**[A finite element model for estimating time-dependent reliability of a corroded pipeline elbow](https://www.emerald.com/insight/content/doi/10.1108/IJSI-02-2020-0021/full/html)**

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## Abstract

The aim of this paper is to investigate the failure probability in an irregular area in pipeline (elbow) over its lifetime. The reliability analysis is performed by using of an enhanced first-order reliability method / second-order reliability method (FORM/SORM) and Monte Carlo simulation methods: a numerical model of a corroded pipeline elbow was developed by using finite element method; also, an empirical mechanical behavior model has been proposed. A numerical case with high, moderate and low corrosion rates was conducted to calculate the deferent reliability indexes. The found results can be used in an application case for managing an irregular area in pipeline lifetime. Hence, it is necessary to ensure a rigorous inspection for this part of a pipeline to avoid human and environmental disasters.