Datos

$e := 0.95$ $\gamma_w := 9.81\frac{kN}{m^3}$ $\gamma_s := 27\frac{kN}{m^3}$ $OCR := 1.2$ $C_r := 0.03$ $C_c := 0.42$

Un Estrato

$\omega_{sat} := e\cdot\frac{\gamma_w}{\gamma_s}$ $\omega_{sat} = 34.5\cdot\%$

$\gamma := \frac{\gamma_s}{1+e}\cdot(1+\omega_{sat})$ $\gamma = 18.6\cdot\frac{kN}{m^3}$

Tensiónes medias 1 estrato, antes de la carga

$\sigma := \gamma\cdot 4m$ $\sigma = 74.5\cdot kPa$

$u := \gamma_w\cdot 4m$ $u = 39.2\cdot kPa$

$\sigma'_0 := \sigma - u$ $\sigma'_0 = 35.3\cdot kPa$

Tensiónes medias 1 estrato luego de la carga

$\sigma := \gamma\cdot 4m + 100kPa$ $\sigma = 174.5\cdot kPa$

$u := \gamma_w\cdot 4m$ $u = 39.2\cdot kPa$

$\sigma'_f := \sigma - u$ $\sigma'_f = 135.3\cdot kPa$ (Esto es al final de la consolidación)

Tensión de preconsolidación

$\sigma'_c := OCR\cdot\sigma'_0$ $\sigma'_c = 42.3\cdot kPa$

$\Delta e_r := C_r\cdot\log\left(\frac{\sigma'_c}{\sigma'_0}\right)$ $\Delta e_r = 0.002$

$ef := e - \Delta e_r$

$\Delta H_r := \frac{\Delta e_r}{1+e}\cdot 8m$ $\Delta H_r = 0.01\cdot m$

$\Delta e_c := C_c\cdot\log\left(\frac{\sigma'_f}{\sigma'_c}\right)$ $\Delta e_c = 0.2$

$\Delta H_c := \frac{\Delta e_c}{1+ef}\cdot(8m - \Delta H_r)$ $\Delta H_c = 0.87\cdot m$

$\Delta H := \Delta H_r + \Delta H_c$ $\boxed{\Delta H = 0.88\,m}$ $ef = 0.9$

$H_f := 8m - \Delta H = 7.1\,m$

Dos estratos de 4 m cada uno

Tensiónes medias en estrato 1

$\sigma_1 := \gamma \cdot 2m$ $\sigma_1 = 37.3 \cdot kPa$

$u_1 := \gamma_w \cdot 2m$ $u_1 = 19.6 \cdot kPa$

$\sigma'_{01} := \sigma_1 - u_1$ $\sigma'_{01} = 17.6 \cdot kPa$

Tensiónes medias en estrato 2

$\sigma_2 := \gamma \cdot 6m$ $\sigma_2 = 111.8 \cdot kPa$

$u_2 := \gamma_w \cdot 6m$ $u_2 = 58.9 \cdot kPa$

$\sigma'_{02} := \sigma_2 - u_2$ $\sigma'_{02} = 52.9 \cdot kPa$

Tensión de preconsolidación

$\sigma'_{c1} := OCR \cdot \sigma'_{01}$ $\sigma'_{c1} = 21.2 \cdot kPa$

$\sigma'_{c2} := OCR \cdot \sigma'_{02}$ $\sigma'_{c2} = 63.5 \cdot kPa$

Tensiónes medias estrato 1 y 2 luego de la carga

$\sigma'_{f1} := \sigma'_{01} + 100kPa$ $\sigma'_{f1} = 117.6 \cdot kPa$

$\sigma'_{f2} := \sigma'_{02} + 100kPa$ $\sigma'_{f2} = 152.9 \cdot kPa$

Asentamiento estrato 1

$\Delta e_{r1} := C_r \cdot \log\left(\frac{\sigma'_{c1}}{\sigma'_{01}}\right)$ $\Delta e_{r1} = 0.00238$

$\Delta H_{r1} := \frac{\Delta e_{r1}}{1 + e} \cdot 4m$ $\Delta H_{r1} = 0.005 \cdot m$

$e := e - \Delta e_{r1}$

$\Delta e_{c1} := C_c \cdot \log\left(\frac{\sigma'_{f1}}{\sigma'_{c1}}\right)$ $\Delta e_{c1} = 0.3$

$$\Delta H_{c1} := \frac{\Delta e_{c1}}{1 + e}\cdot\left(4m - \Delta H_{r1}\right) \qquad \Delta H_{c1} = 0.642\cdot m$$

$$\Delta H_1 := \Delta H_{r1} + \Delta H_{c1} \qquad \Delta H_1 = 0.6\,m$$

Asentamiento estrato 2

$$\Delta e_{r2} := C_r\cdot\log\left(\frac{\sigma'_{c2}}{\sigma'_{02}}\right) \qquad \Delta e_{r2} = 0.00238$$

$e := e - \Delta e_r$

$$\Delta H_{r2} := \frac{\Delta e_{r2}}{1 + e}\cdot 4m \qquad \Delta H_{r2} = 0.005\cdot m$$

$$\Delta e_{c2} := C_c\cdot\log\left(\frac{\sigma'_{f2}}{\sigma'_{c2}}\right) \qquad \Delta e_{c2} = 0.2$$

$$\Delta H_{c2} := \frac{\Delta e_{c2}}{1 + e}\cdot\left(4m - \Delta H_{r2}\right) \qquad \Delta H_{c2} = 0.329\cdot m$$

$$\Delta H_2 := \Delta H_{r2} + \Delta H_{c2} \qquad \Delta H_2 = 0.3\,m$$

$\Delta H := \Delta H_1 + \Delta H_2$ $\boxed{\Delta H = 0.98\,m}$

$$T_v := 1.781 - 0.933\cdot\log(100 - 95) \qquad T_v = 1.1$$

$$C_v := 2\cdot 10^{-7}\,\frac{m^2}{s} \qquad h_f := 4m \qquad C_\alpha := 0.005$$

$$t_{95} := \frac{T_v\cdot h_f^{\,2}}{C_v} \qquad t_{95} = 90308878.9\,s \qquad t_{95} = 2.9\cdot yr$$

$$\Delta H_\alpha := \frac{C_\alpha}{1 + ef}\cdot\log\left(\frac{5yr}{t_{95}}\right)\cdot H_f \qquad \Delta H_\alpha = 0.4\cdot cm$$

$$H_{final5años} := H_f - \Delta H_\alpha = 711.6\cdot cm$$