### Example 12.3

A steel tank of an air compressor is subjected to internal pressure of 100 psi. The internal diameter of the tank is 20 in. and the wall thickness is 0.25 in. Determine:
  (a) Stress components acting at point A (point on the surface). Show the stresses on a volume element of the material at this point.
  (b) Determine the tensile force per inch length of the weld between the right and left sections of the tank, as shown in the figure.
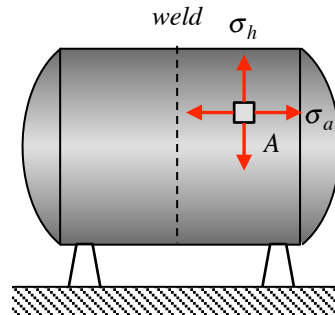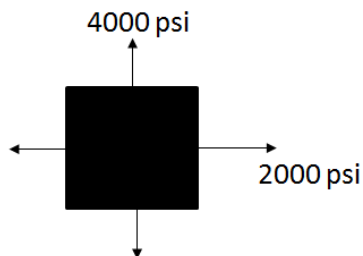

Solution
Axial Stress:

$$\sigma_a = \frac{pr}{2t} = \frac{(100)(10)}{(2)(0.25)} = 2000\,psi$$

Hoop Stress:

$$\sigma_h = \frac{pr}{t} = \frac{(100)(10)}{(0.25)} = 4000\,psi$$

Stress Element

Tensile Force per unit length:

$$F = \sigma_a t = \frac{pr}{t} = \frac{(100)(10)}{(2)} = 50\,lb\,/\,in$$