Integration Tool for HAZOP and LOPA

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Abstract

Hazard and operability (HAZOP) analysis has been the best practice for hazard identification worldwide. Layers of protection analysis (LOPA) is a semi-quantitatively analytical tool for assessing the adequacy of protection layers used to mitigate process hazards. Without performing LOPA, the HAZOP team might assume more risk reduction from the safeguards indentified in a HAZOP meeting. It might result in under-protected process risk. On the other hand, combining HAZOP and LOPA not only saves time and effort but also produces a safety integrity level (SIL) ready HAZOP. The advantages of HAZOP and LOPA integration have been widely recognized. However, the computer tool for facilitating the integration has hardly been reported. In this paper, a new intelligent software tool for assisting both HAZOP and LOPA is presented. Case based reasoning is used to prompt users with similar HAZOP and LOPA cases stored in the case base. Rules are developed for reducing human errors in determination of independent layer of protection. Main features of the tool are demonstrated through an industrial case study.