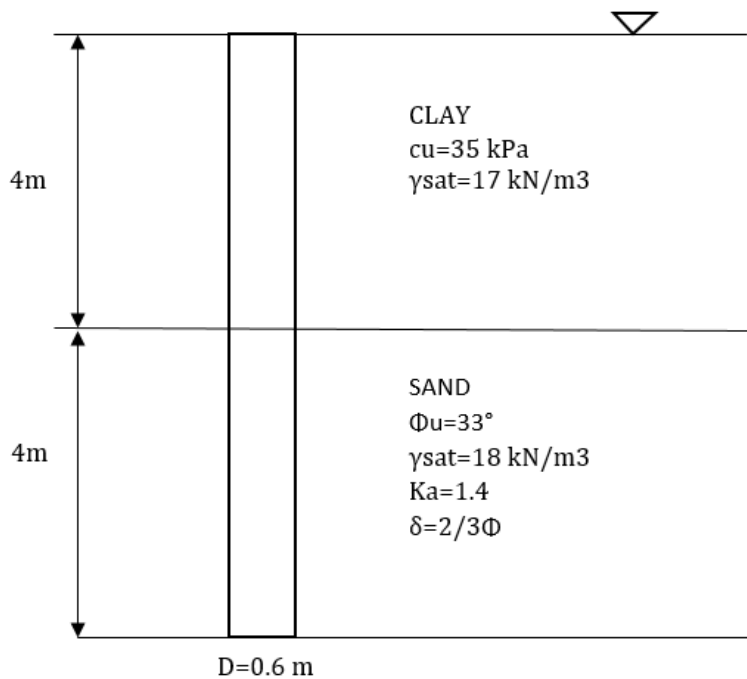


EXAMPLE



Estimate the allowable pile capacity. Use $FS = 3$.

SOLUTION

$$Q_u = Q_s + Q_p$$

$$Q_p = q' N_q A_p$$

$$q' = (17 - 9,81)(4) + (18 - 9,81)(4)$$

$$q' = 61,52 \text{ kPa}$$

$$N_q = 50$$

$$A_p = \pi(0,6)^2/4 = 0,282 \text{ m}^2$$

$$Q_p = q' N_q A_p = (61,52)(50)(0,282) = 869,72 \text{ kN}$$

$$Q_s = [\alpha c_u \Delta_p L] + [K \sigma_v' \text{tg} \delta \Delta_p L]$$

$$Q_s = [(1)(35)(\pi)(0,6)(4)] + [(1,4)((61,52 + 28,76)/2)(\text{tg} 22)(\pi)(0,6)(4)]$$

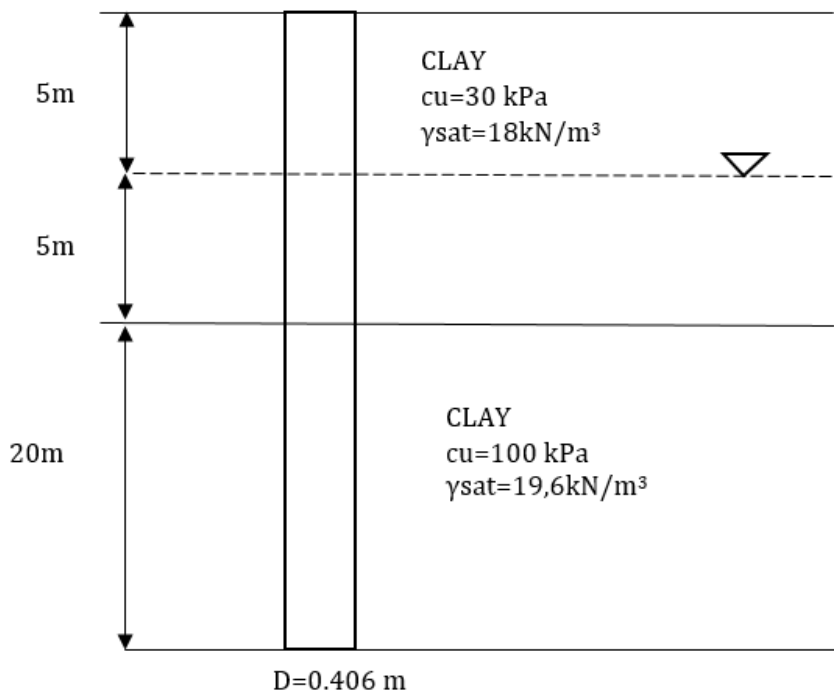
$$Q_s = 456,41 \text{ kN}$$

$$Q_u = Q_s + Q_p$$

$$Q_u = 869,72 + 456,41 = 1326,13 \text{ kN}$$

$$Q_{\text{all}} = Q_u/3 = (1326,13)/3 = 442 \text{ kN}$$

EXAMPLE



Estimate the allowable pile capacity. Use $FS = 4$.

Depth (m)	α
0-5m	0.82
5-10m	0.82
10-30m	0.48

SOLUTION

$$Q_u = Q_s + Q_p$$

$$Q_p = 9c_u A_p$$

$$Q_s = \alpha c_u \Delta_p L$$

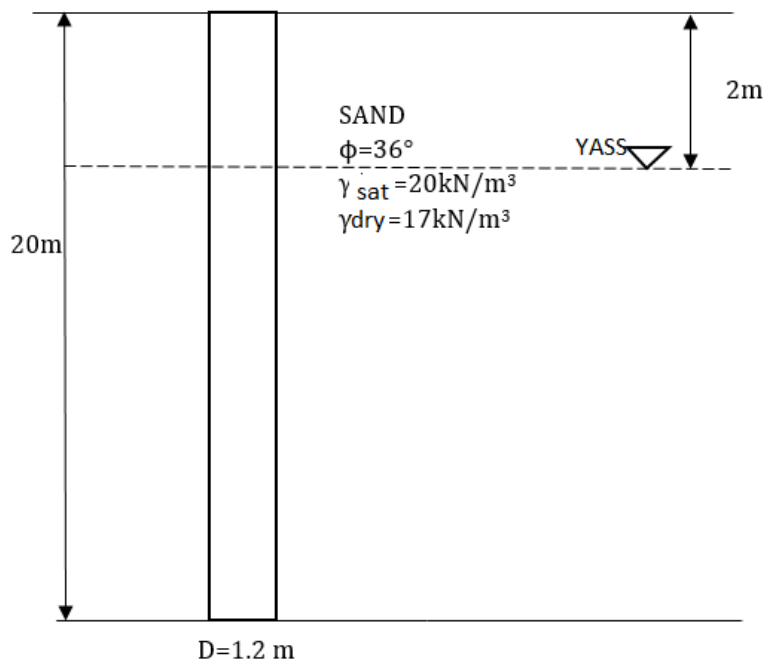
$$Q_u = [(9)(100)(\pi)(0,406^2)/(4)] +$$

$$[(0.82)(30)(\pi)(0,406)(10) + (0.48)(100)(\pi)(0,406)(20)]$$

$$Q_u = 1654,1 \text{ kN}$$

$$Q_{\text{all}} = Q_u / 3 = (1654.1) / 3 = 412 \text{ kN}$$

EXAMPLE



Estimate the allowable pile capacity.

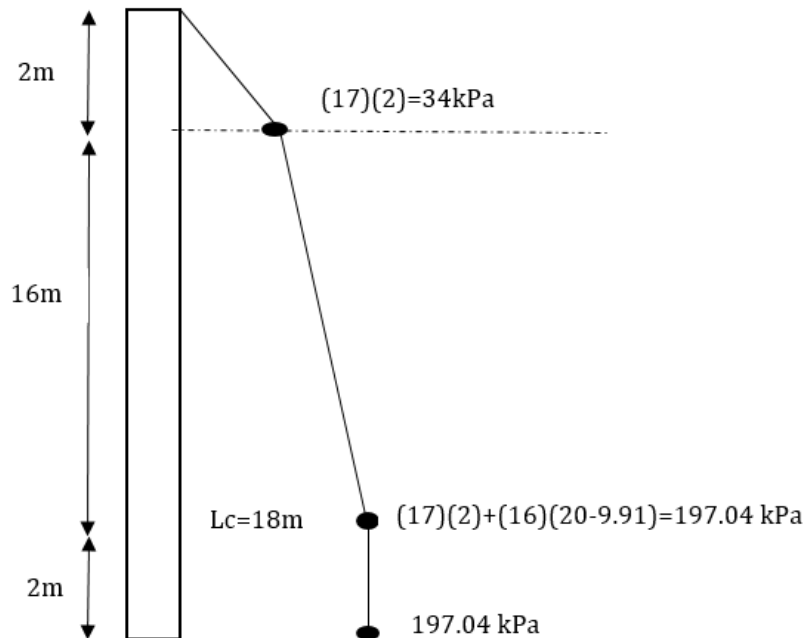
Use $FS=3$.

($N_q=50$, $K=0.8$, $L_c/D=15$, $\delta=0.75\phi$)

SOLUTION

$$L_c/D=15$$

$$L_c=(15)(1.2)=18\text{m}$$



$$Q_u = Q_s + Q_p$$

$$Q_p = q' N_q A_p$$

$$q' = (17)(2) + (16)(20 - 9.91)$$

$$q' = 197.04 \text{ kPa}$$

$$N_q = 50$$

$$A_p = \pi(1.2)^2/4 = 1.131 \text{ m}^2$$

$$Q_p = q' N_q A_p = (197.04)(50)(1.131) = 1142.6 \text{ kN}$$

$$Q_s = K \sigma_v' \text{tg} \delta \Delta_p L$$

$$Q_s = (0.8) \left[\frac{(34)}{2} (2) + \frac{(197.04 - 34)}{2} (16) + (197.04)(2) \right] (\text{tg} 27^\circ) (\pi)(1.2)$$

$$Q_s = 3498.21 \text{ kN}$$

$$Q_u = Q_s + Q_p$$

$$Q_u = 1142.6 + 3498.21 = 14640.81 \text{ kN}$$

$$Q_{\text{all}} = Q_u/3 = (14640.81)/3 = 4880 \text{ kN}$$