Technical Safety Engineering and Risk Control Training Course

15 – 19 March 2027
Singapore

AGILE LEADERS
Training Center

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Ref: 1401_203501 **Date:** 15 – 19 March 2027 **Location:** Singapore **Fees:** 5700 Euro

Overview

Technical Safety Engineering and Risk Control Training Course is a one-week advanced course for technical-safety engineers, process teams, project functions, operations leaders, assurance specialists, and risk professionals who leave with a Technical Safety Assurance File. Participants connect hazard identification, HAZOP, bow-tie analysis, inherently safer design, layers of protection, safety-critical elements, functional-safety interfaces, performance standards, verification, and change control. The course addresses fragmented studies and unverified safeguards. Agile Leaders Training Center frames technical safety engineering as lifecycle evidence for risk reduction.

Who Should Attend

- Functions responsible for technical and process safety assurance
- Engineering teams designing or modifying hazardous systems
- Operations functions owning safety-critical barriers
- Project teams integrating safety requirements and verification
- Risk specialists facilitating hazard studies and decisions
- Assurance teams reviewing technical safety evidence

The course assumes participants already contribute to engineering, operations, projects, risk, or safety studies and leaves out introductory workplace safety and detailed instrument programming.

Departments and Industries

The course serves departments and industries managing engineered hazards and safety-critical systems.

- Oil, gas, refining, chemicals, and petrochemicals
- Energy, utilities, infrastructure, and mining
- Manufacturing, machinery, and industrial automation
- Engineering, projects, operations, and maintenance functions
- Technical safety, process safety, and risk teams
- Independent assurance and design-review functions

Learning Objectives

By the end of this course, participants will be able to:

- Analyze hazards, causes, consequences, and risk pathways
- Apply inherently safer design and risk-reduction hierarchy
- Build bow-tie and barrier assurance models
- Use HAZOP and layers-of-protection reasoning
- Evaluate safety requirements and critical-element performance
- Prioritize verification, change, and lifecycle assurance actions

Course Agenda

Day 1: Technical Safety Foundations

- Technical Safety Lifecycle Map
- Hazard Identification and Risk Register
- Risk Estimation and Evaluation Criteria
- Inherently Safer Design Hierarchy
- Safety Basis and Decision Record

Day 2: Hazard Studies and Barriers

- HAZOP Node and Deviation Method
- Cause-Consequence Pathway Analysis
- Bow-Tie Barrier Model
- Escalation Factor and Control Register
- Hazard Study Action Tracking System

Day 3: Protection and Functional Safety

- Layers of Protection Analysis Screen
- Safety Instrumented Function Interface
- Safety Integrity Requirement Traceability
- Safety-Critical Element Register
- Barrier Independence and Common-Cause Check

Day 4: Performance and Assurance

- Safety Performance Standard Template
- Verification and Validation Plan
- Inspection, Test, and Maintenance Strategy
- Management of Change Safety Review
- Technical Safety Case Evidence Map

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Day 5: Technical Safety Practice

- Exercise: Build a Hazard and Risk Model
- Exercise: Facilitate a HAZOP Segment
- Exercise: Test Barrier Adequacy
- Exercise: Review a Safety Requirement
- Capstone Exercise: Technical Safety Assurance File

Practical Exercises

The course uses suggested activities from process plants, machinery, utilities, infrastructure, and industrial projects.

- Suggested activity: identify hazards, initiating events, consequences, assumptions, and risk criteria for an engineered system.
- Suggested activity: run a structured HAZOP discussion and convert findings into owned, traceable actions.
- Suggested activity: map prevention and mitigation barriers, challenge independence, and define assurance evidence.
- Suggested activity: assemble studies, requirements, performance standards, verification, and change records in the capstone file.

FAQs

Who suits technical safety engineering training, and what does it assume?

Technical safety engineering training suits experienced engineering, operations, projects, process-safety, risk, and assurance personnel who already work with hazardous systems or material design decisions.

How does technical safety engineering differ from occupational safety training?

Technical safety engineering concentrates on engineered hazards, design decisions, barrier performance, safety requirements, verification, and lifecycle assurance rather than routine workplace behaviour and personal-safety controls.

How does HAZOP support technical safety engineering?

HAZOP uses structured guidewords and deviations to identify credible causes, consequences, existing safeguards, information gaps, and actions within defined process or system nodes.

What is a safety-critical element in technical safety?

A safety-critical element is a system, equipment item, structure, or control whose failure could cause or contribute substantially to a major event, or whose purpose is to prevent or limit one.

Why are technical safety performance standards needed?

Performance standards translate barrier intent into measurable functionality, availability, reliability, survivability, dependencies, testing, maintenance, ownership, and evidence requirements.

Conclusion

The course connects hazard studies, risk decisions, design hierarchy, barriers, functional-safety interfaces, performance standards, verification, and change. Participants take back a Technical Safety Assurance File containing hazard, HAZOP, bow-tie, requirement, critical-element, performance, and verification tools. The file helps teams show how engineered safeguards reduce risk and remain effective throughout the asset lifecycle.