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Structural Report

F35 (F34PN)

18444

Date 17/12/2018

for the system by

Global Truss
Furong Industrial Area
Shajing Town

Baoan District Shenzen China

Compiled by: C. Fox

Aachen, 17th December 2018

INGENIEURKAMMER-BAU NORDRHEIN-WESTFALEN
BERATENDER INGENIEUR
101448

This Structural Report includes pages 1 - 40 + annexes

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1 PRELIMINARY NOTES

1.1 Basics

The currently applicable regulations and standards, in particular:

DIN EN 1991-1	Actions on structures (Eurocode 1)
DIN EN 13814	Fairground and amusement park machinery and structures
DIN EN 13782	Temporary Structures – Tents
DIN EN 1993-1	Design of steel structures
DIN EN 1999-1	Design of aluminium structures

1.2 Materials

Tubes	Aluminium EN AW-6082 T6
Bolts	Güte mid. 8.8 (grade min. 8.8)

1.3 General remarks

The truss system is part of a "modular construction system" with the different truss lengths

500mm, 1000mm, 1500mm, 2000mm, 2500 mm, 3000mm, 3500mm, 4000mm, 4500mm and 5000mm.

The Trusses consist of 2 upper and 3 lower main chords (round tube 50 x 4mm), which are arranged in a quadratic shape. The center chord at the bottom is connected to the outer chords by cross tubes (round tube 50 x 4mm). The trusses also consist of welded diagonal bracings (round tube 20 x 2mm). The truss type is stiffened by diagonal bracings at the top and at both vertical sides.

The distance between system lines of the mainchords is 24 cm in vertical- and 24 cm in horizontal direction.

The trusses are connected at the 4 outer mainchords with couplers consisting of female fittings, connectors and bolts. The center chord of the bottom is not connected with couplers.

The loads are applied acc. chapter 1.4. The allowable loads are listed in tables (see chapter 6).

The verification of the single parts is done according the safety concept of EN 1990 with a partial safety factor of the loading side of 1.50 for payloads.

For applications which can be calculated on the basis of other codes, the partial safety factors can be adjusted (for example temporary structures acc. EN 13814, yF = 1.35 for payloads).

To use the resulting allowable loads with British Standard (BS) and ANSI, the allowable loads listed in tables have to be multiplied by 0.85

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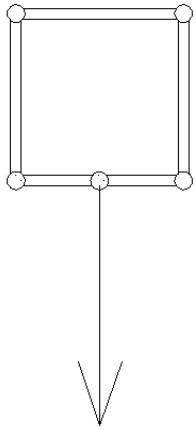
1.4 Geometry and loadings

The selfweight of the truss is approx. 11 kg/m

For the payloads there are 2 loadcases taken into account:



LC 1) The load can be applied as a distributed load, as multiple point loads or as single point loads on the central bottom chord.

The allowable loading on the truss is limited by two conditions:

1) First condition is the local load transfer from the central bottom chord to the bracing node.

2) Second condition is the global load transfer to the truss supports.

Resulting allowable loading see chapter 6

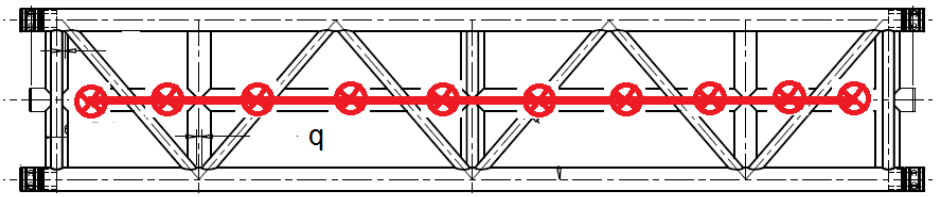
The following principle loadcases and loading situations are taken into account:

Structural system:

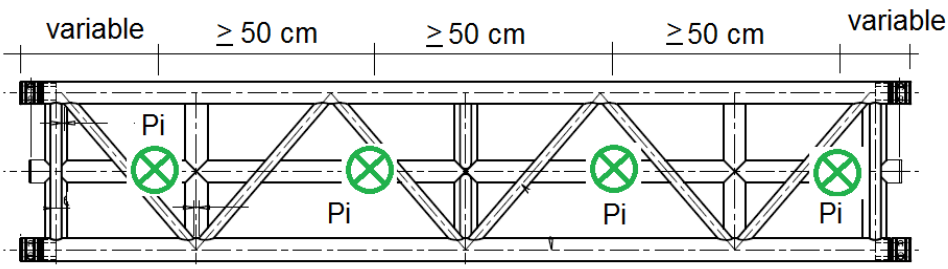
single span girder

Loading situations

1a) uniformly distributed load (UDL) on central bottom chord



1b) multiple point load on central bottom chord at distances ≥ 50 cm
This is equivalent to a distributed load acc. 1a) => Pi = UDL · 0,5 m.
No restrictions concerning position on the central bottom chord but allowable loading in dependence of the span has to be respected, see chapter 6.



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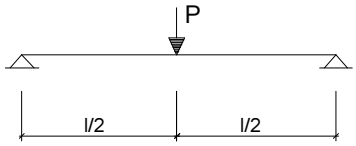
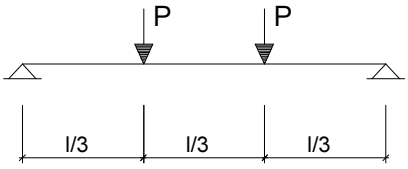
1c) Single point loads on central bottom chord

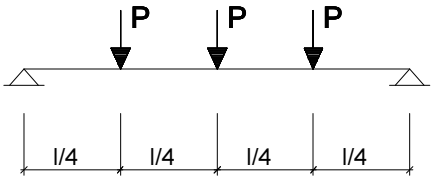
Single-load in 1/2 point



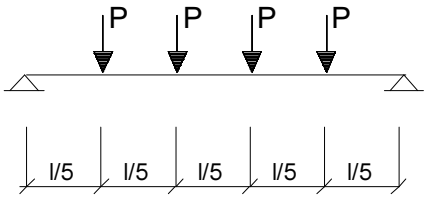
Single-load in 1/3 points



Single-load in 1/4 points



Single-load in 1/5 points



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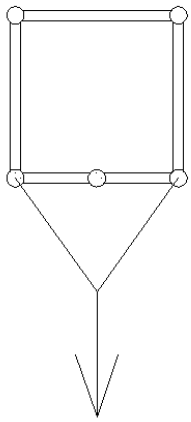


LC 2) The load can be applied as a distributed load or as single point loads on the side chords:

<u>The following principle loadcases and loading situations are taken into account:</u>

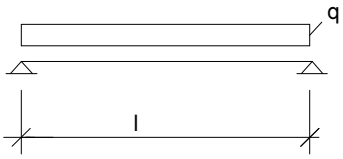
Structural system:

single span girder

Loading situations

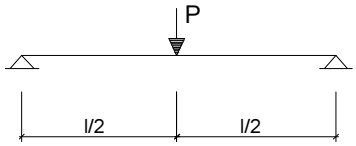
2a) uniformly distributed load (UDL) on side chords

Uniformly distributed load (UDL)

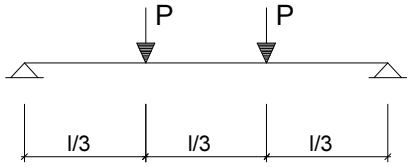


2b) Single point loads on central bottom chord

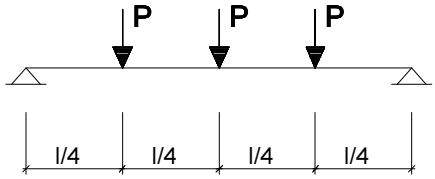
Single-load in 1/2 point



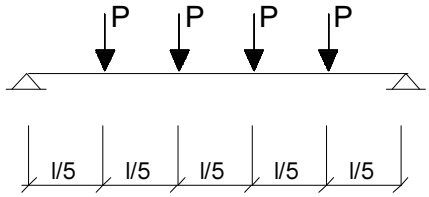
Single-load in 1/3 points



Single-load in 1/4 points



Single-load in 1/5 points



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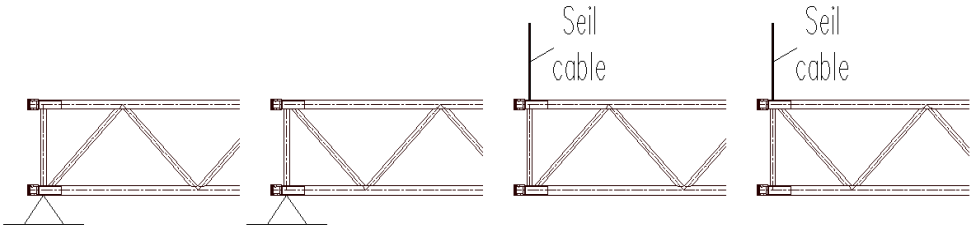
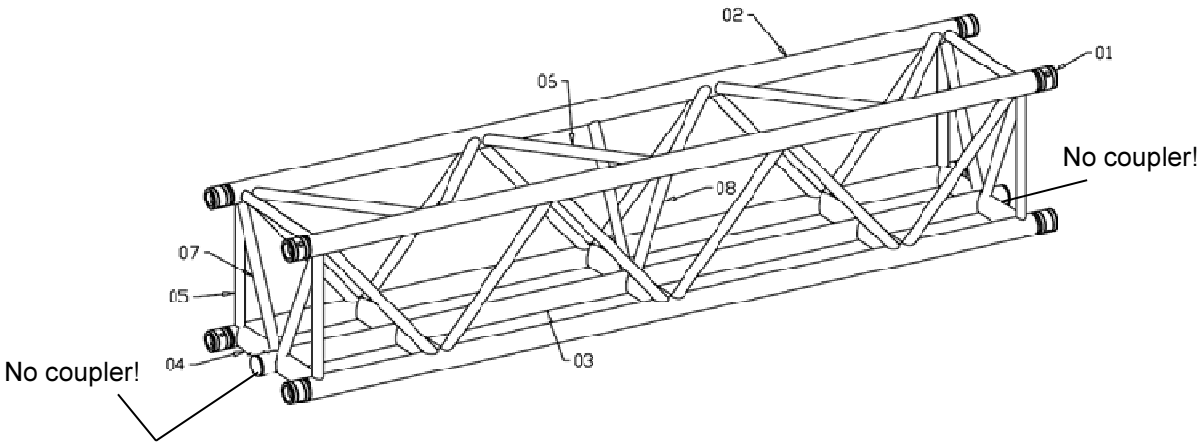
For the support or suspension there are the following possibilities:



The trusses are connected at the 4 outer mainchords with couplers consisting of female fittings, connectors and bolts. The center chord of the bottom is not connected with couplers.



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2 SYSTEM

Drawings F35 (F34PN)

see annex

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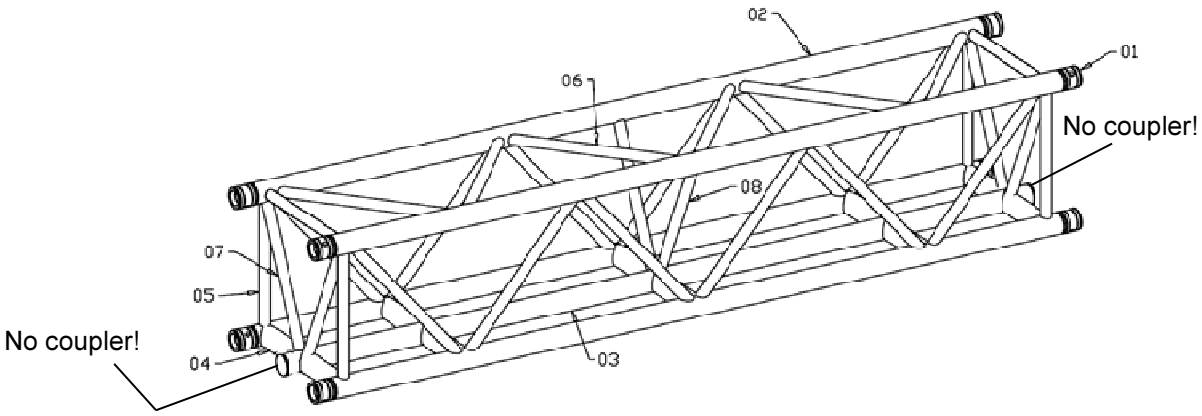
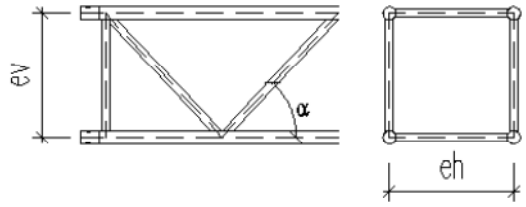
3 SECTION- AND MATERIAL PROPERTIES



Querschnittswerte Rohre / properties Tubes

	D [mm]	t [mm]	A [cm²]	I [cm⁴]	Wel [cm³]	i [cm]
Gurtrohre / main chords	50,0	4	5,78	15,41	6,16	1,63
vertikal Diagonalen / Bracing	20	2	1,13	0,46	0,46	0,64
horizontal Diagonalen / Bracing	20	2	1,13	0,46	0,46	0,64

Geometrie Traverse / truss geometry



Achsabstand Gurtrohre	vertikal	ev	24	[cm]
distance axes main chords	horizontal	eh	24	[cm]
min. Neigung Diagonalen	vertikal	α	36,4	[°]
min. gradient bracing	horizontal	α	36,4	[°]

Kennwerte Gesamttraverse / properties truss-Section

A	$= 4 \times A_G$	=	23,12	[cm²]
Iyy	$= 4 \times I_G + 4 \times A_G \times (ev/2)^2$	=	3391,21	[cm⁴]
Izz	$= 4 \times I_G + 4 \times A_G \times (eh/2)^2$	=	3391,21	[cm⁴]
It	= Näherung aus Erfahrungswerten	=	386,58	[cm⁴]
iy	$= (Iyy/A)^{1/2}$	=	12,11	[cm]
iz	$= (Izz/A)^{1/2}$	=	12,11	[cm]

Index G : Querschnittseigenschaft Gurtrohr
section properties main chord

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Material properties

Gurtrohre + Diagonalen EN AW 6082 T6 (AlMgSi1)
chords and bracing

zulässige Spannungen nach EN-1999-1-1 / allowable stress acc. to EN-1999-1-1

Teilsicherheitsbeiwerte Material / partial safety factors material

γ_{M1}=	1,10	Beulklasse / BC=	A
γ_{M2}=	1,25		

0,2%-Dehngrenze / 0,2%-Proof Strength			Zugfestigkeit / ultimate tensile strength		
fo $t \le 5mm$=	250	[N/mm²]	fu $t \le 5mm$=	290	[N/mm²]
fo $t > 5mm$=	260	[N/mm²]	fu $t > 5mm$=	310	[N/mm²]
fo,haz=	125	[N/mm²]	fu,haz=	185	[N/mm²]

Festigkeit der Schweißnaht fw= 190 [N/mm²]
Strength of welding seams

Faktor für die WEZ-Werte beim WIG-Schweißen: 0,8
Factor for HAZ-values for TIG-welding:

Bolzen / Bolt 42 CrMo (8.8)

Verbinder / Connector EN AW 2011 T6 (AlCuBiPb)

0,2%-Dehngrenze / 0,2%-Proof Strength			Zugfestigkeit / ultimate tensile strength		
fo>	230	[N/mm²]	fu>	310	[N/mm²]

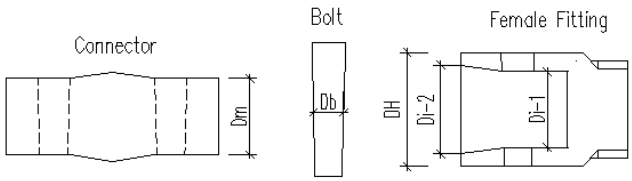
Hülse / Female fitting EN AW 6082 T6

zulässige Spannungen nach EN-1999-1-1 / allowable stress acc. to EN-1999-1-1

Teilsicherheitsbeiwerte Material / partial safety factors material

γ_{M1}=	1,10
γ_{M2}=	1,25

0,2%-Dehngrenze / 0,2%-Proof Strength			Zugfestigkeit / ultimate tensile strength		
fo=	250	[N/mm²]	fu=	290	[N/mm²]



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Querschnitts- und Materialeigenschaften der Gurtrohre / Section- and material properties of the chord tubes

Material	E=	70000	[N/mm²]	
	fo=	250,00	[N/mm²]	
	fo/γ_{M1}=	227,27	[N/mm²]	
	fo,haz=	125,00	[N/mm²]	
	fu=	290,00	[N/mm²]	
	fu/γ_{M2}=	232,00	[N/mm²]	
	fu,haz=	185,00	[N/mm²]	
	fu,haz/γ_{M2}=	148,00	[N/mm²]	
Querschnitt	D0=	50,00	[mm]	
cross section	A=	5,78	[cm²]	
	I=	15,41	[cm^4]	
	i=	1,63	[cm]	
Bestimmung der QS-Klasse	β=	10,61	[-]	$3 \cdot (D0 / t)^{0,5}$ nach 6.10
Determination of section-class	ε=	1,00	[-]	$(250 / fo)^{0,5}$
	QS-Klasse=	2		nach Kap. 6.1.4.4
				acc. chapter 6.1.4.4
Beiwerte Biegeknicken	BC=	A	[-]	
Coefficients for buckling	α=	0,20	[-]	
	λo=	0,10	[-]	
teff im Bereich der WEZ	red-Faktor=	0,8	[-]	(WIG $_{TIG}$)
teff in heat affected zone				
Knotenpunkt mit 1 Diagonalen / node with 1 bracing				
	D1=	20,00	[mm]	
	U_{WEZ}=	80,00	[mm]	D1 + 2 · 30
	U_{Total}=	157,08	[mm]	
	teff,o/t=	0,69	[-]	[1 - (1 - red-Faktor · fo,haz / fo) · U_{WEZ} / U_{Total}]
	teff,u/t=	0,75	[-]	[1 - (1 - red-Faktor · fu,haz / fu) · U_{WEZ} / U_{Total}]
Knotenpunkt mit 2 Diagonalen / node with 2 bracing				
	D1=	20,00	[mm]	
	D2=	20,00	[mm]	
	U_{WEZ}=	119,27	[mm]	π / **4** · D0 + D1 / 2 + D2 / 2 + 2 · 30
	U_{Total}=	157,08	[mm]	
	teff,o / t=	0,54	[-]	[1 - (1 - red-Faktor · fo,haz / fo) · U_{WEZ} / U_{Total}]
	teff,u / t=	0,63	[-]	[1 - (1 - red-Faktor · fu,haz / fu) · U_{WEZ} / U_{Total}]

Querschnitts- und Materialeigenschaften der Diagonalen / Section- and material properties of the bracing

Material	E=	70000	[N/mm²]	
	fo=	250,00	[N/mm²]	
	fo/γ_{M1}=	227,27	[N/mm²]	
	BC=	A	[-]	
	α=	0,20	[-]	
	λo=	0,1	[-]	
Querschnitt / cross section	D0=	20	[mm]	
	A=	1,13	[cm²]	
	I=	0,46	[cm^4]	
	i=	0,64	[cm]	

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4 ALLOWABLE LOADING SINGLE COMPONENTS

Outer chords at top and bottom

Gurtrohr im Bereich der WEZ an der Kupplung main chord in heat affected zone at coupler				
	N_{Rd} =A x 0,8* x fu,haz / γ_{M2}=	**68,44**	[kN]	*(WIG $_{TIG}$) örtliche Schweißnaht nach Kap. 6.2.9.3 (1) local welding seam acc. chapter 6.2.9.3 (1)
Gurtrohr im Bereich der WEZ main chord in heat affected zone	Knotenpunkt mit 1 Diagonalen / node with 1 bracing			
	N_{Rd} = A_{eff} x fo / γ_{M1}= (mit A_{eff}= $t_{eff,o}$ / t x A)	**91,23**	[kN]	örtliche Schweißnaht nach Kap. 6.2.9.3 (2) local welding seam acc. Chapter 6.2.9.3 (2)
	Knotenpunkt mit 2 Diagonalen / node with 2 bracing			
	N_{Rd} = A_{eff} x fo / γ_{M1}= (mit A_{eff}= $t_{eff,o}$ / t x A)	**71,52**	[kN]	örtliche Schweißnaht nach Kap. 6.2.9.3 (2) local welding seam acc. Chapter 6.2.9.3 (2)
Knicken Gurtrohr zw. Knoten mit 1 Diagonale in der Mitte buckling main chord bewteen nodes with 1 bracing in the middle	sk=	56,40	[cm]	
	Ncr=	334,58	[kN]	
	λ^*=	0,66	[-]	
	ϕ=	0,77	[-]	
	X=	0,85	[-]	
	A1=	3,86	[cm²]	nach Tab. 6.5
	κ=	0,83	[-]	acc. table 6.5
	N_{Rd} = X x κ x Aeff x fo / γ_{M1}=	**92,71**	[kN]	nach Gl. 6.49
	(mit A_{eff}=A für QSK 1,2 und 3, s. EN 1999-1-1 Kap. 6.3.1.1)			acc. equation 6.49
Knicken Gurtrohr zw. Knoten ohne Diagonale in der Mitte buckling main chord bewteen nodes without bracing in the middle	sk=	56,40	[cm]	
	Ncr=	334,58	[kN]	
	λ^*=	0,66	[-]	
	ϕ=	0,77	[-]	
	X=	0,85	[-]	
	N_{Rd} = X x A x fo / γ_{M1}=	**111,70**	[kN]	nach Gl. 6.49 acc. equation 6.49
Schweißnaht zwischen Gurtrohr und Hülse welding seam between chord and female conical coupler				
	fw=	190,00	[N/mm²]	
	Ymw=	1,25	[-]	
	N_{Rd} = A x fw / γ_{M1}=	**87,86**	[kN]	nach Gl. 8.29 acc. equation 8.29

relevant for main chord tubes: **N_{Rd_G} = 68,44 kN**

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Bending of the center chord at the bottom and of the cross tubes in heat-affected zone:

Lokale Biegung unteres inneres Gurtrohr Knotenpunkt mit Querrohr				
Local bending of low er inner chord w ith lateral tube				
örtliche Schweißnaht nach Kap. 6.2.9.3 (2)				
local w elding seam acc. Chapter 6.2.9.3 (2)				
	α=	0,55	[-]	nach Tab. 6.4
Nebenrechnung QS-Kl. 3	D=	50,0	[mm]	
Auxiliary calculation for class 3	red-Faktor=	0,8	[-]	(WIG $_{TIG}$)
	$\rho_{o,haz}$=	0,5	[-]	fo,haz / fo
	$t_{o,eff}$=	1,60	[mm]	teff,o / t · t
	$W_{el,haz}$= π x R² x $t_{o,eff}$=	2,66	[cm³]	mit R = D / 2 - t / 2
	Wel=	6,16	[cm³]	
	$W_{pl,haz}$= 4 x R² x $t_{o,eff}$=	3,39	[cm³]	mit R = D / 2 - t / 2
	β_3=	18	nach Kap	nach Kap. 6.1.4.4
	β_2=	13	nach Kap	nach Kap. 6.1.4.4
	$\alpha_{,3w}$=	0,61	[-]	
	MoRd = α · Wel · fo / γ_{M1}=	**76,95**	[kNcm]	nach Gl. 6.24
				acc. equation 6.24

Bending of the center chord outside of heat-affected zone:

Wel = 6,16 cm³ => MRd_G = 6,16 · 25 / 1,1 = 140 kNcm

Bracing

Diagonale im Bereich der WEZ				
bracing in heat affected zone				
	N_{Rd} = A x 0,8* x $f_{u,haz}$ / γ_{M2}=	**13,39**	[kN]	*(WIG $_{TIG}$)
				örtliche Schweißnaht nach Kap. 6.2.9.3 (1)
				local w elding seam acc. chapter 6.2.9.3 (1)
Knicken Diagonale	sk=	35,00	[cm]	
buckling bracing				
	Ncr=	26,15	[kN]	
	λ*=	1,04	[-]	
	ϕ=	1,13	[-]	
	X=	0,63	[-]	
	N_{Rd} = X x A_G x fo / γ_{M1}=	**16,18**	[kN]	nach Gl. 6.49
				acc. equation 6.49
Schweißnaht zwischen Diagonale und Gurtrohr				
w elding seam betw een chord and female conical coupler				
	fw=	190,00	[N/mm²]	
	γmw=	1,25	[-]	
	N_{Rd} = A x fw / γ_{M1}=	**17,19**	[kN]	nach Gl. 8.29
				acc. equation 8.29

relevant for bracing tubes: **NRd_D = 13,39 kN**

Allowable normal force at coupler:

Bolzen / Bolt			
Material / material (8.8)	$f_{y,bk}$=	64,00	[kN/cm²]
	$f_{u,bk}$=	80,00	[kN/cm²]
Geometrie / geometry	Db=	1,08	[cm]
	Ab=	0,91	[cm²]
zul Normalkraft aus Abscheren n. EN 1999-1-1 allow able loading due to shearing acc. to EN 1999-1-1			
	N_{Rd} = 2 x 0,60 x Ab x fub,k / 1,25=	**69,71**	[kN]
Verbinder / Connector			
Material / material	EN AW 2011 (AlCuBiPb F37)		
Geometrie / geometry	Dm=	29	[mm]
Lochleibung in Verbinder Bearing stress in connector	f_u / γ_{M2}=	248,00	[N/mm²]
	do=	11	[mm]
	t=	29	[mm]
	e_1=	17,1	[mm]
	αb=	0,52	[-]
	e2=	14,5	[mm]
	k_1=	1,99090909	[-]
	NRd = k1 x αb x fu x d x t / γ_{M2}=	81,62	[kN]
Nachweis Restquerschnitt auf Zug Remaining section under tension			
	NRd = 0,9 x A,net x fu / γ_{M2}=	**76,23**	[kN]
Hülse / Female Fitting			
Geometrie / geometry	DH=	50	[mm]
	Di-1=	29	[mm]
	Di-2=	35	[mm]
	Di-m=	32	[mm]
Lochleibung in Hülse Bearing stress in female fitting	fu / γ_{M2}=	232	[N/mm²]
	do=	13	[mm]
	t = DH - Di-m=	18	[mm]
	e1>	23	[mm]
	αb=	0,59	
	e2>	20	[mm]
	k1=	2,5	
	NRd = k1 x αb x fu x d x t / γ_{M2}=	**80,04**	[kN]

The allowable normal force of the coupler is not relevant compared to the allowable normal force of the tube (N_{RdG} = 68,44 kN < 69,71 kN).

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Interaction bending and normal force at coupler of the outer chords

Verification of interaction bending and normal force at coupler

=> $\mathbf{(Nsd_G / NRd_G)^{1,3} + (Msd_G / MRd_G) < 1,0}$

mit $Nsd_G = Nsd / 4 + Msd / (2 \cdot 0{,}24\ m)$
und $Msd_G = 0{,}25 \cdot Qsd \cdot 8{,}0\ cm = 2{,}0\ cm \cdot Qsd$
=> a = factor for cantilever at the coupler = 2,0 cm

Nsd, Msd und Qsd: global internal forces in the truss (in kN resp. kNm)

The global internal forces include the following safety factors acc. Eurocode:

selfweight of the truss: yF = 1,35

Net load on the truss: yF = 1,50

NRd_G = allowable loading of the chord in the heat affected zone (see following table):

Gurtrohr im Bereich der WEZ an der Kupplung main chord in heat affected zone at coupler			
N_{Rd} =A x 0,8* x fu,haz / γ_{M2}=	**68,44**	[kN]	*(WIG $_{TIG}$) örtliche Schweißnaht nach Kap. 6.2.9.3 (1) local welding seam acc. chapter 6.2.9.3 (1)

MRd_G = MuRd (see following table):

Lokale Biegung Gurtrohr Knotenpunkt vollst. in WEZ Local bending of chord			
örtliche Schweißnaht nach Kap. 6.2.9.3 (1) local welding seam acc. Chapter 6.2.9.3 (1)			
D=	50	[mm]	
red-Faktor=	0,8	[-]	(WIG $_{TIG}$)
$\rho_{o,haz}$=	0,64	[-]	fu,haz / fu
$t_{u,eff}$=	2,04	[mm]	red-Faktor · $\rho_{u,haz}$ · t
$W_{net} = \pi$ x R^2 x $t_{u,eff}$=	3,39	[cm³]	mit R = D / 2 - t / 2
MuRd = Wnet · fu / yM2=	**78,71**	[kNcm]	nach Gl. 6.24 acc. equation 6.24

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The following 4 cases are taken into account.

1. Verification of the center chords at the bottom at UDL-loads or multiple single point loads (LC 1a and 1b)

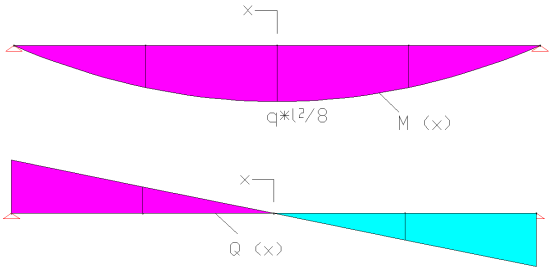
The loads at center chord at the bottom are loaded at the worst points with multiple single point loads at a distance of 50 cm between each load.

2. Verification of the center chord at the bottom with single point loads (LC 1c)
No requirements for position of coupler (see below).

3. Verification of the outer chords with uniformly distributed load (UDL) (LC 2a)

The coupler is always located at the theoretically worst point. This results from the following extremum-calculation:

Note: For the determination of the worst position of the coupler, the exponent 1,3, for the relation of actual load to the allowable load is not taken into account with sufficient accuracy.



$M_{sd}(x) = q_{sd} \cdot L^2 / 8 - q_{sd} \cdot x^2 / 2$
$Q_{sd}(x) = q_{sd} \cdot x$

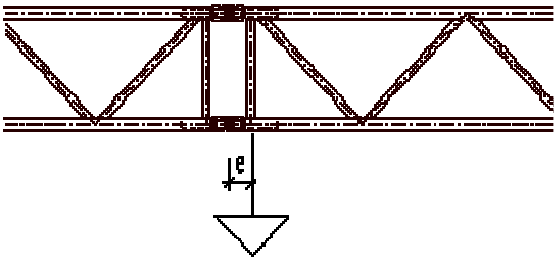
$N_{Rd_G} = 68{,}44$ kN
$M_{Rd_G} = 78{,}71$ kNcm

M-Q Interaction $M_{sd}(x) / (2 \cdot 0{,}24 \cdot 68{,}44) + Q_{sd}(x) \cdot 2{,}0 / 78{,}71$

Extreme value: $d/dx\ \sigma(x) = 0$

$\Rightarrow x = 2 \cdot 0{,}24 \cdot 68{,}44 \cdot 2{,}0 / 78{,}71 = 0{,}835$ m
(from middle of span)

4. Verification of the side chords with single point loads (LC 2b)
No requirements for position of coupler (Distance between load and coupler is e ≥ 9 cm, see below)



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Summary

Following points are relevant for the determination of the allowable loads:

1. Allowable bending moment of the center chord at the bottom and the cross tubes (MRd_G)
   completely in heat affected zone => MRd_G = 76,95 kNcm
   outside heat affectd zone => MRd_G = 140,0 kNcm

2. Allowable normal force in main chord (NRd_G)

   Main chord in heat affected zone at coupler is relevant => NRd_G = 68,44 kN

3. Global shear force in truss (Q)

   Allowable normal force in diagonals at nodes is relevant => NRd_D = 13,39 kN

   zul shear force from $QRd / (2 \cdot \sin 40{,}4°) < 0{,}9 \cdot NRd_D$
   * 10% reduction because of minor stresses

   => allow. $QRd = 0{,}9 \cdot 13{,}39 \cdot 2 \cdot \sin 40{,}4°$ => QRd = 15,62 kN

4. Interaction bending and normal force at coupler see page 13

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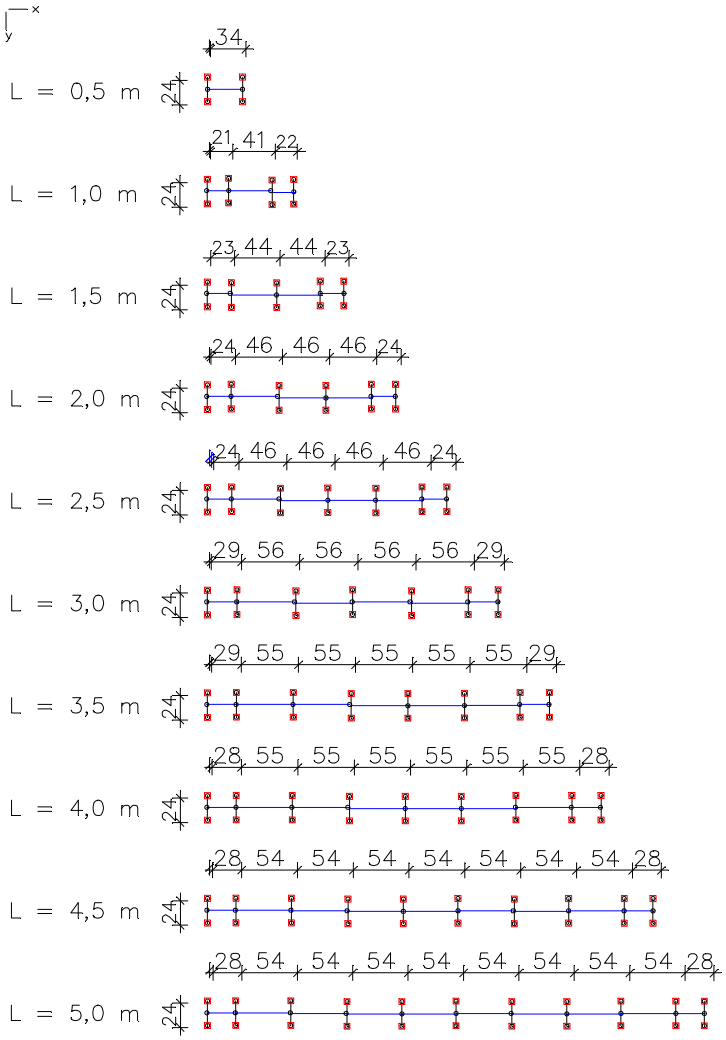
5 ALLOWABLE LOADING SINGLE SPAN GIRDER

5.1 Center chords at bottom

Systems [cm]:



Loadings:	Single point load (CPL or at 1/3-, 1/4- or 1/5-pts)	Pi = 8,0 kN
	For comparison: The maximum allowable UDL acc. loadtables (chapter 6) is Uniformly distributed load (UDL) (covers also Multiple point loads at a distance of 50 cm	 < 6,0 kN/m p = 6,0 kN/m Pi = 3,0 kN)
Calculation		see annex
Verification:	Single point load (transverse tube) max M_{Ed} = 1,5 · 8,0 · 24 / 4 = 72,0 kNcm	 < MRd = 76,95 kNcm
	Single point load (longitudinal tube) max M_{Ed1} = 1,5 · (-37) = -55,5 kNcm max M_{Ed2} = 1,5 · 78 = 117 kNcm	 < MRd = 76,95 kNcm < MRd = 140 kNcm
	UDL (transverse tube) and Multiple point loads for comparison max M_{Ed} = 1,5 · 21 kNcm = 31,5 kNcm	 < MRd = 76,95 kNcm
	UDL (longitudinal tube) and Multiple point loads for comparison max M_{Ed1} = 1,5 · (-17) = -25,5 kNcm max M_{Ed2} = 1,5 · 10 = 15 kNcm	 < MRd = 76,95 kNcm < MRd = 140 kNcm

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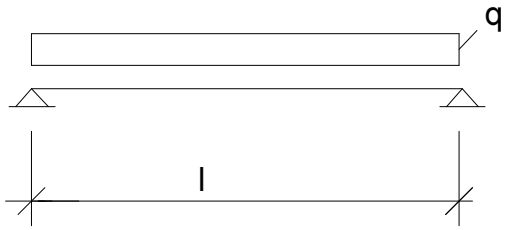
5.2 Outer chords + bracing uniformly distributed load (UDL)

System:



Loading

qsd = psd + gsd — (Net load + selfweight, incl. safety factors)

Normal force in chords:

$N_{Rd} \geq q_{sd} \cdot L^2 / 8 / (n \cdot b)$
$\Rightarrow q_{sd} \leq N_{Rd} \cdot (n \cdot b) \cdot 8 / L^2$
$\Rightarrow zul\ p = (N_{Rd} \cdot (n \cdot b) \cdot 8 / L^2 - g_{sd}) / \gamma_F$

Normal force in bracing:

$Q_{Rd} \geq q_{sd} \cdot L / 2$
$\Rightarrow q_{sd} \leq Q_{Rd} \cdot 2 / L$
$\Rightarrow zul\ p = (Q_{Rd} \cdot 2 / L - g_{sd}) / \gamma_F$

Interaction at coupler:

Verification of interaction bending and normal force at coupler by an iterative method.

$\Rightarrow (N_{sdG} / N_{RdG})^{1,3} + (M_{sdG} / M_{RdG}) < 1,0$

The coupler is located at e = 0,835 m from the middle of the span (theoretically worst point, see extremum-calculation in chapter 4)

Center chord at bottom: — see tables

Limit of deflection:

Limit of deflection max. $u = L / f$
$\Rightarrow zul\ p = (L / f) / (5/384 \cdot L^4 / E / I_{yy}) - g$

3 different limitations are taken into account:
max. u = L / 100
max. u = L / 200
max. u = L / 300

Loading tables: — see following pages

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Gleichstreckenlast
Uniformly distributed load UDL

	zulässige Belastung in Abhängigkeit von			
	allowable load as a function of			
	NRd	QRd	Interaction at coupler	Deflection L/100
L [m]	**zul q [kN/m]**	**zul q [kN/m]**	**zul q [kN/m]**	**zul q [kN/m]**
4,00	10,85	5,11	9,79	28,37
5,00	6,91	4,07	6,47	14,47
6,00	4,77	3,37	4,55	8,33
7,00	3,48	2,88	3,36	5,20
8,00	2,64	2,50	2,57	3,45
9,00	2,06	2,21	2,02	2,39
10,00	1,65	1,98	1,62	1,71
11,00	1,35	1,79	1,33	1,26
12,00	1,12	1,64	1,10	0,94
13,00	0,94	1,50	0,93	0,72
14,00	0,79	1,39	0,79	0,55
15,00	0,68	1,29	0,67	0,43
16,00	0,58	1,20	0,58	0,33
17,00	0,51	1,13	0,50	0,26
18,00	0,44	1,06	0,44	0,20
19,00	0,39	1,00	0,38	0,15
20,00	0,34	0,94	0,34	0,12

Gleichstreckenlast
Uniformly distributed load UDL

	zulässige Belastung in Abhängigkeit von			
	allowable load as a function of			
	NRd	QRd	Interaction at coupler	Deflection L/200
L [m]	**zul q [kN/m]**	**zul q [kN/m]**	**zul q [kN/m]**	**zul q [kN/m]**
4,00	10,85	5,11	9,79	14,13
5,00	6,91	4,07	6,47	7,18
6,00	4,77	3,37	4,55	4,11
7,00	3,48	2,88	3,36	2,55
8,00	2,64	2,50	2,57	1,67
9,00	2,06	2,21	2,02	1,14
10,00	1,65	1,98	1,62	0,80
11,00	1,35	1,79	1,33	0,57
12,00	1,12	1,64	1,10	0,42
13,00	0,94	1,50	0,93	0,30
14,00	0,79	1,39	0,79	0,22
15,00	0,68	1,29	0,67	0,16
16,00	0,58	1,20	0,58	0,11
17,00	0,51	1,13	0,50	0,07
18,00	0,44	1,06	0,44	0,05

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Gleichstreckenlast
Uniformly distributed load UDL

	zulässige Belastung in Abhängigkeit von			
	allowable load as a function of			
	NRd	QRd	Interaction at coupler	Deflection L/300
L [m]	**zul q [kN/m]**	**zul q [kN/m]**	**zul q [kN/m]**	**zul q [kN/m]**
4,00	10,85	5,11	9,79	9,38
5,00	6,91	4,07	6,47	4,75
6,00	4,77	3,37	4,55	2,70
7,00	3,48	2,88	3,36	1,66
8,00	2,64	2,50	2,57	1,08
9,00	2,06	2,21	2,02	0,72
10,00	1,65	1,98	1,62	0,50
11,00	1,35	1,79	1,33	0,35
12,00	1,12	1,64	1,10	0,24
13,00	0,94	1,50	0,93	0,17
14,00	0,79	1,39	0,79	0,11
15,00	0,68	1,29	0,67	0,07
16,00	0,58	1,20	0,58	0,04

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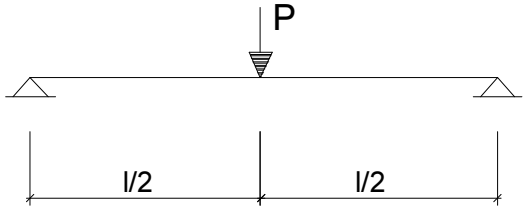
5.3 Outer chords + bracing single point load at 1/2-point

System:



Loading

Psd + gsd — (Net load + selfweight, incl. safety factors)

Normal force in chords:

$N_{Rd} \geq (P_{sd} \cdot L / 4 + g_{sd} \cdot L^2 / 8) / (n \cdot b)$
$\Rightarrow P_{sd} \leq [N_{Rd} \cdot (n \cdot b) - g_{sd} \cdot L^2 / 8] \cdot 4 / L$
$\Rightarrow$ zul P = $[N_{Rd} \cdot (n \cdot b) - g_{sd} \cdot L^2 / 8] \cdot 4 / L / \gamma_F$

Normal force in bracing:

$Q_{Rd} \geq P_{sd} / 2 + g_{sd} \cdot L / 2$
$\Rightarrow P_{sd} \leq (Q_{Rd} - g_{sd} \cdot L / 2) \cdot 2$
$\Rightarrow$ zul P = $(Q_{Rd} - g_{sd} \cdot L / 2) \cdot 2 / \gamma_F$

Interaction at coupler:

Verification of interaction bending and normal force at coupler by an iterative method.

$\Rightarrow (N_{sdG} / N_{RdG})^{1,3} + (M_{sdG} / M_{RdG}) < 1,0$

The load is located at e = 0,09 m from the coupler

Center chord at bottom:

zul P ≤ 8,0 kN

Limit of deflection:

Limit of deflection max. u = L / f
$\Rightarrow$ zul P = $[L / f - g \cdot (5/384 \cdot L^4 / E / I_{yy})] / (L^3/48 / E / I_{yy})$

3 different limitations are taken into account:
max. u = L / 100
max. u = L / 200
max. u = L / 300

Loading tables:

see following pages

Einzellast in Feldmitte
Single-load in 1/2point

	zulässige Belastung in Abhängigkeit von			
	allowable load as a function of			
	Nrd	Qrd	Interaction at coupler	Deflection L/100
			0,09	= e [m]
L [m]	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**
4,00	21,70	20,43	16,94	70,93
5,00	17,27	20,33	14,16	45,23
6,00	14,30	20,23	12,10	31,23
7,00	12,16	20,13	10,53	22,77
8,00	10,55	20,03	9,29	17,25
9,00	9,28	19,93	8,28	13,44
10,00	8,26	19,83	7,45	10,70
11,00	7,41	19,73	6,74	8,65
12,00	6,70	19,63	6,14	7,08
13,00	6,09	19,53	5,61	5,84
14,00	5,56	19,43	5,15	4,84
15,00	5,09	19,33	4,74	4,02
16,00	4,68	19,23	4,37	3,34
17,00	4,30	19,13	4,04	2,76
18,00	3,97	19,03	3,73	2,27
19,00	3,66	18,93	3,46	1,84
20,00	3,38	18,83	3,20	1,46

Note: If the load is applied at the center bottom chord (LC1) it has to be ≤ **8,0 kN**

Einzellast in Feldmitte
Single-load in 1/2point

	zulässige Belastung in Abhängigkeit von			
	allowable load as a function of			
	Nrd	Qrd	Interaction at coupler	Deflection L/200
			0,09	= e [m]
L [m]	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**
4,00	21,70	20,43	16,94	35,33
5,00	17,27	20,33	14,16	22,44
6,00	14,30	20,23	12,10	15,41
7,00	12,16	20,13	10,53	11,14
8,00	10,55	20,03	9,29	8,35
9,00	9,28	19,93	8,28	6,41
10,00	8,26	19,83	7,45	5,00
11,00	7,41	19,73	6,74	3,94
12,00	6,70	19,63	6,14	3,12
13,00	6,09	19,53	5,61	2,47
14,00	5,56	19,43	5,15	1,93
15,00	5,09	19,33	4,74	1,49
16,00	4,68	19,23	4,37	1,11
17,00	4,30	19,13	4,04	0,79
18,00	3,97	19,03	3,73	0,51

Note: If the load is applied at the center bottom chord (LC1) it has to be ≤ **8,0 kN**

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Einzellast in Feldmitte

Single-load in 1/2point

	zulässige Belastung in Abhängigkeit von allowable load as a function of			
	Nrd	Qrd	Interaction at coupler	Deflection L/300
			0,09	= e [m]
L [m]	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**
4,00	21,70	20,43	16,94	23,46
5,00	17,27	20,33	14,16	14,84
6,00	14,30	20,23	12,10	10,13
7,00	12,16	20,13	10,53	7,26
8,00	10,55	20,03	9,29	5,38
9,00	9,28	19,93	8,28	4,06
10,00	8,26	19,83	7,45	3,10
11,00	7,41	19,73	6,74	2,37
12,00	6,70	19,63	6,14	1,80
13,00	6,09	19,53	5,61	1,34
14,00	5,56	19,43	5,15	0,97
15,00	5,09	19,33	4,74	0,65
16,00	4,68	19,23	4,37	0,37

Note: If the load is applied at the center bottom chord (LC1) it has to be ≤ **8,0 kN**

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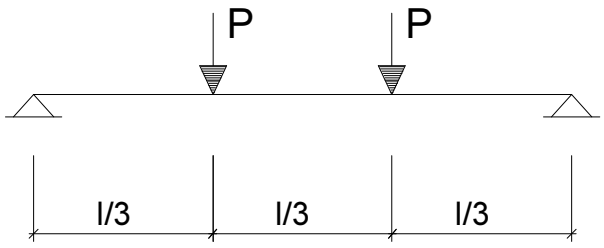
5.4 Outer chords + bracing single point load at 1/3-points

System:



Loading

Psd + gsd — (Net load + selfweight, incl. safety factors)

Normal force in chords:

$N_{Rd} \geq (P_{sd} \cdot L / 3 + g_{sd} \cdot L^2 / 8) / (n \cdot b)$
$\Rightarrow P_{sd} \leq [N_{Rd} \cdot (n \cdot b) - g_{sd} \cdot L^2 / 8] \cdot 3 / L$
$\Rightarrow$ zul P = $[N_{Rd} \cdot (n \cdot b) - g_{sd} \cdot L^2 / 8] \cdot 3 / L / \gamma_F$

Normal force in bracing:

$Q_{Rd} \geq P_{sd} / 2 \; g_{sd} \cdot L / 2$
$\Rightarrow P_{sd} \leq (Q_{Rd} - g_{sd} \cdot L / 2)$
$\Rightarrow$ zul P = $(Q_{Rd} - g_{sd} \cdot L / 2) / \gamma_F$

Interaction at coupler:

Verification of interaction bending and normal force at coupler by an iterative method.

$\Rightarrow (N_{sdG} / N_{RdG})^{1,3} + (M_{sdG} / M_{RdG}) < 1,0$

The load is located at e = 0,09 m from the coupler

Center chord at bottom:

zul P ≤ 8,0 kN

Limit of deflection:

Limit of deflection max. u = L / f
$\Rightarrow$ zul P = $[L / f - g \cdot (5/384 \cdot L^4/E/I_{yy})] / (23/684 \cdot L^3/E/I_{yy})$

3 different limitations are taken into account:
max. u = L / 100
max. u = L / 200
max. u = L / 300

Loading tables:

see following pages

Last in den Drittelspunkten
Single-load in 1/3points

	zulässige Belastung in Abhängigkeit von			
	allowable load as a function of			
	Nrd	Qrd	Interaction at coupler	Deflection L/100
			0,09	= e [m]
L [m]	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**
4,00	16,28	10,21	10,21	41,63
5,00	12,95	10,16	9,60	26,55
6,00	10,73	10,11	8,36	18,33
7,00	9,12	10,06	7,37	13,36
8,00	7,91	10,01	6,56	10,12
9,00	6,96	9,96	5,89	7,89
10,00	6,20	9,91	5,33	6,28
11,00	5,56	9,86	4,85	5,08
12,00	5,03	9,81	4,43	4,16
13,00	4,57	9,76	4,07	3,43
14,00	4,17	9,71	3,75	2,84
15,00	3,82	9,66	3,47	2,36
16,00	3,51	9,61	3,21	1,96
17,00	3,23	9,56	2,98	1,62
18,00	2,98	9,51	2,76	1,33
19,00	2,75	9,46	2,57	1,08
20,00	2,54	9,41	2,39	0,86

Note: If the load is applied at the center bottom chord (LC1) it has to be ≤ **8,0 kN**

Last in den Drittelspunkten
Single-load in 1/3points

	zulässige Belastung in Abhängigkeit von			
	allowable load as a function of			
	Nrd	Qrd	Interaction at coupler	Deflection L/200
			0,09	= e [m]
L [m]	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**
4,00	16,28	10,21	10,21	20,74
5,00	12,95	10,16	9,60	13,17
6,00	10,73	10,11	8,36	9,04
7,00	9,12	10,06	7,37	6,54
8,00	7,91	10,01	6,56	4,90
9,00	6,96	9,96	5,89	3,76
10,00	6,20	9,91	5,33	2,94
11,00	5,56	9,86	4,85	2,32
12,00	5,03	9,81	4,43	1,83
13,00	4,57	9,76	4,07	1,45
14,00	4,17	9,71	3,75	1,14
15,00	3,82	9,66	3,47	0,87
16,00	3,51	9,61	3,21	0,65
17,00	3,23	9,56	2,98	0,46
18,00	2,98	9,51	2,76	0,30

Note: If the load is applied at the center bottom chord (LC1) it has to be ≤ **8,0 kN**

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Last in den Drittelspunkten
Single-load in 1/3points

	zulässige Belastung in Abhängigkeit von			
	allowable load as a function of			
	Nrd	Qrd	Interaction at coupler	Deflection L/300
			0,09	= e [m]
L [m]	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**
4,00	16,28	10,21	10,21	13,77
5,00	12,95	10,16	9,60	8,71
6,00	10,73	10,11	8,36	5,95
7,00	9,12	10,06	7,37	4,26
8,00	7,91	10,01	6,56	3,16
9,00	6,96	9,96	5,89	2,39
10,00	6,20	9,91	5,33	1,82
11,00	5,56	9,86	4,85	1,39
12,00	5,03	9,81	4,43	1,06
13,00	4,57	9,76	4,07	0,79
14,00	4,17	9,71	3,75	0,57
15,00	3,82	9,66	3,47	0,38
16,00	3,51	9,61	3,21	0,22

Note: If the load is applied at the center bottom chord (LC1) it has to be ≤ **8,0 kN**

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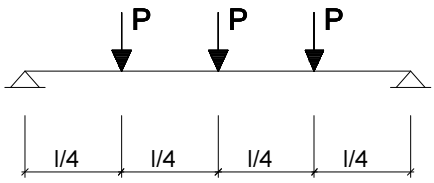
5.5 Outer chords + bracing single point load at 1/4-points

System:



Loading

Psd + gsd — (Net load + selfweight, incl. safety factors)

Normal force in chords:

$N_{Rd} \geq (P_{sd} \cdot L / 4 + g_{sd} \cdot L^2 / 8) / (n \cdot b)$
$\Rightarrow P_{sd} \leq [N_{Rd} \cdot (n \cdot b) - g_{sd} \cdot L^2 / 8] \cdot 2 / L$
$\Rightarrow$ zul P = $[N_{Rd} \cdot (n \cdot b) - g_{sd} \cdot L^2 / 8] \cdot 2 / L / \gamma_F$

Normal force in bracing:

$Q_{Rd} \geq 3 / 2 \cdot P_{sd} + g_{sd} \cdot L / 2$
$\Rightarrow P_{sd} \leq (Q_{Rd} - g_{sd} \cdot L / 2) \cdot 2 / 3$
$\Rightarrow$ zul P = $(Q_{Rd} - g_{sd} \cdot L / 2) \cdot 2 / 3 / \gamma_F$

Interaction at coupler:

Verification of interaction bending and normal force at coupler by an iterative method.

$\Rightarrow (N_{sdG} / N_{RdG})^{1,3} + (M_{sdG} / M_{RdG}) < 1,0$

The load is located at e = 0,09 m from the coupler

Center chord at bottom:

zul P ≤ 8,0 kN

Limit of deflection:

Limit of deflection max. u = L / f
$\Rightarrow$ zul P = $[L / f - g \cdot (5/384 \cdot L^4/E/I_{yy})] / (1/20{,}21 \cdot L^3/E/I_{yy})$

3 different limitations are taken into account:
max. u = L / 100
max. u = L / 200
max. u = L / 300

Loading tables: see following pages

Last in den Viertelspunkten
Single-load in 1/4points

	zulässige Belastung in Abhängigkeit von allowable load as a function of				
	Nrd	Qrd	Interaction at coupler 1	Interaction at coupler 2	Deflection L/100
			0,09	0,09	= e [m]
L [m]	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**
4,00	10,85	6,81	8,98	9,54	29,87
5,00	8,64	6,78	7,78	7,77	19,04
6,00	7,15	6,74	6,85	6,53	13,15
7,00	6,08	6,71	6,10	5,62	9,59
8,00	5,28	6,68	5,47	4,93	7,26
9,00	4,64	6,64	4,95	4,37	5,66
10,00	4,13	6,61	4,50	3,91	4,50
11,00	3,71	6,58	4,12	3,53	3,64
12,00	3,35	6,54	3,79	3,20	2,98
13,00	3,04	6,51	3,50	2,92	2,46
14,00	2,78	6,48	3,25	2,67	2,04
15,00	2,55	6,44	3,02	2,45	1,69
16,00	2,34	6,41	2,81	2,26	1,41
17,00	2,15	6,38	2,62	2,08	1,16
18,00	1,98	6,34	2,45	1,92	0,95
19,00	1,83	6,31	2,29	1,78	0,77
20,00	1,69	6,28	2,14	1,64	0,61

Note: If the load is applied at the center bottom chord (LC1) it has to be ≤ **8,0 kN**

Last in den Viertelspunkten
Single-load in 1/4points

	zulässige Belastung in Abhängigkeit von allowable load as a function of				
	Nrd	Qrd	Interaction at coupler 1	Interaction at coupler 2	Deflection L/200
			0,09	0,09	= e [m]
L [m]	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**
4,00	10,85	6,81	8,98	9,54	14,87
5,00	8,64	6,78	7,78	7,77	9,45
6,00	7,15	6,74	6,85	6,53	6,49
7,00	6,08	6,71	6,10	5,62	4,69
8,00	5,28	6,68	5,47	4,93	3,51
9,00	4,64	6,64	4,95	4,37	2,70
10,00	4,13	6,61	4,50	3,91	2,11
11,00	3,71	6,58	4,12	3,53	1,66
12,00	3,35	6,54	3,79	3,20	1,31
13,00	3,04	6,51	3,50	2,92	1,04
14,00	2,78	6,48	3,25	2,67	0,81
15,00	2,55	6,44	3,02	2,45	0,63
16,00	2,34	6,41	2,81	2,26	0,47
17,00	2,15	6,38	2,62	2,08	0,33
18,00	1,98	6,34	2,45	1,92	0,21

Note: If the load is applied at the center bottom chord (LC1) it has to be ≤ **8,0 kN**

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Last in den Viertelspunkten
Single-load in 1/4points

	zulässige Belastung in Abhängigkeit von allowable load as a function of				
	Nrd	Qrd	Interaction at coupler 1	Interaction at coupler 2	Deflection L/300
			0,09	0,09	= e [m]
L [m]	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**
4,00	10,85	6,81	8,98	9,54	9,88
5,00	8,64	6,78	7,78	7,77	6,25
6,00	7,15	6,74	6,85	6,53	4,27
7,00	6,08	6,71	6,10	5,62	3,06
8,00	5,28	6,68	5,47	4,93	2,26
9,00	4,64	6,64	4,95	4,37	1,71
10,00	4,13	6,61	4,50	3,91	1,31
11,00	3,71	6,58	4,12	3,53	1,00
12,00	3,35	6,54	3,79	3,20	0,76
13,00	3,04	6,51	3,50	2,92	0,57
14,00	2,78	6,48	3,25	2,67	0,41
15,00	2,55	6,44	3,02	2,45	0,27
16,00	2,34	6,41	2,81	2,26	0,16

Note: If the load is applied at the center bottom chord (LC1) it has to be ≤ **8,0 kN**

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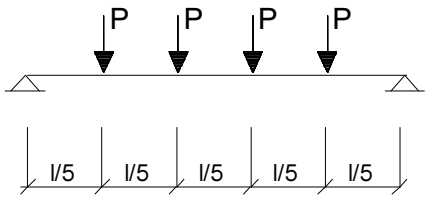
5.5 Outer chords + bracing single point load at 1/5-points

System:



Loading

Psd + gsd — (Net load + selfweight, incl. safety factors)

Normal force in chords:

$N_{Rd} \geq (P_{sd} \cdot 3 / 5 \cdot L + g_{sd} \cdot L^2 / 8) / (n \cdot b)$
$\Rightarrow P_{sd} \leq [N_{Rd} \cdot (n \cdot b) - g_{sd} \cdot L^2 / 8] \cdot 5 / 3$
$\Rightarrow$ zul P = $[N_{Rd} \cdot (n \cdot b) - g_{sd} \cdot L^2 / 8] \cdot 5 / 3 / L / y_F$

Normal force in bracing:

$Q_{Rd} \geq 2 \cdot P_{sd} + g_{sd} \cdot L / 2$
$\Rightarrow P_{sd} \leq (Q_{Rd} - g_{sd} \cdot L / 2) / 2$
$\Rightarrow$ zul P = $(Q_{Rd} - g_{sd} \cdot L / 2) / 2 / y_F$

Interaction at coupler:

Verification of interaction bending and normal force at coupler by an iterative method.

$\Rightarrow (N_{sdG} / N_{RdG})^{1,3} + (M_{sdG} / M_{RdG}) < 1,0$

The load is located at e = 0,09 m from the coupler

Center chord at bottom:

zul P ≤ 8,0 kN

Limit of deflection:

Limit of deflection max. u = L / f
$\Rightarrow$ zul P = $[L / f - g \cdot (5/384 \cdot L^4/E/I_{yy})] / (1/15{,}87 \cdot L^3/E/I_{yy})$

3 different limitations are taken into account:
max. u = L / 100
max. u = L / 200
max. u = L / 300

Loading tables: see following pages

Last in den Fünftelspunkten
Single-load in 1/5points

	zulässige Belastung in Abhängigkeit von				
	allowable load as a function of				
	Nrd	Qrd	Interaction at coupler 1	Interaction at coupler 2	Deflection L/100
			0,09	0,09	= e [m]
L [m]	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**
4,00	9,04	5,11	7,64	7,31	23,45
5,00	7,20	5,08	6,71	6,05	14,95
6,00	5,96	5,06	5,97	5,14	10,33
7,00	5,07	5,03	5,36	4,46	7,53
8,00	4,40	5,01	4,85	3,93	5,70
9,00	3,87	4,98	4,41	3,50	4,44
10,00	3,44	4,96	4,04	3,14	3,54
11,00	3,09	4,93	3,72	2,84	2,86
12,00	2,79	4,91	3,44	2,59	2,34
13,00	2,54	4,88	3,19	2,37	1,93
14,00	2,32	4,86	2,97	2,17	1,60
15,00	2,12	4,83	2,77	2,00	1,33
16,00	1,95	4,81	2,59	1,84	1,10
17,00	1,79	4,78	2,43	1,70	0,91
18,00	1,65	4,76	2,28	1,58	0,75
19,00	1,53	4,73	2,14	1,46	0,61
20,00	1,41	4,71	2,01	1,35	0,48

Note: If the load is applied at the center bottom chord (LC1) it has to be ≤ **8,0 kN**

Last in den Fünftelspunkten
Single-load in 1/5points

	zulässige Belastung in Abhängigkeit von				
	allowable load as a function of				
	Nrd	Qrd	Interaction at coupler 1	Interaction at coupler 2	Deflection L/200
			0,09	0,09	= e [m]
L [m]	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**
4,00	9,04	5,11	7,64	7,31	11,68
5,00	7,20	5,08	6,71	6,05	7,42
6,00	5,96	5,06	5,97	5,14	5,09
7,00	5,07	5,03	5,36	4,46	3,68
8,00	4,40	5,01	4,85	3,93	2,76
9,00	3,87	4,98	4,41	3,50	2,12
10,00	3,44	4,96	4,04	3,14	1,65
11,00	3,09	4,93	3,72	2,84	1,30
12,00	2,79	4,91	3,44	2,59	1,03
13,00	2,54	4,88	3,19	2,37	0,82
14,00	2,32	4,86	2,97	2,17	0,64
15,00	2,12	4,83	2,77	2,00	0,49
16,00	1,95	4,81	2,59	1,84	0,37
17,00	1,79	4,78	2,43	1,70	0,26
18,00	1,65	4,76	2,28	1,58	0,17

Note: If the load is applied at the center bottom chord (LC1) it has to be ≤ **8,0 kN**

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Last in den Fünftelspunkten
Single-load in 1/5points

	zulässige Belastung in Abhängigkeit von allowable load as a function of				
	Nrd	Qrd	Interaction at coupler 1	Interaction at coupler 2	Deflection L/300
			0,09	0,09	= e [m]
L [m]	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**	**zul P [kN]**
4,00	9,04	5,11	7,64	7,31	7,76
5,00	7,20	5,08	6,71	6,05	4,91
6,00	5,96	5,06	5,97	5,14	3,35
7,00	5,07	5,03	5,36	4,46	2,40
8,00	4,40	5,01	4,85	3,93	1,78
9,00	3,87	4,98	4,41	3,50	1,34
10,00	3,44	4,96	4,04	3,14	1,03
11,00	3,09	4,93	3,72	2,84	0,79
12,00	2,79	4,91	3,44	2,59	0,60
13,00	2,54	4,88	3,19	2,37	0,44
14,00	2,32	4,86	2,97	2,17	0,32
15,00	2,12	4,83	2,77	2,00	0,21
16,00	1,95	4,81	2,59	1,84	0,12

Note: If the load is applied at the center bottom chord (LC1) it has to be ≤ **8,0 kN**

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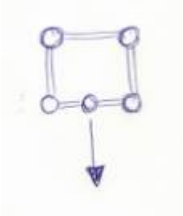
6 SUMMARY OF RESULTS

6.1 Allowable loadings at center bottom chord (LC1):

The values of the following tables are only valid for single-span girder.
The truss-elements have to be braced with diagonals.
Loads have to be applied acc. chapter 1.4.
Loads at the middle of the couplers are not allowed.
The specified values include partial safety coefficients on the loadings side acc. EN 1990 of yF = 1.50 for payloads and yG = 1.35 for selfweight of the truss.
For applications which can be calculated on the basis of other codes, the partial safety factors can be adjusted (for example temporary structures acc. EN 13814, yF = 1.35 for payloads).
To use the resulting allowable loads with British Standard (BS) and ANSI, allowable loads listed in tables have to be multiplied by 0.85.

6.1.1 Limitation of deflection = L/100

Allowable load F35 Loading applied on the central bottom chord



				Einzellasten / Single point loads							
Span		UDL on cBC		in 1/2 Point		in 1/3 Points		in 1/4 Points		in 1/5 Points	
Spannweite		UDL on cBC		in 1/2 Punkt		in 1/3 Punkten		in 1/4 Punkten		in 1/5 Punkten	
[m]	[ft]	[kg/m]	[lbs/ft]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]
4	13,1	511	343	800	1764	800	1764	681	1501	511	1126
5	16,4	407	273	800	1764	800	1764	678	1494	508	1121
6	19,7	337	227	800	1764	800	1764	653	1441	506	1115
7	23,0	288	193	800	1764	737	1625	562	1240	446	983
8	26,2	250	168	800	1764	656	1446	493	1086	393	866
9	29,5	202	136	800	1764	589	1298	437	963	350	771
10	32,8	162	109	745	1643	533	1174	391	862	314	693
11	36,1	126	85	674	1487	485	1069	353	777	284	627
12	39,4	94	63	614	1354	416	916	298	657	234	516
13	42,7	72	48	561	1238	343	756	246	542	193	426
14	45,9	55	37	484	1067	284	627	204	449	160	353
15	49,2	43	29	402	887	236	521	169	373	133	293
16	52,5	33	22	334	736	196	432	141	310	110	243
17	55,8	26	17	276	609	162	357	116	256	91	201
18	59,1	20	14	227	500	133	293	95	210	75	165
19	62,3	15	10	184	405	108	238	77	171	61	134
20	65,6	12	8	146	322	86	189	61	136	48	106

Load limited by allowable local loading on the Bottom chord

Load limited by allowable deflection of L/100

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6.1.2 Limitation of deflection = L/200

Allowable load F35 Loading applied on the central bottom chord

				Einzellasten / Single point loads							
Span		UDL on cBC		in 1/2 Point		in 1/3 Points		in 1/4 Points		in 1/5 Points	
Spannweite		UDL on cBC		in 1/2 Punkt		in 1/3 Punkten		in 1/4 Punkten		in 1/5 Punkten	
[m]	[ft]	[kg/m]	[lbs/ft]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]
4	13,1	511	343	800	1764	800	1764	681	1501	511	1126
5	16,4	407	273	800	1764	800	1764	678	1494	508	1121
6	19,7	337	227	800	1764	800	1764	649	1430	506	1115
7	23,0	255	171	800	1764	654	1442	469	1034	368	812
8	26,2	167	112	800	1764	490	1080	351	775	276	608
9	29,5	114	77	641	1413	376	829	270	595	212	467
10	32,8	80	54	500	1103	294	647	211	464	165	365
11	36,1	57	39	394	870	232	510	166	366	130	288
12	39,4	42	28	312	689	183	404	131	290	103	228
13	42,7	30	20	247	544	145	319	104	229	82	180
14	45,9	22	15	193	427	114	250	81	180	64	141
15	49,2	16	11	149	329	87	193	63	138	49	109
16	52,5	11	7	111	246	65	144	47	103	37	81
17	55,8	7	5	79	174	46	102	33	73	26	58
18	59,1	5	3	51	112	30	66	21	47	17	37

Load limited by allowable local loading on the Bottom chord

Load limited by allowable deflection of L/200

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6.1.3 Limitation of deflection = L/300

Allowable load F35 Loading applied on the central bottom chord

Span		UDL on cBC		Einzellasten / Single point loads							
				in 1/2 Point		in 1/3 Points		in 1/4 Points		in 1/5 Points	
Spannweite		UDL on cBC		in 1/2 Punkt		in 1/3 Punkten		in 1/4 Punkten		in 1/5 Punkten	
[m]	[ft]	[kg/m]	[lbs/ft]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]
4	13,1	511	343	800	1764	800	1764	681	1501	511	1126
5	16,4	407	273	800	1764	800	1764	625	1378	491	1082
6	19,7	270	182	800	1764	595	1311	427	941	335	739
7	23,0	166	112	726	1602	426	940	306	674	240	530
8	26,2	108	72	538	1186	316	696	226	499	178	392
9	29,5	72	49	406	896	239	526	171	377	134	296
10	32,8	50	33	310	684	182	402	131	288	103	226
11	36,1	35	23	237	524	139	307	100	220	79	173
12	39,4	24	16	180	398	106	233	76	167	60	132
13	42,7	17	11	134	296	79	174	57	125	44	98
14	45,9	11	7	97	213	57	125	41	90	32	70
15	49,2	7	5	65	143	38	84	27	60	21	47
16	52,5	4	3	37	82	22	48	16	35	12	27

Load limited by allowable local loading on the Bottom chord

Load limited by allowable deflection of L/300

6.2 Allowable loadings at side chord (LC2):

The values of the following tables are only valid for single-span girder.
The truss-elements have to be braced with diagonals.
Loads have to be applied acc. chapter 1.4.
Loads at the middle of the couplers are not allowed.
The specified values include partial safety coefficients on the loadings side acc. EN 1990 of yF = 1.50 for payloads and yG = 1.35 for selfweight of the truss.
For applications which can be calculated on the basis of other codes, the partial safety factors can be adjusted (for example temporary structures acc. EN 13814, yF = 1.35 for payloads).
To use the resulting allowable loads with British Standard (BS) and ANSI, allowable loads listed in tables have to be multiplied by 0.85.

6.2.1 Limitation of deflection = L/100

Allowable load F35 Loading applied on the side chords

				Einzellasten / Single point loads							
Span		UDL on cBC		in 1/2 Point		in 1/3 Points		in 1/4 Points		in 1/5 Points	
Spannweite		UDL on cBC		in 1/2 Punkt		in 1/3 Punkten		in 1/4 Punkten		in 1/5 Punkten	
[m]	[ft]	[kg/m]	[lbs/ft]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]
4	13,1	511	343	1694	3736	1021	2252	681	1501	511	1126
5	16,4	407	273	1416	3122	960	2116	678	1494	508	1121
6	19,7	337	227	1210	2668	836	1844	653	1441	506	1115
7	23,0	288	193	1053	2322	737	1625	562	1240	446	983
8	26,2	250	168	929	2048	656	1446	493	1086	393	866
9	29,5	202	136	828	1827	589	1298	437	963	350	771
10	32,8	162	109	745	1643	533	1174	391	862	314	693
11	36,1	126	85	674	1487	485	1069	353	777	284	627
12	39,4	94	63	614	1354	416	916	298	657	234	516
13	42,7	72	48	561	1238	343	756	246	542	193	426
14	45,9	55	37	484	1067	284	627	204	449	160	353
15	49,2	43	29	402	887	236	521	169	373	133	293
16	52,5	33	22	334	736	196	432	141	310	110	243
17	55,8	26	17	276	609	162	357	116	256	91	201
18	59,1	20	14	227	500	133	293	95	210	75	165
19	62,3	15	10	184	405	108	238	77	171	61	134
20	65,6	12	8	146	322	86	189	61	136	48	106

Load limited by allowable deflection of L/100

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6.2.2 Limitation of deflection = L/200

Allowable load F35 Loading applied on the side chords

				Einzellasten / Single point loads							
Span		UDL on cBC		in 1/2 Point		in 1/3 Points		in 1/4 Points		in 1/5 Points	
Spannweite		UDL on cBC		in 1/2 Punkt		in 1/3 Punkten		in 1/4 Punkten		in 1/5 Punkten	
[m]	[ft]	[kg/m]	[lbs/ft]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]
4	13,1	511	343	1694	3736	1021	2252	681	1501	511	1126
5	16,4	407	273	1416	3122	960	2116	678	1494	508	1121
6	19,7	337	227	1210	2668	836	1844	649	1430	506	1115
7	23,0	255	171	1053	2322	654	1442	469	1034	368	812
8	26,2	167	112	835	1840	490	1080	351	775	276	608
9	29,5	114	77	641	1413	376	829	270	595	212	467
10	32,8	80	54	500	1103	294	647	211	464	165	365
11	36,1	57	39	394	870	232	510	166	366	130	288
12	39,4	42	28	312	689	183	404	131	290	103	228
13	42,7	30	20	247	544	145	319	104	229	82	180
14	45,9	22	15	193	427	114	250	81	180	64	141
15	49,2	16	11	149	329	87	193	63	138	49	109
16	52,5	11	7	111	246	65	144	47	103	37	81
17	55,8	7	5	79	174	46	102	33	73	26	58
18	59,1	5	3	51	112	30	66	21	47	17	37

Load limited by allowable deflection of L/200

6.2.3 Limitation of deflection = L/300

Allowable load F35 Loading applied on the side chords

Span		UDL on cBC		Einzellasten / Single point loads							
				in 1/2 Point		in 1/3 Points		in 1/4 Points		in 1/5 Points	
Spannweite		UDL on cBC		in 1/2 Punkt		in 1/3 Punkten		in 1/4 Punkten		in 1/5 Punkten	
[m]	[ft]	[kg/m]	[lbs/ft]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]
4	13,1	511	343	1694	3736	1021	2252	681	1501	511	1126
5	16,4	407	273	1416	3122	871	1921	625	1378	491	1082
6	19,7	270	182	1013	2234	595	1311	427	941	335	739
7	23,0	166	112	726	1602	426	940	306	674	240	530
8	26,2	108	72	538	1186	316	696	226	499	178	392
9	29,5	72	49	406	896	239	526	171	377	134	296
10	32,8	50	33	310	684	182	402	131	288	103	226
11	36,1	35	23	237	524	139	307	100	220	79	173
12	39,4	24	16	180	398	106	233	76	167	60	132
13	42,7	17	11	134	296	79	174	57	125	44	98
14	45,9	11	7	97	213	57	125	41	90	32	70
15	49,2	7	5	65	143	38	84	27	60	21	47
16	52,5	4	3	37	82	22	48	16	35	12	27

Load limited by allowable deflection of L/300

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6.3 Deflections at max. allowable loadings on center bottom chords (LC1):

6.3.1 Limitation of deflection = L/100

Deflections [cm] for F35 at max. allowable loading on central Bottom chord

Vorhandene Durchbiegung [cm] F35 unter max. zul. Lasten

				Einzellasten / Single point loads							
Span		UDL		in 1/2 Point		in 1/3 Points		in 1/4 Points		in 1/5 Points	
[m]	[ft]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]
4	13,1	0,73	0,29	0,46	0,18	0,78	0,31	0,92	0,36	0,88	0,35
5	16,4	1,43	0,56	0,92	0,36	1,53	0,60	1,80	0,71	1,72	0,68
6	19,7	2,48	0,97	1,60	0,63	2,66	1,05	3,02	1,19	2,98	1,17
7	23,0	3,93	1,55	2,55	1,01	3,93	1,55	4,17	1,64	4,20	1,66
8	26,2	5,87	2,31	3,84	1,51	5,27	2,07	5,51	2,17	5,59	2,20
9	29,5	7,67	3,02	5,52	2,17	6,82	2,68	7,04	2,77	7,17	2,82
10	32,8	9,52	3,75	7,15	2,81	8,57	3,38	8,76	3,45	8,95	3,53
11	36,1	11,00	4,33	8,77	3,45	10,54	4,15	10,68	4,20	10,94	4,31
12	39,4	12,00	4,72	10,58	4,16	12,00	4,72	12,00	4,72	12,00	4,72
13	42,7	13,00	5,12	12,57	4,95	13,00	5,12	13,00	5,12	13,00	5,12
14	45,9	14,00	5,51	14,00	5,51	14,00	5,51	14,00	5,51	14,00	5,51
15	49,2	15,00	5,91	15,00	5,91	15,00	5,91	15,00	5,91	15,00	5,91
16	52,5	16,00	6,30	16,00	6,30	16,00	6,30	16,00	6,30	16,00	6,30
17	55,8	17,00	6,69	17,00	6,69	17,00	6,69	17,00	6,69	17,00	6,69
18	59,1	18,00	7,09	18,00	7,09	18,00	7,09	18,00	7,09	18,00	7,09
19	62,3	19,00	7,48	19,00	6,38	19,00	7,48	19,00	7,48	19,00	7,48
20	65,6	20,00	7,87	20,00	6,38	20,00	7,87	20,00	7,87	20,00	7,87

6.3.2 Limitation of deflection = L/200

Deflections [cm] for F35 at max. allowable loading on central Bottom chord

Vorhandene Durchbiegung [cm] F35 unter max. zul. Lasten

				Einzellasten / Single point loads							
Span		UDL		in 1/2 Point		in 1/3 Points		in 1/4 Points		in 1/5 Points	
[m]	[ft]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]
4	13,1	0,73	0,29	0,46	0,18	0,78	0,31	0,92	0,36	0,88	0,35
5	16,4	1,43	0,56	0,92	0,36	1,53	0,60	1,80	0,71	1,72	0,68
6	19,7	2,48	0,97	1,60	0,63	2,66	1,05	3,00	1,18	2,98	1,17
7	23,0	3,50	1,38	2,55	1,01	3,50	1,38	3,50	1,38	3,50	1,38
8	26,2	4,00	1,57	3,84	1,51	4,00	1,57	4,00	1,57	4,00	1,57
9	29,5	4,50	1,77	4,50	1,77	4,50	1,77	4,50	1,77	4,50	1,77
10	32,8	5,00	1,97	5,00	1,97	5,00	1,97	5,00	1,97	5,00	1,97
11	36,1	5,50	2,17	5,50	2,17	5,50	2,17	5,50	2,17	5,50	2,17
12	39,4	6,00	2,36	6,00	2,36	6,00	2,36	6,00	2,36	6,00	2,36
13	42,7	6,50	2,56	6,50	2,56	6,50	2,56	6,50	2,56	6,50	2,56
14	45,9	7,00	2,76	7,00	2,76	7,00	2,76	7,00	2,76	7,00	2,76
15	49,2	7,50	2,95	7,50	2,95	7,50	2,95	7,50	2,95	7,50	2,95
16	52,5	8,00	3,15	8,00	3,15	8,00	3,15	8,00	3,15	8,00	3,15
17	55,8	8,50	3,35	8,50	3,35	8,50	3,35	8,50	3,35	8,50	3,35
18	59,1	9,00	3,54	9,00	3,54	9,00	3,54	9,00	3,54	9,00	3,54

6.3.3 Limitation of deflection = L/300

Deflections [cm] for F35 at max. allowable loading on central Bottom chord

Vorhandene Durchbiegung [cm] F35 unter max. zul. Lasten

				Einzellasten / Single point loads							
Span		UDL		in 1/2 Point		in 1/3 Points		in 1/4 Points		in 1/5 Points	
[m]	[ft]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]
4	13,1	0,73	0,29	0,46	0,18	0,78	0,31	0,92	0,36	0,88	0,35
5	16,4	1,43	0,56	0,92	0,36	1,53	0,60	1,67	0,66	1,67	0,66
6	19,7	2,00	0,79	1,60	0,63	2,00	0,79	2,00	0,79	2,00	0,79
7	23,0	2,33	0,92	2,33	0,92	2,33	0,92	2,33	0,92	2,33	0,92
8	26,2	2,67	1,05	2,67	1,05	2,67	1,05	2,67	1,05	2,67	1,05
9	29,5	3,00	1,18	3,00	1,18	3,00	1,18	3,00	1,18	3,00	1,18
10	32,8	3,33	1,31	3,33	1,31	3,33	1,31	3,33	1,31	3,33	1,31
11	36,1	3,67	1,44	3,67	1,44	3,67	1,44	3,67	1,44	3,67	1,44
12	39,4	4,00	1,57	4,00	1,57	4,00	1,57	4,00	1,57	4,00	1,57
13	42,7	4,33	1,71	4,33	1,71	4,33	1,71	4,33	1,71	4,33	1,71
14	45,9	4,67	1,84	4,67	1,84	4,67	1,84	4,67	1,84	4,67	1,84
15	49,2	5,00	1,97	5,00	1,97	5,00	1,97	5,00	1,97	5,00	1,97
16	52,5	5,33	2,10	5,33	2,10	5,33	2,10	5,33	2,10	5,33	2,10

6.4 Deflections at max. allowable loadings on side chords (LC2):

6.4.1 Limitation of deflection = L/100

Deflections [cm] for F35 at max. allowable loading on the side chords

Vorhandene Durchbiegung [cm] F35 unter max. zul. Lasten

				Einzellasten / Single point loads							
Span		UDL	UDL	in 1/2 Point		in 1/3 Points		in 1/4 Points		in 1/5 Points	
[m]	[ft]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]
4	13,1	0,73	0,29	0,97	0,38	0,99	0,39	0,92	0,36	0,88	0,35
5	16,4	1,43	0,56	1,59	0,63	1,83	0,72	1,80	0,71	1,72	0,68
6	19,7	2,48	0,97	2,37	0,93	2,78	1,09	3,02	1,19	2,98	1,17
7	23,0	3,93	1,55	3,32	1,31	3,93	1,55	4,17	1,64	4,20	1,66
8	26,2	5,87	2,31	4,42	1,74	5,27	2,07	5,51	2,17	5,59	2,20
9	29,5	7,67	3,02	5,70	2,24	6,82	2,68	7,04	2,77	7,17	2,82
10	32,8	9,52	3,75	7,15	2,81	8,57	3,38	8,76	3,45	8,95	3,53
11	36,1	11,00	4,33	8,77	3,45	10,54	4,15	10,68	4,20	10,94	4,31
12	39,4	12,00	4,72	10,58	4,16	12,00	4,72	12,00	4,72	12,00	4,72
13	42,7	13,00	5,12	12,57	4,95	13,00	5,12	13,00	5,12	13,00	5,12
14	45,9	14,00	5,51	14,00	5,51	14,00	5,51	14,00	5,51	14,00	5,51
15	49,2	15,00	5,91	15,00	5,91	15,00	5,91	15,00	5,91	15,00	5,91
16	52,5	16,00	6,30	16,00	6,30	16,00	6,30	16,00	6,30	16,00	6,30
17	55,8	17,00	6,69	17,00	6,69	17,00	6,69	17,00	6,69	17,00	6,69
18	59,1	18,00	7,09	18,00	7,09	18,00	7,09	18,00	7,09	18,00	7,09
19	62,3	19,00	7,48	19,00	7,48	19,00	7,48	19,00	7,48	19,00	7,48
20	65,6	20,00	7,87	20,00	7,87	20,00	7,87	20,00	7,87	20,00	7,87

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6.4.2 Limitation of deflection = L/200

Deflections [cm] for F35 at max. allowable loading on the side chords

Vorhandene Durchbiegung [cm] F35 unter max. zul. Lasten

				Einzellasten / Single point loads							
Span		UDL	UDL	in 1/2 Point		in 1/3 Points		in 1/4 Points		in 1/5 Points	
[m]	[ft]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]
4	13,1	0,73	0,29	0,97	0,38	0,99	0,39	0,92	0,36	0,88	0,35
5	16,4	1,43	0,56	1,59	0,63	1,83	0,72	1,80	0,71	1,72	0,68
6	19,7	2,48	0,97	2,37	0,93	2,78	1,09	3,00	1,18	2,98	1,17
7	23,0	3,50	1,38	3,32	1,31	3,50	1,38	3,50	1,38	3,50	1,38
8	26,2	4,00	1,57	4,00	1,57	4,00	1,57	4,00	1,57	4,00	1,57
9	29,5	4,50	1,77	4,50	1,77	4,50	1,77	4,50	1,77	4,50	1,77
10	32,8	5,00	1,97	5,00	1,97	5,00	1,97	5,00	1,97	5,00	1,97
11	36,1	5,50	2,17	5,50	2,17	5,50	2,17	5,50	2,17	5,50	2,17
12	39,4	6,00	2,36	6,00	2,36	6,00	2,36	6,00	2,36	6,00	2,36
13	42,7	6,50	2,56	6,50	2,56	6,50	2,56	6,50	2,56	6,50	2,56
14	45,9	7,00	2,76	7,00	2,76	7,00	2,76	7,00	2,76	7,00	2,76
15	49,2	7,50	2,95	7,50	2,95	7,50	2,95	7,50	2,95	7,50	2,95
16	52,5	8,00	3,15	8,00	3,15	8,00	3,15	8,00	3,15	8,00	3,15
17	55,8	8,50	3,35	8,50	3,35	8,50	3,35	8,50	3,35	8,50	3,35
18	59,1	9,00	3,54	9,00	3,54	9,00	3,54	9,00	3,54	9,00	3,54

6.4.3 Limitation of deflection = L/300

Deflections [cm] for F35 at max. allowable loading on the side chords

Vorhandene Durchbiegung [cm] F35 unter max. zul. Lasten

				Einzellasten / Single point loads							
Span		UDL	UDL	in 1/2 Point		in 1/3 Points		in 1/4 Points		in 1/5 Points	
[m]	[ft]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]	[cm]	[inch]
4	13,1	0,73	0,29	0,97	0,38	0,99	0,39	0,92	0,36	0,88	0,35
5	16,4	1,43	0,56	1,59	0,63	1,67	0,66	1,67	0,66	1,67	0,66
6	19,7	2,00	0,79	2,00	0,79	2,00	0,79	2,00	0,79	2,00	0,79
7	23,0	2,33	0,92	2,33	0,92	2,33	0,92	2,33	0,92	2,33	0,92
8	26,2	2,67	1,05	2,67	1,05	2,67	1,05	2,67	1,05	2,67	1,05
9	29,5	3,00	1,18	3,00	1,18	3,00	1,18	3,00	1,18	3,00	1,18
10	32,8	3,33	1,31	3,33	1,31	3,33	1,31	3,33	1,31	3,33	1,31
11	36,1	3,67	1,44	3,67	1,44	3,67	1,44	3,67	1,44	3,67	1,44
12	39,4	4,00	1,57	4,00	1,57	4,00	1,57	4,00	1,57	4,00	1,57
13	42,7	4,33	1,71	4,33	1,71	4,33	1,71	4,33	1,71	4,33	1,71
14	45,9	4,67	1,84	4,67	1,84	4,67	1,84	4,67	1,84	4,67	1,84
15	49,2	5,00	1,97	5,00	1,97	5,00	1,97	5,00	1,97	5,00	1,97
16	52,5	5,33	2,10	5,33	2,10	5,33	2,10	5,33	2,10	5,33	2,10

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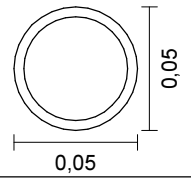
System characteristics

207 Nodes
197 Beams
138 Supports
0 Link elements
1 Material properties
1 Section properties
10 Load cases
2 Load case combinations
7 Result locations in beam elements

Section properties

1	Polygon 	Centroid [m]	ys = 0,000		zs = 0,000	
		Area [m²]	A = 5,7435e-04			
		Moments of inertia [m4]	Ix = 1,0000e-06			
			Iy = 1,5208e-07		I1 = 1,5208e-07	
			Iz = 1,5208e-07		I2 = 1,5208e-07	
		Main axis angle [Grad]	Phi = 0,000		Iyz = 0,0000e+00	
		Averaging of the lateral force shear stress over section width				

Material Properties

	No.	Type	E-Modu. [MN/m²]	GModule [MN/m²]	alpha.t [1/K]	gamma [kN/m³]	Miscellaneous
1	1	Frei	70000	27000	1,0e-05	27,000	fc = 1e+06 [MN/m²] ft = 1e+06

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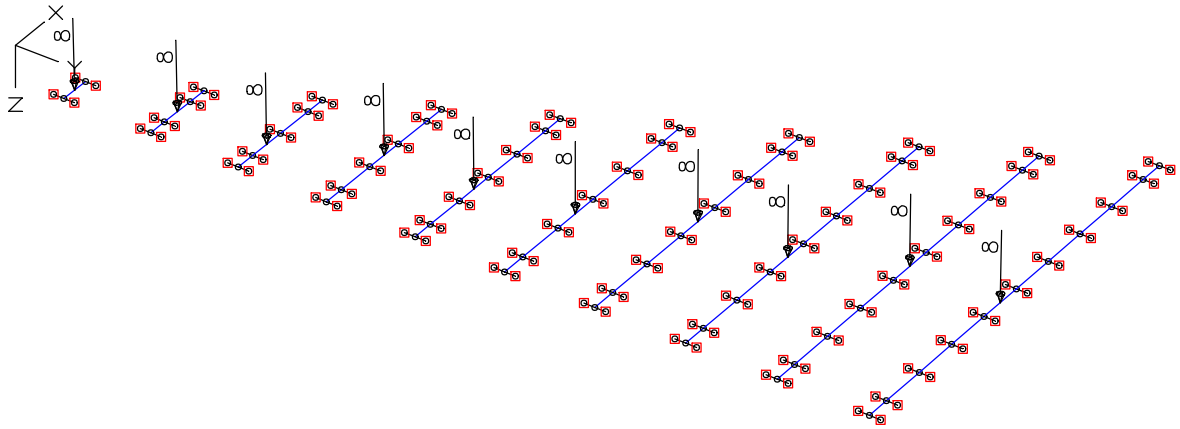
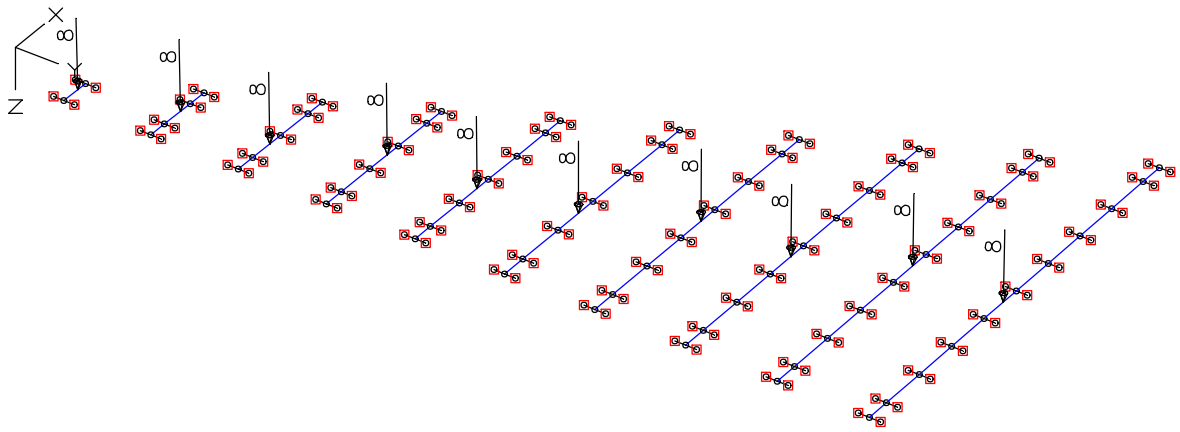
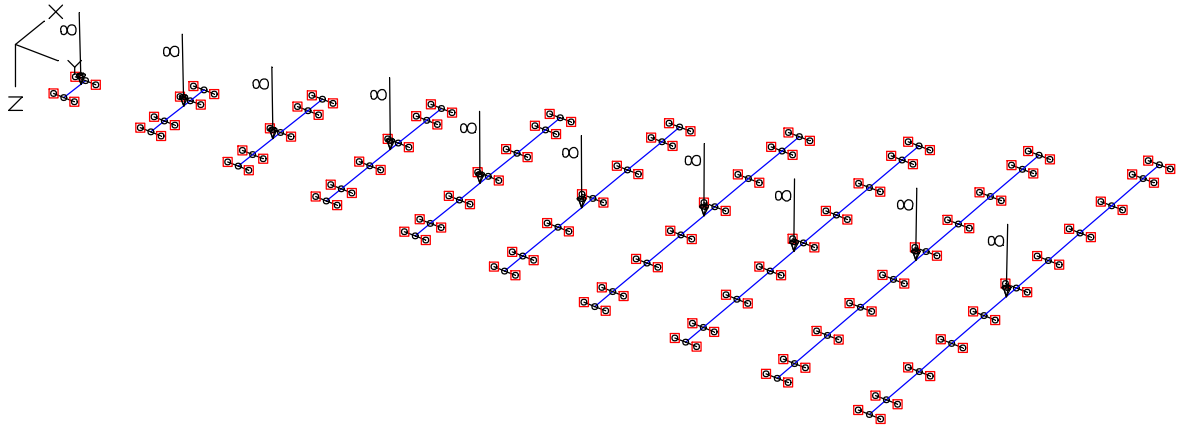


LC 1: Load, P = 8,0 kN



LC 2: Load, P = 8,0 kN



LC 3: Load, P = 8,0 kN

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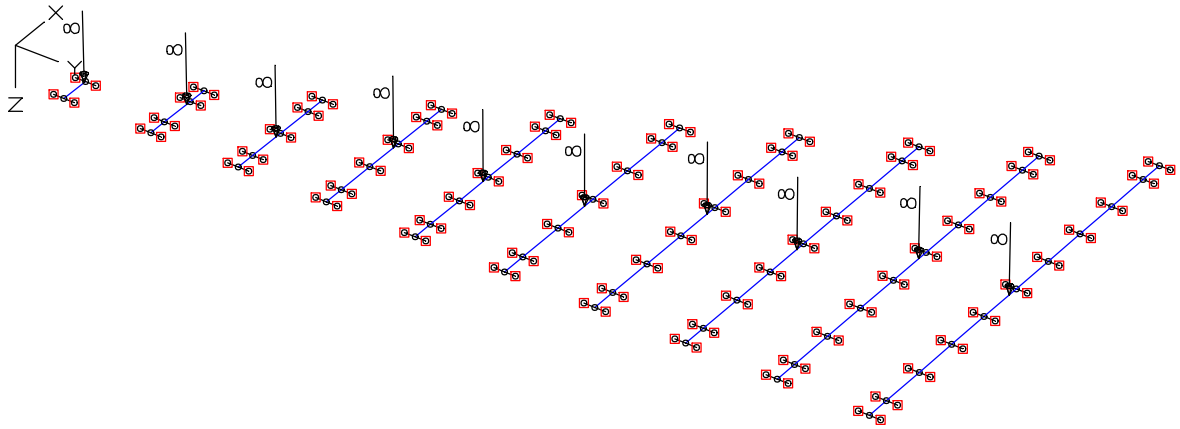
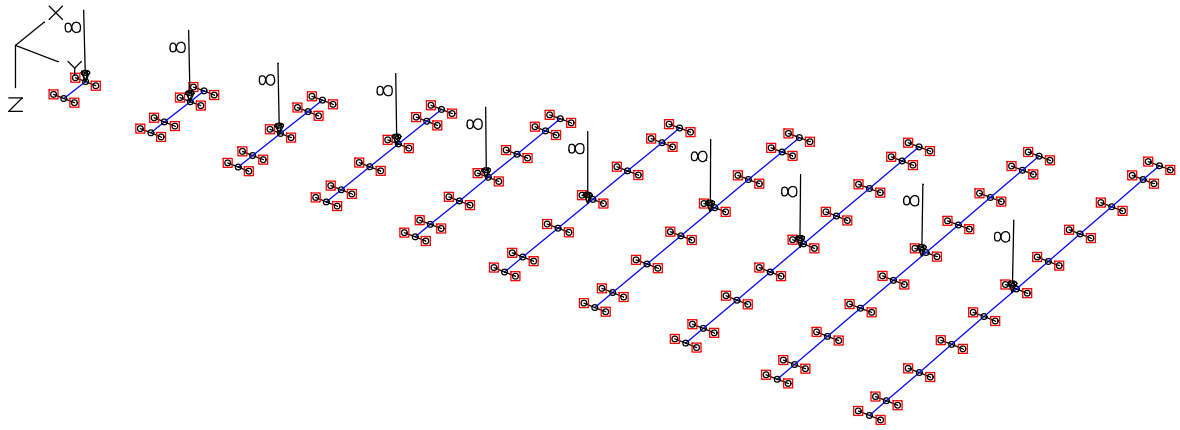
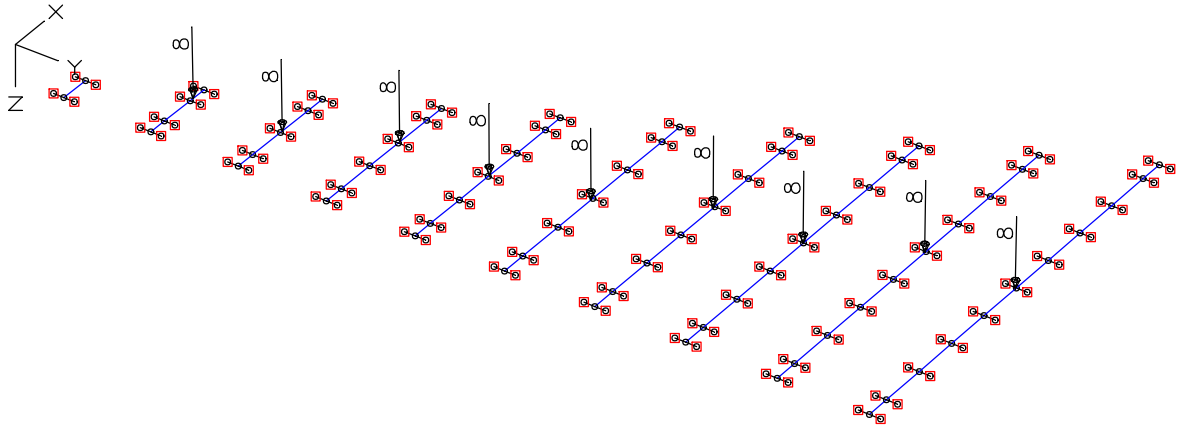


LC 4: Load, P = 8,0 kN



LC 5: Load, P = 8,0 kN



LC 6: Load, P = 8,0 kN

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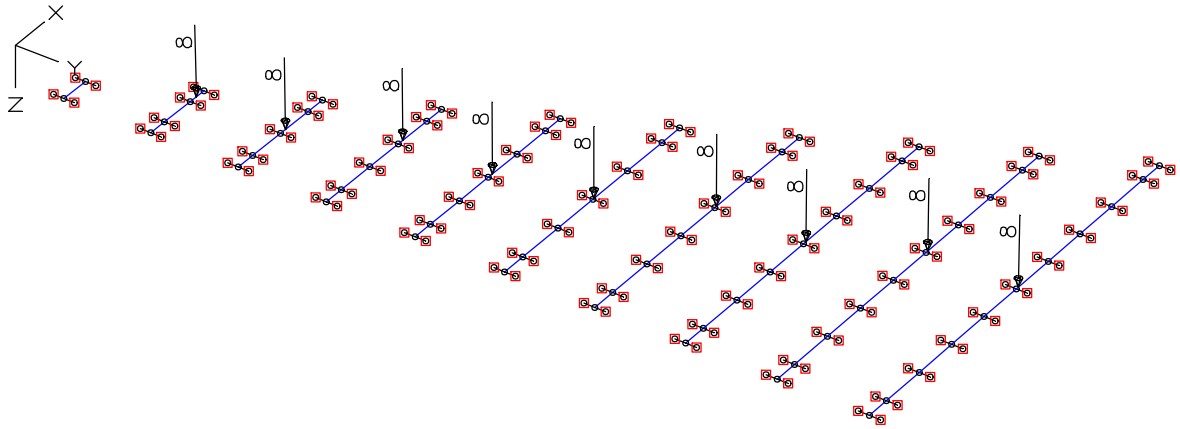
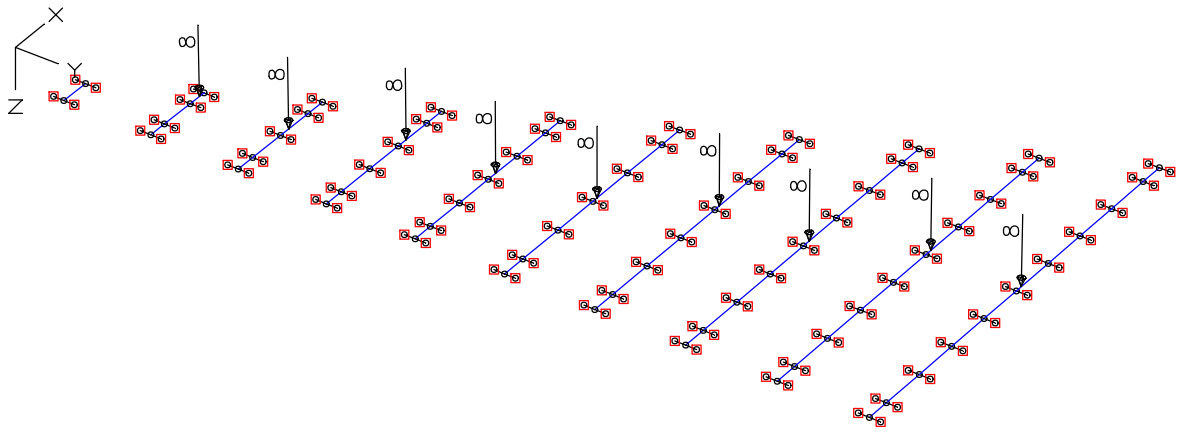
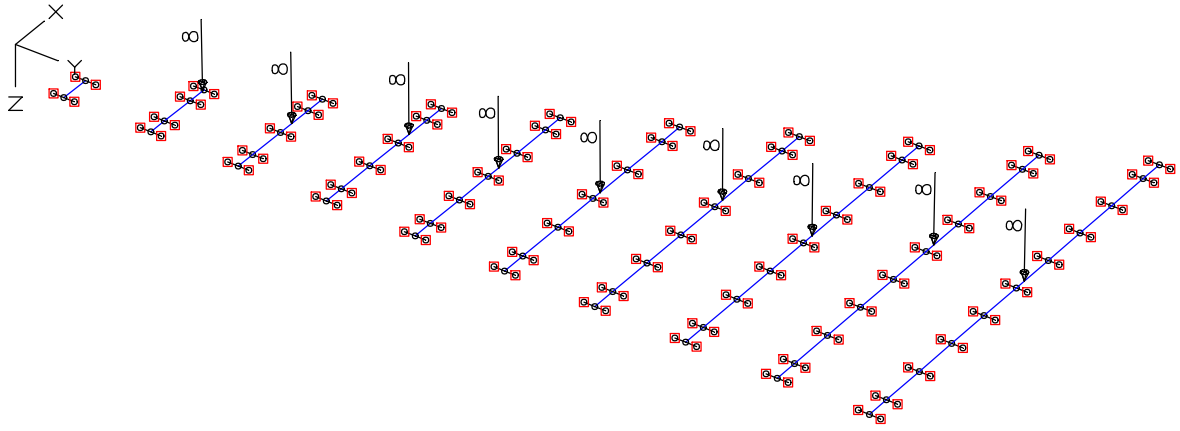


LC 7: Load, P = 8,0 kN



LC 8: Load, P = 8,0 kN



LC 9: Load, P = 8,0 kN

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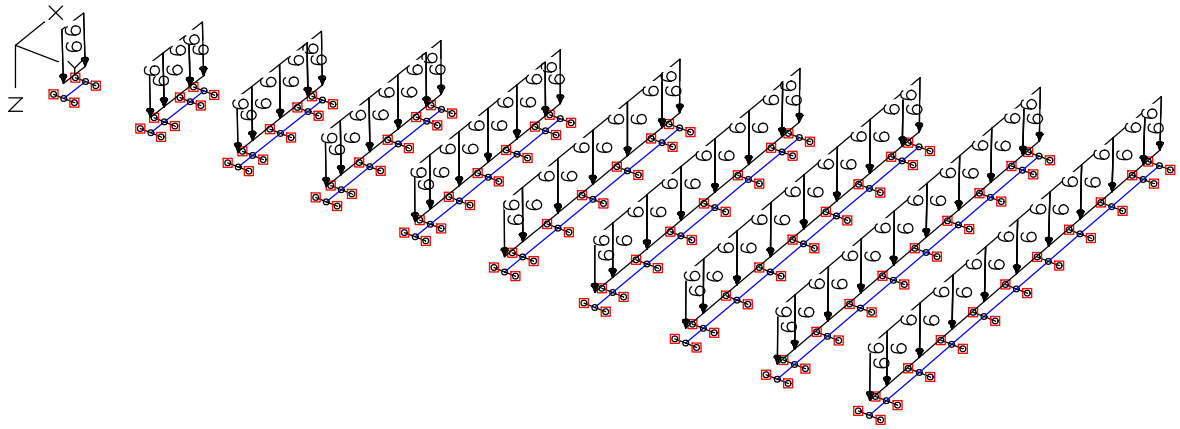

LC 100: Load, p = 6,0 kN/m

Load case combination 777, P = 8,0 kN

Exclusive selection		Factor
1	P = 8,0 kN	1,000
2	P = 8,0 kN	1,000
3	P = 8,0 kN	1,000
4	P = 8,0 kN	1,000
5	P = 8,0 kN	1,000
6	P = 8,0 kN	1,000
7	P = 8,0 kN	1,000
8	P = 8,0 kN	1,000
9	P = 8,0 kN	1,000

Load case combination 999, p = 6,0 kN/m

Exclusive selection		Factor
100	p = 6,0 kN/m	1,000

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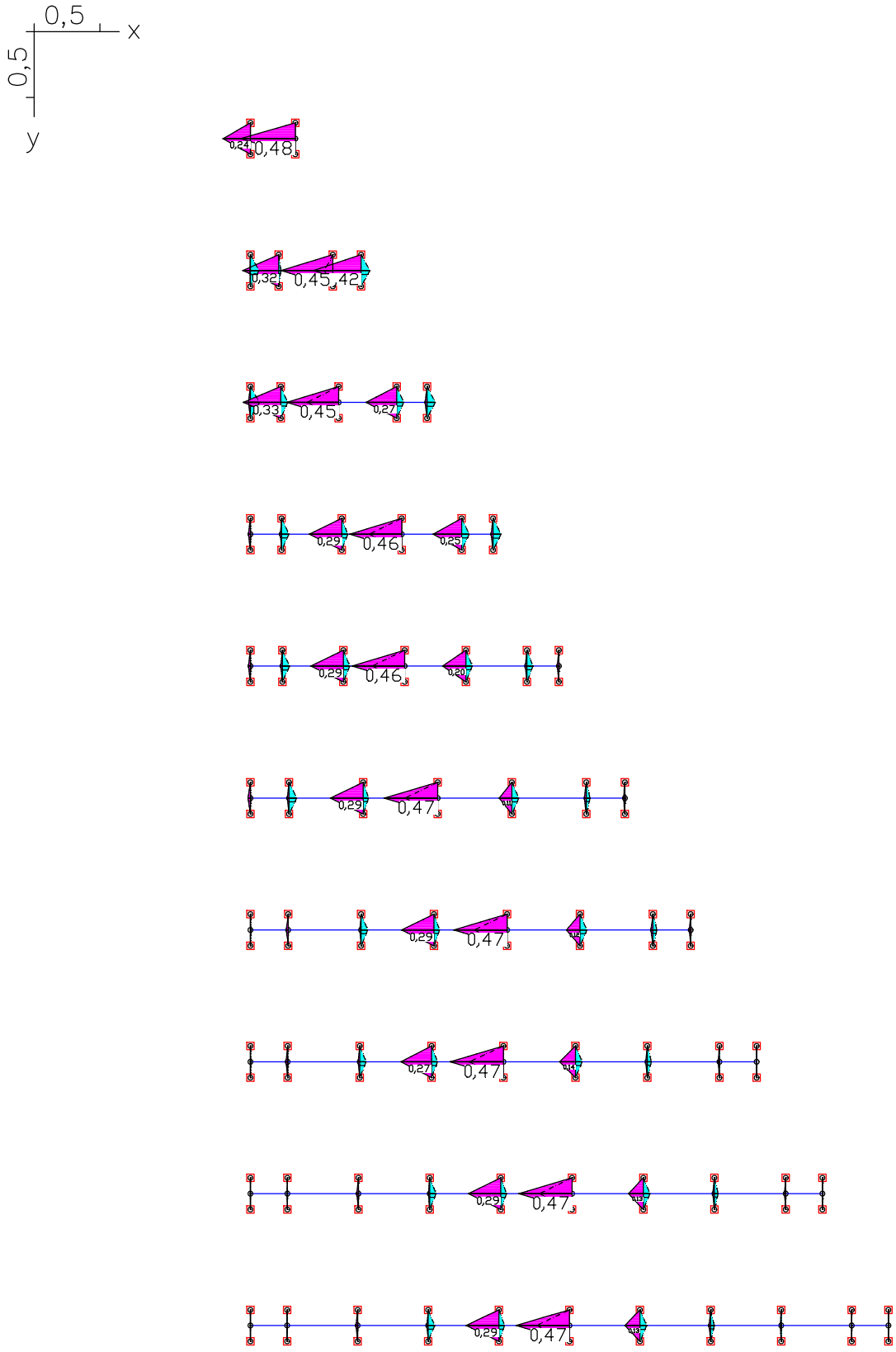
18444 – Annex Loadings at center chord at bottom

17.12.2018

M 1 : 47



LCC 777: P = 8,0 kN

Selected Internal forces min,max My. 0,55 [kNm] =

Value range (subsystem, min/max): −0,08/0,48 [kNm]

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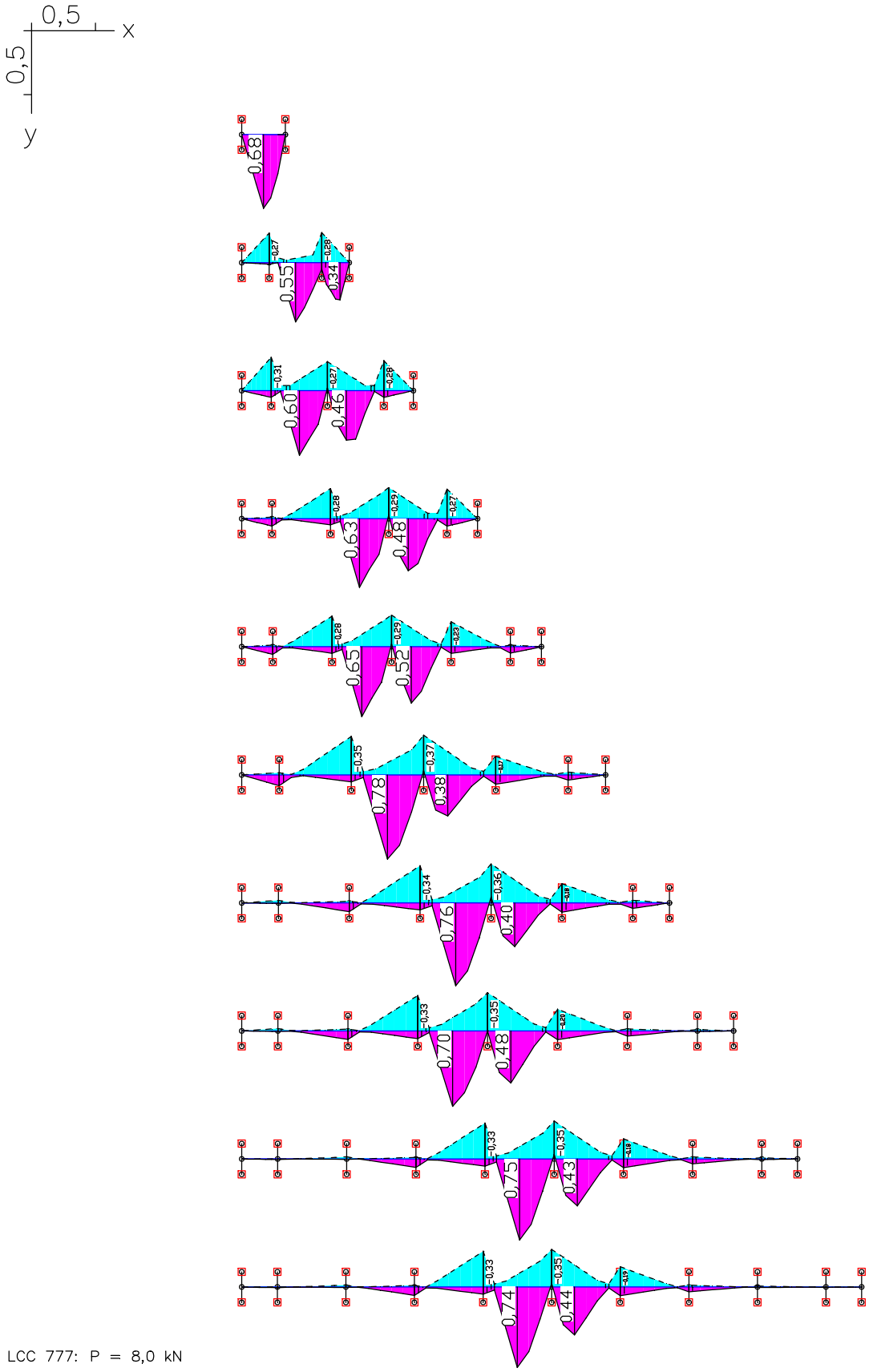

LCC 777: P = 8,0 kN

Selected Internal forces min,max My. 0,56 [kNm] =

Value range (subsystem, min/max): −0,37/0,78 [kNm]

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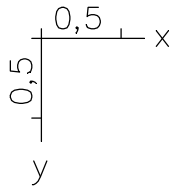

LCC 999: p = 6,0 kN/m

Selected Internal forces min,max My. 0,24 [kNm] = ⊢——⊣

Value range (subsystem, min/max): –0,00/0,21 [kNm]

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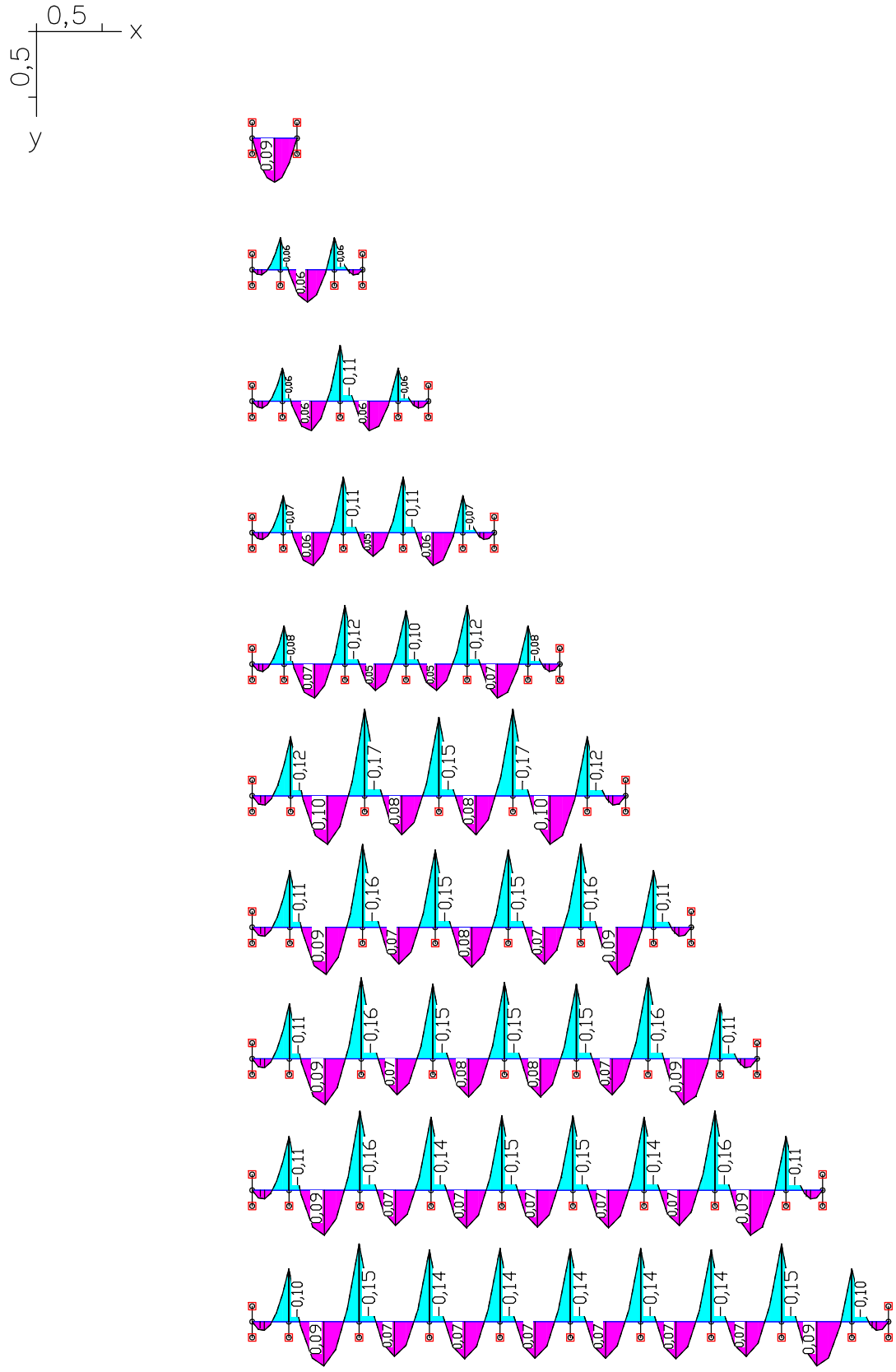

LCC 999: p = 6,0 kN/m

Selected Internal forces min,max My. 0,12 [kNm] =

Value range (subsystem, min/max): −0,17/0,10 [kNm]