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2.0 NASLOVNA STRAN

2.0 – GRADBENE KONSTRUKCIJE

Investitor:
Rdeča dvorana ŠRZ Velenje
Šaleška cesta 3
3320 Velenje

Objekt:
VGRADNJA DVIGALA V BAZEN VELENJE

Vrsta projektne dokumentacije:
PROJEKTNA DOKUMENTACIJA ZA IZVEDBO

Za gradnjo:
MANJŠA REKONSTRUKCIJA

Projektant:
MARKO MARKOJA s.p.,
Prešernova 8, 3320 VELENJE

Odgovorna oseba projektanta:
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Odgovorni projektant:
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(žig, podpis)

Številka projekta:
AP563-23

Številka načrta:
23/2025

Kraj in datum izdelave načrta:
Velenje, julij 2025

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2. TEHNIČNO POROČILO

2.1. SPLOŠNO

V okviru obstoječega objekta Bazen Velenje je predvidena vgradnja dvigala/dvižne ploščadi med pritlično etažo in nadstropjem ter preureditev recepcije. Posegi skladno s klasifikacijo objektov ter razlago GZ-1 sodijo v okvir manjše rekonstrukcije za katero ni potrebno gradbeno dovoljenje. Za potrebe izvede se pripravi obravnavani PZI.

2.2. KONSTRUKCIJA

Gre za obstoječi bazenski objekt v katerem investitor želi zgraditi novo dvižno ploščad in nadstrešnico nad vhodom.

Nadstrešnica bo jeklene izvedbe. Sidrana bo v obstoječo AB konstrukcijo objekta. Konstrukcijo sestavljajo 4 primarni nosilci ki so sidrani v objekt, srednja dva nosilca prereza IPE sta v konstrukcijo dodatno pritrjena z okroglo jekleno zatego premera 12mm v obstoječi objekt za dosego stabilnosti nadstrešnice. Ostali obodni nosilci so škatlastega prereza, katerih minimalna dimenzija je določena v statičnem poročilu. Za potrebe vizualnega izgleda se lahko dimenzije nosilcev tudi povečajo. Predvidena je steklena strešna konstrukcija.

Nosilno konstrukcijo dvigala sestavljajo škatlasti profili prereza 120/120/5mm. Konstrukcijo sestavljajo 4 vogalni stebri ki segajo do temeljne plošče s povezovalno gredo ter se bočno sidrajo v ploščo nad nadstropjem in strešno ploščo. Na eni stranici je dodan steber za vgradnjo potrebe vgradnje vrat dvigalne ploščadi. Nosilci fasade so prav tako škatlastega prereza dimenzije 120/120/5mm, medtem ko so nosilci tračnic dvigalne ploščadi predvideni nosilci prereza 100/100/5, ki se vgradijo na razmakih, ki jih določi proizvajalec dvižne ploščadi. Predvidena fasada jeklene konstrukcije so mavčno kartonske plošče.

Ureditev zunanje okolice in izračun obstoječih betonskih elementov ter novih potrebnih ni predmet tega projekta, ter jih je potrebno izvesti naknadno, dodane so skice ukrepov, ki so običajno potrebne ob takšnih posegih.

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2.3. OBTEŽBE

Objekt je kontroliran na vertikalne in horizontalne obtežbe skladno z EC0, EC1, jeklena nosilna konstrukcija dvižne ploščadi je bila kontrolirana na horizontalne obremenitve podane s strani proizvajalca Otis in sicer po prilogi, številka projekta G9NEH521, ki je tudi priloga tega dokumenta.
Objekt je bil preverjen s v programu SCIA Engineer, katerega poročilo je sestavni del tega dokumenta.

Upoštevane obtežbe:

- Sneg – cona A2 sk=1,68 kN/m2
- Veter – cona 1 vb=20m/s

2.4. MATERIALI

Vsi vgrajeni materiali morajo ustrezati veljavnim standardom in predpisom, za kar je odgovoren izvajalec konstrukcije.

Konstrukcijsko jeklo je kvalitete S355 J2, vijaki so kvalitete 8.8 in 10.9, zvari so II. kvalitete. Delavniške in PZI načrte jeklene konstrukcije naredi izbrani izvajalec.

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2.5. IZRAČUN

Izračun za nosilne konstrukcije objekta je izveden s pomočjo računalniškega programa SCIA engineer. Statični izpis je vsebina tega načrta konstrukcij, celoten izpis je hranjen v arhivu izdelovalca načrta konstrukcij.
Vsi konstruktivni elementi so dimenzionirani skladno z EC1, EC2, EC3, EC4 EC5, EC6, EC7 in EC8.

2.6. ZAKLJUČEK

Kot je omenjeno že v točki 2.5, morajo vsi vgrajeni materiali ustrezati veljavnim standardom in predpisom, za kar je odgovoren izvajalec konstrukcije.
Ni dovoljeno naknadno prebijanje nosilnih elementov brez soglasja odgovornega projektanta konstrukcij.

Velenje, julij 25

Marko Markoja u.d.i.g.

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3. TEHNIČNE ZAHTEVE ZA IZDELAVO IN MONTAŽO NOSILNIH JEKLENIH KONSTRUKCIJ

3.1. SPLOŠNO

Jeklena konstrukcija mora biti izdelana in montirana v skladu s projektno dokumentacijo in določili standarda: SIST EN 1090-2:2008. Prav tako je potrebno upoštevati tudi določila še veljavnega jugoslovanskega pravilnika "Pravilnik o tehničnih predpisih za pregled in preizkušanje nosilnih jeklenih konstrukcij (UL.SFRJ 6/65)", ki predpisuje, da je potrebno pred pričetkom uporabe izvršiti tehnični pregled nove nosilne jeklene konstrukcije z namenom, da se ugotovi skladnost konstrukcije s projektom in ali je kvaliteta izdelave ter montaža konstrukcije v skladu s tehničnimi predpisi in tehničnimi pogoji.

3.2. IZVEDBENI RAZRED

Razred izdelave nosilne konstrukcije je EXC 2.

3.3. USPOSOBLJENOST IZVAJALCA

Delavnica za proizvodnjo jeklenih konstrukcij mora biti certificirana po SIST EN 1090-1 ali DIN 18800-7.
Izvajalec mora predložiti naslednja dokazila:

- da je v podjetju vzpostavljen sistem vodenja kakovosti v skladu s standardom SIST EN ISO 9001:2008 Sistemi vodenja kakovosti - Zahteve;
- da je podjetje usposobljeno za varilska dela v skladu s standardom SIST EN ISO 3834 1-6:2006 Zahteve za kakovost pri talilnem varjenju kovinskih materialov;
- da je notranja kontrola izvajalca organizirana in usposobljena tako, da izpolnjuje zahteve standarda SIST EN 1090-2:2008 Izvedba jeklenih in aluminijastih konstrukcij - 2. del: Tehnične zahteve za izvedbo jeklenih konstrukcij.

Pri izdelavi in montaži jeklene konstrukcije je potrebno upoštevati tudi druge standarde, ki jih krovni standard SIST EN 1090-2:2008 uvaja ali se na njih sklicuje.

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3.4. DOKUMENTACIJA IZVAJALCA

Pred pričetkom izdelave jeklene konstrukcije mora izvajalec pripraviti naslednjo dokumentacijo:

- delavniško dokumentacijo,
- varilni plan in plan sestave,
- plan kontrole kvalitete,
- projekt montaže,
- elaborat protikorozijske zaščite,
- kontrolno (dokazno) dokumentacijo:
    - potrdila o kvaliteti osnovnega materiala, dodajnega materiala, spojnega materiala,
    - spričevala o usposobljenosti varilcev,
    - varilski in montažni dnevnik,
    - merski protokoli,
    - poročila o rezultatih kontrol kvalitete zvarov,
    - protokoli privijanja vijakov,
    - protokoli poskusne montaže delov konstrukcije v delavnici,
    - rezultati geometrijskih kontrol montirane konstrukcije,
    - rezultati kontrol protikorozijske zaščite,
    - potrdila o kvaliteti uporabljenih premazov AKZ,
    - pisne potrditve sprememb,...

Vse morebitne nejasnosti je potrebno razčistiti s projektantom pred samo izvedbo ter za vsako spremembo dobiti njegovo soglasje.

3.5. MATERIAL

<u>Splošno</u>

Ves vgrajen material mora biti opremljen s potrdili o kvaliteti v skladu z zakonom o standardizaciji.
V vseh fazah izdelave in montaže mora biti zagotovljena sledljivost materiala.
Izdelki za izdelavo elementov nosilne jeklene konstrukcije, ki so izdelani v skladu s spodaj navedenimi harmoniziranimi standardi, morajo biti ustrezno opremljeni s CE znakom in dobavljeni z ustrezno izjavo oziroma certifikatom o skladnosti (Zakon o gradbenih proizvodih):

- SIST EN 10025-1:2004 Vroče valjani izdelki iz konstrukcijskih jekel – 1.del: Splošni in tehnični dobavni pogoji,
- SIST EN 10210-1:2006 Vroče valjani votli profile iz nelegiranih in drobnozrnatih konstrukcijskih jekel – 1.del: Tehnični dobavni pogoji,
- -SIST EN 10219-1:2006 Hladno oblikovani varjeni votli konstrukcijski profili iz nelegiranih in drobnozrnatih jekel – 1.del: Tehnični dobavni pogoji,
- -SIST EN 13479:2006 Dodajni material za varjenje – Splošni produktni standard za dodajne materiale in praške za talilno varjenje kovinskih materialov,
- -SIST EN 14399-1:2005 Visokotrdnostne prednapete vijačne zveze za kovinske konstrukcije – 1.del: Splošne zahteve,
- SIST EN 15048-1:2007 Vijačne sestave brez predhodne strukturne obremenitve – 1.del: Splošne zahteve.

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Kvaliteta vgrajenih materialov

- Osnovni material je kvalitete S355J2,
- Vijačni spoji:
  - predvideni vijaki so kvalitete 8.8 in 10.9, standard SIST EN 15048-1; Glede privijanja je potrebno upoštevati standard SIST EN 1090-2. Vsi vijačeni spoji morajo biti vizuelno pregledani. Izvajalec mora ob pritegovanju vijakov po posameznih fazah montaže izdelati pisne protokole privijanja vijakov. Vijaki kv. 10.9 se morajo prednapeti.
  - Pritrditve tehnoloških elementov se izvajajo skladno usmeritvami podanimi v tehnoloških projektih.

- Sidra:
  - Naknadno vgrajena sidra

3.6. IZDELAVA IN MONTAŽA

Izdelava

Pri izdelavi je potrebno upoštevati sledeče:
- sledljivost materiala mora biti zagotovljena v vseh fazah izdelave in montaže;
- sestava in varjenje se mora izvajati v skladu s planom varjenja in sestave;
- pri izdelavi posameznih elementov je potrebno posebno pozornost posvetiti dimenzijski kontroli posameznih elementov in izdelavi zvarnih žlebov;
- mere na izvedbenih načrtih ne upoštevajo tehnoloških zahtev, varilne deformacije in tolerance valjanih profilov mora upoštevati izdelovalec.
- kontrola pločevin na dvoplastnost skladno s standardom SIST EN 1090-2:2008 in razredom izdelave: sočelne pločevina na spoju s stebri

Montaža

Montaža se mora izvajati v skladu s projektom montaže, ki mora zagotoviti stabilnost konstrukcije v času montaže.
Med izdelavo in montažo jeklene konstrukcije mora biti s strani izvajalca zagotovljena stalna ustrezna kontrola glavnih dimenzij. Prav tako morajo biti za vse faze montaže izdelani ustrezni merski protokoli. Po posameznih fazah montaže in po končani montaži mora biti zapisniško preverjena glavna geometrija montirane nosilne jeklene konstrukcije. Geometrija montirane konstrukcije mora biti v okviru predpisanih toleranc.

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3.7. VARJENJE

Varjenje se mora izvajati v skladu z zahtevami standarda SIST EN ISO 3834 1-6:2006

Varjenje se mora izvajati v skladu z varilnim planom, ki ga izdela izvajalec jeklene konstrukcije. Pred izvajanjem varilskih del mora izvajalec določiti odgovornega koordinatorja varilskih del, ki mora biti ustrezno usposobljen in imeti ustrezna pooblastila, pri čemer je potrebno upoštevati standard SIST EN ISO 14731:2007 Koordinacija varilskih del – naloge in odgovornost.
Varijo lahko le varilci z uspešno opravljenim preizkusom za uporabljeni način in položaj varjenja. Varilci morajo opraviti preizkušnjo v skladu s standardom SIST EN 287-1:2011 Preizkušanje varilcev – Talilno varjenje – 1. del: Jekla.
Vse zvare je potrebno 100% vizualno pregledati.
Obseg kontrole je odvisen os tipa zvara, izvedbenega razreda in debelin zvarjencev v skladu z EN 1090-2 tabela 24. Če je potrebno nosilce zaradi različnih trgovskih dolžin variti na pravo dolžino s sočelnimi zvari morajo biti le-ti 100% UZ ali RT kontrolirani.
Kvaliteta zvarov je C.
Pri izdelavi posameznih elementov jeklene konstrukcije je potrebno posebno pozornost posvetiti dimenzijski kontroli posameznih elementov in pripravi zvarnih robov.
Vsi sočelni zvari (K, V, 1/2K, Y,…) morajo biti izvedeni s prevaritvijo korena. Varilne deformacije predvidi izvajalec.
Vsi neoznačeni zvari so:

- amin = 3 mm
- preklopni spoji (enostranski kotni zvar) a=0,7 x tmin (tmin je tanjša pločevina v spoju)

-T-spoji:

- S235: a = 0,5 x tmin
- S355: a = 0,6 x tmin.

3.8. PROTIKOROZIJSKA ZAŠČITA

AKZ mora biti izvedena po standardu SIST EN 12944.
Vsi deli opreme morajo biti neposredno po izdelavi zaščiteni proti koroziji na način in s sredstvi, ki ustrezajo lokalnim pogojem in pogojem med obratovanjem.

Sistem zaščite za jeklene konstrukcije, cevovode, podpore ipd., ki niso izdelani iz nerjavečega jekla, vroče pocinkani ali toplotno izolirani:

- odstranitev rje: peskanje Sa 2 ½
- Elaborat AKZ naj upošteva:
  - korozijski razred C4 trajnost H(nad 15 let), torej C4-H
  - vroče cinkanje: po standardu EN ISO 1461

Določiti stopnjo agresivnosti okolja po SIST EN 12944 ter kontrolo AKZ skladno s SIST EN 12944-7.

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Ponudnik lahko ponudi tudi kakšen drug sistem zaščite, ki je preverjen na podobnih aplikacijah. Podati mora njegov natančen opis z navedbo vrste in lastnosti premazov, zahtevanimi debelinami, pripravo površine ter načinom in pogoji nanašanja.
Zaščitni premazi morajo biti ustrezno temperaturno obstojni in odporni proti topilom, kot so maziva in čistila, ki se uporabljajo pri vzdrževanju.
Zvarni robovi posameznih delov opreme, ki se bo varila med montažo, morajo biti kratkotrajno zaščiteni pred korozijo z ustreznim premazom (Shopprimer). Neposredno po varjenju jih bo potrebno očistiti in zaščititi z osnovnim in vrhnjim premazom.

V okvir montažnih del spada popravilo poškodb zaščitnih premazov. Upoštevati je potrebno, da je nanašanje premazov na gradbišču dovoljeno le z valjčki in čopiči. Material za zaščito pred korozijo je v obsegu dobav opreme.
Nesprejemljivi so premazi, ki predstavljajo kakršnokoli nevarnost za zdravje ljudi ali pa so na podobnih aplikacijah nepreverjeni.
Finalni oplesk konstrukcije se izvede po izvedeni montaži.

3.9. POŽARNA ZAŠČITA

Požarno zaščito je potrebno izvesti v skladu z načrtom požarne varnosti.

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4. PRILOGE

V nadaljevanju dokumenta so priložene naslednje priloge:

- Statično poročilo statičnega izračuna v programu SCIA engineer
- Zahteve proizvajalca dvigala
- Skice predvidenih ukrepov

1. Kazalo

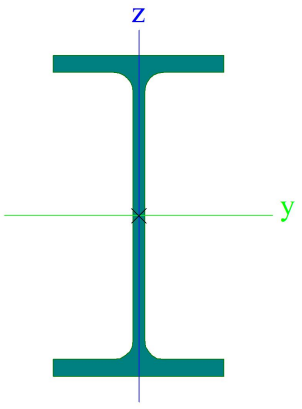
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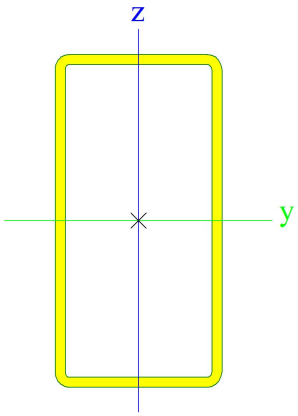
2. Materiali

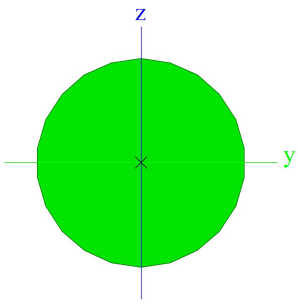
Steel EC3

Name	ρ [kg/m³]	E_{mod} [MPa]	μ	Lower limit [mm]	Upper limit [mm]	F_y [MPa]	F_u [MPa]	Colour
		G_{mod} [MPa]	α [m/mK]					
S 355	7850,00	2,1000e+05	0.3	0,00	40,00	355,0	490,0	
		8,0769e+04	0,01e-003	40,00	80,00	335,0	470,0	

3. Prerezi

Primarni nosilec		
Type	IPE120	
Formcode	1 - I section	
Shape type	Thin-walled	
Item material	S 355	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	a	b
A [mm²]	1,3200e+03	
A_y [mm²], A_z [mm²]	8,4381e+02	5,3657e+02
A_L [m²/m], A_D [m²/m]	4,7513e-01	4,7513e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	32,00	60,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	3,1770e+06	2,7660e+05
i_y [mm], i_z [mm]	49,06	14,48
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	5,2950e+04	8,6460e+03
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	6,0720e+04	1,3580e+04
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	21571558,09	21571558,09
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	4822399,73	4822399,73
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	1,6900e+04	8,8900e+08
β_y [mm], β_z [mm]	0,00	0,00
Picture		
Sekundarni nosilec		
Type	RHS100/50/3.0	
Formcode	2 - Rectangular hollow section	
Shape type	Thin-walled	
Item material	S 355	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	a	a
A [mm²]	8,5400e+02	
A_y [mm²], A_z [mm²]	2,8275e+02	5,6551e+02
A_L [m²/m], A_D [m²/m]	2,9200e-01	5,6565e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	25,00	50,00

α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	1,1000e+06	3,6800e+05
i_y [mm], i_z [mm]	35,89	20,76
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	2,1900e+04	1,4700e+04
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	2,7029e+04	1,6622e+04
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	9595129,10	9595129,10
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	5900803,77	5900803,77
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	8,8400e+05	4,6875e+08
β_y [mm], β_z [mm]	0,00	0,00
Picture		

Zatega		
Type	RD12	
Formcode	11 - Full circular section	
Shape type	Thick-walled	
Item material	S 355	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [mm²]	1,1304e+02	
A_y [mm²], A_z [mm²]	9,6909e+01	9,6909e+01
A_L [m²/m], A_D [m²/m]	3,7600e-02	3,7697e-02
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	6,00	6,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	9,9655e+02	9,9655e+02
i_y [mm], i_z [mm]	2,97	2,97
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	1,6609e+02	1,6609e+02
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	2,8346e+02	2,8346e+02
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	102208,86	102208,86
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	102208,86	102208,86
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	2,0339e+03	0,0000e+00
β_y [mm], β_z [mm]	0,00	0,00
Picture		

Explanations of symbols	
Formcode	h - Height b - Flange width t - Flange thickness s - Web thickness r - Radius at flange root r1 - Radius at flange toe a - Flange slope W - Internal bolt distance wm - Unit warping at flange toe
A	Area
A_y	Shear Area in principal y-direction
A_z	Shear Area in principal z-direction
A_L	Circumference per unit length
A_D	Drying surface per unit length
$c_{Y.UCS}$	Centroid coordinate in Y-direction of Input axis system
$c_{Z.UCS}$	Centroid coordinate in Z-direction of Input axis system
$I_{Y.LCS}$	Second moment of area about the YLCS axis
$I_{Z.LCS}$	Second moment of area about the ZLCS axis
$I_{YZ.LCS}$	Product moment of area in the LCS system
α	Rotation angle of the principal axis system
I_y	Second moment of area about the principal y-axis
I_z	Second moment of area about the principal z-axis
i_y	Radius of gyration about the principal y-axis

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

4. Elementi

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
B1	Primarni nosilec - IPE120	S 355	1,600	N1	N2	general (0)
B2	Primarni nosilec - IPE120	S 355	1,600	N3	N4	general (0)
B3	Sekundarni nosilec - RHS100/50/3.0	S 355	1,759	N5	N2	beam (80)
B4	Sekundarni nosilec - RHS100/50/3.0	S 355	1,200	N2	N4	beam (80)
B5	Sekundarni nosilec - RHS100/50/3.0	S 355	2,777	N6	N4	beam (80)
B8	Zatega - RD12	S 355	1,131	N7	N9	truss diagonal (90)
B9	Zatega - RD12	S 355	1,131	N8	N10	truss diagonal (90)

5. Vozlišča

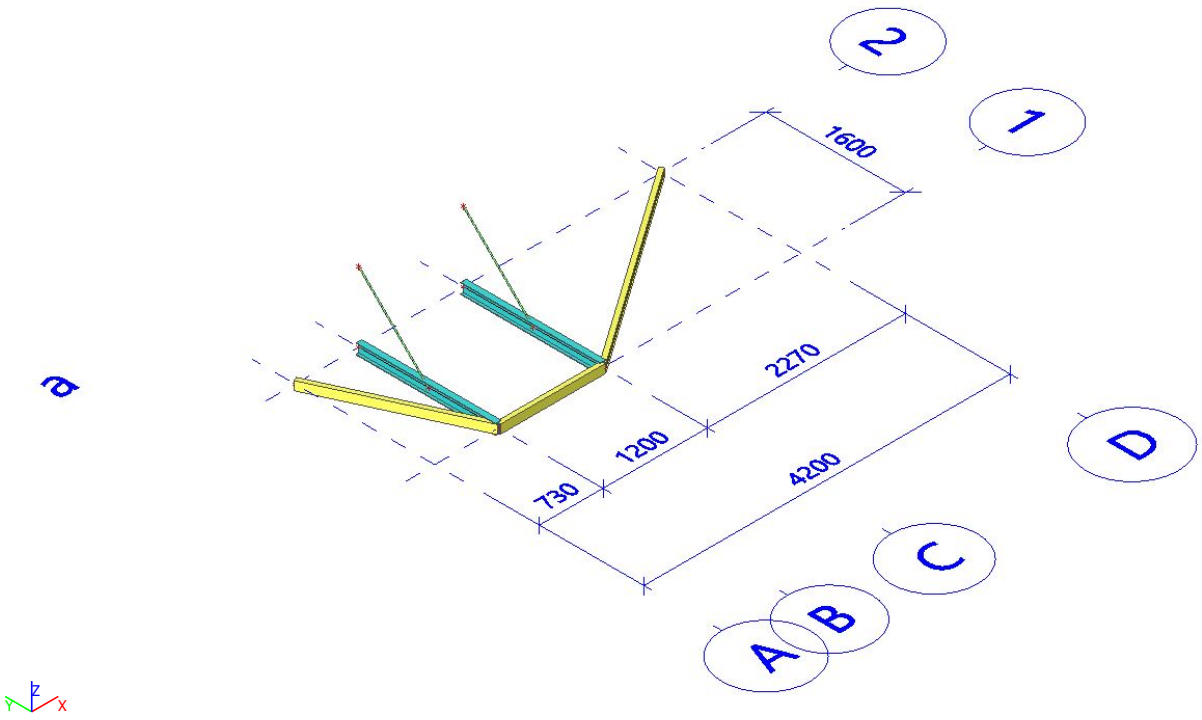
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N1	0,730	1,600	0,000
N2	0,730	0,000	0,000
N3	1,930	1,600	0,000
N4	1,930	0,000	0,000
N5	0,000	1,600	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N6	4,200	1,600	0,000
N7	0,730	1,600	0,800
N8	1,930	1,600	0,800
N9	0,730	0,800	0,000
N10	1,930	0,800	0,000

6. Podpore

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz
Sn1	N3	GCS	Standard	Rigid	Rigid	Rigid	Free	Rigid	Free
Sn2	N1	GCS	Standard	Rigid	Rigid	Rigid	Free	Rigid	Free
Sn3	N5	GCS	Standard	Rigid	Rigid	Rigid	Free	Free	Free
Sn4	N6	GCS	Standard	Rigid	Rigid	Rigid	Free	Free	Free
Sn5	N7	GCS	Standard	Rigid	Rigid	Rigid	Free	Free	Free
Sn6	N8	GCS	Standard	Rigid	Rigid	Rigid	Free	Free	Free

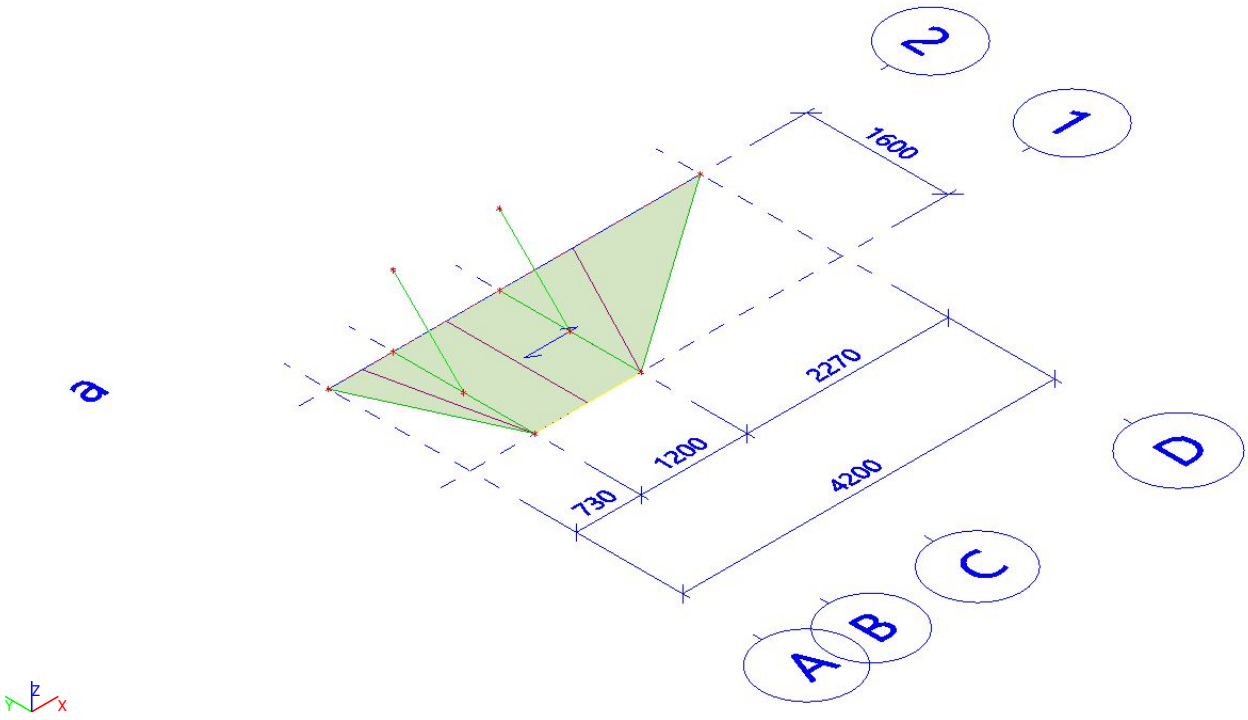
7. Model



8. Obtežni primeri

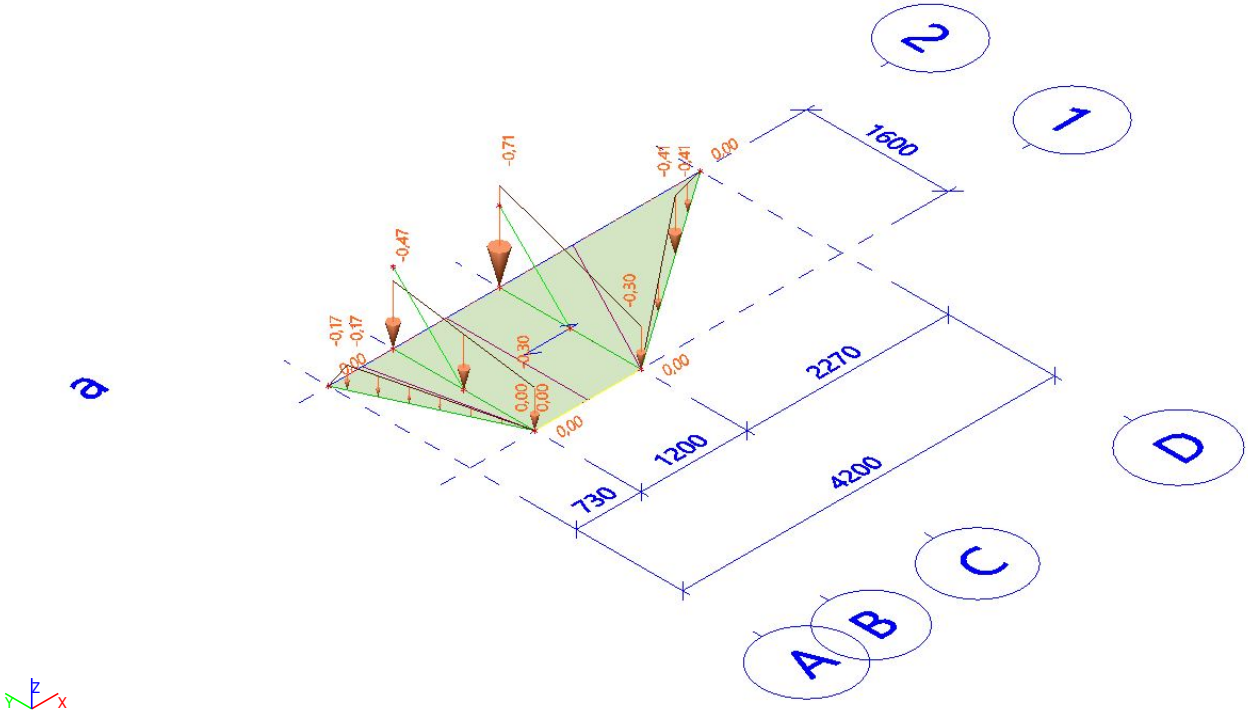
8.1. Obtežni primeri - Lastna

Name	Description	Action type	Load group	Direction
	Spec	Load type		
Lastna		Permanent	Lastna in stalna	-Z
		Self weight		



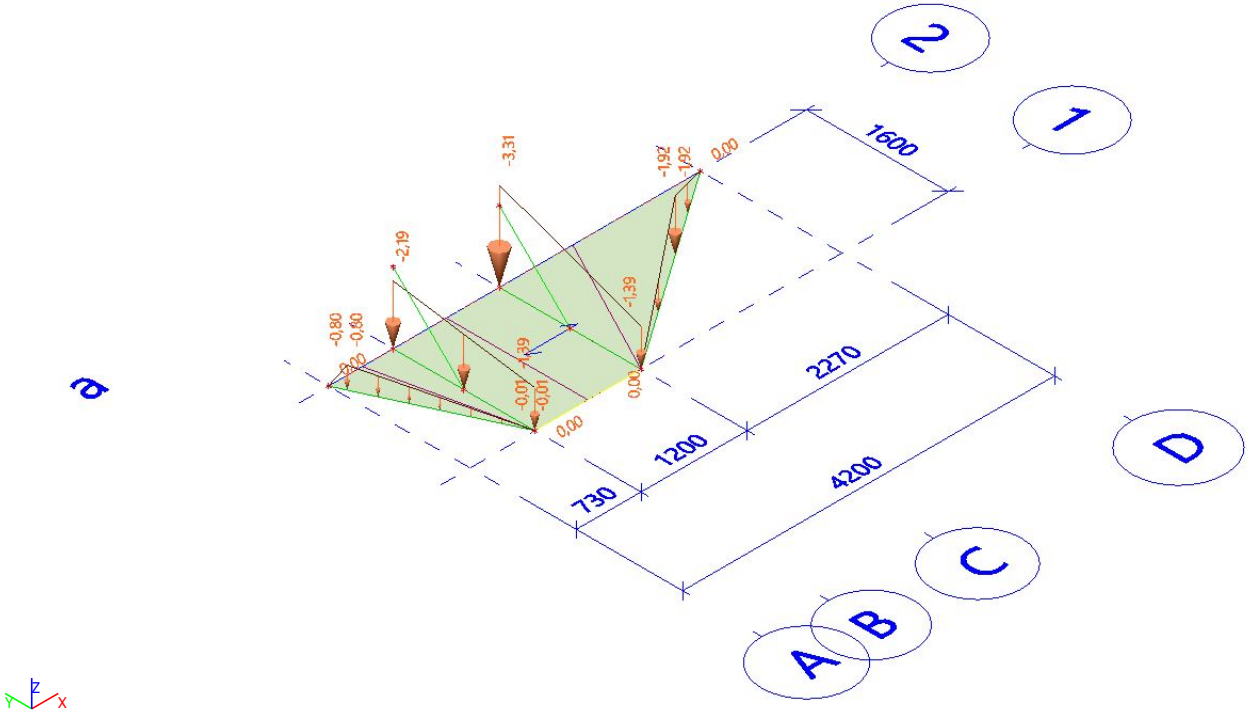
8.2. Obtežni primeri - Stalna

Name	Description	Action type	Load group
	Spec	Load type	
Stalna		Permanent	Lastna in stalna
		Standard	



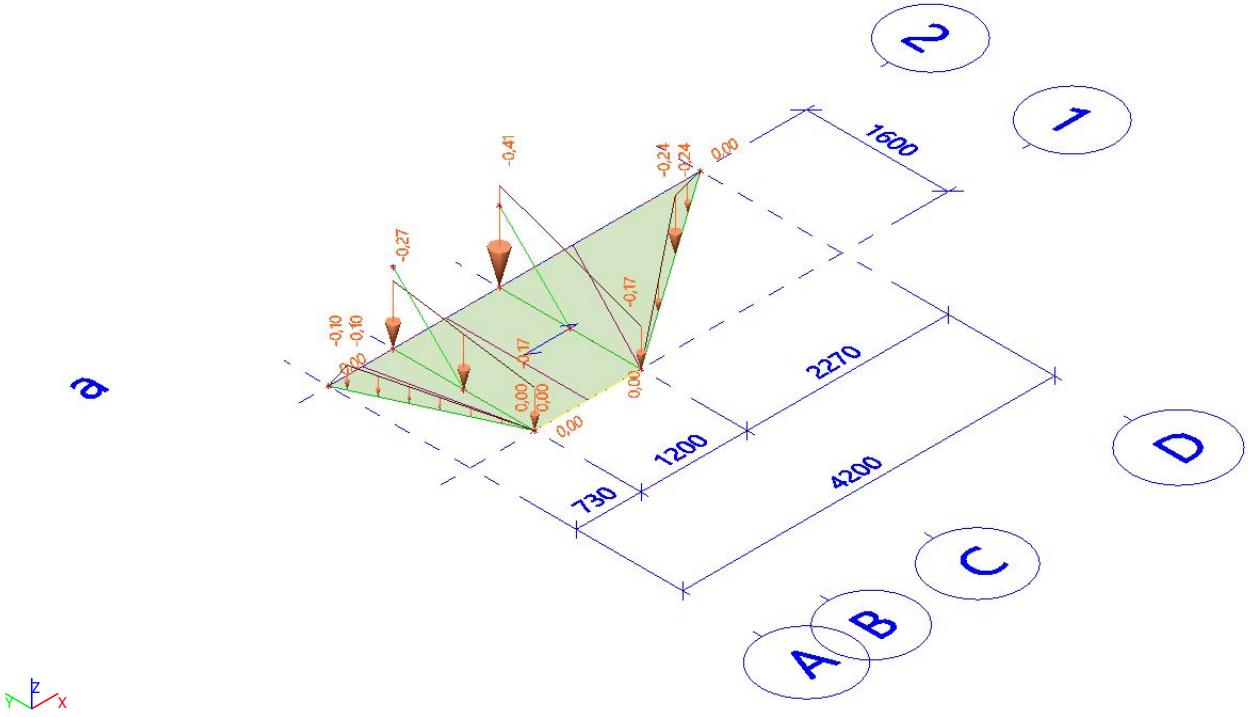
8.3. Obtežni primeri - Sneg

Name	Description	Action type	Load group	Master load case
	Spec	Load type		
Sneg		Variable	Sneg	None
	Snow	Static		



8.4. Obtežni primeri - Veter tlak

Name	Description	Action type	Load group	Master load case
	Spec	Load type		
Veter tlak		Variable	Veter	None
	Static wind	Static		



9. Obtežne kombinacije z NSK in pomiki

9.1. Obtežne kombinacije z NSK in pomiki - All ULS

Name	List
All ULS	ULS-Set B (auto) - EN-ULS (STR/GEO) Set B

9.1.1. 1D internal forces

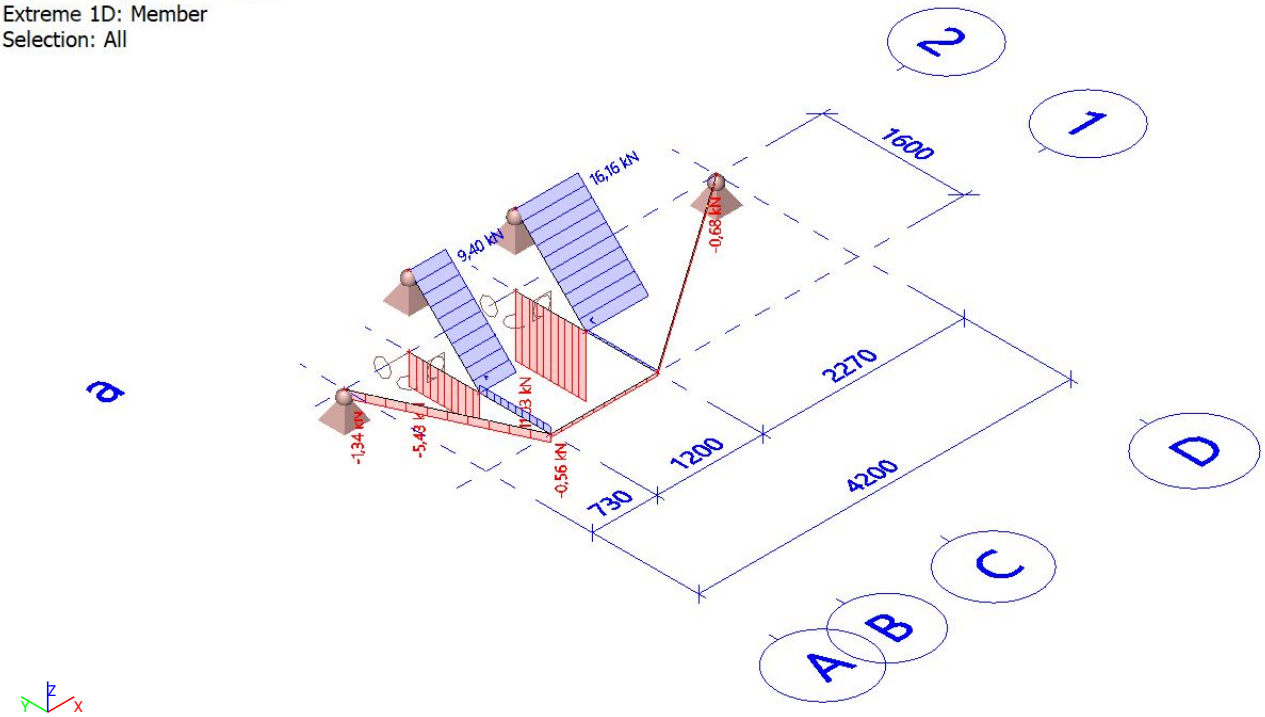
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Member
Selection: All

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B1	0,800+	ULS-Set B (auto)/1	**1,22**	**0,00**	**3,15**	**0,00**	-1,58	**0,00**
B1	0,800-	ULS-Set B (auto)/1	**-5,43**	0,00	**-3,49**	0,00	**-1,58**	0,00
B1	0,000	ULS-Set B (auto)/1	-5,43	0,00	-0,35	0,00	**0,00**	**0,00**
B2	0,800+	ULS-Set B (auto)/1	**0,39**	**0,00**	**5,53**	**0,00**	-3,04	**0,00**
B2	0,800-	ULS-Set B (auto)/1	**-11,03**	0,00	**-5,88**	0,00	**-3,04**	0,00
B2	1,600	ULS-Set B (auto)/1	0,39	0,00	2,58	0,00	**0,11**	0,00
B3	0,000	ULS-Set B (auto)/2	**-0,21**	**0,00**	0,16	**0,00**	**0,00**	**0,00**
B3	1,759	ULS-Set B (auto)/1	-1,34	0,00	**-0,57**	0,00	0,00	0,00
B3	0,703	ULS-Set B	**-1,34**	0,00	0,06	0,00	**0,36**	0,00

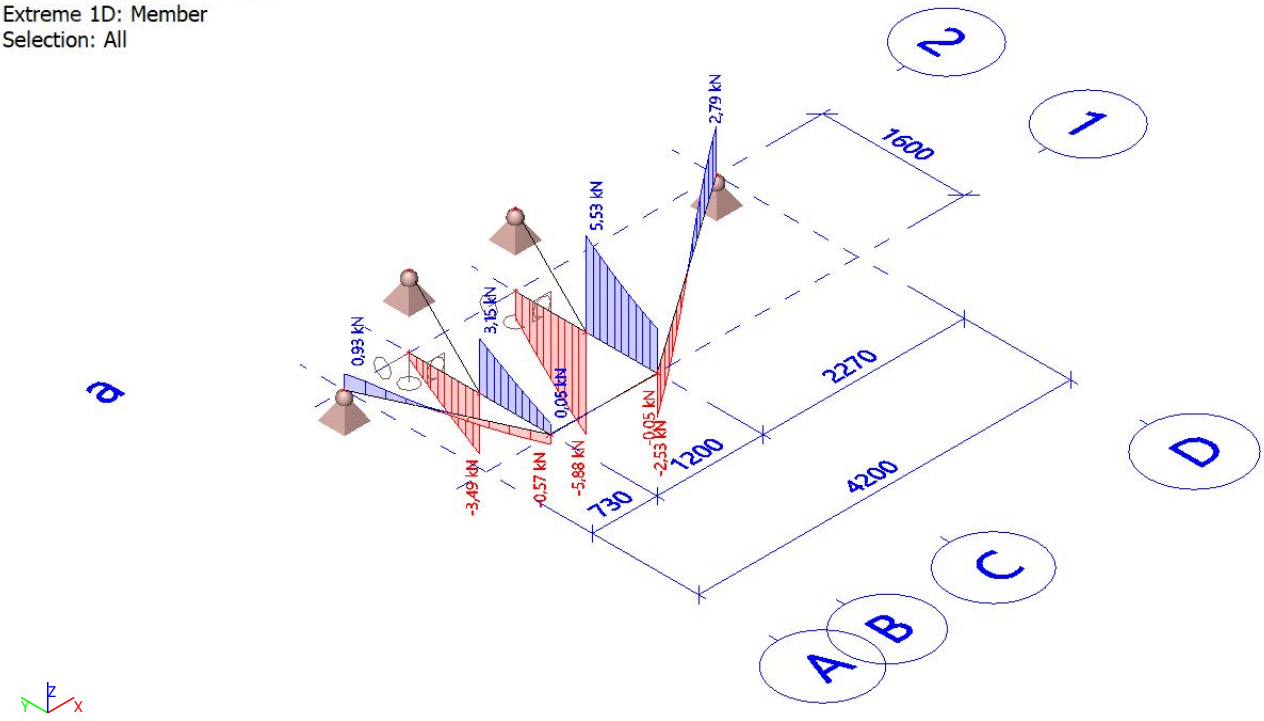
Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
		(auto)/1						
B3	0,000	ULS-Set B (auto)/1	-1,34	0,00	**0,93**	0,00	0,00	**0,00**
B4	1,200	ULS-Set B (auto)/1	-0,56	0,00	**-0,05**	-0,11	0,00	0,00
B4	0,000	ULS-Set B (auto)/2	**-0,09**	**0,00**	0,04	**-0,01**	**0,00**	**0,00**
B4	0,600	ULS-Set B (auto)/1	**-0,56**	0,00	0,00	**-0,11**	**0,02**	0,00
B4	0,000	ULS-Set B (auto)/1	-0,56	0,00	**0,05**	-0,11	0,00	**0,00**
B5	0,000	ULS-Set B (auto)/2	**-0,11**	**0,00**	0,39	**0,00**	**0,00**	**0,00**
B5	2,777	ULS-Set B (auto)/1	-0,68	0,00	**-2,53**	0,00	0,00	0,00
B5	1,296	ULS-Set B (auto)/1	**-0,68**	0,00	0,11	0,00	**2,41**	0,00
B5	0,000	ULS-Set B (auto)/1	-0,68	0,00	**2,79**	0,00	0,00	**0,00**
B8	1,131	ULS-Set B (auto)/2	**1,50**	0,00	0,00	0,00	0,00	0,00
B8	0,000	ULS-Set B (auto)/1	**9,40**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
B9	1,131	ULS-Set B (auto)/2	**2,34**	0,00	0,00	0,00	0,00	0,00
B9	0,000	ULS-Set B (auto)/1	**16,16**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**

Name	Combination key
ULS-Set B (auto)/1	1.35*Lastna + 1.35*Stalna + 1.50*Sneg + 0.90*Veter tlak
ULS-Set B (auto)/2	Lastna + Stalna

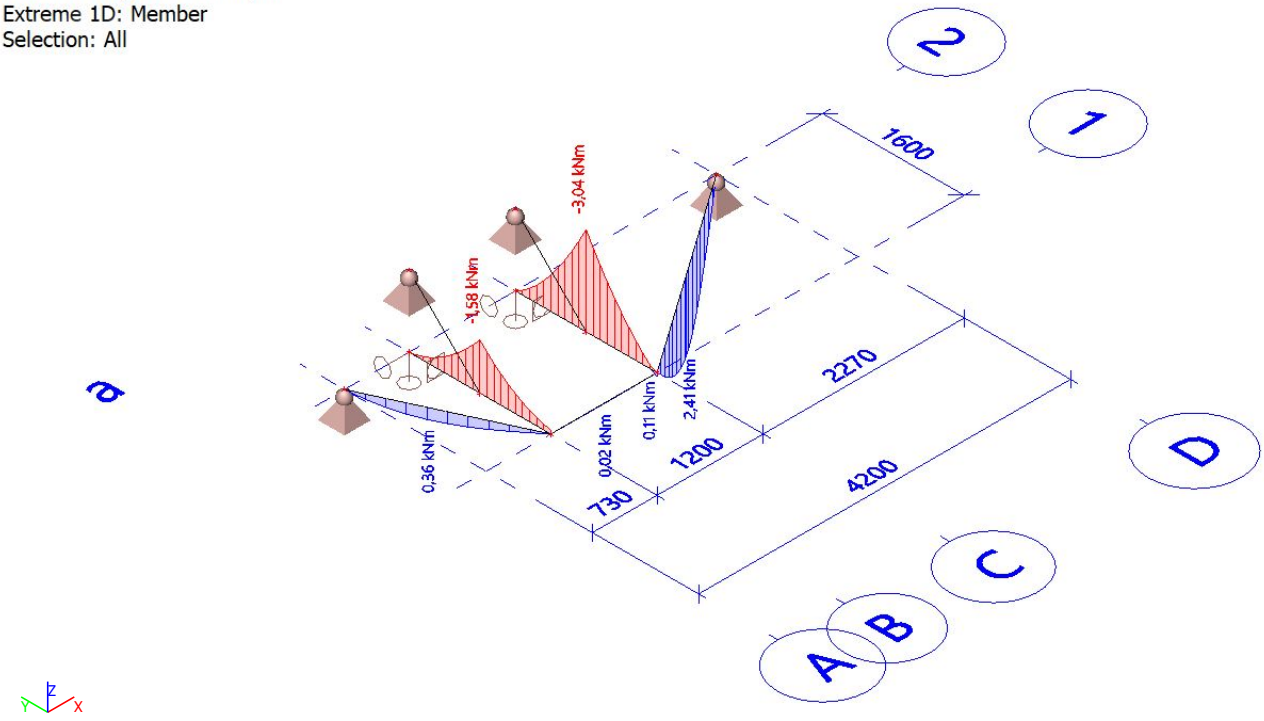
Values: **N**
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Member
Selection: All



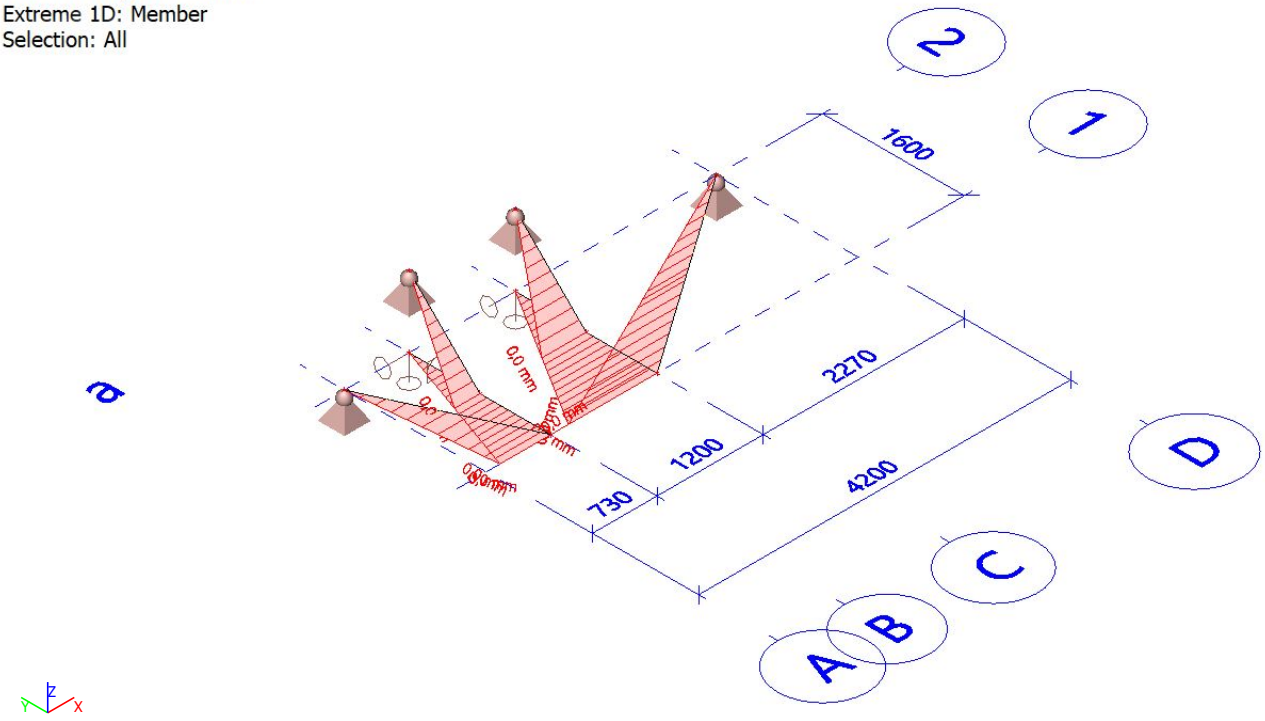
Values: $\mathbf{V_z}$
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Member
Selection: All



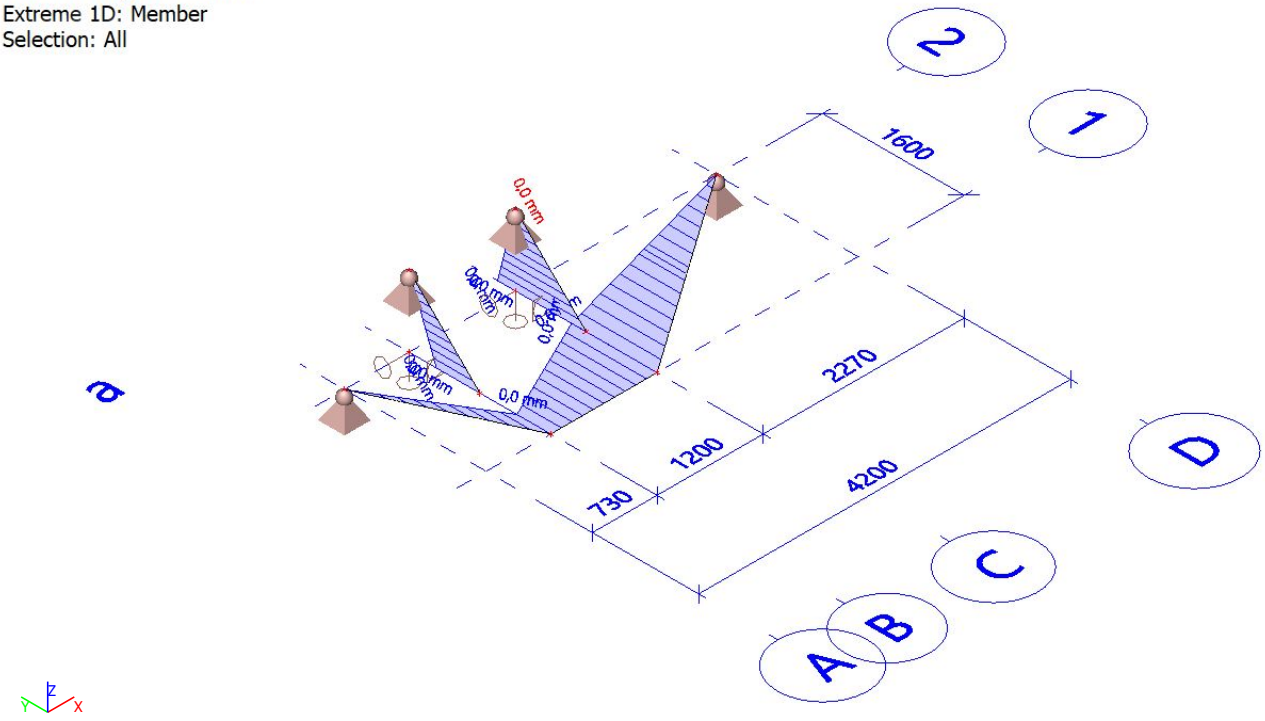
Values: $\mathbf{M_y}$
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Member
Selection: All



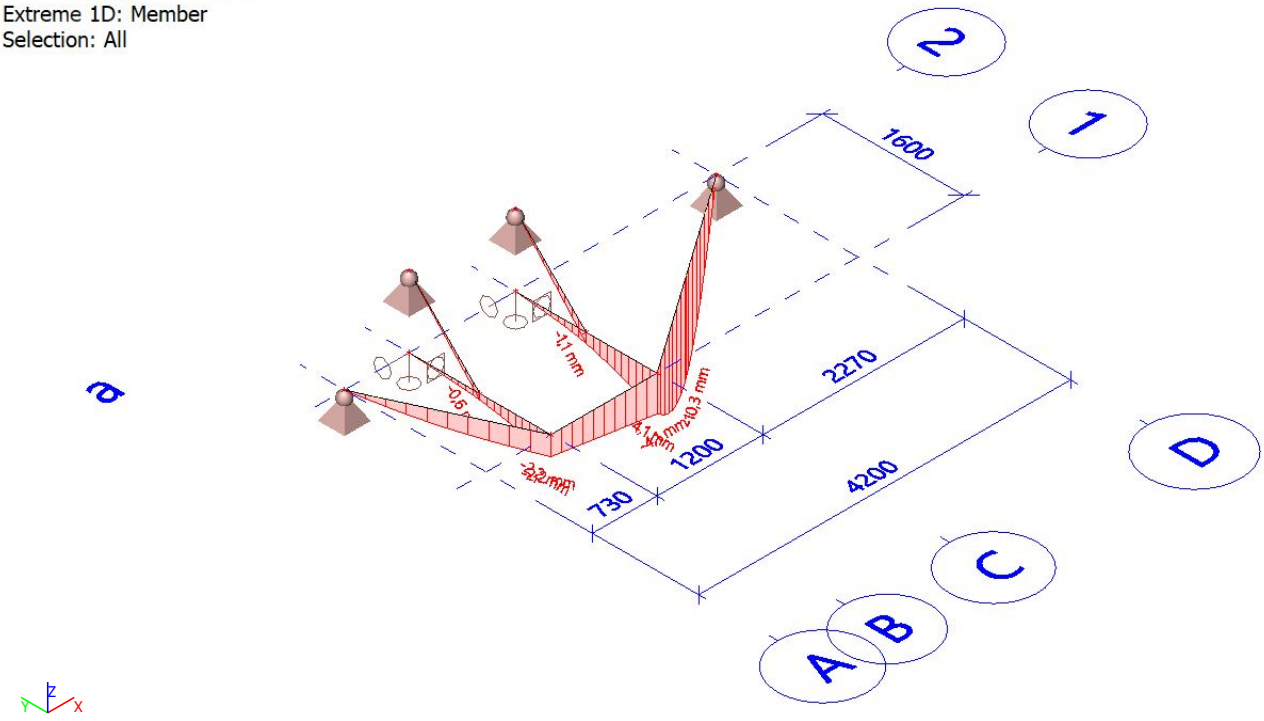
Values: u_x
Linear calculation
Class: All ULS
Coordinate system: Global
Extreme 1D: Member
Selection: All



Values: u_y
Linear calculation
Class: All ULS
Coordinate system: Global
Extreme 1D: Member
Selection: All



Values: u_z
Linear calculation
Class: All ULS
Coordinate system: Global
Extreme 1D: Member
Selection: All



9.2. Obtežne kombinacije z NSK in pomiki - All SLS

Name	List
All SLS	SLS-Char (auto) - EN-SLS Characteristic

9.2.1. 1D internal forces

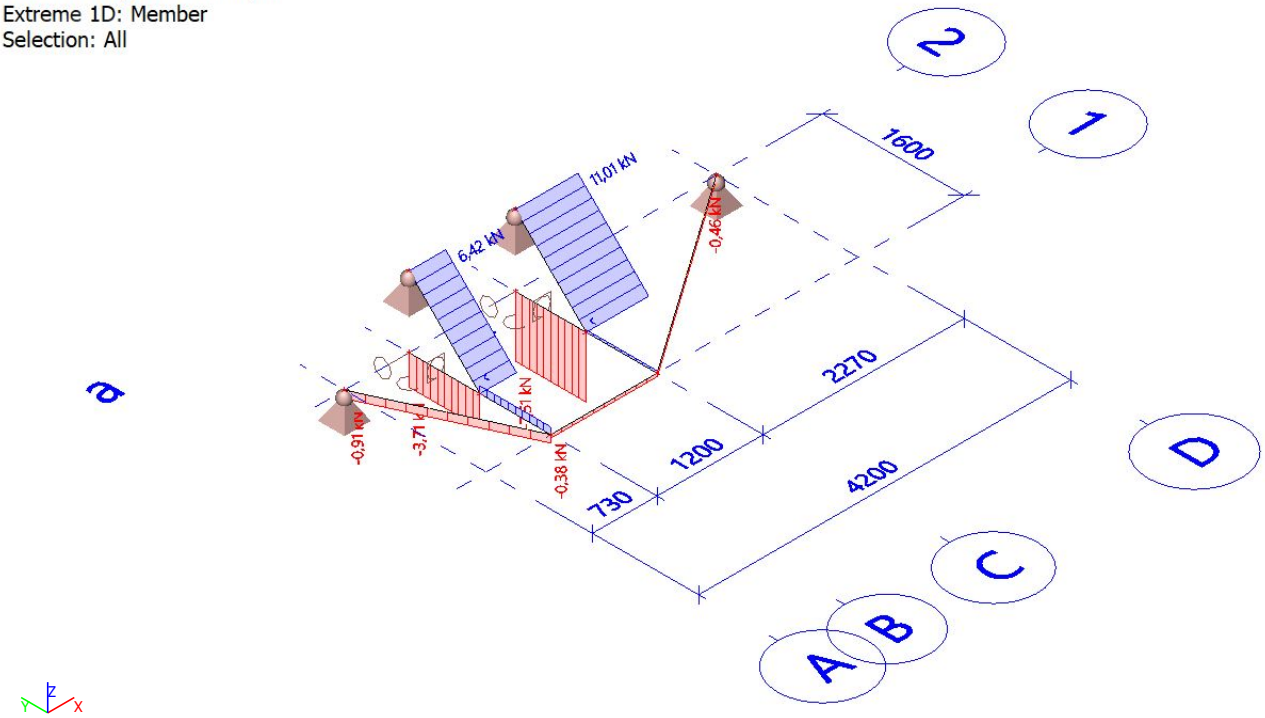
Linear calculation
Class: All SLS
Coordinate system: Principal
Extreme 1D: Member
Selection: All

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B1	0,800+	SLS-Char (auto)/1	**0,83**	**0,00**	**2,15**	**0,00**	-1,08	**0,00**
B1	0,800-	SLS-Char (auto)/1	**-3,71**	0,00	**-2,38**	0,00	**-1,08**	0,00
B1	0,000	SLS-Char (auto)/1	-3,71	0,00	-0,25	0,00	**0,00**	**0,00**
B2	0,800+	SLS-Char (auto)/1	**0,27**	**0,00**	**3,77**	**0,00**	-2,07	**0,00**
B2	0,800-	SLS-Char (auto)/1	**-7,51**	0,00	**-4,01**	0,00	**-2,07**	0,00
B2	1,600	SLS-Char (auto)/1	0,27	0,00	1,76	0,00	**0,08**	0,00
B3	0,000	SLS-Char (auto)/2	**-0,21**	**0,00**	0,16	**0,00**	**0,00**	**0,00**
B3	1,759	SLS-Char (auto)/1	-0,91	0,00	**-0,39**	0,00	0,00	0,00
B3	0,703	SLS-Char (auto)/1	**-0,91**	0,00	0,04	0,00	**0,25**	0,00
B3	0,000	SLS-Char	-0,91	0,00	**0,64**	0,00	0,00	**0,00**

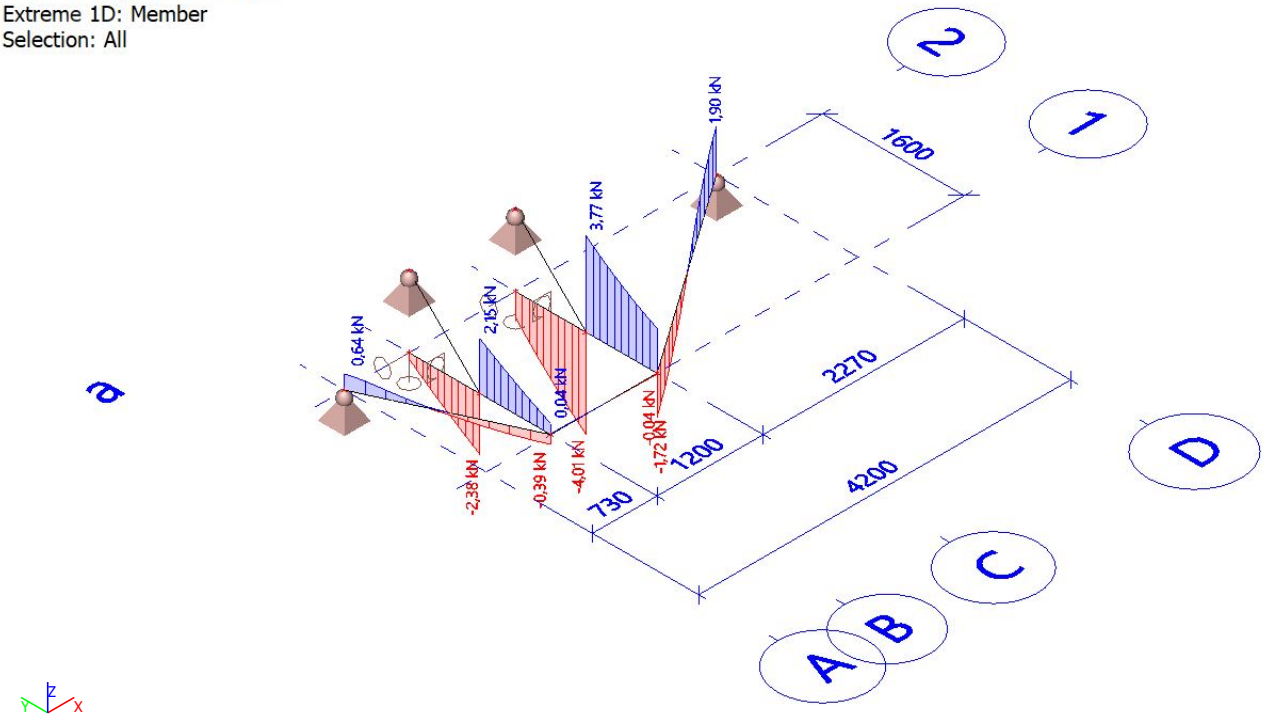
Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
		(auto)/1						
B4	1,200	SLS-Char (auto)/1	-0,38	0,00	**-0,04**	-0,08	0,00	0,00
B4	0,000	SLS-Char (auto)/2	**-0,09**	**0,00**	**0,04**	**-0,01**	**0,00**	**0,00**
B4	0,600	SLS-Char (auto)/1	**-0,38**	0,00	0,00	**-0,08**	**0,01**	0,00
B5	0,000	SLS-Char (auto)/2	**-0,11**	**0,00**	0,39	**0,00**	**0,00**	**0,00**
B5	2,777	SLS-Char (auto)/1	-0,46	0,00	**-1,72**	0,00	0,00	0,00
B5	1,296	SLS-Char (auto)/1	**-0,46**	0,00	0,07	0,00	**1,64**	0,00
B5	0,000	SLS-Char (auto)/1	-0,46	0,00	**1,90**	0,00	0,00	**0,00**
B8	1,131	SLS-Char (auto)/2	**1,50**	0,00	0,00	0,00	0,00	0,00
B8	0,000	SLS-Char (auto)/1	**6,42**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
B9	1,131	SLS-Char (auto)/2	**2,34**	0,00	0,00	0,00	0,00	0,00
B9	0,000	SLS-Char (auto)/1	**11,01**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**

Name	Combination key
SLS-Char (auto)/1	Lastna + Stalna + Sneg + 0.60*Veter tlak
SLS-Char (auto)/2	Lastna + Stalna

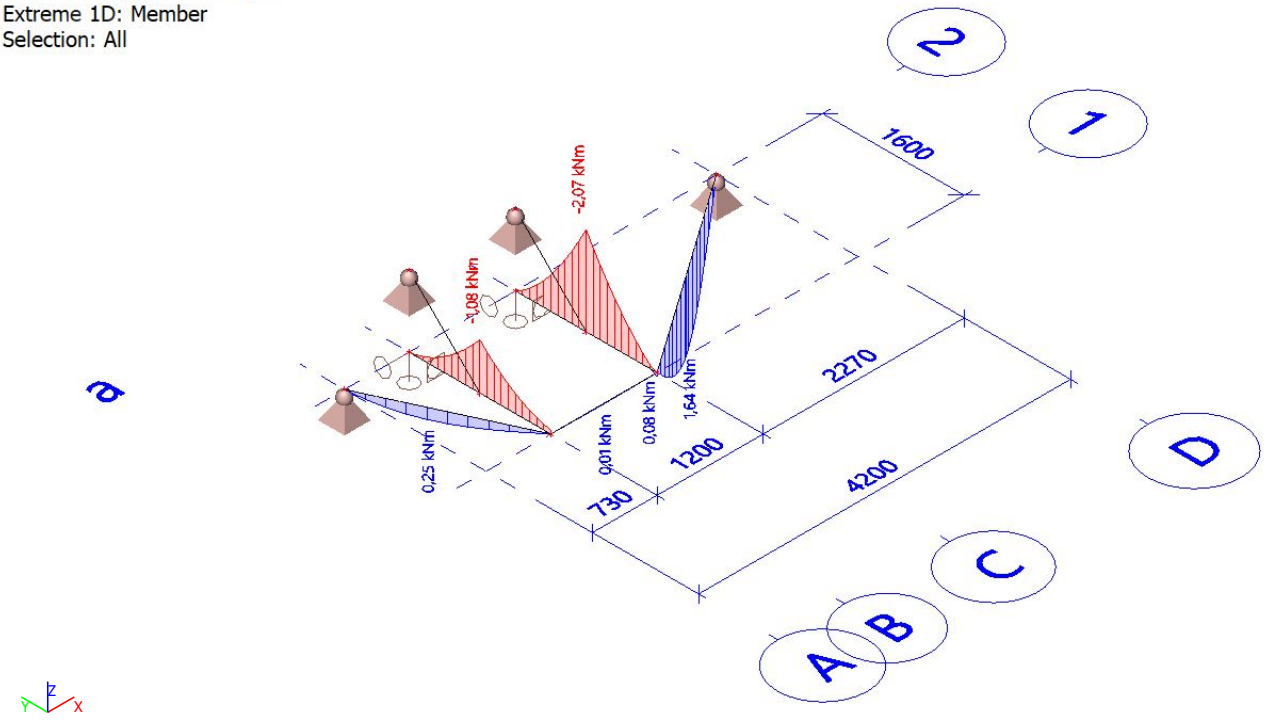
Values: **N**
Linear calculation
Class: All SLS
Coordinate system: Principal
Extreme 1D: Member
Selection: All



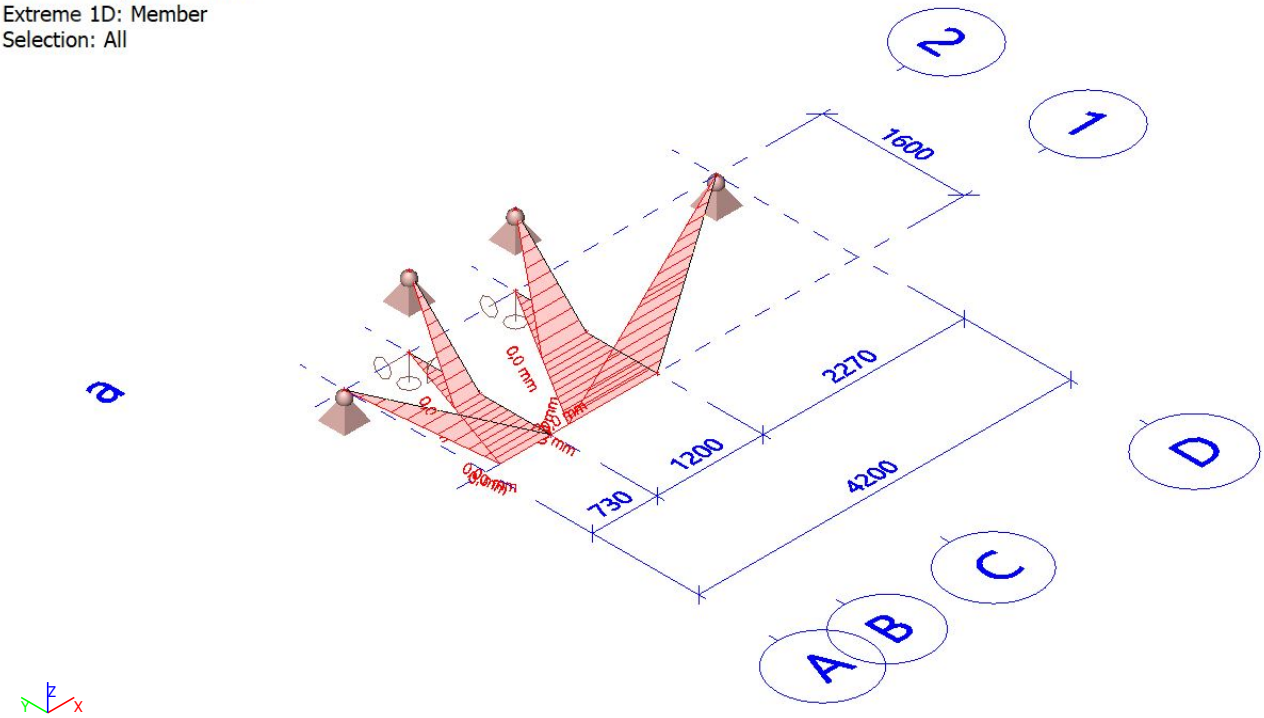
Values: $\mathbf{V_z}$
Linear calculation
Class: All SLS
Coordinate system: Principal
Extreme 1D: Member
Selection: All



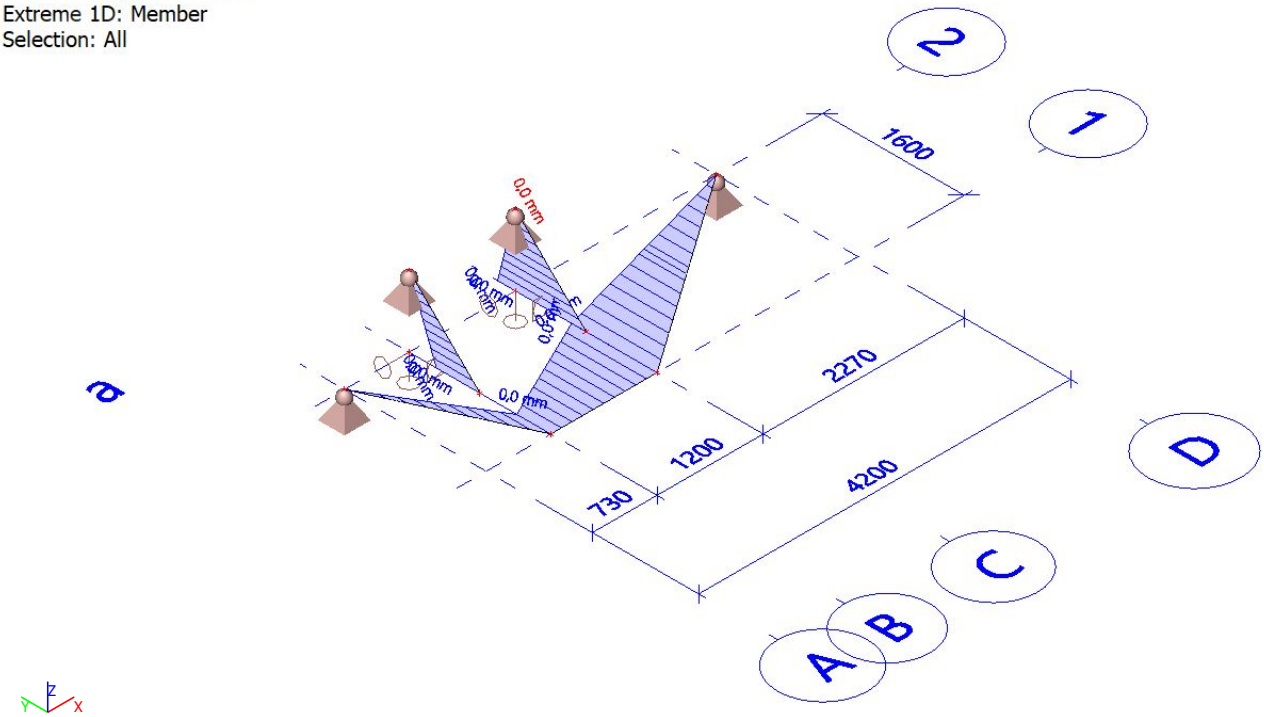
Values: $\mathbf{M_y}$
Linear calculation
Class: All SLS
Coordinate system: Principal
Extreme 1D: Member
Selection: All



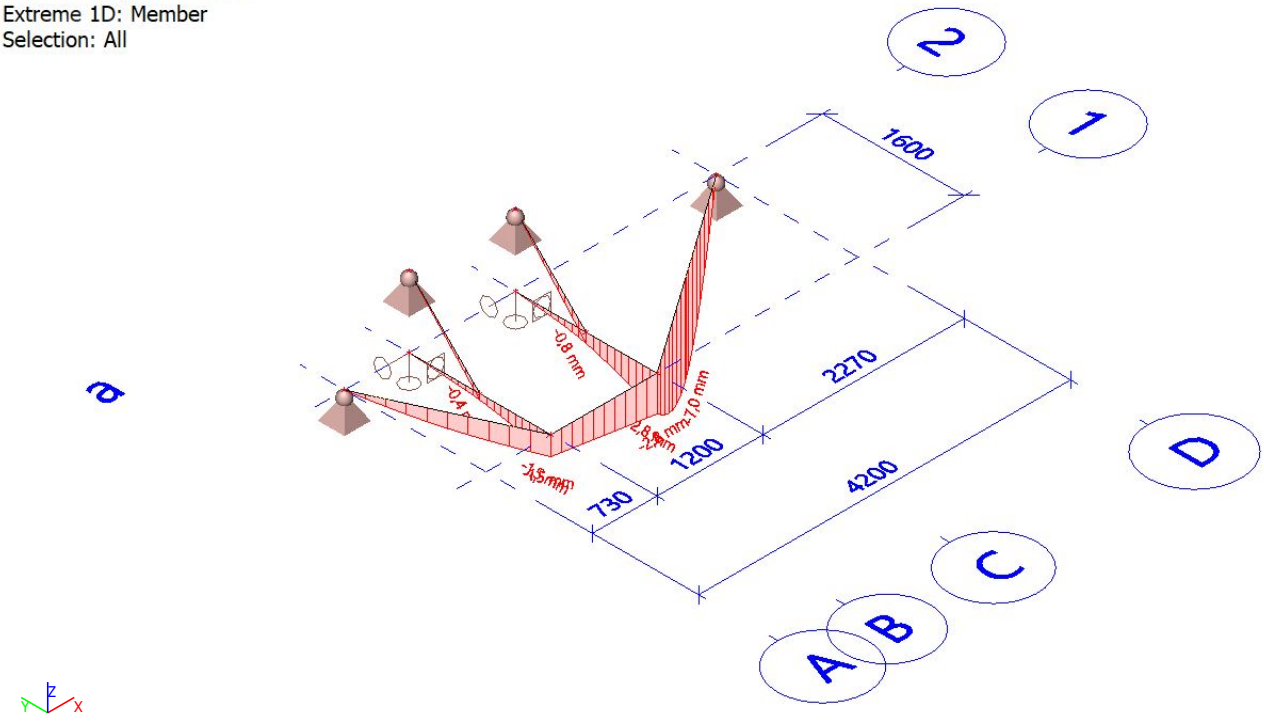
Values: u_x
Linear calculation
Class: All SLS
Coordinate system: Global
Extreme 1D: Member
Selection: All



Values: u_y
Linear calculation
Class: All SLS
Coordinate system: Global
Extreme 1D: Member
Selection: All



Values: u_z
Linear calculation
Class: All SLS
Coordinate system: Global
Extreme 1D: Member
Selection: All



9.3. Obtežne kombinacije z NSK in pomiki - All ULS+SLS

Name	List
All ULS+SLS	ULS-Set B (auto) - EN-ULS (STR/GEO) Set B
	SLS-Char (auto) - EN-SLS Characteristic

9.3.1. 1D internal forces

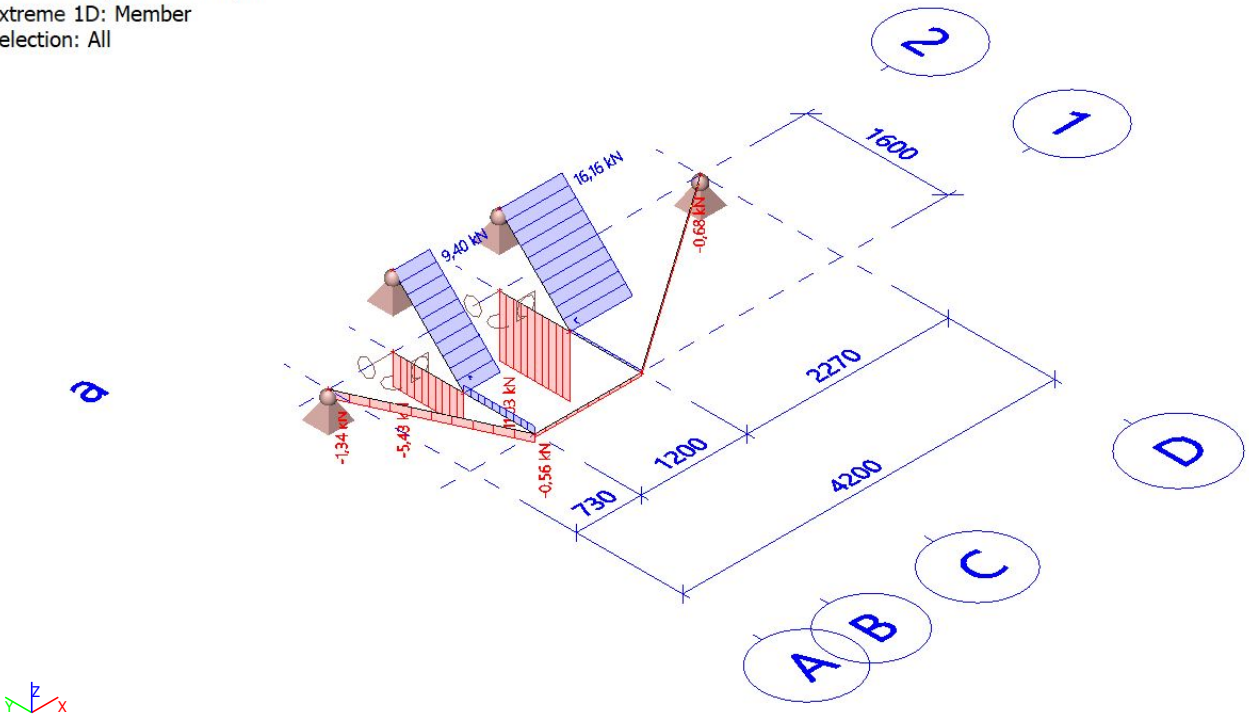
Linear calculation
Class: All ULS+SLS
Coordinate system: Principal
Extreme 1D: Member
Selection: All

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B1	0,800+	ULS-Set B (auto)/1	**1,22**	**0,00**	**3,15**	**0,00**	-1,58	**0,00**
B1	0,800-	ULS-Set B (auto)/1	**-5,43**	0,00	**-3,49**	0,00	**-1,58**	0,00
B1	0,000	ULS-Set B (auto)/1	-5,43	0,00	-0,35	0,00	**0,00**	**0,00**
B2	0,800+	ULS-Set B (auto)/1	**0,39**	**0,00**	**5,53**	**0,00**	-3,04	**0,00**
B2	0,800-	ULS-Set B (auto)/1	**-11,03**	0,00	**-5,88**	0,00	**-3,04**	0,00
B2	1,600	ULS-Set B (auto)/1	0,39	0,00	2,58	0,00	**0,11**	0,00
B3	0,000	ULS-Set B (auto)/2	**-0,21**	**0,00**	0,16	**0,00**	**0,00**	**0,00**
B3	1,759	ULS-Set B (auto)/1	-1,34	0,00	**-0,57**	0,00	0,00	0,00
B3	0,703	ULS-Set B (auto)/1	**-1,34**	0,00	0,06	0,00	**0,36**	0,00

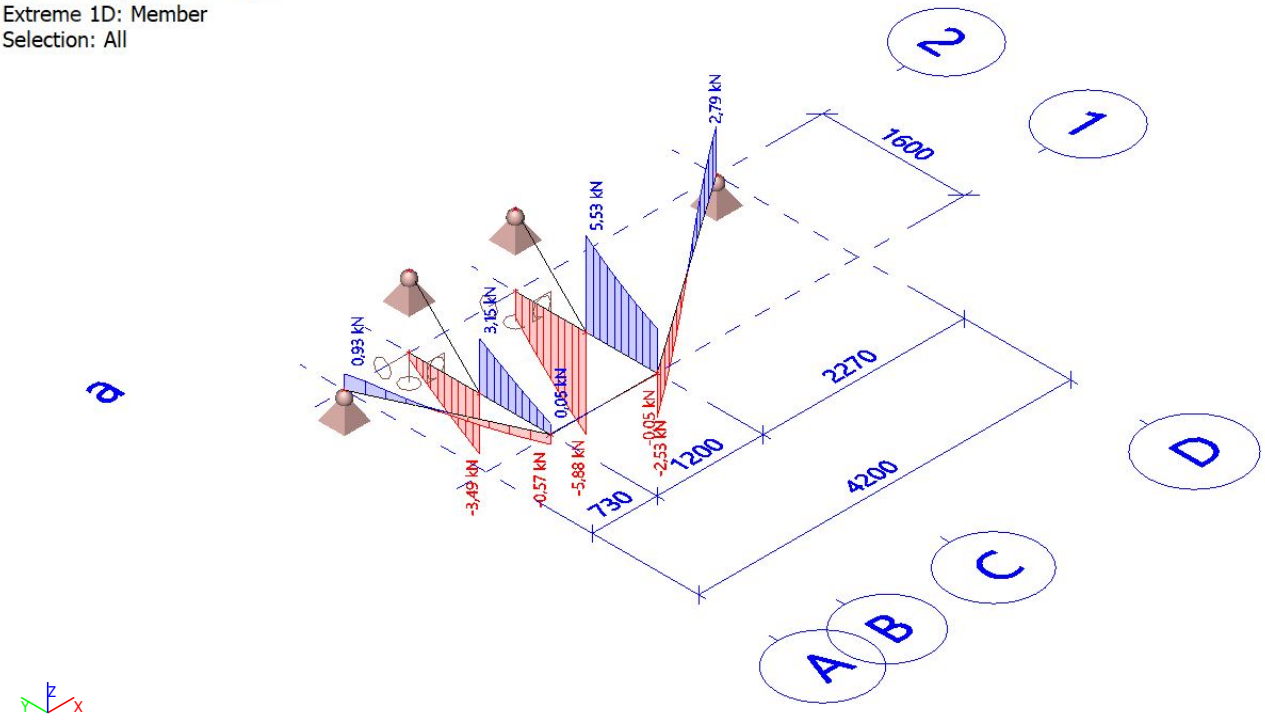
Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B3	0,000	ULS-Set B (auto)/1	-1,34	0,00	**0,93**	0,00	0,00	**0,00**
B4	1,200	ULS-Set B (auto)/1	-0,56	0,00	**-0,05**	-0,11	0,00	0,00
B4	0,000	ULS-Set B (auto)/2	**-0,09**	**0,00**	0,04	**-0,01**	**0,00**	**0,00**
B4	0,600	ULS-Set B (auto)/1	**-0,56**	0,00	0,00	**-0,11**	**0,02**	0,00
B4	0,000	ULS-Set B (auto)/1	-0,56	0,00	**0,05**	-0,11	0,00	**0,00**
B5	0,000	ULS-Set B (auto)/2	**-0,11**	**0,00**	0,39	**0,00**	**0,00**	**0,00**
B5	2,777	ULS-Set B (auto)/1	-0,68	0,00	**-2,53**	0,00	0,00	0,00
B5	1,296	ULS-Set B (auto)/1	**-0,68**	0,00	0,11	0,00	**2,41**	0,00
B5	0,000	ULS-Set B (auto)/1	-0,68	0,00	**2,79**	0,00	0,00	**0,00**
B8	1,131	ULS-Set B (auto)/2	**1,50**	0,00	0,00	0,00	0,00	0,00
B8	0,000	ULS-Set B (auto)/1	**9,40**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
B9	1,131	ULS-Set B (auto)/2	**2,34**	0,00	0,00	0,00	0,00	0,00
B9	0,000	ULS-Set B (auto)/1	**16,16**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**

Name	Combination key
ULS-Set B (auto)/1	1.35*Lastna + 1.35*Stalna + 1.50*Sneg + 0.90*Veter tlak
ULS-Set B (auto)/2	Lastna + Stalna

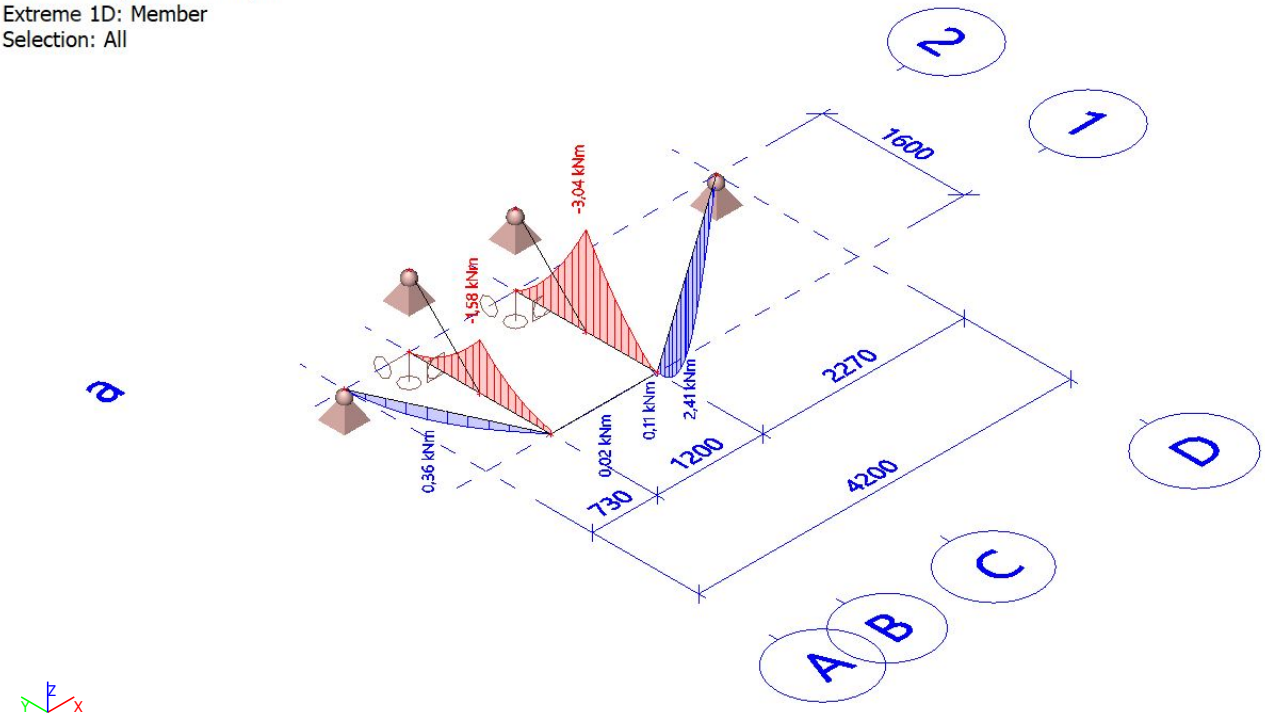
Values: **N**
Linear calculation
Class: All ULS+SLS
Coordinate system: Principal
Extreme 1D: Member
Selection: All



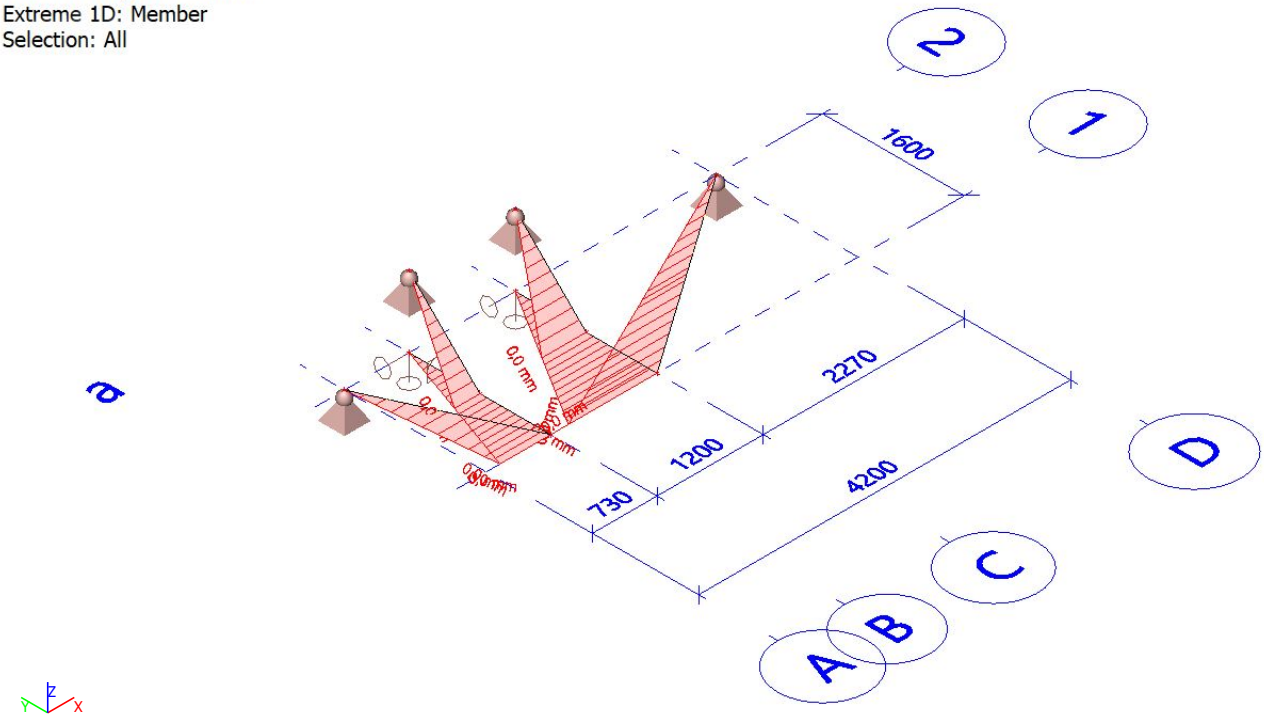
Values: $\mathbf{V_z}$
Linear calculation
Class: All ULS+SLS
Coordinate system: Principal
Extreme 1D: Member
Selection: All



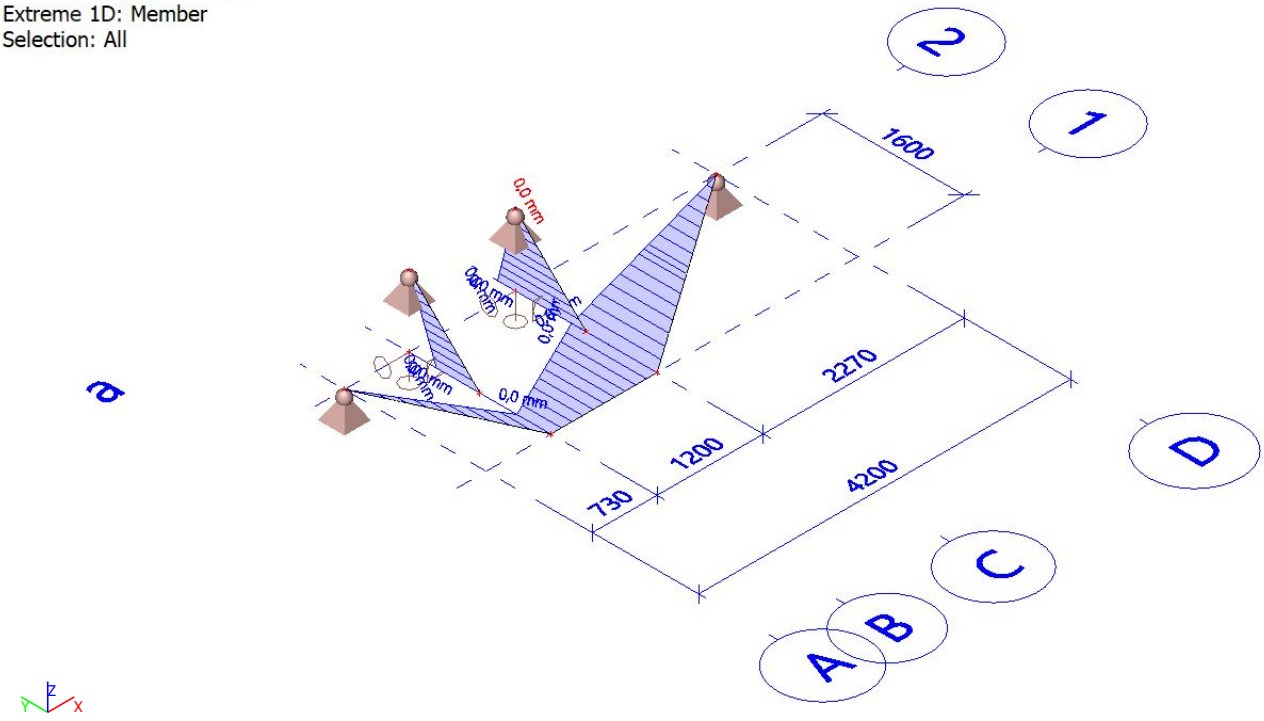
Values: $\mathbf{M_y}$
Linear calculation
Class: All ULS+SLS
Coordinate system: Principal
Extreme 1D: Member
Selection: All



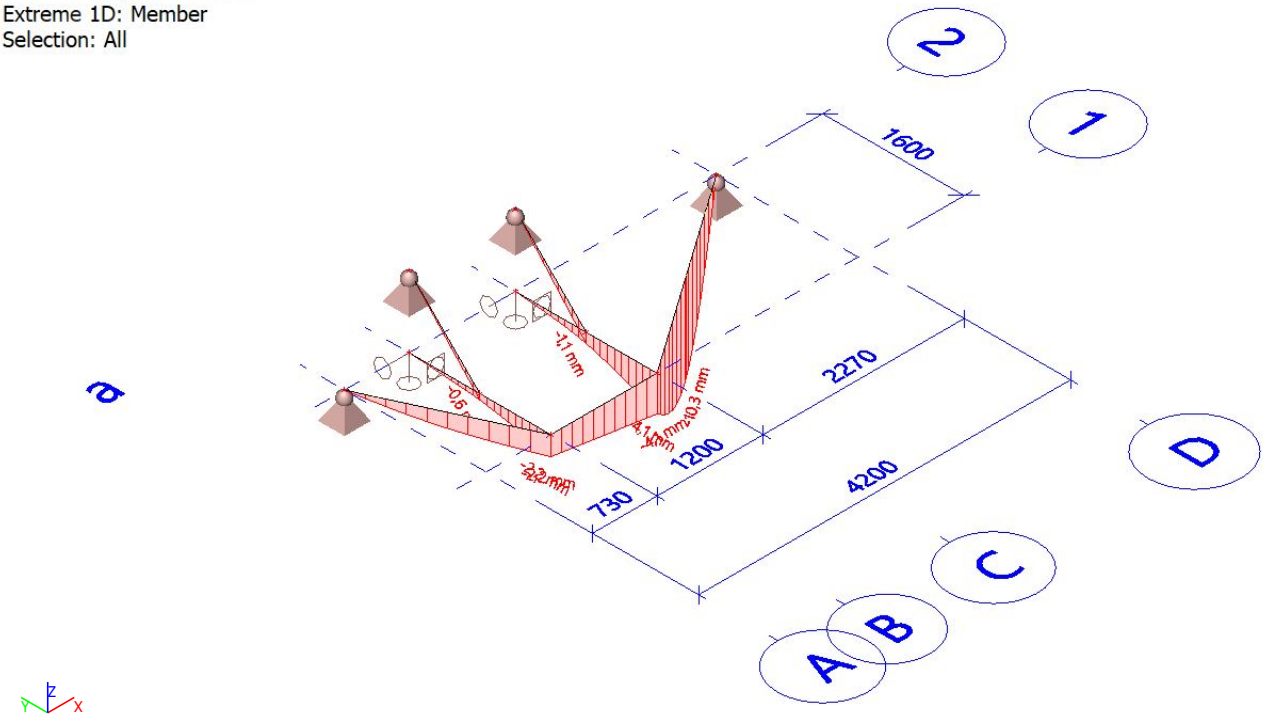
Values: u_x
Linear calculation
Class: All ULS+SLS
Coordinate system: Global
Extreme 1D: Member
Selection: All



Values: u_y
Linear calculation
Class: All ULS+SLS
Coordinate system: Global
Extreme 1D: Member
Selection: All



Values: u_z
Linear calculation
Class: All ULS+SLS
Coordinate system: Global
Extreme 1D: Member
Selection: All



10. Dimenzioniranje Jekla

10.1. EC-EN 1993 Steel check ULS

Values: **$UC_{Overall}$**
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Cross-section
Selection: All

EN 1993-1-1 Code Check
National annex: Slovenian SIST-EN NA

Member B2	**0,800 / 1,600 m**	**IPE120**	**Rolled**	**S 355**	**All ULS**	**0,17 -**

Combination key
All ULS / 1.35*Lastna + 1.35*Stalna + 1.50*Sneg + 0.90*Veter tlak

Partial safety factors		
Resistance of cross-sections	γ_{M0}	1,00
Resistance to instability	γ_{M1}	1,00
Resistance of net sections	γ_{M2}	1,25

Material			
Yield strength	f_y	355,0	MPa
Ultimate strength	f_u	490,0	MPa

...::SECTION CHECK::...

The critical check is on position 0,800 m

Internal forces		Calculated	Unit
Normal force	N_{Ed}	-11,03	kN
Shear force	$V_{y,Ed}$	0,00	kN
Shear force	$V_{z,Ed}$	-5,88	kN
Torsion	T_{Ed}	0,00	kNm
Bending moment	$M_{y,Ed}$	-3,04	kNm
Bending moment	$M_{z,Ed}$	0,00	kNm

Classification for cross-section design
Classification according to EN 1993-1-1 article 5.5.2
Classification of Internal and Outstand parts according to EN 1993-1-1 Table 5.2 Sheet 1 & 2

Id	Type	c [mm]	t [mm]	σ_1 [MPa]	σ_2 [MPa]	Ψ [-]	k_σ [-]	α [-]	c/t [-]	Class 1 Limit [-]	Class 2 Limit [-]	Class 3 Limit [-]	Class
1	SO	22,80	6,30	62,69	62,69	1,0	0,4	1,0	3,6	7,3	8,1	11,4	1
3	SO	22,80	6,30	62,69	62,69	1,0	0,4	1,0	3,6	7,3	8,1	11,4	1
4	I	93,40	4,40	52,99	-36,29	-0,7		0,5	21,2	52,4	60,9	74,4	1
5	SO	22,80	6,30	-46,00	-46,00								
7	SO	22,80	6,30	-46,00	-46,00								

The cross-section is classified as Class 1
Note: The Classification limits have been set according to Semi-Comp+.

Compression check
According to EN 1993-1-1 article 6.2.4 and formula (6.9)

Cross-section area	A	1,3200e+03	mm^2
Compression resistance	$N_{c,Rd}$	468,60	kN
Unity check		0,02	-

Bending moment check for M_y
According to EN 1993-1-1 article 6.2.5 and formula (6.12),(6.13)

Plastic section modulus	$W_{pl,y}$	6,0720e+04	mm^3
Plastic bending moment	$M_{pl,y,Rd}$	21,56	kNm
Unity check		0,14	-

Shear check for V_z
According to EN 1993-1-1 article 6.2.6 and formula (6.17)

Shear correction factor	η	1,20	
Shear area	A_v	6,2952e+02	mm^2
Plastic shear resistance for V_z	$V_{pl,z,Rd}$	129,03	kN
Unity check		0,05	-

Combined bending, axial force and shear force check
According to EN 1993-1-1 article 6.2.9.1 and formula (6.31)

Plastic bending moment	$M_{pl,y,Rd}$	21,56	kNm
Unity check		0,14	-

Note: Since the shear forces are less than half the plastic shear resistances their effect on the moment resistances is neglected.
Note: Since the axial force satisfies both criteria (6.33) and (6.34) of EN 1993-1-1 article 6.2.9.1(4) its effect on the moment resistance about the y-y axis is neglected.

The member satisfies the section check.

...::STABILITY CHECK::...

Classification for member buckling design
Decisive position for stability classification: 0,800 m
Decisive utilisation factor η: 0,14
Classification according to EN 1993-1-1 article 5.5.2
Classification of Internal and Outstand parts according to EN 1993-1-1 Table 5.2 Sheet 1 & 2

Id	Type	c [mm]	t [mm]	σ_1 [MPa]	σ_2 [MPa]	Ψ [-]	k_σ [-]	α [-]	c/t [-]	Class 1 Limit [-]	Class 2 Limit [-]	Class 3 Limit [-]	Class
1	SO	22,80	6,30	62,69	62,69	1,0	0,4	1,0	3,6	7,3	8,1	11,4	1
3	SO	22,80	6,30	62,69	62,69	1,0	0,4	1,0	3,6	7,3	8,1	11,4	1
4	I	93,40	4,40	52,99	-36,29	-0,7		0,5	21,2	52,4	60,9	74,4	1
5	SO	22,80	6,30	-46,00	-46,00								
7	SO	22,80	6,30	-46,00	-46,00								

The cross-section is classified as Class 1
Note: The Classification limits have been set according to Semi-Comp+.
Note: The decisive position for the stability classification is based on the utilisation factor η according to Semi-Comp+.

Flexural Buckling check
According to EN 1993-1-1 article 6.3.1.1 and formula (6.46)

Buckling parameters		yy	zz	
Sway type		sway	non-sway	
System length	L	0,800	1,600	m
Buckling factor	k	3,22	1,00	
Buckling length	l_{cr}	2,574	1,600	m
Critical Euler load	N_{cr}	993,53	223,95	kN
Slenderness	λ	52,48	110,53	
Relative slenderness	λ_{rel}	0,69	1,45	
Limit slenderness	$\lambda_{rel,0}$	0,20	0,20	
Buckling curve		a	b	
Imperfection	α	0,21	0,34	
Reduction factor	χ	0,85	0,36	
Buckling resistance	$N_{b,Rd}$	400,12	169,94	kN

Flexural Buckling verification			
Cross-section area	A	1,3200e+03	mm^2
Buckling resistance	$N_{b,Rd}$	169,94	kN
Unity check		0,06	-

Torsional(-Flexural) Buckling check
According to EN 1993-1-1 article 6.3.1.1 and formula (6.46)
Note: For this I-section the Torsional(-Flexural) buckling resistance is higher than the resistance for Flexural buckling. Therefore Torsional(-Flexural) buckling is not printed on the output.

Lateral Torsional Buckling check
According to EN 1993-1-1 article 6.3.2.1 & 6.3.2.3 and formula (6.54)

LTB parameters			
Method for LTB curve		Alternative case	
Plastic section modulus	$W_{pl,y}$	6,0720e+04	mm^3
Elastic critical moment	M_{cr}	29,13	kNm
Relative slenderness	$\lambda_{rel,LT}$	0,86	
Limit slenderness	$\lambda_{rel,LT,0}$	0,40	

Note: The slenderness or bending moment is such that Lateral Torsional Buckling effects may be ignored according to EN 1993-1-1 article 6.3.2.2(4).

M_{cr} parameters			
LTB length	l_{LT}	1,600	m
Influence of load position		no influence	
Correction factor	k	1,00	
Correction factor	k_w	1,00	
LTB moment factor	C_1	1,35	
LTB moment factor	C_2	0,63	
LTB moment factor	C_3	0,41	
Shear centre distance	d_z	0,00	mm
Distance of load application	z_g	0,00	mm
Mono-symmetry constant	β_y	0,00	mm
Mono-symmetry constant	z_j	0,00	mm

Note: C parameters are determined according to ECCS 119 2006 / Galea 2002.

Bending and axial compression check
According to EN 1993-1-1 article 6.3.3 and formula (6.61),(6.62)

Bending and axial compression check parameters			
Interaction method		alternative method 1	
Cross-section area	A	1,3200e+03	mm^2
Plastic section modulus	$W_{pl,y}$	6,0720e+04	mm^3
Design compression force	N_{Ed}	11,03	kN
Design bending moment (maximum)	$M_{y,Ed}$	-3,04	kNm
Design bending moment (maximum)	$M_{z,Ed}$	0,00	kNm
Characteristic compression resistance	N_{Rk}	468,60	kN
Characteristic moment resistance	$M_{y,Rk}$	21,56	kNm
Reduction factor	χ_y	0,85	
Reduction factor	χ_z	0,36	
Modified reduction factor	$\chi_{LT,mod}$	1,00	
Interaction factor	k_{yy}	1,04	
Interaction factor	k_{zy}	0,55	

Maximum moment $M_{y,Ed}$ is derived from beam B2 position 0,800 m.
Maximum moment $M_{z,Ed}$ is derived from beam B2 position 0,000 m.

Interaction method 1 parameters			
Critical Euler load	$N_{cr,y}$	993,53	kN
Critical Euler load	$N_{cr,z}$	223,95	kN
Elastic critical load	$N_{cr,T}$	796,81	kN
Plastic section modulus	$W_{pl,y}$	6,0720e+04	mm^3
Elastic section modulus	$W_{el,y}$	5,2950e+04	mm^3
Plastic section modulus	$W_{pl,z}$	1,3580e+04	mm^3
Elastic section modulus	$W_{el,z}$	8,6460e+03	mm^3
Second moment of area	I_y	3,1770e+06	mm^4
Second moment of area	I_z	2,7660e+05	mm^4
Torsional constant	I_t	1,6900e+04	mm^4
Method for equivalent moment factor $C_{my,0}$		Table A.2 Line 2 (General)	
Design bending moment (maximum)	$M_{y,Ed}$	-3,04	kNm
Maximum relative deflection	δ_z	0,1	mm
Equivalent moment factor	$C_{my,0}$	0,99	
Factor	μ_y	1,00	
Factor	μ_z	0,97	
Factor	ε_y	6,87	
Factor	a_{LT}	0,99	
Critical moment for uniform bending	$M_{cr,0}$	21,61	kNm
Relative slenderness	$\lambda_{rel,0}$	1,00	
Limit relative slenderness	$\lambda_{rel,0,lim}$	0,23	
Equivalent moment factor	C_{my}	1,00	
Equivalent moment factor	C_{mLT}	1,02	
Factor	b_{LT}	0,00	
Factor	d_{LT}	0,00	
Factor	w_y	1,15	
Factor	w_z	1,50	
Factor	n_{pl}	0,02	
Maximum relative slenderness	$\lambda_{rel,max}$	1,45	
Factor	C_{yy}	0,99	
Factor	C_{zy}	0,96	

Unity check (6.61) = 0,03 + 0,15 + 0,00 = 0,17 -
Unity check (6.62) = 0,06 + 0,08 + 0,00 = 0,14 -

Shear Buckling check
According to EN 1993-1-5 article 5 & 7.1 and formula (5.10) & (7.1)

Shear Buckling parameters			
Buckling field length	a	1,600	m
Web		unstiffened	
Web height	h_w	107,40	mm
Web thickness	t	4,40	mm
Material coefficient	ε	0,81	
Shear correction factor	η	1,20	

Shear Buckling verification		
Web slenderness	h_w/t	24,41
Web slenderness limit		48,82

Note: The web slenderness is such that Shear Buckling effects may be ignored according to EN 1993-1-5 article 5.1(2).

The member satisfies the stability check.

EN 1993-1-1 Code Check
National annex: Slovenian SIST-EN NA

Member B5	**1,296 / 2,777 m**	**RHS100/50/3.0**	**Rolled**	**S 355**	**All ULS**	**0,25 -**

Combination key
All ULS / 1.35*Lastna + 1.35*Stalna + 1.50*Sneg + 0.90*Veter tlak

Partial safety factors		
Resistance of cross-sections	γ_{M0}	1,00
Resistance to instability	γ_{M1}	1,00
Resistance of net sections	γ_{M2}	1,25

Material			
Yield strength	f_y	355,0	MPa
Ultimate strength	f_u	490,0	MPa

...::SECTION CHECK::...

The critical check is on position 1,296 m

Internal forces		Calculated	Unit
Normal force	N_{Ed}	-0,68	kN
Shear force	$V_{y,Ed}$	0,00	kN
Shear force	$V_{z,Ed}$	0,11	kN
Torsion	T_{Ed}	0,00	kNm
Bending moment	$M_{y,Ed}$	2,41	kNm
Bending moment	$M_{z,Ed}$	0,00	kNm

Classification for cross-section design
Classification according to EN 1993-1-1 article 5.5.2
Classification of Internal and Outstand parts according to EN 1993-1-1 Table 5.2 Sheet 1 & 2

Id	Type	c [mm]	t [mm]	σ_1 [MPa]	σ_2 [MPa]	Ψ [-]	k_σ [-]	α [-]	c/t [-]	Class 1 Limit [-]	Class 2 Limit [-]	Class 3 Limit [-]	Class
1	I	41,00	3,00	-107,22	-107,22								
3	I	91,00	3,00	-100,54	102,14	-1,0		0,5	30,3	57,9	66,8	99,3	1
5	I	41,00	3,00	108,83	108,83	1,0		1,0	13,7	22,8	27,7	30,9	1
7	I	91,00	3,00	102,14	-100,54	-1,0		0,5	30,3	57,9	66,8	99,3	1

The cross-section is classified as Class 1
Note: The Classification limits have been set according to Semi-Comp+.

Compression check
According to EN 1993-1-1 article 6.2.4 and formula (6.9)

Cross-section area	A	8,5400e+02	mm^2
Compression resistance	$N_{c,Rd}$	303,17	kN
Unity check		0,00	-

Bending moment check for M_y
According to EN 1993-1-1 article 6.2.5 and formula (6.12),(6.13)

Plastic section modulus	$W_{pl,y}$	2,7029e+04	mm^3
Plastic bending moment	$M_{pl,y,Rd}$	9,60	kNm
Unity check		0,25	-

Shear check for V_z
According to EN 1993-1-1 article 6.2.6 and formula (6.17)

Shear correction factor	η	1,20	
Shear area	A_v	5,6933e+02	mm^2
Plastic shear resistance for V_z	$V_{pl,z,Rd}$	116,69	kN
Unity check		0,00	-

Combined bending, axial force and shear force check
According to EN 1993-1-1 article 6.2.9.1 and formula (6.31)

Design plastic moment resistance reduced due to N_{Ed}	$M_{N,y,Rd}$	9,60	kNm
Unity check		0,25	-

Note: Since the shear forces are less than half the plastic shear resistances their effect on the moment resistances is neglected.

The member satisfies the section check.

...::STABILITY CHECK::...

Classification for member buckling design
Decisive position for stability classification: 1,296 m
Decisive utilisation factor η: 0,25
Classification according to EN 1993-1-1 article 5.5.2
Classification of Internal and Outstand parts according to EN 1993-1-1 Table 5.2 Sheet 1 & 2

Id	Type	c [mm]	t [mm]	σ_1 [MPa]	σ_2 [MPa]	Ψ [-]	k_σ [-]	α [-]	c/t [-]	Class 1 Limit [-]	Class 2 Limit [-]	Class 3 Limit [-]	Class
1	I	41,00	3,00	-107,22	-107,22								
3	I	91,00	3,00	-100,54	102,14	-1,0		0,5	30,3	57,9	66,8	99,3	1
5	I	41,00	3,00	108,83	108,83	1,0		1,0	13,7	22,8	27,7	30,9	1
7	I	91,00	3,00	102,14	-100,54	-1,0		0,5	30,3	57,9	66,8	99,3	1

The cross-section is classified as Class 1
Note: The Classification limits have been set according to Semi-Comp+.
Note: The decisive position for the stability classification is based on the utilisation factor η according to Semi-Comp+.

Flexural Buckling check
According to EN 1993-1-1 article 6.3.1.1 and formula (6.46)

Buckling parameters		yy	zz	
Sway type		sway	non-sway	
System length	L	2,777	2,777	m
Buckling factor	k	1,00	1,00	
Buckling length	l_{cr}	2,777	2,777	m
Critical Euler load	N_{cr}	295,59	98,89	kN
Slenderness	λ	77,38	133,78	
Relative slenderness	λ_{rel}	1,01	1,75	
Limit slenderness	$\lambda_{rel,0}$	0,20	0,20	

Note: The slenderness or compression force is such that Flexural Buckling effects may be ignored according to EN 1993-1-1 article 6.3.1.2(4).

Torsional(-Flexural) Buckling check
According to EN 1993-1-1 article 6.3.1.1 and formula (6.46)
Note: The cross-section concerns a RHS section which is not susceptible to Torsional(-Flexural) Buckling.

Lateral Torsional Buckling check
According to EN 1993-1-1 article 6.3.2.1
Note: The cross-section concerns an RHS section with 'h / b < 10 / $\lambda_{rel,z}$'.
This section is thus not susceptible to Lateral Torsional Buckling.

Bending and axial compression check
According to EN 1993-1-1 article 6.3.3 and formula (6.61),(6.62)

Bending and axial compression check parameters			
Interaction method		alternative method 1	
Cross-section area	A	8,5400e+02	mm^2
Plastic section modulus	$W_{pl,y}$	2,7029e+04	mm^3
Design compression force	N_{Ed}	0,68	kN
Design bending moment (maximum)	$M_{y,Ed}$	2,41	kNm
Design bending moment (maximum)	$M_{z,Ed}$	0,00	kNm
Characteristic compression resistance	N_{Rk}	303,17	kN
Characteristic moment resistance	$M_{y,Rk}$	9,60	kNm
Reduction factor	χ_y	1,00	
Reduction factor	χ_z	1,00	
Reduction factor	χ_{LT}	1,00	
Interaction factor	k_{yy}	1,00	
Interaction factor	k_{zy}	0,63	

Maximum moment $M_{y,Ed}$ is derived from beam B5 position 1,296 m.
Maximum moment $M_{z,Ed}$ is derived from beam B5 position 0,000 m.

Interaction method 1 parameters			
Critical Euler load	$N_{cr,y}$	295,59	kN
Critical Euler load	$N_{cr,z}$	98,89	kN
Elastic critical load	$N_{cr,T}$	41609,79	kN
Plastic section modulus	$W_{pl,y}$	2,7029e+04	mm^3
Elastic section modulus	$W_{el,y}$	2,1900e+04	mm^3
Plastic section modulus	$W_{pl,z}$	1,6622e+04	mm^3
Elastic section modulus	$W_{el,z}$	1,4700e+04	mm^3
Second moment of area	I_y	1,1000e+06	mm^4
Second moment of area	I_z	3,6800e+05	mm^4
Torsional constant	I_t	8,8400e+05	mm^4
Method for equivalent moment factor $C_{my,0}$		Table A.2 Line 4 (Line load)	
Equivalent moment factor	$C_{my,0}$	1,00	
Factor	μ_y	1,00	
Factor	μ_z	1,00	
Factor	ε_y	138,37	
Factor	a_{LT}	0,20	
Critical moment for uniform bending	$M_{cr,0}$	84,10	kNm
Relative slenderness	$\lambda_{rel,0}$	0,34	
Limit relative slenderness	$\lambda_{rel,0,lim}$	0,21	
Equivalent moment factor	C_{my}	1,00	
Equivalent moment factor	C_{mLT}	1,00	
Factor	b_{LT}	0,00	
Factor	d_{LT}	0,00	
Factor	w_y	1,23	
Factor	w_z	1,13	
Factor	n_{pl}	0,00	
Maximum relative slenderness	$\lambda_{rel,max}$	1,75	
Factor	C_{yy}	1,00	
Factor	C_{zy}	0,99	

Unity check (6.61) = 0,00 + 0,25 + 0,00 = 0,25 -
Unity check (6.62) = 0,00 + 0,16 + 0,00 = 0,16 -

The member satisfies the stability check.

EN 1993-1-1 Code Check
National annex: Slovenian SIST-EN NA

Member B9	**0,000 / 1,131 m**	**RD12**	**Rolled**	**S 355**	**All ULS**	**0,41 -**

Combination key
All ULS / 1.35*Lastna + 1.35*Stalna + 1.50*Sneg + 0.90*Veter tlak

Partial safety factors		
Resistance of cross-sections	γ_{M0}	1,00
Resistance to instability	γ_{M1}	1,00
Resistance of net sections	γ_{M2}	1,25

Material			
Yield strength	f_y	355,0	MPa
Ultimate strength	f_u	490,0	MPa

Warning: Strength reduction in function of the thickness is not supported for this type of cross-section.

...::SECTION CHECK::...

The critical check is on position 0,000 m

Internal forces		Calculated	Unit
Normal force	N_{Ed}	16,16	kN
Shear force	$V_{y,Ed}$	0,00	kN
Shear force	$V_{z,Ed}$	0,00	kN
Torsion	T_{Ed}	0,00	kNm
Bending moment	$M_{y,Ed}$	0,00	kNm
Bending moment	$M_{z,Ed}$	0,00	kNm

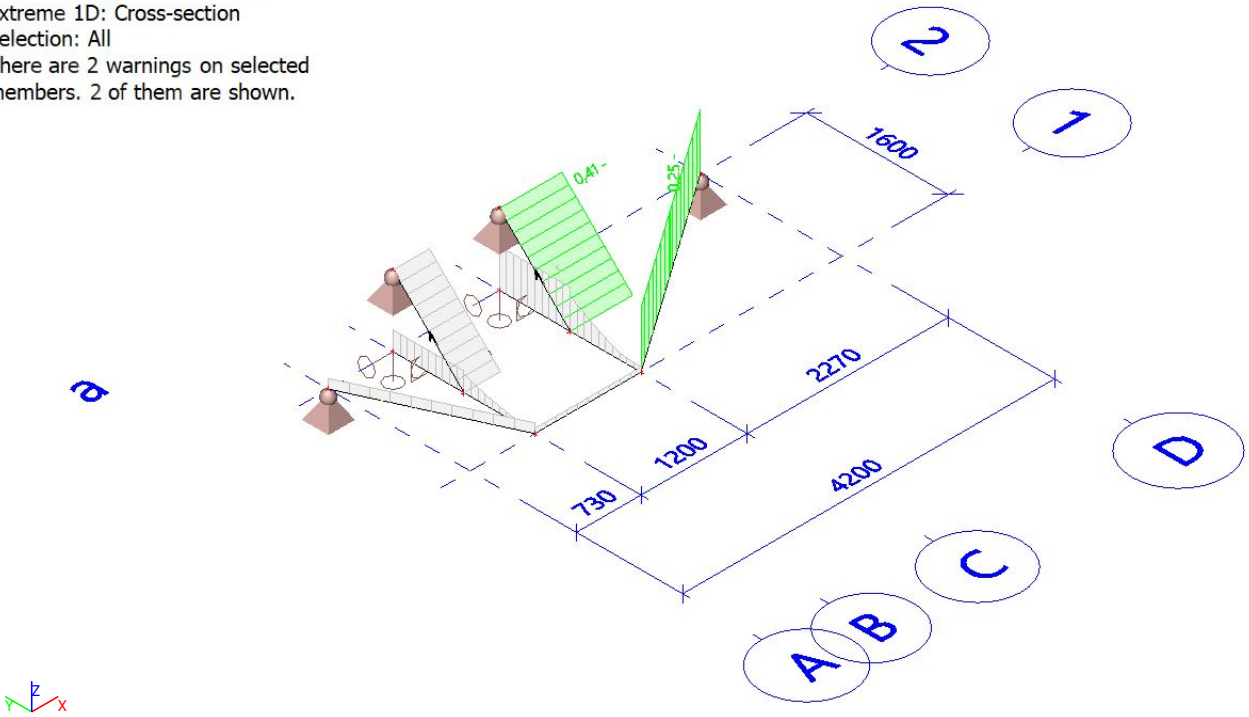
Classification for cross-section design
Warning: Classification is not supported for this type of cross-section.
The section is checked as elastic, class 3.

Tension check
According to EN 1993-1-1 article 6.2.3 and formula (6.5)

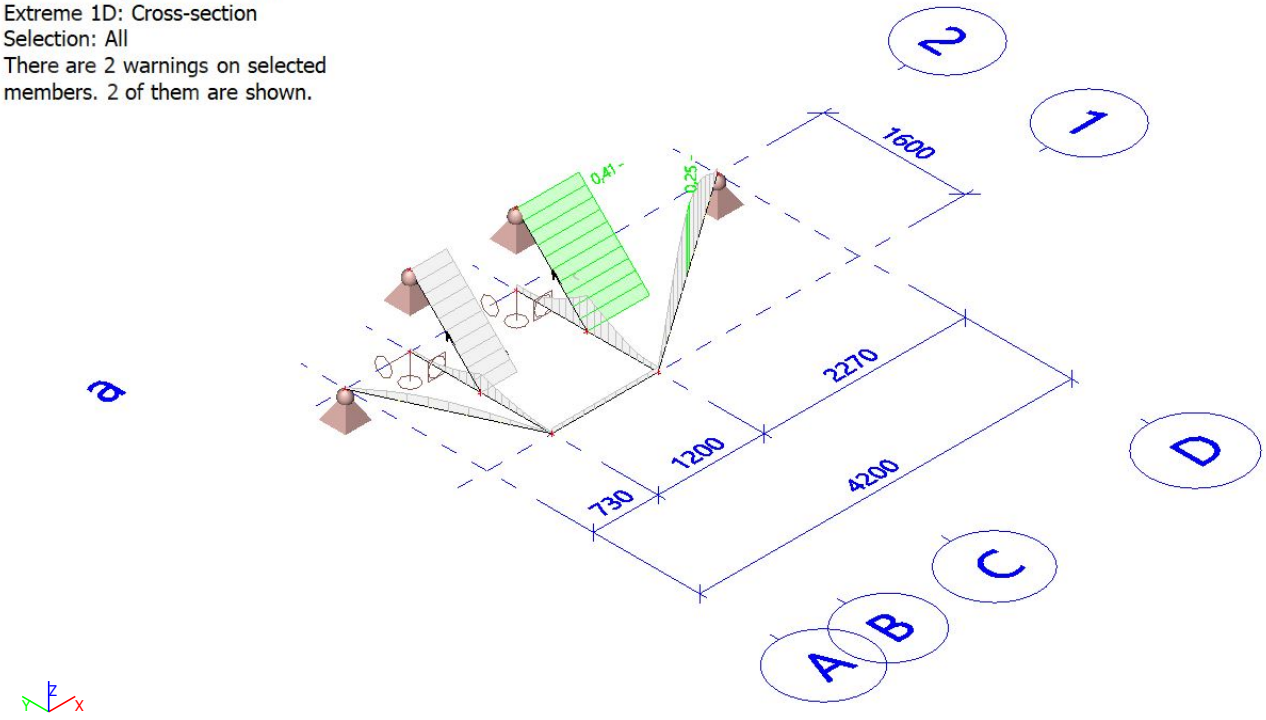
Cross-section area	A	1,1304e+02	mm^2
Plastic tension resistance	$N_{pl,Rd}$	40,13	kN
Ultimate tension resistance	$N_{u,Rd}$	39,88	kN
Tension resistance	$N_{t,Rd}$	39,88	kN
Unity check		0,41	-

The member satisfies the section check.

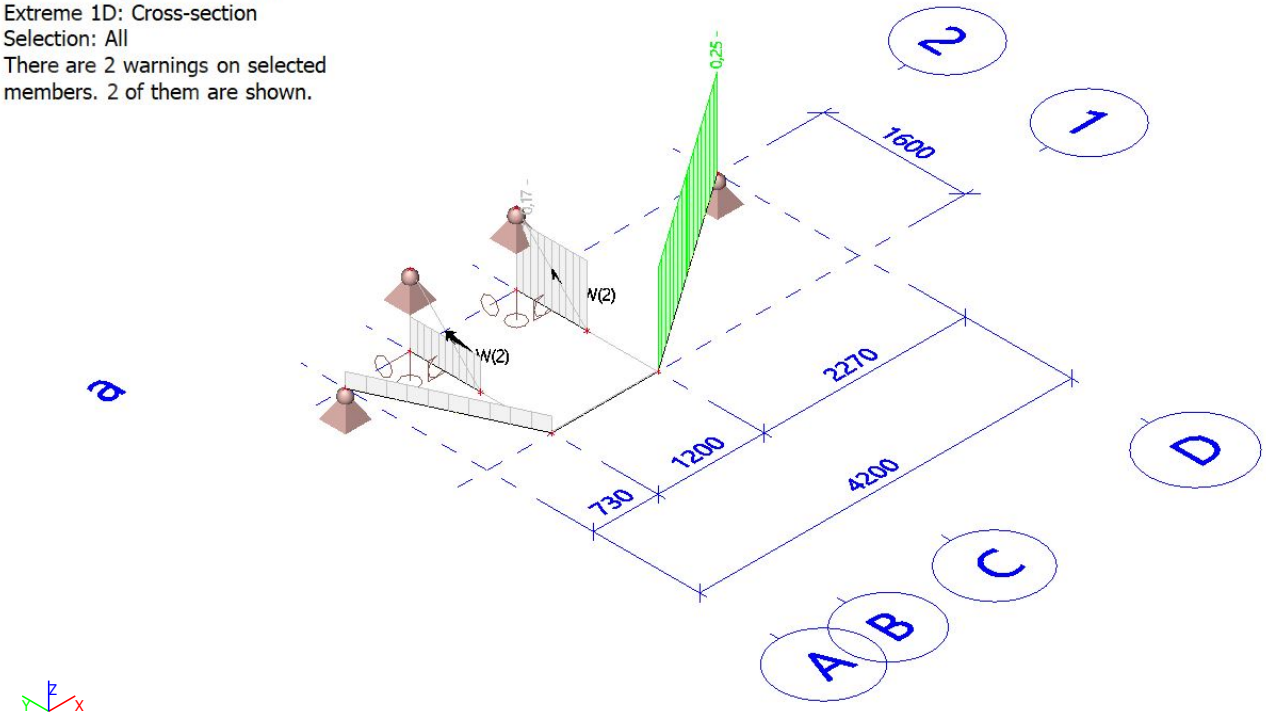
Values: **$UC_{Overall}$**
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Cross-section
Selection: All
There are 2 warnings on selected members. 2 of them are shown.



Values: **UC**$_{Sec}$
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Cross-section
Selection: All
There are 2 warnings on selected members. 2 of them are shown.



Values: **UC**$_{Stab}$
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Cross-section
Selection: All
There are 2 warnings on selected members. 2 of them are shown.



1. Kazalo

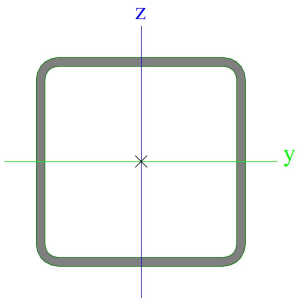
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2. Materiali

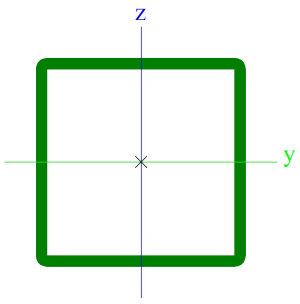
Steel EC3

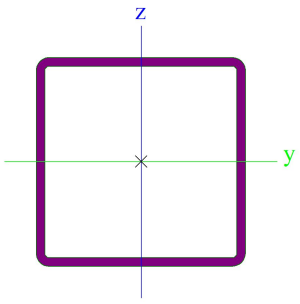
Name	ρ [kg/m³]	E_{mod} [MPa]	μ	Lower limit [mm]	Upper limit [mm]	F_y [MPa]	F_u [MPa]	Colour
		G_{mod} [MPa]	α [m/mK]					
S 355	7850,00	2,1000e+05	0.3	0,00	40,00	355,0	490,0	
		8,0769e+04	0,01e-003	40,00	80,00	335,0	470,0	

3. Prerezi

Stebri		
Type	QRO120X5K	
Formcode	2 - Rectangular hollow section	
Shape type	Thin-walled	
Item material	S 355	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	a	a
A [mm²]	2,2142e+03	
A_y [mm²], A_z [mm²]	1,1063e+03	1,1063e+03
A_L [m²/m], A_D [m²/m]	4,5854e-01	8,8550e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	60,00	60,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	4,7769e+06	4,7769e+06
i_y [mm], i_z [mm]	46,45	46,45
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	7,9614e+04	7,9614e+04
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	9,4150e+04	9,4150e+04
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	33391504,87	33391504,87
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	33391504,87	33391504,87
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm⁴], I_w [mm⁶]	7,8000e+06	1,0368e+10
β_y [mm], β_z [mm]	0,00	0,00
Picture		

Nosilci dvigala		
Type	QRO100X5	
Formcode	2 - Rectangular hollow section	
Shape type	Thin-walled	
Item material	S 355	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	a	a
A [mm²]	1,8800e+03	
A_y [mm²], A_z [mm²]	9,3907e+02	9,3907e+02
A_L [m²/m], A_D [m²/m]	3,9100e-01	7,5137e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	50,00	50,00
α [deg]	0,00	
I_y [mm⁴], I_z [mm⁴]	2,8100e+06	2,8100e+06
i_y [mm], i_z [mm]	38,66	38,66
$W_{el.y}$ [mm³], $W_{el.z}$ [mm³]	5,6300e+04	5,6300e+04
$W_{pl.y}$ [mm³], $W_{pl.z}$ [mm³]	6,6700e+04	6,6700e+04

$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	23672030,60	23672030,60
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	23672030,60	23672030,60
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm^4], I_w [mm^6]	4,3300e+06	4,1667e+09
β_y [mm], β_z [mm]	0,00	0,00
Picture		

Prečke		
Type	QRO120X5	
Formcode	2 - Rectangular hollow section	
Shape type	Thin-walled	
Item material	S 355	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	a	a
A [mm^2]	2,2600e+03	
A_y [mm^2], A_z [mm^2]	1,1303e+03	1,1303e+03
A_L [m^2/m], A_D [m^2/m]	4,6800e-01	9,0448e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	60,00	60,00
α [deg]	0,00	
I_y [mm^4], I_z [mm^4]	4,9500e+06	4,9500e+06
i_y [mm], i_z [mm]	46,80	46,80
$W_{el.y}$ [mm^3], $W_{el.z}$ [mm^3]	8,2400e+04	8,2400e+04
$W_{pl.y}$ [mm^3], $W_{pl.z}$ [mm^3]	9,7000e+04	9,7000e+04
$M_{pl.y.+}$ [Nmm], $M_{pl.y.-}$ [Nmm]	34412986,45	34412986,45
$M_{pl.z.+}$ [Nmm], $M_{pl.z.-}$ [Nmm]	34412986,45	34412986,45
d_y [mm], d_z [mm]	0,00	0,00
I_t [mm^4], I_w [mm^6]	7,7100e+06	1,0368e+10
β_y [mm], β_z [mm]	0,00	0,00
Picture		

Explanations of symbols	
Formcode	h - Height b - Width s - Thickness r - Outer radius r1 - Inner radius
A	Area
A_y	Shear Area in principal y-direction
A_z	Shear Area in principal z-direction
A_L	Circumference per unit length

Explanations of symbols	
A_D	Drying surface per unit length
$c_{Y.UCS}$	Centroid coordinate in Y-direction of Input axis system
$c_{Z.UCS}$	Centroid coordinate in Z-direction of Input axis system
$I_{Y.LCS}$	Second moment of area about the YLCS axis
$I_{Z.LCS}$	Second moment of area about the ZLCS axis

Explanations of symbols	
$I_{YZ.LCS}$	Product moment of area in the LCS system
α	Rotation angle of the principal axis system
I_y	Second moment of area about the principal y-axis
I_z	Second moment of area about the principal z-axis
i_y	Radius of gyration about the principal y-axis
i_z	Radius of gyration about the principal z-axis
$W_{el.y}$	Elastic section modulus about the principal y-axis
$W_{el.z}$	Elastic section modulus about the principal z-axis
$W_{pl.y}$	Plastic section modulus about the principal y-axis
$W_{pl.z}$	Plastic section modulus about the principal z-axis

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

4. Elementi

Name	Cross-section	Material	Length [m]	Beg. node	End node	Type
B1	Stebri - QRO120X5K	S 355	9,180	N1	N2	column (100)
B2	Stebri - QRO120X5K	S 355	9,180	N3	N4	column (100)
B3	Stebri - QRO120X5K	S 355	9,180	N5	N6	column (100)
B4	Stebri - QRO120X5K	S 355	9,180	N7	N8	column (100)
B5	Prečke - QRO120X5	S 355	1,870	N9	N10	beam (80)
B6	Prečke - QRO120X5	S 355	1,770	N10	N11	beam (80)
B7	Prečke - QRO120X5	S 355	1,870	N11	N12	beam (80)
B8	Prečke - QRO120X5	S 355	1,770	N12	N9	beam (80)
B9	Prečke - QRO120X5	S 355	1,870	N2	N4	beam (80)
B10	Prečke - QRO120X5	S 355	1,770	N6	N4	beam (80)
B11	Prečke - QRO120X5	S 355	1,870	N6	N8	beam (80)
B12	Prečke - QRO120X5	S 355	1,770	N8	N2	beam (80)
B13	Prečke - QRO120X5	S 355	1,870	N15	N13	beam (80)
B14	Prečke - QRO120X5	S 355	1,770	N16	N15	beam (80)
B15	Prečke - QRO120X5	S 355	1,870	N14	N16	beam (80)
B17	Nosilci dvigala - QRO100X5	S 355	1,870	N17	N18	beam (80)
B18	Nosilci dvigala - QRO100X5	S 355	1,870	N19	N20	beam (80)
B19	Nosilci dvigala - QRO100X5	S 355	1,870	N21	N22	beam (80)
B20	Nosilci dvigala - QRO100X5	S 355	1,870	N23	N24	beam (80)
B21	Prečke - QRO120X5	S 355	0,200	N12	N25	beam (80)
B22	Prečke - QRO120X5	S 355	0,200	N12	N26	beam (80)
B23	Prečke - QRO120X5	S 355	0,200	N11	N27	beam (80)
B24	Prečke - QRO120X5	S 355	0,200	N11	N28	beam (80)
B25	Prečke - QRO120X5	S 355	0,200	N10	N29	beam (80)
B26	Prečke - QRO120X5	S 355	0,200	N10	N30	beam (80)
B27	Prečke - QRO120X5	S 355	0,200	N9	N31	beam (80)
B28	Prečke - QRO120X5	S 355	0,200	N9	N32	beam (80)
B29	Prečke - QRO120X5	S 355	1,770	N33	N34	beam (80)
B30	Stebri - QRO120X5K	S 355	2,600	N35	N36	beam (80)
B31	Prečke - QRO120X5	S 355	0,350	N13	N37	beam (80)
B32	Prečke - QRO120X5	S 355	1,420	N37	N14	beam (80)
B33	Stebri - QRO120X5K	S 355	1,860	N36	N38	column (100)
B34	Stebri - QRO120X5K	S 355	2,250	N38	N39	column (100)
B35	Prečke - QRO120X5	S 355	1,770	N40	N41	beam (80)
B36	Stebri - QRO120X5K	S 355	2,470	N39	N42	column (100)

5. Vozlišča

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N1	0,000	0,000	0,000

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N2	0,000	0,000	9,180

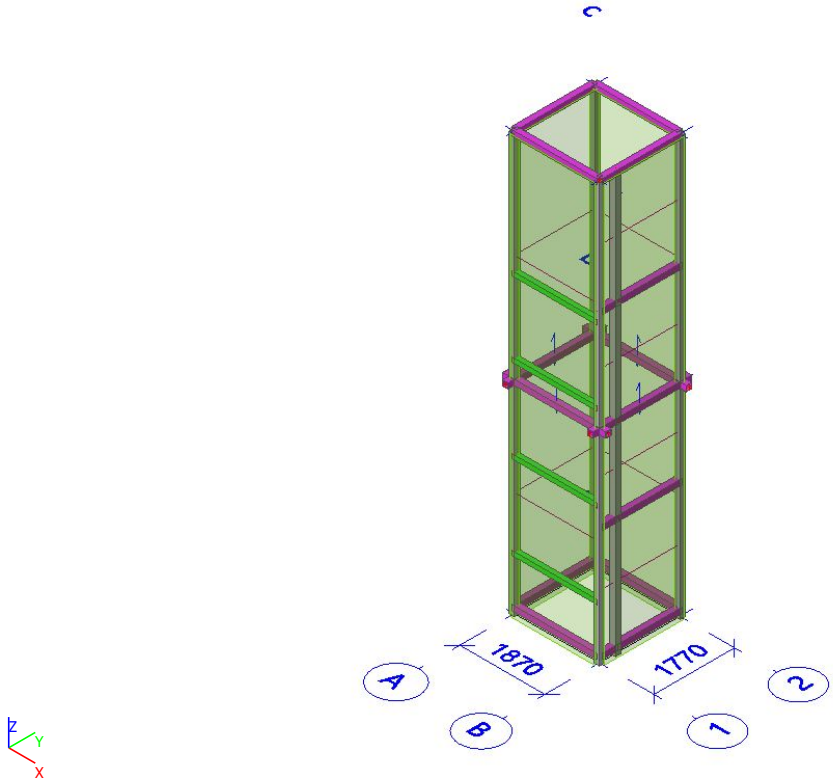
Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N3	1,870	0,000	0,000
N4	1,870	0,000	9,180
N5	1,870	1,770	0,000
N6	1,870	1,770	9,180
N7	0,000	1,770	0,000
N8	0,000	1,770	9,180
N9	0,000	0,000	4,460
N10	1,870	0,000	4,460
N11	1,870	1,770	4,460
N12	0,000	1,770	4,460
N13	1,870	0,000	0,150
N14	1,870	1,770	0,150
N15	0,000	0,000	0,150
N16	0,000	1,770	0,150
N17	0,000	0,000	1,180
N18	1,870	0,000	1,180
N19	0,000	0,000	3,020
N20	1,870	0,000	3,020
N21	0,000	0,000	4,860
N22	1,870	0,000	4,860

Name	Coord X [m]	Coord Y [m]	Coord Z [m]
N23	0,000	0,000	6,500
N24	1,870	0,000	6,500
N25	-0,200	1,770	4,460
N26	0,000	1,970	4,460
N27	1,870	1,970	4,460
N28	2,070	1,770	4,460
N29	1,870	-0,200	4,460
N30	2,070	0,000	4,460
N31	-0,200	0,000	4,460
N32	0,000	-0,200	4,460
N33	1,870	0,000	2,600
N34	1,870	1,770	2,600
N35	1,870	0,350	0,000
N36	1,870	0,350	2,600
N37	1,870	0,350	0,150
N38	1,870	0,350	4,460
N39	1,870	0,350	6,710
N40	1,870	0,000	6,710
N41	1,870	1,770	6,710
N42	1,870	0,350	9,180

6. Podpore

Name	Node	System	Type	X	Y	Z	Rx	Ry	Rz
Sn1	N1	GCS	Standard	Rigid	Rigid	Rigid	Free	Free	Free
Sn2	N3	GCS	Standard	Rigid	Rigid	Rigid	Free	Free	Free
Sn3	N5	GCS	Standard	Rigid	Rigid	Rigid	Free	Free	Free
Sn4	N7	GCS	Standard	Rigid	Rigid	Rigid	Free	Free	Free
Sn5	N2	GCS	Standard	Rigid	Rigid	Free	Free	Free	Rigid
Sn6	N4	GCS	Standard	Rigid	Rigid	Free	Free	Free	Rigid
Sn7	N6	GCS	Standard	Rigid	Rigid	Free	Free	Free	Rigid
Sn8	N8	GCS	Standard	Rigid	Rigid	Free	Free	Free	Rigid
Sn9	N26	GCS	Standard	Free	Rigid	Free	Free	Free	Free
Sn10	N27	GCS	Standard	Free	Rigid	Free	Free	Free	Free
Sn11	N29	GCS	Standard	Free	Rigid	Free	Free	Free	Free
Sn12	N32	GCS	Standard	Free	Rigid	Free	Free	Free	Free
Sn13	N25	GCS	Standard	Rigid	Free	Free	Free	Free	Free
Sn14	N28	GCS	Standard	Rigid	Free	Free	Free	Free	Free
Sn15	N30	GCS	Standard	Rigid	Free	Free	Free	Free	Free
Sn16	N31	GCS	Standard	Rigid	Free	Free	Free	Free	Free
Sn17	N35	GCS	Standard	Rigid	Rigid	Rigid	Free	Free	Free

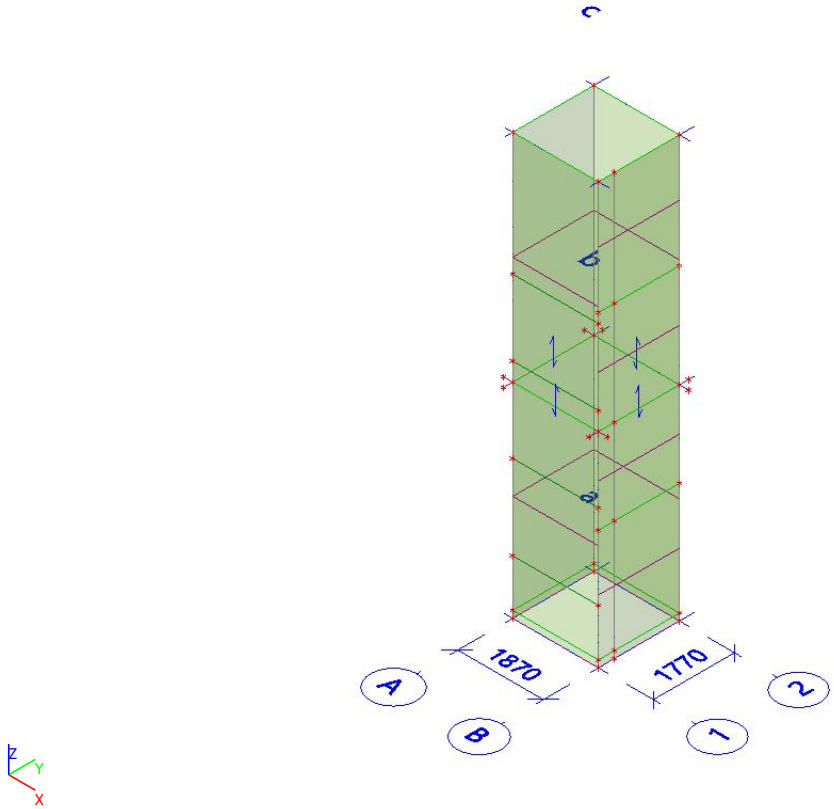
7. Model konstrikcije



8. Obtežni primeri

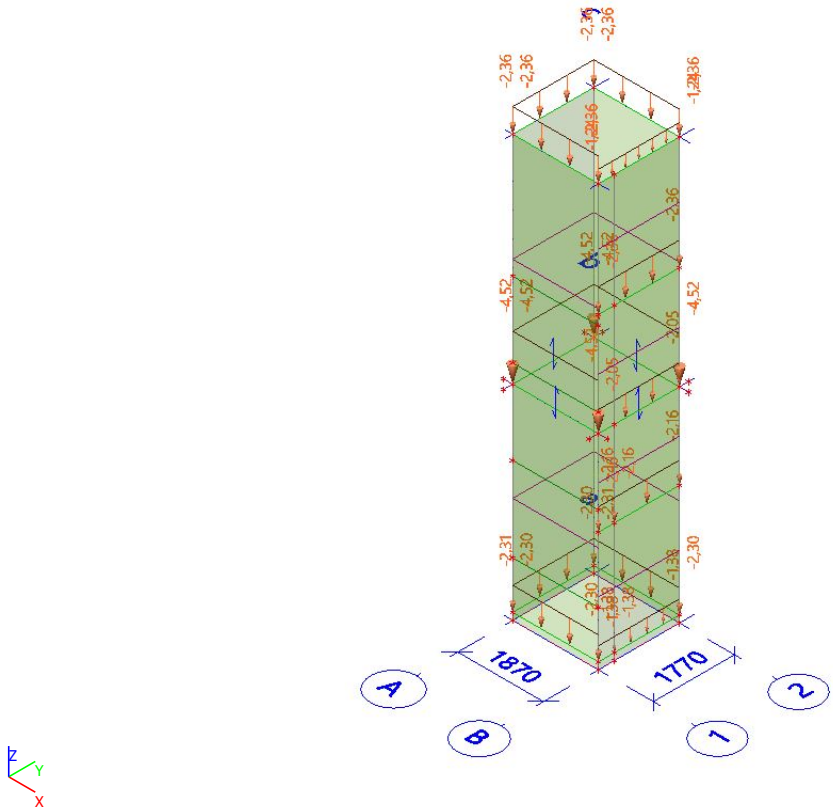
8.1. Obtežni primeri - Lastna

Name	Description	Action type	Load group	Direction
	Spec	Load type		
Lastna		Permanent	Lastna in stalna	-Z
		Self weight		



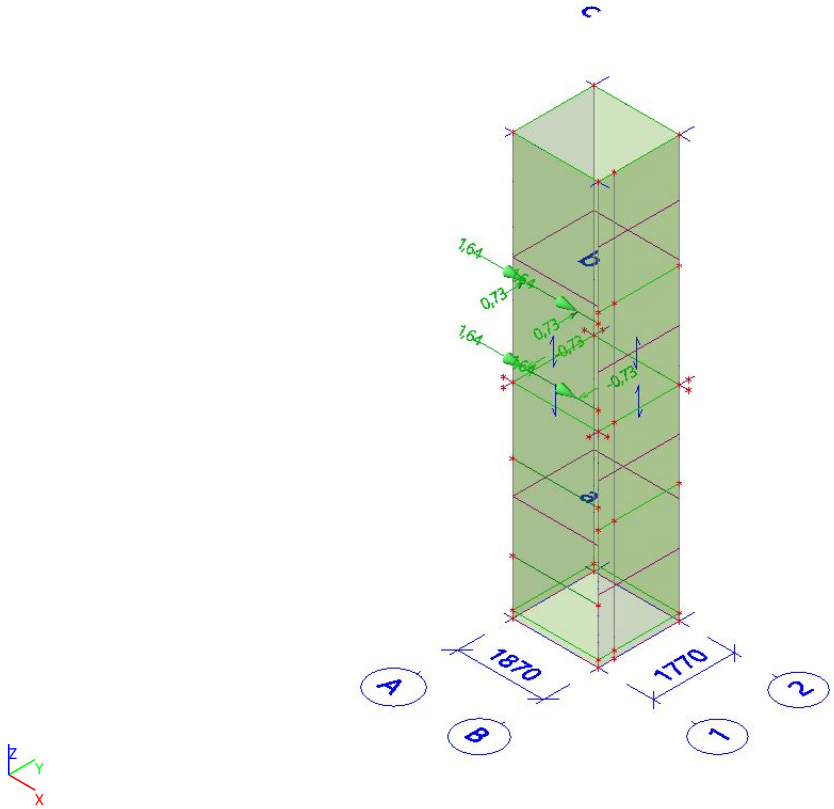
8.2. Obtežni primeri - Stalna

Name	Description	Action type	Load group
	Spec	Load type	
Stalna		Permanent	Lastna in stalna
		Standard	



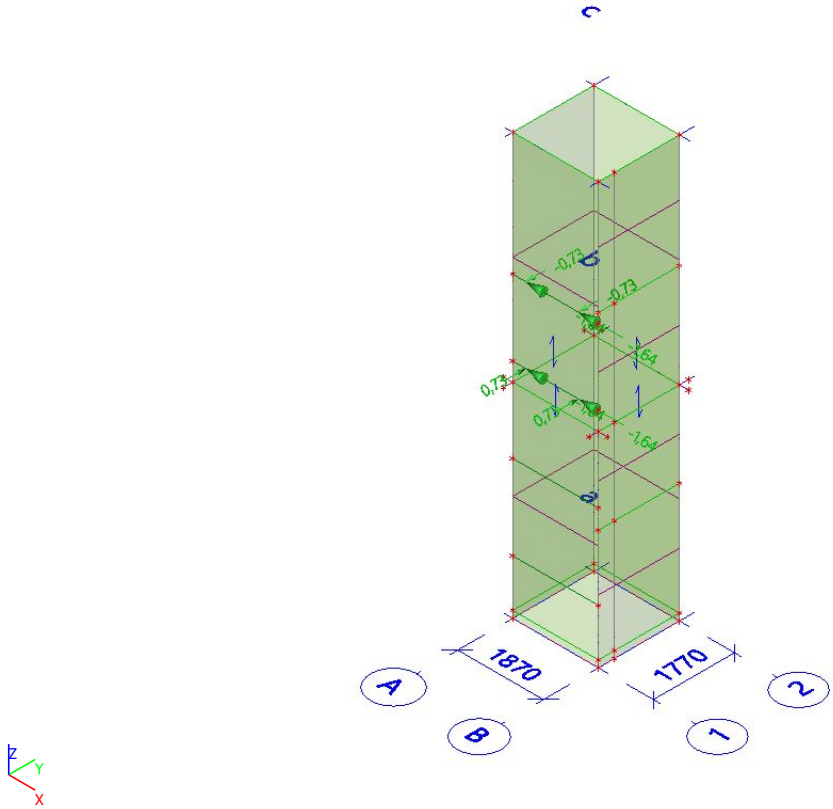
8.3. Obtežni primeri - Koristna1

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
Koristna1		Variable	Koristna	Medium	None
	Standard	Static			



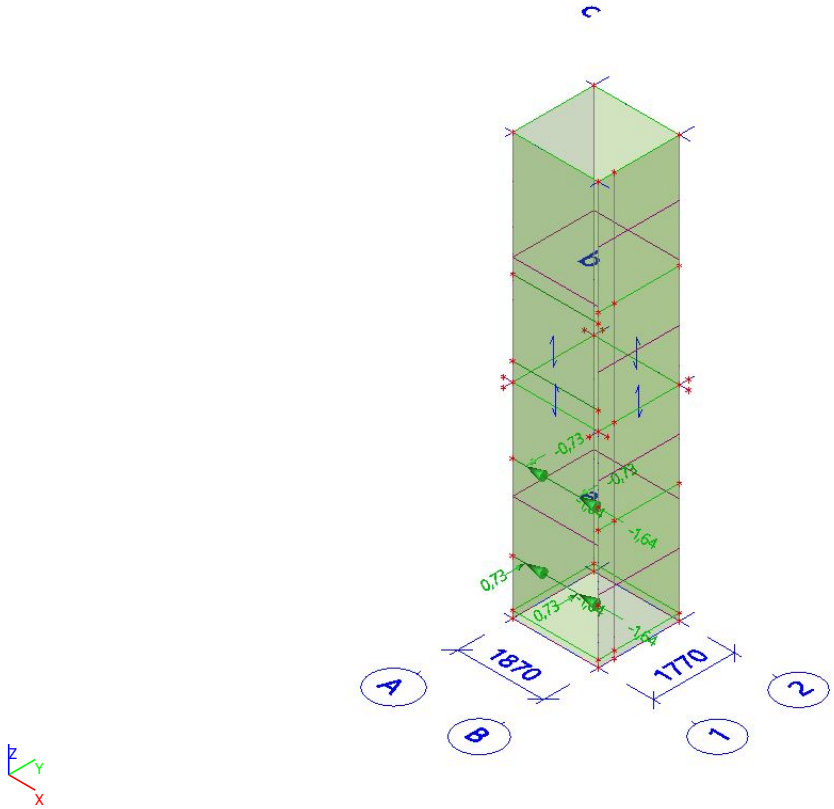
8.4. Obtežni primeri - Koristna2

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
Koristna2		Variable	Koristna	Medium	None
	Standard	Static			



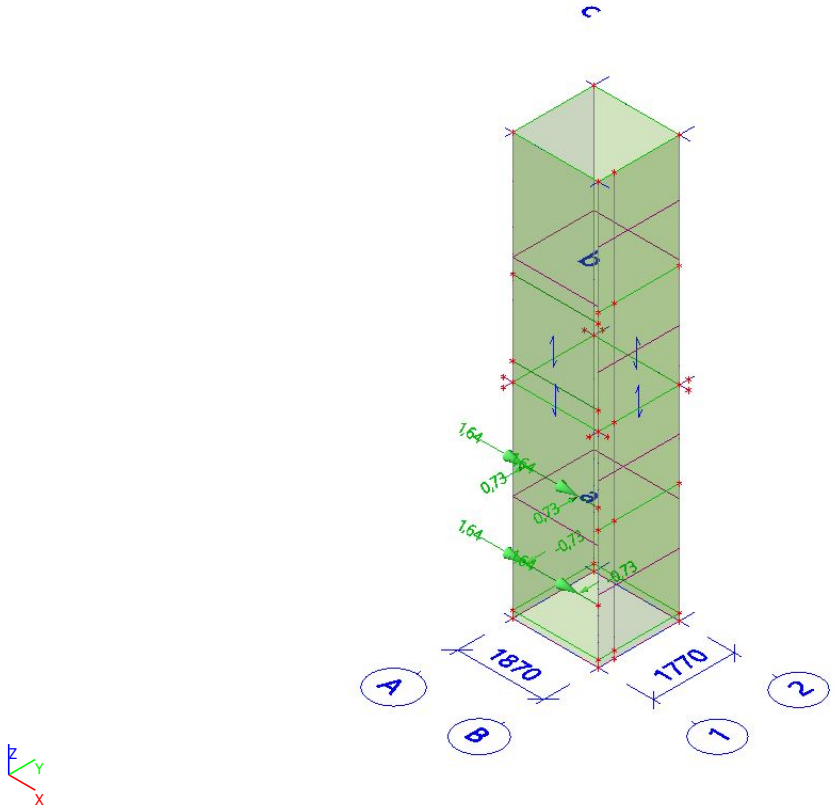
8.5. Obtežni primeri - Koristna3

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
Koristna3		Variable	Koristna	Medium	None
	Standard	Static			



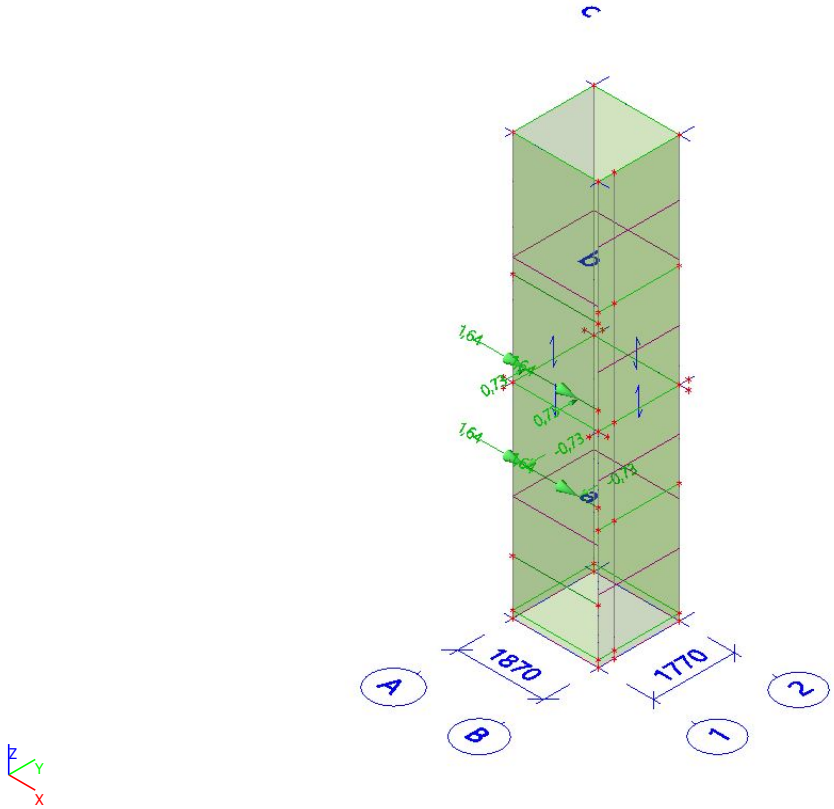
8.6. Obtežni primeri - Koristna4

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
Koristna4		Variable	Koristna	Medium	None
	Standard	Static			



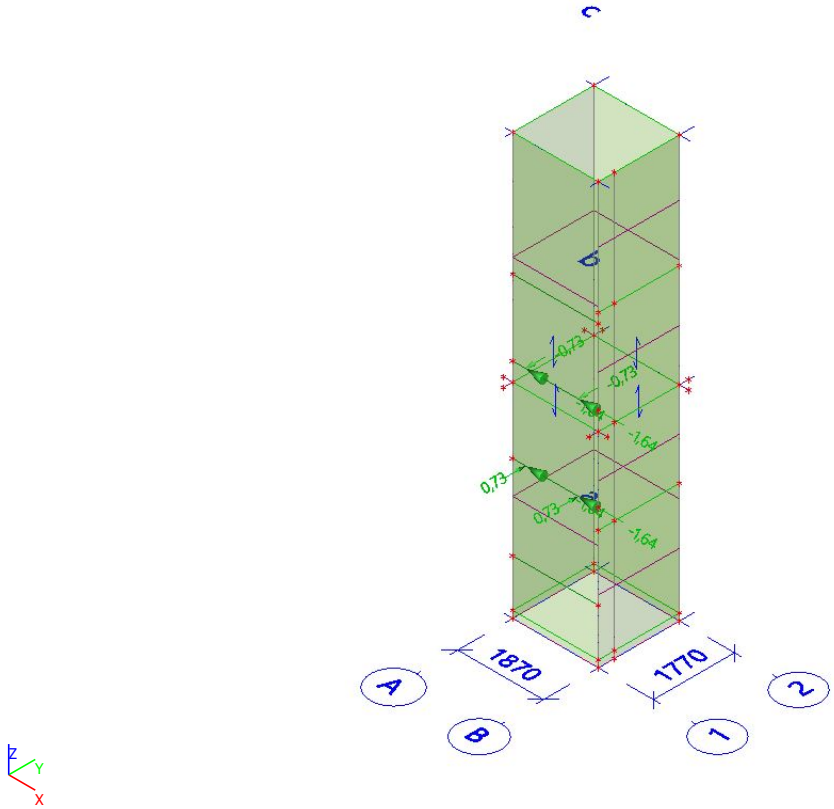
8.7. Obtežni primeri - Koristna5

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
Koristna5		Variable	Koristna	Medium	None
	Standard	Static			



8.8. Obtežni primeri - Koristna6

Name	Description	Action type	Load group	Duration	Master load case
	Spec	Load type			
Koristna6		Variable	Koristna	Medium	None
	Standard	Static			



9. Obtežne kombinacije z NSK in pomiki

9.1. Obtežne kombinacije z NSK in pomiki - All ULS

Name	List
All ULS	ULS-Set B (auto) - EN-ULS (STR/GEO) Set B

9.1.1. 1D internal forces

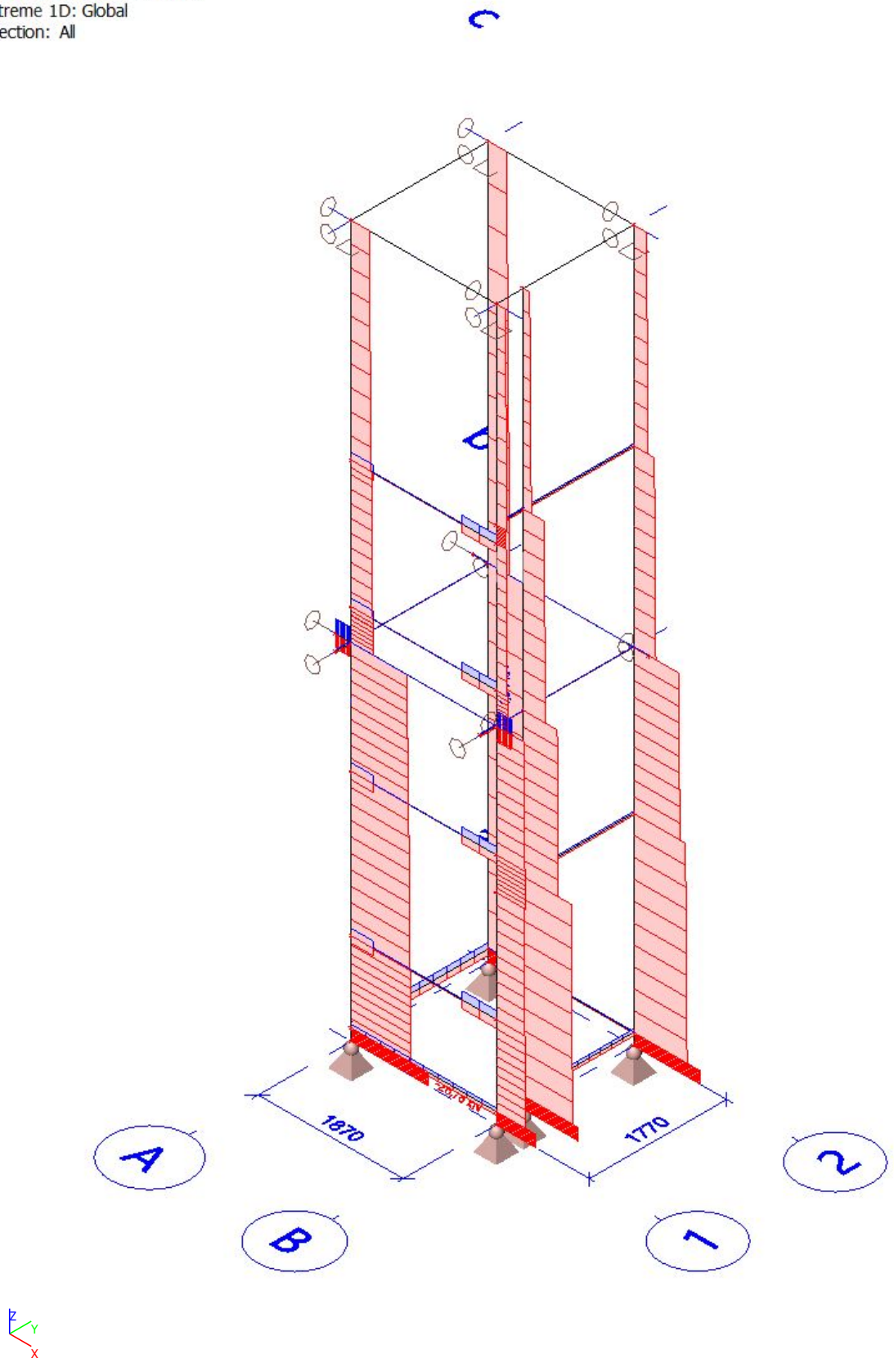
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Global
Selection: All

Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B1	0,000	ULS-Set B (auto)/1	**-26,78**	0,01	0,00	0,00	0,00	0,00
B26	0,000	ULS-Set B (auto)/2	**4,54**	0,00	0,05	0,00	0,00	0,00
B4	0,000	ULS-Set B (auto)/2	-26,05	**-1,87**	-0,12	0,00	0,00	0,00
B4	0,000	ULS-Set B (auto)/3	-19,29	**1,86**	0,11	0,00	0,00	0,00
B5	1,870	ULS-Set B (auto)/4	-0,02	0,00	**-5,92**	-0,03	0,00	0,00
B5	0,000	ULS-Set B (auto)/4	-0,02	0,00	**5,92**	-0,03	0,00	0,00
B31	0,000	ULS-Set B (auto)/5	-2,00	0,00	0,27	**-1,24**	0,00	0,00
B31	0,000	ULS-Set B (auto)/6	2,00	0,00	0,37	**1,24**	0,00	0,00
B2	6,500-	ULS-Set B	-2,56	0,42	-1,38	0,00	**-2,13**	0,43

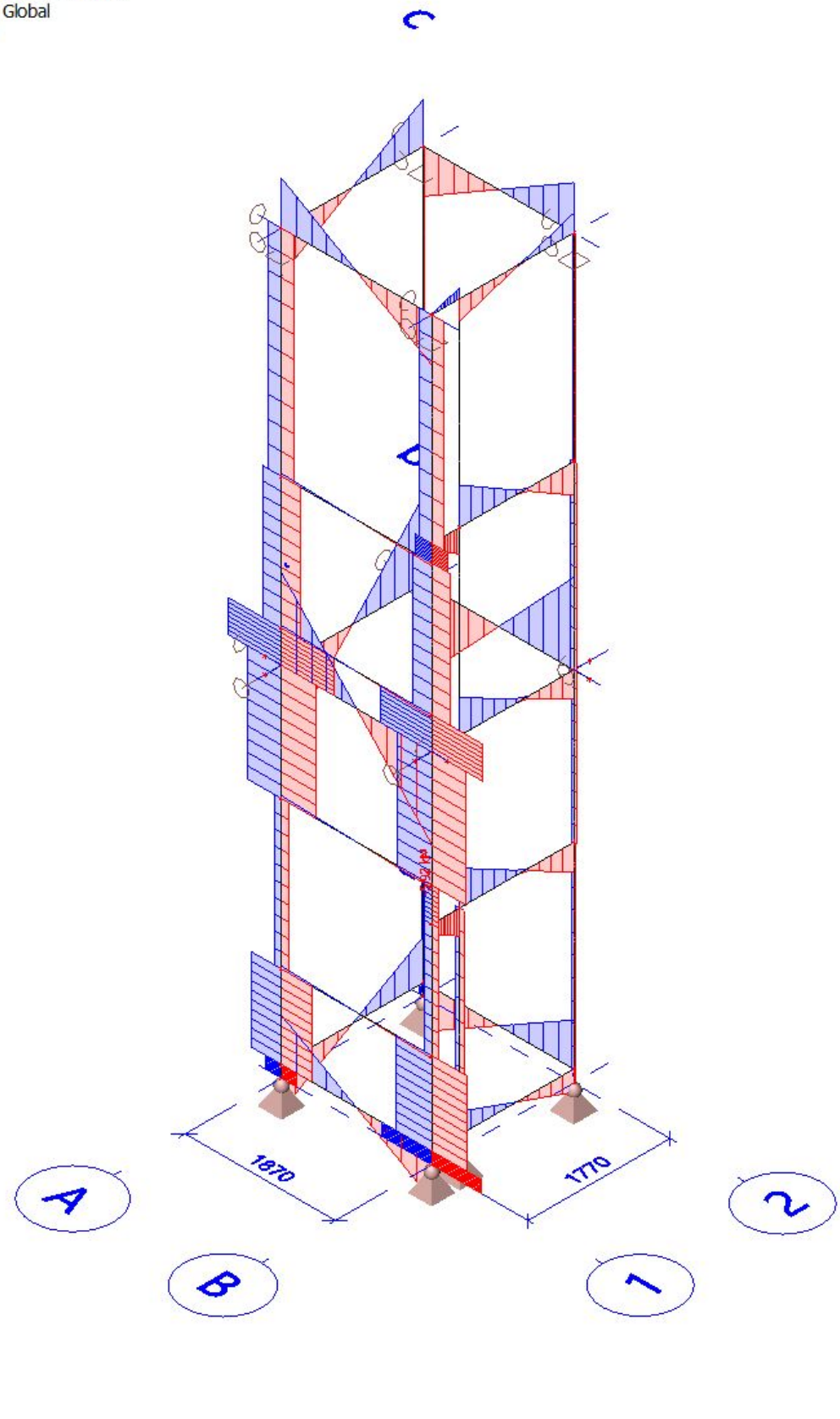
Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
		(auto)/7						
B5	0,935-	ULS-Set B (auto)/4	-0,02	0,00	0,00	-0,03	**2,77**	0,00
B1	3,020+	ULS-Set B (auto)/2	-19,62	0,78	1,91	0,00	-1,33	**-0,89**
B1	3,020+	ULS-Set B (auto)/3	-14,54	-0,78	-1,91	0,00	1,33	**0,89**

Name	Combination key
ULS-Set B (auto)/1	1.35*Lastna + 1.35*Stalna
ULS-Set B (auto)/2	1.35*Lastna + 1.35*Stalna + 1.50*Koristna6
ULS-Set B (auto)/3	Lastna + Stalna + 1.50*Koristna5
ULS-Set B (auto)/4	1.35*Lastna + 1.35*Stalna + 1.50*Koristna3
ULS-Set B (auto)/5	Lastna + Stalna + 1.50*Koristna3
ULS-Set B (auto)/6	1.35*Lastna + 1.35*Stalna + 1.50*Koristna4
ULS-Set B (auto)/7	Lastna + Stalna + 1.50*Koristna2

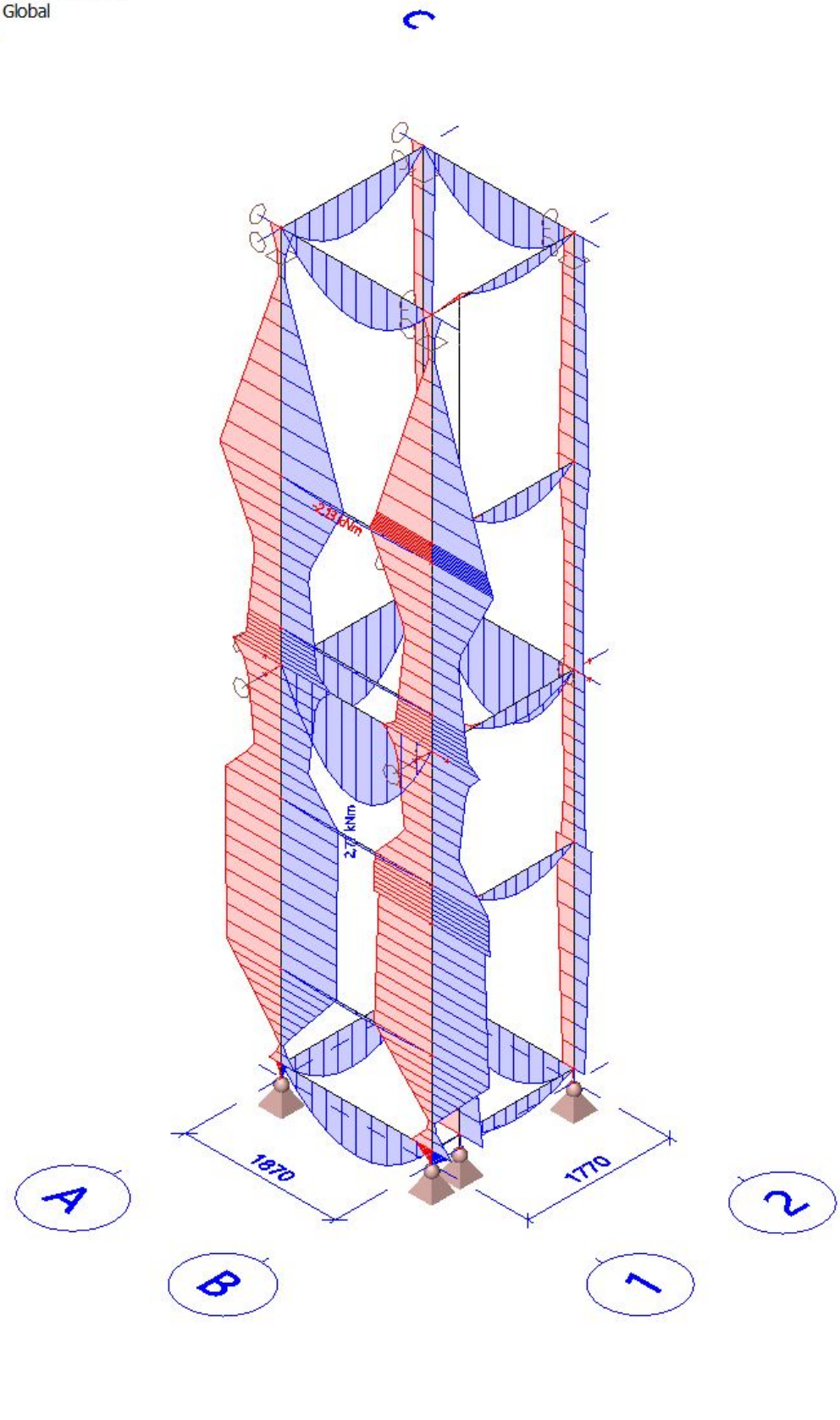
Values: **N**
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Global
Selection: All



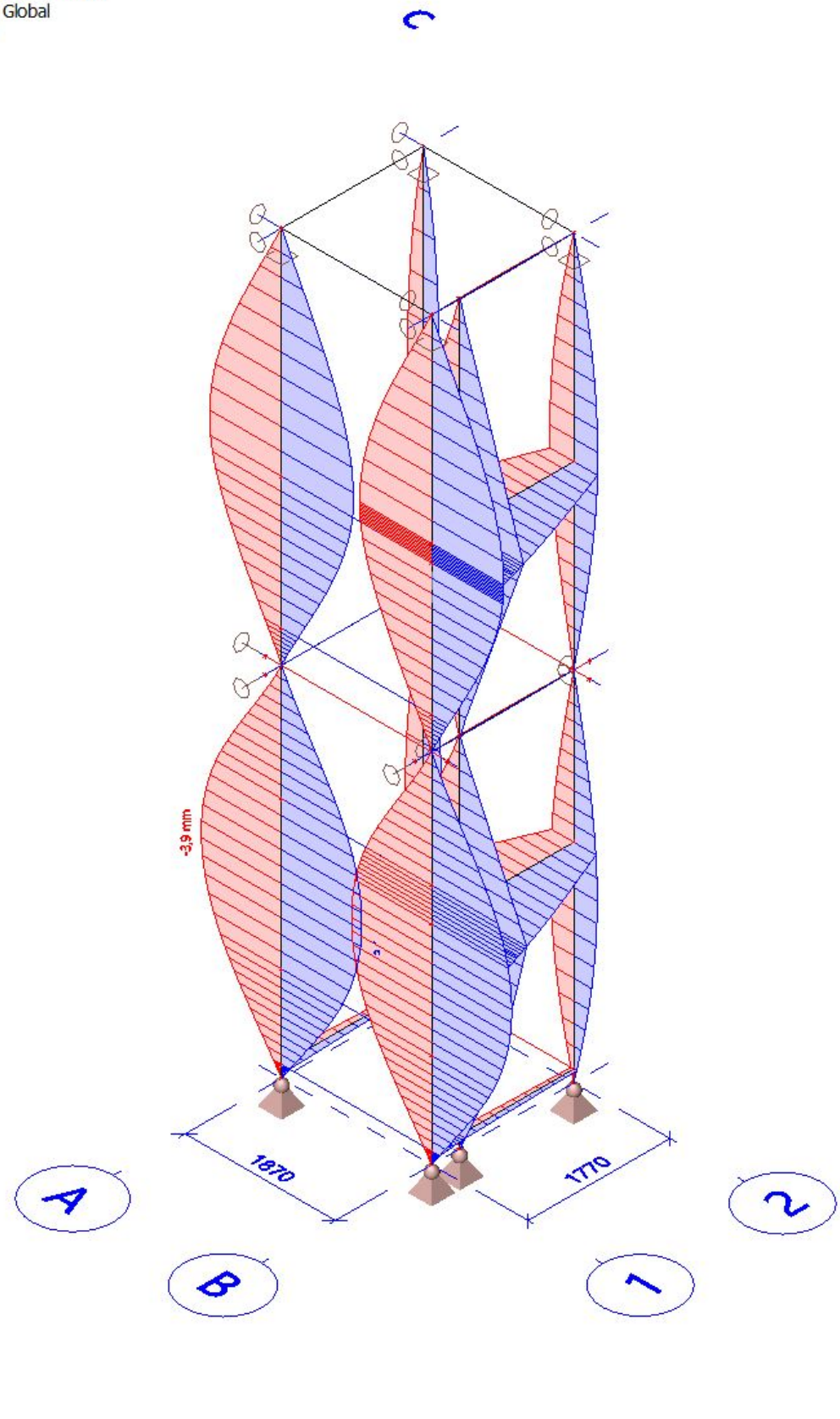
Values: V_z
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Global
Selection: All



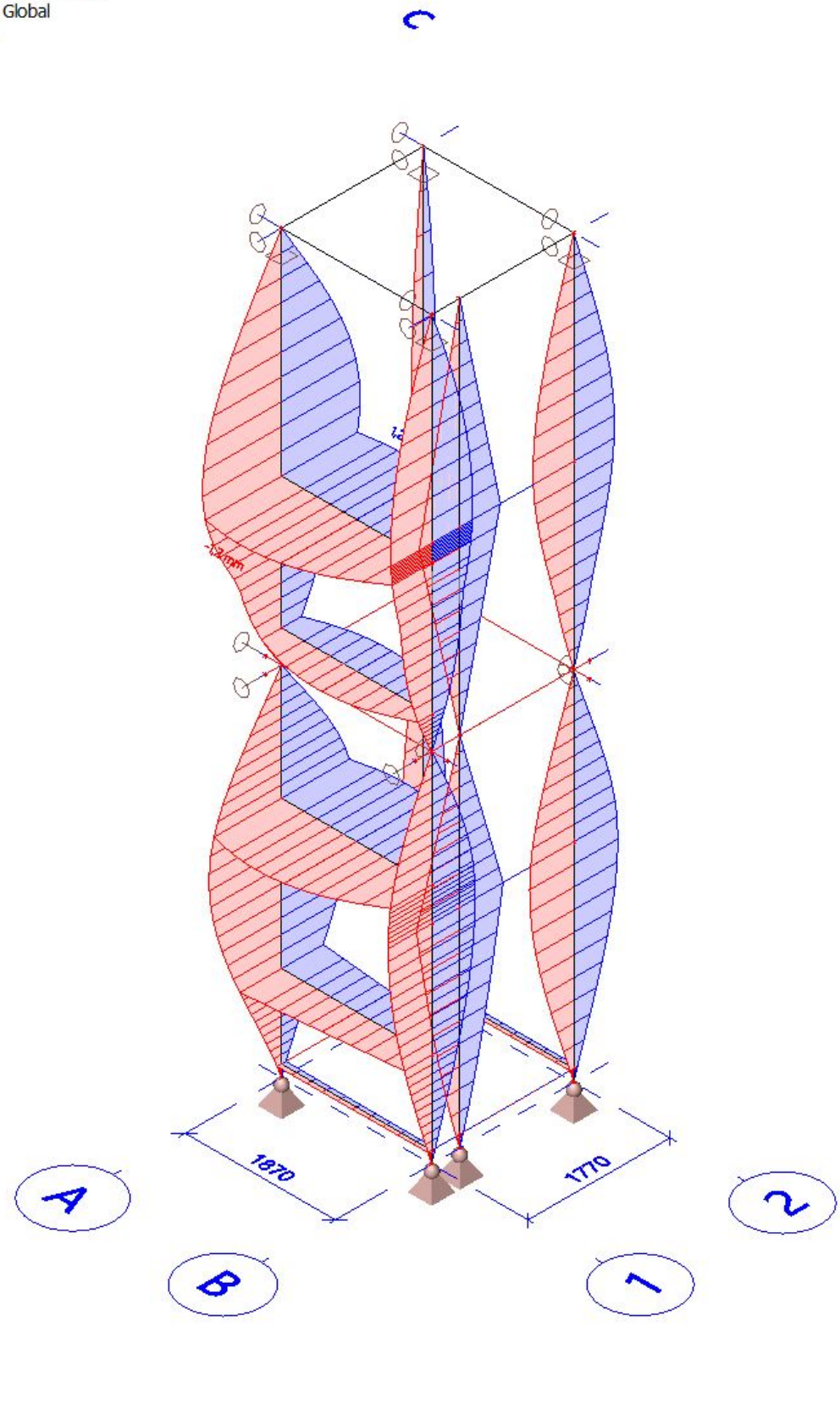
Values: M_y
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Global
Selection: All



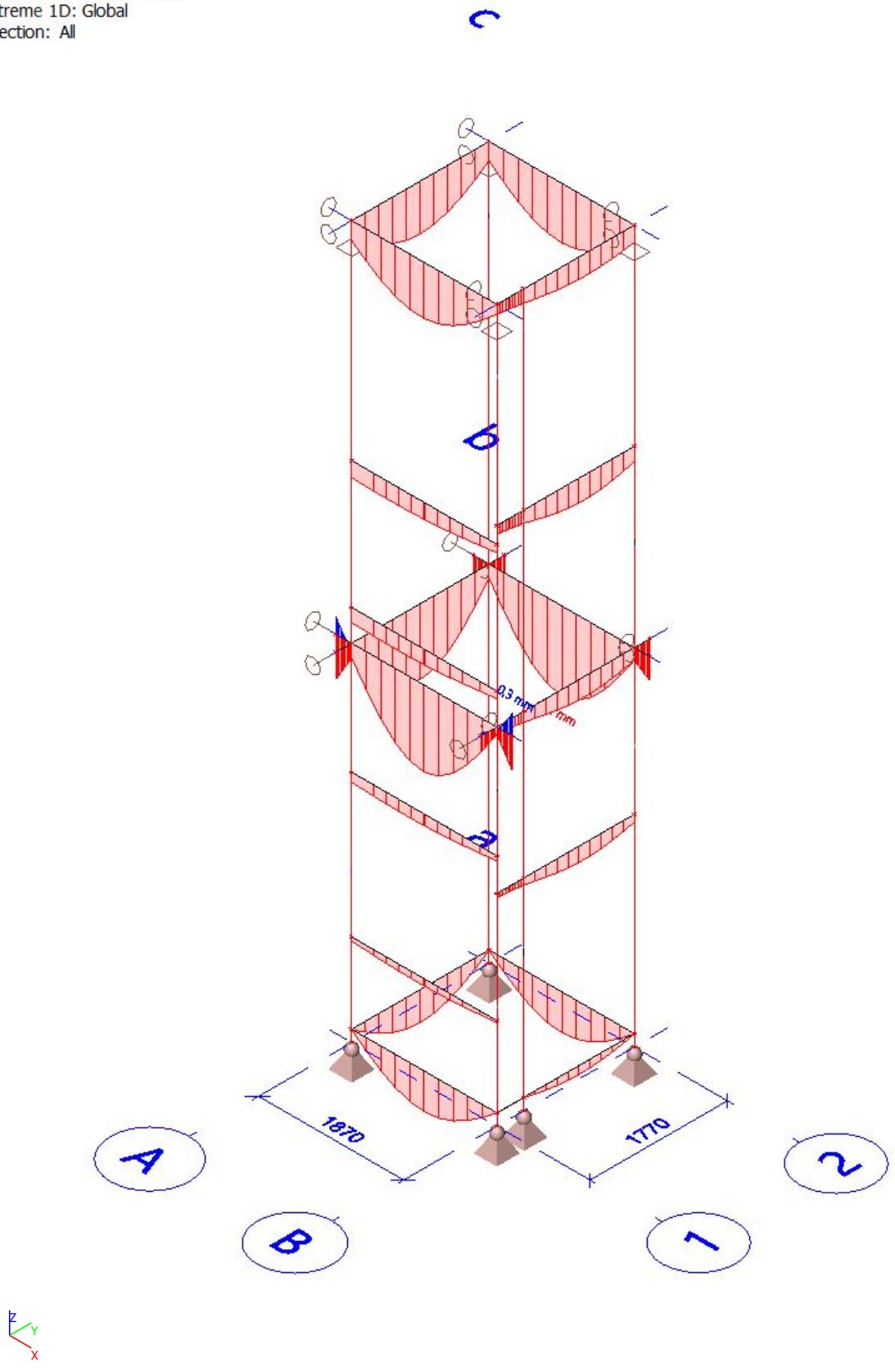
Values: u_x
Linear calculation
Class: All ULS
Coordinate system: Global
Extreme 1D: Global
Selection: All



Values: u_y
Linear calculation
Class: All ULS
Coordinate system: Global
Extreme 1D: Global
Selection: All



Values: u_z
Linear calculation
Class: All ULS
Coordinate system: Global
Extreme 1D: Global
Selection: All



9.2. Obtežne kombinacije z NSK in pomiki - All SLS

Name	List
All SLS	SLS-Char (auto) - EN-SLS Characteristic

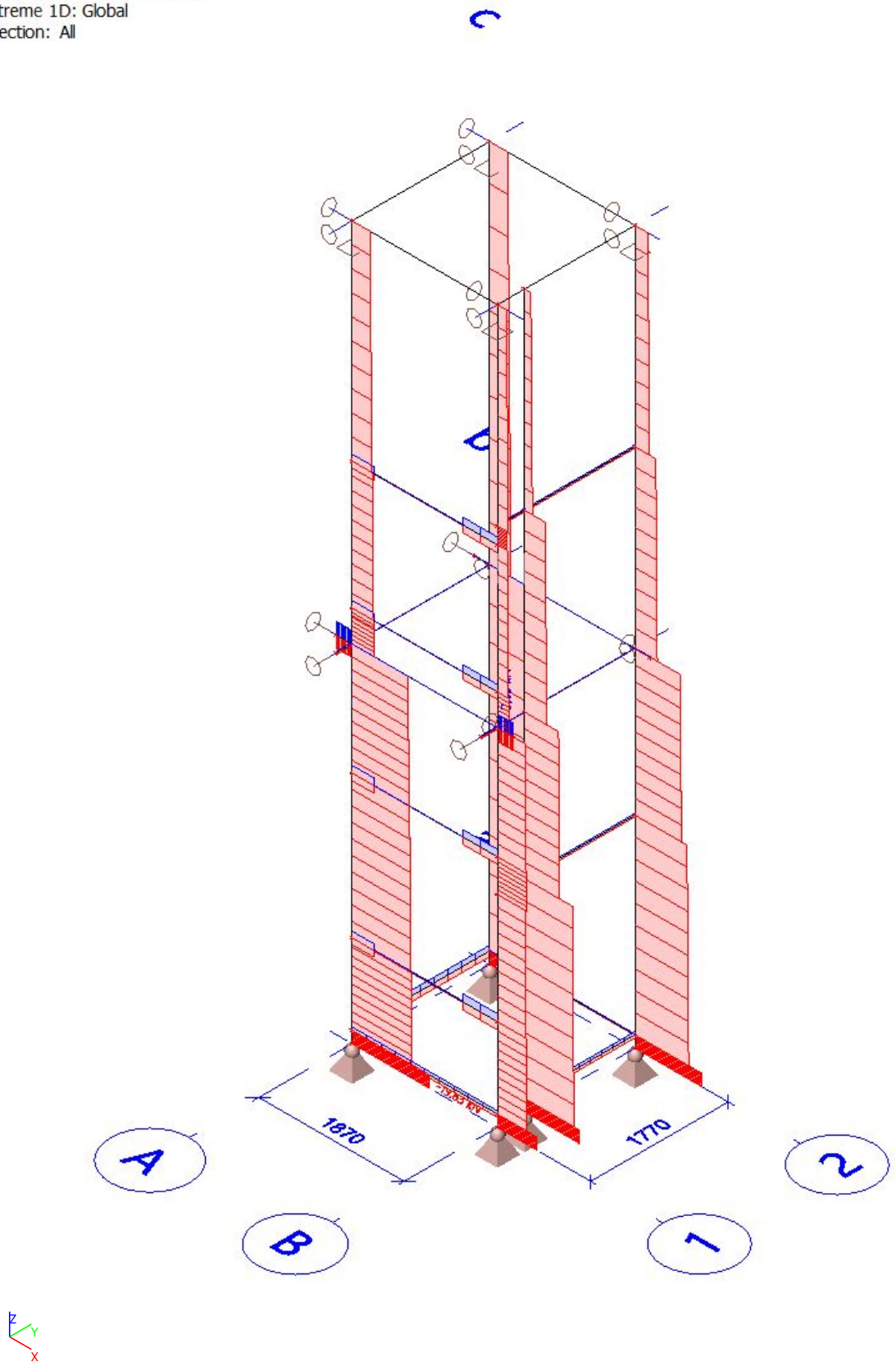
9.2.1. 1D internal forces

Linear calculation
Class: All SLS
Coordinate system: Principal
Extreme 1D: Global
Selection: All

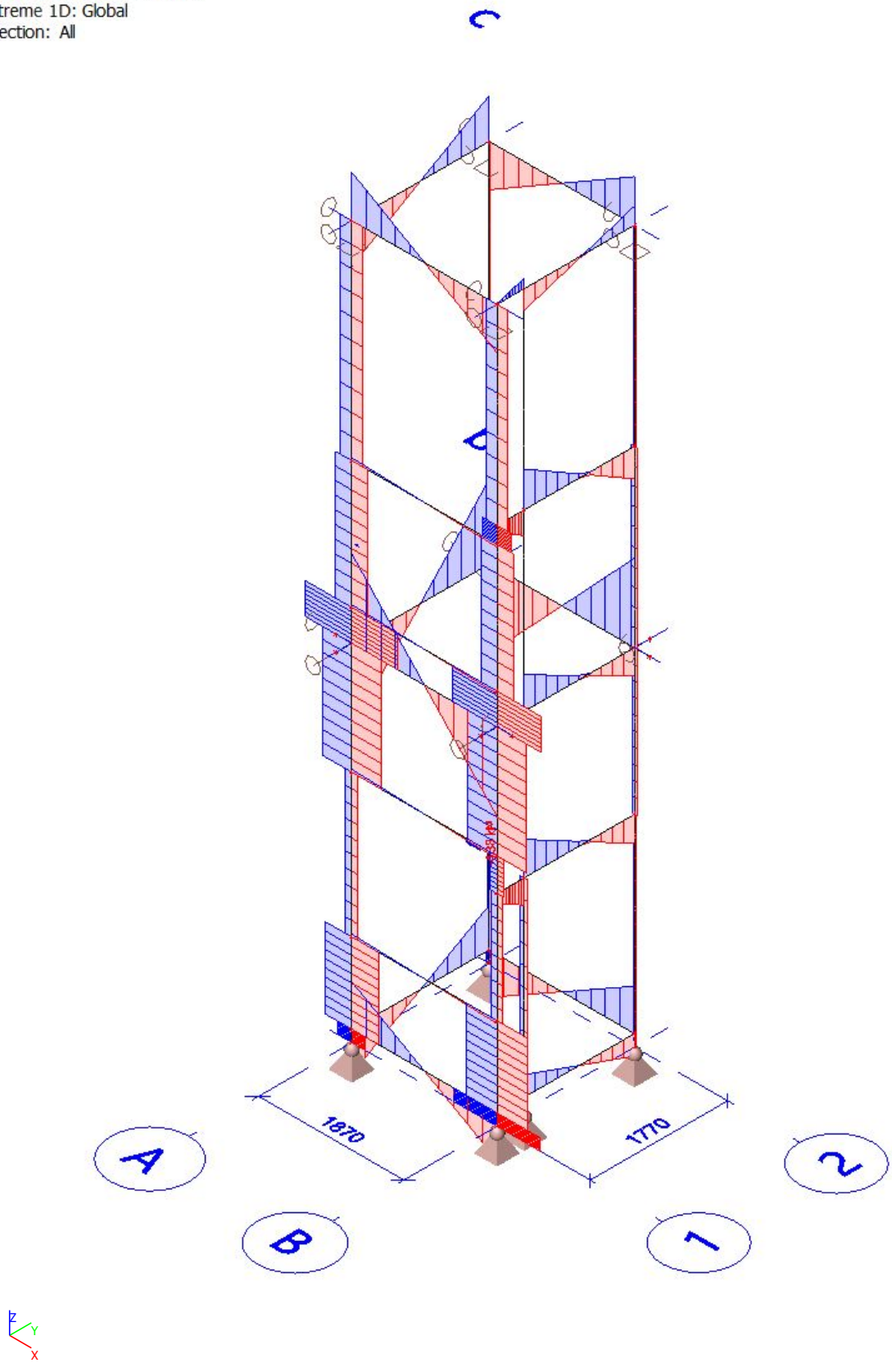
Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B1	0,000	SLS-Char (auto)/1	**-19,83**	0,00	0,00	0,00	0,00	0,00
B26	0,000	SLS-Char (auto)/2	**3,03**	0,00	0,03	0,00	0,00	0,00
B4	0,000	SLS-Char (auto)/2	-19,29	**-1,25**	-0,08	0,00	0,00	0,00
B4	0,000	SLS-Char (auto)/3	-19,29	**1,24**	0,07	0,00	0,00	0,00
B5	1,870	SLS-Char (auto)/4	-0,02	0,00	**-4,38**	-0,02	0,00	0,00
B5	0,000	SLS-Char (auto)/4	-0,02	0,00	**4,38**	-0,02	0,00	0,00
B31	0,000	SLS-Char (auto)/4	-1,33	0,00	0,27	**-0,83**	0,00	0,00
B31	0,000	SLS-Char (auto)/5	1,34	0,00	0,27	**0,83**	0,00	0,00
B2	6,500+	SLS-Char (auto)/6	-2,43	-0,39	0,82	0,00	**-1,42**	0,30
B5	0,935-	SLS-Char (auto)/4	-0,02	0,00	0,00	-0,02	**2,05**	0,00
B1	3,020+	SLS-Char (auto)/2	-14,54	0,52	1,28	0,00	-0,88	**-0,59**
B1	3,020+	SLS-Char (auto)/3	-14,54	-0,52	-1,27	0,00	0,88	**0,59**

Name	Combination key
SLS-Char (auto)/1	Lastna + Stalna
SLS-Char (auto)/2	Lastna + Stalna + Koristna6
SLS-Char (auto)/3	Lastna + Stalna + Koristna5
SLS-Char (auto)/4	Lastna + Stalna + Koristna3
SLS-Char (auto)/5	Lastna + Stalna + Koristna4
SLS-Char (auto)/6	Lastna + Stalna + Koristna2

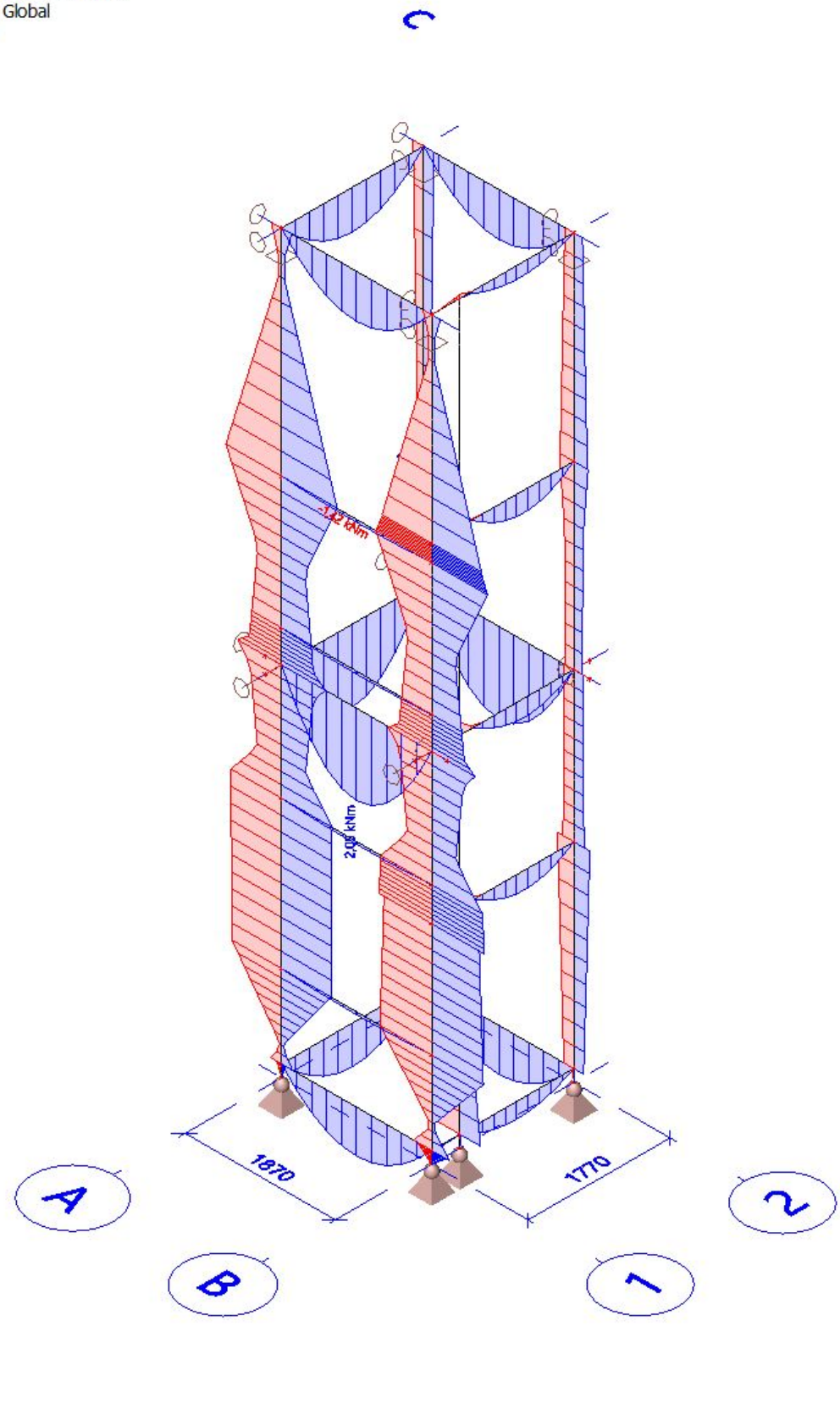
Values: **N**
Linear calculation
Class: All SLS
Coordinate system: Principal
Extreme 1D: Global
Selection: All



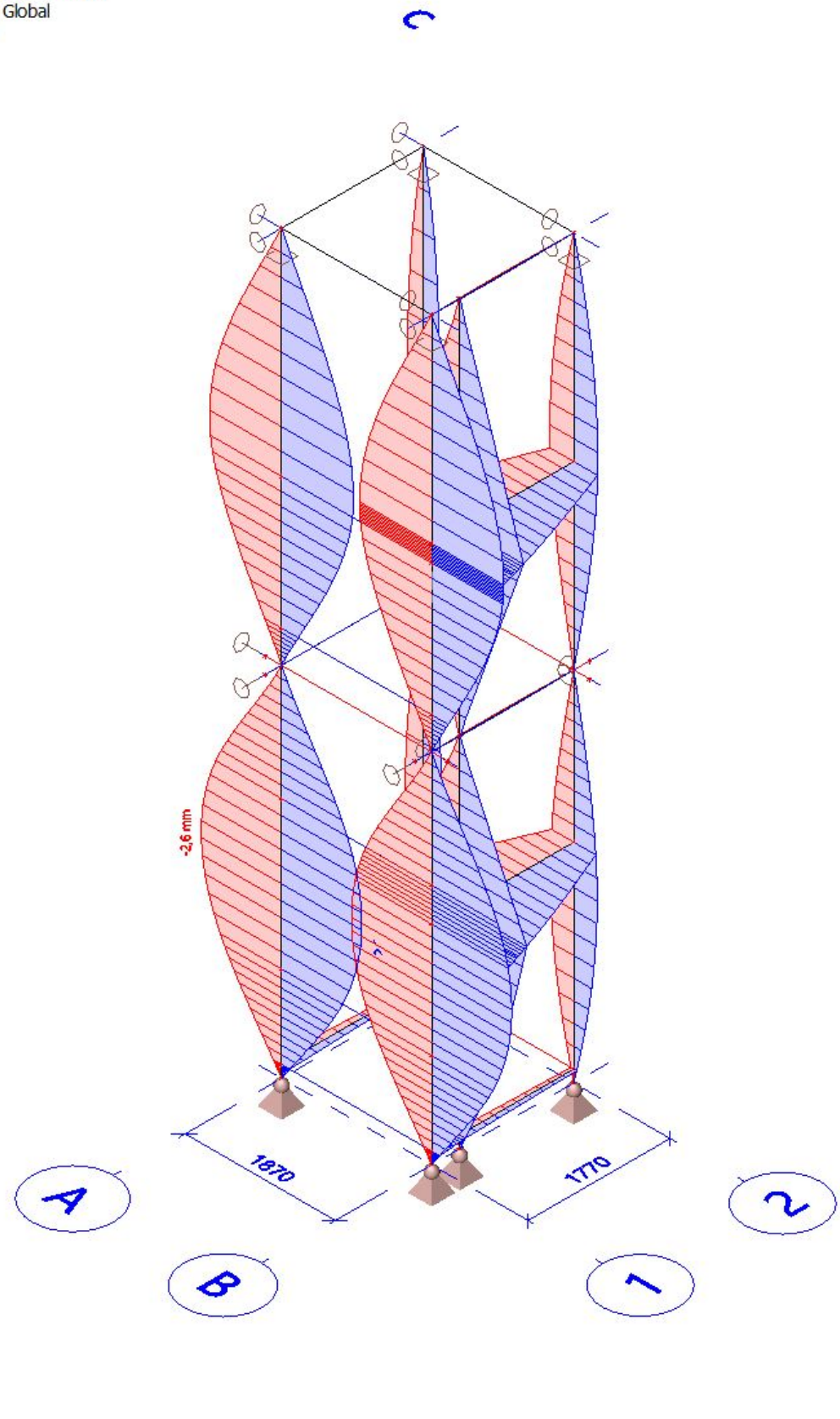
Values: V_z
Linear calculation
Class: All SLS
Coordinate system: Principal
Extreme 1D: Global
Selection: All



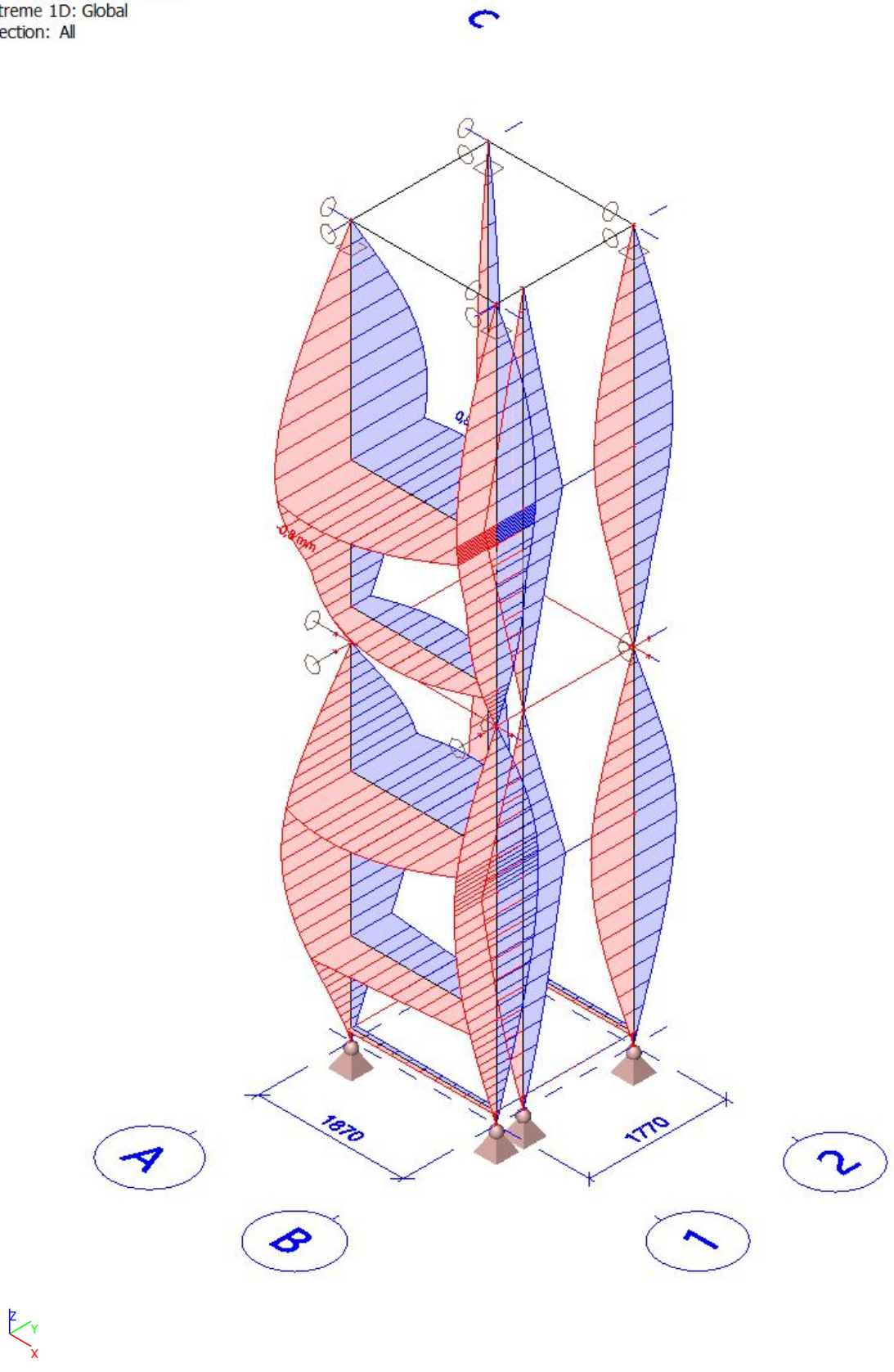
Values: M_y
Linear calculation
Class: All SLS
Coordinate system: Principal
Extreme 1D: Global
Selection: All



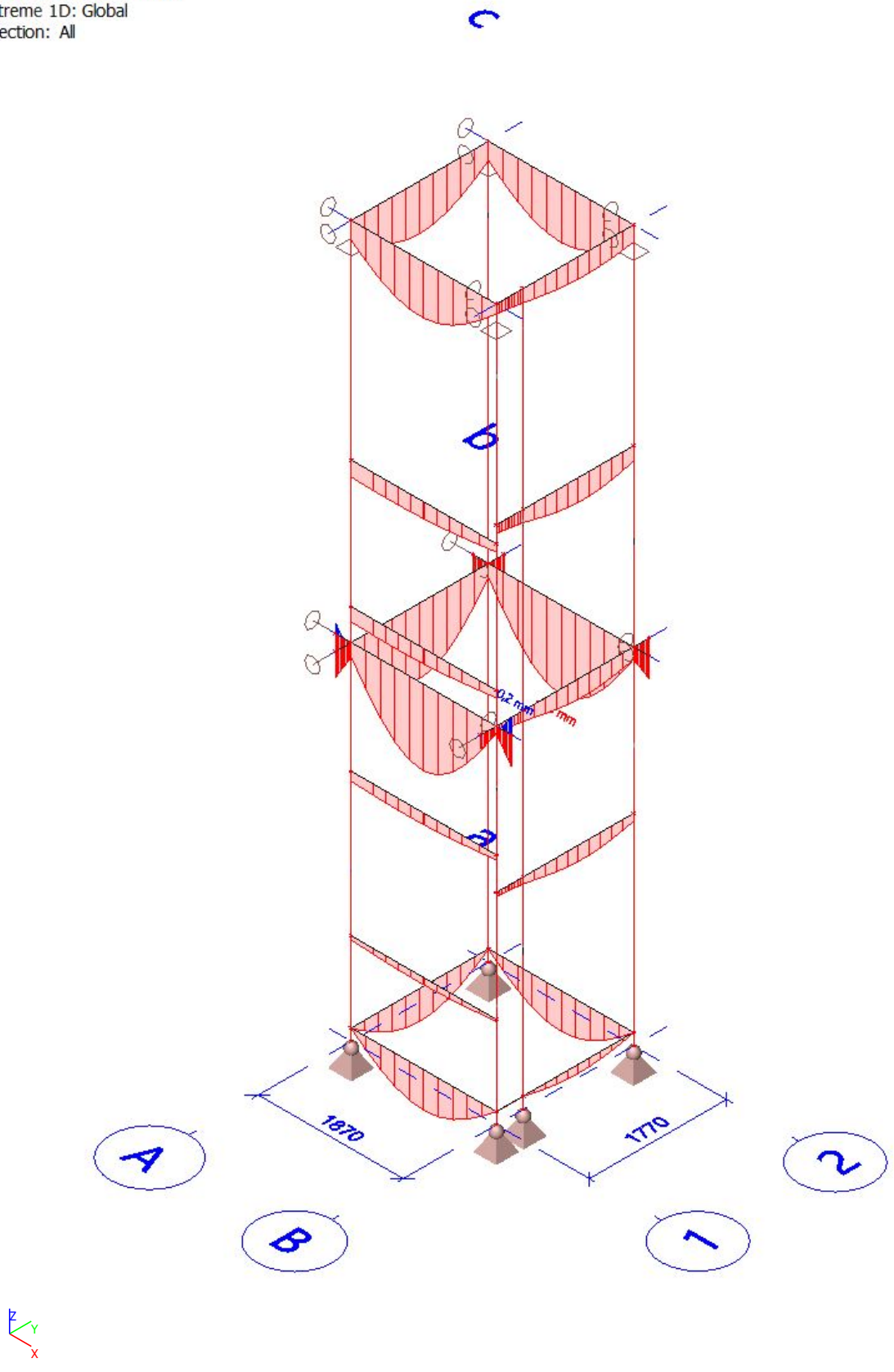
Values: u_x
Linear calculation
Class: All SLS
Coordinate system: Global
Extreme 1D: Global
Selection: All



Values: u_y
Linear calculation
Class: All SLS
Coordinate system: Global
Extreme 1D: Global
Selection: All



Values: u_z
Linear calculation
Class: All SLS
Coordinate system: Global
Extreme 1D: Global
Selection: All



9.3. Obtežne kombinacije z NSK in pomiki - All ULS+SLS

Name	List
All ULS+SLS	ULS-Set B (auto) - EN-ULS (STR/GEO) Set B
	SLS-Char (auto) - EN-SLS Characteristic

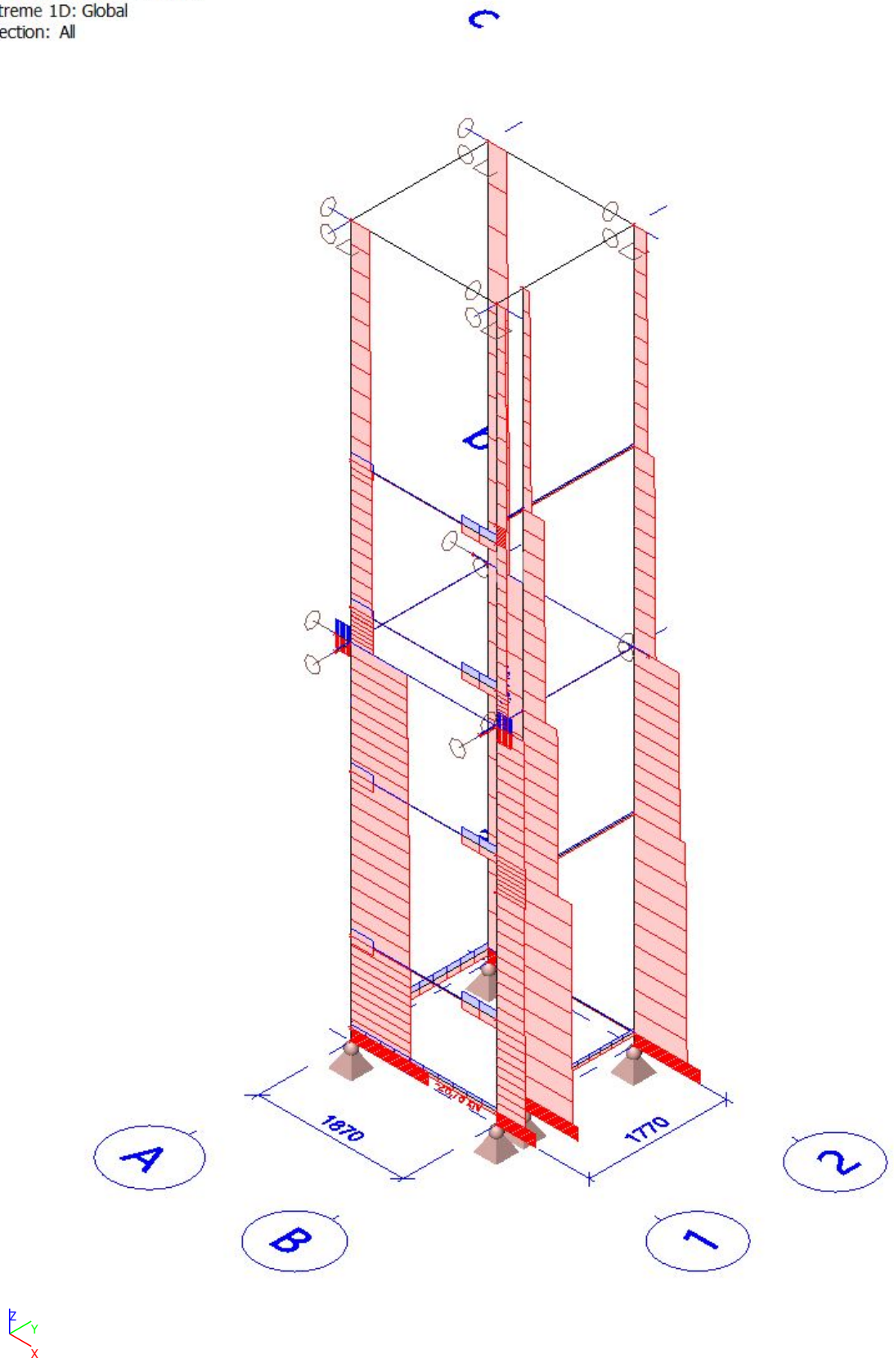
9.3.1. 1D internal forces

Linear calculation
Class: All ULS+SLS
Coordinate system: Principal
Extreme 1D: Global
Selection: All

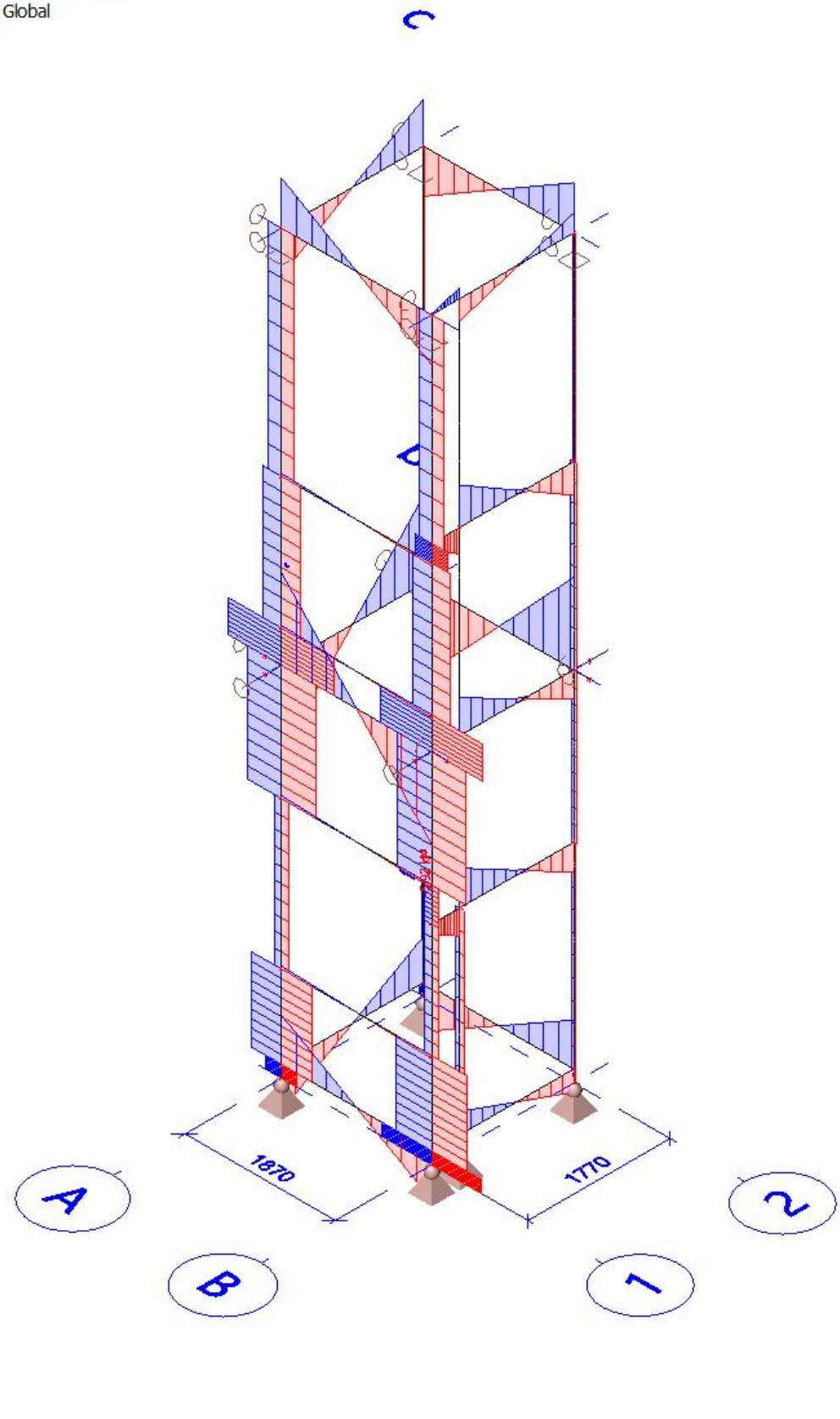
Name	dx [m]	Case	N [kN]	V_y [kN]	V_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]
B1	0,000	ULS-Set B (auto)/1	**-26,78**	0,01	0,00	0,00	0,00	0,00
B26	0,000	ULS-Set B (auto)/2	**4,54**	0,00	0,05	0,00	0,00	0,00
B4	0,000	ULS-Set B (auto)/2	-26,05	**-1,87**	-0,12	0,00	0,00	0,00
B4	0,000	ULS-Set B (auto)/3	-19,29	**1,86**	0,11	0,00	0,00	0,00
B5	1,870	ULS-Set B (auto)/4	-0,02	0,00	**-5,92**	-0,03	0,00	0,00
B5	0,000	ULS-Set B (auto)/4	-0,02	0,00	**5,92**	-0,03	0,00	0,00
B31	0,000	ULS-Set B (auto)/5	-2,00	0,00	0,27	**-1,24**	0,00	0,00
B31	0,000	ULS-Set B (auto)/6	2,00	0,00	0,37	**1,24**	0,00	0,00
B2	6,500-	ULS-Set B (auto)/7	-2,56	0,42	-1,38	0,00	**-2,13**	0,43
B5	0,935-	ULS-Set B (auto)/4	-0,02	0,00	0,00	-0,03	**2,77**	0,00
B1	3,020+	ULS-Set B (auto)/2	-19,62	0,78	1,91	0,00	-1,33	**-0,89**
B1	3,020+	ULS-Set B (auto)/3	-14,54	-0,78	-1,91	0,00	1,33	**0,89**

Name	Combination key
ULS-Set B (auto)/1	1.35*Lastna + 1.35*Stalna
ULS-Set B (auto)/2	1.35*Lastna + 1.35*Stalna + 1.50*Koristna6
ULS-Set B (auto)/3	Lastna + Stalna + 1.50*Koristna5
ULS-Set B (auto)/4	1.35*Lastna + 1.35*Stalna + 1.50*Koristna3
ULS-Set B (auto)/5	Lastna + Stalna + 1.50*Koristna3
ULS-Set B (auto)/6	1.35*Lastna + 1.35*Stalna + 1.50*Koristna4
ULS-Set B (auto)/7	Lastna + Stalna + 1.50*Koristna2

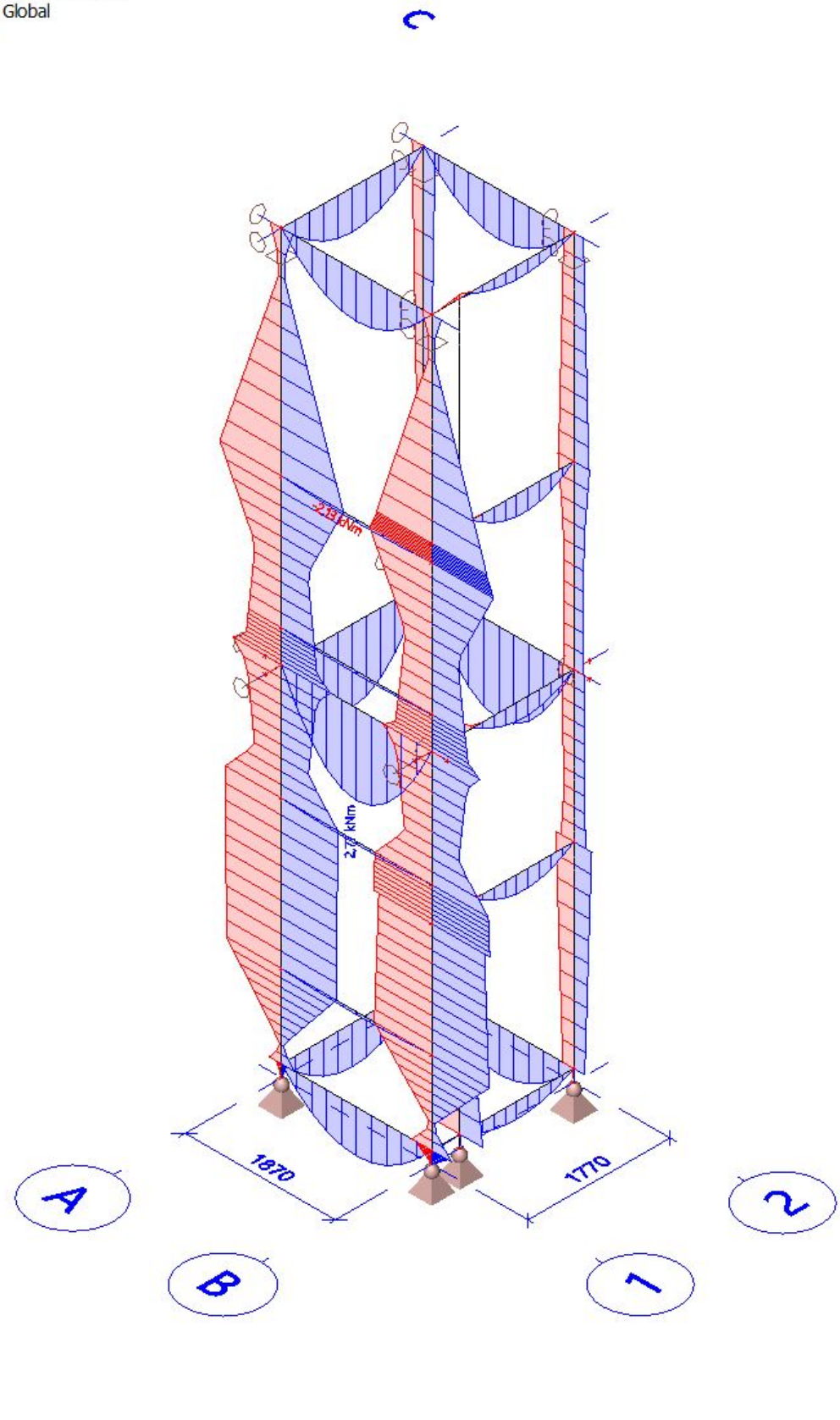
Values: **N**
Linear calculation
Class: All ULS+SLS
Coordinate system: Principal
Extreme 1D: Global
Selection: All



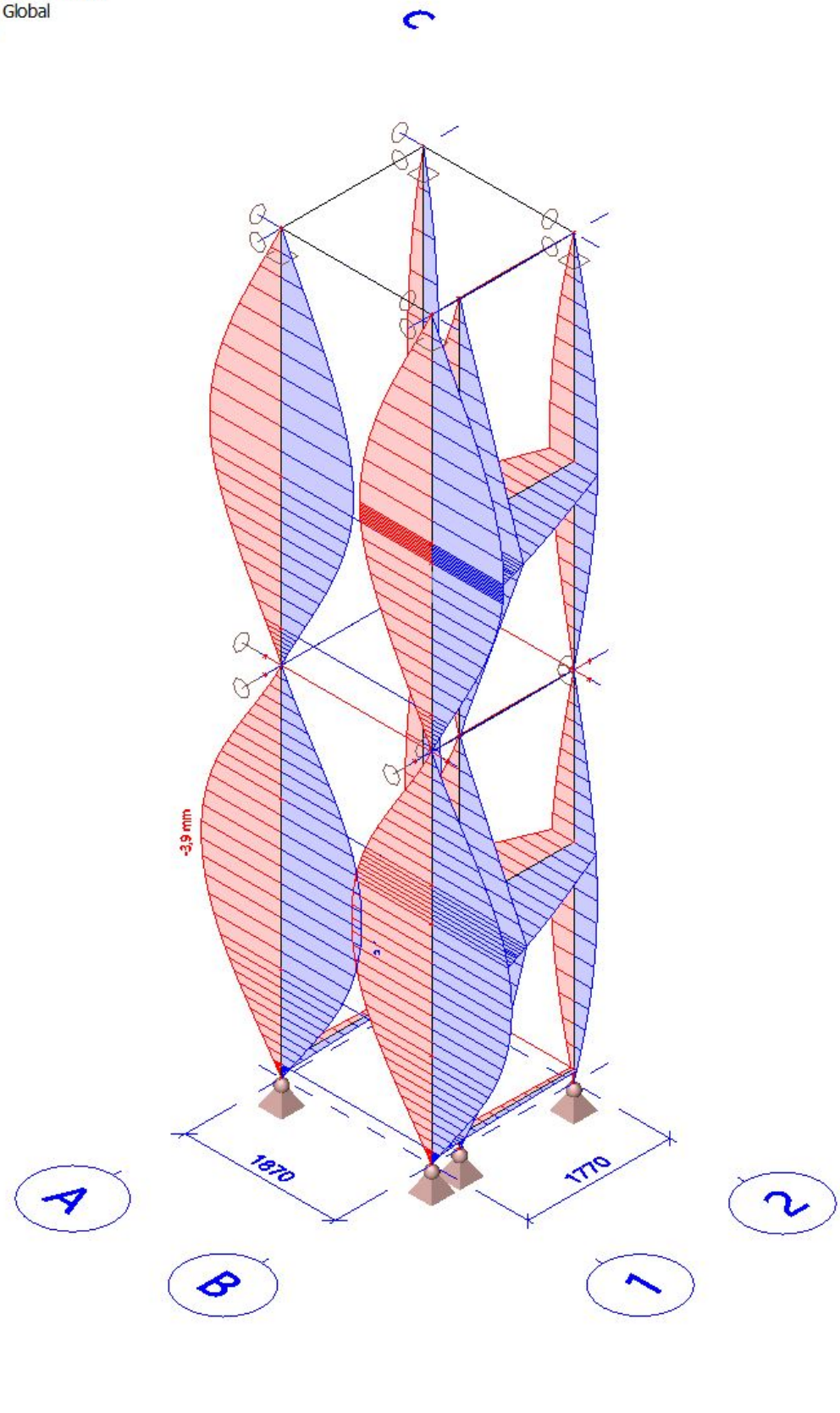
Values: V_z
Linear calculation
Class: All ULS+SLS
Coordinate system: Principal
Extreme 1D: Global
Selection: All



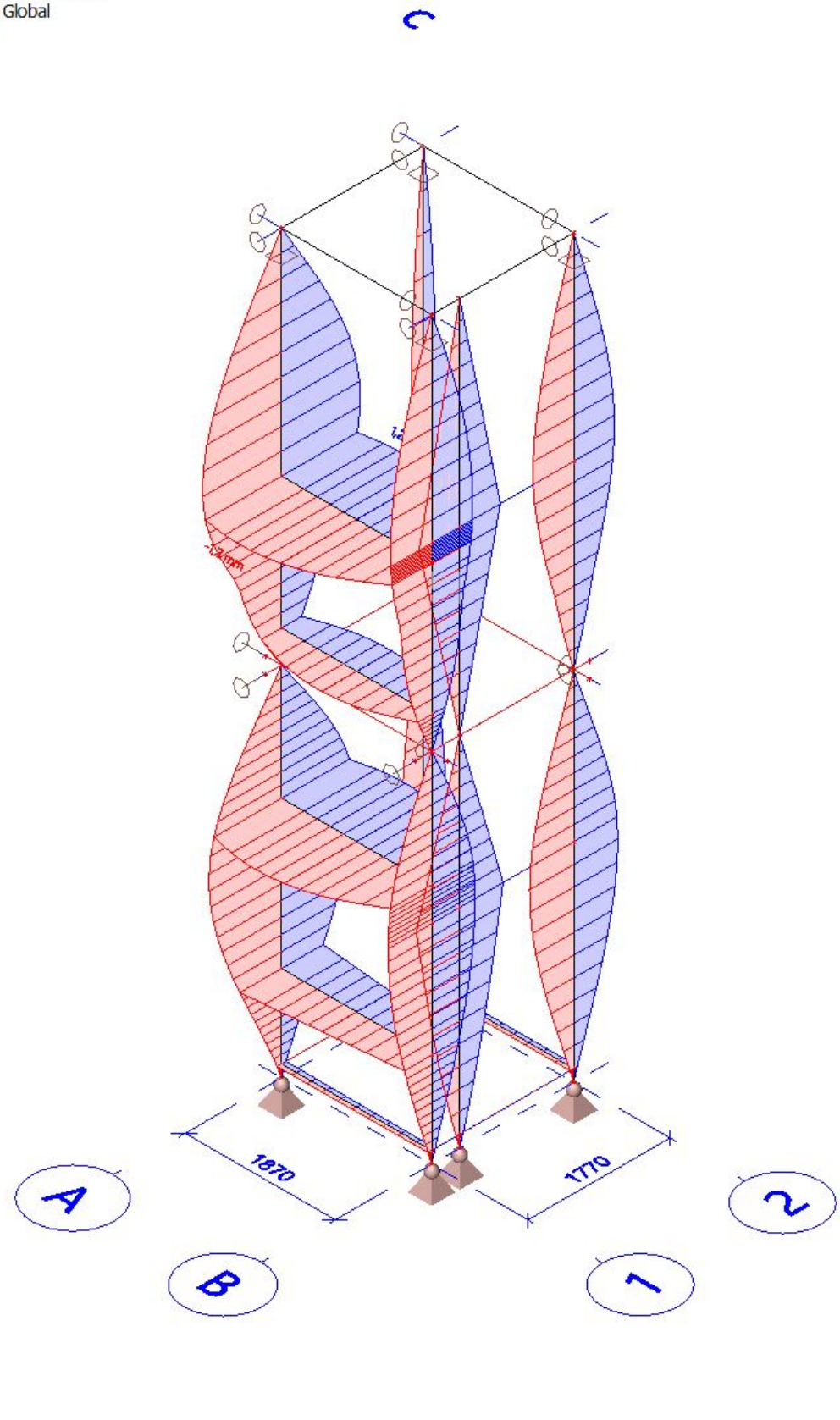
Values: M_y
Linear calculation
Class: All ULS+SLS
Coordinate system: Principal
Extreme 1D: Global
Selection: All



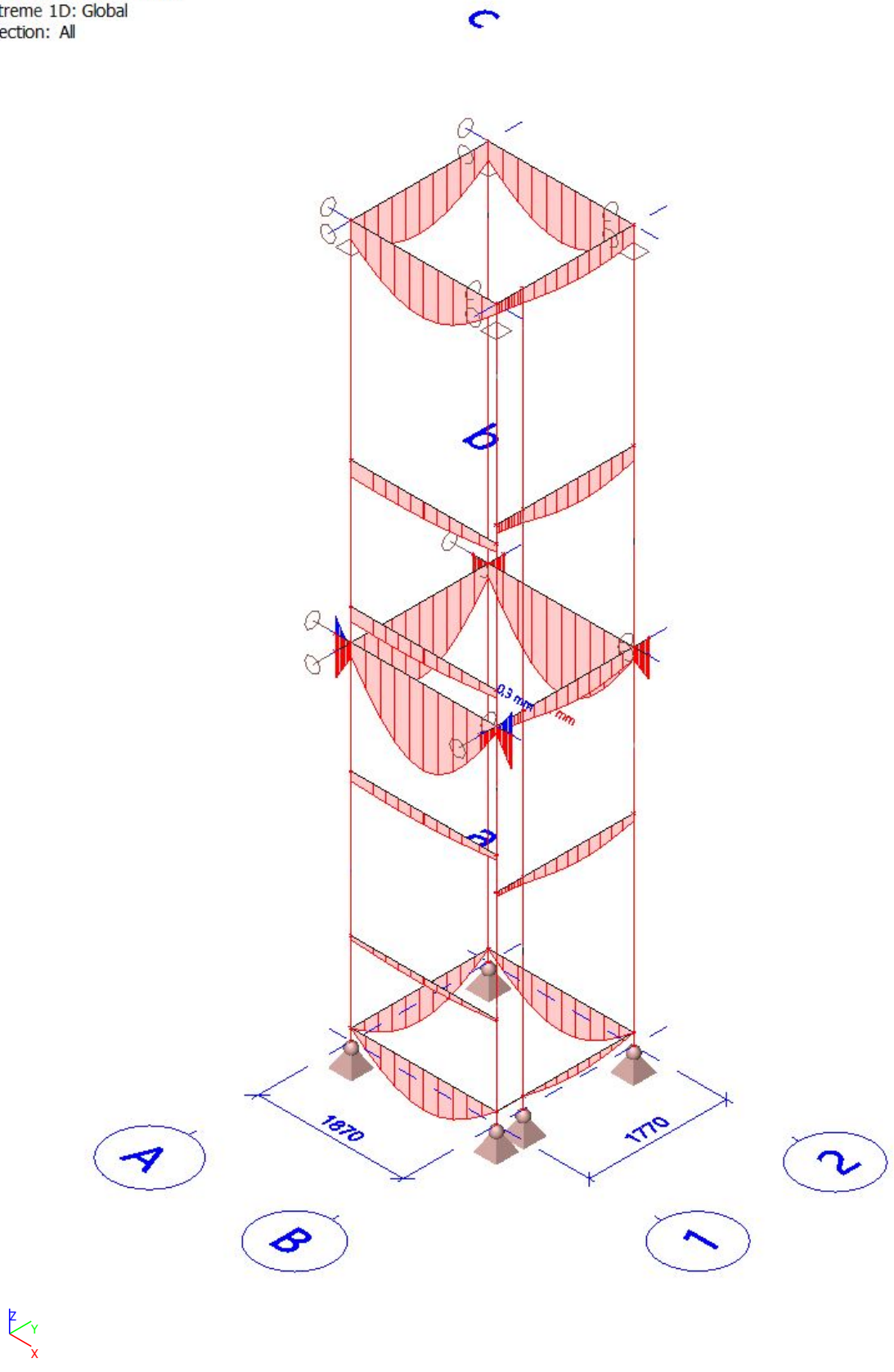
Values: u_x
Linear calculation
Class: All ULS+SLS
Coordinate system: Global
Extreme 1D: Global
Selection: All



Values: u_y
Linear calculation
Class: All ULS+SLS
Coordinate system: Global
Extreme 1D: Global
Selection: All



Values: u_z
Linear calculation
Class: All ULS+SLS
Coordinate system: Global
Extreme 1D: Global
Selection: All



10. Dimenzioniranje Jekla

10.1. EC-EN 1993 Steel check ULS

Values: **$UC_{Overall}$**
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Cross-section
Selection: All

EN 1993-1-1 Code Check
National annex: Slovenian SIST-EN NA

Member B3	**0,150 / 9,180 m**	**QRO120X5K**	**Rolled**	**S 355**	**All ULS**	**0,15 -**

Combination key
All ULS / 1.35*Lastna + 1.35*Stalna + 1.50*Koristna3

Partial safety factors		
Resistance of cross-sections	γ_{M0}	1,00
Resistance to instability	γ_{M1}	1,00
Resistance of net sections	γ_{M2}	1,25

Material			
Yield strength	f_y	355,0	MPa
Ultimate strength	f_u	490,0	MPa

Section checks
Section is classified as Class 1

Section checks	Design force	Value	Unit	Resistance	Value	Unit	Unity check [-]
Compression	N_{Ed}	-18,50	kN	$N_{c,Rd}$	786,03	kN	0,02
Shear V_y	$V_{y,Ed}$	0,11	kN	$V_{pl,y,Rd}$	226,91	kN	0,00
Shear V_z	$V_{z,Ed}$	-0,10	kN	$V_{pl,z,Rd}$	226,91	kN	0,00
Bending M_y	$M_{y,Ed}$	-0,38	kNm	$M_{pl,y,Rd}$	33,42	kNm	0,01
Bending M_z	$M_{z,Ed}$	-0,16	kNm	$M_{pl,z,Rd}$	33,42	kNm	0,00

Combined section checks

Combined section checks	Unity check [-]
Bending, Axial force and Shear	0,00

Stability checks
Decisive position for stability classification: 0,150 m
Section is classified as Class 1
Buckling group : Default

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1,80	7,779	163,63		2,19	0,19
z-z	0,83	2,039	2380,80		0,57	0,90
LTB	1,00	2,450		1265,60	0,16	1,00

Stability checks	Design force	Value	Unit	Resistance	Value	Unit	Unity check [-]
Flexural buckling	N_{Ed}	-18,50	kN	$N_{b,Rd}$	147,78	kN	0,13

Combined stability checks

Interaction factors	k_{yy}	k_{yz}	k_{zy}	k_{zz}
Value	1,05	0,36	0,76	0,65

Maximum moment $M_{y,Ed}$ is derived from beam B3 position 2,355 m.
Maximum moment $M_{z,Ed}$ is derived from beam B3 position 0,150 m.

Combined stability checks	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]	Unity check [-]
Bending and Axial Compression	-0,60	-0,16	0,15

EN 1993-1-1 Code Check
National annex: Slovenian SIST-EN NA

Member B5	**0,935 / 1,870 m**	**QRO120X5**	**Rolled**	**S 355**	**All ULS**	**0,08 -**

Combination key
All ULS / 1.35*Lastna + 1.35*Stalna + 1.50*Koristna3

Partial safety factors		
Resistance of cross-sections	γ_{M0}	1,00
Resistance to instability	γ_{M1}	1,00
Resistance of net sections	γ_{M2}	1,25

Material			
Yield strength	f_y	355,0	MPa
Ultimate strength	f_u	490,0	MPa

Section checks
Section is classified as Class 1

Section checks	Design force	Value	Unit	Resistance	Value	Unit	Unity check [-]
Compression	N_{Ed}	-0,02	kN	$N_{c,Rd}$	802,30	kN	0,00
Bending M_y	$M_{y,Ed}$	2,77	kNm	$M_{pl,y,Rd}$	34,44	kNm	0,08
Torsion	τ_{Ed}	0,2	MPa	τ_{Rd}	205,0	MPa	0,00

Combined section checks

Combined section checks	Unity check [-]
Bending, Axial force and Shear	0,08

Stability checks
Decisive position for stability classification: 0,935 m
Section is classified as Class 1
Buckling group : Default

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1,00	1,870	2933,87		0,52	1,00
z-z	1,00	1,870	2934,02		0,52	1,00
LTB	1,00	1,870		1530,83	0,15	1,00

Combined stability checks

Interaction factors	k_{yy}	k_{yz}	k_{zy}	k_{zz}
Value	1,00	0,60	0,60	1,00

Maximum moment $M_{y,Ed}$ is derived from beam B5 position 0,935 m.
Maximum moment $M_{z,Ed}$ is derived from beam B5 position 0,000 m.

Combined stability checks	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]	Unity check [-]
Bending and Axial Compression	2,77	0,00	0,08

EN 1993-1-1 Code Check
National annex: Slovenian SIST-EN NA

Member B17	1,430 / 1,870 m	QRO100X5	Rolled	S 355	All ULS	0,02 -

Combination key
All ULS / 1.35*Lastna + 1.35*Stalna + 1.50*Koristna4

Partial safety factors		
Resistance of cross-sections	γ_{M0}	1,00
Resistance to instability	γ_{M1}	1,00
Resistance of net sections	γ_{M2}	1,25

Material			
Yield strength	f_y	355,0	MPa
Ultimate strength	f_u	490,0	MPa

Section checks
Section is classified as Class 1

Section checks	Design force	Value	Unit	Resistance	Value	Unit	Unity check [-]
Compression	N_{Ed}	-2,70	kN	$N_{c,Rd}$	667,40	kN	0,00
Shear V_y	$V_{y,Ed}$	-1,00	kN	$V_{pl,y,Rd}$	192,66	kN	0,01
Shear V_z	$V_{z,Ed}$	-0,10	kN	$V_{pl,z,Rd}$	192,66	kN	0,00
Bending M_y	$M_{y,Ed}$	0,06	kNm	$M_{pl,y,Rd}$	23,68	kNm	0,00
Bending M_z	$M_{z,Ed}$	0,44	kNm	$M_{pl,z,Rd}$	23,68	kNm	0,02
Torsion	τ_{Ed}	0,2	MPa	τ_{Rd}	205,0	MPa	0,00

Combined section checks

Combined section checks	Unity check [-]
Bending, Axial force and Shear	0,00

Stability checks

Decisive position for stability classification: 1,430 m
Section is classified as Class 1
Buckling group : Default

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1,00	1,870	1665,49		0,63	1,00
z-z	1,00	1,870	1665,57		0,63	1,00
LTB	1,00	1,870		863,16	0,17	1,00

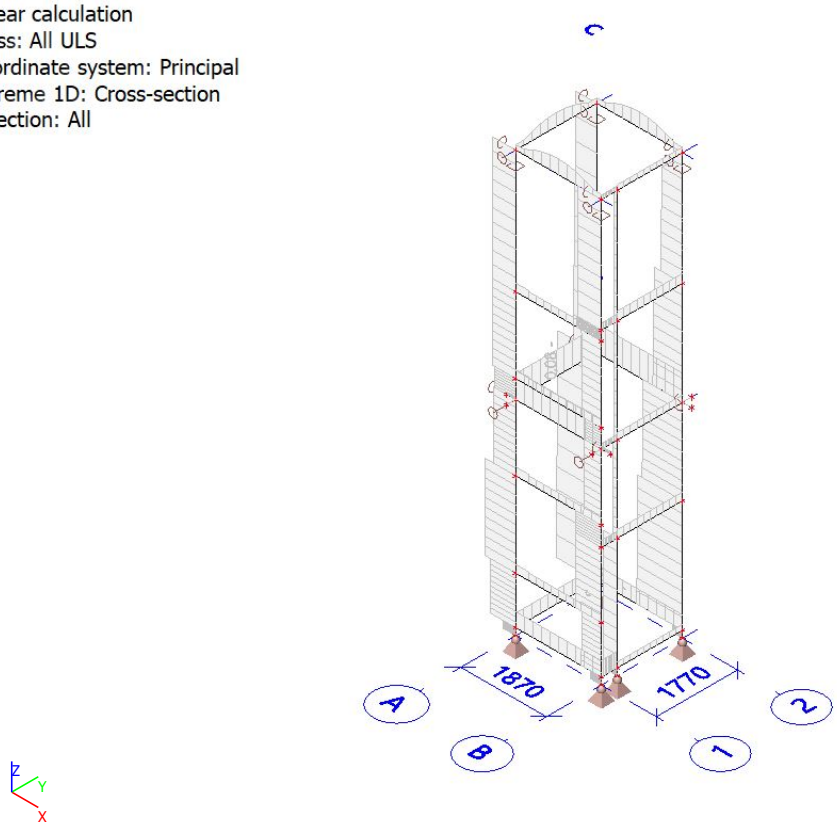
Combined stability checks

Interaction factors	k_{yy}	k_{yz}	k_{zy}	k_{zz}
Value	1,00	0,60	0,60	1,00

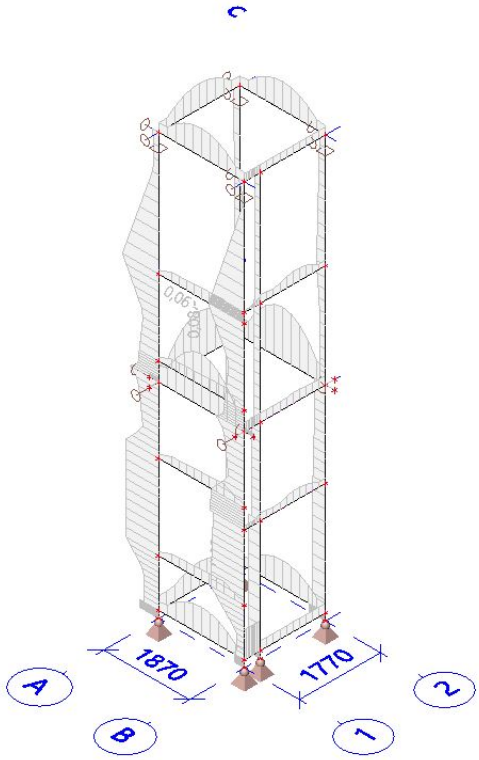
Maximum moment $M_{y,Ed}$ is derived from beam B17 position 0,935 m.
Maximum moment $M_{z,Ed}$ is derived from beam B17 position 1,430 m.

Combined stability checks	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]	Unity check [-]
Bending and Axial Compression	0,09	0,44	0,02

Values: **$UC_{Overall}$**
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Cross-section
Selection: All

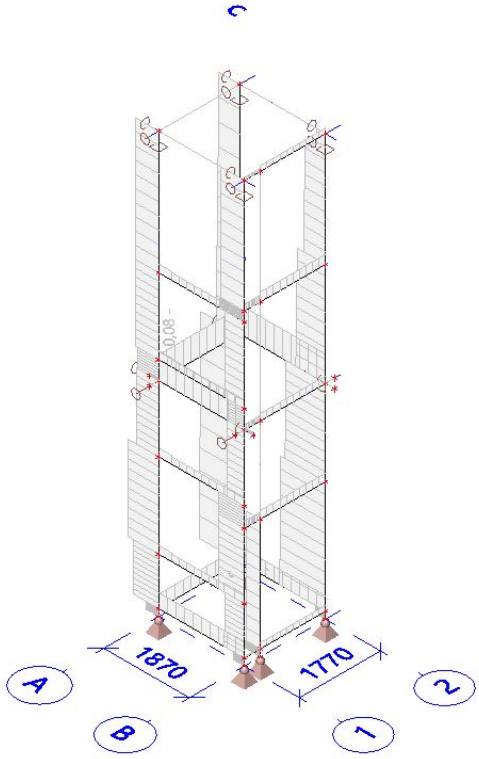


Values: **UC_{Sec}**
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Cross-section
Selection: All



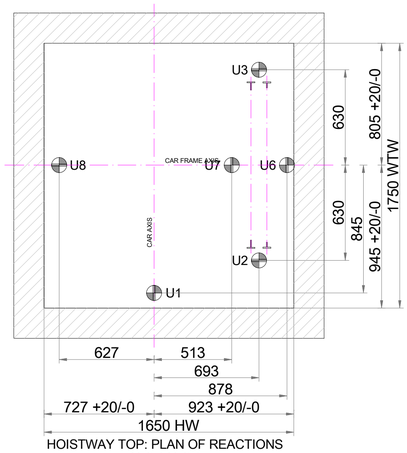


Values: **UC_{Stab}**
Linear calculation
Class: All ULS
Coordinate system: Principal
Extreme 1D: Cross-section
Selection: All

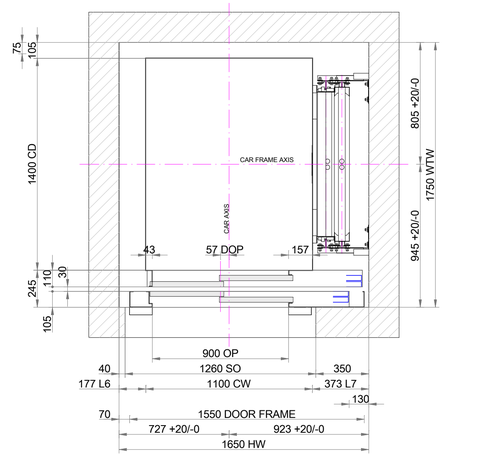




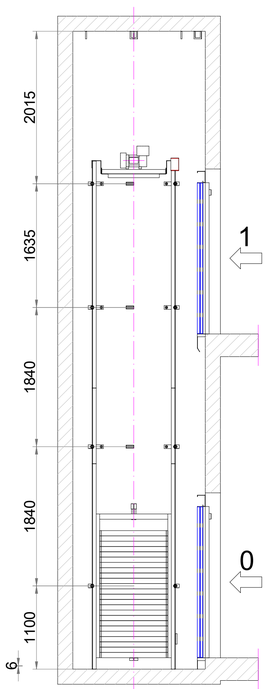
Merodajni so bili pomiki po zahtevah proizvajalca. uy=max 2mm

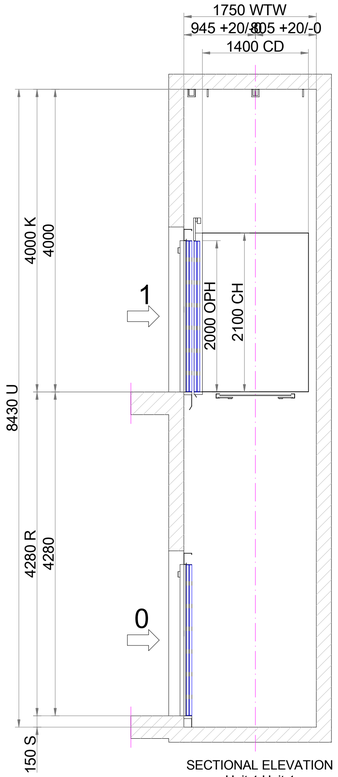


HOISTWAY TOP: PLAN OF REACTIONS
Unit 1 Unit 1

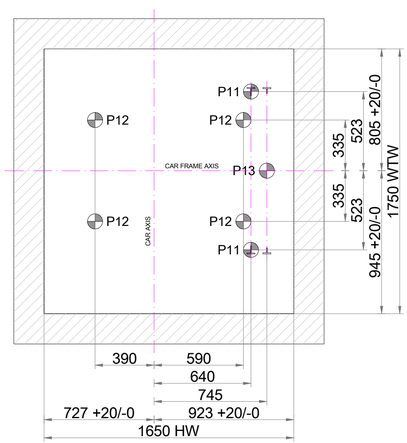


FRONT: LEVELS SERVED 0,1
HOISTWAY: PLAN OF CAR
Unit 1 Unit 1





SECTIONAL ELEVATION
Unit 1 Unit 1



HOISTWAY PIT: PLAN OF REACTIONS
Unit 1 Unit 1

Hoistway top load SWL (kN) Suspended method		
Material distribution	U1	20
Guide rail hoisting and suspension	U2 & U3	20
Machine and CWT hoisting	U6	20
Carframe hoisting	U7	20
Carframe suspension	U8	20

Note
- U2, U3 and U8 act simultaneously. All installation loads have a safety factor of 2.
- During maintenance U2 & U3 are used.
- Refer to Detail F - Lifting Eyes.

Index	Level markings	Floor to floor	FFL
25	.		
24	.		
23	.		
22	.		
21	.		
20	.		
19	.		
18	.		
17	.		
16	.		
15	.		
14	.		
13	.		
12	.		
11	.		
10	.		
9	.		
8	.		
7	.		
6	.		
5	.		
4	.		
3	.		
2	1	4000	4280
1	0	4280	0

Dimension		Value [mm]
Overhead	K	4000
Rise	R	4280
Pit	S	150

Pit loads (kN)		
Car guides	P11	16
Car buffer	P12	9
Counterweight buffer	P13	15
Counterweight guides	P17	11

Note
- Loads P11/P11 & P17/P17 do act simultaneously from each guide rail onto the pit floor; they support the machine and hitch which the equipment is suspended from.
- Loads P12 and P13 do not act simultaneously. If multiple buffers are shown the load is distributed equally between those buffers.

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Key

CD	- Car Depth	HW	- Hoistway Width
CH	- Car Height	K	- Overhead
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CWT	- Counterweight	R	- Rise
DBG	- Distance Between Guides	S	- Pit
DOP	- Door Offset	SO	- Structural Opening
E&I	- Emergency & Inspection	U	- Hoistway Height
HD	- Hoistway Depth	WTW	- Wall To Wall

Notes

Location Plan

Rev	Date	Comments	By
A	29-Jul-2025	Izhodiščni načrt dvižne ploščadi. Datum: 29. 7. 2025	SZ

Project Name Bazen Velenje
Project Number G9NEH521

Site Address Kopališka cesta 2 A
Velenje
3320

Owner .
Contractor .
Architect
Consultant .

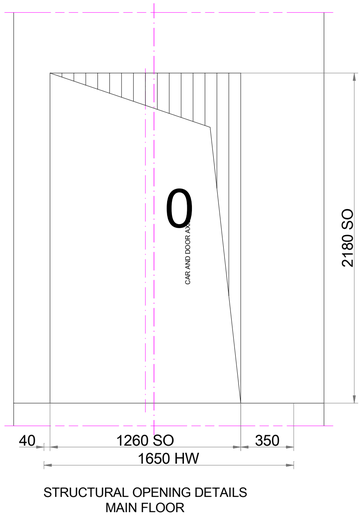
Group Name	Gen2 Home			
Unit Name	Unit 1			
Unit Number	Unit 1			
Unit Type	GEN2 HOME			
Duty Load [kg]	385			
Speed [m/s]	0.15			
Floors [No]	2			
Door Name	PRIMAPGL TLD			
Counterw. Safety	No			

Drawing Purpose
For Construction

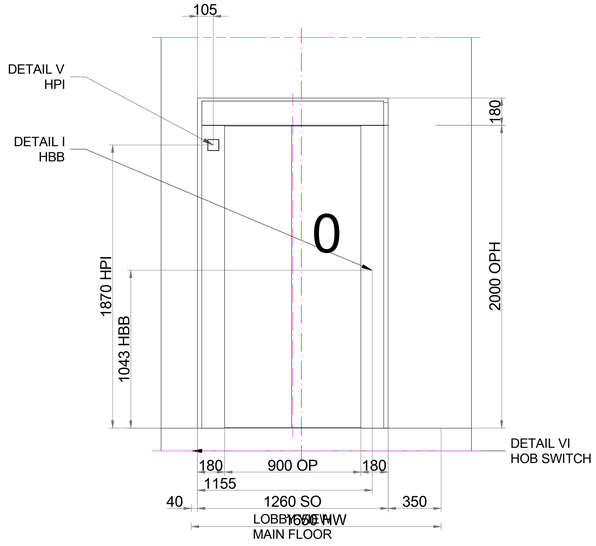
Drawing Title
Gen2 Home - Unit 1
BUILDERS WORK - ELEVATION & PLAN

Otis Drawing Number	Rev	Drawn	Checked
G9NEH521-01-01-01	A	SZ	S. Zivec

Project Drawing Number	Scale @A1	Sheet No
.	N/A	1 of 6

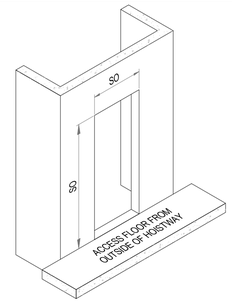


STRUCTURAL OPENING DETAILS
MAIN FLOOR



LOBBY VIEW
MAIN FLOOR

DETAIL N
STRUCTURAL OPENING AT ACCESS FLOOR LEVEL



THE TYPICAL STRUCTURAL OPENING AT THE ACCESS FLOOR WILL BE SUFFICIENT TO ALLOW THE INTRODUCTION OF THE LIFT PLATFORM INTO THE HOISTWAY.
SEE NOTE 3.10

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DOP	- Door Offset	SO	- Structural Opening
E&I	- Emergency & Inspection	U	- Hoistway Height
HD	- Hoistway Depth	WTW	- Wall To Wall

Notes

Location Plan

Rev	Date	Comments	By
A	29-Jul-2025	Izhodiščni načrt dvižne ploščadi. Datum: 29. 7. 2025	SZ

Project Name	Bazen Velenje
Project Number	G9NEH521
Site Address	Kopališka cesta 2 A Velenje 3320
Owner	
Contractor	.
Architect	
Consultant	.

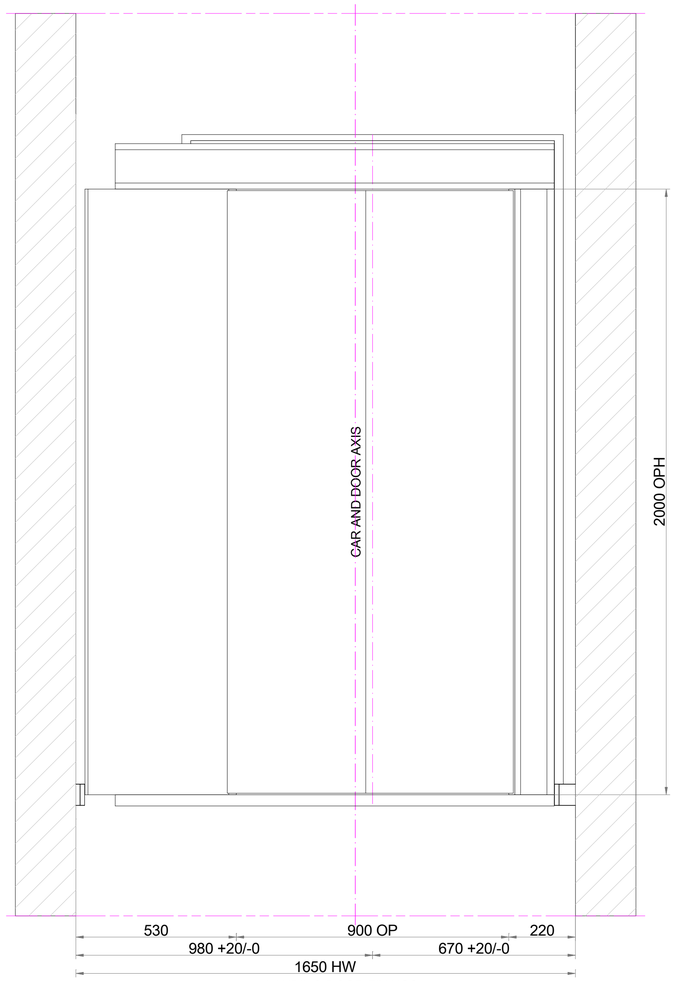
Group Name	Gen2 Home			
Unit Name	Unit 1			
Unit Number	Unit 1			
Unit Type	GEN2 HOME			
Duty Load [kg]	385			
Speed [m/s]	0.15			
Floors [No]	2			
Door Name	PRIMAPGL TLD			
Counterw. Safety	No			

Drawing Purpose
For Construction

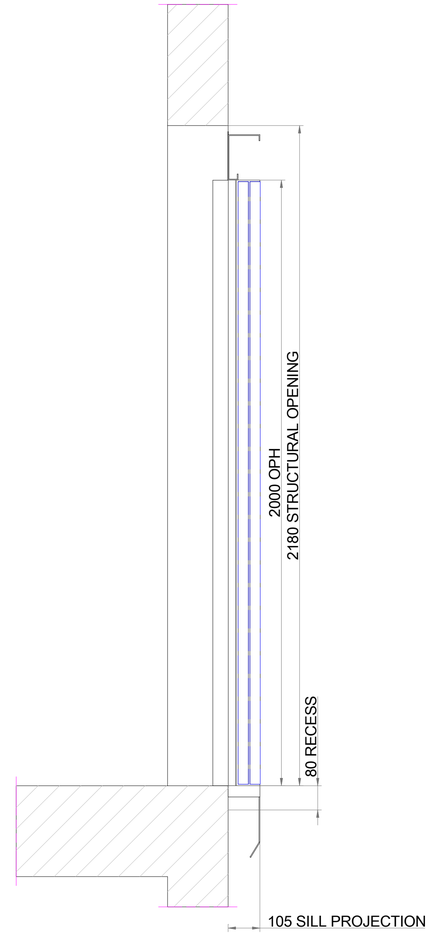
Drawing Title
Gen2 Home - Unit 1
BUILDERS WORK - ENTRANCES & LOBBY

Otis Drawing Number	Rev	Drawn	Checked
G9NEH521-01-01-02	A	SZ	S. Zivec

Project Drawing Number	Scale @A1	Sheet No
.	N/A	2 of 6



LANDING DOOR FIXINGS
VIEW FROM INSIDE THE HOISTWAY



LANDING DOOR FIXINGS
SECTIONAL ELEVATION

Unit Name		Unit 1
Unit Number		Unit 1
OP	[mm]	900
OPH	[mm]	2000
Weight	[kg]	125
Sill Bracket	Fixing	M12
	Load [kN]	2
Header Bracket	Fixing	M12
	Load [kN]	1
Side Bracket	Fixing	M6
	Load [kN]	0.5

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HD	- Hoistway Depth	WTW	- Wall To Wall

Notes

Location Plan

Rev	Date	Comments	By
A	29-Jul-2025	Izhodiščni načrt dvižne ploščadi. Datum: 29. 7. 2025	SZ

Project Name Bazen Velenje
Project Number G9NEH521

Site Address Kopališka cesta 2 A
Velenje
3320

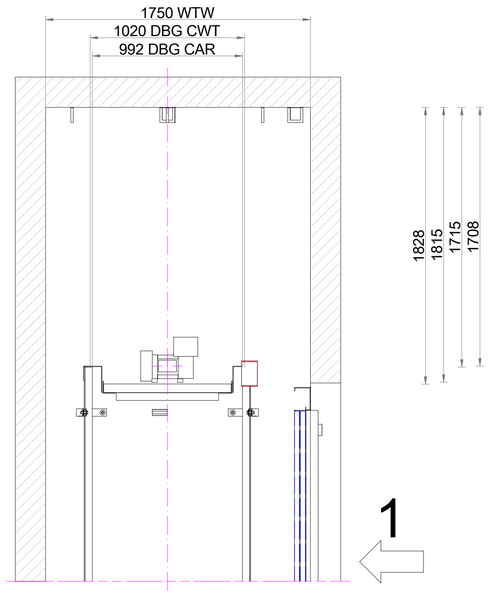
Owner
Contractor .
Architect
Consultant .

Group Name	Gen2 Home			
Unit Name	Unit 1			
Unit Number	Unit 1			
Unit Type	GEN2 HOME			
Duty Load [kg]	385			
Speed [m/s]	0.15			
Floors [No]	2			
Door Name	PRIMAPGL TLD			
Counterw. Safety	No			

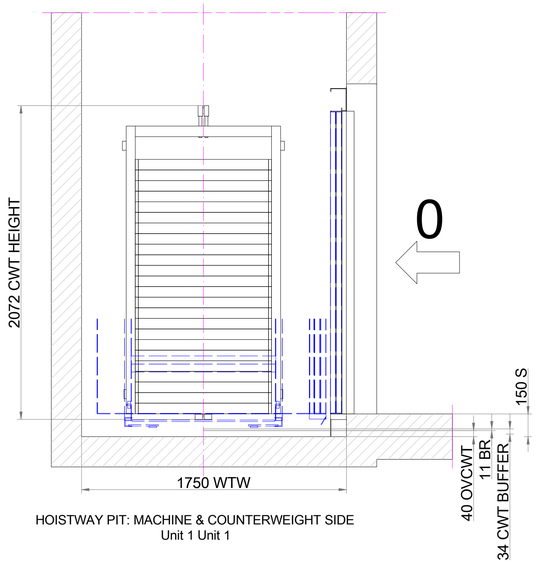
Drawing Purpose
For Construction

Drawing Title
Gen2 Home - Unit 1
FIXINGS

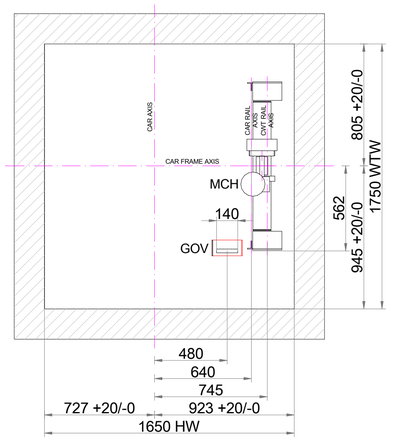
Otis Drawing Number	Rev	Drawn	Checked
G9NEH521-01-01-03	A	SZ	S. Zivec
Project Drawing Number		Scale @A1	Sheet No
.		N/A	3 of 6



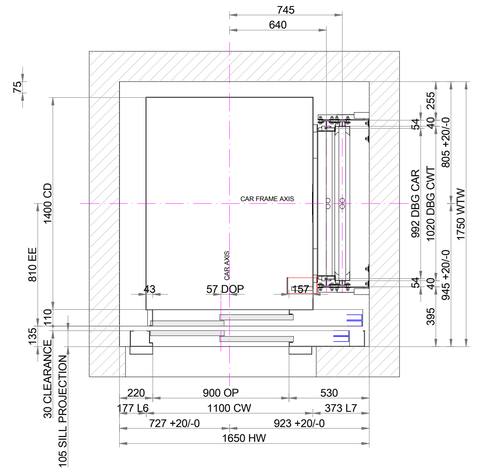
HOISTWAY PIT: MACHINE & COUNTERWEIGHT SIDE
Unit 1 Unit 1



TOP OF HOISTWAY: MACHINE & COUNTERWEIGHT SIDE
Unit 1 Unit 1



HOISTWAY TOP: PLAN OF MACHINE
Unit 1 Unit 1



FRONT: LEVELS SERVED 0,1
HOISTWAY: PLAN OF CAR
Unit 1 Unit 1

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Notes

Location Plan

Rev	Date	Comments	By
A	29-Jul-2025	Izhodiščni načrt dvižne ploščadi. Datum: 29. 7. 2025	SZ

Project Name	Bazen Velenje
Project Number	G9NEH521
Site Address	Kopališka cesta 2 A Velenje 3320
Owner	
Contractor	.
Architect	
Consultant	.

Group Name	Gen2 Home			
Unit Name	Unit 1			
Unit Number	Unit 1			
Unit Type	GEN2 HOME			
Duty Load [kg]	385			
Speed [m/s]	0.15			
Floors [No]	2			
Door Name	PRIMAPGL TLD			
Counterw. Safety	No			

Drawing Purpose
For Construction

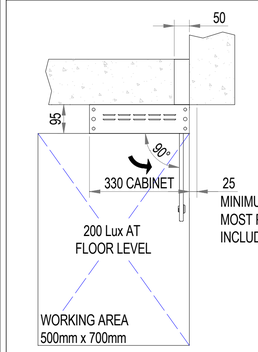
Drawing Title
Gen2 Home - Unit 1
INSTALLATION DETAILS

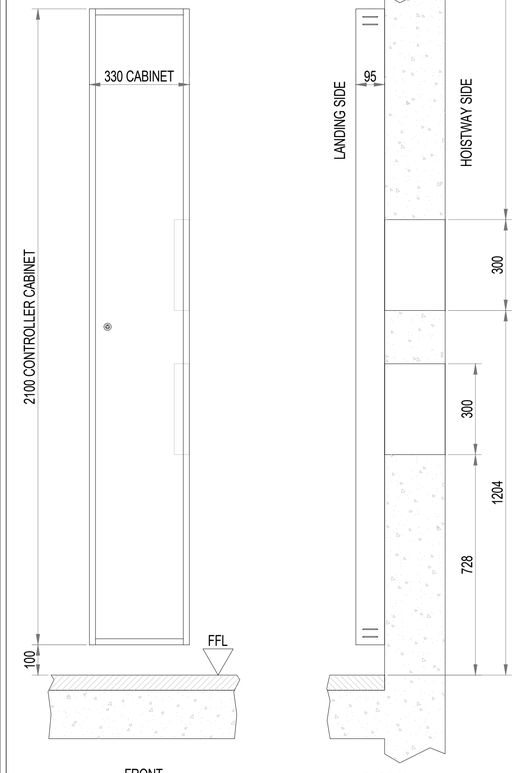
Otis Drawing Number	Rev	Drawn	Checked
G9NEH521-01-01-04	A	SZ	S. Zivec

Project Drawing Number	Scale @A1	Sheet No
.	N/A	4 of 6

DETAIL II
CONTROLLER CABINET (E&I) - STAND ALONE

LEFT HAND CABINET SHOWN, RIGHT HAND OPPOSITE.
FOR SAFETY REASONS, IT IS ESSENTIAL THAT THE CABINET IS ALLOWED TO OPEN 90°. A CLEAR WORKING AREA OF 500mm WIDE x 700mm DEEP (MINIMUM) IS REQUIRED IN FRONT OF THE CABINET, WITH MINIMUM 200 Lux AT FLOOR LEVEL. CABINET DOOR NOT TO BE REMOVED TO ENSURE EMC COMPLIANCE.





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Notes

Location Plan

Rev	Date	Comments	By
A	29-Jul-2025	Izhodiščni načrt dvižne ploščadi. Datum: 29. 7. 2025	SZ

Project Name	Bazen Velenje
Project Number	G9NEH521
Site Address	Kopališka cesta 2 A Velenje 3320
Owner	
Contractor	.
Architect	
Consultant	.

Group Name	Gen2 Home				
Unit Name	Unit 1				
Unit Number	Unit 1				
Unit Type	GEN2 HOME				
Duty Load [kg]	385				
Speed [m/s]	0.15				
Floors [No]	2				
Door Name	PRIMAPGLTLD				
Counterw. Safety	No				

Drawing Purpose
For Construction

Drawing Title
Gen2 Home - Unit 1
DETAILS

Otis Drawing Number	Rev	Drawn	Checked
G9NEH521-01-01-05	A	SZ	S. Zivec

Project Drawing Number	Scale @A1	Sheet No
.	N/A	5 of 6

1 General and Safety Requirements "By Others"

1.1 Lighting of the landings in the vicinity of the landing doors shall be at least 50 lux at floor level, 200 lux in front of the E&I panel.
1.2 A dry, locked and protected storage space is to be provided adjacent to the lift hoistway.
1.3 Building Regulations Part B and Lift Regulations 2016 do not permit a lift to open directly into an apartment. It must be possible to access lift landing doors at all times from the landing side without passing through private premises. Required for fire and other emergency situations.
1.4 Procedure for safe site access to be confirmed with local Otis office.
1.5 There shall be provided a safety hole of Ø35mm on the top floor for life line safety harness anchorage point with shock load 14kN for work in hoistway, 2400mm above floor and 750mm from the door centre opposite of the machine / counterweight. (Detail E - Top Floor.)
1.6 Hoistway opening protection - suitable protection with minimum requirements as shown (Detail D - Hoistway opening protection) until Otis have completed the installation of all landing doors. The protection must be able to withstand a load of 90kg applied from the landing. The area in front of the landing entrances is to be kept clear at all times.
1.7 The centre line of the landing call buttons should be at least 500mm (preferably 700mm) away from the corner of any adjacent wall in accordance with BS EN81-70. For a landing call button located in a recess, the recess can be no more than 250mm deep. (Detail C - Pit ladder and hall button locations.)

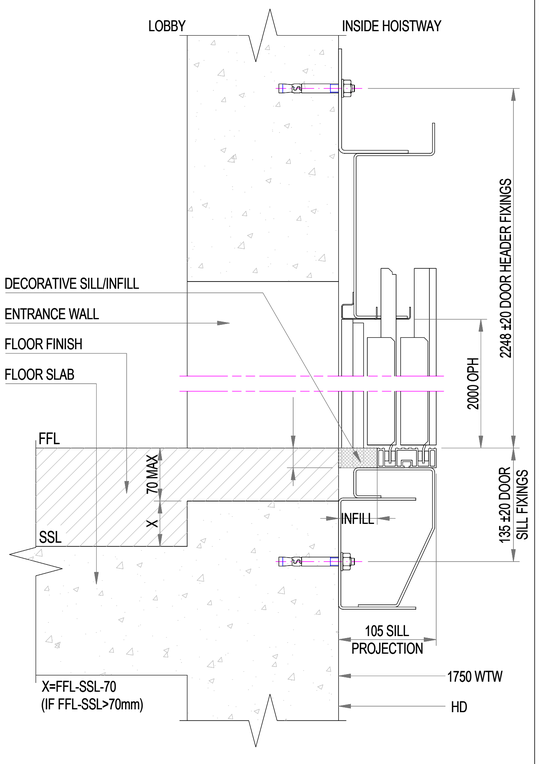
2 Electrical Note and Requirements "By Others"

2.1 A permanent electrical power supply must be provided at the start of the installation, or as otherwise specified in the contract (required for the installation). The electrical power supply shall have the capacity as detailed in Table 1- General Unit Data [VOLTAGE].
2.2 Electrical supply cable installed, phased, tested and terminated in a lockable rotary 6 pole unfused isolator. The supply shall have the capacity for the load detailed in Table 1 - General Unit Data [MOTOR POWER], with maximum dimensions as [ISOLATOR MAXIMUM DIMENSION]. All supply cables should be calculated in accordance with BS7671. Recommended isolator [ISOLATOR]: Type 1 = Eaton T3-4-15682/I2/SVB, Type 2 = Eaton T5B-3-8342/I4/SVB
2.3 When EAR 3 (Emergency automatic return with door opening) has been supplied with this unit, then this must be connected via a separate pole in the isolator, to ensure this feature is disabled when the lift power supply is removed via operation of the isolator.
2.4 The maximum volt drop permitted on the supply cable (from the origin of the supply), due to the lift starting current given in Table 1 - General Unit Data must not exceed 2.5% of nominal voltage measured at the lockable non fused isolator.
2.5 The supply cable shall enter the lift hoistway at the top (Detail E - Top Floor). The supply cable to the isolator shall be provided with 2m of spare cable, to enable it to be relocated within the lift hoistway when the lift is installed. The isolator shall be temporarily installed on a steel back plate.
2.6 A temporary 110vAC power supply and lighting for use during the installation at top of hoistway next to main isolator.
2.7 Otis will provide single and 3-phase protection within the lift control equipment as stated in Table 1 - General Unit Data. This will provide overload protection of the equipment and supply. Otis will derive the single phase load from the 3-phase supply. The 3-phase supply cable shall be suitable to carry the currents stated in Table 1 - General Unit Data. Suitable short circuit protection of the supply cable shall be provided. This protection shall provide suitable discrimination from the Otis overload protection device. Otis will provide and install permanent hoistway lighting and pit socket in accordance with the requirements of BS EN81-20.
2.8 Otis Remote Elevator Monitoring (REM) system gives a remote alarm system in accordance with BS EN 81-28, ensuring a two-way voice communication allowing permanent contact with a rescue service (by Otis).
2.9 Communication; GSM. There shall be provided; a 25mm hole at the top of the lift hoistway, for the GSM antenna (to outside of building or into roof space), to achieve a GSM signal strength of -85dbm (max) or better and suitable containment for the antenna location.
2.10 Fire alarm signal (normally closed) to be next to isolator (Detail E - Top Floor) with 5m spare cable.
2.11 The E&I panel door is not to be removed to ensure EMC compliance.

3 Building and Hoistway Requirements "By Others"

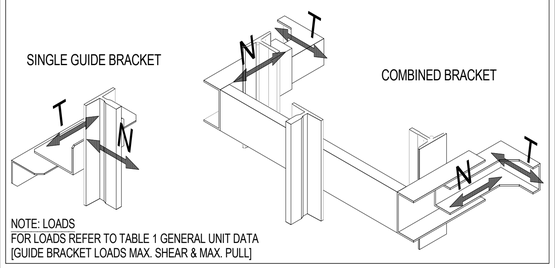
3.1 Equipment is designed for internal application only. No direct exposure to the elements. Hoistway needs to be watertight and weatherproof. The ambient temperature in the hoistway and the machinery space(s) is to be maintained between + 5°C and + 40°C.
3.2 Construction of hoistway including the entrance side walls, to be in line with fire rating as per building design. The lift hoistway must be able to withstand the applied loads as shown on drawings, Detail B, Table 1 - General Unit Data, and the fixings sheet for the door fixing loadings. The builder shall do the necessary checks to ensure the lift construction is suitable for these loadings. The minimum requirements for wall thickness and material are listed below. They can only be used if approved by the builder, and higher grades or thicker walls may be necessary, depending on the building and the lift.
3.2.1 140mm thick c35 reinforced concrete.
3.2.2 140mm thick high density non-aerated blocks with a minimum strength of 10N/mm². This option is only available for units with a duty load lower than 2000kg, and must be discussed and agreed with Otis.
3.2.3 Steel structure suitable for the shown loads, with particular emphasis on the 2mm deflection requirement (3.4), which is typically the most stringent requirement. The steel structure shall be equipped with plates and slots to attach Otis's guide brackets and door fixations in lieu of a flat concrete wall. Minimum profile size for door fixation is U120x60 channel. Suitable fire protection shall be installed where a solid wall is missing.
3.3 Tolerances shown on layouts are of highest importance. Note that the clear plumb hoistway is the key dimension for a lift installation. All landing doors will be installed from a plumb line spanning the full hoistway length. Any work related to non-conforming tolerances is "by others". Typical such work is, but not limited to: fascias, post-cut concrete, additional secondary steel work.
3.4 Deflection at guide fixings: It is imperative that the structural integrity of the building fabric in the location of each guide rail bracket is restricted to a maximum overall deflection of 2mm under the live loads applied by the lift equipment as stated in Table 1 - General Unit Data, and Detail A - Guide bracket pull and shear.
3.5 The reaction shown in Table 1 - General Unit Data. Values N and T act on guide rail bracket fixings, and can act on any fixing in any direction (N = push or pull, T = left or right). The single guide bracket typically has the largest loading on its two fixings, with N acting on both fixings - one in compression and the other in tension. T acts on both fixings in the same direction. The combination bracket can be assumed to have each of these loads spread over two fixings on each side. All loads are inclusive of load factors from BS EN81-20 covering emergency scenarios and can be classed as accidental.
3.6 Distance between slab structural level (SSL) and finished floor level (FFL).
If the distance between SSL and FFL is greater than allowed, an upstand will be required at the landing to ensure safe mounting of door sill. See Detail A - Landing door sill & header section.
3.7 Establish a permanent datum line on the inside of the lift hoistway at all levels, from which the finished floor level (FFL) can be established.
3.8 Establish a permanent gridline on the hoistway pit floor.
3.9 Grout in all frames and sills to Otis requirements and finish floor up to door sills.
3.10 The structural opening at the access floor level may need to be larger than typical, to allow for the introduction of the car platform and associated equipment into the hoistway (see Detail N - Structural opening at access floor level). This enlarged opening is to be built up to the typical structural opening dimensions following the installation of the car platform.
3.11 Drill and Fix - Hilti type anchors: hsa x 100mm long (by Otis).
3.12 Blockwork - if blockwork is to be used the distance from edge of the block fixing point should be minimum 100mm.
3.13 Pit fixation - needs to withstand the shown loads. Needs to be minimum 150mm thick reinforced concrete mat, pre-casted plates or pre-casted anchor channels for fixing bolts.
3.14 All holes, penetrations and cut-outs according to Otis requirements.
3.15 The fire rating of the lift landing doors follows BS EN81-58, tested according to Annex B. Shaft front construction to comply to minimum requirements. Firestopping between the lift landing doors and the entrance side walls is the responsibility of others, unless otherwise agreed on the contract.

DETAIL A
LANDING DOOR SILL & HEADER SECTION



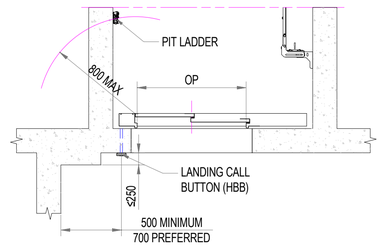
NOTE: LANDINGS
FFL - FINISHED FLOOR LEVEL
SSL - SLAB STRUCTURAL LEVEL

DETAIL B
GUIDE BRACKET PULL AND SHEAR



NOTE: LOADS
FOR LOADS REFER TO TABLE 1 GENERAL UNIT DATA
[GUIDE BRACKET LOADS MAX. SHEAR & MAX. PULL]

DETAIL C
PIT LADDER AND HALL BUTTON LOCATIONS



DETAIL D
HOISTWAY OPENING PROTECTION

IF THE STRUCTURAL OPENING IS LARGER THAN THE GATE, THE GAP WILL RECEIVE ADDITIONAL COVERING

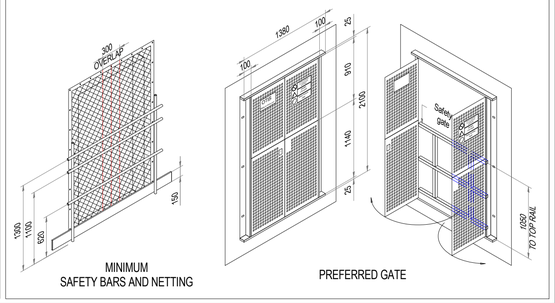
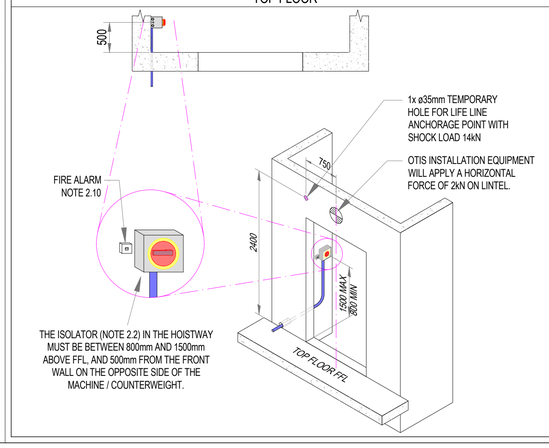


Table 1 - General Unit Data

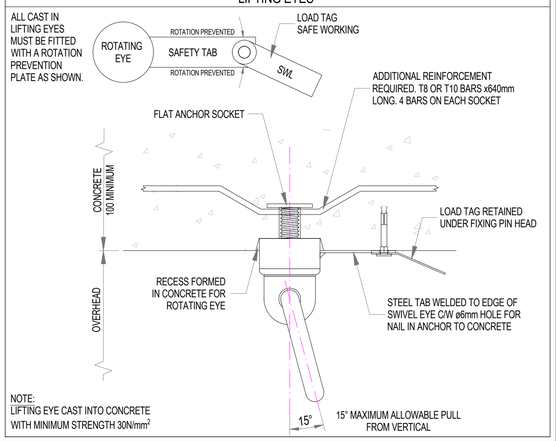
VERSION UK 2025/02

DESCRIPTION		ABBREVIATION	UOM	Unit 1				-	-	-	-	-
UNIT NUMBER		UN	-	Unit 1				-	-	-	-	-
UNIT TYPE		UT	-	GEN2 HOME				-	-	-	-	-
CAR TYPE		CARTYPE	-					-	-	-	-	-
NUMBER OF PASSENGERS		NBPAS	-	3				-	-	-	-	-
DUTY LOAD		DL	kg	385				-	-	-	-	-
SPEED		V	m/s	0.15				-	-	-	-	-
CAR WIDTH (SHELL)		CW	mm	1100				-	-	-	-	-
CAR DEPTH (SHELL)		CD	mm	1400				-	-	-	-	-
CAR HEIGHT (SHELL)		CH	mm	2100				-	-	-	-	-
HOISTWAY WIDTH		HW	mm	1650				-	-	-	-	-
HOISTWAY DEPTH		HD	mm					-	-	-	-	-
HOISTWAY WALL TO WALL		WTW	mm	1750				-	-	-	-	-
OVERHEAD		K	mm	4000				-	-	-	-	-
PIT		S	mm	150				-	-	-	-	-
RISE		R	m	4.28				-	-	-	-	-
CAR ENTRANCES		NBENT	-	1				-	-	-	-	-
STOPS		N	-	2				-	-	-	-	-
OPENINGS		NBLD	-					-	-	-	-	-
DOOR OPENING WIDTH		OP	mm	900				-	-	-	-	-
DOOR OPENING HEIGHT		OPH	mm	2000				-	-	-	-	-
DOOR		DOOR	-	TLD				-	-	-	-	-
DOOR TYPE		DOTYP	-	PRIMAPGL				-	-	-	-	-
DOOR FRAME		DF	-	MRF150				-	-	-	-	-
COUNTERWEIGHT SAFETY		CWT	-	No				-	-	-	-	-
FIREFIGHTER LIFT		FF	-	No				-	-	-	-	-
EVACUATION LIFT		EVAC	-	No				-	-	-	-	-
PHASE		PH	-	3-Phase				-	-	-	-	-
VOLTAGE		VOLT	vAC	230				-	-	-	-	-
FREQUENCY		FREQ	Hz	50				-	-	-	-	-
STARTING CURRENT (MOTOR)		Is	A	4.3				-	-	-	-	-
FULL LOAD CURRENT (MOTOR)		In	A	4.3				-	-	-	-	-
STARTING CURRENT (LIGHTING)		Is_Lighting	A	6				-	-	-	-	-
FULL LOAD CURRENT (LIGHTING)		In_Lighting	A	6				-	-	-	-	-
OVERLOAD FUSE		Fuse	A	10				-	-	-	-	-
MOTOR POWER		PowerKW	kW	0.64				-	-	-	-	-
MAX. REGENERATED POWER		RegenKW	kW					-	-	-	-	-
HEAT RELEASE		HR	kJ/s					-	-	-	-	-
ISOLATOR	NOTE 2.2	-	-	Type 1				-	-	-	-	-
ISOLATOR MAXIMUM DIMENSION (WxDxH)		-	mm	100x181x135				-	-	-	-	-
COMMUNICATION	NOTE 2.9	COM	-	BT				-	-	-	-	-
DESIGN		D	-	NO				-	-	-	-	-
GUIDE BRACKET FIXING BOLT SIZE		Ø	mm	M12				-	-	-	-	-
GUIDE BRACKET LOADS MAX. SHEAR	NOTE 3.5	T	kN	1.64				-	-	-	-	-
GUIDE BRACKET LOADS MAX. PULL	NOTE 3.5	N	kN	0.73				-	-	-	-	-
NUMBER OF LIFTING EYES		EYES	-	6				-	-	-	-	-

DETAIL E
TOP FLOOR



DETAIL F
LIFTING EYES



NOTE:
LIFTING EYE CAST INTO CONCRETE WITH MINIMUM STRENGTH 30N/mm²

Disclaimer

- Do not scale from this drawing.
- Discrepancies must be reported immediately to Otis before proceeding.
- Only figured dimensions are to be used.
- All dimensions must be site checked before fabrication or setting out.
- This document is copyrighted and the data is to be used only by relevant stakeholders for this specific project.
- For hoistway construction and tolerances refer to the general notes page.

Key

CD	- Car Depth	HW	- Hoistway Width
CH	- Car Height	K	- Overhead
COP	- Car Operating Panel	OP	- Opening Width
CW	- Car Width	OPH	- Opening Height
CWT	- Counterweight	R	- Rise
DBG	- Distance Between Guides	S	- Pit
DOP	- Door Offset	SO	- Structural Opening
E&I	- Emergency & Inspection	U	- Hoistway Height
HD	- Hoistway Depth	WTW	- Wall To Wall

Notes

Location Plan

Rev	Date	Comments	By
A	29-Jul-2025	Izhodiščni načrt dvižne ploščadi. Datum: 29. 7. 2025	SZ

Project Name	Bazen Velenje
Project Number	G9NEH521
Site Address	Kopališka cesta 2 A Velenje 3320
Owner	
Contractor	.
Architect	
Consultant	.

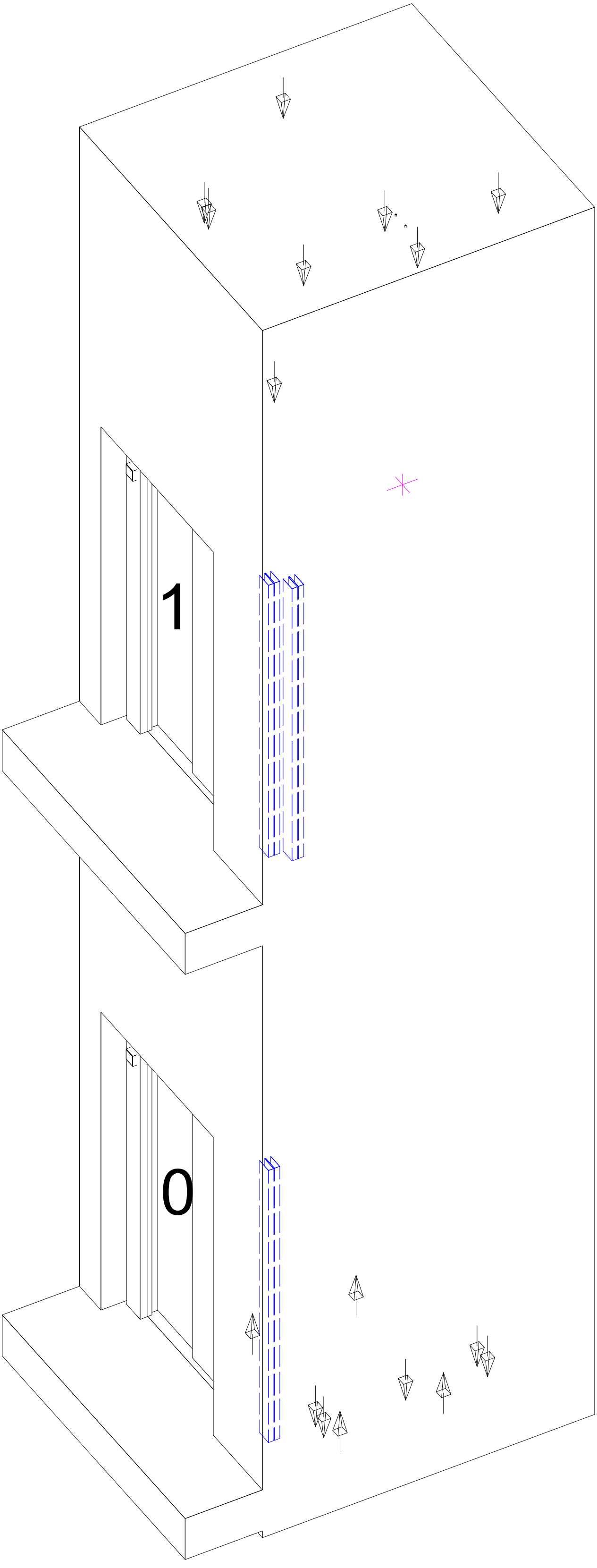
Group Name	Gen2 Home			
Unit Name	Unit 1			
Unit Number	Unit 1			
Unit Type	GEN2 HOME			
Duty Load [kg]	385			
Speed [m/s]	0.15			
Floors [No]	2			
Door Name	PRIMAPGL TLD			
Counterw. Safety	No			

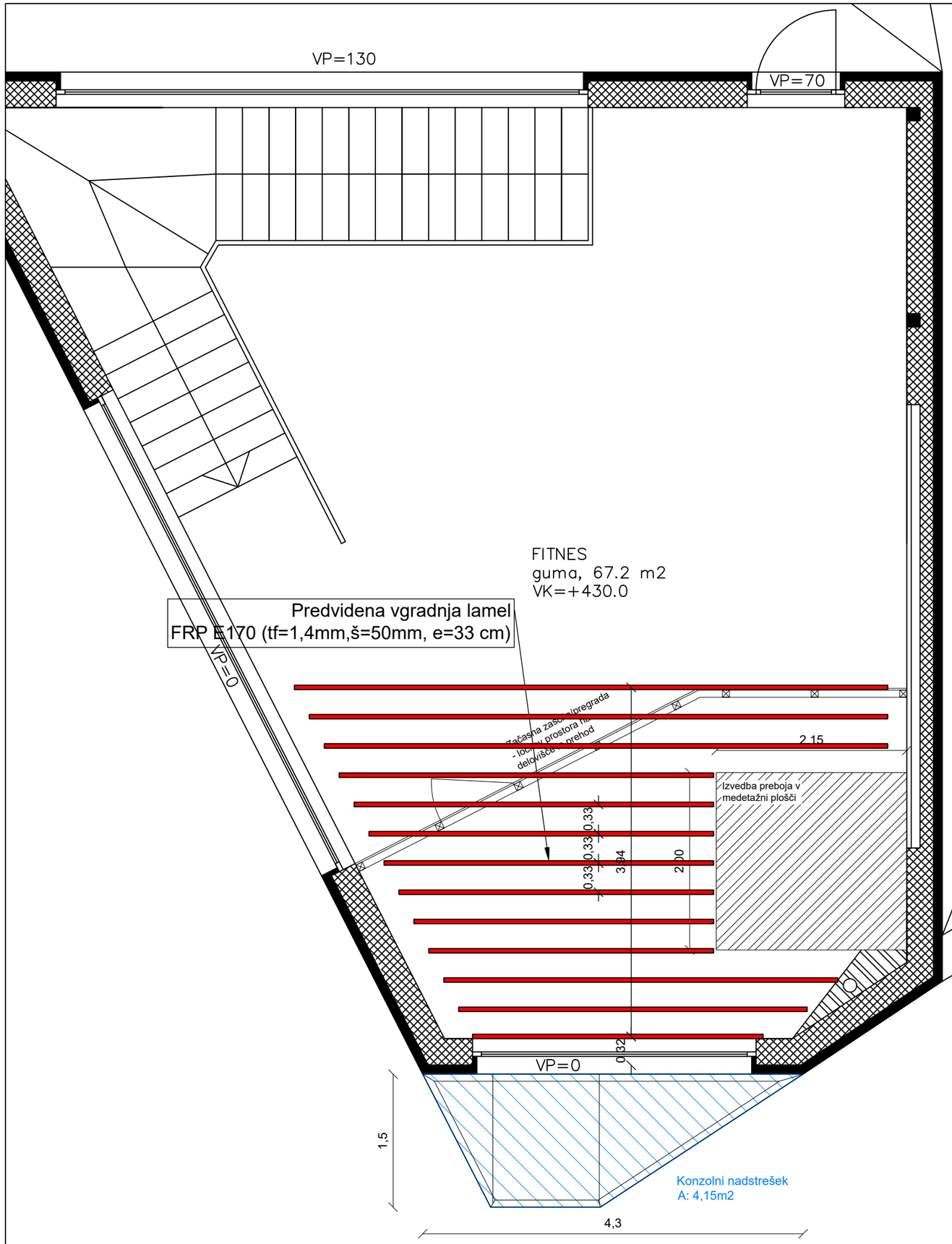
Drawing Purpose
For Construction

Drawing Title
Gen2 Home - Unit 1
GENERAL NOTES

Otis Drawing Number	Rev	Drawn	Checked
G9NEH521-01-01-06	A	SZ	S. Zivec

Project Drawing Number	Scale @A1	Sheet No
.	N/A	6 of 6


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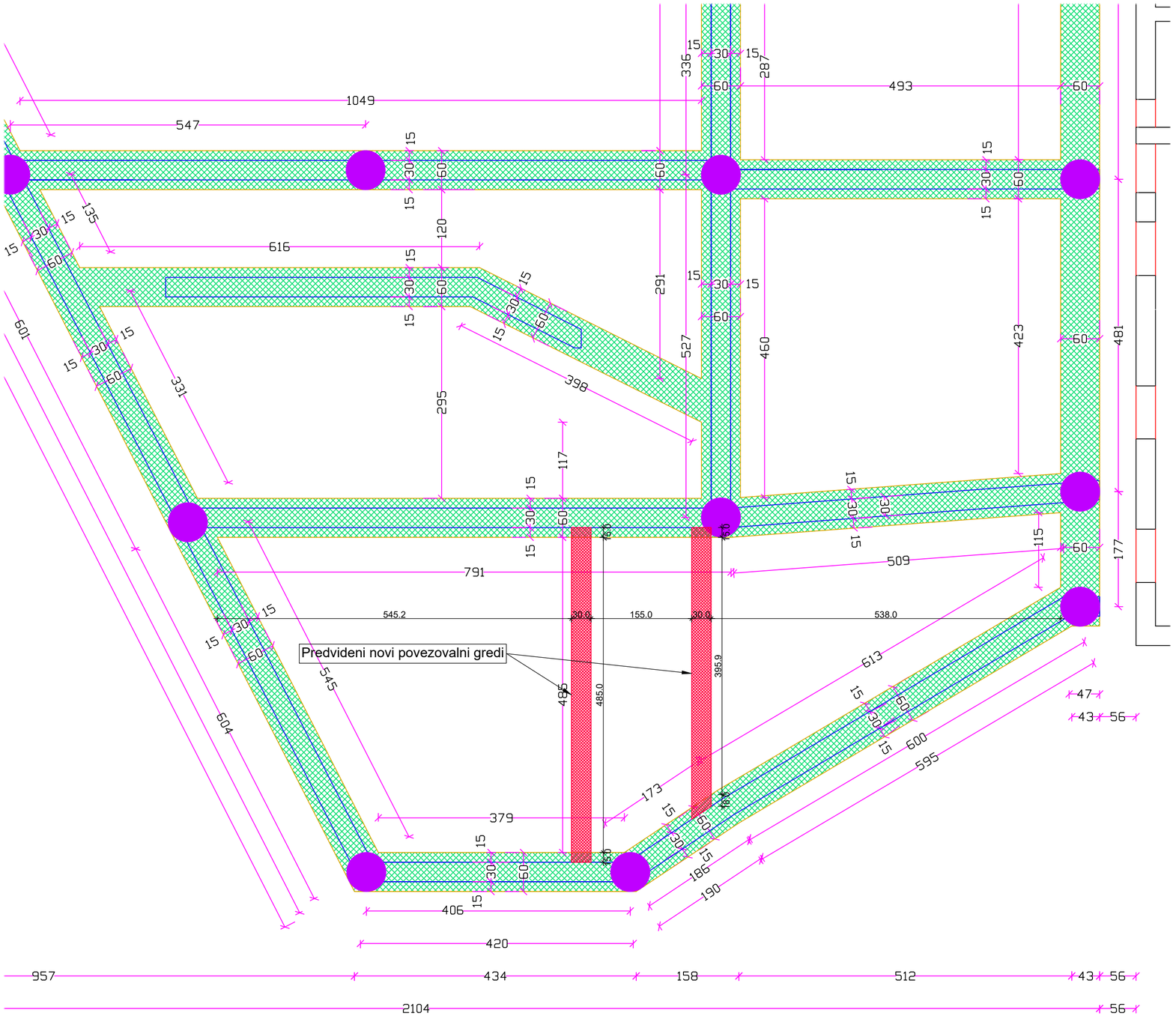
Opomba: - Točno specifikacijo in razporeditev lamel določi statik po preračunu nosilnosti plošč in preverbi obstoječe armature v ploščah.
- Vgradnja lamel na spodnjo cono plošče

SPREMEMBA	OPIS SPREMEMBE	DATUM

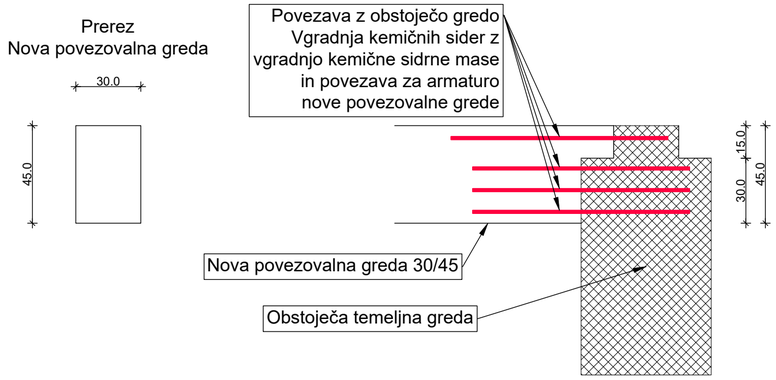
Marko Markoja projektiranje in tehnično svetovanje, s.p.	MARKO MARKOJA s.p. Projektiranje in tehnično svetovanje Prešernova 8, 3320 VELENJE	NAROČNIK / INVESTITOR RDEČA DVORANA - ŠRZ Šaleška cesta 3 3320 Velenje
OBJEKT / LOKACIJA / GRADNJA		NASLOV RISBE / VSEBINA
Postavitev dvižne ploščadi znotraj objekta in preureditev recepcije - BAZEN VELENJE MANJŠA REKONSTRUKCIJA		2.0.NAČRT S PODROČJA GRADBENIŠTVA SKICA PREDVIDENE VGRADNJE LAMEL

NAZIV	IME	ID. ŠT.	PODPIS		
VODJA PROJEKTA	Jernej Kac univ.dipl.inž.arh.				
POOBLAŠČENI INŽENIR	MARKO MARKOJA, univ.dipl.inž.grad.	IZS G - 3082			
SODELAVCI	Vid Markota mag. inž. grad.				
ŠT. PROJEKTA	ŠT. NAČRTA	VRSTA NAČRTA	DATUM	MERILO	ŠT. LISTA
AP563-23	23/2025	PZI	JULIJ 2025	1:50	S01

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Detajl navezave na obstoječo gredo in prerez
M 1:20



Opomba:
- Točno dimenzijo nove povezovalne grede in način sidranja določi statik po preračunu nosilnosti plošč in preverbi obstoječe armature v ploščah.
- Vse stike novega betona z starim je potrebno naštokati, uporabiti emulzijo za stik staro novo in sidrati z armaturo po navodilih in detajlih statika!
- Povezovalne grede je potrebno vgraditi osno na pozicijo novih jeklnih stebrov konstrukcije dvižne ploščadi!

SPREMEMBA	OPIS SPREMEMBE	DATUM

Marko Markoja projektiranje in tehnično svetovanje, s.p.	MARKO MARKOJA s.p. Projektiranje in tehnično svetovanje Prešernova 8, 3320 VELENJE

NAROČNIK / INVESTITOR
RDEČA DVORANA - ŠRZ Šaleška cesta 3 3320 Velenje

OBJEKT / LOKACIJA / GRADNJA	NASLOV RISBE / VSEBINA
Postavitev dvižne ploščadi znotraj objekta in preureditev recepcije - BAZEN VELENJE MANJŠA REKONSTRUKCIJA	2.0.NAČRT S PODROČJA GRADBENIŠTVA SKICA PREDVIDENE IZGRADNJE NOVE POVEZOVALNE GREDE

NAZIV	IME	ID. ŠT.	PODPIS
VODJA PROJEKTA	Jernej Kac univ.dipl.inž.arh.		
POOBLAŠČENI INŽENIR	MARKO MARKOJA, univ.dipl.inž.grad.	IZS G - 3082	
SODELAVCI	Vid Markota mag. inž. grad.		

ŠT. PROJEKTA	ŠT. NAČRTA	VRSTA NAČRTA	DATUM	MERILO	ŠT. LISTA
AP563-23	23/2025	PZI	JULIJ 2025	1:50	S02

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