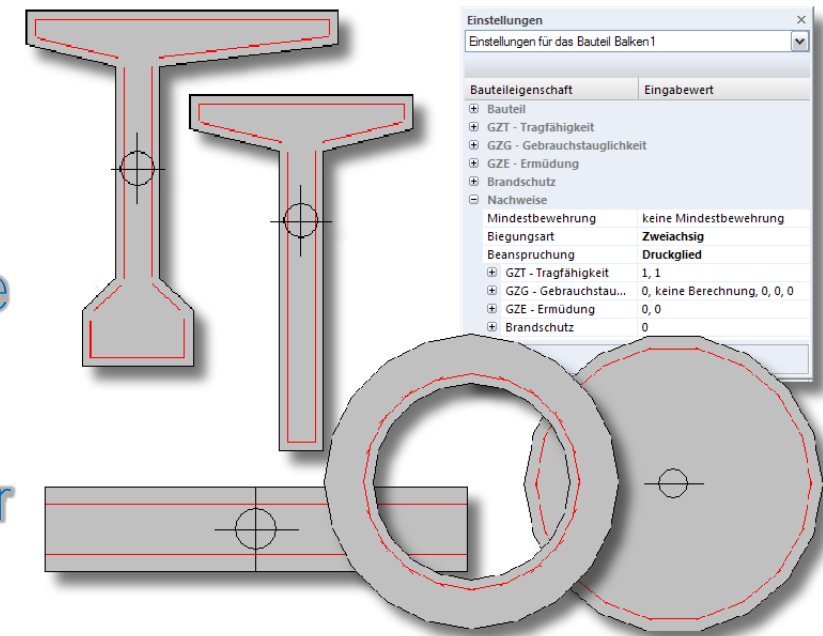


- Design according to DIN 1045-1, DIN FB 102 and EN 1992 with consideration of national annexes for DE, UK, CZ/SK, AT
- Standardised, symmetrical and asymmetrical reinforced concrete cross-sections in building and bridge construction
- Dimensioning of typical beam cross-sections as well as slab, plate and shell cross-sections
- Reliable one- or two-axis design with bending, normal force, shear force and torsion
- Automatic load case superposition for extreme load conditions
- Fire protection design for components under compressive and flexural stress in analogy to the tabular fire protection designs



Versatile Engineering Tool for Concrete Design

Graphic-interactive working environment

Dialog to edit cross-sections

Table of properties

Cross-section dialog details:

- Name: Cross Section 1
- Type: General
- Cross-section dimensions:
 - top: Cross-sect.Height: 160.0 cm
 - Web thickness: 20.0 cm
 - Flange width: left 40.0 cm, right 40.0 cm
 - Flange thickness: 15.0 cm
 - Haunch height: 10.0 cm
 - Bottom: Web thickness: 20.0 cm
 - Flange width: left 15.0 cm, right 15.0 cm
 - Flange thickness: 25.0 cm
 - Haunch height: 15.0 cm

Table of properties (Member properties):

- Structural member: Beam
- Stress: Predominantly bending
- Bending type: Uniaxial
- Requirement class: D
- Material: C55/67, B500S
- Reinforcement: B500S
- Exposure class: XC1, XC1, XC1
- ULS - Structural strength: Concrete age at first load: 28 Days
- SLS - Serviceability: Crack width limitation: 28 Days, 28 Days, 0.20 mm, ...
- FLS - Fatigue: without: 2.00, -25.00, 0.80, 5...
- Fire protection: 1

Section panel details:

- Name: Pos101
- Layer: 0.000 m
- Cross-section: Q1
- Longitudinal reinforcement table:

Position	Edge	d1 (cm)	As min (Unit)	As max (Unit)	Unit
Top flange	1,3	4.0	0.00	0.00	cm2
Web top	2	4.0	0.00	0.00	cm2
Bottom flange	9,11	4.0	0.00	0.00	cm2
Web bottom	10	4.0	0.00	0.00	cm2

Rc steel laying table:

	Web	Flange
top	2.5 cm	8.0 mm
Bottom	2.5 cm	10.0 mm

Design for torsion:

- Calculate input automatically:
- Area within box girder Ak: 0.0000 m²
- Circumference box girder: 0.00 m
- Wall thickness reference box: 0.0 cm

Dialog for editing different cross-sections

Section selection

Slab
Rectangular section
T-section
I-section
General I-profile
Full circle section
Tubular section

New
Delete
Database
Geometry
Static Values
Copy

Selection Window

Cross-section

160.0
70.0 20.0 70.0
20.0
10.0
160.0
130.0
10.0 20.0
130.0
20.0

Name: Cross Section T
Type: T-section

Cross-section dimensions

Cross-sect.Height: 160.0 cm

top

Web thickness: 20.0 cm

Flange width: left 70.0 cm, right 70.0 cm

Flange thickness: 20.0 cm

Haunch height: 10.0 cm, 10.0 cm

Bottom

Web thickness: 20.0 cm

Flange width: left 15.0 cm, right 15.0 cm

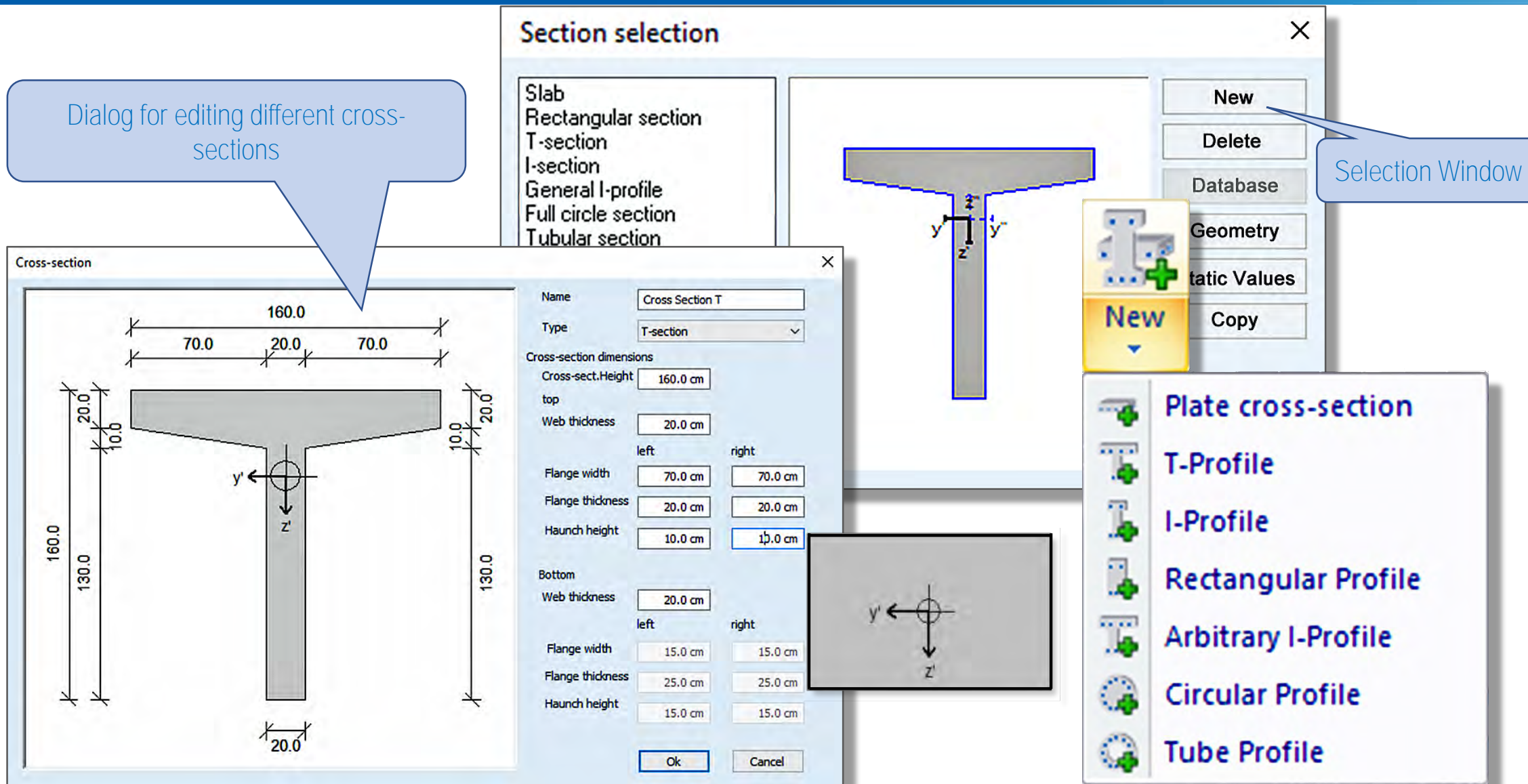
Flange thickness: 25.0 cm

Haunch height: 15.0 cm, 15.0 cm

Ok Cancel

New

Plate cross-section
T-Profile
I-Profile
Rectangular Profile
Arbitrary I-Profile
Circular Profile
Tube Profile

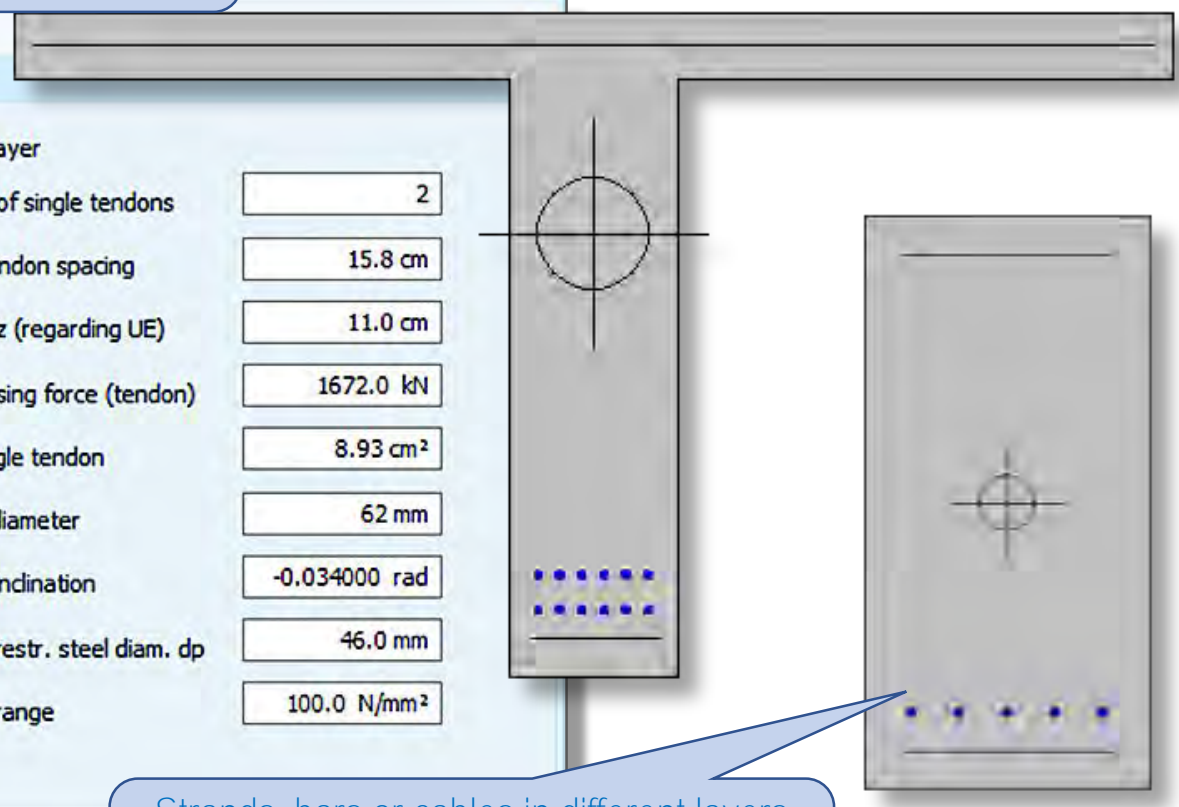


The prestressing can be set for Pre-tensioned, Post-Tensioned or without bond

Prestressing

Stress resultants | Section | **Prestressing**

Tendon layer selection	Bond type	Tendon layer
New layer 1	Post-tensioned bond	Number of single tendons 2
Tensioning system	Variance coefficients	Single tendon spacing 15.8 cm
Tendon type Strand	r.sup (upper) 1.10	Position z (regarding UE) 11.0 cm
Surface type profiled	r.inf (lower) 0.90	Prestressing force (tendon) 1672.0 kN
Prestressing Steel	Copy layer Delete layer	Area single tendon 8.93 cm ²
ST1660/1860		Sheath diameter 62 mm
		Tendon inclination -0.034000 rad
		Equiv. prestr. steel diam. dp 46.0 mm
		Fatigue range 100.0 N/mm ²



Strands, bars or cables in different layers with different surface types and prestressing steel grades available

Transparency and a Clear Overview of the Output

Output to

RTconfig

Extent of list

Standard list

Standard list

Short list



Add detail list



Issue graphic

Beam - Pos101

Structure class: Building construction Design standard: DIN 1045-1:2008
 Type of action: Beam cross-section uniaxial Design situation: permanent/transient
 Requirement class: D Type of action: Load action

Material data: [N/mm²]
 C55/67 fcd 30.9 fctm 4.2 Ecm 23700 Cem 32,5 R
 B5005 fyd 434.0 Es 200000 highly ductile
 ST1660/1860 fp01k 1600.0 fph 1860.0 Ep 195000
 ST1570/1770 fp01k 1500.0 fph 1770.0 Ep 195000

Default reinforc.	[cm,cm ²]	d1-t	d1-l	d1-b	minAs _t	minAs _l	minAs _b	Minimum reinforcement
		4.0	4.0	4.0	0.00	0.00	0.00	compute

Prestressing [cm,N/mm²,kN,cm²] s sg k sup r inf sig esk V Ap Prest. steel

Post-tensioned bond	129.0	-0.024	1.10	0.90	100.0	1672.0	17.86	ST1660/1860
Pretensioned bond	130.2	0.000	1.05	0.95	100.0	672.0	7.44	ST1660/1860
Pretensioned bond	126.4	0.000	1.05	0.95	100.0	169.0	1.86	ST1660/1860
Pretensioned bond	140.0	0.000	1.05	0.95	100.0	0.0	0.92	ST1570/1770

Section properties [m²,m⁴,cm,m³]

A	Iy	Is	ix	Ixy	Iyy
0.4065	0.100641	0.009002	59.56	0.16897	0.12511

Combination [kN,kNm]

	NEd	NEd.y	VEd.s	MEd.s	VEd.y	MEd.x	Lc
Basic combination	minMy -2511.0	-99.0	56.8	0.0	0.0	0.0	1 2 4
Basic combination	maxMy -2511.0	99.0	56.8	0.0	0.0	0.0	1 2 3 4
Rare	minMy -2511.0	-99.0	56.8	0.0	0.0	0.0	1 2 4
Rare	maxMy -2511.0	217.0	56.8	0.0	0.0	0.0	1 2 3 4
Frequent	minMy -2511.0	-99.0	56.8	0.0	0.0	0.0	1 2 4
Frequent	maxMy -2511.0	-35.0	56.8	0.0	0.0	0.0	1 2 3 4
Quasi-permanent	maxMy -2511.0	-99.0	56.8	0.0	0.0	0.0	1 2 4

selected analysis: Bending(M+N) Shear Crack width Stresses fire protection

Bending design [o/oo,cm,cm²] - Time of initial loading: 28 d

Basic combination:	eps.c	eps.s	si	k/d	req Ast	req Ass	req Asb
	-2.1	14.4	120.2	0.16	2.18	0.00	6.21

The report can be easily configured using the markers in the table of contents

RIB Engineering GmbH
 Software for Structural Engineers - Member Design, CAD, FEM for Building & Bridges
 statik-hotline@rib-software.com
 Telefon: +49(0)711 7873-41



Vaihingerstraße 151 D-70567 Stuttgart
 www.rib-software.com
 Telefon: +49(0)711 7873-8841

RIB RTcDesign DIN 1045-1:2008 © 2018 RIB Software SE

Project: Introductory Example
 Structural member: Beam

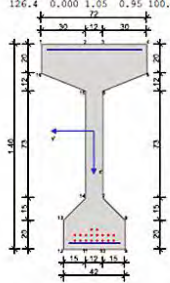
Beam - Pos101

Structure class: Building construction Design standard: DIN 1045-1:2008
 Type of action: Beam cross-section uniaxial Design situation: permanent/transient
 Requirement class: D Type of action: Load action

Material data: [N/mm²]
 C55/67 f_{cm} 30.9 f_{ctm} 4.2 E_{cm} 35700 Com 32.5 R
 B5008 f_{yk} 434.8 E_s 200000 highly ductile
 ST1660/1860 f_{pk} 1620.0 f_{yk} 1860.0 E_s 193000

Default reinforc. [cm,cm²] d1-t d1-l d1-b minAs_t minAs_b Minimum reinforcement
 compute

Prestressing [cm,N/mm²,kN,cm²] z e_g r_{sup} r_{inf} sig_{stk} sig_{stb} V A_p Feest. steel
 Pre-tensioned bond 134.0 0.000 1.05 0.95 100.0 672.0 7.44 ST1660/1860
 Pre-tensioned bond 130.2 0.000 1.05 0.95 100.0 672.0 7.44 ST1660/1860
 Pre-tensioned bond 126.4 0.000 1.05 0.95 100.0 668.0 1.86 ST1660/1860



Section properties [m ² ,m ⁴ ,cm,m ³]	A	I _y	I _z	ss	W _{oy}	W _{uy}
	0.4065	0.100641	0.009002	59.56	0.16897	0.12811
Combination [kN,kNm]	NEd	MEd,y	VED,s	MEd,s	VED,y	MEd,w Lc
Basic combination	minMy	-1512.0	562.8	0.0	0.0	0.0
2 3 4						
Basic combination	maxMy	-1512.0	1612.8	0.0	0.0	0.0
2 3 4						
Rare	minMy	-1512.0	562.8	0.0	0.0	0.0
4						
Rare	maxMy	-1512.0	877.8	0.0	0.0	0.0
3 4						
Frequent	minMy	-1512.0	562.8	0.0	0.0	0.0
2 4						
Frequent	maxMy	-1512.0	628.8	0.0	0.0	0.0
2 3 4						
Quasi-permanent	maxMy	-1512.0	562.8	0.0	0.0	0.0
4						

selected analysis: Bending (M=N) Shear Crack width Stresses Fire protection

Bending design [o/oo,cm,cm²] - Time of initial loading: 28 d
 Basic combination: eps.c eps.s z1 x/d req Ast
 req Ass req Asb



Seite: 1

Clear and comprehensible output of results

Vaihingerstraße 151 D-70567 Stuttgart
 Member Design, CAD, FEM for Building & Bridges
 www.rib-software.com
 Telefon: +49(0)711 7873-8841



RIB RTcDesign DIN 1045-1:2008 © 2018 RIB Software SE

Project: Introductory Example
 Structural member: Beam

RIB RTcDesign 19.0 Design concr struct t = 28 d

Pos101 - My

Tabular fire resistance analysis

Analysis of the constructive resistance of fire according to DIN 4102-4
 - mainly bending stressed beams according to table 3 + 6
 - statically determinate or statically indeterminate with moment redistribution > 15 %
 - trilateral fire load with ETB DIN 4102-4
 - Further fire resistance design features must be complied with

Conc.: C 55/ 67 gamma_{sc} 1.50 alpha_{cc} 0.85 Cross-sect.: Pos101 -
 ReinfSteel: B500(B) gamma_{st} 1.15 flexion mem
 Pres.Steel sp0.1;d 1391 gamma_{st} 1.15 accidental situation

Fire resistance class R 60

existing reinforcement As_{tot}(cm²) = 4.37 rho_{st} = 0.114
 Accidental combination (kNm) MEd,fi = 1650.0
 Basic combination (kNm) MEd = 2700.0
 As_{prov}/As_{req} = 1.11
 crit. temperature reinf. steel crit.T_{st} = 526.7 °C del.as = -0.3
 crit. temperature prestr. steel crit.T_p = 493.4 °C del.ap = 1.0

Web table 5.5 modified due to min. 7:
 web thickness - class: exis.th (cm) = 12.0 >= req.th = 9.2
 Beam width s-d reinforcement exis.th (cm) = 42.0 >= req.th = 16.0
 Center dist. tens. reinf. exis.as (cm) = >= req.as = 2.2
 Center distance of multilayer reinforcement req.as/2 = 4.9
 Center distance single-ply reinforcement req.as = 2.2
 min conditions 7.1

Biaxial slab results

Fire design for components subjected to compressive and bending loads according to tabular fire protection proofs

RIB Engineering GmbH
 Software for Structural Engineers - Member Design, CAD, FEM for Building & Bridges
 statik-hotline@rib-software.com
 Telefon: +49(0)711 7873-41



Vaihingerstraße 151 D-70567 Stuttgart
 www.rib-software.com
 Telefon: +49(0)711 7873-8841

RIB RTcDesign DIN EN 1992-1-1 © 2018 RIB Software SE

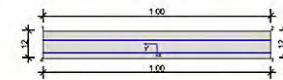
Project: DBV-Ex.2
 Structural member: Biaxial solid slab

Biaxial solid slab - End support

Structure class: Building construction Design standard: DIN EN 1992-1-1
 Type of action: Slab Design situation: permanent/transient
 Requirement class: S3 Type of action: Load action

Material data: [N/mm²]
 C20/25 f_{cm} 11.3 f_{ctm} 2.2 E_{cm} 30000 Com 32.5 R
 B5008 f_{yk} 434.8 E_s 200000 normal ductile

Default reinforc. d1x-t d1x-b d1y-t d1y-b min-As_t min-As_b As_{xt} As_{yt} As_{xb} As_{yb} Minimum reinforcement
 compute



Section properties [m ² ,m ⁴ ,cm,m ³]	A	I _y	I _z	ss	W _{oy}	W _{uy}
	0.1200	0.000144	0.000000	6.00	0.00240	0.00240

Combination [kNm/m, kN/m]	mxmd	myyd	myxd	nxmd	nyyd	nyxd	wxsd
Basic combination max-mn	0.0	0.0	0.0	0.0	0.0	0.0	10.2
0.0 1							
Basic combination max-mv	0.0	0.0	0.0	0.0	0.0	0.0	19.7
0.0 1 2							

selected analysis: Bending (M=N) Shear Crack width Stresses Fire protection

(M) Robustness and surface reinforcement
 (B) Bending strength with longitudinal force
 (R) Individual and final crack formation

Layer	Nw	nEd	x-direction		y-direction	
			mEd	asx	nEd	mEd
			kNm/m	cm ² /m	kNm/m	cm ² /m
v M	0.0	0.0	0.00	0.0	0.0	0.00
B	0.0	0.0	0.00	0.0	0.0	0.00
R	0.0	0.0	0.00	0.0	0.0	0.00
b M	0.0	0.0	0.00	0.0	0.0	0.00
B	0.0	0.0	0.00	0.0	0.0	0.00
R	0.0	0.0	0.00	0.0	0.0	0.00

Shear design [kN/m, %, cm²/m] - Time of initial loading: 28 d - alpha: 90 degrees

Basic combination:	VEd	VRdmin	VRdct	VRdmax	rho.s1	shefa
as,min req asw						
0.00	0.00	19.7	42.5	42.5	114.7	0.00
48.0						

Fire protection: Analysis of R60 established



Seite: 1



Seite: 7