

Liu, M., Wang, Y.-Y., Zhang, F., Horsley, D., and Nanney, S., Multi-Tier Tensile Strain Models for Strain-Based Design Part 1 – Fundamental Basis, Proceedings of the 9th International Pipeline Conference, September 24-28, 2012, Calgary, Alberta, Canada, Paper no. IPC2012-90690

Abstract

This is the first paper in a three-paper series on the tensile strain design of pipelines. The formulation of the multi-tier models [1] and evaluation of the models against experiment data [2] are presented in two companion papers. This paper starts with an introduction of general concept of strain-based design. The central part of the paper is then devoted to the tensile strain capacity, including (1) physical process of tensile strain failure, (2) limit states of tensile strain failure and associated toughness representation, and (3) fundamental basis of tensile strain models. The most significant part of the fundamental basis, the limit state of tensile failure and associated representation of the material's toughness, is given the greatest amount of attention.

Keywords

Pipeline, Strain-based design, Girth weld integrity