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**Probabilistic Methods of Quantitative Risk Analysis: A Case Study with  
Bayesian Networks and Petri Nets Approach**

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**ABSTRACT**

Conventional risk assessment methods such as Bow Ties have been incapable of capturing the dynamic nature of a system and hence have failed to properly predict the time dependent failure of barriers. Modifications made to incorporate time dependencies in such methods have not found wide application yet. Rapidly changing physical parameters necessitate techniques capable of considering the dynamic aspects of a system throughout its lifetime. The present work is aimed at demonstrating the applicability of Bayesian Networks and Petri Nets to capture the time dependencies of systems to carry out a quantitative risk analysis. A case study is to be carried out using both Bayesian Network and Petri Nets to provide an insight into the pros and cons of using each method to model the system. This insight is to provide a starting point for the development of a model that will enable us to conduct a quantitative risk analysis considering all factors that can lead to an incident.