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HAZOP, Celebrating 60th Birthday

Adhere to fundamentals

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Agenda

1. Introduction
2. History
3. Observations
4. Remediation
5. Q&A

1. Introduction

- Ton Jansen, Senior Principal Specialist Safety Engineering @Worley The Hague
- HAZOP Facilitator since 2004
- Predominantly Project Hazops and 3rd Party Hazops
- Stopt counting # Hazops performed
- This presentation is based on experience from various projects/Hazop leaders within Worley Netherlands

1. Introduction

Personal Professional Goal:

Perform a HAZOP without any action before my retirement

2. History

- Developed by ICI and first used in 1963
- Celebrating the 60th birthday this year
- Widely accepted in the industry as the method for screening designs regarding HAZards and OPerational issues
- Formulate recommendations to improve the design to avoid unacceptable consequences

Are we still adhering to the fundamental principles of the method?

HAZOP Essentials

Hazard and Operability

Planning
- P&ID Review
- Required input documentation
- Session (Prior P&IDs Issue for Design)
- HAZOP Report
- Close of actions

Terms of Reference

Matured and reviewed Process design
- Process Description & PFD's
- Physical Data Process & Utility streams
- P&ID's (issued for HAZOP)
- Equipment & line information (operating & design data)
- Safeguardings
- Cause and effect Diagram or description

Team Composition

Selection of team (Mandatory & optional participants)
Competence and Experience

Required Mandatory participants present
Keep team engaged/ breaks

Issue actions ASAP
Assign priorities (per phase)
Traceable record of closure.
Counterpart acceptance of actions
Disciplines are responsible for timely closure

Design changes to be monitored
Changes to be HAZOPed

3. Observations

Principles:

- Divide the design in Nodes ✓
- Apply Parameters and Guidewords ✓
- Go systemically through the design ✓
- The design is assumed to be Mature, Reviewed, Safe and Operable?

3. Observations

The design is assumed to be safe and operable

- Maturity of the designs presented in HAZOP decreases gradually

Why?

- More schedule driven projects
- Reduced engineering time
- HAZOP dates fixed at project start
- Need to find (big) issues that might impact TIC estimates; De-risking of the project prior to moving ahead

3. Observations

Resulting in:

- Potential issues in the design not addressed but transferred to HAZOP
  “Let’s move on”, “Let HAZOP team decide if we need…..”
- HAZOP not longer a review confirming a SAFE and OPERABLE design, more an extended P&ID Review and tool to minimize financial risks
- Unclear answers in HAZOP regarding causes, consequences and function/independency of safeguards
- Extra HAZOP recommendations required to sort out the issue

3. Observation

50% of HAZOP recommendations **is avoidable !**

4. Remediation

How to achieve:

“Do not HAZOP before you are ready!”

- Learn/Train engineers to design with the HAZOP in their mind
- When schedule floats backwards > HAZOP floats along with it
- In-depth (physical) P&ID review 6-4 wks before HAZOP
- **All** documents used in HAZOP shall have an Issue For HAZOP status
- Rigorously apply a HAZOP Readiness Procedure (by facilitator or other independent engineer) to verify the state of the HAZOP documentation
  - Fail, HAZOP to be delayed

4. Remediation

Resulting in:

Earlier identifying (before the HAZOP) Hazards & Risks

More efficient HAZOP

Less effort to close actions

Lower stress levels on projects

Higher quality achieved at end of project


Q&A


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