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Abstract

In-line inspection (ILI) has become a routine procedure in the Oil and Gas industry for performing cost-effective pipeline integrity assessments, allowing continuing monitoring and providing a basis for informed decisions in terms of repair, maintenance or a change to the operating conditions. The amount of ILI data is however immense and dealing with these data from a fitness-for-service point of view poses a significant challenge to the industry. Thus, smart methods for using ILI data in the assessment of the integrity of oil and gas transmission pipelines are essential. The aim of this paper is to propose a screening approach for reducing the amount of ILI inspection data requiring detailed structural integrity assessment. The screening approach has two main stages: (I) a geometry based filter assessing the shape of the flaw and (II) an elastic stress based filter that uses the point method, as in the Theory of Critical Distances (TCD), to identify the most severe flaws. The methodology uses the outputs from ILI (dimensions of flaws, orientation and distance from starting point) to generate a visualisation of the pits within the pipeline, a ranking of pits in terms of sphericity (roundness) and depth, to evaluate pit density and generate the models for finite element analysis. The method was tested on actual ILI data, where the number of pits in a 12.75 inch riser of 11 km length was reduced significantly (i.e. two/three orders of magnitude), such reduction depending on the level of conservatism introduced by the analyst. The tool will allow Oil and Gas owners and operators to reduce the immense amount of data obtained during pigging to a much less time-consuming set for flaw assessment.

Key words: In-line inspection data, Screening methodology, Pitting corrosion, Sphericity, Theory of Critical Distances, Fatigue, Fracture