Global Horizon
TRAINING CENTER

Conference:
Piping Systems & Process Equipment

27 December 2026 - 7 January 2027
Istanbul (Turkey)
DoubleTree by Hilton Istanbul Esentepe

Conference:
Piping Systems & Process Equipment

Conference code: CO8207 From: 27 December 2026 - 7 January 2027 Venue: Istanbul (Turkey) - DoubleTree by Hilton Istanbul Esentepe Conference Fees: 10300 Euro

Introduction

This course is designed to improve the mechanical integrity and reliability of process equipment and piping systems, essential for plant safety, availability, and profitability. It covers fundamentals, methodologies, and best practices for design, operation, and maintenance within the integrity operating window IOW. Participants will gain practical tools to enhance technical competencies, ensuring improved performance and value for their organizations

Objectives

- To increase the participant's awareness and understanding that the mechanical integrity of process equipment and piping systems depends jointly on the proper design, operation, condition assessment, and maintenance of the equipment, underscoring their vital individual and team roles in managing change.
- Provide participants with practical and sound methods and tools to enable them to carry out basic design calculations for pressure equipment by applicable industrial codes, standards, and best practices.
- To provide the participants with a clear understanding of the degradation mechanisms that process equipment could be subjected to over their operating life, how to identify them, predict and determine their impact, and what appropriate measures can be taken to prevent and control the resultant damage.
- To provide the participants with the knowledge and failure analysis skills they need to conduct damage and failure analysis to prevent similar failures from happening.
- To enhance the knowledge and skills of the participants in hazard identification and analysis, and in risk assessment and management.

Target Audience

This course is designed for:

- Mechanical Engineers and Piping Engineers
- Process Engineers and Production Engineers
- Reliability Engineers and Asset Integrity Engineers
- Maintenance Engineers and Maintenance Supervisors
- Inspection Engineers and NDT Specialists
- Plant Managers and Operations Managers
- HSE Engineers involved in process safety and equipment integrity
- Petroleum, Oil & Gas, and Petrochemical Engineers
- Power Plant Engineers and Utility Engineers
- Project Engineers involved in design, commissioning, and maintenance
- Technical Supervisors working with pressure equipment, piping systems, pumps, compressors, and rotating

equipment
- Professionals seeking to strengthen skills in mechanical integrity, failure prevention, inspection, and equipment reliability

Outlines

Module 1:

Process Equipment and Piping Systems: Application, Design & Operation

Day 1: Key Design Considerations, Guidelines, and Practices

- Process Equipment - An Overview
- Plant Integrity and Reliability
    - The interdependence of engineering, operation, and maintenance
    - Management of change
- Fitness for Purpose
- Service conditions, equipment sizing, and functional performance
- Business-Focused-Facilities - Appropriate quality at the lowest life cycle cost
- Worst foreseeable credible scenarios, safeguarding, best industry practices
- Codes, Standards, and Industry Practices
- Safety by Design
- Compliance with Regulations and Acts - HS&E requirements and considerations

Day 2: Design and Operation of Thermal Equipment

- Process Heaters
    - Types and configuration; box type, vertical cylindrical type
    - Thermal and mechanical design
    - API 560, API 530
- Boilers
- Types and configuration; water tube, firetube, and waste heat recovery boilers
- Fundamentals of design and operation
- Operating efficiency and testing

- ASME B&PVC Section 1 and Section 4, ASME PTC-4
- Types and applications; Shell & Tube Heat Exchangers, Plate Heat Exchangers, Air Cooled Heat Exchangers
- Thermal and mechanical design
- Overview of TEMA standards, API 660, API 661
- The operation, fouling, and effectiveness
- Heat Exchangers

Day 3: Design and Operation of Pressure Equipment

- Pressure Vessels and Reactors
    - Materials of construction and standards
    - Basic Design Methodology
    - ASME Boiler and Pressure Vessel Code Sections 2, 5, 8 and 9
    - Worked examples
- Storage Tanks
- Types and applications; cone roof tanks, floating roof tanks
- Basic design methodology
- Overview of API 650
- Materials of construction and standards
- Basic Design Methodology - hydraulic design, pressure integrity, mechanical integrity
- ASME B31.1 and B31.3
- Piping flexibility and support
- Piping system components - valves and fittings; classes, ratings
- Worked Examples
- Types and applications of pressure-relieving devices
- Code requirements
- Sizing methodology: API 520 and 521

- Specific operation and maintenance requirements: API 576
- Piping Systems
- Overpressure Protection

Day 4: Design and Operation of Fluid Handling Equipment

- Pumps
    - Types and application; Centrifugal, Positive Displacement
    - Performance characteristics
    - Selection and design considerations and standards; ANSI, API 610
    - Worked examples
- Compressors
- Types and applications; Centrifugal, Screw, Reciprocating
- Design considerations and standards
- Operation and troubleshooting
- Types and application
- Operation and troubleshooting
- Vibration monitoring
- Lubricating oil analysis
- Methodology and guidelines
- Reliability improvement
- Electric motors
- Condition Monitoring
- Troubleshooting

Day 5: Degradation and Condition Assessment of Process Equipment

- Degradation processes
    - Corrosion, erosion, fatigue, hydrogen attack

- Overview of API 571

- Industrial Failures and Failure Prevention
- Inspection and Testing
- Inspection strategies, plans, and coverage - A real function of inspection
- Nondestructive Testing NDT methods and their characteristics and applicability
- Risk-Based Inspection RBI
- Overview of API 580 and API 581
- Overview of API 579
- Worked examples
- Optimum mix of reactive, preventive,e and predictive methods
- Reliability Centered Maintenance RCM
- Fitness-For-Service Assessment
- Maintenance Strategies and Best Practices

Module 2:

Process Equipment & Piping Systems: Failures, Failure Prevention & Repairs

Day 6: Failure Prevention By Design

- Failure Causes - Design, Operation; Maintenance, Other Causes
- Material properties, and selection
    - Physical properties and limitations of components
    - Physical properties of steel and alloy piping and tubing
    - Physical properties of fittings
- Basic Design
- Pressure Vessels
- Piping Systems
- Liquid Storage Tanks
- Operation and Maintenance of Process Equipment

- Damage Mechanisms Affecting Process Equipment

Day 7: Failure Mechanics

- Wear & Failure Mechanisms
    - Imperfections and Defects
    - Corrosion Mechanisms
- Failure Modes
- Fatigue
- Fretting
- Creep & Thermal fatigue
- Stress Corrosion Cracking, Other modes
- Carbon & Alloy steels
- Nickel, Titanium, and Specialty alloys
- Aluminum, aluminum alloys
- Copper, copper alloys
- Plastic piping
- Alternative options-linings, cladding
- Limitations and safeguards
- Material selection - economics-life cycle costing
- Material properties, and selection

Day 8: Process Equipment Failures

- Failures in Pressure Vessels, Piping and Boilers
    - Strength reduction through material loss
    - Case histories
- Piping System Vibration
- Mechanical & Flow-Induced Resonance

- Transient Hydraulic pulsation
- Pipe supports and restraints
- Wind Loading
- Industry Practices for Failure Prevention

Day 9: Inspection, Assessment, and Maintenance

- Inspection Strategies Plans and Procedures - Risk-Based Inspection API 580
    - Developing an RBI Plan
    - Fitness-For-Service AssessmentAPI 579
- NDT Methods and Techniques
- Probability of Detection
- Damage Characterization
- Selecting the correct techniques
- Smart pigging
- Cleaning
- Operational procedures
- Pigging of Pipelines

Day 10: Operation and Maintenance

- Maintenance Programs
- Repair and Alteration of Pressure Equipment and Piping
    - Rerating Piping and Pressure Vessels
    - Estimation of the Consequences of Pressure Vessels and Piping Failures
- Failure Analysis Techniques

Registration form on the Conference:
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