

Examen de Elasticidad y Resistencia de Materiales (Exámen) sept-02

$$1) 800 = T \cos 60^\circ \rightarrow \boxed{T = 1.600 \text{ daN}}$$

$$2) V_c = 1.600 \cdot \cos 30^\circ \rightarrow \underline{V_c = 1.386 \text{ daN}}$$

$$V_T = V_h + V_c = 350 + 2 \times 13,86 \Rightarrow \underline{V_T = 377,72 \text{ kN}}$$

$$\lambda_{em-ap} = \frac{0,7l}{i} ; \lambda_{em-li} = \frac{2l}{i} \rightarrow \underline{i' \approx 2,86}$$

← croquis a la vista de la estela de deformación

$$\lambda = \frac{0,7 \times 1800}{i_z} ; \frac{V_T \times w}{2J} \leq \sigma_{adm} \text{ Tanteo}$$

$$2[PN-220 \rightarrow i_z = 8,48 \text{ cm} \quad J_z = 37,4 \text{ cm}^2$$

$$\lambda = \frac{1260}{8,48} = 149 \rightarrow w = 3,91$$

$$\frac{377,72 \times 10^3 \times 3,91}{2 \times 37,4 \times 10^{-4}} = 197 \text{ MPa} > 170 \text{ MPa no vale}$$

$$\boxed{2[PN-240} \rightarrow i_z = 9,22 \text{ cm}; J_z = 42,3 \text{ cm}^2$$

$$\lambda = \frac{1260}{9,22} = 137 \rightarrow w = 3,36$$

$$\frac{377,72 \times 10^3 \times 3,36}{2 \times 42,3 \times 10^{-4}} = 150 \text{ MPa} < 170 \text{ MPa vale}$$

$$4) w = \frac{170 \times 10^6 \times 2 \times 42,3 \times 10^{-4}}{377,72 \times 10^3} = 3,81 \rightarrow \lambda = 147 = \frac{2 \times 1800}{i_x} \rightarrow i_x = 24,49$$

$$d^2 = 24,49^2 - 2,42^2 = 24,37 \text{ cm}; D_T = (24,37 + 2,23) \times 2 = \boxed{53,2 \text{ cm}}$$

$$5) m = \frac{\sigma_{crit}}{\sigma_{Er}} ; \text{lim Euler} \rightarrow \sigma_{el} = \frac{\pi^2 E}{\lambda^2} \rightarrow \lambda^2 = \frac{\pi^2 \times 10^5}{265} \rightarrow \lambda = 86,3$$

$$\sigma_{crit} = \frac{\pi^2 \times 2 \times 10^5}{147^2} = 126,33 ; \sigma_{cr} = \frac{377,72 \times 10^3}{2 \times 42,3 \times 10^{-4}} = 44,65$$

$$\boxed{n = \frac{126,33}{44,65} = 2,83}$$

