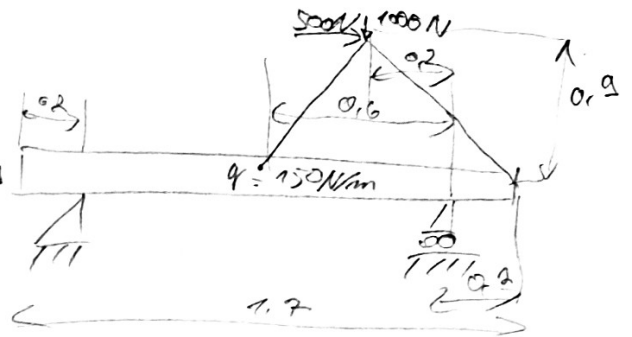


①

$$\tan x = \frac{0.9}{0.4}$$

$$x = 66^\circ$$

$$B = 24^\circ$$



$$\cos B = \frac{F}{\dots}$$

$$\sum F_y = -2Q \cos 12 - 1000 = 0$$

$$Q = 542N$$



$$\sum F_x = -Q' \cos x + Q \cos x = -500N$$

$$\sum F_y = -Q' \cos B - Q \cos B - 1000 = 0$$

$$Q - Q' = -1229N$$

$$Q' = Q + 1229$$

$$-(Q + 1229) - Q = \frac{1000}{\cos 24}$$

$$-Q = \frac{1000}{\cos 24} + 1229$$

$$Q = 2781N \Rightarrow Q' = 1162N$$

$$\sum F_x = H_A + Q' \cos x - Q \cos x = 0$$

$$\sum F_y = R_A + R_B - 255 + Q' \sin x + Q \sin x = 0$$

$$\sum M_A = -255 \cdot 0.85 + Q' \sin x \cdot 0.9 + 15R_B + 1000 \sin x \cdot 1.7 = 0$$

$$-255 \cdot 0.85 - 67 \cdot \sin 66 \cdot 0.9 - 17(-1162) \sin 66 = -15R_B \Rightarrow R_B = -1030N$$

$$H_A = +67 \cdot \cos 66 - (-1162) \cos 66$$

$$H_A = 500N$$

$$R_A + (-1030) - 255 - 67 \sin 66 - (-1162) \sin 66 = 0$$

$$R_A = 215N$$

$$-255 \cdot 0.85 + 67 \cdot \sin 66 \cdot 0.9 + 15R_B + (-1162) \cdot \sin 66 \cdot 1.7 = 0$$

$$R_B = 1311N \Rightarrow R_A = 255 + 67 \sin 66 - (-1162) \sin 66 = 1311$$

$$R_A = -56N$$

$$H_A = -67 \cos 66 + (-1162) \cos 66$$

$$H_A = 500N$$



Reaction forces & diagrams

②

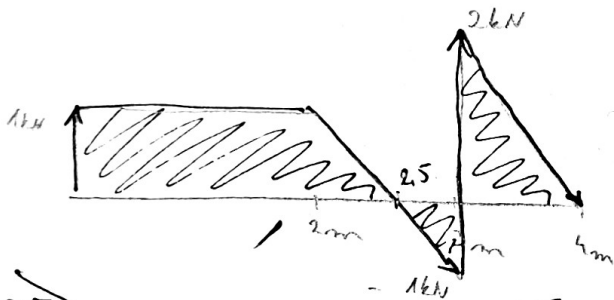
$$\rightarrow \sum F_x \Rightarrow H_A = 2 \text{ kN}$$

$$\uparrow \sum F_y \Rightarrow R_A = +1 \text{ kN}$$

$$\uparrow \sum M_A = M_A + 3 \cdot 0 - 4 \cdot 3 - 2 \text{ kNm} = 0$$

$$M_A = 5 \text{ kNm}$$

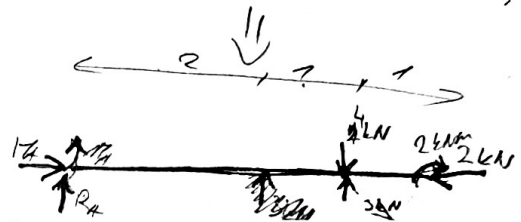
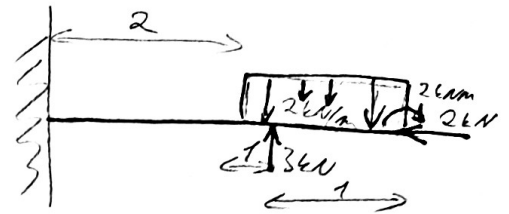
Shear force diagram



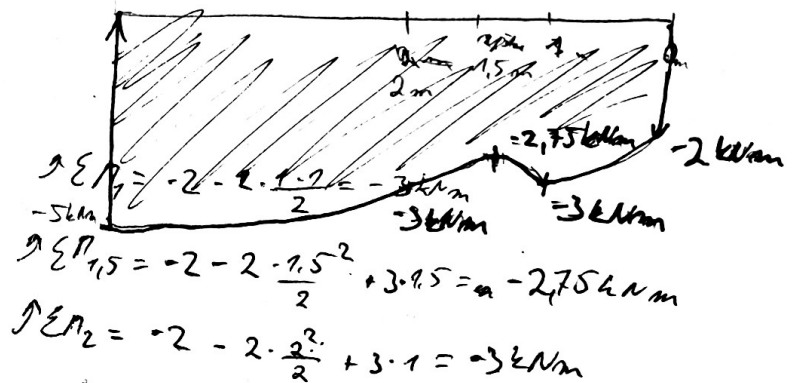
$$\uparrow \sum M_{2.5} = 5 + 2.5 \cdot 1 - 2 \cdot 0.5^2 = 7.25 \text{ kNm}$$

$$\uparrow \sum M_3 = 5 + 3 \cdot 1 - 2 \cdot \frac{1 \cdot 1}{2} = 7 \text{ kNm}$$

$$\uparrow \sum M_4 = 5 + 4 \cdot 1 - 2 \cdot \frac{2 \cdot 2}{2} + 3 \cdot 1 - 2 =$$



Bending diagram



$$\uparrow \sum M = -2 - 2 \cdot \frac{1 \cdot 1}{2} = -3 \text{ kNm}$$

$$\uparrow \sum M_{1.5} = -2 - 2 \cdot \frac{1.5^2}{2} + 3 \cdot 1.5 = -2.75 \text{ kNm}$$

$$\uparrow \sum M_2 = -2 - 2 \cdot \frac{2^2}{2} + 3 \cdot 1 = -3 \text{ kNm}$$

~~$$\frac{22}{3} = -22 \text{ Nm} \cdot 0,5 + 3 \cdot 1 + 1 \cdot 3 + 1 \cdot 4 = +9 \text{ Nm}$$~~

$$\uparrow \sum F_3 = \frac{0.7}{1.76} F_{BC} - 700 = 0 \quad \underline{\underline{F_{CD} = -5000 N}}$$

$$\uparrow \sum F_3 = \frac{0.7}{1.76} F_{BC} - 700 = 0 \quad \underline{\underline{F_{CD} = -5000 N}}$$

$$F_{BC} = 1760 \text{ N}$$

$$\downarrow \sum F_z = \frac{0.2}{1.53} \cdot F_{AC} + \left(\frac{-96}{1.76} \sqrt{\frac{1760}{-100}} \right) = 0$$

$$F_{AC} = 3570 \text{ N}$$