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15/ENG07/008

CHEMICAL ENGINEERING

CHE 512: LOSS PREVENTION AND INDUSTRIAL LAW

ASSIGNMENT

1. Briefly describe hazard operability technique.
   Hazard operability Technique is a systematic way to identify possible hazards in a work process. The concept involves investigating how the plant might deviate from the design intent. [1]

   HAZOP is based on the principle that several experts with different backgrounds can interact and identify more problems when working together than when working separately and combining their results. Although the HAZOP study was developed to supplement experience-based practices when a new design or technology is involved, its use has expanded to almost all phases of a plant's life.
   The task of analysing 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. It's the old proverb: "An ounce of prevention is worth a pound of cure." [2]

2. State the Significance if HAZOP Technique.
   A HAZOP Technique helps in minimising risk of injury at work and its significance is such that it could lead to some recommendations such as the under listed to curb these possibilities of injuries;

   - A review of existing protection system designs by a specialist
   - Adding or modifying alarms that warn of deviations for a device/plant.
   - Adding or modifying relief systems for equipments.

    - Adding or modifying ventilation systems
- Increasing sampling and testing frequency for processes.

3. With the aid of a block diagram, list the components of HAZOP.

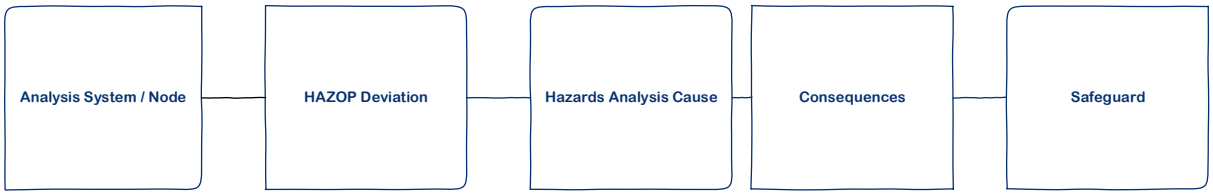

Figure 1 : Components of Hazard Operability [3]

Explaining the items outlined in the block diagram above;

- Hazards Analysis System/Node: Details on the asset, asset group, or functional location that is used to perform the process.
- HAZOP Deviation: Details about the condition that deviates from the normal behavior of that process and directly leads to a risk. This condition is referred to as a deviation or guideword. A Deviation is linked to a Cause.
- Hazards Analysis Cause: Details on what has caused the deviation, including how frequently it may occur, and the asset that is associated with it. Causes can include human error, equipment failure, or other factors.
- Hazards Analysis Consequence: Details on the negative outcome that results from the event that is defined in the Cause.
- Hazards Analysis Safeguard: Details on the safety precautions that are currently in place to prevent or lessen the impact of the negative outcome that is defined in the Consequence. Additional details about a safeguard defined in a Safeguard that is considered to be an independent layer of protection. Not all safeguards are independent layers of protection.

In addition to the records above, the HAZOP Analysis team creates two Risk Assessments, where:

- One is linked to the Consequence to store the unmitigated risk value associated with the scenario *without* a safeguard in place. In other words, the team will define the risk value that is associated with that scenario *without* the toxicity detector.

- One is linked to the Safeguard to store the mitigated risk rank value of the scenario *with* that safeguard in place. In other words, the team will define the risk value associated with a scenario when the toxicity detector is in place.

Once all the safeguards that are available have been applied, the team determines if additional risk mitigation is required to meet tolerable level of risk. If the risk is to be mitigated further, then the team proposes one or more recommendations to reduce the risk to tolerable limits.

A Recommendation created in a Hazards Analysis is called a strategic recommendation. It can be leveraged within a strategy to define Action as that will mitigate the risk further.

REFERENCES

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- Graphic Products Staff, "What is HAZOP," [Online]. Available: https://www.graphicproducts.com/articles/what-is-hazop/
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