

## **Use of Fault Trees for Quantitative Risk Assessment**

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### **ABSTRACT**

There are many examples in industry where accidents have occurred because of process safeguard failures. With the increasing risk of accidents and approval of ISA-S84.01 and IEC 61508, people are making extensive efforts to meet desired safety objectives.

Fault Tree Analysis (FTA) has been widely used to conduct quantitative risk assessments of processes to relate local causes and effects contributing to top events (accidents) in nuclear and utility industry. This analysis helps to determine which events contribute most to the possibility for overall process failure. However, drawbacks of this technology have limited its use in the chemical process industry. FTA is time consuming, requires a detailed understanding of the process, and is vulnerable to human error for omitting possible failure causes. Furthermore there is no standard taxonomy for collecting and reporting failure rate data, hence the quality of failure rate data in available sources is highly variable. All of these factors make FTA difficult to apply for any one analysis.

The object of this research is to design a practical and efficient Computer-aided Fault Tree Synthesis Methodology (CFTSM). This research will eventually provide a computer package that will read information contained in process Piping and Instrumentation Diagram (P&ID) and system specific information, utilize a generic database and user-defined failure modes and rates, provide automatic aids to assist engineers in generating fault trees, analyze Minimum Cut Sets (MCS) for fault trees and provide a safety report.