



(1) 平衡条件
 $R_1 + R_2 = P$

A点回拉距离为 x 的条件

$$Px = R_2 a$$

$$\therefore R_2 = \frac{x}{a} P$$

$$R_1 = \left(1 - \frac{x}{a}\right) P$$

(2) $\Delta l_1 = \frac{R_1}{E_1 A_1} l = \frac{\left(1 - \frac{x}{a}\right) P l}{E_1 A_1}$

$$\Delta l_2 = \frac{R_2}{E_2 A_2} l = \frac{P l}{E_2 A_2} \frac{x}{a}$$

(3) 伸长 $\Delta l_1 = \Delta l_2 = \Delta l$

$$\frac{P l}{E_1 A_1} \left(1 - \frac{x}{a}\right) = \frac{P l}{E_2 A_2} \frac{x}{a}$$

$$\frac{P l}{E_1 A_1} = \left(\frac{P l}{E_1 A_1} + \frac{P l}{E_2 A_2}\right) \frac{x}{a}$$

$$\therefore \frac{x}{a} = \frac{1/E_1 A_1}{1/E_1 A_1 + 1/E_2 A_2} = \frac{E_2 A_2}{E_1 A_1 + E_2 A_2}$$

$$x = \frac{E_2 A_2}{E_1 A_1 + E_2 A_2} a$$

$$\Delta l = \Delta l_2 = \frac{P l}{E_2 A_2} \frac{x}{a} = \frac{P l}{E_1 A_1 + E_2 A_2}$$