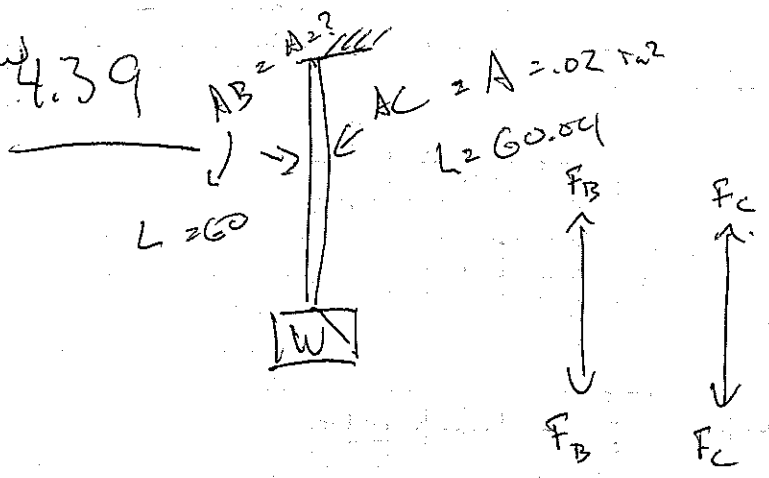
#W 4.39



$E_{ST} = 29 \times 10^3$ ksi

$\sigma_Y = 75$ ksi

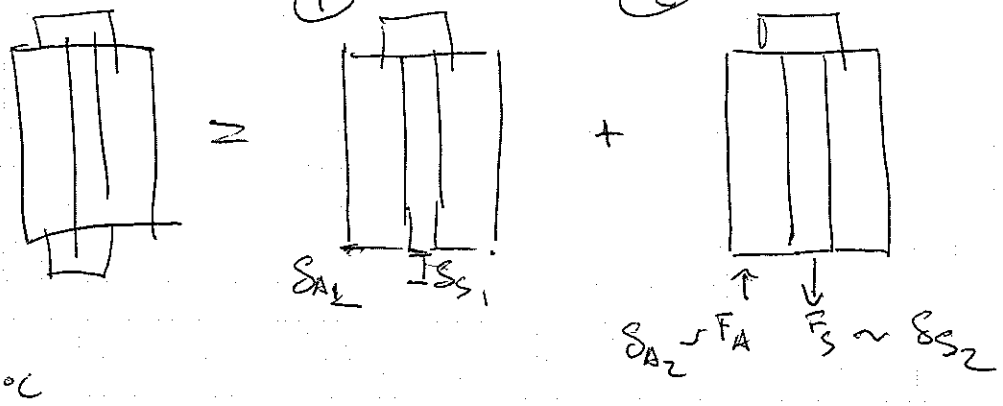
$F_B = F_C = W/2$

$F_B + F_C = W$

$L_B + \delta_B = L_C + \delta_C$

$L_B + \frac{F_B L_B}{A_B E} = L_C + \frac{F_C L_C}{A_C E}$

Ex 4.12



$\delta = \alpha \Delta T L$

$\alpha_A = 23 \times 10^{-6}$ /°C

$\alpha_{ST} = 12 \times 10^{-6}$ /°C

$\delta_{A_1} = 23 \times 10^{-6} (80 - 15)\ 150\ mm$

$= 0.224$ mm

$\delta_{ST} = 12 \times 10^{-6} (80 - 15)\ 150\ mm$

$= 0.117$ mm

$E_A = 70$ GPa

$E_S = 200$ GPa

$\delta_{AL} - \delta_{A2} = \delta_{S_1} + \delta_{S_2}$

$\delta_{A2} = \frac{F_A L}{A_A E_A} = \frac{F_A (150)}{600\ mm^2\ E_A}$

$\delta_{S2} = \frac{F_S L}{A_S E_S} = \frac{F_S (150)}{400\ mm^2\ E_S}$

$.224 - \frac{F(150)}{600 \cdot (70\ GPa)} = .117 + \frac{F(150)}{400(200)}$

$.107 = F \left(\frac{150}{600(70)} + \frac{150}{400(200)} \right)$

$F = 19.6$ kN

Ex 5.1 $\tau_{MAX} = \frac{Tc}{J} \Rightarrow T = \frac{75\,MPa\,(\frac{\pi}{2})\,c^4}{c^3} \cdot \frac{1m}{1000mm}$

$= 75(100)^3 \cdot \frac{\pi/2}{1000}$

$T_2 = \frac{75\,(\frac{\pi}{2})\,(100^4 - 75^4)}{100} \cdot \frac{1m}{1000mm}$ $T_1 = 118\,kN\cdot m$

$= 80.5\,kN\cdot m$ $\tau_0 = 75\,MPa\,\frac{75}{100} = 56.3\,MPa$