Trench Excavation with Side Slopes

Excavated volume of a trench with sloping sides from bottom width, depth, side slope and length, with the top width and the loose volume to haul.

Method: Trapezoidal prism volume

Input parameters

Unit system: SI

Parameter	Value	Unit
Bottom width	0.60000	m
Depth	1.5000	m
Side slope (horizontal per 1 vertical; 0 for vertical sides)	0.50000	
Length	100.00	m
Swell (bulking) of the excavated soil Your soil's figure; roughly 10–30 % for soils, 40–60 % for rock.	25.000	%

Calculated results

Parameter	Value	Unit
Top width b + 2 z d	2.1000	m
Cross-section	2.0250	m^2
Bank (in-place) volume	202.50	m^3
Loose volume to haul	253.13	m^3

Notes for this case

- Safe side slopes depend on the soil and depth; follow your site's excavation safety rules and shoring needs.

Formula and method

$$A = (b + zd)\,d, \quad V = AL, \quad V_l = V(1 + s_w)$$

Variables

b	Bottom width	m
d	Depth	m
z	Side slope (horizontal per 1 vertical; 0 for vertical sides)	-
L	Length	m
s_w	Swell (bulking) of the excavated soil	-
B	Top width b + 2 z d	m
A	Cross-section	m^2
V	Bank (in-place) volume	m^3
V_l	Loose volume to haul	m^3

Method and standards

Trapezoidal section.

Assumptions and limits

- The side slope z is horizontal run per 1 vertical (H:V). A slope written "1:2" may mean 1 H : 2 V (z = 0.5) or 1 V : 2 H (z = 2) depending on the convention; check before entering.
- Uniform depth.

References

- Trapezoidal prism volume

Report details

Report reference	FCC-9XF6-K21M (the same inputs always give the same reference)
Generated	17 November 2026, 19:48 UTC
Calculator	Trench Excavation with Side Slopes
Method last reviewed	12 November 2026
Software release	FireCAD Calc, release of 17 November 2026
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/quantities/trench-excavation

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.