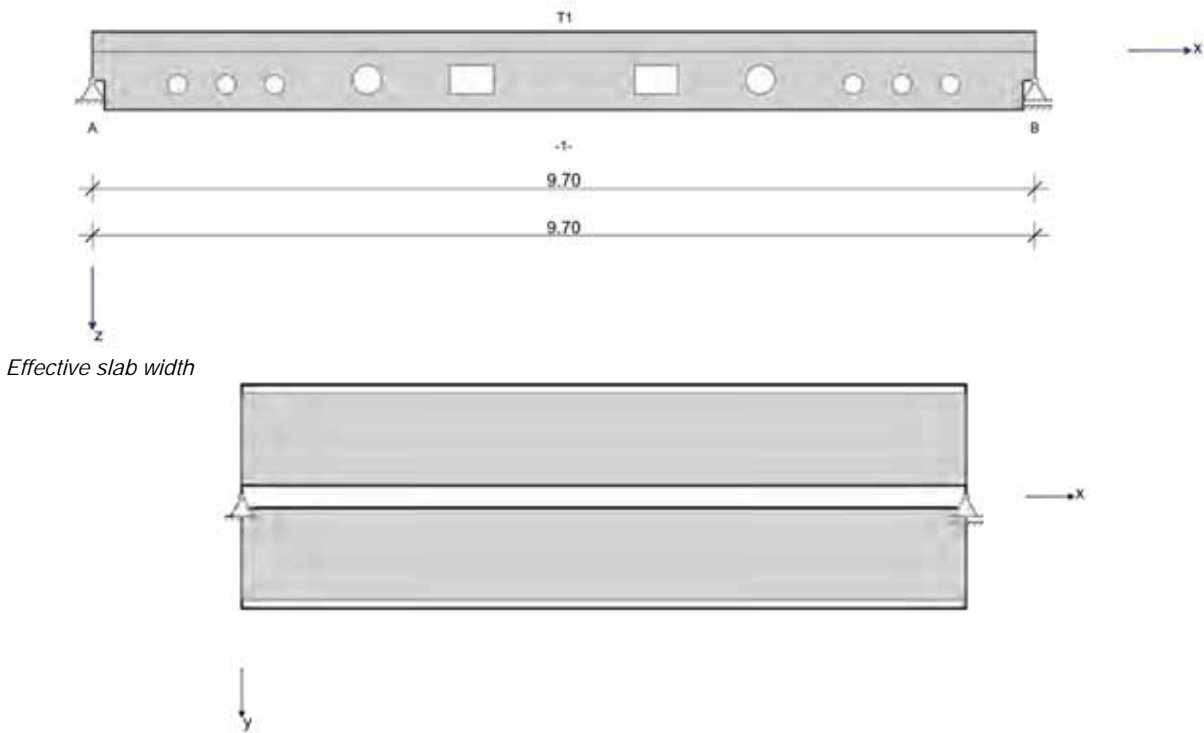


RIB Software SE	BALKEN V18.0 Build-No. 19102018	Type: Reinforced concrete
File: FT-Binder Aussparungen.Balx		

### Project information

Contract	Ausklinkungen + große Öffnungen
Description	BVFT Binder
Position	D10
Structural member	Stahlbeton DLT

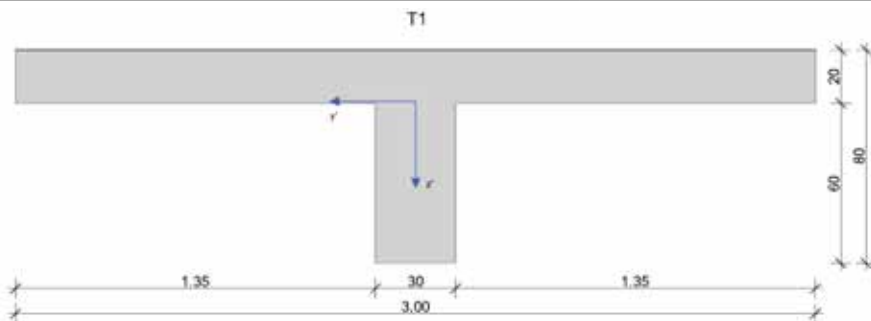
### System information



Standards:	DIN EN 1992-1-1	Design	
Calculation:	effective widths are being considered	Moment redistribution:	limited < 15.00 %
Building type:	Civil engineering	Prestressing:	none
Design situation:	permanent		
Exposure class:	top:XC1 bottom:XC1		
Fire protection:	no fire protection analysis		

### Continuous beam geometry

Type	Cross-section type	$b_t$	Top flange width
$b_w$	Web width	$d_t$	Top flange thickness
$h_w$	Web height	$b_b$	Bottom flange width
$z_s$	Distance of the centroid measured from the TE	$d_b$	Bottom flange thickness



Cross-section	Type	$b_w$ [cm]	$h_w$ [cm]	$b_t$ [cm]	$d_t$ [cm]	$b_b$ [cm]	$d_b$ [cm]	$A_c$ [cm <sup>2</sup> ]	$I_y$ [cm <sup>4</sup> ]	$z_s$ [cm]
T1	T	30.0	60.0	300.0	20.0			7800.0	2955385	19.2

Span	Length [m]	Cross-section
------	------------	---------------

1	9.70	T1
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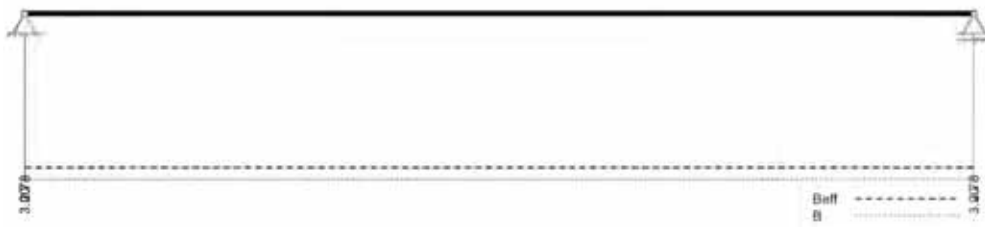
**Recesses**

No.	Span	a to the origin [m]	Type	Distance fom BE [cm]	Ø or b <sub>x</sub> [cm]	h <sub>z</sub> [cm]
1	1	0.870	Circle	16.0	20.0	0.0
2	1	1.370	Circle	16.0	20.0	0.0
3	1	1.870	Circle	16.0	20.0	0.0
4	1	2.825	Circle	16.0	30.0	0.0
5	1	3.900	Rectangle	16.0	45.0	30.0
6	1	5.800	Rectangle	16.0	45.0	30.0
7	1	6.875	Circle	16.0	30.0	0.0
8	1	7.830	Circle	16.0	20.0	0.0
9	1	8.330	Circle	16.0	20.0	0.0
10	1	8.830	Circle	16.0	20.0	0.0

**Effective slab widths**

Span no.	x [m]	B <sub>ges</sub> [m]	B <sub>eff</sub> [m]	B <sub>eff</sub> / B <sub>ges</sub>	L <sub>0</sub> [m]
1	0.000	3.000	2.780	0.927	9.700
1	9.700	3.000	2.780	0.927	9.700

Effective slab width [m]



**Support**

Support	Type	C <sub>x</sub> [kN/m]	C <sub>z</sub> [kN/m]	C <sub>φx</sub> [kNm]	C <sub>φy</sub> [kNm]	Width [cm]	Notch	
							ba [cm]	h [cm]
A	Concrete, direct	rigid	rigid	rigid		15.0	12.5	30.0
B	Concrete, direct		rigid			15.0	12.5	30.0

**Material**

Concrete	f <sub>ck</sub> [N/mm <sup>2</sup> ]	E <sub>cm</sub> [N/mm <sup>2</sup> ]	γ <sub>c</sub>	α <sub>cc</sub>	f <sub>cd</sub> [N/mm <sup>2</sup> ]	f <sub>ctm</sub> [N/mm <sup>2</sup> ]	γ [kN/m <sup>3</sup> ]
C35/45	35.0	34100	1.50	0.85	19.8	3.2	25.00

The rising branch of the stress-strain curve is considered according to 3.2.7 (2)a.

Reinforcement	Application	f <sub>yk</sub> [N/mm <sup>2</sup> ]	E <sub>s</sub> [N/mm <sup>2</sup> ]	γ <sub>s</sub>	f <sub>yd</sub> [N/mm <sup>2</sup> ]	Ductility	Δσ <sub>RSK(N<sup>2</sup>)</sub>
B500S	Longitudinal & Lateral	500.00	200000	1.15	434.8	B (high)	175.00
B420S	Shear joint	420.00	200000	1.15	365.2	B (high)	175.00

**Reinforcement specification**

**Longitudinal reinforcement**

d <sub>1</sub>	Reinforcement axis distance to the edge					Ø <sub>s</sub>	Bar diameter in the web or flange					
Span No.	Section [m]		A <sub>s</sub> top [cm <sup>2</sup> ]			A <sub>s</sub> bottom [cm <sup>2</sup> ]			Ø <sub>s</sub> -top [mm]		Ø <sub>s</sub> -bottom [mm]	
	a	b	d <sub>1</sub> [cm]	Web	Flange	d <sub>1</sub> [cm]	Web	Flange	Web	Flange	Web	Flange
1	0.000	9.700	4.0	0.00	0.00	4.0	0.00	0.00	20	10	25	10

**Loading**

Relation	Support/Span ... 'a' relates to the support position or the beginning of the span Beam ... Line load extends over the entire beam
LR	Load direction in global system of coordinates, x-, y- or z-direction
n, Δx	Generating a single load n-times with distance Δx

$\Delta s$ [cm]	Support settlement relative to bearing	$\Delta T$ [K]	Temperature load in x- y- or z-direction
$e_x/e_y$ [cm]	Eccentricity of the load application	a to the beginning [m]	Distance to the reference point
$b_R$ [m]	for trapezoidal loads - distance right to $q_R$	$P$ [kN], $M$ [kNm]	Single load, Single moment
$b_L$ [m]	for trapezoidal and triangular loads - distance left to $q_L$	$q_L, q_R$ [kN/m], $m_L, m_R$ [kNm/m]	Uniformly / trapezoidal / triangular load, line moment
T	Load transfer from different calculation		

Reinforced concrete - all load values in the load cases are characteristic

Dead load:  $q_z$  [kN/m] = 25.00 [kN/m<sup>2</sup>] \* A [m<sup>2</sup>] for all LCC

**Load cases**

LC	Type of action	$\gamma_{sup}$	$\gamma_{inf}$	$\psi_0$	$\psi_1$	$\psi_2$	Name
0	Dead load	1.35	1.00	1.00	1.00	1.00	Ei gengewicht Träger
1	Permanent load	1.35	1.00	1.00	1.00	1.00	
2	Traffic load	1.50	0.00	0.80	0.70	0.50	

**Load case 1:**

Loads in z-direction



Loading in XZ plane

T	Type	Relation	LR	a to the origin [m]	$q_L/m_L$ [kN,kNm]	$q_R/m_R$ [kN,kNm]	$e_y$ [cm]	$e_z$ [cm]	Length [m]	$b_L$ [m]	$b_R$ [m]
	Line load	Support A	z	0.000	10.00	10.00		0.0	9.700		

**Load case 2:**

Loads in z-direction



Loading in XZ plane

T	Type	Relation	LR	a to the origin [m]	$q_L/m_L$ [kN,kNm]	$q_R/m_R$ [kN,kNm]	$e_y$ [cm]	$e_z$ [cm]	Length [m]	$b_L$ [m]	$b_R$ [m]
	Trapezoidal load	Support A	z	0.000	36.08	36.08		0.0	9.700		

**Combination coefficients**

Type of action	$\gamma_{sup}$	$\gamma_{inf}$	$\psi_0$	$\psi_1$	$\psi_2$
Dead load	1.35	1.00	1.00	1.00	1.00
Permanent load	1.35	1.00	1.00	1.00	1.00
Traffic load	1.50	0.00	0.80	0.70	0.50

**Results**

**Support forces**

LC 1,2, ...	Original LC	EXTR	Leading parameter
Q	Live loads, characteristic	EQU	Safety against displacement
A	Accidental action effect	GK	Basic combination

ΣG	Permanent action effects	AK	Accidental combination
ΣP <sub>∞</sub>	Prestressing t <sub>∞</sub>	CoA	Earthquake combination

Support	Load case	EXTR	A <sub>x</sub> [kN]	A <sub>z</sub> [kN]	M <sub>x</sub> [kNm]	M <sub>y</sub> [kNm]
A	0		0.00	91.73	0.00	0.00
A	1		0.00	48.50	0.00	0.00
A	2		0.00	174.99	0.00	0.00
A	Sum G		0.00	140.23	0.00	0.00
A	Verkehr	max Az	0.00	174.99	0.00	0.00
A	Verkehr	mi n Az	0.00	0.00	0.00	0.00
A	EQU	mi n Az	0.00	126.21	0.00	0.00
A	GK	max Az	0.00	451.80	0.00	0.00
A	GK	mi n Az	0.00	140.23	0.00	0.00
B	0		0.00	91.73	0.00	0.00
B	1		0.00	48.50	0.00	0.00
B	2		0.00	174.99	0.00	0.00
B	Sum G		0.00	140.23	0.00	0.00
B	Verkehr	max Az	0.00	174.99	0.00	0.00
B	Verkehr	mi n Az	0.00	0.00	0.00	0.00
B	EQU	mi n Az	0.00	126.21	0.00	0.00
B	GK	max Az	0.00	451.80	0.00	0.00
B	GK	mi n Az	0.00	140.23	0.00	0.00

**Stress resultants**

**Load case 0: Eigengewicht Träger**

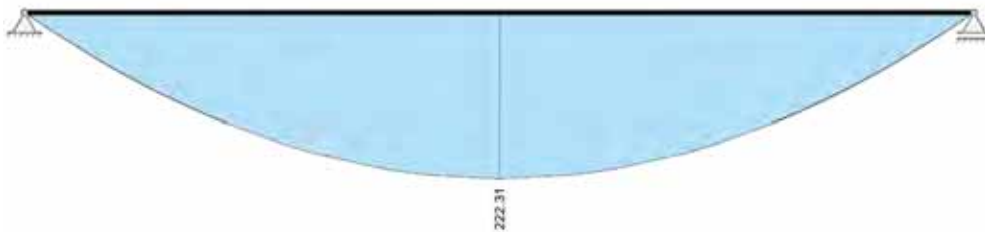
Span No.	x [m]	L/R	M <sub>y</sub> [kNm]	V <sub>z</sub> [kN]	M <sub>t</sub> [kNm]	N <sub>x</sub> [kN]
1	0.000	R	0.00	91.73	0.00	0.00
1	0.075		6.83	90.44	0.00	0.00
1	0.125		11.33	89.58	0.00	0.00
1	0.335		29.71	85.48	0.00	0.00
1	0.770		65.05	77.00	0.00	0.00
1	0.870		72.66	75.20	0.00	0.00
1	0.970		80.09	73.39	0.00	0.00
1	1.270		101.23	67.54	0.00	0.00
1	1.370		107.90	65.74	0.00	0.00
1	1.470		114.38	63.94	0.00	0.00
1	1.770		132.69	58.09	0.00	0.00
1	1.870		138.40	56.29	0.00	0.00
1	1.940		142.30	55.03	0.00	0.00
1	1.970		143.94	54.49	0.00	0.00
1	2.675		177.51	40.74	0.00	0.00
1	2.825		183.43	38.15	0.00	0.00
1	2.910		186.61	36.68	0.00	0.00
1	2.975		188.96	35.56	0.00	0.00
1	3.675		209.07	21.91	0.00	0.00
1	3.880		213.20	18.37	0.00	0.00
1	3.900		213.56	18.02	0.00	0.00
1	4.125		217.18	14.14	0.00	0.00
1	4.850		222.31	0.00	0.00	0.00
1	5.575		217.18	-14.14	0.00	0.00
1	5.800		213.56	-18.02	0.00	0.00
1	5.820		213.20	-18.37	0.00	0.00
1	6.025		209.07	-21.91	0.00	0.00
1	6.725		188.96	-35.56	0.00	0.00
1	6.790		186.61	-36.68	0.00	0.00
1	6.875		183.43	-38.15	0.00	0.00
1	7.025		177.51	-40.74	0.00	0.00
1	7.730		143.94	-54.49	0.00	0.00
1	7.760		142.30	-55.03	0.00	0.00
1	7.830		138.40	-56.29	0.00	0.00
1	7.930		132.69	-58.09	0.00	0.00
1	8.230		114.38	-63.94	0.00	0.00
1	8.330		107.90	-65.74	0.00	0.00
1	8.430		101.23	-67.54	0.00	0.00
1	8.730		80.09	-73.39	0.00	0.00
1	8.830		72.66	-75.20	0.00	0.00

1	8.930		65.05	-77.00	0.00	0.00
1	9.365		29.71	-85.48	0.00	0.00
1	9.575		11.33	-89.58	0.00	0.00
1	9.625		6.83	-90.44	0.00	0.00
1	9.700	L	0.00	-91.73	0.00	0.00

Shear forces Vz [kN]



Moments My [kNm]



Load case 1:

Span No.	x [m]	L/R	My [kNm]	Vz [kN]	Mt [kNm]	Nx [kN]
1	0.000	R	0.00	48.50	0.00	0.00
1	0.075		3.61	47.75	0.00	0.00
1	0.125		5.98	47.25	0.00	0.00
1	0.335		15.69	45.15	0.00	0.00
1	0.770		34.38	40.80	0.00	0.00
1	0.870		38.41	39.80	0.00	0.00
1	0.970		42.34	38.80	0.00	0.00
1	1.270		53.53	35.80	0.00	0.00
1	1.370		57.06	34.80	0.00	0.00
1	1.470		60.49	33.80	0.00	0.00
1	1.770		70.18	30.80	0.00	0.00
1	1.870		73.21	29.80	0.00	0.00
1	1.940		75.27	29.10	0.00	0.00
1	1.970		76.14	28.80	0.00	0.00
1	2.675		93.96	21.75	0.00	0.00
1	2.825		97.11	20.25	0.00	0.00
1	2.910		98.79	19.40	0.00	0.00
1	2.975		100.03	18.75	0.00	0.00
1	3.675		110.71	11.75	0.00	0.00
1	3.880		112.91	9.70	0.00	0.00
1	3.900		113.10	9.50	0.00	0.00
1	4.125		114.98	7.25	0.00	0.00
1	4.850		117.61	0.00	0.00	0.00
1	5.575		114.98	-7.25	0.00	0.00
1	5.800		113.10	-9.50	0.00	0.00
1	5.820		112.91	-9.70	0.00	0.00
1	6.025		110.71	-11.75	0.00	0.00
1	6.725		100.03	-18.75	0.00	0.00
1	6.790		98.79	-19.40	0.00	0.00
1	6.875		97.11	-20.25	0.00	0.00
1	7.025		93.96	-21.75	0.00	0.00
1	7.730		76.14	-28.80	0.00	0.00
1	7.760		75.27	-29.10	0.00	0.00

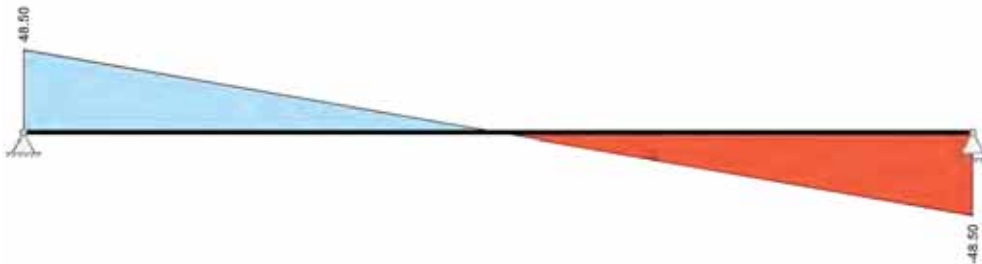
Auftrag: Ausklinkungen + große

Position: D10

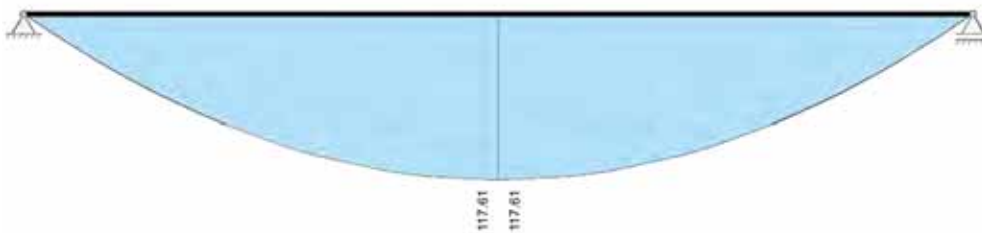
Bauteil: Stahlbeton DLT

1	7.830		73.21	-29.80	0.00	0.00
1	7.930		70.18	-30.80	0.00	0.00
1	8.230		60.49	-33.80	0.00	0.00
1	8.330		57.06	-34.80	0.00	0.00
1	8.430		53.53	-35.80	0.00	0.00
1	8.730		42.34	-38.80	0.00	0.00
1	8.830		38.41	-39.80	0.00	0.00
1	8.930		34.38	-40.80	0.00	0.00
1	9.365		15.69	-45.15	0.00	0.00
1	9.575		5.98	-47.25	0.00	0.00
1	9.625		3.61	-47.75	0.00	0.00
1	9.700	L	0.00	-48.50	0.00	0.00

Shear forces Vz [kN]



Moments My [kNm]



Load case 2:

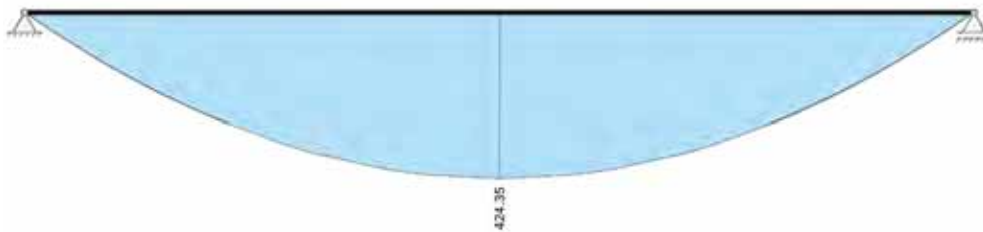
Span No.	x [m]	L/R	My [kNm]	Vz [kN]	Mt [kNm]	Nx [kN]
1	0.000	R	0.00	174.99	0.00	0.00
1	0.075		13.02	172.28	0.00	0.00
1	0.125		21.59	170.48	0.00	0.00
1	0.335		56.60	162.90	0.00	0.00
1	0.770		124.05	147.21	0.00	0.00
1	0.870		138.59	143.60	0.00	0.00
1	0.970		152.76	139.99	0.00	0.00
1	1.270		193.14	129.17	0.00	0.00
1	1.370		205.87	125.56	0.00	0.00
1	1.470		218.25	121.95	0.00	0.00
1	1.770		253.21	111.13	0.00	0.00
1	1.870		264.14	107.52	0.00	0.00
1	1.940		271.58	104.99	0.00	0.00
1	1.970		274.71	103.91	0.00	0.00
1	2.675		339.01	78.47	0.00	0.00
1	2.825		350.37	73.06	0.00	0.00
1	2.910		356.45	70.00	0.00	0.00
1	2.975		360.92	67.65	0.00	0.00
1	3.675		399.44	42.39	0.00	0.00
1	3.880		407.37	35.00	0.00	0.00
1	4.125		414.86	26.16	0.00	0.00
1	4.850		424.35	0.00	0.00	0.00
1	5.575		414.86	-26.16	0.00	0.00
1	5.800		408.07	-34.28	0.00	0.00
1	5.820		407.37	-35.00	0.00	0.00
1	6.025		399.44	-42.39	0.00	0.00

1	6.725		360.92	-67.65	0.00	0.00
1	6.790		356.45	-70.00	0.00	0.00
1	6.875		350.37	-73.06	0.00	0.00
1	7.025		339.01	-78.47	0.00	0.00
1	7.730		274.71	-103.91	0.00	0.00
1	7.760		271.58	-104.99	0.00	0.00
1	7.830		264.14	-107.52	0.00	0.00
1	7.930		253.21	-111.13	0.00	0.00
1	8.230		218.25	-121.95	0.00	0.00
1	8.330		205.87	-125.56	0.00	0.00
1	8.430		193.14	-129.17	0.00	0.00
1	8.730		152.76	-139.99	0.00	0.00
1	8.830		138.59	-143.60	0.00	0.00
1	8.930		124.05	-147.21	0.00	0.00
1	9.365		56.60	-162.90	0.00	0.00
1	9.575		21.59	-170.48	0.00	0.00
1	9.625		13.02	-172.28	0.00	0.00
1	9.700	L	0.00	-174.99	0.00	0.00

Shear forces Vz [kN]



Moments My [kNm]



Span stress resultants, summary

Span No.	max MyEd [kNm]	min MyEd [kNm]	max VzEd [kN]	max MtEd [kNm]	max NxEd [kN]	min NxEd [kN]
1	1095.41	0.00	451.80	0.00	0.00	0.00

Support stress resultants, summary

Support	max MyEd [kNm]	min MyEd [kNm]	max VzEd-Li max VzEd-Re [kN]	max MtEd-Li max MtEd-Re [kNm]	max NxEd [kN]	min NxEd [kN]
A	0.00	0.00	0.00 451.80	0.00 0.00	0.00	0.00
B	0.00	0.00	-451.80 0.00	0.00 0.00	0.00	0.00

Deformations

Load case 0: Eigengewicht Träger

Span No.	x [m]	L/R	dx [mm]	dz [mm]	ry [1000]	rx [1000]
1	0.000	R	0.00	0.00	-0.824	0.000
1	0.075		0.00	0.06	-0.823	0.000
1	0.125		0.00	0.10	-0.822	0.000
1	0.335		0.00	0.28	-0.817	0.000
1	0.770		0.00	0.63	-0.796	0.000
1	0.870		0.00	0.71	-0.787	0.000

1	0.970		0.00	0.79	-0.776	0.000
1	1.270		0.00	1.02	-0.749	0.000
1	1.370		0.00	1.10	-0.734	0.000
1	1.470		0.00	1.17	-0.719	0.000
1	1.770		0.00	1.38	-0.681	0.000
1	1.870		0.00	1.45	-0.663	0.000
1	1.940		0.00	1.50	-0.649	0.000
1	1.970		0.00	1.52	-0.643	0.000
1	2.675		0.00	1.93	-0.528	0.000
1	2.825		0.00	2.01	-0.488	0.000
1	2.910		0.00	2.05	-0.464	0.000
1	2.975		0.00	2.08	-0.446	0.000
1	3.675		0.00	2.35	-0.305	0.000
1	3.880		0.00	2.40	-0.240	0.000
1	3.900		0.00	2.41	-0.234	0.000
1	4.125		0.00	2.45	-0.162	0.000
1	4.850		0.00	2.51	0.000	0.000
1	5.575		0.00	2.45	0.162	0.000
1	5.800		0.00	2.41	0.234	0.000
1	5.820		0.00	2.40	0.240	0.000
1	6.025		0.00	2.35	0.305	0.000
1	6.725		0.00	2.08	0.446	0.000
1	6.790		0.00	2.05	0.464	0.000
1	6.875		0.00	2.01	0.488	0.000
1	7.025		0.00	1.93	0.528	0.000
1	7.730		0.00	1.52	0.643	0.000
1	7.760		0.00	1.50	0.649	0.000
1	7.830		0.00	1.45	0.663	0.000
1	7.930		0.00	1.38	0.681	0.000
1	8.230		0.00	1.17	0.719	0.000
1	8.330		0.00	1.10	0.734	0.000
1	8.430		0.00	1.02	0.749	0.000
1	8.730		0.00	0.79	0.776	0.000
1	8.830		0.00	0.71	0.787	0.000
1	8.930		0.00	0.63	0.796	0.000
1	9.365		0.00	0.28	0.817	0.000
1	9.575		0.00	0.10	0.822	0.000
1	9.625		0.00	0.06	0.823	0.000
1	9.700	L	0.00	0.00	0.824	0.000

Load case 1:

Span No.	x [m]	L/R	d <sub>x</sub> [mm]	d <sub>z</sub> [mm]	r <sub>y</sub> [1000]	r <sub>x</sub> [1000]
1	0.000	R	0.00	0.00	-0.436	0.000
1	0.075		0.00	0.03	-0.436	0.000
1	0.125		0.00	0.06	-0.435	0.000
1	0.335		0.00	0.15	-0.432	0.000
1	0.770		0.00	0.33	-0.421	0.000
1	0.870		0.00	0.38	-0.416	0.000
1	0.970		0.00	0.42	-0.411	0.000
1	1.270		0.00	0.54	-0.396	0.000
1	1.370		0.00	0.58	-0.389	0.000
1	1.470		0.00	0.62	-0.381	0.000
1	1.770		0.00	0.73	-0.361	0.000
1	1.870		0.00	0.77	-0.351	0.000
1	1.940		0.00	0.79	-0.344	0.000
1	1.970		0.00	0.80	-0.340	0.000
1	2.675		0.00	1.02	-0.280	0.000
1	2.825		0.00	1.06	-0.258	0.000
1	2.910		0.00	1.09	-0.246	0.000
1	2.975		0.00	1.10	-0.236	0.000
1	3.675		0.00	1.24	-0.161	0.000
1	3.880		0.00	1.27	-0.127	0.000
1	3.900		0.00	1.27	-0.124	0.000
1	4.125		0.00	1.30	-0.086	0.000
1	4.850		0.00	1.33	0.000	0.000
1	5.575		0.00	1.30	0.086	0.000
1	5.800		0.00	1.27	0.124	0.000
1	5.820		0.00	1.27	0.127	0.000



1	6.025		0.00	1.24	0.161	0.000
1	6.725		0.00	1.10	0.236	0.000
1	6.790		0.00	1.09	0.246	0.000
1	6.875		0.00	1.06	0.258	0.000
1	7.025		0.00	1.02	0.280	0.000
1	7.730		0.00	0.80	0.340	0.000
1	7.760		0.00	0.79	0.344	0.000
1	7.830		0.00	0.77	0.351	0.000
1	7.930		0.00	0.73	0.361	0.000
1	8.230		0.00	0.62	0.381	0.000
1	8.330		0.00	0.58	0.389	0.000
1	8.430		0.00	0.54	0.396	0.000
1	8.730		0.00	0.42	0.411	0.000
1	8.830		0.00	0.38	0.416	0.000
1	8.930		0.00	0.33	0.421	0.000
1	9.365		0.00	0.15	0.432	0.000
1	9.575		0.00	0.06	0.435	0.000
1	9.625		0.00	0.03	0.436	0.000
1	9.700	L	0.00	0.00	0.436	0.000

**Load case 2:**

Span No.	x [m]	L/R	d <sub>x</sub> [mm]	d <sub>z</sub> [mm]	r <sub>y</sub> [1000]	r <sub>x</sub> [1000]
1	0.000	R	0.00	0.00	-1.574	0.000
1	0.075		0.00	0.12	-1.572	0.000
1	0.125		0.00	0.20	-1.569	0.000
1	0.335		0.00	0.53	-1.560	0.000
1	0.770		0.00	1.21	-1.520	0.000
1	0.870		0.00	1.36	-1.502	0.000
1	0.970		0.00	1.51	-1.482	0.000
1	1.270		0.00	1.95	-1.430	0.000
1	1.370		0.00	2.10	-1.402	0.000
1	1.470		0.00	2.24	-1.373	0.000
1	1.770		0.00	2.64	-1.301	0.000
1	1.870		0.00	2.77	-1.266	0.000
1	1.940		0.00	2.86	-1.240	0.000
1	1.970		0.00	2.90	-1.228	0.000
1	2.675		0.00	3.69	-1.009	0.000
1	2.825		0.00	3.84	-0.932	0.000
1	2.910		0.00	3.92	-0.887	0.000
1	2.975		0.00	3.98	-0.852	0.000
1	3.675		0.00	4.48	-0.582	0.000
1	3.880		0.00	4.59	-0.459	0.000
1	3.900		0.00	4.60	-0.447	0.000
1	4.125		0.00	4.68	-0.309	0.000
1	4.850		0.00	4.80	0.000	0.000
1	5.575		0.00	4.68	0.309	0.000
1	5.800		0.00	4.60	0.447	0.000
1	5.820		0.00	4.59	0.459	0.000
1	6.025		0.00	4.48	0.582	0.000
1	6.725		0.00	3.98	0.852	0.000
1	6.790		0.00	3.92	0.887	0.000
1	6.875		0.00	3.84	0.932	0.000
1	7.025		0.00	3.69	1.009	0.000
1	7.730		0.00	2.90	1.228	0.000
1	8.230		0.00	2.24	1.373	0.000
1	8.330		0.00	2.10	1.402	0.000
1	8.430		0.00	1.95	1.430	0.000
1	8.730		0.00	1.51	1.482	0.000
1	8.830		0.00	1.36	1.502	0.000
1	8.930		0.00	1.21	1.520	0.000
1	9.365		0.00	0.53	1.560	0.000
1	9.575		0.00	0.20	1.569	0.000
1	9.625		0.00	0.12	1.572	0.000
1	9.700	L	0.00	0.00	1.574	0.000

**Design**

**Design combinations according to EN 1990**

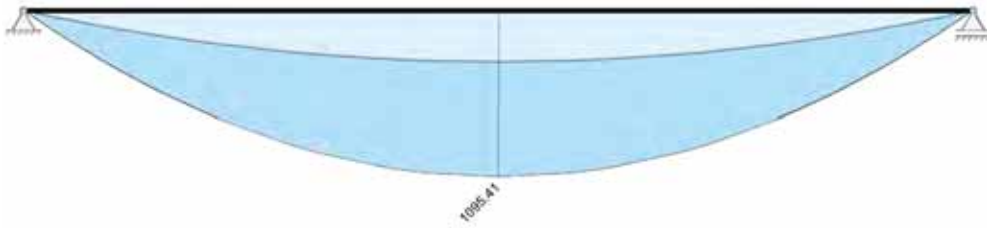
Analyses	decisive CoA for exposure classXC1	
Ductility behavior	rare	
Load bearing capacity	Basic combination STR/GEO	
Safety against displacement	Basic combination EQU	
Decompression	quasi-permanent	
Crack width limitation		
Concrete stress	rare	quasi-permanent
Reinforcing steel stresses	rare	
Tendon stress	quasi-permanent	
Fatigue	frequent	
Deformation	rare	
Fire protection	accidental	

**Combination stress resultants**

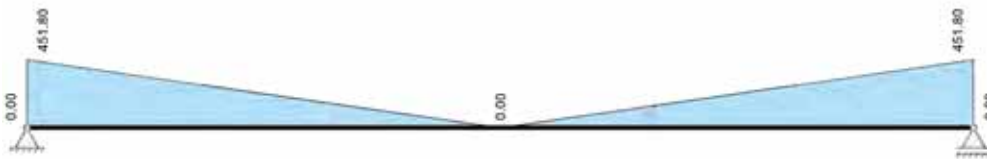
Combination stress resultants do not contain prestressing. (Moment redistribution not admissible)

Span No.	x [m]	Basic combination STR/GEO				rare CoA		frequent CoA		quasi-permanent CoA	
		max Myd [kNm]	min Myd [kNm]	max  Vzd  [kN]	max  Mtd  [kNm]	max Myd [kNm]	min Myd [kNm]	max Myd [kNm]	min Myd [kNm]	max Myd [kNm]	min Myd [kNm]
1	0.000	0.00	0.00	451.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.075	33.63	10.44	444.98	0.00	23.46	10.44	19.56	10.44	16.95	10.44
1	0.125	55.76	17.32	440.43	0.00	38.91	17.32	32.43	17.32	28.11	17.32
1	0.335	146.18	45.40	420.70	0.00	102.00	45.40	85.02	45.40	73.70	45.40
1	0.770	320.30	99.43	379.84	0.00	223.48	99.43	186.26	99.43	161.45	99.43
1	0.870	357.82	111.07	370.64	0.00	249.66	111.07	208.08	111.07	180.36	111.07
1	0.970	394.43	122.43	361.45	0.00	275.20	122.43	229.37	122.43	198.81	122.43
1	1.270	498.64	154.76	333.26	0.00	347.90	154.76	289.96	154.76	251.33	154.76
1	1.370	531.50	164.96	324.07	0.00	370.83	164.96	309.07	164.96	267.89	164.96
1	1.470	563.45	174.87	314.88	0.00	393.12	174.87	327.65	174.87	284.00	174.87
1	1.770	653.68	202.87	286.69	0.00	456.08	202.87	380.11	202.87	329.47	202.87
1	1.870	681.89	211.61	277.50	0.00	475.76	211.61	396.51	211.61	343.69	211.61
1	1.940	701.10	217.57	271.06	0.00	489.15	217.57	407.68	217.57	353.36	217.57
1	1.970	709.19	220.08	268.30	0.00	494.80	220.08	412.38	220.08	357.44	220.08
1	2.675	874.99	271.47	202.07	0.00	610.48	271.47	508.77	271.47	440.97	271.47
1	2.825	904.28	280.54	188.43	0.00	630.91	280.54	525.80	280.54	455.72	280.54
1	2.910	919.97	285.40	180.70	0.00	641.85	285.40	534.92	285.40	463.63	285.40
1	2.975	931.52	288.99	174.79	0.00	649.91	288.99	541.64	288.99	469.45	288.99
1	3.675	1030.86	319.78	109.03	0.00	719.22	319.78	599.39	319.78	519.50	319.78
1	3.880	1051.30	326.11	90.39	0.00	733.48	326.11	611.27	326.11	529.79	326.11
1	3.900	1053.09	326.66	88.57	0.00	734.73	326.66	612.31	326.66	530.70	326.66
1	4.125	1070.72	332.17	68.11	0.00	747.03	332.17	622.57	332.17	539.60	332.17
1	4.850	1095.41	339.92	0.00	0.00	764.26	339.92	636.96	339.92	552.09	339.92
1	5.575	1070.72	332.17	68.11	0.00	747.03	332.17	622.57	332.17	539.60	332.17
1	5.800	1053.09	326.66	88.57	0.00	734.73	326.66	612.31	326.66	530.70	326.66
1	5.820	1051.30	326.11	90.39	0.00	733.48	326.11	611.27	326.11	529.79	326.11
1	6.025	1030.86	319.78	109.03	0.00	719.22	319.78	599.39	319.78	519.50	319.78
1	6.725	931.52	288.99	174.79	0.00	649.91	288.99	541.64	288.99	469.45	288.99
1	6.790	919.97	285.40	180.70	0.00	641.85	285.40	534.92	285.40	463.63	285.40
1	6.875	904.28	280.54	188.43	0.00	630.91	280.54	525.80	280.54	455.72	280.54
1	7.025	874.99	271.47	202.07	0.00	610.48	271.47	508.77	271.47	440.97	271.47
1	7.730	709.19	220.08	268.30	0.00	494.80	220.08	412.38	220.08	357.44	220.08
1	7.760	701.10	217.57	271.06	0.00	489.15	217.57	407.68	217.57	353.36	217.57
1	7.830	681.89	211.61	277.50	0.00	475.76	211.61	396.51	211.61	343.69	211.61
1	7.930	653.68	202.87	286.69	0.00	456.08	202.87	380.11	202.87	329.47	202.87
1	8.230	563.45	174.87	314.88	0.00	393.12	174.87	327.65	174.87	284.00	174.87
1	8.330	531.50	164.96	324.07	0.00	370.83	164.96	309.07	164.96	267.89	164.96
1	8.430	498.64	154.76	333.26	0.00	347.90	154.76	289.96	154.76	251.33	154.76
1	8.730	394.43	122.43	361.45	0.00	275.20	122.43	229.37	122.43	198.81	122.43
1	8.830	357.82	111.07	370.64	0.00	249.66	111.07	208.08	111.07	180.36	111.07
1	8.930	320.30	99.43	379.84	0.00	223.48	99.43	186.26	99.43	161.45	99.43
1	9.365	146.18	45.40	420.70	0.00	102.00	45.40	85.02	45.40	73.70	45.40
1	9.575	55.76	17.32	440.43	0.00	38.91	17.32	32.43	17.32	28.11	17.32
1	9.625	33.63	10.44	444.98	0.00	23.46	10.44	19.56	10.44	16.95	10.44
1	9.700	0.00	0.00	451.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00

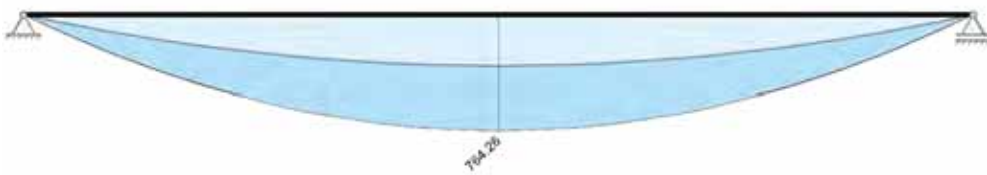
Basic combination  $M_{yd}$  [kNm]



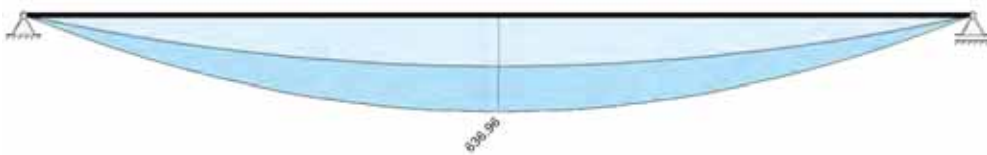
Basic combination  $|V_{zd}|$  [kN]



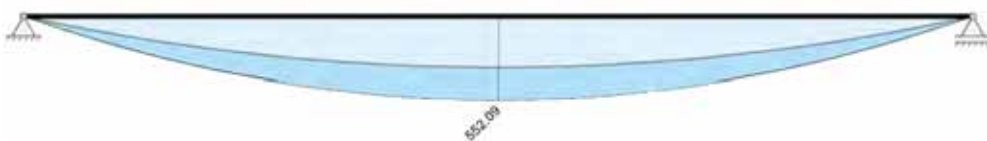
rare combination of actions  $M_{yd}$  [kNm]



frequent combination of actions  $M_{yd}$  [kNm]



quasi-permanent combination of actions  $M_{yd}$  [kNm]



Moment zero-points

Area of negative design moments in the ULS				
Span No.	Compression underside [m]		Tension - top side [m]	
	from the origin	from the end	from the origin	from the end
1			2.32	2.32

Bending design - bearing capacity

EXTR leading value for the design combination

Span No.	x [m]	EXTR	N <sub>Ed,max</sub> N <sub>Ed,min</sub> M [kN]	M <sub>yEd,max</sub> M <sub>yEd,min</sub> [kNm]	Cross-section [cm]		Reinforcement				Utilization (As top) (As bottom)
					Height	d10 d1u	As top [cm <sup>2</sup> ]		As bottom [cm <sup>2</sup> ]		
							Flange	Web	Flange	Web	
1	0.000	max M min M	0.00 0.00	0.00 -273.85	50.0	4.0 4.0	13.71	1.66	0.00	0.00	1.00 0.00
1	0.075	max M min M	0.00 0.00	33.63 -273.85	50.0	4.0 4.0	13.71	1.66	0.00	1.65	0.98 0.99
1	0.125	max M min M	0.00 0.00	55.76 -273.85	50.0	4.0 4.0	13.71	1.66	0.00	2.74	0.97 1.00
1	0.125	max M min M	0.00 0.00	55.76 -273.85	80.0	4.0 4.0	7.58	0.92	0.00	1.65	1.00 1.00
1	0.335	max M min M	0.00 0.00	146.18 -273.85	80.0	4.0 4.0	7.58	0.92	0.00	4.35	1.00 1.00
1	0.770	max M min M	0.00 0.00	320.30 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	9.58	0.99 1.00
1	0.870	max M min M	0.00 0.00	357.82 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	10.71	0.99 1.00
1	0.970	max M min M	0.00 0.00	394.43 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	11.82	0.99 1.00
1	1.270	max M min M	0.00 0.00	498.64 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	14.98	0.99 1.00
1	1.370	max M min M	0.00 0.00	531.50 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	15.98	0.99 1.00
1	1.470	max M min M	0.00 0.00	563.45 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	16.95	0.99 1.00
1	1.770	max M min M	0.00 0.00	653.68 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	19.70	0.99 1.00
1	1.870	max M min M	0.00 0.00	681.89 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	20.56	0.99 1.00
1	1.940	max M min M	0.00 0.00	701.10 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	21.15	0.99 1.00
1	1.970	max M min M	0.00 0.00	709.19 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	21.39	0.99 1.00
1	2.675	max M min M	0.00 0.00	874.99 271.47	80.0	4.0 4.0	0.00	0.00	0.00	26.48	0.00 1.00
1	2.675	max M min M	0.00 0.00	874.99 271.47	80.0	4.0 4.0	0.00	0.00	0.00	26.47	0.00 1.00
1	2.825	max M min M	0.00 0.00	904.28 280.54	80.0	4.0 4.0	0.00	0.00	0.00	27.38	0.00 1.00
1	2.910	max M min M	0.00 0.00	919.97 285.40	80.0	4.0 4.0	0.00	0.00	0.00	27.86	0.00 1.00
1	2.975	max M min M	0.00 0.00	931.52 288.99	80.0	4.0 4.0	0.00	0.00	0.00	28.21	0.00 1.00
1	3.675	max M min M	0.00 0.00	1030.86 319.78	80.0	4.0 4.0	0.00	0.00	0.00	31.28	0.00 1.00
1	3.880	max M min M	0.00 0.00	1051.30 326.11	80.0	4.0 4.0	0.00	0.00	0.00	31.91	0.00 1.00
1	3.900	max M min M	0.00 0.00	1053.09 326.66	80.0	4.0 4.0	0.00	0.00	0.00	31.96	0.00 1.00
1	4.125	max M min M	0.00 0.00	1070.72 332.17	80.0	4.0 4.0	0.00	0.00	0.00	32.51	0.00 1.00
1	4.850	max M min M	0.00 0.00	1095.41 339.92	80.0	4.0 4.0	0.00	0.00	0.00	33.27	0.00 1.00
1	5.575	max M min M	0.00 0.00	1070.72 332.17	80.0	4.0 4.0	0.00	0.00	0.00	32.51	0.00 1.00
1	5.800	max M min M	0.00 0.00	1053.09 326.66	80.0	4.0 4.0	0.00	0.00	0.00	31.96	0.00 1.00
1	5.820	max M min M	0.00 0.00	1051.30 326.11	80.0	4.0 4.0	0.00	0.00	0.00	31.91	0.00 1.00
1	6.025	max M min M	0.00 0.00	1030.86 319.78	80.0	4.0 4.0	0.00	0.00	0.00	31.28	0.00 1.00
1	6.725	max M min M	0.00 0.00	931.52 288.99	80.0	4.0 4.0	0.00	0.00	0.00	28.21	0.00 1.00
1	6.790	max M min M	0.00 0.00	919.97 285.40	80.0	4.0 4.0	0.00	0.00	0.00	27.86	0.00 1.00
1	6.875	max M min M	0.00 0.00	904.28 280.54	80.0	4.0 4.0	0.00	0.00	0.00	27.38	0.00 1.00
1	7.025	max M min M	0.00 0.00	874.99 271.47	80.0	4.0 4.0	0.00	0.00	0.00	26.47	0.00 1.00
1	7.025	max M min M	0.00 0.00	874.99 271.47	80.0	4.0 4.0	0.00	0.00	0.00	26.48	0.00 1.00
1	7.730	max M min M	0.00 0.00	709.19 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	21.39	0.99 1.00
1	7.760	max M min M	0.00 0.00	701.10 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	21.15	0.99 1.00
1	7.830	max M min M	0.00 0.00	681.89 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	20.56	0.99 1.00
1	7.930	max M min M	0.00 0.00	653.68 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	19.70	0.99 1.00

1	8.230	max M min M	0.00 0.00	563.45 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	16.95	0.99 1.00
1	8.330	max M min M	0.00 0.00	531.50 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	15.98	0.99 1.00
1	8.430	max M min M	0.00 0.00	498.64 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	14.98	0.99 1.00
1	8.730	max M min M	0.00 0.00	394.43 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	11.82	0.99 1.00
1	8.830	max M min M	0.00 0.00	357.82 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	10.71	0.99 1.00
1	8.930	max M min M	0.00 0.00	320.30 -273.85	80.0	4.0 4.0	7.57	0.92	0.00	9.58	0.99 1.00
1	9.365	max M min M	0.00 0.00	146.18 -273.85	80.0	4.0 4.0	7.58	0.92	0.00	4.35	1.00 1.00
1	9.575	max M min M	0.00 0.00	55.76 -273.85	80.0	4.0 4.0	7.58	0.92	0.00	1.65	1.00 1.00
1	9.575	max M min M	0.00 0.00	55.76 -273.85	50.0	4.0 4.0	13.71	1.66	0.00	2.74	0.97 1.00
1	9.625	max M min M	0.00 0.00	33.63 -273.85	50.0	4.0 4.0	13.71	1.66	0.00	1.65	0.98 0.99
1	9.700	max M min M	0.00 0.00	0.00 -273.85	50.0	4.0 4.0	13.71	1.66	0.00	0.00	1.00 0.00

Bending design

Moment redistribution not admissible	
E	E={a,e,u,i} action
B	B={m,v,A,D,g} reinforcement
a	M <sub>yEd</sub> from moment round-off
m	Minimum longitudinal reinforcement
e	M <sub>yEd</sub> from minimum restraint
v	Anchorage reinforcement
u	M <sub>yEd</sub> from moment redistribution
A	Recess reinforcement
i	M <sub>yEd</sub> section moment
D	Ductility reinforcement
EXTR	leading value for the design combination
g	Reinforcement specification

Span No.	x [m]	EXTR	N <sub>Ed,max</sub> N <sub>Ed,min</sub> M [kN]	M <sub>yEd,max</sub> M <sub>yEd,min</sub> M [kNm]	E	Cross-section [cm]		Reinforcement						Utilization (As top) (As bottom)	
						Height Redistribution [%]	d1o d1u	As top [cm <sup>2</sup> ]		B	As bottom [cm <sup>2</sup> ]		B		
								Flange	Web		Flange	Web			
1	0.000	max M min M	0.00 0.00	0.00 -273.85	e	80.0	4.0 4.0	13.71	1.66		0.00	8.32	m	1.00 0.00	
1	0.075	max M min M	0.00 0.00	33.63 -273.85	e	80.0	4.0 4.0	13.71	1.66		0.00	8.32	m	0.98 0.25	
1	0.125	max M min M	0.00 0.00	55.76 -273.85	e	80.0	4.0 4.0	13.71	1.66		0.00	8.32	m	0.97 0.33	
1	0.125	max M min M	0.00 0.00	55.76 -273.85	e	80.0	4.0 4.0	7.59	0.92		0.00	8.32	m	1.00 0.56	
1	0.335	max M min M	0.00 0.00	146.18 -273.85	e	80.0	4.0 4.0	7.59	0.92		0.00	8.32	m	1.00 0.56	
1	0.770	max M min M	0.00 0.00	320.30 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	9.58		0.99 1.00	
1	0.770	max M min M	0.00 0.00	320.30 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	10.71	A	0.99 1.00	
1	0.870	max M min M	0.00 0.00	357.82 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	10.71		0.99 1.00	
1	0.970	max M min M	0.00 0.00	394.43 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	11.82		0.99 1.00	
1	1.270	max M min M	0.00 0.00	498.64 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	14.98		0.99 1.00	
1	1.270	max M min M	0.00 0.00	498.64 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	15.98	A	0.99 1.00	
1	1.370	max M min M	0.00 0.00	531.50 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	15.98		0.99 1.00	
1	1.470	max M min M	0.00 0.00	563.45 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	16.95		0.99 1.00	
1	1.770	max M min M	0.00 0.00	653.68 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	19.70		0.99 1.00	
1	1.770	max M min M	0.00 0.00	653.68 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	20.56	A	0.99 1.00	
1	1.870	max M min M	0.00 0.00	681.89 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	20.56		0.99 1.00	
1	1.940	max M min M	0.00 0.00	701.10 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	21.15		0.99 1.00	
1	1.970	max M min M	0.00 0.00	709.19 -273.85	e	80.0	4.0 4.0	7.56	0.91		0.00	21.39		0.99 1.00	
1	2.675	max M min M	0.00 0.00	874.99 271.47		80.0	4.0 4.0	0.00	0.00		0.00	26.47		0.00 1.00	
1	2.675	max M min M	0.00 0.00	874.99 271.47		80.0	4.0 4.0	0.00	0.00		0.00	27.38	A	0.00 1.00	
1	2.825	max M min M	0.00 0.00	904.28 280.54		80.0	4.0 4.0	0.00	0.00		0.00	27.38		0.00 1.00	
1	2.910	max M min M	0.00 0.00	919.97 285.40		80.0	4.0 4.0	0.00	0.00		0.00	27.86		0.00 1.00	
1	2.975	max M min M	0.00 0.00	931.52 288.99		80.0	4.0 4.0	0.00	0.00		0.00	28.22		0.00 1.00	
1	3.675	max M min M	0.00 0.00	1030.86 319.78		80.0	4.0 4.0	0.00	0.00		0.00	31.27		0.00 1.00	
1	3.675	max M min M	0.00 0.00	1030.86 319.78		80.0	4.0 4.0	0.00	0.00		0.00	31.96	A	0.00 1.00	
1	3.880	max M min M	0.00 0.00	1051.30 326.11		80.0	4.0 4.0	0.00	0.00		0.00	31.96	A	0.00 1.00	

1	3.900	max M min M	0.00 0.00	1053.09 326.66		80.0	4.0 4.0	0.00	0.00	0.00	31.96	0.00 1.00
1	4.125	max M min M	0.00 0.00	1070.72 332.17		80.0	4.0 4.0	0.00	0.00	0.00	32.51	0.00 1.00
1	4.850	max M min M	0.00 0.00	1095.41 339.92		80.0	4.0 4.0	0.00	0.00	0.00	33.27	0.00 1.00
1	5.575	max M min M	0.00 0.00	1070.72 332.17		80.0	4.0 4.0	0.00	0.00	0.00	32.51	0.00 1.00
1	5.800	max M min M	0.00 0.00	1053.09 326.66		80.0	4.0 4.0	0.00	0.00	0.00	31.96	0.00 1.00
1	5.820	max M min M	0.00 0.00	1051.30 326.11		80.0	4.0 4.0	0.00	0.00	0.00	31.96	A 0.00 1.00
1	6.025	max M min M	0.00 0.00	1030.86 319.78		80.0	4.0 4.0	0.00	0.00	0.00	31.96	A 0.00 1.00
1	6.025	max M min M	0.00 0.00	1030.86 319.78		80.0	4.0 4.0	0.00	0.00	0.00	31.27	0.00 1.00
1	6.725	max M min M	0.00 0.00	931.52 288.99		80.0	4.0 4.0	0.00	0.00	0.00	28.22	0.00 1.00
1	6.790	max M min M	0.00 0.00	919.97 285.40		80.0	4.0 4.0	0.00	0.00	0.00	27.86	0.00 1.00
1	6.875	max M min M	0.00 0.00	904.28 280.54		80.0	4.0 4.0	0.00	0.00	0.00	27.38	0.00 1.00
1	7.025	max M min M	0.00 0.00	874.99 271.47		80.0	4.0 4.0	0.00	0.00	0.00	27.38	A 0.00 1.00
1	7.025	max M min M	0.00 0.00	874.99 271.47		80.0	4.0 4.0	0.00	0.00	0.00	26.47	0.00 1.00
1	7.730	max M min M	0.00 0.00	709.19 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	21.39	0.99 1.00
1	7.760	max M min M	0.00 0.00	701.10 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	21.15	0.99 1.00
1	7.830	max M min M	0.00 0.00	681.89 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	20.56	0.99 1.00
1	7.930	max M min M	0.00 0.00	653.68 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	20.56	A 0.99 1.00
1	7.930	max M min M	0.00 0.00	653.68 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	19.70	0.99 1.00
1	8.230	max M min M	0.00 0.00	563.45 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	16.95	0.99 1.00
1	8.330	max M min M	0.00 0.00	531.50 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	15.98	0.99 1.00
1	8.430	max M min M	0.00 0.00	498.64 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	15.98	A 0.99 1.00
1	8.430	max M min M	0.00 0.00	498.64 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	14.98	0.99 1.00
1	8.730	max M min M	0.00 0.00	394.43 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	11.82	0.99 1.00
1	8.830	max M min M	0.00 0.00	357.82 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	10.71	0.99 1.00
1	8.930	max M min M	0.00 0.00	320.30 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	10.71	A 0.99 1.00
1	8.930	max M min M	0.00 0.00	320.30 -273.85	e	80.0	4.0 4.0	7.56	0.91	0.00	9.58	0.99 1.00
1	9.365	max M min M	0.00 0.00	146.18 -273.85	e	80.0	4.0 4.0	7.59	0.92	0.00	8.32	m 1.00 0.56
1	9.575	max M min M	0.00 0.00	55.76 -273.85	e	80.0	4.0 4.0	7.59	0.92	0.00	8.32	m 1.00 0.56
1	9.575	max M min M	0.00 0.00	55.76 -273.85	e	80.0	4.0 4.0	13.71	1.66	0.00	8.32	m 0.97 0.33
1	9.625	max M min M	0.00 0.00	33.63 -273.85	e	80.0	4.0 4.0	13.71	1.66	0.00	8.32	m 0.98 0.25
1	9.700	max M min M	0.00 0.00	0.00 -273.85	e	80.0	4.0 4.0	13.71	1.66	0.00	8.32	m 1.00 0.00

Maximum utilization: 1.00 at span / pos. = 1 / 0.000 m Analysis fulfilled.

Shear design

Moment redistribution not admissible			
A	Support axis	Ar	Support edge
Ar±d	Distance d from support edge	r	red. shear force from sinlge loads close to a support
m	Minimum shear force reinforcement	j	Design of the shear joint decisive
asw	Stirrup reinforcement (shear force + torsion) double shear	AsTL	Longitudinal torsion reinforcement distributed over the circumference

Span No.	x [m]	Attr	VEd [kN]	MTd [kNm]	VRdc [kN]	θ [cm]	zi [cm]	VRdmax [kN]	TRdmax [kNm]	VTed / VTRd	asmin [cm²/m]	asw [cm²/m]	AsTL [cm²]
1	0.000	A	451.8	0.0	63.3	33.2	41.0	838.7	72.1	0.00	3.07	16.61	0.00
1	0.075	Ar	445.0	0.0	63.3	33.1	41.0	837.3	72.1	0.00	3.07	16.29	0.00
1	0.125		440.4	0.0	63.3	33.0	41.0	836.4	72.1	0.00	3.07	16.08	0.00
1	0.125		440.4	0.0	80.6	27.3	71.0	1292.5	122.4	0.00	3.07	6.84	0.00
1	0.335	Ar+d	420.7	0.0	80.6	26.7	71.0	1270.5	122.4	0.00	3.07	6.84	0.00
1	0.770		379.8	0.0	84.5	25.0	71.0	1213.8	122.4	0.00	3.07	5.74	0.00
1	0.870		370.6	0.0	87.7	24.6	71.0	1198.4	122.4	0.00	3.07	5.49	0.00
1	0.970		361.4	0.0	90.6	24.1	71.0	1181.8	122.4	0.00	3.07	5.24	0.00
1	1.270		333.3	0.0	98.1	22.5	71.0	1122.1	122.4	0.00	3.07	4.48	0.00
1	1.370		324.1	0.0	100.2	22.0	71.0	1099.1	122.4	0.00	3.07	4.23	0.00
1	1.470		314.9	0.0	102.2	21.3	71.0	1074.1	122.4	0.00	3.07	3.99	0.00
1	1.770		286.7	0.0	107.5	19.2	71.0	981.9	122.4	0.00	3.07	3.23	0.00

1	1.870		277.5	0.0	109.0	18.9	71.0	969.5	122.4	0.00	3.07	3.07	m	0.00
1	1.940		271.1	0.0	110.0	19.3	71.0	987.6	122.4	0.00	3.07	3.07	m	0.00
1	1.970		268.3	0.0	110.5	19.5	71.0	995.5	122.4	0.00	3.07	3.07	m	0.00
1	2.675		202.1	0.0	118.6	25.1	71.0	1218.5	122.4	0.00	3.07	3.07	m	0.00
1	2.825		188.4	0.0	119.9	26.7	71.0	1272.3	122.4	0.00	3.07	3.07	m	0.00
1	2.910		180.7	0.0	120.6	27.7	71.0	1303.7	122.4	0.00	3.07	3.07	m	0.00
1	2.975		174.8	0.0	121.1	28.5	71.0	1328.1	122.4	0.00	3.07	3.07	m	0.00
1	3.675		109.0	0.0	125.4	41.0	71.0	1568.9	122.4	0.00	3.07	3.07	m	0.00
1	3.880		90.4	0.0	126.2	45.0	71.0	1584.2	122.4	0.00	3.07	3.07	m	0.00
1	3.900		88.6	0.0	126.3	45.0	71.0	1584.2	122.4	0.00	3.07	3.07	m	0.00
1	4.125		68.1	0.0	127.0	45.0	71.0	1584.2	122.4	0.00	3.07	3.07	m	0.00
1	4.850		0.0	0.0	128.0	45.0	71.0	1584.2	122.4	0.00	3.07	3.07	m	0.00
1	5.575		68.1	0.0	127.0	45.0	71.0	1584.2	122.4	0.00	3.07	3.07	m	0.00
1	5.800		88.6	0.0	126.3	45.0	71.0	1584.2	122.4	0.00	3.07	3.07	m	0.00
1	5.820		90.4	0.0	126.2	45.0	71.0	1584.2	122.4	0.00	3.07	3.07	m	0.00
1	6.025		109.0	0.0	125.4	41.0	71.0	1568.9	122.4	0.00	3.07	3.07	m	0.00
1	6.725		174.8	0.0	121.1	28.5	71.0	1328.1	122.4	0.00	3.07	3.07	m	0.00
1	6.790		180.7	0.0	120.6	27.7	71.0	1303.7	122.4	0.00	3.07	3.07	m	0.00
1	6.875		188.4	0.0	119.9	26.7	71.0	1272.3	122.4	0.00	3.07	3.07	m	0.00
1	7.025		202.1	0.0	118.6	25.1	71.0	1218.5	122.4	0.00	3.07	3.07	m	0.00
1	7.730		268.3	0.0	110.5	19.5	71.0	995.5	122.4	0.00	3.07	3.07	m	0.00
1	7.760		271.1	0.0	110.0	19.3	71.0	987.6	122.4	0.00	3.07	3.07	m	0.00
1	7.830		277.5	0.0	109.0	18.9	71.0	969.5	122.4	0.00	3.07	3.07	m	0.00
1	7.930		286.7	0.0	107.5	19.2	71.0	981.9	122.4	0.00	3.07	3.23	m	0.00
1	8.230		314.9	0.0	102.2	21.3	71.0	1074.1	122.4	0.00	3.07	3.99	m	0.00
1	8.330		324.1	0.0	100.2	22.0	71.0	1099.1	122.4	0.00	3.07	4.23	m	0.00
1	8.430		333.3	0.0	98.1	22.5	71.0	1122.1	122.4	0.00	3.07	4.48	m	0.00
1	8.730		361.4	0.0	90.6	24.1	71.0	1181.8	122.4	0.00	3.07	5.24	m	0.00
1	8.830		370.6	0.0	87.7	24.6	71.0	1198.4	122.4	0.00	3.07	5.49	m	0.00
1	8.930		379.8	0.0	84.5	25.0	71.0	1213.8	122.4	0.00	3.07	5.74	m	0.00
1	9.365	Ar-d	420.7	0.0	80.6	26.7	71.0	1270.5	122.4	0.00	3.07	6.84	m	0.00
1	9.575		440.4	0.0	80.6	27.3	71.0	1292.5	122.4	0.00	3.07	6.84	m	0.00
1	9.575		440.4	0.0	63.3	33.0	41.0	836.4	72.1	0.00	3.07	16.08	m	0.00
1	9.625	Ar	445.0	0.0	63.3	33.1	41.0	837.3	72.1	0.00	3.07	16.29	m	0.00
1	9.700	A	451.8	0.0	63.3	33.2	41.0	838.7	72.1	0.00	3.07	16.61	m	0.00

Maximum utilization: 1.00 at span / pos. = 1 / 0.000 m Analysis fulfilled.

Flange connecting reinforcement

$A_c$	effective flange area	$h_f$	Flange thickness at the connection
$b_f/b$	Flange width/Slab width	$V_{Ed}$	Longitudinal shear stress at the connection ( $\Delta F_d / (h_f \Delta x)$ )
$\Delta F_d$	Longitudinal force margin in the flange over the length of $\Delta x$	$V_{Rdmax}$	adm. strut stress
$\Delta x$	Half distance moment zero point / maximum	$z$	Tension flange in condition I

Span No.	x [m]	Pos.	$A_c$ [m <sup>2</sup> ]	$h_f$ [cm]	$b_f/b$ [-]	$V_{Ed}$ [kN/m <sup>2</sup> ]	$V_{Rdmax}$ [kN/m <sup>2</sup> ]	$asf$ [cm <sup>2</sup> /m]
1	0.000	TF-l e	0.2480	20.0	0.446	1830.8	6584.0	7.02
		TF-r i	0.2480	20.0	0.446	1830.8	6584.0	7.02
1	0.075	TF-l e	0.2480	20.0	0.446	1830.8	6584.0	7.02
		TF-r i	0.2480	20.0	0.446	1830.8	6584.0	7.02
1	0.125	TF-l e	0.2480	20.0	0.446	1830.8	6584.0	7.02
		TF-r i	0.2480	20.0	0.446	1830.8	6584.0	7.02
1	0.125	TF-l e	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-r i	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	0.335	TF-l e	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-r i	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	0.770	TF-l e	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-r i	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	0.870	TF-l e	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-r i	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	0.970	TF-l e	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-r i	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	1.270	TF-l e	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-r i	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	1.370	TF-l e	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-r i	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	1.470	TF-l e	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-r i	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	1.770	TF-l e	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-r i	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	1.870	TF-l e	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-r i	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	1.940	TF-l e	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-r i	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	1.970	TF-l e	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-r i	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	2.675	TF-l e	0.2480	20.0	0.446	361.7	6584.0	1.39

1	2.825	TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	2.910	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	2.975	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	3.675	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	3.880	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	3.900	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	4.125	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	4.850	TF-le	0.2480	20.0	0.446	151.6	6584.0	0.58
		TF-ri	0.2480	20.0	0.446	151.6	6584.0	0.58
1	5.575	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	5.800	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	5.820	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	6.025	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	6.725	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	6.790	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	6.875	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	7.025	TF-le	0.2480	20.0	0.446	361.7	6584.0	1.39
		TF-ri	0.2480	20.0	0.446	361.7	6584.0	1.39
1	7.730	TF-le	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-ri	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	7.760	TF-le	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-ri	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	7.830	TF-le	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-ri	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	7.930	TF-le	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-ri	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	8.230	TF-le	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-ri	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	8.330	TF-le	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-ri	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	8.430	TF-le	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-ri	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	8.730	TF-le	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-ri	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	8.830	TF-le	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-ri	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	8.930	TF-le	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-ri	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	9.365	TF-le	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-ri	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	9.575	TF-le	0.2480	20.0	0.446	1057.2	6584.0	4.05
		TF-ri	0.2480	20.0	0.446	1057.2	6584.0	4.05
1	9.575	TF-le	0.2480	20.0	0.446	1830.8	6584.0	7.02
		TF-ri	0.2480	20.0	0.446	1830.8	6584.0	7.02
1	9.625	TF-le	0.2480	20.0	0.446	1830.8	6584.0	7.02
		TF-ri	0.2480	20.0	0.446	1830.8	6584.0	7.02
1	9.700	TF-le	0.2480	20.0	0.446	1830.8	6584.0	7.02
		TF-ri	0.2480	20.0	0.446	1830.8	6584.0	7.02

Maximum utilization: 0.28 at span / pos. = 1 / 9.575 m Analysis fulfilled.

Shear joint design

Shear joint in	z =	20.0 cm from TE	Properties	c <sub>j</sub> =	0.40
Reduction value	δ <sub>b</sub> =	2.0 cm		μ <sub>j</sub> =	0.70
Surface		rough		v <sub>j</sub> =	0.50
Reinforcing steel	f <sub>yk</sub> =	420 N/mm <sup>2</sup>		α =	90.0 degree
Joint reinforcement	erf a <sub>sj</sub>	Stirrups + Additions	Additions	Δa <sub>sj</sub>	without stirrups

Span No.	x [m]	a <sub>sw</sub> [cm <sup>2</sup> /m]	b <sub>j</sub> [cm]	σ <sub>N</sub> [N/mm <sup>2</sup> ]	v <sub>Ed</sub> [kN/m <sup>2</sup> ]	v <sub>Rdcj</sub> [kN/m <sup>2</sup> ]	v <sub>Rdmaxj</sub> [kN/m <sup>2</sup> ]	erf a <sub>sj</sub> [cm <sup>2</sup> /m]	Δa <sub>sj</sub> [cm <sup>2</sup> /m]
1	0.000	16.61	28.0	0.0	3935.5	507.7	4958.3	31.29	11.52
1	0.075	16.29	28.0	0.0	3876.1	507.7	4958.3	30.74	11.35
1	0.125	16.08	28.0	0.0	3836.5	507.7	4958.3	30.38	11.24
1	0.335	6.84	28.0	0.0	2116.2	507.7	4958.3	14.68	6.53



1	0.770	5.74	28.0	0.0	1910.6	507.7	4958.3	12.80	5.97
1	0.870	5.49	28.0	0.0	1864.4	507.7	4958.3	12.38	5.84
1	0.970	5.24	28.0	0.0	1818.1	507.7	4958.3	11.96	5.72
1	1.270	4.48	28.0	0.0	1676.4	507.7	4958.3	10.67	5.33
1	1.370	4.23	28.0	0.0	1630.1	507.7	4958.3	10.24	5.20
1	1.470	3.99	28.0	0.0	1583.9	507.7	4958.3	9.82	5.08
1	1.770	3.23	28.0	0.0	1442.1	507.7	4958.3	8.53	4.69
1	1.870	3.07	28.0	0.0	1395.9	507.7	4958.3	8.11	4.45
1	1.940	3.07	28.0	0.0	1363.5	507.7	4958.3	7.81	4.15
1	1.970	3.07	28.0	0.0	1349.6	507.7	4958.3	7.68	4.03
1	2.675	3.07	28.0	0.0	1016.5	507.7	4958.3	4.64	0.99
1	2.825	3.07	28.0	0.0	947.9	507.7	4958.3	4.02	0.36
1	2.910	3.07	28.0	0.0	909.0	507.7	4958.3	3.66	0.00
1	2.975	3.07	28.0	0.0	879.2	507.7	4958.3	3.39	0.00
1	3.675	3.07	28.0	0.0	548.4	507.7	4958.3	0.37	0.00
1	3.880	3.07	28.0	0.0	454.7	507.7	4958.3	0.00	0.00
1	3.900	3.07	28.0	0.0	445.5	507.7	4958.3	0.00	0.00
1	4.125	3.07	28.0	0.0	342.6	507.7	4958.3	0.00	0.00
1	4.850	3.07	28.0	0.0	0.0	507.7	4958.3	0.00	0.00
1	5.575	3.07	28.0	0.0	342.6	507.7	4958.3	0.00	0.00
1	5.800	3.07	28.0	0.0	445.5	507.7	4958.3	0.00	0.00
1	5.820	3.07	28.0	0.0	454.7	507.7	4958.3	0.00	0.00
1	6.025	3.07	28.0	0.0	548.4	507.7	4958.3	0.37	0.00
1	6.725	3.07	28.0	0.0	879.2	507.7	4958.3	3.39	0.00
1	6.790	3.07	28.0	0.0	909.0	507.7	4958.3	3.66	0.00
1	6.875	3.07	28.0	0.0	947.9	507.7	4958.3	4.02	0.36
1	7.025	3.07	28.0	0.0	1016.5	507.7	4958.3	4.64	0.99
1	7.730	3.07	28.0	0.0	1349.6	507.7	4958.3	7.68	4.03
1	7.760	3.07	28.0	0.0	1363.5	507.7	4958.3	7.81	4.15
1	7.830	3.07	28.0	0.0	1395.9	507.7	4958.3	8.11	4.45
1	7.930	3.23	28.0	0.0	1442.1	507.7	4958.3	8.53	4.69
1	8.230	3.99	28.0	0.0	1583.9	507.7	4958.3	9.82	5.08
1	8.330	4.23	28.0	0.0	1630.1	507.7	4958.3	10.24	5.20
1	8.430	4.48	28.0	0.0	1676.4	507.7	4958.3	10.67	5.33
1	8.730	5.24	28.0	0.0	1818.1	507.7	4958.3	11.96	5.72
1	8.830	5.49	28.0	0.0	1864.4	507.7	4958.3	12.38	5.84
1	8.930	5.74	28.0	0.0	1910.6	507.7	4958.3	12.80	5.97
1	9.365	6.84	28.0	0.0	2116.2	507.7	4958.3	14.68	6.53
1	9.575	6.84	28.0	0.0	2215.4	507.7	4958.3	14.68	6.53
1	9.625	16.29	28.0	0.0	3876.1	507.7	4958.3	30.74	11.35
1	9.700	16.61	28.0	0.0	3935.5	507.7	4958.3	31.29	11.52

**Maximum utilization: 0.79 Analysis fulfilled.**

**Design - notch**

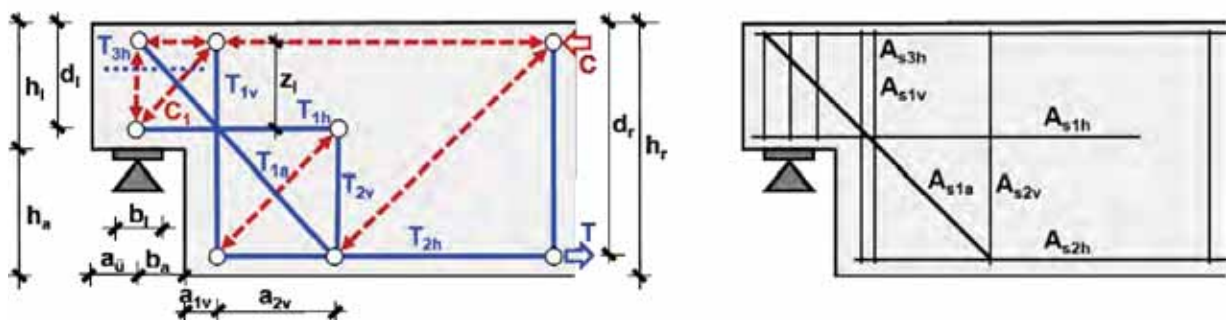
Method: Strut and tie model acc. to Schlaich/Schäfer and Reineck (BK 2007) for forces in xz-plane

L / R	left / right end of beam		C <sub>1</sub>	Strut of corbel
V <sub>Ed</sub>	vertical support force		H <sub>Ed</sub>	horizontal support force
T <sub>1v</sub> ;A <sub>s1v</sub> T <sub>2v</sub> ;A <sub>s2v</sub> T <sub>1a</sub> ;A <sub>s1a</sub>	vertical layer A <sub>s1v</sub> vertical layer A <sub>s2v</sub> inclined layer A <sub>s1a</sub>	Suspension force: 75% Suspension force: 75% Inclination angle:45°	T <sub>1h</sub> ;A <sub>s1h</sub> T <sub>2h</sub> ;A <sub>s2h</sub> T <sub>3h</sub> ;A <sub>s3h</sub>	horizontal bottom in corbel A <sub>s1h</sub> horizontal anchorage in BE of beam A <sub>s2h</sub> horizontal tensile splitting in corbel A <sub>s3h</sub> (at b <sub>a</sub> /h <sub>l</sub> ≤ 0.5)

*Dimensions*

x [m]	b <sub>a</sub> [cm]	h <sub>a</sub> [cm]	b <sub>l</sub> [cm]	a <sub>1v</sub> [cm]	a <sub>2v</sub> [cm]	a <sub>ü</sub> [cm]	z <sub>l</sub> [cm]	h <sub>l</sub> [cm]	d <sub>l</sub> [cm]	h <sub>r</sub> [cm]	d <sub>r</sub> [cm]
0.00 L	12.5	30.0	15.0	7.5	30.0	12.5	42.0	50.0	46.0	80.0	76.0
9.70 R	12.5	30.0	15.0	7.5	30.0	12.5	42.0	50.0	46.0	80.0	76.0

*General drawing of notch*



*Design*

x [m]	V <sub>Ed</sub> [kN]	H <sub>Ed</sub> [kN]	Position	LCC	F [kN]	As [cm²]	VRdmax [kN]	σ <sub>cd</sub> [N/mm²]	IAB [-]
0.00 L	451.8	90.4	T <sub>1v</sub> ; A <sub>s1v</sub> T <sub>2v</sub> ; A <sub>s2v</sub>	max Vz max Vz	391.6 167.8	9.01 3.86			

Auftrag: Ausklinkungen + große

Position: D10

Bauteil: Stahlbeton DLT

			T1a; As1a T1h; As1h T2h; As2h T3h; As3h C1	max Vz max Vz max Vz max Vz max Vz	159.7 258.2 511.7 77.5	3.67 5.94 11.77 1.78			
9.70 R	451.8	90.4	T1v; As1v T2v; As2v T1a; As1a T1h; As1h T2h; As2h T3h; As3h C1	mi n Vz mi n Vz mi n Vz mi n Vz mi n Vz mi n Vz mi n Vz	391.6 167.8 159.7 258.2 511.7 77.5	9.01 3.86 3.67 5.94 11.77 1.78	771.7	12.50	0.84

**Maximum utilization: 0.84 Analysis fulfilled.**

**Design - recess**

Method: Strut and tie model according to DAfStb Heft 459

MEd,li,NEd,li,VEd,li Flange t Aso,o As3h,Asu,o,As4h aswo lo,lu lv	Design stress resultants - left Top chord Reinforcement TE top flange Reinforcement BE top flange Shear force reinforcement due to VEdo horizontal distances from the edge of the opening Area of the suspension reinforcement	MEd,re,NEd,re,VEd,re Flange b Asu,u As1h,Aso,u,As2h aswu as1v,as2v as3v,as4v	Design stress resultants - right Bottom chord Reinforcement BE bottom flange Reinforcement TE bottom flange Shear force reinforcement due to VEdu Suspension reinforcement, left Suspension reinforcement, right
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**Dimensions**

No.	xl [m]	xr [m]	b [cm]	h [cm]	ho [cm]	hu [cm]	bw [cm]	zi [cm]	zo [cm]	Zu [cm]	d1,o [cm]	d1 [cm]	d1,u [cm]
1	0.77	0.97	20.0	20.0	44.0	16.0	30.0	75.3	35.0	6.0	4.0	5.0	4.0
2	1.27	1.47	20.0	20.0	44.0	16.0	30.0	75.2	34.0	7.0	4.0	5.0	4.0
3	1.77	1.97	20.0	20.0	44.0	16.0	30.0	75.0	34.0	7.0	4.0	5.0	4.0
4	2.68	2.98	30.0	30.0	34.0	16.0	30.0	74.9	24.0	7.0	4.0	5.0	4.0
5	3.67	4.13	45.0	30.0	34.0	16.0	30.0	74.8	24.0	7.0	4.0	5.0	4.0
6	5.58	6.02	45.0	30.0	34.0	16.0	30.0	73.7	24.0	7.0	4.0	5.0	4.0
7	6.72	7.03	30.0	30.0	34.0	16.0	30.0	73.9	24.0	7.0	4.0	5.0	4.0
8	7.73	7.93	20.0	20.0	44.0	16.0	30.0	74.2	34.0	7.0	4.0	5.0	4.0
9	8.23	8.43	20.0	20.0	44.0	16.0	30.0	74.4	34.0	7.0	4.0	5.0	4.0
10	8.73	8.93	20.0	20.0	44.0	16.0	30.0	74.7	35.0	6.0	4.0	5.0	4.0

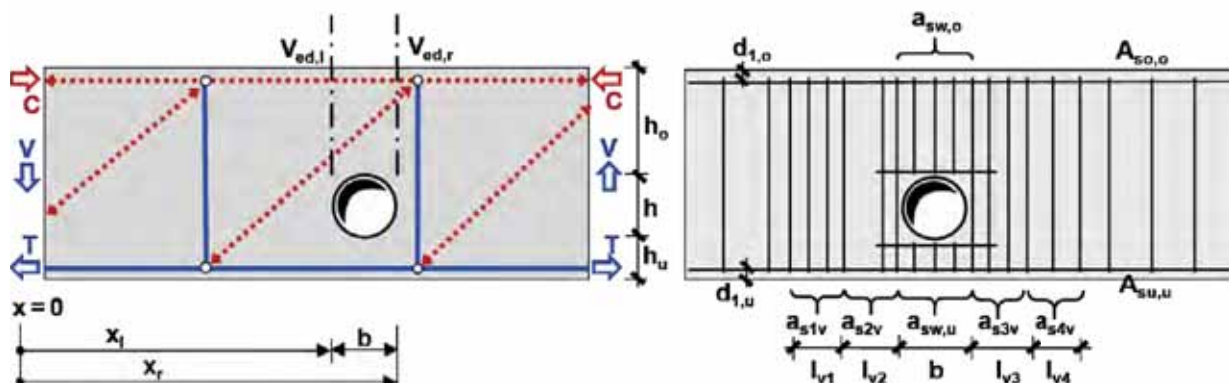
**Design stress resultants - cross-section (inner lever arm zi from the bending design)**

No.	xl [m]	xr [m]	Combi	MEd,li [kNm]	NEd,li [kN]	VEd,li [kN]	MEd,re [kNm]	NEd,re [kN]	VEd,re [kN]
5	3.67	4.13	max My	1030.9	0.0	109.0	1070.7	0.0	68.1
6	5.58	6.02	max My	1070.7	0.0	-68.1	1030.9	0.0	-109.0

**Design stress resultants - chord (Factor shear force in the compression chord = 0.80)**

No.	xl [m]	xr [m]	Combi	Flange	VRdmax [kN]	MEd,li [kNm]	NEd,li [kN]	VEd,li [kN]	VRdmax	MEd,re [kNm]	NEd,re [kN]	VEd,re [kN]	VEd,re/VRdmax
5	3.67	4.13	max My max My	o	376.1 113.1	0.0 0.0	-1398.3 1398.3	87.2 21.8	0.23 0.19	24.5 6.1	-1398.3 1398.3	54.5 13.6	0.14 0.12
6	5.58	6.02	max My max My	o u	376.1 113.1	24.5 6.1	-1398.3 1398.3	-54.5 -13.6	0.14 0.12	0.0 0.0	-1398.3 1398.3	-87.2 -21.8	0.23 0.19

**General drawing 'Small opening' Heft 459, figure 3.2.3.3**



**Longitudinal reinforcement 'Small openings'**

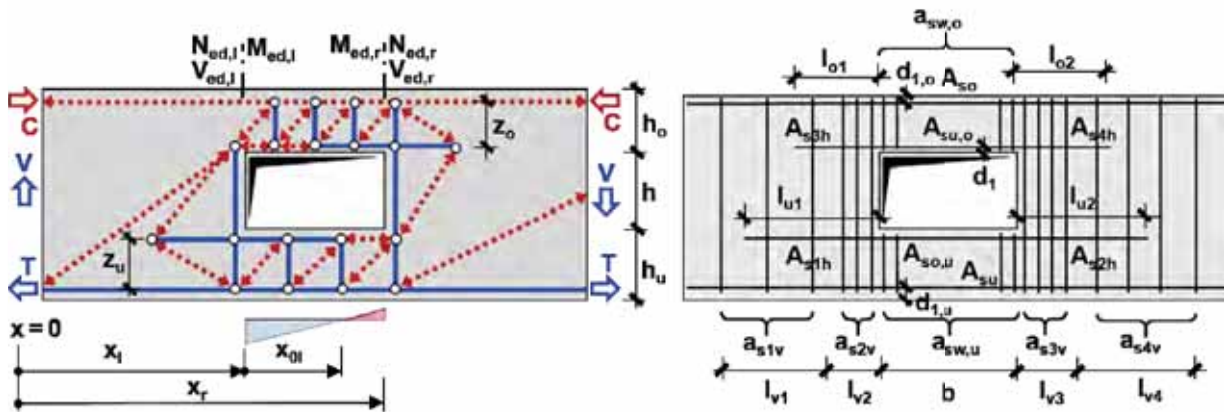
No.	xl [m]	xr [m]	Top chord	Bottom chord	Strut			
			Aso,o [cm²]	Asu,u [cm²]	dc [cm]	θ [°]	σc [N/mm²]	adm σc [N/mm²]
1	0.77	0.97	0.91	10.71	12.1	55.0	12.8	13.4
2	1.27	1.47	0.91	15.98	10.2	57.0	13.0	13.4
3	1.77	1.97	0.91	20.56	9.2	58.0	12.3	13.4
4	2.68	2.98	0.00	27.38	7.6	45.0	12.6	13.4
7	6.72	7.03	0.00	27.38	7.6	45.0	12.6	13.4

8	7.73	7.93	0.91	20.56	9.2	58.0	12.3	13.4
9	8.23	8.43	0.91	15.98	10.2	57.0	13.0	13.4
10	8.73	8.93	0.91	10.71	12.1	55.0	12.8	13.4

*Suspension and shear reinforcement 'Small openings'*

No.	x <sub>l</sub> [m]	x <sub>r</sub> [m]	a <sub>sw0</sub> [cm <sup>2</sup> /m]	a <sub>swu</sub> [cm <sup>2</sup> /m]	l <sub>v1</sub> [cm]	a <sub>s1v</sub> [cm <sup>2</sup> ]	l <sub>v2</sub> [cm]	a <sub>s2v</sub> [cm <sup>2</sup> ]	l <sub>v3</sub> [cm]	a <sub>s3v</sub> [cm <sup>2</sup> ]	l <sub>v4</sub> [cm]	a <sub>s4v</sub> [cm <sup>2</sup> ]
1	0.77	0.97	10.92	29.12	14.7	8.74	17.6		14.7	8.31		
2	1.27	1.47	9.17	21.90	12.1	7.67	16.2		12.1	7.24		
3	1.77	1.97	7.35	18.84	10.8	6.59	15.5		10.8	6.17		
4	2.68	2.98	6.87	4.43	10.7	4.65	33.2		10.7	4.02		
7	6.72	7.03	6.87	4.43			10.7	4.02	33.2		10.7	4.65
8	7.73	7.93	7.35	18.84			10.8	6.17	15.5		10.8	6.59
9	8.23	8.43	9.17	21.90			12.1	7.24	16.2		12.1	7.67
10	8.73	8.93	10.92	29.12			14.7	8.31	17.6		14.7	8.74

*General drawing 'Large opening' Heft 459, figure 4.31,4.32*



*Longitudinal reinforcement 'Large openings'*

No.	x <sub>l</sub> [m]	x <sub>r</sub> [m]	Top chord						Bottom chord						
			A <sub>so,o</sub> [cm <sup>2</sup> ]	A <sub>s3h</sub> [cm <sup>2</sup> ]	l <sub>o1</sub> [cm]	A <sub>su,o</sub> [cm <sup>2</sup> ]	A <sub>s4h</sub> [cm <sup>2</sup> ]	l <sub>o2</sub> [cm]	A <sub>su,u</sub> [cm <sup>2</sup> ]	A <sub>s1h</sub> [cm <sup>2</sup> ]	l <sub>u1</sub> [cm]	A <sub>so,u</sub> [cm <sup>2</sup> ]	A <sub>s2h</sub> [cm <sup>2</sup> ]	l <sub>u2</sub> [cm]	
5	3.67	4.13	0.00				0.00			31.96	22.03	57.6	18.38	20.49	57.6
6	5.58	6.02	0.00				0.00			31.96	20.49	57.6	18.38	22.03	57.6

*Suspension and shear reinforcement 'Large openings'*

No.	x <sub>l</sub> [m]	x <sub>r</sub> [m]	a <sub>sw0</sub> [cm <sup>2</sup> /m]	a <sub>swu</sub> [cm <sup>2</sup> /m]	l <sub>v1</sub> [cm]	a <sub>s1v</sub> [cm <sup>2</sup> /m]	l <sub>v2</sub> [cm]	a <sub>s2v</sub> [cm <sup>2</sup> /m]	l <sub>v3</sub> [cm]	a <sub>s3v</sub> [cm <sup>2</sup> /m]	l <sub>v4</sub> [cm]	a <sub>s4v</sub> [cm <sup>2</sup> /m]
5	3.67	4.13	3.43	3.07	49.2	5.10	20.8	16.24	44.2	4.05	72.0	2.18
6	5.58	6.02	3.43	3.07	72.0	2.18	44.2	4.05	20.8	16.24	49.2	5.10

Maximum utilization: 0.86 Pos.= 8.830 m Analysis fulfilled.

**Summary**

**Analysis summary**

Structural analysis of continuous beam with linear elastic stress resultant calculation					
Design according to DIN EN 1992-1-1		Civil engineering		Design is carried out normative	
ULS	Analysis	SLS	Analysis	FLS	Analysis
Announcement behavior	yes	Decompression	w/o ana.	Fatigue - bending	w/o ana.
Bending bearing capacity	fulfilled	Limitation of the crack width	w/o ana.	Fatigue - shear force	w/o ana.
Shear loading capacity	fulfilled	Limitation of the stresses	w/o ana.		
Shear joint loading capacity	fulfilled	Limitation of the deformations	w/o ana.		
Structural fire protection	w/o ana.				
Notches	fulfilled				
Recesses	fulfilled				

**Required reinforcement**

∅ <sub>s,..o/u</sub>	Bar diameter - top / bottom	A <sub>s,..t/b</sub>	Longitudinal reinforcement - top / bottom
A <sub>sv,..t/b</sub>	Flange connecting reinforcement in the top / bottom flange - in each case to be distributed in 2 layers in the flange	..f. / ..w..	Flange / web
A <sub>sv,w</sub>	Stirrups in the web double shear	A <sub>sTL</sub>	additional longitudinal torsion reinforcement
r	required reinforcement	p	existing reinforcement

Span	x	Longitudinal reinforcement A <sub>s</sub> top [cm <sup>2</sup> ]	Longitudinal reinforcement A <sub>s</sub> bottom	Shear reinforcement [cm <sup>2</sup> /m]	A <sub>sTL</sub>
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Auftrag: Ausklinkungen + große

Position: D10

Bauteil: Stahlbeton DLT

No.	[m]	r/p	[cm <sup>2</sup> ]						[cm <sup>2</sup> ]			[cm <sup>2</sup> ]		
			Ø <sub>s,ft</sub>	Ø <sub>s,wt</sub>	A <sub>s,ft</sub>	A <sub>s,wt</sub>	Ø <sub>s,fb</sub>	Ø <sub>s,wb</sub>	A <sub>s,fb</sub>	A <sub>s,wb</sub>	a <sub>sv,fo</sub>		a <sub>sv,fu</sub>	A <sub>sv,w</sub>
1	0.000	p r	10	20	0.00 13.71	0.00 1.66	10	25	0.00 0.00	0.00 8.32	0.00 7.02	0.00 0.00	16.61 0.00	0.00 0.00
1	0.075	p r	10	20	0.00 13.71	0.00 1.66	10	25	0.00 0.00	0.00 8.32	0.00 7.02	0.00 0.00	16.29 0.00	0.00 0.00
1	0.125	p r	10	20	0.00 13.71	0.00 1.66	10	25	0.00 0.00	0.00 8.32	0.00 7.02	0.00 0.00	16.08 0.00	0.00 0.00
1	0.125	p r	10	20	0.00 7.59	0.00 0.92	10	25	0.00 0.00	0.00 8.32	0.00 4.05	0.00 0.00	6.84 0.00	0.00 0.00
1	0.335	p r	10	20	0.00 7.59	0.00 0.92	10	25	0.00 0.00	0.00 8.32	0.00 4.05	0.00 0.00	6.84 0.00	0.00 0.00
1	0.770	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 9.58	0.00 4.05	0.00 0.00	5.74 0.00	0.00 0.00
1	0.870	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 10.71	0.00 4.05	0.00 0.00	5.49 0.00	0.00 0.00
1	0.970	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 11.82	0.00 4.05	0.00 0.00	5.24 0.00	0.00 0.00
1	1.270	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 14.98	0.00 4.05	0.00 0.00	4.48 0.00	0.00 0.00
1	1.370	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 15.98	0.00 4.05	0.00 0.00	4.23 0.00	0.00 0.00
1	1.470	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 16.95	0.00 4.05	0.00 0.00	3.99 0.00	0.00 0.00
1	1.770	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 19.70	0.00 4.05	0.00 0.00	3.23 0.00	0.00 0.00
1	1.870	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 20.56	0.00 4.05	0.00 0.00	3.07 0.00	0.00 0.00
1	1.940	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 21.15	0.00 4.05	0.00 0.00	3.07 0.00	0.00 0.00
1	1.970	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 21.39	0.00 4.05	0.00 0.00	3.07 0.00	0.00 0.00
1	2.675	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 26.47	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	2.825	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 27.38	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	2.910	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 27.86	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	2.975	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 28.22	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	3.675	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 31.27	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	3.880	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 31.96	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	3.900	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 31.96	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	4.125	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 32.51	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	4.850	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 33.27	0.00 0.58	0.00 0.00	3.07 0.00	0.00 0.00
1	5.575	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 32.51	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	5.800	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 31.96	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	5.820	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 31.96	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	6.025	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 31.96	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	6.725	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 28.22	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	6.790	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 27.86	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	6.875	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 27.38	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	7.025	p r	10	20	0.00 0.00	0.00 0.00	10	25	0.00 0.00	0.00 27.38	0.00 1.39	0.00 0.00	3.07 0.00	0.00 0.00
1	7.730	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 21.39	0.00 4.05	0.00 0.00	3.07 0.00	0.00 0.00
1	7.760	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 21.15	0.00 4.05	0.00 0.00	3.07 0.00	0.00 0.00
1	7.830	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 20.56	0.00 4.05	0.00 0.00	3.07 0.00	0.00 0.00
1	7.930	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 20.56	0.00 4.05	0.00 0.00	3.23 0.00	0.00 0.00
1	8.230	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 16.95	0.00 4.05	0.00 0.00	3.99 0.00	0.00 0.00
1	8.330	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 15.98	0.00 4.05	0.00 0.00	4.23 0.00	0.00 0.00
1	8.430	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 15.98	0.00 4.05	0.00 0.00	4.48 0.00	0.00 0.00
1	8.730	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 11.82	0.00 4.05	0.00 0.00	5.24 0.00	0.00 0.00
1	8.830	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 10.71	0.00 4.05	0.00 0.00	5.49 0.00	0.00 0.00
1	8.930	p r	10	20	0.00 7.56	0.00 0.91	10	25	0.00 0.00	0.00 10.71	0.00 4.05	0.00 0.00	5.74 0.00	0.00 0.00
1	9.365	p r	10	20	0.00 7.59	0.00 0.92	10	25	0.00 0.00	0.00 8.32	0.00 4.05	0.00 0.00	6.84 0.00	0.00 0.00
1	9.575	p r	10	20	0.00 7.59	0.00 0.92	10	25	0.00 0.00	0.00 8.32	0.00 4.05	0.00 0.00	6.84 0.00	0.00 0.00
1	9.575	p r	10	20	0.00 13.71	0.00 1.66	10	25	0.00 0.00	0.00 8.32	0.00 7.02	0.00 0.00	16.08 0.00	0.00 0.00

1	9.625	p	10	20	0.00	0.00	10	25	0.00	0.00	0.00	0.00	0.00	0.00
		r			13.71	1.66			0.00	8.32	7.02	0.00	0.00	0.00
1	9.700	p	10	20	0.00	0.00	10	25	0.00	0.00	0.00	0.00	0.00	0.00
		r			13.71	1.66			0.00	8.32	7.02	0.00	16.61	0.00

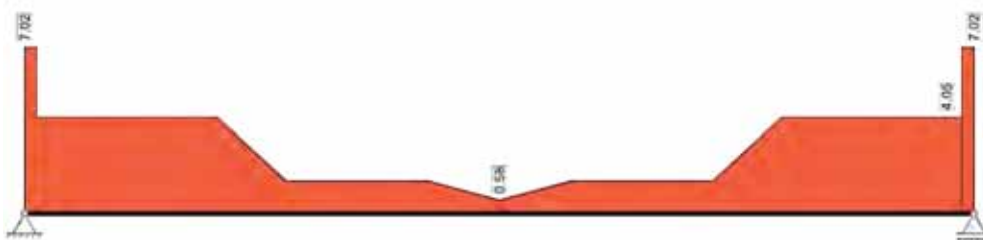
Required longitudinal reinforcement [cm<sup>2</sup>]



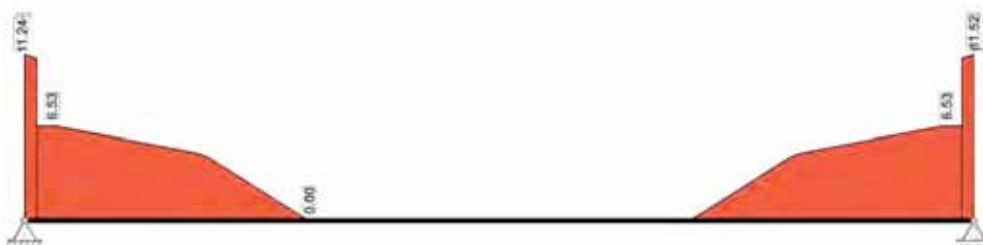
Required stirrups - web [cm<sup>2</sup>/m]



Required flange connecting reinforcement [cm<sup>2</sup>/m]



Required additional reinforcement - bond joint [cm<sup>2</sup>/m]



**Material consumption**

Material		Volume [m <sup>3</sup> ]	Weight [kg]
Concrete	C35/45	7.793	19483
Reinforcing steel	B500S	0.041	324
Prestressing steel			

Theoretical material consumption of the design results without structural reinforcement, additions and lap lengths.