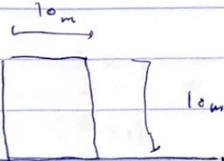


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ENCE 331
Final Exam.

- Question 1:

$$q = \gamma (10)$$



$$\text{Volume of tank} = \frac{\pi d^2}{4} (h)$$

$$= 785 \text{ m}^3$$

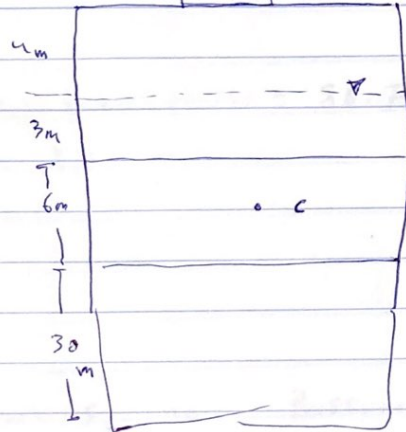
$$W = V (\gamma) = 7850 \text{ KN}$$

$$q = \frac{W}{A} = \frac{7850}{10 \times 10} = 78.5 \text{ kN/m}^2$$

$$\sigma'_{atc} = (3)(20-10) + (3)(21-10) + (4)(18)$$

$$\sigma'_o = 135 \text{ kPa}$$

$$\Delta \sigma'_{avg} = atc = \frac{\Delta \sigma'_a + 4 \Delta \sigma'_m + \Delta \sigma'_b}{6}$$



for same time: $\Delta \sigma'_{atc} = (0.005) W (21)(2.5)$
 $\Delta \sigma'_{middle} = 26.25 \text{ kPa}$

$$z = 10 \text{ m} \rightarrow 1.51''$$

$$= \frac{2060.6}{100} \text{ kPa}$$

by using Influence chart

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$$\sigma'_o = 135 \text{ kPa}, \quad \Delta \sigma'_c = 26.25 \text{ kPa}$$

$$\sigma'_o + \Delta \sigma'_c = 161.25 \text{ kPa} > \sigma'_c = 140 \text{ kPa}$$

$$S_c = \frac{C_s H}{1+e_o} \log \left(\frac{140}{135} \right) + \frac{C_c H}{1+e_o} \log \left(\frac{161.25}{140} \right)$$

$$\textcircled{1} S_c = 0.177 \text{ m} = 17.7 \text{ cm}$$

$$= 0.1733$$

$$S_c = 30 \text{ cm}$$

$$U = \frac{S_c}{300} \times 100\% = 16.66\% \rightarrow \text{table 11.7}$$

$$T_v = \frac{C_v t}{(H_{dr})^2}$$

$$T_v = 0.0218$$

$$H_{dr} = \frac{6\text{m}}{2} = 3\text{m}$$

$$\cancel{0.0218} = \frac{(0.01) t}{(300)^2}$$

$$\Rightarrow t = 196500 \text{ sec.}$$

$$= 2.27 \text{ day.}$$

$$\textcircled{2} \quad t = 2160000 \text{ sec.}$$

$$T_v = \frac{(0.01)(2160000)}{(300)^2} = 0.24 \rightarrow \text{table 11.7}$$

$$U = 55\%$$

$$U = \frac{\text{Settle}}{30} = \frac{55}{100}$$

$$\text{Cons. Settlement} = 16.5 \text{ cm.}$$

Question 2

$$f.s = \frac{\gamma'}{c_{avg} \gamma_w} = \frac{(19.25 - 9.81)}{(0.238)(9.81)} = 4.04$$

$$\sigma' = \sigma - u = (0.5)(9.81) + (4.25)(19.25) = 86.72 \text{ kPa}$$

$$\Delta h = \sigma - (4.25 + 0.5) = 1.25 \text{ m}$$

$$L = 5.75 - 0.5 = 5.25 \text{ m}$$

$$c_{avg} = 0.238$$

After:

- flow stop because there is no pressure differ.

~~the soil particles stable with~~

$$\sigma_{tot} / A = \cancel{(4.25)(19.25)}$$

$$u = \sigma (9.81) = 68.86 \text{ kPa}$$

$$\sigma' = (4.25)(19.25 - 9.81) = 40.12 \text{ kPa}$$

$$\sigma_{tot} = 108.98 \text{ kPa}$$

$$\cancel{\sigma_{tot}}$$