

A Study on Determination of Safety Integrity Level by Using Fuzzy Layer of Protection Analysis

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Recently, safety management of hazardous chemical production plant has been considered as a part of plant life cycle. According to this trend, it is recommended that safety integrity level (SIL) analysis should be performed to meet both efficiency of process operation and safety specification of process at the same time. In this study, SIL analysis was conducted to improve process safety of hydroxylamine (HA) production plant, especially focused on preventing HA decomposition (two scenarios). As a method of determining demanded SIL, fuzzy layer of protection analysis (fLOPA) was used. As provided by Markowski in 2006, fLOPA can solve the problem that layer of protection (IPL) has different effects depending on particular elements of the risks, which is the difference from traditional layer of protection analysis (LOPA). After calculating total risk for each scenario, it was able to be reduced below risk criteria (10⁻⁵/year). This study can be of great help in proposing methodology of determining SIL, which is expected to be more beneficial research when considered cost-benefit analysis (CBA).