BLACKBIRD FOR TRAINING

Plant Hazard Identification and Risk Assessment: HAZOP

16 – 20 November 2026
Casablanca (Morocco)

UK Traininig
PARTNER



Plant Hazard Identification and Risk Assessment: HAZOP

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Plant hazard identification and risk assessment is the structured search for ways a process or machine can cause harm, followed by an estimate of how likely and how severe that harm would be. This one-week course is for engineers and supervisors who must apply HAZOP, FMEA and fault tree analysis to one plant system, and it ends with a completed risk assessment file for that system.

Introduction

The course is built on three standards. IEC 61882 is the application guide for hazard and operability studies, the HAZOP method of applying guidewords to design intent. IEC 60812 describes failure mode and effects analysis, which examines how each component can fail. IEC 61511 sets requirements for safety instrumented systems in the process industry, including safety integrity levels. The level is practitioner. Rather than a broad safety management survey, the one week concentrate on the core techniques an engineer uses, practised through worked examples from a chemical unit and a packaging line.

Course Objectives

- Define hazard, risk and tolerability and apply the ALARP principle to a plant decision.
- Apply the HAZOP method to a process node and record deviations, causes, safeguards and actions.
- Distinguish FMEA from HAZOP and select the technique that suits equipment or process questions.
- Compare fault tree and event tree analysis and build a simple fault tree with minimal cut sets.
- Interpret safety integrity level targets for a safety instrumented function.
- Justify recommended risk controls to management using ranked risk and consequence results.

Target Audience

- Process and chemical engineers who decide whether an existing safeguard is adequate for a deviation.
- Maintenance and reliability engineers who judge which equipment failures deserve design or inspection changes.
- Plant supervisors and shift leads who decide when a task needs a formal risk assessment.
- Health and safety advisers who choose the right technique for a hazard study.
- Instrumentation and control engineers who decide what integrity level a protective function needs.



Course Outline

Day 1: Hazards, Risk and Tolerability

- Hazard vs Risk: Source of Harm Against Likelihood and Severity Combined
- Major Accident Case Studies: Lessons From Chemical and Manufacturing Plant Disasters
- Risk Tolerability Criteria: ALARP Region, Individual Risk and Societal Risk
- Safety Lifecycle: Stages From Concept and Design to Decommissioning of Systems
- Safety Technology Overview: Detection, Shutdown, Relief and Containment Systems Described

Day 2: Hazard Identification Techniques

- What-If vs Checklist Review: Open Questioning Against Structured Prompts for Hazards
- HAZOP Method per IEC 61882: Nodes, Guidewords, Deviations, Causes and Safeguards
- HAZOP Team and Worksheet: Roles, Session Discipline and Recording Actions
- Task-Based vs Equipment-Based Risk Assessment: Activity Steps Against Asset Failure
- Process Safety Hazard Sources: Typical Chemical and Manufacturing Plant Hazards Compared

Day 3: Failure Modes, Machinery and Human Factors

- FMEA per IEC 60812: Failure Modes, Effects, Severity and Detection Ratings
- FMEA vs HAZOP: Component-Level Focus Against Process Deviation Focus Compared
- Machinery Hazards: Guarding, Interlocks and Safe Systems of Work for Equipment
- Human Factors Analysis: Error Types, Task Design and Error Reduction Measures
- IT and Control System Risks: Cyber and Software Failures Affecting Plant Safety

Day 4: Reliability, Fault Trees and SIL

- Fault Tree vs Event Tree Analysis: Causes Traced Upward Against Outcomes Branching Forward
- Failure Types and Causes: Random, Systematic and Common-Cause Failures Explained
- Fault Tree Construction: AND and OR Gates, Minimal Cut Sets and Probability
- IEC 61511 Safety Integrity Levels: Risk Reduction Required From Safety Instrumented Functions
- Protective System Reliability: Proof Testing, Maintenance Rules and Failure Prevention

Day 5: Consequence Analysis and the Plant Risk Assessment

- Pool Fire vs Jet Fire vs BLEVE: Fire and Explosion Types Compared
- Toxic Release and Dispersion Modelling: Software Estimates of Hazard Zones
- Quantitative Risk Assessment: Combining Frequencies and Consequences Into Risk Figures
- Risk Control Advice to Management: Ranking Measures by Risk Reduction and Cost
- Plant System Risk Assessment File: HAZOP, FMEA, Fault Tree and Risk Ranking Completed



Skills You Will Gain

- HAZOP guideword application
- FMEA severity and detection rating
- Fault tree cut set analysis
- ALARP judgement
- Safety integrity level targeting
- Consequence estimation
- Risk ranking

Why Attend This Course

- From relying on experience alone to applying a recognised technique to each hazard question.
- From listing hazards without priority to ranking them by likelihood, severity and existing safeguards.
- From vague requests for more safety equipment to costed control recommendations management can approve.
- From scattered study notes to a plant system risk assessment file with HAZOP, FMEA, fault tree and risk ranking.

Conclusion

Assessing plant risk means asking systematically what can go wrong, how often and with what result, then deciding whether existing protection is enough. The course separates hazard from risk, component failures from process deviations, and cause-based fault trees from outcome-based event trees. It suits engineers and supervisors who need to run or contribute to hazard studies on a specific system within one week, rather than an extended safety management course.

Course FAQs

What is plant hazard identification and risk assessment?

It is the systematic search for ways a process or machine could cause harm, followed by estimating how likely and severe each outcome is and deciding whether current safeguards reduce risk enough.

What is the difference between HAZOP and FMEA in plant risk assessment?

HAZOP applies guidewords to process design intent to find deviations such as high pressure or no flow. FMEA starts from individual components and asks how each can fail and with what effect.

Which standards does a plant hazard identification and risk assessment course follow?

It follows IEC 61882 for HAZOP, IEC 60812 for FMEA and IEC 61511 for safety instrumented systems and safety integrity levels.



Is a plant hazard identification and risk assessment course right for a maintenance engineer?

Yes, for a maintenance engineer who must judge which equipment failures matter most, take part in HAZOP sessions and plan proof testing of protective systems.

What does a delegate produce in a plant hazard identification and risk assessment course?

Each delegate completes a risk assessment file for one plant system containing a HAZOP worksheet, an FMEA table, a fault tree and a ranked list of recommended controls.

