

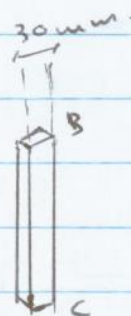
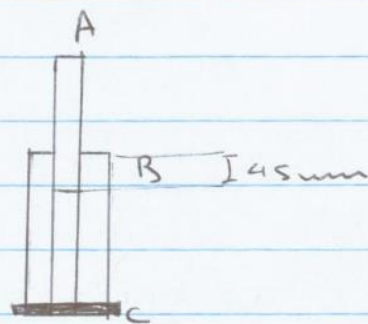
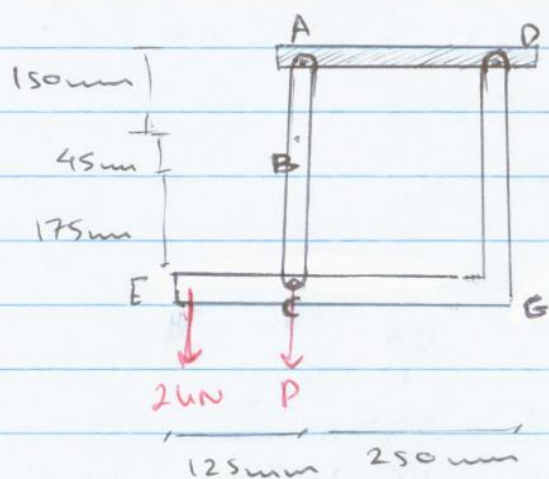
Project 2.

Flavins Apples - 2018050055

$$E_1 = 1$$

$$E_3 = 18$$

1)



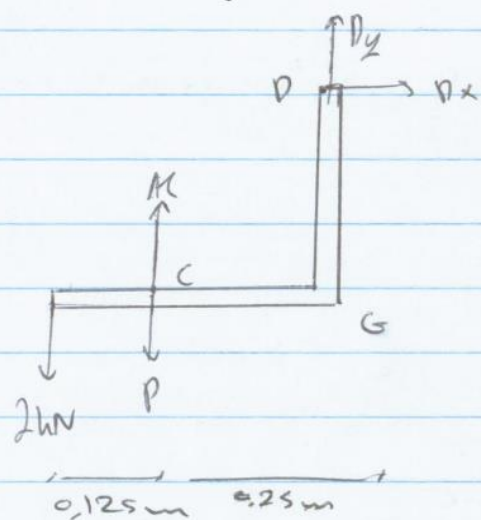
$$P = 22 \text{ kN}$$

$$\sigma_{\text{cr}} = 151 \text{ MPa}$$

$$\tau_{\text{cr}} = 68 \text{ MPa}$$

2)

$\Delta C \varepsilon$ parabolice undeformare



AC $\rightarrow$ for 2 swartur - așevim
fieron

$$\sum M_D = 0 \Rightarrow 2 \cdot 0,375 + 22 \cdot 0,250 = AC \cdot 0,250$$

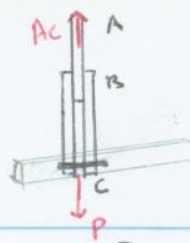
$$\Rightarrow AC = 25 \text{ kN} \uparrow$$

Pia 2a clădărea BC - idic raxey

$$\sigma_{AB} = 151 \cdot 10^6 \text{ Pa} \Rightarrow \frac{AC/2}{A_{AC}} = 151 \cdot 10^6$$

$$\Rightarrow \frac{12,5 \cdot 10^3}{0,03 t_1} = 151 \cdot 10^6 \Rightarrow t_1 = 2,76 \cdot 10^{-3} \text{ m} = 2,76 \text{ mm}$$

Pia 2a AB : $\sigma_{\text{cr}} = \frac{F_{AB}}{A_{AB}} \Rightarrow 151 \cdot 10^6 = \frac{25 \cdot 10^3}{0,03 t_2} \Rightarrow t_2 = 5,52 \cdot 10^{-3} \text{ m}$
 $= 5,52 \text{ mm}$

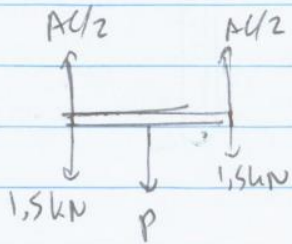


2) Analiza A : $\tau = \frac{F_{AC}}{\frac{\pi d^2}{4}} \Rightarrow 68 \cdot 10^6 \cdot \frac{4 \cdot 25 \cdot 10^3}{\pi d^2}$

$$\Rightarrow d^2 = 4,68 \cdot 10^{-4}$$

$$d = 2,16 \cdot 10^{-2} \text{ m} \text{ in } 2,16 \text{ cm}$$

Analiza C



$$\tau = \frac{F_{AC}/2 - 1,5}{\frac{\pi d^2}{4}} \Rightarrow 68 \cdot 10^6 = \frac{44 \cdot 10^3}{\pi d^2}$$

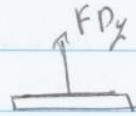
$$\Rightarrow d^2 = 306 \cdot 10^{-9}$$

$$d = 1,44 \cdot 10^{-2} \text{ m} \text{ in } 1,44 \text{ cm}$$

Analiza D

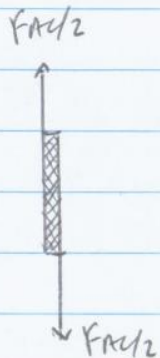
$$F_{Dy} = 25 - 2 - 22 = 1 \text{ kN}$$

$$F_{DA} = 0$$



$$68 \cdot 10^6 \geq \frac{1 \cdot 10^3}{\pi d^2} \Rightarrow d^2 = 46,8 \cdot 10^{-4} \Rightarrow d = 6,8 \cdot 10^{-2} \text{ m} \text{ in } 6,8 \text{ cm}$$

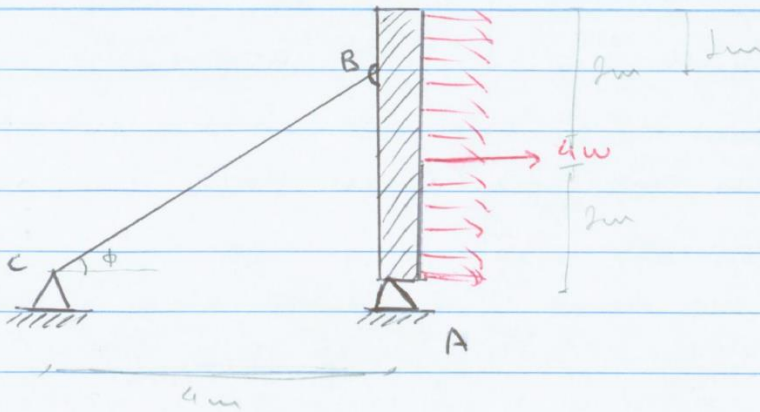
3) Tam an epuizării



$$\tau_{\text{max}} \geq \frac{F_{AC}/2}{45 \cdot 10^{-3} \cdot 30 \cdot 10^{-3}} = \frac{12,5}{45 \cdot 30} \cdot \frac{10^3}{10^{-6}}$$

$$= 9,26 \cdot 10^6 \text{ Pa} \leq 68 \cdot 10^6 \text{ Pa} \checkmark$$

2)



$$\tau = 8 \text{ MPa}$$

$$\sigma = 138 \text{ MPa}$$

$$\tan \phi = \frac{3}{4} \Rightarrow \phi = 36,86^\circ$$

$$\cos \phi = 0,8$$

$$\sin \phi = 0,6$$

$$\sum F_x = 0 \Rightarrow F_{BC} \cdot 0,6 + A_x = 4w \quad (1)$$

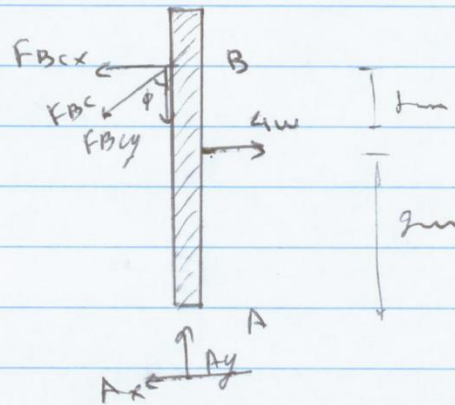
$$\sum F_y = 0 \Rightarrow A_y = F_{BC} \cdot 0,8$$

$$\sum M_B = 0 \Rightarrow 4w = A_x \cdot 3$$

$$\Rightarrow A_x = \frac{4w}{3} \quad (2)$$

$$(1) \xrightarrow{(2)} F_{BC} = 4,44 w \quad (3)$$

$$A_y = 0,8 \cdot 4,44 w \quad (3)$$



Equivalență arie rezultă BC, $\sigma = 138 \text{ MPa}$

Diaprază BC $\rightarrow 20 \text{ mm}$ în $0,02 \text{ m}$

$$A_{\text{rea}} \quad 138 \cdot 10^6 = \frac{4,44 w}{\frac{\pi \cdot 4 \cdot 10^{-4}}{4}} \Rightarrow w = 9704,4 \text{ N} \text{ în } 9,76 \text{ kN}$$

$$(w = 9,76 \text{ kN/m})$$

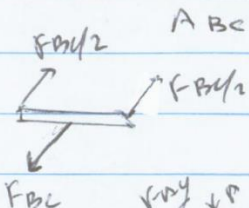
Mărețori B (cârlă pe C)

Diaprază și mărețori în 20 mm în $0,02 \text{ m}$ (cârlă și scurț)

$$\text{Pia } w = 9,76 \text{ kN} \rightarrow F_{BC} = 43,3 \text{ kN}$$

$$\tau \leq \tau \geq \frac{F_{BC}}{12} \Rightarrow 81 \cdot 10^6 \geq \frac{21,7 \cdot 10^3}{\frac{\pi \cdot 4 \cdot 10^{-4}}{4}} = 6,9 \cdot 10^7$$

$$\frac{\pi \cdot 4 \cdot 10^{-4}}{4} \text{ în } 6,9 \cdot 10^6 \quad \checkmark$$

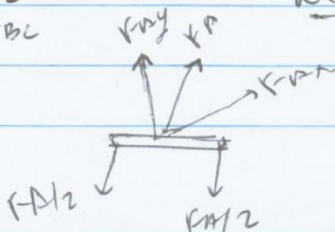


$$\text{Mărețori A } \text{Pia } w = 9,76 \text{ kN} \rightarrow A_x = 13,0 \text{ kN}$$

$$A_y = 34,6 \text{ kN}$$

$$F_A = \sqrt{13^2 + 34,6^2} = 36,9 \approx 37,0 \text{ kN}$$

$$81 \cdot 10^6 \geq \frac{18,5 \cdot 10^3 F_A/2}{\frac{\pi \cdot 4 \cdot 10^{-4}}{4}} = 5,88 \cdot 10^7 = 58,8 \cdot 10^6 \quad \checkmark$$



Αρα, με διπλάσιο κλάδον νερού BC ίση με
20 mm, το φορτίο στην πτερύκη να είναι
και η κατανάλωση ισχύος με 9,76 kW