Example 15.1

Consider the state of stress shown below in a component made up of a ductile material with a shear strength of $\sigma_Y = 250 MPa$. Does the maximum shear stress theory predict failure for the material? Does the maximum distortional energy theory predict failure of the material?

$$T_{x} = i25 MPa$$

$$T_{y} = -40 MPa$$

$$T_{y} = 105 MP$$

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$$T_{y} = \frac{125 - 40}{2} = 42.5 MPa$$

$$C_{z} = 176.0 MPa$$

$$T_{p_{1}} = T_{aue} + R = 42.5 + i33.6 = 176.0 MPa$$

$$T_{p_{1}} = T_{aue} - R = 42.5 - i33.6 = -9(.1 MPa)$$

$$Mohr's circles$$

$$Snue the radius of the
out-of-place Mohr's circle
is the largest, then:
$$T_{max}_{abo} = R = i33.6 MPa$$

$$T_{p_{2}} = 125 MPa$$

$$Snue the statistic < T_{max}_{abo} = \frac{1}{2}$$

$$T_{aue} = \frac{1}{2} = 125 MPa$$

$$T_{p_{2}} = T_{aue} = T_{p_{1}}$$$$