

## GUÍA N°2 - RESULTADOS

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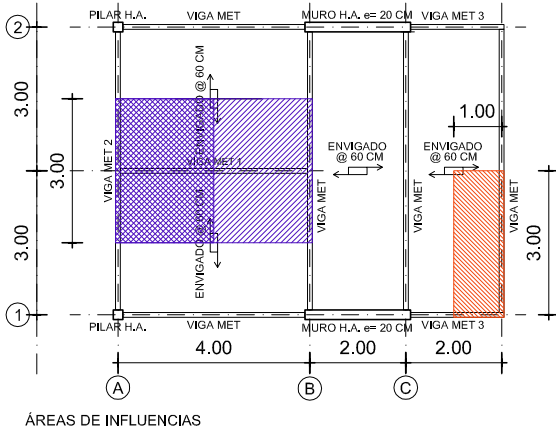
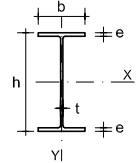


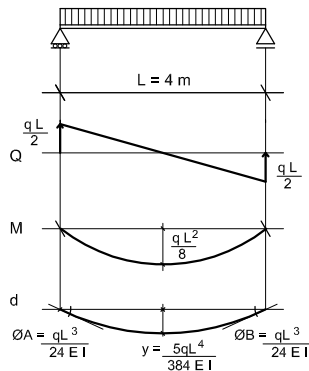
TABLA DE PERFILES SOLDADOS COPROMET

|         | h   | b   | t   | e    | A               | P     | I <sub>x</sub>  | W <sub>x</sub>  | i <sub>x</sub> | I <sub>y</sub>  | W <sub>y</sub>  | i <sub>y</sub> |
|---------|-----|-----|-----|------|-----------------|-------|-----------------|-----------------|----------------|-----------------|-----------------|----------------|
|         | mm  | mm  | mm  | mm   | cm <sup>2</sup> | kg/m  | cm <sup>4</sup> | cm <sup>3</sup> | cm             | cm <sup>4</sup> | cm <sup>3</sup> | cm             |
| IPE 100 | 100 | 55  | 4,1 | 5,7  | 10,30           | 8,10  | 171             | 34,20           | 4,07           | 15,9            | 5,79            | 1,24           |
| IPE 140 | 140 | 73  | 4,7 | 6,9  | 19,40           | 12,90 | 541             | 77,30           | 5,74           | 44,9            | 12,30           | 1,65           |
| IPE 180 | 180 | 91  | 5,3 | 8,0  | 23,90           | 18,80 | 1.320           | 146,00          | 7,43           | 101             | 22,20           | 2,05           |
| IPE 200 | 200 | 100 | 5,6 | 8,5  | 28,50           | 22,40 | 1.940           | 194,00          | 8,25           | 142             | 28,50           | 2,24           |
| IPE 240 | 240 | 120 | 6,2 | 9,8  | 39,10           | 30,70 | 3.890           | 324,00          | 9,97           | 284             | 47,30           | 2,70           |
| IPE 270 | 270 | 135 | 6,6 | 10,2 | 45,90           | 36,10 | 5.790           | 429,00          | 11,23          | 420             | 62,20           | 3,02           |
| IPE 300 | 300 | 150 | 7,1 | 10,7 | 53,80           | 42,20 | 8.360           | 557,00          | 12,47          | 604             | 80,50           | 3,35           |
| IPE 360 | 360 | 170 | 8,0 | 12,7 | 72,70           | 57,10 | 16.270          | 904,00          | 14,96          | 1.040           | 123,00          | 3,78           |

Peso propio de la cubierta + sobrecarga nieve: 125 kg/m<sup>2</sup>

$$q = 375 \text{ kg/ml}$$

## 1) VIGA MET 1



$$q = 125 \text{ kg/m}^2 \times 3 \text{ m} = 375 \text{ kg/ml}$$

## Diseño por resistencia

$$M_{\text{máx}} = \frac{qL^2}{8} = \frac{375 \times (4)^2}{8} = 750 \text{ kg}\cdot\text{m} = 75000 \text{ kg}\cdot\text{cm}$$

$$f_{\text{adm}} = \frac{M}{W} \rightarrow W = \frac{M}{f_{\text{adm}}} = \frac{75000 \text{ kg}\cdot\text{cm}}{1440 \text{ kg/cm}^2} = 52,08 \text{ cm}^3$$

→ Aplicando tabla nos da Perfil IPE 140

## Diseño por deformación

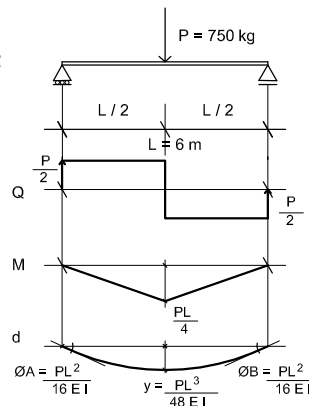
$$y_{\text{adm}} = \frac{400}{300} = 1,33 \text{ cm}$$

$$y = 1,33 \text{ cm} = \frac{5 \times 3,75 \times 400^4}{384 \times 21000000 \times I}$$

$$I = 457 \text{ cm}^4$$

→ Aplicando tabla nos da Perfil IPE 140

## 2) VIGA MET 2



$$P = 125 \text{ kg/m}^2 \times 3 \text{ m} \times 2 \text{ m} = 750 \text{ kg}$$

## Diseño por resistencia

$$M_{\text{máx}} = \frac{PL}{4} = \frac{750 \times 6}{4} = 1125 \text{ kg}\cdot\text{m} = 112500 \text{ kg}\cdot\text{cm}$$

$$f_{\text{adm}} = \frac{M}{W} \rightarrow W = \frac{M}{f_{\text{adm}}} = \frac{112500 \text{ kg}\cdot\text{cm}}{1440 \text{ kg/cm}^2} = 80,35 \text{ cm}^3$$

→ Aplicando tabla nos da Perfil IPE 140

## Diseño por deformación

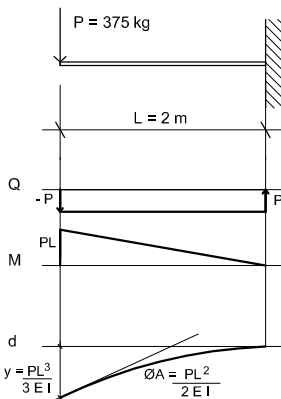
$$y_{\text{adm}} = \frac{600}{300} = 2 \text{ cm}$$

$$y = 2 \text{ cm} = \frac{750 \times 600^3}{48 \times 21000000 \times I}$$

$$I = 803,57 \text{ cm}^4$$

→ Aplicando tabla nos da Perfil IPE 180

## 3) VIGA MET 3



$$P = 125 \text{ kg/m}^2 \times 3 \text{ m} \times 1 \text{ m} = 375 \text{ kg}$$

## Diseño por resistencia

$$M_{\text{máx}} = PL = 375 \times 2 = 750 \text{ kg}\cdot\text{m} = 75000 \text{ kg}\cdot\text{cm}$$

$$f_{\text{adm}} = \frac{M}{W} \rightarrow W = \frac{M}{f_{\text{adm}}} = \frac{75000 \text{ kg}\cdot\text{cm}}{1440 \text{ kg/cm}^2} = 52,08 \text{ cm}^3$$

→ Aplicando tabla nos da Perfil IPE 140

## Diseño por deformación

$$y_{\text{adm}} = \frac{200}{300} = 0,66 \text{ cm}$$

$$y = 0,66 \text{ cm} = \frac{375 \times 200^3}{3 \times 21000000 \times I}$$

$$I = 721,5 \text{ cm}^4$$

→ Aplicando tabla nos da Perfil IPE 180