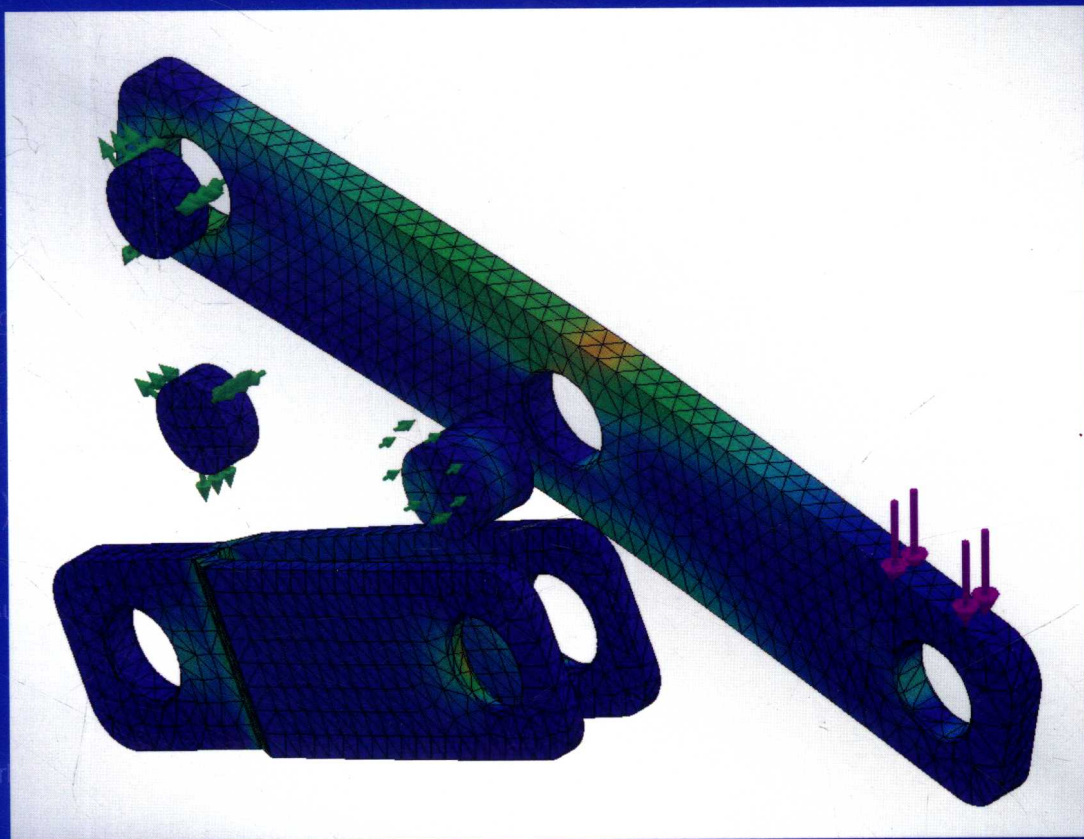


Finite Element Analysis with SOLIDWORKS Simulation®



$$L_{AC} := 500 \cdot \text{mm} \quad b :=$$

$$\theta := 30 \cdot \text{deg} \quad \phi :=$$

$$F_{Cy} := -1000 \cdot \text{N}$$

$$F_{Cy} \cdot L_{AC} = -F_{By} \cdot \frac{L_{AC}}{2}$$

$$F_{BD} := \frac{F_{By}}{\sin(\theta)} = -4 \cdot 10^3$$

$$F_{By} := -F_{BD} = (2 \cdot 10^3)$$

axial stress in inclined s

MOI without hole

MOI with hole (at center

Inclined link length

$$\cos(\theta) = \frac{2}{L_I} \quad L_I := \left(\frac{2}{\cos(\theta)} \right) = 288.675 \text{ mm}$$

axial deformation in the inclined link: $\delta_a := \frac{F_{BD} \cdot L_I}{A \cdot E} = -0.003 \text{ mm}$

Y component of axial deformation: $\delta_{ay} := \delta_a \cdot \cos(\theta) = -0.003 \text{ mm}$

Y bending deformation in the link: $\delta_{by} := \frac{F_{Cy} \cdot \left(\frac{L_{AC}}{2} \right)^3}{3 \cdot E \cdot I_h} = -0.018 \text{ mm}$

Y deformation in the link: $\delta_y := \delta_{ay} + \delta_{by} = -0.02 \text{ mm}$

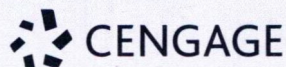
ROBERT H. KING



Finite Element Analysis with SOLIDWORKS Simulation®

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**Finite Element Analysis with
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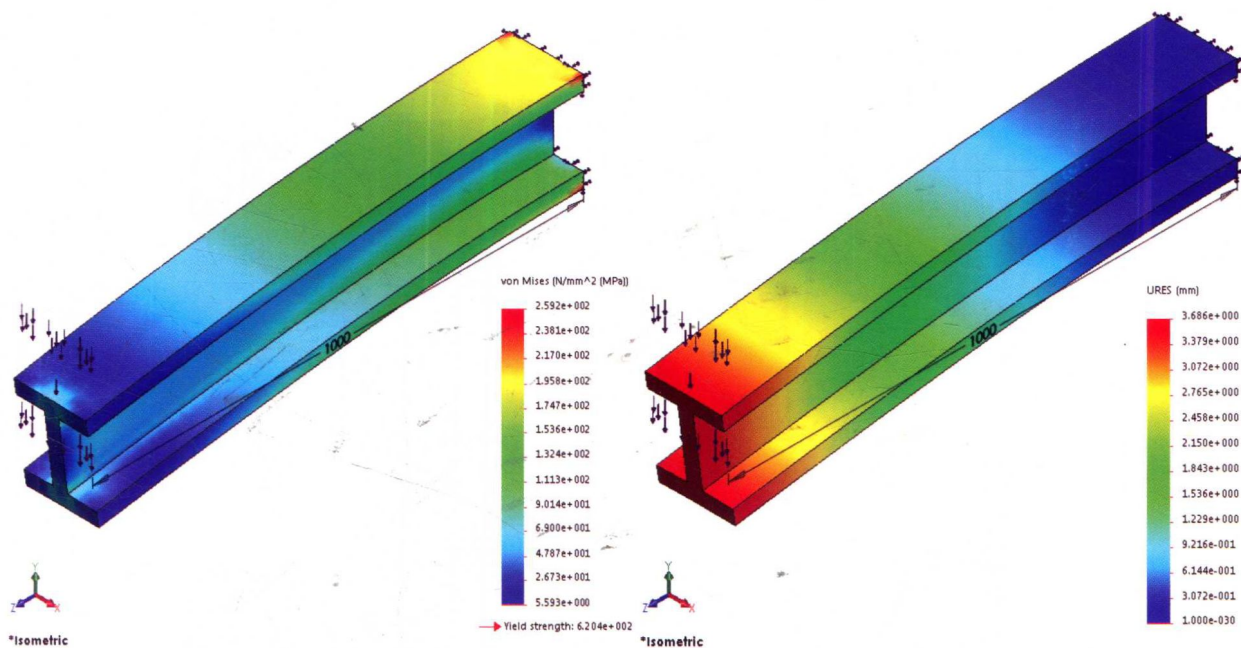


Figure 1.17 Stress and displacement results plots

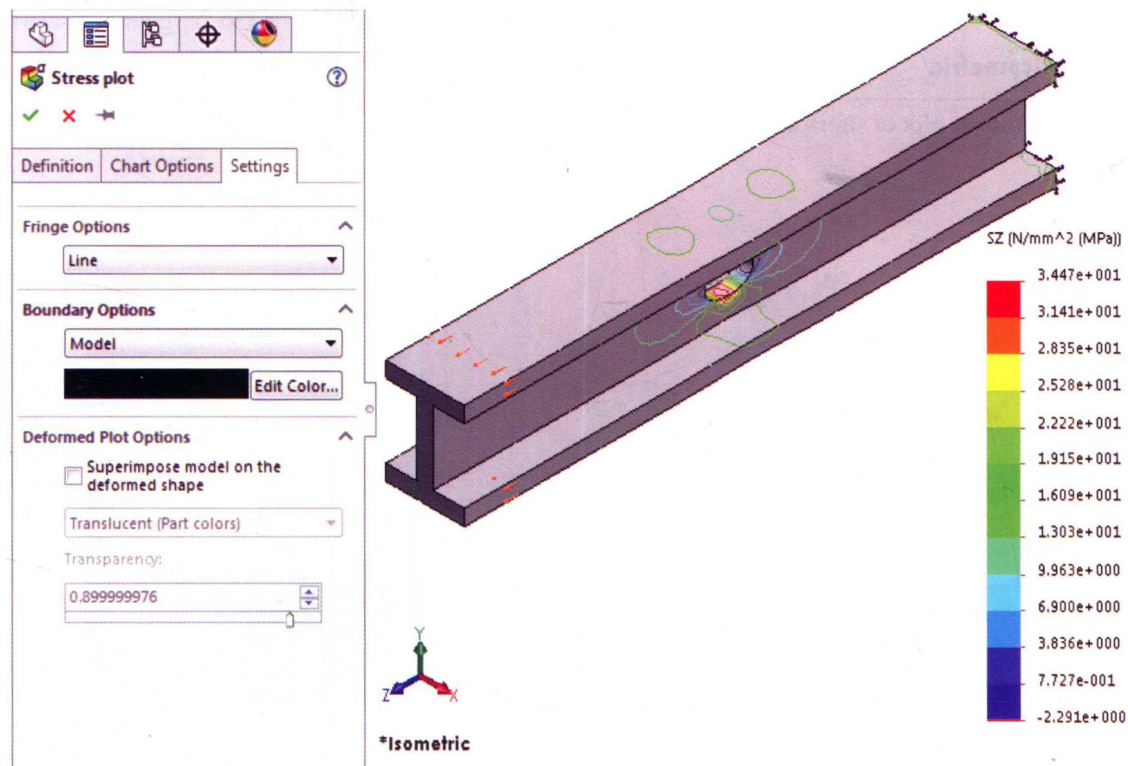


Figure 1.27 Stress concentration around the hole in the model

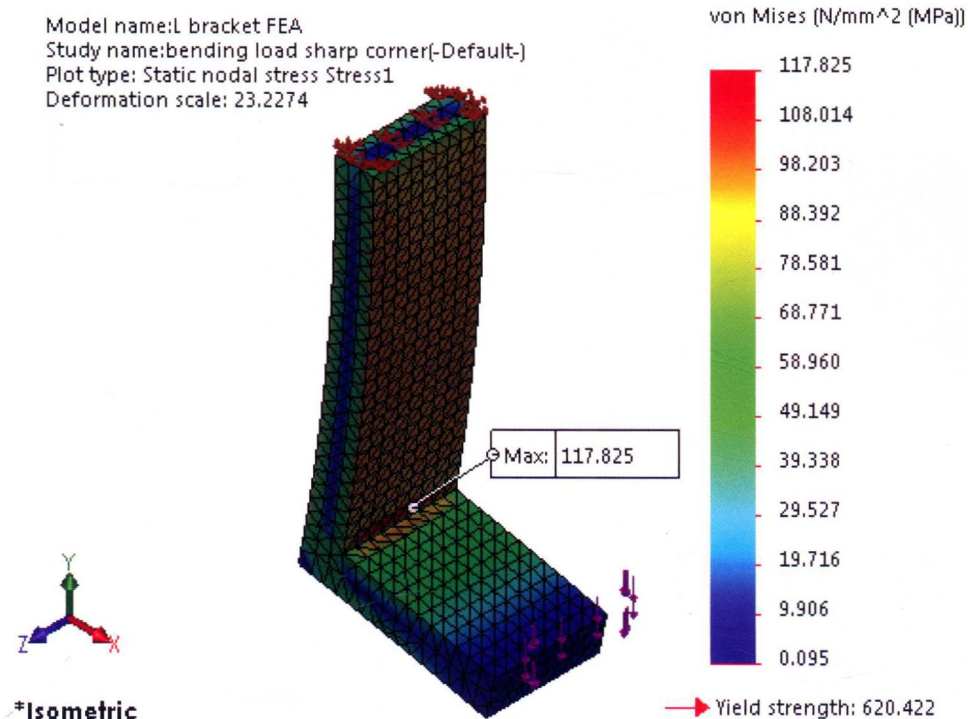


Figure 1.31 vM stress plot of stress intensity at a re-entrant corner

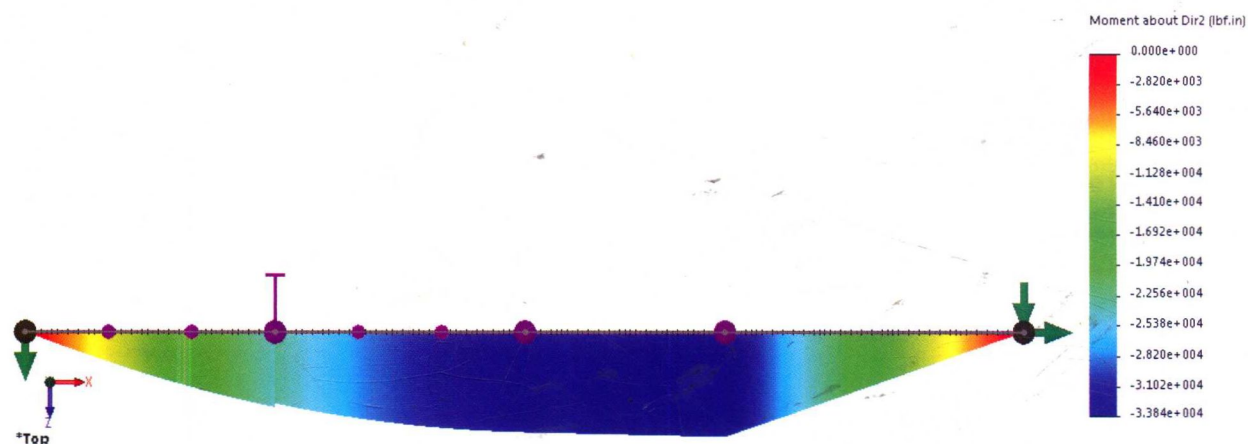


Figure 3.54 Moment diagram results plot

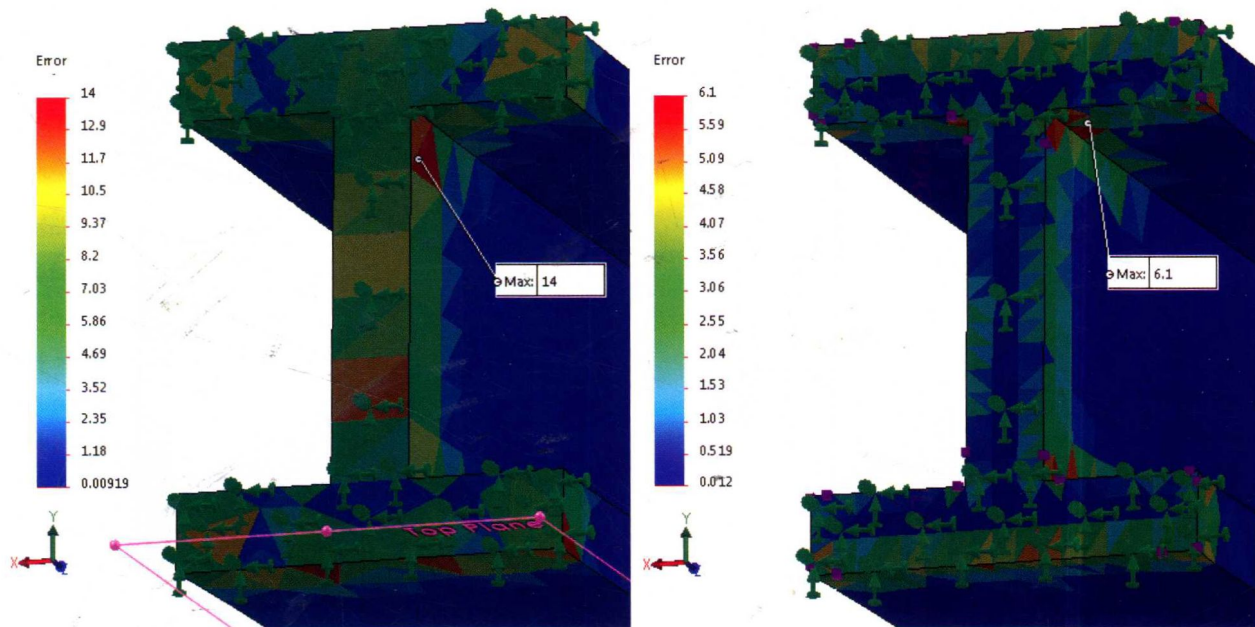


Figure 4.15 The effect of mesh control on energy norm error

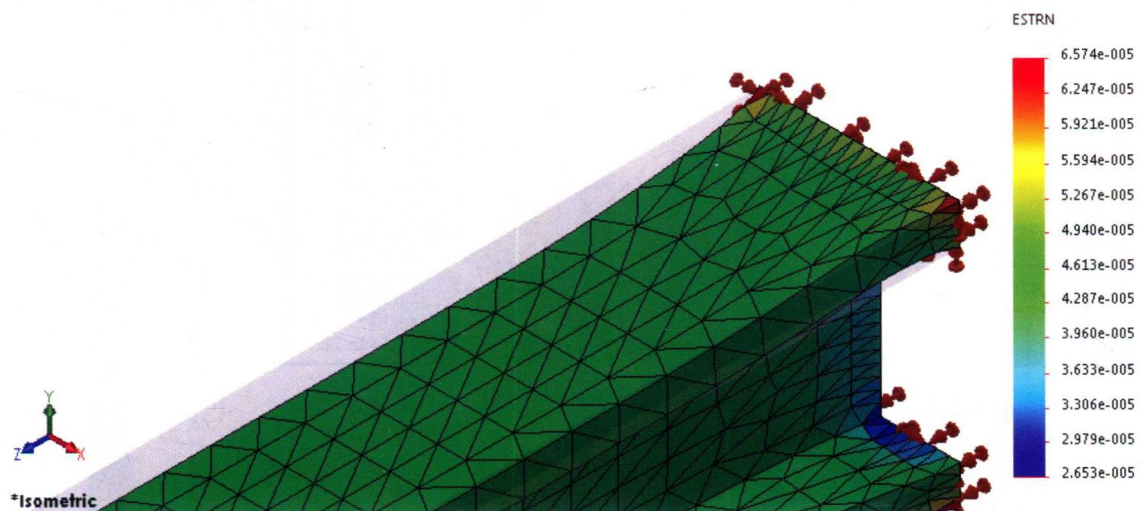


Figure 4.43 Equivalent strain plot showing original and deformed shapes at 10,000 deformation scale

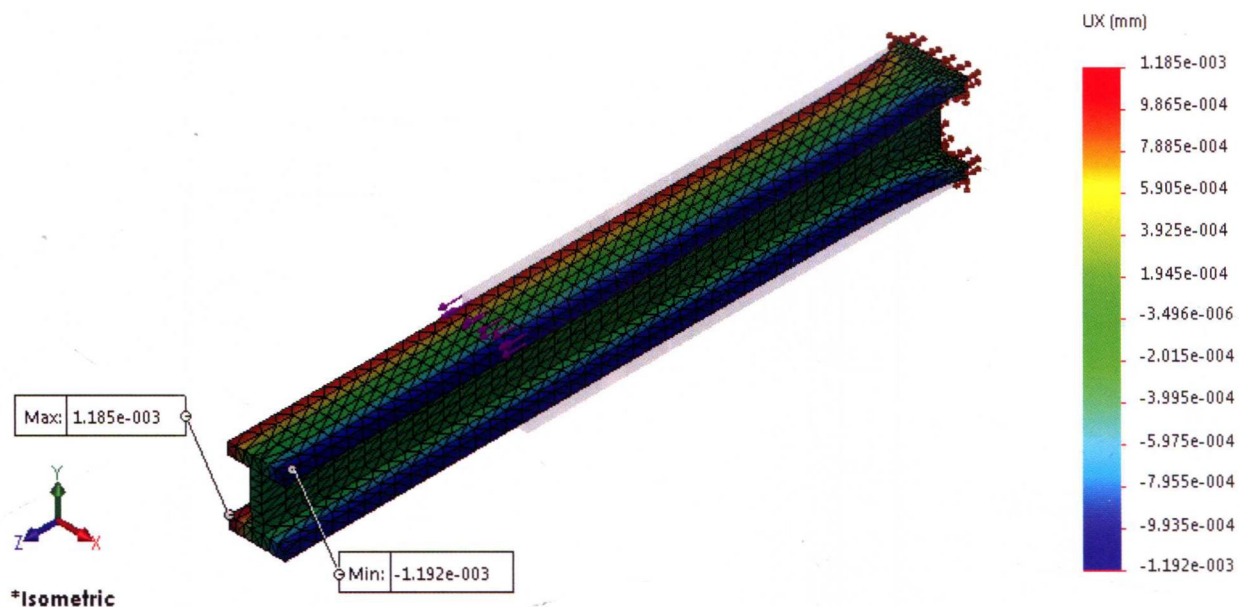


Figure 4.44 X displacement contour plot of mesh-control I-beam model

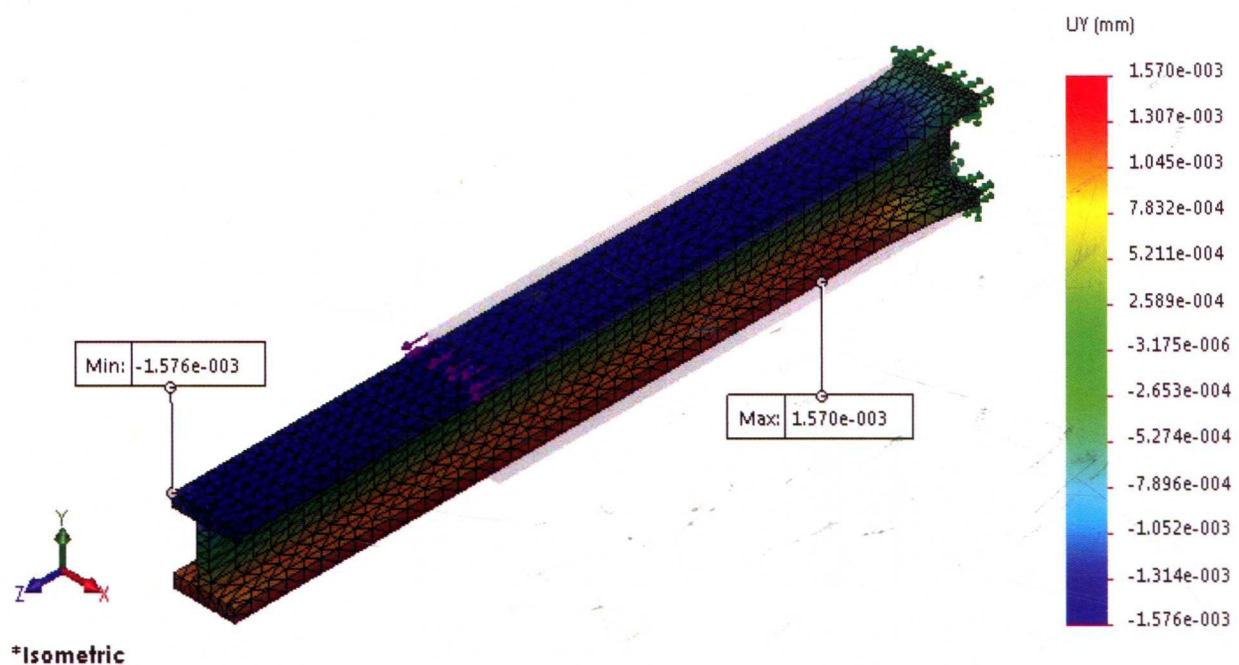


Figure 4.45 Y displacement contour plot for the mesh-control I-beam model simulation

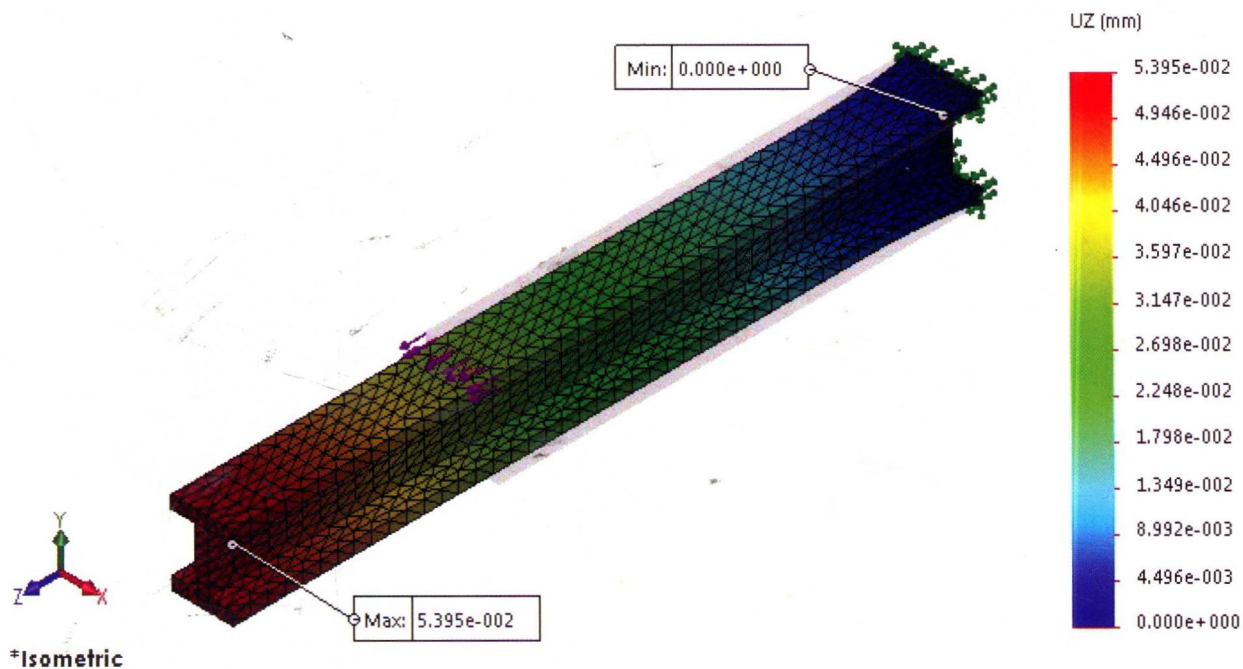


Figure 4.46 Z displacement contour plot of mesh-control I-beam model simulation

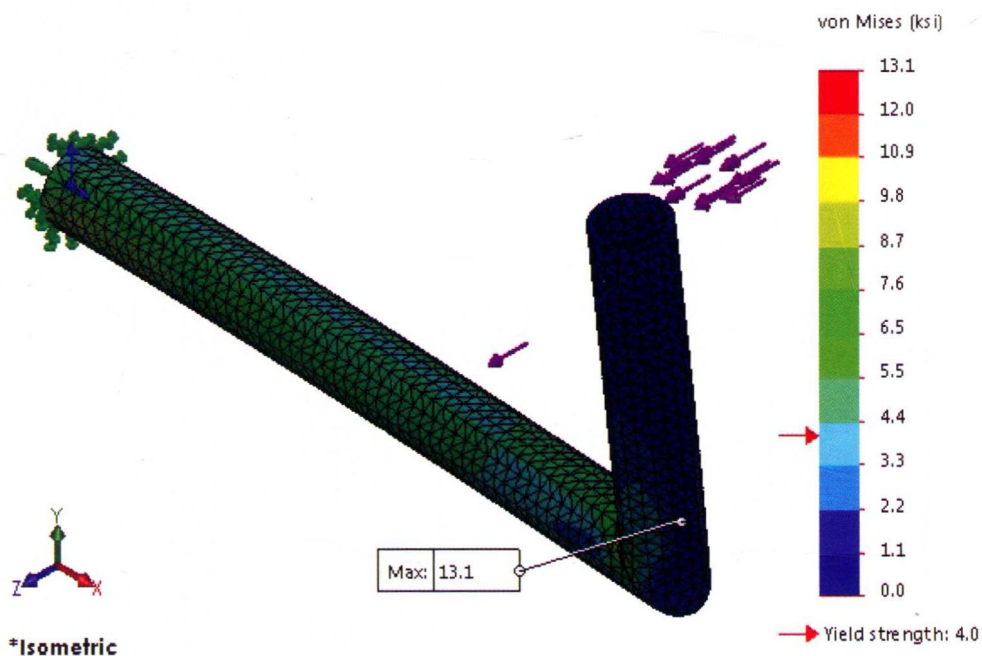


Figure 4.52 vM stress plot results from the L-pipe model analysis with default mesh

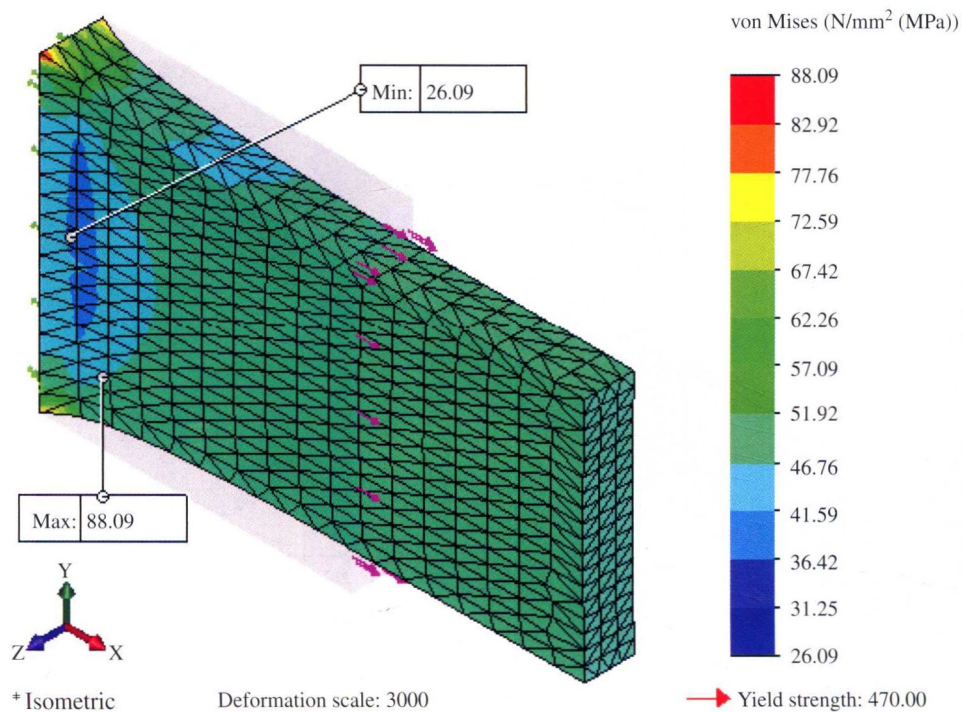


Figure 6.24 vM stress results plot from analysis with a fixed-geometry restraint

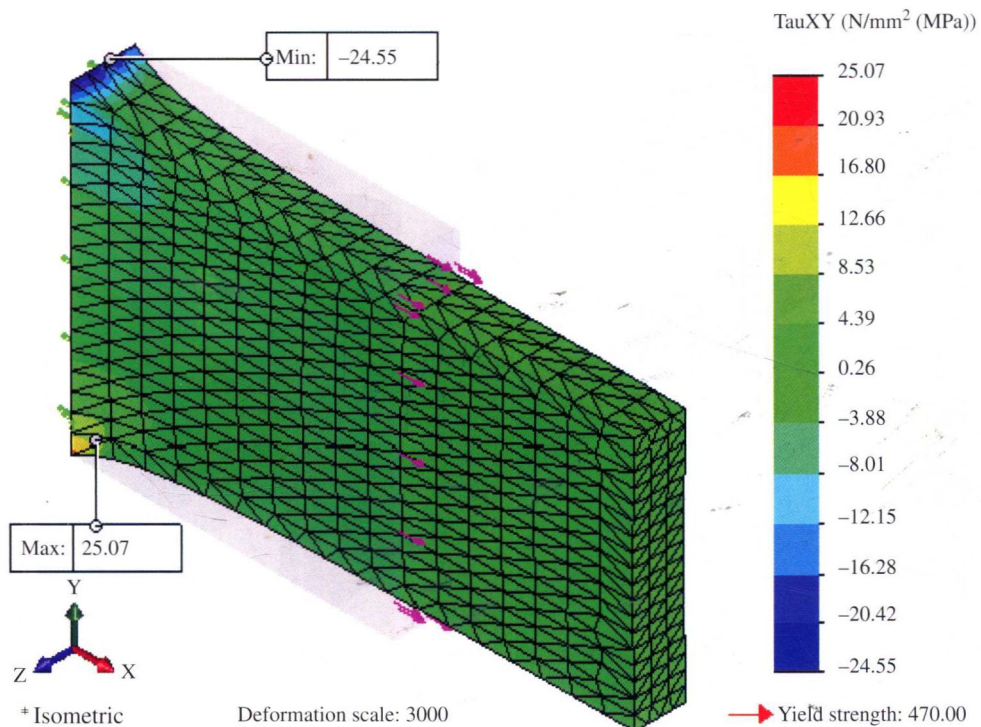


Figure 6.25 TXY results plot from analysis with a fixed-geometry restraint

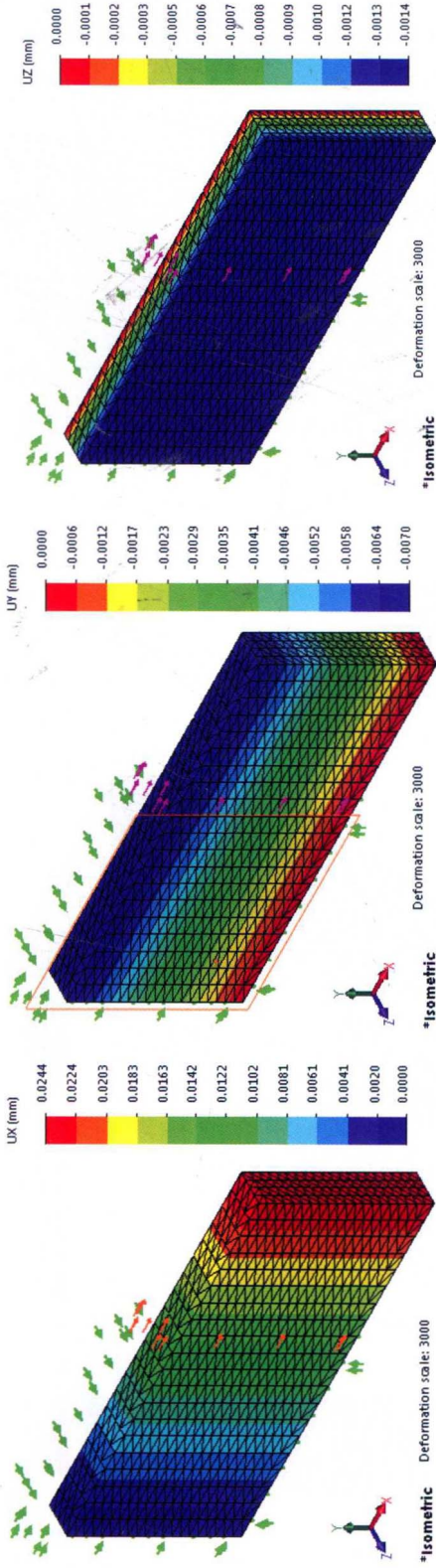


Figure 6.29 UX, UY, and UZ results from analysis with roller/slider restraints

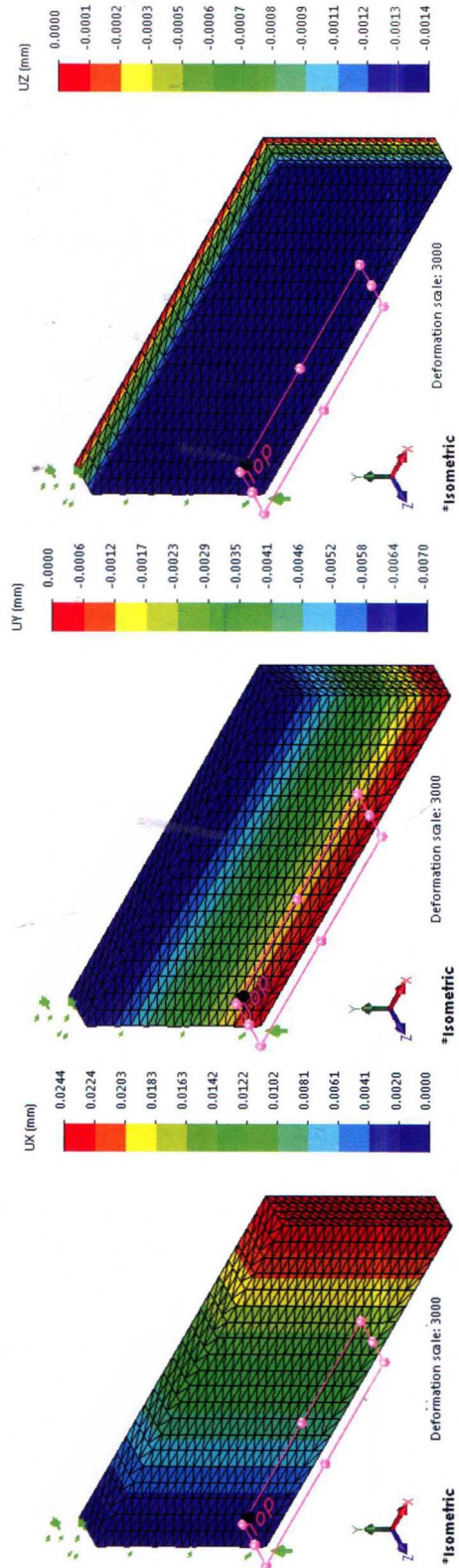


Figure 6.33 UX, UY, and UZ displacement results from analysis with a roller/slider restraint on the restraint end and edge restraints to prevent rigid-body motion

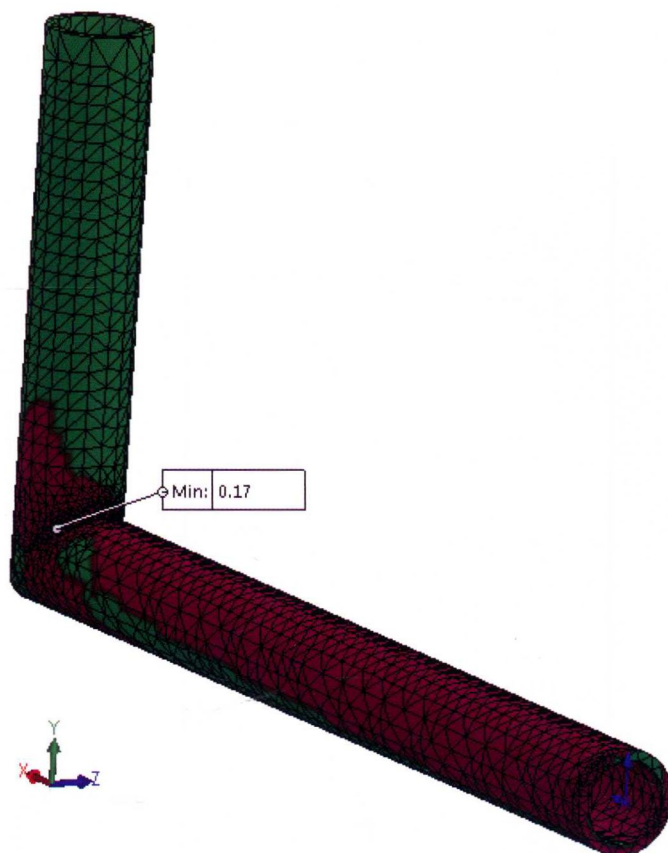


Figure 7.11 Above-and-below FOS plot for vM stress criterion

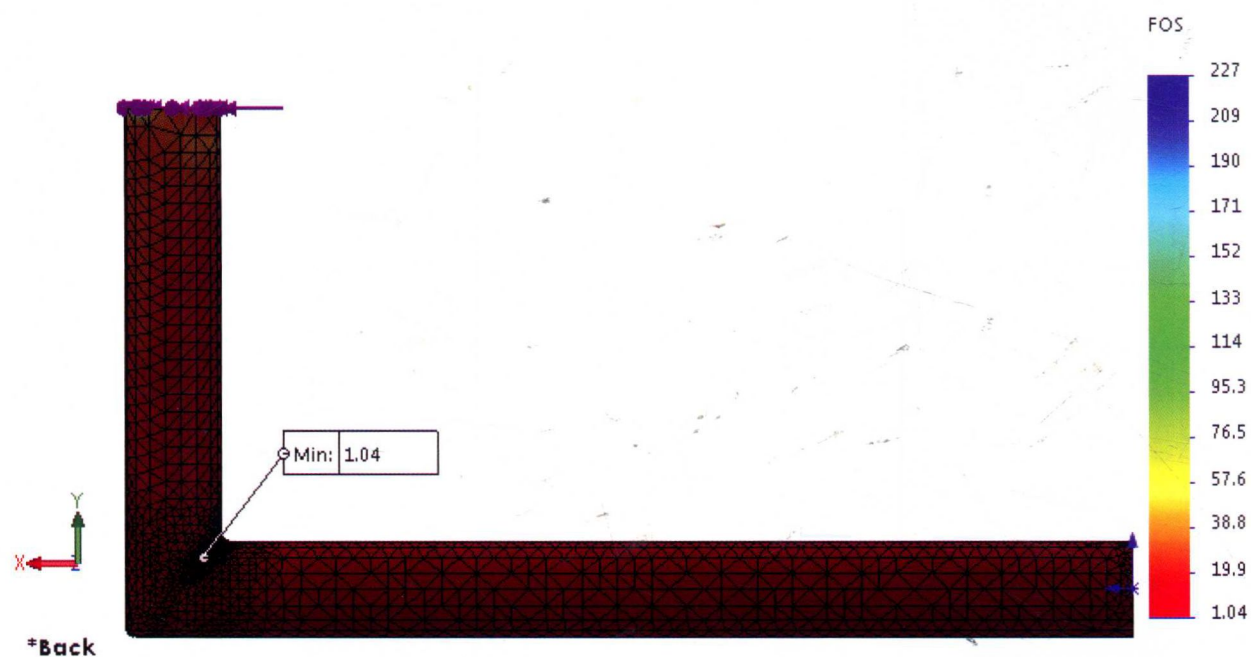


Figure 7.21 Reduced-load L-pipe model with FOS > 1

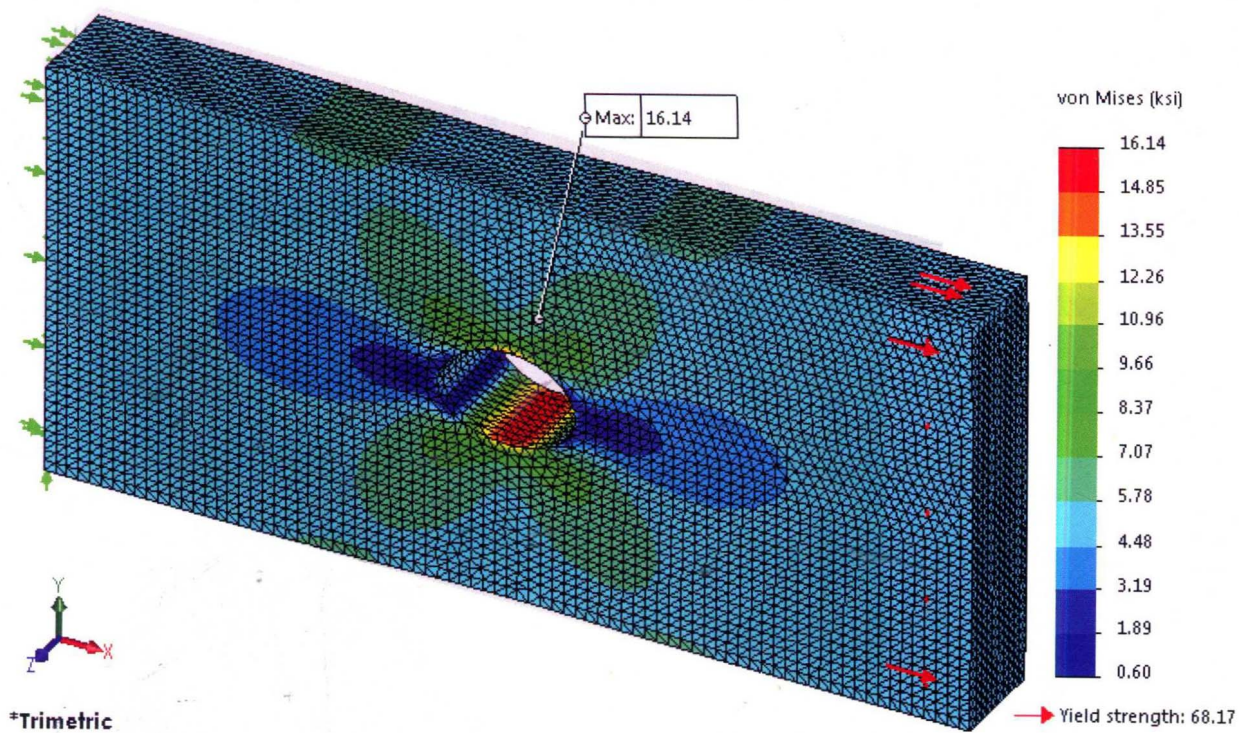


Figure 8.2 vM stress results plot from the full-model analysis

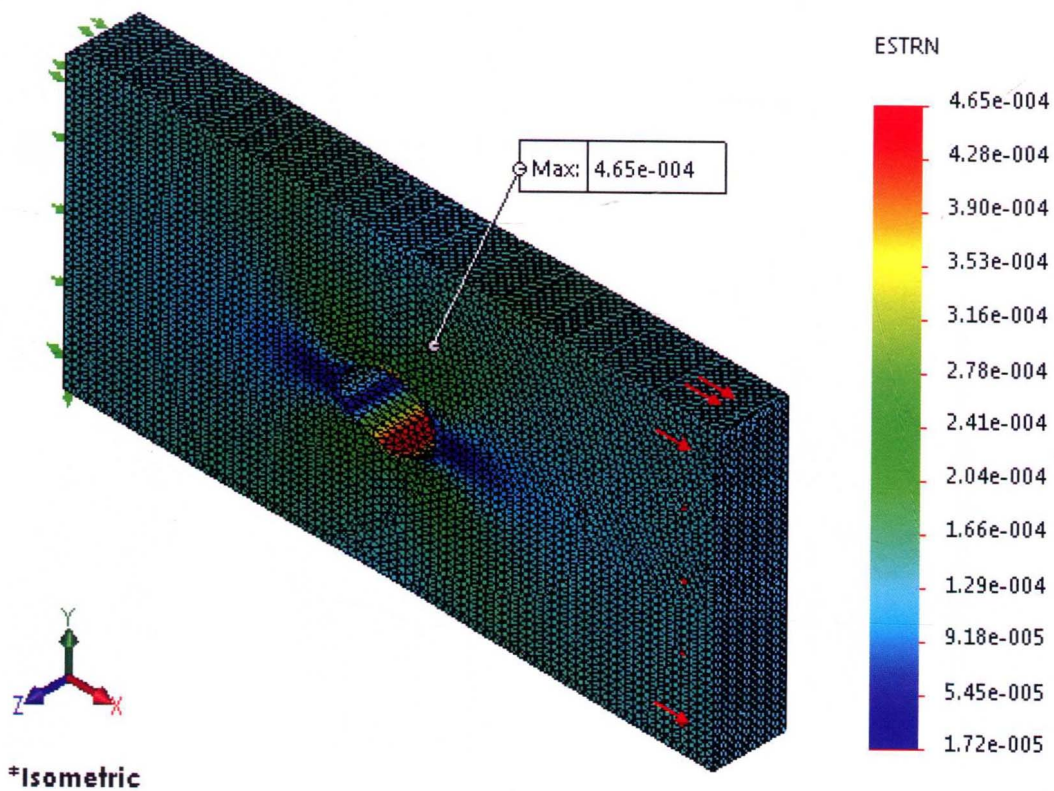


Figure 8.3 Equivalent strain results plot from the full-model analysis

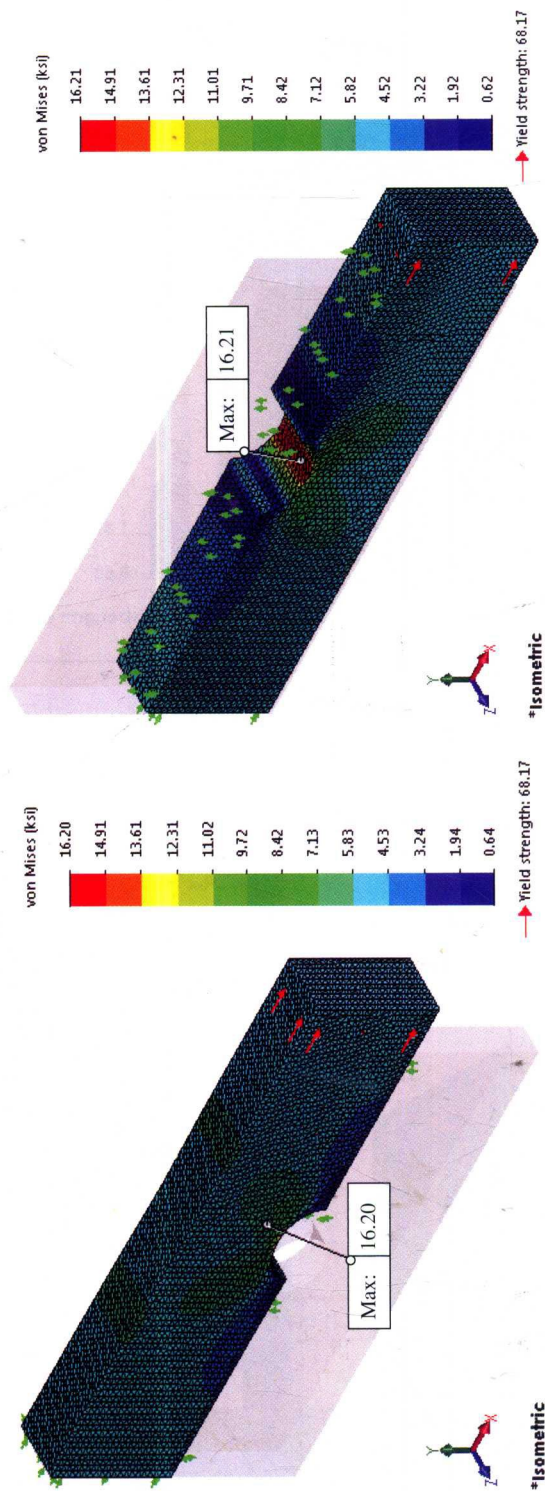


Figure 8.14 vM stress results plot from the XZ plane half symmetry model analysis

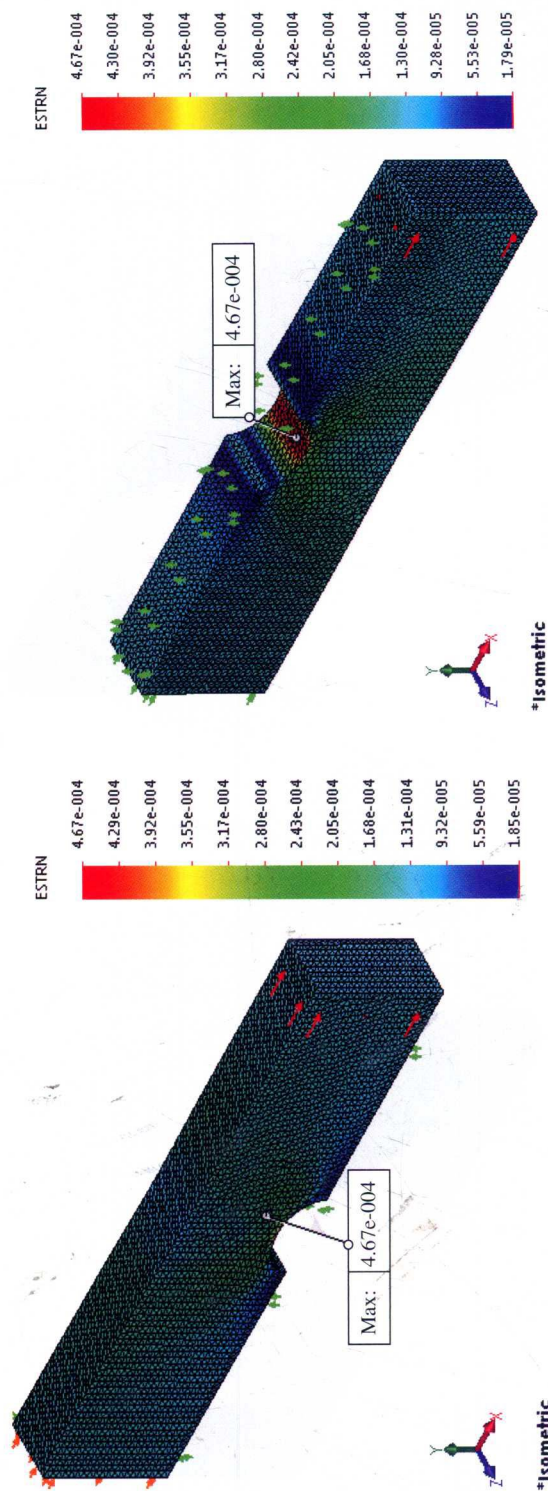


Figure 8.15 Equivalent strain results plot from the XZ plane half symmetry model analysis

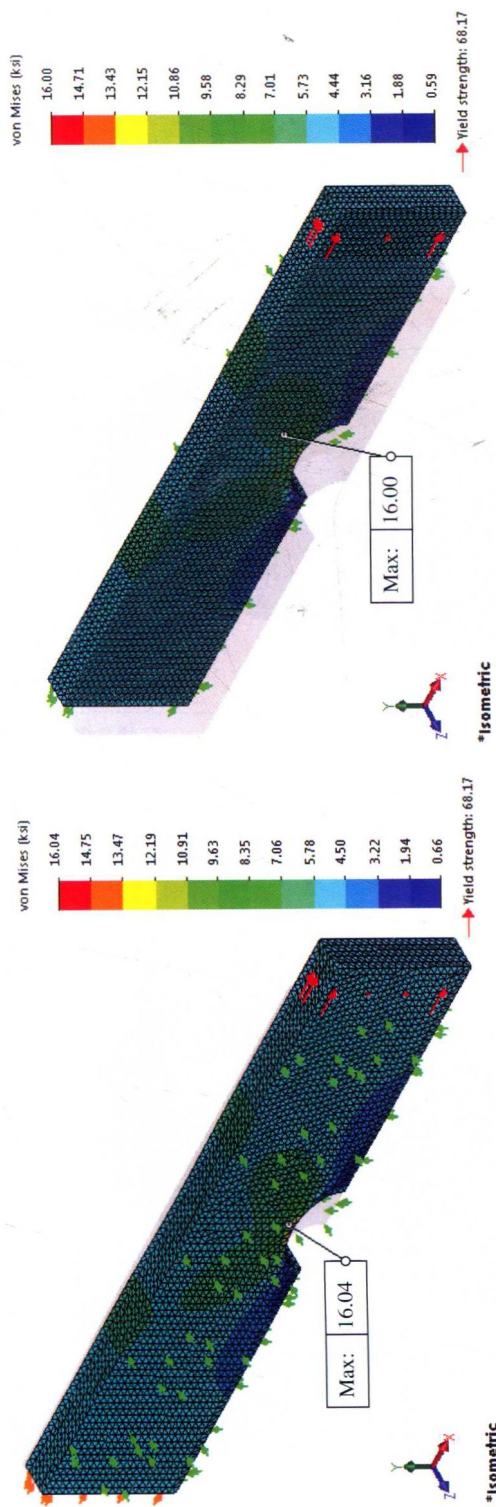


Figure 8.17 vM stress results plot from the quarter symmetry model analysis

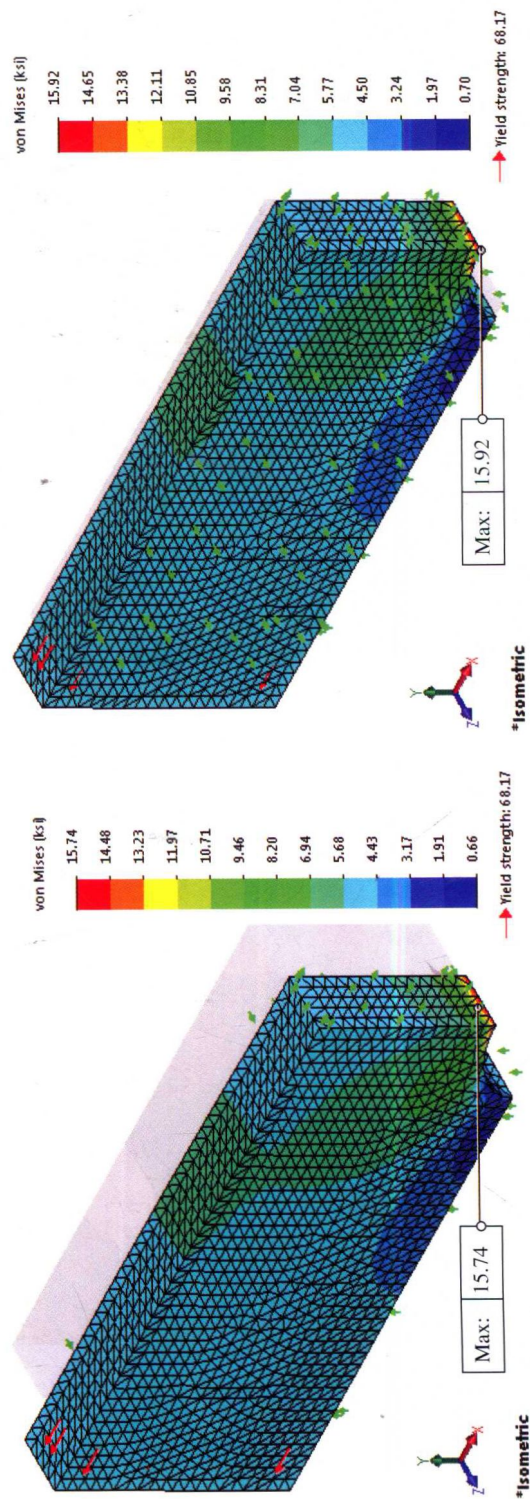


Figure 8.20 vM stress results plot from the eighth symmetry model analysis

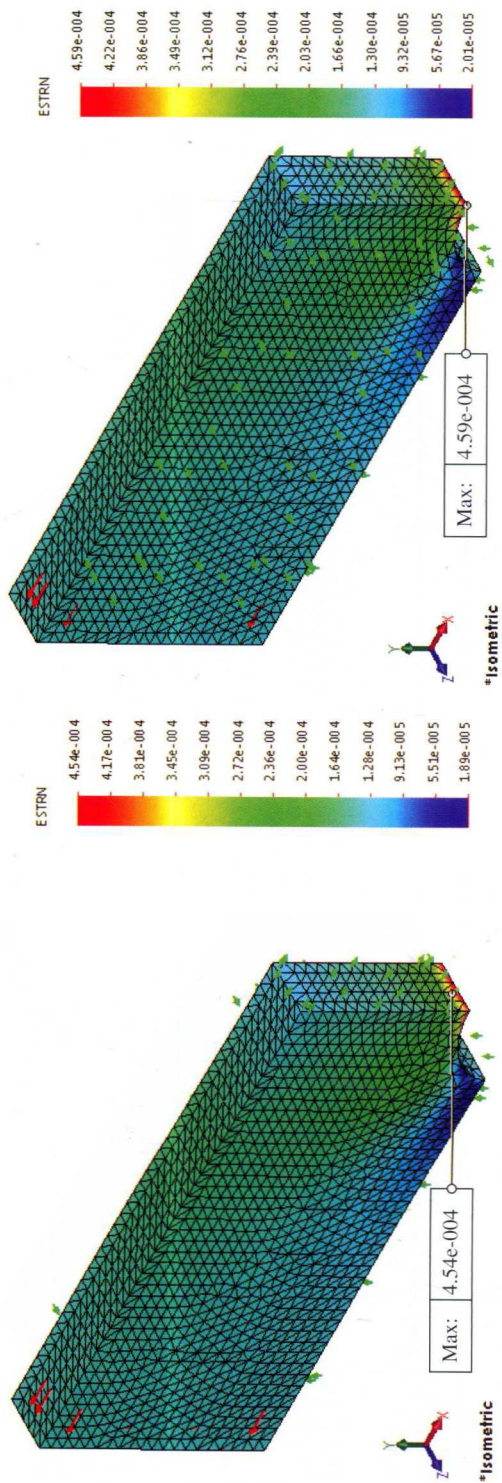


Figure 8.21 Equivalent strain results plot from the eighth symmetry model analysis

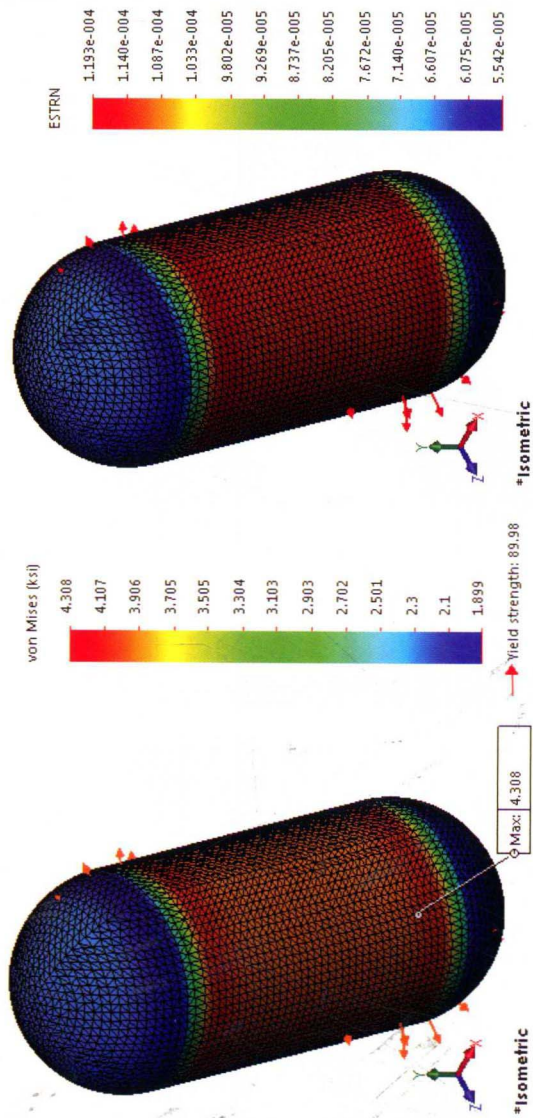


Figure 8.33 vM stress and equivalent strain results plots for the full pressure-vessel model

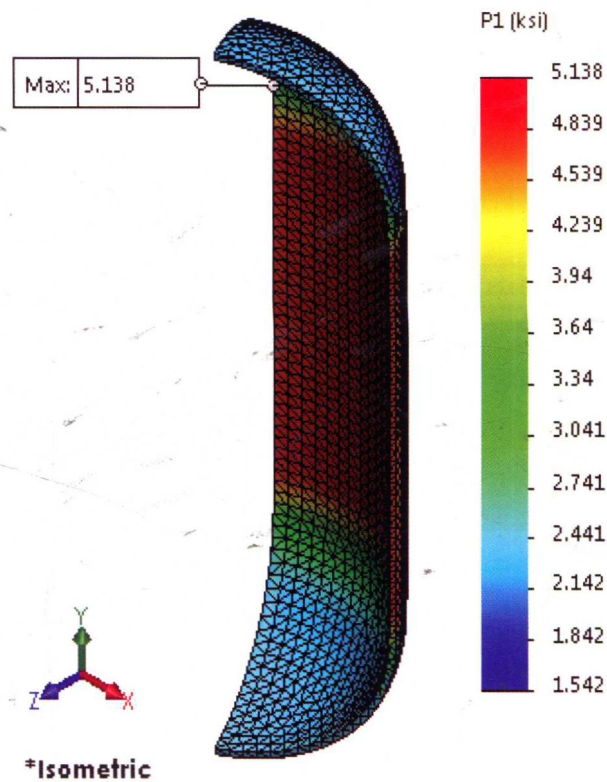


Figure 8.36 P1 stress results plot from the pressure-vessel symmetry model analysis

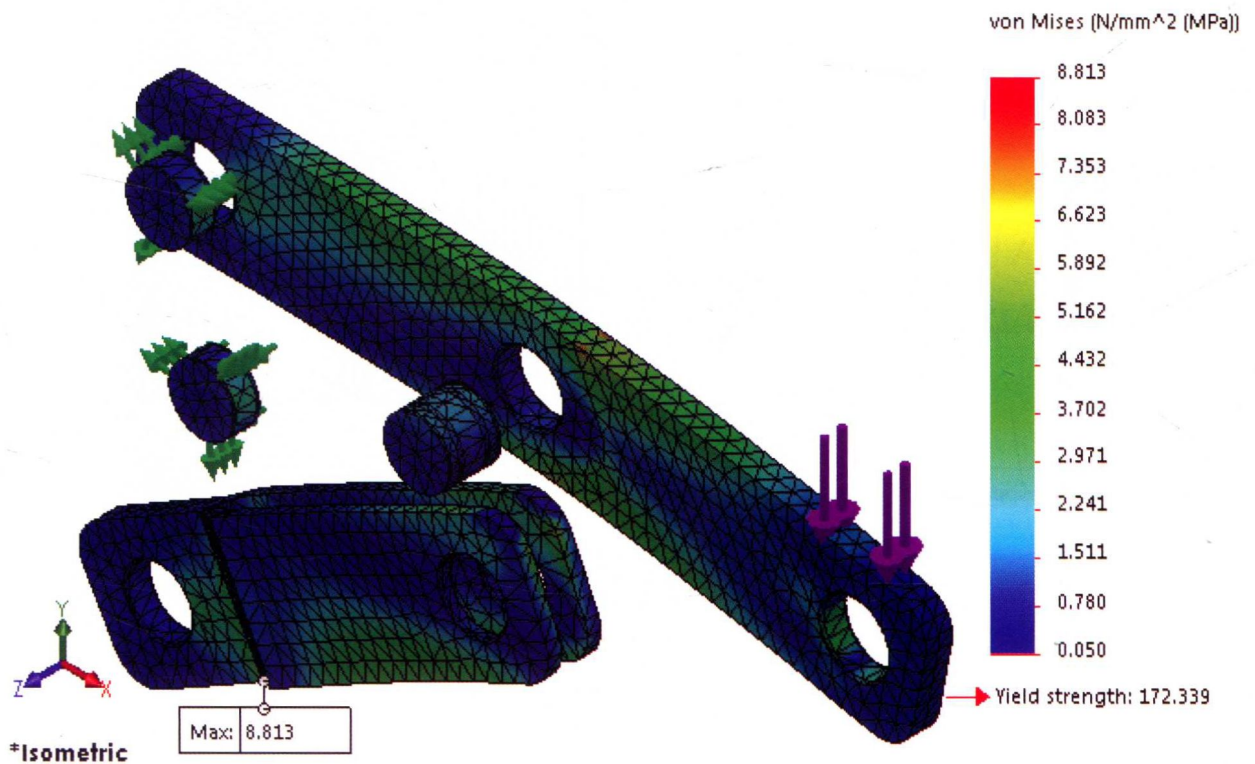


Figure 9.25 Beam assembly vM-stress results plot from analysis with global-bonded contacts

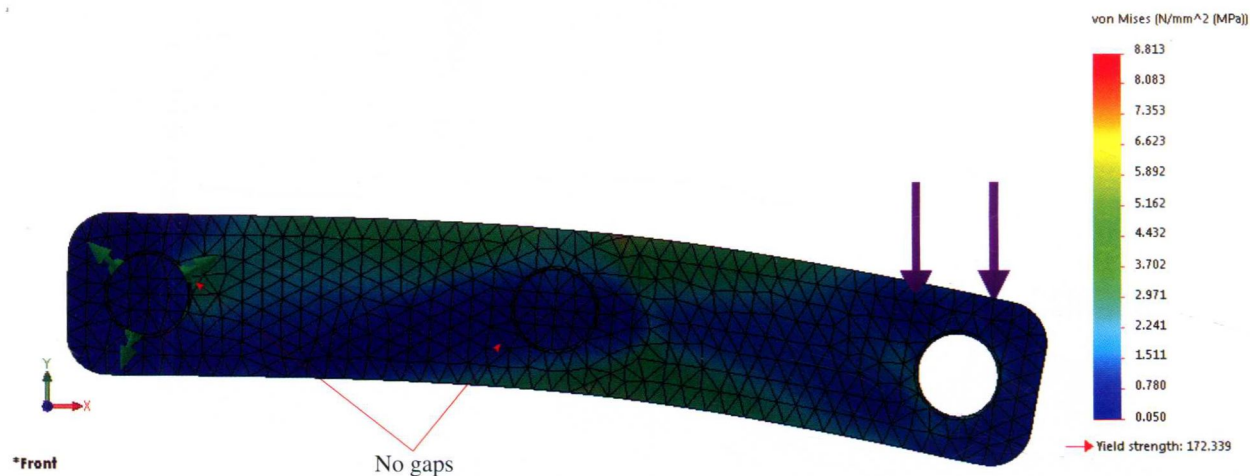


Figure 9.26 No gaps around pins with global-bonded contacts

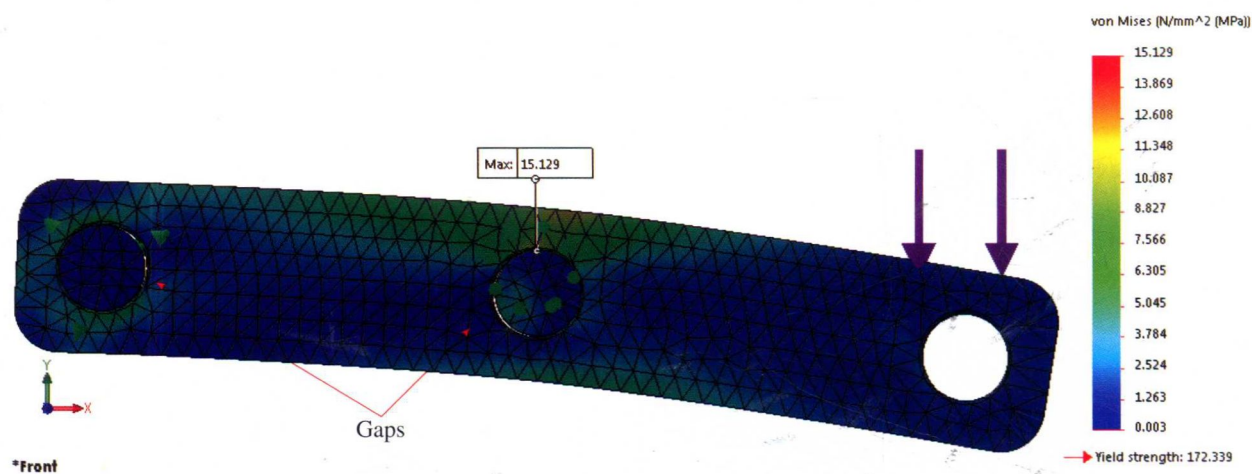


Figure 9.28 Gaps appear above pins with global no-penetration contacts