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Correlation between defect depth and defect length through a reliability index when evaluating of the remaining life of steel pipeline under corrosion and crack defects.

Djamel Zelmati, Oualid GHELLOUDJ, Abdelaziz AMIRAT

Abstract: Despite the various engineering models existing for lifetime investigation of hydrocarbon steel pipelines under localized corrosion and crack defects there is still a lack of information about the correlation between the two main parameters characterizing the geometrical defect model, depth and length. So the aim of the present work is a contribution in evaluating the remaining life of the pipeline using reliability analysis in order to correlate the two parameters through one common parameter, the reliability index. As a first step, the investigation is carried out on four standard and well established engineering models; Irwin, SINTAP, ASME B31G and Modified ASME B31G methods, aiming to coordinate results given by each of the four models. The potential defect depth and length correlation through a reliability index can be used as a decision-making tool to give realistic answers for replacing and/or repairing a tube subjected to internal pressure and on which flaws of different depths and lengths have been detected from inspection of a pipeline after few years of service.

Keywords : corrosion, Defect, Reliability, Correlation, Sensitivity