

Soil Mechanics

HW 8

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Problem ①:-

① * layer ①: $\gamma_{dry} = \frac{G_s \gamma_w}{1+e} = 15.52 \text{ kN/m}^3$

* layer ②: $\gamma_{sat} = \frac{(G_s + e) \gamma_w}{1+e} = 20.56 \text{ kN/m}^3$

* layer ③: $e = w G_s \rightarrow G_s = 3.15$

$$\gamma_{sat} = \frac{(G_s + e) \gamma_w}{1+e} = 19.43 \text{ kN/m}^3$$

* At point A: $\sigma = 0$, $\sigma' = 0$, $u = 0$

* At point B: $\sigma = 3 * 15.52 = 46.56 \text{ kPa}$

$$\sigma' = \sigma = 46.56 \text{ kPa}$$

$$u = 0$$

* At point C: $\sigma = \sigma_B + 8 * 20.56 = 211.04 \text{ kPa}$

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$$u = 8 * 9.81 = 78.48 \text{ kPa}$$

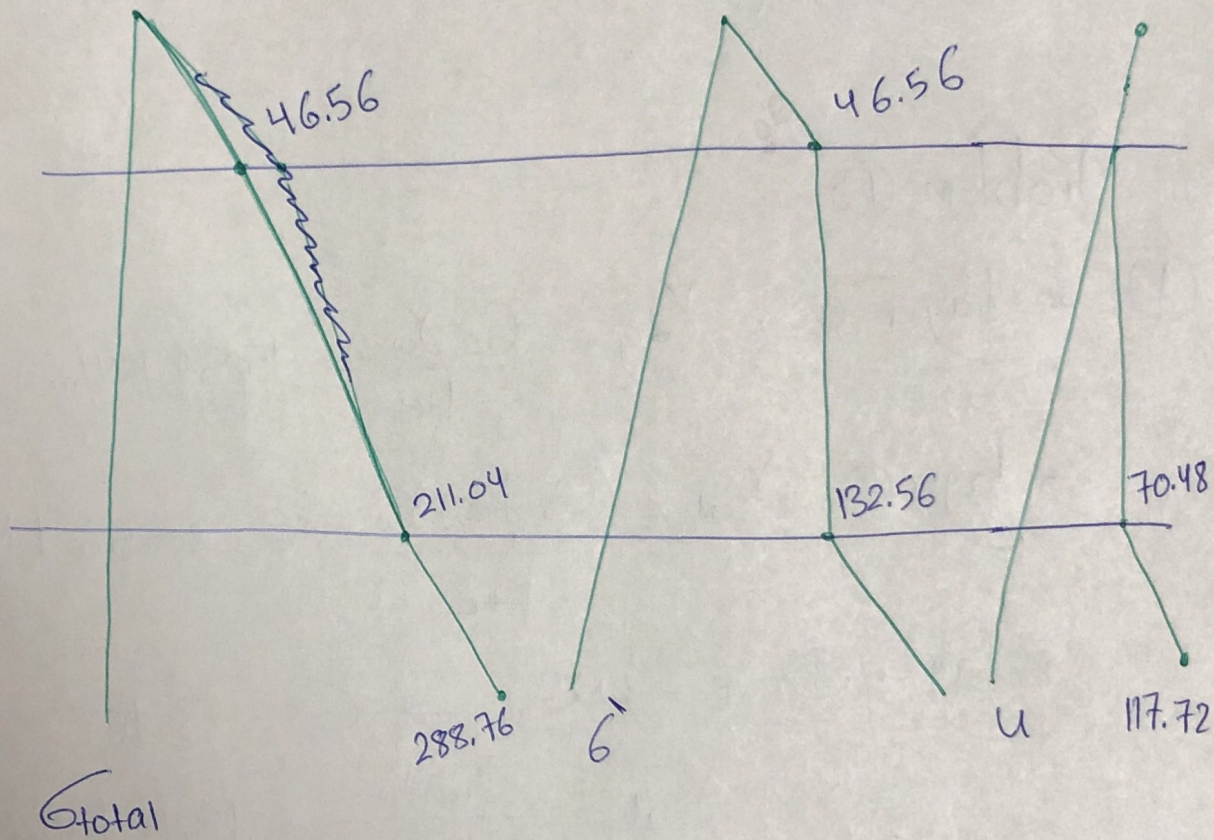
$$\sigma' = 132.56 \text{ kPa}$$

* at Point D: $\sigma = \sigma_c + 4 * 19.43 = 288.76 \text{ kPa}$

$u = 12 * 9.81 = 117.72 \text{ kPa}$

$\sigma' = 171.04 \text{ kPa}$

~~*~~ (2)



* Problem ②:-

① layer I: $\gamma_{dry} = 17.95 \text{ kN/m}$

layer II: $\gamma_{dry} = 18.32 \text{ kN/m}$

layer III: $\gamma_{moist} = 18.63 \text{ kN/m}$

At point A: $\sigma = 0$, $u = 0$, $\sigma' = 0$

At point B: $\sigma = 5 * 17.95 = 89.75 \text{ kPa}$
(above) $u = 0$

$$\sigma' = 89.75 \text{ kPa}$$

At point B: $\sigma = \cancel{89.75} 89.75 \text{ kPa}$
(Below)

$$u = -8 \gamma_w \quad u_z = -8.8 \text{ kPa}$$

$$\sigma' = 98.579 \text{ kPa}$$

~~At point C:~~

At point C: $\sigma = 5 * 17.95 + 1.5 * 18.32 = 117.2 \text{ kPa}$

$$u = 0$$

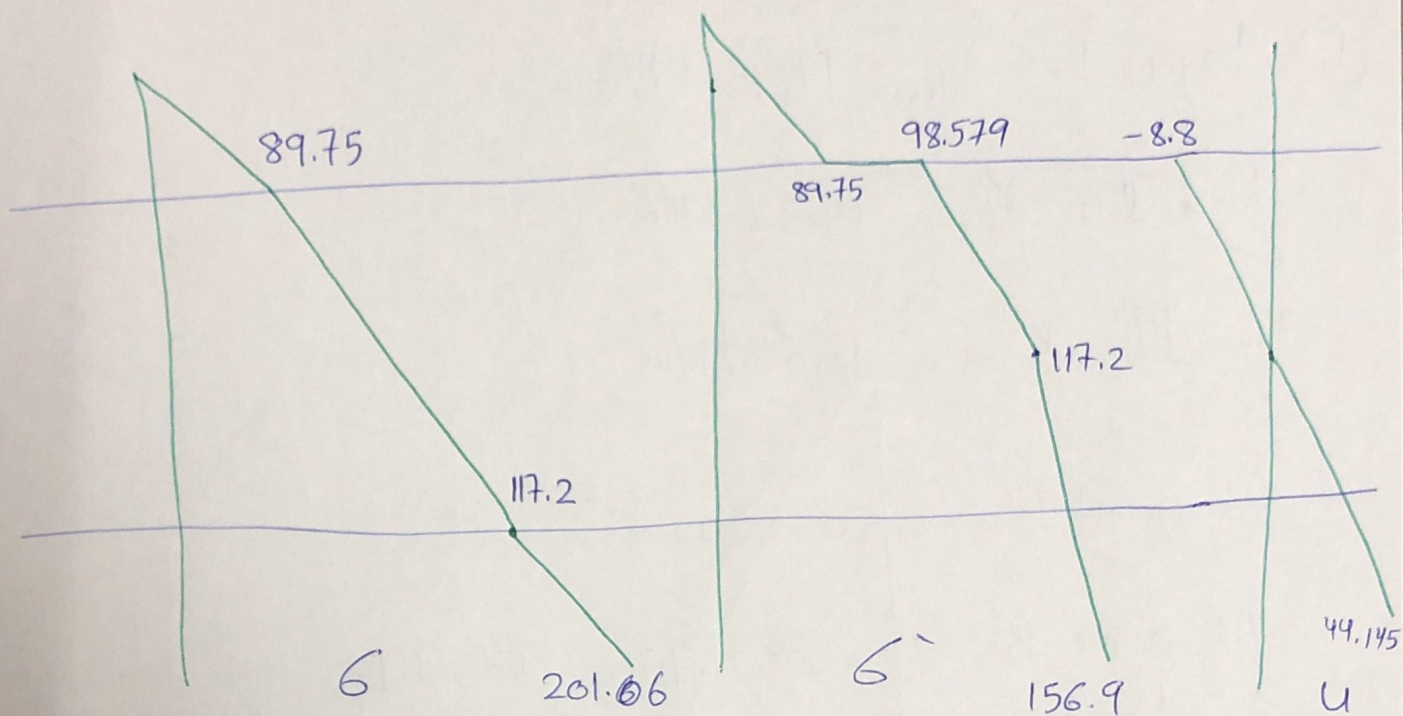
$$\sigma' = 117.2 \text{ kPa}$$

At point D: $\sigma = \sigma_c + 4.5 * 18.63 = 201.06 \text{ kPa}$

$$u = 4.5 * 9.81 = 44.145 \text{ kPa}$$

$$\sigma' = 156.915 \text{ kPa}$$

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~~Problem 8~~

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