UAB „PANEVĖŽIO MIESTPROJEKTAS“
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www.pmp.lt

Statytojas/Užsakovas:	**PANEVĖŽIO MIESTO SAVIVALDYBĖS ADMINISTRACIJA**
Sutarties pavadinimas (sutarties objektas):	**Kultūros centro Panevėžio bendruomenių rūmų pastato dalies patalpų, Kranto g. 28, Panevėžys, remonto techninis darbo projektas**
Projekto pavadinimas:	**KULTŪROS CENTRO PANEVĖŽIO BENDRUOMENIŲ RŪMŲ PASTATO DALIES PATALPŲ, KRANTO G. 28, PANEVĖŽYJE, KAPITALINIO REMONTO PROJEKTAS**
Statinio pavadinimas:	Kultūros paskirties pastatas
Statinio adresas (statybos vieta):	Kranto g. 28, Panevėžys
Statybos rūšis:	**Kapitalinis remontas**
Naudojimo paskirtis:	**Kultūros paskirties pastatas**
Statinio kategorija:	**Ypatingasis statinys**
Projekto etapas:	**Techninis darbo projektas (TDP)**
Projekto Nr. **P/6941**	Projekto dalis **Inžineriniai skaičiavimai (SK.IS)**
Statinio Nr. **01**	Bylos žymuo: **P/6941-TDP_SK.IS** Bylos laida **0**

Pareigos	Vardas, Pavardė, atestato Nr.	Parašas
DIREKTORĖ	VILMA ŠIMATONIENĖ	
PROJEKTO VADOVAS	VYTAUTAS SUKACKAS Atestato Nr. 1859	
PROJEKTO DALIES VADOVAS	POVILAS GUDANAVIČIUS Atestato Nr. 40616	

Panevėžys, 2022 m. lapkričio mėn.

AIŠKINAMASIS RAŠTAS

TURINYS

0	2022-11	DERINIMUI SU UŽSAKOVU. EKSPERTIZEI. STATYBOS LEIDIMUI.			
LAIDA	IŠLEIDIMO DATA	LAIDOS STATUSAS. KEITIMO PRIEŽASTIS (JEI TAIKOMA)			
KVAL. PATV. DOK.NR.	UAB „PANEVĖŽIO MIESTPROJEKTAS“		STATINIO PROJEKTO PAVADINIMAS KULTŪROS CENTRO PANEVĖŽIO BENDRUOMENIŲ RŪMŲ PASTATO DALIES PATALPŲ, KRANTO G. 28, PANEVĖŽYJE, KAPITALINIO REMONTO PROJEKTAS		
1859	PV	VYTAUTAS SUKACKAS			
40616	PDV	POVILAS GUDANAVIČIUS	DOKUMENTO PAVADINIMAS **INŽINERINIAI SKAIČIAVIMAI**		Laida 0
LT	UŽSAKOVAS PANEVĖŽIO MIESTO SAVIVALDYBĖS ADMINISTRACIJA		DOKUMENTO ŽYMUO **P/6941 – TDP _SK.IS**	Lapas 1	Lapų 123

APRAŠYMAS

Projektuojant konstrukcijas, apkrovų dydžiai ir jų patikimumo koeficientai priimti pagal STR 2.05.04:2003 „Poveikiai ir apkrovos" bei technologines užduotis.

Nuolatiniai poveikiai

- *Savasis konstrukcijų svoris.* Skaičiuojant apkrovas, priimtos laikančiųjų konstrukcijų savojo svorio nuolatinės apkrovos charakteristinės reikšmės:
  - gelžbetoninių 25,0kN/m^3;
  - plieninių 78,5kN/m^3.
- *Denginio konstrukcijos svoris.*
- *Naudojimo apkrova*

Kintamieji trumpalaikiai ir ilgalaikiai poveikiai

- *Sniego apkrova.* Sniego apkrovos rajonas – I-asis.
- *Vėjo apkrova.* Vėjo apkrovos rajonas – I-asis, ataskaitinė vėjo greičio reikšmė $v_{ref,\ 0}$=24 m/s.
- *Apkrova statybos metu.* Statybos metu atsirandančios apkrovos nuo statybinių mechanizmų, medžiagų sandėliavimo ir kt. neturi viršyti eksploatacinių apkrovų.

Tikrinant konstrukcijų mechaninį patvarumą ir pastovumą, atliekami statiniai skaičiavimai ir tikrinami statinio bei jo elementų saugos ribiniai bei tinkamumo ribiniai būviai.
Konstrukcijų patikimumo koeficientai:

- saugos ribiniam būviui (ULS) – 1,30 ir 1,35;
- tinkamumo ribiniam būviui (SLS) – 1,0.

Visos laikančios konstrukcijos projektuotos nuolatinių ir kintamųjų poveikių nepalankiausiam deriniui.

Išvados:

Pagal atliktus skaičiavimus pastato bendrasis pastovumas ir stabilumas, bei konstrukcinių elementų ir jų jungčių laikomosios galios išnaudojimas tenkina normatyviniuose dokumentuose keliamus reikalavimus.

IŠVADOS

Pagal atliktus skaičiavimus nustatyta, kad:

Santvaros F-3 elementai maksimaliai išnaudojami iki 92% laikomosios galios. Santvaros įlinkis 22.9mm (F-3 santvaros ilgis ~18.9m) šis įlinkis neviršyja ribinių reikšmių, kurios keliamos pagal STR 2.05.04:2003 "Poveikiai ir apkrovos" XVII skyriaus III skirsnio lentelė 17.1. ribinis įlinkis l/250=75.6mm.

Santvaros F-4 elementai maksimaliai išnaudojami iki 84% laikomosios galios. Santvaros įlinkis 8.1 mm (F-4 santvaros ilgis ~15.6m) šis įlinkis neviršyja ribinių reikšmių, kurios keliamos pagal STR 2.05.04:2003 "Poveikiai ir apkrovos" XVII skyriaus III skirsnio lentelė 17.1. ribinis įlinkis l/250=62.4mm.

Santvaros F-5 elementai maksimaliai išnaudojami iki 91% laikomosios galios (įvertinus atraminio spyrio stiprinimą papildomai privirinant du kampuočius 80x80x6). Santvaros įlinkis 18.3mm (F-5 santvaros ilgis ~19.7m) šis įlinkis neviršyja ribinių reikšmių, kurios keliamos pagal STR 2.05.04:2003 "Poveikiai ir apkrovos" XVII skyriaus III skirsnio lentelė 17.1. ribinis įlinkis l/250=78.8mm.

Naujų ŠVOK sijų HEB 120 profilio maksimalus išnaudojimas pagal stiprumo salygą 23.6%. Sijos išnaudojimas pagal įlinkį 73.1% sija įlinksta 22mm. (Sijos ilgis ~5.8m). šis įlinkis neviršyja ribinių reikšmių, kurios keliamos pagal STR 2.05.04:2003 "Poveikiai ir apkrovos" XVII skyriaus III skirsnio lentelė 17.1. ribinis įlinkis l/200=29mm.

Naujų ardyno sijų HEA 100 profilio maksimalus išnaudojimas pagal stiprumo salygą 17.8%. Sijos išnaudojimas pagal įlinkį 18.8% sija įlinksta 7.2mm. (Sijos ilgis ~3.0m). šis įlinkis neviršyja ribinių reikšmių, kurios keliamos pagal STR 2.05.04:2003 "Poveikiai ir apkrovos" XVII skyriaus III skirsnio lentelė 17.1. ribinis įlinkis l/150=20mm.

Esamų ardyno sijų I20 profilio maksimalus išnaudojimas pagal stiprumo salygą 55.3%. Sijos išnaudojimas pagal įlinkį 77.9% sija įlinksta 22mm. (Sijos ilgis ~5.53m). šis įlinkis neviršyja ribinių reikšmių, kurios keliamos pagal STR 2.05.04:2003 "Poveikiai ir apkrovos" XVII skyriaus III skirsnio lentelė 17.1. ribinis įlinkis l/200=27.65mm

Esamų ardyno sijų I24 profilio maksimalus išnaudojimas pagal stiprumo salygą 44.6%. Sijos išnaudojimas pagal įlinkį 67.2% sija įlinksta 18.6mm. (Sijos ilgis ~5.53m). šis įlinkis neviršyja ribinių reikšmių, kurios keliamos pagal STR 2.05.04:2003 "Poveikiai ir apkrovos" XVII skyriaus III skirsnio lentelė 17.1. ribinis įlinkis l/200=27.65mm

Naujai kertamos angos sijos maksimalus išnaudojimas pagal stiprumo salygą 84%. Sijos išnaudojimas pagal įlinkį 45% sija įlinksta 9.8mm. (Sijos ilgis ~4.4m). šis įlinkis neviršyja ribinių reikšmių, kurios keliamos pagal STR 2.05.04:2003 "Poveikiai ir apkrovos" XVII skyriaus III skirsnio lentelė 17.1. ribinis įlinkis l/200=22mm

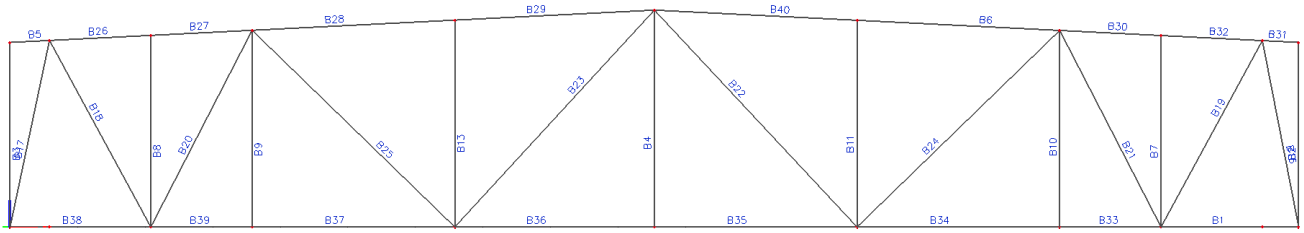
Naujai kertamos angos statramsčių maksimalus išnaudojimas pagal stiprumo salygą 78%.

Pagal atliktus skaičiavimus, suprojektuotos ir esamos konstrukcijos bei jų jungtys atitinka normatyviniuose dokumentuose keliamus reikalavimus.

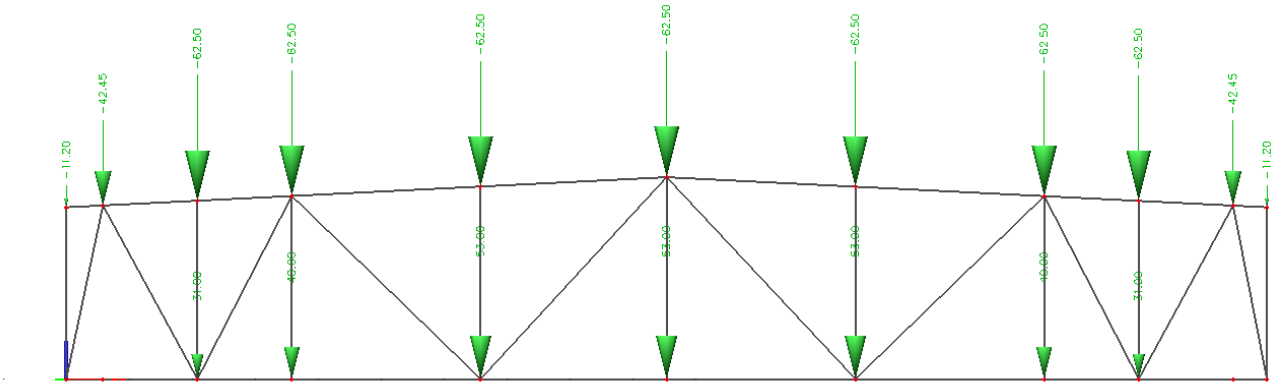
Pastato bendrasis pastovumas bei stabilumas atitinka normatyviniuose dokumentuose keliamus reikalavimus.

SANTVAROS F-3 SKAIČIAVIMAI

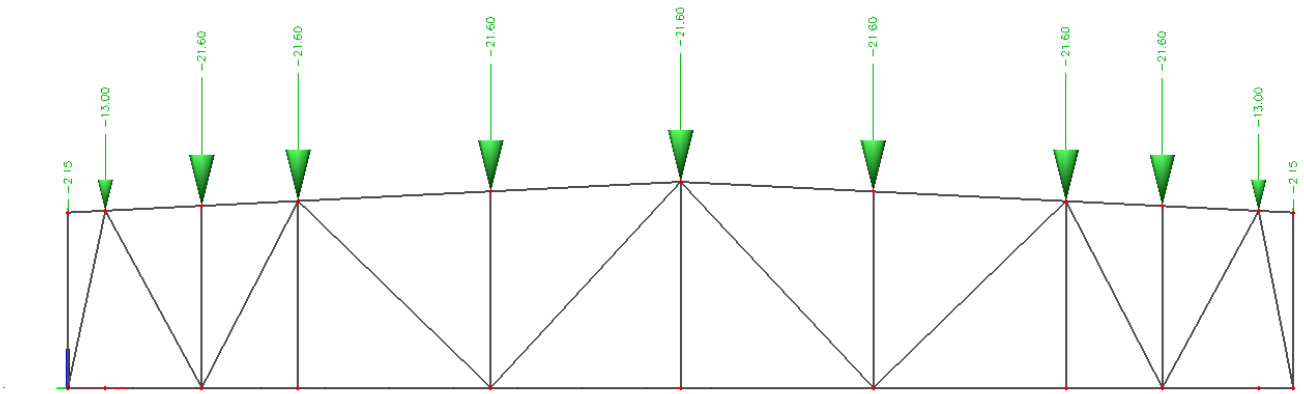
Santvaros F-3 skaičiuojamoji schema



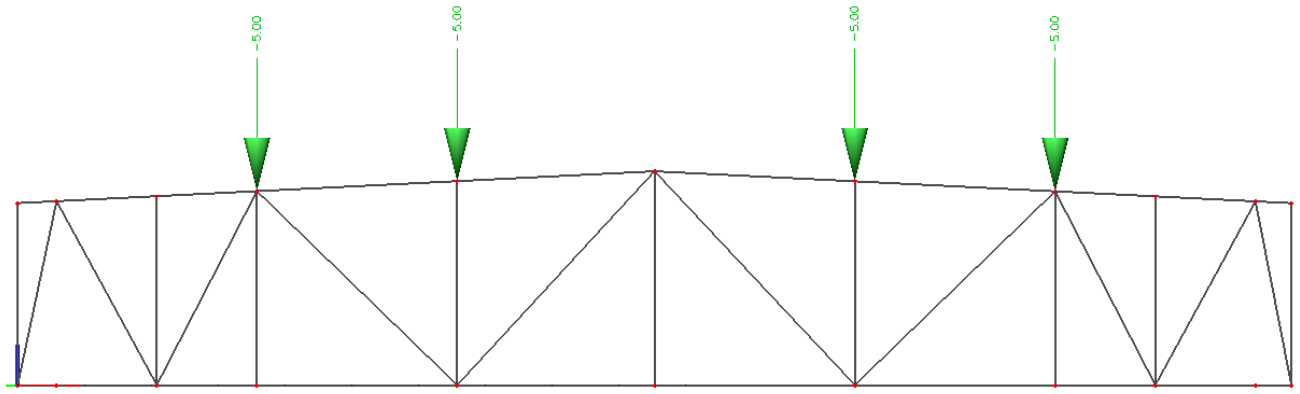
Santvaros F-3 nuolatinių apkrovų išdėstymas



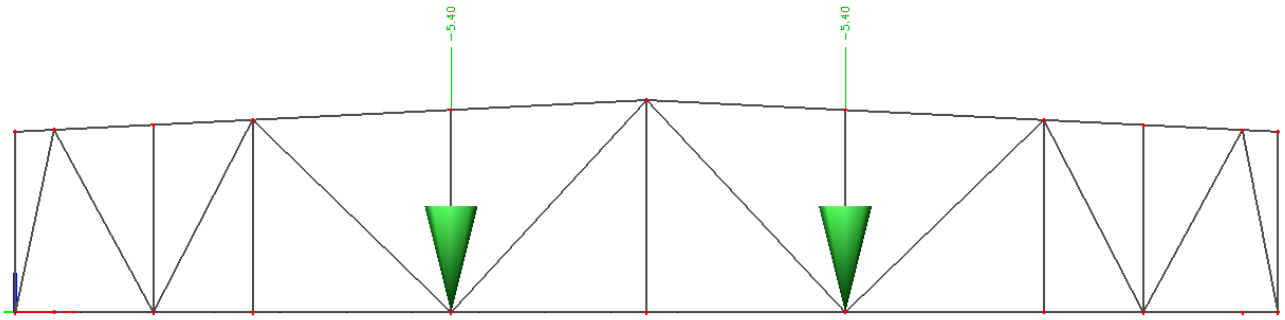
Santvaros F-3 Sniego apkrovų išdėstymas



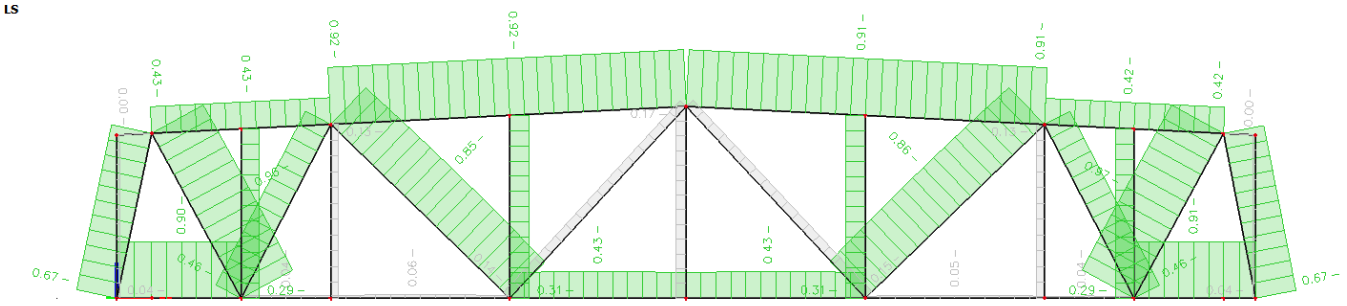
Santvaros F-3 ŠVOK įrangos apkrovų išdėstymas



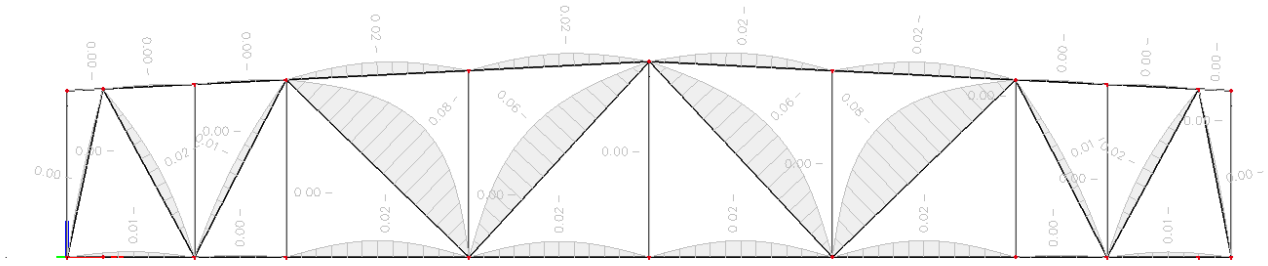
Santvaros F-3 technologinių apkrovų išdėstymas



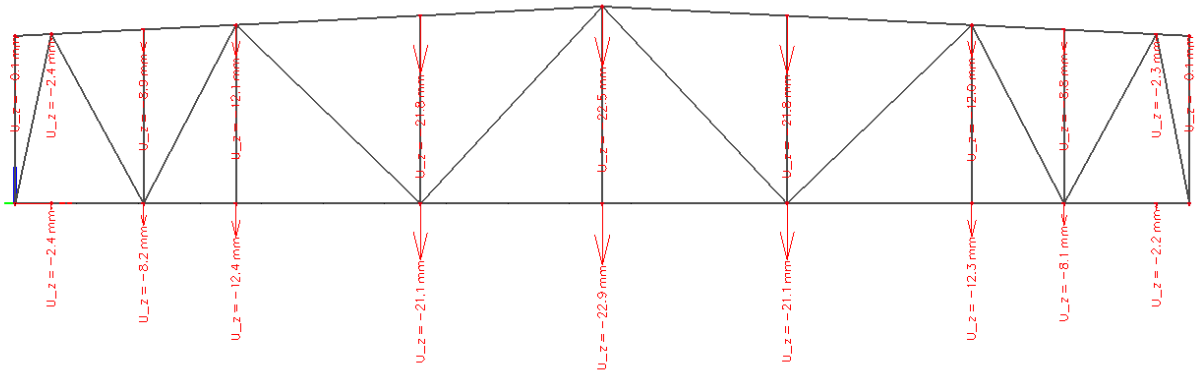
Santvaros F-3 išnaudojimas pagal saugos ribinį būvį



Santvaros F-3 išnaudojimas pagal tinkamumo ribinį būvį



Santvaros F-3 deformacijos



Santvaros F-3 detalieji skaičiavimai.

1. EC-EN 1993 Steel check ULS

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

EN 1993-1-1 Code Check
National annex: Standard EN

Member B1	**1.000 / 2.038 m**	**2LT (ISEA110/110/8; 10)**	**S 235**	**All ULS**	**0.91 -**

Beam data	
Fabrication	Rolled
Buckling group	BG6

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-543.74	0.01	0.00	0.00	0.00	0.18

Section check	
Section classification	3
Compression check	0.68 -
Bending moment check for M_z	0.02 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.69 -
Conclusion - section check	0.69 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	2.038	4056.84		0.44	0.87

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
z-z	1.00	2.038	1963.95		0.64	0.76
y-z	1.00	2.038	8613.15		0.31	0.95
LTB	1.00	2.038		244.45	0.26	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.89 -
Torsional(-Flexural) Buckling check	0.72 -
Bending and axial compression check	0.91 -
Conclusion - stability check	0.91 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B2	**0.000 / 2.723 m**	**2LT (L(ARC)80x80x6; 10)**	**S 235**	**All ULS**	**0.04 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-18.58	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.04 -
Conclusion - section check	0.04 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B3	**0.000 / 2.723 m**	**2LT (L(ARC)80x80x6; 10)**	**S 235**	**All ULS**	**0.04 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-18.59	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.04 -
Conclusion - section check	0.04 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B4	**3.200 / 3.200 m**	**2LT (L(ARC)80x80x6; 10)**	**S 235**	**All ULS**	**0.17 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
73.23	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	1
Tension check	0.17 -
Conclusion - section check	0.17 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B5	**0.000 / 0.584 m**	**2LT (L(CSN)125/10; 10)**	**S 235**	**All ULS**	**0.00 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-0.01	0.15	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.00 -
Shear check for V_y	0.00 -
Conclusion - section check	0.00 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.71	1.000	30608.87		0.19	1.00
z-z	1.71	1.000	14913.47		0.28	1.00
LTB	1.00	0.584		1737.54	0.12	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.00 -
Conclusion - stability check	0.00 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B6	**0.000 / 3.004 m**	**2LT (L(CSN)125/10; 10)**	**S 235**	**All ULS**	**0.91 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-969.60	0.76	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.85 -
Shear check for V_y	0.00 -
Conclusion - section check	0.85 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.33	1.000	30608.87		0.19	1.00
z-z	0.33	1.000	14913.47		0.28	0.96
y-z	1.00	3.004	15285.78		0.27	0.96
LTB	1.00	3.004		337.66	0.28	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.88 -
Torsional(-Flexural) Buckling check	0.88 -
Bending and axial compression check	0.91 -
Conclusion - stability check	0.91 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B7	**0.000 / 2.825 m**	**2LT (L(ARC)80x80x6; 10)**	**S 235**	**All ULS**	**0.29 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-113.76	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.26 -
Conclusion - section check	0.26 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.35	1.000	5068.33		0.29	0.95
z-z	0.35	1.000	2312.84		0.44	0.88
LTB	1.00	2.825		51.59	0.36	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.29 -
Conclusion - stability check	0.29 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B8	**0.000 / 2.827 m**	**2LT (L(ARC)80x80x6; 10)**	**S 235**	**All ULS**	**0.29 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-113.76	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.26 -
Conclusion - section check	0.26 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.35	1.000	5068.33		0.29	0.95
z-z	0.35	1.000	2312.84		0.44	0.88
LTB	1.00	2.827		51.55	0.36	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.29 -
Conclusion - stability check	0.29 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B9	**2.902 / 2.902 m**	**2LT (L(ARC)80x80x6; 10)**	**S 235**	**All ULS**	**0.13 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
55.36	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	1
Tension check	0.13 -
Conclusion - section check	0.13 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B10	**2.900 / 2.900 m**	**2LT (L(ARC)80x80x6; 10)**	**S 235**	**All ULS**	**0.13 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
55.36	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	1
Tension check	0.13 -
Conclusion - section check	0.13 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B11	**0.000 / 3.050 m**	**2LT (L(ARC)80x80x6; 10)**	**S 235**	**All ULS**	**0.31 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-121.32	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.28 -
Conclusion - section check	0.28 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.33	1.000	5068.33		0.29	0.95
z-z	0.33	1.000	2312.84		0.44	0.88
LTB	1.00	3.050		47.78	0.38	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.31 -
Conclusion - stability check	0.31 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B13	**0.000 / 3.052 m**	**2LT (L(ARC)80x80x6; 10)**	**S 235**	**All ULS**	**0.31 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-121.30	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.28 -

Section check	
Conclusion - section check	0.28 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.33	1.000	5068.33		0.29	0.95
z-z	0.33	1.000	2312.84		0.44	0.88
LTB	1.00	3.052		47.75	0.38	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.31 -
Conclusion - stability check	0.31 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B16	**0.000 / 2.802 m**	**2LT (L(CSN)125/10; 10)**	**S 235**	**All ULS**	**0.67 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-725.24	0.14	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.63 -
Shear check for V_y	0.00 -
Conclusion - section check	0.63 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.36	1.000	30608.87		0.19	1.00
z-z	0.36	1.000	14913.47		0.28	0.96
y-z	1.00	2.802	15285.78		0.27	0.96
LTB	1.00	2.802		361.97	0.27	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.66 -
Torsional(-Flexural) Buckling check	0.66 -
Bending and axial compression check	0.67 -
Conclusion - stability check	0.67 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B17	**0.000 / 2.813 m**	**2LT (L(CSN)125/10; 10)**	**S 235**	**All ULS**	**0.67 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-724.58	0.15	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.63 -
Shear check for V_y	0.00 -
Conclusion - section check	0.63 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.36	1.000	30608.87		0.19	1.00
z-z	0.36	1.000	14913.47		0.28	0.96
y-z	1.00	2.813	15285.78		0.27	0.96
LTB	1.00	2.813		360.53	0.27	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.66 -
Torsional(-Flexural) Buckling check	0.66 -
Bending and axial compression check	0.67 -
Conclusion - stability check	0.67 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B18	**1.567 / 3.134 m**	**2LT (L(ARC)100x100x8; 10)**	**S 235**	**All ULS**	**0.96 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
692.61	0.00	0.00	0.00	0.00	0.19

Section check	
Section classification	1
Tension check	0.95 -
Bending moment check for M_z	0.01 -
Combined bending, axial force and shear force check	0.96 -
Conclusion - section check	0.96 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B19	**1.566 / 3.132 m**	**2LT (L(ARC)100x100x8; 10)**	**S 235**	**All ULS**	**0.97 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
696.54	0.00	0.00	0.00	0.00	0.19

Section check	
Section classification	1
Tension check	0.96 -
Bending moment check for M_z	0.01 -
Combined bending, axial force and shear force check	0.97 -
Conclusion - section check	0.97 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B20	**0.000 / 3.267 m**	**2LT (L(CSN)125/10; 10)**	**S 235**	**All ULS**	**0.46 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-507.92	0.38	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.44 -
Shear check for V_y	0.00 -
Conclusion - section check	0.44 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.31	1.000	30608.87		0.19	1.00
z-z	0.31	1.000	14913.47		0.28	1.00
LTB	1.00	3.267		310.46	0.29	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.46 -
Conclusion - stability check	0.46 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B21	**0.000 / 3.265 m**	**2LT (L(CSN)125/10; 10)**	**S 235**	**All ULS**	**0.46 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-511.78	0.38	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.45 -
Shear check for V_y	0.00 -
Conclusion - section check	0.45 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.31	1.000	30608.87		0.19	1.00
z-z	0.31	1.000	14913.47		0.28	1.00
LTB	1.00	3.265		310.65	0.29	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.46 -
Conclusion - stability check	0.46 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B22	**4.386 / 4.386 m**	**2LT (L(ARC)100x100x8; 10)**	**S 235**	**All ULS**	**0.15 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-66.79	-0.48	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.09 -
Shear check for V_y	0.00 -
Conclusion - section check	0.09 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.23	1.000	12736.34		0.24	1.00
z-z	0.23	1.000	6001.40		0.35	1.00
LTB	1.00	4.386		92.74	0.39	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.15 -
Conclusion - stability check	0.15 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B23	**4.356 / 4.356 m**	**2LT (L(ARC)100x100x8; 10)**	**S 235**	**All ULS**	**0.14 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-62.22	-0.48	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.09 -
Shear check for V_y	0.00 -
Conclusion - section check	0.09 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.23	1.000	12736.34		0.24	1.00
z-z	0.23	1.000	6001.40		0.35	1.00
LTB	1.00	4.356		93.40	0.38	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.14 -
Conclusion - stability check	0.14 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B24	**2.209 / 4.172 m**	**2LT (L(ARC)80x80x6; 10)**	**S 235**	**All ULS**	**0.86 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
362.87	-0.02	0.00	0.00	0.00	0.30

Section check	
Section classification	1
Tension check	0.83 -
Bending moment check for M_z	0.04 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.86 -
Conclusion - section check	0.86 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B25	**2.210 / 4.174 m**	**2LT (L(ARC)80x80x6; 10)**	**S 235**	**All ULS**	**0.85 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
358.29	-0.02	0.00	0.00	0.00	0.30

Section check	
Section classification	1
Tension check	0.82 -
Bending moment check for M_z	0.04 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.85 -
Conclusion - section check	0.85 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B26	**0.000 / 1.502 m**	**2LT (L(CSN)125/10; 10)**	**S 235**	**All ULS**	**0.43 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-482.09	0.38	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.42 -
Shear check for V_y	0.00 -
Conclusion - section check	0.42 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.67	1.000	30608.87		0.19	1.00
z-z	0.67	1.000	14913.47		0.28	1.00
LTB	1.00	1.502		675.33	0.20	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.43 -
Conclusion - stability check	0.43 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B27	**0.000 / 1.502 m**	**2LT (L(CSN)125/10; 10)**	**S 235**	**All ULS**	**0.43 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-482.09	0.38	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.42 -
Shear check for V_y	0.00 -
Conclusion - section check	0.42 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.67	1.000	30608.87		0.19	1.00
z-z	0.67	1.000	14913.47		0.28	1.00
LTB	1.00	1.502		675.33	0.20	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.43 -
Conclusion - stability check	0.43 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B28	0.000 / 3.004 m	2LT (L(CSN)125/10; 10)	S 235	All ULS	0.92 -

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-973.10	0.76	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.85 -
Shear check for V_y	0.00 -
Conclusion - section check	0.85 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.33	1.000	30608.87		0.19	1.00
z-z	0.33	1.000	14913.47		0.28	0.96
y-z	1.00	3.004	15285.78		0.27	0.96
LTB	1.00	3.004		337.66	0.28	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.89 -
Torsional(-Flexural) Buckling check	0.88 -
Bending and axial compression check	0.92 -
Conclusion - stability check	0.92 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B29	0.000 / 2.959 m	2LT (L(CSN)125/10; 10)	S 235	All ULS	0.92 -

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-973.09	0.75	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.85 -
Shear check for V_y	0.00 -
Conclusion - section check	0.85 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.34	1.000	30608.87		0.19	1.00
z-z	0.34	1.000	14913.47		0.28	0.96
y-z	1.00	2.959	15285.78		0.27	0.96
LTB	1.00	2.959		342.80	0.28	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.89 -
Torsional(-Flexural) Buckling check	0.88 -
Bending and axial compression check	0.92 -
Conclusion - stability check	0.92 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B30	**0.000 / 1.502 m**	**2LT (L(CSN)125/10; 10)**	**S 235**	**All ULS**	**0.42 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-473.27	0.38	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.41 -
Shear check for V_y	0.00 -
Conclusion - section check	0.41 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.67	1.000	30608.87		0.19	1.00
z-z	0.67	1.000	14913.47		0.28	1.00
LTB	1.00	1.502		675.33	0.20	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.42 -
Conclusion - stability check	0.42 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B31	0.000 / 0.539 m	2LT (L(CSN)125/10; 10)	S 235	All ULS	0.00 -

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-0.01	0.14	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.00 -
Shear check for V_y	0.00 -
Conclusion - section check	0.00 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.86	1.000	30608.87		0.19	1.00
z-z	1.86	1.000	14913.47		0.28	1.00
LTB	1.00	0.539		1882.88	0.12	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.00 -
Conclusion - stability check	0.00 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B32	0.000 / 1.502 m	2LT (L(CSN)125/10; 10)	S 235	All ULS	0.42 -

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-473.27	0.38	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.41 -
Shear check for V_y	0.00 -
Conclusion - section check	0.41 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.67	1.000	30608.87		0.19	1.00
z-z	0.67	1.000	14913.47		0.28	1.00
LTB	1.00	1.502		675.33	0.20	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.42 -
Conclusion - stability check	0.42 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B33	**0.750 / 1.500 m**	**2LT (ISEA110/110/8; 10)**	**S 235**	**All ULS**	**0.04 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
25.00	0.00	0.00	0.00	0.00	0.10

Section check	
Section classification	1
Tension check	0.03 -
Bending moment check for M_z	0.00 -
Combined bending, axial force and shear force check	0.04 -
Conclusion - section check	0.04 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B34	**1.500 / 3.000 m**	**2LT (ISEA110/110/8; 10)**	**S 235**	**All ULS**	**0.05 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
25.00	0.00	0.00	0.00	0.00	0.40

Section check	
Section classification	1
Tension check	0.03 -
Bending moment check for M_z	0.02 -
Combined bending, axial force and shear force check	0.05 -
Conclusion - section check	0.05 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B35	**1.500 / 3.000 m**	**2LT (ISEA110/110/8; 10)**	**S 235**	**All ULS**	**0.43 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
329.85	0.00	0.00	0.00	0.00	0.40

Section check	
Section classification	1
Tension check	0.41 -
Bending moment check for M_z	0.02 -
Combined bending, axial force and shear force check	0.43 -
Conclusion - section check	0.43 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B36	**1.478 / 2.955 m**	**2LT (ISEA110/110/8; 10)**	**S 235**	**All ULS**	**0.43 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
329.85	0.00	0.00	0.00	0.00	0.39

Section check	
Section classification	1
Tension check	0.41 -
Bending moment check for M_z	0.02 -
Combined bending, axial force and shear force check	0.43 -
Conclusion - section check	0.43 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B37	**1.500 / 3.000 m**	**2LT (ISEA110/110/8; 10)**	**S 235**	**All ULS**	**0.06 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
31.80	0.00	0.00	0.00	0.00	0.40

Section check	
Section classification	1
Tension check	0.04 -
Bending moment check for M_z	0.02 -
Combined bending, axial force and shear force check	0.06 -
Conclusion - section check	0.06 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B38	**1.083 / 2.083 m**	**2LT (ISEA110/110/8; 10)**	**S 235**	**All ULS**	**0.90 -**

Beam data	
Fabrication	Rolled
Buckling group	BG6

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-532.84	-0.01	0.00	0.00	0.00	0.19

Section check	
Section classification	3
Compression check	0.66 -
Bending moment check for M_z	0.02 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.68 -
Conclusion - section check	0.68 -

Buckling axis	**k**	**L [m]**	**N_{cr} [kN]**	**M_{cr} [kNm]**	**λ_{rel}**	**χ**
y-y	1.00	2.083	3883.45		0.45	0.87
z-z	1.00	2.083	1880.01		0.65	0.75
y-z	1.00	2.083	8613.15		0.31	0.95
LTB	1.00	2.083		239.17	0.26	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.88 -
Torsional(-Flexural) Buckling check	0.70 -
Bending and axial compression check	0.90 -
Conclusion - stability check	0.90 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B39	**0.750 / 1.500 m**	**2LT (ISEA110/110/8; 10)**	**S 235**	**All ULS**	**0.04 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
31.80	0.00	0.00	0.00	0.00	0.10

Section check	
Section classification	1
Tension check	0.04 -
Bending moment check for M_z	0.00 -
Combined bending, axial force and shear force check	0.04 -
Conclusion - section check	0.04 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B40	0.000 / 3.004 m	2LT (L(CSN)125/10; 10)	S 235	All ULS	0.91 -

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 1.35*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-969.60	0.76	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.85 -
Shear check for V_y	0.00 -
Conclusion - section check	0.85 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.33	1.000	30608.87		0.19	1.00
z-z	0.33	1.000	14913.47		0.28	0.96
y-z	1.00	3.004	15285.78		0.27	0.96
LTB	1.00	3.004		337.66	0.28	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.88 -
Torsional(-Flexural) Buckling check	0.88 -
Bending and axial compression check	0.91 -
Conclusion - stability check	0.91 -

2. EC-EN 1993 Steel Check SLS

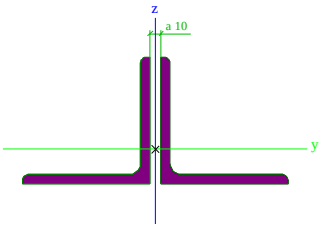
Linear calculation
Class: All SLS
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Overall Unity Check

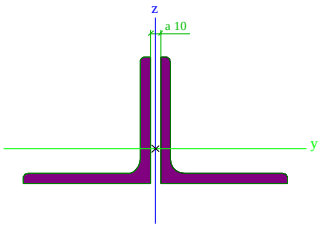
Name	dx [mm]	Case	$u_{y,max}$ [mm] $u_{z,max}$ [mm]	$u_{y,var}$ [mm] $u_{z,var}$ [mm]	Lim. $u_{y,max}$ [mm] Lim. $u_{z,max}$ [mm]	Lim. $u_{y,var}$ [mm] Lim. $u_{z,var}$ [mm]	Check $u_{y,max}$ [-] Check $u_{z,max}$ [-]	Check $u_{y,var}$ [-] Check $u_{z,var}$ [-]	Camber dx u_z [mm] Camber [mm]	Check Overall [-]
B1	1000.000	SLS-Char	0.0	0.0	10.2	5.7	0.00	0.00	-	**0.01**
		(auto)/1	-0.1	0.0	10.2	5.7	0.01	0.00	-	
B2	2227.909	SLS-Char	0.0	0.0	13.6	7.6	0.00	0.00	-	**0.00**
		(auto)/1	0.0	0.0	13.6	7.6	0.00	0.00	-	
B3	1732.818	SLS-Char	0.0	0.0	13.6	7.6	0.00	0.00	-	**0.00**
		(auto)/2	0.0	0.0	13.6	7.6	0.00	0.00	-	
B4	1723.077	SLS-Char	0.0	0.0	16.0	8.9	0.00	0.00	-	**0.00**
		(auto)/1	0.0	0.0	16.0	8.9	0.00	0.00	-	
B5	291.864+	SLS-Char	0.0	0.0	2.9	1.6	0.00	0.00	-	**0.00**
		(auto)/1	0.0	0.0	2.9	1.6	0.00	0.00	-	
B6	1501.875+	SLS-Char	0.0	0.0	15.0	8.3	0.00	0.00	-	**0.02**
		(auto)/1	-0.3	0.0	15.0	8.3	0.02	0.00	-	
B7	1284.055	SLS-Char	0.0	0.0	14.1	7.8	0.00	0.00	-	**0.00**
		(auto)/2	0.0	0.0	14.1	7.8	0.00	0.00	-	
B8	2056.125	SLS-Char	0.0	-	14.1	7.9	0.00	-	-	**0.00**
		(auto)/3	0.0	-	14.1	7.9	0.00	-	-	
B9	1055.341	SLS-Char	0.0	0.0	14.5	8.1	0.00	0.00	-	**0.00**

Name	dx [mm]	Case	$u_{y,max}$ [mm] $u_{z,max}$ [mm]	$u_{y,var}$ [mm] $u_{z,var}$ [mm]	Lim. $u_{y,max}$ [mm] Lim. $u_{z,max}$ [mm]	Lim. $u_{y,var}$ [mm] Lim. $u_{z,var}$ [mm]	Check $u_{y,max}$ [-] Check $u_{z,max}$ [-]	Check $u_{y,var}$ [-] Check $u_{z,var}$ [-]	Camber dx u_z [mm] Camber [mm]	Check Overall [-]
		(auto)/2	0.0	0.0	14.5	8.1	0.00	0.00	-	
B10	2636.306	SLS-Char	0.0	0.0	14.5	8.1	0.00	0.00	-	**0.00**
		(auto)/4	0.0	0.0	14.5	8.1	0.00	0.00	-	
B11	1524.984	SLS-Char	0.0	0.0	15.2	8.5	0.00	0.00	-	**0.00**
		(auto)/2	0.0	0.0	15.2	8.5	0.00	0.00	-	
B13	1017.406	SLS-Char	0.0	0.0	15.3	8.5	0.00	0.00	-	**0.00**
		(auto)/2	0.0	0.0	15.3	8.5	0.00	0.00	-	
B16	1273.654	SLS-Char	0.0	0.0	14.0	7.8	0.00	0.00	-	**0.00**
		(auto)/4	0.0	0.0	14.0	7.8	0.00	0.00	-	
B17	1278.740	SLS-Char	0.0	-	14.1	7.8	0.00	-	-	**0.00**
		(auto)/3	0.0	-	14.1	7.8	0.00	-	-	
B18	1567.192	SLS-Char	0.0	0.0	15.7	8.7	0.00	0.00	-	**0.02**
		(auto)/5	-0.2	0.0	15.7	8.7	0.02	0.00	-	
B19	1566.204	SLS-Char	0.0	0.0	15.7	8.7	0.00	0.00	-	**0.02**
		(auto)/2	-0.2	0.0	15.7	8.7	0.02	0.00	-	
B20	1759.105	SLS-Char	0.0	0.0	16.3	9.1	0.00	0.00	-	**0.01**
		(auto)/4	-0.2	0.0	16.3	9.1	0.01	0.00	-	
B21	1758.028	SLS-Char	0.0	0.0	16.3	9.1	0.00	0.00	-	**0.01**
		(auto)/2	-0.2	0.0	16.3	9.1	0.01	0.00	-	
B22	2064.161	SLS-Char	0.0	0.0	21.9	12.2	0.00	0.00	-	**0.06**
		(auto)/5	-1.3	0.0	21.9	12.2	0.06	0.00	-	
B23	2049.736	SLS-Char	0.0	0.0	21.8	12.1	0.00	0.00	-	**0.06**
		(auto)/5	-1.2	0.0	21.8	12.1	0.06	0.00	-	
B24	1963.523	SLS-Char	0.0	0.0	20.9	11.6	0.00	0.00	-	**0.08**
		(auto)/5	-1.7	0.0	20.9	11.6	0.08	0.00	-	
B25	1964.259	SLS-Char	0.0	0.0	20.9	11.6	0.00	0.00	-	**0.08**
		(auto)/2	-1.7	0.0	20.9	11.6	0.08	0.00	-	
B26	750.937	SLS-Char	0.0	0.0	7.5	4.2	0.00	0.00	-	**0.00**
		(auto)/5	0.0	0.0	7.5	4.2	0.00	0.00	-	
B27	750.937+	SLS-Char	0.0	0.0	7.5	4.2	0.00	0.00	-	**0.00**
		(auto)/1	0.0	0.0	7.5	4.2	0.00	0.00	-	
B28	1501.875	SLS-Char	0.0	0.0	15.0	8.3	0.00	0.00	-	**0.02**
		(auto)/5	-0.3	0.0	15.0	8.3	0.02	0.00	-	
B29	1479.346+	SLS-Char	0.0	0.0	14.8	8.2	0.00	0.00	-	**0.02**
		(auto)/1	-0.2	0.0	14.8	8.2	0.02	0.00	-	
B30	750.937	SLS-Char	0.0	0.0	7.5	4.2	0.00	0.00	-	**0.00**
		(auto)/4	0.0	0.0	7.5	4.2	0.00	0.00	-	
B31	269.336	SLS-Char	0.0	0.0	2.7	1.5	0.00	0.00	-	**0.00**
		(auto)/5	0.0	0.0	2.7	1.5	0.00	0.00	-	
B32	750.937+	SLS-Char	0.0	0.0	7.5	4.2	0.00	0.00	-	**0.00**
		(auto)/1	0.0	0.0	7.5	4.2	0.00	0.00	-	
B33	750.000-	SLS-Char	0.0	0.0	7.5	4.2	0.00	0.00	-	**0.00**
		(auto)/1	0.0	0.0	7.5	4.2	0.00	0.00	-	
B34	1500.000	SLS-Char	0.0	-	15.0	8.3	0.00	-	-	**0.02**
		(auto)/3	-0.3	-	15.0	8.3	0.02	-	-	
B35	1500.000-	SLS-Char	0.0	0.0	15.0	8.3	0.00	0.00	-	**0.02**
		(auto)/2	-0.3	0.0	15.0	8.3	0.02	0.00	-	
B36	1477.500	SLS-Char	0.0	-	14.8	8.2	0.00	-	-	**0.02**
		(auto)/3	-0.3	-	14.8	8.2	0.02	-	-	
B37	1500.000+	SLS-Char	0.0	0.0	15.0	8.3	0.00	0.00	-	**0.02**
		(auto)/1	-0.3	0.0	15.0	8.3	0.02	0.00	-	
B38	1083.000	SLS-Char	0.0	0.0	10.4	5.8	0.00	0.00	-	**0.01**
		(auto)/2	-0.1	0.0	10.4	5.8	0.01	0.00	-	
B39	750.000	SLS-Char	0.0	-	7.5	4.2	0.00	-	-	**0.00**
		(auto)/3	0.0	-	7.5	4.2	0.00	-	-	
B40	1501.875	SLS-Char	0.0	0.0	15.0	8.3	0.00	0.00	-	**0.02**
		(auto)/1	-0.3	0.0	15.0	8.3	0.02	0.00	-	

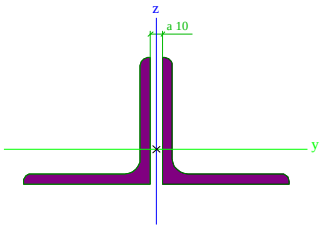
Name	Combination key
SLS-Char (auto)/1	LC1 + LC2 + LC3 + LC4 + 0.70*LC5
SLS-Char (auto)/2	LC1 + LC2 + LC3 + LC4
SLS-Char (auto)/3	LC1 + LC2 + LC4
SLS-Char (auto)/4	LC1 + LC2 + 0.70*LC3 + LC4 + LC5
SLS-Char (auto)/5	LC1 + LC2 + LC4 + LC5

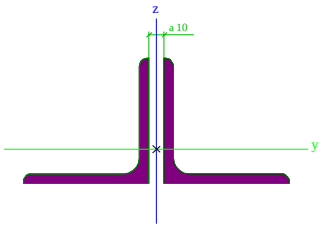
3. Cross-sections

CS2		
Type	2LT	
Detailed	ISEA110/110/8; 10	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	3.4156e-03	
A_y [m^2], A_z [m^2]	1.9457e-03	1.6190e-03
A_L [m^2/m], A_D [m^2/m]	8.6310e-01	8.6310e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	115	30
α [deg]	0.00	
I_y [m^4], I_z [m^4]	3.9357e-06	8.1297e-06
i_y [mm], i_z [mm]	34	49
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	4.9222e-05	7.0693e-05
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	8.9335e-05	1.1969e-04
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	2.10e+04	2.10e+04
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	2.81e+04	2.81e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	3.7670e-07	0.0000e+00
β_y [mm], β_z [mm]	-20	0
Picture		

CS3		
Type	2LT	
Detailed	L125/10; 10	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	4.8672e-03	
A_y [m^2], A_z [m^2]	2.8734e-03	2.3498e-03
A_L [m^2/m], A_D [m^2/m]	9.7999e-01	9.7999e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	130	34
α [deg]	0.00	
I_y [m^4], I_z [m^4]	7.1955e-06	1.4768e-05
i_y [mm], i_z [mm]	38	55
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	7.9459e-05	1.1360e-04
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	1.4394e-04	1.9198e-04
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	3.38e+04	3.38e+04
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	4.51e+04	4.51e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	8.5402e-07	0.0000e+00
β_y [mm], β_z [mm]	-22	0
Picture		

CS4		
Type	2LT	
Detailed	L100x100x8; 10	
Shape type	Thin-walled	

Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	3.1035e-03	
A_y [m^2], A_z [m^2]	1.5451e-03	1.5022e-03
A_L [m^2/m], A_D [m^2/m]	7.7930e-01	7.7930e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	105	27
α [deg]	0.00	
I_y [m^4], I_z [m^4]	2.8956e-06	6.1451e-06
i_y [mm], i_z [mm]	31	44
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	3.9861e-05	5.8524e-05
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	7.2829e-05	1.0042e-04
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	1.71e+04	1.71e+04
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	2.36e+04	2.36e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	3.4140e-07	0.0000e+00
β_y [mm], β_z [mm]	-19	0
Picture		

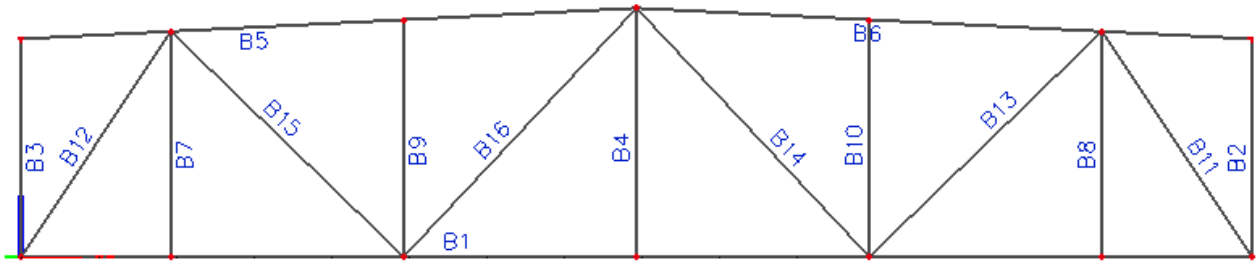
CS5		
Type	2LT	
Detailed	L80x80x6; 10	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	1.8699e-03	
A_y [m^2], A_z [m^2]	1.2401e-03	8.9188e-04
A_L [m^2/m], A_D [m^2/m]	6.2275e-01	6.2275e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	85	22
α [deg]	0.00	
I_y [m^4], I_z [m^4]	1.1159e-06	2.4454e-06
i_y [mm], i_z [mm]	24	36
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	1.9129e-05	2.8769e-05
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	3.5025e-05	4.9859e-05
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	8.23e+03	8.23e+03
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	1.17e+04	1.17e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	1.1370e-07	0.0000e+00
β_y [mm], β_z [mm]	-16	0
Picture		

Explanations of symbols	
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

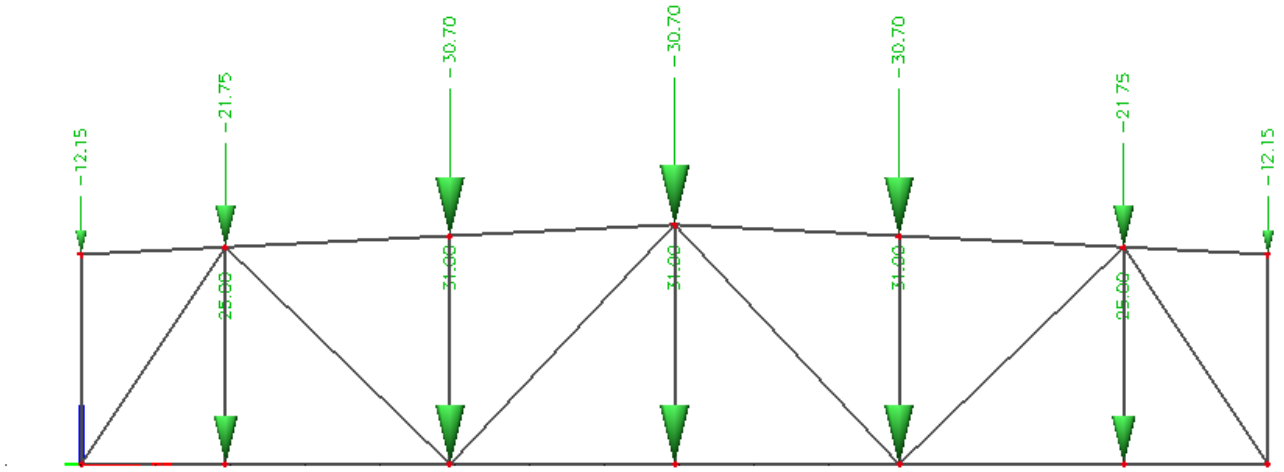
Explanations of symbols	
	Input axis system
$I_{Y.LCS}$	Second moment of area about the YLCS axis
$I_{Z.LCS}$	Second moment of area about the ZLCS axis
$I_{YZ.LCS}$	Product moment of area in the LCS system
α	Rotation angle of the principal axis system
I_y	Second moment of area about the principal y-axis
I_z	Second moment of area about the principal z-axis
i_y	Radius of gyration about the principal y-axis
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 - Not calculated or simplified
d_z	Shear center coordinate in principal z-direction measured from the centroid - Not calculated or simplified
I_t	Torsional constant - Not calculated or simplified
I_w	Warping constant - Not calculated or simplified
β_y	Mono-symmetry constant about the principal y-axis
β_z	Mono-symmetry constant about the principal z-axis

SANTVAROS F-4 SKAIČIAVIMAI

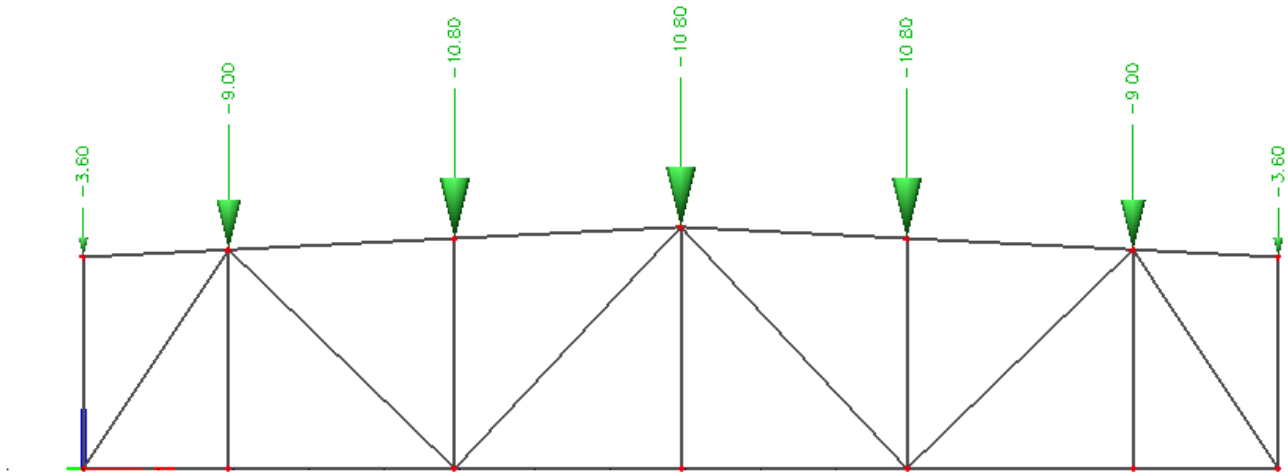
Santvaros F-4 skaičiuojamoji schema



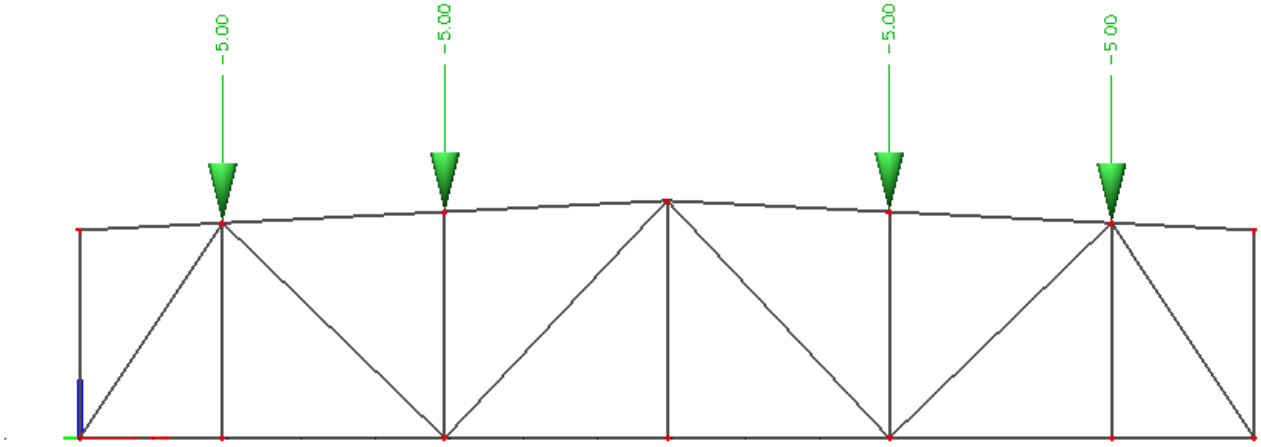
Santvaros F-4 nuolatinių apkrovų išdėstymas



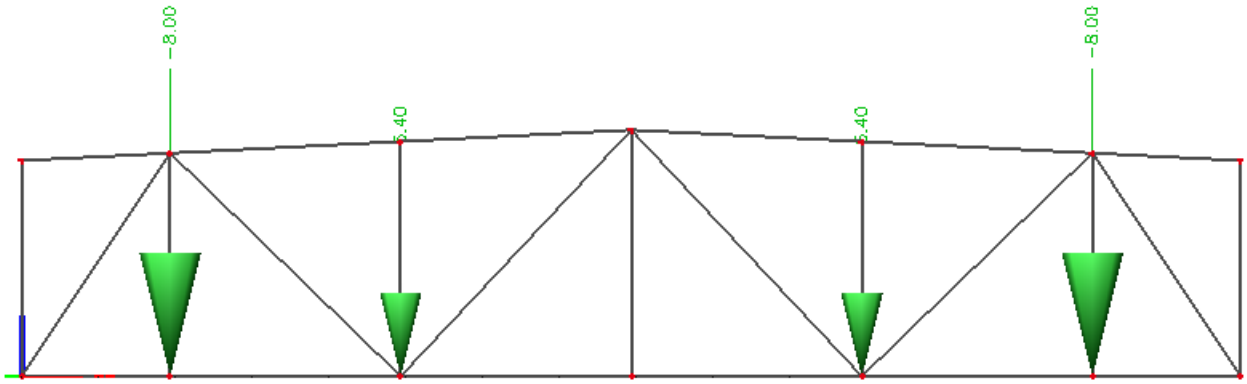
Santvaros F-4 Sniego apkrovų išdėstymas



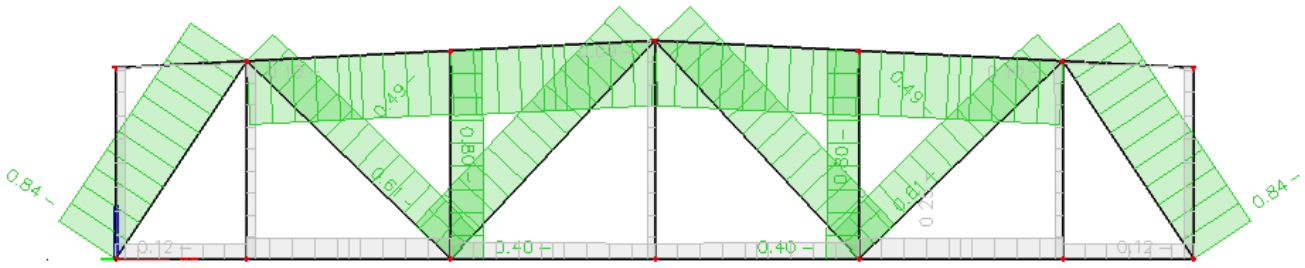
Santvaros F-4 ŠVOK įrangos apkrovų išdėstymas



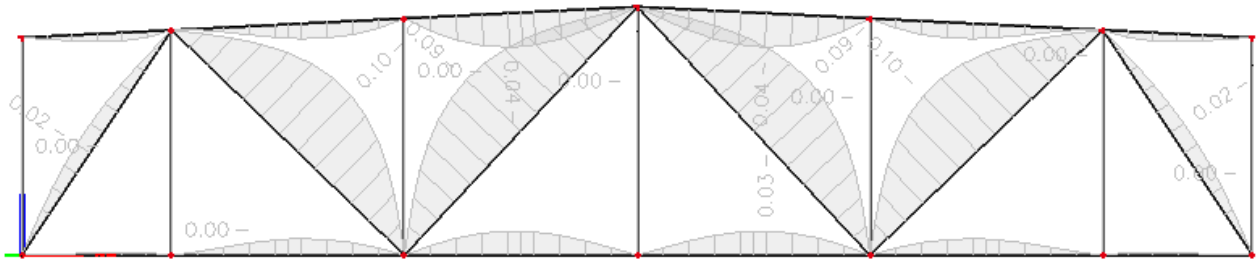
Santvaros F-4 technologinių apkrovų išdėstymas



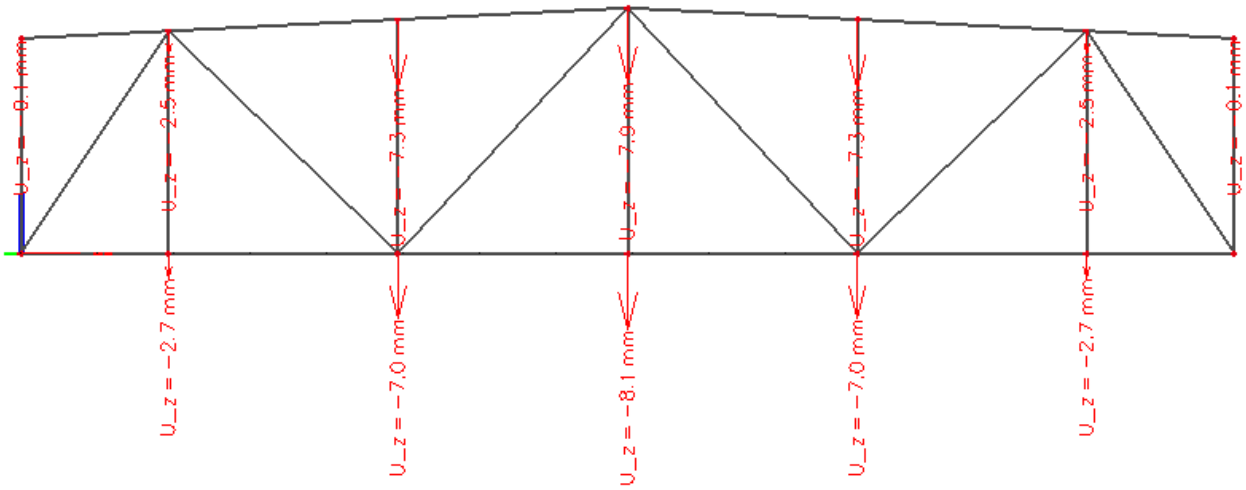
Santvaros F-4 išnaudojimas pagal saugos ribinį būvį



Santvaros F-4 išnaudojimas pagal tinkamumo ribinį būvį



Santvaros F-4 deformacijos



Santvaros F-4 detalieji skaičiavimai.

1. EC-EN 1993 Steel check ULS

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

EN 1993-1-1 Code Check
National annex: Standard EN

Member B1	**11.930 / 15.860 m**	**2LT (ISEA100/100/7; 10)**	**S 235**	**All ULS**	**0.25 -**

Beam data	
Fabrication	Rolled
Buckling group	BG2

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4 + 0.94*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-70.92	-0.02	0.00	0.00	0.00	0.30

Section check	
Section classification	3
Compression check	0.11 -
Bending moment check for M_z	0.03 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.14 -
Conclusion - section check	0.14 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	3.000	1270.06		0.72	0.72
z-z	1.00	3.000	610.42		1.03	0.52
LTB	1.00	3.000		108.50	0.34	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.21 -
Bending and axial compression check	0.25 -
Conclusion - stability check	0.25 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B2	**0.000 / 2.803 m**	**2LT (L80X6; 10)**	**S 235**	**All ULS**	**0.12 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-22.31	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.05 -
Conclusion - section check	0.05 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	2.803	645.09		0.83	0.65
z-z	1.00	2.803	294.37		1.22	0.42
LTB	1.00	2.803		51.99	0.36	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.12 -
Conclusion - stability check	0.12 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B3	**0.000 / 2.803 m**	**2LT (L80X6; 10)**	**S 235**	**All ULS**	**0.12 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-22.31	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.05 -
Conclusion - section check	0.05 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	2.803	645.09		0.83	0.65
z-z	1.00	2.803	294.37		1.22	0.42
LTB	1.00	2.803		51.99	0.36	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.12 -
Conclusion - stability check	0.12 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B4	**3.200 / 3.200 m**	**2LT (HFLeq75x75x7; 10)**	**S 235**	**All ULS**	**0.09 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4 + 0.94*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
43.56	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	1
Tension check	0.09 -
Conclusion - section check	0.09 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B5	**4.936 / 7.940 m**	**2LT (L(ARC)110x110x8; 10)**	**S 235**	**All ULS**	**0.80 -**

Beam data	
Fabrication	Rolled
Buckling group	BG1

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4 + 0.94*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-328.44	-0.34	0.00	0.00	0.00	-0.57

Section check	
Section classification	3

Section check	
Compression check	0.41 -
Bending moment check for M_z	0.05 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.43 -
Conclusion - section check	0.43 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	3.004	1851.96		0.66	0.75
z-z	1.00	3.004	896.88		0.95	0.57
LTB	1.00	3.004		166.65	0.31	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.71 -
Bending and axial compression check	0.80 -
Conclusion - stability check	0.80 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B6	3.004 / 7.940 m	2LT (L(ARC)110x110x8; 10)	S 235	All ULS	0.80 -

Beam data	
Fabrication	Rolled
Buckling group	BG1

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4 + 0.94*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-328.44	0.34	0.00	0.00	0.00	-0.57

Section check	
Section classification	3
Compression check	0.41 -
Bending moment check for M_z	0.05 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.43 -
Conclusion - section check	0.43 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	3.004	1851.96		0.66	0.75
z-z	1.00	3.004	896.88		0.95	0.57
LTB	1.00	3.004		166.65	0.31	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.71 -
Bending and axial compression check	0.80 -
Conclusion - stability check	0.80 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B7	2.900 / 2.900 m	2LT (HFLeq75x75x7; 10)	S 235	All ULS	0.10 -

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.94*LC3 + 1.35*LC4 + 1.50*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
47.35	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	1
Tension check	0.10 -
Conclusion - section check	0.10 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B8	**2.900 / 2.900 m**	**2LT (HFLeq75x75x7; 10)**	**S 235**	**All ULS**	**0.10 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.94*LC3 + 1.35*LC4 + 1.50*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
47.35	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	1
Tension check	0.10 -
Conclusion - section check	0.10 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B9	**0.000 / 3.050 m**	**2LT (L80X6; 10)**	**S 235**	**All ULS**	**0.40 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-65.45	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.15 -
Conclusion - section check	0.15 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	3.050	544.90		0.90	0.60

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
z-z	1.00	3.050	248.66		1.33	0.38
LTB	1.00	3.050		47.79	0.38	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.40 -
Conclusion - stability check	0.40 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B10	0.000 / 3.050 m	2LT (L80X6; 10)	S 235	All ULS	0.40 -

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-65.45	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.15 -
Conclusion - section check	0.15 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	3.050	544.90		0.90	0.60
z-z	1.00	3.050	248.66		1.33	0.38
LTB	1.00	3.050		47.79	0.38	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.40 -
Conclusion - stability check	0.40 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B11	0.000 / 3.483 m	2LT (L(ARC)110x110x8; 10)	S 235	All ULS	0.84 -

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4 + 0.94*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-313.93	0.34	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.39 -
Shear check for V_y	0.00 -

Section check	
Conclusion - section check	0.39 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	3.483	1377.22		0.76	0.68
z-z	1.00	3.483	666.97		1.10	0.49
LTB	1.00	3.483		143.71	0.34	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.80 -
Bending and axial compression check	0.84 -
Conclusion - stability check	0.84 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B12	0.000 / 3.483 m	2LT (L(ARC)110x110x8; 10)	S 235	All ULS	0.84 -

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4 + 0.94*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-313.93	0.34	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.39 -
Shear check for V_y	0.00 -
Conclusion - section check	0.39 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	3.483	1377.22		0.76	0.68
z-z	1.00	3.483	666.97		1.10	0.49
LTB	1.00	3.483		143.71	0.34	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.80 -
Bending and axial compression check	0.84 -
Conclusion - stability check	0.84 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B13	1.926 / 4.172 m	2LT (HFLeq75x75x7; 10)	S 235	All ULS	0.49 -

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4 + 0.94*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
214.69	0.02	0.00	0.00	0.00	0.33

Section check	
Section classification	1
Tension check	0.45 -
Bending moment check for M_z	0.04 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.49 -
Conclusion - section check	0.49 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B14	**0.000 / 4.386 m**	**2LT (L80X6; 10)**	**S 235**	**All ULS**	**0.61 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-49.61	0.29	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.11 -
Shear check for V_y	0.00 -
Conclusion - section check	0.11 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	4.386	263.43		1.29	0.39
z-z	1.00	4.386	120.21		1.91	0.21
LTB	1.00	4.386		33.23	0.45	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.53 -
Bending and axial compression check	0.61 -
Conclusion - stability check	0.61 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B15	**1.926 / 4.172 m**	**2LT (HFLeq75x75x7; 10)**	**S 235**	**All ULS**	**0.49 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4 + 0.94*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
214.69	0.02	0.00	0.00	0.00	0.33

Section check	
Section classification	1
Tension check	0.45 -
Bending moment check for M_z	0.04 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.49 -
Conclusion - section check	0.49 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B16	**0.000 / 4.386 m**	**2LT (L80X6; 10)**	**S 235**	**All ULS**	**0.61 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.50*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-49.61	0.29	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.11 -
Shear check for V_y	0.00 -
Conclusion - section check	0.11 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	4.386	263.43		1.29	0.39
z-z	1.00	4.386	120.21		1.91	0.21
LTB	1.00	4.386		33.23	0.45	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.53 -
Bending and axial compression check	0.61 -
Conclusion - stability check	0.61 -

2. EC-EN 1993 Steel Check SLS

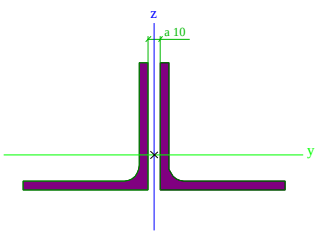
Linear calculation
Class: All SLS
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Overall Unity Check

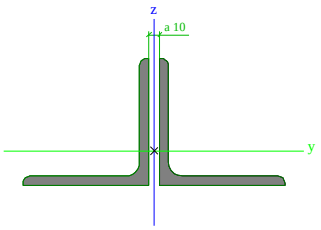
Name	dx [mm]	Case	$u_{y,max}$ [mm] $u_{z,max}$ [mm]	$u_{y,var}$ [mm] $u_{z,var}$ [mm]	Lim. $u_{y,max}$ [mm] Lim. $u_{z,max}$ [mm]	Lim. $u_{y,var}$ [mm] Lim. $u_{z,var}$ [mm]	Check $u_{y,max}$ [-] Check $u_{z,max}$ [-]	Check $u_{y,var}$ [-] Check $u_{z,var}$ [-]	Camber dx u_z [mm] Camber [mm]	Check Overall [-]
B1	9596.667	SLS-Char	0.0	0.0	15.0	8.3	0.00	0.00	-	**0.03**
		(auto)/1	-0.4	-0.1	15.0	8.3	0.03	0.01	-	
B2	1051.125	SLS-Char	0.0	0.0	14.0	7.8	0.00	0.00	-	**0.00**
		(auto)/2	0.0	0.0	14.0	7.8	0.00	0.00	-	
B3	1401.500	SLS-Char	0.0	-	14.0	7.8	0.00	-	-	**0.00**
		(auto)/3	0.0	-	14.0	7.8	0.00	-	-	
B4	2240.000	SLS-Char	0.0	0.0	16.0	8.9	0.00	0.00	-	**0.00**
		(auto)/1	0.0	0.0	16.0	8.9	0.00	0.00	-	
B5	6271.177	SLS-Char	0.0	0.0	15.0	8.3	0.00	0.00	-	**0.04**

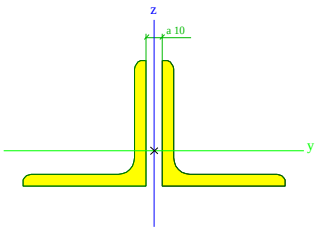
Name	dx [mm]	Case	$u_{y,max}$ [mm] $u_{z,max}$ [mm]	$u_{y,var}$ [mm] $u_{z,var}$ [mm]	Lim. $u_{y,max}$ [mm] Lim. $u_{z,max}$ [mm]	Lim. $u_{y,var}$ [mm] Lim. $u_{z,var}$ [mm]	Check $u_{y,max}$ [-] Check $u_{z,max}$ [-]	Check $u_{y,var}$ [-] Check $u_{z,var}$ [-]	Camber dx u_z [mm] Camber [mm]	Check Overall [-]
		(auto)/1	0.6	0.1	15.0	8.3	0.04	0.01	-	
B6	1668.754	SLS-Char	0.0	0.0	15.0	8.3	0.00	0.00	-	**0.04**
		(auto)/1	0.6	0.1	15.0	8.3	0.04	0.01	-	
B7	322.180	SLS-Char	0.0	0.0	14.5	8.1	0.00	0.00	-	**0.00**
		(auto)/2	0.0	0.0	14.5	8.1	0.00	0.00	-	
B8	2577.442	SLS-Char	0.0	0.0	14.5	8.1	0.00	0.00	-	**0.00**
		(auto)/1	0.0	0.0	14.5	8.1	0.00	0.00	-	
B9	2372.075	SLS-Char	0.0	0.0	15.2	8.5	0.00	0.00	-	**0.00**
		(auto)/4	0.0	0.0	15.2	8.5	0.00	0.00	-	
B10	2033.207	SLS-Char	0.0	0.0	15.2	8.5	0.00	0.00	-	**0.00**
		(auto)/2	0.0	0.0	15.2	8.5	0.00	0.00	-	
B11	1899.929	SLS-Char	0.0	-	17.4	9.7	0.00	-	-	**0.02**
		(auto)/3	-0.3	-	17.4	9.7	0.02	-	-	
B12	1583.274	SLS-Char	0.0	0.0	17.4	9.7	0.00	0.00	-	**0.02**
		(auto)/5	-0.3	0.0	17.4	9.7	0.02	0.00	-	
B13	2246.605	SLS-Char	0.0	-	20.9	11.6	0.00	-	-	**0.10**
		(auto)/3	-2.0	-	20.9	11.6	0.10	-	-	
B14	2193.171	SLS-Char	0.0	0.0	21.9	12.2	0.00	0.00	-	**0.09**
		(auto)/5	-2.0	0.0	21.9	12.2	0.09	0.00	-	
B15	2246.605	SLS-Char	0.0	0.0	20.9	11.6	0.00	0.00	-	**0.10**
		(auto)/5	-2.0	0.0	20.9	11.6	0.10	0.00	-	
B16	2193.171	SLS-Char	0.0	0.0	21.9	12.2	0.00	0.00	-	**0.09**
		(auto)/1	-2.0	0.0	21.9	12.2	0.09	0.00	-	

Name	Combination key
SLS-Char (auto)/1	LC1 + LC2 + LC3 + LC4 + 0.70*LC5
SLS-Char (auto)/2	LC1 + LC2 + 0.70*LC3 + LC4 + LC5
SLS-Char (auto)/3	LC1 + LC2 + LC4
SLS-Char (auto)/4	LC1 + LC2 + LC3 + LC4
SLS-Char (auto)/5	LC1 + LC2 + LC4 + LC5

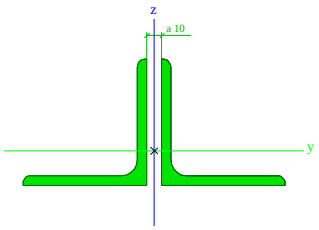
3. Cross-sections

CS2		
Type	2LT	
Detailed	ISEA100/100/7; 10	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	2.7650e-03	
A_y [m^2], A_z [m^2]	1.3926e-03	1.3174e-03
A_L [m^2/m], A_D [m^2/m]	7.8965e-01	7.8965e-01
$c_{Y,UCS}$ [mm], $c_{Z,UCS}$ [mm]	105	27
α [deg]	0.00	
I_y [m^4], I_z [m^4]	2.6507e-06	5.5150e-06
i_y [mm], i_z [mm]	31	45
$W_{el,y}$ [m^3], $W_{el,z}$ [m^3]	3.6403e-05	5.2524e-05
$W_{pl,y}$ [m^3], $W_{pl,z}$ [m^3]	6.5612e-05	8.8993e-05
$M_{pl,y,+}$ [Nm], $M_{pl,y,-}$ [Nm]	1.54e+04	1.54e+04
$M_{pl,z,+}$ [Nm], $M_{pl,z,-}$ [Nm]	2.09e+04	2.09e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	2.3879e-07	0.0000e+00
β_y [mm], β_z [mm]	-18	0
Picture		

CS3		
Type	2LT	
Detailed	L110x110x8; 10	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	3.4235e-03	
A_y [m^2], A_z [m^2]	1.9573e-03	1.6293e-03
A_L [m^2/m], A_D [m^2/m]	8.5930e-01	8.5930e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	115	30
α [deg]	0.00	
I_y [m^4], I_z [m^4]	3.9043e-06	8.0620e-06
i_y [mm], i_z [mm]	34	49
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	4.8712e-05	7.0104e-05
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	8.8832e-05	1.1931e-04
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	2.09e+04	2.09e+04
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	2.80e+04	2.80e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	3.8337e-07	0.0000e+00
β_y [mm], β_z [mm]	-20	0
Picture		

CS4		
Type	2LT	
Detailed	HFLeq75x75x7; 10	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	2.0239e-03	
A_y [m^2], A_z [m^2]	1.4075e-03	9.9078e-04
A_L [m^2/m], A_D [m^2/m]	5.8275e-01	5.8275e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	80	21
α [deg]	0.00	
I_y [m^4], I_z [m^4]	1.0466e-06	2.4012e-06
i_y [mm], i_z [mm]	23	34
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	1.9335e-05	3.0015e-05
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	3.5393e-05	5.2360e-05
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	8.32e+03	8.32e+03
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	1.23e+04	1.23e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	1.6013e-07	0.0000e+00
β_y [mm], β_z [mm]	-16	0
Picture		

CS5		
Type	2LT	
Detailed	L80X6; 10	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	

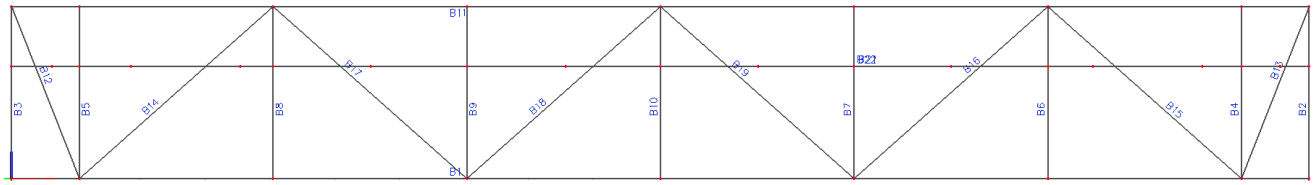
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	1.8699e-03	
A_y [m^2], A_z [m^2]	1.2401e-03	8.9188e-04
A_L [m^2/m], A_D [m^2/m]	6.2275e-01	6.2275e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	85	22
α [deg]	0.00	
I_y [m^4], I_z [m^4]	1.1159e-06	2.4454e-06
i_y [mm], i_z [mm]	24	36
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	1.9129e-05	2.8769e-05
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	3.5025e-05	4.9859e-05
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	8.23e+03	8.23e+03
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	1.17e+04	1.17e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	1.1370e-07	0.0000e+00
β_y [mm], β_z [mm]	-16	0
Picture		

Explanations of symbols	
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
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 -

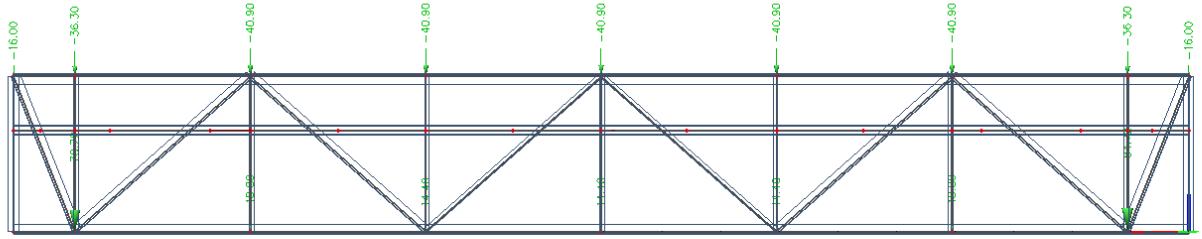
Explanations of symbols	
	Not calculated or simplified
d_z	Shear center coordinate in principal z-direction measured from the centroid - Not calculated or simplified
I_t	Torsional constant - Not calculated or simplified
I_w	Warping constant - Not calculated or simplified
β_y	Mono-symmetry constant about the principal y-axis
β_z	Mono-symmetry constant about the principal z-axis

SANTVAROS F-5 SKAIČIAVIMAI

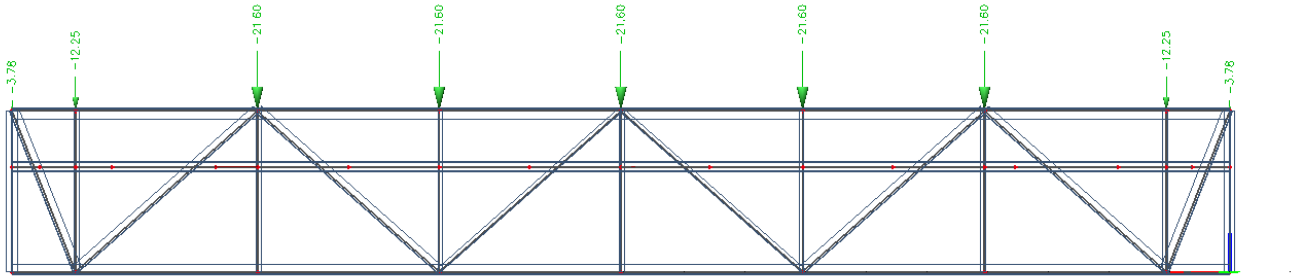
Santvaros F-5 skaičiuojamoji schema



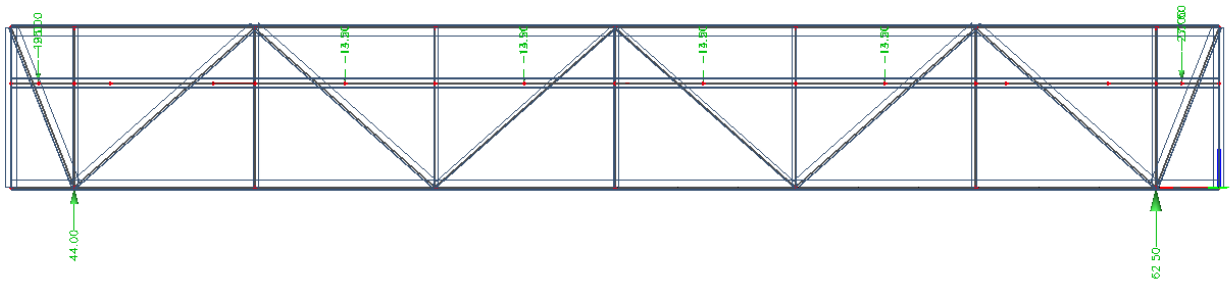
Santvaros F-5 nuolatinių apkrovų išdėstymas



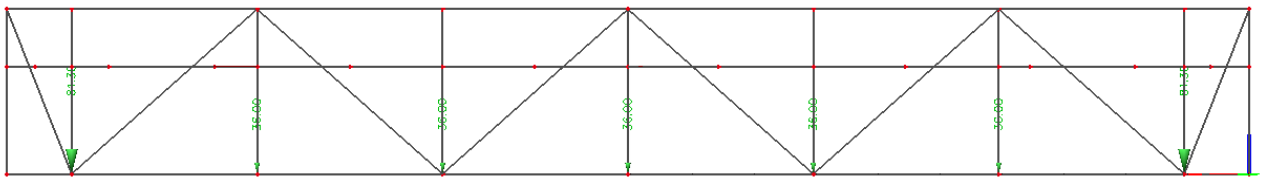
Santvaros F-5 Sniego apkrovų išdėstymas



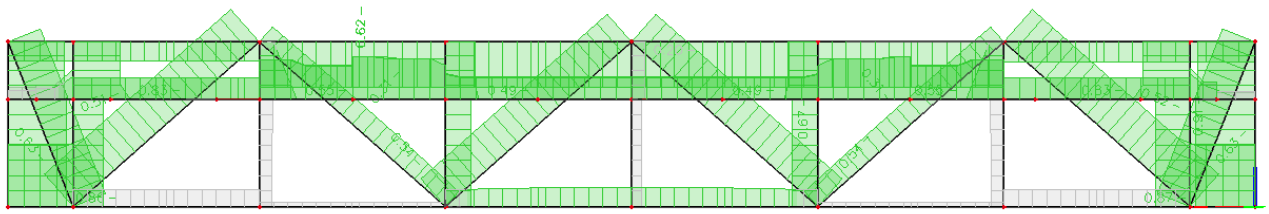
Santvaros F-5 mechanizmų įrangos apkrovų išdėstymas



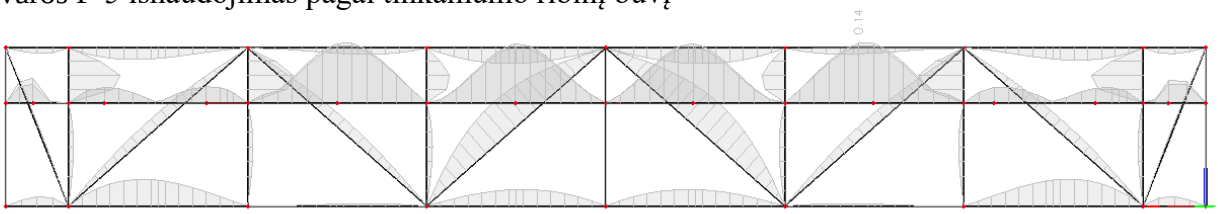
Santvaros F-5 naudojimo apkrovų išdėstymas



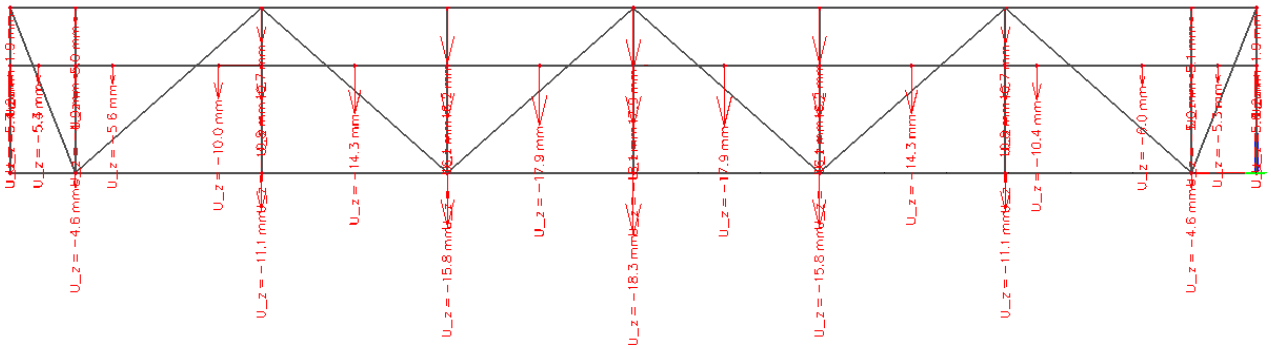
Santvaros F-5 išnaudojimas pagal saugos ribinį būvį



Santvaros F-5 išnaudojimas pagal tinkamumo ribinį būvį



Santvaros F-5 deformacijos



Santvaros F-5 detalieji skaičiavimai.

1. EC-EN 1993 Steel check ULS

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

EN 1993-1-1 Code Check
National annex: Standard EN

Member B1	**1.050 / 20.100 m**	**2LT (L(CSN)160/10; 10)**	**S 235**	**All ULS**	**0.91 -**

Beam data	
Fabrication	Rolled
Buckling group	BG1

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$\Delta M_{y,Ed}$ [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]	$\Delta M_{z,Ed}$ [kNm]	$M_{z,total,Ed}$ [kNm]
-787.81	6.16	0.00	0.00	0.00	0.00	0.00	6.83	2.13	8.97

Section check	
Section classification	4
Compression check	0.58 -
Bending moment check for M_z	0.29 -
Shear check for V_y	0.02 -
Combined bending, axial force and shear force check	0.87 -
Conclusion - section check	0.87 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.50	0.525	221622.60		0.08	1.00
z-z	0.50	0.525	114417.64		0.11	1.00
y-z	1.00	1.050	13129.36		0.32	0.94
LTB	1.00	1.050		1636.95	0.16	1.00

Stability Check	
Stability classification	4
Torsional(-Flexural) Buckling check	0.62 -
Bending and axial compression check	0.91 -
Conclusion - stability check	0.91 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B2	**0.000 / 2.650 m**	**4LX (RSEA80/80/6; 5; 10)**	**S 235**	**All ULS**	**0.86 -**

Beam data	
Fabrication	Rolled
Buckling group	BG5

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-730.27	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.83 -
Conclusion - section check	0.83 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.50	0.865	13581.02		0.25	0.97
z-z	0.50	0.865	12262.50		0.27	0.97
LTB	1.00	1.730		428.91	0.18	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.86 -
Conclusion - stability check	0.86 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B3	**0.000 / 2.650 m**	**4LX (RSEA80/80/6; 5; 10)**	**S 235**	**All ULS**	**0.87 -**

Beam data	
Fabrication	Rolled
Buckling group	BG5

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-734.74	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.84 -
Conclusion - section check	0.84 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.50	0.865	13581.02		0.25	0.97
z-z	0.50	0.865	12262.50		0.27	0.97
LTB	1.00	1.730		428.91	0.18	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.87 -
Conclusion - stability check	0.87 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B4	**1.730 / 2.650 m**	**2LT (L(CSN)80/6; 15)**	**S 235**	**All ULS**	**0.83 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-52.32	-3.48	0.00	0.00	0.00	3.20

Section check	
Section classification	3
Compression check	0.12 -
Bending moment check for M_z	0.71 -
Shear check for V_y	0.03 -
Combined bending, axial force and shear force check	0.83 -
Conclusion - section check	0.83 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	0.920	6627.19		0.26	1.00
z-z	1.00	0.920	2732.56		0.40	1.00
LTB	1.00	0.920		151.79	0.22	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.69 -
Conclusion - stability check	0.69 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B5	**1.730 / 2.650 m**	**2LT (L(CSN)80/6; 15)**	**S 235**	**All ULS**	**0.83 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-51.76	-3.48	0.00	0.00	0.00	3.20

Section check	
Section classification	3
Compression check	0.12 -
Bending moment check for M_z	0.71 -
Shear check for V_y	0.03 -
Combined bending, axial force and shear force check	0.83 -
Conclusion - section check	0.83 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	0.920	6627.19		0.26	1.00
z-z	1.00	0.920	2732.56		0.40	1.00
LTB	1.00	0.920		152.87	0.22	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.69 -
Conclusion - stability check	0.69 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B6	1.730 / 2.650 m	2LT (L(CSN)80/6; 15)	S 235	All ULS	0.55 -

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
90.48	-3.07	0.00	0.00	0.00	2.83

Section check	
Section classification	1
Tension check	0.21 -
Bending moment check for M_z	0.34 -
Shear check for V_y	0.03 -
Combined bending, axial force and shear force check	0.55 -
Conclusion - section check	0.55 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B7	1.730 / 2.650 m	2LT (L(CSN)80/6; 15)	S 235	All ULS	0.49 -

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 0.91*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-82.14	-1.47	0.00	0.00	0.00	1.36

Section check	
Section classification	3
Compression check	0.19 -
Bending moment check for M_z	0.30 -
Shear check for V_y	0.01 -
Combined bending, axial force and shear force check	0.49 -
Conclusion - section check	0.49 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	0.920	6627.19		0.26	1.00
z-z	1.00	0.920	2732.56		0.40	1.00
LTB	1.00	0.920		159.93	0.21	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.43 -
Conclusion - stability check	0.43 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B8	**1.730 / 2.650 m**	**2LT (L(CSN)80/6; 15)**	**S 235**	**All ULS**	**0.55 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
90.47	-3.07	0.00	0.00	0.00	2.83

Section check	
Section classification	1
Tension check	0.21 -
Bending moment check for M_z	0.34 -
Shear check for V_y	0.03 -
Combined bending, axial force and shear force check	0.55 -
Conclusion - section check	0.55 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B9	**1.730 / 2.650 m**	**2LT (L(CSN)80/6; 15)**	**S 235**	**All ULS**	**0.49 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 1.30*LC3 + 0.91*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-82.07	-1.47	0.00	0.00	0.00	1.35

Section check	
Section classification	3
Compression check	0.19 -
Bending moment check for M_z	0.30 -
Shear check for V_y	0.01 -
Combined bending, axial force and shear force check	0.49 -
Conclusion - section check	0.49 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	0.920	6627.19		0.26	1.00
z-z	1.00	0.920	2732.56		0.40	1.00
LTB	1.00	0.920		151.79	0.22	1.00

Stability Check	
Stability classification	3
Bending and axial compression check	0.43 -
Conclusion - stability check	0.43 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B10	**2.650 / 2.650 m**	**2LT (L(CSN)80/6; 15)**	**S 235**	**All ULS**	**0.20 -**

Beam data	
Fabrication	Rolled
Buckling group	BG3

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
86.42	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	1
Tension check	0.20 -
Shear check for V_y	0.00 -
Conclusion - section check	0.20 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B11	**7.281 / 20.100 m**	**2LT (L(CSN)180/12; 10)**	**S 235**	**All ULS**	**0.66 -**

Beam data	
Fabrication	Rolled
Buckling group	BG1

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-1026.51	0.05	0.00	0.00	0.00	-4.39

Section check	
Section classification	4
Compression check	0.54 -
Bending moment check for M_z	0.09 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.63 -
Conclusion - section check	0.63 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.50	1.500	46112.71		0.20	1.00
z-z	0.50	1.500	23894.65		0.28	0.96
y-z	1.00	3.000	19977.24		0.31	0.94
LTB	1.00	3.000		2203.05	0.17	1.00

Stability Check	
Stability classification	4
Flexural Buckling check	0.56 -
Torsional(-Flexural) Buckling check	0.57 -
Bending and axial compression check	0.66 -
Conclusion - stability check	0.66 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B12	**1.425 / 2.850 m**	**2LT (L(CSN)160/10; 10)**	**S 235**	**All ULS**	**0.52 -**

Beam data	
Fabrication	Rolled
Buckling group	BG2

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
753.54	0.00	0.00	0.00	0.00	0.24

Section check	
Section classification	1
Tension check	0.51 -
Bending moment check for M_z	0.00 -
Combined bending, axial force and shear force check	0.52 -
Conclusion - section check	0.52 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B13	**1.425 / 2.850 m**	**2LT (L(CSN)160/10; 10)**	**S 235**	**All ULS**	**0.51 -**

Beam data	
Fabrication	Rolled
Buckling group	BG2

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
749.14	0.00	0.00	0.00	0.00	0.24

Section check	
Section classification	1
Tension check	0.51 -
Bending moment check for M_z	0.00 -
Combined bending, axial force and shear force check	0.51 -
Conclusion - section check	0.51 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B14	**0.000 / 4.003 m**	**2LT (L(CSN)140/10; 10)**	**S 235**	**All ULS**	**0.63 -**

Beam data	
Fabrication	Rolled
Buckling group	BG2

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-639.26	0.85	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.50 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.50 -
Conclusion - section check	0.50 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.50	2.001	10415.60		0.35	0.92
z-z	0.50	2.001	5218.13		0.50	0.85
y-z	1.00	4.003	14261.52		0.30	0.95
LTB	1.00	4.003		323.99	0.32	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.59 -
Torsional(-Flexural) Buckling check	0.53 -
Bending and axial compression check	0.63 -
Conclusion - stability check	0.63 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B15	**0.000 / 4.003 m**	**2LT (L(CSN)140/10; 10)**	**S 235**	**All ULS**	**0.63 -**

Beam data	
Fabrication	Rolled
Buckling group	BG2

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-640.03	0.85	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.50 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.50 -
Conclusion - section check	0.50 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.50	2.001	10415.60		0.35	0.92
z-z	0.50	2.001	5218.13		0.50	0.85
y-z	1.00	4.003	14261.52		0.30	0.95
LTB	1.00	4.003		324.26	0.32	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.59 -
Torsional(-Flexural) Buckling check	0.53 -
Bending and axial compression check	0.63 -
Conclusion - stability check	0.63 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B16	**2.001 / 4.003 m**	**2LT (L(CSN)140/10; 10)**	**S 235**	**All ULS**	**0.31 -**

Beam data	
Fabrication	Rolled
Buckling group	BG2

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
372.68	0.00	0.00	0.00	0.00	0.85

Section check	
Section classification	1
Tension check	0.29 -
Bending moment check for M_z	0.02 -
Combined bending, axial force and shear force check	0.31 -
Conclusion - section check	0.31 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B17	**2.001 / 4.003 m**	**2LT (L(CSN)140/10; 10)**	**S 235**	**All ULS**	**0.31 -**

Beam data	
Fabrication	Rolled
Buckling group	BG2

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
371.55	0.00	0.00	0.00	0.00	0.85

Section check	
Section classification	1
Tension check	0.29 -
Bending moment check for M_z	0.02 -
Combined bending, axial force and shear force check	0.31 -
Conclusion - section check	0.31 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B18	**0.000 / 4.003 m**	**2LT (L(CSN)80/6; 15)**	**S 235**	**All ULS**	**0.54 -**

Beam data	
Fabrication	Rolled
Buckling group	BG2

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-125.61	0.29	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.29 -
Shear check for V_y	0.00 -
Conclusion - section check	0.29 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.50	2.001	1400.34		0.56	0.81
z-z	0.50	2.001	577.40		0.87	0.62
LTB	1.00	4.003		34.89	0.46	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.46 -
Bending and axial compression check	0.54 -
Conclusion - stability check	0.54 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B19	**4.003 / 4.003 m**	**2LT (L(CSN)80/6; 15)**	**S 235**	**All ULS**	**0.54 -**

Beam data	
Fabrication	Rolled
Buckling group	BG2

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 0.91*LC4 + 1.30*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-125.88	-0.29	0.00	0.00	0.00	0.00

Section check	
Section classification	3
Compression check	0.29 -
Shear check for V_y	0.00 -
Combined bending, axial force and shear force check	0.29 -
Conclusion - section check	0.29 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.50	2.001	1400.34		0.56	0.81
z-z	0.50	2.001	577.40		0.87	0.62
LTB	1.00	4.003		37.82	0.44	1.00

Stability Check	
Stability classification	3
Flexural Buckling check	0.46 -
Bending and axial compression check	0.54 -
Conclusion - stability check	0.54 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B21	5.555 / 20.100 m	UPN160	S 235	All ULS	0.62 -

Beam data	
Fabrication	Rolled
Buckling group	BG4

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 1.30*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-3.06	0.00	-3.05	0.00	6.70	0.00

Section check	
Section classification	1
Compression check	0.01 -
Bending moment check for M_y	0.21 -
Shear check for V_z	0.02 -
Combined bending, axial force and shear force check	0.21 -
Conclusion - section check	0.21 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.50	1.500	8520.76		0.26	1.00
z-z	0.50	0.748	3164.07		0.42	1.00
LTB	1.00	1.495		128.01	0.50	0.78

Stability Check	
Stability classification	1
Lateral Torsional Buckling check	0.27 -
Bending and axial compression check	0.62 -
Conclusion - stability check	0.62 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B22	5.555 / 20.100 m	UPN160	S 235	All ULS	0.62 -

Beam data	
Fabrication	Rolled
Buckling group	BG4

Combination key
All ULS / 1.35*LC1 + 1.35*LC2 + 0.91*LC3 + 1.30*LC4 + 0.91*LC5

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-3.06	0.00	-3.51	0.00	7.04	0.00

Section check	
Section classification	1
Compression check	0.01 -
Bending moment check for M_y	0.22 -
Shear check for V_z	0.02 -
Combined bending, axial force and shear force check	0.22 -
Conclusion - section check	0.22 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	0.50	1.500	8520.76		0.26	1.00
z-z	0.50	0.748	3164.07		0.42	1.00
LTB	1.00	1.495		132.94	0.49	0.78

Stability Check	
Stability classification	1
Lateral Torsional Buckling check	0.28 -
Bending and axial compression check	0.62 -
Conclusion - stability check	0.62 -

2. EC-EN 1993 Steel Check SLS

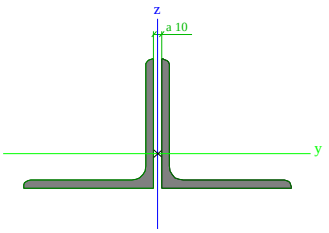
Linear calculation
Class: All SLS
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Overall Unity Check

Name	dx [mm]	Case	$u_{y,max}$ [mm] $u_{z,max}$ [mm]	$u_{y,var}$ [mm] $u_{z,var}$ [mm]	Lim. $u_{y,max}$ [mm] Lim. $u_{z,max}$ [mm]	Lim. $u_{y,var}$ [mm] Lim. $u_{z,var}$ [mm]	Check $u_{y,max}$ [-] Check $u_{z,max}$ [-]	Check $u_{y,var}$ [-] Check $u_{z,var}$ [-]	Camber dx u_z [mm] Camber [mm]	Check $_{Overall}$ [-]
B1	2203.846	SLS-Char (auto)/1	0.0 -0.9	0.0 -0.4	15.0 15.0	8.3 8.3	0.00 0.06	0.00 0.05	- -	**0.06**
B2	1960.000	SLS-Char (auto)/1	0.0 0.0	0.0 0.0	4.6 4.6	2.6 2.6	0.00 0.00	0.00 0.00	- -	**0.00**
B3	1960.000	SLS-Char (auto)/2	0.0 0.0	0.0 0.0	4.6 4.6	2.6 2.6	0.00 0.00	0.00 0.00	- -	**0.00**
B4	2190.000	SLS-Char (auto)/1	0.0 -0.5	0.0 -0.3	4.6 4.6	2.6 2.6	0.00 0.12	0.00 0.11	- -	**0.12**
B5	2190.000	SLS-Char (auto)/1	0.0 -0.5	0.0 -0.3	4.6 4.6	2.6 2.6	0.00 0.12	0.00 0.11	- -	**0.12**
B6	2190.000	SLS-Char (auto)/1	0.0 -0.5	0.0 -0.2	4.6 4.6	2.6 2.6	0.00 0.10	0.00 0.10	- -	**0.10**
B7	2190.000	SLS-Char (auto)/1	0.0 -0.2	0.0 -0.1	4.6 4.6	2.6 2.6	0.00 0.05	0.00 0.05	- -	**0.05**
B8	2190.000	SLS-Char (auto)/1	0.0 -0.5	0.0 -0.2	4.6 4.6	2.6 2.6	0.00 0.10	0.00 0.10	- -	**0.10**
B9	2190.000	SLS-Char (auto)/1	0.0 -0.2	0.0 -0.1	4.6 4.6	2.6 2.6	0.00 0.05	0.00 0.05	- -	**0.05**
B10	2190.000	SLS-Char (auto)/3	0.0 0.0	0.0 0.0	4.6 4.6	2.6 2.6	0.00 0.00	0.00 0.00	- -	**0.00**
B11	8434.615	SLS-Char (auto)/1	0.0 0.5	0.0 0.3	15.0 15.0	8.3 8.3	0.00 0.04	0.00 0.03	- -	**0.04**
B12	1425.219	SLS-Char (auto)/4	0.0 0.0	0.0 0.0	14.3 14.3	7.9 7.9	0.00 0.00	0.00 0.00	- -	**0.00**
B13	1425.219	SLS-Char (auto)/1	0.0 0.0	0.0 0.0	14.3 14.3	7.9 7.9	0.00 0.00	0.00 0.00	- -	**0.00**
B14	2001.406	SLS-Char	0.0	0.0	20.0	11.1	0.00	0.00	-	**0.02**

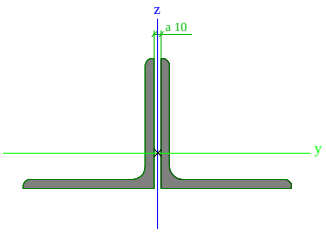
Name	dx [mm]	Case	$u_{y,max}$ [mm] $u_{z,max}$ [mm]	$u_{y,var}$ [mm] $u_{z,var}$ [mm]	Lim. $u_{y,max}$ [mm] Lim. $u_{z,max}$ [mm]	Lim. $u_{y,var}$ [mm] Lim. $u_{z,var}$ [mm]	Check $u_{y,max}$ [-] Check $u_{z,max}$ [-]	Check $u_{y,var}$ [-] Check $u_{z,var}$ [-]	Camber dx u_z [mm] Camber [mm]	Check Overall [-]
		(auto)/5	-0.5	0.0	20.0	11.1	0.02	0.00	-	
B15	2001.406	SLS-Char	0.0	0.0	20.0	11.1	0.00	0.00	-	**0.02**
		(auto)/5	-0.5	0.0	20.0	11.1	0.02	0.00	-	
B16	2001.406	SLS-Char	0.0	0.0	20.0	11.1	0.00	0.00	-	**0.02**
		(auto)/6	-0.5	0.0	20.0	11.1	0.02	0.00	-	
B17	2001.406	SLS-Char	0.0	0.0	20.0	11.1	0.00	0.00	-	**0.02**
		(auto)/6	-0.5	0.0	20.0	11.1	0.02	0.00	-	
B18	2001.406	SLS-Char	0.0	0.0	20.0	11.1	0.00	0.00	-	**0.08**
		(auto)/7	-1.5	0.0	20.0	11.1	0.08	0.00	-	
B19	2001.406	SLS-Char	0.0	0.0	20.0	11.1	0.00	0.00	-	**0.08**
		(auto)/8	-1.5	0.0	20.0	11.1	0.08	0.00	-	
B21	14287.500	SLS-Char	0.0	0.0	7.4	4.1	0.00	0.00	-	**0.13**
		(auto)/2	-1.2	-1.1	15.0	8.3	0.08	0.13	-	
B22	14287.500	SLS-Char	0.0	0.0	7.4	4.1	0.00	0.00	-	**0.14**
		(auto)/2	-1.3	-1.1	15.0	8.3	0.08	0.14	-	

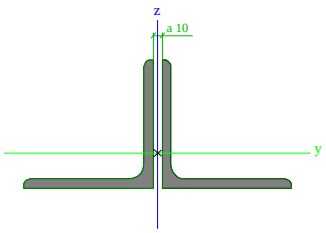
Name	Combination key
SLS-Char (auto)/1	LC1 + LC2 + 0.70*LC3 + 0.70*LC4 + LC5
SLS-Char (auto)/2	LC1 + LC2 + 0.70*LC3 + LC4 + 0.70*LC5
SLS-Char (auto)/3	LC1 + LC2 + LC4
SLS-Char (auto)/4	LC1 + LC2 + 0.70*LC3 + LC5
SLS-Char (auto)/5	LC1 + LC2 + LC3
SLS-Char (auto)/6	LC1 + LC2 + 0.70*LC4 + LC5
SLS-Char (auto)/7	LC1 + LC2 + 0.70*LC3 + LC4
SLS-Char (auto)/8	LC1 + LC2 + LC3 + 0.70*LC4

3. Cross-sections

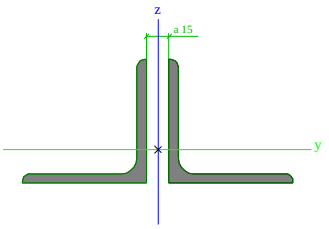
CS3		
Type	2LT	
Detailed	L160/10; 10	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	6.2632e-03	
A_y [m^2], A_z [m^2]	3.4691e-03	2.9871e-03
A_L [m^2/m], A_D [m^2/m]	1.2507e+00	1.2507e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	165	43
α [deg]	0.00	
I_y [m^4], I_z [m^4]	1.5216e-05	2.9472e-05
i_y [mm], i_z [mm]	49	69
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	1.2973e-04	1.7862e-04
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	2.3674e-04	2.9882e-04
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	5.56e+04	5.56e+04
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	7.02e+04	7.02e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	1.1598e-06	0.0000e+00
β_y [mm], β_z [mm]	-25	0
Picture		

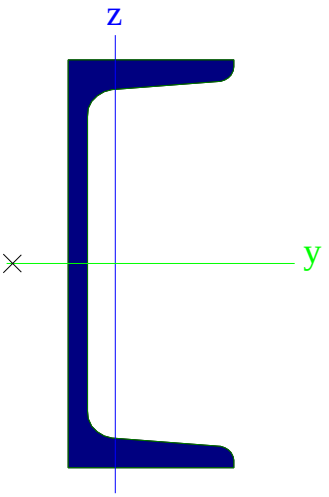
CS4		
Type	2LT	
Detailed	L180/12; 10	
Shape type	Thin-walled	

Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	8.4228e-03	
A_y [m^2], A_z [m^2]	4.6534e-03	4.0130e-03
A_L [m^2/m], A_D [m^2/m]	1.4090e+00	1.4090e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	185	49
α [deg]	0.00	
I_y [m^4], I_z [m^4]	2.5940e-05	5.0059e-05
i_y [mm], i_z [mm]	55	77
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	1.9728e-04	2.7059e-04
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	3.5922e-04	4.5073e-04
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	8.44e+04	8.44e+04
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	1.06e+05	1.06e+05
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	2.2317e-06	0.0000e+00
β_y [mm], β_z [mm]	-28	0
Picture		

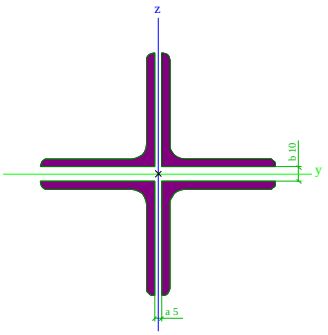
CS5		
Type	2LT	
Detailed	L140/10; 10	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	5.4492e-03	
A_y [m^2], A_z [m^2]	3.1411e-03	2.5944e-03
A_L [m^2/m], A_D [m^2/m]	1.0941e+00	1.0941e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	145	38
α [deg]	0.00	
I_y [m^4], I_z [m^4]	1.0085e-05	2.0130e-05
i_y [mm], i_z [mm]	43	61
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	9.8807e-05	1.3882e-04
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	1.8013e-04	2.3396e-04
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	4.23e+04	4.23e+04
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	5.50e+04	5.50e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	9.7904e-07	0.0000e+00
β_y [mm], β_z [mm]	-23	0
Picture		

CS6		
Type	2LT	
Detailed	L80/6; 15	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	1.8699e-03	

A_y [m^2], A_z [m^2]	1.3436e-03	8.9188e-04
A_L [m^2/m], A_D [m^2/m]	6.2275e-01	6.2275e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	87	22
α [deg]	0.00	
I_y [m^4], I_z [m^4]	1.1159e-06	2.7064e-06
i_y [mm], i_z [mm]	24	38
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	1.9129e-05	3.0930e-05
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	3.5025e-05	5.4534e-05
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	8.23e+03	8.23e+03
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	1.28e+04	1.28e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	1.0440e-07	0.0000e+00
β_y [mm], β_z [mm]	-19	0
Picture		

CS8		
Type	UPN160	
Formcode	5 - Channel section	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	2.4000e-03	
A_y [m^2], A_z [m^2]	1.3168e-03	1.1998e-03
A_L [m^2/m], A_D [m^2/m]	5.4472e-01	5.4472e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	18	80
α [deg]	0.00	
I_y [m^4], I_z [m^4]	9.2500e-06	8.5300e-07
i_y [mm], i_z [mm]	62	19
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	1.1600e-04	1.8300e-05
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	1.3800e-04	3.5200e-05
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	3.23e+04	3.23e+04
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	8.26e+03	8.26e+03
d_y [mm], d_z [mm]	-40	0
I_t [m^4], I_w [m^6]	7.3900e-08	3.7645e-09
β_y [mm], β_z [mm]	0	173
Picture		

CS9		
Type	4LX	
Detailed	RSEA80/80/6; 5; 10	
Shape type	Thin-walled	
Item material	S 235	

Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	3.7431e-03	
A_y [m^2], A_z [m^2]	2.1678e-03	2.4815e-03
A_L [m^2/m], A_D [m^2/m]	1.2462e+00	1.2462e+00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	82	85
α [deg]	0.00	
I_y [m^4], I_z [m^4]	4.9028e-06	4.4268e-06
i_y [mm], i_z [mm]	36	34
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	5.7680e-05	5.3658e-05
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	9.9877e-05	9.0519e-05
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	2.35e+04	2.35e+04
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	2.13e+04	2.13e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	7.4297e-07	0.0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

Explanations of symbols	
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
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

Explanations of symbols	
$M_{pl.z.+}$	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 - Not calculated or simplified
d_z	Shear center coordinate in principal z-direction measured from the centroid - Not calculated or simplified
I_t	Torsional constant - Not calculated or simplified
I_w	Warping constant - Not calculated or simplified
β_y	Mono-symmetry constant about the principal y-axis
β_z	Mono-symmetry constant about the principal z-axis

Švok sijų ant santvaros F-5 skaičiavimai

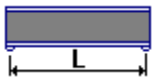
Beams

Analysis complies with EN 1993

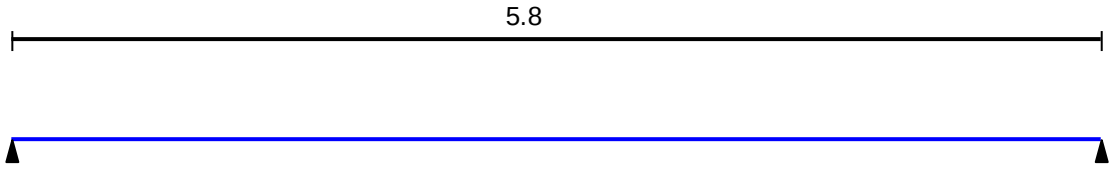
General Properties

Steel: S355

Importance factor $K_{FI} = 1$



Structural scheme

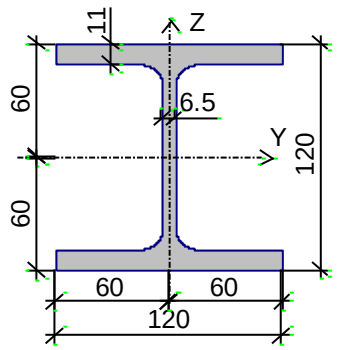


Restraints against lateral displacements and rotations

	Left	Right
Displacement along Y	Restrained	Restrained

	Left	Right
Displacement along Z	Restrained	Restrained
Rotation about Y		
Rotation about Z		

Section



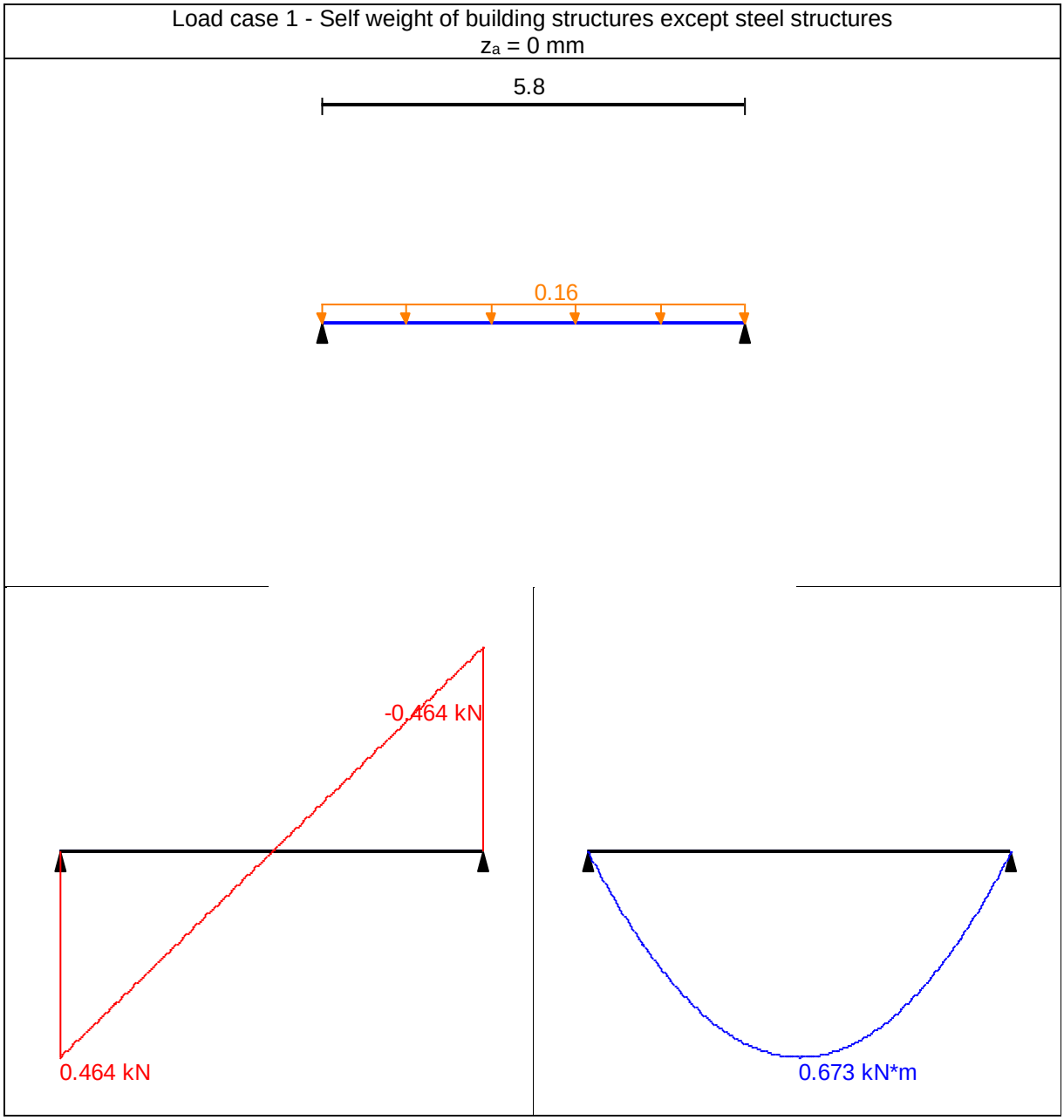
Profile: HEB Shapes NF A 45-201 120

Geometric Properties of the Section

	Parameter	Value	Unit of measurement
A	Cross-sectional area	34	cm^2
$A_{v,y}$	Conventional shear area along U-axis	27.63	cm^2
$A_{v,z}$	Conventional shear area along V-axis	10.955	cm^2
α	Angle of principal axes of inertia	0	degree
I_y	Moment of inertia about centroidal Y1-axis parallel with Y-axis	864	cm^4
I_z	Moment of inertia about centroidal Z1-axis parallel with Z-axis	318	cm^4
I_t	Torsional moment of inertia (St. Venant)	14.4	cm^4
I_w	Sectorial moment of inertia	9445.395	cm^6
i_y	Radius of gyration about Y1-axis	5.041	cm
i_z	Radius of gyration about Z1-axis	3.058	cm
Y_b	Y-coordinate of the shear center	0	cm
Z_b	Z-coordinate of the shear center	0	cm
W_{u+}	Maximum section modulus about U-axis	144	cm^3
W_{u-}	Minimum section modulus about U-axis	144	cm^3
W_{v+}	Maximum section modulus about V-axis	53	cm^3
W_{v-}	Minimum section modulus about V-axis	53	cm^3
$W_{pl,u}$	Plastic section modulus about U-axis	165.212	cm^3
$W_{pl,v}$	Plastic section modulus about V-axis	80.968	cm^3
I_u	Maximum moment of inertia	864	cm^4
I_v	Minimum moment of inertia	318	cm^4
i_u	Maximum radius of gyration	5.041	cm
i_v	Minimum radius of gyration	3.058	cm
a_{u+}	Core size along positive Y(U)-axis	1.559	cm
a_{u-}	Core size along negative Y(U)-axis	1.559	cm
a_{v+}	Core size along positive Z(V)-axis	4.235	cm
a_{v-}	Core size along negative Z(V)-axis	4.235	cm
P	Perimeter	68.64	cm
M	Mass per running meter	26.69	kg

Load case 1 - Self weight of building structures except steel structures

	Load type	Value	
	length = 5.8 m		
		0.16	kN/m

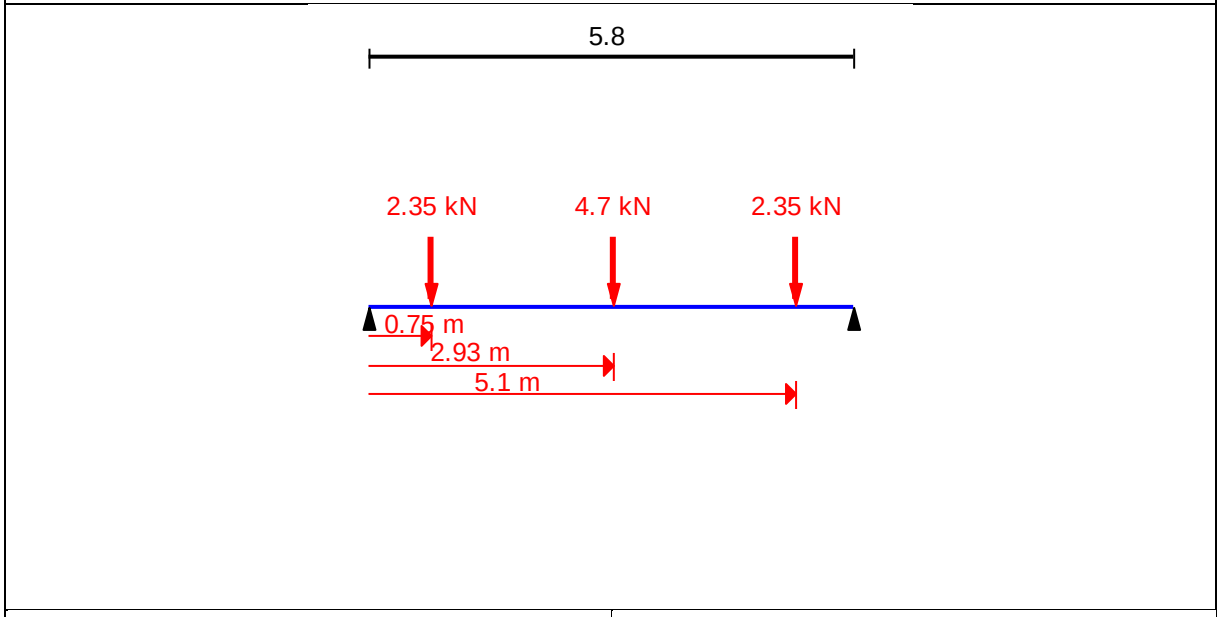


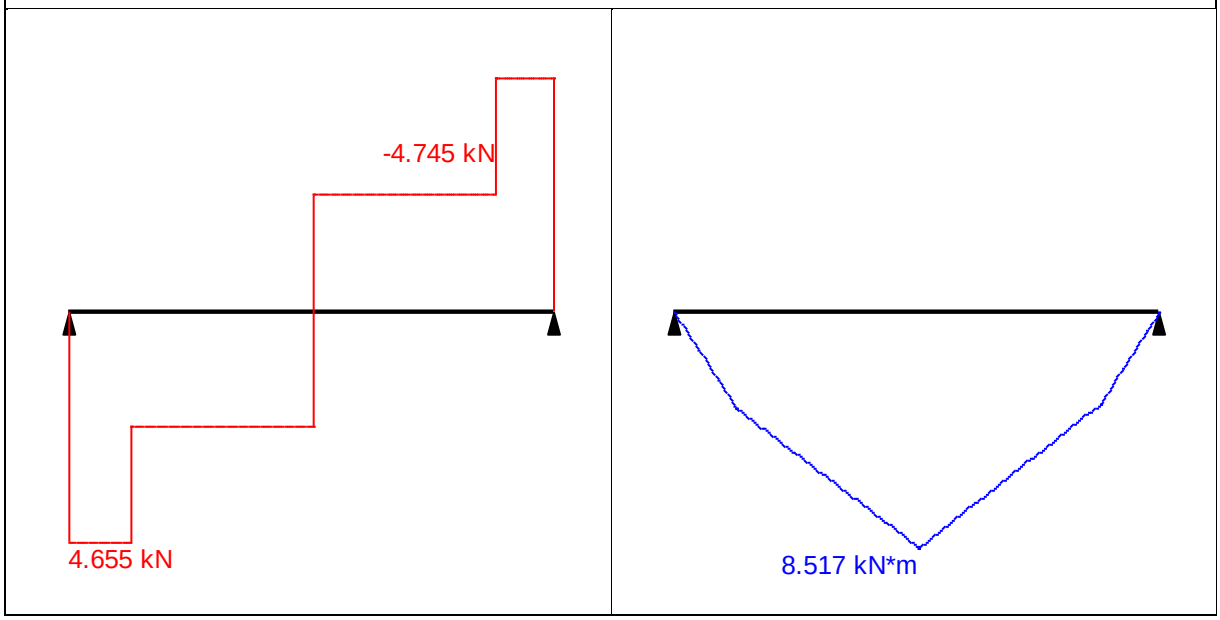
Load case 2 - Self weight of building structures except steel structures

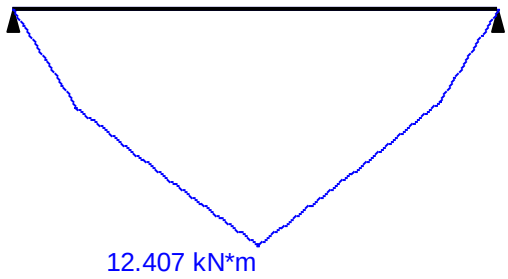
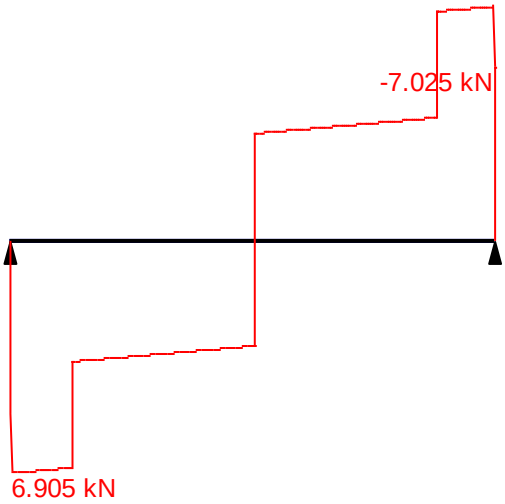
	Load type	Value		Position x		Load application width, s	
	length = 5.8 m						
		2.35	kN	0.75	m	1.e-004	m

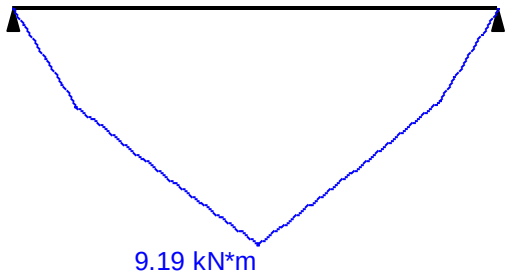
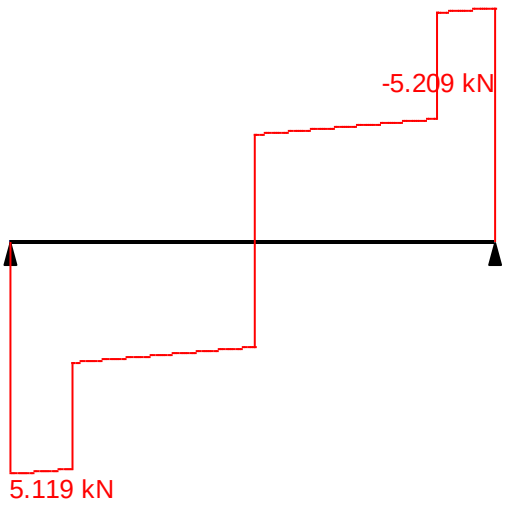
	Load type	Value		Position x		Load application width, s	
		2.35	kN	5.1	m	1.e-004	m
		4.7	kN	2.93	m	1.e-004	m

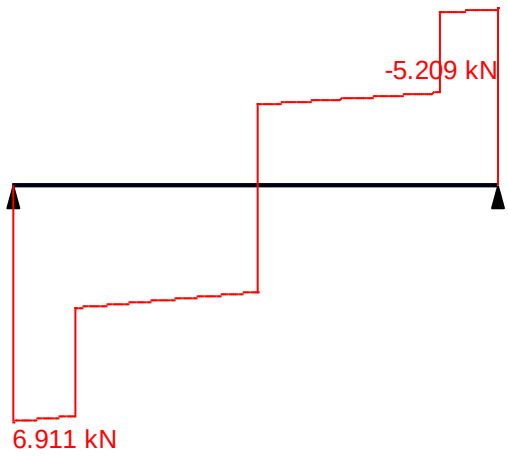
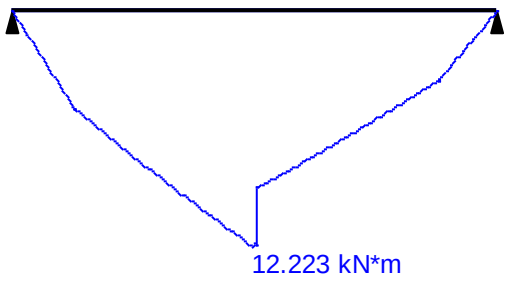
Load case 2 - Self weight of building structures except steel structures
z_a = 0 mm

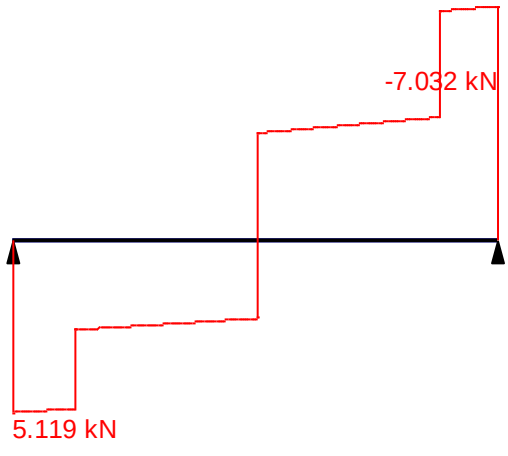
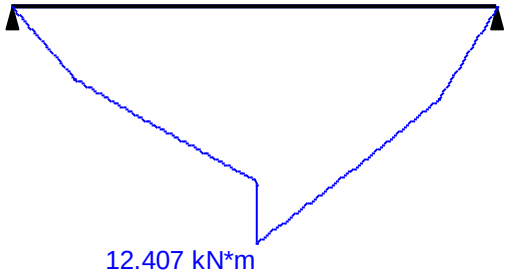


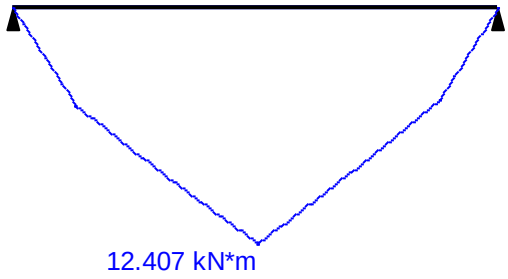
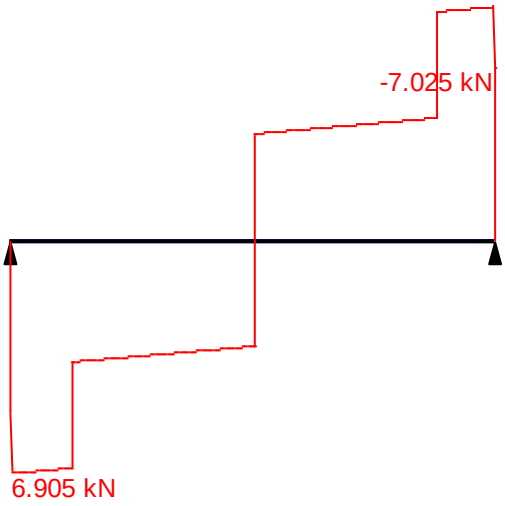


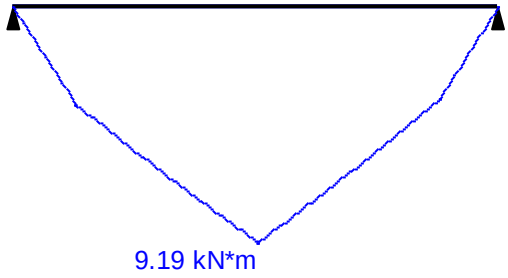
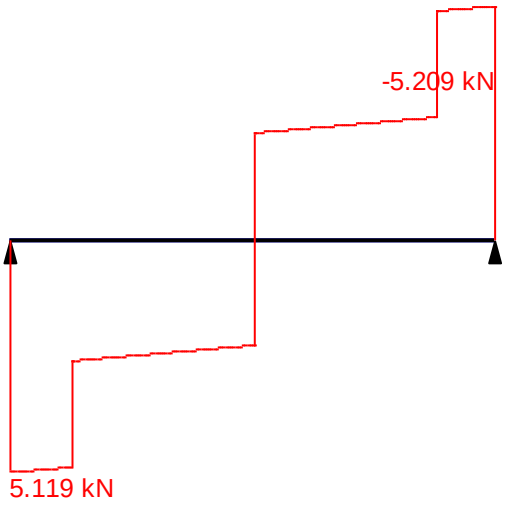
Envelope of the values Mmax for fundamental combination	
	
Maximum bending moment	Shear force corresponding to maximum bending moment

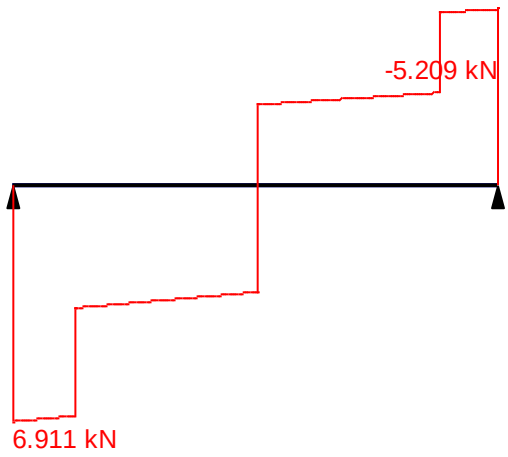
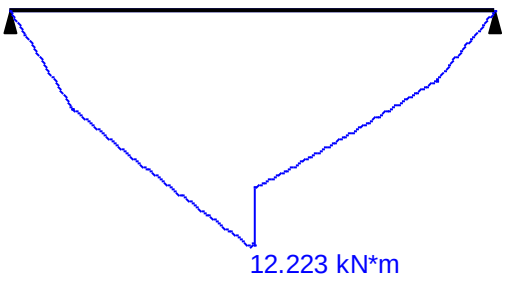
Envelope of the values Mmin for fundamental combination	
	
Minimum bending moment	Shear force corresponding to minimum bending moment

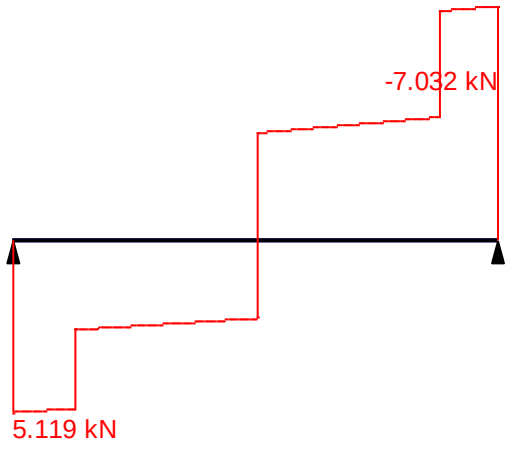
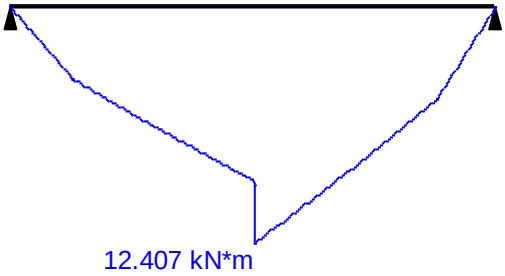
Envelope of the values Vmax for fundamental combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

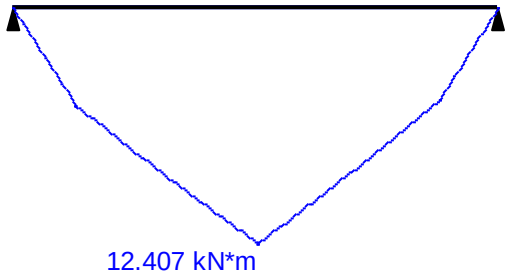
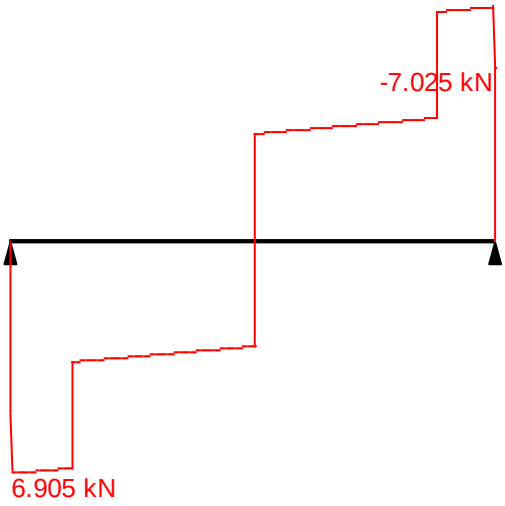
Envelope of the values Vmin for fundamental combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

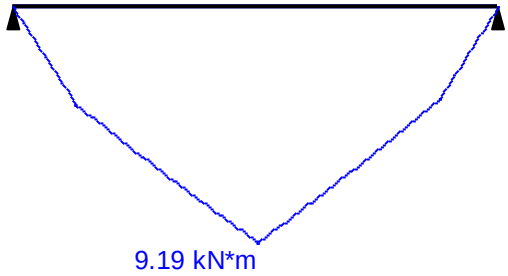
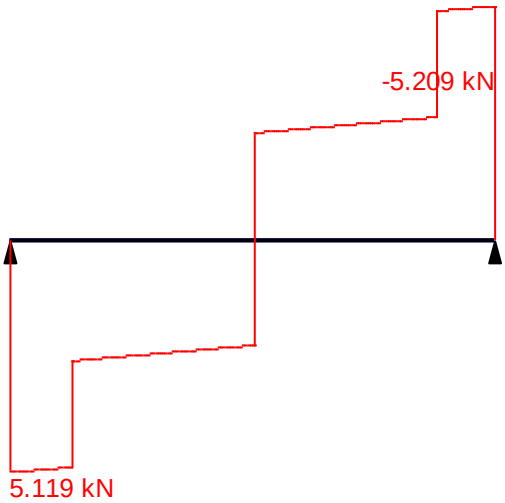
Envelope of the values Mmax for characteristic combination	
	
Maximum bending moment	Shear force corresponding to maximum bending moment

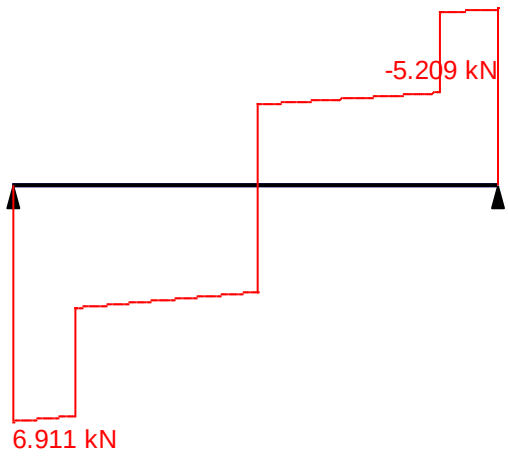
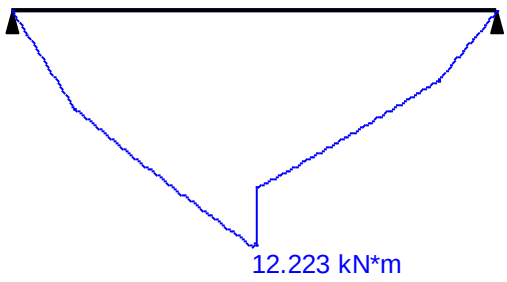
Envelope of the values Mmin for characteristic combination	
	
Minimum bending moment	Shear force corresponding to minimum bending moment

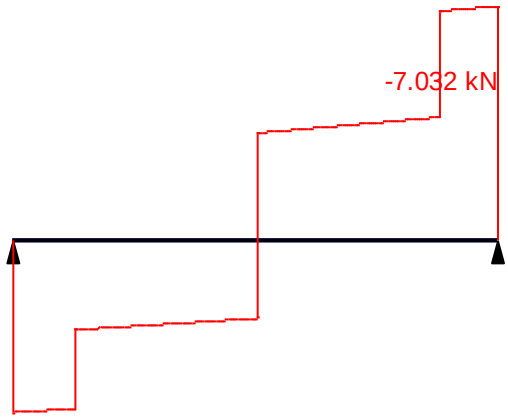
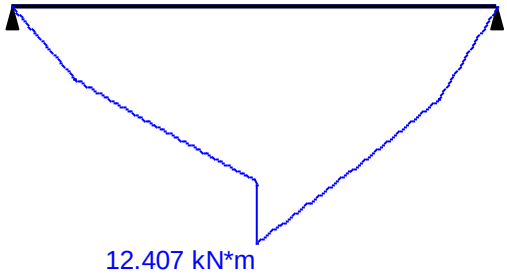
Envelope of the values Vmax for characteristic combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

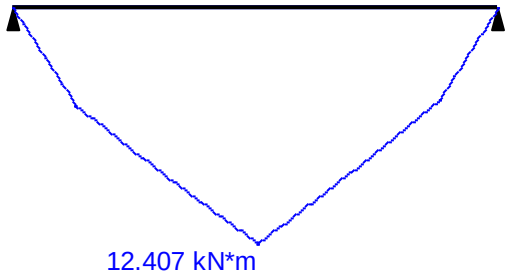
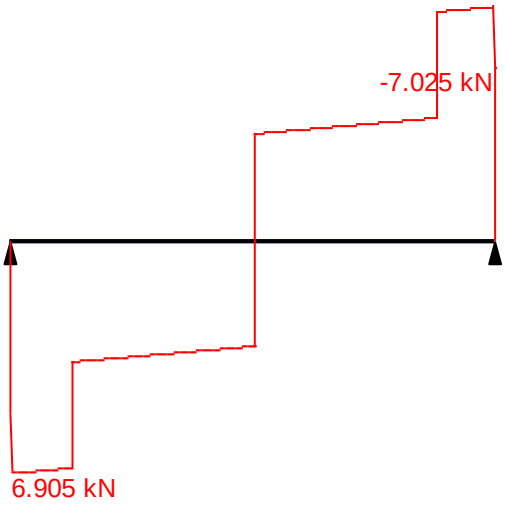
Envelope of the values Vmin for characteristic combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

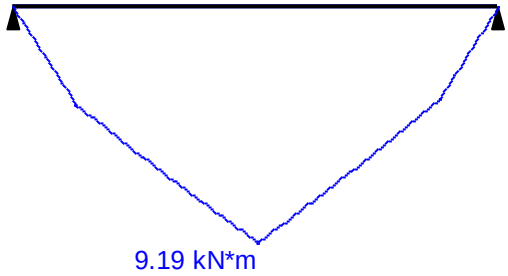
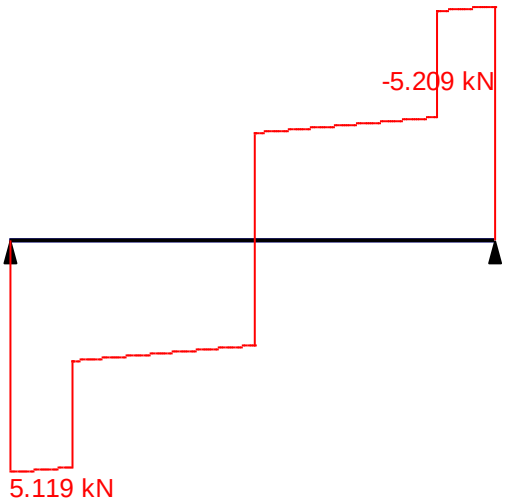
Envelope of the values Mmax for frequent combination	
	
Maximum bending moment	Shear force corresponding to maximum bending moment

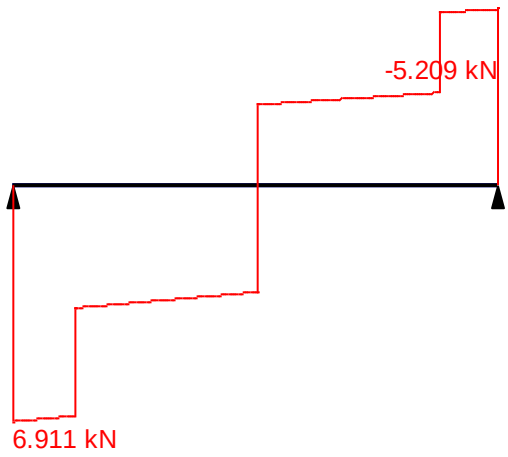
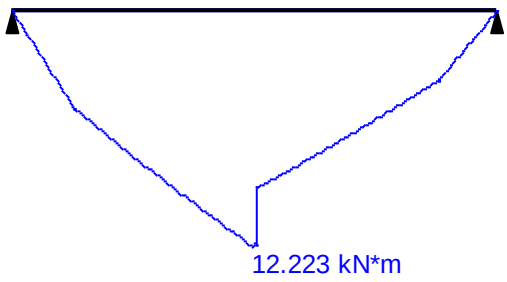
Envelope of the values Mmin for frequent combination	
	
Minimum bending moment	Shear force corresponding to minimum bending moment

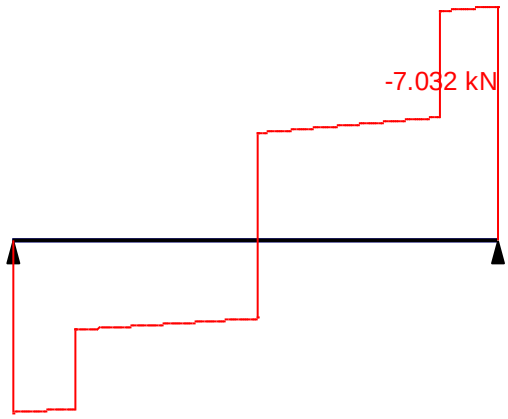
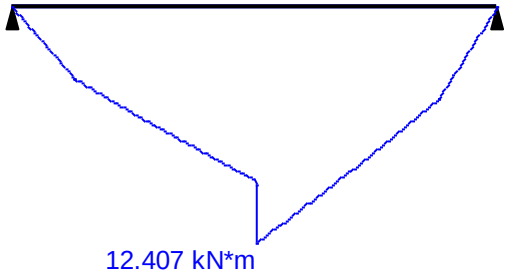
Envelope of the values Vmax for frequent combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

Envelope of the values Vmin for frequent combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

Envelope of the values Mmax for quasi-permanent combination	
	
Maximum bending moment	Shear force corresponding to maximum bending moment

Envelope of the values Mmin for quasi-permanent combination	
	
Minimum bending moment	Shear force corresponding to minimum bending moment

Envelope of the values Vmax for quasi-permanent combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

Envelope of the values Vmin for quasi-permanent combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

	Support reactions	
	Force in support 1	**Force in support 2**
	kN	**kN**
by criterion M_{max}	5.119	5.209
by criterion M_{min}	5.119	5.209
by criterion V_{max}	6.911	5.209
by criterion V_{min}	5.119	7.032

Results of analysis

Checked according to EN 1993	Check	Utilization Factor
Sec. 6.2.6 (EN1993-1-1)	Shear strength of the member subject to shear force Vz	0.024
Sec. 6.2.5 (EN1993-1-1)	Bending strength of the member subject to bending moment My	0.212
Sec. 6.3.2.1, 6.3.2.2 (EN1993-1-1)	Buckling strength of the member subject to lateral-torsional buckling due to bending moment My	0.236
Sec. 8(1) (EN1993-1-5)	Flange induced buckling	0.08
	Deflect limit for characteristic combination	0.731

Utilization Factor 0.731 - Deflect limit for characteristic combination

Maximum deflection -	k*L	Factor
for characteristic combination	0.005	0.731

Report created **2023.04.05 15:21:00 (UTC+02:00)** by **Kristall (64-bit)**, version: **21.1.9.7** dated **23.06.2020**

ARDYNO SIJŲ SKAIČIAVIMAI

Naujų ardyno sijų HEA 100 skaičiavimai

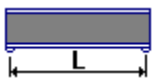
Beams

Analysis complies with EN 1993

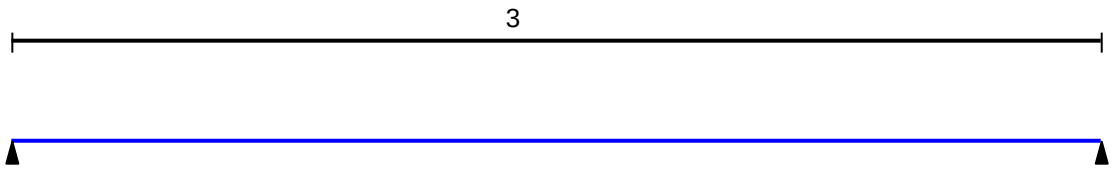
General Properties

Steel: S355

Importance factor $K_{FI} = 1$



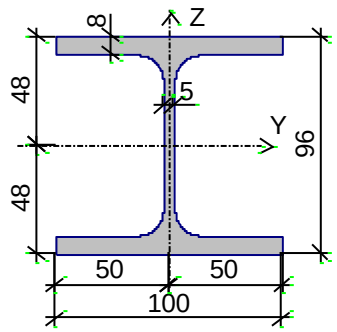
Structural scheme



Restraints against lateral displacements and rotations

	Left	Right
Displacement along Y	Restrained	Restrained
Displacement along Z	Restrained	Restrained
Rotation about Y		
Rotation about Z	Restrained	

Section



Profile: HEA Shapes NF A 45-201 100

Geometric Properties of the Section

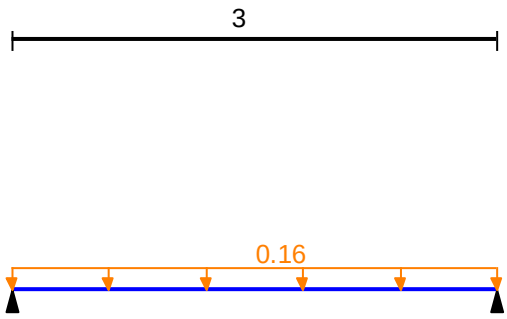
	Parameter	Value	Unit of measurement
A	Cross-sectional area	21.2	cm^2
$A_{v,y}$	Conventional shear area along U-axis	17.2	cm^2
$A_{v,z}$	Conventional shear area along V-axis	7.52	cm^2
α	Angle of principal axes of inertia	0	degree
I_y	Moment of inertia about centroidal Y1-axis parallel with Y-axis	349	cm^4
I_z	Moment of inertia about centroidal Z1-axis parallel with Z-axis	134	cm^4
I_t	Torsional moment of inertia (St. Venant)	4.69	cm^4
I_w	Sectorial moment of inertia	2594.24	cm^6
i_y	Radius of gyration about Y1-axis	4.057	cm
i_z	Radius of gyration about Z1-axis	2.514	cm
Y_b	Y-coordinate of the shear center	0	cm
Z_b	Z-coordinate of the shear center	0	cm
W_{u+}	Maximum section modulus about U-axis	72.708	cm^3
W_{u-}	Minimum section modulus about U-axis	72.708	cm^3
W_{v+}	Maximum section modulus about V-axis	26.8	cm^3

	Parameter	Value	Unit of measurement
W_{v-}	Minimum section modulus about V-axis	26.8	cm^3
$W_{pl,u}$	Plastic section modulus about U-axis	83.013	cm^3
$W_{pl,v}$	Plastic section modulus about V-axis	41.14	cm^3
I_u	Maximum moment of inertia	349	cm^4
I_v	Minimum moment of inertia	134	cm^4
i_u	Maximum radius of gyration	4.057	cm
i_v	Minimum radius of gyration	2.514	cm
a_{u+}	Core size along positive Y(U)-axis	1.264	cm
a_{u-}	Core size along negative Y(U)-axis	1.264	cm
a_{v+}	Core size along positive Z(V)-axis	3.43	cm
a_{v-}	Core size along negative Z(V)-axis	3.43	cm
P	Perimeter	56.14	cm
M	Mass per running meter	16.642	kg

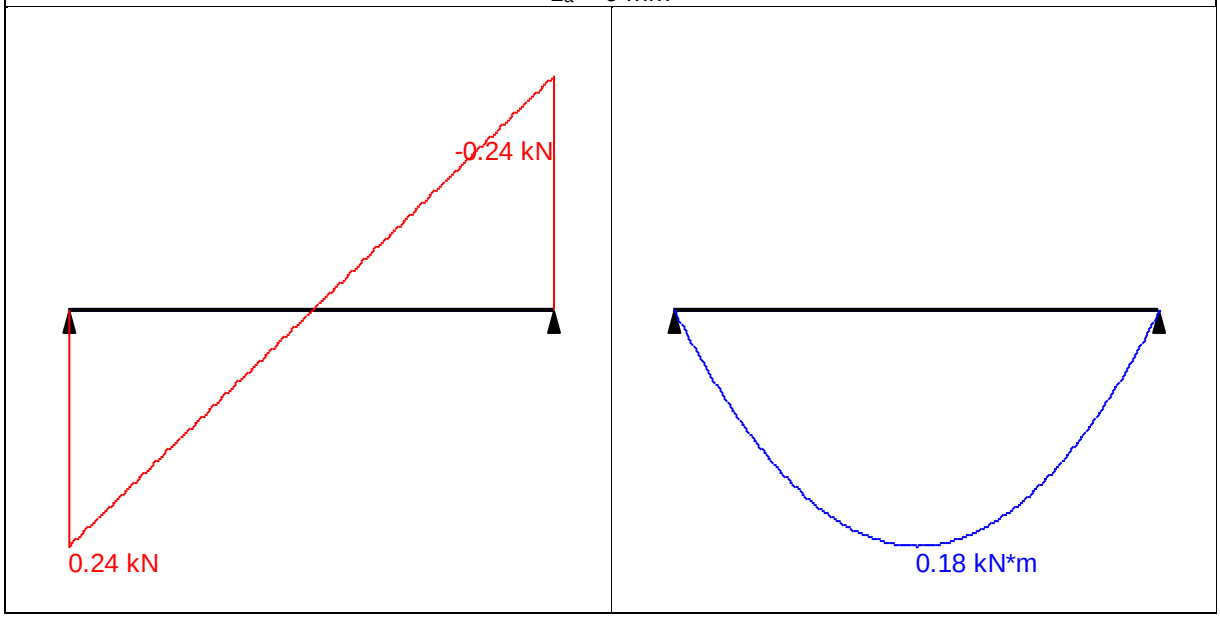
Load case 1 - Self weight of steel structures

	Load type	Value	
	length = 3 m		
		0.16	kN/m

Load case 1 - Self weight of steel structures
z_a = 0 mm



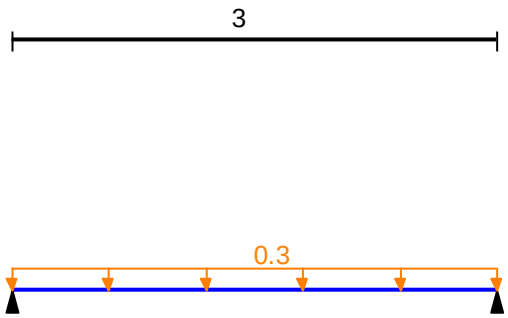
Load case 1 - Self weight of steel structures
z_a = 0 mm



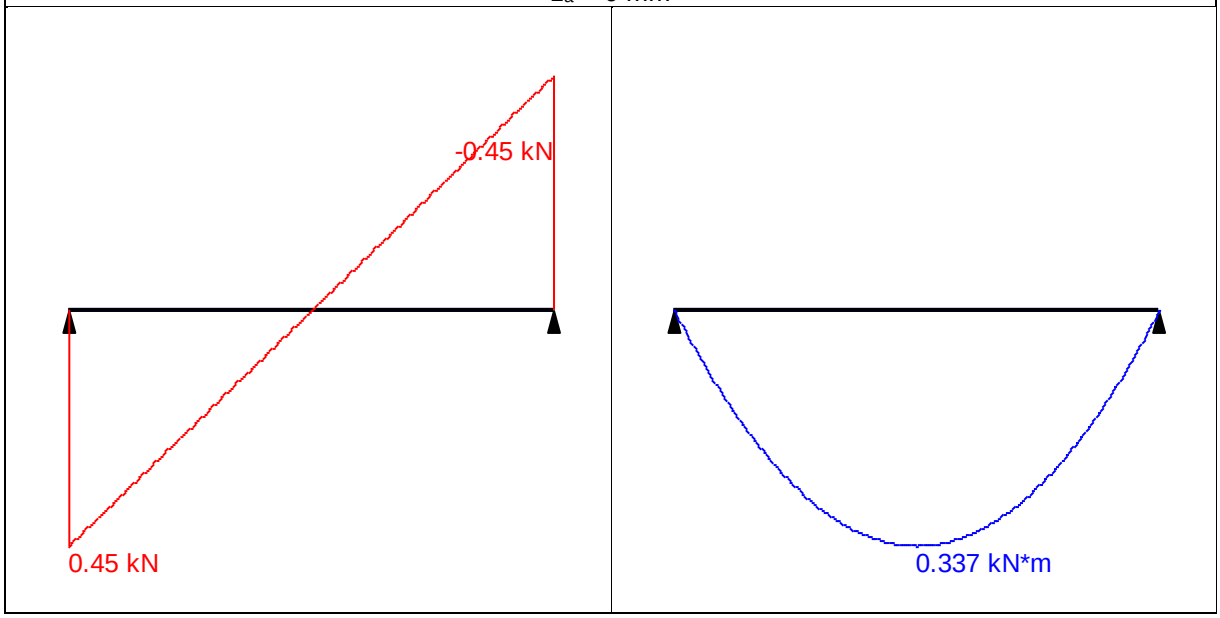
Load case 2 - Self weight of building structures except steel structures

	Load type	Value	
	length = 3 m		
		0.3	kN/m

Load case 2 - Self weight of building structures except steel structures
z_a = 0 mm



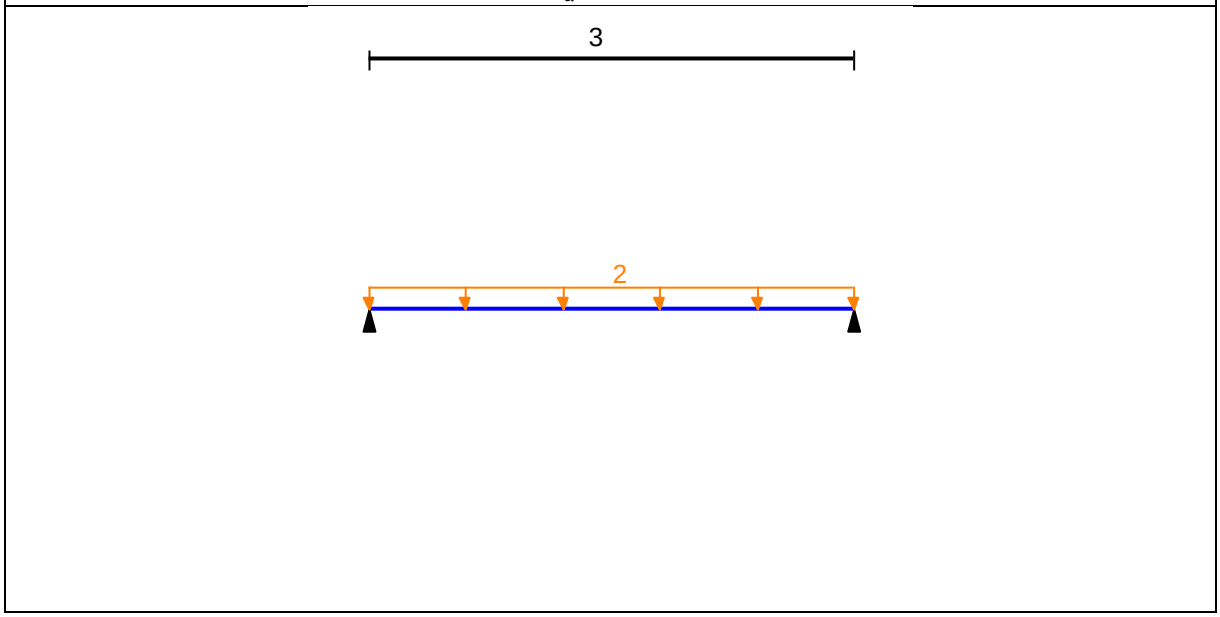
Load case 2 - Self weight of building structures except steel structures
z_a = 0 mm



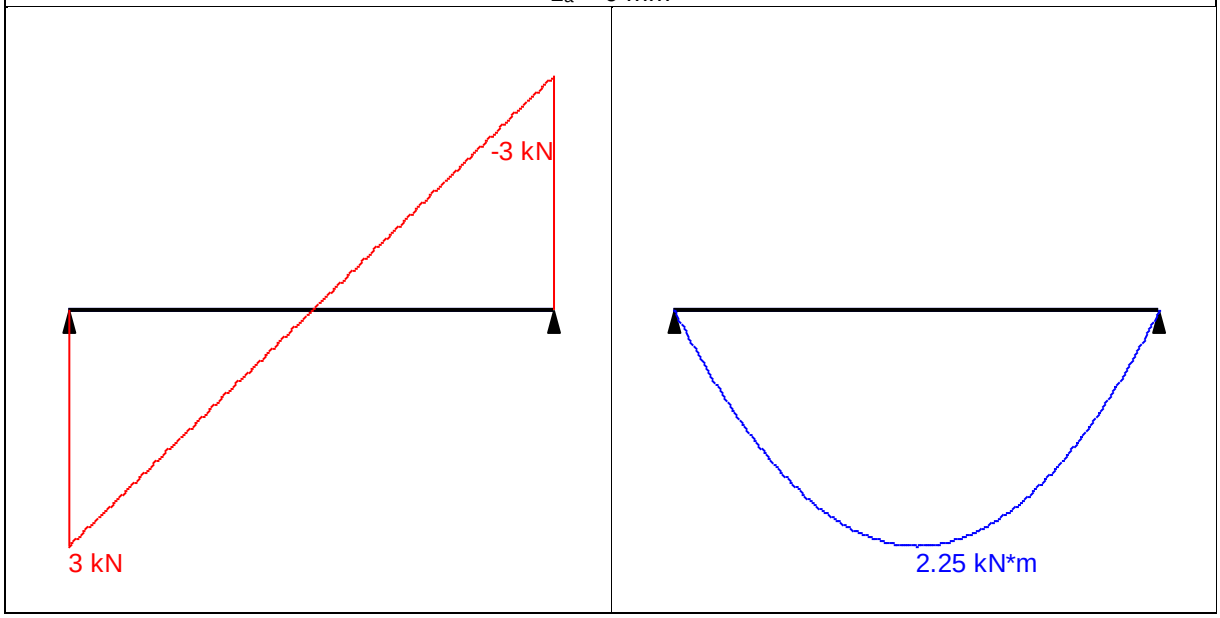
Load case 3 - Imposed loads in buildings, category A (domestic, residental areas)

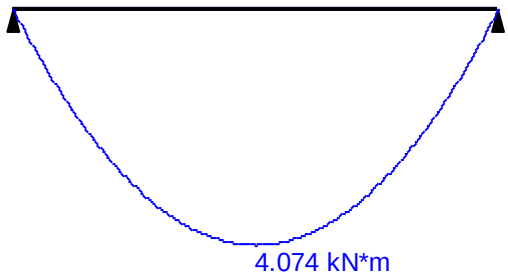
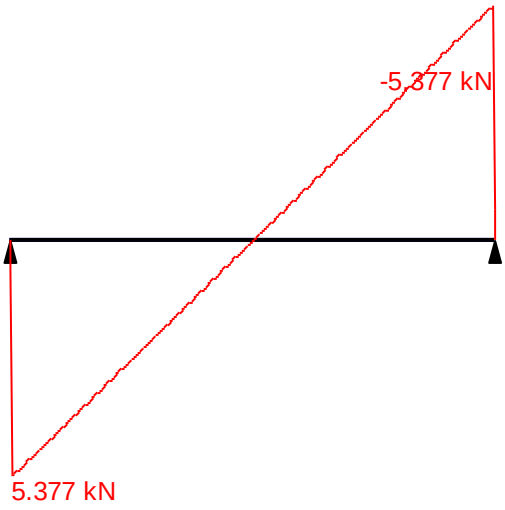
	Load type	Value	
	length = 3 m		
		2	kN/m

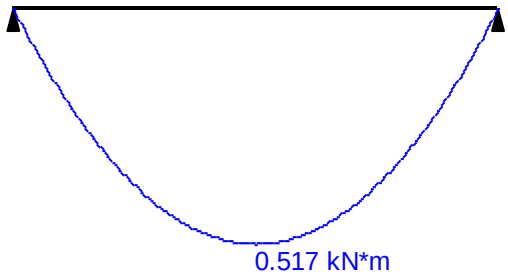
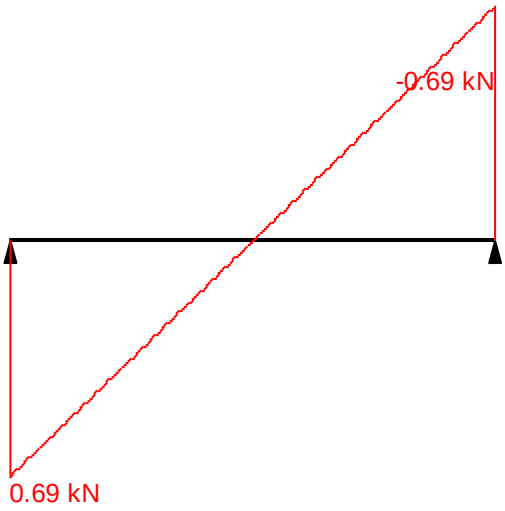
Load case 3 - Imposed loads in buildings, category A (domestic, residental areas)
z_a = 0 mm

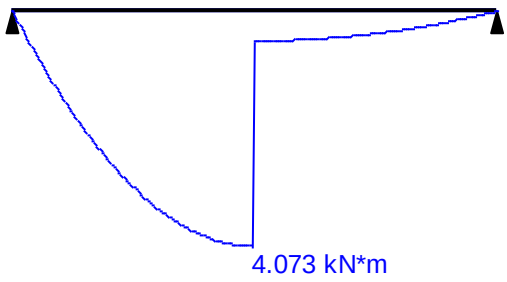


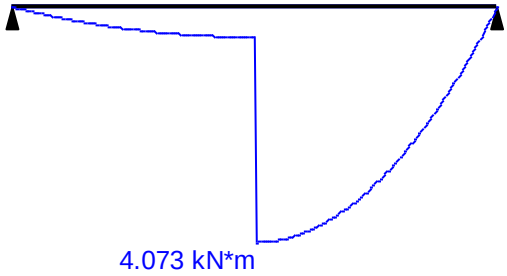
Load case 3 - Imposed loads in buildings, category A (domestic, residental areas)
z_a = 0 mm

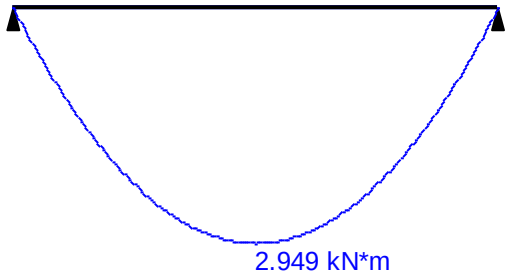
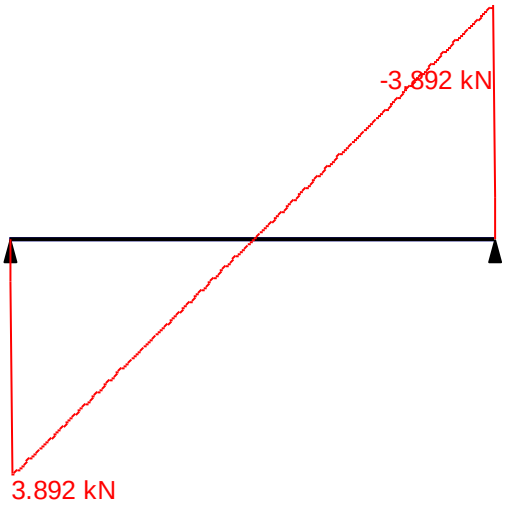


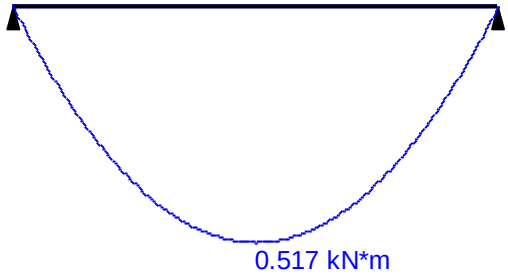
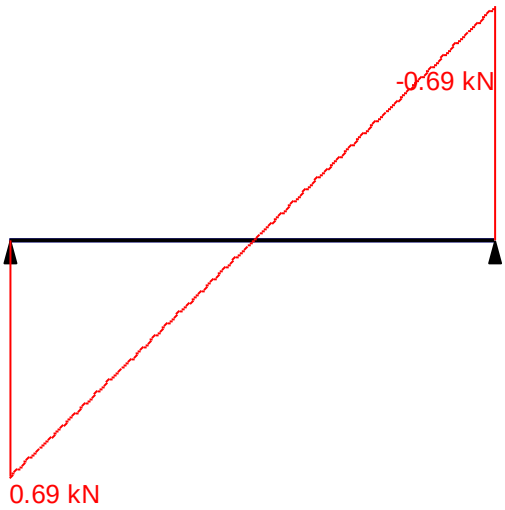
Envelope of the values Mmax for fundamental combination	
	
Maximum bending moment	Shear force corresponding to maximum bending moment

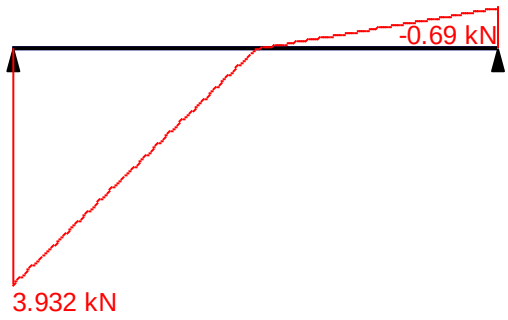
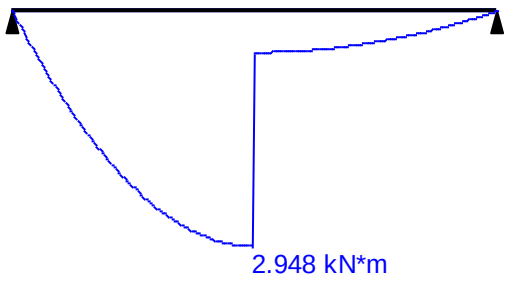
Envelope of the values Mmin for fundamental combination	
	
Minimum bending moment	Shear force corresponding to minimum bending moment

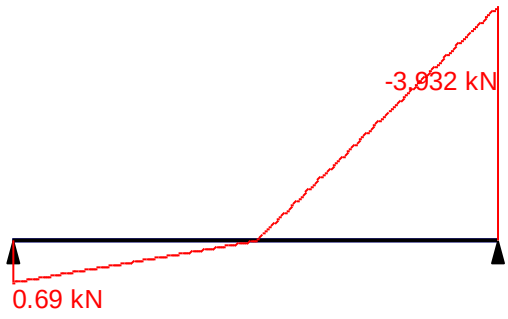
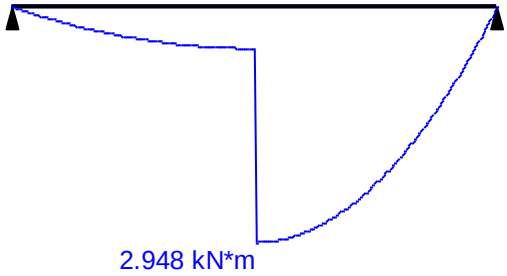
Envelope of the values Vmax for fundamental combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

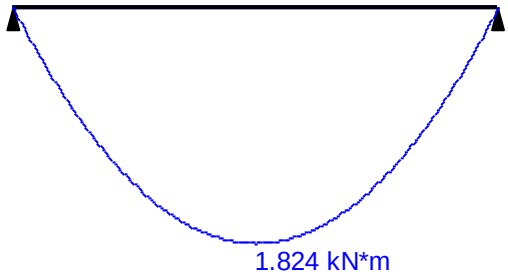
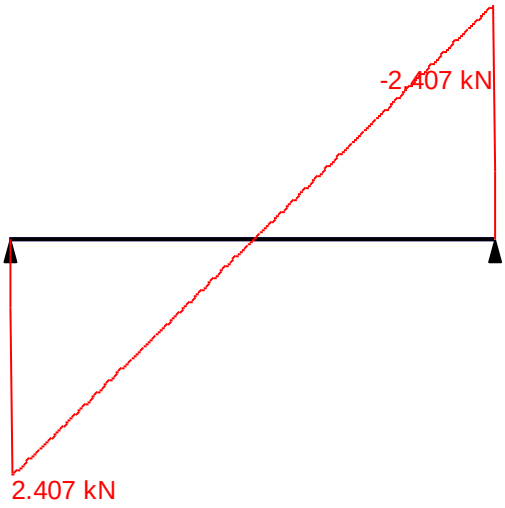
Envelope of the values Vmin for fundamental combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

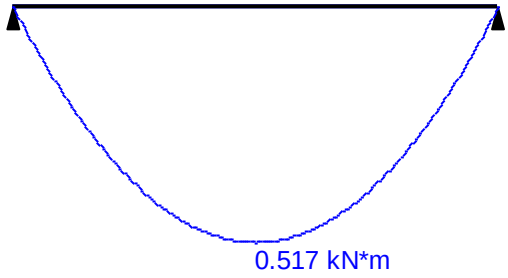
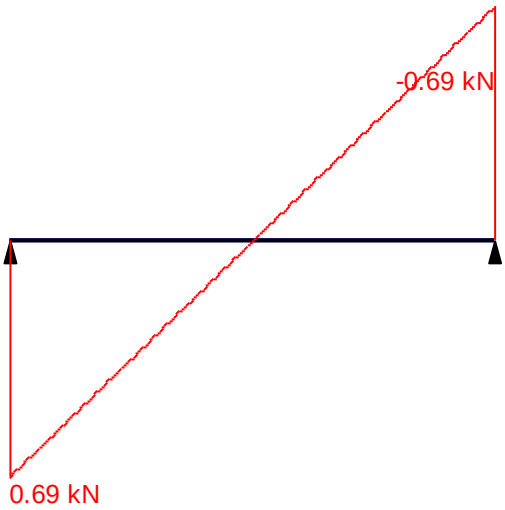
Envelope of the values Mmax for characteristic combination	
	
Maximum bending moment	Shear force corresponding to maximum bending moment

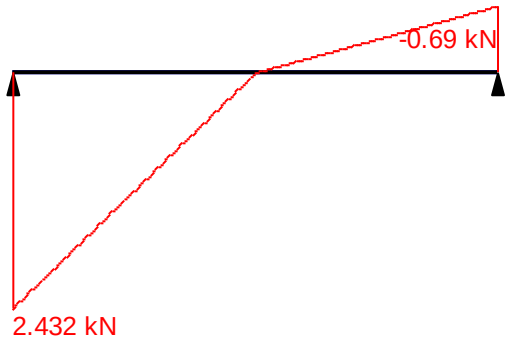
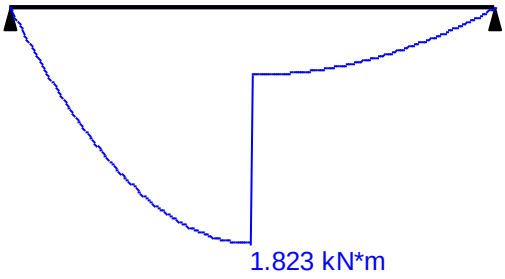
Envelope of the values Mmin for characteristic combination	
	
Minimum bending moment	Shear force corresponding to minimum bending moment

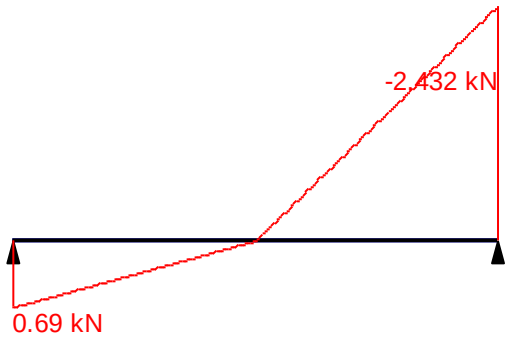
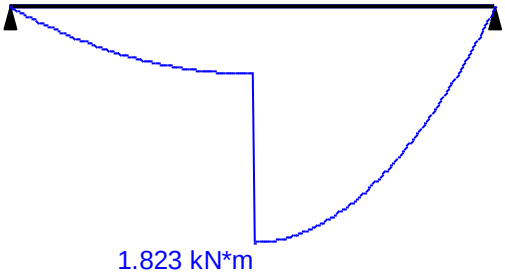
Envelope of the values Vmax for characteristic combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

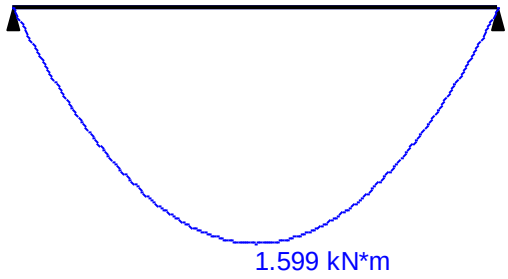
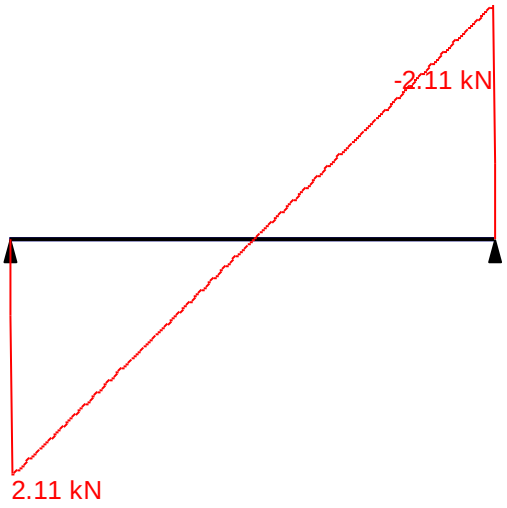
Envelope of the values Vmin for characteristic combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

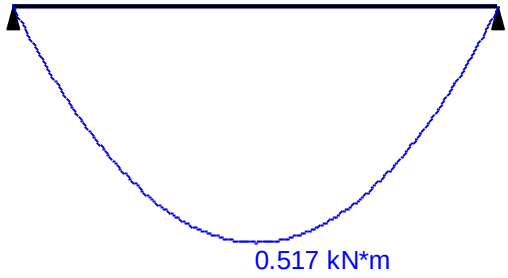
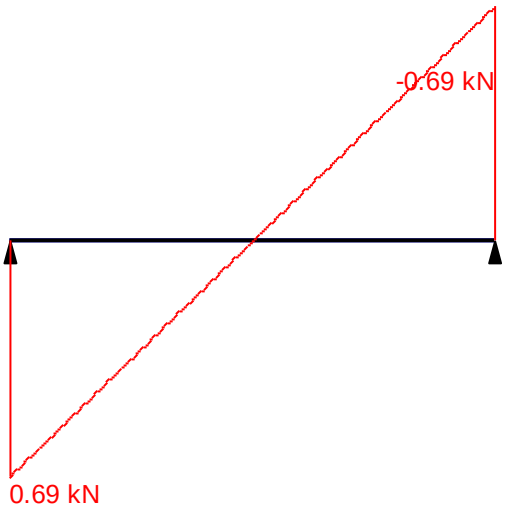
Envelope of the values Mmax for frequent combination	
	
Maximum bending moment	Shear force corresponding to maximum bending moment

Envelope of the values Mmin for frequent combination	
	
Minimum bending moment	Shear force corresponding to minimum bending moment

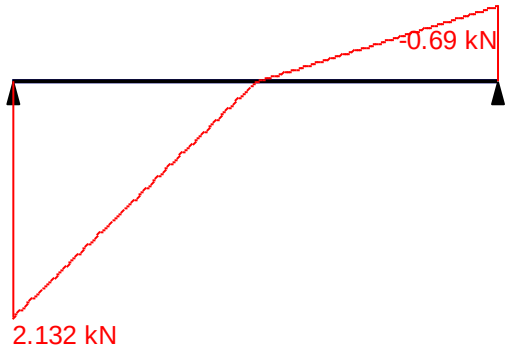
Envelope of the values Vmax for frequent combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

Envelope of the values Vmin for frequent combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

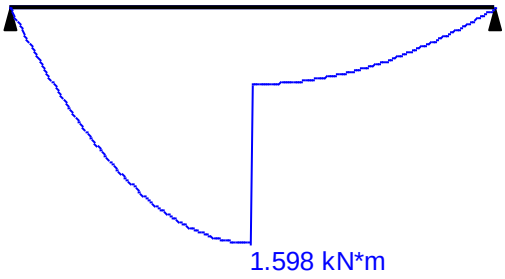
Envelope of the values Mmax for quasi-permanent combination	
	
Maximum bending moment	Shear force corresponding to maximum bending moment

Envelope of the values Mmin for quasi-permanent combination	
	
Minimum bending moment	Shear force corresponding to minimum bending moment

Envelope of the values Vmax for quasi-permanent combination

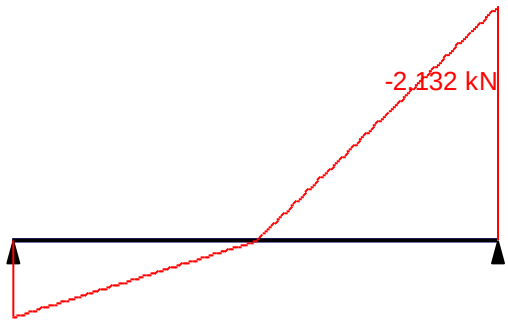


Maximum shear force

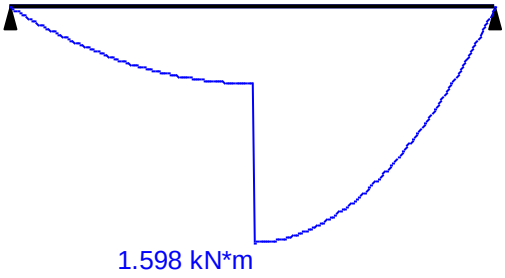


Bending moment corresponding to maximum shear force

Envelope of the values Vmin for quasi-permanent combination



Minimum shear force



Bending moment corresponding to minimum shear force

	Support reactions	
	Force in support 1	**Force in support 2**
	kN	**kN**
by criterion M_{max}	0.69	0.69
by criterion M_{min}	0.69	0.69
by criterion V_{max}	5.431	0.69
by criterion V_{min}	0.69	5.431

Results of analysis

Checked according to EN 1993	Check	Utilization Factor
Sec. 6.2.6 (EN1993-1-1)	Shear strength of the member subject to shear force Vz	0.027
Sec. 6.2.5 (EN1993-1-1)	Bending strength of the member subject to bending moment My	0.138
Sec. 6.3.2.1, 6.3.2.2 (EN1993-1-1)	Buckling strength of the member subject to lateral-torsional buckling due to bending moment My	0.178
Sec. 8(1) (EN1993-1-5)	Flange induced buckling	0.08
	Deflect limit for characteristic combination	0.188

Utilization Factor 0.188 - Deflect limit for characteristic combination

Maximum deflection -	k*L	Factor
for characteristic combination	0.00667	0.188

Report created **2023.04.05 15:27:05 (UTC+02:00)** by **Kristall (64-bit)**, version: **21.1.9.7** dated **23.06.2020**

Esamų ardyno sijų I20 skaičiavimai

Beams

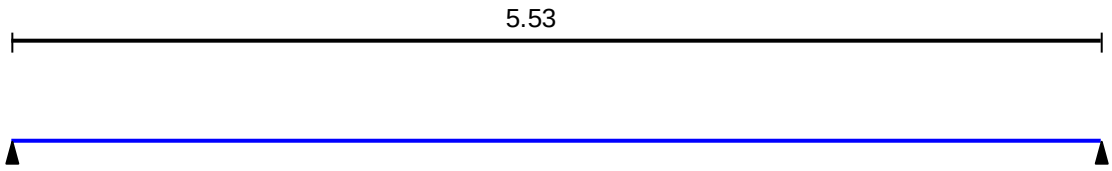
Analysis complies with EN 1993

General Properties

Steel: S355

Importance factor $K_{FI} = 1$

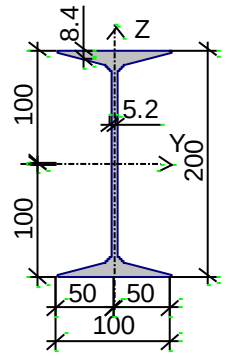
Structural scheme



Restraints against lateral displacements and rotations

	Left	Right
Displacement along Y	Restrained	Restrained
Displacement along Z	Restrained	Restrained
Rotation about Y		
Rotation about Z		

Section



Profile: I-beam with sloped inner flange surfaces GOST 8239-89 20

Geometric Properties of the Section

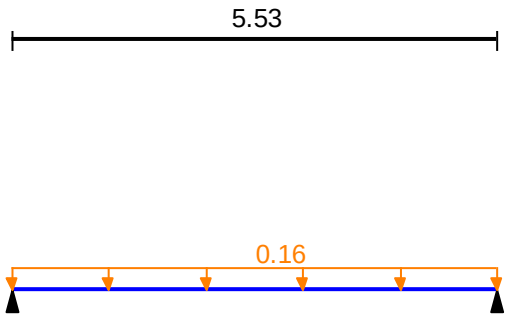
	Parameter	Value	Unit of measurement
A	Cross-sectional area	26.8	cm^2
$A_{v,y}$	Conventional shear area along U-axis	17.274	cm^2
$A_{v,z}$	Conventional shear area along V-axis	12.033	cm^2
α	Angle of principal axes of inertia	0	degree
I_y	Moment of inertia about centroidal Y1-axis parallel with Y-axis	1840	cm^4
I_z	Moment of inertia about centroidal Z1-axis parallel with Z-axis	115	cm^4
I_t	Torsional moment of inertia (St. Venant)	6.92	cm^4
I_w	Sectorial moment of inertia	10554.286	cm^6
i_y	Radius of gyration about Y1-axis	8.286	cm
i_z	Radius of gyration about Z1-axis	2.071	cm
Y_b	Y-coordinate of the shear center	0	cm
Z_b	Z-coordinate of the shear center	0	cm
W_{u+}	Maximum section modulus about U-axis	184	cm^3
W_{u-}	Minimum section modulus about U-axis	184	cm^3
W_{v+}	Maximum section modulus about V-axis	23	cm^3

	Parameter	Value	Unit of measurement
W_{v-}	Minimum section modulus about V-axis	23	cm^3
$W_{pl,u}$	Plastic section modulus about U-axis	211.507	cm^3
$W_{pl,v}$	Plastic section modulus about V-axis	43.604	cm^3
I_u	Maximum moment of inertia	1840	cm^4
I_v	Minimum moment of inertia	115	cm^4
i_u	Maximum radius of gyration	8.286	cm
i_v	Minimum radius of gyration	2.071	cm
a_{u+}	Core size along positive Y(U)-axis	0.858	cm
a_{u-}	Core size along negative Y(U)-axis	0.858	cm
a_{v+}	Core size along positive Z(V)-axis	6.866	cm
a_{v-}	Core size along negative Z(V)-axis	6.866	cm
P	Perimeter	76.642	cm
M	Mass per running meter	21.038	kg

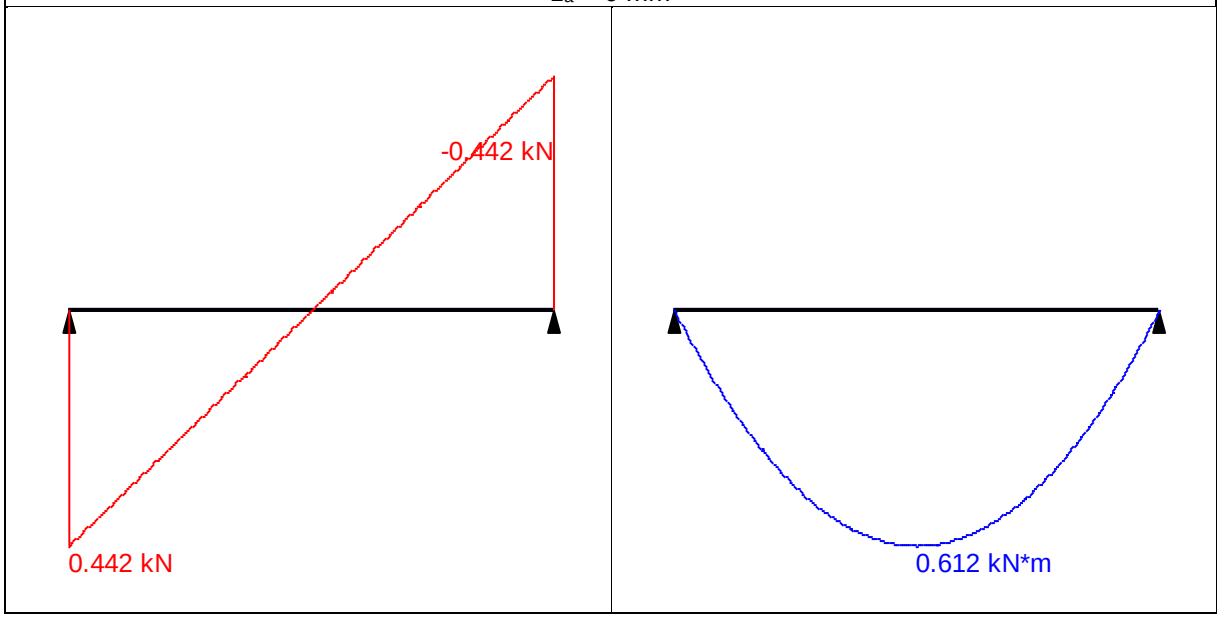
Load case 1 - Self weight of building structures except steel structures

	Load type	Value	
	length = 5.53 m		
		0.16	kN/m

Load case 1 - Self weight of building structures except steel structures
z_a = 0 mm



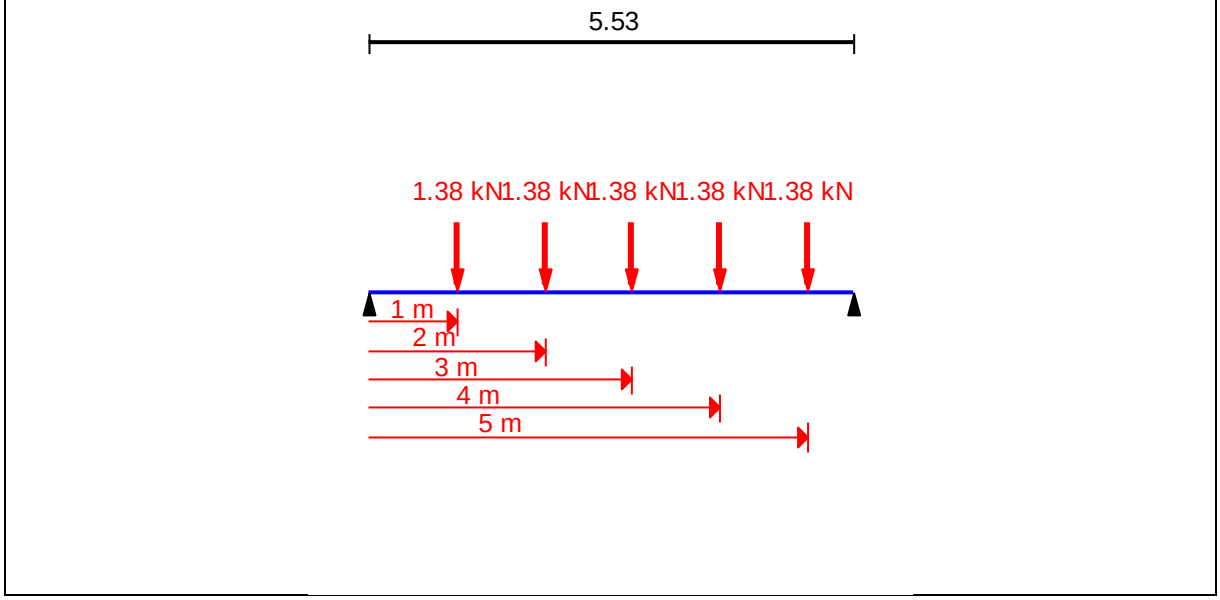
Load case 1 - Self weight of building structures except steel structures
z_a = 0 mm



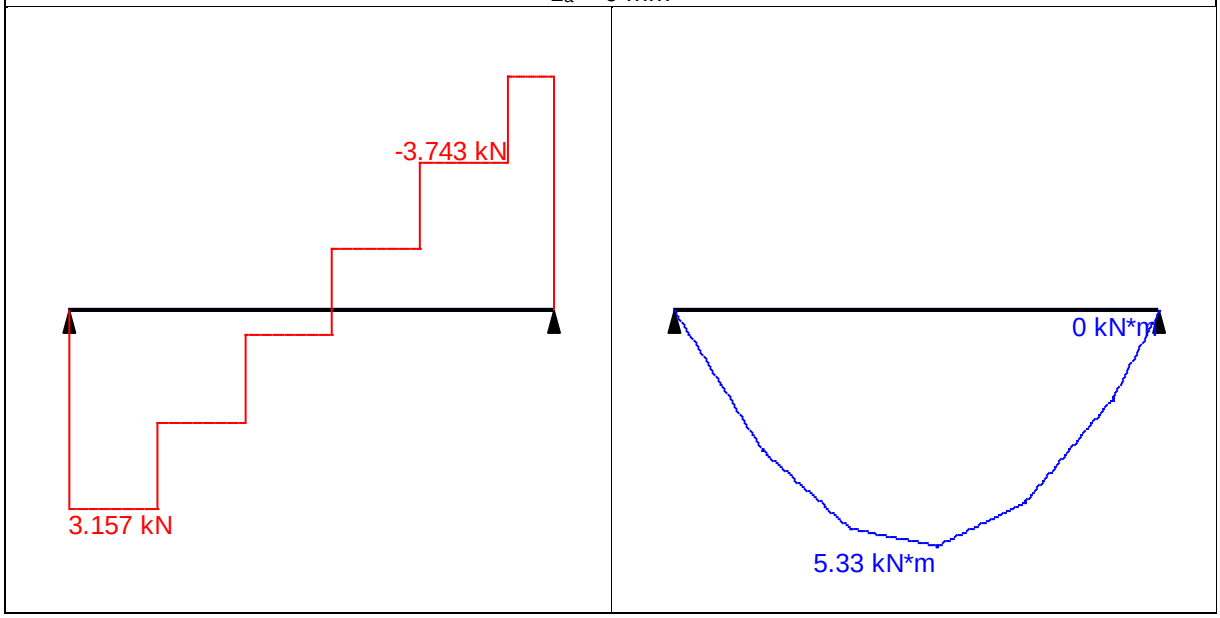
Load case 2 - Self weight of building structures except steel structures

	Load type	Value		Position x		Load application width, s	
	length = 5.53 m						
		1.38	kN	1	m	1.e-004	m
		1.38	kN	2	m	1.e-004	m
		1.38	kN	3	m	1.e-004	m
		1.38	kN	4	m	1.e-004	m
		1.38	kN	5	m	1.e-004	m

Load case 2 - Self weight of building structures except steel structures
z_a = 0 mm



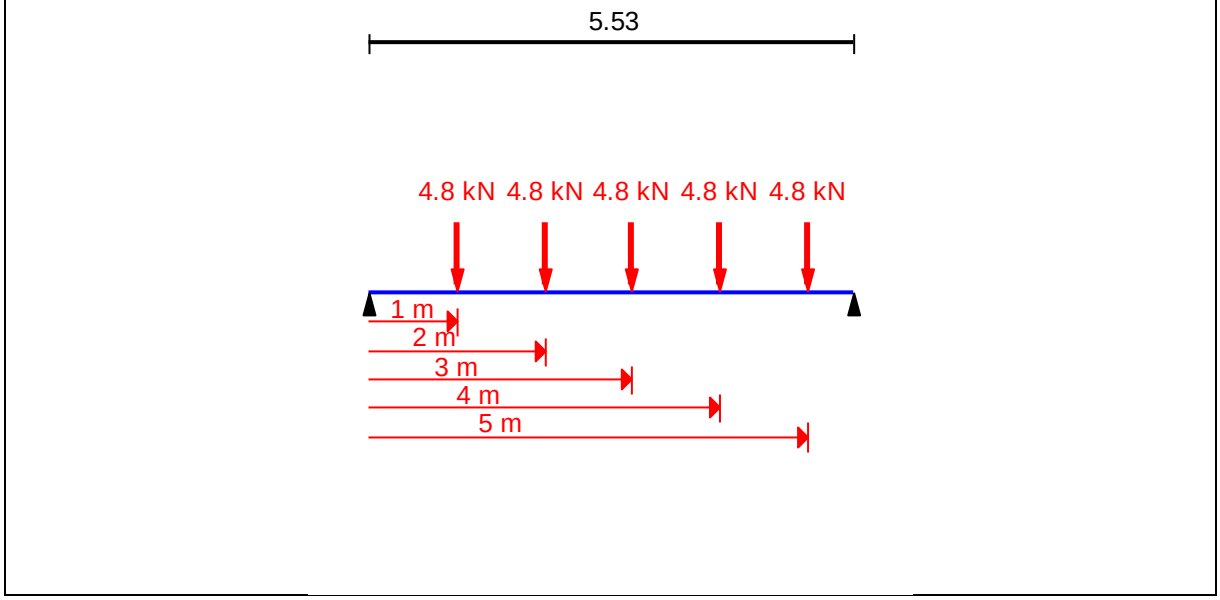
Load case 2 - Self weight of building structures except steel structures
z_a = 0 mm



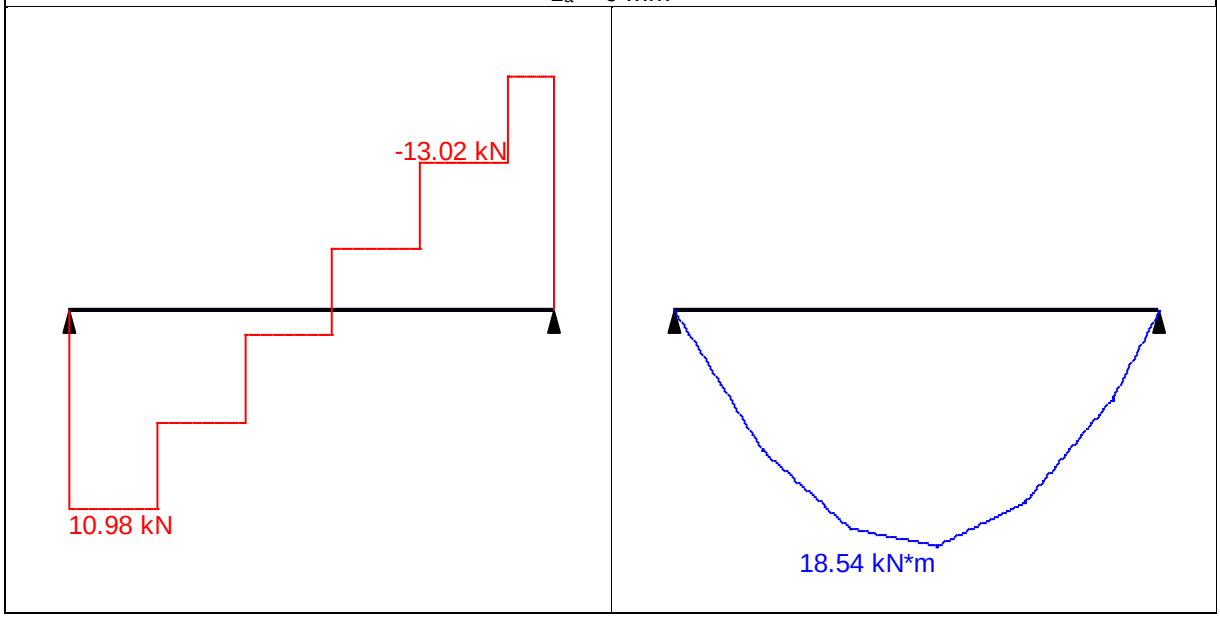
Load case 3 - Imposed loads in buildings, category A (domestic, residental areas)

	Load type	Value		Position x		Load application width, s	
	length = 5.53 m						
		4.8	kN	1	m	1.e-004	m
		4.8	kN	2	m	1.e-004	m
		4.8	kN	3	m	1.e-004	m
		4.8	kN	4	m	1.e-004	m
		4.8	kN	5	m	1.e-004	m

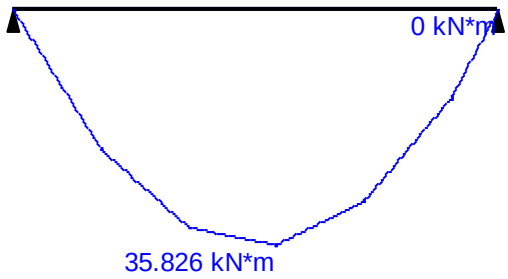
Load case 3 - Imposed loads in buildings, category A (domestic, residental areas)
z_a = 0 mm



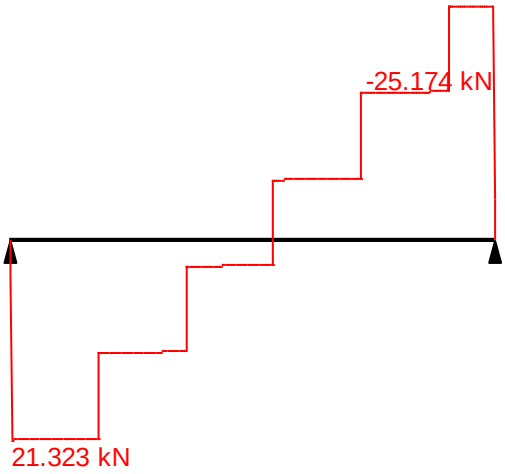
Load case 3 - Imposed loads in buildings, category A (domestic, residental areas)
z_a = 0 mm



Envelope of the values Mmax for fundamental combination

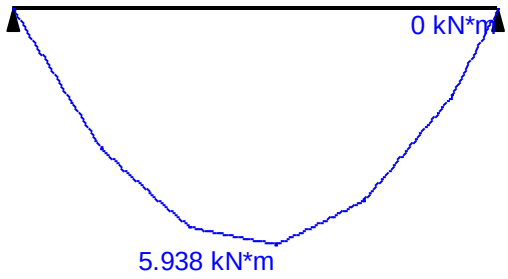


Maximum bending moment

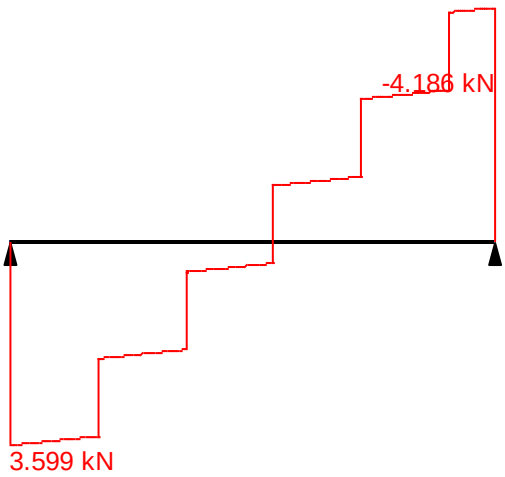


Shear force corresponding to maximum bending moment

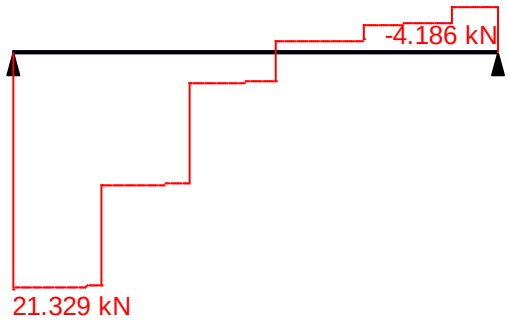
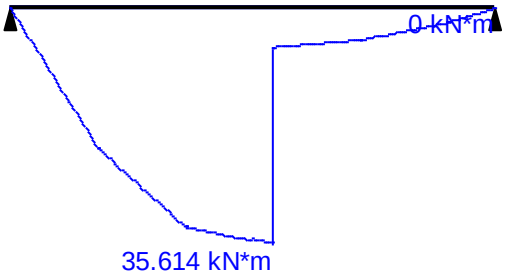
Envelope of the values Mmin for fundamental combination

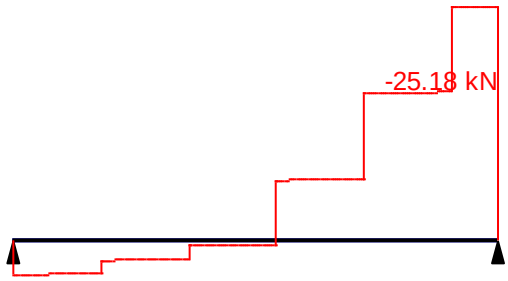
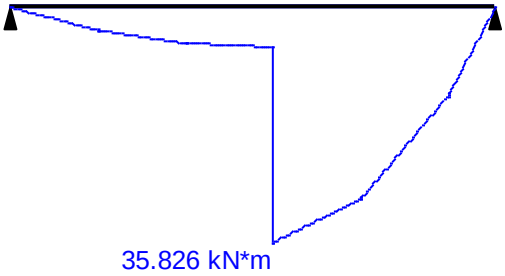


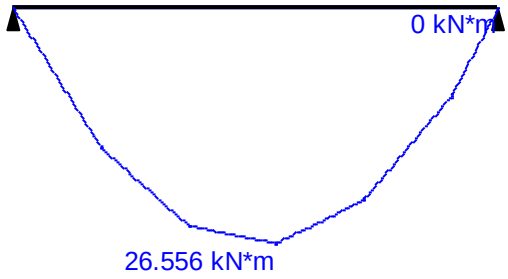
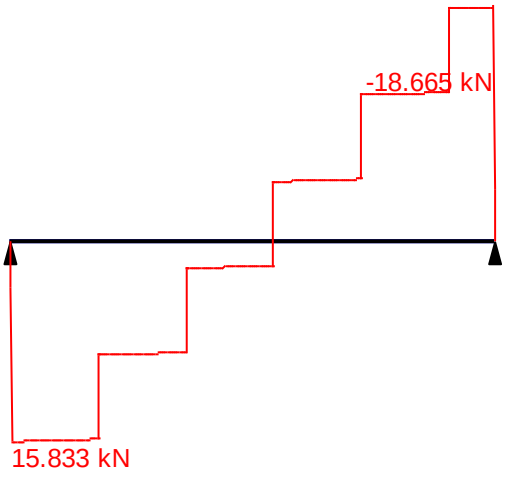
Minimum bending moment

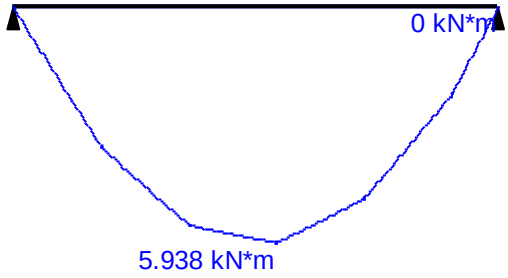
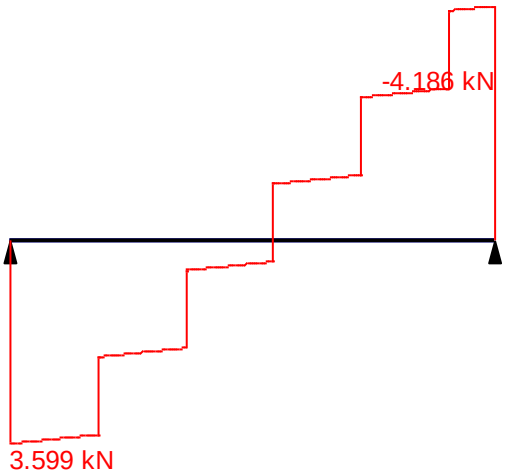


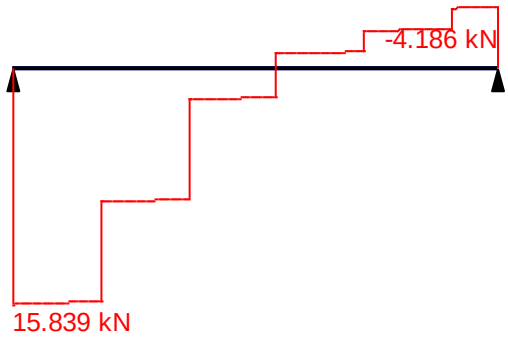
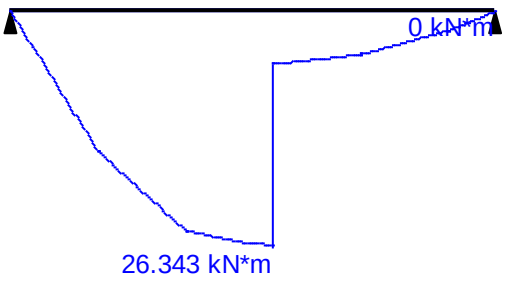
Shear force corresponding to minimum bending moment

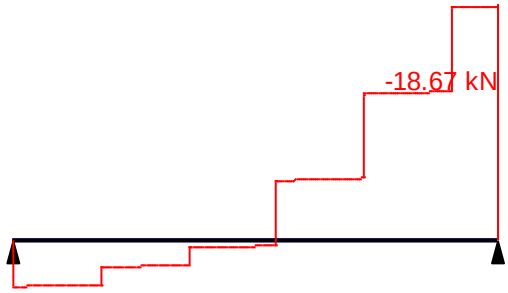
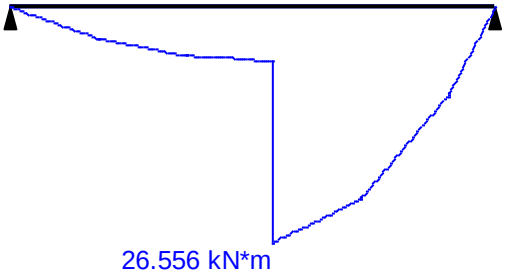
Envelope of the values Vmax for fundamental combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

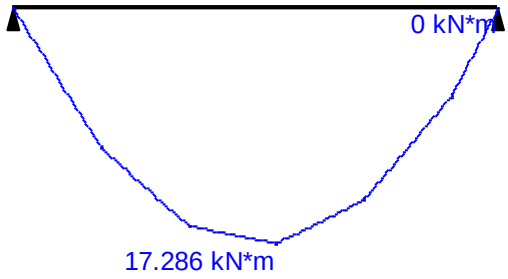
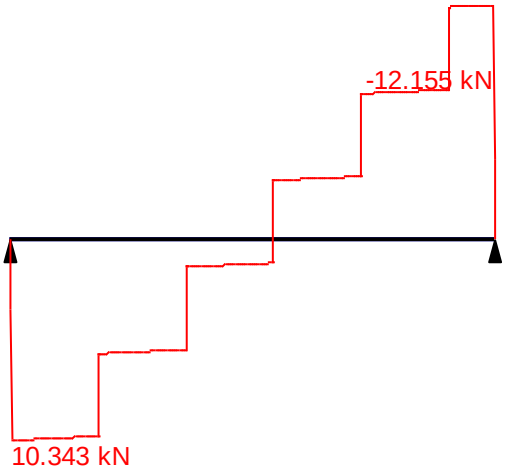
Envelope of the values Vmin for fundamental combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

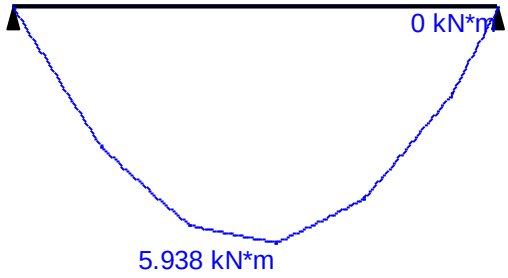
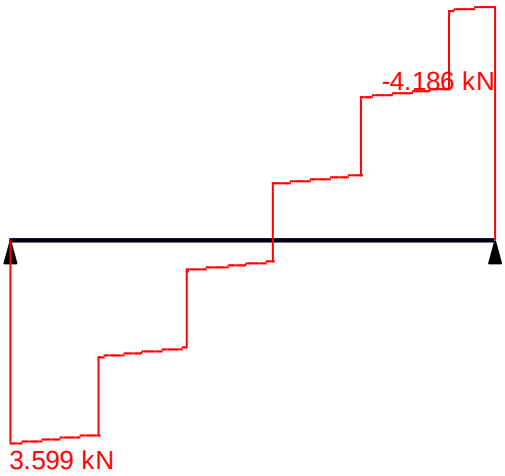
Envelope of the values Mmax for characteristic combination	
	
Maximum bending moment	Shear force corresponding to maximum bending moment

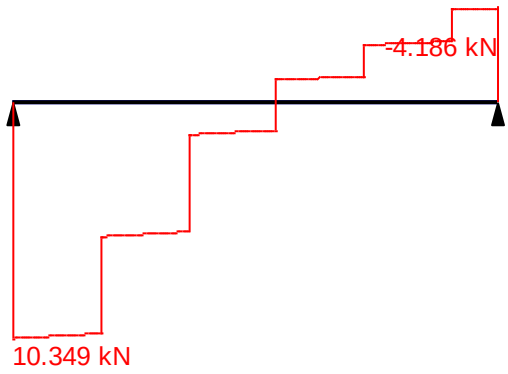
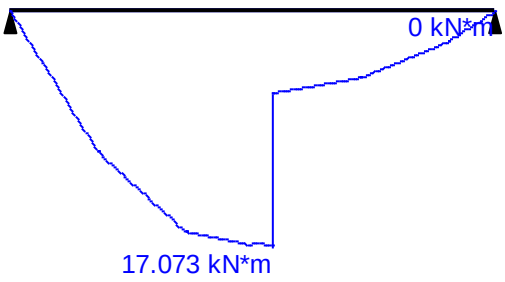
Envelope of the values Mmin for characteristic combination	
	
Minimum bending moment	Shear force corresponding to minimum bending moment

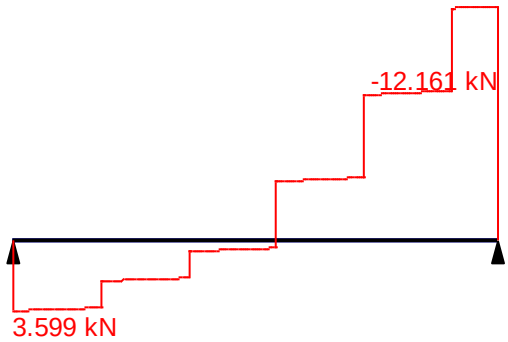
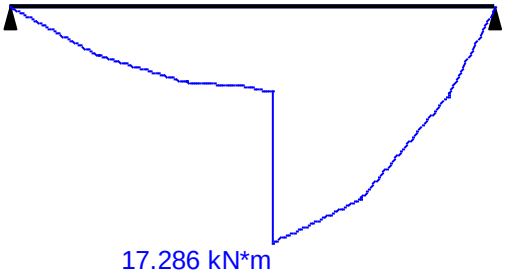
Envelope of the values Vmax for characteristic combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

Envelope of the values Vmin for characteristic combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

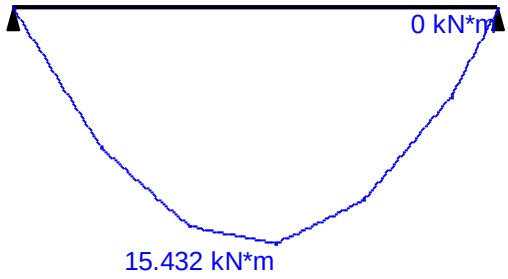
Envelope of the values Mmax for frequent combination	
	
Maximum bending moment	Shear force corresponding to maximum bending moment

Envelope of the values Mmin for frequent combination	
	
Minimum bending moment	Shear force corresponding to minimum bending moment

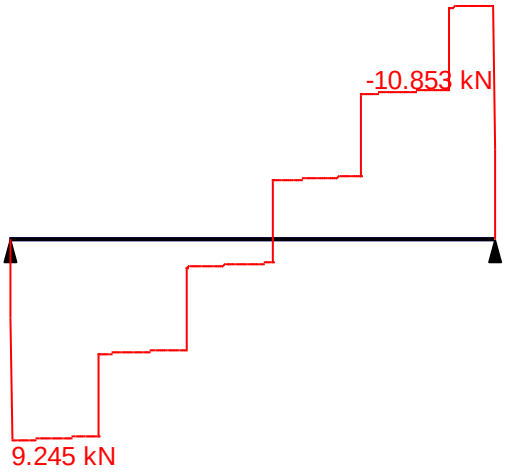
Envelope of the values Vmax for frequent combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

Envelope of the values Vmin for frequent combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

Envelope of the values Mmax for quasi-permanent combination

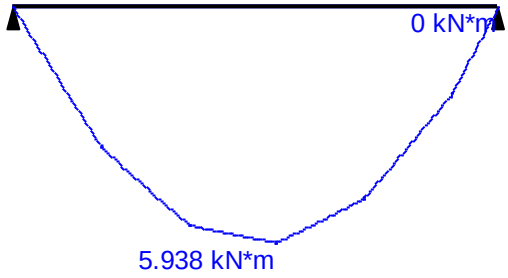


Maximum bending moment

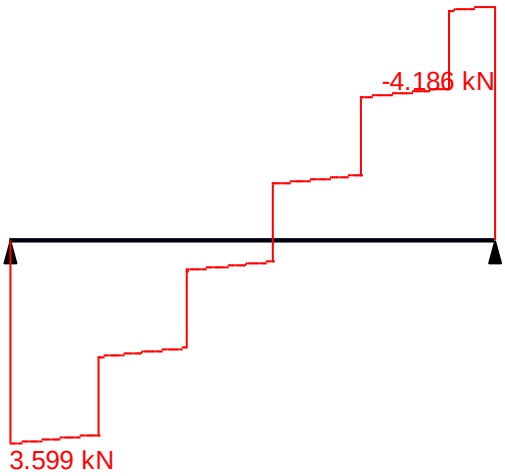


Shear force corresponding to maximum bending moment

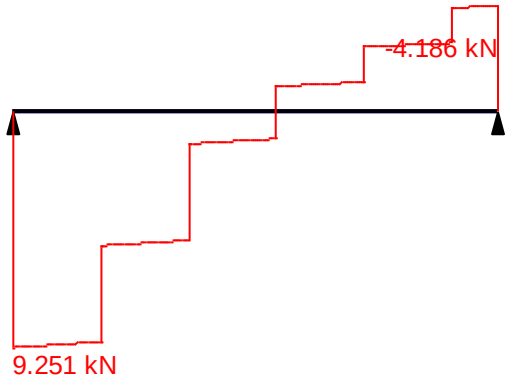
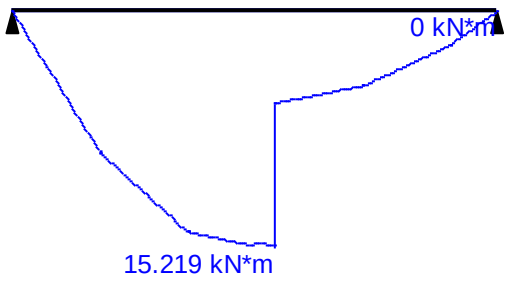
Envelope of the values Mmin for quasi-permanent combination

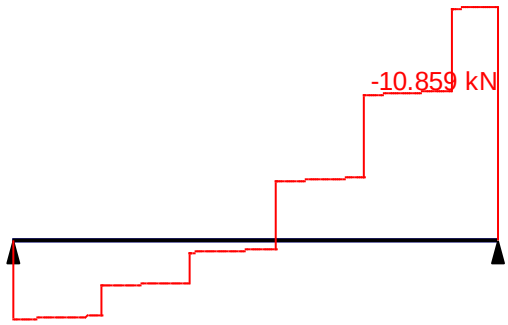
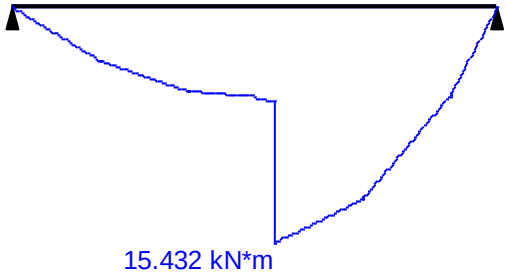


Minimum bending moment



Shear force corresponding to minimum bending moment

Envelope of the values Vmax for quasi-permanent combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

Envelope of the values Vmin for quasi-permanent combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

	Support reactions	
	Force in support 1	**Force in support 2**
	kN	**kN**
by criterion M_{max}	3.599	4.186
by criterion M_{min}	3.599	4.186
by criterion V_{max}	21.329	4.186
by criterion V_{min}	3.599	25.18

Results of analysis

Checked according to EN 1993	Check	Utilization Factor
Sec. 6.2.6 (EN1993-1-1)	Shear strength of the member subject to shear force Vz	0.087
Sec. 6.2.5 (EN1993-1-1)	Bending strength of the member subject to bending moment My	0.477
Sec. 6.3.2.1, 6.3.2.2 (EN1993-1-1)	Buckling strength of the member subject to lateral-torsional buckling due to bending moment My	0.553
Sec. 8(1) (EN1993-1-5)	Flange induced buckling	0.132
	Deflect limit for characteristic combination	0.779

Utilization Factor 0.779 - Deflect limit for characteristic combination

Maximum deflection -	k*L	Factor
for characteristic combination	0.005	0.779

Report created **2023.04.05 15:30:09 (UTC+02:00)** by **Kristall (64-bit)**, version: **21.1.9.7** dated **23.06.2020**

Esamų ardyno sijų l24 skaičiavimai

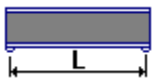
Beams

Analysis complies with EN 1993

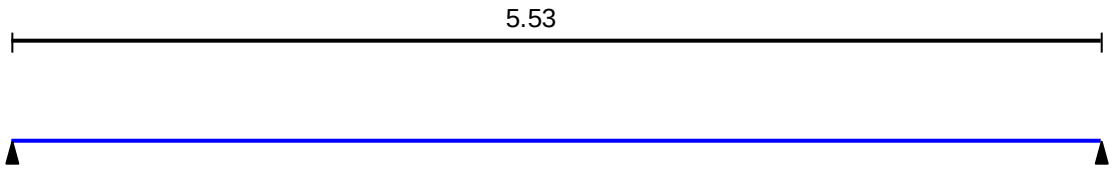
General Properties

Steel: S355

Importance factor $K_{FI} = 1$



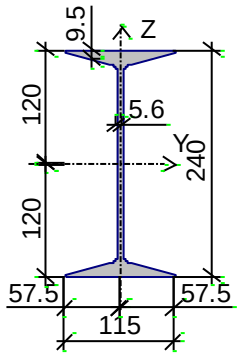
Structural scheme



Restraints against lateral displacements and rotations

	Left	Right
Displacement along Y	Restrained	Restrained
Displacement along Z	Restrained	Restrained
Rotation about Y		
Rotation about Z		

Section



Profile: I-beam with sloped inner flange surfaces GOST 8239-89 24

Geometric Properties of the Section

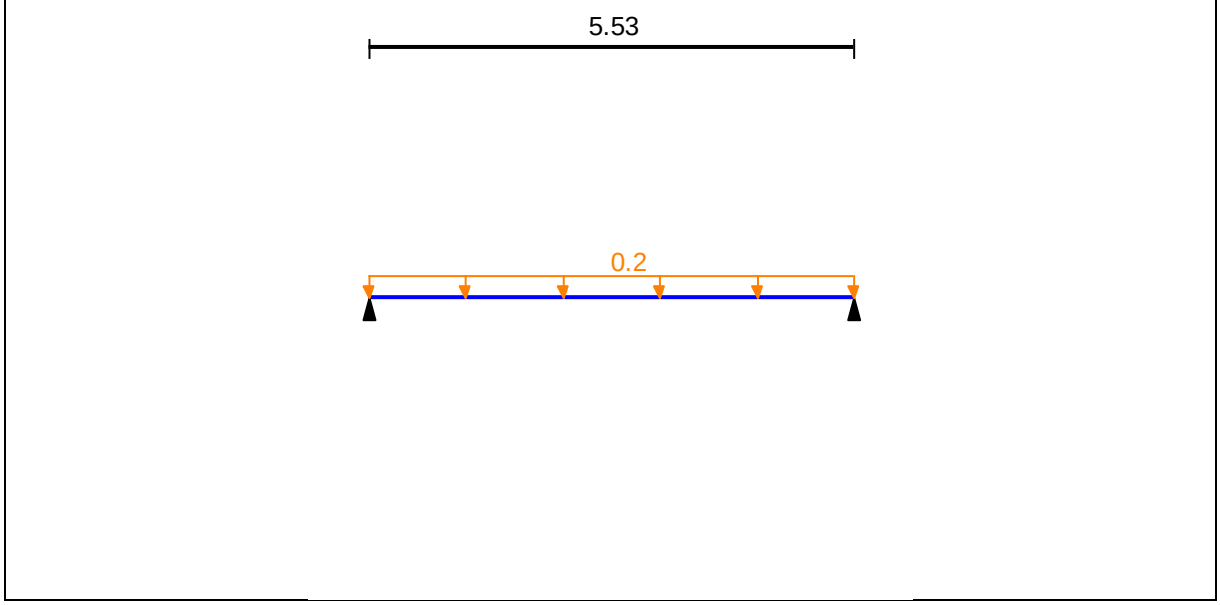
	Parameter	Value	Unit of measurement
A	Cross-sectional area	34.8	cm^2
$A_{v,y}$	Conventional shear area along U-axis	22.424	cm^2
$A_{v,z}$	Conventional shear area along V-axis	15.477	cm^2
α	Angle of principal axes of inertia	0	degree
I_y	Moment of inertia about centroidal Y1-axis parallel with Y-axis	3460	cm^4
I_z	Moment of inertia about centroidal Z1-axis parallel with Z-axis	198	cm^4
I_t	Torsional moment of inertia (St. Venant)	11.1	cm^4
I_w	Sectorial moment of inertia	26299.473	cm^6
i_y	Radius of gyration about Y1-axis	9.971	cm
i_z	Radius of gyration about Z1-axis	2.385	cm
Y_b	Y-coordinate of the shear center	0	cm
Z_b	Z-coordinate of the shear center	0	cm
W_{u+}	Maximum section modulus about U-axis	288.333	cm^3
W_{u-}	Minimum section modulus about U-axis	288.333	cm^3
W_{v+}	Maximum section modulus about V-axis	34.435	cm^3

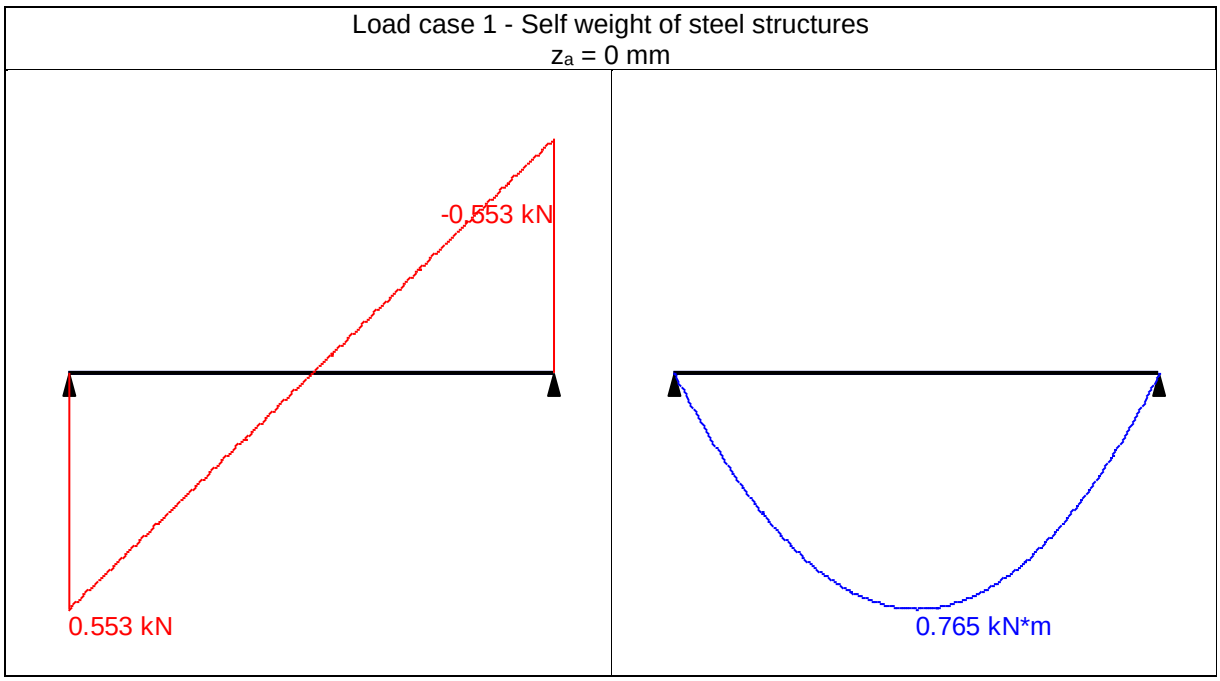
	Parameter	Value	Unit of measurement
W_{v-}	Minimum section modulus about V-axis	34.435	cm^3
$W_{pl,u}$	Plastic section modulus about U-axis	330.434	cm^3
$W_{pl,v}$	Plastic section modulus about V-axis	65.038	cm^3
I_u	Maximum moment of inertia	3460	cm^4
I_v	Minimum moment of inertia	198	cm^4
i_u	Maximum radius of gyration	9.971	cm
i_v	Minimum radius of gyration	2.385	cm
a_{u+}	Core size along positive Y(U)-axis	0.99	cm
a_{u-}	Core size along negative Y(U)-axis	0.99	cm
a_{v+}	Core size along positive Z(V)-axis	8.285	cm
a_{v-}	Core size along negative Z(V)-axis	8.285	cm
P	Perimeter	90.391	cm
M	Mass per running meter	27.318	kg

Load case 1 - Self weight of steel structures

	Load type	Value	
	length = 5.53 m		
		0.2	kN/m

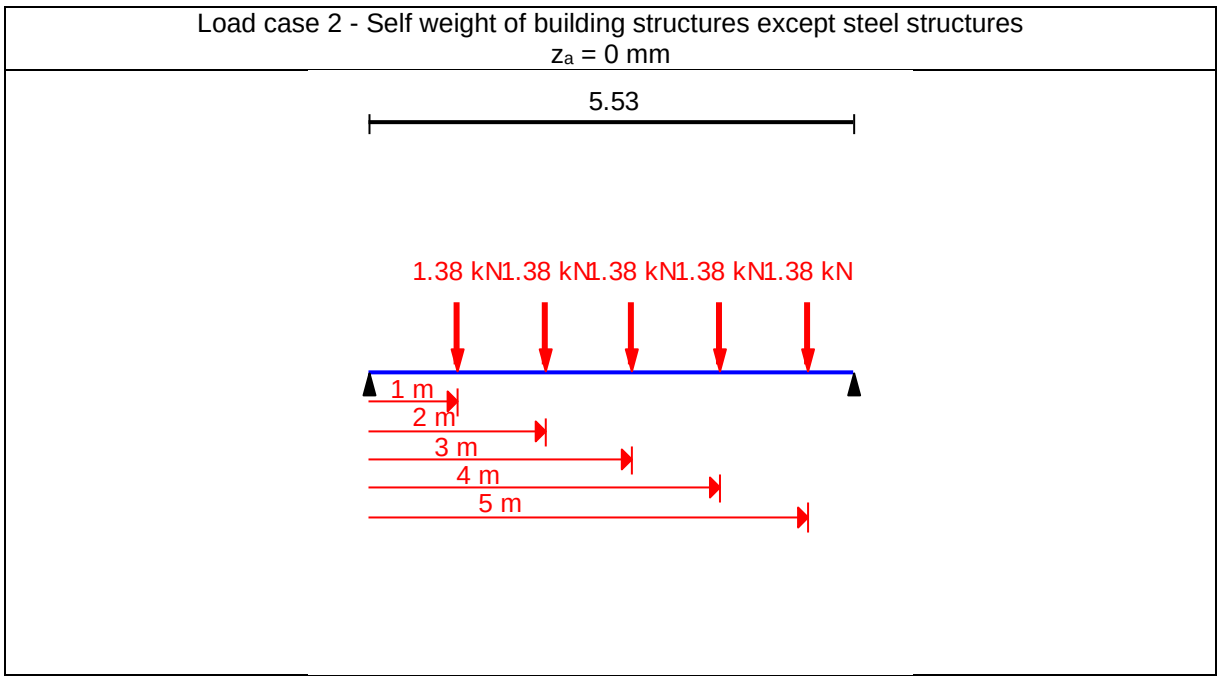
Load case 1 - Self weight of steel structures
z_a = 0 mm



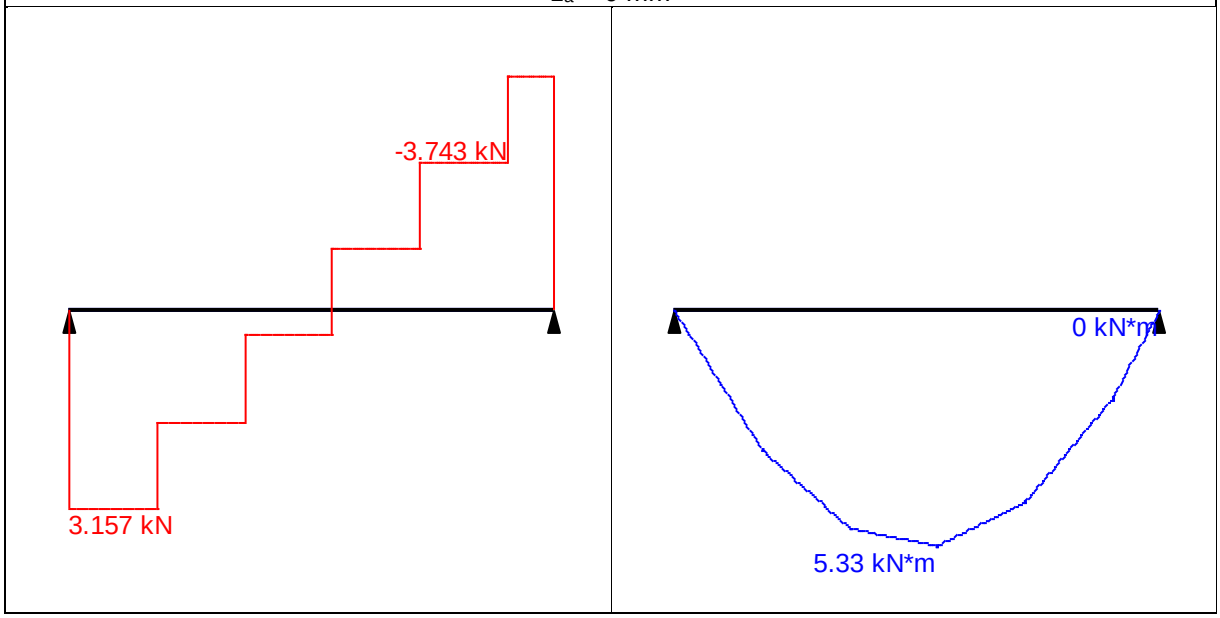


Load case 2 - Self weight of building structures except steel structures

	Load type	Value		Position x		Load application width, s	
	length = 5.53 m						
		1.38	kN	1	m	1.e-004	m
		1.38	kN	2	m	1.e-004	m
		1.38	kN	3	m	1.e-004	m
		1.38	kN	4	m	1.e-004	m
		1.38	kN	5	m	1.e-004	m



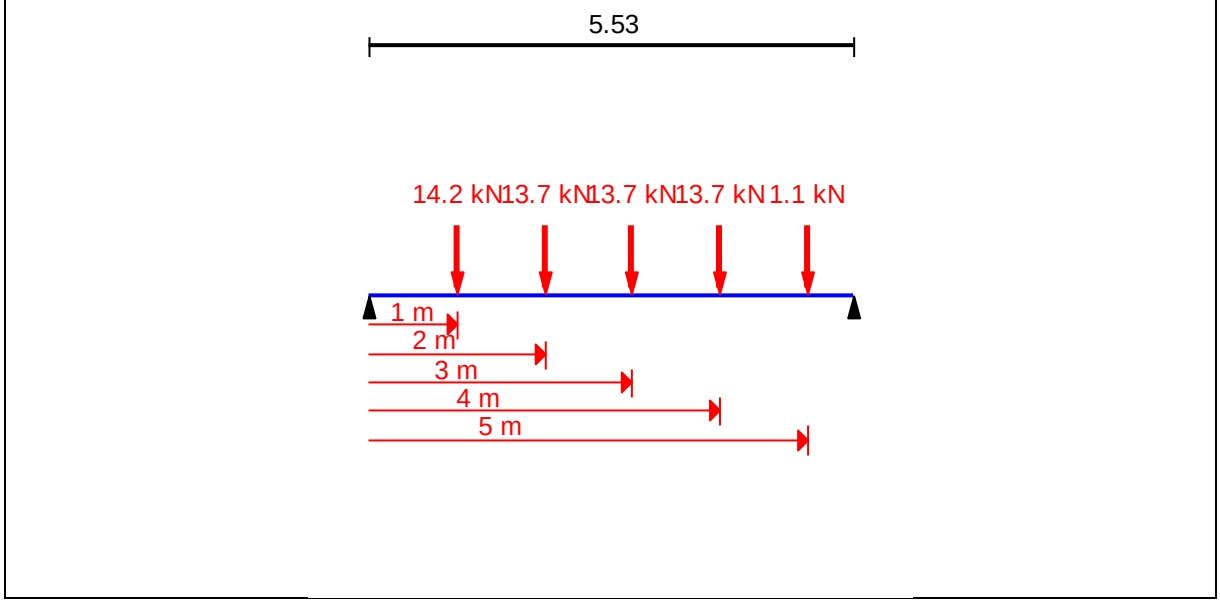
Load case 2 - Self weight of building structures except steel structures
z_a = 0 mm

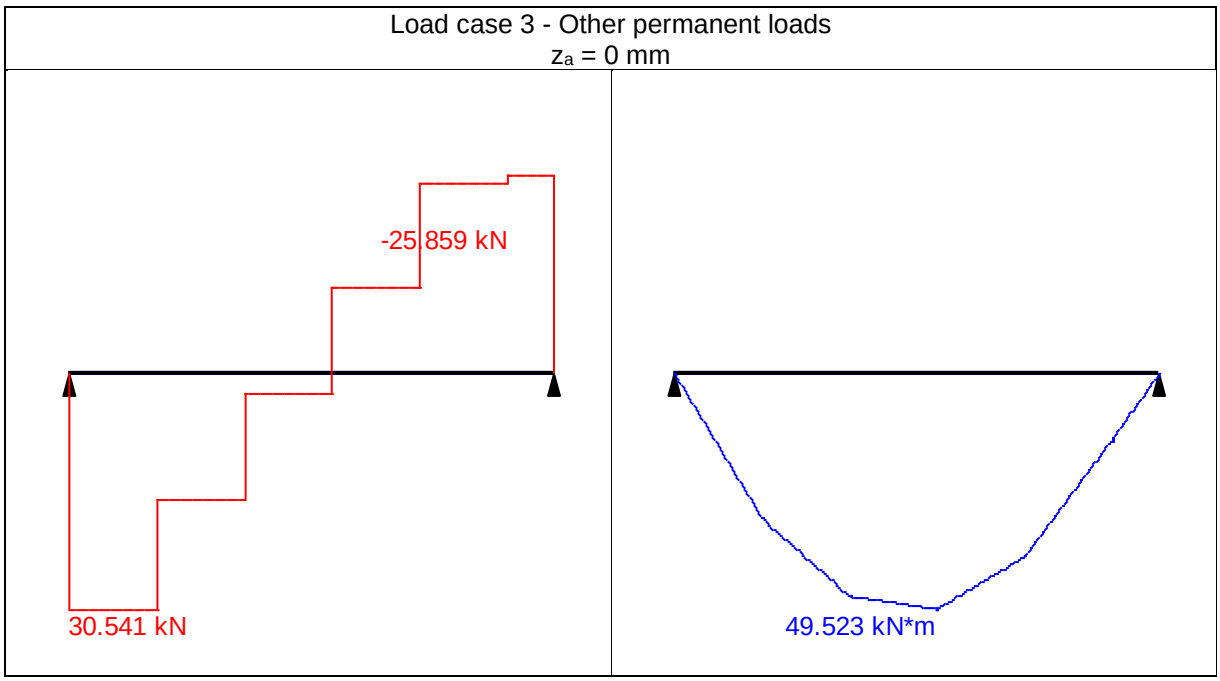


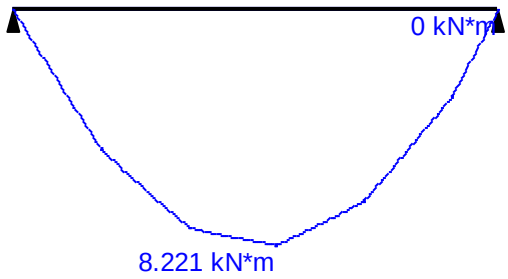
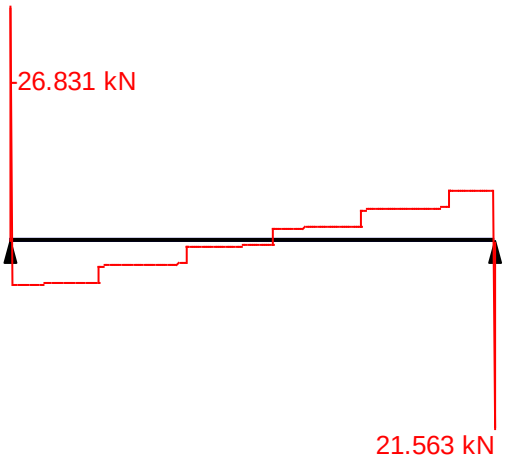
Load case 3 - Other permanent loads

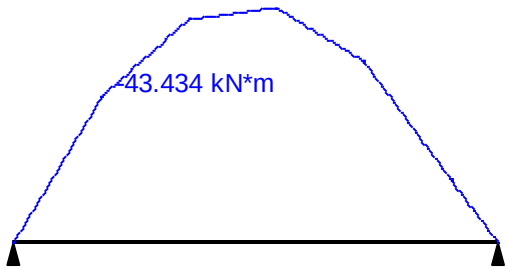
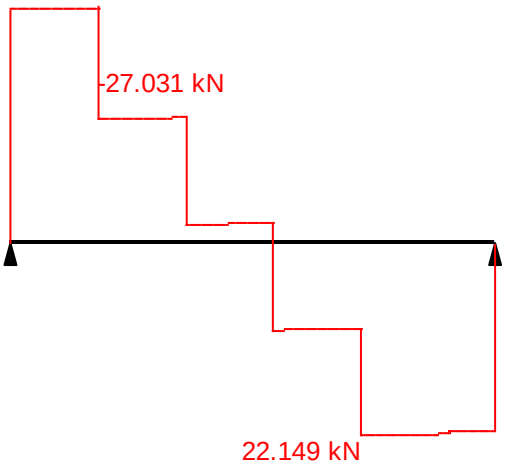
	Load type	Value		Position x		Load application width, s	
	length = 5.53 m						
		14.2	kN	1	m	1.e-004	m
		13.7	kN	2	m	1.e-004	m
		13.7	kN	3	m	1.e-004	m
		13.7	kN	4	m	1.e-004	m
		1.1	kN	5	m	1.e-004	m

Load case 3 - Other permanent loads
z_a = 0 mm

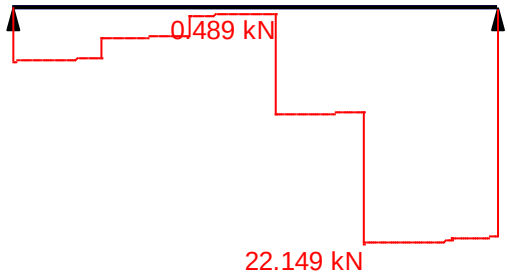



Load case 3 - Other permanent loads
z_a = 0 mm
-25.859 kN
30.541 kN
49.523 kN*m

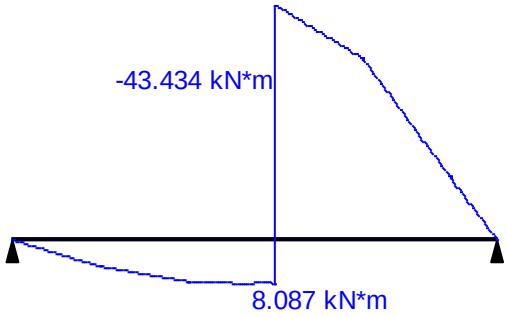
Envelope of the values Mmax for fundamental combination	
	
Maximum bending moment	Shear force corresponding to maximum bending moment

Envelope of the values Mmin for fundamental combination	
	
Minimum bending moment	Shear force corresponding to minimum bending moment

Envelope of the values Vmax for fundamental combination

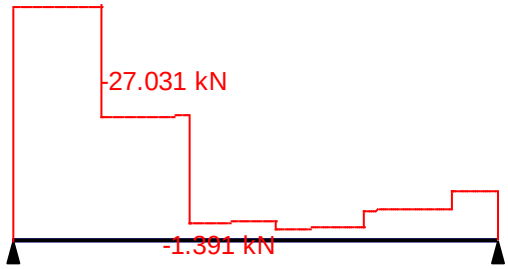


Maximum shear force

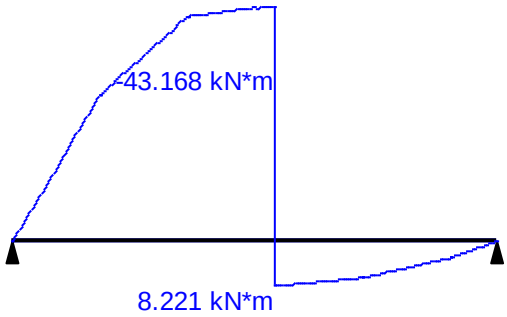


Bending moment corresponding to maximum shear force

Envelope of the values Vmin for fundamental combination

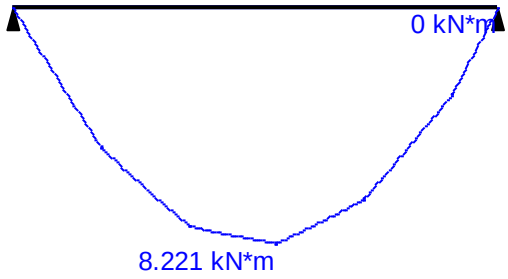


Minimum shear force

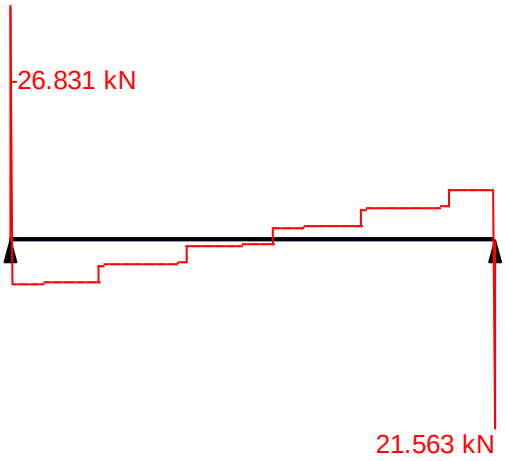


Bending moment corresponding to minimum shear force

Envelope of the values Mmax for characteristic combination

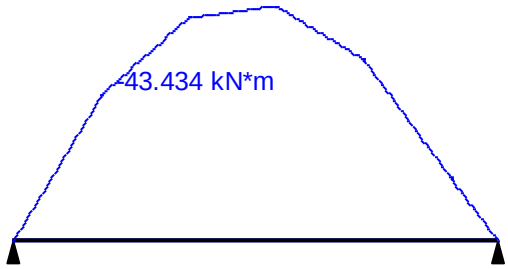


Maximum bending moment

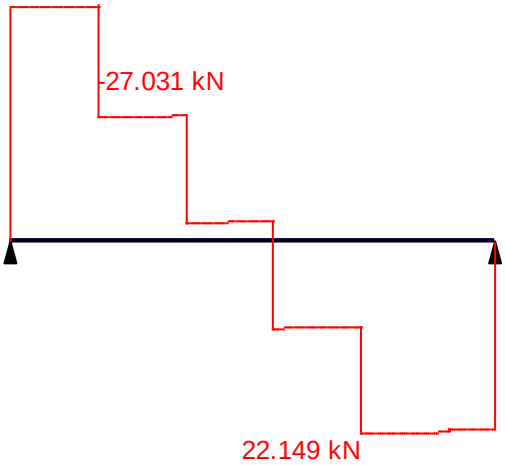


Shear force corresponding to maximum bending moment

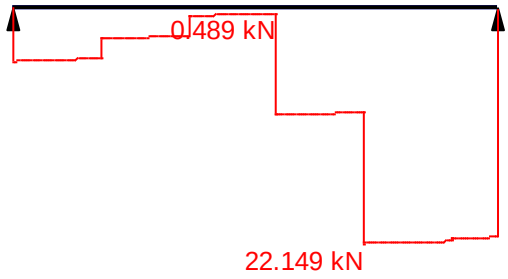
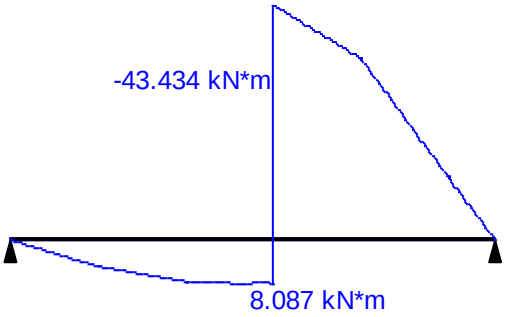
Envelope of the values Mmin for characteristic combination

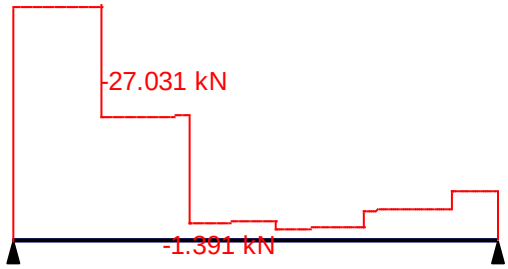
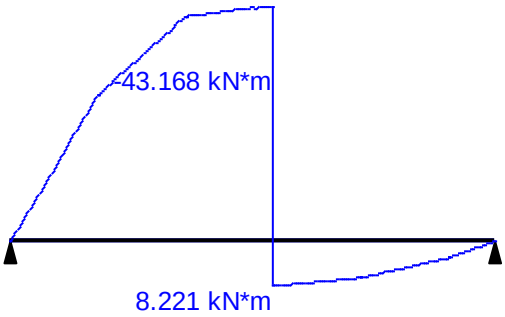


Minimum bending moment

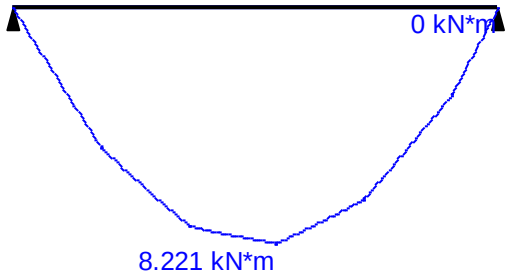


Shear force corresponding to minimum bending moment

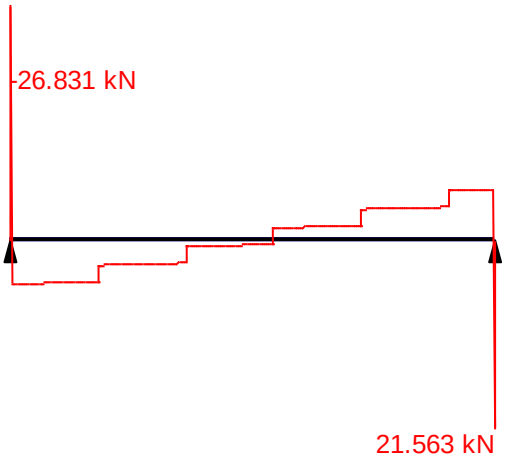
Envelope of the values Vmax for characteristic combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

Envelope of the values Vmin for characteristic combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

Envelope of the values Mmax for frequent combination

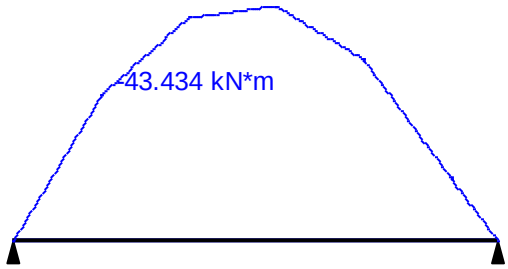


Maximum bending moment

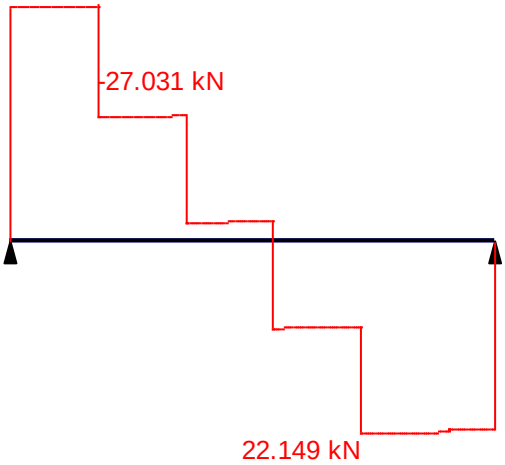


Shear force corresponding to maximum bending moment

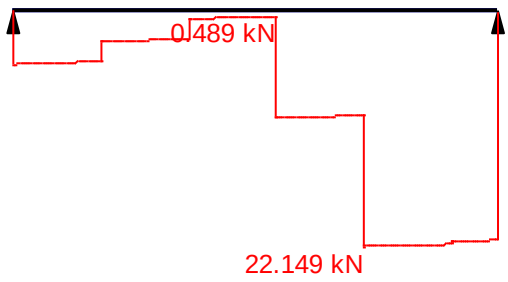
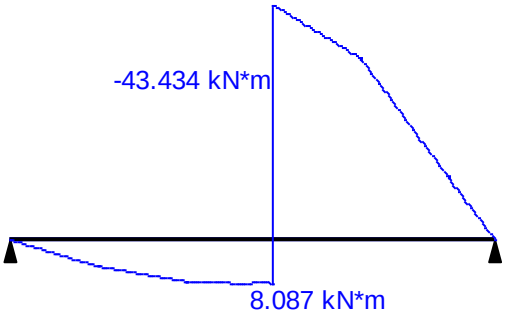
Envelope of the values Mmin for frequent combination

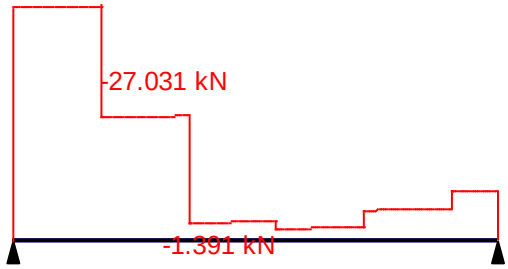
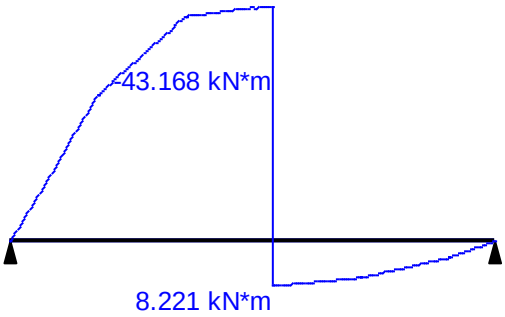


Minimum bending moment

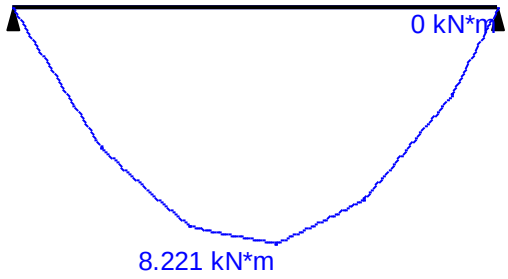


Shear force corresponding to minimum bending moment

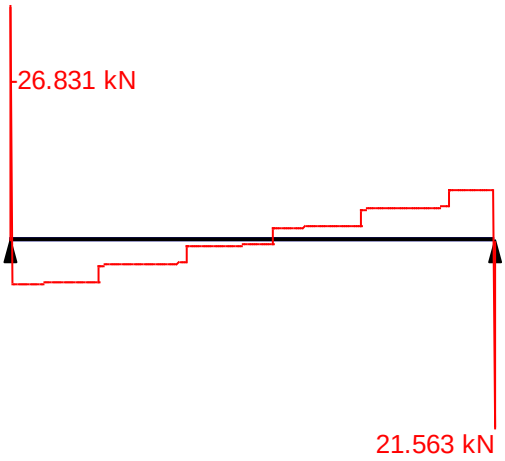
Envelope of the values Vmax for frequent combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

Envelope of the values Vmin for frequent combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

Envelope of the values Mmax for quasi-permanent combination

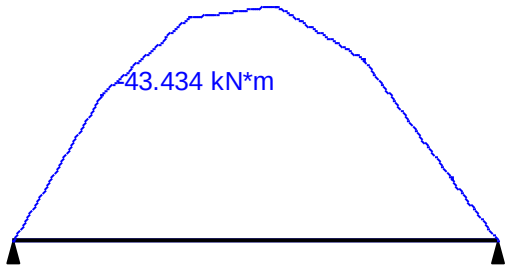


Maximum bending moment

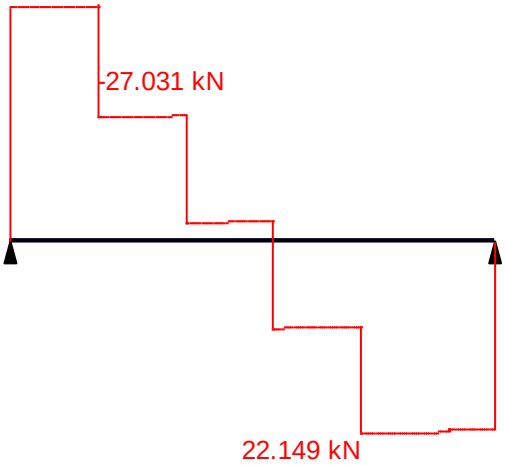


Shear force corresponding to maximum bending moment

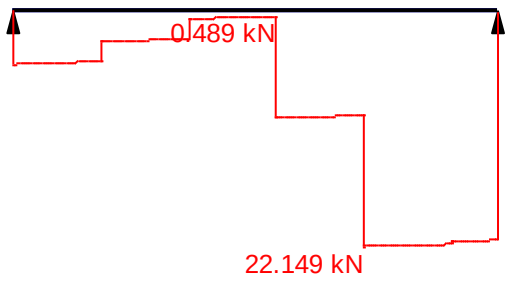
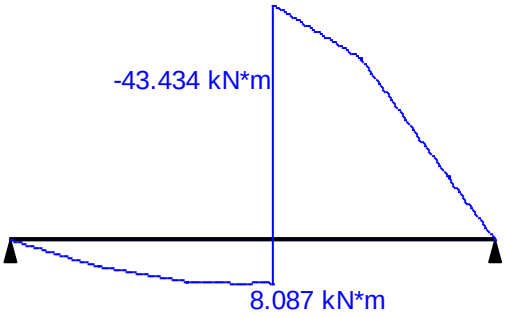
Envelope of the values Mmin for quasi-permanent combination

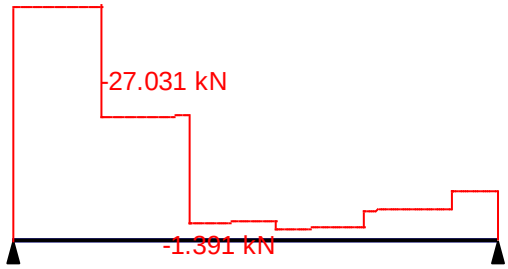
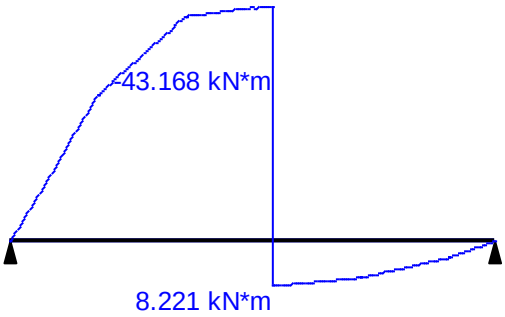


Minimum bending moment



Shear force corresponding to minimum bending moment

Envelope of the values Vmax for quasi-permanent combination	
	
Maximum shear force	Bending moment corresponding to maximum shear force

Envelope of the values Vmin for quasi-permanent combination	
	
Minimum shear force	Bending moment corresponding to minimum shear force

	Support reactions	
	Force in support 1	**Force in support 2**
	kN	**kN**
by criterion M_{max}	-26.831	-21.563
by criterion M_{min}	-26.831	-21.563
by criterion V_{max}	5.008	-21.563
by criterion V_{min}	-26.831	5.8

Results of analysis

Checked according to EN 1993	Check	Utilization Factor
Sec. 6.2.6 (EN1993-1-1)	Shear strength of the member subject to shear force Vz	0.073
Sec. 6.2.5 (EN1993-1-1)	Bending strength of the member subject to bending moment My	0.37
Sec. 6.3.2.1, 6.3.2.2 (EN1993-1-1)	Buckling strength of the member subject to lateral-torsional buckling due to bending moment My	0.446
Sec. 8(1) (EN1993-1-5)	Flange induced buckling	0.149
	Deflect limit for characteristic combination	0.672

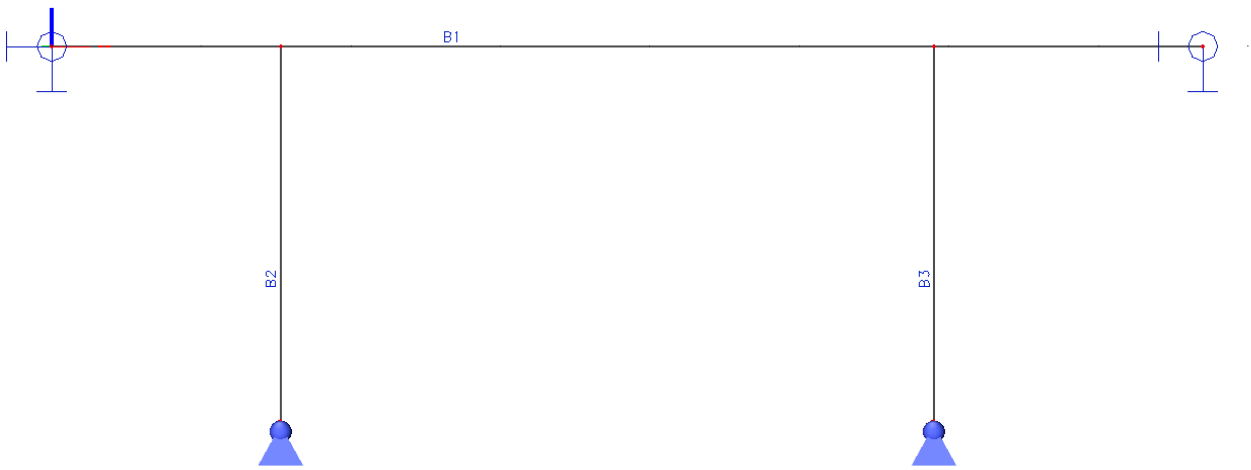
Utilization Factor 0.672 - Deflect limit for characteristic combination

Maximum deflection -	k*L	Factor
for characteristic combination	0.005	0.672

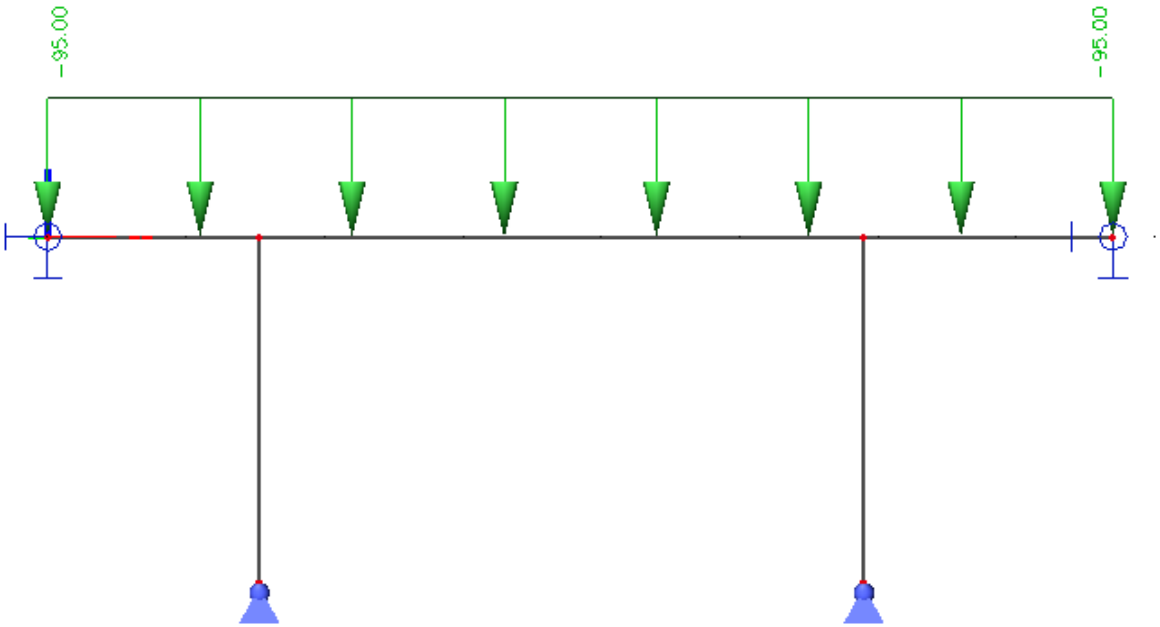
Report created **2023.04.05 15:32:31 (UTC+02:00)** by **Kristall (64-bit)**, version: **21.1.9.7** dated **23.06.2020**

ANGOS ATYVĖRIMO SĄRAMOS TARP ŽIŪROVINĖS DALIES IR OPERATORINĖS PATALPOS SKAIČIAVIMAI

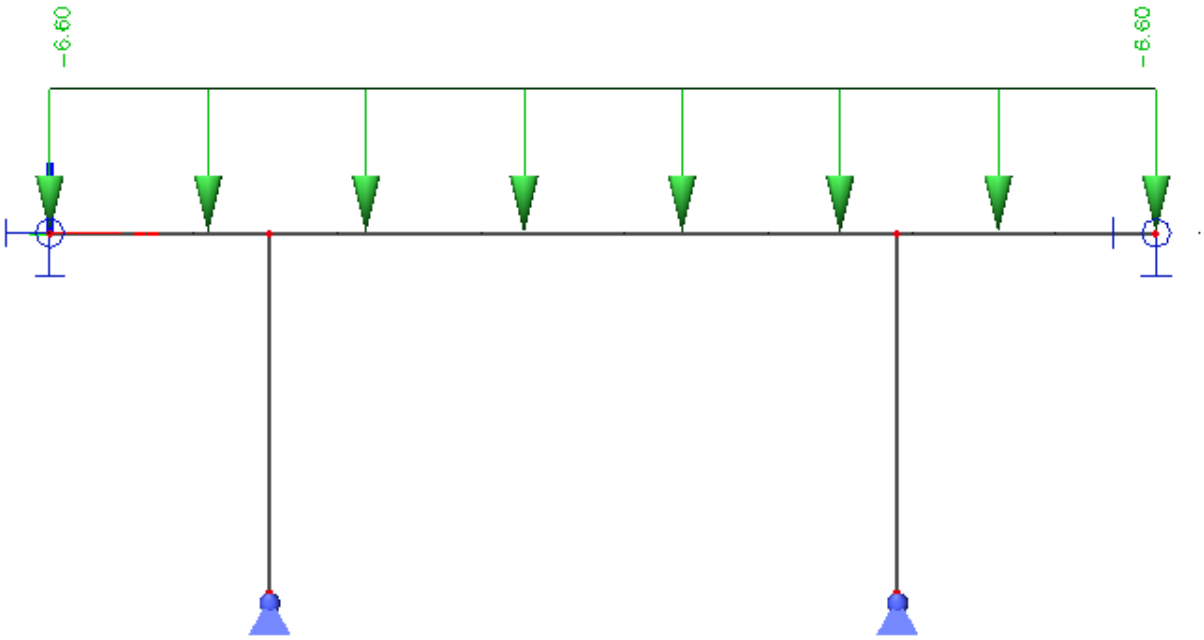
Angos atvėrimo sąramos skaičiuojamoji schema



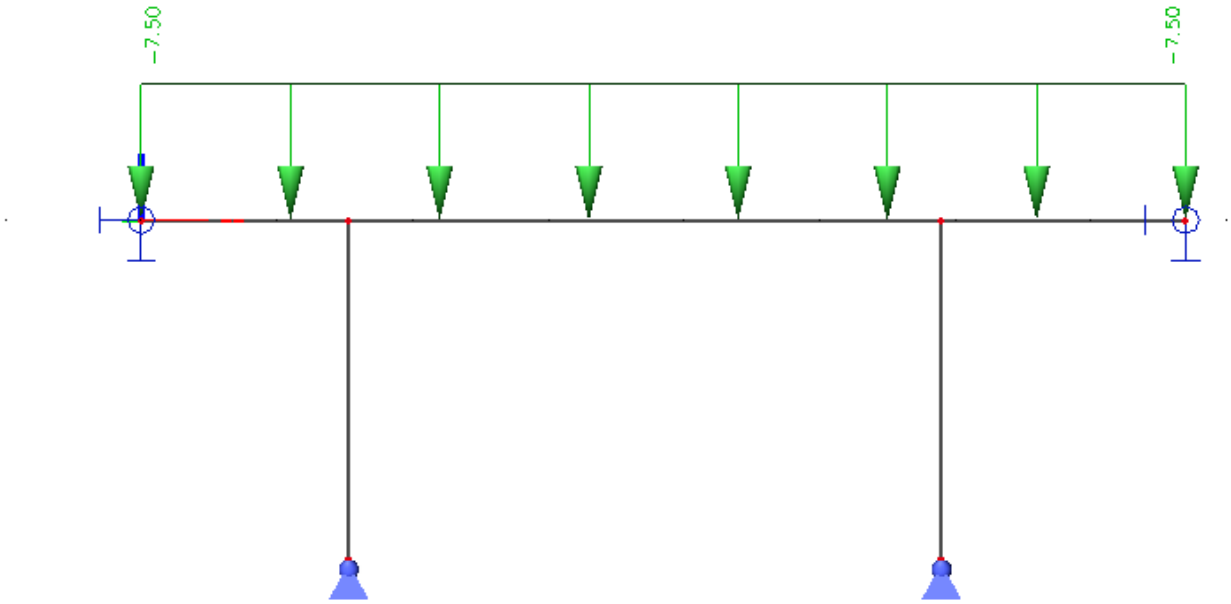
Nuolatinių apkrovų išdėstymas



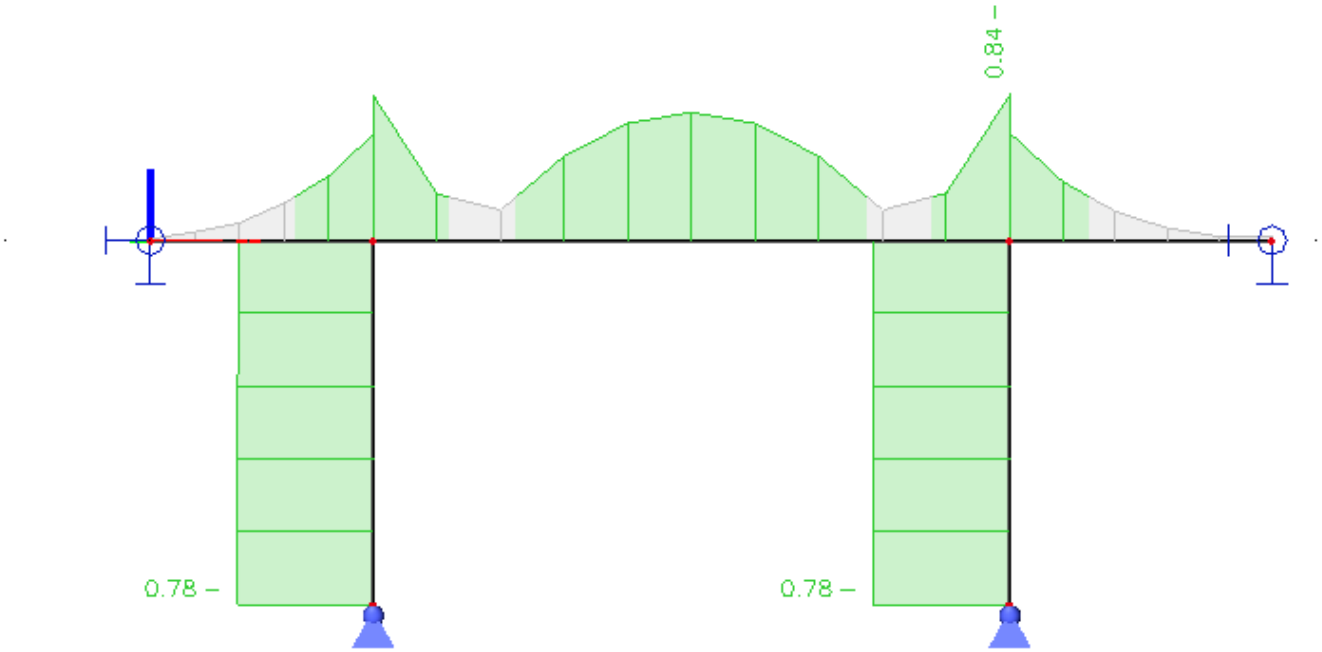
Sniego apkrovų išdėstymas



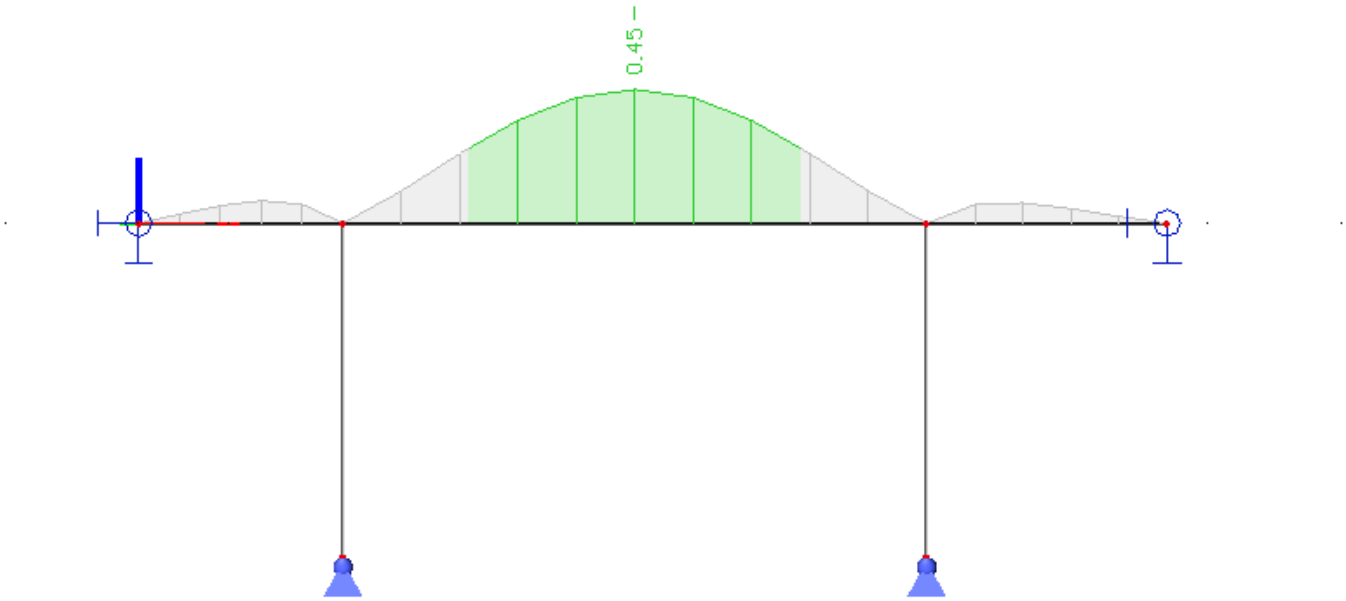
Naudojimo apkrovų išdėstymas



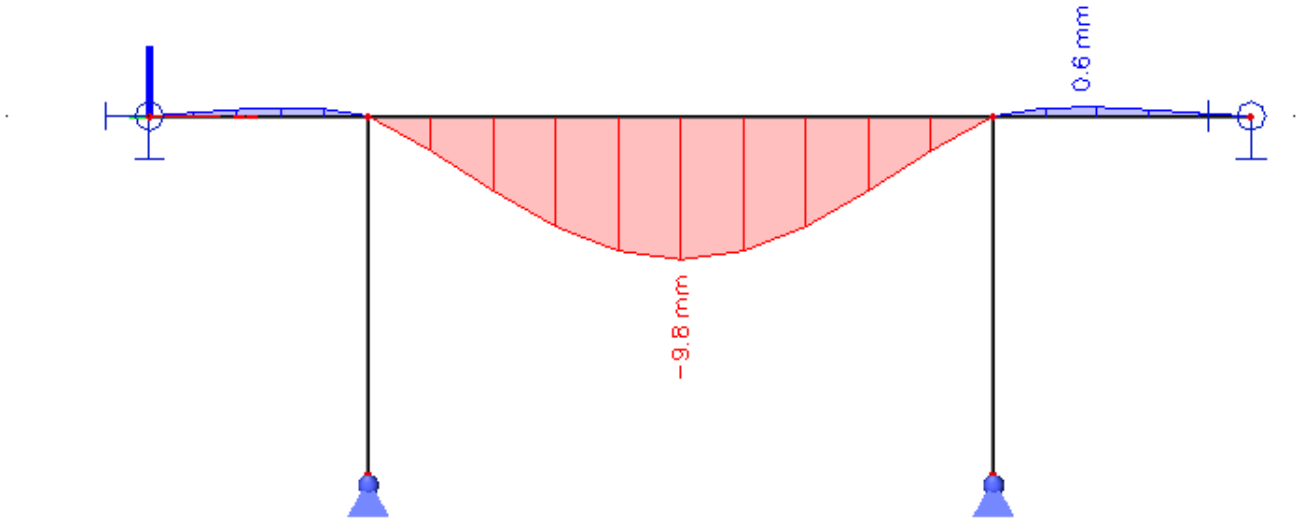
Angos atvėrimo profilių išnaudojimas pagal saugos ribinį būvį



Angos atvėrimo profilių išnaudojimas pagal tinkamumo ribinį būvį



Angos atvėrimo profilių deformacijų skaičiavimai.



Angos atvėrimo profilių detalieji skaičiavimai

1. EC-EN 1993 Steel check ULS

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

EN 1993-1-1 Code Check
National annex: Standard EN

Member B1	**5.900 / 7.700 m**	**2Uo (UPN260; 10)**	**S 355**	**All ULS**	**0.84 -**

Beam data	
Fabrication	Rolled
Buckling group	BG2

Combination key
All ULS / 1.30*LC1 + 1.30*LC2 + 0.94*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
0.00	0.00	-307.95	0.00	-179.26	0.00

Section check	
Section classification	1
Bending moment check for M_y	0.57 -
Shear check for V_z	0.29 -
Conclusion - section check	0.57 -

Buckling axis	**k**	**L [m]**	**N_{cr} [kN]**	**M_{cr} [kNm]**	**λ_{rel}**	**χ**
y-y	1.00	4.370	10474.56		0.57	1.00
z-z	1.00	4.370	1550.00		1.49	1.00
y-z	1.00	4.370	15705.68		0.47	1.00
LTB	1.00	4.370		758.26	0.64	0.68

Stability Check	
Stability classification	1
Lateral Torsional Buckling check	0.84 -
Conclusion - stability check	0.84 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B2	0.000 / 2.500 m	SHS100/100/10.0	S 235	All ULS	0.78 -

Beam data	
Fabrication	Rolled
Buckling group	Default

Combination key
All ULS / 1.30*LC1 + 1.30*LC2 + 0.94*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-532.56	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	1
Compression check	0.65 -
Conclusion - section check	0.65 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	2.500	1532.08		0.73	0.83
z-z	0.97	2.425	1627.72		0.71	0.84
LTB	1.00	2.500		972.59	0.17	1.00

Stability Check	
Stability classification	1
Flexural Buckling check	0.78 -
Conclusion - stability check	0.78 -

EN 1993-1-1 Code Check
National annex: Standard EN

Member B3	0.000 / 2.500 m	SHS100/100/10.0	S 235	All ULS	0.78 -

Beam data	
Fabrication	Rolled
Buckling group	Default

Combination key
All ULS / 1.30*LC1 + 1.30*LC2 + 0.94*LC3 + 1.35*LC4

N_{Ed} [kN]	$V_{y,Ed}$ [kN]	$V_{z,Ed}$ [kN]	T_{Ed} [kNm]	$M_{y,Ed}$ [kNm]	$M_{z,Ed}$ [kNm]
-535.16	0.00	0.00	0.00	0.00	0.00

Section check	
Section classification	1
Compression check	0.65 -
Conclusion - section check	0.65 -

Buckling axis	k	L [m]	N_{cr} [kN]	M_{cr} [kNm]	λ_{rel}	χ
y-y	1.00	2.500	1532.08		0.73	0.83
z-z	0.97	2.421	1633.29		0.71	0.84
LTB	1.00	2.500		972.59	0.17	1.00

Stability Check	
Stability classification	1
Flexural Buckling check	0.78 -
Conclusion - stability check	0.78 -

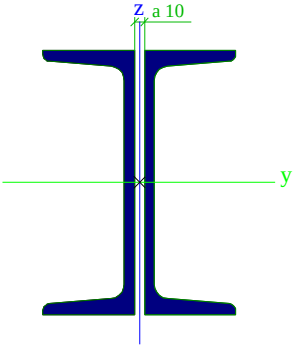
2. EC-EN 1993 Steel Check SLS

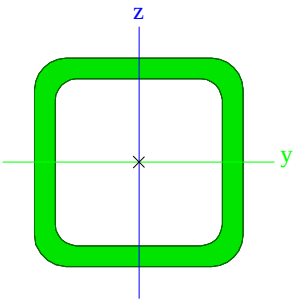
Linear calculation
Class: All SLS
Coordinate system: Principal
Extreme 1D: Member
Selection: All
Overall Unity Check

Name	dx [mm]	Case	$u_{y,max}$ [mm] $u_{z,max}$ [mm]	$u_{y,var}$ [mm] $u_{z,var}$ [mm]	Lim. $u_{y,max}$ [mm] Lim. $u_{z,max}$ [mm]	Lim. $u_{y,var}$ [mm] Lim. $u_{z,var}$ [mm]	Check $u_{y,max}$ [-] Check $u_{z,max}$ [-]	Check $u_{y,var}$ [-] Check $u_{z,var}$ [-]	Camber dx u_z [mm] Camber [mm]	Check Overall [-]
B1	3715.000	SLS-Char (auto)/1	0.0 -9.8	0.0 -1.1	21.9 21.9	12.1 12.1	0.00 0.45	0.00 0.09	- -	**0.45**
B2	0.000	SLS-Char (auto)/2	0.0 0.0	- -	25.0 12.5	13.9 6.9	0.00 0.00	- -	- -	**0.00**
B3	0.000	SLS-Char (auto)/2	0.0 0.0	- -	25.0 12.5	13.9 6.9	0.00 0.00	- -	- -	**0.00**

Name	Combination key
SLS-Char (auto)/1	LC1 + LC2 + 0.70*LC3 + LC4
SLS-Char (auto)/2	LC1 + LC2

3. Cross-sections

CS2		
Type	2Uo	
Detailed	UPN260; 10	
Shape type	Thin-walled	
Item material	S 355	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	c	c
A [m^2]	9.6590e-03	
A_y [m^2], A_z [m^2]	7.2805e-03	5.1572e-03
A_L [m^2/m], A_D [m^2/m]	1.6654e+00	1.6654e+00
$c_{Y,UCS}$ [mm], $c_{Z,UCS}$ [mm]	95	130
α [deg]	0.00	
I_y [m^4], I_z [m^4]	9.6512e-05	1.4282e-05
i_y [mm], i_z [mm]	100	38
$W_{el,y}$ [m^3], $W_{el,z}$ [m^3]	7.4240e-04	1.5033e-04
$W_{pl,y}$ [m^3], $W_{pl,z}$ [m^3]	8.8508e-04	2.7692e-04
$M_{pl,y,+}$ [Nm], $M_{pl,y,-}$ [Nm]	3.14e+05	3.14e+05
$M_{pl,z,+}$ [Nm], $M_{pl,z,-}$ [Nm]	9.83e+04	9.83e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	2.2304e-06	0.0000e+00
β_y [mm], β_z [mm]	0	0
Picture		

CS3		
Type	SHS100/100/10.0	
Formcode	2 - Rectangular hollow section	
Shape type	Thin-walled	
Item material	S 235	
Fabrication	rolled	
Colour		
Flexural buckling y-y, Flexural buckling z-z	a	a
A [m^2]	3.4900e-03	
A_y [m^2], A_z [m^2]	1.7454e-03	1.7454e-03
A_L [m^2/m], A_D [m^2/m]	3.7400e-01	6.7688e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]	50	50
α [deg]	0.00	
I_y [m^4], I_z [m^4]	4.6200e-06	4.6200e-06
i_y [mm], i_z [mm]	36	36
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	9.2400e-05	9.2400e-05
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	1.1600e-04	1.1600e-04
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	2.73e+04	2.73e+04
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	2.73e+04	2.73e+04
d_y [mm], d_z [mm]	0	0
I_t [m^4], I_w [m^6]	7.6100e-06	8.3333e-09
β_y [mm], β_z [mm]	0	0
Picture		

Explanations of symbols	
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
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 - Not calculated or simplified
d_z	Shear center coordinate in principal z-direction measured from the centroid - Not calculated or simplified
I_t	Torsional constant - Not calculated or simplified
I_w	Warping constant - Not calculated or simplified
β_y	Mono-symmetry constant about the principal y-axis
β_z	Mono-symmetry constant about the principal z-axis