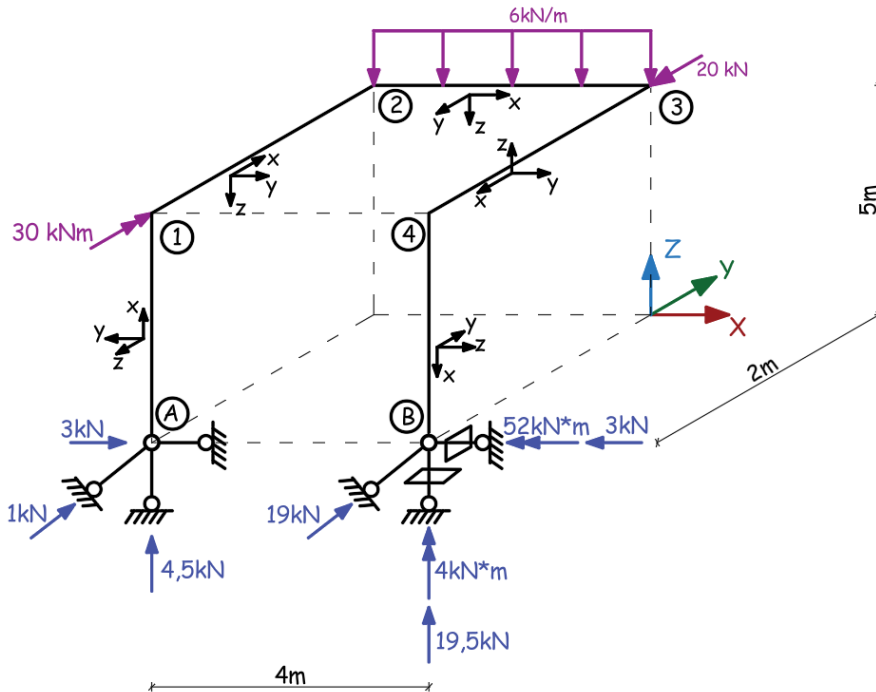


Zadanie 3

Znając wartości reakcji w układzie statycznie niewyznaczalnym sporządzić wykresy momentów skręcających i zginających



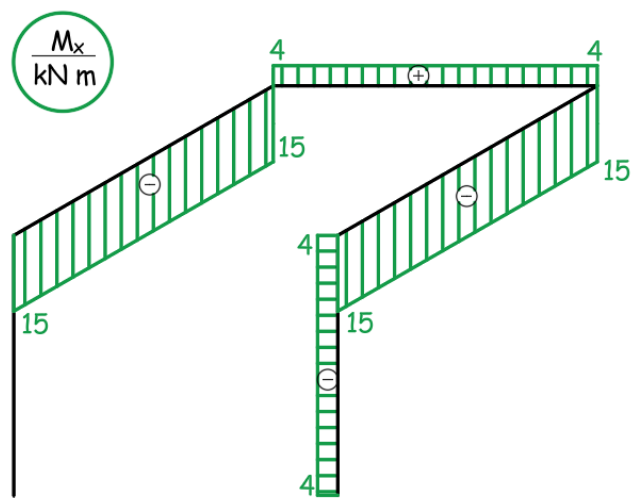
$$M_{x,A1} = M_{x,1A} = 0,$$

$$M_{x,12} = M_{x,21} = -30 \text{ kN} \cdot \text{m} + 3 \text{ kN} \cdot 5 \text{ m} = -15 \text{ kN} \cdot \text{m},$$

$$M_{x,23} = M_{x,32} = -1 \text{ kN} \cdot 5 \text{ m} + 4.5 \text{ kN} \cdot 2 \text{ m} = 4 \text{ kN} \cdot \text{m},$$

$$M_{x,B4} = M_{x,4B} = -4 \text{ kN} \cdot \text{m},$$

$$M_{x,43} = M_{x,34} = -3 \text{ kN} \cdot 5 \text{ m} = -15 \text{ kN} \cdot \text{m}.$$



$$M_{y,A1} = 0,$$

$$M_{y,1A} = 1 \text{ kN} \cdot 5 \text{ m} = 5 \text{ kN} \cdot \text{m},$$

$$M_{y,12} = -1 \text{ kN} \cdot 5 \text{ m} = -5 \text{ kN} \cdot \text{m},$$

$$M_{y,21} = -1 \text{ kN} \cdot 5 \text{ m} + 4.5 \text{ kN} \cdot 2 \text{ m} = 4 \text{ kN} \cdot \text{m},$$

$$M_{y,23} = 30 \text{ kN} \cdot m - 3 \text{ kN} \cdot 5 \text{ m} = -15 \text{ kN} \cdot m,$$

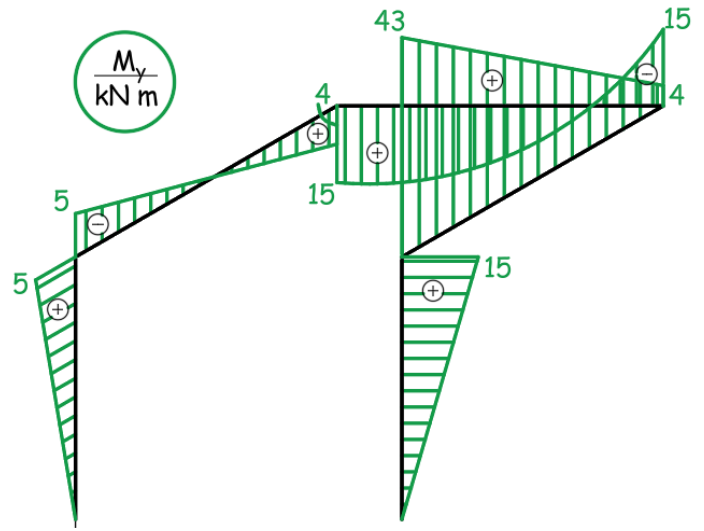
$$M_{y,32} = 30 \text{ kN} \cdot m - 3 \text{ kN} \cdot 5 \text{ m} - 6 \frac{\text{kN}}{\text{m}} \cdot 4 \text{ m} \cdot 2 \text{ m} + 4,5 \text{ kN} \cdot 4 \text{ m} = 15 \text{ kN} \cdot m,$$

$$M_{y,B4} = 0,$$

$$M_{y,4B} = 3 \text{ kN} \cdot 5 \text{ m} = 15 \text{ kN} \cdot m,$$

$$M_{y,43} = 52 \text{ kN} \cdot m + 19 \text{ kN} \cdot 5 \text{ m} = 43 \text{ kN} \cdot m,$$

$$M_{y,34} = 52 \text{ kN} \cdot m + 19 \text{ kN} \cdot 5 \text{ m} - 19,5 \text{ kN} \cdot 2 \text{ m} = 4 \text{ kN} \cdot m.$$



$$M_{z,A1} = 0,$$

$$M_{z,1A} = -3 \text{ kN} \cdot 5 \text{ m} = -15 \text{ kN} \cdot m,$$

$$M_{z,12} = 0,$$

$$M_{z,21} = 3 \text{ kN} \cdot 2 \text{ m} = 6 \text{ kN} \cdot m,$$

$$M_{z,23} = 3 \text{ kN} \cdot 2 \text{ m} = 6 \text{ kN} \cdot m,$$

$$M_{z,32} = 3 \text{ kN} \cdot 2 \text{ m} - 1 \text{ kN} \cdot 4 \text{ m} = 2 \text{ kN} \cdot m,$$

$$M_{z,B4} = -52 \text{ kN} \cdot m,$$

$$M_{z,4B} = -52 \text{ kN} \cdot m + 19 \text{ kN} \cdot 5 \text{ m} = 43 \text{ kN} \cdot m$$

$$M_{z,43} = 4 \text{ kN} \cdot m,$$

$$M_{z,34} = 4 \text{ kN} \cdot m - 3 \text{ kN} \cdot 2 \text{ m} = -2 \text{ kN} \cdot m.$$

