Hazard Analysis and Risk Assessments for Industrial Processes Using FMEA &Bow-Tie Methodologies

Hazard Analysis and Risk Assessments for Industrial Processes Using FMEA &Bow-Tie Methodologies

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Abstract:

Several risk assessment techniques have been presented and investigated in previous research, focusing mainly on the failure mode and effect analysis (FMEA). FMEA can be employed to determine where failures can occur within industrial systems and to assess the impact of such failures. This research proposes a novel methodology for hazard analysis and risk assessments that integrates FMEA with the bow-tie model. The proposed method has been applied and evaluated in a real industrial process, illustrating the effectiveness of the proposed method. Specifically, the bow-tie diagram of the critical equipment in the adopted plant in the case study was built. Safety critical barriers are identified and each of these is assigned to industrial process with an individual responsible. The detection rating to the failure mode and the values of risk priority number (RPN) are calculated. The analysis shows the high values of RPN are ٥٠٠ and ٤٩٠ in this process. A global corrective actions are suggested to improve the RPN measure. Further managerial insights have been provided.