

EVALUATING THE EFFECTS OF WRINKLE BENDS ON PIPELINE INTEGRITY

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ABSTRACT

Concerns exist among the pipeline industry about the effects of wrinkle bends on the long-term integrity of pipelines. For this reason, a study was sponsored to assess the relative severity of wrinkle bends present in the El Paso pipeline system. The study involved a combination of full-scale cyclic pressure fatigue tests, along with finite element analysis, to determine cycles to failure. Strain gages were installed on select samples to determine alternating stresses. Also included in the study was installation of E-glass composite repair materials (Armor Plate® Pipe Wrap) on selected wrinkles to determine the potential for life extension considering the presence of reinforcement. The study helped in developing "in-the-ditch" evaluation criterion and a tool to determine the severity of a specific wrinkle bend based on geometric parameters including wrinkle height and length. The effects of metal loss due to corrosion were also considered. Additionally, the experimental results demonstrated that composite materials can extend the fatigue life of wrinkle bends

Alexander, C., and Kulkarni, S., "Evaluating the Effects of Wrinkle Bends on Pipeline Integrity," Proceedings of IPC2008 (Paper No. IPC2008-64039), 7th International Pipeline Conference, September 29-October 3, 2008, Calgary, Alberta, Canada.