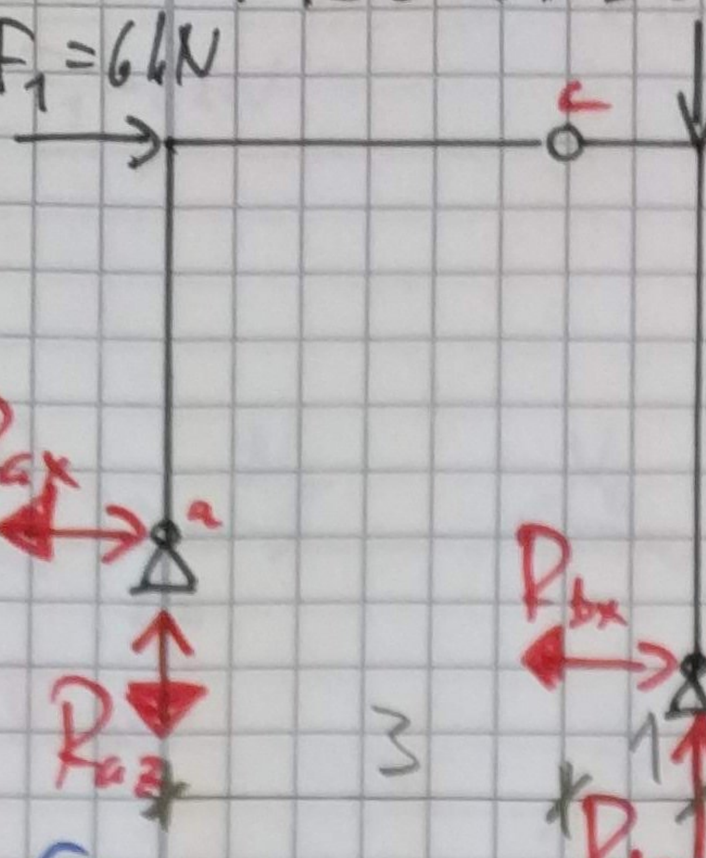
TROJKLOUBOVÝ NOSNÍK



$$\sum M_{ic} = 0 \curvearrowleft +$$

$$-F_1 \cdot 3 - F_2 \cdot 4 + R_{bz} \cdot 4 + R_{bx} \cdot 1 = 0$$

$$4R_{bz} + R_{bx} = 66$$

$$\sum M_{ib} = 0 \curvearrowleft +$$

$$-F_1 \cdot 4 + F_2 \cdot 0 - R_{ax} \cdot 1 - R_{az} \cdot 4 = 0$$

$$4R_{az} + R_{ax} = -24$$

kloub nepřenáší ohybový moment, proto $\sum M_{ic}$ zprava i zleva musí být rovna 0 !

$$\sum M_{ic}^{L} = 0 \curvearrowleft \quad -3R_{az} + 3R_{ax} = 0$$

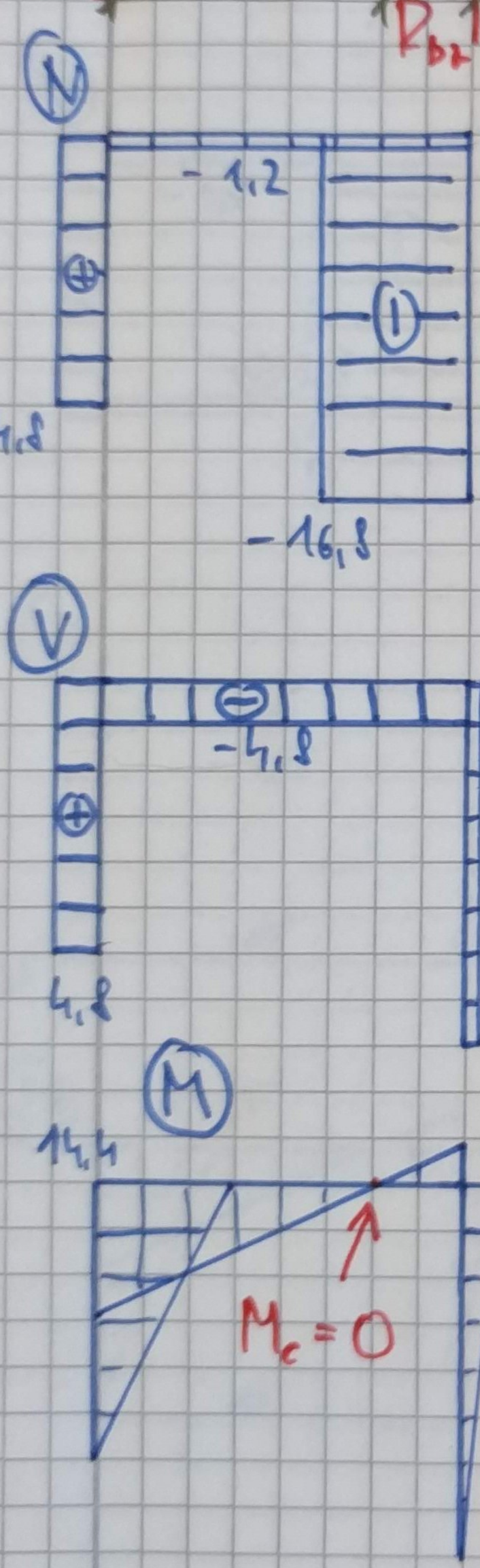
$$\sum M_{ic}^{R} = 0 \curvearrowleft + \quad R_{bz} + 4R_{bx} = 12$$

$$R_{bx} = +1{,}2 \text{ kN} \quad (\leftarrow)$$

$$R_{bz} = 16{,}8 \text{ kN} \quad (\uparrow)$$

$$R_{ax} = +4{,}8 \text{ kN} \quad (\leftarrow)$$

$$R_{az} = +4{,}8 \text{ kN} \quad (\downarrow)$$



kontrola

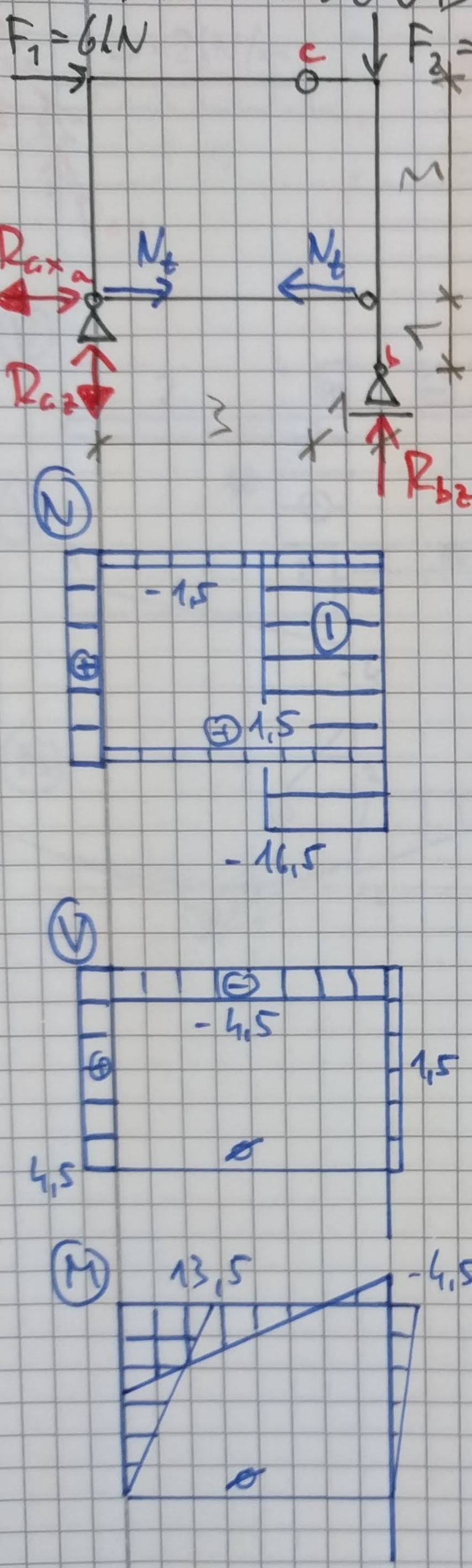
$$\sum F_{ix} \stackrel{?}{=} 0$$

$$6 - 4{,}8 - 1{,}2 = 0 \checkmark$$

$$\sum F_{iz} \stackrel{?}{=} 0$$

$$12 + 4{,}8 - 16{,}8 = 0 \checkmark$$

TROJKLOUBOVÝ NOSNÍK S TÁHLEM



táhlo nahradíme silami N_t, působícími v místech uchycení táhla na konstrukci.

$$\sum F_{ix} = 0 \qquad R_{ax} = +6\,kN\ (\leftarrow)$$

$$\sum M_{ic} = 0 \ \curvearrowleft+$$

$$-F_1 \cdot 3 - F_2 \cdot 4 + R_{bz} \cdot 4 = 0$$

$$R_{bz} = 16{,}5\,kN\ (\uparrow)$$

$$\sum M_{ib} = 0 \ \curvearrowleft+$$

$$-R_{az} \cdot 4 + R_{ax} \cdot 1 + (N_t \cdot 1 - N_t \cdot 1) - F_1 \cdot 4 = 0$$

$$R_{az} = +4{,}5\,kN\ (\downarrow)$$

síla v táhle

$$\sum M_{ic}^{R} = 0 \ \curvearrowleft$$

$$-F_2 \cdot 1 - N_t \cdot 3 + R_{bz} \cdot 1 = 0$$

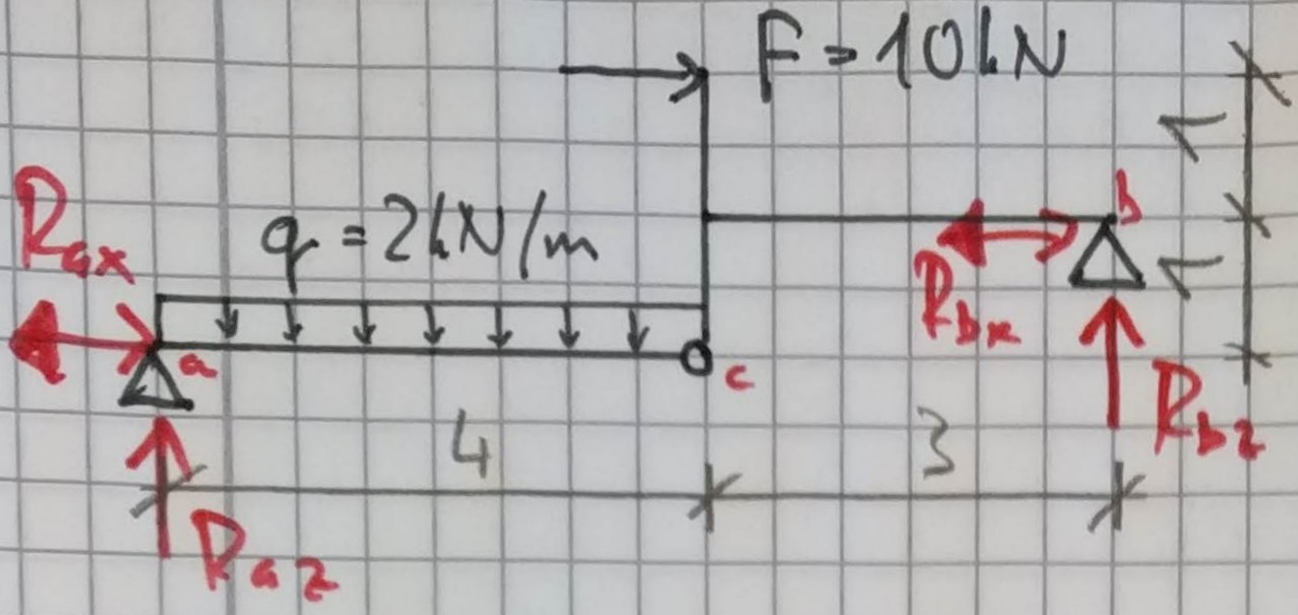
$$N_t = 1{,}5\,kN$$

síla v táhle musí být kladná (tahová), pokud by vyšla $N_t < 0$, je buď kde špatně navrženo, nebo jsme špatně počítali!

kontrola:

$$\sum F_{iz} \stackrel{?}{=} 0$$

$$12 - 4{,}5 - 16{,}5 = 0 \checkmark$$



$$\sum M_{ia} = 0 \circlearrowleft$$

$$-q \cdot 4 \cdot 2 - F \cdot 2 - R_{bx} \cdot 1 + R_{bz} \cdot 7 = 0$$

$$7R_{bz} - R_{bx} = 36$$

$$\sum M^{R}_{ic} = 0 \circlearrowleft$$

$$3R_{bz} - R_{bx} = 20$$

$$R_{bz} = 4kN \ (\uparrow)$$

$$R_{bx} = +8kN \ (\leftarrow)$$

$$\sum M_{ib} = 0 \circlearrowleft$$

$$R_{ax} \cdot 1 - R_{az} \cdot 7 + q \cdot 4 \cdot 5 - F \cdot 1 = 0$$

$$-7R_{az} + R_{ax} = -30$$

$$\sum M^{L}_{ic} = 0 \circlearrowleft$$

$$-4R_{az} = -16$$

$$R_{az} = 4kN \ (\uparrow)$$

$$R_{ax} = +2kN \ (\leftarrow)$$

kontrola:

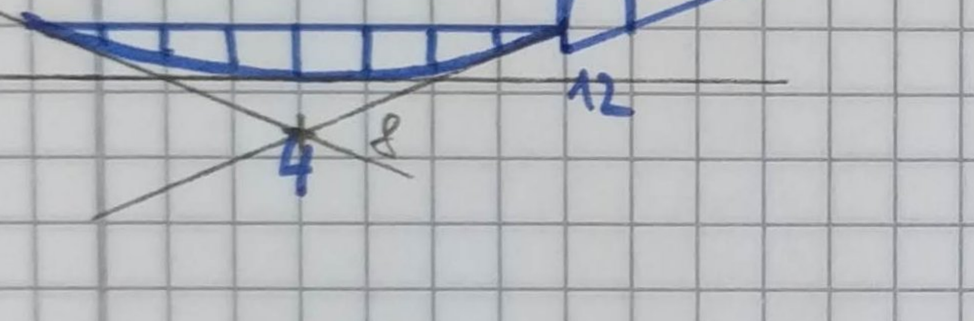
$$\sum F_{ix} \stackrel{?}{=} 0$$

$$-2 - 8 + 10 = 0 \ \checkmark$$

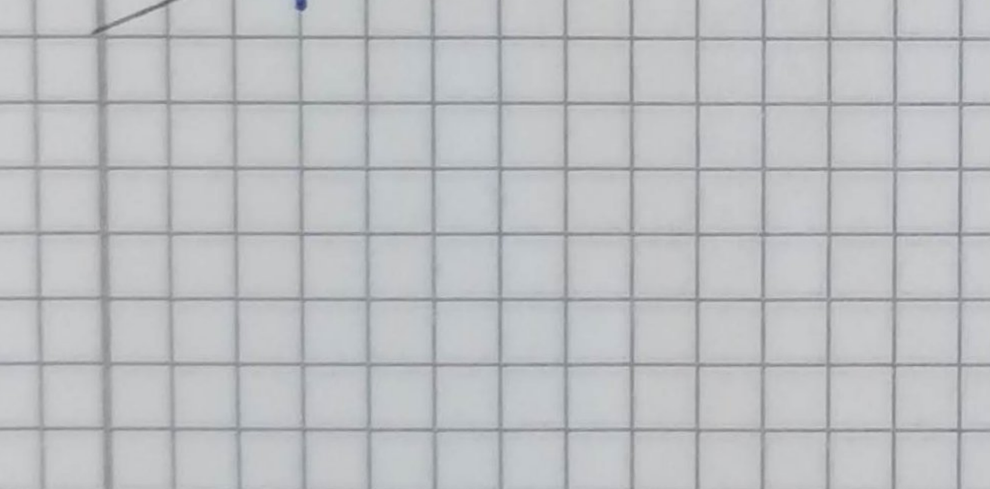
$$\sum F_{iz} \stackrel{?}{=} 0$$

$$2 \cdot 4 - 4 - 4 = 0 \ \checkmark$$

(N)



(V)



(M)