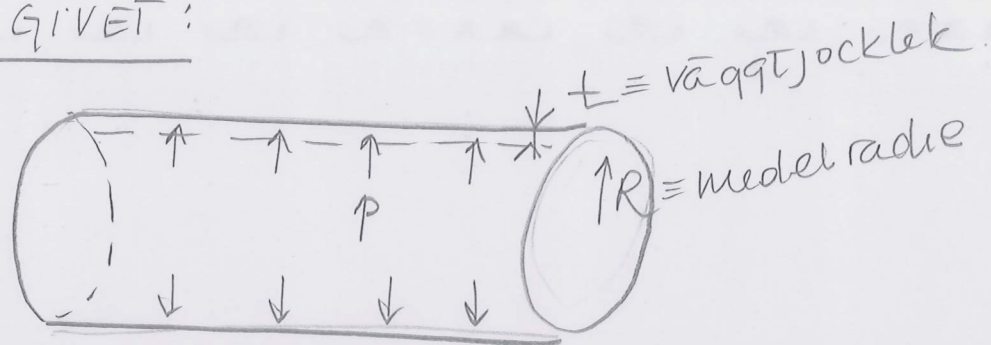


2.8.11

GIVET:

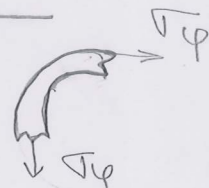


tunnväggigt \Leftrightarrow tjockväggigt

SÖKT: Skillnad i tangentiell spänning mellan tjockväggigt \Leftrightarrow tunnväggigt. $R/t = 2, 5, 10$

LÖSNING:

Tangentiell spänning: σ_φ



Tunnväggiga rör: $\sigma_\varphi^{\text{tunn}} = \frac{p \cdot R}{t}$

Tjockväggiga rör: $\sigma_\varphi^{\text{tj}} = A + \frac{B}{r^2}$ men A, B?

1. - Hitta A, B.

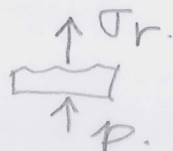
2. - Ta fram $\sigma_\varphi^{\text{tj}}$

3. - Jämför $\sigma_\varphi^{\text{tunn}} \Leftrightarrow \sigma_\varphi^{\text{tj}}$

1 - Titta på R.V:

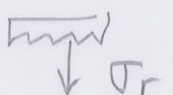
$$\sigma_r = A - \frac{B}{r^2}$$

$$r = R - \frac{t}{2} \text{ (snitta)}$$



$$\text{Jmv} \Rightarrow \sigma_r \left(r = R - \frac{t}{2} \right) = -p$$

$$r = R + \frac{t}{2}$$



$$\text{Jmv} \Rightarrow \sigma_r \left(r = R + \frac{t}{2} \right) = 0$$

$$\begin{matrix} 2 \text{ ekv} \\ 2 \text{ obek} \end{matrix} \Rightarrow \underline{\text{LÖS}} \quad \nabla r = \frac{\rho \left(R - \frac{t}{2}\right)^2}{2Rt} \left(1 - \frac{\left(R + \frac{t}{2}\right)^2}{r^2}\right)$$

[F.S. 7.30]

$$\left. \begin{matrix} A = \dots \\ B = \dots \end{matrix} \right\} \Rightarrow \nabla \varphi^{+j} = \dots$$

2. -

$$\nabla \varphi^{+j} = \frac{\rho \left(R - \frac{t}{2}\right)^2}{2Rt} \left(1 + \frac{\left(R + \frac{t}{2}\right)^2}{r^2}\right) \quad [\text{F.S. 7.30}]$$

3
väljer
inreradien,

$$\nabla \varphi^{+j} = \frac{\rho \cdot \left(R/t - 1/2\right)^2}{2(R/t)} \left(1 + \frac{\left(R/t + 1/2\right)^2}{(r/t)^2}\right)$$

3

$$\nabla \varphi^{+j} \left(r = R - \frac{t}{2}\right) = \frac{\rho \cdot (x - 1/2)^2}{2x} \left(1 + \frac{(x + 1/2)^2}{(x - 1/2)^2}\right)$$

(param. ändring $\Rightarrow x = R/t$)

$$\nabla \varphi^{+j} \left(R - \frac{t}{2}\right) = \frac{\rho \cdot (x^2 + 1/4)}{x}$$

$$\nabla \varphi^{+j} \left(R - \frac{t}{2}\right) = \rho \cdot \left(x + \frac{1}{4x}\right)$$

$$\frac{\nabla \varphi^{+j} - \nabla \varphi^{+uuu}}{\nabla \varphi^{+j}} = \frac{1}{4x^2 + 1}$$

$$x = 2 \Rightarrow 1/17 \sim 6\%$$

$$x = 5 \Rightarrow 1/101 \sim 1\%$$

$$x = 10 \Rightarrow 1/401 \sim 0.2\%$$

Felet minskar
här man. $x \rightarrow \infty$