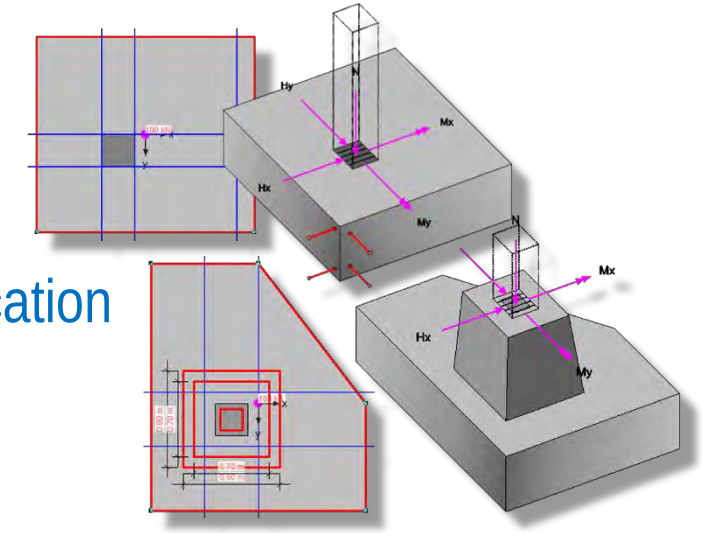
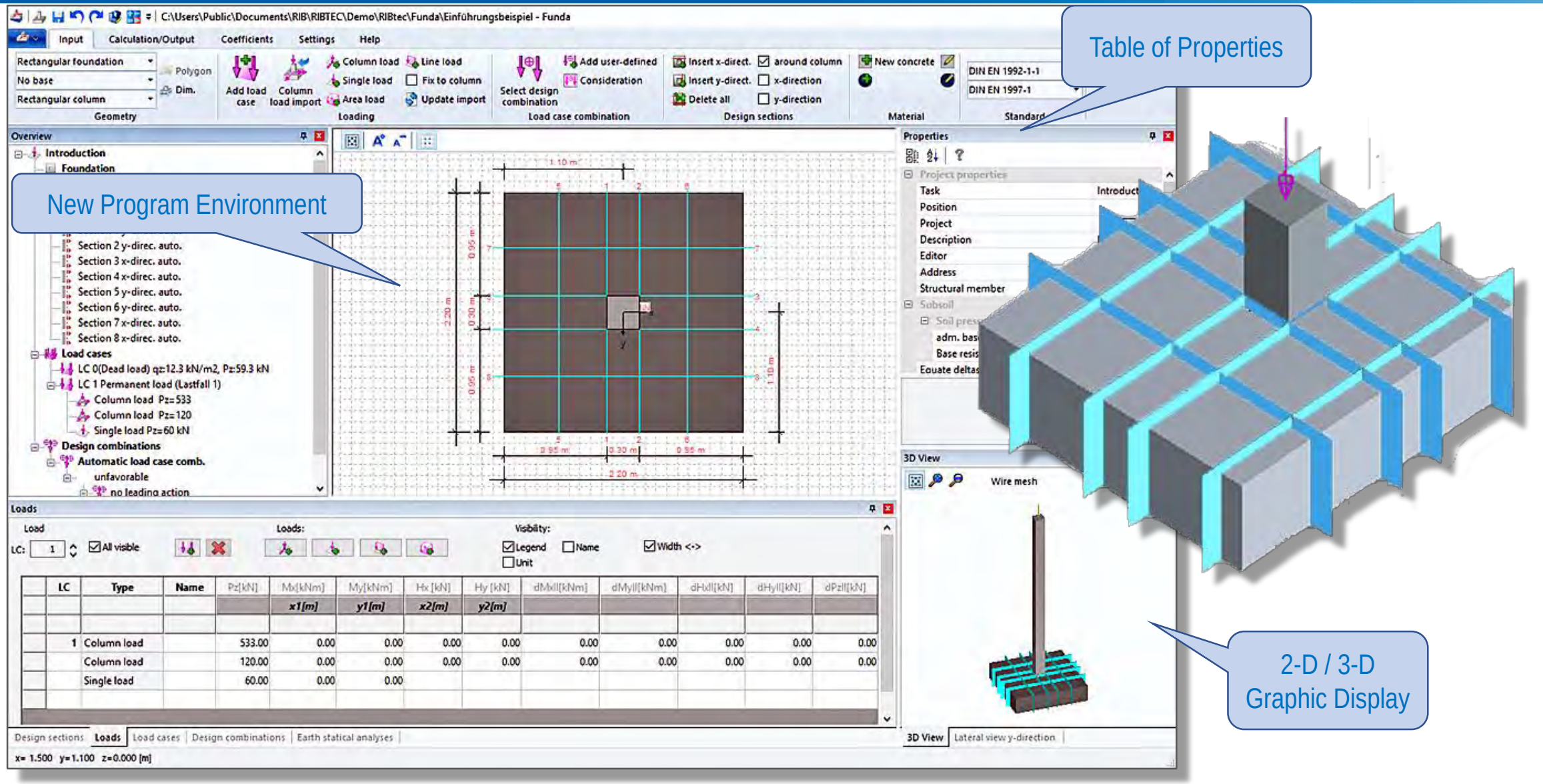
RTfooting – RC footing as plate or prefabricated components

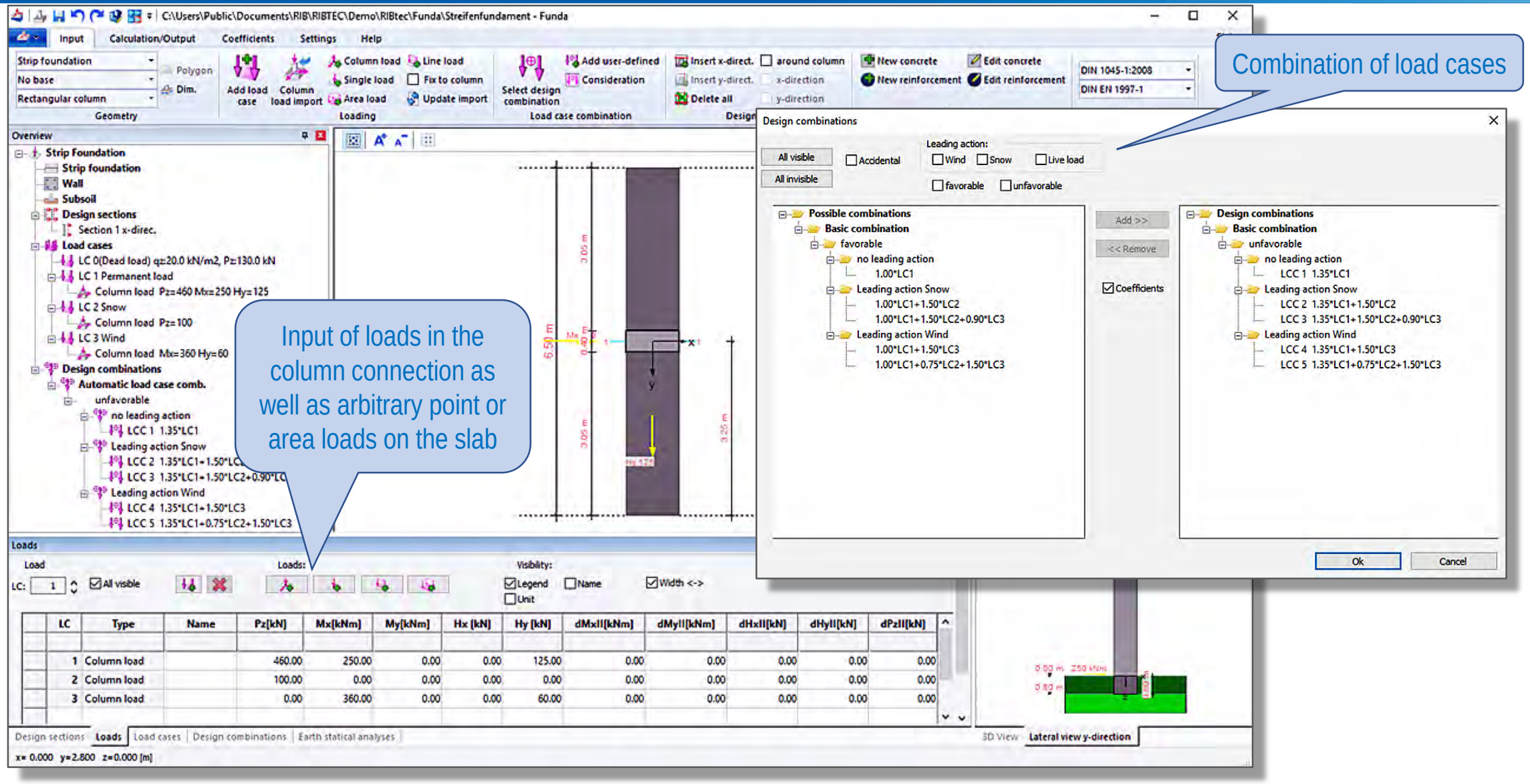
- Superposition and design according to Euronorm for reinforced concrete and foundation with national annexes for DE, AT, SK/CZ
- Dimensioning according to previous standards supports " Refurbishment"
- Dimensioning of sleeve and block foundations with reinforcement plan generation
- Bending and shear analysis on generated or user defined sections
- Punching shear, position, bearing capacity and sliding stability verification also for polygonal foundations
- Clear program control, configuration and language selection with application of templates



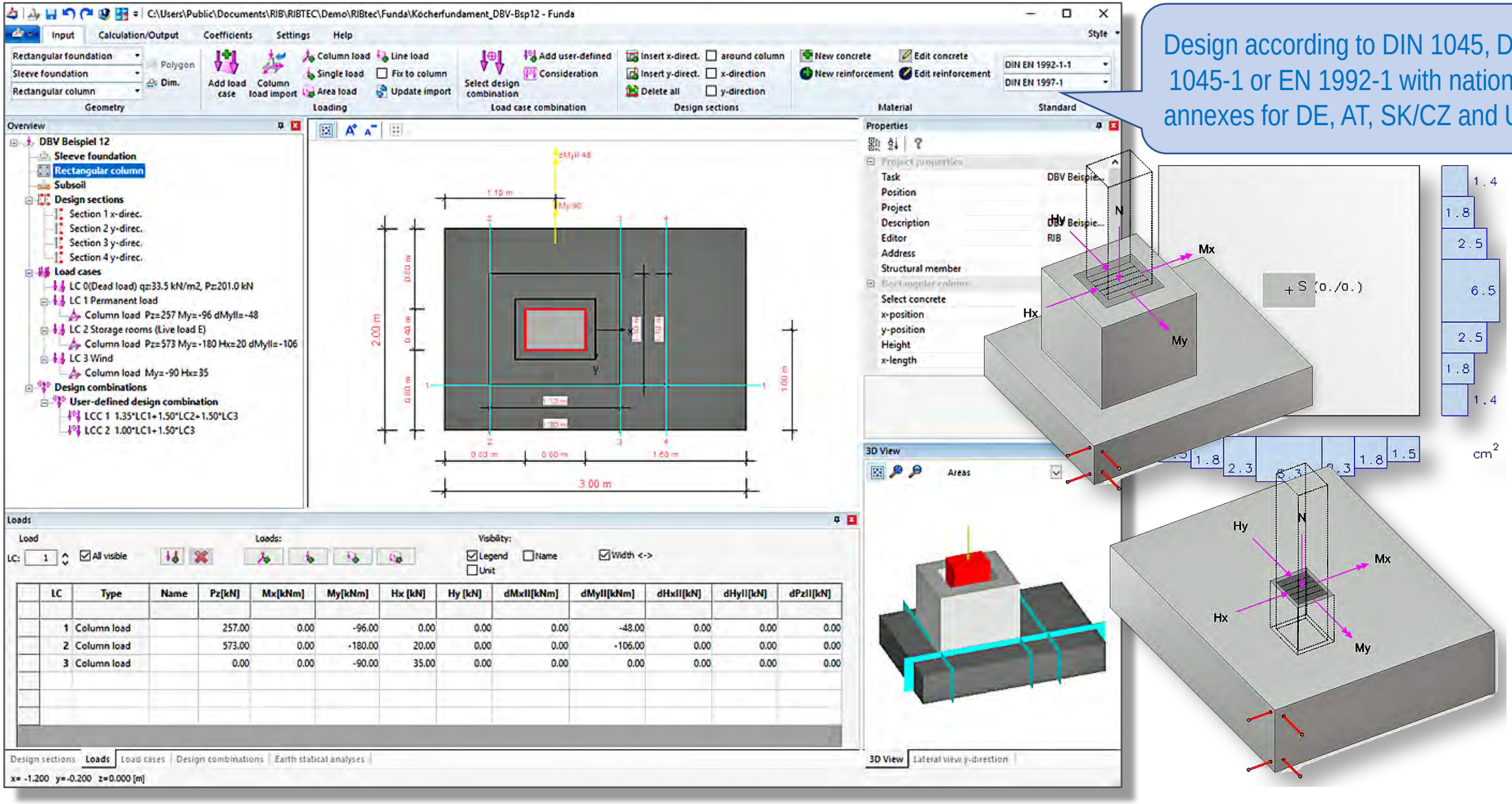
RTfooting EXPERT – modern software ergonomics for structural engineers



RTfooting EXPERT – efficient generation of load combinations



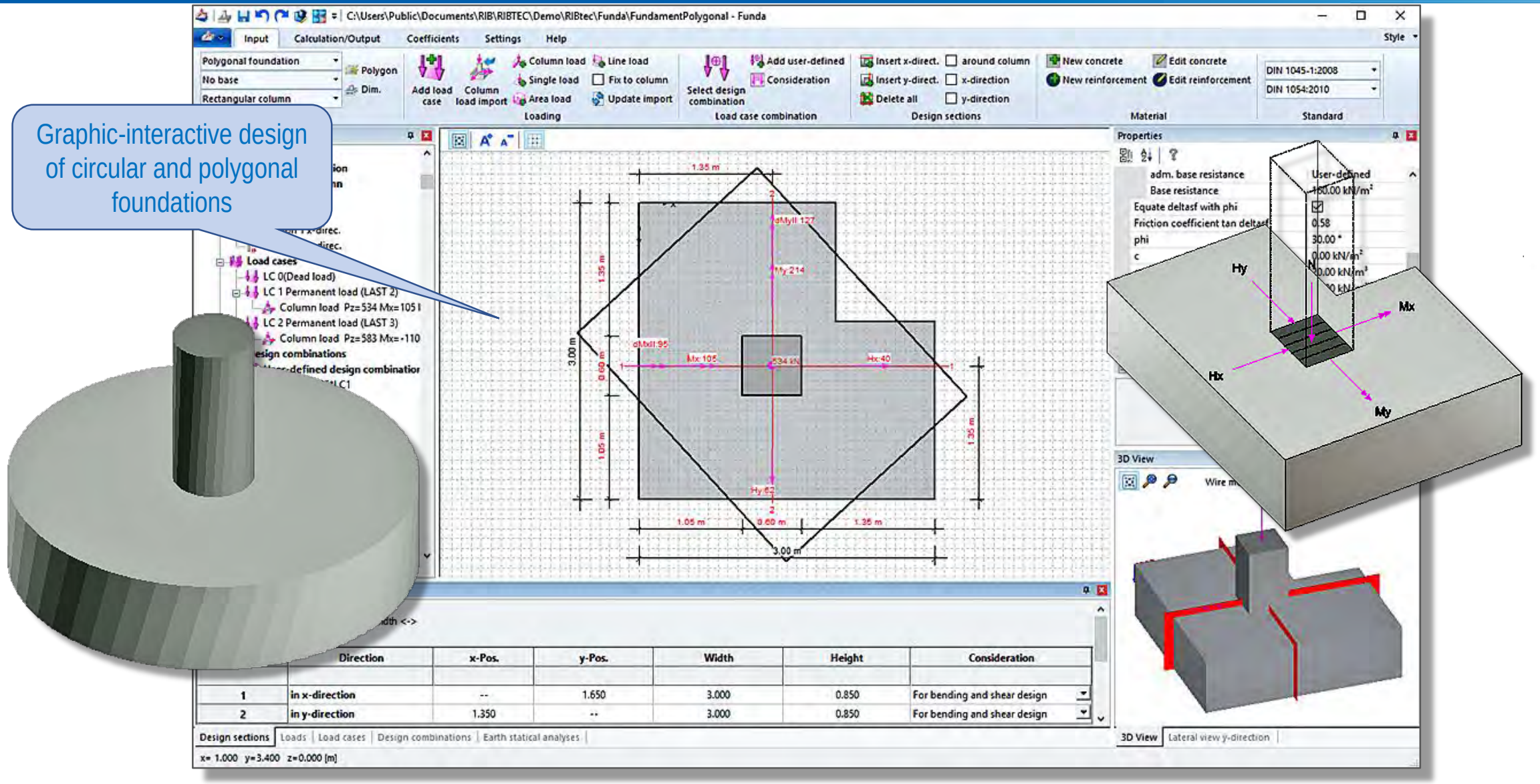
RTfooting EXPERT – sleeve and block footings as prefabricated components



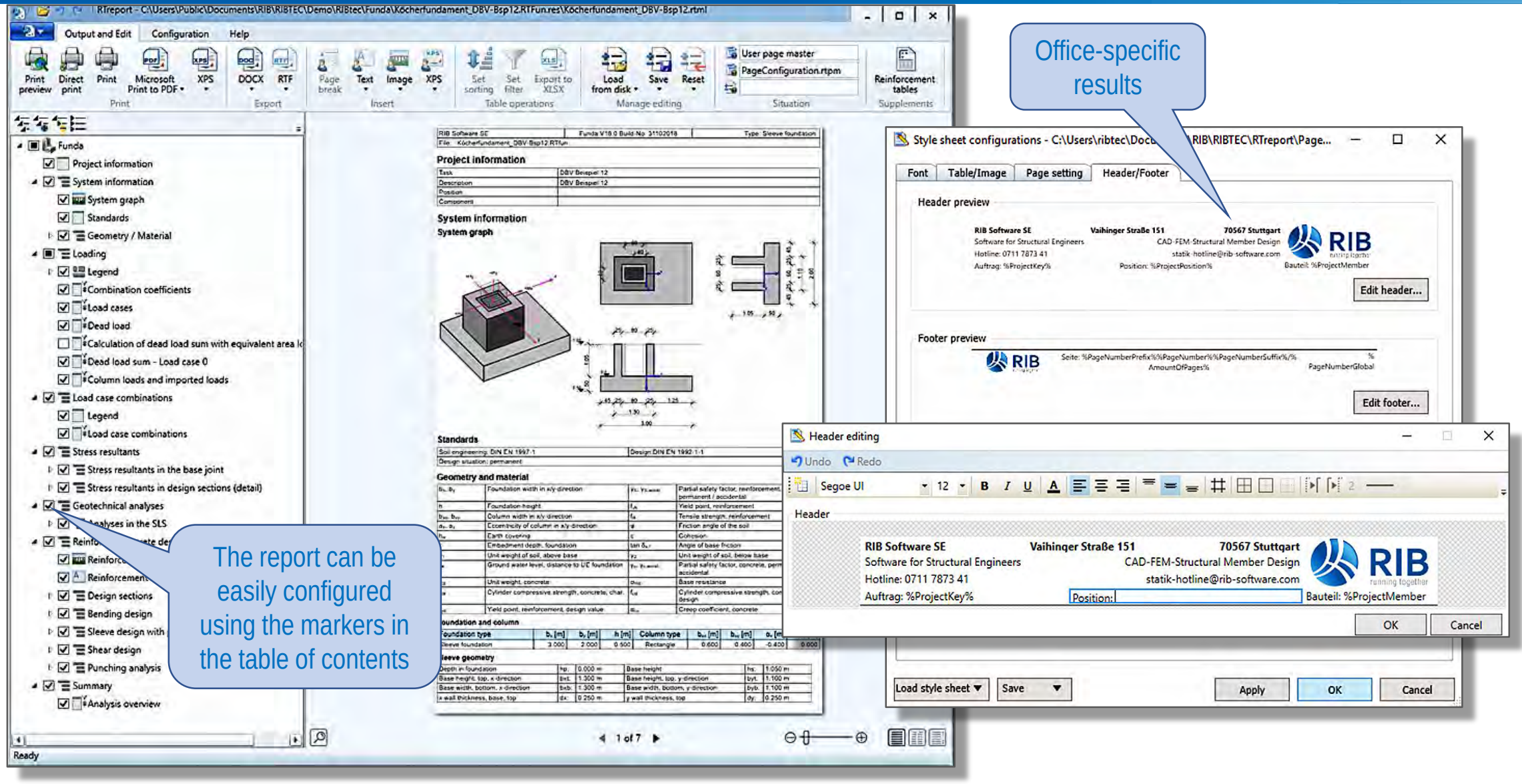
Design according to DIN 1045, DIN 1045-1 or EN 1992-1 with national annexes for DE, AT, SK/CZ and UK

RTfooting EXPERT – circular and polygonal footings

Graphic-interactive design of circular and polygonal foundations



RTfooting EXPERT – configurable output list

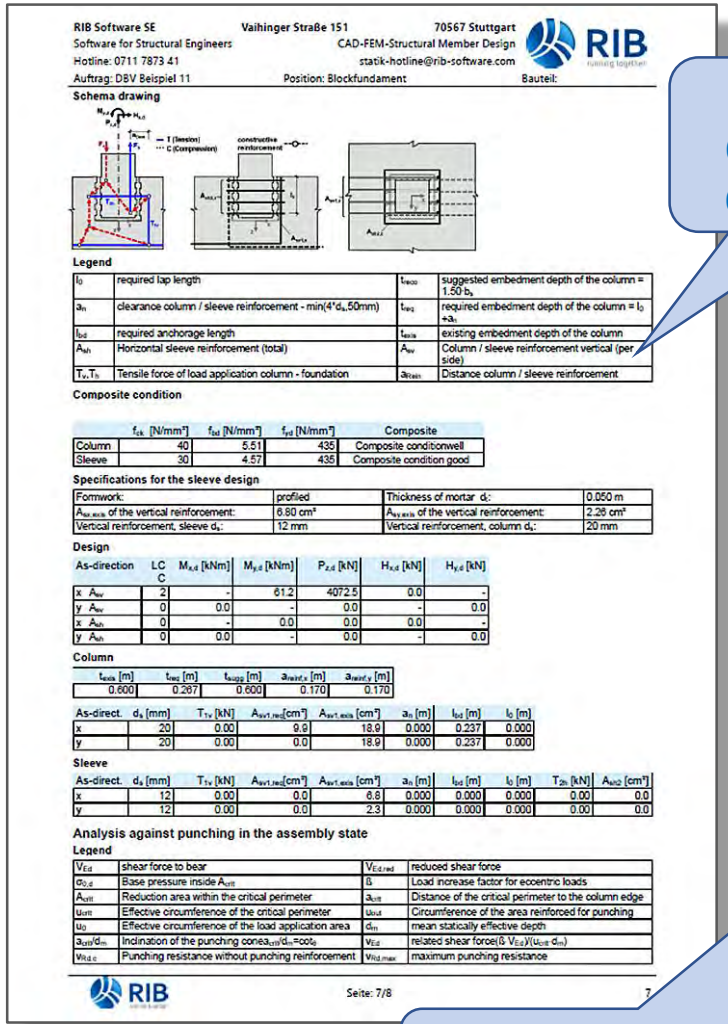


RTfooting EXPERT – clear result list with graphics

Clear and comprehensible output of results

Sleeve Foundation Result Report

Reinforcement and bending design


RIB Software SE Vaihinger Straße 151 70567 Stuttgart
Software for Structural Engineers CAD-FEM-Structural Member Design
Hotline: 0711 7873 41 statik-hotline@rib-software.com
Auftrag: DBV Beispiel 11 Position: Blockfundament Bauteil:

Schema drawing

Legend

l_0	required lap length	$t_{req,c}$	suggested embedment depth of the column = 1.50 b_c
a_{sh}	clearance column / sleeve reinforcement - min(4*d_s,50mm)	t_{req}	required embedment depth of the column = l_0 +a_{sh}
l_{bd}	required anchorage length	t_{exis}	existing embedment depth of the column
A_{sh}	Horizontal sleeve reinforcement (total)	A_{sv}	Column / sleeve reinforcement vertical (per side)
T_s,T_b	Tensile force of load application column - foundation	a_{reinf}	Distance column / sleeve reinforcement

Composite condition

	f_{ck} [N/mm²]	f_{cd} [N/mm²]	f_{yd} [N/mm²]	Composite
Column	40	5.51	435	Composite conditionwell
Sleeve	30	4.57	435	Composite condition good

Specifications for the sleeve design

Formwork:	profiled	Thickness of mortar d_r:	0.050 m
$A_{sv,exis}$ of the vertical reinforcement:	6.80 cm²	$A_{sv,exis}$ of the vertical reinforcement:	2.26 cm²
Vertical reinforcement, sleeve d_s:	12 mm	Vertical reinforcement, column d_s:	20 mm

Design

As-direction	LC C	$M_{x,d}$ [kNm]	$M_{y,d}$ [kNm]	$P_{z,d}$ [kN]	$H_{x,d}$ [kN]	$H_{y,d}$ [kN]
x A_{sv}	2	-	61.2	4072.5	0.0	-
y A_{sv}	0	0.0	-	0.0	-	0.0
x A_{sh}	0	-	0.0	0.0	0.0	-
y A_{sh}	0	0.0	-	0.0	-	0.0

Column

t_{exis} [m]	t_{req} [m]	t_{supp} [m]	$a_{reinf,x}$ [m]	$a_{reinf,y}$ [m]
0.600	0.267	0.600	0.170	0.170

As-direct.	d_s [mm]	T_{Tv} [kN]	$A_{sv1,req}$[cm²]	$A_{sv1,exis}$ [cm²]	a_s [m]	l_{bd} [m]	l_0 [m]
x	20	0.00	0.0	18.9	0.000	0.237	0.000
y	20	0.00	0.0	18.9	0.000	0.237	0.000

Sleeve

As-direct.	d_s [mm]	T_{Tv} [kN]	$A_{sv1,req}$[cm²]	$A_{sv1,exis}$ [cm²]	a_s [m]	l_{bd} [m]	l_0 [m]	T_{Zb} [kN]	A_{sh2} [cm²]
x	12	0.00	0.0	6.8	0.000	0.000	0.000	0.00	0.0
y	12	0.00	0.0	2.3	0.000	0.000	0.000	0.00	0.0

Analysis against punching in the assembly state

Legend

V_{Ed}	shear force to bear	$V_{Ed,red}$	reduced shear force
$\sigma_{0,d}$	Base pressure inside A_{crit}	β	Load increase factor for eccentric loads
A_{crit}	Reduction area within the critical perimeter	a_{crit}	Distance of the critical perimeter to the column edge
u_{crit}	Effective circumference of the critical perimeter	u_{out}	Circumference of the area reinforced for punching
u_0	Effective circumference of the load application area	d_m	mean statically effective depth
a_{crit}/d_m	Inclination of the punching cone$_{crit}$/d_m=cotθ	v_{Ed}	related shear force(β V_{Ed})/(u_{crit} d_m)
$v_{Rd,c}$	Punching resistance without punching reinforcement	$v_{Rd,max}$	maximum punching resistance

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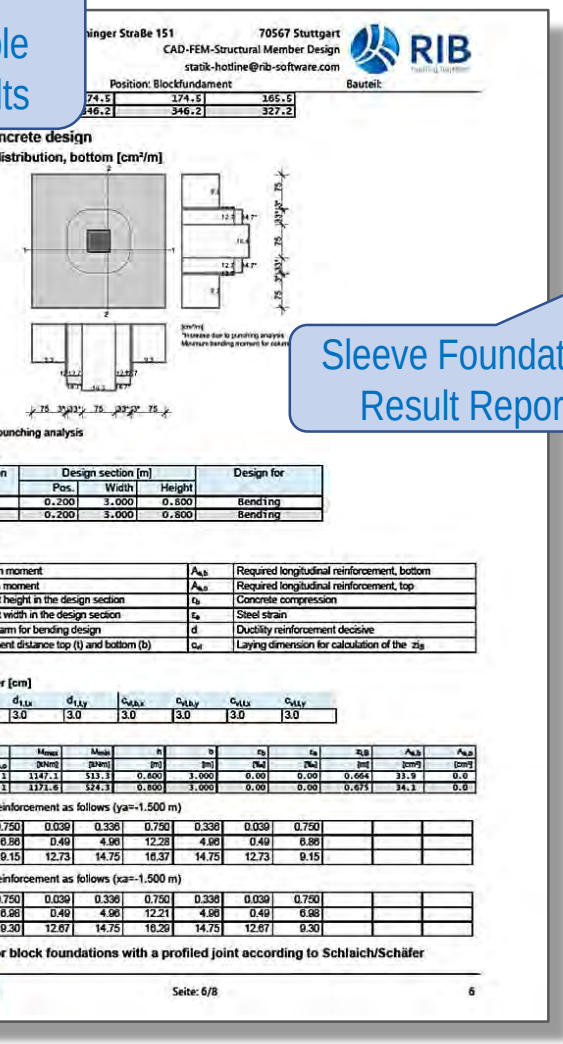
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Position: Blockfundament Bauteil:

74.5	174.5	165.5
46.2	346.2	327.2

Reinforced concrete design

Reinforcement distribution, bottom [cm²/m]

Increase due to the punching analysis

Design sections

Section	As-direction	Design section [m] Pos.	Width	Height	Design for
1	y	0.200	3.000	0.800	Bending
2	x	0.200	3.000	0.800	Bending

Bending design

Legend

M_{max}	max. design moment	$A_{s,b}$	Required longitudinal reinforcement, bottom
M_{min}	min. design moment	$A_{s,o}$	Required longitudinal reinforcement, top
h	Component height in the design section	ε_b	Concrete compression
b	Component width in the design section	ε_s	Steel strain
$z_{i,B}$	inner lever arm for bending design	d	Ductility reinforcement decisive
d_1	Reinforcement distance top (t) and bottom (b)	a_{el}	Laying dimension for calculation of the $z_{i,B}$

Reinforcement layer [cm]

$d_{1,b,x}$	$d_{1,b,y}$	$d_{1,t,x}$	$d_{1,t,y}$	$c_{el,b,x}$	$c_{el,b,y}$	$c_{el,t,x}$	$c_{el,t,y}$
5.0	6.2	3.0	3.0	3.0	3.0	3.0	3.0

Bending design

Section	decisl.comb. $A_{s,b}$	$A_{s,o}$	M_{max} [kNm]	M_{min} [kNm]	h [m]	b [m]	ε_b [‰]	ε_s [‰]	$z_{i,B}$ [m]	$A_{s,b}$ [cm²]	$A_{s,o}$ [cm²]
1	2	1	1147.1	513.3	0.800	3.000	0.00	0.00	0.664	33.9	0.0
2	2	1	1171.6	524.3	0.800	3.000	0.00	0.00	0.675	34.1	0.0

distribute bottom x reinforcement as follows (ya=-1.500 m)

sb_y [m]	0.750	0.039	0.336	0.750	0.338	0.039	0.750			
A_{su} [cm²]	6.86	0.49	4.98	12.28	4.98	0.49	6.86			
A_{su} [cm²/m]	9.15	12.73	14.75	16.37	14.75	12.73	9.15			

distribute bottom y reinforcement as follows (xa=-1.500 m)

sb_x [m]	0.750	0.039	0.336	0.750	0.338	0.039	0.750			
A_{su} [cm²]	6.98	0.49	4.98	12.21	4.98	0.49	6.98			
A_{su} [cm²/m]	9.30	12.67	14.75	16.29	14.75	12.67	9.30			

Sleeve design for block foundations with a profiled joint according to Schlaich/Schäfer

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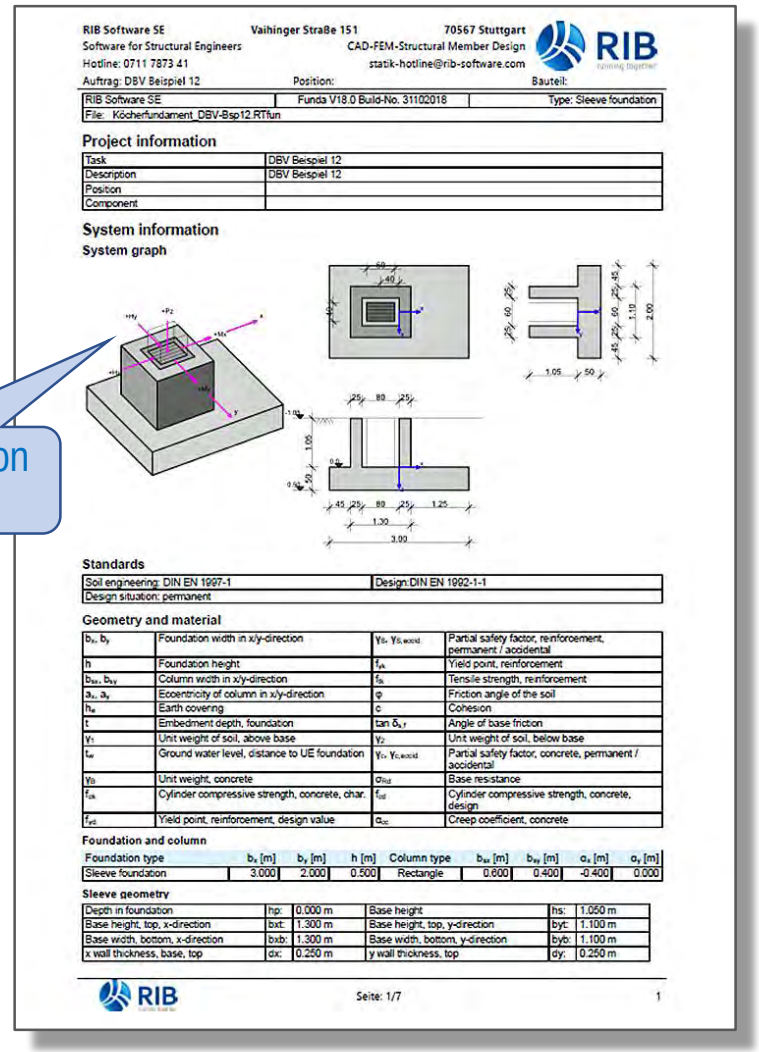
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Auftrag: DBV Beispiel 12 Position: Bauteil:

RIB Software SE	Funda V18.0 Build-No. 31102018	Type: Sleeve foundation
File: Köcherfundament_DBV-Bsp12.RTfun		

Project information

Task	DBV Beispiel 12
Description	DBV Beispiel 12
Position	
Component	

System information

System graph

Standards

Soil engineering: DIN EN 1997-1	Design:DIN EN 1992-1-1
Design situation: permanent	

Geometry and material

b_x, b_y	Foundation width in x/y-direction	$\gamma_{G,wood}$	Partial safety factor, reinforcement, permanent / accidental
h	Foundation height	f_{yk}	Yield point, reinforcement
b_{tx}, b_{ty}	Column width in x/y-direction	f_{tk}	Tensile strength, reinforcement
a_x, a_y	Eccentricity of column in x/y-direction	φ	Friction angle of the soil
h_e	Earth covering	c	Cohesion
t	Embedment depth, foundation	tan $\delta_{s,f}$	Angle of base friction
γ_1	Unit weight of soil, above base	γ_2	Unit weight of soil, below base
t_w	Ground water level, distance to UE foundation	$\gamma_{G,wood}$	Partial safety factor, concrete, permanent / accidental
γ_0	Unit weight, concrete	σ_{bd}	Base resistance
f_{ck}	Cylinder compressive strength, concrete, char.	f_{cd}	Cylinder compressive strength, concrete, design
f_{yd}	Yield point, reinforcement, design value	α_{cc}	Creep coefficient, concrete

Foundation and column

Foundation type	b_x [m]	b_y [m]	h [m]	Column type	b_{tx} [m]	b_{ty} [m]	a_x [m]	a_y [m]
Sleeve foundation	3.000	2.000	0.500	Rectangle	0.600	0.400	-0.400	0.000

Sleeve geometry

Depth in foundation	hp: 0.000 m	Base height	hs: 1.050 m		
Base height, top, x-direction	bxt: 1.300 m	Base height, top, y-direction	byt: 1.100 m		
Base width, bottom, x-direction	bxb: 1.300 m	Base width, bottom, y-direction	byb: 1.100 m		
x wall thickness, base, top	dx: 0.250 m	y wall thickness, top	dy: 0.250 m		

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