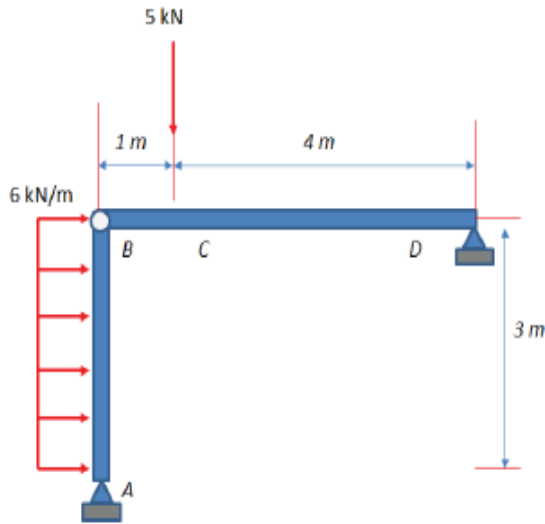


Determine the reaction at the supports in the next structure and force laws diagrams:



a) Reaction calculation

$$\sum M_B = 3H_A - 6.3 \cdot \frac{3}{2} = 0 \rightarrow H_A = -9 \text{ kN}$$

$$\sum F_x = 0 \rightarrow H_D = -9 \text{ kN}$$

$$\sum M_A = 5V_D - 5.1 - 9.3 + 6.3 \cdot \frac{3}{2} = 0 \rightarrow$$

$$V_D = 1 \text{ kN}$$

$$\sum F_y = 0 \rightarrow V_A = 4 \text{ kN}$$

b) Force laws

$$\{(0 \leq y \leq 3) \cap (x = 0)\}$$

$$N_3 = -4 \text{ kN}$$

$$V_3 = 9 - 6x \text{ kN}$$

$$M_3 = 9x - \frac{6x^2}{2}$$

$$M_{max} \rightarrow \frac{dM(x)}{dx} = V(x) = 0 \rightarrow x = 1,5 \text{ m}$$

$$M_3(x = 1,5) = 9.1,5 - \frac{6(1,5)^2}{2} = 6,75 \text{ kN.m}$$

$$\{(1 \leq x \leq 5) \cap (y = 3)\}$$

$$N_3 = -9 \text{ kN}$$

$$V_3 = -1 \text{ kN}$$

$$M_3 = -x' = 5 - x$$

$$\{(0 \leq x \leq 1) \cap (y = 3)\}$$

$$N_3 = -9 \text{ kN}$$

$$V_3 = -1 + 5 = 4 \text{ kN}$$

$$M_3 = 5 - x - 5(x' - 4) =$$

$$5 - x - 5(5 - x - 4) = 4x$$

c) Force laws diagrams

