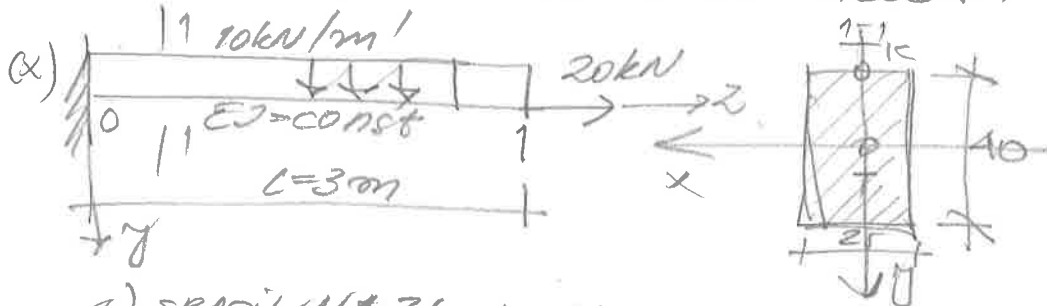


09.02.2021.

MEHANIKA I ODPORNOST MATERIJALA  
 DRUGI KOLLOVIJUM

ZA NOSAČI, OPIŠE DANAJE TREBA:



- SKICIRATI I NACRTATI DIAGRAME KOMPONENTALNIH NAPONA U PRESEKU 0
- IZVRŠITI ANALIZU STAJA NAPONA U TAČKI K TOG PRESEKA
- SKICIRATI MOROV KRUG NAPONA
- MOR MAKSIMUMOM ANALOGIJOM ODREDITI UŠIB I NAGIB U ZAKRI 1
- SKICIRATI DEFORMISANJE OJU NOSAČA

$$a) F = 25 \times 40 = 1000 \text{ cm}^2$$

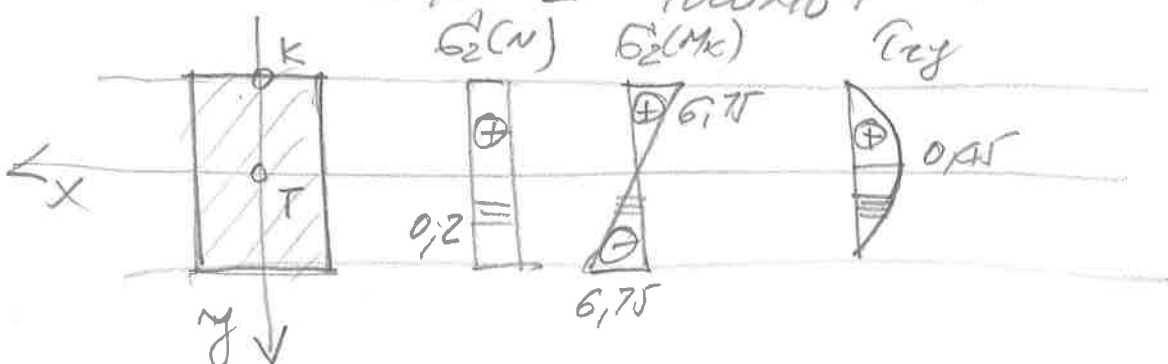
$$I_x = \frac{25 \times 40^3}{12} = 133\,333,3 \text{ cm}^4$$

$$M_0 = -10 \cdot \frac{3^2}{2} = -45 \text{ kN} \quad T_0 = 10 \cdot 3 = 30 \text{ kN} \quad N_0 = 20 \text{ kN}$$

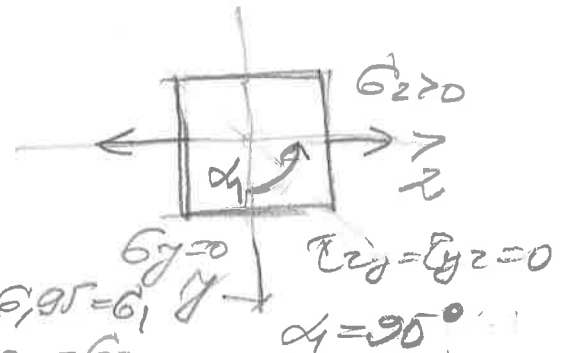
$$\sigma_2^k(N) = \frac{N}{F} = \frac{20 \times 10^{-3}}{1000 \times 10^{-4}} = 0,2 \text{ MPa}$$

$$\sigma_2^k(M_x) = \frac{M_x}{I_x} = \frac{-45 \times 10^{-3} \cdot (20 \times 10^{-2})}{133\,333,3 \times 10^{-8}} = 6,75 \text{ MPa}$$

$$\max \tau = \frac{3}{2} \frac{T_0}{F} = \frac{3}{2} \times \frac{30 \cdot 10^{-3}}{1000 \times 10^{-4}} = 0,45 \text{ MPa}$$



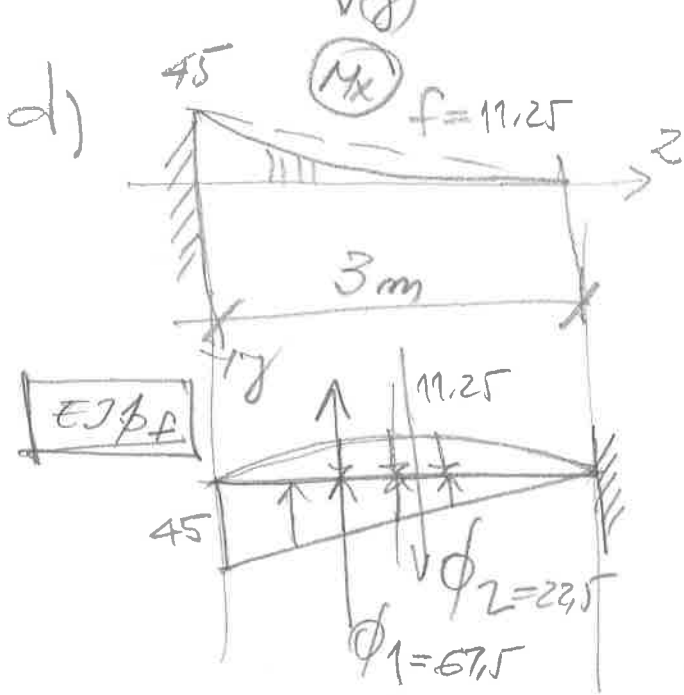
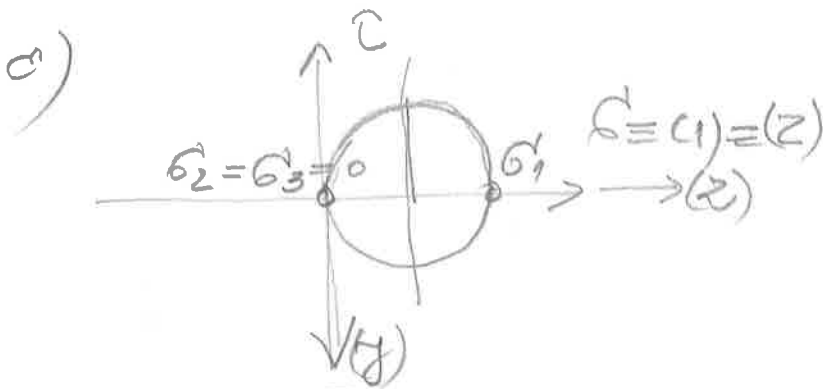
b)  $\sigma_z = 0,2 + 6,75 = 6,95 \text{ MPa}$   
 $\sigma_y = 0$   
 $\tau_{yz} = \tau_{zy} = 0$



$$\sigma_{\max/\min} = \frac{6,95}{2} \pm \sqrt{6,95^2} = 0 = \sigma_2$$

$$0 = \sigma_3$$

$$\tan 2\alpha_1 = \frac{-2 \cdot 0}{-6,95} = \frac{0}{(-)} = 0 \Rightarrow 2\alpha_1 = 180^\circ \Rightarrow \alpha_1 = 90^\circ$$



$$EJ = 30 \times 10^3 \times 133.333,3 \cdot 10^{-8}$$

$$EJ_x = 40 \text{ MNm}^2$$

$$\phi_1 = \frac{45 \times 3}{2} = 67,5 \text{ kNm}^2$$

$$\phi_2 = \frac{2}{3} \times 11,25 \times 3 = 22,5 \text{ kNm}^2$$

$$\bar{M}_1 = 67,5 \times \frac{2}{3} \times 3 + 22,5 \times \frac{1}{2} \times 3 =$$

$$\bar{M}_1 = 101,25 \text{ kNm}^3$$

$$\bar{M}_2 = 67,5 - 22,5 = 45 \text{ kNm}^2$$

$$v_1 = \frac{101,25 \times 10^{-3}}{40} = 2,531 \times 10^{-3} \text{ m}$$

$$\varphi_1 = \frac{45 \times 10^{-3}}{40} = 1,125 \times 10^{-3} \text{ rad}$$

