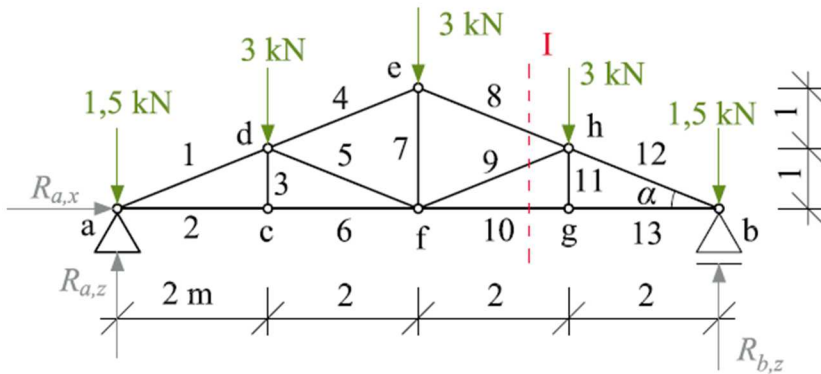


Příklad 1

Určete osové síly v prutech 7, 8, 9, 10

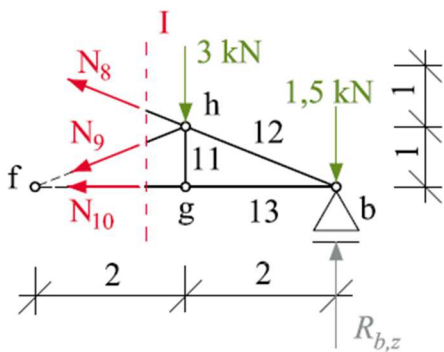


$$\sum F_{i,x} = 0 \rightarrow R_{a,x} = 0$$

$$\sum M_{i,a} = 0 \rightarrow R_{b,z} = 6 \text{ kN}$$

$$\sum M_{i,b} = 0 \rightarrow R_{a,z} = 6 \text{ kN}$$

Řez I – průsečná metoda



$$l_1 = l_4 = l_5 = l_8 = l_9 = l_{12} = \sqrt{2^2 + 1^2} = \sqrt{5} = 2,236 \text{ m}$$

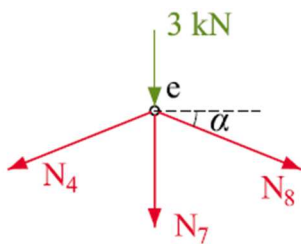
$$\sin \alpha = \frac{1}{\sqrt{5}} = 0,4472; \cos \alpha_2 = \frac{2}{\sqrt{5}} = 0,8944$$

$$\sum M_{i,h} = 0 \rightarrow N_{10} = 9 \text{ kN (tah)} = N_6$$

$$\sum M_{i,b} = 0 \rightarrow N_9 = -3,354 \text{ kN (tlak)} = N_5$$

$$\sum M_{i,f} = 0 \rightarrow N_8 = -6,708 \text{ kN (tlak)} = N_4$$

Styčnick „e“ – zjednodušená styčnicková metoda



$$\sum F_{i,z} = 0 \rightarrow N_7 = 3 \text{ kN (tah)}$$

$$N_1 = -10 \text{ kN (tlak)} = N_{12}$$

$$N_2 = 9 \text{ kN (tah)} = N_{13}$$

$$N_3 = 0 = N_{11}$$

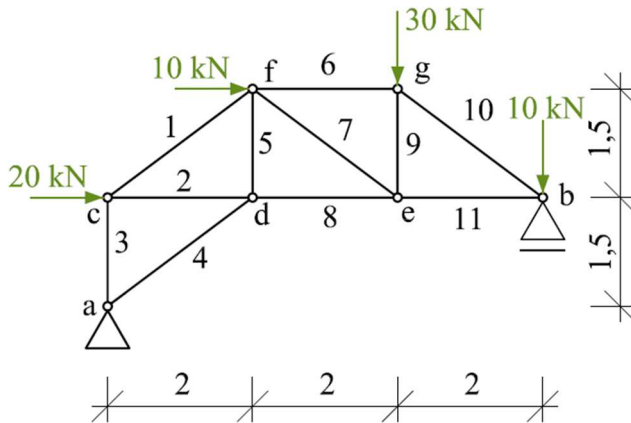
$$N_4 = -6,708 \text{ kN (tlak)} = N_8$$

$$N_5 = -3,354 \text{ kN (tlak)} = N_9$$

$$N_6 = 9 \text{ kN (tah)} = N_{10}$$

Příklad 2

Pomocí zjednodušené styčnickové metody určete osové síly ve všech prutech příhradové konstrukce.



$$\sum F_{i,z} = 0 \rightarrow R_{a,z} = -30 \text{ kN}$$

$$\sum M_{i,a} = 0 \rightarrow R_{b,z} = 40 \text{ kN}$$

$$\sum M_{i,e} = 0 \rightarrow R_{a,z} = 0 \text{ kN}$$

$a \rightarrow c \rightarrow d \rightarrow f \rightarrow g \rightarrow b$

$b \rightarrow g \rightarrow e \rightarrow f \rightarrow d \rightarrow c$

$N_1 = -37,5 \text{ kN (tlak)}$

$N_5 = 22,5 \text{ kN (tah)}$

$N_9 = 0$

$N_2 = 10 \text{ kN (tah)}$

$N_6 = -40 \text{ kN (tlak)}$

$N_{10} = -50 \text{ kN (tlak)}$

$N_3 = -22,5 \text{ kN (tlak)}$

$N_7 = 0$

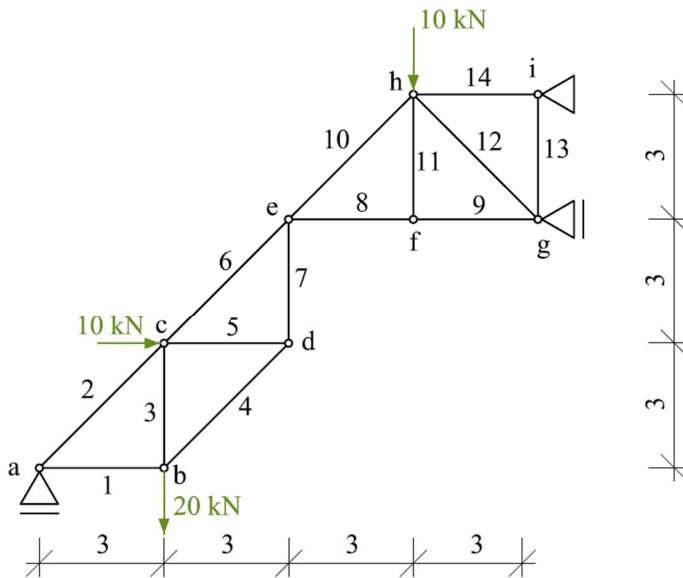
$N_{11} = 40 \text{ kN (tah)}$

$N_4 = 37,5 \text{ kN (tah)}$

$N_8 = 40 \text{ kN (tah)}$

Příklad 3

Pomocí průsečné metody určete osové síly v prutech 3, 4, 5, 9, 10, 11

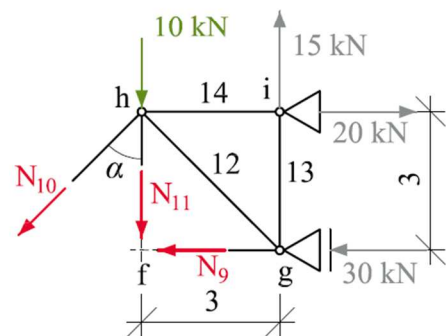
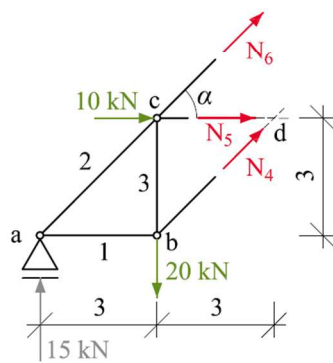
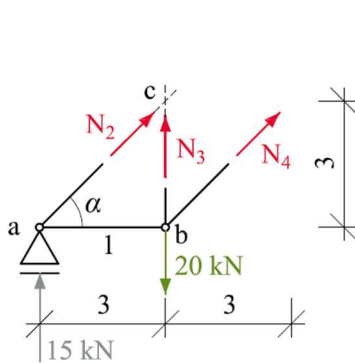


$$\sum M_{ie}^L = 0 \rightarrow R_{a,z} = 15 \text{ kN}$$

$$\sum F_{i,z} = 0 \rightarrow R_{i,z} = 15 \text{ kN}$$

$$\sum M_{ie}^P = 0 \rightarrow R_{i,x} = -20 \text{ kN}$$

$$\sum F_{i,x} = 0 \rightarrow R_{g,x} = 30 \text{ kN}$$



$$N_1 = 15 \text{ kN (tah)}$$

$$N_2 = -21,21 \text{ kN (tlak)}$$

$$N_3 = 5 \text{ kN (tah)}$$

$$N_4 = 21,21 \text{ kN (tah)}$$

$$N_5 = -15 \text{ kN (tlak)}$$

$$N_6 = -14,14 \text{ kN (tlak)}$$

$$N_7 = 15 \text{ kN (tah)}$$

$$N_8 = -15 \text{ kN (tlak)}$$

$$N_9 = -15 \text{ kN (tlak)}$$

$$N_{10} = 7,07 \text{ kN (tah)}$$

$$N_{11} = 0$$

$$N_{12} = -21,21 \text{ kN (tlak)}$$

$$N_{13} = 15 \text{ kN (tah)}$$

$$N_{14} = 20 \text{ kN (tah)}$$