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Abstract

Toughness is a critical parameter in all phases of a pipeline service life. There are a variety of toughness testing forms, ranging from relatively inexpensive small-scale laboratory specimens to highly sophisticated full-scale tests. The correlation of physically significant parameters, such as transition temperature and upper shelf energy/toughness, from those test forms is examined. The ultimate objective is to understand of the similitude of various specimen forms. The similitude allows the prediction of large-scale behavior from small-scale laboratory test specimens. The paper presents data developed from various current and past research programs. The trends exhibited by the various forms of specimens are examined. The implications of those trends in the strain-based design of pipelines are summarized at the end of the paper.

Keywords

Pipeline, Strain-based design, Girth weld, Toughness, Constraint effects