

 Vysus Group

in partnership with

 KAIRÓS®

HAZOP Assistant

Digitised process knowledge

Vysus Group and Kairos have teamed up to deliver complete quality HAZOPS. The combination between Vysus Group's proven expertise within risk analysis and Kairos innovative new technology is truly a game-changer.



WHAT IS A HAZOP?

A HAZOP (hazard and operability study) is a structured and systematic examination of a process to identify problems that may be a risk to personnel or to equipment. The current method is qualitative, where multi-disciplinary teams identify potential hazards, root causes, consequences, and how our model can mitigate the outcomes. In this way, the risks can be accurately identified using predetermined criteria.



HOW IT WORKS

The HAZOP Assistant combines deterministic modelling (MFM) of the plant, with deviation propagation analysis and artificial intelligence. The process knowledge is modelled based on plant design and enhanced with real world experience. The system identifies the root cause and consequences and categorises based on observations and risk. HAZOP worksheets are pre-populated directly from the tool.

The model may be re-used by the control room assistant for real-time decision support in the control room.



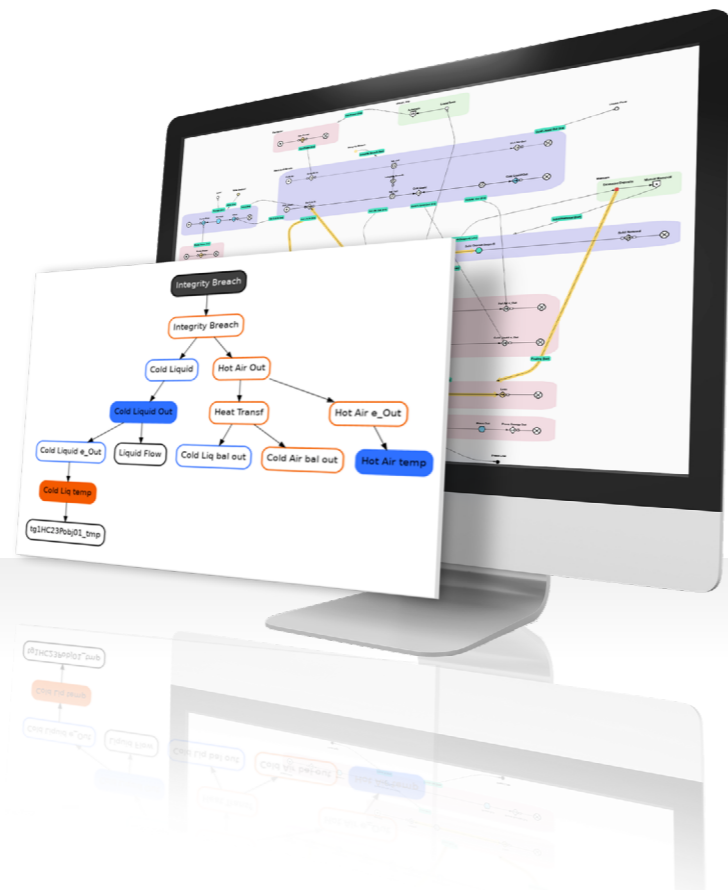


The Challenge

The HAZOP has proven useful and is the industry's best practice to mitigate hazard risks. There are a number of challenges with the way HAZOPs and re-HAZOPs are currently carried out. They are heavily dependent on the individuals in the cross-functional team, specifically their expertise and availability. A typical medium sized chemical plant may have 1200 items to be considered and needs as many as 40 meetings to complete the HAZOP. Maintaining focus and consistency during all these meetings can be an issue. Complexity is handled by splitting the process into "nodes", which may introduce challenges with hazards spanning multiple nodes.

Our Solution

Our solution digitises the process knowledge and includes the physical model, combined with the team's experience, makes this available to the HAZOP team. The guide words (such as high pressure, high level, and so on) are automatically inserted as hypothetical errors into our model. The result is a pre-populated HAZOP worksheet, where possible causes, consequences, and recommended mitigations are indicated. This populated worksheet is then used as a baseline for HAZOP meetings, which focuses on the areas requiring attention. The results may be displayed on a global level where signals across nodes are handled.



User Interface

Kairos HAZOP simulator is a cloud-based application with an extensive set of libraries for process equipment, is used to digitise the process knowledge.

Output formats

P&ID View

This view will overlay process equipment such as sensors and valves from the model. Guide words may be selected, and the corresponding root causes and consequences will be highlighted on the drawing, along with links to the next P&ID if the equipment is not in the current drawing.

HAZOP Worksheet

The automatic HAZOP worksheet will be generated based on applying all guide words and calculating root causes and consequences. The results are shown in the HAZOP worksheet.

Causal mode map

One output from the model is a causal mode map. This map identifies all root causes and shows the graph which illustrates the instrumentation through to a consequence.

Safeguard map

This graph shows the patterns of sensors or safeguards that represent the actual root cause or consequence. This is useful to understand the detectability and manageability of the root cause.

Benefits

- Capture and re-use knowledge
- HAZOP models are fully compatible with Kairos Control Room Assistant
- Updated HAZOP documentation
- Leverage learnings from incidents
- Increase the quality of HAZOP
- Reduce the time to re-HAZOP



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