Public Page
Integrity Management for Wrinklebends and Buckles #132
Contract Number: DTRS56005-T-0003
2nd Quarterly Report
March 7 – May 31, 2005
Battelle

Detailed three dimensional elastic-plastic finite element analyses of wrinklebends were conducted for different wrinklebends with various pipeline diameters from 12 to 24 inches during the second quarter. Using the simulation procedures developed for use in cold forming wrinklebends and the application of internal pressure loading, different sized wrinklebends were analyzed using finite element analysis. Special attention has been paid to the effects of the loading and stress-strain response on the results of the FEA simulations. The results indicate significant complexity develops during wrinklebend formation, and subsequent internal pressure loading. Based on the FEA results and material fatigue experimental data, a defect-free wrinklebend fatigue criteria was developed to cover various pipeline diameters from 12 to 36 inches. Comparison shows that our proposed wrinklebend criterion can match reasonably with the laboratory test data developed for 24 inch X42 wrinklebends. It follows that the wrinklebend criterion proposed for use on bends without defects can be reasonably used for integrity assessment of wrinklebends.