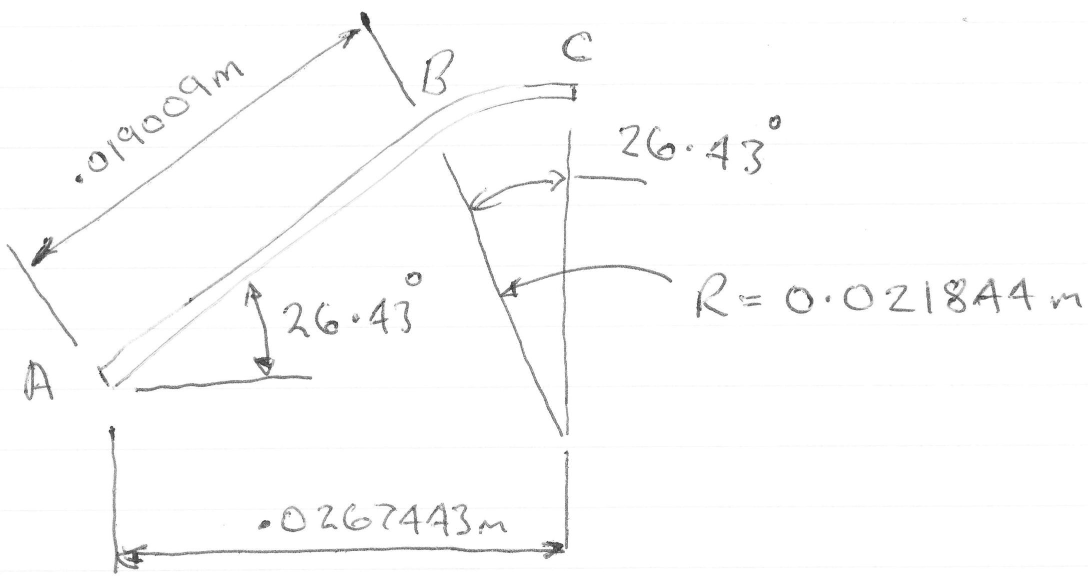
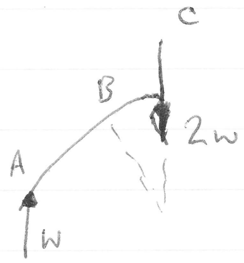
.1.



USING STRAIN ENERGY



$$\text{STRAIN ENERGY} = \int \frac{M^2}{2EI}$$

$$\frac{1}{2EI}\int_0^x M^2$$

FOR AB :

$$\frac{1}{2EI}\int_0^l \left(W \times x \cos 26.43^\circ\right)^2$$

$M = W x \cos 26.43^\circ$

$$\frac{W^2}{2EI}\int_0^l \left(x \cos 26.43\right)^2 = \frac{1.8359768\, W^2 \times 10^{-6}}{2EI}$$

$$\text{STRAIN ENERGY} = \frac{W^2 \times 1.8359768 \times 10^{-6}}{2EI}$$

FOR BC

$$M = W\left(R\sin\theta + .019009\cos 26.43^\circ\right)$$

$$M^2 = \left(W\left(R\sin\theta + .019009\cos 26.43^\circ\right)\right)^2$$

$$\therefore \text{STRAIN ENERGY} = \frac{1}{2EI}\int_0^{26.43^\circ}\left(W\left(R\sin\theta + .019009 \times \cos 26.43^\circ\right)\right)^2 \times R\,d\theta$$

$$\text{STRAIN ENERGY} = \frac{W^2\, 4.944400387 \times 10^{-6}}{2EI}$$

$$\text{TOTAL STRAIN ENERGY} = \frac{W^2}{2EI}\left(4.944400387 \times 10^{-6} + 1.8359768 \times 10^{-6}\right)$$

$$\text{"} = \frac{W^2 \times 6.780377187 \times 10^{-6}}{2EI}$$

IF I = CONSTANT

$W = 1$

$$\text{"} = \frac{6.780377187 \times 10^{-6}}{2 \times 206 \times 10^{9} \times \frac{.020955 \times (.4064 \times 10^{-3})^3}{12}}$$

$$\text{"}\ 1.40407\ J$$

Now $\frac{1}{2} P x = 1 \cdot 40407 \text{ J}$

$P =$ FORCE $= 1$

$x =$ DEFLECTON

$\therefore$ DEFLECTION $x = \dfrac{1 \cdot 40407 \times 2}{1}$

$x = 2 \cdot 80814 \times 10^{-4} \text{ m}$

$x = 0 \cdot 280814 \text{ mm}$

STIFFNESS $= \dfrac{P}{x} = \dfrac{1 \text{ N}}{0 \cdot 280814 \text{ mm}} = 3 \cdot 56 \dfrac{\text{N}}{\text{mm}}$

" $= 20 \cdot 2846 \dfrac{\text{lb}}{\text{in}}$ (HALF SPRING)

$\therefore$ FOR COMPLETE SPRING $2 \times 20 \cdot 2846 \dfrac{\text{lb}}{\text{in}}$

" " $= 40 \cdot 57 \dfrac{\text{lb}}{\text{in}}$