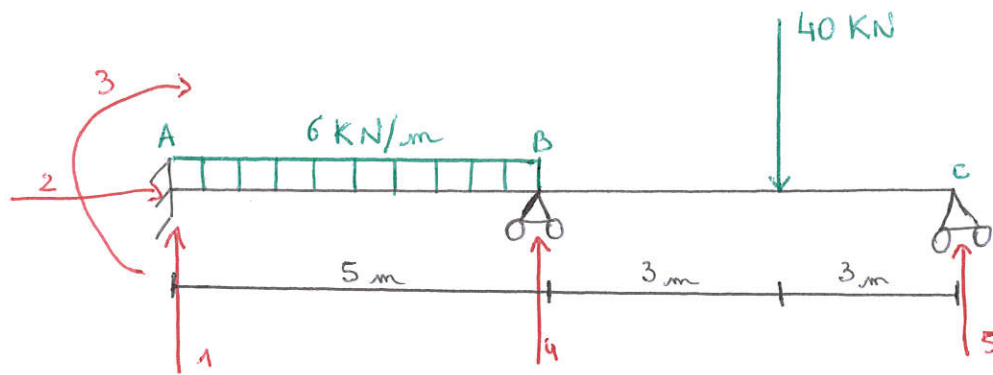
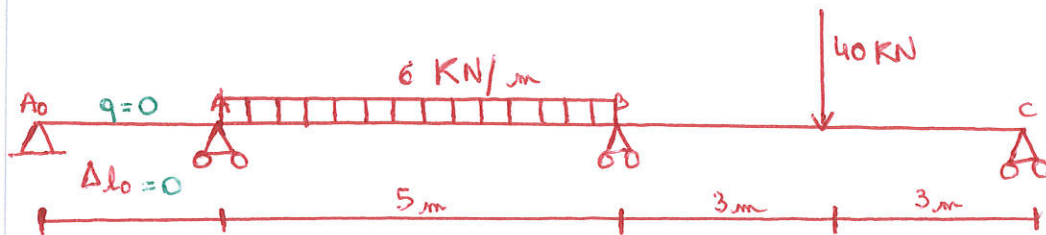


Les trois moments :



$$\begin{aligned} m &= R - 3 \\ &= 5 - 3 \\ &= 2 \end{aligned}$$



$$M_{i-1} l_{i-1} + 2(l_{i-1} + l_i) M_i + M_{i+1} l_i = -6EI (\psi_{ig} + \psi_{id})$$

Point A

$$\Delta l M_{A0} + 2(\Delta l + 5) M_A + 5 M_B = -6EI (\psi_{Ag} + \psi_{Ad})$$

$$10 M_A + 5 M_B = -6EI \left(0 - \frac{1}{4} q l^3 \right)$$

$$10 M_A + 5 M_B = -6EI \left(0 - \frac{1 \times 6 \times 5^3}{4} \right)$$

$$10 M_A + 5 M_B = -187,5 \text{ kN/m}^2$$

Point B:

$$5M_A + 2(5+6)M_B + 6M_C = -6EI(\varphi_{Bg} + \varphi_{Bd})$$

$$-6EI\varphi_{Bg} = -\left(\frac{1}{4}ql^3\right) = \frac{-1 \times 6 \times 5^3}{4} = -187,5$$

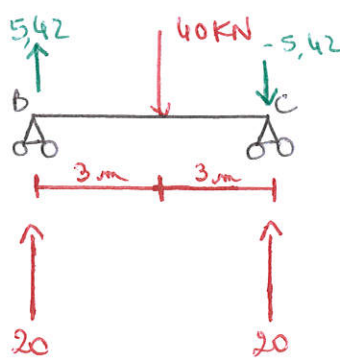
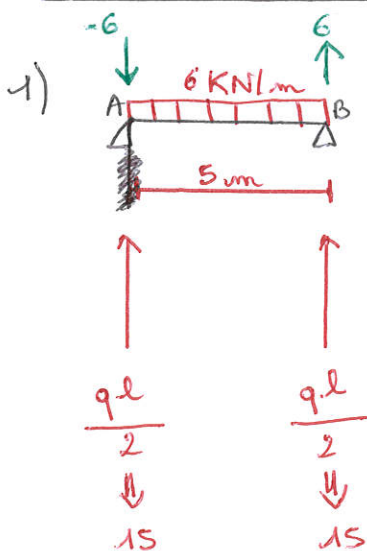
$$-6EI\varphi_{Bd} = -\left(\frac{3}{8}pl^2\right) = \frac{-3 \times (40 \times 6^2)}{8} = -540$$

$$5M_A + 22M_B = -727,5 \text{ kN/m}^2$$

$$M_A = -2,5 \text{ kN/m}$$

$$M_B = -32,5 \text{ kN/m}$$

Calcul des réactions



2) Réactions dues aux moments

$$R_A = \frac{M_B - M_A}{l} = \frac{-32,5 + 2,5}{5} = \frac{-30}{5} = -6$$

$$R_B = \frac{M_A - M_B}{l} = \frac{-2,5 + 32,5}{5} = 6$$

$$\frac{0 - (-32,5)}{l} = \frac{32,5}{6} = 5,42$$

$$R_A = 15 - 6 = 9 \text{ KN}, R_B = 21 + 25,42 = 46,42 \text{ KN}, R_C = 20 - 5,42 = 14,58 \text{ KN}$$

Diagramme des moments fléchissants:

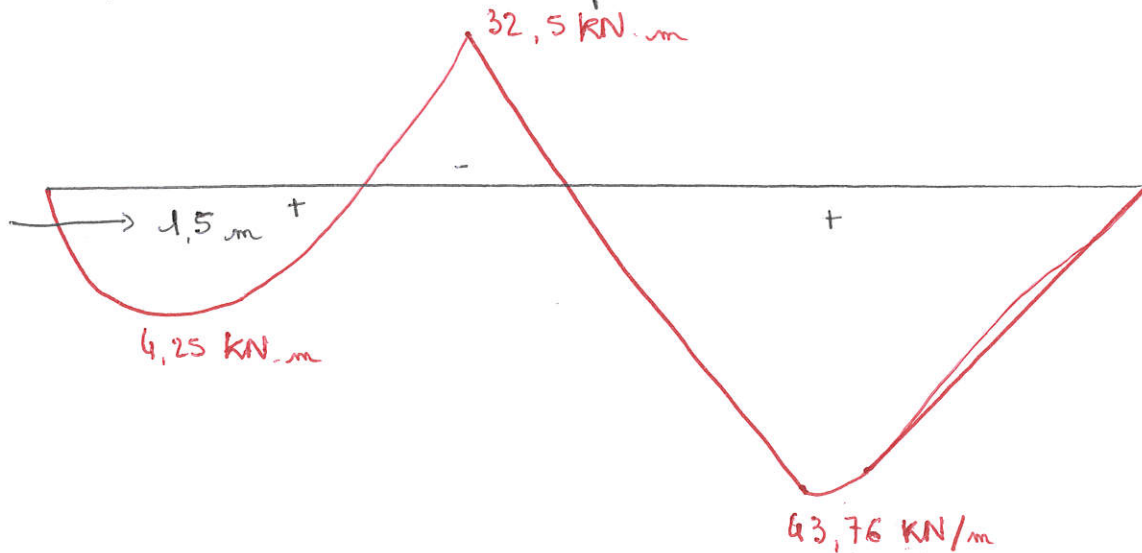
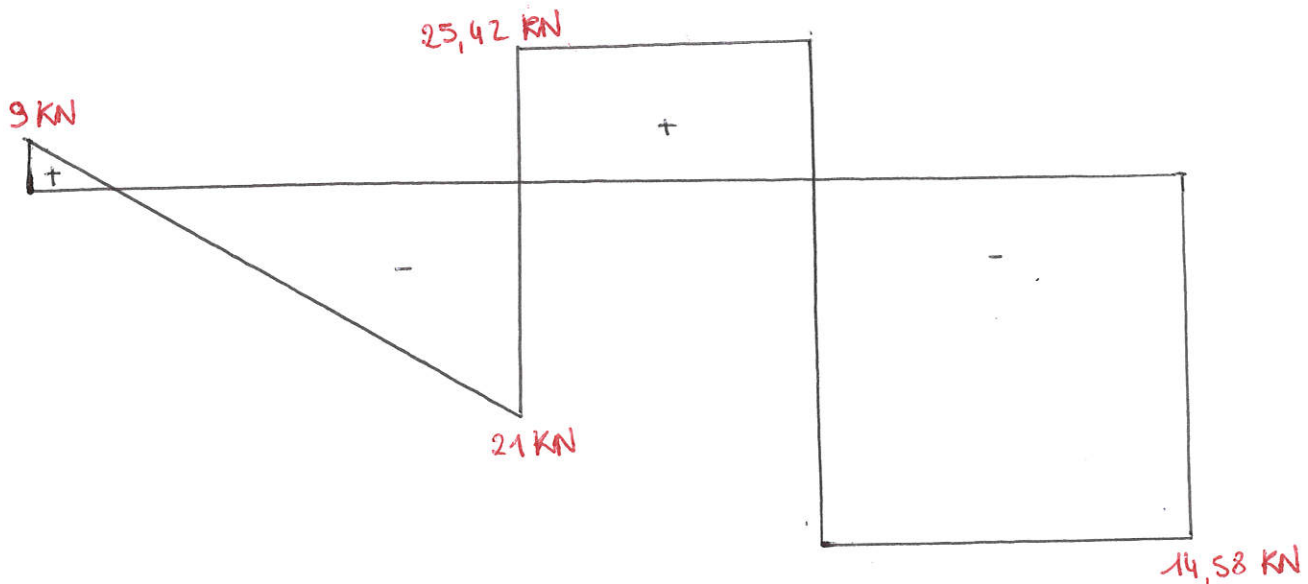
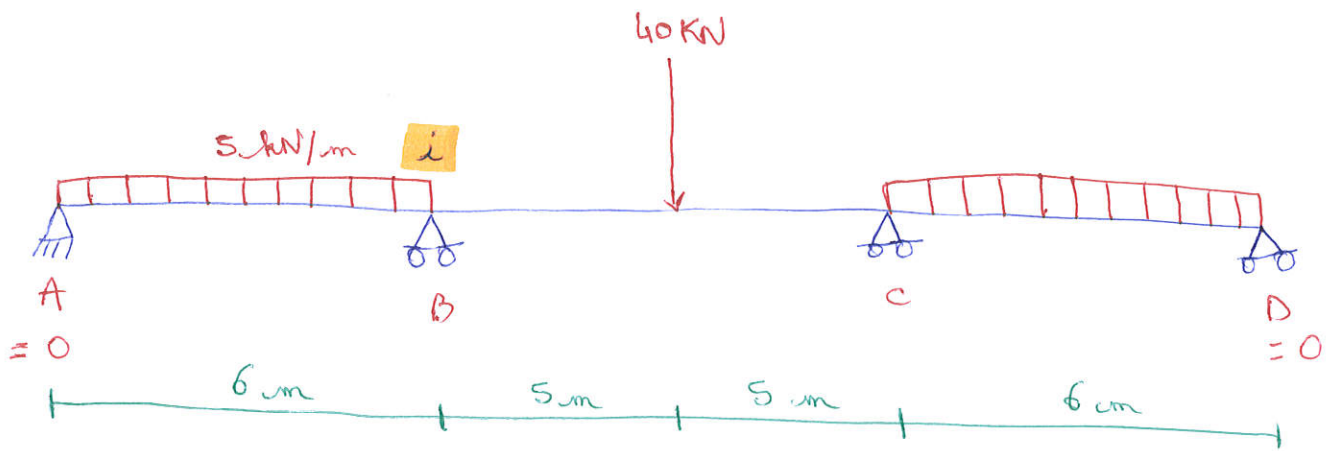


Diagramme des efforts tranchants :





- Réactions aux appuis

$$M_i - 12l_{i-1} + 2(l_{i-1} + l_i)M_i + M_{i+1}l_i = 6EI(\psi_{i-1} + \psi_i)$$

- Tracer le diagramme M.T

$$M_A = M_D = 0$$

Point B :

$$6M_A + 2(6 + 10)M_B + 10M_C = -6EI(-270 - 1500)$$

$$-6EI\psi_g = -\left(\frac{1}{4}ql^3\right) = \frac{(-1 \times 5) \times 6^3}{4} = -270$$

$$-6EI\psi_d = -\left(\frac{3}{8}pl^2\right) = \frac{-3 \times (40 \times 10^2)}{8} = -1500$$

$$32M_B + 10M_C = -1770 \text{ kNm}^2$$

Point C :

$$10M_B + 2(10 + 6)M_C + 6M_D = -6EI(-270 - 1500)$$

$$10M_B + 32M_C = -1770 \text{ kNm}^2$$

$$\begin{cases} \textcircled{1} 32 \text{ MB} + 10 \text{ Mc} = -1770 \quad (\Rightarrow) \text{ Mc} = \frac{(-1770 - 32 \text{ MB})}{10} \\ \textcircled{2} 10 \text{ MB} + 32 \text{ Mc} = -1770 \quad (\Rightarrow) 10 \text{ MB} + 32 \frac{(-1770 - 32 \text{ MB})}{10} \end{cases}$$

On remplace dans les équations:

$$10 \text{ MB} + 32 \left(\frac{-1770 - 32 \text{ MB}}{10} \right) = -1770$$

$$10 \text{ MB} + 32 (-177 - 3,2 \text{ MB}) = -1770$$

$$10 \text{ MB} - 5664 = 102,4 \text{ MB} = -1770$$

$$10 \text{ MB} - 102,4 \text{ MB} = -1770 + 5664$$

$$-92,4 \text{ MB} = 3894$$

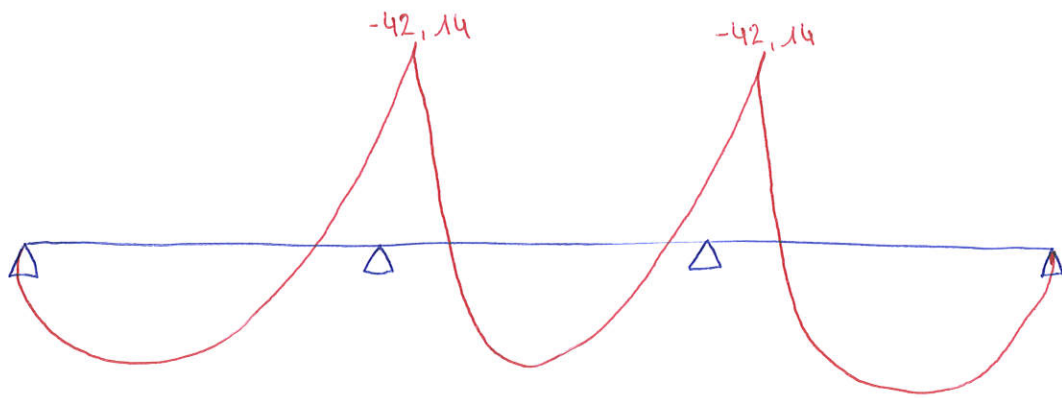
$$\text{MB} = \frac{3894}{-92,4}$$

$$\text{MB} = -42,14$$

$$32 \times -42,14 + 10 \left(\frac{-1770 - 32 \text{ MB}}{10} \right) = -1770$$

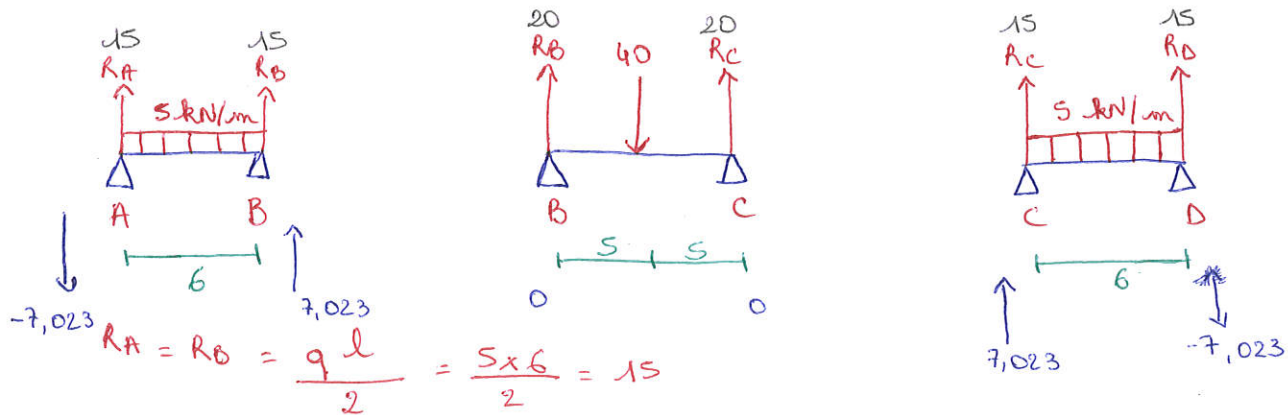
$$-1348,48 + 10 (-177 - 3,2 \text{ MB}) = -1770$$

$$-1348,48 \neq -1770 - 32 \text{ MB} = -1770$$



1) Calcul des réactions : principe de

Réactions dues aux charges extérieures :



Réactions dues aux moments appliqués au niveau des appuis

$$R_A = \frac{M_B - M_A}{l} = \frac{-42,14 - 0}{6} = -7,023 \text{ kN}$$

$$R_B = \frac{M_A - M_B}{l} = \frac{0 + 42,14}{6} = 7,023 \text{ kN}$$