

Zhou, H., Wang, Y.-Y., Bergman, J., Stephens, M., and Nanney, S., 2018, Tensile and Compressive Strain Capacity in the Presence of Corrosion Anomalies, Proceedings of the 12th International Pipeline Conference, Paper No. IPC2018-78802, September 24-28, 2018, Calgary, AB, Canada.

Abstract

Over the past 15 years, extensive studies have been conducted on the tensile strain capacity (TSC) and compressive strain capacity (CSC) of pipelines. The existing studies were mainly targeted at the design and construction of new pipelines. However, the impact of anomalies (e.g., corrosion anomalies) on the TSC and CSC has not been explicitly and adequately considered.

This paper summarizes work performed as part of a major effort funded by the US Department of Transportation Pipeline and Hazardous Materials Safety Administration (DOT PHMSA) aimed at examining the impact of corrosion anomalies on the TSC and CSC of pipelines. In this work, the strain capacities were examined analytically, and the analytical work was compared to results from selected full-scale tests.

Based on the summarized work, guidelines were developed for assessing the TSC and the CSC of corroded pipes. The guidelines are applicable to different types of corrosion anomalies, including circumferential grooves, longitudinal grooves and general corrosion. The strain capacities can be calculated using the key material properties and dimensions of pipe and corrosion anomalies as inputs.