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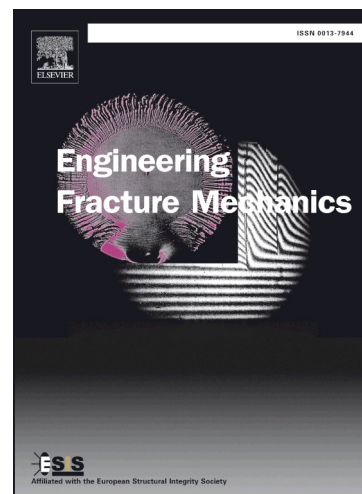
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A Model to Evaluate Unstable Ductile Crack Arrestability of Offshore Pipeline

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Abstract:

We developed the first model to evaluate unstable ductile crack arrestability in offshore pipelines. The proposed model is an integrated one-dimensional model with four sub-models to calculate (a) pipe deformation, (b) gas flow inside pipe, (c) bubble growth, and (d) crack propagation. We validated the proposed model by applying it to two types of tests: laboratory scale underwater rupture tests and existing data of a full-scale burst test of an offshore pipeline. In addition, the calculation results of the proposed model showed that a deep water depth results in increased unstable crack arrestability of the pipeline.

Key words:

Unstable ductile crack propagation; Offshore pipeline; Finite difference method; bubble growth

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