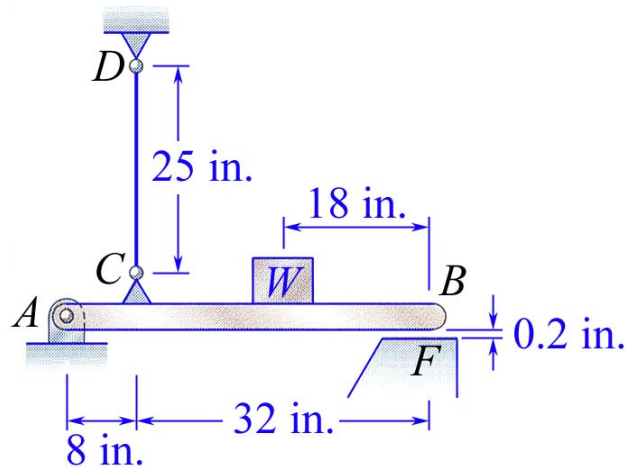


MEEG 3013 Quiz #2.m09.091

The length of the 0.0625-in.-diameter steel wire CD has been adjusted so that with no load applied, a gap of 0.2 in. exists between the end B of the rigid beam ACB and a contact point F . Knowing that the modulus of elasticity is $E = 29 \times 10^6$ psi for the steel wire, determine the weight W of the block that should be placed as shown on the beam in order to cause contact between B and F .



Sketch of deflection of rigid beam ACB ①

$$\frac{\delta_{CD}}{0.2} = \frac{8}{40} \quad \delta_{CD} = 0.04 \text{ in.} \quad \textcircled{2}$$

$$\delta = \frac{PL}{AE} : 0.04 = \frac{F_{CD}(25)}{\pi (0.0625 / 2)^2 (29 \times 10^6)} \quad F_{CD} = 142.35 \text{ lb} \quad \textcircled{3}$$

FBD of rigid beam ACB ①

$$+\circlearrowleft \Sigma M_A = 0 : 8F_{CD} - 22W = 0 \quad \textcircled{2} \quad W = 51.76$$

$$W = 51.8 \text{ lb} \quad \textcircled{1}$$