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CHEMICAL ENGINEERING

CHE 512 ASSIGNMENTS

HAZOP Techniques

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QUESTION ONE

HAZOP, or hazard operability study, is a systematic way to identify possible hazards in a work process. In this approach, the process is broken down into steps, and every variation in work parameters is considered for each step, to see what could go wrong. [1]

It is a useful hazard analysis method for complex systems; it can be used to identify problems even during the early stages of project development, as well as identifying potential hazards in existing systems. HAZOP's meticulous approach is commonly used with chemical production and piping systems.

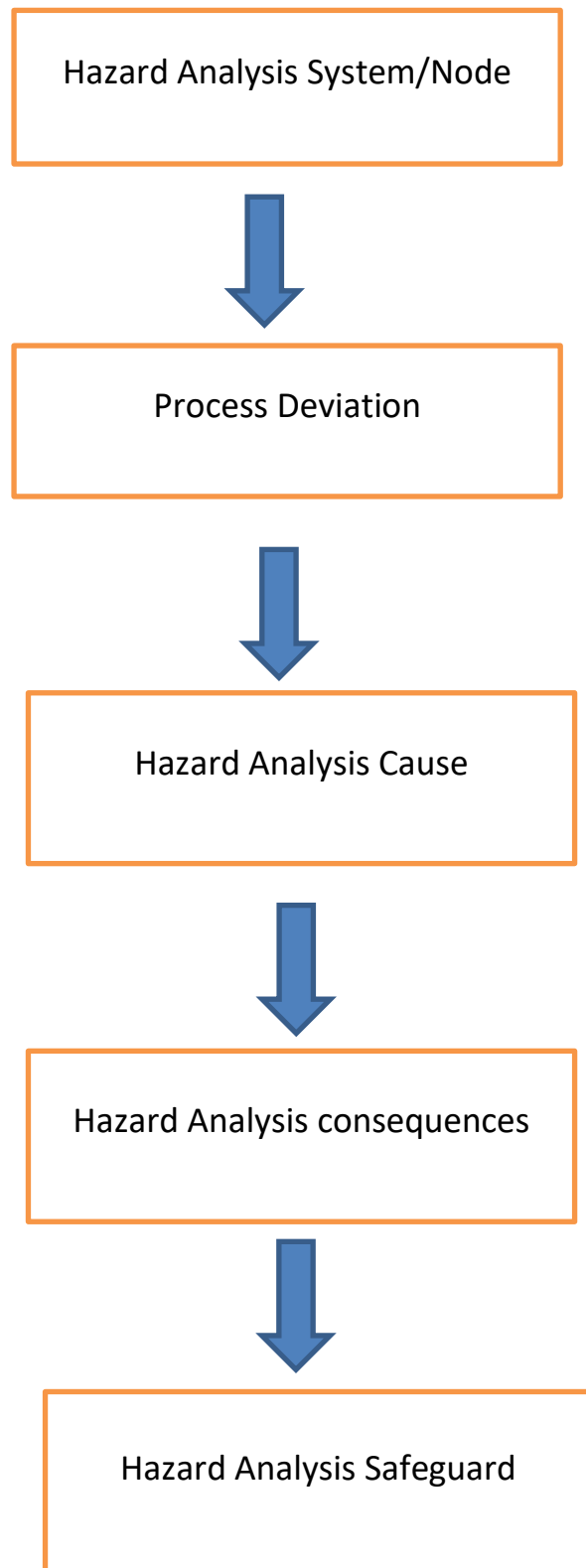
The task of analyzing hazards in a workplace or system can be daunting. However, without an effective analysis, potential hazards may not be discovered before they result in injuries and loss. The cost of an accident is often many times greater than the cost of the analysis that could have stopped it.[1]

The HAZOP process is based on the principle that a team approach to hazard analysis will identify more problems than when individuals working separately combine results. The HAZOP team is made up of individuals with varying backgrounds and expertise. The expertise is brought together during HAZOP sessions and through a collective brainstorming effort that stimulates creativity and new ideas, a thorough review of the process under consideration is made. [2]

QUESTION TWO

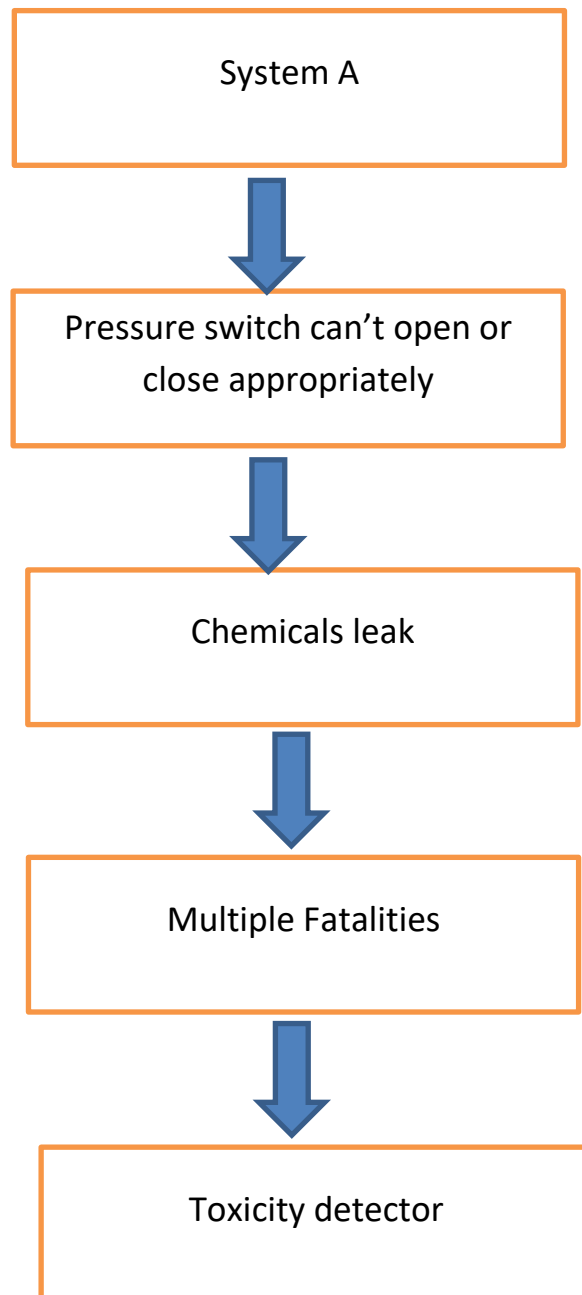
1. It provides a particular method to enhance plant safety by taking consideration of technical and organizational hazards, human errors and external influences.
2. It can be applied to a wide range of types of systems
3. HAZOP technique is a systematic and rigorous process
4. It helps to identify the qualitative solutions for functional safety assets of process control
5. Hazop technique creates a detailed and auditable record of the hazards identification process
6. The solutions of the HAZOP technique can be used to reduce the likelihood of costly and time-consuming malfunctions while increasing operational safety and availability
7. It involves interaction of views from multidisciplinary experts
8. The HAZOP results are integral elements of plant and safety records and also appropriate to plant modifications. [3],[4]

QUESTION THREE



For example,

The HAZOP analysis team of Afe Babalola University discussed a process that is controlled by System A. From the discussion, the team described the following scenario for system A: if the pressure monitor of a system fails, the pressure switch isn't triggered to open or close appropriately, causing hazardous chemicals to leak out of the connector, which will result in human injury. To prevent this occurrence, a toxicity detector is in place, which sounds an alarm when the toxicity levels within the facility reach a high risk level.[5] The hazard analysis is thus:



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- [5] “Hazards Analysis.” [Online]. Available: <https://www.ge.com/digital/documentation/meridium/Help/V43020/Default/Subsystems/HazardsAnalysis/Content/AboutDefiningComponentsHazop.htm>.