



HAZOP & LOPA Leadership

Explore risks,
identify problems,
find solutions.



WE ENABLE A REAL SAFETY

DEKRA Process Safety

Expertise, People, Global presence

The width and depth of expertise in process safety makes us globally recognised specialists and trusted advisors.

We help our customers to **understand and evaluate their risks**, and work together to develop pragmatic solutions. Our value-adding and practical approach integrates specialist process safety management, engineering and testing. We seek to educate and grow customer's competences to provide sustainable performance improvement. Partnering with our customers we combine technical expertise with a passion for life preservation, risk reduction and asset protection.

We are a service unit of DEKRA, a global leader in safety since 1925 with over 44.000 employees in 60 countries. As a part of the world's leading expert organisation DEKRA, we are the **global partner for a safe world**.

Why using HAZOP

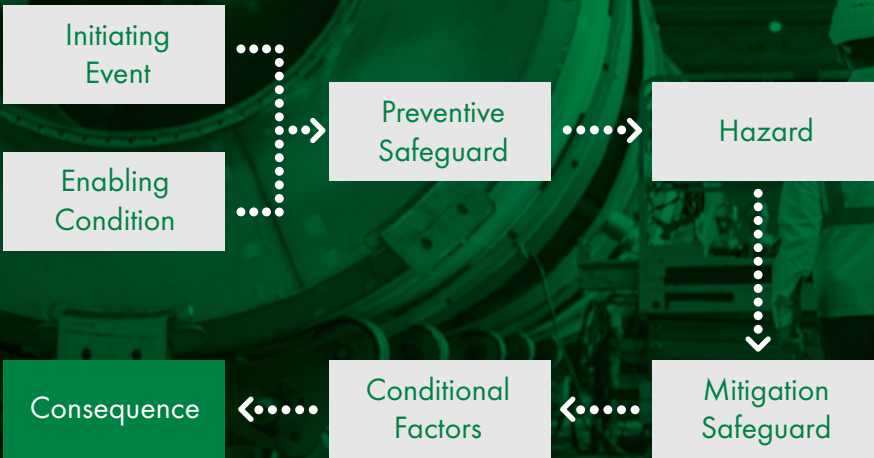
Identify and analyze risks

The Hazard and Operability (HAZOP) analysis methodology is a systematic team-based Process Hazards Analysis (PHA) technique that can be used to effectively identify and analyze the risks of potentially hazardous process operations.

The HAZOP methodology is the **most widely used PHA technique** in the chemical, pharmaceutical, oil & gas and nuclear industries worldwide. It is used during the design stages of a new process or project, for major process modifications and for periodic review of existing operations.

The U.S. Occupational Safety and Health Administration (OSHA) recognizes the HAZOP technique as an acceptable methodology for conducting PHA's of processes covered by the Industrial services OSHA Process Safety Management (PSM) standard (Title 29, CFR Part 1910.119). Other regulators around the world also accept the HAZOP methodology as appropriate for analyzing the existing and potential hazards of a complex process that involves a highly hazardous substance.

The quality of a HAZOP-based PHA is influenced by the ability of the HAZOP Leader to ask the appropriate questions to ensure the team identifies all the hazards of the process being studied, not just the most obvious hazards. This ability is based on the Leader's experience, both with the HAZOP technique and the chemical processes.



Our Approach

Prevent and mitigate

Our approach is to **use a semi-quantitative HAZOP** that somehow incorporates Layers of Protection Analysis (LOPA) to assess the reliability and number of risk reduction measures (safeguards).

Our emphasis is to prevent the release of hazardous materials followed by mitigation of the consequences should a release occur.

Consequences assessment

>>> A review of the available Process Safety Information (PSI) and identification of missing PSI required, identifying all process hazards. PSI includes, among others:

- hazardous materials properties
- process operation, including procedures
- process & instrumentation drawings (P&IDs)
- equipment design specifications
- pressure relief systems specifications

➤➤➤ A review of the Risk Ranking Methodology that will be used, including failure frequencies, conditional probabilities, and Safeguard Probability of Failure on Demand (PFD). Consequences can be further evaluated using our expertise in consequence modelling with specialist software such as Phast® and Effects®.

Risk Ranking and Risk Reduction

Once the consequences are evaluated, a risk ranking is performed to determine what safeguards are required to reduce the likelihood to a level that is acceptable to the operating company. Examples of safe-guards include both engineered devices, such as safety instrumented functions (SIFs, or “interlocks”), and administrative controls such as alarms and procedures.

Recommendations can also include further evaluation of the SIFs using ISA 84.01 and IEC 61508/11 standards for conducting Safety Integrity Level (SIL) assessments using, preferably, LOPA.

The LOPA methodology involves the analysis of separate initiating event frequencies and known reliabilities, including documented failure frequencies, probability of Failure on Demand of a processes existing safe-guards and then comparing them to risk tolerance criteria that have been established by the operating company.

After the team-based HAZOP or LOPA sessions are concluded, a comprehensive study report can be prepared as a record of the completed analysis, including the potential risks of a process with existing safeguards and recommendations for additional safeguards.



Our Experience, Our Tools and Strengths

Unrivalled capability on the market

Our large team of HAZOP leaders have facilitated hundreds of HAZOP-based PHA's worldwide, in all sectors of the process industry. Our leaders are chemical engineers with a **strong chemical process knowledge** complemented by an expertise in process safety.

We can facilitate HAZOP, or more largely any PHA, in a large variety of languages: English, Spanish, French, German, Portuguese, Italian, Arabic, Hindi, etc.

Our wide local presence also ensures intimate knowledge of local codes, standards and cultures.



Combined with our **specific knowledge of process safety** engineering and process safety data, this provides a capability unrivalled in our market. Although we can offer the classical HAZOP leader and secretary facilitation if required, we tend to lead HAZOPs using dedicated software to minimize the costs of the study, simplify reporting and focus on the process safety risks. The software also facilitates the tracking and action allocation.

Through our **Process Safety Academy**, we also train and qualify large numbers of internal HAZOP & LOPA leaders of process industry companies worldwide, using their internal corporate guidelines if required. We also deliver HAZOP/PHA Leadership training courses at various locations worldwide in local language.



**PREVENT YOUR RISK,
EMPOWER YOUR BUSINESS.**

Less incidents. Fewer injuries. Saved lives.
Expertise | Team | Global Presence

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