Failure Analysis of Industrial Equipment Training Course

Professional Development Training Course Outline

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

Course Introduction

Industrial equipment failures can result in unplanned downtime, production losses, safety incidents, environmental risks, and significant maintenance costs. In today's highly competitive manufacturing, oil & gas, power generation, mining, chemical processing, and infrastructure sectors, organizations must adopt advanced Failure Analysis, Root Cause Analysis (RCA), Predictive Maintenance, Reliability Engineering, Asset Integrity Management, and Condition Monitoring techniques to identify failure mechanisms and prevent recurring equipment breakdowns. Failure Analysis of Industrial Equipment Training Course equips professionals with the knowledge and practical skills required to investigate equipment failures, evaluate operational risks, and implement sustainable corrective actions that enhance operational excellence and business continuity.

The course provides an in-depth understanding of mechanical, electrical, structural, and process equipment failures using internationally recognized methodologies and industry best practices. Participants will learn to apply Digital Reliability Analytics, AI-Driven Maintenance Strategies, Failure Modes and Effects Analysis (FMEA), Reliability-Centered Maintenance (RCM), Asset Performance Management (APM), Industrial IoT Monitoring, Data-Driven Decision Making, and Predictive Diagnostics to improve equipment reliability and lifecycle performance. Through practical case studies and real-world industrial examples, attendees will develop the capability to conduct systematic failure investigations and implement world-class reliability improvement programs.

Programme Curriculum

Failure Analysis of Industrial Equipment Training Course

Introduction

Industrial equipment failures can result in unplanned downtime, production losses, safety incidents, environmental risks, and significant maintenance costs. In today's highly competitive manufacturing, oil & gas, power generation, mining, chemical processing, and infrastructure sectors, organizations must adopt advanced Failure Analysis, Root Cause Analysis (RCA), Predictive Maintenance, Reliability Engineering, Asset Integrity Management, and Condition Monitoring techniques to identify failure mechanisms and prevent recurring equipment breakdowns. Failure Analysis of Industrial Equipment Training Course equips professionals with the knowledge and practical skills required to investigate equipment failures, evaluate operational risks, and implement sustainable corrective actions that enhance operational excellence and business continuity.

The course provides an in-depth understanding of mechanical, electrical, structural, and process equipment failures using internationally recognized methodologies and industry best practices. Participants will learn to apply Digital Reliability Analytics, AI-Driven Maintenance Strategies, Failure Modes and Effects Analysis (FMEA), Reliability-Centered Maintenance (RCM), Asset Performance Management (APM), Industrial IoT Monitoring, Data-Driven Decision Making, and Predictive Diagnostics to improve equipment reliability and lifecycle performance. Through practical case studies and real-world industrial examples, attendees will develop the capability to conduct systematic failure investigations and implement world-class reliability improvement programs.

Course Duration

5 days

Course Objectives

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

1. Understand advanced Failure Analysis and Reliability Engineering principles.
2. Apply Root Cause Analysis (RCA) methodologies to industrial failures.
3. Conduct systematic investigations using Data-Driven Failure Diagnostics.
4. Identify common Mechanical Failure Mechanisms and degradation modes.
5. Analyze Electrical Equipment Failures using modern troubleshooting tools.
6. Implement Predictive Maintenance and Condition Monitoring strategies.
7. Perform Failure Modes and Effects Analysis (FMEA) effectively.
8. Utilize Reliability-Centered Maintenance (RCM) frameworks.
9. Integrate Industrial IoT and Smart Maintenance Technologies into reliability programs.
10. Improve Asset Integrity Management and Lifecycle Optimization.
11. Apply Risk-Based Inspection (RBI) techniques to critical assets.
12. Develop corrective and preventive actions using Continuous Improvement Methodologies.
13. Enhance organizational performance through Digital Transformation in Maintenance and Reliability.

Target Audience

1. Maintenance Engineers
2. Reliability Engineers
3. Mechanical Engineers
4. Electrical & Instrumentation Engineers
5. Asset Integrity Professionals
6. Plant Managers and Operations Managers
7. Inspection and Quality Assurance Personnel
8. Maintenance Supervisors and Technical Specialists

Course Modules

Module 1: Fundamentals of Failure Analysis and Reliability Engineering

- Introduction to Failure Analysis concepts
- Equipment reliability fundamentals
- Failure mechanisms and degradation processes
- Reliability metrics and KPIs
- Asset lifecycle management
- **Case Study:** Reliability improvement program in a petrochemical processing plant.

Module 2: Root Cause Analysis (RCA) Methodologies

- RCA principles and frameworks
- 5 Why Analysis technique
- Fishbone (Ishikawa) methodology
- Fault Tree Analysis (FTA)
- Corrective Action Development
- **Case Study:** Investigation of recurring centrifugal pump failures in a refinery.

Module 3: Mechanical Equipment Failure Analysis

- Fatigue and fracture analysis
- Corrosion and erosion mechanisms
- Wear and lubrication failures
- Rotating equipment diagnostics
- Material failure investigations
- **Case Study:** Turbine shaft fracture analysis and corrective actions.

Module 4: Electrical and Instrumentation Failure Analysis

- Motor failure diagnostics
- Transformer failure investigations
- Electrical insulation degradation
- Instrumentation reliability issues
- Power quality impact assessment
- **Case Study:** Critical motor failure affecting production operations.

Module 5: Predictive Maintenance and Condition Monitoring

- Vibration analysis techniques
- Thermography applications
- Oil and lubricant analysis
- Ultrasonic inspection methods
- Predictive analytics and AI applications
- **Case Study:** Predictive maintenance implementation reducing downtime by 35%.

Module 6: Failure Modes and Effects Analysis (FMEA)

- FMEA methodology and structure
- Risk Priority Number (RPN) evaluation
- Criticality assessments

- Preventive action planning
- FMEA software applications
- **Case Study:** FMEA deployment in an automotive manufacturing facility.

Module 7: Asset Integrity and Reliability Improvement

- Asset Integrity Management Systems
- Risk-Based Inspection (RBI)
- Reliability-Centered Maintenance (RCM)
- Performance optimization strategies
- Continuous reliability improvement
- **Case Study:** Asset integrity enhancement in offshore oil and gas facilities.

Module 8: Digital Technologies for Failure Prevention

- Industrial IoT monitoring systems
- AI-powered failure prediction
- Digital twins for asset management
- Big data analytics in maintenance
- Smart maintenance transformation
- **Case Study:** Digital reliability platform implementation in a smart manufacturing plant.

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
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