



*Training Course:
Process and Plant Safety*

*7 - 11 October 2024
Madrid (Spain)
Pestana CR7 Gran Vía*

Training Course: Process and Plant Safety

Training Course code: HE234796 From: 7 - 11 October 2024 Venue: Madrid (Spain) - Pestana CR7 Gran Vía Training Course Fees: 5775 € Euro

Introduction

The production of the process industry often involves hazards. Their nature can be both physical and chemical. Physical hazards derive from operating conditions that may be extreme, such as very low or very high temperatures and pressures. Chemical hazards are those associated with the materials present in the process, which can be toxic, flammable, exposable, or release energy due to spontaneous reactions. Indeed, it is necessary to put the substances into a reactive state in order to enable one to produce the desired products that may lead to hazards.

This comprehensive training course will provide an overview of each of the process safety management elements in the plant. Facilitators will also share best practices for implementing and managing each of these elements. The course is organized into 5 modules, each module will shed the light on the safety process that will be involved in the design of plants.

Program objectives

In this training program, you will:

- Learn how to identify process safety and major accident hazards in your facilities, and how to assess their risks and define critical controls barriers
- Understand the concepts of static and dynamic barrier management, and how barrier management can be used to analyze process safety and root cause incident investigation.
- Get hands-on experience with the development of bowtie diagrams
- Learn the characteristics of different types of barriers: hardware plant, human people, and organizational process
- Understand how a PSM system can help manage process safety risks, by providing governance and structure in terms of:
 - Showing commitment of the organization to process safety
 - Understanding hazards and their associated risk
 - Managing risk in operations, maintenance, and when new projects are initiated, and
 - Learning from incidents.
- Get a detailed overview of the expectations and good-industry practices.

Target Audience

The course is designed for those responsible for developing and implementing process safety management in their organization and plant design, but that does not yet have a solid understanding of process safety and good industry practices of PSM.

This could include:

- Plant or unit managers
- Head of sections or departments:

- Operations.
- Maintenance inspection.
- Engineering
- Senior engineers :
 - Reliability.
 - Inspection.

Course contents

Module 1:

Commit to process safety

- Process safety culture
- Compliance with standards
- Process safety competency
- Hazardous Properties of Materials

Exothermic and Pressure-Generating Reactions

- Formal Kinetics Description of Chemical Reactions
- Reactor Models
- Autocatalytic Reactions
- Polymerization
- Extreme Process Conditions
- Endothermic Processes

Module 2:

Understand Hazards and Risk

- Process knowledge management
- Hazard identification and risk analysis

Manage Risk

- Operating procedures
- Safe work practices
- Asset integrity and reliability
- Contractor management
- Training and performance assurance
- Management of change
- Operational readiness
- Conduct operations
- Emergency management

Module 3:

Safe Design and Operation of Plants

- Procedure for Ensuring Safety in Planning, Building, and Operating Plants
- Principles of Plant Safety and Fundamental Concepts

- External Events
- Plant Layout and Spacing
- Fire and Explosion Protection

Personal Safety and Personal Protective Equipment

- Safe Design and the Procurement of Safe Apparatuses and Work Equipment
- Apparatuses, Machinery, and Tools
- Hazard Assessment
- Personal Protective Equipment
- Safe Handling of Chemical Substances
- Work with Special Hazards: Permit-to-work System

Safety of Process Plants by Process Control

- Control System Characteristics and P&I Diagrams
- Programmable Electronic Systems
- Integration of PCE in the Safety Concept
- Case Study: Iron-Catalyzed Oxidation of Ethanol with Hydrogen Peroxide

Protection of Equipment End-of-pipe Technology

- Safety Valves
- Bursting Disc Protection Device
- Combination of Safety Valve and Bursting Disc Protection Device
- Dimensioning of Relief Devices
- Constructive Measures of Explosion Protection

Module 4:

Risk

- Overview of Risk and Safety Analyses
- Risk Limits
- Representation of Risks

Investigation of Engineered Plant Systems

- Fundamentals
- Mathematical Description of the Components of Engineered Systems
- Determination of Reliability Data for Engineered Components
- Boolean Variables and Their Application in Fault Tree Analysis
- Methods for Increasing the Survival Probability and Availability
- Dependent Failures
- Human Error
- Examples and Case Studies for the Application of Fault Tree Analysis

Module 5:

Consequences of Accidents

- Failure of Containment
- Emission from Leaks
- Pool Formation and Pool Vaporization
- Atmospheric Dispersion
- Fires and Explosions
- BLEVE
- Dust Explosion
- Flight of Missiles
- Scenarios and Probability Assignments
- Case Study: Risk Assessment for the Failure of a Natural Gas High-Pressure Pipeline

Functional Safety Safety Integrity Levels

Determination of Appropriate Distances Between Industry and Residential Areas

- Risk-Based Approach
- Processing of Random Variables
- Risk Limits and Distances on the Basis of Risk Considerations
- Deterministic Procedure in Germany Based on the Guidelines of the Commission of Plant Safety KAS

Registration form on the Training Course: Process and Plant Safety

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