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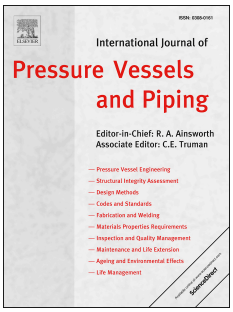

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Economic risk analysis of pitting corrosion in processing facility

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Abstract

This paper presents a predictive probabilistic model to estimate the overall economic impacts of pitting corrosion by considering both the corrosion costs and significant losses that may occur if failures occur because of pitting corrosion. The major loss categories are considered as business loss and accidental loss. Models are proposed to estimate the elements in each loss category. Corrosion prevention, monitoring, maintenance and management (CPM3) costs are considered as the main categories of corrosion costs and the probabilistic models are proposed to estimate these costs. The Monte Carlo (MC) method is used to integrate the loss and cost models and also to address the uncertainties in these models. The effect of inflation on loss values and the mitigating impact of CPM3 costs are also taken into consideration in the developed models. The application of the proposed risk model is demonstrated using a piping case study. As highlighted in the case study, the developed models help to assess corrosion economic risk, which is used for corrosion prevention and control's decision-making.

Keywords: Markov Process; probability of failure; risk assessment; consequence analysis; remaining life evaluation

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