



# Mi Universidad

*Nombre del Alumno Ervin Altamirano Jimenez*

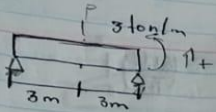
*Nombre del tema:*

*Parcial: 3ro*

*Nombre de la Materia: Analisis de estructuras*

*Nombre del profesor: Arq.Pera*

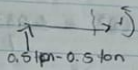
*Nombre de la Licenciatura: Arquitectura*



• Determinar la flexión en el centro de la viga

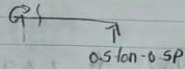
$$0 \leq x \leq 3$$

Corte 1



$$M_1 = 0.5Px - 0.5 \text{ ton}(x)$$

Corte 2



$$M_2 = -0.5 \text{ ton}(x) + 0.5 \text{ ton}(x)$$

$$\sum m_o = 0$$

$$C_x = (6m) 3 \text{ ton/m} - P(3m) = 0$$

$$C_y = -3 \text{ ton/m} \cdot 6m + P(3/6) = 0$$

$$C_y = -0.5 \text{ ton/m} + 0.5 P$$

$$A_x - P + C_x = 0$$

$$A_y = -P (-0.5 \text{ ton} + 0.5 P)$$

$$A_y = +0.5P + 0.5 \text{ ton}$$

$$\frac{dm}{dx} = 0.5x \rightarrow M_1$$

$$\frac{dm}{dx} = 0.5x \rightarrow M_2$$

Formula 
$$\Delta = \int_0^L \frac{M}{EI} \left( \frac{dm}{dx} \right) dx$$

$$\Delta = \int_0^3 \frac{(0.5x)(0.5x)}{EI} dx + \int_0^3 \frac{(0.5x - 3(0.5x))}{EI} dx$$

$$\Delta = \int_0^3 \frac{0.25x^2}{EI} dx + \int_0^3 \frac{(-0.25x^2 + 1.5x)}{EI} dx$$

$$\Delta = -0.25 \left( \frac{x^{2+1}}{2+1} \right) + 0.25 \left( \frac{x^{2+1}}{2+1} \right) \Big|_0^3 - \left[ \frac{1x^{2+1}}{2+1} \right] \Big|_0^3$$

$$\Delta = \frac{-0.25x^3}{3} + \frac{0.25x^3}{3} - \frac{1x^2}{2}$$

$$= \frac{-0.0833(3)^3}{1} + \frac{0.0833(3)^3}{1} - \frac{0.75(9)}{1}$$

$$= \frac{-0.0833(27)}{EI} + \frac{0.0833(81)}{EI} + \frac{0.75(9)}{EI}$$

$$+ \frac{2.2967}{EI} = 2.2967 + 0.75$$

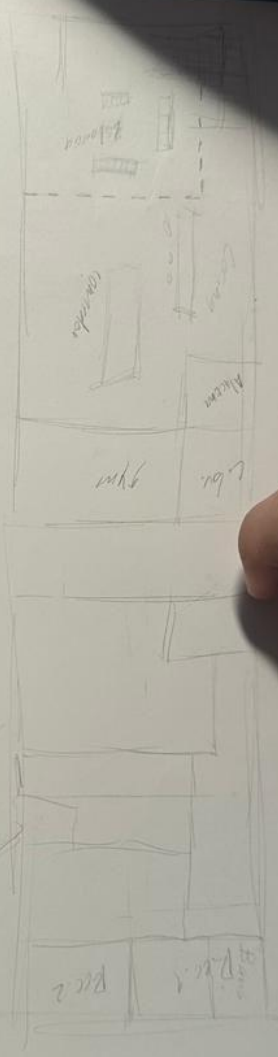
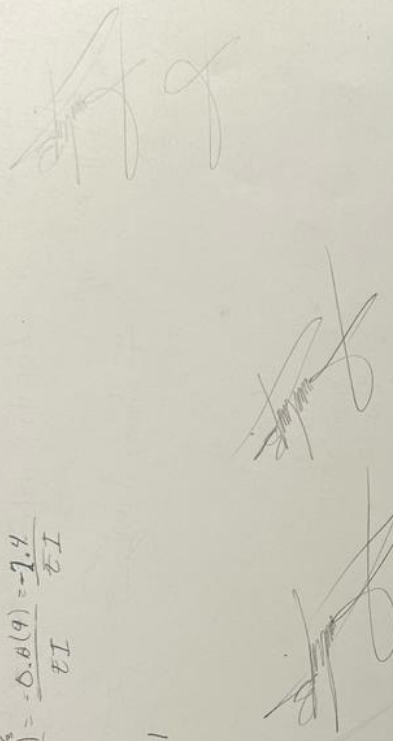
0.75

$$\Delta = \frac{3.0467}{EI}$$

$$\Delta V = \int_0^2 (-2)(0.6x) \frac{EI}{EI} dx = \frac{EI}{EI} \int_0^2 (-1.2x) dx = \frac{EI}{EI} \left[ -0.6x^2 \right]_0^2 = -0.6x^2 \Big|_0^2 = -2.4$$

$$-0.4x^2 \Big|_0^2 = -0.4(2)^2 = -1.6$$

$$-1.931 + 0.64 - 2.4 = -3.191$$



$$\int_0^2 \frac{1.2}{EI} x^2 dx = \frac{1.2}{EI} \left[ \frac{x^3}{3} \right]_0^2 = \frac{1.2}{EI} \left( \frac{8}{3} \right) = \frac{3.2}{EI}$$





1. Aplicar Carga P<sup>o</sup>

$$\sum M_D = 0$$

$$C_y(5m) - 2.7m \cdot m - P(2m) = 0$$

$$C_y = 2.7 \text{ ton} \cdot m / 5m - P(3m/5m)$$

$$C_y = 0.4 \text{ ton} - 0.6P$$

$$A_y - P + C_y = 0$$

$$A_y = P - (0.4 \text{ ton} - 0.6P)$$

$$A_y = 0.4P - 0.4 \text{ ton}$$

Determinar la deflexión en el Punto "B" de la viga.

$$\sum M_1 \frac{a m}{a p} = 0.4 x$$

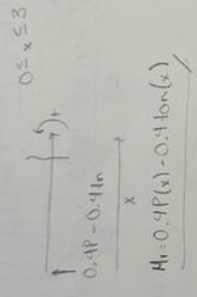
$$\sum M_2 \frac{a m}{a p} = 0.6 x$$

Integral:

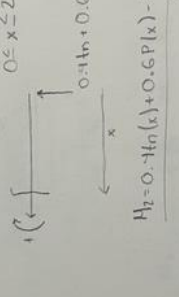
Formula

$$\Delta = \int_0^L \frac{M(x)}{EI} dx$$

Corte 1



Corte 2



$$\Delta_{VB} = \int_0^2 \frac{(-0.4x)(0.4x) dx}{EI} + \int_2^5 \frac{(-0.16x^2)}{EI} dx - \frac{1}{EI} \int_0^2 \frac{(-0.16x^2)}{EI} dx - \frac{1}{EI} \int_2^5 \frac{(-0.16(x^{2+1}))}{2+1} dx$$

$$= \frac{1}{EI} \left[ -\frac{0.16x^3}{3} \right]_0^2 + \frac{1}{EI} \left[ -\frac{0.053x^3}{3} \right]_2^5 - \frac{1}{EI} \left[ -\frac{0.053x^3}{3} \right]_0^2 - \frac{1}{EI} \left[ -\frac{0.08x^2}{2} \right]_2^5$$

$$= \frac{1}{EI} \left[ -\frac{0.16(8)}{3} \right] + \frac{1}{EI} \left[ -\frac{0.053(125)}{3} + \frac{0.053(8)}{3} \right] - \frac{1}{EI} \left[ -\frac{0.053(8)}{3} \right] - \frac{1}{EI} \left[ -\frac{0.08(25)}{2} + \frac{0.08(4)}{2} \right]$$

$$= \frac{1}{EI} \left[ -\frac{1.28}{3} - \frac{6.125 + 0.424}{3} + \frac{0.424}{3} + \frac{0.08(21)}{2} \right] = \frac{1}{EI} [-1.43]$$

INTEGRAL

$$\Delta = \int_0^2 \frac{(-0.4x)(0.4x) dx}{EI} + \int_2^5 \frac{(-0.4x-2)(0.6x) dx}{EI}$$

$$\Delta_{VB} = \int_0^2 \frac{(-0.4x)(0.4x) dx}{EI} + \int_2^5 \frac{(-0.24x^2)}{EI} dx - \frac{1}{EI} \int_0^2 \frac{(-0.24x^2)}{EI} dx - \frac{1}{EI} \int_2^5 \frac{(-0.24(x^{2+1}))}{2+1} dx$$

$$= \frac{0.08(8)^3}{EI} - \frac{0.08(5)^3}{EI} - \frac{0.08(8)^3}{EI} = \frac{0.64}{EI}$$

