4-10

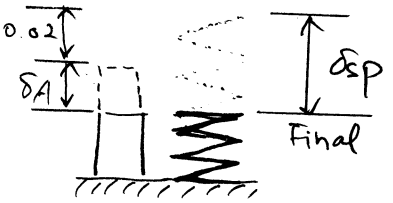
• Equilibrium ;

the structure is symmetry

F_A (force of post A) = F_B (post B) = F

$\uparrow \Sigma F = 0$; $2F + F_{sp} = 100(10^3)$ .... ①

• compatibility ;



$\delta_A + 0.02 = \delta_{sp}$

$$\frac{F(1)}{600(10^{-9})(9.65)(10^9)} + 0.02 = \frac{F_{sp}}{2.0(10^6)}$$

E : refer to Any manual

$0.1127F - 0.5F_{sp} = -20(10^3)$ .... ②

From ① & ②

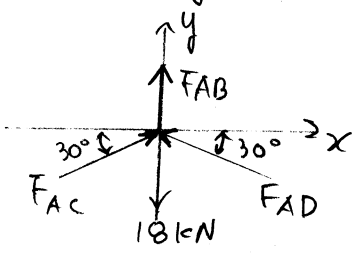
$F = 25,581.1(N)$ $F_{sp} = 48,836.5(N)$

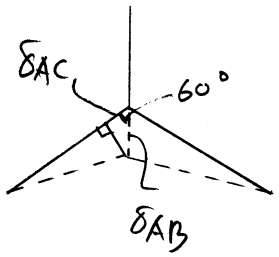
• Displacement ;

$$\delta_A = \delta_B = \frac{FL}{AE} = \frac{25581.1(1000)}{600(10^{-6})9.65(10^9)}$$

$$= \underline{4.42\,(mm)}$$

4-13 (Symmetric structure)





• Equilibrium ;

$F_{AC} = F_{AD} = F$

$\uparrow \Sigma F = 0$; $F_{AB} + 2F \cdot \sin 30 = 18$

$F_{AB} + F = 18$ .... ①

• compatibility ;

$\delta_{AC} = \delta_{AB} \cdot \cos 60$

$$\frac{F \cdot L}{AE} = \frac{F_{AB} \cdot L}{AE} \cdot \frac{1}{2}$$

$$F = \frac{F_{AB}}{2} \quad .... \quad ②$$

From ① & ②

$F_{AB} = \underline{12\,kN\ (tension)}$

$F = \underline{6\,kN = F_{AC} = F_{AD}\ (compression)}$

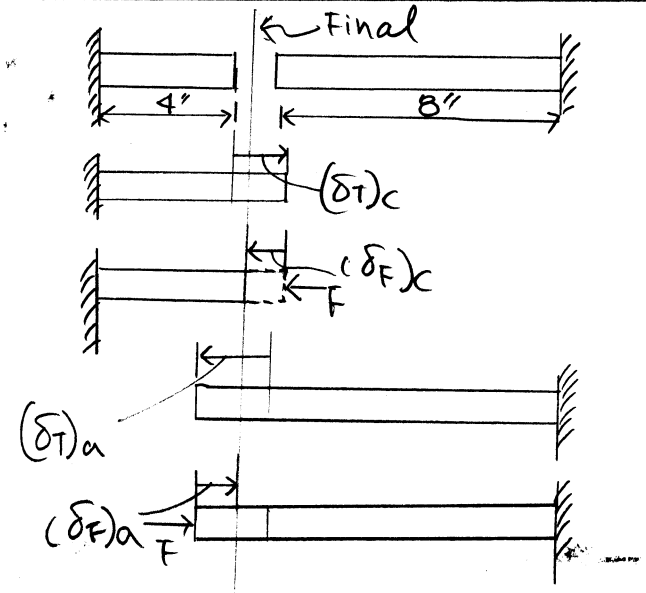
4-19

• compatibility ;

$\delta_F = \delta_T$

$$\frac{F(4)}{\frac{\pi}{4}(0.4^2)(29.0)(10^6)} = \underbrace{6.60(10^{-6})}_{\alpha}\underbrace{(70)}_{\Delta T}\underbrace{(4)}_{L}$$

A, E

$F = \underline{1.68^{\circ}\,kip}$

4-86