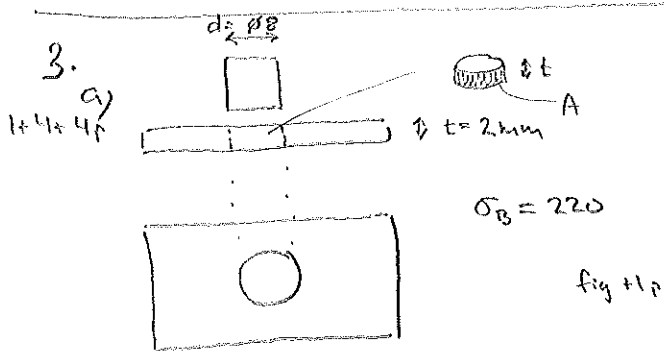


1. $\tau = \frac{F}{A}$
 3p
 $\tau = 1 \left[\frac{N}{mm^2} \right]$
 $F = 6000 [N]$ fördela på 2 limar
 $A_{tot} = 2 \cdot \frac{L}{2} \cdot 95$ +1p
 \uparrow
 2st
 $= L \cdot 95$
 $\Rightarrow 1 = \frac{6000}{L \cdot 95} \Rightarrow$ +1p
 $L = \frac{6000}{95} \approx 63,2 < 64$
 SVAR: 64 mm +1p



b) $\tau = \frac{F}{A}$
 $A = \pi d t$ (skjuvarea) +1p
 $\tau_B = \sigma_B \cdot 0,6$ +1p
 ska gå sönder +1p
 B + motv

$\sigma_B \cdot 0,6 = \frac{F}{\pi d t} \Rightarrow$
 $F = 0,6 \pi d t \sigma_B$
 $= 0,6 \pi \cdot 8 \cdot 2 \cdot 220$
 $\approx 6635 < \underline{6,7 kN}$ +1p

c) $\sigma_s = \frac{F}{A}$ +1p
 \uparrow
 för ej ändras +1p
 $A = \pi r^2$
 $d = 2r$
 $\sigma_s = \frac{6700}{\pi \cdot 4^2} = 133 < 500 \Rightarrow$ +1p
 håller SVAR: b) F = 6,7 kN c) håller +1p

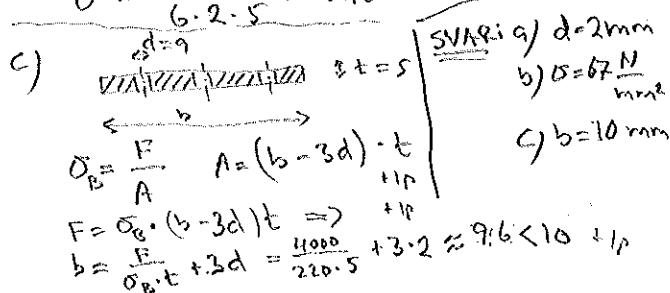
4. $\tau = \frac{F}{A}$
 5p
 $\tau_s = 0,6 \sigma_s$
 \uparrow
 inga deformationer \Rightarrow +1p
 $A = 2 \cdot (L - 2a) a$ +1p
 \uparrow +1p
 2st
 $0,6 \sigma_s = \frac{F}{2(L - 2a) a} \Rightarrow$
 $F = 0,6 \cdot 2 \cdot (L - 2a) a \sigma_s$
 $a = 3$
 $L = 200$
 $\sigma_s = 300$

$F = 0,6 \cdot 2 \cdot (200 - 2 \cdot 3) \cdot 3 \cdot 300$
 $F = 209520 > 200 [kN]$
 SVAR: 200 kN

5. 3+2+3p
 a) 6 nitar delar på kraften
 $\tau = \frac{F}{A}$ +1p
 $\tau_s = 0,6 \sigma_s$ +1p
 \uparrow
 mindre deformation +1p
 $A = 6 \cdot \pi r^2$ +1p

sökt: $d = 2r$ [mm]
 $0,6 \sigma_s = \frac{F}{6 \pi r^2}$
 $r = \sqrt{\frac{F}{6 \pi \cdot 0,6 \cdot \sigma_s}}$
 $= \sqrt{\frac{4000}{3,6 \cdot \pi \cdot 500}} \approx 0,84$

$d = 2r \approx 1,7 < 2$ +1p
 b) $\sigma = \frac{F}{A}$
 $A = 6 \cdot d \cdot t$ +1p
 \uparrow
 6st
 $\sigma = \frac{F}{6 d t}$
 $\sigma = \frac{4000}{6 \cdot 2 \cdot 5} \approx 66,6 \approx 67$ +1p

c) 
 $\sigma_B = \frac{F}{A}$ +1p
 $A = (b - 3d) \cdot t$ +1p
 $F = \sigma_B \cdot (b - 3d) t \Rightarrow$ +1p
 $b = \frac{F}{\sigma_B \cdot t} + 3d = \frac{4000}{220 \cdot 5} + 3 \cdot 2 \approx 9,6 < 10$ +1p
 SVAR: a) d = 2 mm
 b) $\sigma = 67 \frac{N}{mm^2}$
 c) b = 10 mm

$$d=2r=? \quad \text{nit av skjuvna}$$

$$6. \quad F = 20\,000 \text{ N}$$

5+4+4p)

$$A_{\text{tot}} = 4\pi r^2$$

4st brotylor

$$n = 1,5$$

$$\tau_s = 0,6 \sigma_s = 0,6 \cdot 500 = 300$$

deformation moduli

$$\tau_{\text{till}} = \frac{F}{A} \rightarrow \tau_{\text{till}} = \frac{F}{4\pi r^2}$$

$$\tau_{\text{till}} = \frac{\tau_s}{n} = \frac{300}{1,5} = 200$$

$$\Rightarrow r = \sqrt{\frac{F}{4\pi \tau_{\text{till}}}}$$

$$= \sqrt{\frac{20\,000}{4\pi \cdot 200}}$$

$$\approx 2,82$$

$$d = 2r \approx 5,6 < 6$$

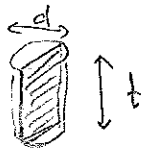
hålkanttryck $t=?$

$$\sigma_{\text{till}} = \frac{F}{A}$$

$$\sigma_{\text{till}} = \frac{\sigma_s}{n} = \frac{500}{1,5} = 333,33 \dots$$

$$A = 2d \cdot t$$

2 hål

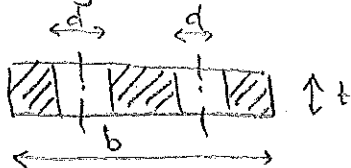


$$\Rightarrow \sigma_{\text{till}} = \frac{F}{2d \cdot t} \Rightarrow$$

$$t = \frac{F}{2d \cdot \sigma_{\text{till}}}$$

$$= \frac{20\,000}{2 \cdot 6 \cdot 333,33 \dots} \approx 12,5 < 13$$

drag i plattor $b=?$



$$\sigma_{\text{till}} = 333,33 \text{ fr ovan} \quad +1p$$

$$\sigma_{\text{till}} = \frac{F}{A}$$

$$A = (b - 2d)t \quad +1p$$

$$\Rightarrow \sigma_{\text{till}} = \frac{F}{(b - 2d)t}$$

$$\Rightarrow (b - 2d) = \frac{F}{\sigma_{\text{till}} \cdot t}$$

$$b = \frac{F}{\sigma_{\text{till}} \cdot t} + 2d$$

$$= \frac{20\,000}{133,33 \cdot 13} + 2 \cdot 6$$

$$\approx 11,5 + 12 \approx 23,5 < 24$$

SVARI nit $d = 6 \text{ mm}$

plattjärn $t = 7 \text{ mm}$

$b = 24 \text{ mm}$