



Bottom Failure of Excavations in Clay

$$\gamma := 1.8 \cdot \frac{\text{ton}}{\text{m}^3}$$

$$H := 31.67 \cdot \text{ft} \text{ data for the excavation}$$

$$q_{u_bottom} := 1.25 \cdot \frac{2 \cdot \text{kip}}{\text{ft}^2}$$

undrained compressive strength of the underlying clay

$$c_b := 0.5 \cdot q_{u_bottom}$$

$$c_b = 0.61 \frac{\text{kgf}}{\text{cm}^2}$$

$$\text{Failure} := \begin{cases} \text{"Small movements and small risk of failure"} & \frac{\gamma \cdot H}{c_b} \leq 6 \\ \text{otherwise} & \\ \begin{cases} \text{"Excessive and nontolerable movement at bottom or sides even with sound walls"} & 6 < \frac{\gamma \cdot H}{c_b} \leq 8 \\ \text{"Almost sure failure"} & \text{otherwise} \end{cases} \end{cases}$$

$$\text{Failure} = \text{"Small movements and small risk of failure"} \frac{\gamma \cdot H}{c_b} = 2.85$$
