Footing Size from Safe Bearing Capacity

Plan area and size of an isolated square or rectangular footing from the column load, the self-weight allowance and the safe bearing capacity of the soil.

Method: A = P(1 + k)/q_a (foundation design practice)

Input parameters

Unit system: SI

Parameter	Value	Unit
Column load (service)	1,200.0	kN
Allowance for footing and soil weight	10.000	%
Safe (allowable) bearing capacity	200.00	kPa
Length to width ratio	1.0000	

Calculated results

Parameter	Value	Unit
Area required	6.6000	m²
Width	2.5690	m
Length	2.5690	m
Net upward soil pressure under service load P/(BL)	181.82	kPa

Notes for this case

- Round the sizes up to your detailing step; the structural design of the footing is separate.

Formula and method

$$A = \frac{P(1 + k_{sw})}{q_a}, \quad B = \sqrt{\frac{A}{L/B}}$$

Variables

P	Column load (service)	N
k_{sw}	Allowance for footing and soil weight	-
q_a	Safe (allowable) bearing capacity	Pa
L/B	Length to width ratio	-
A	Area required	m²
B	Width	m
L	Length	m
q_n	Net upward soil pressure under service load P/(BL) (not the ultimate bearing capacity q_u)	Pa

Method and standards

Area from allowable pressure.

Assumptions and limits

- Concentric load; service (unfactored) load. q_n is the net upward pressure for the footing's structural design under service load; limit-state design uses the factored load.

References

- A = P(1 + k)/q_a (foundation design practice)

Report details

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Calculator	Footing Size from Safe Bearing Capacity
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Release checks	2 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/footing-area-sbc

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.