SPT N-Value Corrections: Energy and Overburden

SPT blow count corrected to 60 % hammer energy (N60) and to one atmosphere overburden ((N1)60) with borehole, sampler and rod corrections.

Method: Skempton (1986) energy and equipment corrections; Liao and Whitman (1986) overburden correction (Das, Principles of Foundation Engineering, 7th ed. (Cengage, 2011), ch. 2)

Input parameters

Unit system: SI

Parameter	Value	Unit
Field blow count	18.000	
Hammer energy ratio	60.000	%
Borehole diameter correction	1.0000	
Sampler correction	1.0000	
Rod length correction	0.95000	
Effective overburden stress	80.000	kPa

Calculated results

Parameter	Value	Unit
Energy-corrected N	17.100	
Overburden correction factor	1.1254	
Normalised N	19.245	

Notes for this case

• Liao–Whitman C_N = √(p_a/σ′_v), capped at 1.7. Rod corrections: 0.75 for rods under 4 m, 0.85 for 4–6 m, 0.95 for 6–10 m, 1.0 beyond. Safety (rope-and-cathead) hammers deliver about 60 %, automatic hammers 70–90 %.

Formula and method

The formula is shown on the calculator page: https://calc.firecad.com/civil/geotechnical/spt-n-corrections

Variables

N	Field blow count	-
E_r	Hammer energy ratio	-
C_B	Borehole diameter correction	-
C_S	Sampler correction	-
C_R	Rod length correction	-
\sigma'_v	Effective overburden stress	Pa
N_{60}	Energy-corrected N	-
C_N	Overburden correction factor	-
$(N_1)_{60}$	Normalised N	-
p_a	Atmospheric pressure, 101 325	Pa

Method and standards

Skempton and Liao–Whitman.

Assumptions and limits

- Sands; standard SPT procedure.
- p_a is taken as one standard atmosphere, 101.325 kPa. Many texts write Liao–Whitman with p_a = 100 kPa (or 1 tsf); that gives C_N about 0.66 % lower.

References

• Skempton (1986) energy and equipment corrections; Liao and Whitman (1986) overburden correction (Das, Principles of

Foundation Engineering, 7th ed. (Cengage, 2011), ch. 2)

Report details

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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/geotechnical/spt-n-corrections

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.