Quantitative Risk Assessment for Improvement of a Pervaporation Process for Concentrating Hydrogen Peroxide

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When a plant is designed, especially when based on a newly developed process, problems and risks that can occur should be predicted and clarified. In addition, impacts and results must be checked in gradual, systematic, and critical positions, and then necessary safety measures should be conducted. In this study, the accident rate of a pervaporation process for concentrating hydrogen peroxide is predicted by the failure frequencies of the main devices in the process and the PFD (Probability of Failure on Demand) for the IPL (Independent Protection Layer) and the SIF (Safety Instrumented Function). Then, the SIL (Safety Integrity Level) can be assessed. Based on this SIL assessment, a method to improve the safety of the process has been proposed. This study is expected to be able to contribute to a methodology for general planning to meet efficiency and safety specifications of a process at the same time.