Allowable Bearing Pressure from SPT N (Meyerhof, Bowles)

Allowable bearing pressure of a shallow footing on sand for a chosen settlement from the corrected SPT N value, by Meyerhof's equations as modified by Bowles.

Method: Meyerhof's SPT method as modified by Bowles

Input parameters

Unit system: SI

Parameter	Value	Unit
Corrected SPT N (55 % energy)	18.000	
Footing width	2.0000	m
Footing depth	1.2000	m
Tolerable settlement	25.000	mm

Calculated results

Parameter	Value	Unit
Depth factor	1.1980	
Allowable bearing pressure	356.48	kPa
For 25 mm settlement	356.48	kPa
Load on a square footing	1,425.9	kN

Notes for this case

• Bowles' adjustment of Meyerhof (1965), N corrected to 55 % hammer energy, q_a in kPa for 25 mm settlement: q_a = (N/0.05)K_d for B ≤ 1.2 m and q_a = (N/0.08)[(B + 0.3)/B]²K_d for wider footings, K_d = 1 + 0.33D_f/B ≤ 1.33. Allowable pressure scales linearly with the tolerable settlement. The method is empirical for sands; check bearing capacity failure separately and reduce for a high water table.

Formula and method

$$q_a = \frac{N_{55}}{F_2}\left(\frac{B+F_3}{B}\right)^2 K_d \frac{S}{25\ \text{mm}}, \quad K_d = 1 + 0.33\frac{D_f}{B} \le 1.33$$

Variables

N_{55}	Corrected SPT N (55 % energy)	-
B	Footing width	m
D_f	Footing depth	m
S	Tolerable settlement	m
K_d	Depth factor	-
q_a	Allowable bearing pressure	Pa
$q_{a,25}$	For 25 mm settlement	Pa
F	Load on a square footing	N

Method and standards

SPT bearing.

Assumptions and limits

- Sand; settlement-controlled; Bowles' F_2 = 0.05 and 0.08, F_3 = 0.3 m (SI).

References

Meyerhof's SPT method as modified by Bowles

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/spt-allowable-bearing-meyerhof

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.