Wang, Y.-Y., **Zhang, F., Liu, M.,** Song, Y., Cho, W., and Seo, D., Tensile Strain Capacity of X80 and X100 Welds, Proceedings of the 31st International Conference on Ocean, Offshore and Arctic Engineering, 2012, Paper no. OMAE 2012-84240

Abstract

High-strength pipelines (API 5L grade X70 and above) provide viable economic options for large diameter and high-pressure transmission of energy products. To facilitate the understanding and potential use of high-strength pipelines, the tensile strain capacity (TSC) of X80 and X100 girth welds was evaluated through a series of mechanical tests and analytical/computational modeling. The experimental tests include tensile, Charpy, SENT, and curved-wideplate (CWP) tests. The TSC measured from CWP tests is compared with the prediction from TSC models developed at CRES. The TSC of the girth welds is assessed by comparing experimentally measured values with the expected TSC from similar welds. The assessment confirms that this particular set of X80 and X100 girth welds provide very good tensile strain capacity.

Keywords

Pipeline, Strain-based design, SBD, Tensile strain capacity, Tensile strain limit, Fracture mechanics, Ductile fracture