

EXERCÍCIO ESTIRADO

①

$d_i = 0.155 \text{ in} \parallel r = 0.24 \parallel K = 42500 \text{ lb/in}^2 \parallel m = 0.151$

$\alpha = 13.8^\circ \parallel \mu = 0.127 \parallel P = 1.75 \text{ hp} \parallel \eta = 90\%$

a) A_F EN CADA TROQUEL

$$A_i = \frac{\pi \cdot 0.155^2}{4} = 0.0189 \text{ in}^2$$

$$A_{F1} = 0.0189 \times (1 - 0.24) = 0.0143 \text{ in}^2$$

$$A_{F2} = 0.0143 \times (1 - 0.24) = 0.0109 \text{ in}^2$$

b) F ESTIRADO EN CADA TROQUEL

$$F = A_F \cdot \frac{\sigma_d}{L}$$

$$\rightarrow \sigma_d = \sigma_F \cdot \left(1 + \frac{m}{E_{\text{mod}}}\right) \cdot \phi \cdot \ln\left(\frac{A_0}{A_F}\right)$$

$$\rightarrow \sigma_F = \frac{K \cdot \epsilon^m}{1+m}$$

$$\phi = 0.88 + 0.12 \cdot \frac{D}{L_c}$$

$$\left\{ \begin{aligned} D &= \frac{D_0 + D_F}{2} \\ L_c &= \frac{D_0 - D_F}{2 \sin \alpha} \end{aligned} \right.$$

1er PRO

(2)

SACO D_{F1} con A_{F1} :

$$\bullet 0'0143 = \frac{\pi D_{F1}^2}{4} \Rightarrow D_{F1} = \sqrt{\frac{4 \times 0'0143}{\pi}} = 0'135 \text{ cm}$$

$$\left\{ \begin{array}{l} D = \frac{0'155 + 0'135}{2} = 0'145 \\ L_c = \frac{0'155 - 0'135}{2 \cdot \sin 13'8} = 0'0419 \end{array} \right. \bullet \phi = 0'88 + 0'112 \frac{0'145}{0'0419} = 1'29$$

$$\bullet \sigma_d = \left(\frac{42500 \cdot \ln\left(\frac{0'189}{0'043}\right)^{0'151}}{1 + 0'151} \right) \cdot \left(1 + \frac{0'129}{\tan(13'8)} \right) \cdot 1'29$$

$$\ln\left(\frac{0'189}{0'043}\right) = 16619'54 \text{ lb/in}^2$$

$$\bullet F = 0'0143 \cdot 16619'54 = 237'66 \text{ lb}$$

2do PRO

$$\text{SOMO } E = E_1 + E_2 = \ln\left(\frac{0'189}{0'0143}\right) + \ln\left(\frac{0'0143}{0'0099}\right) = 0'55$$

IMPORTANT

REPITO D_{F2} y con D_{F1} : $D_{F2} = 0'117 \text{ cm}$

$$\left\{ \begin{array}{l} D = \frac{0'135 + 0'117}{2} = 0'126 \\ L_c = \frac{0'135 - 0'117}{2 \cdot \sin 13'8} = 0'0377 \end{array} \right. \phi = 1'28$$

$$\bullet \sigma_d = \left(\frac{42500 \cdot 0'55^{0'151}}{1 + 0'151} \right) \cdot \left(1 + \frac{0'129}{\tan(13'8)} \right) \cdot 1'28 \cdot 0'55 = 36031 \text{ lb}$$

$$\bullet F = 0'0109 \cdot 36031 = 392'74 \text{ lb}$$

c) VELOCIDAD SALIDA 2db TROR

(3)

$$P = F \cdot V \quad P = 1.75 \cdot 0.19 = 1.575 \text{ hp} \cdot \frac{550 \text{ lb/ft}^2}{1 \text{ hp}}$$

$$V = \frac{P}{F} = \frac{869 \text{ lb/ft}^2}{392.74 \text{ lb}} = 2.212 \text{ lb/s}$$