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Abstract

Pipeline construction activities and in-service interference events can frequently result in dents on the pipe. The pipelines can also experience high longitudinal strain in areas of ground movement and seismic activity. Current assessment procedures for dents were developed and validated under the assumption that the predominant loading is internal pressure and that the level of longitudinal strain is low. The behavior of dents under high longitudinal strain is not known. This paper discusses work funded by US DOT PHMSA on the assessment of dents under high longitudinal strain.

Parametric numerical analyses were conducted to identify and examine key parameters and mechanisms controlling the compressive strain capacity (CSC) of pipes with dents. Selected full-scale tests were also conducted to experimentally examine the impact of dents on CSC. The focus of this work was on CSC because tensile strain capacity is known not to be significantly affected by the presence of dents. Through the parametric analyses and full-scale validation tests, guidelines on the CSC assessment of dented pipes under high longitudinal strain were developed.