

Remarks: See §2.2.1, pages 19 till 21
 See §2.3, pages 24 till 26
 See §2.6, pages 34 onwards

Answers:

a. $\varepsilon^{(1)} = 6,67 \text{ ‰}$
 $\varepsilon^{(2)} = 13,3 \text{ ‰}$

b. $N^{(1)} = +10 \text{ kN}$
 $N^{(2)} = +40 \text{ kN}$

c. $F = 45 \text{ kN}$

d. $A_v = 5 \text{ kN} (\downarrow)$

Explanation:

a. Rigid beam:

$$\Delta \ell^{(1)} = \frac{2}{4} \times (20 \text{ mm}) = 10 \text{ mm}$$

$$\varepsilon^{(1)} = \frac{10 \text{ mm}}{1500 \text{ mm}} = 6,67 \times 10^{-3}$$

$$\varepsilon^{(2)} = \frac{20 \text{ mm}}{1500 \text{ mm}} = 13,33 \times 10^{-3}$$

b. $N^{(1)} = 6,67 \times 10^{-3} \times (1500 \text{ kN}) = +10 \text{ kN}$

$$N^{(2)} = 13,33 \times 10^{-3} \times (3000 \text{ kN}) = +40 \text{ kN}$$

c. $\sum T_z|_A = 0 \Rightarrow F = 45 \text{ kN}$

d. $\sum F_{\text{vert}} = 0 \Rightarrow A_v = 5 \text{ kN} (\downarrow)$