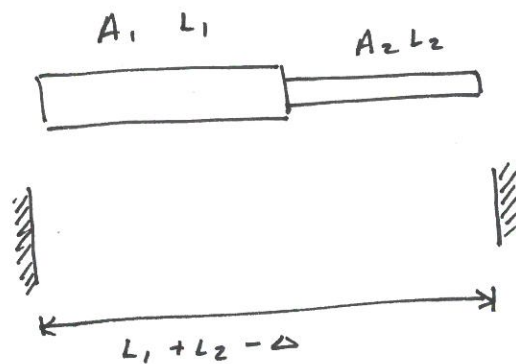


2.1.34

Givet



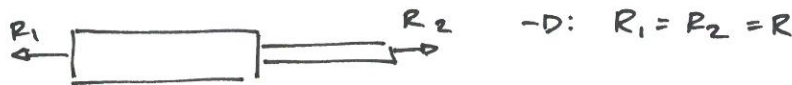
x Passningstfel  $\Delta$  ( $\Delta \ll L_1, L_2$ )  
 x Lin och mtrl (E)

Sökt  $\sigma_1$  och  $\sigma_2$  efter montering

Lösning

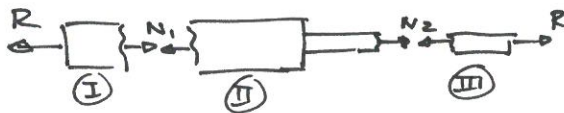
1. Frilägg

2. Jmv



3. Snitta

4. Jmv



$$\text{I: } -R + N_1 = 0 \Rightarrow N_1 = R$$

$$\text{II: } -N_1 + N_2 = 0 \Rightarrow N_1 = N_2 = R$$

5. Normalspänning

$$\left[ \sigma = \frac{N}{A} \right] \quad \sigma_1 = \frac{N_1}{A_1} = \frac{R}{A_1}$$

$$\sigma_2 = \frac{N_2}{A_2} = \frac{R}{A_2}$$

6. Konstitutiv

$$\left[ \sigma = E \epsilon \right] \rightarrow \epsilon = \frac{\sigma}{E}$$

$$\epsilon_1 = \frac{R}{EA_1}$$

$$\epsilon_2 = \frac{R}{EA_2}$$

7. Kompatibilitet

$$\delta_1 + \delta_2 - \Delta = 0$$

$$\Leftrightarrow \underline{\underline{\delta_1 + \delta_2 = \Delta}}$$

$$\text{och } \left[ \delta = \frac{FL}{EA} \right] \text{ ger } \frac{RL_1}{EA_1} + \frac{RL_2}{EA_2} = \Delta$$

$$\Leftrightarrow R \cdot \frac{1}{E} \left( \frac{L_1}{A_1} + \frac{L_2}{A_2} \right) = \Delta \Rightarrow R = \frac{\Delta E}{\frac{L_1}{A_1} + \frac{L_2}{A_2}}$$

$$\therefore \sigma_1 = \frac{1}{A_1} \cdot \frac{\Delta E}{\frac{L_1}{A_1} + \frac{L_2}{A_2}} = \frac{\Delta E A_2}{A_1 L_2 + A_2 L_1}$$

$$\begin{array}{l} \text{Dim kontroll} \\ \frac{[\text{m}] \cdot [\frac{\text{N}}{\text{m}^2}] \cdot [\text{m}^2]}{[\text{m}^2] \cdot [\text{m}]} = \left[ \frac{\text{N}}{\text{m}^2} \right] \text{ ok!} \end{array}$$

$$\underline{\underline{\sigma_2 = \frac{1}{A_2} \cdot \frac{\Delta E}{\frac{L_1}{A_1} + \frac{L_2}{A_2}} = \frac{\Delta E A_1}{A_1 L_2 + A_2 L_1}}}$$

Obs om R det. åt andra hållet för negativa  $\sigma$  (tryck)