

PROBABILITY ANALYSIS OF DAMAGES TO SUBSEA PIPELINE

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Abstract:

Pipeline failure due to various threats might contribute to a significant adverse impact on life safety, environment, and economy. In order to mitigate the severity of pipeline consequences, maintaining the integrity of the vast and aging pipeline structure is crucial. The main concern in offshore risk analysis is to deal with unpredictable and uncertain conditions. In probability theory, Bayesian network is known as a powerful tool for knowledge presentation and condition inference under uncertainty. Probability analysis of pipeline damages is necessary to prevent unwanted incidents that may cause catastrophic accidents. In this paper, a Bayesian network model was developed to identify and analyse the probability of subsea pipeline condition subjected to corrosion, third party, operational and material damages. Statistical data and experts' knowledge were integrated in addressing data limitation. Attaining the proposed network model, diagnostic analysis, mutual analysis and sensitivity analysis were performed to validate and provide a substantial amount of confidence on the outcomes of the proposed model. The analyses have demonstrated that the developed model estimation is reliable. The outcome obtained can be used to assist the decision maker to prepare preventive safety measures and allocate proper resources to significantly minimize the probability occurrence of the risk factors.

Keywords : Bayesian Network; Probability Analysis; Pipeline; Risk Assessment

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