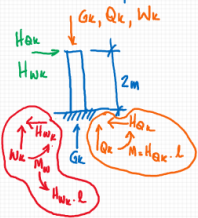


Combinação das Ações



$$H_{Qk} = 20 \text{ kN}$$

$$H_{Wk} = 30 \text{ kN}$$

$$G_k = 100 \text{ kN}$$

$$Q_k = 50 \text{ kN}$$

$$W_k = 30 \text{ kN}$$

$$\gamma_g = 1,4 \text{ (D)} ; \gamma_g = 1,0 \text{ (F)}$$

$$\gamma_q = 1,4 ; \psi_{0q} = 0,7$$

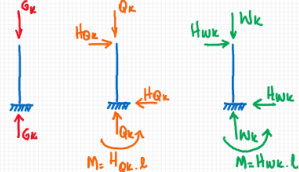
$$\gamma_w = 1,4 ; \psi_{0w} = 0,6$$

Exercício

① Q → como principal

$$N_d = \gamma_g \cdot G_k + \gamma_q \cdot Q_k + \gamma_w \cdot \psi_{0w} \cdot W_k$$

$$N_d = 1,4 \cdot 100 + 1,4 \cdot 50 + 1,4 \cdot 0,6 \cdot 30 = 235,2 \text{ kN} \rightarrow Q_k \text{ (principal)}$$

② $N_d = 231 \text{ kN} \rightarrow W_k \text{ (principal)}$ 

$$\textcircled{1} V_d = \gamma_g \cdot G_k + \gamma_q \cdot H_{Qk} + \gamma_w \cdot \psi_{0w} \cdot H_{Wk} \quad \text{H}_{Qk} \rightarrow \text{principal}$$

$$V_d = 1,4 \cdot 20 + 1,4 \cdot 0,6 \cdot 30 = 53,2 \text{ kN}$$

$$\textcircled{2} V_d = \gamma_w \cdot H_{Wk} + \gamma_q \cdot \psi_{0q} \cdot H_{Qk} \quad \text{H}_{Wk} \rightarrow \text{principal}$$

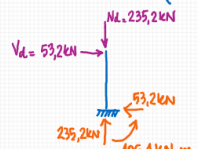
$$V_d = 1,4 \cdot 30 + 1,4 \cdot 0,7 \cdot 20 = 61,60 \text{ kN}$$

$$\textcircled{1} M_d = \gamma_g \cdot G_k + \gamma_q \cdot M_{Qk} + \gamma_w \cdot \psi_{0w} \cdot M_{Wk} \quad \text{H}_{Qk} \rightarrow \text{principal}$$

$$M_d = 0 + 1,4 (20 \cdot 2) + 1,4 \cdot 0,6 \cdot (30 \cdot 2) = 106,4 \text{ kN} \cdot \text{m}$$

$$\textcircled{2} M_d = 0 + \gamma_w (H_{Wk} \cdot l) + \gamma_q \cdot \psi_{0q} \cdot (H_{Qk} \cdot l) \quad \text{H}_{Wk} \rightarrow \text{principal}$$

$$M_d = 1,4 (30 \cdot 2) + 1,4 \cdot 0,7 \cdot (20 \cdot 2) = 123,20 \text{ kN} \cdot \text{m}$$

Ações Q_k como principal

Vento como principal

$$\textcircled{3} Q_k \rightarrow \text{principal} + \gamma_g = 1,0 \text{ (Favorável)}$$

$$\textcircled{4} W_k \rightarrow \text{principal} + \gamma_g = 1,0 \text{ (Favorável)}$$

