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Fundamentals of Mechanical Technology

9 - 20 September 2024

Amsterdam (Netherlands)

Fundamentals of Mechanical Technology

course code: C8048 From: 9 - 20 September 2024 Venue: Amsterdam (Netherlands) - course Fees: 4500 Euro

The Conference

Mechanical engineering is at the centre of the chemical, oil, gas, and petrochemical industries. It requires familiarity not only with sound engineering principles, but also with other engineering techniques including inspection, monitoring and condition evaluation. The mechanical engineer is interested in safe containment and movement of solids, liquids and gases. Of specific importance are material properties, design, static & rotating equipment design, inspection and repair as well as an understanding of maintenance strategies and condition monitoring.

The Goals

This seminar focuses on the central areas of mechanical engineering and guides the delegates in developing both fundamental and practical understandings of key issues. Workshop examples will be drawn from the oil and gas mechanical equipment.

The Process

The course combines sound engineering principles, methods, and applicable codes & standards and best industry practices. Actual major incidents as well as industry experience will be reviewed in depth to reinforce every topic.

The Benefits

Upon completion of this workshop, the delegates will develop both fundamental and practical understanding of central issues in mechanical engineering as applied in the petrochemical and allied industries.

The Results

The seminar provides a practical introduction to the fundamentals of mechanical engineering thereby developing perspective and focus from a company viewpoint.

The Core Competencies

Delegates will enhance their competencies in the following areas:

- Mechanical design of pressure equipment and piping systems in compliance with applicable codes, standards, and regulations.

- Engineering materials properties and selection criteria for specific applications.
- Identification and assessment of active degradation mechanisms and the failures they may cause.
- An understanding of the various static and rotating equipment used in the petrochemical environment.
- Application of maintenance strategies and philosophies.
- Condition monitoring, inspections and assessments.

The Conference Content

Introduction & Fundamentals

- Engineering Material Properties
    - Stress and Strain
    - Fracture failure, Modes, Stress concentration, Fracture toughness
    - Fatigue failure, testing and mechanism
    - Temperature Considerations and Creep Failure
    - Identification of Damage Mechanisms
- Mechanical Design
- ASME & API
- Codes & Standards
- Design for static strength

Materials Selection and Inspection

- Materials Selection
    - Materials of Construction
    - Carbon Steels
    - Alloy Steels
    - Stainless Steels
    - Nickel Based and Titanium Alloys
- Inspection techniques
- Visual
- Penetrant
- Magnetic Flux
- Eddy Current Inspections
- X-Ray & Gamma ray
- Ultrasonics – TOFD & Pulse-Echo

Valves, Piping & Fitness for Service

- Valves
    - Valve Types
    - Valve Characteristics
    - Valve Applications
    - Valve Selection
    - Valve Actuators
- Piping & Pipelines
- ASME B31
- Pipe Types, construction and Schedules
- Steel Pipes
- Welded Types and Sections
- Flanges and Gaskets

- Plastic Pipes, Composite Pipes
- Pipe Coatings and Linings
- Pipe Supports and insulation blocks
- Stress relief in Piping Design
- Pigging
- Water hammer
- Overview of API 570 - Inspection & repair of Pipelines & Piping
- API 579 overview
- Fitness for Service

Corrosion

- Corrosion Fundamentals
- Types of Corrosion
- Corrosion Inspection and Monitoring
- Corrosion Minimization
- Coatings
- Inhibitors
- Cathodic Protection

Compressors

- Types of Compressors – Reciprocating, Centrifugal and Screw
- Blading and Staging
- Performance Curves
- Compressed Air Usage and instruments
- Glands and Mechanical Seals

Mechanical Maintenance

- Strategies & Philosophies
    - Maintenance system optimisation
    - Maintenance Management Systems
- Condition Monitoring
- Vibration Analysis
- Shaft Alignment
- Practical Examples