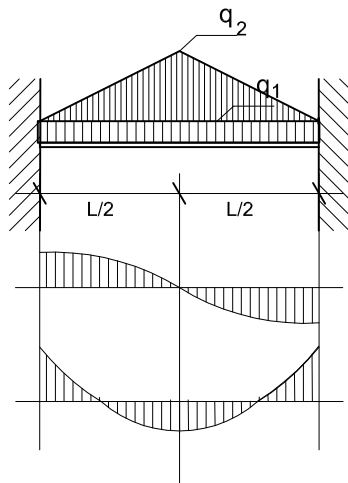


GUIA N°3 - RESULTADOS

1)



$$l = 4,0 \text{ m}$$

$$q_1 = 0,2 \text{ m} \times 0,4 \text{ m} \times 2500 \text{ kg/m}^3 = 200 \text{ kg/ml}$$

$$q_2 = 2,0 \text{ m} \times 550 \text{ kg/m}^2 = 1100 \text{ kg/ml}$$

$$M_a \times 4 + 2M_b(4+0) + 0 \times 0 = 6 \left(\frac{200 \times 4^3}{24} + 5 \frac{1100 \times 4^3}{192} \right)$$

$$M_a = M_b = M$$

$$M = 1183 \text{ kgm}$$

$$R_a = R_b = 1500 \text{ kg}$$

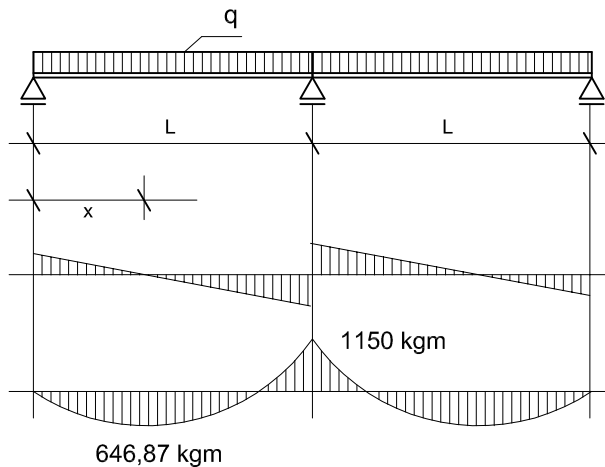
$$M_{2,0} = 1500 \times 2 - 1183 - 200 \times 2 \times 1 - \frac{1100 \times 2 \times 0,66}{2} = 684,4 \text{ kgm}$$

$$I = \frac{b h^3}{12} = \frac{20 \times 40^3}{12} = 106667 \text{ cm}^4$$

$$y = \frac{5 \times 2,0 \times 400^4}{384 \times 268700 \times 106667} + \frac{11 \times 400^4}{120 \times 268700 \times 106667}$$

$$- \frac{2 \times 118300 \times 400^2}{16 \times 268700 \times 106667} = 0,01 \text{ cm}$$

2)



$$l = 4,0 \text{ m}$$

$$q_a = 1,5 \text{ m} \times 250 \text{ kg/m}^2 = 375 \text{ kg/ml}$$

$$q_b = 0,2 \text{ m} \times 0,4 \text{ m} \times 2500 \text{ kg/m}^3 = 200 \text{ kg/ml}$$

$$q_t = 575 \text{ kg/ml}$$

$$0 \times 4 + 2M_b(4+4) + 0 \times 4 = 6 \left(\frac{575 \times 4^3}{24} + \frac{575 \times 4^3}{24} \right)$$

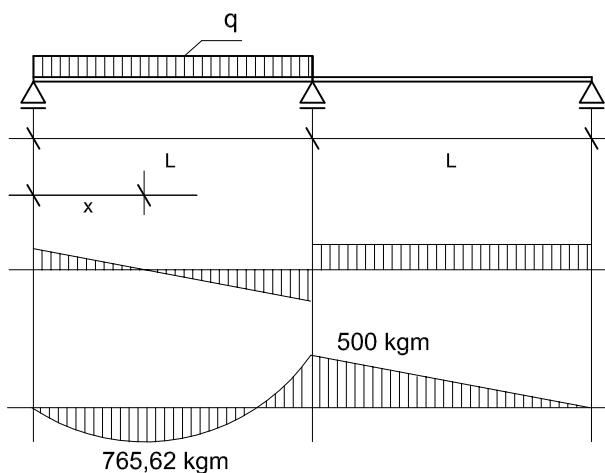
$$M = 1150 \text{ kgm}$$

$$R_a = 862,5 \text{ kg} \quad R_b = 1437,5 \text{ kg}$$

$$V_x = 862,5 - 575 x = 0 \quad x = 1,5 \text{ m}$$

$$M_{1,5} = 862,5 \times 1,5 - \frac{575 \times 1,5^2}{2} = 646,87 \text{ kgm}$$

3)



$$l = 4,0 \text{ m}$$

$$q = 2,0 \text{ m} \times 250 \text{ kg/m}^2 = 500 \text{ kg/ml}$$

$$0 \times 4 + 2M_b(4+4) + 0 \times 4 = 6 \left(\frac{500 \times 4^3}{24} + 0 \right)$$

$$M = 500 \text{ kgm}$$

$$R_a = 875 \text{ kg} \quad R_b = 1125 \text{ kg}$$

$$V_x = 875 - 500 x = 0 \quad x = 1,75 \text{ m}$$

$$M_{1,75} = 875 \times 1,75 - \frac{500 \times 1,75^2}{2} = 765,62 \text{ kgm}$$

$$W = \frac{76562,5}{1440} = 53 \text{ cm}^3 \quad \text{IPE 270}$$