

Course Name: Process Equipment & Piping Systems Design, Operation, Failure Evaluation & Repairs

Reference Code: Gas 709

About the course:

This Process Equipment & Piping Systems training course is designed to provide practical aspects of the mechanical design of pressure vessels, storage tanks, thermal equipment, piping systems and fluid transport machinery

Course Objective:

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

- Understand the safe design and operation of pressurized process equipment
- Follow the procedure for inspection and testing of process equipment
- Apply the fundamental concepts and strategies to prevent failures
- Use the best practices of FFS to estimate the remaining life of operating equipment
- Select the methods of repair and alteration of pressurized process equipment

Who Should attend?.

- Process, Mechanical and Chemical Engineers
- Operation and Maintenance Engineers
- Project Engineers
- Supervisors and Managers
- Technical Personnel involved in inspection

Course Methodology:

This training course is designed to be a hands-on, stimulating experience. The training course is highly interactive with many discussion and practice sessions.

☑ Relevant computer simulations and videos .

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- ☐ Copies of all presentation material.
- ☐ Variety of Learning Methods.
- ☐ Pre-test and final test.
- ☐ Case Study
- ☐ Training Groups.
- ☐ Presentation.
- ☐ Lectures

Course Outline:

Day One: Overview of Design Features of Process Equipment and Piping System

- General Concept of Safety in Design: Codes and Standards
- Design Features of Pressure Vessels and Storage Tanks
- Design Features of Piping Systems
- Design Characteristics of Fluid Handling Equipment
- Design Characteristics of Thermal Equipment
- Overpressure Protection of Equipment

Day Two: Overview of Operation Issues of Components of Process Equipment

- Safe Operation of Process Equipment: Integrity Operating Window
- Over-pressuring of Process Equipment
- Uncontrolled Runaway Chemical Reaction
- Overheating of Boiler Tubes
- Abnormal Operation of Fluid Handling Equipment
- Vibration of Piping Systems

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Day Three: Failure Modes and Fracture Mechanisms

- Characteristics of Material Used for Construction of Process Equipment
- Material Degradation Processes
- Causes of Failures of Process Equipment and Piping Systems
- Failure Modes
- Fracture Mechanisms
- Lessons Learnt from Major World Equipment Failures

Day Four: Design and Operation of Fluid Handling Equipment

- Condition Monitoring
- Inspection and Testing Techniques: API 572, API 510, API 570
- Risk Based Inspection (RBI): API 580
- Fitness for Service Assessment: API 579/ASME FS1
- Failure Evaluation and Calculation of Component Remaining Life
- Failure Prevention Methods

Day Five: Repairs, Alterations and Rerating of Process Equipment

- Classification of Repairs
- Repair Best Practices for Pressure Vessels and Other Equipment
- Rerating of Pressure Vessels
- Hot Taping and Line Stopping
- Positive Material Identification (PMI)

Time: 08:00 AM -03:00 PM Numbers of hours: 35 Hours

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