Bases for 500 Sq. In. Weld Overlay over Ferritic Material

ASME/USNRC Meeting

Rockville, MD

January 10-11, 2007

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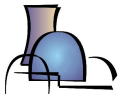

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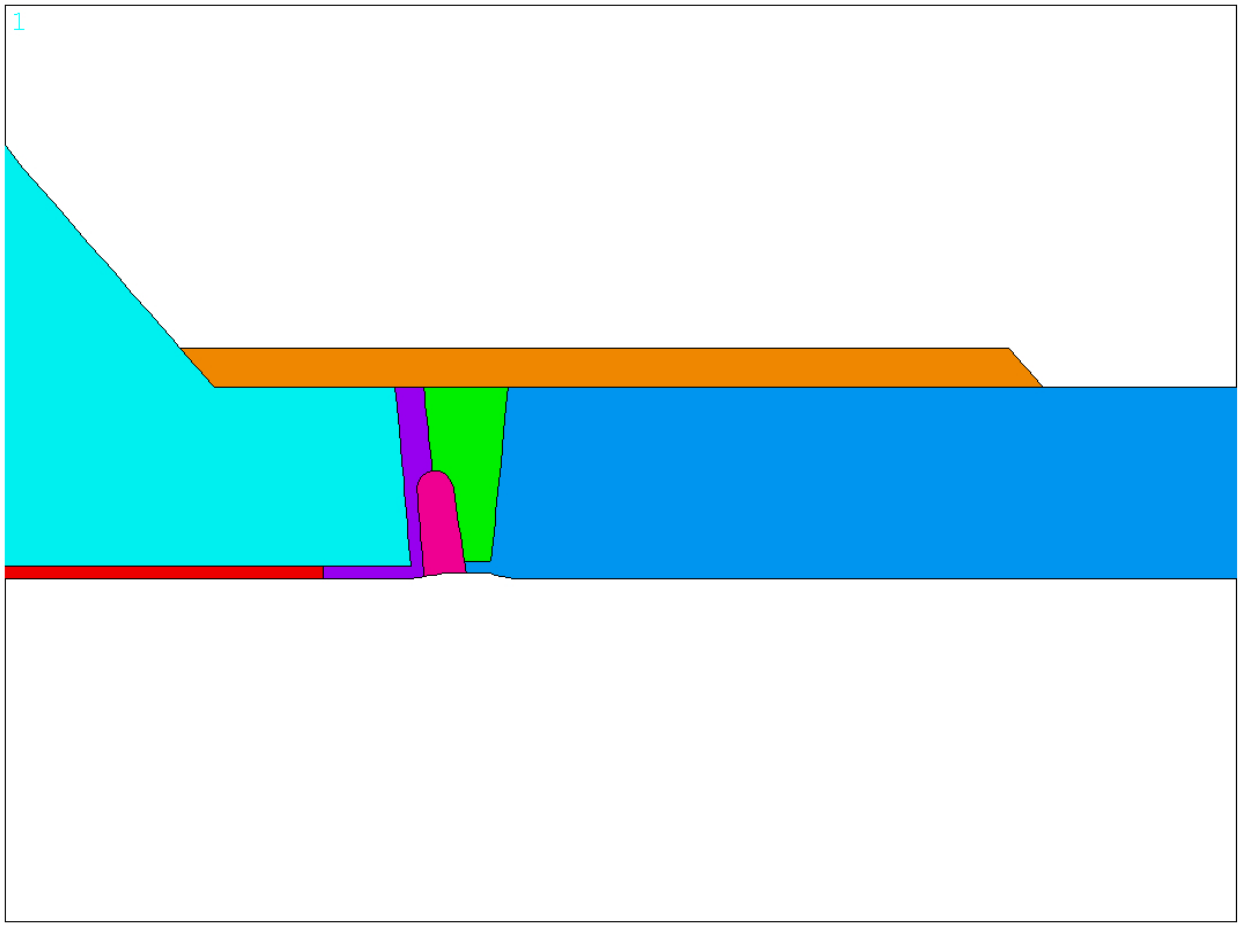
Summary of Dimensions for the Weld Overlay Finite Element Model, L~ 11.6in., R=16.5in.



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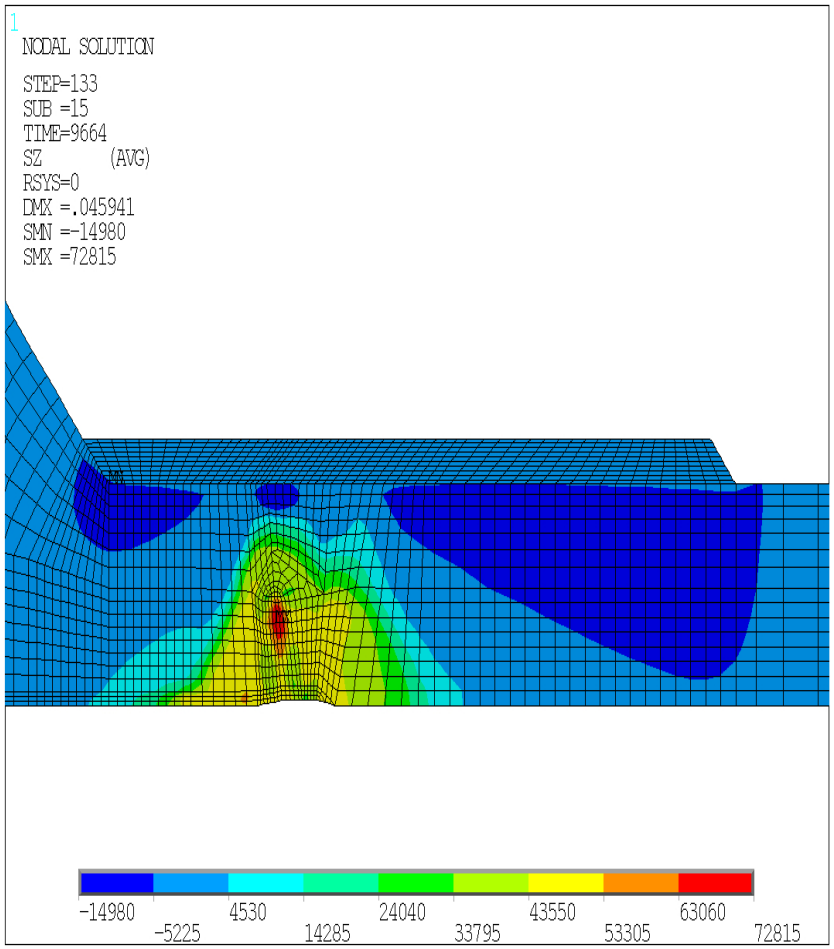
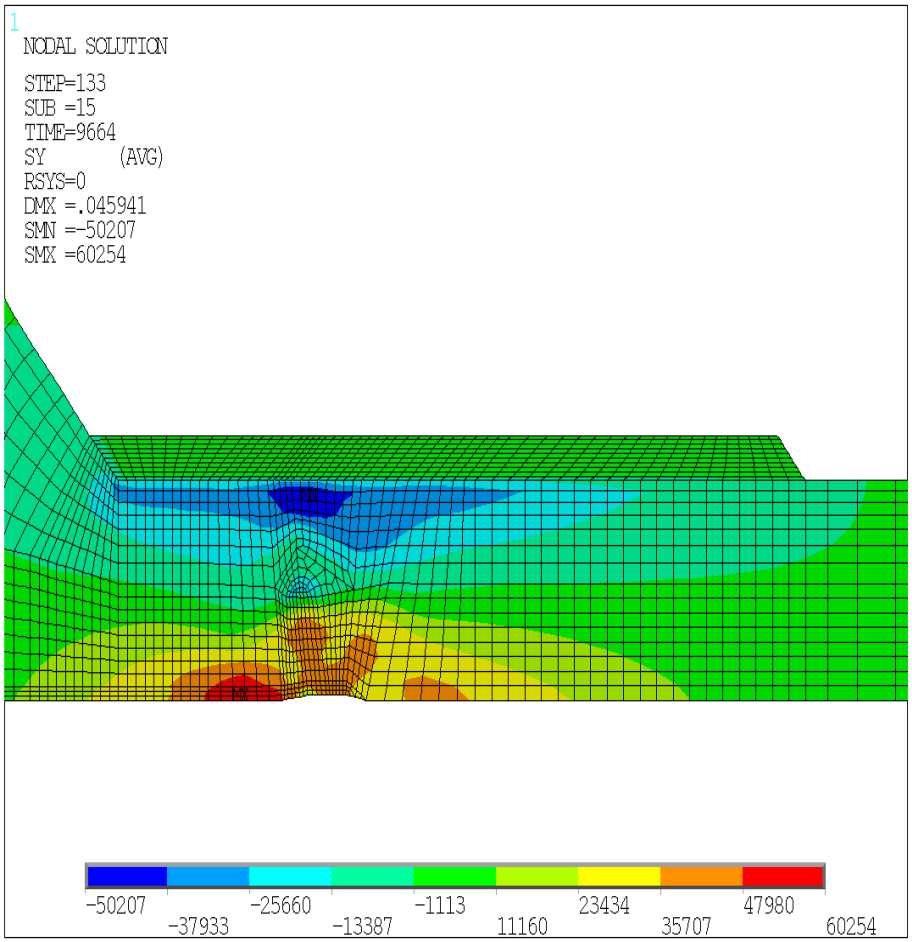
Pre-WOL Stress Contours

Hoop and Axial





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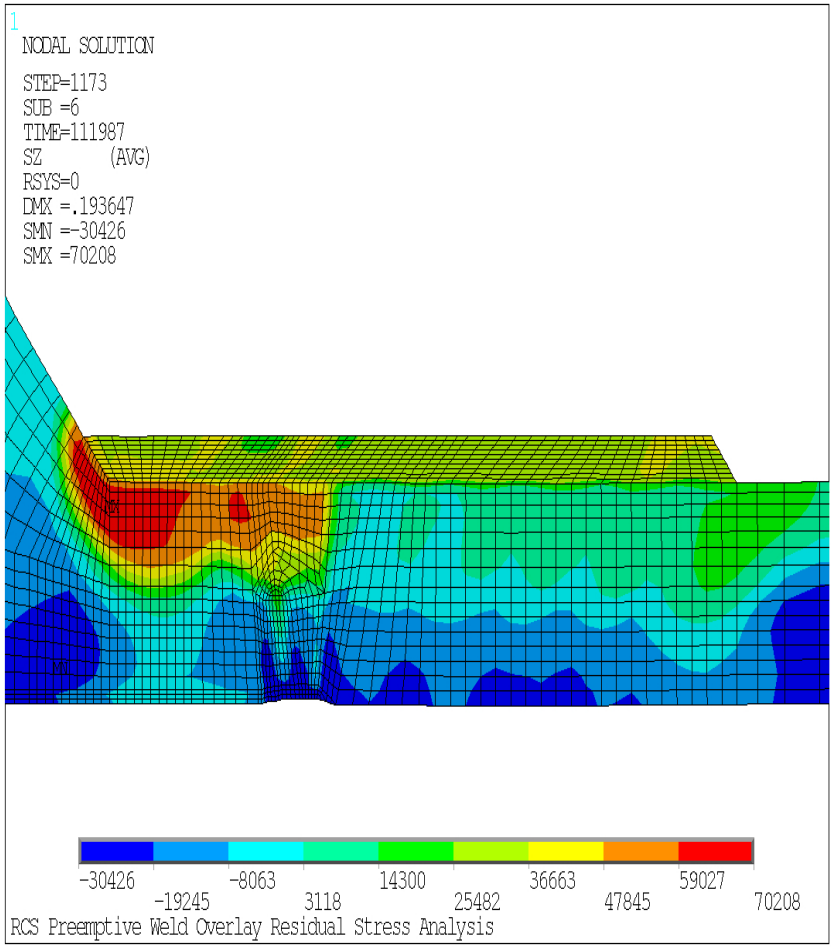
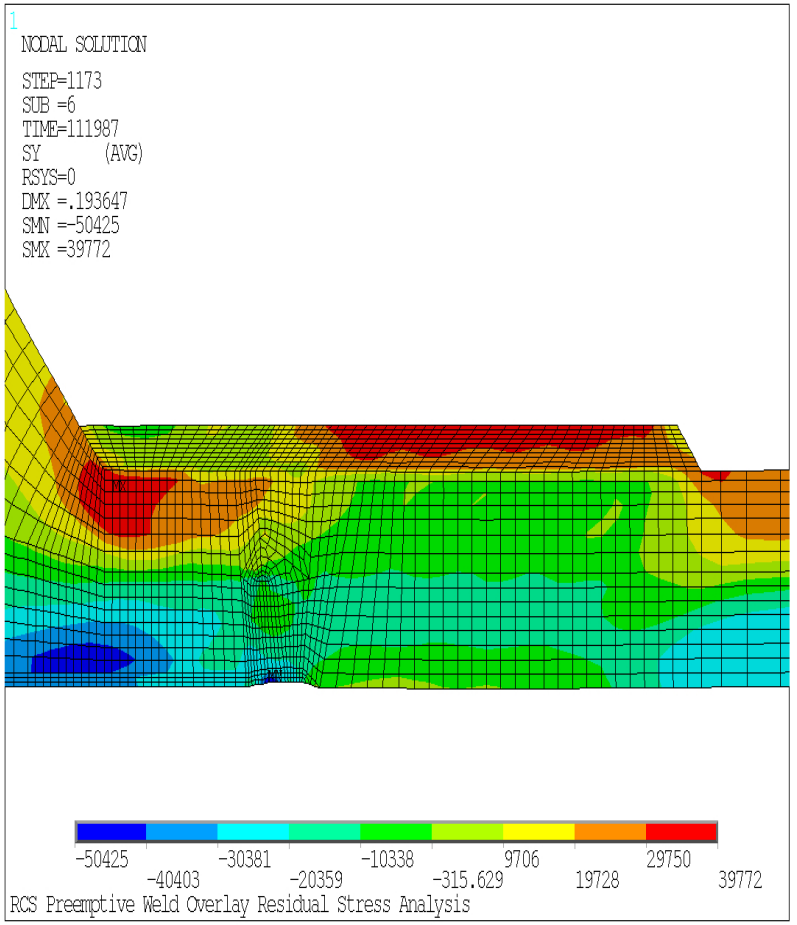
Post -WOL Stress Contours

Hoop and Axial





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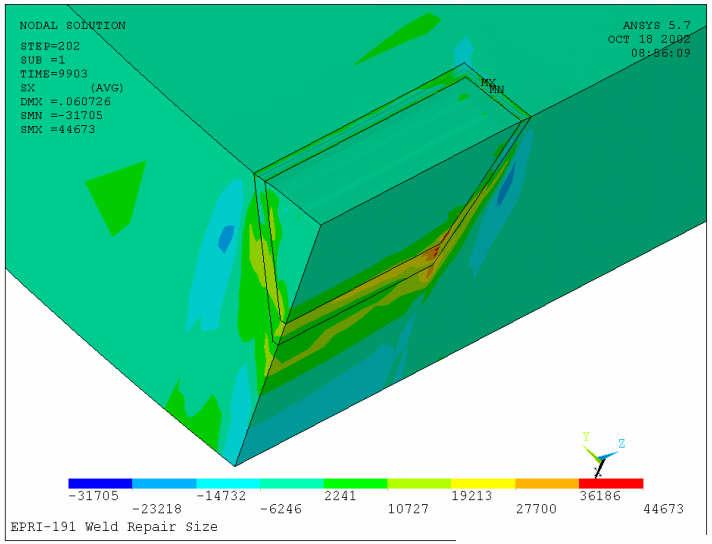
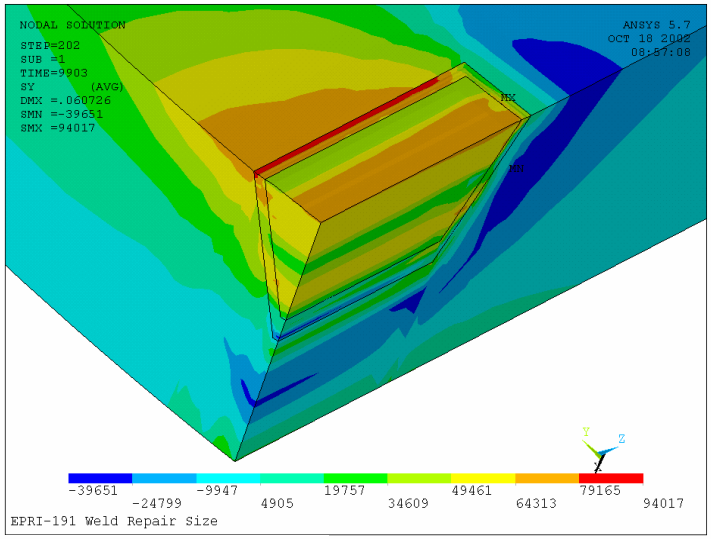
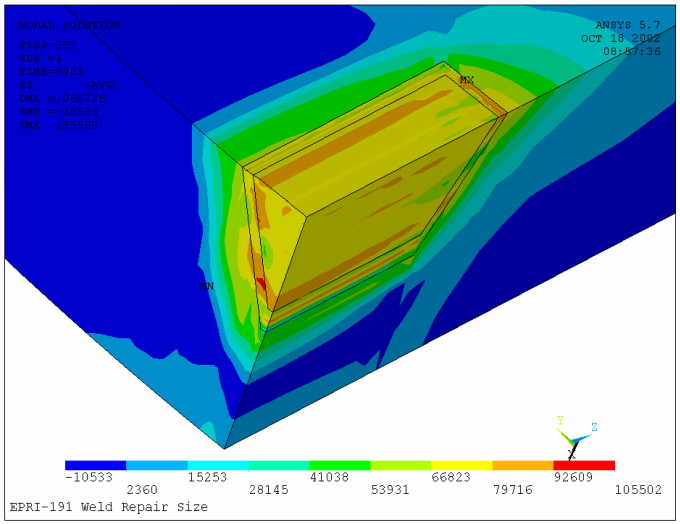
Post–Cavity Repair Stress Contours
100 sq. in.







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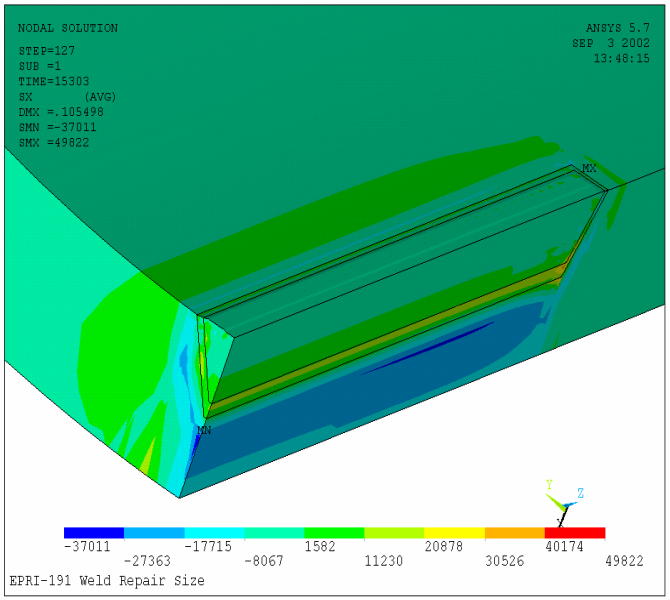
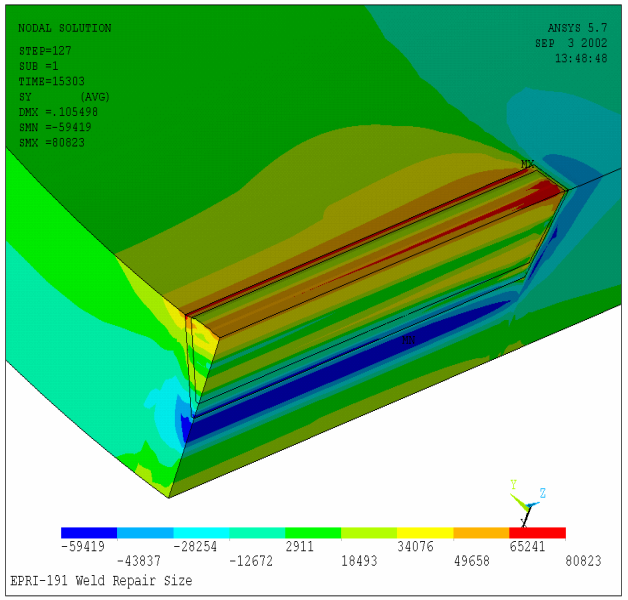
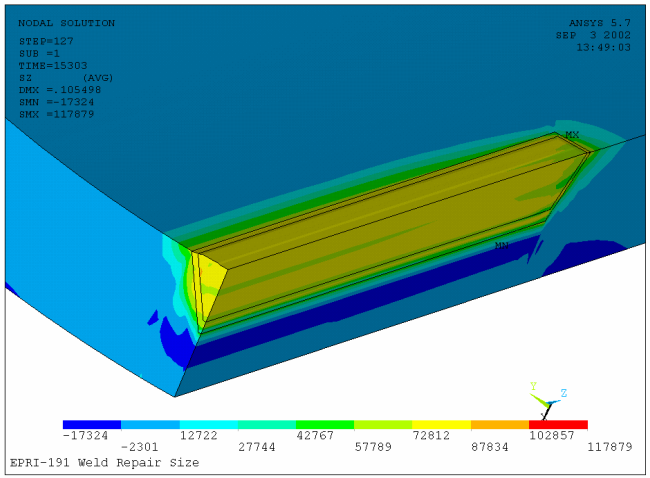
Post–Cavity Repair Stress Contours
500 sq. in.







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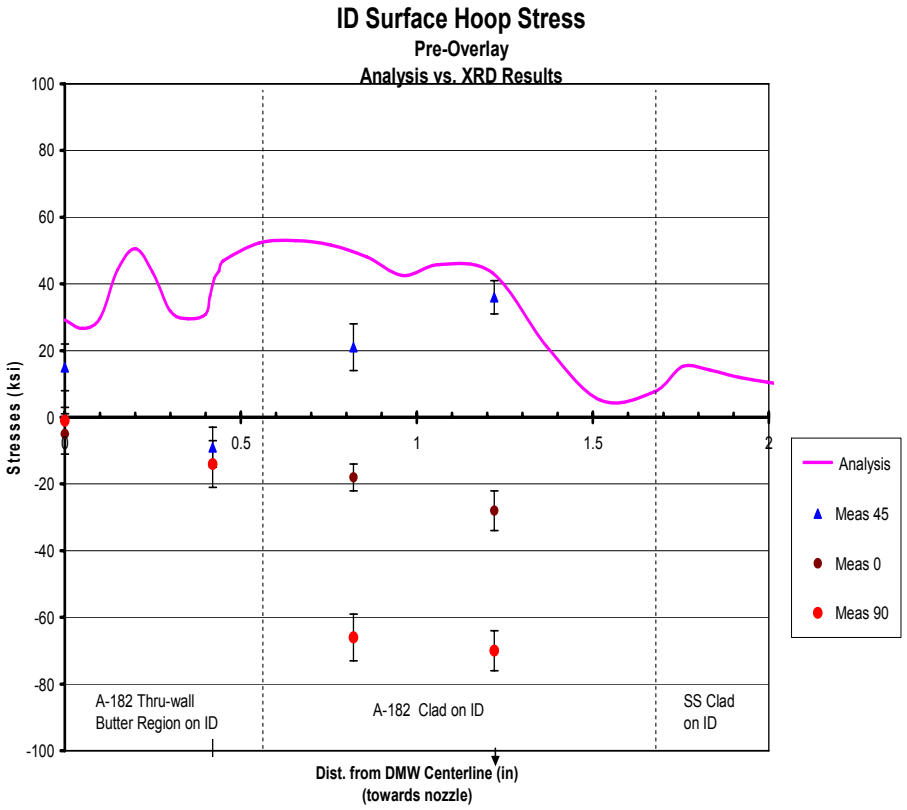
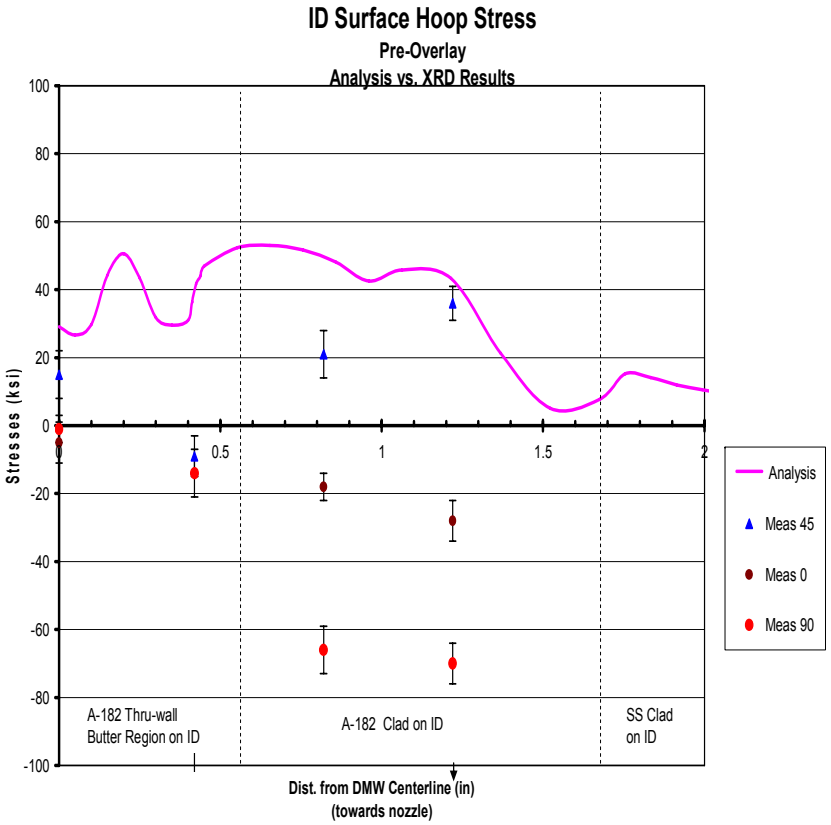
Plot of the Inside Surface Axial and Hoop Residual Stresses Pre-Overlay - Analysis versus XRD Measurements Pressurizer Surge Nozzle Mockup





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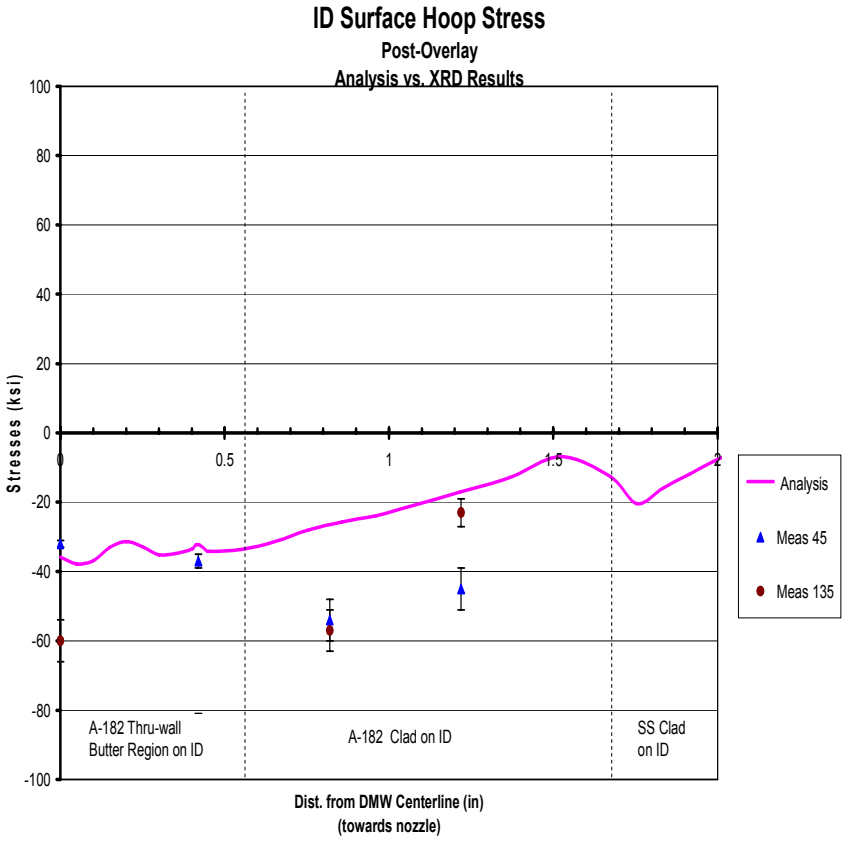
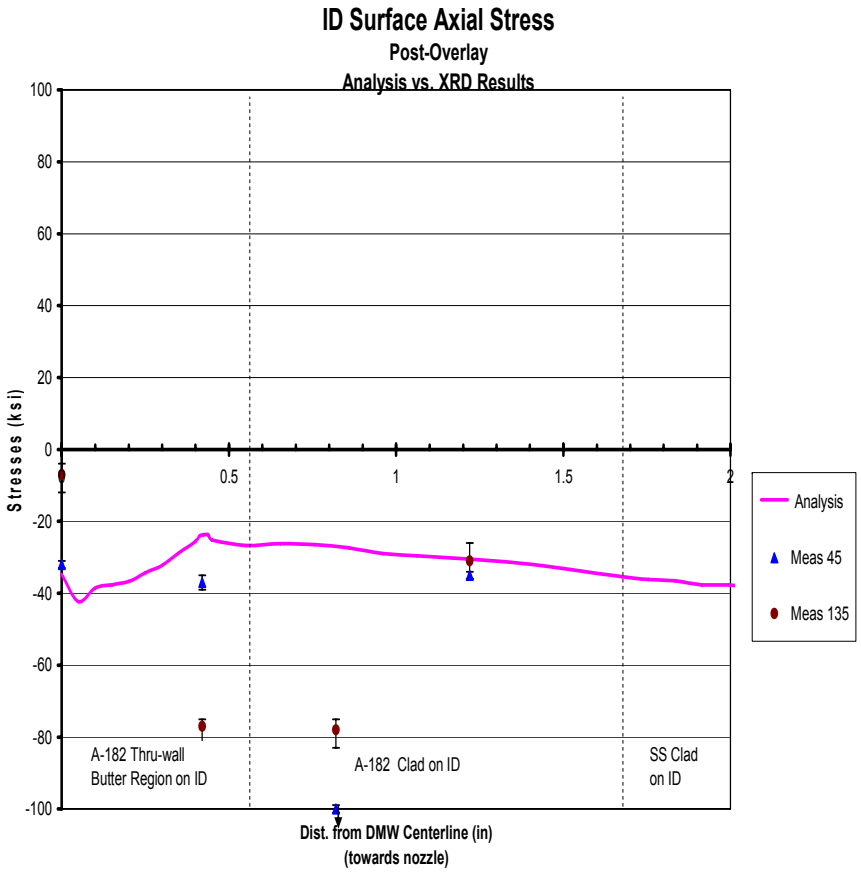
Pressurizer Surge Nozzle Mockup





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Conclusions

- Original100 Sq. Inch Limitation Was Arbitrary
- Results from FEA Analyses for Overlay and Cavity Repairs Show that the Residual Stresses are Comparable for 100 and 500 Sq. In.
- Residual Stresses Predicted by the Finite Element Analysis (FEA) are Consistent with those Measured by the XRD and Strain Gage Residual Stress Measurements
- Results Clearly Demonstrate FEA is a Useful Tool for Designing Repair and Preemptive Weld Overlays in Various Size Piping
- There is No Technical Basis to Limit Ambient Temperature Temper Bead Weld Overlays to 300 Sq. In. Over the Ferritic Material