

## Dynamic Risk Model for Offshore Decommissioning Using Bayesian Belief Network

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**Abstract :** The global oil and gas industry is beginning to witness an increase in the number of installations moving towards decommissioning. Decommissioning of offshore installations is a complex, costly and hazardous activity, making safety one of the major concerns. Among existing removal options, complete and partial removal options pose the highest risks. Therefore, a dynamic risk model of the accidents from the two options is important to assess the risks on an overall basis. In this study, a risk-based safety model is developed to conduct quantitative risk analysis (QRA) for jacket structure systems failure. Firstly, bow-tie (BT) technique is utilised to model the causal relationship between the system failure and potential accident scenarios. Subsequently, to relax the shortcomings of BT, Bayesian Belief Networks (BBNs) were established to dynamically assess associated uncertainties and conditional dependencies. The BBN is developed through a similitude mapping of the developed bow-tie. The BBN is used to update the failure probabilities of the contributing elements through diagnostic analysis, thus, providing a case-specific and realistic safety analysis method when compared to a bow-tie. This paper presents the application of dynamic safety analysis to guide the allocation of risk control measures and consequently, drive down the avoidable cost of remediation.

**Keywords :** Bayesian belief network, offshore decommissioning, dynamic safety model, quantitative risk analysis

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