

Process Safety Management

10 days
Overview

PSM-EN-P

LEVEL

Skilled

PURPOSE

This course provides the knowledge necessary to acquire a consistent approach to achieve an efficient development to effectively manage process safety in production facilities.

LEARNING OBJECTIVES

Upon completion of the course, participants will be able to:

- describe standards and participate in the deterministic methods of safety engineering,
- explain the different elements of process safety management and identify strategies for implementation,
- identify and describe the safety critical elements in the production process, explain the most relevant features of asset integrity,
- define roles and responsibilities applicable to process safety management,
- establish process safety management objectives.

WAYS AND MEANS

Several applications and illustrations.
Several case studies and teamwork sessions.

LEARNING ASSESSMENT

Continuous assessments all-along the program.

PREREQUISITES

Provide evidence of a professional experience of at least 3 months related to HSE and/or Oil & Gas process industry.

Agenda

FUNDAMENTALS OF PROCESS SAFETY

Concept of process safety. Historical approach.
Process safety roles and responsibilities.
Safe design principles. Introduction to inherently safer design.
Concept of loss of containment. Fundamentals of flammability and fluid behavior.
Major accident hazards. Introduction to bowtie diagram representation.

1 d

PROCESS SAFETY REGULATIONS

Identification and compliance with legislation and industry standards.
Best practices standards: OSHA, CCPS.
Relationship with other benchmarking standards: offshore safety case regulation, SEVESO III.

0.5 d

PROCESS SAFETY CULTURE

Safety leadership and commitment.

0.5 d

Safety culture.
Workforce involvement.
Stakeholders identification and communication.

PROCESS HAZARD ANALYSIS

1.5 d

Process safety information: products, technology, equipment and human intervention.
Hazards related to typical Oil & Gas process.
Methodology for carrying out a HAZID.
HAZID application.
Introduction to HAZOP methodology. Node identification. Guidewords.
HAZOP register matrix. Group management.
Introduction to What-if methodology.
HAZOP exercise.
Introduction to Failure Mode and Equipment Analysis (FMEA study).
Introduction to fault tree analysis.
Plant layout. Introduction to consequence analysis.

OPERATING PROCEDURES

1.5 d

Definition of operating phase steps and limits.
Process monitoring. Process control system elements.
Safe isolation of equipment.
Pre-startup safety review. Operational readiness.
Case study: Buncefield .

ASSET INTEGRITY

2 d

Safety critical equipment. Equipment deficiencies and quality assurance.
Definition and functions of safety systems.
Control of ignition sources. Electrical equipment regulations.
Control of hydrocarbon inventory. Flares and vents.
Introduction to safety instrumented systems.
Fire & gas detection systems.
Passive and active fire protection.
Maintenance procedures and training.
Introduction to corrosion.
Inspection and testing planning and execution.

ORGANIZATIONAL ELEMENTS

1.5 d

Safe work practices. Permit to work system.
Management of change.
Downgraded situations.
Emergency response planning. Escape, evacuation and rescue.
HSE management of contractors: evaluation and performance monitoring.
Workforce training. Training matrix development.
Human factors in process control. Alarm systems. Human error in process plants.
Case study: platform P-36.

CONTINUOUS IMPROVEMENT ELEMENTS

1.5 d

Undesired events reporting and investigation. Analysis strategies.
Management system audit.
Process Safety Key Performance indicators. API RP 754.
IOGP Process safety reporting scope.
Management review.
Case study: Piper Alpha.