Rectangular Combined Footing for Two Columns

Length and width of a rectangular combined footing giving uniform soil pressure under two column loads, with the maximum shear and hogging moment between columns.

Method: Rigid combined footing with uniform pressure

Input parameters

Unit system: SI

Parameter	Value	Unit
Exterior column load (service)	900.00	kN
Interior column load (service)	1,300.0	kN
Column spacing	5.0000	m
Footing edge to exterior column centre	0.25000	m
Net allowable soil pressure	200.00	kPa

Calculated results

Parameter	Value	Unit
Resultant from exterior column	2.9545	m
Footing length	6.4091	m
Footing width	1.7163	m
Maximum shear at a column centreline	902.13	kN
Maximum hogging moment between columns	954.86	kN·m

Notes for this case

• The footing centroid is placed under the load resultant: L = 2(a + x̄), x̄ = P₂s/(P₁ + P₂), B = ΣP/(q_aL). As a beam loaded upward by w = ΣP/L, the largest hogging moment is where shear is zero, $x_0 = P_1/w$ from the edge. Apply load factors and the user's concrete code for depth and steel; the interior column also needs a punching check.

Formula and method

$$\bar{x} = \frac{P_2 s}{P_1 + P_2}, \quad L = 2(a + \bar{x}), \quad B = \frac{P_1 + P_2}{q_a L}, \quad M_{max} = P_1(x_0 - a) - \frac{w x_0^2}{2}$$

Variables

P_1	Exterior column load (service)	N
P_2	Interior column load (service)	N
s	Column spacing	m
a	Footing edge to exterior column centre	m
q_a	Net allowable soil pressure	Pa
$\bar{x}$	Resultant from exterior column	m
L	Footing length	m
B	Footing width	m
V_{max}	Maximum shear at a column centreline	N
M_{max}	Maximum hogging moment between columns	N·m

Method and standards

Combined footing.

Assumptions and limits

- Rigid footing; uniform pressure; vertical loads only.

References
Rigid combined footing with uniform pressure

Report details

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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online
https://calc.firecad.com/civil/foundations/combined-footing-two-columns

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Reopens the calculator with the inputs of this report.