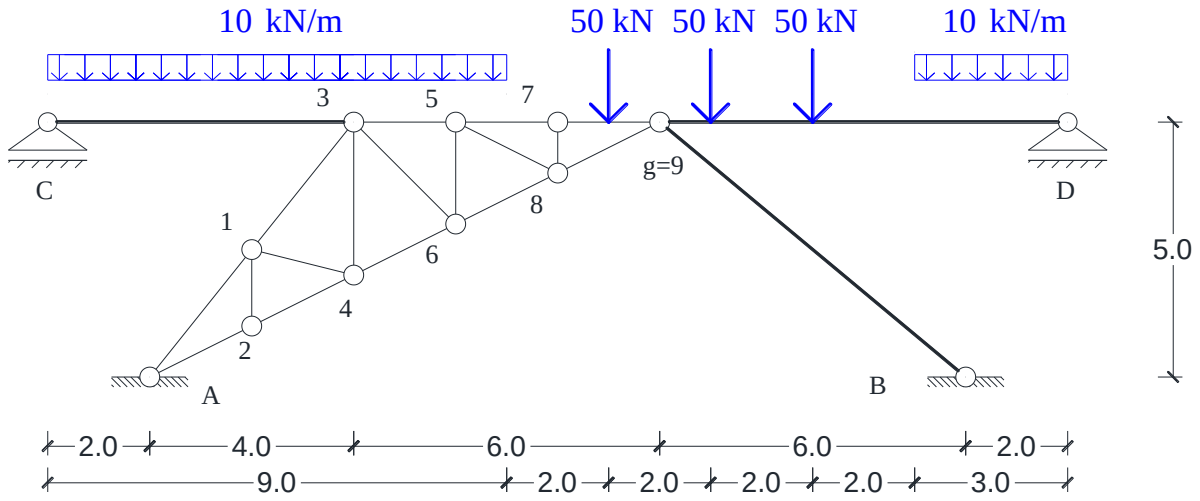
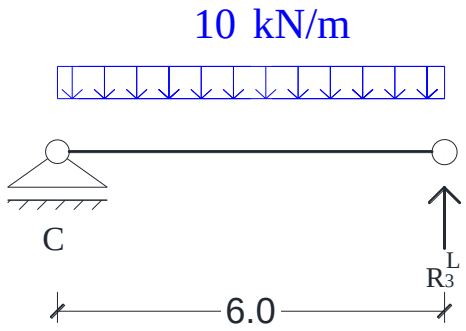
Zadatak: *Za nosač i opterećenje sa slike odrediti reakcije oslonaca i dijagrame presečnih sila.*



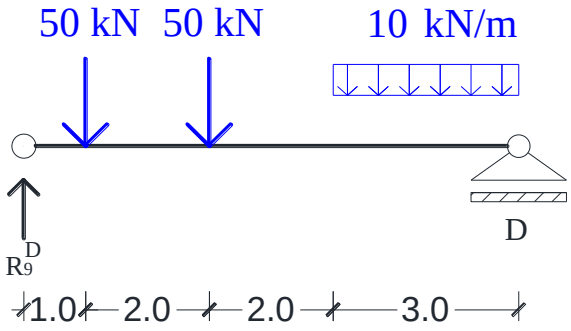
-Ploča I (prosta greda)



$$\sum M_C = 0 \quad \rightarrow R_3{}^L = \frac{10 \cdot 6 \cdot 3}{6} = 30\ kN$$

$$\sum V_i = 0 \quad \rightarrow C = 10 \cdot 6 - 30 = 30\ kN$$

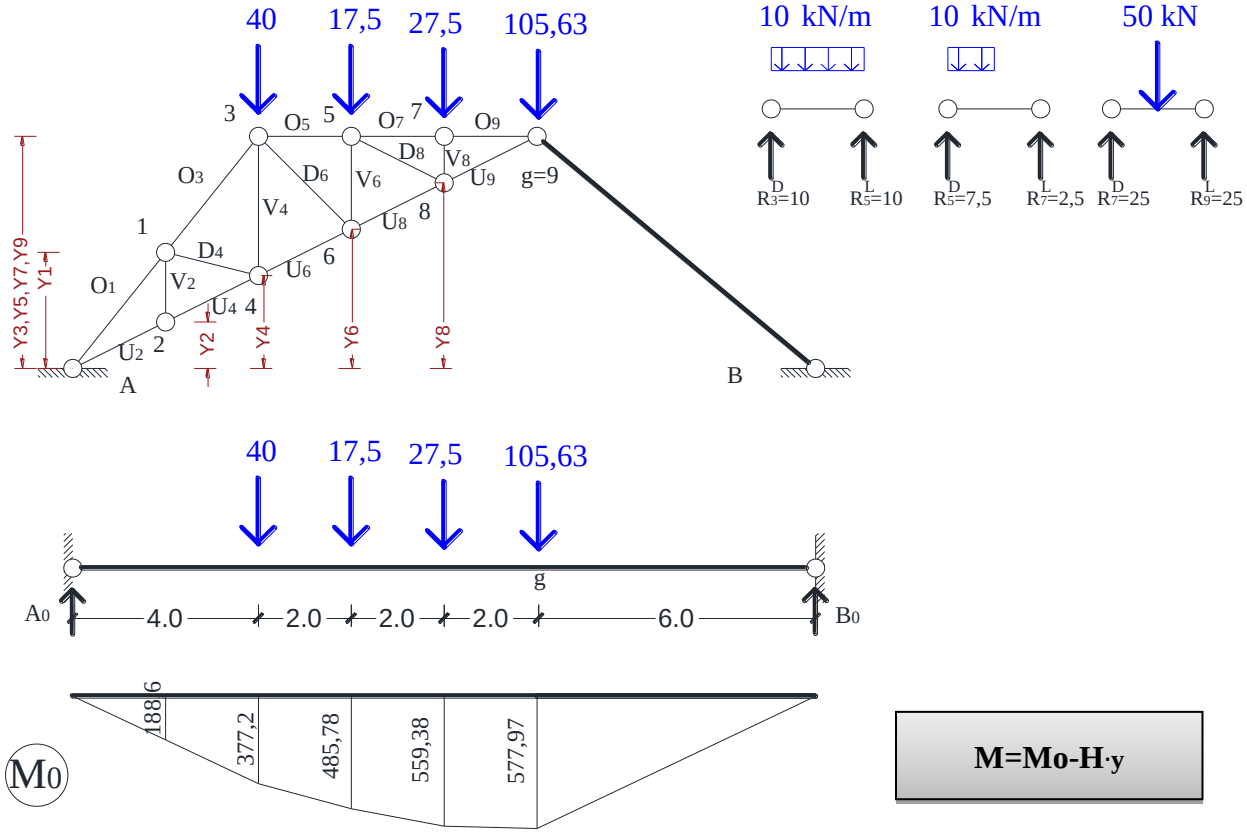
-Ploča II (prosta greda)



$$\sum M_D = 0 \quad \rightarrow R_9{}^D = \frac{50 \cdot (7+5) + 10 \cdot 3 \cdot 1{,}5}{8} = 80.63\ kN$$

$$\sum V_i = 0 \quad \rightarrow D = 10 \cdot 3 - 50 - 50 + 80{,}63 = 49.37\ kN$$

-Ploče III i IV (luk na tri zgloba)



M=Mo-H·y

$$\sum M_{Bo} = 0 \;\rightarrow Ao = \frac{40 \cdot 12 + 17{,}5 \cdot 10 + 27{,}5 \cdot 8 + 105{,}63 \cdot 6}{16} = 94{,}30\ kN$$

$$\sum V_i = 0 \;\rightarrow Bo = 40 + 17{,}5 + 27{,}5 + 105{,}63 - 94{,}3 = 96{,}33\ kN$$

$$H = \frac{M_{go}}{f} = \frac{96{,}33 \cdot 6}{5} = 115{,}6\ kN$$

Gornji pojas: $\boldsymbol{O_{m+1}} = -\frac{\boldsymbol{M_m}}{\boldsymbol{h_m}} \frac{\boldsymbol{1}}{\boldsymbol{cos\alpha_{m+1}}}$

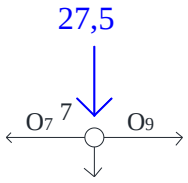
$cos\alpha_1 = cos\alpha_3 = 0.6247;\ \ cos\alpha_5 = cos\alpha_7 = cos\alpha_9 = 1.0$

$$O_1 = -\frac{M_2}{h_2}\frac{1}{cos\alpha_1} = -\frac{188{,}6 - 115{,}6 \cdot 1}{1{,}5}\frac{1}{0{,}6247} = -77{,}9\ kN$$

$$O_3 = -\frac{M_4}{h_4}\frac{1}{cos\alpha_3} = -\frac{377{,}2 - 115{,}6 \cdot 2}{3}\frac{1}{0{,}6247} = -77{,}9\ kN$$

$$O_5 = -\frac{\frac{M_6}{h_6}\frac{1}{cos\alpha_5}}{} = -\frac{\frac{485{,}78 - 115{,}6 \cdot 3}{2}\frac{1}{1}}{} = -69{,}49\ kN$$

$$O_7 = -\frac{M_8}{h_8}\frac{1}{cos\alpha_7} = -\frac{559{,}38 - 115{,}6 \cdot 4}{1}\frac{1}{1} = -96{,}98\ kN$$



$$\sum H_i = 0 \rightarrow O_7 = O_9 = -96{,}98\ kN$$

$$\sum V_i = 0 \rightarrow V_8 = -27{,}5\ kN$$

Donji pojas: $\boldsymbol{U_m = \frac{M_{m-1}}{h_{m-1}} \frac{1}{cos\beta_m}}$

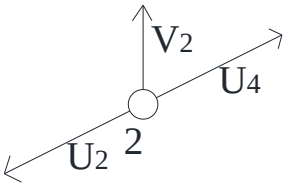
$cos\beta_m = 0{,}8944$ *za sve štapove donjeg pojas*

$$U_4 = \frac{M_1}{h_1}\frac{1}{cos\beta_4} = \frac{188{,}6 - 115{,}6 \cdot 2{,}5}{1{,}5}\frac{1}{0{,}8944} = -74{,}84\ kN$$

$$U_6 = \frac{M_3}{h_3}\frac{1}{cos\beta_6} = \frac{377{,}2 - 115{,}6 \cdot 5}{3}\frac{1}{0{,}8944} = -74{,}84\ kN$$

$$U_8 = \frac{M_5}{h_5}\frac{1}{cos\beta_8} = \frac{485{,}76 - 115{,}6 \cdot 5}{2}\frac{1}{0{,}8944} = -51{,}55\ kN$$

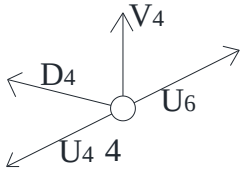
$$U_9 = \frac{M_7}{h_7}\frac{1}{cos\beta_8} = \frac{559{,}38 - 115{,}6 \cdot 5}{1}\frac{1}{0{,}8944} = -20{,}82\ kN$$



$$\sum H_i = 0 \rightarrow U_2 = U_4 = -74{,}84\ kN$$

Dijagonale: $\boldsymbol{D_m = \left(\frac{M_m}{h_m} - \frac{M_{m-1}}{h_{m-1}} - H_m\right)\frac{1}{cos\gamma_m}}$

$cos\gamma_6 = \sqrt{2}/2;\ cos\gamma_8 = 0{,}8944$



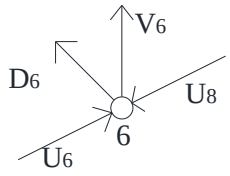
$$U_6 = U_4 \rightarrow D_4 = 0$$
$$\sum V_i = 0 \rightarrow V_4 = 0$$

$$D_6 = \left(\frac{M_6}{h_6} - \frac{M_3}{h_3} - H\right)\frac{1}{cos\gamma_6} = \left(\frac{485{,}78 - 115{,}6 \cdot 3}{2} - \frac{377{,}2 - 115{,}6 \cdot 5}{3} - 115{,}6\right)\frac{1}{\sqrt{2}/2} = 29{,}45\ kN$$

$$D_8 = \left(\frac{M_8}{h_8} - \frac{M_5}{h_5} - H\right)\frac{1}{cos\gamma_8} = \left(\frac{559{,}38 - 115{,}6 \cdot 4}{1} - \frac{485{,}78 - 115{,}6 \cdot 5}{2} - 115{,}6\right)\frac{1}{0{,}8944} = 30{,}74\ kN$$

-Vertikale

$V_2 = V_4 = 0\ ;\ V_8 = -27{,}5\ kN$



$$\sum V_i = 0 \rightarrow cos45 D_6 + V_6 + sin\beta U_6 - sin\beta U_8 = 0$$
$$\rightarrow V_6 = -31{,}26\ kN$$

-Dijagrami presečnih sila