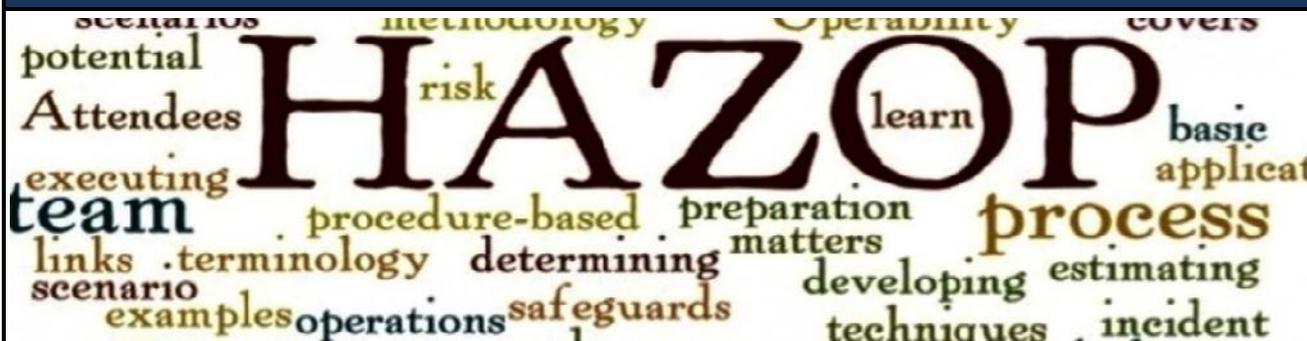


## HAZOP: A Preliminary Tool For PHA



HAZOP is the most familiar method of hazards identification acknowledged worldwide. Although hazard identification is the main focus, operability problems should be identified to the extent that they have the potential to lead to process hazards, result in an environmental violation or have a negative impact on profitability.

The technique has been developed from its origins in process plants to many other types of complex system. HAZOP is used to identify:

- Hazards (ways the system can fail leading to injury or damage)
- Operability (ways in which the system can fail to perform)

Following are the brief description of various terms used in HAZOP study.

Term used in HAZOP study	Description
Leader/Chairman	The HAZOP member who leads the discussion using parameter-guidewords.
Recorder/Scribe	The HAZOP member who keeps a record of the discussions.
P & ID	Process and Instrumentation Diagram
Design Intent	This defines how the plant is expected to operate in the absence of deviations at the study nodes.
Node	The segment of P & ID at which the process parameters are investigated for deviations.
Guideword	Guide words are simple words which are used to qualify or quantify the intention in order to guide and stimulate the brainstorming process and so discover deviations. Some examples of guidewords are: No, Reverse, Less, Also, High, Other than, More, etc.
Parameter	A physical property of a component of the process. For Ex. Temperature, Pressure, flow, level, concentration.
Deviation	The word or phrase expressing a deviation of a parameter from design intent. It is a combination of guideword and parameter. For example, High Temp., Low Pressure, Reverse Flow.
Causes	These are the reasons why deviations might occur. These causes can be hardware failures, human errors, an unanticipated process state (e.g., change of composition), external disruptions (e.g., loss of power), etc.
Consequence	Unwanted process conditions OR events of damage to persons, property or environment.

Safeguards	Existing controls and means of risk reduction.
Recommendations	A mitigation measure the HAZOP team agrees to suggest an improvement aimed at improving safety or plant performance

**HOW HAZOP STUDY IS CARRIED OUT?**

**HAZOP TEAM**

The HAZOP study is a team activity. This is important because when working as a team, more problems can be identified than when individuals working separately combine results. HAZOP team might include:

- Design engineer
- Process engineer
- Operations supervisor
- Instrument engineer
- Chemist
- Maintenance Engineer
- R & D representative
- Safety engineer

**HAZOP PROCESS**

The HAZOP team focuses on specific portions of the process called “nodes”. Generally these are identified from the P&ID of the process before the study begins. A process parameter is identified, say flow, and an intention is created for the node under consideration. Then a series of guidewords is combined with the parameter “flow” to create a deviation.

For example, the guideword “no” is combined with the parameter flow to give the deviation “no flow”. The team then focuses on listing all the credible causes of a “no flow” deviation beginning with the cause that can result in the worst possible consequence the team can think of at the time. Once the causes are recorded the team lists the consequences, safeguards and any recommendations deemed appropriate.

The process is repeated for the next deviation and so on until completion of the node. The team moves on to the next node and repeats the process.

**Deriving Recommendations (Closure)**

Recommendations are made when the safeguards for a given hazard scenario, as judged by an assessment of the risk of the scenario, are inadequate to protect against the hazard. Action Items are those recommendations for whom an individual or department has been assigned.

The following guidelines are suggested for the implementation of recommendations:

- High priority action items should be resolved within 4 months
- Medium priority action items should be resolved within 4-6 months, and
- Lower priority action items should be resolved following medium priority items.

Recommendations include design, operating or maintenance changes that reduce or eliminate Deviations, Causes and/or Consequences.

**Action Party**

To avoid misunderstanding, action party should be specified for each recommendation derived during the HAZOP session.

*Bringing to you the "Act-Now" solutions of process safety...*

**An Initiative by:**

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