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Cool! I'am really happy

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so many fake sites. this is the first one which worked! Many thanks

**PROBLEM 2.46**

The rigid bar AD is supported by two steel wires of  $\frac{1}{4}$ -in. diameter (E =  $29 \times 10^6$  psi) and a pin and bracket at D. Knowing that the wires were initially taut, determine (a) the additional tension in each wire when a 120-lb load P is applied at B, (b) the corresponding deflection of point B.

**SOLUTION**

Let  $\delta$  be the rotation of bar ABCD.

Then  $\delta = \theta$

$$P_B \delta = \frac{F_{AC} L_{AC}}{AE} + \frac{F_{BD} L_{BD}}{AE}$$

$$P_B \delta = \frac{EA}{L_{AC}} (\delta \sin \theta) + \frac{EA}{L_{BD}} (\delta \cos \theta)$$

$$P_B \delta = \frac{EA \delta}{L_{AC}} \sin \theta + \frac{EA \delta}{L_{BD}} \cos \theta$$

$$P_B = \frac{EA}{L_{AC}} \sin \theta + \frac{EA}{L_{BD}} \cos \theta$$

Using free body ABCD:

$$\sum M_D = 0: 24(42.355 \text{ lb}) + 16(20) = 88.971 \text{ lb} \delta$$

$$\delta = 0.40519 \text{ in.}$$

(a)  $F_{AC} = (42.355 \text{ lb}) \sin \theta = 16.40519 \text{ lb}$   $F_{BD} = 66.2 \text{ lb}$

(b)  $\delta = 0.40519 \text{ in.}$   $\delta = 1.4410 \text{ in.}$

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