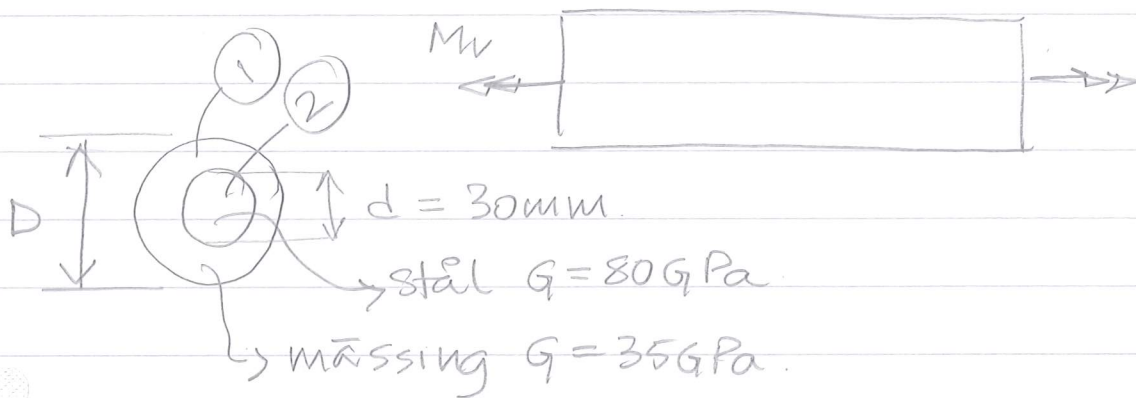


2.6.22

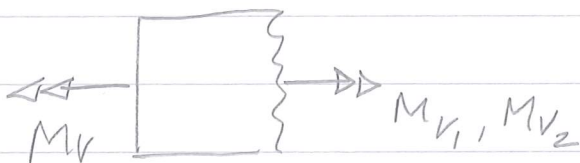
GIVET



SÖKT:  $D$ ? för att  $M_{v1} = M_{v2}$   
 $\tau_{\text{max}1} / \tau_{\text{max}2}$ ?

LÖSNING:

1. - Snitta och gmv



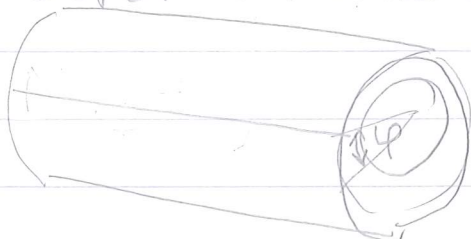
$$\text{gmv} \Rightarrow \underline{M_v = M_{v1} + M_{v2}} \quad (1)$$

STATISK  
OBESTÄMT (20 bek  
1 ekv)

+ samband ( $\Rightarrow$  givet)  $\underline{M_{v1} = M_{v2}} \quad (2)$

$$(2) \text{ i } (1) \Rightarrow \begin{cases} M_{v1} = M_v / 2 \\ M_{v2} = M_v / 2 \end{cases}$$

2. - Deformationssambandet ger:



$$\underline{\underline{\phi_1 = \phi_2}}$$

3. - Förvrindningsvinkel  $\varphi$ :

$$\varphi_1 = \frac{M_{v1} L_1}{G_1 k_1} = \begin{cases} M_{v1} = M_v/2 \\ L_1 = L \\ k_1 = \frac{\pi}{2} \left( \left( \frac{D}{2} \right)^4 - \left( \frac{d}{2} \right)^4 \right) \end{cases}$$

$$\varphi_1 = \frac{(M_v/2) L}{G_1 \left( \frac{\pi}{2} \left( \frac{D^4}{16} - \frac{d^4}{16} \right) \right)}$$

$$\varphi_2 = \frac{M_{v2} L_2}{G_2 k_2} = \begin{cases} M_{v2} = M_v/2 \\ L_2 = L \\ k_2 = \frac{\pi}{2} \left( \frac{d^4}{16} \right) \end{cases}$$

$$\varphi_2 = \frac{(M_v/2) L}{G_2 \frac{\pi}{2} \left( \frac{d^4}{16} \right)}$$

$$\varphi_1 = \varphi_2$$

$$\frac{(\cancel{M_v/2}) \cancel{L}}{G_1 \left( \frac{\pi}{2} \left( \frac{D^4}{16} - \frac{d^4}{16} \right) \right)} = \frac{(\cancel{M_v/2}) \cancel{L}}{G_2 \left( \frac{\pi}{2} \left( \frac{d^4}{16} \right) \right)}$$

$$G_2 \left( \frac{d^4}{16} \right) = G_1 \left( \frac{D^4}{16} - \frac{d^4}{16} \right)$$

$$\cancel{16} \frac{(G_1 + G_2)}{G_1} \left( \frac{d^4}{\cancel{16}} \right) = D^4$$

$$D = \sqrt[4]{\frac{d^4 (G_1 + G_2)}{G_1}}$$

$$D = 40,39 \text{ mm}$$

$$\epsilon_{\max 1} = \frac{M_{v1}}{W_1} \quad \left\{ \begin{array}{l} M_{v1} = M_v/2 \\ W_1 = \frac{\pi}{2} \frac{D}{2} \left( \left( \frac{D}{2} \right)^4 - \left( \frac{d}{2} \right)^4 \right) \end{array} \right.$$

$$\epsilon_{\max 2} = \frac{M_{v2}}{W_2} \quad \left\{ \begin{array}{l} M_{v2} = M_v/2 \\ W_2 = \frac{\pi}{2} \frac{d}{2} \left( \frac{d^4}{8} \right) \end{array} \right.$$

$$\frac{\epsilon_{\max 1}}{\epsilon_{\max 2}} = \frac{W_2}{W_1} = \frac{\pi d^3/8}{\frac{\pi}{2} \frac{D}{2} \left( \frac{D^4}{16} - \frac{d^4}{16} \right)} = \frac{\pi D}{\left( \frac{D^4}{d^3} - d^3 \right)} \quad (M_{v1} = M_{v2})$$

$$\boxed{\frac{\epsilon_{\max 1}}{\epsilon_{\max 2}} = 0,588}$$