

4.4 Potrebno je odrediti dopušteno opterećenje silom P, za sustav prikazan na crtežu, ako je poznato:

$$H_1 = 4 \text{ m}$$

$$H_2 = 2 \text{ m}$$

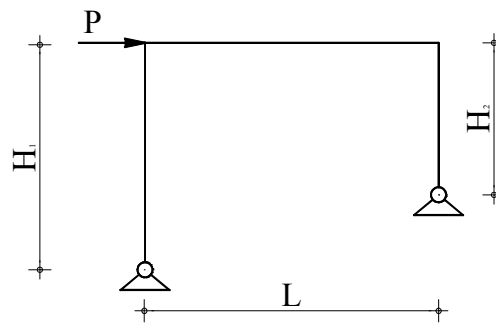
$$L = 4 \text{ m}$$

$$S_{\text{stupa}} = 200 \text{ cm}^3$$

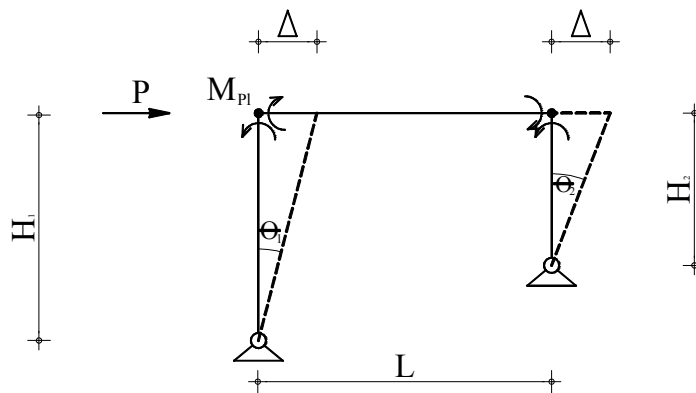
$$S_{\text{grede}} = 400 \text{ cm}^3$$

$$\sigma_{\text{pl}} = 25.0 \frac{\text{kN}}{\text{cm}^2}$$

$$\nu = 1.5$$



Kinematski princip /princip virtualnih radova/



$$P \cdot \Delta - M_{\text{pl}} \cdot \Theta_1 - M_{\text{pl}} \cdot \Theta_2 = 0$$

$$P \cdot \Theta_1 \cdot H_1 - M_{\text{pl}} \cdot \Theta_1 - M_{\text{pl}} \cdot \Theta_2 = 0$$

$$P \cdot \Theta_1 \cdot H_1 - M_{\text{pl}} \cdot \Theta_1 - M_{\text{pl}} \cdot \frac{4}{2} \Theta_1 = 0$$

$$P \cdot H_1 = 3M_{\text{pl}}$$

$$P = \frac{3}{4m} M_{\text{pl}}$$

Uvjet

$$M_{\text{pl}} \leq M_{\text{pl.dop}} = \frac{\sigma_{\text{R}} \cdot 2S}{\nu} = \frac{25 \frac{\text{kN}}{\text{cm}^2} \cdot 2 \cdot 200 \text{ cm}^3}{1.5} = 66.67 \text{ kNm}$$

$$P_{\text{dop}} = \frac{3}{4m} M_{\text{pl.dop}} = 50 \text{ kN}$$