

习题答案

1、解: $\sigma_{0\text{底}} = k_0 \gamma H = 44.55 \text{ KPa}$ $E_0 = \frac{1}{2} \sigma_{0\text{底}} H = 100.24 \text{ KN/m}$

2、解:

$$\begin{aligned} z = 0\text{m} \quad \sigma_{a1} &= 15.4 & z = 5\text{m} \quad \sigma_{a2} &= 39.2 \\ z_0 &= 1.4\text{m} \quad E_a &= 70.56 \text{ KN/m} & \text{作用点: } 1.2\text{m} \end{aligned}$$

3、解:

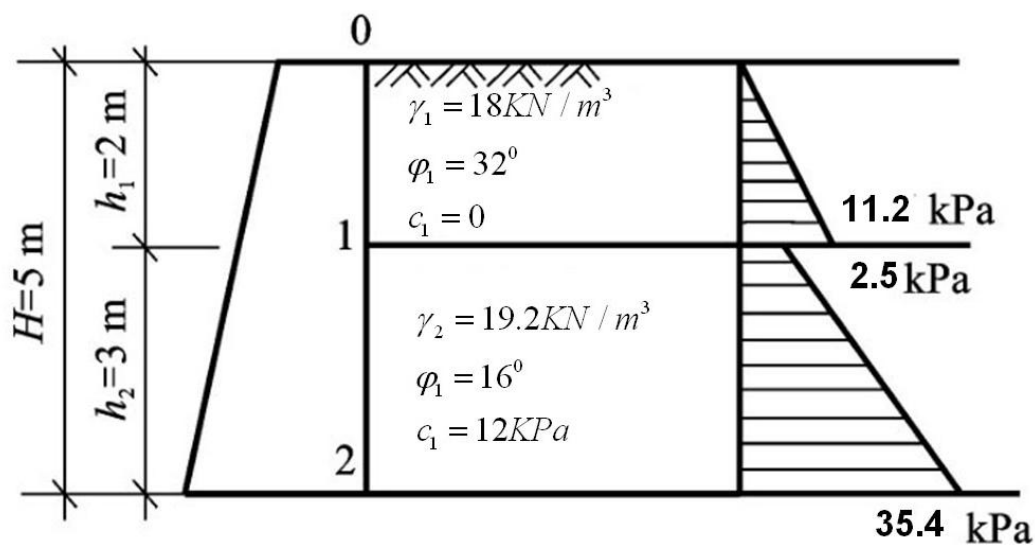
$$\begin{aligned} z = 0 \quad \sigma_{p1} &= 57.2 & z = 5\text{m} \quad \sigma_{p2} &= 183.6 + 57.2 = 240.8 \\ E_{p1} &= 286 & E_{p2} &= 459 & E_p &= 745 & z_p &= 1.99\text{m} \end{aligned}$$

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4、解:

$$\begin{aligned} z = 0 \quad \sigma_{a1} &= 6.14 & z = 5\text{m} \quad \sigma_{a2} &= 33.77 \\ E_{a1} &= 30.7 & E_{a2} &= 69.1 & E_a &= 99.8 \\ z_a &= 1.92\text{m} \end{aligned}$$

5、解:



6、解：

$$\gamma = 19.6 \quad E_a = 134.8 \quad z = 1.667m$$

7、解： $\alpha' = 90^\circ - 75^\circ = 25^\circ$

$$k_a = \frac{\cos^2(\varphi - \alpha')}{\cos^2 \alpha' \cdot \cos(\delta + \alpha') \left[1 + \sqrt{\frac{\sin(\delta + \varphi) \cdot \sin(\varphi - \beta)}{\cos(\delta + \alpha') \cdot \cos(\alpha' - \beta)}} \right]^2}$$

$$= \frac{\cos^2(30^\circ - 25^\circ)}{\cos^2 25^\circ \cos 25^\circ \left[1 + \sqrt{\frac{\sin 30^\circ \sin 30^\circ}{\cos 25^\circ \cos 25^\circ}} \right]^2} = 0.037$$

$$E_a = \frac{1}{2} \gamma H^2 K_a = 12kN / m$$

8、解：（1）求 k_a 和 E_a

$$k_a = \tan^2 \left(45^\circ - \frac{\varphi}{2} \right) = 0.333 \quad E_a = \frac{1}{2} \gamma H^2 K_a = 49.28kN / m$$

（2）求 G_K 和 k_s 、 k_t 验算其稳定性

$$G_k = \frac{1}{2} \times (3 - 0.6) \times 4 \times 22 + 0.6 \times 4 \times 22 = 105.6 + 52.8 = 158.4kPa$$

$$k_s = \frac{\mu G_K}{E_a} = 1.61 > 1.3 \quad k_t = \frac{G_{k1} \cdot x_1 + G_{k2} \cdot x_2}{E_a \cdot z_f} = 5.38 > 1.6$$

所以，该挡土墙能满足稳定性的要求。