

Application of Failure Mode and Effects Analysis (FMEA) on the Virtual Process Hazard Analysis of Acetone Production Process

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Abstract : Failure Mode and Effects Analysis (FMEA) has been used in the virtual Process Hazard Analysis (PHA) of the Acetone production process through the dehydrogenation of isopropyl alcohol, for which very limited process risk assessment has been published. In this study, the potential failure modes, effects, and possible causes of selected major equipment in the process were identified. During the virtual FMEA mock sessions, the risks in the process were evaluated and recommendations to reduce and/or mitigate the process risks were formulated. The risk was estimated using the calculated risk priority number (RPN) and was classified into four (4) levels according to their effects on acetone production. Results of this study were also used to rank the criticality of equipment in the process based on the calculated criticality rating (CR). Bow tie diagrams were also created for the critical hazard scenarios identified in the study.

Keywords : chemical process safety, failure mode and effects analysis (FMEA), process hazard analysis (PHA), process safety management (PSM)

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