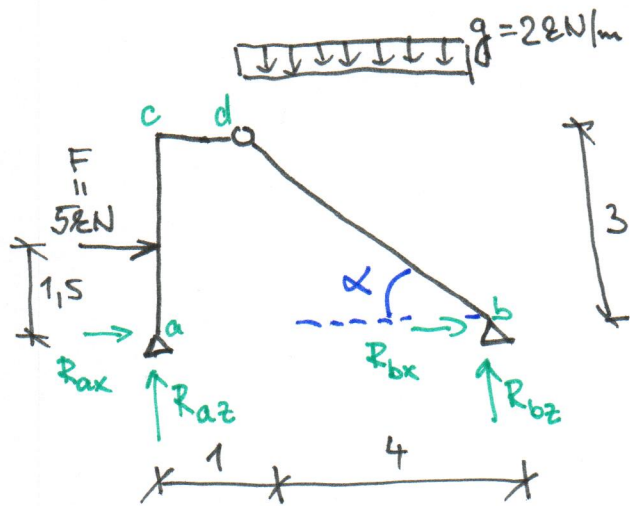


TROJKLOUBOVÝ NOSNÍK BEZ TAHLA



TAHLA

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

$$F \cdot 1,5 + q \cdot 4 \cdot 3 - R_{bz} \cdot 5 = 0$$

$$R_{bz} = 6,3 \text{ kN}$$

$$\sum M_{bi} = 0$$

$$F \cdot 1,5 - q \cdot 4 \cdot 2 + R_{az} \cdot 5 = 0$$

$$R_{az} = 1,7 \text{ kN}$$

$$\sum M_{di}^P = 0$$

$$q \cdot 4 \cdot 2 - R_{bz} \cdot 4 - R_{bx} \cdot 3 = 0$$

$$R_{bx} = -3,06 \text{ kN}$$

$$\sum M_{di}^L = 0$$

$$-F \cdot 1,5 - R_{ax} \cdot 3 + R_{az} \cdot 1 = 0$$

$$R_{ax} = -1,93 \text{ kN}$$

KONTROLA:

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

$$R_{ax} + R_{bx} + F = 0$$

$$0 = 0 \checkmark$$

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

$$R_{az} + R_{bz} - q \cdot 4 = 0$$

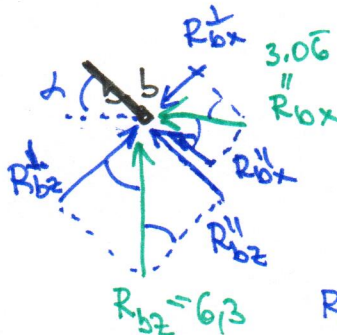
$$0 = 0 \checkmark \quad (6 \text{ min})$$

$$\cos \alpha = \frac{4}{5} \quad \sin \alpha = \frac{3}{5}$$

$$q' = q \cos \alpha = 2 \cdot \frac{4}{5} = 1,6 \text{ kN/m}$$

$$q'' = q \cdot \cos^2 \alpha = 2 \left(\frac{4}{5}\right)^2 = 1,28 \text{ kN/m}$$

$$n = q \cdot \cos \alpha \sin \alpha = 2 \cdot \frac{4}{5} \cdot \frac{3}{5} = 0,96 \text{ kN/m}$$



$$R_{bx}^{\perp} = R_{bx} \sin \alpha =$$

$$= 3,06 \cdot \frac{3}{5} = 1,84 \text{ kN}$$

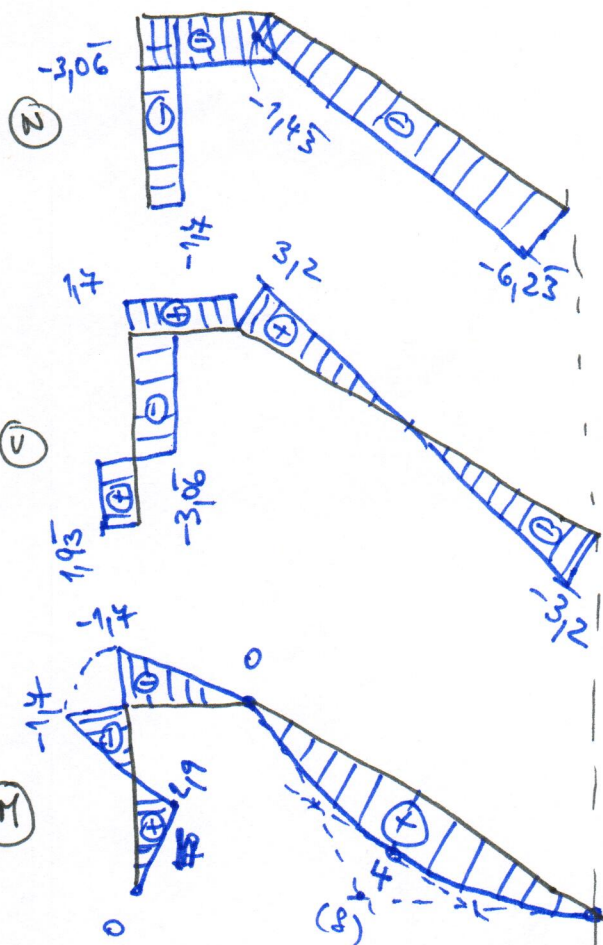
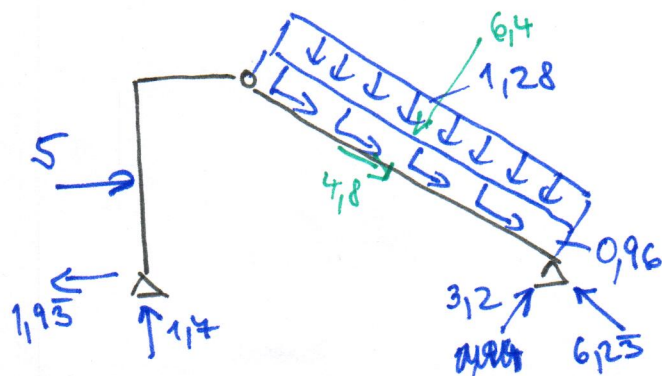
$$R_{bx}^{\parallel} = R_{bx} \cos \alpha =$$

$$= 3,06 \cdot \frac{4}{5} = 2,45 \text{ kN}$$

$$R_{bz}^{\perp} = R_{bz} \cos \alpha =$$

$$= 6,3 \cdot \frac{4}{5} = 5,04 \text{ kN}$$

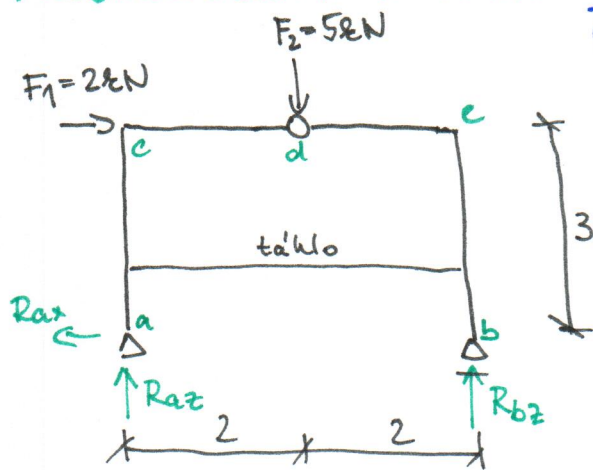
$$R_{bz}^{\parallel} = R_{bz} \sin \alpha = 6,3 \cdot \frac{3}{5} = 3,78 \text{ kN}$$



KONTROLA sil ve styčnicku

d
c

TROJKLOUBOVÝ NOSNÍK S TAHLÉM

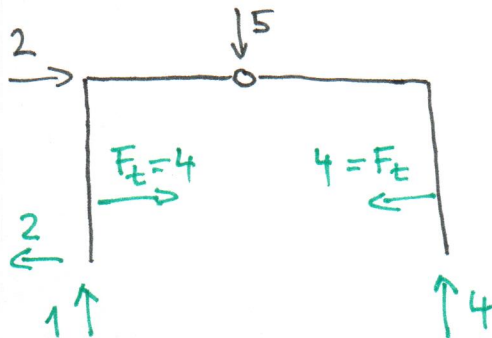


$$\begin{aligned} \sum F_{xi} &= 0 \\ F_1 - R_{ax} &= 0 \Rightarrow R_{ax} = 2 \text{ kN} \end{aligned}$$

$$\begin{aligned} \sum M_{ai} &= 0 \\ F_1 \cdot 3 + F_2 \cdot 2 - R_{bz} \cdot 4 &= 0 \\ R_{bz} &= 4 \text{ kN} \end{aligned}$$

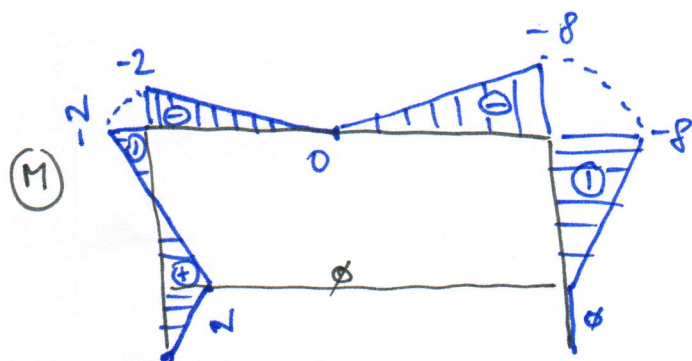
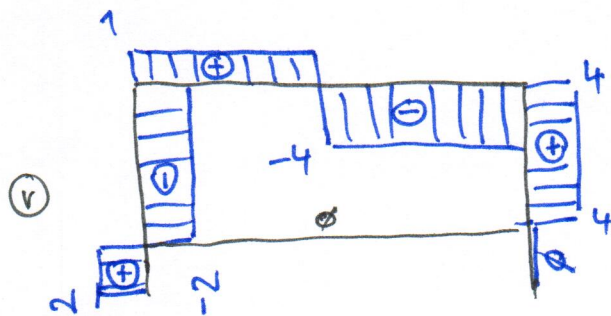
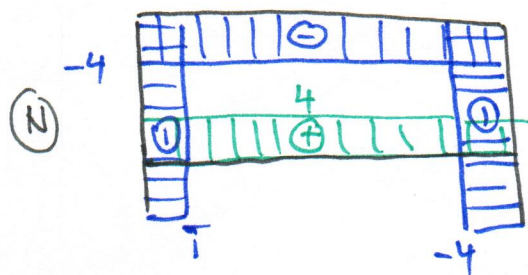
$$\begin{aligned} \sum M_{bi} &= 0 \\ R_{az} \cdot 4 + F_1 \cdot 3 - F_2 \cdot 2 &= 0 \\ R_{az} &= 1 \text{ kN} \end{aligned}$$

$$\begin{aligned} \sum F_{zi} &= 0 \\ R_{az} + R_{bz} - 5 &= 0 \\ 0 &= 0 \checkmark \end{aligned}$$

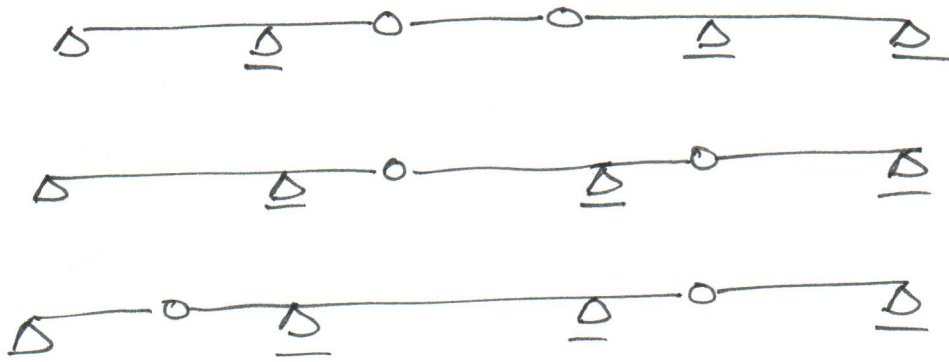


$$\begin{aligned} \sum M_{di}^L &= 0 \\ R_{az} \cdot 2 + R_{ax} \cdot 3 + F_t \cdot 2 &= 0 \\ F_t &= 4 \text{ kN} \end{aligned}$$

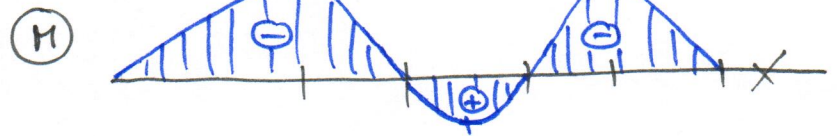
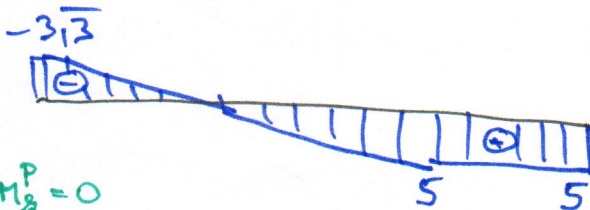
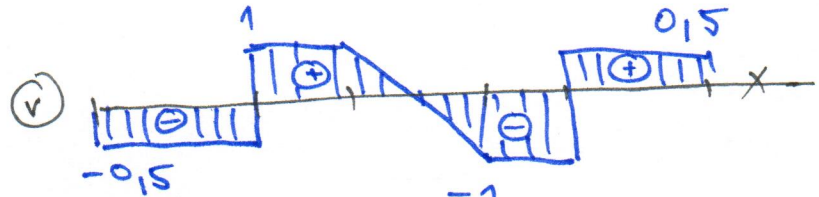
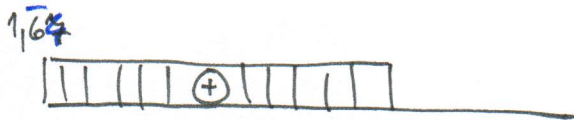
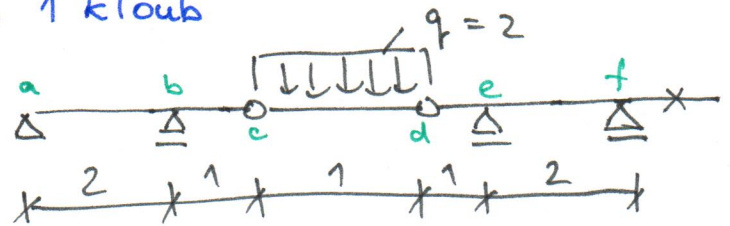
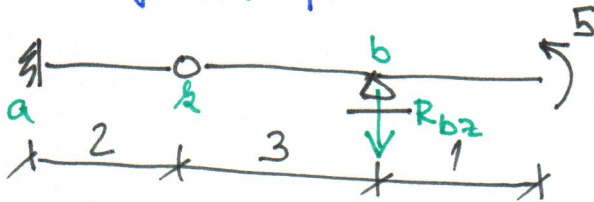
$$\begin{aligned} \sum M_{di}^P &= 0 \\ R_{bz} \cdot 2 - F_t \cdot 2 &= 0 \\ F_t &= 4 \text{ kN} \end{aligned} \quad \checkmark$$



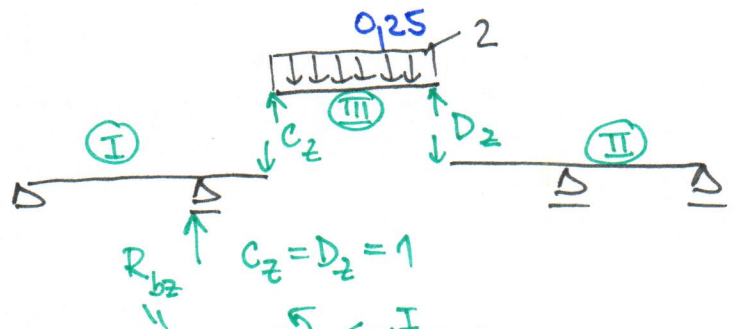
GERBERŮV NOSNÍK



- nesmí vzniknout nestabilní část
- krajní pole zakončené $\Delta \Delta$ - max 1 kloub
- nebo ve vnitřním poli - max 2 kl.
- v krajním poli s ∇ min 1 kloub



$$\begin{aligned} \sum M_{a2}^P &= 0 \\ R_{b2} \cdot 3 - 5 &= 0 \\ R_{b2} &= \frac{5}{3} = 1,67 \text{ kN} \end{aligned}$$



$$\begin{aligned} C_2 &= D_2 = 1 \\ \sum M_{a1}^I &= 0 \end{aligned}$$

$$\begin{aligned} R_{b2} \cdot 2 - C_2 \cdot 3 &= 0 \\ R_{b2} &= 1,5 \text{ kN} \end{aligned}$$