ABSTRACT

Investigation of major hazard accidents is required by law in all countries. It also provides essential information in order to improve a safety system. The objective of accident investigation, as seen from a safety engineer’s are to identify and describe the true course of events (what, where, when), identify the direct and root causes or contributing factors to the accident (why), and to identify risk reducing measures so that a recurrence of the accident can be prevented. There is numbers of accident investigation methods for occupational work accidents, e.g. TRIPOD, Events and Casual Factors analysis, Barrier Analysis, MORT Tree, etc. However there are a few approaches available for process analysis accidents. Most of these methods originate in process hazard and risk analysis methods.

The investigation team must often deal with incomplete data as during the accident the destruction of evidence occurs (equipment and process data). Moreover, unfortunately the most important witnesses are not available anymore. It will essentially decrease the quality and comprehensiveness of the fact-finding process.

The best strategy for dealing with these difficulties is, besides of well done collection of real evidence and facts, there is possibility to support an investigation process with use other numerous historical data and independent sources (learning process). This idea will be used in this paper and it may be considered as a road map for major accident investigation process.

This paper presents formalized logic diagram for major accident investigation process called MART tree, where the concept of MORT tree is utilized with additional application of the basic principles of the Layer of Protection Analysis concerning the accident scenario. In addition, the diagram provides an expert knowledge of the major accidents in process industry, the causes of accidents as well as a layers of protection system applied in the process industries.

The proposed MART tree supports and extends the existing methods for major accident investigation process making them quicker and more comprehensive that existing ones. The BP Texas case study illustrates the application of the method.

Key words: process industries, major accident, investigation, MORT Tree, LOPA, risk assessment, expert system,