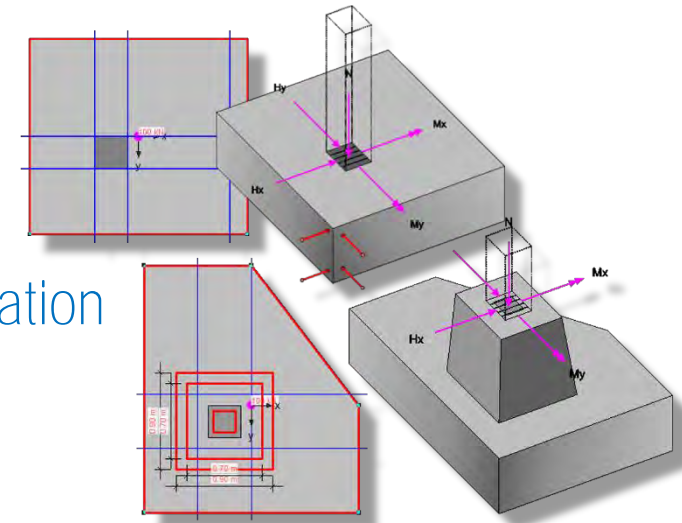


- Superposition and design according to Euronorm for reinforced concrete and foundation with national annexes for DE, AT, SK/CZ
- Dimensioning according to previous standards supports "Refurbishment"
- Dimensioning of sleeve and block foundations with reinforcement plan generation
- Bending and shear 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



Input Calculation/Output Coefficients Settings Help

Rectangular foundation Polygon Add load case Column load import Area load Update import Column load Single load Fix to column Select design combination Add user-defined Consideration Insert x-direct. around column Insert y-direct. x-direction Delete all y-direction New concrete Material Standard

Overview
 Introduction
 Foundation

Section 2 y-dir. auto.
 Section 3 x-dir. auto.
 Section 4 x-dir. auto.
 Section 5 y-dir. auto.
 Section 6 y-dir. auto.
 Section 7 x-dir. auto.
 Section 8 x-dir. auto.

Load cases
 LC 0 (Dead load) $q_z=12.3 \text{ kN/m}^2$, $P_z=59.3 \text{ kN}$
 LC 1 Permanent load (Lastfall 1)
 Column load $P_z=533$
 Column load $P_z=120$
 Single load $P_z=60 \text{ kN}$

Design combinations
 Automatic load case comb.
 unfavorable
 no leading action

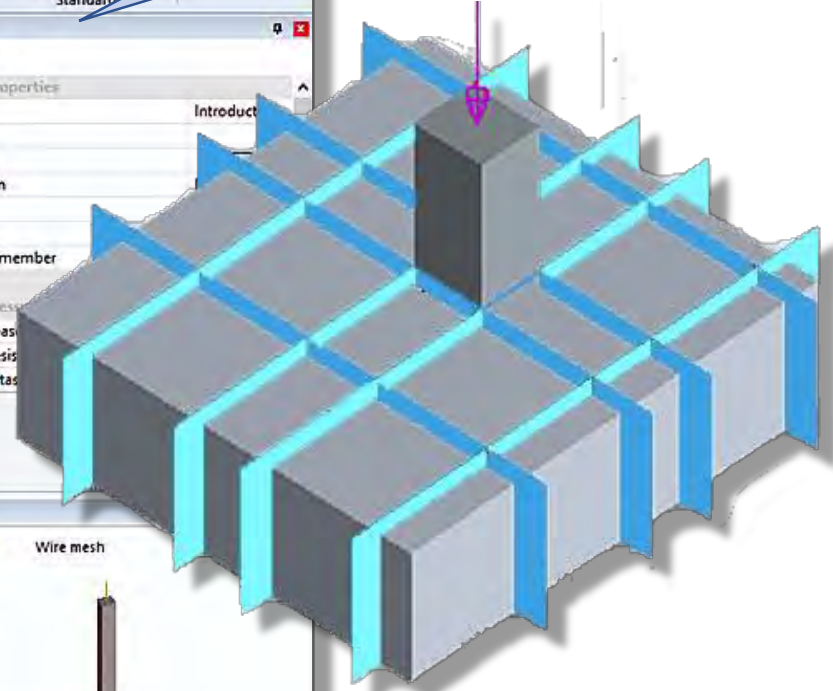
Loads
 Load: LC: 1 All visible Visibility: Legend Name Width <>> Unit

LC	Type	Name	Pz[kN]	Mb[kNm]		My[kNm]		Hx[kN]		Hy[kN]		dMxll[kNm]	dMyll[kNm]	dHxll[kN]	dHyll[kN]	dPzll[kN]
				x1[m]	y1[m]	x2[m]	y2[m]									
1	Column load		533.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Column load		120.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Single load		60.00	0.00	0.00											

Design sections **Loads** Load cases Design combinations Earth statical analyses
 x= 1.500 y= 1.100 z=0.000 [m]

Table of Properties

New Program Environment



2-D / 3-D Graphic Display

RTfooting EXPERT – efficient generation of load combinations

The screenshot displays the RTfooting EXPERT software interface. The main window shows a 3D model of a column connection with dimensions: 6.50 m total height, 3.05 m column height, 0.40 m slab thickness, and 3.25 m footing height. A callout bubble points to the column connection area, stating: "Input of loads in the column connection as well as arbitrary point or area loads on the slab".

The "Design combinations" dialog box is open, showing a tree view of combinations. A callout bubble points to the "Leading action" section, stating: "Combination of load cases".

The "Loads" table at the bottom lists the input load cases:

LC	Type	Name	Pz[kN]	Mx[kNm]	My[kNm]	Hx[kN]	Hy[kN]	dMxII[kNm]	dMyII[kNm]	dHxII[kN]	dHyII[kN]	dPzII[kN]
1	Column load		460.00	250.00	0.00	0.00	125.00	0.00	0.00	0.00	0.00	0.00
2	Column load		100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Column load		0.00	360.00	0.00	0.00	60.00	0.00	0.00	0.00	0.00	0.00

The "Design combinations" dialog shows the following structure:

- Possible combinations
 - Basic combination
 - favorable
 - no leading action: 1.00*LC1
 - Leading action Snow: 1.00*LC1+1.50*LC2, 1.00*LC1+1.50*LC2+0.90*LC3
 - Leading action Wind: 1.00*LC1+1.50*LC3, 1.00*LC1+0.75*LC2+1.50*LC3
 - unfavorable
 - no leading action: LCC 1 1.35*LC1
 - Leading action Snow: LCC 2 1.35*LC1+1.50*LC2, LCC 3 1.35*LC1+1.50*LC2+0.90*LC3
 - Leading action Wind: LCC 4 1.35*LC1+1.50*LC3, LCC 5 1.35*LC1+0.75*LC2+1.50*LC3

RTfooting EXPERT – sleeve and block footings as prefabricated components

C:\Users\Public\Documents\RIB\RIBTEC\Demo\RIBtec\Funda\Kocherfundament_DBV-Bsp12 - Funda

Input Calculation/Output Coefficients Settings Help

Rectangular foundation Polygon Add load case Column load import Area load Loading

Sleeve foundation Dim. Add user-defined Consideration Select design combination Load case combination

Rectangular column Geometry

Insert x-direct. around column New concrete Edit concrete

Insert y-direct. x-direction New reinforcement Edit reinforcement

Delete all y-direction Design sections

Style DIN EN 1992-1-1 DIN EN 1997-1

Overview DBV Beispiel 12 Sleeve foundation Rectangular column Subsoil Design sections Section 1 x-dir. Section 2 y-dir. Section 3 y-dir. Section 4 y-dir. Load cases LC 0 (Dead load) $q_d=33.5 \text{ kN/m}^2$, $P_z=201.0 \text{ kN}$ LC 1 Permanent load Column load $P_z=257 \text{ My}=-96 \text{ dMyII}=-48$ LC 2 Storage rooms (Live load E) Column load $P_z=573 \text{ My}=-180 \text{ Hx}=20 \text{ dMyII}=-106$ LC 3 Wind Column load $\text{My}=-90 \text{ Hx}=35$ Design combinations User-defined design combination LCC 1 $1.35 \cdot \text{LC1} + 1.50 \cdot \text{LC2} + 1.50 \cdot \text{LC3}$ LCC 2 $1.00 \cdot \text{LC1} + 1.50 \cdot \text{LC3}$

Loads

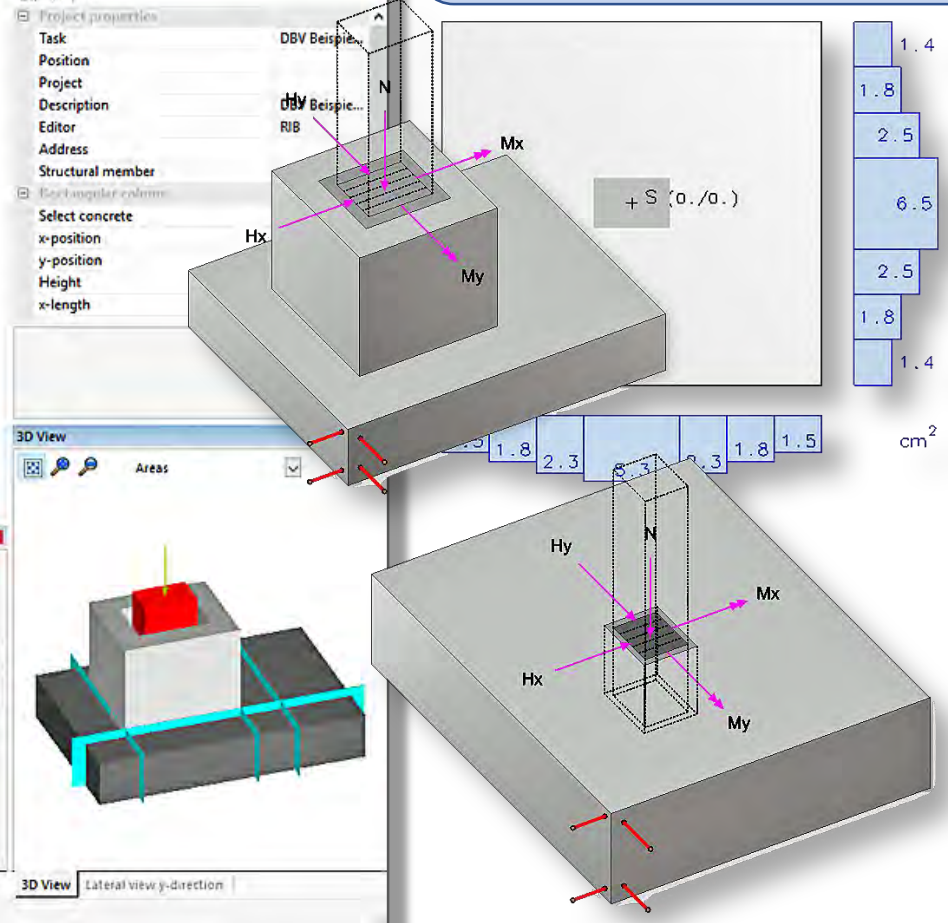
Load LC: 1 All visible

LC	Type	Name	Pz[kN]	Mx[kNm]	My[kNm]	Hx[kN]	Hy[kN]	dMxII[kNm]	dMyII[kNm]	dHxII[kN]	dHyII[kN]	dPzII[kN]
1	Column load		257.00	0.00	-96.00	0.00	0.00	0.00	-48.00	0.00	0.00	0.00
2	Column load		573.00	0.00	-180.00	20.00	0.00	0.00	-106.00	0.00	0.00	0.00
3	Column load		0.00	0.00	-90.00	35.00	0.00	0.00	0.00	0.00	0.00	0.00

Design sections: Loads Load cases Design combinations Earth static analyses

x=-1.200 y=-0.200 z=0.000 [m]

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



Graphic-interactive design of circular and polygonal foundations

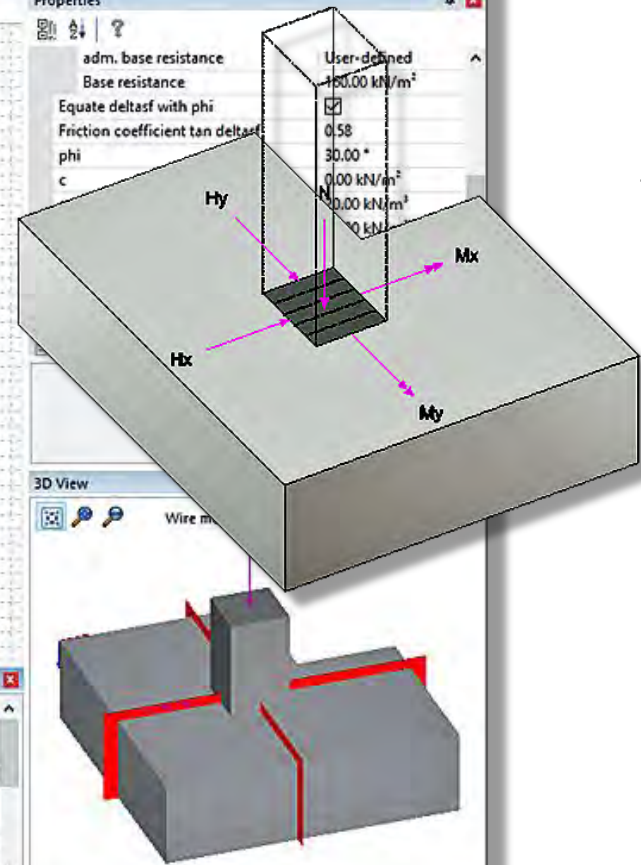
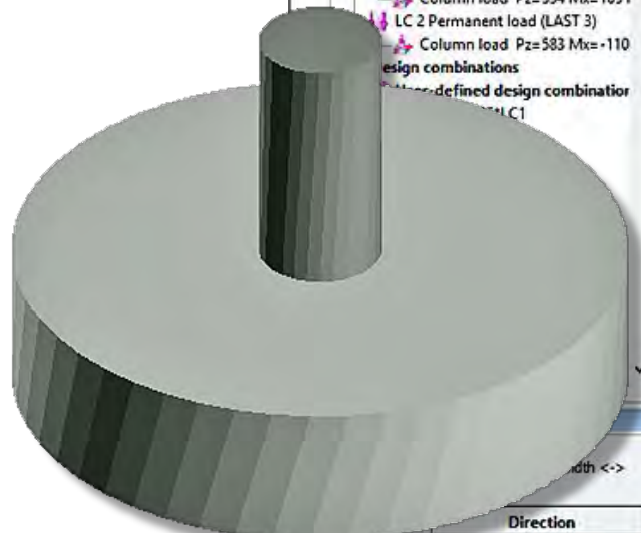
The screenshot displays the RTfooting EXPERT software interface. The main window shows a 2D plan view of a polygonal foundation with a central column. Dimensions are indicated in meters: a total width of 3.00 m, a central column width of 0.40 m, and various offsets and heights. The foundation is divided into two design sections, 1 and 2.

Direction	x-Pos.	y-Pos.	Width	Height	Consideration
1	in x-direction	--	3.000	0.850	For bending and shear design
2	in y-direction	1.350	3.000	0.850	For bending and shear design

Below the table, the design sections are defined as:

- Design sections: Loads | Load cases | Design combinations | Earth statistical analyses |
- x= 1.000 y=3.400 z=0.000 [m]

The right-hand side of the interface shows the 'Properties' panel with various material and design parameters, including adm. base resistance, Base resistance, Equate deltasf with phi, Friction coefficient tan deltasf, phi, and c. A 3D view of the foundation is also visible, showing the column and the foundation base with coordinate axes (Mx, My, Hx, Hy).



RTfooting EXPERT – configurable output list

The screenshot displays the RTfooting EXPERT software interface. The main window shows a project configuration for a 'Sleeve foundation' with various parameters and a 3D system graph. A table of contents on the left lists sections like 'Project information', 'System information', 'Loading', 'Stress resultants', 'Geotechnical analyses', and 'Reinforcement design'. A callout bubble points to this table of contents with the text: "The report can be easily configured using the markers in the table of contents".

Overlaid on the main window is a 'Style sheet configurations' dialog box. A callout bubble points to the header preview area with the text: "Office-specific results". The dialog shows a preview of the report's header and footer, including the RIB logo and contact information for 'RIB Software SE' in Stuttgart. The 'Header editing' dialog is also open, showing a text editor for the header content.

Below the 'Header editing' dialog, there is a table for 'Foundation and column' parameters:

Foundation type	b _x [m]	b _y [m]	h [m]	Column type	b _x [m]	b _y [m]	d _c [m]
Sleeve foundation	3.000	2.000	0.900	Rectangle	0.600	0.400	-0.400

Below this table is a table for 'Sleeve geometry' parameters:

Depth in foundation	hg	Base height	hs
Depth in foundation	0.000 m	1.050 m	1.050 m
Base height, top, x direction	1.300 m	Base height, top, y direction	1.100 m
Base width, bottom, x direction	1.300 m	Base width, bottom, y direction	1.100 m
Base width, bottom, y direction	0.250 m	Base width, top	0.250 m
Base width, top	0.250 m	Base width, top	0.250 m

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 Auftrag: DBV Beispiel 11 Position: Blockfundament Bauteil:

Schema drawing

Legend

l_b	required lap length	$l_{b,req}$	suggested embedment depth of the column = $1.50 l_b$
a_n	clearance column / sleeve reinforcement - $\min(4 \cdot d_s, 50\text{mm})$	$l_{b,req}$	required embedment depth of the column = l_b
$l_{a,d}$	required anchorage length	$l_{b,exis}$	existing embedment depth of the column
$A_{s,h}$	Horizontal sleeve reinforcement (total)	$A_{s,v}$	Column / sleeve reinforcement vertical (per side)
T_x, T_y	Tensile force of load application column - foundation	$s_{c,req}$	Distance column / sleeve reinforcement

Composite condition

	f_{tk} [N/mm ²]	f_{td} [N/mm ²]	f_{td} [N/mm ²]	Composite
Column	40	5.51	435	Composite condition well
Sleeve	30	4.57	435	Composite condition good

Specifications for the sleeve design

Formwork:	profiled	Thickness of mortar d_s :	0.050 m
$A_{s,req}$ of the vertical reinforcement:	6.80 cm ²	$A_{s,exis}$ of the vertical reinforcement:	2.28 cm ²
Vertical reinforcement, sleeve d_s :	12 mm	Vertical reinforcement, column d_s :	20 mm

Design

As-direction	LC	$M_{x,d}$ [kNm]	$M_{y,d}$ [kNm]	$P_{x,d}$ [kN]	$H_{x,d}$ [kN]	$H_{y,d}$ [kN]
x $A_{s,v}$	2	-	61.2	4072.5	0.0	-
y $A_{s,v}$	0	0.0	-	0.0	0.0	0.0
x $A_{s,h}$	0	-	0.0	0.0	0.0	-
y $A_{s,h}$	0	0.0	-	0.0	-	0.0

Column

	l_{col} [m]	l_{top} [m]	l_{bot} [m]	$\Delta_{max,t}$ [m]	$\Delta_{max,b}$ [m]
	0.600	0.267	0.600	0.170	0.170

As-direct

As-direct	d_s [mm]	$T_{x,d}$ [kN]	$A_{s,vt,req}$ [cm ²]	$A_{s,vt,exis}$ [cm ²]	a_n [m]	$l_{a,d}$ [m]	l_b [m]
x	20	0.00	0.0	6.81	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]	$T_{x,d}$ [kN]	$A_{s,vt,req}$ [cm ²]	$A_{s,vt,exis}$ [cm ²]	a_n [m]	$l_{a,d}$ [m]	l_b [m]	$T_{x,d}$ [kN]	$A_{s,d}$ [cm ²]
x	12	0.00	0.0	6.81	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
β	Base pressure inside $A_{s,h}$	β	Load increase factor for eccentric loads
$A_{s,h}$	Reduction area within the critical perimeter	Δu_{crit}	Distance of the critical perimeter to the column edge
u_{crit}	Effective circumference of the critical perimeter	$u_{l,eff}$	Circumference of the area reinforced for punching
u_0	Effective circumference of the load application area	d_{crit}	mean statically effective depth
$\Delta u_{p,rel}$	Inclination of the punching cone $\Delta u_{p,rel} = \Delta u_{crit} / d_{crit}$	$V_{Ed,rel}$	related shear force ($V_{Ed,rel} = V_{Ed} / (1 + \beta \cdot \Delta u_{p,rel})$)
$V_{Ed,max}$	Punching resistance without punching reinforcement	$V_{Ed,max}$	maximum punching resistance

Clear and comprehensible output of results

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 Position: Blockfundament Bauteil:

Reinforced concrete design

Reinforcement distribution, bottom [cm²/m]

Increase due to the punching analysis

Design sections

Section	As-direction	Design section [m]			Design for
		Post.	Width	Height	
1	y	0.200	3.000	0.600	Bending
2	x	0.200	3.000	0.600	Bending

Bending design

Legend

M_{max}	max. design moment	$A_{s,b}$	Required longitudinal reinforcement, bottom
M_{min}	min. design moment	$A_{s,t}$	Required longitudinal reinforcement, top
h	Component height in the design section	f_c	Concrete compression
b	Component width in the design section	f_s	Steel strain
$z_{b,t}$	inner lever arm for bending design	d	Ductility reinforcement calculate
d_t	Reinforcement distance top (t) and bottom (b)	$z_{b,t}$	Laying dimension for calculation of the $z_{b,t}$

Reinforcement layer [cm]

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

Bending design

Section	design comb.	M_{max} [kNm]	M_{min} [kNm]	h [m]	b [m]	f_c [Pa]	f_s [Pa]	β	$\Delta u_{p,rel}$	$A_{s,b}$ [cm ²]	$A_{s,t}$ [cm ²]
1	1	1147.1	513.3	0.600	3.000	0.00	0.00	0.664	33.9	0.0	0.0
2	2	1171.6	524.3	0.600	3.000	0.00	0.00	0.675	34.3	0.0	0.0

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

$s_{b,y}$ [m]	0.750	0.036	0.336	0.750	0.336	0.036	0.750
$A_{s,b}$ [cm ²]	6.86	0.49	4.96	12.28	4.96	0.49	6.86
$A_{s,t}$ [cm ² /m]	9.15	12.73	14.75	16.37	14.75	12.73	9.15

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

$s_{b,x}$ [m]	0.750	0.036	0.336	0.750	0.336	0.036	0.750
$A_{s,b}$ [cm ²]	6.86	0.49	4.96	12.21	4.96	0.49	6.86
$A_{s,t}$ [cm ² /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

Sleeve Foundation Result Report

RIB Software SE Vaihinger Straße 151 70567 Stuttgart
 Software for Structural Engineers CAD-FEM-Structural Member Design
 Hotline: 0711 7873 41 stack-hotline@rib-software.com
 Auftrag: DBV Beispiel 12 Position: 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	$\gamma_s, \gamma_{s,acc}$	Partial safety factor, reinforcement, permanent / accidental
h	Foundation height	f_{yk}	Yield point, reinforcement
b_x, b_y	Column width in x/y-direction	f_{tk}	Tensile strength, reinforcement
$\Delta u_{p,rel}$	Eccentricity of column in x/y-direction	ϕ	Friction angle of the soil
h_{cov}	Earth covering	c	Cohesion
t	Embedment depth, foundation	$\tan \delta_{s,r}$	Angle of base friction
u_0	Unit weight of soil, above base	γ_{s2}	Unit weight of soil, below base
$z_{b,t}$	Ground water level, distance to UE foundation	$\gamma_{s,acc}$	Partial safety factor, concrete, permanent / accidental
γ_{s1}	Unit weight, concrete	σ_{Ed}	Base resistance
f_{ck}	Cylinder compressive strength, concrete, char. design	f_{cd}	Cylinder compressive strength, concrete, design
f_{yk}	Yield point, reinforcement, design value	α_{cr}	Creep coefficient, concrete

Foundation and column

Foundation type	b_x [m]	b_y [m]	h [m]	Column type	$b_{x,c}$ [m]	$b_{y,c}$ [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	bx: 1.300 m	Base height, top, y-direction	by: 1.100 m
Base width, bottom, x-direction	bx: 1.300 m	Base width, bottom, y-direction	by: 1.100 m
x wall thickness, base, top	dx: 0.250 m	y wall thickness, top	dy: 0.250 m

Reinforcement and bending design