

Process Hazard Analysis and Fire Safety Assessment For Chemical Tank Farm

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ABSTRACT

Objective: The objective of the paper is to identify the process hazard associated with the chemical process plant by using a process hazard analysis tool. This is required to fulfill the legal requirement for aging plant assessment by the Department of Occupational Safety and Health (DOSH) after 17 years in operation. The result of the assessment will predict the integrity level, and the individual risk to the surrounding as well as the aging management system in the company. **Method:** The methodology for the analysis is using Hazard and Operability (HAZOP) in which we covered the process hazard identification and analysis and the operability of the IPA tank operation. The basic data required are as-built drawing for the design, standard operating procedure (SOP), surrounding data, process update deviation, previous accidents related to the process as well as the integrity data such as corrosion, thickness test, and safety protection system for the tank. The assessments have been conducted with the assistance of the process owner so that all the elements in the process are included in the study. Relevant recommendations will be provided according to the current availability of the technology and based on the previous studies. **Findings:** Based on the overall HAZOP study conducted, a significant risk has been identified in the current operation of the IPA storage tank after 17 years of operation. The most critical safety issues are related to the foundation of the tank, asset integrity, corrosion and erosion, and safe operation. Based on the site observation, it is found that the foundation stability of the IPA storage tank is still intact as it was designed and showed no sign of settlement and slanting. This indicates that the foundation is still in good condition; however periodic inspection needs to be done on a yearly basis to identify any sign of settlement. In the asset integrity level in the IPA tank, NDT has been conducted to determine whether the remaining thickness is still within the design limit. As far as corrosion and erosion are concerned, based on observation there is no visible corrosion or erosion on site. Thus, proper testing should be carried out as soon as possible to confirm the issue. The safe operation of the IPA tank is up to the standard hence complying with legal requirements. **Conclusion:** In conclusion, a detailed assessment using the HAZOP study has been conducted on storage tanks particularly handling IPA. The tank has been operated for 17 years hence concerns related to aging issues are seen to be significant and worth attention by the management. The findings from the study are highly valuable to serve as input for justifying action and investment for improvement.

Keywords: Plant aging, IPA, storage tank, HAZOP study, chemical plant
