Stress-Strain Behavior

6.3 This problem calls for us to calculate the elastic strain that results for a copper specimen stressed in tension. The cross-sectional area is just (15.2 mm) x (19.1 mm) = 290 mm^2 (= 2.90 x 10^{-4} m^2 = 0.45 in.^{2}); also, the elastic modulus for Cu is given in Table 6.1 as 110 GPa (or 110 x 10^9 N/m^2). Combining Equations 6.1 and 6.5 and solving for the strain yields

$$\varepsilon = \frac{\sigma}{E} = \frac{F}{A_0 E} = \frac{44,500 \ N}{\left(2.90 \times 10^{-4} \ m^2\right)\left(110 \times 10^9 \ N/m^2\right)} = 1.39 \ x \ 10^{-3}$$