

B6 – Punching shear analysis

This application allows you to perform punching shear analysis for all sorts of point-shaped supported slabs.

The shear-ratio is, contrary to the ratio for beams and plates, characterized by spatial stresses.

This condition emerges in the case of a symmetrical load. The allowable stresses are

therefore higher than in case of normal shear.

B6 applies a methodology which is clearly described in the EN 1992

According to the design code and boundary conditions, the critical area's of the inner-, outer- and columns on the corners are identified. It is also possible to check „ends of a wall“ and „wall-inner corners“.

When shear reinforcement is not taken into account, you can, by means of a „column head“, still reduce the shear-values.

The software is equipped with an interactive interface and also includes optimized reinforcement templates and reinforcement directives.

Development:

The checks under dynamic loading, earth quake, tension-/compression-normal tension, as well as the link with element plates are currently being developed.

plate

concrete: C12/15
 reinf: BS1 420(A)
 type of slab: slab
 width of plate: h = 300 mm
 static height: dm = 260 mm

column

type of col: rectangle - innersupport
 width of col: cx = 400 mm
 thickness of col: cy = 400 mm
 edge distance: nx = 0 mm
 all effective span: Lx = 1.5 m
 edge distance: ny = 0 mm
 all effective span: Ly = 1.3 m

loads

max shear force: VE = 500.0 kN
 safety factor: gE = 1.00
 dynamic load: = 0.0 kN
 increment: β = 1.15
 normal stress: psd = 0.0 kN/m²
 soil pressure: = 0.0 kN/m²

ratio of reinf.: ρ = 1.000 %
 uload-factor: no interpolate

design according EN 1992

req reinforcing: LH = 2 cm, LH = 3 cm
 selected column head: no strengthening
 sel strengthening-height: LH = 86 cm (at lower flange-slab)
 sel strengthening length: LHx = 96 cm (at edge of column)
 sel strengthening length: LHx = 96 cm (at edge of column)
 shear reinf: BS1 500(A)
 inclination shear reinforce: Alpha =
 sel distance of stirrups: sw =

holes

decisive are holes with distance to column :
 for punching shear ac DIN 1045-1 (6.0*dm) α<= 156.0 cm
 (for not strengthened slab)

	xs [cm]	ys [cm]	dx=dk [cm]	dy [cm]	D-Ai [cm²]	D-Ui [cm]	D-Alpha [degree]
1	50.0	75.0	40.0	60.0	0.0	47.9	41.3
2	-25.0	50.0	20.0	30.0	0.0	36.8	32.0
3	-60.0	-80.0	25.0	10.0	0.0	17.4	14.8
*	0.0	0.0					

distance from center of hole to center of column x-direction

sum for further calculation :
 δFA = 0.0 cm²
 δUi = 102.1 cm
 δαi = 0.0 °

remark: delta-Ui and delta-Alpha i are used according DIN 1045-1 07/01.

Other types of supporting entities:

