Plate Load Test: Settlement of a Footing (Terzaghi–Peck)

Settlement of a footing on sand from a plate load test by the Terzaghi–Peck relation, or on clay in proportion to width, with the plate and footing widths.

Method: Terzaghi and Peck (1948) plate-to-footing settlement relation for sand; linear in width for clay

Input parameters

Unit system: SI

Parameter	Value	Unit
Plate settlement at the design pressure	8.0000	mm
Plate width	300.00	mm
Footing width	2.0000	m
Soil	Sand (Terzaghi–Peck)	

Calculated results

Parameter	Value	Unit
Footing settlement	24.197	mm
Ratio	3.0246	

Notes for this case

- For sand the ratio cannot exceed 4 however wide the footing (the limit as B_f grows).
- Terzaghi–Peck uses widths in metres with the 0.3 m term; the plate test sees only shallow soil, so check deeper layers separately.

Formula and method

$$S_f = S_p \left[\frac{B_f(B_p+0.3)}{B_p(B_f+0.3)}\right]^2 \ (\text{sand}), \quad S_f = S_p \frac{B_f}{B_p} \ (\text{clay})$$

Variables

S_p	Plate settlement at the design pressure	m
B_p	Plate width	m
B_f	Footing width	m
soil	Soil	-
S_f	Footing settlement	m
S_f/S_p	Ratio	-

Method and standards

Empirical relation, widths in metres.

Assumptions and limits

- Same pressure on plate and footing.
- For sand the ratio tends to [(B_p + 0.3)/B_p]² for a very wide footing (4 for a 0.3 m plate); a footing narrower than the plate gives a ratio below 1 and gets a warning.

References

- Terzaghi and Peck (1948) plate-to-footing settlement relation for sand; linear in width for clay

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/plate-load-test-settlement

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.