



مركز الوقت للتدريب  
Time Training Center

**MECH INTEGRITY, SAFETY & RELIABILITY**  
**COURSE**



## Introduction

This course delivers a comprehensive framework for managing the mechanical integrity (MI), safety, and reliability of industrial assets. Designed for professionals in engineering, maintenance, and safety roles, the program emphasizes regulatory compliance, risk-based inspection, and performance improvement strategies. Covering both fixed and rotating equipment, participants will gain practical tools to ensure safe operations and regulatory readiness while aligning with industry best practices and global standards such as OSHA 1910.119, API 580/581, and ASME codes.

## Learning Objectives

- Perform risk-based assessments and inspection planning
- Identify failure modes and apply root cause analysis
- Integrate reliability strategies and predictive maintenance
- Comply with PSM and regulatory audit requirements
- Enhance asset lifecycle safety and operational continuity

## Course Details

Mode of Training	Classroom or Online
Duration	5 Days

## Who Should Attend?

- Mechanical, reliability, and maintenance engineers
- Inspection and asset integrity professionals
- PSM coordinators and safety officers
- Plant engineers and operations managers

## Certificate(s)

Participants who complete a minimum of 80% of the total training hours will receive a **Certificate of Completion** issued by **Time Training Center**. This certificate reflects their active participation and commitment to professional development in the relevant field.



## Course Outline

### Module 1: Introduction to Mechanical Integrity

- Definition and importance of MI
- Key components of a mechanical integrity program
- Role in Process Safety Management (PSM)
- Industry regulations and standards (OSHA, API, ASME, NBIC)

### Module 2: Equipment Covered by MI

- Pressure vessels
- Piping systems and pipelines
- Storage tanks
- Relief systems and devices
- Rotating equipment (pumps, compressors)
- Boilers and heat exchangers
- Instrumentation and controls

### Module 3: Risk-Based Inspection (RBI)

- API 580/581 principles
- Probability vs. consequence of failure
- Risk assessment matrix
- RBI implementation and inspection planning

### Module 4: Inspection & Testing Techniques

- Visual inspection (VT)
- NDT methods: UT, RT, MT, PT, AE
- Fitness-for-service (FFS) assessments (API 579)
- Corrosion monitoring and material degradation

### Module 5: Failure Modes & Root Cause Analysis

- Common failure mechanisms: fatigue, corrosion, creep, erosion
- Case studies of mechanical failure
- Root Cause Analysis (RCA) and incident investigation techniques (5 Whys, FMEA, Fault Tree)



## **Module 6: Reliability Engineering Basics**

- Reliability, availability, and maintainability (RAM) concepts
- Failure data analysis (MTBF, MTTR)
- Reliability-Centered Maintenance (RCM)
- Preventive and predictive maintenance integration

## **Module 7: Documentation, Auditing & Compliance**

- Inspection records and integrity management systems
- Regulatory reporting and audit preparation
- KPI tracking and continuous improvement
- Role of digital tools in MI (CMMS, RBI software)

## **Module 8: Safety Integration and Risk Management**

- Links between MI and process safety
- Layers of Protection Analysis (LOPA) overview
- Safety instrumented systems (SIS)
- Emergency response and integrity failure consequences



## Methodology

We employ a comprehensive and applied learning strategy, integrating theory with real-world implementation:

- ❖ **Conceptual Learning:** Expert-led sessions on catalytic theory and engineering principles
- ❖ **Interactive Workshops:** Group exercises, presentations, and technical discussion forums
- ❖ **Case-Based Learning:** Industry-specific examples and troubleshooting scenarios
- ❖ **Technology Integration:** Digital tools, simulations, and catalyst modeling applications
- ❖ **Assessment:** Pre-tests, post-tests, and Competence Validation Exams for Certified courses to ensure knowledge transfer and skills validation

***Note: Instructors may adjust the training approach to fit technical requirements or participant engagement levels.***

## Instructors

Our instructors are senior mechanical integrity and reliability experts with 10+ years of experience across the oil & gas, petrochemical, and power sectors. They hold certifications in API, ASME, and RBI methodologies, and are highly skilled in aligning technical instruction with operational realities. Trainers are known for delivering actionable strategies, audit-ready guidance, and system-based thinking. Trainer profiles will be shared upon request.

## About Time Training Center

Time Training Center is a leading professional training institute in Abu Dhabi that provides students and professionals with quality education and skill development programs. Time Training Center is accredited by the Abu Dhabi Center for Technical Vocational Education & Training (ACTVET) with a specialization in Computer and Management Training programs and certified by QA QC with ISO 9001:2015.

Operating in Abu Dhabi for over 3 decades, Time Training Center has established brand value as a high-quality Management & Technical Training Center in Abu Dhabi. We have also secured strong loyalty from corporate companies and associations with our holistic and practical teaching approach.

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