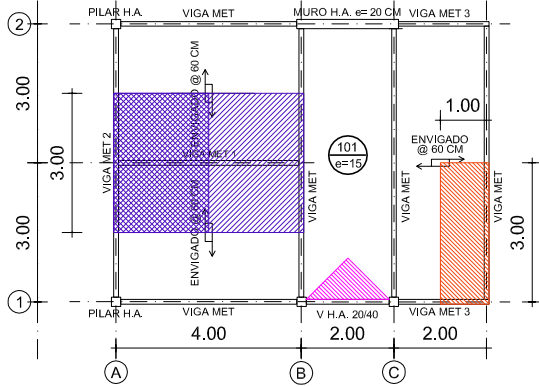


GUÍA N°2 - RESULTADOS

Prof.: Gabriela Muñoz - Verónica Veas

Ayud.: Elisabeth Avalos - Preeti Bellani



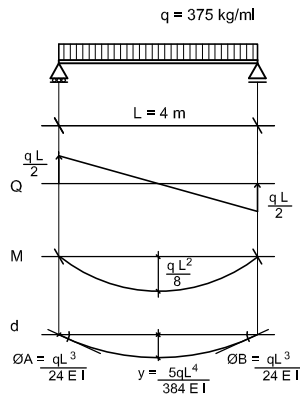
ÁREAS DE INFLUENCIAS

TABLA DE PERFILES SOLDADOS COPROMET

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

Peso propio de la cubierta + sobrecarga nieve: 125 kg/m²

1) VIGA MET 1



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

Diseño por resistencia

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

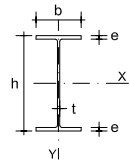
$$f_{\text{adm}} = \frac{M}{W} \rightarrow W = \frac{M}{f_{\text{adm}}} = \frac{75000 \text{ kg} \cdot \text{cm}}{1440 \text{ kg/cm}^2} = 52,08 \text{ cm}^3 \rightarrow \text{Aplicando tabla nos da Perfil IPE 140}$$

Diseño por deformación

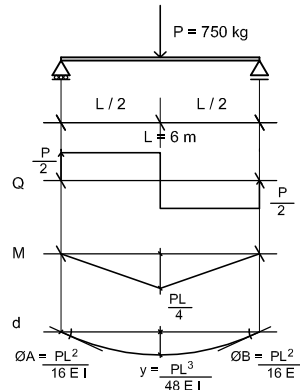
$$y_{\text{adm}} = \frac{400}{300} = 1,33 \text{ cm}$$

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

$$I = 447 \text{ cm}^4 \rightarrow \text{Aplicando tabla nos da Perfil IPE 140}$$



2) VIGA MET 2



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

Diseño por resistencia

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

$$f_{\text{adm}} = \frac{M}{W} \rightarrow W = \frac{M}{f_{\text{adm}}} = \frac{112500 \text{ kg} \cdot \text{cm}}{1440 \text{ kg/cm}^2} = 78,125 \text{ cm}^3 \rightarrow \text{Aplicando tabla nos da Perfil IPE 180}$$

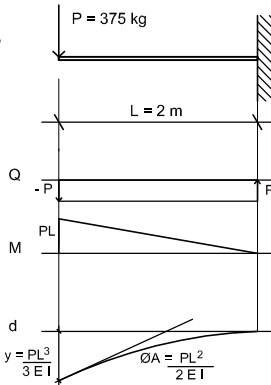
Diseño por deformación

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

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

$$I = 803,57 \text{ cm}^4 \rightarrow \text{Aplicando tabla nos da Perfil IPE 180}$$

3) VIGA MET 3



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

Diseño por resistencia

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

$$f_{\text{adm}} = \frac{M}{W} \rightarrow W = \frac{M}{f_{\text{adm}}} = \frac{75000 \text{ kg} \cdot \text{cm}}{1440 \text{ kg/cm}^2} = 52,08 \text{ cm}^3 \rightarrow \text{Aplicando tabla nos da Perfil IPE 140}$$

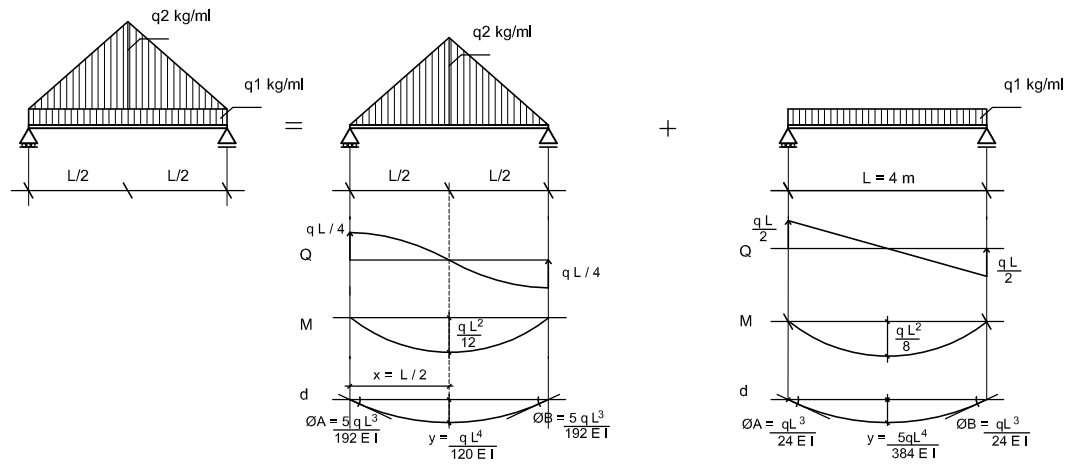
Diseño por deformación

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

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

$$I = 721,5 \text{ cm}^4 \rightarrow \text{Aplicando tabla nos da Perfil IPE 180}$$

4) VIGA H.A 20/40



$$q_2 = (25 \cdot 1 \text{ m}) + (0,15 \cdot 1 \text{ m} \cdot 2500) = 400 \text{ kg/ml}$$

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

$$I = \frac{bh^3}{12} = \frac{20 \cdot 40^3}{12} = 106667 \text{ cm}^4$$

$$I = \frac{bh^3}{12} = \frac{20 \cdot 40^3}{12} = 106667 \text{ cm}^4$$

$$y_1 = \frac{q_2 L^4}{120 EI} = \frac{4 \cdot 200^4}{120 \cdot 220000 \cdot 106667} = 0,0022 \text{ cm} +$$

$$y_2 = \frac{5 q_1 L^4}{384 EI} = \frac{5 \cdot 2 \cdot 200^4}{384 \cdot 220000 \cdot 106667} = 0,0017 \text{ cm}$$

Diseño por deformación

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

$$y_1 + y_2 = 0,0237 \text{ cm}$$

La viga se deforma menos de lo permitido.