# Equipment Failure Analysis 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

Equipment Failure Analysis Training is designed to equip professionals with advanced skills to systematically identify, diagnose, and prevent equipment failures across industrial environments. In today's data-driven and Industry 4.0 landscape, organizations demand predictive maintenance, root cause analysis (RCA), reliability engineering, failure diagnostics, asset integrity management, and condition monitoring capabilities to reduce downtime and maximize operational efficiency. This course integrates real-world failure investigation techniques with modern analytical tools such as vibration analysis, thermography, oil analysis, and failure mode and effects analysis (FMEA), enabling participants to transform reactive maintenance cultures into proactive reliability-centered operations.

With increasing pressure on industries such as oil & gas, manufacturing, power generation, mining, automotive, and heavy engineering, equipment failure analysis has become a mission-critical discipline for achieving operational excellence, asset reliability optimization, predictive analytics, downtime reduction, and cost-efficient maintenance strategies. This training focuses on bridging the gap between theory and industrial application by emphasizing structured methodologies like Root Cause Failure Analysis (RCFA), Failure Mode Analysis (FMA), Weibull Analysis, condition-based monitoring, and reliability-centered maintenance (RCM). Participants will develop the ability to investigate failures scientifically, interpret failure data, and implement sustainable corrective and preventive actions that align with global reliability standards and digital maintenance transformation trends.

## Programme Curriculum

**Equipment Failure Analysis Training Course**

**Introduction**

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data-driven and Industry 4.0 landscape, organizations demand predictive maintenance, root cause analysis (RCA), reliability engineering, failure diagnostics, asset integrity management, and condition monitoring capabilities to reduce downtime and maximize operational efficiency. This course integrates real-world failure investigation techniques with modern analytical tools such as vibration analysis, thermography, oil analysis, and failure mode and effects analysis (FMEA), enabling participants to transform reactive maintenance cultures into proactive reliability-centered operations.

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**Course Duration**

5 days

**Course Objectives**

1. Master Root Cause Failure Analysis (RCFA) techniques
2. Apply Reliability-Centered Maintenance (RCM) frameworks
3. Perform advanced Failure Mode and Effects Analysis (FMEA)
4. Develop predictive maintenance strategies using condition monitoring
5. Understand equipment lifecycle and degradation patterns
6. Conduct vibration analysis for rotating equipment diagnostics
7. Interpret thermography and infrared inspection data
8. Execute oil and lubrication analysis for fault detection
9. Apply Weibull distribution for failure prediction modeling
10. Improve asset reliability and uptime optimization strategies
11. Reduce operational risk using criticality analysis techniques
12. Integrate Industrial IoT (IIoT) in failure monitoring systems
13. Build data-driven maintenance decision-making capability

**Target Audience**

1. Maintenance Engineers & Technicians
2. Reliability Engineers & Asset Managers
3. Mechanical & Industrial Engineers
4. Plant Managers & Operations Supervisors
5. Condition Monitoring Specialists
6. Manufacturing & Production Engineers
7. Oil, Gas & Power Plant Professionals
8. Quality Assurance & Safety Engineers

**Course Modules**

**Module 1: Fundamentals of Equipment Failure Analysis**

- Types of equipment failures
- Failure patterns in industrial systems
- Introduction to RCA methodology
- Failure documentation and reporting systems
- Case Study: Unexpected pump failure in a chemical plant

**Module 2: Root Cause Failure Analysis (RCFA)**

- RCA frameworks
- Data collection and evidence preservation
- Failure investigation workflow
- Corrective and preventive actions
- Case Study: Conveyor belt breakdown in mining operation

**Module 3: Reliability-Centered Maintenance (RCM)**

- RCM decision logic process
- Critical asset identification
- Maintenance strategy selection
- Risk-based maintenance planning
- Case Study: Power plant turbine reliability optimization

**Module 4: Failure Mode and Effects Analysis (FMEA)**

- FMEA structure and scoring system
- Risk Priority Number (RPN) calculation
- Design vs process FMEA
- Mitigation planning strategies
- Case Study: Automotive engine assembly defect analysis

**Module 5: Condition Monitoring Techniques**

- Vibration analysis fundamentals
- Thermography and infrared diagnostics
- Ultrasonic and acoustic monitoring
- Oil analysis and contamination detection
- Case Study: Bearing failure detection in rotating machinery

**Module 6: Statistical Failure Analysis**

- Weibull distribution and reliability curves
- Mean Time Between Failures (MTBF)
- Failure rate modeling
- Data-driven forecasting techniques
- Case Study: HVAC system lifecycle failure prediction

**Module 7: Industrial IoT & Predictive Maintenance**

- Sensors and data acquisition systems
- Real-time monitoring dashboards
- Machine learning in failure prediction
- Smart maintenance ecosystems

- Case Study: Smart factory predictive maintenance system

**Module 8: Asset Integrity & Risk Management**

- Equipment criticality assessment
- Risk matrices and mitigation strategies
- Lifecycle asset management
- Maintenance cost optimization
- Case Study: Offshore drilling rig integrity failure prevention

## Training Methodology

- 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