Snimak stanja stare krovne konstrukcije i prijedlog sanacije

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SVEUČILIŠTE U ZAGREBU

GRAĐEVINSKI FAKULTET

ZAVRŠNI RAD

Snimak stanja stare krovne konstrukcije i prijedlog sanacije

Assesment of the old roof structure and sanation proposal

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Komentor:

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Sažetak

Cilj ovog rada bio je napraviti ocjenu stanja konstrukcije postojećeg krovišta zgrade Gradske skupštine Grada Zagreba te dati prijedlog sanacije Zone 2. U prvom dijelu opisane su nedestruktivne metode ispitivanja i procjene stanja drva na temelju kojih dobijemo mehanička svojstva koja koristimo u daljnjim proračunima. Nakon toga, modelirana je konstrukcija postojećeg krovišta u programu Dlubal kako bi se napravilo izvješće u kojem su definirane dimenzije konstrukcije i njezinih presjeka te sva zadana opterećenja na temelju kojih je napravljen statički proračun same konstrukcije.

Summary

The aim of this work was to evaluate the condition of the existing roof structure of the City Assembly Building of the City of Zagreb and to provide a proposal for its rehabilitation of Zone 2. In the first part, non-destructive testing methods and the evaluation of the condition of the wood were described, based on which mechanical properties were obtained and used in further calculations. Afterward, the existing roof structure was modeled in the Dlubal program to create a report that defines the dimensions of the structure and its cross-sections, as well as all specified loads, which were used for the static analysis of the structure itself.

Sadržaj

NEDESTRUKTIVNE METODE ISPITIVANJA I PROCJENE STANJA DRVA

1. Drvo kao građevni materijal

Drvo je, kao ekološki i obnovljiv izvor, jedno od najtraženijih prirodnih materijala. Velika potražnja i razvoj novih proizvoda su doveli do brze sječe i nedostatka kvalitetne drvne sirovine pa se velika pažnja mora posvetiti njegovom racionalnom korištenju.

Slika 1. Drvena crkva u Malopoljskoj, izgrađena tijekom 15.-16. stoljeća

Sve veća ekološka osviještenost nalaže smanjenje emisije stakleničkih plinova u industriji i potrebu da se gospodarstvo (građevinarstvo) preusmjeri na prirodne materijale kakvi su drvo i kamen.

Prirodna trajnost drva je njegova sposobnost da se odupre biološkim utjecajima. Ona ovisi o vrsti drva, te mjestu i načinu upotrebe drvenog proizvoda.

Prednosti drva s obzirom na druge materijale su laka obrada, niska osjetljivost na temperaturu, niska cijena, ekološki i obnovljiva sirovina, visoka čvrstoća paralelno s vlaknima, mala težina elemenata, jeftina obrada i dobra izolacijska svojstva.

2. Metode ispitivanja

Metode ispitivanja materijala dijelimo na destruktivne (razorne) i nedestruktivne (nerazorne).

a) Destruktivne metode ispitivanja:

Destruktivne metode ispitivanja drva obuhvaćaju tehnike koje uzrokuju oštećenje ili uništavanje uzoraka drva kako bi se analizirala njihova unutrašnja struktura ili svojstva. Ova metoda se primjenjuje radi procjene čvrstoće, kvalitete ili drugih karakteristika drva.

b) Nedestruktivne (nerazorne) metode ispitivanja:

Prednost nedestruktivnih metoda testiranja u odnosu na destruktivne je što one pridonose očuvanju materijala, čime se ostvaruje bolja kontrola kvalitete uz postizanje potpune automatizacije proizvodnje. U tim su ispitivanjima eksperimentalni uzorci manjih dimenzija i na istim je uzorcima moguće odrediti više različitih mehaničkih svojstava.

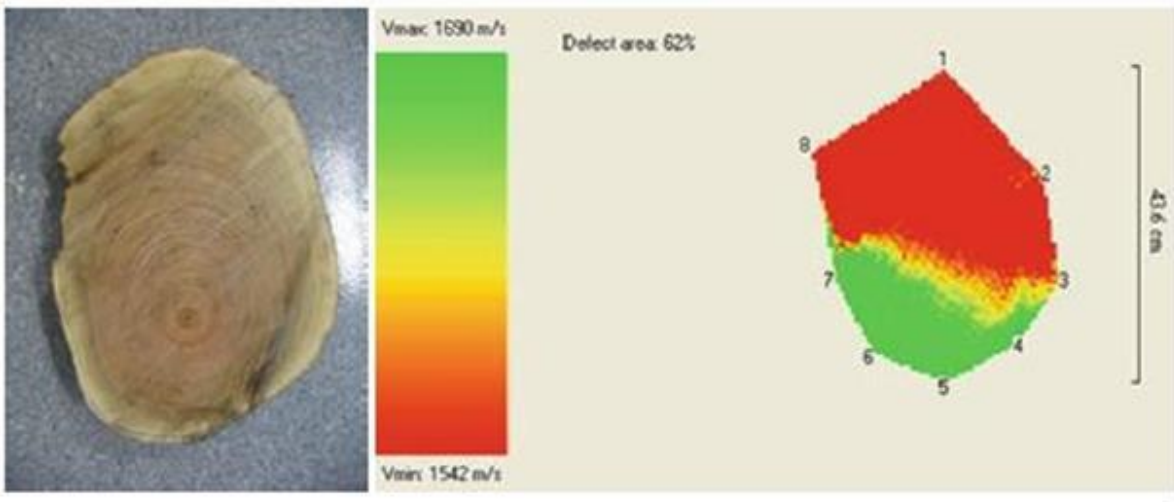
Nedestruktivne metode ispitivanja drva su tehnike koje omogućavaju procjenu svojstava drva bez oštećenja ili uništavanja uzorka. Neke od ovih metoda uključuju:

Ultrazvuk. Ova metoda se koristi za merenje brzine zvuka kroz drvo kako bi se utvrdila njegova gustoća i moguća oštećenja. Utvrđivanje kvalitete drva ultrazvukom je nerazorna metoda koja se često koristi u industriji drva kako bi se procjenila unutrašnja struktura drva. Ova tehnika koristi ultrazvučne valove koji prolaze kroz drvo i omogućuju analizu karakteristika kao što su gustoća, vlaga, prisustvo pukotina ili drugih oštećenja. Na osnovu rezultata ultrazvučnog testiranja, moguće je donijeti odluke o kvalitetu i upotrebljivosti drva za određenu svrhu, kao što su građevinski materijali ili proizvodi od drva.

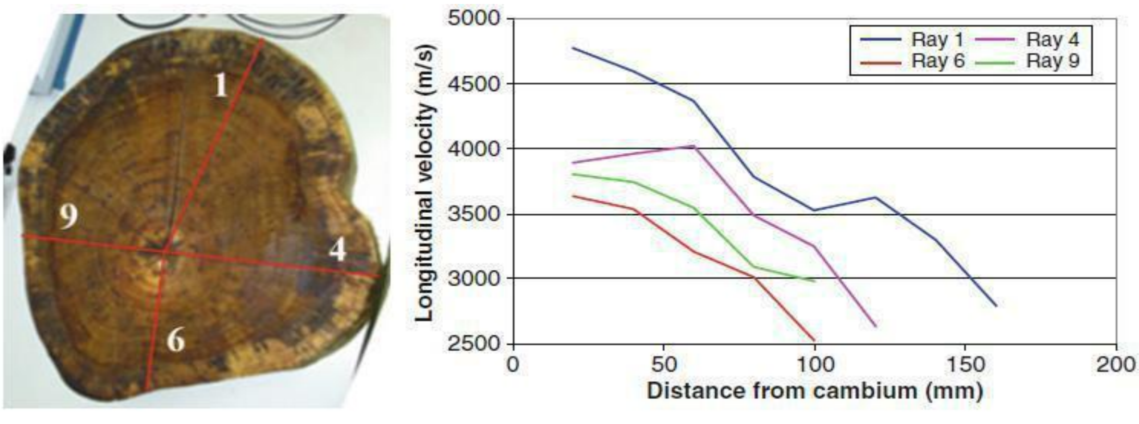
Ova metoda se često primjenjuje jer omogućava brzo i precizno ispitivanje unutrašnje strukture drva bez oštećenja materijala. Rezultati ultrazvučnog testiranja pomažu u optimizaciji procesa proizvodnje i smanjenju gubitaka u drvnoj industriji. Akustična tomografija stvara sliku raspodjele brzine ultrazvučnih valova koji se šire kroz drvo. U uzorak se zabiju sonde koje detektiraju širenje ultrazvučnih valova te šalju signal u računalo koje brzinu širenja valova pretvara u sliku.

Mehaničkim udarom u drvo izazovemo zvučne valove koji se preko sondi i računala pretvaraju u grafički prikaz. Veće brzine postižu se tangentnog a manje kod radijalnog ispitivanja. Značajni pad brzine upućuje na deformaciju ili trulež drva.

Slika 2. Prikaz pretvornika i pozicioniranja pinova kod ispitivanja u radijalnom smjeru (lijevo) i tangentnom smjeru (desno), (Bucur, 2011.)

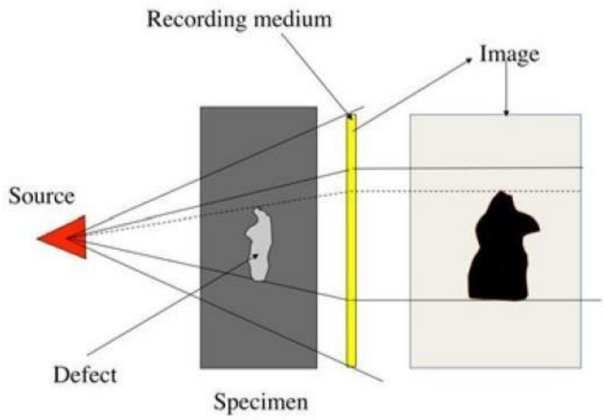


Slika 3. Prikaz brzine kretanja zvuka u radijalnom smjeru (Bucur, 2011.)



Slika 4. Prikaz brzine kretanja zvuka u longitudinalnom smjeru (Bucur, 2011.)

Radiografija. Metoda je slična kao u medicini, radiografija može otkriti unutrašnje nedostatke poput pukotina, čvorova ili insekata u drvu. Utvrđivanje kvalitete drva radiografijom je postupak koji se koristi za procjenu unutarnje strukture drva i identifikaciju eventualnih nedostataka ili oštećenja, kao što su pukotine, insektni napadi ili trulež. Ovaj postupak se obično naziva "radiografsko ispitivanje drva" ili "radiografija drva". Radiografija drva koristi rendgenske ili gama zrake kako bi se stvorila slika unutarnje strukture drveta. Ovaj postupak može biti koristan u različitim industrijama, kao što su građevinarstvo, proizvodnja namještaja ili drvna industrija, jer omogućava bolje razumijevanje kvalitete i pouzdanosti drva prije nego što se koristi u određenim projektima ili proizvodima. Radiografsko ispitivanje drva može pomoći u smanjenju rizika od korištenja nekvalitetnog drva i potencijalnih problema u budućnosti. Da bi se izvršilo radiografsko ispitivanje drva, potrebna je odgovarajuća oprema za generiranje rendgenskih ili gama zraka, kao i uređaj za snimanje i analizu dobivenih slika. Stručnjaci koji su obučeni za ovu vrstu ispitivanja mogu tumačiti rezultate i pružiti informacije o kvaliteti drva na temelju dobivenih slika.



Slika 5. Shematski prikaz principa rada

Termografska snimanja. Termalne kamere se koriste za identifikaciju varijacija temperature u drvu koje može ukazati na prisustvo oštećenja. Utvrđivanje kvalitete drva termografijom je postupak koji koristi termografsku kameru ili termalnu sliku kako bi se identificirale promjene u temperaturi drva. Ovaj postupak može pomoći u otkrivanju nedostataka u drvu kao što su pukotine, trulež ili nejednaka sušenost. Termografska slika može pokazati varijacije u temperaturi na površini drva, što može ukazivati na probleme. Kako bi se koristila termografija za utvrđivanje kvalitete drva, potrebno je provesti sljedeće korake:

1. Priprema: Drvo treba biti na sobnoj temperaturi kako bi se osigurala točna mjerenja.

2. Skeniranje: Termalnom kamerom ili senzorom skenirati površinu drva. Različiti dijelovi drva mogu pokazivati različite temperature.

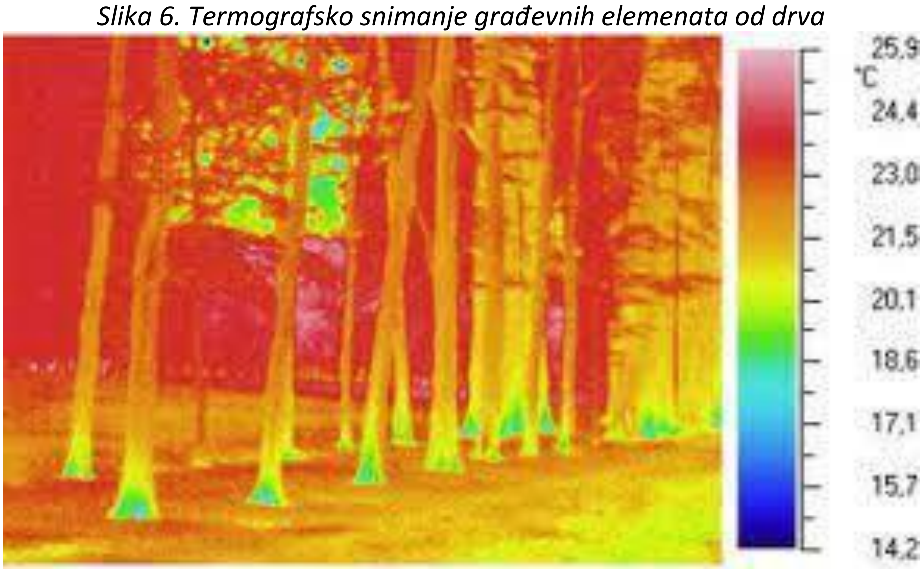
3. Analiza: Termografske slike se analiziraju kako bi se identificirale anomalije u temperature kao npr. povišene temperature na određenim područjima mogu ukazivati na trulež ili druge probleme.

4. Interpretacija: Stručnjak interpretira termografske slike i donosi zaključke o kvaliteti drva na temelju promjena u temperaturi.

Termografija može biti korisna u otkrivanju skrivenih nedostataka u drvu koji nisu vidljivi golim okom. Međutim, važno je napomenuti da termografski pregled neće dati sve informacije o kvaliteti drva i da se treba koristiti u kombinaciji s drugim metodama ispitivanja drva kako bi se dobio cjelovit pregled kvalitete.

Termografska snimanja drva vrše se preventivno i prije same sječe stabala kako bi se utvrdili nedostaci i spriječilo rušenje stabala uslijed vjetra, posebno u urbanim sredinama.

Slika 6. Termografsko snimanje građevnih elemenata od drva



Slika 7. Primjena termografije u analizi stanja drveta

Računalni programi. Novija nedestruktivna metoda utemeljena je na računalnim programima koju omogućavaju dobivanje rezultata za veliki broj materijala i njihovih kombinacija bez opasnosti od uništenja kao što je slučaj kod destruktivnog ispitivanja. Kod analize stanja drva računalnim programima material ne mora biti fizički prisutan. Analiza se provodi na računalnim modelima različitih tipova drva šte su takve metode ekonomski prihvatljive.

Ova metoda ne može u potpunosti zamijeniti fizička ispitivanja ali može suziti izbor materijala u fazi projektiranja drvnih konstrukcija i drugih proizvoda što doprinosi bržem odabiru materijala a time i smanjenju vremena proizvodnje.

Metode procjene stanja drva pomoću računalnih programa uveliko pomažu kod procjene svojstva uslojenog drva i raznih ploča na bazi drva.

Za uslojeno drvo trenutno je važeća Europska norma za ispitivanje HRN EN 14272 – Računska metoda za pojedina mehanička svojstva. Računalni program koji je u potpunosti utemeljen je WoodLab Ply Calc.

Kako bi se dobila slika o pouzdanosti ove metode dobiveni rezultati se uspoređuju sa rezultatima dobiveni destruktivnom metodom koja se provode prema točno određenim pravilima koja propisuje norma HRN EN 310.

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Structural Analysis

CLIENT

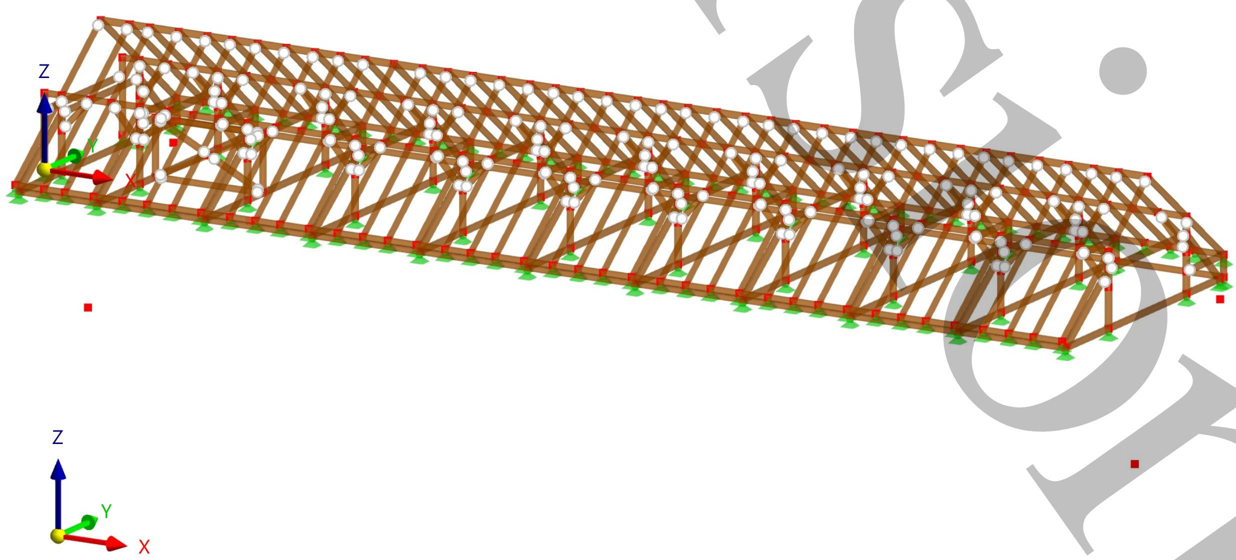
CREATED BY

PROJECT

Chapters

MODEL

In Axonometric Direction by Default



Dimensions [m]

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CONTENTS

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A MODEL - LOCATION

Location

Country	:	Croatia
Street	:	Ćirilometodska ulica 5
Zip / Postal code	:	10000
City	:	Zagreb
State	:	
Latitude	:	45.816 deg
Longitude	:	15.973 deg
Altitude	:	162.929 m

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Graphic **MODEL, IN AXONOMETRIC DIRECTION** **Static Analysis**

LC1 - Self-weight
Static Analysis

In Axonometric Direction by Default

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1 Basic Objects

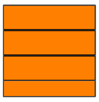
1.1 MATERIALS

Legend
Stiffness modification

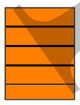
Material No.	Material Name	Material Type	Analysis Model	Options
3	GL24h | Isotropic | Linear Elastic	Timber	Isotropic | Linear Elastic	%

1.2 SECTIONS

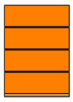
SQ_M1 150



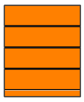
R_M1 150/200



R_M1 120/170



R_M1 150/180

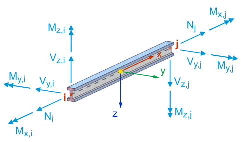


Section No.	Material No.	Section Type	Manufacturing Type	J [cm⁴] / A [cm²]	I_u [cm⁴] / A_u [cm²]	I_v [cm⁴] / A_v [cm²]	Overall Dimensions b [mm]	h [mm]
3	SQ_M1 150 | 3 - GL24h							
	3	Parametric - Massive I		7129.69	4218.75	4218.75	500.0	500.0
				225.00	187.50	187.50		
4	R_M1 150/200 | 3 - GL24h							
	3	Parametric - Massive I		12149.07	10000.00	5625.00	150.0	200.0
				300.00	250.00	250.00		
5	R_M1 120/170 | 3 - GL24h							
	3	Parametric - Massive I		5527.53	4913.00	2448.00	120.0	170.0
				204.00	170.00	170.00		
6	R_M1 150/180 | 3 - GL24h							
	3	Parametric - Massive I		10046.00	7290.00	5062.50	150.0	180.0
				270.00	225.00	225.00		

1.3 MEMBERS

Legend
Design properties
Effective Length (Timber Design)
Member Hinge
Member Hinge
Service Class (Timber Design)

Beam



Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
1	2	Beam / Uniform	Angle	0.00	3	-- / 1	-- / --	2.398	|| Z
2	4	Beam / Uniform	Angle	0.00	3	-- / 1	-- / --	2.412	|| Z
3	8	Beam / Uniform	Angle	0.00	4	1 / 1	-- / --	4.700	|| Y
4	14	Beam / Uniform	Angle	0.00	3	1 / 1	-- / --	1.522	In XZ
5	15	Beam / Uniform	Angle	0.00	3	1 / 1	-- / --	1.523	In XZ
6	16	Beam / Uniform	Angle	0.00	3	1 / 1	-- / --	1.496	|| XZ
7	17	Beam / Uniform	Angle	0.00	3	1 / 1	-- / --	1.496	|| XZ
8	21	Beam / Uniform	Angle	0.00	5	-- / 1	-- / --	2.961	|| YZ
9	22	Beam / Uniform	Angle	0.00	5	-- / --	-- / --	2.953	|| YZ
10	26	Beam / Uniform	Angle	0.00	5	-- / --	-- / --	2.827	|| YZ
11	27	Beam	Angle	0.00	5	--	--	3.529	|| YZ

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1.3 MEMBERS

Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
		Uniform				–	–		
12	28	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
13	29	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
14	30	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
15	31	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
16	32	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
17	33	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
18	34	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
20	11	Beam	Angle	0.00	6	–	–	3.750	|| X
		Uniform				–	–		
23	12	Beam	Angle	0.00	6	–	–	3.750	|| X
		Uniform				–	–		
24	9	Beam	Angle	0.00	3	–	–	2.398	|| Z
		Uniform				1	–		
25	10	Beam	Angle	0.00	3	–	–	2.412	|| Z
		Uniform				1	–		
26	13	Beam	Angle	0.00	4	1	–	4.700	|| Y
		Uniform				1	–		
27	44	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
28	45	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
29	46	Beam	Angle	0.00	3	1	–	1.496	|| XZ
		Uniform				1	–		
30	47	Beam	Angle	0.00	3	1	–	1.496	|| XZ
		Uniform				1	–		
31	48	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
32	49	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
33	53	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		

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1.3 MEMBERS

Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
34	54	Beam	Angle	0.00	5	--	--	3.529	|| YZ
		Uniform				--	--		
35	55	Beam	Angle	0.00	5	--	--	2.961	|| YZ
		Uniform				1	--		
36	56	Beam	Angle	0.00	5	--	--	2.953	|| YZ
		Uniform				--	--		
37	57	Beam	Angle	0.00	5	--	--	2.827	|| YZ
		Uniform				--	--		
38	58	Beam	Angle	0.00	5	--	--	3.529	|| YZ
		Uniform				--	--		
39	59	Beam	Angle	0.00	5	--	--	2.961	|| YZ
		Uniform				1	--		
40	60	Beam	Angle	0.00	5	--	--	2.953	|| YZ
		Uniform				--	--		
41	61	Beam	Angle	0.00	5	--	--	2.827	|| YZ
		Uniform				--	--		
42	62	Beam	Angle	0.00	5	--	--	3.529	|| YZ
		Uniform				--	--		
43	41	Beam	Angle	0.00	6	--	--	3.750	|| X
		Uniform				--	--		
44	42	Beam	Angle	0.00	6	--	--	3.750	|| X
		Uniform				--	--		
45	63	Beam	Angle	0.00	3	--	--	2.398	|| Z
		Uniform				1	--		
46	64	Beam	Angle	0.00	3	--	--	2.412	|| Z
		Uniform				1	--		
47	65	Beam	Angle	0.00	4	1	--	4.700	|| Y
		Uniform				1	--		
48	71	Beam	Angle	0.00	3	1	--	1.485	In XZ
		Uniform				1	--		
49	72	Beam	Angle	0.00	3	1	--	1.485	In XZ
		Uniform				1	--		
50	73	Beam	Angle	0.00	3	1	--	1.496	|| XZ
		Uniform				1	--		
51	74	Beam	Angle	0.00	3	1	--	1.496	|| XZ
		Uniform				1	--		
52	75	Beam	Angle	0.00	5	--	--	2.961	|| YZ
		Uniform				--	--		

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1.3 **MEMBERS**

Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
53	76	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
54	80	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
55	81	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
56	82	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
57	83	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
58	84	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
59	85	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
60	86	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
61	87	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
62	88	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
63	89	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
64	68	Beam	Angle	0.00	6	–	–	3.750	|| X
		Uniform				–	–		
65	69	Beam	Angle	0.00	6	–	–	3.750	|| X
		Uniform				–	–		
66	90	Beam	Angle	0.00	3	–	–	2.398	|| Z
		Uniform				1	–		
67	91	Beam	Angle	0.00	3	–	–	2.412	|| Z
		Uniform				1	–		
68	92	Beam	Angle	0.00	4	1	–	4.700	|| Y
		Uniform				1	–		
69	98	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
70	99	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
71	100	Beam	Angle	0.00	3	1	–	1.496	|| XZ
		Uniform				1	–		
72	101	Beam	Angle	0.00	3	1	–	1.496	|| XZ

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MEMBERS

Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
		Uniform				1	–		
73	102	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
74	103	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
75	107	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
76	108	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
77	109	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
78	110	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
79	111	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
80	112	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
81	113	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
82	114	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
83	115	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
84	116	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
85	95	Beam	Angle	0.00	6	–	–	3.750	|| X
		Uniform				–	–		
86	96	Beam	Angle	0.00	6	–	–	3.750	|| X
		Uniform				–	–		
87	117	Beam	Angle	0.00	3	–	–	2.398	|| Z
		Uniform				1	–		
88	118	Beam	Angle	0.00	3	–	–	2.412	|| Z
		Uniform				1	–		
89	119	Beam	Angle	0.00	4	1	–	4.700	|| Y
		Uniform				1	–		
90	125	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
91	126	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		

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92	127	Beam	Angle	0.00	3	1	--	1.496	|| XZ
		Uniform				1	--		
93	128	Beam	Angle	0.00	3	1	--	1.496	|| XZ
		Uniform				1	--		
94	129	Beam	Angle	0.00	5	--	--	2.961	|| YZ
		Uniform				1	--		
95	130	Beam	Angle	0.00	5	--	--	2.953	|| YZ
		Uniform				--	--		
96	134	Beam	Angle	0.00	5	--	--	2.827	|| YZ
		Uniform				--	--		
97	135	Beam	Angle	0.00	5	--	--	3.529	|| YZ
		Uniform				--	--		
98	136	Beam	Angle	0.00	5	--	--	2.961	|| YZ
		Uniform				1	--		
99	137	Beam	Angle	0.00	5	--	--	2.953	|| YZ
		Uniform				--	--		
100	138	Beam	Angle	0.00	5	--	--	2.827	|| YZ
		Uniform				--	--		
101	139	Beam	Angle	0.00	5	--	--	3.529	|| YZ
		Uniform				--	--		
102	140	Beam	Angle	0.00	5	--	--	2.961	|| YZ
		Uniform				1	--		
103	141	Beam	Angle	0.00	5	--	--	2.953	|| YZ
		Uniform				--	--		
104	142	Beam	Angle	0.00	5	--	--	2.827	|| YZ
		Uniform				--	--		
105	143	Beam	Angle	0.00	5	--	--	3.529	|| YZ
		Uniform				--	--		
106	122	Beam	Angle	0.00	6	--	--	3.750	|| X
		Uniform				--	--		
107	123	Beam	Angle	0.00	6	--	--	3.750	|| X
		Uniform				--	--		
108	144	Beam	Angle	0.00	3	--	--	2.398	|| Z
		Uniform				1	--		
109	145	Beam	Angle	0.00	3	--	--	2.412	|| Z
		Uniform				1	--		
110	146	Beam	Angle	0.00	4	1	--	4.700	|| Y
		Uniform				1	--		

1.3 MEMBERS

Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
111	152	Beam	Angle	0.00	3	1	--	1.485	In XZ
		Uniform				1	--		
112	153	Beam	Angle	0.00	3	1	--	1.485	In XZ
		Uniform				1	--		
113	154	Beam	Angle	0.00	3	1	--	1.496	|| XZ
		Uniform				1	--		
114	155	Beam	Angle	0.00	3	1	--	1.496	|| XZ
		Uniform				1	--		
115	156	Beam	Angle	0.00	5	--	--	2.961	|| YZ
		Uniform				1	--		
116	157	Beam	Angle	0.00	5	--	--	2.953	|| YZ
		Uniform				--	--		
117	161	Beam	Angle	0.00	5	--	--	2.827	|| YZ
		Uniform				--	--		
118	162	Beam	Angle	0.00	5	--	--	3.529	|| YZ
		Uniform				--	--		
119	163	Beam	Angle	0.00	5	--	--	2.961	|| YZ
		Uniform				1	--		
120	164	Beam	Angle	0.00	5	--	--	2.953	|| YZ
		Uniform				--	--		
121	165	Beam	Angle	0.00	5	--	--	2.827	|| YZ
		Uniform				--	--		
122	166	Beam	Angle	0.00	5	--	--	3.529	|| YZ
		Uniform				--	--		
123	167	Beam	Angle	0.00	5	--	--	2.961	|| YZ
		Uniform				1	--		
124	168	Beam	Angle	0.00	5	--	--	2.953	|| YZ
		Uniform				--	--		
125	169	Beam	Angle	0.00	5	--	--	2.827	|| YZ
		Uniform				--	--		
126	170	Beam	Angle	0.00	5	--	--	3.529	|| YZ
		Uniform				--	--		
127	149	Beam	Angle	0.00	6	--	--	3.750	|| X
		Uniform				--	--		
128	150	Beam	Angle	0.00	6	--	--	3.750	|| X
		Uniform				--	--		
129	147	Beam	Angle	0.00	3	--	--	2.398	|| Z
		Uniform				1	--		
130	148	Beam	Angle	0.00	3	--	--	2.412	|| Z

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		Uniform				1	–		
131	151	Beam	Angle	0.00	4	1	–	4.700	|| Y
		Uniform				1	–		
132	176	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
133	177	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
134	178	Beam	Angle	0.00	3	1	–	1.496	|| XZ
		Uniform				1	–		
135	179	Beam	Angle	0.00	3	1	–	1.496	|| XZ
		Uniform				1	–		
136	180	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
137	181	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
138	185	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
139	186	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
140	187	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
141	188	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
142	189	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
143	190	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
144	191	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
145	192	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
146	193	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
147	194	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
148	174	Beam	Angle	0.00	6	–	–	3.750	|| X
		Uniform				–	–		
149	175	Beam	Angle	0.00	6	–	–	3.750	|| X
		Uniform				–	–		

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Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
150	195	Beam	Angle	0.00	3	–	–	2.398	|| Z
		Uniform				1	–		
151	196	Beam	Angle	0.00	3	–	–	2.412	|| Z
		Uniform				1	–		
152	197	Beam	Angle	0.00	4	1	–	4.700	|| Y
		Uniform				1	–		
153	200	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
154	201	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
155	202	Beam	Angle	0.00	3	1	–	1.496	|| XZ
		Uniform				1	–		
156	203	Beam	Angle	0.00	3	1	–	1.496	|| XZ
		Uniform				1	–		
157	204	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
158	205	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
159	209	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
160	210	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
161	211	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
162	212	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
163	213	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
164	214	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
165	215	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
166	216	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
167	217	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
168	218	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		

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Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
169	198	Beam	Angle	0.00	6	–	–	3.750	|| X
		Uniform				–	–		
170	199	Beam	Angle	0.00	6	–	–	3.750	|| X
		Uniform				–	–		
171	219	Beam	Angle	0.00	3	–	–	2.398	|| Z
		Uniform				1	–		
172	220	Beam	Angle	0.00	3	–	–	2.412	|| Z
		Uniform				1	–		
173	221	Beam	Angle	0.00	4	1	–	4.700	|| Y
		Uniform				1	–		
174	227	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
175	228	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
176	229	Beam	Angle	0.00	3	1	–	1.496	|| XZ
		Uniform				1	–		
177	230	Beam	Angle	0.00	3	1	–	1.496	|| XZ
		Uniform				1	–		
178	231	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
179	232	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
180	236	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
181	237	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
182	238	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
183	239	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
184	240	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
185	241	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
186	242	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
187	243	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
188	244	Beam	Angle	0.00	5	–	–	2.827	|| YZ

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Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
		Uniform				–	–		
189	245	Beam	Angle	0.00	5	–	–	3.529	∥ YZ
		Uniform				–	–		
190	224	Beam	Angle	0.00	6	–	–	3.750	∥ X
		Uniform				–	–		
191	225	Beam	Angle	0.00	6	–	–	3.750	∥ X
		Uniform				–	–		
192	246	Beam	Angle	0.00	3	–	–	2.398	∥ Z
		Uniform				1	–		
193	247	Beam	Angle	0.00	3	–	–	2.412	∥ Z
		Uniform				1	–		
194	248	Beam	Angle	0.00	4	1	–	4.700	∥ Y
		Uniform				1	–		
195	251	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
197	253	Beam	Angle	0.00	3	1	–	1.496	∥ XZ
		Uniform				1	–		
199	255	Beam	Angle	0.00	5	–	–	2.961	∥ YZ
		Uniform				1	–		
200	256	Beam	Angle	0.00	5	–	–	2.953	∥ YZ
		Uniform				–	–		
201	260	Beam	Angle	0.00	5	–	–	2.827	∥ YZ
		Uniform				–	–		
202	261	Beam	Angle	0.00	5	–	–	3.529	∥ YZ
		Uniform				–	–		
207	266	Beam	Angle	0.00	5	–	–	2.961	∥ YZ
		Uniform				1	–		
208	267	Beam	Angle	0.00	5	–	–	2.953	∥ YZ
		Uniform				–	–		
209	268	Beam	Angle	0.00	5	–	–	2.827	∥ YZ
		Uniform				–	–		
210	269	Beam	Angle	0.00	5	–	–	3.529	∥ YZ
		Uniform				–	–		
214	281	Beam	Angle	0.00	5	–	–	2.953	∥ YZ
		Uniform				–	–		
215	285	Beam	Angle	0.00	5	–	–	2.827	∥ YZ
		Uniform				–	–		
217	271	Beam	Angle	0.00	6	–	–	2.725	∥ X
		Uniform				–	–		

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MEMBERS

Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
218	272	Beam	Angle	0.00	6	–	–	2.725	|| X
		Uniform				–	–		
226	273	Beam	Angle	0.00	6	–	–	1.300	|| Z
		Uniform				–	–		
227	274	Beam	Angle	0.00	6	–	–	2.412	|| Z
		Uniform				1	–		
228	291	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
229	292	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
230	293	Beam	Angle	0.00	3	1	–	1.485	In XZ
		Uniform				1	–		
231	294	Beam	Angle	0.00	3	1	–	1.496	|| XZ
		Uniform				1	–		
232	295	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
233	296	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
234	297	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
235	298	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
236	300	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
237	301	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
238	302	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
239	303	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
240	304	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
241	305	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
242	306	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
243	307	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		

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244	308	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
245	309	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
246	310	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
247	311	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
248	312	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
249	313	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
250	314	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
251	315	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
252	316	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
253	317	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
254	318	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
255	319	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
256	320	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
257	321	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
258	322	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
259	323	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
260	324	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
261	325	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
262	326	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
263	327	Beam	Angle	0.00	5	–	–	3.529	|| YZ

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1.3

MEMBERS

Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
		Uniform				–	–		
264	328	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
265	329	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
266	330	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
267	331	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
268	332	Beam	Angle	0.00	5	–	–	2.961	|| YZ
		Uniform				1	–		
269	333	Beam	Angle	0.00	5	–	–	2.953	|| YZ
		Uniform				–	–		
270	334	Beam	Angle	0.00	5	–	–	2.827	|| YZ
		Uniform				–	–		
271	335	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
272	336	Beam	Angle	0.00	5	–	–	3.529	|| YZ
		Uniform				–	–		
273	7	Beam	Angle	0.00	3	1	–	4.700	|| Y
		Uniform				1	–		
274	275	Beam	Angle	0.00	3	1	–	4.700	|| Y
		Uniform				1	–		
275	23	Beam	Angle	0.00	3	–	–	3.191	|| YZ
		Uniform				–	–		
276	24	Beam	Angle	0.00	3	–	–	2.724	|| YZ
		Uniform				–	–		
277	25	Beam	Angle	0.00	3	1	–	2.250	|| Y
		Uniform				–	–		
278	50	Beam	Angle	0.00	3	–	–	3.191	|| YZ
		Uniform				–	–		
279	51	Beam	Angle	0.00	3	–	–	2.724	|| YZ
		Uniform				–	–		
280	52	Beam	Angle	0.00	3	1	–	2.250	|| Y
		Uniform				–	–		
281	77	Beam	Angle	0.00	3	–	–	3.191	|| YZ
		Uniform				–	–		
282	78	Beam	Angle	0.00	3	–	–	2.724	|| YZ
		Uniform				–	–		

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1.3 **MEMBERS**

Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
283	79	Beam	Angle	0.00	3	1	--	2.250	|| Y
		Uniform				--	--		
284	104	Beam	Angle	0.00	3	--	--	3.191	|| YZ
		Uniform				--	--		
285	105	Beam	Angle	0.00	3	--	--	2.724	|| YZ
		Uniform				--	--		
286	106	Beam	Angle	0.00	3	1	--	2.250	|| Y
		Uniform				--	--		
287	131	Beam	Angle	0.00	3	--	--	3.191	|| YZ
		Uniform				--	--		
288	132	Beam	Angle	0.00	3	--	--	2.724	|| YZ
		Uniform				--	--		
289	133	Beam	Angle	0.00	3	1	--	2.250	|| Y
		Uniform				--	--		
290	158	Beam	Angle	0.00	3	--	--	3.191	|| YZ
		Uniform				--	--		
291	159	Beam	Angle	0.00	3	--	--	2.724	|| YZ
		Uniform				--	--		
292	160	Beam	Angle	0.00	3	1	--	2.250	|| Y
		Uniform				--	--		
293	182	Beam	Angle	0.00	3	--	--	3.191	|| YZ
		Uniform				--	--		
294	183	Beam	Angle	0.00	3	--	--	2.724	|| YZ
		Uniform				--	--		
295	184	Beam	Angle	0.00	3	1	--	2.250	|| Y
		Uniform				--	--		
296	206	Beam	Angle	0.00	3	--	--	3.191	|| YZ
		Uniform				--	--		
297	207	Beam	Angle	0.00	3	--	--	2.724	|| YZ
		Uniform				--	--		
298	208	Beam	Angle	0.00	3	1	--	2.250	|| Y
		Uniform				--	--		
299	233	Beam	Angle	0.00	3	--	--	3.191	|| YZ
		Uniform				--	--		
300	234	Beam	Angle	0.00	3	--	--	2.724	|| YZ
		Uniform				--	--		
301	235	Beam	Angle	0.00	3	1	--	2.250	|| Y
		Uniform				--	--		

1.3 MEMBERS

Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
302	257	Beam	Angle	0.00	3	–	–	3.191	|| YZ
		Uniform				–	–		
303	258	Beam	Angle	0.00	3	–	–	2.724	|| YZ
		Uniform				–	–		
304	259	Beam	Angle	0.00	3	1	–	2.250	|| Y
		Uniform				–	–		
305	282	Beam	Angle	0.00	3	–	–	3.191	|| YZ
		Uniform				–	–		
306	283	Beam	Angle	0.00	3	–	–	2.724	|| YZ
		Uniform				–	–		
307	284	Beam	Angle	0.00	3	1	–	2.250	|| Y
		Uniform				–	–		
308	1	Beam	Angle	0.00	3	–	–	1.850	On Z
		Uniform				–	–		
309	3	Beam	Angle	0.00	3	–	–	2.412	|| Z
		Uniform				–	–		
310	276	Beam	Angle	0.00	3	–	–	0.600	|| X
		Uniform				–	–		
311	277	Beam	Angle	0.00	3	–	–	0.600	|| X
		Uniform				–	–		
312	337	Beam	Angle	0.00	3	–	–	9.550	|| Y
		Uniform				–	–		
313	338	Beam	Angle	0.00	3	–	–	9.550	|| Y
		Uniform				–	–		
314	340	Beam	Angle	0.00	3	–	–	9.550	|| Y
		Uniform				–	–		
315	341	Beam	Angle	0.00	3	–	–	9.550	|| Y
		Uniform				–	–		
316	342	Beam	Angle	0.00	3	–	–	9.550	|| Y
		Uniform				–	–		
317	343	Beam	Angle	0.00	3	–	–	9.550	|| Y
		Uniform				–	–		
318	344	Beam	Angle	0.00	3	–	–	9.550	|| Y
		Uniform				–	–		
319	345	Beam	Angle	0.00	3	–	–	9.550	|| Y
		Uniform				–	–		
320	346	Beam	Angle	0.00	3	–	–	9.550	|| Y
		Uniform				–	–		
321	347	Beam	Angle	0.00	3	–	–	9.550	|| Y

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1.3 MEMBERS

Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
		Uniform				–	–		
329	355	Beam	Angle	0.00	3	1	–	2.091	|| XZ
		Uniform				1	–		
330	356	Beam	Angle	0.00	3	1	–	4.181	|| XZ
		Uniform				1	–		
331	357	Beam	Angle	0.00	3	–	–	1.850	|| Z
		Uniform				–	–		
332	358	Beam	Angle	0.00	3	1	–	3.750	|| X
		Uniform				1	–		
333	359	Beam	Angle	0.00	3	–	–	1.850	|| Z
		Uniform				–	–		
334	360	Beam	Angle	0.00	3	1	–	3.750	|| X
		Uniform				1	–		
335	361	Beam	Angle	0.00	3	1	–	2.091	|| XZ
		Uniform				1	–		
336	362	Beam	Angle	0.00	4	–	–	36.475	|| X
		Uniform				–	–		
337	364	Beam	Angle	0.00	3	–	–	0.548	On Z
		Uniform				–	–		
338	365	Beam	Angle	0.00	6	–	–	0.550	|| Z
		Uniform				–	–		
339	366	Beam	Angle	0.00	6	–	–	0.548	|| Z
		Uniform				1	–		
340	377	Beam	Angle	0.00	3	–	–	9.550	|| Y
		Uniform				–	–		
341	381	Beam	Angle	0.00	3	–	–	36.475	|| X
		Uniform				–	–		
342	382	Beam	Angle	0.00	3	–	–	36.475	|| X
		Uniform				–	–		
343	367	Beam	Angle	0.00	3	–	–	0.700	|| Z
		Uniform				–	–		
344	368	Beam	Angle	0.00	3	–	–	0.700	|| Z
		Uniform				–	–		
345	369	Beam	Angle	0.00	3	–	–	0.700	|| Z
		Uniform				–	–		
346	370	Beam	Angle	0.00	3	–	–	0.700	|| Z
		Uniform				–	–		
347	371	Beam	Angle	0.00	3	–	–	0.700	|| Z
		Uniform				–	–		

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1.3 MEMBERS

Member No.	Line No.	Member Type / Section Distribution	Rotation Type	β [deg]	Section i/k/j	Hinge i/j	Eccentricity i/j	Length L [m]	Position
348	372	Beam / Uniform	Angle	0.00	3	-- / --	-- / --	0.700	∥ Z
349	373	Beam / Uniform	Angle	0.00	3	-- / --	-- / --	0.700	∥ Z
350	374	Beam / Uniform	Angle	0.00	3	-- / --	-- / --	0.700	∥ Z
351	375	Beam / Uniform	Angle	0.00	3	-- / --	-- / --	0.700	∥ Z
352	376	Beam / Uniform	Angle	0.00	3	-- / --	-- / --	0.700	∥ Z
353	378	Beam / Uniform	Angle	0.00	3	-- / --	-- / --	0.700	∥ Z
354	379	Beam / Uniform	Angle	0.00	3	-- / --	-- / --	36.475	∥ X
355	380	Beam / Uniform	Angle	0.00	3	-- / --	-- / --	36.475	∥ X

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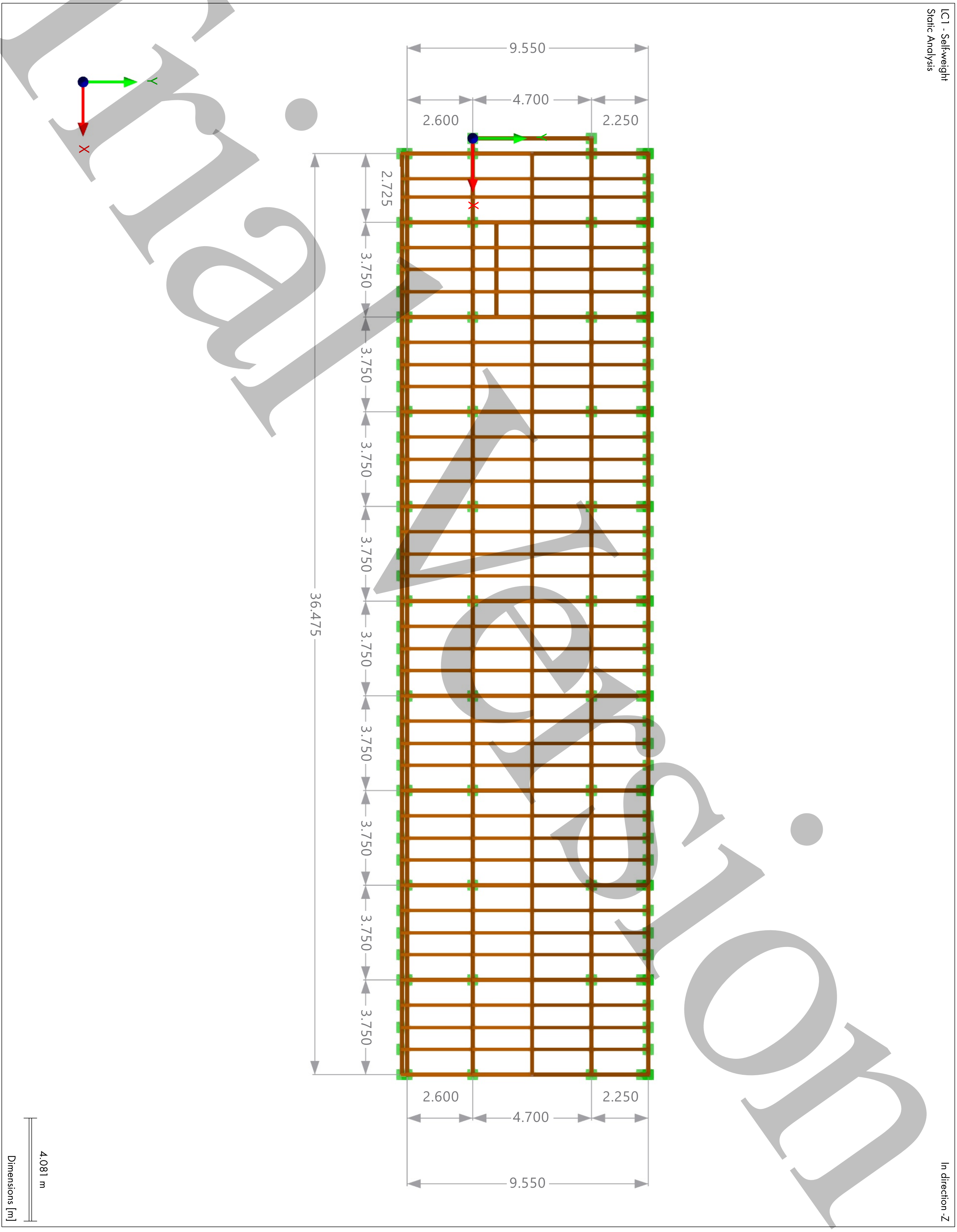
Graphic **DIMENZIJE** **Static Analysis**



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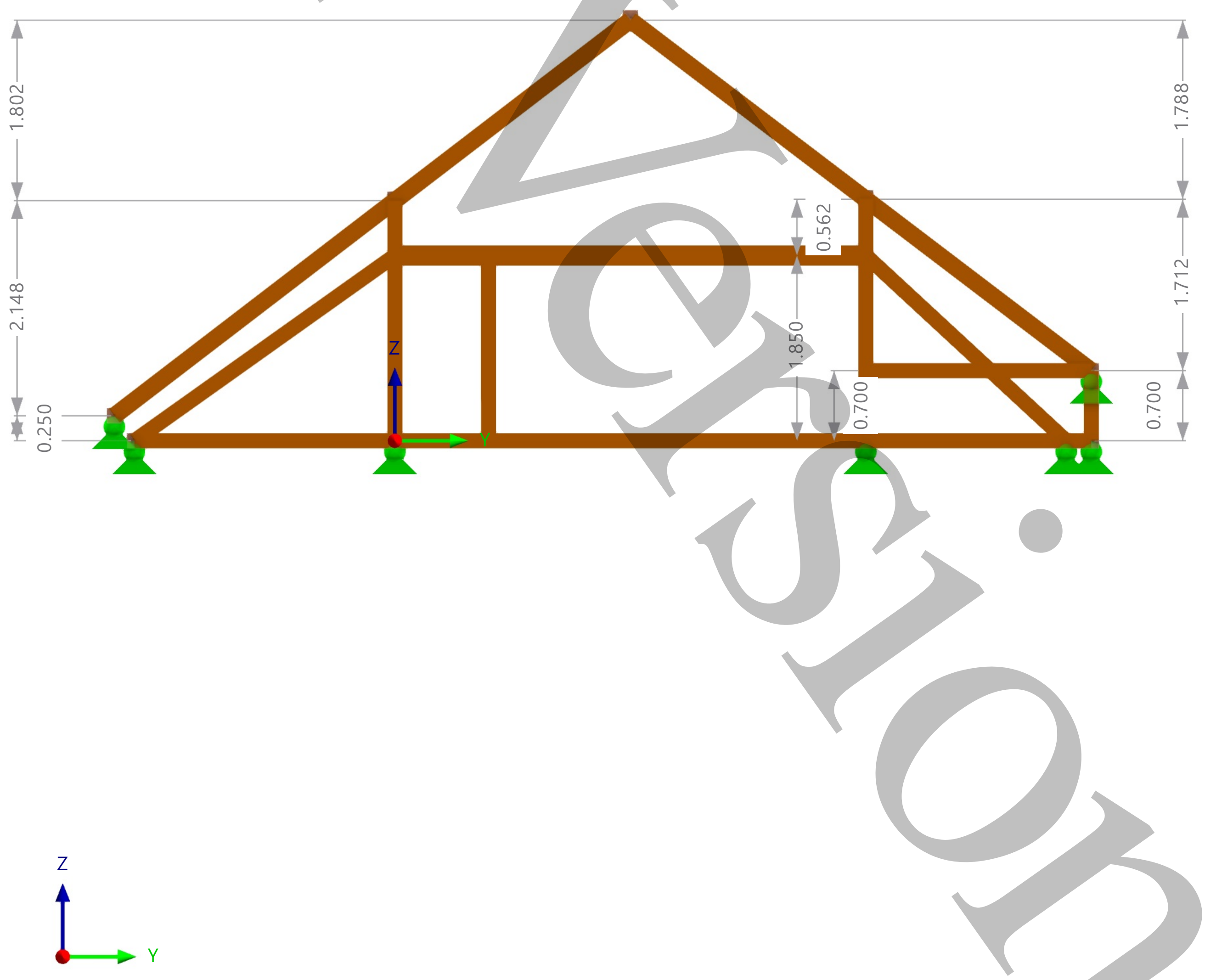
Graphic **DIMENZIJE - OKVIR** **Static Analysis**

Visibility mode
LC1 - Self-weight
Static Analysis

In direction -X



1.386 m

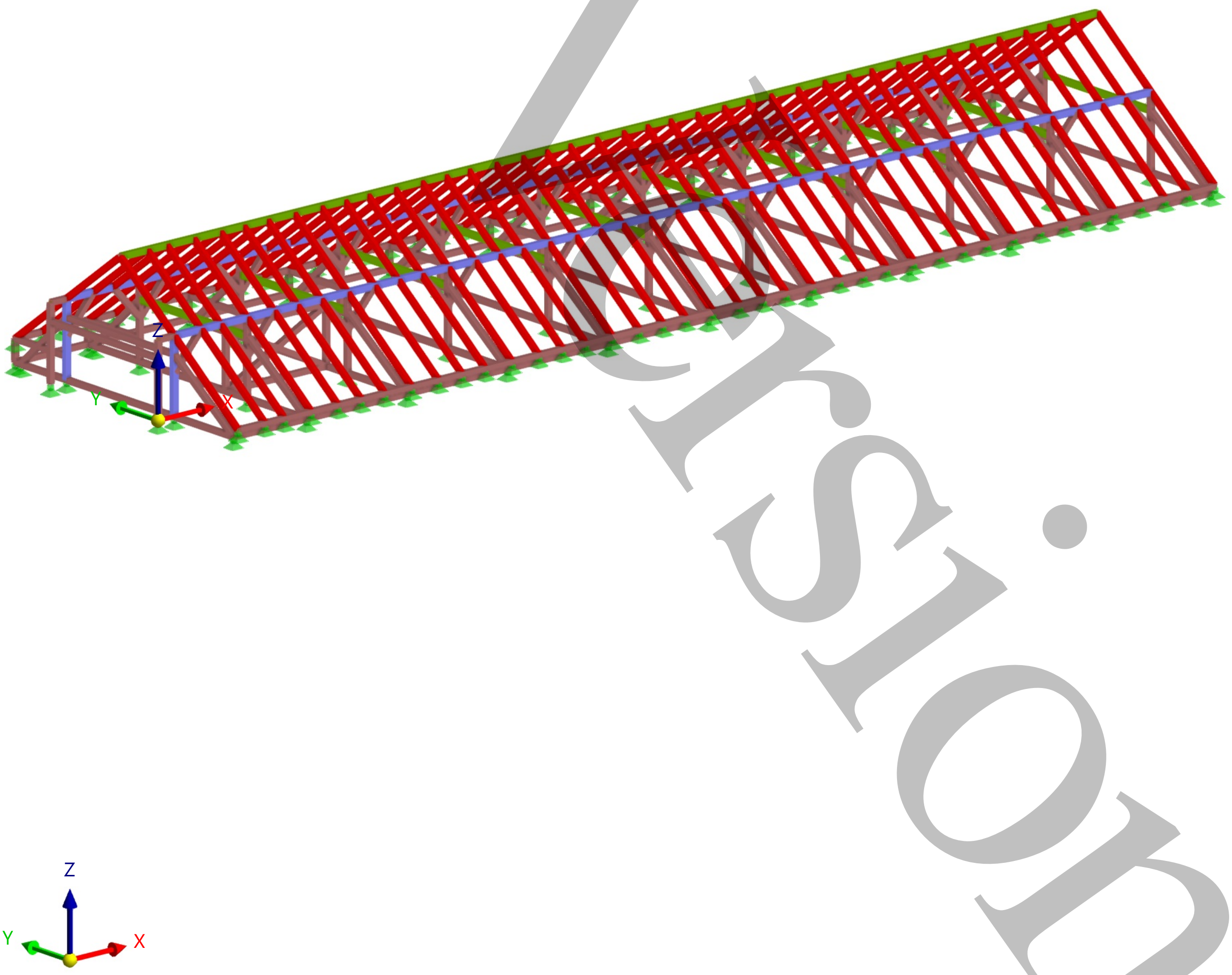
Dimensions [m]

Graphic **POPREČNI PRESJECI** **Static Analysis**

LC1 - Self-weight
Static Analysis

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170
6 - R_M1 150/180



Dimensions [m]

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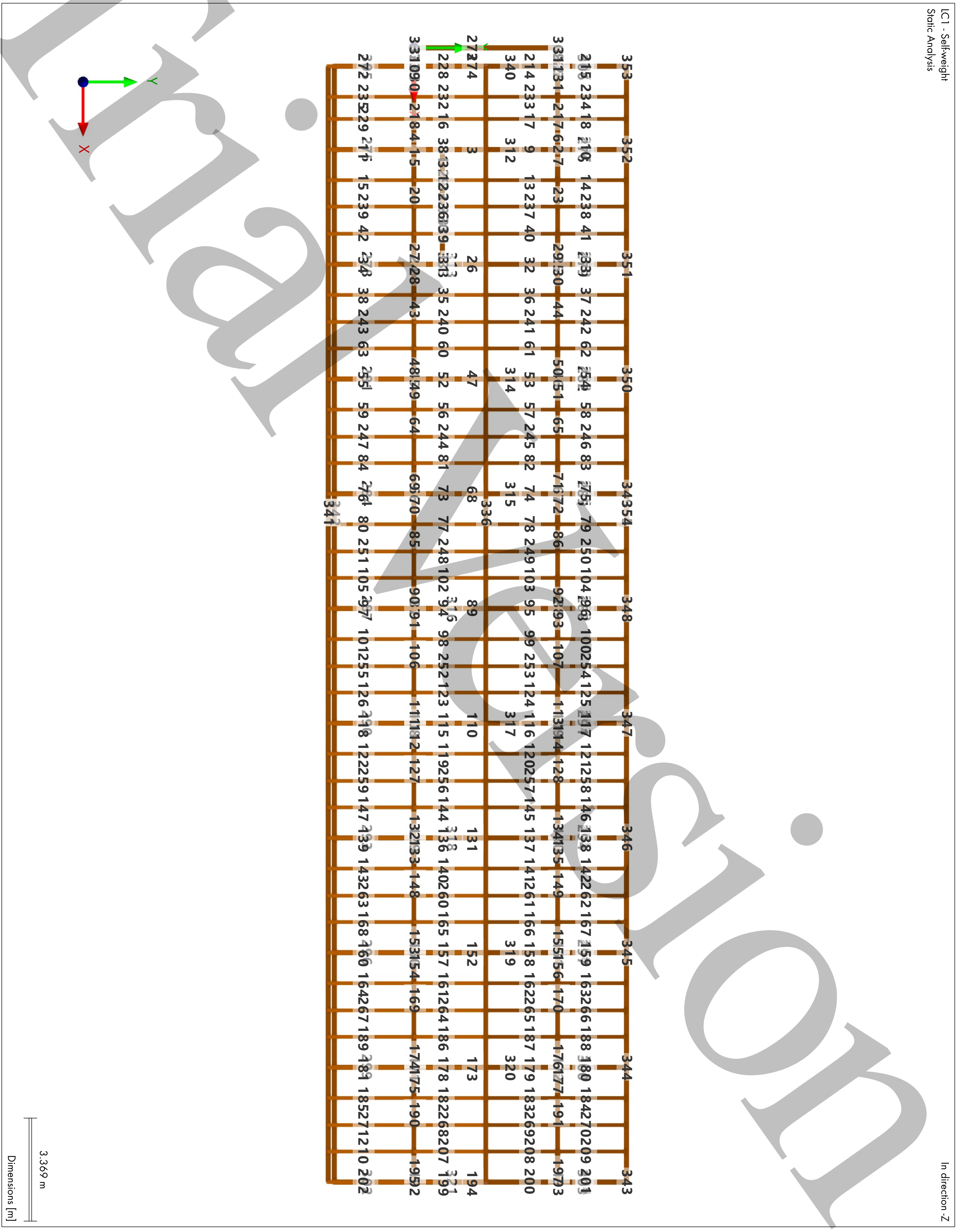
Graphic **MEMBER SETS - NUMBERING** **Static Analysis**



2 Types for Nodes

2.1 NODAL SUPPORTS

Support No.	Nodes No.	Coordinate System	Translation Spring [kN/m] $C_{u,X}$	$C_{u,Y}$	$C_{u,Z}$	Rotation Spring [kNm/rad] $C_{\varphi,X}$	$C_{\varphi,Y}$	$C_{\varphi,Z}$
1	☑☑☑ ☐☐☑ | Hinged							
	1, 3,5,7,13,15,28-31,33,35, 38,41,59-62,64,66,67,69 ,70,73,74,90-93,95,97,9 8,100,101,104,105,121- 124,126,128,129,131,13 2,135,136,152-155,157, 159,160,162,163,166,16 7,170,172,183-186,188, 190,191,193,194,208-21 0,212,214,215,217,218, 220,221,231-234,236,23 8,239,241,242,245,246, 262-265,267,269,270,27 2,273,277,278,288-290, 292,297,298,361,362,37 5-378,386,390,391,397, 398,403,404,408,409,41 3,414,418,419,423,424, 428,429,433,434,438,43 9,442,445,461	1 - Global XYZ	☒	☒	☒	☐	☐	☒

3 Types for Members

3.1 MEMBER HINGES

Hinge No.	Coordinate System	Translation Spring [kN/m] $C_{u,x}$	$C_{u,y}$	$C_{u,z}$	Rotation Spring [kNm/rad] $C_{\varphi,x}$	$C_{\varphi,y}$	$C_{\varphi,z}$
1	☐☐☐ ☐☑☑ | Local xyz						
	Local xyz	☐	☐	☐	☐	☒	☒

4 Types for Timber Design

4.1 EFFECTIVE LENGTHS

Legend
Principal Section Axes y/u and z/v

Length No.	Description	Symbol	Value	Unit	Options
1	Standard (Members : 2)				
	Assigned to members		2		
	Assigned to member sets				
	Flexural buckling about y		☒		
	Flexural buckling about z		☒		
	Lateral-torsional buckling		☒		
	Determination of M_{cr}		Analytical (for rectangular or trapezoidal section)		
	Fire design - different buckling factors		☐		
	Intermediate nodes		☐		
	Different properties		☒		

4.1.1 EFFECTIVE LENGTHS - NODAL SUPPORTS

Length No.	Node Seq. No.	Fixed in z/v	y/u	Restraint About x	Nodes	Springs $c_{y/u}$ [kN/m]	$c_{\varphi,x}$ [kNm/rad]	Eccentricity Type	e_z [mm]
1	Standard (Members : 2)								
	Start	☒ 2	☒	☒	7			None	
	End	☒ 2	☒	☒	8			None	

4.1.2 EFFECTIVE LENGTHS - FACTORS

Length No.	Segment No.	Flexural Buckling $k_{y/u}$ [--]	$k_{z/v}$ [--]	Lateral-Torsional k_{LT} [--]	$k_{LT,top}$ [--]	$k_{LT,bottom}$ [--]	Critical Moment M_{crit} [kNm]
1	Standard (Members : 2)						
	1	1.00	1.00	1.00			

4.2 SERVICE CLASSES

Class No.	Assigned to Members	Member Sets	Surfaces	Surface Sets	Service Class Type	Comment
1	Service Class 1 (Members : 1-18,20,23-195,197,199-202,207-210,214,215,217,218,226-321,329-355)					
	1-18,20,23-195,197,199-202,207-210,214,215,217,218,226-321,329-355				1 - Dry	

5 Load Cases & Combinations

5.1 LOAD CASES

LC No.	Settings	Value	Unit	To Solve
1	G Self-weight			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA1 - Geometrically linear		
	Action category	G Permanent		
	Self-weight - Factor in direction X	0.000	--	
	Self-weight - Factor in direction Y	0.000	--	
	Self-weight - Factor in direction Z	-1.000	--	
	Load duration	Permanent		
2	G Dodatno stalno			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA1 - Geometrically linear		
	Action category	G Permanent		
	Load duration	Permanent		
3	Qw vjetar			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA1 - Geometrically linear		
	Action category	Qw Wind		
	Load duration	Short-term		
4	Qs snijeg			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA1 - Geometrically linear		
	Action category	Qs Snow / Ice loads - H <= 1000 m		
	Load duration	Short-term		

5.2 ACTIONS

Action No.	Settings	Value	Active
1	G Permanent		
	Action Category	G Permanent	☒
	Action Type	Simultaneously	
2	Qw Wind		
	Action Category	Qw Wind	☒
	Action Type	Alternatively	
3	Qs Snow / Ice loads - H <= 1000 m		
	Action Category	Qs Snow / Ice loads - H <= 1000 m	☒
	Action Type	Alternatively	

5.2.1 ACTIONS - LOAD CASES

Action No.	Load Case	Acting Group No.
1	G Permanent	
	G LC1	-
	G LC2	-
2	Qw Wind	
	Qw LC3	-
3	Qs Snow / Ice loads - H <= 1000 m	
	Qs LC4	-

5.3 DESIGN SITUATIONS

DS No.	Settings	Value	Active
1	ULS ULS (STR/GEO) - Permanent and transient - Eq. 6.10		
	Design situation type	ULS ULS (STR/GEO) - Permanent and transient - Eq. 6.10	☒
	Combination wizard	1	
2	S Ch SLS - Characteristic		
	Design situation type	S Ch SLS - Characteristic	☒
	Combination wizard	1	
3	S Qp SLS - Quasi-permanent		
	Design situation type	S Qp SLS - Quasi-permanent	☒
	Combination wizard	1	

5.4 ACTION COMBINATIONS

AC No.	Settings	Value	Active
1	ULS 1.35 * A1		
	Design Situation	ULS DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10	☒
	Generated load combinations	1	
	Generated by	Design Situation No. 1	
2	ULS 1.35 * A1 + 1.50 * A2		
	Design Situation	ULS DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10	☒
	Generated load combinations	2	
	Generated by	Design Situation No. 1	
3	ULS 1.35 * A1 + 1.50 * A2 + 0.75 * A3		
	Design Situation	ULS DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10	☒
	Generated load combinations	3	
	Generated by	Design Situation No. 1	
4	ULS 1.35 * A1 + 1.50 * A3		
	Design Situation	ULS DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10	☒
	Generated load combinations	4	
	Generated by	Design Situation No. 1	
5	ULS 1.35 * A1 + 0.90 * A2 + 1.50 * A3		
	Design Situation	ULS DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10	☒
	Generated load combinations	5	
	Generated by	Design Situation No. 1	
6	S Ch A1		
	Design Situation	S Ch DS2 - SLS - Characteristic	☒
	Generated load combinations	6	
	Generated by	Design Situation No. 2	
7	S Ch A1 + A2		
	Design Situation	S Ch DS2 - SLS - Characteristic	☒
	Generated load combinations	7	
	Generated by	Design Situation No. 2	
8	S Ch A1 + A2 + 0.50 * A3		
	Design Situation	S Ch DS2 - SLS - Characteristic	☒
	Generated load combinations	8	
	Generated by	Design Situation No. 2	
9	S Ch A1 + A3		
	Design Situation	S Ch DS2 - SLS - Characteristic	☒
	Generated load combinations	9	
	Generated by	Design Situation No. 2	
10	S Ch A1 + 0.60 * A2 + A3		
	Design Situation	S Ch DS2 - SLS - Characteristic	☒
	Generated load combinations	10	
	Generated by	Design Situation No. 2	
11	S Qp 1.60 * A1		
	Design Situation	S Qp DS3 - SLS - Quasi-permanent	☒
	Generated load combinations	11	
	Generated by	Design Situation No. 3	
12	S Qp 1.60 * A1 + A2		
	Design Situation	S Qp DS3 - SLS - Quasi-permanent	☒
	Generated load combinations	12	
	Generated by	Design Situation No. 3	

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5.4 ACTION COMBINATIONS

AC No.	Settings	Value	Active
13	S Qp 1.60 * A1 + A2 + 0.50 * A3		
	Design Situation	S Qp DS3 - SLS - Quasi-permanent	☒
	Generated load combinations	13	
	Generated by	Design Situation No. 3	
14	S Qp 1.60 * A1 + A3		
	Design Situation	S Qp DS3 - SLS - Quasi-permanent	☒
	Generated load combinations	14	
	Generated by	Design Situation No. 3	
15	S Qp 1.60 * A1 + 0.60 * A2 + A3		
	Design Situation	S Qp DS3 - SLS - Quasi-permanent	☒
	Generated load combinations	15	
	Generated by	Design Situation No. 3	

5.4.1 ACTION COMBINATIONS - INCLUDED ACTIONS

Action No.	Factor	No.	Operator	Leading	γ	ψ	K_{def}	$ψ_0$	$ψ_2$
1	ULS	1.35 * A1							
	1.35	G A1		☐	1.35				
2	ULS	1.35 * A1 + 1.50 * A2							
	1.35	G A1	+	☐	1.35				
	1.50	Qw A2		☒	1.50				
3	ULS	1.35 * A1 + 1.50 * A2 + 0.75 * A3							
	1.35	G A1	+	☐	1.35				
	1.50	Qw A2	+	☒	1.50				
	0.75	Qs A3		☐	1.50	0.50			
4	ULS	1.35 * A1 + 1.50 * A3							
	1.35	G A1	+	☐	1.35				
	1.50	Qs A3		☒	1.50				
5	ULS	1.35 * A1 + 0.90 * A2 + 1.50 * A3							
	1.35	G A1	+	☐	1.35				
	0.90	Qw A2	+	☐	1.50	0.60			
	1.50	Qs A3		☒	1.50				
6	S Ch	A1							
	1.00	G A1		☐					
7	S Ch	A1 + A2							
	1.00	G A1	+	☐					
	1.00	Qw A2		☒					
8	S Ch	A1 + A2 + 0.50 * A3							
	1.00	G A1	+	☐					
	1.00	Qw A2	+	☒					
	0.50	Qs A3		☐		0.50			
9	S Ch	A1 + A3							
	1.00	G A1	+	☐					
	1.00	Qs A3		☒					
10	S Ch	A1 + 0.60 * A2 + A3							
	1.00	G A1	+	☐					
	0.60	Qw A2	+	☐		0.60			
	1.00	Qs A3		☒					
11	S Qp	1.60 * A1							
	1.60	G A1		☐			0.60		
12	S Qp	1.60 * A1 + A2							
	1.60	G A1	+	☐			0.60		
	1.00	Qw A2		☒			0.60		0.00
13	S Qp	1.60 * A1 + A2 + 0.50 * A3							
	1.60	G A1	+	☐			0.60		
	1.00	Qw A2	+	☒			0.60		0.00
	0.50	Qs A3		☐			0.60	0.50	0.00
14	S Qp	1.60 * A1 + A3							
	1.60	G A1	+	☐			0.60		
	1.00	Qs A3		☒			0.60		0.00

5.4.1 ACTION COMBINATIONS - INCLUDED ACTIONS

Action No.	Factor	No.	Operator	Leading	γ	ψ	K_{def}	ψ_0	ψ_2
15	SQp	1.60 * A1 + 0.60 * A2 + A3							
	1.60	G A1	+	☐			0.60		
	0.60	Qw A2	+	☐			0.60	0.60	0.00
	1.00	Qs A3		☒			0.60		0.00

5.5 LOAD COMBINATIONS

CO No.	Settings	Value	Unit	To Solve
1	ULS 1.35 * LC1 + 1.35 * LC2			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	ULS DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10		
	Structure modification	1		
	Load duration	Permanent		
2	ULS 1.35 * LC1 + 1.35 * LC2 + 1.50 * LC3			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	ULS DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10		
	Structure modification	1		
	Load duration	Short-term		
3	ULS 1.35 * LC1 + 1.35 * LC2 + 1.50 * LC3 + 0.75 * LC4			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	ULS DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10		
	Structure modification	1		
	Load duration	Short-term		
4	ULS 1.35 * LC1 + 1.35 * LC2 + 1.50 * LC4			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	ULS DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10		
	Structure modification	1		
	Load duration	Short-term		
5	ULS 1.35 * LC1 + 1.35 * LC2 + 0.90 * LC3 + 1.50 * LC4			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	ULS DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10		
	Structure modification	1		
	Load duration	Short-term		
6	S Ch LC1 + LC2			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	S Ch DS2 - SLS - Characteristic		
	Load duration	Permanent		
7	S Ch LC1 + LC2 + LC3			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	S Ch DS2 - SLS - Characteristic		
	Load duration	Short-term		
8	S Ch LC1 + LC2 + LC3 + 0.50 * LC4			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	S Ch DS2 - SLS - Characteristic		
	Load duration	Short-term		
9	S Ch LC1 + LC2 + LC4			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	S Ch DS2 - SLS - Characteristic		
	Load duration	Short-term		
10	S Ch LC1 + LC2 + 0.60 * LC3 + LC4			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	S Ch DS2 - SLS - Characteristic		
	Load duration	Short-term		
11	S Qp 1.60 * LC1 + 1.60 * LC2			
	Analysis type	Static Analysis		☒

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5.5 LOAD COMBINATIONS

CO No.	Settings	Value	Unit	To Solve
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	S Qp DS3 - SLS - Quasi-permanent		
	Load duration	Permanent		
12	S Qp 1.60 * LC1 + 1.60 * LC2 + LC3			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	S Qp DS3 - SLS - Quasi-permanent		
	Load duration	Short-term		
13	S Qp 1.60 * LC1 + 1.60 * LC2 + LC3 + 0.50 * LC4			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	S Qp DS3 - SLS - Quasi-permanent		
	Load duration	Short-term		
14	S Qp 1.60 * LC1 + 1.60 * LC2 + LC4			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	S Qp DS3 - SLS - Quasi-permanent		
	Load duration	Short-term		
15	S Qp 1.60 * LC1 + 1.60 * LC2 + 0.60 * LC3 + LC4			
	Analysis type	Static Analysis		☒
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1		
	Design Situation	S Qp DS3 - SLS - Quasi-permanent		
	Load duration	Short-term		

5.5.1 LOAD COMBINATIONS - INCLUDED LOAD CASES

CO No.	Factor	Load Case	Action	Leading	γ	ψ	K_{def}	$ψ_0$	$ψ_2$
1	ULS 1.35 * LC1 + 1.35 * LC2								
	1.35	G LC1	G A1	☐	1.35				
	1.35	G LC2	G A1	☐	1.35				
2	ULS 1.35 * LC1 + 1.35 * LC2 + 1.50 * LC3								
	1.35	G LC1	G A1	☐	1.35				
	1.35	G LC2	G A1	☐	1.35				
	1.50	Qw LC3	Qw A2	☒	1.50				
3	ULS 1.35 * LC1 + 1.35 * LC2 + 1.50 * LC3 + 0.75 * LC4								
	1.35	G LC1	G A1	☐	1.35				
	1.35	G LC2	G A1	☐	1.35				
	1.50	Qw LC3	Qw A2	☒	1.50				
	0.75	Qs LC4	Qs A3	☐	1.50	0.50			
4	ULS 1.35 * LC1 + 1.35 * LC2 + 1.50 * LC4								
	1.35	G LC1	G A1	☐	1.35				
	1.35	G LC2	G A1	☐	1.35				
	1.50	Qs LC4	Qs A3	☒	1.50				
5	ULS 1.35 * LC1 + 1.35 * LC2 + 0.90 * LC3 + 1.50 * LC4								
	1.35	G LC1	G A1	☐	1.35				
	1.35	G LC2	G A1	☐	1.35				
	0.90	Qw LC3	Qw A2	☐	1.50	0.60			
	1.50	Qs LC4	Qs A3	☒	1.50				
6	S Ch LC1 + LC2								
	1.00	G LC1	G A1	☐					
	1.00	G LC2	G A1	☐					
7	S Ch LC1 + LC2 + LC3								
	1.00	G LC1	G A1	☐					
	1.00	G LC2	G A1	☐					
	1.00	Qw LC3	Qw A2	☒					
8	S Ch LC1 + LC2 + LC3 + 0.50 * LC4								
	1.00	G LC1	G A1	☐					
	1.00	G LC2	G A1	☐					
	1.00	Qw LC3	Qw A2	☒					
	0.50	Qs LC4	Qs A3	☐		0.50			
9	S Ch LC1 + LC2 + LC4								
	1.00	G LC1	G A1	☐					
	1.00	G LC2	G A1	☐					

5.5.1 LOAD COMBINATIONS - INCLUDED LOAD CASES

CO No.	Factor	Load Case	Action	Leading	γ	ψ	K_{def}	$ψ_0$	$ψ_2$
	1.00	Qs LC4	Qs A3	☒					
10	S Ch LC1 + LC2 + 0.60 * LC3 + LC4								
	1.00	G LC1	G A1	☐					
	1.00	G LC2	G A1	☐					
	0.60	Qw LC3	Qw A2	☐		0.60			
	1.00	Qs LC4	Qs A3	☒					
11	S Qp 1.60 * LC1 + 1.60 * LC2								
	1.60	G LC1	G A1	☐			0.60		
	1.60	G LC2	G A1	☐			0.60		
12	S Qp 1.60 * LC1 + 1.60 * LC2 + LC3								
	1.60	G LC1	G A1	☐			0.60		
	1.60	G LC2	G A1	☐			0.60		
	1.00	Qw LC3	Qw A2	☒			0.60		0.00
13	S Qp 1.60 * LC1 + 1.60 * LC2 + LC3 + 0.50 * LC4								
	1.60	G LC1	G A1	☐			0.60		
	1.60	G LC2	G A1	☐			0.60		
	1.00	Qw LC3	Qw A2	☒			0.60		0.00
	0.50	Qs LC4	Qs A3	☐			0.60	0.50	0.00
14	S Qp 1.60 * LC1 + 1.60 * LC2 + LC4								
	1.60	G LC1	G A1	☐			0.60		
	1.60	G LC2	G A1	☐			0.60		
	1.00	Qs LC4	Qs A3	☒			0.60		0.00
15	S Qp 1.60 * LC1 + 1.60 * LC2 + 0.60 * LC3 + LC4								
	1.60	G LC1	G A1	☐			0.60		
	1.60	G LC2	G A1	☐			0.60		
	0.60	Qw LC3	Qw A2	☐			0.60	0.60	0.00
	1.00	Qs LC4	Qs A3	☒			0.60		0.00

5.6 STATIC ANALYSIS SETTINGS

Settings No.	Description	Symbol	Value	Unit
1	Geometrically linear			
	Analysis type		Geometrically linear	
	Modify loading by multiplier factor		☐	
	Displacements due to member load of type 'Pipe internal pressure' (Bourdon effect)		☐	
	Method for equation system		Direct	
	Plate bending theory		Mindlin	
	Activate mass conversion to load		☐	
	Asymmetric direct solver		☐	
2	Second-order (P-Δ) | Picard | 100 | 1			
	Analysis type		Second-order (P-Δ)	
	Iterative method for nonlinear analysis		Picard	
	Maximum number of iterations		100	
	Number of load increments		1	
	Modify standard precision and tolerance settings		☐	
	Ignore all nonlinearities		☐	
	Modify loading by multiplier factor		☐	
	Consider favorable effect due to tension in members		☒	
	Displacements due to member load of type 'Pipe internal pressure' (Bourdon effect)		☐	
	Refer internal forces to deformed structure		☒	
	Refer internal forces to deformed structure for normal forces		☒	
	Refer internal forces to deformed structure for shear forces		☒	
	Refer internal forces to deformed structure for moments		☒	
	Method for equation system		Direct	
	Plate bending theory		Mindlin	
	Activate mass conversion to load		☐	
	Asymmetric direct solver		☐	
3	Large deformations | Newton-Raphson | 100 | 1			
	Analysis type		Large deformations	
	Iterative method for nonlinear analysis		Newton-Raphson	
	Maximum number of iterations		100	
	Number of load increments		1	
	Modify standard precision and tolerance settings		☐	

5.6 STATIC ANALYSIS SETTINGS

Settings No.	Description	Symbol	Value	Unit
	Ignore all nonlinearities		☐	
	Modify loading by multiplier factor		☐	
	Consider favorable effect due to tension in members		☒	
	Try to calculate unstable structure		☐	
	Displacements due to member load of type 'Pipe internal pressure' (Bourdon effect)		☐	
	Method for equation system		Direct	
	Plate bending theory		Mindlin	
	Activate mass conversion to load		☐	
	Asymmetric direct solver		☐	

5.7 COMBINATION WIZARDS

Wizard No.	Settings	Value
1	Load combinations | SA2 - Second-order (P-Δ) | Picard | 100 | 1	
	Assigned to	DS 1-3
	Generate combinations	Load combinations (non-linear analysis)
	Static analysis settings	SA2 - Second-order (P-Δ) | Picard | 100 | 1
	Consider imperfection case	☒
	Consider initial state	☐
	Structure modification enabled	☐
	Generate same load combinations without imperfection case	☐
	Consider construction stages	☐
	User-defined action combinations	☐
	Favorable permanent actions	☐
	Reduce number of generated combinations	☐
2	Load combinations | SA1 - Geometrically linear	
	Assigned to	
	Generate combinations	Load combinations (non-linear analysis)
	Static analysis settings	SA1 - Geometrically linear
	Consider imperfection case	☐
	Consider initial state	☐
	Structure modification enabled	☐
	Consider construction stages	☐
	User-defined action combinations	☐
	Favorable permanent actions	☐
	Reduce number of generated combinations	☐

6 Loads

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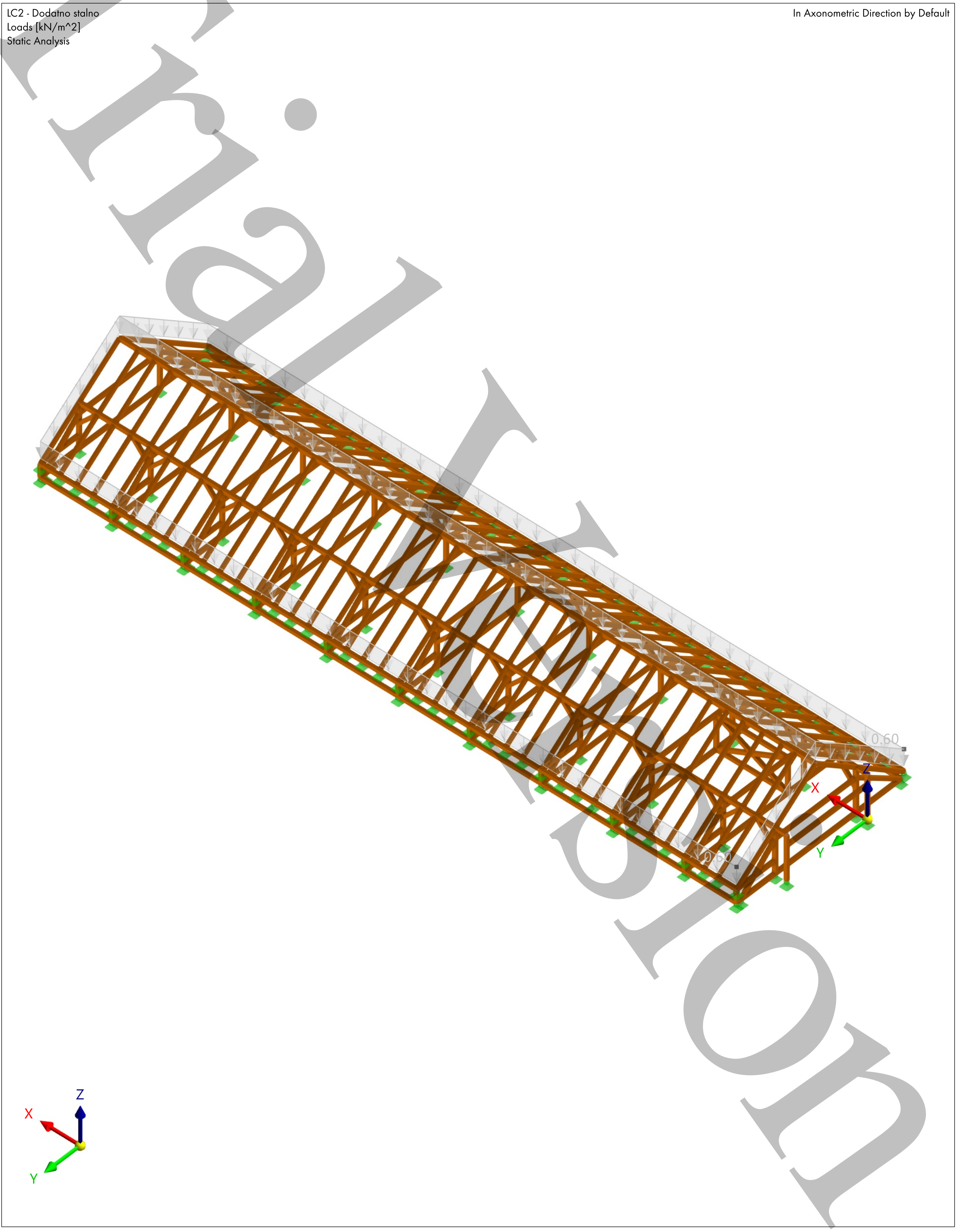
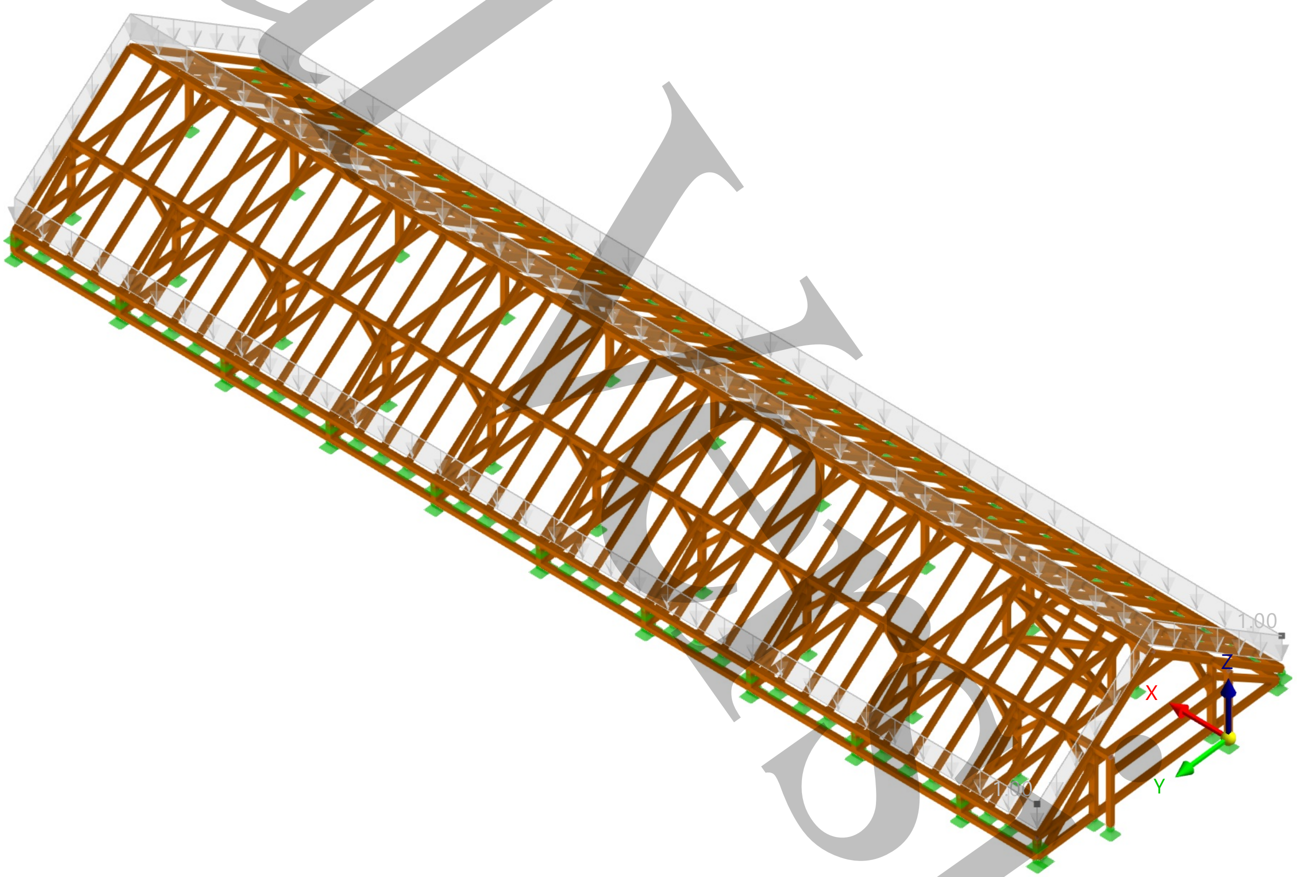
Graphic **LC2: , LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT** **Static Analysis**



Graphic **LC4: , LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT** **Static Analysis**

LC4 - snijeg
Loads [kN/m^2]
Static Analysis

In Axonometric Direction by Default



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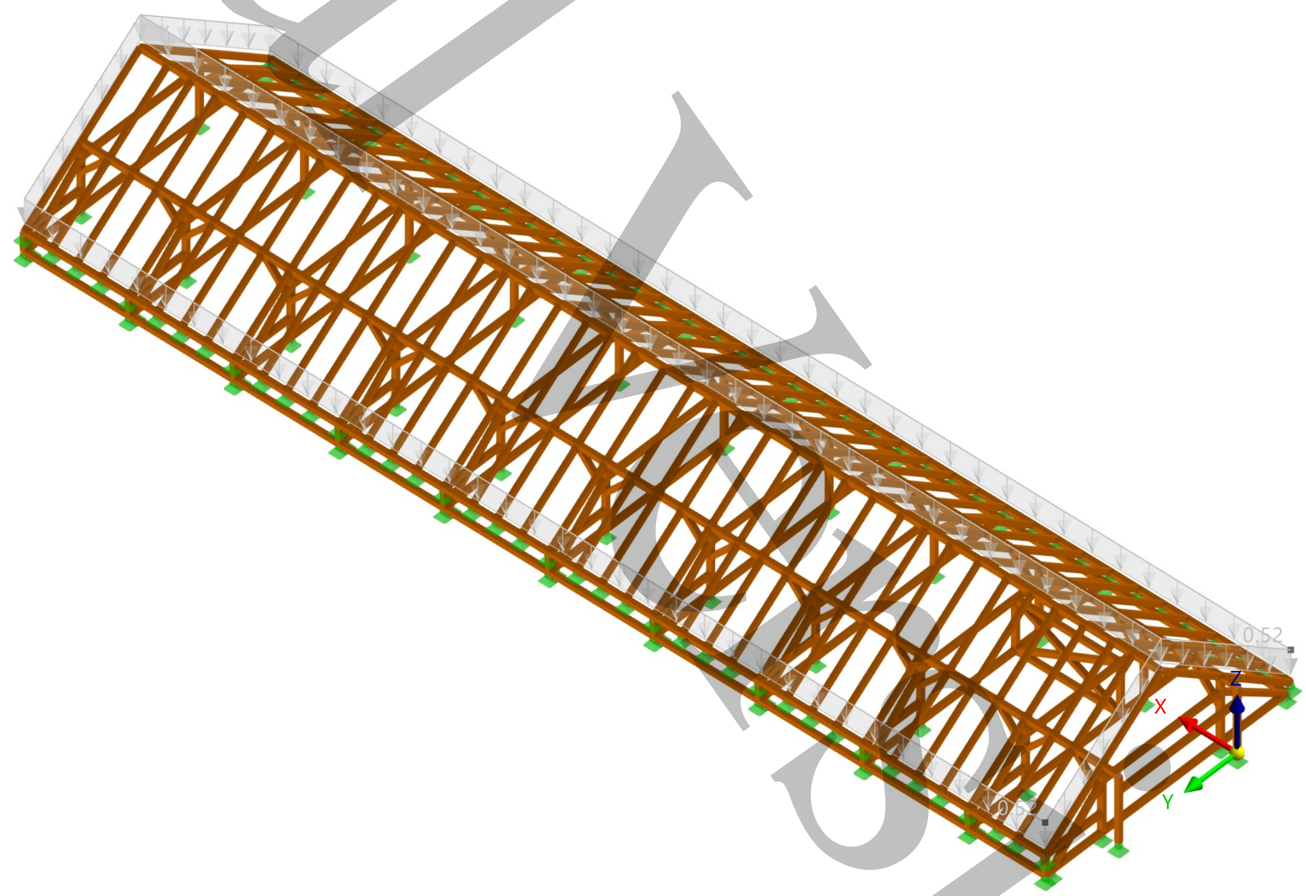
Graphic **LC3: , LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT** **Static Analysis**

LC3 - vjetar
Loads [kN/m^2]
Static Analysis

In Axonometric Direction by Default



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7 Guide Objects

7.1 COORDINATE SYSTEMS

System No.	Type	Coordinates Symbol	Coordinates Value	Coordinates Unit	Rotation Sequence	Rotation Symbol	Rotation Value	Rotation Unit	Comment
1	Global XYZ								

8 Static Analysis Results

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Graphic

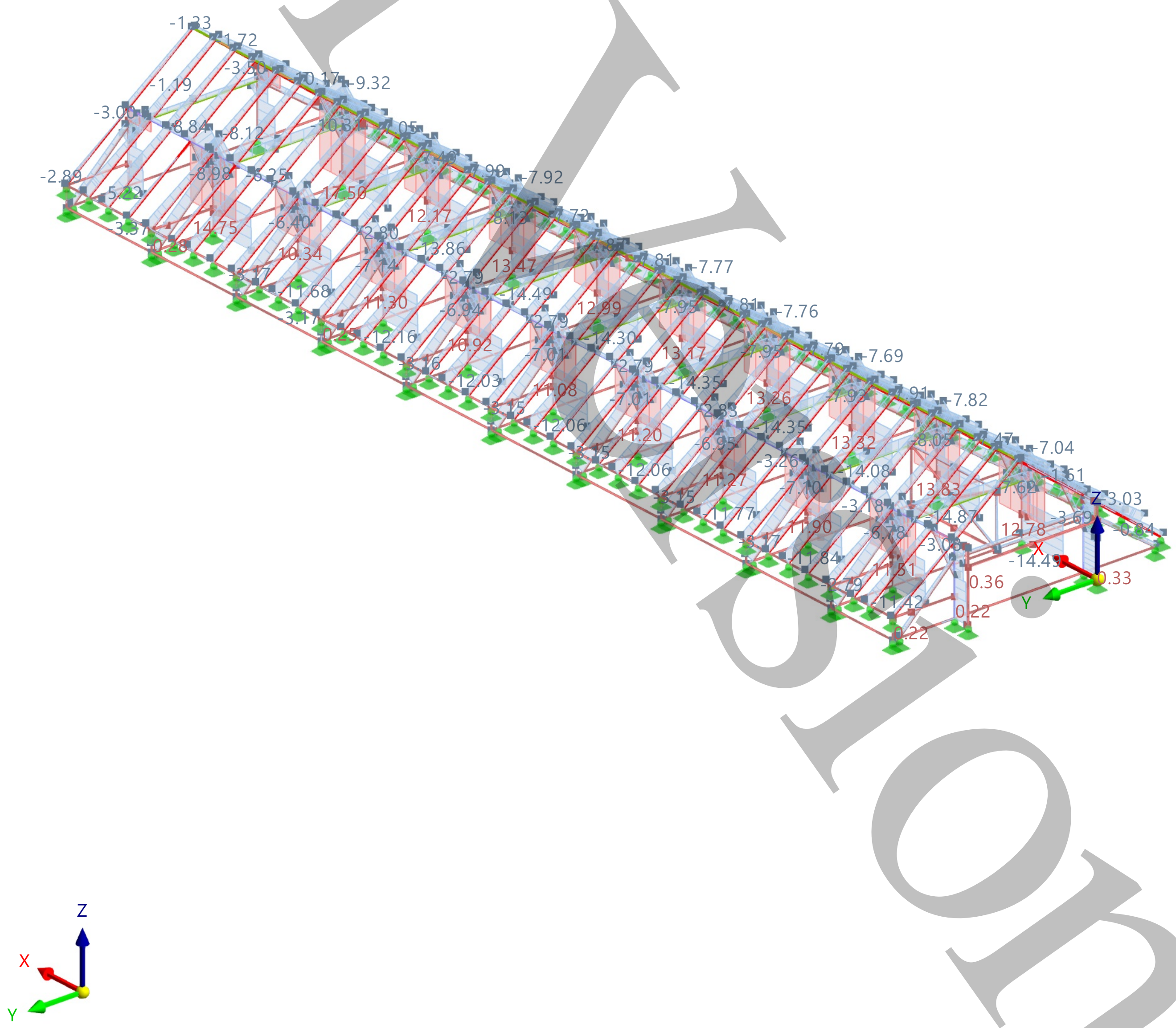
DS1: ENVELOPE VALUES - MAX VALUES, INTERNAL FORCES N, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

Static Analysis

DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Forces N [kN]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
- 3 - SQ_M1 150
- 4 - R_M1 150/200
- 5 - R_M1 120/170
- 6 - R_M1 150/180



max N : 17.50 | min N : -15.97 kN

Dimensions [m]

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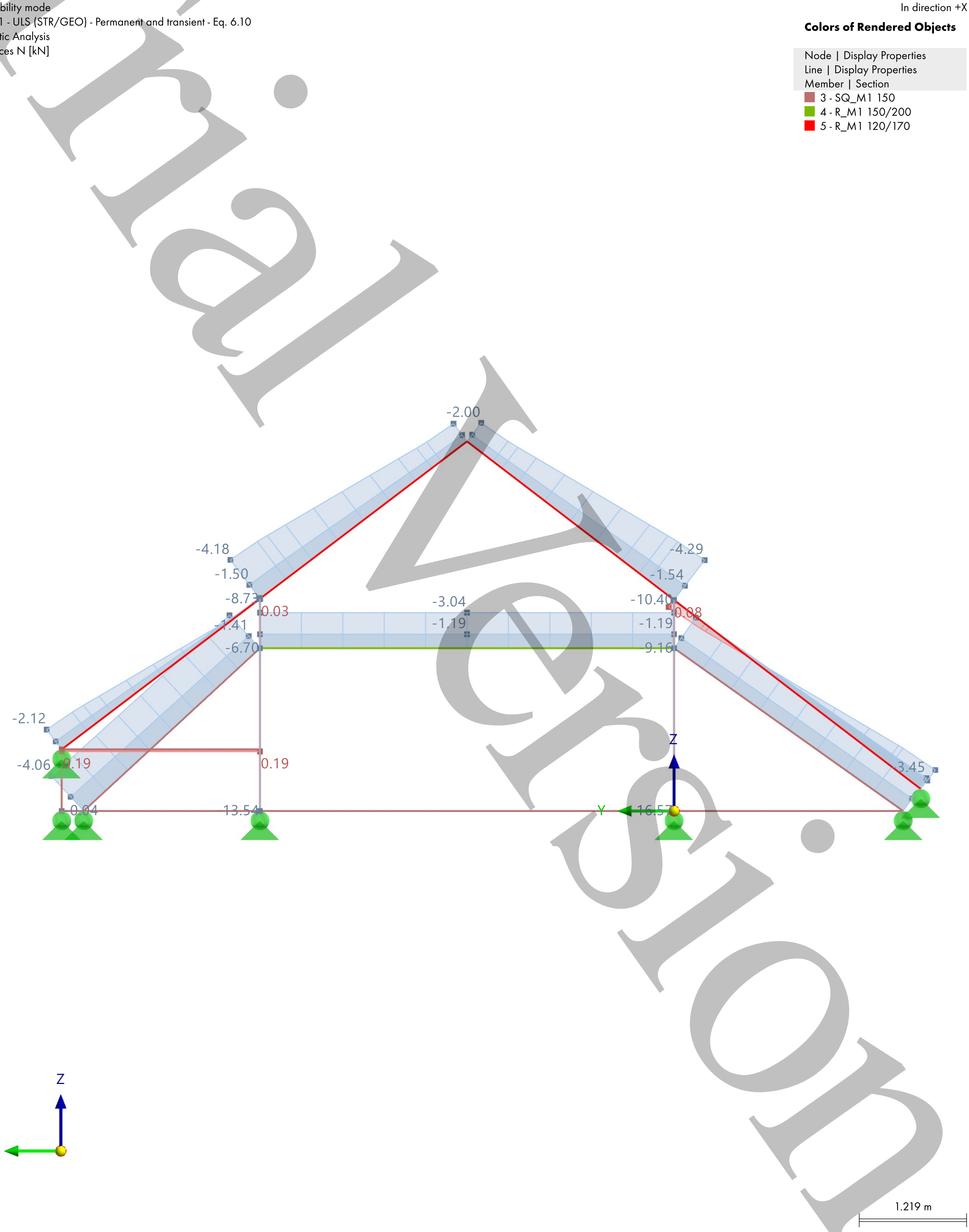
Graphic

DS1: ENVELOPE VALUES - MAX AND MIN VALUES, INTERNAL FORCES N, LOADING, IN DIRECTION +X

Static Analysis

Visibility mode
DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Forces N [kN]

In direction +X



max N : 0.76 | min N : -16.57 kN

Dimensions [m]

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Graphic

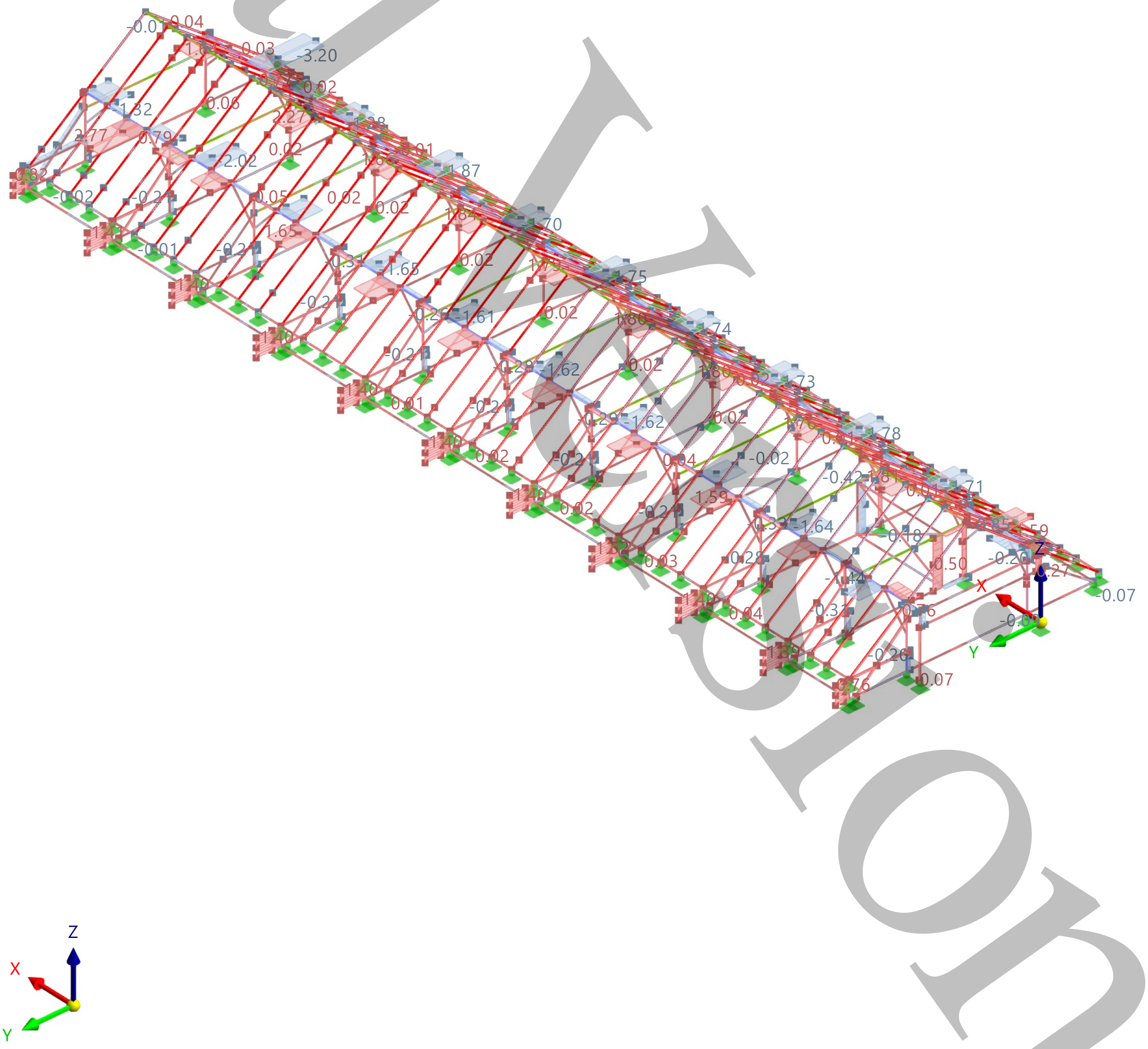
DS1: ENVELOPE VALUES - MAX AND MIN VALUES, INTERNAL FORCES V_y, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

Static Analysis

DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Forces V_y [kN]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170
6 - R_M1 150/180



max V_y : 2.77 | min V_y : -3.20 kN

Dimensions [m]

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Graphic

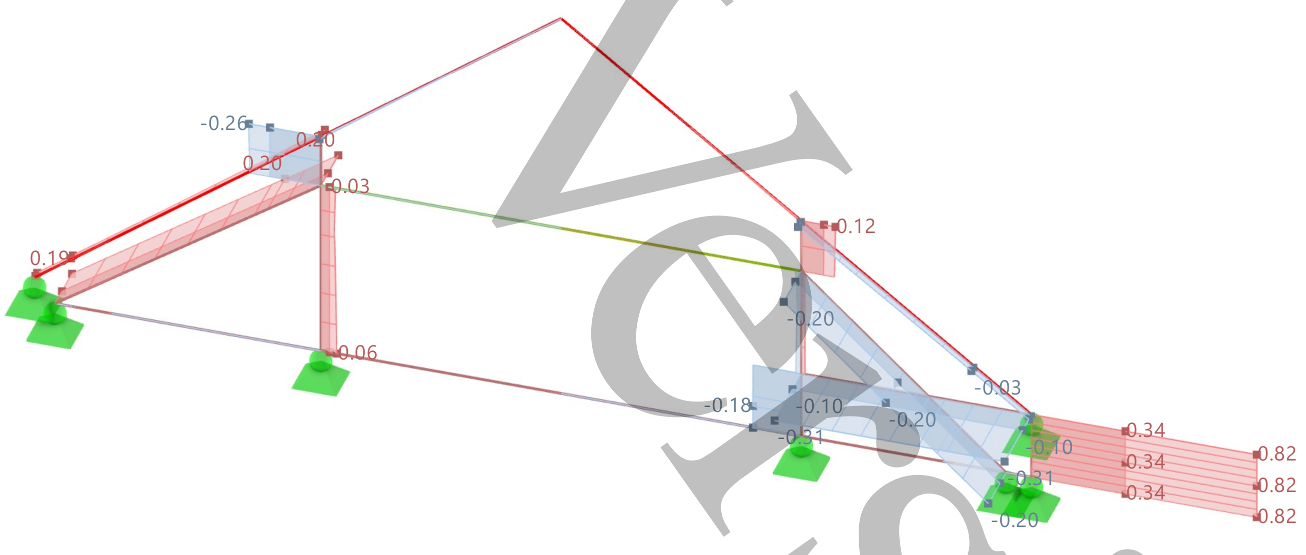
DS1: ENVELOPE VALUES - MAX AND MIN VALUES, INTERNAL FORCES V_y, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

Static Analysis

Visibility mode
DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Forces V_y [kN]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170



max V_y : 0.82 | min V_y : -0.31 kN

Dimensions [m]

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Graphic

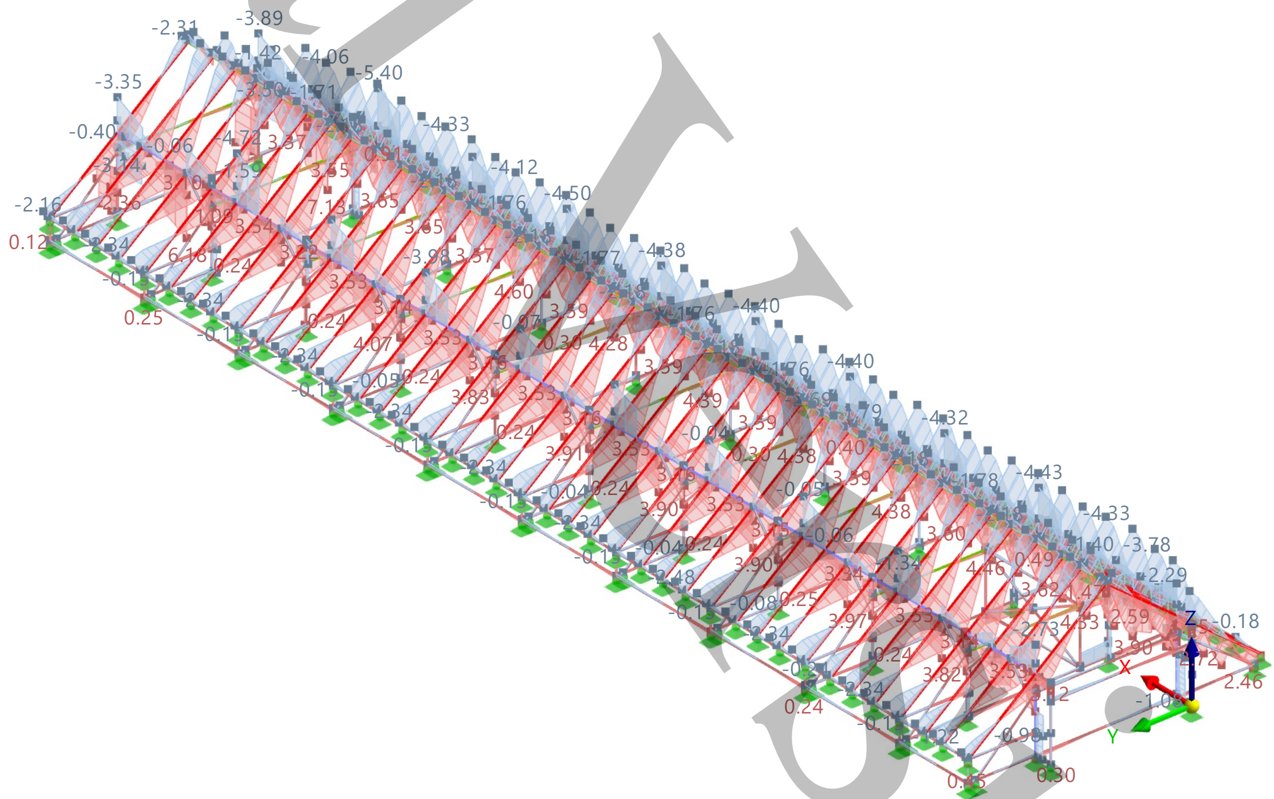
DS1: ENVELOPE VALUES - MAX AND MIN VALUES, INTERNAL FORCES V_z, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

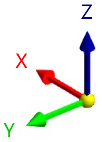
Static Analysis

DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Forces V_z [kN]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
- 3 - SQ_M1 150
- 4 - R_M1 150/200
- 5 - R_M1 120/170
- 6 - R_M1 150/180





max V_z : 7.13 | min V_z : -5.40 kN

Dimensions [m]

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Graphic

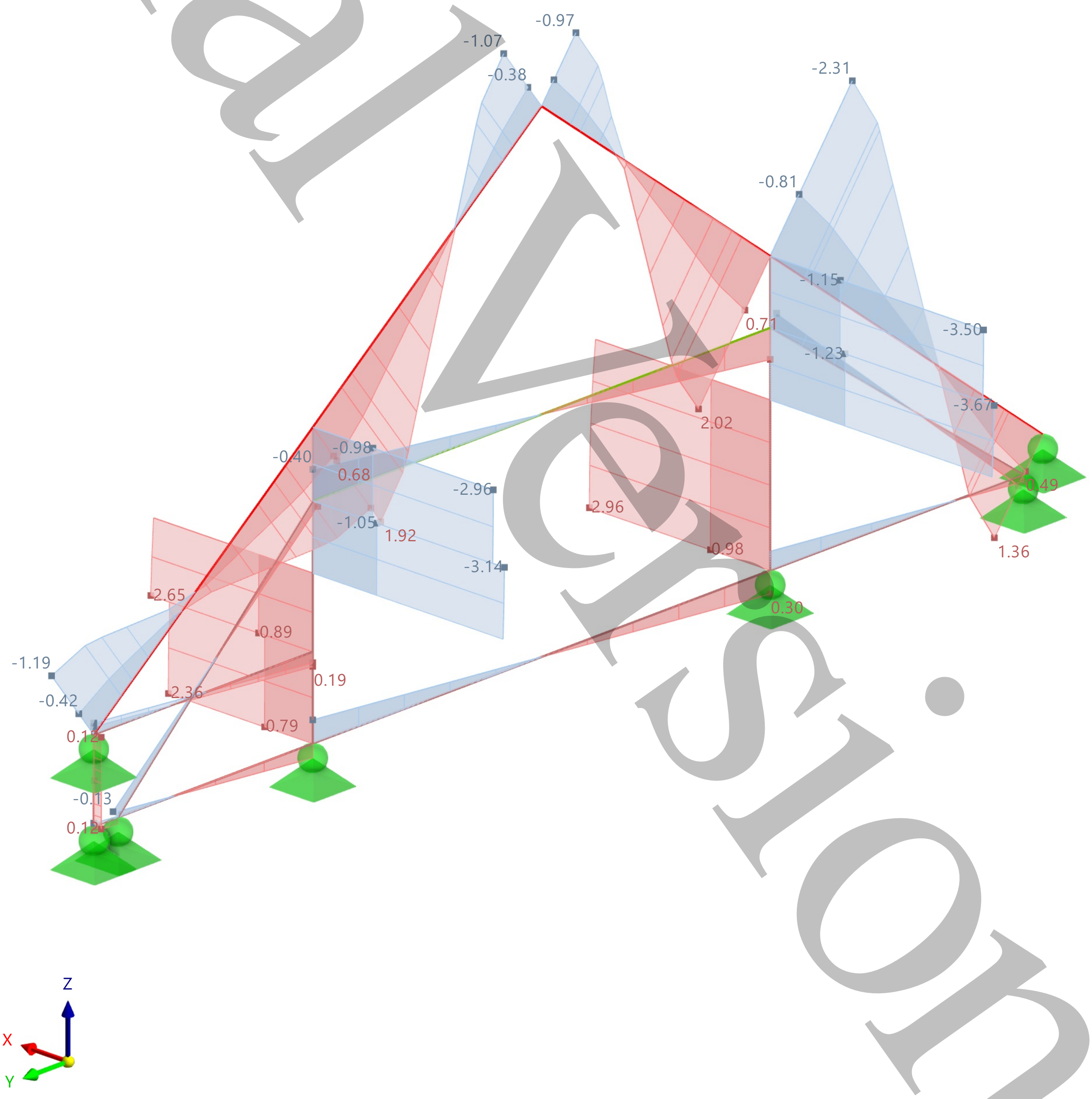
DS1: ENVELOPE VALUES - MAX AND MIN VALUES, INTERNAL FORCES V_z, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

Static Analysis

Visibility mode
DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Forces V_z [kN]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170



max V_z : 2.96 | min V_z : -3.67 kN

Dimensions [m]

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Graphic

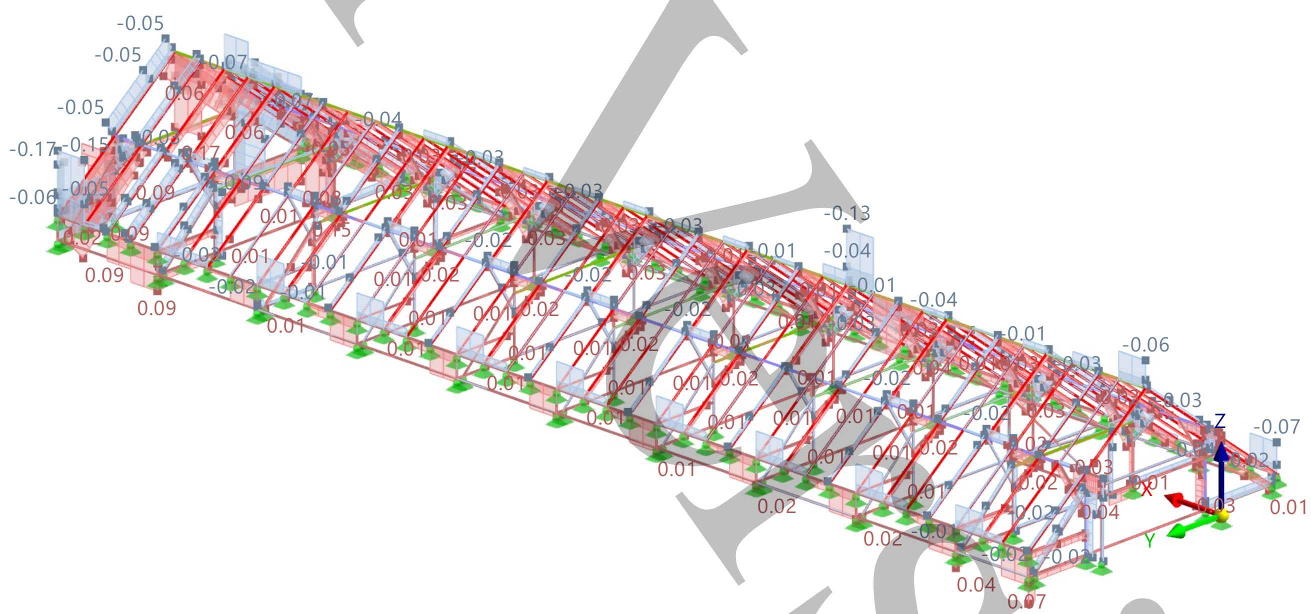
DS1: ENVELOPE VALUES - MAX AND MIN VALUES, INTERNAL FORCES M_T, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

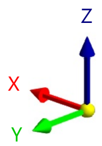
Static Analysis

DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Moments M_T [kNm]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170
6 - R_M1 150/180





max M_T : 0.17 | min M_T : -0.17 kNm

Dimensions [m]

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Graphic

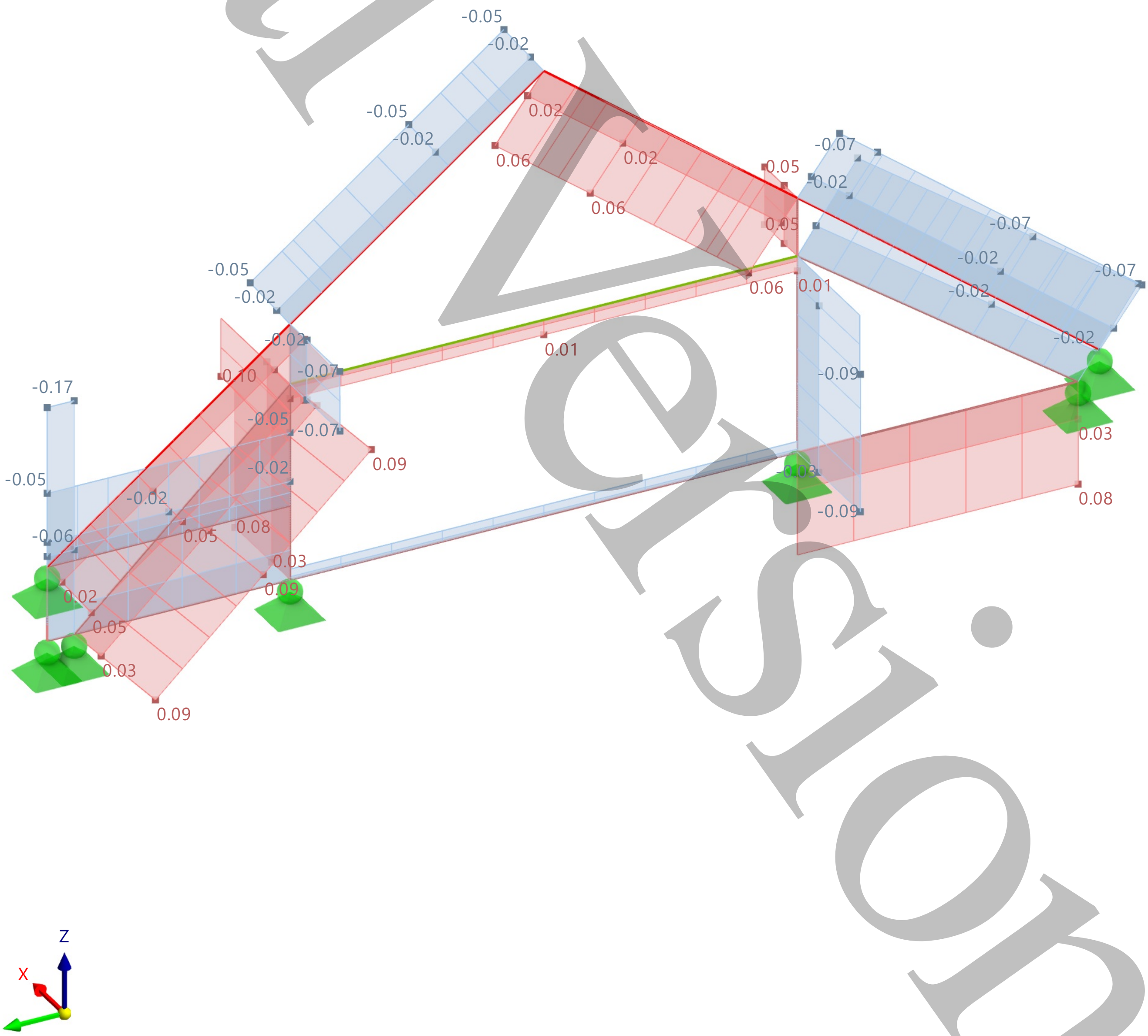
DS1: ENVELOPE VALUES - MAX AND MIN VALUES, INTERNAL FORCES M_T, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

Static Analysis

Visibility mode
DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Moments M_T [kNm]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170



max M_T : 0.10 | min M_T : -0.17 kNm

Dimensions [m]

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Graphic

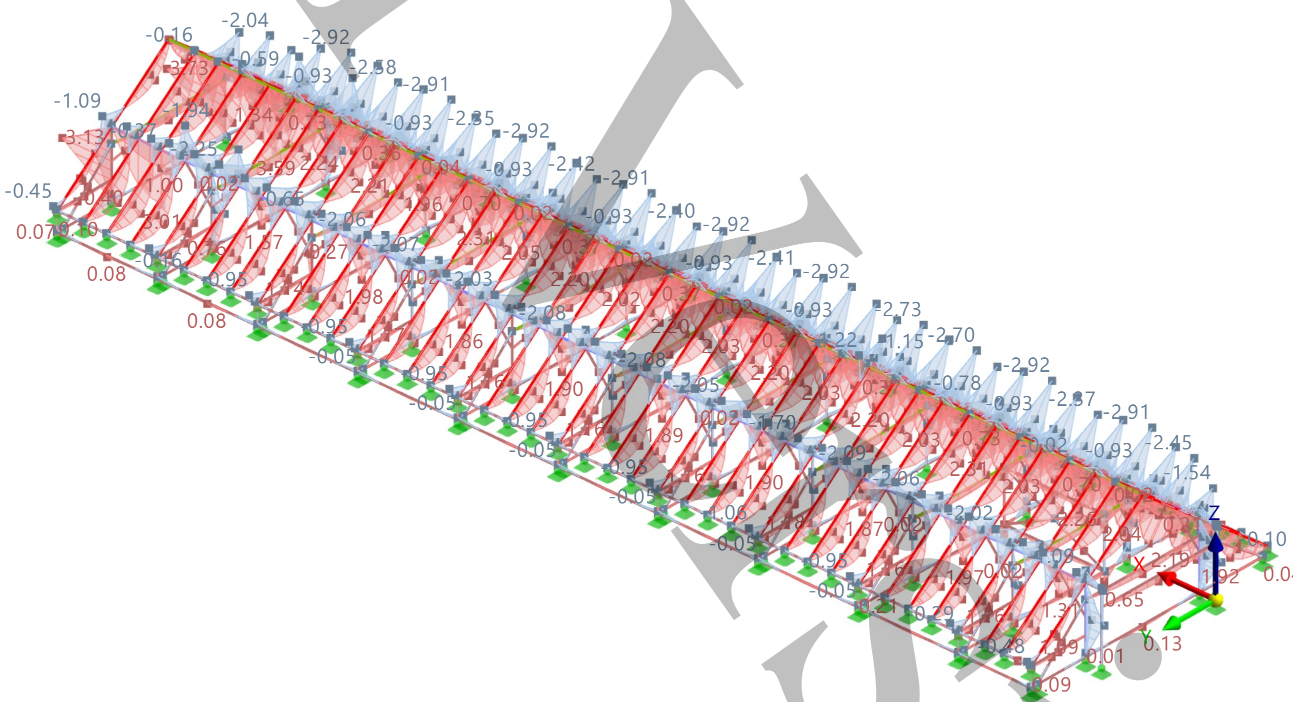
DS1: ENVELOPE VALUES - MAX AND MIN VALUES, INTERNAL FORCES M_y, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

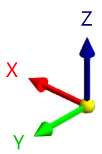
Static Analysis

DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Moments M_y [kNm]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170
6 - R_M1 150/180





max M_y : 3.73 | min M_y : -2.92 kNm

Dimensions [m]

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Graphic

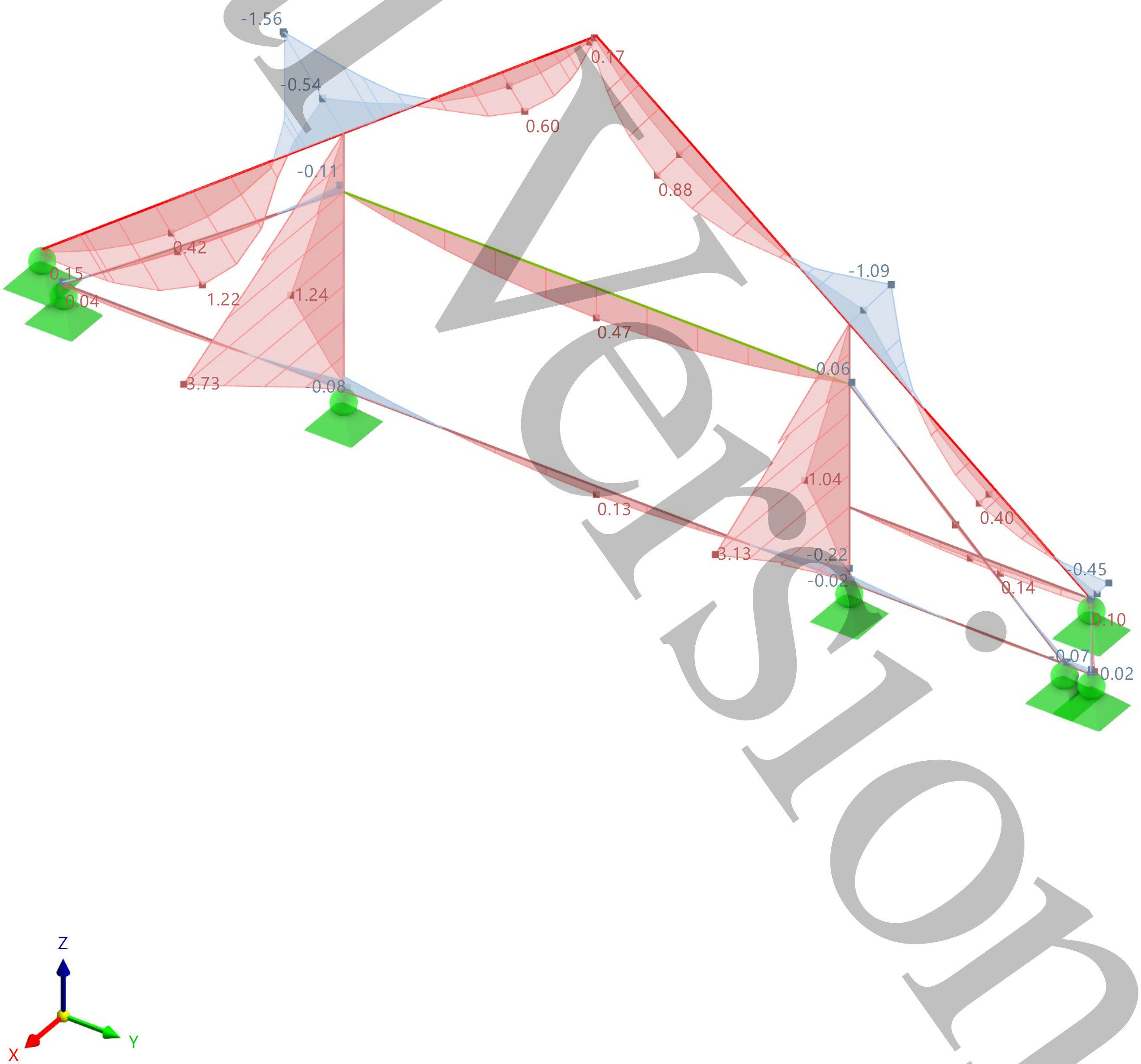
DS1: ENVELOPE VALUES - MAX AND MIN VALUES, INTERNAL FORCES M_y, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

Static Analysis

Visibility mode
DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Moments M_y [kNm]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170



max M_y : 3.73 | min M_y : -1.56 kNm

Dimensions [m]

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Graphic

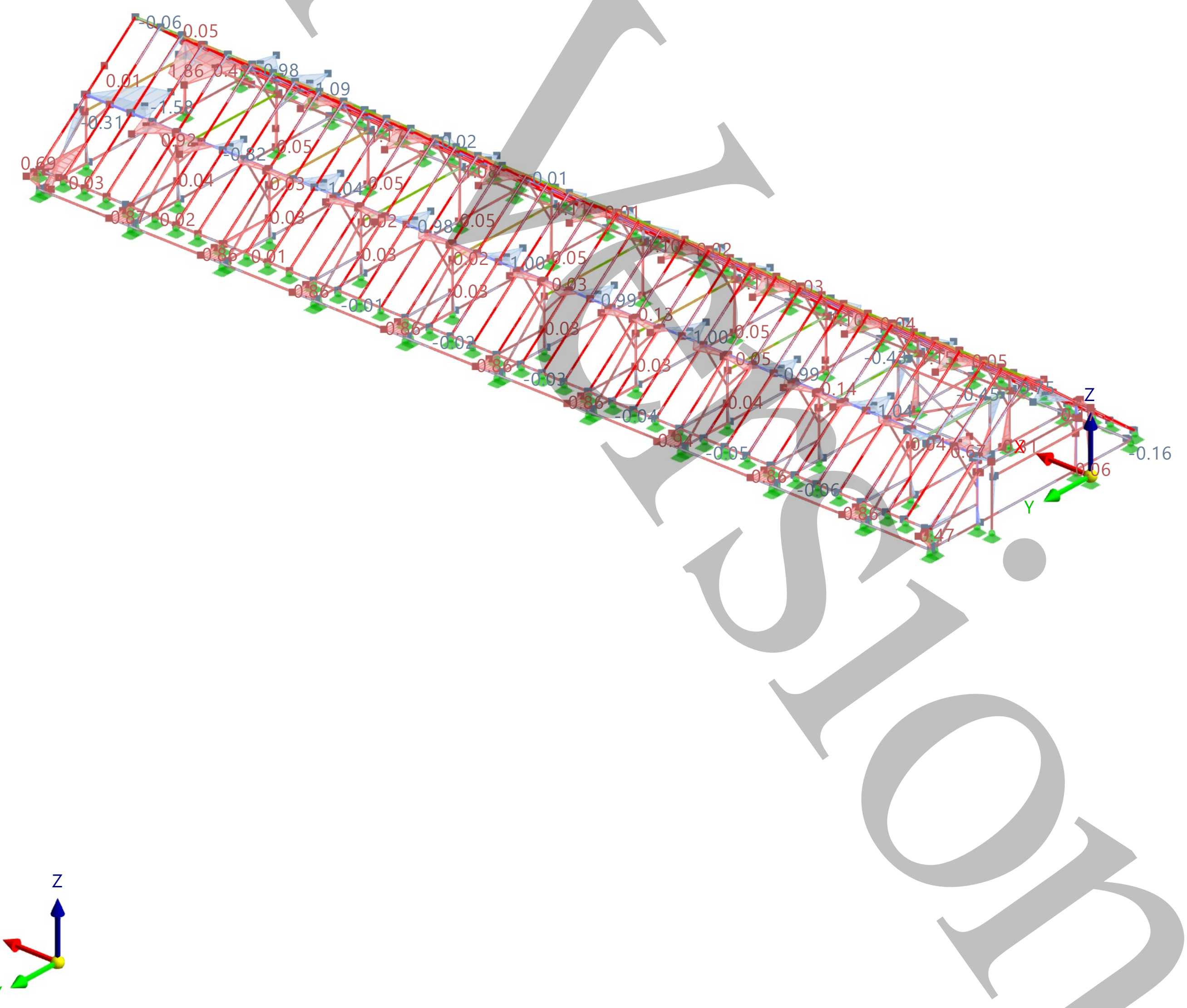
DS1: ENVELOPE VALUES - MAX AND MIN VALUES, INTERNAL FORCES M_z, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

Static Analysis

DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Moments M_z [kNm]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170
6 - R_M1 150/180



max M_z : 1.86 | min M_z : -1.58 kNm

Dimensions [m]

Graphic

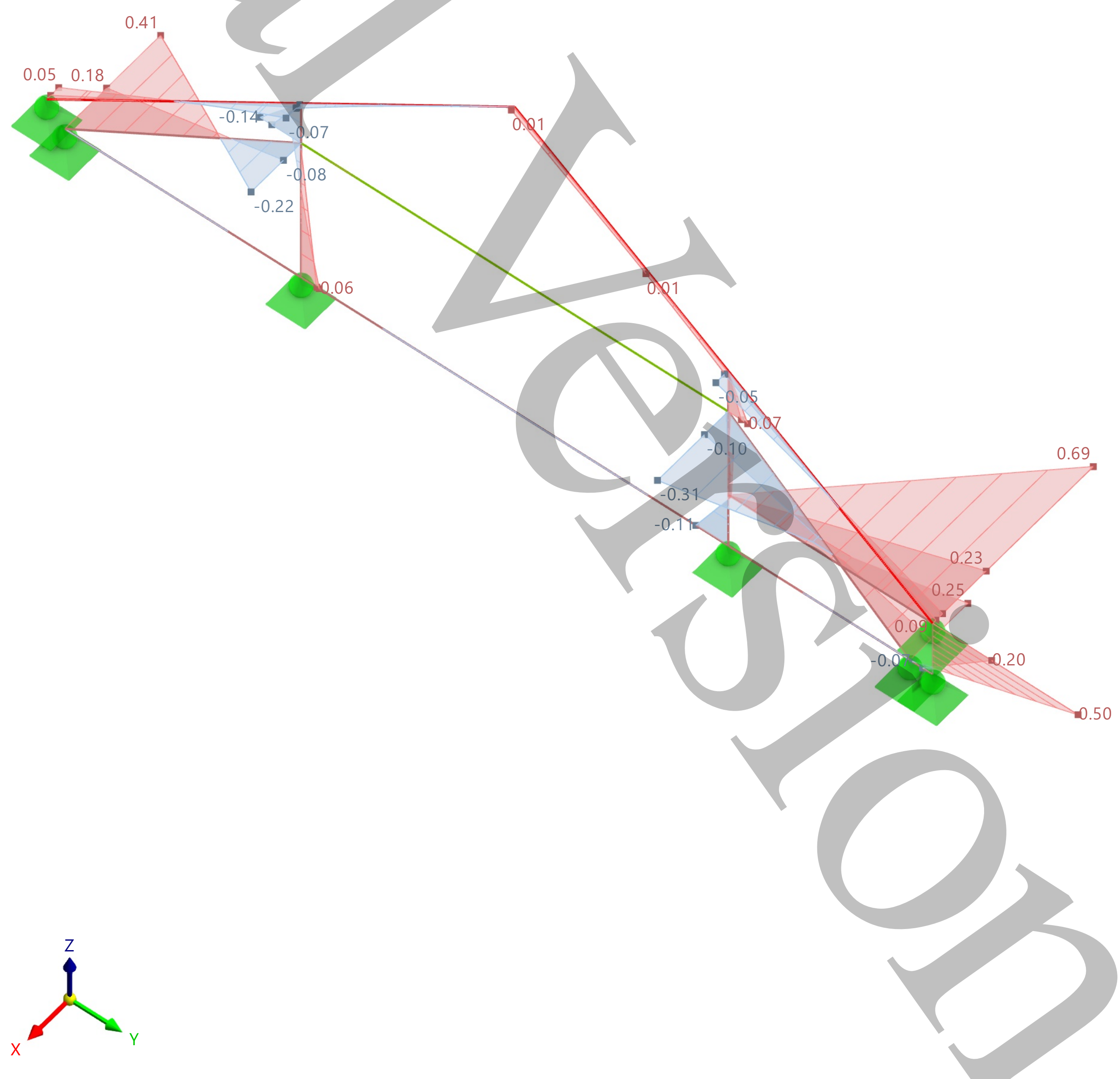
DS1: ENVELOPE VALUES - MAX AND MIN VALUES, INTERNAL FORCES M_z, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

Static Analysis

Visibility mode
DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Moments M_z [kNm]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170



max M_z : 0.69 | min M_z : -0.31 kNm

Dimensions [m]

Graphic

DS1: ENVELOPE VALUES - MAX AND MIN VALUES, NODAL SUPPORTS P_X , NODAL SUPPORTS P_Y , NODAL SUPPORTS P_Z , LINE SUPPORTS P_X , LINE SUPPORTS P_Y , LINE SUPPORTS P_Z , LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

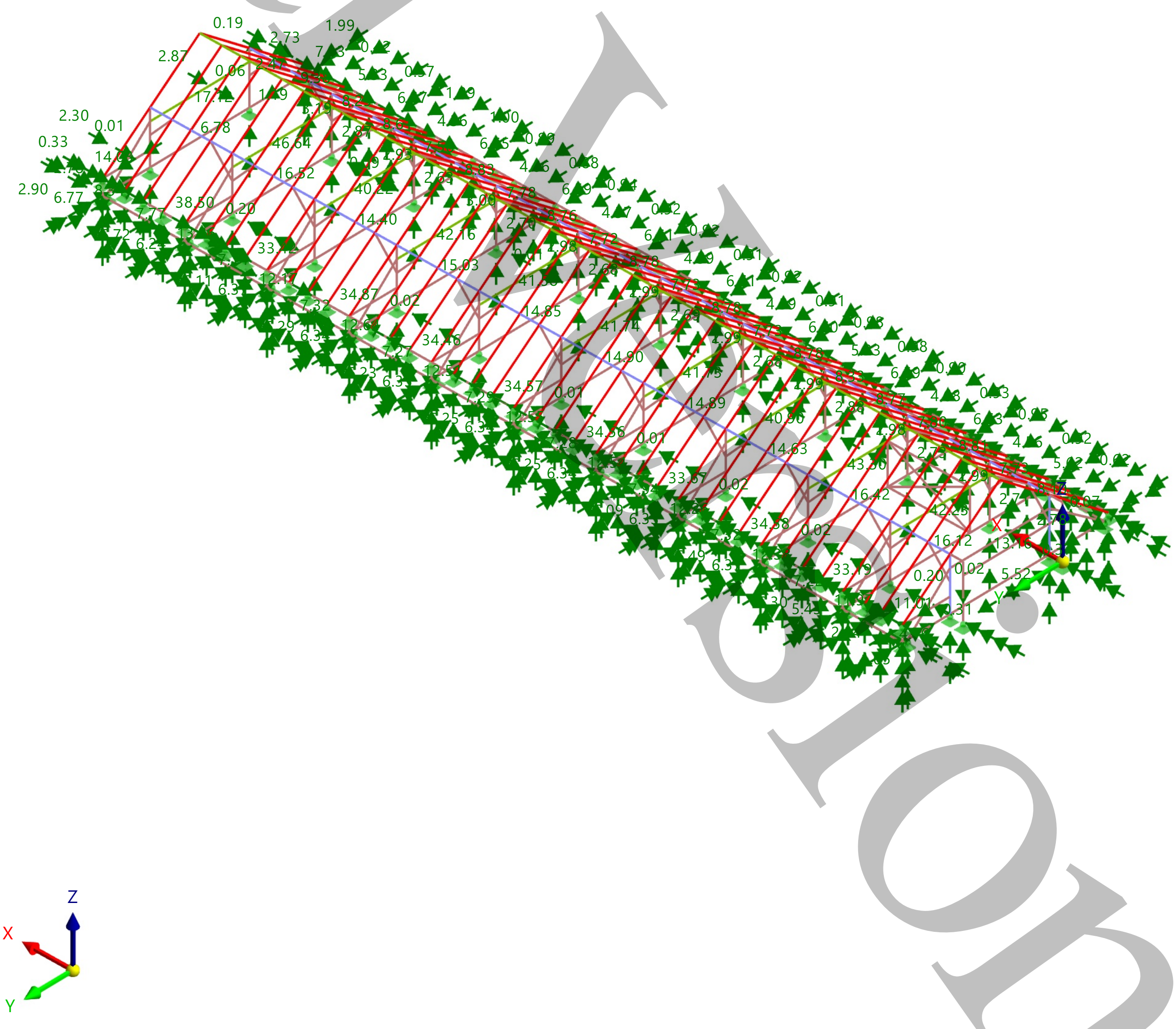
Static Analysis

DS1 - ULS (STR/GEO) - Permanent and transient - Eq. 6.10
Static Analysis
Local Reaction Forces P_x, P_y, P_z [kN]

In Axonometric Direction by Default

Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170
6 - R_M1 150/180



max P_x : 2.87 | min P_x : -1.07 kN
max P_y : 6.77 | min P_y : -7.13 kN
max P_z : 0.33 | min P_z : -46.64 kN

Dimensions [m]

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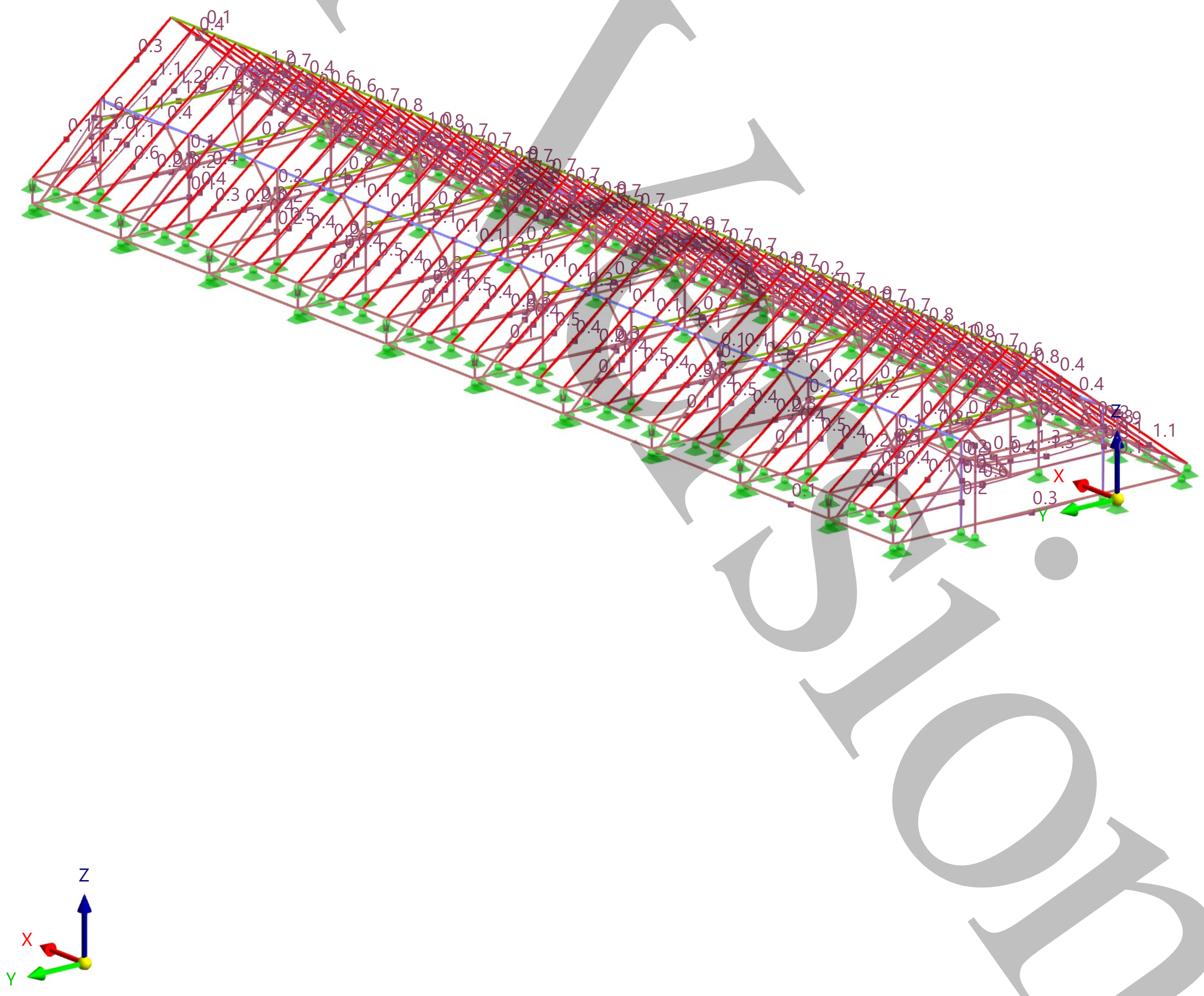
Graphic

DS2: ENVELOPE VALUES - MAX VALUES, GLOBAL DEFORMATIONS |U|, LINE SUPPORTS P_x, LINE SUPPORTS P_y, LINE SUPPORTS P_z, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT **Static Analysis**

DS2 - SLS - Characteristic
Static Analysis
Displacements |u| [mm]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170
6 - R_M1 150/180



max |u| : 3.4 | min |u| : 0.0 mm

Dimensions [m]

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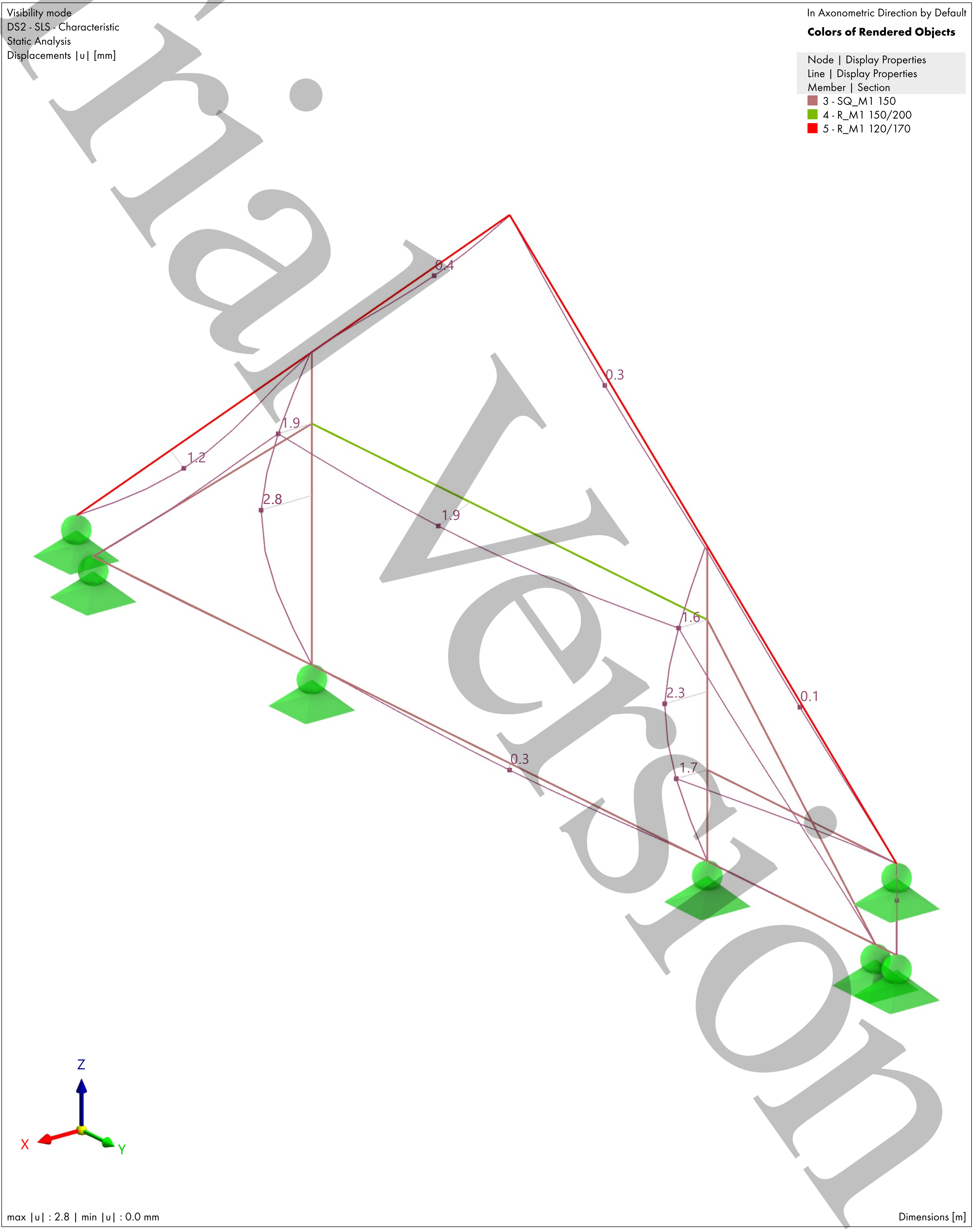
Graphic

DS2: ENVELOPE VALUES - MAX VALUES, GLOBAL DEFORMATIONS |U|, LINE SUPPORTS P_x, LINE SUPPORTS P_y, LINE SUPPORTS P_z, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

Static Analysis



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Graphic

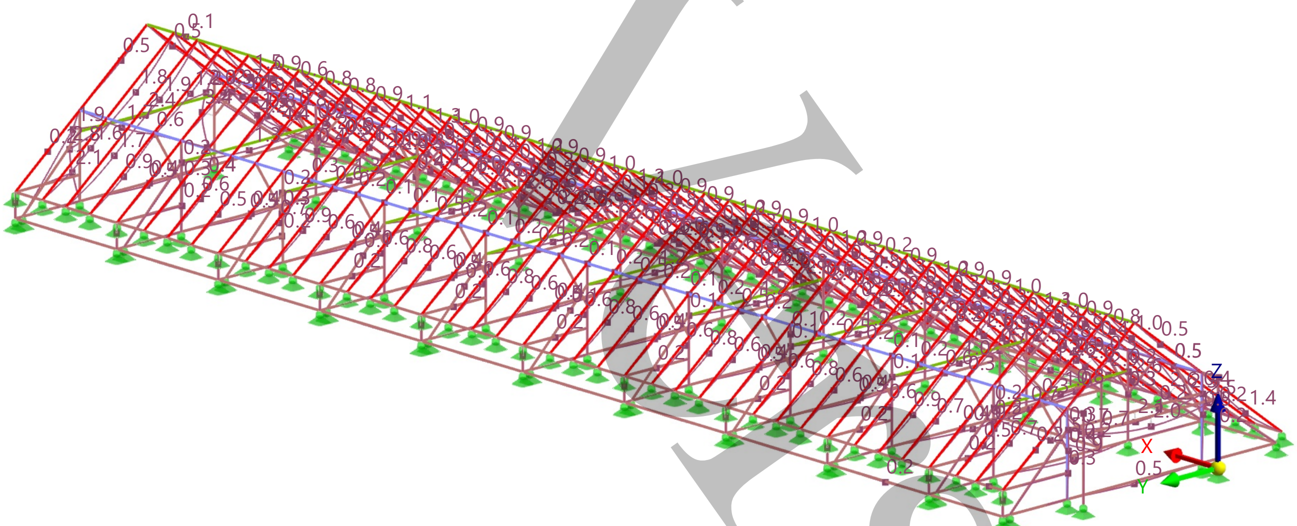
DS3: ENVELOPE VALUES - MAX VALUES, GLOBAL DEFORMATIONS |U|, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

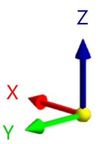
Static Analysis

DS3 - SLS - Quasi-permanent
Static Analysis
Displacements |u| [mm]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170
6 - R_M1 150/180





max |u| : 4.4 | min |u| : 0.0 mm

Dimensions [m]

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Graphic

DS3: ENVELOPE VALUES - MAX VALUES, GLOBAL DEFORMATIONS |U|, LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

Static Analysis

Visibility mode
DS3 - SLS - Quasi-permanent
Static Analysis
Displacements |u| [mm]

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170

max |u| : 3.4 | min |u| : 0.0 mm

Dimensions [m]

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9 Timber Design

9.1 OBJECTS TO DESIGN

Object Type	Design All	Selected	To Calculate	Removed	Not Valid / Deact.	Comment
Members	☒	1-18,20,23-195,197,199-202,207-210,214,215,217,218,226-321,329-355	1-18,20,23-195,197,199-202,207-210,214,215,217,218,226-321,329-355			

9.2 DESIGN SITUATIONS

DS No.	EN 1990 | Timber | CEN | 2010-04 Design Situation Type	To Design	Active	EN 1995 | CEN | 2014-05 Design Situation Type	Combinations to Design for Enumeration Method
1	ULS ULS (STR/GEO) - Permanent and transient - Eq. 6.10	☒	☒	ULS ULS (STR/GEO) - Permanent and transient	All
2	S Ch SLS - Characteristic	☒	☒	S Ch SLS - Characteristic	All
3	S Qp SLS - Quasi-permanent	☒	☒	S Qp1 SLS - Quasi-permanent 1	All

9.3 MATERIALS

Legend
Stiffness modification

Material No.	Name	To Design	Material Type	Options	Comment
3	GL24h	☒	Timber	%	

9.4 SECTIONS

Legend
Warping stiffness deactivated

Section No.	Name	Material	To Design	Section Type	Use Other Section for Design	Options
3	SQ_M1 150	3	☒	Parametric - Massive I	--	
4	R_M1 150/200	3	☒	Parametric - Massive I	--	
5	R_M1 120/170	3	☒	Parametric - Massive I	--	
6	R_M1 150/180	3	☒	Parametric - Massive I	--	

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Text

MEMBER NO. 289 | DS1 | CO5 | 0.000 M | STRESS POINT NO. 1 | SP3100.01

Timber Design

Design Check SP3100.01 | EN 1995 | CEN | 2014-05

Section Proof
Shear in z-axis acc. to 6.1.7

EN 1995-1-1, 2.4.1, Eq. 2.14

$$f_{v,d} = k_{mod} \cdot \frac{f_{v,k}}{\gamma_M} = 0.90 \cdot \frac{3.500\,N/mm^2}{1.25} = 2.520\,N/mm^2$$

$$\tau_{xz,d} = \frac{\tau_{xz}}{k_{cr}} = \frac{0.000\,N/mm^2}{0.67} = 0.000\,N/mm^2$$

6.1.7, Eq. 6.13

$$\eta = \frac{\tau_{xz,d}}{f_{v,d}} = \frac{0.000\,N/mm^2}{2.520\,N/mm^2} = 0.000$$

$$\eta = 0.000 \leq 1$$ ✔

$f_{v,d}$	Design shear strength
k_{mod}	Modification factor
$f_{v,k}$	Characteristic shear strength
γ_M	Partial factor
$\tau_{xz,d}$	Design shear stress
τ_{xz}	Shear stress
k_{cr}	Crack influence factor

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Text

MEMBER NO. 173 | DS1 | CO5 | 0.000 M | STRESS POINT NO. 1 | SP1200

Timber Design

Design Check SP1200 | EN 1995 | CEN | 2014-05

Section Proof
Compression along grain acc. to 6.1.4

$$f_{c,0,d} = k_{mod} \cdot \frac{f_{c,0,k}}{\gamma_M} = 0.90 \cdot \frac{24.000\,\mathrm{N/mm^2}}{1.25} = 17.280\,\mathrm{N/mm^2}$$

EN 1995-1-1, 2.4.1, Eq. 2.14

$$\eta = \left|\frac{\sigma_{c,0,d}}{f_{c,0,d}}\right| = \left|\frac{-0.221\,\mathrm{N/mm^2}}{17.280\,\mathrm{N/mm^2}}\right| = 0.013$$

6.1.4, Eq. 6.2

$$\eta = 0.013 \leq 1$$ ✔

$f_{c,0,d}$	Design compressive strength
k_{mod}	Modification factor
$f_{c,0,k}$	Characteristic compressive strength
γ_M	Partial factor
$\sigma_{c,0,d}$	Design compressive stress

Text

MEMBER NO. 90 | DS1 | CO5 | 0.000 M | STRESS POINT NO. 1 | SP1200

Timber Design

Design Check SP1200 | EN 1995 | CEN | 2014-05

Section Proof
Compression along grain acc. to 6.1.4

$$f_{c,0,d} = k_{mod} \cdot \frac{f_{c,0,k}}{\gamma_M} = 0.90 \cdot \frac{24.000\ \text{N/mm}^2}{1.25} = 17.280\ \text{N/mm}^2$$

EN 1995-1-1, 2.4.1, Eq. 2.14

$$\eta = \left|\frac{\sigma_{c,0,d}}{f_{c,0,d}}\right| = \left|\frac{-1.045\ \text{N/mm}^2}{17.280\ \text{N/mm}^2}\right| = 0.060$$

6.1.4, Eq. 6.2

$$\eta = 0.060 \leq 1$$ ✔

$f_{c,0,d}$	Design compressive strength
k_{mod}	Modification factor
$f_{c,0,k}$	Characteristic compressive strength
γ_M	Partial factor
$\sigma_{c,0,d}$	Design compressive stress

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Text

MEMBER NO. 87 | DS1 | CO5 | 0.000 M | STRESS POINT NO. 1 | SP1200

Timber Design

Design Check SP1200 | EN 1995 | CEN | 2014-05

Section Proof
Compression along grain acc. to 6.1.4

$$f_{c,0,d} = k_{mod} \cdot \frac{f_{c,0,k}}{\gamma_M} = 0.90 \cdot \frac{24.000\,N/mm^2}{1.25} = 17.280\,N/mm^2$$

EN 1995-1-1, 2.4.1, Eq. 2.14

$$\eta = \left|\frac{\sigma_{c,0,d}}{f_{c,0,d}}\right| = \left|\frac{-1.831\,N/mm^2}{17.280\,N/mm^2}\right| = 0.106$$

6.1.4, Eq. 6.2

$\eta = 0.106 \leq 1$ ✔

$f_{c,0,d}$	Design compressive strength
k_{mod}	Modification factor
$f_{c,0,k}$	Characteristic compressive strength
γ_M	Partial factor
$\sigma_{c,0,d}$	Design compressive stress

Text

MEMBER NO. 284 | DS1 | CO5 | 0.000 M | STRESS POINT NO. 1 | SP1200

Timber Design

Design Check SP1200 | EN 1995 | CEN | 2014-05

Section Proof
Compression along grain acc. to 6.1.4

EN 1995-1-1, 2.4.1, Eq. 2.14

$$f_{c,0,d} = k_{mod} \cdot \frac{f_{c,0,k}}{\gamma_M} = 0.90 \cdot \frac{24.000\,N/mm^2}{1.25} = 17.280\,N/mm^2$$

6.1.4, Eq. 6.2

$$\eta = \left|\frac{\sigma_{c,0,d}}{f_{c,0,d}}\right| = \left|\frac{-0.334\,N/mm^2}{17.280\,N/mm^2}\right| = 0.019$$

$$\eta = 0.019 \le 1$$ ✓

$f_{c,0,d}$	Design compressive strength
k_{mod}	Modification factor
$f_{c,0,k}$	Characteristic compressive strength
γ_M	Partial factor
$\sigma_{c,0,d}$	Design compressive stress

Text

MEMBER NO. 229 | DS1 | CO5 | 0.000 M | STRESS POINT NO. 1 | SP1200

Timber Design

Design Check SP1200 | EN 1995 | CEN | 2014-05

Section Proof
Compression along grain acc. to 6.1.4

$$f_{c,0,d} = k_{mod} \cdot \frac{f_{c,0,k}}{\gamma_M} = 0.90 \cdot \frac{24.000\ N/mm^2}{1.25} = 17.280\ N/mm^2$$

EN 1995-1-1, 2.4.1, Eq. 2.14

$$\eta = \left|\frac{\sigma_{c,0,d}}{f_{c,0,d}}\right| = \left|\frac{-0.250\ N/mm^2}{17.280\ N/mm^2}\right| = 0.014$$

6.1.4, Eq. 6.2

$\eta = 0.014 \leq 1$ ✓

$f_{c,0,d}$	Design compressive strength
k_{mod}	Modification factor
$f_{c,0,k}$	Characteristic compressive strength
γ_M	Partial factor
$\sigma_{c,0,d}$	Design compressive stress

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Text **MEMBER NO. 8 | DS1 | CO5 | 0.000 M | STRESS POINT NO. 1 | SP1200** **Timber Design**

Design Check SP1200 | EN 1995 | CEN | 2014-05

Section Proof
Compression along grain acc. to 6.1.4

$$f_{c,0,d} = k_{mod} \cdot \frac{f_{c,0,k}}{\gamma_M} = 0.90 \cdot \frac{24.000\,N/mm^2}{1.25} = 17.280\,N/mm^2$$

EN 1995-1-1, 2.4.1, Eq. 2.14

$$\eta = \left|\frac{\sigma_{c,0,d}}{f_{c,0,d}}\right| = \left|\frac{-0.385\,N/mm^2}{17.280\,N/mm^2}\right| = 0.022$$

6.1.4, Eq. 6.2

$\eta = 0.022 \leq 1$ ✓

$f_{c,0,d}$	Design compressive strength
k_{mod}	Modification factor
$f_{c,0,k}$	Characteristic compressive strength
γ_M	Partial factor
$\sigma_{c,0,d}$	Design compressive stress

Text

MEMBER NO. 341 | DS1 | CO5 | 0.000 M | STRESS POINT NO. 1 | SP2100

Timber Design

Design Check SP2100 | EN 1995 | CEN | 2014-05

Section Proof
Shear due to torsion acc. to 6.1.8

$$f_{v,d} = k_{mod} \cdot \frac{f_{v,k}}{\gamma_M} = 0.90 \cdot \frac{3.500\ N/mm^2}{1.25} = 2.520\ N/mm^2$$

EN 1995-1-1, 2.4.1, Eq. 2.14

$$\eta = \frac{\tau_{tor,d}}{k_{shape} \cdot f_{v,d}} = \frac{0.008\ N/mm^2}{1.05 \cdot 2.520\ N/mm^2} = 0.003$$

6.1.8, Eq. 6.14

$\eta = 0.003 \leq 1$ ✓

$f_{v,d}$	Design shear strength
k_{mod}	Modification factor
$f_{v,k}$	Characteristic shear strength
γ_M	Partial factor
$\tau_{tor,d}$	Design torsional stress
k_{shape}	Torsion factor

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Text

MEMBER NO. 43 | DS1 | CO5 | 0.000 M | STRESS POINT NO. 1 | SP1100

Timber Design

Design Check SP1100 | EN 1995 | CEN | 2014-05

Section Proof
Tension along grain acc. to 6.1.2

$$f_{t,0,d} = k_{mod} \cdot \frac{f_{t,0,k}}{\gamma_M} = 0.90 \cdot \frac{19.200\,N/mm^2}{1.25} = 13.824\,N/mm^2$$ 2.4.1, Eq. 2.14

$$\eta = \frac{\sigma_{t,0,d}}{f_{t,0,d}} = \frac{0.512\,N/mm^2}{13.824\,N/mm^2} = 0.037$$ 6.1.2(1), Eq. 6.1

$\eta = 0.037 \leq 1$ ✔

$f_{t,0,d}$	Design tensile strength
k_{mod}	Modification factor
$f_{t,0,k}$	Characteristic tensile strength
γ_M	Partial factor
$\sigma_{t,0,d}$	Design tensile stress

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Text

MEMBER NO. 336 | DS1 | CO5 | 0.000 M | STRESS POINT NO. 1 | SP2100

Timber Design

Design Check SP2100 | EN 1995 | CEN | 2014-05

Section Proof
Shear due to torsion acc. to 6.1.8

$$f_{v,d} = k_{mod} \cdot \frac{f_{v,k}}{\gamma_M} = 0.90 \cdot \frac{3.500\ \text{N/mm}^2}{1.25} = 2.520\ \text{N/mm}^2$$

EN 1995-1-1, 2.4.1, Eq. 2.14

$$\eta = \frac{\tau_{tor,d}}{k_{shape} \cdot f_{v,d}} = \frac{0.004\ \text{N/mm}^2}{1.07 \cdot 2.520\ \text{N/mm}^2} = 0.002$$

6.1.8, Eq. 6.14

$\eta = 0.002 \leq 1$ ✔

$f_{v,d}$	Design shear strength
k_{mod}	Modification factor
$f_{v,k}$	Characteristic shear strength
γ_M	Partial factor
$\tau_{tor,d}$	Design torsional stress
k_{shape}	Torsion factor

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Graphic

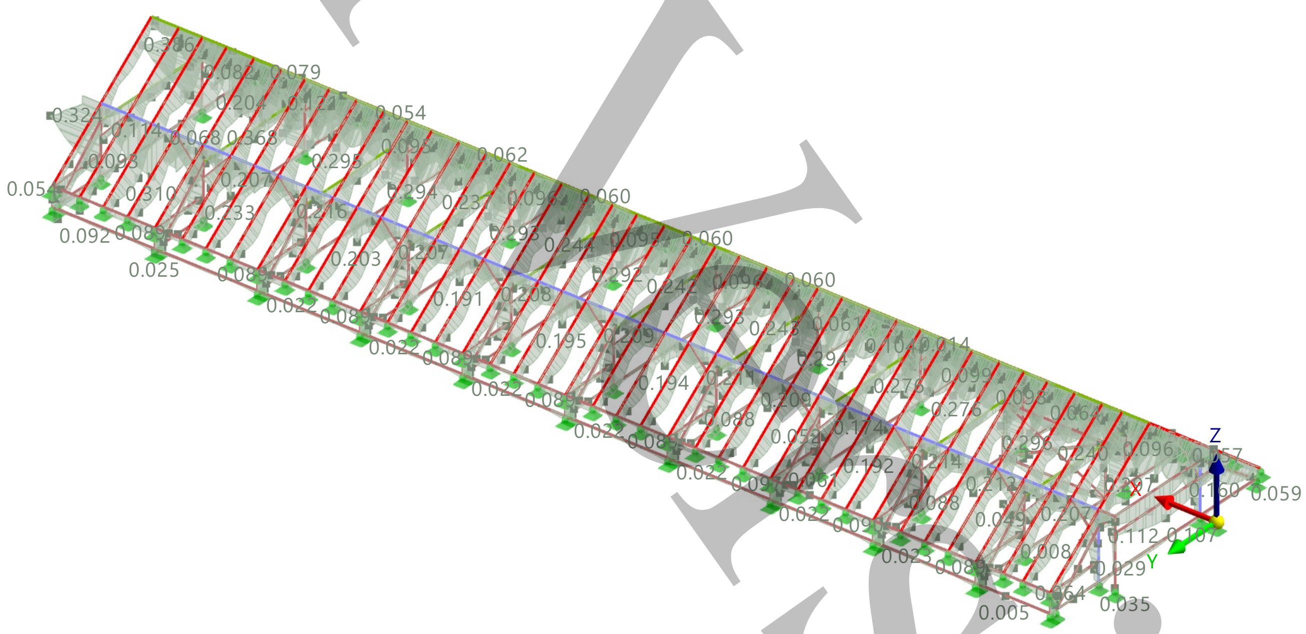
TIMBER DESIGN: MAX. OF ALL DESIGN CHECKS, DS1: LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

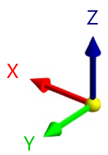
Timber Design

Timber Design
Members | Design check ratio η

In Axonometric Direction by Default
Colors of Rendered Objects

Node | Display Properties
Line | Display Properties
Member | Section
3 - SQ_M1 150
4 - R_M1 150/200
5 - R_M1 120/170
6 - R_M1 150/180





Max. of all design checks | max : 0.386 | min : 0.002
Members | max η : 0.386 | min η : 0.002

Dimensions [m]

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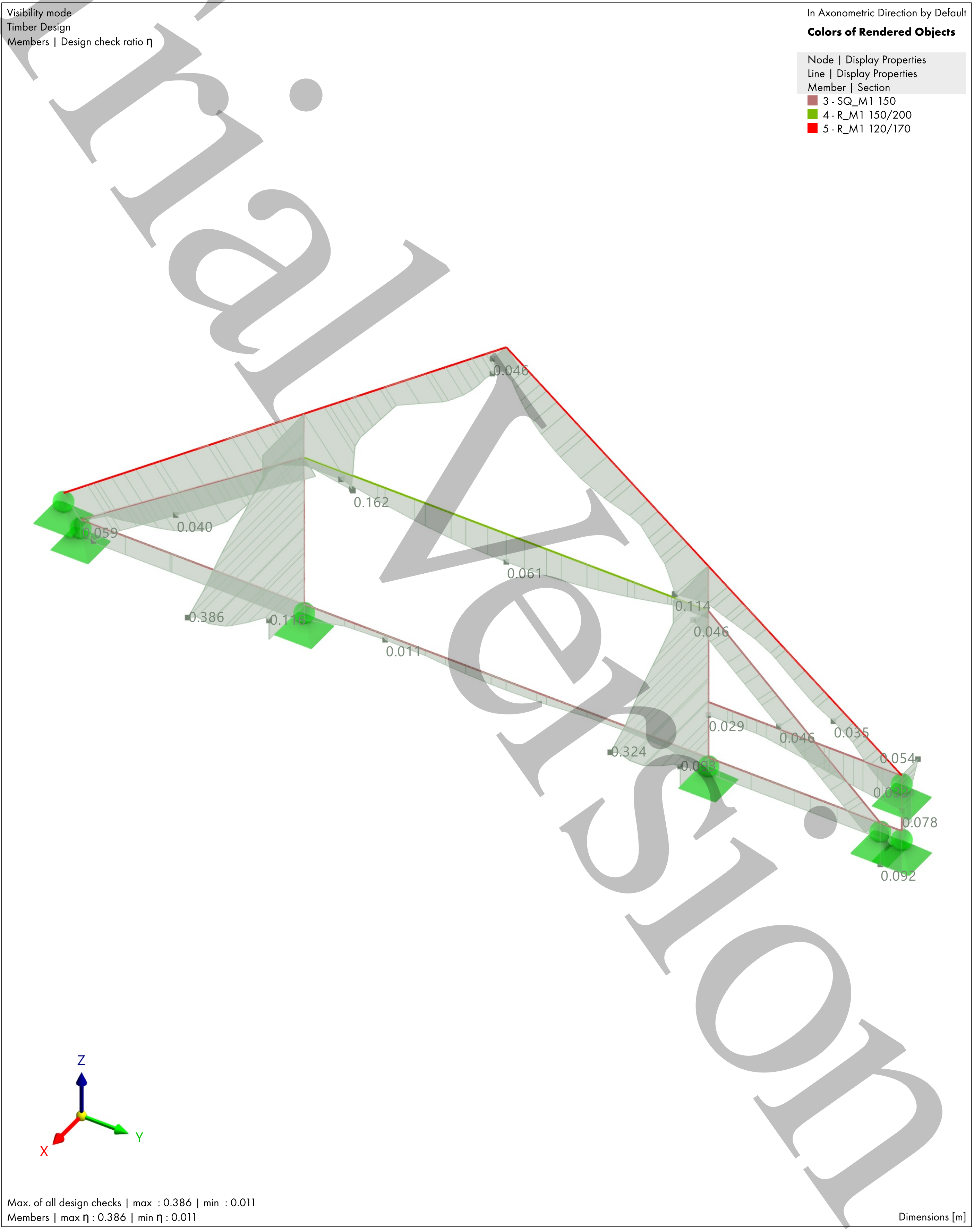
Graphic

TIMBER DESIGN: MAX. OF ALL DESIGN CHECKS, DS1: LOADING, IN AXONOMETRIC DIRECTION BY DEFAULT

Timber Design



10 Design Overview

10.1 DESIGN OVERVIEW

Design Overview

	Objects				Design	Loading	Design Check		
	Addon	Type	No.	Location [m]	Situation	No.	Ratio η [--]	Type	Description
	Timber Design	Member	192	x: 1.300	DS1	CO5	0.386 ✓	SP6100.00	Section Proof | Bending about y-axis and compressive axial force acc. to 6.2.4
	Timber Design	Member	190	x: 1.888	DS1	CO5	0.368 ✓	SP6300.00	Section Proof | Biaxial bending and compressive axial force acc. to 6.2.4
	Timber Design	Member	192	x: 1.300	DS3	CO15	0.343 ✓	SE1200.02	Serviceability | Combination of actions 'Quasi-permanent 1' | z-direction acc. to 7.2
	Timber Design	Member	192	x: 1.300	DS2	CO10	0.338 ✓	SE1200.01	Serviceability | Combination of actions 'Characteristic' | z-direction acc. to 7.2
	Timber Design	Member	190	x: 2.750	DS1	CO5	0.323 ✓	SP5300.00	Section Proof | Biaxial bending and tensile axial force acc. to 6.2.3
	Timber Design	Member	38	x: 3.529	DS1	CO5	0.279 ✓	SP4300.00	Section Proof | Biaxial bending acc. to 6.1.6
	Timber Design	Member	122	x: 3.529	DS1	CO5	0.274 ✓	SP4100.00	Section Proof | Bending about y-axis acc. to 6.1.6
	Timber Design	Member	190	x: 1.000	DS1	CO5	0.234 ✓	SP3100.01	Section Proof | Shear in z-axis acc. to 6.1.7
	Timber Design	Member	190	x: 2.319	DS3	CO15	0.167 ✓	SE1100.02	Serviceability | Combination of actions 'Quasi-permanent 1' | y-direction acc. to 7.2
	Timber Design	Member	190	x: 2.319	DS2	CO10	0.165 ✓	SE1100.01	Serviceability | Combination of actions 'Characteristic' | y-direction acc. to 7.2
	Timber Design	Member	2	x: 1.300	DS1	CO5	0.135 ✓	ST1600.03	Stability | Biaxial bending and compression with buckling about both axes acc. to 6.3.2
	Timber Design	Member	171	x: 0.000	DS1	CO5	0.119 ✓	SP1200.00	Section Proof | Compression along grain acc. to 6.1.4
	Timber Design	Member	190	x: 1.364	DS1	CO5	0.105 ✓	SP3100.02	Section Proof | Shear in y-axis acc. to 6.1.7
	Timber Design	Member	321	x: 9.300	DS1	CO5	0.092 ✓	SP2100.00	Section Proof | Shear due to torsion acc. to 6.1.8
	Timber Design	Member	344	x: 0.000	DS1	CO5	0.089 ✓	SP4200.00	Section Proof | Bending about z-axis acc. to 6.1.6
	Timber Design	Member	2	x: 1.300	DS1	CO2	0.080 ✓	ST1600.01	Stability | Bending about y-axis and compression with buckling about both axes acc. to 6.3.2
	Timber Design	Member	2	x: 0.000	DS1	CO2	0.078 ✓	ST1600.02	Stability | Bending about z-axis and compression with buckling about both axes acc. to 6.3.2
	Timber Design	Member	172	x: 1.447	DS1	CO5	0.073 ✓	SP5100.00	Section Proof | Bending about y-axis and tensile axial force acc. to 6.2.3
	Timber Design	Member	331	x: 1.850	DS1	CO1	0.070 ✓	SP6200.00	Section Proof | Bending about z-axis and compressive axial force acc. to 6.2.4
	Timber Design	Member	190	x: 0.000	DS1	CO5	0.047 ✓	SP1100.00	Section Proof | Tension along grain acc. to 6.1.2
	Timber Design	Member	2	x: 2.412	DS1	CO5	0.026 ✓	ST1300.00	Stability | Axial compression with buckling about both axes acc. to 6.3.2
	Timber Design	Member	1-18,20,23-195,197,199-202,207-210,214,215,217,218,226-321,329-355	x: 0.000	DS2	CO6	0.000 ✓	SE0100.01	Serviceability | Negligible deflection | Combination of actions 'Characteristic'
	Timber Design	Member	1-18,20,23-195,197,199-202,207-210,214,215,217,218,226-321,329-355	x: 0.000	DS3	CO11	0.000 ✓	SE0100.02	Serviceability | Negligible deflection | Combination of actions 'Quasi-permanent 1'

Izvori

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