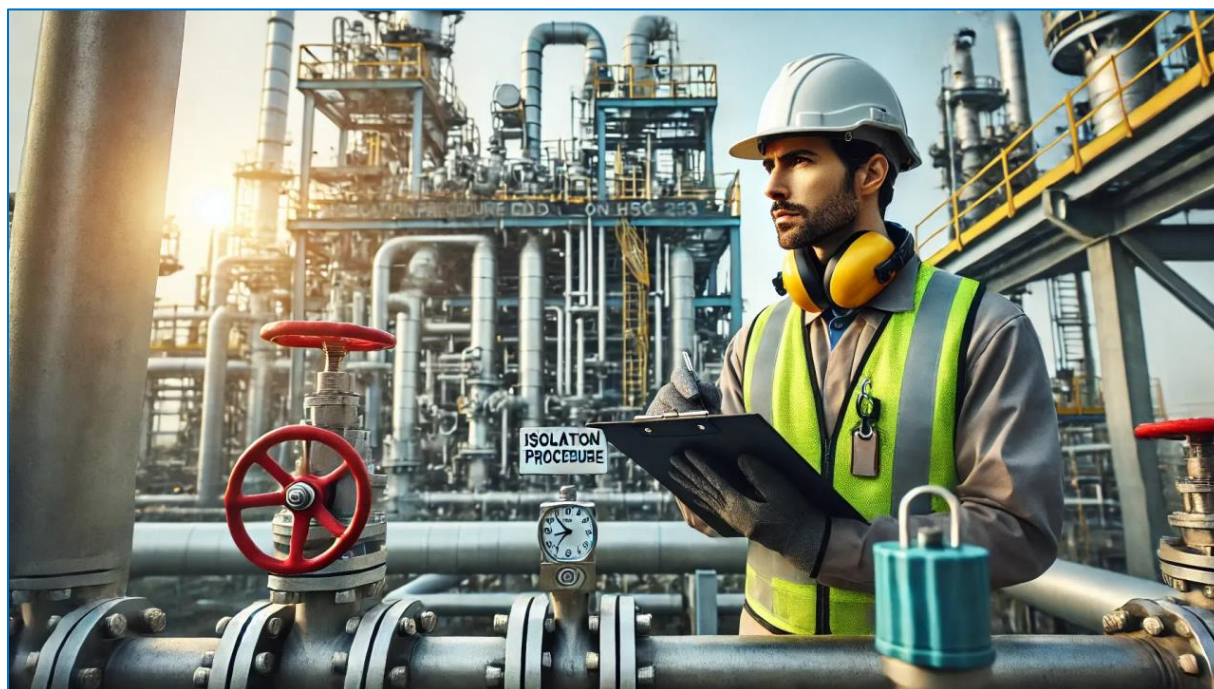




MU191: Mechanical Integrity, Safety & Reliability

Training Description:

This comprehensive training course is designed to equip professionals with the knowledge and practical tools necessary to ensure the integrity, safety, and reliability of mechanical equipment and systems. The training course blends engineering principles, risk-based strategies, regulatory compliance, and best practices to maintain and improve asset performance throughout its lifecycle.

Training Objectives:

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

- ✓ Understand the principles of mechanical integrity and its impact on process safety
- ✓ Identify and assess risks associated with mechanical failures
- ✓ Develop and implement mechanical integrity programs per industry standards (API, OSHA, ASME)
- ✓ Apply reliability-centered maintenance (RCM) and root cause analysis (RCA) techniques
- ✓ Enhance inspection, testing, and preventive maintenance strategies
- ✓ Understand the regulatory and safety compliance requirements (e.g., OSHA PSM, API 580/581)

Training Designed for:

This training course is intended for Mechanical Engineers and Maintenance Engineers, Reliability Engineers and Process Safety Engineers, Inspection & Integrity Personnel, Plant Managers and Operation Supervisors, Asset Integrity Managers, HSE and Risk Management Professionals and Regulatory Compliance Officers.

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:

- ❖ Introduction to Mechanical Integrity & Safety
 - Overview of Mechanical Integrity (MI) within Process Safety Management (PSM)
 - Key MI definitions and concepts
 - Regulatory requirements (OSHA 1910.119, API standards)
 - Key industry incidents and case studies
 - MI program elements (design, fabrication, installation, maintenance, etc.)
 - Equipment types covered under MI
- ❖ Exercises:
 - Case study review: Texas City Refinery explosion
 - Discussion: Your current MI program status

DAY TWO:

- ❖ Risk-Based Mechanical Integrity and Reliability Fundamentals
 - Introduction to Risk-Based Inspection (RBI) – API 580/581

- Asset criticality ranking and risk assessment methodologies
- Introduction to Reliability Engineering principles
- Failure modes and effects analysis (FMEA/FMECA)
- Key performance indicators (KPIs) for integrity and reliability
- ❖ **Exercises:**
 - Workshop: Build a risk matrix for plant equipment
 - Hands-on exercise: Basic FMEA of a centrifugal pump

DAY THREE:

- ❖ **Inspection, Testing, and Preventive Maintenance**
 - Inspection planning and interval optimization
 - Non-destructive testing (NDT) techniques and applications
 - Preventive and predictive maintenance (PdM) techniques
 - API 510, 570, and 653 inspection codes
- ❖ **Exercises:**
 - Demonstration: Interpreting thickness data trends
 - Simulation: Writing an inspection plan for a pressure vessel

DAY FOUR:

- ❖ **Failure Analysis, Root Cause Analysis & Reliability Tools**
 - Introduction to Root Cause Failure Analysis (RCFA)
 - Common mechanical failure modes
 - Tools and techniques (5 Whys, fishbone diagrams, fault tree analysis)
 - Using CMMS and reliability data
 - Reliability-Centered Maintenance (RCM) strategies
- ❖ **Exercises:**
 - RCA Workshop: Analyze a real-world pump failure
 - Group work: Develop a reliability improvement plan

DAY FIVE:

- ❖ **Building & Sustaining an Effective Mechanical Integrity Program**
 - Developing MI policies, procedures, and workflows
 - Integration with PSM, HAZOPs, and MOC (Management of Change)
 - Documentation, audits, and continuous improvement
 - Digitalization and use of MI software tools
 - Leadership, training, and culture for reliability and safety
- ❖ **Exercises:**
 - Case study: MI audit findings and improvement plan
 - Capstone project: Design a Mechanical Integrity Program framework
- ❖ **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:

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