Tel No:+97126654546 | Fax No:+97126654182 | Email: training@cmc-me.com | www.cmc-me.com



FE160:
Pipeline Inspection, Testing, Integrity & Maintenance

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Training Description & Objectives:

At completion of this intensive training course, participants will gain an in- depth understanding of the ASME B31 design, construction, inspection and testing rules; as well as their application to integrity assessment of operating systems.

Participants will gain an in-depth knowledge of pipe and fitting material specifications, fabrication process and influence on mechanical properties of strength and toughness, to help in material selection and failure analysis. Participant will understand the technical background to the design equations, and their application to the design of piping systems and pipelines.

The training course addresses rules of good practice in layout of piping systems for reliable operation. The training course provides an in-depth, step-by-step review of operating transients in piping systems and pipelines, their cause, and the methods for their analysis.

The training course covers construction and welding practices, weld inspections, weld flaws and acceptance criteria. The training course covers hydro testing methods and alternative leak detection techniques. Participant will gain a practical understanding of piping and pipeline corrosion mechanisms, how to recognize them, classify them and resolve them.

Participant will be introduced to the latest techniques and research in piping and pipeline integrity to analyze a degraded condition due to either corrosion or mechanical damage. Participants will review case histories of field failures and will evaluate their cause and solutions to avoid recurrence.

Training Designed for:

The course is intended for engineers, maintenance technicians and inspectors responsible for the design, testing, integrity, maintenance and repair of pipelines and piping systems.

Training Requirement:

"Hand's on practical sessions, equipment and software will be applied during the course if required and as per the client's request."

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

- ❖ MATERIALS AND SIZING INTRODUCTION
  - History of Pipeline Technology
  - ASME Codes and Standards API Standards NACE, MSS-SP, PFI Standards
  - Fundamentals of Maintenance and Integrity
- ❖ MATERIALS API 5Land ASTM Specifications
  - Practical Aspects of Metallurgical Properties
  - Chemistry and Material Test Reports

- Fabrication of Line Pipe and Forged Fittings
- Mechanical Properties: Strength and Toughness

❖ OPERATING AND DESIGN PRESSURE
- How to Establish the System Design Pressure
- Introduction to Pressure Relief Valves
- Pipe and Pipeline Sizing Formula with Applications

DAY TWO:

❖ INTEGRITY FOR SUSTAINED LOADS LAYOUT AND SUPPORT
- Rules of Good Practice in Layout Pump and Compressor Piping
- How to Support a Piping System
- Review of Support Types and Their Application Lessons Learned from Poor Support Practices

❖ TEMPERATURE EFFECTS
- Flexibility Layout Analysis
- Temperature Transients and Fatigue Damage

❖ VIBRATION IN SERVICE
- Mechanical and Hydraulic Induced Vibration in Piping
- How to Measure, Analyze and Resolve Vibration

DAY THREE:

❖ INTEGRITY FOR OCCASIONAL LOADS PRESSURE TRANSIENTS
- Recognizing and Solving Liquid Hammer Pump Station Transients
- Study of Pipeline Failures Due to Transients
- Two-Phase Liquid-Vapor Transients
- Two-Phase Liquid-Gas Transients
- Gas Discharge Transients

❖ BURIED PIPE
- Soil Loads
- Surface Loads Expansion of Buried Pipe
- Soil Settlement
- In-Service Movement of Pipeline

❖ PIPELINE FAILURES
- Study of Case Histories
- Understanding Why Failures Occur and How to Avoid Them

DAY FOUR:

❖ MATERIAL FLAWS AND INSPECTIONS WELDING
- Overview of Pipe and Pipeline Welding Practice
- API 1104 and ASME IX Requirements Welding In-Service: Challenge and Solutions

❖ INSPECTION
- Weld Inspection Techniques
- Pigging Technology: Overview of Utility and Smart Pigs
- Overview of Regulations for In-Line Inspections

- ❖ FLANGE AND MECHANICAL JOINTS
  - Overview of Different Types of Flanges and Application
  - Gasket and Bolt Selection
  - Causes of Flange Leaks and How to Resolve
  - Case Study of Flange Failure Assembly of Flange Joints and Leak Tightness
- ❖ PRESSURE AND LEAK TESTING
  - The Difference Between Leak Testing and Pressure Testing
  - Review of Different Testing Techniques
  - The Purpose of Hydrotest
  - How to Conduct a Hydrotest Pipeline and Piping Systems
  - Testing Pneumatic Testing

DAY FIVE:

- ❖ CORROSION, ASSESSMENT AND REPAIRS CORROSION
  - Introduction to Practical Corrosion
  - Classification of Corrosion Mechanisms
  - General Wall Thinning Local Corrosion: Galvanic Effects Crevice
  - Corrosion Pitting
  - Corrosion Environmental Effects
  - Hydrogen and H2S Effects
  - Microbiological Corrosion
  - Corrosion Protection
  - Cathodic Protection
  - Overview
- ❖ MECHANICAL DAMAGE TO PIPELINES
  - Dents and Gouges
  - Ripples and Buckles
- ❖ FITNESS-FOR-SERVICE OVERVIEW
  - Application of ASME B31G to Determine Remaining Life Application of API 579 to General and Local Corrosion Analysis of Dents and Gouges in Pipelines
  - How to Evaluate Cracks in Piping and Pipelines
- ❖ REPAIR TECHNIQUES
  - The New ASME Repair Standards
  - The Fundamentals of Repair Packages
  - Pipe and Component Replacement
  - Grinding and Welding
  - Welded Sleeve: Type A and Type B
  - Flush Patch
  - Repair Fillet
  - Welded Patch
  - Weld Overlay
  - Repair Mechanical Clamp with Sealant Injection
  - Mechanical Clamp without Sealant Injection
  - Insertion Liners Painted and Brushed Liners Pipe Coating

- Course Conclusion

❖ POST-ASSESSMENT and EVALUATION

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:
Aisha Relativo - Training & Career Development Manager
aisha@cmc-me.com / training@cmc-me.com
Tel.: +971 2 665 3945 or +971 2 643 6653 | Mob.: +971 52 2954615