



Datasheet
HAZOP & LOPA
Leadership

DEKRA provides expert Hazard and Operability (HAZOP) and Layers of Protection Analysis (LOPA) leadership services to the process industries worldwide.

Why Using HAZOP?

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 analyse 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) recognise 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 analysing the existing and potential hazards of a complex process that involves a highly hazardous substance.

In practice, 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 process being analysed.

Our Approach

Our approach is to use a semi-quantitative HAZOP that 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

- A review of the available Process Safety Information (PSI) and identification of missing PSI required, identifying all process hazards. PSI includes, amongst 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®.

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 safeguards 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 analysing separate initiating event frequencies and known reliabilities, including documented failure frequencies; probability of Failure on Demand of a process existing safeguards 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 to serve as a record of the completed analysis, including of the potential risks of a process with existing safeguards and recommendations for additional safeguards.

Our Experience, Our Tools and Strengths

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 generally former process engineers with a strong chemical industry background complemented by an expertise in process safety. CVs are available on request.

We can facilitate HAZOP, or more largely any PHA, in a large variety of languages: English, Spanish, French, German, Portuguese, Italian, Arabic, Hindi... Our wide local presence also ensures intimate knowledge of local codes, standards and cultures. Combined with our intimate 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 minimise the costs of the study, simplify reporting and focus on the process safety risks. The software also facilitates ease of 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 open courses at various locations worldwide in local language.



Our References

- **Oil & Gas**
Exxon Mobil, Shell, Repsol, Total, Conoco Phillips, Reliance, Maersk, BP, Amerada Hess, NPCC
- **Energy**
GDF-Suez, Eon, EDF, Alstom, Scottish Southern Power
- **Chemistry**
BASF, Bayer, Ineos, Dupont, Arkema, PPG, Clariant, Chemtura, Huber Corp., SNF, United Phosphorus, Solvay, Arizona Chemicals
- **Pharmaceuticals**
GSK, Teva, Merck, Roche, BMS, Sanofi, Boehringer-Ingelheim, Covidien, J&J, Pfizer, Merck, UCB Pharma, Astellas, Dr Reddy
- **Cosmetics & Household**
L'Oreal, P&G, Diversey, Reckitt Benckiser, Henkel
- **Food industry**
Unilever, Cargill, IFF, Conagra, Kraft, Nestle, Pepsico, Sensient, Firmenich, British Sugar, Premier Foods...
- **Engineering & Procurement**
Foster-Wheeler, Saipem, Technip, SNC Lavalin, Bechtel, Tecnimont, Tetrapak, Bocard...
- **Other sectors**
Siemens, Areva, BMW, ABB, EADS, TATA, Vedanta, BHP Billiton, Lafarge, Danieli, Imperial Tobacco

DEKRA Organisational & Process Safety Contact

DEKRA Organisational and Process Safety are a behavioural change and process safety consultancy company. Working in collaboration with our clients, our approach is to assess the process safety and influence the safety culture with the aim of making a difference.

In terms of behavioural change, we deliver the skills, methods, and motivation to change leadership attitudes, behaviours, and decision-making among employees. Supporting our clients in creating a culture of care and measurable sustainable improvement of safety outcomes is our goal.

The breadth and depth of expertise in process safety makes us globally recognised specialists and trusted advisors. We help our clients understand and evaluate their risks, and we work together to develop pragmatic solutions. Our value-adding and practical approach integrate specialist process safety management, engineering, and testing. We seek to educate and grow client competence in order to provide sustainable performance improvement. Partnering with our clients, we combine technical expertise with a passion for life preservation, harm reduction and asset protection.

We are a service unit of DEKRA SE, a global leader in safety since 1925 with over 48,000 employees in 60 countries and five continents. As a part of the world's leading expert organisation DEKRA, we are the global partner for a safe world.

We have offices throughout North America, Europe, and Asia.

For more information visit
www.dekra-uk.co.uk

Would you like more information?

Contact