

Escaleras

1) Predimensionado

$$h_{\min} = \frac{\text{Luz}}{20}$$

$d = h - \text{recubrimiento}$

2) Cargas

$$g_{\text{piso}} = 0,20 \text{ KN/m}^2$$

$$g_{\text{carpeta}} = 0,03 \text{ m} \cdot 16 \text{ KN/m}^3 = 0,48 \text{ KN/m}^2$$

$$g_{\text{losa}} = (h + 0,07 \text{ m}) \cdot 24 \text{ KN/m}^3$$

$$\cos \alpha = 0,8$$

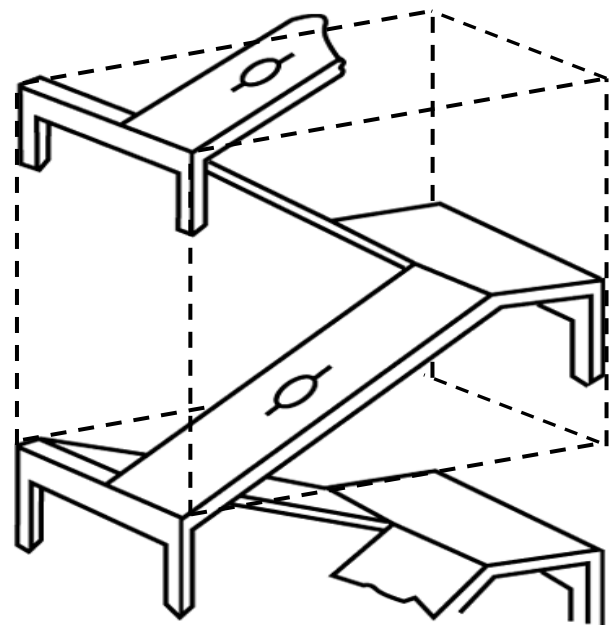
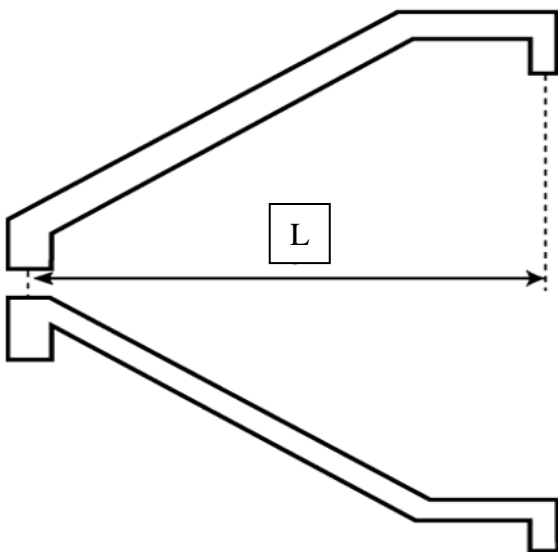
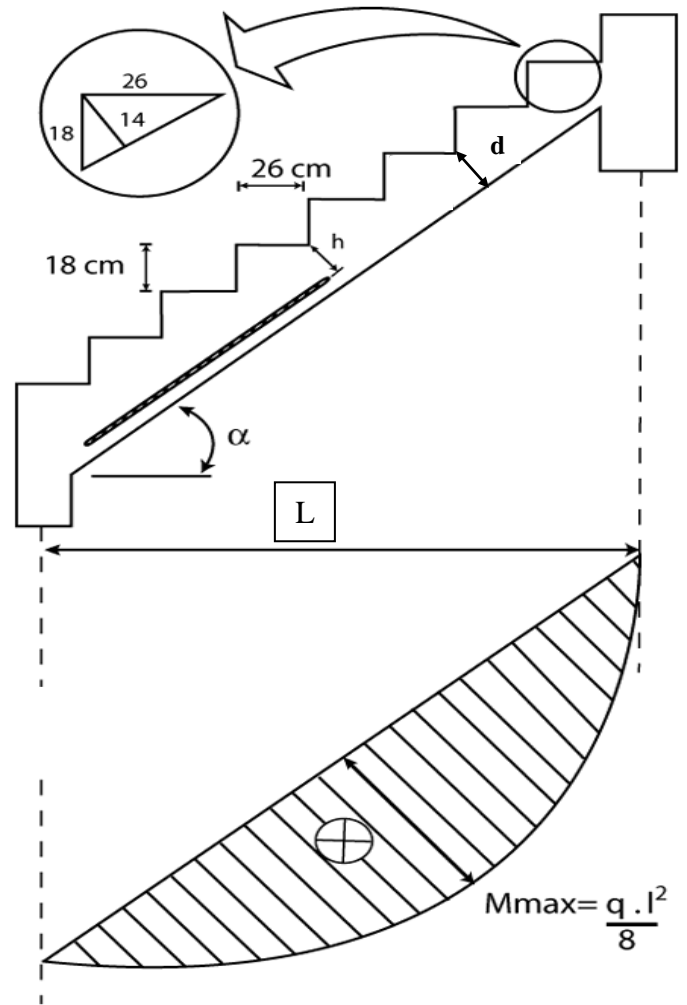
$$p = 3 \text{ KN/m}^2 \text{ (por código)}$$

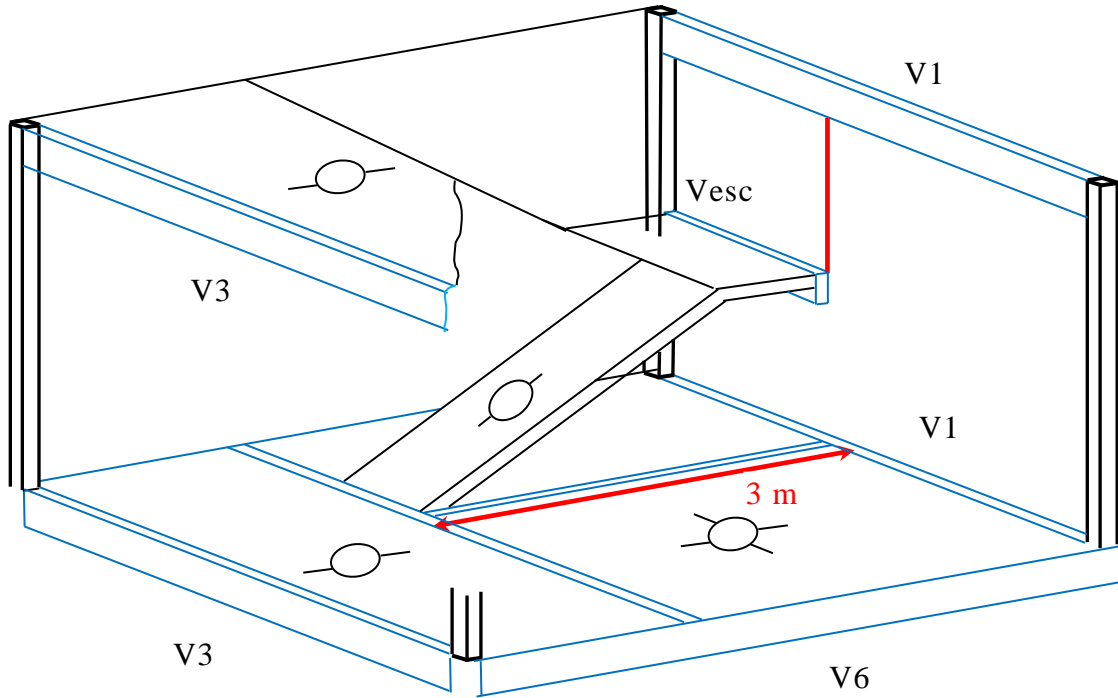
Luego mayorar las cargas para obtener qu

$$3) M_u = \frac{q_u \cdot L^2}{8}$$

4) Armaduras

$$m_n = \frac{M_u}{0,9 \cdot 1 \text{ m} \cdot d^2 \cdot 0,85 \cdot f'_c} \rightarrow k_a \rightarrow A_s$$





Calcular la escalera
H20

1) Predimensionado

$$h_{\min} = \frac{\text{Luz}}{20} = \frac{300 \text{ cm}}{20} = 15 \text{ cm} \quad d = 12,5 \text{ cm}$$

2) Cargas

$$g_{\text{piso}} = 0,20 \text{ KN/m}^2$$

$$g_{\text{carpeta}} = 0,03 \text{ m} \cdot 16 \text{ KN/m}^3 = 0,48 \text{ KN/m}^2$$

$$g_{\text{losa}} = (0,15 \text{ m} + 0,07 \text{ m}) \cdot 24 \text{ KN/m}^3 = 6,6 \text{ KN/m}^2$$

$$\cos \alpha = 0,8$$

$$p = 3 \text{ KN/m}^2 \text{ (por código)}$$

$$D = 7,28 \text{ KN/m}^2 \quad L = 3 \text{ KN/m}^2$$

$$q_u = 1,2 \times 7,28 \text{ KN/m}^2 + 1,6 \times 3 \text{ KN/m}^2 = 13,54 \text{ KN/m}^2$$

$$3) M_u = \frac{q_u \cdot l^2}{8} = \frac{13,54 \text{ KN/m}^2 \times (3 \text{ m})^2}{8} = 15,23 \text{ KNm}$$

4) Armaduras

$$m_n = \frac{15,23 \text{ KNm}}{0,9 \cdot 1 \text{ m} \cdot (12,5 \text{ cm})^2 \cdot 0,85 \cdot 2 \text{ KN/cm}^2} = 0,064 \quad k_a = 0,066$$

$$A_s = \frac{0,066 \cdot 100 \text{ cm} \cdot 12,5 \text{ cm} \cdot 0,85 \cdot 2 \text{ KN/cm}^2}{42 \text{ KN/cm}^2} = 3,34 \text{ cm}^2$$

$$1 \phi 8 \text{ c/14 cm}$$

