

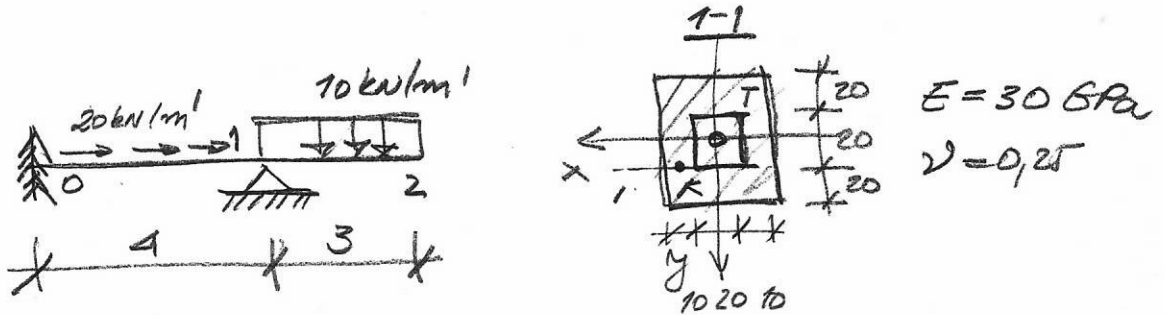
UNIVERZITET U BANSJACUJ

ARHITEKTONSKO - GRADEVINSKO - GEODEZSKI FAKULTET
KATEORA ZA MEKANIKU I TEORIJU KONSTRUKCIJA
STUDIJSKI PROGRAM GRADEVINARSTVO

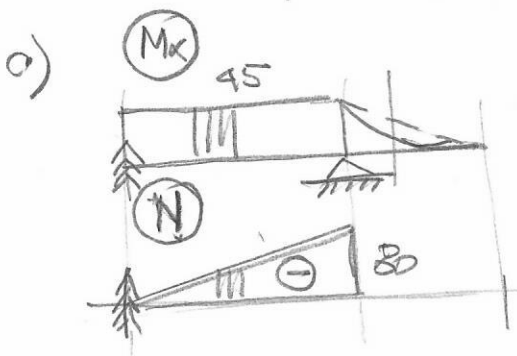
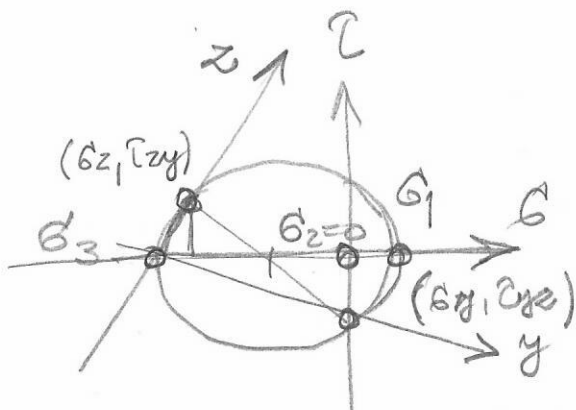
18.06.2021.

OTPORNOST MATERIJALA 1.

ZA NOSAČ I OPTEREĆENJE NA SKICI TREBA:



- 30 a) NACRTATI DIJAGRAME KOMPONENTIČNIH NAPONA U PRESEKU 1 DESNO
- 20 b) IZVRŠITI ANALIZU STANJA NAPONA U TAČKI K DOLE PRESEKA I NACRTATI MOROV KRUG NAPONA.
- 25 c) INTEGRACIJOM DIF. JEDNAČINA ODREDITI v_0, φ_1 I w_0
- 25 d) MOR-MAKSVELOVOM ANALOGIJOM ODREDITI v_0, φ_1 I v_2 I SKICIRATI DEF. OSU NOSAČA



$$M_x(z) = -45 \text{ kNm} \quad 0 \leq z \leq 4 \text{ m}$$

$$N(z) = -20z \text{ kN}$$

$$EJ_x = 30 \cdot 10^3 \cdot 706666,6 \cdot 10^{-8}$$

$$EJ_x = 212 \text{ MNm}^2$$

$$EF = 30 \cdot 10^3 \cdot 2000 \cdot 10 = 6000 \text{ MN}$$

$$EJ_x v''(z) = 45$$

$$EJ_x v'(z) = C_1 + 45z$$

$$EJ_x v(z) = C_2 + 45 \frac{z^2}{2}$$

$$v_0 = \frac{-360 + 45 \cdot \frac{0^2}{2}}{212 \cdot 10^3} = -1,698 \cdot 10^{-3} \text{ m} = -1,698 \text{ mm}$$

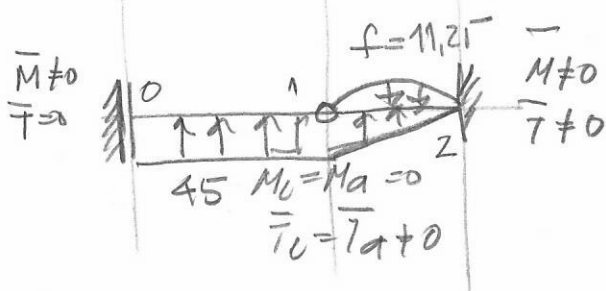
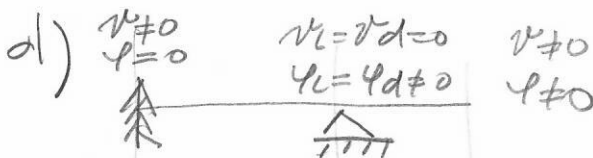
$$\varphi_1 = \frac{45 \cdot 4}{212 \cdot 10^3} = 0,849 \cdot 10^{-3} \text{ rad}$$

$$EF w'(z) = -20z$$

$$EF w(z) = C_1 - 10z^2$$

$$EF w(4) = C_1 - 10 \cdot 4^2 = 0 \quad C_1 = 160$$

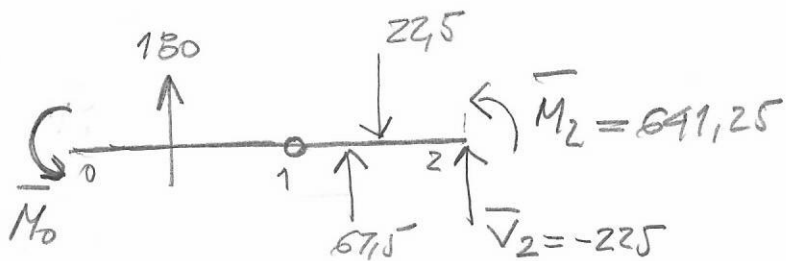
$$w_0 = w(0) = \frac{160}{6000 \cdot 10^3} = 0,026 \cdot 10^{-3} \text{ m} = 0,026 \text{ mm}$$



$$\phi_1 = 4 \cdot 45 = 180$$

$$\phi_2 = \frac{3 \cdot 45}{2} = 67,5$$

$$\phi_3 = \frac{2}{3} \cdot 11,25 \cdot 3 = 22,5$$



$$\bar{M}_0 = 180 \cdot 2 = 360$$

$$\bar{M}_2 = 22,5 \cdot 1,5 + 22,5 \cdot 3 - 67,5 \cdot 1 = 691,25$$

$$\bar{T}_1 = 180$$

$$\bar{V}_2 = 22,5 - 67,5 - 180 = -225$$

$$v_0 = \frac{-360 \cdot 10^{-3}}{212} = -1,698 \cdot 10^{-3} \text{ m} = \underline{\underline{-1,698 \text{ mm}}}$$

$$\varphi_1 = \frac{180 \cdot 10^{-3}}{212} = 0,849 \cdot 10^{-3} \text{ rad}$$

$$v_2 = \frac{691,25 \cdot 10^{-3}}{212} = 3,025 \cdot 10^{-3} \text{ m} = \underline{\underline{3,025 \text{ mm}}}$$

