

Problem 1:

Given: Figure

Find: The avg. stress increase in clay below the center of the foundation due to the net foundation load of 900 kN. use 2:1 method.

Solution:

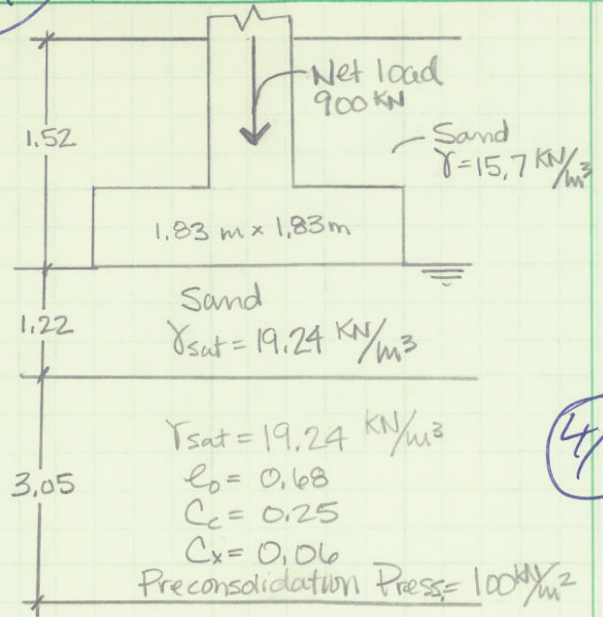
$$\Delta\sigma_{top} = \frac{900 \text{ kN} \cdot 1.0 \text{ m}^2}{(1.83 \text{ m} + 1.22 \text{ m})^2} = 9674.8 \text{ kN/m}^2$$

$$\Delta\sigma_{mid} = \frac{900}{(1.83 + 2.745)^2} = 4300 \text{ kN/m}^2$$

$$\Delta\sigma_{bot} = \frac{900}{(1.83 + 4.27)^2} = 2418.7 \text{ kN/m}^2$$

$$\Delta\sigma_{avg} = \frac{1}{6} [9674.8 + 4(4300) + 2418.7] = 4882.3 \text{ kN/m}^2$$

4882 kN/m<sup>2</sup>



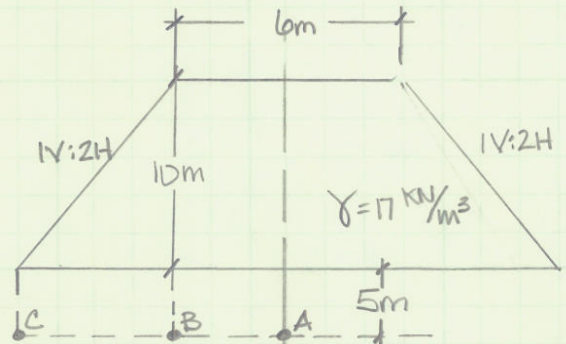
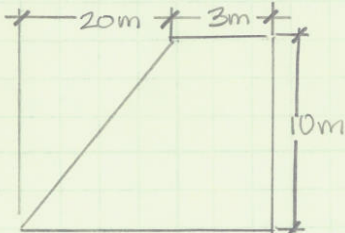
4/5

Problem 2:

Given: Figure

Find: Stress increase @ A, B, C, 5m below surface.

Solution:



1)  $\frac{B_1}{Z} = \frac{3}{5} = 0.6$

From Fig 5.11  $I' = 0.47$

5/5

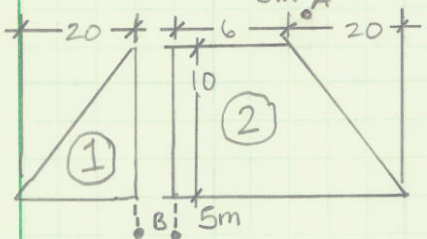
2)  $\frac{B_2}{Z} = \frac{20}{5} = 4$

$$\Delta\sigma_A = (2 \times 10 \times 17)(0.47) = 159.8 \text{ kN/m}^2$$

Area 1 =  $\frac{B_1}{Z} = \frac{0}{5} = 0$ ;  $\frac{B_2}{Z} = \frac{20}{5} = 4$ ;  $I = 0.42$

Area 2 =  $\frac{B_1}{Z} = \frac{6}{5} = 1.2$ ;  $\frac{B_2}{Z} = \frac{20}{5} = 4$ ;  $I = 0.48$

$$\Delta\sigma_B = (10 \times 17)(0.42 + 0.48) = 153 \text{ kN/m}^2$$



Area 1 =  $\frac{B_1}{Z} = \frac{26}{5} = 5.2$ ;  $\frac{B_2}{Z} = \frac{20}{5} = 4$ ;  $I = 0.5$  (max)

Area 2 =  $\frac{B_1}{Z} = \frac{0}{5} = 0$ ;  $\frac{B_2}{Z} = \frac{20}{5} = 4$ ;  $I = 0.42$

$$\Delta\sigma_C = (10 \times 17)(0.5 - 0.42) = 13.6 \text{ kN/m}^2$$

