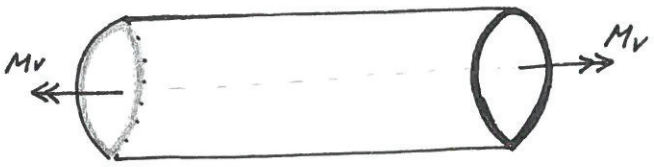
2.6.1 Givet Tunnväggigt rör

- x Tunnväggigt
- x Medelradie a
- x Godstjocklek h
- x Vridmoment M_V



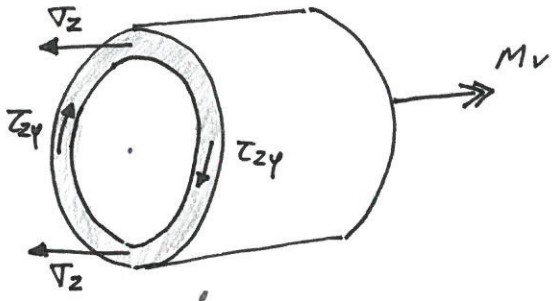
Sökt Spänningstillstånd

Lösning

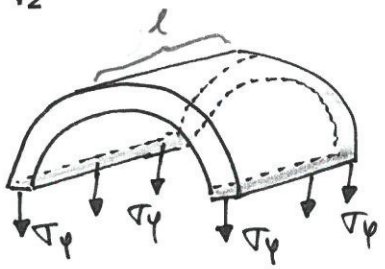
(1. Friläggning, 2. Jmv)

3. Snitta

a)



b)



4. Jmv

a) $\rightarrow: -\sigma_z \cdot A = 0 \quad \Rightarrow \underline{\sigma_z = 0}$

Obs

$\Rightarrow dA = h \cdot a\, d\varphi$

$\therefore A = \int_0^{2\pi} dA = \int_0^{2\pi} h \cdot a\, d\varphi = \underline{2\pi h a}$

Area som σ_z och $\tau_{z\varphi}$ verkar på!

$\circlearrowright: -M_V + \tau_{z\varphi} \cdot A \cdot \underline{a} = 0$ "hävarmen"

$\Leftrightarrow \tau_{z\varphi} = \frac{M_V}{A \cdot a} = \frac{M_V}{2\pi h a^2}$

b) $\uparrow: -\sigma_\varphi \cdot \underline{2\pi \cdot l} = 0 \quad \Rightarrow \sigma_\varphi = 0$

Area som σ_φ verkar på!

Svar

$$\begin{cases} \sigma_r = 0 \\ \tau_{rz} = 0 \\ \tau_{r\varphi} = 0 \end{cases}$$ ty tunnväggigt

$$\begin{cases} \sigma_z = 0 \qquad \sigma_\varphi = 0 \\ \tau_{z\varphi} = \dfrac{M_V}{2\pi a^2 h} \end{cases}$$ (pga M_V)