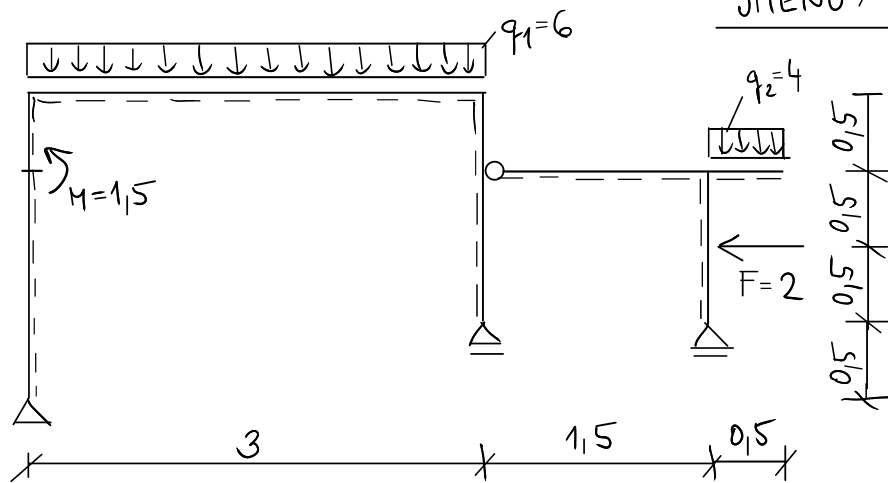
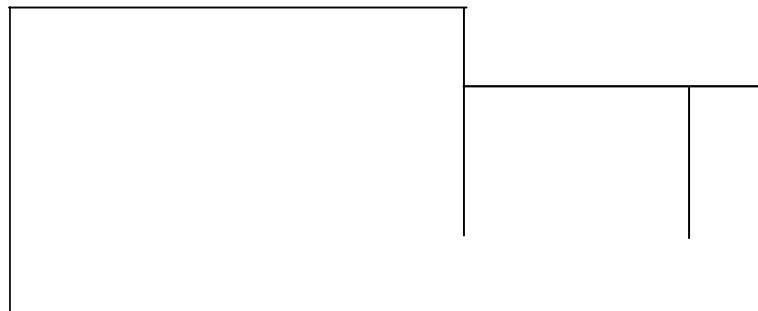
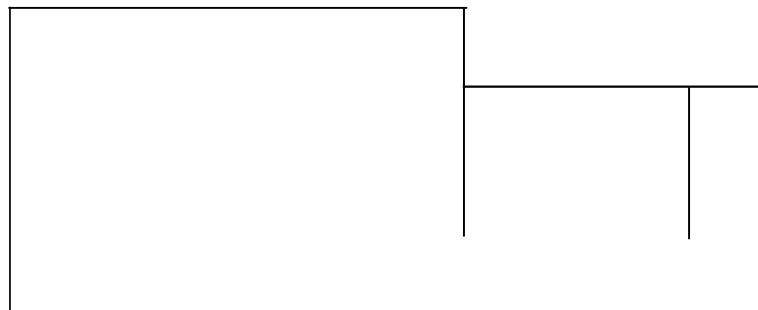
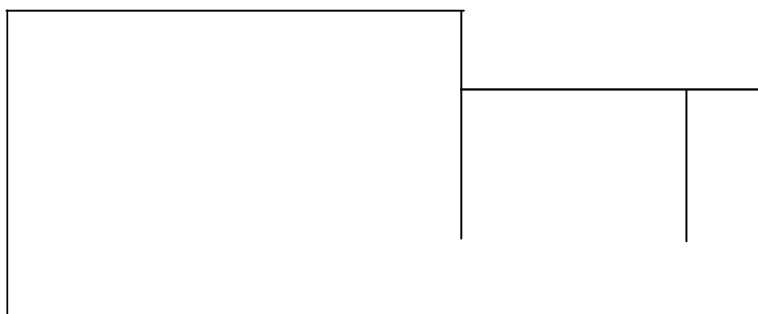


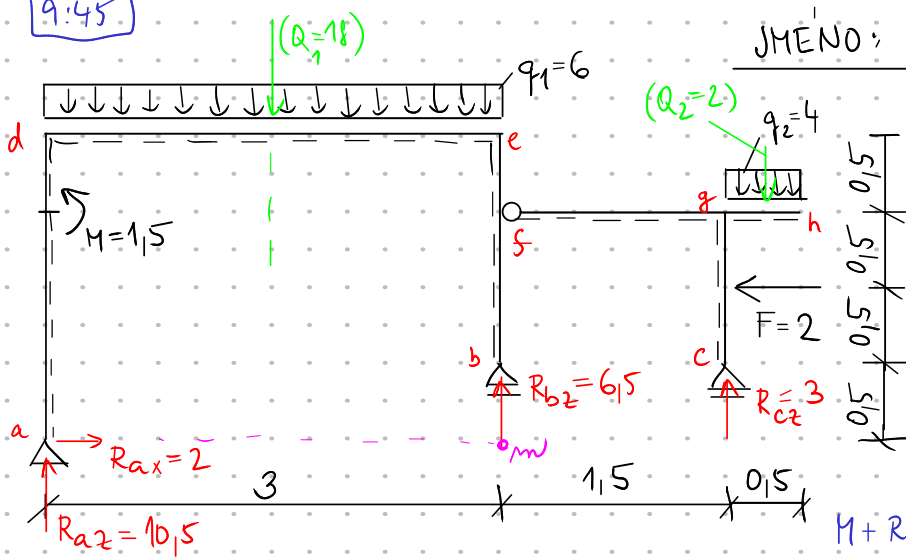
JMENO:



[$\&N/m$, $\&Nm$, $\&N/m$]



9.45



JMENO:

[kN , m , kNm , kN/m]

Reakce:

$$\sum M_{fi}^P = 0 \oplus \uparrow$$

$$R_{cz} \cdot 1.5 - F \cdot 0.5 - q_2 \cdot 0.5 \cdot (1.5 + \frac{0.5}{2}) = 0$$

$$R_{cz} = 3 \text{ kN}$$

$$\sum M_{ai} = 0 \oplus \uparrow$$

$$M + R_{bz} \cdot 3 - q_1 \cdot 3 \cdot \frac{3}{2} + R_{cz} \cdot 1.5 - q_2 \cdot 0.5 \cdot (1.5 + \frac{0.5}{2}) + F \cdot 1 = 0 \Rightarrow R_{bz} = 6.5 \text{ kN}$$

$$\sum M_{mi} = 0 \oplus \downarrow$$

$$R_{az} \cdot 3 - q_1 \cdot 3 \cdot \frac{3}{2} - M + q_2 \cdot 0.5 \cdot (1.5 + \frac{0.5}{2}) - F \cdot 1 - R_{cz} \cdot 1.5 = 0$$

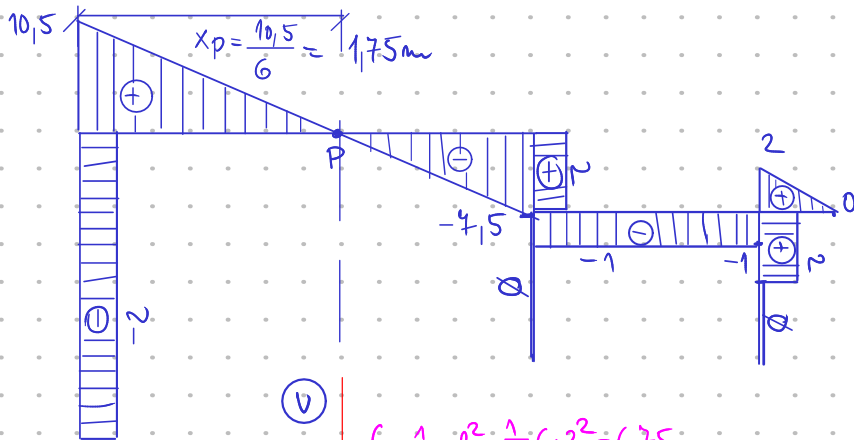
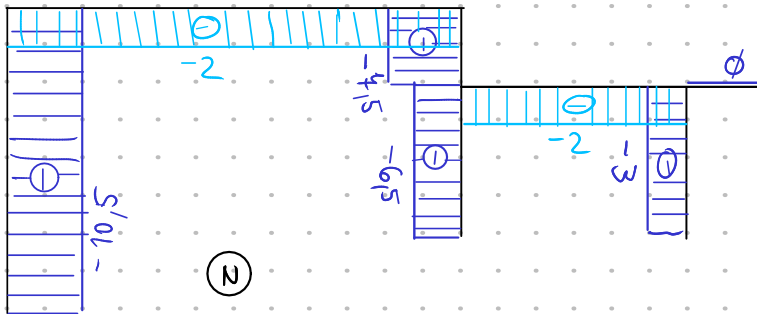
$$R_{az} = 10.5 \text{ kN}$$

$$\sum F_{xi} = 0 \oplus \rightarrow$$

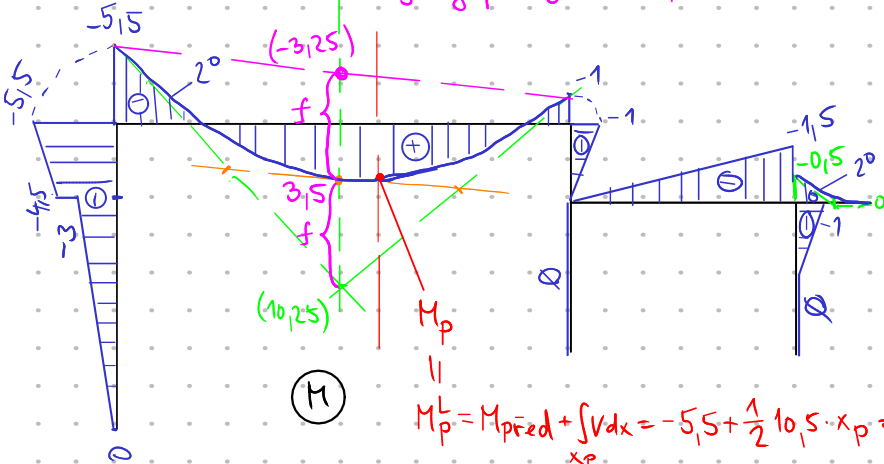
$$R_{ax} - F = 0 \Rightarrow R_{ax} = F = 2 \text{ kN}$$

$$\sum F_{zi} = 0 \oplus \uparrow$$

$$R_{az} - q_1 \cdot 3 + R_{bz} + R_{cz} - q_2 \cdot 0.5 = 0 \checkmark$$



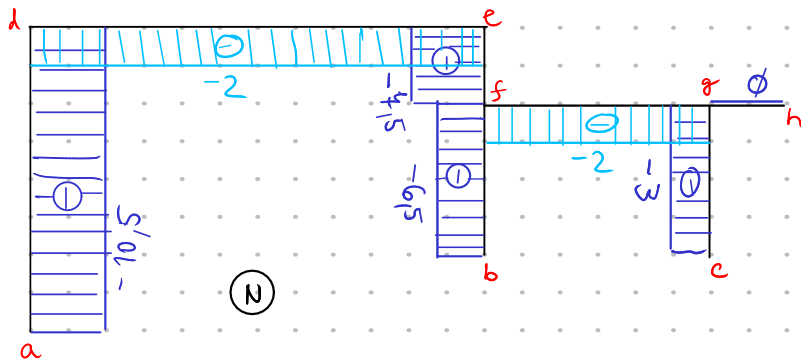
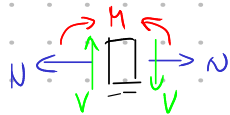
$$f = \frac{1}{8} q l^2 = \frac{1}{8} \cdot 6 \cdot 3^2 = 6.75$$



$$\begin{matrix} -1.5 \\ \uparrow \\ -1 \end{matrix} = 5 \cdot 0.5 \checkmark$$

$$M_p^L = M_{pred} + \int_{x_p} V dx = -5.5 + \frac{1}{2} \cdot 10.5 \cdot x_p = 3.6875 \text{ kNm}$$

Normálové síly



Vše musí platit i z druhé strany např:

$$N_{ef}^L = R_{az} - q_1 \cdot 3 = -7.5 \text{ kN} \checkmark = N_{fe}^L$$

$$N_{fg}^L = -R_{ax} = -2 \text{ kN} \checkmark = N_{gf}^L \quad \text{atd.}$$

$$N_{ad}^L = -R_{az} = -10.5 \text{ kN} = N_{da}^L$$

$$N_{de}^L = -R_{ax} = -2 \text{ kN} = N_{ed}^L$$

$$N_{hg}^P = 0 = N_{gh}^P$$

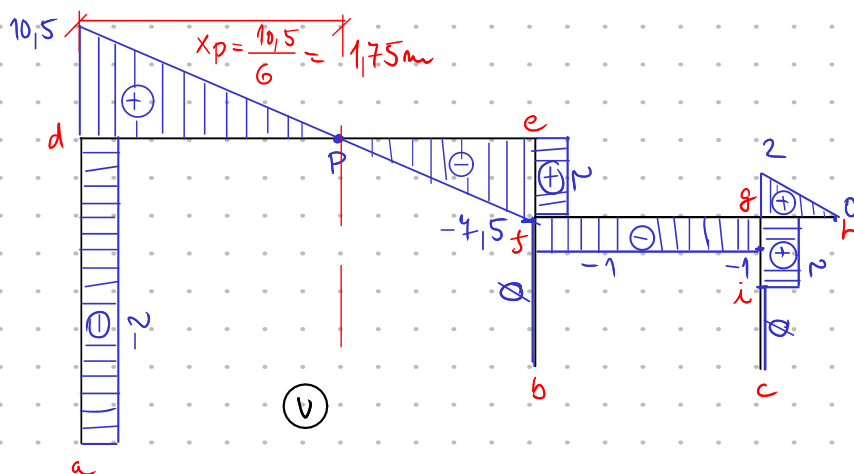
$$N_{cg}^P = -R_{cz} = -3 \text{ kN} = N_{gc}^P$$

$$N_{gf}^P = -F = -2 \text{ kN} = N_{fg}^P$$

$$N_{bf}^P = -R_{bz} = -6.5 \text{ kN} = N_{fb}^P$$

$$N_{fe}^P = -R_{bz} - R_{cz} + q_2 \cdot 0.5 = -7.5 \text{ kN} = N_{ef}^P$$

Posouvající síly



Vše musí platit i z druhé strany např:

$$V_{ed}^P = -R_{bz} - R_{cz} + q_2 \cdot 0.5 = -7.5 \text{ kN} \checkmark$$

$$V_{fg}^L = R_{az} + R_{bz} - Q_1 = -1 \text{ kN} \checkmark = V_{gf}^L$$

$$V_{ad}^L = -R_{ax} = -2 \text{ kN} = V_{da}^L$$

$$V_{de}^L = R_{az} = 10.5 \text{ kN}$$

$$V_{ed}^L = R_{az} - Q_1 = -7.5 \text{ kN}$$

$$V_{hg}^P = 0$$

$$V_{gh}^P = q_2 \cdot 0.5 = 2 \text{ kN}$$

$$V_{ci}^P = 0 = V_{ic}^P$$

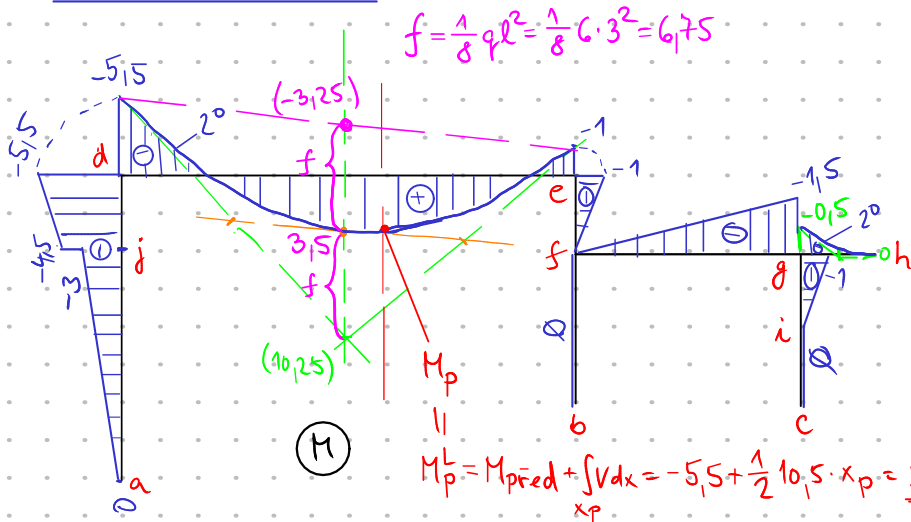
$$V_{ig}^P = F = 2 \text{ kN} = V_{gi}^P$$

$$V_{gf}^P = -R_{cz} + q_2 \cdot 0.5 = -1 \text{ kN} = V_{fg}^P$$

$$V_{bf}^P = 0 = V_{fb}^P$$

$$V_{fe}^P = F = 2 \text{ kN} = V_{ef}^P$$

Ohybové momenty



$$M_a^L = 0$$

$$M_{ja}^L = -R_{ax} \cdot 1.5 = -3 \text{ kNm}$$

$$M_{jd}^L = -R_{ax} \cdot 1.5 - M = -4.5 \text{ kNm}$$

$$M_{da}^L = -R_{ax} \cdot 2 - M = -5.5 \text{ kNm} = M_{de}^L$$

$$M_h^P = 0$$

$M_{\text{pod } Q_2 \text{ bez } q_2} = 0 \Rightarrow v'''' = 0$ vodorovná
tečna $\Rightarrow$ vrchol paraboly

$$M_{gh}^P = -Q_2 \cdot \frac{0.5}{2} = -0.5 \text{ kNm}$$

Vše musí platit i z druhé strany např:

$$M_{ed}^L = R_{az} \cdot 3 - R_{ax} \cdot 2 - M - Q_2 \cdot 1.5 = -1 \text{ kNm} \checkmark$$

$$M_{de}^P = -Q_2 \cdot 1.5 + R_{bz} \cdot 3 + R_{cz} \cdot 4.5 - F \cdot 1 - Q_2 \cdot 4.75 = -5.5 \text{ kNm} \checkmark$$

$$M_p^P = M_{\text{před}} - \int V dx = -1 - \frac{1}{2} (-7.5) \cdot x_p = 3.6875 \text{ kNm} \checkmark$$

$$x_p' = \frac{7.5}{6} \text{ m}$$

$$M_p^L = R_{az} \cdot x_p - R_{ax} \cdot 2 - M - q_1 \cdot \frac{x_p^2}{2} = 3.6875 \text{ kNm} \checkmark$$

$$M_c^P = 0$$

$$M_i^P = 0$$

$$M_{gi}^P = -F \cdot 0.5 = -1 \text{ kNm}$$

$$M_{gf}^P = -F \cdot 0.5 - Q_2 \cdot \frac{0.5}{2} = -1.5 \text{ kNm}$$

$$M_{fg}^P = R_{cz} \cdot 1.5 - F \cdot 0.5 - Q_2 \cdot 1.75 = 0 \checkmark \text{ kloub} \\ = M_{se}^P$$

$$M_b^P = 0$$

$$M_{fb}^P = 0$$

$$M_{ef}^P = R_{cz} \cdot 1.5 - F \cdot 1 - Q_2 \cdot 1.75 = -1 \text{ kNm} = M_{ed}^P$$

Rovnováha ve styčnicích:

