

WHySE Compass Landmark 1

HAZOP - Hazard and Operability Study



Monkey and the Cough Syrup

Monkey came out onto the veranda, completely flustered.

“Dog!” Dog looked up from his H₂ terrain map. “Yes?” Monkey held up a piece of paper. It said: HAZOP. Dog nodded. “And?”

“At first I thought it was cough syrup.”

Dog laughed heartily. “I can see why.” Monkey sat down. “Is it a problem if I don’t know what HAZOP is yet?” Dog shook his head. “The only problem is when everyone acts as if it’s obvious.” Monkey looked at him. “So will you explain it to me?” Dog placed the compass on the table. “That’s exactly what this landmark is for.”

What does HAZOP mean?

HAZOP stands for **Hazard and Operability Study**.

You could say: **A HAZOP is a structured analysis of hazards and operational issues in a plant or process.**

Dog took Monkey's note and turned it over. “HAZOP doesn’t just ask: ‘What should happen?’” He wrote underneath: ‘What happens if something goes differently to plan?’

Monkey nodded slowly. "So, a safety check?" "More like a very structured discussion," said Dog. "With a method, documentation and measures."

In a HAZOP, a team of experts examines a process. Section by section. They consider possible deviations from the intended operation and ask:

What could go differently from plan?

Why might that happen?

What would the consequences be?

What protective measures are already in place?

What additional safeguards do we need?

Dog tapped the piece of paper. "So a HAZOP isn't just a gut feeling. It's a method."

Monkey looked at the compass. "And is there a standard for that?" "Yes," said Dog. "The method is described in IEC 61882."

Why do you carry out a HAZOP?

Monkey leaned back. "And why is everyone talking about it in H₂ projects?" Dog pointed to the H₂ terrain map. "Because you want to understand risks before they arise during operation."

A HAZOP helps to identify potential hazards. For example, deviations in pressure, temperature, flow rate, composition or operation.

It also helps to learn from previous incidents. If something has been critical in the past, this knowledge should be incorporated into the next assessment.

Monkey looked at her notes. "So you also look at human failure?" "Yes," said Dog. "People are part of the system. Operation, maintenance, clear instructions – all of that plays a role."

A HAZOP also examines existing control and protective measures.

Are they sufficient?

Are there any gaps?

What happens if a control fails?

Dog paused briefly. "And then comes the important part." "Which one?" "You record the consequences."

Because a HAZOP doesn't end with the realisation:

Something could happen here.

It documents safety-relevant aspects and sets out preventive measures.

In this way, it helps to make operations safer - not just on paper, but in the plant's day-to-day operations later on.

What basis does a HAZOP require?

Monkey reached for a pen. "Then I'll write a list of the documents now." Dog placed his paw on the piece of paper. "Slow down." Monkey looked at him. "No list?" "Not a general one." "Why?" "Because the right documents depend on the plant. And on the location. And on the project stage."

A HAZOP needs a solid foundation.

All relevant documents must be available or provided.

Exactly which ones depends on the specific plant, its location, the applicable requirements and the project phase.

A water electrolysis plant raises different questions to a storage facility.

A compressor station raises different questions to a refuelling station.

A project in an early planning phase requires different documentation to a plant about to go into operation.

Dog looked at Monkey. "The simple rule is: anything relevant to assessing the deviations needs to be on the table." Monkey nodded. "Otherwise, you're groping in the dark." "Exactly."

Who belongs at the table?

Monkey looked back at her notes. "And who sits at the table during a HAZOP?" Dog replied: "The people who understand the process, the technology, operations and safety. And those responsible for HSE." Monkey looked up. "HSE?" Dog smiled. "Another one of those terms." "A landmark?" "Perhaps later." Dog wrote it down slowly:

HSE stands for **Health, Safety, Environment**.

"It refers to the people responsible for occupational health and safety, safety and environmental protection." Monkey nodded. "So not just technical people." "Exactly," said Dog. "A HAZOP is most effective when the right people in charge work together."

He pointed to the card. "Depending on the plant, these can be different roles. Engineering. Operations. Safety. HSE. And sometimes someone who keeps a particularly close eye on standards, evidence or documentation. Rooster would be one such example." Monkey grinned. "So HSE stays on the list of possible landmarks?" "Yes," said Dog. "For today, we'll stick with HAZOP."

What is documented?

Monkey looked at the piece of paper. "And what's left at the end of a HAZOP like this?" Dog tapped the card. "More than just a good discussion."

During a HAZOP, safety-related aspects are systematically recorded.

These include the deviations considered, possible causes, possible consequences, existing protective measures and additional countermeasures that have been defined.

It's also crucial to determine who is responsible for the measures and how their implementation is monitored.

Monkey nodded slowly. "So it's not just: 'We've talked about it.'" "Exactly," said Dog. "But rather: 'We've identified it, recorded it and turned it into an action point.'" Monkey looked at the H₂ Terrain map. "So HAZOP is actually a way of turning uncertainty into clarity." Dog smiled. "That's well put."

What HAZOP is not

Monkey picked up the piece of paper again. "So is HAZOP the solution to every safety problem, then?" Dog shook his head. "HAZOP is a powerful tool. It's not a magic wand."

A HAZOP is no substitute for planning.

It is no substitute for technical design.

It is no substitute for accountability within the project.

And it is no substitute for implementation in accordance with standards by a qualified team.

It helps to systematically identify hazards and operational issues.

The value lies in taking the results seriously.

That is, where preventive measures are documented, responsibilities are clarified and outstanding issues are followed up.

Monkey looked at the compass. "So the method is only as good as what happens afterwards." Dog nodded. "Exactly."

The plain-language translation

Dog picked up the piece of paper with 'HAZOP' written on it once more. "When someone says 'HAZOP', at first it sounds like technical jargon." Monkey nodded. "Or like cough syrup." Dog smiled. "In plain language, it means: we take a systematic look at a plant and ask what could go differently from plan - and what would happen then."

Monkey thought for a moment. "That actually makes quite a lot of sense." "Yes," said Dog. "Good methods sometimes sound more complicated than they are." Then Dog wrote a sentence on the card:

When someone says HAZOP, they mean: We're now going to check thoroughly whether the whole thing's going to blow up in our faces - before it does.

Monkey read the sentence twice. "I'll remember that." "That was the plan."

The one-sentence reminder

If you only want to remember one sentence:

HAZOP is the method we use to check whether the whole thing's going to blow up in our faces - before it does.

Sources and references

The HAZOP method is described in **IEC 61882**. The standard treats Hazard and Operability Studies as a structured method for investigating hazards and operational problems in systems and processes.

Which other standards, technical documents, approval documents and regulations are relevant to a specific HAZOP depends on the plant, the location, the project phase and the regulatory environment.

This guide therefore does not list them individually.

For a specific HAZOP, all relevant documents must be available or provided. Which documents are relevant depends on the plant, its location and the purpose of the assessment.

Source:

IEC 61882: Hazard and operability studies (HAZOP studies).

Note:

This guide describes HAZOP in general terms. It is not a substitute for a project-specific safety assessment or for the standard-compliant conduct of a HAZOP study by a qualified team.