

Rudland, D., Wang, Y.-Y., Low-Constraint Testing of Pipeline Girth Welds, Proceedings of 6th International Pipeline Conference, Calgary, Alberta, Canada, September 25- 29, 2006, Paper no. IPC2006-10492

Abstract

Conventional fracture toughness test specimens have high crack-tip constraint. Defects in pipelines are typically under low constraint conditions. Assessment of the pipeline defects using the fracture toughness of the conventional test specimens can be overly conservative.

This paper presents a novel low-constraint test configuration termed back-bend test to measure the toughness of pipeline girth welds. Full transition curve tests were conducted with both weld centerline and HAZ notched specimens. The test setup, instrumentation, and data analysis are described in the paper. The crack initiation transition temperature results for an X70 and X100 linepipe steel girth weld and heat affected zone are presented and discussed.