# Mechanical Integrity in Process Plants Training Course

Professional Development Training Course Outline

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| **Category** | General Training | **Duration** | 5 Days |
| **Base Fee** | $1,500 USD | **Delivery Mode** | Online / On-site Hybrid |

## Course Introduction

In today’s highly regulated industrial environment, maintaining mechanical integrity in process plants is critical for ensuring operational safety, reliability, and efficiency. This training course equips engineers, maintenance professionals, and safety managers with the skills to identify, assess, and mitigate risks associated with equipment failure. Through a combination of practical case studies, industry best practices, and hands-on exercises, participants will gain the knowledge to implement preventive maintenance strategies, risk-based inspections, and compliance with API, ASME, and OSHA standards.

Mechanical Integrity in Process Plants Training Course is designed for modern process industries, the program emphasizes the integration of predictive maintenance technologies, condition monitoring, and risk-based inspection frameworks to enhance plant uptime, reduce operational costs, and ensure regulatory compliance. Participants will learn to apply mechanical integrity principles to real-world scenarios, improving the safety culture and fostering operational excellence across chemical, petrochemical, oil and gas, and power plants.

## Programme Curriculum

**Mechanical Integrity in Process Plants Training Course**

**Introduction**

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**Course Duration**

5 days

**Course Objectives**

1. Understand mechanical integrity fundamentals and its role in process safety.
2. Develop skills in risk-based inspection (RBI) methodologies.
3. Implement preventive and predictive maintenance strategies.
4. Learn to identify critical equipment and process hazards.
5. Apply API, ASME, OSHA, and ISO standards in plant operations.
6. Conduct failure analysis and root cause investigations.
7. Enhance equipment reliability and asset management.
8. Utilize condition monitoring and diagnostic tools effectively.
9. Integrate corrosion management and mitigation techniques.
10. Improve plant safety culture and regulatory compliance.
11. Optimize maintenance planning and cost reduction strategies.
12. Develop skills in mechanical integrity audits and inspections.
13. Implement continuous improvement and operational excellence frameworks.

**Target Audience**

1. Process Engineers
2. Maintenance Engineers and Supervisors
3. Reliability and Asset Integrity Professionals
4. Safety and HSE Managers
5. Mechanical Engineers in Process Industries
6. Plant Managers and Operations Supervisors
7. Inspection and Quality Assurance Professionals
8. Technical Consultants in Process Safety

**Course Modules**

**Module 1: Introduction to Mechanical Integrity**

- Definition, scope, and importance in process plants
- Key regulations and compliance standards
- Risk-based maintenance and integrity frameworks
- Case study: Equipment failure due to integrity lapses
- Integrating MI into plant safety culture

**Module 2: Risk-Based Inspection (RBI) Methodologies**

- Principles of RBI and its industrial significance
- Risk assessment and criticality ranking
- Inspection planning and resource allocation

- Case study: RBI implementation in a chemical plant
- Tools for predictive and preventive maintenance

**Module 3: Corrosion and Material Degradation**

- Types of corrosion in process plants
- Inspection techniques and monitoring
- Material selection and mitigation strategies
- Case study: Corrosion failure in heat exchangers
- Coating, lining, and cathodic protection methods

**Module 4: Equipment Failure Analysis**

- Common failure mechanisms in mechanical equipment
- Root cause analysis (RCA) techniques
- Failure reporting and documentation
- Case study: Pump failure and corrective action
- Integrating RCA into maintenance planning

**Module 5: Pressure Vessels and Piping Integrity**

- Design codes, standards, and inspection requirements
- Non-destructive testing (NDT) techniques
- Maintenance and repair strategies
- Case study: Pressure vessel rupture incident
- Lifecycle management and integrity monitoring

**Module 6: Rotating Equipment Reliability**

- Types of rotating equipment and failure modes
- Vibration monitoring and predictive maintenance
- Lubrication management and alignment checks
- Case study: Centrifugal pump reliability improvement
- Performance optimization strategies

**Module 7: Mechanical Integrity Audits and Compliance**

- Audit planning and execution
- Gap analysis and compliance reporting
- Risk management and safety review
- Case study: Compliance audit in oil and gas plant
- Continuous improvement in audit practices

**Module 8: Advanced Predictive Maintenance and Smart Technologies**

- Condition monitoring and IoT-enabled sensors
- Predictive analytics and digital twins
- AI and machine learning in equipment reliability
- Case study: Smart maintenance implementation in refineries
- Strategies for operational excellence and cost reduction

## Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

**Register as a group from 3 participants for a Discount**

**Send us an email: info@fineskilltrainingcenter.org or call** *+254769199797*

***Certification***

*Upon successful completion of this training, participants will be issued with a globally- recognized certificate.*

***Tailor-Made Course***

*We also offer tailor-made courses based on your needs.*

**Key Notes**

**a.** The participant must be conversant with English.

**b.** Upon completion of training the participant will be issued with an Authorized Training Certificate

**c.** Course duration is flexible and the contents can be modified to fit any number of days.

**d.** The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

**e.** One-year post-training support Consultation and Coaching provided after the course.

**f.** Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

## Upcoming Scheduled Sessions

| Start Date | End Date | Location | Price |
|---|---|---|---|
| **23 Nov 2026** | 27 Nov 2026 | Online | $1,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $1,500 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $3,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $3,000 |

| Start Date | End Date | Location | Price |
|---|---|---|---|
| **23 Nov 2026** | 27 Nov 2026 | Physical | $6,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $4,500 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $6,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $6,000 |

Ready to enroll or request a customized program? Book online or contact us:

**Register Online Now**

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com