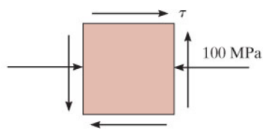


Practice

Complete

Determine the equivalent state of stress on an element at the same point which represents the principal stress, and the maximum in-plane shear stress and the associated average normal stress. Also, for each case, determine the corresponding orientation of the element with respect to the element shown in the figure below. Suppose that $\tau = 23 \text{ MPa}$. (Figure 1)

Figure



1 of 1

Review

Part A

Determine the orientation of principal planes of stress.

Express your answers using three significant figures separated by a comma.

$\theta_{p_1}, \theta_{p_2} = 77.6, -12.4^\circ$

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Correct

Part B

Determine the normal stress $\sigma_{x'}$ that acts on the element with orientation $\theta = -12.4^\circ$.

Express your answer to three significant figures and include the appropriate units.

$\sigma_{x'} = -105 \text{ MPa}$

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Part C

Determine the normal stress $\sigma_{y'}$ that acts on the element with orientation $\theta = -12.4^\circ$.

Express your answer to three significant figures and include the appropriate units.

$\sigma_{y'} = 5.04 \text{ MPa}$

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Correct

Part D

Determine the shear stress $\tau_{x'y'}$ that acts on the element with orientation $\theta = -12.4^\circ$.

Express your answer as an integer.

$\tau_{x'y'} = 0 \text{ MPa}$

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▼ Part E

Determine the orientation of the planes of maximum in-plane shear stress.

Express your answers using three significant figures separated by a comma.

Submit

[Previous Answers](#)

✓ Correct

▼ Part F

Determine the shear stress $\tau_{x''y''}$ that acts on the element with orientation $\theta = 32.6^\circ$.

Express your answer to three significant figures and include the appropriate units.

Submit

[Previous Answers](#)

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▼ Part G

Determine the normal stress $\sigma_{x''}$ that acts on the element with orientation $\theta = 32.6^\circ$.

Express your answer to three significant figures and include the appropriate units.

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✓ Correct

▼ Part H

Determine the normal stress $\sigma_{y''}$ that acts on the element with orientation $\theta = 32.6^\circ$.

Express your answer to three significant figures and include the appropriate units.

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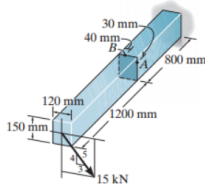
Problem 9.34

Practice

Complete

(Figure 1)

Figure



Part A

Determine the principal stresses in the cantilevered beam at point A. Express your answers, separated by a comma, to three significant figures.

$\sigma_1 =, \sigma_2 = 37.8,-10.8 \text{ kPa, MPa}$

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Correct

Part B

Determine the principal stresses in the cantilevered beam at point B. Express your answers, separated by a comma, to three significant figures.

$\sigma_1 =, \sigma_2 = 42.0,-10.6 \text{ MPa, kPa}$

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Correct

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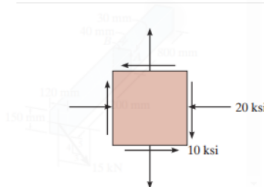
Problem 9.52

Practice

Complete

In (Figure 1), $\sigma_y = 11.8 \text{ ksi}$.

Figure



Part A

Determine the principal stresses. Specify the orientation of the element. Express your answers, separated by commas, to three significant figures.

$\sigma_1 =, \sigma_2 =, \theta_{p1} = 14.7,-22.9,73.9 \text{ ksi, ksi, }^\circ \text{ (clockwise)}$

Submit Previous Answers

Correct

Part B

Determine the maximum in-plane shear stress and average normal stress. Specify the orientation of the element. Express your answers, separated by commas, to three significant figures.

$\tau_{\text{in-plane}}^{\text{max}} =, \sigma_{\text{avg}} =, \theta_s = 18.8,-4.10,28.9 \text{ ksi, ksi, }^\circ \text{ (clockwise)}$

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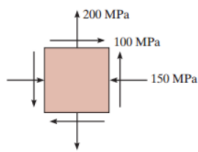
Problem 9.59

Practice

Complete

(Figure 1)

Figure



Part A

Determine the principal stresses. Specify the orientation of the element. Express your answers, separated by commas, to three significant figures.

$\sigma_1 =, \sigma_2 =, \theta_p = 227,-177,-14.9 \text{ MPa, MPa, }^\circ$

Submit Previous Answers

Correct

Part B

Determine the maximum in-plane shear stress and average normal stress. Specify the orientation of the element. Express your answers, separated by commas, to three significant figures.

$\tau_{\text{in-plane}}^{\text{max}} =, \sigma_{\text{avg}} =, \theta_s = 202,25,0,30.1 \text{ MPa, MPa, }^\circ$

Submit Previous Answers

Correct

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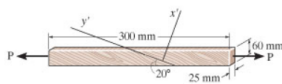
Problem 9.62

Practice

Complete

The grains of wood in the board make an angle of 20° with the horizontal as shown. Using Mohr's circle, determine the normal and shear stresses that act perpendicular and parallel to the grains if the board is subjected to an axial load of $P = 300 \text{ N}$. (Figure 1)

Figure



Part A

Determine the normal stress. Express your answer to three significant figures and include the appropriate units.

$\sigma_x = 23.4 \text{ kPa}$

Submit Previous Answers

Correct

Part B

Determine the shear stress. Express your answer to three significant figures and include the appropriate units.

$\tau_{x'y'} = -64.3 \text{ kPa}$

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Correct

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Problem 9.65

Practice

Complete

The thin-walled pipe has an inner diameter of 0.5 in and a thickness of 0.025 in.

Part A

If it is subjected to an internal pressure of 439 psi and the axial tension and torsional loadings shown, determine the principal stress at a point on the surface of the pipe. (Figure 1)

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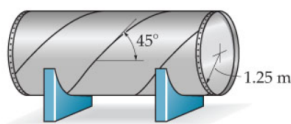
Problem 9.71

Practice

Complete

The cylindrical pressure vessel has an inner radius of 1.25 m and a wall thickness of 22 mm. It is made from steel plates that are welded along the 45° seam.

Figure



Part A

Review

Determine the normal stress component along this seam if the vessel is subjected to an internal pressure of 5 MPa. (Figure 1)

Express your answer with the appropriate units.

$\sigma_{x'} = 213 \text{ MPa}$

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Correct

Part B

Determine the shear stress component along this seam if the vessel is subjected to an internal pressure of 5 MPa.

Express your answer with the appropriate units.

$\tau_{x'y'} = 71.0 \text{ MPa}$

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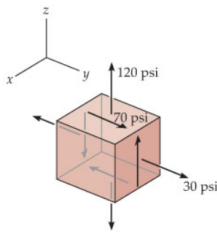
Problem 9.80

Practice

Complete

The stress at a point is shown on the element.

Figure



Part A

Review

Determine the principal stress. (Figure 1)

Enter your answers numerically separated by commas.

$\sigma_{\max}, \sigma_{\min} = 158, -8.22 \text{ psi}$

Submit Previous Answers

Correct

Part B

Determine the absolute maximum shear stress.

$\tau_{\text{abs max}} = 83.2 \text{ psi}$

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Problem 9.86

Practice

Complete

The frame in (Figure 1) is subjected to a horizontal force of $P = 590 \text{ N}$ and couple moment. The cross-sectional area at this point is shown.

Part A

Review

Determine the principal stresses and the absolute maximum shear stress at point A. Express your answers, separated by commas, to three significant figures.

$\sigma_1, \sigma_2, \tau_{\text{abs max}} = 7.42, -1480, 745 \text{ kPa, kPa, kPa}$

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