



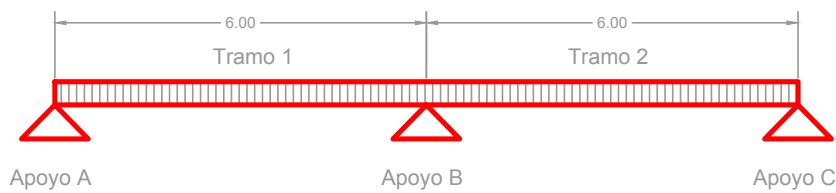
VIGA CONTINUAS

Datos

2 Tramos

$L=6m$

$q=3,0 t / m$



COEFICIENTES

$$q \cdot L^2$$

Coeficientes

DETERMINACIÓN DE MOMENTOS

$$M_{tramo} = \frac{q \cdot L^2}{12} = \frac{3,0 t/m \cdot 36m^2}{12} = 9tm$$

$$M_B = \frac{q \cdot L^2}{-8} = \frac{3,0 t/m \cdot 36 m^2}{-8} = -13,5tm$$

$$M_0 = \frac{q \cdot L^2}{8} = \frac{3,0 t/m \cdot 36 m^2}{8} = 13,5tm$$

REACCIONES

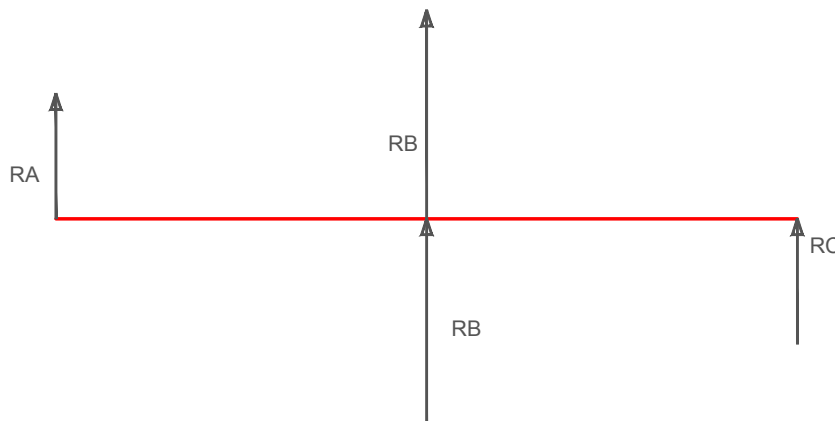
Reacción simple en el tramo AB

$$\frac{q \cdot L}{2} = \frac{3,0 t/m \cdot 6m}{2} = 9t$$

$$R_A = 9t - \frac{M}{L} = 9t - \frac{13,5tm}{6m} = 6,75t$$

$$R_A = R_C = 6,75t$$

$$R_B = 9t + \frac{M}{L} = 9t + \frac{13,5tm}{6m} = 11,25t$$



CORTE EN EL TRAMO AB

$$x_{(V=0)} = \frac{R_A}{q_u} = \frac{6,75t}{3,0 t/m} = 2,25m$$

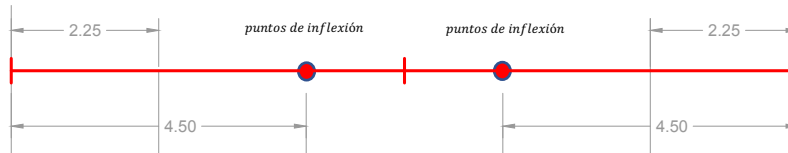


MOMENTO EN EL TRAMO AB

$$M_x = R_A \cdot x - q \frac{x^2}{2} = 6,75t \cdot 2,25m - 3,0 t/m \cdot \frac{(2,25)^2 \cdot m^2}{2} = 7,59tm$$

PUNTO DE INFLEXION

$$0 = R_A \cdot x - q \frac{x^2}{2} = x \left(R_A - q \cdot \frac{x}{2} \right) = 0 = \frac{2 \cdot R_A}{q} = \frac{2 \cdot 6,75t}{3 t/m} = 4,5m$$



puntos de inflexión

DIMENSIONAMIENTO (H°A°)

$$L = 6,00m \quad b = 200mm = 20cm$$

$$d = \frac{L}{15} = \frac{6,00}{15} = 0,4 m$$

$$\text{Se adopta } = b \cdot d = 20cm \cdot 40cm$$

$$\text{Cuantía Mínima} = \frac{b \cdot d}{300} = \frac{20cm \cdot 40cm}{300} = 2,66 cm^2 = 2 \emptyset 12 + 1 \emptyset 8 \longrightarrow 2,76cm^2$$

$$2,26cm^2 + 0,5cm^2$$

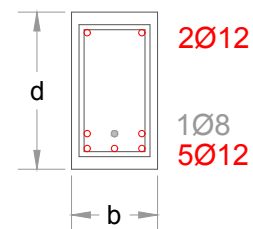
$$z = d - 2r - 1\emptyset barra = 400mm - 40mm - 10mm = 350mm$$

$$A_s = \frac{M_u}{0,9 \cdot z \cdot f_y}$$

$$A_{s_{tramo AB}} = \frac{759 t \cdot cm}{0,9 \cdot 35cm \cdot 4,2 t/cm^2} = 5,73cm^2$$

$$A_{s_{tramo AB}} = 5,73cm^2 = \text{cuantía Mínima} + 3,39$$

$$= 2\emptyset 12 + 1\emptyset 8 + 3\emptyset 12$$



$$A_{s_{apoyo}} = \frac{1350 t \cdot cm}{0,9 \cdot 35cm \cdot 4,2 t/cm^2} = 10,20cm^2$$

$$A_{s_{apoyo}} = 10,20cm^2 = \text{cuantía Mínima} + 7,54cm^2$$

$$= 2\emptyset 12 + 4\emptyset 16$$

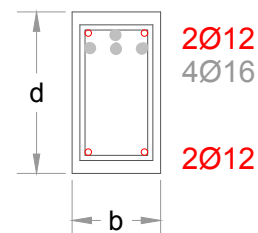


DIAGRAMA DE COBERTURA

Determinar M_n y M_d

Tramo $AB = BC$

$$A_{s_{sup}} = 2\emptyset 12 = 2,26cm^2 \longrightarrow M_n^- = A_s \cdot f_y \cdot z = 3,32tm$$

$$A_{s_{inf}} = 5\emptyset 12 + 1\emptyset 8 = 6,15cm^2 \longrightarrow M_n^+ = A_s \cdot f_y \cdot z = 9,04tm$$

Apoyo

$$A_{s_{sup}} = 4\emptyset 16 + 2\emptyset 12 = 10,30cm^2 \longrightarrow M_n^- = A_s \cdot f_y \cdot z = 15,14tm$$

$$A_{s_{inf}} = 2\emptyset 12 = 2,26cm^2 \longrightarrow M_n^+ = A_s \cdot f_y \cdot z = 3,32tm$$



MOMENTO DE DISEÑO (M_d) \geq MOMENTO ULTIMO (M_u)

$$Md_{Tramo AB}^- = Mn^- \cdot \phi = 3,32 \text{ tm} \cdot 0,9 = 2,98 \text{ tm}$$

$$Md_{Tramo AB}^+ = Mn^+ \cdot \phi = 9,04 \text{ tm} \cdot 0,9 = 8,13 \text{ tm} \geq 7,59 \text{ tm} \quad \text{VERIFICA}$$

$$Md_{Apoyo}^- = Mn^- \cdot \phi = 15,14 \text{ tm} \cdot 0,9 = 13,62 \text{ tm} \geq 13,50 \text{ tm} \quad \text{VERIFICA}$$

$$Md_{Apoyo}^+ = Mn^+ \cdot \phi = 3,32 \text{ tm} \cdot 0,9 = 2,98 \text{ tm}$$

