

Earth Pressure

Civil Engineering

Active, at-rest and passive pressure.

How hard soil pushes on a wall depends on whether the wall yields away from it, into it, or not at all.

$$K_a = (1 - \sin \varphi) / (1 + \sin \varphi) \cdot K_p = 1/K_a$$

$\varphi = 30^\circ$, level fill

Rankine case.

$$K_a = 1/3, K_p = 3$$

Wall cannot move

At-rest pressure.

$$K_o \approx 1 - \sin \varphi$$

Undrained backfill

Drain it instead.

Add full hydrostatic

THE COMMON MISTAKE

× **Designing for active pressure alone**

✓ **Add water, surcharge, compaction**

Water behind an undrained wall can double the thrust, and compaction plant working close to the stem locks in pressures well above the active value.

Educational reference. Retaining design follows the governing code and is work for a qualified geotechnical engineer.