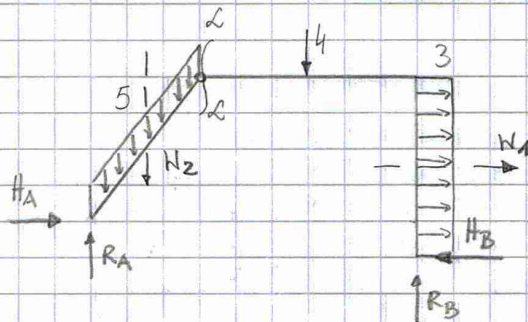
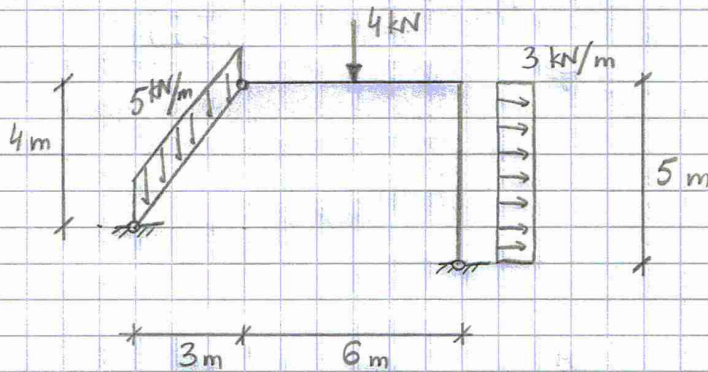


Zad 1

Wyznacz wykresy  $N, T, M$ .



$$N_1 = 3 \cdot 5 = 15 \text{ kN}$$

$$N_2 = 5 \cdot 5 = 25 \text{ kN}$$

$$\textcircled{a} \sum M_A = 0$$

$$R_B \cdot 9 - H_B \cdot 1 - N_1 \cdot 1,5 - 4 \cdot 6 - N_2 \cdot 1,5 = 0$$

$$H_B = 9R_B - 15 \cdot 1,5 - 24 - 25 \cdot 1,5$$

$$\boxed{H_B = 9R_B - 84}$$

$$\textcircled{b} \sum M_C^P = 0$$

$$-4 \cdot 3 + N_1 \cdot 2,5 + R_B \cdot 6 - H_B \cdot 5 = 0$$

$$-12 + 15 \cdot 2,5 + 6R_B - 5H_B = 0$$

$$5H_B = 6R_B + 25,5$$

$$\boxed{H_B = \frac{6}{5}R_B + 5,1}$$

Porównując  $H_B$  z obu przypadków odejmujemy:

$$9R_B - 84 = 1,2R_B + 5,1$$

$$7,8R_B = 89,1$$

$$\boxed{R_B = 11,42 \text{ kN}}$$

$$\boxed{H_B = 9R_B - 84 = 18,78 \text{ kN}}$$

$$\textcircled{1} \sum M_B = 0$$

$$-W_1 \cdot 2,5 + 4 \cdot 3 + N_2 \cdot 7,5 - 9 \cdot R_A - 1 \cdot H_A = 0$$

$$H_A = -15 \cdot 2,5 + 12 + 25 \cdot 7,5 - 9 R_A$$

$$H_A = 162 - 9 R_A$$

$$\textcircled{2} \sum M_C^L = 0$$

$$N_2 \cdot 1,5 - R_A \cdot 3 + H_A \cdot 4 = 0$$

$$4 H_A = 3 R_A - 25 \cdot 1,5$$

$$4 H_A = 3 R_A - 37,5$$

$$H_A = 0,75 R_A - 9,375$$

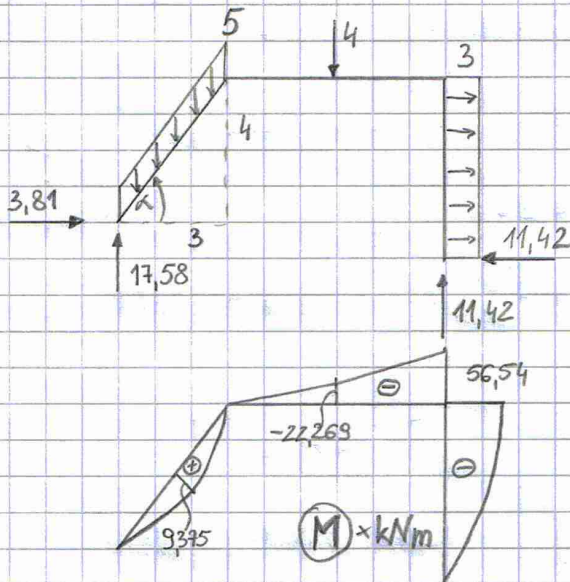
Porównując  $H_A$  z obu przypadków mamy:

$$162 - 9 R_A = 0,75 R_A - 9,375$$

$$171,375 = 9,75 R_A$$

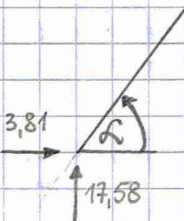
$$R_A = 17,58 \text{ kN}$$

$$H_A = 0,75 R_A - 9,375 = 0,75 \cdot 17,58 - 9,375 = 3,81 \text{ kN}$$



$$\sin \alpha = \frac{4}{5}$$

$$\cos \alpha = \frac{3}{5}$$

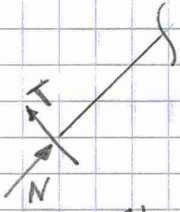


$$\frac{x_1}{3,81} = \cos \alpha \Rightarrow x_1 = 3,81 \cdot \frac{3}{5} = 2,286 \text{ kN}$$

$$\frac{y_1}{3,81} = \sin \alpha \Rightarrow y_1 = 3,81 \cdot \frac{4}{5} = 3,048 \text{ kN}$$

$$\frac{x_2}{17,58} = \sin \alpha \Rightarrow x_2 = 17,58 \cdot \frac{4}{5} = 14,064 \text{ kN}$$

$$\frac{y_2}{17,58} = \cos \alpha \Rightarrow y_2 = 17,58 \cdot \frac{3}{5} = 10,548 \text{ kN}$$



$$N = x_1 + x_2 = 16,35 \text{ kN}$$

$$T = -y_1 + y_2 = 7,5 \text{ kN}$$

minus bo zwrot ujemny

