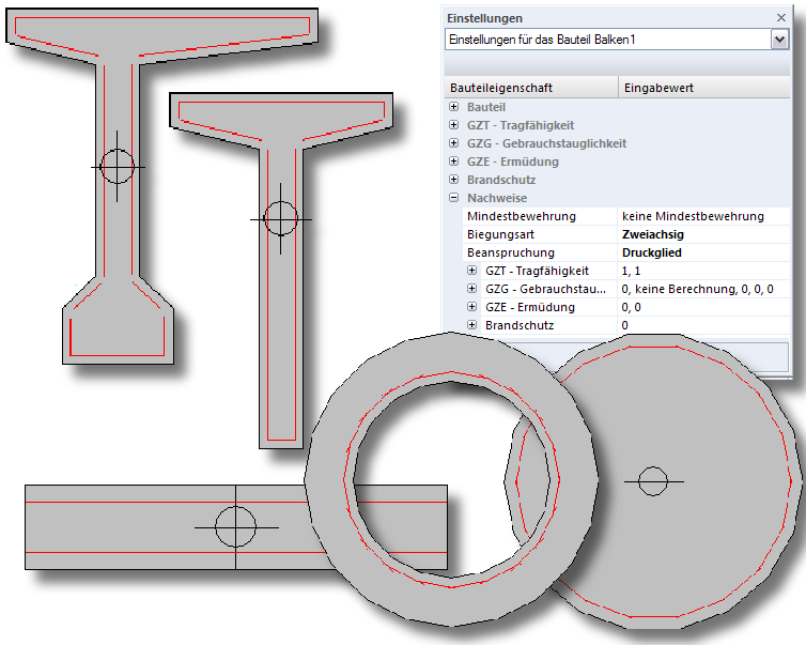
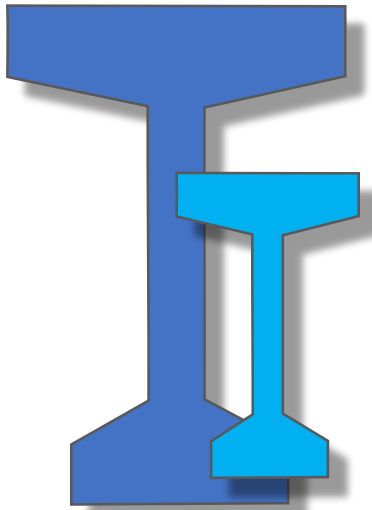
RTcdesign – Design of Concrete Cross-Sections

- 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

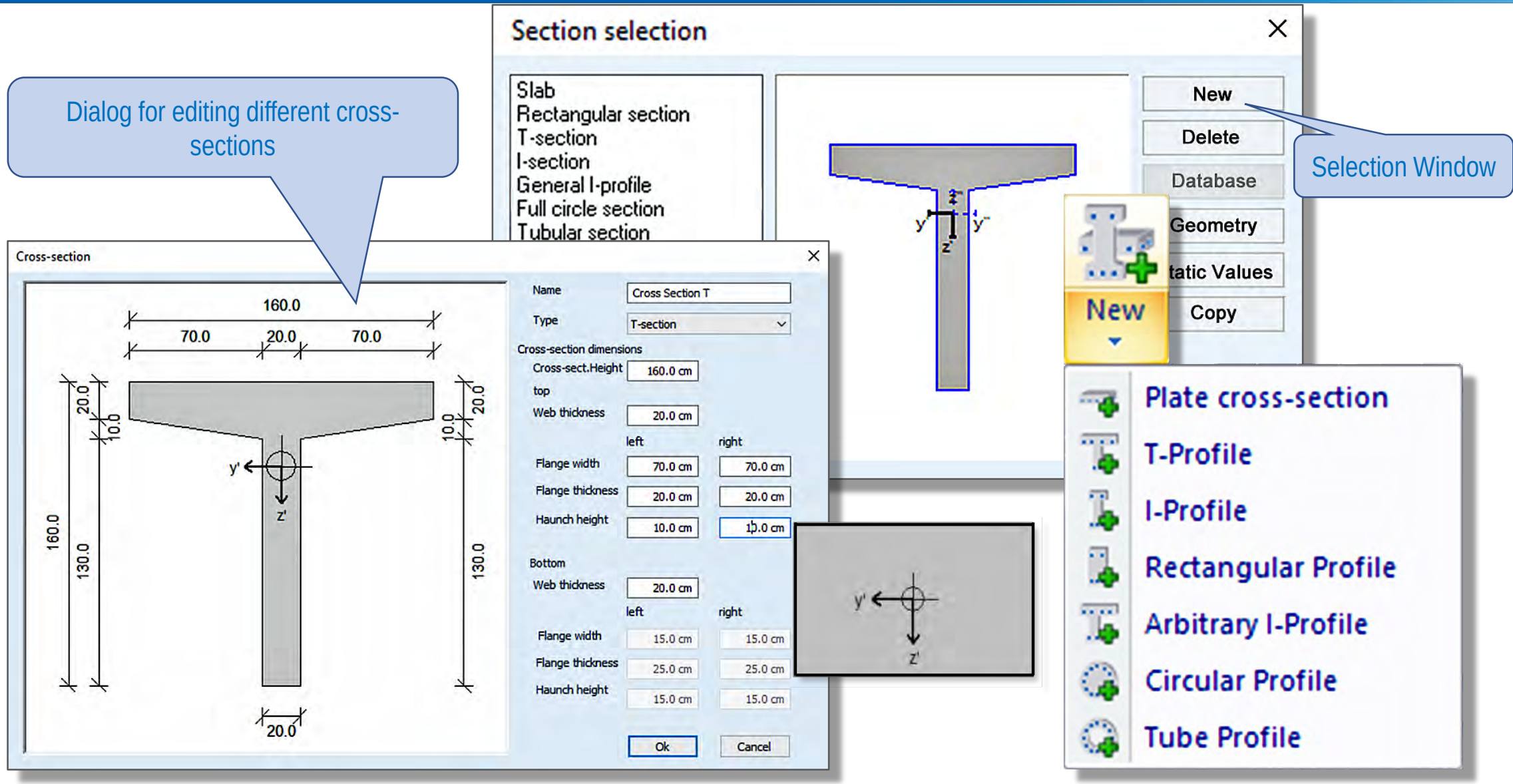


Graphic-interactive working environment

Table of properties

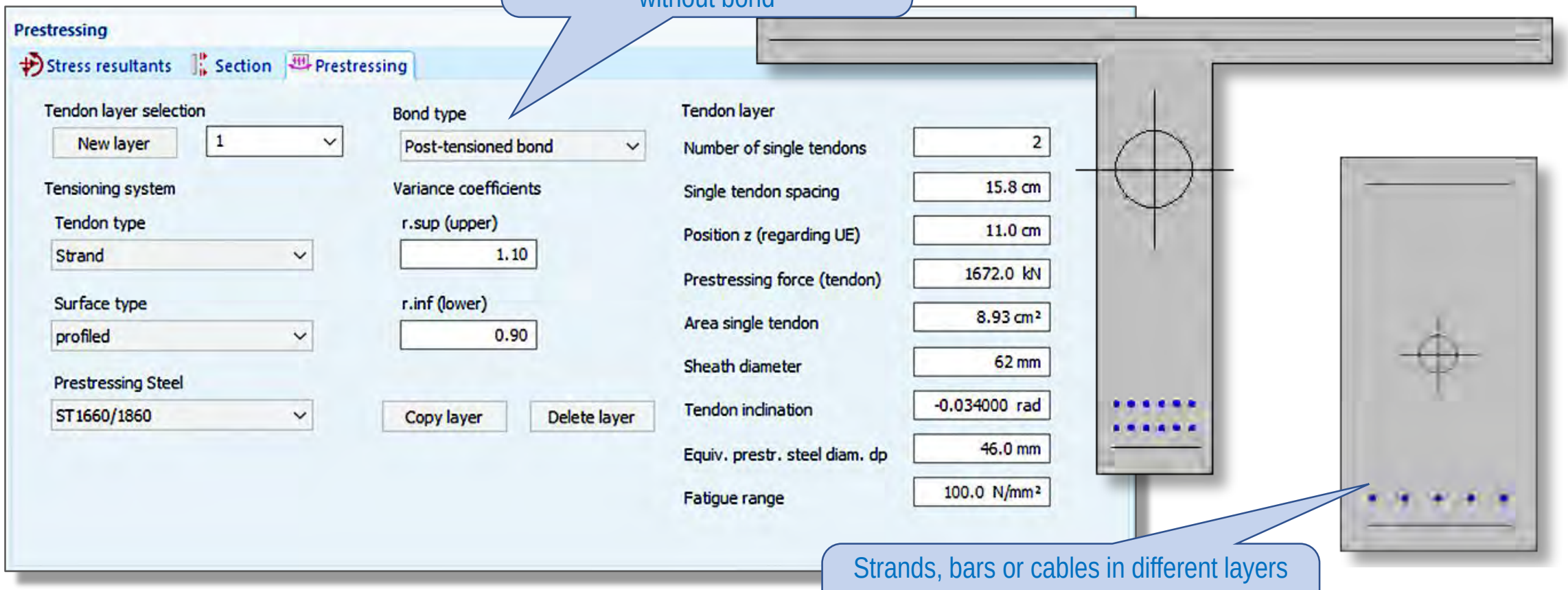
Dialog to edit cross-sections

Efficient Input of Cross Sections



Consideration of Prestressing

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



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

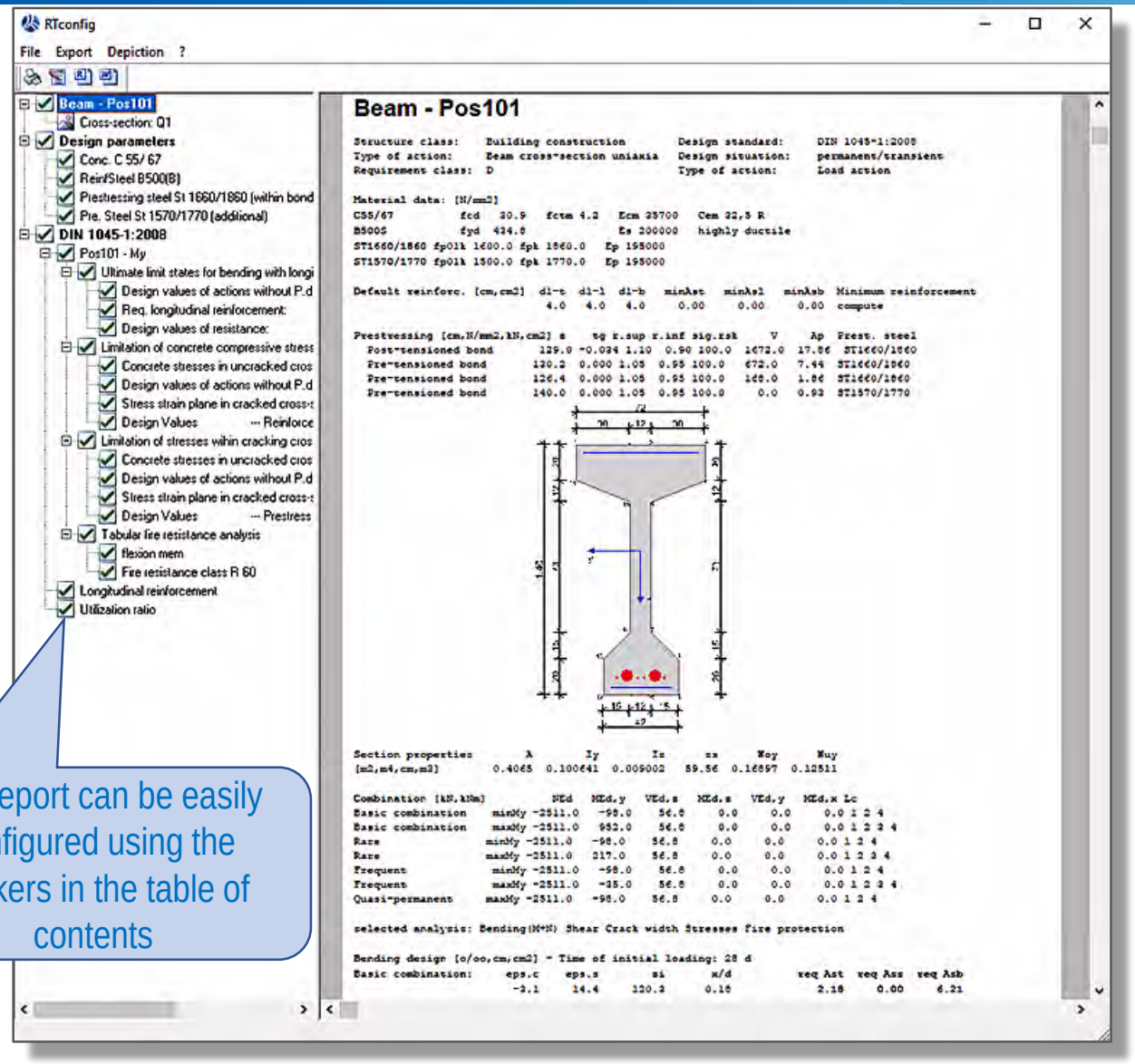
Transparency and a Clear Overview of the Output

Output to: RTconfig

Extent of list: Standard list

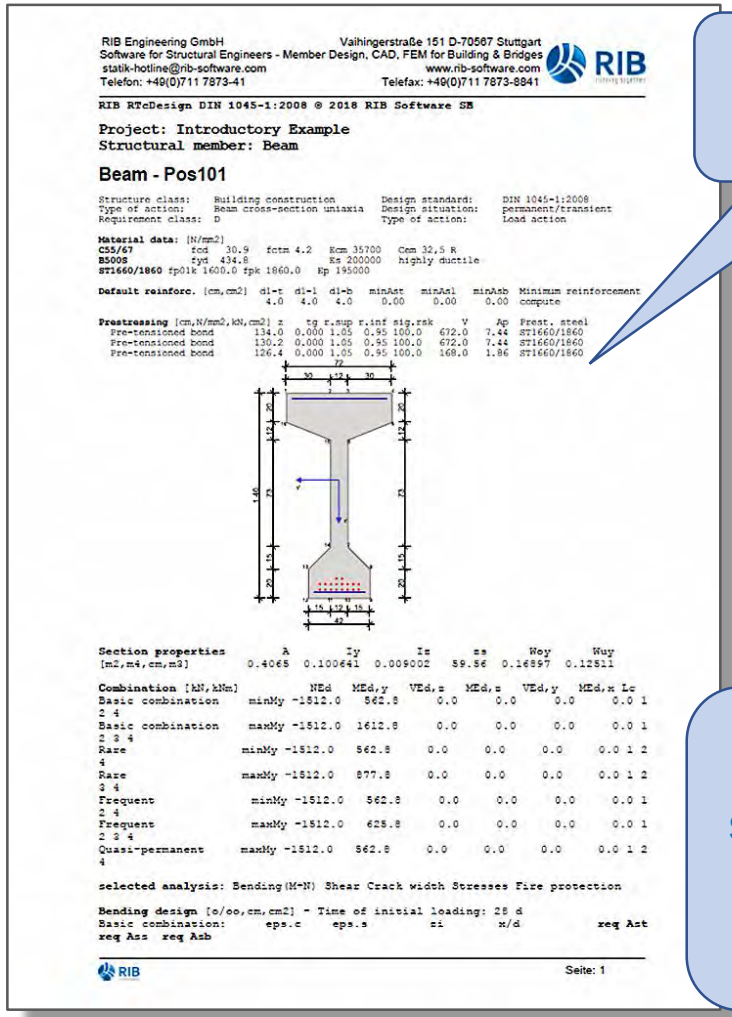
- Standard list
- Short list

- ☑ Add detail list
- ☑ Issue graphic



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

Results Report



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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 uniaxia — 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 35700 Cem 32,5 R
B500S fyd 434.8 Es 200000 highly ductile
ST1660/1860 fp01k 1600.0 fpk 1860.0 Kp 195000

Default reinforc. [cm,cm2] dl-t dl-l dl-b minAst minAsl minAsb Minimum reinforcement
4.0 4.0 4.0 0.00 0.00 0.00 compute

Prestressing [cm,N/mm2,kN,cm2] z tg r.sup r.inf sig.rsk V Ap Prest. 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 0.95 100.0 168.0 1.86 ST1660/1860

Section properties A Iy Iz zs Woy Wuy
[m2,m4,cm,m3] 0.4065 0.100641 0.009002 59.56 0.16897 0.12511

Combination [kN,kNm] NEd MEd,y VEd,z MEd,z VEd,y MEd,x Lc
Basic combination minMy -1512.0 562.8 0.0 0.0 0.0 0.0 1 2 4
Basic combination maxMy -1512.0 1612.8 0.0 0.0 0.0 0.0 1 2 3 4
Rare minMy -1512.0 562.8 0.0 0.0 0.0 0.0 1 2 4
Rare maxMy -1512.0 877.8 0.0 0.0 0.0 0.0 1 2 3 4
Frequent minMy -1512.0 562.8 0.0 0.0 0.0 0.0 1 2 4
Frequent maxMy -1512.0 625.8 0.0 0.0 0.0 0.0 1 2 3 4
Quasi-permanent maxMy -1512.0 562.8 0.0 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 zi x/d req Ast req Ass req Asb

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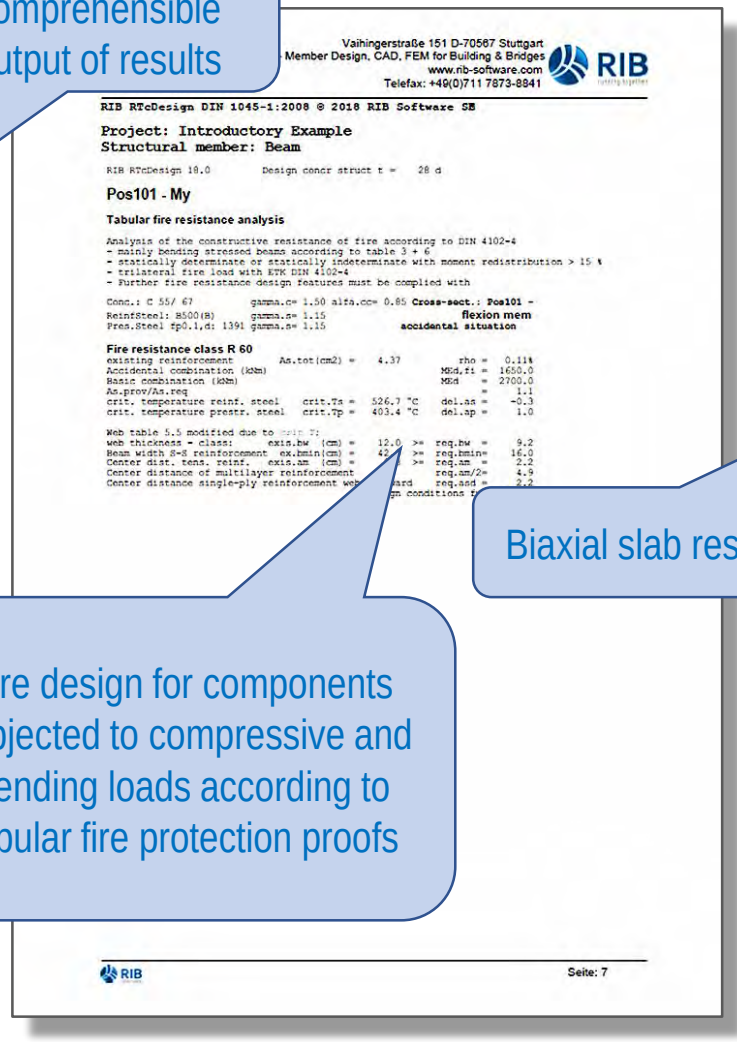
Clear and comprehensible output of results



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

Project: Introductory Example
Structural member: Beam

RIB RTcDesign 10.0 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 ETK DIN 4102-4
- Further fire resistance design features must be complied with

Conc.: C 55/ 67 gamma.c= 1.50 alfa.cc= 0.85 Cross-sect.: Pos101 -
ReinfSteel: B500(B) gamma.s= 1.15 flexion mem
Pres.Steel fp0.1,d: 1391 gamma.s= 1.15 accidental situation

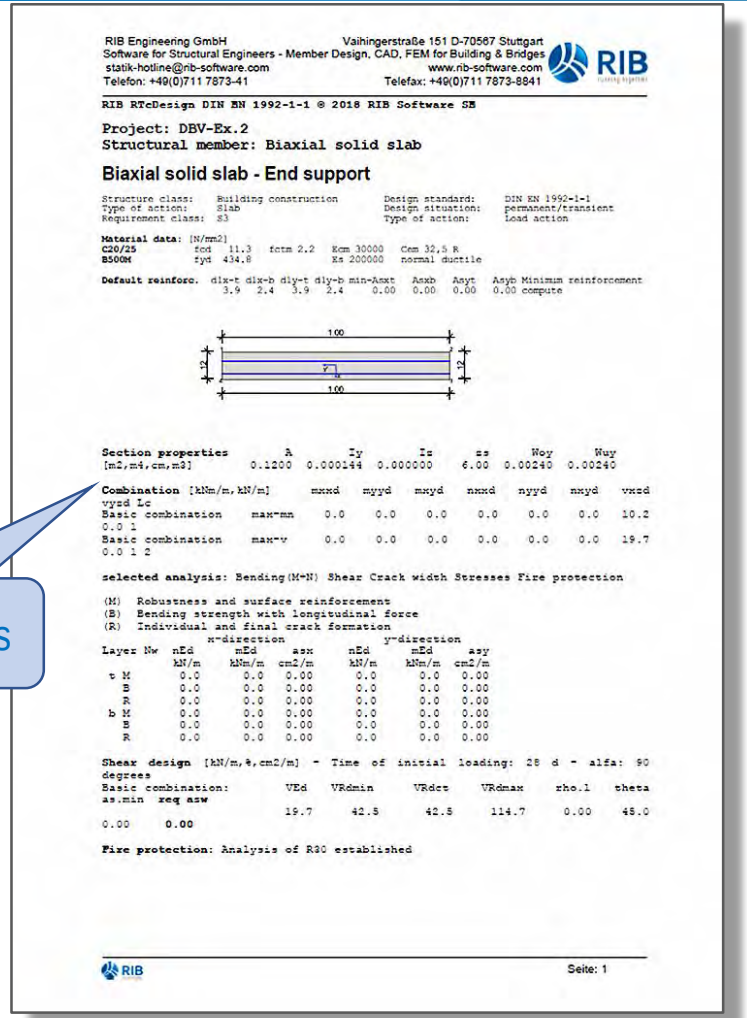
Fire resistance class R 60
existing reinforcement As.tot(cm2) = 4.37 rho = 0.11%
Accidental combination (kNm) MEd,fi = 1650.0
Basic combination (kNm) MEd = 2700.0
As.prov/As.req = 1.1
crit. temperature reinf. steel crit.Ts = 526.7 °C del.as = -0.3
crit. temperature prestr. steel crit.Tp = 403.4 °C del.ap = 1.0

Web table 5.5 modified due to crit T:
web thickness - class: exis.bw (cm) = 12.0 >= req.bw = 9.2
Beam width S-S reinforcement ex.bmin(cm) = 42 >= req.bmin= 16.0
Center dist. tens. reinf. exis.am (cm) = >= req.am = 2.2
Center distance of multilayer reinforcement req.am/2= 4.9
Center distance single-ply reinforcement web ard req.asd = 2.2
gn conditions f

RIB Seite: 7

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

Biaxial slab results



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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 fcd 11.3 fctm 2.2 Ecm 30000 Cem 32,5 R
B500M fyd 434.8 Es 200000 normal ductile

Default reinforc. dlx-t dlx-b dly-t dly-b min-Asxt Asxb Asyt Asyb Minimum reinforcement
3.9 2.4 3.9 2.4 0.00 0.00 0.00 0.00 compute

Section properties A Iy Iz zs Woy Wuy
[m2,m4,cm,m3] 0.1200 0.000144 0.000000 6.00 0.00240 0.00240

Combination [kNm/m,kN/m] mxxd myyd mxyd nxxd nyyd nxyd vxzd vyzd Lc
Basic combination max-mn 0.0 0.0 0.0 0.0 0.0 0.0 10.2 0.0 1
Basic combination max-v 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	x-direction nEd kN/m	mEd kNm/m	asx cm2/m	y-direction nEd kN/m	mEd kNm/m	asy cm2/m
t	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 - alfa: 90 degrees
Basic combination: VEd VRdmin VRdct VRdmax rho.l theta
as.min req asw
19.7 42.5 42.5 114.7 0.00 45.0
0.00 0.00

Fire protection: Analysis of R30 established

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