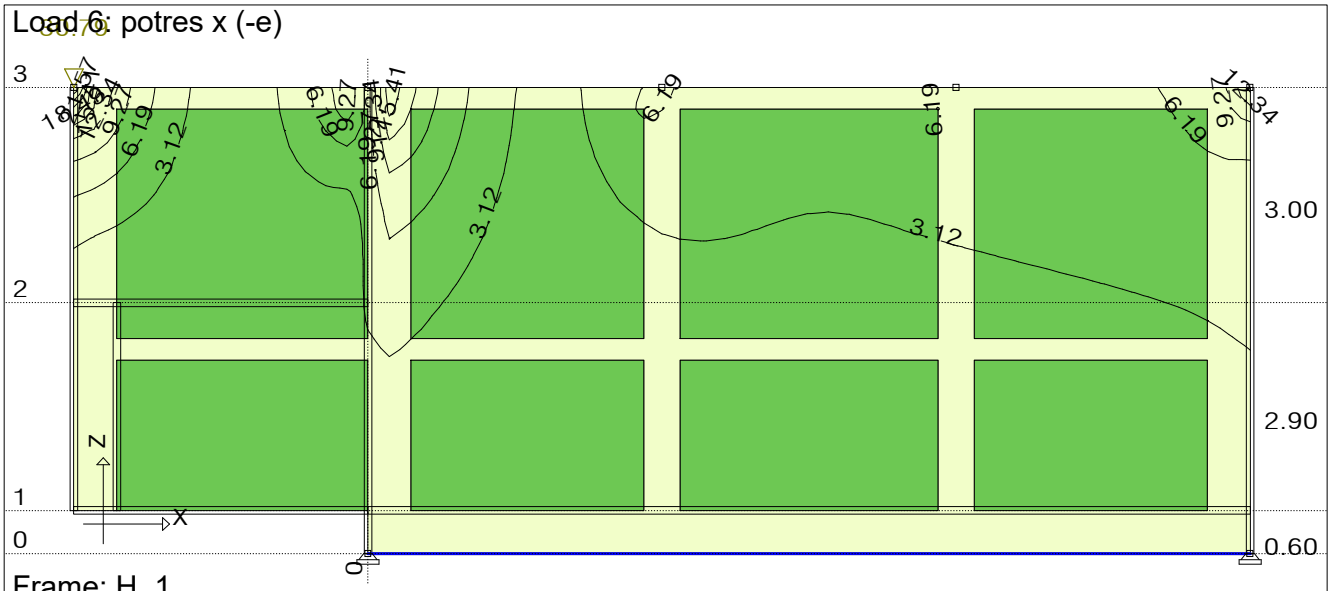
Level: [0.60 m]
Area Support Results: max σ,soil= 51.62 / min...

Load 5: potres x (+e)



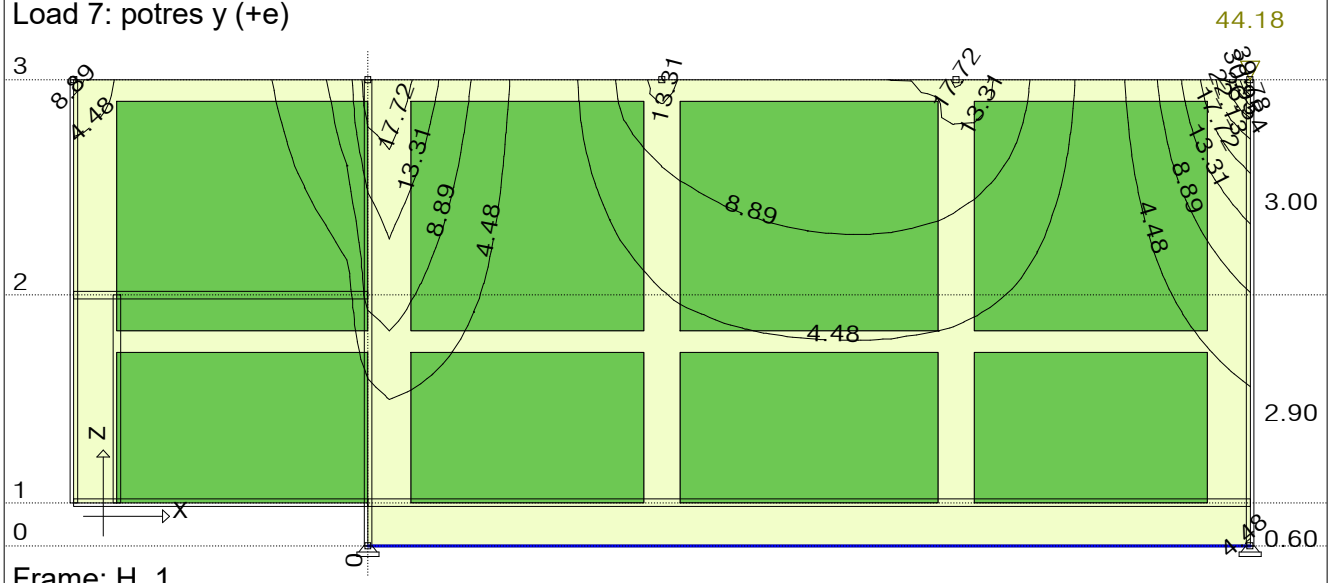
Frame: H_1
Slab Results: max Mx= 35.00 / min Mx= 0.05 kNm/m

Load 6: potres x (-e)



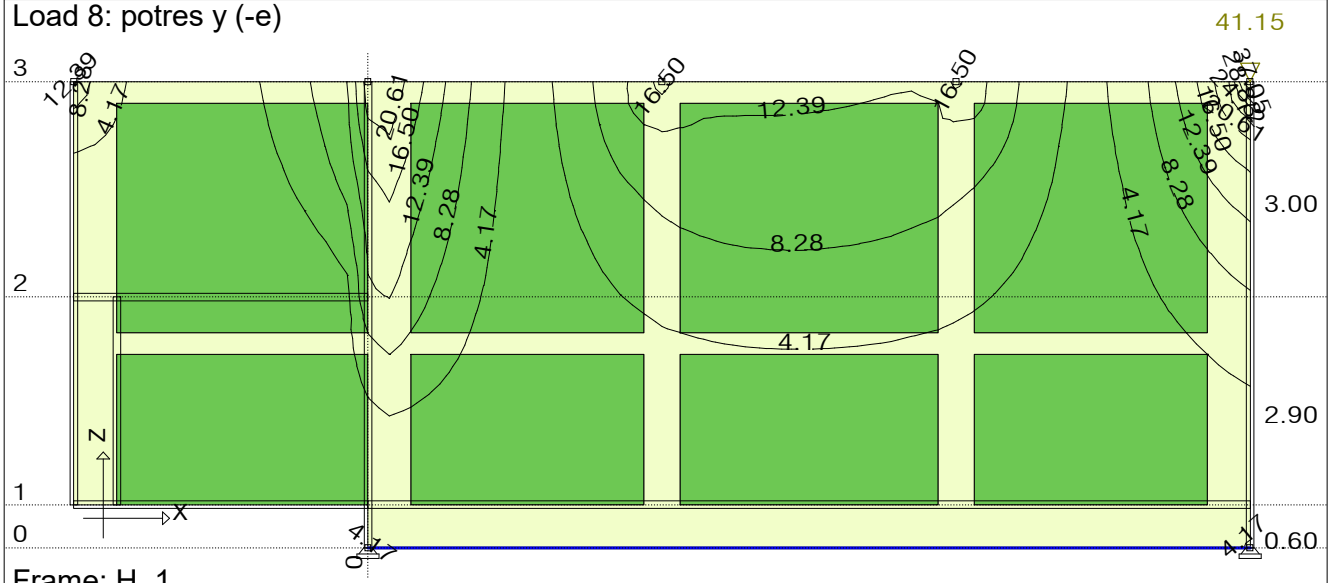
Frame: H_1
Slab Results: max Mx= 30.79 / min Mx= 0.05 kNm/m

Load 7: potres y (+e)



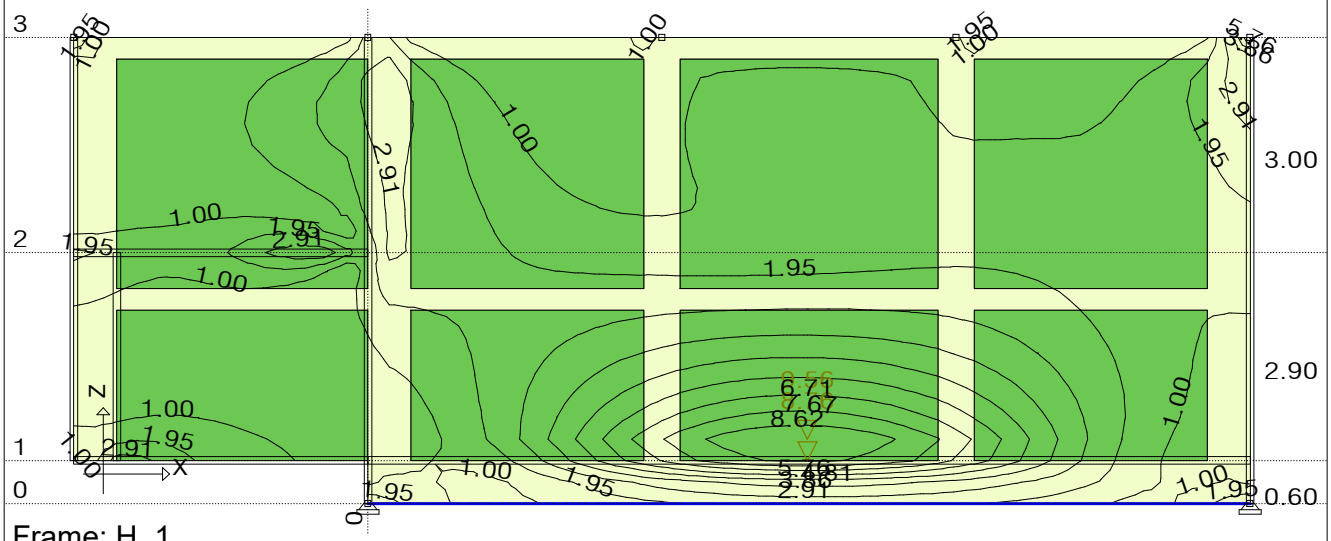
Frame: H_1
Slab Results: max Mx= 44.18 / min Mx= 0.07 kNm/m

Load 8: potres y (-e)



Frame: H_1
Slab Results: max Mx= 41.15 / min Mx= 0.06 kNm/m

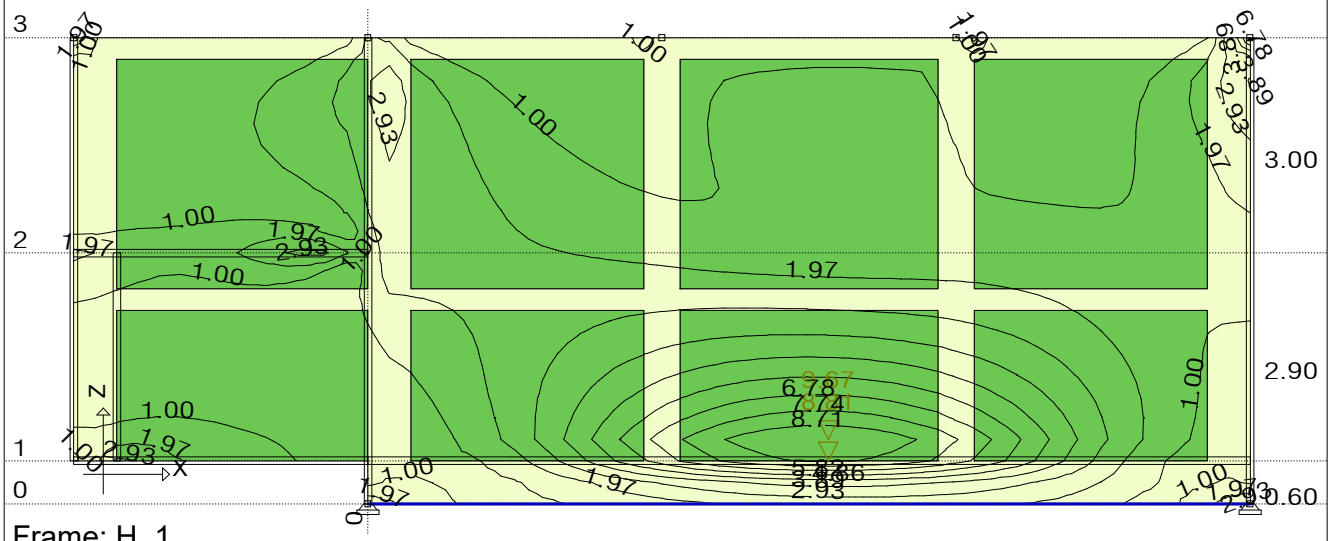
Load 8: potres y (-e)



Frame: H_1

Slab Results: max My= 9.56 / min My= 0.05 kNm/m

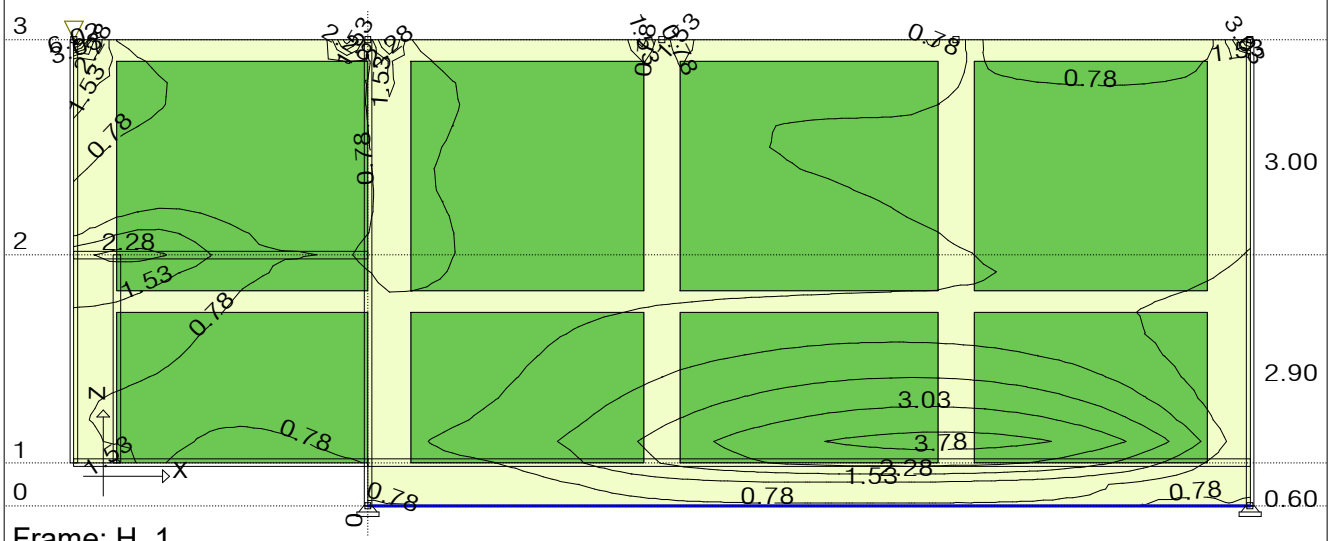
Load 7: potres y (+e)



Frame: H_1

Slab Results: max My= 9.67 / min My= 0.05 kNm/m

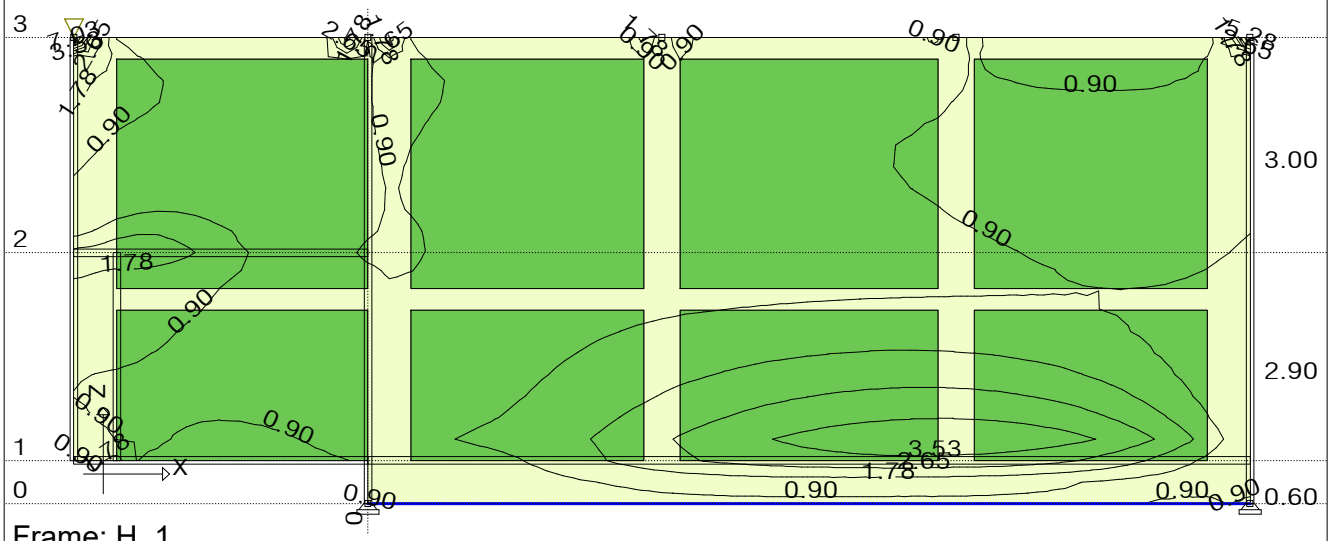
Load 6: potres x (-e)



Frame: H_1

Slab Results: max My= 7.52 / min My= 0.04 kNm/m

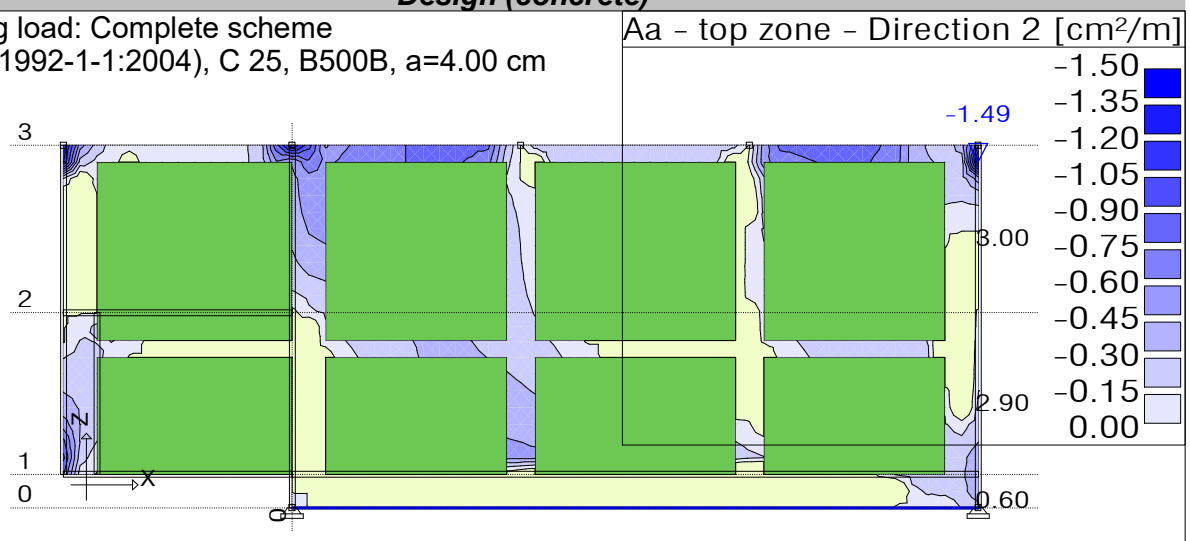
Load 5: potres x (+e)



Frame: H_1
Slab Results: max My= 8.78 / min My= 0.04 kNm/m

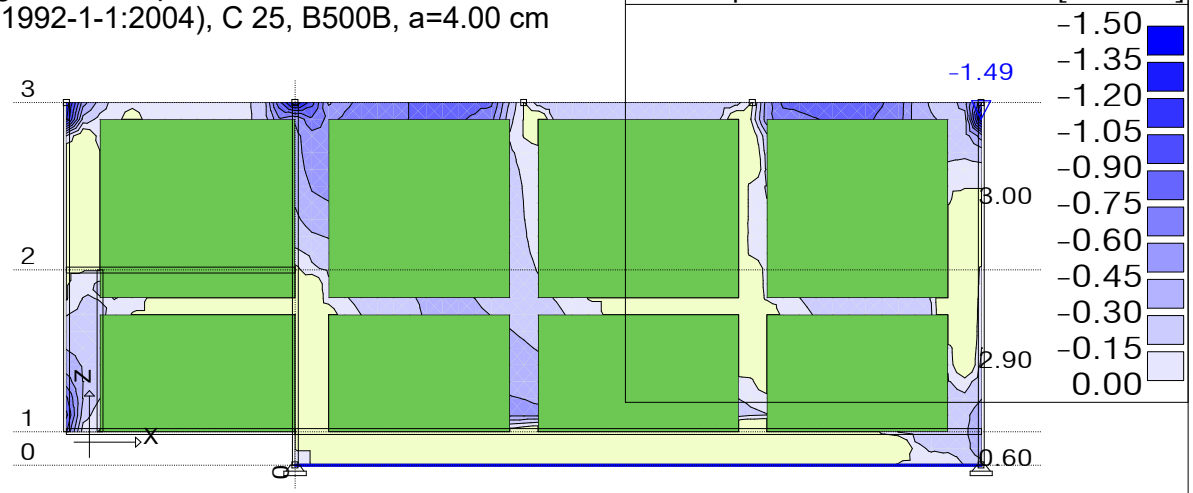
Design (concrete)

Governing load: Complete scheme
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



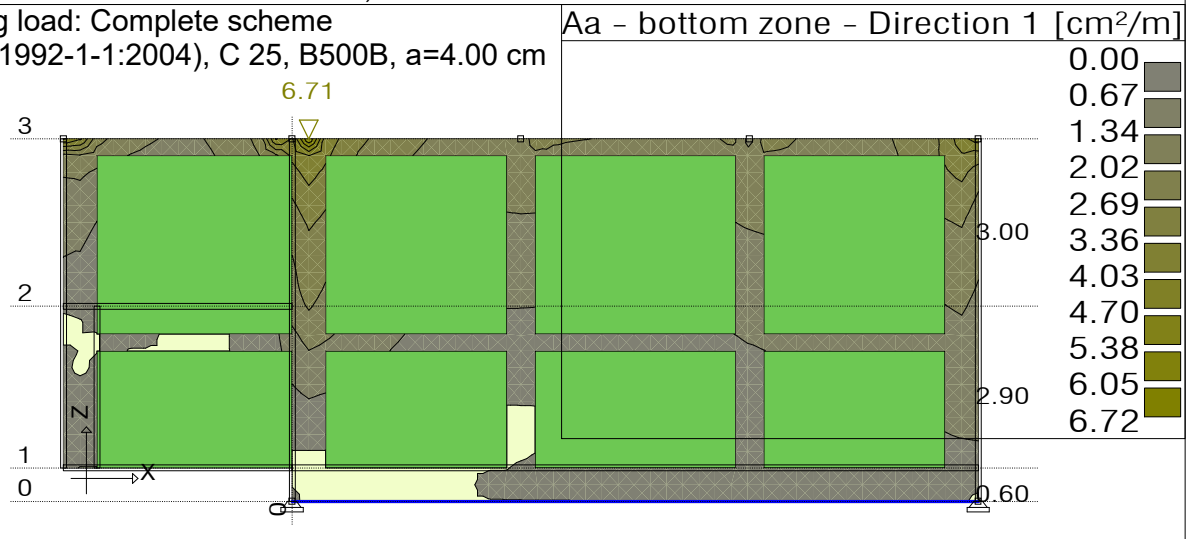
Frame: H_1
Aa - top zone - Direction 2 - max Aa2,u= -1.49 cm²/m

Governing load: Complete scheme
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



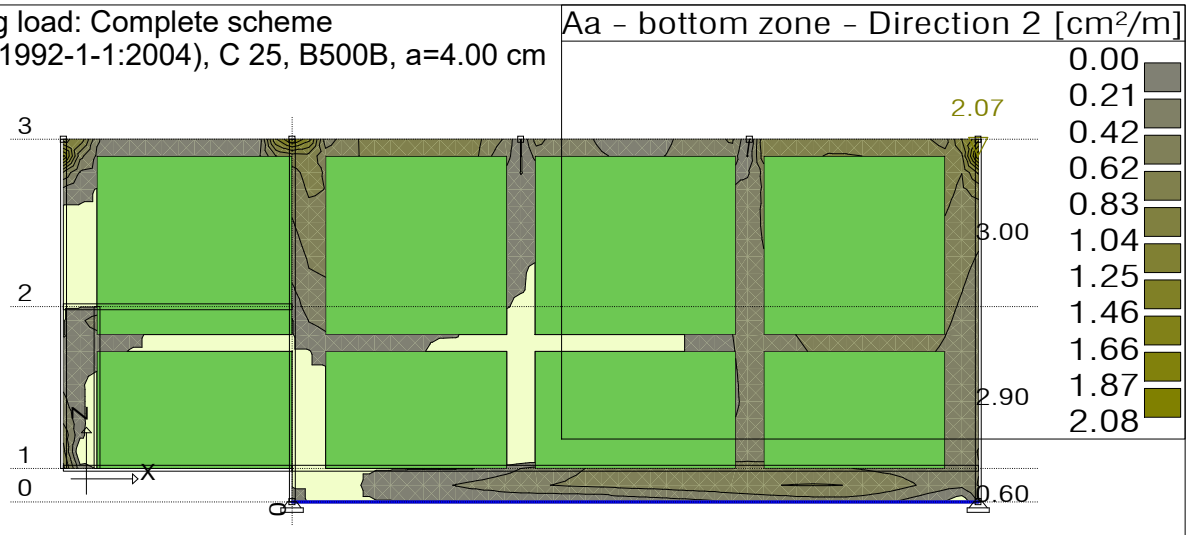
Frame: H_1
Aa - top zone - Direction 2 - max Aa2,u= -1.49 cm²/m

Governing load: Complete scheme
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



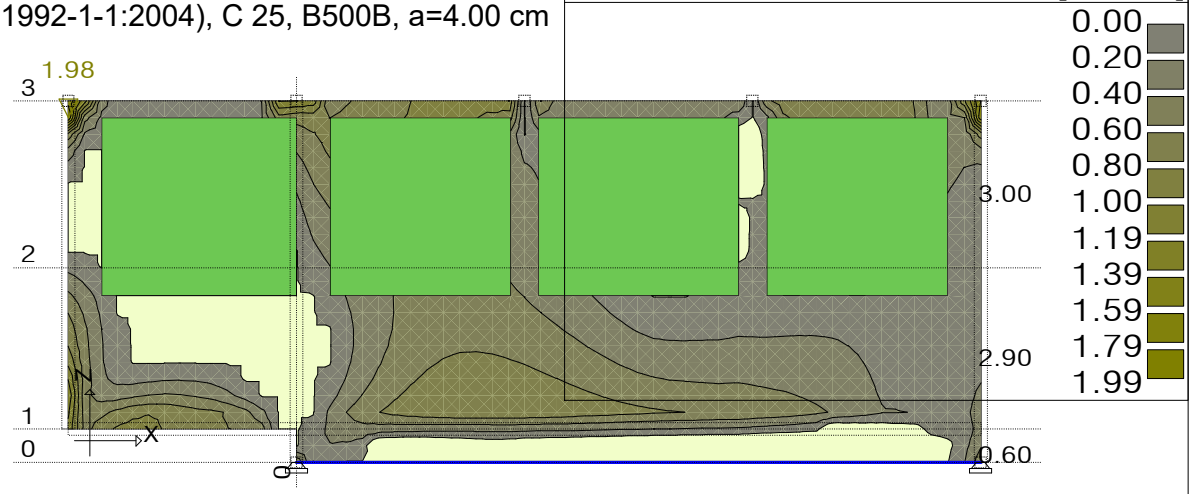
Frame: H_1
Aa - bottom zone - Direction 1 - max Aa1,d= 6.71 cm²/m

Governing load: Complete scheme
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



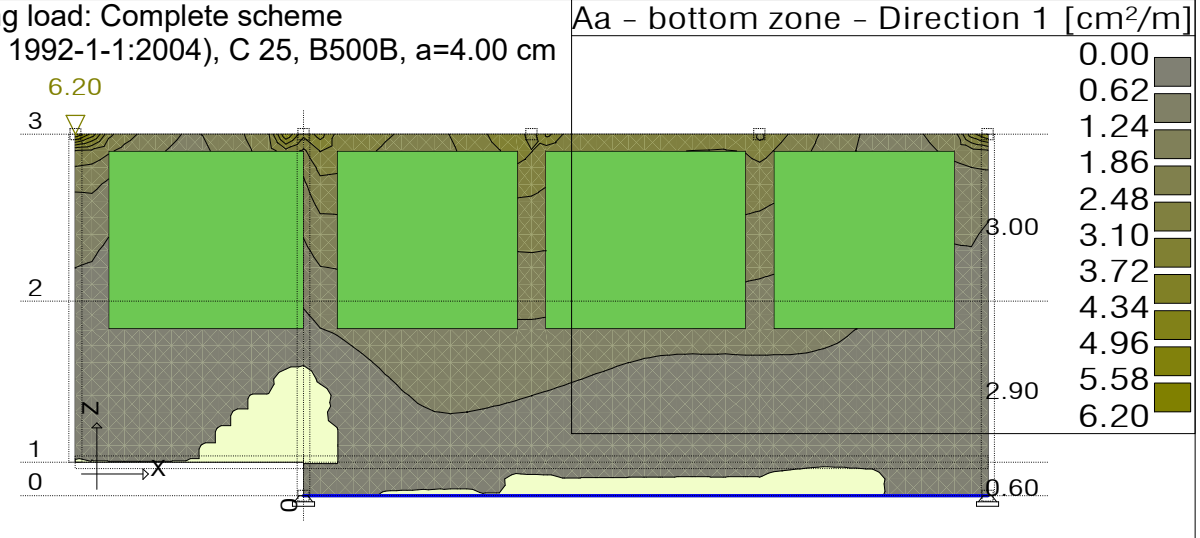
Frame: H_1
Aa - bottom zone - Direction 2 - max Aa2,d= 2.07 cm²/m

Governing load: Complete scheme
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



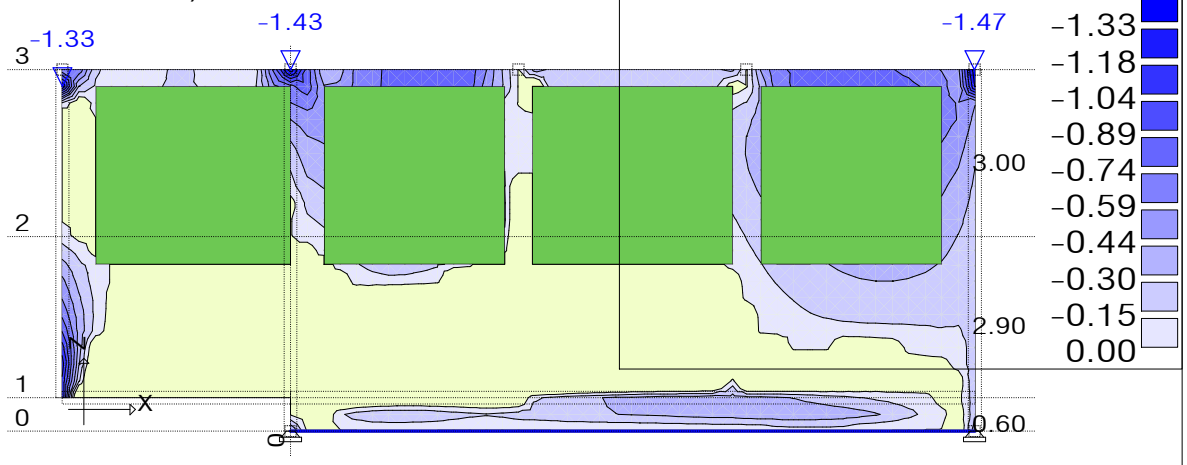
Frame: H_2
Aa - bottom zone - Direction 2 - max Aa2,d= 1.98 cm²/m

Governing load: Complete scheme
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



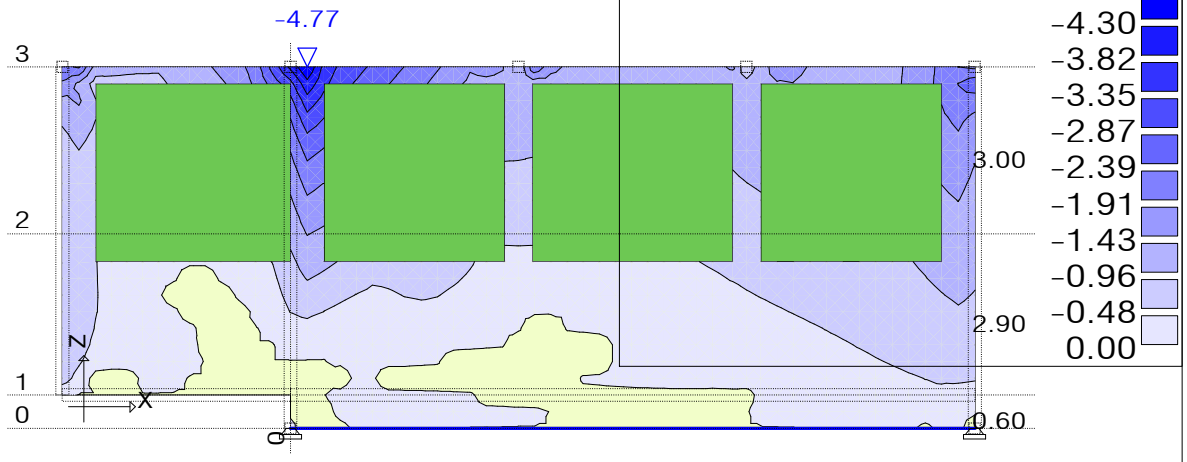
Frame: H_2
Aa - bottom zone - Direction 1 - max Aa1,d= 6.20 cm²/m

Governing load: Complete scheme
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



Frame: H_2
Aa - top zone - Direction 2 - max Aa2,u= -1.47 cm²/m

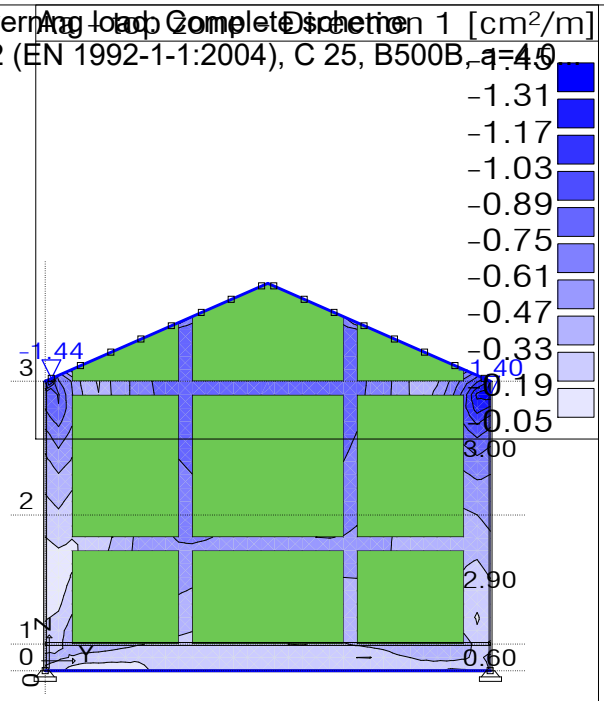
Governing load: Complete scheme
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



Frame: H_2
Aa - top zone - Direction 1 - max Aa1,u= -4.77 cm²/m

Governing load Combination
EC2 (EN 1992-1-1:2004), C 25, B500B, a=40...

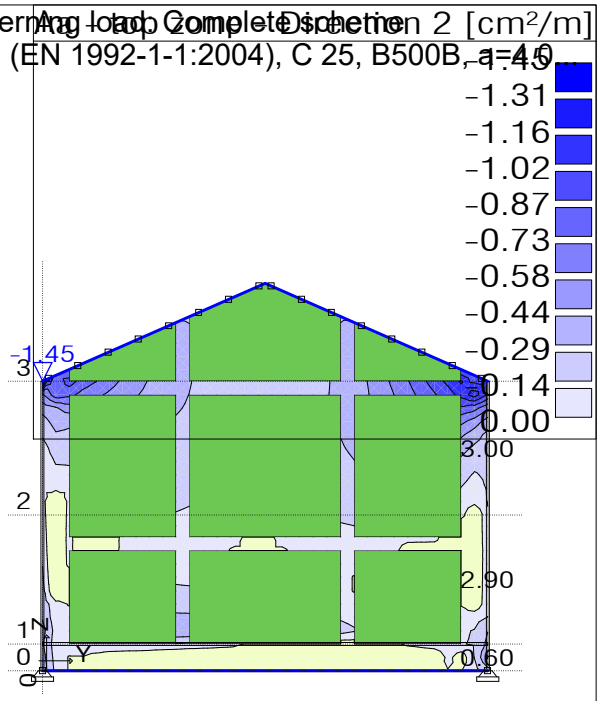
Aa - top zone - Direction 1 [cm²/m]



Frame: V_2
Aa - top zone - Direction 1 - max Aa1,u= -1.4...

Governing load Combination
EC2 (EN 1992-1-1:2004), C 25, B500B, a=40...

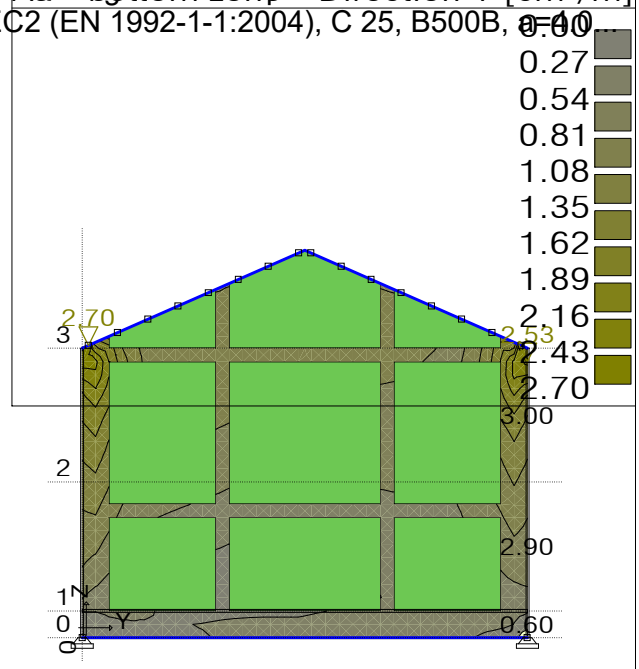
Aa - top zone - Direction 2 [cm²/m]



Frame: V_2
Aa - top zone - Direction 2 - max Aa2,u= -1.4...

Governing load Combination
EC2 (EN 1992-1-1:2004), C 25, B500B, a=40...

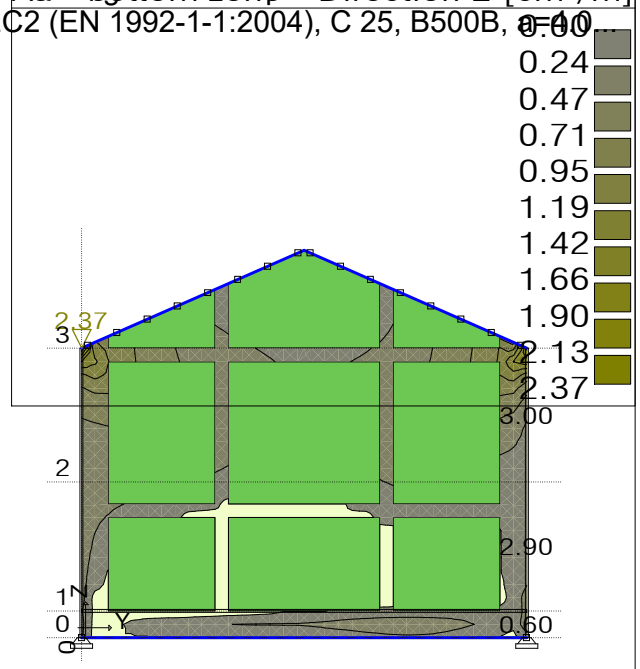
Aa - bottom zone - Direction 1 [cm²/m]



Frame: V_2
Aa - bottom zone - Direction 1 - max Aa1,d= 2...

Governing load Combination
EC2 (EN 1992-1-1:2004), C 25, B500B, a=40...

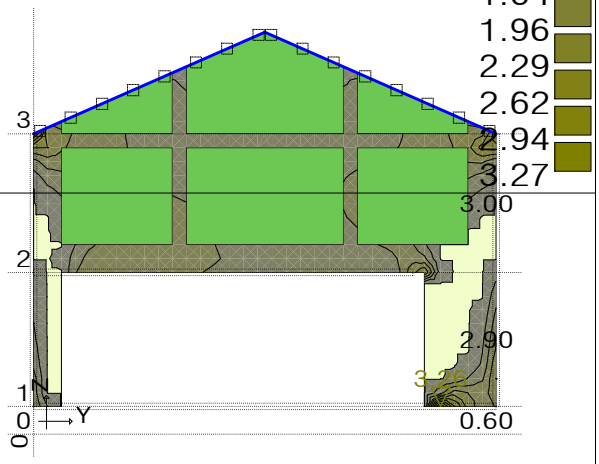
Aa - bottom zone - Direction 2 [cm²/m]



Frame: V_2
Aa - bottom zone - Direction 2 - max Aa2,d= 2...

Governing load Combination
EC2 (EN 1992-1-1:2004), C 25, B500B, a=40...

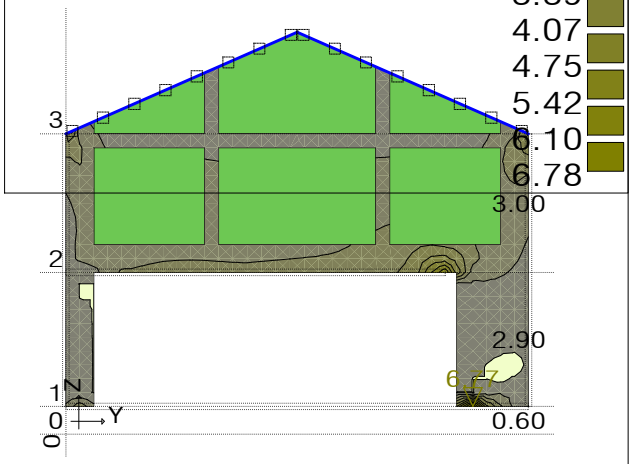
Aa - bottom zone - Direction 2 [cm²/m]



Frame: V_5
Aa - bottom zone - Direction 2 - max Aa2,d= 3...

Governing load Combination
EC2 (EN 1992-1-1:2004), C 25, B500B, a=40...

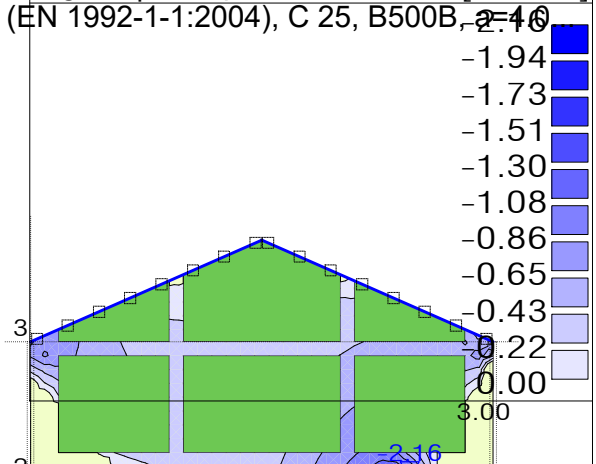
Aa - bottom zone - Direction 1 [cm²/m]



Frame: V_5
Aa - bottom zone - Direction 1 - max Aa1,d= 6...

Governing load Combination
EC2 (EN 1992-1-1:2004), C 25, B500B, a=40...

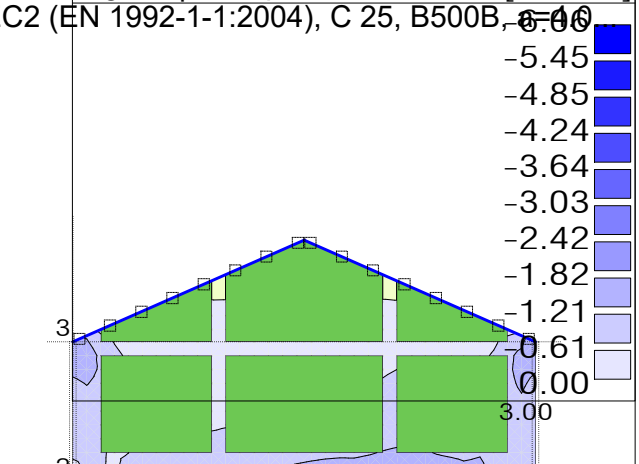
Aa - top zone - Direction 2 [cm²/m]



Frame: V_5
Aa - top zone - Direction 2 - max Aa2,u= -2.1...

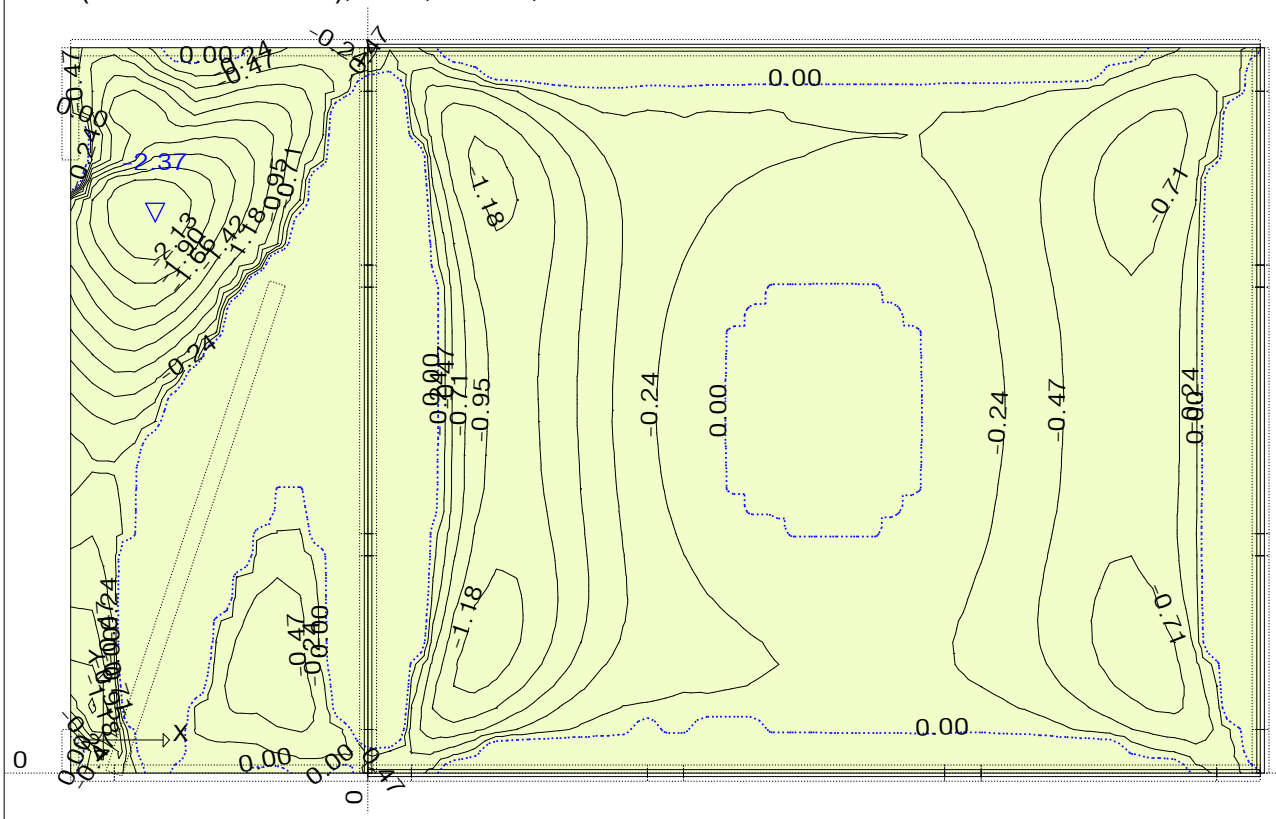
Governing load Combination
EC2 (EN 1992-1-1:2004), C 25, B500B, a=40...

Aa - top zone - Direction 1 [cm²/m]



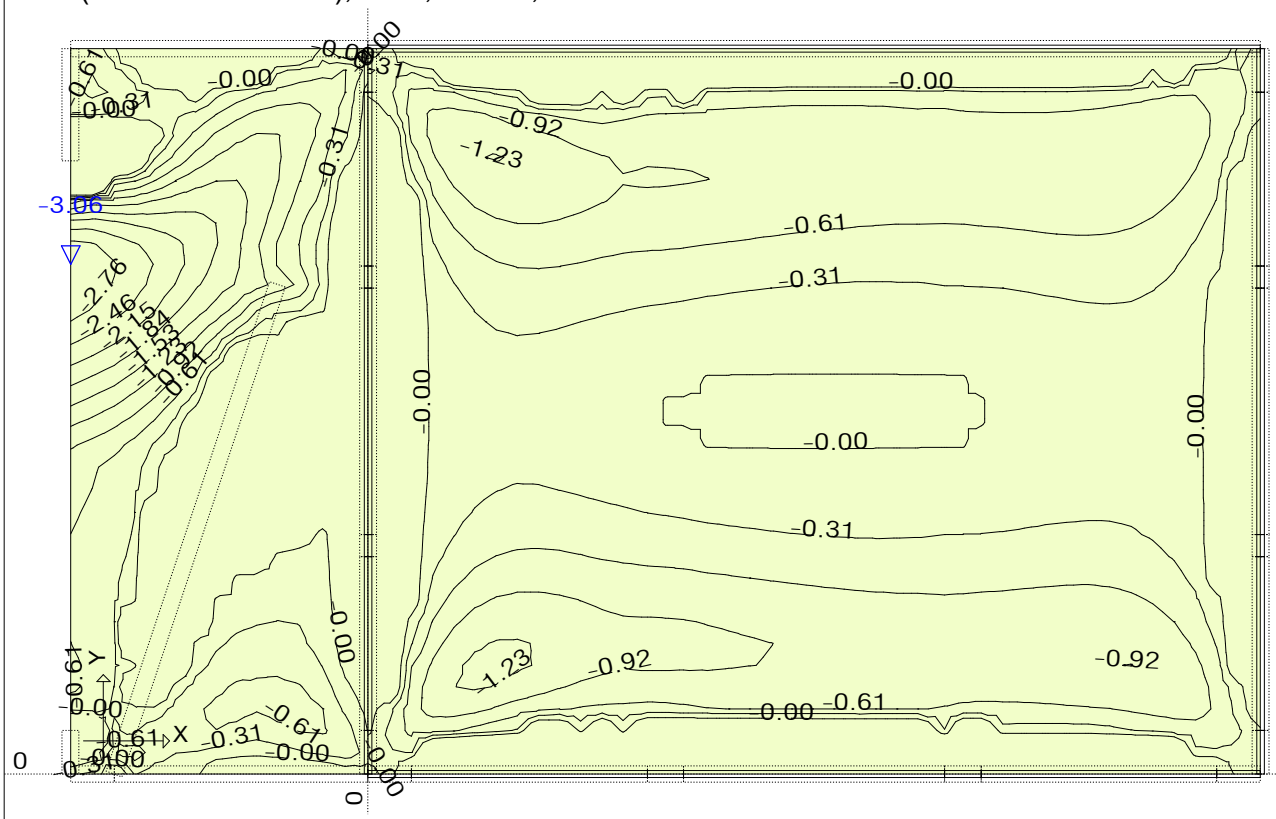
Frame: V_5
Aa - top zone - Direction 1 - max Aa1,u= -6.0...

Governing load: Complete scheme
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



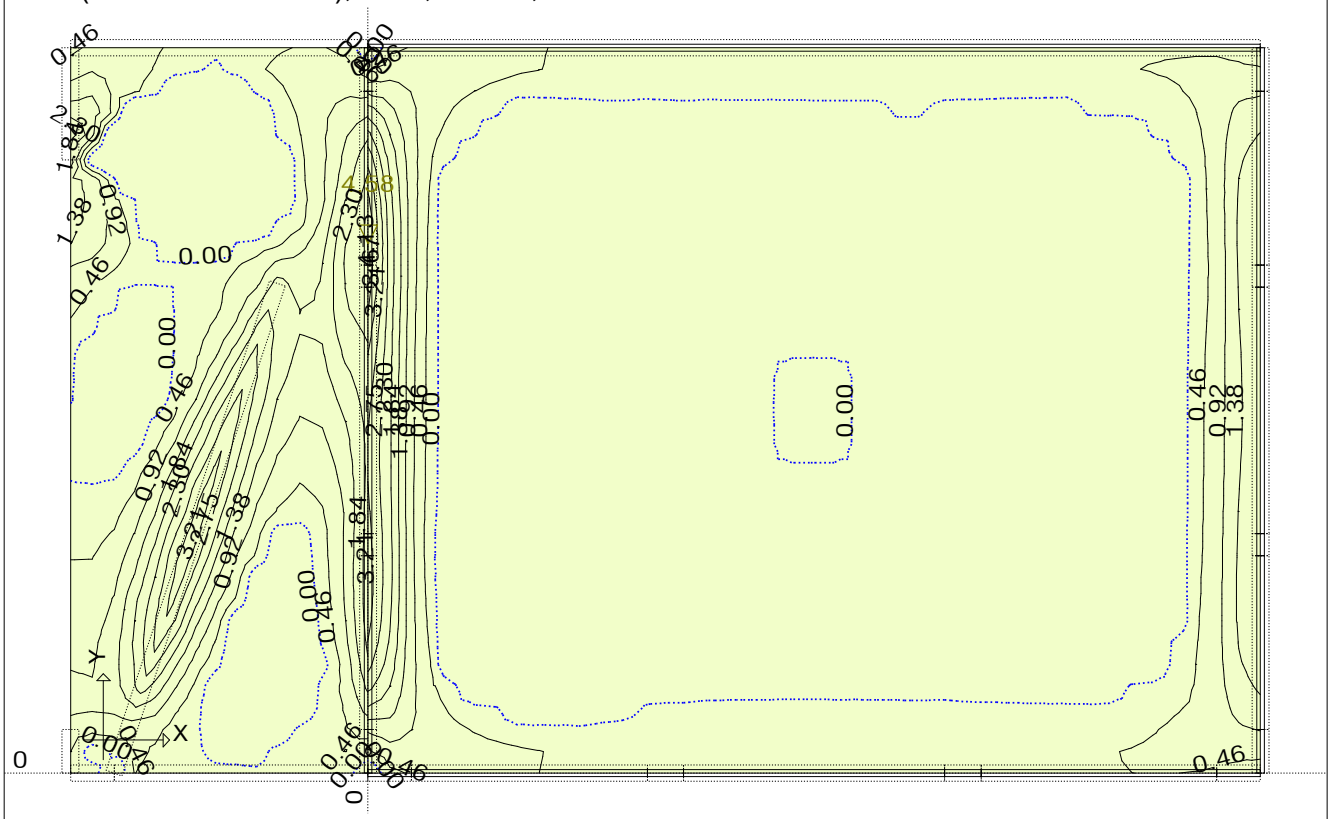
Level: [0.60 m]
Aa - top zone - Direction 1 - max Aa1,u= -2.37 cm²/m

Governing load: Complete scheme
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



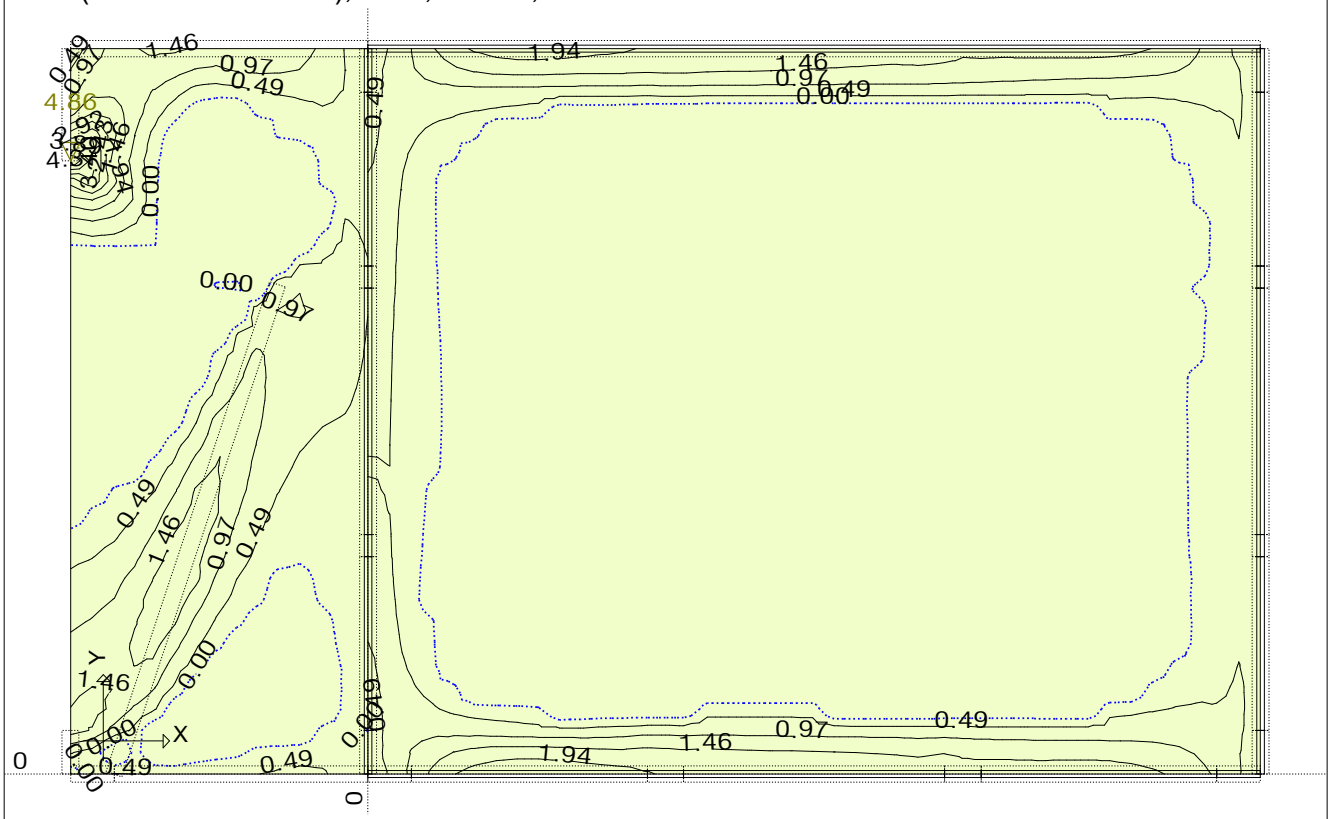
Level: [0.60 m]
Aa - top zone - Direction 2 - max Aa2,u= -3.06 cm²/m

Governing load: Complete scheme
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



Level: [0.60 m]
Aa - bottom zone - Direction 1 - max Aa1,d= 4.58 cm²/m

Governing load: Complete scheme
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



Level: [0.60 m]
Aa - bottom zone - Direction 2 - max Aa2,d= 4.86 cm²/m

Contents

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Input Data

Input data - Structure 3

Input data - Load 10

Results

Design (concrete) 16

Basic model properties

Database:	prizidek.twp
Analysis date:	17.12.2025

Analysis type: 3D model

☒ Linear theory ☐ Modal Analysis ☐ Stability

☐ Non-linear theory ☐ Seismic analysis ☐ Stage Construction

☐ Non linear analysis

Model size

Number of nodes:	3143
Number of area elements:	2971
Number of beams:	133
Number of boundary elements:	11349
Number of primary load cases:	4
Number of load case combinations:	0

Units

Length:	m [cm,mm]
Force:	kN
Temperature:	Celsius

Input data - Structure

Level scheme

Name	z [m]	h [m]
	3.20	0.30
	2.90	2.90

Name	z [m]	h [m]
	0.00	

Table of materials

No	Material name	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	Opeka/Blokovi	3.100e+7	0.20	25.00	1.000e-5	3.100e+7	0.20
3	Jeklo	2.100e+8	0.30	78.50	1.000e-5	2.100e+8	0.30

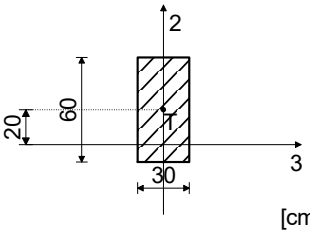
Slab sets

No	t[m]	e[m]	Material	Analysis type	Orthotropy	E2[kN/m2]	G[kN/m2]	α
<1>	0.300	0.150	1	Thin slab	Isotrophy			
<2>	0.200	0.100	1	Thin slab	Isotrophy			
<3>	0.250	0.125	1	Thin slab	Isotrophy			
<4>	0.300	0.150	2	Masonry	Isotrophy			
<5>	0.250	0.125	2	Masonry	Isotrophy			

Beam sets

Set: 1 Section: b/d=30/60, Approx. eccentricity

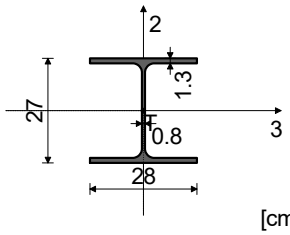
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.800e-1	1.500e-1	1.500e-1	3.708e-3	1.350e-3	5.400e-3



[cm]

Set: 2 Section: IPBl 280, Approx. eccentricity

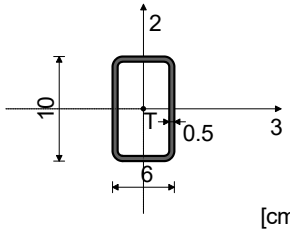
Mat.	A1	A2	A3	I1	I2	I3
3 - Jeklo	9.730e-3	3.178e-3	6.552e-3	6.240e-7	4.760e-5	1.367e-4



[cm]

Set: 3 Section: HOP [] 100x60x5, Approx. eccentricity

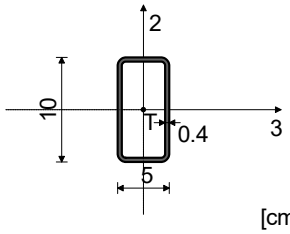
Mat.	A1	A2	A3	I1	I2	I3
3 - Jeklo	1.436e-3	1.000e-3	6.000e-4	1.867e-6	8.071e-7	1.808e-6



[cm]

Set: 4 Section: HOP [] 100x50x4, Approx. eccentricity

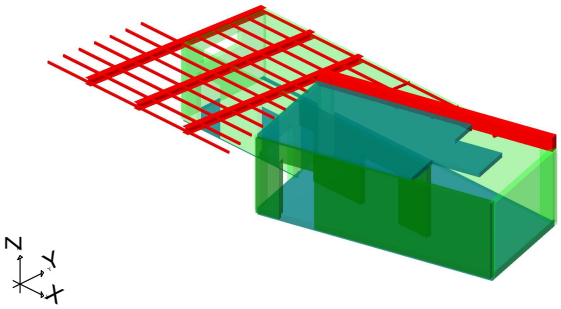
Mat.	A1	A2	A3	I1	I2	I3
3 - Jeklo	1.095e-3	8.000e-4	4.000e-4	1.124e-6	4.490e-7	1.341e-6



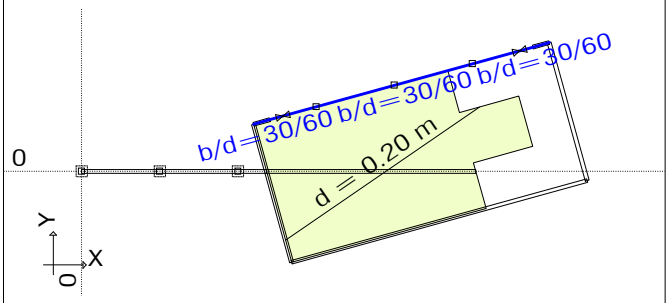
[cm]

Area support sets

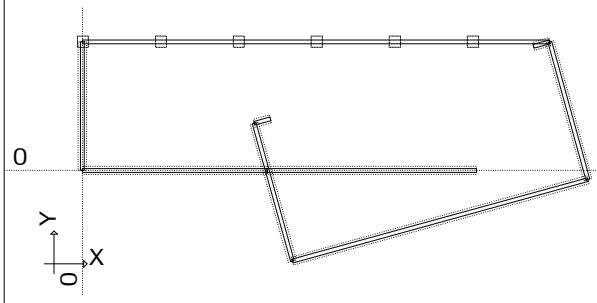
Set	K,R1	K,R2	K,R3
1	2.000e+4	2.500e+4	2.500e+4



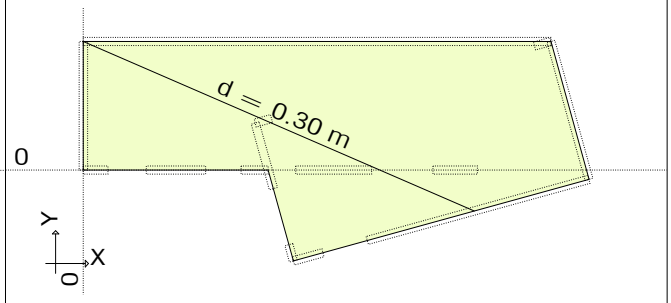
Isometric



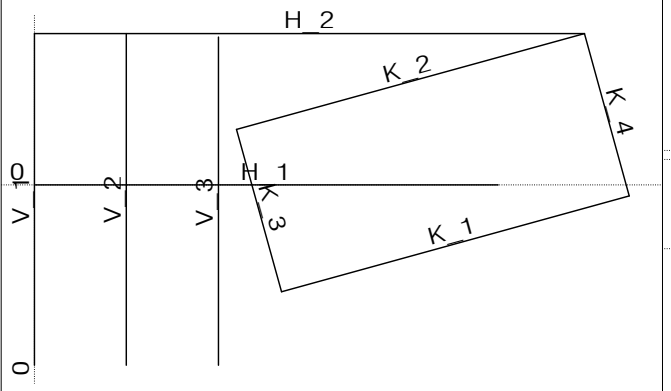
Level: [3.20 m]



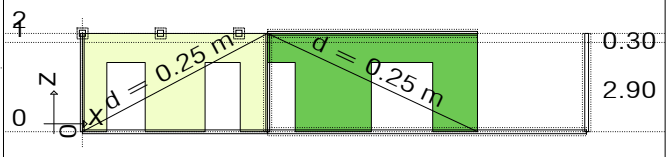
Level: [2.90 m]



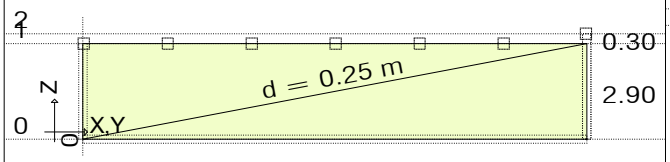
Level: [0.00 m]



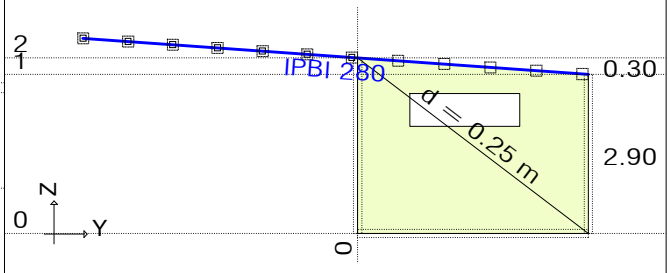
Frame disposition



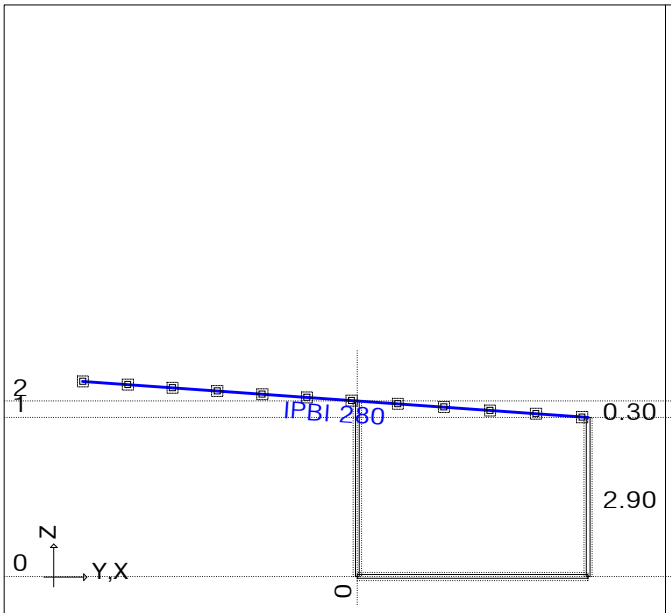
Frame: H_1



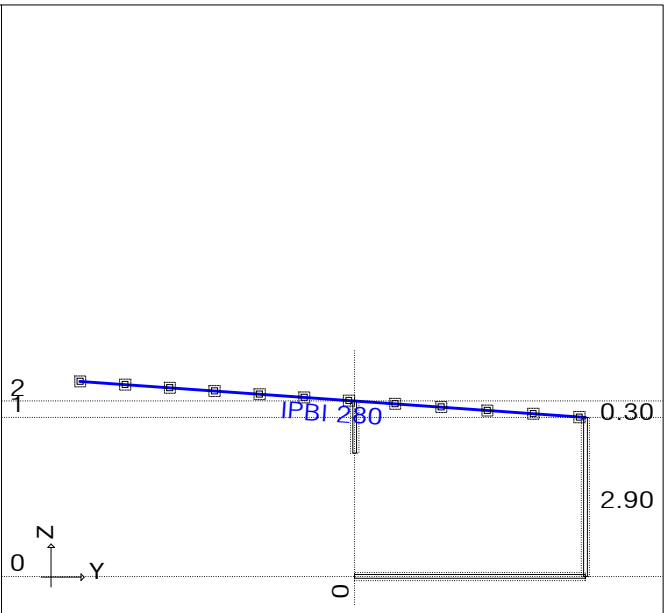
Frame: H_2



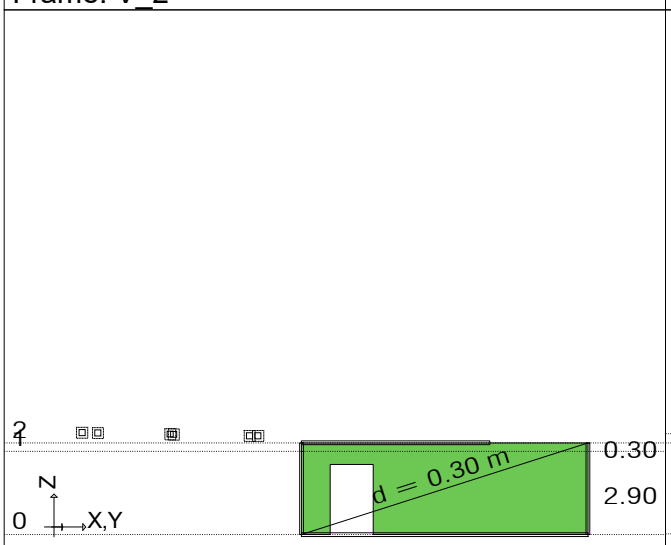
Frame: V_1



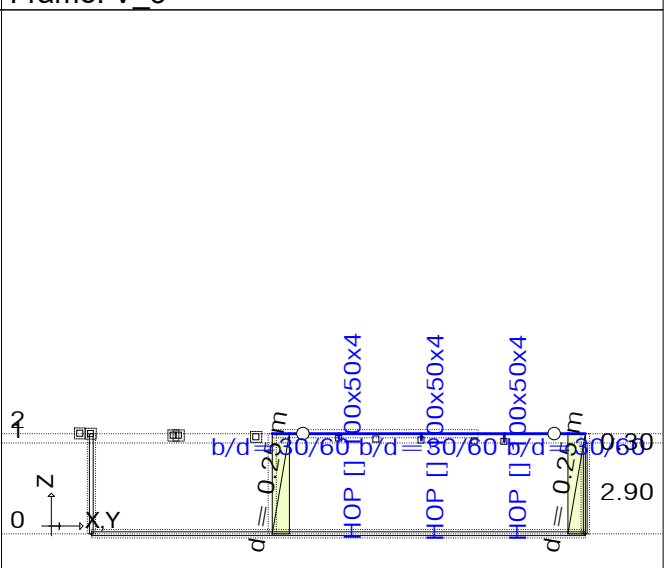
Frame: V_2



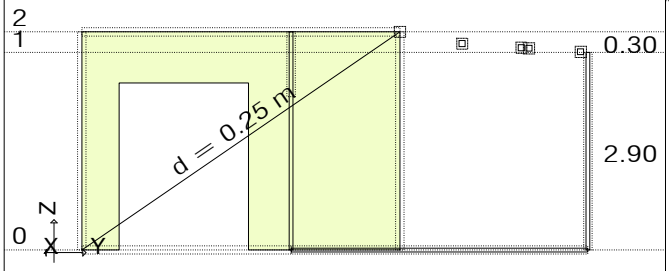
Frame: V_3



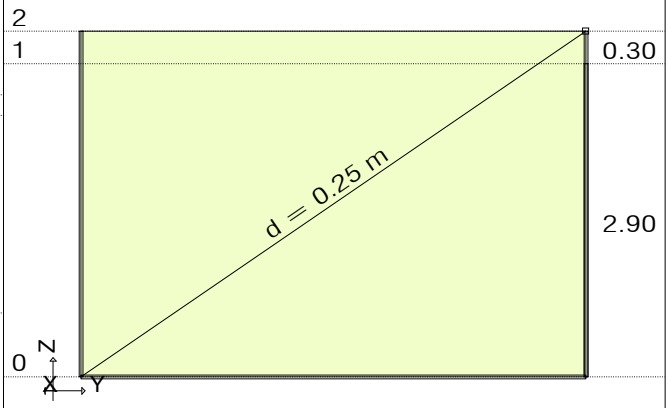
Frame: K_1



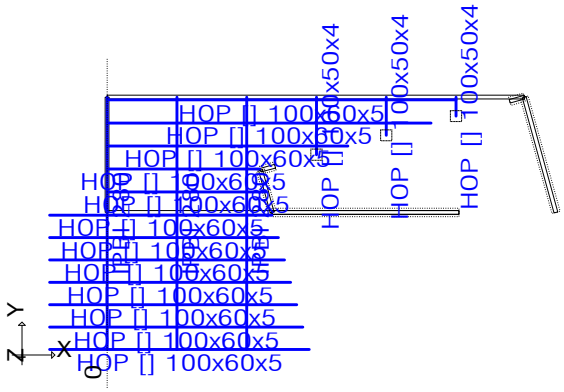
Frame: K_2



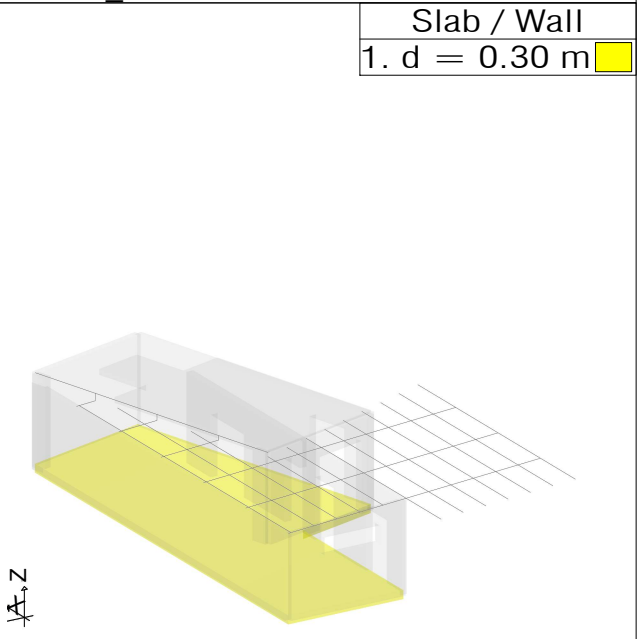
Frame: K_3



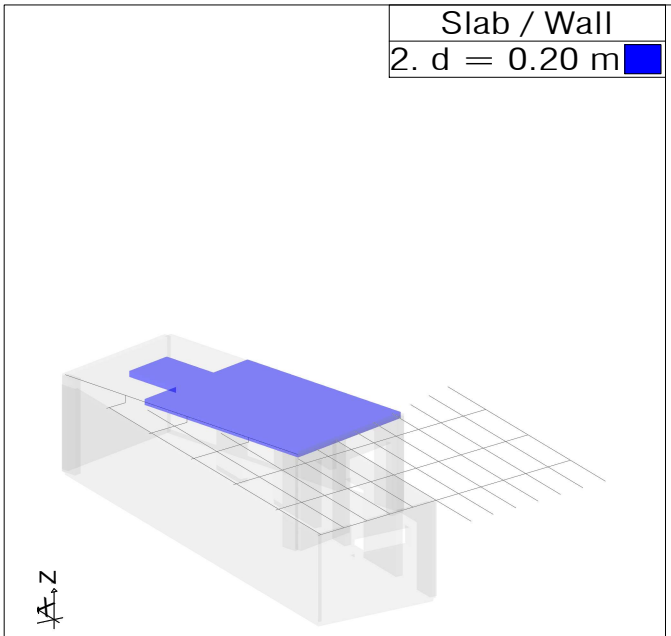
Frame: K_4



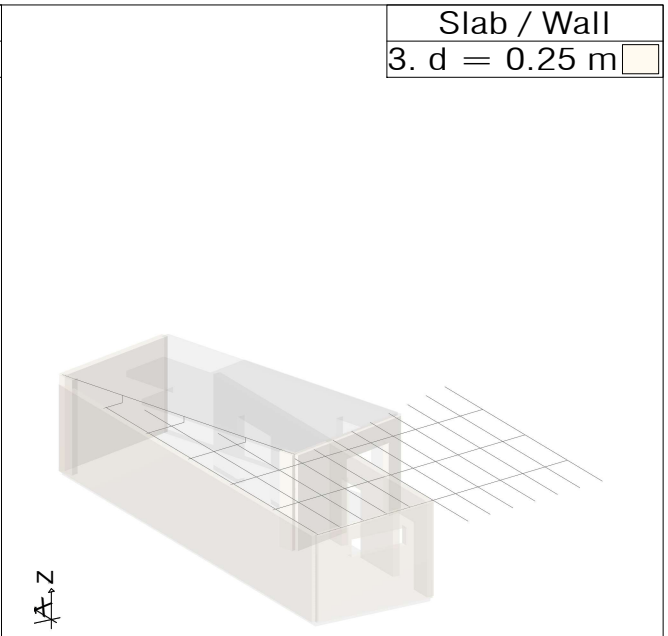
View: konzolna streha



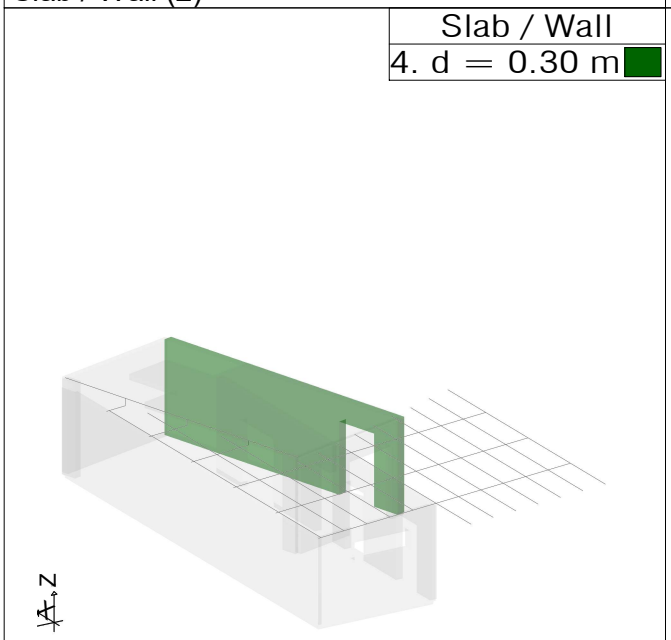
Numerical data set
Slab / Wall (1)



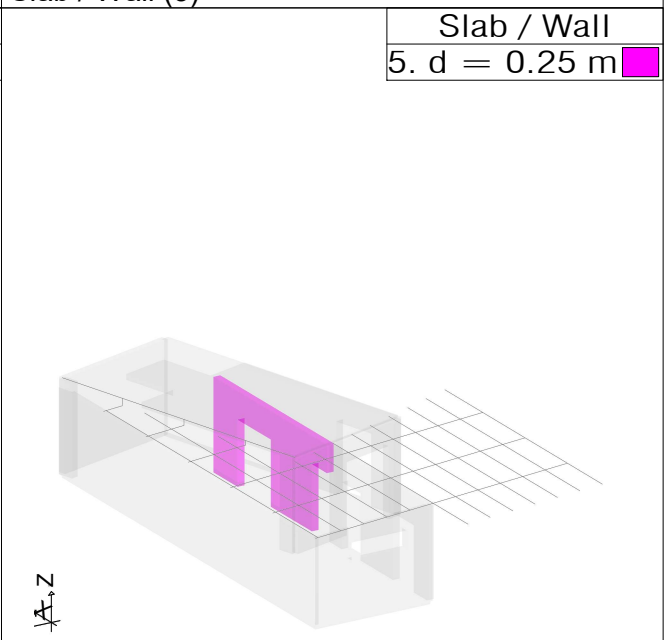
Numerical data set
Slab / Wall (2)



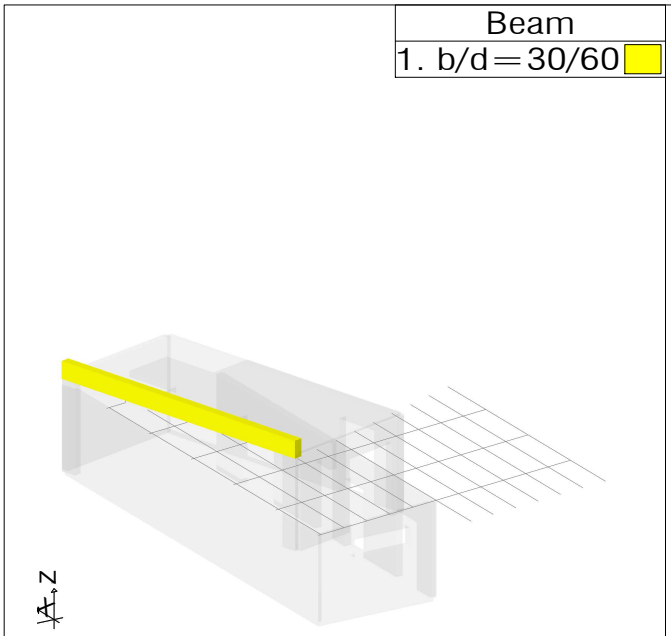
Numerical data set
Slab / Wall (3)



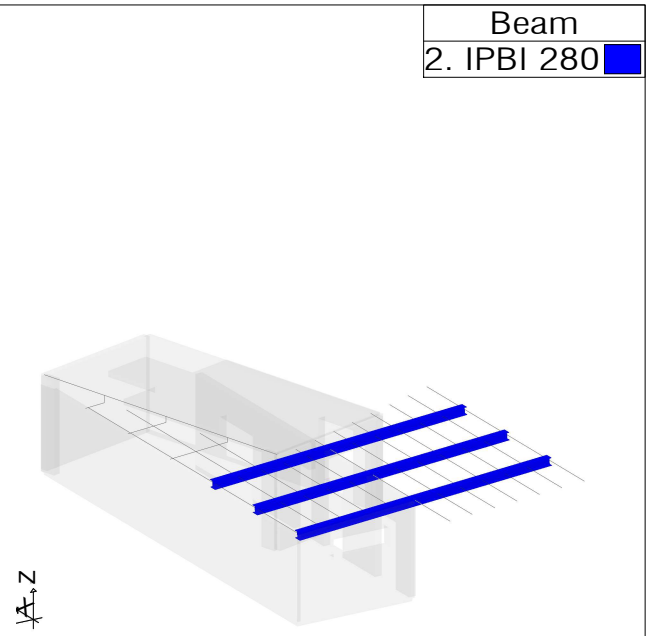
Numerical data set
Slab / Wall (4)



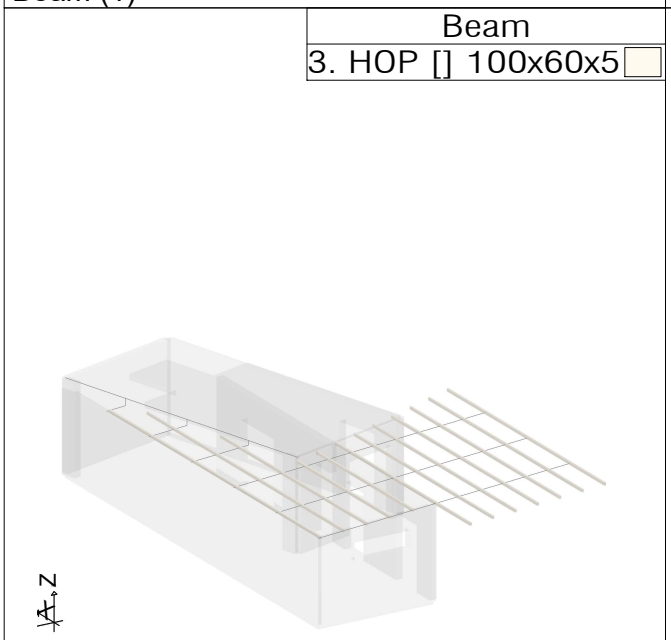
Numerical data set
Slab / Wall (5)



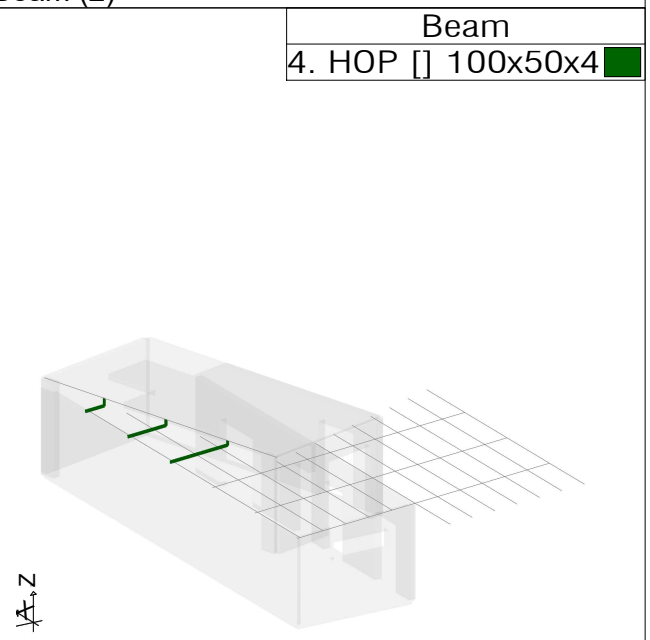
Numerical data set
Beam (1)



Numerical data set
Beam (2)



Numerical data set
Beam (3)



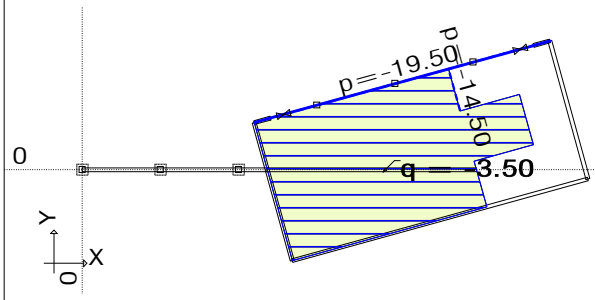
Numerical data set
Beam (4)

Input data - Load

Load cases list

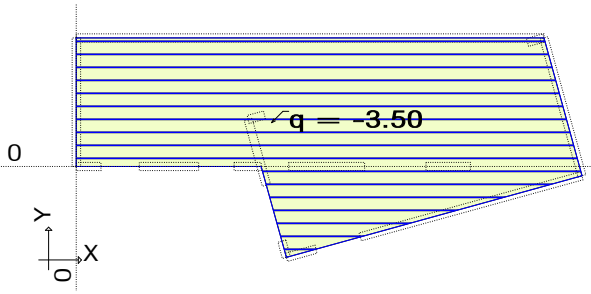
LC	Name
1	LASTNA + STALNA (g)
2	KORISTNA
3	SNEG
4	ZEMELJSKI PRITISK

Load 1: LASTNA + STALNA (g)



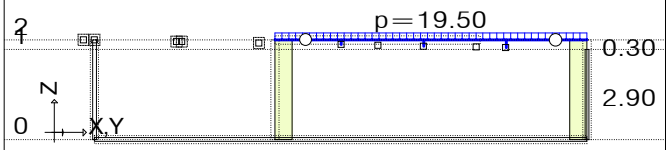
Level: [3.20 m]

Load 1: LASTNA + STALNA (g)



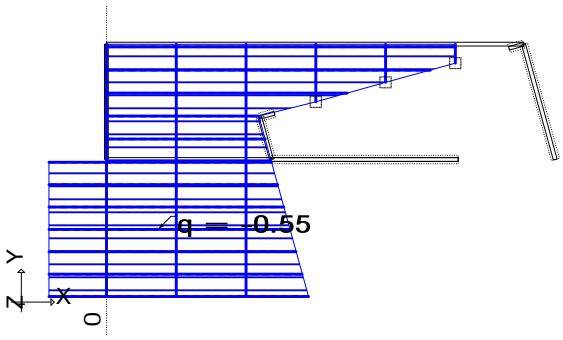
Level: [0.00 m]

Load 1: LASTNA + STALNA (g)



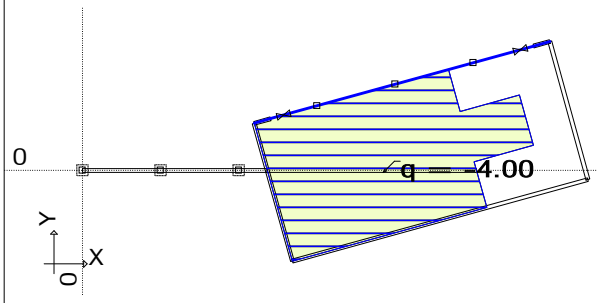
Frame: K_2

Load 1: LASTNA + STALNA (g)



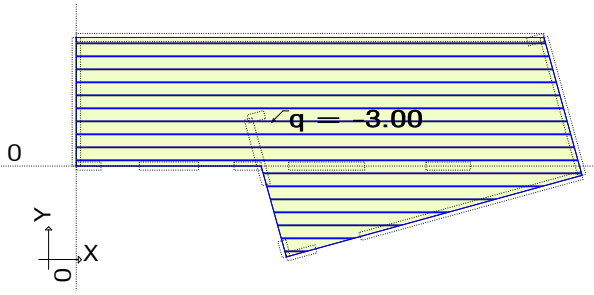
View: konzolna streha

Load 2: KORISTNA



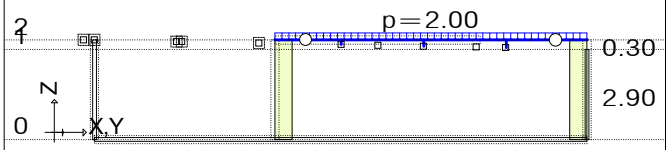
Level: [3.20 m]

Load 2: KORISTNA



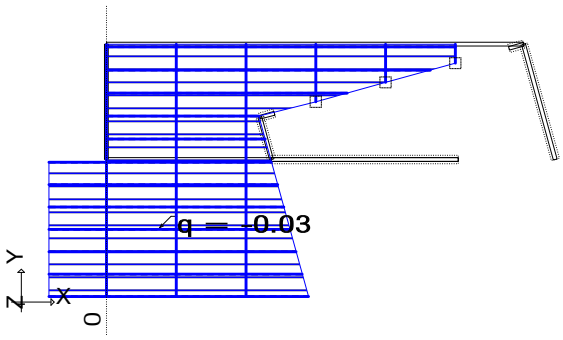
Level: [0.00 m]

Load 3: SNEG



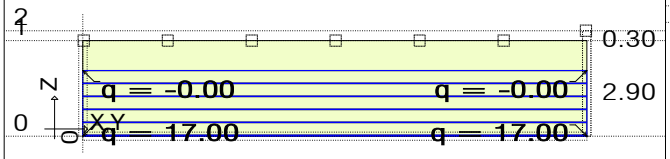
Frame: K_2

Load 3: SNEG



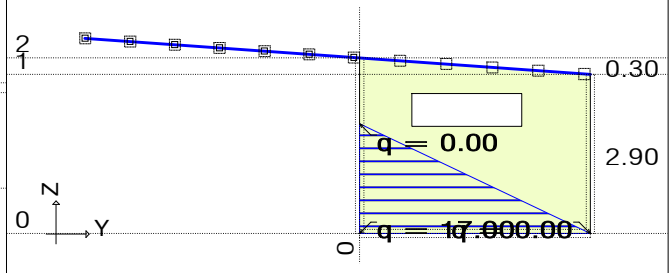
View: konzolna streha

Load 4: ZEMELJSKI PRITISK



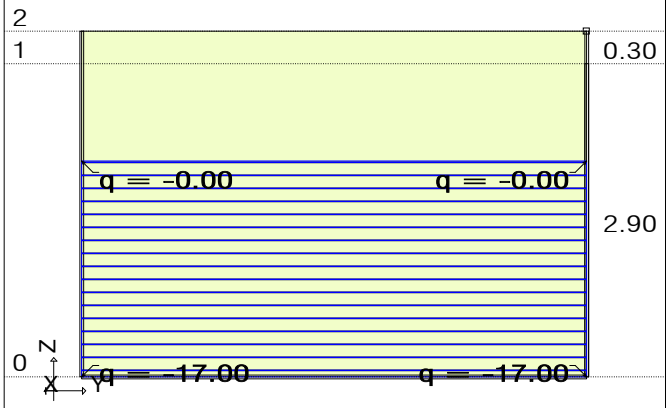
Frame: H_2

Load 4: ZEMELJSKI PRITISK



Frame: V_1

Load 4: ZEMELJSKI PRITISK

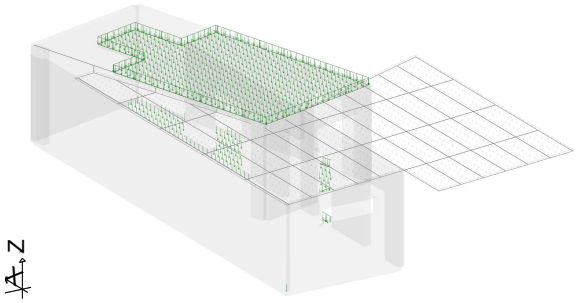


Frame: K_4

Load 1: LASTNA + STALNA (g)

Area Load

4. p = -3.50 kN/m²

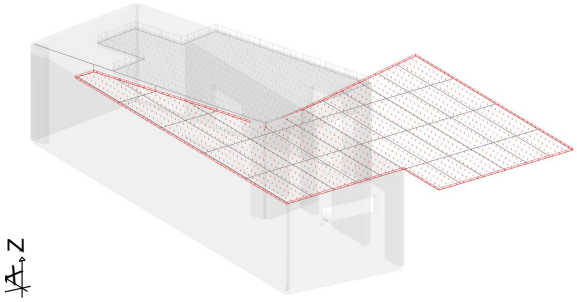


Numerical data set
Area Load (4)

Load 1: LASTNA + STALNA (g)

Area Load

7. p = -0.55 kN/m²

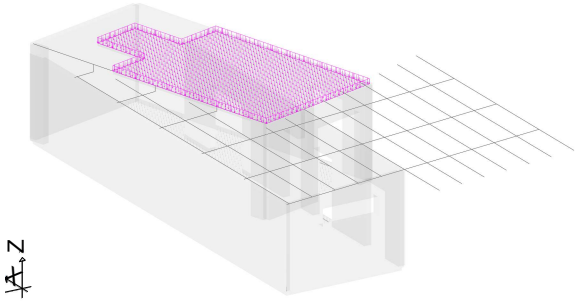


Numerical data set
Area Load (7)

Load 2: KORISTNA

Area Load

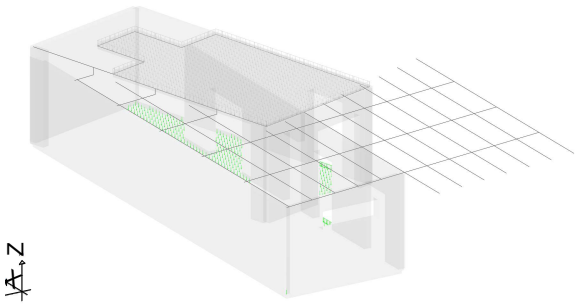
5. p = -4.00 kN/m²



Numerical data set
Area Load (5)

Load 2: KORISTNA

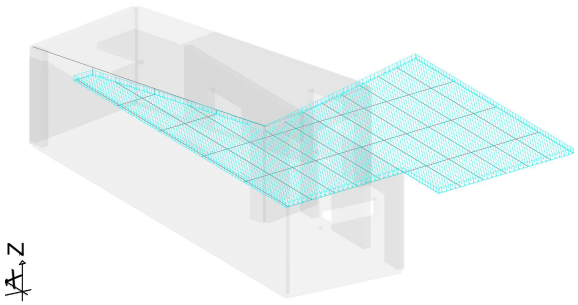
Area Load
6. p = -3.00 kN/m²



Numerical data set
Area Load (6)

Load 3: SNEG

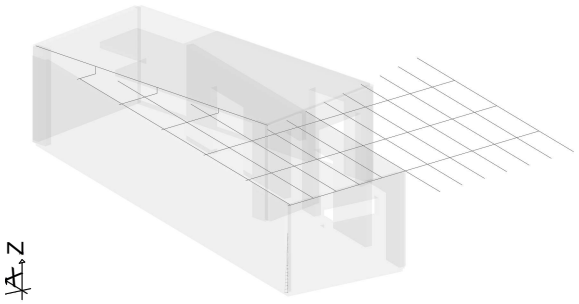
Area Load
8. p = -0.03 kN/m²



Numerical data set
Area Load (8)

Load 4: ZEMELJSKI PRITISK

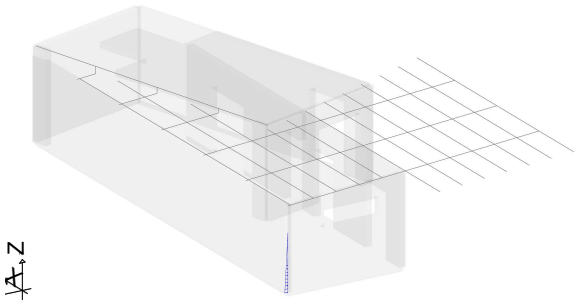
Area Load
1. Non Uniform



Numerical data set
Area Load (1)

Load 4: ZEMELJSKI PRITISK

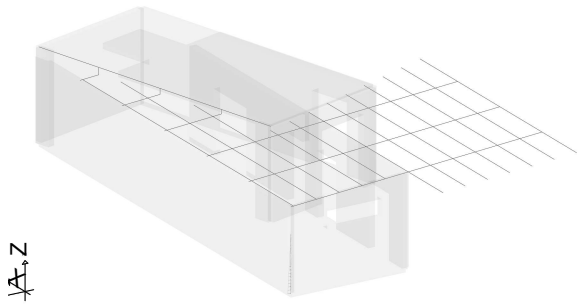
Area Load
2. Non Uniform



Numerical data set
Area Load (2)

Load 4: ZEMELJSKI PRITISK

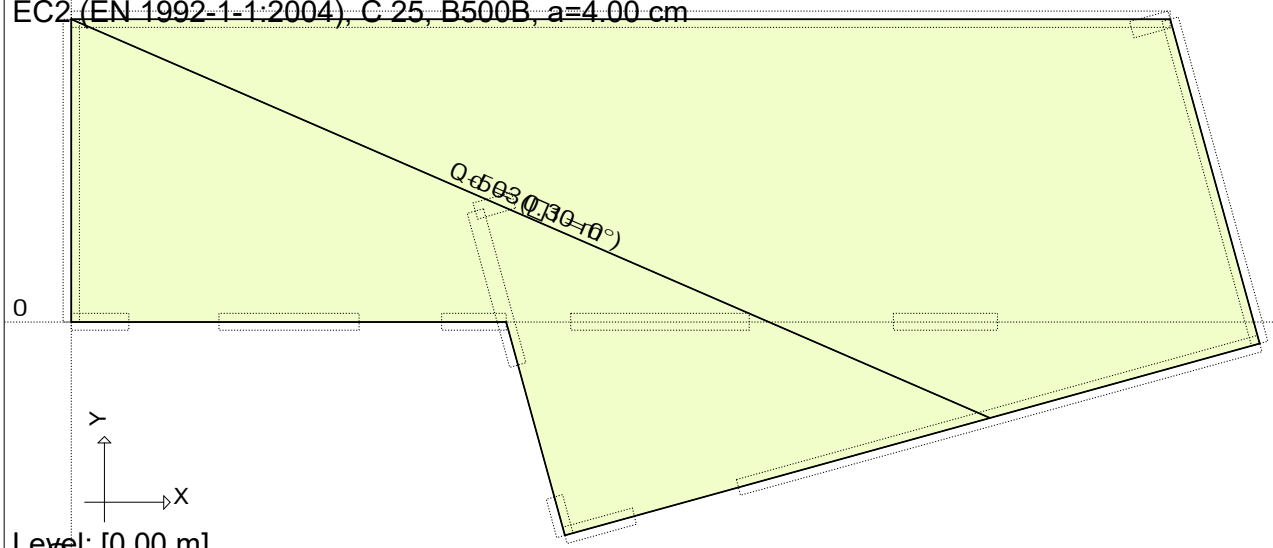
Area Load
3. Non Uniform



Numerical data set
Area Load (3)

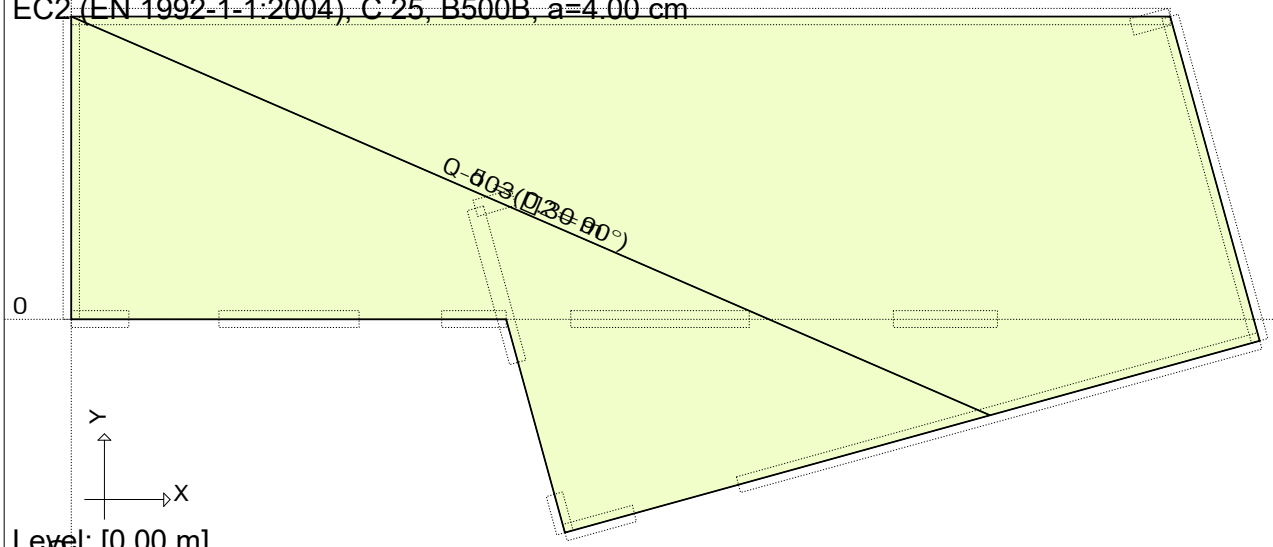
Design (concrete)

Adopted reinforcement
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



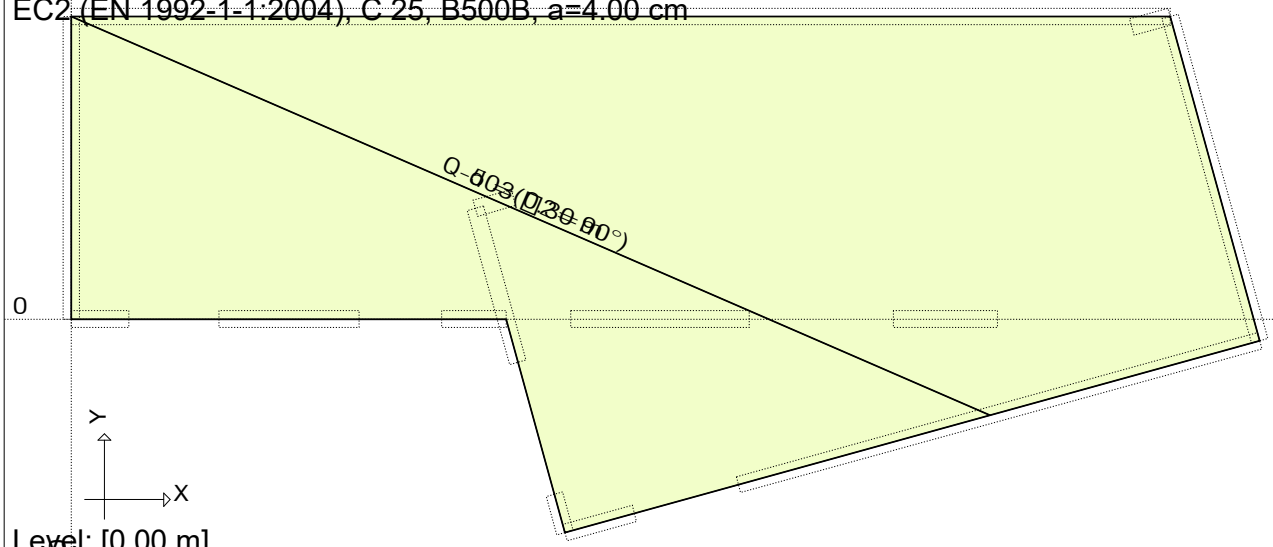
Level: [0.00 m]
Aa - top zone

Adopted reinforcement
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



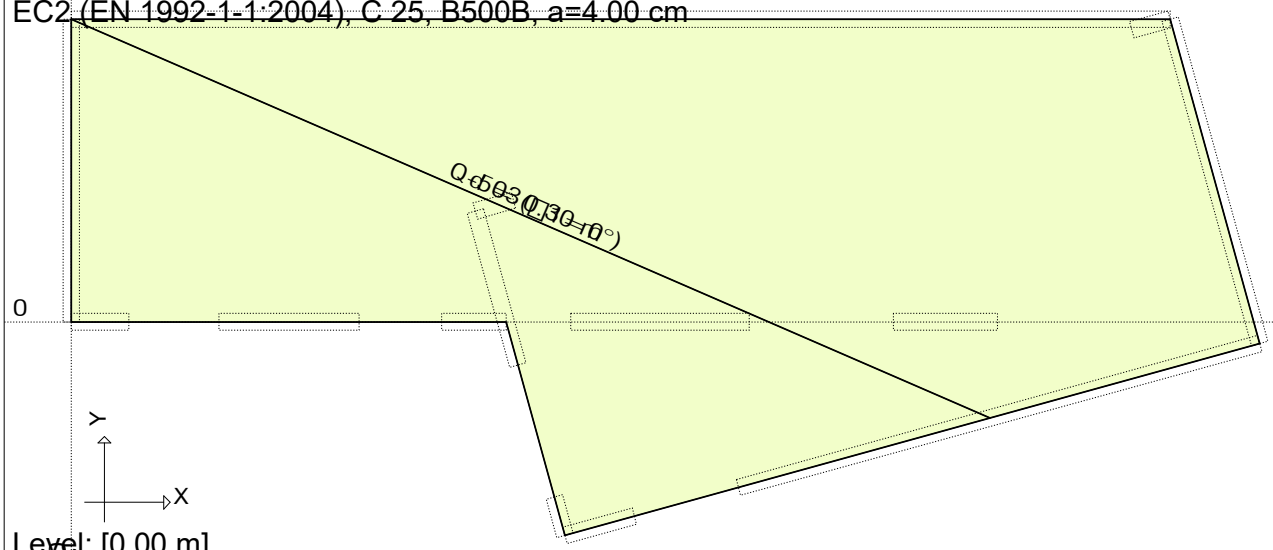
Level: [0.00 m]
Aa - top zone

Adopted reinforcement
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



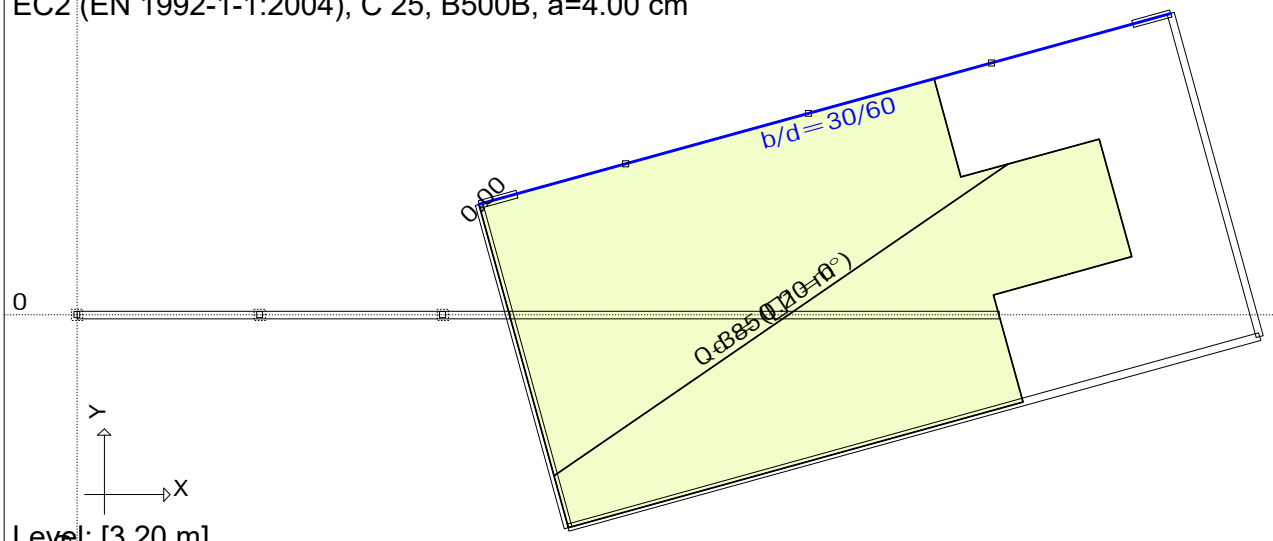
Level: [0.00 m]
Aa - bottom zone

Adopted reinforcement
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



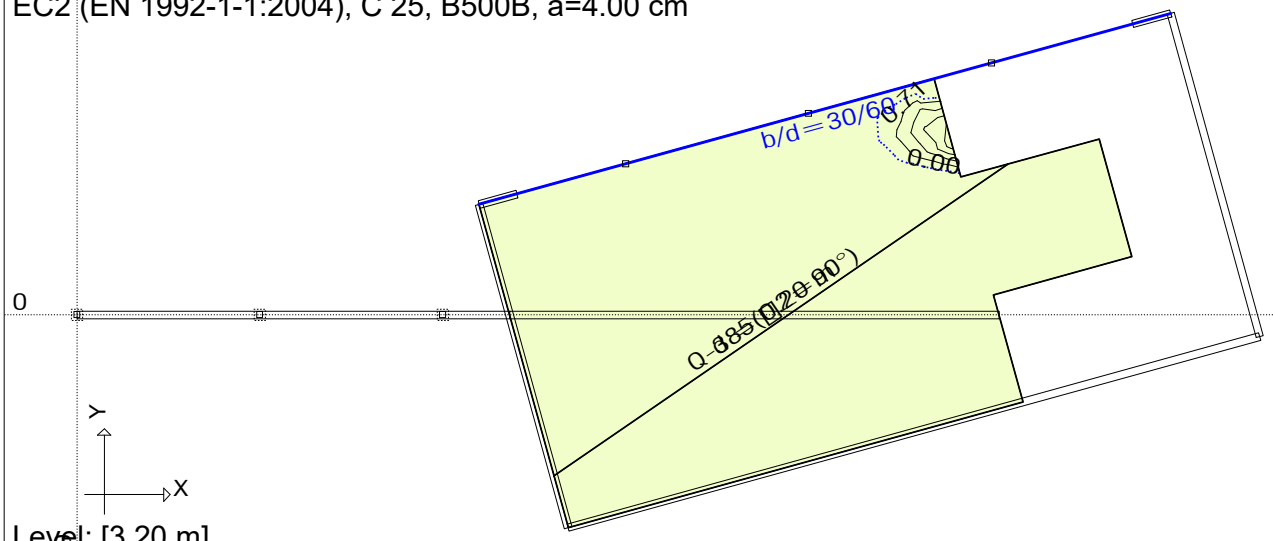
Level: [0.00 m]
Aa - bottom zone

Adopted reinforcement
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



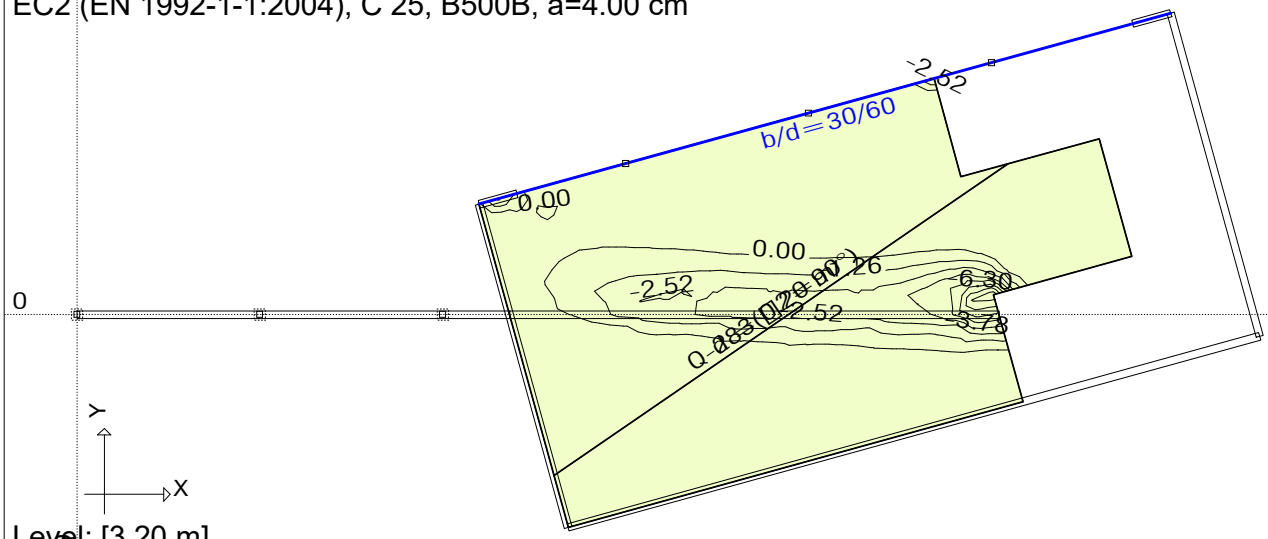
Level: [3.20 m]
Aa - bottom zone

Adopted reinforcement
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



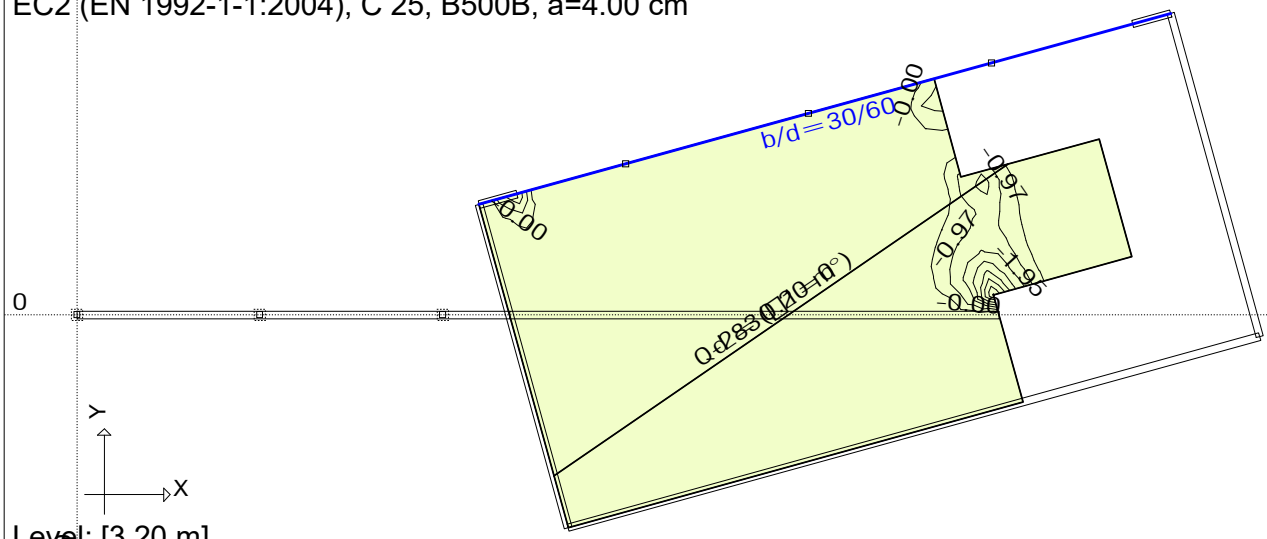
Level: [3.20 m]
Aa - bottom zone

Adopted reinforcement
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



Level: [3.20 m]
Aa - top zone

Adopted reinforcement
EC2 (EN 1992-1-1:2004), C 25, B500B, a=4.00 cm



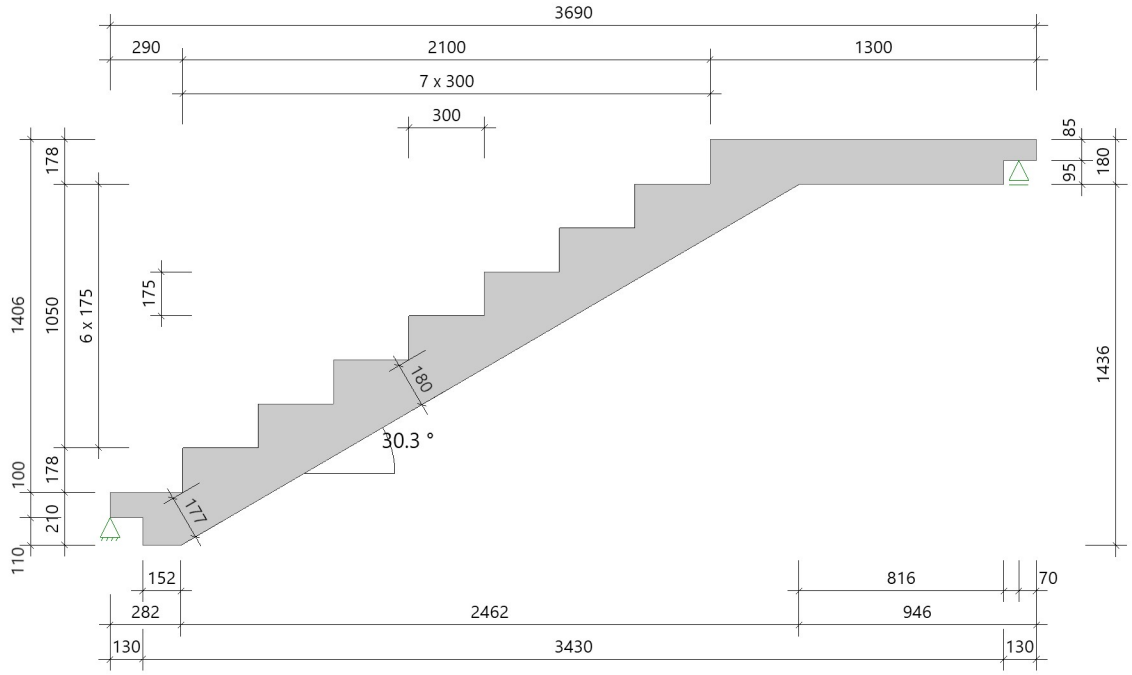
Level: [3.20 m]
Aa - top zone

Item: stopnice rama 1

Flight of Stairs (x64) B7+ 02/25 (FRILO R-2025-2/P06)

System

System graphic



Geometry

Rfb floor landing top - Rfb floor landing bottom	H_1 =	1406	mm
Length from 1-st to to last step tread	L_1 =	2100	mm
Length lower landing to FE support	L_2 =	290	mm
Length upper landing to FE support	L_3 =	1300	mm
width of flight	B_1 =	1200	mm
Width of cover	B_2 =	1200	mm
Live load width	B_3 =	1200	mm
Number of steps	n_s =	8	
Height of step bottom	H_u =	178	mm
Height of step top	H_o =	178	mm
Stairs	H_s / L_s =	175 / 300	mm
Nosing	u =	0	mm
Thickness of stairs	D_1 =	180	mm
Thickness lower landing	D_2 =	210	mm
Thickness upper landing	D_3 =	180	mm
Length of the staircase bottom view in plan	L_4 =	2462	mm
Distance 1st step to break point bottom	L_5 =	-8	mm
Length of lower support console	L_6 =	130	mm
Length of top support console	L_7 =	130	mm
Thickness lower support console	D_6 =	100	mm
Deep of upper support console	D_7 =	85	mm
Distance lower support to console end	L_{14} =	0	mm
Distance of the upper support from the end of the lower console	L_{15} =	70	mm

bearing

bottom: hinged with console
top: hinged with console

Support

Location [-]	horizontal [kN/m]	vertical [kN/m]	turning [kNm/rad]
left	rigid	rigid	free
right	free	rigid	free

Durability

Requirements durability

attack on concrete		X0			
reinforc. corrosion		XC1			
min. concrete class		C 16/20			
long. reinforcement	$d_{s,l}$	=	10	mm	
allowance in design	Δc_{dev}	=	10	mm	
longitudinal bars	$c_{min,m}$	=	10	mm	*5
concrete coverage	$c_{nom,m}$	=	20	mm	
laying dist. link	$c_{,l}$	=	20	mm	
all. crack width	w_{max}	=	0.40	mm	

*5: bond decisive

Loads

Safety and combination factors

Action group	γ_G	γ_Q	ψ_0	ψ_1	ψ_2
Cat. A: domestic, residental areas	1.35	1.5	0.7	0.5	0.3

Load

Location [-]	Type [-]	g [kN/m²]	q [kN/m²]
lower landing/ console	Covering	1.00	-
	Live load	-	3.00
Stairway	Covering	1.00	-
	Live load	-	3.00
upper landing/console	Covering	1.00	-
	Live load	-	3.00

Resulting loading (relative to the horizontal surface)

Location [-]	Type [-]	g [kN/m²]	q [kN/m²]
lower landing/ console	Self weight	5.25	-
	Covering	1.00	-
	Live load	-	3.00
	Total	6.25	3.00
Stairway	Self weight	7.40	-
	Covering	1.00	-
	Live load	-	3.00
	Total	8.40	3.00
upper landing/console	Self weight	4.50	-
	Covering	1.00	-
	Live load	-	3.00
	Total	5.50	3.00

The dead weight is with gamma = 25.00 kN/m^3 considered.

Standard, Materials und Reinforcement layer

Design acc.to DIN EN 1992-1-1/NA/A1:2015-12

Construction materials:	Concrete	C25/30		Reinforcing steel	B500A	
	γ_c =	1.50		γ_s =	1.15	
	f_{ck} =	25.0	N/mm²	f_{yk} =	500.0	N/mm²
	f_{cd} =	14.2	N/mm²	f_{yd} =	434.8	N/mm²

Individual lengths (based on the rod axes)

	lower landing	Stairway	upper landing
Dimension	0.28 m	2.44 m (L_{hor}) 1.42 m (L_{vert}) 2.82 m (L_{tot})	0.90 m

Reinforcement layer bottom d_1 = 30 mm
Reinforcement upper layer d_2 = 30 mm

Results stair

Bending design

All design results per m stair width!

Flexural reinforcement

Location [-]	h [mm]	M_{Ed} [kNm/m]	N_{Ed} [kN/m]	req. a_{sb} [mm²/m]	req. a_{st} [mm²/m]	&About [-]
lower landing, lower reinforcement	210	7.26	0.0	233	0	*)
Stairway, lower reinforcement	180	25.04	0.7	383	0	#)
upper landing, lower reinforcement	180	18.17	0.0	274	0	

*) Minimum longitudinal reinforcement acc.to DIN EN 1992-1-1/NA/A1:2015-12 9.2.1.1 (1) is decisive.
#) Hu > Hs, the static height of the stairway is reduced in the area of the notch

exist. reinforcement

lower reinforcement 6 O 10 / 220 mm (Suggestion from program for number O)
exist. a_{sbtm} = 3.93 cm²/m

Note: existing a_s (related reinforcement) = existing A_s (absolute reinforcement) / B_1 (running width).

Shear design

Shear reinforcement B500A

Location [-]	V_{Ed} [kN/m]	N_{Ed} [kN/m]	k_z [-]	θ [Degree]	a_{sL} [mm²/m]	$V_{Rd,c}$ [kN/m]	$V_{Rd,max}$ [kN/m]	req. a_{sStir} [mm²/m²]	&About [-]
lower landing left	27.4	0.0	0.78	18.4	0	89.1	446.3	0	
lower landing right	23.8	0.0	0.78	18.4	233	89.1	446.3	0	
Stairway left	20.5	-12.0	0.73	18.4	203	74.2	342.4	0	#)
Stairway right	-12.8	7.5	0.73	18.4	284	73.5	350.6	0	
Upper landing left	-14.8	0.0	0.73	18.4	274	74.2	350.6	0	
Upper landing right	-25.5	0.0	0.73	18.4	0	74.2	350.6	0	

#) Hu> Hs, the static height at this section has been reduced

Crack width check

The check is carried out with the quasi-permanent action combination

Crack width limitation stairs:

Location [-]	h [mm]	M_{Ed} [kNm]	N_{Ed} [kN]	exist. A_{sb} [mm²]	exist. A_{st} [mm²]	Env.Cl [-]	$d_{s,exist}$ [mm]	$d_{s,limit}$ [mm]	exist. w [mm]	perm. w [mm]
Stairway, bottom side	180	17.48	0.5	471	0	XC1	10	17	0.23	0.40

Deformation

The calculation will be done with quasi permanent Action combination at state I (E_{cm} = 31000 N/mm²).

max. f = 0.2 cm (in staircase at x = 1.69 m)

Note: The deflection value is to be understood perpendicular to the corresponding member axis. The x-value refers to the beginning of the member (beginning lower platform, staircase or upper platform) and runs in the direction of the member axis.

Support reactions

Definition supporting forces

(A) support left (v) vertical supporting force
(B) support right (v) horizontal supporting force

Support reactions per m stair width

	A_v [kN/m]	A_h [kN/m]	B_v [kN/m]	B_h [kN/m]
γ = 1.0				
Total	19.7	0.0	18.3	0.0
from g	14.3	0.0	12.9	0.0
from q	5.4	0.0	5.4	0.0
γ-times				
Total	27.4	0.0	25.5	0.0
from g	19.3	0.0	17.4	0.0
from q	8.1	0.0	8.1	0.0

Self weight of stairs

The self-weight of the stair (without covering) G_k is 28.3 kN

Note :

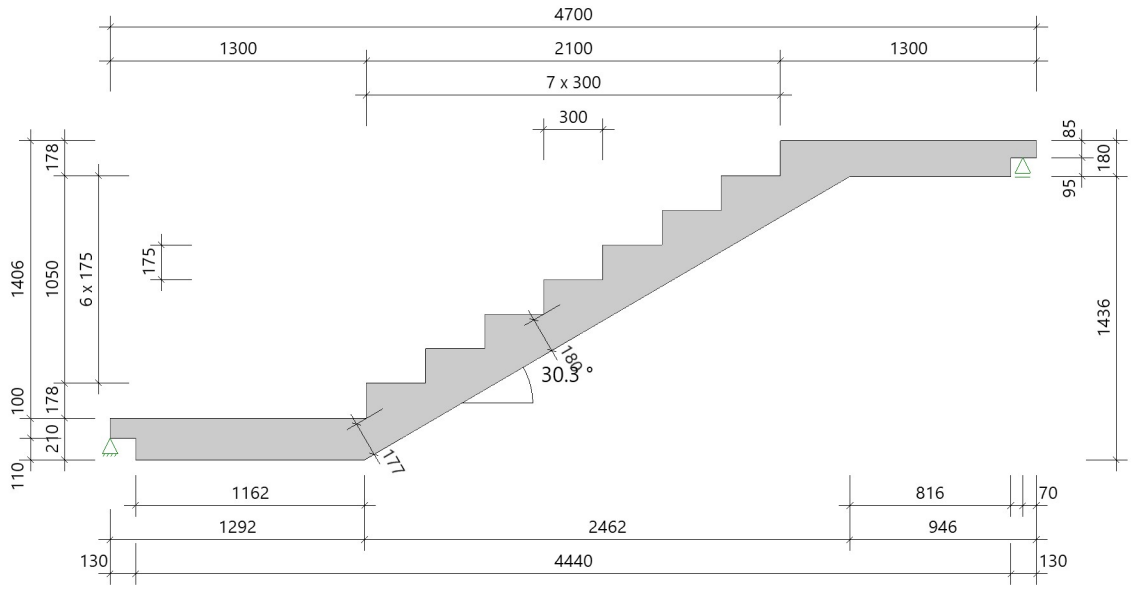
The lower and upper console were not measured.

Item: stopnice rama 2

Flight of Stairs (x64) B7+ 02/25 (FRILO R-2025-2/P06)

System

System graphic



Geometry

Rf b floor landing top - Rf b floor landing bottom	H_1 =	1406	mm
Length from 1-st to to last step tread	L_1 =	2100	mm
Length lower landing to FE support	L_2 =	1300	mm
Length upper landing to FE support	L_3 =	1300	mm
width of flight	B_1 =	1200	mm
Width of cover	B_2 =	1200	mm
Live load width	B_3 =	1200	mm
Number of steps	n_s =	8	
Height of step bottom	H_u =	178	mm
Height of step top	H_o =	178	mm
Stairs	H_s / L_s =	175 / 300	mm
Nosing	u =	0	mm
Thickness of stairs	D_1 =	180	mm
Thickness lower landing	D_2 =	210	mm
Thickness upper landing	D_3 =	180	mm
Length of the staircase bottom view in plan	L_4 =	2462	mm
Distance 1st step to break point bottom	L_5 =	-8	mm
Length of lower support console	L_6 =	130	mm
Length of top support console	L_7 =	130	mm
Thickness lower support console	D_6 =	100	mm
Deep of upper support console	D_7 =	85	mm
Distance lower support to console end	L_{14} =	0	mm
Distance of the upper support from the end of the lower console	L_{15} =	70	mm

bearing

bottom: hinged with console
top: hinged with console

Support

Location [-]	horizontal [kN/m]	vertical [kN/m]	turning [kNm/rad]
left	rigid	rigid	free
right	free	rigid	free

Durability

Requirements durability

attack on concrete		X0			
reinforc. corrosion		XC1			
min. concrete class		C 16/20			
long. reinforcement	$d_{s,l}$	=	10	mm	
allowance in design	Δc_{dev}	=	10	mm	
longitudinal bars	$c_{min,m}$	=	10	mm	*5
concrete coverage	$c_{nom,m}$	=	20	mm	
laying dist. link	$c_{,l}$	=	20	mm	
all. crack width	w_{max}	=	0.40	mm	

*5: bond decisive

Loads

Safety and combination factors

Action group	γ_G	γ_Q	ψ_0	ψ_1	ψ_2
Cat. A: domestic, residental areas	1.35	1.5	0.7	0.5	0.3

Load

Location [-]	Type [-]	g [kN/m²]	q [kN/m²]
lower landing/ console	Covering	1.00	-
	Live load	-	3.00
Stairway	Covering	1.00	-
	Live load	-	3.00
upper landing/console	Covering	1.00	-
	Live load	-	3.00

Resulting loading (relative to the horizontal surface)

Location [-]	Type [-]	g [kN/m²]	q [kN/m²]
lower landing/ console	Self weight	5.25	-
	Covering	1.00	-
	Live load	-	3.00
	Total	6.25	3.00
Stairway	Self weight	7.40	-
	Covering	1.00	-
	Live load	-	3.00
	Total	8.40	3.00
upper landing/console	Self weight	4.50	-
	Covering	1.00	-
	Live load	-	3.00
	Total	5.50	3.00

The dead weight is with gamma = 25.00 kN/m³ considered.

Standard, Materials und Reinforcement layer

Design acc.to DIN EN 1992-1-1/NA/A1:2015-12

Construction materials:	Concrete	C25/30		Reinforcing steel	B500A	
	γ_c =	1.50		γ_s =	1.15	
	f_{ck} =	25.0	N/mm²	f_{yk} =	500.0	N/mm²
	f_{cd} =	14.2	N/mm²	f_{yd} =	434.8	N/mm²

Individual lengths (based on the rod axes)

	lower landing	Stairway	upper landing
Dimension	1.29 m	2.44 m (L_{hor}) 1.42 m (L_{vert}) 2.82 m (L_{tot})	0.90 m

Reinforcement layer bottom d_1 = 30 mm
Reinforcement upper layer d_2 = 30 mm

Results stair

Bending design

All design results per m stair width!

Flexural reinforcement

Location [-]	h [mm]	M_{Ed} [kNm/m]	N_{Ed} [kN/m]	req. a_{sb} [mm²/m]	req. a_{st} [mm²/m]	&About [-]
lower landing, lower reinforcement	210	31.98	0.0	405	0	
Stairway, lower reinforcement	180	40.40	0.5	645	0	#)
upper landing, lower reinforcement	180	24.84	0.0	379	0	
#) Hu > Hs, the static height of the stairway is reduced in the area of the notch						

exist. reinforcement

lower reinforcement 7 O 12 / 183 mm (Suggestion from program for number O)
exist. a_{sbtm} = 6.60 cm²/m

Note: existing a_s (related reinforcement) = existing A_s (absolute reinforcement) / B_1 (running width).

Shear design

Shear reinforcement B500A

Location [-]	V_{Ed} [kN/m]	N_{Ed} [kN/m]	k_z [-]	θ [Degree]	a_{sL} [mm²/m]	$V_{Rd,c}$ [kN/m]	$V_{Rd,max}$ [kN/m]	req. a_{sStir} [mm²/m²]	&About [-]
lower landing left	33.1	0.0	0.78	18.4	0	89.1	446.3	0	
lower landing right	16.4	0.0	0.78	18.4	405	89.1	446.3	0	
Stairway left	14.1	-8.2	0.73	18.4	497	73.8	342.4	0	#)
Stairway right	-19.2	11.2	0.73	18.4	393	73.1	350.6	0	
Upper landing left	-22.2	0.0	0.73	18.4	379	74.2	350.6	0	
Upper landing right	-33.0	0.0	0.73	18.4	0	74.2	350.6	0	
#) Hu> Hs, the static height at this section has been reduced									

Crack width check

The check is carried out with the quasi-permanent action combination

Crack width limitation stairs:

Location [-]	h [mm]	M_{Ed} [kNm]	N_{Ed} [kN]	exist. A_{sb} [mm²]	exist. A_{st} [mm²]	Env.Cl [-]	$d_{s,exist}$ [mm]	$d_{s,limit}$ [mm]	exist. w [mm]	perm. w [mm]
Stairway, bottom side	180	28.09	0.3	792	0	XC1	12	22	0.22	0.40

Deformation

The calculation will be done with quasi permanent Action combination at state I (E_{cm} = 31000 N/mm²).

max. f = 0.4 cm (in staircase at x = 1.27 m)

Note: The deflection value is to be understood perpendicular to the corresponding member axis. The x-value refers to the beginning of the member (beginning lower platform, staircase or upper platform) and runs in the direction of the member axis.

Support reactions

Definition supporting forces

(A) support left (v) vertical supporting force
(B) support right (v) horizontal supporting force

Support reactions per m stair width

	A_v [kN/m]	A_h [kN/m]	B_v [kN/m]	B_h [kN/m]
γ = 1.0				
Total	23.7	0.0	23.6	0.0
from g	16.8	0.0	16.7	0.0
from q	6.9	0.0	6.9	0.0
γ-times				
Total	33.1	0.0	33.0	0.0
from g	22.7	0.0	22.5	0.0
from q	10.4	0.0	10.4	0.0

Self weight of stairs

The self-weight of the stair (without covering) G_k is 34.6 kN

Note :

The lower and upper console were not measured.

2.5 RISBE

1. Armaturni načrt temeljev – spodnja armatura
2. Armaturni načrt temeljev – zgornja armatura
3. Armaturni načrt sten in vezi
4. Armaturni načrt etažne plošče
5. Armaturni načrt stopnic

Bogomir Ipavec
ARMATURA NA GLAVAH.dwg

0.817 x 0.594 = 0.48m2

palici št.1 in 4 - rezati na objektu !
največ 1/2 palic preklapljati v enem prerezu !

1 Φ14, l=6.00m', kos 60 - preklop min 85cm

2 Φ12, l=6.00m', kos 20 - preklop min 65cm

3 Φ10/15.0cm, l=2.17m', kos

5 Φ16, l=1.60m', kos 4x12

6 Φ10/15.0cm, l=2.17m', kos

7 Φ10/15.0cm, l=2.16m', kos

8 Φ10/15.0cm, l=2.20m', kos 500

9 Φ10/15.0/20.0cm, l=1.96m', kos 290

11 Φ10/15.0cm, l=1.82m', kos

12 Φ10/15.0cm, l=2.56m', kos

Q-503 15x4.60

Q-503 6.00x2.15

Q-385 2.15x4.60

Q-385 6.00x2.15

po celi širini plošče

po celi širini stene

POGOJI ZA IZVEDBO ARMIRANOBETONSKE KONSTRUKCIJE

ELEMENT KONSTRUKCIJE	MATERIAL		ZAŠČITNA PLAST (mm)		
	tlačna trdnost	izpostavljenost	spodaj	zgoraj	bočno
PODLOŽNI BETON	C 8/10				
TEMELJI	C25/30	XC2	30	30	30
STENE IN VEZI	C25/30	XC2	25	25	25
ETAŽNA PLOŠČA	C30/37	XC2	25	25	25

ARMATURA	SIST EN 10080, SIST EN 1992-1-1				
ELEMENT KONSTRUKCIJE	oznaka	razred duktilnosti	f_{yk} Mpa	f_{tk} / f_{yk}	ε_{uk} (%)
vsi armiranobetonski elementi	B500	B	500	>1.08	>5.0

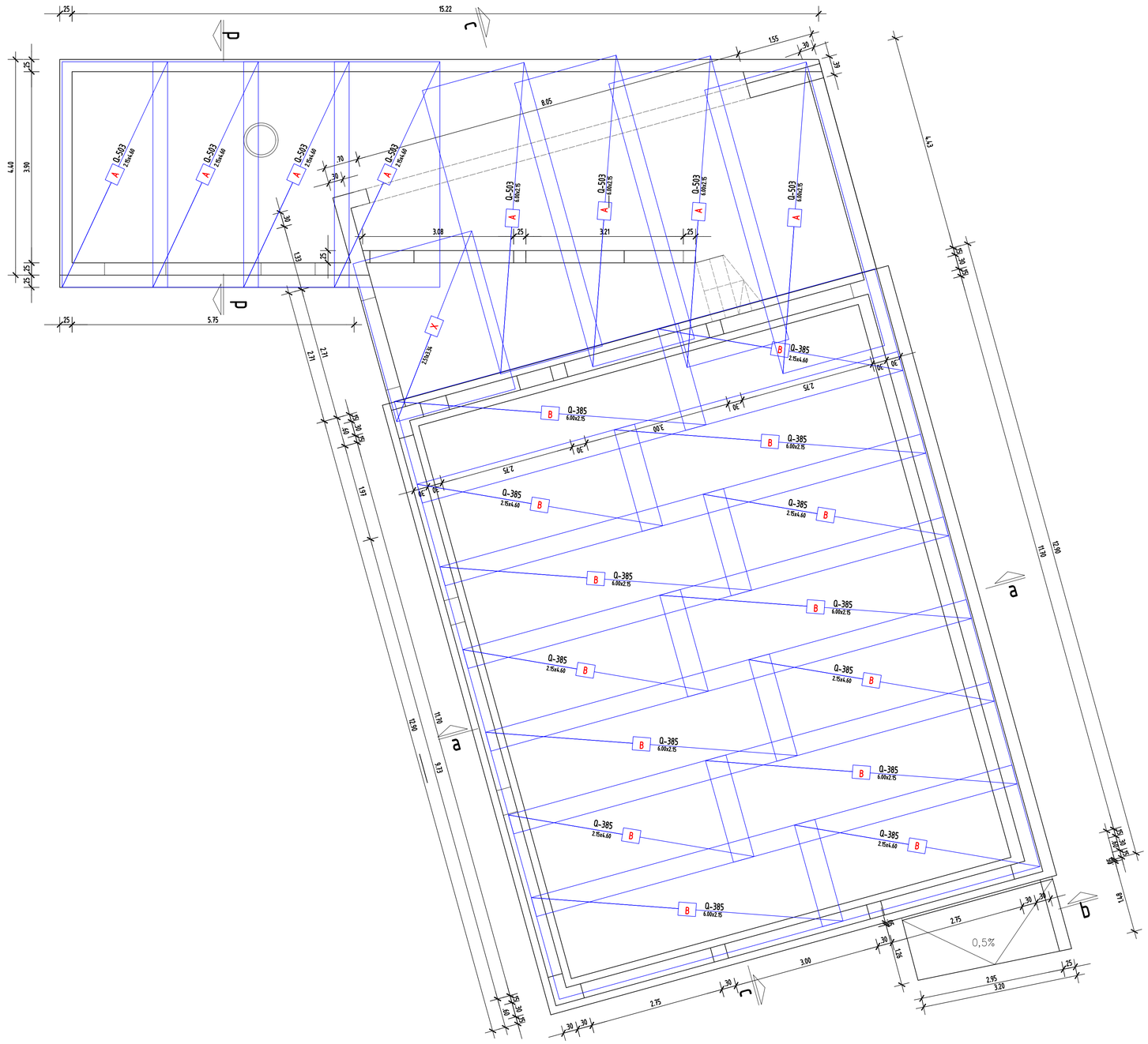
OPOMBA:
1/ Pred pričetkom del mora izvajalec preveriti dimenzije navedene v načrtu.
2/ O morebitnih napakah in neskladjih je potrebno obvestiti projektanta konstrukcije.
3/ Vse manjkajoče kote gledati načrte arhitekture.
4/ Vse preboje gledati tudi na načrtih strojnih in elektro instalacij.
5/ Pred izvedbo je potrebno vse preboje uskladiti s projektantom gradbenih konstrukcij

ARMATURNI NAČRT TEMELJEV -SPODNJA ARMATURA

STATICON IB

STATICON IB, družba za projektiranje, inženiring in svetovanje d.o.o.
Lokarjev drevored 1, 5270 Ajdovščina
telefon: 05 99 66 290 e- mail: bogomir.ipavec@staticon-ib.si

investitor:	OBČINA AJDOVŠČINA Cesta 5. maja 6a 5270 Ajdovščina		
Naziv gradnje:	DOM KRAJANOV		
lokacija:	MALE ŽABLJE		
vodja projektiranja:	ANA VIDRIH GRAHOVAC mag.inž.arh.	ZAPS PA=-1844	
odgovorni inženir:	BOGOMIR IPAVEC univ.dipl.inž.grad.	G-0250	
področje načrta:	2 Načrt gradbeništva		
št. projekta: 42/2024	št. načrta: 1231/2025	vrsta projekta: PZI	datum: december 2025
merilo: 1:50	risba: ARMATURNI NAČRT TEMELJEV		list: 1



POGOJI ZA IZVEDBO ARMIRANOBETONSKE KONSTRUKCIJE					
ELEMENT KONSTRUKCIJE	MATERIAL		ZAŠČITNA PLAST (mm)		
	tlačna trdnost	izpostavljenost	spodaj	zgoraj	bočno
PODLOŽNI BETON	C 8/10				
TEMELJI	C25/30	XC2	30	30	30
STENE IN VEZI	C25/30	XC2	25	25	25
ETAŽNA PLOŠČA	C30/37	XC2	25	25	25

ARMATURA	SIST EN 10080, SIST EN 1992-1-1				
ELEMENT KONSTRUKCIJE	oznaka	razred duktilnosti	f_{tk} Mpa	f_{tk} / f_{yk}	ε_{uk} (%)
vsi armiranobetonski elementi	B500	B	500	>1.08	>5.0

OPOMBA:
1/ Pred pričetkom del mora izvajalec preveriti dimenzije navedene v načrtu.
2/ O morebitnih napakah in neskladjih je potrebno obvestiti projektanta konstrukcije.
3/ Vse manjkajoče kote gledati načrte arhitekture.
4/ Vse preboje gledati tudi na načrtih strojnih in elektro instalacij.
5/ Pred izvedbo je potrebno vse preboje uskladiti s projektantom gradbenih konstrukcij

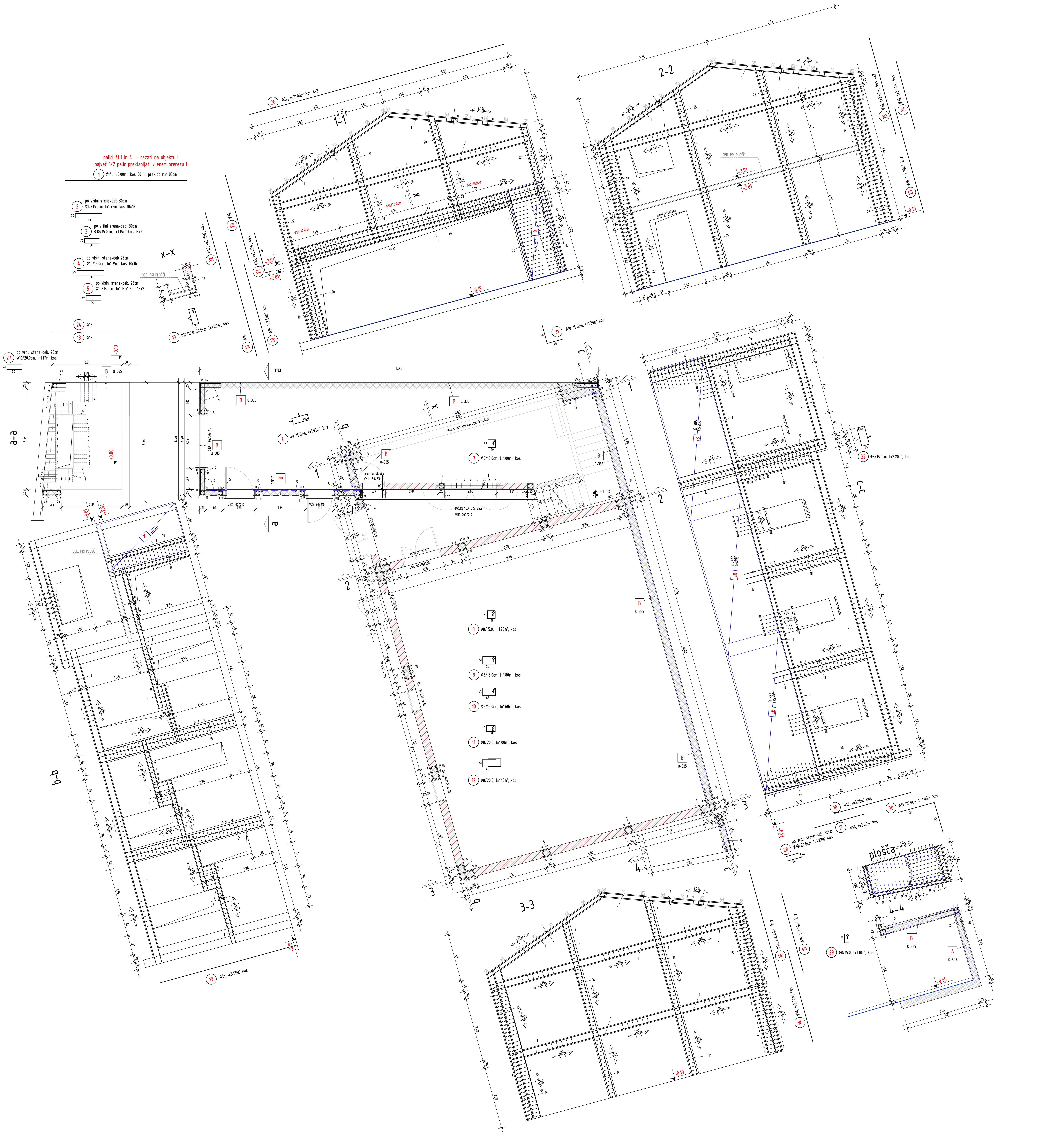
ARMATURNI NAČRT TEMELJEV -ZGORNJA ARMATURA

STATICON IB
STATICON IB, družba za projektiranje, inženiring in svetovanje d.o.o.
Lokarjev drevored 1, 5270 Ajdovščina
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investitor:	OBČINA AJDOVŠČINA Cesta 5. maja 6a 5270 Ajdovščina		
Naziv gradnje:	DOM KRAJANOV		
lokacija:	MALE ŽABLJE		
vodja projektiranja:	ANA VIDRIH GRAHOVAC mag.inž.arh. ZAPS PA=-1844		
odgovorni inženir:	BOGOMIR IPAVEC univ.dipl.inž.grad. G-0250		
področje načrta:	2 Načrt gradbeništva		
št. projekta: 42/2024	št. načrta: 1231/2025	vrsta projekta: PZI	datum: december 2025
merilo: 1:50	risba: ARMATURNI NAČRT TEMELJEV		list: 2

Bogomir Ipavec
ARMATURA NA GLAVAH.dwg

0.817 x 0.594 = 0.48m2



POGOJI ZA IZVEDBO ARMIRANOBETONSKE KONSTRUKCIJE

ELEMENT KONSTRUKCIJE	MATERIAL		ZAŠČITNA PLAST (mm)		
	tlačna trdnost	izpostavljenost	spodaj	zgoraj	bočno
PODLOŽNI BETON	C 8/10				
TEMELJI	C25/30	XC2	30	30	30
STENE IN VEZI	C25/30	XC2	25	25	25
ETAŽNA PLOŠČA	C30/37	XC2	25	25	25

ARMATURA — SIST EN 10080, SIST EN 1992-1-1

ELEMENT KONSTRUKCIJE	oznaka	razred duktilnosti	f_{yk} Mpa	f_{tk} / f_{yk}	ε_{uk} (%)
vsi armiranobetonski elementi	B500	B	500	>1.08	>5.0

OPOMBA:
1/ Pred pričetkom del mora izvajalec preveriti dimenzije navedene v načrtu.
2/ O morebitnih napakah in neskladjih je potrebno obvestiti projektanta konstrukcije.
3/ Vse manjkajoče kote gledati načrte arhitekture.
4/ Vse preboje gledati tudi na načrtih strojnih in elektro instalacij.
5/ Pred izvedbo je potrebno vse preboje uskladiti s projektantom gradbenih konstrukcij

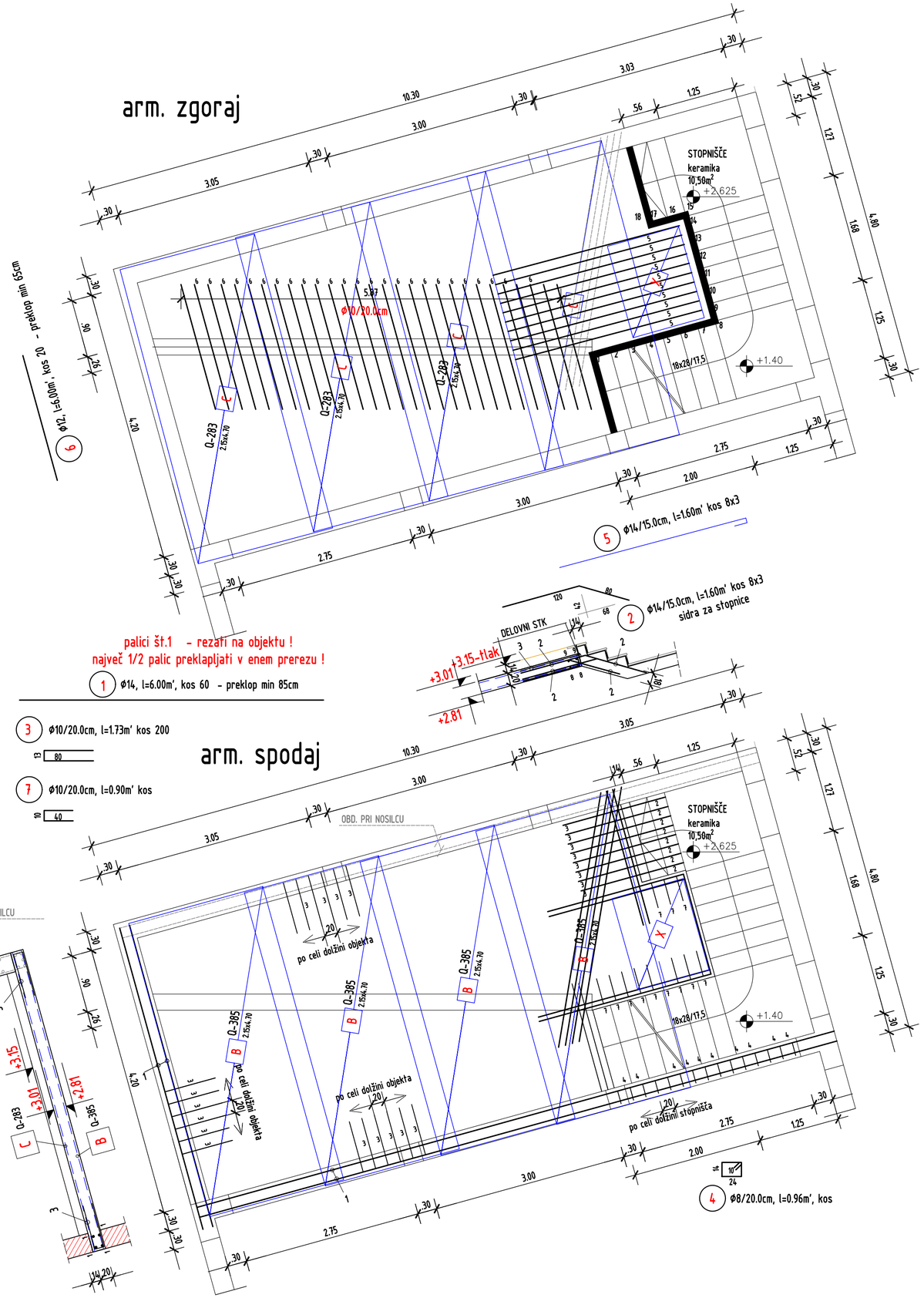
ARMATURNI NAČRT STEN IN VEZI

STATICON IB, družba za projektiranje, inženiring in svetovanje d.o.o.
Lokarjev drevored 1, 5270 Ajdovščina
telefon: 05 99 66 290 e- mail: bogomir.ipavec@staticon-ib.si

investitor:	OBČINA AJDOVŠČINA Cesta 5. maja 6a 5270 Ajdovščina
Naziv gradnje:	DOM KRAJANOV
lokacija:	MALE ŽABLJE
vodja projektiranja:	ANA VIDRIH GRAHOVAC mag.inž.arh. ZAPS PA*-1844
odgovorni inženir:	BOGOMIR IPAVEC univ.dipl.inž.grad. G-0250
področje načrta:	2 Načrt gradbeništva
št. projekta: 42/2024	št. načrta: 1231/2025 — vrsta projekta: PZI — datum: december 2025
merilo: 1:50	risba: ARMATURNI NAČRT STEN IN VEZI — list: 3

Bogomir Ipavec
ARMATURA NA GLAVAH.dwg

1.056 x 0.916 = 0.97m2



Bogomir Ipavec
ARMATURA NA GLAVAH.dwg

POGOJI ZA IZVEDBO ARMIRANOBETONSKE KONSTRUKCIJE					
ELEMENT KONSTRUKCIJE	MATERIAL		ZAŠČITNA PLAST (mm)		
	tlačna trdnost	izpostavljenost	spodaj	zgoraj	bočno
PODLOŽNI BETON	C 8/10				
TEMELJI	C25/30	XC2	30	30	30
STENE IN VEZI	C25/30	XC2	25	25	25
ETAŽNA PLOŠČA	C30/37	XC2	25	25	25

ARMATURA		SIST EN 10080, SIST EN 1992-1-1			
ELEMENT KONSTRUKCIJE	oznaka	razred duktilnosti	f_{yk} Mpa	f_{tk} /f_{yk}	ε_{uk} (%)
vsi armiranobetonski elementi	B500	B	500	>1.08	>5.0

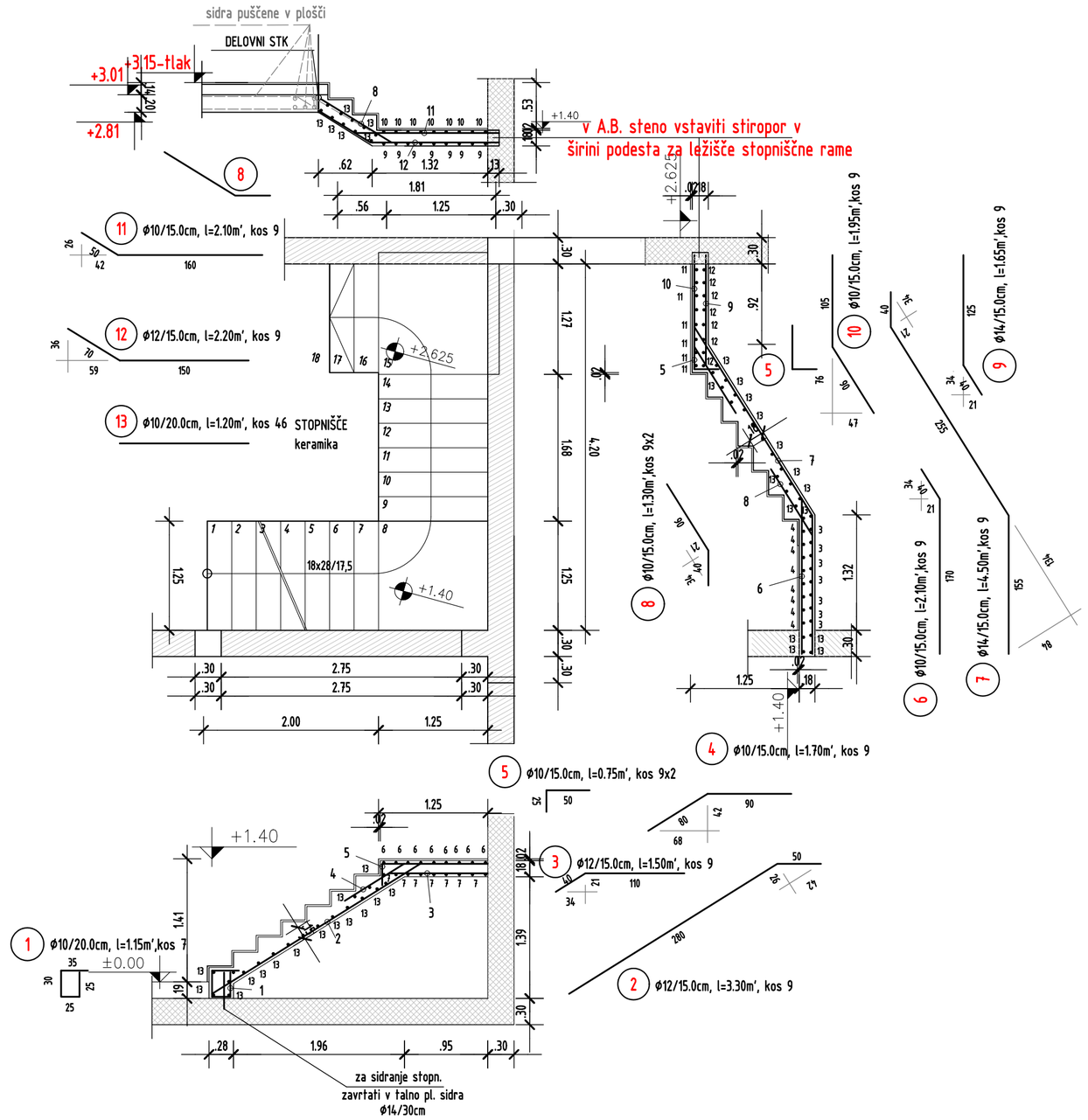
OPOMBA:
1/ Pred pričetkom del mora izvajalec preveriti dimenzije navedene v načrtu.
2/ O morebitnih napakah in nesklagjih je potrebno obvestiti projektanta konstrukcije.
3/ Vse manjkajoče kote gledati načrte arhitekture.
4/ Vse preboje gledati tudi na načrtih strojnih in elektro instalacij.
5/ Pred izvedbo je potrebno vse preboje uskladiti s projektantom gradbenih konstrukcij

ARMATURNI NAČRT PLOŠČE NAD PRITLIČJEM

STATICON IB
STATICON IB, družba za projektiranje, inženiring in svetovanje d.o.o.
Lokarjev drevored 1, 5270 Ajdovščina
telefon: 05 99 66 290 e- mail: bogomir.ipavec@staticon-ib.si

investitor:	OBČINA AJDOVŠČINA Cesta 5. maja 6a 5270 Ajdovščina		
Naziv gradnje:	DOM KRAJANOV		
lokacija:	MALE ŽABLJE		
vodja projektiranja:	ANA VIDRIH GRAHOVAC mag.inž.arh. ZAPS PA*-1844		
odgovorni inženir:	BOGOMIR IPAVEC univ.dipl.inž.grad. G-0250		
področje načrta:	2 Načrt gradbeništva		
št. projekta: 42/2024	št. načrta: 1231/2025	vrsta projekta: PZI	datum: december 2025
merilo: 1:50	risba: ARMATURNI NAČRT PLOŠČE NAD PRITLIČJEM		list: 4

Bogomir Ipavec
ARMATURA NA GLAVAH.dwg



0.506 x 0.297 = 0.15m2

POGOJI ZA IZVEDBO ARMIRANOBETONSKE KONSTRUKCIJE					
ELEMENT KONSTRUKCIJE	MATERIAL		ZAŠČITNA PLAST (mm)		
	tlačna trdnost	izpostavljenost	spodaj	zgoraj	bočno
PODLOŽNI BETON	C 8/10				
TEMELJI	C25/30	XC2	30	30	30
STENE IN VEZI	C25/30	XC2	25	25	25
ETAŽNA PLOŠČA	C30/37	XC2	25	25	25

ARMATURA		SIST EN 10080, SIST EN 1992-1-1			
ELEMENT KONSTRUKCIJE	oznaka	razred duktilnosti	f_{yk} Mpa	f_{tk} / f_{yk}	ε_{uk} (%)
vsi armiranobetonski elementi	B500	B	500	>1.08	>5.0

OPOMBA:
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5/ Pred izvedbo je potrebno vse preboje uskladiti s projektantom gradbenih konstrukcij

ARMATURNI NAČRT STOPNIC

STATICON IB
STATICON IB, družba za projektiranje, inženiring in svetovanje d.o.o.
Lokarjev drevored 1, 5270 Ajdovščina
telefon: 05 99 66 290 e- mail: bogomir.ipavec@staticon-ib.si

investitor:	OBČINA AJDOVŠČINA Cesta 5. maja 6a 5270 Ajdovščina		
Naziv gradnje:	DOM KRAJANOV		
lokacija:	MALE ŽABLJE		
vodja projektiranja:	ANA VIDRIH GRAHOVAC mag.inž.arh. ZAPS PA*-1844		
odgovorni inženir:	BOGOMIR IPAVEC univ.dipl.inž.grad. G-0250		
področje načrta:	2 Načrt gradbeništva		
št. projekta: 42/2024	št. načrta: 1231/2025	vrsta projekta: PZI	datum: december 2025
merilo: 1:50	risba: ARMATURNI NAČRT STOPNIC		list: 5