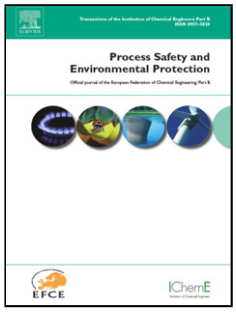

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Security Assessment of Process Facilities - Intrusion Modeling

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Highlights

- A novel intrusion model is proposed to study intrusion process
- The proposed enable intrusion probabilities for range of scenarios
- The study observe strong dependence of successful intrusion probabilities and security potentials.
- Extensive intrusion scenarios must be considered to design robust the security systems of process facilities.

Abstract: The process industry is confronted with terrorism threats. Effective security management demands the ability to defend facilities against different intrusion scenarios. This study first presented various intrusion scenarios to explain the corresponding intrusion process using graphical barriers. Subsequently, this work dynamically analyzed the successful intrusion probabilities and security potentials of barriers using a Bayesian network considering the dependency of barriers and interaction of different intrusion scenarios. It was observed that successful intrusion probabilities and security potentials are strong functions of intrusion scenarios. Therefore, extensive intrusion scenarios must be considered while assessing and designing the security systems of process facilities.

Keywords: Intrusion scenarios; Intrusion process analysis; Bayesian network model; Dependency modelling; Probability update

1 Introduction

Terrorism is increasingly becoming a pressing concern across the world. The attacks on process facilities [1-10] demonstrate that the process industry is now an attractive target for terrorists. The process industry plays an essential role in the social and economic development, and large amounts of hazardous substances are processed in process plants every day. Attacking a process plant not only results in substantial economic losses [2] but also generates severe societal impact [11]. Thus, decent security management is urgently needed to protect process plants from terrorist attacks.