



Aluno:

GABARITO - T1 - 2012.1

Disciplina:

MEC. SOL. I

Turma:

Professor:

1

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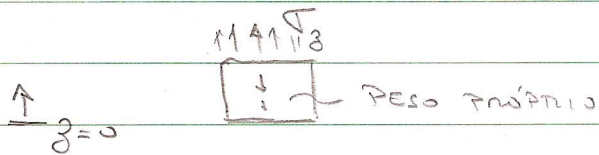
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4

5

1ª QUESTÃO (3,5)

# EQUILÍBRIO:



$$\sigma_z(z) A = \int_0^z \rho A g dz = \rho A g z$$

$$\sigma_z(z) = \rho g z \rightarrow \sigma(z) \Big|_{\text{MAX}} \text{ em } z=L$$

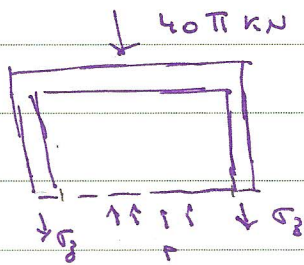
$$\sigma_{\text{MAX}} = \rho g L \leq \sigma_{\text{ruptura}}$$

$$L \leq \frac{200 \times 10^6}{2.800 \times 10}$$

$$L \leq 71429 \text{ m}$$

## 2ª. QUESTÃO

# EQUILÍBRIO NA DIREÇÃO Z



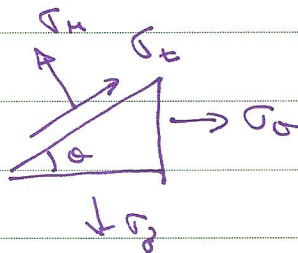
$$\sigma_z 2\pi R t + 40\pi k = p \pi R^2$$

$$\sigma_z = \frac{1}{2} \frac{(-40k + pR^2)}{Rt} = 32 \text{ MPa}$$

# EQUILÍBRIO EM  $\theta$  :  $\sigma_\theta = \frac{pR}{t} = 68 \text{ MPa}$

$$\# \begin{cases} \sigma_r = 0 \rightarrow \text{TENSÃO PLANA} \\ \sigma_{\theta\theta} = \sigma_{\phi\phi} = \sigma_{rr} = 0 \end{cases}$$

• PLANO DA SOLDADA



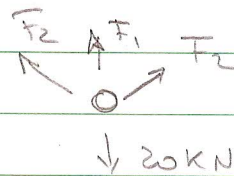
$$\tan \theta = \frac{3}{4}$$

$$\sigma_n = \sigma_\theta \cos^2 \theta + \sigma_z \sin^2 \theta = 45 \text{ MPa}$$

$$\sigma_t = \sigma_\theta \sin \theta \cos \theta = 17 \text{ MPa}$$

3ª QUESTÃO (2,5 PONTOS)

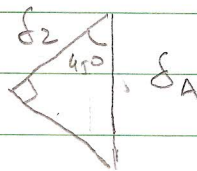
# EQUILIBRIO



$$F_1 + \cancel{2} F_2 \frac{\sqrt{2}}{\cancel{2}} = 20 \times 10^3$$

$$F_1 + F_2 \sqrt{2} = 20 \times 10^3 \quad (1)$$

# COMPATIBILIDADE GEOMÉTRICA



$$\delta_A \sin 45^\circ = \delta_2 \quad (2)$$

# COMP. CONSTITUTIVO :  $\frac{F_1}{S} = E \frac{\delta_A}{L} \quad \therefore F_1 = \frac{ES}{L} \delta_A \quad (3.1)$   
( $\sigma = E \epsilon$ )

$$\frac{F_2}{-S} = E \frac{\delta_2}{L\sqrt{2}} \quad \therefore F_2 = \frac{ES}{L\sqrt{2}} \delta_2 \quad (3.2)$$

$$(3.1) \text{ e } (3.2) \rightarrow (1)^o$$

$$\frac{ES}{L} \delta_A + \frac{ES}{L\sqrt{2}} \delta_2 = 20 \times 10^3$$

$$\frac{ES}{L} \left[ \delta_A + \delta_A \frac{\sqrt{2}}{2} \frac{1}{\sqrt{2}} \right] = 20 \times 10^3$$

$$\left\{ S \geq 30 \text{ mm}^2 \right\}$$