

Training Title

PROCESS EQUIPMENT, APPLICATION, DESIGN AND OPERATION

Training Duration

5 days

Training Venue and Dates

PE146	Process Equipment, Application, Design and Operation	5	24 – 28 November, 2019	\$4,250	Dubai, UAE
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In any of the 5 star hotels. The exact venue will be informed once finalized.

Training Fees

- 4,250 US\$ per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch.

Training Certificate

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

TRAINING DESCRIPTION

Process Equipment and Piping Systems: Application, Design and Operation in 3D technique

This course is designed to provide practical aspects of the mechanical design and operation of process equipment and piping systems including plant Integrity and reliability, design of pressure vessels and storage tanks, process heaters and heat exchangers, pumps, compressors, industrial failure, equipment inspection and testing.

The course will discuss the performance of process systems under various operating conditions including in-depth explanation on the process of material degradation such as corrosion, erosion, fatigue and others that may lead to component failure. Several examples and case studies included in the workshops and will demonstrate the application of Fitness for Service (FFS) assessment method that enables quantitative evaluation of the remaining life in service of any component of equipment. Failure prevention methods will be discussed and explained.

TRAINING OBJECTIVES

The programme should help the participants to understand the key elements

- Understand the safe design and operation of process equipment
- Follow the procedure for inspection and testing of process equipment
- Apply the fundamental concepts and strategies to prevent equipment 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

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WHO SHOULD ATTEND?

This course is designed to benefit all levels of Technical Personnel in the oil and gas industry as well as in chemical and process industries but will greatly benefit: Process, Mechanical and Chemical Engineers • Operation and Maintenance Engineers • Project Engineers • Supervisors and Managers • Technical Personnel involved in inspection Shutdown planners

TRAINING METHODOLOGY:

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course. Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work & Practical Exercises
- 20% Videos & General Discussions

DAILY OUTLINE

DAY 1- PROCESS PLANT DESIGN AND LAYOUT FUNDAMENTALS

Design and Layout Fundamentals

- Scope and definitions
- Design methodologies and guidelines
- Applicable design codes, standards, recommended practices and regulations

Process Plant Design

- Objectives and principles
- Methodology and guidelines
- Process Flow Diagrams (PFDs) – Symbols, conventions and best practices

Layout Design -General Philosophy and Principles

- Goals of plant layout design
- Site location, layout and conditions
- Separation Distances

Layout Planning and Procedures

- Plant Layout & Plot Plans - Codes of Practice relating to Plant Layout (PIP)
- Plot Plans, Equipment Drawings, Nozzle Specifications

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- Process & Instrumentation Diagrams (P&ID's)
- Piping & Instrument Diagrams (P&IDs) – Symbols, conventions and best practices (PIP)
- Considerations for civil, structural, mechanical, electrical, instrumentation
- Design and layout checklist

DAY 2- SIZING AND SPECIFYING PROCESS PLANT EQUIPMENT

Process Equipment Sizing and Design Methodology and Guidelines

- Codes, standards, and recommended practices
- Preliminary sizing and mechanical design of major equipment
- Estimating costs of major equipment and piping
- Standard Specifications & Data Sheets for Process Equipment

Materials of Construction for Process Equipment

- Material types standards
- Material selection guidelines

Sizing and Design of Pressure Vessels in 3D technique

Sizing and Design of Heat Exchangers in 3D technique

Sizing and Design of Aboveground Storage Tanks in 3D technique

Sizing and Specifying Mechanical Equipment

- Pumps in 3D technique
- Compressors in 3D technique

Workshop 2 – Worked Examples: Preliminary Design of Pressure Equipment

DAY 3-PIPING SYSTEMS-DESIGN METHODOLOGY AND CONSIDERATIONS

Piping Fundamentals

- Pipe system components; Dimensions; Pipe Data; Materials;
- Regulations; Codes, Standards and Specifications; Fabrication & Installation;
- Piping Joints; Design, Bases and Documents

Basic Design of Piping Systems

- Design methodology and guidelines
- Codes, standards and best industry practices
- Hydraulic design
- Pressure Integrity – Internal and external pressure
- Mechanical (Structural) Integrity – Additional loads and stresses

Piping Thermal Expansion and Flexibility

- Expansion bends, loops, and expansion joints
- Piping loads on load-sensitive equipment

Pipe Supports and Restraints

- Types and Application

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- Sizing and Selection
- Location of supports, guides, and anchors

Introduction to Pipe Stress Analysis

- Code requirements (ASME B31.3)
- Best industry practices
- Examples of simplified screening methods

Workshop 2 - Worked Examples

Day 4- Equipment Piping Layout Considerations and Best Practices

Additional Layout and Design Requirements of Piping Systems

- Optimization of process plant layout with pipe routing
- Isolation and Blinding
- Vents, drains, slopes, injection points and sample connections
- Configuration of spared equipment – testing and operating philosophy
- Specific requirements - Pressure relief and flare header; gas piping, heat tracing
- Piping loads on equipment nozzles – vessels, heat exchangers, tanks, pumps, compressors.

Pressure Vessels and Reactors

- Vertical vessels and towers
- Horizontal vessels

Atmospheric Storage Tanks

- Fixed roof
- Floating roof corrosion and erosion in heat exchangers

Fired Heaters

- Natural draft
- Forced draft

Heat Exchangers

- Shell and tube
- Reboilers and condensers
- Plate type
- Air-cooled heat exchangers

Pumps in 3D technique

- Types - Centrifugal; Vertical in-line; Positive displacement
- Applications – Process; Boiler feedwater; Firewater

Compressors, Blowers and Fans in 3D technique

- Centrifugal
- Reciprocating

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Gas Turbines in 3D technique

- Combined heat and power systems configurations

Steam Turbines in 3D technique

- Steam and Condensate Piping Systems
- Condensing
- Backpressure

NOTE:

Pre & Post Tests will be conducted

Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.



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