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TEHNO-innova d.o.o.

Kukuljevićeva 7, Varaždin

revizije:

Ivan Paska
Digitalno potpisao:
Ivan Paska
Datum:
2025.09.24
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Kontrola projekta:
Područje mehaničke otpornosti i
stabilnosti drvenih konstrukcija
dr. sc. Dean Čizmar, dipl. ing. grad.
Br. upisa R 111
Br. ovlaštenja G 4390

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by Dean Čizmar
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by Tomislav
Kušan



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Nikola Skendžić
Date: 2025.09.22
17:32:54 +02'00'

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SKENDŽIĆ

Date: 2025.09.22 17:39:55 +02'00'

GRAĐEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić-
Đakovo

INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja
Tomislava 25, 31400 Đakovo, OIB: 31582799502

LOKACIJA: k.č.br. 6471, k.o. Đakovo

RAZINA RAZRADE / MAPA GLAVNI PROJEKT, MAPA 3

STRUKOVNA ODREDNICA: GRAĐEVINSKI PROJEKT – PROJEKT KONSTRUKCIJE

T.D. : 090725-P

Zajed.ozn.proj. VIZ-EX/GP-31/2024

GLAVNI PROJEKTANT: Tomislav Kušan, dipl.ing.arh.

PROJEKTANT: Nikola Skendžić, mag.ing.aedif.

DATUM: 8/2025

DIREKTOR: Nikola Skendžić,
mag.ing.aedif.



 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRAĐEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 2

1.1. POPIS MAPA GLAVNOG PROJEKTA

BROJ	VRSTA PROJEKTA	TVRTKA	BR. TEH. DN.
MAPA 1	arhitektonski projekt Tomislav Kušan, dipl.ing.arh. broj ovlaštenja: A 2616	VIZ-EX d.o.o. Jurja Križanića 6, Nedelišće OIB: 05103167154	GP-31/2024
MAPA 2	projekt zgrade u odnosu na racionalnu uporabu energije i toplinsku zaštitu zgrade Ivica Vizinger, dipl.ing.grad. broj ovlaštenja G 3623	VIZ-EX d.o.o. Jurja Križanića 6, Nedelišće OIB: 05103167154	EF-135/2025
MAPA 3	građevinski projekt – projekt konstrukcije Nikola Skendžić, mag.ing.aedif. broj ovlaštenja G 7512	TEHNO-INNOVA d.o.o. Ulica I. Kukuljevića 7, Varaždin OIB: 78332681065	090725-P
MAPA 4	građevinski projekt – projekt vanjskog uređenja Ivica Vizinger, dipl. ing. grad. broj ovlaštenja G 3623	VIZ-EX d.o.o. Jurja Križanića 6, Nedelišće OIB: 05103167154	GP-136/2025
MAPA 5	građevinski projekt – projekt vodovoda i odvodnje Ivica Vizinger, dipl. ing. grad. broj ovlaštenja G 3623	VIZ-EX d.o.o. Jurja Križanića 6, Nedelišće OIB: 05103167154	GP-137/2025
MAPA 6	strojarski projekt – projekt grijanja, hlađenja i ventilacije Tomo Planinić, dipl. ing. stroj. br. ovlaštenja: S 1357	Planinić Projekt d.o.o Zagrebačka ulica 132A, Zagreb, OIB: 39607283390	2025/226
MAPA 7	elektrotehnički projekt i projekt sunčane elektrane Ivan Đurđević, dipl. ing. el. br. ovlaštenja: E 284	SLIMEL d.o.o. Ivanićgradska 59b, Zagreb, OIB: 65100985613	TD-E 2501/25
MAPA 8	elektrotehnički projekt - projekt sustava za dojavu požara Ivan Đurđević, dipl. ing. el. br. ovlaštenja: E 284	SLIMEL d.o.o. Ivanićgradska 59b, Zagreb, OIB: 65100985613	TD-DP 2501/25

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRAĐEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
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Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo

INVESTITOR:
Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502

DATUM:
8/2025

STR:
4



Elektronički zapis
Datum: 05.01.2025

IZVADAK IZ SUDSKOG REGISTRA

SUBJEKT UPISA	
IBS:	070213619
OIB:	78332681065
EUID:	HSR.070213619
TVRTKA:	1 TEHNO-INNOVA društvo s ograničenom odgovornošću za projektiranje, nadzor i konsalting
	1 TEHNO-INNOVA d.o.o.
SJEDIŠTE/ADRESA:	1 Varaždin (Grad Varaždin) ULICA IVANA KURULJEVIĆA 7
ADRESA ELEKTRONIČKE POŠTE:	1 tehnno-innova@outlook.com
PRAVNI OBLIK:	1 društvo s ograničenom odgovornošću
PRETEŽITA DJELATNOST:	1 71.12 - Inženjerstvo i s njim povezano tehničko savjetovanje
OSNOVNAČI/ČLANOVI DRUŠTVA:	1 Milovan Skendžić, OIB: 79795540464 Lepoglava, Ulica Hrvatskih Pavlina 12 1 - jedini član d.o.o.
OSOBE OVLAŠTENE ZA ZASTUPANJE:	1 Nikola Skendžić, OIB: 30324548200 Varaždin, Koprivnička ulica 3 1 - direktor 1 - zastupa društvo pojedinačno i samostalno
TEMELJNI KAPITAL:	1 2.500,00 euro
PRAVNI ODNOSI:	1 Izjava o osnivanju od 27.11.2024.

D004
Stranica: 1 od 3

Stranica: 1 od 3
1004Elektronički zapis
Datum: 05.01.2025

IZVADAK IZ SUDSKOG REGISTRA

SUBJEKT UPISA	
EVIDENCIJSKE DIELATNOSTI:	
1 *	- projektiranje i građenje građevina, održavanje zgrade
1 *	- stručni nadzor građenja
1 *	- energetsko certificiranje, energetski pregled zgrade i redoviti pregledi sustava grijanja i sustava hlađenja ili klimatizacije u zgradi
1 *	- djelatnost kontrole i notifikacije projekata
1 *	- inženjerstvo i s njim povezano tehničko savjetovanje
1 *	- djelatnosti prostornog uređenja i gradnje
1 *	- djelatnost projektiranja i/ili stručnog nadzora gradnja
1 *	- djelatnost upravljanja projektom gradnje
1 *	- djelatnost tehničkog ispitivanja i analize
1 *	- djelatnost ispitivanja
1 *	- djelatnost prethodnih istraživanja
1 *	- kupnja i prodaja robe
1 *	- pružanje usluga u trgovini
1 *	- obavljanje trgovačkog posredovanja na domaćem i inozemnom tržištu
1 *	- zastupanje inozemnih tvrtki
1 *	- usluge informacijskog društva
1 *	- promidžba (reklama i propaganda)
1 *	- trgovina na malo preko pošte ili Interneta
1 *	- skladištenje robe
1 *	- posredovanje u prometu nekretninama
1 *	- poslovanje nekretninama
1 *	- poslovanje vlastitim nekretninama
1 *	- poslovi upravljanja nekretninom i održavanje nekretnina
1 *	- pružanje usluga smještaja
1 *	- pripremanje hrane za potrošnju na drugom mjestu sa ili bez usluživanja (u prijevornom sredstvu, na priredbama i opskrba tom hranom (catering)
1 *	- pripremanje hrane i pružanje usluga prehrane
1 *	- pripremanje i usluživanje pića i napitaka
1 *	- proizvodnja gotove hrane i jela
1 *	- poslovne pomoćne uslužne djelatnosti
1 *	- ostale djelatnosti pripreme i usluživanja hrane
1 *	- djelatnosti pripreme i usluživanja pića
1 *	- proizvodnja hrane
1 *	- turističke usluge koje uključuju športsko-rekreativne ili pustolovne aktivnosti
1 *	- usluge iznajmljivanja opreme za šport i rekreaciju turistima i obveze pružatelja usluge
1 *	- turističke usluge u nautičkom turizmu
1 *	- turističke usluge aktivnog i pustolovnog turizma
1 *	- turističke usluge na poljoprivrednom gospodarstvu, ugađanju vodenih organizama, lovistišu i u šumi
1 *	- šumoposrednika te ribolovnog turizmu
1 *	- turističke usluge u ostalim oblicima turističke ponude

D004
Stranica: 2 od 3

Stranica: 2 od 3

Elektronički zapis
Datum: 05. 07. 2005

TEIADRY TS SIMOC DECTOMD A

SUBJEKT UPISA	
EVIDENCIJSKE DJELATNOSTI:	
1 *	- prijevoz putnika u unutarnjem cestovnom prometu
1 *	- prijevoz putnika u međunarodnom cestovnom prometu
1 *	- prijevoz tereta u unutarnjem cestovnom prometu
1 *	- prijevoz tereta u međunarodnom cestovnom prometu
1 *	- cestovni prijevoz robe
1 *	- prijevoz za vlastite potrebe
1 *	- računalne i srodne djelatnosti
1 *	- izrada i održavanje web stranica
1 *	- web dizajn
1 *	- računovodstveni poslovi
Upise u glavnu knjigu proveli su:	
BBU Tt	Datum Naziv suda
0001 Tt-24/4809-2	12.12.2024 Trgovački sud u Varaždinu
Sukladno Uredbi o tarifi sudskih pristojbi (NN br. 37/2023) tar. br. 28. ne plaća se pristojba za izdavanje aktivnog i/ili povijesnog izvataka iz sudskeg registra. Ova isprava je u digitalnom obliku elektronički potpisana certifikatom: CN=sudreg, L=ZAGREB, O=MINISTARSTVO PRAVOVEDBA I UPRAVE HR/2910430276, C=HR Broj zapisa: 007gt-2vžw2-sohr7-v56wa-v3xfj Kontrolni broj: OXSHx-HV5JX-qdPz6-9pLda Štampanjem ovog QR koda možete provjeriti točnost podataka.	

Sukladno Uredbi o tarifi sudskih pristojbi (NN br. 37/2023) Tar. br. 28. ne plaća se pristojba za izdavanje aktivnog i/ili povijesnog izvotka iz sudskog registra.



Ova isprava je u digitalnom obliku elektronički
potpisana certifikatom:
CN=sudreg, L=ZAGREB,
O=MINISTARSTVO PRAVOSUDA I UPRAVE HR72910430276, C=HR

Broj zapisa: 007gt-2vZW2-soHR7-v5eWa-v3xfj
Kontrolni broj: OXShx-HV5JX-q4PZ6-9PLDa

R koda možete provjeriti točnost podataka.

http://sudreg.pravosudje.hr/register/kontrola_izvornika/ unosom gore navedenog broja
zapisa i kontrolnog broja dokumenta.

U oba slučaja sustav će prikazati izvornik ovog dokumenta. Ukoliko je ovaj dokument

identičan prikazanom izvorniku u digitalnom obliku, Ministarstvo pravosuđa i uprave

potvrđuje točnost isprave i stanje podataka u trenutku izrade izvataka.

Provjera točnosti podataka može se izvršiti u roku tri mjeseca od izdavanja isprave.

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRAĐEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
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3	uračunava se u iznos članarine, sve u skladu s člankom 55. Stavcima 1. i 2. Zakona o komori arhitekata i komorama inženjera u graditeljstvu i prostornom uređenju. Ovlašteni inženjer građevinarstva uplatio je za upis Hrvatskoj komori inženjera građevinarstva upisninu u iznosu od 135,00 € sukladno članku 13. stavku 1. točki 4. Statuta Hrvatske komore inženjera građevinarstva („Narodne novine“, broj 132/15 i 123/19) i članku 2. stavku 2. Odluke o visini članarine, upisnine i naknade za usluge Hrvatske komore inženjera građevinarstva. Na temelju Tar. br. 1. i 2. Uredbe o tarifi upravnih pristojbi (NN 156/2022) na zahtjev i rješenje ne plaća se upravna pristojba. Slijedom navedenog, na temelju članaka 26. i 27. Zakona o komori arhitekata i komorama inženjera u graditeljstvu i prostornom uređenju i članka 17. i 18. Zakona o poslovima i djelatnostima prostornoga uređenja i gradnje, odlučeno je kao u treći. Upućiti o pravnom lijeku: Protiv ovog rješenja dopuštena je žalba koja se podnosi Ministarstvu prostornoga uređenja, graditeljstva i državne imovine u roku 15 dana od dana dostave rješenja. Žalba se predaje neposredno ili šaljive poštom u pisanom obliku, u tri primjerka, putem tijela koje je izdalo rješenje. Na temelju Tar. br. 3. Uredbe o tarifi upravnih pristojbi (NN 156/2022) na žalbu izjavljenu protiv ovog rješenja ne plaća se upravna pristojba. Dostavliti: Nikola Skendžić, 42000 Varaždin, Koprivnička 3 - U Zbirku isprava Komore 
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2	Prema odredbi članka 27. Zakona o komori arhitekata i komorama inženjera u graditeljstvu i prostornom uređenju, pravo na upis u imenik ovlaštenih arhitekata, ovlaštenih arhitekata urbanista, odnosno ovlaštenih inženjera Komore ima fizička osoba koja kumulativno ispunjava sljedeće uvjete: - da je završila odgovarajući prediplomski i diplomski sveučilišni studij ili integrirani prediplomski i diplomski sveučilišni studij i stekla akademski naziv magister inženjer, ili da je završila odgovarajući specijalistički diplomski stručni studij i stekla stručni naziv stručni specijalist inženjer ako je tijekom cijelog svog studija stekla najmanje 300 ECTS bodova, odnosno da je na drugi način propisan posebnim propisom stekla odgovarajući stupanj obrazovanja odgovarajuće struke, - da je po završetku odgovarajućeg diplomskog sveučilišnog studija ili po završetku odgovarajućeg specijalističkog diplomskog stručnog studija provela na odgovarajućim poslovima u struci najmanje dvije godine, da je po završetku odgovarajućeg diplomskog sveučilišnog studija ili odgovarajućeg specijalističkog diplomskog stručnog studija provela na odgovarajućim poslovima u struci najmanje jednu godinu, ako je uz navedeno iskustvo po završetku odgovarajućeg prediplomskog i diplomskog sveučilišnog ili po završetku odgovarajućeg prediplomskog stručnog studija stekla odgovarajuće iskustvo u struci u trajanju od najmanje tri godine, odnosno bila zaposlena na stručnim poslovima (regionalne) samopoprave, te zavedena za prostorno uređenje županije, odnosno grada Zagreba najmanje deset godina, - da je ispunila uvjete sukladno posebnim propisima kojima se propisuje polaganje stručnog ispita. Zahtjev podnosiocima je osnovan. U postupku koji je prethodio donošenju ovog rješenja izvršen je uvid u priloženu dokumentaciju i utvrđeno je da je zahtjev podnosiocima osnovan, te da podnosioci udovoljavaju kumulativno svim uvjetima za upis u Imenik ovlaštenih inženjera građevinarstva koji su propisani člankom 27. Zakona o komori arhitekata i komorama inženjera u graditeljstvu i prostornom uređenju. Podnosioci zahtjeva stekao je pravo na uporabu strukovnog naziva „ovlašteni inženjer građevinarstva“ i pravo na obavljanje stručnih poslova temeljem članka 46., 50., 53. stavak 1. i 2., 55. Zakona o poslovima i djelatnostima prostornoga uređenja i gradnje, te ostala prava i dužnosti sukladno ovom Zakonu, posebnim zakonima i propisima donesenim temeljem tih zakona, te općim aktima Komore. Ovlašteni inženjer građevinarstva dužan je izvršavati navedene stručne poslove sukladno zakonu te temeljnim načelima i pravilima struke koje treba poštovati ovlašteni inženjer građevinarstva. Pravo na obavljanje navedenih stručnih poslova prestaje s prestankom članstva u Komori, u skladu s člankom 34. i 35. Zakona o komori arhitekata i komorama inženjera u graditeljstvu i prostornom uređenju. Ovlaštenom inženjeru građevinarstva Hrvatska komora inženjera građevinarstva izdaje pečat i iskaznicu ovlaštenog inženjera građevinarstva, sukladno članku 26. stavku 5. Zakona o komori arhitekata i komorama inženjera u graditeljstvu i prostornom uređenju. Ovlašteni inženjer građevinarstva dužan je plaćati Hrvatskoj komori inženjera građevinarstva članarinu i ostala davanja koja utvrde tijela Komore osim u slučaju mirovanja članstva i privremenog prekida obavljanja djelatnosti, a pri prestanku članstva u Komori dužan je podmiriti sve dospjele financijske obveze prema Komori, sve sukladno članku 13. stavku 1. točki 5. Statuta Hrvatske komore inženjera građevinarstva. Ovlašteni inženjer građevinarstva dobiva putem Hrvatske komore inženjera građevinarstva Potvrdu o polici osiguranja od profesionalne odgovornosti kod odabranog osiguravatelja. Polica se izdaje na razdoblje od godine dana i obnavlja svake godine. Premija osiguranja plaća se sa članarinom, odnosno
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REPUBLIKA HRVATSKA HRVATSKA KOMORA INŽENJERA GRAĐEVINARSTVA 10000 Zagreb, Ulica grada Vukovara 271 KLASA: UP/I-360-02/23-01/248 URBROJ: 251-500-03-23-2 Zagreb, 15. studenog 2023. godine Hrvatska komora inženjera građevinarstva na temelju članka 26. stavka 3. i članka 27. Zakona o komori arhitekata i komorama inženjera u graditeljstvu i prostornom uređenju („Narodne novine“, broj 78/2015, 114/2018, 110/2019) odlučujući o zahtjevu koji je podnio Nikola Skendžić, Varaždin, Koprivnička 3, donosi sljedeće	RJEŠENJE - U Imenik ovlaštenih inženjera građevinarstva uplaćuje se Nikola Skendžić, mag. ing. aedif., Varaždin, Koprivnička 3, OIB 30324948200, pod rednim brojem 7512, s danom upisa 15.11.2023. godine. - Upisom u Imenik ovlaštenih inženjera građevinarstva Nikola Skendžić, mag. ing. aedif., stječe pravo na uporabu strukovnog naziva „ovlašteni inženjer građevinarstva“ i pravo na obavljanje stručnih poslova temeljem članka 46., 50., 53. stavak 1. i 2., 55. Zakona o poslovima i djelatnostima prostornoga uređenja i gradnje („Narodne novine“, broj 78/2015, 118/2018, 110/2019), te ostala prava i dužnosti sukladno ovom Zakonu, posebnim zakonima i propisima donesenim temeljem tih zakona, te općim aktima Komore. - Ovlaštenom inženjeru građevinarstva Hrvatska komora inženjera građevinarstva izdaje pečat i iskaznicu ovlaštenog inženjera građevinarstva koje su vlasništvo Komore. Obrazloženje Dana 06.11.2023. godine Nikola Skendžić, mag. ing. aedif., podnio je zahtjev za upis u Imenik ovlaštenih inženjera građevinarstva. U prilogu zahtjeva, podnosioci zahtjeva je podnio sljedeću dokumentaciju: - presliku važećeg osobnog dokumenta, - presliku diplome, - presliku Uvjerjenja o položenoj stručnom ispitu za obavljanje poslova prostornog uređenja i graditeljstva, - dokaz o radnom stažu (Elektronički zapis o podacima evidentiranim u matičnoj evidenciji Hrvatskog zavoda za mirovinsko osiguranje), - popis poslova u struci ovjeren od ovlaštenog inženjera građevinarstva pod čijim je nadzorom obavljao poslove, - dokaz o uplati upisnine u iznosu od 135,00 eur.
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 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRAĐEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
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Na temelju Čl. 52 , Zakona o gradnji (NN RH 153 /13, 20/17, 39/19, 125/19 , 145/24), Ovim aktom

Projektantom konstrukcije

na izradi glavnog građevinskog projekta **090725-P** **za**

građevinu:

Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo

investitor:

Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502

lokacija:

k.č.br. 6471, k.o. Đakovo

Imenuje se:

Nikola Skendžić, mag.ing.aedif.
ovlašteni inženjer građevinarstva

Varaždin, 8/2025

Ovlašteni inženjer:

Nikola Skendžić, mag.ing.aedif.

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRAĐEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
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Na temelju čl.108 , Zakona o gradnji (NN RH 153 /13, 20/17, 39/19, 125/19, 145/24), projektant izdaje slijedeću

IZJAVU

Ovaj glavni građevinski projekt **090725-P** Izrađen u skladu s:

[Prostornim planom:](#)

- Odredbama za provođenje GUP-a grada Đakova – III. ID (Službeni glasnik Grada Đakova" broj 6/08., 12/15., 14/15.-pročišćeni tekst, 9/19, 12/19- pročišćeni tekst, 6/21 i 12/21 - pročišćeni tekst) i
- Odredbama za provođenje PPUG Đakovo – V. ID ("Službeni glasnik Grada Đakovo" broj 07/06., 7/12., 1/15., 2/15.-pročišćeni tekst, 9/18., 11/18.-pročišćeni plan, 9/19, 12/19-pročišćeni tekst, 6/21., 12/21.-pročišćeni tekst i 14/21.-ispravak).

[i drugim propisima u skladu s kojima mora biti izrađen:](#)

1. Zakon o gradnji ("Narodne novine" broj 153/13 , 20/17, 39/19 , 125/19, 145/24)
2. Zakon o prostornom uređenju ("Narodne novine" broj 153/13, 65/17, 114/18, 39/19, 98/19, 67/23)
3. Zakon o građevnim proizvodima ("Narodne novine" broj 76/13, 130/17, 39/19, 118/20)
4. Zakon o komori arhitekata i komorama inženjera u graditeljstvu i prostornom uređenju ("Narodne novine" broj 78/15, 114/18, 110/19)
5. Zakon o poslovima i djelatnostima prostornog uređenja i gradnje ("Narodne novine" broj 78/15, 118/18, 110/19)
6. Pravilnik o obveznom sadržaju i opremanju projekata građevina ("Narodne novine" broj 118/19, 65/2020)
7. Pravilnik o tehničkim dopuštenjima za građevne proizvode ("Narodne novine" broj 103/08.).
8. Pravilnik o ocjenjivanju sukladnosti, ispravama o sukladnosti i označavanju građevnih proizvoda ("Narodne novine" broj 103/08., 147/09., 87/10. i 129/11.).
9. Pravilnik o nadzoru građevnih proizvoda ("Narodne novine" broj 113/08.)
10. Pravilnik o održavanju građevina ("Narodne novine" broj 122/14, 98/19)
11. Pravilnik o građevnom otpadu i otpadu koji sadrži azbest (NN 69/16)
14. Tehnički propis o građevnim proizvodima ("Narodne novine" broj 35/18, 104/19, 103/24)
17. Tehnički propis kojim se utvrđuju tehničke specifikacije za građevne proizvode u usklađenom području ("Narodne novine" broj 4/15, 24/15, 93/15, 133/15, 36/16, 58/16, 104/16, 28/17, 88/17, 29/18, 43/19, 150/22, 142/23)
18. Tehnički propis za građevinske konstrukcije ("Narodne novine" broj 17/17, 75/20, 7/22)

Varaždin, 8/2025

Ovlašteni inženjer:

Nikola Skendžić, mag.ing.aedif.

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TEHNIČKI DIO

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRAĐEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
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1 . TEHNIČKI OPIS

1.1 . OPIS PROJEKTIRANOG DIJELA GRAĐEVINE

Predmet ovog projekta je dogradnja postojeće škole. Postojećoj građevini dograditi će se novi nezavisni dio koji se sastoji od sportske dvorane te popratnih prizemnih prostorija. Tražena vatrootpornost nosivih el. građevine je REI 90. Čelične zatege potrebno je dodatno zaštititi vatrootpornim premazom ili izolacijom.

Dvorana se sastoji od dva dijela - veća i manja dvorana koje su odijeljene a.b.zidom, a tlocrtno gledano su zamaknute tako da im se sljeme krovšta poklapa, međutim uzdužni zidovi nisu pokopljani. Krovnu konstrukciju čine sekundarni lamelirani nosači raspona 5,5m, postavljeni na osnovnom međusobnom razmaku od 2,25m. Kao pokrov koristi se termoizolirani čel.panel debljine 20cm.

Glavni nosači su lamelirani sedlasti nosači zakrivljenog intradosa debljine 24cm i promjenjive visine od 102cm na ležaju do 159cm u sljemenu. Nosači su zbog geometrije dvorane nesimetrični sa različitim visinama oslonaca na stupovima. Nagib krovne ravnine je 18st. Dodatno nosač većoj dvorani različit je od nosača u manjoj dvorani i po rasponu i po obliku. Raspon većeg nosača (osni) je 15,23m a manjeg 14,23m. Na mjestu oslanjanja gl.nosača na a.b.stupove potrebno je izvesti čelični viličasti ležaj . Jedan od ležajeva potrebno je izvesti kao horizontalno pomičan ležaj. Na središnjem dijelu glavnog nosača kako bi se pokrio vlak okomito na vlakanca potrebno je izvesti ojačanja u obliku vertikalnih ulijepljenih šipki ili navojnih šipki/vijaka.

U krovnim ravninama izvesti će se horizontalna poprečna stabilizacija u obliku vlačnih čeličnih zatega(dijagonala). Vezovi su postavljeni uz rubove zabatnih zidova.

Nosivi stupovi na koje se oslanjaju glavni lamelirani nosači su a.b.stupovi 50x50cm. Uzdužne ravnine dvorane između stupova ispunjene su a.b.zidom debljine 20cm. Dodatno u svim kutovima dvorane također se izvode stupovi 50x50cm. U zabatnim ravninama i središnjoj poprečnoj ravnini postavljeni su stupovi 60x60cm i to na poziciji sljemena. Zabatni stupovi međusobno su povezani a.b.zidom ispunom debljine 20cm.

Zajedno sa dvoranom izvodi se niži prizemni dio sa svlačionicama i drugim potrebnim prostorijama. Stropna konstrukcija nad prizemljem je ujedno i ravni krov - a.b.ploča debljine 20cm. Svi zidovi su a.b.zidovi debljine 20cm.

A.b.podna ploča dvorane i dogradnje je debljine 15cm. Ploču izvesti na nabijenom tamponu šljunka. Šljunak zbijati u slojevima do propisanog modula stišljivosti.

Temelji samci ispod glavnih stupova dvorane su dimenzija 250x250x60cm, dok su temelji pod jačim zabatnim stupovima 350x250x60cm. Svi temelji dvorane međusobno su po obodu povezani trakastim temeljima širine 80cm ispod a.b.zidova ispune. Trakasti temelji pod zidovima prizemnog dijela su širine 60cm. Dubina temeljenja prema geomehanici iznosi 1,5m. Eventualnu razliku u dubini potrebno je nadoknaditi ili mršavim betonom ili nabijenim slojem šljunka MS = 50MPa.

Nosivost tla preuzeta je iz geotehničkog elaborata: TD: SPP/2025/060 , napravljenog od strane SPP d.o.o. Varaždin, srpanja 2025.g. Nakon iskopa, a prije betoniranja temelja potrebno je izvršiti pregled iskopa od strane ovlaštenog geomehaničara.

MATERIJALI:

DRVO: gl28h / LAMELIRANO DRVO - ČETINARI
 BETON: temelji c30/37, ostalo c25/30
 B.ČELIK: B500b
 K.ČELIK: S235 (Fe360)

Projektant:

Nikola Skendžić, mag.ing.aedif.

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1.2. UVJETI I ZAHTJEVI KOJI MORAJU BITI ISPUNJENI PRI IZVOĐENJU RADOVA

Prilikom gradnje upotrijebit će se materijali koji nisu štetni za ljude i okoliš.

U toku gradnje posebno obratiti pažnju da se izvođenjem radova ne ugrozi postojeća dosadašnji način korištenja susjednih građevina.

Isto tako, radovima se ne smije ugroziti dosadašnji način korištenja okolnih nekretnina ili na bilo koji način ugroziti tuđe vlasništvo. Investitor je dužan eventualnu štetu ukloniti te teren i građevine dovesti u prvobitno stanje.

Posebno se pridržavati mjera osiguranja gradilišta i zaštite radnika za siguran rad.

Pridržavati se svih opisanih uvjeta i zahtjeva prikazanih kroz ostala poglavlja ovog projekta jer su bitni za ispunjavanje tehničkih svojstava projektiranog dijela građevine te temeljnih zahtjeva za građevinu.

Građevnim otpadom u svemu postupati u skladu Pravilnikom o gospodarenju građevnim otpadom i otpadom koji sadrži azbest (NN 69/16).

1.3. OPIS UTJECAJA NAMJENE I NAČINA UPORABE PROJEKTIRANE GRAĐEVINE

Namjena građevine je u skladu sa zahtjevima prostornog plana područja te će se upotrebljavati isključivo za projektiranu namjenu.

Upotrebom građevine stambene namjene se neće stvarati negativni i/ili štetni utjecaji na okoliš. U potpunosti su ispunjeni bitni zahtjevi za građevinu.

1.4. OPIS ISPUNJENJA UVJETA GRADNJE NA LOKACIJI

Projektirana građevina je u skladu s odredbama prostornog plana područja (osobito u pogledu oblika, veličine i uređenja građevinske čestice, pristupa na parcelu, smještaja građevine na parceli, namjene i korištenja građevine te načina sprečavanja nepovoljnog utjecaja na okoliš, zatim koeficijenta izgrađenosti i iskoristivosti parcele, gabarita građevine i katnosti.

1.5. OPIS ISPUNJENJA TEMELJNIH ZAHTJEVA ZA PROJEKTIRANU GRAĐEVINU

1/ Mehanička otpornost i stabilnost građevine – građevina je projektirana tako da opterećenja koja na nju mogu djelovati tijekom građenja i uporabe ne mogu dovesti do:

- rušenja cijele građevine ili nekog njezina dijela
- velikih deformacija u stupnju koji nije prihvatljiv
- oštećenja na drugim dijelovima građevine, instalacijama ili ugrađenoj opremi kao rezultat velike deformacije nosive konstrukcije
- oštećenja kao rezultat nekog događaja, u mjeri koja je nerazmjerna izvornom uzroku.

2/ Sigurnost u slučaju požara – građevina je projektirana tako da u slučaju požara:

- nosivost građevine može biti zajamčena tijekom određenog razdoblja
- nastanak i širenje požara i dima unutar građevine je ograničeno
- širenje požara na okolne građevine je ograničeno
- korisnici mogu napustiti građevinu ili na drugi način biti spašeni
- sigurnost spasilačkog tima je uzeta u obzir.

3/ Higijena, zdravlje i okoliš – građevina je projektirana tako da tijekom svog vijeka trajanja ne predstavlja prijetnju za higijenu ili zdravlje i sigurnost radnika, korisnika ili susjeda te da tijekom cijelog svog vijeka trajanja nema iznimno velik utjecaj na kvalitetu okoliša ili klimu, tijekom građenja, uporabe ili uklanjanja, a posebno kao rezultat bilo čega od:

- istjecanja otrovnog plina
- emisije opasnih tvari, hlapljivih organskih spojeva (VOC), stakleničkih plinova ili opasnih čestica u zatvoreni i otvoreni prostor
- emisije opasnog zračenja
- ispuštanja opasnih tvari u podzemne vode, morske vode, površinske vode ili tlo
- ispuštanja opasnih tvari u pitku vodu ili tvari koje na drugi način negativno utječu na pitku vodu
- pogrešno ispuštanje otpadnih voda, emisije dimnih plinova ili nepropisno odlaganje krutog ili tekućeg otpada
- prisutnost vlage u dijelovima građevine ili na površini unutar građevine.

4/ Sigurnost i pristupačnost tijekom uporabe – građevina je projektirana tako da ne predstavlja neprihvatljive rizike od nezgoda ili oštećenja tijekom uporabe ili funkcioniranja, kao što su proklizavanje, pad, sudar, opekline, električni udari, ozljede od eksplozija i provale. Kod korištenja prostora prizemlja i potreba za parkiranjem, vođeno je računa o pristupačnosti i uporabi od strane osoba smanjene pokretljivosti.

5/ Zaštita od buke – građevina je projektirana tako da buka koju zamjećuju korisnici ili osobe koje se nalaze u blizini ostaje na razini koja ne predstavlja prijetnju njihovu zdravlju i koja im omogućuje spavanje, odmor i rad u zadovoljavajućim uvjetima.

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6/ Gospodarenje energijom i očuvanje topline – građevina i njezine instalacije za grijanje, hlađenje, osvjetljenje i provjetravanje su projektirane tako da količina energije koju zahtijevaju ostane na niskoj razini, uzimajući u obzir korisnike i klimatske uvjete smještaja građevine. Energetska učinkovitost osigurat će se i time da se koristi što je moguće manje energije tijekom građenja i razgradnje.

7/ Održiva uporaba prirodnih izvora – građevina je projektirana tako da je uporaba prirodnih izvora održiva, a posebno da se može zajamčiti:

- ponovna uporaba ili mogućnost reciklaže građevine, njezinih materijala i dijelova nakon uklanjanja
- trajnost građevine
- uporaba okolišu prihvatljivih sirovina i sekundarnih materijala u građevinama.

1.6. Prethodna istraživanja, studije i podloge od utjecaja na tehnička svojstva građevine

-nisu vršena

1.7. POKUSNI RAD

- ne postoji potreba za pokusnim radom

1.8. MOGUĆNOST I UVJETI UPORABE PROJEKTIRANOG DIJELA GRAĐEVINE PRIJE DOVRŠETKA PLANIRANOG ZAHVATA

-nije predviđeno

1.9. PROJEKTIRANI VIJEK UPORABE GRAĐEVINE I UVJETI ZA NJENO ODRŽAVANJE

1. Opće napomene projektiranja konstrukcije da zadovolji potrebni uporabni vijek građevine

Suglasno HRN ENV 1991-1 ovisno o vrsti konstrukcije razlikuju se četiri razreda sa različitim proračunskim uporabnim vijekom prema sljedećoj tablici:

Tablica 1 Razredba proračunskoga uporabnog vijeka (prema HRN ENV 1991-1)

Razred	Zahtijevani proračunski uporabni vijek [godine]	Primjer
1	1-5	Privremene konstrukcije
2	25	Zamjenjivi dijelovi konstrukcije, npr. grede pokretnih kranova, ležajevi
3	50	Konstrukcije zgrada ili druge uobičajene konstrukcije
4	100	Monumentalne građevine, mostovi i druge inženjerske konstrukcije

Suglasno ovoj normi konstrukciju zgrade koja je predmet projektiranja ovim projektom treba svrstati u treći razred što znači da je zahtijevani proračunski uporabni vijek ove građevine

50 godina

Ova vrijednost usvojena za uporabni vijek predstavlja polazište na osnovi kojega su definirani zahtjevi na beton, zahtjevi na izvođenje radova te održavanje konstrukcije.

Prema Eurokodu 1, 1. dio i Eurokodu 2 za ostvarenje trajne betonske konstrukcije valja razmotriti sljedeće, međusobno ovisne, čimbenike:

- namjenu konstrukcije (sadašnju i buduću)
- zahtijevana svojstva/ponašanje konstrukcije
- očekivane uvjete okoliša i njegov utjecaj
- sastav, svojstva i ponašanje materijala
- oblik konstrukcijskih elemenata, konstruiranje pojedinosti i građevnu izvedbu
- kvalitetu građenja i opseg nadzora
- naročite mjere zaštite
- održavanje tijekom predviđenog uporabnog vijeka.

Opće odredbe dane u normi osiguravaju zadovoljavajući uporabni vijek, uz pretpostavku da su u ranoj fazi projektiranja odgovarajuće razmatrani zahtjevi za uporabu i trajnost.

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Obzirom na djelovanja koja utječu na trajnost, Eurokod 2 se uglavnom bavi s četiri glavna mehanizma degradacije, tj.:

- korozijom armature
- alkalno-agregatnom reakcijom
- kemijskim djelovanjima
- smrzavanjem/odmrzavanjem.

Prvi mehanizam degradacije u prvom redu napada i oštećuje armaturu, što ima za posljedicu raspucavanje i odlamanje betona. Preostala tri mehanizma degradacije izravno razaraju beton. Svi navedeni mehanizmi degradacije zahtijevaju prisutnost vode. Kako je voda neophodna za proces hidratacije, uvijek je prisutna u određenoj količini. Brzina napredovanja degradacije smanjuje se što je beton više suh.

Budući da je djelovanje vode vrlo nepovoljno i razorno za betonsku konstrukciju, osnovna pravila ispravnog projektiranja građevine s obzirom na djelovanje vode mogu se sumirati kako slijedi:

- vodu što prije odvesti s konstrukcije
- spriječiti da voda prođe u konstrukciju
- odgovarajuće riješiti opću odvodnju i zaštitu
- osigurati nepropusnost betona.

Razne vrste soli, a osobito kloridi, koje dolaze u dodir s betonskom konstrukcijom pokazale su se najrazornijim agresivnim tvarima s obzirom na sastojke armiranog betona.

Očito je da se trajnosti zasniva prvenstveno na odabiru odgovarajuće mješavine betona uz definirane zahtjeve na čvrstoću betona i debljinu zaštitnog sloja armature, ovisno o uvjetima okoliša u kojima se betonska konstrukcija nalazi. Ako se ispune zahtjevi dani u normi, implicitno se smatra da će biti dosegnut predviđeni uporabni vijek.

2. Definiranje sastava i svojstava betona betonske konstrukcije

- Analiza izloženosti konstrukcije

Tablica 2. Razredi izloženosti ovisno o uvjetima okoliša (prema Eurokodu 2)

Razred izloženosti		Primjeri za uvjete okoliša
1 Suhi okoliš		- unutrašnjost stambenih ili uredskih zgrada ¹⁾
2 Vlažan okoliš	a) bez mraza	- unutrašnjost zgrade s velikom vlažnošću - vanjski elementi - elementi u neškodljivom tlu i/ili vodi
	b) s mrazom	- vanjski elementi izloženi mrazu - elementi u neškodljivom tlu i/ili vodi izloženi mrazu - unutarnji elementi u velikoj vlazi izloženi mrazu
3 Vlažan okoliš s mrazom i djelovanjem sredstava za odmrzavanje		- unutarnji i vanjski elementi izloženi mrazu i sredstvima za odmrzavanje
4 Morski okoliš	a) bez mraza	- elementi izloženi prskanju morske vode ili uronjeni u more - elementi na zraku zasićenom solju (neposredna blizina mora)
	b) s mrazom	- elementi izloženi prskanju morske vode ili uronjeni u more - elementi na zraku zasićenom solju i izloženi smrzavici
Ovi razredi mogu pojedinačno postojati ili biti u kombinaciji s gore navedenim:		
5 Kemijski škodljiv okoliš²⁾	a)	- neznatno kemijski škodljiv okoliš (u plinovitom, tekućem ili krutom stanju) - škodljiva industrijska atmosfera
	b)	- umjereno kemijski škodljiv okoliš (u plinovitom, tekućem ili krutom stanju)
5 Kemijski škodljiv	c)	- kemijski vrlo škodljiv okoliš (u plinovitom, tekućem ili krutom stanju)
1) Ovaj razred izloženosti vrijedi samo ako građevina ili njezin dio za vrijeme izvođenja dulje vrijeme ne budu izloženi lošijim uvjetima. 2) Kemijski škodljiv okoliš razvrstan je u ISO DP 9690. Mogu se također usvojiti ovi istovrijedni razredi izloženosti: Razred izloženosti 5a: ISO - razredba A1G, A1L, A1S Razred izloženosti 5b: ISO - razredba A2G, A2L, A2S Razred izloženosti 5c: ISO - razredba A3G, A3L, A3S		

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Ovisno o razredu izloženosti Eurokod 2 definira debljinu zaštitnog sloja na slijedeći način

Tablica 3: Najmanja debljina zaštitnog sloja za obični beton (Eurokod 2)

		Razred izloženosti (prema Eurokodu 2)								
		1	2a	2b	3	4a	4b	5a	5b	
Najmanji zaštitni sloj	Čelik za armiranje	15	20	25	40	40	40	25	30	
	Čelik za prednapinjanje	25	30	35	50	50	50	35	40	

Suglasno ovom AB konstrukciju zgrade treba svrstati u 2a razred izloženosti koji se definira kao:

1 Suhi okoliš		- unutrašnjost stambenih ili uredskih zgrada ¹⁾
2 Vlažan okoliš	a) bez mraza	- unutrašnjost zgrade s velikom vlažnošću - vanjski elementi - elementi u neškodljivom tlu i/ili vodi

debljina zaštitnog sloja za navedenu izloženost konstrukcije je:

d = 2,0 cm

Projektiranje trajnosti podrazumijeva definiranje i izvedbu betonskih elemenata odgovarajuće otpornosti.

Prema novim europskim i hrvatskim normama projektiranje trajnosti provodi se kao funkcija spomenutih razreda izloženosti, a u osnovi se sastoji od ispunjavanja tri zahtjeva koji se odnose na:

- maksimalni vodocementni faktor
- minimalni sadržaj cementa
- minimalni razred čvrstoće betona

Tablica 4. Razredi izloženosti (prema HRN EN 206-1)

Ozna	Opis okoliša / izloženost	Informativni primjeri moguće pojave razreda izloženosti
1 Nema rizika korozije		
X0	Za beton bez armature ili ugrađenog metala: sve izloženosti gdje nema smrzavanja, abrazije ili kemijskog djelovanja. Za beton s armaturom ili ugrađenim metalom: vrlo suho.	Beton unutar građevine s vrlo niskom vlažnosti zraka.
2 Korozija uzrokovana karbonatizacijom		
XC1	Suha ili stalno vlažna	Beton unutar građevina s niskom vlagom zraka. Beton stalno u vodi.
XC2	Vlažna, rjeđe suha	Površina betona izložena dugotrajnom dodiru s vodom. Mnogi temelji.
XC3	Umjereno vlažna	Beton unutar građevina s umjerenom ili niskom vlažnosti zraka. Vanjski beton zaštićen od kiše.
XC4	Izmjenično vlažna i suha	Površina betona u dodiru s vodom, ali ne kao u XC2.

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3 Korozija uzrokovana kloridima koji nisu iz mora		
XD1	Umjereno vlažna	Površina betona izložena kloridima iz zraka.
XD2	Vlažna, rjeđe suha	Plivališta, beton izložen otpadnim industrijskim vodama koje sadrže kloride.
XD3	Izmjenično vlažna i suha	Dijelovi mostova izloženi prskanju s kloridima, kolnici, parkirališta.
4 Korozija uzrokovana kloridima iz morske vode		
XS 1	Izloženo solima iz zraka, ali ne u izravnom dodiru s morskom vodom	Konstrukcije blizu mora ili na obali.
XS 2	Stalne uronjena	Dijelovi konstrukcije u moru.
XS 3	Područje plime i oseke i područje zapljusavanja	Dijelovi konstrukcije u moru.
5 Korozija uzrokovana smrzavanjem i odmrzavanjem sa soli za odmrzavanje ili bez nje		
XF1	Umjerena zasićenost vodom bez soli za odmrzavanje	Vertikalne površine betona izložene kiši i smrzavanju.
XF2	Umjerena zasićenost vodom sa solju za odmrzavanje	Vertikalne površine betona cestovnih konstrukcija izložene smrzavanju i solima za odmrzavanje iz zraka.
XF3	Visoka zasićenost vodom bez soli za odmrzavanje	Horizontalne površine betona izložene kiši i smrzavanju.
XF4	Visoka zasićenost vodom sa solju za odmrzavanje	Cestovne i mostovne kolničke ploče izložene solima za odmrzavanje. Površine betona izložene prskanju solima i smrzavanju. Područja vlaženja morem izložena smrzavanju.
6 Kemijska korozija Odnosi se na kemijsko djelovanje iz prirodnog tla i podzemne vode. Klasifikacija morske vode ovisi o zemljopisnoj lokaciji pa treba primijeniti razredbu koja vrijedi na mjestu uporabe betona. U normi je dana posebna specifikacija kemijske agresije prirodnog tla i podzemne vode. Ako se radi o djelovanjima izvan te specifikacije, drugim agresivnim kemikalijama, kemijski onečišćenoj podzemnoj vodi, velikoj brzini vode u kombinaciji sa specificiranim kemikalijama, može biti potrebna posebna studija za utvrđivanje odgovarajuće izloženosti.		
XA1	Lagano kemijski agresivan okoliš	
XA2	Umjereno kemijski agresivan okoliš	
XA3	Vrlo kemijski agresivan okoliš	

Suglasno prethodnoj tablici konstrukcija zgrade se treba svrstati u slijedeće razred izloženosti :

XC1	Suha ili stalno vlažna	Beton unutar građevina s niskom vlagom zraka. Beton stalno u vodi.
XC2	Vlažna, rjeđe suha	Površina betona izložena dugotrajnom dodiru s vodom. Mnogi temelji.

Ostale korozije se mogu zanemariti.

Kloridni ioni su drugi uzrok (uz karbonatizaciju) gubitka pasivizirajućeg učinka. Kloridni ioni mogu prodrijeti u beton, ako je konstrukcija u morskom okolišu ili u kontaktu sa solima za odleđivanje. Također, kloridi mogu biti prisutni u betonu od samog početka, primjerice kada se rabi morski pijesak za sitnu frakciju ili kalcijev klorid kao ubrzivač.

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HRN EN 206-1 zabranjuje uporabu kalcijevog klorida i kemijskih dodataka na osnovi kalcijevog klorida u betonu koji sadrži ubetonirane metalne dijelove (armaturu, čelik za prednapinjanje ili drugi ugrađeni metal). Definirana je granična vrijednost sadržaja klorida u armiranom betonu izražena kao postotak kloridnih iona od 0,4% na masu cementa.

3. Preporučene granične vrijednosti sastava i svojstava betona

Tablica 5. Preporučene granične vrijednosti sastava i svojstava betona (prema HRN EN 206-1)

Razredi izloženosti				Preporučene granične vrijednosti		
Oznaka razreda	Djelovanje			Max v/c	Min cement [kg/m ³]	Razred čvrstoće
X0		Nema rizika		Nema zahtje	Nema zahtjeva	C12/15
XC	1	Karbonatizacija (H ₂ O, CO ₂)	Suho ili u vodi	0,65	260	C20/25
	2		Vlaga (stalna)	0,60	280	C25/30
	3		Umjerena vlaga	0,55	280	C30/37
	4		Vlaženje/sušenje	0,50	300	C30/37
XD	1	Kloridi koji nisu iz mora (H ₂ O, Cl)	Umjerena vlaga	0,55	300	C30/37
	2		Vlaga (stalna)	0,55	300	C30/37
	3		Vlaženje/sušenje	0,45	320	C35/45
XS	1	Kloridi iz mora (H ₂ O, Cl)	Bez dodira s vodom	0,50	300	C30/37
	2		Uvodi	0,45	320	C35/45
	3		Plima/oseka, zapljuskivanje	0,45	340	C35/45
XF¹⁾	1	Smrzavanje - odmrzavanje + sol	Umjerena zasićenost vodom	0,55	300	C30/37
	2 ²⁾		Umjerena zasićenost vodom + sol	0,55	300	C25/30
	3 ²⁾		Visoka zasićenost vodom	0,50	320	C30/37
	4 ²⁾		Visoka zasićenost vodom + sol	0,45	340	C30/37
XA	1	Kemijsko djelovanje	Neznatno škodljiv	0,55	300	C30/37
	2 ³⁾		Umjereno škodljiv	0,50	320	C30/37
	3 ³⁾		Vrlo škodljiv	0,45	360	C35/45

- 1) Potrebno je primijeniti agregat prema prEN 12620:2000 s dovoljnom otpornošću na smrzavanje.
- 2) Preporučljiva količina zraka od minimalno 4,0%. Kada beton nije aeriran, ponašanje betona treba ispitivati prema prikladnoj metodi u usporedbi s betonom kojemu je otpornost na smrzavanje za odgovarajući razred izloženosti dokazana.
- 3) Primijeniti sulfatootporni cement. Kada SO₄²⁻ vodi ka razredu izloženosti XA2 i XA3, ispravno je upotrijebiti sulfatootporni cement. Kada je cement razvrstan prema sulfatnoj otpornosti, umjereno ili visoko sulfatootporni cement treba rabiti u razredu izloženosti XA2 (i u XA1 kad je primjenljiv), a visoko sulfatootporni cement treba

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4. Usvojeni sastav i svojstva betona

Sukladno navedenim preporukama za izgradnju konstrukcije **stambenih i poslovnih zgrada te zgrada slične namjene** usvaja se beton slijedećih karakteristika:

	debljina zaštitnog sloja d [cm]	maksimalan sadržaj kloridnih iona	Max v/c	Min cement [kg/m³]	Razred čvrstoće
Nearmirani i slaboarmirani temelji i podne ploče	2,5	0,2% na masu cementa.	-	-	16 / 20
AB elementi konstrukcije	2,0	0,4% na masu cementa.	0,60	280	25 / 30

5. Održavanje konstrukcije

Radnje u okviru održavanja konstrukcije treba provoditi prema odredbama **Priloga II. Tehničkog propisa za građevinske konstrukcije (NN br. 7/22)** i normama na koje upućuje navedeni Prilog, te odgovarajućom primjenom odredaba važećih ostalih propisa.

Bitni dijelovi konstrukcije su:

- AB konstrukcija
- Zidani zidovi sa AB serklažima

a.) Održavanje AB konstrukcije zgrade

Redovitih pregleda u svrhu održavanja betonske konstrukcije provode se ne rjeđe od 10 godina.

Pregled uključuje najmanje:

- vizualni pregled, u kojeg je uključeno utvrđivanje položaja i veličine napuklina i pukotina te drugih oštećenja bitnih za očuvanje mehaničke otpornosti i stabilnosti građevine,
- utvrđivanja stanja zaštitnog sloja armature,
- utvrđivanje veličine progiba glavnih nosivih elemenata ako se vizualnom kontrolom sumnja u ispunjavanje bitnog zahtijeva mehaničke otpornosti i stabilnosti ,

U slučaju da su pukotine veće da narušavaju trajnost AB konstrukcije potrebno ih je sanirati prema provjerenim tehničkim sustavima

b.) Održavanje Zidane konstrukcije zgrade

Isti pregled za zidane zidove konstrukcije potrebno je provesti kao i za AB elemente konstrukcije navedene pod točkom a.) ovog poglavlja. Sanacije pukotina potrebno je napraviti prikladnim sustavima injektiranja i vraćanjem svojstava zida u projektirano stanje bez pukotina.

c.) Čuvanje dokumentacije održavanja

Dokumentaciju pregleda te dokumentaciju o održavanju konstrukcije dužan je trajno čuvati vlasnik građevine. Pregled konstrukcije zgrade moraju obavljati za to ovlaštene osobe i ako se uoče da su bitna svojstva građevine narušena potrebno konstrukciju sanirati.

Projektant:

Nikola Skendžić, mag.ing.aedif.

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2 . DOKAZI O ISPUNJAVANJU TEMELJNIH I DRUGIH ZAHTJEVA

2.1 MEHANIČKA OTPORNOST I STABILNOST - ovim projektom obuhvaćen je dokaz mehaničke otpornosti i stabilnosti predmetne građevine. Detaljni proračuni i dokazi nalaze se u poglavlju – **statički proračun**.

2.2 PRIKAZ MJERA ZAŠTITE NA RADU

svih tehničkih mjera za primjenu propisa i pravila zaštite na radu primijenjenih u konstrukterskom projektu. Na temelju čl. 93 Zakona o zaštiti na radu (NN RH br. 71/14 i 118/14,154/14)

1. PRIMIJENJENI PROPISI ZAKONI I PRAVILNICI

- 1.1. Zakon o zaštiti na radu (NN RH br. 71/14 i 118/14,154/14,94/18,96/18)
- 1.2. Zakon o zaštiti od buke (NN RH br. 30/09, 55/13, 153/13, 41/16, 114/18 i 14/21)
- 1.3. Zakon o zaštiti od požara (NN RH br. 92/10, 114/22)
- 1.4. Zakon o gradnji ("Narodne novine" broj 153/13 , 20/17 , 39/19 , 125/19, 145/24)
- 1.5. Zakon o prostornom uređenju ("Narodne novine" broj 153/13, 65/17, 114/18, 39/19, 98/19, 67/23)
- 1.6. Zakon o gospodarenju otpadom (NN 84/2021, NN 142/2023-Odluka USRH)
- 1.7. Pravilnik o najvišim dopuštenim razinama buke s obzirom na vrstu izvora buke, vrijeme i mjesto nastanka (NN 143/2021)
- 1.8. Tehnički propis o racionalnoj uporabi energije i toplinskoj zaštiti u zgradama NN 128/15, 70/18, 73/18, 86/18, NN 102/20)
- 1.9. Tehnički propis o sustavima ventilacije, djelomične klimatizacije i klimatizacije zgrada(NN RH br. 03/07)
- 1.10. Zakon o normizaciji (NN RH br. 80/13)

2. OPASNOSTI PRI RADU

U procesu korištenja građevine, opasnosti na radu od konstrukcije glede njenih mehaničkih i geometrijskih svojstava ne postoje.

3. PRIKAZ PROJEKTOM DATIH RJEŠENJA KOJIMA SE OSIGURAVA RAD NA SIGURAN NAČIN

Projektom dana rješenja u skladu su s namjenom i navedenim propisima o općim mjerama i normativima zaštite na radu. Projektirani materijali prilagođeni su namjeni i u funkciji su ovog prostora.

Predmetna građevina je projektirana na način da će se tijekom njezinog korištenja osigurati:

- sigurnost na statička i dinamička opterećenja,
- stabilnost s obzirom na klimatske i atmosferske utjecaje,
- toplinska, zvučna i hidro - izolacija,
- higijena i zdravlje ljudi te zaštita radnog i životnog okoliša,
- sigurnost u korištenju,

odnosno, zadovoljava sva pravila i propise zaštite na radu, kao i zahtjeve iz Zakona o prostornom uređenju i Zakona o gradnji.

Projektant:

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3. PROGRAM KONTROLE I OSIGURANJA KVALITETE

1. Primjena općih tehničkih uvjeta

Tehnički uvjeti i program kontrole kvaliteta (u daljnjem tekstu Tehnički uvjeti) definiraju tehničke uvjete izvođenja radova, tehnologiju izvođenja i način ocjenjivanja kvalitete. Primjenjuju se na radove na konstrukciji i na radove koji se naknadno odrede na gradilištu koji su neophodni za potpuno dovršenje predmetne građevine.

Ovi tehnički uvjeti su usklađeni sa Zakonom o gradnji. Njihova primjena je obavezna te su se dužni pridržavati svi sudionici u građenju. (investitor, izvođač i dr.)

1.1. Investitor je dužan:

Projektiranje, građenje i nadzor povjeriti osobama ovlaštenim za obavljanje tih djelatnosti

Prije gradnje ishoditi građevinsku dozvolu

Osigurati stručni nadzor nad građenjem

Po završetku gradnje poduzeti potrebne radnje za obavljanje tehničkog pregleda i ishođenje uporabne dozvole

Pridržavati se ostalih obveza po navedenom zakonu

1.2. Izvođač je dužan

Graditi u skladu sa građevnom dozvolom, i drugim dokumentima koji su njoj prethodili - posebnim suglasnostima za gradnju.

Projektima na osnovi kojih je izdana građevna dozvola

Radove izvoditi na način da zadovolje svojstva u smislu pouzdanosti, mehaničke otpornosti i stabilnosti, sigurnosti za slučaj požara, zaštite zdravlja ljudi, zaštite korisnika od povreda, zaštite od buke i vibracija, toplinske zaštite i uštede energije, zaštite od korozije, te ostala funkcionalna i zaštitna svojstva.

Ugrađivati materijale, opremu i proizvode predviđene projektom, provjerene u praksi, a čija je kvaliteta dokazana certifikatima sukladno propisima i normama.

Osigurati dokaze o kvaliteti radova i ugrađenih proizvoda i opreme

1.3. Dokumentacija

Da bi se osigurao ispravan tok i kvaliteta građenja, Izvođač mora na gradilištu posjedovati odgovarajuću dokumentaciju za građenje i pridržavati se nje kako slijedi:

Građevinsku dozvolu i dokumentaciju koja je njoj prethodila (suglasnosti)

Uredno vođen građevinski dnevnik i građevinsku knjigu

Rješenja o imenovanju odgovornih osoba

Elaborat o organizaciji gradilišta sa mjerama zaštite na radu i zaštite od požara.

Zapisnik o iskolčenju objekta i način osiguranja stalnih točaka iskolčenja

Dokumentaciju o kvaliteti radova i ugrađenog materijala i opreme. (atesti, uvjerenja certifikati, jamstveni listovi i sl.) a naročito:

Program ispitivanja kvalitete ugrađenog betona i Izvještaje o ispitivanju betona od strane ovlaštene institucije.

Atesti kvalitete ugrađenih zidnih elemenata i morta korištenog za zidanje oblogu korita.

Izvještaje o svim ostalim ispitivanjima koja su provedena po nalogu ispitivanju nadzornog inženjera ili bez njegovog naloga a koja su potrebna radi dokazivanja kvalitete izvedenih radova i ugrađenih materijala.

1.4. Kontrolna ispitivanja

O izvršenim kontrolnim ispitivanjima materijala koji se ugrađuje u građevinu mora se cijelo vrijeme građenja voditi evidencija te sačiniti izvješće o pogodnosti ugrađenih materijala sukladno projektu, ovom programu ili citiranim pravilnicima, normama i standardima.

Izvješće o pogodnosti ugrađenih materijala mora sadržavati slijedeće dijelove:

Naziv materijala, laboratorijsku oznaku uzorka, količinu uzoraka, namjenu materijala, mjesto i vrijeme (datum) uzimanja uzorka te izvršenih ispitivanja, podatke o proizvođaču i investitoru, podatke o građevini za koju se uzimaju uzorci odnosno vrši ispitivanje.

Prikaz svih rezultata, laboratorijskih, terenskih ispitivanja za koja se izdaje uvjerenje odnosno ocjena kvalitete.

Ocjenu kvalitete i mišljenje o pogodnosti (uporabljivosti) materijala za primjenu na navedenoj građevini te rok do kojega vrijedi izvješće.

Uzimanje uzoraka i rezultati laboratorijskih ispitivanja moraju se upisivati u laboratorijsku i gradilišnu dokumentaciju. (građevinski dnevnik, građevinska knjiga)

Uz dokumentaciju koja prati isporuku proizvoda ili poluproizvoda proizvođač je dužan priložiti rezultate tekućih ispitivanja koja se odnose na isporučene količine.

Za materijale koji podliježu obveznom atestiranju mora se izdati atestna dokumentacija sukladno propisima

Sva izvješća, atesti i drugi dokazi kvalitete moraju se odmah po dobivanju dostaviti i nadzornom inženjeru.

Po završetku svih radova izvođač je obavezan da izradi elaborat izvedenog stanja građevine i katastra podzemnih instalacija.

2. Standardi

Nabavku opreme i materijala Izvođač mora usuglasiti sa specifikacijama i važećim standardima:

HRN i HRN EN (Hrvatske norme – preuzete europske norme)

Ukoliko neki radovi nisu obuhvaćeni ovim standardima, mjerodavni će biti:

a) Međunarodne Organizacije za Standardizaciju ISO

2. BETONSKI I ARMIRANO BETONSKI RADOVI

a. Beton proizveden prema odredbama Tehničkog propisa za betonske konstrukcije i ovih tehničkih uvjeta ugrađuje se u betonsku konstrukciju prema projektu, normi HRN EN 13670-1, normama na koje ta norma upućuje i odredbama ovoga Priloga.

b. Izvođač mora prema normi HRN EN 13670-1 prije početka ugradnje provjeriti da li je beton u skladu sa zahtjevima iz projekta betonske konstrukcije, te da li je u transportu betona došlo do promjene njegovih svojstava koja bi utjecala na tehnička svojstva betonske konstrukcije.

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- c. Kontrolni postupak utvrđivanja svojstava svježeg betona provodi se na uzorcima uzetim neposredno prije ugradnje betona u betonsku konstrukciju u skladu sa zahtjevima norme HRN EN 13670-1 i projekta betonske konstrukcije, a najmanje pregledom svake otpremnice i vizualnom kontrolom konzistencije kod svake dopreme (svakog vozila) te, kod opravdane sumnje ispitivanjem konzistencije istim postupkom kojim je ispitana u proizvodnji.
- d. Kontrolni postupak utvrđivanja tlačne čvrstoće očvrslulog betona provodi se na uzorcima koji se uzimaju neposredno prije ugradnje betona u betonsku konstrukciju u skladu sa zahtjevima projekta betonske konstrukcije, ali ne manje od jednog uzorka za istovrsne elemente betonske konstrukcije koji se bez prekida ugrađivanja betona izvedu unutar 24 sata od betona istih iskazanih svojstava i istog proizvođača.
- d.1. Ako je količina ugrađenog betona veća od 100 m³, za svakih slijedećih ugrađenih 100 m³ uzima se po jedan dodatni uzorak betona.
- d.2. Podaci o istovrsnim elementima betonske konstrukcije izvedenim od betona istih iskazanih svojstava i istog proizvođača evidentiraju se uz navođenje podataka iz otpremnice tog betona, a podaci o uzimanju uzoraka betona evidentiraju se uz obvezno navođenje oznake pojedinačnog elementa betonske konstrukcije i mjesta u elementu betonske konstrukcije na kojem se beton ugrađivao u trenutku uzimanja uzoraka.
- d.3.. Kontrolni postupak utvrđivanja tlačne čvrstoće očvrslulog betona ocjenjivanjem rezultata ispitivanja uzoraka i dokazivanje karakteristične tlačne čvrstoće betona provodi se odgovarajućom primjenom kriterija iz Dodatka B norme HRN EN 206-1 »Ispitivanje identičnosti tlačne čvrstoće«.
- e. Kontrolni postupak utvrđivanja tlačne čvrstoće očvrslulog betona ugrađenog u pojedini element betonske konstrukcije u slučaju sumnje, provodi se kontrolnim ispitivanjem na mjestu koje se određuje na temelju podataka iz točke d.2. ovoga Priloga.
- f. U slučaju nepotvrđivanja zahtijevanog razreda tlačne čvrstoće betona treba na dijelu konstrukcije u koji je ugrađen beton nedokazanog razreda tlačne čvrstoće provesti naknadno ispitivanje tlačne čvrstoće betona u konstrukciji prema HRN EN 12504-1 i ocjenu sukladnosti prema EN 13791.

2.1. ISPORUKA SVJEŽEG BETONA

2.1.1. Informacije korisnika betona proizvođaču

Korisnik treba usuglasiti s proizvođačem datum isporuke, vrijeme i količinu te informirati proizvođača o posebnom transportu na gradilište, posebnim postupcima ugradnje, ograničenjima vozila isporuke, npr. tipa (agitirajuća ili neagitirajuća oprema), veličine, visine ili bruto težine.

2.1.2. Informacije proizvođača betona korisniku

Prilikom naručivanja korisnik će zahtijevati informacije o sastavu mješavine betona radi primjene pravilne ugradnje i zaštite svježeg betona i utvrđivanja razvoja čvrstoće betona.

Te informacije mora na zahtjev korisnika dati proizvođač prije isporuke betona, već prema tome kako odgovara korisniku.

Kad je posrijedi tvornički proizvedeni beton, informacije, kad se zatraže, mogu također biti dane i referencama proizvođačeva kataloga sastava mješavina betona, u kojima su iskazane pojedinosti o klasama čvrstoće, klasama konzistencije, težina mješavine i drugi mjerodavni podaci.

Informacije za utvrđivanje vremena zaštite betona prema razvoju čvrstoće mogu biti iskazane nazivima iz tablice 2 ili krivuljom razvoja čvrstoće betona pri 20°C između 2 i 28 dana.

Tablica 2 Razvoj čvrstoće betona pri 20°C

Razvoj čvrstoće	Omjeri čvrstoće σ_2 / σ_{28}
Brz	>0,5
Srednji	>0,3 i < 0,5
Polagan	> 0,15 i < 0,3
Vrlo polagan	<0,15

Omjer čvrstoće kao indikator razvoja čvrstoće jest omjer srednje vrijednosti tlačne čvrstoće nakon 2 dana σ_2 i srednje vrijednosti tlačne čvrstoće nakon 28 dana σ_{28} utvrđen početnim ispitivanjima ili zasnovan na poznatim svojstvima betona komparabilnog sastava. U ovim početnim ispitivanjima uzorke za utvrđivanje čvrstoće treba praviti, njegovati i ispitivati prema HRN EN 12350-1, HRN EN 12390-1, HRN EN 12390-2 i HRN EN 12390-3.

Proizvođač treba informirati korisnika o zdravstvenom riziku koji se može pojaviti tijekom rukovanja betonom.

2.1.3. Otpremnica za gotov (tvornički proizveden) beton

Pri isporuci betona proizvođač mora dostaviti korisniku otpremnicu za svaku transportnim sredstvom isporučenu količinu betona, na kojoj su otisnute, utisnute ili upisane najmanje sljedeće informacije:

Ime tvornice betona, serijski broj otpremnice, datum i vrijeme utovara, tj. vrijeme prvog kontakta cementa i vode, broj vozila, ime kupca, ime i lokacija gradilišta, detalji ili reference uvjeta, npr. kodni broj, redni broj, količina betona u m³, deklaracija sukladnosti s referentnim uvjetima kvalitete i EN 206, ime ili znak certifikacijskog tijela ako je relevantno, vrijeme kad beton stiže na gradilište, vrijeme početka istovara, vrijeme završetka istovara.

2.1.4. Otpremne informacije za gradilišni beton

Odgovarajuća informacija tražena potpoglavljem 2.1.3. za otpremnicu betona mjerodavna je i za beton proizveden na velikom gradilištu, ili kad uključuje više tipova betona.

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2.1.5. Konzistencija pri isporuci

Općenito je svako dodavanje vode ili kemijskih dodataka pri isporuci zabranjeno. U posebnim slučajevima voda ili kemijski dodaci mogu biti dodani kad je to pod odgovornošću proizvođača i primjenjuje se za dobivanje uvjetovane vrijednosti konzistencije, osiguravajući da uvjetovane granične vrijednosti nisu prekoračene i da je dodatak kemijskog dodatka uključen u projekt betona. Količina svakog dodatka vode ili kemijskog dodatka dodana u vozilo (mikser) mora biti upisana u otpremni dokument u svim slučajevima.

2.1.6. Kontrola sukladnosti i kriteriji sukladnosti

Kontrola sukladnosti sastoji se od aktivnosti i odluka koje treba poduzeti u skladu s pravilima sukladnosti prilagođenim unaprijed radi provjere sukladnosti betona s propisanim uvjetima. Kontrola sukladnosti je integralni dio kontrole proizvodnje.

Svojstva betona kojima se kontrolira sukladnost jesu ona koja se mjere odgovarajućim ispitivanjima prema normiranim postupcima. Stvarne vrijednosti svojstava betona u konstrukcijama mogu se razlikovati od tih utvrđenih ispitivanjima, npr. ovisno o dimenzijama konstrukcije, ugradnji, zbijanju, njegovanju i klimatskim uvjetima.

Plan uzorkovanja i ispitivanja te kriteriji sukladnosti trebaju zadovoljavati postupke navedene u ovom poglavlju.

Mjesto uzimanja uzoraka za ispitivanje sukladnosti treba odabrati tako da se mjerodavna svojstva betona i sastav betona značajnije ne mijenjaju od mjesta uzorkovanja do mjesta isporuke.

Kada su ispitivanja kontrole proizvodnje ista kao i ispitivanja uvjetovana za kontrolu sukladnosti, treba ih uzeti u obzir pri vrednovanju sukladnosti. Proizvođač može koristiti i druge rezultate ispitivanja isporučenog betona u prihvaćanju sukladnosti.

Sukladnost ili nesukladnost prosuđuje se prema kriterijima sukladnosti. Nesukladnost može voditi daljnjim akcijama na mjestu proizvodnje i na gradilištu.

2.1.7. Kontrola proizvodnje

Proizvođač je odgovoran za besprijekorno upravljanje proizvodnjom betona. Sav beton mora biti predmet kontrole proizvodnje.

Kontrola proizvodnje obuhvaća sve mjere nužne za održavanje svojstava betona u sukladnosti s uvjetovanim svojstvima.

To uključuje: izbor materijala, projektiranje betona, proizvodnju betona, preglede i ispitivanja, uporabu rezultata ispitivanja sastavnih materijala, svježeg i očvrsllog betona i opreme kontrolu sukladnosti.

Kontrola proizvodnje mora se odvijati prema načelima serije normi HRN EN ISO 9000. Sustav kontrole proizvodnje treba sadržavati odgovarajuće dokumentirani postupak i upute. Taj postupak i upute treba po potrebi utvrditi uzimajući u obzir potrebe kontrole iskazane u tablicama 22, 23 i 24 EN 206. Namjeravanu učestalost ispitivanja i nadzora treba dokumentirati. Rezultate ispitivanja i kontrola treba evidentirati izvještajima.

Svi mjerodavni podaci o kontroli proizvodnje trebaju biti zapisani (sadržani u izvještajima). Izvještaje o kontroli proizvodnje treba čuvati najmanje 3 godina, ako zakonske obveze ne traže duže razdoblje.

2.1.8.. Vrednovanje i potvrđivanje sukladnosti

Proizvođač je odgovoran za ocjenu sukladnosti betona s uvjetovanim svojstvima. U tu svrhu proizvođač mora provoditi sljedeće:

- početno ispitivanje kad je traženo
- kontrolu proizvodnje
- kontrolu sukladnosti

Proizvođačevu kontrolu proizvodnje treba za sve betone klase iznad C 16/20 vrednovati i pregledavati ovlašteno nadzorno tijelo i zatim ovjeriti ovlašteno certifikacijsko tijelo.

Proizvođač je odgovoran za održavanje sustava kontrole proizvodnje.

2.2. SKELE I OPLATE

2.4.2.1. Osnovni zahtjevi

Skele i oplate, uključujući njihove potpore i temelje, treba projektirati i konstruirati tako da su:

otporne na svako djelovanje kojem su izložene tijekom izvedbe,

dovoljno čvrste da osiguraju zadovoljenje tolerancija uvjetovanih za konstrukciju i spriječe oštećivanje konstrukcije.

Oblik, funkcioniranje, izgled i trajnost stalnih radova ne smiju biti ugroženi ni oštećeni svojstvima skela i oplate te njihovim uklanjanjem.

Skele i oplate moraju zadovoljavati mjerodavne hrvatske i europske norme kao što je EN 1065.

2.2.2. Materijali

2.2.2.1. Općenito

Može se upotrijebiti svaki materijal koji će ispuniti uvjete konstrukcije ovih tehničkih uvjeta. Moraju zadovoljavati odgovarajuće norme za proizvod ako postoje. U obzir treba uzeti svojstva posebnih materijala.

2.2.2.2. Oplatna ulja

Oplatna ulja treba odabrati i primijeniti na način da ne štete betonu, armaturi ili oplati i da ne djeluju štetno na okolinu.

Nije li namjerno specificirano, oplatna ulja ne smiju štetno utjecati na valjanost površine, njezinu boju ili na posebne površinske premaze.

Oplatna ulja treba primjenjivati u skladu s uputama proizvođača ili isporučitelja.

2.2.2.3. Skele

Projekt skele treba uzeti u obzir deformacije tijekom i nakon betoniranja kako bi se izbjegle štetne pukotine u mladom betonu. To se može postići:

- ograničenjem progibanja i/ili slijeganja,
- kontrolom betoniranja i/ili specificiranjem betona npr. usporavanjem ugradnje.

2.2.2.4. Oplate

Oplata treba osigurati betonu traženi oblik dok ne očvrstne.

Oplata i spojnice između elemenata trebaju biti dovoljno nepropusni da spriječe gubitak finog morta.

Oplatu koja apsorbira značajniju količinu vode iz betona ili omogućava evaporaciju treba odgovarajuće vlažiti da se spriječi gubitak vode iz betona, osim ako nije za to posebno i kontrolirano namijenjena.

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Unutarnja površina oplate mora biti čista. Ako se koristi za vidni beton, njezina obrada mora osigurati takvu površinu betona.

2.2.2.5 .Posebne optate

Pri izvedbi konstrukcije kliznom oplatom, projekt takvog sustava mora uzeti u obzir materijal optate i osigurati kontrolu geometrije radova. Za osiguranje traženog zaštitnog sloja betona, usklađenog s tolerancijama definiranim ovim tehničkim uvjetima, treba koristiti odgovarajuće vodilice ili distancere optate od armature.

2.2.2.6. Površinska obrada

Posebnu površinsku obradu betona, ako se traži, treba utvrditi projektnim specifikacijama.

Za prihvatanje zadane kvalitete površinske obrade mogu biti uvjetovani pokusni betonski paneli.

Vrsta i kvaliteta površinske obrade ovise o tipu optate, betonu (agregatu, cementu, kemijskim i mineralnim dodacima), izvedbi i zaštiti tijekom izvedbe.

2.2.2.7 .Oplatni ulošci i nosači

Privremeni držači optate, šipke, cijevi i slični predmeti koji će se ubetonirati u sklop koji se izvodi i ugrađeni elementi kao npr. ploče, ankeri i distanceri trebaju:

- biti čvrsto fiksirani tako da očuvaju projektirani položaj tijekom betoniranja,
- ne uzrokovati neprihvatljive utjecaje na konstrukciju,
- ne reagirati štetno s betonom, armaturom ili prednapetim čelikom,
- ne uzrokovati neprihvatljivi površinski izgled betona,
 - ne štetiti funkcionalnosti i trajnosti konstrukcijskog elementa.

Svaki ugrađeni dio treba imati dovoljnu čvrstoću i krutost da zadrži oblik tijekom betoniranja. Ne smije sadržavati tvari koje mogu štetno djelovati na njih same, beton ili armaturu.

Udubljenja ili otvore za privremene radove treba zapuniti i završno obraditi materijalom kakvoće slične okolnom betonu, osim ako ne ostaju otvoreni ili im je drugi način obrade specificiran.

2.2.2.8. Otpuštanje skela i uklanjanje optate

Skele ni optata se ne smiju uklanjati dok beton ne dobije dovoljnu čvrstoću:

- otpornu na oštećenje površine skidanjem optate,
- dovoljnu za preuzimanje svih djelovanja na betonski element u tom trenutku,
- da izbjegne deformacije veće od specificiranih tolerancija elastičnog ili neelastičnog ponašanja betona.

Uklanjanje optate treba izvoditi na način da se konstrukcija ne preoptereti i ne ošteti.

Opterećenja skela treba otpuštati postupno tako da se drugi elementi skele ne preoprote. Stabilnost skela i optate treba održavati pri oslobađanju i uklanjanju opterećenja.

Postupak podupiranja ili otpuštanja kad se primjenjuje za reduciranje utjecaja početnog opterećenja, sukcesivno opterećenje i/ili izbjegavanje velike deformacije treba detaljno utvrditi.

2.3. ARMATURA I UGRADNJA ARMATURE

- Armatura izrađena od čelika za armiranje prema odredbama ugrađuje se u armiranu betonsku konstrukciju prema projektu betonske konstrukcije, normi HRN EN 13670-1, normama na koje ta upućuje
- Rukovanje, skladištenje i zaštita armature treba biti u skladu sa zahtjevima tehničkih specifikacija koje se odnose na čelik za armiranje, projekta betonske konstrukcije te odredbama ovoga Priloga.
- Izvođač mora prema normi HRN EN 13670-1 prije početka ugradnje provjeriti je li armatura u skladu sa zahtjevima iz projekta betonske konstrukcije, te je li tijekom rukovanja i skladištenja armature došlo do njezinog oštećivanja, deformacije ili druge promjene koja bi bila od utjecaja na tehnička svojstva betonske konstrukcije.
- Nadzorni inženjer neposredno prije početka betoniranja mora:
 - provjeriti postoji li isprava o sukladnosti za čelik za armiranje, odnosno za armaturu i jesu li iskazana svojstva sukladna zahtjevima iz projekta betonske konstrukcije,
 - provjeriti je li armatura izrađena, postavljena i povezana u skladu s projektom betonske konstrukcije te u skladu s Prilozima »B« te dokumentirati nalaze svih provedenih provjera zapisom u građevinski dnevnik.

2.4.3.1. Materijali

Čelik za armiranje betona treba zadovoljavati uvjete EN 10080 i uvjete projekta konstrukcije. Svaki proizvod treba biti jasno označen i prepoznatljiv.

Sidreni i spojni elementi trebaju zadovoljavati uvjete EN 1992-1-1, priznatih propisa navedenih u TPGK i uvjete projekta.

Površina armature mora biti očišćena od slobodne hrđe i tvari koje mogu štetno djelovati na čelik, beton ili vezu između njih.

Galvanizirana armatura može se koristiti samo u betonu s cementom koji nema štetnog djelovanja na vezu s galvaniziranom armaturom.

2.3.2. Savijanje, rezanje, prijevoz i skladištenje

Čelik za armiranje betona treba rezati i savijati prema projektnim specifikacijama. Pri tome:

- savijanje treba izvoditi jednolikom brzinom,
- savijanje čelika pri temperaturi ispod -5 °C, ako je dopušteno projektnim specifikacijama, treba izvoditi uz poduzimanje odgovarajućih posebnih mjera osiguranja,
- savijanje armature grijanjem smije se izvoditi samo uz posebno odobrenje u projektnim specifikacijama.

Promjer trna za savijanje šipki treba biti prilagođen stvarnom tipu armature

2.4. BETONIRANJE

2.4.1. Uvjeti kakvoće betona

Beton mora biti proizveden prema uvjetima iz EN 206 i ovim tehničkim uvjetima

2.4.2. Isporuka, preuzimanje i gradilišni prijevoz svježeg betona

Nadzor i kontrolu kakvoće treba provesti na mjestu ugradnje i to najmanje u opsegu definiranom ovim tehničkim uvjetima.

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Među ostalim treba provjeriti otpremni dokument i paraform potvrditi izvršeni nadzor.

2.4.3. Kontrola prije betoniranja

- Treba pripremiti planove betoniranja i nadzora kao i sve ostale mjere predviđene ovim Tehničkim uvjetima i projektom, a ako ne postoji projekt, a prema složenosti izvedbe je neophodan potrebo ga je uzraditi.
- Treba po potrebi izvesti početno ispitivanje betoniranja pokusnom ugradnjom i to prije izvedbe dokumentirati.
- Sve pripremne radnje treba provjeriti i dokumentirati prema ovim uvjetima prije no što ugradnja betona počne.
- Konstrukcijske spojnice moraju biti čiste i navlažene. Oplatu treba očistiti od prljavštine, leda, snijega ili vode.
- Ako se beton ugrađuje izravno na tlo, svježi beton treba zaštititi od miješanja s tlom i gubitka vode.
- Konstrukcijske elemente treba podložnim betonom od najmanje 3-5 cm odvojiti od temeljnog tla ili za odgovarajuću vrijednost povećati donji zaštitni sloj betona.
- Temeljno tlo, stijena, oplata ili konstrukcijski dijelovi u dodiru s pozicijom koja se betonira trebaju imati temperaturu koja neće uzrokovati smrzavanje betona prije no što dostigne dovoljnu otpornost na smrzavanje. Ugradnja betona na smrznuto tlo nije dopuštena ako za takve slučajeve nisu predviđene posebne mjere.
- Predviđa li se temperatura okoline ispod 0°C u vrijeme ugradnje betona ili u razdoblju njegovanja, treba planirati mjere zaštite betona od oštećenja smrzavanjem.
- Površinska temperatura betona spojnice prije betoniranja idućeg sloja treba biti iznad 0°C. Ako se predviđa visoka temperatura okoline u vrijeme betoniranja ili u razdoblju njegovanja, treba planirati mjere zaštite betona od tih negativnih djelovanja.

2.4.4. Ugradnja i zbijanje

- Beton treba ugraditi i zbiti tako da se sva armatura i uloženi elementi dobro obuhvate betonom i osigura zaštitni sloj betona unutar propisanih tolerancija te beton dobije traženu čvrstoću i trajnost. Posebnu pažnju treba posvetiti ugradnji i zbijanju betona na mjestima promjene presjeka, suženja presjeka, uz otvore, na mjestima zgusnute armature i prekida betoniranja.
- Vibriranje, osim ako nije drugačije uvjetovano projektom, treba u pravilu izvoditi uronjenim vibratorima. Beton treba uložiti što bliže konačnom položaju u konstrukcijskom elementu: Vibriranjem se beton ne smije namjerno navlačiti kroz oplatu i armaturu.
- Normalna debljina sloja ne bi smjela biti veća od visine uronjenog vibratora. Vibriranje treba izvoditi sustavnim vertikalnim uranjanjem vibratora tako da se površina donjeg sloja revibrira. Kod debljih slojeva je revibriranje površinskog sloja preporučljivo i radi izbjegavanja plastičnog slijeganja betona ispod gornjih sipki armature.
- Vibriranje površinskim vibratorima treba izvoditi sustavno dok se iz betona oslobađa zarobljeni zrak. Prekomjerno površinsko vibriranje koje slabi kvalitetu površinskog sloja betona treba izbjeći. Kad se primjenjuje samo površinsko vibriranje, debljina sloja nakon vibriranja obično ne treba prelaziti 100 mm, osim ako nije prethodno eksperimentalno dokazano drugačije. Korisno je dodatno vibriranje površina uz podupore.
- Brzina ugradnje i zbijanja betona treba biti dovoljno velika da se izbjegnu hladne spojnice i dovoljno niska da se izbjegnu pretjerana slijeganja ili preopterećenje oplata i skela. Hladna spojica se može stvarati tijekom betoniranja, ako beton ugrađenog sloja veže prije ugradnje i zbijanja narednog. Dodatni zahtjevi na postupak i brzinu ugradnje betona mogu biti potrebni kod posebnih zahtjeva za površinsku obradu.
- Segregaciju betona treba pri ugradnji i zbijanju svesti na najmanju mjeru.
- Beton treba tijekom ugradnje i zbijanja zaštititi od insolacije, jakog vjetra, smrzavanja, vode, kiše i snijega.
- Naknadno dodavanje vode, cementa, površinskih otvrdivača ili sličnih materijala nije dopušteno.

2.4.5. Njegovanje i zaštita

- Beton u ranom razdoblju treba zaštititi:
 - da se skupljanje svede na najmanju mjeru,
 - da se postigne potrebna površinska čvrstoća,
 - da se osigura dovoljna trajnost površinskog sloja,
 - od smrzavanja,
 - od štetnih vibracija, udara ili drugih oštećivanja.
 - Pogodni su sljedeći postupci njegovanja primijenjeni odvojeno ili uzastopno:
 - držanje betona u oplati,
 - pokrivanje površine betona paronepropusnim folijama, posebno učvršćenim i osiguranim na spojevima i na krajevima,
 - pokrivanjem vlažnim materijalima i njihovom zaštitom od sušenja,
 - držanjem površine betona vidljivo vlažnom prikladnim vlaženjem,
 - primjenom zaštitnog premaza utvrđene uporabivosti (potvrđene certifikatom ili tehničkim dopuštenjem).
 - Postupci njegovanja trebaju osigurati nisku evaporaciju vlage iz površinskog sloja betona ili držati površinu stalno vlažnom. Prirodno njegovanje je dovoljno ako su uvjeti u cijelom razdoblju potrebnog njegovanja takvi daje brzina evaporacije vlage iz betona dovoljno niska, npr. u vlažnom, kišnom ili maglovitom vremenu. Njegovanje površine betona treba bez odgode započeti odmah po završetku zbijanja i površinske obrade. Ako slobodnu površinu betona treba zaštititi od pucanja zbog plastičnog skupljanja, privremeno njegovanje treba primijeniti i prije površinske obrade.
 - Trajanje primijenjenog njegovanja treba biti funkcija razvoja svojstava betona u površinskom sloju ovisno o omjeru:
 - čvrstoće i zrelosti betona,
 - oslobođene topline i ukupne topline oslobođene u adijabatskim uvjetima.
- Beton za uporabu u uvjetima izloženosti konstrukcije definiranim u poglavlju 3 a treba negovati dok površinski sloj betona ne dosegne najmanje 50 % uvjetovane tlačne čvrstoće. Iskustveno se taj uvjet, iskazan vremenski, može kontrolirati prema podacima danim u tablici

"Najmanje razdoblje njegovanja betona za klase izloženosti betona drugačije od X0 i XC1"

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Tablica 3: Najmanje razdoblje njegovanja betona za klase izloženosti betona drugačije od X0 i XC1

Površinska temperatura betona, °C	Najmanje razdoblje njegovanja, dana ^{1) 2)}			
	Razvoj čvrstoće betona ⁴⁾ f_{cm2} / f_{cm28}			
	brz, $r > 0,50$	srednji, $r = 0,30$	spor, $r = 0,15$	vrlo spor,
$r < 0,15$				
$T > 25$	1,0	1,5	2,0	3,0
$25 > T > 15$	1,0	2,0	3,0	5,0
$15 > T > 10$	2,0	4,0	7,0	10,0
$10 > T > 5^{3)}$	3,0	6,0	10,0	15,0
1) dodajući svako vrijeme vezanja iznad 5 sati 2) linearna interpolacija između vrijednosti u redovima je moguća 3) za temperature ispod 5°C trajanje treba produžiti za razdoblje jednako vremenu ispod 5°C 4) razvoj čvrstoće betona je omjer između srednje tlačne čvrstoće betona nakon 2 dana i srednje tlačne čvrstoće betona nakon 28 dana				

Ako se razvoj topline koristi za mjerenje razvoja svojstava betona, omjer topline i odgovarajuće čvrstoće treba prethodno utvrditi ili odobriti ovlaštena institucija.

Pobliža određenja razvoja svojstava betona mogu se temeljiti na jednom od sljedećih postupaka:

- računu zrelosti iz mjerenja temperature na dubini najviše 10 mm u betonu ispod površine,
- računu zrelosti iz mjerenja srednjih dnevnih temperatura zraka,
- temperaturi grijanja,
- drugim pogodnim postupcima.

Račun zrelosti treba se zasnivati na odgovarajućoj funkciji zrelosti, dokazanoj za tip cementa ili kombinaciju cementa i uporabljenog mineralnog dodatka.

Primjena zaštitnih premaza nije dopuštena na konstrukcijskim spojnica, na površinama koje će se naknadno obrađivati ili na površinama na kojima treba osigurati vezu s drugim materijalima, osim ako se prethodno potpuno ne uklone prije te sljedeće operacije ili ako dokazano ne djeluju štetno na tu sljedeću operaciju.

Ako projektnim specifikacijama nije naglašeno dopušteno, zaštitni premazi se ne smiju koristiti ni na površinama s uvjetovanim posebnim izgledom površine.

Površinska temperatura betona ne smije pasti ispod 0°C dok površina betona ne dosegne čvrstoću dovoljnu za otpornost na smrzavanje (obično iznad 5 N/mm²).

Najviša temperatura betona ne smije prijeći 65°C.

Mogući negativni utjecaji visokih temperatura betona tijekom njegovanja uključuju:

- značajno smanjenje čvrstoće,
- značajno povećanje poroznosti,
- odloženo formiranje etringita,
- povećanje razlike temperature betoniranog i prethodnog elementa.

2.4.6. Aktivnosti poslije betoniranja

Nakon skidanja oplate nadzorni inženjer treba prema uvjetovanom razredu nadzora provesti kontrolu površine betona i potvrditi sukladnost za zahtjevima.

Površinu betona treba tijekom izvedbe zaštititi od oštećivanja i remećenja površinske teksture.

Potrebe ispitivanja betona na građevini (svojstvo, učestalost i kriterije sukladnosti) treba prema uvjetima izvedbe i eksploatacije građevine utvrditi projektom konstrukcije i planom kontrole kvalitete izvedbe radova.

2.4.7. Konstrukcijske spojnice

Spojni dijelovi bilo kojeg tipa trebaju biti neoštećeni, točno postavljeni i ispravno izvedeni tako da osiguraju učinkovito ponašanje konstrukcije.

2.4.8. Geometrijske tolerancije

Izvedene dimenzije konstrukcija trebaju biti unutar najvećih dopuštenih odstupanja radi izbjegavanja štetnih utjecaja na:

- mehaničku otpornost i stabilnost u privremenom i kasnijem uporabnom stanju,
 - ponašanje tijekom uporabe građevine,
 - kompatibilnost postavljanja i izvedbe konstrukcije i njezinih nekonstrukcijskih dijelova.
- Nenamjerna mala odstupanja od referentnih vrijednosti koje nemaju značajniji utjecaj na ponašanje izvedene konstrukcije mogu se zanemariti.
- Date tolerancije, nominirane kao normalne tolerancije, odgovaraju projektnim pretpostavkama, EN 1992 i traženoj razini sigurnosti.

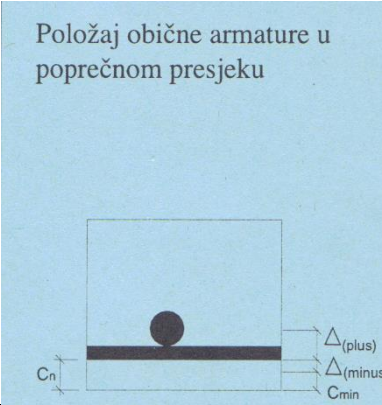
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Zahtjevi ovog poglavlja odnose se na ukupnu konstrukciju. Kod pojedinih dijelova svaka međukontrola tih dijelova mora poštivati uvjete konačne kontrole izvedene konstrukcije.
 Ako je određeno geometrijsko odstupanje pokriveno različitim zahtjevima (predujetovano), primjenjuje se stroži uvjet.

a. Presjeci

Dimenzije poprečnog presjeka, zaštitni sloj betona i položaj armature ne smiju odstupati od zadanih vrijednosti više no što je prikazano u slijedećoj tablici

tablica 4 - tolerancije

N ^o	Tip odstupanja	Opis	Dopušteno odstupanje
a	Dimenzije poprečnog presjeka		+ 10 mm
b	Položaj obične armature u poprečnom presjeku 	Za sve h vrijednosti je: Δ(minus) a pozitivno za h < 150 mm h = 400 mm h > 2500 mm uz linearnu interpolaciju međuvrijednosti	- 10 mm + 10 mm + 15 mm + 20 mm
C _{min} = traženi najmanji zaštitni sloj betona			
c _n = nominalni zaštitni sloj = c + Δ(minus)			
c = stvarni zaštitni sloj			
Δ = dopušteno odstupanje od c _n			
h = visina poprečnog presjeka			
Uvjet: c + Δ(plus) > c _n - Δ(minus)			
Dopušteno pozitivno odstupanje zaštitnog sloja temelja i elemenata u temeljima može se povećati za 15 mm. Dano negativno odstupanje ne može.			
c	Preklopni spoj	l preklopna duljina	-0,06 l
d	okomitost poprečnog presjeka	a – duljina dimenzije poprečnog presjeka	ne više od 0,04 a ili 10 mm
e	ravnost		
	Oplaćena ili zaglađena površina Ne oplaćene površine : ➤ globalno ➤ lokalno	L = 2,0 m L = 0,2 m L 2,0 m L = 0,2 m	9 mm 4 mm 15 mm 6 mm
f	Zakošenost poprečnog presjeka	ne veće od h/25 ili b/25 ali ne više od 30 mm	
g	ravnost bridova	za dužine ≥ 1 m > 1 m	8mm 8 mm / m ali ne više od 20 mm
h	otvori u ulošci	Δ ₁ ; Δ ₂ ; Δ ₃ ;	+ - 25 mm

3. ZIDARSKI RADOVI

Prilikom izvedbe zidarskih radova prema projektu i troškovniku izrađenog na osnovu ovog projekta, izvođač radova mora se pridržavati svih uvjeta i opisa u projektu i troškovniku kao i važećih propisa, a posebno:

- Tehnički propis za građevinske konstrukcije (NN 17/17).
- HRN EN 771-1+2:2005 - Specifikacije za zidne elemente - 1. dio: Opečni zidni elementi (EN 771- 1:2003+A1:2005)
- HRN EN 998-1/AC:2007 - Specifikacija morta za zide - 1. dio: Vanjska i unutarnja žbuka (EN 998- 1:2003/AC:2005)
- HRN EN 772-1+20:200x - Metode ispitivanja zidnih elemenata - 1.+20. dio:

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3.1. Materijali

Materijali koji se upotrebljava za zidarske radove mora biti ispravan, kvalitetan, a na zahtjev izvođač mora predložiti važeće ateste ili dati ispitati prema važećim standardima. Ispitivanje pada na teret izvođača. Tehnička svojstva građevnih proizvoda za zidane konstrukcije moraju ispunjavati opće i posebne zahtjeve bitne za krajnju namjenu i moraju biti specificirana prema normama navedenim u Tehničkom propisu za građevinske konstrukcije, i to:

- HRN ENV 1996-1-1:2007 Eurokod 6: Projektiranje zidanih konstrukcija – 1-1. dio: Opća pravila za zgrade. Pravila za armirano i nearmirano zide (ENV 1996-1-1:1995)
- HRN EN 771-1:2005 Specifikacije za zidne elemente – 1. dio: Opečni zidni elementi (EN 771-1:2003+A1:2005)
- HRN EN 771-3:2005 Specifikacije za zidne elemente – 3. dio: Betonski zidni elementi (gusti i lagani agregat) (EN 771-3:2003+A1:2005)
- HRN EN 845-1:2003 Specifikacije za pomoćne dijelove zida – 1. dio: Spone, vlačne trake, vješaljke i kutnici (EN 845-1:2003)
- HRN ISO 15686-1:2002, Zgrade i druge građevine – Planiranje vijeka uporabe – 1. dio: Opća načela (ISO 15686-1:2000)
- HRN ISO 15686-2:2002, Zgrade i druge građevine – Planiranje vijeka uporabe – 2. dio: Postupci predviđanja vijeka uporabe (ISO 15686-2:2001)
- HRN ISO 15686-3:2004, Zgrade i druge građevine – Planiranje vijeka uporabe – 3. dio: Neovisne ocjene (auditi) i pregledi svojstava (ISO 15686-3:2002)
- HRN DIN 18201:1997, Tolerancije u graditeljstvu – Pojmovi, načela, primjena, ispitivanje (DIN 18201:1997)
- HRN EN 998-1:2003 – Specifikacija morta za zide -- 1. dio: Vanjska i unutarnja žbuka (EN 998-1:2003)
- HRN EN 998-1:2003/AC:2007 – Specifikacija morta za zide -- 1. dio: Vanjska i unutarnja žbuka (EN 998-1:2003/AC:2005)
- HRN EN 15824:2009 – Specifikacije za vanjske i unutrašnje žbuke na osnovi organskih veziva (EN 15824:2009)
- HRN EN 998-1:2010 – Specifikacija morta za zide -- 1. dio: Vanjska i unutarnja žbuka (EN 998-1:2010)
- HRN EN 845-1:2008 – Specifikacije za pomoćne dijelove zida -- 1. dio: Spone, vlačne vezice, papuče za grede i konzole (EN 845-1:2003+A1:2008)
- HRN EN 845-3:2008 – Specifikacije za pomoćne dijelove zida -- 3. dio: Armatura horizontalnih sljubnica od čeličnih mreža (EN 845-3:2003+A1:2008)
- HRN EN 15743:2010 – Supersulfatni cement – sastav, specifikacije i kriteriji sukladnosti (EN 15743:2010)
- HRN EN 998-1:2003/AC:2007 – Specifikacija morta za zide -- 1. dio: Vanjska i unutarnja žbuka (EN 998-1:2003/AC:2005)
- HRN EN 413-1:2007 – Zidarski cement -- 1. dio: Sastav, specifikacije i kriteriji sukladnosti (EN 413-1:2004)
- HRN EN 413-1:2011 – Zidarski cement -- 1. dio: Sastav, specifikacije i kriteriji sukladnosti (EN 413-1:2011)
- HRN EN 197-1:2012 – Cement -- 1. dio: Sastav, specifikacije i kriteriji sukladnosti cementa opće namjene (EN 197-1:2011)
- HRN EN 15368:2010 – Hidraulično vezivo za nekonstrukcijske primjene -- Definicija, specifikacije i kriteriji sukladnosti (EN 15368:2008+A1:2010)

Kontrolu zahtijevane kvalitete opeke i morta kao i kvalitete morta provesti i prema europskim normama:

-zapreminska masa i poroznost svježeg morta	EN 1015-7
-konzistencija svježeg morta	EN 1015-3
-tlačna i savojna vlačna čvrstoća morta	EN 1015-11
-tlačna čvrstoća opeke	EN 771-1, EN 772-1, EN 772-3, EN 772-13, EN 772-16

Uskladištenje materijala, koji se koriste za zidanje, mora biti takvo da nije moguće oštećenje do stupnja kada nisu pogodni za korištenje. Opeka se ne smije polagati na površine koje sadrže kemijske nečistoće, klinker ili pepeo, niti na novo betonirane ploče, dok ta konstrukcija nema dovoljnu nosivost. U zimi opeku koja nije otporna na mraz potrebno je skladištiti u zatvorenim prostorima gdje temperatura nije niža od 0°C.

Cement i vapno trebaju biti zaštićeni od djelovanja vlage za vrijeme transporta i skladištenja. Veziva skladištiti odvojeno tako da ne dođe do mješanja.

Pijesak različitih tipova treba pohraniti odvojeno na tvrdj podlozi, gdje neće biti onečišćen.

Mort treba biti mješan u omjerima materijala kako je određeno projektom morta, a koji je dužan dostaviti izvođač. Navedenim projektom se mora postići projektirana marka morta. Sav pribor koji se koristi pri mješanju i transportu treba održavati čistim. Nakon što se mort izmješai izvađen je iz mješalice ne smije mu se dodavati nikakav materijal.

Mort mora biti upotrijebljen prije nego počne vezivanje. Mort mora imati plastičnu konzistenciju određenu normama za mort.

Unaprijed pripremljeni mort treba rabiti u skladu sa uputama proizvođača i prije kraja roka uporabe deklariranog od proizvođača.

Zidne elemente treba postavljati u pravilan zidni vez. Opeka mora biti čista i neoštećena. Prije nego se opeka počne postavljati u mort mora imati potrebnu vlažnost da se postigne što bolja prionljivost sa mortom. Stoga se preporuča kvašenje elemenata prije polaganja u mort. Duljinu kvašenja odrediti ovisno o konzistenciji morta, tipu opeke i preporukama pojedinih radova i propisa danih u ovom projektu.

Zidanje je potrebno obustaviti ako temperatura padne ispod +5°C ili je veća od +35°C.

Kod izvedbe vertikalnih serklaža opeku je potrebno ozidati tako da zid završava na "šmor". Horizontalne serklaže na razini stropova betonirati zajedno sa stropnom konstrukcijom.

Novoizvedene zidove potrebno je zaštititi od mehaničkih oštećenja i utjecaja nevremena. Vrhovi zidova trebaju biti pokriveni vodonepropusnim presvlakama. Zidovima se ne smije dopustiti prebrzo sušenje, stoga ih je u vrućim danima potrebno vlažiti dok ne postigne odgovarajuću čvrstoću.

Kvaliteta zidanja mora biti u skladu sa zahtijevanom kvalitetom zidova u ovom projektu, prema važećim propisima za zidane konstrukcije, a u nedostatku državnih normi koristiti pripadne euronorme.

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4. ČELIČNA KONSTRUKCIJA

4.1. Opći uvjeti za izradu i montažu čelične konstrukcije

Čelični dio konstrukcija obrađen u ovom projektu podliježe primjeni tehničkih propisa za nosive čelične konstrukcije. U tehničkoj dokumentaciji (statički proračun i radioničko – montažna dokumentacija) predviđena je vrsta i kvaliteta materijala od kojeg konstrukciju treba izraditi. Materijal druge vrste i kvalitete ne može se upotrijebiti bez suglasnosti i odobrenja projektanta. U istoj tehničkoj dokumentaciji definiran je oblik, kvaliteta i pozicije. Za svaku promjenu potrebno je prethodno ishoditi odobrenje projektanta.

4.2. Osnovni dokumenti za izvođenje

Prije početka izvođenja shodno Zakonu o gradnji potrebno je sve radove izvoditi prema:

- glavnom projektu
- izvedbenom projektu (usklađenom s glavnim projektom)
- tehnološkom projektu

Izvođač radova izrade i montaže mora imati zakonske potvrde podobnosti.

Prije početka radova izvoditelj izrađuje tehnološki projekt izrade i montaže. Podloga za izradu ovog projekta je revidirani glavni i izvedbeni projekt, tehnički propisi i normativi, zakon zaštite na radu i drugi važeći zakoni.

Osnovni sastav projekta je:

- opći dokumenti pogoma
- rješenje o postavljanju odgovorne osobe za izradu i montažu
- opis tehnologije po kojoj se izvodi i montira čelični dio konstrukcije
- tehnološki postupak zavarivanja
- plan kontrole i popis svih potrebnih atesta materijala
- mjere i sredstva zaštite na radu
- organizacija montaže usaglašena sa ukupnom organizacijom gradilišta
- terminski planovi izrade i montaže

4.3. Dokazi kvalitete prije početka izrade čelične konstrukcije

- rješenja za voditelja izrade i montaže čelične nosive konstrukcije
- atesti materijala od kojih će biti izrađena konstrukcija
- atesti za spojni materijal (vijci, elektrode)
- svjedodžba tehnologa zavarivanja i zavarivača koji će raditi na ovoj konstrukciji
- tehnologija izrade (tehnologija zavarivanja)
- tehnologija montaže
- plan kontrole

Ova dokumentacija ovjerena od strane nadzornog inženjera odnosno projektanta sastavni je dio dokumenata za tehnički pregled konstrukcije. Ukoliko se materija nabavlja tijekom rada, potrebno je ateste materijala prije početka izrade dostaviti nadzornom inženjeru na ovjeru.

4.4. Kontrola u toku izrade, transporta i montaže

Tijekom izrade konstrukcije u radionici i montaže izvoditelj je dužan voditi zakonom propisane dnevnik i provoditi svoju kontrolu u skladu s planom kontrole. Dužnost je nadzornog inženjera kontrolirati izvedbu u svim fazama izrade i montaže, tj. usklađenost s tehničkom dokumentacijom i važećim tehničkim normama i pravilima, ovjeravati navedene dokumente i ateste, te zapisnik o preuzimanju elemenata u radionici prije isporuke na montažu. Sve izmjene u dimenzijama ili načinu spajanja elemenata moraju biti ovjerene od projektanta konstrukcije.

4.5. Fazne kontrole (fazni tehnički pregled) koje se provode u toku

Izvedba čelične konstrukcije ima slijedeće faze:

- izrada elemenata u radionici
- transport od radionice na gradilište
- montaža čelične konstrukcije na gradilištu na prethodno pripremljenu sidrenu konstrukciju (temelje ili dijelove zgrade)

U pravilu se svaka faza mora pregledati i utvrditi da je izvedena prema tehničkoj dokumentaciji i prema važećim tehničkim propisima. Izvršene fazne kontrole potvrđuju putem zapisnika odgovorne osobe projektanta, stručnog nadzora i izvoditelja. Dok se ne uklone nedostaci utvrđeni u nekoj fazi, u pravilu ne može započeti iduća faza.

Fazni pregledi sa zapisnicima potpisanim od strane odgovornih imenovanih osoba su:

- kontrola dokaza kvalitete prije početka izrade konstrukcije
- prijem čelične konstrukcije po izradi u radionici
- prijem čelične konstrukcije po transportu na gradilište
- geodetska kontrola montirane čelične konstrukcije
- završni pregled čelične konstrukcije prije početka drugih radova na čeličnoj konstrukciji (pokrivanje, oblaganje, montaža instalacija ili opreme i drugo)

Prijem elementa obavlja se na temelju radioničkih crteža i specifikacija. Kontrola i prijem čelične konstrukcije vrši se prema Pravilniku o tehničkim mjerama i uvjetima za montažu čeličnih konstrukcija. Sve daljnje aktivnosti prigodom transporta, skladištenja i montažnih radova

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moraju biti u skladu s navedenim Pravilnikom. Posebno se naglašava potreba pažljivog postupanja prigodom utovara, istovara i transporta dijelova konstrukcije.

Dijelovi konstrukcije ne smiju se odlagati neposredno na zemlju nego na drvene grede i sl.

Dijelovi konstrukcije se slažu tako da se omogući lagano pronalaženje pozicija i pristup zbog dizanja i transporta.

Prigodom prijema u radionici izvođači radova na izradi čelkične konstrukcije dužan je staviti na uvid potrebnu tehničku dokumentaciju.

- radioničke nacрте sa specifikacijama
- ateste osnovnog materijala
- ateste dodatnog materijala
- ateste zavarivača
- ateste priključnih elemenata
- dnevnik izrade materijala
- dnevnik zavarivanja
- podatke i tehnologiji zavarivanja
- izvješće interne tehničke kontrole
- uvjerenja o kvalifikacijama stručnih osoba koje sudjeluju u izradi konstrukcije

Završnom pregledu po montaži u pravilu sudjeluje i rukovoditelj ili koordinator izgradnje cjelokupne građevine.

4.6. Antikorozivna zaštita

Prema normi HRN-EN 12944, definira se tip antikorozivne zaštite. Sistem antikorozivne zaštite izvesti tipa kao „PRONTO“ („Pronto Industrial Paints“) : za klasu okruženja konstruktivnih elemenata C3 (medium), te za visoku trajnost sistema (više od 15g.), sistem Pronto nosi oznaku P52 ukupne debljine nanosa 200μ, odnosno oznaku P56 ukupne debljine od 160 μ.

4.7. Tehnički pregled konstrukcije u sklopu pregleda građevine

Nakon izvedbe građevine prema Zakonu o gradnji provodi se postupak Tehničkog pregleda. Stručnoj komisiji za tehnički pregled izvedene građevine predočuje se sva projektna dokumentacija i dokumentacija praćenja izvedbe sa svim elaboratnim dokazima kvalitete i izvještajima o izvršenim ispitivanjima i pregledima.

5. ZEMLJANI RADOVI

Prije početka gradnje zemljište se mora očistiti od raslinja, smeća i otpadaka. To se isto odnosi na dio zemljišta na kojem je bila prethodno konstrukcija, a srušena je kako bi sad na istom mjestu gradila nova.

Tlo na mjestu građenja potrebno je isplanirati i iskolčiti. Prilikom iskopa izvođač je dužan obavijestiti geomehaničara koji mora izvršiti kontrolu svojstava tla i napraviti kontrolu statičkog proračuna. Zemljani i kameni materijali kategorizirani su kako slijedi:

Kategorija «A»

Pod zemljanim materijalom kategorije «A» podrazumijevaju se svi čvrsti materijali, gdje je potrebno miniranje kod cijelog iskopa.

U ovu grupu spadaju sve vrste čvrstih tala, kompaktnih stijena (eruptivnih i metamorfih) u zdravom stanju uključujući i eventualno tanje slojeve rastresenog materijala na površini ili takve stijene s mjestimičnim gnjezdima gline i lokalnim trošnim, odnosno zdrobljenim zonama.

U ovu grupu spadaju i tla koja sadrže više od 50% samaca za čiji je iskop također potrebno miniranje.

Kategorija «B»

Pod materijalom kategorije «B» podrazumijevaju se polučvrsta kamenita tla, gdje je potrebno djelomično miniranje, a ostali se dio iskopa obavlja izravnim strojnim radom

U ovu grupu materijala spadaju:

Flišni materijali uključujući i rastreseni materijal, homogeni lapori, trošni pješčenjaci i mješavine lapora i pješčenjaka, većina dolomita, jako zdrobljeni vapnenac, sve vrste škriljevca, neki konglomerati i slični materijali.

Kategorija «C»

Pod materijalom kategorije «C» podrazumijevaju se svi ostali zemljani materijali koje nije potrebno minirati, nego se mogu kopati upotrebom pogodnih strojeva (bagera, buldozera, skrepera i sl.)

Potrebno je napraviti i kontrolu geometrije i kvalitete gradiva postojeće temeljne konstrukcije. Ako se ustvrdi da geometrija odstupa od pretpostavki potrebno je napraviti dodatnu kontrolu statičkog proračuna.

Sve iskope potrebno je izvesti po projektu s bočnim odsijecanjem i zaštitom bočnih strana kako ne bi došlo do urušavanja zemljišta prilikom njihova betoniranja.

Sve radove, kontrolu i potvrdu parametara izvođač, geomehaničar i nadzorni inženjer su dužni upisati u građevinski dnevnik.

Kod zatrpavanja i nasipanja prostora oko temelja do nivoa tla potrebno je nasipavati i nabijati u slojevima po 30 cm.

Na kraju je potrebno obaviti planiranje zemljišta, zatrpavanje svih jama i uklanjanje svega nepotrebnog s gradilišta.

6. NADZOR

Pregledi i nadzor trebaju osigurati da se radovi završavaju u skladu s ovim Tehničkim uvjetima i zahtjevima projektnih specifikacija.

Nadzor u ovom kontekstu odnosi se na verifikaciju (potvrđivanje) sukladnosti svojstava proizvoda i materijala koji će se upotrijebiti i na nadzor nad izvedbom radova.

6.1. Nadzor materijala i proizvoda

Koji će se nadzor svojstava materijala i proizvoda primijeniti u radovima prikazanje slijedećom tablicom.

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Tablica 5: Zahtjevi nadzora materijala i proizvoda

PREDMET	VRSTA NADZORA
Materijali oplata	Vizualni nadzor
Armaturni čelik	Prema ENV 10080 i zahtjevima projekta ³⁾
Svježi beton" proizveden u tvornici ili na gradilištu.	Prema EN 206, I prema ovim tehničkim uvjetima . Pri preuzimanju betona treba postojati otpremnica.
Ostali materijali ²⁾	Prema projektnim specifikacijama i normama
Predgotovljeni elementi	Prema projektnim specifikacijama ³⁾
Nadzorni izvještaj	Treba
1) Na gradilištu izrađeni sastavni dijelovi smatraju se kao sastavni dijelovi proizvedeni sa "svježim betonom, tvorničkim ili gradilišnim", osim ako nisu proizvedeni prema normi. 2) Npr. element ugrađenog čelika, opeka i si. 3) Proizvode s potvrdom sukladnosti treće osobe treba vizualno pregledati i provjeriti otpremnicu. U slučaju sumnje treba poduzeti daljnje provjere sukladnosti sa specifikacijama. Ostale proizvode treba provjeriti i ispitati prema projektnim specifikacijama.	

6.2. Područje nadzora izvedbe

Područje nadzora koji treba provesti prikazano je u tablici

Tablica 6: Područje nadzora

PREDMET	VRSTA NADZORA
Kalupi, oplata i skele	Glavne kalupe i oplatu pregledati prije betoniranja
Obična armatura	Glavnu armaturu pregledati prije betoniranja
Ugrađeni elementi	Prema projektnim specifikacijama i ovim tehničkim uvjetima
Zidani elementi	Prema projektnim specifikacijama i ovim tehničkim uvjetima
Čelična konstrukcija	Prema projektnim i izvedbenim specifikacijama i ovim tehničkim uvjetima
Predgotovljeni elementi	Prema izvedbenim specifikacijama
Gradilišni prijevoz i ugradnja betona	Prema ovim tehničkim uvjetima
Završna obrada i njegovanje betona	Prema ovim tehničkim uvjetima
Geometrija	Prema projektnim specifikacijama
Nadzorna dokumentacija	Kako se traži ovim uvjetima

6.3. Nadzor prije betoniranja

Prije početka betoniranja nadzor treba uključivati:

- geometriju oplata,
- stabilnost oplata, skela i njihovih temelja,
- nepropusnost oplata,
- uklanjanje nečistoća (kao što su prašina, snijeg i/ili led i ostaci žice) s dijela koji će se betonirati,
- obradu lica konstrukcijskih spojnica,
- uklanjanje vode s dna oplata, osim ako se ne betonira pod vodom,
- pripremu površine oplata,

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- otvore u oplati.

6.4. Nadzor poslije betoniranja

Na konstrukcijskim spojnica treba provjeriti i potvrditi da je preklopna (kontinuitetna) armatura u projektiranom položaju.

Treba provjeriti položaj dilatacijske trake

6.5. Nadzor armature

6.5.1. Nadzor prije betoniranja

Prije betoniranja nadzor u skladu s odgovarajućim nadzornim razredom treba potvrditi daje:

- armatura iskazana u nacrtima ugrađena i prema nacrtima postavljena u projektiranu poziciju,
- zaštitni sloj u skladu s ovim uvjetima i projektnim specifikacijama,
- armatura nezagađena uljem, mastima, bojom ili drugim štetnim materijalima,
- armatura ispravno učvršćena i osigurana od pomicanja tijekom betoniranja,
- razmak između sipki armature dovoljan za ugradnju i zbijanje betona,
- ugrađena armatura popraćena odgovarajućom potvrdom sukladnosti sa svojstvima uvjetovanim u EN 10080.

Ako za armaturu dopremljenu u savjilište ili na građevinu nema odgovarajuće potvrde sukladnosti s uvjetovanim svojstvima, ta svojstva treba korisnik potvrditi ispitivanjem odgovarajućeg broja uzoraka dopremljenih profila.

6.5.2. Nadzor poslije betoniranja

Na konstrukcijskim spojnica treba provjeriti i potvrditi daje preklopna (kontinuitetna) armatura u projektiranom položaju.

6.5.3. Nadzor postupka betoniranja

Nadzor i ispitivanje postupka betoniranja treba planirati, izvoditi i dokumentirati prema tablici

Tablica 7: Planiranja, nadzora i dokumentiranja

PREDMET	VRSTA NADZORA
Planiranje nadzora	Plan nadzora, procedure i instrukcije prema specifikacijama Aktivnosti kod nesukladnosti
Nadzor	Osnovni i povremeni detaljni nadzor
Dokumentacija	Svi dokumenti planiranja, Izvještaji o svim nadzorima Izvještaji o svim nesukladnostima i popravnim mjerama

Plan nadzora treba identificirati sve nadzore, motrenja i ispitivanja za potrebne dokaze kvalitete.

Najbolji nadzor je kontinuirani nadzor sukladnosti i uobičajene dobre prakse.

7. MJERE U SLUČAJU NESUKLADNOSTI

Kad nadzor otkrije nesukladnost, treba poduzeti odgovarajuće radnje koje će osigurati uvjetovanu stabilnost i sigurnost konstrukcije i zadovoljiti namjeravanu uporabu.

Kad je nesukladnost potvrđena, treba istražiti sljedeće:

- utjecaj nesukladnosti na izvedbu i uporabu,
- mjere potrebne da bi se nesukladni element ili dio konstrukcije učinili prihvatljivima,
- potrebu zabrane i zamjene nepopravljivog nesukladnog elementa ili dijela konstrukcije.

Veličina nesukladnosti uvjetovanih svojstava betona utvrđuje se naknadnim ispitivanjima istih svojstava na uzorcima betona iz konstrukcijskog elementa prema važećim normama. Ispitivanja se odlukom nadzornog inženjera povjeravaju odgovarajućoj ovlaštenoj instituciji.

Nesukladnost tlačne čvrstoće (postignute i uvjetovane klase) betona rješava se naknadnim ispitivanjem uzoraka betona izvađenih iz dijela konstrukcije u koji je ugrađen nesukladni beton.

Ispitivanja treba provesti prema HRN EN 7034 i HRN U.M1.048 i utvrditi klasu tlačne čvrstoće kojoj ugrađeni beton odgovara u vrijeme ispitivanja! približnu klasu kojoj je odgovarao pri 28-dnevnoj starosti. Prva služi za kontrolu stabilnosti i sigurnosti predmetnog konstrukcijskog dijela a druga za reguliranje ugovornih odnosa između proizvođača i kupca betona.

Ako su neispravnosti i nesukladnosti zanemarive za izvedbu i uporabu element treba preuzeti. Ako se nesukladnost može popraviti, element treba preuzeti nakon popravka.

Ocjenu sukladnosti elementa nakon popravka trebaju dati nadzorni inženjer i ovlaštena institucija koja je utvrdila veličinu nesukladnosti i uvjetovala popravak.

Rektifikacija nesukladnosti mora biti u skladu s projektnim specifikacijama i ovim Tehničkim uvjetima.

Dokumentaciju postupka i materijala koji će se upotrijebiti treba prije popravka odobriti nadzorni inženjer.

Ovlašteni inženjer:

Nikola Skendžić, mag.ing.aedif.

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3a. ISKAZ PROCIJENJENIH TROŠKOVA GRAĐENJA

GRAĐEVINSKI – KONSTRUKCIJA 250.000,00 €

Gruba procjena investicijskih ulaganja je dana na bazi procjene građevinskih radova

Iskazana cijena ne obvezuje projektanta.

Ovlašteni inženjer:

Nikola Skendžić, mag.ing.aedif.

4. POSEBNI TEHNIČKI UVJETI GRADNJE I GOSPODARENJE OTPADOM

POSEBNI TEHNIČKI UVJETI GRADNJE

U slučaju predmetnog zahvata nisu posebnim propisima ili aktima propisani posebni tehnički uvjeti gradnje. Prilikom gradnje upotrijebit će se materijali koji nisu štetni za ljude i okoliš. Sav potreban građevinski materijal će se skladištiti na parceli investitora, uz uvjet da se ostavi slobodan prostor za manipulaciju uz građevinu. U toku gradnje posebno obratiti pažnju da se izvođenjem radova ne ugrozi konstrukcija i dosadašnji način korištenja susjednih građevina. Isto tako, radovima se ne smije ugroziti dosadašnji način korištenja okolnih nekretnina ili na bilo koji način ugroziti tuđe vlasništvo. Investitor je dužan eventualnu štetu ukloniti te teren i građevine dovesti u prvobitno stanje. Posebno se pridržavati mjera osiguranja gradilišta i zaštite radnika za siguran rad.

POSEBNI TEHNIČKI UVJETI GOSPODARENJA GRAĐEVNIM OTPADOM

Izvođač je dužan gospodariti građevnim otpadom nastalim na gradilištu tijekom građenja osnovnog i nadograđenog dijela građevine, sukladno Pravilniku o gospodarenju građevnim otpadom ("Narodne novine" broj 38/08). Građevni otpad je otpad nastao prilikom građenja građevine te otpad nastao od iskopanog materijala, koji se ne može bez prethodne uporabe koristiti za građenje građevine zbog kojeg građenja je nastao. Gospodarenje građevnim otpadom podrazumijeva skup aktivnosti i mjera koje obuhvaćaju odvojeno skupljanje, uporabu i/ili zbrinjavanje građevnog otpada. Posjednik građevnog otpada je:

- vlasnik građevine,
- investitor,
- izvođač kojem je vlasnik građevine odnosno investitor na temelju valjanog pravnog posla prenio pravo raspolaganja odnosno posjedništva nad građevnim otpadom,
- treća osoba kojoj je vlasnik građevine odnosno investitor na temelju valjanog pravnog posla prenio pravo raspolaganja odnosno posjedništva nad građevnim otpadom.

Građevni otpad ne smije se odložiti na mjestu nastanka kao niti na lokacijama koje nisu za to predviđene. Posjednik građevnog otpada dužan je snositi sve troškove gospodarenja građevnim otpadom. Posjednik građevnog otpada dužan je osigurati uvjete za odvojeno skupljanje i privremeno skladištenje građevnog otpada. Odvojeno skupljanje i privremeno skladištenje građevnog otpada posjednik građevnog otpada mora povjeriti ovlaštenoj osobi. Posjednik građevnog otpada može obavljati uporabu građevnog otpada na mjestu nastanka u uređajima za materijalnu uporabu otpada.

Takvi uređaji moraju udovoljavati uvjetima propisanim posebnim propisom. Odlaganje građevnog otpada može se obavljati u slučajevima kada ga nije moguće materijalno i/ili energetski oporabiti i ponovno uporabiti u skladu s odredbama Pravilnika. Građevni otpad predviđen za odlaganje predaje se ovlaštenim osobama koje upravljaju odlagalištima otpada sukladno uvjetima propisanim posebnim propisom.

POSEBNI TEHNIČKI UVJETI GOSPODARENJA OPASNIM OTPADOM

Projektiranom namjenom građevine, u građevini nije predviđeno stvaranje opasnog otpada određenog u Dodatku III Zakona o održivom gospodarenju otpadom ("Narodne novine" broj 94/13). Tijekom korištenja u građevini će se stvarati isključivo komunalni otpad kojeg će investitori zbrinjavati na način propisan uvjetima ovlaštene tvrtke za odvoz komunalnog otpada na predmetnoj lokaciji.

Projektant:

Nikola Skendžić, mag.ing.aedif.

ANALIZA POŽARNE OTPORNOSTI NOSIVE KONSTRUKCIJE

Prema prikazanim mjerama zaštite od požara svi konstrukcijski nosivi elementi trebaju biti minimalne klase vatrootpornosti **REI 90** tj. **Trebaju imati požarnu otpornost od 90 minuta.**

ANALIZA MINIMALNIH ZAŠTITNIH SLOJEVA BETONA S OBZIROM NA RAZREDE IZLOŽENOSTI DJELOVANJU OKOLIŠA

Određivanja minimalnog zaštitnog sloja provodi se prema normi HRN EN 1992-1-1:2013: Eurokod 2 – Projektiranje betonskih konstrukcija – Dio 1-1: Opća pravila I pravila za zgrade (EN 1992-1-1:2004/AC:2010)

Pretpostavljena klasa konstrukcija prema HRN EN 1992-1-1:2013 je S4. Na temelju toga I razreda izloženosti te razreda betona, iz tablica 4.3N I 4.4N se očitavaju minimalne debljine zaštitnog sloja $C_{min,dur}$.

Tablica 4.3N: Preporučena klasifikacija konstrukcija (preporučena početna S4)

Structural Class							
Criterion	Exposure Class according to Table 4.1						
	X0	XC1	XC2 / XC3	XC4	XD1	XD2 / XS1	XD3 / XS2 / XS3
Design Working Life of 100 years	increase class by 2	increase class by 2	increase class by 2	increase class by 2	increase class by 2	increase class by 2	increase class by 2
Strength Class ¹⁾²⁾	$\geq C30/37$ reduce class by 1	$\geq C30/37$ reduce class by 1	$\geq C35/45$ reduce class by 1	$\geq C40/50$ reduce class by 1	$\geq C40/50$ reduce class by 1	$\geq C40/50$ reduce class by 1	$\geq C45/55$ reduce class by 1
Member with slab geometry (position of reinforcement not affected by construction process)	reduce class by 1	reduce class by 1	reduce class by 1	reduce class by 1	reduce class by 1	reduce class by 1	reduce class by 1
Special Quality Control of the concrete production ensured	reduce class by 1	reduce class by 1	reduce class by 1	reduce class by 1	reduce class by 1	reduce class by 1	reduce class by 1

Tablica 4.4N: Vrijednosti minimalnog zaštitnog sloja $C_{min,dur}$ za armature s obzirom na trajnost, prema EN 10080

Environmental Requirement for $c_{min,dur}$ (mm)							
Structural Class	Exposure Class according to Table 4.1						
	X0	XC1	XC2 / XC3	XC4	XD1 / XS1	XD2 / XS2	XD3 / XS3
S1	10	10	10	15	20	25	30
S2	10	10	15	20	25	30	35
S3	10	10	20	25	30	35	40
S4	10	15	25	30	35	40	45
S5	15	20	30	35	40	45	50
S6	20	25	35	40	45	50	55

Prema HRN EN 1992-1-1:2013, poglavlje 4.4.1.2 (11) kod odabira je povećan zaštitni sloj za 5 mm kod elemenata koji se betoniraju na podlozi koja nije potpuno glatka (temeljna konstrukcija). Također je sukladno poglavlju 4.4.1.3 (1)P potrebno povećati zaštitni sloj za 10 mm radi odstupanja kod izvedbe.

Slijedi prikaz odabira zaštitnih slojeva s obzirom na razrede izloženosti okolišu:

Nosivi elementi konstrukcije	Razredi izloženosti	Razred betona	Odabrani zaštitni sloj betona (mm)
Nezaštićena temeljna konstrukcija	XC2	C 25/30	$C_{nom} = 40$ mm
Zaštićena temeljna konstrukcija i podna ploča	XC1	C 25/30	$C_{nom} = 25$ mm
Zidovi (unutrašnji elementi konstrukcije građevine)	XC1	C 25/30	$C_{nom} = 20$ mm
Ploče (unutrašnji elementi konstrukcije građevine)	XC1	C 25/30	$C_{nom} = 20$ mm
Grede i stupovi (unutrašnji elementi konstrukcije)	XC1	C 25/30	$C_{nom} = 25$ mm

ARMIRANOBETONSKA KONSTRUKCIJA

Dokaz požarne otpornosti armiranobetonskih konstrukcijskih elemenata provesti će se sukladno normi HRN EN 1992-1-2:2013: Eurokod 2: Projektiranje betonskih konstrukcija – Dio 1-2: Opća pravila – Projektiranje konstrukcija na djelovanje požara (EN 1992-1-2:2004/AC:2008), primjenom propisanih pravila i tabličnom kontrolom potrebnih zaštitnih slojeva i minimalnih dimenzija armiranobetonskih konstrukcijskih elemenata. Za svaki pojedini tip nosive konstrukcije će se odrediti minimalna izmjera poprečnog presjeka i minimalni zaštitni sloj koji nosivi element mora zadovoljavati. U daljnjem proračunu konstrukcije će se svi ovi zahtjevi uvažiti kod proračuna pojedinih elemenata nosive konstrukcije.

STUPOVI

Tablica 5.2a: U tablici 5.2.a iz EN 1992-1-2:2004 dane su najmanje izmjere poprečnog presjeka stupova i udaljenost težišta armature do ruba presjeka za stupove pravokutnog i kružnog poprečnog presjeka.

Standard fire resistance	Minimum dimensions (mm)			
	Column width b_{min} /axis distance a of the main bars			
	Column exposed on more than one side			Exposed on one side
	$\mu_{fi} = 0.2$	$\mu_{fi} = 0.5$	$\mu_{fi} = 0.7$	$\mu_{fi} = 0.7$
1	2	3	4	5
R 30	200/25	200/25	200/32 300/27	155/25
R 60	200/25	200/36 300/31	250/46 350/40	155/25
R 90	200/31 300/25	300/45 400/38	350/53 450/40**	155/25
R 120	250/40 350/35	350/45** 450/40**	350/57** 450/51**	175/35
R 180	350/45**	350/63**	450/70**	230/55
R 240	350/61**	450/75**	-	295/70

Faktor redukcije za proračunsku razinu opterećenja prema EN 1992-1-2:2004 (5.6) iznosi 0,33

Minimalne dimenzije poprečnog presjeka stupova i zaštitnih slojeva iznose:

Požarna otpornost	Minimalne dimenzije presjeka stupa (cm)	Minimalni zaštitni sloj betona (mm)
REI 90	$b_{min} = 25$ cm	$C_{nom} \geq 45 - (14/2+8) = 30$ mm → odabrano $C_{nom} = 30$ mm
	$b_{min} = 30$ cm	$C_{nom} \geq 35 - (14/2+8) = 20$ mm → odabrano $C_{nom} = 25$ mm

ZIDOVI

Tablica 5.4: U tablici 5.4. iz EN 1992-1-2:2004 dane su najmanje debljine nosivih zidova I udaljenost težišta armature do ruba zida.

Standard fire resistance	Minimum dimensions (mm)			
	Wall thickness/axis distance for			
	$\mu_{fi} = 0,35$		$\mu_{fi} = 0,7$	
	wall exposed on one side	wall exposed on two sides	wall exposed on one side	wall exposed on two sides
1	2	3	4	5
REI 30	100/10*	120/10*	120/10*	120/10*
REI 60	110/10*	120/10*	130/10*	140/10*
REI 90	120/20*	140/10*	140/25	170/25
REI 120	150/25	160/25	160/35	220/35
REI 180	180/40	200/45	210/50	270/55
REI 240	230/55	250/55	270/60	350/60

* Normally the cover required by EN 1992-1-1 will control.

Note: For the definition of μ_{fi} see 5.3.2 (3).

Za nisku razinu naprezanja za faktor redukcije može se uzeti da iznosi 0,35.

Minimalne debljine zidova I zaštitnih slojeva iznose:

Požarna otpornost	Minimalne debljine zida (cm)	Minimalni zaštitni sloj betona (mm)
REI 90	$t_{min} = 14 \text{ cm}$	$C_{nom} \geq 10 - 8/2 = 6 \text{ mm} \rightarrow \text{odabrano } C_{nom} = 20 \text{ mm}$

GREDE

Tablica 5.5 / 5.6: U tablicama iz EN 1992-1-2:2004 dane su najmanje minimalne dimenzije rebra grede I udaljenosti od težišta armature do ruba za proste/kontinuirane armiranobetonske I prednapete grede.

Standard fire resistance	Minimum dimensions (mm)						
	Possible combinations of a and b_{min} where a is the average axis distance and b_{min} is the width of beam				Web thickness b_w		
					Class WA	Class WB	Class WC
1	2	3	4	5	6	7	8
R 30	$b_{min}=80$ $a=25$	120 20	160 15*	200 15*	80	80	80
R 60	$b_{min}=120$ $a=40$	160 35	200 30	300 25	100	80	100
R 90	$b_{min}=150$ $a=55$	200 45	300 40	400 35	110	100	100
R 120	$b_{min}=200$ $a=65$	240 60	300 55	500 50	130	120	120
R 180	$b_{min}=240$ $a=80$	300 70	400 65	600 60	150	150	140
R 240	$b_{min}=280$ $a=90$	350 80	500 75	700 70	170	170	160
$a_{sd} = a + 10\text{mm}$ (see note below)							
For prestressed beams the increase of axis distance according to 5.2(5) should be noted.							
a_{sd} is the axis distance to the side of beam for the corner bars (or tendon or wire) of beams with only one layer of reinforcement. For values of b_{min} greater than that given in Column 4 no increase of a_{sd} is required.							
* Normally the cover required by EN 1992-1-1 will control.							

Standard fire resistance	Minimum dimensions (mm)						
	Possible combinations of a and b_{min} where a is the average axis distance and b_{min} is the width of beam				Web thickness b_w		
					Class WA	Class WB	Class WC
1	2	3	4	5	6	7	8
R 30	$b_{min}=80$ $a=15^*$	160 12*			80	80	80
R 60	$b_{min}=120$ $a=25$	200 12*			100	80	100
R 90	$b_{min}=150$ $a=35$	250 25			110	100	100
R 120	$b_{min}=200$ $a=45$	300 35	450 35	500 30	130	120	120
R 180	$b_{min}=240$ $a=60$	400 50	550 50	600 40	150	150	140
R 240	$b_{min}=280$ $a=75$	500 60	650 60	700 50	170	170	160
$a_{sd} = a + 10\text{mm}$ (see note below)							
For prestressed beams the increase of axis distance according to 5.2(5) should be noted.							
a_{sd} is the axis distance to the side of beam for the corner bars (or tendon or wire) of beams with only one layer of reinforcement. For values of b_{min} greater than that given in Column 3 no increase of a_{sd} is required.							
* Normally the cover required by EN 1992-1-1 will control.							

Minimalne izmjere poprečnog presjeka greda I zaštitnih slojeva iznose:

Požarna otpornost	Minimalne debljine rebra greda (cm)	Minimalni zaštitni sloj betona(mm)
REI 90	$b_{min} = 20\text{cm}$	$C_{nom} \geq 45 - (14/2+8) = 30\text{mm}$

PLOČE

Tablica 5.8: U tablici 5.8. iz EN 1992-1-2:2004 dane su najmanje debljine ploča I udaljenost od težišta armature do ruba za slobodno oslonjene armiranobetonske I prednapete ploče nosive u jednom I u dva smjera.

Standard fire resistance	Minimum dimensions (mm)			
	slab thickness h_s (mm)	axis-distance a		
		one way	two way:	
1	2	3	$l_y/l_x \leq 1,5$	$1,5 < l_y/l_x \leq 2$
REI 30	60	10*	10*	10*
REI 60	80	20	10*	15*
REI 90	100	30	15*	20
REI 120	120	40	20	25
REI 180	150	55	30	40
REI 240	175	65	40	50

l_x and l_y are the spans of a two-way slab (two directions at right angles) where l_y is the longer span.

Minimalne debljine ploča nosivih u jednom ili dva smjera I njihovih zaštitnih slojeva iznose:

Požarna otpor.	Minimalne debljine ploča	Minimalni zaštitni sloj betona (mm)
REI 90	$h_{min} = 10 \text{ cm}$	$C_{nom} \geq 30 - 10/2 = 25 \text{ mm} \rightarrow$ odabrano $C_{nom} = 25 \text{ mm}$

Tablica 5.9: U tablici 5.9. iz EN 1992-1-2:2004 dane su najmanje debljine ploča I udaljenost od težišta armature do ruba za slobodno oslonjene armiranobetonske I prednapete ravne ploče.

Standard fire resistance	Minimum dimensions (mm)	
1	slab-thickness h_s	axis-distance a
	2	3
REI 30	150	10*
REI 60	180	15*
REI 90	200	25
REI 120	200	35
REI 180	200	45
REI 240	200	50

* Normally the cover required by EN 1992-1-1 will control.

Minimalne debljine ravnih ploča I njihovih zaštitnih slojeva iznose:

Požarna otpor.	Minimalne debljine ploča	Minimalni zaštitni sloj betona (mm)
REI 90	$b_{min} = 20 \text{ cm}$	$C_{nom} \geq 25 - 10/2 = 20 \text{ mm} \rightarrow$ odabrano $C_{nom} = 25 \text{ mm}$

ODABRANI ZAŠTITNI SLOJEVI S OBZIROM NA RAZREDE IZLOŽENOSTI I POŽARNO OPTEREĆENJE

Iz prethodno provedene analize može se zaključiti da kod odabira minimalnih zaštitnih slojeva je mjerodavna analiza utjecaja okoliša. Slijedi prikaz odabranih minimalnih dimenzija elemenata nosive konstrukcije i zaštitnih slojeva.

Nosivi elementi konstrukcije	Razredi izloženosti	Razred betona	Minimalna dimenzija elementa	Odabrani zaštitni sloj betona (mm)
Nezaštićena temeljna konstrukcija	XC2	C 25/30	-	$C_{nom} = 40 \text{ mm}$
Zaštićena temeljna konstrukcija i podna ploča	XC1	C 25/30	-	$C_{nom} = 25 \text{ mm}$
Zidovi (unutrašnji elementi konstrukcije građevine)	XC1	C 25/30	$t = 14 \text{ cm}$	$C_{nom} = 20 \text{ mm}$
Stupovi (unutrašnji elementi konstrukcije)	XC1	C 25/30	$b = 25 \text{ cm}$	$C_{nom} = 30 \text{ mm}$
Ploče (unutrašnji elementi konstrukcije)	XC1	C 25/30	$h = 10 \text{ (20) cm}$	$C_{nom} = 25 \text{ mm}$
Grede (unutrašnji elementi konstrukcije)	XC1	C 25/30	$b = 15 \text{ cm}$	$C_{nom}=30 \text{ mm}$

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRAĐEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 37

PRORAČUN MEHANIČKE OTPORNOSTI I STABILNOSTI

(statički proračun)

Popis propisa :

1. Zakon o gradnji ("Narodne novine" broj 153/13 , 20/17, 39/19 , 125/19), Zakon o prostornom uređenju (NN RH 153/13, 65/17, 114/18, 39/19, 98/19, 67/23)
2. Zakon o građevinskoj inspekciji (NN RH 153/13)
3. Tehnički propis za građevinske konstrukcije ("Narodne novine" broj 17/17, 75/20, 7/22)
4. **HRN EN 1990:2011+ NA:2011** (Nacionalni dodatak)
Eurokod: Osnove projektiranja konstrukcija (EN 1990:2002+A1:2005+A1:2005/AC:2010)
5. NIZ NORMI **HRN EN 1991 :2012 + NA:2012**
Eurokod 1 -- Djelovanja na konstrukcije
6. NIZ NORMI **HRN EN 1992-1-1:2013 + NA:2015**
Eurokod 2 -- Projektiranje betonskih konstrukcija
7. NIZ NORMI **HRN EN 1993-1-1:2014 + NA:2014**
Eurokod 3 -- Projektiranje čeličnih konstrukcija
8. NIZ NORMI **HRN EN 1995-1-1:2013 + NA:2013** (Nacionalni dodatak)
Eurokod 5 -- Projektiranje drvenih konstrukcija
9. NIZ NORMI **HRN EN 1996-1-1:2012 + NA:2012** (Nacionalni dodatak)
Eurokod 6 -- Opća pravila za zgrade – pravila za armirane i nearmirane zidne konstrukcije
10. NIZ NORMI **HRN EN 1997-1:2012+ NA:2012** (Nacionalni dodatak)
Eurokod 7: Geotehničko projektiranje
11. NIZ NORMI **HRN EN 1998-1:2011+ NA:2011** (Nacionalni dodatak)
Eurokod 8: Projektiranje potresne otpornosti konstrukcija
12. Zakon o obveznim odnosima (NN 35/05, 41/08, 63/08, 134/09, 94/13, 78/15, 29/18, 126/21, 114/22, 156/22, 155/23)
13. Zakon o zaštiti okoliša (NN 80/13, 78/15, 12/18, 118/18)
14. Zakon o zaštiti od buke (NN 30/09, 55/13, 153/13, 41/16, 114/18, 14/21)
15. Zakon o mjeriteljstvu (NN 163/03, 194/03, 111/07, 74/14, 111/18, 114/22)
16. Pravilnik o kontroli projekata (NN 32/14, 69/14, 27/15, 72/20, 90/23)
17. Zakon o zaštiti na radu (NN RH br. 71/14, 118/14, 154/14, 94/18, 96/18)
18. Zakon o zaštiti od požara (NN br.92/10, 114/22)
19. Zakon o normizaciji (NN 80/13)

Projektant:

Nikola Skendžić, mag.ing.aedif.

ANALIZA OPTEREĆENJA - KROV DVORANE

raster sek.nosača 2,25 m

Analiza opterećenja

h b y

STALNO: termoizolirani panel 20cm = 0,35 kN/m²
 instalacije = 0,10 kN/m²
 solarni paneli = 0,25 kN/m²
 v.t.sek.nosača (1 / r) x 0,20 X 0,26 X 6,00 = 0,14 kN/m²

g = 0,84 kN/m²

g' = 1,89 kN/m'

SNIJEG:
HRN-EN-1991-1-3

zona: **III**
nmv: **200**

KONTINENTALNA HRVATSKA

α = **6** ° sk = 1,25 kN/m²
 [kN/m²] [kN/m']

$$s = \mu_i \cdot C_e \cdot C_t \cdot s_k$$

μ₁ = 0,80
μ₂ = 0,96

s₁ = 1,25 x 0,80 = 1,00 2,25
 s₂ = 1,25 x 0,96 = 1,20 2,70

vjetar

qp (z) = **0,6 kN/m²**

	cpe	cpe+-cpi	w[kN/m ²]	w[kN/m']
pritisak	0,3	0,5	0,30	0,68 G
odizanje	-0,8	-1,1	-0,66	-1,49 G

VJETAR EN - ANALIZA OPTEREĆENJA

KATEGORIJA TERENA:

II

==>

zo[m] =

0,05

zmin[m] =

2

z =

10 m

Vb,0 =

20 m/s

ρ =

1,25 kg/m³

Vb = Cdir X Cseason X Vb,0 =

20 m/s

vm(z) = cr(z) x co(z) x vb

co(z) =

1

cr(z) = kr x ln (z/zo)

zmin <= z <= zmax

zmax = 200 m

cr(z) = cr (zmin)

z < zmin

kr = 0.19 (zo/z0,II)^{0.07} =

0,19

cr(z) =

1,01

vm(z) =

20,13 m/s

ce(z) = qp (z) / qb

qp (z) = [1+7lv(z)] x 0.5 x ρ x vm²(z)

lv(z) = $\sigma_v/v_m(z) = k_l / [co(z) x \ln(z/zo)]$

zmin <= z <= zmax

kl =

1

lv(z) = lv(zmin)

z < zmin

lv(z) =

0,19

qb = 0.5 x ρ x vb² =

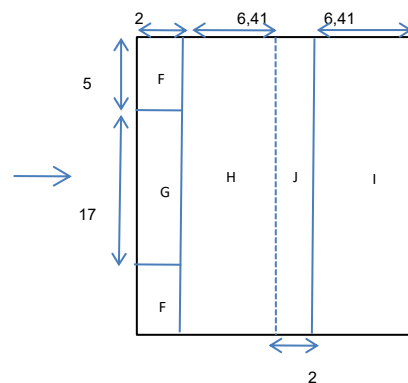
0,25 kN/m²

qp (z) =

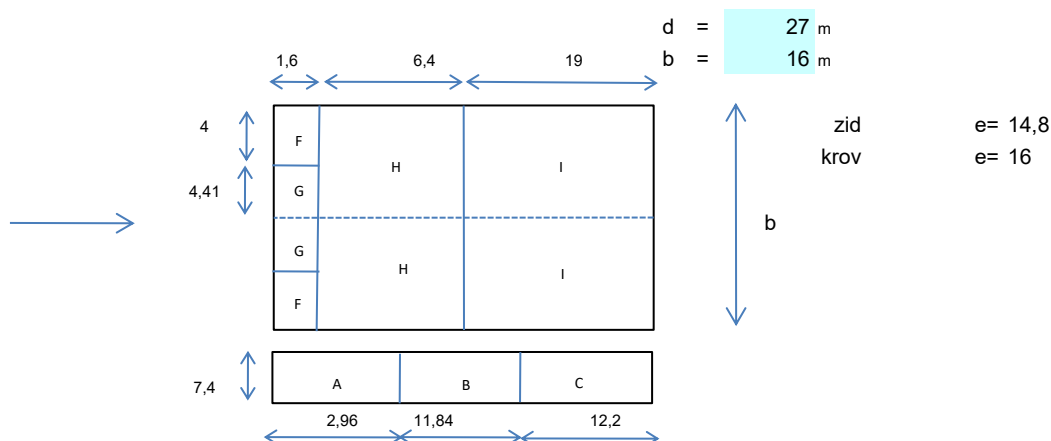
0,59 kN/m²

ce(z) =

2,35



OPTREĆENJE VJETROM $\theta = 90^\circ$



	[m ²]		cpe
A	21,90	>10	-1,00
B	87,62	>10	-0,80
C	90,28		-0,50
D	180,80	>10	0,80
E	180,80		-0,30
F	6,40	<10	-1,51
G	7,06	<10	-1,54
H	53,84	>10	-0,64
I	159,83	>10	-0,50

cpi	Wi
0,2	0,12
-0,3	-0,18

TLAK VJETRA NA VANJSKE POVRŠINE

ZID	We(A) =	-0,54	kN/m ²
	We(B) =	-0,43	kN/m ²
	We(C) =	-0,27	kN/m ²
	We(D) =	0,43	kN/m ²
	We(E) =	-0,16	kN/m ²
KROV	We(F) =	-0,89	kN/m ²
	We(G) =	-0,91	kN/m ²
	We(H) =	-0,38	kN/m ²
	We(I) =	-0,29	kN/m ²

TLAK VJETRA NA UNUTARNJE POVRŠINE

	kN/m ²	kN/m ²
SUMA		
We(A) =	-0,66	-0,37
We(B) =	-0,55	-0,26
We(C) =	-0,39	-0,10
We(D) =	0,32	0,61
We(E) =	-0,28	0,01
We(F) =	-1,01	-0,71
We(G) =	-1,02	-0,73
We(H) =	-0,49	-0,20
We(I) =	-0,41	-0,12

TRENJE PO KROVU I ZIDOVIMA:

cfr = 0,04 usvojeno: 0,1
w,fr = 0,02 kN/m² 0,06

KROVNI PANELI

Tabela D.11: Opterećenje snegom

Krovni panel Trimoterm SNV _{TS} 200, t _N = 0,60/0,60 mm																						
Statički sastav	Skupina boje	Opterećenja snegom [kN/m ²]																				
		0	0,25	0,50	0,75	1,00	1,25	1,50	1,75	2,00	2,25	2,50	2,75	3,00	3,25	3,50	3,75	4,00	4,25	4,50	4,75	5,00
Jedno-poljni nosač	I, II, III	54	72	80	81	82	83	84	85	86	87	88	89	90	91	92	94	95	95	96	97	99
		15,58	11,70	8,89	6,87	5,63	4,78	4,17	3,71	3,35	3,06	2,82	2,62	2,45	2,30	2,18	2,07	1,97	1,88	1,80	1,73	1,67
	I, II, III(f)	51	72	80	81	82	83	84	85	86	87	88	89	90	91	92	94	95	95	96	97	99
		14,56	11,70	8,89	6,87	5,63	4,78	4,17	3,71	3,35	3,06	2,82	2,62	2,45	2,30	2,18	2,07	1,97	1,88	1,80	1,73	1,67
Dvo-poljni nosač	I, II, III	40	49	71	80	81	82	83	85	86	87	88	89	90	91	92	93	94	95	96	97	98
		7,96	7,96	7,96	6,82	5,59	4,75	4,15	3,69	3,33	3,04	2,81	2,61	2,44	2,30	2,17	2,06	1,96	1,88	1,80	1,73	1,66
		72	98	142	160	162	164	166	169	171	173	175	177	179	182	184	186	188	190	192	194	196
Tro-poljni nosač	I, II, III	40	64	79	80	81	82	83	85	86	87	88	89	90	91	92	93	94	95	96	97	98
		10,39	10,39	8,82	6,82	5,59	4,75	4,15	3,69	3,33	3,04	2,81	2,61	2,44	2,30	2,17	2,06	1,96	1,88	1,80	1,73	1,66
		72	128	157	160	162	164	166	169	171	173	175	177	179	182	184	186	188	190	192	194	196

$g+s = 1,49 \text{ kN/m}^2$

Tabela D.12: Opterećenje vetrom

Krovni panel Trimoterm SNV _{TS} 200, t _N = 0,60/0,60 mm																						
Statički sastav	Skupina boje	Opterećenje vetrom [kN/m²]																				
		o	-0,25	-0,50	-0,75	-1,00	-1,25	-1,50	-1,75	-2,00	-2,25	-2,50	-2,75	-3,00	-3,25	-3,50	-3,75	-4,00	-4,25	-4,50	-4,75	-5,00
Jedno-poljni nosač	I, II, III	15,58	15,58	14,25	9,86	8,00	6,90	6,17	5,62	5,20	4,81	4,30	3,90	3,57	3,30	3,06	2,87	2,70	2,54	2,41	2,30	2,19
	I, II, III(f)	14,56	14,56	14,25	9,86	8,00	6,90	6,17	5,62	5,20	4,81	4,30	3,90	3,57	3,30	3,06	2,87	2,70	2,54	2,41	2,30	2,19
Dvo-poljni nosač	I	7,96	7,96	7,96	7,96	7,84	6,31	5,32	4,64	4,12	3,72	3,40	3,13	2,91	2,72	2,56	2,41	2,28	2,17	2,07	1,98	1,89
	II	7,96	7,96	7,96	7,96	7,50	5,60	4,63	4,03	3,62	3,31	3,08	2,88	2,72	2,58	2,46	2,36	2,26	2,17	2,07	1,98	1,89
	III	7,96	7,96	7,96	6,81	4,47	3,72	3,29	3,00	2,79	2,62	2,48	2,36	2,25	2,16	2,08	2,01	1,94	1,88	1,83	1,78	1,73
Tro-poljni nosač	I, II	10,39	10,39	10,39	9,86	8,00	6,89	5,77	4,99	4,41	3,96	3,60	3,31	3,07	2,86	2,68	2,53	2,39	2,27	2,16	2,07	1,98
	III	10,39	10,39	10,39	9,86	8,00	6,49	5,15	4,32	3,77	3,38	3,08	2,86	2,67	2,52	2,39	2,28	2,18	2,10	2,02	1,95	1,89

$w_{od} = 0,65 \text{ kN/m}^2$

ODBIR LIMA NIJE ZAMJENA ZA STATIČKI PRORAČUN

UKOLIKO SE ODABERE DRUGI PROIZVOŽAČ ILI TIP - LIM ODABRATI PO KATALOGU PROIZVOĐAČA

FINALNI PRORAČUN I PRORAČUN SPAJALA JE POTREBNO NAPRAVITI
OD STRANE TEHNIČKOG TIMA PROIZVOĐAČA

ANALIZA OPTEREĆENJA - RAVNI KROV

Analiza opterećenja		h	b	γ		
STALNO:	nasip od oblutaka 5cm	0,05	X	1	X	25,00 = 1,25 kN/m ²
	h.izolacija + geotekstil					= 0,10 kN/m ²
	termoizolacija 20 cm	0,20	X	1	X	2,00 = 0,40 kN/m ²
	beton za pad 5-15cm	0,10	X	1	X	25,00 = 2,50 kN/m ²
	v.t. a.b.ploče					uzima se zasebno
	cem.žbuka / spušteni strop	0,02	X	1	X	19,00 = 0,38 kN/m ²
					g	= 4,63 kN/m²

PROMJENJIVO: SNIJEG $\alpha = 0^\circ$ $s_k = 1,25 \text{ kN/m}^2$

$$s = \mu_i \cdot C_e \cdot C_t \cdot s_k$$

$\mu_1 =$	0,80	$s_1 =$	1,25	x	0,80	=	1,00
$\mu_2 =$	0,80	$s_2 =$	1,25	x	0,80	=	1,00
$\mu_3 =$	0,80	$s_3 =$	1,25	x	0,80	=	1,00

[kN/m²]

KORISNO: $q = 0,75 \text{ kN/m}^2$
(neprohodni krov)

usvaja se $q = 3,00 \text{ kN/m}^2$
(pokrivanje težine strojarskih uređaja)

A.B.ATIKA - (PO OBODU PLOČE)

težina atike $0,15 \text{ X } 0,85 \text{ X } 25,00 = 3,19 \text{ kN/m}$

ANALIZA OPTEREĆENJA - POD DVORANE

Analiza opterećenja		h	b	γ		
STALNO:	završni sloj 0,62cm	0,006	X	1	X	20,00 = 0,12 kN/m ²
	plivajući cem.estrih 6cm	0,06	X	1	X	22,00 = 1,32 kN/m ²
	podno grijanje + folije					= 0,10 kN/m ²
	EPS 12cm	0,10	X	1	X	0,50 = 0,05 kN/m ²
	v.t. a.b.ploče					uzima se zasebno
					g	= 1,59 kN/m²

KORISNO: $q = 5,00 \text{ kN/m}^2$

SEIZMIČKO OPTEREĆENJE - HRN-EN 1998-1

PRORAČUNSKI SPEKTAR

$a_g = 0,16 \text{ g}$ (ĐAKOVO)

TIP TLA:

TIP SPEKTRA:

FAKTOR PON. $q =$

$\beta =$

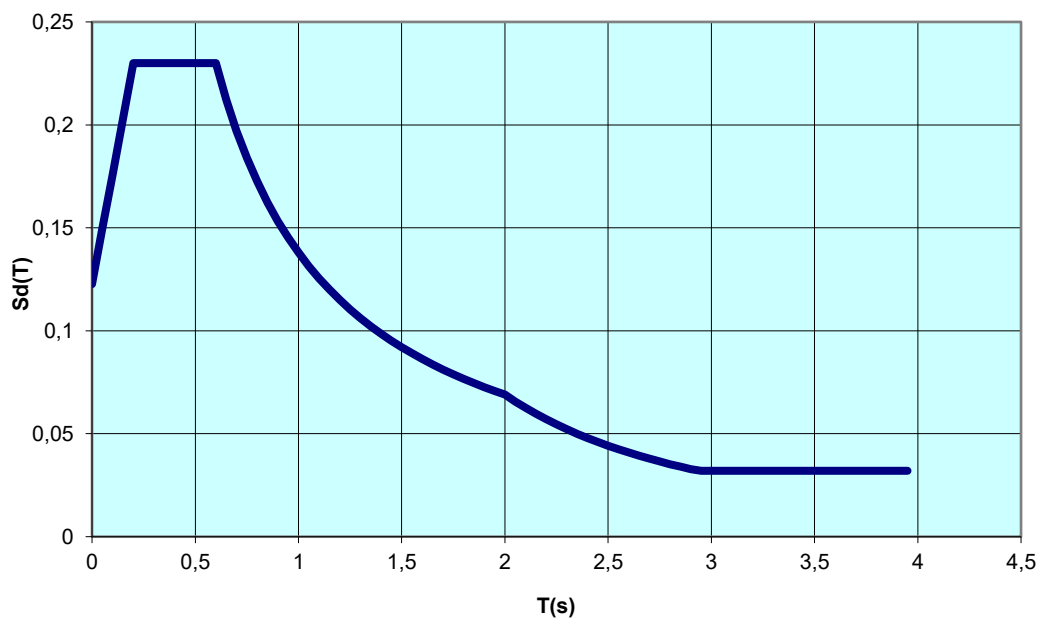
S	TB(s)	TC(s)	TD(s)
1,15	0,2	0,6	2

$$0 \leq T \leq T_B : S_d(T) = a_g \cdot S \cdot \left[\frac{2}{3} + \frac{T}{T_B} \cdot \left(\frac{2,5}{q} - \frac{2}{3} \right) \right]$$

$$T_B \leq T \leq T_C : S_d(T) = a_g \cdot S \cdot \frac{2,5}{q}$$

$$T_C \leq T \leq T_D : S_d(T) = \begin{cases} a_g \cdot S \cdot \frac{2,5}{q} \cdot \left[\frac{T_C}{T} \right] \\ \geq \beta \cdot a_g \end{cases}$$

$$T_D \leq T_D : S_d(T) = \begin{cases} a_g \cdot S \cdot \frac{2,5}{q} \cdot \left[\frac{T_C \cdot T_D}{T^2} \right] \\ \geq \beta \cdot a_g \end{cases}$$



TEŽINA KONSTRUKCIJE OVJEŠENOG KOŠA

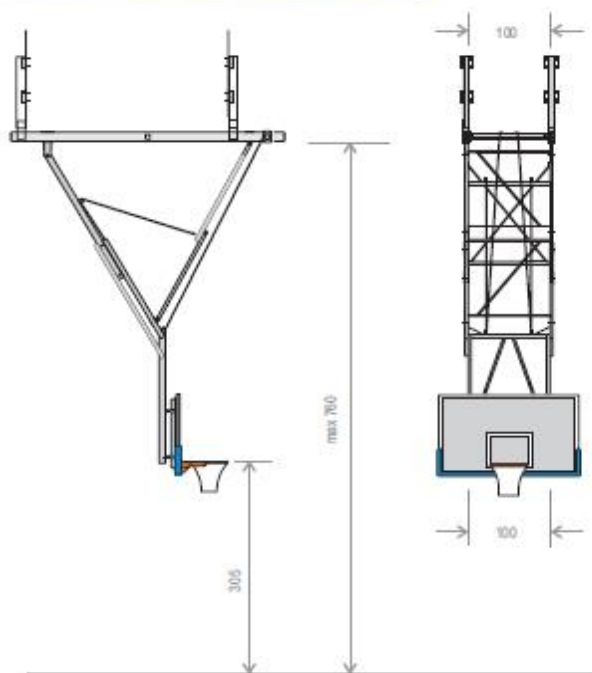
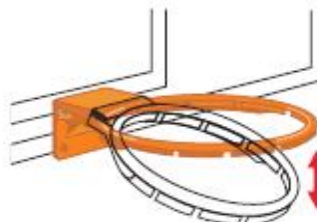


E13109 KOŠARKA STROPNA DVIŽNA tip-V, "MANTIS", do 7.5m (EN1270)
Konstrukciju koša tip V, podizna, širina ruke 100/100

E13140Y Ploča sekurit dim. 180 x 105 cm u okviru s mekom zaštitom donjeg ruba ploče
E13183 Nosač ploče za sekurit u okviru (4 kom/SET)
E23161 Pregibni obroč FIBA z mrežicom (rupe 90x110)
E13130 El. motor 220V i reduktor / pogon s krajnjim sigurnosnim sklopkama
E13146 Konstrukcija 400/100cm
093000 Mehanička sigurnosna kočnica . DIN 7892 do 7.5m
E14701 Ormarić za upravljanje

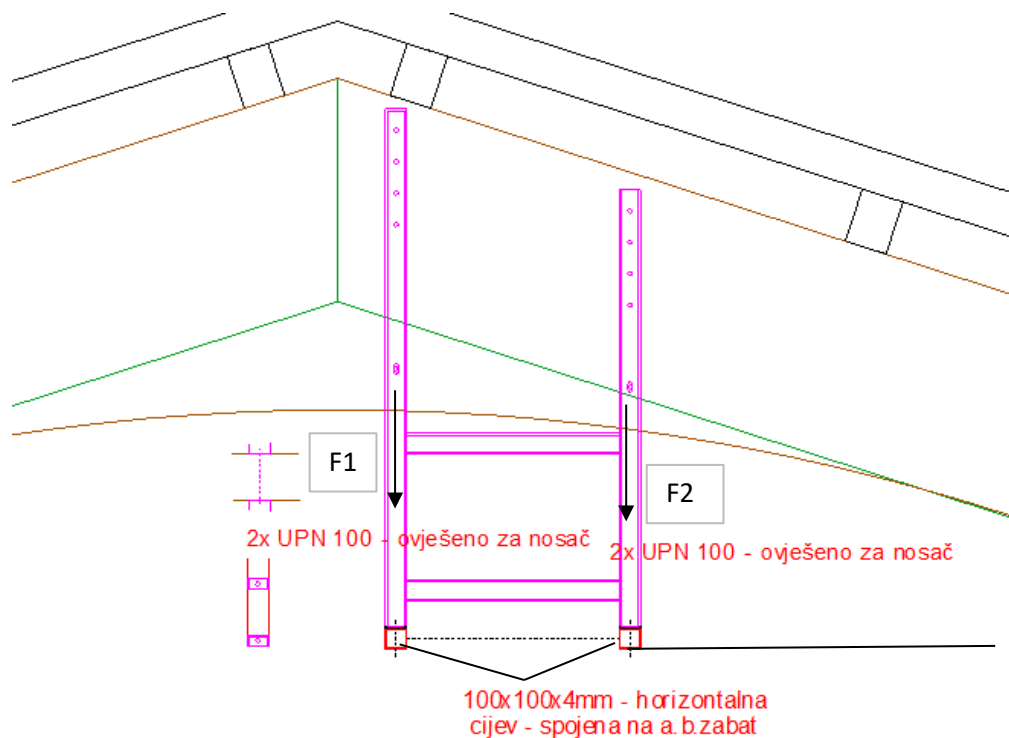
08.8.2006

Prodajna konferencija 2006



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(grede za prihvat tipske konstrukcije)
ovještene za prvi nosač i prihvaćene na a.b.zabat

TEŽINA TIPSKOG KOŠA:

340 kg == 3,4 kN

preko grede za montažu pola opterećenja prenosi se na zabat a pola na drveni nosač.

G = 1,7 kN

TEŽINA GREDA: 100x100x5mm

14,41 kg/m == 0,144 kN/m'

L = 5,25m , G1 = 0,144*5,25/2 = 0,378 kN

TEŽINA KONSTR.ZA VJEŠANJE:

UPN 100 - 10,6 kg/m'== 0,106 kN/m'

L = 2,6m, 2 kom

G2,1 = 0,106*2*2,6 = 0,55 kN

(vertikale)

G2,2 = 2*2*0,106*1/2 = 0,212 kN

(horiz.ukrute)

G2 = sum = 0,762 kN

F1 = F2 = 1,7/2 + 0,378 + 0,762 =

1,99 kN

stalno

F1 + F2 =

3,98 kN

(u težištu) Mmax = 15,12

zamjensko opterećenje - koninuirano po cijelom nosaču (L = 15,25)

g' =

0,52 kN/m

Mmax = 15,12

g(r=5,25) =

0,10 kN/m2

(dodatno opt.za program)

usvaja se:

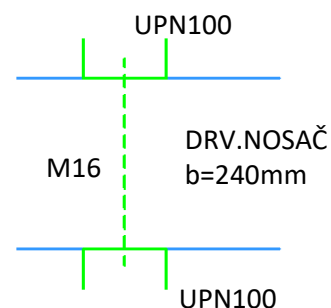
0,20 kN/m2

(uključuje sluč. nesimetričnost opt. I ev.korisno opt.)

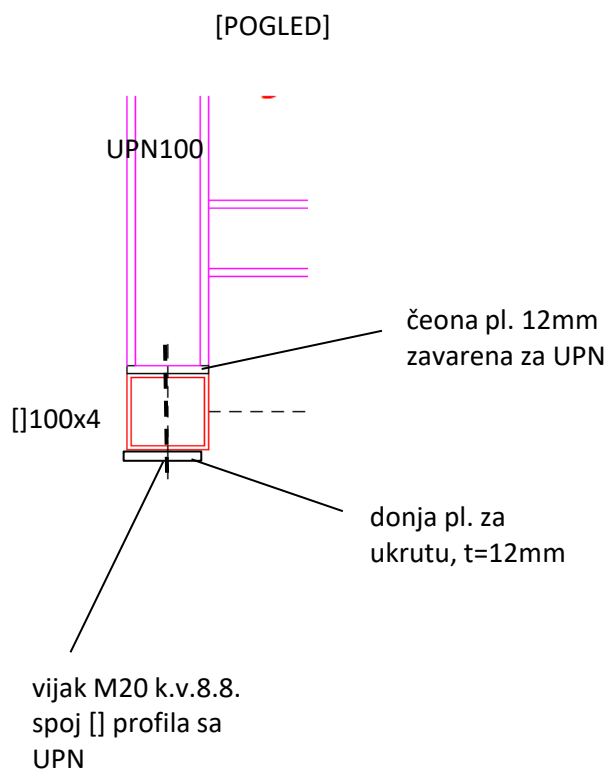
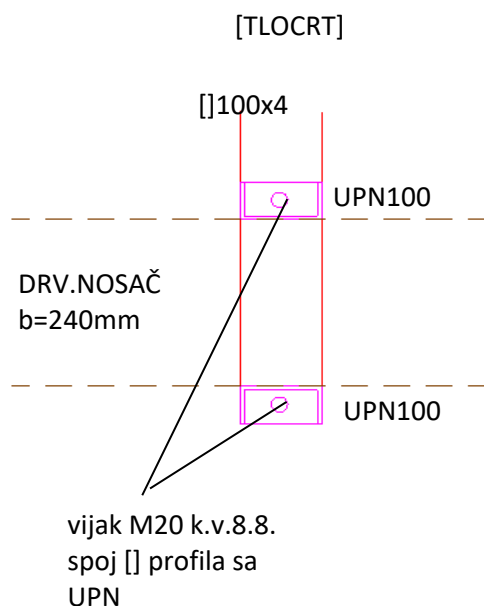
	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 47

spoj sa drvenim nosačem

dvorezni vijci M16 k.v.8.8. x 4 kom u gornjoj zoni po jednom ovjesu
te dodatno 1 M16 k.v.8.8. u donjoj zoni s vert.ovalnom rupom kako bi se
teret prenio u gornju zonu nosača

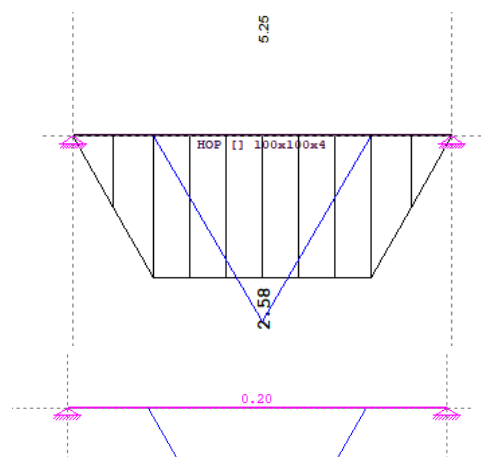
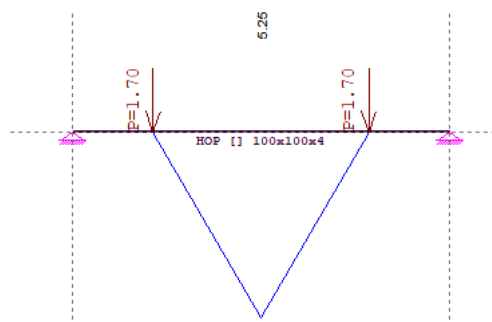


spoj [] 100x100x4mm profila na vješaljke



GREDA ZA VJEŠANJE TIPSKOG KOŠA

$G = 3,4 / 4 = 0,85 \text{ kN}$ - usvaja se $x2 = 1,7 \text{ kN}$



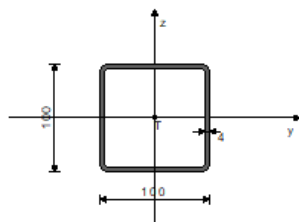
nosivost grede višestruko zadovoljava

Dimenzioniranje (čelik)

ŠTAP 2-1

POPREČNI PRESJEK: HOP [] 100x100x4 [S 235] [Set: 1]
EUROCODE 3 (EN 1993-1-1:2005)

GEOMETRIJSKE KARAKTERISTIKE PRESJEKA



($f_y = 23.5 \text{ kN/cm}^2$, $f_u = 36.0 \text{ kN/cm}^2$)

$A_x = 14.950 \text{ cm}^2$
 $A_y = 7.475 \text{ cm}^2$
 $A_z = 7.475 \text{ cm}^2$
 $I_x = 361.21 \text{ cm}^4$
 $I_y = 221.33 \text{ cm}^4$
 $I_z = 221.33 \text{ cm}^4$
 $W_y = 44.266 \text{ cm}^3$
 $W_z = 44.266 \text{ cm}^3$
 $W_{y,pl} = 55.328 \text{ cm}^3$
 $W_{z,pl} = 55.328 \text{ cm}^3$
 $\gamma_{M0} = 0.500$
 $\gamma_{M1} = 1.050$
 $\gamma_{M2} = 1.250$
 $A_{net}/A = 0.900$

Plastični moment otpora $W_{y,pl} = 55.328 \text{ cm}^3$
Računska otpornost na savijanje $M_{c,Rd} = 26.004 \text{ kNm}$
Uvjet 6.12: $M_{Ed,y} \leq M_{c,Rd,y}$ (2.58 $\leq$ 26.00)

6.3.3 Elementi konstantnog poprečnog presjeka opterećeni savijanjem i normalnim tlakom
Proračun koeficijentata interakcije izvršen je alternativnom metodom br. 2 (Aneks B)
Koeficijent uniformnog momenta $C_{my} = 0.950$
Koeficijent uniformnog momenta $C_{mz} = 1.000$
Koeficijent uniformnog momenta $C_{mLT} = 0.950$
Koeficijent interakcije $k_{xy} = 0.950$
Koeficijent interakcije $k_{yz} = 0.600$
Koeficijent interakcije $k_{zy} = 0.570$
Koeficijent interakcije $k_{zz} = 1.000$

$k_{yy} * (M_{y,Ed} + \Delta M_{y,Ed}) / \dots = 0.198$
Uvjet 6.61: (0.20 $\leq$ 1)

$k_{zy} * (M_{y,Ed} + \Delta M_{y,Ed}) / \dots = 0.119$
Uvjet 6.62: (0.12 $\leq$ 1)

FAKTORI ISKORIŠTENJA PO KOMBINACIJAMA OPTEREĆENJA 2. $\gamma = 0.20$

ŠTAP IZLOŽEN SAVIJANJU
(slučaj opterećenja 2, na 112.5 cm od početka štapa)

Momenat savijanja oko y osi $M_{Ed,y} = 2.582 \text{ kNm}$
Sistemska dužina štapa $L = 525.00 \text{ cm}$

5.5 KLASIFIKACIJA POPREČNIH PRESJEKA
Klasa presjeka 1

6.2 NOSIVOST POPREČNIH PRESJEKA
6.2.5 Savijanje y-y

PROVJERA OTPORNOSTI NA POSMIK (slučaj opterećenja 2, na 112.5 cm od početka štapa)

Poprečna sila u z pravcu $V_{Ed,z} = -2.295 \text{ kN}$
Momenat savijanja oko y osi $M_{Ed,y} = 2.582 \text{ kNm}$
Sistemska dužina štapa $L = 525.00 \text{ cm}$

6.2 NOSIVOST POPREČNIH PRESJEKA

6.2.6 Posmik
Računska nosivost na posmik $V_{pl,Rd,z} = 202.84 \text{ kN}$
Računska nosivost na posmik $V_{c,Rd,z} = 202.84 \text{ kN}$
Uvjet 6.17: $V_{Ed,z} \leq V_{c,Rd,z}$ (2.30 $\leq$ 202.84)

SPOJ ČELIČNE GREDE SA A.B.ZIDOM ZABATA

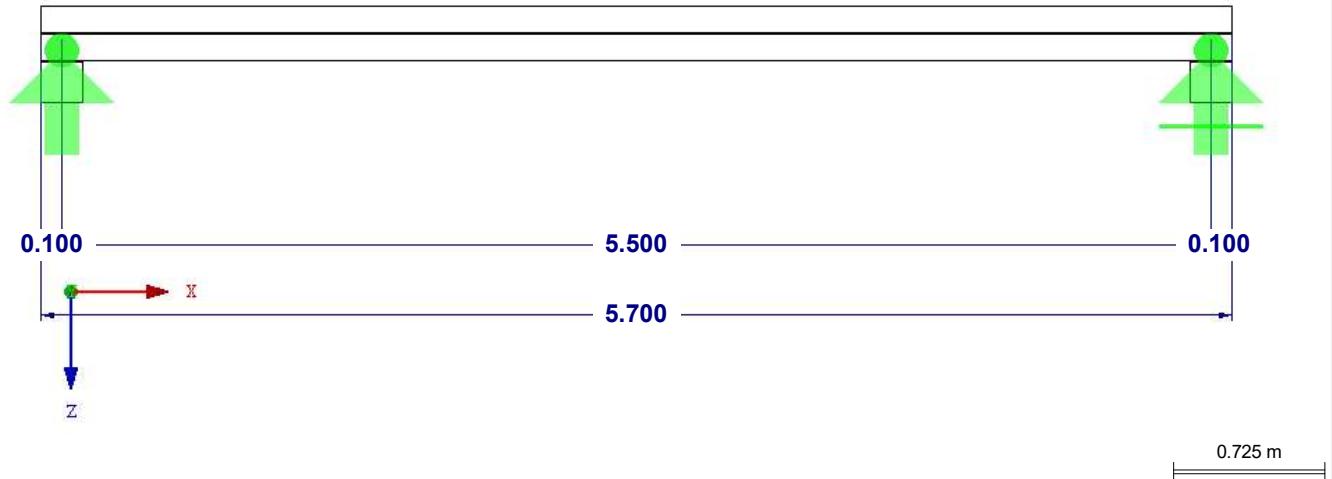
spoj izvesti preko čelone ploče $t=12\text{mm}$ zavarene za gredu

te 4 anker vijka - npr. FISCHER FIS V PLUS M16 k.v.8.8.

POZ SEK - SEKUNDARNI NOSAČ (prosta greda)

GRAPHICAL REPRESENTATION

Material: Glulam Timber GL28h Width: 22 cm Height: 26 cm Volume: 0.33 m³



RX-TIMBER

Purlin
acc. to EN
1995-1-1:2004/A2:2014

DETAILS

Reduction of Internal Forces

Moment Reduction on Support ☐
Reduction of shear forces according to 6.1.7(3) for force at distance h from the edge of a support (h = beam height along support axis) ☐

Design Settings

Reduction of stiffness with coefficient $1 / (1 + k_{def})$ due to creep effects in Service ☐
Classes 2 and 3 according to DIN EN 1995-1-1/NA:2013-08, NCI NA. 5.9

DATA FOR NATIONAL ANNEX

Partial Factor for Material Properties

Fundamental combinations for glulam timber	γ_M	:	1.250
Fundamental combinations for solid timber	γ_M	:	1.300
Accidental combinations	γ_M	:	1.000
Combinations for fire design	$\gamma_{M,fi}$	:	1.000

Limit Values of Deformations acc. to Tab. 7.2 - Characteristic (Rare) Design Situation

	Span	Cantilevered Beam
W_{inst}	$\leq l / 300$	$\leq l_k / 150$

Limit Values of Deformations - Quasi-Permanent Design Situation

$W_{fin} - W_c$	$\leq l / 250$	$\leq l_k / 125$
W_{fin}	$\leq l / 150$	$\leq l_k / 75$

Modification Factor k_{mod}

LDC	1	2	3
-Permanent	0.600	0.600	0.500
-Long-term	0.700	0.700	0.550
-Medium-term	0.800	0.800	0.650
-Short-term	0.900	0.900	0.700
-Instantaneous	1.100	1.100	0.900

Data for Fire Resistance

		Softwood	Glulam Timber	Hardwood	
Charring Rate	β_n	0.80	0.70	0.55	[mm/min]
Increased Charring	d_0	7.00	7.00	7.00	[mm]
Factor	k_{fi}	1.250	1.150	1.250	

MATERIAL DATA

Material

Material:	Glulam Timber GL28h - EN 14080:2013-08		
Charact. Strength for Bending	$f_{m,k}$	:	28.0 N/mm ²
Charact. Strength for Tension Parallel	$f_{t,0,k}$	:	22.3 N/mm ²
Charact. Strength for Tension Perpendicular to Grain	$f_{t,90,k}$	:	0.5 N/mm ²
Charact. Strength for Compression Parallel	$f_{c,0,k}$	:	28.0 N/mm ²
Charact. Strength for Compression Perpendic.	$f_{c,90,k}$	:	2.5 N/mm ²

MATERIAL DATA

Charact. Strength for Shear/Torsion	$f_{v,k}$	:	3.5	N/mm ²
Shear Modulus	G_{mean}	:	650.0	N/mm ²
Modulus of Elasticity Parallel	$E_{0,05}$	:	10500.0	N/mm ²
Shear Modulus	G_{05}	:	540.0	N/mm ²
Specific Weight	γ	:	4.60	kN/m ³
Coefficient of Thermal Expansion	α	:	0.000005	1/°C

GEOMETRY

Building Dimensions

Roof Type	Duopitch roof		
Building Height	H	:	10.000 m
Building Depth	B	:	16.000 m
Distance to Roof Edge	a	:	2.250 m
Purlin Distance	b	:	2.250 m
Roof Inclination	γ	:	18.00 °
Load Factor for Continuity	k	:	1.000

Beam Geometry

Number of spans	n	:	1
Total Length of Beam	L	:	5.700 m

Information - Parameters

Coat Surface of Beam	A_s	:	5.59 m ²
Beam volume	V	:	0.33 m ³
Beam Weight (4.60 kN/m ³)	G	:	0.150 t

SUPPORTS

Supports No.	Location X [m]	Span Length l [m]	Support Width b [cm]	Support Type	Support u_x	Support u_y	Support u_z	Restraint ϕ_x	Restraint ϕ_y	Restraint ϕ_z
1	0.100	5.500	20.00	Hinged	☒	☒	☒	☒	☐	☐
2	5.600		20.00	Hinged free	☐	☒	☒	☒	☐	☐

CROSS-SECTION AND COUPLING

Cross-Section Dimensions

All spans	b	:	22.00 cm
	h	:	26.00 cm

Couplings

All inner supports

Coupling Lengths

Inner	:	0.10	x L [-]
Outer	:	0.17	x L [-]

Coupling Elements - One Coupling

Nails			
Number	n	:	4
Diameter	D	:	8 mm
Length	l	:	280 mm
Hole type	Not prebored		

LOAD DATA

Load Definition

Load Width	k . b	:	2.250 m
------------	-------	---	---------

Permanent Loads

Consider with factor	:	1.000	
Roof Structure			
stalno - slojevi	:	0.840	kN/m ²
Roof Structure	$g_{k,2}$	:	0.840 kN/m ² RA
	$g_{k,2}$	:	1.890 kN/m RA
Self-weight of Beam (Average)	$g_{k,1}$	:	0.263 kN/m RA
	g_k	:	2.153 kN/m RA

Snow Load

Topography Type	Ce	:	Normal
Exposure	Ce	:	1.0
Snow Load - Define Manually	s_k	:	1.250 kN/m ² BA
	s_k	:	2.813 kN/m BA

Wind Load

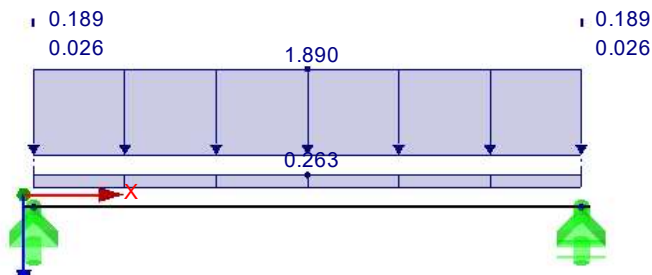
Building Height	H	:	10.000 m
Wind Load - Define Manually	q(z)	:	0.600 kN/m ² RA
	q(z)	:	1.350 kN/m RA

Service Class

Service Class	SECL	:	1
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■ LC1 - SELF-WEIGHT + ROOF FINISHES

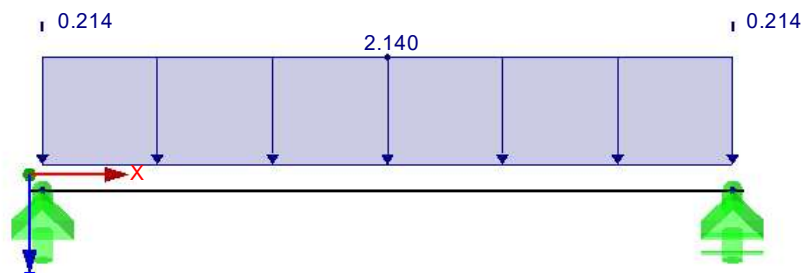
LC1 : Self-Weight + Roof Finishes
Loads [kN/m], [kN]



Against Y-direction

■ LC41 - SNOW

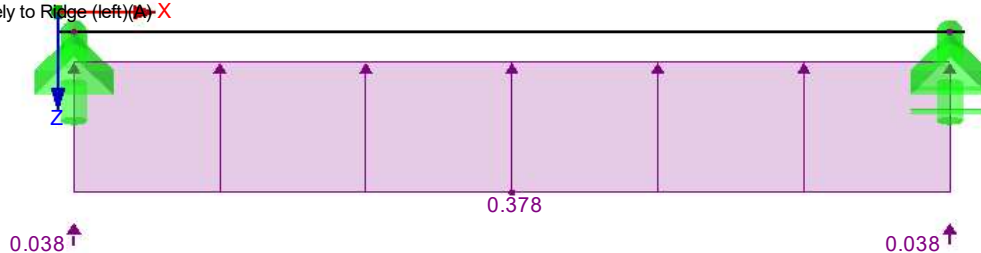
LC41 : Snow
Loads [kN/m], [kN]



Against Y-direction

■ LC51 - WIND TRANSVERSELY TO RIDGE (LEFT)(A)

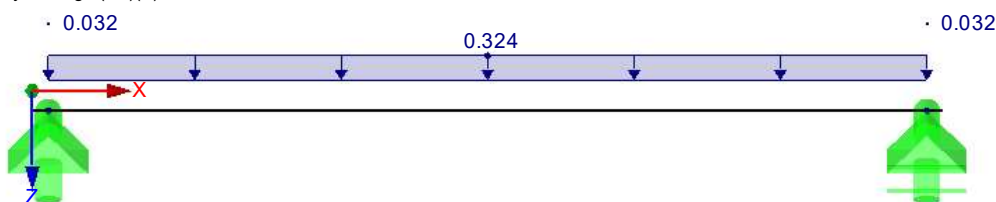
LC51 : Wind Transversely to Ridge (left)(A)
Loads [kN/m], [kN]



Against Y-direction

■ LC52 - WIND TRANSVERSELY TO RIDGE (LEFT)(B)

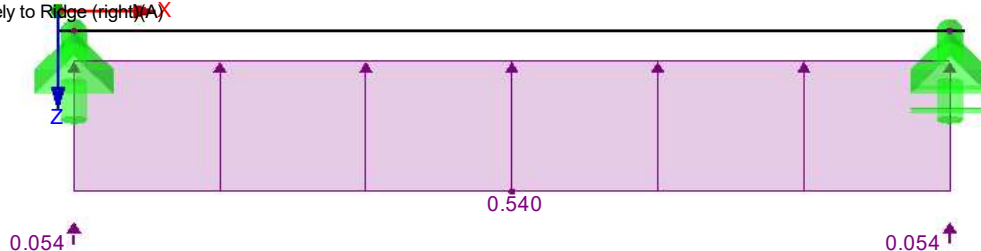
LC52 : Wind Transversely to Ridge (left)(B)
Loads [kN/m], [kN]



Against Y-direction

■ LC53 - WIND TRANSVERSELY TO RIDGE (RIGHT)(A)

LC53 : Wind Transversely to Ridge (right)(A)
Loads [kN/m], [kN]

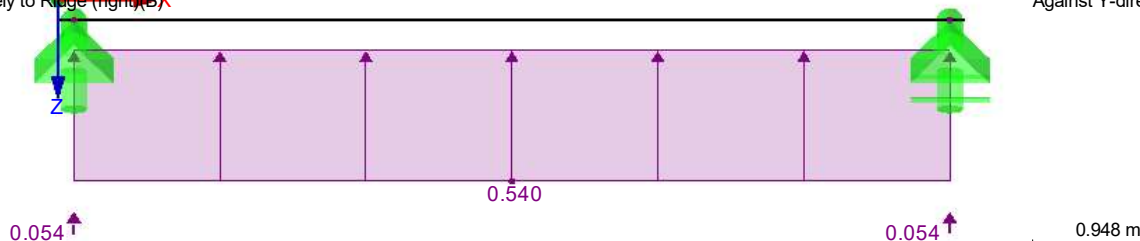


Against Y-direction

■ LC54 - WIND TRANSVERSELY TO RIDGE (RIGHT)(B)

LC54 : Wind Transversely to Ridge (right)(B)
Loads [kN/m], [kN]

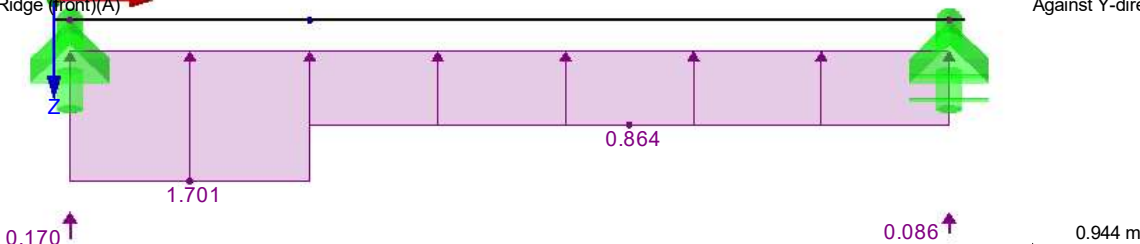
Against Y-direction



■ LC55 - WIND PARALLEL TO RIDGE (FRONT)(A)

LC55 : Wind Parallel to Ridge (front)(A)
Loads [kN/m], [kN]

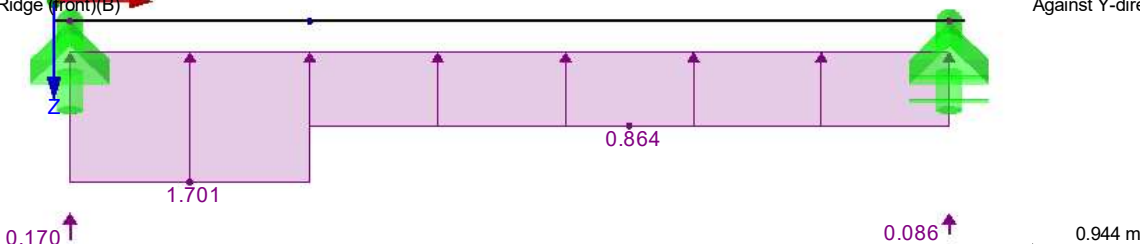
Against Y-direction



■ LC56 - WIND PARALLEL TO RIDGE (FRONT)(B)

LC56 : Wind Parallel to Ridge (front)(B)
Loads [kN/m], [kN]

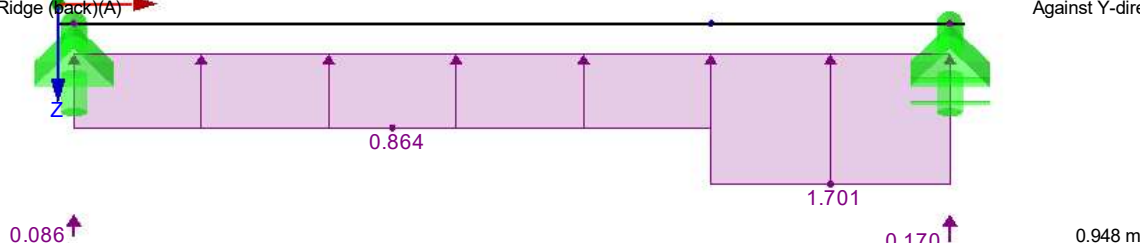
Against Y-direction



■ LC57 - WIND PARALLEL TO RIDGE (BACK)(A)

LC57 : Wind Parallel to Ridge (back)(A)
Loads [kN/m], [kN]

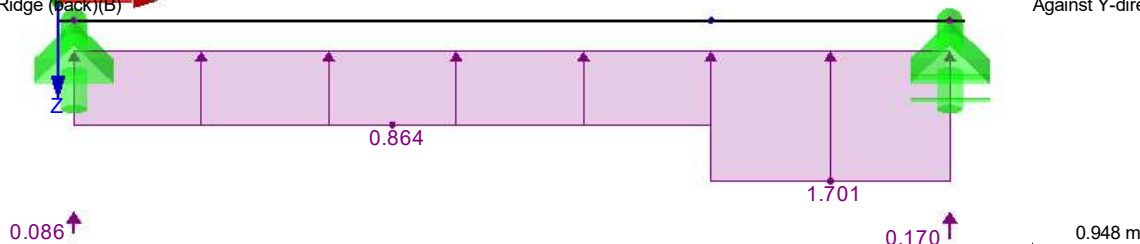
Against Y-direction



■ LC58 - WIND PARALLEL TO RIDGE (BACK)(B)

LC58 : Wind Parallel to Ridge (back)(B)
Loads [kN/m], [kN]

Against Y-direction



 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić - Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 53

■ CONTROL PARAMETERS

Design of		
Static equilibrium EQU	☐	
Ultimate limit state STR	☒	
Serviceability limit state	☒	
Fire resistance	☒	
Support compression	☒	
Display support forces	☒	
Display deformations	☒	
Data for Serviceability Limit State Design		
Precamber	w_c	: 0.0 mm
Data for Fire Resistance		
Fire Resistance Class	R 90	
Sides exposed to fire	☒ Left ☒ Right ☐ Top ☒ Bottom	
Calculation Parameters		
Number of member divisions for result diagrams		10
Number of internal divisions of tapered members		10

■ EFFECTIVE LENGTHS

Set No.	Buckling Possible	Lengths l [m]	Buckling About Axis y-y	Buckling About Axis z-z	Lateral Buckling
			Possible $\beta_{ef,y}$	Possible $\beta_{ef,z}$	Possible l_{ef} manually
			$l_{ef,y}$ [m]	$l_{ef,z}$ [m]	l_{ef} [m]
1	☒	5.500	☒ 1.000	☒ 1.000	☒ 5.500

RESULTS

■ RESULT COMBINATIONS

RC	Result Combinations Description	Load Cases	Design Situation	LDC	Factor k_{mod}	Max. Ratio
Ultimate Limit State Design						
RC1	g	1.35*LC1	UB	Permanent	0.60	0.40
RC2	g + s	1.35*LC1 + 1.50*LC41	UB	Short-term	0.90	0.56
RC3	g + s + w(q,l,A)	1.35*LC1 + 1.50*LC41 + 0.90*LC51	UB	Short-term	0.90	0.53
RC4	g + s + w(q,l,B)	1.35*LC1 + 1.50*LC41 + 0.90*LC52	UB	Short-term	0.90	0.58
RC5	g + s + w(q,r,A)	1.35*LC1 + 1.50*LC41 + 0.90*LC53	UB	Short-term	0.90	0.52
RC6	g + s + w(q,r,B)	1.35*LC1 + 1.50*LC41 + 0.90*LC54	UB	Short-term	0.90	0.52
RC7	g + s + w(p,f,A)	1.35*LC1 + 1.50*LC41 + 0.90*LC55	UB	Short-term	0.90	0.49
RC8	g + s + w(p,f,B)	1.35*LC1 + 1.50*LC41 + 0.90*LC56	UB	Short-term	0.90	0.49
RC9	g + s + w(p,b,A)	1.35*LC1 + 1.50*LC41 + 0.90*LC57	UB	Short-term	0.90	0.49
RC10	g + s + w(p,b,B)	1.35*LC1 + 1.50*LC41 + 0.90*LC58	UB	Short-term	0.90	0.49
RC11	g + w(q,l,A)	1.35*LC1 + 1.50*LC51	UB	Short-term	0.90	0.22
RC12	g + w(q,l,B)	1.35*LC1 + 1.50*LC52	UB	Short-term	0.90	0.30
RC13	g + w(q,r,A)	1.35*LC1 + 1.50*LC53	UB	Short-term	0.90	0.20
RC14	g + w(q,r,B)	1.35*LC1 + 1.50*LC54	UB	Short-term	0.90	0.20
RC15	g + w(p,f,A)	1.35*LC1 + 1.50*LC55	UB	Short-term	0.90	0.15
RC16	g + w(p,f,B)	1.35*LC1 + 1.50*LC56	UB	Short-term	0.90	0.15
RC17	g + w(p,b,A)	1.35*LC1 + 1.50*LC57	UB	Short-term	0.90	0.15
RC18	g + w(p,b,B)	1.35*LC1 + 1.50*LC58	UB	Short-term	0.90	0.15
RC19	g + s + w(q,l,A)	1.35*LC1 + 0.75*LC41 + 1.50*LC51	UB	Short-term	0.90	0.37
RC20	g + s + w(q,l,B)	1.35*LC1 + 0.75*LC41 + 1.50*LC52	UB	Short-term	0.90	0.45
RC21	g + s + w(q,r,A)	1.35*LC1 + 0.75*LC41 + 1.50*LC53	UB	Short-term	0.90	0.35
RC22	g + s + w(q,r,B)	1.35*LC1 + 0.75*LC41 + 1.50*LC54	UB	Short-term	0.90	0.35
RC23	g + s + w(p,f,A)	1.35*LC1 + 0.75*LC41 + 1.50*LC55	UB	Short-term	0.90	0.30
RC24	g + s + w(p,f,B)	1.35*LC1 + 0.75*LC41 + 1.50*LC56	UB	Short-term	0.90	0.30
RC25	g + s + w(p,b,A)	1.35*LC1 + 0.75*LC41 + 1.50*LC57	UB	Short-term	0.90	0.30
RC26	g + s + w(p,b,B)	1.35*LC1 + 0.75*LC41 + 1.50*LC58	UB	Short-term	0.90	0.30
Serviceability Limit State Design						
RC27	g	LC1	SC	Permanent		0.34
RC28	g + s	LC1 + LC41	SC	Short-term		0.68
RC29	g + s + w(q,l,A)	LC1 + LC41 + 0.60*LC51	SC	Short-term		0.64
RC30	g + s + w(q,l,B)	LC1 + LC41 + 0.60*LC52	SC	Short-term		0.71
RC31	g + s + w(q,r,A)	LC1 + LC41 + 0.60*LC53	SC	Short-term		0.63
RC32	g + s + w(q,r,B)	LC1 + LC41 + 0.60*LC54	SC	Short-term		0.63
RC33	g + s + w(p,f,A)	LC1 + LC41 + 0.60*LC55	SC	Short-term		0.58
RC34	g + s + w(p,f,B)	LC1 + LC41 + 0.60*LC56	SC	Short-term		0.58
RC35	g + s + w(p,b,A)	LC1 + LC41 + 0.60*LC57	SC	Short-term		0.58
RC36	g + s + w(p,b,B)	LC1 + LC41 + 0.60*LC58	SC	Short-term		0.58
RC37	g + w(q,l,A)	LC1 + LC51	SC	Short-term		0.28
RC38	g + w(q,l,B)	LC1 + LC52	SC	Short-term		0.40
RC39	g + w(q,r,A)	LC1 + LC53	SC	Short-term		0.25
RC40	g + w(q,r,B)	LC1 + LC54	SC	Short-term		0.25
RC41	g + w(p,f,A)	LC1 + LC55	SC	Short-term		0.17
RC42	g + w(p,f,B)	LC1 + LC56	SC	Short-term		0.17
RC43	g + w(p,b,A)	LC1 + LC57	SC	Short-term		0.17
RC44	g + w(p,b,B)	LC1 + LC58	SC	Short-term		0.17
RC45	g + s + w(q,l,A)	LC1 + 0.50*LC41 + LC51	SC	Short-term		0.45
RC46	g + s + w(q,l,B)	LC1 + 0.50*LC41 + LC52	SC	Short-term		0.57
RC47	g + s + w(q,r,A)	LC1 + 0.50*LC41 + LC53	SC	Short-term		0.42
RC48	g + s + w(q,r,B)	LC1 + 0.50*LC41 + LC54	SC	Short-term		0.42
RC49	g + s + w(p,f,A)	LC1 + 0.50*LC41 + LC55	SC	Short-term		0.34
RC50	g + s + w(p,f,B)	LC1 + 0.50*LC41 + LC56	SC	Short-term		0.34
RC51	g + s + w(p,b,A)	LC1 + 0.50*LC41 + LC57	SC	Short-term		0.34
RC52	g + s + w(p,b,B)	LC1 + 0.50*LC41 + LC58	SC	Short-term		0.34
RC53	g	1.60*LC1	SQ	Permanent		0.46
RC54	g + s	1.60*LC1 + LC41	SQ	Short-term		0.74

■ RESULT COMBINATIONS

RC	Result Combinations Description	Load Cases	Design Situation	LDC	Factor k_{mod}	Max. Ratio
RC55	g + s + w(q,l,A)	1.60*LC1 + LC41 + 0.60*LC51	SQ	Short-term		0.71
RC56	g + s + w(q,l,B)	1.60*LC1 + LC41 + 0.60*LC52	SQ	Short-term		0.76
RC57	g + s + w(q,r,A)	1.60*LC1 + LC41 + 0.60*LC53	SQ	Short-term		0.69
RC58	g + s + w(q,r,B)	1.60*LC1 + LC41 + 0.60*LC54	SQ	Short-term		0.69
RC59	g + s + w(p,f,A)	1.60*LC1 + LC41 + 0.60*LC55	SQ	Short-term		0.65
RC60	g + s + w(p,f,B)	1.60*LC1 + LC41 + 0.60*LC56	SQ	Short-term		0.65
RC61	g + s + w(p,b,A)	1.60*LC1 + LC41 + 0.60*LC57	SQ	Short-term		0.65
RC62	g + s + w(p,b,B)	1.60*LC1 + LC41 + 0.60*LC58	SQ	Short-term		0.65
RC63	g + w(q,l,A)	1.60*LC1 + LC51	SQ	Short-term		0.40
RC64	g + w(q,l,B)	1.60*LC1 + LC52	SQ	Short-term		0.50
RC65	g + w(q,r,A)	1.60*LC1 + LC53	SQ	Short-term		0.38
RC66	g + w(q,r,B)	1.60*LC1 + LC54	SQ	Short-term		0.38
RC67	g + w(p,f,A)	1.60*LC1 + LC55	SQ	Short-term		0.32
RC68	g + w(p,f,B)	1.60*LC1 + LC56	SQ	Short-term		0.32
RC69	g + w(p,b,A)	1.60*LC1 + LC57	SQ	Short-term		0.32
RC70	g + w(p,b,B)	1.60*LC1 + LC58	SQ	Short-term		0.32
RC71	g + s + w(q,l,A)	1.60*LC1 + 0.50*LC41 + LC51	SQ	Short-term		0.54
RC72	g + s + w(q,l,B)	1.60*LC1 + 0.50*LC41 + LC52	SQ	Short-term		0.64
RC73	g + s + w(q,r,A)	1.60*LC1 + 0.50*LC41 + LC53	SQ	Short-term		0.52
RC74	g + s + w(q,r,B)	1.60*LC1 + 0.50*LC41 + LC54	SQ	Short-term		0.52
RC75	g + s + w(p,f,A)	1.60*LC1 + 0.50*LC41 + LC55	SQ	Short-term		0.46
RC76	g + s + w(p,f,B)	1.60*LC1 + 0.50*LC41 + LC56	SQ	Short-term		0.46
RC77	g + s + w(p,b,A)	1.60*LC1 + 0.50*LC41 + LC57	SQ	Short-term		0.46
RC78	g + s + w(p,b,B)	1.60*LC1 + 0.50*LC41 + LC58	SQ	Short-term		0.46
Fire Resistance Check						
RC79	g	LC1	UA	Permanent	1.00	0.77
RC80	g + s	LC1 + 0.20*LC41	UA	Short-term	1.00	0.92
RC89	g + w(q,l,A)	LC1 + 0.20*LC51	UA	Short-term	1.00	0.75
RC90	g + w(q,l,B)	LC1 + 0.20*LC52	UA	Short-term	1.00	0.79
RC91	g + w(q,r,A)	LC1 + 0.20*LC53	UA	Short-term	1.00	0.74
RC92	g + w(q,r,B)	LC1 + 0.20*LC54	UA	Short-term	1.00	0.74
RC93	g + w(p,f,A)	LC1 + 0.20*LC55	UA	Short-term	1.00	0.72
RC94	g + w(p,f,B)	LC1 + 0.20*LC56	UA	Short-term	1.00	0.72
RC95	g + w(p,b,A)	LC1 + 0.20*LC57	UA	Short-term	1.00	0.72
RC96	g + w(p,b,B)	LC1 + 0.20*LC58	UA	Short-term	1.00	0.72

■ DESIGN - ALL

No.	Location X [m]	RC	Ratio	Design Description
1	0.650	RC4	0.21 ≤ 1	111) Cross-section resistance - Shear due to shear force Vz acc. to 6.1.7
2	0.650	RC2	0.06 ≤ 1	112) Cross-section resistance - Shear due to shear force Vy acc. to 6.1.7
3	0.100	RC4	0.27 ≤ 1	114) Cross-section resistance - Shear stress on support Vz acc. to 6.1.7
4	0.100	RC2	0.08 ≤ 1	115) Cross-section resistance - Shear stress on support Vy acc. to 6.1.7
5	2.850	RC4	0.58 ≤ 1	153) Cross-section resistance - Biaxial bending acc. to 6.1.6
6	0.100	RC4	0.11 ≤ 1	251) Support pressure - Compression perpendicular to grain of wood acc. to 6.1.5
7	2.850	RC4	0.46 ≤ 1	311) Stability - Uniaxial bending about y-axis without compression force acc. to 6.3.3
8	2.850	RC30	0.71 ≤ 1	401) Serviceability - Design Situation Characteristic acc. to 7.2 - Inner span, z-direction
9	2.850	RC56	0.76 ≤ 1	402) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span, z-direction
10	2.850	RC56	0.46 ≤ 1	403) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span, z-direction
11	2.850	RC28	0.31 ≤ 1	406) Serviceability - Design Situation Characteristic acc. to 7.2 - Inner span, y-direction
12	2.850	RC54	0.33 ≤ 1	407) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span, y-direction
13	2.850	RC54	0.20 ≤ 1	408) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span, y-direction
14	0.650	RC80	0.20 ≤ 1	611) Fire resistance - Cross-section resistance - Shear due to shear force Vz acc. to 6.1.7
15	0.650	RC80	0.06 ≤ 1	612) Fire resistance - Cross-section resistance - Shear due to shear force Vy acc. to 6.1.7(1)
16	0.100	RC80	0.26 ≤ 1	614) Fire resistance - Cross-section resistance - Shear stress on support Vz acc. to 6.1.7
17	0.100	RC80	0.08 ≤ 1	615) Fire resistance - Cross-section resistance - Shear stress on support Vy acc. to 6.1.7
18	2.850	RC80	0.92 ≤ 1	653) Fire resistance - Cross-section resistance - Biaxial bending acc. to 6.1.6
19	0.100	RC80	0.08 ≤ 1	751) Fire resistance - Support pressure - Compression perpendicular to grain of wood acc. to 6.1.5
20	2.850	RC80	0.65 ≤ 1	811) Fire resistance - Stability - Uniaxial bending about y-axis without compression force acc. to 6.3.3
Max			0.92 ≤ 1	

■ DESIGN - ALL - DETAILS

111) Cross-section resistance - Shear due to shear force Vz acc. to 6.1.7

Governing	Location	X	0.650 m
	Result Combinations	RC	RC4
Design Internal Forces	Normal Force	N_d	0.000 kN
	Shear Force	$V_{y,d}$	4.158 kN
	Shear Force	$V_{z,d}$	13.439 kN
	Torsion	M_T	0.000 kNm
	Moment	$M_{y,d}$	8.316 kNm
	Moment	$M_{z,d}$	-2.573 kNm

■ DESIGN - ALL - DETAILS

Design	Shear Force	$V_{z,d}$	13.439	kN	
	Cross-Section Width	b	22.00	cm	
	Cross-Section Height	h	26.00	cm	
	Crack Influence Factor	k_{cr}	0.670		6.1.7 (2)
	Effective Area	A_{ef}	383.24	cm ²	
	Shear Stress	τ_d	0.5	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Shear Strength	$f_{v,d}$	2.5	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.21		Eq. (6.13)
112) Cross-section resistance - Shear due to shear force Vy acc. to 6.1.7					
Governing	Location	X	0.650	m	
	Result Combinations	RC	RC2		
Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	4.158	kN	
	Shear Force	$V_{z,d}$	12.798	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	7.919	kNm	
	Moment	$M_{z,d}$	-2.573	kNm	
Design	Shear Force	$V_{y,d}$	4.158	kN	
	Cross-Section Width	b	22.00	cm	
	Cross-Section Height	h	26.00	cm	
	Crack Influence Factor	k_{cr}	0.670		6.1.7 (2)
	Effective Area	A_{ef}	383.24	cm ²	
	Shear Stress	τ_d	0.2	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Shear Strength	$f_{v,d}$	2.5	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.06		Eq. (6.13)
114) Cross-section resistance - Shear stress on support Vz acc. to 6.1.7					
Governing	Location	X	0.100	m	
	Result Combinations	RC	RC4		
Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	5.387	kN	
	Shear Force	$V_{z,d}$	17.410	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	0.000	kNm	
	Moment	$M_{z,d}$	0.000	kNm	
Design	Shear Force	$V_{z,d}$	17.410	kN	
	Cross-Section Width	b	22.00	cm	
	Cross-Section Height	h	26.00	cm	
	Crack Influence Factor	k_{cr}	0.670		6.1.7 (2)
	Effective Area	A_{ef}	383.24	cm ²	
	Shear Stress	τ_d	0.7	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Shear Strength	$f_{v,d}$	2.5	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.27		Eq. (6.13)
115) Cross-section resistance - Shear stress on support Vy acc. to 6.1.7					
Governing	Location	X	0.100	m	
	Result Combinations	RC	RC2		
Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	5.387	kN	
	Shear Force	$V_{z,d}$	16.579	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	0.000	kNm	
	Moment	$M_{z,d}$	0.000	kNm	
Design	Shear Force	$V_{y,d}$	5.387	kN	
	Cross-Section Width	b	22.00	cm	
	Cross-Section Height	h	26.00	cm	
	Crack Influence Factor	k_{cr}	0.670		6.1.7 (2)
	Effective Area	A_{ef}	383.24	cm ²	
	Shear Stress	τ_d	0.2	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Shear Strength	$f_{v,d}$	2.5	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.08		Eq. (6.13)
153) Cross-section resistance - Biaxial bending acc. to 6.1.6					
Governing	Location	X	2.850	m	
	Result Combinations	RC	RC4		
Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	0.000	kN	

■ DESIGN - ALL - DETAILS

Design	Shear Force	$V_{z,d}$	0.000	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	23.099	kNm	
	Moment	$M_{z,d}$	-7.147	kNm	
	Moment	$M_{y,d}$	23.099	kNm	
	Moment	$M_{z,d}$	7.147	kNm	
	Section Modulus	W_y	2478.67	cm ³	
	Section Modulus	W_z	2097.33	cm ³	
	Bending Stress	$\sigma_{m,y,d}$	9.3	N/mm ²	
	Bending Stress	$\sigma_{m,z,d}$	3.4	N/mm ²	
	Bending Strength	$f_{m,y,k}$	28.0	N/mm ²	[7], Tab.1
	Bending Strength	$f_{m,z,k}$	28.0	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 3.1
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Bending Strength	$f_{m,y,d}$	20.2	N/mm ²	Eq. (2.14)
	Bending Strength	$f_{m,z,d}$	20.2	N/mm ²	Eq. (2.14)
	Reduction Factor	k_m	0.700		6.1.6
	Design 1	η_1	0.58	≤ 1	Eq. (6.11)
	Design 2	η_2	0.49	≤ 1	Eq. (6.12)
	Design Ratio	η	0.58	≤ 1	
251) Support pressure - Compression perpendicular to grain of wood acc. to 6.1.5					
Governing	Location	X	0.100	m	
	Result Combinations	RC	RC4		
Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	5.387	kN	
	Shear Force	$V_{z,d}$	17.410	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	0.000	kNm	
	Moment	$M_{z,d}$	0.000	kNm	
Design	Support Force	A_d	17.410	kN	
	Support Length	l_A	20.00	cm	
	Effective Support Length	$l_{A,ef}$	23.00	cm	
	Beam Width	b	22.00	cm	
	Effective Area of Transversal Compression	A_{ef}	506.00	cm ²	
	Transversal Compressive Stress	$\sigma_{c,90,d}$	0.3	N/mm ²	
	Transversal Compression Factor	$k_{c,90}$	1.750		
	Transversal Compressive Strength	$f_{c,90,k}$	2.5	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Transversal Compressive Strength	$f_{c,90,d}$	1.8	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.11	≤ 1	Eq. (6.3)
311) Stability - Uniaxial bending about y-axis without compression force acc. to 6.3.3					
Governing	Location	X	2.850	m	
	Result Combinations	RC	RC4		
Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	0.000	kN	
	Shear Force	$V_{z,d}$	0.000	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	23.099	kNm	
	Moment	$M_{z,d}$	-7.147	kNm	
Design	Moment	$M_{y,d}$	23.099	kNm	
	Cross-Section Width	b	22.00	cm	
	Cross-Section Height	h	26.00	cm	
	Section Modulus	W_y	2478.67	cm ³	
	Bending Stress	$\sigma_{m,y,d}$	9.3	N/mm ²	
	Equivalent Member Length	l_{ef}	5.500	m	
	Modulus of Elasticity	$E_{0,05}$	10500.0	N/mm ²	[7], Tab.1
	Shear Modulus	G_{05}	540.0	N/mm ²	[7], Tab.1
	Relative Slenderness Ratio	$\lambda_{rel,m}$	0.398	≤ 0.75	Eq. (6.30)
	Moment of Inertia	I_z	23070.70	cm ⁴	
	Torsional Moment of Inertia	I_t	45170.40	cm ⁴	
	Critical Bending Stress	$\sigma_{m,crit}$	177.1	N/mm ²	Eq. (6.31)
	Lateral Buckling Coefficient	k_{crit}	1.000		Eq. (6.34)
	Bending Strength	$f_{m,y,k}$	28.0	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Bending Strength	$f_{m,y,d}$	20.2	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.46	≤ 1	Eq. (6.33)
401) Serviceability - Design Situation Characteristic acc. to 7.2 - Inner span, z-direction					
Governing	Location	X	2.850	m	
	Result Combinations	RC	RC30		
Deformations	Direction x	w_x	0.0	mm	
	Direction y	w_y	5.6	mm	
	Direction z	w_z	13.1	mm	
Design	Deformation on Inner Span	$w_{inst,z}$	13.1	mm	

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	Reference Length	l	5.500	m		
	Limit Value Criterion	$l / w_{inst,limit,z}$	300			
	Limit Value of Deformation	$w_{inst,limit,z}$	18.3	mm		
	Design Ratio	η	0.71		≤ 1	Tab. 7.2
402) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span, z-direction						
Governing	Location	X	2.850	m		
	Result Combinations	RC	RC56			
Deformations	Direction x	w_x	0.0	mm		
	Direction y	w_y	7.3	mm		
	Direction z	w_z	16.8	mm		
Design	Deformation Coefficient	k_{def}	0.60			Tab. 3.2
	Deformation on Inner Span	$w_{fin,z}$	16.8	mm		
	Precamber	w_c	0.0	mm		
	Deformation, Deducting Raise	$w_{fin,z} - w_c$	16.8	mm		
	Reference Length	l	5.500	m		
	Limit Value Criterion	$l / w_{fin,limit,z}$	250			
	Limit Value of Deformation	$w_{fin,limit,z}$	22.0	mm		
	Design Ratio	η	0.76		≤ 1	Tab. 7.2
403) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span, z-direction						
Governing	Location	X	2.850	m		
	Result Combinations	RC	RC56			
Deformations	Direction x	w_x	0.0	mm		
	Direction y	w_y	7.3	mm		
	Direction z	w_z	16.8	mm		
Design	Deformation Coefficient	k_{def}	0.60			Tab. 3.2
	Deformation on Inner Span	$w_{fin,z}$	16.8	mm		
	Reference Length	l	5.500	m		
	Limit Value Criterion	$l / w_{fin,limit,z}$	150			
	Limit Value of Deformation	$w_{fin,limit,z}$	36.7	mm		
	Design Ratio	η	0.46		≤ 1	Tab. 7.2
406) Serviceability - Design Situation Characteristic acc. to 7.2 - Inner span, y-direction						
Governing	Location	X	2.850	m		
	Result Combinations	RC	RC28			
Deformations	Direction x	w_x	0.0	mm		
	Direction y	w_y	5.6	mm		
	Direction z	w_z	12.5	mm		
Design	Deformation on Inner Span	$w_{inst,y}$	5.6	mm		
	Reference Length	l	5.500	m		
	Limit Value Criterion	$l / w_{inst,limit,y}$	300			
	Limit Value of Deformation	$w_{inst,limit,y}$	18.3	mm		
	Design Ratio	η	0.31		≤ 1	Tab. 7.2
407) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span, y-direction						
Governing	Location	X	2.850	m		
	Result Combinations	RC	RC54			
Deformations	Direction x	w_x	0.0	mm		
	Direction y	w_y	7.3	mm		
	Direction z	w_z	16.2	mm		
Design	Deformation Coefficient	k_{def}	0.60			Tab. 3.2
	Deformation on Inner Span	$w_{fin,y}$	7.3	mm		
	Precamber	w_c	0.0	mm		
	Deformation, Deducting Raise	$w_{fin,y} - w_c$	7.3	mm		
	Reference Length	l	5.500	m		
	Limit Value Criterion	$l / w_{fin,limit,y}$	250			
	Limit Value of Deformation	$w_{fin,limit,y}$	22.0	mm		
	Design Ratio	η	0.33		≤ 1	Tab. 7.2
408) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span, y-direction						
Governing	Location	X	2.850	m		
	Result Combinations	RC	RC54			
Deformations	Direction x	w_x	0.0	mm		
	Direction y	w_y	7.3	mm		
	Direction z	w_z	16.2	mm		
Design	Deformation Coefficient	k_{def}	0.60			Tab. 3.2
	Deformation on Inner Span	$w_{fin,y}$	7.3	mm		
	Reference Length	l	5.500	m		
	Limit Value Criterion	$l / w_{fin,limit,y}$	150			
	Limit Value of Deformation	$w_{fin,limit,y}$	36.7	mm		
	Design Ratio	η	0.20		≤ 1	Tab. 7.2
611) Fire resistance - Cross-section resistance - Shear due to shear force Vz acc. to 6.1.7						
Governing	Location	X	0.650	m		
	Result Combinations	RC	RC80			

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Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	1.755	kN	
	Shear Force	$V_{z,d}$	5.400	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	3.342	kNm	
	Moment	$M_{z,d}$	-1.086	kNm	
Design	Shear Force	$V_{z,d}$	5.400	kN	
	Cross-Section Width	b_r	8.00	cm	
	Cross-Section Height	h_r	19.00	cm	
	Crack Influence Factor	k_{cr}	0.670		6.1.7 (2)
	Effective Area	A_{ef}	101.84	cm ²	
	Shear Stress	τ_d	0.8	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab.1
	Factor	k_{fi}	1.150		[2], Tab. 2.1
	Shear Strength	$f_{v,20}$	4.0	N/mm ²	[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
	Shear Strength	$f_{v,d,fi}$	4.0	N/mm ²	[2], Eq. (2.1)
	Design Ratio	η	0.20		Eq. (6.13)
612) Fire resistance - Cross-section resistance - Shear due to shear force V_y acc. to 6.1.7(1)					
Governing	Location	X	0.650	m	
	Result Combinations	RC	RC80		
Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	1.755	kN	
	Shear Force	$V_{z,d}$	5.400	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	3.342	kNm	
	Moment	$M_{z,d}$	-1.086	kNm	
Design	Shear Force	$V_{y,d}$	1.755	kN	
	Cross-Section Width	b_r	8.00	cm	
	Cross-Section Height	h_r	19.00	cm	
	Crack Influence Factor	k_{cr}	0.670		6.1.7 (2)
	Effective Area	A_{ef}	101.84	cm ²	
	Shear Stress	τ_d	0.3	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab.1
	Factor	k_{fi}	1.150		[2], Tab. 2.1
	Shear Strength	$f_{v,20}$	4.0	N/mm ²	[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
	Shear Strength	$f_{v,d,fi}$	4.0	N/mm ²	[2], Eq. (2.1)
	Design Ratio	η	0.06		Eq. (6.13)
614) Fire resistance - Cross-section resistance - Shear stress on support V_z acc. to 6.1.7					
Governing	Location	X	0.100	m	
	Result Combinations	RC	RC80		
Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	2.273	kN	
	Shear Force	$V_{z,d}$	6.996	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	0.000	kNm	
	Moment	$M_{z,d}$	0.000	kNm	
Design	Shear Force	$V_{z,d}$	6.996	kN	
	Cross-Section Width	b_r	8.00	cm	
	Cross-Section Height	h_r	19.00	cm	
	Crack Influence Factor	k_{cr}	0.670		6.1.7 (2)
	Effective Area	A_{ef}	101.84	cm ²	
	Shear Stress	τ_d	1.0	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab.1
	Factor	k_{fi}	1.150		[2], Tab. 2.1
	Shear Strength	$f_{v,20}$	4.0	N/mm ²	[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
	Shear Strength	$f_{v,d,fi}$	4.0	N/mm ²	[2], Eq. (2.1)
	Design Ratio	η	0.26		Eq. (6.13)
615) Fire resistance - Cross-section resistance - Shear stress on support V_y acc. to 6.1.7					
Governing	Location	X	0.100	m	
	Result Combinations	RC	RC80		
Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	2.273	kN	
	Shear Force	$V_{z,d}$	6.996	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	0.000	kNm	
	Moment	$M_{z,d}$	0.000	kNm	
Design	Shear Force	$V_{y,d}$	2.273	kN	
	Cross-Section Width	b_r	8.00	cm	
	Cross-Section Height	h_r	19.00	cm	
	Crack Influence Factor	k_{cr}	0.670		6.1.7 (2)
	Effective Area	A_{ef}	101.84	cm ²	

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	Shear Stress	τ_d	0.3	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab.1
	Factor	k_{fi}	1.150		[2], Tab. 2.1
	Shear Strength	$f_{v,20}$	4.0	N/mm ²	[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
	Shear Strength	$f_{v,d,fi}$	4.0	N/mm ²	[2], Eq. (2.1)
	Design Ratio	η	0.08		Eq. (6.13)
653) Fire resistance - Cross-section resistance - Biaxial bending acc. to 6.1.6					
Governing	Location	X	2.850	m	
	Result Combinations	RC	RC80		
Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	0.000	kN	
	Shear Force	$V_{z,d}$	0.000	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	9.282	kNm	
	Moment	$M_{z,d}$	-3.016	kNm	
Design	Moment	$M_{y,d}$	9.282	kNm	
	Moment	$M_{z,d}$	3.016	kNm	
	Section Modulus	$W_{y,r}$	481.33	cm ³	
	Section Modulus	$W_{z,r}$	202.67	cm ³	
	Bending Stress	$\sigma_{m,y,d}$	19.3	N/mm ²	
	Bending Stress	$\sigma_{m,z,d}$	14.9	N/mm ²	
	Bending Strength	$f_{m,y,k}$	28.0	N/mm ²	[7], Tab.1
	Bending Strength	$f_{m,z,k}$	28.0	N/mm ²	[7], Tab.1
	Factor	k_{fi}	1.150		[2], Tab. 2.1
	Bending Strength	$f_{m,y,20}$	32.2	N/mm ²	[2], Eq. (2.4)
	Bending Strength	$f_{m,z,20}$	32.2	N/mm ²	[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
	Bending Strength	$f_{m,y,d,fi}$	32.2	N/mm ²	[2], Eq. (2.1)
	Bending Strength	$f_{m,z,d,fi}$	32.2	N/mm ²	[2], Eq. (2.1)
	Reduction Factor	k_m	0.700		6.1.6
	Design 1	η_1	0.92		Eq. (6.11)
	Design 2	η_2	0.88		Eq. (6.12)
	Design Ratio	η	0.92		≤ 1
751) Fire resistance - Support pressure - Compression perpendicular to grain of wood acc. to 6.1.5					
Governing	Location	X	0.100	m	
	Result Combinations	RC	RC80		
Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	2.193	kN	
	Shear Force	$V_{z,d}$	6.751	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	0.000	kNm	
	Moment	$M_{z,d}$	0.000	kNm	
Design	Support Force	A_d	6.996	kN	
	Support Length	l_A	20.00	cm	
	Effective Support Length	$l_{A,ef}$	23.00	cm	
	Beam Width	b	8.00	cm	
	Effective Area of Transversal	A_{ef}	184.00	cm ²	
	Compression				
	Transversal Compressive Stress	$\sigma_{c,90,d}$	0.4	N/mm ²	
	Transversal Compression Factor	$k_{c,90}$	1.750		
	Transversal Compressive	$f_{c,90,k}$	2.5	N/mm ²	[7], Tab.1
	Strength				
	Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
	Transversal Compressive	$f_{c,90,d,fi}$	2.9	N/mm ²	Eq. (2.14)
	Strength				
	Design Ratio	η	0.08		Eq. (6.3)
811) Fire resistance - Stability - Uniaxial bending about y-axis without compression force acc. to 6.3.3					
Governing	Location	X	2.850	m	
	Result Combinations	RC	RC80		
Design Internal Forces	Normal Force	N_d	0.000	kN	
	Shear Force	$V_{y,d}$	0.000	kN	
	Shear Force	$V_{z,d}$	0.000	kN	
	Torsion	M_T	0.000	kNm	
	Moment	$M_{y,d}$	9.282	kNm	
	Moment	$M_{z,d}$	-3.016	kNm	
Design	Moment	$M_{y,d}$	9.282	kNm	
	Cross-Section Width	b_r	8.00	cm	
	Cross-Section Height	h_r	19.00	cm	
	Section Modulus	$W_{y,r}$	481.33	cm ³	
	Bending Stress	$\sigma_{m,y,d}$	19.3	N/mm ²	
	Equivalent Member Length	l_{ef}	5.500	m	
	Modulus of Elasticity	$E_{d,fi}$	12075.0	N/mm ²	[2], Eq. (2.2)
	Shear Modulus	$G_{d,fi}$	621.0	N/mm ²	[2], Eq. (2.2)
	Relative Slenderness Ratio	$\lambda_{rel,m}$	0.844		Eq. (6.30)
	Moment of Inertia	$I_{z,r}$	810.67	cm ⁴	

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Torsional Moment of Inertia	$I_{t,r}$	2384.74	cm ⁴	
Critical Bending Stress	$\sigma_{m,crit}$	45.2	N/mm ²	Eq. (6.31)
Lateral Buckling Coefficient	k_{crit}	0.927		Eq. (6.34)
Bending Strength	$f_{m,y,k}$	28.0	N/mm ²	[7], Tab.1
Factor	k_{fi}	1.150		[2], Tab. 2.1
Bending Strength	$f_{m,y,20}$	32.2	N/mm ²	[2], Eq. (2.4)
Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
Bending Strength	$f_{m,y,d,fi}$	32.2	N/mm ²	[2], Eq. (2.1)
Design Ratio	η	0.65		Eq. (6.33)

SUPPORT FORCES

RC	Result Combinations	Supports	X [m]	Support Forces [kN]			Support Moments [kNm]		
	Description			No.	P _X	P _Y	P _Z	M _X	M _Y
Load Cases (Characteristic Values)									
LC1	Self-Weight + Roof Finishes	1	0.100	0.000	1.896	5.836	0.000	0.000	0.000
		2	5.600	0.000	1.896	5.836	0.000	0.000	0.000
LC21	Imposed Load Span No. 1	1	0.100	0.000	0.000	0.000	0.000	0.000	0.000
		2	5.600	0.000	0.000	0.000	0.000	0.000	0.000
LC41	Snow	1	0.100	0.000	1.885	5.800	0.000	0.000	0.000
		2	5.600	0.000	1.885	5.800	0.000	0.000	0.000
LC51	Wind Transversely to Ridge (left)(A)	1	0.100	0.000	0.000	-1.077	0.000	0.000	0.000
		2	5.600	0.000	0.000	-1.077	0.000	0.000	0.000
LC52	Wind Transversely to Ridge (left)(B)	1	0.100	0.000	0.000	0.923	0.000	0.000	0.000
		2	5.600	0.000	0.000	0.923	0.000	0.000	0.000
LC53	Wind Transversely to Ridge (right)(A)	1	0.100	0.000	0.000	-1.539	0.000	0.000	0.000
		2	5.600	0.000	0.000	-1.539	0.000	0.000	0.000
LC54	Wind Transversely to Ridge (right)(B)	1	0.100	0.000	0.000	-1.539	0.000	0.000	0.000
		2	5.600	0.000	0.000	-1.539	0.000	0.000	0.000
LC55	Wind Parallel to Ridge (front)(A)	1	0.100	0.000	0.000	-3.630	0.000	0.000	0.000
		2	5.600	0.000	0.000	-2.634	0.000	0.000	0.000
LC56	Wind Parallel to Ridge (front)(B)	1	0.100	0.000	0.000	-3.630	0.000	0.000	0.000
		2	5.600	0.000	0.000	-2.634	0.000	0.000	0.000
LC57	Wind Parallel to Ridge (back)(A)	1	0.100	0.000	0.000	-2.634	0.000	0.000	0.000
		2	5.600	0.000	0.000	-3.630	0.000	0.000	0.000
LC58	Wind Parallel to Ridge (back)(B)	1	0.100	0.000	0.000	-2.634	0.000	0.000	0.000
		2	5.600	0.000	0.000	-3.630	0.000	0.000	0.000
Max		1	0.100	0.000	1.896	5.836	0.000	0.000	0.000
Min				0.000	0.000	-3.630	0.000	0.000	0.000
Max		2	5.600	0.000	1.896	5.836	0.000	0.000	0.000
Min				0.000	0.000	-3.630	0.000	0.000	0.000
Result Combinations for Ultimate Limit State (Design Values) (STR)									
RC1	g	1	0.100	0.000	2.560	7.879	0.000	0.000	0.000
		2	5.600	0.000	2.560	7.879	0.000	0.000	0.000
RC2	g + s	1	0.100	0.000	5.387	16.579	0.000	0.000	0.000
		2	5.600	0.000	5.387	16.579	0.000	0.000	0.000
RC3	g + s + w(q,l,A)	1	0.100	0.000	5.387	15.609	0.000	0.000	0.000
		2	5.600	0.000	5.387	15.609	0.000	0.000	0.000
RC4	g + s + w(q,l,B)	1	0.100	0.000	5.387	17.410	0.000	0.000	0.000
		2	5.600	0.000	5.387	17.410	0.000	0.000	0.000
RC5	g + s + w(q,r,A)	1	0.100	0.000	5.387	15.194	0.000	0.000	0.000
		2	5.600	0.000	5.387	15.194	0.000	0.000	0.000
RC6	g + s + w(q,r,B)	1	0.100	0.000	5.387	15.194	0.000	0.000	0.000
		2	5.600	0.000	5.387	15.194	0.000	0.000	0.000
RC7	g + s + w(p,f,A)	1	0.100	0.000	5.387	13.312	0.000	0.000	0.000
		2	5.600	0.000	5.387	14.209	0.000	0.000	0.000
RC8	g + s + w(p,f,B)	1	0.100	0.000	5.387	13.312	0.000	0.000	0.000
		2	5.600	0.000	5.387	14.209	0.000	0.000	0.000
RC9	g + s + w(p,b,A)	1	0.100	0.000	5.387	14.209	0.000	0.000	0.000
		2	5.600	0.000	5.387	13.312	0.000	0.000	0.000
RC10	g + s + w(p,b,B)	1	0.100	0.000	5.387	14.209	0.000	0.000	0.000
		2	5.600	0.000	5.387	13.312	0.000	0.000	0.000
RC11	g + w(q,l,A)	1	0.100	0.000	2.560	6.263	0.000	0.000	0.000
		2	5.600	0.000	2.560	6.263	0.000	0.000	0.000
RC12	g + w(q,l,B)	1	0.100	0.000	2.560	9.264	0.000	0.000	0.000
		2	5.600	0.000	2.560	9.264	0.000	0.000	0.000
RC13	g + w(q,r,A)	1	0.100	0.000	2.560	5.570	0.000	0.000	0.000
		2	5.600	0.000	2.560	5.570	0.000	0.000	0.000
RC14	g + w(q,r,B)	1	0.100	0.000	2.560	5.570	0.000	0.000	0.000
		2	5.600	0.000	2.560	5.570	0.000	0.000	0.000
RC15	g + w(p,f,A)	1	0.100	0.000	2.560	2.433	0.000	0.000	0.000
		2	5.600	0.000	2.560	3.928	0.000	0.000	0.000
RC16	g + w(p,f,B)	1	0.100	0.000	2.560	2.433	0.000	0.000	0.000
		2	5.600	0.000	2.560	3.928	0.000	0.000	0.000
RC17	g + w(p,b,A)	1	0.100	0.000	2.560	3.928	0.000	0.000	0.000
		2	5.600	0.000	2.560	2.433	0.000	0.000	0.000
RC18	g + w(p,b,B)	1	0.100	0.000	2.560	3.928	0.000	0.000	0.000
		2	5.600	0.000	2.560	2.433	0.000	0.000	0.000
RC19	g + s + w(q,l,A)	1	0.100	0.000	3.973	10.613	0.000	0.000	0.000
		2	5.600	0.000	3.973	10.613	0.000	0.000	0.000
RC20	g + s + w(q,l,B)	1	0.100	0.000	3.973	13.614	0.000	0.000	0.000
		2	5.600	0.000	3.973	13.614	0.000	0.000	0.000
RC21	g + s + w(q,r,A)	1	0.100	0.000	3.973	9.920	0.000	0.000	0.000
		2	5.600	0.000	3.973	9.920	0.000	0.000	0.000
RC22	g + s + w(q,r,B)	1	0.100	0.000	3.973	9.920	0.000	0.000	0.000
		2	5.600	0.000	3.973	9.920	0.000	0.000	0.000
RC23	g + s + w(p,f,A)	1	0.100	0.000	3.973	6.783	0.000	0.000	0.000

SUPPORT FORCES

RC	Result Combinations	Supports	X [m]	Support Forces [kN]			Support Moments [kNm]		
	Description	No.		P _x	P _y	P _z	M _x	M _y	M _z
RC24	g + s + w(p,f,B)	2	5.600	0.000	3.973	8.278	0.000	0.000	0.000
		1	0.100	0.000	3.973	6.783	0.000	0.000	0.000
RC25	g + s + w(p,b,A)	2	5.600	0.000	3.973	8.278	0.000	0.000	0.000
		1	0.100	0.000	3.973	8.278	0.000	0.000	0.000
RC26	g + s + w(p,b,B)	2	5.600	0.000	3.973	6.783	0.000	0.000	0.000
		1	0.100	0.000	3.973	8.278	0.000	0.000	0.000
Max		2	5.600	0.000	3.973	6.783	0.000	0.000	0.000
		1	0.100	0.000	5.387	17.410	0.000	0.000	0.000
Min				0.000	2.560	2.433	0.000	0.000	0.000
Max		2	5.600	0.000	5.387	17.410	0.000	0.000	0.000
Min				0.000	2.560	2.433	0.000	0.000	0.000
Result Combinations for Serviceability Limit State (Characteristic Values)									
RC27	g	1	0.100	0.000	1.896	5.836	0.000	0.000	0.000
		2	5.600	0.000	1.896	5.836	0.000	0.000	0.000
RC28	g + s	1	0.100	0.000	3.781	11.636	0.000	0.000	0.000
		2	5.600	0.000	3.781	11.636	0.000	0.000	0.000
RC29	g + s + w(q,l,A)	1	0.100	0.000	3.781	10.990	0.000	0.000	0.000
		2	5.600	0.000	3.781	10.990	0.000	0.000	0.000
RC30	g + s + w(q,l,B)	1	0.100	0.000	3.781	12.190	0.000	0.000	0.000
		2	5.600	0.000	3.781	12.190	0.000	0.000	0.000
RC31	g + s + w(q,r,A)	1	0.100	0.000	3.781	10.713	0.000	0.000	0.000
		2	5.600	0.000	3.781	10.713	0.000	0.000	0.000
RC32	g + s + w(q,r,B)	1	0.100	0.000	3.781	10.713	0.000	0.000	0.000
		2	5.600	0.000	3.781	10.713	0.000	0.000	0.000
RC33	g + s + w(p,f,A)	1	0.100	0.000	3.781	9.458	0.000	0.000	0.000
		2	5.600	0.000	3.781	10.056	0.000	0.000	0.000
RC34	g + s + w(p,f,B)	1	0.100	0.000	3.781	9.458	0.000	0.000	0.000
		2	5.600	0.000	3.781	10.056	0.000	0.000	0.000
RC35	g + s + w(p,b,A)	1	0.100	0.000	3.781	10.056	0.000	0.000	0.000
		2	5.600	0.000	3.781	9.458	0.000	0.000	0.000
RC36	g + s + w(p,b,B)	1	0.100	0.000	3.781	10.056	0.000	0.000	0.000
		2	5.600	0.000	3.781	9.458	0.000	0.000	0.000
RC37	g + w(q,l,A)	1	0.100	0.000	1.896	4.759	0.000	0.000	0.000
		2	5.600	0.000	1.896	4.759	0.000	0.000	0.000
RC38	g + w(q,l,B)	1	0.100	0.000	1.896	6.759	0.000	0.000	0.000
		2	5.600	0.000	1.896	6.759	0.000	0.000	0.000
RC39	g + w(q,r,A)	1	0.100	0.000	1.896	4.297	0.000	0.000	0.000
		2	5.600	0.000	1.896	4.297	0.000	0.000	0.000
RC40	g + w(q,r,B)	1	0.100	0.000	1.896	4.297	0.000	0.000	0.000
		2	5.600	0.000	1.896	4.297	0.000	0.000	0.000
RC41	g + w(p,f,A)	1	0.100	0.000	1.896	2.206	0.000	0.000	0.000
		2	5.600	0.000	1.896	3.202	0.000	0.000	0.000
RC42	g + w(p,f,B)	1	0.100	0.000	1.896	2.206	0.000	0.000	0.000
		2	5.600	0.000	1.896	3.202	0.000	0.000	0.000
RC43	g + w(p,b,A)	1	0.100	0.000	1.896	3.202	0.000	0.000	0.000
		2	5.600	0.000	1.896	2.206	0.000	0.000	0.000
RC44	g + w(p,b,B)	1	0.100	0.000	1.896	3.202	0.000	0.000	0.000
		2	5.600	0.000	1.896	2.206	0.000	0.000	0.000
RC45	g + s + w(q,l,A)	1	0.100	0.000	2.839	7.659	0.000	0.000	0.000
		2	5.600	0.000	2.839	7.659	0.000	0.000	0.000
RC46	g + s + w(q,l,B)	1	0.100	0.000	2.839	9.660	0.000	0.000	0.000
		2	5.600	0.000	2.839	9.660	0.000	0.000	0.000
RC47	g + s + w(q,r,A)	1	0.100	0.000	2.839	7.197	0.000	0.000	0.000
		2	5.600	0.000	2.839	7.197	0.000	0.000	0.000
RC48	g + s + w(q,r,B)	1	0.100	0.000	2.839	7.197	0.000	0.000	0.000
		2	5.600	0.000	2.839	7.197	0.000	0.000	0.000
RC49	g + s + w(p,f,A)	1	0.100	0.000	2.839	5.106	0.000	0.000	0.000
		2	5.600	0.000	2.839	6.103	0.000	0.000	0.000
RC50	g + s + w(p,f,B)	1	0.100	0.000	2.839	5.106	0.000	0.000	0.000
		2	5.600	0.000	2.839	6.103	0.000	0.000	0.000
RC51	g + s + w(p,b,A)	1	0.100	0.000	2.839	6.103	0.000	0.000	0.000
		2	5.600	0.000	2.839	5.106	0.000	0.000	0.000
RC52	g + s + w(p,b,B)	1	0.100	0.000	2.839	6.103	0.000	0.000	0.000
		2	5.600	0.000	2.839	5.106	0.000	0.000	0.000
RC53	g	1	0.100	0.000	3.034	9.338	0.000	0.000	0.000
		2	5.600	0.000	3.034	9.338	0.000	0.000	0.000
RC54	g + s	1	0.100	0.000	4.919	15.138	0.000	0.000	0.000
		2	5.600	0.000	4.919	15.138	0.000	0.000	0.000
RC55	g + s + w(q,l,A)	1	0.100	0.000	4.919	14.491	0.000	0.000	0.000
		2	5.600	0.000	4.919	14.491	0.000	0.000	0.000
RC56	g + s + w(q,l,B)	1	0.100	0.000	4.919	15.692	0.000	0.000	0.000
		2	5.600	0.000	4.919	15.692	0.000	0.000	0.000
RC57	g + s + w(q,r,A)	1	0.100	0.000	4.919	14.214	0.000	0.000	0.000
		2	5.600	0.000	4.919	14.214	0.000	0.000	0.000
RC58	g + s + w(q,r,B)	1	0.100	0.000	4.919	14.214	0.000	0.000	0.000
		2	5.600	0.000	4.919	14.214	0.000	0.000	0.000
RC59	g + s + w(p,f,A)	1	0.100	0.000	4.919	12.960	0.000	0.000	0.000
		2	5.600	0.000	4.919	13.558	0.000	0.000	0.000
RC60	g + s + w(p,f,B)	1	0.100	0.000	4.919	12.960	0.000	0.000	0.000
		2	5.600	0.000	4.919	13.558	0.000	0.000	0.000
RC61	g + s + w(p,b,A)	1	0.100	0.000	4.919	13.558	0.000	0.000	0.000
		2	5.600	0.000	4.919	12.960	0.000	0.000	0.000
RC62	g + s + w(p,b,B)	1	0.100	0.000	4.919	13.558	0.000	0.000	0.000
		2	5.600	0.000	4.919	12.960	0.000	0.000	0.000
RC63	g + w(q,l,A)	1	0.100	0.000	3.034	8.260	0.000	0.000	0.000
		2	5.600	0.000	3.034	8.260	0.000	0.000	0.000
RC64	g + w(q,l,B)	1	0.100	0.000	3.034	10.261	0.000	0.000	0.000
		2	5.600	0.000	3.034	10.261	0.000	0.000	0.000
RC65	g + w(q,r,A)	1	0.100	0.000	3.034	7.799	0.000	0.000	0.000
		2	5.600	0.000	3.034	7.799	0.000	0.000	0.000
RC66	g + w(q,r,B)	1	0.100	0.000	3.034	7.799	0.000	0.000	0.000
		2	5.600	0.000	3.034	7.799	0.000	0.000	0.000
RC67	g + w(p,f,A)	1	0.100	0.000	3.034	5.707	0.000	0.000	0.000
		2	5.600	0.000	3.034	5.707	0.000	0.000	0.000

SUPPORT FORCES

RC	Result Combinations Description	Supports No.	X [m]	Support Forces [kN]			Support Moments [kNm]		
				P _x	P _y	P _z	M _x	M _y	M _z
RC68	g + w(p,f,B)	2	5.600	0.000	3.034	6.704	0.000	0.000	0.000
		1	0.100	0.000	3.034	5.707	0.000	0.000	0.000
RC69	g + w(p,b,A)	2	5.600	0.000	3.034	6.704	0.000	0.000	0.000
		1	0.100	0.000	3.034	6.704	0.000	0.000	0.000
RC70	g + w(p,b,B)	2	5.600	0.000	3.034	5.707	0.000	0.000	0.000
		1	0.100	0.000	3.034	6.704	0.000	0.000	0.000
RC71	g + s + w(q,l,A)	2	5.600	0.000	3.034	5.707	0.000	0.000	0.000
		1	0.100	0.000	3.976	11.160	0.000	0.000	0.000
RC72	g + s + w(q,l,B)	2	5.600	0.000	3.976	11.160	0.000	0.000	0.000
		1	0.100	0.000	3.976	13.161	0.000	0.000	0.000
RC73	g + s + w(q,r,A)	2	5.600	0.000	3.976	13.161	0.000	0.000	0.000
		1	0.100	0.000	3.976	10.699	0.000	0.000	0.000
RC74	g + s + w(q,r,B)	2	5.600	0.000	3.976	10.699	0.000	0.000	0.000
		1	0.100	0.000	3.976	10.699	0.000	0.000	0.000
RC75	g + s + w(p,f,A)	2	5.600	0.000	3.976	8.607	0.000	0.000	0.000
		1	0.100	0.000	3.976	9.604	0.000	0.000	0.000
RC76	g + s + w(p,f,B)	2	5.600	0.000	3.976	8.607	0.000	0.000	0.000
		1	0.100	0.000	3.976	9.604	0.000	0.000	0.000
RC77	g + s + w(p,b,A)	2	5.600	0.000	3.976	9.604	0.000	0.000	0.000
		1	0.100	0.000	3.976	8.607	0.000	0.000	0.000
RC78	g + s + w(p,b,B)	2	5.600	0.000	3.976	8.607	0.000	0.000	0.000
		1	0.100	0.000	3.976	9.604	0.000	0.000	0.000
Max		1	0.100	0.000	4.919	15.692	0.000	0.000	0.000
Min				0.000	1.896	2.206	0.000	0.000	0.000
Max		2	5.600	0.000	4.919	15.692	0.000	0.000	0.000
Min				0.000	1.896	2.206	0.000	0.000	0.000

Result Combinations for Fire Resistance (Design Values)

RC79	g	1	0.100	0.000	1.896	5.836	0.000	0.000	0.000
		2	5.600	0.000	1.896	5.836	0.000	0.000	0.000
RC80	g + s	1	0.100	0.000	2.273	6.996	0.000	0.000	0.000
		2	5.600	0.000	2.273	6.996	0.000	0.000	0.000
RC89	g + w(q,l,A)	1	0.100	0.000	1.896	5.621	0.000	0.000	0.000
		2	5.600	0.000	1.896	5.621	0.000	0.000	0.000
RC90	g + w(q,l,B)	1	0.100	0.000	1.896	6.021	0.000	0.000	0.000
		2	5.600	0.000	1.896	6.021	0.000	0.000	0.000
RC91	g + w(q,r,A)	1	0.100	0.000	1.896	5.528	0.000	0.000	0.000
		2	5.600	0.000	1.896	5.528	0.000	0.000	0.000
RC92	g + w(q,r,B)	1	0.100	0.000	1.896	5.528	0.000	0.000	0.000
		2	5.600	0.000	1.896	5.528	0.000	0.000	0.000
RC93	g + w(p,f,A)	1	0.100	0.000	1.896	5.110	0.000	0.000	0.000
		2	5.600	0.000	1.896	5.309	0.000	0.000	0.000
RC94	g + w(p,f,B)	1	0.100	0.000	1.896	5.110	0.000	0.000	0.000
		2	5.600	0.000	1.896	5.309	0.000	0.000	0.000
RC95	g + w(p,b,A)	1	0.100	0.000	1.896	5.309	0.000	0.000	0.000
		2	5.600	0.000	1.896	5.110	0.000	0.000	0.000
RC96	g + w(p,b,B)	1	0.100	0.000	1.896	5.309	0.000	0.000	0.000
		2	5.600	0.000	1.896	5.110	0.000	0.000	0.000
Max		1	0.100	0.000	2.273	6.996	0.000	0.000	0.000
Min				0.000	1.896	5.110	0.000	0.000	0.000
Max		2	5.600	0.000	2.273	6.996	0.000	0.000	0.000
Min				0.000	1.896	5.110	0.000	0.000	0.000

DEFORMATIONS

RC	Result Combinations		Location		Translation [mm]			Rotations [mrad]		
	Description		Description	X [m]	u _x	u _y	u _z	φ _x	φ _y	φ _z
Load Cases										
LC1	Self-Weight + Roof Finishes	Support No. 1	0.100	0.0	0.0	0.0	0.0	0.0	-3.8	0.4
		Span No. 1	2.850	0.0	2.8	6.3	0.0	-3.5	1.6	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	3.8	-0.4	
LC21	Imposed Load Span No. 1	Support No. 1	0.100	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Span No. 1	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Support No. 2	5.600	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LC41	Snow	Support No. 1	0.100	0.0	0.0	0.0	0.0	-3.8	0.4	
		Span No. 1	2.850	0.0	2.8	6.2	0.0	-3.5	1.6	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	3.8	-0.4	
LC51	Wind Transversely to Ridge (left)(A)	Support No. 1	0.100	0.0	0.0	0.0	0.0	0.0	0.6	0.2
		Span No. 1	2.850	0.0	0.0	-1.2	0.0	0.6	0.0	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	-0.6	-0.2	
LC52	Wind Transversely to Ridge (left)(B)	Support No. 1	0.100	0.0	0.0	0.0	0.0	0.0	-0.5	-0.2
		Span No. 1	2.850	0.0	0.0	1.0	0.0	-0.6	0.0	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	0.5	0.2	
LC53	Wind Transversely to Ridge (right)(A)	Support No. 1	0.100	0.0	0.0	0.0	0.0	0.0	0.9	0.3
		Span No. 1	2.850	0.0	0.0	-1.7	0.0	0.9	0.0	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	-0.9	-0.3	
LC54	Wind Transversely to Ridge (right)(B)	Support No. 1	0.100	0.0	0.0	0.0	0.0	0.0	0.9	0.3
		Span No. 1	2.850	0.0	0.0	-1.7	0.0	0.9	0.0	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	-0.9	-0.3	
LC55	Wind Parallel to Ridge (front)(A)	Support No. 1	0.100	0.0	0.0	0.0	0.0	0.0	1.7	0.6
		Span No. 1	2.850	0.0	0.0	-3.1	0.0	1.8	0.0	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	-1.6	-0.5	
LC56	Wind Parallel to Ridge (front)(B)	Support No. 1	0.100	0.0	0.0	0.0	0.0	0.0	1.7	0.6
		Span No. 1	2.850	0.0	0.0	-3.1	0.0	1.8	0.0	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	-1.6	-0.5	
LC57	Wind Parallel to Ridge (back)(A)	Support No. 1	0.100	0.0	0.0	0.0	0.0	0.0	1.6	0.5
		Span No. 1	2.850	0.0	0.0	-3.1	0.0	-1.8	0.0	

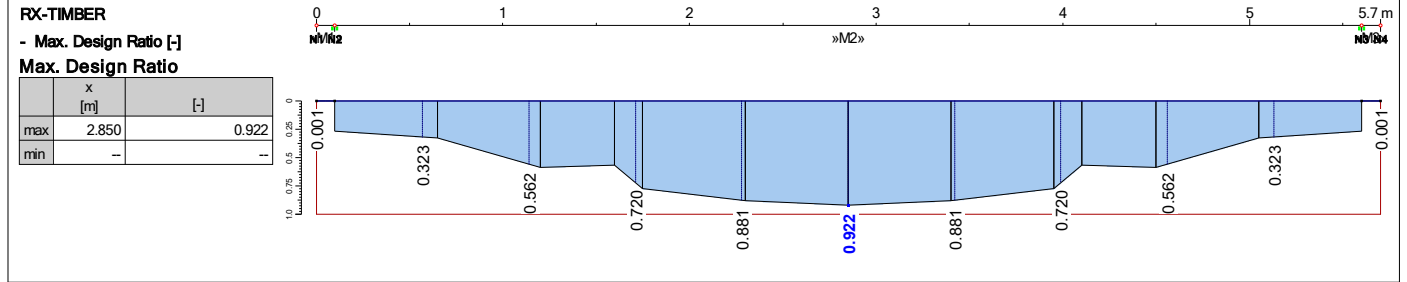
■ DEFORMATIONS

RC	Result Combinations		Location		Translation [mm]			Rotations [mrad]		
	Description	Description	X [m]	u _x	u _y	u _z	φ _x	φ _y	φ _z	
LC58	Wind Parallel to Ridge (back)(B)	Support No. 2	5.600	0.0	0.0	0.0	0.0	-1.7	-0.6	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	1.6	0.5	
		Span No. 1	2.850	0.0	0.0	-3.1	0.0	-1.8	0.0	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	-1.7	-0.6	
Result Combinations										
RC27	g	Support No. 1	0.100	0.0	0.0	0.0	0.0	-3.8	0.4	
RC28	g + s	Span No. 1	2.850	0.0	2.8	6.3	0.0	-3.5	1.6	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	3.8	-0.4	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-7.6	0.9	
		Span No. 1	2.850	0.0	5.6	12.5	0.0	-7.0	3.2	
RC29	g + s + w(q,l,A)	Support No. 2	5.600	0.0	0.0	0.0	0.0	7.6	-0.9	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-7.2	1.1	
		Span No. 1	2.850	0.0	5.6	11.8	0.0	-6.6	3.2	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	7.2	-1.0	
RC30	g + s + w(q,l,B)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-7.9	0.8	
		Span No. 1	2.850	0.0	5.6	13.1	0.0	-7.3	3.2	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	7.9	-0.8	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-7.1	1.0	
RC31	g + s + w(q,r,A)	Span No. 1	2.850	0.0	5.6	11.5	0.0	-6.4	3.2	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	7.1	-1.0	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-7.1	1.0	
		Span No. 1	2.850	0.0	5.6	11.5	0.0	-6.4	3.2	
RC32	g + s + w(q,r,B)	Support No. 2	5.600	0.0	0.0	0.0	0.0	7.1	-1.0	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-7.1	1.0	
		Span No. 1	2.850	0.0	5.6	11.5	0.0	-6.4	3.2	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	7.1	-1.0	
RC33	g + s + w(p,f,A)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.6	1.2	
		Span No. 1	2.850	0.0	5.6	10.6	0.0	6.0	3.2	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.6	-1.2	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.6	1.2	
RC34	g + s + w(p,f,B)	Span No. 1	2.850	0.0	5.6	10.6	0.0	6.0	3.2	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.6	-1.2	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.6	1.2	
		Span No. 1	2.850	0.0	5.6	10.6	0.0	6.0	3.2	
RC35	g + s + w(p,b,A)	Support No. 2	5.600	0.0	0.0	0.0	0.0	6.6	-1.2	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.6	1.2	
		Span No. 1	2.850	0.0	5.6	10.6	0.0	-6.0	3.2	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.6	-1.2	
RC36	g + s + w(p,b,B)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.6	1.2	
		Span No. 1	2.850	0.0	5.6	10.6	0.0	-6.0	3.2	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.6	-1.2	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.6	1.2	
RC37	g + w(q,l,A)	Span No. 1	2.850	0.0	5.6	10.6	0.0	-6.0	3.2	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.6	-1.2	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-3.2	0.6	
		Span No. 1	2.850	0.0	2.8	5.1	0.0	-2.9	1.6	
RC38	g + w(q,l,B)	Support No. 2	5.600	0.0	0.0	0.0	0.0	3.2	-0.6	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.3	0.3	
		Span No. 1	2.850	0.0	2.8	7.2	0.0	-4.0	1.6	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	4.3	-0.3	
RC39	g + w(q,r,A)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-2.9	0.7	
		Span No. 1	2.850	0.0	2.8	4.6	0.0	-2.6	1.6	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	2.9	-0.7	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-2.9	0.7	
RC40	g + w(q,r,B)	Span No. 1	2.850	0.0	2.8	4.6	0.0	-2.6	1.6	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	2.9	-0.7	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-2.1	1.0	
		Span No. 1	2.850	0.0	2.8	3.2	0.0	1.8	1.6	
RC41	g + w(p,f,A)	Support No. 2	5.600	0.0	0.0	0.0	0.0	2.2	-0.9	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-2.1	1.0	
		Span No. 1	2.850	0.0	2.8	3.2	0.0	1.8	1.6	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	2.2	-0.9	
RC42	g + w(p,f,B)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-2.1	1.0	
		Span No. 1	2.850	0.0	2.8	3.2	0.0	1.8	1.6	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	2.2	-0.9	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-2.2	0.9	
RC43	g + w(p,b,A)	Span No. 1	2.850	0.0	2.8	3.2	0.0	-1.8	1.6	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	2.1	-1.0	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-2.2	0.9	
		Span No. 1	2.850	0.0	2.8	3.2	0.0	-1.8	1.6	
RC44	g + w(p,b,B)	Support No. 2	5.600	0.0	0.0	0.0	0.0	2.1	-1.0	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-2.2	0.9	
		Span No. 1	2.850	0.0	2.8	3.2	0.0	-1.8	1.6	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	2.1	-1.0	
RC45	g + s + w(q,l,A)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-5.1	0.8	
		Span No. 1	2.850	0.0	4.2	8.2	0.0	-4.6	2.4	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	5.1	-0.8	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.2	0.5	
RC46	g + s + w(q,l,B)	Span No. 1	2.850	0.0	4.2	10.4	0.0	-5.8	2.4	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.2	-0.5	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.8	0.9	
		Span No. 1	2.850	0.0	4.2	7.7	0.0	-4.3	2.4	
RC47	g + s + w(q,r,A)	Support No. 2	5.600	0.0	0.0	0.0	0.0	4.8	-0.9	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.8	0.9	
		Span No. 1	2.850	0.0	4.2	7.7	0.0	-4.3	2.4	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	4.8	-0.9	
RC48	g + s + w(q,r,B)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.8	0.9	
		Span No. 1	2.850	0.0	4.2	7.7	0.0	-4.3	2.4	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	4.8	-0.9	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.0	1.2	
RC49	g + s + w(p,f,A)	Span No. 1	2.850	0.0	4.2	6.3	0.0	3.6	2.4	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	4.1	-1.2	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.0	1.2	
		Span No. 1	2.850	0.0	4.2	6.3	0.0	3.6	2.4	
RC50	g + s + w(p,f,B)	Support No. 2	5.600	0.0	0.0	0.0	0.0	4.1	-1.2	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.0	1.2	
		Span No. 1	2.850	0.0	4.2	6.3	0.0	3.6	2.4	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	4.1	-1.2	
RC51	g + s + w(p,b,A)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.1	1.2	
		Span No. 1	2.850	0.0	4.2	6.3	0.0	-3.6	2.4	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	4.0	-1.2	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.1	1.2	
RC52	g + s + w(p,b,B)	Span No. 1	2.850	0.0	4.2	6.3	0.0	-3.6	2.4	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	4.0	-1.2	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.1	1.2	
		Span No. 1	2.850	0.0	4.2	6.3	0.0	-3.6	2.4	
RC53	q	Support No. 2	5.600	0.0	0.0	0.0	0.0	4.0	-1.2	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.1	0.7	
		Span No. 1	2.850	0.0	4.5	10.0	0.0	-5.6	2.5	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.1	-0.7	
RC54	g + s	Support No. 1	0.100	0.0	0.0	0.0	0.0	-9.9	1.1	
		Span No. 1	2.850	0.0	7.3	16.2	0.0	-9.1	4.1	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	9.9	-1.1	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-9.5	1.2	
RC55	q + s + w(q,l,A)	Span No. 1	2.850	0.0	7.3	15.5	0.0	-8.7	4.1	
		Support No. 2	5.600	0.0	0.0	0.0	0.0	9.5	-1.2	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-10.2	1.2	
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-10.2	1.2	

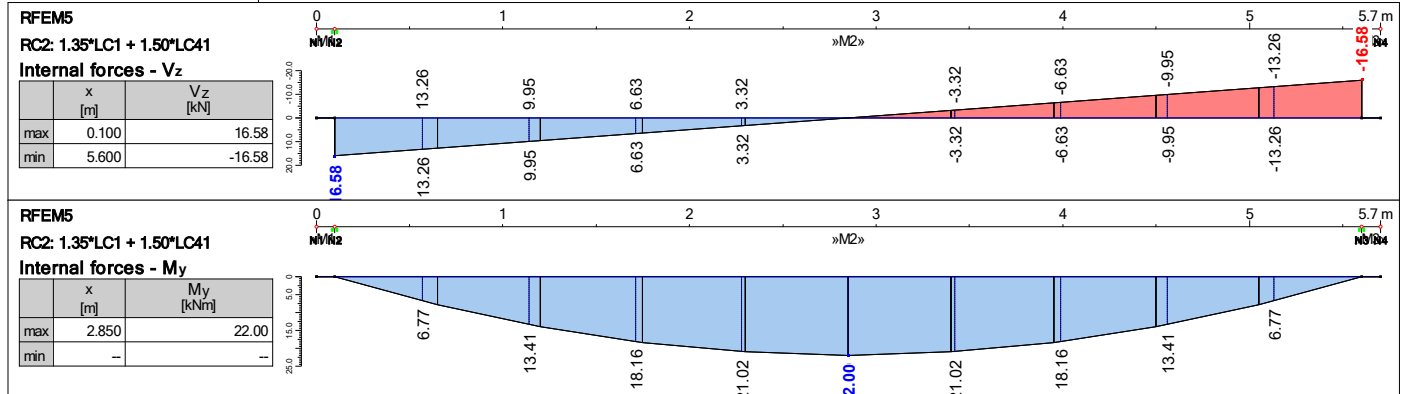
■ DEFORMATIONS

RC	Result Combinations	Location		Translation [mm]			Rotations [mrad]		
	Description	Description	X [m]	u _x	u _y	u _z	φ _x	φ _y	φ _z
RC57	g + s + w(q,r,A)	Span No. 1	2.850	0.0	7.3	16.8	0.0	-9.4	4.1
		Support No. 2	5.600	0.0	0.0	0.0	0.0	10.2	-1.0
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-9.4	1.3
		Span No. 1	2.850	0.0	7.3	15.2	0.0	-8.5	4.1
RC58	g + s + w(q,r,B)	Support No. 2	5.600	0.0	0.0	0.0	0.0	9.4	-1.3
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-9.4	1.3
		Span No. 1	2.850	0.0	7.3	15.2	0.0	-8.5	4.1
		Support No. 2	5.600	0.0	0.0	0.0	0.0	9.4	-1.3
RC59	g + s + w(p,f,A)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-8.9	1.4
		Span No. 1	2.850	0.0	7.3	14.4	0.0	8.1	4.1
		Support No. 2	5.600	0.0	0.0	0.0	0.0	8.9	-1.4
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-8.9	1.4
RC60	g + s + w(p,f,B)	Span No. 1	2.850	0.0	7.3	14.4	0.0	8.1	4.1
		Support No. 2	5.600	0.0	0.0	0.0	0.0	8.9	-1.4
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-8.9	1.4
		Span No. 1	2.850	0.0	7.3	14.4	0.0	-8.1	4.1
RC61	g + s + w(p,b,A)	Support No. 2	5.600	0.0	0.0	0.0	0.0	8.9	-1.4
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-8.9	1.4
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-8.9	1.4
		Span No. 1	2.850	0.0	7.3	14.4	0.0	-8.1	4.1
RC62	g + s + w(p,b,B)	Support No. 2	5.600	0.0	0.0	0.0	0.0	8.9	-1.4
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-8.9	1.4
		Span No. 1	2.850	0.0	7.3	14.4	0.0	-8.1	4.1
		Support No. 2	5.600	0.0	0.0	0.0	0.0	8.9	-1.4
RC63	g + w(q,l,A)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-5.5	0.9
		Span No. 1	2.850	0.0	4.5	8.9	0.0	-4.9	2.5
		Support No. 2	5.600	0.0	0.0	0.0	0.0	5.5	-0.9
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.6	0.5
RC64	g + w(q,l,B)	Span No. 1	2.850	0.0	4.5	11.0	0.0	-6.1	2.5
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.6	-0.5
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-5.2	1.0
		Span No. 1	2.850	0.0	4.5	8.4	0.0	-4.7	2.5
RC66	g + w(q,r,B)	Support No. 2	5.600	0.0	0.0	0.0	0.0	5.2	-1.0
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-5.2	1.0
		Span No. 1	2.850	0.0	4.5	8.4	0.0	-4.7	2.5
		Support No. 2	5.600	0.0	0.0	0.0	0.0	5.2	-1.0
RC67	g + w(p,f,A)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.4	1.2
		Span No. 1	2.850	0.0	4.5	6.9	0.0	3.9	2.5
		Support No. 2	5.600	0.0	0.0	0.0	0.0	4.5	-1.2
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.4	1.2
RC68	g + w(p,f,B)	Span No. 1	2.850	0.0	4.5	6.9	0.0	3.9	2.5
		Support No. 2	5.600	0.0	0.0	0.0	0.0	4.5	-1.2
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.5	1.2
		Span No. 1	2.850	0.0	4.5	6.9	0.0	-3.9	2.5
RC69	g + w(p,b,A)	Support No. 2	5.600	0.0	0.0	0.0	0.0	4.4	-1.2
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.5	1.2
		Span No. 1	2.850	0.0	4.5	6.9	0.0	-3.9	2.5
		Support No. 2	5.600	0.0	0.0	0.0	0.0	4.4	-1.2
RC70	g + w(p,b,B)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-4.5	1.2
		Span No. 1	2.850	0.0	4.5	6.9	0.0	-3.9	2.5
		Support No. 2	5.600	0.0	0.0	0.0	0.0	4.4	-1.2
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-7.4	1.1
RC71	g + s + w(q,l,A)	Span No. 1	2.850	0.0	5.9	12.0	0.0	-6.7	3.3
		Support No. 2	5.600	0.0	0.0	0.0	0.0	7.4	-1.1
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-8.5	0.7
		Span No. 1	2.850	0.0	5.9	14.1	0.0	-7.9	3.3
RC72	g + s + w(q,l,B)	Support No. 2	5.600	0.0	0.0	0.0	0.0	8.5	-0.7
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-7.1	1.2
		Span No. 1	2.850	0.0	5.9	11.5	0.0	-6.4	3.3
		Support No. 2	5.600	0.0	0.0	0.0	0.0	7.1	-1.2
RC73	g + s + w(q,r,A)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.3	1.5
		Span No. 1	2.850	0.0	5.9	10.1	0.0	5.7	3.3
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.4	-1.4
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.3	1.5
RC74	g + s + w(q,r,B)	Span No. 1	2.850	0.0	5.9	11.5	0.0	-6.4	3.3
		Support No. 2	5.600	0.0	0.0	0.0	0.0	7.1	-1.2
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-7.1	1.2
		Span No. 1	2.850	0.0	5.9	10.1	0.0	-5.7	3.3
RC75	g + s + w(p,f,A)	Support No. 2	5.600	0.0	0.0	0.0	0.0	6.4	-1.4
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.3	1.5
		Span No. 1	2.850	0.0	5.9	10.1	0.0	5.7	3.3
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.4	-1.4
RC76	g + s + w(p,f,B)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.4	1.4
		Span No. 1	2.850	0.0	5.9	10.1	0.0	-5.7	3.3
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.3	-1.5
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.4	1.4
RC77	g + s + w(p,b,A)	Span No. 1	2.850	0.0	5.9	10.1	0.0	-5.7	3.3
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.3	-1.5
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.4	1.4
		Span No. 1	2.850	0.0	5.9	10.1	0.0	-5.7	3.3
RC78	g + s + w(p,b,B)	Support No. 2	5.600	0.0	0.0	0.0	0.0	6.3	-1.5
		Support No. 1	0.100	0.0	0.0	0.0	0.0	-6.4	1.4
		Span No. 1	2.850	0.0	5.9	10.1	0.0	-5.7	3.3
		Support No. 2	5.600	0.0	0.0	0.0	0.0	6.3	-1.5
Max/Min Deformations									
Max	RC75 (φ _z)	Support No. 1	0.100	0.0	0.0	0.0	0.0	-2.1	1.5
Min	RC56 (φ _y)		0.100	0.0	0.0	0.0	0.0	-10.2	0.3
Max	RC56 (u _z)	Span No. 1	2.750	0.0	7.3	16.8	0.0	9.4	4.1
Min	RC78 (u _y)		5.500	0.0	0.0	0.0	0.0	-9.4	-4.1
Max	RC56 (φ _y)	Support No. 2	5.600	0.0	0.0	0.0	0.0	10.2	-0.3
Min	RC77 (φ _z)		5.600	0.0	0.0	0.0	0.0	2.1	-1.5

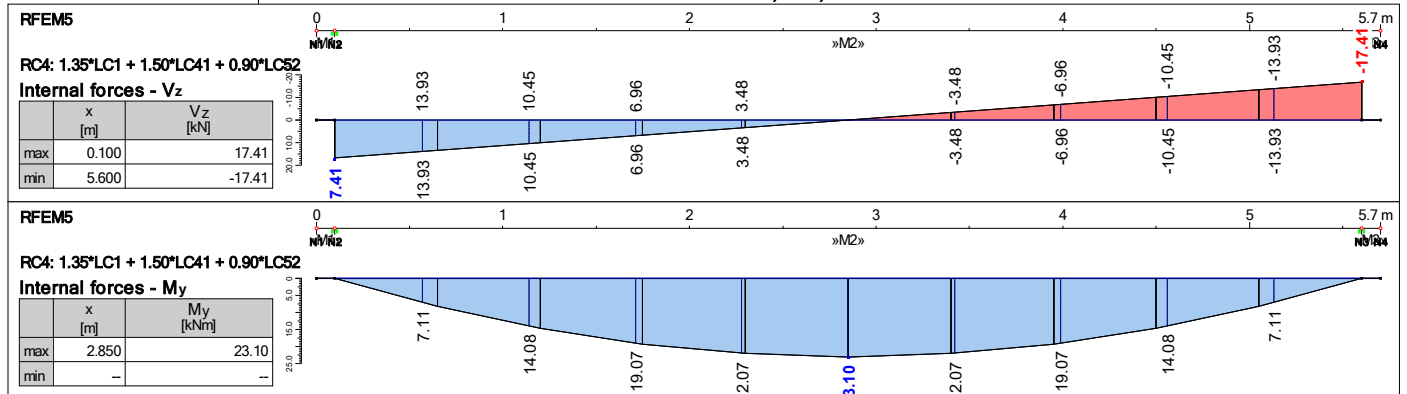
■ RESULT DIAGRAMS ON MEMBER M1,M2,M3



■ RESULT DIAGRAMS ON MEMBER M1,M2,M3



■ RESULT DIAGRAMS ON MEMBER M1,M2,M3



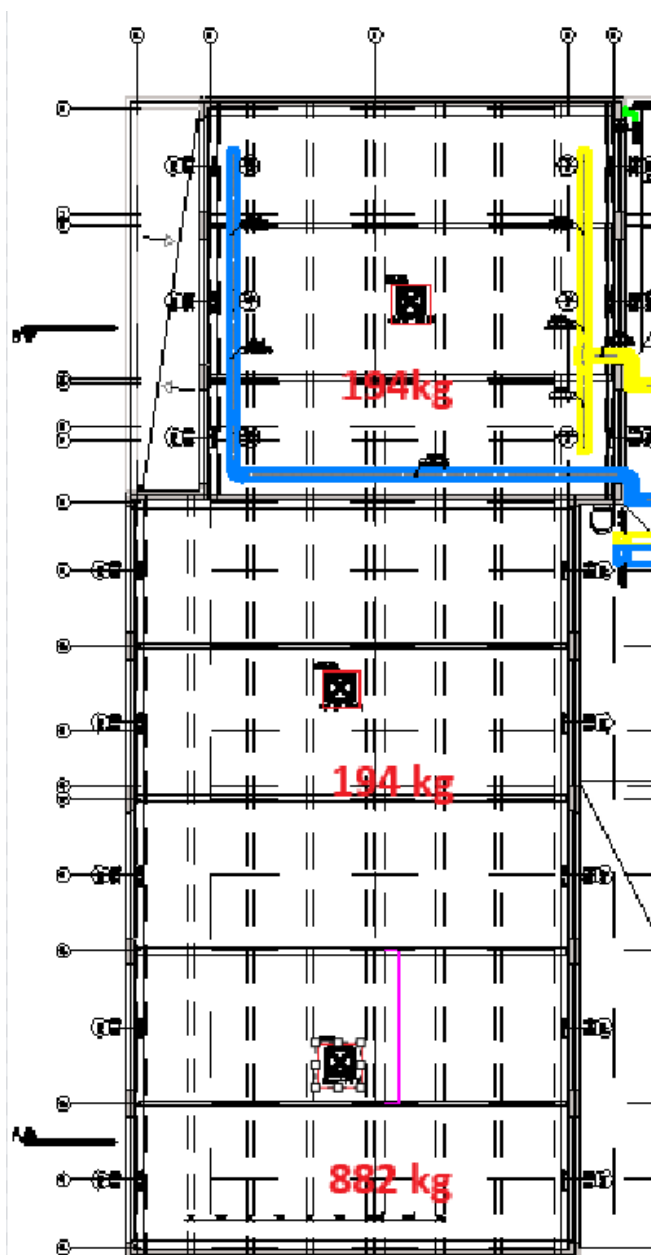
SEKUNDARCI - OSLANJANJE KROVNIH VENTILATORA

VENTILATORI SE UGRAĐUJU IZMEĐU SEKUNDARACA

TEŽINA VENTILATORA: 882 kg (teži), 194 kg(lakši)

882kg == 8,82 kN - na dvije čelične grede po 4,41 kN

UZIMA SE VEĆE OPTEREĆENJE ZBOG MOGUĆNOSTI IZMJENE POZICIJE VENTILATORA



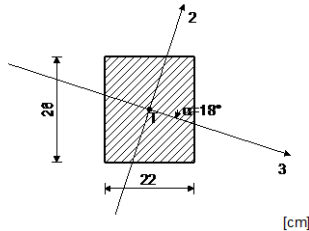
Ulazni podaci - Konstrukcija

Tabela materijala

No	Naziv materijala	E[kN/m ²]	μ	γ[kN/m ³]	αt[1/C]	Em[kN/m ²]	μm
1	Drvo Lamelirano Čet.	1.100e+7	0.20	5.00	1.000e-5	1.100e+7	0.20
2	Čelik	2.100e+8	0.30	78.50	1.000e-5	2.100e+8	0.30

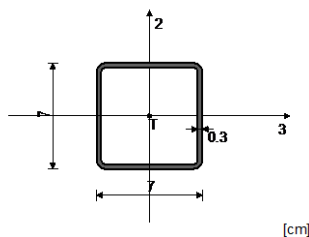
Setovi greda

Set: 1 Presek: b/d=22/26, Fiktivna ekscentricnost



Mat.	A1	A2	A3	I1	I2	I3
1 - Drvo Lamelira...	5.720e-2	4.767e-2	5.712e-2	4.519e-4	2.394e-4	3.135e-4

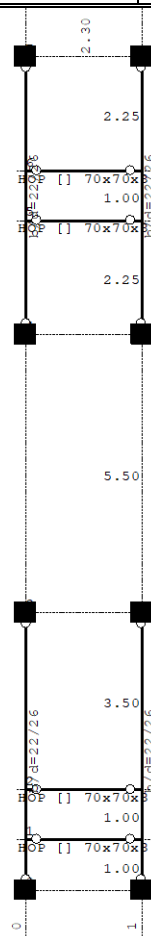
Set: 2 Presek: HOP □ 70x70x3, Fiktivna ekscentricnost



Mat.	A1	A2	A3	I1	I2	I3
2 - Čelik	7.810e-4	4.200e-4	4.200e-4	9.023e-7	5.606e-7	5.606e-7

Setovi tackastih oslonaca

	K,R1	K,R2	K,R3	K,M1	K,M2	K,M3
1	1.000e+10	1.000e+10	1.000e+10			

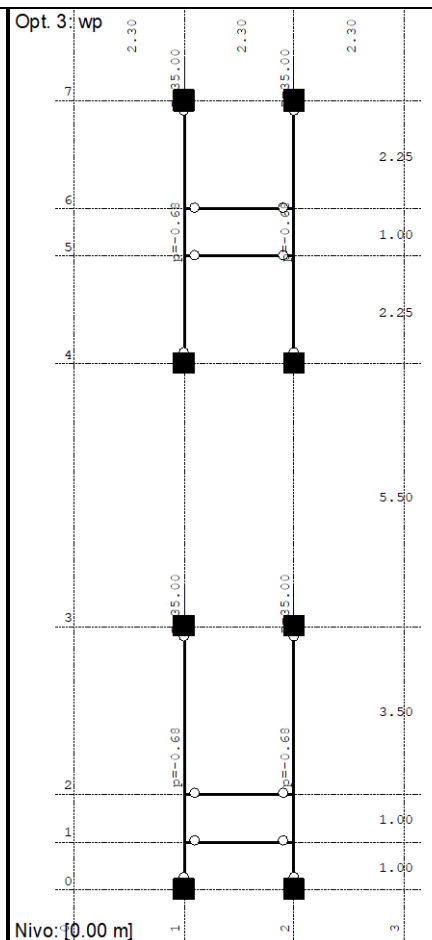
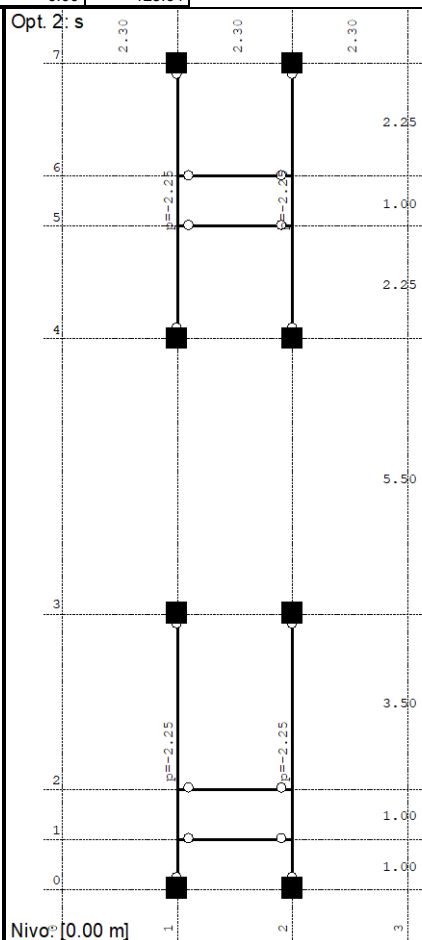
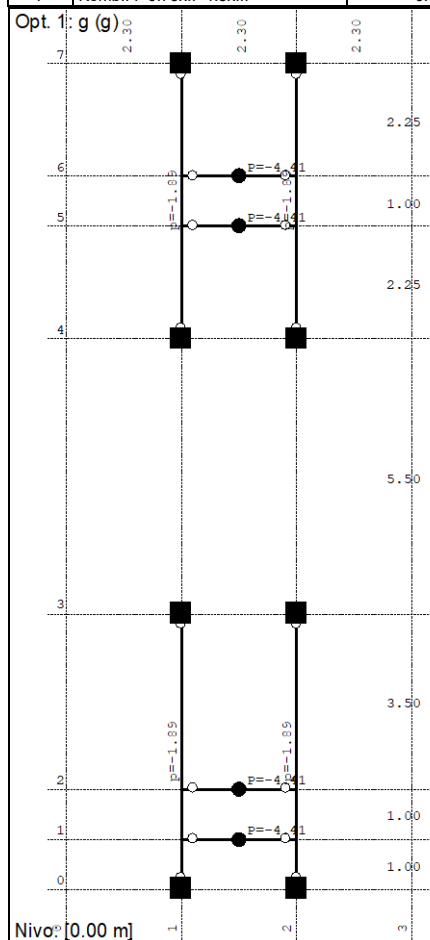


Ulazni podaci - Opterećenje

Lista slučajeva opterećenja

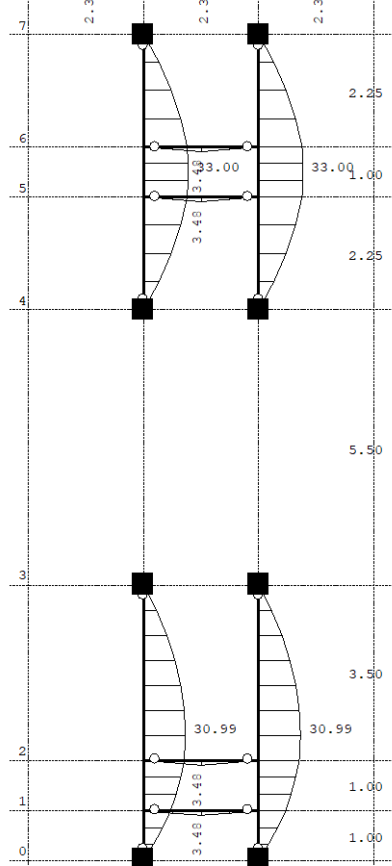
No	Naziv	pX [kN]	pY [kN]	pZ [kN]
1	g (g)	0.00	0.00	-66.08
2	s	0.00	0.00	-49.50
3	wp	0.00	0.00	-14.96
4	Komb.: 1.35xl+1.5xII+0.9xIII	0.00	0.00	-176.92
5	Komb.: 1.35xl+0.75xII+1.5xIII	0.00	0.00	-148.77
6	Komb.: I+1.5xII+0.9xIII	0.00	0.00	-153.79
7	Komb.: I+0.75xII+1.5xIII	0.00	0.00	-125.64

8	Komb.: 1.35xl+1.5xIII	0.00	0.00	-111.64
9	Komb.: 1.35xl+1.5xII	0.00	0.00	-163.45
10	Komb.: I+1.5xII	0.00	0.00	-140.33
11	Komb.: I+1.5xIII	0.00	0.00	-88.52
12	Komb.: 1.35xl	0.00	0.00	-89.20
13	Komb.: I	0.00	0.00	-66.08
14	Komb.: I+II+0.6xIII	0.00	0.00	-124.55



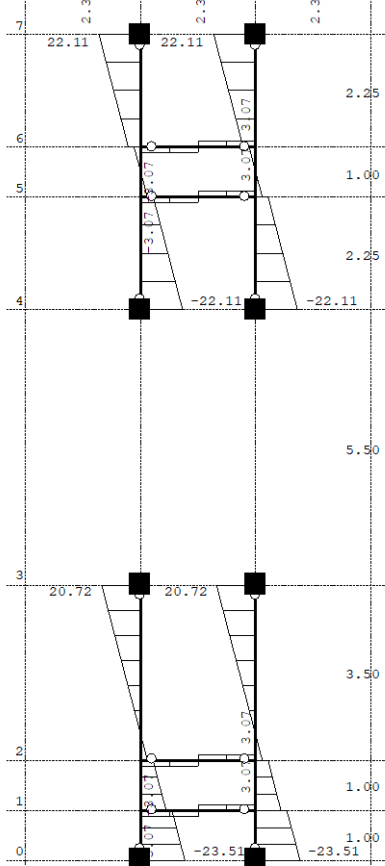
Statički proračun

Opt. 4: 1.35xI+1.5xII+0.9xIII



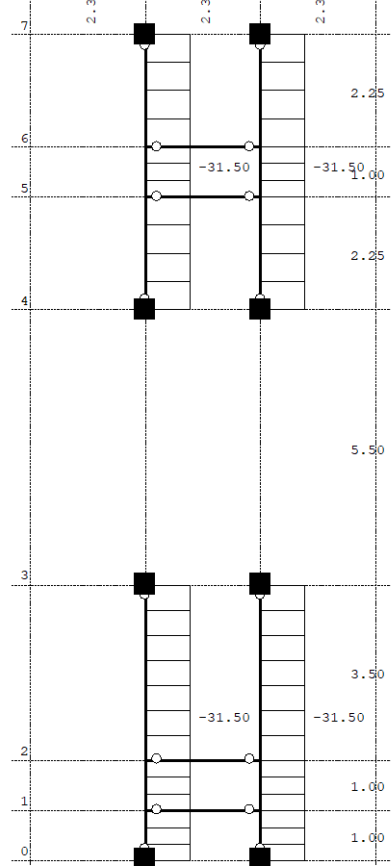
Utjecaji u gredi: max M3= 33.00 / min M3= 0.00 kNm

Opt. 4: 1.35xI+1.5xII+0.9xIII



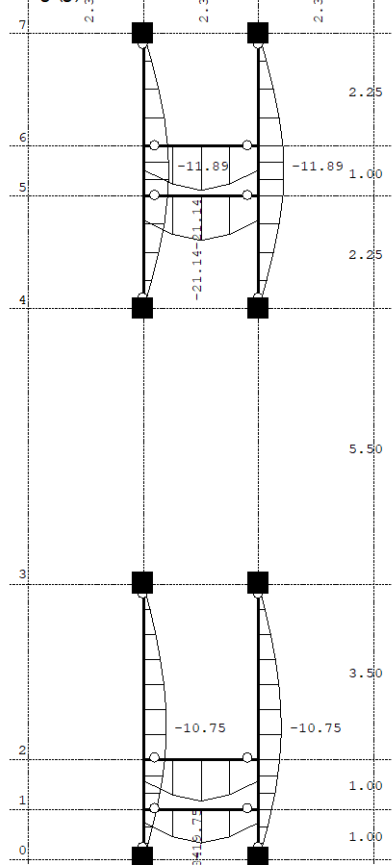
Utjecaji u gredi: max T2= 22.11 / min T2= -23.51 kN

Opt. 4: 1.35xI+1.5xII+0.9xIII



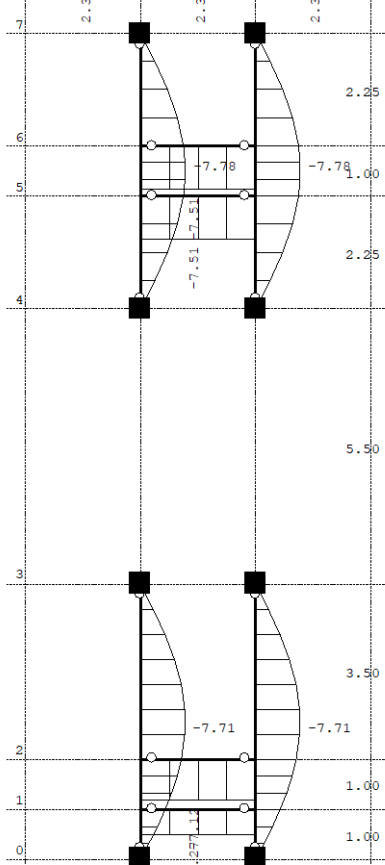
Nivo: [0.00 m]
Utjecaji u gredi: max N1= 0.00 / min N1= -31.50 kN

Opt. 1: g (g)



Nivo: [0.00 m]
Utjecaji u gredi: max Zp= -0.00 / min Zp= -21.14 m ...

Opt. 2: s

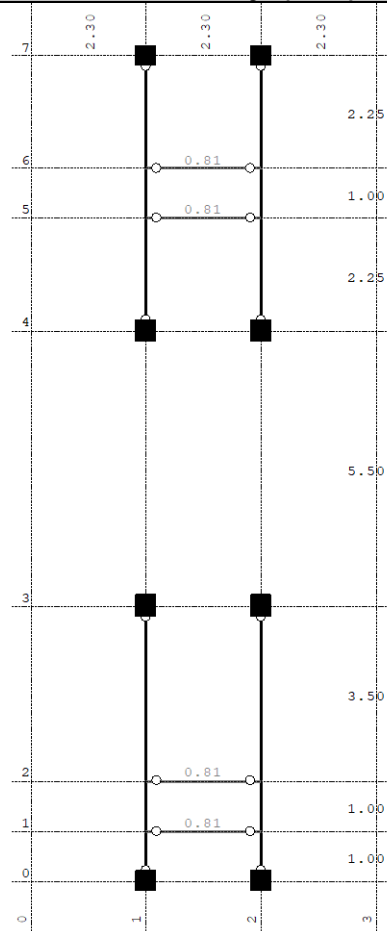


Nivo: [0.00 m]
Utjecaji u gredi: max Zp= -0.00 / min Zp= -7.78 m /...

$$u_g + u_s = 19,67 \text{ mm} < L/200 = 27,5$$

$$u_{fin} = u_g(1+0,6) + u_s(1+0) = 26,8 < L/200$$

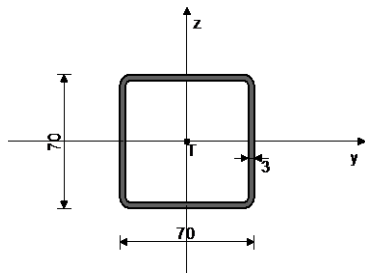
Dimenzioniranje (čelik)



Nivo: [0.00 m]
Kontrola stabilnosti

STAP 15-12
POPREČNI PRESJEK: HOP [70x70x3 [S 235]
EUROCODE

GEOMETRIJSKE KARAKTERISTIKE PRESJEKA



($f_y = 23.5 \text{ kN/cm}^2$, $f_u = 36.0 \text{ kN/cm}^2$)

$A_x = 7.810 \text{ cm}^2$
 $A_y = 3.905 \text{ cm}^2$
 $A_z = 3.905 \text{ cm}^2$
 $I_x = 90.230 \text{ cm}^4$
 $I_y = 56.060 \text{ cm}^4$
 $I_z = 56.060 \text{ cm}^4$
 $W_y = 16.017 \text{ cm}^3$
 $W_z = 16.017 \text{ cm}^3$
 $W_{y,pl} = 20.214 \text{ cm}^3$
 $W_{z,pl} = 19.598 \text{ cm}^3$
 $y_{M0} = 1.100$
 $y_{M1} = 1.100$
 $y_{M2} = 1.250$
 $A_{net}/A = 0.900$

[m m]

FAKTORI ISKORIŠTENJA PO KOMBINACIJAMA OPTEREĆENJA

4. $\gamma = 0.81$	5. $\gamma = 0.81$	8. $\gamma = 0.81$
9. $\gamma = 0.81$	12. $\gamma = 0.81$	7. $\gamma = 0.60$
10. $\gamma = 0.60$	11. $\gamma = 0.60$	6. $\gamma = 0.60$
13. $\gamma = 0.60$	14. $\gamma = 0.60$	

ŠTAP IZLOŽEN SAVIJANJU
(slučaj opterećenja 4, na 115.0 cm od početka štapa)

Poprečna sila u z pravcu	$V_{sd,z} = 2.977 \text{ kN}$
Momenat savijanja oko y osi	$M_{sd,y} = 3.478 \text{ kNm}$
Sistemska dužina štapa	$L = 230.00 \text{ cm}$

5.3 KLASIFIKACIJA POPREČNIH PRESJEKA
Klasa presjeka 1

5.4 OTPORNOST POPREČNIH PRESJEKA

5.4.5 Savijanje y-y

Računski plastični moment
Računska otp. na lokalno izbočavanje

Računski elastični momenat

Računska otpornost na savijanje

Uvjet 5.17: $M_{sd,y} \leq M_{c,Rd,y}$ (3.48 <= 4.32)

$M_{pl,Rd} = 4.318 \text{ kNm}$
 $M_{o,Rd} = 3.422 \text{ kNm}$
 $M_{el,Rd} = 3.422 \text{ kNm}$
 $M_{c,Rd} = 4.318 \text{ kNm}$

5.4.6 Posmik

Računska plast.otp.na posmik z-z
Uvjet 5.20: $V_{sd,z} \leq V_{pl,Rd,z}$ (2.98 <= 48.17)

$V_{pl,Rd} = 48.165 \text{ kN}$

5.4.7 Savijanje i posmik

Nije potrebna redukcija momenata otpornosti

Uvjet: $V_{sd,z} \leq 50\% V_{pl,Rd,z}$

5.5 OTPORNOST ELEMENATA NA IZVIJANJE

5.5.2 Bočno-torzijsko izvijanje greda

Koeficijent

Koeficijent

Koeficijent

Koef.efekt.dužine bočnog izvijanja

Koef.efekt.dužine torzijskog uvijanja

Koordinata

Koordinata

Razmak bočno pridržanih točaka

Sektorski moment inercije

Krit.mom.za bočno tor.izvijanje

Koeficijent

Koeficijent imperf.

Bezdimenzionalna vitkost

Koeficijent redukcije

Računska otpornost na izvijanje

Nije potrebno voditi računa o bočno-torz.izv. $\lambda_{LT} \leq 0.4$

$C1 = 1.365$
 $C2 = 0.553$
 $C3 = 1.730$
 $k = 1.000$
 $kw = 1.000$
 $zg = 0.000 \text{ cm}$
 $zj = 0.000 \text{ cm}$
 $L = 230.00 \text{ cm}$
 $I_w = 0.000 \text{ cm}^6$
 $M_{cr} = 172.70 \text{ kNm}$
 $\beta_w = 1.000$
 $\alpha_{LT} = 0.210$
 $\lambda_{LT} = 0.166$
 $\chi_{LT} = 1.000$
 $M_{b,Rd} = 4.318 \text{ kNm}$

5.6 OTPORNOST NA IZBOČAVANJE POSMIKOM

za posmik u ravni z-z

Širina lima

$d = 6.400 \text{ cm}$

Debljina lima

$tw = 0.300 \text{ cm}$

Nema poprečnih ukrčenja u sredini

Koeficijent izbočavanja posmiikom

$kt = 5.340$

Nije potrebna provjera otpornosti na izbočavanje posmiikom

Uvjet: $d / tw \leq 69 \epsilon$ (21.33 <= 69.00)

5.6.7 Interakcija posmične sile, savijanja i centr.sile

za posmik u ravni z-z

Nije potrebno reducirati računsku otpornost presjeka

Računska otpornost na izbočavanje

$V_{b,Rd} = 23.703 \text{ kN}$

$V_{sd} \leq 50\% V_{b,Rd}$

5.7 OTPORNOST REBRA NA POPREČNE SILE

5.7.7 Izvijanje tlačne nožice u ravni rebra

Koeficijent (klasa nožice 1)

$k = 0.300$

Površina rebra

$A_w = 2.100 \text{ cm}^2$

Površina tlač. nožice

$A_{fc} = 2.100 \text{ cm}^2$

Spriječena je mogućnost izvijanja nožice u ravni rebra

Uvjet 5.80: (10.67 <= 268.09)

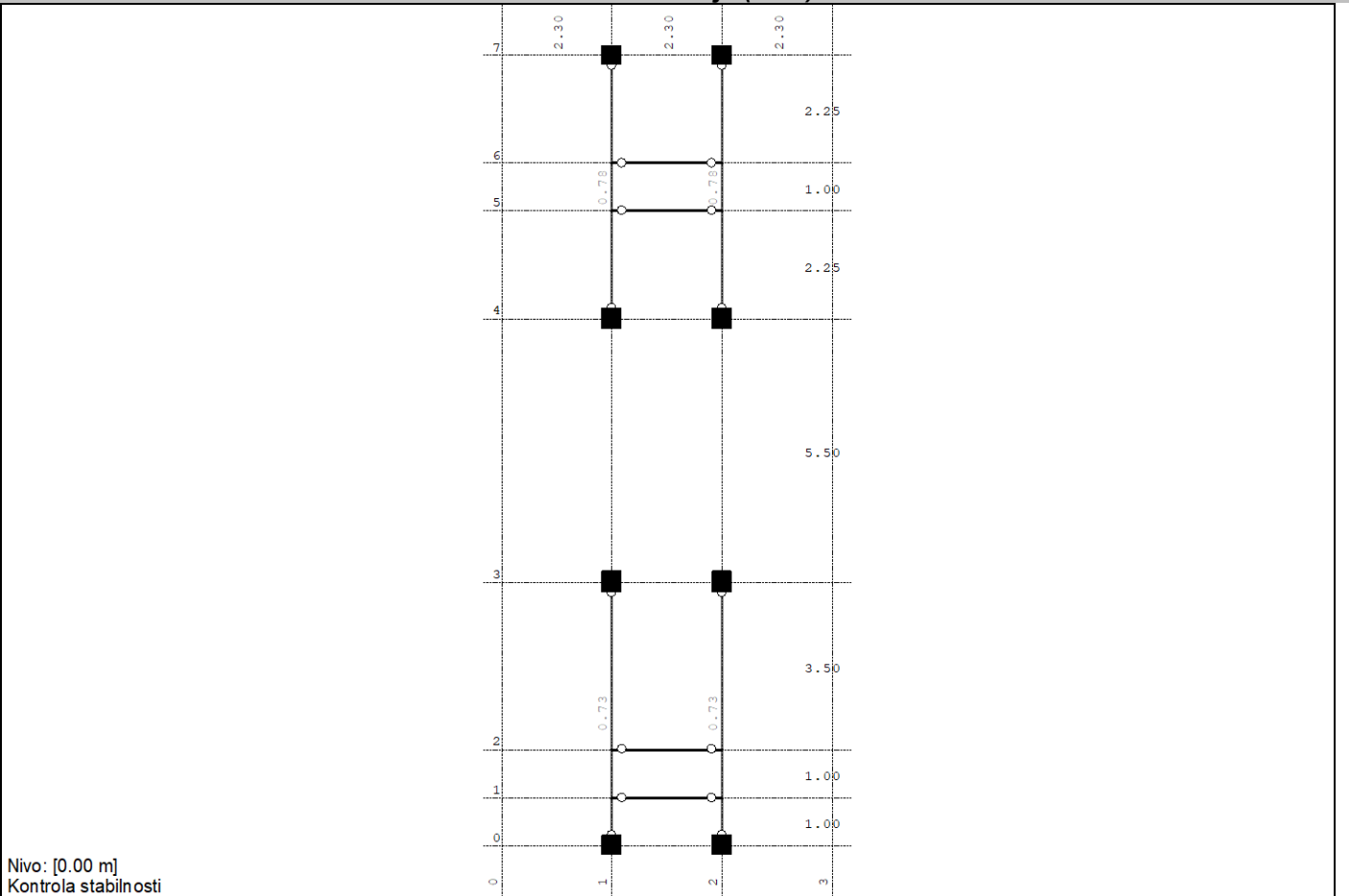
PROVJERA OTPORNOSTI NA POSMIK

(slučaj opterećenja 4, početak štapa)

	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 71

Poprečna sila u z pravcu Sistemska dužina štapa	Vsd_z = -3.072 kN L = 230.00 cm	za posmik u ravnini z-z Širina lima Debljina lima Nema poprečnih ukrčenja u sredini Koeffcijent izbočavanja posmikom Nije potrebna provjera otpornosti na izbočavanje posmikom Uvjet: d / tw <= 69 ε (21.33 <= 69.00)	d = 6.400 cm tw = 0.300 cm kt = 5.340
5.4 OTPORNOST POPREČNIH PRESJEKA 5.4.6 Posmik Računska plast.otp.na posmik z-z Uvjet 5.20: Vsd_z <= Vpl.Rd_z (3.07 <= 48.17)	Vpl.Rd = 48.165 kN		
5.6 OTPORNOST NA IZBOČAVANJE POSMIKOM			

Dimenzioniranje (drvo)

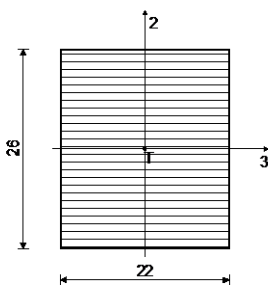


Nivo: [0.00 m]
Kontrola stabilnosti

STAP 4-8

Lijepljeno lamelirano drvo - GL28h
u pravcu gornjeg ruba štapa
Debljina lamele 2.00 cm
Klasa uporabljivosti 1
EUROCODE

Karakteristična čvrstoća na savijanje	$f_{m,k} =$	28.000 MPa
Računska čvrstoća na savijanje - os 2	$f_{m,2,d} =$	22.176 MPa
Računska čvrstoća na savijanje - os 3	$f_{m,3,d} =$	21.918 MPa
Relativna vitkost	$\lambda_{rel,2} =$	1.405
Relativna vitkost	$\lambda_{rel,3} =$	1.405
Normalni tlačni napon	$\sigma_{c,0,d} =$	0.551 MPa
Moment otpora	$W_2 =$	2097.3 cm ³
Normalni napon savijanja oko osi 2	$\sigma_{m,2,d} =$	4.546 MPa



[cm]

$\sigma_{m,2,d} \leq f_{m,2,d} (4.546 \leq 22.176)$
Iskorištenje presjeka je 20.5%

Moment otpora	$W_3 =$	2478.7 cm ³
Normalni napon savijanja oko osi 3	$\sigma_{m,3,d} =$	11.839 MPa

$\sigma_{m,3,d} \leq f_{m,3,d} (11.839 \leq 21.918)$
Iskorištenje presjeka je 54.0%

TLAK I SAVIJANJE - VELIKA VITKOST

Početna imperfekcija	$\beta_x =$	0.100
Koeficijent	$k_3 =$	1.251
Koeficijent	$k_2 =$	1.542
Koeficijent	$k_{c,3} =$	0.609
Koeficijent	$k_{c,2} =$	0.459

FAKTORI ISKORIŠTENJA PO KOMBINACIJAMA OPTEREĆENJA

4. $\gamma=0.73$	5. $\gamma=0.66$	6. $\gamma=0.64$
9. $\gamma=0.63$	7. $\gamma=0.56$	10. $\gamma=0.54$
12. $\gamma=0.54$	8. $\gamma=0.52$	14. $\gamma=0.51$
11. $\gamma=0.43$	13. $\gamma=0.40$	

$$(\sigma_{c,0,d} / (k_{c,2} \times f_{c,0,d})) + k_m \times (\sigma_{m,3,d} / f_{m,3,d}) + \sigma_{m,2,d} / f_{m,2,d} \leq 1 (0.646 \leq 1)$$

Iskorištenje presjeka je 64.6%

KONTROLA NORMALNIH NAPONA

(slučaj opterećenja 4, na 258.3 cm od početka štapa)

Računska uzdužna sila	$N =$	-31.500 kN
Poprečna sila u pravcu osi 2	$T_2 =$	0.496 kN
Poprečna sila u pravcu osi 3	$T_3 =$	0.161 kN
Moment savijanja oko osi 2	$M_2 =$	9.535 kNm
Moment savijanja oko osi 3	$M_3 =$	-29.344 kNm

Iskorištenje presjeka je 73.1%

$$(\sigma_{c,0,d} / (k_{c,3} \times f_{c,0,d})) + \sigma_{m,3,d} / f_{m,3,d} + k_m \times (\sigma_{m,2,d} / f_{m,2,d}) \leq 1 (0.731 \leq 1)$$

KONTROLA NAPONA - TLAK I SAVIJANJE

Vrsta opterećenja: osnovno - kratkotrajno

Korekcijski koeficijent
Parcijalni koef. za svojstva gradiva
Dodatak za elemente sa malim dimenzijama - os 2

$K_{mod} =$	0.900
$\gamma_m =$	1.250

DOKAZ BOČNE STABILNOSTI

Vrsta opterećenja: osnovno - kratkotrajno
Korekcijski koeficijent
Parcijalni koef. za svojstva gradiva
Razmak pridržajnih točaka okomitih na pravac osi 2

$K_{mod} =$	0.900
$\gamma_m =$	1.250

Dodatak za elemente sa malim dimenzijama - os 3

$K_{h,2} =$	1.100
$K_{h,3} =$	1.087

Faktor oblika (za pravokutni presjek)

Karakteristična tlačna čvrstoća

Računska tlačna čvrstoća

$f_{c,0,k} =$	26.500 MPa
$f_{c,0,d} =$	19.080 MPa

5% fraktil modula E paralelno vlaknima

5% fraktil modula posmika G

Torzijski momenat inercije

Moment inercije

Moment otpora

Kritični napon izvijanja

Relativna vitkost za izvijanje

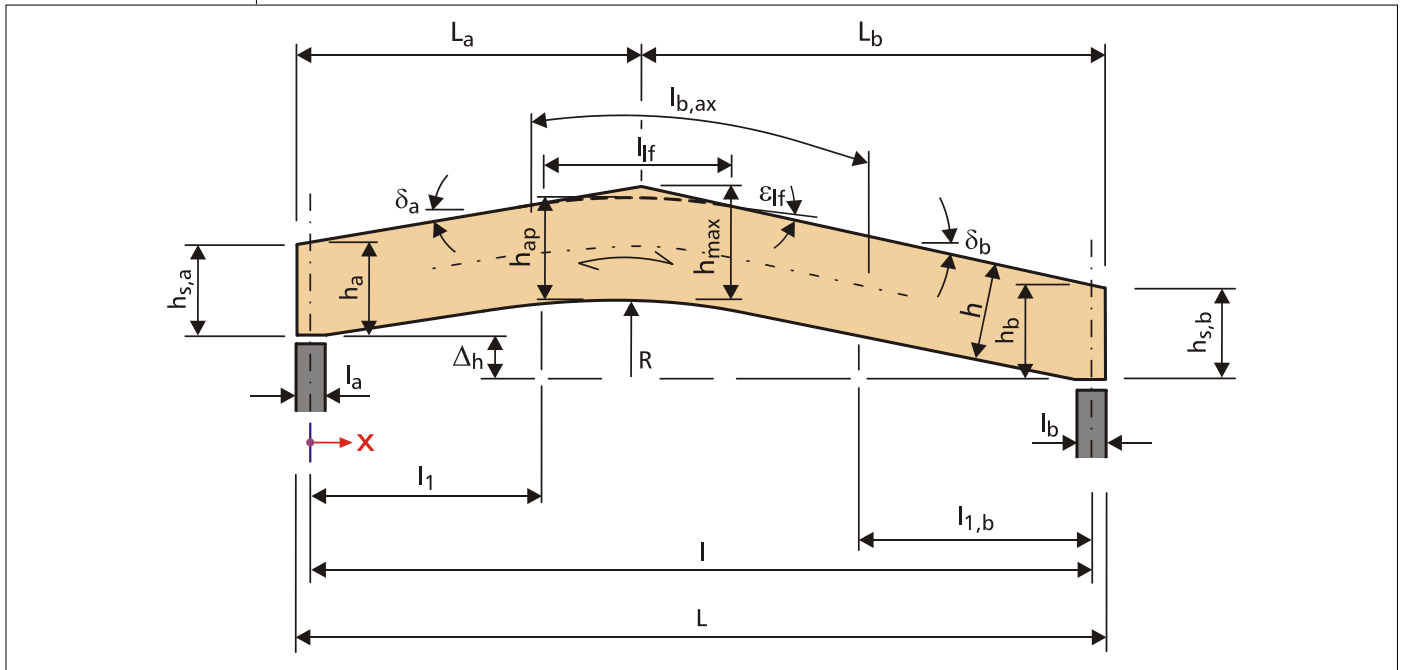
Koeficijent

$I_{ef} =$	550.00 cm ⁴
$E_{0.05} =$	10200 MPa
$G_{0.05} =$	520.00 MPa
$I_{tor} =$	45157 cm ⁴
$I_2 =$	23071 cm ⁴
$W_3 =$	2478.7 cm ³
$\sigma_{m,crit} =$	171.30 MPa
$\lambda_{rel} =$	0.404
$k_{krit} =$	1.000

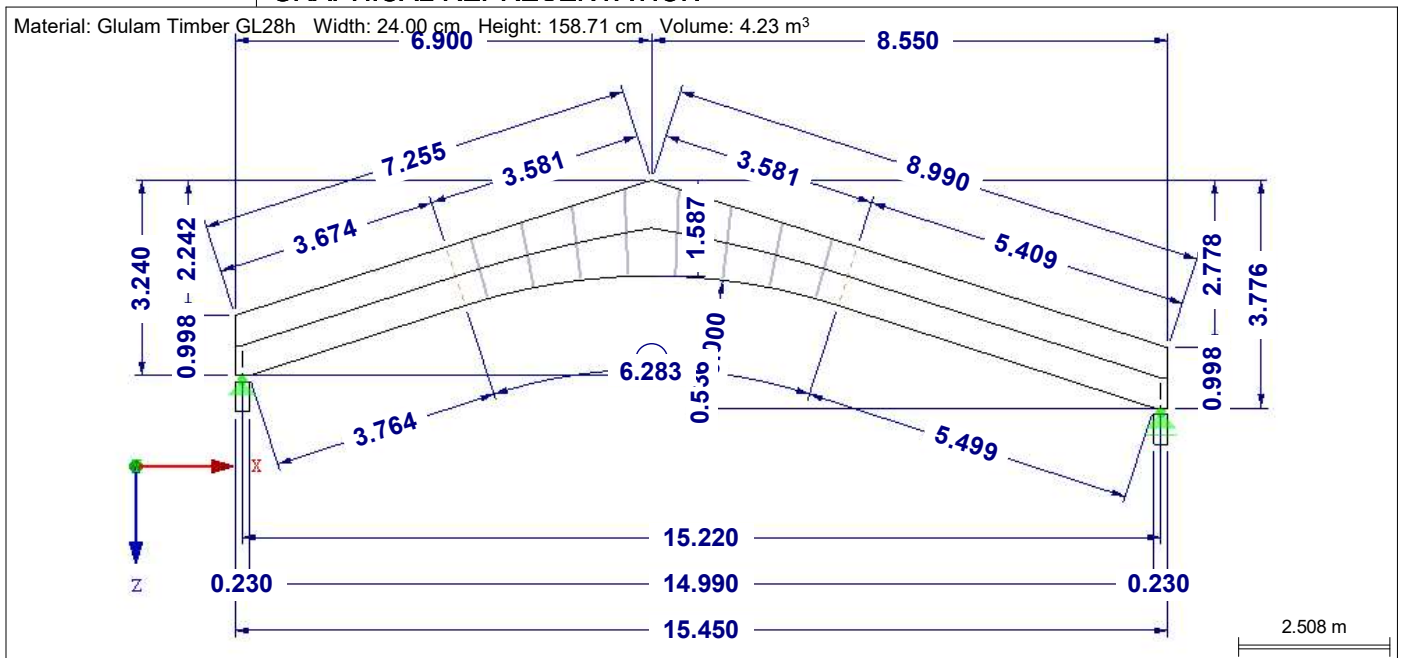
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POZ GN1 - glavni nosač

■ SYSTEM LAYOUT



■ GRAPHICAL REPRESENTATION



RX-TIMBER
Glued Laminated Beams
acc. to EN
1995-1-1:2004/A2:2014

■ DETAILS

Maximum Influence of Grain to Tapered Edge

Use Limitation

$$\alpha \leq 20.00^\circ$$

Special Settings for Glulam

Effect of Cross-Section Dimensions on Material Properties

Increase in strength $f_{m,k}$ and $f_{t,0,k}$ acc. to:

3.3(3) for glulam with $h < 600$ mm (bending) or $b < 600$ mm (tension)

☐

Reduction of Internal Forces

Moment Reduction on Support

☐

Reduction of shear forces according to 6.1.7(3) for force at distance h from the edge of a support (h = beam height along support axis)

☐

Design Settings

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	DATUM: 8/2025 STR: 75
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DETAILS

Reduction of stiffness with coefficient $1 / (1 + k_{def})$ due to creep effects in Service Classes 2 and 3 according to DIN EN 1995-1-1/NA:2013-08, NCI NA. 5.9

DATA FOR NATIONAL ANNEX

Partial Factor for Material Properties

Fundamental combinations for glulam timber	γ_M	:	1.250
Fundamental combinations for solid timber	γ_M	:	1.300
Accidental combinations	γ_M	:	1.000
Combinations for fire design	$\gamma_{M,fi}$	:	1.000

Limit Values of Deformations acc. to Tab. 7.2 - Characteristic (Rare) Design Situation

	Span	Cantilevered Beam
w_{inst}	$\leq l / 300$	$\leq l_k / 150$

Limit Values of Deformations - Quasi-Permanent Design Situation

$w_{fin} - w_c$	$\leq l / 250$	$\leq l_k / 125$
w_{fin}	$\leq l / 150$	$\leq l_k / 75$

Modification Factor k_{mod}

	1	2	3
LDC			
-Permanent	0.600	0.600	0.500
-Long-term	0.700	0.700	0.550
-Medium-term	0.800	0.800	0.650
-Short-term	0.900	0.900	0.700
-Instantaneous	1.100	1.100	0.900

Data for Fire Resistance

		Softwood	Glulam Timber	Hardwood	
Charring Rate	β_n	0.80	0.70	0.55	[mm/min]
Increased Charring	d_0	7.00	7.00	7.00	[mm]
Factor	k_{fi}	1.250	1.150	1.250	

USED STANDARDS

- | | | |
|-----|--|---|
| [1] | EN 1995-1-1:2004+AC:2006+A2:2014 | Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings |
| [2] | EN 1995-1-2:2004+AC:2009-03 | Eurocode 5: Design of timber structures - Part 1-2: General - Structural fire design |
| [3] | EN 1990:2002+A1:2005+AC:2010-04 | Eurocode: Basis of structural design |
| [4] | EN 1991-1-1:2002+AC:2009-03 | Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings |
| [5] | EN 1991-1-3:2003+AC:2009-03 | Eurocode 1: Actions on structures - Part 1-3: General actions - Snow loads |
| [6] | EN 1991-1-4:2005+AC:2010-01+A1:2010-01 | Eurocode 1: Actions on structures - Part 1-4: General actions - Wind loads |
| [7] | EN 14080:2013-08 | Timber structures - Glued laminated timber and glued solid timber - Requirements |
| [8] | EN 338:2016-07 | Structural timber - Strength classes |

BEAM TYPE AND MATERIAL

Beam Type

Beam Type:	Pitched Cambered Beam with Constant Height
Unsymmetrical Layout	☒

Material

Material Glulam Timber GL28h - EN 14080:2013-08

Charact. Strength for Bending	$f_{m,k}$	:	28.0	N/mm ²
Charact. Strength for Tension Parallel	$f_{t,0,k}$	:	22.3	N/mm ²
Charact. Strength for Tension Perpendicular to Grain	$f_{t,90,k}$	:	0.5	N/mm ²
Charact. Strength for Compression Parallel	$f_{c,0,k}$	:	28.0	N/mm ²
Charact. Strength for Compression Perpendic.	$f_{c,90,k}$	:	2.5	N/mm ²
Charact. Strength for Shear/Torsion	$f_{v,k}$	:	3.5	N/mm ²
Shear Modulus	G_{mean}	:	650.0	N/mm ²
Modulus of Elasticity Parallel	$E_{0,05}$	:	10500.0	N/mm ²
Shear Modulus	G_{05}	:	540.0	N/mm ²
Specific Weight	γ	:	4.60	kN/m ³
Coefficient of Thermal Expansion	α	:	0.000005	1/°C

Stiffening Elements for Transversal Tension

Apply - Transversal Tension Stiffening - Type:	Structural if Required
Stiffening Elements Used:	Glued-in Rods

Stiffening Elements for Transversal Tension - Layout of Rods

Determine Quantity			
Number of Rods Within a_1	n	:	1

Stiffening Elements for Transversal Tension - Diameter and Material

Outside Diameter of Rods	d_r	:	16	mm
Size of Bore	d_b	:	1.6	cm
Strength Class of Rods		:	8.8	
Yield Strength	$f_{y,b,k}$	:	640.0	N/mm ²
Tensile Strength	$f_{u,b,k}$	:	800.0	N/mm ²
Glued Joint Strength	$f_{k1,k}$	:	4.00	N/mm ²

Stiffening Elements for Transversal Tension

Length of Transversal Tension Area	l_{a1}	:	6.78	m
Number of Rods	n_{a1}	:	8	

■ BEAM TYPE AND MATERIAL

Distance of Rods a_1 : 0.848 m

■ GEOMETRY

Building Dimensions

Building Height	H	:	10.000	m
Building Depth	B	:	27.000	m
Beam Spacing	a	:	5.500	m
Distance to Roof Edge	ū	:	0.000	m
Load Factor for Continuity	k	:	1.000	

Roof Beam Geometry

Beam Length	L	:	15.450	m
Axial Spacing	l	:	15.220	m
Support Width, Left	l _a	:	23.00	cm
Support Width, Right	l _b	:	23.00	cm
Beam Height	h	:	102.00	cm
Inclination Angle, Left Side	δ _a	:	18.00	°
Inclination Angle	δ _b	:	18.00	°
Beam Length, Left Side	L _a	:	6.900	m
Beam Length, Right Side	L _b	:	8.550	m
Radius of Curvature for Lower Chord	R	:	10.000	m

Cross-section

Cross-Section Width	b	:	24.00	cm
Lamella Thickness	t	:	3.00	cm

Data for Lateral Buckling

Beam Endangered by Lateral Buckling	☒			
Lateral Supports Available	☒			
Equivalent Member Length	l _{ef}	:	2.250	m
Bracing Distance	e	:	60.00	cm
Lateral supports resist to fire	☒			

Information - Parameters

Beam Length, Straight Part, Left Side	l _{1,a}	:	3.695	m
Beam Length, Straight Part, Right Side	l _{1,b}	:	5.345	m
Axis Length of Arch Area	l _{b,ax}	:	6.782	m
Support Difference	Δ _h	:	0.536	m
Beam Height, Support Center, Left	h _a	:	103.51	cm
Beam Height on Edge Left	h _{s,a}	:	99.78	cm
Beam Height, Support Center, Right	h _b	:	103.51	cm
Beam Height on Edge Right	h _{s,b}	:	99.78	cm
Beam Height on Ridge	h _{ap}	:	158.71	cm
Coat Surface of Beam	A _S	:	43.48	m ²
Beam Volume	V	:	4.23	m ³
Beam Weight	G	:	1.946	t

■ LOAD DATA

Permanent Loads

Roof Structure		:		
slojevi		:	0.840	kN/m ² RA
težina koša - košarka		:	0.200	kN/m ² RA
Roof Structure	g _{k,2}	:	1.040	kN/m ² RA

	g _{k,2}	:	5.720	kN/m RA
Self-weight of Beam (Average)	g _{k,1}	:	1.209	kN/m RA
	g _k	:	6.929	kN/m RA

Consider with factor		:	1.000	
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Snow Load

Topography Type		:	Normal	
Exposure	C _e	:	1.0	
Snow Load - Define Manually	s _k	:	1.250	kN/m ² BA
	s _k	:	6.875	kN/m BA

Wind Load

Building Height	H	:	10.000	m
Wind Load - Define Manually	q(z)	:	0.600	kN/m ² RA
	q(z)	:	3.300	kN/m RA

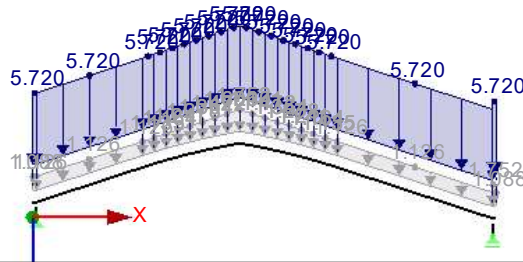
Service Class

Service Class	SECL	:	1	
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■ LC1 - SELF-WEIGHT + ROOF FINISHES

LC1 : Self-Weight + Roof Finishes
Loads [kN/m]

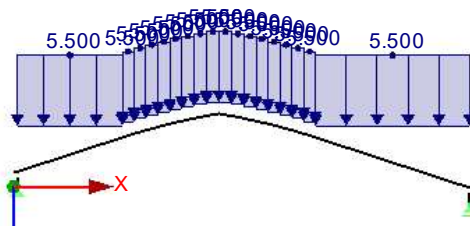
Against Y-direction



■ LC41 - SNOW (BOTH SIDES FULL)

LC41 : Snow (Both Sides Full)
Loads [kN/m]

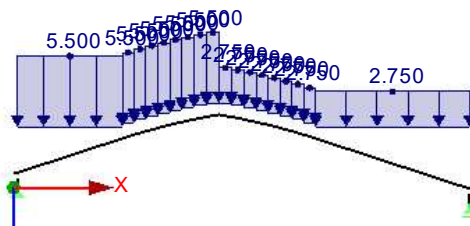
Against Y-direction



■ LC42 - SNOW (LEFT SIDE FULL)

LC42 : Snow (Left Side Full)
Loads [kN/m]

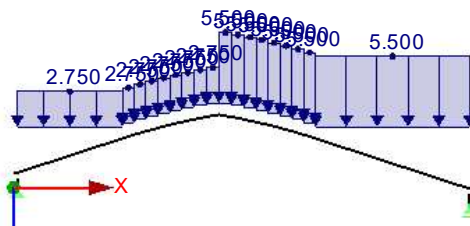
Against Y-direction



■ LC43 - SNOW (RIGHT SIDE FULL)

LC43 : Snow (Right Side Full)
Loads [kN/m]

Against Y-direction



■ LC51 - WIND TRANSVERSELY TO RIDGE (LEFT)(AA)

LC51 : Wind Transversely to Ridge (left)(AA)
Loads [kN/m]

Against Y-direction



■ LC57 - WIND TRANSVERSELY TO RIDGE (RIGHT)(AB)

LC57 : Wind Transversely to Ridge (right)(AB)
Loads [kN/m]

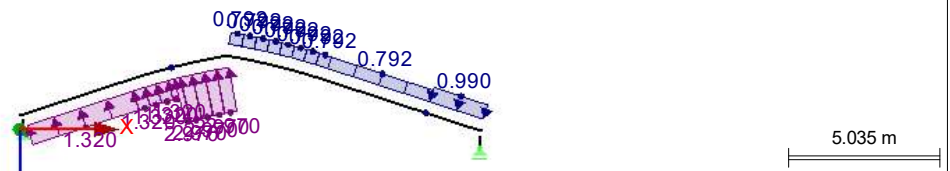
Against Y-direction



■ LC58 - WIND TRANSVERSELY TO RIDGE (RIGHT)(BA)

LC58 : Wind Transversely to Ridge (right)(BA)
Loads [kN/m]

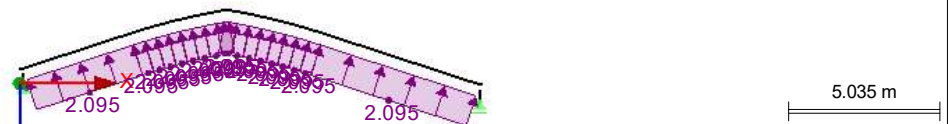
Against Y-direction



■ LC59 - WIND PARALLEL TO RIDGE (A)

LC59 : Wind Parallel to Ridge (A)
Loads [kN/m]

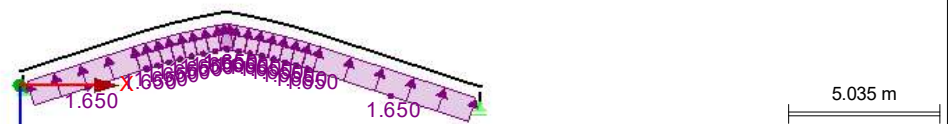
Against Y-direction



■ LC60 - WIND PARALLEL TO RIDGE (B)

LC60 : Wind Parallel to Ridge (B)
Loads [kN/m]

Against Y-direction



■ CONTROL PARAMETERS

Design of

Static equilibrium EQU	☐
Ultimate limit state STR	☒
Serviceability limit state	☒
Fire resistance	☒
Support compression	☒
Display support forces	☒
Display deformations	☒

Data for Serviceability Limit State Design

Precamber w_0 : 0.0 mm

Data for Fire Resistance

Fire Resistance Class R 90

Sides exposed to fire ☒ Left
☒ Right
☐ Top
☒ Bottom

Support Modeling

Left Support Horizontal fixed-hinged
Right Support Horizontal free-hinged
Supports On Center Line ☐

Calculation Parameters

Generate supplementary combinations from favorable permanent actions ☐
Distribute permanent load span-by-span ☐

Number of member divisions for result diagrams 10
Number of internal divisions of tapered members 10

RESULTS

■ RESULT COMBINATIONS

RC	Result Combinations Description	Load Cases	Design Situation	LDC	Factor k_{mod}	Max. Ratio
Ultimate Limit State Design						
RC1	g	1.35*LC1	UB	Permanent	0.600	0.91
RC2	g + s	1.35*LC1 + 1.50*LC41	UB	Short-term	0.900	1.12
RC3	g + s(l)	1.35*LC1 + 1.50*LC42	UB	Short-term	0.900	0.97
RC4	g + s(r)	1.35*LC1 + 1.50*LC43	UB	Short-term	0.900	1.00
RC5	g + s + w(q,l,AA)	1.35*LC1 + 1.50*LC41 + 0.90*LC51	UB	Short-term	0.900	1.04
RC6	g + s + w(q,l,BB)	1.35*LC1 + 1.50*LC41 + 0.90*LC52	UB	Short-term	0.900	1.14
RC7	g + s + w(q,l,AB)	1.35*LC1 + 1.50*LC41 + 0.90*LC53	UB	Short-term	0.900	1.09
RC8	g + s + w(q,l,BA)	1.35*LC1 + 1.50*LC41 + 0.90*LC54	UB	Short-term	0.900	1.09
RC9	g + s + w(q,r,AA)	1.35*LC1 + 1.50*LC41 + 0.90*LC55	UB	Short-term	0.900	1.04
RC10	g + s + w(q,r,BB)	1.35*LC1 + 1.50*LC41 + 0.90*LC56	UB	Short-term	0.900	1.13
RC11	g + s + w(q,r,AB)	1.35*LC1 + 1.50*LC41 + 0.90*LC57	UB	Short-term	0.900	1.10
RC12	g + s + w(q,r,BA)	1.35*LC1 + 1.50*LC41 + 0.90*LC58	UB	Short-term	0.900	1.08
RC13	g + s + w(p,A)	1.35*LC1 + 1.50*LC41 + 0.90*LC59	UB	Short-term	0.900	1.01
RC14	g + s + w(p,B)	1.35*LC1 + 1.50*LC41 + 0.90*LC60	UB	Short-term	0.900	1.03
RC15	g + s(l) + w(q,l,AA)	1.35*LC1 + 1.50*LC42 + 0.90*LC51	UB	Short-term	0.900	0.90
RC16	g + s(l) + w(q,l,BB)	1.35*LC1 + 1.50*LC42 + 0.90*LC52	UB	Short-term	0.900	1.00
RC17	g + s(l) + w(q,l,AB)	1.35*LC1 + 1.50*LC42 + 0.90*LC53	UB	Short-term	0.900	0.94
RC18	g + s(l) + w(q,l,BA)	1.35*LC1 + 1.50*LC42 + 0.90*LC54	UB	Short-term	0.900	0.95
RC19	g + s(l) + w(q,r,AA)	1.35*LC1 + 1.50*LC42 + 0.90*LC55	UB	Short-term	0.900	0.90
RC20	g + s(l) + w(q,r,BB)	1.35*LC1 + 1.50*LC42 + 0.90*LC56	UB	Short-term	0.900	0.99
RC21	g + s(l) + w(q,r,AB)	1.35*LC1 + 1.50*LC42 + 0.90*LC57	UB	Short-term	0.900	0.96
RC22	g + s(l) + w(q,r,BA)	1.35*LC1 + 1.50*LC42 + 0.90*LC58	UB	Short-term	0.900	0.93
RC23	g + s(r) + w(p,A)	1.35*LC1 + 1.50*LC42 + 0.90*LC59	UB	Short-term	0.900	0.87
RC24	g + s(r) + w(p,B)	1.35*LC1 + 1.50*LC42 + 0.90*LC60	UB	Short-term	0.900	0.89
RC25	g + s(r) + w(q,l,AA)	1.35*LC1 + 1.50*LC43 + 0.90*LC51	UB	Short-term	0.900	0.93
RC26	g + s(r) + w(q,l,BB)	1.35*LC1 + 1.50*LC43 + 0.90*LC52	UB	Short-term	0.900	1.03
RC27	g + s(r) + w(q,l,AB)	1.35*LC1 + 1.50*LC43 + 0.90*LC53	UB	Short-term	0.900	0.97
RC28	g + s(r) + w(q,l,BA)	1.35*LC1 + 1.50*LC43 + 0.90*LC54	UB	Short-term	0.900	0.98
RC29	g + s(r) + w(q,r,AA)	1.35*LC1 + 1.50*LC43 + 0.90*LC55	UB	Short-term	0.900	0.93
RC30	g + s(r) + w(q,r,BB)	1.35*LC1 + 1.50*LC43 + 0.90*LC56	UB	Short-term	0.900	1.02
RC31	g + s(r) + w(q,r,AB)	1.35*LC1 + 1.50*LC43 + 0.90*LC57	UB	Short-term	0.900	0.99
RC32	g + s(r) + w(q,r,BA)	1.35*LC1 + 1.50*LC43 + 0.90*LC58	UB	Short-term	0.900	0.96
RC33	g + s(r) + w(p,A)	1.35*LC1 + 1.50*LC43 + 0.90*LC59	UB	Short-term	0.900	0.90
RC34	g + s(r) + w(p,B)	1.35*LC1 + 1.50*LC43 + 0.90*LC60	UB	Short-term	0.900	0.92
RC35	g + w(q,l,AA)	1.35*LC1 + 1.50*LC51	UB	Short-term	0.900	0.48
RC36	g + w(q,l,BB)	1.35*LC1 + 1.50*LC52	UB	Short-term	0.900	0.64
RC37	g + w(q,l,AB)	1.35*LC1 + 1.50*LC53	UB	Short-term	0.900	0.56
RC38	g + w(q,l,BA)	1.35*LC1 + 1.50*LC54	UB	Short-term	0.900	0.56
RC39	g + w(q,r,AA)	1.35*LC1 + 1.50*LC55	UB	Short-term	0.900	0.48
RC40	g + w(q,r,BB)	1.35*LC1 + 1.50*LC56	UB	Short-term	0.900	0.63
RC41	g + w(q,r,AB)	1.35*LC1 + 1.50*LC57	UB	Short-term	0.900	0.58
RC42	g + w(q,r,BA)	1.35*LC1 + 1.50*LC58	UB	Short-term	0.900	0.54
RC43	g + w(p,A)	1.35*LC1 + 1.50*LC59	UB	Short-term	0.900	0.43
RC44	g + w(p,B)	1.35*LC1 + 1.50*LC60	UB	Short-term	0.900	0.47
RC45	g + s + w(q,l,AA)	1.35*LC1 + 0.75*LC41 + 1.50*LC51	UB	Short-term	0.900	0.73
RC46	g + s + w(q,l,BB)	1.35*LC1 + 0.75*LC41 + 1.50*LC52	UB	Short-term	0.900	0.90
RC47	g + s + w(q,l,AB)	1.35*LC1 + 0.75*LC41 + 1.50*LC53	UB	Short-term	0.900	0.81
RC48	g + s + w(q,l,BA)	1.35*LC1 + 0.75*LC41 + 1.50*LC54	UB	Short-term	0.900	0.82
RC49	g + s + w(q,r,AA)	1.35*LC1 + 0.75*LC41 + 1.50*LC55	UB	Short-term	0.900	0.74
RC50	g + s + w(q,r,BB)	1.35*LC1 + 0.75*LC41 + 1.50*LC56	UB	Short-term	0.900	0.89
RC51	g + s + w(q,r,AB)	1.35*LC1 + 0.75*LC41 + 1.50*LC57	UB	Short-term	0.900	0.83
RC52	g + s + w(q,r,BA)	1.35*LC1 + 0.75*LC41 + 1.50*LC58	UB	Short-term	0.900	0.79
RC53	g + s + w(p,A)	1.35*LC1 + 0.75*LC41 + 1.50*LC59	UB	Short-term	0.900	0.69
RC54	g + s + w(p,B)	1.35*LC1 + 0.75*LC41 + 1.50*LC60	UB	Short-term	0.900	0.72
RC55	g + s(l) + w(q,l,AA)	1.35*LC1 + 0.75*LC42 + 1.50*LC51	UB	Short-term	0.900	0.66
RC56	g + s(l) + w(q,l,BB)	1.35*LC1 + 0.75*LC42 + 1.50*LC52	UB	Short-term	0.900	0.83
RC57	g + s(l) + w(q,l,AB)	1.35*LC1 + 0.75*LC42 + 1.50*LC53	UB	Short-term	0.900	0.74

■ RESULT COMBINATIONS

RC	Result Combinations Description	Load Cases	Design Situation	LDC	Factor k_{mod}	Max. Ratio
RC58	g + s(l) + w(q,l,BA)	1.35*LC1 + 0.75*LC42 + 1.50*LC54	UB	Short-term	0.900	0.75
RC59	g + s(l) + w(q,r,AA)	1.35*LC1 + 0.75*LC42 + 1.50*LC55	UB	Short-term	0.900	0.66
RC60	g + s(l) + w(q,r,BB)	1.35*LC1 + 0.75*LC42 + 1.50*LC56	UB	Short-term	0.900	0.82
RC61	g + s(l) + w(q,r,AB)	1.35*LC1 + 0.75*LC42 + 1.50*LC57	UB	Short-term	0.900	0.76
RC62	g + s(l) + w(q,r,BA)	1.35*LC1 + 0.75*LC42 + 1.50*LC58	UB	Short-term	0.900	0.72
RC63	g + s(l) + w(p,A)	1.35*LC1 + 0.75*LC42 + 1.50*LC59	UB	Short-term	0.900	0.62
RC64	g + s(l) + w(p,B)	1.35*LC1 + 0.75*LC42 + 1.50*LC60	UB	Short-term	0.900	0.65
RC65	g + s(r) + w(q,l,AA)	1.35*LC1 + 0.75*LC43 + 1.50*LC51	UB	Short-term	0.900	0.68
RC66	g + s(r) + w(q,l,BB)	1.35*LC1 + 0.75*LC43 + 1.50*LC52	UB	Short-term	0.900	0.84
RC67	g + s(r) + w(q,l,AB)	1.35*LC1 + 0.75*LC43 + 1.50*LC53	UB	Short-term	0.900	0.76
RC68	g + s(r) + w(q,l,BA)	1.35*LC1 + 0.75*LC43 + 1.50*LC54	UB	Short-term	0.900	0.76
RC69	g + s(r) + w(q,r,AA)	1.35*LC1 + 0.75*LC43 + 1.50*LC55	UB	Short-term	0.900	0.68
RC70	g + s(r) + w(q,r,BB)	1.35*LC1 + 0.75*LC43 + 1.50*LC56	UB	Short-term	0.900	0.83
RC71	g + s(r) + w(q,r,AB)	1.35*LC1 + 0.75*LC43 + 1.50*LC57	UB	Short-term	0.900	0.77
RC72	g + s(r) + w(q,r,BA)	1.35*LC1 + 0.75*LC43 + 1.50*LC58	UB	Short-term	0.900	0.74
RC73	g + s(r) + w(p,A)	1.35*LC1 + 0.75*LC43 + 1.50*LC59	UB	Short-term	0.900	0.63
RC74	g + s(r) + w(p,B)	1.35*LC1 + 0.75*LC43 + 1.50*LC60	UB	Short-term	0.900	0.67
Serviceability Limit State Design						
RC75	g	LC1	SC	Permanent		0.31
RC76	g + s	LC1 + LC41	SC	Short-term		0.54
RC77	g + s(l)	LC1 + LC42	SC	Short-term		0.47
RC78	g + s(r)	LC1 + LC43	SC	Short-term		0.50
RC79	g + s + w(q,l,AA)	LC1 + LC41 + 0.60*LC51	SC	Short-term		0.51
RC80	g + s + w(q,l,BB)	LC1 + LC41 + 0.60*LC52	SC	Short-term		0.55
RC81	g + s + w(q,l,AB)	LC1 + LC41 + 0.60*LC53	SC	Short-term		0.53
RC82	g + s + w(q,l,BA)	LC1 + LC41 + 0.60*LC54	SC	Short-term		0.53
RC83	g + s + w(q,r,AA)	LC1 + LC41 + 0.60*LC55	SC	Short-term		0.51
RC84	g + s + w(q,r,BB)	LC1 + LC41 + 0.60*LC56	SC	Short-term		0.55
RC85	g + s + w(q,r,AB)	LC1 + LC41 + 0.60*LC57	SC	Short-term		0.53
RC86	g + s + w(q,r,BA)	LC1 + LC41 + 0.60*LC58	SC	Short-term		0.53
RC87	g + s + w(p,A)	LC1 + LC41 + 0.60*LC59	SC	Short-term		0.49
RC88	g + s + w(p,B)	LC1 + LC41 + 0.60*LC60	SC	Short-term		0.50
RC89	g + s(l) + w(q,l,AA)	LC1 + LC42 + 0.60*LC51	SC	Short-term		0.44
RC90	g + s(l) + w(q,l,BB)	LC1 + LC42 + 0.60*LC52	SC	Short-term		0.48
RC91	g + s(l) + w(q,l,AB)	LC1 + LC42 + 0.60*LC53	SC	Short-term		0.46
RC92	g + s(l) + w(q,l,BA)	LC1 + LC42 + 0.60*LC54	SC	Short-term		0.46
RC93	g + s(l) + w(q,r,AA)	LC1 + LC42 + 0.60*LC55	SC	Short-term		0.44
RC94	g + s(l) + w(q,r,BB)	LC1 + LC42 + 0.60*LC56	SC	Short-term		0.48
RC95	g + s(l) + w(q,r,AB)	LC1 + LC42 + 0.60*LC57	SC	Short-term		0.46
RC96	g + s(l) + w(q,r,BA)	LC1 + LC42 + 0.60*LC58	SC	Short-term		0.46
RC97	g + s(l) + w(p,A)	LC1 + LC42 + 0.60*LC59	SC	Short-term		0.42
RC98	g + s(l) + w(p,B)	LC1 + LC42 + 0.60*LC60	SC	Short-term		0.43
RC99	g + s(r) + w(q,l,AA)	LC1 + LC43 + 0.60*LC51	SC	Short-term		0.46
RC100	g + s(r) + w(q,l,BB)	LC1 + LC43 + 0.60*LC52	SC	Short-term		0.51
RC101	g + s(r) + w(q,l,AB)	LC1 + LC43 + 0.60*LC53	SC	Short-term		0.49
RC102	g + s(r) + w(q,l,BA)	LC1 + LC43 + 0.60*LC54	SC	Short-term		0.48
RC103	g + s(r) + w(q,r,AA)	LC1 + LC43 + 0.60*LC55	SC	Short-term		0.46
RC104	g + s(r) + w(q,r,BB)	LC1 + LC43 + 0.60*LC56	SC	Short-term		0.51
RC105	g + s(r) + w(q,r,AB)	LC1 + LC43 + 0.60*LC57	SC	Short-term		0.49
RC106	g + s(r) + w(q,r,BA)	LC1 + LC43 + 0.60*LC58	SC	Short-term		0.49
RC107	g + s(r) + w(p,A)	LC1 + LC43 + 0.60*LC59	SC	Short-term		0.45
RC108	g + s(r) + w(p,B)	LC1 + LC43 + 0.60*LC60	SC	Short-term		0.46
RC109	g + w(q,l,AA)	LC1 + LC51	SC	Short-term		0.25
RC110	g + w(q,l,BB)	LC1 + LC52	SC	Short-term		0.32
RC111	g + w(q,l,AB)	LC1 + LC53	SC	Short-term		0.29
RC112	g + w(q,l,BA)	LC1 + LC54	SC	Short-term		0.28
RC113	g + w(q,r,AA)	LC1 + LC55	SC	Short-term		0.25
RC114	g + w(q,r,BB)	LC1 + LC56	SC	Short-term		0.33
RC115	g + w(q,r,AB)	LC1 + LC57	SC	Short-term		0.29
RC116	g + w(q,r,BA)	LC1 + LC58	SC	Short-term		0.29
RC117	g + w(p,A)	LC1 + LC59	SC	Short-term		0.23
RC118	g + w(p,B)	LC1 + LC60	SC	Short-term		0.24
RC119	g + s + w(q,l,AA)	LC1 + 0.50*LC41 + LC51	SC	Short-term		0.37
RC120	g + s + w(q,l,BB)	LC1 + 0.50*LC41 + LC52	SC	Short-term		0.44
RC121	g + s + w(q,l,AB)	LC1 + 0.50*LC41 + LC53	SC	Short-term		0.41
RC122	g + s + w(q,l,BA)	LC1 + 0.50*LC41 + LC54	SC	Short-term		0.40
RC123	g + s + w(q,r,AA)	LC1 + 0.50*LC41 + LC55	SC	Short-term		0.37
RC124	g + s + w(q,r,BB)	LC1 + 0.50*LC41 + LC56	SC	Short-term		0.44
RC125	g + s + w(q,r,AB)	LC1 + 0.50*LC41 + LC57	SC	Short-term		0.41
RC126	g + s + w(q,r,BA)	LC1 + 0.50*LC41 + LC58	SC	Short-term		0.41
RC127	g + s + w(p,A)	LC1 + 0.50*LC41 + LC59	SC	Short-term		0.34
RC128	g + s + w(p,B)	LC1 + 0.50*LC41 + LC60	SC	Short-term		0.36
RC129	g + s(l) + w(q,l,AA)	LC1 + 0.50*LC42 + LC51	SC	Short-term		0.33
RC130	g + s(l) + w(q,l,BB)	LC1 + 0.50*LC42 + LC52	SC	Short-term		0.41
RC131	g + s(l) + w(q,l,AB)	LC1 + 0.50*LC42 + LC53	SC	Short-term		0.37
RC132	g + s(l) + w(q,l,BA)	LC1 + 0.50*LC42 + LC54	SC	Short-term		0.37
RC133	g + s(l) + w(q,r,AA)	LC1 + 0.50*LC42 + LC55	SC	Short-term		0.33
RC134	g + s(l) + w(q,r,BB)	LC1 + 0.50*LC42 + LC56	SC	Short-term		0.41
RC135	g + s(l) + w(q,r,AB)	LC1 + 0.50*LC42 + LC57	SC	Short-term		0.37
RC136	g + s(l) + w(q,r,BA)	LC1 + 0.50*LC42 + LC58	SC	Short-term		0.37
RC137	g + s(l) + w(p,A)	LC1 + 0.50*LC42 + LC59	SC	Short-term		0.31
RC138	g + s(l) + w(p,B)	LC1 + 0.50*LC42 + LC60	SC	Short-term		0.33
RC139	g + s(r) + w(q,l,AA)	LC1 + 0.50*LC43 + LC51	SC	Short-term		0.34
RC140	g + s(r) + w(q,l,BB)	LC1 + 0.50*LC43 + LC52	SC	Short-term		0.42
RC141	g + s(r) + w(q,l,AB)	LC1 + 0.50*LC43 + LC53	SC	Short-term		0.38
RC142	g + s(r) + w(q,l,BA)	LC1 + 0.50*LC43 + LC54	SC	Short-term		0.38
RC143	g + s(r) + w(q,r,AA)	LC1 + 0.50*LC43 + LC55	SC	Short-term		0.35
RC144	g + s(r) + w(q,r,BB)	LC1 + 0.50*LC43 + LC56	SC	Short-term		0.42
RC145	g + s(r) + w(q,r,AB)	LC1 + 0.50*LC43 + LC57	SC	Short-term		0.38
RC146	g + s(r) + w(q,r,BA)	LC1 + 0.50*LC43 + LC58	SC	Short-term		0.38
RC147	g + s(r) + w(p,A)	LC1 + 0.50*LC43 + LC59	SC	Short-term		0.32
RC148	g + s(r) + w(p,B)	LC1 + 0.50*LC43 + LC60	SC	Short-term		0.34

■ RESULT COMBINATIONS

RC	Result Combinations Description	Load Cases	Design Situation	LDC	Factor k_{mod}	Max. Ratio
RC149	g	1.60*LC1	SQ	Permanent		0.41
RC150	g + s	1.60*LC1 + LC41	SQ	Short-term		0.61
RC151	g + s(l)	1.60*LC1 + LC42	SQ	Short-term		0.55
RC152	g + s(r)	1.60*LC1 + LC43	SQ	Short-term		0.57
RC153	g + s + w(q,l,AA)	1.60*LC1 + LC41 + 0.60*LC51	SQ	Short-term		0.58
RC154	g + s + w(q,l,BB)	1.60*LC1 + LC41 + 0.60*LC52	SQ	Short-term		0.62
RC155	g + s + w(q,l,AB)	1.60*LC1 + LC41 + 0.60*LC53	SQ	Short-term		0.60
RC156	g + s + w(q,l,BA)	1.60*LC1 + LC41 + 0.60*LC54	SQ	Short-term		0.60
RC157	g + s + w(q,r,AA)	1.60*LC1 + LC41 + 0.60*LC55	SQ	Short-term		0.58
RC158	g + s + w(q,r,BB)	1.60*LC1 + LC41 + 0.60*LC56	SQ	Short-term		0.62
RC159	g + s + w(q,r,AB)	1.60*LC1 + LC41 + 0.60*LC57	SQ	Short-term		0.60
RC160	g + s + w(q,r,BA)	1.60*LC1 + LC41 + 0.60*LC58	SQ	Short-term		0.60
RC161	g + s + w(p,A)	1.60*LC1 + LC41 + 0.60*LC59	SQ	Short-term		0.57
RC162	g + s + w(p,B)	1.60*LC1 + LC41 + 0.60*LC60	SQ	Short-term		0.58
RC163	g + s(l) + w(q,l,AA)	1.60*LC1 + LC42 + 0.60*LC51	SQ	Short-term		0.52
RC164	g + s(l) + w(q,l,BB)	1.60*LC1 + LC42 + 0.60*LC52	SQ	Short-term		0.56
RC165	g + s(l) + w(q,l,AB)	1.60*LC1 + LC42 + 0.60*LC53	SQ	Short-term		0.54
RC166	g + s(l) + w(q,l,BA)	1.60*LC1 + LC42 + 0.60*LC54	SQ	Short-term		0.54
RC167	g + s(l) + w(q,r,AA)	1.60*LC1 + LC42 + 0.60*LC55	SQ	Short-term		0.52
RC168	g + s(l) + w(q,r,BB)	1.60*LC1 + LC42 + 0.60*LC56	SQ	Short-term		0.56
RC169	g + s(l) + w(q,r,AB)	1.60*LC1 + LC42 + 0.60*LC57	SQ	Short-term		0.54
RC170	g + s(l) + w(q,r,BA)	1.60*LC1 + LC42 + 0.60*LC58	SQ	Short-term		0.54
RC171	g + s(l) + w(p,A)	1.60*LC1 + LC42 + 0.60*LC59	SQ	Short-term		0.51
RC172	g + s(l) + w(p,B)	1.60*LC1 + LC42 + 0.60*LC60	SQ	Short-term		0.52
RC173	g + s(r) + w(q,l,AA)	1.60*LC1 + LC43 + 0.60*LC51	SQ	Short-term		0.54
RC174	g + s(r) + w(q,l,BB)	1.60*LC1 + LC43 + 0.60*LC52	SQ	Short-term		0.58
RC175	g + s(r) + w(q,l,AB)	1.60*LC1 + LC43 + 0.60*LC53	SQ	Short-term		0.56
RC176	g + s(r) + w(q,l,BA)	1.60*LC1 + LC43 + 0.60*LC54	SQ	Short-term		0.56
RC177	g + s(r) + w(q,r,AA)	1.60*LC1 + LC43 + 0.60*LC55	SQ	Short-term		0.54
RC178	g + s(r) + w(q,r,BB)	1.60*LC1 + LC43 + 0.60*LC56	SQ	Short-term		0.58
RC179	g + s(r) + w(q,r,AB)	1.60*LC1 + LC43 + 0.60*LC57	SQ	Short-term		0.56
RC180	g + s(r) + w(q,r,BA)	1.60*LC1 + LC43 + 0.60*LC58	SQ	Short-term		0.56
RC181	g + s(r) + w(p,A)	1.60*LC1 + LC43 + 0.60*LC59	SQ	Short-term		0.53
RC182	g + s(r) + w(p,B)	1.60*LC1 + LC43 + 0.60*LC60	SQ	Short-term		0.54
RC183	g + w(q,l,AA)	1.60*LC1 + LC51	SQ	Short-term		0.36
RC184	g + w(q,l,BB)	1.60*LC1 + LC52	SQ	Short-term		0.43
RC185	g + w(q,l,AB)	1.60*LC1 + LC53	SQ	Short-term		0.40
RC186	g + w(q,l,BA)	1.60*LC1 + LC54	SQ	Short-term		0.39
RC187	g + w(q,r,AA)	1.60*LC1 + LC55	SQ	Short-term		0.36
RC188	g + w(q,r,BB)	1.60*LC1 + LC56	SQ	Short-term		0.43
RC189	g + w(q,r,AB)	1.60*LC1 + LC57	SQ	Short-term		0.40
RC190	g + w(q,r,BA)	1.60*LC1 + LC58	SQ	Short-term		0.39
RC191	g + w(p,A)	1.60*LC1 + LC59	SQ	Short-term		0.34
RC192	g + w(p,B)	1.60*LC1 + LC60	SQ	Short-term		0.36
RC193	g + s + w(q,l,AA)	1.60*LC1 + 0.50*LC41 + LC51	SQ	Short-term		0.46
RC194	g + s + w(q,l,BB)	1.60*LC1 + 0.50*LC41 + LC52	SQ	Short-term		0.52
RC195	g + s + w(q,l,AB)	1.60*LC1 + 0.50*LC41 + LC53	SQ	Short-term		0.49
RC196	g + s + w(q,l,BA)	1.60*LC1 + 0.50*LC41 + LC54	SQ	Short-term		0.49
RC197	g + s + w(q,r,AA)	1.60*LC1 + 0.50*LC41 + LC55	SQ	Short-term		0.46
RC198	g + s + w(q,r,BB)	1.60*LC1 + 0.50*LC41 + LC56	SQ	Short-term		0.52
RC199	g + s + w(q,r,AB)	1.60*LC1 + 0.50*LC41 + LC57	SQ	Short-term		0.49
RC200	g + s + w(q,r,BA)	1.60*LC1 + 0.50*LC41 + LC58	SQ	Short-term		0.49
RC201	g + s + w(p,A)	1.60*LC1 + 0.50*LC41 + LC59	SQ	Short-term		0.44
RC202	g + s + w(p,B)	1.60*LC1 + 0.50*LC41 + LC60	SQ	Short-term		0.46
RC203	g + s(l) + w(q,l,AA)	1.60*LC1 + 0.50*LC42 + LC51	SQ	Short-term		0.43
RC204	g + s(l) + w(q,l,BB)	1.60*LC1 + 0.50*LC42 + LC52	SQ	Short-term		0.49
RC205	g + s(l) + w(q,l,AB)	1.60*LC1 + 0.50*LC42 + LC53	SQ	Short-term		0.46
RC206	g + s(l) + w(q,l,BA)	1.60*LC1 + 0.50*LC42 + LC54	SQ	Short-term		0.46
RC207	g + s(l) + w(q,r,AA)	1.60*LC1 + 0.50*LC42 + LC55	SQ	Short-term		0.43
RC208	g + s(l) + w(q,r,BB)	1.60*LC1 + 0.50*LC42 + LC56	SQ	Short-term		0.49
RC209	g + s(l) + w(q,r,AB)	1.60*LC1 + 0.50*LC42 + LC57	SQ	Short-term		0.46
RC210	g + s(l) + w(q,r,BA)	1.60*LC1 + 0.50*LC42 + LC58	SQ	Short-term		0.46
RC211	g + s(l) + w(p,A)	1.60*LC1 + 0.50*LC42 + LC59	SQ	Short-term		0.41
RC212	g + s(l) + w(p,B)	1.60*LC1 + 0.50*LC42 + LC60	SQ	Short-term		0.43
RC213	g + s(r) + w(q,l,AA)	1.60*LC1 + 0.50*LC43 + LC51	SQ	Short-term		0.44
RC214	g + s(r) + w(q,l,BB)	1.60*LC1 + 0.50*LC43 + LC52	SQ	Short-term		0.50
RC215	g + s(r) + w(q,l,AB)	1.60*LC1 + 0.50*LC43 + LC53	SQ	Short-term		0.47
RC216	g + s(r) + w(q,l,BA)	1.60*LC1 + 0.50*LC43 + LC54	SQ	Short-term		0.47
RC217	g + s(r) + w(q,r,AA)	1.60*LC1 + 0.50*LC43 + LC55	SQ	Short-term		0.44
RC218	g + s(r) + w(q,r,BB)	1.60*LC1 + 0.50*LC43 + LC56	SQ	Short-term		0.50
RC219	g + s(r) + w(q,r,AB)	1.60*LC1 + 0.50*LC43 + LC57	SQ	Short-term		0.48
RC220	g + s(r) + w(q,r,BA)	1.60*LC1 + 0.50*LC43 + LC58	SQ	Short-term		0.47
RC221	g + s(r) + w(p,A)	1.60*LC1 + 0.50*LC43 + LC59	SQ	Short-term		0.42
RC222	g + s(r) + w(p,B)	1.60*LC1 + 0.50*LC43 + LC60	SQ	Short-term		0.44
Fire Resistance Check						
RC223	g	LC1	UA	Permanent	1.000	0.72
RC224	g + s	LC1 + 0.20*LC41	UA	Short-term	1.000	0.83
RC225	g + s(l)	LC1 + 0.20*LC42	UA	Short-term	1.000	0.80
RC226	g + s(r)	LC1 + 0.20*LC43	UA	Short-term	1.000	0.81
RC257	g + w(q,l,AA)	LC1 + 0.20*LC51	UA	Short-term	1.000	0.69
RC258	g + w(q,l,BB)	LC1 + 0.20*LC52	UA	Short-term	1.000	0.73
RC259	g + w(q,l,AB)	LC1 + 0.20*LC53	UA	Short-term	1.000	0.71
RC260	g + w(q,l,BA)	LC1 + 0.20*LC54	UA	Short-term	1.000	0.71
RC261	g + w(q,r,AA)	LC1 + 0.20*LC55	UA	Short-term	1.000	0.69
RC262	g + w(q,r,BB)	LC1 + 0.20*LC56	UA	Short-term	1.000	0.73
RC263	g + w(q,r,AB)	LC1 + 0.20*LC57	UA	Short-term	1.000	0.72
RC264	g + w(q,r,BA)	LC1 + 0.20*LC58	UA	Short-term	1.000	0.71
RC265	g + w(p,A)	LC1 + 0.20*LC59	UA	Short-term	1.000	0.68
RC266	g + w(p,B)	LC1 + 0.20*LC60	UA	Short-term	1.000	0.69

■ DESIGN - ALL

No.	Location X [m]	RC	Ratio	Design Description
1	15.105	RC10	0.48 ≤ 1	111) Shear stress acc. to 6.1.7
2	15.220	RC10	0.51 ≤ 1	112) Shear stress at support acc. to 6.1.7
3	10.033	RC43	0.21 ≤ 1	122) Tension and bending stress acc. to 6.2.3
4	10.033	RC10	0.57 ≤ 1	123) Compression and bending stress acc. to 6.2.4
5	8.033	RC10	0.70 ≤ 1	133) Bending stress on tapered edge acc. to 6.4.2 - Compression edge
6	9.639	RC10	0.65 ≤ 1	136) Bending stress on curved beam acc. to 6.4.3
7	6.785	RC6	0.49 ≤ 1	143) Bending stress at ridge cross-section 6.4.3
8	6.785	RC6	1.14 > 1	158) Transversal tension stress at ridge cross-section acc. to DIN EN 1995-1-1/NA:2013-08, NA. 6.4.3
9	6.785	RC6	0.88 ≤ 1	173) Transversal tension stress - Structural transversal tension reinforcement acc. to DIN EN 1995-1-1/NA 2013-08, NA.6.8.5, Glued-in rods
10	9.639	RC10	0.62 ≤ 1	301) Lateral torsional stability verification - Bending without compression acc. to 6.3.3
11	3.734	RC10	0.25 ≤ 1	302) Lateral torsional stability verification - Bending and compression acc. to 6.3.3
12	15.220	RC10	0.67 ≤ 1	352) Support pressure - Compression at an angle acc. to 6.2.2
13	8.236	RC84	0.55 ≤ 1	401) Serviceability - Design Situation Characteristic acc. to 7.2 - Inner span
14	8.236	RC158	0.62 ≤ 1	402) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span
15	8.236	RC158	0.37 ≤ 1	403) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span
16	0.115	RC224	0.35 ≤ 1	511) Fire resistance - Shear stress acc. to 6.1.7
17	0.000	RC224	0.34 ≤ 1	512) Fire resistance - Shear stress at support acc. to 6.1.7
18	10.033	RC224	0.45 ≤ 1	523) Fire resistance - Compression and bending stress acc. to 6.2.4
19	8.440	RC224	0.60 ≤ 1	533) Fire resistance - Bending stress on cut edge acc. to 6.4.2 - Compression edge
20	9.639	RC224	0.56 ≤ 1	536) Fire resistance - Bending stress on curved beam acc. to 6.4.3
21	6.785	RC224	0.41 ≤ 1	543) Fire resistance - Bending stress at ridge cross-section 6.4.3
22	6.785	RC224	0.83 ≤ 1	558) Fire resistance - Transversal tension stress at ridge cross-section acc. to DIN EN 1995-1-1/NA:2013-08, NA. 6.4.3
23	6.785	RC224	0.11 ≤ 1	573) Fire resistance - Transversal tension stress - Structural transversal tension reinforcement acc. to DIN EN 1995-1-1/NA 2013-08, NA.6.8.5, Glued-in rods
24	9.639	RC224	0.60 ≤ 1	701) Fire resistance - Lateral torsional stability verification - Bending without compression acc. to 6.3.3
25	13.664	RC224	0.05 ≤ 1	702) Fire resistance - Lateral torsional stability verification - Bending and compression acc. to 6.3.3
Max			1.14 > 1	

■ DESIGN - ALL - DETAILS

111) Shear stress acc. to 6.1.7

Governing	Location Result Combinations	X RC	15.105 RC10	m	
Design Internal Forces	Normal Force Shear Force Moment	N _d V _{z,d} M _{y,d}	-43.095 -132.525 15.647	kN kN kNm	
Design	Shear Force Beam Width Cross-Section Height Crack Influence Factor Effective Width Shear Stress Shear Strength Partial Factor Modification Factor Shear Strength Design Ratio	V _{z,d} b h k _{cr} b _{ef} τ _d f _{v,k} γ _M k _{mod} f _{v,d} η	132.525 24.00 102.00 0.670 16.08 1.2 3.5 1.250 0.900 2.5 0.48	kN cm cm cm N/mm ² N/mm ² N/mm ² N/mm ² N/mm ² ≤ 1	6.1.7 (2) [7], Tab.1 Tab. 2.3 Tab. 3.1 Eq. (2.14) Eq. (6.13)

112) Shear stress at support acc. to 6.1.7

Governing	Location Result Combinations	X RC	15.220 RC10	m	
Design Internal Forces	Normal Force Shear Force Moment	N _d V _{z,d} M _{y,d}	-43.734 -134.598 -0.064	kN kN kNm	
Design	Shear Force Beam Width Cross-Section Depth Crack Influence Factor Effective Width Shear Stress Shear Strength Partial Factor Modification Factor Shear Strength Design Ratio	V _{z,d} b h _A k _{cr} b _{ef} τ _d f _{v,k} γ _M k _{mod} f _{v,d} η	134.598 24.00 98.45 0.670 16.08 1.3 3.5 1.250 0.900 2.5 0.51	kN cm cm cm N/mm ² N/mm ² N/mm ² N/mm ² N/mm ² ≤ 1	6.1.7 (2) [7], Tab.1 Tab. 2.3 Tab. 3.1 Eq. (2.14) Eq. (6.13)

122) Tension and bending stress acc. to 6.2.3

Governing	Location Result Combinations	X RC	10.033 RC43	m	
Design Internal Forces	Normal Force Shear Force Moment	N _d V _{z,d} M _{y,d}	0.019 -17.082 177.102	kN kN kNm	
Design	Normal Force	N _d	0.019	kN	

■ DESIGN - ALL - DETAILS

	Cross-Sectional Area	A	2448.00	cm ²	
	Tensile Stress	$\sigma_{t,0,d}$	0.0	N/mm ²	Eq. (6.36)
	Tensile Strength	$f_{t,0,k}$	22.3	N/mm ²	[7], Tab. 1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Tensile Strength	$f_{t,0,d}$	16.1	N/mm ²	Eq. (2.14)
	Design - Axial Force Portion		0.00		≤ 1
	Moment	M_d	177.102	kNm	
	Section Modulus	W	41616.00	cm ³	
	Bending Stress	$\sigma_{m,d}$	4.3	N/mm ²	
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab. 1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²	Eq. (2.14)
	Design - Moment Portion		0.21		≤ 1
	Design Ratio	η	0.21		≤ 1 Eq. (6.17)
123) Compression and bending stress acc. to 6.2.4					
Governing	Location	X	10.033	m	
	Result Combinations	RC	RC10		
Design Internal Forces	Normal Force	N_d	-14.932	kN	
	Shear Force	$V_{z,d}$	-41.733	kN	
	Moment	$M_{y,d}$	480.207	kNm	
Design	Normal Force	N_d	14.932	kN	
	Cross-Sectional Area	A	2448.00	cm ²	
	Compressive Stress	$\sigma_{c,0,d}$	0.1	N/mm ²	Eq. (6.36)
	Compressive Strength	$f_{c,0,k}$	28.0	N/mm ²	[7], Tab. 1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Compressive Strength	$f_{c,0,d}$	20.2	N/mm ²	Eq. (2.14)
	Design - Axial Force Portion		0.00		≤ 1
	Moment	M_d	480.207	kNm	
	Section Modulus	W	41616.00	cm ³	
	Bending Stress	$\sigma_{m,d}$	11.5	N/mm ²	
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab. 1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²	Eq. (2.14)
	Design - Moment Portion		0.57		≤ 1
	Design Ratio	η	0.57		≤ 1 Eq. (6.19)
133) Bending stress on tapered edge acc. to 6.4.2 - Compression edge					
Governing	Location	X	8.033	m	
	Result Combinations	RC	RC10		
Design Internal Forces	Normal Force	N_d	-3.140	kN	
	Shear Force	$V_{z,d}$	-6.463	kN	
	Moment	$M_{y,d}$	530.694	kNm	
Design	Cut-to-Grain Angle	α	11.25	°	
	Moment	M_d	530.694	kNm	
	Reduced Beam Width	b_{red}	22.40	cm	
	Beam Depth	h	123.59	cm	
	Longitudinal Stress	$\sigma_{m,\alpha,d}$	9.3	N/mm ²	Eq. (6.37)
	Compressive Strength Perpendicular to Grain	$f_{c,90,d}$	1.8	N/mm ²	Eq. (2.14)
	Shear Strength	$f_{v,d}$	2.5	N/mm ²	Eq. (2.14)
	Auxiliary factor	$k_{m,\alpha}$	0.656		Eq. (6.40)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab. 1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²	Eq. (2.14)
	Bending Strength	$f_{m,\alpha,d}$	13.2	N/mm ²	
	Design Ratio	η	0.70		≤ 1 Eq. (6.19; 6.38)
136) Bending stress on curved beam acc. to 6.4.3					
Governing	Location	X	9.639	m	
	Result Combinations	RC	RC10		
Design Internal Forces	Normal Force	N_d	-11.770	kN	
	Shear Force	$V_{z,d}$	-35.060	kN	
	Moment	$M_{y,d}$	496.041	kNm	
Design	Beam Depth	h	102.85	cm	
	Arc Radius	r_{in}	10.000	m	
	Arc Radius	r	10.514	m	
	Factor	k_l	1.040		Eq. (6.43)
	Lamination Thickness	t	3.00	cm	
	Factor	k_r	1.000		Eq. (6.49)
	Moment	M_d	496.041	kNm	
	Reduced Beam Width	b_{red}	22.40	cm	
	Longitudinal Stress	$\sigma_{m,d}$	13.1	N/mm ²	Eq. (6.42)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab. 1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.65		≤ 1 Eq. (6.41)
143) Bending stress at ridge cross-section 6.4.3					

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Governing	Location	X	6.785	m	
	Result Combinations	RC	RC6		
Design Internal Forces	Normal Force	N _d	2.446	kN	
	Shear Force	V _{z,d}	13.397	kN	
	Moment	M _{y,d}	526.889	kNm	
Design	Beam Depth	h _{ap}	158.71	cm	
	Arc Radius	r _{in}	10.000	m	
	Arc Radius	r	10.794	m	
	Inclination Angle	α _{ap}	18.00	°	
	Aux. Factor	k ₁	2.025		Eq. (6.44)
	Aux. Factor	k ₂	-2.249		Eq. (6.45)
	Aux. Factor	k ₃	2.473		Eq. (6.46)
	Aux. Factor	k ₄	0.633		Eq. (6.47)
	Factor	k _l	1.750		Eq. (6.43)
	Lamination Thickness	t	3.00	cm	
	Factor	k _r	1.000		Eq. (6.49)
	Moment at Ridge Cross-Section	M _{ap,d}	526.889	kNm	
	Reduced Beam Width	b _{ap,red}	22.40	cm	
	Longitudinal Stress	σ _{m,d}	9.8	N/mm ²	Eq. (6.42)
	Bending Strength	f _{m,k}	28.0	N/mm ²	[7], Tab. 1
	Partial Factor	γ _M	1.250		Tab. 2.3
	Modification Factor	k _{mod}	0.900		Tab. 3.1
	Bending Strength	f _{m,d}	20.2	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.49		Eq. (6.41)
158) Transversal tension stress at ridge cross-section acc. to DIN EN 1995-1-1/NA:2013-08, NA. 6.4.3					
Governing	Location	X	6.785	m	
	Result Combinations	RC	RC6		
Design Internal Forces	Normal Force	N _d	-2.446	kN	
	Shear Force	V _{z,d}	13.397	kN	
	Moment	M _{y,d}	526.889	kNm	
Design	Beam Depth	h _{ap}	158.71	cm	
	Beam Width	b _{ap}	24.00	cm	
	Arc Radius	r _{in}	10.000	m	
	Arc Radius	r	10.794	m	
	Inclination Angle	α _{ap}	18.00	°	
	Factor	k _p	0.076		Eq. (6.56)
	Aux. Factor	k ₅	0.065		Eq. (6.57)
	Aux. Factor	k ₆	0.037		Eq. (6.58)
	Aux. Factor	k ₇	0.260		Eq. (6.59)
	Moment at Ridge Cross-Section	M _{ap,d}	526.889	kNm	
	Transversal Tension Stress	σ _{t,90,d}	0.4	N/mm ²	Eq. (6.54)
	Modification Factor	k _{mod}	0.900		Tab. 3.1
	Partial Factor	γ _M	1.250		Tab. 2.3
	Transversal Tensile Strength	f _{t,90,d}	0.4	N/mm ²	Eq. (2.14)
	Factor	k _{dis, DIN EN NA}	1.300		DIN EN 1995-1-1/NA A:2010-12, NA 6.8.5, NA.1
	Reference Height	h ₀	60.00	cm	DIN EN 1995-1-1/NA A:2010-12, NA 6.8.5, NA.1
	Shear Force	V _{z,d}	13.397	kN	
	Shear Stress	τ _d	0.1	N/mm ²	
	Shear Strength	f _{v,k}	3.5	N/mm ²	[7], Tab. 1
	Shear Strength	f _{v,d}	2.5	N/mm ²	Eq. (2.14)
	Design Ratio	η	1.14		DIN EN 1995-1-1/NA A:2013-08, Eq. (NA.93)
173) Transversal tension stress - Structural transversal tension reinforcement acc. to DIN EN 1995-1-1/NA 2013-08, NA.6.8.5, Glued-in rods					
Governing	Location	X	6.785	m	
	Result Combinations	RC	RC6		
Design Internal Forces	Normal Force	N _d	-2.446	kN	
	Shear Force	V _{z,d}	13.397	kN	
	Moment	M _{y,d}	526.889	kNm	
Design	Beam Depth	h _{ap}	158.71	cm	
	Beam Width	b _{ap}	24.00	cm	
	Arc Radius	r _{in}	10.000	m	
	Arc Radius	r	10.794	m	
	Inclination Angle	α _{ap}	18.00	°	
	Factor	k _p	0.076		Eq. (6.56)
	Aux. Factor	k ₅	0.065		Eq. (6.57)
	Aux. Factor	k ₆	0.037		Eq. (6.58)
	Aux. Factor	k ₇	0.260		Eq. (6.59)
	Moment at Ridge Cross-Section	M _{ap,d}	526.889	kNm	
	Transversal Tension Stress	σ _{t,90,d}	0.4	N/mm ²	Eq. (6.54)
	Steel Rod - Outside Diameter	d _r	1.60	cm	

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	Steel Rod - Area	A_{ef}	1.57	cm ²	
	Steel Rod - Tensile Strength	$f_{u,b,k}$	800.0	N/mm ²	EN 1993-1-8
	Steel Rod - Ultimate Limit State	$F_{t,Rk}$	113.040	kN	Calculated,
					Tab.3.4(EN 1993-1-8)
	Steel Rod - Partial Factor	γ_{M2}	1.250		EN 1993-1-8
	Steel Rod - Tension Resistance (Failure)	$F_{t,Rd}$	90.432	kN	Tab.3.4(EN 1993-1-8)
	Glued Joint Strength	$f_{k1,k}$	4.0	N/mm ²	DIN EN 1995-1-1/N A:2013-08,
					Tab.NA.12
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Partial Factor	γ_M	1.300		Tab. 2.3
	Glued Joint Strength	$f_{k1,d}$	2.8	N/mm ²	Eq. (2.14)
	Beam Height in Transversal Tension Area	h_c	102.00	cm	
	Lamination Thickness	t	3.00	cm	
	Half of Glue Length of Steel Rod	l_{ad}	49.50	cm	DIN EN 1995-1-1/N A:2013-08, NA.6.8.5, NA.3
	Steel Rod - Glued Joint Stress Resistance	$R_{ax,F,d}$	34.451	kN	
	Length of Transversal Tension Area	l_{a1}	6.782	m	
	Number of Rods Within a_1	n	1		
	Number of Rods	n_{a1}	8		
	Distance of Rods	a_1	0.848	m	
	Design Value of Tensile Force	$F_{t,90,d}$	30.348	kN	DIN EN 1995-1-1/N A:2013-08, Eq. (NA.94)
	Steel Rod - Glued Joint Stress	$\tau_{ef,d}$	2.4	N/mm ²	DIN EN 1995-1-1/N A:2013-08, Eq. (NA.96)
	Design of Tensile Force of Rod		0.34		EN 1993-1-8
	Design of Glued Joint Stresses of Steel Rod		0.88		DIN EN 1995-1-1/N A:2013-08, Eq. (NA.95)
	Governing Design	η	0.88		≤ 1
301) Lateral torsional stability verification - Bending without compression acc. to 6.3.3					
Governing	Location	X	9.639	m	
	Result Combinations	RC	RC10		
Design Internal Forces	Normal Force	N_d	-11.770	kN	
	Shear Force	$V_{z,d}$	-35.060	kN	
	Moment	$M_{y,d}$	496.041	kNm	
Design	Moment	M_d	496.041	kNm	
	Beam Width	b	24.00	cm	
	Reduced Beam Width	b_{red}	22.40	cm	
	Beam Depth	h	102.85	cm	
	Reduced Section Modulus	W_{red}	39491.70	cm ³	
	Longitudinal Stress	$\sigma_{m,d}$	12.6	N/mm ²	
	Equivalent Cross-Section Height	$h_{0,65}$	108.58	cm	
	Second Moment of Area	I_z^*	125082.00	cm ⁴	
	Torsional Moment of Inertia	I_t^*	430668.00	cm ⁴	
	Section Modulus	W_y^*	47156.70	cm ³	
	Equivalent Member Length	l_{ef}	2.250	m	$> l$
	Modulus of Elasticity	$E_{0,05}$	10500.0	N/mm ²	[7], Tab.1
	Shear Modulus	$G_{0,05}$	540.0	N/mm ²	[7], Tab.1
	Relative Slenderness Ratio	$\lambda_{rel,m}$	0.414		≤ 0.75
	Critical Bending Stress	$\sigma_{m,crit}$	163.6	N/mm ²	Eq. (6.30)
	Lateral Buckling Coefficient	k_{crit}^*	1.000		Eq. (6.34)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.62		≤ 1 Eq. (6.33)
302) Lateral torsional stability verification - Bending and compression acc. to 6.3.3					
Governing	Location	X	3.734	m	
	Result Combinations	RC	RC10		
Design Internal Forces	Normal Force	N_d	-23.344	kN	
	Shear Force	$V_{z,d}$	67.952	kN	
	Moment	$M_{y,d}$	390.191	kNm	
Design	Beam Width	b	24.00	cm	
	Reduced Beam Width	b_{red}	22.40	cm	
	Beam Depth	h	102.43	cm	
	Reduced Cross-Sectional Area	A_{red}	2294.32	cm ²	
	Equivalent Cross-Section Height	$h_{0,65}$	106.45	cm	

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	Torsional Moment of Inertia	I_t^*	420845.00	cm ⁴		
	Section Modulus	W_y^*	45323.00	cm ³		
	Equivalent Cross-Sectional Area	$A_{0,65}$	2554.70	cm ²		
	Second Moment of Area	I_y^*	2412230.00	cm ⁴		
	Radius of Inertia	i_y^*	30.73	cm		
	Compressive Strength	$f_{c,0,k}$	28.0	N/mm ²		[7], Tab. 1
	Partial Factor	γ_M	1.250			Tab. 2.3
	Modification Factor	k_{mod}	0.900			Tab. 3.1
	Compressive Strength	$f_{c,0,d}$	20.2	N/mm ²		Eq. (2.14)
	Modulus of Elasticity	$E_{0,05}$	10500.0	N/mm ²		[7], Tab. 1
	Straightness Factor	β_c	0.100			Eq. (6.29)
	Normal Force	N_d	23.344	kN		
	Compressive Stress	$\sigma_{c,0,d}$	0.1	N/mm ²		Eq. (6.36)
	Design - Axial Force Portion (Compression)		0.01		≤ 1	Eq. (6.2)
	Equivalent Member Length	$l_{ef,z}$	2.250	m		
	Second Moment of Area	I_z^*	122626.00	cm ⁴		
	Radius of Inertia	i_z^*	6.93	cm		
	Slenderness Degree	λ_z^*	32.476			
	Relative Slenderness Ratio	$\lambda_{rel,z}^*$	0.534			Eq. (6.22), Ann. (2)
	Buckling Coefficient	k_z^*	0.654			Eq. (6.28)
	Buckling Coefficient	$k_{c,z}^*$	0.969			Eq. (6.26)
	Design - Axial Force Portion (Compression)		0.01		≤ 1	
	Moment	M_d	390.191	kNm		
	Reduced Section Modulus	W_{red}	39166.00	cm ³		
	Longitudinal Stress	$\sigma_{m,d}$	10.0	N/mm ²		
	Equivalent Member Length	l_{ef}	2.250	m	> l /	
	Shear Modulus	G_{05}	540.0	N/mm ²		[7], Tab. 1
	Relative Slenderness Ratio	$\lambda_{rel,m}$	0.410		≤ 0.75	Eq. (6.30)
	Critical Bending Stress	$\sigma_{m,crit}$	166.6	N/mm ²		Eq. (6.31)
	Lateral Buckling Coefficient	k_{crit}^*	1.000			Eq. (6.34)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²		[7], Tab. 1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²		Eq. (2.14)
	Design Ratio	η	0.25		≤ 1	Eq. (6.35)
352) Support pressure - Compression at an angle acc. to 6.2.2						
Governing	Location	X	15.220	m		
	Result Combinations	RC	RC10			
Design Internal Forces	Normal Force	N_d	-43.734	kN		
	Shear Force	$V_{z,d}$	-134.598	kN		
	Moment	$M_{y,d}$	-0.064	kNm		
Design	Support Force	A_d	142.633	kN		
	Roof Inclination	γ	18.00	°		
	Angle	α	72.00	°		
	Support Length	l_A	23.00	cm		
	Effective Support Length	$l_{A,ef}$	25.85	cm		
	Beam Width	b	24.00	cm		
	Effective Area of Transversal Compression	A_{ef}	620.48	cm ²		
	Transversal compressive Stress	$\sigma_{c,\alpha,d}$	2.3	N/mm ²		
	Transversal Compression Factor	$k_{c,90}$	1.750			
	Compressive Strength	$f_{c,0,k}$	28.0	N/mm ²		[7], Tab. 1
	Partial Factor	γ_M	1.250			Tab. 2.3
	Modification Factor	k_{mod}	0.900			Tab. 3.1
	Compressive Strength	$f_{c,0,d}$	20.2	N/mm ²		Eq. (2.14)
	Transversal Compressive Strength	$f_{c,90,k}$	2.5	N/mm ²		[7], Tab. 1
	Transversal Compressive Strength	$f_{c,90,d}$	1.8	N/mm ²		Eq. (2.14)
	Shear Strength	$f_{v,k}$	3.5	N/mm ²		[7], Tab. 1
	Shear Strength	$f_{v,d}$	2.5	N/mm ²		Eq. (2.14)
	Transv. Compressive Strength Below α	$f_{c,\alpha,d}$	3.4	N/mm ²		
	Design Ratio	η	0.67		≤ 1	Eq. (6.16)
401) Serviceability - Design Situation Characteristic acc. to 7.2 - Inner span						
Governing	Location	X	8.236	m		
	Result Combinations	RC	RC84			
Deformations	Direction x	w_x	11.0	mm		
	Direction y	w_y	0.0	mm		
	Direction z	w_z	28.1	mm		
Design	Deformation in Span	w_{inst}	28.1	mm		
	Reference Length	l	15.220	m		
	Limit Value Criterion	l / ...	300			
	Limit Value of Deformation	$w_{inst,limit}$	50.7	mm		
	Design Ratio	η	0.55		≤ 1	Tab. 7.2
402) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span						
Governing	Location	X	8.236	m		
	Result Combinations	RC	RC158			
Deformations	Direction x	w_x	14.6	mm		
	Direction y	w_y	0.0	mm		
	Direction z	w_z	37.5	mm		

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Design	Deformation Coefficient	k_{def}	0.60		Tab. 3.2
	Deformation in Span	w_{fin}	37.5	mm	
	Precamber	w_c	0.0	mm	
	Deformation, Deducting Raise	$w_{fin} - w_c$	37.5	mm	
	Reference Length	l	15.220	m	
	Limit Value Criterion	$l / \dots$	250		
	Limit Value of Deformation	$w_{fin,limit}$	60.9	mm	
	Design Ratio	η	0.62	≤ 1	Tab. 7.2
403) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span					
Governing	Location	X	8.236	m	
	Result Combinations	RC	RC158		
Deformations	Direction x	w_x	14.6	mm	
	Direction y	w_y	0.0	mm	
	Direction z	w_z	37.5	mm	
Design	Deformation Coefficient	k_{def}	0.60		Tab. 3.2
	Deformation in Span	w_{fin}	37.5	mm	
	Reference Length	l	15.220	m	
	Limit Value Criterion	$l / \dots$	150		
	Limit Value of Deformation	$w_{fin,limit}$	101.5	mm	
	Design Ratio	η	0.37	≤ 1	Tab. 7.2
511) Fire resistance - Shear stress acc. to 6.1.7					
Governing	Location	X	0.115	m	
	Result Combinations	RC	RC224		
Design Internal Forces	Normal Force	N_d	-19.301	kN	
	Shear Force	$V_{z,d}$	59.401	kN	
	Moment	$M_{y,d}$	7.006	kNm	
Design	Shear Force	$V_{z,d}$	59.401	kN	
	Beam Width	b	10.00	cm	
	Cross-Section Height	h_r	95.00	cm	
	Crack Influence Factor	k_{cr}	0.670		6.1.7 (2)
	Effective Width	b_{ef}	6.70	cm	
	Shear Stress	τ_d	1.4	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab. 1
	Factor	k_{fi}	1.150		[2], Tab. 2.1
	Shear Strength	$f_{v,20}$	4.0	N/mm ²	[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
	Shear Strength	$f_{v,d,fi}$	4.0	N/mm ²	[2], Eq. (2.1)
	Design Ratio	η	0.35	≤ 1	Eq. (6.13)
512) Fire resistance - Shear stress at support acc. to 6.1.7					
Governing	Location	X	0.000	m	
	Result Combinations	RC	RC224		
Design Internal Forces	Normal Force	N_d	-19.596	kN	
	Shear Force	$V_{z,d}$	60.309	kN	
	Moment	$M_{y,d}$	-0.045	kNm	
Design	Shear Force	$V_{z,d}$	60.309	kN	
	Beam Width	b	10.00	cm	
	Cross-Section Depth	h_A	98.45	cm	
	Crack Influence Factor	k_{cr}	0.670		6.1.7 (2)
	Effective Width	b_{ef}	6.70	cm	
	Shear Stress	τ_d	1.4	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab. 1
	Factor	k_{fi}	1.150		[2], Tab. 2.1
	Shear Strength	$f_{v,20}$	4.0	N/mm ²	[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
	Shear Strength	$f_{v,d,fi}$	4.0	N/mm ²	[2], Eq. (2.1)
	Design Ratio	η	0.34	≤ 1	Eq. (6.13)
523) Fire resistance - Compression and bending stress acc. to 6.2.4					
Governing	Location	X	10.033	m	
	Result Combinations	RC	RC224		
Design Internal Forces	Normal Force	N_d	-6.278	kN	
	Shear Force	$V_{z,d}$	-19.321	kN	
	Moment	$M_{y,d}$	216.980	kNm	
Design	Normal Force	N_d	6.278	kN	
	Cross-Sectional Area	A	950.00	cm ²	
	Compressive Stress	$\sigma_{c,0,d}$	0.1	N/mm ²	Eq. (6.36)

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	Compressive Strength Factor	$f_{c,0,k}$ k_{fi}	28.0 1.150	N/mm ²		[7], Tab. 1 [2], Tab. 2.1
	Compressive Strength	$f_{c,0,20}$	32.2	N/mm ²		[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000			[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000			[2], 4.2.2 (5)
	Compressive Strength	$f_{c,0,d,fi}$	32.2	N/mm ²		[2], Eq. (2.1)
	Design - Axial Force Portion Moment	M_d	0.00	kNm	≤ 1	
	Section Modulus	W	216.980 15041.70	cm ³		
	Bending Stress	$\sigma_{m,d}$	14.4	N/mm ²		
	Bending Strength	$f_{m,k}$	28.0	N/mm ²		[7], Tab. 1
	Bending Strength	$f_{m,z,20}$	32.2	N/mm ²		[2], Eq. (2.4)
	Bending Strength	$f_{m,d,fi}$	32.2	N/mm ²		[2], Eq. (2.1)
	Design - Moment Portion		0.45		≤ 1	
	Design Ratio	η	0.45		≤ 1	Eq. (6.19)
533) Fire resistance - Bending stress on cut edge acc. to 6.4.2 - Compression edge						
Governing	Location	X	8.440	m		
	Result Combinations	RC	RC224			
Design Internal Forces	Normal Force	N_d	-1.638	kN		
	Shear Force	$V_{z,d}$	-6.947	kN		
	Moment	$M_{y,d}$	238.847	kNm		
Design	Cut-to-Grain Angle	α	9.00	°		
	Moment	M_d	238.847	kNm		
	Reduced Beam Width	b_{red}	8.40	cm		
	Beam Depth	h	108.74	cm		
	Longitudinal Stress	$\sigma_{m,\alpha,d}$	14.4	N/mm ²		Eq. (6.37)
	Compressive Strength Perpendicular to Grain	$f_{c,90,d,fi}$	2.9	N/mm ²		Eq. (2.14)
	Shear Strength	$f_{v,d,fi}$	4.0	N/mm ²		Eq. (2.14)
	Auxiliary factor	$k_{m,\alpha}$	0.747			Eq. (6.40)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²		[7], Tab. 1
	Factor	k_{fi}	1.150			[2], Tab. 2.1
	Bending Strength	$f_{m,z,20}$	32.2	N/mm ²		[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000			[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000			[2], 4.2.2 (5)
	Bending Strength	$f_{m,d,fi}$	32.2	N/mm ²		[2], Eq. (2.1)
	Bending Strength	$f_{m,\alpha,d,fi}$	24.1	N/mm ²		
	Design Ratio	η	0.60		≤ 1	Eq. (6.19; 6.38)
536) Fire resistance - Bending stress on curved beam acc. to 6.4.3						
Governing	Location	X	9.639	m		
	Result Combinations	RC	RC224			
Design Internal Forces	Normal Force	N_d	-5.118	kN		
	Shear Force	$V_{z,d}$	-16.268	kN		
	Moment	$M_{y,d}$	224.337	kNm		
Design	Beam Depth	h	95.85	cm		
	Arc Radius	r_{in}	10.000	m		
	Arc Radius	r	10.479	m		
	Factor	k_l	1.037			Eq. (6.43)
	Lamination Thickness	t	3.00	cm		
	Factor	k_r	1.000			Eq. (6.49)
	Moment	M_d	224.337	kNm		
	Reduced Beam Width	b_{red}	8.40	cm		
	Longitudinal Stress	$\sigma_{m,d}$	18.1	N/mm ²		Eq. (6.42)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²		[7], Tab. 1
	Factor	k_{fi}	1.150			[2], Tab. 2.1
	Bending Strength	$f_{m,z,20}$	32.2	N/mm ²		[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000			[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000			[2], 4.2.2 (5)
	Bending Strength	$f_{m,d,fi}$	32.2	N/mm ²		[2], Eq. (2.1)
	Design Ratio	η	0.56		≤ 1	Eq. (6.41)
543) Fire resistance - Bending stress at ridge cross-section 6.4.3						
Governing	Location	X	6.785	m		
	Result Combinations	RC	RC224			
Design Internal Forces	Normal Force	N_d	1.234	kN		
	Shear Force	$V_{z,d}$	6.760	kN		

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	Moment	$M_{y,d}$	239.148	kNm	
Design	Beam Depth	h_{ap}	151.71	cm	
	Arc Radius	r_{in}	10.000	m	
	Arc Radius	r	10.759	m	
	Inclination Angle	α_{ap}	18.00	°	
	Aux. Factor	k_1	2.025		Eq. (6.44)
	Aux. Factor	k_2	-2.249		Eq. (6.45)
	Aux. Factor	k_3	2.473		Eq. (6.46)
	Aux. Factor	k_4	0.633		Eq. (6.47)
	Factor	k_i	1.759		Eq. (6.43)
	Lamination Thickness	t	3.00	cm	
	Factor	k_r	1.000		Eq. (6.49)
	Moment at Ridge Cross-Section	$M_{ap,d}$	239.148	kNm	
	Reduced Beam Width	$b_{ap,red}$	8.40	cm	
	Longitudinal Stress	$\sigma_{m,d}$	13.1	N/mm ²	Eq. (6.42)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab. 1
	Factor	k_{fi}	1.150		[2], Tab. 2.1
	Bending Strength	$f_{m,z,20}$	32.2	N/mm ²	[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
	Bending Strength	$f_{m,d,fi}$	32.2	N/mm ²	[2], Eq. (2.1)
	Design Ratio	η	0.41		Eq. (6.41) ≤ 1
558) Fire resistance - Transversal tension stress at ridge cross-section acc. to DIN EN 1995-1-1/NA:2013-08, NA. 6.4.3					
Governing	Location	X	6.785	m	
	Result Combinations	RC	RC224		
Design Internal Forces	Normal Force	N_d	-1.234	kN	
	Shear Force	$V_{z,d}$	6.760	kN	
	Moment	$M_{y,d}$	239.148	kNm	
Design	Beam Depth	h_{ap}	151.71	cm	
	Beam Width	b_{ap}	10.00	cm	
	Arc Radius	r_{in}	10.000	m	
	Arc Radius	r	10.759	m	
	Inclination Angle	α_{ap}	18.00	°	
	Factor	k_p	0.075		Eq. (6.56)
	Aux. Factor	k_5	0.065		Eq. (6.57)
	Aux. Factor	k_6	0.037		Eq. (6.58)
	Aux. Factor	k_7	0.260		Eq. (6.59)
	Moment at Ridge Cross-Section	$M_{ap,d}$	239.148	kNm	
	Transversal Tension Stress	$\sigma_{t,90,d}$	0.5	N/mm ²	Eq. (6.54)
	Modification Factor	k_{mod}	1.000		Tab. 3.1
	Partial Factor	γ_M	1.000		Tab. 2.3
	Transversal Tensile Strength	$f_{t,90,d}$	0.6	N/mm ²	Eq. (2.14)
	Factor	$k_{dis, DIN EN NA}$	1.300		DIN EN 1995-1-1/N A:2010-12, NA 6.8.5, NA.1
	Reference Height	h_0	60.00	cm	DIN EN 1995-1-1/N A:2010-12, NA 6.8.5, NA.1
	Shear Force	$V_{z,d}$	6.760	kN	
	Shear Stress	τ_d	0.1	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab. 1
	Shear Strength	$f_{v,d}$	4.0	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.83		DIN EN 1995-1-1/N A:2013-08, Eq. (NA.93) ≤ 1
573) Fire resistance - Transversal tension stress - Structural transversal tension reinforcement acc. to DIN EN 1995-1-1/NA 2013-08, NA.6.8.5, Glued-in rods					
Governing	Location	X	6.785	m	
	Result Combinations	RC	RC224		
Design Internal Forces	Normal Force	N_d	-1.234	kN	
	Shear Force	$V_{z,d}$	6.760	kN	
	Moment	$M_{y,d}$	239.148	kNm	
Design	Beam Depth	h_{ap}	151.71	cm	
	Beam Width	b_{ap}	10.00	cm	
	Arc Radius	r_{in}	10.000	m	
	Arc Radius	r	10.759	m	
	Inclination Angle	α_{ap}	18.00	°	
	Factor	k_p	0.075		Eq. (6.56)
	Aux. Factor	k_5	0.065		Eq. (6.57)
	Aux. Factor	k_6	0.037		Eq. (6.58)
	Aux. Factor	k_7	0.260		Eq. (6.59)
	Moment at Ridge Cross-Section	$M_{ap,d}$	239.148	kNm	

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Transversal Tension Stress	$\sigma_{t,90,d}$	0.5	N/mm ²	Eq. (6.54)
Steel Rod - Outside Diameter	d_r	1.60	cm	
Steel Rod - Area	A_{ef}	1.57	cm ²	
Steel Rod - Tensile Strength	$f_{u,b,k}$	800.0	N/mm ²	EN 1993-1-8
Steel Rod - Ultimate Limit State	$F_{t,Rk}$	113.040	kN	Calculated,
Steel Rod - Partial Factor	γ_{M2}	1.000		Tab.3.4(EN 1993-1-8)
Steel Rod - Tension Resistance (Failure)	$F_{t,Rd}$	113.040	kN	EN 1993-1-8
Glued Joint Strength	$f_{k1,k}$	4.0	N/mm ²	Tab.3.4(EN 1993-1-8)
Factor	k_{fi}	1.150		EN 1993-1-8
Modification Factor	$k_{mod,fi}$	1.000		Tab.3.4(EN 1993-1-8)
Partial Factor	$\gamma_{M,fi}$	1.000		DIN EN 1995-1-1/N A:2013-08,
Glued Joint Strength	$f_{k1,d,fi}$	4.6	N/mm ²	Tab.NA.12
Beam Height in Transversal Tension Area	h_c	102.00	cm	[2], Tab. 2.1
Lamination Thickness	t	3.00	cm	[2], 4.2.2 (5)
Half of Glue Length of Steel Rod	l_{ad}	49.50	cm	[2], 2.3 (1)
Length of Transversal Tension Area	l_{a1}	57.227	kN	Eq. (2.14)
Number of Rods Within a_1	n	6.782	m	
Number of Rods	n_{a1}	1		
Distance of Rods	a_1	8		
Design Value of Tensile Force	$F_{t,90,d}$	0.848	m	DIN EN 1995-1-1/N A:2013-08, NA.6.8.5, NA.3
Steel Rod - Glued Joint Stress	$\tau_{ef,d}$	6.225	kN	
Design of Tensile Force of Rod		0.06		DIN EN 1995-1-1/N A:2013-08, Eq. (NA.94)
Design of Glued Joint Stresses of Steel Rod		0.11		DIN EN 1995-1-1/N A:2013-08, Eq. (NA.96)
Governing Design	η	0.11		EN 1993-1-8
				DIN EN 1995-1-1/N A:2013-08, Eq. (NA.95)
701) Fire resistance - Lateral torsional stability verification - Bending without compression acc. to 6.3.3				
Governing	Location	X	9.639	m
	Result Combinations	RC	RC224	
Design Internal Forces	Normal Force	N_d	-4.814	kN
	Shear Force	$V_{z,d}$	-16.361	kN
	Moment	$M_{y,d}$	224.338	kNm
Design	Moment	M_d	224.338	kNm
	Beam Width	b	10.00	cm
	Reduced Beam Width	b_{red}	8.40	cm
	Beam Depth	h	95.85	cm
	Reduced Section Modulus	W_{red}	12862.10	cm ³
	Longitudinal Stress	$\sigma_{m,d}$	17.4	N/mm ²
	Equivalent Cross-Section Height	$h_{0,65}$	101.58	cm
	Second Moment of Area	I_{z^*}	8465.00	cm ⁴
	Torsional Moment of Inertia	I_{t^*}	31760.00	cm ⁴
	Section Modulus	W_{y^*}	17197.50	cm ³
	Equivalent Member Length	l_{ef}	2.250	m
	Modulus of Elasticity	$E_{d,fi}$	12075.0	N/mm ²
	Shear Modulus	G_{fi}	621.0	N/mm ²
	Relative Slenderness Ratio	$\lambda_{rel,m}$	0.876	
	Critical Bending Stress	$\sigma_{m,crit}$	36.5	N/mm ²
	Lateral Buckling Coefficient	k_{crit}	0.903	
	Bending Strength	$f_{m,k}$	28.0	N/mm ²
	Factor	k_{fi}	1.150	
	Bending Strength	$f_{m,z,20}$	32.2	N/mm ²
	Partial Factor	$\gamma_{M,fi}$	1.000	
	Modification Factor	$k_{mod,fi}$	1.000	
	Bending Strength	$f_{m,d,fi}$	32.2	N/mm ²
	Design Ratio	η	0.60	
				≤ 1
702) Fire resistance - Lateral torsional stability verification - Bending and compression acc. to 6.3.3				

■ DESIGN - ALL - DETAILS

Governing	Location	X	13.664	m	
	Result Combinations	RC	RC224		
Design Internal Forces	Normal Force	N _d	-15.589	kN	
	Shear Force	V _{z,d}	-47.979	kN	
	Moment	M _{y,d}	88.506	kNm	
Design	Beam Width	b	10.00	cm	
	Beam Depth	h	95.00	cm	
	Cross-Sectional Area	A	950.00	cm ²	
	Equivalent Cross-Section Height	h _{0,65}	95.00	cm	
	Torsional Moment of Inertia	I _u *	29566.70	cm ⁴	
	Section Modulus	W _y *	15041.70	cm ³	
	Equivalent Cross-Sectional Area	A _{0,65}	950.00	cm ²	
	Second Moment of Area	I _y *	714479.00	cm ⁴	
	Radius of Inertia	i _y *	27.42	cm	
	Compressive Strength	f _{c,0,k}	28.0	N/mm ²	[7], Tab. 1
	Factor	k _{fi}	1.150		[2], Tab. 2.1
	Compressive Strength	f _{c,0,20}	32.2	N/mm ²	[2], Eq. (2.4)
	Partial Factor	γ _{M,fi}	1.000		[2], 2.3 (1)
	Modification Factor	k _{mod,fi}	1.000		[2], 4.2.2 (5)
	Compressive Strength	f _{c,0,d,fi}	32.2	N/mm ²	[2], Eq. (2.1)
	Modulus of Elasticity	E _{d,fi}	12075.0	N/mm ²	[2], Eq. (2.2)
	Straightness Factor	β _c	0.100		Eq. (6.29)
	Normal Force	N _d	15.589	kN	
	Compressive Stress	σ _{c,0,d}	0.2	N/mm ²	Eq. (6.36)
	Design - Axial Force Portion (Compression)		0.01		Eq. (6.2)
	Equivalent Member Length	l _{ef,z}	2.250	m	
	Second Moment of Area	I _z *	7916.67	cm ⁴	
	Radius of Inertia	i _z *	2.89	cm	
	Slenderness Degree	λ _z *	77.942		
	Relative Slenderness Ratio	λ _{rel,z} *	1.195		Eq. (6.22), Ann. (2)
	Buckling Coefficient	k _z *	1.258		Eq. (6.28)
	Buckling Coefficient	k _{c,z} *	0.605		Eq. (6.26)
	Design - Axial Force Portion (Compression)		0.01		≤ 1
	Moment	M _d	88.506	kNm	
	Section Modulus	W	15041.70	cm ³	
	Longitudinal Stress	σ _{m,d}	5.9	N/mm ²	
	Equivalent Member Length	l _{ef}	2.250	m	> l /
	Shear Modulus	G _{d,fi}	621.0	N/mm ²	[2], Eq. (2.2)
	Relative Slenderness Ratio	λ _{rel,m}	0.849		≤ 1.4
	Critical Bending Stress	σ _{m,crit}	38.9	N/mm ²	Eq. (6.31)
	Lateral Buckling Coefficient	k _{crit} *	0.924		Eq. (6.34)
	Bending Strength	f _{m,k}	28.0	N/mm ²	[7], Tab. 1
	Bending Strength	f _{m,z,20}	32.2	N/mm ²	[2], Eq. (2.4)
	Bending Strength	f _{m,d,fi}	32.2	N/mm ²	[2], Eq. (2.1)
	Design Ratio	η	0.05		≤ 1
					Eq. (6.35)

■ SUPPORT FORCES

LC	Result Combinations	Left Support		Right Support		Stab. loads	Max.Moment	
RC	Description	A _x [kN]	A _z [kN]	A _x [kN]	A _z [kN]	q [kN/m]	M _y [kNm]	
Load Cases (Characteristic Values)								
LC1	Self-Weight + Roof Finishes	0.000	55.827	0.000	55.812	0.139	210.039	
LC21	Imposed Load	0.000	0.000	0.000	0.000	0.000	0.000	
LC41	Snow (Both Sides Full)	0.000	41.855	0.000	41.855	0.106	159.258	
LC42	Snow (Left Side Full)	0.000	35.427	0.000	25.086	0.079	114.083	
LC43	Snow (Right Side Full)	0.000	27.355	0.000	37.696	0.088	129.166	
LC51	Wind Transversely to Ridge (left)(AA)	1.169	-12.571	0.000	-11.150	0.021	42.313	
LC52	Wind Transversely to Ridge (left)(BB)	1.665	4.373	0.000	1.377	0.007	12.762	
LC53	Wind Transversely to Ridge (left)(AB)	-2.804	-7.544	0.000	-1.818	0.009	17.046	
LC54	Wind Transversely to Ridge (left)(BA)	5.638	-0.654	0.000	-7.955	0.011	21.682	
LC55	Wind Transversely to Ridge (right)(AA)	0.023	-11.013	0.000	-11.692	0.019	39.248	
LC56	Wind Transversely to Ridge (right)(BB)	-2.082	2.030	0.000	5.006	0.012	12.502	
LC57	Wind Transversely to Ridge (right)(AB)	3.242	-2.529	0.000	-8.180	0.007	14.900	
LC58	Wind Transversely to Ridge (right)(BA)	-5.301	-6.455	0.000	1.493	0.019	25.158	
LC59	Wind Parallel to Ridge (A)	1.123	-15.961	0.000	-15.927	0.027	55.129	
LC60	Wind Parallel to Ridge (B)	0.885	-12.570	0.000	-12.543	0.021	43.417	
Max		5.638	55.827	0.000	55.812	0.139	210.039	
Min		-5.301	-15.961	0.000	-15.927	0.000	0.000	
Result Combinations for Ultimate Limit State (Design Values) (STR)								

SUPPORT FORCES

LC RC	Result Combinations Description	Left Support		Right Support		Stab. loads q [kN/m]	Max.Moment M _y [kNm]
		A _x [kN]	A _z [kN]	A _x [kN]	A _z [kN]		
RC1	g	0.000	75.366	0.000	75.346	0.188	283.553
RC2	g + s	0.000	138.148	0.000	138.128	0.347	522.440
RC3	g + s(l)	0.000	128.507	0.000	112.975	0.306	451.948
RC4	g + s(r)	0.000	116.399	0.000	131.890	0.320	475.878
RC5	g + s + w(q,l,AA)	1.052	126.835	0.000	128.093	0.322	484.701
RC6	g + s + w(q,l,BB)	1.498	142.084	0.000	139.367	0.352	531.856
RC7	g + s + w(q,l,AB)	-2.524	131.359	0.000	136.492	0.342	510.008
RC8	g + s + w(q,l,BA)	5.074	137.560	0.000	130.969	0.335	507.147
RC9	g + s + w(q,r,AA)	0.021	128.236	0.000	127.605	0.324	488.048
RC10	g + s + w(q,r,BB)	-1.874	139.975	0.000	142.633	0.357	531.819
RC11	g + s + w(q,r,AB)	2.918	135.872	0.000	130.766	0.337	512.233
RC12	g + s + w(q,r,BA)	-4.771	132.339	0.000	139.472	0.346	508.287
RC13	g + s + w(p,A)	1.011	123.784	0.000	123.794	0.313	473.047
RC14	g + s + w(p,B)	0.796	126.835	0.000	126.839	0.320	483.541
RC15	g + s(l) + w(q,l,AA)	1.052	117.193	0.000	102.940	0.279	415.363
RC16	g + s(l) + w(q,l,BB)	1.498	132.443	0.000	114.215	0.311	461.991
RC17	g + s(l) + w(q,l,AB)	-2.524	121.717	0.000	111.339	0.300	438.835
RC18	g + s(l) + w(q,l,BA)	5.074	127.918	0.000	105.816	0.289	439.521
RC19	g + s(l) + w(q,r,AA)	0.021	118.595	0.000	102.452	0.283	417.204
RC20	g + s(l) + w(q,r,BB)	-1.874	130.333	0.000	117.481	0.316	460.606
RC21	g + s(l) + w(q,r,AB)	2.918	126.231	0.000	105.613	0.294	442.922
RC22	g + s(l) + w(q,r,BA)	-4.771	122.697	0.000	114.320	0.304	435.837
RC23	g + s(l) + w(p,A)	1.011	114.142	0.000	98.641	0.271	403.317
RC24	g + s(l) + w(p,B)	0.796	117.194	0.000	101.687	0.278	413.617
RC25	g + s(r) + w(q,l,AA)	1.052	105.085	0.000	121.855	0.295	437.857
RC26	g + s(r) + w(q,l,BB)	1.498	120.335	0.000	133.129	0.325	485.003
RC27	g + s(r) + w(q,l,AB)	-2.524	109.609	0.000	130.253	0.313	464.119
RC28	g + s(r) + w(q,l,BA)	5.074	115.810	0.000	124.730	0.307	459.118
RC29	g + s(r) + w(q,r,AA)	0.021	106.487	0.000	121.367	0.296	441.961
RC30	g + s(r) + w(q,r,BB)	-1.874	118.225	0.000	136.395	0.328	485.858
RC31	g + s(r) + w(q,r,AB)	2.918	114.123	0.000	124.528	0.310	465.037
RC32	g + s(r) + w(q,r,BA)	-4.771	110.589	0.000	133.234	0.315	463.324
RC33	g + s(r) + w(p,A)	1.011	102.034	0.000	117.556	0.286	426.296
RC34	g + s(r) + w(p,B)	0.796	105.086	0.000	120.601	0.293	436.822
RC35	g + w(q,l,AA)	1.754	56.509	0.000	58.621	0.147	221.184
RC36	g + w(q,l,BB)	2.497	81.926	0.000	77.411	0.197	299.538
RC37	g + w(q,l,AB)	-4.206	64.050	0.000	72.619	0.179	263.107
RC38	g + w(q,l,BA)	8.457	74.385	0.000	63.413	0.169	261.195
RC39	g + w(q,r,AA)	0.034	58.846	0.000	57.807	0.149	226.312
RC40	g + w(q,r,BB)	-3.123	78.410	0.000	82.854	0.205	299.426
RC41	g + w(q,r,AB)	4.863	71.573	0.000	63.076	0.172	267.160
RC42	g + w(q,r,BA)	-7.952	65.683	0.000	77.586	0.188	261.729
RC43	g + w(p,A)	1.685	51.425	0.000	51.456	0.132	201.465
RC44	g + w(p,B)	1.327	56.511	0.000	56.531	0.144	218.875
RC45	g + s + w(q,l,AA)	1.754	87.901	0.000	90.012	0.226	340.374
RC46	g + s + w(q,l,BB)	2.497	113.317	0.000	108.802	0.277	418.903
RC47	g + s + w(q,l,AB)	-4.206	95.441	0.000	104.010	0.259	382.454
RC48	g + s + w(q,l,BA)	8.457	105.777	0.000	94.805	0.248	379.235
RC49	g + s + w(q,r,AA)	0.034	90.237	0.000	89.198	0.229	345.676
RC50	g + s + w(q,r,BB)	-3.123	109.802	0.000	114.246	0.284	418.772
RC51	g + s + w(q,r,AB)	4.863	102.964	0.000	94.467	0.251	386.267
RC52	g + s + w(q,r,BA)	-7.952	97.075	0.000	108.977	0.267	380.408
RC53	g + s + w(p,A)	1.685	82.816	0.000	82.847	0.211	320.829
RC54	g + s + w(p,B)	1.327	87.902	0.000	87.922	0.223	338.240
RC55	g + s(l) + w(q,l,AA)	1.754	83.080	0.000	77.436	0.201	306.101
RC56	g + s(l) + w(q,l,BB)	2.497	108.496	0.000	96.226	0.254	383.949
RC57	g + s(l) + w(q,l,AB)	-4.206	90.620	0.000	91.433	0.238	346.254
RC58	g + s(l) + w(q,l,BA)	8.457	100.956	0.000	82.228	0.224	346.579
RC59	g + s(l) + w(q,r,AA)	0.034	85.416	0.000	76.622	0.208	309.802
RC60	g + s(l) + w(q,r,BB)	-3.123	104.981	0.000	101.669	0.263	382.608
RC61	g + s(l) + w(q,r,AB)	4.863	98.143	0.000	81.890	0.227	352.017
RC62	g + s(l) + w(q,r,BA)	-7.952	92.254	0.000	96.401	0.245	343.289
RC63	g + s(l) + w(p,A)	1.685	77.995	0.000	70.270	0.188	286.010
RC64	g + s(l) + w(p,B)	1.327	83.081	0.000	75.346	0.200	303.260
RC65	g + s(r) + w(q,l,AA)	1.754	77.026	0.000	86.893	0.212	316.347
RC66	g + s(r) + w(q,l,BB)	2.497	102.442	0.000	105.683	0.263	394.990
RC67	g + s(r) + w(q,l,AB)	-4.206	84.566	0.000	100.891	0.243	359.622
RC68	g + s(r) + w(q,l,BA)	8.457	94.902	0.000	91.685	0.233	353.701
RC69	g + s(r) + w(q,r,AA)	0.034	79.362	0.000	86.079	0.215	322.693
RC70	g + s(r) + w(q,r,BB)	-3.123	98.927	0.000	111.126	0.267	395.854
RC71	g + s(r) + w(q,r,AB)	4.863	92.089	0.000	91.348	0.237	362.006
RC72	g + s(r) + w(q,r,BA)	-7.952	86.200	0.000	105.858	0.249	358.580
RC73	g + s(r) + w(p,A)	1.685	71.941	0.000	79.728	0.198	296.979
RC74	g + s(r) + w(p,B)	1.327	77.027	0.000	84.803	0.210	314.522
Max		8.457	142.084	0.000	142.633	0.357	531.856
Min		-7.952	51.425	0.000	51.456	0.132	201.465

Result Combinations for Serviceability Limit State (Characteristic Values)

RC75	g	0.000	55.827	0.000	55.812	0.139	210.039
RC76	g + s	0.000	97.682	0.000	97.667	0.245	369.297
RC77	g + s(l)	0.000	91.254	0.000	80.898	0.218	322.250
RC78	g + s(r)	0.000	83.182	0.000	93.508	0.227	338.210
RC79	g + s + w(q,l,AA)	0.702	90.139	0.000	90.977	0.229	344.128
RC80	g + s + w(q,l,BB)	0.999	100.306	0.000	98.493	0.249	375.575
RC81	g + s + w(q,l,AB)	-1.682	93.155	0.000	96.576	0.242	361.009
RC82	g + s + w(q,l,BA)	3.383	97.289	0.000	92.894	0.237	359.092
RC83	g + s + w(q,r,AA)	0.014	91.074	0.000	90.651	0.230	346.369
RC84	g + s + w(q,r,BB)	-1.249	98.899	0.000	100.670	0.252	375.550
RC85	g + s + w(q,r,AB)	1.945	96.164	0.000	92.759	0.239	362.482
RC86	g + s + w(q,r,BA)	-3.181	93.809	0.000	98.563	0.245	359.841
RC87	g + s + w(p,A)	0.674	88.105	0.000	88.111	0.223	336.369
RC88	g + s + w(p,B)	0.531	90.140	0.000	90.141	0.228	343.364
RC89	g + s(l) + w(q,l,AA)	0.702	83.711	0.000	74.208	0.200	297.785

■ SUPPORT FORCES

LC RC	Result Combinations Description	Left Support		Right Support		Stab. loads q [kN/m]	Max.Moment M _y [kNm]
		A _x [kN]	A _z [kN]	A _x [kN]	A _z [kN]		
RC90	g + s(l) + w(q,l,BB)	0.999	93.878	0.000	81.724	0.221	328.871
RC91	g + s(l) + w(q,l,AB)	-1.683	86.727	0.000	79.807	0.214	313.508
RC92	g + s(l) + w(q,l,BA)	3.383	90.862	0.000	76.125	0.207	313.781
RC93	g + s(l) + w(q,r,AA)	0.014	84.646	0.000	73.883	0.202	299.088
RC94	g + s(l) + w(q,r,BB)	-1.249	92.472	0.000	83.902	0.224	328.022
RC95	g + s(l) + w(q,r,AB)	1.945	89.737	0.000	75.990	0.210	316.157
RC96	g + s(l) + w(q,r,BA)	-3.181	87.381	0.000	81.794	0.217	311.552
RC97	g + s(l) + w(p,A)	0.674	81.677	0.000	71.342	0.194	289.754
RC98	g + s(l) + w(p,B)	0.531	83.712	0.000	73.372	0.199	296.621
RC99	g + s(r) + w(q,l,AA)	0.702	75.639	0.000	86.818	0.210	312.887
RC100	g + s(r) + w(q,l,BB)	0.999	85.806	0.000	94.334	0.231	344.318
RC101	g + s(r) + w(q,l,AB)	-1.683	78.655	0.000	92.417	0.223	330.343
RC102	g + s(r) + w(q,l,BA)	3.383	82.790	0.000	88.735	0.219	327.083
RC103	g + s(r) + w(q,r,AA)	0.014	76.574	0.000	86.492	0.212	315.571
RC104	g + s(r) + w(q,r,BB)	-1.249	84.400	0.000	96.511	0.233	344.836
RC105	g + s(r) + w(q,r,AB)	1.945	81.665	0.000	88.600	0.221	331.007
RC106	g + s(r) + w(q,r,BA)	-3.181	79.309	0.000	94.404	0.224	329.732
RC107	g + s(r) + w(p,A)	0.674	73.605	0.000	83.952	0.205	305.180
RC108	g + s(r) + w(p,B)	0.531	75.640	0.000	85.982	0.210	312.197
RC109	g + w(q,l,AA)	1.169	43.256	0.000	44.662	0.112	168.407
RC110	g + w(q,l,BB)	1.665	60.200	0.000	57.189	0.146	220.686
RC111	g + w(q,l,AB)	-2.804	48.283	0.000	53.994	0.134	196.388
RC112	g + w(q,l,BA)	5.638	55.173	0.000	47.857	0.127	194.897
RC113	g + w(q,r,AA)	0.023	44.813	0.000	44.119	0.113	171.858
RC114	g + w(q,r,BB)	-2.082	57.856	0.000	60.817	0.150	220.600
RC115	g + w(q,r,AB)	3.242	53.298	0.000	47.632	0.129	199.058
RC116	g + w(q,r,BA)	-5.301	49.372	0.000	57.305	0.139	195.335
RC117	g + w(p,A)	1.123	39.866	0.000	39.885	0.102	155.304
RC118	g + w(p,B)	0.885	43.257	0.000	43.269	0.110	166.911
RC119	g + s + w(q,l,AA)	1.169	64.183	0.000	65.589	0.164	247.910
RC120	g + s + w(q,l,BB)	1.665	81.127	0.000	78.116	0.198	300.262
RC121	g + s + w(q,l,AB)	-2.804	69.210	0.000	74.921	0.186	275.952
RC122	g + s + w(q,l,BA)	5.638	76.100	0.000	68.784	0.179	273.663
RC123	g + s + w(q,r,AA)	0.023	65.741	0.000	65.047	0.166	251.455
RC124	g + s + w(q,r,BB)	-2.082	78.784	0.000	81.745	0.203	300.164
RC125	g + s + w(q,r,AB)	3.242	74.225	0.000	68.559	0.181	278.501
RC126	g + s + w(q,r,BA)	-5.301	70.299	0.000	78.233	0.192	274.536
RC127	g + s + w(p,A)	1.123	60.793	0.000	60.812	0.155	234.880
RC128	g + s + w(p,B)	0.885	64.184	0.000	64.196	0.163	246.487
RC129	g + s(l) + w(q,l,AA)	1.169	60.969	0.000	57.205	0.148	224.934
RC130	g + s(l) + w(q,l,BB)	1.665	77.913	0.000	69.732	0.184	276.918
RC131	g + s(l) + w(q,l,AB)	-2.804	65.996	0.000	66.537	0.173	251.840
RC132	g + s(l) + w(q,l,BA)	5.638	72.887	0.000	60.400	0.163	251.785
RC133	g + s(l) + w(q,r,AA)	0.023	62.527	0.000	56.663	0.152	227.528
RC134	g + s(l) + w(q,r,BB)	-2.082	75.570	0.000	73.361	0.189	276.076
RC135	g + s(l) + w(q,r,AB)	3.242	71.011	0.000	60.175	0.165	255.554
RC136	g + s(l) + w(q,r,BA)	-5.301	67.085	0.000	69.848	0.177	249.790
RC137	g + s(l) + w(p,A)	1.123	57.579	0.000	52.428	0.139	211.591
RC138	g + s(l) + w(p,B)	0.885	60.970	0.000	55.812	0.147	223.125
RC139	g + s(r) + w(q,l,AA)	1.169	56.933	0.000	63.510	0.155	231.902
RC140	g + s(r) + w(q,l,BB)	1.665	73.877	0.000	76.037	0.189	284.330
RC141	g + s(r) + w(q,l,AB)	-2.804	61.960	0.000	72.842	0.176	260.679
RC142	g + s(r) + w(q,l,BA)	5.638	68.851	0.000	66.705	0.170	256.752
RC143	g + s(r) + w(q,r,AA)	0.023	58.491	0.000	62.967	0.157	236.059
RC144	g + s(r) + w(q,r,BB)	-2.082	71.534	0.000	79.665	0.192	284.833
RC145	g + s(r) + w(q,r,AB)	3.242	66.975	0.000	66.480	0.172	262.341
RC146	g + s(r) + w(q,r,BA)	-5.301	63.049	0.000	76.153	0.180	259.902
RC147	g + s(r) + w(p,A)	1.123	53.543	0.000	58.733	0.146	218.987
RC148	g + s(r) + w(p,B)	0.885	56.934	0.000	62.117	0.154	230.664
RC149	g	0.000	89.323	0.000	89.299	0.223	336.063
RC150	g + s	0.000	131.178	0.000	131.154	0.329	495.321
RC151	g + s(l)	0.000	124.750	0.000	114.385	0.302	447.959
RC152	g + s(r)	0.000	116.678	0.000	126.995	0.311	464.107
RC153	g + s + w(q,l,AA)	0.702	123.635	0.000	124.464	0.312	470.141
RC154	g + s + w(q,l,BB)	0.999	133.801	0.000	131.980	0.333	501.598
RC155	g + s + w(q,l,AB)	-1.683	126.651	0.000	130.063	0.325	487.032
RC156	g + s + w(q,l,BA)	3.383	130.785	0.000	126.381	0.321	485.054
RC157	g + s + w(q,r,AA)	0.014	124.569	0.000	124.138	0.313	472.393
RC158	g + s + w(q,r,BB)	-1.249	132.395	0.000	134.157	0.335	501.574
RC159	g + s + w(q,r,AB)	1.945	129.660	0.000	126.246	0.322	488.445
RC160	g + s + w(q,r,BA)	-3.181	127.304	0.000	132.050	0.328	485.737
RC161	g + s + w(p,A)	0.674	121.601	0.000	121.598	0.306	462.392
RC162	g + s + w(p,B)	0.531	123.636	0.000	123.628	0.311	469.388
RC163	g + s(l) + w(q,l,AA)	0.702	117.207	0.000	107.695	0.283	423.295
RC164	g + s(l) + w(q,l,BB)	0.999	127.374	0.000	115.211	0.305	454.580
RC165	g + s(l) + w(q,l,AB)	-1.683	120.223	0.000	113.294	0.298	439.426
RC166	g + s(l) + w(q,l,BA)	3.383	124.358	0.000	109.612	0.290	438.807
RC167	g + s(l) + w(q,r,AA)	0.014	118.142	0.000	107.370	0.286	424.883
RC168	g + s(l) + w(q,r,BB)	-1.249	125.968	0.000	117.389	0.308	453.964
RC169	g + s(l) + w(q,r,AB)	1.945	123.233	0.000	109.477	0.293	441.685
RC170	g + s(l) + w(q,r,BA)	-3.181	120.877	0.000	115.281	0.300	437.533
RC171	g + s(l) + w(p,A)	0.674	115.173	0.000	104.829	0.278	415.384
RC172	g + s(l) + w(p,B)	0.531	117.208	0.000	106.859	0.283	422.305
RC173	g + s(r) + w(q,l,AA)	0.702	109.135	0.000	120.305	0.294	438.784
RC174	g + s(r) + w(q,l,BB)	0.999	119.302	0.000	127.821	0.314	470.215
RC175	g + s(r) + w(q,l,AB)	-1.683	112.151	0.000	125.904	0.306	456.043
RC176	g + s(r) + w(q,l,BA)	3.383	116.286	0.000	122.222	0.302	453.106
RC177	g + s(r) + w(q,r,AA)	0.014	110.070	0.000	119.979	0.295	441.325
RC178	g + s(r) + w(q,r,BB)	-1.249	117.896	0.000	129.998	0.316	470.570
RC179	g + s(r) + w(q,r,AB)	1.945	115.161	0.000	122.087	0.304	456.904
RC180	g + s(r) + w(q,r,BA)	-3.181	112.805	0.000	127.891	0.307	455.275
RC181	g + s(r) + w(p,A)	0.674	107.101	0.000	117.439	0.288	431.077
RC182	g + s(r) + w(p,B)	0.531	109.136	0.000	119.469	0.293	438.094
RC183	g + w(q,l,AA)	1.169	76.752	0.000	78.149	0.195	294.296

SUPPORT FORCES

LC RC	Result Combinations Description	Left Support		Right Support		Stab. loads q [kN/m]	Max.Moment M _y [kNm]
		A _x [kN]	A _z [kN]	A _x [kN]	A _z [kN]		
RC184	g + w(q,l,BB)	1.665	93.696	0.000	90.676	0.229	346.648
RC185	g + w(q,l,AB)	-2.804	81.779	0.000	87.481	0.217	322.284
RC186	g + w(q,l,BA)	5.638	88.669	0.000	81.344	0.210	319.809
RC187	g + w(q,r,AA)	0.023	78.309	0.000	77.606	0.197	297.849
RC188	g + w(q,r,BB)	-2.082	91.352	0.000	94.304	0.234	346.497
RC189	g + w(q,r,AB)	3.242	86.794	0.000	81.119	0.212	324.887
RC190	g + w(q,r,BA)	-5.301	82.867	0.000	90.792	0.222	320.737
RC191	g + w(p,A)	1.123	73.362	0.000	73.372	0.186	281.266
RC192	g + w(p,B)	0.885	76.753	0.000	76.756	0.194	292.873
RC193	g + s + w(q,l,AA)	1.169	97.679	0.000	99.076	0.248	373.872
RC194	g + s + w(q,l,BB)	1.665	114.623	0.000	111.603	0.282	426.225
RC195	g + s + w(q,l,AB)	-2.804	102.706	0.000	108.408	0.270	401.878
RC196	g + s + w(q,l,BA)	5.638	109.596	0.000	102.271	0.263	399.126
RC197	g + s + w(q,r,AA)	0.023	99.237	0.000	98.534	0.250	377.478
RC198	g + s + w(q,r,BB)	-2.082	112.280	0.000	115.232	0.287	426.113
RC199	g + s + w(q,r,AB)	3.242	107.721	0.000	102.046	0.265	404.463
RC200	g + s + w(q,r,BA)	-5.301	103.795	0.000	111.720	0.275	400.121
RC201	g + s + w(p,A)	1.123	94.299	0.000	94.299	0.239	360.842
RC202	g + s + w(p,B)	0.885	97.680	0.000	97.683	0.247	372.470
RC203	g + s(l) + w(q,l,AA)	1.169	94.465	0.000	90.692	0.231	350.484
RC204	g + s(l) + w(q,l,BB)	1.665	111.409	0.000	103.219	0.267	402.669
RC205	g + s(l) + w(q,l,AB)	-2.804	99.492	0.000	100.024	0.256	377.864
RC206	g + s(l) + w(q,l,BA)	5.638	106.382	0.000	93.887	0.246	376.467
RC207	g + s(l) + w(q,r,AA)	0.023	96.023	0.000	90.150	0.236	353.491
RC208	g + s(l) + w(q,r,BB)	-2.082	109.066	0.000	106.848	0.273	402.099
RC209	g + s(l) + w(q,r,AB)	3.242	104.507	0.000	93.662	0.249	381.135
RC210	g + s(l) + w(q,r,BA)	-5.301	100.581	0.000	103.335	0.261	375.687
RC211	g + s(l) + w(p,A)	1.123	91.075	0.000	85.915	0.223	337.300
RC212	g + s(l) + w(p,B)	0.885	94.466	0.000	89.299	0.231	348.894
RC213	g + s(r) + w(q,l,AA)	1.169	90.429	0.000	96.997	0.239	357.925
RC214	g + s(r) + w(q,l,BB)	1.665	107.373	0.000	109.524	0.273	410.354
RC215	g + s(r) + w(q,l,AB)	-2.804	95.456	0.000	106.329	0.259	386.476
RC216	g + s(r) + w(q,l,BA)	5.638	102.346	0.000	100.192	0.253	382.580
RC217	g + s(r) + w(q,r,AA)	0.023	91.987	0.000	96.454	0.241	361.945
RC218	g + s(r) + w(q,r,BB)	-2.082	105.030	0.000	113.152	0.276	410.688
RC219	g + s(r) + w(q,r,AB)	3.242	100.471	0.000	99.967	0.256	388.365
RC220	g + s(r) + w(q,r,BA)	-5.301	96.545	0.000	109.640	0.263	385.175
RC221	g + s(r) + w(p,A)	1.123	87.039	0.000	92.220	0.229	345.011
RC222	g + s(r) + w(p,B)	0.885	90.430	0.000	95.604	0.237	356.670
Max		5.638	133.801	0.000	134.157	0.335	501.598
Min		-5.301	39.866	0.000	39.885	0.102	155.304

Result Combinations for Fire Resistance (Design Values)

RC223	g	0.000	55.827	0.000	55.812	0.419	210.039
RC224	g + s	0.000	64.198	0.000	64.183	0.483	241.891
RC225	g + s(l)	0.000	62.912	0.000	60.829	0.465	232.346
RC226	g + s(r)	0.000	61.298	0.000	63.351	0.471	235.571
RC257	g + w(q,l,AA)	0.234	53.312	0.000	53.582	0.403	201.646
RC258	g + w(q,l,BB)	0.333	56.701	0.000	56.087	0.423	212.132
RC259	g + w(q,l,AB)	-0.561	54.318	0.000	55.448	0.415	207.277
RC260	g + w(q,l,BA)	1.128	55.696	0.000	54.221	0.412	206.605
RC261	g + w(q,r,AA)	0.005	53.624	0.000	53.473	0.404	202.397
RC262	g + w(q,r,BB)	-0.416	56.232	0.000	56.813	0.424	212.124
RC263	g + w(q,r,AB)	0.648	55.321	0.000	54.176	0.414	207.735
RC264	g + w(q,r,BA)	-1.060	54.536	0.000	56.110	0.415	206.789
RC265	g + w(p,A)	0.225	52.634	0.000	52.626	0.397	199.063
RC266	g + w(p,B)	0.177	53.313	0.000	53.303	0.402	201.395
Max		1.128	64.198	0.000	64.183	0.483	241.891
Min		-1.060	52.634	0.000	52.626	0.397	199.063

Stabilising Forces

Overtuning Moment for Forked Support	T _d	6.648	kNm	Eq. (14)
Axial Force at Compression Chord	N _d	119.378	kN	Eq. (15)
Equiv. Load	q	0.358	kN/m	Eq. (16)

DEFORMATIONS

LC	Result Combinations	Left Support [mm]		Max. Span Deform.		Right Support [mm]	
RC	Description	u _{z,A}	u _{x,A}	X [m]	max u _z [mm]	u _{z,B}	u _{x,B}
Load Cases							
LC1	Self-Weight + Roof Finishes	0.0	0.0	8.236	15.7	0.0	12.9
LC21	Imposed Load	0.0	0.0	0.000	0.0	0.0	0.0
LC41	Snow (Both Sides Full)	0.0	0.0	8.236	11.9	0.0	9.8
LC42	Snow (Left Side Full)	0.0	0.0	8.033	8.3	0.0	6.9
LC43	Snow (Right Side Full)	0.0	0.0	8.641	9.6	0.0	7.7
LC51	Wind Transversely to Ridge (left)(AA)	0.0	0.0	8.440	-3.1	0.0	-2.5
LC52	Wind Transversely to Ridge (left)(BB)	0.0	0.0	6.364	0.8	0.0	0.7
LC53	Wind Transversely to Ridge (left)(AB)	0.0	0.0	6.364	-1.1	0.0	-0.9
LC54	Wind Transversely to Ridge (left)(BA)	0.0	0.0	9.441	-1.3	0.0	-0.9
LC55	Wind Transversely to Ridge (right)(AA)	0.0	0.0	8.033	-2.9	0.0	-2.4
LC56	Wind Transversely to Ridge (right)(BB)	0.0	0.0	9.242	0.9	0.0	0.6

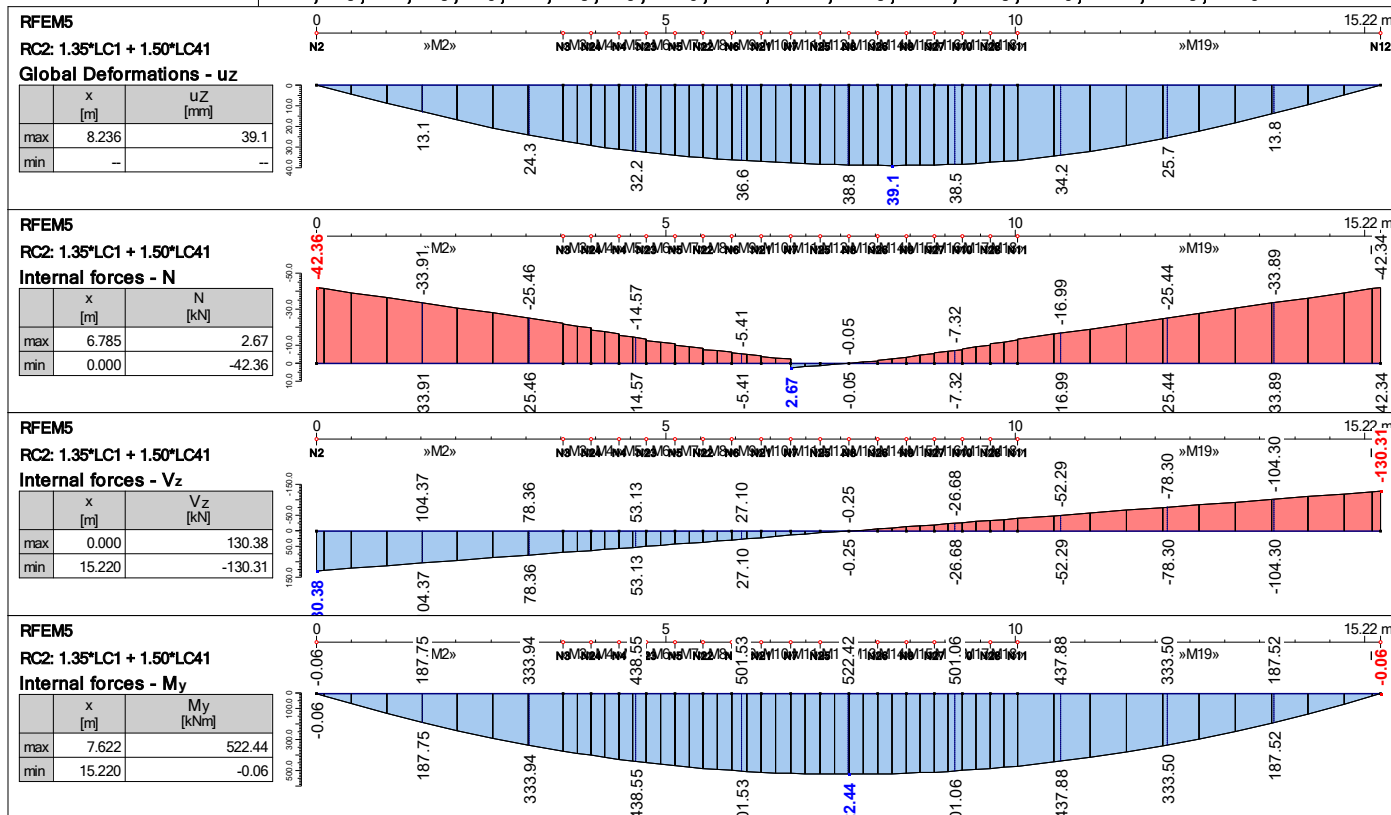
■ DEFORMATIONS

LC RC	Result Combinations Description	Left Support [mm]		Max. Span Deform.		Right Support [mm]	
		u _{z,A}	u _{x,A}	X [m]	max u _z [mm]	u _{z,B}	u _{x,B}
LC57	Wind Transversely to Ridge (right)(AB)	0.0	0.0	9.441	-1.0	0.0	-0.7
LC58	Wind Transversely to Ridge (right)(BA)	0.0	0.0	5.537	-1.3	0.0	-1.0
LC59	Wind Parallel to Ridge (A)	0.0	0.0	8.440	-4.2	0.0	-3.4
LC60	Wind Parallel to Ridge (B)	0.0	0.0	8.440	-3.3	0.0	-2.7
Result Combinations							
RC75	g	0.0	0.0	8.236	15.7	0.0	12.9
RC76	g + s	0.0	0.0	8.236	27.6	0.0	22.6
RC77	g + s(l)	0.0	0.0	8.236	24.0	0.0	19.8
RC78	g + s(r)	0.0	0.0	8.440	25.3	0.0	20.6
RC79	g + s + w(q,l,AA)	0.0	0.0	8.236	25.8	0.0	21.1
RC80	g + s + w(q,l,BB)	0.0	0.0	8.236	28.1	0.0	23.1
RC81	g + s + w(q,l,AB)	0.0	0.0	8.236	27.0	0.0	22.1
RC82	g + s + w(q,l,BA)	0.0	0.0	8.236	26.9	0.0	22.1
RC83	g + s + w(q,r,AA)	0.0	0.0	8.236	25.9	0.0	21.2
RC84	g + s + w(q,r,BB)	0.0	0.0	8.236	28.1	0.0	23.0
RC85	g + s + w(q,r,AB)	0.0	0.0	8.236	27.0	0.0	22.2
RC86	g + s + w(q,r,BA)	0.0	0.0	8.440	27.0	0.0	22.0
RC87	g + s + w(p,A)	0.0	0.0	8.236	25.1	0.0	20.6
RC88	g + s + w(p,B)	0.0	0.0	8.236	25.6	0.0	21.0
RC89	g + s(l) + w(q,l,AA)	0.0	0.0	8.236	22.1	0.0	18.3
RC90	g + s(l) + w(q,l,BB)	0.0	0.0	8.236	24.5	0.0	20.2
RC91	g + s(l) + w(q,l,AB)	0.0	0.0	8.236	23.4	0.0	19.2
RC92	g + s(l) + w(q,l,BA)	0.0	0.0	8.033	23.2	0.0	19.3
RC93	g + s(l) + w(q,r,AA)	0.0	0.0	8.236	22.3	0.0	18.4
RC94	g + s(l) + w(q,r,BB)	0.0	0.0	8.236	24.5	0.0	20.2
RC95	g + s(l) + w(q,r,AB)	0.0	0.0	8.033	23.4	0.0	19.4
RC96	g + s(l) + w(q,r,BA)	0.0	0.0	8.236	23.3	0.0	19.2
RC97	g + s(l) + w(p,A)	0.0	0.0	8.236	21.5	0.0	17.7
RC98	g + s(l) + w(p,B)	0.0	0.0	8.236	22.0	0.0	18.2
RC99	g + s(r) + w(q,l,AA)	0.0	0.0	8.440	23.4	0.0	19.1
RC100	g + s(r) + w(q,l,BB)	0.0	0.0	8.440	25.7	0.0	21.0
RC101	g + s(r) + w(q,l,AB)	0.0	0.0	8.440	24.7	0.0	20.1
RC102	g + s(r) + w(q,l,BA)	0.0	0.0	8.440	24.5	0.0	20.1
RC103	g + s(r) + w(q,r,AA)	0.0	0.0	8.440	23.6	0.0	19.2
RC104	g + s(r) + w(q,r,BB)	0.0	0.0	8.440	25.8	0.0	21.0
RC105	g + s(r) + w(q,r,AB)	0.0	0.0	8.440	24.7	0.0	20.2
RC106	g + s(r) + w(q,r,BA)	0.0	0.0	8.440	24.6	0.0	20.0
RC107	g + s(r) + w(p,A)	0.0	0.0	8.440	22.7	0.0	18.5
RC108	g + s(r) + w(p,B)	0.0	0.0	8.440	23.3	0.0	19.0
RC109	g + w(q,l,AA)	0.0	0.0	8.236	12.6	0.0	10.4
RC110	g + w(q,l,BB)	0.0	0.0	8.236	16.5	0.0	13.6
RC111	g + w(q,l,AB)	0.0	0.0	8.440	14.7	0.0	11.9
RC112	g + w(q,l,BA)	0.0	0.0	8.033	14.4	0.0	12.0
RC113	g + w(q,r,AA)	0.0	0.0	8.440	12.8	0.0	10.5
RC114	g + w(q,r,BB)	0.0	0.0	8.440	16.5	0.0	13.5
RC115	g + w(q,r,AB)	0.0	0.0	8.236	14.7	0.0	12.1
RC116	g + w(q,r,BA)	0.0	0.0	8.440	14.6	0.0	11.8
RC117	g + w(p,A)	0.0	0.0	8.236	11.5	0.0	9.4
RC118	g + w(p,B)	0.0	0.0	8.236	12.4	0.0	10.2
RC119	g + s + w(q,l,AA)	0.0	0.0	8.236	18.6	0.0	15.3
RC120	g + s + w(q,l,BB)	0.0	0.0	8.236	22.4	0.0	18.4
RC121	g + s + w(q,l,AB)	0.0	0.0	8.440	20.6	0.0	16.8
RC122	g + s + w(q,l,BA)	0.0	0.0	8.236	20.4	0.0	16.9
RC123	g + s + w(q,r,AA)	0.0	0.0	8.236	18.8	0.0	15.4
RC124	g + s + w(q,r,BB)	0.0	0.0	8.440	22.5	0.0	18.4
RC125	g + s + w(q,r,AB)	0.0	0.0	8.236	20.7	0.0	17.0
RC126	g + s + w(q,r,BA)	0.0	0.0	8.440	20.6	0.0	16.7
RC127	g + s + w(p,A)	0.0	0.0	8.236	17.4	0.0	14.3
RC128	g + s + w(p,B)	0.0	0.0	8.236	18.3	0.0	15.0
RC129	g + s(l) + w(q,l,AA)	0.0	0.0	8.236	16.8	0.0	13.8
RC130	g + s(l) + w(q,l,BB)	0.0	0.0	8.236	20.6	0.0	17.0
RC131	g + s(l) + w(q,l,AB)	0.0	0.0	8.236	18.8	0.0	15.4
RC132	g + s(l) + w(q,l,BA)	0.0	0.0	8.033	18.6	0.0	15.4
RC133	g + s(l) + w(q,r,AA)	0.0	0.0	8.236	17.0	0.0	13.9
RC134	g + s(l) + w(q,r,BB)	0.0	0.0	8.236	20.7	0.0	17.0
RC135	g + s(l) + w(q,r,AB)	0.0	0.0	8.033	18.9	0.0	15.6
RC136	g + s(l) + w(q,r,BA)	0.0	0.0	8.440	18.8	0.0	15.3
RC137	g + s(l) + w(p,A)	0.0	0.0	8.236	15.6	0.0	12.9
RC138	g + s(l) + w(p,B)	0.0	0.0	8.236	16.5	0.0	13.6
RC139	g + s(r) + w(q,l,AA)	0.0	0.0	8.440	17.4	0.0	14.2
RC140	g + s(r) + w(q,l,BB)	0.0	0.0	8.236	21.3	0.0	17.4
RC141	g + s(r) + w(q,l,AB)	0.0	0.0	8.440	19.4	0.0	15.8
RC142	g + s(r) + w(q,l,BA)	0.0	0.0	8.236	19.2	0.0	15.9
RC143	g + s(r) + w(q,r,AA)	0.0	0.0	8.440	17.6	0.0	14.3
RC144	g + s(r) + w(q,r,BB)	0.0	0.0	8.440	21.3	0.0	17.4
RC145	g + s(r) + w(q,r,AB)	0.0	0.0	8.236	19.5	0.0	16.0
RC146	g + s(r) + w(q,r,BA)	0.0	0.0	8.440	19.4	0.0	15.7
RC147	g + s(r) + w(p,A)	0.0	0.0	8.440	16.3	0.0	13.3
RC148	g + s(r) + w(p,B)	0.0	0.0	8.440	17.2	0.0	14.0
RC149	g	0.0	0.0	8.236	25.1	0.0	20.6
RC150	g + s	0.0	0.0	8.236	37.0	0.0	30.4
RC151	g + s(l)	0.0	0.0	8.236	33.4	0.0	27.5
RC152	g + s(r)	0.0	0.0	8.440	34.7	0.0	28.3
RC153	g + s + w(q,l,AA)	0.0	0.0	8.236	35.2	0.0	28.9
RC154	g + s + w(q,l,BB)	0.0	0.0	8.236	37.5	0.0	30.8
RC155	g + s + w(q,l,AB)	0.0	0.0	8.236	36.4	0.0	29.8
RC156	g + s + w(q,l,BA)	0.0	0.0	8.236	36.3	0.0	29.8
RC157	g + s + w(q,r,AA)	0.0	0.0	8.236	35.3	0.0	28.9
RC158	g + s + w(q,r,BB)	0.0	0.0	8.236	37.5	0.0	30.8

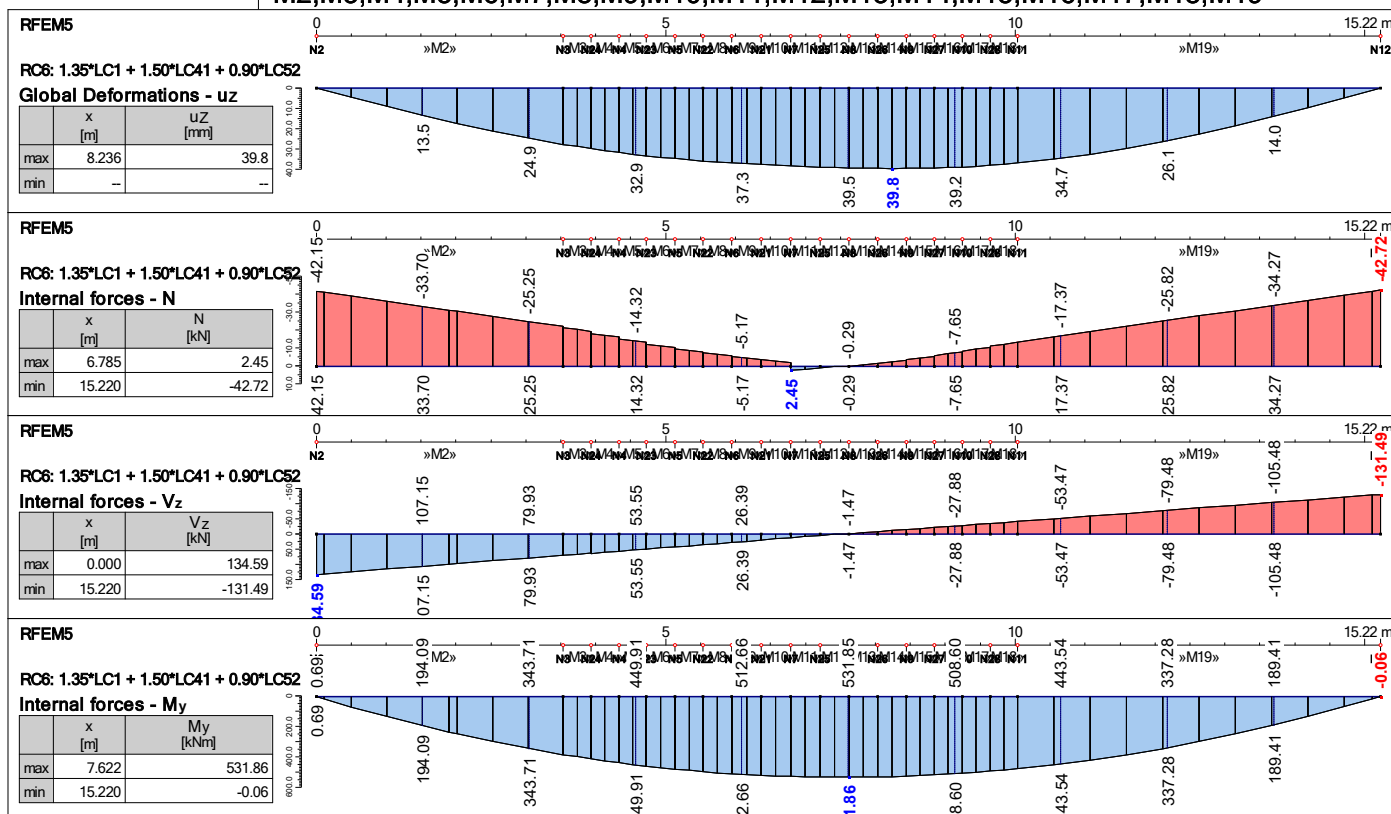
■ DEFORMATIONS

LC RC	Result Combinations Description	Left Support [mm]		Max. Span Deform.		Right Support [mm]	
		u _{z,A}	u _{x,A}	X [m]	max u _z [mm]	u _{z,B}	u _{x,B}
RC159	g + s + w(q,r,AB)	0.0	0.0	8.236	36.5	0.0	29.9
RC160	g + s + w(q,r,BA)	0.0	0.0	8.440	36.4	0.0	29.8
RC161	g + s + w(p,A)	0.0	0.0	8.236	34.5	0.0	28.3
RC162	g + s + w(p,B)	0.0	0.0	8.236	35.0	0.0	28.7
RC163	g + s(l) + w(q,l,AA)	0.0	0.0	8.236	31.6	0.0	26.0
RC164	g + s(l) + w(q,l,BB)	0.0	0.0	8.236	33.9	0.0	27.9
RC165	g + s(l) + w(q,l,AB)	0.0	0.0	8.236	32.8	0.0	27.0
RC166	g + s(l) + w(q,l,BA)	0.0	0.0	8.236	32.7	0.0	27.0
RC167	g + s(l) + w(q,r,AA)	0.0	0.0	8.236	31.7	0.0	26.1
RC168	g + s(l) + w(q,r,BB)	0.0	0.0	8.236	33.9	0.0	27.9
RC169	g + s(l) + w(q,r,AB)	0.0	0.0	8.236	32.8	0.0	27.1
RC170	g + s(l) + w(q,r,BA)	0.0	0.0	8.236	32.8	0.0	26.9
RC171	g + s(l) + w(p,A)	0.0	0.0	8.236	30.9	0.0	25.5
RC172	g + s(l) + w(p,B)	0.0	0.0	8.236	31.4	0.0	25.9
RC173	g + s(r) + w(q,l,AA)	0.0	0.0	8.440	32.8	0.0	26.8
RC174	g + s(r) + w(q,l,BB)	0.0	0.0	8.440	35.2	0.0	28.7
RC175	g + s(r) + w(q,l,AB)	0.0	0.0	8.440	34.1	0.0	27.8
RC176	g + s(r) + w(q,l,BA)	0.0	0.0	8.236	33.9	0.0	27.8
RC177	g + s(r) + w(q,r,AA)	0.0	0.0	8.440	33.0	0.0	26.9
RC178	g + s(r) + w(q,r,BB)	0.0	0.0	8.440	35.2	0.0	28.7
RC179	g + s(r) + w(q,r,AB)	0.0	0.0	8.440	34.1	0.0	27.9
RC180	g + s(r) + w(q,r,BA)	0.0	0.0	8.440	34.1	0.0	27.7
RC181	g + s(r) + w(p,A)	0.0	0.0	8.440	32.2	0.0	26.3
RC182	g + s(r) + w(p,B)	0.0	0.0	8.440	32.7	0.0	26.7
RC183	g + w(q,l,AA)	0.0	0.0	8.236	22.0	0.0	18.1
RC184	g + w(q,l,BB)	0.0	0.0	8.236	25.9	0.0	21.3
RC185	g + w(q,l,AB)	0.0	0.0	8.440	24.1	0.0	19.7
RC186	g + w(q,l,BA)	0.0	0.0	8.236	23.9	0.0	19.7
RC187	g + w(q,r,AA)	0.0	0.0	8.236	22.2	0.0	18.2
RC188	g + w(q,r,BB)	0.0	0.0	8.440	25.9	0.0	21.2
RC189	g + w(q,r,AB)	0.0	0.0	8.236	24.1	0.0	19.9
RC190	g + w(q,r,BA)	0.0	0.0	8.440	24.0	0.0	19.6
RC191	g + w(p,A)	0.0	0.0	8.236	20.9	0.0	17.1
RC192	g + w(p,B)	0.0	0.0	8.236	21.8	0.0	17.9
RC193	g + s + w(q,l,AA)	0.0	0.0	8.236	28.0	0.0	23.0
RC194	g + s + w(q,l,BB)	0.0	0.0	8.236	31.9	0.0	26.2
RC195	g + s + w(q,l,AB)	0.0	0.0	8.440	30.0	0.0	24.6
RC196	g + s + w(q,l,BA)	0.0	0.0	8.236	29.8	0.0	24.6
RC197	g + s + w(q,r,AA)	0.0	0.0	8.236	28.2	0.0	23.1
RC198	g + s + w(q,r,BB)	0.0	0.0	8.236	31.9	0.0	26.1
RC199	g + s + w(q,r,AB)	0.0	0.0	8.236	30.1	0.0	24.8
RC200	g + s + w(q,r,BA)	0.0	0.0	8.440	30.0	0.0	24.5
RC201	g + s + w(p,A)	0.0	0.0	8.236	26.8	0.0	22.0
RC202	g + s + w(p,B)	0.0	0.0	8.236	27.7	0.0	22.8
RC203	g + s(l) + w(q,l,AA)	0.0	0.0	8.236	26.2	0.0	21.6
RC204	g + s(l) + w(q,l,BB)	0.0	0.0	8.236	30.1	0.0	24.7
RC205	g + s(l) + w(q,l,AB)	0.0	0.0	8.236	28.2	0.0	23.1
RC206	g + s(l) + w(q,l,BA)	0.0	0.0	8.236	28.0	0.0	23.2
RC207	g + s(l) + w(q,r,AA)	0.0	0.0	8.236	26.4	0.0	21.7
RC208	g + s(l) + w(q,r,BB)	0.0	0.0	8.236	30.1	0.0	24.7
RC209	g + s(l) + w(q,r,AB)	0.0	0.0	8.236	28.3	0.0	23.3
RC210	g + s(l) + w(q,r,BA)	0.0	0.0	8.440	28.2	0.0	23.0
RC211	g + s(l) + w(p,A)	0.0	0.0	8.236	25.0	0.0	20.6
RC212	g + s(l) + w(p,B)	0.0	0.0	8.236	25.9	0.0	21.3
RC213	g + s(r) + w(q,l,AA)	0.0	0.0	8.236	26.8	0.0	22.0
RC214	g + s(r) + w(q,l,BB)	0.0	0.0	8.236	30.7	0.0	25.2
RC215	g + s(r) + w(q,l,AB)	0.0	0.0	8.440	28.9	0.0	23.5
RC216	g + s(r) + w(q,l,BA)	0.0	0.0	8.236	28.6	0.0	23.6
RC217	g + s(r) + w(q,r,AA)	0.0	0.0	8.440	27.0	0.0	22.1
RC218	g + s(r) + w(q,r,BB)	0.0	0.0	8.440	30.7	0.0	25.1
RC219	g + s(r) + w(q,r,AB)	0.0	0.0	8.236	28.9	0.0	23.7
RC220	g + s(r) + w(q,r,BA)	0.0	0.0	8.440	28.8	0.0	23.4
RC221	g + s(r) + w(p,A)	0.0	0.0	8.236	25.7	0.0	21.0
RC222	g + s(r) + w(p,B)	0.0	0.0	8.236	26.6	0.0	21.7
Max/Min Deformations							
Max		0.0	0.0	8.236	37.5	0.0	30.8
Min		0.0	0.0	8.440	-4.2	0.0	-3.4

■ RESULT DIAGRAMS ON MEMBER M2,M3,M4,M5,M6,M7,M8,M9,M10,M11,M12,M13,M14,M15,M16,M17,M18,M19

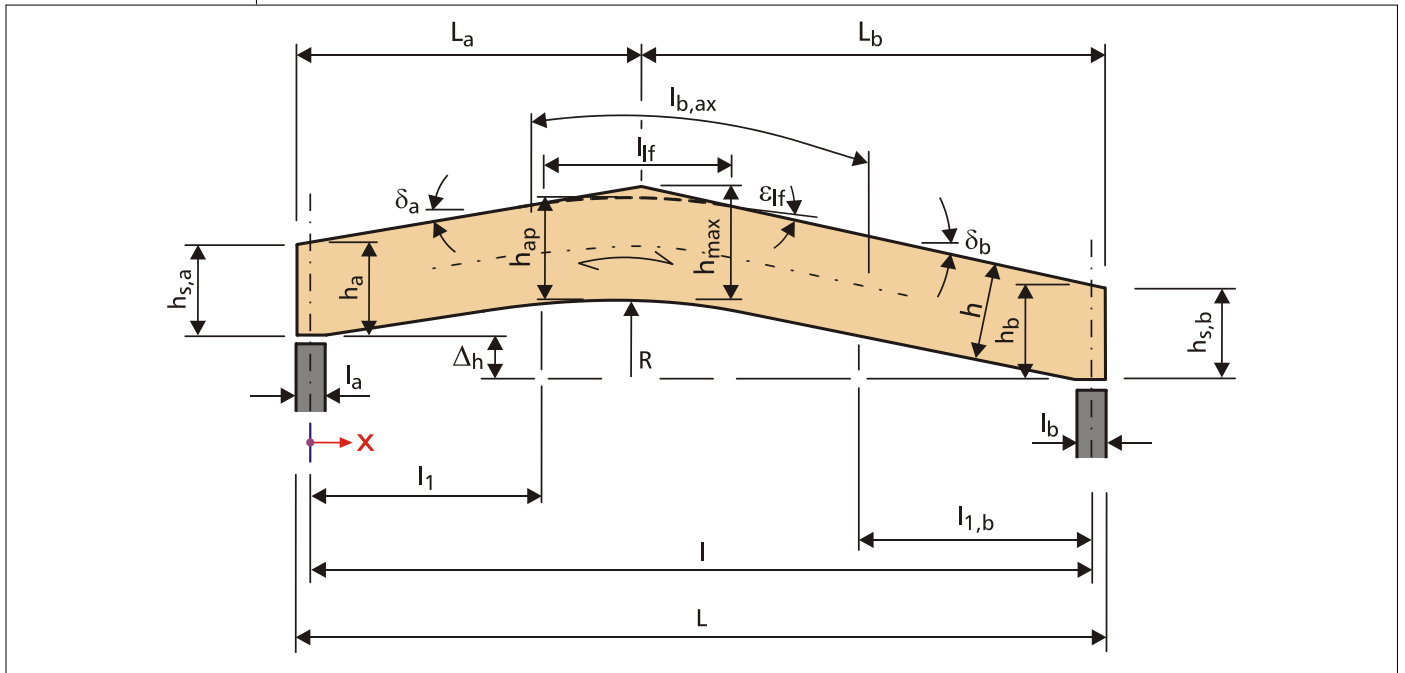


■ RESULT DIAGRAMS ON MEMBER M2,M3,M4,M5,M6,M7,M8,M9,M10,M11,M12,M13,M14,M15,M16,M17,M18,M19

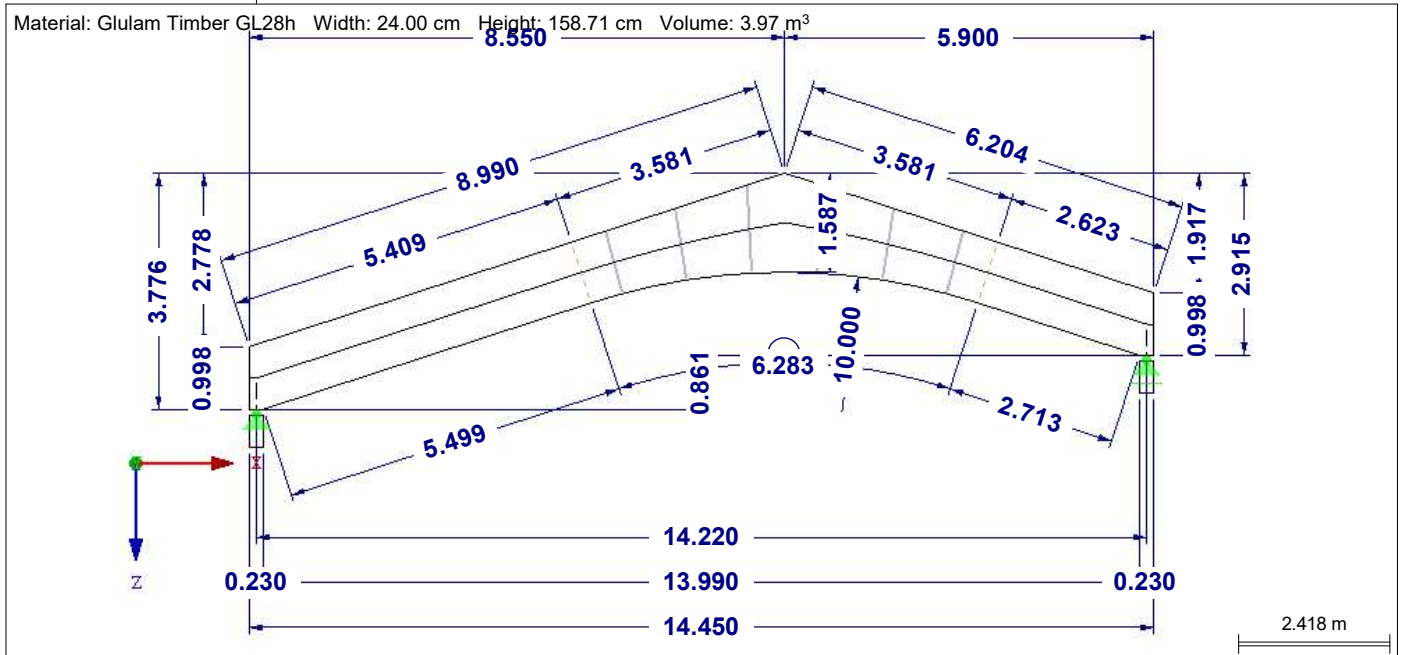


POZ GN2 - GLAVNI NOSAČ

■ SYSTEM LAYOUT



■ GRAPHICAL REPRESENTATION



DETAILS

Reduction of stiffness with coefficient $1 / (1 + k_{def})$ due to creep effects in Service ☐
Classes 2 and 3 according to DIN EN 1995-1-1/NA:2013-08, NCI NA. 5.9

DATA FOR NATIONAL ANNEX

Partial Factor for Material Properties

Fundamental combinations for glulam timber	γ_M	:	1.250
Fundamental combinations for solid timber	γ_M	:	1.300
Accidental combinations	γ_M	:	1.000
Combinations for fire design	$\gamma_{M,fi}$	:	1.000

Limit Values of Deformations acc. to Tab. 7.2 - Characteristic (Rare) Design Situation

	Span	Cantilevered Beam
w_{inst}	$\leq l / 300$	$\leq l_k / 150$

Limit Values of Deformations - Quasi-Permanent Design Situation

$w_{fin} - w_c$	$\leq l / 250$	$\leq l_k / 125$
w_{fin}	$\leq l / 150$	$\leq l_k / 75$

Modification Factor k_{mod}

	1	2	3
LDC			
-Permanent	0.600	0.600	0.500
-Long-term	0.700	0.700	0.550
-Medium-term	0.800	0.800	0.650
-Short-term	0.900	0.900	0.700
-Instantaneous	1.100	1.100	0.900

Data for Fire Resistance

		Softwood	Glulam Timber	Hardwood	
Charring Rate	β_n	0.80	0.70	0.55	[mm/min]
Increased Charring	d_0	7.00	7.00	7.00	[mm]
Factor	k_{fi}	1.250	1.150	1.250	

USED STANDARDS

- | | | |
|-----|--|---|
| [1] | EN 1995-1-1:2004+AC:2006+A2:2014 | Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings |
| [2] | EN 1995-1-2:2004+AC:2009-03 | Eurocode 5: Design of timber structures - Part 1-2: General - Structural fire design |
| [3] | EN 1990:2002+A1:2005+AC:2010-04 | Eurocode: Basis of structural design |
| [4] | EN 1991-1-1:2002+AC:2009-03 | Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings |
| [5] | EN 1991-1-3:2003+AC:2009-03 | Eurocode 1: Actions on structures - Part 1-3: General actions - Snow loads |
| [6] | EN 1991-1-4:2005+AC:2010-01+A1:2010-01 | Eurocode 1: Actions on structures - Part 1-4: General actions - Wind loads |
| [7] | EN 14080:2013-08 | Timber structures - Glued laminated timber and glued solid timber - Requirements |
| [8] | EN 338:2016-07 | Structural timber - Strength classes |

BEAM TYPE AND MATERIAL

Beam Type

Beam Type: Pitched Cambered Beam with Constant Height
Unsymmetrical Layout ☒

Material

Material: Glulam Timber GL28h - EN 14080:2013-08

Charact. Strength for Bending	$f_{m,k}$	:	28.0	N/mm ²
Charact. Strength for Tension Parallel	$f_{t,0,k}$	:	22.3	N/mm ²
Charact. Strength for Tension Perpendicular to Grain	$f_{t,90,k}$	:	0.5	N/mm ²
Charact. Strength for Compression Parallel	$f_{c,0,k}$	:	28.0	N/mm ²
Charact. Strength for Compression Perpendic.	$f_{c,90,k}$	:	2.5	N/mm ²
Charact. Strength for Shear/Torsion	$f_{v,k}$	:	3.5	N/mm ²
Shear Modulus	G_{mean}	:	650.0	N/mm ²
Modulus of Elasticity Parallel	$E_{0,05}$	:	10500.0	N/mm ²
Shear Modulus	G_{05}	:	540.0	N/mm ²
Specific Weight	γ	:	4.60	kN/m ³
Coefficient of Thermal Expansion	α	:	0.000005	1/°C

Stiffening Elements for Transversal Tension

Apply - Transversal Tension Stiffening - Type: Structural if Required
Stiffening Elements Used: Glued-in Rods

Stiffening Elements for Transversal Tension - Layout of Rods

Determine Quantity
Number of Rods Within a_1 n : 1

Stiffening Elements for Transversal Tension - Diameter and Material

Outside Diameter of Rods	d_r	:	16	mm
Size of Bore	d_b	:	1.6	cm
Strength Class of Rods		:	8.8	
Yield Strength	$f_{y,b,k}$	:	640.0	N/mm ²
Tensile Strength	$f_{u,b,k}$	:	800.0	N/mm ²
Glued Joint Strength	$f_{k1,k}$	:	4.00	N/mm ²

Stiffening Elements for Transversal Tension

Length of Transversal Tension Area l_{a1} : 6.78 m
Number of Rods n_{a1} : 6

■ BEAM TYPE AND MATERIAL

Distance of Rods a_1 : 1.130 m

■ GEOMETRY

Building Dimensions

Building Height	H	:	10.000	m
Building Depth	B	:	14.000	m
Beam Spacing	a	:	5.500	m
Distance to Roof Edge	ū	:	0.000	m
Load Factor for Continuity	k	:	1.000	

Roof Beam Geometry

Beam Length	L	:	14.450	m
Axial Spacing	l	:	14.220	m
Support Width, Left	l _a	:	23.00	cm
Support Width, Right	l _b	:	23.00	cm
Beam Height	h	:	102.00	cm
Inclination Angle, Left Side	δ _a	:	18.00	°
Inclination Angle	δ _b	:	18.00	°
Beam Length, Left Side	L _a	:	8.550	m
Beam Length, Right Side	L _b	:	5.900	m
Radius of Curvature for Lower Chord	R	:	10.000	m

Cross-section

Cross-Section Width	b	:	24.00	cm
Lamella Thickness	t	:	3.00	cm

Data for Lateral Buckling

Beam Endangered by Lateral Buckling	☒			
Lateral Supports Available	☒			
Equivalent Member Length	l _{ef}	:	2.250	m
Bracing Distance	e	:	60.00	cm
Lateral supports resist to fire	☒			

Information - Parameters

Beam Length, Straight Part, Left Side	l _{1,a}	:	5.345	m
Beam Length, Straight Part, Right Side	l _{1,b}	:	2.695	m
Axis Length of Arch Area	l _{b,ax}	:	6.782	m
Support Difference	Δ _h	:	-0.861	m
Beam Height, Support Center, Left	h _a	:	103.51	cm
Beam Height on Edge Left	h _{s,a}	:	99.78	cm
Beam Height, Support Center, Right	h _b	:	103.51	cm
Beam Height on Edge Right	h _{s,b}	:	99.78	cm
Beam Height on Ridge	h _{ap}	:	158.71	cm
Coat Surface of Beam	A _S	:	40.83	m ²
Beam Volume	V	:	3.97	m ³
Beam Weight	G	:	1.828	t

■ LOAD DATA

Permanent Loads

Roof Structure		:	0.840	kN/m ²	RA
slojevi krova		:	0.840	kN/m ²	RA
Roof Structure	g _{k,2}	:	0.840	kN/m ²	RA
	g _{k,2}	:	4.620	kN/m	RA
Self-weight of Beam (Average)	g _{k,1}	:	1.215	kN/m	RA
	g _k	:	5.835	kN/m	RA
Consider with factor		:	1.000		

Snow Load

Topography Type		:	Normal		
Exposure	C _e	:	1.0		
Snow Load - Define Manually	s _k	:	1.250	kN/m ²	BA
	s _k	:	6.875	kN/m	BA

Wind Load

Building Height	H	:	10.000	m	
Wind Load - Define Manually	q(z)	:	0.600	kN/m ²	RA
	q(z)	:	3.300	kN/m	RA

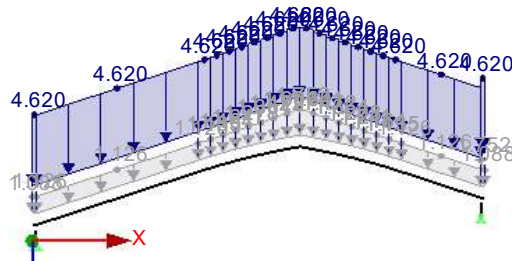
Service Class

Service Class	SECL	:	1
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■ LC1 - SELF-WEIGHT + ROOF FINISHES

LC1 : Self-Weight + Roof Finishes
Loads [kN/m]

Against Y-direction

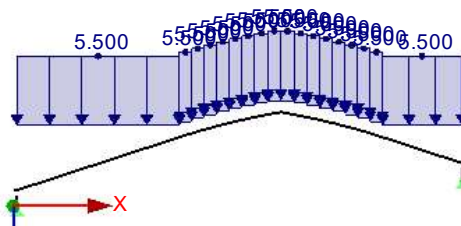


4.825 m

■ LC41 - SNOW (BOTH SIDES FULL)

LC41 : Snow (Both Sides Full)
Loads [kN/m]

Against Y-direction

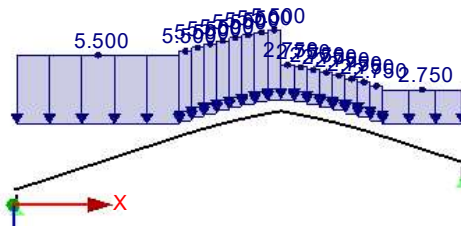


4.825 m

■ LC42 - SNOW (LEFT SIDE FULL)

LC42 : Snow (Left Side Full)
Loads [kN/m]

Against Y-direction

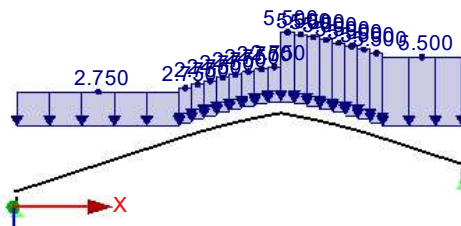


4.825 m

■ LC43 - SNOW (RIGHT SIDE FULL)

LC43 : Snow (Right Side Full)
Loads [kN/m]

Against Y-direction

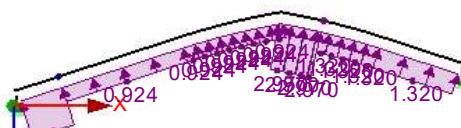


4.825 m

■ LC51 - WIND TRANSVERSELY TO RIDGE (LEFT)(AA)

LC51 : Wind Transversely to Ridge (left)(AA)
Loads [kN/m]

Against Y-direction

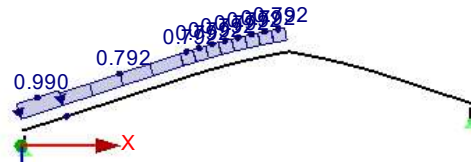


4.825 m

■ LC52 - WIND TRANSVERSELY TO RIDGE (LEFT)(BB)

LC52 : Wind Transversely to Ridge (left)(BB)
Loads [kN/m]

Against Y-direction



■ LC53 - WIND TRANSVERSELY TO RIDGE (LEFT)(AB)

LC53 : Wind Transversely to Ridge (left)(AB)
Loads [kN/m]

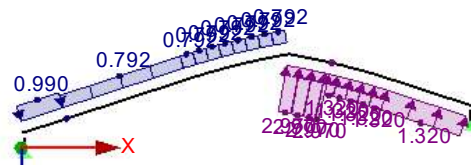
Against Y-direction



■ LC54 - WIND TRANSVERSELY TO RIDGE (LEFT)(BA)

LC54 : Wind Transversely to Ridge (left)(BA)
Loads [kN/m]

Against Y-direction



■ LC55 - WIND TRANSVERSELY TO RIDGE (RIGHT)(AA)

LC55 : Wind Transversely to Ridge (right)(AA)
Loads [kN/m]

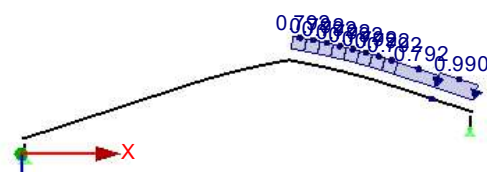
Against Y-direction



■ LC56 - WIND TRANSVERSELY TO RIDGE (RIGHT)(BB)

LC56 : Wind Transversely to Ridge (right)(BB)
Loads [kN/m]

Against Y-direction



CONTROL PARAMETERS

Design of

Static equilibrium EQU	☐
Ultimate limit state STR	☒
Serviceability limit state	☒
Fire resistance	☒
Support compression	☒
Display support forces	☒
Display deformations	☒

Data for Serviceability Limit State Design

Precamber w_0 : 0.0 mm

Data for Fire Resistance

Fire Resistance Class R 90

Sides exposed to fire

☒	Left
☒	Right
☐	Top
☒	Bottom

Support Modeling

Left Support Horizontal fixed-hinged
Right Support Horizontal free-hinged
Supports On Center Line ☐

Calculation Parameters

Generate supplementary combinations from favorable permanent actions ☐
Distribute permanent load span-by-span ☐

Number of member divisions for result diagrams 10
Number of internal divisions of tapered members 10

RESULTS

RESULT COMBINATIONS

RC	Result Combinations Description	Load Cases	Design Situation	LDC	Factor k_{mod}	Max. Ratio
Ultimate Limit State Design						
RC1	g	1.35*LC1	UB	Permanent	0.600	0.67
RC2	g + s	1.35*LC1 + 1.50*LC41	UB	Short-term	0.900	0.90
RC3	g + s(l)	1.35*LC1 + 1.50*LC42	UB	Short-term	0.900	0.81
RC4	g + s(r)	1.35*LC1 + 1.50*LC43	UB	Short-term	0.900	0.77
RC5	g + s + w(q,l,AA)	1.35*LC1 + 1.50*LC41 + 0.90*LC51	UB	Short-term	0.900	0.84
RC6	g + s + w(q,l,BB)	1.35*LC1 + 1.50*LC41 + 0.90*LC52	UB	Short-term	0.900	0.92
RC7	g + s + w(q,l,AB)	1.35*LC1 + 1.50*LC41 + 0.90*LC53	UB	Short-term	0.900	0.87
RC8	g + s + w(q,l,BA)	1.35*LC1 + 1.50*LC41 + 0.90*LC54	UB	Short-term	0.900	0.89
RC9	g + s + w(q,r,AA)	1.35*LC1 + 1.50*LC41 + 0.90*LC55	UB	Short-term	0.900	0.83
RC10	g + s + w(q,r,BB)	1.35*LC1 + 1.50*LC41 + 0.90*LC56	UB	Short-term	0.900	0.91
RC11	g + s + w(q,r,AB)	1.35*LC1 + 1.50*LC41 + 0.90*LC57	UB	Short-term	0.900	0.89
RC12	g + s + w(q,r,BA)	1.35*LC1 + 1.50*LC41 + 0.90*LC58	UB	Short-term	0.900	0.85
RC13	g + s + w(p,A)	1.35*LC1 + 1.50*LC41 + 0.90*LC59	UB	Short-term	0.900	0.80
RC14	g + s + w(p,B)	1.35*LC1 + 1.50*LC41 + 0.90*LC60	UB	Short-term	0.900	0.80
RC15	g + s(l) + w(q,l,AA)	1.35*LC1 + 1.50*LC42 + 0.90*LC51	UB	Short-term	0.900	0.74
RC16	g + s(l) + w(q,l,BB)	1.35*LC1 + 1.50*LC42 + 0.90*LC52	UB	Short-term	0.900	0.83
RC17	g + s(l) + w(q,l,AB)	1.35*LC1 + 1.50*LC42 + 0.90*LC53	UB	Short-term	0.900	0.78
RC18	g + s(l) + w(q,l,BA)	1.35*LC1 + 1.50*LC42 + 0.90*LC54	UB	Short-term	0.900	0.80
RC19	g + s(l) + w(q,r,AA)	1.35*LC1 + 1.50*LC42 + 0.90*LC55	UB	Short-term	0.900	0.74
RC20	g + s(l) + w(q,r,BB)	1.35*LC1 + 1.50*LC42 + 0.90*LC56	UB	Short-term	0.900	0.82
RC21	g + s(l) + w(q,r,AB)	1.35*LC1 + 1.50*LC42 + 0.90*LC57	UB	Short-term	0.900	0.79
RC22	g + s(l) + w(q,r,BA)	1.35*LC1 + 1.50*LC42 + 0.90*LC58	UB	Short-term	0.900	0.76
RC23	g + s(r) + w(p,A)	1.35*LC1 + 1.50*LC42 + 0.90*LC59	UB	Short-term	0.900	0.71
RC24	g + s(r) + w(p,B)	1.35*LC1 + 1.50*LC42 + 0.90*LC60	UB	Short-term	0.900	0.71
RC25	g + s(r) + w(q,l,AA)	1.35*LC1 + 1.50*LC43 + 0.90*LC51	UB	Short-term	0.900	0.70
RC26	g + s(r) + w(q,l,BB)	1.35*LC1 + 1.50*LC43 + 0.90*LC52	UB	Short-term	0.900	0.79
RC27	g + s(r) + w(q,l,AB)	1.35*LC1 + 1.50*LC43 + 0.90*LC53	UB	Short-term	0.900	0.73
RC28	g + s(r) + w(q,l,BA)	1.35*LC1 + 1.50*LC43 + 0.90*LC54	UB	Short-term	0.900	0.76
RC29	g + s(r) + w(q,r,AA)	1.35*LC1 + 1.50*LC43 + 0.90*LC55	UB	Short-term	0.900	0.70
RC30	g + s(r) + w(q,r,BB)	1.35*LC1 + 1.50*LC43 + 0.90*LC56	UB	Short-term	0.900	0.78
RC31	g + s(r) + w(q,r,AB)	1.35*LC1 + 1.50*LC43 + 0.90*LC57	UB	Short-term	0.900	0.75
RC32	g + s(r) + w(q,r,BA)	1.35*LC1 + 1.50*LC43 + 0.90*LC58	UB	Short-term	0.900	0.72
RC33	g + s(r) + w(p,A)	1.35*LC1 + 1.50*LC43 + 0.90*LC59	UB	Short-term	0.900	0.67
RC34	g + s(r) + w(p,B)	1.35*LC1 + 1.50*LC43 + 0.90*LC60	UB	Short-term	0.900	0.67
RC35	g + w(q,l,AA)	1.35*LC1 + 1.50*LC51	UB	Short-term	0.900	0.34
RC36	g + w(q,l,BB)	1.35*LC1 + 1.50*LC52	UB	Short-term	0.900	0.49
RC37	g + w(q,l,AB)	1.35*LC1 + 1.50*LC53	UB	Short-term	0.900	0.40
RC38	g + w(q,l,BA)	1.35*LC1 + 1.50*LC54	UB	Short-term	0.900	0.44
RC39	g + w(q,r,AA)	1.35*LC1 + 1.50*LC55	UB	Short-term	0.900	0.33
RC40	g + w(q,r,BB)	1.35*LC1 + 1.50*LC56	UB	Short-term	0.900	0.47
RC41	g + w(q,r,AB)	1.35*LC1 + 1.50*LC57	UB	Short-term	0.900	0.43
RC42	g + w(q,r,BA)	1.35*LC1 + 1.50*LC58	UB	Short-term	0.900	0.37
RC43	g + w(p,A)	1.35*LC1 + 1.50*LC59	UB	Short-term	0.900	0.29
RC44	g + w(p,B)	1.35*LC1 + 1.50*LC60	UB	Short-term	0.900	0.29
RC45	g + s + w(q,l,AA)	1.35*LC1 + 0.75*LC41 + 1.50*LC51	UB	Short-term	0.900	0.57
RC46	g + s + w(q,l,BB)	1.35*LC1 + 0.75*LC41 + 1.50*LC52	UB	Short-term	0.900	0.72
RC47	g + s + w(q,l,AB)	1.35*LC1 + 0.75*LC41 + 1.50*LC53	UB	Short-term	0.900	0.62
RC48	g + s + w(q,l,BA)	1.35*LC1 + 0.75*LC41 + 1.50*LC54	UB	Short-term	0.900	0.66
RC49	g + s + w(q,r,AA)	1.35*LC1 + 0.75*LC41 + 1.50*LC55	UB	Short-term	0.900	0.56
RC50	g + s + w(q,r,BB)	1.35*LC1 + 0.75*LC41 + 1.50*LC56	UB	Short-term	0.900	0.69
RC51	g + s + w(q,r,AB)	1.35*LC1 + 0.75*LC41 + 1.50*LC57	UB	Short-term	0.900	0.65
RC52	g + s + w(q,r,BA)	1.35*LC1 + 0.75*LC41 + 1.50*LC58	UB	Short-term	0.900	0.60
RC53	g + s + w(p,A)	1.35*LC1 + 0.75*LC41 + 1.50*LC59	UB	Short-term	0.900	0.51
RC54	g + s + w(p,B)	1.35*LC1 + 0.75*LC41 + 1.50*LC60	UB	Short-term	0.900	0.51
RC55	g + s(l) + w(q,l,AA)	1.35*LC1 + 0.75*LC42 + 1.50*LC51	UB	Short-term	0.900	0.52
RC56	g + s(l) + w(q,l,BB)	1.35*LC1 + 0.75*LC42 + 1.50*LC52	UB	Short-term	0.900	0.67
RC57	g + s(l) + w(q,l,AB)	1.35*LC1 + 0.75*LC42 + 1.50*LC53	UB	Short-term	0.900	0.58

■ RESULT COMBINATIONS

RC	Result Combinations Description	Load Cases	Design Situation	LDC	Factor k_{mod}	Max. Ratio
RC58	g + s(l) + w(q,l,BA)	1.35*LC1 + 0.75*LC42 + 1.50*LC54	UB	Short-term	0.900	0.62
RC59	g + s(l) + w(q,r,AA)	1.35*LC1 + 0.75*LC42 + 1.50*LC55	UB	Short-term	0.900	0.51
RC60	g + s(l) + w(q,r,BB)	1.35*LC1 + 0.75*LC42 + 1.50*LC56	UB	Short-term	0.900	0.65
RC61	g + s(l) + w(q,r,AB)	1.35*LC1 + 0.75*LC42 + 1.50*LC57	UB	Short-term	0.900	0.61
RC62	g + s(l) + w(q,r,BA)	1.35*LC1 + 0.75*LC42 + 1.50*LC58	UB	Short-term	0.900	0.55
RC63	g + s(l) + w(p,A)	1.35*LC1 + 0.75*LC42 + 1.50*LC59	UB	Short-term	0.900	0.47
RC64	g + s(l) + w(p,B)	1.35*LC1 + 0.75*LC42 + 1.50*LC60	UB	Short-term	0.900	0.47
RC65	g + s(r) + w(q,l,AA)	1.35*LC1 + 0.75*LC43 + 1.50*LC51	UB	Short-term	0.900	0.50
RC66	g + s(r) + w(q,l,BB)	1.35*LC1 + 0.75*LC43 + 1.50*LC52	UB	Short-term	0.900	0.65
RC67	g + s(r) + w(q,l,AB)	1.35*LC1 + 0.75*LC43 + 1.50*LC53	UB	Short-term	0.900	0.55
RC68	g + s(r) + w(q,l,BA)	1.35*LC1 + 0.75*LC43 + 1.50*LC54	UB	Short-term	0.900	0.60
RC69	g + s(r) + w(q,r,AA)	1.35*LC1 + 0.75*LC43 + 1.50*LC55	UB	Short-term	0.900	0.49
RC70	g + s(r) + w(q,r,BB)	1.35*LC1 + 0.75*LC43 + 1.50*LC56	UB	Short-term	0.900	0.63
RC71	g + s(r) + w(q,r,AB)	1.35*LC1 + 0.75*LC43 + 1.50*LC57	UB	Short-term	0.900	0.59
RC72	g + s(r) + w(q,r,BA)	1.35*LC1 + 0.75*LC43 + 1.50*LC58	UB	Short-term	0.900	0.53
RC73	g + s(r) + w(p,A)	1.35*LC1 + 0.75*LC43 + 1.50*LC59	UB	Short-term	0.900	0.45
RC74	g + s(r) + w(p,B)	1.35*LC1 + 0.75*LC43 + 1.50*LC60	UB	Short-term	0.900	0.45
Serviceability Limit State Design						
RC75	g	LC1	SC	Permanent		0.22
RC76	g + s	LC1 + LC41	SC	Short-term		0.41
RC77	g + s(l)	LC1 + LC42	SC	Short-term		0.38
RC78	g + s(r)	LC1 + LC43	SC	Short-term		0.35
RC79	g + s + w(q,l,AA)	LC1 + LC41 + 0.60*LC51	SC	Short-term		0.39
RC80	g + s + w(q,l,BB)	LC1 + LC41 + 0.60*LC52	SC	Short-term		0.43
RC81	g + s + w(q,l,AB)	LC1 + LC41 + 0.60*LC53	SC	Short-term		0.40
RC82	g + s + w(q,l,BA)	LC1 + LC41 + 0.60*LC54	SC	Short-term		0.42
RC83	g + s + w(q,r,AA)	LC1 + LC41 + 0.60*LC55	SC	Short-term		0.38
RC84	g + s + w(q,r,BB)	LC1 + LC41 + 0.60*LC56	SC	Short-term		0.42
RC85	g + s + w(q,r,AB)	LC1 + LC41 + 0.60*LC57	SC	Short-term		0.41
RC86	g + s + w(q,r,BA)	LC1 + LC41 + 0.60*LC58	SC	Short-term		0.39
RC87	g + s + w(p,A)	LC1 + LC41 + 0.60*LC59	SC	Short-term		0.37
RC88	g + s + w(p,B)	LC1 + LC41 + 0.60*LC60	SC	Short-term		0.37
RC89	g + s(l) + w(q,l,AA)	LC1 + LC42 + 0.60*LC51	SC	Short-term		0.36
RC90	g + s(l) + w(q,l,BB)	LC1 + LC42 + 0.60*LC52	SC	Short-term		0.40
RC91	g + s(l) + w(q,l,AB)	LC1 + LC42 + 0.60*LC53	SC	Short-term		0.37
RC92	g + s(l) + w(q,l,BA)	LC1 + LC42 + 0.60*LC54	SC	Short-term		0.38
RC93	g + s(l) + w(q,r,AA)	LC1 + LC42 + 0.60*LC55	SC	Short-term		0.35
RC94	g + s(l) + w(q,r,BB)	LC1 + LC42 + 0.60*LC56	SC	Short-term		0.39
RC95	g + s(l) + w(q,r,AB)	LC1 + LC42 + 0.60*LC57	SC	Short-term		0.38
RC96	g + s(l) + w(q,r,BA)	LC1 + LC42 + 0.60*LC58	SC	Short-term		0.36
RC97	g + s(l) + w(p,A)	LC1 + LC42 + 0.60*LC59	SC	Short-term		0.34
RC98	g + s(l) + w(p,B)	LC1 + LC42 + 0.60*LC60	SC	Short-term		0.34
RC99	g + s(r) + w(q,l,AA)	LC1 + LC43 + 0.60*LC51	SC	Short-term		0.32
RC100	g + s(r) + w(q,l,BB)	LC1 + LC43 + 0.60*LC52	SC	Short-term		0.36
RC101	g + s(r) + w(q,l,AB)	LC1 + LC43 + 0.60*LC53	SC	Short-term		0.33
RC102	g + s(r) + w(q,l,BA)	LC1 + LC43 + 0.60*LC54	SC	Short-term		0.35
RC103	g + s(r) + w(q,r,AA)	LC1 + LC43 + 0.60*LC55	SC	Short-term		0.32
RC104	g + s(r) + w(q,r,BB)	LC1 + LC43 + 0.60*LC56	SC	Short-term		0.35
RC105	g + s(r) + w(q,r,AB)	LC1 + LC43 + 0.60*LC57	SC	Short-term		0.34
RC106	g + s(r) + w(q,r,BA)	LC1 + LC43 + 0.60*LC58	SC	Short-term		0.33
RC107	g + s(r) + w(p,A)	LC1 + LC43 + 0.60*LC59	SC	Short-term		0.30
RC108	g + s(r) + w(p,B)	LC1 + LC43 + 0.60*LC60	SC	Short-term		0.30
RC109	g + w(q,l,AA)	LC1 + LC51	SC	Short-term		0.17
RC110	g + w(q,l,BB)	LC1 + LC52	SC	Short-term		0.24
RC111	g + w(q,l,AB)	LC1 + LC53	SC	Short-term		0.19
RC112	g + w(q,l,BA)	LC1 + LC54	SC	Short-term		0.22
RC113	g + w(q,r,AA)	LC1 + LC55	SC	Short-term		0.17
RC114	g + w(q,r,BB)	LC1 + LC56	SC	Short-term		0.22
RC115	g + w(q,r,AB)	LC1 + LC57	SC	Short-term		0.21
RC116	g + w(q,r,BA)	LC1 + LC58	SC	Short-term		0.18
RC117	g + w(p,A)	LC1 + LC59	SC	Short-term		0.14
RC118	g + w(p,B)	LC1 + LC60	SC	Short-term		0.14
RC119	g + s + w(q,l,AA)	LC1 + 0.50*LC41 + LC51	SC	Short-term		0.27
RC120	g + s + w(q,l,BB)	LC1 + 0.50*LC41 + LC52	SC	Short-term		0.34
RC121	g + s + w(q,l,AB)	LC1 + 0.50*LC41 + LC53	SC	Short-term		0.29
RC122	g + s + w(q,l,BA)	LC1 + 0.50*LC41 + LC54	SC	Short-term		0.32
RC123	g + s + w(q,r,AA)	LC1 + 0.50*LC41 + LC55	SC	Short-term		0.26
RC124	g + s + w(q,r,BB)	LC1 + 0.50*LC41 + LC56	SC	Short-term		0.32
RC125	g + s + w(q,r,AB)	LC1 + 0.50*LC41 + LC57	SC	Short-term		0.31
RC126	g + s + w(q,r,BA)	LC1 + 0.50*LC41 + LC58	SC	Short-term		0.28
RC127	g + s + w(p,A)	LC1 + 0.50*LC41 + LC59	SC	Short-term		0.24
RC128	g + s + w(p,B)	LC1 + 0.50*LC41 + LC60	SC	Short-term		0.24
RC129	g + s(l) + w(q,l,AA)	LC1 + 0.50*LC42 + LC51	SC	Short-term		0.26
RC130	g + s(l) + w(q,l,BB)	LC1 + 0.50*LC42 + LC52	SC	Short-term		0.32
RC131	g + s(l) + w(q,l,AB)	LC1 + 0.50*LC42 + LC53	SC	Short-term		0.27
RC132	g + s(l) + w(q,l,BA)	LC1 + 0.50*LC42 + LC54	SC	Short-term		0.30
RC133	g + s(l) + w(q,r,AA)	LC1 + 0.50*LC42 + LC55	SC	Short-term		0.25
RC134	g + s(l) + w(q,r,BB)	LC1 + 0.50*LC42 + LC56	SC	Short-term		0.31
RC135	g + s(l) + w(q,r,AB)	LC1 + 0.50*LC42 + LC57	SC	Short-term		0.29
RC136	g + s(l) + w(q,r,BA)	LC1 + 0.50*LC42 + LC58	SC	Short-term		0.26
RC137	g + s(l) + w(p,A)	LC1 + 0.50*LC42 + LC59	SC	Short-term		0.23
RC138	g + s(l) + w(p,B)	LC1 + 0.50*LC42 + LC60	SC	Short-term		0.23
RC139	g + s(r) + w(q,l,AA)	LC1 + 0.50*LC43 + LC51	SC	Short-term		0.24
RC140	g + s(r) + w(q,l,BB)	LC1 + 0.50*LC43 + LC52	SC	Short-term		0.30
RC141	g + s(r) + w(q,l,AB)	LC1 + 0.50*LC43 + LC53	SC	Short-term		0.26
RC142	g + s(r) + w(q,l,BA)	LC1 + 0.50*LC43 + LC54	SC	Short-term		0.29
RC143	g + s(r) + w(q,r,AA)	LC1 + 0.50*LC43 + LC55	SC	Short-term		0.23
RC144	g + s(r) + w(q,r,BB)	LC1 + 0.50*LC43 + LC56	SC	Short-term		0.29
RC145	g + s(r) + w(q,r,AB)	LC1 + 0.50*LC43 + LC57	SC	Short-term		0.28
RC146	g + s(r) + w(q,r,BA)	LC1 + 0.50*LC43 + LC58	SC	Short-term		0.25
RC147	g + s(r) + w(p,A)	LC1 + 0.50*LC43 + LC59	SC	Short-term		0.21
RC148	g + s(r) + w(p,B)	LC1 + 0.50*LC43 + LC60	SC	Short-term		0.21

■ RESULT COMBINATIONS

RC	Result Combinations Description	Load Cases	Design Situation	LDC	Factor k_{mod}	Max. Ratio
RC149	g	1.60*LC1	SQ	Permanent		0.29
RC150	g + s	1.60*LC1 + LC41	SQ	Short-term		0.45
RC151	g + s(l)	1.60*LC1 + LC42	SQ	Short-term		0.43
RC152	g + s(r)	1.60*LC1 + LC43	SQ	Short-term		0.40
RC153	g + s + w(q,l,AA)	1.60*LC1 + LC41 + 0.60*LC51	SQ	Short-term		0.43
RC154	g + s + w(q,l,BB)	1.60*LC1 + LC41 + 0.60*LC52	SQ	Short-term		0.46
RC155	g + s + w(q,l,AB)	1.60*LC1 + LC41 + 0.60*LC53	SQ	Short-term		0.44
RC156	g + s + w(q,l,BA)	1.60*LC1 + LC41 + 0.60*LC54	SQ	Short-term		0.46
RC157	g + s + w(q,r,AA)	1.60*LC1 + LC41 + 0.60*LC55	SQ	Short-term		0.43
RC158	g + s + w(q,r,BB)	1.60*LC1 + LC41 + 0.60*LC56	SQ	Short-term		0.46
RC159	g + s + w(q,r,AB)	1.60*LC1 + LC41 + 0.60*LC57	SQ	Short-term		0.45
RC160	g + s + w(q,r,BA)	1.60*LC1 + LC41 + 0.60*LC58	SQ	Short-term		0.44
RC161	g + s + w(p,A)	1.60*LC1 + LC41 + 0.60*LC59	SQ	Short-term		0.42
RC162	g + s + w(p,B)	1.60*LC1 + LC41 + 0.60*LC60	SQ	Short-term		0.42
RC163	g + s(l) + w(q,l,AA)	1.60*LC1 + LC42 + 0.60*LC51	SQ	Short-term		0.41
RC164	g + s(l) + w(q,l,BB)	1.60*LC1 + LC42 + 0.60*LC52	SQ	Short-term		0.44
RC165	g + s(l) + w(q,l,AB)	1.60*LC1 + LC42 + 0.60*LC53	SQ	Short-term		0.41
RC166	g + s(l) + w(q,l,BA)	1.60*LC1 + LC42 + 0.60*LC54	SQ	Short-term		0.43
RC167	g + s(l) + w(q,r,AA)	1.60*LC1 + LC42 + 0.60*LC55	SQ	Short-term		0.40
RC168	g + s(l) + w(q,r,BB)	1.60*LC1 + LC42 + 0.60*LC56	SQ	Short-term		0.43
RC169	g + s(l) + w(q,r,AB)	1.60*LC1 + LC42 + 0.60*LC57	SQ	Short-term		0.42
RC170	g + s(l) + w(q,r,BA)	1.60*LC1 + LC42 + 0.60*LC58	SQ	Short-term		0.41
RC171	g + s(l) + w(p,A)	1.60*LC1 + LC42 + 0.60*LC59	SQ	Short-term		0.39
RC172	g + s(l) + w(p,B)	1.60*LC1 + LC42 + 0.60*LC60	SQ	Short-term		0.39
RC173	g + s(r) + w(q,l,AA)	1.60*LC1 + LC43 + 0.60*LC51	SQ	Short-term		0.38
RC174	g + s(r) + w(q,l,BB)	1.60*LC1 + LC43 + 0.60*LC52	SQ	Short-term		0.41
RC175	g + s(r) + w(q,l,AB)	1.60*LC1 + LC43 + 0.60*LC53	SQ	Short-term		0.39
RC176	g + s(r) + w(q,l,BA)	1.60*LC1 + LC43 + 0.60*LC54	SQ	Short-term		0.40
RC177	g + s(r) + w(q,r,AA)	1.60*LC1 + LC43 + 0.60*LC55	SQ	Short-term		0.37
RC178	g + s(r) + w(q,r,BB)	1.60*LC1 + LC43 + 0.60*LC56	SQ	Short-term		0.40
RC179	g + s(r) + w(q,r,AB)	1.60*LC1 + LC43 + 0.60*LC57	SQ	Short-term		0.40
RC180	g + s(r) + w(q,r,BA)	1.60*LC1 + LC43 + 0.60*LC58	SQ	Short-term		0.38
RC181	g + s(r) + w(p,A)	1.60*LC1 + LC43 + 0.60*LC59	SQ	Short-term		0.36
RC182	g + s(r) + w(p,B)	1.60*LC1 + LC43 + 0.60*LC60	SQ	Short-term		0.36
RC183	g + w(q,l,AA)	1.60*LC1 + LC51	SQ	Short-term		0.25
RC184	g + w(q,l,BB)	1.60*LC1 + LC52	SQ	Short-term		0.31
RC185	g + w(q,l,AB)	1.60*LC1 + LC53	SQ	Short-term		0.27
RC186	g + w(q,l,BA)	1.60*LC1 + LC54	SQ	Short-term		0.29
RC187	g + w(q,r,AA)	1.60*LC1 + LC55	SQ	Short-term		0.25
RC188	g + w(q,r,BB)	1.60*LC1 + LC56	SQ	Short-term		0.30
RC189	g + w(q,r,AB)	1.60*LC1 + LC57	SQ	Short-term		0.28
RC190	g + w(q,r,BA)	1.60*LC1 + LC58	SQ	Short-term		0.26
RC191	g + w(p,A)	1.60*LC1 + LC59	SQ	Short-term		0.23
RC192	g + w(p,B)	1.60*LC1 + LC60	SQ	Short-term		0.23
RC193	g + s + w(q,l,AA)	1.60*LC1 + 0.50*LC41 + LC51	SQ	Short-term		0.34
RC194	g + s + w(q,l,BB)	1.60*LC1 + 0.50*LC41 + LC52	SQ	Short-term		0.39
RC195	g + s + w(q,l,AB)	1.60*LC1 + 0.50*LC41 + LC53	SQ	Short-term		0.35
RC196	g + s + w(q,l,BA)	1.60*LC1 + 0.50*LC41 + LC54	SQ	Short-term		0.38
RC197	g + s + w(q,r,AA)	1.60*LC1 + 0.50*LC41 + LC55	SQ	Short-term		0.33
RC198	g + s + w(q,r,BB)	1.60*LC1 + 0.50*LC41 + LC56	SQ	Short-term		0.38
RC199	g + s + w(q,r,AB)	1.60*LC1 + 0.50*LC41 + LC57	SQ	Short-term		0.37
RC200	g + s + w(q,r,BA)	1.60*LC1 + 0.50*LC41 + LC58	SQ	Short-term		0.34
RC201	g + s + w(p,A)	1.60*LC1 + 0.50*LC41 + LC59	SQ	Short-term		0.31
RC202	g + s + w(p,B)	1.60*LC1 + 0.50*LC41 + LC60	SQ	Short-term		0.31
RC203	g + s(l) + w(q,l,AA)	1.60*LC1 + 0.50*LC42 + LC51	SQ	Short-term		0.32
RC204	g + s(l) + w(q,l,BB)	1.60*LC1 + 0.50*LC42 + LC52	SQ	Short-term		0.38
RC205	g + s(l) + w(q,l,AB)	1.60*LC1 + 0.50*LC42 + LC53	SQ	Short-term		0.34
RC206	g + s(l) + w(q,l,BA)	1.60*LC1 + 0.50*LC42 + LC54	SQ	Short-term		0.36
RC207	g + s(l) + w(q,r,AA)	1.60*LC1 + 0.50*LC42 + LC55	SQ	Short-term		0.32
RC208	g + s(l) + w(q,r,BB)	1.60*LC1 + 0.50*LC42 + LC56	SQ	Short-term		0.36
RC209	g + s(l) + w(q,r,AB)	1.60*LC1 + 0.50*LC42 + LC57	SQ	Short-term		0.35
RC210	g + s(l) + w(q,r,BA)	1.60*LC1 + 0.50*LC42 + LC58	SQ	Short-term		0.33
RC211	g + s(l) + w(p,A)	1.60*LC1 + 0.50*LC42 + LC59	SQ	Short-term		0.30
RC212	g + s(l) + w(p,B)	1.60*LC1 + 0.50*LC42 + LC60	SQ	Short-term		0.30
RC213	g + s(r) + w(q,l,AA)	1.60*LC1 + 0.50*LC43 + LC51	SQ	Short-term		0.31
RC214	g + s(r) + w(q,l,BB)	1.60*LC1 + 0.50*LC43 + LC52	SQ	Short-term		0.36
RC215	g + s(r) + w(q,l,AB)	1.60*LC1 + 0.50*LC43 + LC53	SQ	Short-term		0.32
RC216	g + s(r) + w(q,l,BA)	1.60*LC1 + 0.50*LC43 + LC54	SQ	Short-term		0.35
RC217	g + s(r) + w(q,r,AA)	1.60*LC1 + 0.50*LC43 + LC55	SQ	Short-term		0.30
RC218	g + s(r) + w(q,r,BB)	1.60*LC1 + 0.50*LC43 + LC56	SQ	Short-term		0.35
RC219	g + s(r) + w(q,r,AB)	1.60*LC1 + 0.50*LC43 + LC57	SQ	Short-term		0.34
RC220	g + s(r) + w(q,r,BA)	1.60*LC1 + 0.50*LC43 + LC58	SQ	Short-term		0.31
RC221	g + s(r) + w(p,A)	1.60*LC1 + 0.50*LC43 + LC59	SQ	Short-term		0.28
RC222	g + s(r) + w(p,B)	1.60*LC1 + 0.50*LC43 + LC60	SQ	Short-term		0.28
Fire Resistance Check						
RC223	g	LC1	UA	Permanent	1.000	0.52
RC224	g + s	LC1 + 0.20*LC41	UA	Short-term	1.000	0.61
RC225	g + s(l)	LC1 + 0.20*LC42	UA	Short-term	1.000	0.59
RC226	g + s(r)	LC1 + 0.20*LC43	UA	Short-term	1.000	0.59
RC257	g + w(q,l,AA)	LC1 + 0.20*LC51	UA	Short-term	1.000	0.50
RC258	g + w(q,l,BB)	LC1 + 0.20*LC52	UA	Short-term	1.000	0.53
RC259	g + w(q,l,AB)	LC1 + 0.20*LC53	UA	Short-term	1.000	0.51
RC260	g + w(q,l,BA)	LC1 + 0.20*LC54	UA	Short-term	1.000	0.52
RC261	g + w(q,r,AA)	LC1 + 0.20*LC55	UA	Short-term	1.000	0.50
RC262	g + w(q,r,BB)	LC1 + 0.20*LC56	UA	Short-term	1.000	0.52
RC263	g + w(q,r,AB)	LC1 + 0.20*LC57	UA	Short-term	1.000	0.52
RC264	g + w(q,r,BA)	LC1 + 0.20*LC58	UA	Short-term	1.000	0.50
RC265	g + w(p,A)	LC1 + 0.20*LC59	UA	Short-term	1.000	0.49
RC266	g + w(p,B)	LC1 + 0.20*LC60	UA	Short-term	1.000	0.49

■ DESIGN - ALL

No.	Location X [m]	RC	Ratio	Design Description
1	0.115	RC6	0.41 ≤ 1	111) Shear stress acc. to 6.1.7
2	0.000	RC6	0.44 ≤ 1	112) Shear stress at support acc. to 6.1.7
3	5.187	RC38	0.24 ≤ 1	122) Tension and bending stress acc. to 6.2.3
4	5.187	RC6	0.48 ≤ 1	123) Compression and bending stress acc. to 6.2.4
5	6.780	RC6	0.57 ≤ 1	133) Bending stress on tapered edge acc. to 6.4.2 - Compression edge
6	5.581	RC6	0.54 ≤ 1	136) Bending stress on curved beam acc. to 6.4.3
7	8.435	RC6	0.38 ≤ 1	143) Bending stress at ridge cross-section 6.4.3
8	8.435	RC6	0.90 ≤ 1	158) Transversal tension stress at ridge cross-section acc. to DIN EN 1995-1-1/NA:2013-08, NA. 6.4.3
9	8.435	RC6	0.92 ≤ 1	173) Transversal tension stress - Structural transversal tension reinforcement acc. to DIN EN 1995-1-1/NA 2013-08, NA.6.8.5, Glued-in rods
10	5.581	RC6	0.52 ≤ 1	301) Lateral torsional stability verification - Bending without compression acc. to 6.3.3
11	11.683	RC10	0.11 ≤ 1	302) Lateral torsional stability verification - Bending and compression acc. to 6.3.3
12	0.000	RC6	0.57 ≤ 1	352) Support pressure - Compression at an angle acc. to 6.2.2
13	6.377	RC80	0.43 ≤ 1	401) Serviceability - Design Situation Characteristic acc. to 7.2 - Inner span
14	6.377	RC154	0.46 ≤ 1	402) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span
15	6.377	RC154	0.28 ≤ 1	403) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span
16	14.105	RC224	0.28 ≤ 1	511) Fire resistance - Shear stress acc. to 6.1.7
17	14.220	RC224	0.27 ≤ 1	512) Fire resistance - Shear stress at support acc. to 6.1.7
18	5.187	RC224	0.35 ≤ 1	523) Fire resistance - Compression and bending stress acc. to 6.2.4
19	6.780	RC224	0.46 ≤ 1	533) Fire resistance - Bending stress on cut edge acc. to 6.4.2 - Compression edge
20	5.581	RC224	0.43 ≤ 1	536) Fire resistance - Bending stress on curved beam acc. to 6.4.3
21	8.435	RC224	0.30 ≤ 1	543) Fire resistance - Bending stress at ridge cross-section 6.4.3
22	8.435	RC224	0.61 ≤ 1	558) Fire resistance - Transversal tension stress at ridge cross-section acc. to DIN EN 1995-1-1/NA:2013-08, NA. 6.4.3
23	8.435	RC224	0.11 ≤ 1	573) Fire resistance - Transversal tension stress - Structural transversal tension reinforcement acc. to DIN EN 1995-1-1/NA 2013-08, NA.6.8.5, Glued-in rods
24	5.581	RC224	0.46 ≤ 1	701) Fire resistance - Lateral torsional stability verification - Bending without compression acc. to 6.3.3
Max			0.92 ≤ 1	

■ DESIGN - ALL - DETAILS

111) Shear stress acc. to 6.1.7

Governing	Location	X	0.115	m
	Result Combinations	RC	RC6	
Design Internal Forces	Normal Force	N _d	-35.121	kN
	Shear Force	V _{z,d}	113.961	kN
	Moment	M _{y,d}	14.363	kNm
Design	Shear Force	V _{z,d}	113.961	kN
	Beam Width	b	24.00	cm
	Cross-Section Height	h	102.00	cm
	Crack Influence Factor	k _{cr}	0.670	
	Effective Width	b _{ef}	16.08	cm
	Shear Stress	τ _d	1.0	N/mm ²
	Shear Strength	f _{v,k}	3.5	N/mm ²
	Partial Factor	γ _M	1.250	
	Modification Factor	k _{mod}	0.900	
	Shear Strength	f _{v,d}	2.5	N/mm ²
	Design Ratio	η	0.41	≤ 1

6.1.7 (2)

[7], Tab.1

Tab. 2.3

Tab. 3.1

Eq. (2.14)

Eq. (6.13)

112) Shear stress at support acc. to 6.1.7

Governing	Location	X	0.000	m
	Result Combinations	RC	RC6	
Design Internal Forces	Normal Force	N _d	-35.704	kN
	Shear Force	V _{z,d}	115.863	kN
	Moment	M _{y,d}	0.870	kNm
Design	Shear Force	V _{z,d}	115.863	kN
	Beam Width	b	24.00	cm
	Cross-Section Depth	h _A	98.45	cm
	Crack Influence Factor	k _{cr}	0.670	
	Effective Width	b _{ef}	16.08	cm
	Shear Stress	τ _d	1.1	N/mm ²
	Shear Strength	f _{v,k}	3.5	N/mm ²
	Partial Factor	γ _M	1.250	
	Modification Factor	k _{mod}	0.900	
	Shear Strength	f _{v,d}	2.5	N/mm ²
	Design Ratio	η	0.44	≤ 1

6.1.7 (2)

[7], Tab.1

Tab. 2.3

Tab. 3.1

Eq. (2.14)

Eq. (6.13)

122) Tension and bending stress acc. to 6.2.3

Governing	Location	X	5.187	m
	Result Combinations	RC	RC38	
Design Internal Forces	Normal Force	N _d	0.796	kN
	Shear Force	V _{z,d}	13.243	kN
	Moment	M _{y,d}	203.354	kNm
Design	Normal Force	N _d	0.796	kN
	Cross-Sectional Area	A	2448.00	cm ²
	Tensile Stress	σ _{t,0,d}	0.0	N/mm ²

Eq. (6.36)

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	Tensile Strength	$f_{t,0,k}$	22.3	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Tensile Strength	$f_{t,0,d}$	16.1	N/mm ²	Eq. (2.14)
	Design - Axial Force Portion		0.00	≤ 1	
	Moment	M_d	203.354	kNm	
	Section Modulus	W	41616.00	cm ³	
	Bending Stress	$\sigma_{m,d}$	4.9	N/mm ²	
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab.1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²	Eq. (2.14)
	Design - Moment Portion		0.24	≤ 1	
	Design Ratio	η	0.24	≤ 1	Eq. (6.17)
123) Compression and bending stress acc. to 6.2.4					
Governing	Location	X	5.187	m	
	Result Combinations	RC	RC6		
Design Internal Forces	Normal Force	N_d	-9.405	kN	
	Shear Force	$V_{z,d}$	30.787	kN	
	Moment	$M_{y,d}$	400.294	kNm	
Design	Normal Force	N_d	9.405	kN	
	Cross-Sectional Area	A	2448.00	cm ²	
	Compressive Stress	$\sigma_{c,0,d}$	0.0	N/mm ²	Eq. (6.36)
	Compressive Strength	$f_{c,0,k}$	28.0	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Compressive Strength	$f_{c,0,d}$	20.2	N/mm ²	Eq. (2.14)
	Design - Axial Force Portion		0.00	≤ 1	
	Moment	M_d	400.294	kNm	
	Section Modulus	W	41616.00	cm ³	
	Bending Stress	$\sigma_{m,d}$	9.6	N/mm ²	
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab.1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²	Eq. (2.14)
	Design - Moment Portion		0.48	≤ 1	
	Design Ratio	η	0.48	≤ 1	Eq. (6.19)
133) Bending stress on tapered edge acc. to 6.4.2 - Compression edge					
Governing	Location	X	6.780	m	
	Result Combinations	RC	RC6		
Design Internal Forces	Normal Force	N_d	-0.895	kN	
	Shear Force	$V_{z,d}$	4.869	kN	
	Moment	$M_{y,d}$	430.060	kNm	
Design	Cut-to-Grain Angle	α	9.00	°	
	Moment	M_d	430.060	kNm	
	Reduced Beam Width	b_{red}	22.40	cm	
	Beam Depth	h	115.74	cm	
	Longitudinal Stress	$\sigma_{m,\alpha,d}$	8.6	N/mm ²	Eq. (6.37)
	Compressive Strength Perpendicular to Grain	$f_{c,90,d}$	1.8	N/mm ²	Eq. (2.14)
	Shear Strength	$f_{v,d}$	2.5	N/mm ²	Eq. (2.14)
	Auxiliary factor	$k_{m,\alpha}$	0.747		Eq. (6.40)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²	Eq. (2.14)
	Bending Strength	$f_{m,\alpha,d}$	15.1	N/mm ²	
	Design Ratio	η	0.57	≤ 1	Eq. (6.19; 6.38)
136) Bending stress on curved beam acc. to 6.4.3					
Governing	Location	X	5.581	m	
	Result Combinations	RC	RC6		
Design Internal Forces	Normal Force	N_d	-6.724	kN	
	Shear Force	$V_{z,d}$	24.553	kN	
	Moment	$M_{y,d}$	411.707	kNm	
Design	Beam Depth	h	102.85	cm	
	Arc Radius	r_{in}	10.000	m	
	Arc Radius	r	10.514	m	
	Factor	k_l	1.040		Eq. (6.43)
	Lamination Thickness	t	3.00	cm	
	Factor	k_r	1.000		Eq. (6.49)
	Moment	M_d	411.707	kNm	
	Reduced Beam Width	b_{red}	22.40	cm	
	Longitudinal Stress	$\sigma_{m,d}$	10.8	N/mm ²	Eq. (6.42)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.54	≤ 1	Eq. (6.41)
143) Bending stress at ridge cross-section 6.4.3					
Governing	Location	X	8.435	m	
	Result Combinations	RC	RC6		

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Design Internal Forces	Normal Force	N_d	4.281	kN	
	Shear Force	$V_{z,d}$	-23.444	kN	
	Moment	$M_{y,d}$	414.589	kNm	
Design	Beam Depth	h_{ap}	158.71	cm	
	Arc Radius	r_{in}	10.000	m	
	Arc Radius	r	10.794	m	
	Inclination Angle	α_{ap}	18.00	°	
	Aux. Factor	k_1	2.025		Eq. (6.44)
	Aux. Factor	k_2	-2.249		Eq. (6.45)
	Aux. Factor	k_3	2.473		Eq. (6.46)
	Aux. Factor	k_4	0.633		Eq. (6.47)
	Factor	k_l	1.750		Eq. (6.43)
	Lamination Thickness	t	3.00	cm	
	Factor	k_r	1.000		Eq. (6.49)
	Moment at Ridge Cross-Section	$M_{ap,d}$	414.589	kNm	
	Reduced Beam Width	$b_{ap,red}$	22.40	cm	
	Longitudinal Stress	$\sigma_{m,d}$	7.7	N/mm ²	Eq. (6.42)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab. 1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.38		Eq. (6.41)
158) Transversal tension stress at ridge cross-section acc. to DIN EN 1995-1-1/NA:2013-08, NA. 6.4.3					
Governing	Location	X	8.435	m	
	Result Combinations	RC	RC6		
Design Internal Forces	Normal Force	N_d	4.281	kN	
	Shear Force	$V_{z,d}$	-23.444	kN	
	Moment	$M_{y,d}$	414.589	kNm	
Design	Beam Depth	h_{ap}	158.71	cm	
	Beam Width	b_{ap}	24.00	cm	
	Arc Radius	r_{in}	10.000	m	
	Arc Radius	r	10.794	m	
	Inclination Angle	α_{ap}	18.00	°	
	Factor	k_p	0.076		Eq. (6.56)
	Aux. Factor	k_5	0.065		Eq. (6.57)
	Aux. Factor	k_6	0.037		Eq. (6.58)
	Aux. Factor	k_7	0.260		Eq. (6.59)
	Moment at Ridge Cross-Section	$M_{ap,d}$	414.589	kNm	
	Transversal Tension Stress	$\sigma_{t,90,d}$	0.3	N/mm ²	Eq. (6.54)
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Transversal Tensile Strength	$f_{t,90,d}$	0.4	N/mm ²	Eq. (2.14)
	Factor	$k_{dis, DIN EN NA}$	1.300		DIN EN 1995-1-1/N A:2010-12, NA 6.8.5, NA.1
	Reference Height	h_0	60.00	cm	DIN EN 1995-1-1/N A:2010-12, NA 6.8.5, NA.1
	Shear Force	$V_{z,d}$	23.444	kN	
	Shear Stress	τ_d	0.1	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab. 1
	Shear Strength	$f_{v,d}$	2.5	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.90		DIN EN 1995-1-1/N A:2013-08, Eq. (NA.93)
173) Transversal tension stress - Structural transversal tension reinforcement acc. to DIN EN 1995-1-1/NA 2013-08, NA.6.8.5, Glued-in rods					
Governing	Location	X	8.435	m	
	Result Combinations	RC	RC6		
Design Internal Forces	Normal Force	N_d	4.281	kN	
	Shear Force	$V_{z,d}$	-23.444	kN	
	Moment	$M_{y,d}$	414.589	kNm	
Design	Beam Depth	h_{ap}	158.71	cm	
	Beam Width	b_{ap}	24.00	cm	
	Arc Radius	r_{in}	10.000	m	
	Arc Radius	r	10.794	m	
	Inclination Angle	α_{ap}	18.00	°	
	Factor	k_p	0.076		Eq. (6.56)
	Aux. Factor	k_5	0.065		Eq. (6.57)
	Aux. Factor	k_6	0.037		Eq. (6.58)
	Aux. Factor	k_7	0.260		Eq. (6.59)
	Moment at Ridge Cross-Section	$M_{ap,d}$	414.589	kNm	
	Transversal Tension Stress	$\sigma_{t,90,d}$	0.3	N/mm ²	Eq. (6.54)
	Steel Rod - Outside Diameter	d_r	1.60	cm	
	Steel Rod - Area	A_{ef}	1.57	cm ²	
	Steel Rod - Tensile Strength	$f_{u,b,k}$	800.0	N/mm ²	EN 1993-1-8

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Steel Rod - Ultimate Limit State		$F_{t,Rk}$	113.040	kN	Calculated,
Steel Rod - Partial Factor		γ_{M2}	1.250		Tab.3.4(EN 1993-1-8)
Steel Rod - Tension Resistance (Failure)		$F_{t,Rd}$	90.432	kN	EN 1993-1-8
Glued Joint Strength		$f_{k1,k}$	4.0	N/mm ²	Tab.3.4(EN 1993-1-8)
Modification Factor		k_{mod}	0.900		DIN EN 1995-1-1/N A:2013-08,
Partial Factor		γ_M	1.300		Tab.NA.12
Glued Joint Strength		$f_{k1,d}$	2.8	N/mm ²	Tab. 3.1
Beam Height in Transversal Tension Area		h_c	102.00	cm	Tab. 2.3
Lamination Thickness		t	3.00	cm	Eq. (2.14)
Half of Glue Length of Steel Rod		l_{ad}	49.50	cm	
Steel Rod - Glued Joint Stress Resistance		$R_{ax,F,d}$	34.451	kN	DIN EN 1995-1-1/N A:2013-08, NA.6.8.5, NA.3
Length of Transversal Tension Area		l_{a1}	6.782	m	
Number of Rods Within a_1		n	1		
Number of Rods		n_{a1}	6		
Distance of Rods		a_1	1.130	m	
Design Value of Tensile Force		$F_{t,90,d}$	31.839	kN	DIN EN 1995-1-1/N A:2013-08, Eq. (NA.94)
Steel Rod - Glued Joint Stress		$\tau_{ef,d}$	2.6	N/mm ²	DIN EN 1995-1-1/N A:2013-08, Eq. (NA.96)
Design of Tensile Force of Rod			0.35	≤ 1	EN 1993-1-8
Design of Glued Joint Stresses of Steel Rod			0.92	≤ 1	DIN EN 1995-1-1/N A:2013-08, Eq. (NA.95)
Governing Design		η	0.92	≤ 1	
301) Lateral torsional stability verification - Bending without compression acc. to 6.3.3					
Governing	Location	X	5.581	m	
	Result Combinations	RC	RC6		
Design Internal Forces	Normal Force	N_d	-6.724	kN	
	Shear Force	$V_{z,d}$	24.553	kN	
	Moment	$M_{y,d}$	411.707	kNm	
Design	Moment	M_d	411.707	kNm	
	Beam Width	b	24.00	cm	
	Reduced Beam Width	b_{red}	22.40	cm	
	Beam Depth	h	102.85	cm	
	Reduced Section Modulus	W_{red}	39491.70	cm ³	
	Longitudinal Stress	$\sigma_{m,d}$	10.4	N/mm ²	
	Equivalent Cross-Section Height	$h_{0,65}$	108.58	cm	
	Second Moment of Area	I_z^*	125082.00	cm ⁴	
	Torsional Moment of Inertia	I_t^*	430668.00	cm ⁴	
	Section Modulus	W_y^*	47156.70	cm ³	
	Equivalent Member Length	l_{ef}	2.250	m	$> l$
	Modulus of Elasticity	$E_{0,05}$	10500.0	N/mm ²	[7], Tab.1
	Shear Modulus	$G_{0,05}$	540.0	N/mm ²	[7], Tab.1
	Relative Slenderness Ratio	$\lambda_{rel,m}$	0.414		Eq. (6.30)
	Critical Bending Stress	$\sigma_{m,crit}^*$	163.6	N/mm ²	Eq. (6.31)
	Lateral Buckling Coefficient	k_{crit}^*	1.000		Eq. (6.34)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.52	≤ 1	Eq. (6.33)
302) Lateral torsional stability verification - Bending and compression acc. to 6.3.3					
Governing	Location	X	11.683	m	
	Result Combinations	RC	RC10		
Design Internal Forces	Normal Force	N_d	-23.678	kN	
	Shear Force	$V_{z,d}$	-73.065	kN	
	Moment	$M_{y,d}$	249.764	kNm	
Design	Beam Width	b	24.00	cm	
	Reduced Beam Width	b_{red}	22.40	cm	
	Beam Depth	h	102.00	cm	
	Reduced Cross-Sectional Area	A_{red}	2284.80	cm ²	
	Equivalent Cross-Section Height	$h_{0,65}$	104.75	cm	
	Torsional Moment of Inertia	I_t^*	413045.00	cm ⁴	
	Section Modulus	W_y^*	43892.80	cm ³	

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	Equivalent Cross-Sectional Area	$A_{0,65}$	2514.07	cm ²	
	Second Moment of Area	I_y^*	2298950.00	cm ⁴	
	Radius of Inertia	I_y^*	30.24	cm	
	Compressive Strength	$f_{c,0,k}$	28.0	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Compressive Strength	$f_{c,0,d}$	20.2	N/mm ²	Eq. (2.14)
	Modulus of Elasticity	$E_{0,05}$	10500.0	N/mm ²	[7], Tab.1
	Straightness Factor	β_c	0.100		Eq. (6.29)
	Normal Force	N_d	23.678	kN	
	Compressive Stress	$\sigma_{c,0,d}$	0.1	N/mm ²	Eq. (6.36)
	Design - Axial Force Portion (Compression)		0.01		Eq. (6.2)
	Equivalent Member Length	$l_{ef,z}$	2.250	m	
	Second Moment of Area	I_z^*	120675.00	cm ⁴	
	Radius of Inertia	I_z^*	6.93	cm	
	Slenderness Degree	λ_z^*	32.476		
	Relative Slenderness Ratio	$\lambda_{rel,z}$	0.534		Eq. (6.22), Ann. (2)
	Buckling Coefficient	k_z^*	0.654		Eq. (6.28)
	Buckling Coefficient	$k_{c,z}$	0.969		Eq. (6.26)
	Design - Axial Force Portion (Compression)		0.01		≤ 1
	Moment	M_d	249.764	kNm	
	Reduced Section Modulus	W_{red}	38841.60	cm ³	
	Longitudinal Stress	$\sigma_{m,d}$	6.4	N/mm ²	
	Equivalent Member Length	l_{ef}	2.250	m	> l /
	Shear Modulus	G_{05}	540.0	N/mm ²	[7], Tab.1
	Relative Slenderness Ratio	$\lambda_{rel,m}$	0.407		Eq. (6.30)
	Critical Bending Stress	$\sigma_{m,crit}$	169.1	N/mm ²	Eq. (6.31)
	Lateral Buckling Coefficient	k_{crit}	1.000		Eq. (6.34)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab.1
	Bending Strength	$f_{m,d}$	20.2	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.11		Eq. (6.35)
					≤ 1
352) Support pressure - Compression at an angle acc. to 6.2.2					
Governing	Location	X	0.000	m	
	Result Combinations	RC	RC6		
Design Internal Forces	Normal Force	N_d	-35.704	kN	
	Shear Force	$V_{z,d}$	115.863	kN	
	Moment	$M_{y,d}$	0.870	kNm	
Design	Support Force	A_d	122.115	kN	
	Roof Inclination	γ	18.00	°	
	Angle	α	72.00	°	
	Support Length	l_A	23.00	cm	
	Effective Support Length	$l_{A,ef}$	25.85	cm	
	Beam Width	b	24.00	cm	
	Effective Area of Transversal Compression	A_{ef}	620.48	cm ²	
	Transversal compressive Stress	$\sigma_{c,\alpha,d}$	2.0	N/mm ²	
	Transversal Compression Factor	$k_{c,90}$	1.750		
	Compressive Strength	$f_{c,0,k}$	28.0	N/mm ²	[7], Tab.1
	Partial Factor	γ_M	1.250		Tab. 2.3
	Modification Factor	k_{mod}	0.900		Tab. 3.1
	Compressive Strength	$f_{c,0,d}$	20.2	N/mm ²	Eq. (2.14)
	Transversal Compressive Strength	$f_{c,90,k}$	2.5	N/mm ²	[7], Tab.1
	Transversal Compressive Strength	$f_{c,90,d}$	1.8	N/mm ²	Eq. (2.14)
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab.1
	Shear Strength	$f_{v,d}$	2.5	N/mm ²	Eq. (2.14)
	Transv. Compressive Strength Below α	$f_{c,\alpha,d}$	3.4	N/mm ²	
	Design Ratio	η	0.57		Eq. (6.16)
					≤ 1
401) Serviceability - Design Situation Characteristic acc. to 7.2 - Inner span					
Governing	Location	X	6.377	m	
	Result Combinations	RC	RC80		
Deformations	Direction x	w_x	8.8	mm	
	Direction y	w_y	0.0	mm	
	Direction z	w_z	20.3	mm	
Design	Deformation in Span	w_{inst}	20.3	mm	
	Reference Length	l	14.220	m	
	Limit Value Criterion	$l / \dots$	300		
	Limit Value of Deformation	$w_{inst,limit}$	47.4	mm	
	Design Ratio	η	0.43		Eq. (6.16)
					≤ 1
402) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span					
Governing	Location	X	6.377	m	
	Result Combinations	RC	RC154		
Deformations	Direction x	w_x	11.5	mm	
	Direction y	w_y	0.0	mm	
	Direction z	w_z	26.4	mm	
Design	Deformation Coefficient	k_{def}	0.60		Tab. 3.2
	Deformation in Span	w_{fin}	26.4	mm	
	Precamber	w_c	0.0	mm	

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	Deformation, Deducting Raise	$w_{fin} - w_c$	26.4	mm		
	Reference Length	l	14.220	m		
	Limit Value Criterion	$l / \dots$	250			
	Limit Value of Deformation	$w_{fin,limit}$	56.9	mm		
	Design Ratio	η	0.46		≤ 1	Tab. 7.2
403) Serviceability - Design Situation Quasi-permanent acc. to 7.2 - Inner span						
Governing	Location	X	6.377	m		
	Result Combinations	RC	RC154			
Deformations	Direction x	w_x	11.5	mm		
	Direction y	w_y	0.0	mm		
	Direction z	w_z	26.4	mm		
Design	Deformation Coefficient	k_{def}	0.60			Tab. 3.2
	Deformation in Span	w_{fin}	26.4	mm		
	Reference Length	l	14.220	m		
	Limit Value Criterion	$l / \dots$	150			
	Limit Value of Deformation	$w_{fin,limit}$	94.8	mm		
	Design Ratio	η	0.28		≤ 1	Tab. 7.2
511) Fire resistance - Shear stress acc. to 6.1.7						
Governing	Location	X	14.105	m		
	Result Combinations	RC	RC224			
Design Internal Forces	Normal Force	N_d	-15.551	kN		
	Shear Force	$V_{z,d}$	-47.862	kN		
	Moment	$M_{y,d}$	5.633	kNm		
Design	Shear Force	$V_{z,d}$	47.862	kN		
	Beam Width	b	10.00	cm		
	Cross-Section Height	h_r	95.00	cm		
	Crack Influence Factor	k_{cr}	0.670			6.1.7 (2)
	Effective Width	b_{ef}	6.70	cm		
	Shear Stress	τ_d	1.1	N/mm ²		
	Shear Strength	$f_{v,k}$	3.5	N/mm ²		[7], Tab. 1
	Factor	k_{fi}	1.150			[2], Tab. 2.1
	Shear Strength	$f_{v,20}$	4.0	N/mm ²		[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000			[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000			[2], 4.2.2 (5)
	Shear Strength	$f_{v,d,fi}$	4.0	N/mm ²		[2], Eq. (2.1)
	Design Ratio	η	0.28		≤ 1	Eq. (6.13)
512) Fire resistance - Shear stress at support acc. to 6.1.7						
Governing	Location	X	14.220	m		
	Result Combinations	RC	RC224			
Design Internal Forces	Normal Force	N_d	-15.805	kN		
	Shear Force	$V_{z,d}$	-48.644	kN		
	Moment	$M_{y,d}$	-0.040	kNm		
Design	Shear Force	$V_{z,d}$	48.644	kN		
	Beam Width	b	10.00	cm		
	Cross-Section Depth	h_A	98.45	cm		
	Crack Influence Factor	k_{cr}	0.670			6.1.7 (2)
	Effective Width	b_{ef}	6.70	cm		
	Shear Stress	τ_d	1.1	N/mm ²		
	Shear Strength	$f_{v,k}$	3.5	N/mm ²		[7], Tab. 1
	Factor	k_{fi}	1.150			[2], Tab. 2.1
	Shear Strength	$f_{v,20}$	4.0	N/mm ²		[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000			[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000			[2], 4.2.2 (5)
	Shear Strength	$f_{v,d,fi}$	4.0	N/mm ²		[2], Eq. (2.1)
	Design Ratio	η	0.27		≤ 1	Eq. (6.13)
523) Fire resistance - Compression and bending stress acc. to 6.2.4						
Governing	Location	X	5.187	m		
	Result Combinations	RC	RC224			
Design Internal Forces	Normal Force	N_d	-4.322	kN		
	Shear Force	$V_{z,d}$	13.300	kN		
	Moment	$M_{y,d}$	168.587	kNm		
Design	Normal Force	N_d	4.322	kN		
	Cross-Sectional Area	A	950.00	cm ²		
	Compressive Stress	$\sigma_{c,0,d}$	0.0	N/mm ²		Eq. (6.36)
	Compressive Strength	$f_{c,0,k}$	28.0	N/mm ²		[7], Tab. 1
	Factor	k_{fi}	1.150			[2], Tab. 2.1
	Compressive Strength	$f_{c,0,20}$	32.2	N/mm ²		[2], Eq. (

■ DESIGN - ALL - DETAILS

	Partial Factor	$\gamma_{M,fi}$	1.000		(2.4) [2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		(1) [2], 4.2.2 (5)
	Compressive Strength	$f_{c,0,d,fi}$	32.2	N/mm ²	[2], Eq. (2.1)
	Design - Axial Force Portion		0.00		≤ 1
	Moment	M_d	168.587	kNm	
	Section Modulus	W	15041.70	cm ³	
	Bending Stress	$\sigma_{m,d}$	11.2	N/mm ²	
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab.1
	Bending Strength	$f_{m,z,20}$	32.2	N/mm ²	[2], Eq. (2.4)
	Bending Strength	$f_{m,d,fi}$	32.2	N/mm ²	[2], Eq. (2.1)
	Design - Moment Portion		0.35		≤ 1
	Design Ratio	η	0.35		≤ 1 Eq. (6.19)
533) Fire resistance - Bending stress on cut edge acc. to 6.4.2 - Compression edge					
Governing	Location	X	6.780	m	
	Result Combinations	RC	RC224		
Design Internal Forces	Normal Force	N_d	-0.603	kN	
	Shear Force	$V_{z,d}$	2.559	kN	
	Moment	$M_{y,d}$	181.825	kNm	
Design	Cut-to-Grain Angle	α	9.00	°	
	Moment	M_d	181.825	kNm	
	Reduced Beam Width	b_{red}	8.40	cm	
	Beam Depth	h	108.74	cm	
	Longitudinal Stress	$\sigma_{m,\alpha,d}$	11.0	N/mm ²	Eq. (6.37)
	Compressive Strength Perpendicular to Grain	$f_{c,90,d,fi}$	2.9	N/mm ²	Eq. (2.14)
	Shear Strength	$f_{v,d,fi}$	4.0	N/mm ²	Eq. (2.14)
	Auxiliary factor	$k_{m,\alpha}$	0.747		Eq. (6.40)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab.1
	Factor	k_{fi}	1.150		[2], Tab. 2.1
	Bending Strength	$f_{m,z,20}$	32.2	N/mm ²	[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
	Bending Strength	$f_{m,d,fi}$	32.2	N/mm ²	[2], Eq. (2.1)
	Bending Strength	$f_{m,\alpha,d,fi}$	24.1	N/mm ²	≤ 1
	Design Ratio	η	0.46		≤ 1 Eq. (6.19; 6.38)
536) Fire resistance - Bending stress on curved beam acc. to 6.4.3					
Governing	Location	X	5.581	m	
	Result Combinations	RC	RC224		
Design Internal Forces	Normal Force	N_d	-3.355	kN	
	Shear Force	$V_{z,d}$	10.662	kN	
	Moment	$M_{y,d}$	173.541	kNm	
Design	Beam Depth	h	95.85	cm	
	Arc Radius	r_{in}	10.000	m	
	Arc Radius	r	10.479	m	
	Factor	k_l	1.037		Eq. (6.43)
	Lamination Thickness	t	3.00	cm	
	Factor	k_r	1.000		Eq. (6.49)
	Moment	M_d	173.541	kNm	
	Reduced Beam Width	b_{red}	8.40	cm	
	Longitudinal Stress	$\sigma_{m,d}$	14.0	N/mm ²	Eq. (6.42)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab.1
	Factor	k_{fi}	1.150		[2], Tab. 2.1
	Bending Strength	$f_{m,z,20}$	32.2	N/mm ²	[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
	Bending Strength	$f_{m,d,fi}$	32.2	N/mm ²	[2], Eq. (2.1)
	Design Ratio	η	0.43		≤ 1 Eq. (6.41)
543) Fire resistance - Bending stress at ridge cross-section 6.4.3					
Governing	Location	X	8.435	m	
	Result Combinations	RC	RC224		
Design Internal Forces	Normal Force	N_d	1.710	kN	
	Shear Force	$V_{z,d}$	-9.366	kN	
	Moment	$M_{y,d}$	176.207	kNm	
Design	Beam Depth	h_{ap}	151.71	cm	
	Arc Radius	r_{in}	10.000	m	

■ DESIGN - ALL - DETAILS

	Arc Radius	r	10.759	m	
	Inclination Angle	α_{ap}	18.00	°	
	Aux. Factor	k_1	2.025		Eq. (6.44)
	Aux. Factor	k_2	-2.249		Eq. (6.45)
	Aux. Factor	k_3	2.473		Eq. (6.46)
	Aux. Factor	k_4	0.633		Eq. (6.47)
	Factor	k_l	1.759		Eq. (6.43)
	Lamination Thickness	t	3.00	cm	
	Factor	k_r	1.000		Eq. (6.49)
	Moment at Ridge Cross-Section	$M_{ap,d}$	176.207	kNm	
	Reduced Beam Width	$b_{ap,red}$	8.40	cm	
	Longitudinal Stress	$\sigma_{m,d}$	9.6	N/mm ²	Eq. (6.42)
	Bending Strength	$f_{m,k}$	28.0	N/mm ²	[7], Tab. 1
	Factor	k_{fi}	1.150		[2], Tab. 2.1
	Bending Strength	$f_{m,z,20}$	32.2	N/mm ²	[2], Eq. (2.4)
	Partial Factor	$\gamma_{M,fi}$	1.000		[2], 2.3 (1)
	Modification Factor	$k_{mod,fi}$	1.000		[2], 4.2.2 (5)
	Bending Strength	$f_{m,d,fi}$	32.2	N/mm ²	[2], Eq. (2.1)
	Design Ratio	η	0.30		≤ 1 Eq. (6.41)
558) Fire resistance - Transversal tension stress at ridge cross-section acc. to DIN EN 1995-1-1/NA:2013-08, NA. 6.4.3					
Governing	Location	X	8.435	m	
	Result Combinations	RC	RC224		
Design Internal Forces	Normal Force	N_d	1.710	kN	
	Shear Force	$V_{z,d}$	-9.366	kN	
	Moment	$M_{y,d}$	176.207	kNm	
Design	Beam Depth	h_{ap}	151.71	cm	
	Beam Width	b_{ap}	10.00	cm	
	Arc Radius	r_{in}	10.000	m	
	Arc Radius	r	10.759	m	
	Inclination Angle	α_{ap}	18.00	°	
	Factor	k_p	0.075		Eq. (6.56)
	Aux. Factor	k_5	0.065		Eq. (6.57)
	Aux. Factor	k_6	0.037		Eq. (6.58)
	Aux. Factor	k_7	0.260		Eq. (6.59)
	Moment at Ridge Cross-Section	$M_{ap,d}$	176.207	kNm	
	Transversal Tension Stress	$\sigma_{t,90,d}$	0.3	N/mm ²	Eq. (6.54)
	Modification Factor	k_{mod}	1.000		Tab. 3.1
	Partial Factor	γ_M	1.000		Tab. 2.3
	Transversal Tensile Strength	$f_{t,90,d}$	0.6	N/mm ²	Eq. (2.14)
	Factor	$k_{dis, DIN EN NA}$	1.300		DIN EN 1995-1-1/N A:2010-12, NA 6.8.5, NA.1
	Reference Height	h_0	60.00	cm	DIN EN 1995-1-1/N A:2010-12, NA 6.8.5, NA.1
	Shear Force	$V_{z,d}$	9.366	kN	
	Shear Stress	τ_d	0.1	N/mm ²	
	Shear Strength	$f_{v,k}$	3.5	N/mm ²	[7], Tab. 1
	Shear Strength	$f_{v,d}$	4.0	N/mm ²	Eq. (2.14)
	Design Ratio	η	0.61		≤ 1 DIN EN 1995-1-1/N A:2013-08, Eq. (NA.93)
573) Fire resistance - Transversal tension stress - Structural transversal tension reinforcement acc. to DIN EN 1995-1-1/NA 2013-08, NA.6.8.5, Glued-in rods					
Governing	Location	X	8.435	m	
	Result Combinations	RC	RC224		
Design Internal Forces	Normal Force	N_d	1.710	kN	
	Shear Force	$V_{z,d}$	-9.366	kN	
	Moment	$M_{y,d}$	176.207	kNm	
Design	Beam Depth	h_{ap}	151.71	cm	
	Beam Width	b_{ap}	10.00	cm	
	Arc Radius	r_{in}	10.000	m	
	Arc Radius	r	10.759	m	
	Inclination Angle	α_{ap}	18.00	°	
	Factor	k_p	0.075		Eq. (6.56)
	Aux. Factor	k_5	0.065		Eq. (6.57)
	Aux. Factor	k_6	0.037		Eq. (6.58)
	Aux. Factor	k_7	0.260		Eq. (6.59)
	Moment at Ridge Cross-Section	$M_{ap,d}$	176.207	kNm	
	Transversal Tension Stress	$\sigma_{t,90,d}$	0.3	N/mm ²	Eq. (6.54)
	Steel Rod - Outside Diameter	d_r	1.60	cm	
	Steel Rod - Area	A_{ef}	1.57	cm ²	
	Steel Rod - Tensile Strength	$f_{u,b,k}$	800.0	N/mm ²	EN 1993-1-8

■ DESIGN - ALL - DETAILS

Steel Rod - Ultimate Limit State	$F_{t,Rk}$	113.040	kN	Calculated,
Steel Rod - Partial Factor	γ_{M2}	1.000		Tab.3.4(EN 1993-1-8)
Steel Rod - Tension Resistance (Failure)	$F_{t,Rd}$	113.040	kN	EN 1993-1-8
Glued Joint Strength	$f_{k1,k}$	4.0	N/mm ²	Tab.3.4(EN 1993-1-8)
Factor	k_{fi}	1.150		DIN EN 1995-1-1/N A:2013-08,
Modification Factor	$k_{mod,fi}$	1.000		Tab.NA.12 [2], Tab. 2.1
Partial Factor	$\gamma_{M,fi}$	1.000		[2], 4.2.2 (5)
Glued Joint Strength	$f_{k1,d,fi}$	4.6	N/mm ²	[2], 2.3 (1)
Beam Height in Transversal Tension Area	h_c	102.00	cm	Eq. (2.14)
Lamination Thickness	t	3.00	cm	
Half of Glue Length of Steel Rod	l_{ad}	49.50	cm	DIN EN 1995-1-1/N A:2013-08, NA.6.8.5, NA.3
Length of Transversal Tension Area	l_{a1}	57.227	kN	
Number of Rods Within a_1	n	6.782	m	
Number of Rods	n_{a1}	1		
Distance of Rods	a_1	6		
Design Value of Tensile Force	$F_{t,90,d}$	1.130	m	DIN EN 1995-1-1/N A:2013-08, Eq. (NA.94)
Steel Rod - Glued Joint Stress	$\tau_{ef,d}$	6.116	kN	DIN EN 1995-1-1/N A:2013-08, Eq. (NA.96)
Design of Tensile Force of Rod		0.05		EN 1993-1-8
Design of Glued Joint Stresses of Steel Rod		0.11		DIN EN 1995-1-1/N A:2013-08, Eq. (NA.95)
Governing Design	η	0.11		≤ 1
701) Fire resistance - Lateral torsional stability verification - Bending without compression acc. to 6.3.3				
Governing	Location	X	5.581	m
	Result Combinations	RC	RC224	
Design Internal Forces	Normal Force	N_d	-3.355	kN
	Shear Force	$V_{z,d}$	10.662	kN
	Moment	$M_{y,d}$	173.541	kNm
Design	Moment	M_d	173.541	kNm
	Beam Width	b	10.00	cm
	Reduced Beam Width	b_{red}	8.40	cm
	Beam Depth	h	95.85	cm
	Reduced Section Modulus	W_{red}	12862.10	cm ³
	Longitudinal Stress	$\sigma_{m,d}$	13.5	N/mm ²
	Equivalent Cross-Section Height	$h_{0,65}$	101.58	cm
	Second Moment of Area	I_z^*	8465.00	cm ⁴
	Torsional Moment of Inertia	$I_{t,1}^*$	31760.00	cm ⁴
	Section Modulus	$W_{y,1}^*$	17197.50	cm ³
	Equivalent Member Length	l_{ef}	2.250	m
	Modulus of Elasticity	$E_{d,fi}$	12075.0	N/mm ²
	Shear Modulus	G_{fi}	621.0	N/mm ²
	Relative Slenderness Ratio	$\lambda_{rel,m}$	0.876	
	Critical Bending Stress	$\sigma_{m,crit}$	36.5	N/mm ²
	Lateral Buckling Coefficient	k_{crit}^*	0.903	
	Bending Strength	$f_{m,k}$	28.0	N/mm ²
	Factor	k_{fi}	1.150	
	Bending Strength	$f_{m,z,20}$	32.2	N/mm ²
	Partial Factor	$\gamma_{M,fi}$	1.000	
	Modification Factor	$k_{mod,fi}$	1.000	
	Bending Strength	$f_{m,d,fi}$	32.2	N/mm ²
	Design Ratio	η	0.46	≤ 1

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRAĐEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 117

■ SUPPORT FORCES

LC	Result Combinations	Left Support		Right Support		Stab. loads	Max.Moment	
RC	Description	A _x [kN]	A _z [kN]	A _x [kN]	A _z [kN]	q [kN/m]	M _y [kNm]	
Load Cases (Characteristic Values)								
LC1	Self-Weight + Roof Finishes	0.000	43.868	0.000	44.020	0.105	154.500	
LC21	Imposed Load	0.000	0.000	0.000	0.000	0.000	0.000	
LC41	Snow (Both Sides Full)	0.000	39.105	0.000	39.105	0.095	139.007	
LC42	Snow (Left Side Full)	0.000	35.869	0.000	26.432	0.082	116.953	
LC43	Snow (Right Side Full)	0.000	22.789	0.000	32.225	0.068	94.416	
LC51	Wind Transversely to Ridge (left)(AA)	-0.366	-9.923	0.000	-9.839	0.015	31.567	
LC52	Wind Transversely to Ridge (left)(BB)	2.052	4.705	0.000	2.239	0.009	15.953	
LC53	Wind Transversely to Ridge (left)(AB)	-2.967	-7.140	0.000	-2.723	0.011	19.552	
LC54	Wind Transversely to Ridge (left)(BA)	4.653	1.922	0.000	-4.877	0.004	8.172	
LC55	Wind Transversely to Ridge (right)(AA)	-1.569	-9.734	0.000	-10.687	0.018	36.865	
LC56	Wind Transversely to Ridge (right)(BB)	-1.363	1.147	0.000	3.676	0.007	6.853	
LC57	Wind Transversely to Ridge (right)(AB)	2.116	-1.465	0.000	-5.779	0.004	7.964	
LC58	Wind Transversely to Ridge (right)(BA)	-5.049	-7.122	0.000	-1.232	0.020	28.783	
LC59	Wind Parallel to Ridge (A)	-1.766	-14.467	0.000	-14.698	0.024	50.914	
LC60	Wind Parallel to Ridge (B)	-1.766	-14.467	0.000	-14.698	0.024	50.914	
Max		4.653	43.868	0.000	44.020	0.105	154.500	
Min		-5.049	-14.467	0.000	-14.698	0.000	0.000	
Result Combinations for Ultimate Limit State (Design Values) (STR)								
RC1	g	0.000	59.222	0.000	59.428	0.142	208.575	
RC2	g + s	0.000	117.880	0.000	118.085	0.284	417.085	
RC3	g + s(l)	0.000	113.026	0.000	99.076	0.264	383.177	
RC4	g + s(r)	0.000	93.405	0.000	107.766	0.244	348.400	
RC5	g + s + w(q,l,AA)	-0.330	108.949	0.000	109.230	0.265	388.921	
RC6	g + s + w(q,l,BB)	1.847	122.115	0.000	120.100	0.292	430.721	
RC7	g + s + w(q,l,AB)	-2.670	111.454	0.000	115.634	0.277	400.512	
RC8	g + s + w(q,l,BA)	4.188	119.609	0.000	113.696	0.282	419.510	
RC9	g + s + w(q,r,AA)	-1.412	109.119	0.000	108.467	0.265	383.907	
RC10	g + s + w(q,r,BB)	-1.227	118.912	0.000	121.394	0.289	421.142	
RC11	g + s + w(q,r,AB)	1.904	116.561	0.000	112.884	0.278	412.827	
RC12	g + s + w(q,r,BA)	-4.544	111.470	0.000	116.976	0.278	392.237	
RC13	g + s + w(p,A)	-1.589	104.860	0.000	104.857	0.256	371.434	
RC14	g + s + w(p,B)	-1.589	104.860	0.000	104.857	0.256	371.434	
RC15	g + s(l) + w(q,l,AA)	-0.330	104.095	0.000	90.221	0.245	355.319	
RC16	g + s(l) + w(q,l,BB)	1.847	117.261	0.000	101.091	0.270	397.149	
RC17	g + s(l) + w(q,l,AB)	-2.670	106.600	0.000	96.625	0.258	366.202	
RC18	g + s(l) + w(q,l,BA)	4.188	114.755	0.000	94.687	0.258	386.341	
RC19	g + s(l) + w(q,r,AA)	-1.412	104.265	0.000	89.457	0.245	350.075	
RC20	g + s(l) + w(q,r,BB)	-1.227	114.058	0.000	102.385	0.270	386.941	
RC21	g + s(l) + w(q,r,AB)	1.904	111.707	0.000	93.875	0.257	379.258	
RC22	g + s(l) + w(q,r,BA)	-4.544	106.616	0.000	97.967	0.258	357.870	
RC23	g + s(l) + w(p,A)	-1.589	100.006	0.000	85.848	0.237	337.355	
RC24	g + s(l) + w(p,B)	-1.589	100.006	0.000	85.848	0.237	337.355	
RC25	g + s(r) + w(q,l,AA)	-0.330	84.474	0.000	98.911	0.224	320.044	
RC26	g + s(r) + w(q,l,BB)	1.847	97.640	0.000	109.780	0.252	361.672	
RC27	g + s(r) + w(q,l,AB)	-2.670	86.979	0.000	105.315	0.234	332.473	
RC28	g + s(r) + w(q,l,BA)	4.188	95.135	0.000	103.376	0.241	349.694	
RC29	g + s(r) + w(q,r,AA)	-1.412	84.644	0.000	98.147	0.221	315.472	
RC30	g + s(r) + w(q,r,BB)	-1.227	94.438	0.000	111.074	0.248	352.781	
RC31	g + s(r) + w(q,r,AB)	1.904	92.086	0.000	102.564	0.238	343.859	
RC32	g + s(r) + w(q,r,BA)	-4.544	86.995	0.000	106.657	0.232	324.702	
RC33	g + s(r) + w(p,A)	-1.589	80.385	0.000	94.538	0.213	303.250	
RC34	g + s(r) + w(p,B)	-1.589	80.385	0.000	94.538	0.213	303.250	
RC35	g + w(q,l,AA)	-0.549	44.337	0.000	44.669	0.110	161.740	
RC36	g + w(q,l,BB)	3.079	66.280	0.000	62.786	0.155	231.458	
RC37	g + w(q,l,AB)	-4.450	48.513	0.000	55.343	0.131	181.230	
RC38	g + w(q,l,BA)	6.980	62.105	0.000	52.112	0.139	213.366	
RC39	g + w(q,r,AA)	-2.354	44.621	0.000	43.397	0.110	153.278	
RC40	g + w(q,r,BB)	-2.045	60.943	0.000	64.942	0.151	215.375	
RC41	g + w(q,r,AB)	3.174	57.024	0.000	50.759	0.132	201.634	
RC42	g + w(q,r,BA)	-7.573	48.540	0.000	57.580	0.132	168.052	
RC43	g + w(p,A)	-2.649	37.522	0.000	37.381	0.096	132.609	
RC44	g + w(p,B)	-2.649	37.522	0.000	37.381	0.096	132.609	
RC45	g + s + w(q,l,AA)	-0.549	73.666	0.000	73.998	0.181	265.971	
RC46	g + s + w(q,l,BB)	3.079	95.609	0.000	92.114	0.226	335.689	
RC47	g + s + w(q,l,AB)	-4.450	77.841	0.000	84.672	0.202	285.329	
RC48	g + s + w(q,l,BA)	6.980	91.434	0.000	81.441	0.210	317.313	
RC49	g + s + w(q,r,AA)	-2.354	73.950	0.000	72.725	0.181	257.533	
RC50	g + s + w(q,r,BB)	-2.045	90.272	0.000	94.271	0.222	319.600	
RC51	g + s + w(q,r,AB)	3.174	86.353	0.000	80.088	0.204	305.865	
RC52	g + s + w(q,r,BA)	-7.573	77.868	0.000	86.908	0.202	271.719	
RC53	g + s + w(p,A)	-2.649	66.851	0.000	66.710	0.167	236.756	
RC54	g + s + w(p,B)	-2.649	66.851	0.000	66.710	0.167	236.756	
RC55	g + s(l) + w(q,l,AA)	-0.549	71.239	0.000	64.494	0.171	249.163	
RC56	g + s(l) + w(q,l,BB)	3.079	93.182	0.000	82.610	0.212	318.880	
RC57	g + s(l) + w(q,l,AB)	-4.450	75.414	0.000	75.167	0.192	267.784	
RC58	g + s(l) + w(q,l,BA)	6.980	89.007	0.000	71.936	0.195	301.081	
RC59	g + s(l) + w(q,r,AA)	-2.354	71.523	0.000	63.221	0.171	240.466	
RC60	g + s(l) + w(q,r,BB)	-2.045	87.845	0.000	84.767	0.212	302.268	
RC61	g + s(l) + w(q,r,AB)	3.174	83.926	0.000	70.583	0.191	289.061	
RC62	g + s(l) + w(q,r,BA)	-7.573	75.441	0.000	77.404	0.192	253.986	
RC63	g + s(l) + w(p,A)	-2.649	64.424	0.000	57.205	0.157	219.456	
RC64	g + s(l) + w(p,B)	-2.649	64.424	0.000	57.205	0.157	219.456	
RC65	g + s(r) + w(q,l,AA)	-0.549	61.428	0.000	68.838	0.160	231.190	
RC66	g + s(r) + w(q,l,BB)	3.079	83.372	0.000	86.955	0.206	300.796	
RC67	g + s(r) + w(q,l,AB)	-4.450	65.604	0.000	79.512	0.177	251.528	
RC68	g + s(r) + w(q,l,BA)	6.980	79.196	0.000	76.281	0.189	281.838	

SUPPORT FORCES

LC RC	Result Combinations Description	Left Support		Right Support		Stab. loads q [kN/m]	Max.Moment M _y [kNm]
		A _x [kN]	A _z [kN]	A _x [kN]	A _z [kN]		
RC69	g + s(r) + w(q,r,AA)	-2.354	61.712	0.000	67.565	0.156	223.193
RC70	g + s(r) + w(q,r,BB)	-2.045	78.034	0.000	89.111	0.200	285.375
RC71	g + s(r) + w(q,r,AB)	3.174	74.116	0.000	74.928	0.183	271.018
RC72	g + s(r) + w(q,r,BA)	-7.573	65.631	0.000	81.749	0.178	238.767
RC73	g + s(r) + w(p,A)	-2.649	54.614	0.000	61.550	0.142	202.824
RC74	g + s(r) + w(p,B)	-2.649	54.614	0.000	61.550	0.142	202.824
Max		6.980	122.115	0.000	121.394	0.292	430.721
Min		-7.573	37.522	0.000	37.381	0.096	132.609

Result Combinations for Serviceability Limit State (Characteristic Values)

RC75	g	0.000	43.868	0.000	44.020	0.105	154.500
RC76	g + s	0.000	82.973	0.000	83.126	0.200	293.507
RC77	g + s(l)	0.000	79.737	0.000	70.453	0.187	270.860
RC78	g + s(r)	0.000	66.657	0.000	76.246	0.173	247.655
RC79	g + s + w(q,l,AA)	-0.220	77.019	0.000	77.222	0.187	274.731
RC80	g + s + w(q,l,BB)	1.231	85.797	0.000	84.469	0.205	302.589
RC81	g + s + w(q,l,AB)	-1.780	78.689	0.000	81.492	0.195	282.458
RC82	g + s + w(q,l,BA)	2.792	84.126	0.000	80.199	0.199	295.115
RC83	g + s + w(q,r,AA)	-0.942	77.133	0.000	76.713	0.187	271.388
RC84	g + s + w(q,r,BB)	-0.818	83.662	0.000	85.331	0.204	296.212
RC85	g + s + w(q,r,AB)	1.270	82.094	0.000	79.658	0.196	290.665
RC86	g + s + w(q,r,BA)	-3.029	78.700	0.000	82.386	0.196	276.941
RC87	g + s + w(p,A)	-1.060	74.293	0.000	74.307	0.181	263.073
RC88	g + s + w(p,B)	-1.060	74.293	0.000	74.307	0.181	263.073
RC89	g + s(l) + w(q,l,AA)	-0.220	73.783	0.000	64.549	0.174	252.287
RC90	g + s(l) + w(q,l,BB)	1.231	82.561	0.000	71.796	0.190	280.174
RC91	g + s(l) + w(q,l,AB)	-1.780	75.453	0.000	68.819	0.182	259.577
RC92	g + s(l) + w(q,l,BA)	2.792	80.890	0.000	67.527	0.182	272.965
RC93	g + s(l) + w(q,r,AA)	-0.942	73.897	0.000	64.040	0.174	248.792
RC94	g + s(l) + w(q,r,BB)	-0.818	80.426	0.000	72.659	0.190	273.401
RC95	g + s(l) + w(q,r,AB)	1.270	78.858	0.000	66.985	0.182	268.247
RC96	g + s(l) + w(q,r,BA)	-3.029	75.464	0.000	69.714	0.182	254.022
RC97	g + s(l) + w(p,A)	-1.060	71.057	0.000	61.634	0.168	240.311
RC98	g + s(l) + w(p,B)	-1.060	71.057	0.000	61.634	0.168	240.311
RC99	g + s(r) + w(q,l,AA)	-0.220	60.703	0.000	70.342	0.160	228.790
RC100	g + s(r) + w(q,l,BB)	1.231	69.480	0.000	77.589	0.178	256.547
RC101	g + s(r) + w(q,l,AB)	-1.780	62.373	0.000	74.612	0.167	237.037
RC102	g + s(r) + w(q,l,BA)	2.792	67.810	0.000	73.320	0.171	248.579
RC103	g + s(r) + w(q,r,AA)	-0.942	60.816	0.000	69.833	0.158	225.703
RC104	g + s(r) + w(q,r,BB)	-0.818	67.345	0.000	78.452	0.176	250.576
RC105	g + s(r) + w(q,r,AB)	1.270	65.778	0.000	72.778	0.169	244.671
RC106	g + s(r) + w(q,r,BA)	-3.029	62.384	0.000	75.507	0.165	231.786
RC107	g + s(r) + w(p,A)	-1.060	57.977	0.000	67.427	0.152	217.555
RC108	g + s(r) + w(p,B)	-1.060	57.977	0.000	67.427	0.152	217.555
RC109	g + w(q,l,AA)	-0.366	33.945	0.000	34.182	0.084	123.268
RC110	g + w(q,l,BB)	2.052	48.574	0.000	46.259	0.114	169.747
RC111	g + w(q,l,AB)	-2.967	36.729	0.000	41.297	0.098	136.252
RC112	g + w(q,l,BA)	4.653	45.790	0.000	39.143	0.103	157.594
RC113	g + w(q,r,AA)	-1.569	34.134	0.000	33.333	0.084	117.635
RC114	g + w(q,r,BB)	-1.364	45.016	0.000	47.697	0.111	159.016
RC115	g + w(q,r,AB)	2.116	42.403	0.000	38.241	0.099	149.864
RC116	g + w(q,r,BA)	-5.049	36.747	0.000	42.789	0.098	127.352
RC117	g + w(p,A)	-1.766	29.402	0.000	29.323	0.074	103.838
RC118	g + w(p,B)	-1.766	29.402	0.000	29.323	0.074	103.838
RC119	g + s + w(q,l,AA)	-0.366	53.497	0.000	53.734	0.131	192.755
RC120	g + s + w(q,l,BB)	2.052	68.126	0.000	65.812	0.161	239.234
RC121	g + s + w(q,l,AB)	-2.967	56.281	0.000	60.850	0.145	205.652
RC122	g + s + w(q,l,BA)	4.653	65.343	0.000	58.696	0.150	226.950
RC123	g + s + w(q,r,AA)	-1.569	53.687	0.000	52.886	0.131	187.139
RC124	g + s + w(q,r,BB)	-1.364	64.568	0.000	67.249	0.159	228.517
RC125	g + s + w(q,r,AB)	2.116	61.956	0.000	57.794	0.146	219.352
RC126	g + s + w(q,r,BA)	-5.049	56.299	0.000	62.341	0.146	196.578
RC127	g + s + w(p,A)	-1.766	48.954	0.000	48.875	0.122	173.287
RC128	g + s + w(p,B)	-1.766	48.954	0.000	48.875	0.122	173.287
RC129	g + s(l) + w(q,l,AA)	-0.366	51.879	0.000	47.398	0.125	181.517
RC130	g + s(l) + w(q,l,BB)	2.052	66.508	0.000	59.475	0.152	227.995
RC131	g + s(l) + w(q,l,AB)	-2.967	54.663	0.000	54.514	0.138	193.973
RC132	g + s(l) + w(q,l,BA)	4.653	63.725	0.000	52.360	0.141	216.071
RC133	g + s(l) + w(q,r,AA)	-1.569	52.069	0.000	46.549	0.125	175.753
RC134	g + s(l) + w(q,r,BB)	-1.364	62.950	0.000	60.913	0.152	216.954
RC135	g + s(l) + w(q,r,AB)	2.116	60.338	0.000	51.458	0.138	208.116
RC136	g + s(l) + w(q,r,BA)	-5.049	54.681	0.000	56.005	0.139	184.774
RC137	g + s(l) + w(p,A)	-1.766	47.336	0.000	42.539	0.115	161.746
RC138	g + s(l) + w(p,B)	-1.766	47.336	0.000	42.539	0.115	161.746
RC139	g + s(r) + w(q,l,AA)	-0.366	45.339	0.000	50.294	0.117	169.576
RC140	g + s(r) + w(q,l,BB)	2.052	59.968	0.000	62.372	0.148	215.981
RC141	g + s(r) + w(q,l,AB)	-2.967	48.123	0.000	57.410	0.129	183.074
RC142	g + s(r) + w(q,l,BA)	4.653	57.184	0.000	55.256	0.137	203.334
RC143	g + s(r) + w(q,r,AA)	-1.569	45.528	0.000	49.446	0.114	164.192
RC144	g + s(r) + w(q,r,BB)	-1.364	56.410	0.000	63.810	0.144	205.676
RC145	g + s(r) + w(q,r,AB)	2.116	53.797	0.000	54.354	0.133	196.129
RC146	g + s(r) + w(q,r,BA)	-5.049	48.141	0.000	58.901	0.129	174.404
RC147	g + s(r) + w(p,A)	-1.766	40.796	0.000	45.435	0.105	150.604
RC148	g + s(r) + w(p,B)	-1.766	40.796	0.000	45.435	0.105	150.604
RC149	g	0.000	70.189	0.000	70.433	0.168	247.200
RC150	g + s	0.000	109.294	0.000	109.538	0.263	386.207
RC151	g + s(l)	0.000	106.058	0.000	96.865	0.250	363.441
RC152	g + s(r)	0.000	92.978	0.000	102.658	0.236	340.238
RC153	g + s + w(q,l,AA)	-0.220	103.340	0.000	103.634	0.250	367.431
RC154	g + s + w(q,l,BB)	1.231	112.118	0.000	110.881	0.268	395.278
RC155	g + s + w(q,l,AB)	-1.780	105.011	0.000	107.904	0.259	375.157
RC156	g + s + w(q,l,BA)	2.792	110.447	0.000	106.612	0.262	387.765
RC157	g + s + w(q,r,AA)	-0.942	103.454	0.000	103.125	0.250	364.088

SUPPORT FORCES

LC RC	Result Combinations Description	Left Support		Right Support		Stab. loads q [kN/m]	Max.Moment M _y [kNm]	
		A _x [kN]	A _z [kN]	A _x [kN]	A _z [kN]			
RC158	g + s + w(q,r,BB)	-0.818	109.983	0.000	111.744	0.267	388.912	
RC159	g + s + w(q,r,AB)	1.270	108.415	0.000	106.070	0.259	383.365	
RC160	g + s + w(q,r,BA)	-3.029	105.021	0.000	108.799	0.259	369.640	
RC161	g + s + w(p,A)	-1.060	100.614	0.000	100.719	0.245	355.773	
RC162	g + s + w(p,B)	-1.060	100.614	0.000	100.719	0.245	355.773	
RC163	g + s(l) + w(q,l,AA)	-0.220	100.104	0.000	90.962	0.237	344.752	
RC164	g + s(l) + w(q,l,BB)	1.231	108.882	0.000	98.208	0.253	372.640	
RC165	g + s(l) + w(q,l,AB)	-1.780	101.775	0.000	95.231	0.245	352.226	
RC166	g + s(l) + w(q,l,BA)	2.792	107.211	0.000	93.939	0.245	365.414	
RC167	g + s(l) + w(q,r,AA)	-0.942	100.218	0.000	90.453	0.237	341.330	
RC168	g + s(l) + w(q,r,BB)	-0.818	106.747	0.000	99.071	0.253	366.051	
RC169	g + s(l) + w(q,r,AB)	1.270	105.179	0.000	93.398	0.245	360.710	
RC170	g + s(l) + w(q,r,BA)	-3.029	101.785	0.000	96.126	0.245	346.671	
RC171	g + s(l) + w(p,A)	-1.060	97.378	0.000	88.046	0.231	332.926	
RC172	g + s(l) + w(p,B)	-1.060	97.378	0.000	88.046	0.231	332.926	
RC173	g + s(r) + w(q,l,AA)	-0.220	87.024	0.000	96.755	0.223	321.383	
RC174	g + s(r) + w(q,l,BB)	1.231	95.801	0.000	104.001	0.241	349.141	
RC175	g + s(r) + w(q,l,AB)	-1.780	88.694	0.000	101.024	0.230	329.396	
RC176	g + s(r) + w(q,l,BA)	2.792	94.131	0.000	99.732	0.235	341.278	
RC177	g + s(r) + w(q,r,AA)	-0.942	87.137	0.000	96.246	0.221	318.163	
RC178	g + s(r) + w(q,r,BB)	-0.818	93.666	0.000	104.864	0.239	343.054	
RC179	g + s(r) + w(q,r,AB)	1.270	92.099	0.000	99.191	0.232	337.265	
RC180	g + s(r) + w(q,r,BA)	-3.029	88.705	0.000	101.919	0.228	324.053	
RC181	g + s(r) + w(p,A)	-1.060	84.298	0.000	93.839	0.215	309.947	
RC182	g + s(r) + w(p,B)	-1.060	84.298	0.000	93.839	0.215	309.947	
RC183	g + w(q,l,AA)	-0.366	60.266	0.000	60.594	0.147	215.918	
RC184	g + w(q,l,BB)	2.052	74.895	0.000	72.672	0.177	262.397	
RC185	g + w(q,l,AB)	-2.967	63.050	0.000	67.710	0.161	228.846	
RC186	g + w(q,l,BA)	4.653	72.111	0.000	65.556	0.166	250.039	
RC187	g + w(q,r,AA)	-1.569	60.455	0.000	59.745	0.147	210.335	
RC188	g + w(q,r,BB)	-1.364	71.337	0.000	74.109	0.174	251.714	
RC189	g + w(q,r,AB)	2.116	68.724	0.000	64.654	0.162	242.514	
RC190	g + w(q,r,BA)	-5.049	63.068	0.000	69.201	0.161	219.773	
RC191	g + w(p,A)	-1.766	55.723	0.000	55.735	0.137	196.485	
RC192	g + w(p,B)	-1.766	55.723	0.000	55.735	0.137	196.485	
RC193	g + s + w(q,l,AA)	-0.366	79.818	0.000	80.146	0.194	285.410	
RC194	g + s + w(q,l,BB)	2.052	94.447	0.000	92.224	0.225	331.884	
RC195	g + s + w(q,l,AB)	-2.967	82.602	0.000	87.262	0.208	298.294	
RC196	g + s + w(q,l,BA)	4.653	91.664	0.000	85.108	0.213	319.427	
RC197	g + s + w(q,r,AA)	-1.569	80.008	0.000	79.298	0.194	279.839	
RC198	g + s + w(q,r,BB)	-1.364	90.889	0.000	93.662	0.222	321.215	
RC199	g + s + w(q,r,AB)	2.116	88.277	0.000	84.206	0.209	312.001	
RC200	g + s + w(q,r,BA)	-5.049	82.620	0.000	88.753	0.209	289.172	
RC201	g + s + w(p,A)	-1.766	75.275	0.000	75.288	0.185	265.986	
RC202	g + s + w(p,B)	-1.766	75.275	0.000	75.288	0.185	265.986	
RC203	g + s(l) + w(q,l,AA)	-0.366	78.200	0.000	73.810	0.188	274.105	
RC204	g + s(l) + w(q,l,BB)	2.052	92.829	0.000	85.888	0.215	320.584	
RC205	g + s(l) + w(q,l,AB)	-2.967	80.984	0.000	80.926	0.202	286.673	
RC206	g + s(l) + w(q,l,BA)	4.653	90.046	0.000	78.772	0.204	308.429	
RC207	g + s(l) + w(q,r,AA)	-1.569	78.390	0.000	72.962	0.188	268.402	
RC208	g + s(l) + w(q,r,BB)	-1.364	89.271	0.000	87.325	0.215	309.603	
RC209	g + s(l) + w(q,r,AB)	2.116	86.659	0.000	77.870	0.201	300.702	
RC210	g + s(l) + w(q,r,BA)	-5.049	81.002	0.000	82.417	0.202	277.474	
RC211	g + s(l) + w(p,A)	-1.766	73.657	0.000	68.951	0.178	254.395	
RC212	g + s(l) + w(p,B)	-1.766	73.657	0.000	68.951	0.178	254.395	
RC213	g + s(r) + w(q,l,AA)	-0.366	71.660	0.000	76.707	0.180	262.275	
RC214	g + s(r) + w(q,l,BB)	2.052	86.289	0.000	88.784	0.211	308.679	
RC215	g + s(r) + w(q,l,AB)	-2.967	74.444	0.000	83.822	0.192	275.507	
RC216	g + s(r) + w(q,l,BA)	4.653	83.505	0.000	81.668	0.200	295.983	
RC217	g + s(r) + w(q,r,AA)	-1.569	71.849	0.000	75.858	0.177	256.786	
RC218	g + s(r) + w(q,r,BB)	-1.364	82.731	0.000	90.222	0.207	298.270	
RC219	g + s(r) + w(q,r,AB)	2.116	80.118	0.000	80.766	0.196	288.828	
RC220	g + s(r) + w(q,r,BA)	-5.049	74.462	0.000	85.313	0.192	266.545	
RC221	g + s(r) + w(p,A)	-1.766	67.117	0.000	71.848	0.168	243.093	
RC222	g + s(r) + w(p,B)	-1.766	67.117	0.000	71.848	0.168	243.093	
Max		4.653	112.118	0.000	111.744	0.268	395.278	
Min		-5.049	29.402	0.000	29.323	0.074	103.838	

Result Combinations for Fire Resistance (Design Values)

RC223	g	0.000	43.868	0.000	44.020	0.322	154.500	
RC224	g + s	0.000	51.689	0.000	51.841	0.379	182.301	
RC225	g + s(l)	0.000	51.042	0.000	49.307	0.370	177.691	
RC226	g + s(r)	0.000	48.426	0.000	50.466	0.361	173.050	
RC257	g + w(q,l,AA)	-0.073	41.884	0.000	42.053	0.308	148.241	
RC258	g + w(q,l,BB)	0.410	44.809	0.000	44.468	0.328	157.524	
RC259	g + w(q,l,AB)	-0.593	42.440	0.000	43.476	0.315	150.817	
RC260	g + w(q,l,BA)	0.931	44.253	0.000	43.045	0.322	154.991	
RC261	g + w(q,r,AA)	-0.314	41.922	0.000	41.883	0.307	147.127	
RC262	g + w(q,r,BB)	-0.273	44.098	0.000	44.756	0.324	155.402	
RC263	g + w(q,r,AB)	0.423	43.575	0.000	42.865	0.319	153.553	
RC264	g + w(q,r,BA)	-1.010	42.444	0.000	43.774	0.312	148.978	
RC265	g + w(p,A)	-0.353	40.975	0.000	41.081	0.301	144.356	
RC266	g + w(p,B)	-0.353	40.975	0.000	41.081	0.301	144.356	
Max		0.931	51.689	0.000	51.841	0.379	182.301	
Min		-1.010	40.975	0.000	41.081	0.301	144.356	

Stabilising Forces

Overturning Moment for Forked Support	T _d	5.384	kNm	Eq. (14)
Axial Force at Compression Chord	N _d	87.810	kN	Eq. (15)
Equiv. Load	q	0.296	kN/m	Eq. (16)

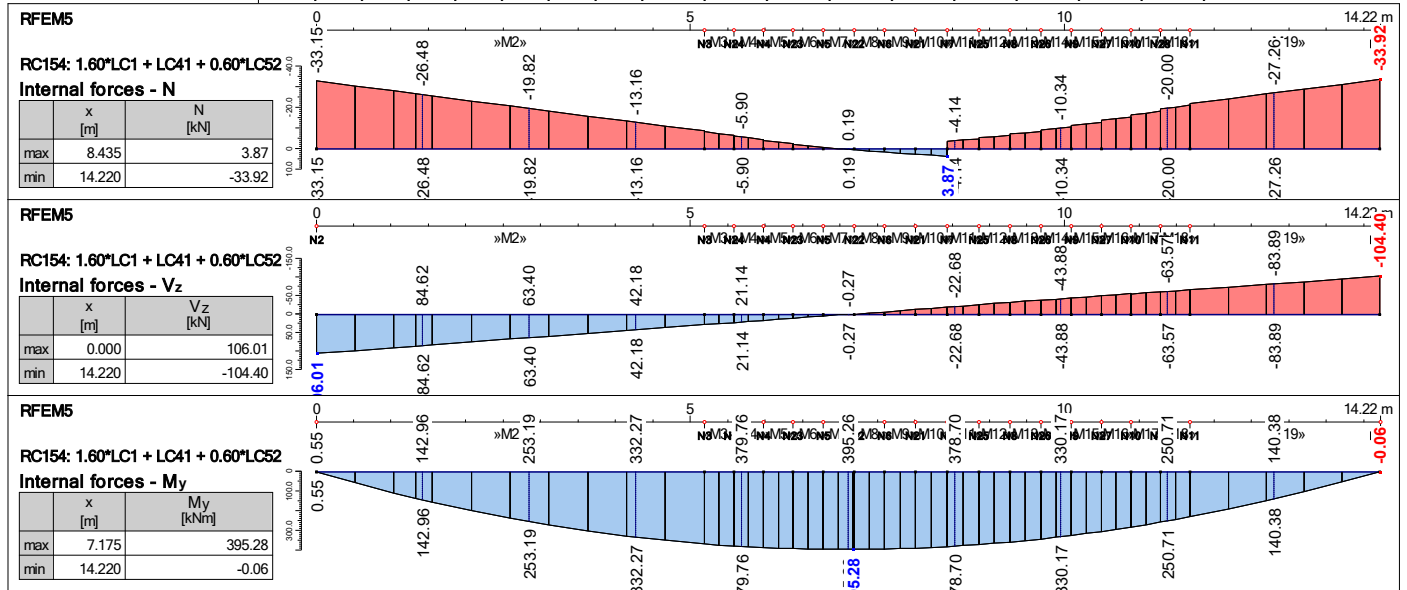
■ DEFORMATIONS

LC RC	Result Combinations Description	Left Support [mm]		Max. Span Deform.		Right Support [mm]	
		u _{z,A}	u _{x,A}	X [m]	max u _z [mm]	u _{z,B}	u _{x,B}
Load Cases							
LC1	Self-Weight + Roof Finishes	0.0	0.0	6.377	10.3	0.0	8.2
LC21	Imposed Load	0.0	0.0	0.000	0.0	0.0	0.0
LC41	Snow (Both Sides Full)	0.0	0.0	6.377	9.3	0.0	7.4
LC42	Snow (Left Side Full)	0.0	0.0	6.177	7.8	0.0	6.1
LC43	Snow (Right Side Full)	0.0	0.0	6.579	6.2	0.0	5.0
LC51	Wind Transversely to Ridge (left)(AA)	0.0	0.0	6.579	-2.1	0.0	-1.7
LC52	Wind Transversely to Ridge (left)(BB)	0.0	0.0	5.977	1.0	0.0	0.8
LC53	Wind Transversely to Ridge (left)(AB)	0.0	0.0	5.977	-1.3	0.0	-1.0
LC54	Wind Transversely to Ridge (left)(BA)	0.0	0.0	4.150	0.3	0.0	0.1
LC55	Wind Transversely to Ridge (right)(AA)	0.0	0.0	6.377	-2.4	0.0	-1.9
LC56	Wind Transversely to Ridge (right)(BB)	0.0	0.0	8.856	0.3	0.0	0.3
LC57	Wind Transversely to Ridge (right)(AB)	0.0	0.0	9.064	-0.4	0.0	-0.3
LC58	Wind Transversely to Ridge (right)(BA)	0.0	0.0	5.779	-1.8	0.0	-1.3
LC59	Wind Parallel to Ridge (A)	0.0	0.0	6.377	-3.5	0.0	-2.7
LC60	Wind Parallel to Ridge (B)	0.0	0.0	6.377	-3.5	0.0	-2.7
Result Combinations							
RC75	g	0.0	0.0	6.377	10.3	0.0	8.2
RC76	g + s	0.0	0.0	6.377	19.6	0.0	15.6
RC77	g + s(l)	0.0	0.0	6.377	18.1	0.0	14.3
RC78	g + s(r)	0.0	0.0	6.377	16.5	0.0	13.2
RC79	g + s + w(q,l,AA)	0.0	0.0	6.377	18.4	0.0	14.6
RC80	g + s + w(q,l,BB)	0.0	0.0	6.377	20.3	0.0	16.1
RC81	g + s + w(q,l,AB)	0.0	0.0	6.377	18.9	0.0	15.0
RC82	g + s + w(q,l,BA)	0.0	0.0	6.377	19.8	0.0	15.6
RC83	g + s + w(q,r,AA)	0.0	0.0	6.377	18.2	0.0	14.4
RC84	g + s + w(q,r,BB)	0.0	0.0	6.377	19.8	0.0	15.7
RC85	g + s + w(q,r,AB)	0.0	0.0	6.377	19.4	0.0	15.4
RC86	g + s + w(q,r,BA)	0.0	0.0	6.377	18.5	0.0	14.8
RC87	g + s + w(p,A)	0.0	0.0	6.377	17.6	0.0	13.9
RC88	g + s + w(p,B)	0.0	0.0	6.377	17.6	0.0	13.9
RC89	g + s(l) + w(q,l,AA)	0.0	0.0	6.377	16.8	0.0	13.2
RC90	g + s(l) + w(q,l,BB)	0.0	0.0	6.377	18.7	0.0	14.7
RC91	g + s(l) + w(q,l,AB)	0.0	0.0	6.377	17.3	0.0	13.7
RC92	g + s(l) + w(q,l,BA)	0.0	0.0	6.177	18.2	0.0	14.3
RC93	g + s(l) + w(q,r,AA)	0.0	0.0	6.377	16.6	0.0	13.1
RC94	g + s(l) + w(q,r,BB)	0.0	0.0	6.377	18.3	0.0	14.4
RC95	g + s(l) + w(q,r,AB)	0.0	0.0	6.377	17.9	0.0	14.1
RC96	g + s(l) + w(q,r,BA)	0.0	0.0	6.377	17.0	0.0	13.5
RC97	g + s(l) + w(p,A)	0.0	0.0	6.377	16.0	0.0	12.6
RC98	g + s(l) + w(p,B)	0.0	0.0	6.377	16.0	0.0	12.6
RC99	g + s(r) + w(q,l,AA)	0.0	0.0	6.377	15.2	0.0	12.2
RC100	g + s(r) + w(q,l,BB)	0.0	0.0	6.377	17.1	0.0	13.7
RC101	g + s(r) + w(q,l,AB)	0.0	0.0	6.579	15.7	0.0	12.6
RC102	g + s(r) + w(q,l,BA)	0.0	0.0	6.377	16.6	0.0	13.3
RC103	g + s(r) + w(q,r,AA)	0.0	0.0	6.579	15.0	0.0	12.1
RC104	g + s(r) + w(q,r,BB)	0.0	0.0	6.579	16.7	0.0	13.4
RC105	g + s(r) + w(q,r,AB)	0.0	0.0	6.377	16.3	0.0	13.0
RC106	g + s(r) + w(q,r,BA)	0.0	0.0	6.579	15.4	0.0	12.4
RC107	g + s(r) + w(p,A)	0.0	0.0	6.579	14.4	0.0	11.6
RC108	g + s(r) + w(p,B)	0.0	0.0	6.579	14.4	0.0	11.6
RC109	g + w(q,l,AA)	0.0	0.0	6.377	8.2	0.0	6.5
RC110	g + w(q,l,BB)	0.0	0.0	6.377	11.4	0.0	9.0
RC111	g + w(q,l,AB)	0.0	0.0	6.377	9.0	0.0	7.2
RC112	g + w(q,l,BA)	0.0	0.0	6.177	10.5	0.0	8.3
RC113	g + w(q,r,AA)	0.0	0.0	6.377	7.9	0.0	6.3
RC114	g + w(q,r,BB)	0.0	0.0	6.377	10.6	0.0	8.5
RC115	g + w(q,r,AB)	0.0	0.0	6.377	10.0	0.0	7.9
RC116	g + w(q,r,BA)	0.0	0.0	6.579	8.5	0.0	6.9
RC117	g + w(p,A)	0.0	0.0	6.377	6.9	0.0	5.5
RC118	g + w(p,B)	0.0	0.0	6.377	6.9	0.0	5.5
RC119	g + s + w(q,l,AA)	0.0	0.0	6.377	12.9	0.0	10.2
RC120	g + s + w(q,l,BB)	0.0	0.0	6.377	16.0	0.0	12.7
RC121	g + s + w(q,l,AB)	0.0	0.0	6.377	13.7	0.0	10.9
RC122	g + s + w(q,l,BA)	0.0	0.0	6.377	15.2	0.0	12.0
RC123	g + s + w(q,r,AA)	0.0	0.0	6.377	12.5	0.0	10.0
RC124	g + s + w(q,r,BB)	0.0	0.0	6.377	15.3	0.0	12.2
RC125	g + s + w(q,r,AB)	0.0	0.0	6.377	14.6	0.0	11.6
RC126	g + s + w(q,r,BA)	0.0	0.0	6.377	13.2	0.0	10.5
RC127	g + s + w(p,A)	0.0	0.0	6.377	11.5	0.0	9.2
RC128	g + s + w(p,B)	0.0	0.0	6.377	11.5	0.0	9.2
RC129	g + s(l) + w(q,l,AA)	0.0	0.0	6.377	12.1	0.0	9.5
RC130	g + s(l) + w(q,l,BB)	0.0	0.0	6.377	15.3	0.0	12.0
RC131	g + s(l) + w(q,l,AB)	0.0	0.0	6.377	12.9	0.0	10.3
RC132	g + s(l) + w(q,l,BA)	0.0	0.0	6.177	14.4	0.0	11.3
RC133	g + s(l) + w(q,r,AA)	0.0	0.0	6.377	11.8	0.0	9.3
RC134	g + s(l) + w(q,r,BB)	0.0	0.0	6.377	14.5	0.0	11.5
RC135	g + s(l) + w(q,r,AB)	0.0	0.0	6.377	13.9	0.0	10.9
RC136	g + s(l) + w(q,r,BA)	0.0	0.0	6.377	12.4	0.0	9.9
RC137	g + s(l) + w(p,A)	0.0	0.0	6.377	10.8	0.0	8.5

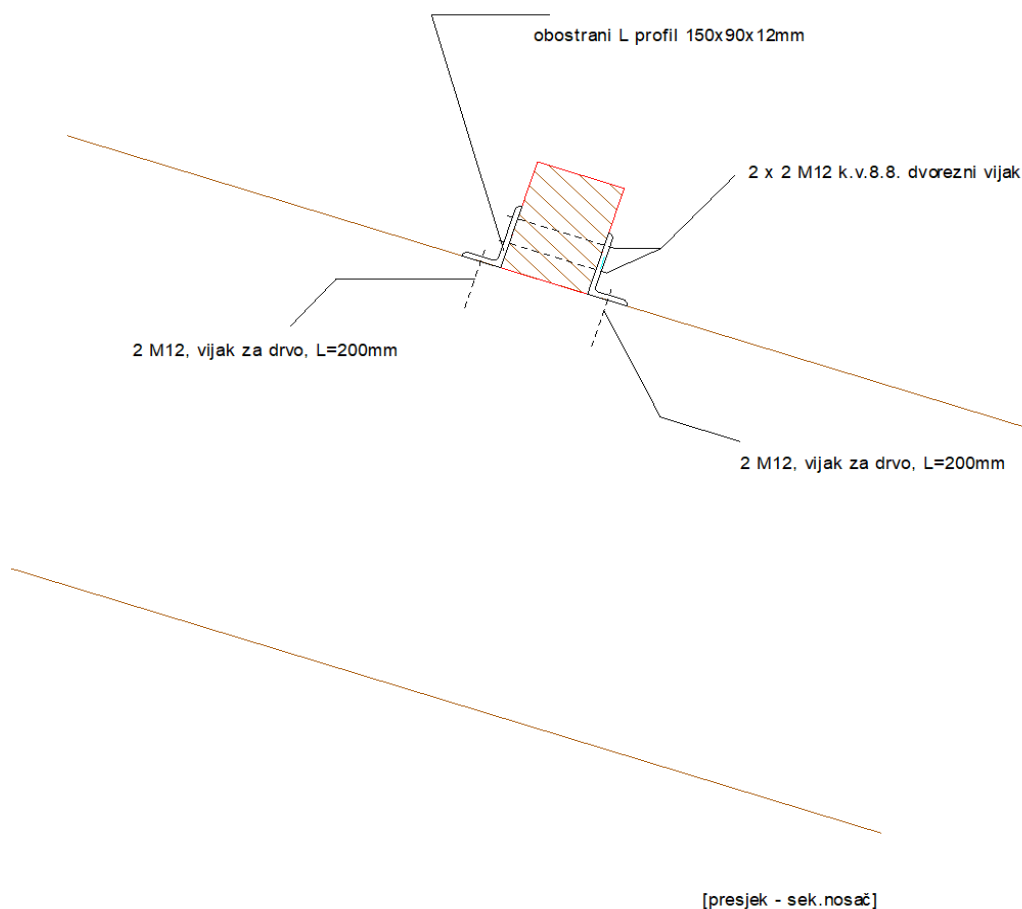
■ DEFORMATIONS

LC RC	Result Combinations Description	Left Support [mm]		Max. Span Deform.		Right Support [mm]	
		u _{z,A}	u _{x,A}	X [m]	max u _z [mm]	u _{z,B}	u _{x,B}
RC138	g + s(l) + w(p,B)	0.0	0.0	6.377	10.8	0.0	8.5
RC139	g + s(r) + w(q,l,AA)	0.0	0.0	6.377	11.3	0.0	9.0
RC140	g + s(r) + w(q,l,BB)	0.0	0.0	6.377	14.4	0.0	11.5
RC141	g + s(r) + w(q,l,AB)	0.0	0.0	6.579	12.1	0.0	9.7
RC142	g + s(r) + w(q,l,BA)	0.0	0.0	6.377	13.6	0.0	10.8
RC143	g + s(r) + w(q,r,AA)	0.0	0.0	6.377	11.0	0.0	8.8
RC144	g + s(r) + w(q,r,BB)	0.0	0.0	6.377	13.7	0.0	11.0
RC145	g + s(r) + w(q,r,AB)	0.0	0.0	6.377	13.1	0.0	10.4
RC146	g + s(r) + w(q,r,BA)	0.0	0.0	6.579	11.6	0.0	9.4
RC147	g + s(r) + w(p,A)	0.0	0.0	6.579	9.9	0.0	8.0
RC148	g + s(r) + w(p,B)	0.0	0.0	6.579	9.9	0.0	8.0
RC149	g	0.0	0.0	6.377	16.5	0.0	13.1
RC150	g + s	0.0	0.0	6.377	25.8	0.0	20.5
RC151	g + s(l)	0.0	0.0	6.377	24.3	0.0	19.2
RC152	g + s(r)	0.0	0.0	6.377	22.7	0.0	18.1
RC153	g + s + w(q,l,AA)	0.0	0.0	6.377	24.6	0.0	19.5
RC154	g + s + w(q,l,BB)	0.0	0.0	6.377	26.4	0.0	21.0
RC155	g + s + w(q,l,AB)	0.0	0.0	6.377	25.1	0.0	19.9
RC156	g + s + w(q,l,BA)	0.0	0.0	6.377	25.9	0.0	20.5
RC157	g + s + w(q,r,AA)	0.0	0.0	6.377	24.4	0.0	19.3
RC158	g + s + w(q,r,BB)	0.0	0.0	6.377	26.0	0.0	20.7
RC159	g + s + w(q,r,AB)	0.0	0.0	6.377	25.6	0.0	20.3
RC160	g + s + w(q,r,BA)	0.0	0.0	6.377	24.7	0.0	19.7
RC161	g + s + w(p,A)	0.0	0.0	6.377	23.7	0.0	18.9
RC162	g + s + w(p,B)	0.0	0.0	6.377	23.7	0.0	18.9
RC163	g + s(l) + w(q,l,AA)	0.0	0.0	6.377	23.0	0.0	18.2
RC164	g + s(l) + w(q,l,BB)	0.0	0.0	6.377	24.9	0.0	19.7
RC165	g + s(l) + w(q,l,AB)	0.0	0.0	6.377	23.5	0.0	18.6
RC166	g + s(l) + w(q,l,BA)	0.0	0.0	6.377	24.4	0.0	19.2
RC167	g + s(l) + w(q,r,AA)	0.0	0.0	6.377	22.8	0.0	18.0
RC168	g + s(l) + w(q,r,BB)	0.0	0.0	6.377	24.5	0.0	19.3
RC169	g + s(l) + w(q,r,AB)	0.0	0.0	6.377	24.1	0.0	19.0
RC170	g + s(l) + w(q,r,BA)	0.0	0.0	6.377	23.2	0.0	18.4
RC171	g + s(l) + w(p,A)	0.0	0.0	6.377	22.2	0.0	17.5
RC172	g + s(l) + w(p,B)	0.0	0.0	6.377	22.2	0.0	17.5
RC173	g + s(r) + w(q,l,AA)	0.0	0.0	6.377	21.4	0.0	17.1
RC174	g + s(r) + w(q,l,BB)	0.0	0.0	6.377	23.3	0.0	18.6
RC175	g + s(r) + w(q,l,AB)	0.0	0.0	6.377	21.9	0.0	17.5
RC176	g + s(r) + w(q,l,BA)	0.0	0.0	6.377	22.8	0.0	18.2
RC177	g + s(r) + w(q,r,AA)	0.0	0.0	6.377	21.2	0.0	17.0
RC178	g + s(r) + w(q,r,BB)	0.0	0.0	6.377	22.9	0.0	18.3
RC179	g + s(r) + w(q,r,AB)	0.0	0.0	6.377	22.5	0.0	17.9
RC180	g + s(r) + w(q,r,BA)	0.0	0.0	6.579	21.6	0.0	17.3
RC181	g + s(r) + w(p,A)	0.0	0.0	6.377	20.6	0.0	16.5
RC182	g + s(r) + w(p,B)	0.0	0.0	6.377	20.6	0.0	16.5
RC183	g + w(q,l,AA)	0.0	0.0	6.377	14.4	0.0	11.4
RC184	g + w(q,l,BB)	0.0	0.0	6.377	17.6	0.0	13.9
RC185	g + w(q,l,AB)	0.0	0.0	6.377	15.2	0.0	12.1
RC186	g + w(q,l,BA)	0.0	0.0	6.377	16.7	0.0	13.2
RC187	g + w(q,r,AA)	0.0	0.0	6.377	14.1	0.0	11.2
RC188	g + w(q,r,BB)	0.0	0.0	6.377	16.8	0.0	13.4
RC189	g + w(q,r,AB)	0.0	0.0	6.377	16.2	0.0	12.8
RC190	g + w(q,r,BA)	0.0	0.0	6.377	14.7	0.0	11.8
RC191	g + w(p,A)	0.0	0.0	6.377	13.1	0.0	10.4
RC192	g + w(p,B)	0.0	0.0	6.377	13.1	0.0	10.4
RC193	g + s + w(q,l,AA)	0.0	0.0	6.377	19.1	0.0	15.1
RC194	g + s + w(q,l,BB)	0.0	0.0	6.377	22.2	0.0	17.6
RC195	g + s + w(q,l,AB)	0.0	0.0	6.377	19.9	0.0	15.8
RC196	g + s + w(q,l,BA)	0.0	0.0	6.377	21.4	0.0	16.9
RC197	g + s + w(q,r,AA)	0.0	0.0	6.377	18.7	0.0	14.9
RC198	g + s + w(q,r,BB)	0.0	0.0	6.377	21.5	0.0	17.1
RC199	g + s + w(q,r,AB)	0.0	0.0	6.377	20.8	0.0	16.5
RC200	g + s + w(q,r,BA)	0.0	0.0	6.377	19.4	0.0	15.5
RC201	g + s + w(p,A)	0.0	0.0	6.377	17.7	0.0	14.1
RC202	g + s + w(p,B)	0.0	0.0	6.377	17.7	0.0	14.1
RC203	g + s(l) + w(q,l,AA)	0.0	0.0	6.377	18.3	0.0	14.4
RC204	g + s(l) + w(q,l,BB)	0.0	0.0	6.377	21.4	0.0	16.9
RC205	g + s(l) + w(q,l,AB)	0.0	0.0	6.377	19.1	0.0	15.2
RC206	g + s(l) + w(q,l,BA)	0.0	0.0	6.377	20.6	0.0	16.2
RC207	g + s(l) + w(q,r,AA)	0.0	0.0	6.377	18.0	0.0	14.2
RC208	g + s(l) + w(q,r,BB)	0.0	0.0	6.377	20.7	0.0	16.4
RC209	g + s(l) + w(q,r,AB)	0.0	0.0	6.377	20.1	0.0	15.8
RC210	g + s(l) + w(q,r,BA)	0.0	0.0	6.377	18.6	0.0	14.8
RC211	g + s(l) + w(p,A)	0.0	0.0	6.377	17.0	0.0	13.4
RC212	g + s(l) + w(p,B)	0.0	0.0	6.377	17.0	0.0	13.4
RC213	g + s(r) + w(q,l,AA)	0.0	0.0	6.377	17.5	0.0	13.9
RC214	g + s(r) + w(q,l,BB)	0.0	0.0	6.377	20.6	0.0	16.4
RC215	g + s(r) + w(q,l,AB)	0.0	0.0	6.377	18.3	0.0	14.6
RC216	g + s(r) + w(q,l,BA)	0.0	0.0	6.377	19.8	0.0	15.7
RC217	g + s(r) + w(q,r,AA)	0.0	0.0	6.377	17.2	0.0	13.7
RC218	g + s(r) + w(q,r,BB)	0.0	0.0	6.377	19.9	0.0	15.9
RC219	g + s(r) + w(q,r,AB)	0.0	0.0	6.377	19.3	0.0	15.3
RC220	g + s(r) + w(q,r,BA)	0.0	0.0	6.579	17.8	0.0	14.3
RC221	g + s(r) + w(p,A)	0.0	0.0	6.377	16.1	0.0	12.9
RC222	g + s(r) + w(p,B)	0.0	0.0	6.377	16.1	0.0	12.9
Max/Min Deformations							
Max		0.0	0.0	6.377	26.4	0.0	21.0
Min		0.0	0.0	6.377	-3.5	0.0	-2.7

■ RESULT DIAGRAMS ON MEMBER
M2,M3,M4,M5,M6,M7,M8,M9,M10,M11,M12,M13,M14,M15,M16,M17,M18,M19

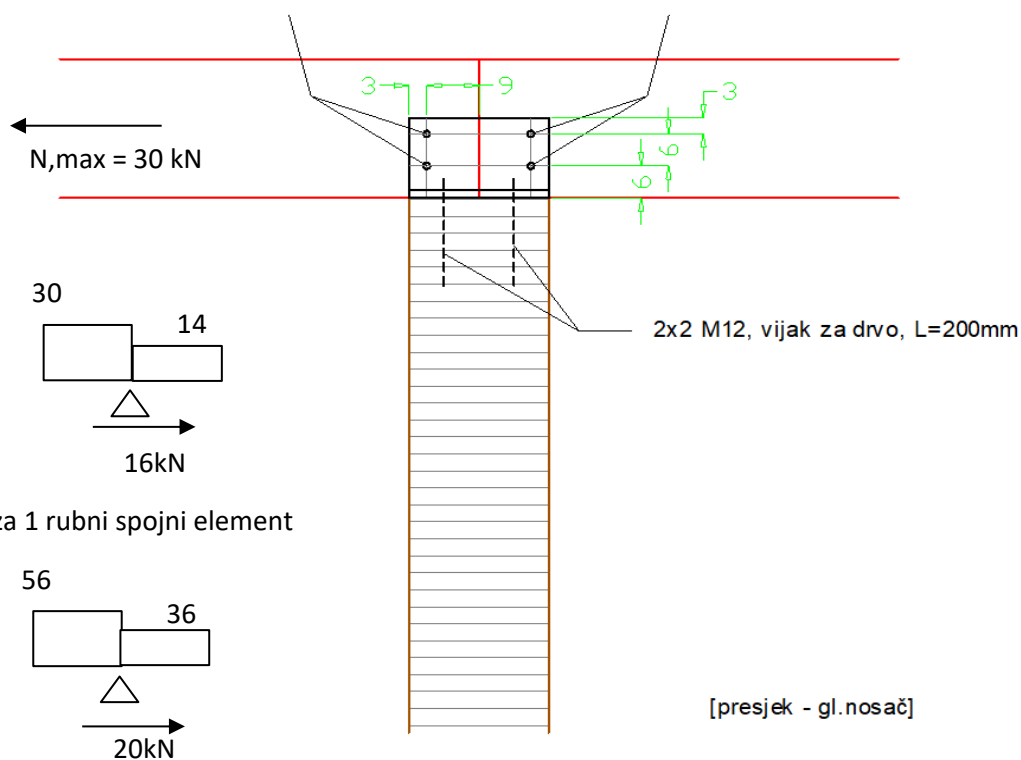


SPOJ SEKUNDARNOG NOSAČA NA GLAVNI



2 M12 k.v.8.8. dvorezni vijak

2 M12 k.v.8.8. dvorezni vijak



maksimalne sile prekoračenja - samo od seizmike , od vjetrova uzd.sile su max 20 kN

SPOJ SEKUNDARCA NA PRIHVATNI LIM (G.NOS)

DVOREZNI SPOJ VIJCIMA ČELIČNI LIM - DRVO

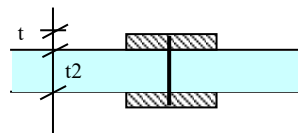
DRVO: **gl24** (lamelirano)

ρ_k 420 kg/m³
 γ_M 1,25
 k_{mod} 0,9

VIJCI

f_{uk} 800 N/mm²
 d 12 mm
 n 2 kom
 γ_M 1,1
 n_r 2 broj posm.ravnina

8,8



$M_{yk} =$ 184320 Nmm
 $M_{yd} = M_{yk} / \gamma_M =$ 167564 Nmm

$f_{h,0,k} =$ 30,31 N/mm² ($\alpha = 0$)
 $f_{h,0,d} = f_{h,0,k} * k_M / \gamma_M =$ 21,82 N/mm²

$f_{h,a,d} =$ 21,82 N/mm² ($\alpha = 0^\circ$)

$\alpha =$ 0°
 $t =$ 12 mm debeli čel.lim
 $t_1 =$ 220 mm
 $F_t, E_d =$ 56 kN 30

(maksimalna sila samo u jednom rubnom sek.na spoju 2 dvorane premašuje 30kN)

$k_{90} =$ 1,53 (crnogorica)

(nosivost 1 vijka u 1 reznoj ravnini)

oblik sloma	Rd [kN]	
hs	28,80	$R_d = 0,5 f_{h,2,d} t_2 d$
js	10,30	$R_d = 1,1 \sqrt{2 M_{y,d} f_{h,2,d} d}$

DVOREZNA VEZA -TANKI LIM

$R_{d,min} =$ 10,30 kN

$\Sigma R_d = n * n_r * R_{d,min} =$ 41,22 kN <

56 kN (F_t, S_d) **NE ZADOVOLJAVA**

(nosivost 1 vijka u 1 reznoj ravnini)

oblik sloma	Rd [kN]	
ks	28,80	$R_d = 0,5 f_{h,2,d} t_2 d$
ls	14,05	$R_d = 1,5 \sqrt{2 M_{y,d} f_{h,2,d} d}$

DVOREZNA VEZA -DEBELI LIM

$R_{d,min} =$ 14,05 kN

$\Sigma R_d = n * 2 * R_{d,min} =$ 56,21 kN >

56 kN (F_t, S_d) **ZADOVOLJAVA**

INTERPOLACIJA TANKI/DEBELI LIM

$\Sigma R_d = n * 2 * R_{d,min} =$ 56,21 kN >

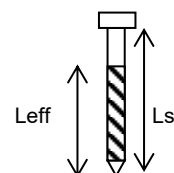
56 kN (F_t, S_d) **ZADOVOLJAVA**

Najmanje dopušteni razmaci vijaka:

				($\alpha=0$)	($\alpha=0^\circ$)
a₁ međusobno i u smjeru (II) vlakanca (razmak stupaca)		II s pravcem vlakanca drva (razmak stupaca)	$(4 + 3 \cos \alpha)d$	84	84
a₂ međusobno i okomito (⊥) na vlakanca (razmak redaka)		⊥ na pravac vlakanca drva (razmak redova)	4d	48	48
a_{3,l} od opterećenog ruba drva II s vlakancima		$-90^\circ \leq \alpha \leq 90^\circ$	7d ($\geq 80\text{mm}$)	84	84
a_{3,c} od neopterećenog ruba drva II s vlakancima		$150^\circ \leq \alpha \leq 210^\circ$	4d	48	48
		$90^\circ < \alpha < 150^\circ$	$(1 + 6 \sin \alpha)d$ (ali $\geq 4d$)	48	48
		$210^\circ \leq \alpha \leq 270^\circ$	$(1 + 6 \sin \alpha)d$ (ali $\geq 4d$)	48	48
a_{4,l} od opterećenog ruba drva ⊥ na vlakanca		$0^\circ \leq \alpha \leq 180^\circ$	$(2 + 2 \sin \alpha)d$ (ali $\geq 4d$)	48	48
a_{4,c} od neopterećenog ruba drva ⊥ na vlakanca		Svi ostali α	3d	36	36

SPOJ ČEL.L PROFILA NA GL.NOSAČ

DRVO: **gl28** (lamelirano)
 ρ_k **420** kg/m³
 γ_M **1,25**
 k_{mod} **0,9**



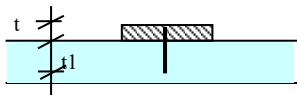
VIJCI ZA DRVO obavezno predbušenje rupa za vijke

f_{uk} **300** N/mm²
 d **12** mm
 $L_s =$ **200** mm
 $L_{eff} = 0.6L_s =$ **120** mm
 n **4** kom

$d \geq 8$

20 kN (dva L profila)

γ_M **1,1**
 nr **1**
 (nr = broj posm.ravnina)



$M_{yk} =$ **69120** Nmm
 $M_{yd} = M_{yk} / \gamma_M =$ **62836** Nmm

$\alpha =$ **90** °
 $t =$ **12** mm debeli čel.lim
 $t_1 =$ **188** mm $t_{1min}(mm) = 48$
 $F_v, Ed =$ **20** KN (posmik)
 $F_t, Ed =$ **5** KN (vlak)

$f_{h,0,k} =$ **30,31** N/mm² ($\alpha = 0$)
 $f_{h,0,d} = f_{h,0,k} \cdot k_M / \gamma_M =$ **21,82** N/mm²

(utj.vrha vijka)

$d_{eff} =$ **12** mm
 $t_1 = t_1 - 1,5d =$ **170** mm

$f_{h,a,d} =$ **14,26** N/mm² ($\alpha = 90^\circ$)

$k_{90} =$ **1,53** (crnogorica)

POSMIK:

(nosivost 1 vijka u 1 reznoj ravnini)

oblik sloma	Rd [kN]
as	12,05
bs	5,10

JEDNOREZNA VEZA -TANKI LIM

$R_{d,min} =$ **5,10** kN

$\Sigma R_d = n \cdot nr \cdot R_{d,min} =$ **20,41** kN >

20 kN (FH,Ed) **ZADOVOLJAVA**

(nosivost 1 vijka u 1 reznoj ravnini)

oblik sloma	Rd [kN]
cs	13,83
ds	6,96
as	29,09

JEDNOREZNA VEZA -DEBELI LIM

$R_{d,min} =$ **6,96** kN

$\Sigma R_d = n \cdot nr \cdot R_{d,min} =$ **27,83** kN >

20 kN (FH,Ed) **ZADOVOLJAVA**

INTERPOLACIJA TANKI/DEBELI LIM

$\Sigma R_d = n \cdot 2 \cdot R_{d,min} =$ **27,83** kN >

20 kN (Ft,Sd) **ZADOVOLJAVA**

VLAK / IZVLAČENJE

$f_{3,k} =$ **178,30** N/mm
 $f_{3,d} = f_{3,k} \cdot k_M / \gamma_M =$ **128,37** N/mm²
 $\Sigma R_d = n \cdot R_{a,x,d} =$ **55,46** kN

$R_{a,x,d} = f_{3,d} (L_{eff} - d) =$ **13,86** kN
5 kN (Ft,Sd) **ZADOVOLJAVA**

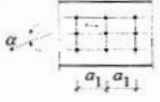
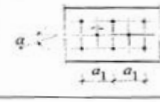
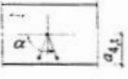
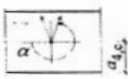
INTERAKCIJA M/N

0,52 <

1

ZADOVOLJAVA

Najmanje dopušteni razmaci vijaka:

				($\alpha=0$)	($\alpha=90^\circ$)
a₁ međusobno i u smjeru (II) vlakanca (razmak stupaca)		II s pravcem vlakanca drva (razmak stupaca)	$(4 + 3 \cos \alpha)d$	84	48
a₂ međusobno i okomito (⊥) na vlakanca (razmak redaka)		⊥ na pravac vlakanca drva (razmak redova)	4d	48	48
a_{3,t} od opterećenog ruba drva II s vlakancima		$-90^\circ \leq \alpha \leq 90^\circ$	7d ($\geq 80\text{mm}$)	84	84
a_{3,c} od neopterećenog ruba drva II s vlakancima		$150^\circ \leq \alpha \leq 210^\circ$	4d	48	48
		$90^\circ < \alpha < 150^\circ$	$(1 + 6 \sin \alpha)d$ (ali $\geq 4d$)	48	84
		$210^\circ \leq \alpha \leq 270^\circ$			
a_{4,t} od opterećenog ruba drva ⊥ na vlakanca		$0^\circ \leq \alpha \leq 180^\circ$	$(2 + 2 \sin \alpha)d$ (ali $\geq 4d$)	48	48
a_{4,c} od neopterećenog ruba drva ⊥ na vlakanca		Svi ostali α	3d	36	36

SPOJ NA ZABATNI betonski serklaž može se izvesti na isti način, samo koristiti anker vijke za beton : **FISCHER FAZ II gvz M16**

PRIHVAT DIJAGONALE SPREGA ZA GL.NOSAČ ČELIČNA PAPUČA ZA PRIHVAT DIJAGONALE

DRVO: gl28h (lamelirano)

ρ_k 420 kg/m³
 γ_M 1,25
 k_{mod} 0,9

VIJCI 8,8 M12

f_{uk} 800 N/mm²

d 12 mm

n 4 kom

γ_M 1,1

nr 1

(nr = broj posm.ravnina)

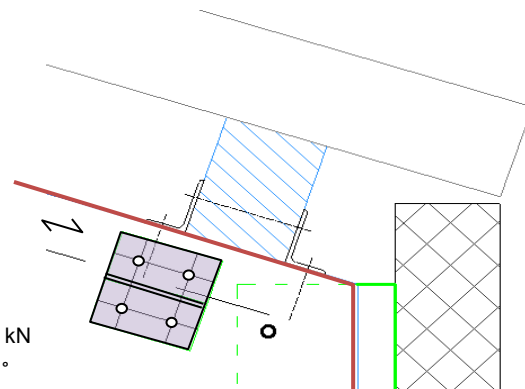
$M_{yk} =$ 184320 Nmm

$M_{yd} = M_{yk} / \gamma_M =$ 167564 Nmm

$f_{h,0,k} =$ 30,31 N/mm² ($\alpha = 0$)

$f_{h,0,d} = f_{h,0,k} * k_M / \gamma_M =$ 21,82 N/mm²

$f_{h,a,d} =$ 21,82 N/mm² ($\alpha = 0^\circ$)



$\alpha =$ 0°
 $t =$ 12 mm debeli čel.lim
 $t1 =$ 240 mm
 $F_v, E_d =$ 11,4 kN
 $F_t, E_d =$ 23,37 kN

$k_{90} =$ 1,53 (crnogorica)

(nosivost 1 vijka u 1 reznoj ravnini)

oblik sloma	Rd [kN]
as	26,03
bs	14,05

JEDNOREZNA VEZA -TANKI LIM

$R_{d,min} =$ 14,05 kN

$\Sigma R_d = n * nr * R_{d,min} =$ 56,21 kN >

11,4 kN (FH,Ed) **ZADOVOLJAVA**

(nosivost 1 vijka u 1 reznoj ravnini)

oblik sloma	Rd [kN]
cs	29,71
ds	14,05
as	62,85

JEDNOREZNA VEZA -DEBELI LIM

$R_{d,min} =$ 14,05 kN

$\Sigma R_d = n * nr * R_{d,min} =$ 56,21 kN >

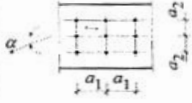
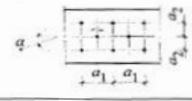
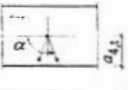
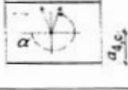
11,4 kN (FH,Ed) **ZADOVOLJAVA**

VLAČNA SILA U VIJCIMA SIDRI SE SA STRAŽNJE STRANE NOSAČA PREKO PODLOŽNIH PLOČICA ILI ZAJEDNIČKE LEŽAJNE PLOČE

$F_{t,1} = F_t / 4 =$ 5,85 kN

za podl.lim 60x60 mm $A =$ 34,67 $\sigma_c =$ 1,69 N/mm²
 $d_0 = 14$ $f_{c,k,90} =$ 3,00 N/mm²
 $f_{c,d,90} =$ 2,16 N/mm²

Najmanje dopušteni razmaci vijaka:

				($\alpha=0$)	($\alpha=0^\circ$)
a₁ međusobno i u smjeru (II) vlakanca (razmak stupaca)		II s pravcem vlakanca drva (razmak stupaca)	$(4 + 3 \cos \alpha)d$	84	84
a₂ međusobno i okomito (⊥) na vlakanca (razmak redaka)		⊥ na pravac vlakanca drva (razmak redova)	4d	48	48
a_{3,l} od opterećenog ruba drva II s vlakancima		$-90^\circ \leq \alpha \leq 90^\circ$	7d ($\geq 80\text{mm}$)	84	84
a_{3,c} od neopterećenog ruba drva II s vlakancima		$150^\circ \leq \alpha \leq 210^\circ$	4d	48	48
		$90^\circ < \alpha < 150^\circ$	$(1 + 6 \sin \alpha)d$ (ali $\geq 4d$)	48	48
		$210^\circ \leq \alpha \leq 270^\circ$	$(2 + 2\sin \alpha)d$ (ali $\geq 4d$)	48	48
a_{4,l} od opterećenog ruba drva ⊥ na vlakanca		$0^\circ \leq \alpha \leq 180^\circ$	$(2 + 2\sin \alpha)d$ (ali $\geq 4d$)	48	48
a_{4,c} od neopterećenog ruba drva ⊥ na vlakanca		Svi ostali α	3d	36	36

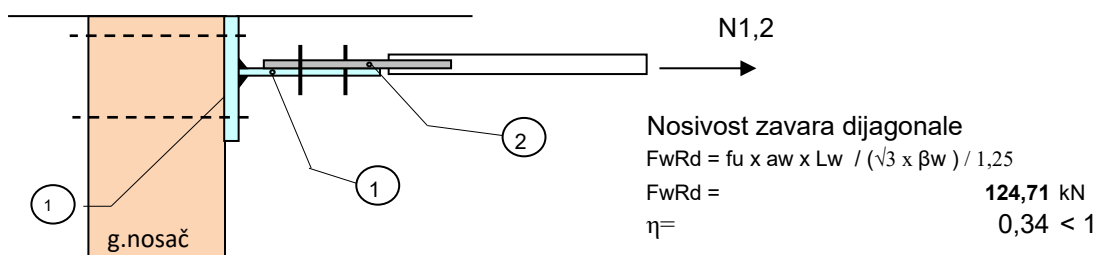
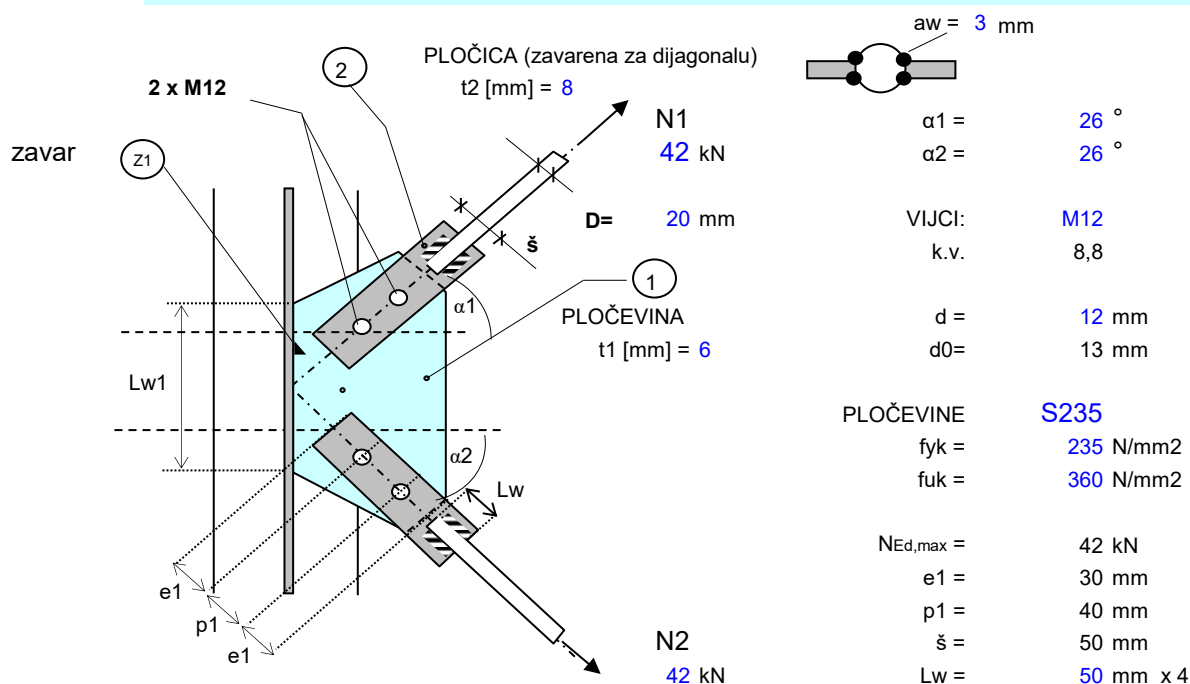
USVOJITI:

LEŽAJNU PLOČEVINU 20x20cm , t = 12mm , S235

SPOJNU PLOČEVINU t=12mm zavarenu za ležajnu pločevinu (na nju se spaja dijagonala)

vijci 4 M16 k.v.8.8. kroz nosač, razmak vijaka 120x120mm u oba smjera

SPOJ KROVNE VLAČNE DIJAGONALE I PREČKE



NOSIVOST VIJAKA: M12 k.v. 8,8

$$Fv,Rk,1 = 60,7 \text{ kN} \quad \gamma_{M2} = 1,25$$

$$Fv,Rd,2 = 2 \times Fv,Rk,1 / \gamma_{M2} = 97,12 \text{ kN} \quad \eta = 0,43 < 1$$

OTPORNOST PO OMOTAČU RUPE OSNOVNOG MATERIJALA

$$Fb,Rd,1 = 2,5 \times \alpha \times fu \times d \times t / \gamma_{M2} = 39,88 \text{ kN} \quad fu = 360 \text{ N/mm}^2$$

$$\alpha = \min (e1/3d0, p1/3d0 - 1/4) = 0,77 \quad \gamma_{M2} = 1,25$$

$$\eta = 79,75 \text{ kN} \quad \eta = 0,53 < 1$$

OTPORNOST P.PRESJEKA PLOČICE ZAVARENE ZA DIJAGONALU

$$A_{net} = (\bar{s} - d0) \times t2 = 2,96 \text{ cm}^2 \quad A = \bar{s} \times t2 = 4 \text{ cm}^2 \quad \gamma_{M0} = 1$$

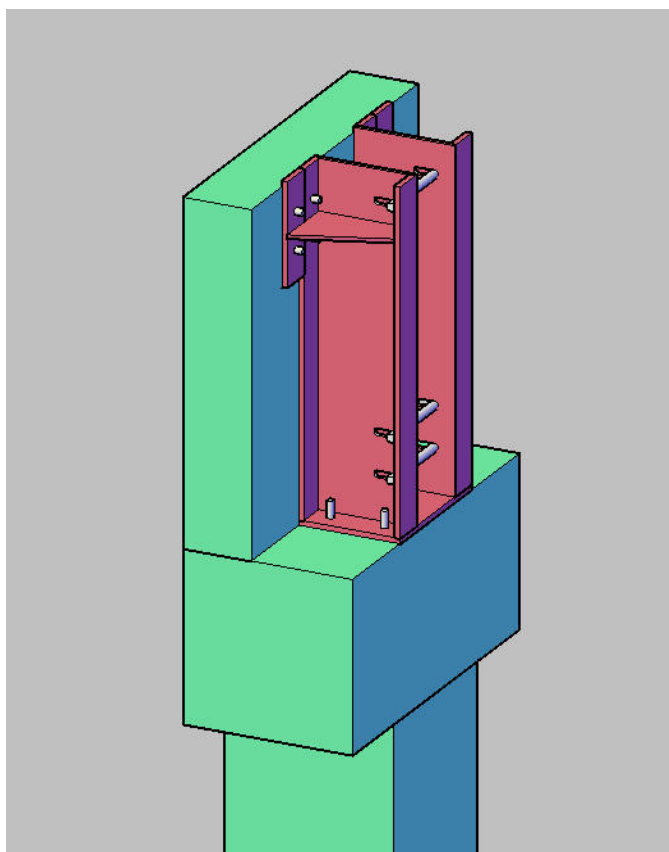
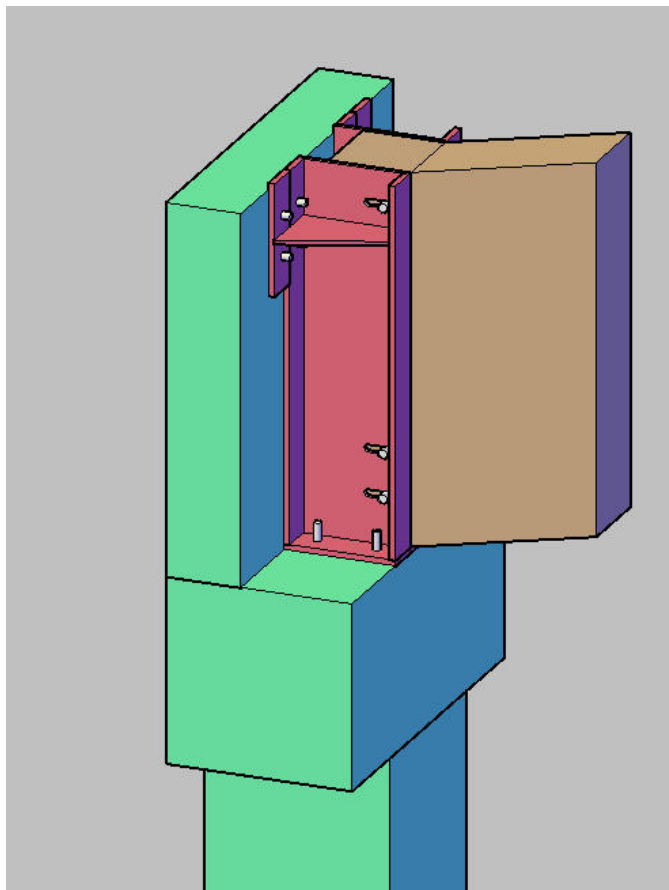
$$N_{u,Rd} = 0,9 \times A_{net} \times fu / \gamma_{M2} = 76,72 \text{ kN} \quad N_{pl,Rd} = A \times fy / \gamma_{M0} = 94 \text{ kN}$$

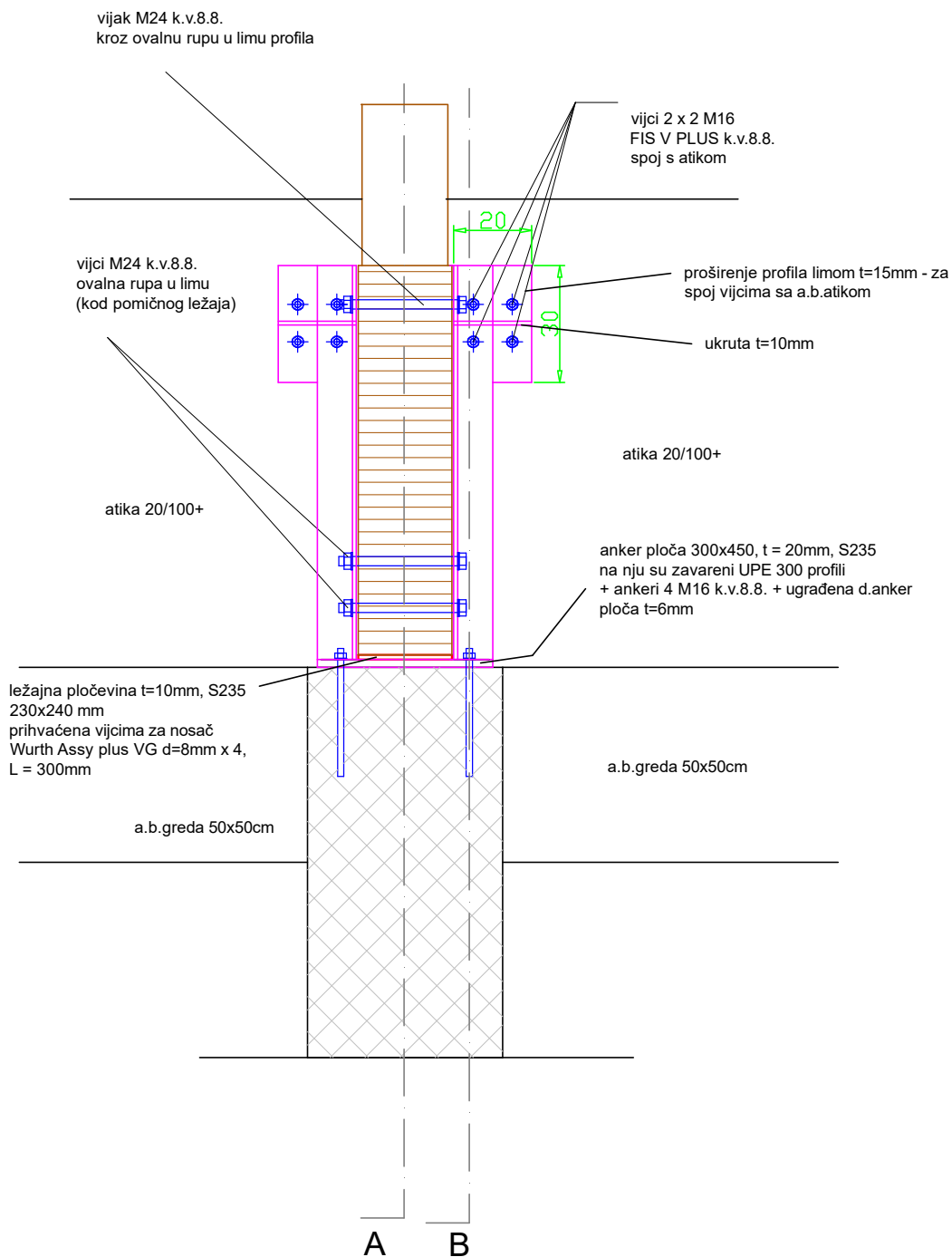
$$\eta = 0,55 < 1 \quad \eta = 0,45 < 1$$

ZAVAR PLOČEVINE (1) LEŽAJNU PLOČU

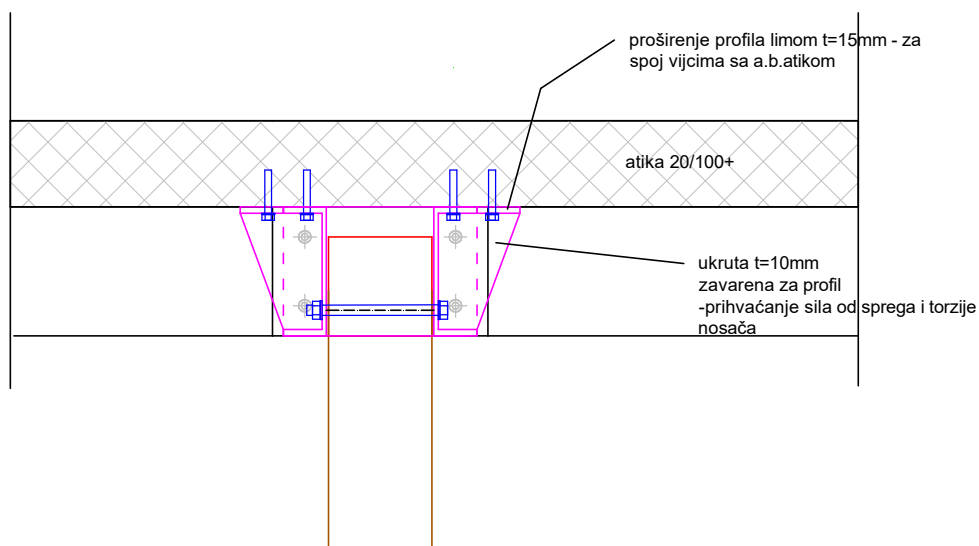
R
Lw1
N1
N2
R = 75,50 kN
aw = 4 mm
Lw,1,min = 80 mm
FwRd = 133,02 kN
NEd,max / FwRd = 0,32 < 1

OSLONAC GL.NOSAČA NA A.B.STUP - VILIČASTI LEŽAJ





TLOCRT





TEHNO-innova d.o.o.
Kukuljevićeva 7, Varaždin

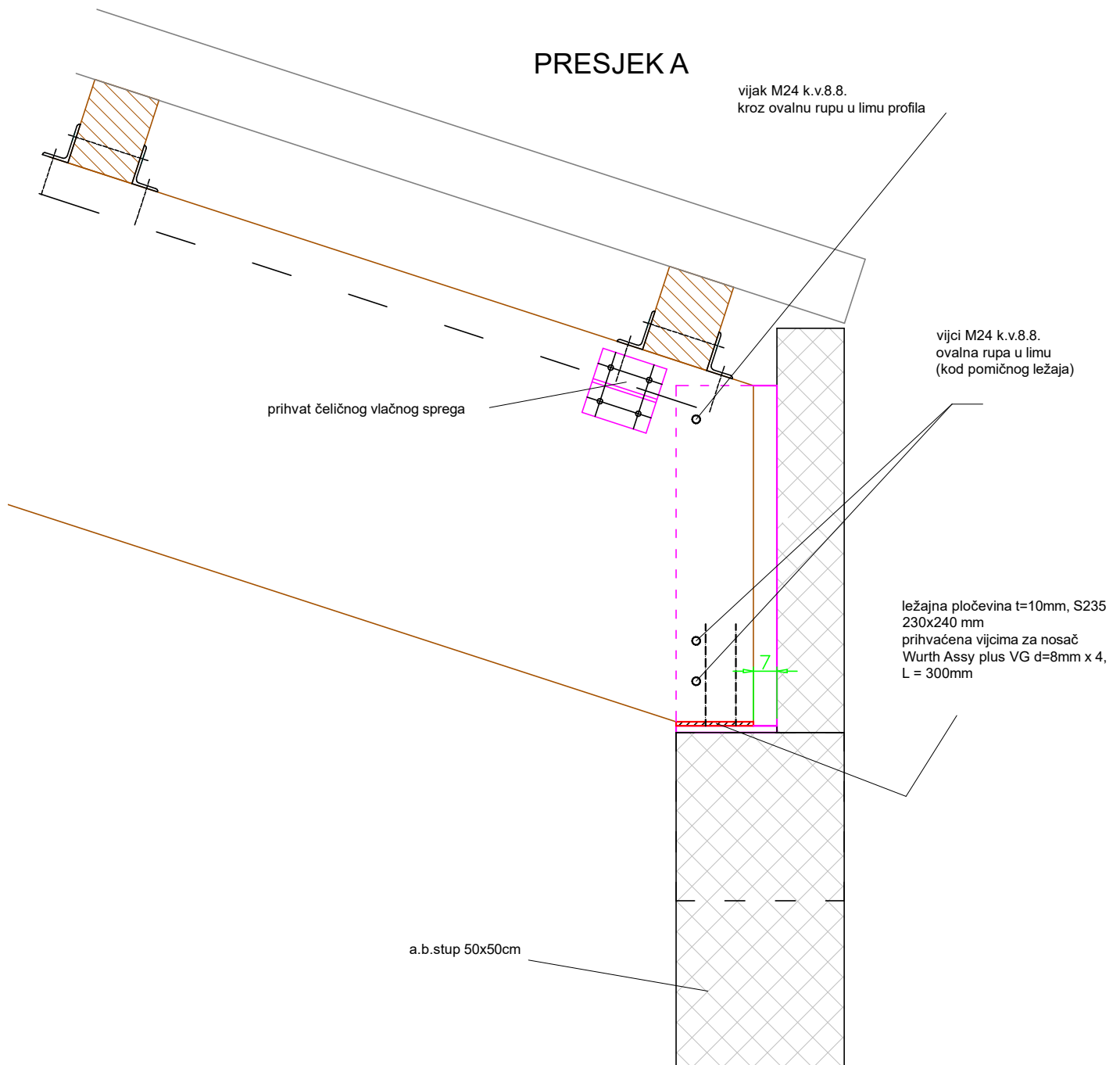
GRADEVINA:
Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo

INVESTITOR:
Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502

DATUM:
8/2025

STR:
133

PRESJEK A



PRESJEK B

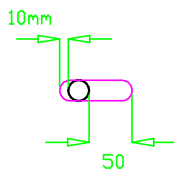
vijak M24 k.v.8.8.
kroz ovalnu rupu u limu profila

viličasti ležaj
2 x UPE 300, S235
prihvaćeno dolje za stup - ankeri 4M16
k.v. 8.8
i bočno za a.b.atiku 2 x 2 M16
fischer FIS V Plus k.v.8.8

2 x 2 M16
fischer FIS V Plus
k.v.8.8.

ukruta t = 10mm

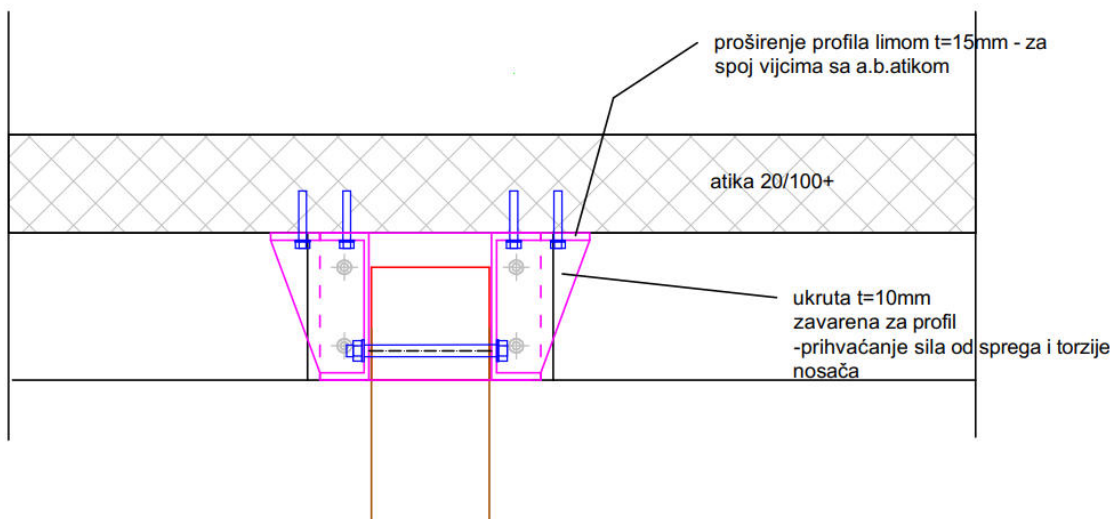
vijci kroz ovalne rupe u limu profila



KLIZNI LEŽAJ samo s jedne strane
nosača - s druge strane nepomični ležaj
-nisu potrebne donje ovalne rupe

anker ploča 300x450, t = 20mm, S235
na nju su zavareni UPE 300 profili
+ ankeri 4 M16 k.v.8.8. + ugrađena d.anker
ploča t=6mm

TLOCRT



VILIČASTI LEŽAJ

sila od sprega: 42 kN

h.komponenta sile: 38 kN 19 kN na svaki u-profil

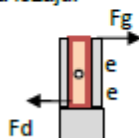


Dodatno od torzije nosača na ležaju:

$$M_t = M_d/80 = 6,65 \text{ kNm}$$

$$e = 50 \text{ cm}$$

$$R_g, R_d = 6,65 \text{ kN}$$

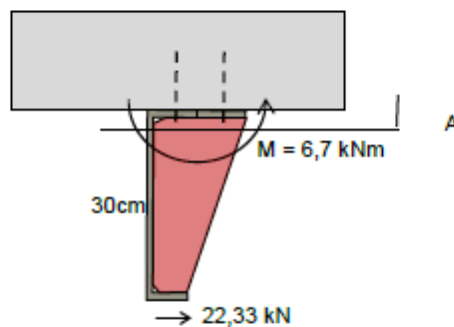


R_g - pola na svaki u profil = 3,33

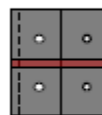
prijenos sile sa ležaja na a.b.atiku

$$V_1 = 19 + 3,33 = 22,33 \text{ kN}$$

$$M = 23,33 \cdot 0,3 = 6,7 \text{ kNm}$$



presjek A



20x30 - proširenje
UPE profila na mjestu
spoja

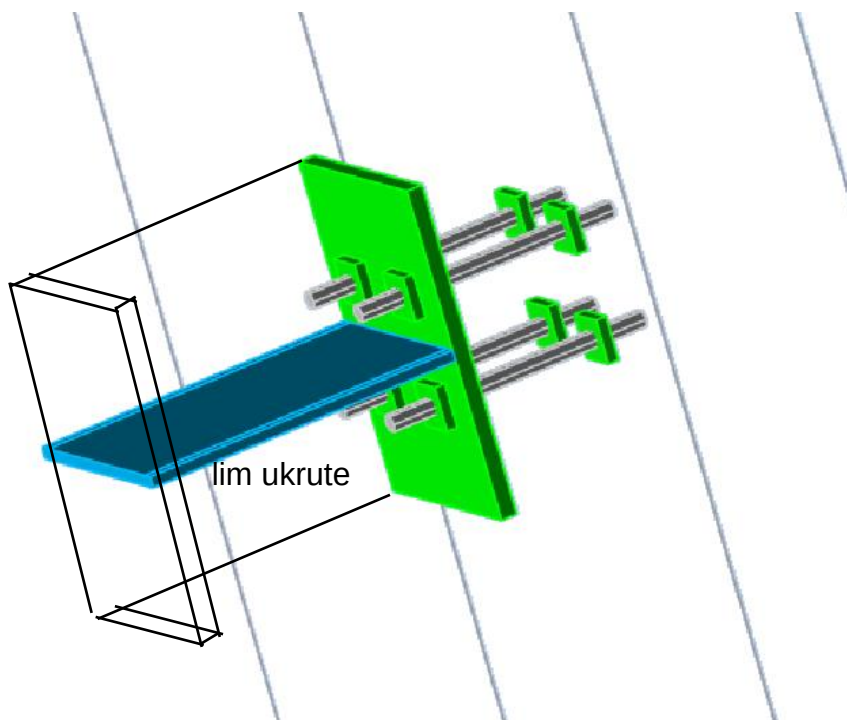
razmak vijaka 10cm
oba smjera

proračun spoja na sljedećoj stranici

Ako je jednostavnije ukrućenje viličastog ležaja može se izvesti čeličnim kosnicima i spojem na a.b.gredu

Spoj viličastog ležaja i a.b.atike

Eurocode 3: EN 1993-1-8:2005/AC:2009 + CEB Design Guide:
Design of fastenings in concrete



GEOMETRY

COLUMN

Section: I-BISYM_1

$L_c =$	5,00	[m]	Column length
$\alpha =$	0,0	[Deg]	Inclination angle
$h_c =$	200	[mm]	Height of column section
$b_{fc} =$	10	[mm]	Width of column section
$t_{wc} =$	10	[mm]	Thickness of the web of column section
$t_{fc} =$	10	[mm]	Thickness of the flange of column section
$r_c =$	0	[mm]	Radius of column section fillet
$A_c =$	20,00	[cm ²]	Cross-sectional area of a column
$I_{yc} =$	666,67	[cm ⁴]	Moment of inertia of the column section
Material: S 235			
$f_{yc} =$	235,00	[MPa]	Resistance
$f_{uc} =$	360,00	[MPa]	Yield strength of a material

COLUMN BASE

$l_{pd} =$	200	[mm]	Length
$b_{pd} =$	300	[mm]	Width
$t_{pd} =$	15	[mm]	Thickness
Material: S 235			
$f_{ypd} =$	235,00	[MPa]	Resistance
$f_{upd} =$	360,00	[MPa]	Yield strength of a material

ANCHORAGE

The shear plane passes through the UNTHREADED portion of the bolt.

Class = 8.8 Anchor class
 $f_{yb} = 640,00$ [MPa] Yield strength of the anchor material
 $f_{ub} = 800,00$ [MPa] Tensile strength of the anchor material
 $d = 16$ [mm] Bolt diameter
 $A_s = 1,57$ [cm²] Effective section area of a bolt
 $A_v = 2,01$ [cm²] Area of bolt section
 $n_H = 2$ Number of bolt columns
 $n_V = 2$ Number of bolt rows
Horizontal spacing $e_{Hi} = 90$ [mm]
Vertical spacing $e_{Vi} = 100$ [mm]

Anchor dimensions

$L_1 = 50$ [mm]
 $L_2 = 150$ [mm]
 $L_3 = 40$ [mm]

Anchor plate

$l_p = 40$ [mm] Length
 $b_p = 40$ [mm] Width
 $t_p = 10$ [mm] Thickness
Material: S 235
 $f_y = 235,00$ [MPa] Resistance

Washer

$l_{wd} = 40$ [mm] Length
 $b_{wd} = 40$ [mm] Width
 $t_{wd} = 10$ [mm] Thickness

MATERIAL FACTORS

$\gamma_{M0} = 1,00$ Partial safety factor
 $\gamma_{M2} = 1,25$ Partial safety factor
 $\gamma_C = 1,50$ Partial safety factor

SPREAD FOOTING

$L = 1000$ [mm] Spread footing length
 $B = 1000$ [mm] Spread footing width
 $H = 200$ [mm] Spread footing height

Concrete

Class C25/30
 $f_{ck} = 25,00$ [MPa] Characteristic resistance for compression

Grout layer

$t_g = 0$ [mm] Thickness of leveling layer (grout)
 $f_{ck,g} = 12,00$ [MPa] Characteristic resistance for compression
 $C_{f,d} = 0,30$ Coeff. of friction between the base plate and concrete

WELDS

$a_p = 4$ [mm] Footing plate of the column base

LOADS

Case: Manual calculations.

$V_{j,Ed,z} = 22,33$ [kN] Shear force
 $M_{j,Ed,y} = 6,70$ [kN*m] Bending moment

RESULTS

COMPRESSION ZONE

COMPRESSION OF CONCRETE

$f_{cd} = 16,67$ [MPa] Design compressive resistance EN 1992-1:[3.1.6.(1)]
 $f_j = 20,29$ [MPa] Design bearing resistance under the base plate [6.2.5.(7)]
 $c = t_p \sqrt{(f_{yp}/(3*f_j*\gamma_{M0}))}$
 $c = 29$ [mm] Additional width of the bearing pressure zone [6.2.5.(4)]
 $b_{eff} = 39$ [mm] Effective width of the bearing pressure zone under the flange [6.2.5.(3)]
 $l_{eff} = 69$ [mm] Effective length of the bearing pressure zone under the flange [6.2.5.(3)]
 $A_{c0} = 27,22$ [cm²] Area of the joint between the base plate and the foundation EN 1992-1:[6.7.(3)]
 $A_{c1} = 244,97$ [cm²] Maximum design area of load distribution EN 1992-1:[6.7.(3)]
 $F_{rd,u} = A_{c0}*f_{cd}*\sqrt{(A_{c1}/A_{c0})} \leq 3*A_{c0}*f_{cd}$
 $F_{rd,u} = 136,10$ [kN] Bearing resistance of concrete EN 1992-1:[6.7.(3)]
 $\beta_j = 0,67$ Reduction factor for compression [6.2.5.(7)]
 $f_{jd} = \beta_j*F_{rd,u}/(b_{eff}*l_{eff})$
 $f_{jd} = 33,33$ [MPa] Design bearing resistance [6.2.5.(7)]
 $A_{c,y} = 27,22$ [cm²] Bearing area for bending M_y [6.2.8.3.(1)]
 $F_{c,Rd,i} = A_{c,i}*f_{jd}$
 $F_{c,Rd,y} = 90,73$ [kN] Bearing resistance of concrete for bending M_y [6.2.8.3.(1)]

COLUMN FLANGE AND WEB IN COMPRESSION

$CL = 1,00$ Section class EN 1993-1-1:[5.5.2]
 $W_{pl,y} = 100,00$ [cm³] Plastic section modulus EN1993-1-1:[6.2.5.(2)]
 $M_{c,Rd,y} = 23,50$ [kN*m] Design resistance of the section for bending EN1993-1-1:[6.2.5]
 $h_{f,y} = 190$ [mm] Distance between the centroids of flanges [6.2.6.7.(1)]
 $F_{c,fc,Rd,y} = M_{c,Rd,y} / h_{f,y}$
 $F_{c,fc,Rd,y} = 123,68$ [kN] Resistance of the compressed flange and web [6.2.6.7.(1)]

RESISTANCES OF SPREAD FOOTING IN THE COMPRESSION ZONE

$F_{c,Rd,y} = \min(F_{c,Rd,y}, F_{c,fc,Rd,y})$
 $F_{c,Rd,y} = 90,73$ [kN] Resistance of spread footing in the compression zone [6.2.8.3]

TENSION ZONE

STEEL FAILURE

$A_b = 1,57$ [cm²] Effective anchor area [Table 3.4]
 $f_{ub} = 800,00$ [MPa] Tensile strength of the anchor material [Table 3.4]
 $\beta = 0,85$ Reduction factor of anchor resistance [3.6.1.(3)]
 $F_{t,Rd,s1} = \beta*0.9*f_{ub}*A_b/\gamma_{M2}$
 $F_{t,Rd,s1} = 76,87$ [kN] Anchor resistance to steel failure [Table 3.4]
 $\gamma_{Ms} = 1,20$ Partial safety factor CEB [3.2.3.2]

$\gamma_{Ms} = 1,20$ Partial safety factor CEB [3.2.3.2]
 $f_{yb} = 640,00$ [MPa] Yield strength of the anchor material CEB [9.2.2]
 $F_{t,Rd,s2} = f_{yb} \cdot A_b / \gamma_{Ms}$
 $F_{t,Rd,s2} = 83,73$ [kN] Anchor resistance to steel failure CEB [9.2.2]

$F_{t,Rd,s} = \min(F_{t,Rd,s1}, F_{t,Rd,s2})$
 $F_{t,Rd,s} = 76,87$ [kN] Anchor resistance to steel failure

PULL-OUT FAILURE

$f_{ck} = 25,00$ [MPa] Characteristic compressive strength of concrete EN 1992-1:[3.1.2]
 $A_h = 13,99$ [cm²] Bearing area of the head CEB [15.1.2.3]
 $p_k = 175,00$ [MPa] Characteristic strength of concrete (pull-out) CEB [15.1.2.3]
 $\gamma_{Mp} = 2,16$ Partial safety factor CEB [3.2.3.1]
 $F_{t,Rd,p} = p_k \cdot A_h / \gamma_{Mp}$
 $F_{t,Rd,p} = 121,44$ [kN] Design uplift capacity CEB [9.2.3]

CONCRETE CONE FAILURE

$h_{ef} = 150$ [mm] Effective anchorage depth CEB [9.2.4]
 $N_{Rk,c}^0 = 9.0[N^{0.5}/mm^{0.5}] \cdot f_{ck} \cdot h_{ef}^{1.5}$
 $N_{Rk,c}^0 = 82,67$ [kN] Characteristic resistance of an anchor CEB [9.2.4]
 $s_{cr,N} = 450$ [mm] Critical width of the concrete cone CEB [9.2.4]
 $c_{cr,N} = 225$ [mm] Critical edge distance CEB [9.2.4]
 $A_{c,N0} = 2970,00$ [cm²] Maximum area of concrete cone CEB [9.2.4]
 $A_{c,N} = 2970,00$ [cm²] Actual area of concrete cone CEB [9.2.4]
 $\psi_{A,N} = A_{c,N} / A_{c,N0}$
 $\psi_{A,N} = 1,00$ Factor related to anchor spacing and edge distance CEB [9.2.4]
 $c = 225$ [mm] Minimum edge distance from an anchor CEB [9.2.4]
 $\psi_{s,N} = 0.7 + 0.3 \cdot c / c_{cr,N} \leq 1.0$
 $\psi_{s,N} = 1,00$ Factor taking account the influence of edges of the concrete member on the distribution of stresses in the concrete CEB [9.2.4]
 $\psi_{ec,N} = 1,00$ Factor related to distribution of tensile forces acting on anchors CEB [9.2.4]
 $\psi_{re,N} = 0.5 + h_{ef}[mm] / 200 \leq 1.0$
 $\psi_{re,N} = 1,00$ Shell spalling factor CEB [9.2.4]
 $\psi_{ucr,N} = 1,00$ Factor taking into account whether the anchorage is in cracked or non-cracked concrete CEB [9.2.4]
 $\gamma_{Mc} = 2,16$ Partial safety factor CEB [3.2.3.1]
 $F_{t,Rd,c} = N_{Rk,c}^0 \cdot \psi_{A,N} \cdot \psi_{s,N} \cdot \psi_{ec,N} \cdot \psi_{re,N} \cdot \psi_{ucr,N} / \gamma_{Mc}$
 $F_{t,Rd,c} = 38,27$ [kN] Design anchor resistance to concrete cone failure EN 1992-1:[8.4.2.(2)]

SPLITTING FAILURE

$h_{ef} = 150$ [mm] Effective anchorage depth CEB [9.2.5]
 $N_{Rk,c}^0 = 9.0[N^{0.5}/mm^{0.5}] \cdot f_{ck} \cdot h_{ef}^{1.5}$
 $N_{Rk,c}^0 = 82,67$ [kN] Design uplift capacity CEB [9.2.5]
 $s_{cr,N} = 300$ [mm] Critical width of the concrete cone CEB [9.2.5]
 $c_{cr,N} = 150$ [mm] Critical edge distance CEB [9.2.5]
 $A_{c,N0} = 1560,00$ [cm²] Maximum area of concrete cone CEB [9.2.5]
 $A_{c,N} = 1560,00$ [cm²] Actual area of concrete cone CEB [9.2.5]
 $\psi_{A,N} = A_{c,N} / A_{c,N0}$
 $\psi_{A,N} = 1,00$ Factor related to anchor spacing and edge distance CEB [9.2.5]
 $c = 150$ [mm] Minimum edge distance from an anchor CEB [9.2.5]
 $\psi_{s,N} = 0.7 + 0.3 \cdot c / c_{cr,N} \leq 1.0$
 $\psi_{s,N} = 1,00$ Factor taking account the influence of edges of the concrete member on the distribution of stresses in the concrete CEB [9.2.5]
 $\psi_{ec,N} = 1,00$ Factor related to distribution of tensile forces acting on anchors CEB [9.2.5]
 $\psi_{re,N} = 0.5 + h_{ef}[mm] / 200 \leq 1.0$
 $\psi_{re,N} = 1,00$ Shell spalling factor CEB [9.2.5]
 $\psi_{ucr,N} = 1,00$ Factor taking into account whether the anchorage is in cracked or non-cracked concrete CEB [9.2.5]
 $\psi_{h,N} = (h / (2 \cdot h_{ef}))^{2/3} \leq 1.2$
 $\psi_{h,N} = 0,76$ Coeff. related to the foundation height CEB [9.2.5]
 $\gamma_{M,sp} = 2,16$ Partial safety factor CEB [3.2.3.1]

$$F_{t,Rd,sp} = N_{Rk,c} \cdot \psi_{A,N} \cdot \psi_{s,N} \cdot \psi_{ec,N} \cdot \psi_{re,N} \cdot \psi_{ucr,N} \cdot \psi_{h,N} / \gamma_{M,sp}$$

$$F_{t,Rd,sp} = 29,21 \text{ [kN]} \quad \text{Design anchor resistance to splitting of concrete}$$

CEB [9.2.5]

TENSILE RESISTANCE OF AN ANCHOR

$$F_{t,Rd} = \min(F_{t,Rd,s}, F_{t,Rd,p}, F_{t,Rd,c}, F_{t,Rd,sp})$$

$$F_{t,Rd} = 29,21 \text{ [kN]} \quad \text{Tensile resistance of an anchor}$$

BENDING OF THE BASE PLATE

Bending moment $M_{j,Ed,y}$

$$l_{eff,1} = 150 \text{ [mm]} \quad \text{Effective length for a single bolt for mode 1} \quad [6.2.6.5]$$

$$l_{eff,2} = 150 \text{ [mm]} \quad \text{Effective length for a single bolt for mode 2} \quad [6.2.6.5]$$

$$m = 40 \text{ [mm]} \quad \text{Distance of a bolt from the stiffening edge} \quad [6.2.6.5]$$

$$M_{pl,1,Rd} = 1,98 \text{ [kN*m]} \quad \text{Plastic resistance of a plate for mode 1} \quad [6.2.4]$$

$$M_{pl,2,Rd} = 1,98 \text{ [kN*m]} \quad \text{Plastic resistance of a plate for mode 2} \quad [6.2.4]$$

$$F_{T,1,Rd} = 195,96 \text{ [kN]} \quad \text{Resistance of a plate for mode 1} \quad [6.2.4]$$

$$F_{T,2,Rd} = 76,00 \text{ [kN]} \quad \text{Resistance of a plate for mode 2} \quad [6.2.4]$$

$$F_{T,3,Rd} = 58,42 \text{ [kN]} \quad \text{Resistance of a plate for mode 3} \quad [6.2.4]$$

$$F_{t,pl,Rd,y} = \min(F_{T,1,Rd}, F_{T,2,Rd}, F_{T,3,Rd})$$

$$F_{t,pl,Rd,y} = 58,42 \text{ [kN]} \quad \text{Tension resistance of a plate} \quad [6.2.4]$$

TENSILE RESISTANCE OF A COLUMN WEB

Bending moment $M_{j,Ed,y}$

$$t_{wc} = 10 \text{ [mm]} \quad \text{Effective thickness of the column web} \quad [6.2.6.3.(8)]$$

$$b_{eff,t,wc} = 150 \text{ [mm]} \quad \text{Effective width of the web for tension} \quad [6.2.6.3.(2)]$$

$$A_{vc} = 18,00 \text{ [cm}^2\text{]} \quad \text{Shear area} \quad \text{EN1993-1-1:[6.2.6.(3)]}$$

$$\omega = 0,72 \quad \text{Reduction factor for interaction with shear} \quad [6.2.6.3.(4)]$$

$$F_{t,wc,Rd,y} = \omega \cdot b_{eff,t,wc} \cdot t_{wc} \cdot f_{yc} / \gamma_{M0}$$

$$F_{t,wc,Rd,y} = 255,54 \text{ [kN]} \quad \text{Column web resistance} \quad [6.2.6.3.(1)]$$

RESISTANCES OF SPREAD FOOTING IN THE TENSION ZONE

$$F_{T,Rd,y} = \min(F_{t,pl,Rd,y}, F_{t,wc,Rd,y})$$

$$F_{T,Rd,y} = 58,42 \text{ [kN]} \quad \text{Resistance of a column base in the tension zone} \quad [6.2.8.3]$$

CONNECTION CAPACITY CHECK

$$e_y = 0 \text{ [mm]} \quad \text{Axial force eccentricity} \quad [6.2.8.3]$$

$$Z_{c,y} = 80 \text{ [mm]} \quad \text{Lever arm } F_{C,Rd,y} \quad [6.2.8.1.(2)]$$

$$Z_{t,y} = 45 \text{ [mm]} \quad \text{Lever arm } F_{T,Rd,y} \quad [6.2.8.1.(3)]$$

$$M_{j,Rd,y} = 7,32 \text{ [kN*m]} \quad \text{Connection resistance for bending} \quad [6.2.8.3]$$

$$M_{j,Ed,y} / M_{j,Rd,y} \leq 1,0 \text{ (6.23)} \quad 0,92 < 1,00 \quad \text{verified} \quad (0,92)$$

SHEAR

BEARING PRESSURE OF AN ANCHOR BOLT ONTO THE BASE PLATE

Shear force $V_{j,Ed,z}$

$$\alpha_{d,z} = 1,02 \quad \text{Coeff. taking account of the bolt position - in the direction of shear} \quad [\text{Table 3.4}]$$

$$\alpha_{b,z} = 1,00 \quad \text{Coeff. for resistance calculation } F_{1,vb,Rd} \quad [\text{Table 3.4}]$$

$$k_{1,z} = 2,50 \quad \text{Coeff. taking account of the bolt position - perpendicularly to the direction of shear} \quad [\text{Table 3.4}]$$

$$F_{1,vb,Rd,z} = k_{1,z} \cdot \alpha_{b,z} \cdot f_{up} \cdot d \cdot t_p / \gamma_{M2}$$

$$F_{1,vb,Rd,z} = 172,80 \text{ [kN]} \quad \text{Resistance of an anchor bolt for bearing pressure onto the base plate} \quad [6.2.2.(7)]$$

SHEAR OF AN ANCHOR BOLT

$$\alpha_b = 0,25 \quad \text{Coeff. for resistance calculation } F_{2,vb,Rd} \quad [6.2.2.(7)]$$

$$A_{vb} = 2,01 \text{ [cm}^2\text{]} \quad \text{Area of bolt section} \quad [6.2.2.(7)]$$

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$\alpha_b =$	0,25	Coeff. for resistance calculation $F_{2,vb,Rd}$	[6.2.2.(7)]
$f_{ub} =$	800,00 [MPa]	Tensile strength of the anchor material	[6.2.2.(7)]
$\gamma_{M2} =$	1,25	Partial safety factor	[6.2.2.(7)]
$F_{2,vb,Rd} = \alpha_b \cdot f_{ub} \cdot A_{vb} / \gamma_{M2}$			
$F_{2,vb,Rd} =$	31,91 [kN]	Shear resistance of a bolt - without lever arm	[6.2.2.(7)]

CONCRETE PRY-OUT FAILURE

$N_{Rk,c} =$	82,67 [kN]	Design uplift capacity	CEB [9.2.4]
$k_3 =$	2,00	Factor related to the anchor length	CEB [9.3.3]
$\gamma_{Mc} =$	2,16	Partial safety factor	CEB [3.2.3.1]
$F_{v,Rd,cp} = k_3 \cdot N_{Rk,c} / \gamma_{Mc}$			
$F_{v,Rd,cp} =$	76,55 [kN]	Concrete resistance for pry-out failure	CEB [9.3.1]

CONCRETE EDGE FAILURE

Shear force $V_{j,Ed,z}$

$V_{Rk,c,z}^0 =$	551,59 [kN]	Characteristic resistance of an anchor	
$\psi_{A,V,z} =$	0,19	Factor related to anchor spacing and edge distance	
$\psi_{h,V,z} =$	1,51	Factor related to the foundation thickness	
$\psi_{s,V,z} =$	0,90	Factor related to the influence of edges parallel to the shear load direction	
$\psi_{ec,V,z} =$	1,00	Factor taking account a group effect when different shear loads are acting on the individual anchors in a group	
$\psi_{\alpha,V,z} =$	1,00	Factor related to the angle at which the shear load is applied	
$\psi_{ucr,V,z} =$	1,00	Factor related to the type of edge reinforcement used	
$\gamma_{Mc} =$	2,16	Partial safety factor	
$F_{v,Rd,c,z} = V_{Rk,c,z}^0 \cdot \psi_{A,V,z} \cdot \psi_{h,V,z} \cdot \psi_{s,V,z} \cdot \psi_{ec,V,z} \cdot \psi_{\alpha,V,z} \cdot \psi_{ucr,V,z} / \gamma_{Mc}$			
$F_{v,Rd,c,z} =$	66,69 [kN]	Concrete resistance for edge failure	CEB [9.3.1]

SPLITTING RESISTANCE

$C_{f,d} =$	0,30	Coeff. of friction between the base plate and concrete	[6.2.2.(6)]
$N_{c,Ed} =$	0,00 [kN]	Compressive force	[6.2.2.(6)]
$F_{f,Rd} = C_{f,d} \cdot N_{c,Ed}$			
$F_{f,Rd} =$	0,00 [kN]	Slip resistance	[6.2.2.(6)]

SHEAR CHECK

$V_{j,Rd,z} = n_b \cdot \min(F_{1,vb,Rd,z}, F_{2,vb,Rd}, F_{v,Rd,cp}, F_{v,Rd,c,z}) + F_{f,Rd}$			
$V_{j,Rd,z} =$	127,65 [kN]	Connection resistance for shear	CEB [9.3.1]
$V_{j,Ed,z} / V_{j,Rd,z} \leq 1,0$	0,17 < 1,00	verified	(0,17)

WELDS BETWEEN THE COLUMN AND THE BASE PLATE

$\sigma_{\perp} =$	104,38 [MPa]	Normal stress in a weld	[4.5.3.(7)]
$\tau_{\perp} =$	104,38 [MPa]	Perpendicular tangent stress	[4.5.3.(7)]
$\tau_{yII} =$	0,00 [MPa]	Tangent stress parallel to $V_{j,Ed,y}$	[4.5.3.(7)]
$\tau_{zII} =$	15,51 [MPa]	Tangent stress parallel to $V_{j,Ed,z}$	[4.5.3.(7)]
$\beta_W =$	0,80	Resistance-dependent coefficient	[4.5.3.(7)]
$\sigma_{\perp} / (0.9 \cdot f_u / \gamma_{M2}) \leq 1.0$ (4.1)			
	0,40 < 1,00	verified	(0,40)
$\sqrt{(\sigma_{\perp}^2 + 3.0 (\tau_{yII}^2 + \tau_{\perp}^2))} / (f_u / (\beta_W \cdot \gamma_{M2})) \leq 1.0$ (4.1)			
	0,58 < 1,00	verified	(0,58)
$\sqrt{(\sigma_{\perp}^2 + 3.0 (\tau_{zII}^2 + \tau_{\perp}^2))} / (f_u / (\beta_W \cdot \gamma_{M2})) \leq 1.0$ (4.1)			
	0,51 < 1,00	verified	(0,51)

CONNECTION STIFFNESS

Bending moment $M_{i,Ed,y}$

$b_{eff} =$	39 [mm]	Effective width of the bearing pressure zone under the flange	[6.2.5.(3)]
$l_{eff} =$	69 [mm]	Effective length of the bearing pressure zone under the flange	[6.2.5.(3)]
$k_{13,y} = E_c \cdot \sqrt{(b_{eff} \cdot l_{eff})} / (1.275 \cdot E)$			
$k_{13,y} =$	6 [mm]	Stiffness coeff. of compressed concrete	[Table 6.11]

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$l_{eff} =$	150	[mm]	Effective length for a single bolt for mode 2	[6.2.6.5]
$m =$	40	[mm]	Distance of a bolt from the stiffening edge	[6.2.6.5]
$k_{15,y} = 0.850 \cdot l_{eff} \cdot t_p^3 / (m^3)$				
$k_{15,y} =$	6	[mm]	Stiffness coeff. of the base plate subjected to tension	[Table 6.11]
$L_b =$	161	[mm]	Effective anchorage depth	[Table 6.11]
$k_{16,y} = 1.6 \cdot A_b / L_b$				
$k_{16,y} =$	2	[mm]	Stiffness coeff. of an anchor subjected to tension	[Table 6.11]
$\lambda_{0,y} =$	0,92		Column slenderness	[5.2.2.5.(2)]
$S_{j,ini,y} =$	1456,24	[kN*m]	Initial rotational stiffness	[Table 6.12]
$S_{j,rig,y} =$	8400,00	[kN*m]	Stiffness of a rigid connection	[5.2.2.5]
$S_{j,ini,y} < S_{j,rig,y}$ SEMI-RIGID				[5.2.2.5.(2)]

Connection conforms to the code

Ratio 0,92

RADI LAKŠE MONTAŽE MOGU SE KORISTITI NAKNADNO BUŠENI ANKER VIJCI
ODABIR I PRORAČUN NA SLIJEDEĆOJ STRANICI

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Design Specifications

Anchor

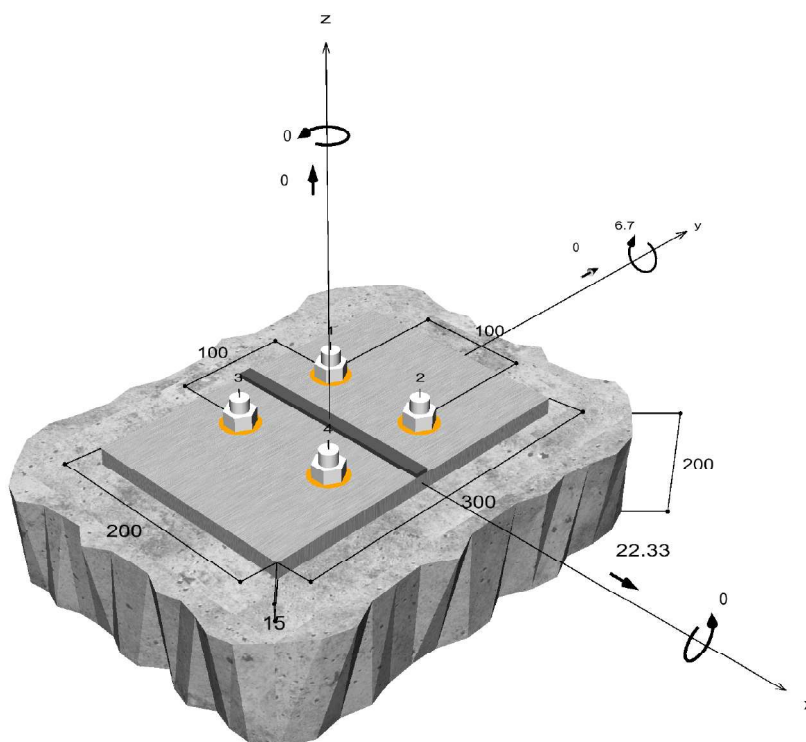
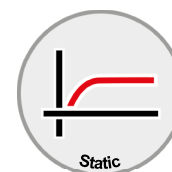
Anchor system	fischer Injection system FIS V Plus
Injection resin	FIS V Plus 360 S
Fixing element	Threaded rod FIS A M 16 x 200 8.8, zinc plated steel, Property Class 8.8
Calculated anchorage depth	150.00 mm
Design Data	Anchor design in Concrete according European Technical Assessment ETA-20/0603, Option 1, Issued 13/11/2020



Geometry / Loads / Scale units

mm, kN, kNm

Value of design actions (including partial safety factor for the load)



Not drawn to scale

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Input data

Design method	EN1992-4:2018 bonded fastener
Base material	C25/30, EN 206
Concrete condition	Non-cracked, dry hole
Temperature range	24 °C long term temperature, 40 °C short term temperature
Reinforcement	Normal or no reinforcement. No edge reinforcement
Drilling method	Hammer drilling
Installation type	Push-through installation
Annular gap	Annular gap filled
Type of loading	Permanent-Transient/Static
Base plate location	Base plate flush installed on base material
Base plate geometry	200 mm x 300 mm x 15 mm
Profile type	Rectangular (200 x 12 (S 235))

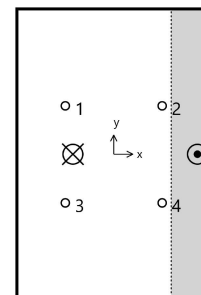
Design actions *)

#	N _{Ed} kN	V _{Ed,x} kN	V _{Ed,y} kN	M _{Ed,x} kNm	M _{Ed,y} kNm	M _{T,Ed} kNm	Type of loading
1	0,00	22,33	0,00	0,00	6,70	0,00	Permanent-Transient/Static

*) The required partial safety factors for actions are included

Resulting anchor forces

Anchor no.	Tensile action kN	Shear Action kN	Shear Action x kN	Shear Action y kN
1	24.01	5.58	5.58	0.00
2	2.04	5.58	5.58	0.00
3	24.01	5.58	5.58	0.00
4	2.04	5.58	5.58	0.00



max. concrete compressive strain :	0.27 ‰
max. concrete compressive stress :	8.5 N/mm ²
Resulting tensile actions :	52.1 kN , X/Y position (-42.2 / 0)
Resulting compression actions :	52.1 kN , X/Y position (86.4 / 0)

Resistance to tension loads

Proof	Action kN	Capacity kN	Utilisation β _N %
Steel failure *	24	83,7	28,7
Combined pull-out and concrete cone failure	52,1	93,5	55,7
Concrete cone failure	52,1	121,1	43,0

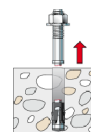
* Most unfavourable anchor

The input values and the design results should be checked against local valid standards and approvals. Please respect the disclaimer of warranty in the license agreement of the Software.

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	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 145

Steel failure

$$N_{Ed} \leq \frac{N_{Rk,s}}{\gamma_{Ms}} \quad (N_{Rd,s})$$

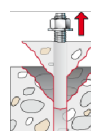


$N_{Rk,s}$ kN	γ_{Ms}	$N_{Rd,s}$ kN	N_{Ed} kN	$\beta_{N,s}$ %
125.6	1.50	83.7	24	28.7

Anchor no.	$\beta_{N,s}$ %	Group N°	Decisive Beta
1	28.7	1	$\beta_{N,s,1}$
2	2.4	2	$\beta_{N,s,2}$
3	28.7	3	$\beta_{N,s,3}$
4	2.4	4	$\beta_{N,s,4}$

Combined pull-out and concrete cone failure

$$N_{Ed} \leq \frac{N_{Rk,p}}{\gamma_{Mp}} \quad (N_{Rd,p})$$



$$N_{Rk,p} = N_{Rk,p}^0 \cdot \frac{A_{p,N}}{A_{p,N}^0} \cdot \Psi_{s,Np} \cdot \Psi_{g,Np} \cdot \Psi_{ec,Np} \cdot \Psi_{re,Np} \quad \text{Eq. (7.13)}$$

$$N_{Rk,p} = 110.84kN \cdot \frac{288,369mm^2}{190,969mm^2} \cdot 1.000 \cdot 1.000 \cdot 0.838 \cdot 1.000 = 140.30kN$$

$$N_{Rk,p}^0 = \Psi_{sus} \cdot \pi \cdot d \cdot h_{ef} \cdot \tau_{Rk} = 1.00 \cdot \pi \cdot 16mm \cdot 150mm \cdot 14.7N/mm^2 = 110.84kN \quad \text{Eq. (7.14)}$$

$$\Psi_{sus} = 1.00 \quad \text{Eq. (7.14a)}$$

$$\alpha_{sus} = 0.00 \leq \Psi_{sus}^0 = 0.76$$

$$s_{cr,Np} = \min \left(7.3 \cdot d \cdot \left(\Psi_{sus} \cdot \tau_{Rk,ucr} \right)^{0.5} ; 3 \cdot h_{ef} \right) \quad \text{Eq. (7.15)}$$

$$s_{cr,Np} = \min \left(7.3 \cdot 16mm \cdot \left(1.00 \cdot 14.0N/mm^2 \right)^{0.5} ; 3 \cdot 150mm \right) = 437mm$$

$$c_{cr,Np} = \frac{s_{cr,Np}}{2} = \frac{437mm}{2} = 219mm \quad \text{Eq. (7.16)}$$

$$\Psi_{s,Np} = \min \left(1; 0.7 + 0.3 \cdot \frac{c}{c_{cr,Np}} \right) = \min \left(1; 0.7 + 0.3 \cdot \frac{\infty}{219mm} \right) = 1.000 \leq 1 \quad \text{Eq. (7.20)}$$

$$\Psi_{g,Np} = \max \left(1; \Psi_{g,Np}^0 - \sqrt{\frac{s}{s_{cr,Np}}} \cdot \left(\Psi_{g,Np}^0 - 1 \right) \right) = 1.000 - \sqrt{\frac{100mm}{437mm}} \cdot (1.000 - 1) = 1.000 \geq 1 \quad \text{Eq. (7.17)}$$

$$\Psi_{g,Np}^0 = \max \left(1; \sqrt{n} - \left(\sqrt{n} - 1 \right) \cdot \left(\frac{\tau_{Rk}}{\tau_{Rk,c}} \right)^{1.5} \right) \quad \text{Eq. (7.18)}$$

$$\Psi_{g,Np}^0 = \max \left(1; \sqrt{4} - \left(\sqrt{4} - 1 \right) \cdot \left(\frac{14.7N/mm^2}{13.4N/mm^2} \right)^{1.5} \right) = 1.000 \geq 1$$

$$\tau_{Rk,c} = \frac{k_3}{\pi \cdot d} \sqrt{h_{ef} \cdot f_{ck}} = \frac{11}{3.14 \cdot 16mm} \sqrt{150mm \cdot 25.0N/mm^2} = 13.4N/mm^2 \quad \text{Eq. (7.19)}$$

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$$\Psi_{ec,Np} = \frac{1}{1 + \frac{2e_n}{s_{cr,Np}}} = \Psi_{ec,Npx} \cdot \Psi_{ec,Npy} = 0.838 \cdot 1.000 = 0.838 \leq 1 \quad \text{Eq. (7.21)}$$

$$\Psi_{ec,Npx} = \frac{1}{1 + \frac{2 \cdot 42mm}{437mm}} = 0.838 \leq 1 \quad \Psi_{ec,Npy} = \frac{1}{1 + \frac{2 \cdot 0mm}{437mm}} = 1.000 \leq 1$$

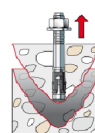
$$\Psi_{re,Np} = 1.000 \quad \text{Eq. (7.5)}$$

N_{Rk,p} kN	γ_{Mp}	N_{Rd,p} kN	N_{Ed} kN	β_{N,p} %
140.3	1.50	93.5	52.1	55.7

Anchor no.	β_{N,p} %	Group N°	Decisive Beta
1, 2, 3, 4	55.7	1	β _{N,p;1}

Concrete cone failure

$$N_{Ed} \leq \frac{N_{Rk,c}}{\gamma_{Mc}} \quad (N_{Rd,c})$$



$$N_{Rk,c} = N_{Rk,c}^0 \cdot \frac{A_{c,N}}{A_{c,N}^0} \cdot \Psi_{s,N} \cdot \Psi_{re,N} \cdot \Psi_{ec,N} \cdot \Psi_{M,N} \quad \text{Eq. (7.1)}$$

$$N_{Rk,c} = 101.04kN \cdot \frac{302,500mm^2}{202,500mm^2} \cdot 1.000 \cdot 1.000 \cdot 0.842 \cdot 1.428 = 181.59kN$$

$$N_{Rk,c}^0 = k_1 \cdot \sqrt{f_{ck}} \cdot h_{ef}^{1.5} = 11.0 \cdot \sqrt{25.0N/mm^2} \cdot (150mm)^{1.5} = 101.04kN \quad \text{Eq. (7.2)}$$

$$\Psi_{s,N} = \min\left(1; 0.7 + 0.3 \cdot \frac{c}{c_{cr,N}}\right) = \min\left(1; 0.7 + 0.3 \cdot \frac{\infty}{225mm}\right) = 1.000 \leq 1 \quad \text{Eq. (7.4)}$$

$$\Psi_{re,N} = 1.000 \quad \text{Eq. (7.5)}$$

$$\Psi_{ec,N} = \frac{1}{1 + \frac{2e_n}{s_{cr,N}}} \Rightarrow \Psi_{ec,Nx} \cdot \Psi_{ec,Ny} = 0.842 \cdot 1.000 = 0.842 \leq 1 \quad \text{Eq. (7.6)}$$

$$\Psi_{ec,Nx} = \frac{1}{1 + \frac{2 \cdot 42mm}{450mm}} = 0.842 \leq 1 \quad \Psi_{ec,Ny} = \frac{1}{1 + \frac{2 \cdot 0mm}{450mm}} = 1.000 \leq 1$$

$$\Psi_{M,N} = 2 - \frac{z}{1.5 \cdot h_{ef}} = 2 - \frac{129mm}{1.5 \cdot 150mm} = 1.43 \geq 1 \quad \text{Eq. (7.7)}$$

N_{Rk,c} kN	γ_{Mc}	N_{Rd,c} kN	N_{Ed} kN	β_{N,c} %
181.6	1.50	121.1	52.1	43.0

Anchor no.	β_{N,c} %	Group N°	Decisive Beta
1, 2, 3, 4	43.0	1	β _{N,c;1}

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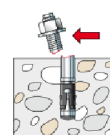
Resistance to shear loads

Proof	Action kN	Capacity kN	Utilisation β_v %
Steel failure without lever arm *	5,6	50.4	11.1
Concrete pry-out failure	22,3	201.3	11.1

* Most unfavourable anchor

Steel failure without lever arm

$$V_{Ed} \leq \frac{V_{Rk,s}}{\gamma_{Ms}} \quad (V_{Rd,s})$$



$$V_{Rk,s} = k_7 \cdot V_{Rk,s}^0 = 1.00 \cdot 63.00 kN = 63.00 kN$$

Eq. (7.35)/
(7.36)

$V_{Rk,s}$ kN	γ_{Ms}	$V_{Rd,s}$ kN	V_{Ed} kN	β_{Vs} %
63	1.25	50.4	5.6	11.1

Anchor no.	β_{Vs} %	Group N°	Decisive Beta
1	11.1	1	$\beta_{Vs,1}$
2	11.1	2	$\beta_{Vs,2}$
3	11.1	3	$\beta_{Vs,3}$
4	11.1	4	$\beta_{Vs,4}$

Concrete pry-out failure

$$V_{Ed} \leq \frac{V_{Rk,cp}}{\gamma_{Mc}} \quad (V_{Rd,cp})$$



$$V_{Rk,cp} = k_8 \cdot N_{Rk,c} = 2 \cdot 150.94 kN = 301.88 kN$$

Eq. (7.39c)

$$N_{Rk,c} = N_{Rk,c}^0 \cdot \frac{A_{c,N}}{A_{c,N}^0} \cdot \Psi_{s,N} \cdot \Psi_{re,N} \cdot \Psi_{ec,N} \cdot \Psi_{M,N}$$

Eq. (7.1)

$$N_{Rk,c} = 101.04 kN \cdot \frac{302,500 mm^2}{202,500 mm^2} \cdot 1.000 \cdot 1.000 \cdot 1.000 \cdot 1.000 = 150.94 kN$$

$$N_{Rk,c}^0 = k_1 \cdot \sqrt{f_{ck}} \cdot h_{ef}^{1.5} = 11 \cdot \sqrt{25.0 N/mm^2} \cdot (150 mm)^{1.5} = 101.04 kN$$

Eq. (7.2)

$$\Psi_{s,N} = \min\left(1; 0.7 + 0.3 \cdot \frac{c}{c_{cr,N}}\right) = \min\left(1; 0.7 + 0.3 \cdot \frac{\infty}{225 mm}\right) = 1.000 \leq 1$$

Eq. (7.4)

$$\Psi_{re,N} = 1.000$$

Eq. (7.5)

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$$\Psi_{ec,N} = \frac{1}{1 + \frac{2e_n}{s_{cr,N}}} \Rightarrow \Psi_{ec,Nx} \cdot \Psi_{ec,Ny} = 1.000 \cdot 1.000 = 1.000 \leq 1 \quad \text{Eq. (7.6)}$$

$$\Psi_{M,N} = 1.00 \geq 1 \quad \text{Eq. (7.7)}$$

V_{Rk,cp} kN	Y_{Mcp}	V_{Rd,cp} kN	V_{Ed} kN	β_{V,cp} %
301,9	1,50	201,3	22,3	11,1

Anchor no.	β_{V,cp} %	Group N°	Decisive Beta
1, 2, 3, 4	11,1	1	β _{V,cp,1}

Utilization of tension and shear loads

Tension loads	Utilisation β_N %	Shear Loads	Utilisation β_V %
Steel failure *	28,7	Steel failure without lever arm *	11,1
Combined pull-out and concrete cone failure	55,7	Concrete pry-out failure	11,1
Concrete cone failure	43,0		

* Most unfavourable anchor

Resistance to combined tensile and shear loads

Utilisation steel			
$\beta_{N,s} = \beta_{N,s;3} = 0.29 \leq 1$			
$\beta_{V,s} = \beta_{V,s;1} = 0.11 \leq 1$			
$\beta_N^2 + \beta_V^2 = \beta_{N,s;3}^2 + \beta_{V,s;1}^2 = 0.09 \leq 1$			Eq. (7.55)
Utilisation concrete			Proof successful
$\beta_{N,p} = \beta_{N,p;1} = 0.56 \leq 1$			
$\beta_{V,cp} = \beta_{V,cp;1} = 0.11 \leq 1$			
$\beta_N^{1.5} + \beta_V^{1.5} = \beta_{N,p;1}^{1.5} + \beta_{V,cp;1}^{1.5} = 0.45 \leq 1$			Eq. (7.56)

Information concerning the anchor plate

Base plate details

Plate thickness specified by user without proof

t = 15 mm

Profile type

Rectangular (200 x 12 (S 235))

Technical remarks

The transmission of the anchor loads to the supports of the concrete member shall be shown for the ultimate limit state and the serviceability limit state; for this purpose, the normal verifications shall be carried out under due consideration of the actions introduced by the anchors. For these verifications the additional provisions given in the current design method shall be taken into account.

As a pre-condition the anchor plate is assumed to be flat when subjected to the actions. Therefore, the plate (if present) must be sufficiently stiff. The C-Fix anchor plate design is based on a proof of stresses and does not allow a statement about the stiffness of the plate. The proof of the necessary stiffness is not carried out by C-Fix.

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During the design process, the following hints and warnings were issued:

- The factor $\psi_{M,N}$ is taking into account the effect of a compression force between the fixture and concrete in case of bending moments with or without axial force. If the bending moment does not act continuously, please also check this load case. See EN 1992-4, 7.2.1.4 (7)

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Installation data

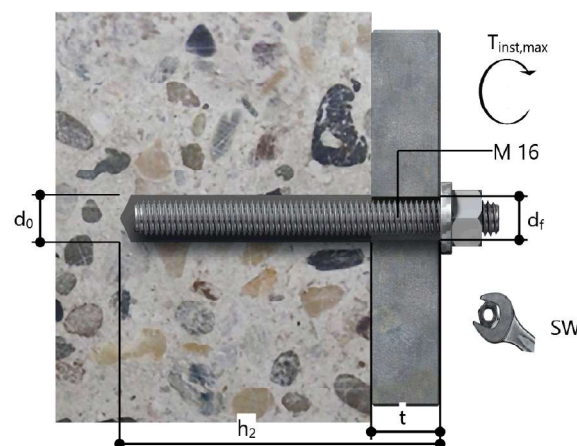
Anchor

Anchor system	fischer Injection system FIS V Plus	
Injection resin	FIS V Plus 360 S (other cartridge sizes available)	Art.-No. 558745
Fixing element	Threaded rod FIS A M 16 x 200 8.8, zinc plated steel, Property Class 8.8	Art.-No. 517939
Accessories	FIS MR Plus	Art.-No. 545853
	FIS Extension tube 9mm	Art.-No. 48983
	FIS DM S Pro	Art.-No. 563337
	Compressed-air cleaning tool	Art.-No. 93286
	compressed air (oil-free), min. 6 bar	By job site
	BSD 18	Art.-No. 1493
	SDS Chuck with internal thread M8	Art.-No. 530332
	Quattric II 18/200/250	Art.-No. 549956
	or alternatively	
	FHD 18/320/450	Art.-No. 546600
Alternative cartridges	FIS VW Plus 360 S	Art.-No. 558759
	FIS V Plus 410 C	Art.-No. 558780
	FIS V Plus 825 S	Art.-No. 567511
	The shown cartridges are alternative to the highlighted one above with the same approval number.	



Installation details

Thread diameter	M 16
Drill hole diameter	$d_0 = 18 \text{ mm}$
Drill hole depth	$h_2 = 165 \text{ mm}$
Calculated anchorage depth	$h_{ef} = 150.00 \text{ mm}$
Installation depth	$h_{nom} = 150 \text{ mm}$
Drilling method	Hammer drilling
Borehole cleaning	4 times blowing, 4 times brushing, 4 times blowing required activities according the given instruction in the approval No borehole cleaning required in case of using a hollow drill bit, e.g. fischer FHD.
Installation type	Push-through installation
Annular gap	Annular gap filled
Maximum torque	$T_{inst,max} = 60.0 \text{ Nm}$
Socket size	24 mm
Base plate thickness	$t = 15 \text{ mm}$
Total fixing thickness	$t_{fix} = 15 \text{ mm}$
$T_{fix,max}$	
Volume of resin per drill hole	20 ml/10 scale divisions



Base plate details

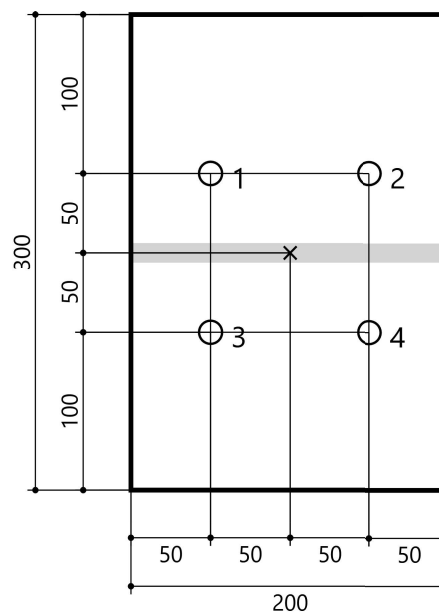
Base plate material Not available
Base plate thickness $t = 15 \text{ mm}$
Clearance hole in base plate $d_i = 20 \text{ mm}$

Attachment

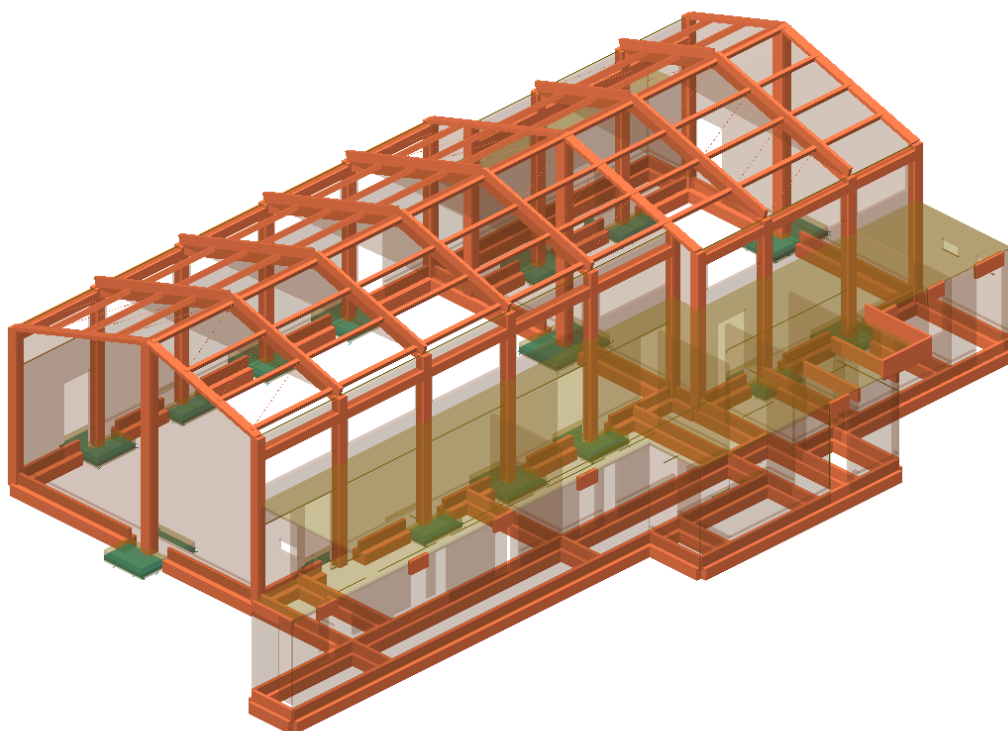
Profile type Rectangular (200 x 12 (S 235))

Anchor coordinates

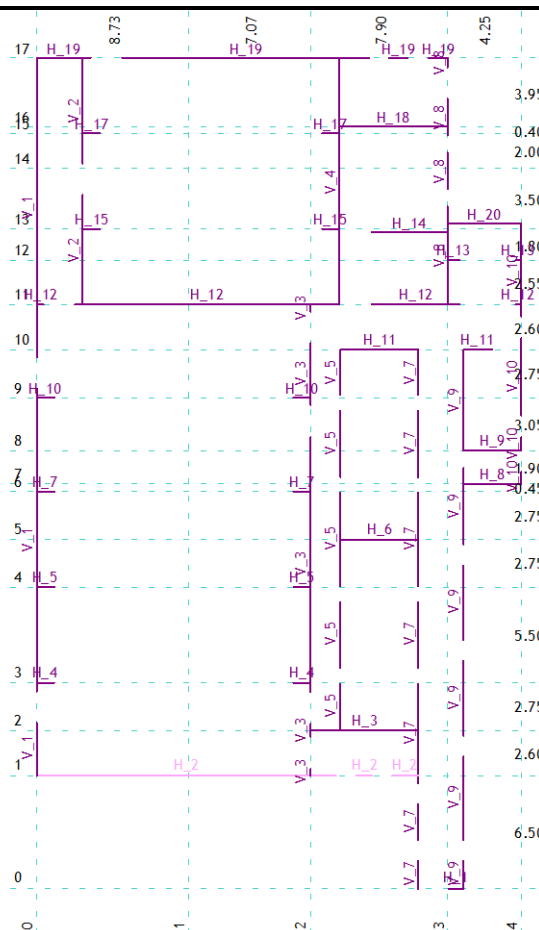
Anchor no.	x mm	y mm
1	-50	50
2	50	50
3	-50	-50
4	50	-50



GLOBALNI MODEL - Konstrukcija



Izometrija



Dispozicija okvira

Shema nivoa

Naziv	z [m]	h [m]
sljeme	10.19	1.94
vrh stupa 2L 7.75 +0.5	8.25	0.24
vrh stupa 1D	8.01	0.51
vrh stupa 2D 7+0.5	7.50	0.10

vrh stupa 1L	7.40	3.00
strop prizemlja	4.40	3.63
po	0.77	1.77
	-1.00	

Tabela materijala

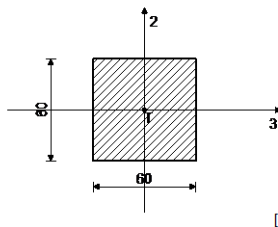
No	Naziv materijala	E[kN/m ²]	μ	γ[kN/m ³]	αt[1/C]	Em[kN/m ²]	μm
1	C 25/30	3.100e+7	0.20	25.00	1.000e-5	3.100e+7	0.20
2	Drvo-Četinari-Lamelirani	1.100e+7	0.20	0.00	1.000e-5	1.100e+7	0.20
3	Drvo-Četinari-Masivno	1.100e+7	0.20	5.00	1.000e-5	1.000e+7	0.20
4	Čelik	2.100e+8	0.30	0.00	1.000e-5	2.100e+8	0.30

Setovi ploča

No	d[m]	e[m]	Materijal	Tip proračuna	Ortotropija	E2[kN/m ²]	G[kN/m ²]	α
<1>	0.200	0.100	1	Tanka ploča	Izotropna			
<2>	0.200	0.100	1	Tanka ploča	Izotropna			
<3>	0.600	0.300	1	Tanka ploča	Izotropna			
<4>	0.220	0.110	2	Tanka ploča	Izotropna			

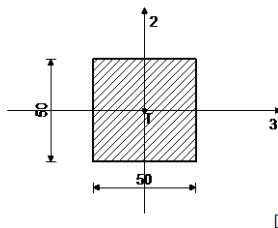
Setovi greda

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



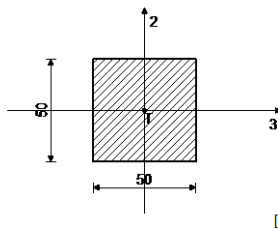
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	3.600e-1	3.000e-1	3.000e-1	1.825e-2	1.080e-2	1.080e-2

Set: 2 Presjek: b/d=50/50, Fiktivna ekscentričnost



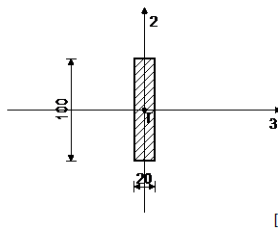
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	2.500e-1	2.083e-1	2.083e-1	8.802e-3	5.208e-3	5.208e-3

Set: 3 Presjek: b/d=50/50, Fiktivna ekscentričnost, greda



Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	2.500e-1	2.083e-1	2.083e-1	8.802e-3	5.208e-3	5.208e-3

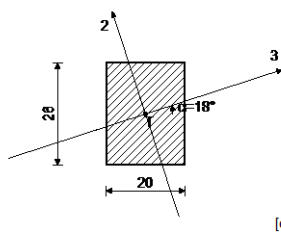
Set: 4 Presjek: b/d=20/100, Fiktivna ekscentričnost



Mat.	A1	A2	A3	I1	I2	I3
3 - Drvo-Četinari...	2.000e-1	1.667e-1	1.667e-1	2.331e-3	6.667e-4	1.667e-2

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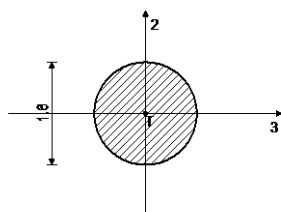
Set: 5 Presjek: b/d=20/26, Fiktivna ekscentričnost



[cm]

Mat.	A1	A2	A3	I1	I2	I3
3 - Drvo-Četinari...	5.200e-2	4.333e-2	4.333e-2	3.671e-4	1.848e-4	2.815e-4

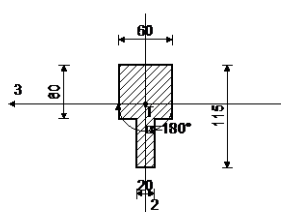
Set: 6 Presjek: D=d=1.6, Jednostavni štap, Fiktivna ekscentričnost



[cm]

Mat.	A1	A2	A3	I1	I2	I3
4 - Čelik	2.011e-4	1.810e-4	1.810e-4	6.434e-9	3.217e-9	3.217e-9

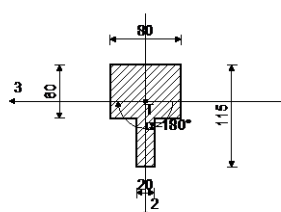
Set: 7 Presjek: T 60/115, Fiktivna ekscentričnost



[cm]

Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	4.700e-1	3.467e-1	4.178e-1	4.467e-2	1.117e-2	4.143e-2

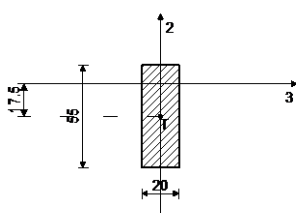
Set: 8 Presjek: T 80/115, Fiktivna ekscentričnost



[cm]

Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	5.900e-1	4.102e-1	5.120e-1	5.907e-2	2.597e-2	4.676e-2

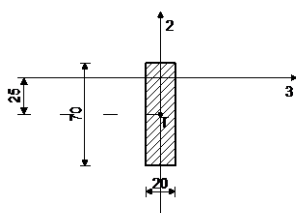
Set: 11 Presjek: b/d=20/55, Fiktivna ekscentričnost



[cm]

Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.100e-1	9.167e-2	9.167e-2	1.131e-3	3.667e-4	2.773e-3

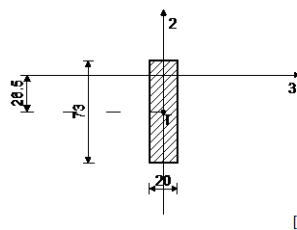
Set: 12 Presjek: b/d=20/70, Fiktivna ekscentričnost



[cm]

Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.400e-1	1.167e-1	1.167e-1	1.531e-3	4.667e-4	5.717e-3

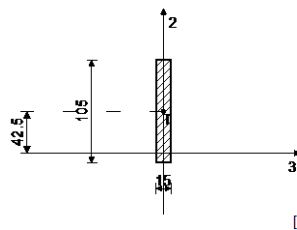
Set: 13 Presjek: b/d=20/73, Fiktivna ekscentričnost



[cm]

Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.460e-1	1.217e-1	1.217e-1	1.611e-3	4.867e-4	6.484e-3

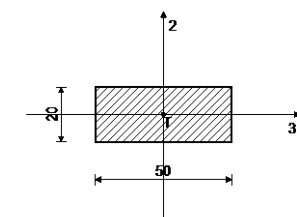
Set: 14 Presjek: b/d=15/105, Fiktivna ekscentričnost



[cm]

Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.575e-1	1.313e-1	1.313e-1	1.075e-3	2.953e-4	1.447e-2

Set: 15 Presjek: b/d=50/20, Fiktivna ekscentričnost



[cm]

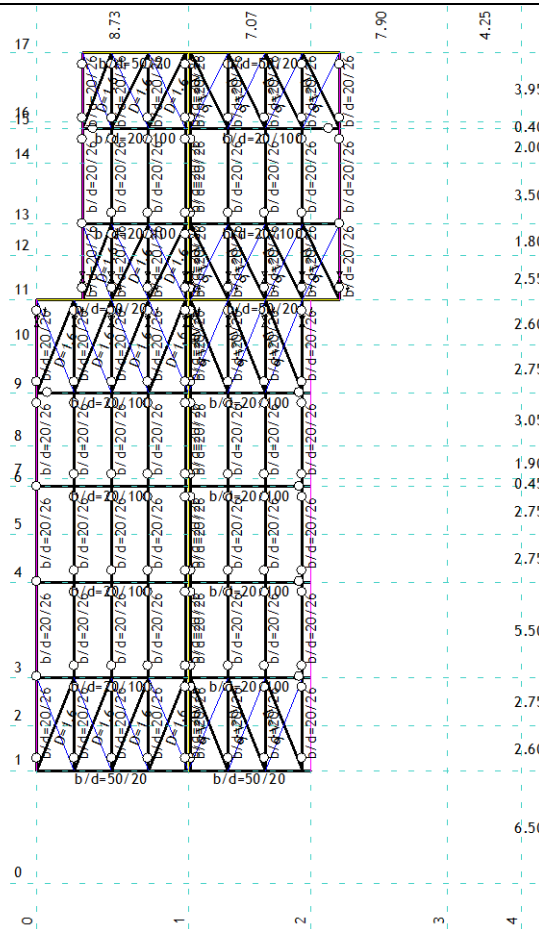
Mat.	A1	A2	A3	I1	I2	I3
1 - C 25/30	1.000e-1	8.333e-2	8.333e-2	9.981e-4	2.083e-3	3.333e-4

Setovi površinskih ležajeva

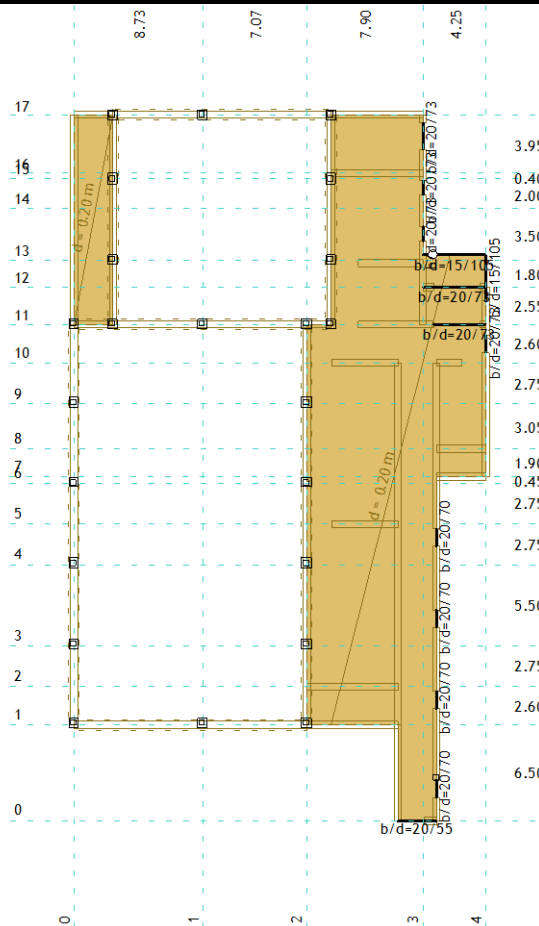
Set	K,R1	K,R2	K,R3
1	1.000e+10	1.000e+10	4.000e+3

Setovi linijskih ležajeva

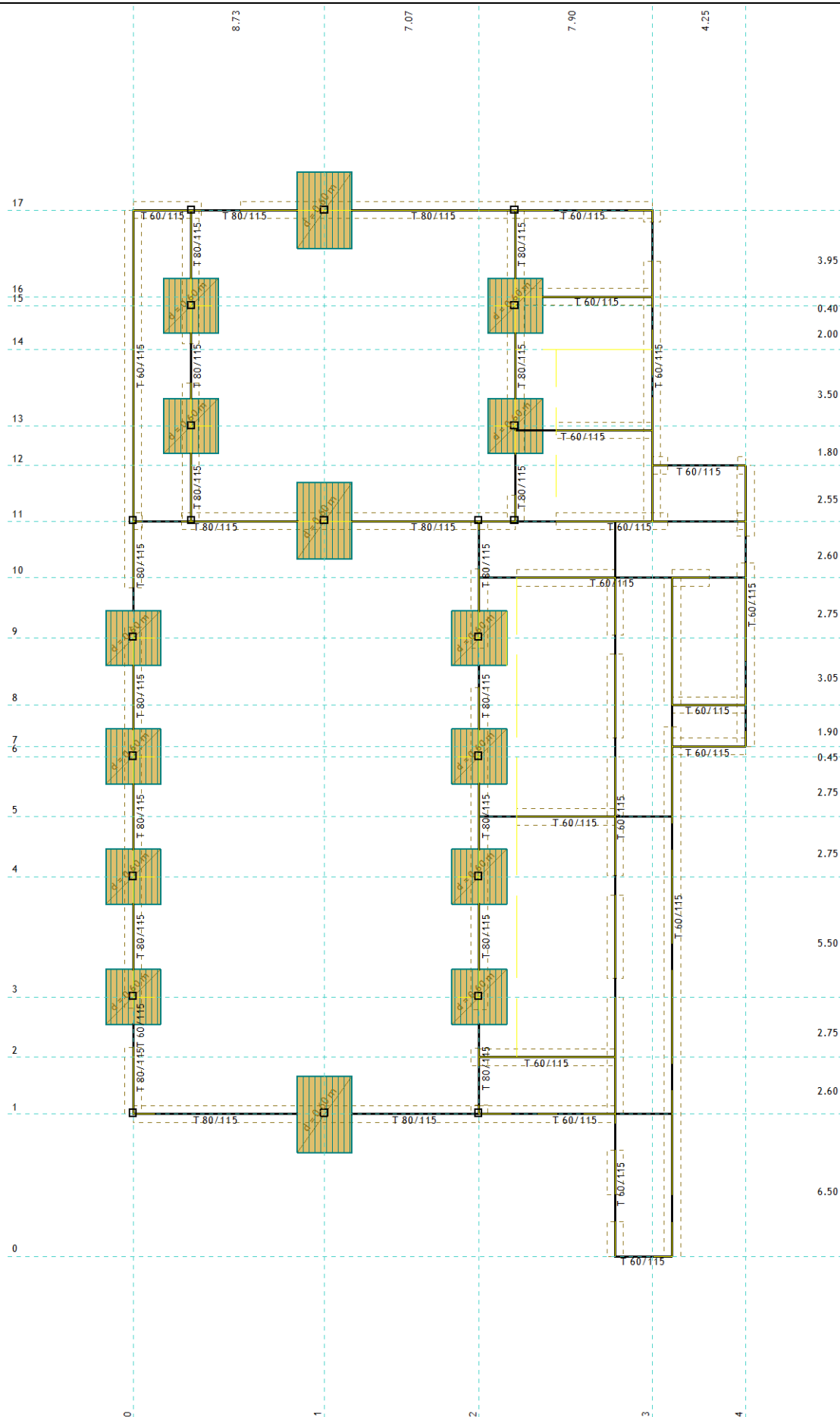
Set	K,R1	K,R2	K,R3	K,M1	Tlo [m]
1	1.000e+10	4.000e+3	1.000e+10		0.600
2	1.000e+10	4.000e+3	1.000e+10		0.800



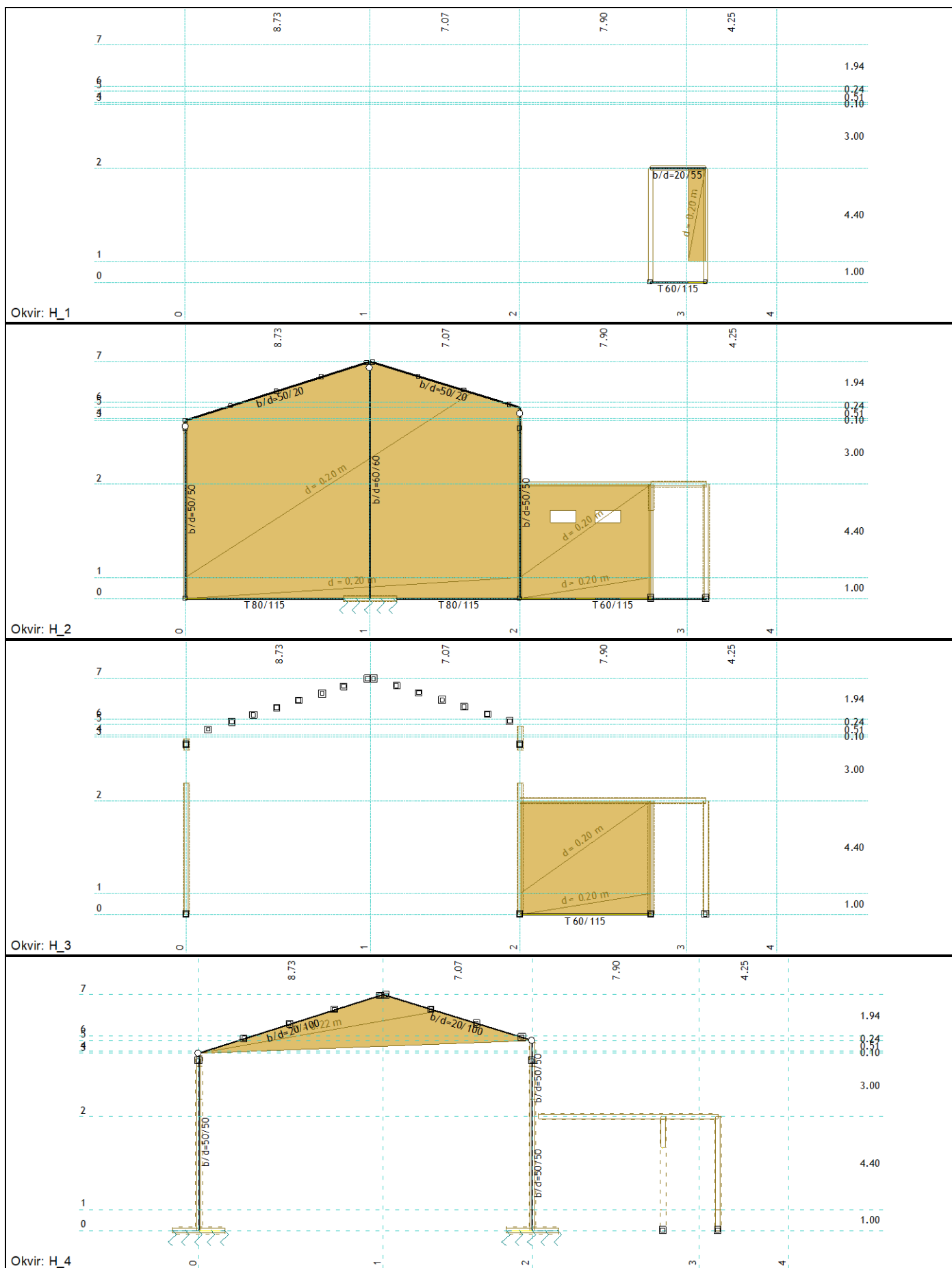
Pogled: k1+k2
Dispozicija presjeka

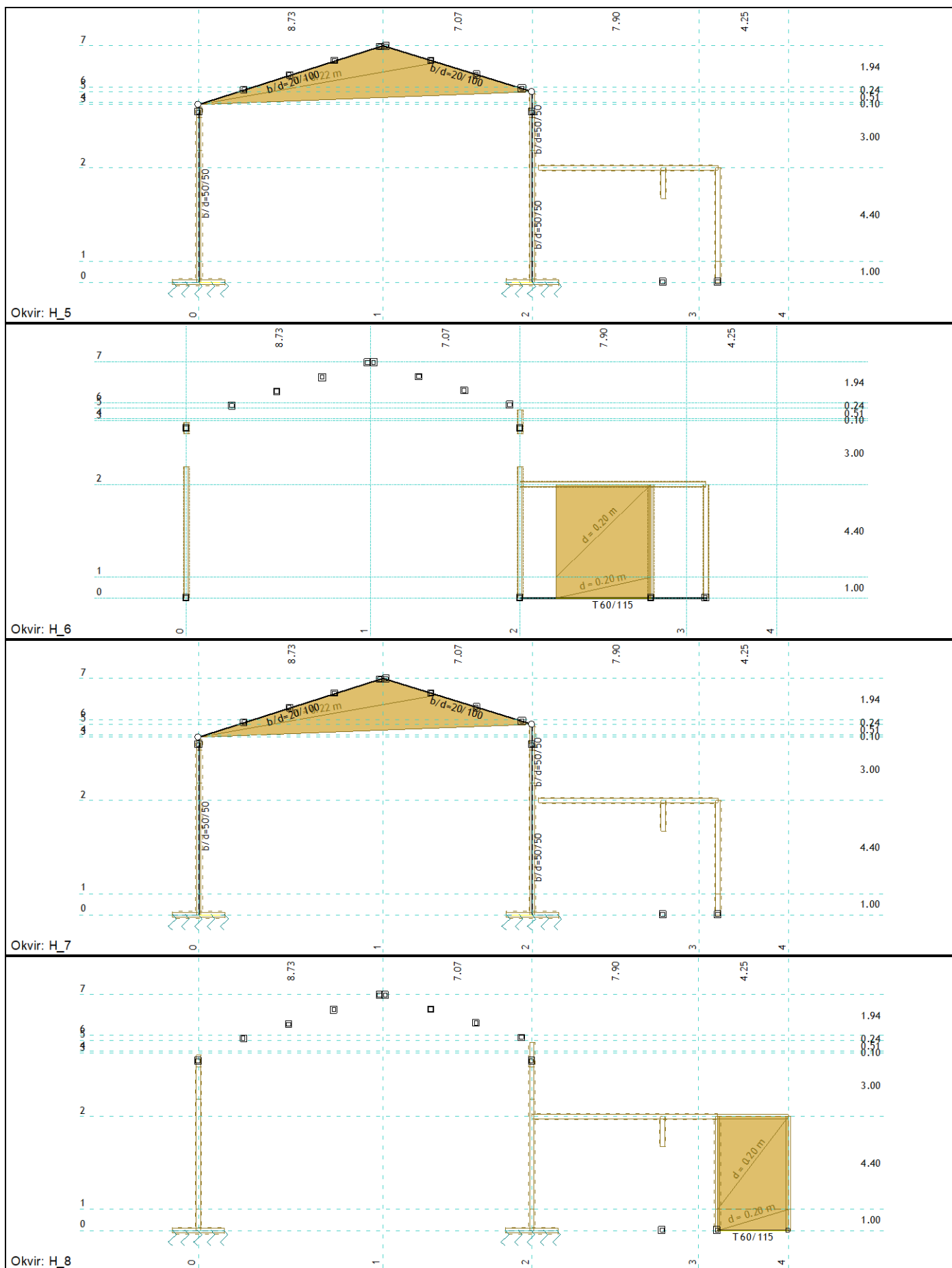


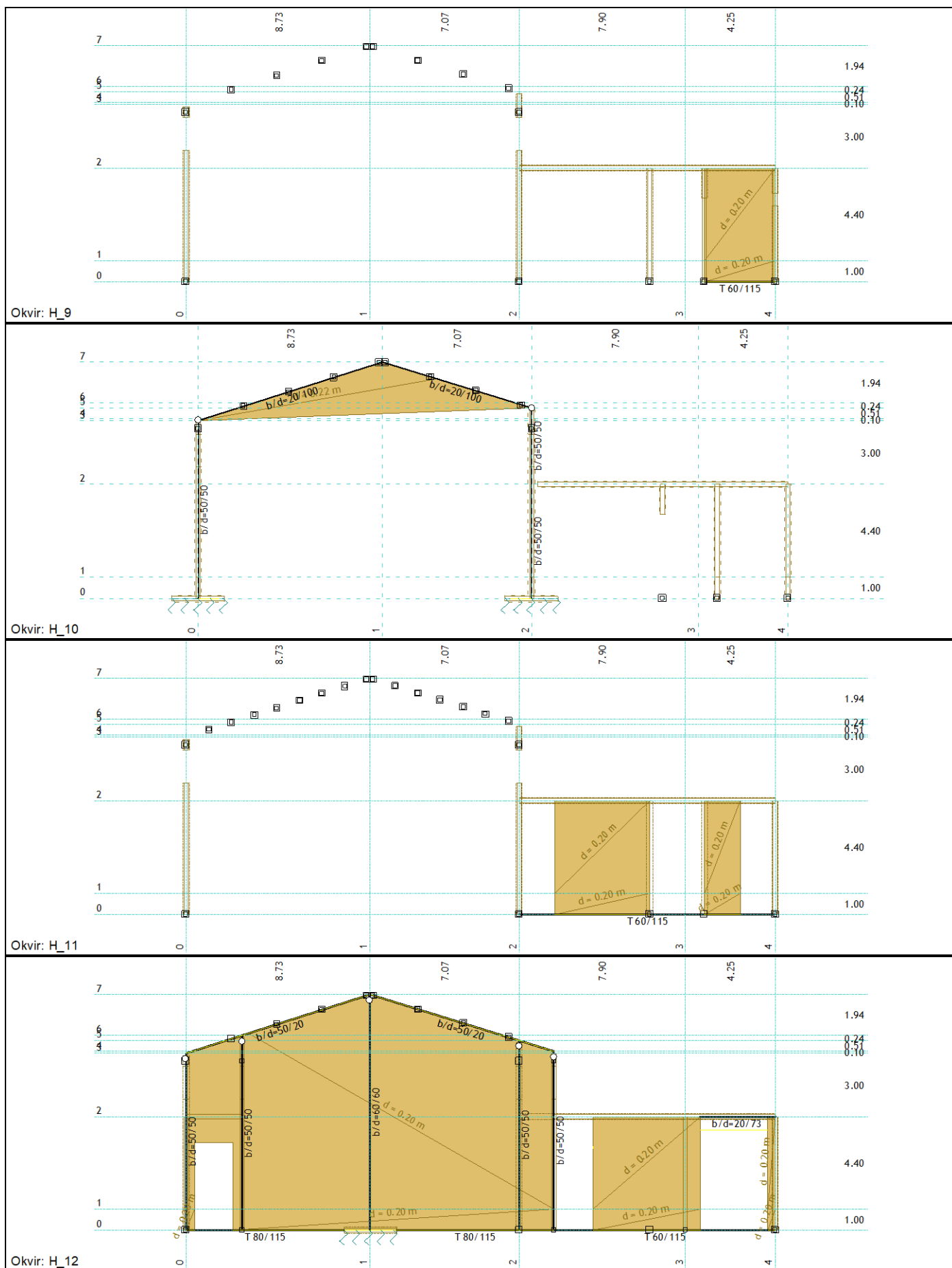
Nivo: strop prizemlja [4.40 m]

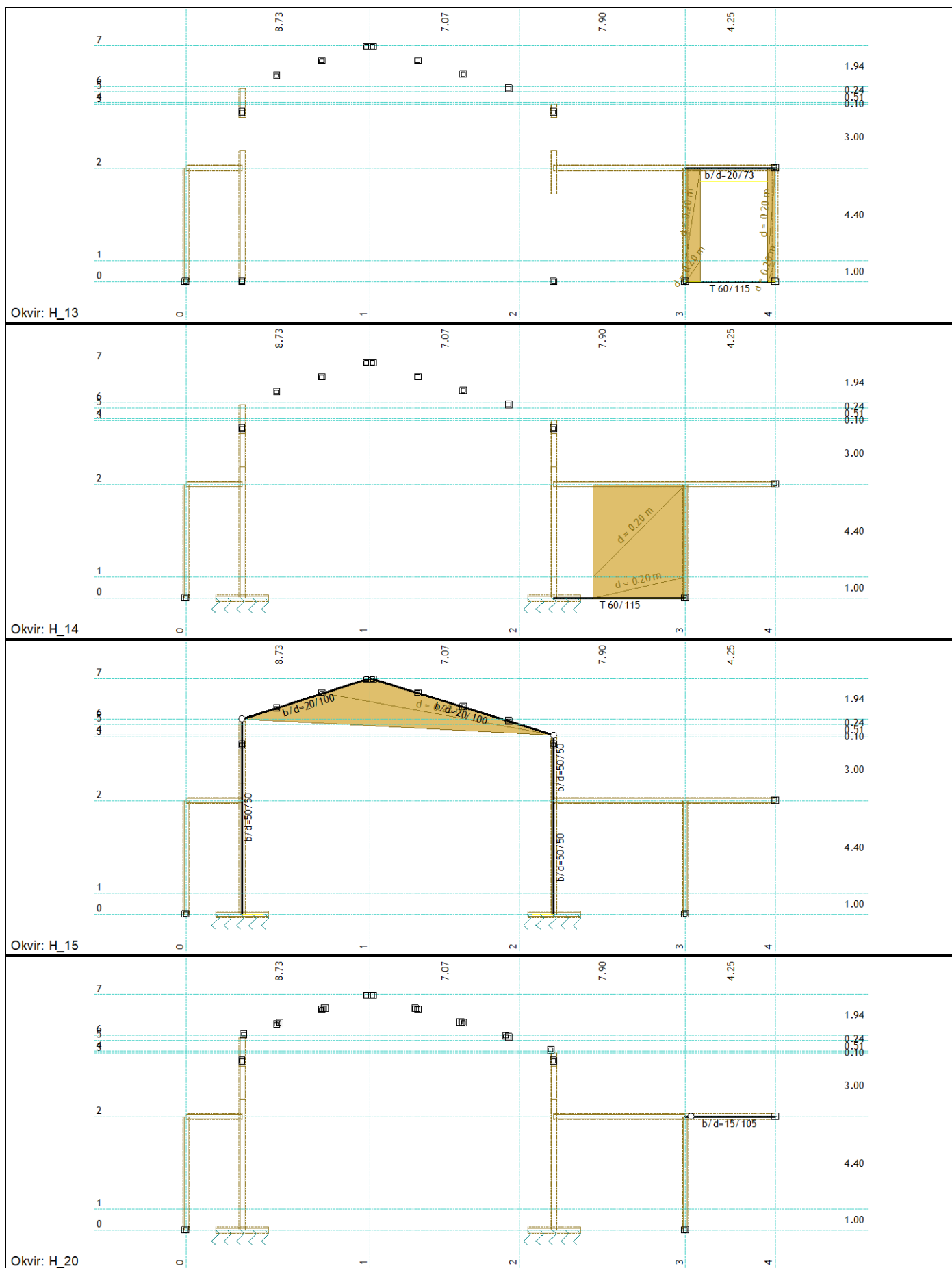


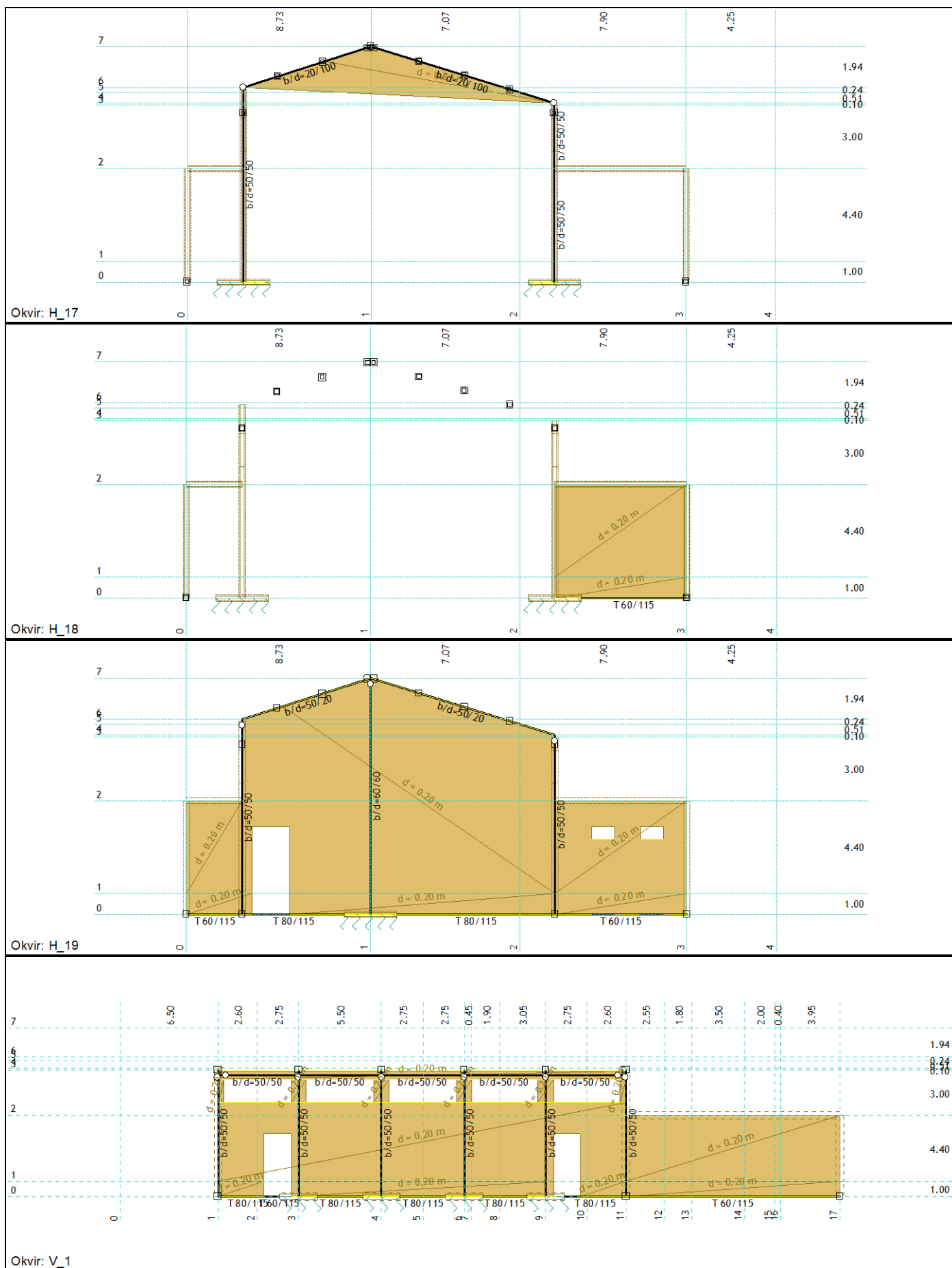
Nivo: [-1.00 m]

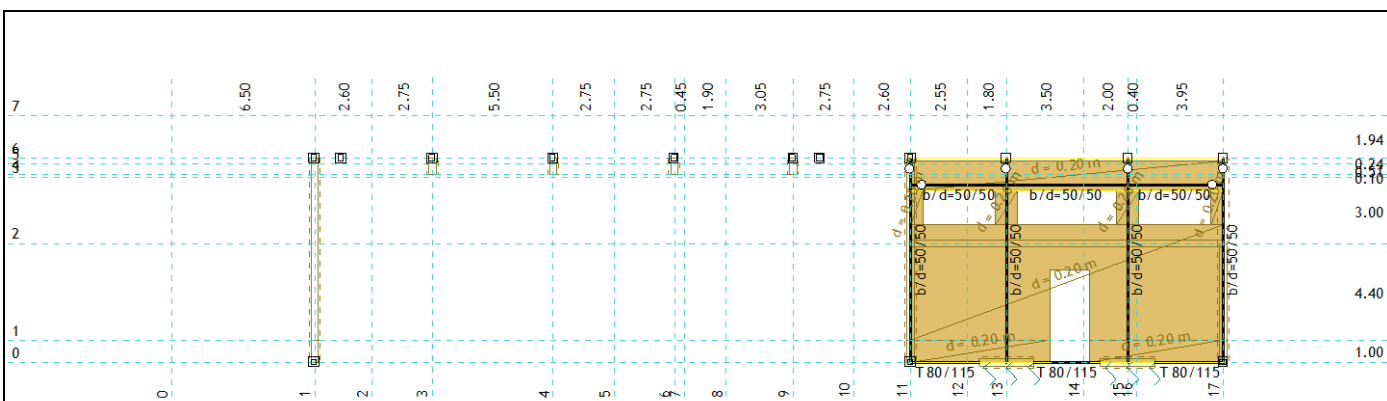




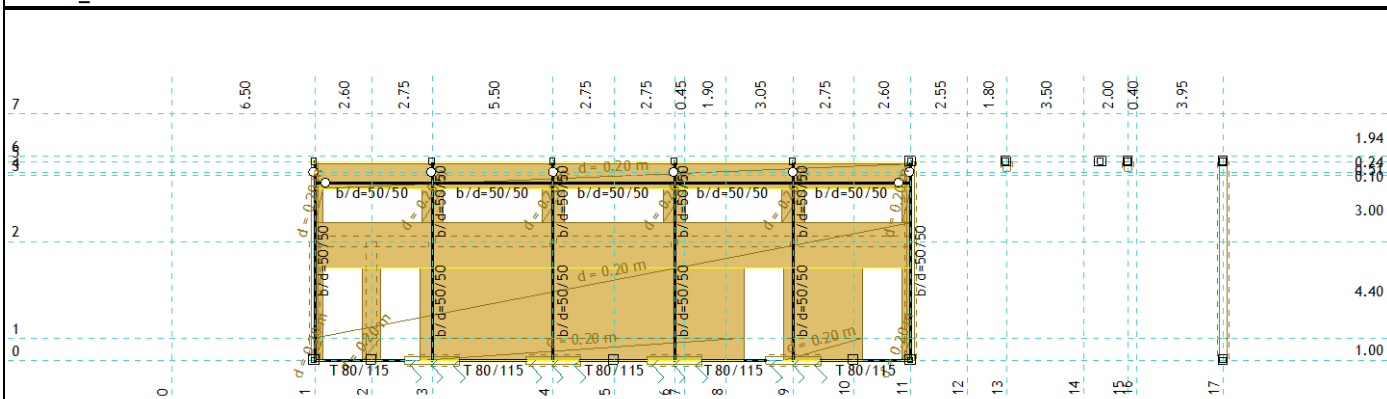




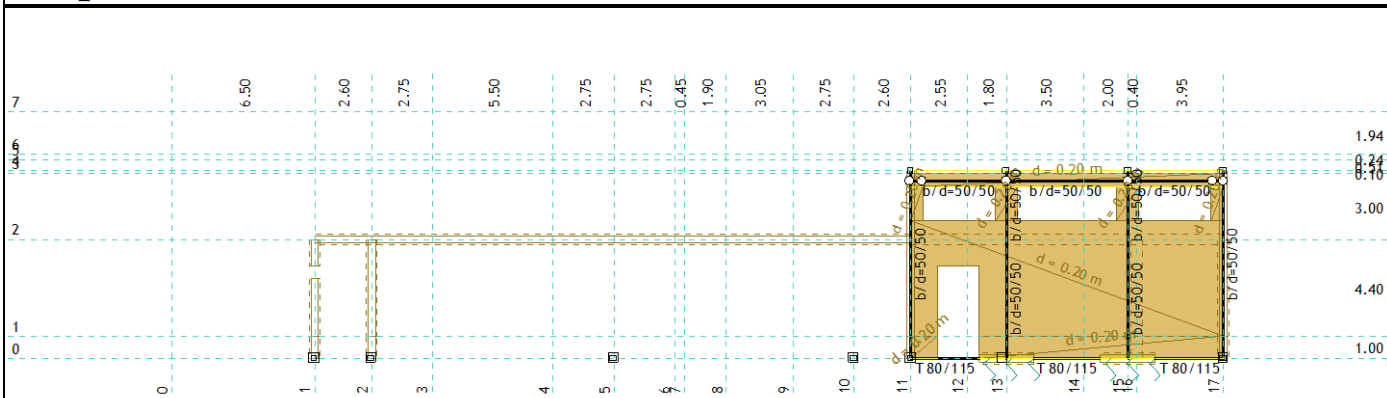




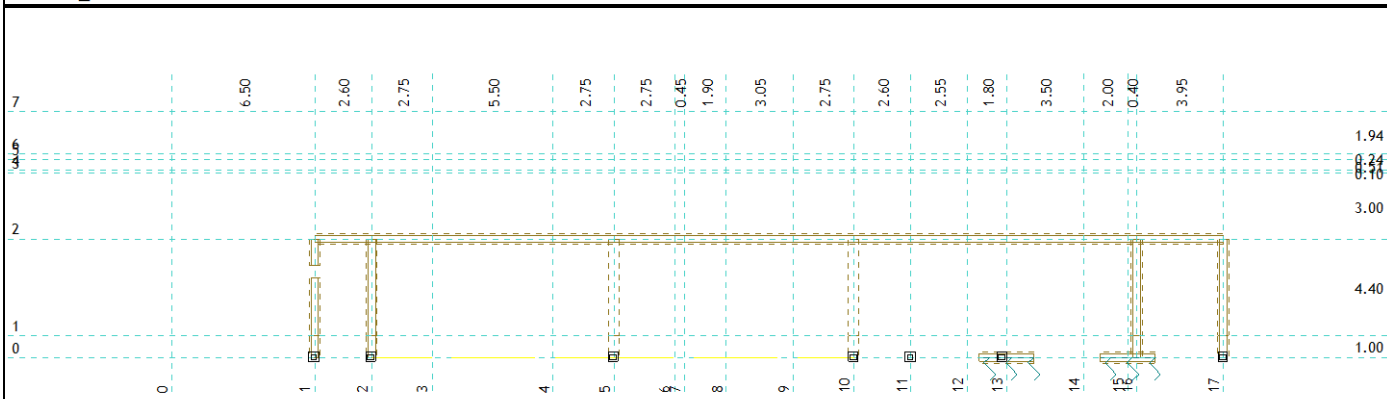
Okvir: V_2



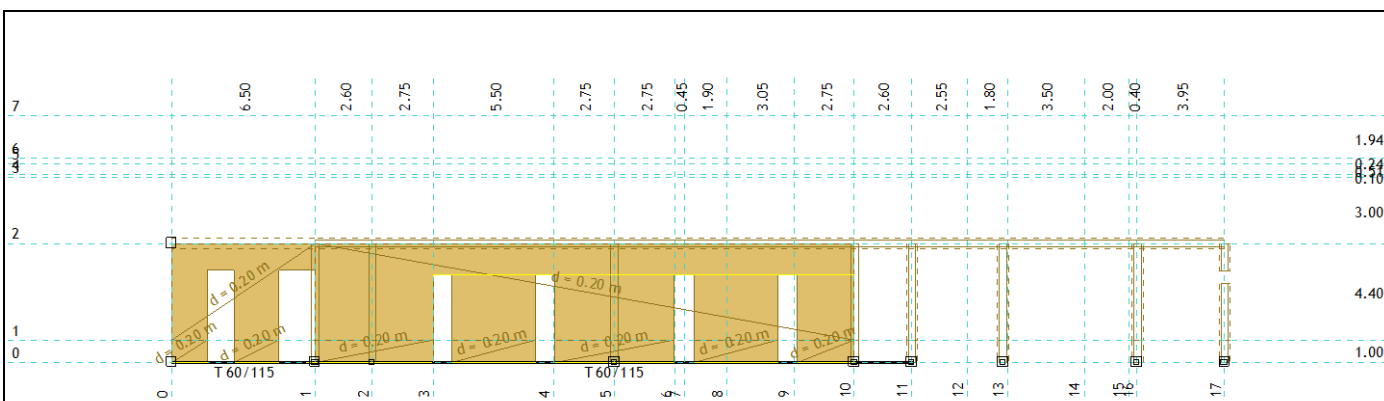
Okvir: V_3



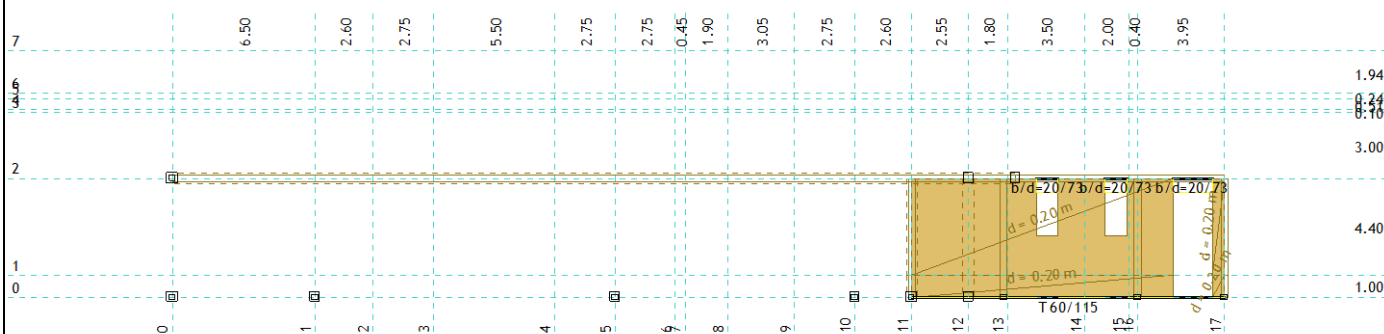
Okvir: V_4



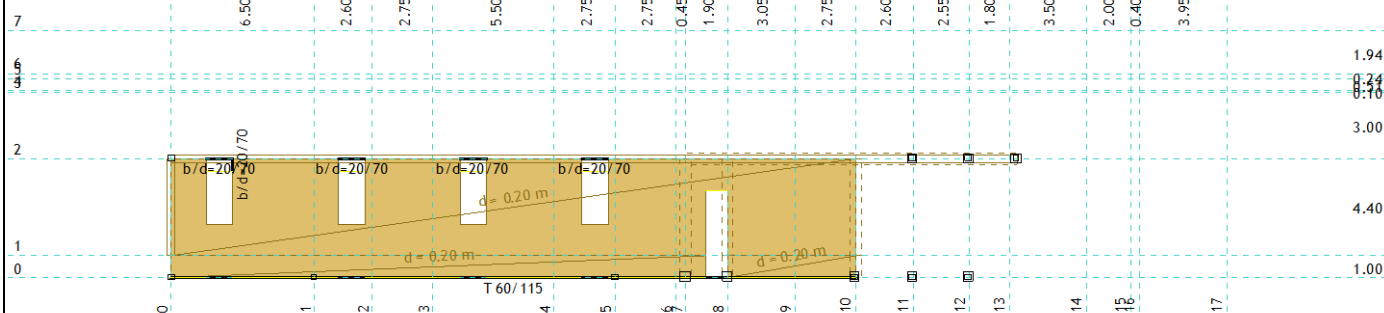
Okvir: V_5



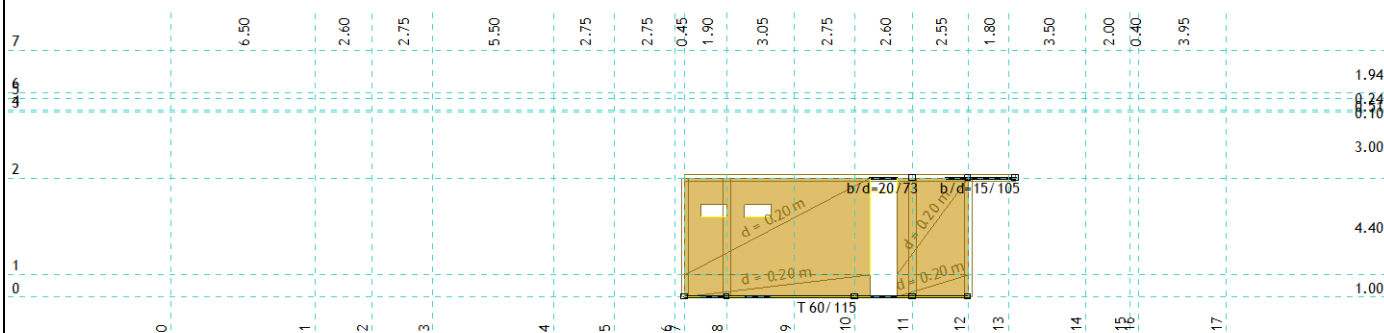
Okvir: V 7



Okvir: V_8



Okvir: V_9



Okvir: V_10

Ulazni podaci - Opterećenje

Lista slučajeva opterećenja

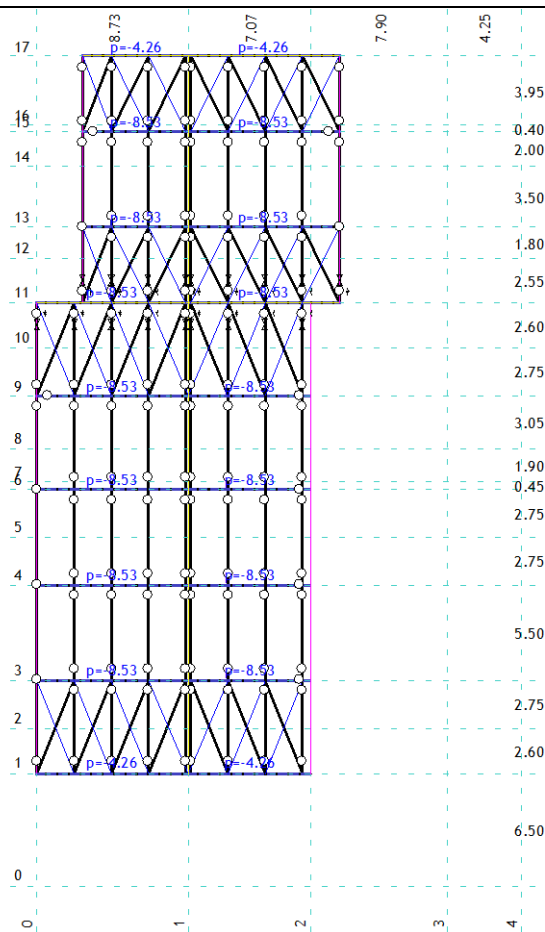
LC	Naziv	pX [kN]	pY [kN]	pZ [kN]
1	g (g)	0.00	0.00	-20392.8
2	s	0.00	0.00	-723.74
3	q	0.00	0.00	-872.48
4	Sx			
5	Sy			
6	Komb.: 1.35xI+1.5xII+1.05xIII	0.00	0.00	-29532.0
7	Komb.: 1.35xI+0.75xII+1.5xIII	0.00	0.00	-29381.8
8	Komb.: I+1.5xII+1.05xIII	0.00	0.00	-22394.5
9	Komb.: I+0.75xII+1.5xIII	0.00	0.00	-22244.3
10	Komb.: 1.35xI+1.5xIII	0.00	0.00	-28839.0
11	Komb.: 1.35xI+1.5xII	0.00	0.00	-28615.9
12	Komb.: I+1.5xIII	0.00	0.00	-21701.5
13	Komb.: I+1.5xII	0.00	0.00	-21478.4
14	Komb.: I+0.3xIII-1xIV			
15	Komb.: I+0.3xIII-1xV			
16	Komb.: I+0.3xIII+V			
17	Komb.: I+0.3xIII+IV			
18	Komb.: I-1xIV			
19	Komb.: I-1xV			
20	Komb.: I+V			
21	Komb.: I+IV			
22	Komb.: 1.35xI	0.00	0.00	-27530.3
23	Komb.: I	0.00	0.00	-20392.8

vjetar kao opterećenje se kontrolira u drugom modelu (s nel.vlačnim dijagonalama) , nakon čega se zaključuje kako je seizmičko opt.merodavno za dimenzioniranje.

Lista anvelopskih slučajeva opterećenja

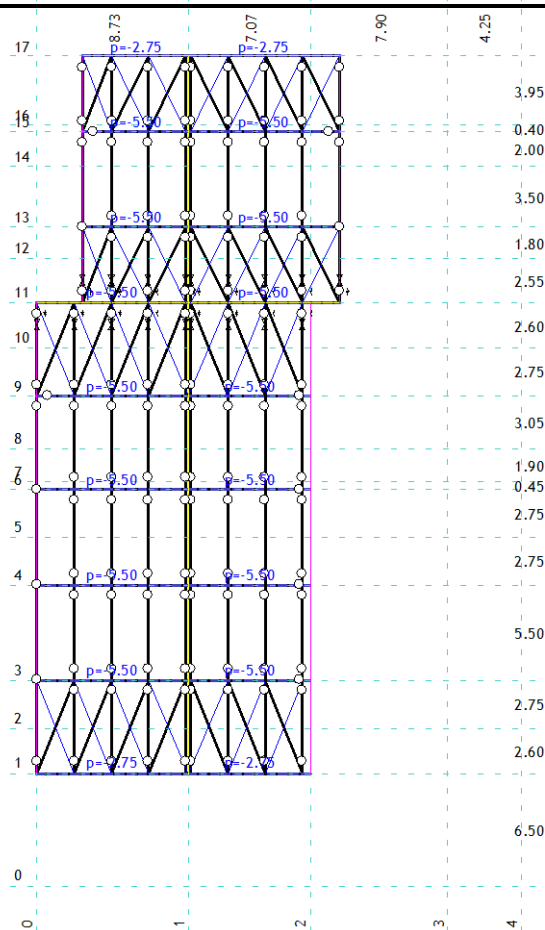
LC	Naziv
24	[seizm] 14-21

Opt. 1: g (g)



Pogled: k1+k2
Dispozicija presjeka

Opt. 2: s



Pogled: k1+k2
Dispozicija presjeka

Modalna analiza

Napredne opcije seizmičkog proračuna

Multiplikator krutosti ležajeva: 50.000
Sprječeno osciliranje u Z pravcu

Faktori opterećenja za proračun masa

No	Naziv	Koeficijent
1	g (g)	1.00
2	s	0.00
3	q	0.00

Raspored masa po visini objekta

Nivo	Z [m]	X [m]	Y [m]	Masa [T]	T/m²
sljeme	10.19	8.74	-19.73	62.99	
vrh stupa 2L 7.75 +0.5	8.25	9.02	-18.23	87.15	
vrh stupa 1D	8.01	10.47	-24.37	28.50	
vrh stupa 2D 7+0.5	7.50	7.10	-19.01	23.66	
vrh stupa 1L	7.40	8.68	-19.93	150.18	
strop prizemlja	4.40	16.76	-20.64	888.22	2.04
po	0.77	14.44	-21.06	446.37	
	-1.00	14.04	-20.85	592.15	5.85
Ukupno:	2.87	14.37	-20.64	2279.22	

Položaj centara krutosti po visini objekta (približna metoda)

Nivo	Z [m]	X [m]	Y [m]
sljeme	10.19	8.73	-20.08
vrh stupa 2L 7.75 +0.5	8.25	8.26	-19.53
vrh stupa 1D	8.01	2.67	-21.84
vrh stupa 2D 7+0.5	7.50	14.14	-18.78
vrh stupa 1L	7.40	14.34	-19.07
strop prizemlja	4.40	10.21	-19.10
po	0.77	16.34	-22.13
	-1.00	16.34	-22.11

Ekscentricitet po visini objekta (približna metoda)

Nivo	Z [m]	eox [m]	eoy [m]
sljeme	10.19	0.01	0.35
vrh stupa 2L 7.75 +0.5	8.25	0.75	1.30
vrh stupa 1D	8.01	7.80	2.53
vrh stupa 2D 7+0.5	7.50	7.04	0.23
vrh stupa 1L	7.40	5.66	0.87
strop prizemlja	4.40	6.56	1.54
po	0.77	1.90	1.07
	-1.00	2.31	1.26

Periodi osciliranja konstrukcije

No	T [s]	f [Hz]
1	0.3566	2.8039
2	0.3202	3.1226
3	0.2242	4.4611
4	0.1782	5.6131
5	0.1650	6.0588
6	0.1581	6.3247
7	0.1372	7.2869
8	0.1324	7.5501
9	0.1209	8.2723
10	0.1158	8.6335
11	0.1087	9.2036
12	0.1061	9.4222
13	0.1036	9.6533
14	0.1013	9.8760
15	0.0898	11.1381
16	0.0895	11.1750
17	0.0832	12.0177
18	0.0778	12.8593
19	0.0774	12.9243
20	0.0694	14.4108
21	0.0683	14.6465
22	0.0669	14.9381
23	0.0665	15.0461
24	0.0659	15.1843
25	0.0647	15.4614
26	0.0635	15.7544
27	0.0613	16.3140
28	0.0598	16.7103
29	0.0581	17.2118
30	0.0573	17.4616
31	0.0542	18.4640
32	0.0530	18.8851
33	0.0521	19.1855
34	0.0511	19.5562
35	0.0508	19.6866
36	0.0496	20.1579
37	0.0493	20.2695
38	0.0491	20.3839
39	0.0480	20.8209
40	0.0473	21.1531
41	0.0471	21.2295
42	0.0470	21.2912
43	0.0469	21.3105

44	0.0467	21.4203
45	0.0460	21.7511
46	0.0457	21.8848
47	0.0456	21.9526
48	0.0453	22.0548
49	0.0444	22.5339
50	0.0442	22.6017
51	0.0436	22.9183
52	0.0430	23.2515
53	0.0425	23.5528
54	0.0423	23.6517
55	0.0421	23.7709
56	0.0418	23.9190
57	0.0417	23.9764
58	0.0410	24.3703
59	0.0408	24.5169
60	0.0407	24.5946
61	0.0400	25.0068
62	0.0399	25.0814
63	0.0397	25.1983
64	0.0396	25.2502
65	0.0394	25.3519
66	0.0393	25.4596
67	0.0391	25.5940
68	0.0390	25.6445
69	0.0388	25.7779
70	0.0385	25.9835
71	0.0381	26.2185
72	0.0379	26.4028
73	0.0376	26.5779
74	0.0374	26.7586
75	0.0371	26.9391
76	0.0369	27.0652
77	0.0366	27.3286
78	0.0365	27.4148
79	0.0359	27.8872
80	0.0358	27.9072
81	0.0356	28.1154
82	0.0350	28.5399
83	0.0349	28.6388
84	0.0347	28.7960
85	0.0345	28.9664
86	0.0341	29.3303

87	0.0339	29.4809
88	0.0335	29.8562
89	0.0334	29.9483
90	0.0333	30.0215
91	0.0331	30.2307
92	0.0330	30.2733
93	0.0328	30.4655
94	0.0327	30.5676
95	0.0327	30.5759
96	0.0326	30.6774
97	0.0325	30.8135
98	0.0324	30.8782
99	0.0322	31.0507
100	0.0319	31.3137

Seizmički proračun

Seizmički proračun: EC8 (HRN EN 1998-1:2011)

Razred tla:	C
Razred važnosti:	III ($\gamma=1.2$)
Odnos $a_g/R/g$:	0.160
Postotak viskoznog prigušenja ζ :	5%

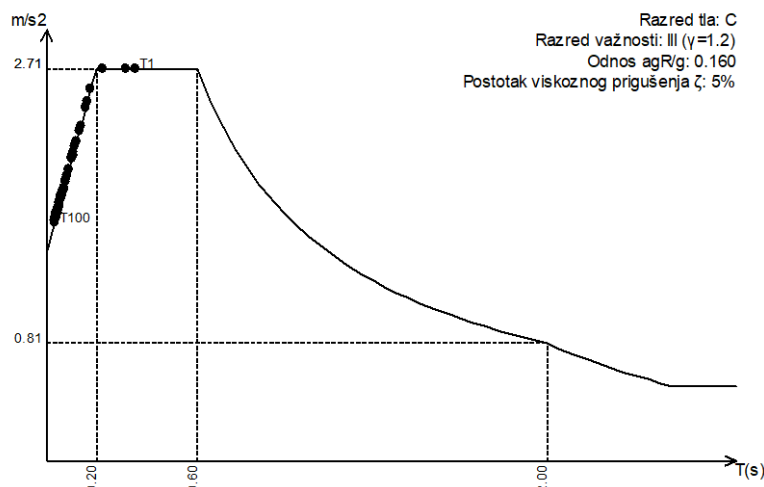
Faktori pravca potresa:

Slučaj opterećenja	Kut α [°]	k_α	$k_{\alpha+90^\circ}$	k_z	Faktor P.
Sx	0	1.000	0.300	0.000	2.000
Sy	90	1.000	0.300	0.000	2.000

Tip spektra

Slučaj opterećenja	S	Tb	Tc	Td	avg/ag
Sx	1.150	0.200	0.600	2.000	1.000
Sy	1.150	0.200	0.600	2.000	1.000

Projektni spektar



S=1.15, Tb=0.20, Tc=0.60, Td=2.00

Raspored seizmičkih sila po visini objekta - Sx

Nivo	Z [m]	Ton 1			Ton 2			Ton 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-1.52	57.65	-0.29	79.42	15.12	5.22	-0.00	-0.01	0.00
vrh stupa 2L 7.75 +0.5	8.25	-1.88	38.70	-0.27	97.49	9.22	4.56	-0.00	-0.00	0.00
vrh stupa 1D	8.01	-0.68	6.58	-0.02	37.39	1.00	0.58	0.00	0.01	0.00
vrh stupa 2D 7+0.5	7.50	-0.29	5.70	-0.01	15.12	1.18	0.32	0.00	0.00	0.00
vrh stupa 1L	7.40	-2.76	14.37	-0.01	143.67	3.76	0.30	0.00	0.00	0.00
strop prizemlja	4.40	-1.26	19.75	-0.00	82.09	5.65	-0.27	-0.00	-0.00	-0.00
po	0.77	-0.26	3.46	0.01	16.18	1.03	-0.06	0.00	0.00	-0.00
	-1.00	-0.00	0.00	0.00	0.00	0.00	-0.10	0.00	0.00	-0.00
	Σ	-8.65	146.20	-0.59	471.37	36.95	10.57	0.01	-0.00	-0.00

Nivo	Z [m]	Ton 4			Ton 5			Ton 6		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	42.03	0.25	4.38	0.07	0.30	0.07	7.02	0.88	0.33
vrh stupa 2L 7.75 +0.5	8.25	65.72	0.10	4.54	0.08	0.75	0.06	8.56	-0.98	0.27
vrh stupa 1D	8.01	7.75	-0.01	0.40	0.04	-0.50	0.01	3.68	-0.16	0.01
vrh stupa 2D 7+0.5	7.50	6.81	-0.03	0.07	0.02	0.02	0.00	1.43	-0.31	0.02
vrh stupa 1L	7.40	65.60	0.23	0.45	0.17	0.38	-0.00	15.58	-0.34	0.12
strop prizemlja	4.40	24.11	0.84	-2.02	0.06	0.53	-0.00	10.96	-0.67	-0.32
po	0.77	-1.04	0.09	-0.38	0.02	-0.04	-0.00	1.70	-0.01	-0.01
	-1.00	0.00	-0.00	-0.24	0.00	0.00	-0.00	0.00	-0.00	-0.03
	Σ	210.98	1.47	7.20	0.44	1.44	0.13	48.95	-1.59	0.38

Nivo	Z [m]	Ton 7			Ton 8			Ton 9		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.28	-5.84	0.06	0.02	0.23	0.00	0.02	-7.76	0.19
vrh stupa 2L 7.75 +0.5	8.25	0.33	-0.33	0.04	0.03	0.08	0.00	0.02	-2.20	0.17
vrh stupa 1D	8.01	0.15	0.62	0.02	0.01	0.07	0.00	-0.01	0.92	0.02
vrh stupa 2D 7+0.5	7.50	0.06	1.16	0.01	0.00	0.02	0.00	0.01	1.00	0.01
vrh stupa 1L	7.40	0.63	3.74	0.02	0.05	-0.12	-0.00	0.02	5.75	0.01
strop prizemlja	4.40	0.81	11.58	-0.05	0.02	-0.48	-0.00	-0.46	18.63	0.00
po	0.77	0.18	3.71	-0.01	0.01	-0.16	0.00	-0.04	5.87	0.01
	-1.00	0.00	0.00	-0.01	0.00	-0.00	-0.00	-0.00	0.00	0.00
	Σ	2.44	14.65	0.09	0.14	-0.36	0.00	-0.43	22.21	0.42

Nivo	Z [m]	Ton 10			Ton 11			Ton 12		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.00	-0.00	-0.00	0.05	-0.26	0.02	0.04	-1.26	-0.09
vrh stupa 2L 7.75 +0.5	8.25	0.00	-0.03	-0.00	0.07	1.81	0.01	0.06	-0.58	-0.08
vrh stupa 1D	8.01	0.00	-0.01	-0.00	0.01	0.38	-0.00	0.02	0.20	-0.01
vrh stupa 2D 7+0.5	7.50	0.00	-0.00	-0.00	0.01	0.09	-0.00	0.00	0.10	-0.01
vrh stupa 1L	7.40	0.01	0.01	-0.00	0.10	-0.19	0.00	0.04	0.62	-0.01
strop prizemlja	4.40	0.00	0.04	0.00	-0.01	-1.03	0.00	-0.18	2.70	-0.00
po	0.77	-0.01	0.01	0.00	0.04	-0.35	-0.00	-0.06	0.79	-0.00

	-1.00	-0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00
	Σ=	0.00	0.03	-0.01	0.27	0.43	0.03	-0.09	2.57	-0.21

Nivo	Z [m]	Ton 13			Ton 14			Ton 15		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.03	0.06	0.03	-5.76	-0.00	5.54	0.00	-0.01	0.00
vrh stupa 2L 7.75 +0.5	8.25	0.05	-0.09	0.03	-7.48	-0.30	4.88	0.00	-0.03	0.00
vrh stupa 1D	8.01	-0.00	-0.02	0.00	-3.13	-0.03	0.75	0.00	0.01	0.00
vrh stupa 2D 7+0.5	7.50	0.00	-0.01	0.00	-0.87	-0.01	0.40	0.00	0.00	0.00
vrh stupa 1L	7.40	0.03	-0.01	0.00	-4.28	0.02	-0.06	0.01	0.01	0.00
strop prizemlja	4.40	-0.02	-0.04	-0.00	24.12	0.11	0.15	0.01	-0.01	-0.00
po	0.77	0.03	-0.01	-0.00	19.99	0.03	0.02	0.00	-0.01	-0.00
	-1.00	0.00	-0.00	-0.00	0.00	-0.00	0.02	0.00	-0.00	-0.00
	Σ=	0.12	-0.11	0.06	22.57	-0.19	11.71	0.02	-0.05	0.01

Nivo	Z [m]	Ton 16			Ton 17			Ton 18		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.01	-0.07	-0.01	0.05	-10.66	-0.11	-0.21	-0.02	0.29
vrh stupa 2L 7.75 +0.5	8.25	0.01	-0.04	-0.01	0.04	20.26	-0.13	-0.28	-0.18	0.25
vrh stupa 1D	8.01	0.01	0.06	0.00	0.09	4.48	0.02	-0.14	-0.02	0.04
vrh stupa 2D 7+0.5	7.50	0.00	0.03	-0.00	0.03	2.62	0.00	-0.03	-0.01	0.02
vrh stupa 1L	7.40	0.02	0.06	-0.00	0.29	4.08	0.03	-0.21	-0.02	-0.00
strop prizemlja	4.40	0.07	-0.02	0.00	3.85	3.96	-0.14	0.97	-0.12	0.02
po	0.77	-0.01	-0.07	-0.00	0.70	0.04	-0.00	0.45	-0.06	0.00
	-1.00	0.00	-0.00	-0.00	0.00	0.00	-0.02	0.00	-0.00	0.00
	Σ=	0.11	-0.06	-0.01	5.04	24.79	-0.35	0.56	-0.44	0.62

Nivo	Z [m]	Ton 19			Ton 20			Ton 21		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.12	0.32	0.13	-0.42	-7.78	-1.46	-0.58	13.31	-6.27
vrh stupa 2L 7.75 +0.5	8.25	-0.16	0.87	0.12	-0.68	17.97	-1.24	-0.21	-35.48	-3.50
vrh stupa 1D	8.01	-0.07	0.12	0.03	0.21	1.05	0.22	2.87	-3.38	0.51
vrh stupa 2D 7+0.5	7.50	-0.02	0.05	0.02	-0.07	0.85	0.11	2.60	-1.65	0.81
vrh stupa 1L	7.40	-0.17	0.11	0.00	0.69	5.53	1.17	26.50	-10.98	8.98
strop prizemlja	4.40	0.63	0.89	-0.00	58.93	5.75	-1.84	703.14	-24.84	-20.60
po	0.77	0.20	0.42	0.00	14.69	0.05	-0.32	244.53	-2.55	-4.06
	-1.00	0.00	0.00	0.00	0.00	0.00	-0.33	0.00	-0.00	-3.82
	Σ=	0.28	2.78	0.30	73.35	23.41	-3.69	978.84	-65.58	-27.95

Nivo	Z [m]	Ton 22			Ton 23			Ton 24		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.06	0.01	-0.10	0.09	-7.74	1.04	0.08	2.98	2.50
vrh stupa 2L 7.75 +0.5	8.25	0.09	0.00	-0.08	0.27	29.34	0.91	0.59	-10.93	2.49
vrh stupa 1D	8.01	0.04	-0.01	-0.02	0.32	1.94	0.13	0.19	-0.41	-0.07
vrh stupa 2D 7+0.5	7.50	0.02	-0.00	-0.01	0.62	1.11	0.02	1.12	-0.76	0.06
vrh stupa 1L	7.40	0.17	-0.00	-0.00	3.78	9.94	0.44	7.11	-2.52	0.23
strop prizemlja	4.40	0.33	-0.04	-0.04	49.39	20.39	-1.79	72.71	0.12	-1.99
po	0.77	0.51	-0.01	-0.01	26.47	2.99	-0.67	36.38	0.73	-0.54
	-1.00	0.00	-0.00	-0.00	0.00	0.00	-0.35	0.00	-0.00	-0.28
	Σ=	1.21	-0.04	-0.26	80.94	57.98	-0.27	118.19	-10.79	2.40

Nivo	Z [m]	Ton 25			Ton 26			Ton 27		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.09	0.61	-1.46	0.31	2.16	-8.51	-0.01	-2.70	-0.26
vrh stupa 2L 7.75 +0.5	8.25	-0.18	-0.57	-1.26	0.18	-0.83	-6.73	-0.03	3.21	-0.22
vrh stupa 1D	8.01	0.19	-0.11	-0.11	2.41	-0.82	-0.14	0.05	0.70	-0.02
vrh stupa 2D 7+0.5	7.50	-0.00	-0.19	-0.06	1.18	-0.29	0.17	0.02	0.50	0.00
vrh stupa 1L	7.40	1.01	0.94	0.18	13.93	2.52	4.48	0.19	0.01	0.03
strop prizemlja	4.40	14.83	8.00	-0.67	314.07	16.00	-13.65	5.72	-5.40	-0.23
po	0.77	4.30	1.89	-0.17	-15.01	4.04	-0.90	1.31	-2.87	-0.02
	-1.00	0.00	0.00	-0.03	0.00	0.00	-1.55	0.00	-0.00	-0.02
	Σ=	20.06	10.57	-3.60	317.06	22.78	-26.82	7.26	-6.54	-0.74

Nivo	Z [m]	Ton 28			Ton 29			Ton 30		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.01	0.33	-0.16	0.07	0.06	0.28	-0.00	-0.23	-0.03
vrh stupa 2L 7.75 +0.5	8.25	0.00	-1.17	-0.13	0.08	-0.25	0.25	-0.00	0.82	-0.03
vrh stupa 1D	8.01	0.01	0.17	-0.01	0.03	0.14	0.03	-0.01	-0.51	-0.01
vrh stupa 2D 7+0.5	7.50	-0.00	0.35	-0.00	0.06	0.12	0.02	-0.00	-0.37	-0.00
vrh stupa 1L	7.40	0.01	0.26	0.02	0.54	0.12	0.01	-0.01	-0.20	-0.01
strop prizemlja	4.40	0.43	0.40	-0.06	0.45	-0.15	0.00	0.11	0.25	0.03
po	0.77	0.15	0.05	-0.00	0.30	-0.03	0.00	0.07	0.13	0.00
	-1.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	-0.00	0.00
	Σ=	0.59	0.40	-0.35	1.53	0.01	0.60	0.17	-0.10	-0.05

Nivo	Z [m]	Ton 31			Ton 32			Ton 33		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.04	0.03	-0.08	0.31	0.82	5.27	0.69	-0.75	5.86
vrh stupa 2L 7.75 +0.5	8.25	0.07	-0.14	-0.05	1.55	-6.21	4.98	2.26	3.17	5.48
vrh stupa 1D	8.01	0.05	0.13	-0.01	-0.31	-0.27	0.10	0.09	1.98	0.11
vrh stupa 2D 7+0.5	7.50	0.05	0.07	0.00	0.87	-0.67	0.02	1.26	0.21	0.05
vrh stupa 1L	7.40	0.38	0.28	0.06	5.28	0.56	0.02	7.43	-3.15	0.08
strop prizemlja	4.40	4.11	1.20	-0.57	33.42	3.03	-0.88	45.99	-2.93	-1.46
po	0.77	1.98	0.23	-0.13	-3.14	-3.13	-0.71	-1.69	3.24	-0.86
	-1.00	0.00	0.00	-0.04	0.00	-0.00	-0.29	0.00	-0.00	-0.40
	Σ=	6.69	1.81	-0.81	37.98	-5.88	8.49	56.03	1.76	8.85

Nivo	Z [m]	Ton 34			Ton 35			Ton 36		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.01	-0.05	-0.38	-0.00	0.01	-0.00	0.29	1.26	1.06
vrh stupa 2L 7.75 +0.5	8.25	0.04	0.13	-0.31	-0.00	-0.00	-0.00	0.45	2.41	0.91
vrh stupa 1D	8.01	0.08	-0.04	-0.02	0.00	-0.00	-0.00	0.31	-1.21	0.04
vrh stupa 2D 7+0.5	7.50	0.01	-0.00	-0.01	-0.00	-0.00	-0.00	0.31	-0.61	-0.00
vrh stupa 1L	7.40	0.34	0.01	0.12	-0.00	-0.01	-0.00	1.58	-2.21	0.01

strop prizemlja	4.40	4.15	0.00	-0.67	-0.00	0.01	-0.00	3.88	2.44	0.78
po	0.77	-2.41	-0.03	-0.03	-0.00	0.02	0.00	-0.68	5.89	0.02
	-1.00	0.00	0.00	-0.04	-0.00	0.00	0.00	0.00	0.00	-0.02
	Σ=	2.22	0.03	-1.34	-0.00	0.01	-0.00	6.14	7.98	2.80

Nivo	Z [m]	Ton 37			Ton 38			Ton 39		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.34	-1.06	1.62	0.00	-0.01	0.02	-0.01	-0.06	-0.00
vrh stupa 2L 7.75 +0.5	8.25	0.19	1.48	1.34	0.00	0.02	0.02	0.06	0.36	0.00
vrh stupa 1D	8.01	0.24	0.96	0.18	0.00	-0.00	0.00	0.03	0.01	-0.02
vrh stupa 2D 7+0.5	7.50	0.30	0.87	0.11	0.00	0.00	0.00	0.00	0.00	-0.02
vrh stupa 1L	7.40	1.07	3.19	-0.07	0.01	0.00	0.00	0.10	-0.14	0.01
strop prizemlja	4.40	2.80	2.97	0.72	0.05	-0.05	0.01	0.12	-0.28	-0.09
po	0.77	0.40	-0.74	0.04	-0.05	-0.01	0.00	-0.13	0.26	-0.00
	-1.00	0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	-0.00
	Σ=	5.35	7.67	3.94	0.02	-0.05	0.06	0.17	0.16	-0.12

Nivo	Z [m]	Ton 40			Ton 41			Ton 42		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.88	-0.59	-9.56	0.35	3.32	-1.24	0.06	0.09	-0.04
vrh stupa 2L 7.75 +0.5	8.25	0.16	0.55	-8.45	-0.11	0.57	-1.09	0.01	-0.85	-0.05
vrh stupa 1D	8.01	0.56	3.30	-0.79	-0.25	-0.07	0.02	0.09	-0.52	-0.01
vrh stupa 2D 7+0.5	7.50	-0.00	1.91	-0.16	0.06	-1.88	0.12	0.04	-0.11	0.00
vrh stupa 1L	7.40	-0.60	4.46	0.02	-0.92	-5.85	0.07	0.14	0.74	-0.03
strop prizemlja	4.40	5.94	18.81	1.85	3.96	10.09	-0.07	0.32	-0.15	0.52
po	0.77	6.42	4.88	-0.26	4.59	10.88	-0.22	0.95	-1.26	-0.01
	-1.00	0.00	0.00	-0.09	0.00	0.00	-0.06	0.00	-0.00	0.00
	Σ=	13.35	33.33	-17.44	7.68	17.06	-2.47	1.61	-2.06	0.39

Nivo	Z [m]	Ton 43			Ton 44			Ton 45		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.16	-0.02	3.77	1.37	0.53	-8.89	-0.37	0.98	3.36
vrh stupa 2L 7.75 +0.5	8.25	-0.07	0.01	3.28	0.22	-1.08	-7.90	0.13	-0.27	3.01
vrh stupa 1D	8.01	-0.29	0.02	0.45	0.84	-0.06	-0.57	-0.17	0.93	0.23
vrh stupa 2D 7+0.5	7.50	0.18	0.04	0.24	0.28	0.01	0.06	0.03	0.58	-0.02
vrh stupa 1L	7.40	-0.31	0.10	0.01	-0.07	1.27	0.26	0.66	1.53	0.01
strop prizemlja	4.40	0.35	0.13	-0.07	16.84	4.35	0.70	0.86	9.64	0.45
po	0.77	0.85	-0.01	-0.01	-3.53	0.39	-0.16	-2.18	3.42	-0.03
	-1.00	0.00	0.00	-0.01	0.00	0.00	-0.17	-0.00	0.00	-0.02
	Σ=	0.86	0.27	7.66	15.94	5.43	-16.65	-1.05	16.81	6.99

Nivo	Z [m]	Ton 46			Ton 47			Ton 48		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.05	0.02	-0.25	0.04	-0.03	-0.61	-0.06	-0.05	0.74
vrh stupa 2L 7.75 +0.5	8.25	0.01	0.08	-0.23	0.07	-0.13	-0.55	0.05	-0.14	0.66
vrh stupa 1D	8.01	0.02	0.07	-0.01	0.07	-0.04	-0.05	-0.05	-0.02	0.04
vrh stupa 2D 7+0.5	7.50	0.01	0.07	0.00	-0.00	0.33	-0.02	0.01	-0.13	0.00
vrh stupa 1L	7.40	-0.07	0.18	0.01	0.01	1.35	0.01	0.11	-0.13	0.01
strop prizemlja	4.40	0.02	0.89	-0.15	0.82	3.11	-0.40	1.15	0.14	0.55
po	0.77	0.31	0.34	-0.01	0.48	-0.00	-0.03	-0.61	-0.00	-0.01
	-1.00	0.00	0.00	-0.00	0.00	0.00	-0.01	0.00	-0.00	-0.01
	Σ=	0.35	1.65	-0.65	1.49	4.59	-1.66	0.60	-0.33	1.98

Nivo	Z [m]	Ton 49			Ton 50			Ton 51		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.43	1.19	4.51	-0.02	0.01	-0.78	0.12	-0.30	1.92
vrh stupa 2L 7.75 +0.5	8.25	1.06	-5.72	4.10	0.04	-0.06	-0.68	0.14	1.17	1.72
vrh stupa 1D	8.01	-0.35	1.95	0.44	0.15	0.02	-0.09	-0.05	-0.32	0.21
vrh stupa 2D 7+0.5	7.50	0.51	-0.48	0.12	-0.02	-0.01	-0.05	0.19	0.00	0.12
vrh stupa 1L	7.40	1.87	7.58	0.40	0.26	0.02	0.02	0.52	-0.38	0.27
strop prizemlja	4.40	14.55	38.59	-1.71	0.16	-0.05	0.12	11.65	1.25	5.48
po	0.77	1.64	8.00	-0.62	-0.12	-0.05	-0.01	-4.68	1.88	-0.24
	-1.00	0.00	0.00	-0.30	0.00	-0.00	-0.01	0.00	0.00	-0.16
	Σ=	19.72	51.12	6.93	0.46	-0.14	-1.47	7.88	3.30	9.32

Nivo	Z [m]	Ton 52			Ton 53			Ton 54		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.15	-0.12	2.20	-0.18	-0.15	-1.73	0.33	-0.06	1.68
vrh stupa 2L 7.75 +0.5	8.25	-0.26	0.36	1.91	0.10	0.15	-1.47	0.23	0.30	1.46
vrh stupa 1D	8.01	-0.35	-0.05	0.22	-0.10	-0.39	-0.17	0.48	0.09	0.20
vrh stupa 2D 7+0.5	7.50	0.06	-0.01	0.10	-0.16	-0.17	-0.13	0.27	0.06	0.15
vrh stupa 1L	7.40	-0.29	0.45	-0.14	-0.25	0.98	0.12	2.04	0.15	0.13
strop prizemlja	4.40	-1.07	6.05	-4.43	1.43	17.04	-0.64	1.00	-3.56	-1.79
po	0.77	3.44	2.57	-0.04	0.72	8.39	-0.32	1.38	-1.42	-0.00
	-1.00	0.00	0.00	-0.00	0.00	0.00	-0.11	0.00	-0.00	-0.04
	Σ=	1.39	9.26	-0.19	1.56	25.86	-4.43	5.74	-4.43	1.79

Nivo	Z [m]	Ton 55			Ton 56			Ton 57		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.02	-0.30	-0.03	-0.04	-0.69	-0.50	-0.02	0.05	-0.14
vrh stupa 2L 7.75 +0.5	8.25	-0.01	0.23	-0.03	0.05	0.33	-0.43	0.00	-0.03	-0.13
vrh stupa 1D	8.01	-0.06	0.10	-0.01	0.09	0.07	-0.05	-0.01	-0.05	-0.00
vrh stupa 2D 7+0.5	7.50	-0.01	0.09	-0.00	-0.04	0.16	-0.04	-0.02	0.24	-0.01
vrh stupa 1L	7.40	-0.24	0.36	-0.00	0.42	1.04	-0.01	-0.02	0.67	0.03
strop prizemlja	4.40	0.55	0.02	-0.02	-1.32	5.29	-0.05	-0.16	3.07	-0.07
po	0.77	0.12	-0.66	-0.00	-0.02	1.57	-0.06	-0.12	1.14	-0.03
	-1.00	0.00	-0.00	-0.00	-0.00	0.00	-0.01	-0.00	0.00	-0.01
	Σ=	0.33	-0.14	-0.10	-0.86	7.77	-1.15	-0.34	5.09	-0.35

Nivo	Z [m]	Ton 58			Ton 59			Ton 60		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.05	-0.40	-0.08	-0.06	0.21	-0.19	0.08	-0.03	0.25
vrh stupa 2L 7.75 +0.5	8.25	0.05	0.14	0.01	-0.04	-0.26	-0.16	0.01	0.26	0.18
vrh stupa 1D	8.01	-0.11	-0.49	-0.04	-0.02	0.08	-0.03	0.06	0.07	0.06

vrh stupa 2D 7+0.5	7.50	0.01	-0.31	0.01	-0.04	0.01	-0.03	0.04	0.07	0.02
vrh stupa 1L	7.40	0.26	-1.30	0.12	-0.04	0.20	-0.05	-0.12	0.92	0.01
strop prizemlja	4.40	3.23	-3.07	-0.12	-0.70	3.72	0.04	-1.21	3.31	-0.03
po	0.77	0.41	-1.56	-0.05	-0.16	1.06	0.03	-0.26	2.50	0.04
	-1.00	0.00	-0.00	-0.04	-0.00	0.00	0.01	-0.00	0.00	0.02
	Σ=	3.80	-6.98	-0.18	-1.08	5.00	-0.38	-1.40	7.10	0.55

Nivo	Z [m]	Ton 61			Ton 62			Ton 63		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.04	-0.31	-0.32	0.30	0.47	-0.08	-0.00	0.00	0.01
vrh stupa 2L 7.75 +0.5	8.25	0.08	0.60	-0.30	0.42	-1.05	-0.01	-0.01	0.01	0.00
vrh stupa 1D	8.01	-0.02	0.08	-0.03	0.06	-0.21	-0.03	0.00	0.00	0.00
vrh stupa 2D 7+0.5	7.50	-0.03	-0.17	-0.04	0.13	0.24	0.03	-0.00	0.01	0.00
vrh stupa 1L	7.40	-0.48	0.25	-0.03	0.07	0.13	0.13	0.00	0.04	0.00
strop prizemlja	4.40	-1.51	5.53	-0.34	1.71	-1.80	-0.72	-0.05	0.07	-0.03
po	0.77	0.82	1.73	-0.01	2.08	-0.60	-0.06	-0.01	0.07	-0.00
	-1.00	-0.00	0.00	0.01	0.00	-0.00	-0.04	-0.00	0.00	-0.00
	Σ=	-1.10	7.71	-1.07	4.76	-2.82	-0.78	-0.06	0.20	-0.02

Nivo	Z [m]	Ton 64			Ton 65			Ton 66		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.00	-0.04	0.02	0.00	-0.01	0.10	0.05	0.12	-0.30
vrh stupa 2L 7.75 +0.5	8.25	-0.00	0.05	0.02	-0.01	0.03	0.09	0.00	0.46	-0.34
vrh stupa 1D	8.01	-0.00	-0.01	0.00	0.00	0.03	0.01	0.19	0.33	0.05
vrh stupa 2D 7+0.5	7.50	0.00	-0.01	0.00	0.01	0.03	0.01	-0.01	0.41	-0.01
vrh stupa 1L	7.40	0.01	-0.15	0.01	0.11	0.20	-0.00	-0.01	3.17	0.07
strop prizemlja	4.40	0.18	-0.54	0.06	0.29	1.12	-0.99	-2.16	13.03	1.05
po	0.77	0.05	0.01	-0.01	-0.50	1.12	0.02	0.64	6.41	-0.06
	-1.00	0.00	-0.00	-0.00	-0.00	0.00	0.00	-0.00	0.00	-0.02
	Σ=	0.24	-0.68	0.10	-0.09	2.51	-0.76	-1.30	23.92	0.43

Nivo	Z [m]	Ton 67			Ton 68			Ton 69		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.09	0.01	-0.92	-0.06	0.06	1.27	-0.11	-0.03	2.45
vrh stupa 2L 7.75 +0.5	8.25	0.17	0.04	-0.81	-0.20	0.39	1.06	-0.31	0.02	2.17
vrh stupa 1D	8.01	0.12	0.03	-0.11	-0.05	0.25	0.25	-0.23	-0.04	0.33
vrh stupa 2D 7+0.5	7.50	-0.02	0.03	-0.06	0.04	0.33	0.10	0.13	-0.03	0.19
vrh stupa 1L	7.40	-0.21	0.25	-0.00	0.32	2.56	0.11	0.83	-0.18	0.14
strop prizemlja	4.40	-1.03	0.67	-0.21	0.24	10.67	-0.61	4.27	-1.19	-0.30
po	0.77	1.15	-0.12	-0.01	-1.04	2.59	-0.12	-2.90	-0.26	-0.07
	-1.00	0.00	0.00	-0.00	-0.00	0.00	-0.05	0.00	-0.00	-0.05
	Σ=	0.27	0.91	-2.13	-0.75	16.85	2.00	1.68	-1.71	4.87

Nivo	Z [m]	Ton 70			Ton 71			Ton 72		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.26	-0.04	-1.67	0.41	0.01	-3.09	-0.01	0.00	0.18
vrh stupa 2L 7.75 +0.5	8.25	0.43	0.07	-1.43	0.73	0.24	-2.71	-0.02	0.10	0.15
vrh stupa 1D	8.01	0.21	0.05	-0.20	0.40	0.01	-0.44	-0.03	0.06	0.02
vrh stupa 2D 7+0.5	7.50	-0.05	0.04	-0.11	-0.02	-0.11	-0.22	0.00	0.00	0.00
vrh stupa 1L	7.40	-0.72	0.23	0.01	-0.76	-0.25	-0.02	0.05	0.29	-0.03
strop prizemlja	4.40	-1.69	0.01	-0.38	-2.49	-2.06	-0.83	-0.15	1.92	0.19
po	0.77	3.21	-0.25	-0.03	5.80	-1.07	-0.03	-0.50	0.10	0.00
	-1.00	0.00	0.00	-0.01	0.00	-0.00	-0.02	-0.00	0.00	0.01
	Σ=	1.66	0.10	-3.82	4.07	-3.23	-7.36	-0.66	2.47	0.53

Nivo	Z [m]	Ton 73			Ton 74			Ton 75		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	1.16	0.02	-3.66	0.50	-0.09	-1.43	0.13	0.01	-0.94
vrh stupa 2L 7.75 +0.5	8.25	1.86	0.84	-3.17	0.73	-2.11	-1.23	0.22	0.14	-0.82
vrh stupa 1D	8.01	0.70	0.58	-0.43	0.34	0.37	-0.11	0.17	-0.07	-0.13
vrh stupa 2D 7+0.5	7.50	0.18	0.31	-0.26	0.12	1.14	-0.04	-0.01	-0.12	-0.07
vrh stupa 1L	7.40	-0.68	4.00	0.22	0.09	4.37	0.32	-0.05	-0.59	-0.01
strop prizemlja	4.40	0.89	18.51	-2.03	0.72	3.57	-1.42	-1.13	-1.01	-0.12
po	0.77	6.25	1.02	-0.39	3.59	-4.64	-0.22	1.55	0.42	0.01
	-1.00	0.00	0.00	-0.20	0.00	0.00	-0.13	0.00	-0.00	0.01
	Σ=	10.36	25.27	-9.92	6.10	2.62	-4.26	0.88	-1.21	-2.07

Nivo	Z [m]	Ton 76			Ton 77			Ton 78		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.98	0.03	0.22	-0.25	-0.01	-0.26	-0.44	0.09	1.15
vrh stupa 2L 7.75 +0.5	8.25	1.25	0.29	0.26	-0.41	0.50	-0.34	-0.39	1.14	0.98
vrh stupa 1D	8.01	0.45	-0.25	0.06	-0.10	0.57	0.01	-0.20	0.98	0.45
vrh stupa 2D 7+0.5	7.50	0.51	-0.02	0.11	0.03	0.17	-0.01	-0.36	1.16	0.11
vrh stupa 1L	7.40	3.92	-0.32	0.49	1.12	2.87	-0.14	-2.46	8.12	0.70
strop prizemlja	4.40	1.88	-1.96	-1.83	-1.22	13.29	0.48	2.04	28.32	-2.49
po	0.77	0.67	1.78	-0.15	-2.31	-0.65	0.04	4.48	1.56	-0.68
	-1.00	0.00	-0.00	-0.15	-0.00	0.00	0.05	0.00	0.00	-0.28
	Σ=	9.66	-0.46	-0.99	-3.14	16.74	-0.18	2.67	41.37	-0.07

Nivo	Z [m]	Ton 79			Ton 80			Ton 81		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.49	0.13	-0.94	0.14	-0.28	-0.64	1.68	-0.11	4.50
vrh stupa 2L 7.75 +0.5	8.25	0.50	0.12	-0.87	0.11	-0.50	-0.61	2.79	0.41	4.24
vrh stupa 1D	8.01	0.36	0.03	-0.13	0.08	0.04	-0.07	0.38	-0.02	0.52
vrh stupa 2D 7+0.5	7.50	0.39	0.09	0.01	0.23	0.02	0.03	0.68	0.63	0.17
vrh stupa 1L	7.40	1.66	-0.27	0.08	1.56	0.66	0.08	2.28	2.16	0.44
strop prizemlja	4.40	2.15	-3.41	-0.41	2.77	3.31	-0.36	1.80	2.48	-2.33
po	0.77	-1.88	0.42	0.02	-2.02	-1.00	-0.06	-0.34	0.51	-0.29
	-1.00	0.00	-0.00	-0.02	0.00	0.00	-0.04	0.00	0.00	-0.17
	Σ=	3.66	-2.90	-2.26	2.88	2.25	-1.68	9.27	6.06	7.08

Nivo	Z [m]	Ton 82			Ton 83			Ton 84		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.05	-0.34	-2.92	-0.01	0.18	-1.48	-0.19	0.64	-2.40
vrh stupa 2L 7.75 +0.5	8.25	-0.52	-0.29	-2.77	-0.15	0.06	-1.36	-0.78	-0.50	-2.29
vrh stupa 1D	8.01	0.30	-0.44	-0.20	0.12	0.23	-0.12	0.25	0.83	0.07
vrh stupa 2D 7+0.5	7.50	0.27	0.46	0.08	0.04	0.12	-0.01	0.34	1.12	0.22
vrh stupa 1L	7.40	1.79	0.31	0.39	0.21	0.74	0.16	3.28	3.93	0.99
strop prizemlja	4.40	5.97	-5.00	-1.92	2.04	-0.08	-0.67	8.97	-1.52	-3.76
po	0.77	-0.34	-0.46	-0.31	-0.19	-0.19	-0.10	-2.32	-0.79	-0.62
	-1.00	0.00	-0.00	-0.17	0.00	0.00	-0.06	0.00	0.00	-0.36
	Σ=	7.41	-5.75	-7.82	2.07	1.07	-3.63	9.55	3.72	-8.15

Nivo	Z [m]	Ton 85			Ton 86			Ton 87		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.02	0.22	-1.05	0.22	-0.10	-0.42	0.76	0.37	-2.24
vrh stupa 2L 7.75 +0.5	8.25	-0.28	0.78	-1.02	0.05	-0.51	-0.35	0.27	-2.62	-2.10
vrh stupa 1D	8.01	0.14	-0.11	0.01	0.30	-0.08	-0.00	0.86	0.55	-0.05
vrh stupa 2D 7+0.5	7.50	0.14	0.23	0.08	0.21	-0.07	0.06	0.60	1.60	0.20
vrh stupa 1L	7.40	0.99	0.72	0.25	1.12	0.43	0.25	2.48	4.58	0.85
strop prizemlja	4.40	3.08	0.03	-1.41	2.83	3.81	-0.09	1.27	6.10	-0.32
po	0.77	-0.56	1.89	-0.22	-2.60	2.33	0.02	4.12	9.08	-0.16
	-1.00	0.00	0.00	-0.13	0.00	0.00	-0.06	0.00	0.00	-0.20
	Σ=	3.49	3.77	-3.50	2.13	5.82	-0.58	10.35	19.64	-4.01

Nivo	Z [m]	Ton 88			Ton 89			Ton 90		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.01	-0.11	-1.18	0.00	-0.01	0.03	0.25	0.03	0.90
vrh stupa 2L 7.75 +0.5	8.25	-0.28	-0.06	-1.06	0.00	0.06	0.02	0.52	0.15	0.85
vrh stupa 1D	8.01	0.22	-0.22	-0.07	-0.00	-0.05	0.00	-0.02	-0.01	0.06
vrh stupa 2D 7+0.5	7.50	0.16	-0.29	0.03	0.00	-0.05	0.00	0.00	-0.07	-0.01
vrh stupa 1L	7.40	1.43	-0.23	0.09	0.02	-0.14	0.01	-0.71	-0.23	-0.04
strop prizemlja	4.40	0.80	2.21	-1.01	0.14	-0.41	0.05	-0.80	-0.59	0.43
po	0.77	-0.23	-0.82	-0.06	0.01	0.04	-0.01	2.25	-0.20	0.09
	-1.00	0.00	0.00	-0.04	0.00	-0.00	-0.00	0.00	-0.00	0.04
	Σ=	2.09	0.48	-3.29	0.18	-0.55	0.10	1.50	-0.92	2.30

Nivo	Z [m]	Ton 91			Ton 92			Ton 93		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.67	0.23	2.85	1.01	-0.61	4.50	0.97	1.22	3.81
vrh stupa 2L 7.75 +0.5	8.25	1.11	-1.21	2.58	1.58	0.02	4.05	1.30	-1.88	3.44
vrh stupa 1D	8.01	0.02	0.28	0.22	0.33	-0.39	0.45	0.04	0.81	0.37
vrh stupa 2D 7+0.5	7.50	0.15	0.42	0.04	0.34	0.27	0.15	0.36	0.37	0.19
vrh stupa 1L	7.40	-1.14	1.53	0.05	0.23	0.95	0.16	-0.16	1.23	0.18
strop prizemlja	4.40	-1.87	4.92	-0.13	-1.50	6.80	-1.56	0.22	-0.55	-0.07
po	0.77	1.65	0.17	0.03	2.57	3.12	0.06	4.05	-3.36	0.02
	-1.00	0.00	0.00	0.01	0.00	0.00	-0.02	0.00	-0.00	-0.03
	Σ=	0.59	6.34	5.64	4.56	10.16	7.80	6.78	-2.17	7.90

Nivo	Z [m]	Ton 94			Ton 95			Ton 96		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.75	-1.52	2.90	0.07	-0.14	0.25	0.11	0.22	0.42
vrh stupa 2L 7.75 +0.5	8.25	0.91	3.74	2.60	-0.03	0.31	0.17	0.13	-0.03	0.38
vrh stupa 1D	8.01	0.41	-0.17	0.38	-0.06	-0.05	0.02	0.04	-0.23	0.04
vrh stupa 2D 7+0.5	7.50	0.49	-0.62	0.25	0.03	-0.05	0.02	0.06	-0.26	0.02
vrh stupa 1L	7.40	2.26	1.92	0.56	-0.37	-0.19	-0.02	0.10	-0.45	0.03
strop prizemlja	4.40	4.83	2.71	-2.14	-0.49	-0.30	0.14	0.31	-0.83	-0.23
po	0.77	-1.93	-2.40	-0.20	1.10	0.16	0.00	-0.02	-0.06	-0.01
	-1.00	0.00	0.00	-0.19	0.00	-0.00	0.01	0.00	-0.00	-0.01
	Σ=	7.72	3.65	4.16	0.24	-0.26	0.60	0.71	-1.65	0.64

Nivo	Z [m]	Ton 97			Ton 98			Ton 99		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.09	-0.17	0.18	0.41	-0.08	1.59	0.44	-0.01	0.67
vrh stupa 2L 7.75 +0.5	8.25	0.36	0.36	0.27	0.55	0.14	1.42	0.55	-0.37	0.59
vrh stupa 1D	8.01	0.06	0.03	-0.01	-0.15	-0.00	0.12	0.03	0.26	0.06
vrh stupa 2D 7+0.5	7.50	0.02	0.00	-0.02	0.11	0.00	0.05	0.14	0.24	0.02
vrh stupa 1L	7.40	0.37	-0.76	0.07	-1.09	-0.67	0.06	-0.67	1.57	0.10
strop prizemlja	4.40	0.90	-3.26	-0.10	1.35	-2.24	-0.04	1.73	3.95	-0.90
po	0.77	-0.03	-0.04	-0.06	0.37	0.18	-0.04	-0.45	-1.76	-0.05
	-1.00	0.00	-0.00	-0.03	0.00	-0.00	-0.02	0.00	0.00	-0.05
	Σ=	1.78	-3.84	0.31	1.55	-2.67	3.14	1.77	3.87	0.45

Nivo	Z [m]	Ton 100		
		Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	1.71	2.80	0.04
vrh stupa 2L 7.75 +0.5	8.25	2.16	-3.49	-0.01
vrh stupa 1D	8.01	0.56	-1.84	0.17
vrh stupa 2D 7+0.5	7.50	0.67	-0.22	0.11
vrh stupa 1L	7.40	-0.89	7.35	0.97
strop prizemlja	4.40	3.29	30.99	-3.36
po	0.77	5.24	-3.45	-0.43
	-1.00	0.00	0.00	-0.30
	Σ=	12.74	32.14	-2.82

Raspored seizmičkih sila po visini objekta - Sy

Nivo	Z [m]	Ton 1			Ton 2			Ton 3		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-6.41	243.60	-1.23	-17.20	-3.27	-1.13	0.00	0.00	-0.00
vrh stupa 2L 7.75 +0.5	8.25	-7.95	163.54	-1.13	-21.11	-2.00	-0.99	0.00	0.00	-0.00
vrh stupa 1D	8.01	-2.89	27.79	-0.07	-8.10	-0.22	-0.13	-0.00	-0.00	-0.00
vrh stupa 2D 7+0.5	7.50	-1.21	24.08	-0.06	-3.27	-0.25	-0.07	-0.00	-0.00	-0.00
vrh stupa 1L	7.40	-11.65	60.72	-0.03	-31.11	-0.81	-0.07	-0.00	-0.00	-0.00
strop prizemlja	4.40	-5.34	83.45	-0.01	-17.77	-1.22	0.06	0.00	0.00	0.00

po	0.77	-1.09	14.60	0.04	-3.50	-0.22	0.01	-0.00	-0.00	0.00
	-1.00	-0.00	0.00	0.01	-0.00	-0.00	0.02	-0.00	-0.00	0.00
	Σ=	-36.54	617.79	-2.48	-102.06	-8.00	-2.29	-0.00	0.00	0.00

Nivo	Z [m]	Ton 4			Ton 5			Ton 6		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-12.29	-0.07	-1.28	0.10	0.45	0.10	-2.36	-0.29	-0.11
vrh stupa 2L 7.75 +0.5	8.25	-19.22	-0.03	-1.33	0.11	1.12	0.09	-2.88	0.33	-0.09
vrh stupa 1D	8.01	-2.27	0.00	-0.12	0.05	-0.74	0.01	-1.24	0.05	-0.00
vrh stupa 2D 7+0.5	7.50	-1.99	0.01	-0.02	0.03	0.03	0.00	-0.48	0.10	-0.01
vrh stupa 1L	7.40	-19.18	-0.07	-0.13	0.26	0.57	-0.00	-5.23	0.12	-0.04
strop prizemlja	4.40	-7.05	-0.25	0.59	0.08	0.79	-0.01	-3.68	0.22	0.11
po	0.77	0.30	-0.03	0.11	0.03	-0.05	-0.01	-0.57	0.00	0.00
	-1.00	-0.00	0.00	0.07	0.00	0.00	-0.00	-0.00	0.00	0.01
	Σ=	-61.69	-0.43	-2.10	0.66	2.15	0.20	-16.44	0.54	-0.13

Nivo	Z [m]	Ton 7			Ton 8			Ton 9		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.57	-11.90	0.12	-0.29	-3.06	-0.04	0.08	-27.80	0.69
vrh stupa 2L 7.75 +0.5	8.25	0.68	-0.66	0.09	-0.35	-1.06	-0.02	0.07	-7.90	0.61
vrh stupa 1D	8.01	0.30	1.27	0.04	-0.16	-0.90	-0.02	-0.02	3.31	0.09
vrh stupa 2D 7+0.5	7.50	0.13	2.36	0.02	-0.06	-0.26	-0.01	0.05	3.59	0.04
vrh stupa 1L	7.40	1.28	7.63	0.05	-0.59	1.63	0.00	0.07	20.58	0.04
strop prizemlja	4.40	1.65	23.58	-0.09	-0.27	6.30	0.05	-1.63	66.72	0.00
po	0.77	0.38	7.55	-0.02	-0.09	2.03	-0.00	-0.13	21.04	0.03
	-1.00	0.00	0.00	-0.01	-0.00	0.00	0.00	-0.00	0.00	0.01
	Σ=	4.97	29.83	0.19	-1.81	4.69	-0.04	-1.53	79.54	1.51

Nivo	Z [m]	Ton 10			Ton 11			Ton 12		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.01	-0.00	-0.01	0.04	-0.23	0.01	0.14	-4.79	-0.34
vrh stupa 2L 7.75 +0.5	8.25	0.01	-0.08	-0.01	0.06	1.59	0.01	0.21	-2.20	-0.31
vrh stupa 1D	8.01	0.01	-0.01	-0.00	0.01	0.34	-0.00	0.07	0.77	-0.05
vrh stupa 2D 7+0.5	7.50	0.00	-0.00	-0.00	0.01	0.08	-0.00	0.02	0.38	-0.03
vrh stupa 1L	7.40	0.01	0.02	-0.00	0.09	-0.17	0.00	0.14	2.36	-0.05
strop prizemlja	4.40	0.00	0.11	0.01	-0.01	-0.91	0.00	-0.67	10.24	-0.01
po	0.77	-0.04	0.03	0.00	0.04	-0.31	-0.00	-0.23	2.98	-0.01
	-1.00	-0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00
	Σ=	0.01	0.07	-0.01	0.24	0.38	0.03	-0.32	9.74	-0.81

Nivo	Z [m]	Ton 13			Ton 14			Ton 15		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.05	-0.10	-0.05	1.78	0.00	-1.71	-0.01	0.04	-0.03
vrh stupa 2L 7.75 +0.5	8.25	-0.08	0.14	-0.05	2.31	0.09	-1.51	-0.01	0.24	-0.02
vrh stupa 1D	8.01	0.00	0.04	-0.00	0.97	0.01	-0.23	-0.01	-0.04	-0.00
vrh stupa 2D 7+0.5	7.50	-0.01	0.01	-0.00	0.27	0.00	-0.12	-0.00	-0.02	-0.00
vrh stupa 1L	7.40	-0.05	0.02	-0.00	1.32	-0.01	0.02	-0.05	-0.04	-0.00
strop prizemlja	4.40	0.03	0.06	0.01	-7.46	-0.03	-0.05	-0.05	0.06	0.01
po	0.77	-0.04	0.02	0.01	-6.18	-0.01	-0.01	-0.03	0.09	0.00
	-1.00	-0.00	0.00	0.00	-0.00	0.00	-0.01	-0.00	0.00	0.00
	Σ=	-0.20	0.18	-0.10	-6.98	0.06	-3.62	-0.15	0.34	-0.05

Nivo	Z [m]	Ton 16			Ton 17			Ton 18		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.01	0.07	0.01	0.10	-19.89	-0.21	0.29	0.03	-0.40
vrh stupa 2L 7.75 +0.5	8.25	-0.02	0.04	0.01	0.07	37.81	-0.24	0.39	0.26	-0.36
vrh stupa 1D	8.01	-0.01	-0.06	-0.00	0.16	8.37	0.03	0.19	0.04	-0.05
vrh stupa 2D 7+0.5	7.50	-0.00	-0.03	0.00	0.05	4.89	0.01	0.04	0.02	-0.03
vrh stupa 1L	7.40	-0.02	-0.06	0.00	0.54	7.61	0.05	0.30	0.03	0.00
strop prizemlja	4.40	-0.07	0.02	-0.00	7.18	7.40	-0.27	-1.37	0.17	-0.03
po	0.77	0.01	0.08	0.00	1.30	0.07	-0.01	-0.63	0.08	-0.00
	-1.00	-0.00	0.00	0.00	0.00	0.00	-0.03	-0.00	0.00	-0.00
	Σ=	-0.11	0.06	0.01	9.40	46.26	-0.66	-0.79	0.62	-0.87

Nivo	Z [m]	Ton 19			Ton 20			Ton 21		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.29	0.77	0.32	-0.01	-0.14	-0.03	0.22	-4.99	2.35
vrh stupa 2L 7.75 +0.5	8.25	-0.40	2.10	0.28	-0.01	0.32	-0.02	0.08	13.29	1.31
vrh stupa 1D	8.01	-0.18	0.28	0.08	0.00	0.02	0.00	-1.07	1.27	-0.19
vrh stupa 2D 7+0.5	7.50	-0.05	0.13	0.04	-0.00	0.01	0.00	-0.97	0.62	-0.30
vrh stupa 1L	7.40	-0.42	0.27	0.01	0.01	0.10	0.02	-9.92	4.11	-3.36
strop prizemlja	4.40	1.53	2.15	-0.00	1.03	0.10	-0.03	-263.35	9.30	7.72
po	0.77	0.49	1.01	0.01	0.26	0.00	-0.01	-91.58	0.96	1.52
	-1.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.00	0.00	1.43
	Σ=	0.68	6.71	0.73	1.29	0.41	-0.06	-366.60	24.56	10.47

Nivo	Z [m]	Ton 22			Ton 23			Ton 24		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.02	-0.00	0.03	0.03	-2.65	0.36	-0.03	-1.20	-1.01
vrh stupa 2L 7.75 +0.5	8.25	-0.03	-0.00	0.03	0.09	10.05	0.31	-0.24	4.40	-1.00
vrh stupa 1D	8.01	-0.01	0.00	0.01	0.11	0.67	0.05	-0.08	0.16	0.03
vrh stupa 2D 7+0.5	7.50	-0.01	0.00	0.00	0.21	0.38	0.01	-0.45	0.30	-0.02
vrh stupa 1L	7.40	-0.06	0.00	0.00	1.30	3.41	0.15	-2.86	1.02	-0.09
strop prizemlja	4.40	-0.11	0.01	0.01	16.92	6.99	-0.61	-29.25	-0.05	0.80
po	0.77	-0.17	0.00	0.00	9.07	1.02	-0.23	-14.63	-0.29	0.22
	-1.00	-0.00	0.00	0.00	0.00	0.00	-0.12	-0.00	0.00	0.11
	Σ=	-0.41	0.01	0.09	27.73	19.87	-0.09	-47.54	4.34	-0.97

Nivo	Z [m]	Ton 25			Ton 26			Ton 27		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.02	0.12	-0.29	-0.07	-0.48	1.90	0.02	4.45	0.43
vrh stupa 2L 7.75 +0.5	8.25	-0.03	-0.11	-0.25	-0.04	0.18	1.50	0.06	-5.30	0.37
vrh stupa 1D	8.01	0.04	-0.02	-0.02	-0.54	0.18	0.03	-0.09	-1.15	0.03
vrh stupa 2D 7+0.5	7.50	-0.00	-0.04	-0.01	-0.26	0.07	-0.04	-0.03	-0.83	-0.00

vrh stupa 1L	7.40	0.20	0.18	0.04	-3.11	-0.56	-1.00	-0.32	-0.01	-0.04
strop prizemlja	4.40	2.90	1.57	-0.13	-70.15	-3.57	3.05	-9.42	8.90	0.38
po	0.77	0.84	0.37	-0.03	3.35	-0.90	0.20	-2.17	4.73	0.03
	-1.00	0.00	0.00	-0.01	-0.00	-0.00	0.35	-0.00	0.00	0.04
	Σ=	3.93	2.07	-0.70	-70.81	-5.09	5.99	-11.95	10.78	1.22

Nivo	Z [m]	Ton 28			Ton 29			Ton 30		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.00	0.10	-0.05	-0.02	-0.02	-0.08	0.00	0.24	0.04
vrh stupa 2L 7.75 +0.5	8.25	0.00	-0.36	-0.04	-0.02	0.07	-0.07	0.00	-0.86	0.03
vrh stupa 1D	8.01	0.00	0.05	-0.00	-0.01	-0.04	-0.01	0.01	0.53	0.01
vrh stupa 2D 7+0.5	7.50	-0.00	0.11	-0.00	-0.02	-0.04	-0.01	0.00	0.38	0.00
vrh stupa 1L	7.40	0.00	0.08	0.01	-0.16	-0.04	-0.00	0.01	0.21	0.01
strop prizemlja	4.40	0.13	0.12	-0.02	-0.13	0.04	-0.00	-0.12	-0.26	-0.03
po	0.77	0.05	0.02	-0.00	-0.09	0.01	-0.00	-0.08	-0.14	-0.00
	-1.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00
	Σ=	0.18	0.12	-0.11	-0.45	-0.00	-0.17	-0.18	0.10	0.05

Nivo	Z [m]	Ton 31			Ton 32			Ton 33		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.00	-0.00	0.00	-0.15	-0.39	-2.51	-0.18	0.20	-1.56
vrh stupa 2L 7.75 +0.5	8.25	-0.00	0.00	0.00	-0.74	2.96	-2.37	-0.60	-0.84	-1.46
vrh stupa 1D	8.01	-0.00	-0.00	0.00	0.15	0.13	-0.05	-0.02	-0.53	-0.03
vrh stupa 2D 7+0.5	7.50	-0.00	-0.00	-0.00	-0.42	0.32	-0.01	-0.34	-0.05	-0.01
vrh stupa 1L	7.40	-0.01	-0.01	-0.00	-2.52	-0.27	-0.01	-1.98	0.84	-0.02
strop prizemlja	4.40	-0.11	-0.03	0.02	-15.94	-1.44	0.42	-12.23	0.78	0.39
po	0.77	-0.05	-0.01	0.00	1.50	1.49	0.34	0.45	-0.86	0.23
	-1.00	-0.00	-0.00	0.00	-0.00	0.00	0.14	-0.00	0.00	0.11
	Σ=	-0.18	-0.05	0.02	-18.12	2.80	-4.05	-14.90	-0.47	-2.36

Nivo	Z [m]	Ton 34			Ton 35			Ton 36		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.00	0.01	0.11	-0.02	3.33	-0.85	0.21	0.91	0.76
vrh stupa 2L 7.75 +0.5	8.25	-0.01	-0.04	0.09	-0.05	-1.80	-0.78	0.33	1.73	0.66
vrh stupa 1D	8.01	-0.02	0.01	0.01	0.10	-1.34	-0.08	0.22	-0.87	0.03
vrh stupa 2D 7+0.5	7.50	-0.00	0.00	0.00	-0.06	-1.38	-0.03	0.22	-0.44	-0.00
vrh stupa 1L	7.40	-0.10	-0.00	-0.03	-0.16	-4.56	-0.05	1.14	-1.59	0.01
strop prizemlja	4.40	-1.19	-0.00	0.19	-1.44	4.27	-0.11	2.79	1.75	0.56
po	0.77	0.69	0.01	0.01	-0.14	7.38	0.02	-0.49	4.23	0.02
	-1.00	-0.00	-0.00	0.01	-0.00	0.00	0.01	0.00	0.00	-0.01
	Σ=	-0.64	-0.01	0.38	-1.76	5.91	-1.87	4.41	5.73	2.01

Nivo	Z [m]	Ton 37			Ton 38			Ton 39		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.27	-0.84	1.28	-0.05	0.23	-0.77	-0.01	-0.03	-0.00
vrh stupa 2L 7.75 +0.5	8.25	0.15	1.17	1.06	-0.07	-0.59	-0.67	0.03	0.18	0.00
vrh stupa 1D	8.01	0.19	0.76	0.15	-0.05	0.04	-0.07	0.02	0.01	-0.01
vrh stupa 2D 7+0.5	7.50	0.24	0.69	0.08	-0.08	-0.08	-0.03	0.00	0.00	-0.01
vrh stupa 1L	7.40	0.85	2.52	-0.05	-0.34	-0.14	-0.00	0.05	-0.07	0.01
strop prizemlja	4.40	2.22	2.35	0.57	-1.45	1.65	-0.27	0.06	-0.14	-0.04
po	0.77	0.32	-0.59	0.03	1.54	0.38	-0.01	-0.06	0.13	-0.00
	-1.00	0.00	0.00	-0.00	-0.00	0.00	0.01	0.00	0.00	-0.00
	Σ=	4.24	6.08	3.12	-0.50	1.50	-1.82	0.09	0.08	-0.06

Nivo	Z [m]	Ton 40			Ton 41			Ton 42		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	1.10	-0.74	-12.01	0.40	3.83	-1.43	-0.15	-0.24	0.11
vrh stupa 2L 7.75 +0.5	8.25	0.21	0.69	-10.61	-0.12	0.66	-1.26	-0.03	2.18	0.14
vrh stupa 1D	8.01	0.70	4.14	-0.99	-0.29	-0.08	0.02	-0.24	1.34	0.02
vrh stupa 2D 7+0.5	7.50	-0.00	2.40	-0.20	0.07	-2.17	0.14	-0.11	0.28	-0.01
vrh stupa 1L	7.40	-0.75	5.60	0.03	-1.06	-6.74	0.09	-0.35	-1.89	0.09
strop prizemlja	4.40	7.45	23.63	2.32	4.57	11.62	-0.08	-0.82	0.38	-1.34
po	0.77	8.06	6.13	-0.33	5.29	12.54	-0.25	-2.43	3.24	0.02
	-1.00	0.00	0.00	-0.11	0.00	0.00	-0.07	-0.00	0.00	-0.00
	Σ=	16.77	41.86	-21.90	8.86	19.66	-2.84	-4.13	5.29	-0.99

Nivo	Z [m]	Ton 43			Ton 44			Ton 45		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.00	-0.00	0.03	0.05	0.02	-0.33	-1.60	4.21	14.42
vrh stupa 2L 7.75 +0.5	8.25	-0.00	0.00	0.03	0.01	-0.04	-0.29	0.55	-1.14	12.91
vrh stupa 1D	8.01	-0.00	0.00	0.00	0.03	-0.00	-0.02	-0.74	3.99	0.97
vrh stupa 2D 7+0.5	7.50	0.00	0.00	0.00	0.01	0.00	0.00	0.12	2.47	-0.07
vrh stupa 1L	7.40	-0.00	0.00	0.00	-0.00	0.05	0.01	2.83	6.55	0.04
strop prizemlja	4.40	0.00	0.00	-0.00	0.62	0.16	0.03	3.69	41.33	1.91
po	0.77	0.01	-0.00	-0.00	-0.13	0.01	-0.01	-9.35	14.67	-0.12
	-1.00	0.00	0.00	-0.00	0.00	0.00	-0.01	-0.00	0.00	-0.10
	Σ=	0.01	0.00	0.06	0.59	0.20	-0.61	-4.50	72.08	29.96

Nivo	Z [m]	Ton 46			Ton 47			Ton 48		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.09	0.05	-0.47	0.06	-0.04	-0.88	0.06	0.05	-0.75
vrh stupa 2L 7.75 +0.5	8.25	0.03	0.15	-0.42	0.10	-0.19	-0.80	-0.05	0.14	-0.68
vrh stupa 1D	8.01	0.03	0.12	-0.02	0.10	-0.05	-0.07	0.05	0.02	-0.04
vrh stupa 2D 7+0.5	7.50	0.01	0.12	0.00	-0.01	0.48	-0.03	-0.01	0.14	-0.00
vrh stupa 1L	7.40	-0.12	0.34	0.02	0.02	1.95	0.01	-0.11	0.13	-0.01
strop prizemlja	4.40	0.03	1.63	-0.27	1.19	4.50	-0.57	-1.18	-0.14	-0.56
po	0.77	0.57	0.62	-0.02	0.70	-0.00	-0.04	0.63	0.00	0.01
	-1.00	0.00	0.00	-0.01	0.00	0.00	-0.02	-0.00	0.00	0.01
	Σ=	0.64	3.02	-1.19	2.15	6.64	-2.40	-0.62	0.34	-2.03

Nivo	Z [m]	Ton 49			Ton 50			Ton 51		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.55	1.53	5.82	0.01	-0.00	0.52	0.01	-0.03	0.20
vrh stupa 2L 7.75 +0.5	8.25	1.36	-7.37	5.29	-0.03	0.04	0.45	0.01	0.12	0.18
vrh stupa 1D	8.01	-0.45	2.52	0.56	-0.10	-0.01	0.06	-0.01	-0.03	0.02
vrh stupa 2D 7+0.5	7.50	0.66	-0.62	0.15	0.01	0.01	0.03	0.02	0.00	0.01
vrh stupa 1L	7.40	2.41	9.78	0.51	-0.17	-0.01	-0.01	0.05	-0.04	0.03
strop prizemlja	4.40	18.77	49.77	-2.20	-0.10	0.04	-0.08	1.23	0.13	0.58
po	0.77	2.12	10.32	-0.80	0.08	0.03	0.00	-0.49	0.20	-0.03
	-1.00	0.00	0.00	-0.39	-0.00	0.00	0.00	0.00	0.00	-0.02
	Σ=	25.43	65.93	8.94	-0.30	0.09	0.98	0.83	0.35	0.98

Nivo	Z [m]	Ton 52			Ton 53			Ton 54		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.31	-0.26	4.67	-0.49	-0.40	-4.70	-0.46	0.09	-2.35
vrh stupa 2L 7.75 +0.5	8.25	-0.54	0.76	4.05	0.26	0.41	-4.00	-0.33	-0.42	-2.04
vrh stupa 1D	8.01	-0.75	-0.10	0.46	-0.28	-1.07	-0.47	-0.67	-0.12	-0.28
vrh stupa 2D 7+0.5	7.50	0.12	-0.02	0.22	-0.42	-0.45	-0.34	-0.38	-0.08	-0.21
vrh stupa 1L	7.40	-0.62	0.96	-0.30	-0.69	2.69	0.34	-2.84	-0.21	-0.19
strop prizemlja	4.40	-2.27	12.85	-9.42	3.89	46.46	-1.74	-1.40	4.96	2.50
po	0.77	7.31	5.46	-0.09	1.97	22.89	-0.87	-1.93	1.98	0.00
	-1.00	0.00	0.00	-0.00	0.00	0.00	-0.29	-0.00	0.00	0.06
	Σ=	2.94	19.66	-0.40	4.24	70.52	-12.08	-8.01	6.19	-2.49

Nivo	Z [m]	Ton 55			Ton 56			Ton 57		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.01	0.25	0.03	-0.20	-3.76	-2.70	-0.07	0.21	-0.60
vrh stupa 2L 7.75 +0.5	8.25	0.01	-0.19	0.02	0.29	1.82	-2.33	0.01	-0.14	-0.55
vrh stupa 1D	8.01	0.05	-0.09	0.00	0.48	0.40	-0.27	-0.05	-0.24	-0.02
vrh stupa 2D 7+0.5	7.50	0.01	-0.08	0.00	-0.24	0.87	-0.23	-0.07	1.05	-0.03
vrh stupa 1L	7.40	0.20	-0.30	0.00	2.29	5.68	-0.05	-0.08	2.94	0.12
strop prizemlja	4.40	-0.46	-0.02	0.02	-7.22	28.83	-0.26	-0.71	13.42	-0.29
po	0.77	-0.10	0.55	0.00	-0.09	8.53	-0.34	-0.51	4.98	-0.14
	-1.00	-0.00	0.00	0.00	-0.00	0.00	-0.07	-0.00	0.00	-0.03
	Σ=	-0.28	0.12	0.08	-4.68	42.37	-6.25	-1.48	22.22	-1.55

Nivo	Z [m]	Ton 58			Ton 59			Ton 60		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.24	1.90	0.36	-0.79	2.58	-2.40	0.83	-0.27	2.57
vrh stupa 2L 7.75 +0.5	8.25	-0.22	-0.68	-0.06	-0.53	-3.22	-2.06	0.11	2.66	1.86
vrh stupa 1D	8.01	0.52	2.34	0.20	-0.21	0.98	-0.40	0.60	0.73	0.61
vrh stupa 2D 7+0.5	7.50	-0.05	1.48	-0.06	-0.56	0.07	-0.33	0.39	0.74	0.22
vrh stupa 1L	7.40	-1.25	6.18	-0.60	-0.55	2.46	-0.62	-1.29	9.46	0.06
strop prizemlja	4.40	-15.40	14.62	0.59	-8.84	46.59	0.54	-12.44	34.14	-0.27
po	0.77	-1.96	7.46	0.23	-2.03	13.29	0.33	-2.64	25.71	0.42
	-1.00	-0.00	0.00	0.20	-0.00	0.00	0.19	-0.00	0.00	0.17
	Σ=	-18.11	33.30	0.86	-13.50	62.75	-4.76	-14.43	73.17	5.64

Nivo	Z [m]	Ton 61			Ton 62			Ton 63		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.26	-2.05	-2.16	-0.33	-0.52	0.08	-0.27	0.22	0.63
vrh stupa 2L 7.75 +0.5	8.25	0.54	3.98	-2.01	-0.46	1.14	0.02	-0.62	0.83	0.39
vrh stupa 1D	8.01	-0.11	0.52	-0.21	-0.06	0.23	0.03	0.23	0.42	0.24
vrh stupa 2D 7+0.5	7.50	-0.22	-1.11	-0.28	-0.14	-0.27	-0.03	-0.09	0.59	0.07
vrh stupa 1L	7.40	-3.20	1.65	-0.22	-0.07	-0.14	-0.14	0.22	3.56	0.09
strop prizemlja	4.40	-10.01	36.70	-2.23	-1.85	1.96	0.78	-4.04	5.82	-2.74
po	0.77	5.42	11.49	-0.06	-2.26	0.65	0.06	-0.53	6.30	-0.01
	-1.00	-0.00	0.00	0.06	-0.00	0.00	0.05	-0.00	0.00	-0.01
	Σ=	-7.31	51.19	-7.11	-5.17	3.06	0.84	-5.11	17.75	-1.35

Nivo	Z [m]	Ton 64			Ton 65			Ton 66		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.03	0.87	-0.42	0.00	-0.05	0.39	0.21	0.48	-1.25
vrh stupa 2L 7.75 +0.5	8.25	0.03	-0.96	-0.44	-0.03	0.12	0.34	0.02	1.88	-1.42
vrh stupa 1D	8.01	0.06	0.14	-0.05	0.00	0.11	0.06	0.77	1.37	0.22
vrh stupa 2D 7+0.5	7.50	-0.03	0.11	-0.07	0.05	0.13	0.03	-0.05	1.70	-0.05
vrh stupa 1L	7.40	-0.25	3.02	-0.14	0.44	0.76	-0.01	-0.04	13.11	0.28
strop prizemlja	4.40	-3.76	11.06	-1.18	1.10	4.30	-3.83	-8.92	53.86	4.33
po	0.77	-1.02	-0.29	0.11	-1.93	4.30	0.07	2.65	26.51	-0.26
	-1.00	-0.00	0.00	0.05	-0.00	0.00	0.01	-0.00	0.00	-0.08
	Σ=	-4.93	13.94	-2.15	-0.36	9.68	-2.93	-5.36	98.91	1.77

Nivo	Z [m]	Ton 67			Ton 68			Ton 69		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.14	0.01	-1.41	-0.25	0.25	5.04	0.22	0.06	-4.64
vrh stupa 2L 7.75 +0.5	8.25	0.26	0.06	-1.24	-0.79	1.57	4.19	0.58	-0.04	-4.11
vrh stupa 1D	8.01	0.18	0.05	-0.17	-0.19	0.99	0.98	0.44	0.08	-0.63
vrh stupa 2D 7+0.5	7.50	-0.04	0.05	-0.10	0.17	1.29	0.38	-0.24	0.06	-0.37
vrh stupa 1L	7.40	-0.32	0.38	-0.00	1.27	10.17	0.43	-1.58	0.34	-0.27
strop prizemlja	4.40	-1.58	1.03	-0.32	0.95	42.32	-2.43	-8.10	2.26	0.56
po	0.77	1.76	-0.19	-0.02	-4.14	10.25	-0.46	5.49	0.49	0.13
	-1.00	0.00	0.00	-0.00	-0.00	0.00	-0.19	-0.00	0.00	0.10
	Σ=	0.41	1.40	-3.25	-2.98	66.85	7.94	-3.19	3.25	-9.25

Nivo	Z [m]	Ton 70			Ton 71			Ton 72		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.06	0.01	0.39	-0.59	-0.02	4.45	-0.40	0.03	5.61
vrh stupa 2L 7.75 +0.5	8.25	-0.10	-0.02	0.33	-1.04	-0.34	3.90	-0.58	3.14	4.75
vrh stupa 1D	8.01	-0.05	-0.01	0.05	-0.57	-0.02	0.63	-0.81	1.76	0.74
vrh stupa 2D 7+0.5	7.50	0.01	-0.01	0.03	0.03	0.16	0.32	0.08	0.06	0.13
vrh stupa 1L	7.40	0.17	-0.05	-0.00	1.09	0.36	0.03	1.45	9.20	-0.90
strop prizemlja	4.40	0.39	-0.00	0.09	3.58	2.96	1.19	-4.82	60.96	6.10
po	0.77	-0.75	0.06	0.01	-8.35	1.54	0.05	-15.77	3.22	0.06

	-1.00	-0.00	-0.00	0.00	-0.00	0.00	0.03	-0.00	0.00	0.20
	Σ=	-0.39	-0.02	0.89	-5.85	4.65	10.59	-20.84	78.37	16.69

Nivo	Z [m]	Ton 73			Ton 74			Ton 75		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	1.43	0.02	-4.52	0.06	-0.01	-0.16	-0.36	-0.04	2.70
vrh stupa 2L 7.75 +0.5	8.25	2.30	1.04	-3.92	0.08	-0.24	-0.14	-0.62	-0.40	2.35
vrh stupa 1D	8.01	0.86	0.72	-0.53	0.04	0.04	-0.01	-0.48	0.20	0.38
vrh stupa 2D 7+0.5	7.50	0.23	0.38	-0.32	0.01	0.13	-0.00	0.02	0.35	0.19
vrh stupa 1L	7.40	-0.84	4.94	0.27	0.01	0.50	0.04	0.14	1.69	0.04
strop prizemlja	4.40	1.10	22.86	-2.50	0.08	0.41	-0.16	3.24	2.89	0.34
po	0.77	7.72	1.25	-0.49	0.41	-0.53	-0.03	-4.45	-1.21	-0.04
	-1.00	0.00	0.00	-0.24	0.00	0.00	-0.01	-0.00	0.00	-0.02
	Σ=	12.80	31.21	-12.25	0.70	0.30	-0.49	-2.51	3.47	5.94

Nivo	Z [m]	Ton 76			Ton 77			Ton 78		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.35	-0.01	-0.08	-2.34	-0.11	-2.43	-1.19	0.24	3.09
vrh stupa 2L 7.75 +0.5	8.25	-0.44	-0.10	-0.09	-3.87	4.73	-3.17	-1.04	3.06	2.63
vrh stupa 1D	8.01	-0.16	0.09	-0.02	-0.91	5.36	0.09	-0.54	2.63	1.22
vrh stupa 2D 7+0.5	7.50	-0.18	0.01	-0.04	0.28	1.64	-0.14	-0.96	3.12	0.29
vrh stupa 1L	7.40	-1.38	0.11	-0.17	10.50	26.97	-1.36	-6.60	21.85	1.89
strop prizemlja	4.40	-0.66	0.69	0.65	-11.45	124.92	4.49	5.48	76.16	-6.71
po	0.77	-0.23	-0.63	0.05	-21.75	-6.12	0.40	12.04	4.18	-1.83
	-1.00	-0.00	0.00	0.05	-0.00	0.00	0.44	0.00	0.00	-0.77
	Σ=	-3.40	0.16	0.35	-29.53	157.40	-1.67	7.19	111.25	-0.19

Nivo	Z [m]	Ton 79			Ton 80			Ton 81		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.71	-0.18	1.35	0.06	-0.11	-0.25	0.50	-0.03	1.33
vrh stupa 2L 7.75 +0.5	8.25	-0.72	-0.17	1.24	0.04	-0.20	-0.24	0.82	0.12	1.25
vrh stupa 1D	8.01	-0.51	-0.05	0.18	0.03	0.02	-0.03	0.11	-0.01	0.15
vrh stupa 2D 7+0.5	7.50	-0.55	-0.13	-0.02	0.09	0.01	0.01	0.20	0.19	0.05
vrh stupa 1L	7.40	-2.38	0.39	-0.12	0.61	0.26	0.03	0.67	0.64	0.13
strop prizemlja	4.40	-3.07	4.89	0.59	1.08	1.29	-0.14	0.53	0.73	-0.69
po	0.77	2.69	-0.60	-0.03	-0.79	-0.39	-0.02	-0.10	0.15	-0.09
	-1.00	-0.00	0.00	0.03	0.00	0.00	-0.02	0.00	0.00	-0.05
	Σ=	-5.25	4.15	3.23	1.12	0.88	-0.65	2.74	1.79	2.09

Nivo	Z [m]	Ton 82			Ton 83			Ton 84		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.06	0.47	4.09	-0.00	0.03	-0.28	-0.02	0.05	-0.19
vrh stupa 2L 7.75 +0.5	8.25	0.73	0.40	3.89	-0.03	0.01	-0.25	-0.06	-0.04	-0.18
vrh stupa 1D	8.01	-0.42	0.61	0.27	0.02	0.04	-0.02	0.02	0.07	0.01
vrh stupa 2D 7+0.5	7.50	-0.38	-0.64	-0.11	0.01	0.02	-0.00	0.03	0.09	0.02
vrh stupa 1L	7.40	-2.50	-0.43	-0.54	0.04	0.14	0.03	0.26	0.31	0.08
strop prizemlja	4.40	-8.37	7.01	2.69	0.38	-0.01	-0.13	0.72	-0.12	-0.30
po	0.77	0.48	0.64	0.44	-0.04	-0.03	-0.02	-0.18	-0.06	-0.05
	-1.00	-0.00	0.00	0.23	0.00	0.00	-0.01	0.00	0.00	-0.03
	Σ=	-10.40	8.07	10.96	0.39	0.20	-0.68	0.76	0.30	-0.65

Nivo	Z [m]	Ton 85			Ton 86			Ton 87		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.01	0.13	-0.62	0.29	-0.14	-0.56	0.77	0.37	-2.28
vrh stupa 2L 7.75 +0.5	8.25	-0.17	0.46	-0.60	0.07	-0.68	-0.46	0.27	-2.67	-2.13
vrh stupa 1D	8.01	0.08	-0.07	0.01	0.40	-0.11	-0.00	0.87	0.56	-0.05
vrh stupa 2D 7+0.5	7.50	0.08	0.14	0.05	0.28	-0.09	0.09	0.61	1.62	0.20
vrh stupa 1L	7.40	0.58	0.42	0.15	1.50	0.58	0.33	2.53	4.66	0.87
strop prizemlja	4.40	1.82	0.02	-0.83	3.77	5.09	-0.12	1.29	6.20	-0.32
po	0.77	-0.33	1.12	-0.13	-3.46	3.11	0.03	4.19	9.25	-0.17
	-1.00	0.00	0.00	-0.08	0.00	0.00	-0.08	0.00	0.00	-0.20
	Σ=	2.06	2.22	-2.06	2.85	7.76	-0.77	10.54	19.99	-4.08

Nivo	Z [m]	Ton 88			Ton 89			Ton 90		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.00	0.01	0.08	-0.13	0.28	-0.87	-0.28	-0.03	-1.00
vrh stupa 2L 7.75 +0.5	8.25	0.02	0.00	0.07	-0.16	-1.88	-0.76	-0.58	-0.17	-0.95
vrh stupa 1D	8.01	-0.01	0.01	0.00	0.00	1.66	-0.13	0.02	0.01	-0.06
vrh stupa 2D 7+0.5	7.50	-0.01	0.02	-0.00	-0.14	1.72	-0.10	-0.00	0.08	0.01
vrh stupa 1L	7.40	-0.09	0.01	-0.01	-0.73	4.48	-0.25	0.79	0.26	0.05
strop prizemlja	4.40	-0.05	-0.14	0.07	-4.58	13.49	-1.63	0.89	0.66	-0.48
po	0.77	0.01	0.05	0.00	-0.38	-1.41	0.26	-2.52	0.22	-0.10
	-1.00	-0.00	-0.00	0.00	-0.00	0.00	0.12	-0.00	0.00	-0.04
	Σ=	-0.14	-0.03	0.21	-6.11	18.33	-3.37	-1.68	1.03	-2.57

Nivo	Z [m]	Ton 91			Ton 92			Ton 93		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	1.65	0.58	7.07	1.17	-0.71	5.20	-0.67	-0.84	-2.61
vrh stupa 2L 7.75 +0.5	8.25	2.74	-3.00	6.38	1.83	0.02	4.68	-0.89	1.29	-2.36
vrh stupa 1D	8.01	0.06	0.69	0.53	0.39	-0.45	0.52	-0.03	-0.56	-0.25
vrh stupa 2D 7+0.5	7.50	0.36	1.04	0.09	0.40	0.32	0.17	-0.25	-0.26	-0.13
vrh stupa 1L	7.40	-2.83	3.78	0.12	0.26	1.09	0.19	0.11	-0.84	-0.12
strop prizemlja	4.40	-4.63	12.19	-0.32	-1.74	7.85	-1.81	-0.15	0.38	0.05
po	0.77	4.10	0.42	0.08	2.96	3.60	0.07	-2.78	2.31	-0.01
	-1.00	0.00	0.00	0.01	0.00	0.00	-0.02	-0.00	0.00	0.02
	Σ=	1.45	15.70	13.96	5.27	11.73	9.01	-4.65	1.49	-5.41

Nivo	Z [m]	Ton 94			Ton 95			Ton 96		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	0.11	-0.23	0.44	-0.14	0.29	-0.52	-0.94	-1.95	-3.73
vrh stupa 2L 7.75 +0.5	8.25	0.14	0.56	0.39	0.06	-0.64	-0.36	-1.12	0.29	-3.32
vrh stupa 1D	8.01	0.06	-0.03	0.06	0.12	0.10	-0.05	-0.32	2.03	-0.32
vrh stupa 2D 7+0.5	7.50	0.07	-0.09	0.04	-0.06	0.11	-0.05	-0.49	2.32	-0.20
vrh stupa 1L	7.40	0.34	0.29	0.08	0.76	0.39	0.05	-0.85	4.01	-0.25

strop prizemlja	4.40	0.73	0.41	-0.32	1.02	0.62	-0.29	-2.70	7.33	2.01
po	0.77	-0.29	-0.36	-0.03	-2.25	-0.34	-0.00	0.18	0.56	0.05
	-1.00	0.00	0.00	-0.03	-0.00	0.00	-0.01	-0.00	0.00	0.09
	Σ=	1.16	0.55	0.63	-0.49	0.54	-1.22	-6.24	14.59	-5.67

Nivo	Z [m]	Ton 97			Ton 98			Ton 99		
		Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]	Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	-0.60	1.18	-1.27	-1.71	0.35	-6.61	0.50	-0.01	0.76
vrh stupa 2L 7.75 +0.5	8.25	-2.55	-2.50	-1.87	-2.30	-0.58	-5.89	0.63	-0.42	0.67
vrh stupa 1D	8.01	-0.43	-0.19	0.06	0.64	0.01	-0.52	0.03	0.30	0.07
vrh stupa 2D 7+0.5	7.50	-0.14	-0.00	0.13	-0.46	-0.00	-0.21	0.16	0.27	0.02
vrh stupa 1L	7.40	-2.60	5.28	-0.51	4.53	2.77	-0.26	-0.76	1.78	0.11
strop prizemlja	4.40	-6.32	22.76	0.67	-5.63	9.31	0.16	1.97	4.49	-1.02
po	0.77	0.22	0.29	0.45	-1.53	-0.76	0.18	-0.51	-2.01	-0.06
	-1.00	-0.00	0.00	0.22	-0.00	0.00	0.10	0.00	0.00	-0.05
	Σ=	-12.42	26.83	-2.13	-6.46	11.09	-13.06	2.02	4.40	0.51

Nivo	Z [m]	Ton 100		
		Px [kN]	Py [kN]	Pz [kN]
sljeme	10.19	2.16	3.54	0.05
vrh stupa 2L 7.75 +0.5	8.25	2.73	-4.42	-0.01
vrh stupa 1D	8.01	0.71	-2.33	0.22
vrh stupa 2D 7+0.5	7.50	0.84	-0.28	0.14
vrh stupa 1L	7.40	-1.13	9.30	1.22
strop prizemlja	4.40	4.16	39.21	-4.26
po	0.77	6.63	-4.37	-0.54
	-1.00	0.00	0.00	-0.38
	Σ=	16.12	40.66	-3.57

Faktori participacije - Relativno učešće

Ton \ Naziv	1. Sx	2. Sy
1	0.012	0.252
2	0.168	0.009
3	0.000	0.000
4	0.073	0.007
5	0.000	0.001
6	0.017	0.002
7	0.002	0.011
8	0.000	0.002
9	0.002	0.032
10	0.000	0.000
11	0.000	0.000
12	0.000	0.004
13	0.000	0.000
14	0.008	0.001
15	0.000	0.000
16	0.000	0.000
17	0.004	0.017
18	0.000	0.000
19	0.000	0.003
20	0.028	0.000
21	0.333	0.054
22	0.000	0.000
23	0.034	0.005
24	0.040	0.007
25	0.008	0.000
26	0.112	0.006
27	0.002	0.006
28	0.000	0.000
29	0.001	0.000
30	0.000	0.000
31	0.003	0.000
32	0.013	0.003
33	0.020	0.002
34	0.001	0.000
35	0.000	0.003
36	0.003	0.002
37	0.003	0.002
38	0.000	0.001
39	0.000	0.000
40	0.008	0.015
41	0.004	0.007
42	0.000	0.003
43	0.000	0.000
44	0.006	0.000
45	0.001	0.029
46	0.000	0.001
47	0.001	0.002
48	0.000	0.000
49	0.012	0.023
50	0.000	0.000
51	0.003	0.000
52	0.001	0.008
53	0.003	0.028
54	0.002	0.003
55	0.000	0.000
56	0.001	0.018
57	0.000	0.009
58	0.001	0.016
59	0.000	0.027
60	0.000	0.031
61	0.000	0.021
62	0.001	0.002

63	0.000	0.008
64	0.000	0.006
65	0.000	0.004
66	0.002	0.040
67	0.000	0.001
68	0.001	0.027
69	0.000	0.002
70	0.001	0.000
71	0.001	0.003
72	0.000	0.034
73	0.006	0.011
74	0.002	0.000
75	0.000	0.002
76	0.003	0.000
77	0.001	0.067
78	0.005	0.044
79	0.001	0.002
80	0.001	0.000
81	0.004	0.000
82	0.002	0.004
83	0.001	0.000
84	0.004	0.000
85	0.002	0.001
86	0.001	0.003
87	0.006	0.007
88	0.001	0.000
89	0.000	0.008
90	0.000	0.001
91	0.001	0.006
92	0.003	0.004
93	0.002	0.001
94	0.003	0.000
95	0.000	0.000
96	0.000	0.007
97	0.000	0.012
98	0.000	0.005
99	0.001	0.002
100	0.008	0.014

Faktori participacije - Sudjelujuće mase

Ton	U [α=0°]	U [α=90°]
U obzir se uzima samo masa iznad kote temelja		
Kota temelja:	0.00 m	
Ukupna masa iznad temelja:	1547.62 T	
Ukupna masa cijelog objekta:	2279.22 T	

1	0.05	14.45
2	10.95	0.07
3	0.00	0.00
4	5.34	0.00
5	0.01	0.06
6	1.30	0.00
7	0.02	0.84
8	0.02	0.11
9	0.00	2.21
10	0.00	0.00
11	0.01	0.02
12	0.00	0.28
13	0.01	0.00
14	0.61	0.00
15	0.00	0.01
16	0.00	0.00
17	0.06	1.62
18	0.02	0.02
19	0.00	0.23
20	2.20	0.24
21	33.74	0.16
22	0.04	0.00
23	2.10	1.18
24	4.04	0.04
25	0.57	0.17
26	12.52	0.06
27	0.34	0.26
28	0.02	0.01
29	0.05	0.00
30	0.01	0.00
31	0.22	0.02
32	1.67	0.03
33	2.27	0.00
34	0.12	0.00
35	0.02	0.15
36	0.18	0.24
37	0.14	0.31
38	0.01	0.05
39	0.01	0.00
40	0.32	2.30
41	0.16	0.81
42	0.08	0.14
43	0.08	0.01
44	0.99	0.11
45	0.01	3.65
46	0.01	0.35
47	0.03	0.30

48	0.06	0.01
49	0.46	3.02
50	0.06	0.00
51	0.41	0.05
52	0.00	0.92
53	0.01	3.51
54	0.32	0.20
55	0.02	0.00
56	0.02	1.72
57	0.00	0.78
58	0.33	1.10
59	0.10	2.19
60	0.10	2.51
61	0.05	1.86
62	0.21	0.08
63	0.06	0.64
64	0.06	0.50
65	0.00	0.36
66	0.01	3.97
67	0.00	0.07
68	0.00	2.82
69	0.28	0.17
70	0.08	0.00
71	0.23	0.21
72	0.17	3.16
73	0.22	1.57
74	0.19	0.06
75	0.04	0.15
76	0.41	0.00
77	0.18	6.81
78	0.01	5.94
79	0.29	0.16
80	0.12	0.07
81	0.40	0.16
82	0.47	0.27
83	0.08	0.02
84	0.48	0.07
85	0.12	0.11
86	0.09	0.35
87	0.26	0.94
88	0.14	0.01
89	0.08	0.79
90	0.05	0.03
91	0.00	0.94
92	0.13	0.73
93	0.27	0.02
94	0.34	0.09
95	0.00	0.03
96	0.10	0.58
97	0.31	1.41

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo		DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502		STR: 180

98	0.14	0.51
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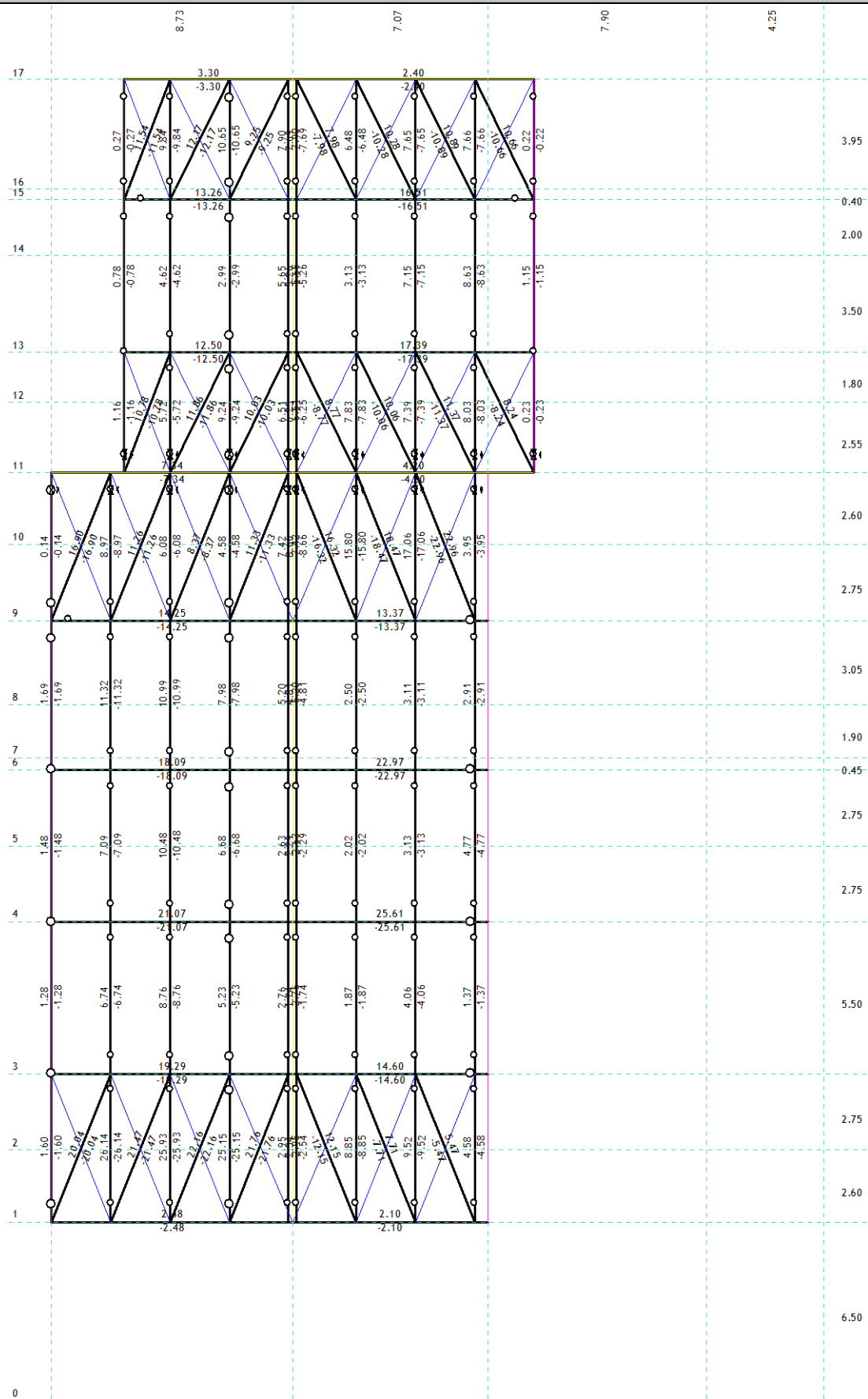
99	0.05	0.27
100	0.27	2.06
ΣU (%)	88.69	84.56

Poprečne sile u tlocrtu [0.00 m]

Slučaj opterećenja	Kut α[°]	VtB[kN]
Sx	0	1634.98
Sy	90	1332.76

DIJAGONALE POPREČNOG KROVNOG SPREGA

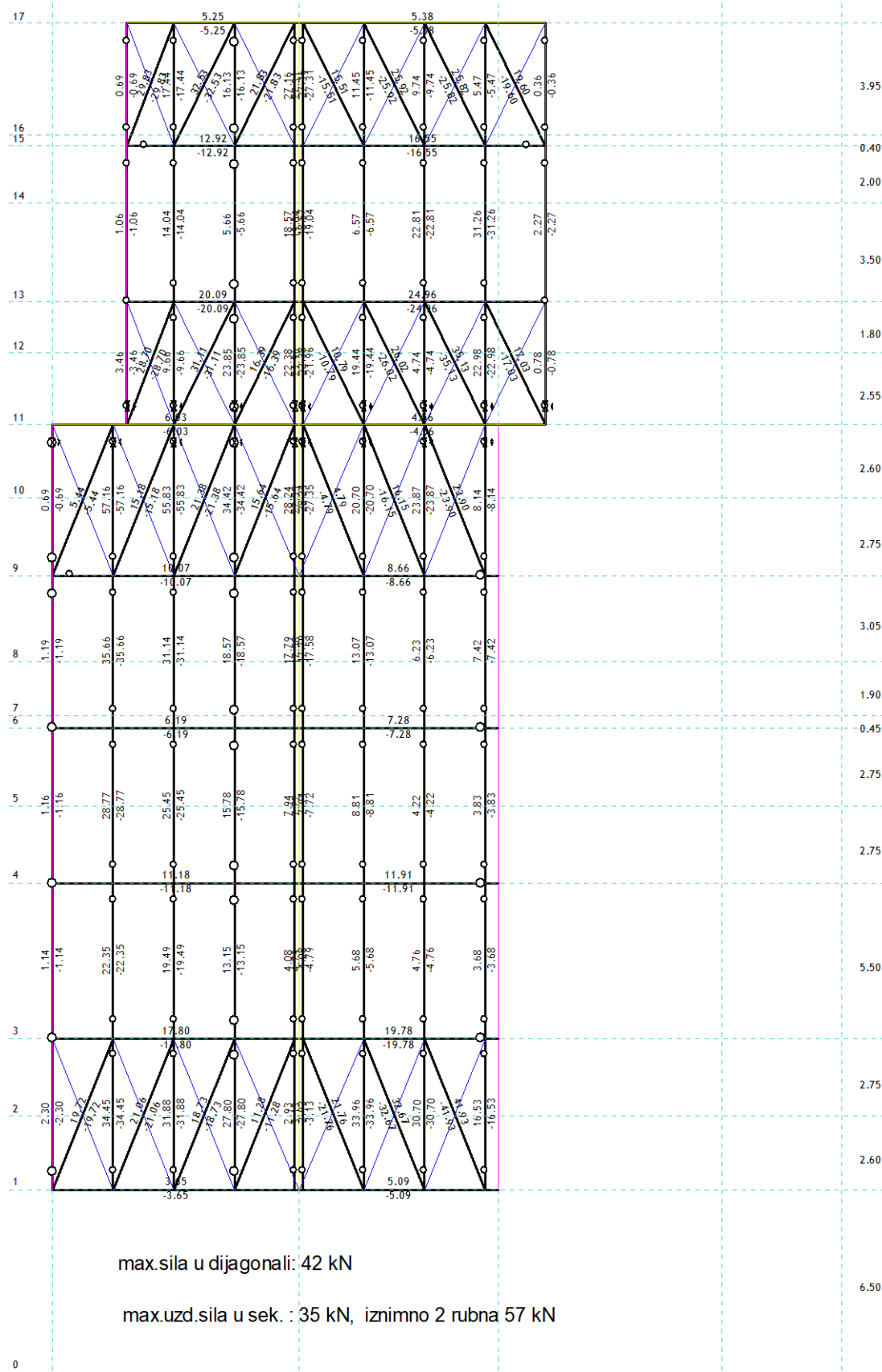
Opt. 4: Sx



Pogled: k1+k2

Utjecaji u gredi: max N1= 64.06 / min N1= -64.06 kN

Opt. 5: Sy



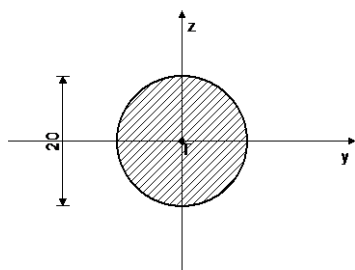
Pogled: k1+k2

Utjecaji u gredi: max N1= 57.16 / min N1= -57.16 kN

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 183

POPREČNI PRESJEK: Kružni [S 235]
 EUROCODE 3 (EN 1993-1-1:2005)

GEOMETRIJSKE KARAKTERISTIKE PRESJEKA



Ax =	3.142 cm ²
Ay =	2.827 cm ²
Az =	2.827 cm ²
Ix =	1.571 cm ⁴
Iy =	0.785 cm ⁴
Iz =	0.785 cm ⁴
Wy =	0.785 cm ³
Wz =	0.785 cm ³
Wy,pl =	1.333 cm ³
Wz,pl =	1.333 cm ³
yM0 =	0.500
yM1 =	1.050
yM2 =	1.250
Anet/A =	0.900

[mm]

(fy = 23.5 kN/cm², fu = 36.0 kN/cm²)

ŠTAP IZLOŽEN CENTRIČNOM VLAKU

Računska uzdužna sila

NEd = 44.000 kN

Sistemska dužina štapa

L = 200.00 cm

6.2 NOSIVOST POPREČNIH PRESJEKA

6.2.3 Vlak

Plast.rač.otpornost bruto presjeka

Npl,Rd = 147.65 kN

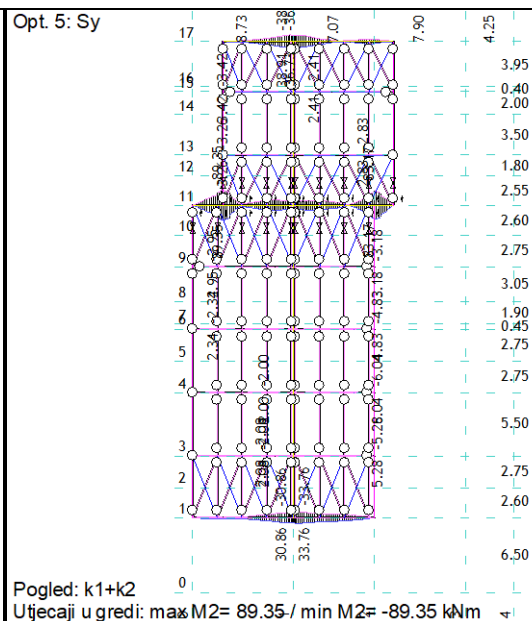
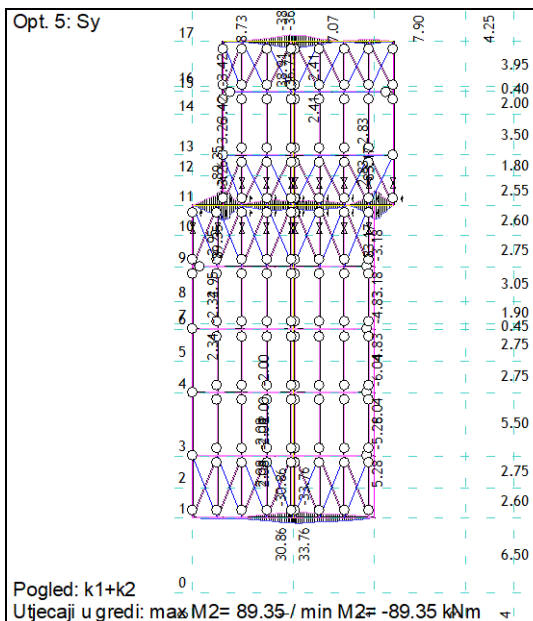
Granična rač.otpornost neto pres.

Nu,Rd = 73.287 kN

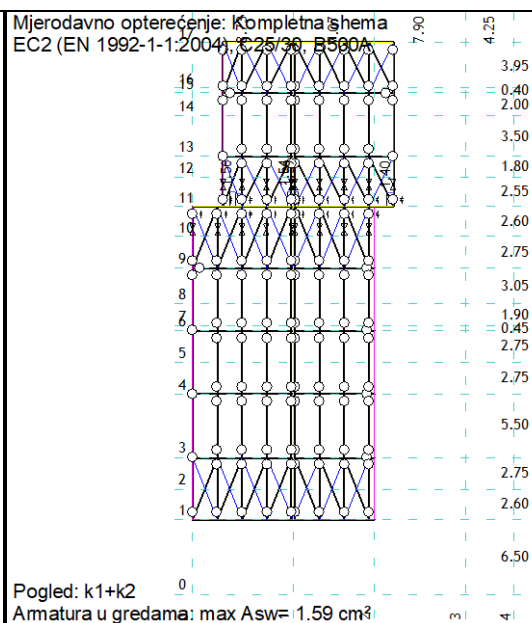
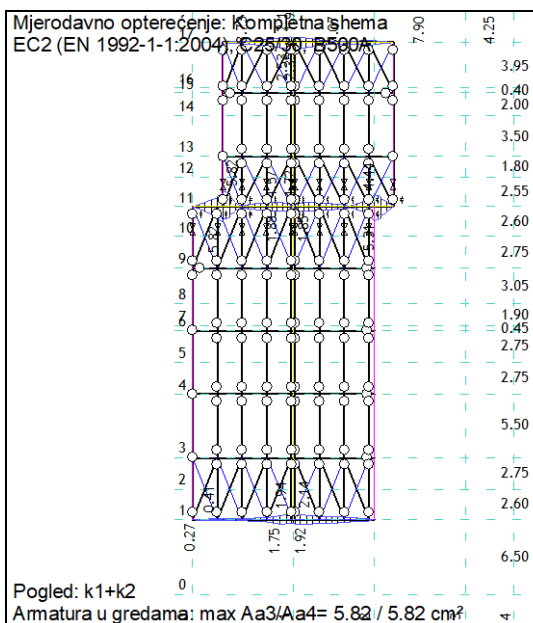
Računska otp. na vlak

Nt,Rd = 73.287 kN

Uvjet 6.5: NEd <= Nt,Rd (44.00 <= 73.29)



HORIZONTALNO OPTEREĆENJE ZBOG SVOJE KRUTOSTI PREUZIMAJU BETONSKE GREDE NA VRHU ZABATNIH ZIDOVA, PA JE UTJECAJ NA GLAVNE DRVENE NOSAČE ZANEMARIV



Greda 2154-3523
EC2 (EN 1992-1-1:2004)
C25/30 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

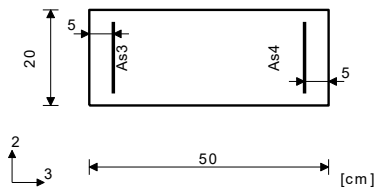
Presjek 1-1 x = 2.78m
Mjerodavna kombinacija za savijanje:
1.00xI+0.30xIII+1.00xV
N1Ed = 14.45 kN
M2Ed = 85.53 kNm
M3Ed = 0.00 kNm

As1 = 0.00 cm²
As2 = 0.00 cm²
As3 = 5.82 cm²
As4 = 4.86 cm²
Asw = 0.00 cm²/m (m=2)

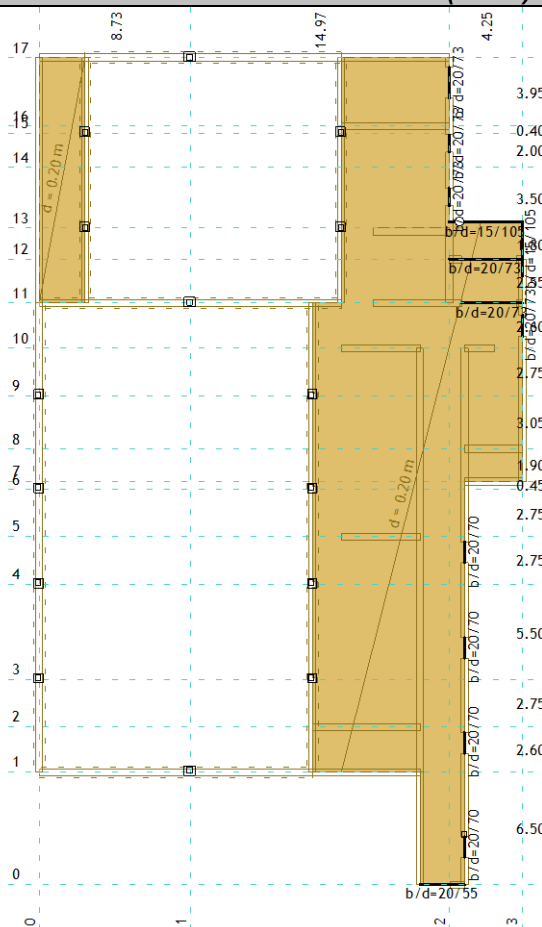
Mjerodavna kombinacija za torziju:
1.00xI+0.30xIII+1.00xV
M1Ed = -0.03 kNm

Mjerodavna kombinacija za posmik:
1.00xI+1.00xV
V2Ed = -2.57 kN
V3Ed = 21.77 kN
M1Ed = 0.03 kNm

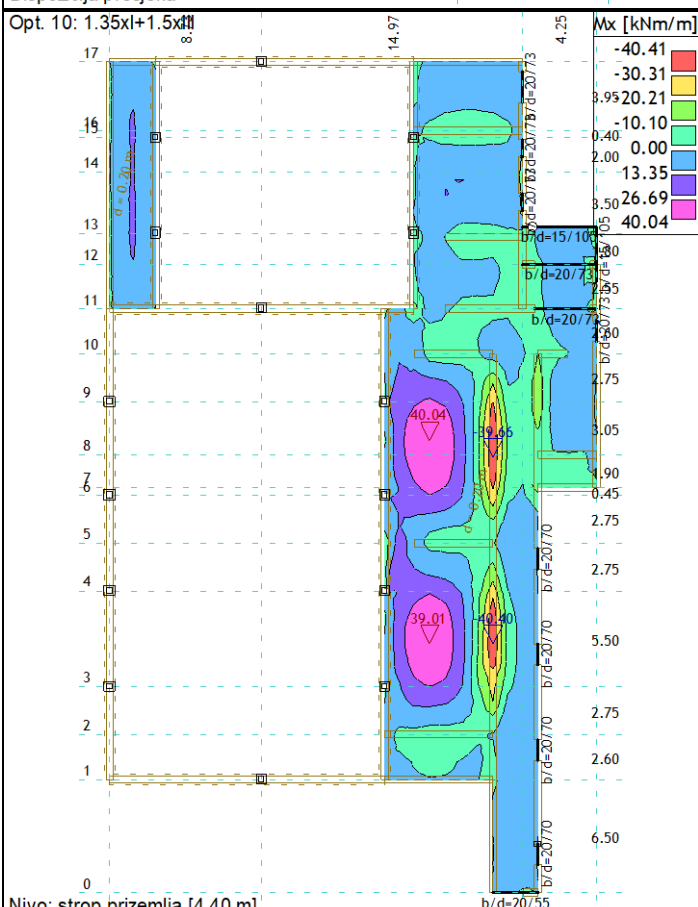
V2Rd,max = 303.75 kN
V3Rd,max = 364.50 kN
εb/εa = -2.956/20.000 ‰



A.B.PLOČA NAD PRIZEMLJEM (20cm)

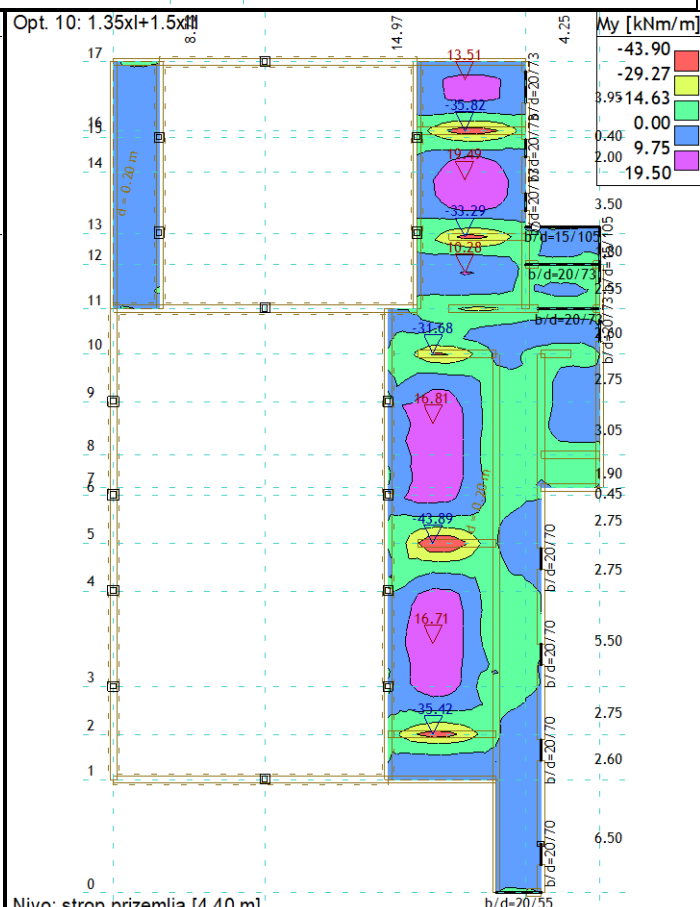


Nivo: strop prizemlja [4.40 m]
Dispozicija presjeka



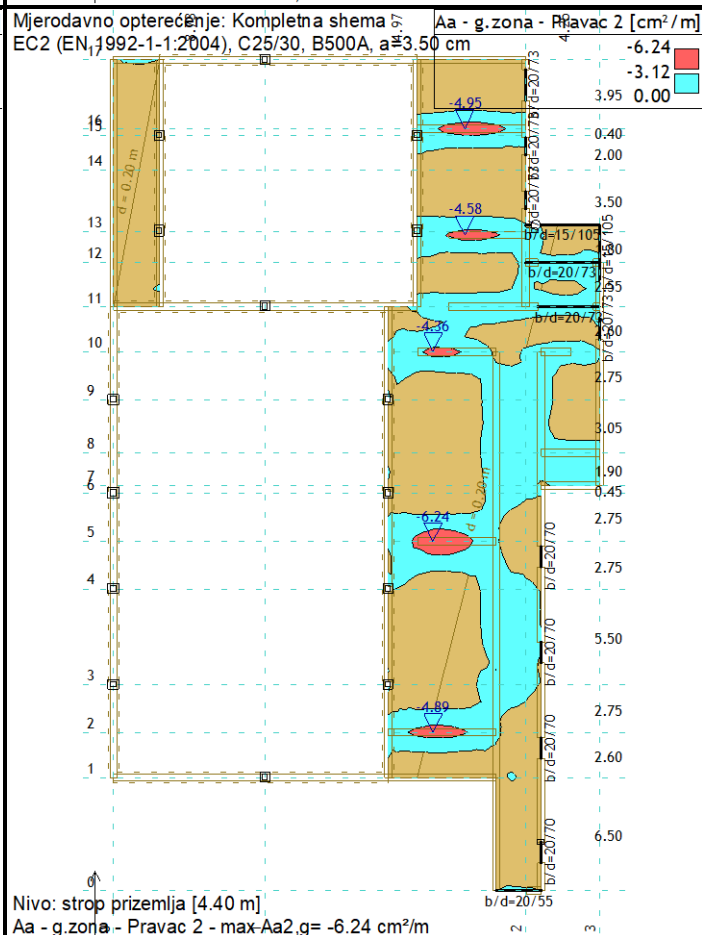
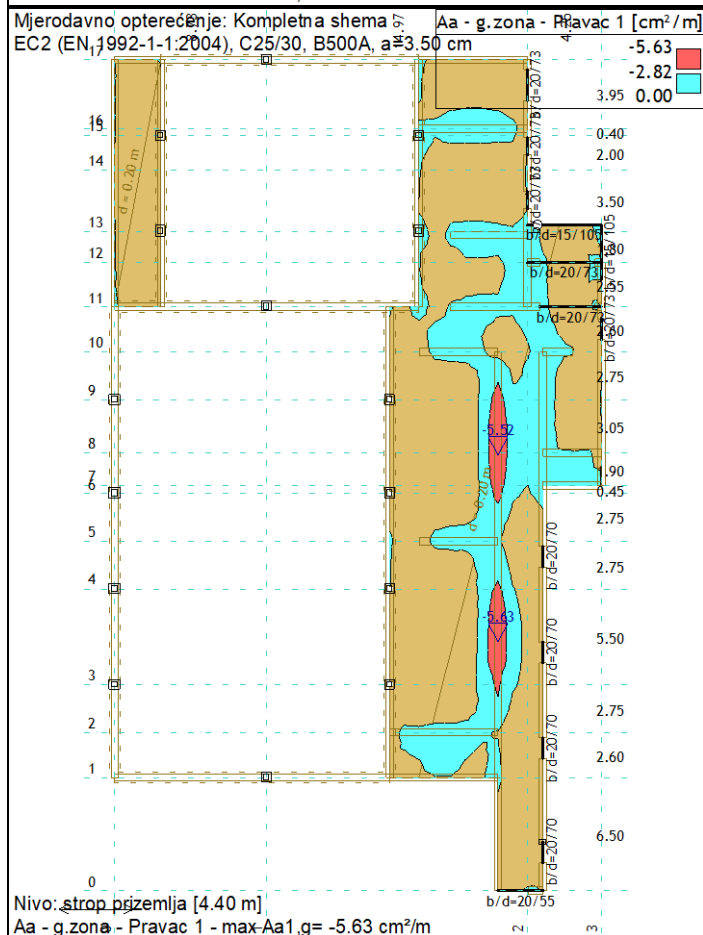
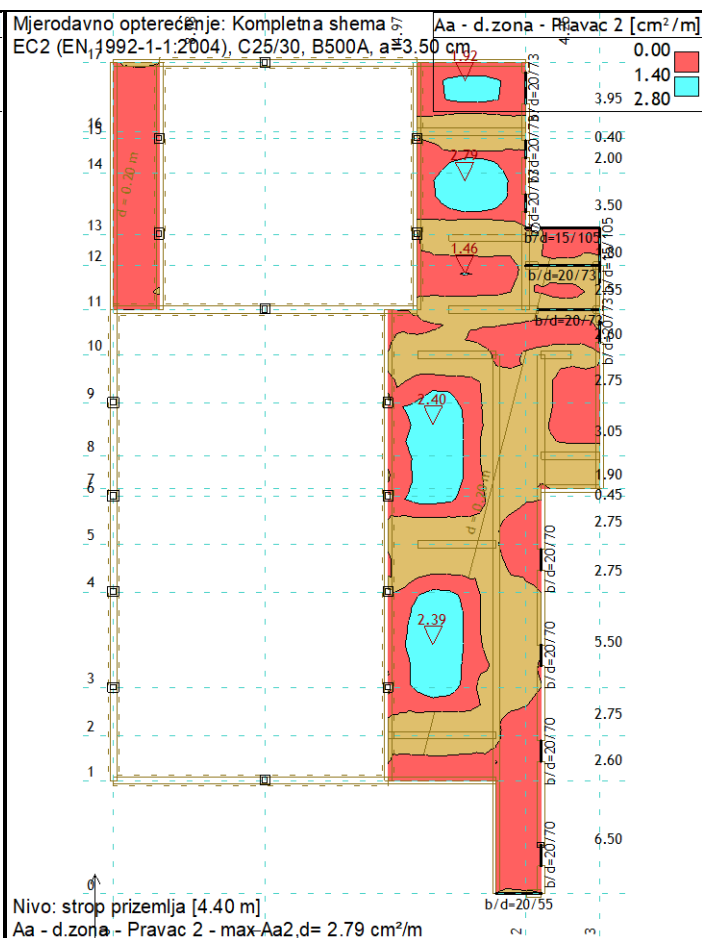
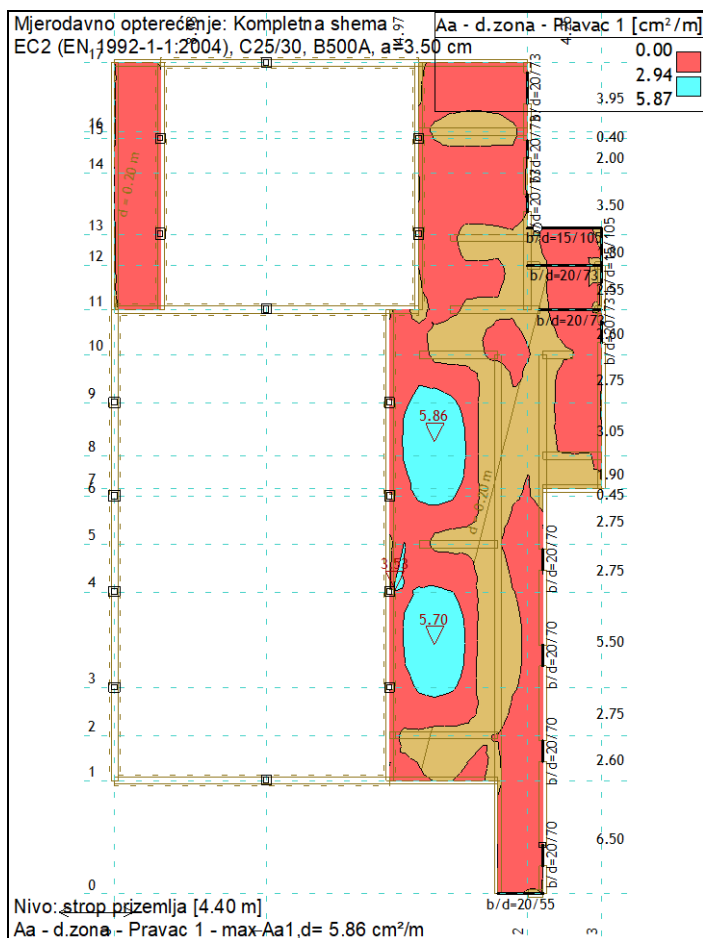
Nivo: strop prizemlja [4.40 m]

Utjecaji u ploči: max $M_x = 40.04$ / min $M_x = -40.40$ kNm/m 2 3



Nivo: strop prizemlja [4.40 m]

Utjecaji u ploči: max $M_y = 19.49$ / min $M_y = -43.89$ kNm/m

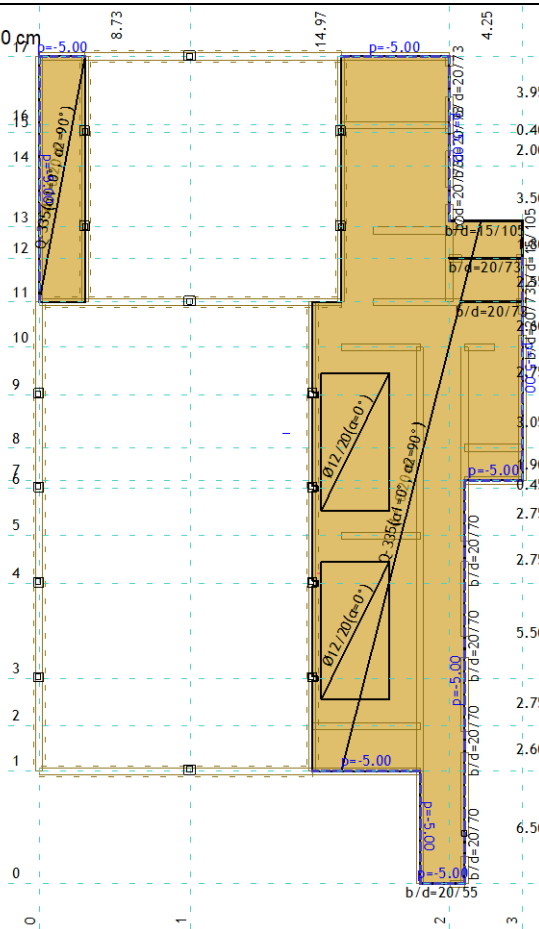


Odabrana armatura

EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

Aa - d.zona [cm²/m]

0.00
2.94
5.87



Nivo: strop prizemlja [4.40 m]

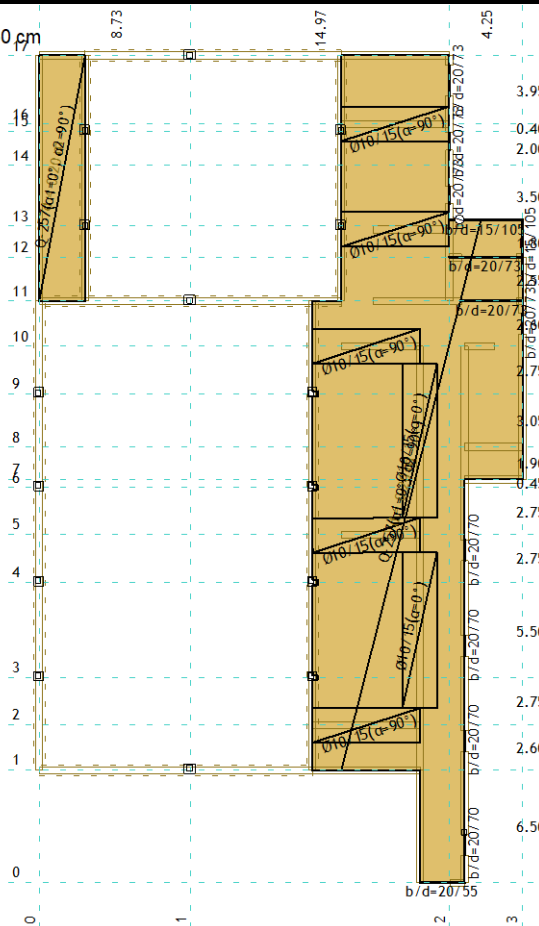
Aa - d.zona

Odabrana armatura

EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

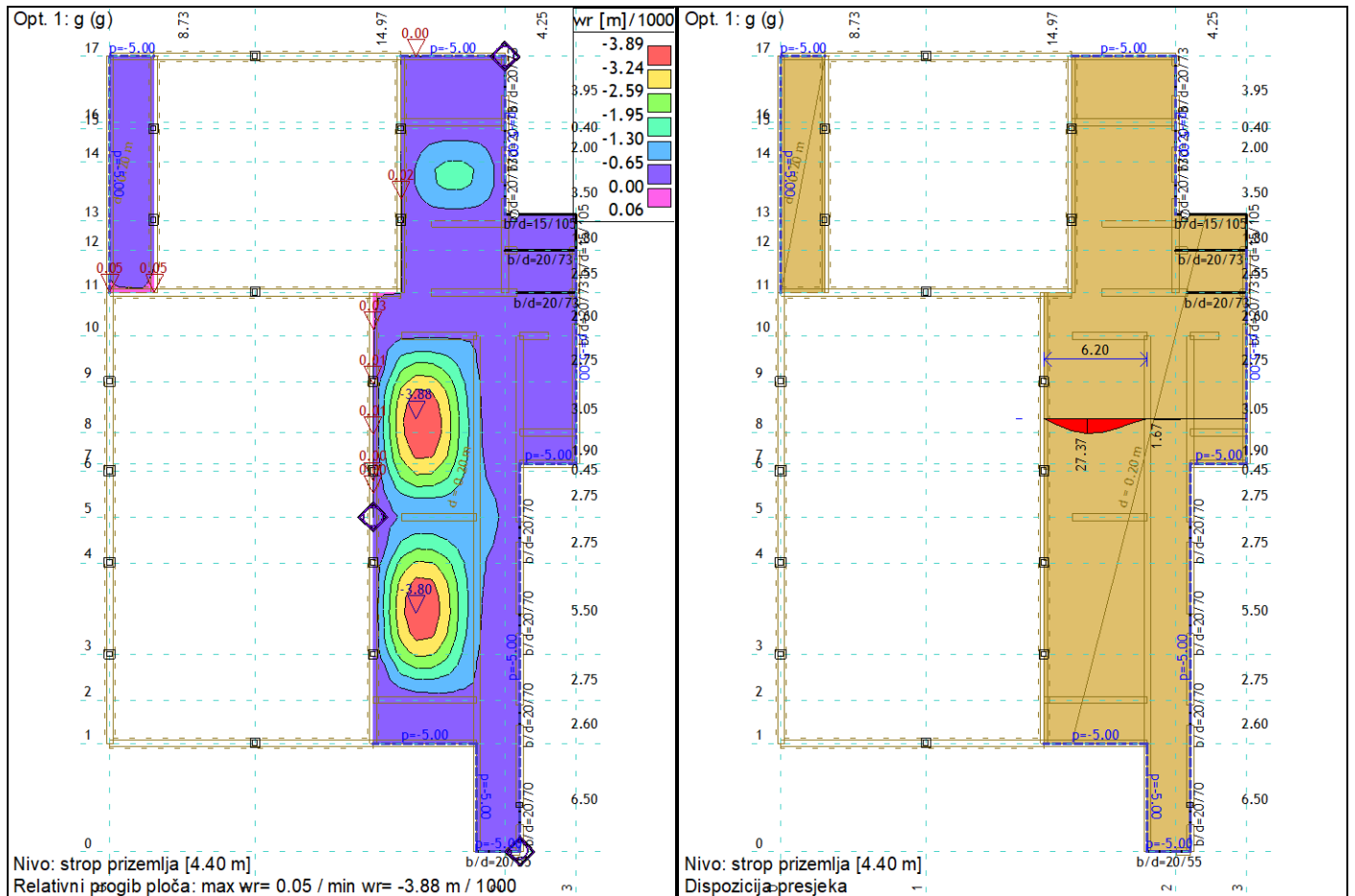
Aa - g.zona [cm²/m]

-6.24
-3.12
0.00



Nivo: strop prizemlja [4.40 m]

Aa - g.zona



Nivo: strop prizemlja [4.40 m] - EC2 (EN 1992-1-1:2004)

C25/30 (d,pl=20.0 cm)

Gornja zona: B500A (a=3.5 cm)

Donja zona: B500A (a=3.5 cm)

Modul elastičnosti betona

Vlačna čvrstoća pri savijanju

Modul elastičnosti armature

Koef. utjecaja prijanjanja arm.

Koeficijent tečenja betona

Dilatacija skupljanja betona

Kut = 0°

Eb(t0)= 31000 MPa

fbzs= 2.60 MPa

Ea= 2.00e+5 MPa

k1= 0.80

φ∞= 2.63

εs= 0.59 ‰

Ø7/15 α = 0°

Ø7/15 α = 90°

Donja zona

Ø8/15 α = 0°

Ø12/20 α = 0°

Ø8/15 α = 90°

T = 0

Mjerodavna kombinacija: 1.00xl+0.30xIII

N1 = 0.00 kN/m

M = 25.69 kNm/m

Veličina početnog progiba

ug(0)= 6.76 mm

T = ∞

Dugotrajni utjecaji

Mjerodavna kombinacija: 1.00xl+0.30xIII

N1 = 0.00 kN/m

M = 25.69 kNm/m

Veličina trajnog progiba

ug(∞)= 27.37 mm

Presjek 1-1

Kompletna shema opterećenja

(kvazi-stalne kombinacije)

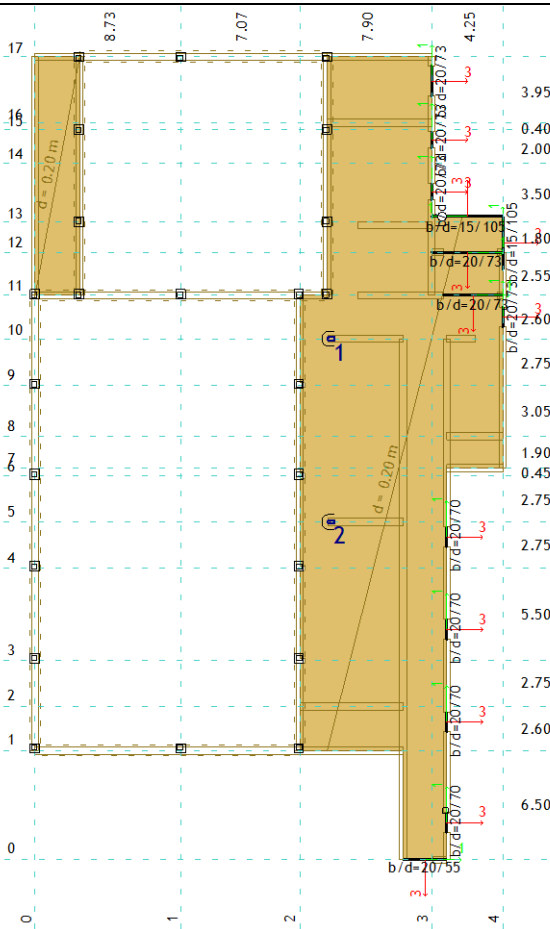
X=18.37 m; Y=-21.79 m; Z=4.40 m

Gornja zona

$$L/250 = 24,8\text{mm}$$

STROPU JE POTREBNO DATI NADVIŠENJE U OPLATI OD

15mm (na mjestu najvećeg raspona 6.2m)



Nivo: strop prizemlja [4.40 m]
Dispozicija presjeka

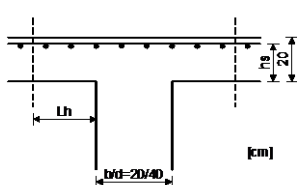
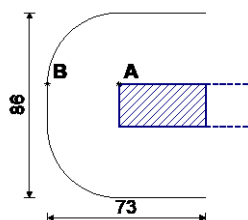
Kontrola ploča na proboj

EC2 (EN 1992-1-1:2004)

Nivo: strop prizemlja [4.40 m]

Presjek 2 (19.75,-27.70,4.40)

C25/30



KONTROLA KRITIČNOG PRESJEKA 1. (Lh = 0.33m od ruba zida)

Mjerodavna kombinacija:

1.35xI+0.75xII+1.50xIII

Računska sila na kraju zida

Faktor ekscentriciteta

Mjerodavni posmični napon (točka B)

Debljina ploče

Statička visina ploče

N = 71.365 kN

β = 1.350

ved = 0.287 MPa

d,pl = 0.200 m

hs = 0.165 m

Opseg kritičnog presjeka

u1 = 2.037 m

Čvrstoća betona

fck = 25.000 MPa

Računska čvrstoća betona

fcd = 16.667 MPa

Koeficijent

v = 0.540

Koeficijent

yc = 1.500

Maksimalna otpornost

vRd,max = 3.600 MPa

0.40xvxfcd

=

KONTROLA PRESJEKA UZ RUB ZIDA

Zona kraja zida d = min(2b ; 6d-b) = 0.40m

Mjerodavna kombinacija:

1.35xI+0.75xII+1.50xIII

Računska sila na kraju zida

Faktor ekscentriciteta

Mjerodavni posmični napon (točka A)

Debljina ploče

Statička visina ploče

N = 71.365 kN

β = 1.350

ved = 0.584 MPa

d,pl = 0.200 m

hs = 0.165 m

Čvrstoća betona

fck = 25.000 MPa

Računska čvrstoća betona

fcd = 16.667 MPa

Koeficijent

v = 0.540

Koeficijent

yc = 1.500

Maksimalna otpornost

vRd,max = 3.600 MPa

0.40xvxfcd

=

Uvjet: ved <= vRd,max (0.58 <= 3.60)

Uvjet je ispunjen.

Uvjet: ved <= vRd,max (0.29 <= 3.60)

Uvjet je ispunjen.

Postojeća armatura u ploči

Površina armature - pravac 1

Postotak armiranja - pravac 1

Površina armature - pravac 2

Postotak armiranja - pravac 2

Srednja vrijednost postotka armiranja

Koeficijent

Koeficijent

Koeficijent

Koeficijent

Normalni napon u betonu

Otpornost na proboj ploče bez dodatne armature

Aa,1 = 7.802 cm²

ρ ,1 = 0.473 %

Aa,2 = 2.566 cm²

ρ ,2 = 0.155 %

pl = 0.271 %

CRd,c = 0.120

K1 = 0.100

k,vmin = 0.035

vmin = 0.495

scp = -0.005 MPa

vRd,c = 0.494 MPa

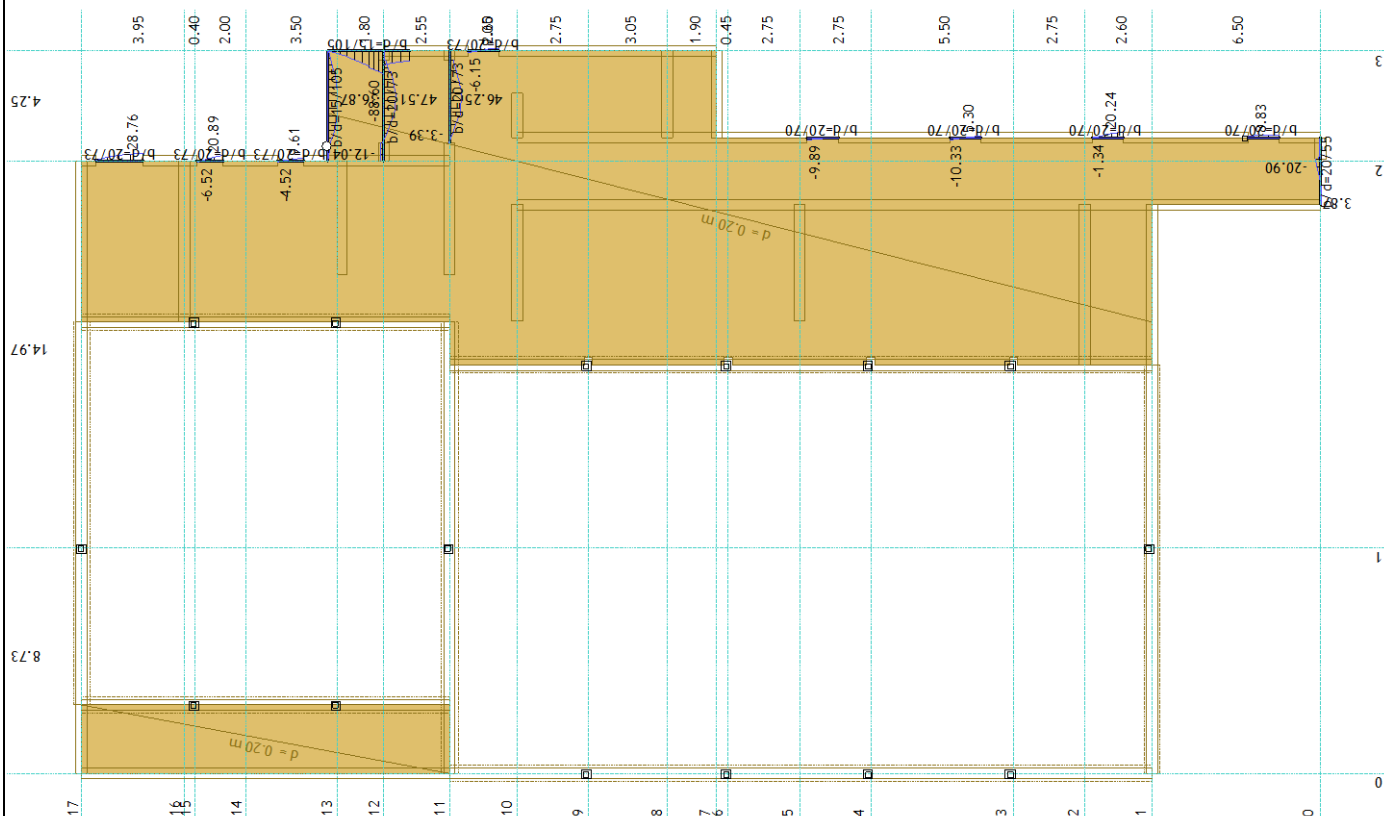
Uvjet: ved <= vRd,c (0.29 <= 0.49)

Uvjet je ispunjen, nije potrebna dodatna armatura za osiguranje od proboja ploče.

	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 190

GREDE U RAZINI PLOČE NAD PRIZEMLJEM

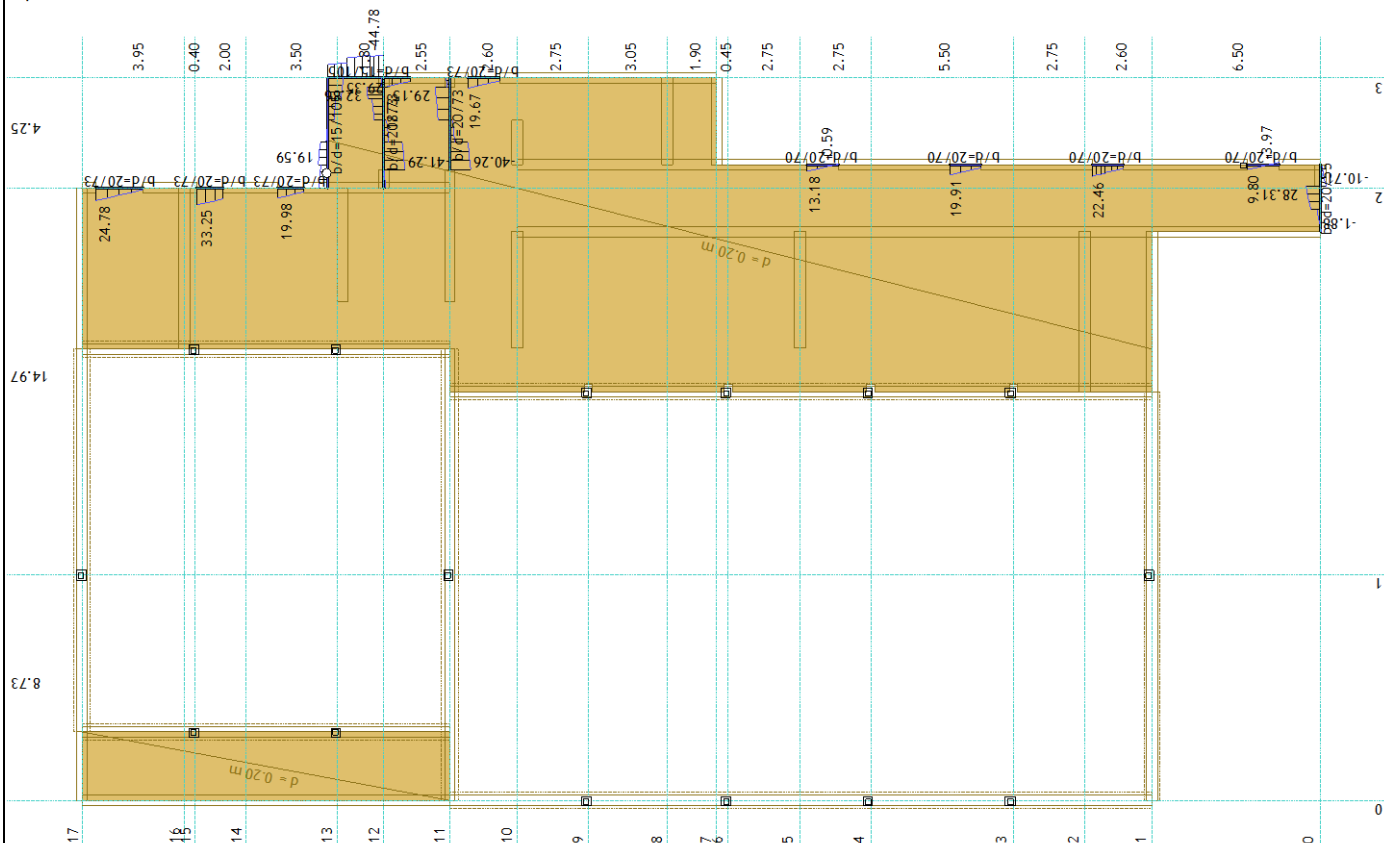
Opt. 10: 1.35xl+1.5xIII



Nivo: strop prizemlja [4.40 m]

Utjecaji u gredi: max M3= 47.51 / min M3= -88.60 kNm

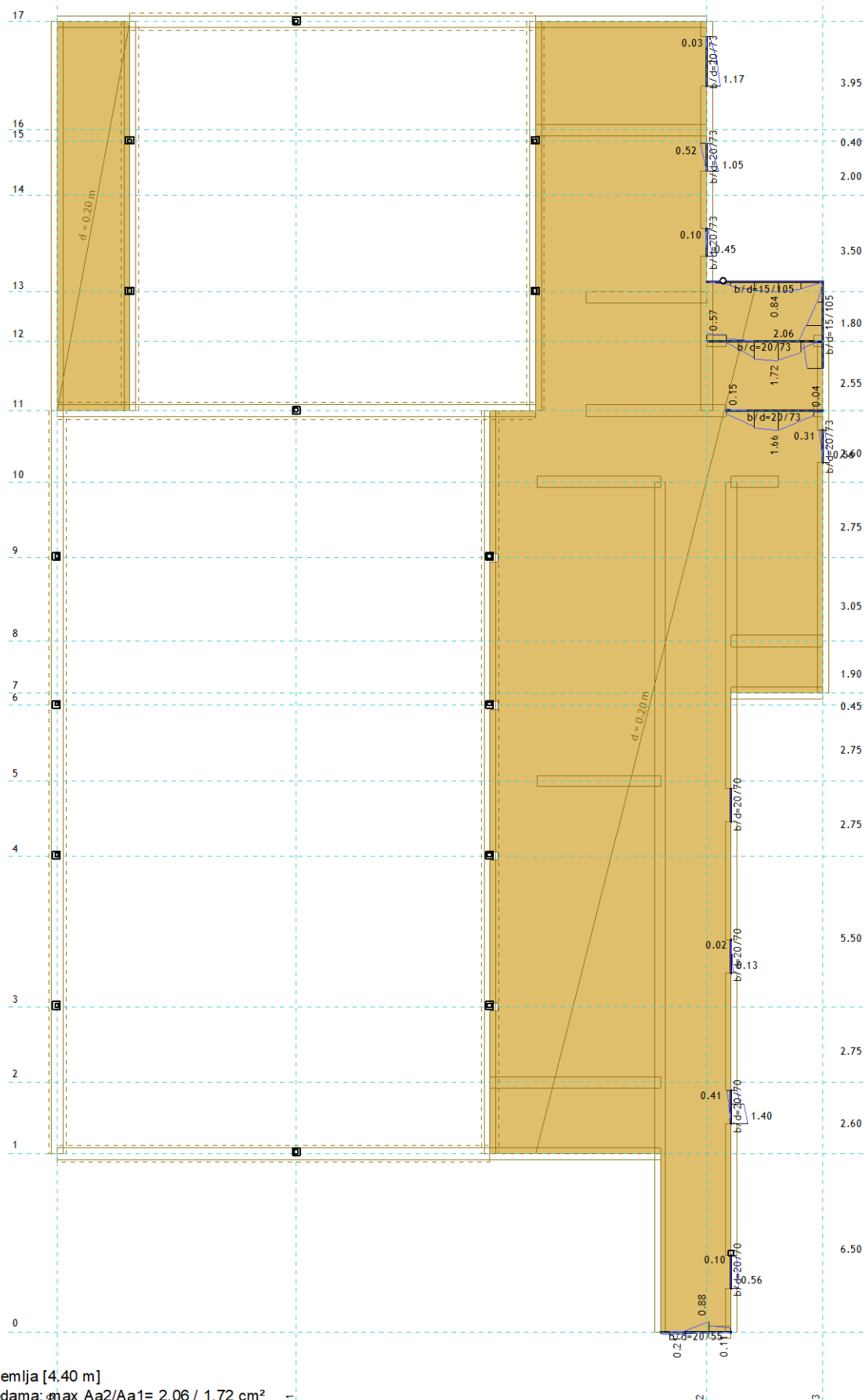
Opt. 10: 1.35xl+1.5xIII



Nivo: strop prizemlja [4.40 m]

Utjecaji u gredi: max V2= 33.25 / min V2= -44.78 kN

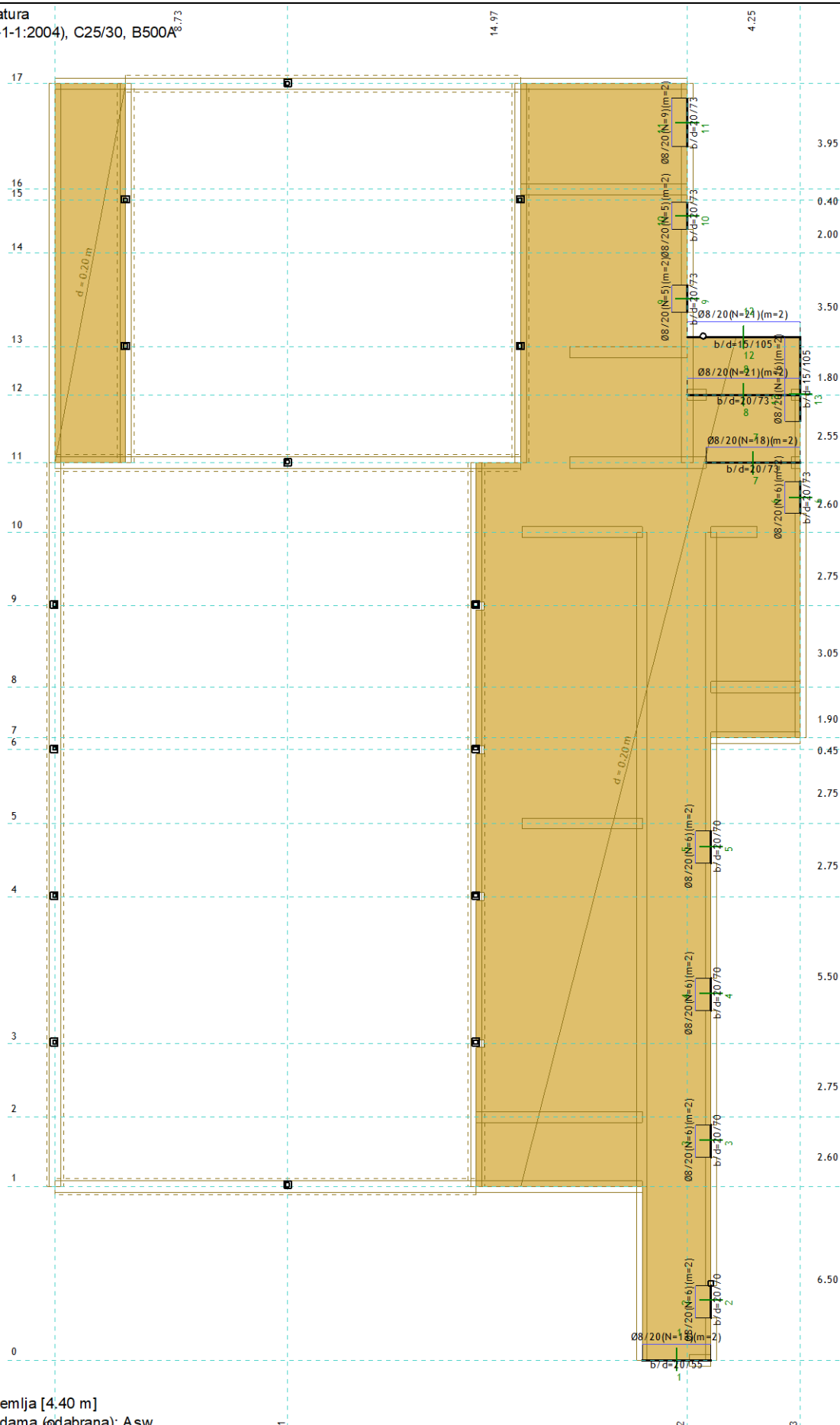
Mjerodavno opterećenje: Kompletna shema EC2 (EN 1992-1-1:2004), C25/30, B500A⁰⁰



Nivo: strop prizemlja [4.40 m]

Armatura u gredama: $\max A_{a2}/A_{a1} = 2.06 / 1.72 \text{ cm}^2$

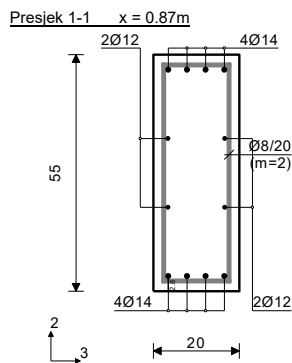
Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A^{8,73}



Nivo: strop prizemlja [4.40 m]
Armatura u gredama (odabrana): Asw

Greda 828-1035

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



Mjerodavna kombinacija za savijanje:
1.00xI+0.30xIII+1.00xIV
N1Ed = -7.62 kN
M2Ed = 0.00 kNm
M3Ed = -2.71 kNm

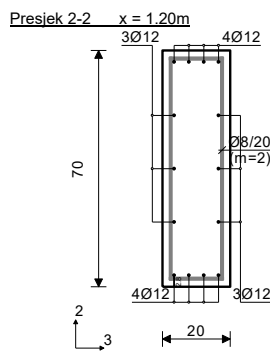
Mjerodavna kombinacija za posmik:
1.35xI+1.50xIII
V2Ed = 18.86 kN
V3Ed = -0.40 kN
M1Ed = 0.00 kNm

V2Rd,max = 400.95 kN
V3Rd,max = 400.95 kN
 $\epsilon_b/\epsilon_a = -0.625/20.000 \text{ ‰}$
As1 = 0.17 cm²
As2 = 0.02 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 1.53%

Greda 1176-1251

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



Mjerodavna kombinacija za torziju:
1.35xI+0.75xII+1.50xIII
M1Ed = 0.01 kNm

Mjerodavna kombinacija za posmik:
1.00xI+0.30xIII+1.00xIV
V2Ed = 10.24 kN
V3Ed = 0.25 kN
M1Ed = 0.01 kNm

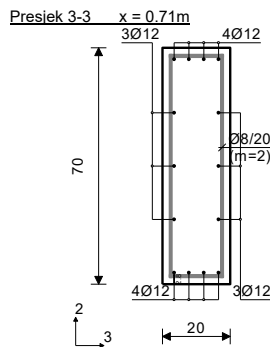
V2Rd,max = 510.30 kN
V3Rd,max = 510.30 kN
 $\epsilon_b/\epsilon_a = -0.204/20.000 \text{ ‰}$
As1 = 0.42 cm²
As2 = 0.10 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 1.13%

Mjerodavna kombinacija za savijanje:
1.35xI+0.75xII+1.50xIII
N1Ed = 20.06 kN
M2Ed = 0.00 kNm
M3Ed = 4.75 kNm

Greda 1569-1657

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



Mjerodavna kombinacija za torziju:
1.00xI+0.30xIII+1.00xIV
M1Ed = -0.01 kNm

Mjerodavna kombinacija za posmik:
1.00xI+0.30xIII+1.00xIV
V2Ed = 15.24 kN
V3Ed = -0.79 kN
M1Ed = -0.00 kNm

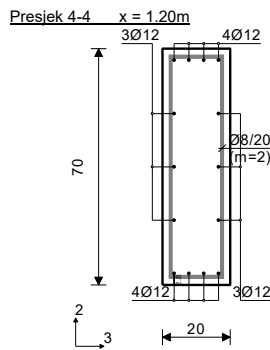
V2Rd,max = 510.30 kN
V3Rd,max = 510.30 kN
 $\epsilon_b/\epsilon_a = -0.140/20.000 \text{ ‰}$
As1 = 1.07 cm²
As2 = 0.24 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 1.13%

Mjerodavna kombinacija za savijanje:
1.00xI+0.30xIII+1.00xIV
N1Ed = 55.95 kN
M2Ed = 0.00 kNm
M3Ed = 10.56 kNm

Greda 2100-2228

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



Mjerodavna kombinacija za savijanje:
1.00xI-1.00xV
N1Ed = -23.97 kN
M2Ed = 0.00 kNm
M3Ed = -8.82 kNm

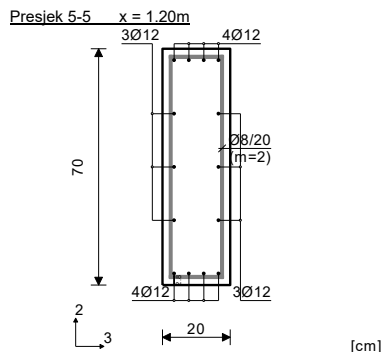
Mjerodavna kombinacija za posmik:
1.35xI+1.50xIII
V2Ed = 19.91 kN
V3Ed = -0.56 kN
M1Ed = 0.00 kNm

V2Rd,max = 510.30 kN
V3Rd,max = 510.30 kN
 $\epsilon_b/\epsilon_a = -0.751/20.000 \text{ ‰}$
As1 = 0.00 cm²
As2 = 0.02 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 1.13%

Greda 2642-2769

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
N1Ed = -63.59 kN
M2Ed = 0.00 kNm
M3Ed = -9.16 kNm

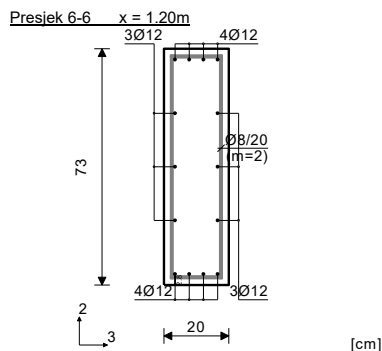
Mjerodavna kombinacija za torziju:
1.00xI+0.30xII+1.00xIV
M1Ed = 0.01 kNm

Mjerodavna kombinacija za posmik:
1.00xI+1.00xV
V2Ed = 14.06 kN
V3Ed = -0.06 kN
M1Ed = 0.01 kNm

V2Rd,max = 510.30 kN
V3Rd,max = 510.30 kN
Nije potrebna armatura.

Greda 4402-4499

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



Mjerodavna kombinacija za savijanje:
1.00xI+0.30xIII-1.00xIV
N1Ed = -4.88 kN
M2Ed = 0.00 kNm
M3Ed = -10.79 kNm

Mjerodavna kombinacija za torziju:
1.35xI+0.75xII+1.50xIII
M1Ed = -0.03 kNm

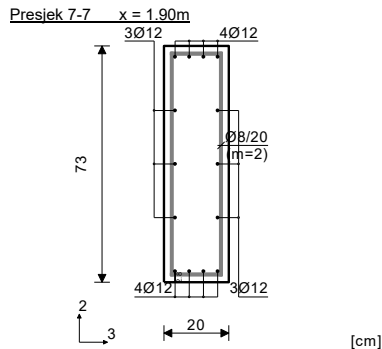
Mjerodavna kombinacija za posmik:
1.00xI+0.30xII+1.00xIV
V2Ed = 24.89 kN
V3Ed = 0.15 kN
M1Ed = -0.01 kNm

V2Rd,max = 532.17 kN
V3Rd,max = 532.17 kN
sb/ea = -0.716/20.000 ‰
As1 = 0.18 cm²
As2 = 0.31 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 1.08%

Greda 4260-4559

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



Mjerodavna kombinacija za savijanje:
1.35xI+0.75xII+1.50xIII
N1Ed = 1.58 kN
M2Ed = 0.00 kNm
M3Ed = 45.82 kNm

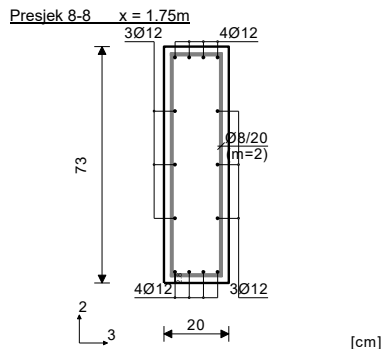
Mjerodavna kombinacija za posmik:
1.35xI+1.50xIII
V2Ed = -5.33 kN
V3Ed = -0.10 kN
M1Ed = 0.00 kNm

V2Rd,max = 532.17 kN
V3Rd,max = 532.17 kN
sb/ea = -1.331/20.000 ‰
As1 = 1.66 cm²
As2 = 0.00 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 1.08%

Greda 4429-4758

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



Mjerodavna kombinacija za savijanje:
1.35xI+0.75xII+1.50xIII
N1Ed = -0.16 kN
M2Ed = 0.00 kNm
M3Ed = 42.37 kNm

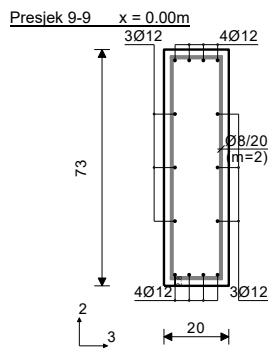
Mjerodavna kombinacija za posmik:
1.35xI+1.50xIII
V2Ed = -9.52 kN
V3Ed = -0.08 kN
M1Ed = -0.00 kNm

V2Rd,max = 532.17 kN
V3Rd,max = 532.17 kN
sb/ea = -1.278/20.000 ‰
As1 = 1.51 cm²
As2 = 0.00 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 1.08%

Greda 4661-4742

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



Mjerodavna kombinacija za savijanje:
1.00xI+0.30xIII+1.00xIV
N1Ed = 10.21 kN
M2Ed = 0.00 kNm
M3Ed = 9.09 kNm

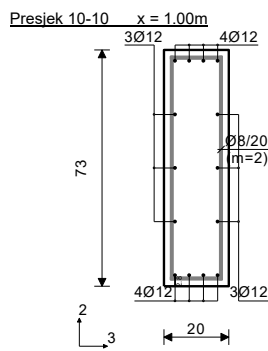
Mjerodavna kombinacija za posmik:
1.35xI+1.50xIII
V2Ed = 8.30 kN
V3Ed = -0.47 kN
M1Ed = -0.00 kNm

V2Rd,max = 532.17 kN
V3Rd,max = 532.17 kN
 $\epsilon_b/\epsilon_a = -0.436/20.000 \text{ ‰}$
As1 = 0.45 cm²
As2 = 0.00 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 1.08%

Greda 4868-4912

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



Mjerodavna kombinacija za savijanje:
1.35xI+1.50xIII
N1Ed = 24.43 kN
M2Ed = 0.00 kNm
M3Ed = -6.52 kNm

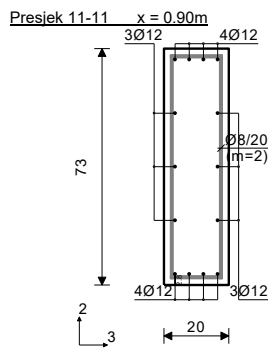
Mjerodavna kombinacija za posmik:
1.35xI+1.50xIII
V2Ed = 33.25 kN
V3Ed = -0.84 kN
M1Ed = 0.00 kNm

V2Rd,max = 532.17 kN
V3Rd,max = 532.17 kN
 $\epsilon_b/\epsilon_a = -0.340/20.000 \text{ ‰}$
As1 = 0.20 cm²
As2 = 0.52 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 1.08%

Greda 4985-5003

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



Mjerodavna kombinacija za savijanje:
1.35xI+1.50xIII
N1Ed = 11.43 kN
M2Ed = 0.00 kNm
M3Ed = 20.65 kNm

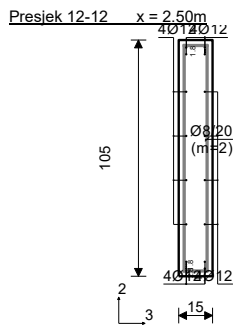
Mjerodavna kombinacija za posmik:
1.35xI+1.50xIII
V2Ed = 14.27 kN
V3Ed = -0.30 kN
M1Ed = 0.00 kNm

V2Rd,max = 532.17 kN
V3Rd,max = 532.17 kN
 $\epsilon_b/\epsilon_a = -0.763/20.000 \text{ ‰}$
As1 = 0.88 cm²
As2 = 0.00 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 1.08%

Greda 4883-4591

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



Mjerodavna kombinacija za savijanje:
1.35xI+0.75xII+1.50xIII
N1Ed = -8.01 kN
M2Ed = 0.00 kNm
M3Ed = 35.47 kNm

Mjerodavna kombinacija za posmik:
1.35xI+1.50xIII
V2Ed = 4.38 kN
V3Ed = -0.10 kN
M1Ed = -0.00 kNm

V2Rd,max = 574.09 kN
V3Rd,max = 552.83 kN
 $\epsilon_b/\epsilon_a = -0.938/20.000 \text{ ‰}$
As1 = 0.78 cm²
As2 = 0.00 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 1.15%

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 199

I	-13.0	-13.0	-9.3
II	-0.6	0.1	0.1
III	5.0	-3.4	-2.9
IV	14.8	8.2	5.0
V	15.5	5.8	3.6

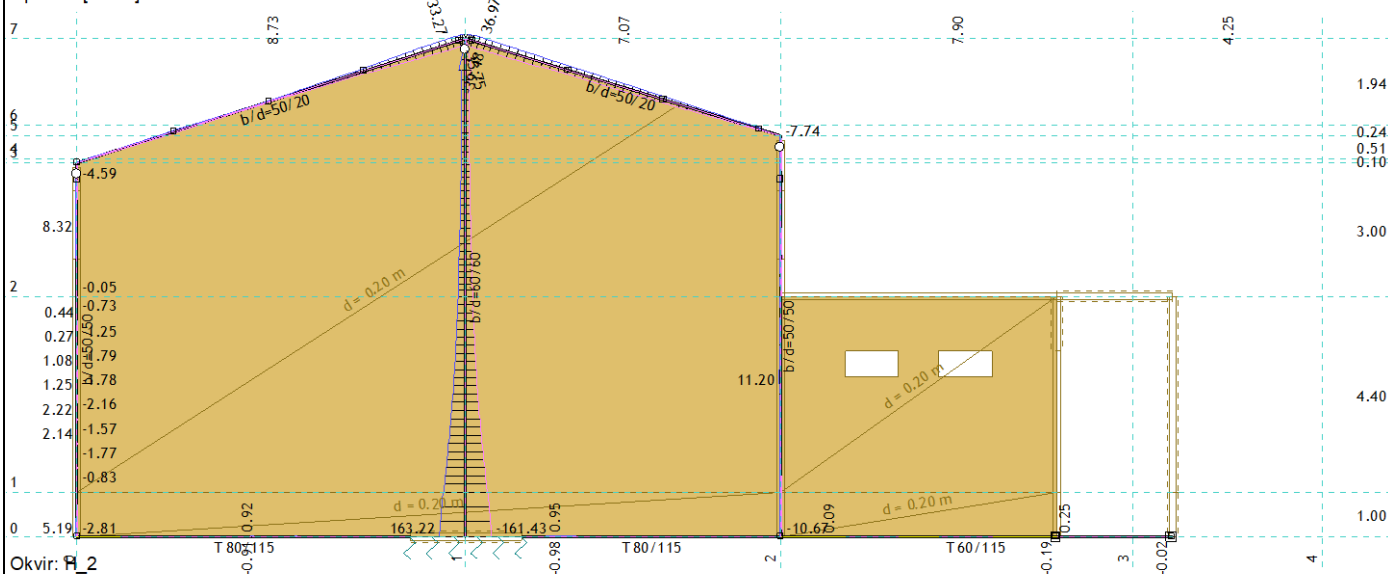
Mjerodavna kombinacija za savijanje: I+0.30xIII+IV
Mjerodavna kombinacija za posmik: I+0.30xII-1.00xIV

MEd = -15.16 kNm
NEd = 3.32 kN
VEd = -22.25 kN (VRd,max = 597.60 kN)

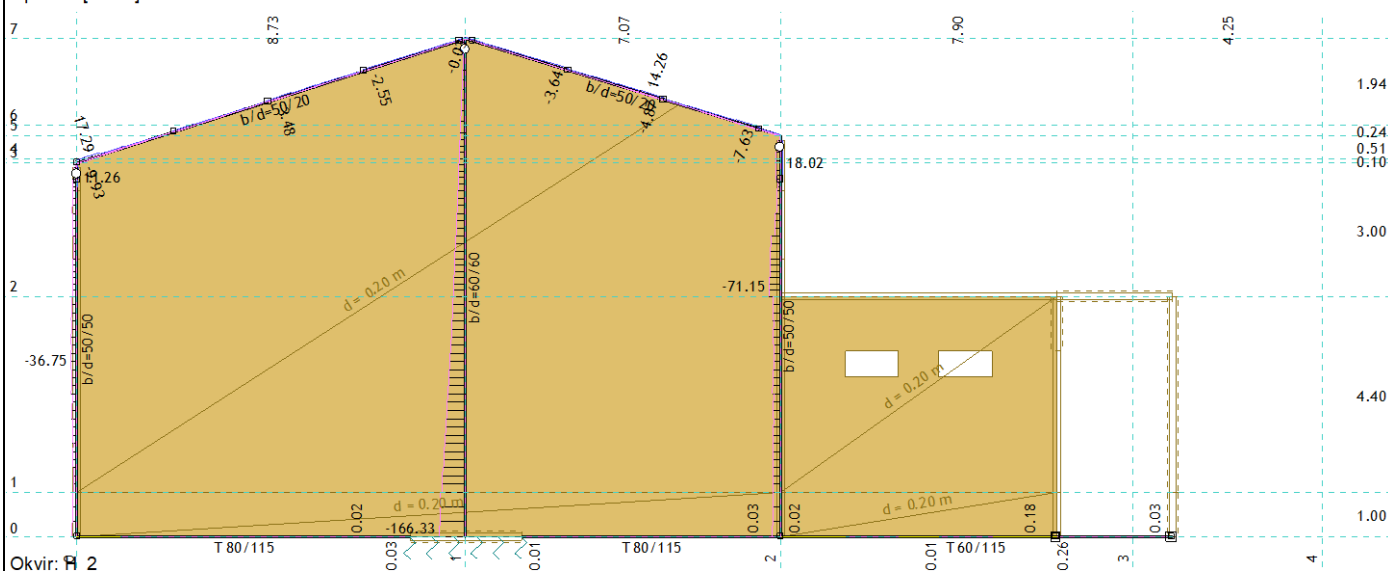
$\epsilon_b/\epsilon_a = -0.812/20.000 \text{ ‰}$
As1 = 0.00 cm² (min:2.49) (odab:4Ø14)
As2 = 0.00 cm² (min:2.49) (odab:4Ø14)
Aav = ±0.63 cm²/m (min:±1.50)
Aah = ±0.39 cm²/m (min:±2.00) (odab:±Q-335)

OKVIR H2

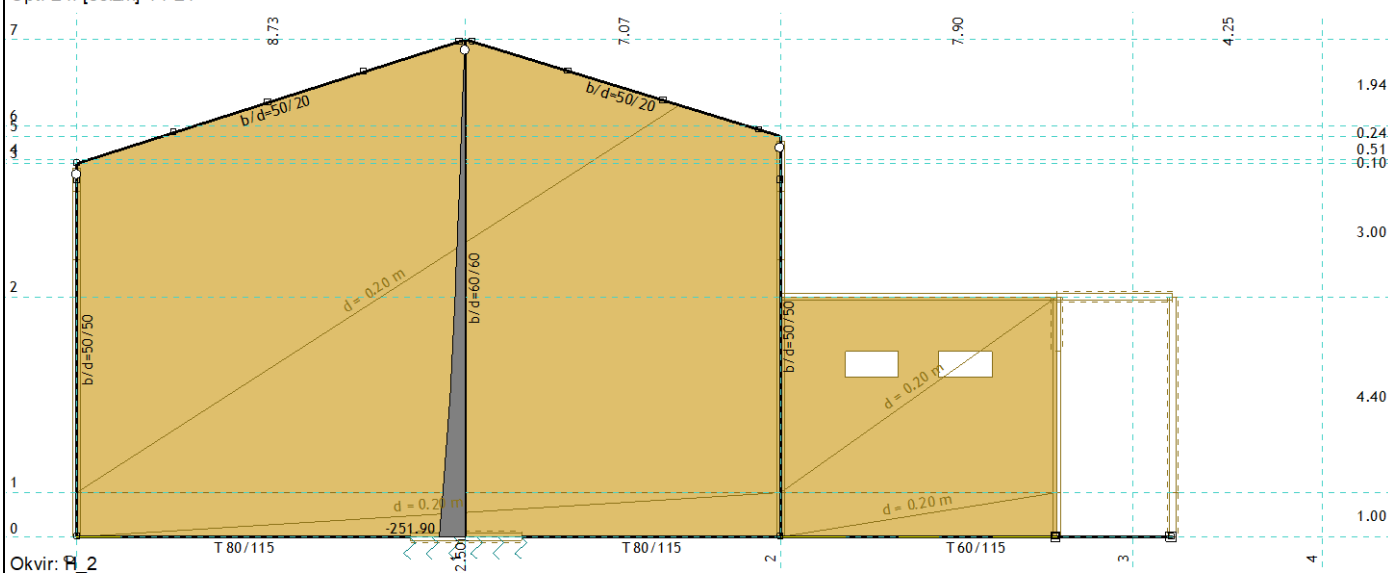
Opt. 24: [seizm] 14-21



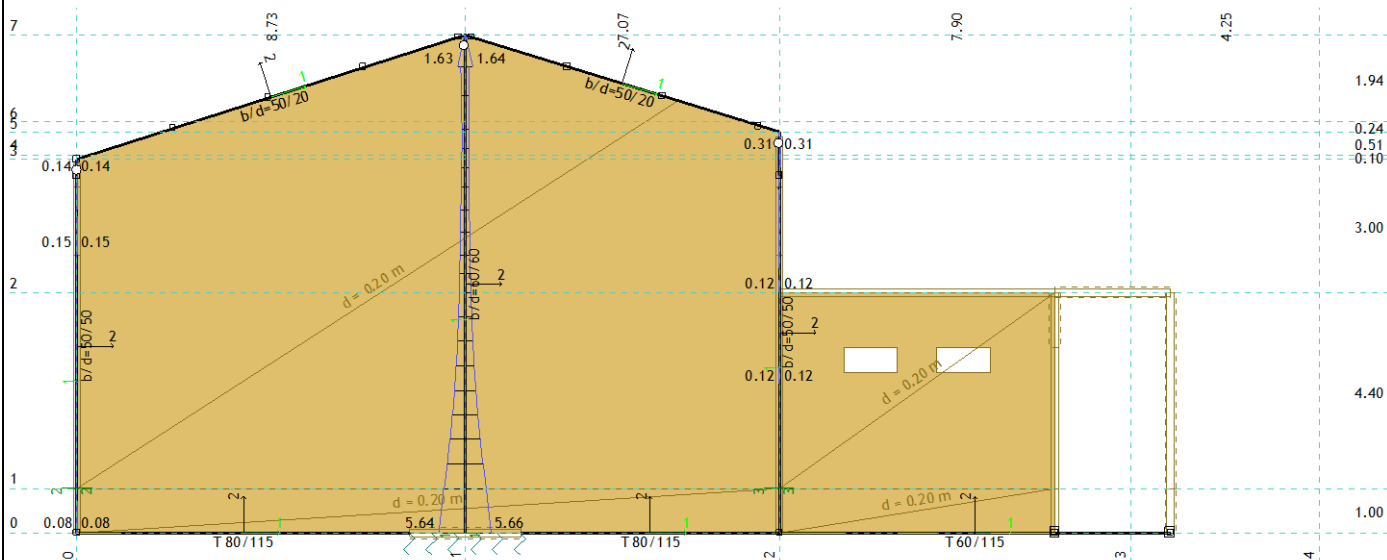
Opt. 24: [seizm] 14-21



Opt. 24: [seizm] 14-21



Mjerodavno opterećenje: Kompletna shema
EC2 (EN 1992-1-1:2004), C25/30, B500A

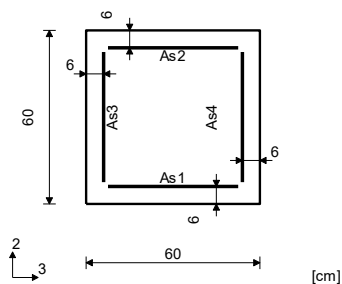


Okvir: H_2

Amatura u gredama: max $A_{a3}/A_{a4} = 5.66 / 5.64 \text{ cm}^2$

Greda 827-251

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
B500A
Kompletna shema opterećenja



$l_{i,2} = 22.38 \text{ m}$ ($\lambda_2 = 129.21$)
Pomična konstrukcija

Presjek 1-1 $x = 11.19 \text{ m}$

Mjerodavna kombinacija za savijanje:

$1.00xI + 1.00xV$

$N1_{Ed} = -149.01 \text{ kN}$

$M2_{Ed} = 163.22 \text{ kNm}$

$M3_{Ed} = 0.45 \text{ kNm}$

Uvećanje momenta savijanja uslijed

izvijanja

$\Delta e2 = 3.7 < e_{i,2} > + 0.0 < e_{i,2} > = 3.7 \text{ cm}$

$|\Delta M2| = 5.56 \text{ kNm}$

Mjerodavna kombinacija za torziju:

$1.00xI + 0.30xII - 1.00xV$

$M1_{Ed} = -0.05 \text{ kNm}$

Mjerodavna kombinacija za posmik:

$1.00xI + 0.30xIII - 1.00xV$

$V2_{Ed} = -0.39 \text{ kN}$

$V3_{Ed} = -26.07 \text{ kN}$

$M1_{Ed} = -0.05 \text{ kNm}$

$V2_{Rd,max} = 1312.20 \text{ kN}$

$V3_{Rd,max} = 1312.20 \text{ kN}$

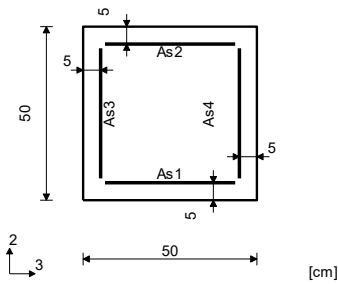
$\epsilon_b/\epsilon_a = -2.370/20.000 \text{ ‰}$

As1 =	0.00	cm ²
As2 =	0.00	cm ²
As3 =	5.66	cm ²
As4 =	5.64	cm ²
Asw =	0.00	cm ² /m (m=2)

KONAČNA ARMATURA SREDIŠNJIH ZABATNIH STUPOVA ĆE SE USVOJITI NAKON ŠTO SE STUPOVI DODATNO PROVJERE NA LOKALNOM MODELU

Greda 238-2

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
B500A
Kompletna shema opterećenja



$l_{i,2} = 8.40 \text{ m}$ ($\lambda_2 = 58.23$)

$l_{i,3} = 8.40 \text{ m}$ ($\lambda_3 = 58.23$)
Pomična konstrukcija

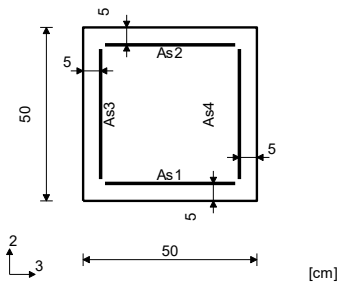
Presjek 2-2 $x = 7.40 \text{ m}$
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
N1Ed = -24.20 kN
M2Ed = 1.98 kNm
M3Ed = 0.27 kNm
Uvećanje momenta savijanja uslijed izvijanja
 $e_{l,2} = 0$; $e_{l,2} \geq e_{2min}$
 $|\Delta M_2| = 0.00 \text{ kNm}$
 $e_3 = e_{3min} = e_{0,3} = 2.00 \text{ cm}$
 $|M_3Ed|_{min} = 0.48 \text{ kNm}$
=

Mjerodavna kombinacija za torziju:
1.00xI+1.00xV
M1Ed = 0.26 kNm

Mjerodavna kombinacija za posmik:
1.00xI+1.00xV
V2Ed = 1.49 kN
V3Ed = 5.43 kN
M1Ed = 0.26 kNm

V2Rd,max = 911.25 kN
V3Rd,max = 911.25 kN
Nije potrebna armatura.

Greda 1251-570
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



$l_{i,2} = 9.01 \text{ m}$ ($\lambda_2 = 62.42$)
 $l_{i,3} = 9.01 \text{ m}$ ($\lambda_3 = 62.42$)
Pomična konstrukcija

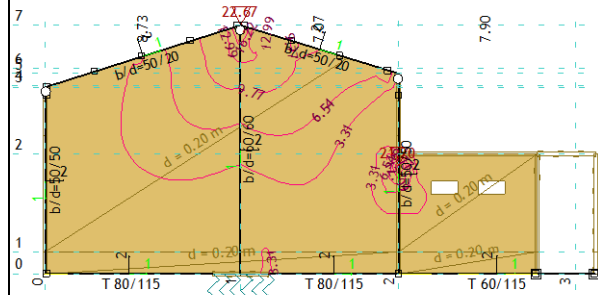
Presjek 3-3 $x = 8.01 \text{ m}$
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
N1Ed = -62.04 kN
M2Ed = -3.04 kNm
M3Ed = -0.45 kNm
Uvećanje momenta savijanja uslijed izvijanja
 $e_{l,2} = 0$; $e_{l,2} \geq e_{2min}$
 $|\Delta M_2| = 0.00 \text{ kNm}$
 $e_3 = e_{3min} = e_{0,3} = 2.00 \text{ cm}$
 $|M_3Ed|_{min} = 1.24 \text{ kNm}$
=

Mjerodavna kombinacija za torziju:
1.00xI+0.30xIII-1.00xV
M1Ed = -0.10 kNm

Mjerodavna kombinacija za posmik:
1.00xI-1.00xIV
V2Ed = -3.55 kN
V3Ed = -4.58 kN
M1Ed = -0.03 kNm

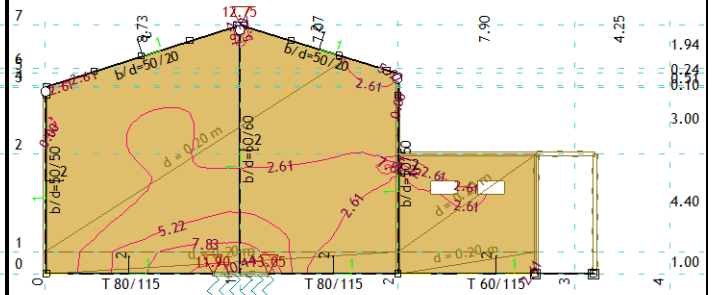
V2Rd,max = 911.25 kN
V3Rd,max = 911.25 kN
Nije potrebna armatura.

Opt. 24: [seizm] 14-21



Okvir: H_2
Utjecaji u ploči: max $M_x = 22.67$ / min $M_x = 0.09 \text{ kNm/m}$

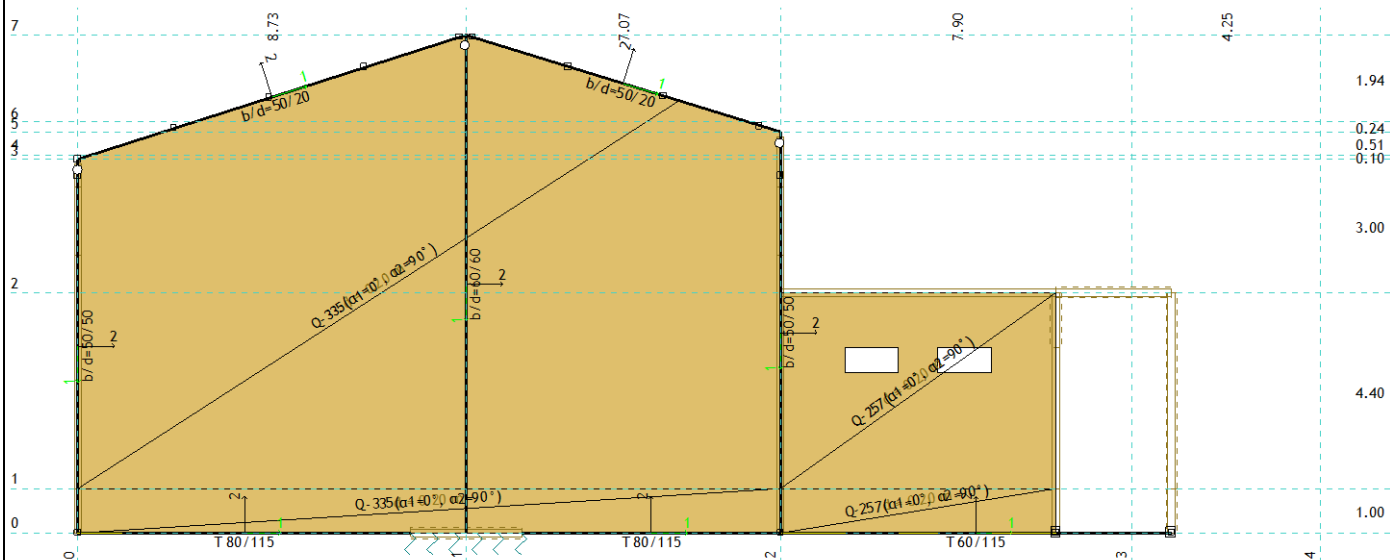
Opt. 24: [seizm] 14-21



Okvir: H_2
Utjecaji u ploči: max $M_y = 13.05$ / min $M_y = 0.00 \text{ kNm/m}$

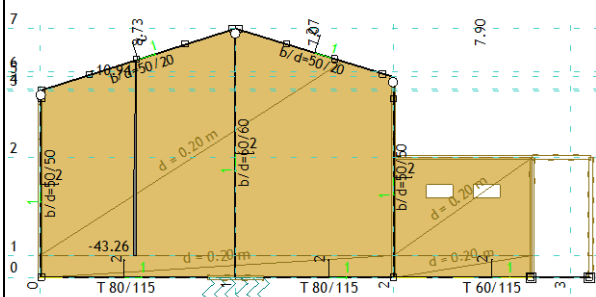
Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

Aa - d.zona [cm ² /m]
0.00
1.21
2.41



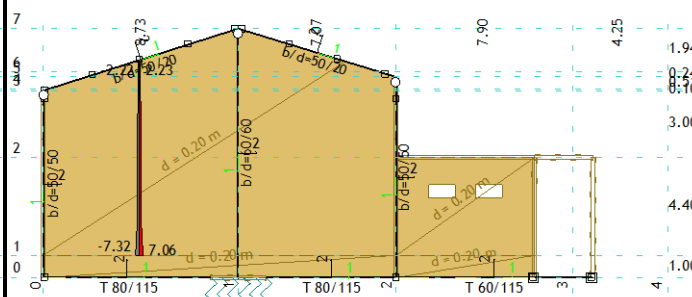
Okvir: H_2
Aa - d.zona

Opt. 24: [seizm] 14-21



Okvir: H_2
Vektorski presjeci: Ns

Opt. 24: [seizm] 14-21



Okvir: H_2
Vektorski presjeci: Ms

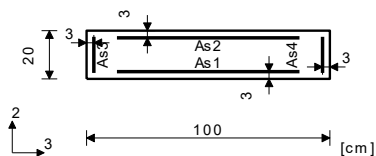
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500B

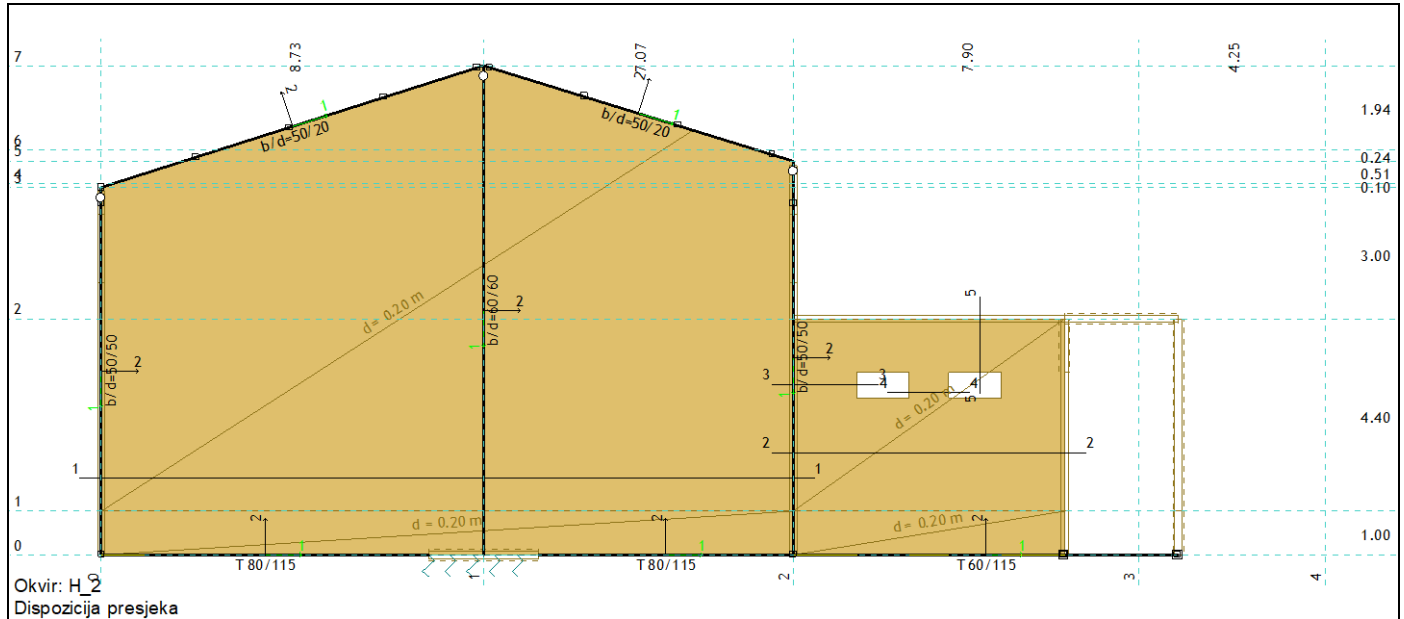
$l_{i,3} = 8.00 \text{ m}$ ($\lambda_3 = 138.56$)

Aa1 = 1.48 cm²
Aa2 = 1.47 cm²
Aa3 = 0.00 cm²
Aa4 = 0.00 cm²

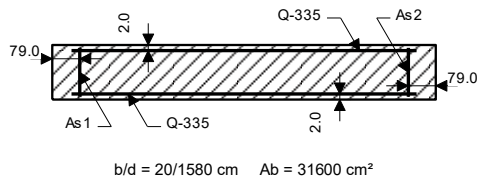
M3Ed = 7.30 kNm
N1Ed = -43.00 kN

Uvećanje momenta savijanja uslijed
izvijanja
 $\Delta e_3 = 2.0 \cdot e_{i,3} + 18.2 \cdot e_{l,3} = 20.2 \text{ cm}$
 $|\Delta M_3| = 6.68 \text{ kNm}$
 $e_b/e_a = -1.936/20.000 \text{ ‰}$





Presjek 1 - 1 (Z=0.77m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



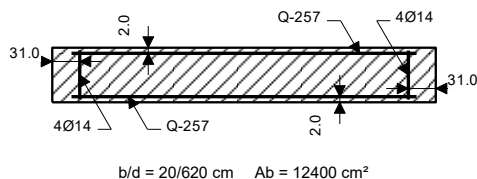
LC	N [kN]	V [kN]	M [kNm]
I	-720.8	76.5	426.4
II	-48.2	8.0	-7.4
III	-17.3	1.9	55.3
IV	60.6	245.1	130.1
V	34.0	81.3	124.5

MEd = 622.66 kNm
NEd = -1063.50 kN
VEd = 322.20 kN (VRd,max = 11376.00 kN)

As1 = 0.00 cm² (min:47.40)
As2 = 0.00 cm² (min:47.40)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.29 cm²/m (min:±2.00) (odab:±Q-335)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII+IV

Presjek 2 - 2 (Z=1.34m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



LC	N [kN]	V [kN]	M [kNm]
I	-185.0	-85.7	-49.3
II	-3.6	9.8	3.7
III	-12.0	-1.1	-11.9
IV	9.4	54.0	87.1
V	16.3	32.8	27.3

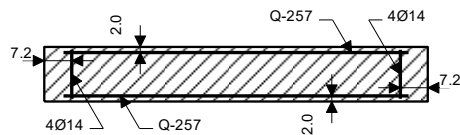
MEd = -73.40 kNm
NEd = -267.89 kN
VEd = -140.00 kN (VRd,max = 4464.00 kN)

As1 = 0.00 cm² (min:18.60) (odab:4Ø14)
As2 = 0.00 cm² (min:18.60) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.32 cm²/m (min:±2.00) (odab:±Q-257)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xIV

Presjek 3 - 3 (Z=2.90m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



b/d = 20/145 cm Ab = 2900 cm²

LC	N [kN]	V [kN]	M [kNm]
I	-43.9	-12.7	0.3
II	-1.0	2.1	0.0
III	-1.8	0.3	-0.2
IV	17.0	19.7	1.5
V	7.4	10.8	0.6

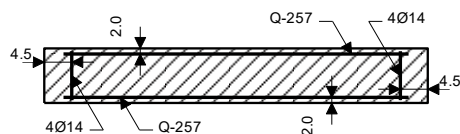
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I-1.00xIV

MEd = 0.29 kNm
NEd = -62.75 kN
VEd = -32.46 kN (VRd,max = 1044.00 kN)

As1 = 0.00 cm² (min:4.35) (odab:4Ø14)
As2 = 0.00 cm² (min:4.35) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.32 cm²/m (min:±2.00) (odab:±Q-257)

Presjek 4 - 4 (Z=2.71m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



b/d = 20/90 cm Ab = 1800 cm²

LC	N [kN]	V [kN]	M [kNm]
I	-31.3	-14.0	-0.0
II	-0.4	2.1	0.1
III	-2.6	-0.2	0.1
IV	2.8	17.4	0.5
V	2.2	8.2	0.3

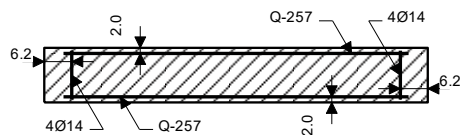
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xIV

MEd = 0.11 kNm
NEd = -45.55 kN
VEd = -31.40 kN (VRd,max = 648.00 kN)

As1 = 0.00 cm² (min:2.70) (odab:4Ø14)
As2 = 0.00 cm² (min:2.70) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.50 cm²/m (min:±2.00) (odab:±Q-257)

Presjek 5 - 5 (X=20.06m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



b/d = 20/123 cm Ab = 2460 cm²

LC	N [kN]	V [kN]	M [kNm]
I	-22.8	15.7	-1.7
II	-0.1	-3.0	-0.0
III	-3.3	0.4	-0.3
IV	49.5	28.4	3.0
V	18.9	11.3	1.2

Mjerodavna kombinacija za savijanje: I+IV
Mjerodavna kombinacija za posmik: I+0.30xIII+IV

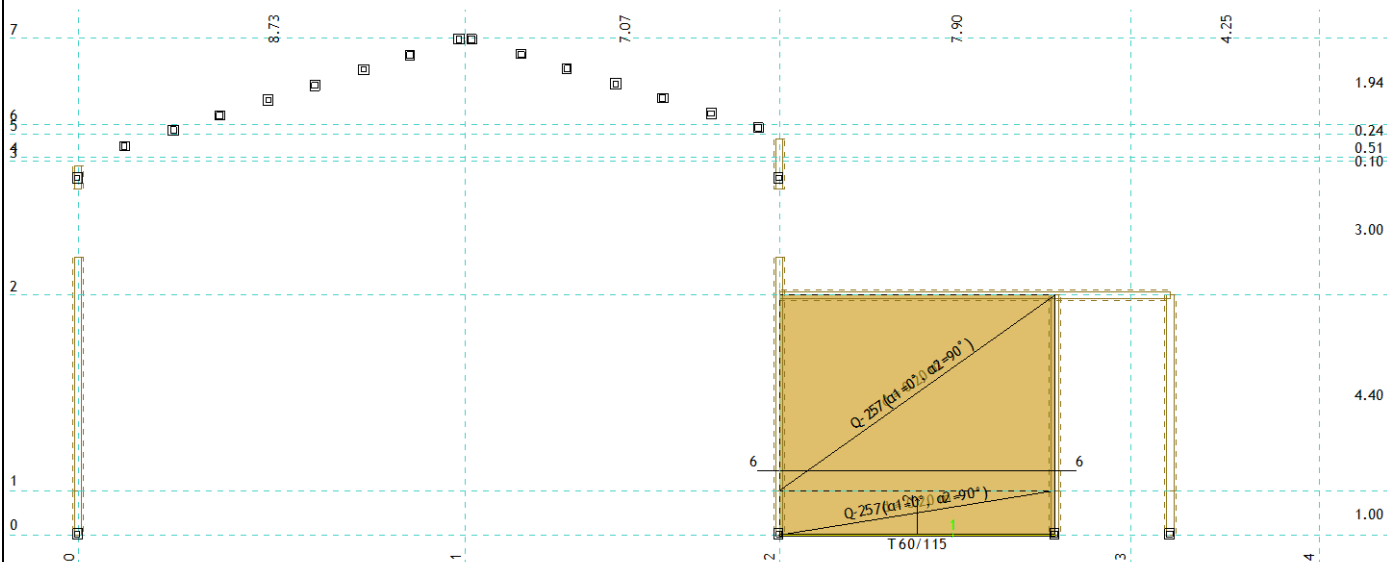
MEd = -4.71 kNm
NEd = 26.73 kN
VEd = 44.14 kN (VRd,max = 885.60 kN)

sb/ea = -0.277/20.000 ‰
As1 = 0.00 cm² (min:3.69) (odab:4Ø14)
As2 = 0.00 cm² (min:3.69) (odab:4Ø14)
Aav = ±0.36 cm²/m (min:±1.50)
Aah = ±0.52 cm²/m (min:±2.00) (odab:±Q-257)

OKVIR H3

Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

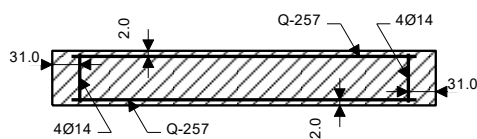
Aa - d.zona [cm ² /m]
0.00
0.45
0.90



Okvir: H_3
Aa - d.zona

Okvir: H_3

Presjek 6 - 6 (Z=0.44m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



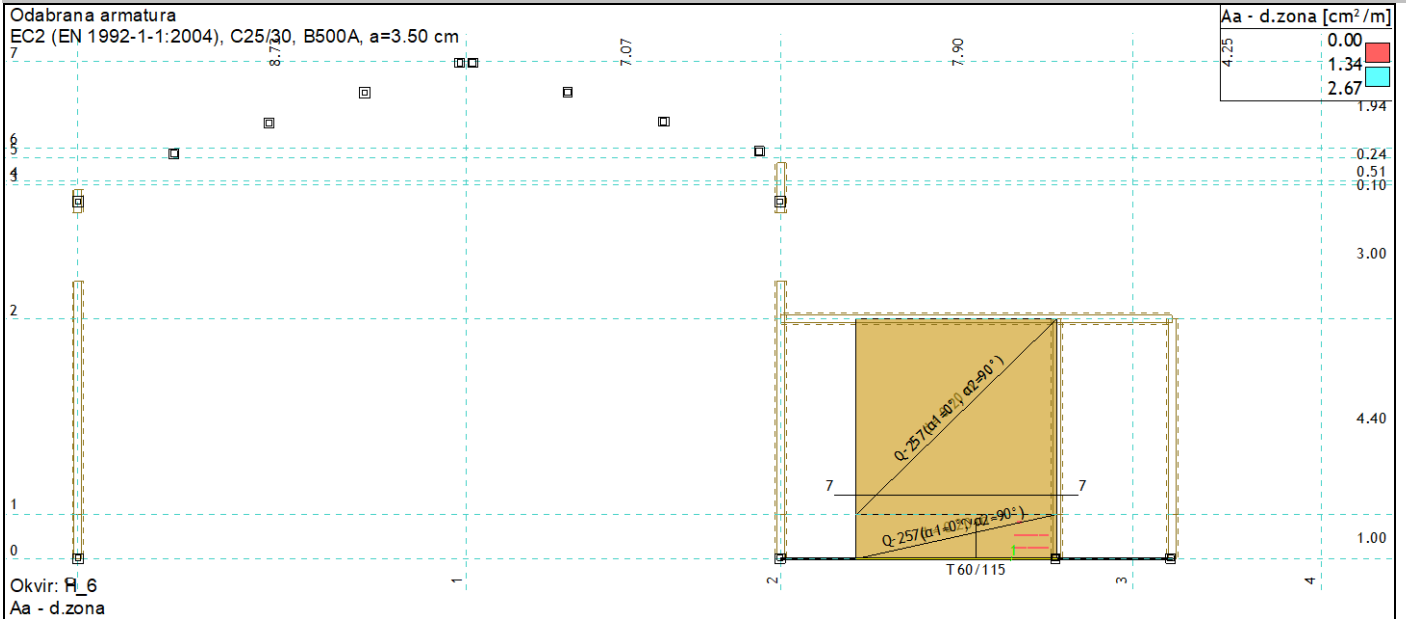
$b/d = 20/620$ cm $Ab = 12400$ cm²

LC	N [kN]	V [kN]	M [kNm]
I	-304.0	129.4	-154.4
II	-7.8	-27.8	-5.4
III	-28.0	19.2	-5.0
IV	8.2	137.5	77.7
V	24.7	48.4	24.3

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII+IV

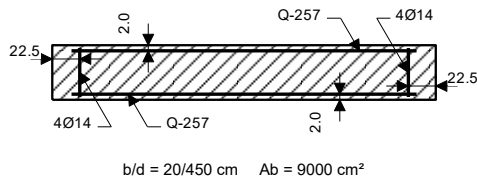
MEd =	-221.85	kNm	
NEd =	-451.52	kN	
VEd =	272.64	kN	(VRd,max = 4464.00 kN)
As1 =	0.00	cm ²	(min:18.60) (odab:4Ø14)
As2 =	0.00	cm ²	(min:18.60) (odab:4Ø14)
Aav =	±0.00	cm ² /m	(min:±1.50)
Aah =	±0.63	cm ² /m	(min:±2.00) (odab:±Q-257)

OKVIR H6



Okvir: H_6

Presjek 7 - 7 (Z=0.44m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



LC	N [kN]	V [kN]	M [kNm]
I	-403.9	8.0	-340.7
II	13.0	-16.7	38.3
III	-60.2	-1.0	-64.6
IV	110.7	127.3	249.9
V	30.8	35.1	69.1

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+IV

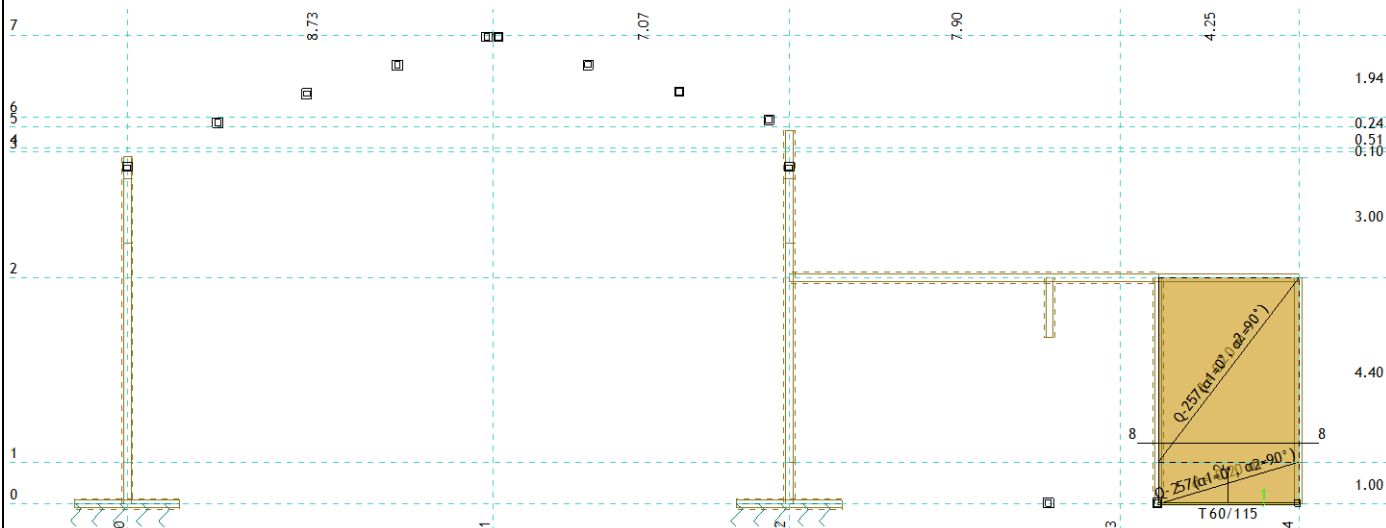
MEd = -470.44 kNm
NEd = -588.97 kN
VEd = 135.36 kN (VRd,max = 3240.00 kN)

As1 = 0.00 cm² (min:13.50) (odab:4Ø14)
As2 = 0.00 cm² (min:13.50) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.43 cm²/m (min:±2.00) (odab:±Q-257)

OKVIR H8

Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

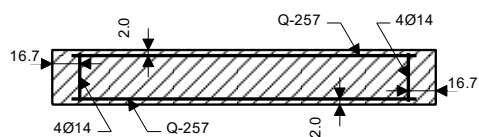
Aa - d.zona [cm ² /m]
0.00
0.06
0.11



Okvir: H_8
Aa - d.zona

Okvir: H_8

Presjek 8 - 8 (Z=0.45m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



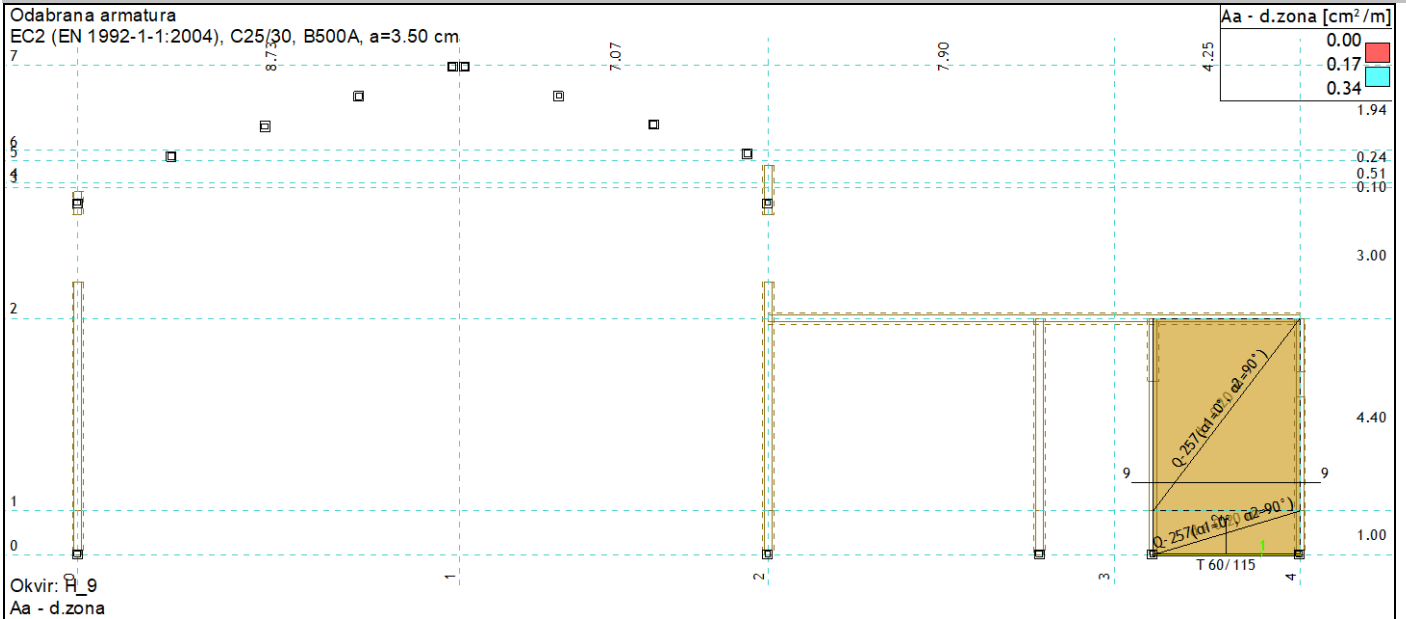
$b/d = 20/335$ cm $A_b = 6700$ cm²

LC	N [kN]	V [kN]	M [kNm]
I	-116.4	-25.6	-8.2
II	-0.4	4.0	-0.4
III	-9.9	-3.9	-0.9
IV	5.0	58.3	15.0
V	2.2	22.5	4.1

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xIV

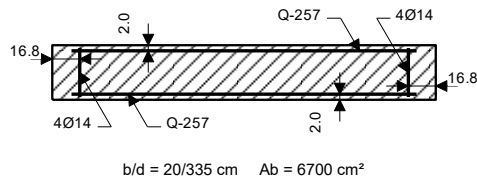
MEd =	-12.72	kNm	
NEd =	-168.11	kN	
VEd =	-85.12	kN	(VRd,max = 2412.00 kN)
As1 =	0.00	cm ²	(min:10.05) (odab:4Ø14)
As2 =	0.00	cm ²	(min:10.05) (odab:4Ø14)
Aav =	±0.00	cm ² /m	(min:±1.50)
Aah =	±0.37	cm ² /m	(min:±2.00) (odab:±Q-257)

OKVIR H9



Okvir: H_9

Presjek 9 - 9 (Z=0.64m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



LC	N [kN]	V [kN]	M [kNm]
I	-123.1	-48.5	-6.9
II	-0.8	-1.6	-0.2
III	-12.2	-14.4	-0.4
IV	8.5	48.8	7.6
V	2.4	12.5	2.0

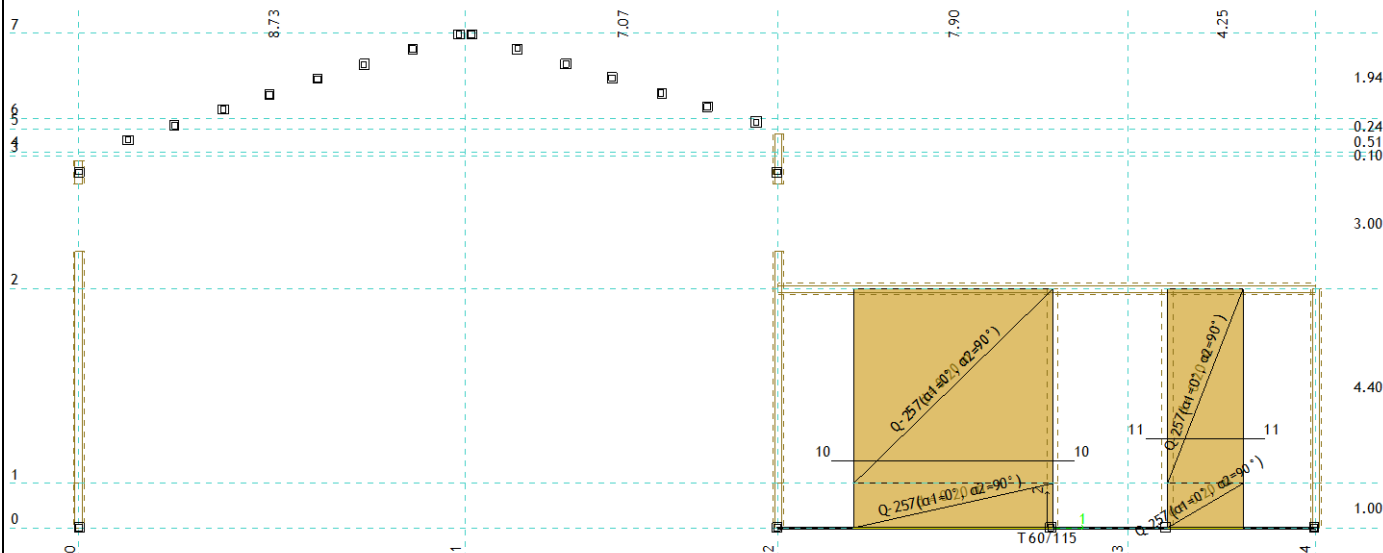
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xIV

MEd =	-10.04	kNm	
NEd =	-180.35	kN	
VEd =	-101.55	kN	(VRd,max = 2412.00 kN)
As1 =	0.00	cm ²	(min:10.05) (odab:4Ø14)
As2 =	0.00	cm ²	(min:10.05) (odab:4Ø14)
Aav =	±0.00	cm ² /m	(min:±1.50)
Aah =	±0.44	cm ² /m	(min:±2.00) (odab:±Q-257)

OKVIR H11

Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

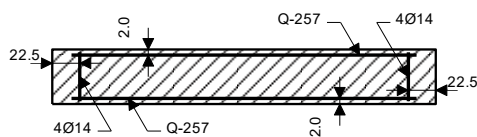
Aa - d.zona [cm ² /m]
0.00
0.51
0.92
1.83



Okvir: H_11
Aa - d.zona

Presjek 10 - 10 (Z=0.50m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$b/d = 20/450$ cm $Ab = 9000$ cm²

LC	N [kN]	V [kN]	M [kNm]
I	-439.9	66.2	171.8
II	11.8	-18.2	-39.5
III	-69.0	14.0	37.9
IV	40.5	75.6	182.5
V	39.0	23.2	46.6

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII+IV

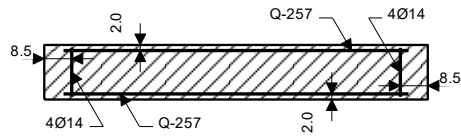
MEd = 212.47 kNm
NEd = -648.64 kN
VEd = 145.94 kN (VRd,max = 3240.00 kN)

As1 = 0.00 cm² (min:13.50) (odab:4Ø14)
As2 = 0.00 cm² (min:13.50) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.47 cm²/m (min:±2.00) (odab:±Q-257)

Presjek 11 - 11 (Z=1.01m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B

Kompletna shema opterećenja



$$b/d = 20/170 \text{ cm} \quad A_b = 3400 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-115.3	-11.1	-32.4
II	-2.2	-1.8	-2.7
III	-15.1	-2.8	-8.7
IV	12.1	10.2	12.5
V	8.8	3.0	3.3

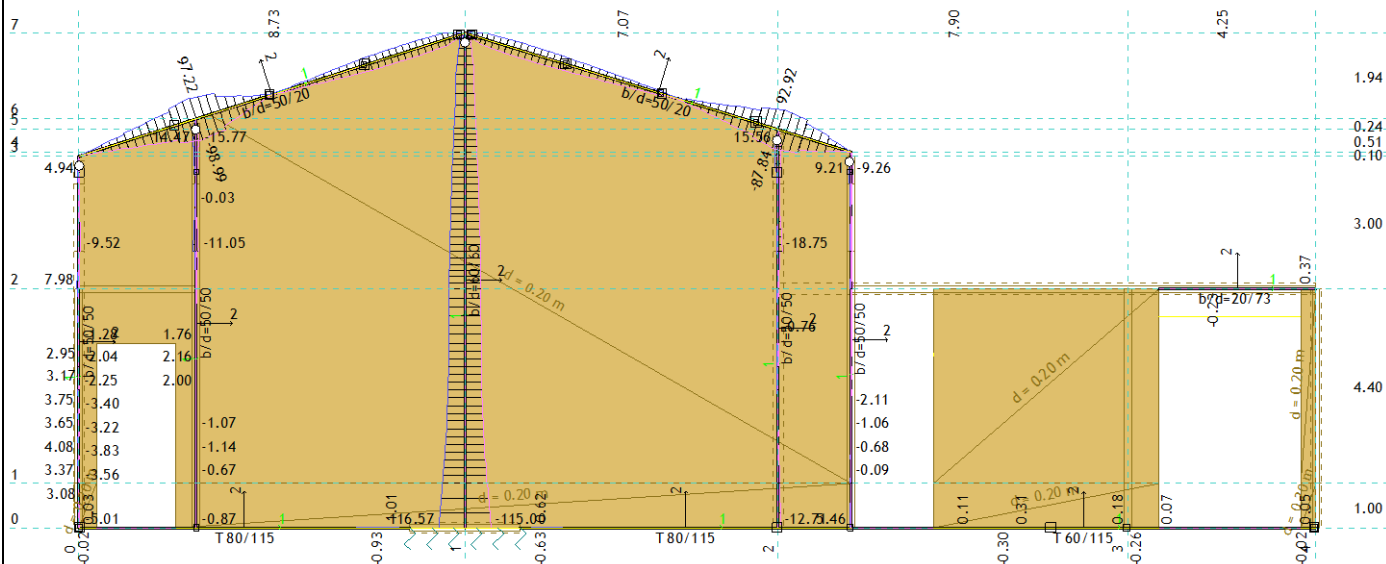
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xIV

MEd = -56.87 kNm
NEd = -174.76 kN
VEd = -22.13 kN (VRd,max = 1224.00 kN)

As1 = 0.00 cm² (min:5.10) (odab:4Ø14)
As2 = 0.00 cm² (min:5.10) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.19 cm²/m (min:±2.00) (odab:±Q-257)

OKVIR H12

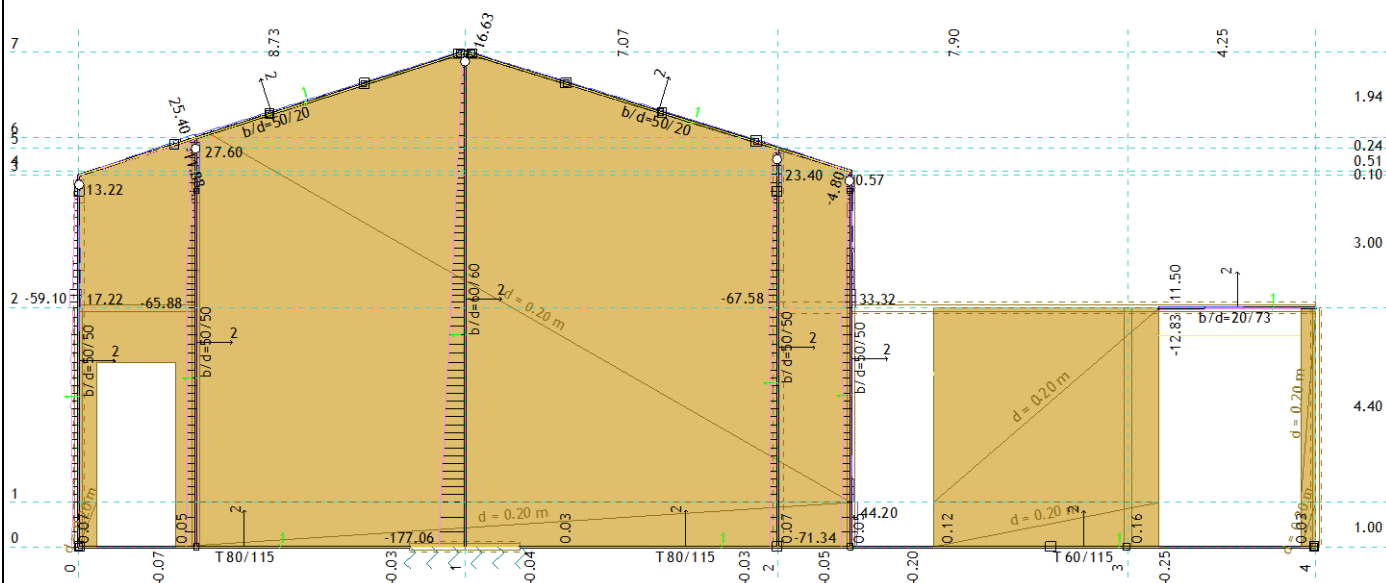
Opt. 24: [seizm] 14-21



Okvir: H_12

Utjecaji u gredi: max M2= 116.57 / min M2= -115.00 kNm

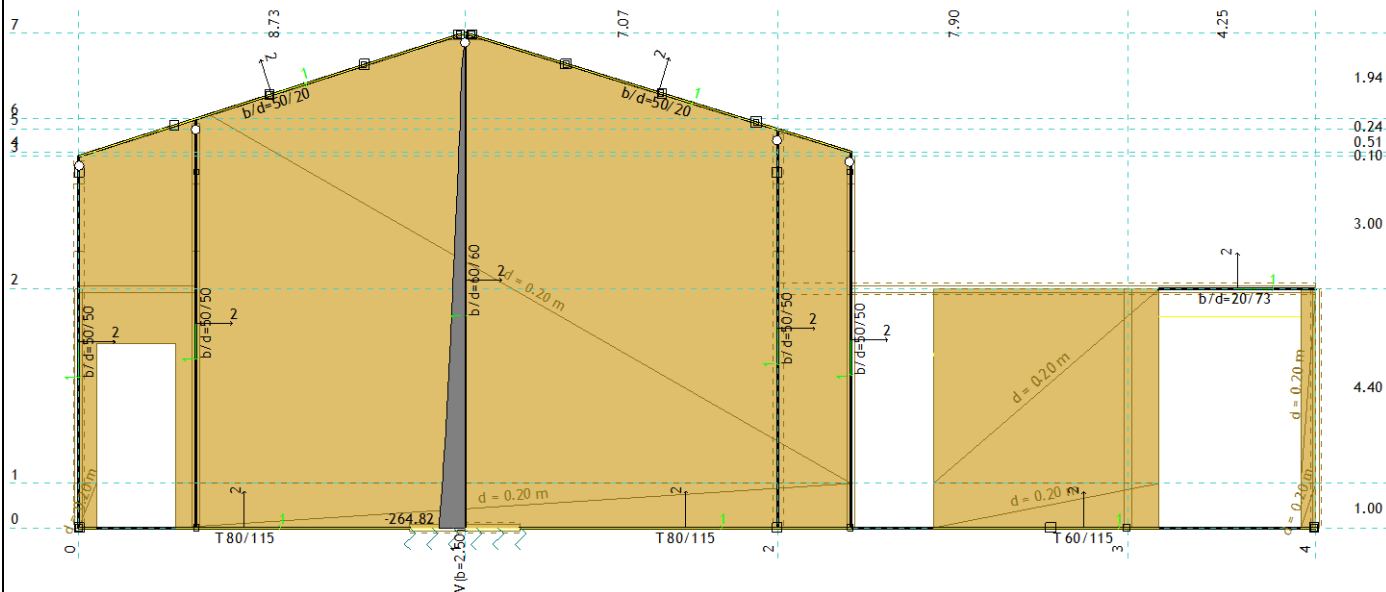
Opt. 24: [seizm] 14-21



Okvir: H_12

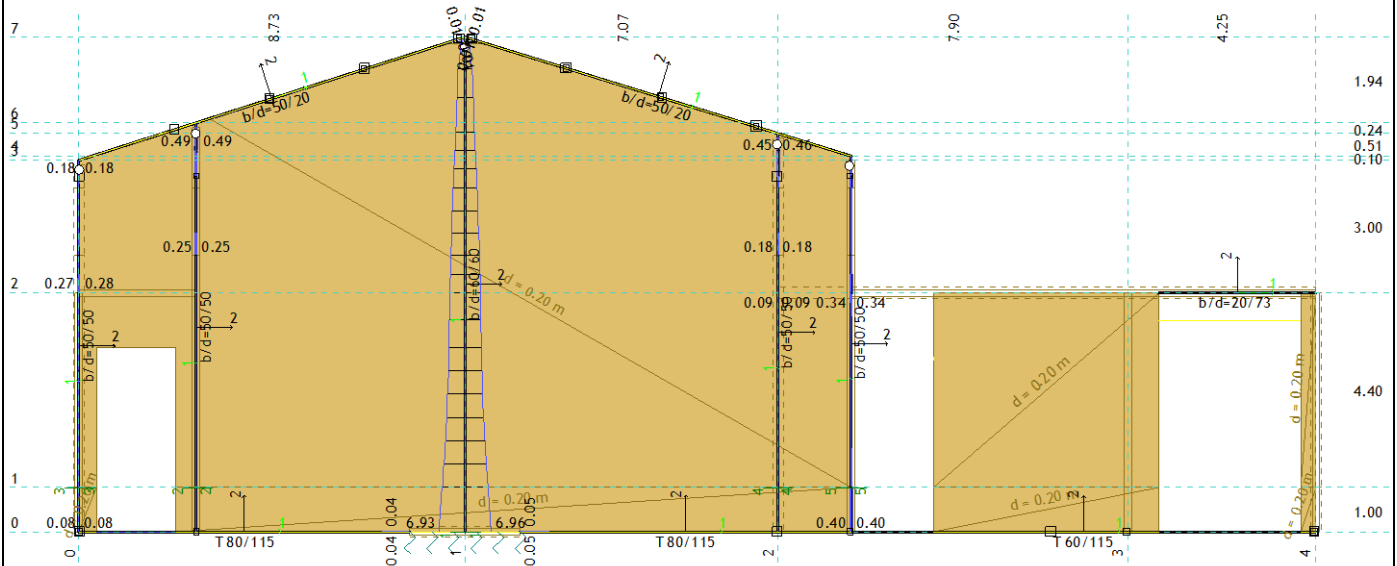
Utjecaji u gredi: max N1= 44.20 / min N1= -177.06 kN

Opt. 24: [seizm] 14-21



Okvir: H_12
Vektorski presjeci: Ns

Mjerodavno opterećenje: Kompletna shema
EC2 (EN 1992-1-1:2004), C25/30, B500A

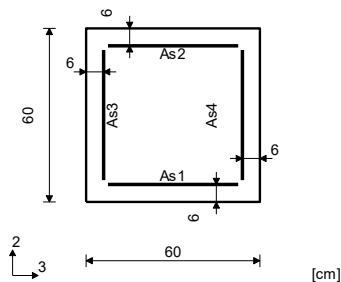


Okrvir: H_12

Armatura u gredama: max Aa3/Aa4= 6.96 / 6.93 cm²

Greda 3521-2188

EC2 (EN 1992-1-1:2004)
C25/30 (γ_C = 1.50, γ_S = 1.15) [SP]
B500A
Kompletna shema opterećenja



li,2 = 22.38 m (λ₂ = 129.21)
Pomična konstrukcija

Presjek 1-1 x = 11.19m

Mjerodavna kombinacija za savijanje:

1.00xI+0.30xIII-1.00xV

N1Ed = -177.06 kN

M2Ed = -114.99 kNm

M3Ed = -0.77 kNm

Uvećanje momenta savijanja uslijed

izvijanja

Δe2 = 3.7 < ei,2 > + 44.8 < ei,2 > = 48.5 cm

[ΔM2] = 85.94 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII-1.00xV

M1Ed = -5.81 kNm

Mjerodavna kombinacija za posmik:

1.00xI+0.30xIII-1.00xV

V2Ed = -4.08 kN

V3Ed = -18.97 kN

M1Ed = -5.81 kNm

V2Rd,max = 1312.20 kN

V3Rd,max = 1312.20 kN

ε_b/ε_a = -2.624/20.000 ‰

As1 =	0.00	+	0.16'	=	0.16 cm ²
As2 =	0.00	+	0.16'	=	0.16 cm ²
As3 =	6.80	+	0.16'	=	6.96 cm ²
As4 =	6.78	+	0.16'	=	6.93 cm ²
Asw =	0.00		cm ² /m		(m=2)

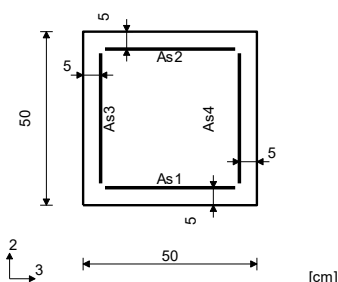
*) - dodatna uzdužna armatura za prihvat torzije.

armatura središnjeg zabatnog stupa usvojiti će se nakon provjere lokalnog modela

Greda 2154-1408

EC2 (EN 1992-1-1:2004)
C25/30 (γ_C = 1.50, γ_S = 1.15) [SP]
B500A
Kompletna shema opterećenja

	GRAĐEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 216



li,2 = 8.40 m ($\lambda_2 = 58.23$)

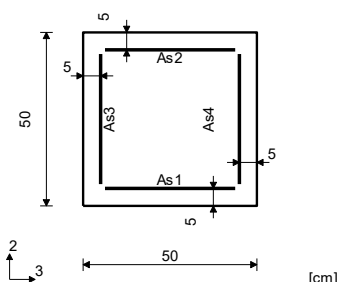
li,3 = 8.40 m ($\lambda_3 = 58.23$)
Pomična konstrukcija

Presjek 3-3 x = 7.40m
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
N1Ed = -50.64 kN
M2Ed = -3.32 kNm
M3Ed = 1.11 kNm
Uvećanje momenta savijanja uslijed izvijanja
eII,2 = 0; eI,2 >= e2min
|ΔM2| = 0.00 kNm
Δe3 = 1.4<ei,3> + 0.0<ei,3> = 1.4 cm
|ΔM3| = 0.73 kNm

Mjerodavna kombinacija za torziju:
1.00xI+0.30xIII-1.00xIV
M1Ed = -0.08 kNm

Mjerodavna kombinacija za posmik:
1.00xI+0.30xIII-1.00xV
V2Ed = -1.87 kN
V3Ed = -13.12 kN
M1Ed = -0.03 kNm
V2Rd,max = 911.25 kN
V3Rd,max = 911.25 kN
Nije potrebna armatura.

Greda 2552-1585
EC2 (EN 1992-1-1:2004)
C25/30 (yC = 1.50, yS = 1.15) [SP]
B500A
Kompletna shema opterećenja



li,2 = 9.25 m ($\lambda_2 = 64.09$)
li,3 = 9.25 m ($\lambda_3 = 64.09$)
Pomična konstrukcija

Presjek 2-2 x = 8.25m
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
N1Ed = -68.76 kN
M2Ed = 1.10 kNm
M3Ed = -0.43 kNm
Uvećanje momenta savijanja uslijed izvijanja
e2 = e2min = e0,2 = 2.00 cm
|M2Ed|min = 1.38 kNm
=
e3 = e3min = e0,3 = 2.00 cm
|M3Ed|min = 1.38 kNm
=

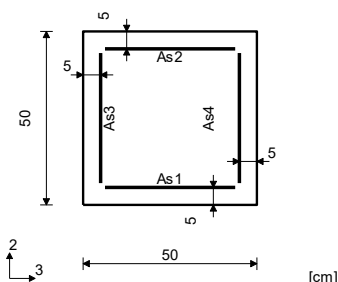
Mjerodavna kombinacija za torziju:
1.00xI+0.30xIII-1.00xV
M1Ed = -0.08 kNm

Mjerodavna kombinacija za posmik:
1.00xI+1.00xIV
V2Ed = 4.83 kN
V3Ed = 4.14 kN
M1Ed = 0.03 kNm

V2Rd,max = 911.25 kN
V3Rd,max = 911.25 kN

Nije potrebna armatura.

Greda 4138-2985
EC2 (EN 1992-1-1:2004)
C25/30 (yC = 1.50, yS = 1.15) [SP]
B500A
Kompletna shema opterećenja



li,2 = 9.01 m ($\lambda_2 = 62.42$)
li,3 = 9.01 m ($\lambda_3 = 62.42$)
Pomična konstrukcija

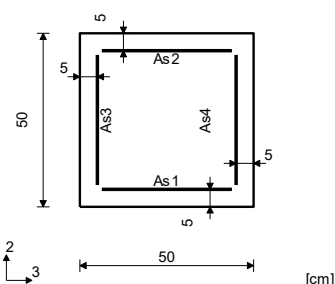
Presjek 4-4 x = 8.01m
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
N1Ed = -74.59 kN
M2Ed = -2.05 kNm
M3Ed = -0.84 kNm
Uvećanje momenta savijanja uslijed izvijanja
eII,2 = 0; eI,2 >= e2min
|ΔM2| = 0.00 kNm
e3 = e3min = e0,3 = 2.00 cm
|M3Ed|min = 1.49 kNm
=

Mjerodavna kombinacija za torziju:
1.00xI+0.30xIII-1.00xV
M1Ed = -0.04 kNm

Mjerodavna kombinacija za posmik:
1.00xI+0.30xIII+1.00xIV
V2Ed = 7.74 kN
V3Ed = 0.90 kN
M1Ed = 0.01 kNm

V2Rd,max = 911.25 kN
V3Rd,max = 911.25 kN
Nije potrebna armatura.

Greda 4258-3193
EC2 (EN 1992-1-1:2004)
C25/30 (yC = 1.50, yS = 1.15) [SP]
B500A
Kompletna shema opterećenja



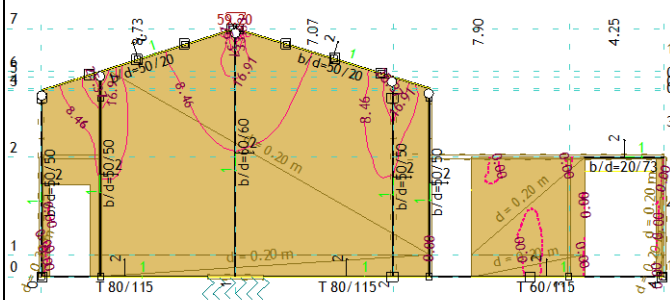
li,2 = 8.50 m ($\lambda_2 = 58.89$)
li,3 = 8.50 m ($\lambda_3 = 58.89$)
Pomična konstrukcija

Presjek 5-5 x = 7.50m
Mjerodavna kombinacija za savijanje:
1.00xI+0.30xIII+1.00xIV
N1Ed = 14.87 kN
M2Ed = 4.84 kNm
M3Ed = 1.52 kNm

Mjerodavna kombinacija za posmik:
1.00xI+0.30xIII+1.00xIV
V2Ed = 6.97 kN
V3Ed = 9.16 kN
M1Ed = 0.00 kNm

V2Rd,max = 911.25 kN
V3Rd,max = 911.25 kN
eb/ea = -0.684/20.000 ‰
As1 = 0.20 cm²
As2 = 0.20 cm²
As3 = 0.20 cm²
As4 = 0.20 cm²
Asw = 0.00 cm²/m (m=2)

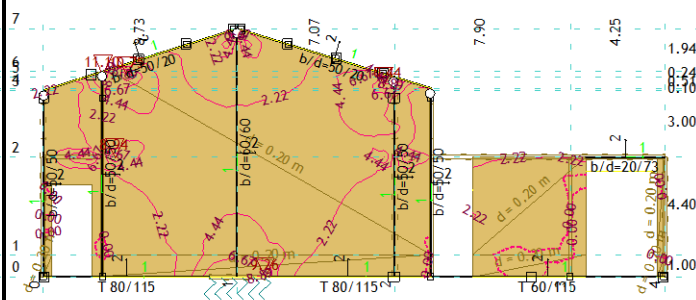
Opt. 24: [seizm] 14-21



Okvir: H_12

Utjecaji u ploči: max $M_x = 59.20$ / min $M_x = 0.00$ kNm/m

Opt. 24: [seizm] 14-21

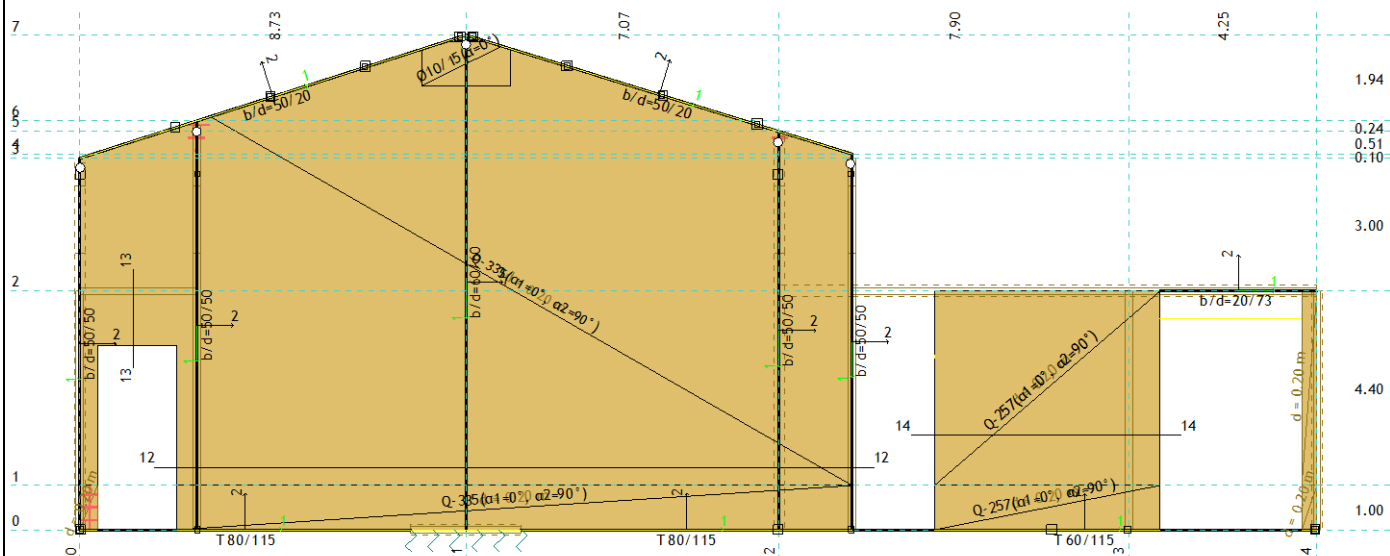


Okvir: H_12

Utjecaji u ploči: max $M_y = 11.10$ / min $M_y = 0.00$ kNm/m

Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

Aa - d.zona [cm ² /m]
0.00
2.53
5.06

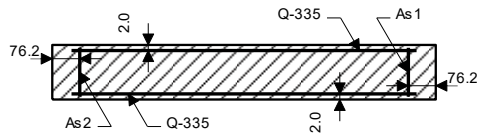


Okvir: H_12

Aa - d.zona

Presjek 12 - 12 (Z=0.41m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/1525 \text{ cm} \quad A_b = 30500 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-812.0	-16.4	208.8
II	-50.8	36.7	3.4
III	-29.3	-3.3	-3.5
IV	17.8	444.0	275.2
V	33.1	113.6	345.4

Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII+1.05xIII

Mjerodavna kombinacija za posmik:

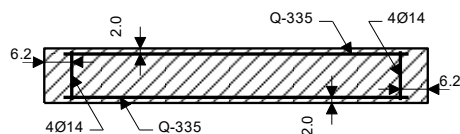
I+0.30xIII-1.00xIV

$$\begin{aligned} M_{Ed} &= 283.26 \text{ kNm} \\ N_{Ed} &= -1203.16 \text{ kN} \\ V_{Ed} &= -461.43 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 10980.00 \text{ kN})$$

$$\begin{aligned} A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 45.75) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 45.75) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.43 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \end{aligned} \quad (\text{odab: } \pm Q-335)$$

Presjek 13 - 13 (X=1.23m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/123 \text{ cm} \quad A_b = 2460 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	22.8	3.8	-4.6
II	10.9	-7.6	-1.2
III	-0.4	3.1	0.1
IV	50.1	25.6	5.5
V	23.1	16.0	3.0

Mjerodavna kombinacija za savijanje: I+IV

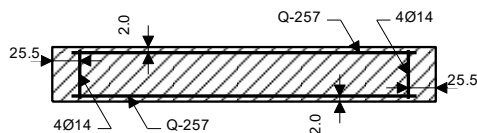
Mjerodavna kombinacija za posmik: I+0.30xIII+IV

$$\begin{aligned} M_{Ed} &= -10.10 \text{ kNm} \\ N_{Ed} &= 72.90 \text{ kN} \\ V_{Ed} &= 30.35 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 885.60 \text{ kN})$$

$$\begin{aligned} \epsilon_b/\epsilon_a &= -0.404/20.000 \text{ ‰} \\ A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 3.69) \quad (\text{odab: } 4\emptyset 14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 3.69) \quad (\text{odab: } 4\emptyset 14) \\ A_{av} &= \pm 0.94 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.35 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \end{aligned} \quad (\text{odab: } \pm Q-335)$$

Presjek 14 - 14 (Z=1.14m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/510 \text{ cm} \quad A_b = 10200 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-274.7	-1.5	-7.1
II	-0.7	-9.2	-19.9
III	-31.8	1.6	16.3
IV	28.7	79.8	143.5
V	24.0	23.9	41.0

Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII+1.05xIII

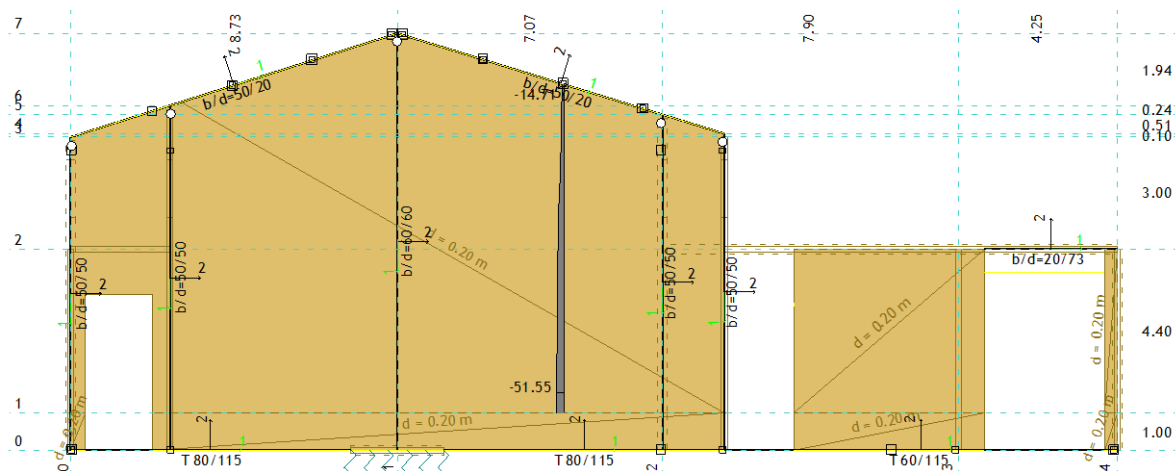
Mjerodavna kombinacija za posmik:

I-1.00xIV

$$\begin{aligned} M_{Ed} &= -22.33 \text{ kNm} \\ N_{Ed} &= -405.27 \text{ kN} \\ V_{Ed} &= -81.30 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 3672.00 \text{ kN})$$

$$\begin{aligned} A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 15.30) \quad (\text{odab: } 4\emptyset 14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 15.30) \quad (\text{odab: } 4\emptyset 14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.23 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \end{aligned} \quad (\text{odab: } \pm Q-257)$$

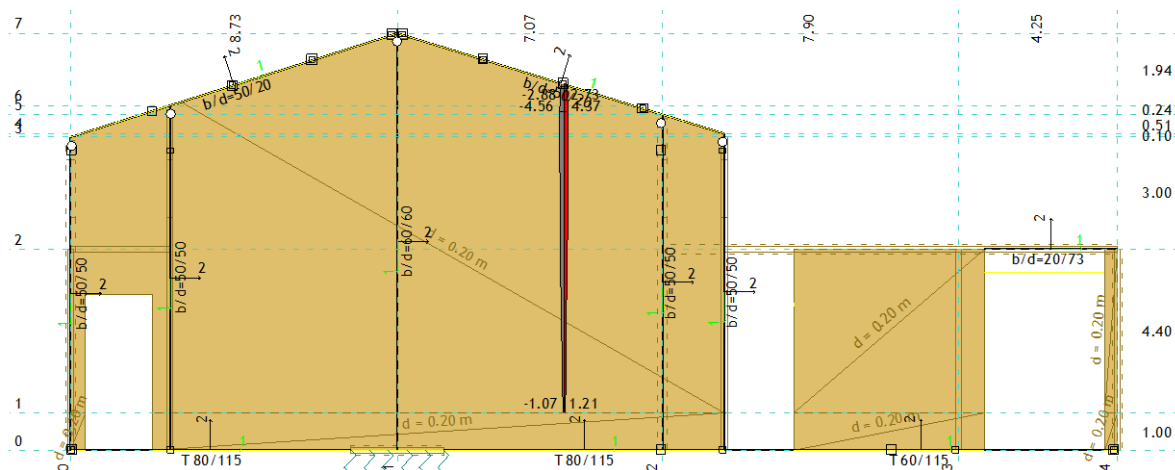
Opt. 24: [seizm] 14-21



Okvir: H_12

Vektorski presjeci: Ns

Opt. 24: [seizm] 14-21



Okvir: H_12

Vektorski presjeci: Ms

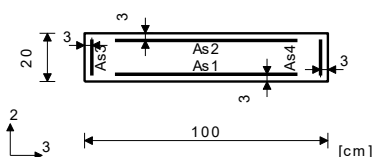
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500B

$l_{i,3} = 8.00 \text{ m}$ ($\lambda_3 = 138.56$)

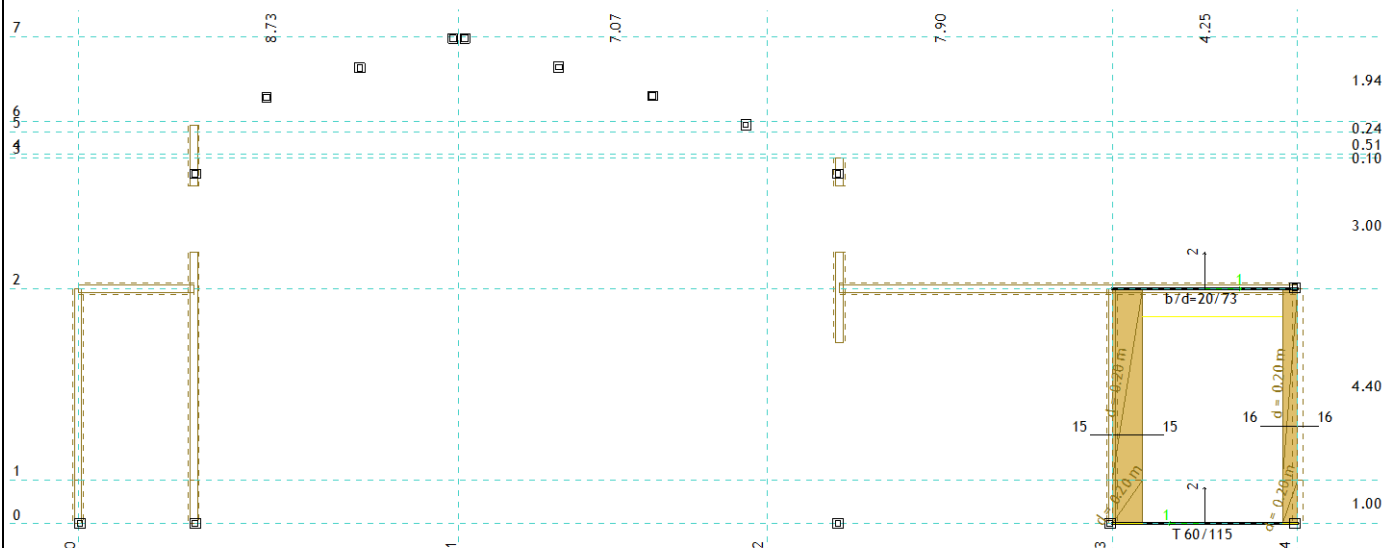
M3Ed = 5.00 kNm
N1Ed = -53.00 kN

Aa1 = 1.32 cm²
Aa2 = 1.31 cm²
Aa3 = 0.00 cm²
Aa4 = 0.00 cm²

Uvećanje momenta savijanja uslijed
izvijanja
 $\Delta e_3 = 2.0 \cdot e_{i,3} + 18.2 \cdot e_{l,3} = 20.2 \text{ cm}$
 $|\Delta M_3| = 10.70 \text{ kNm}$
 $e_b/e_a = -1.916/20.000 \%$



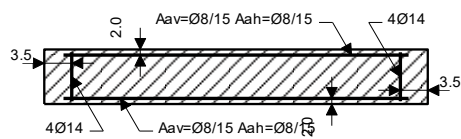
OKVIR 13



Okvir: H_13
Aa - d.zona

Presjek 15 - 15 (Z=1.03m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



b/d = 20/70 cm Ab = 1400 cm²

LC	N [kN]	V [kN]	M [kNm]
I	-58.3	-4.4	-4.7
II	-3.4	-1.6	-0.6
III	-6.0	-0.3	-0.5
IV	12.5	3.7	1.5
V	6.2	2.2	0.9

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xIV

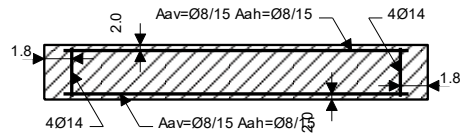
MEd = -7.76 kNm
NEd = -90.07 kN
VEd = -8.25 kN (VRd,max = 504.00 kN)

As1 = 0.00 cm² (min:2.10) (odab:4Ø14)
As2 = 0.00 cm² (min:2.10) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50) (odab:±Ø8/15)
Aah = ±0.17 cm²/m (min:±2.00) (odab:±Ø8/15)

Presjek 16 - 16 (Z=1.24m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B

Kompletna shema opterećenja



b/d = 20/35 cm Ab = 700 cm²

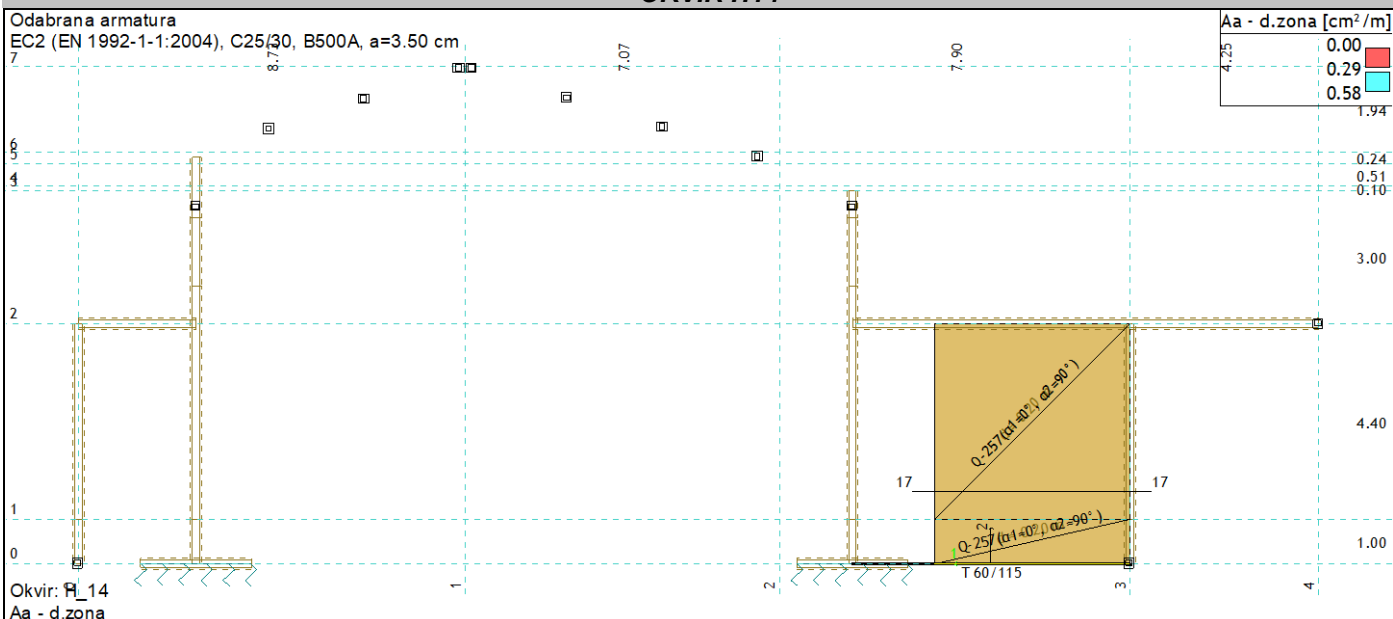
LC	N [kN]	V [kN]	M [kNm]
I	-42.2	-0.3	0.9
II	0.9	-0.1	-0.1
III	-4.4	-0.1	0.1
IV	8.1	0.3	0.2
V	4.4	0.2	0.1

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xIV

MEd = 1.23 kNm
NEd = -60.11 kN
VED = -0.63 kN (VRd,max = 252.00 kN)

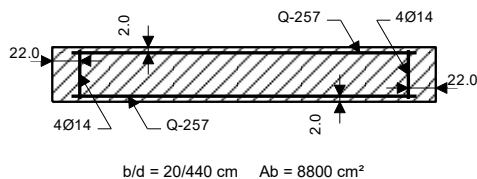
As1 = 0.00 cm² (min:1.05) (odab:4Ø14)
As2 = 0.00 cm² (min:1.05) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50) (odab:±Ø8/15)
Aah = ±0.03 cm²/m (min:±2.00) (odab:±Ø8/15)

OKVIR H14



Okvir: H 14

Presjek 17 - 17 (Z=0.62m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja

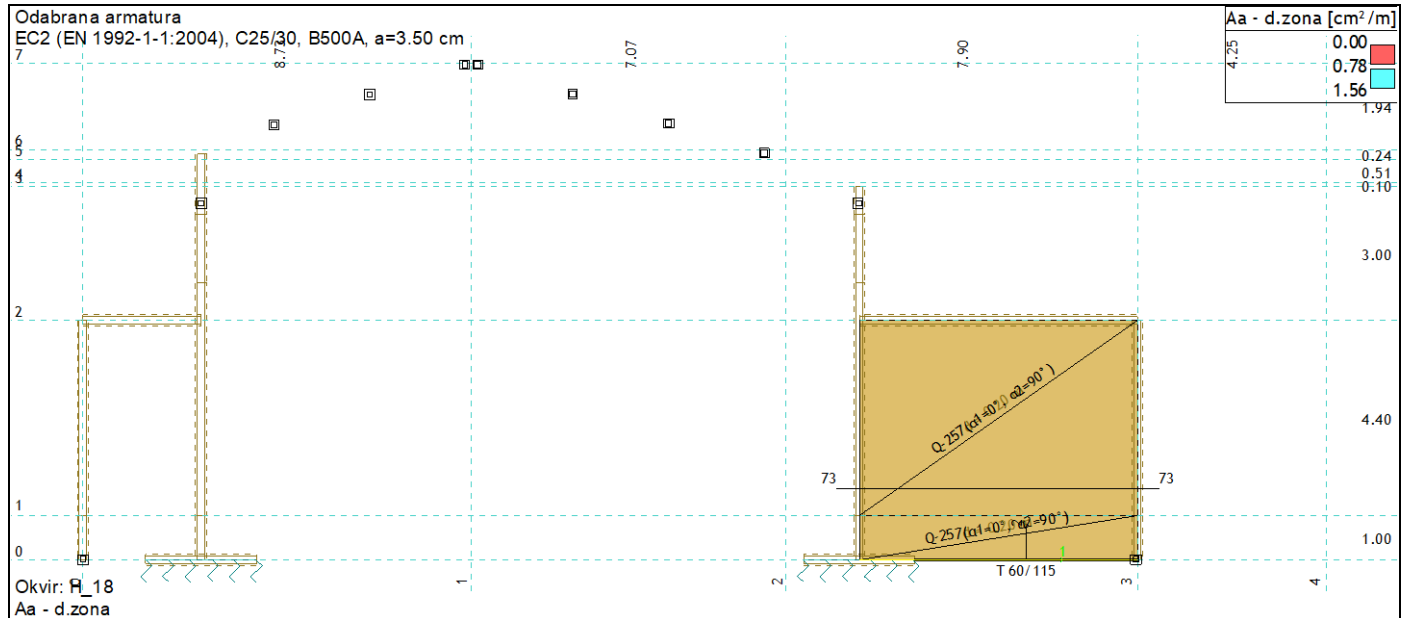


LC	N [kN]	V [kN]	M [kNm]
I	-269.3	-22.0	148.6
II	-1.6	-4.3	-2.7
III	-35.8	-4.3	27.8
IV	32.8	44.9	79.3
V	11.6	16.2	25.0

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xIV

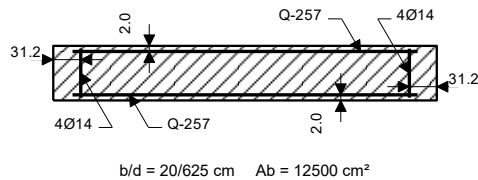
MEd =	225.65	kNm	
NEd =	-403.44	kN	
VEd =	-68.12	kN	(VRd,max = 3168.00 kN)
As1 =	0.00	cm ²	(min:13.20) (odab:4Ø14)
As2 =	0.00	cm ²	(min:13.20) (odab:4Ø14)
Aav =	±0.00	cm ² /m	(min:±1.50)
Aah =	±0.22	cm ² /m	(min:±2.00) (odab:±Q-257)

OKVIR H18



Okvir: H_18

Presjek 73 - 73 (Z=0.60m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



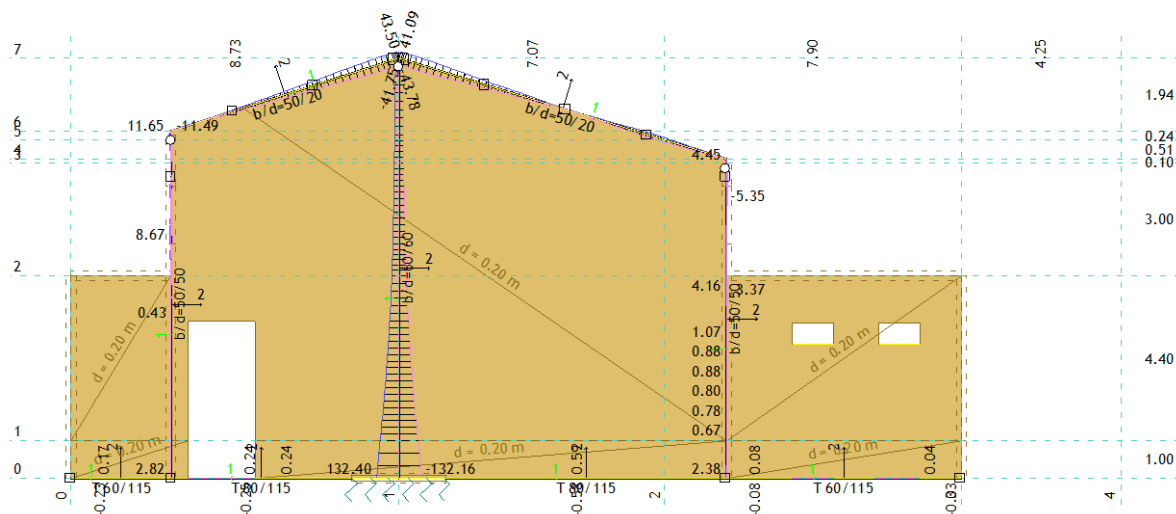
LC	N [kN]	V [kN]	M [kNm]
I	-280.3	129.5	114.5
II	-10.4	-18.5	1.4
III	-25.2	32.5	12.4
IV	31.6	52.5	29.0
V	14.4	36.5	17.8

MEd =	169.65	kNm	
NEd =	-420.46	kN	
VEd =	223.52	kN	(VRd,max = 4809.37 kN)
As1 =	0.00	cm ²	(min:18.75) (odab:4Ø14)
As2 =	0.00	cm ²	(min:18.75) (odab:4Ø14)
Aav =	±0.00	cm ² /m	(min:±1.50)
Aah =	±0.48	cm ² /m	(min:±2.00) (odab:±Q-257)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
1.35xI+1.50xIII

OKVIR H19

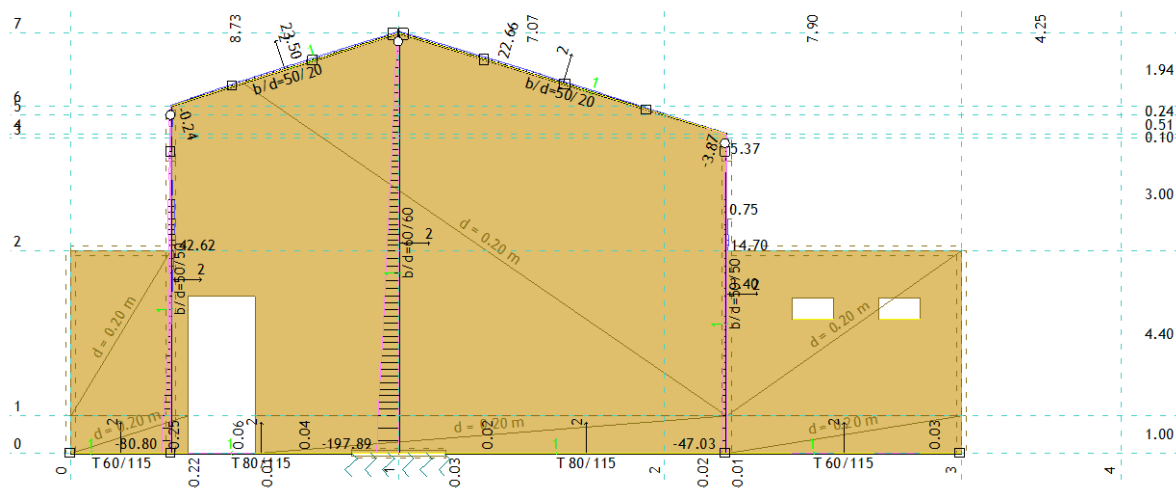
Opt. 24: [seizm] 14-21



Okvir: H_19

Utjecaji u gredi: max M2= 132.40 / min M2= -132.16 kNm

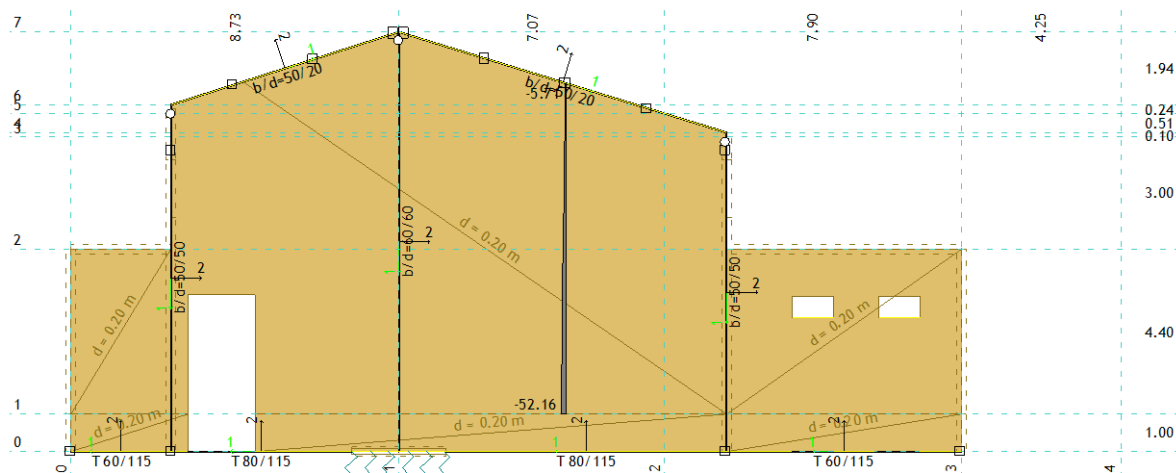
Opt. 24: [seizm] 14-21



Okvir: H_19

Utjecaji u gredi: max N1= 42.62 / min N1= -197.89 kN

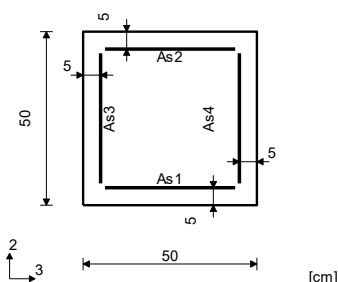
Opt. 24: [seizm] 14-21



Okvir: H_19

Vektorski presjeci: Ns

Radimpex - www.radimpex.rs



$l_{i,2} = 9.25 \text{ m}$ ($\lambda_2 = 64.09$)

$l_{i,3} = 9.25 \text{ m}$ ($\lambda_3 = 64.09$)
Pomična konstrukcija

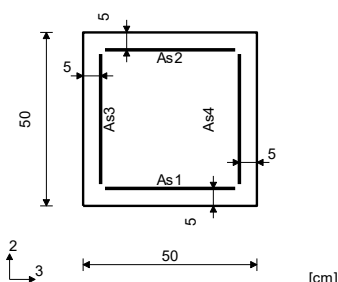
Presjek 2-2 $x = 8.25 \text{ m}$
Mjerodavna kombinacija za savijanje:
 $1.35xI + 1.50xII + 1.05xIII$
 $N1Ed = -66.97 \text{ kN}$
 $M2Ed = -0.03 \text{ kNm}$
 $M3Ed = 3.93 \text{ kNm}$
Uvećanje momenta savijanja uslijed izvijanja
 $e2 = e2min = e0,2 = 2.00 \text{ cm}$
 $|M2Ed|min = 1.34 \text{ kNm}$
 $=$
 $e1,3 = 0; e1,3 \geq e3min$
 $|\Delta M3| = 0.00 \text{ kNm}$

Mjerodavna kombinacija za torziju:
 $1.00xI + 0.30xIII + 1.00xV$
 $M1Ed = 0.03 \text{ kNm}$

Mjerodavna kombinacija za posmik:
 $1.35xI$
 $V2Ed = -8.99 \text{ kN}$
 $V3Ed = 0.95 \text{ kN}$
 $M1Ed = 0.01 \text{ kNm}$
 $V2Rd,max = 911.25 \text{ kN}$
 $V3Rd,max = 911.25 \text{ kN}$
Nije potrebna armatura.

Greda 5372-4812

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50, \gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja



$l_{i,2} = 8.50 \text{ m}$ ($\lambda_2 = 58.89$)
 $l_{i,3} = 8.50 \text{ m}$ ($\lambda_3 = 58.89$)
Pomična konstrukcija

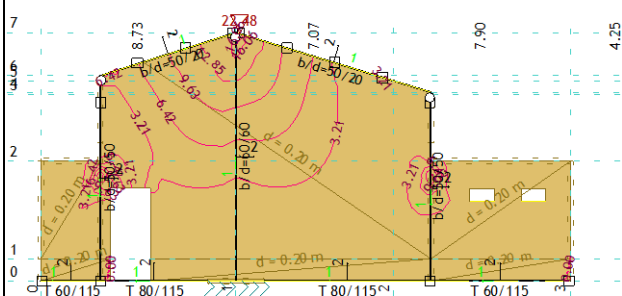
Presjek 3-3 $x = 7.50 \text{ m}$
Mjerodavna kombinacija za savijanje:
 $1.35xI + 1.50xII + 1.05xIII$
 $N1Ed = -45.24 \text{ kN}$
 $M2Ed = -0.59 \text{ kNm}$
 $M3Ed = -0.22 \text{ kNm}$
Uvećanje momenta savijanja uslijed izvijanja
 $e2 = e2min = e0,2 = 2.00 \text{ cm}$
 $|M2Ed|min = 0.90 \text{ kNm}$
 $=$
 $e3 = e3min = e0,3 = 2.00 \text{ cm}$
 $|M3Ed|min = 0.90 \text{ kNm}$
 $=$

Mjerodavna kombinacija za torziju:
 $1.00xI + 0.30xIII - 1.00xV$
 $M1Ed = -0.07 \text{ kNm}$

Mjerodavna kombinacija za posmik:
 $1.00xI - 1.00xV$
 $V2Ed = -0.95 \text{ kN}$
 $V3Ed = -4.22 \text{ kN}$
 $M1Ed = -0.07 \text{ kNm}$

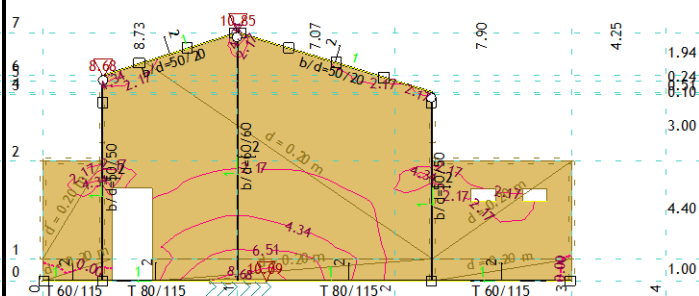
$V2Rd,max = 911.25 \text{ kN}$
 $V3Rd,max = 911.25 \text{ kN}$
Nije potrebna armatura.

Opt. 24: [seizm] 14-21



Okvir: H_19
Utjecaji u ploči: max $M_x = 22.48$ / min $M_x = 0.00 \text{ kNm/m}$

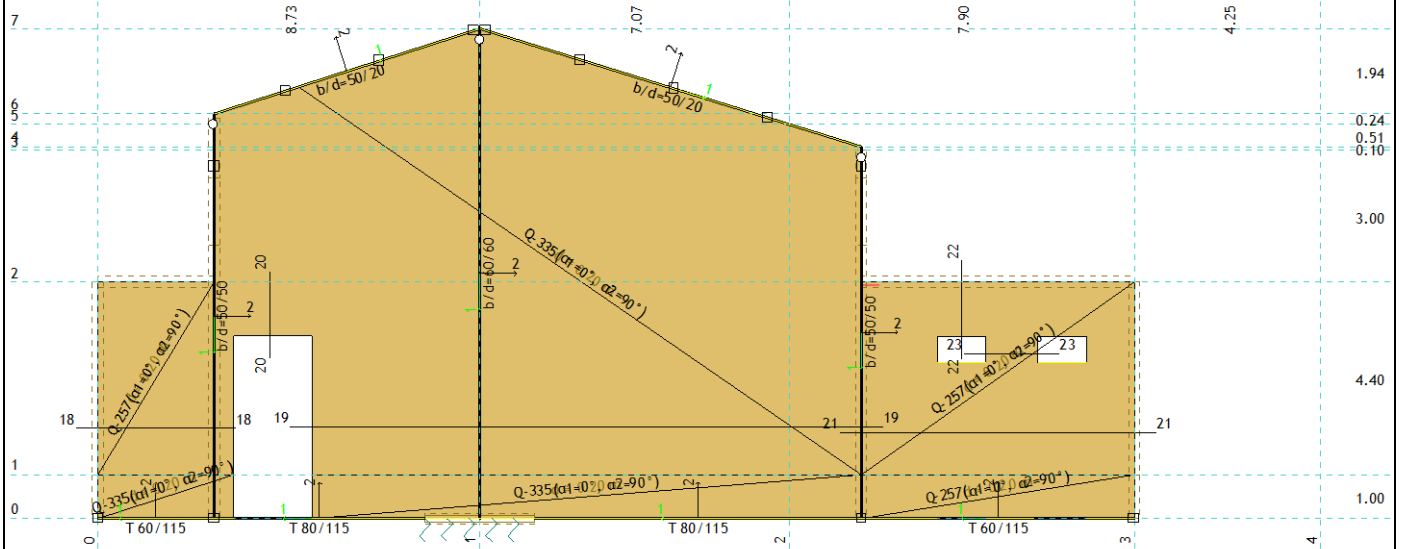
Opt. 24: [seizm] 14-21



Okvir: H_19
Utjecaji u ploči: max $M_y = 10.85$ / min $M_y = 0.00 \text{ kNm/m}$

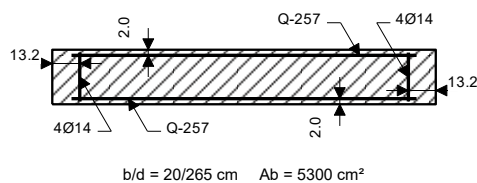
Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

Aa - d.zona [cm ² /m]
0.00
1.41
2.81



Okvir: H_19
Aa - d.zona

Presjek 18 - 18 (Z=1.06m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



LC	N [kN]	V [kN]	M [kNm]
I	-48.0	-56.0	-8.7
II	-5.4	4.2	0.3
III	1.3	-9.4	0.2
IV	16.2	13.3	7.8
V	23.4	7.0	3.1

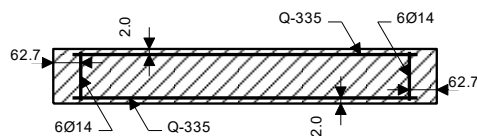
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
1.35xI+1.50xIII

MEd =	-11.18	kNm	
NEd =	-71.53	kN	
VEd =	-89.71	kN	(VRd,max = 2039.17 kN)
As1 =	0.00	cm ²	(min:7.95) (odab:4Ø14)
As2 =	0.00	cm ²	(min:7.95) (odab:4Ø14)
Aav =	±0.00	cm ² /m	(min:±1.50)
Aah =	±0.46	cm ² /m	(min:±2.00) (odab:±Q-257)

Presjek 19 - 19 (Z=1.09m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B

	GRAĐEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 228

Kompletna shema opterećenja



$$b/d = 20/12.55 \text{ cm} \quad A_b = 25100 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-724.7	-134.4	869.2
II	-33.8	45.6	32.3
III	-28.9	-26.6	41.6
IV	26.8	150.1	94.0
V	85.2	68.1	246.7

Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII+1.05xIII

Mjerodavna kombinacija za posmik:

I+0.30xIII-1.00xIV

$$\begin{aligned}
M_{Ed} &= 1265.50 \text{ kNm} \\
N_{Ed} &= -1059.41 \text{ kN} \\
V_{Ed} &= -292.46 \text{ kN} \quad (V_{Rd,max} = 9036.00 \text{ kN}) \\
A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 37.65) \quad (\text{odab: } 6\text{Ø}14) \\
A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 37.65) \quad (\text{odab: } 6\text{Ø}14) \\
A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\
A_{ah} &= \pm 0.33 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335)
\end{aligned}$$

Presjek 20 - 20 (X=3.93m)

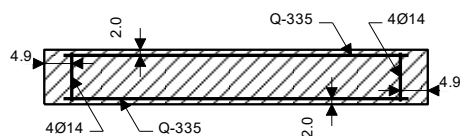
EC2 (EN 1992-1-1:2004)

C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]

Kutna armatura B500B

Uzdužna armatura B500B

Kompletna shema opterećenja



$$b/d = 20/9.85514 \text{ cm} \quad A_b = 1971.03 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	18.6	29.2	-3.8
II	2.4	-1.8	-0.1
III	0.9	5.1	-0.3
IV	32.8	13.6	0.5
V	18.6	6.0	1.2

Mjerodavna kombinacija za savijanje: I+0.30xIII+IV

Mjerodavna kombinacija za posmik: I+0.30xIII+IV

$$\begin{aligned}
M_{Ed} &= -4.36 \text{ kNm} \\
N_{Ed} &= 51.68 \text{ kN} \\
V_{Ed} &= 44.29 \text{ kN} \quad (V_{Rd,max} = 709.57 \text{ kN}) \\
s_b/s_a &= -0.325/20.000 \text{ ‰} \\
A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 2.96) \quad (\text{odab: } 4\text{Ø}14) \\
A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 2.96) \quad (\text{odab: } 4\text{Ø}14) \\
A_{av} &= \pm 0.79 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\
A_{ah} &= \pm 0.65 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335)
\end{aligned}$$

Presjek 21 - 21 (Z=0.96m)

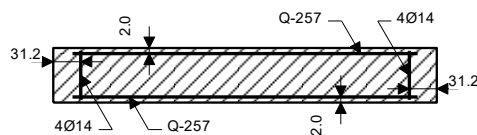
EC2 (EN 1992-1-1:2004)

C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]

Kutna armatura B500B

Uzdužna armatura B500B

Kompletna shema opterećenja



$$b/d = 20/6.25 \text{ cm} \quad A_b = 12500 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-194.2	29.7	106.5
II	-3.8	-12.0	-14.2
III	-15.0	6.9	19.6
IV	21.7	20.1	37.7
V	21.6	22.9	26.0

Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII+1.05xIII

Mjerodavna kombinacija za posmik:

I+0.30xIII+V

$$\begin{aligned}
M_{Ed} &= 143.06 \text{ kNm} \\
N_{Ed} &= -283.71 \text{ kN} \\
V_{Ed} &= 54.64 \text{ kN} \quad (V_{Rd,max} = 4500.00 \text{ kN}) \\
A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 18.75) \quad (\text{odab: } 4\text{Ø}14) \\
A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 18.75) \quad (\text{odab: } 4\text{Ø}14) \\
A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\
A_{ah} &= \pm 0.13 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-257)
\end{aligned}$$

Presjek 22 - 22 (X=19.75m)

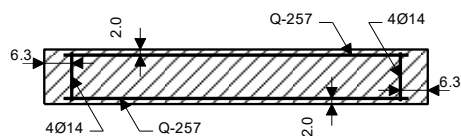
EC2 (EN 1992-1-1:2004)

C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]

Kutna armatura B500B

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 229

Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/125 \text{ cm} \quad A_b = 2500 \text{ cm}^2$$

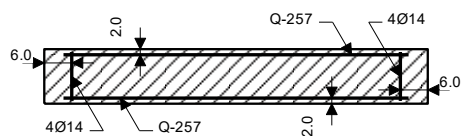
LC	N [kN]	V [kN]	M [kNm]
I	36.4	7.2	-0.2
II	-8.1	-1.1	-0.0
III	7.7	1.4	0.0
IV	15.1	6.8	0.4
V	8.2	3.5	0.2

Mjerodavna kombinacija za savijanje: 1.35xI+1.50xIII
Mjerodavna kombinacija za posmik: I+0.30xIII+IV

MEd = -0.32 kNm
NEd = 60.64 kN
VEd = 14.40 kN (VRd,max = 900.00 kN)

sb/εa = 0.250/20.000 ‰
As1 = 0.00 cm² (min:3.75) (odab:4Ø14)
As2 = 0.00 cm² (min:3.75) (odab:4Ø14)
Aav = ±0.63 cm²/m (min:±1.50)
Aah = ±0.17 cm²/m (min:±2.00) (odab:±Q-257)

Presjek 23 - 23 (Z=2.76m)
EC2 (EN 1992-1-1:2004)
C25/30 (γC = 1.50, γS = 1.15) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/119 \text{ cm} \quad A_b = 2380 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-59.2	-2.7	-0.2
II	0.9	-0.5	0.1
III	-6.9	-0.4	-0.0
IV	5.7	4.8	0.2
V	3.2	3.6	0.2

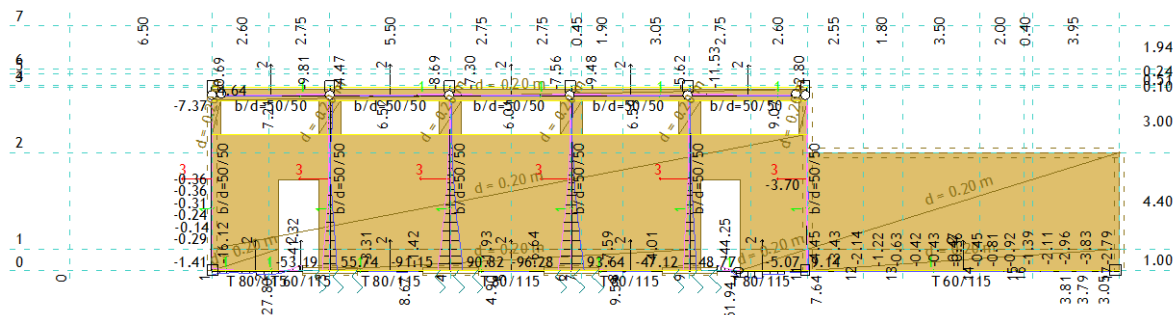
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xIV

MEd = -0.19 kNm
NEd = -85.80 kN
VEd = -7.54 kN (VRd,max = 856.80 kN)

As1 = 0.00 cm² (min:3.57) (odab:4Ø14)
As2 = 0.00 cm² (min:3.57) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.09 cm²/m (min:±2.00) (odab:±Q-257)

OKVIR V1

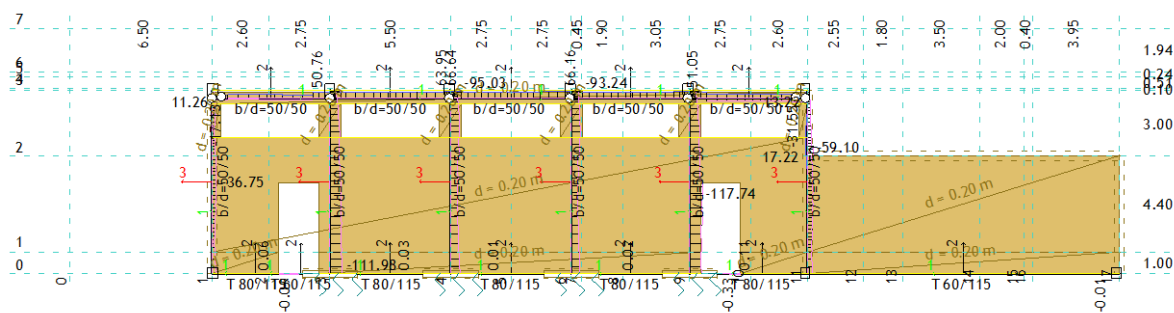
Opt. 24: [seizm] 14-21



Okrvir: V_1

Utjecaji u gredi: max M3= 93.64 / min M3= -96.28 kNm

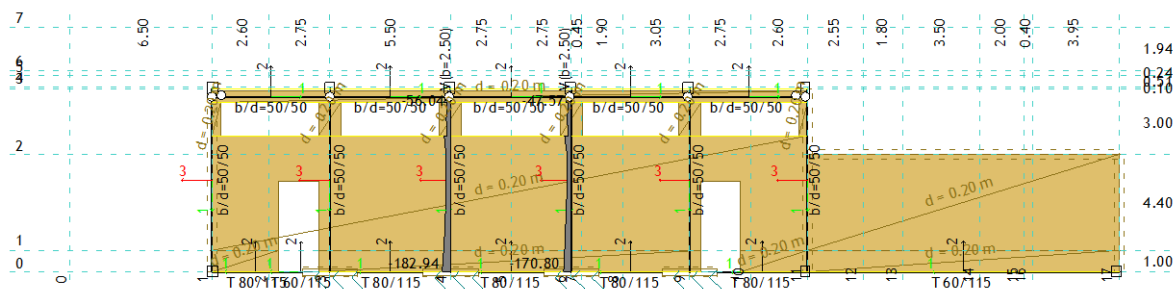
Opt. 24: [seizm] 14-21



Okrvir: V_1

Utjecaji u gredi: max N1= 66.64 / min N1= -117.74 kN

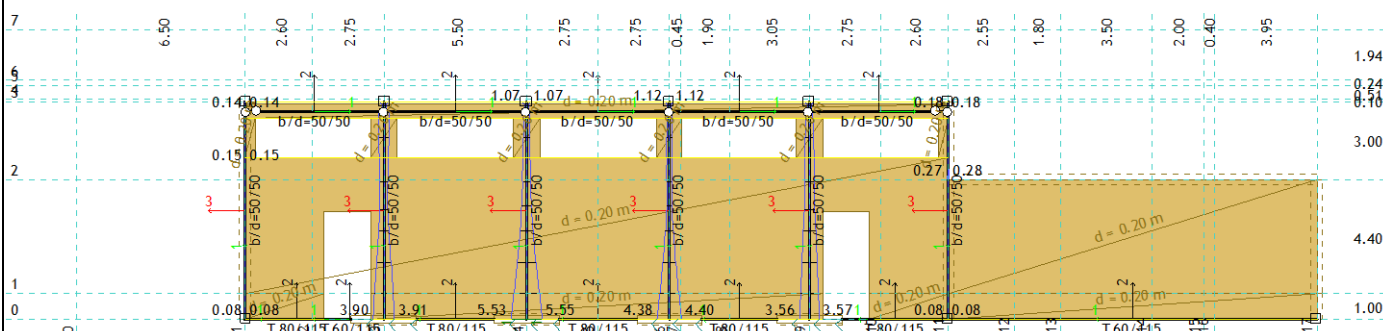
Opt. 24: [seizm] 14-21



Okrvir: V_1

Vektorski presjeci: Ns

Mjerodavno opterećenje: Kompletna shema
EC2 (EN 1992-1-1:2004), C25/30, B500A



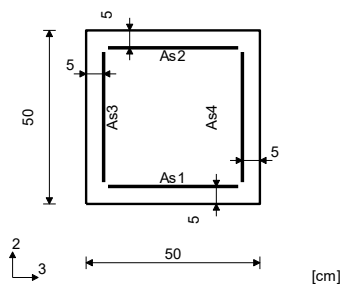
Okrvir: V_1

Armatura u gredama: max Aa2/Aa1 = 5.53 / 5.55 cm²

Greda 782-343

EC2 (EN 1992-1-1:2004)
C25/30 (γ_C = 1.50, γ_S = 1.15) [SP]
B500A

Kompletna shema opterećenja



li,2 = 8.40 m (λ₂ = 58.23)
li,3 = 16.81 m (λ₃ = 116.46)
Pomična konstrukcija

Presjek 1-1 x = 8.40m

Mjerodavna kombinacija za savijanje:

1.00xI-1.00xIV

N1Ed = -85.03 kN

M2Ed = 0.61 kNm

M3Ed = -91.15 kNm

Uvećanje momenta savijanja uslijed

izvijanja

e2 = e2min = e0,2 = 2.00 cm

|M2Ed|min = 1.70 kNm

Δe3 = 2.9 < ei,3 > + 30.3 < ei,3 > = 33.2 cm

|ΔM3| = 28.26 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII+1.00xIV

M1Ed = 5.34 kNm

Mjerodavna kombinacija za posmik:

1.00xI+0.30xIII+1.00xIV

V2Ed = 13.80 kN

V3Ed = 1.58 kN

M1Ed = 5.34 kNm

V2Rd,max = 911.25 kN

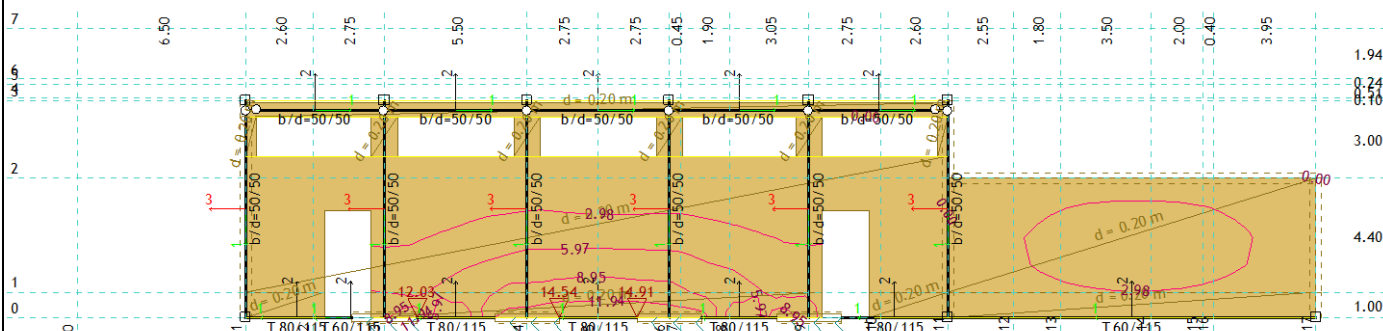
V3Rd,max = 911.25 kN

εb/εa = -2.623/20.000 %

As1 =	5.38	+	0.17'	=	5.55 cm ²
As2 =	5.35	+	0.17'	=	5.53 cm ²
As3 =	0.00	+	0.17'	=	0.17 cm ²
As4 =	0.00	+	0.17'	=	0.17 cm ²
Asw =	0.00	+	0.17'	=	0.17 cm ² /m (m=2)

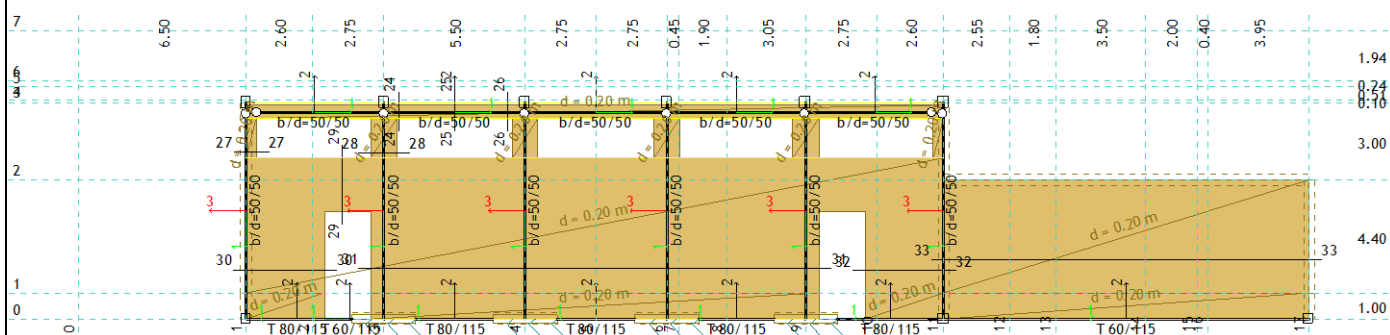
*) - dodatna uzdužna armatura za prihvat torzije.

Opt. 24: [seizm] 14-21



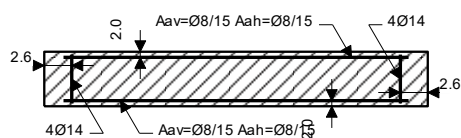
Okrvir: V_1

Utjecaji u ploči: max My = 14.91 / min My = 0.00 kNm/m



Okvir: V_1
Dispozicija presjeka

Presjek 24 - 24 (X=0.00m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/52.4441 \text{ cm} \quad A_b = 1048.88 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	13.1	-2.1	0.6
II	-1.8	-0.3	0.0
III	-0.7	-0.2	0.0
IV	6.7	0.7	0.2
V	6.8	1.1	0.4

Mjerodavna kombinacija za savijanje: I+V
Mjerodavna kombinacija za posmik: I+0.30xIII-1.00xV

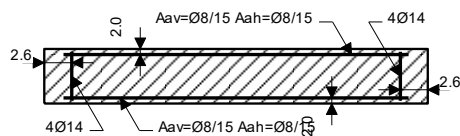
MEd = 0.91 kNm
NEd = 19.92 kN
VED = -3.23 kN (VRd,max = 377.60 kN)

$\epsilon_b/\epsilon_a = 0.447/20.000 \text{ ‰}$
As1 = 0.27 cm² (min:1.57) (odab:4Ø14)
As2 = 0.27 cm² (min:1.57) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50) (odab:±Ø8/15)
Aah = ±0.09 cm²/m (min:±2.00) (odab:±Ø8/15)

Presjek 25 - 25 (X=0.00m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 235

Kompletna shema opterećenja



$$b/d = 20/52.4441 \text{ cm} \quad A_b = 1048.88 \text{ cm}^2$$

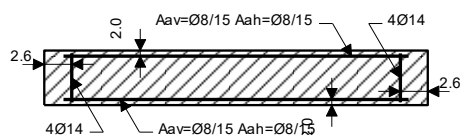
LC	N [kN]	V [kN]	M [kNm]
I	12.7	0.2	-2.5
II	-1.3	-0.1	0.1
III	-0.9	-0.0	0.0
IV	7.2	0.1	0.1
V	7.5	0.1	0.0

Mjerodavna kombinacija za savijanje: 1.35xI
 Mjerodavna kombinacija za posmik: I+V

$$\begin{aligned} M_{Ed} &= -3.31 \text{ kNm} \\ N_{Ed} &= 17.12 \text{ kN} \\ V_{Ed} &= 0.37 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 377.60 \text{ kN})$$

$$\begin{aligned} \epsilon_b/\epsilon_a &= -0.308/20.000 \text{ ‰} \\ A_{s1} &= 0.35 \text{ cm}^2 & (\text{min: } 1.57) & \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.35 \text{ cm}^2 & (\text{min: } 1.57) & \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} & (\text{min: } \pm 1.50) & \quad (\text{odab: } \pm \text{Ø}8/15) \\ A_{ah} &= \pm 0.01 \text{ cm}^2/\text{m} & (\text{min: } \pm 2.00) & \quad (\text{odab: } \pm \text{Ø}8/15) \end{aligned}$$

Presjek 26 - 26 (X=0.00m)
 EC2 (EN 1992-1-1:2004)
 C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
 Kutna armatura B500B
 Uzdužna armatura B500B
 Kompletna shema opterećenja



$$b/d = 20/52.4441 \text{ cm} \quad A_b = 1048.88 \text{ cm}^2$$

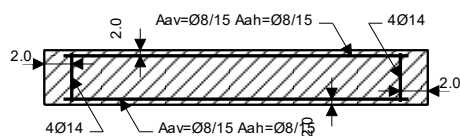
LC	N [kN]	V [kN]	M [kNm]
I	11.4	6.8	1.8
II	-2.3	-0.2	-0.1
III	-0.8	-0.1	-0.1
IV	7.0	0.5	0.2
V	7.0	0.7	0.3

Mjerodavna kombinacija za savijanje: I+V
 Mjerodavna kombinacija za posmik: 1.35xI

$$\begin{aligned} M_{Ed} &= 2.01 \text{ kNm} \\ N_{Ed} &= 18.46 \text{ kN} \\ V_{Ed} &= 9.13 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 403.56 \text{ kN})$$

$$\begin{aligned} \epsilon_b/\epsilon_a &= -0.132/20.000 \text{ ‰} \\ A_{s1} &= 0.31 \text{ cm}^2 & (\text{min: } 1.57) & \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.31 \text{ cm}^2 & (\text{min: } 1.57) & \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} & (\text{min: } \pm 1.50) & \quad (\text{odab: } \pm \text{Ø}8/15) \\ A_{ah} &= \pm 0.23 \text{ cm}^2/\text{m} & (\text{min: } \pm 2.00) & \quad (\text{odab: } \pm \text{Ø}8/15) \end{aligned}$$

Presjek 27 - 27 (Z=5.48m)
 EC2 (EN 1992-1-1:2004)
 C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
 Kutna armatura B500B
 Uzdužna armatura B500B
 Kompletna shema opterećenja



$$b/d = 20/40 \text{ cm} \quad A_b = 800 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-9.2	-6.4	-0.9
II	-0.3	0.8	0.1
III	0.3	0.5	0.0
IV	2.6	2.0	0.2
V	1.1	1.6	0.3

Mjerodavna kombinacija za savijanje:
 1.35xI+1.50xII+1.05xIII
 Mjerodavna kombinacija za posmik:
 I-1.00xIV

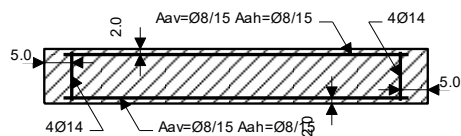
$$\begin{aligned} M_{Ed} &= -1.04 \text{ kNm} \\ N_{Ed} &= -12.49 \text{ kN} \\ V_{Ed} &= -8.30 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 288.00 \text{ kN})$$

$$\begin{aligned} A_{s1} &= 0.00 \text{ cm}^2 & (\text{min: } 1.20) & \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 & (\text{min: } 1.20) & \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} & (\text{min: } \pm 1.50) & \quad (\text{odab: } \pm \text{Ø}8/15) \\ A_{ah} &= \pm 0.30 \text{ cm}^2/\text{m} & (\text{min: } \pm 2.00) & \quad (\text{odab: } \pm \text{Ø}8/15) \end{aligned}$$

Presjek 28 - 28 (Z=5.47m)
 EC2 (EN 1992-1-1:2004)
 C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
 Kutna armatura B500B
 Uzdužna armatura B500B

	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 236

Kompletna shema opterećenja



$$b/d = 20/100 \text{ cm} \quad A_b = 2000 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-62.6	-18.1	10.6
II	-18.9	2.0	-1.2
III	-0.2	1.0	-0.6
IV	5.3	2.7	1.7
V	6.1	3.9	2.0

Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII+1.05xIII

Mjerodavna kombinacija za posmik:

1.35xI

$$\begin{aligned} M_{Ed} &= 11.79 \text{ kNm} \\ N_{Ed} &= -112.99 \text{ kN} \\ V_{Ed} &= -24.41 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 769.50 \text{ kN})$$

$$\begin{aligned} A_{s1} &= 0.00 \text{ cm}^2 & (\text{min: } 3.00) & (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 & (\text{min: } 3.00) & (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} & (\text{min: } \pm 1.50) & (\text{odab: } \pm \text{Ø}8/15) \\ A_{ah} &= \pm 0.33 \text{ cm}^2/\text{m} & (\text{min: } \pm 2.00) & (\text{odab: } \pm \text{Ø}8/15) \end{aligned}$$

Presjek 29 - 29 (X=0.00m)

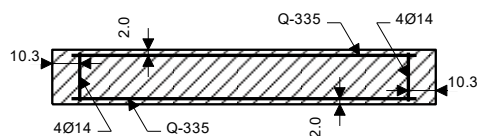
EC2 (EN 1992-1-1:2004)

C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]

Kutna armatura B500B

Uzdužna armatura B500B

Kompletna shema opterećenja



$$b/d = 20/207 \text{ cm} \quad A_b = 4140 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	63.4	34.6	1.3
II	-3.9	-13.9	3.8
III	-3.2	-3.6	0.7
IV	20.4	13.0	2.5
V	10.3	7.7	3.2

Mjerodavna kombinacija za savijanje: I+IV

Mjerodavna kombinacija za posmik: I+IV

$$\begin{aligned} M_{Ed} &= 3.78 \text{ kNm} \\ N_{Ed} &= 83.82 \text{ kN} \\ V_{Ed} &= 47.58 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 1490.40 \text{ kN})$$

$$\begin{aligned} s_b/s_a &= -0.119/20.000 \% \\ A_{s1} &= 0.00 \text{ cm}^2 & (\text{min: } 6.21) & (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 & (\text{min: } 6.21) & (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.54 \text{ cm}^2/\text{m} & (\text{min: } \pm 1.50) & (\text{odab: } \pm \text{Ø}8/15) \\ A_{ah} &= \pm 0.33 \text{ cm}^2/\text{m} & (\text{min: } \pm 2.00) & (\text{odab: } \pm \text{Ø}8/15) \end{aligned}$$

Presjek 30 - 30 (Z=0.90m)

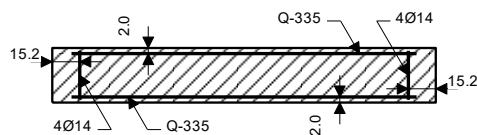
EC2 (EN 1992-1-1:2004)

C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]

Kutna armatura B500B

Uzdužna armatura B500B

Kompletna shema opterećenja



$$b/d = 20/305 \text{ cm} \quad A_b = 6100 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-114.2	-65.4	-54.6
II	-13.2	8.5	-4.8
III	1.3	4.5	0.6
IV	20.1	21.4	6.2
V	8.6	9.9	4.3

Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII+1.05xIII

Mjerodavna kombinacija za posmik:

I-1.00xIV

$$\begin{aligned} M_{Ed} &= -80.26 \text{ kNm} \\ N_{Ed} &= -172.51 \text{ kN} \\ V_{Ed} &= -86.83 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 2196.00 \text{ kN})$$

$$\begin{aligned} A_{s1} &= 0.00 \text{ cm}^2 & (\text{min: } 9.15) & (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 & (\text{min: } 9.15) & (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} & (\text{min: } \pm 1.50) & (\text{odab: } \pm \text{Ø}8/15) \\ A_{ah} &= \pm 0.41 \text{ cm}^2/\text{m} & (\text{min: } \pm 2.00) & (\text{odab: } \pm \text{Ø}8/15) \end{aligned}$$

Presjek 31 - 31 (Z=0.95m)

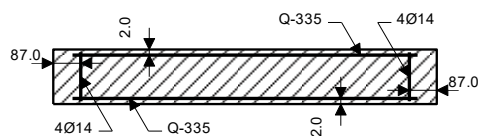
EC2 (EN 1992-1-1:2004)

C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]

Kutna armatura B500B

	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 237

Uzdužna armatura B500B
Kompletna shema opterećenja



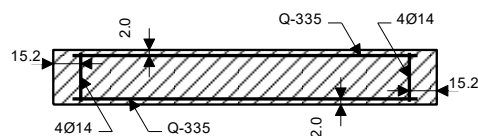
$$b/d = 20/1740 \text{ cm} \quad A_b = 34800 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-912.0	34.6	111.6
II	-113.3	22.2	-4.0
III	2.6	8.1	15.2
IV	29.1	56.8	103.6
V	17.8	70.7	157.9

$$\begin{aligned}
M_{Ed} &= 160.50 \text{ kNm} \\
N_{Ed} &= -1398.49 \text{ kN} \\
V_{Ed} &= 107.73 \text{ kN} \quad (V_{Rd,max} = 12528.00 \text{ kN}) \\
A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 52.20) \quad (\text{odab: } 4\text{Ø}14) \\
A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 52.20) \quad (\text{odab: } 4\text{Ø}14) \\
A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\
A_{ah} &= \pm 0.09 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335)
\end{aligned}$$

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII+V

Presjek 32 - 32 (Z=0.87m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



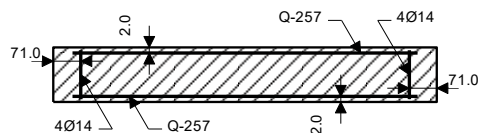
$$b/d = 20/305 \text{ cm} \quad A_b = 6100 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-127.8	110.8	-41.7
II	-15.0	0.5	1.1
III	2.1	4.9	1.2
IV	22.6	36.8	3.0
V	20.0	51.1	4.5

$$\begin{aligned}
M_{Ed} &= -53.26 \text{ kNm} \\
N_{Ed} &= -192.89 \text{ kN} \\
V_{Ed} &= 163.33 \text{ kN} \quad (V_{Rd,max} = 2196.00 \text{ kN}) \\
A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 9.15) \quad (\text{odab: } 4\text{Ø}14) \\
A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 9.15) \quad (\text{odab: } 4\text{Ø}14) \\
A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\
A_{ah} &= \pm 0.77 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335)
\end{aligned}$$

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII+V

Presjek 33 - 33 (Z=1.28m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



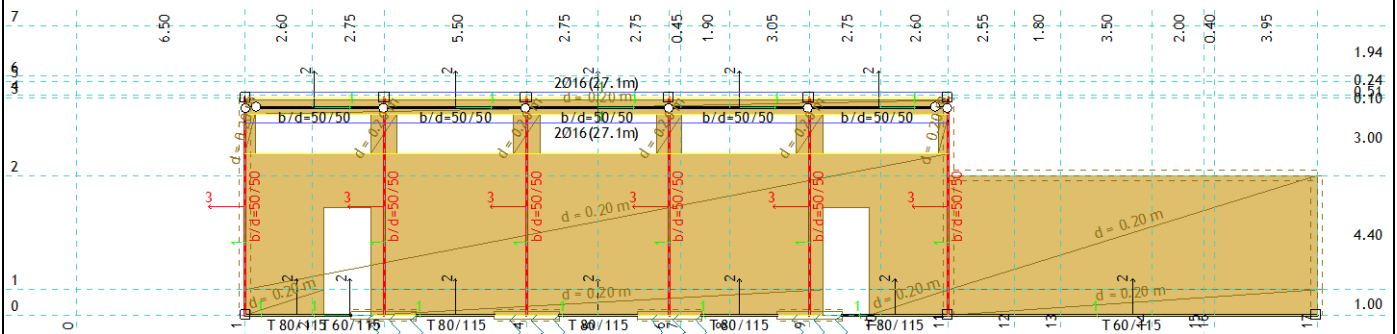
$$b/d = 20/1420 \text{ cm} \quad A_b = 28400 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-365.3	54.0	111.7
II	-22.7	-32.8	41.1
III	-18.3	0.8	1.1
IV	23.9	30.9	165.2
V	19.2	67.6	338.1

$$\begin{aligned}
M_{Ed} &= 213.60 \text{ kNm} \\
N_{Ed} &= -546.53 \text{ kN} \\
V_{Ed} &= 121.79 \text{ kN} \quad (V_{Rd,max} = 10224.00 \text{ kN}) \\
A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 42.60) \quad (\text{odab: } 4\text{Ø}14) \\
A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 42.60) \quad (\text{odab: } 4\text{Ø}14) \\
A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\
A_{ah} &= \pm 0.12 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-257)
\end{aligned}$$

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII+V

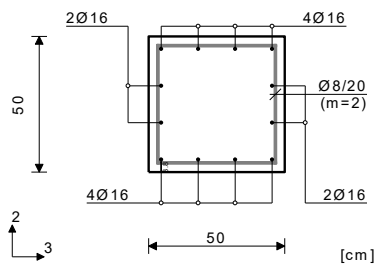
Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A



Okvir: V_1
Armatura u gredama (odabrana): Aa3/Aa4

Greda 756-1201
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
B500A
Kompletna shema opterećenja

Presjek 1-1 $x = 2.30m$



Mjerodavna kombinacija za savijanje:
1.00xI-1.00xIV
N1Ed = 19.96 kN
M2Ed = -44.18 kNm
M3Ed = 5.21 kNm

Mjerodavna kombinacija za torziju:
1.00xI+0.30xIII-1.00xIV
M1Ed = -0.03 kNm

Mjerodavna kombinacija za posmik:
1.35xI
V2Ed = -3.77 kN
V3Ed = -0.13 kN
M1Ed = -0.01 kNm

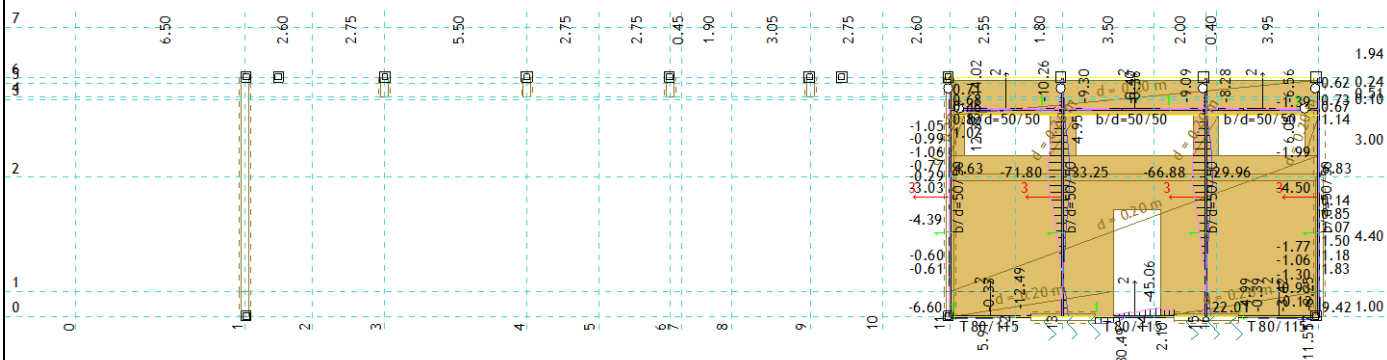
V2Rd,max = 911.25 kN
V3Rd,max = 911.25 kN
 $\epsilon_b/\epsilon_a = -1.757/20.000 \%$

As1 = 0.00 cm²
As2 = 0.00 cm²
As3 = 2.46 cm²
As4 = 2.94 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 0.97%

OKVIR V2

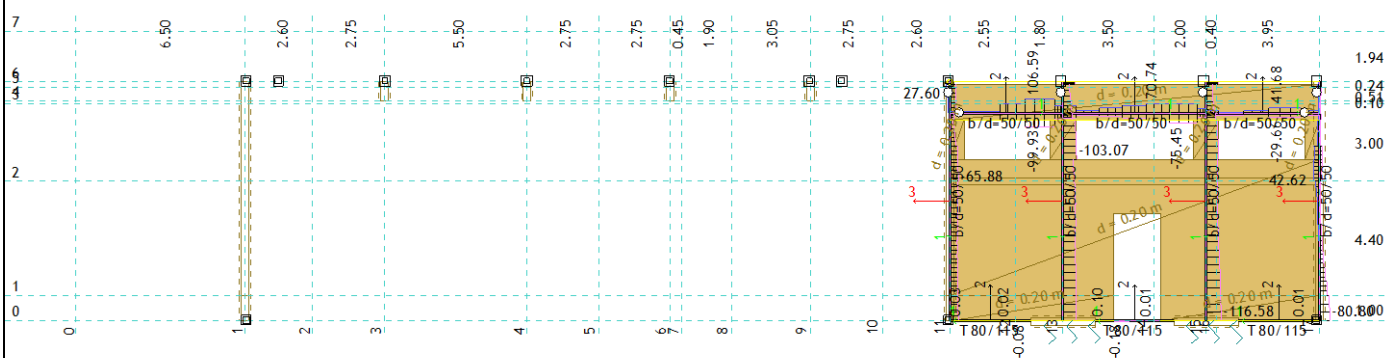
Opt. 24: [seizm] 14-21



Okvir: V 2

Utjecaji u gredi: max $M_3 = 33.25$ / min $M_3 = -71.80$ kNm

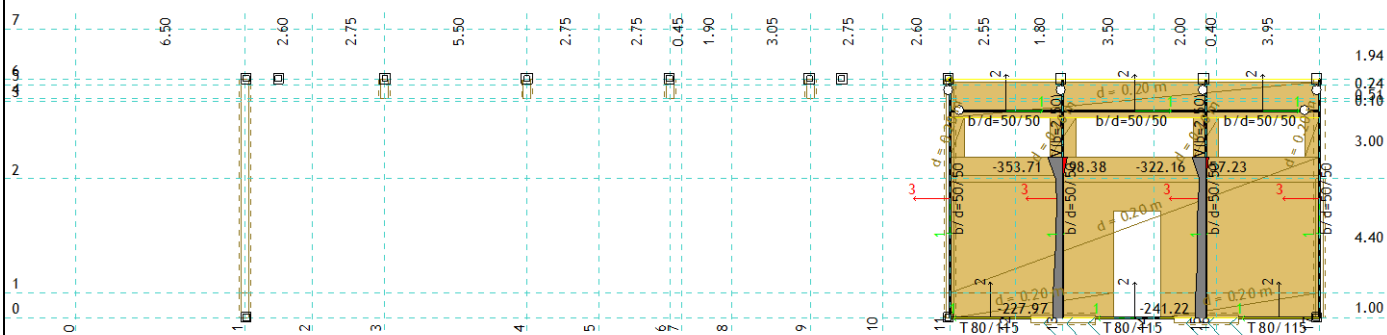
Opt. 24: [seizm] 14-21



Okvir: V_2

Utjecaji u gredi: max N1= 106.59 / min N1= -116.58 kN

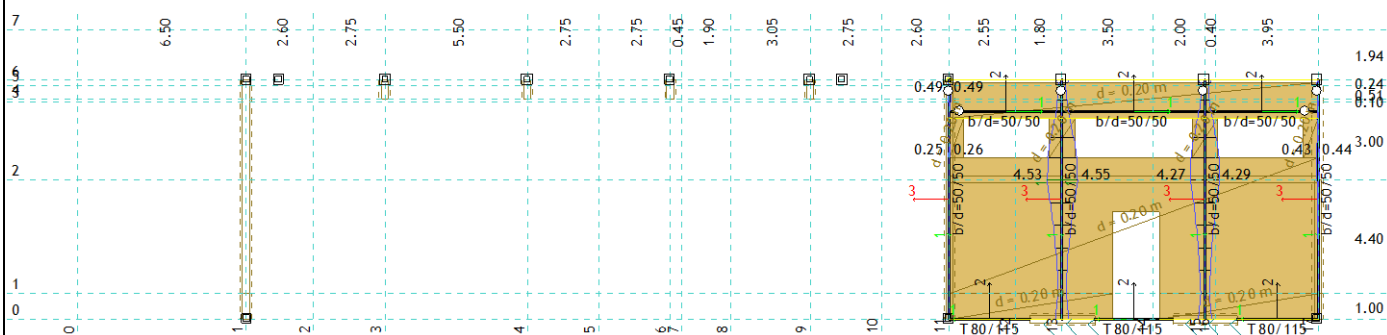
Opt. 24: [seizm] 14-21



Okvir: V_2

Vektorski presjeci: N_s

Mjerodavno opterećenje: Kompletna shema
EC2 (EN 1992-1-1:2004), C25/30, B500A

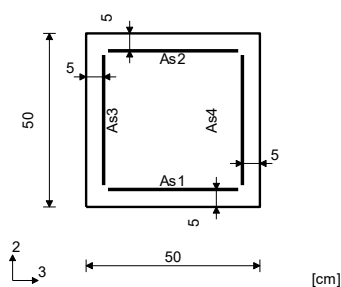


Okvir: V_2

Amaturna u gredama: max $A_{a2}/A_{a1} = 4.53 / 4.55 \text{ cm}^2$

Greda 3040-1976

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
B500A
Kompletna shema opterećenja



$l_{i,2} = 9.25 \text{ m}$ ($\lambda_2 = 64.09$)
 $l_{i,3} = 18.50 \text{ m}$ ($\lambda_3 = 128.17$)
Pomična konstrukcija

Presjek 1-1 $x = 3.85 \text{ m}$

Mjerodavna kombinacija za savijanje:

1.00xI-1.00xIV

N1Ed = -82.93 kN

M2Ed = -2.19 kNm

M3Ed = -68.96 kNm

Uvećanje momenta savijanja uslijed izvijanja

$e_{l,2} = 0$; $e_{l,2} \geq e_{2min}$

$|\Delta M_2| = 0.00 \text{ kNm}$

$\Delta e_3 = 3.1 < e_{l,3} > + 36.7 < e_{l,3} > = 39.8 \text{ cm}$

$|\Delta M_3| = 33.03 \text{ kNm}$

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII+1.00xIV

M1Ed = 0.13 kNm

Mjerodavna kombinacija za posmik:

1.00xI-1.00xIV

V2Ed = -4.07 kN

V3Ed = -1.91 kN

M1Ed = -0.06 kNm

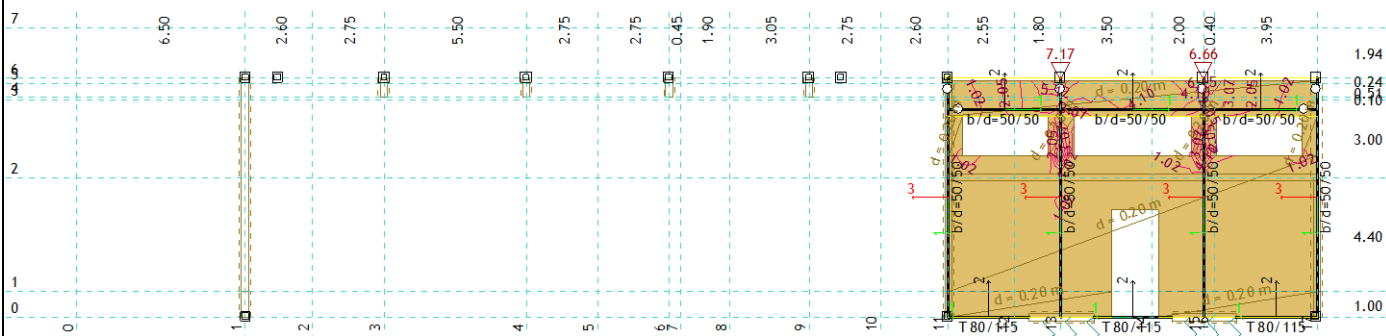
V2Rd,max = 911.25 kN

V3Rd,max = 911.25 kN

$\epsilon_b/\epsilon_a = -2.468/20.000 \text{ ‰}$

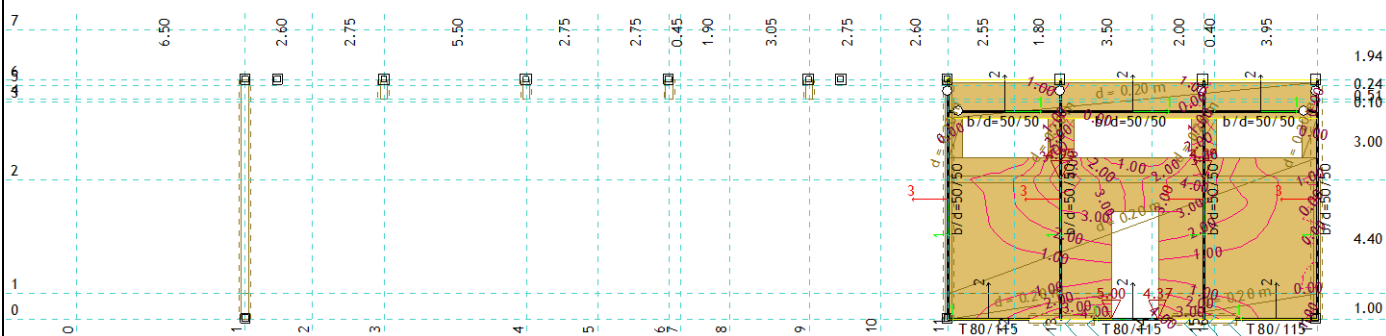
As1 = 4.42 cm^2
As2 = 4.40 cm^2
As3 = 0.00 cm^2
As4 = 0.00 cm^2
Asw = 0.00 cm^2/m (m=2)

Opt. 24: [seizm] 14-21



Okvir: V_2
Utjecaji u ploči: max $M_x = 7.17$ / min $M_x = 0.01$ kNm/m

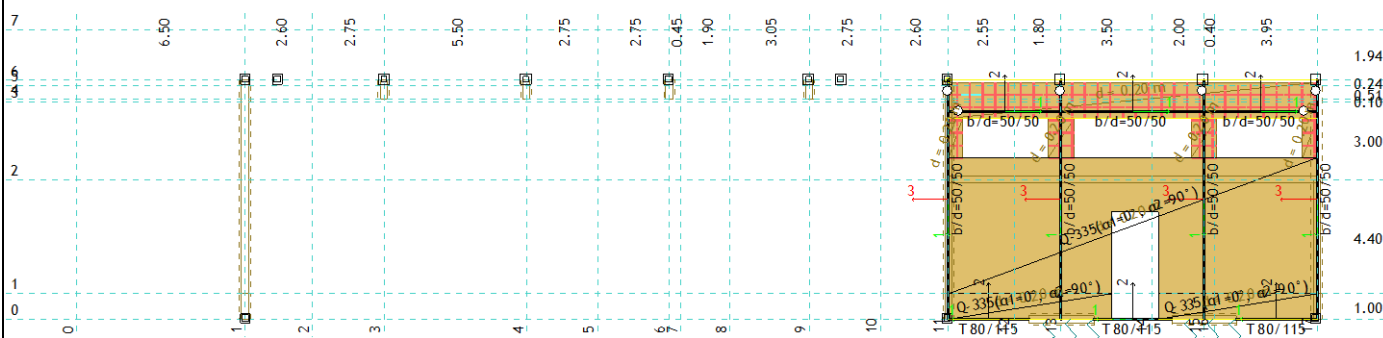
Opt. 24: [seizm] 14-21



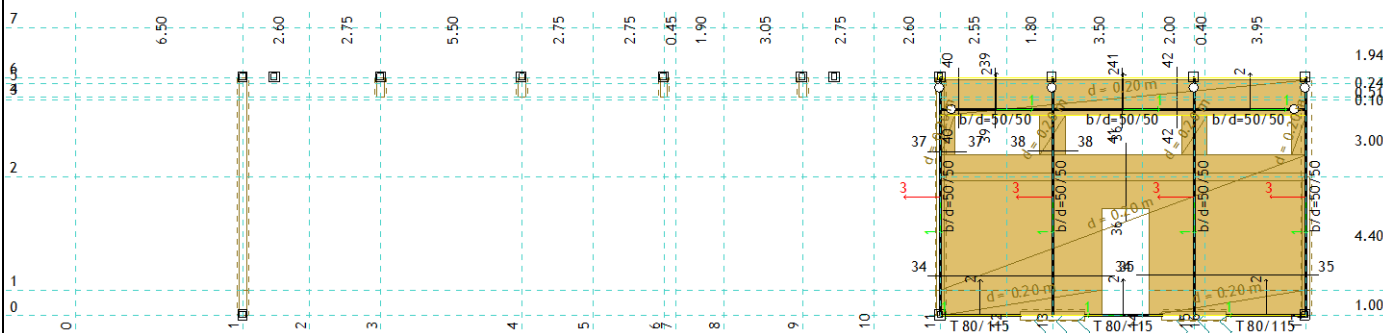
Okvir: V_2
Utjecaji u ploči: max $M_y = 5.00$ / min $M_y = 0.00$ kNm/m

Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

Aa - d.zona [cm ² /m]
0.00
3.18
6.36



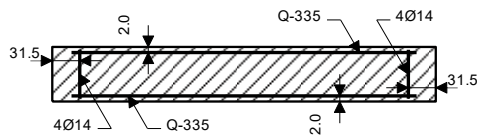
Okvir: V_2
Aa - d.zona



Okvir: V_2
Dispozicija presjeka

Presjek 34 - 34 (Z=0.54m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/630 \text{ cm} \quad A_b = 12600 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-410.0	-98.0	255.3
II	-33.1	4.7	18.8
III	-10.4	-4.3	8.5
IV	47.0	58.1	37.9
V	24.4	75.4	109.3

Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII+1.05xIII

Mjerodavna kombinacija za posmik:

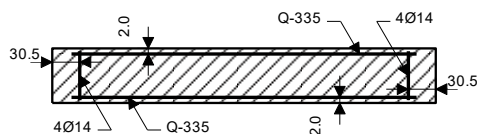
I+0.30xIII-1.00xV

$$\begin{aligned} M_{Ed} &= 381.85 \text{ kNm} \\ N_{Ed} &= -614.05 \text{ kN} \\ V_{Ed} &= -174.71 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 4536.00 \text{ kN})$$

$$\begin{aligned} A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 18.90) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 18.90) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.40 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335) \end{aligned}$$

Presjek 35 - 35 (Z=0.58m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/610 \text{ cm} \quad A_b = 12200 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-378.4	-26.2	-234.0
II	-31.5	-3.1	-21.0
III	-6.9	-13.1	-5.5
IV	27.5	34.4	31.5
V	31.0	69.7	70.3

Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII+1.05xIII

Mjerodavna kombinacija za posmik:

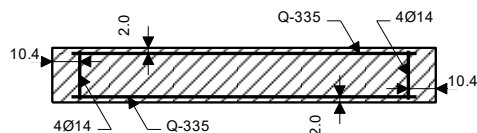
I+0.30xIII-1.00xV

$$\begin{aligned} M_{Ed} &= -353.29 \text{ kNm} \\ N_{Ed} &= -565.35 \text{ kN} \\ V_{Ed} &= -99.88 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 4392.00 \text{ kN})$$

$$\begin{aligned} A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 18.30) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 18.30) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.24 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335) \end{aligned}$$

Presjek 36 - 36 (X=2.65m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/207 \text{ cm} \quad A_b = 4140 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	30.6	33.1	5.7
II	-9.6	-0.9	-2.4
III	-0.3	5.0	1.2
IV	81.1	27.0	9.1
V	36.8	78.8	5.5

Mjerodavna kombinacija za savijanje: I+0.30xIII+IV

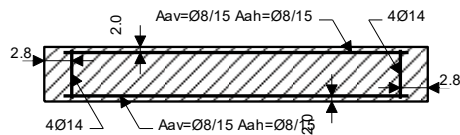
Mjerodavna kombinacija za posmik: I+0.30xIII+V

$$\begin{aligned} M_{Ed} &= 15.12 \text{ kNm} \\ N_{Ed} &= 111.65 \text{ kN} \\ V_{Ed} &= 113.35 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 1490.40 \text{ kN})$$

$$\begin{aligned} s_b/e_a &= -0.282/20.000 \% \\ A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 6.21) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 6.21) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.78 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.79 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335) \end{aligned}$$

Presjek 37 - 37 (Z=5.38m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/55 \text{ cm} \quad A_b = 1100 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-17.8	0.4	0.1
II	-0.6	0.9	-0.1
III	-0.2	0.2	-0.1
IV	6.4	5.4	1.2
V	21.7	15.3	3.8

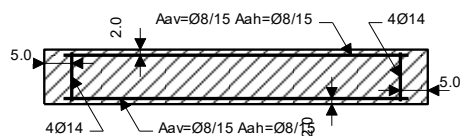
Mjerodavna kombinacija za savijanje: I+V
Mjerodavna kombinacija za posmik: I+0.30xIII+V

$$\begin{aligned} M_{Ed} &= 3.90 \text{ kNm} \\ N_{Ed} &= 3.88 \text{ kN} \\ V_{Ed} &= 15.72 \text{ kN} \quad (V_{Rd,max} = 396.00 \text{ kN}) \end{aligned}$$

$$\begin{aligned} \epsilon_b/\epsilon_a &= -0.457/20.000 \% \\ A_{s1} &= 0.22 \text{ cm}^2 \quad (\text{min: } 1.65) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.22 \text{ cm}^2 \quad (\text{min: } 1.65) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \quad (\text{odab: } \pm \text{Ø}8/15) \\ A_{ah} &= \pm 0.41 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm \text{Ø}8/15) \end{aligned}$$

Presjek 38 - 38 (Z=5.39m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/100 \text{ cm} \quad A_b = 2000 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-72.0	0.5	0.9
II	-17.3	0.9	-0.0
III	0.2	0.4	-0.2
IV	6.6	18.1	5.9
V	20.0	59.8	19.8

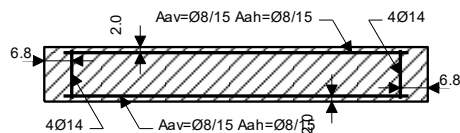
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII+V

$$\begin{aligned} M_{Ed} &= 1.05 \text{ kNm} \\ N_{Ed} &= -123.00 \text{ kN} \\ V_{Ed} &= 60.44 \text{ kN} \quad (V_{Rd,max} = 720.00 \text{ kN}) \end{aligned}$$

$$\begin{aligned} A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 3.00) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 3.00) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \quad (\text{odab: } \pm \text{Ø}8/15) \\ A_{ah} &= \pm 0.87 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm \text{Ø}8/15) \end{aligned}$$

Presjek 39 - 39 (X=2.65m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/137 \text{ cm} \quad A_b = 2740 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-7.6	-1.1	-7.0
II	-1.1	-1.8	0.4
III	-0.8	-0.4	-0.1
IV	37.0	16.5	10.5
V	118.3	55.1	34.3

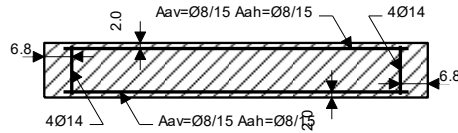
Mjerodavna kombinacija za savijanje: I+V
Mjerodavna kombinacija za posmik: I+0.30xIII-1.00xV

$$\begin{aligned} M_{Ed} &= -41.26 \text{ kNm} \\ N_{Ed} &= 110.77 \text{ kN} \\ V_{Ed} &= -56.35 \text{ kN} \quad (V_{Rd,max} = 986.40 \text{ kN}) \end{aligned}$$

$$\begin{aligned} \epsilon_b/\epsilon_a &= -0.299/20.000 \% \\ A_{s1} &= 2.04 \text{ cm}^2 \quad (\text{min: } 4.11) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 2.04 \text{ cm}^2 \quad (\text{min: } 4.11) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \quad (\text{odab: } \pm \text{Ø}8/15) \\ A_{ah} &= \pm 0.59 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm \text{Ø}8/15) \end{aligned}$$

Presjek 40 - 40 (X=2.65m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/137 \text{ cm} \quad A_b = 2740 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-3.7	-9.7	-0.9
II	-0.1	-1.1	1.0
III	-0.4	-0.3	0.1
IV	78.0	26.1	28.3
V	258.8	87.5	94.3

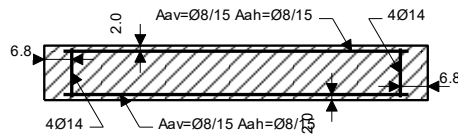
Mjerodavna kombinacija za savijanje: I+V
Mjerodavna kombinacija za posmik: I+0.30xIII-1.00xV

$$\begin{aligned} M_{Ed} &= -95.14 \text{ kNm} \\ N_{Ed} &= 255.12 \text{ kN} \\ V_{Ed} &= -97.27 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 986.40 \text{ kN})$$

$$\begin{aligned} s_b/e_a &= -0.379/20.000 \text{ ‰} \\ A_{s1} &= 4.70 \text{ cm}^2 \quad (\text{min: } 4.11) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 4.70 \text{ cm}^2 \quad (\text{min: } 4.11) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \quad (\text{odab: } \pm \text{Ø}8/15) \\ A_{ah} &= \pm 1.02 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm \text{Ø}8/15) \end{aligned}$$

Presjek 41 - 41 (X=2.65m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/137 \text{ cm} \quad A_b = 2740 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-13.9	0.7	-11.7
II	-2.7	0.1	-0.3
III	-1.0	0.1	-0.2
IV	18.7	6.5	1.3
V	54.7	21.6	1.6

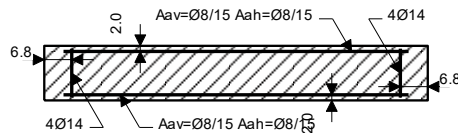
Mjerodavna kombinacija za savijanje: I+V
Mjerodavna kombinacija za posmik: I+0.30xIII+V

$$\begin{aligned} M_{Ed} &= -13.28 \text{ kNm} \\ N_{Ed} &= 40.77 \text{ kN} \\ V_{Ed} &= 22.32 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 986.40 \text{ kN})$$

$$\begin{aligned} s_b/e_a &= -0.170/20.000 \text{ ‰} \\ A_{s1} &= 0.71 \text{ cm}^2 \quad (\text{min: } 4.11) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.71 \text{ cm}^2 \quad (\text{min: } 4.11) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \quad (\text{odab: } \pm \text{Ø}8/15) \\ A_{ah} &= \pm 0.23 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm \text{Ø}8/15) \end{aligned}$$

Presjek 42 - 42 (X=2.65m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/137 \text{ cm} \quad A_b = 2740 \text{ cm}^2$$

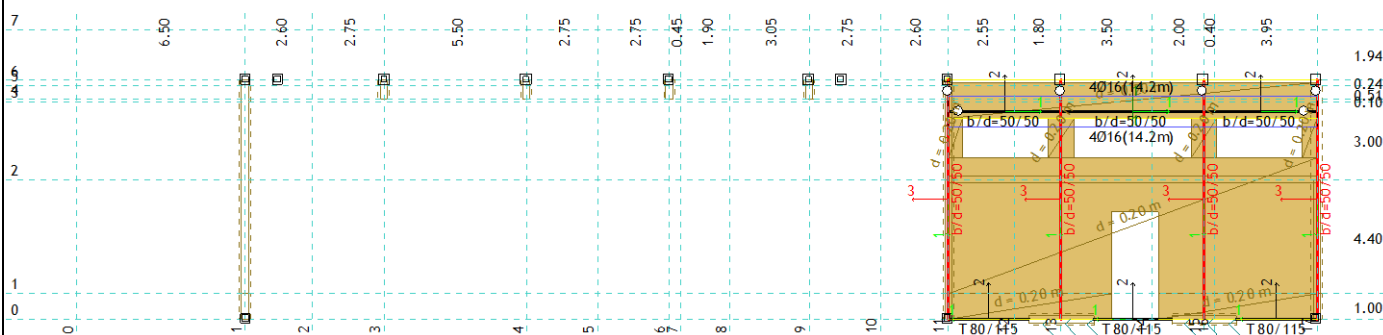
LC	N [kN]	V [kN]	M [kNm]
I	1.9	13.9	5.0
II	-5.9	-0.0	-0.9
III	-0.9	0.0	0.0
IV	17.1	3.1	6.3
V	44.7	10.4	20.7

Mjerodavna kombinacija za savijanje: I+V
Mjerodavna kombinacija za posmik: I+0.30xIII+V

$$\begin{aligned} M_{Ed} &= 25.74 \text{ kNm} \\ N_{Ed} &= 46.51 \text{ kN} \\ V_{Ed} &= 24.33 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 986.40 \text{ kN})$$

$$\begin{aligned} s_b/e_a &= -0.340/20.000 \text{ ‰} \\ A_{s1} &= 1.00 \text{ cm}^2 \quad (\text{min: } 4.11) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 1.00 \text{ cm}^2 \quad (\text{min: } 4.11) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \quad (\text{odab: } \pm \text{Ø}8/15) \\ A_{ah} &= \pm 0.26 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm \text{Ø}8/15) \end{aligned}$$

Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A



Okvir: V_2

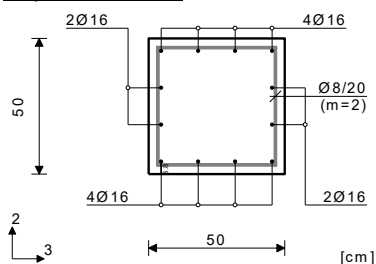
Armatura u gredama (odabrana): Aa2/Aa1

Greda 2894-3606

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
B500A

Kompletna shema opterećenja

Presjek 1-1 $x = 2.30m$



Mjerodavna kombinacija za savijanje:

1.00xI+1.00xV
N1Ed = 59.41 kN
M2Ed = 0.00 kNm
M3Ed = 3.07 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII-1.00xIV
M1Ed = -0.02 kNm

Mjerodavna kombinacija za posmik:

1.00xI-1.00xV
V2Ed = -6.27 kN
V3Ed = -0.77 kN
M1Ed = -0.02 kNm

V2Rd,max = 911.25 kN
V3Rd,max = 911.25 kN
 $\epsilon_b/\epsilon_a = -0.072/20.000 \%$

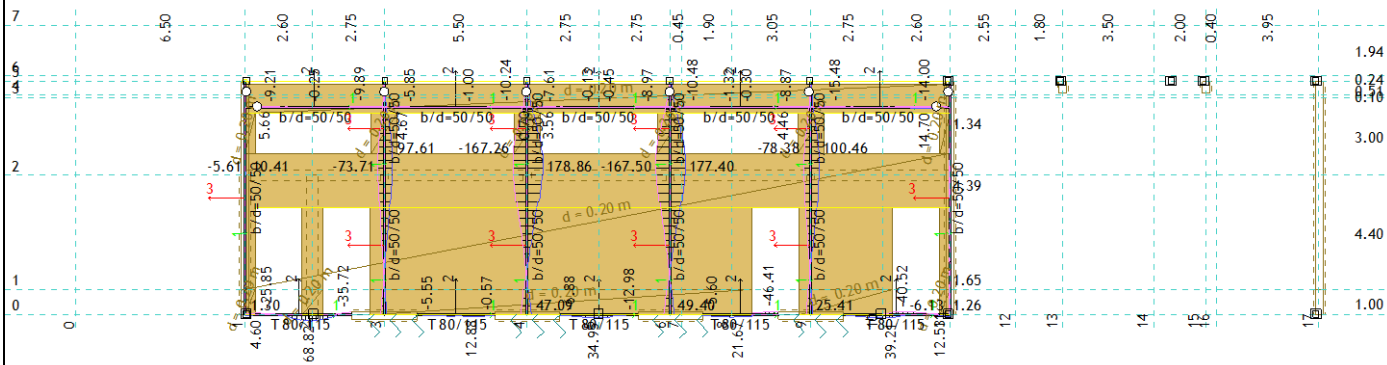
As1 = 0.88 cm²
As2 = 0.51 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)

[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 0.97%

OKVIR V3

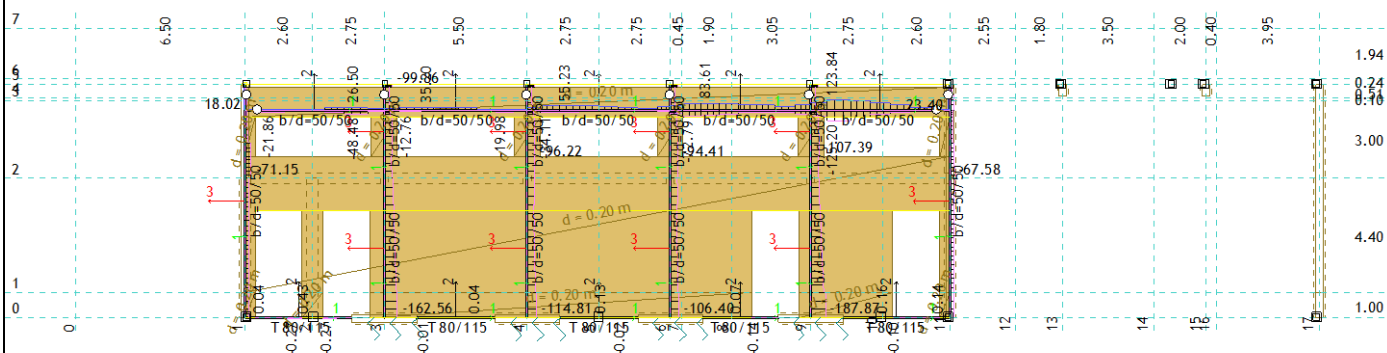
Opt. 24: [seizm] 14-21



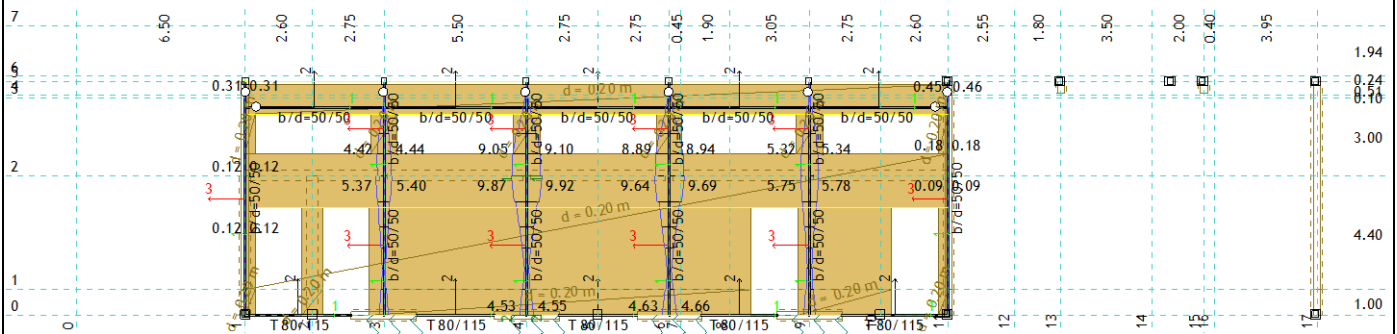
Okvir: V_3

Utjecaji u gredi: max M3= 178.86 / min M3= -167.50 kNm

Opt. 24: [seizm] 14-21



Mjerodavno opterećenje: Kompletna shema
EC2 (EN 1992-1-1:2004), C25/30, B500A

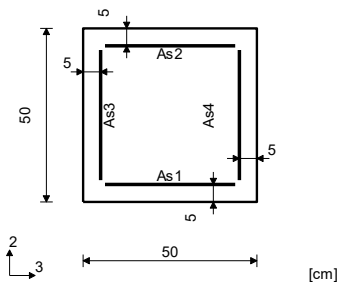


Okvir: V_3

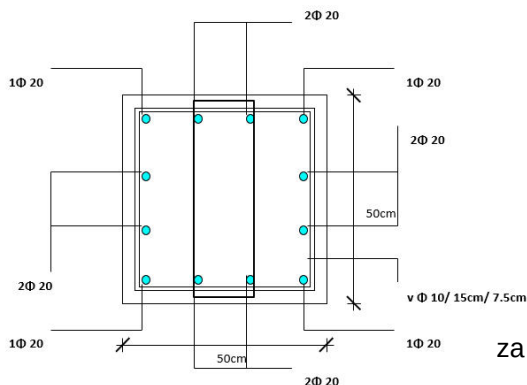
Amaturna u gredama: max Aa2/Aa1 = 9.87 / 9.92 cm²

Greda 1765-1378

EC2 (EN 1992-1-1:2004)
C25/30 (γ_c = 1.50, γ_s = 1.15) [SP]
B500A
Kompletna shema opterećenja



l_{i,2} = 5.40 m (λ₂ = 37.41)
l_{i,3} = 16.20 m (λ₃ = 112.24)
Pomična konstrukcija



unutrašnje vilice
v Φ 8/ 15cm

Presjek 1-1 x = 0.00m

Mjerodavna kombinacija za savijanje:

1.00xI+0.30xIII+1.00xIV
N1Ed = -66.61 kN
M2Ed = 1.60 kNm
M3Ed = 172.51 kNm
Uvećanje momenta savijanja uslijed
izvijanja
e_{l,2} = 0; e_{l,2} ≥ e_{2min}
|ΔM2| = 0.00 kNm
Δe₃ = 3.5<e_{l,3}> + 28.2<e_{l,3}> = 31.7 cm
|ΔM3| = 21.09 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII+1.00xIV
M1Ed = 3.88 kNm
Mjerodavna kombinacija za posmik:
1.00xI+0.30xIII+1.00xIV
V2Ed = 31.22 kN
V3Ed = -0.49 kN
M1Ed = 3.88 kNm

V2Rd,max = 911.25 kN
V3Rd,max = 911.25 kN
e_b/e_a = -3.140/20.000 ‰
As1 = 9.79 + 0.13' = 9.92 cm²
As2 = 9.74 + 0.13' = 9.87 cm²
As3 = 0.00 + 0.13' = 0.13 cm²
As4 = 0.00 + 0.13' = 0.13 cm²
Asw = 0.00 cm²/m (m=2)
' - dodatna uzdužna armatura za prihvat torzije.

Presjek 2-2 x = 5.40m

Mjerodavna kombinacija za savijanje:

1.00xI+0.30xIII-1.00xIV
N1Ed = -114.81 kN
M2Ed = -1.19 kNm
M3Ed = -73.80 kNm
Uvećanje momenta savijanja uslijed
izvijanja
e₂ = e_{2min} = e_{0,2} = 2.00 cm
|M2Ed|_{min} = 2.30 kNm
Δe₃ = 3.5<e_{l,3}> + 28.2<e_{l,3}> = 31.7 cm
|ΔM3| = 36.35 kNm

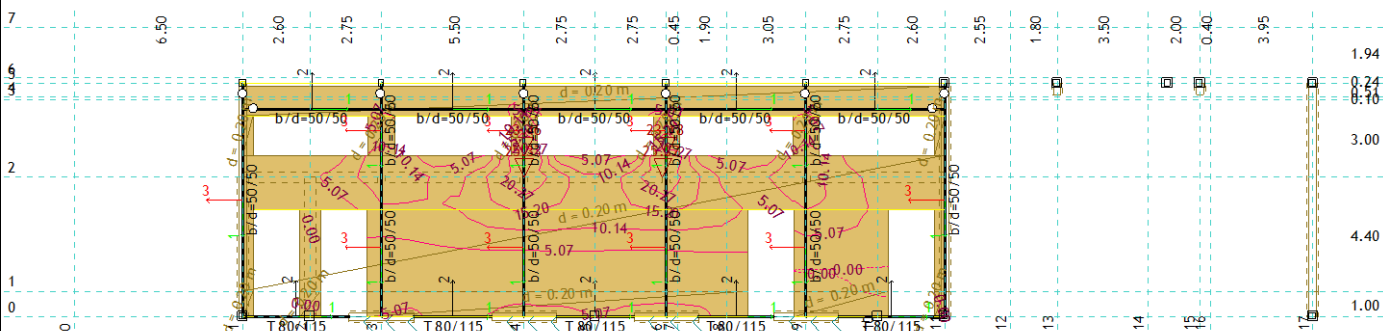
Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII-1.00xIV
M1Ed = -1.64 kNm
Mjerodavna kombinacija za posmik:
1.00xI+0.30xIII-1.00xIV
V2Ed = -28.36 kN
V3Ed = -1.71 kN
M1Ed = -1.64 kNm

V2Rd,max = 911.25 kN
V3Rd,max = 911.25 kN
e_b/e_a = -2.630/20.000 ‰
As1 = 4.50 + 0.05' = 4.55 cm²
As2 = 4.48 + 0.05' = 4.53 cm²
As3 = 0.00 + 0.05' = 0.05 cm²
As4 = 0.00 + 0.05' = 0.05 cm²
Asw = 0.00 cm²/m (m=2)

za sve stupove u uzdužnim ravninama usvojiti istu armaturu

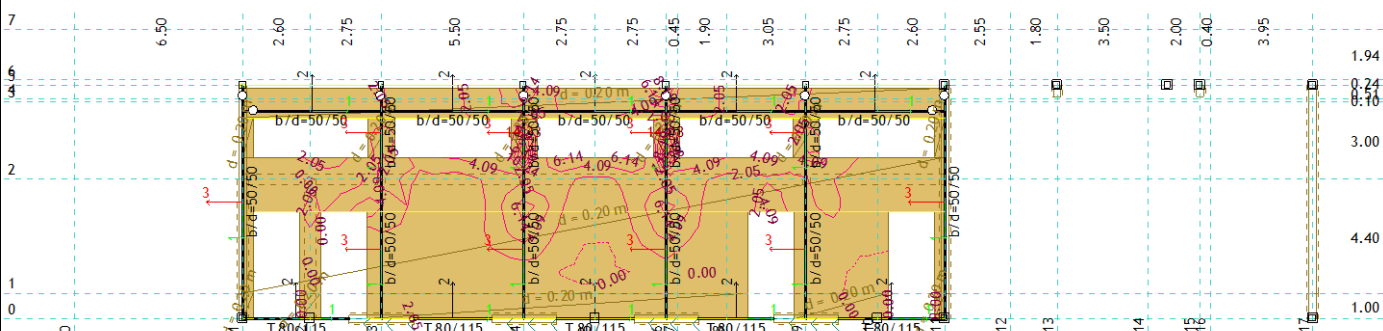
Opt. 24: [seizm] 14-21



Okvir: V_3

Utjecaji u ploči: max $M_y = 25.33$ / min $M_y = 0.00$ kNm/m

Opt. 24: [seizm] 14-21



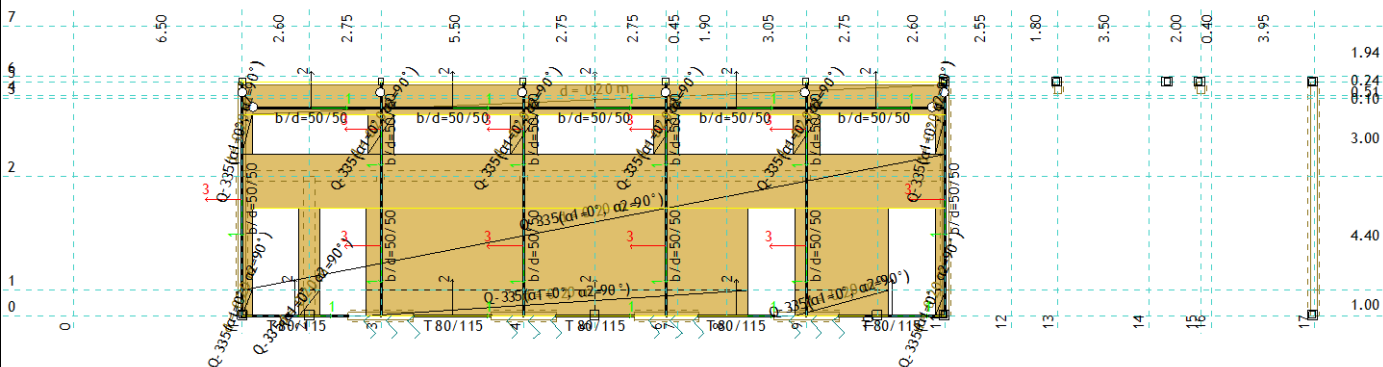
Okvir: V_3

Utjecaji u ploči: max $M_x = 14.33$ / min $M_x = 0.00$ kNm/m

Odabrana armatura

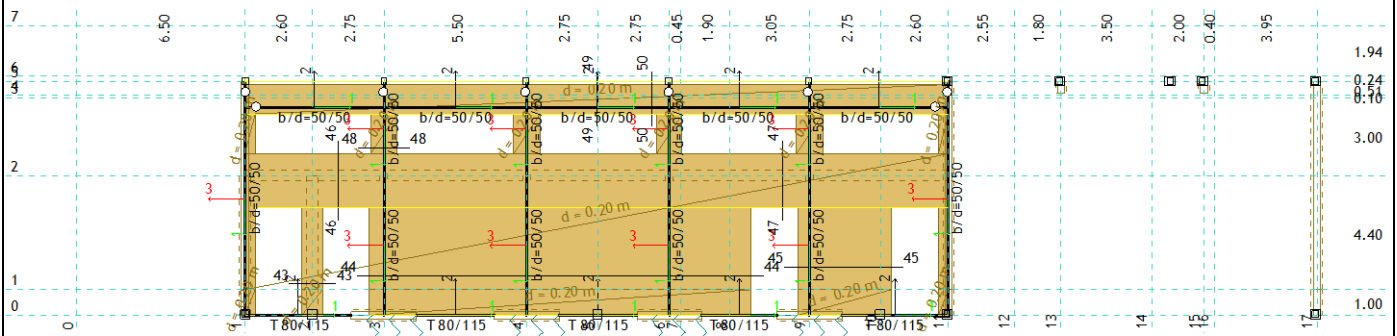
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

Aa - d.zona [cm ² /m]	
0.00	
3.45	
6.89	



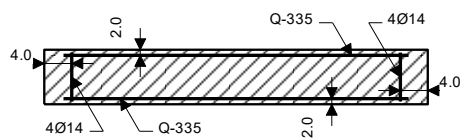
Okvir: V_3

Aa - d.zona



Okvir: V_3
Dispozicija presjeka

Presjek 43 - 43 (Z=0.24m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



b/d = 20/80 cm Ab = 1600 cm²

LC	N [kN]	V [kN]	M [kNm]
I	-87.6	0.6	0.7
II	-1.1	1.5	-2.3
III	-6.2	0.8	-1.1
IV	20.8	2.8	4.1
V	8.2	2.9	2.9

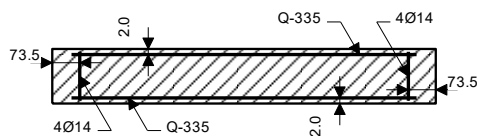
Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
1.35xI+1.50xII+1.05xIII

MEd = -3.68 kNm
NEd = -126.39 kN
VED = 4.00 kN (VRd,max = 615.60 kN)
As1 = 0.00 cm² (min:2.40) (odab:4Ø14)
As2 = 0.00 cm² (min:2.40) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.07 cm²/m (min:±2.00) (odab:±Q-335)

Presjek 44 - 44 (Z=0.52m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B

	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 251

Kompletna shema opterećenja



$$b/d = 20/1470 \text{ cm} \quad A_b = 29400 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-1053.7	36.7	-91.8
II	-75.3	0.7	27.0
III	-48.7	10.2	-13.1
IV	17.4	70.8	151.8
V	18.7	201.7	244.5

Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII+1.05xIII

Mjerodavna kombinacija za posmik:

I+0.30xIII+V

$$\begin{aligned} M_{Ed} &= -97.22 \text{ kNm} \\ N_{Ed} &= -1586.48 \text{ kN} \\ V_{Ed} &= 241.50 \text{ kN} \quad (V_{Rd,max} = 10584.00 \text{ kN}) \\ A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min:}44.10) \quad (\text{odab:}4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min:}44.10) \quad (\text{odab:}4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min:}\pm 1.50) \\ A_{ah} &= \pm 0.24 \text{ cm}^2/\text{m} \quad (\text{min:}\pm 2.00) \quad (\text{odab:}\pm Q-335) \end{aligned}$$

Presjek 45 - 45 (Z=0.86m)

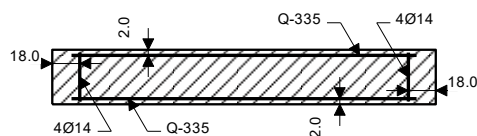
EC2 (EN 1992-1-1:2004)

C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]

Kutna armatura B500B

Uzdužna armatura B500B

Kompletna shema opterećenja



$$b/d = 20/360 \text{ cm} \quad A_b = 7200 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-247.3	72.4	-127.5
II	-24.4	-29.0	-0.5
III	0.5	1.6	-19.8
IV	25.3	46.8	27.1
V	8.4	46.8	17.6

Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII+1.05xIII

Mjerodavna kombinacija za posmik:

I+0.30xIII+IV

$$\begin{aligned} M_{Ed} &= -193.63 \text{ kNm} \\ N_{Ed} &= -369.91 \text{ kN} \\ V_{Ed} &= 119.75 \text{ kN} \quad (V_{Rd,max} = 2592.00 \text{ kN}) \\ A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min:}10.80) \quad (\text{odab:}4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min:}10.80) \quad (\text{odab:}4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min:}\pm 1.50) \\ A_{ah} &= \pm 0.48 \text{ cm}^2/\text{m} \quad (\text{min:}\pm 2.00) \quad (\text{odab:}\pm Q-335) \end{aligned}$$

Presjek 46 - 46 (X=15.80m)

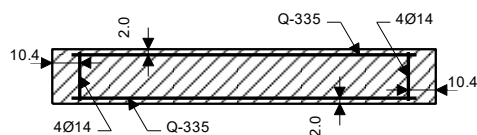
EC2 (EN 1992-1-1:2004)

C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]

Kutna armatura B500B

Uzdužna armatura B500B

Kompletna shema opterećenja



$$b/d = 20/207 \text{ cm} \quad A_b = 4140 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-7.2	18.1	-22.9
II	3.2	-21.3	-8.3
III	-1.5	3.0	-9.6
IV	55.1	16.0	28.1
V	24.1	26.5	19.6

Mjerodavna kombinacija za savijanje: I+0.30xIII+IV

Mjerodavna kombinacija za posmik: I+0.30xIII+V

$$\begin{aligned} M_{Ed} &= -53.92 \text{ kNm} \\ N_{Ed} &= 47.46 \text{ kN} \\ V_{Ed} &= 45.48 \text{ kN} \quad (V_{Rd,max} = 1490.40 \text{ kN}) \\ s_b/e_a &= -0.591/20.000 \% \\ A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min:}6.21) \quad (\text{odab:}4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min:}6.21) \quad (\text{odab:}4\text{Ø}14) \\ A_{av} &= \pm 0.62 \text{ cm}^2/\text{m} \quad (\text{min:}\pm 1.50) \\ A_{ah} &= \pm 0.32 \text{ cm}^2/\text{m} \quad (\text{min:}\pm 2.00) \quad (\text{odab:}\pm Q-335) \end{aligned}$$

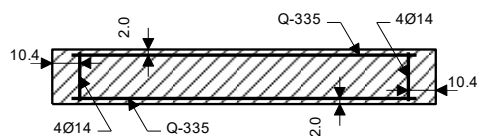
Presjek 47 - 47 (X=15.80m)

EC2 (EN 1992-1-1:2004)

C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]

Kutna armatura B500B

Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/207 \text{ cm} \quad A_b = 4140 \text{ cm}^2$$

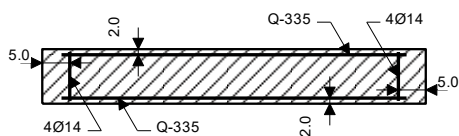
LC	N [kN]	V [kN]	M [kNm]
I	14.5	-24.9	-29.2
II	-5.1	7.9	1.4
III	2.1	1.9	-3.0
IV	70.5	20.1	21.2
V	72.2	53.0	44.1

Mjerodavna kombinacija za savijanje: I+0.30xIII+V
Mjerodavna kombinacija za posmik: I-1.00xV

$$\begin{aligned} M_{Ed} &= -74.18 \text{ kNm} \\ N_{Ed} &= 87.37 \text{ kN} \\ V_{Ed} &= -77.97 \text{ kN} \quad (V_{Rd,max} = 1490.40 \text{ kN}) \end{aligned}$$

$$\begin{aligned} s_b/\epsilon_a &= -0.698/20.000 \text{ ‰} \\ A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 6.21) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 6.21) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 1.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.54 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335) \end{aligned}$$

Presjek 48 - 48 (Z=5.47m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/100 \text{ cm} \quad A_b = 2000 \text{ cm}^2$$

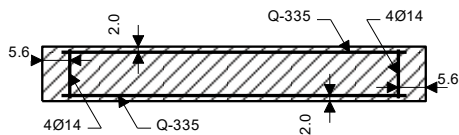
LC	N [kN]	V [kN]	M [kNm]
I	-66.5	-14.5	5.9
II	-17.9	3.3	-1.3
III	1.4	-0.5	0.5
IV	4.6	14.0	6.2
V	6.2	28.6	9.7

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xV

$$\begin{aligned} M_{Ed} &= 6.51 \text{ kNm} \\ N_{Ed} &= -115.23 \text{ kN} \\ V_{Ed} &= -43.33 \text{ kN} \quad (V_{Rd,max} = 720.00 \text{ kN}) \end{aligned}$$

$$\begin{aligned} A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 3.00) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 3.00) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.62 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335) \end{aligned}$$

Presjek 49 - 49 (X=15.80m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/112.9 \text{ cm} \quad A_b = 2258 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-0.2	1.0	-8.2
II	-6.8	-0.2	-0.2
III	-1.5	0.1	-0.0
IV	13.6	2.8	0.8
V	23.6	9.4	0.7

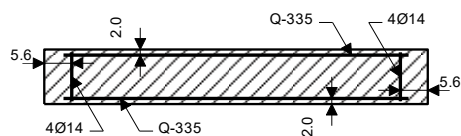
Mjerodavna kombinacija za savijanje: I+V
Mjerodavna kombinacija za posmik: I+0.30xIII+V

$$\begin{aligned} M_{Ed} &= -8.90 \text{ kNm} \\ N_{Ed} &= 23.39 \text{ kN} \\ V_{Ed} &= 10.45 \text{ kN} \quad (V_{Rd,max} = 812.88 \text{ kN}) \end{aligned}$$

$$\begin{aligned} s_b/\epsilon_a &= -0.430/20.000 \text{ ‰} \\ A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 3.39) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 3.39) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.45 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.13 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335) \end{aligned}$$

Presjek 50 - 50 (X=15.80m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B

Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/112.9 \text{ cm} \quad A_b = 2258 \text{ cm}^2$$

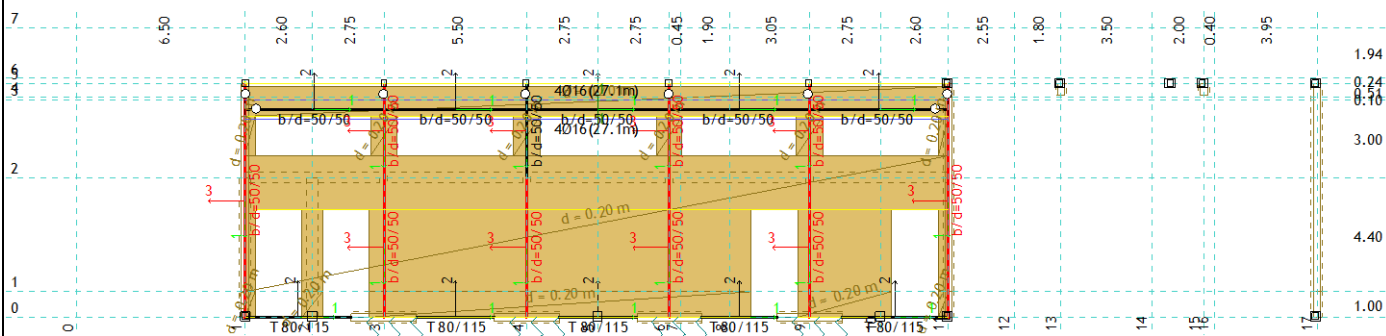
LC	N [kN]	V [kN]	M [kNm]
I	17.3	16.7	7.6
II	-9.3	0.2	-0.7
III	-1.2	0.1	0.1
IV	15.2	1.8	2.9
V	24.5	5.8	9.9

Mjerodavna kombinacija za savijanje: I+V
Mjerodavna kombinacija za posmik: I+0.30xIII+V

$$\begin{aligned} M_{Ed} &= 17.51 \text{ kNm} \\ N_{Ed} &= 41.86 \text{ kN} \\ V_{Ed} &= 22.52 \text{ kN} \quad (V_{Rd,max} = 812.88 \text{ kN}) \end{aligned}$$

$$\begin{aligned} \epsilon_b/\epsilon_a &= -0.615/20.000 \text{ ‰} \\ A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 3.39) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 3.39) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.84 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.29 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335) \end{aligned}$$

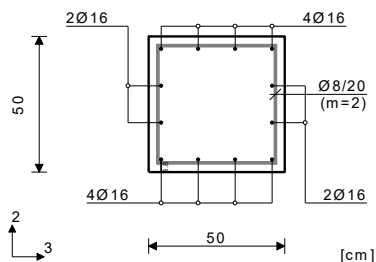
Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A



Okvir: V_3
Armatura u gredama (odabrana): Aa2/Aa1

Greda 2051-2674
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja

Presjek 1-1 $x = 2.75m$



Mjerodavna kombinacija za savijanje:
1.00xI-1.00xIV
N1Ed = 5.30 kN
M2Ed = -33.95 kNm
M3Ed = 1.51 kNm

Mjerodavna kombinacija za torziju:
1.00xI+0.30xIII-1.00xV
M1Ed = -0.04 kNm

Mjerodavna kombinacija za posmik:
1.00xI+0.30xIII+1.00xV
V2Ed = 4.22 kN
V3Ed = 0.58 kN
M1Ed = 0.02 kNm

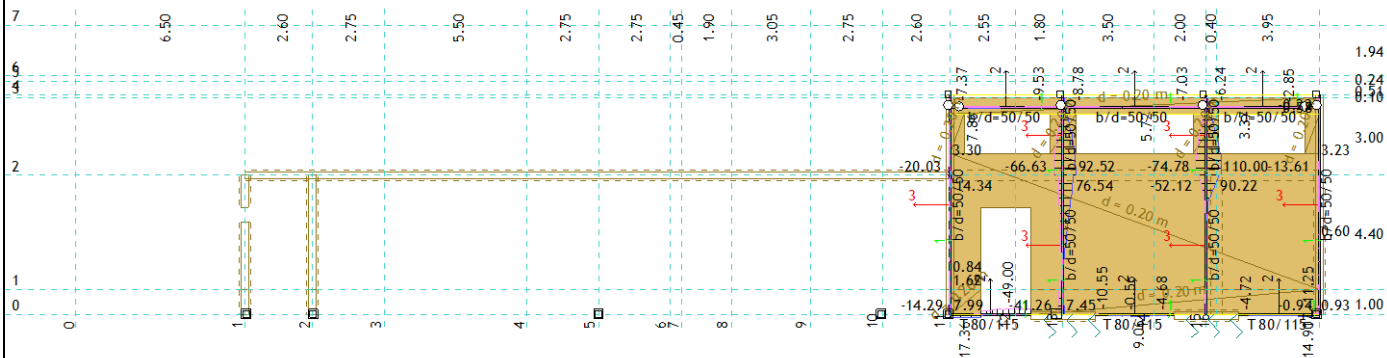
V2Rd,max = 911.25 kN
V3Rd,max = 911.25 kN
 $\epsilon_b/\epsilon_a = -1.391/20.000 \%$

As1 = 0.00 cm²
As2 = 0.00 cm²
As3 = 1.75 cm²
As4 = 2.09 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 0.97%

OKVIR V4

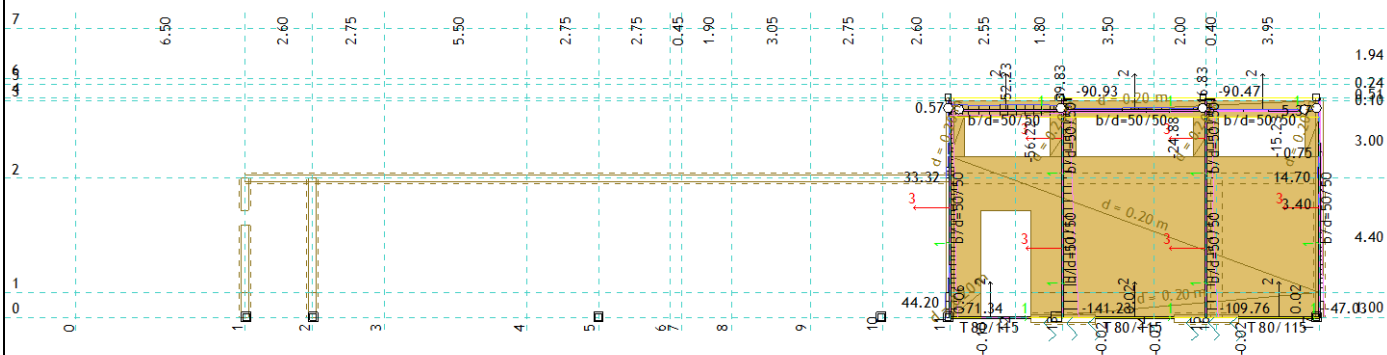
Opt. 24: [seizm] 14-21



Okvir: V_4

Utjecaji u gredi: max M3= 110.00 / min M3= -74.78 kNm

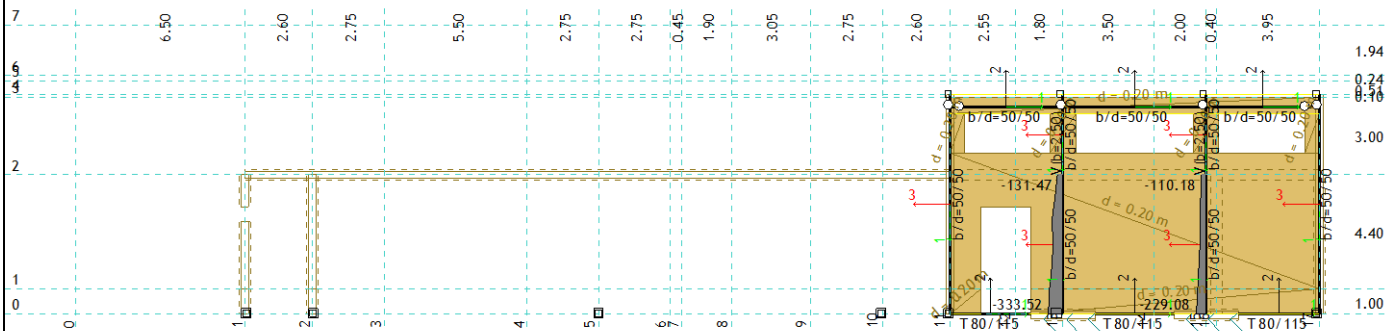
Opt. 24: [seizm] 14-21



Okvir: V_4

Utjecaji u gredi: max N1= 52.23 / min N1= -141.23 kN

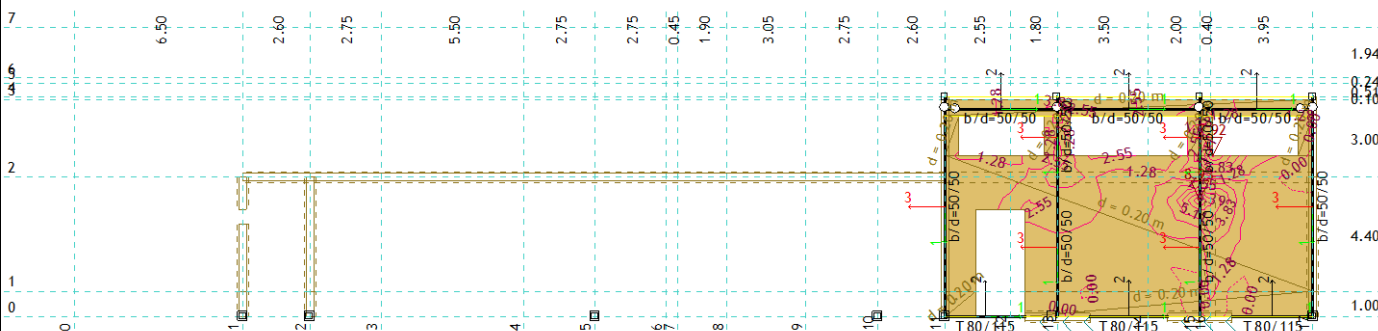
Opt. 24: [seizm] 14-21



Okvir: V_4

Vektorski presjeci: Ns

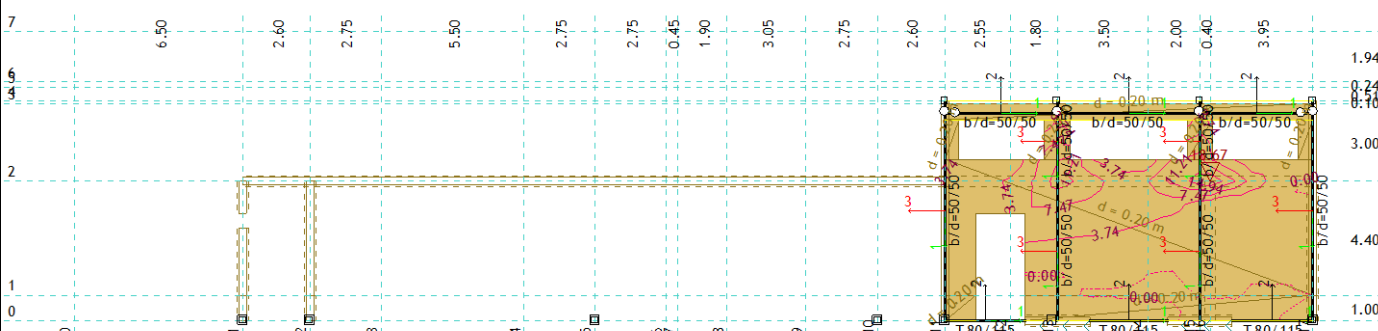
Opt. 24: [seizm] 14-21



Okvir: V_4

Utjecaji u ploči: max $M_x = 8.93$ / min $M_x = 0.00$ kNm/m

Opt. 24: [seizm] 14-21



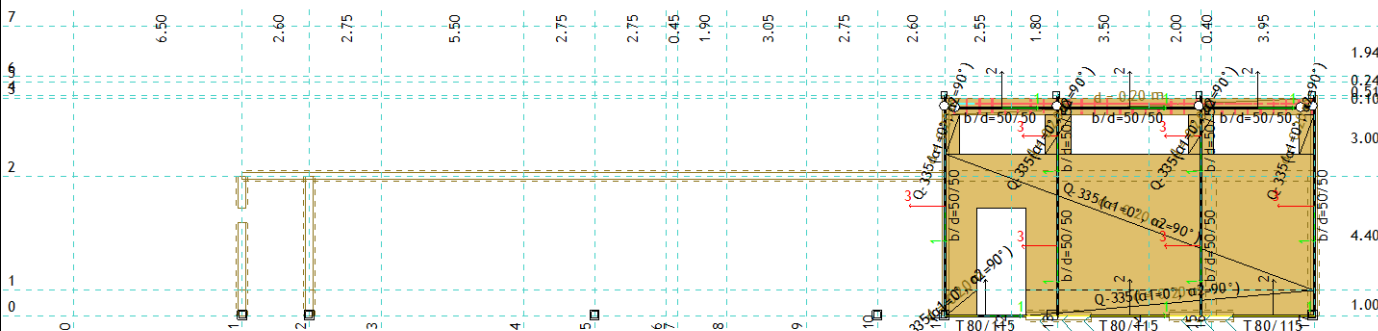
Okvir: V_4

Utjecaji u ploči: max $M_y = 18.67$ / min $M_y = 0.00$ kNm/m

Odabrana armatura

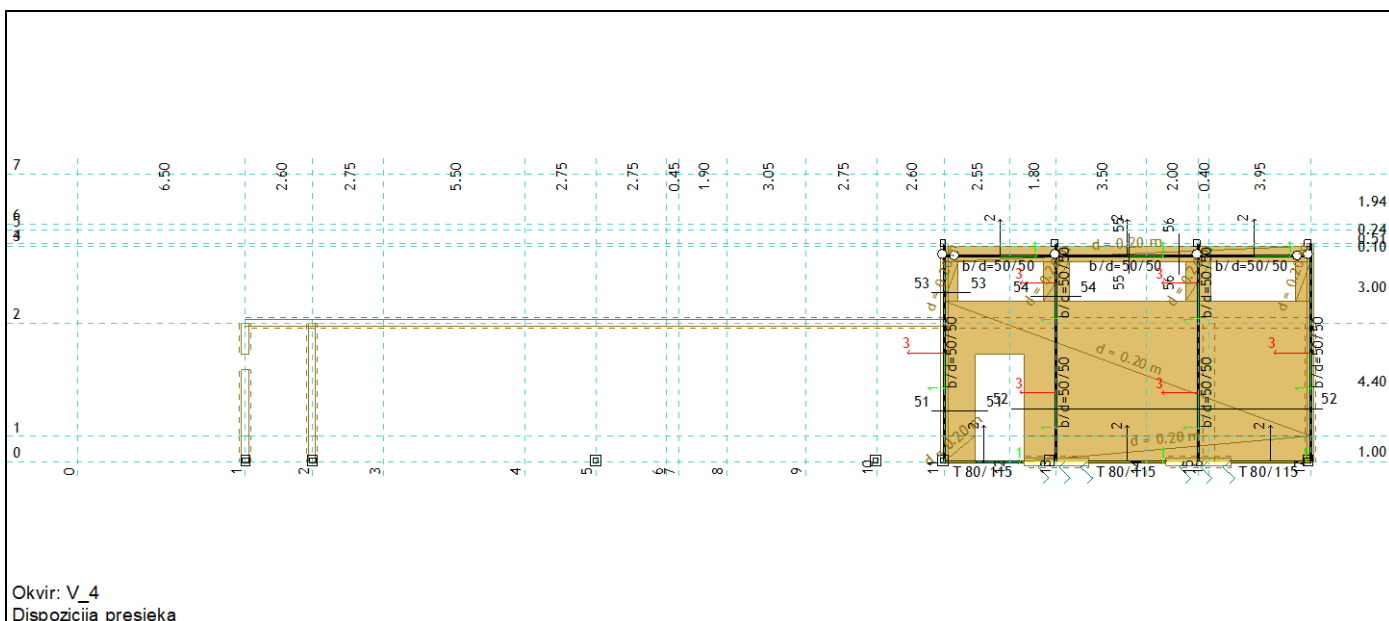
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

Aa - d.zona [cm ² /m]	
0.00	
1.05	
2.10	

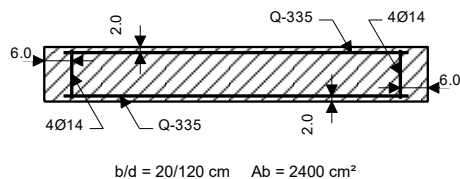


Okvir: V_4

Aa - d.zona



Presjek 51 - 51 (Z=0.96m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



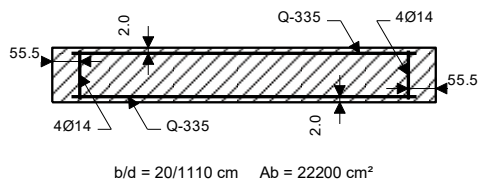
LC	N [kN]	V [kN]	M [kNm]
I	-74.5	-13.1	-11.5
II	-7.1	-2.9	-0.2
III	-2.0	-0.9	-1.1
IV	20.0	12.9	1.9
V	14.9	12.4	1.0

MEd = -16.89 kNm
NEd = -113.24 kN
VEd = -26.32 kN (VRd,max = 864.00 kN)

As1 = 0.00 cm² (min:3.60) (odab:4Ø14)
As2 = 0.00 cm² (min:3.60) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.32 cm²/m (min:±2.00) (odab:±Q-335)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xIV

Presjek 52 - 52 (Z=1.07m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



LC	N [kN]	V [kN]	M [kNm]
I	-674.3	174.4	-666.7
II	-40.3	-57.9	-47.9
III	-35.9	3.2	-28.5
IV	28.9	71.0	104.4
V	13.7	121.4	80.3

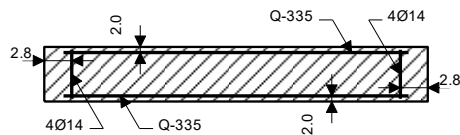
MEd = -1001.73 kNm
NEd = -1008.44 kN
VEd = 296.83 kN (VRd,max = 7992.00 kN)

As1 = 0.00 cm² (min:33.30) (odab:4Ø14)
As2 = 0.00 cm² (min:33.30) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.38 cm²/m (min:±2.00) (odab:±Q-335)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII+V

Presjek 53 - 53 (Z=5.60m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/55 \text{ cm} \quad A_b = 1100 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-8.7	3.5	0.5
II	-2.7	-0.2	0.0
III	1.0	0.7	-0.1
IV	3.7	2.8	0.6
V	4.8	7.0	2.0

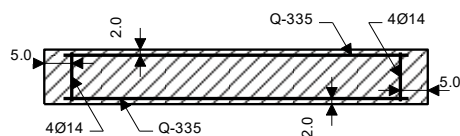
Mjerodavna kombinacija za savijanje: I+0.30xIII+V
Mjerodavna kombinacija za posmik: I+0.30xIII+V

$$\begin{aligned} M_{Ed} &= 2.53 \text{ kNm} \\ N_{Ed} &= -3.68 \text{ kN} \\ V_{Ed} &= 10.68 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 396.00 \text{ kN})$$

$$\begin{aligned} \epsilon_b/\epsilon_a &= -0.485/20.000 \text{ ‰} \\ A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 1.65) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 1.65) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.13 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.28 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335) \end{aligned}$$

Presjek 54 - 54 (Z=5.43m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/100 \text{ cm} \quad A_b = 2000 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-61.9	-0.0	2.1
II	-17.9	-0.3	0.3
III	0.2	0.9	-0.4
IV	3.6	5.0	1.9
V	7.8	18.8	6.9

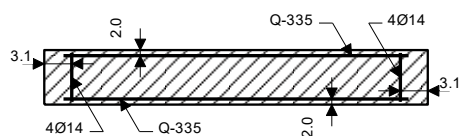
Mjerodavna kombinacija za savijanje: 1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik: I+0.30xIII+V

$$\begin{aligned} M_{Ed} &= 2.92 \text{ kNm} \\ N_{Ed} &= -110.17 \text{ kN} \\ V_{Ed} &= 19.02 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 720.00 \text{ kN})$$

$$\begin{aligned} A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 3.00) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 3.00) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.27 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335) \end{aligned}$$

Presjek 55 - 55 (X=17.45m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/62.4441 \text{ cm} \quad A_b = 1248.88 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-6.3	-0.2	-3.8
II	0.0	-0.0	0.1
III	-0.9	-0.1	0.0
IV	3.3	0.3	0.2
V	9.5	1.0	0.2

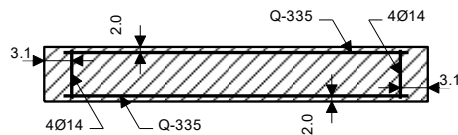
Mjerodavna kombinacija za savijanje: I+V
Mjerodavna kombinacija za posmik: I+0.30xIII-1.00xV

$$\begin{aligned} M_{Ed} &= -3.98 \text{ kNm} \\ N_{Ed} &= 3.24 \text{ kN} \\ V_{Ed} &= -1.23 \text{ kN} \end{aligned} \quad (V_{Rd,max} = 449.60 \text{ kN})$$

$$\begin{aligned} \epsilon_b/\epsilon_a &= -0.535/20.000 \text{ ‰} \\ A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 1.87) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 1.87) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.33 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.03 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-335) \end{aligned}$$

Presjek 56 - 56 (X=17.45m)

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/62.4441 \text{ cm} \quad A_b = 1248.88 \text{ cm}^2$$

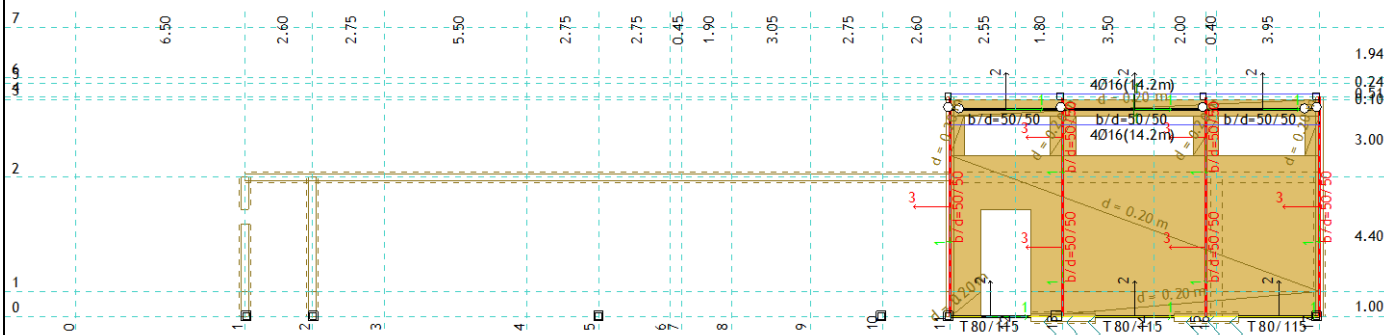
LC	N [kN]	V [kN]	M [kNm]
I	-0.6	5.6	0.7
II	-1.7	-0.8	-0.2
III	-1.2	-0.1	-0.1
IV	2.8	0.7	0.6
V	6.3	2.5	1.8

Mjerodavna kombinacija za savijanje: I+V
Mjerodavna kombinacija za posmik: I+V

MEd = 2.57 kNm
NEd = 5.70 kN
VEd = 8.08 kN (VRd,max = 449.60 kN)

sb/εa = -0.422/20.000 ‰
As1 = 0.00 cm² (min:1.87) (odab:4Ø14)
As2 = 0.00 cm² (min:1.87) (odab:4Ø14)
Aav = ±0.29 cm²/m (min:±1.50)
Aah = ±0.19 cm²/m (min:±2.00) (odab:±Q-335)

Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A



Okvir: V_4
Armatura u gredama (odabrana): Aa2/Aa1

Greda 4638-5114
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja

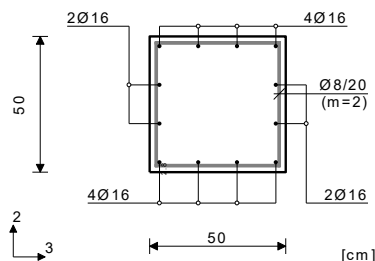
Mjerodavna kombinacija za savijanje:
1.00xI+1.00xIV
N1Ed = 7.62 kN
M2Ed = 32.37 kNm
M3Ed = 4.79 kNm

As1 = 0.00 cm²
As2 = 0.00 cm²
As3 = 1.00 cm²
As4 = 1.73 cm²
Asw = 0.00 cm²/m (m=2)

[Odabrano Asw = Ø8/20(m=2) = 2.51 cm²/m]

Postotak armiranja: 0.97%

Presjek 1-1 x = 2.30m



Mjerodavna kombinacija za torziju:
1.00xI+0.30xIII-1.00xV
M1Ed = -0.04 kNm

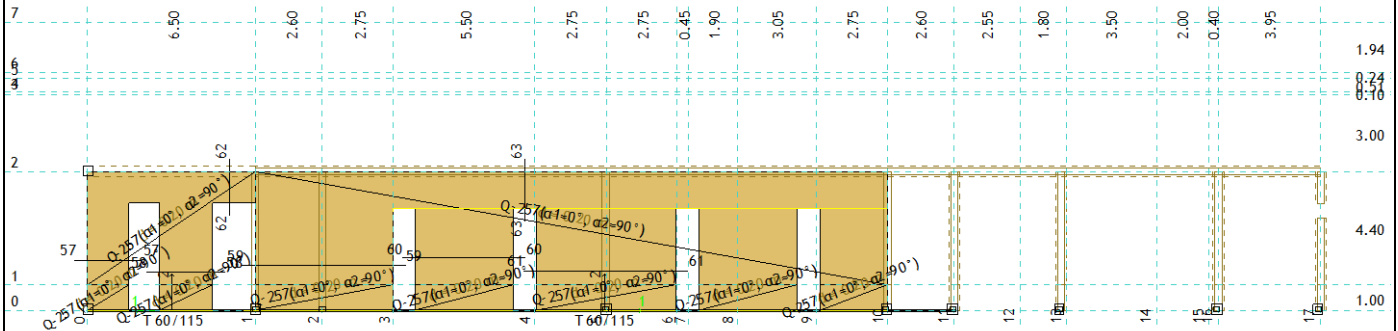
Mjerodavna kombinacija za posmik:
1.00xI+0.30xIII-1.00xV
V2Ed = -4.16 kN
V3Ed = -1.91 kN
M1Ed = -0.04 kNm

V2Rd,max = 911.25 kN
V3Rd,max = 911.25 kN
sb/εa = -1.479/20.000 ‰

OKVIR V7

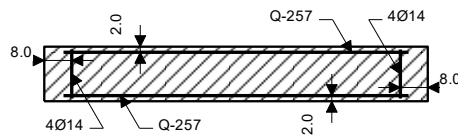
Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

Aa - d.zona [cm ² /m]
0.00
1.29
2.57



Okvir: V_7
Aa - d.zona

Presjek 57 - 57 (Z=0.95m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



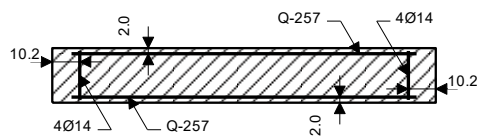
$b/d = 20/160$ cm $Ab = 3200$ cm²

LC	N [kN]	V [kN]	M [kNm]
I	-95.4	27.2	-8.3
II	-1.0	0.5	-0.1
III	-7.9	5.2	-1.3
IV	17.7	10.0	3.6
V	11.1	5.6	1.9

MEd =	-12.68	kNm	
NEd =	-138.52	kN	
VEd =	44.93	kN	(VRd,max = 1231.20 kN)
As1 =	0.00	cm ²	(min:4.80) (odab:4Ø14)
As2 =	0.00	cm ²	(min:4.80) (odab:4Ø14)
Aav =	±0.00	cm ² /m	(min:±1.50)
Aah =	±0.38	cm ² /m	(min:±2.00) (odab:±Q-257)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
1.35xI+0.75xII+1.50xIII

Presjek 58 - 58 (Z=0.50m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



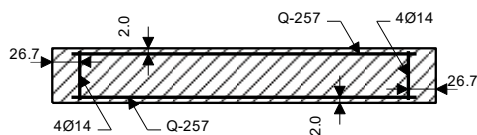
$b/d = 20/205$ cm $Ab = 4100$ cm²

LC	N [kN]	V [kN]	M [kNm]
I	-135.1	48.7	-28.8
II	-1.2	1.8	-1.5
III	-13.6	9.5	-5.8
IV	22.2	23.7	15.4
V	11.8	13.4	9.8

MEd =	-47.22	kNm	
NEd =	-198.49	kN	
VEd =	81.31	kN	(VRd,max = 1577.47 kN)
As1 =	0.00	cm ²	(min:6.15) (odab:4Ø14)
As2 =	0.00	cm ²	(min:6.15) (odab:4Ø14)
Aav =	±0.00	cm ² /m	(min:±1.50)
Aah =	±0.53	cm ² /m	(min:±2.00) (odab:±Q-257)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
1.35xI+0.75xII+1.50xIII

Presjek 59 - 59 (Z=0.76m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



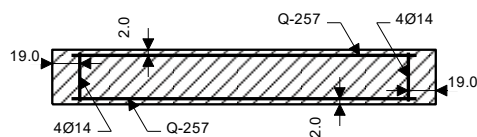
$$b/d = 20/53.5 \text{ cm} \quad A_b = 10700 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-265.7	182.7	-94.4
II	-3.0	9.8	-1.7
III	-32.8	47.4	-16.4
IV	64.4	31.0	52.4
V	28.2	40.2	20.5

$$\begin{aligned} M_{Ed} &= -147.29 \text{ kNm} \\ N_{Ed} &= -397.76 \text{ kN} \\ V_{Ed} &= 325.03 \text{ kN} \quad (V_{Rd,max} = 4116.82 \text{ kN}) \\ A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 16.05) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 16.05) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.82 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-257) \end{aligned}$$

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
1.35xI+0.75xII+1.50xIII

Presjek 60 - 60 (Z=1.04m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



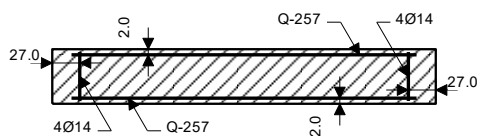
$$b/d = 20/38.0 \text{ cm} \quad A_b = 7600 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-192.4	37.1	22.9
II	-1.7	1.7	0.8
III	-23.4	14.5	6.4
IV	23.2	11.5	4.9
V	9.7	26.9	8.7

$$\begin{aligned} M_{Ed} &= 38.89 \text{ kNm} \\ N_{Ed} &= -286.80 \text{ kN} \\ V_{Ed} &= 73.05 \text{ kN} \quad (V_{Rd,max} = 2924.10 \text{ kN}) \\ A_{s1} &= 0.00 \text{ cm}^2 \quad (\text{min: } 11.40) \quad (\text{odab: } 4\text{Ø}14) \\ A_{s2} &= 0.00 \text{ cm}^2 \quad (\text{min: } 11.40) \quad (\text{odab: } 4\text{Ø}14) \\ A_{av} &= \pm 0.00 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 1.50) \\ A_{ah} &= \pm 0.26 \text{ cm}^2/\text{m} \quad (\text{min: } \pm 2.00) \quad (\text{odab: } \pm Q-257) \end{aligned}$$

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
1.35xI+0.75xII+1.50xIII

Presjek 61 - 61 (Z=0.53m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$$b/d = 20/54.0 \text{ cm} \quad A_b = 10800 \text{ cm}^2$$

LC	N [kN]	V [kN]	M [kNm]
I	-325.7	-43.9	25.1
II	-8.2	2.3	-1.6
III	-42.8	-2.0	0.6
IV	75.8	15.6	8.6
V	21.0	41.2	28.1

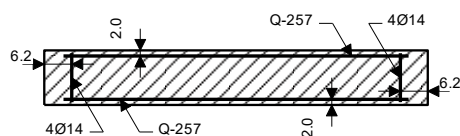
$$\begin{aligned} \text{Mjerodavna kombinacija za posmik:} \\ I+0.30xIII-1.00xV \\ M_{Ed} &= 32.10 \text{ kNm} \\ N_{Ed} &= -497.04 \text{ kN} \\ V_{Ed} &= -85.67 \text{ kN} \quad (V_{Rd,max} = 3888.00 \text{ kN}) \end{aligned}$$

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII

As1 = 0.00 cm² (min:16.20) (odab:4Ø14)
As2 = 0.00 cm² (min:16.20) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.23 cm²/m (min:±2.00) (odab:±Q-257)

Presjek 62 - 62 (X=22.00m)

EC2 (EN 1992-1-1:2004)
C25/30 (γC = 1.50, γS = 1.15) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



b/d = 20/123 cm Ab = 2460 cm²

LC	N [kN]	V [kN]	M [kNm]
I	-86.5	-59.6	-8.3
II	-1.4	-2.4	0.2
III	-18.6	-11.4	-1.2
IV	32.5	37.9	3.8
V	27.0	18.9	1.8

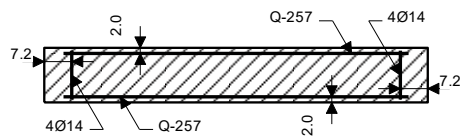
MEd = -12.19 kNm
NEd = -138.39 kN
VEd = -100.89 kN (VRd,max = 885.60 kN)

As1 = 0.00 cm² (min:3.69) (odab:4Ø14)
As2 = 0.00 cm² (min:3.69) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±1.18 cm²/m (min:±2.00) (odab:±Q-257)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xIV

Presjek 63 - 63 (X=22.00m)

EC2 (EN 1992-1-1:2004)
C25/30 (γC = 1.50, γS = 1.15) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



b/d = 20/143 cm Ab = 2860 cm²

LC	N [kN]	V [kN]	M [kNm]
I	-48.9	24.6	-4.6
II	-3.4	-1.7	0.1
III	-13.1	1.5	-1.0
IV	24.5	8.9	0.6
V	10.5	14.4	0.5

MEd = -7.13 kNm
NEd = -84.97 kN
VEd = 39.43 kN (VRd,max = 1029.60 kN)

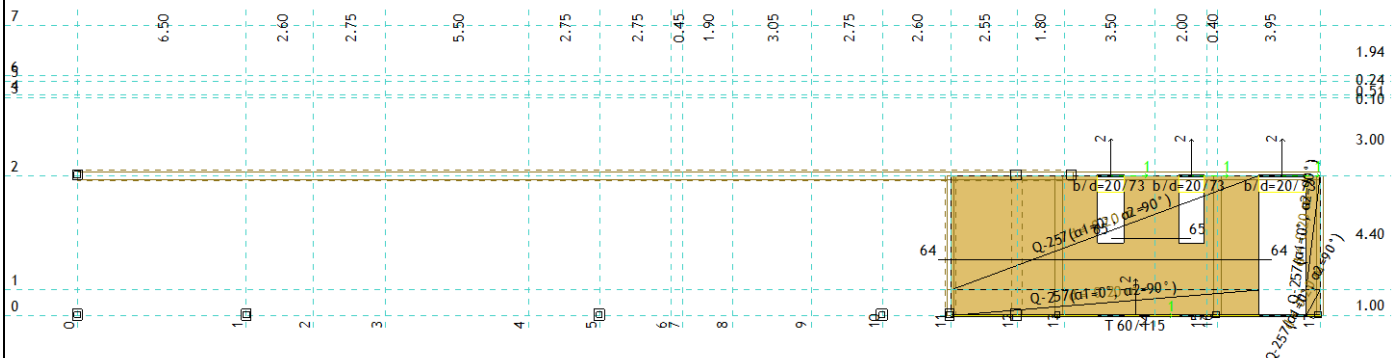
As1 = 0.00 cm² (min:4.29) (odab:4Ø14)
As2 = 0.00 cm² (min:4.29) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.40 cm²/m (min:±2.00) (odab:±Q-257)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII+V

OKVIR V8

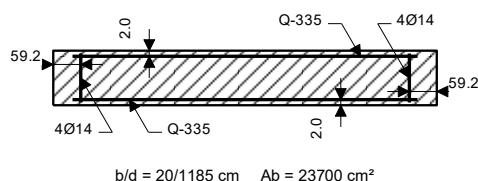
Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

Aa - d.zona [cm ² /m]
0.00
1.10
2.19



Okvir: V_8
Aa - d.zona

Presjek 64 - 64 (Z=1.14m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



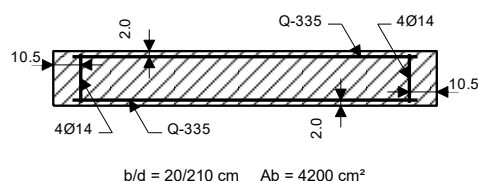
$b/d = 20/1185$ cm $Ab = 23700$ cm²

LC	N [kN]	V [kN]	M [kNm]
I	-442.1	-109.9	-42.4
II	-3.4	28.6	-14.6
III	-45.6	-44.8	-2.7
IV	80.6	71.7	66.1
V	22.7	86.2	86.7

MEd =	-81.92	kNm	
NEd =	-649.77	kN	
VEd =	-209.53	kN	(VRd,max = 8532.00 kN)
As1 =	0.00	cm ²	(min:35.55) (odab:4Ø14)
As2 =	0.00	cm ²	(min:35.55) (odab:4Ø14)
Aav =	±0.00	cm ² /m	(min:±1.50)
Aah =	±0.25	cm ² /m	(min:±2.00) (odab:±Q-335)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xV

Presjek 65 - 65 (Z=1.97m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



$b/d = 20/210$ cm $Ab = 4200$ cm²

LC	N [kN]	V [kN]	M [kNm]
I	-79.0	-37.3	38.5
II	0.2	6.6	-7.5
III	-8.0	-11.0	11.4
IV	5.1	12.0	13.4
V	2.5	15.1	16.3

MEd =	52.68	kNm	
NEd =	-114.79	kN	
VEd =	-66.95	kN	(VRd,max = 1615.95 kN)
As1 =	0.00	cm ²	(min:6.30) (odab:4Ø14)
As2 =	0.00	cm ²	(min:6.30) (odab:4Ø14)
Aav =	±0.00	cm ² /m	(min:±1.50)
Aah =	±0.43	cm ² /m	(min:±2.00) (odab:±Q-335)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
1.35xI+1.50xIII



TEHNO-innova d.o.o.
Kukuljevićeva 7, Varaždin

GRADEVINA:
Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo

DATUM:
8/2025

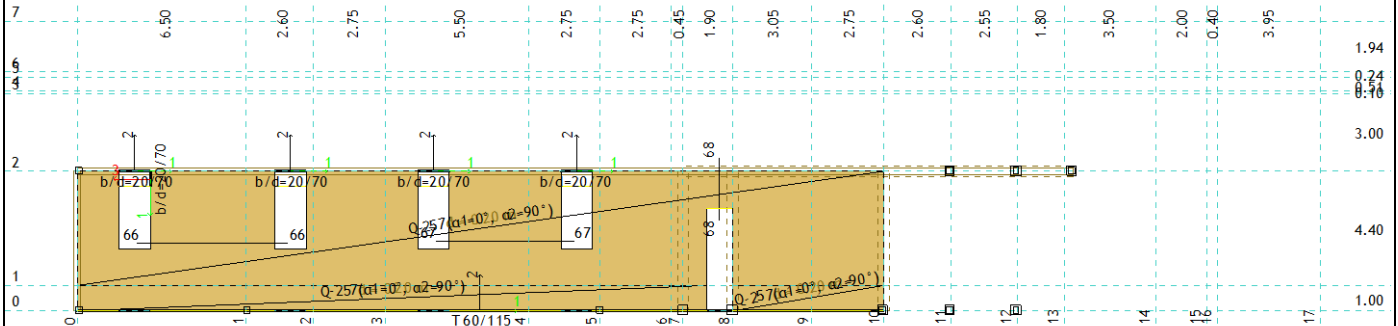
INVESTITOR:
Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502

STR:
265

OKVIR V9

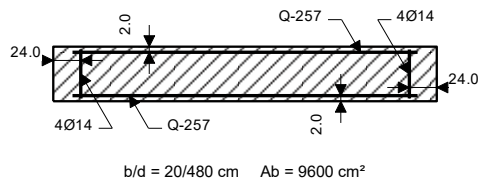
Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

Aa - d.zona [cm ² /m]
0.00
0.74
1.47



Okvir: V_9
Aa - d.zona

Presjek 66 - 66 (Z=1.63m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja

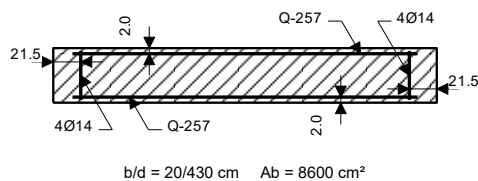


LC	N [kN]	V [kN]	M [kNm]
I	-174.5	-28.6	-33.6
II	0.1	2.2	4.3
III	-14.5	-4.2	-4.4
IV	13.4	21.3	41.5
V	8.2	24.6	55.1

MEd =	-43.44	kNm	
NEd =	-250.59	kN	
VEd =	-54.44	kN	(VRd,max = 3456.00 kN)
As1 =	0.00	cm ²	(min:14.40) (odab:4Ø14)
As2 =	0.00	cm ²	(min:14.40) (odab:4Ø14)
Aav =	±0.00	cm ² /m	(min:±1.50)
Aah =	±0.16	cm ² /m	(min:±2.00) (odab:±Q-257)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xV

Presjek 67 - 67 (Z=1.68m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja

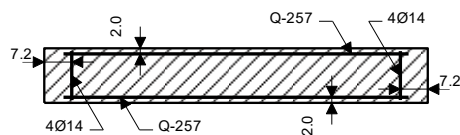


LC	N [kN]	V [kN]	M [kNm]
I	-135.4	-29.2	-72.6
II	0.3	5.4	10.9
III	-9.0	-0.1	-2.5
IV	7.1	11.6	23.7
V	2.7	37.4	76.4

MEd =	-84.31	kNm	
NEd =	-191.69	kN	
VEd =	-66.64	kN	(VRd,max = 3096.00 kN)
As1 =	0.00	cm ²	(min:12.90) (odab:4Ø14)
As2 =	0.00	cm ²	(min:12.90) (odab:4Ø14)
Aav =	±0.00	cm ² /m	(min:±1.50)
Aah =	±0.22	cm ² /m	(min:±2.00) (odab:±Q-257)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xV

Presjek 68 - 68 (X=24.60m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



b/d = 20/143 cm Ab = 2860 cm²

LC	N [kN]	V [kN]	M [kNm]
I	-33.1	-9.4	-2.5
II	-1.6	-1.4	-0.1
III	-9.5	-5.1	-0.6
IV	41.4	3.4	1.1
V	16.4	11.3	0.5

Mjerodavna kombinacija za savijanje: I+IV
Mjerodavna kombinacija za posmik: I+0.30xIII-1.00xV

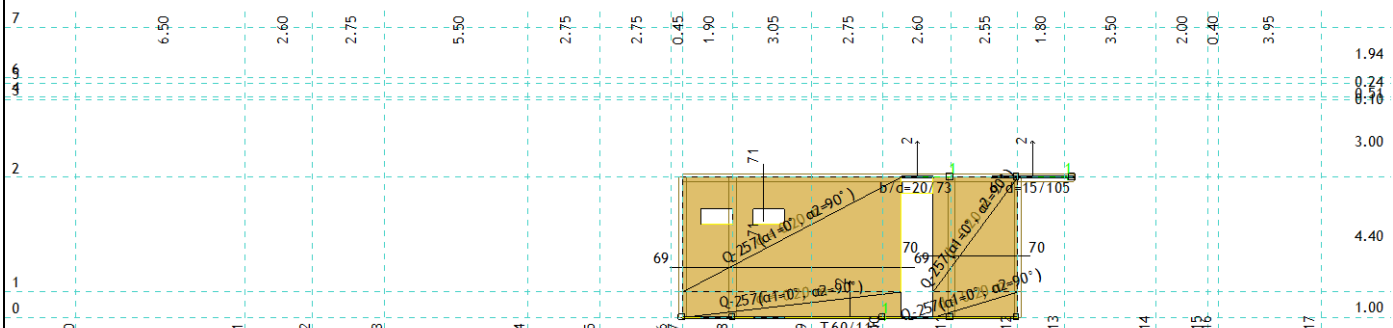
MEd = -3.66 kNm
NEd = 8.29 kN
VEd = -22.24 kN (VRd,max = 1029.60 kN)

sb/ea = -0.213/20.000 ‰
As1 = 0.00 cm² (min:4.29) (odab:4Ø14)
As2 = 0.00 cm² (min:4.29) (odab:4Ø14)
Aav = ±0.12 cm²/m (min:±1.50)
Aah = ±0.22 cm²/m (min:±2.00) (odab:±Q-257)

OKVIR V10

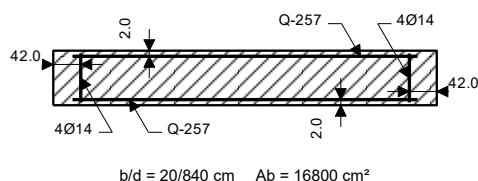
Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A, $a=3.50$ cm

Aa - d.zona [cm ² /m]
0.00
1.17
2.34



Okvir: V_10
Aa - d.zona

Presjek 69 - 69 (Z=0.95m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



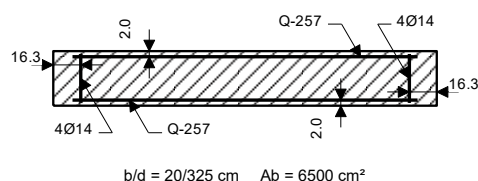
LC	N [kN]	V [kN]	M [kNm]
I	-317.0	-117.6	237.2
II	1.0	10.0	-10.3
III	-30.0	-15.0	20.8
IV	78.3	134.4	132.4
V	25.3	56.7	70.4

MEd = 326.61 kNm
NEd = -457.97 kN
VEd = -256.47 kN (VRd,max = 6048.00 kN)

As1 = 0.00 cm² (min:25.20) (odab:4Ø14)
As2 = 0.00 cm² (min:25.20) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.44 cm²/m (min:±2.00) (odab:±Q-257)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII-1.00xIV

Presjek 70 - 70 (Z=1.38m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



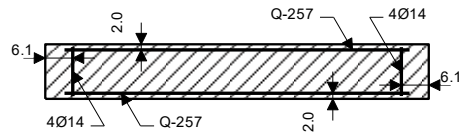
LC	N [kN]	V [kN]	M [kNm]
I	-166.8	7.3	52.6
II	-2.8	3.0	-2.3
III	-16.0	1.5	5.9
IV	16.3	17.9	19.9
V	8.4	9.0	12.8

MEd = 73.77 kNm
NEd = -246.21 kN
VEd = 25.65 kN (VRd,max = 2340.00 kN)

As1 = 0.00 cm² (min:9.75) (odab:4Ø14)
As2 = 0.00 cm² (min:9.75) (odab:4Ø14)
Aav = ±0.00 cm²/m (min:±1.50)
Aah = ±0.11 cm²/m (min:±2.00) (odab:±Q-257)

Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII+1.05xIII
Mjerodavna kombinacija za posmik:
I+0.30xIII+IV

Presjek 71 - 71 (X=27.95m)
EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
Kutna armatura B500B
Uzdužna armatura B500B
Kompletna shema opterećenja



b/d = 20/121 cm Ab = 2420 cm²

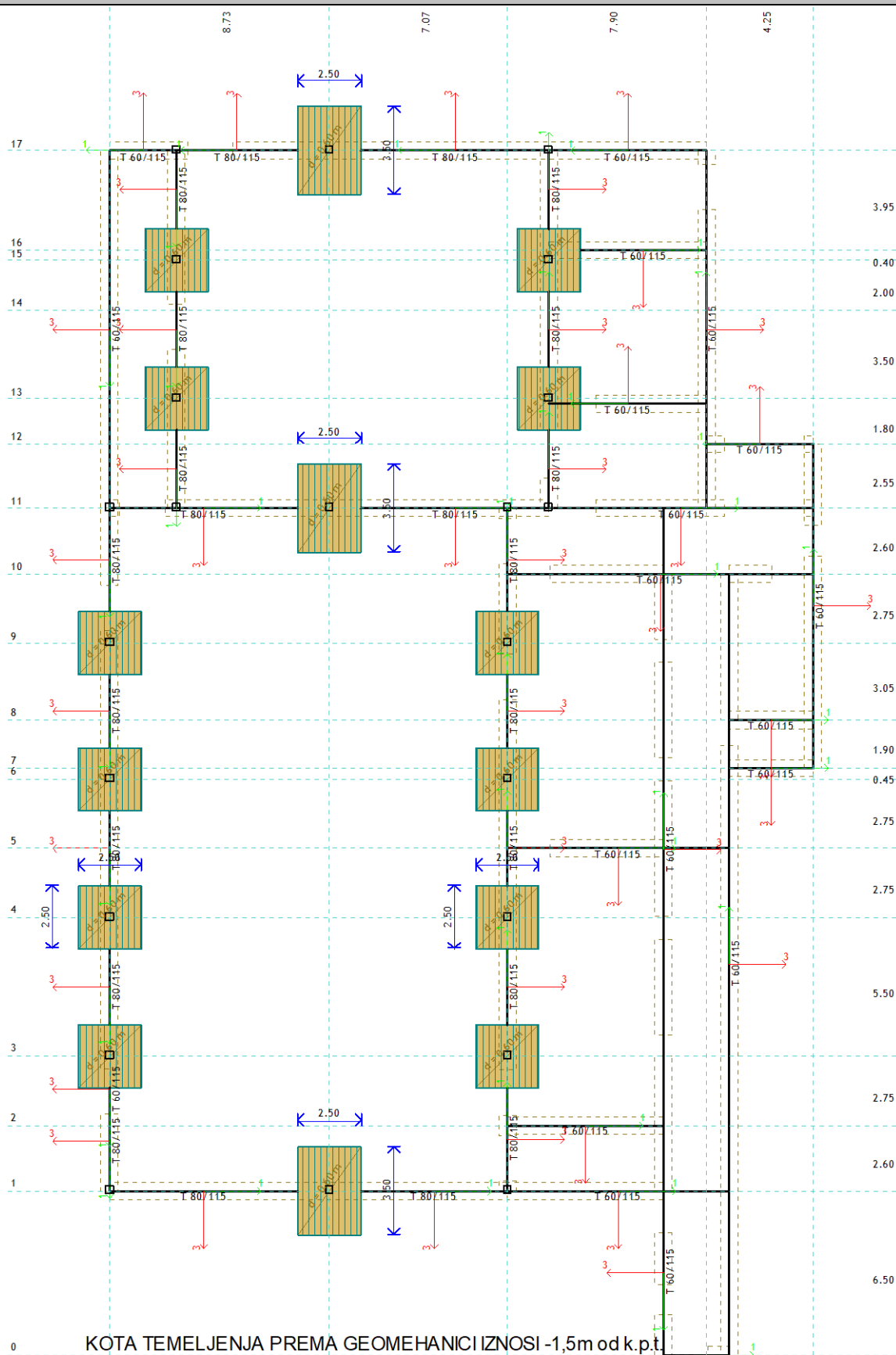
LC	N [kN]	V [kN]	M [kNm]
I	-2.1	20.3	-1.4
II	-1.1	-1.4	-0.1
III	-1.5	3.6	-0.4
IV	16.3	23.7	0.5
V	5.2	8.2	0.3

Mjerodavna kombinacija za savijanje: I+IV
Mjerodavna kombinacija za posmik: I+0.30xIII+IV

MEd = -1.85 kNm
NEd = 14.20 kN
VEd = 45.05 kN (VRd,max = 871.20 kN)

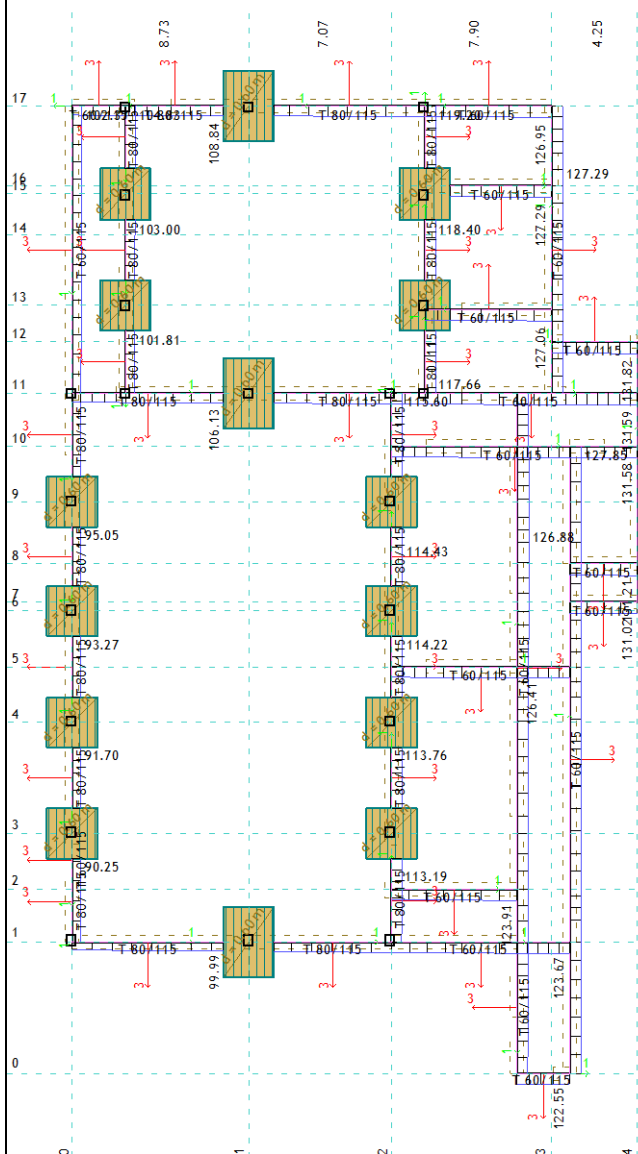
sb/ea = -0.174/20.000 ‰
As1 = 0.00 cm² (min:3.63) (odab:4Ø14)
As2 = 0.00 cm² (min:3.63) (odab:4Ø14)
Aav = ±0.18 cm²/m (min:±1.50)
Aah = ±0.54 cm²/m (min:±2.00) (odab:±Q-257)

TEMELJI



Nivo: [-1.00 m]
Dispozicija presjeka

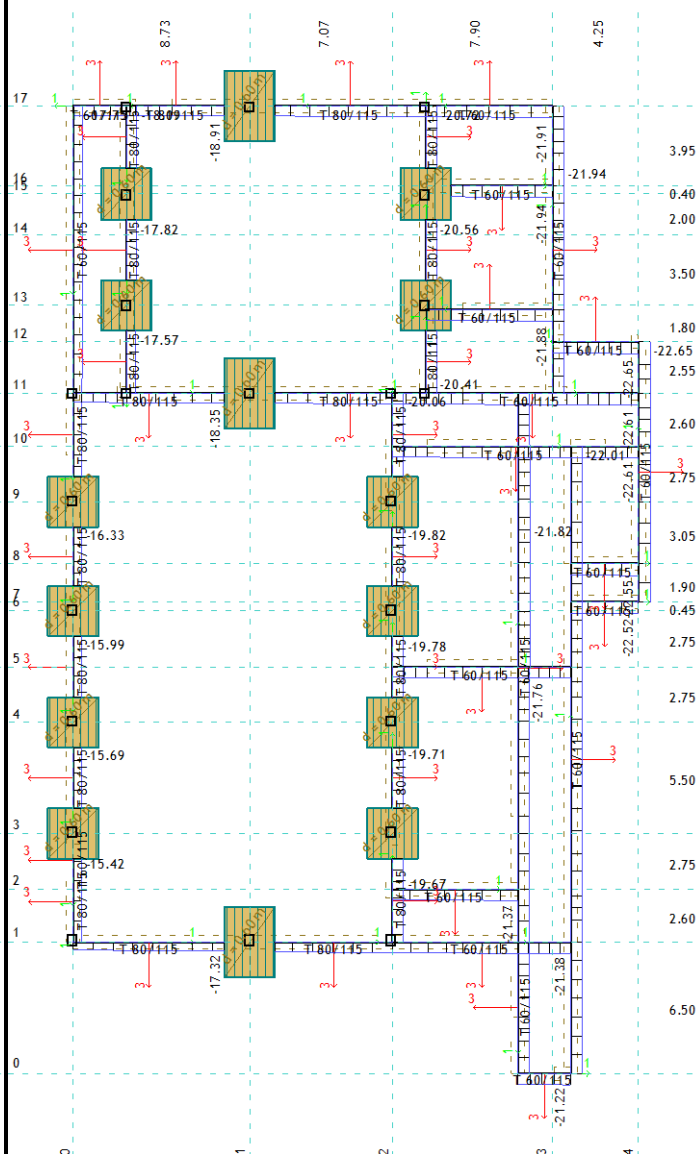
Opt. 25: [GSN S,P] 6-13



Nivo: [-1.00 m]

Utjecaji u lin. ležaju: $\max \sigma_{tla} = 131.82 / \min \sigma_{tla} = 60.35 \text{ kN/m}^2$

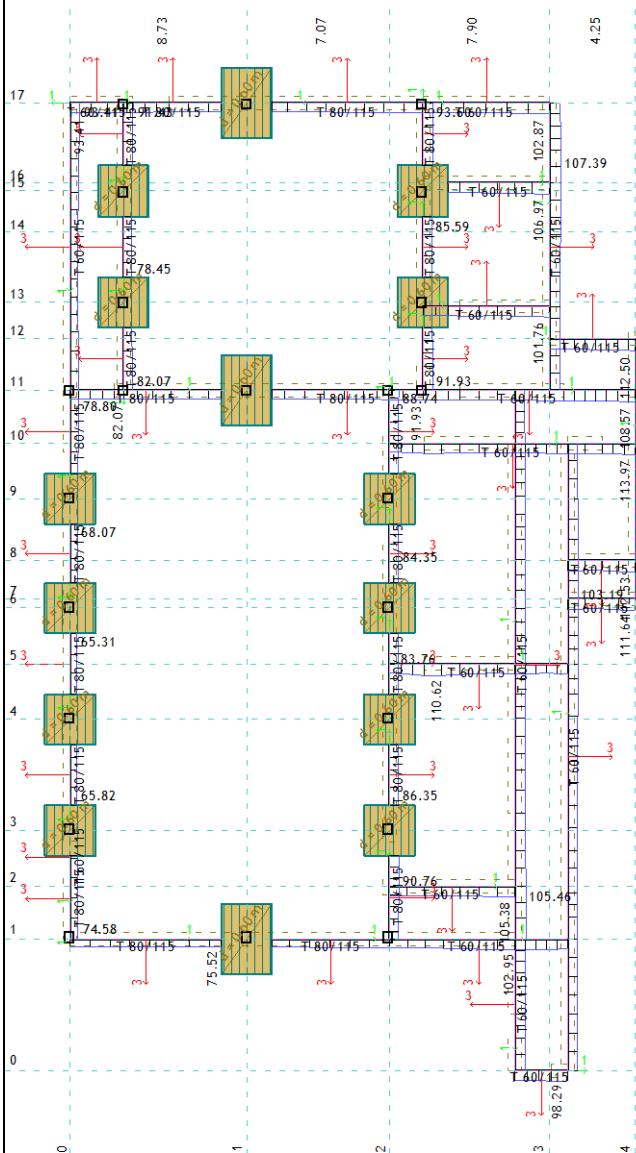
Opt. 1: g (g)



Nivo: [-1.00 m]

Utjecaji u lin. ležaju: max s,tla= -15.33 / min s,tla= -22.65 m / 1000

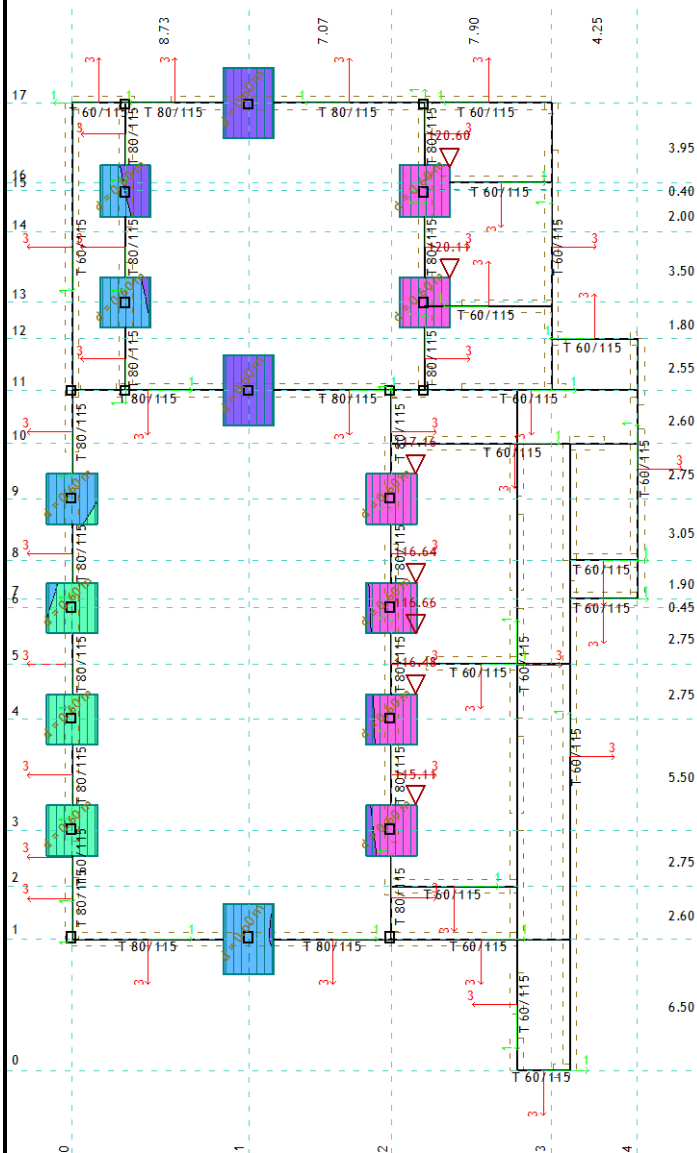
Opt. 24: [seizm] 14-21



Nivo: [-1.00 m]

Utjecaji u lin. ležaju: max σ, tla= 114.21 / min σ, tla= 47.86 kN/m²

Opt. 25: [GSN S,P] 6-13



Nivo: [-1.00 m]

Utjecaji u pov. ležaju: max σ, tla= 120.60 / min σ, tla= 60.24 kN/m²

Opt. 1: g (g)

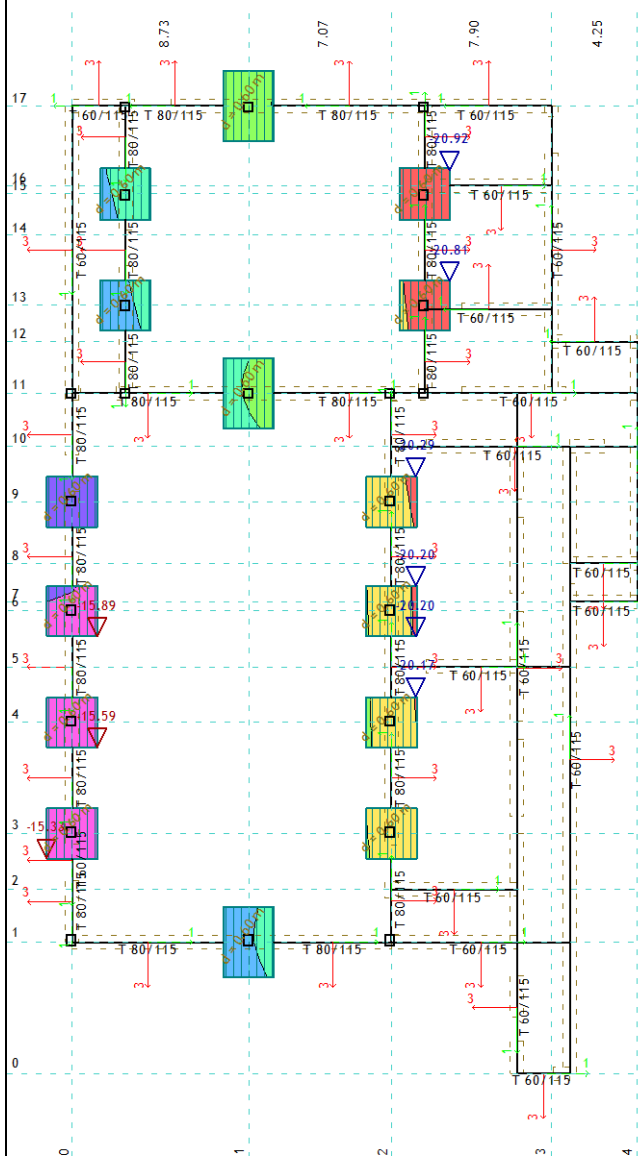
s,tla [m]/1000

-20.92
-20.12
-19.32
-18.52
-17.73
-16.93
-16.13
-15.33

Opt. 24: [seizm] 14-21

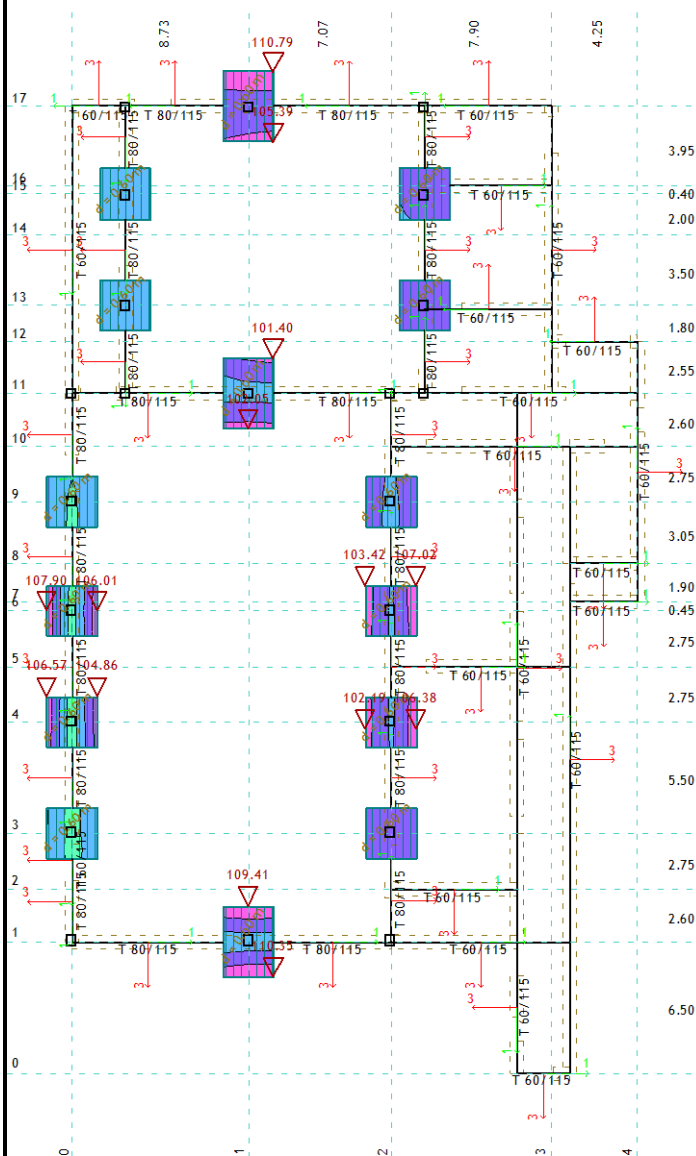
σ ,tla [kN/m²]

20.13
33.08
46.03
58.98
71.94
84.89
97.84
110.79



Nivo: [-1.00 m]

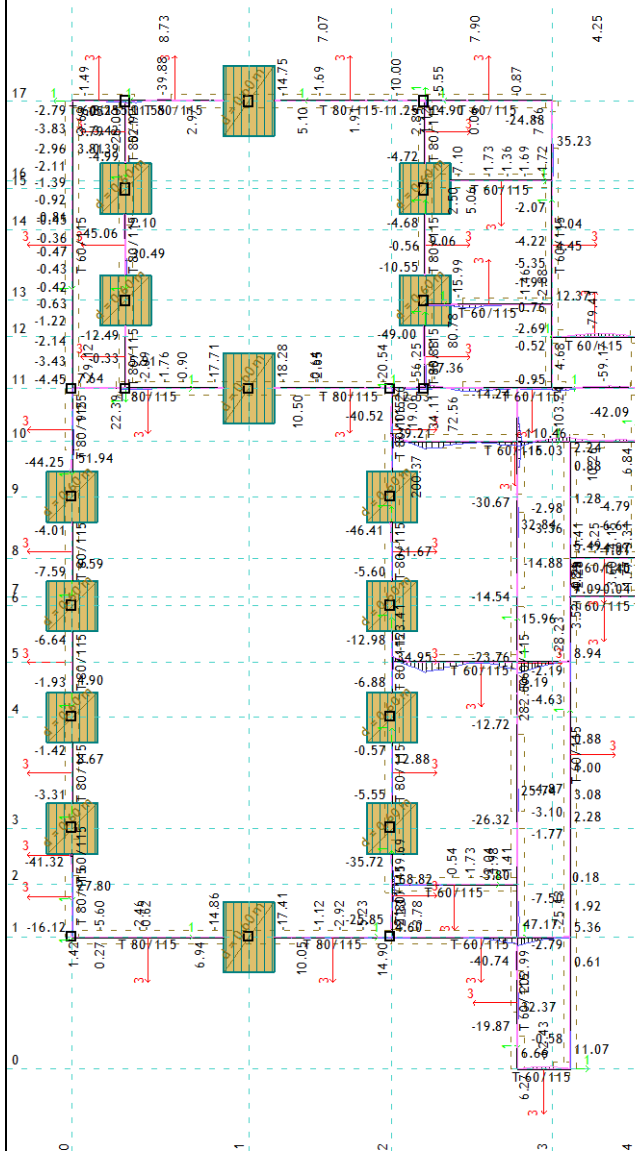
Utjecaji u pov. ležaju: max s,tla= -15.33 / min s,tla= -20.92 m / 1000



Nivo: [-1.00 m]

Utjecaji u pov. ležaju: max σ ,tla= 110.79 / min σ ,tla= 20.14 kN/m²

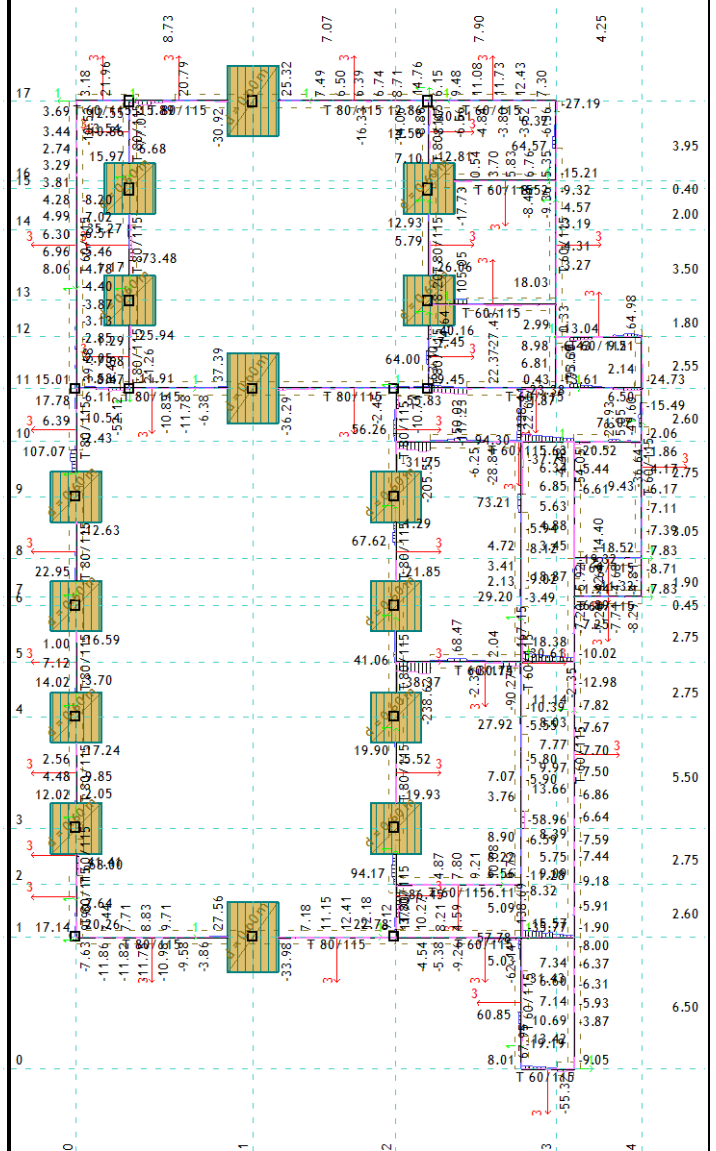
Opt. 24: [seizm] 14-21



Nivo: [-1.00 m]

Utjecaji u gredi: max M3= 282.60 / min M3= -123.41 kNm

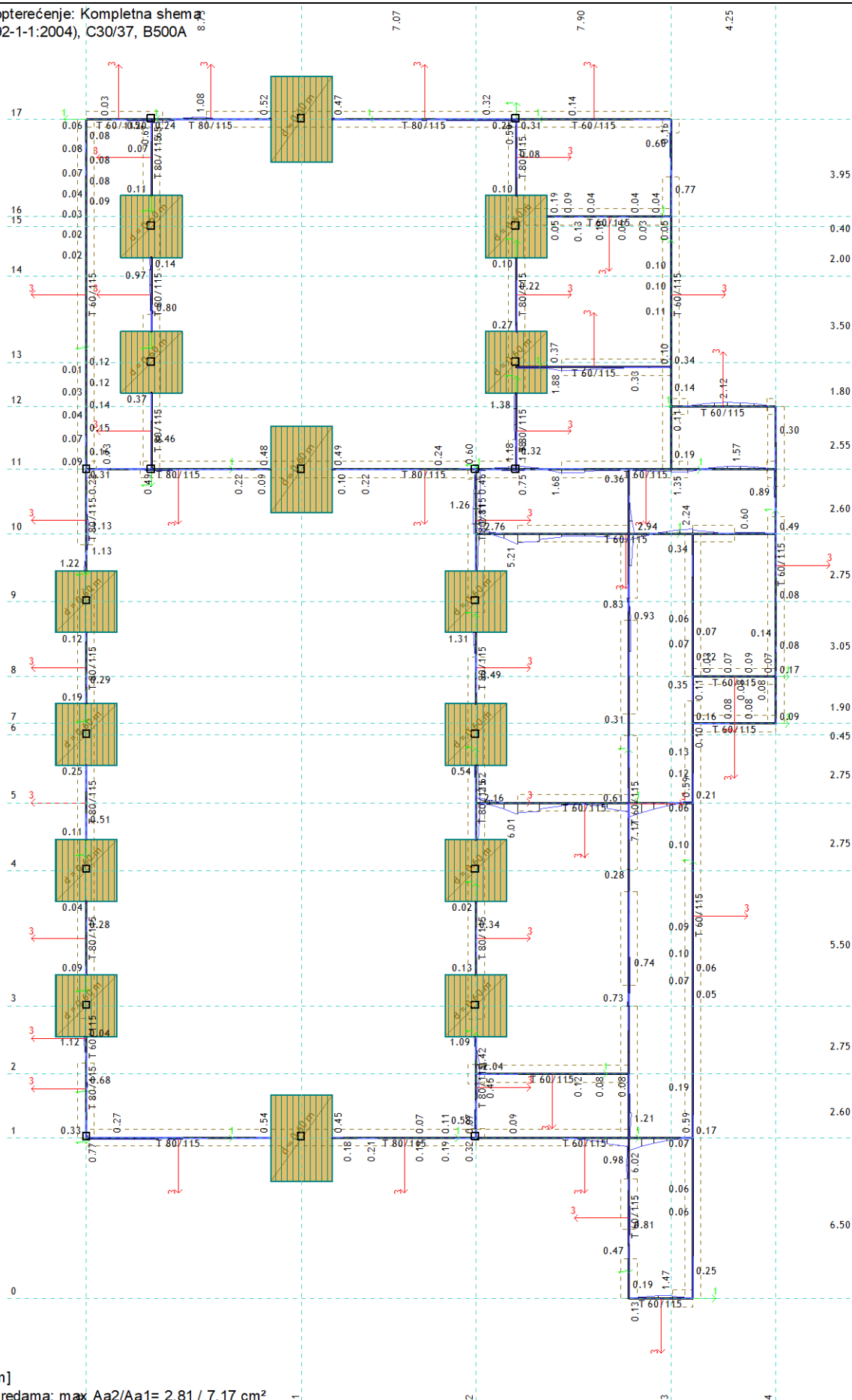
Opt. 24: [seizm] 14-21



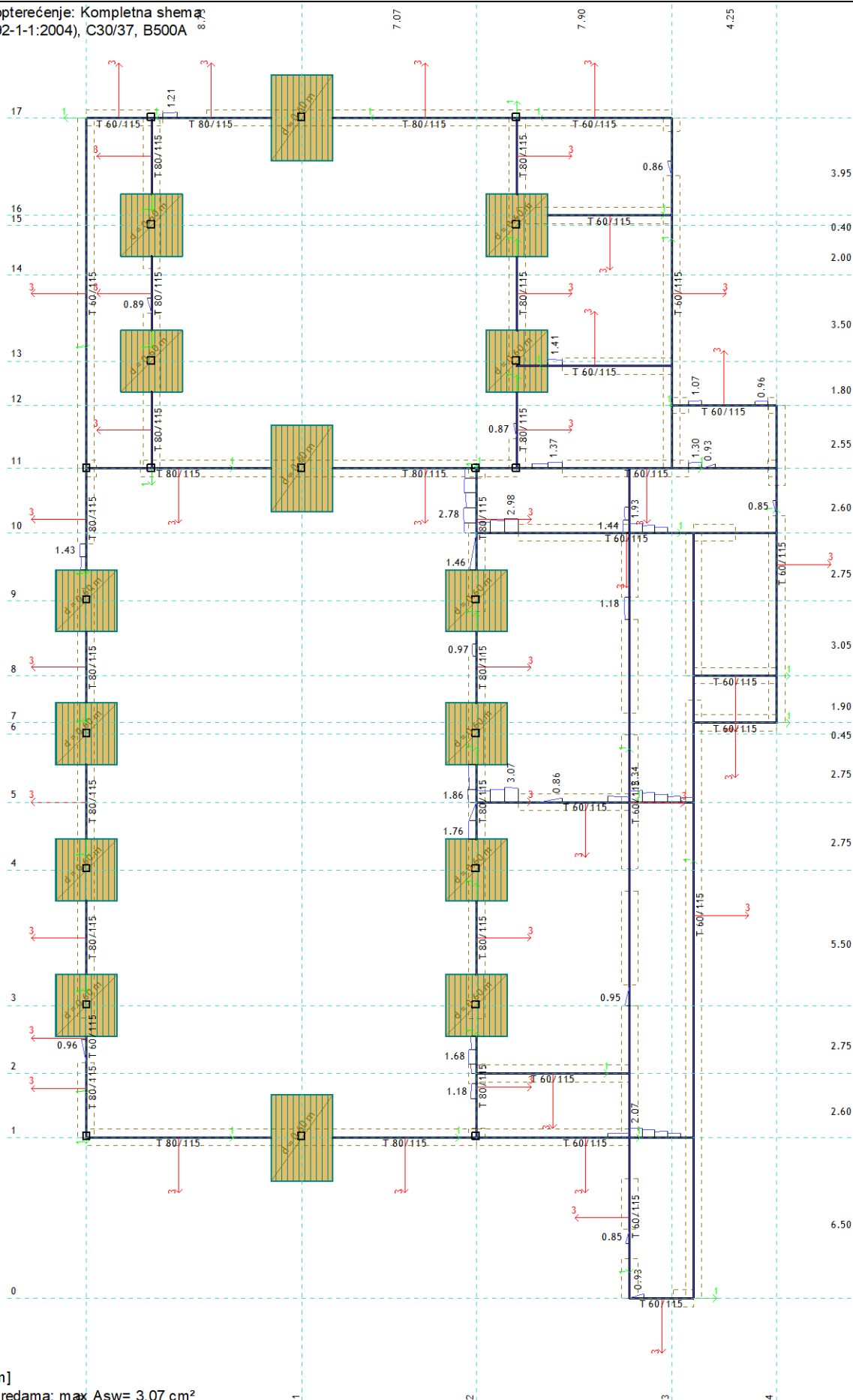
Nivo: [-1.00 m]

Utjecaji u gredi: max V2= 167.15 / min V2= -238.62 kN

Mjerodavno opterećenje: Kompletna shema
EC2 (EN 1992-1-1:2004), C30/37, B500A



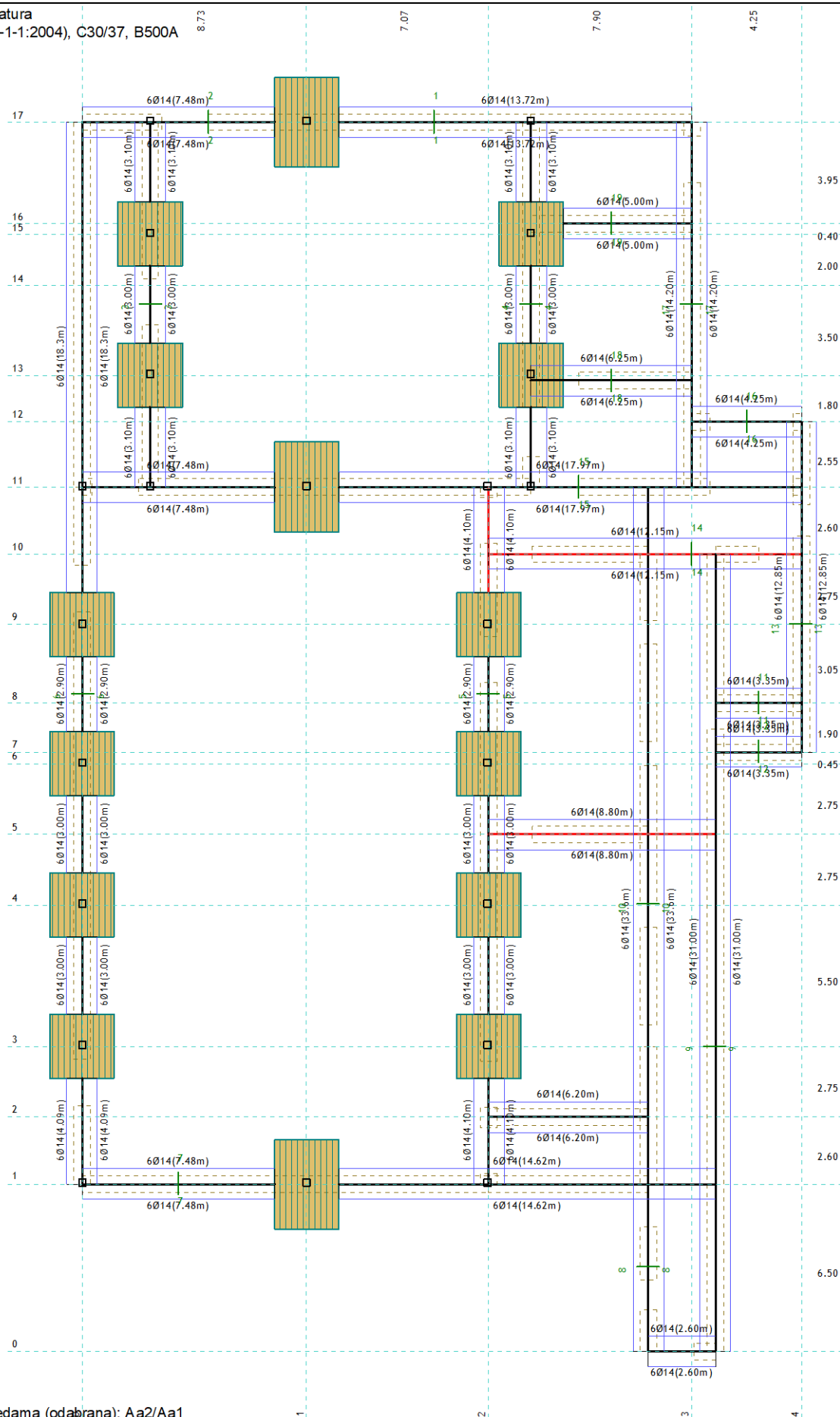
Mjerodavno opterećenje: Kompletna shema
EC2 (EN 1992-1-1:2004), C30/37, B500A



Nivo: [-1.00 m]

Armatura u gredama: max $As_w = 3.07 \text{ cm}^2$

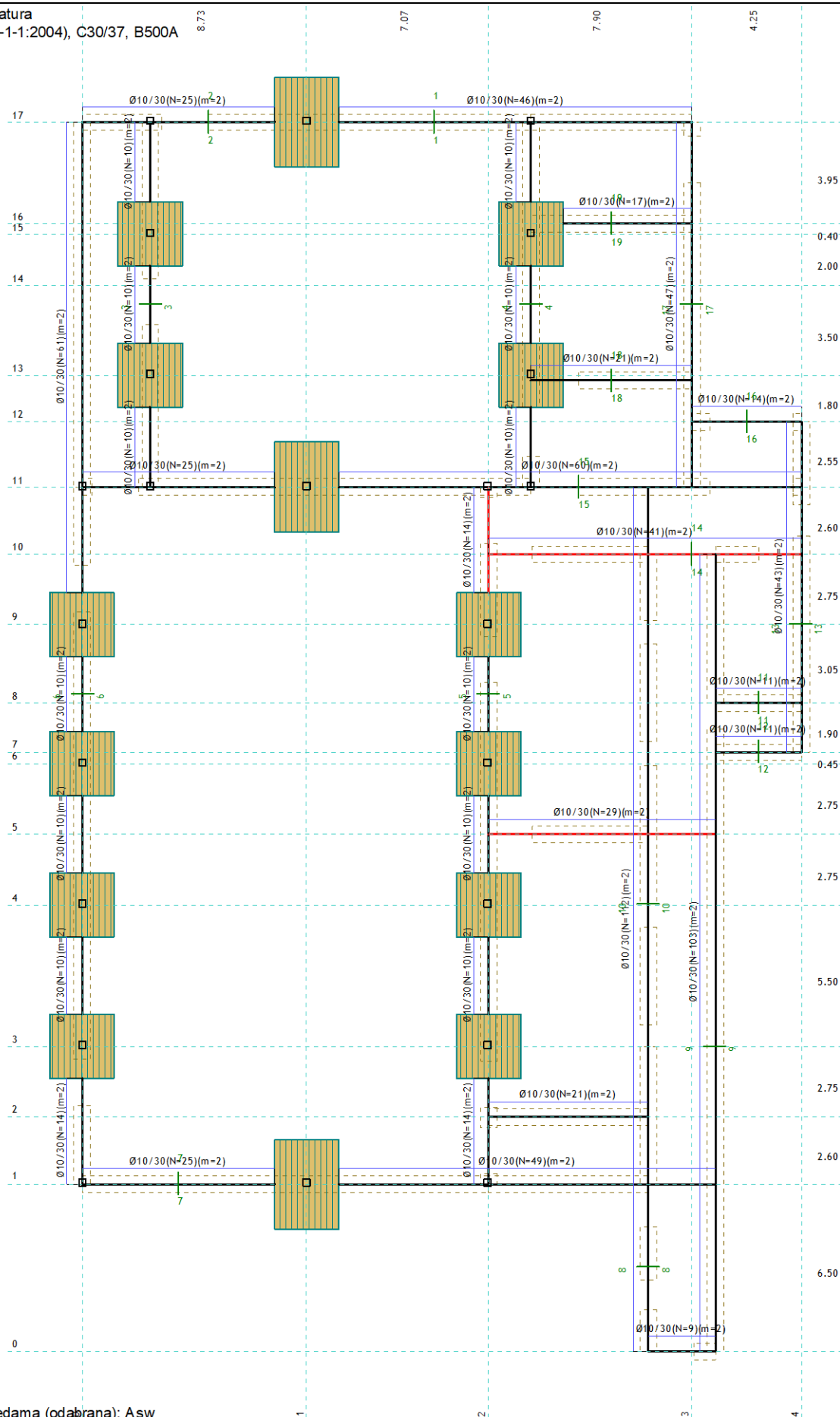
Odabrana armatura
EC2 (EN 1992-1-1:2004), C30/37, B500A



Nivo: [-1.00 m]

Armatura u gredama (odabrana): Aa2/Aa1

Odabrana armatura
EC2 (EN 1992-1-1:2004), C30/37, B500A



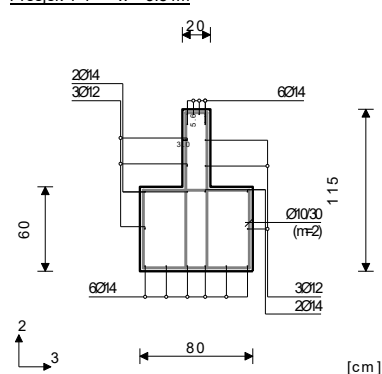
Nivo: [-1.00 m]

Armatura u gredama (odabrana): A sw

Greda 4812-4056

EC2 (EN 1992-1-1:2004)
C30/37 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja

Presjek 1-1 $x = 3.84\text{m}$



Mjerodavna kombinacija za savijanje:
1.00xI+0.30xIII-1.00xIV
N1Ed = 0.00 kN
M2Ed = 0.00 kNm
M3Ed = -1.76 kNm

Mjerodavna kombinacija za torziju:
1.00xI+0.30xIII+1.00xV
M1Ed = 18.64 kNm

Mjerodavna kombinacija za posmik:
1.00xI+0.30xIII+1.00xV
V2Ed = 4.21 kN
V3Ed = 0.75 kN
M1Ed = 18.64 kNm

V2Rd,max = 1038.31 kN
V3Rd,max = 2223.94 kN
 $\epsilon_b/\epsilon_a = -0.075/20.000 \text{ ‰}$
As1 = 0.04 + 0.43' = 0.47 cm²
As2 = 0.04 + 0.09' = 0.13 cm²
As3 = 0.00 + 0.58' = 0.58 cm²
As4 = 0.00 + 0.58' = 0.58 cm²
Asw = 0.00 cm²/m (m=2)

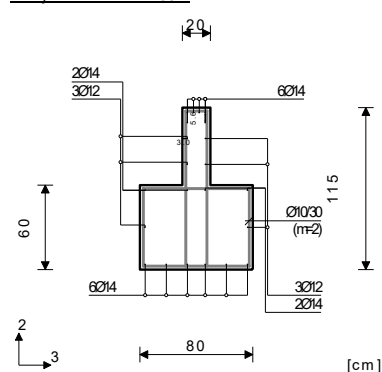
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.53%
) - dodatna uzdužna armatura za prihvrat torzije.

Greda 3760-3112

EC2 (EN 1992-1-1:2004)
C30/37 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja

Presjek 2-2 $x = 2.58\text{m}$



Mjerodavna kombinacija za savijanje:
1.35xI+1.50xIII
N1Ed = -0.02 kN
M2Ed = 0.00 kNm
M3Ed = -32.02 kNm

Mjerodavna kombinacija za torziju:
1.00xI+0.30xIII+1.00xV
M1Ed = 17.70 kNm

Mjerodavna kombinacija za posmik:
1.00xI+0.30xIII+1.00xV
V2Ed = 20.79 kN
V3Ed = 0.49 kN
M1Ed = 17.70 kNm

V2Rd,max = 1038.31 kN
V3Rd,max = 2223.94 kN
 $\epsilon_b/\epsilon_a = -0.267/20.000 \text{ ‰}$
As1 = 0.00 + 0.41' = 0.41 cm²
As2 = 0.68 + 0.09' = 0.76 cm²
As3 = 0.00 + 0.55' = 0.55 cm²
As4 = 0.00 + 0.55' = 0.55 cm²
Asw = 0.00 cm²/m (m=2)

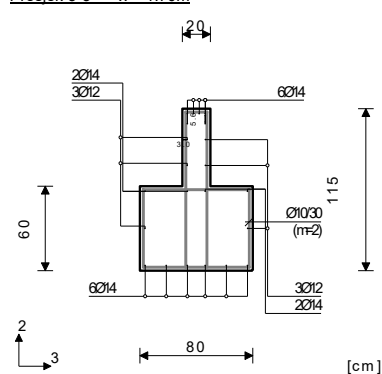
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.53%
) - dodatna uzdužna armatura za prihvrat torzije.

Greda 2477-2126

EC2 (EN 1992-1-1:2004)
C30/37 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja

Presjek 3-3 $x = 1.70\text{m}$



Mjerodavna kombinacija za savijanje:
1.35xI+1.50xII
N1Ed = 0.00 kN
M2Ed = 0.00 kNm
M3Ed = -25.05 kNm

Mjerodavna kombinacija za torziju:
1.35xI+1.50xII
M1Ed = 3.76 kNm

Mjerodavna kombinacija za posmik:
1.00xI+0.30xIII-1.00xV
V2Ed = -37.30 kN
V3Ed = -0.00 kN
M1Ed = 0.20 kNm

V2Rd,max = 1038.31 kN
V3Rd,max = 2223.94 kN
 $\epsilon_b/\epsilon_a = -0.235/20.000 \text{ ‰}$
As1 = 0.00 + 0.09' = 0.09 cm²
As2 = 0.53 + 0.00' = 0.53 cm²
As3 = 0.00 + 0.12' = 0.12 cm²
As4 = 0.00 + 0.12' = 0.12 cm²
Asw = 0.00 cm²/m (m=2)

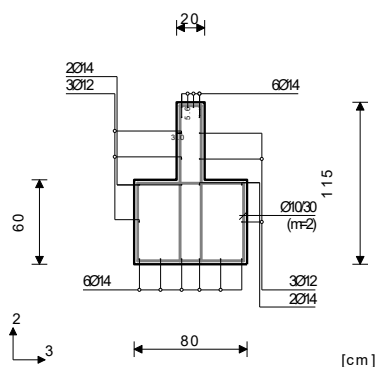
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.53%
) - dodatna uzdužna armatura za prihvrat torzije.

Greda 3921-4278

EC2 (EN 1992-1-1:2004)
C30/37 ($\gamma_C = 1.50$, $\gamma_S = 1.15$) [SP]
B500A
Kompletna shema opterećenja

Presjek 4-4 x = 1.05m



Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII

N1Ed = 0.02 kN

M2Ed = 0.00 kNm

M3Ed = 3.81 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII-1.00xIV

M1ed = -0.18 kNm

Mjerodavna kombinacija za posmik:

1.35xI

V2Ed = -17.77 kN

V3Ed = 0.03 kN

M1Ed = -0.08 kNm

V2Rd,max = 1038.31 kN

V3Rd,max = 2223.94 kN

eb/εa = -0.190/20.000 ‰

As1 = 0.08 cm²

As2 = 0.02 cm²

As3 = 0.00 cm²

As4 = 0.00 cm²

Asw = 0.00 cm²/m (m=2)

[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.53%

Greda 1896-2249

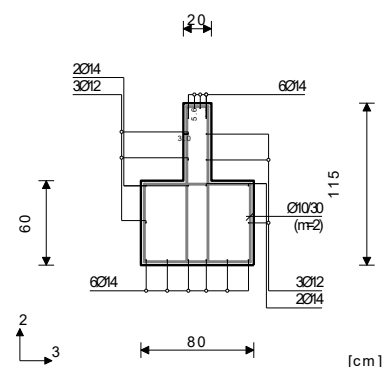
EC2 (EN 1992-1-1:2004)

C30/37 (γC = 1.50, γS = 1.15) [SP]

B500A

Kompletna shema opterećenja

Presjek 5-5 x = 1.02m



Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII+1.05xIII

N1Ed = 0.11 kN

M2Ed = 0.00 kNm

M3Ed = 23.04 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII-1.00xIV

M1ed = -0.17 kNm

Mjerodavna kombinacija za posmik:

1.35xI

V2Ed = 9.43 kN

V3Ed = -0.03 kN

M1Ed = -0.12 kNm

V2Rd,max = 1038.31 kN

V3Rd,max = 2223.94 kN

eb/εa = -0.472/20.000 ‰

As1 = 0.49 cm²

As2 = 0.05 cm²

As3 = 0.00 cm²

As4 = 0.00 cm²

Asw = 0.00 cm²/m (m=2)

[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.53%

Greda 871-679

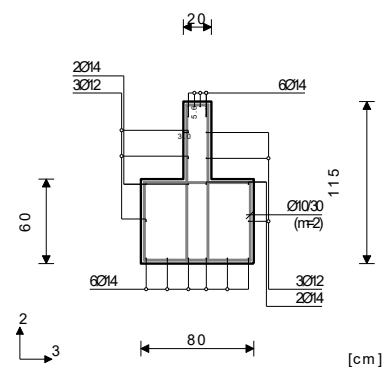
EC2 (EN 1992-1-1:2004)

C30/37 (γC = 1.50, γS = 1.15) [SP]

B500A

Kompletna shema opterećenja

Presjek 6-6 x = 1.69m



Mjerodavna kombinacija za savijanje:

1.35xI+1.50xII+1.05xIII

N1Ed = 0.02 kN

M2Ed = 0.00 kNm

M3Ed = 3.08 kNm

Mjerodavna kombinacija za torziju:

1.00xI+1.00xIV

M1ed = 0.65 kNm

Mjerodavna kombinacija za posmik:

1.35xI

V2Ed = 14.58 kN

V3Ed = -0.12 kN

M1Ed = 0.20 kNm

V2Rd,max = 1038.31 kN

V3Rd,max = 2223.94 kN

eb/εa = -0.164/20.000 ‰

As1 = 0.07 cm²

As2 = 0.00 cm²

As3 = 0.00 cm²

As4 = 0.00 cm²

Asw = 0.00 cm²/m (m=2)

[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.53%

Greda 2-185

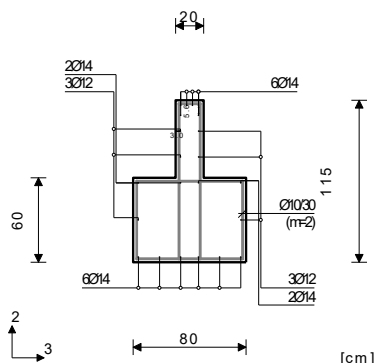
EC2 (EN 1992-1-1:2004)

C30/37 (γC = 1.50, γS = 1.15) [SP]

B500A

Kompletna shema opterećenja

Presjek 7-7 x = 3.94m



Mjerodavna kombinacija za savijanje:

1.00xI+1.00xIV
N1Ed = 0.01 kN
M2Ed = 0.00 kNm
M3Ed = 1.97 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII+1.00xV
M1ed = 20.35 kNm

Mjerodavna kombinacija za posmik:

1.00xI+0.30xIII+1.00xV
V2Ed = 6.96 kN
V3Ed = 1.14 kN
M1Ed = 20.35 kNm

V2Rd,max = 1038.31 kN
V3Rd,max = 2223.94 kN
eb/ea = -0.140/20.000 ‰

As1 = 0.04 + 0.47' = 0.51 cm²
As2 = 0.00 + 0.10' = 0.10 cm²
As3 = 0.00 + 0.64' = 0.64 cm²
As4 = 0.00 + 0.64' = 0.64 cm²
Asw = 0.00 cm²/m (m=2)

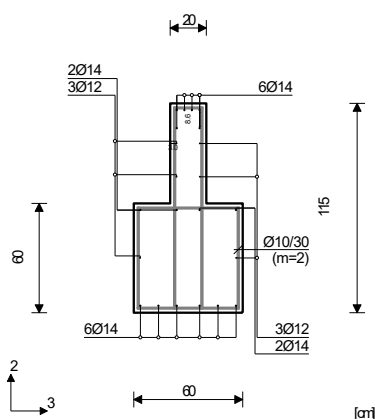
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.53%
) - dodatna uzdužna armatura za prihvat torzije.

Greda 983-556

EC2 (EN 1992-1-1:2004)
C30/37 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

Presjek 8-8 x = 3.70m



Mjerodavna kombinacija za savijanje:

1.35xI+0.75xII+1.50xIII
N1Ed = 0.14 kN
M2Ed = 0.00 kNm
M3Ed = 35.10 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII+1.00xIV
M1ed = 0.15 kNm

Mjerodavna kombinacija za posmik:

1.00xI+1.00xIV
V2Ed = 5.30 kN
V3Ed = -0.00 kN
M1Ed = 0.14 kNm

V2Rd,max = 1038.31 kN
V3Rd,max = 1653.70 kN
eb/ea = -0.583/20.000 ‰

As1 = 0.75 cm²
As2 = 0.00 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)

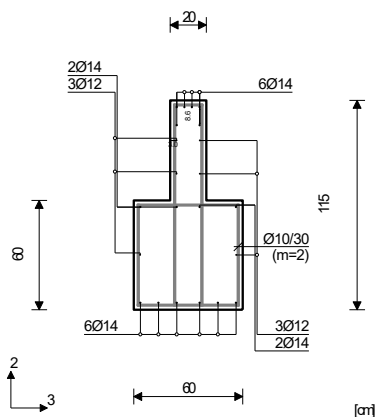
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.67%

Greda 707-3786

EC2 (EN 1992-1-1:2004)
C30/37 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

Presjek 9-9 x = 12.00m



Mjerodavna kombinacija za savijanje:

1.00xI+0.30xIII-1.00xIV
N1Ed = 0.01 kN
M2Ed = 0.00 kNm
M3Ed = -1.77 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII+1.00xIV
M1ed = 0.22 kNm

Mjerodavna kombinacija za posmik:

1.35xI
V2Ed = 9.62 kN
V3Ed = 0.01 kN
M1Ed = 0.02 kNm

V2Rd,max = 1038.31 kN
V3Rd,max = 1653.70 kN
eb/ea = -0.072/20.000 ‰

As1 = 0.00 cm²
As2 = 0.04 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)

[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

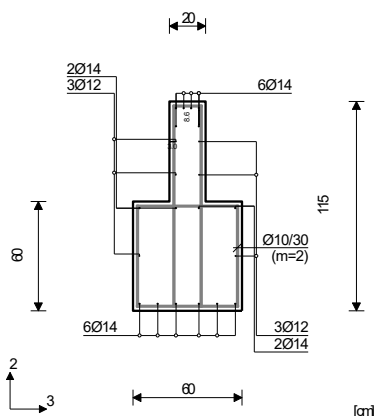
Postotak armiranja: 0.67%

Greda 983-3785

EC2 (EN 1992-1-1:2004)
C30/37 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

 TEHNO-innova d.o.o. Kukuljevićeva 7, Varaždin	GRADEVINA: Rekonstrukcija i dogradnja OŠ Ivan Goran Kovačić- Đakovo	DATUM: 8/2025
	INVESTITOR: Osnovna škola "Ivan Goran Kovačić, Ulica kralja Tomislava 25, 31400 Đakovo, OIB: 31582799502	STR: 282

Presjek 10-10 x = 10.90m



Mjerodavna kombinacija za savijanje:

1.00xI-1.00xV

N1Ed = -0.04 kN

M2Ed = 0.00 kNm

M3Ed = -12.72 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII-1.00xIV

M1Ed = -1.39 kNm

Mjerodavna kombinacija za posmik:

1.00xI+1.00xV

V2Ed = 27.92 kN

V3Ed = 0.06 kN

M1Ed = -0.55 kNm

V2Rd,max = 1038.31 kN

V3Rd,max = 1653.70 kN

sb/ea = -0.193/20.000 ‰

As1 =	0.00	+	0.03'	=	0.03 cm ²
As2 =	0.27	+	0.00'	=	0.27 cm ²
As3 =	0.00	+	0.05'	=	0.05 cm ²
As4 =	0.00	+	0.05'	=	0.05 cm ²
Asw =	0.00	+	0.00 cm ² /m	=	(m=2)

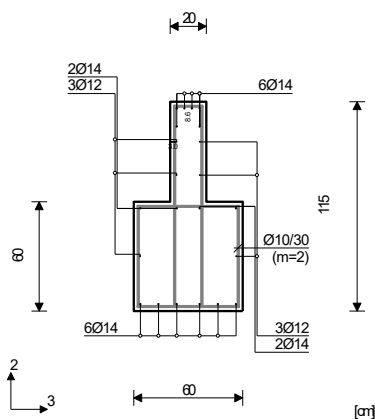
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.67%
') - dodatna uzdužna armatura za prihvrat torzije.

Greda 3030-3474

EC2 (EN 1992-1-1:2004)
C30/37 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

Presjek 11-11 x = 1.70m



Mjerodavna kombinacija za savijanje:

1.00xI+1.00xIV

N1Ed = 0.00 kN

M2Ed = 0.00 kNm

M3Ed = 0.87 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII+1.00xIV

M1Ed = 0.04 kNm

Mjerodavna kombinacija za posmik:

1.00xI+0.30xIII+1.00xIV

V2Ed = 14.40 kN

V3Ed = 0.01 kN

M1Ed = 0.04 kNm

V2Rd,max = 1038.31 kN

V3Rd,max = 1653.70 kN

sb/ea = -0.139/20.000 ‰

As1 = 0.02 cm²

As2 = 0.07 cm²

As3 = 0.00 cm²

As4 = 0.00 cm²

Asw = 0.00 cm²/m (m=2)

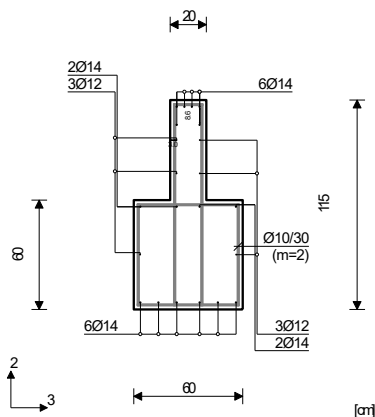
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.67%

Greda 2811-3209

EC2 (EN 1992-1-1:2004)
C30/37 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

Presjek 12-12 x = 1.70m



Mjerodavna kombinacija za savijanje:

1.00xI+0.30xIII-1.00xIV

N1Ed = 0.00 kN

M2Ed = 0.00 kNm

M3Ed = -3.57 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII+1.00xIV

M1Ed = 1.21 kNm

Mjerodavna kombinacija za posmik:

1.00xI+0.30xIII+1.00xIV

V2Ed = 12.45 kN

V3Ed = 0.07 kN

M1Ed = 1.21 kNm

V2Rd,max = 1038.31 kN

V3Rd,max = 1653.70 kN

sb/ea = -0.106/20.000 ‰

As1 = 0.00 + 0.02' = 0.02 cm²

As2 = 0.07 + 0.00' = 0.07 cm²

As3 = 0.00 + 0.05' = 0.05 cm²

As4 = 0.00 + 0.05' = 0.05 cm²

Asw = 0.00 cm²/m (m=2)

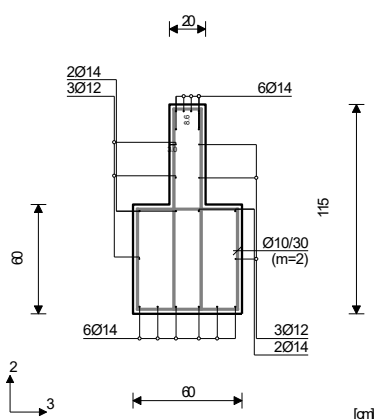
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.67%
') - dodatna uzdužna armatura za prihvrat torzije.

Greda 3209-4701

EC2 (EN 1992-1-1:2004)
C30/37 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

Presjek 13-13 x = 4.94m



Mjerodavna kombinacija za savijanje:

1.00xI+0.30xIII+1.00xIV

N1Ed = 0.01 kN

M2Ed = 0.00 kNm

M3Ed = 3.72 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII-1.00xIV

M1Ed = -0.08 kNm

Mjerodavna kombinacija za posmik:

1.00xI-1.00xIV

V2Ed = -6.17 kN

V3Ed = -0.06 kN

M1Ed = -0.08 kNm

V2Rd,max = 1038.31 kN

V3Rd,max = 1653.70 kN

sb/ea = -0.181/20.000 ‰

As1 = 0.08 cm²
As2 = 0.00 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)

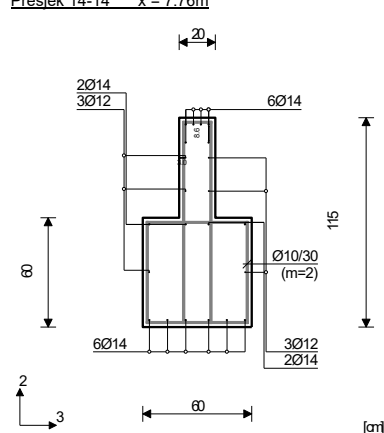
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.67%

Greda 2687-4191

EC2 (EN 1992-1-1:2004)
C30/37 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

Presjek 14-14 x = 7.76m



Mjerodavna kombinacija za savijanje:

1.35xI+0.75xII+1.50xIII

N1Ed = 0.00 kN

M2Ed = 0.00 kNm

M3Ed = -53.87 kNm

Mjerodavna kombinacija za torziju:

1.35xI+1.50xIII

M1Ed = -0.38 kNm

Mjerodavna kombinacija za posmik:

1.00xI+0.30xIII+1.00xIV

V2Ed = 63.74 kN

V3Ed = 0.01 kN

M1Ed = -0.17 kNm

V2Rd,max = 1038.31 kN

V3Rd,max = 1653.70 kN

sb/ea = -0.407/20.000 ‰

As1 = 0.00 cm²

As2 = 1.14 cm²

As3 = 0.00 cm²

As4 = 0.00 cm²

Asw = 0.00 cm²/m (m=2)

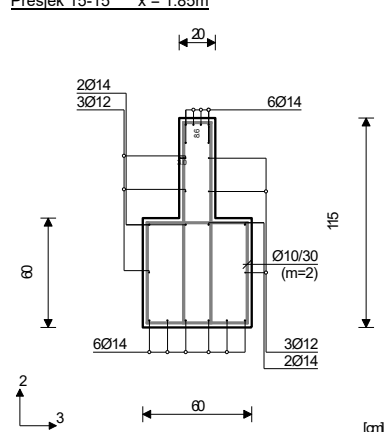
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.67%

Greda 3193-4449

EC2 (EN 1992-1-1:2004)
C30/37 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

Presjek 15-15 x = 1.85m



Mjerodavna kombinacija za savijanje:

1.00xI-1.00xIV

N1Ed = -0.19 kN

M2Ed = 0.00 kNm

M3Ed = -31.40 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII+1.00xV

M1Ed = 0.53 kNm

Mjerodavna kombinacija za posmik:

1.00xI+0.30xIII-1.00xIV

V2Ed = -109.98 kN

V3Ed = 0.00 kN

M1Ed = -0.09 kNm

V2Rd,max = 1038.31 kN

V3Rd,max = 1653.70 kN

sb/ea = -0.414/20.000 ‰

As1 = 1.68 cm²

As2 = 0.64 cm²

As3 = 0.00 cm²

As4 = 0.00 cm²

Asw = 1.29 cm²/m (m=2)

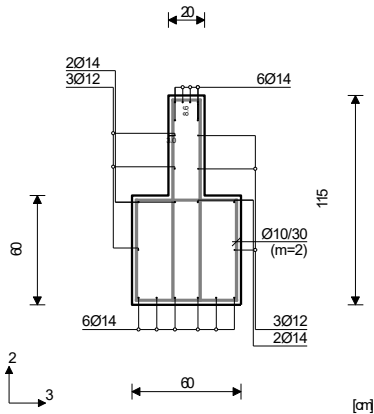
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.67%

Greda 4701-4300

EC2 (EN 1992-1-1:2004)
C30/37 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

Presjek 16-16 x = 1.95m



Mjerodavna kombinacija za savijanje:

1.35xI+1.50xIII

N1Ed = 0.00 kN

M2Ed = 0.00 kNm

M3Ed = -99.86 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII-1.00xIV

M1Ed = -0.01 kNm

Mjerodavna kombinacija za posmik:

1.35xI+1.50xII+1.05xIII

V2Ed = -27.56 kN

V3Ed = 0.00 kN

M1Ed = -0.00 kNm

V2Rd,max = 1038.31 kN

V3Rd,max = 1653.70 kN

sb/ea = -0.564/20.000 ‰

As1 = 0.00 cm²

As2 = 2.12 cm²

As3 = 0.00 cm²

As4 = 0.00 cm²

Asw = 0.00 cm²/m (m=2)

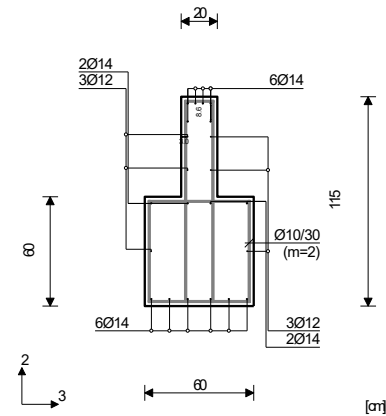
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.67%

Greda 3998-5274

EC2 (EN 1992-1-1:2004)
C30/37 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

Presjek 17-17 x = 6.65m



Mjerodavna kombinacija za savijanje:

1.35xI+1.50xIII

N1Ed = 0.00 kN

M2Ed = 0.00 kNm

M3Ed = 5.02 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII-1.00xV

M1Ed = -0.07 kNm

Mjerodavna kombinacija za posmik:

1.00xI-1.00xV

V2Ed = -4.31 kN

V3Ed = -0.01 kN

M1Ed = -0.07 kNm

V2Rd,max = 1038.31 kN

V3Rd,max = 1653.70 kN

sb/ea = -0.211/20.000 ‰

As1 = 0.11 cm²

As2 = 0.00 cm²

As3 = 0.00 cm²

As4 = 0.00 cm²

Asw = 0.00 cm²/m (m=2)

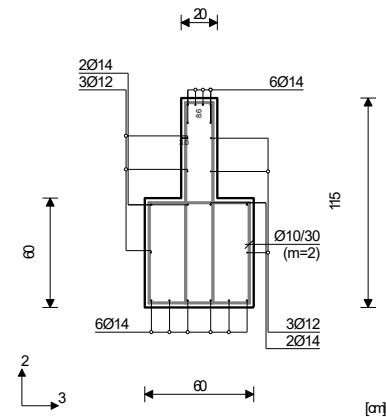
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

Postotak armiranja: 0.67%

Greda 4442-3742

EC2 (EN 1992-1-1:2004)
C30/37 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

Presjek 18-18 x = 3.50m



Mjerodavna kombinacija za savijanje:

1.35xI+1.50xIII

N1Ed = 0.04 kN

M2Ed = 0.00 kNm

M3Ed = 49.17 kNm

Mjerodavna kombinacija za torziju:

1.00xI+0.30xIII+1.00xIV

M1Ed = 2.08 kNm

Mjerodavna kombinacija za posmik:

1.00xI-1.00xIV

V2Ed = -15.80 kN

V3Ed = -0.02 kN

M1Ed = 0.57 kNm

V2Rd,max = 1038.31 kN

V3Rd,max = 1653.70 kN

sb/ea = -0.701/20.000 ‰

As1 = 1.05 + 0.04' = 1.09 cm²

As2 = 0.00 + 0.00' = 0.00 cm²

As3 = 0.00 + 0.08' = 0.08 cm²

As4 = 0.00 + 0.08' = 0.08 cm²

Asw = 0.00 cm²/m (m=2)

[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]

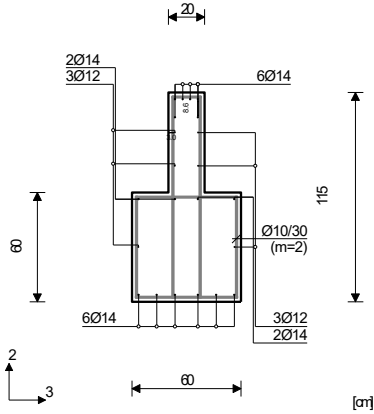
Postotak armiranja: 0.67%

*) - dodatna uzdužna armatura za prihvatanje torzije.

Greda 4552-4998

EC2 (EN 1992-1-1:2004)
C30/37 (γC = 1.50, γS = 1.15) [SP]
B500A
Kompletna shema opterećenja

Presjek 19-19 x = 1.50m



Mjerodavna kombinacija za savijanje:
1.00xI+0.30xIII-1.00xIV
N1Ed = 0.01 kN
M2Ed = 0.00 kNm
M3Ed = -1.73 kNm

Mjerodavna kombinacija za torziju:
1.00xI+0.30xIII+1.00xV
M1Ed = 0.05 kNm

Mjerodavna kombinacija za posmik:
1.35xI
V2Ed = -12.39 kN
V3Ed = 0.00 kN
M1Ed = 0.02 kNm

V2Rd,max = 1038.31 kN
V3Rd,max = 1653.70 kN
 $\epsilon_b/\epsilon_a = -0.071/20.000 \text{ ‰}$

As1 = 0.00 cm²
As2 = 0.04 cm²
As3 = 0.00 cm²
As4 = 0.00 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø10/30(m=2) = 2.62 cm²/m]
Postotak armiranja: 0.67%

POZ PP2 - a.b.podna ploča (DVORANA)

DEBLJINA PLOČE

15 cm

PLOČU ARMIRATI MREŽASTOM ARMATUROM:

GORNJA ZONA:

Q-295

DONJA ZONA:

Q-295

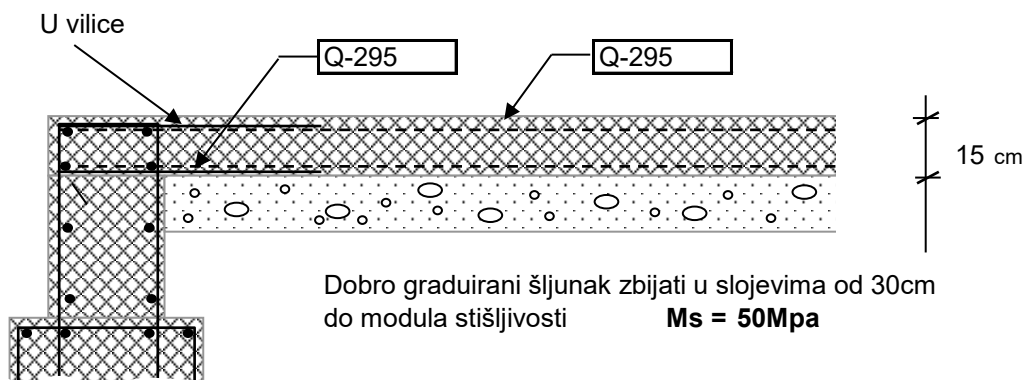
KLASA BETONA

c25/30

ČELIK

B500-B

PLOČU JE POTREBNO DILATIRATI PREMA PRAVILIMA STRUKE



POZ PP1 - a.b.podna ploča (UČIONICE)

DEBLJINA PLOČE

15 cm

PLOČU ARMIRATI MREŽASTOM ARMATUROM:

GORNJA ZONA:

Q-188

DONJA ZONA:

Q-188

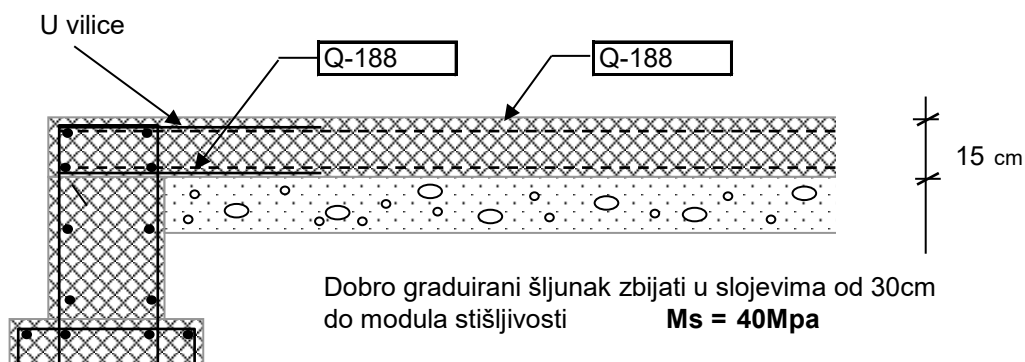
KLASA BETONA

c25/30

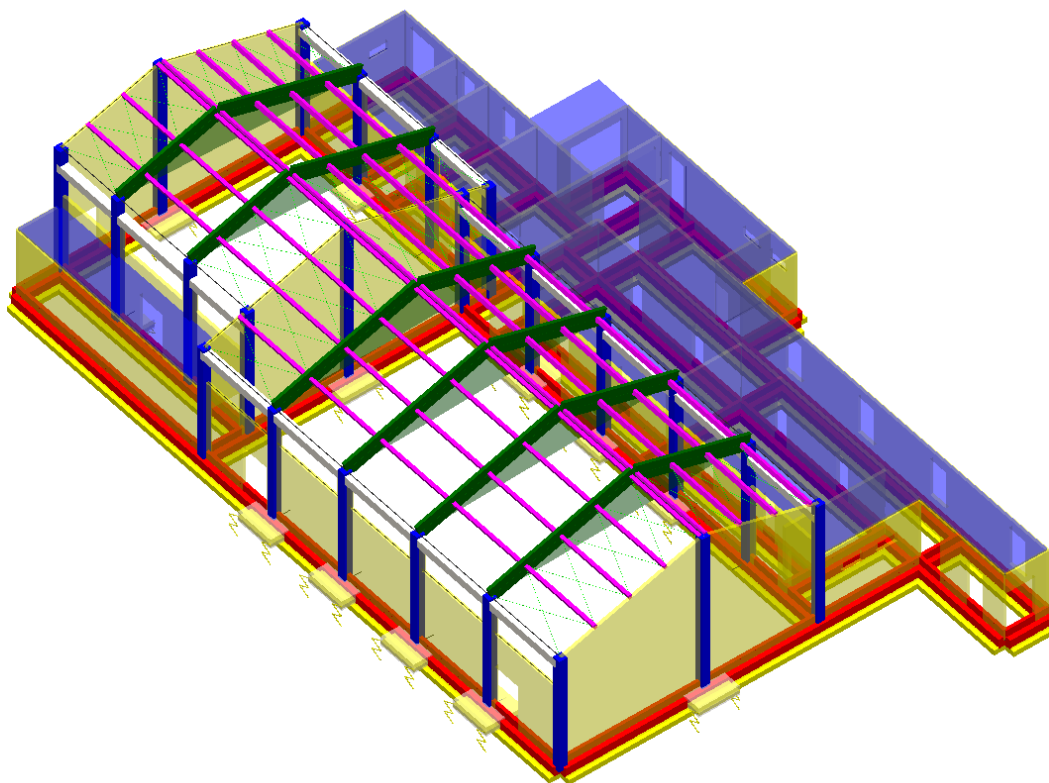
ČELIK

B500-B

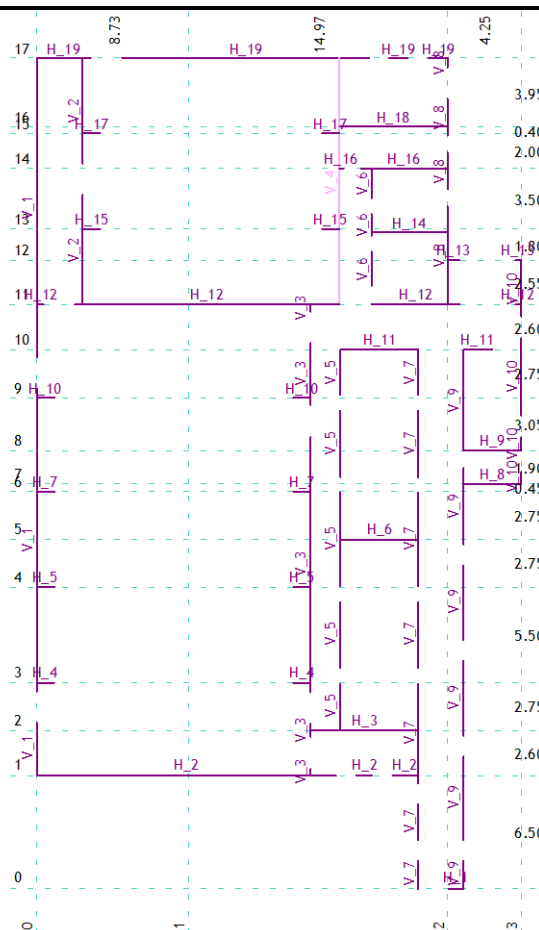
PLOČU JE POTREBNO DILATIRATI PREMA PRAVILIMA STRUKE



MODEL 2 – OPTEREĆENJE VJETROM (nelin.vlačne dijgonale)



Izometrija



Dispozicija okvira

Ulazni podaci - Opterećenje

Lista slučajeva opterećenja

LC	Naziv	pX [kN]	pY [kN]	pZ [kN]
1	g (g)	0.00	0.00	-21775.6
2	s	0.00	0.00	-723.74
3	q	0.00	0.00	-872.48
4	wx	318.60	-1.05	0.26
5	wy+	-5.13	228.92	0.00
6	wy-	1.73	-232.02	0.00
7	Komb.: 1.35xl+1.5xII+1.05xIII+0.9xVI	1.56	-208.82	-31398.8
8	Komb.: 1.35xl+1.5xII+1.05xIII+0.9xV	-4.62	206.02	-31398.8
9	Komb.: 1.35xl+1.5xII+1.05xIII+0.9xIV	286.74	-0.94	-31398.5
10	Komb.: 1.35xl+0.75xII+1.05xIII+1.5xVI	2.59	-348.03	-30856.0
11	Komb.: 1.35xl+0.75xII+1.05xIII+1.5xV	-7.70	343.37	-30856.0
12	Komb.: 1.35xl+0.75xII+1.05xIII+1.5xIV	477.90	-1.57	-30855.6
13	Komb.: 1.35xl+0.75xII+1.5xIII+0.9xVI	1.56	-208.82	-31248.6
14	Komb.: 1.35xl+0.75xII+1.5xIII+0.9xV	-4.62	206.02	-31248.6
15	Komb.: 1.35xl+0.75xII+1.5xIII+0.9xIV	286.74	-0.94	-31248.4
16	Komb.: I+1.5xII+1.05xIII+0.9xVI	1.56	-208.82	-23777.3
17	Komb.: I+1.5xII+1.05xIII+0.9xV	-4.62	206.02	-23777.3
18	Komb.: I+1.5xII+1.05xIII+0.9xIV	286.74	-0.94	-23777.1
19	Komb.: I+0.75xII+1.05xIII+1.5xVI	2.59	-348.03	-23234.5
20	Komb.: I+0.75xII+1.05xIII+1.5xV	-7.70	343.37	-23234.5
21	Komb.: I+0.75xII+1.05xIII+1.5xIV	477.90	-1.57	-23234.1
22	Komb.: I+0.75xII+1.5xIII+0.9xVI	1.56	-208.82	-23627.1
23	Komb.: I+0.75xII+1.5xIII+0.9xV	-4.62	206.02	-23627.1
24	Komb.: I+0.75xII+1.5xIII+0.9xIV	286.74	-0.94	-23626.9
25	Komb.: 1.35xl+1.05xIII+1.5xVI	2.59	-348.03	-30313.2
26	Komb.: 1.35xl+1.05xIII+1.5xV	-7.70	343.37	-30313.2
27	Komb.: 1.35xl+1.05xIII+1.5xIV	477.90	-1.57	-30312.8
28	Komb.: 1.35xl+1.5xII+1.05xIII	0.00	0.00	-31398.8
29	Komb.: 1.35xl+1.5xII+0.9xVI	1.56	-208.82	-30705.8
30	Komb.: 1.35xl+1.5xII+0.9xV	-4.62	206.02	-30705.8
31	Komb.: 1.35xl+1.5xII+0.9xIV	286.74	-0.94	-30705.6
32	Komb.: 1.35xl+1.5xII+0.9xVI	1.56	-208.82	-30482.7
33	Komb.: 1.35xl+1.5xII+0.9xV	-4.62	206.02	-30482.7
34	Komb.: 1.35xl+1.5xII+0.9xIV	286.74	-0.94	-30482.4
35	Komb.: 1.35xl+0.75xII+1.5xVI	2.59	-348.03	-29939.9
36	Komb.: 1.35xl+0.75xII+1.5xV	-7.70	343.37	-29939.9
37	Komb.: 1.35xl+0.75xII+1.5xIV	477.90	-1.57	-29939.5
38	Komb.: 1.35xl+0.75xII+1.5xIII	0.00	0.00	-31248.6
39	Komb.: I+1.05xIII+1.5xVI	2.59	-348.03	-22691.7
40	Komb.: I+1.05xIII+1.5xV	-7.70	343.37	-22691.7
41	Komb.: I+1.05xIII+1.5xIV	477.90	-1.57	-22691.3
42	Komb.: I+1.5xII+1.05xIII	0.00	0.00	-23777.3
43	Komb.: I+1.5xII+0.9xVI	1.56	-208.82	-23084.3
44	Komb.: I+1.5xII+0.9xV	-4.62	206.02	-23084.3
45	Komb.: I+1.5xII+0.9xIV	286.74	-0.94	-23084.1
46	Komb.: I+1.5xII+0.9xVI	1.56	-208.82	-22861.2
47	Komb.: I+1.5xII+0.9xV	-4.62	206.02	-22861.2
48	Komb.: I+1.5xII+0.9xIV	286.74	-0.94	-22861.0
49	Komb.: I+0.75xII+1.5xVI	2.59	-348.03	-22318.4
50	Komb.: I+0.75xII+1.5xV	-7.70	343.37	-22318.4
51	Komb.: I+0.75xII+1.5xIV	477.90	-1.57	-22318.0
52	Komb.: I+0.75xII+1.5xIII	0.00	0.00	-23627.1
53	Komb.: 1.35xl+1.5xVI	2.59	-348.03	-29397.1
54	Komb.: 1.35xl+1.5xV	-7.70	343.37	-29397.1
55	Komb.: 1.35xl+1.5xIV	477.90	-1.57	-29396.7
56	Komb.: 1.35xl+1.5xIII	0.00	0.00	-30705.8
57	Komb.: 1.35xl+1.5xII	0.00	0.00	-30482.7
58	Komb.: I+1.5xVI	2.59	-348.03	-21775.6
59	Komb.: I+1.5xV	-7.70	343.37	-21775.6
60	Komb.: I+1.5xIV	477.90	-1.57	-21775.2
61	Komb.: I+1.5xIII	0.00	0.00	-23084.3
62	Komb.: I+1.5xII	0.00	0.00	-22861.2
63	Komb.: 1.35xl	0.00	0.00	-29397.1
64	Komb.: I	0.00	0.00	-21775.6

Lista anvelopskih slučajeva opterećenja

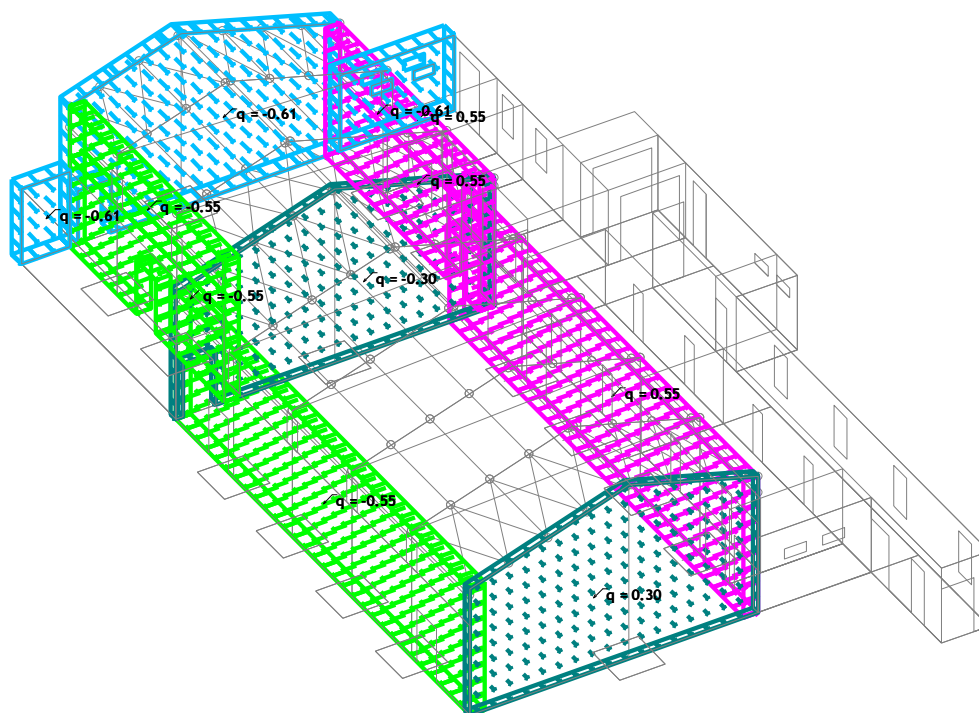
LC	Naziv
65	7-64

Radimpex - www.radimpex.rs

Opt. 6: wy-

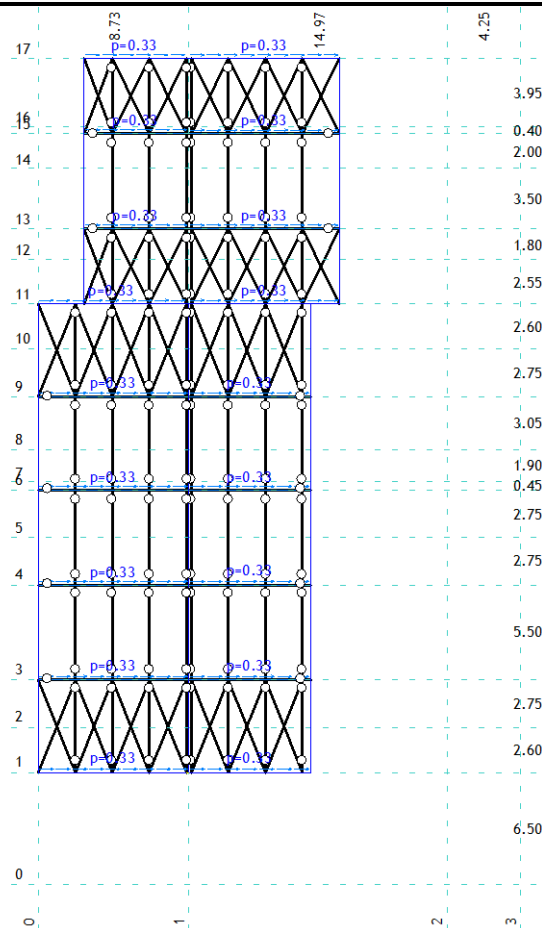
Površinsko opterećenje

- 1. $p=0.30 \text{ kN/m}^2$
- 3. $p=-0.30 \text{ kN/m}^2$
- 4. $p=-0.55 \text{ kN/m}^2$
- 5. $p=0.55 \text{ kN/m}^2$
- 6. $p=-0.55 \text{ kN/m}^2$
- 7. $p=0.55 \text{ kN/m}^2$
- 12. $p=-0.61 \text{ kN/m}^2$



Setovi numeričkih podataka
Površinsko opterećenje (1,3-7,12)

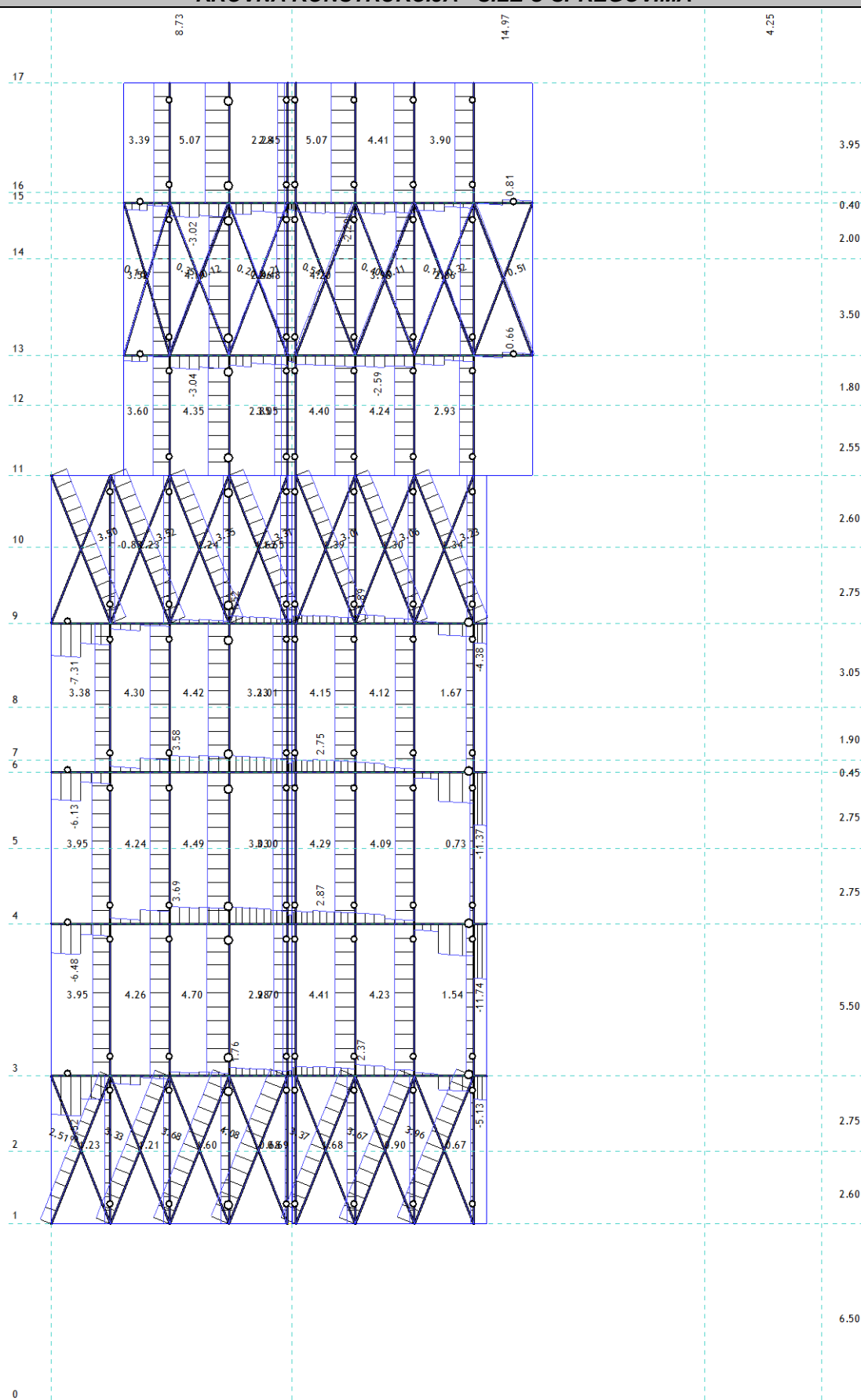
Opt. 4: wx



Pogled: k1+k2

KROVNA KONSTRUKCIJA - SILE U SPREGOVIMA

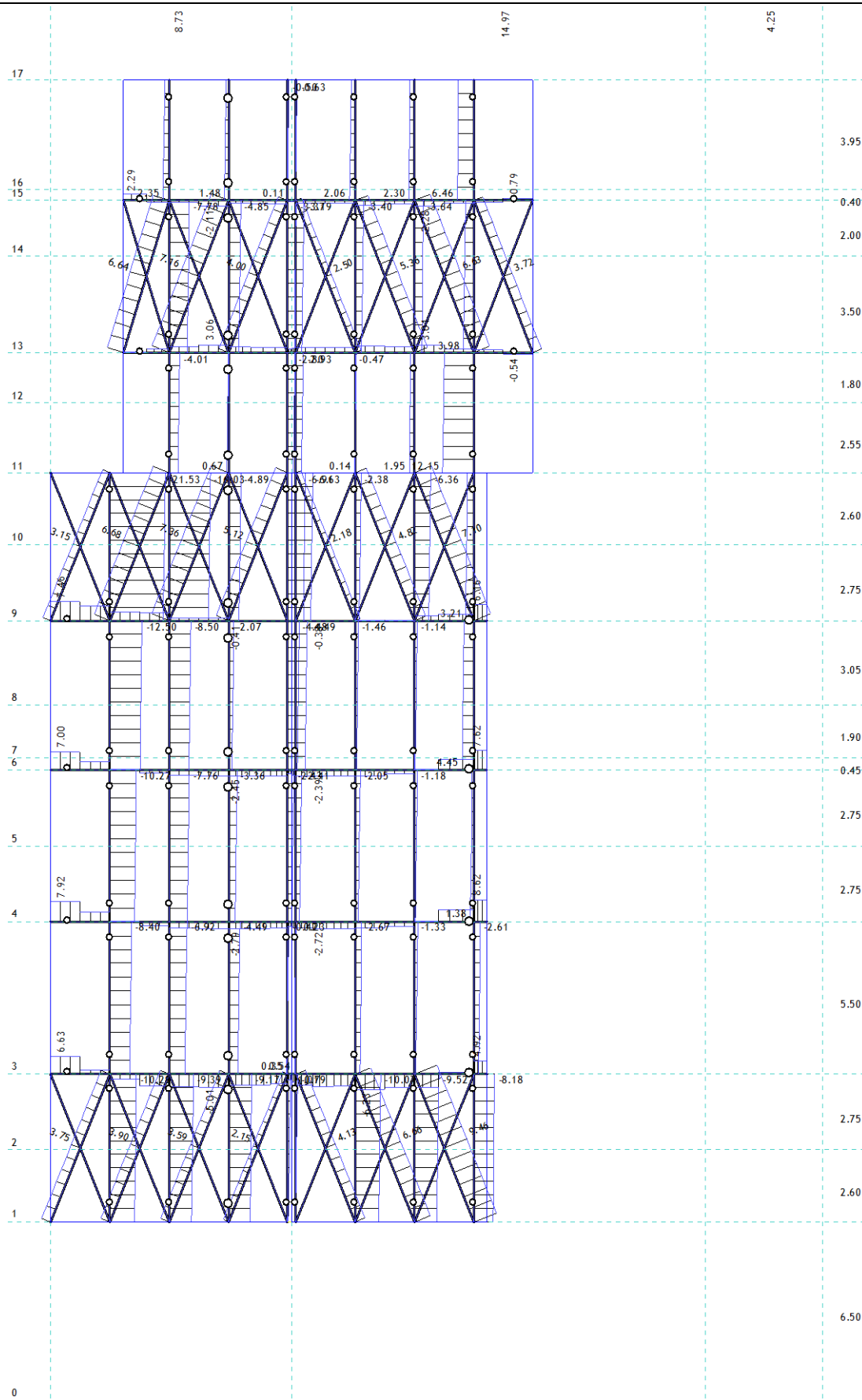
Opt. 4: wx



Pogled: k1+k2

Utjecaji u gredi: max $N_1 = 5.07$ / min $N_1 = -11.74$ kN

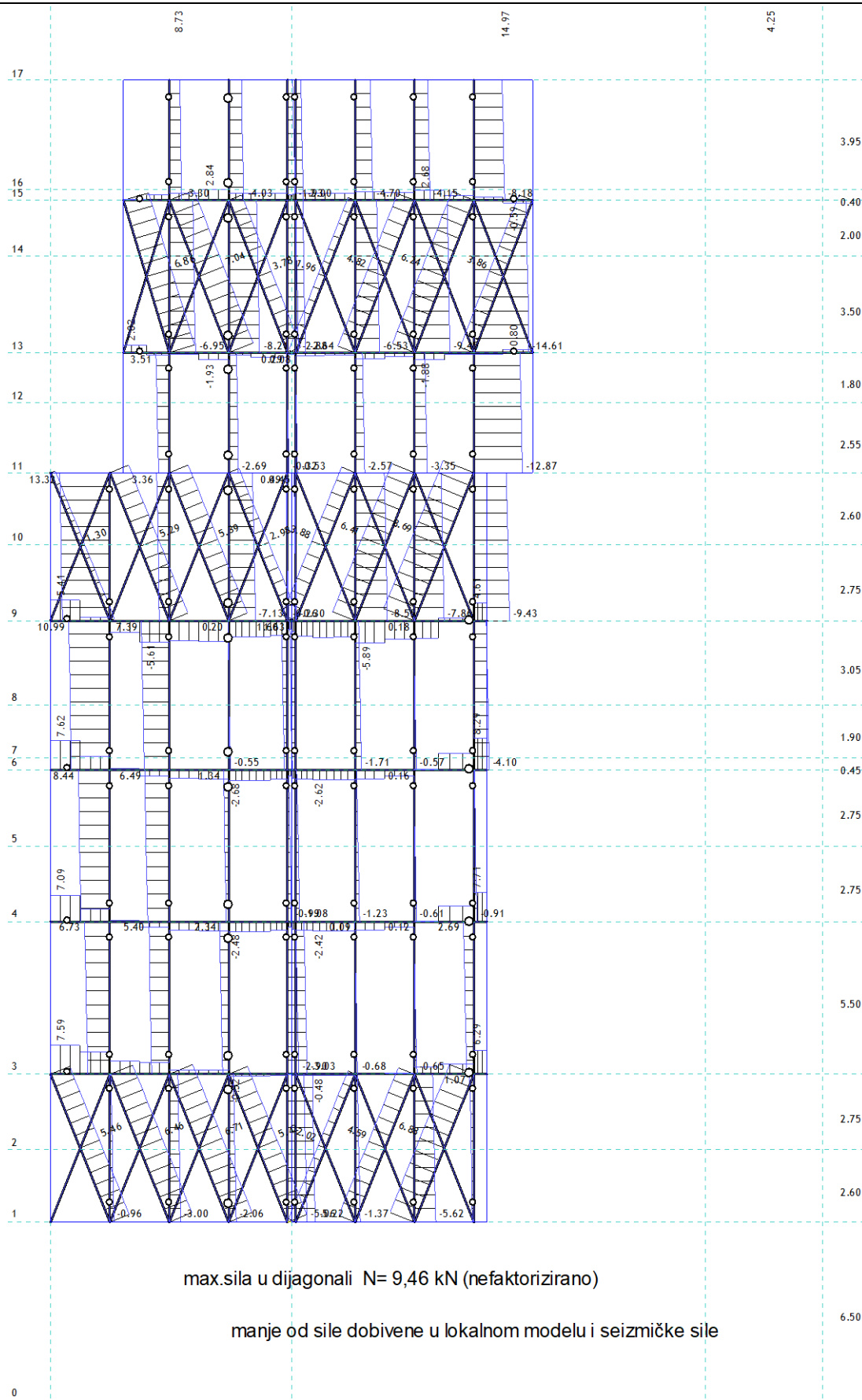
Opt. 5: wy+



Pogled: k1+k2

Utjecaji u gredi: max N1= 12.15 / min N1= -21.53 kN

Opt. 6: wy-

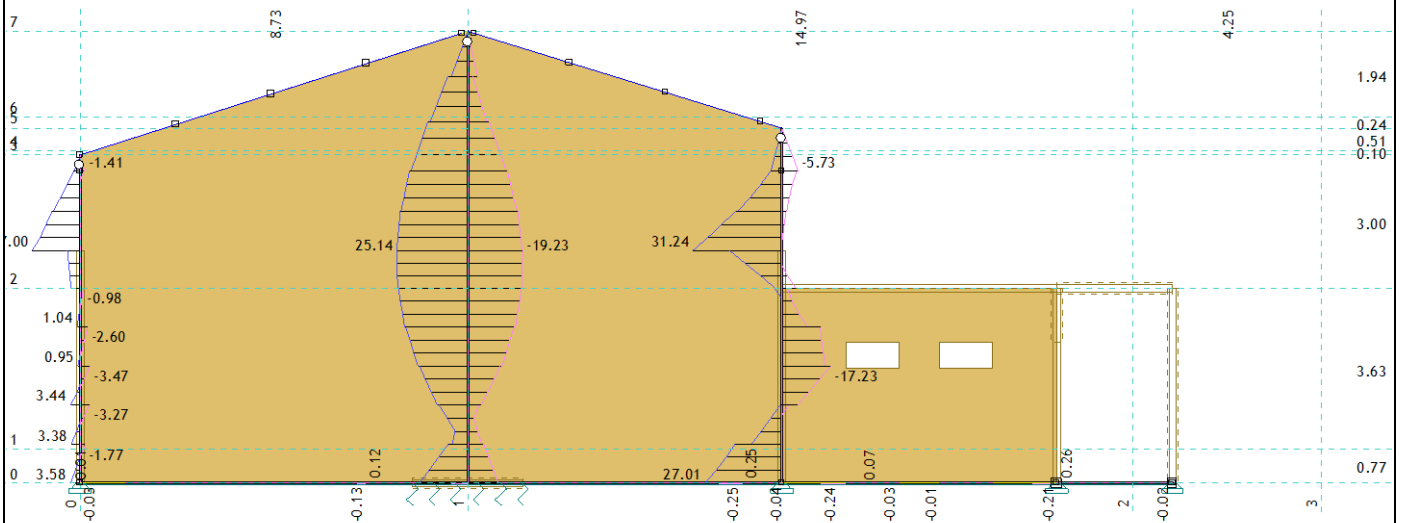


Pogled: k1+k2

Utjecaji u gredi: max $N_1 = 13,32$ / min $N_1 = -14,61$ kN

SILE U STUPOVIMA

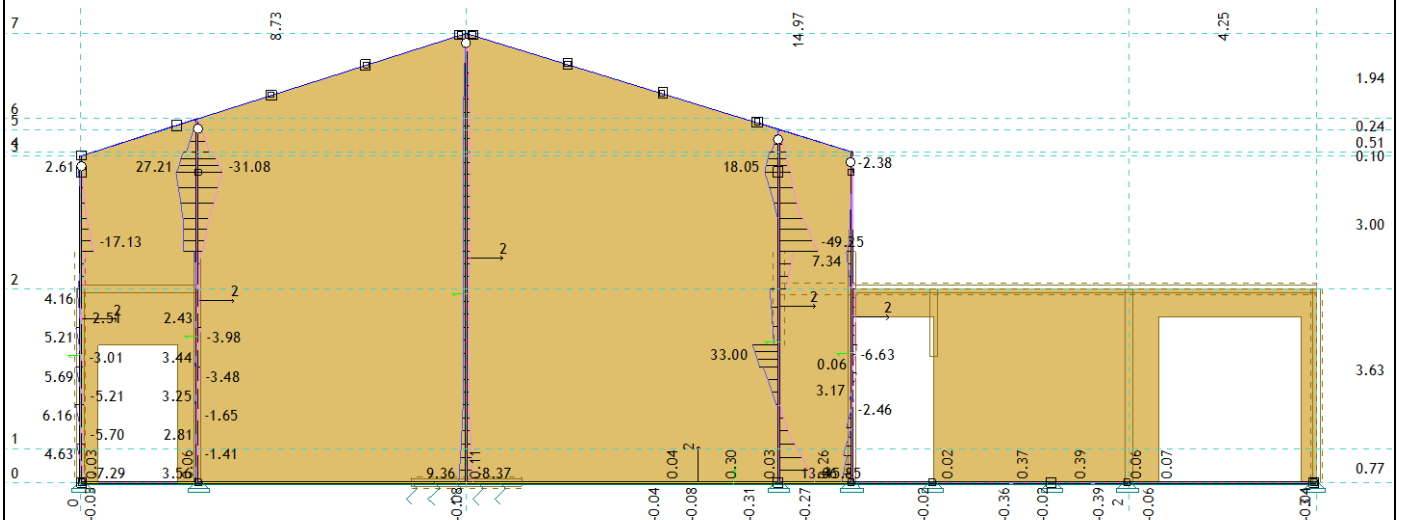
Opt. 65: [Anv] 7-64



Okvir: H_2

Utjecaji u gredi: max M2= 31.24 / min M2= -19.23 kNm

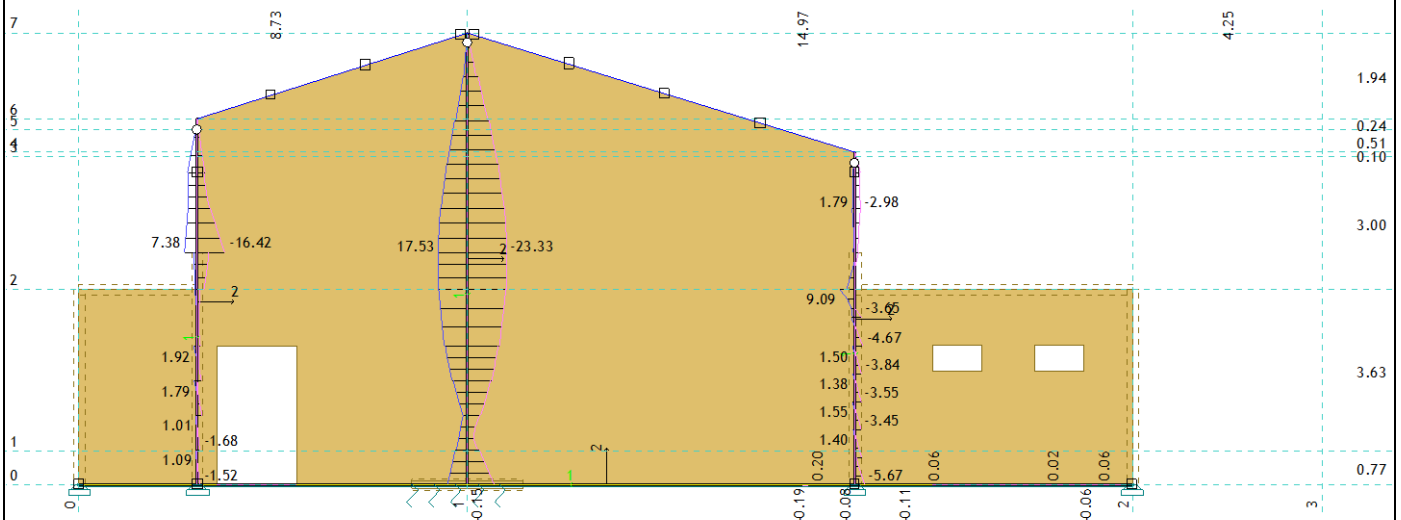
Opt. 65: [Anv] 7-64



Okvir: H_12

Utjecaji u gredi: max M2= 33.00 / min M2= -49.25 kNm

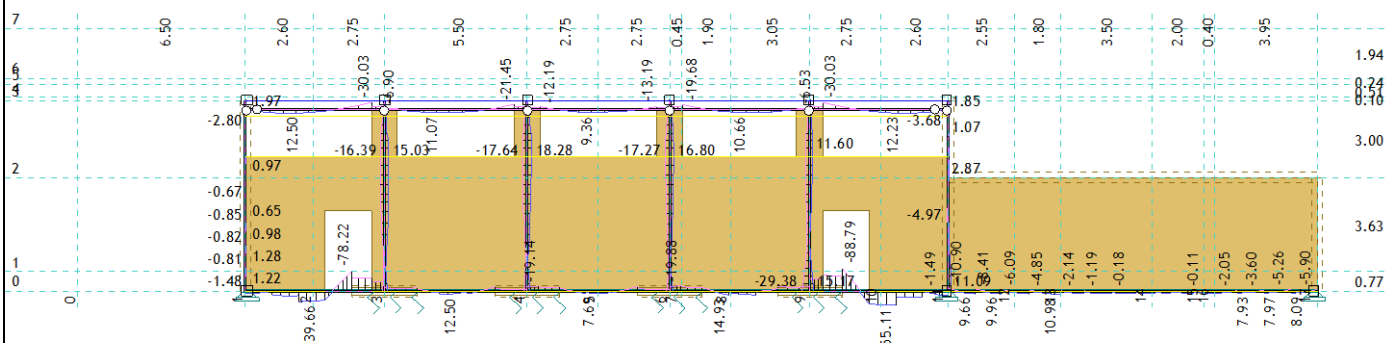
Opt. 65: [Anv] 7-64



Okvir: H_19

Utjecaji u gredi: max M2= 17.53 / min M2= -23.33 kNm

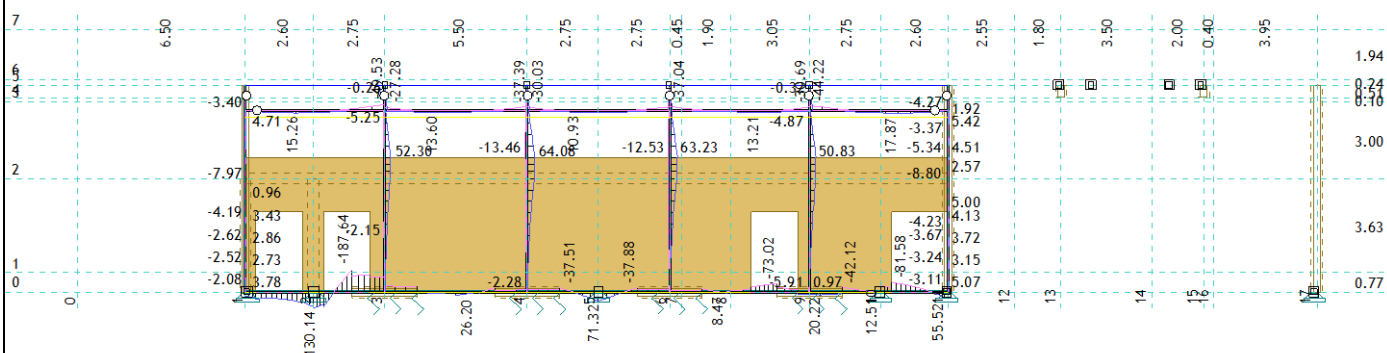
Opt. 65: [Anv] 7-64



Okvir: V 1

Utjecaji u gredi: max $M_3 = 55.11$ / min $M_3 = -88.79$ kNm

Opt. 65: [Anv] 7-64



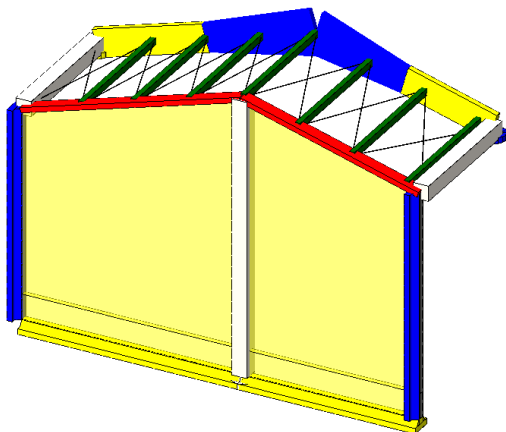
Okvir: V_3

Utjecaji u gredi: max M3= 130.14 / min M3= -187.64 kNm

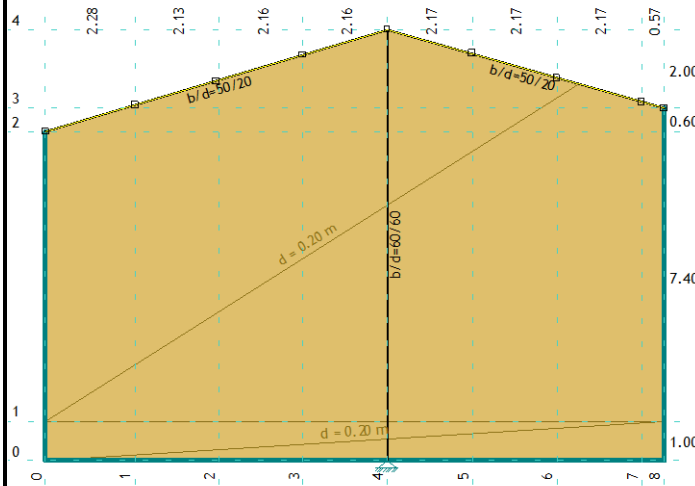
SILE NASTALE OD VJETRA SU ZNAČAJNIJE MANJE OD ONIH SEIZMIČKIH

LOKALNI MODEL ZABATNOG ZIDA – KONTROLA

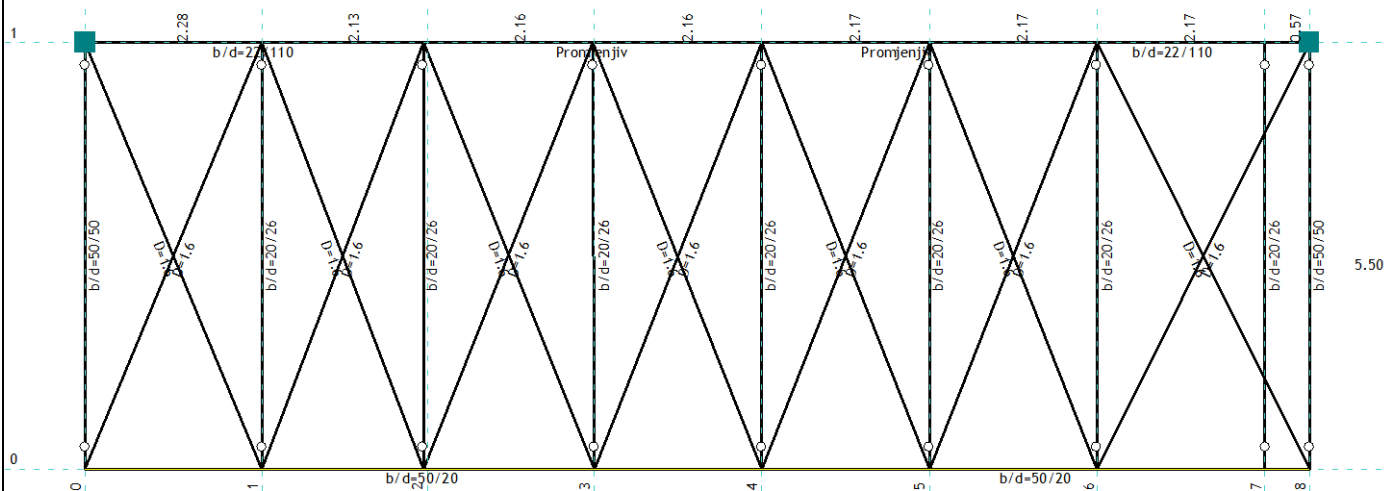
zbog malog pojedinačnog doprinosa
masa u globalnom modelu vrši se
dodatna kontrola



Izometrija



Okvir: H_2



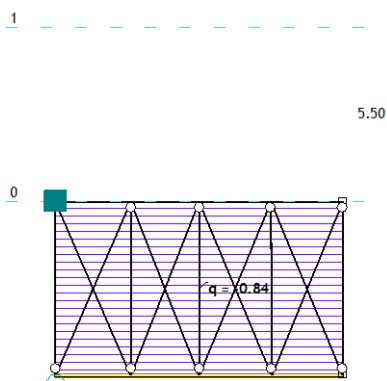
Pogled: k1+k2

Ulazni podaci – Opterećenje

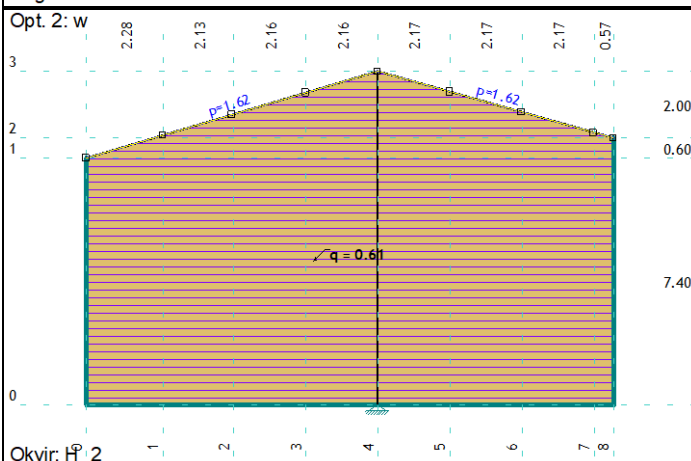
Lista slučajeva opterećenja

LC	Naziv	pX [kN]	pY [kN]	pZ [kN]
1	g (g)	0.00	-0.00	-980.74
2	w	0.00	111.80	0.00
3	Sy	0.00	264.88	0.00
4	Sy (-)	-0.00	-264.88	0.00
5	Komb.: I+1.5xII	0.00	167.71	-980.74
6	Komb.: 1.5xII	0.00	167.71	0.00
7	Komb.: I+III	0.00	264.88	-980.74
8	Komb.: I+IV	-0.00	-264.88	-980.74

Opt. 1: g (g)

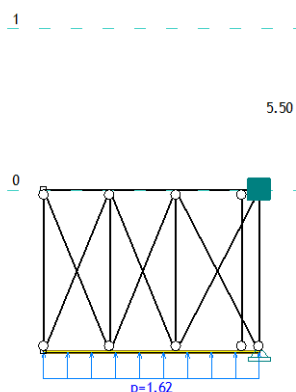


Pogled: k1



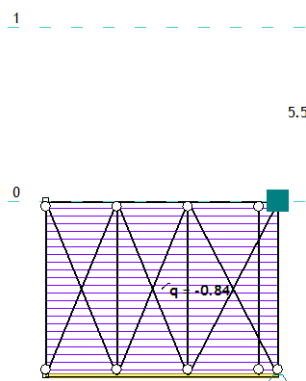
Okvir: H₂

Opt. 2: w



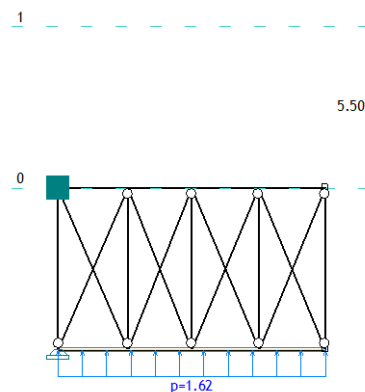
Pogled: k2

Opt. 1: g (g)



Pogled: k2

Opt. 2: w



Pogled: k1

Modalna analiza

Napredne opcije seizmičkog proračuna

Spriječeno osciliranje u X pravcu

Spriječeno osciliranje u Z pravcu

Faktori opterećenja za proračun masa

No	Naziv	Koeficijent
1	g (g)	1.00
2	w	0.00

Raspored masa po visini objekta

Nivo	Z [m]	X [m]	Y [m]	Masa [T]	T/m ²
	0.00	8.06	-4.93	114.87	
Ukupno:	0.00	8.06	-4.93	114.87	

Periodi osciliranja konstrukcije

No	T [s]	f [Hz]
1	0.2837	3.5243
2	0.1295	7.7209
3	0.1155	8.6609

Seizmički proračun

Seizmički proračun: EC8 (HRN EN 1998-1:2011) (Metoda poprečnih sila)

Razred tla: C
Razred važnosti: III ($\gamma=1.2$)
Odnos $a_g R/g$: 0.160
Kota upetosti: $Z_d = 0.00$ m

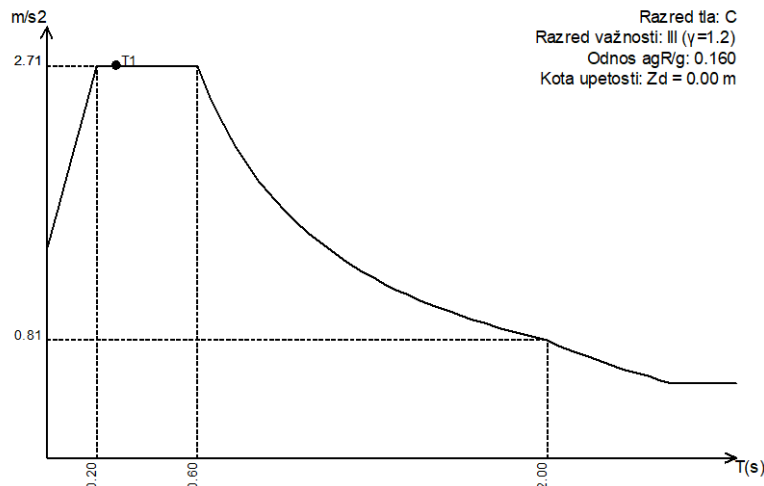
Kut djelovanja potresa:

Naziv	T [sec]	α [°]	Faktor P.
Sy	0.284	90.00	2.00

Tip spektra

Naziv	S	Tb	Tc	Td	avg/ a_g
Sy	1.150	0.200	0.600	2.000	1.000

Projektni spektar



S=1.15, Tb=0.20, Tc=0.60, Td=2.00

Raspored seizmičkih sila po visini objekta (Sy)

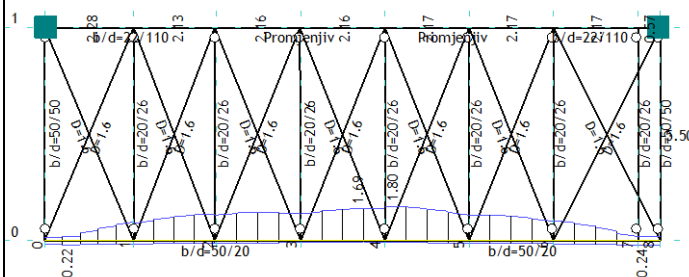
Nivo	Z [m]	S [kN]
	0.00	273.78
	$\Sigma=$	273.78

Raspored masa po visini objekta

Nivo	Z [m]	X [m]	Y [m]	Masa [T]	T/m²
	0.00	8.06	-4.93	114.87	
Ukupno:	0.00	8.06	-4.93	114.87	

Dimenzioniranje (beton)

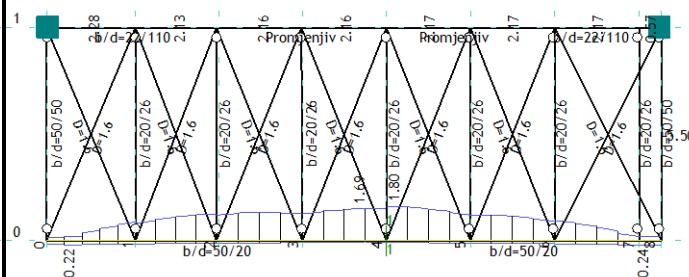
Mjerodavno opterećenje: VII
EC2 (EN 1992-1-1:2004), C25/30, B500A



Pogled: k1+k2

Armatura u gredama: $\max A_{s3}/A_{s4} = 1.80 / 0.24 \text{ cm}^2$

Mjerodavno opterećenje: VII
EC2 (EN 1992-1-1:2004), C25/30, B500A

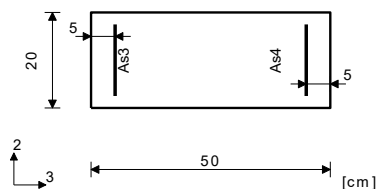


Pogled: k1+k2

Armatura u gredama: $\max A_{s3}/A_{s4} = 1.80 / 0.24 \text{ cm}^2$

Greda 513-595

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
B500A
Dimenzioniranje jednog slučaja
opterećenja: 1.00xVII



Presjek 1-1 x = 0.00m

N1Ed = -3.02 kN
V2Ed = -0.63 kN
V3Ed = 1.14 kN
M1Ed = 2.49 kNm
M2Ed = -33.36 kNm

V2Rd,max = 364.50 kN

V3Rd,max = 364.50 kN

$\epsilon_b/\epsilon_a = -1.799/20.000 \%$

As1 = 0.00 + 0.21' = 0.21 cm²

As2 = 0.00 + 0.21' = 0.21 cm²

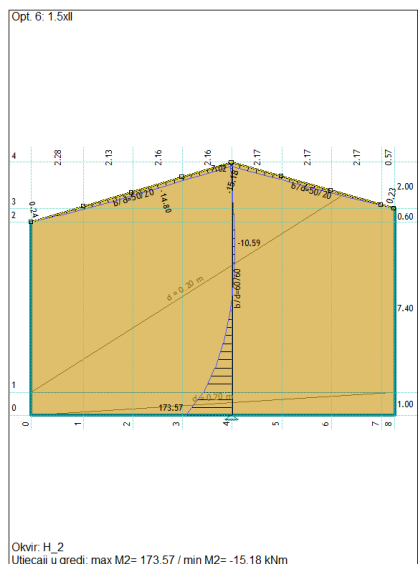
As3 = 1.72 + 0.08' = 1.80 cm²

As4 = 0.00 + 0.08' = 0.08 cm²

Asw = 0.00 cm²/m (m=2)

*) - dodatna uzdužna armatura za prihvat torzije.

bet.greda na vrhu zida - sile u globalnom modelu su veće pa će se usvojiti veća potrebna armatura

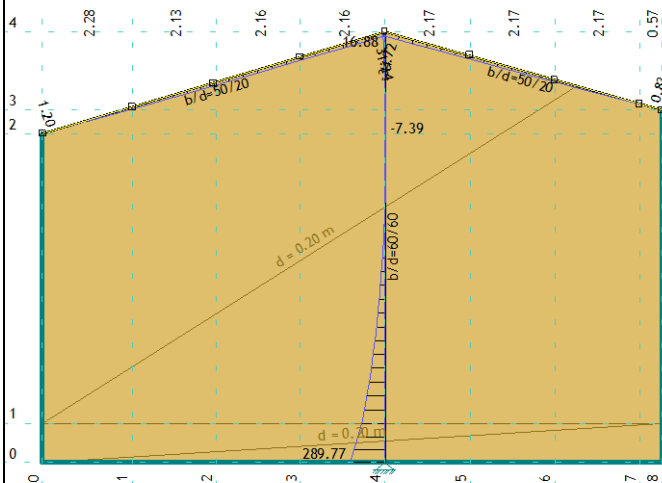


Otvir: H_2

Utljecaji u gredi: max M2= 173.57 / min M2= -15.18 kNm

A.B.STUP U ZABATNOM ZIDU (kontrola)

Opt. 7: I+III

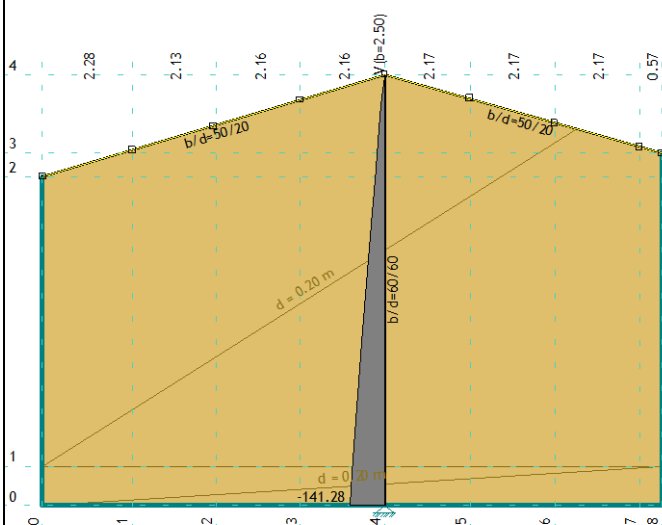


Okvir: H_2

Utjecaji u gredi: max M2= 289.77 / min M2= -34.72 kNm

Opt. 7: I+III

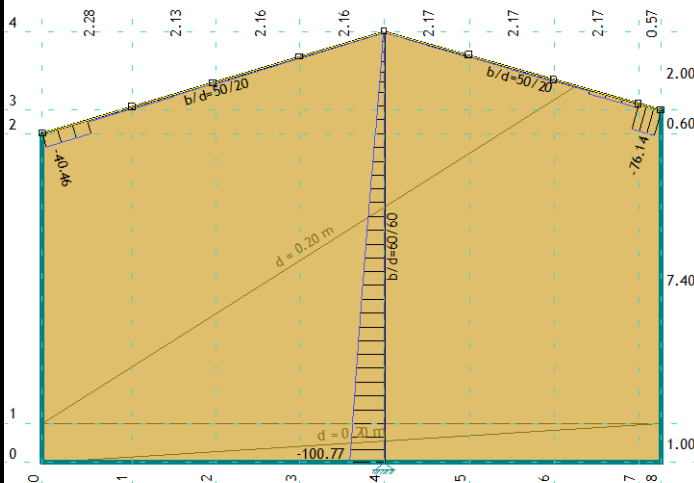
dodatna sila u zidu (na temelj)



Okvir: H_2

Vektorski presjeci: Ns

Opt. 7: I+III

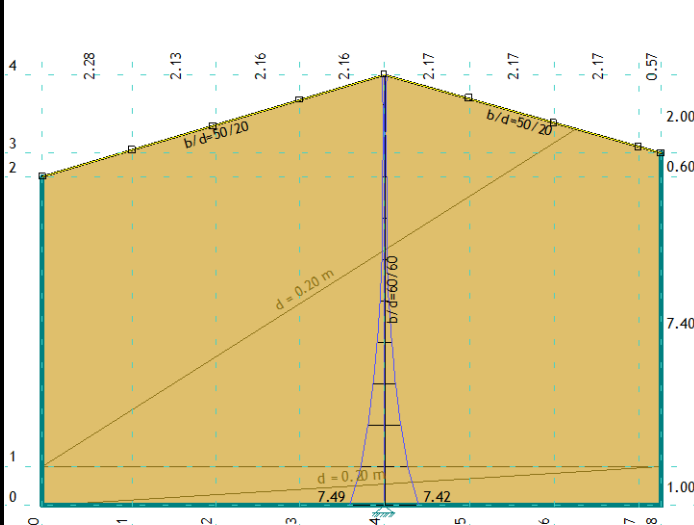


Okvir: H_2

Utjecaji u gredi: max N1= -2.66 / min N1= -100.77 kN

Mjerodavno opterećenje: VII

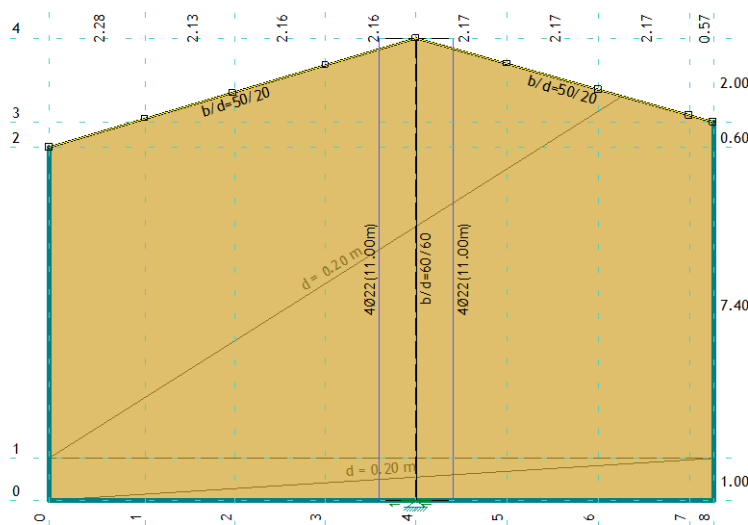
EC2 (EN 1992-1-1:2004), C25/30, B500A



Okvir: H_2

Armatura u gredama: max Aa2/Aa1= 7.42 / 7.49 cm²

Odabrana armatura
EC2 (EN 1992-1-1:2004), C25/30, B500A



Okvir: H_2

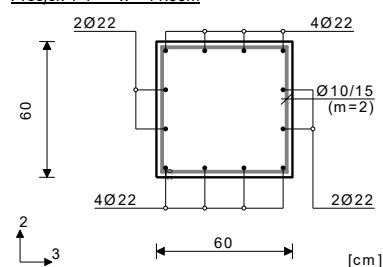
Armatura u gredama (odabrana): Aa2/Aa1

Greda 149-45

EC2 (EN 1992-1-1:2004)
C25/30 ($\gamma_c = 1.50$, $\gamma_s = 1.15$) [SP]
B500A
Dimenzioniranje jednog slučaja
opterećenja: 1.00xVII

$l_{i,2} = 22.00$ m ($\lambda_2 = 127.02$)
Pomoćna konstrukcija

Presjek 1-1 $x = 11.00$ m



N1Ed = -100.77 kN
V2Ed = -0.30 kN
V3Ed = 96.28 kN
M1Ed = -5.64 kNm
M2Ed = 289.77 kNm
M3Ed = 0.15 kNm
Uvećanje momenta savijanja uslijed
izvijanja
 $\Delta e_2 = 3.7 < e_{l,2} > + 47.1 < e_{l,2} > = 50.8$ cm
 $|\Delta M_2| = 51.20$ kNm

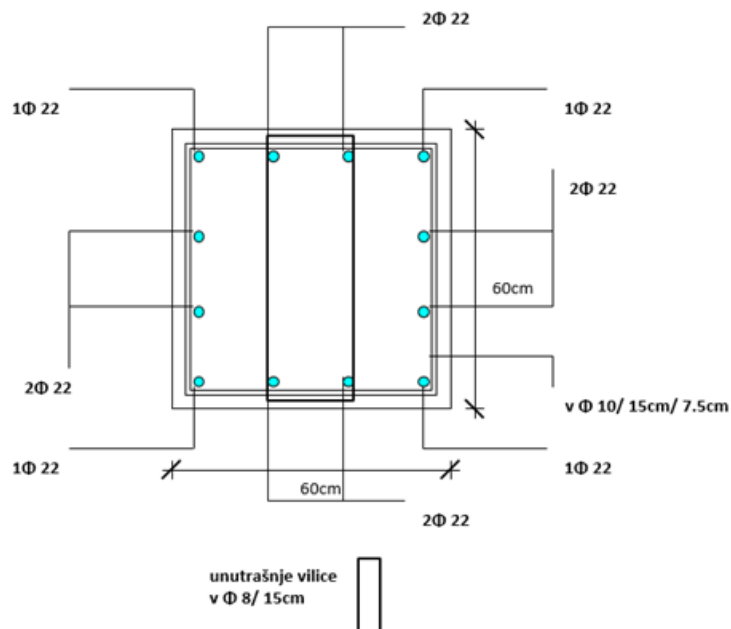
V2Rd,max = 1312.20 kN
V3Rd,max = 1312.20 kN
 $\epsilon_b/\epsilon_a = -3.500/16.394$ ‰
As1 = 7.34 + 0.15' = 7.49 cm²
As2 = 7.27 + 0.15' = 7.42 cm²
As3 = 7.33 + 0.15' = 7.48 cm²
As4 = 7.27 + 0.15' = 7.42 cm²
Asw = 0.00 cm²/m (m=2)
[Odabrano Asw = Ø10/15(m=2) = 5.24 cm²/m]

Postotak armiranja: 1.27%
' - dodatna uzdužna armatura za prihvati torzije.

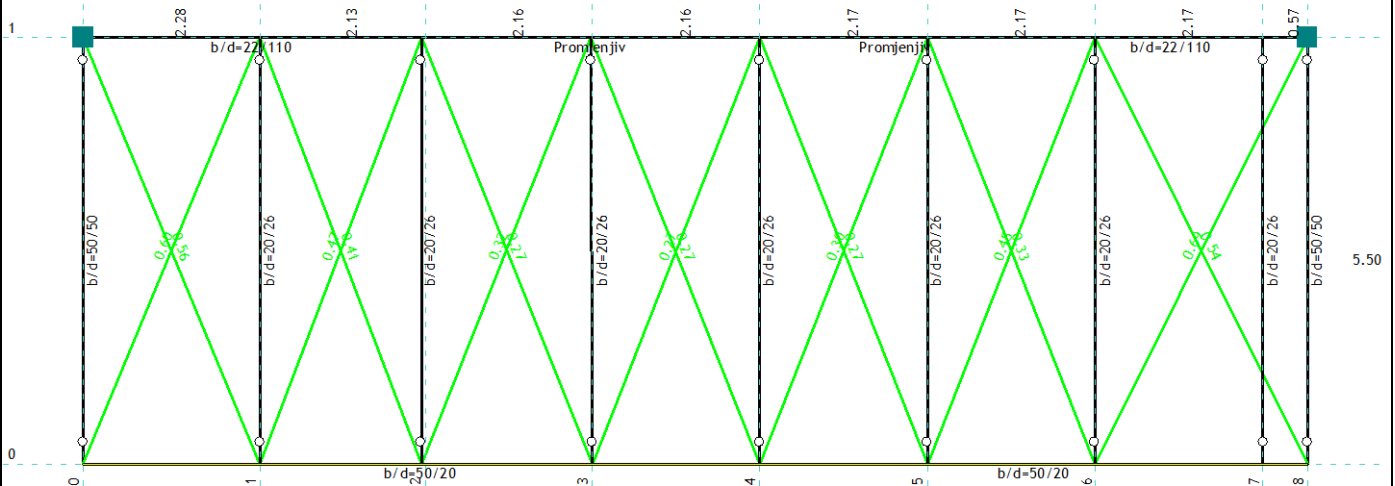
dodatno progustiti vilice 1,5m uz temelj na 7,5cm

dodati unutrašnju vilicu fi 8/15 u smjeru okomitom na ravninu zida da obuhvati središnje šipke

stupove sva tri poprečna zida armirati na isti način



VLAČNE DIJAGONALE - DIMENZIONIRANJE

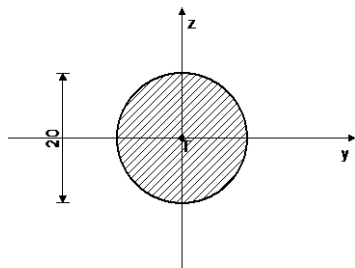


Pogled: k1+k2
Kontrola stabilnosti

ŠTAP 605-578

POPREČNI PRESJEK: Kružni [S 235] [Set: 6]
EUROCODE 3 (EN 1993-1-1:2005)

GEOMETRIJSKE KARAKTERISTIKE PRESJEKA



($f_y = 23.5 \text{ kN/cm}^2$, $f_u = 36.0 \text{ kN/cm}^2$)

[mm]

$A_x =$	3.142	cm ²
$A_y =$	2.827	cm ²
$A_z =$	2.827	cm ²
$I_x =$	1.571	cm ⁴
$I_y =$	0.785	cm ⁴
$I_z =$	0.785	cm ⁴
$W_y =$	0.785	cm ³
$W_z =$	0.785	cm ³
$W_{y,pl} =$	1.333	cm ³
$W_{z,pl} =$	1.333	cm ³
$y_{M0} =$	0.500	
$y_{M1} =$	1.050	
$y_{M2} =$	1.250	
$A_{net}/A =$	0.900	

FAKTORI ISKORIŠTENJA PO KOMBINACIJAMA OPTEREĆENJA

8. $\gamma = 0.69$	6. $\gamma = 0.00$	7. $\gamma = 0.00$
5. $\gamma = 0.00$		

ŠTAP IZLOŽEN VLAKU I SAVIJANJU

(slučaj opterećenja 8, na 309.7 cm od početka štapa)

Računska uzdužna sila	$N_{Ed} =$	50.495	kN
Poprečna sila u z pravcu	$V_{Ed,z} =$	0.062	kN
Moment savijanja oko y osi	$M_{Ed,y} =$	0.046	kNm
Moment torzije	$M_t =$	0.012	kNm
Sistemska dužina štapa	$L =$	619.34	cm

5.5 KLASIFIKACIJA POPREČNIH PRESJEKA

Klasa presjeka 1

6.2 NOSIVOST POPREČNIH PRESJEKA

6.2.3 Vlak

Plast.rač otpornost bruto presjeka
Granica rač otpornost neto pres.

Računska otp. na vlak

Uvjet 6.5: $N_{Ed} \leq N_{t,Rd}$ ($50.50 \leq 73.29$)

$N_{pl,Rd} =$	147.65	kN
$N_{u,Rd} =$	73.287	kN
$N_{t,Rd} =$	73.287	kN

6.2.5 Savijanje y-y

Plastični moment otpora

Računska otpornost na savijanje

Uvjet 6.12: $M_{Ed,y} \leq M_{c,Rd,y}$ ($0.05 \leq 0.63$)

$W_{y,pl} =$	1.333	cm ³
$M_{c,Rd} =$	0.627	kNm

6.2.6 Posmik

Računska nosivost na posmik

Računska nosivost na posmik

Uvjet 6.17: $V_{Ed,z} \leq V_{c,Rd,z}$ ($0.06 \leq 76.72$)

$V_{pl,Rd,z} =$	76.724	kN
$V_{c,Rd,z} =$	76.724	kN

6.2.10 Savijanje, posmik i centrična sila

Nije potrebna redukcija momenata otpornosti

Uvjet: $V_{Ed,z} \leq 50\% V_{pl,Rd,z}$

6.2.9 Savijanje i centrična sila

Omjer $N_{Ed} / N_{pl,Rd}$

Reduc.moment plast.otp.na

savijanje

Omjer $M_{Ed,y} / M_{N,y,Rd}$

Uvjet 6.41: ($0.08 \leq 1$)

$M_{N,y,Rd} =$	0.342	
	0.553	kNm
	0.083	

PROVJERA OTPORNOSTI NA POSMIK

(slučaj opterećenja 8, na 489.4 cm od početka štapa)

Računska uzdužna sila	$N_{Ed} =$	50.492	kN
Poprečna sila u z pravcu	$V_{Ed,z} =$	0.090	kN
Moment savijanja oko y osi	$M_{Ed,y} =$	0.091	kNm
Moment torzije	$M_t =$	0.012	kNm
Sistemska dužina štapa	$L =$	619.34	cm

6.2 NOSIVOST POPREČNIH PRESJEKA

6.2.6 Posmik

Računska nosivost na posmik

Računska nosivost na posmik

Uvjet 6.17: $V_{Ed,z} \leq V_{c,Rd,z}$ ($0.09 \leq 76.72$)

$V_{pl,Rd,z} =$	76.724	kN
$V_{c,Rd,z} =$	76.724	kN

POZ TS-Z - a.b.temelj samac (stupovi u zabatnim.zidovima)

(kontrola h.djelovanja - iz lok.modela)

(seizm)

(g+1,5w)

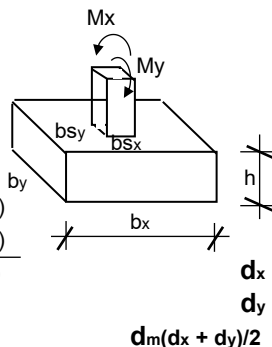
K. BETONA

ČELIK

c30/37

B-500

$b_x = 350$ cm (širina)
 $b_y = 250$ cm (duljina)
 $h = 60$ cm (visina)
 $b_{sx} = 60$ cm (širina stupa)
 $b_{sy} = 60$ cm (širina stupa)
 $C_{nom} = 4$ cm (zaštitni sloj)
 $d_s = 10$ mm (armatura)



v.t.temelja	131,25	131,25
$N_{sd} =$	247	247,00
$N_{sd} =$	378,25	378,25
$M_{sd,x,II} =$	390	180
$e_x =$	1,031	0,476
$M_{sd,y,II} =$	0	0
$e_y =$	0,000	0,000
$f_{ck} =$	30	N/mm^2
$f_{cd} =$	20,00	N/mm^2
$f_{yk} =$	500	N/mm^2
$f_{yd} =$	434,78	N/mm^2

$A_{temelja} = 8,75$ m²

$W_{x,y} = 5,104$ 3,65 m³

$\sigma_{1,2} = 119,92$ -32,90 kN/m²

$\sigma_{3,4} = 119,35$ -33,46 kN/m²

$e_{x,sz} = 1,031$ m

$e_{y,sz} = 0,000$ m

proračunska širina temelja:

proračunska površina:

proračunsko naprezanje:

proračunski moment u traci:

$b_{x'} = 1,44$ m

$b_{y'} = 2,50$ m

$A' = 3,59$ m²

$\sigma_0 = 105,22$ kN/m²

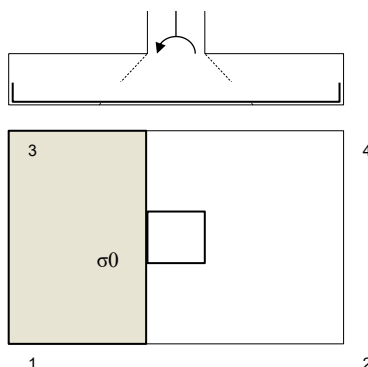
$M_{sd} = 126,07$ kNm/m'

STABILNOST TEMELJA: (gsn)

(seizm)

$e_x / b_x + e_y / b_y = 0,136 < 0,167$ (1/6)

$(e_x/b_x)^2 + (e_y/b_y)^2 = 0,087 < 0,111$ (1/9)



DIMENZIONIRANJE:

$$\mu_{sd} = \frac{M_{sd}}{b \cdot d^2 \cdot f_{cd}} = 0,0122 < 0,252$$

146.7

$$A_{s1,req} = \frac{M_{sd}}{\zeta \cdot d \cdot f_{yd}} = 6,47 \text{ cm}^2/\text{m}'$$

$$\mu = 0,014 \quad \varepsilon_{c2} [\text{‰}] = 0,900$$

$$\varepsilon_{s1} [\text{‰}] = 20,000$$

$$\xi = 0,043$$

$$\zeta = 0,985$$

$$A_{s1,min} = \max \left\{ \begin{array}{l} 0,6 \frac{b \cdot d}{f_{yk}} = 6,1 \text{ cm}^2/\text{m}' \\ 0,022 \cdot \frac{f_{ck}}{f_{yk}} b \cdot d = 6,7 \text{ cm}^2/\text{m}' \end{array} \right.$$

$$A_{s1,max} = \min \left\{ \begin{array}{l} 0,4 \cdot \frac{f_{ck}}{f_{yk}} b \cdot d = 121,2 \text{ cm}^2/\text{m}' \\ 0,310 \cdot b \cdot d \cdot \frac{f_{cd}}{f_{yd}} = 72,0 \text{ cm}^2/\text{m}' \end{array} \right.$$

ODABRANA ARMATURA: (u oba smjera)

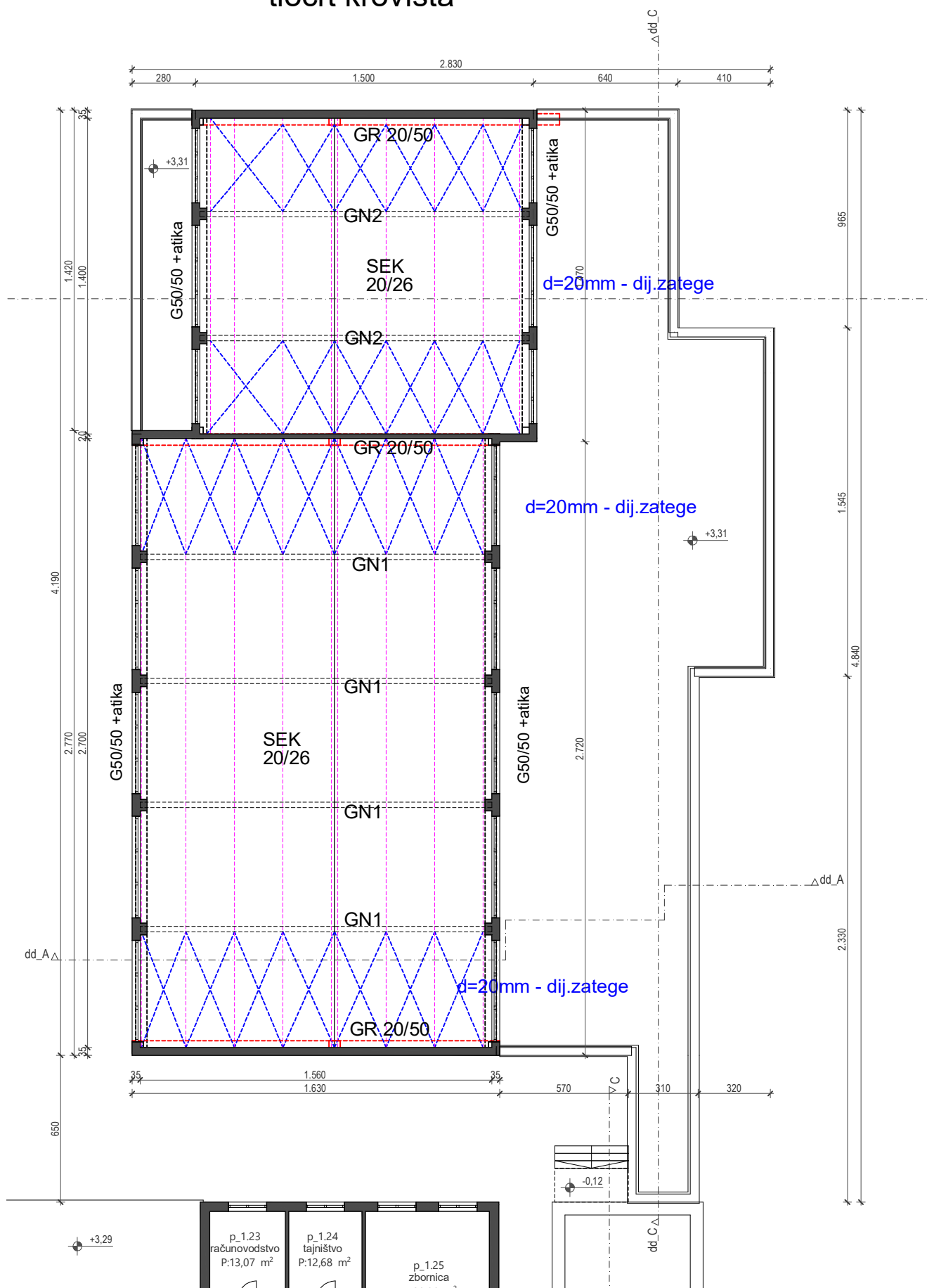
Φ	10	/	10	cm	7,85 cm ² /m'	> 6,7	$A_{s,min}$
						< 72,0	$A_{s,max}$

gornju zonu armirati konstruktivno sa:

Q-335

već usvojena armatura zadovoljava

tlocrt krovišta



tlocrt temelja

