

PROCESS SAFETY ENGINEERING AND MANAGEMENT

"Designing and Managing Safe, Reliable, and Compliant Process Operations"

Schedule

Date	Venue	Fees (Face-to-Face)
04 - 08 May 2026	London, UK	USD 3495 per delegate

► **Available delivery methods:** Face-to-Face & Online Training

Introduction

Process safety engineering plays a critical role in preventing catastrophic failures, protecting lives, and ensuring regulatory compliance in high-risk industries such as oil & gas, chemicals, power, and manufacturing. Unlike occupational safety, which addresses individual hazards, process safety focuses on preventing large-scale incidents such as fires, explosions, and toxic releases.

This comprehensive 5-day course equips engineers, HSE professionals, and plant managers with the tools to design, implement, and manage robust process safety systems. The program covers international standards (e.g., API, OSHA PSM, IEC), risk analysis methodologies, hazard identification techniques, and the organizational frameworks that drive sustainable safety performance.

Objectives

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

- Understand the principles and scope of process safety management (PSM)
- Identify, analyze, and control process-related hazards
- Apply key methodologies such as HAZOP, LOPA, and Bowtie analysis
- Implement safety lifecycle processes, including design, operation, and change management
- Develop safety performance indicators and foster a safety-driven culture

Why Attend

- Gain critical knowledge of engineering practices that prevent major accidents
- Enhance regulatory compliance and reduce operational risk
- Strengthen your ability to manage hazardous processes safely and efficiently
- Bridge the gap between engineering, operations, and safety teams
- Apply practical tools and real-world lessons from process safety incidents

Target Audience

This program is designed for:

- Process, chemical, and mechanical engineers
- HSE and risk management professionals
- Plant and operations managers
- Maintenance and reliability engineers
- Anyone involved in the design, inspection, or management of hazardous processes

Individual Benefits

Key competencies that will be developed include:

- Understanding of process safety standards and legislation
- Technical skills in hazard analysis and risk evaluation
- Incident investigation and learning from near misses
- Designing inherently safer systems and safety barriers
- Strategic decision-making for safety-critical operations

Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Improved control over process safety risks and vulnerabilities
- Reduction in major accident potential and unplanned shutdowns
- Stronger alignment with PSM regulatory frameworks
- Enhanced safety culture and cross-functional collaboration
- Greater reliability, efficiency, and stakeholder confidence

Instructional Methodology

The course follows a blended learning approach combining theory with practice:

- Engineering Briefings – Key concepts and global standards
- Real Case Studies – Major incidents and what went wrong
- Technical Workshops – HAZOP, Bowtie, and barrier analysis
- Group Simulations – Risk assessment and scenario planning
- Templates & Tools – Checklists, matrices, audit forms, and scorecards

MAWA EVENTS

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Course Outline

Training Hours: 7:30 AM - 3:30 PM Daily Format: 3-4 Learning Modules | Coffee Breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 - 02:00

Day 1: Introduction to Process Safety Engineering

- Module 1: Overview of Process Safety and Major Hazards (07:30 - 09:30) • Distinguishing process vs occupational safety • Fire, explosion, toxic release mechanisms • History and evolution of process safety standards
- Module 2: Regulatory Frameworks and Global Standards (09:45 - 11:15) • OSHA PSM, API RP 754, IEC 61511, COMAH • PSM elements and safety case principles • Compliance challenges and enforcement
- Module 3: Safety Culture and Human Factors (11:30 - 01:00) • Behavioral safety and safety leadership • Organizational learning and just culture • Role of management commitment
- Module 4: Workshop - Analyze a Historical Major Accident (02:00 - 03:30) • Bhopal, Texas City, or Deepwater Horizon case study

Day 2: Hazard Identification and Risk Assessment

- Module 5: HAZID and Preliminary Hazard Analysis (07:30 - 09:30) • Early-stage hazard screening methods • Checklists, what-if, and deviation analysis
- Module 6: HAZOP Studies - Planning and Execution (09:45 - 11:15) • Node selection, guidewords, team roles • Documenting findings and follow-up
- Module 7: Layer of Protection Analysis (LOPA) (11:30 - 01:00) • IPL (Independent Protection Layer) modeling • Probability assignments and risk reduction
- Module 8: Workshop - Conduct a HAZOP/LOPA for a Simple System (02:00 - 03:30) • Work in teams to identify deviations and protection layers

Day 3: Risk Control Measures and Barrier Management

- Module 9: Inherently Safer Design (07:30 - 09:30) • Substitution, simplification, minimization • Designing for elimination vs mitigation
- Module 10: Engineering and Administrative Controls (09:45 - 11:15) • Pressure relief, instrumentation, shutdown systems • Procedures, training, and alarms
- Module 11: Bowtie Analysis and Barrier Integrity (11:30 - 01:00) • Cause-event-consequence models • Critical safety barriers and performance standards
- Module 12: Workshop - Create a Bowtie Diagram (02:00 - 03:30) • Model a hazard scenario with controls and mitigations

Day 4: Managing Safety Through the Process Lifecycle

- Module 13: Safety in Design, Operations, and Maintenance (07:30 - 09:30) • Stage-gate safety and design review checkpoints • Permit-to-work, lockout/tagout (LOTO), isolation
- Module 14: Management of Change (MOC) (09:45 - 11:15) • Process changes, approvals, and communication • Temporary changes and risk assessments
- Module 15: Emergency Response and Incident Management (11:30 - 01:00) • Scenario planning and drills • Escalation paths and communication plans
- Module 16: Workshop - MOC Review and Risk Assessment (02:00 - 03:30) • Assess the impact of a process modification

Day 5: Auditing, Metrics, and Process Safety Improvement

- Module 17: Process Safety Performance Indicators (07:30 - 09:30) • Leading and lagging indicators • Tiered metrics and API RP 754
- Module 18: Safety Audits and Assurance (09:45 - 11:15) • Internal audits, compliance checks, and inspections • GAP analysis and corrective action tracking
- Module 19: Learning from Incidents and Near Misses (11:30 - 01:00) • Incident investigation tools (Tripod Beta, 5 Whys) • Reporting systems and trend analysis

- **Module 20: Final Project – Process Safety Case Presentation (02:00 – 03:30)** • Team presentations on risk control for a selected scenario

Certification

Participants will receive a Certificate of Completion in Process Safety Engineering and Management, validating their expertise in applying process safety principles, hazard evaluation methods, and safety lifecycle management in high-risk industrial environments.

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