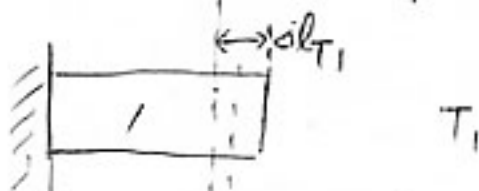
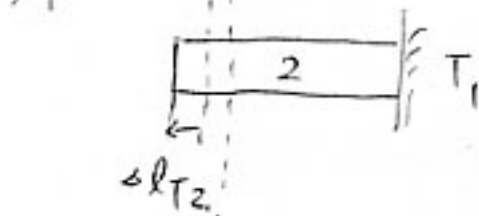


$$\sigma_1 = E_1 \left( \frac{\Delta l}{l_1} - \frac{\Delta l T_1}{l_1} \right)$$

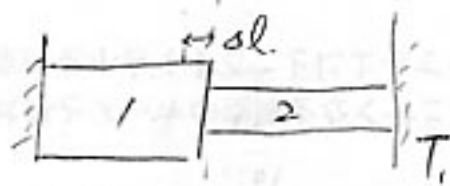


$$\sigma_1 = E_1 \left( \frac{\Delta l}{l_1} - \frac{\Delta l T_1}{l_1} \right) \quad \text{--- (1)}$$



$$\sigma_2 = E_2 \left( -\frac{\Delta l}{l_2} - \frac{\Delta l T_2}{l_2} \right) \quad \text{--- (2)}$$

$$\sigma_1 A_1 = \sigma_2 A_2 \quad \text{--- (3)}$$



∵  $l \pm \Delta l$

$$E_1 A_1 \left( \frac{\Delta l}{l_1} - \frac{\Delta l T_1}{l_1} \right) = E_2 A_2 \left( -\frac{\Delta l}{l_2} - \frac{\Delta l T_2}{l_2} \right)$$

$$\left( \frac{E_1 A_1}{l_1} + \frac{E_2 A_2}{l_2} \right) \Delta l = E_1 A_1 \frac{\Delta l T_1}{l_1} - E_2 A_2 \frac{\Delta l T_2}{l_2}$$

$$= E_1 A_1 \alpha_1 \Delta T - E_2 A_2 \alpha_2 \Delta T$$

$$\Delta l = \frac{E_1 A_1 \alpha_1 - E_2 A_2 \alpha_2}{\frac{E_1 A_1}{l_1} + \frac{E_2 A_2}{l_2}} \Delta T = \frac{E_1 A_1 \alpha_1 l_1 - E_2 A_2 \alpha_2 l_2}{E_1 A_1 l_2 + E_2 A_2 l_1} \Delta T$$

$$\sigma_1 = E_1 \left( \frac{\Delta l}{l_1} - \alpha_1 \Delta T \right) = E_1 \left( \frac{E_1 A_1 \alpha_1 l_1 - E_2 A_2 \alpha_2 l_2 - \alpha_1 (E_1 A_1 l_2 + E_2 A_2 l_1)}{E_1 A_1 l_2 + E_2 A_2 l_1} \Delta T \right)$$

$$= E_1 \frac{E_1 A_1 \alpha_1 l_1 - E_2 A_2 \alpha_2 l_2 - E_1 A_1 \alpha_1 l_2 - E_2 A_2 \alpha_1 l_1}{E_1 A_1 l_2 + E_2 A_2 l_1} \Delta T$$

$$= - \frac{E_1 E_2 A_2 (\alpha_1 l_1 + \alpha_2 l_2)}{E_1 A_1 l_2 + E_2 A_2 l_1} \Delta T$$

$$\sigma_2 = \frac{A_1}{A_2} \sigma_1 = - \frac{E_1 E_2 A_1 (\alpha_1 l_1 + \alpha_2 l_2)}{E_1 A_1 l_2 + E_2 A_2 l_1} \Delta T$$