

$$\begin{aligned}
 h_{ab} &= 0.4 \text{ m} \\
 I_{ab} &= 1.5 \cdot 10^{-3} \text{ m}^4 \\
 I_{bc} &= 2 \cdot 10^{-3} \text{ m}^4 \\
 E &= 25 \cdot 10^6 \text{ kPa} \\
 \alpha_t &= 10^{-5} \text{ } ^\circ\text{C}^{-1}
 \end{aligned}$$

$$1) m_s = 1$$

zsus - soustava prostých nosníků
(odstraníme převislý konec a nahradíme interakcemi)

$$2) \phi_{ba} + \phi_{bc} = 0$$

$$\beta_{ba} M_a + (\alpha_{bc} + \alpha_{ba}) M_b + \beta_{bc} M_c + \varphi_{ba} + \varphi_{bc} = 0$$

$$3) \text{ pole } ab$$

$$\begin{aligned}
 \alpha_{ba} = (\alpha_{ab}) &= |5.13a| = \frac{l_{ab}}{3EI_{ab}} = \frac{4.5}{3EI_{ab}} = \frac{1000}{E} \\
 \beta_{ba} = (\beta_{ab}) &= |5.13b| = \frac{l_{ab}}{6EI_{ab}} = \frac{4.5}{6EI_{ab}} = \frac{500}{E}
 \end{aligned}$$

$$\varphi_{ba,t} = (\varphi_{ab,t}) = |5.20| = \frac{1}{2} \alpha_t \Delta T_{ab} \frac{l_{ab}}{h_{ab}} = \left| T_{ab} = T^d - T^h = -6 - (-2) = -8 \right| =$$

$$= \frac{1}{2} 10^{-5} \cdot 8 \cdot \frac{4.5}{0.4} = 450 \cdot 10^{-6}$$

$$\varphi_{ba,p} = |5.21b| = \frac{w_a - w_b}{l_{ab}} = \frac{0 - 0.9 \cdot 10^{-3}}{4.5} = -200 \cdot 10^{-6}$$

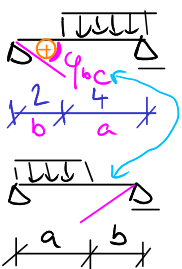
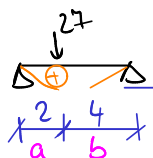
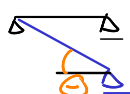
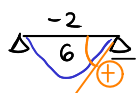
$$\text{pole } bc$$

$$\alpha_{bc} = (\alpha_{cb}) = |5.13a| = \frac{l_{bc}}{3EI_{bc}} = \frac{6}{3EI_{bc}} = \frac{1000}{E}$$

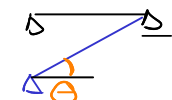
$$\begin{aligned}
 \varphi_{bc,F} &= |5.8a| = \frac{F a b}{6EI_{bc} l_{bc}} (l_{bc} + b) = \frac{27 \cdot 2 \cdot 4}{6EI_{bc} \cdot 6} \cdot (6 + 4) = \\
 &= \frac{30000}{E}
 \end{aligned}$$

$$\begin{aligned}
 \varphi_{bc,q} &= |5.15b| = \frac{q a^2}{24EI_{bc} l_{bc}} (2l_{bc}^2 - a^2) = \\
 &= \frac{4.5 \cdot 4^2}{24EI_{bc} \cdot 6} (2 \cdot 6^2 - 4^2) = \frac{14000}{E}
 \end{aligned}$$

$$\varphi_{bc,p} = |5.21a| = \frac{w_c - w_b}{l_{bc}} = \frac{0 - 0.9 \cdot 10^{-3}}{6} = -150 \cdot 10^{-6}$$



tabulka

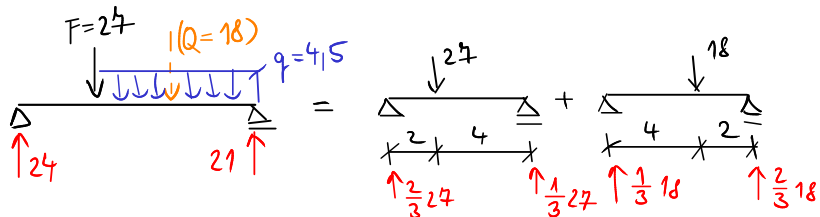
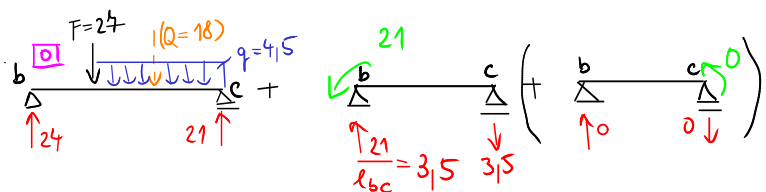
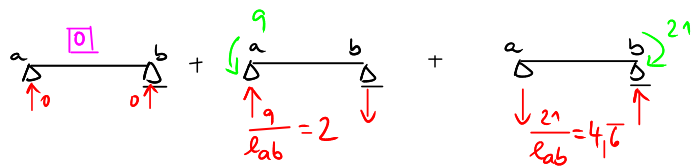
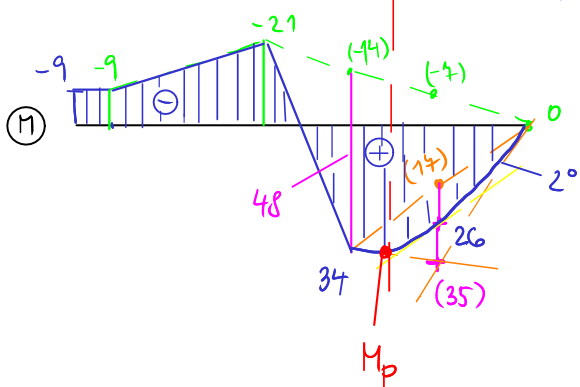
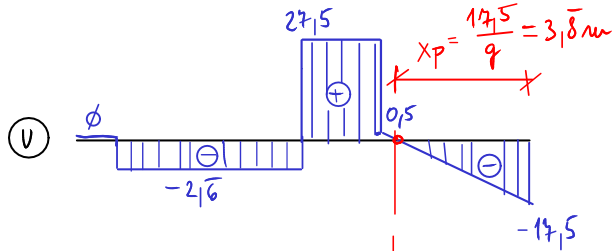
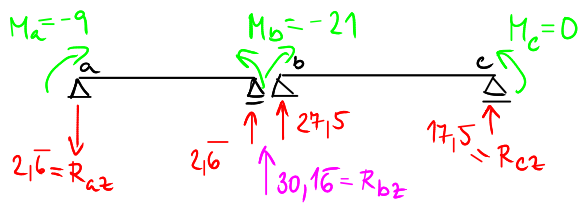
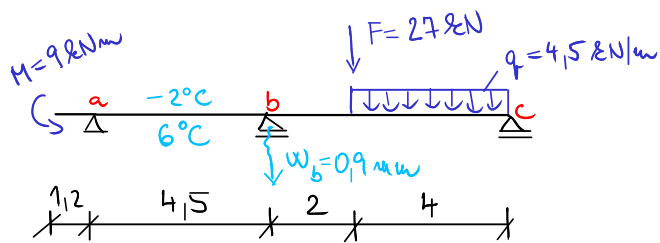


$$\frac{500}{E} \cdot (-9) + \left(\frac{1000}{E} + \frac{1000}{E} \right) M_b + 450 \cdot 10^{-6} - 200 \cdot 10^{-6} + \frac{30000}{E} + \frac{14000}{E} - 150 \cdot 10^{-6} = 0$$

$$\frac{2000}{E} M_b = -100 \cdot 10^{-6} - \frac{39500}{E} \quad | \cdot E$$

$$2000 M_b = -2500 - 39500 = -42000$$

$$\underline{\underline{M_b = -21 \text{ kNm}}}$$



$f = \frac{1}{8} q l^2 = \frac{1}{8} 4,5 \cdot 4^2 = 9$

$M_p = M_{pred} - \int V dx = 0 - \frac{1}{2} (-14,5) \cdot x_p = 34,027 \text{ kNm}$