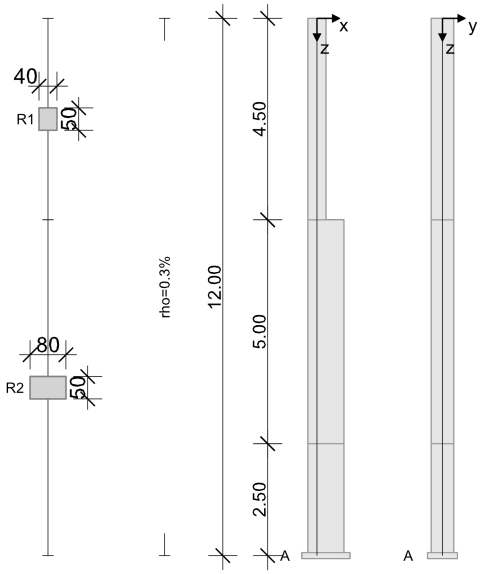
RIB Software SE	BEST V18.0 Build-No. 24072018	Type: Reinforced concrete column
File: Kragstütze_Querschnittssprung.Besx		



Standard:	DIN EN 1992-1-1/2

Column geometry and reinforcement

Cross-section	Type	b_x [m]	b_y [m]	A_c [m²]	d_1 [cm]	ρ_{max} [%]	Shape	Flame application
R1	Rectan.	0.400	0.500	0.20000	5.0	6.00	Circumference	4
R2	Rectan.	0.800	0.500	0.40000	5.0	6.00	Circumference	4

Section	Length [m]	Cross-section	e_x [cm]	e_y [cm]	ρ [%]	As [cm²]	$\varnothing_{exis.}$	Elements	Increments
1	4.50	R1	20.0	0.0	0.30	6.00	-	2	yes
2	5.00	R2	0.0	0.0	0.30	12.00	-	4	yes
3	2.50	R2	0.0	0.0	0.30	12.00	-	2	

Support states and imperfection

Elastic values proportional to the force and in the opposite direction to the displacement, C positive
automatic: the direction of the pre-deformation is calculated by the ratio of the buckling stability / load deformations according to 1st order theory

Final state "Lagerung 1"

Support	Height [m]	c_x [kN/m]	φ_y [kNm]	c_y [kN/m]	φ_x [kNm]
A	0.00	rigid	rigid	rigid	rigid

Imperfection			Direction vector	
Gradient	Height [m]	e_v [cm]	v_x	v_y
Obliquity	automatic	automatic	automatic	automatic

Material coefficients under normal temperature (C35/45, B500S)

Concrete	f_{ck} [N/mm²]	E_{c0m} [N/mm²]	$\gamma_{c,perm}$	$\gamma_{c,accid.}$	α_{cc}	f_{cd} [N/mm²]	γ_c [kN/m³]
C35/45	35.00	35805	1.50	1.30	0.85	19.83	25.00

Reinforcement	f_{yk} [N/mm²]	E_s [N/mm²]	$\gamma_{s,perm}$	$\gamma_{s,accid.}$	Ductility	f_{yd} [N/mm²]	γ_s [kN/m³]
B500S	500.00	200000	1.15	1.00	B (high)	434.78	78.50

Load cases

Creep: 1 = 100%, 0 = 0% considered

LC	Type of action	Creep	γ_{sup}	γ_{inf}	ψ_0	ψ_1	ψ_2	Name
0	Dead load							
1	Permanent load	1.00	1.35	1.00	1.00	1.00	1.00	ständig
2	Storage rooms (Live load E)	0.00	1.50	0.00	1.00	0.90	0.80	Verkehr E
3	Snow	0.00	1.50	0.00	0.50	0.20	0.00	Schnee
4	Wind	0.00	1.50	0.00	0.60	0.20	0.00	Wind

5	Accidental under structure	0.00	1.00	0.00	1.00	1.00	1.00	Anprall

LC	T	Single loads	h [m]	P_z [kN]	e_x [m]	e_y [m]	M_x [kNm]	M_y [kNm]	P_x [kN]	P_y [kN]
1		Verkehr E	7.50	300.00	0.200					
1			12.00	200.00						
2		Verkehr	7.50						40.00	20.00
2			7.50	500.00	0.200					
3		Schnee	12.00	120.00					20.00	10.00
5			2.50						100.00	

LC	T	Line loads	h_a [m]	Length [m]	p_{xa} [kN/m]	p_{xe} [kN/m]	p_{ya} [kN/m]	p_{ye} [kN/m]	p_{za} [kN/m]	p_{ze} [kN/m]
4		Wind	0.00	12.00	1.00	2.00				

Load case combinations

LCC	Load case combination number	GK	Basic combination
Support	LCC is active in the support state i	AK	Impact (accidental)
Type	Type of combination	LS	Safety against displacement
Fire	Use LCC additionally for the tabular fire protection	EK	Earthquake combination
relev.	'*' The load case combination is relevant in the analyses	BK	Fire combination
φ_t	Creep coefficient φ_t	CR	Creep under sustained loading load case with φ_t

LCC	relev.	Type	φ_t	Support	Fire	Combination
1		KR		Lagerung 1	-	1.00*LC1
2		GK	2.50	Lagerung 1	-	1.35*LC1+1.50*LC2+0.75*LC3+0.90*LC4
3	*	GK	2.50	Lagerung 1	-	1.35*LC1+1.50*LC2+1.50*LC3+0.90*LC4
4		GK	2.50	Lagerung 1	-	1.35*LC1+1.50*LC2+0.75*LC3+1.50*LC4
5		AK	2.50	Lagerung 1	-	1.00*LC1+0.80*LC2+0.20*LC3+1.00*LC5
6		AK	2.50	Lagerung 1	-	1.00*LC1+0.80*LC2+0.20*LC4+1.00*LC5
7		BK	2.50	Lagerung 1	yes	1.00*LC1
8		BK	2.50	Lagerung 1	yes	1.00*LC1+0.90*LC2
9		BK	2.50	Lagerung 1	yes	1.00*LC1+0.80*LC2+0.20*LC3
10		BK	2.50	Lagerung 1	yes	1.00*LC1+0.20*LC3
11		BK	2.50	Lagerung 1	yes	1.00*LC1+0.80*LC2+0.20*LC4
12		BK	2.50	Lagerung 1	yes	1.00*LC1+0.20*LC4

Results

Only the results for the decisive design combination are being issued.

Analysis summary

Imperfection	is being considered
Load bearing capacity (geometrical+physical non-linear)	was carried out
Shear force bearing capacity	was carried out
Structural fire protection	R90 fulfilled acc. to the extended zone method
Load transfer to FUNDA (bif file)	yes
total longitudinal reinforcement (without bond lengths etc.)	739.0 kg

Summary of the required reinforcement

No smaller reinforcement than applied for the calculation of the section displacements may be laid out. The reinforcement is to be laid out symmetrically in the cross-section.
Th. = 1 Minimum reinforcement acc. to 1st order theory; Th. = 2 design acc. to 2nd order theory decisive

Height [m]							required reinforcement					
from	to	Type	Shape	relev. LCC	Th.	d_1 [cm]	A_S/A_C [%]	$A_{s,L}$ [cm²]	$A_{s,w}$ [cm²/m]	n_{req}	exis$\varnothing_{s,L}$ [mm]	selected
12.00	7.50	R	Circum	3	2	5.0	1.61	32.2	8.19	-	-	
7.50	2.50	R	Circum	3	2	5.0	2.28	91.4	8.19	-	-	
2.50	0.00	R	Circum	3	2	5.0	3.39	135.6	8.19	-	-	


32.2
91.4
136
As [cm²]