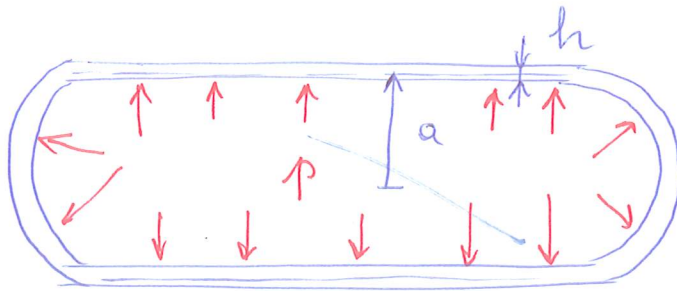


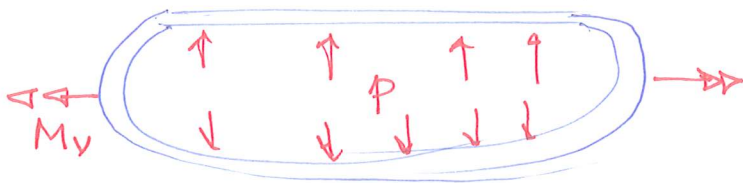
2.11.7

GIVET



sträckgränsen:  $\sigma_s$   
 på grund av  
 övertryck är  
 $\sigma_e^{vm} = \frac{1}{2} \sigma_s$

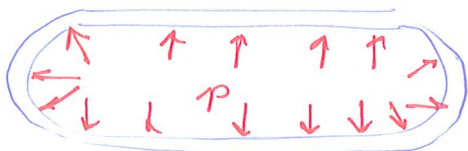
SÖKT:



-  $M_v$  innan röret  
 börjar plastisera.  
 (begränsande plast.)

LÖSNING:

I början.



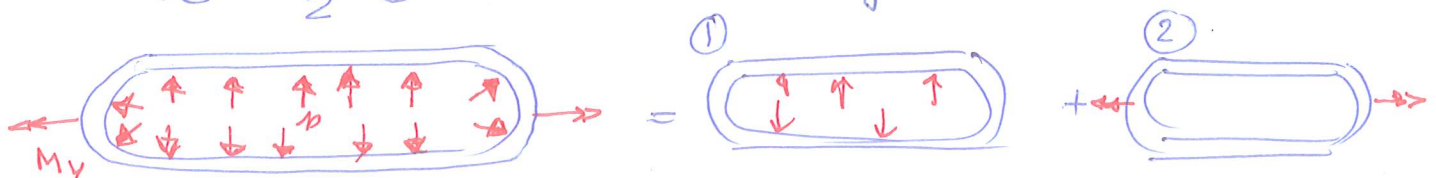
spänningsstillståndet:  
 ⇒ med ångpannens formler:  
 $\sigma_r \approx 0$ ;  $\sigma_z = \frac{p \cdot a}{2h}$ ;  $\sigma_p = \frac{p \cdot a}{h}$

③ VM flyttlag:

$$\sigma_e = \sqrt{\left(\frac{p \cdot a}{2h}\right)^2 + \left(\frac{p \cdot a}{h}\right)^2} = \frac{1}{2} \sigma_s$$

↑  
givet

(1)



① Ångpannens formler

$$\sigma_p^{(1)} = \frac{p \cdot a}{h}$$

$$\sigma_z^{(1)} = \frac{p \cdot a}{2h}$$

$$\sigma_r^{(1)} \approx 0$$

② Vridning:

$$\varphi_z^{(2)} = \frac{M_v}{2\pi a^2 h}$$

$$\varphi_z \Rightarrow \sum 2\pi a h \cdot a - M_v = 0$$

① + ② :

$$\sigma_{\psi} = \frac{\rho a}{h}$$

$$\sigma_z = \frac{\rho a}{2h}$$

$$\sigma_r \approx 0$$

$$\tau_{\psi z} = \frac{M_v}{2\pi a^2 h}$$

$$\sigma_e = \sqrt{\underbrace{\left(\frac{\rho a}{h}\right)^2 + \left(\frac{\rho a}{2h}\right)^2 - \left(\frac{\rho a}{h} \frac{\rho a}{2h}\right)}_{(1) : \left(\frac{1}{2} \sigma_s\right)^2} + 3 \left(\frac{M_v}{2\pi a^2 h}\right)^2} < \sigma_s$$

$$\frac{\sigma_s^2}{4} + \frac{3}{4} \left(\frac{M_v}{\pi a^2 h}\right)^2 < \sigma_s^2$$

$$\cancel{\frac{3}{4}} \left(\frac{M_v}{\pi a^2 h}\right) < \cancel{\frac{3}{4}} \frac{\sigma_s^2}{\cancel{4}}$$

$$\boxed{M_v < \sigma_s \pi a^2 h}$$

VM.