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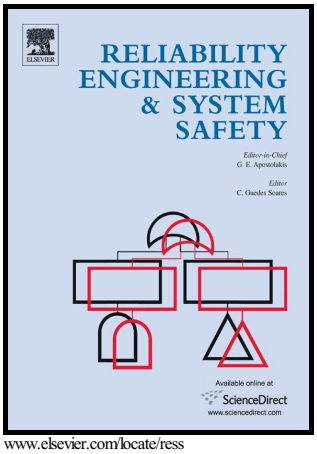

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Corrosion Induced Failure Analysis of Subsea Pipeline

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Abstract

Pipeline corrosion is one of the main causes of subsea pipeline failure. It is necessary to monitor and analyze pipeline condition to effectively predict likely failure. This paper presents an approach to analyze the observed abnormal events to assess the condition of subsea pipelines. First, it focuses on establishing a systematic corrosion failure model by Bow-Tie (BT) analysis, and subsequently the BT model is mapped into a Bayesian Network (BN) model. The BN model facilitates the modelling of interdependency of identified corrosion causes, as well as the updating of failure probabilities depending on the arrival of new information. Furthermore, an Object-Oriented Bayesian Network (OOBN) has been developed to better structure the network and to provide an efficient updating algorithm. Based on this OOBN model, probability updating and probability adaptation are performed at regular intervals to estimate the failure probabilities due to corrosion and potential consequences. This results in an interval-based condition assessment of subsea pipeline subjected to corrosion. The estimated failure probabilities would help prioritize action to prevent and control failures. Practical application of the developed model is demonstrated

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