

Course No. 1338

Root Cause Failure Analysis (RCFA) Training Course

MAINTENANCE ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Root Cause Failure Analysis (RCFA) Training Course provides a structured and practical approach for identifying the underlying causes of equipment failures, operational incidents, recurring defects, service interruptions, and process deviations. Rather than addressing visible symptoms or repeatedly applying temporary fixes, the course enables organizations to investigate failures objectively, understand contributing factors, and implement corrective actions that improve long-term performance.

For government entities, ministries, public sector organizations, banks, financial institutions, oil and gas companies, utilities, industrial facilities, and large corporations, repeated failures can affect operational continuity, safety, customer service, compliance, cost control, and organizational reputation. Root Cause Failure Analysis is therefore an essential capability for managing critical assets, reducing operational risk, and supporting disciplined decision-making across technical and business functions.

This RCFA training course examines the complete investigation lifecycle, from defining the problem and establishing the scope of analysis to gathering evidence, building event timelines, identifying failure mechanisms, testing potential causes, and developing effective corrective and preventive actions. Participants will learn how to distinguish direct causes from contributing factors and true root causes, ensuring that recommendations address the source of failure rather than its consequences.

The course connects technical investigation methods with maintenance management, reliability engineering, safety, quality, risk management, asset management, and continuous improvement. It helps leaders direct resources toward the most significant issues while enabling specialists to conduct consistent, evidence-based investigations. Participants will gain practical methods for improving reliability, preventing recurrence, strengthening accountability, and converting lessons learned into sustainable operational improvements.

Objectives

- Analyze the difference between symptom correction, immediate repair, corrective action, preventive action, and root cause failure analysis during the course.
- Assess the operational, safety, financial, environmental, compliance, and service-delivery impact

of selected failure events.

- Apply a structured RCFA process to define problems, establish investigation scope, and identify relevant stakeholders.
- Develop clear and measurable problem statements that describe the event, affected asset or process, impact, and investigation boundaries.
- Collect and organize technical, operational, maintenance, inspection, and stakeholder evidence for a defined failure scenario.
- Construct an event timeline that identifies confirmed facts, decision points, control gaps, and relevant operating conditions.
- Evaluate potential causes using tools such as Five Whys, Fishbone Analysis, Barrier Analysis, Fault Tree Analysis, and Failure Modes and Effects Analysis.
- Verify root causes through evidence review, technical validation, data analysis, and multidisciplinary challenge sessions.
- Design corrective and preventive actions that address verified root causes and reduce the likelihood of recurrence.
- Prioritize recommendations according to risk, operational value, feasibility, resource requirements, ownership, and implementation time.
- Improve RCFA reports by documenting evidence, assumptions, findings, actions, responsibilities, and verification requirements clearly.
- Develop a time-bound workplace action plan to strengthen root cause failure analysis practices after the course.

Who Should Attend

The Root Cause Failure Analysis (RCFA) Training Course is designed for maintenance managers, reliability managers, engineering managers, operations managers, asset managers, facilities managers, plant managers, technical services leaders, quality managers, HSE managers, and risk management professionals. It is particularly valuable for executives, directors, and decision makers responsible for critical assets, operational performance, business continuity, safety, service reliability, or organizational risk.

The course is highly relevant for maintenance engineers, reliability engineers, mechanical engineers, electrical engineers, instrumentation and control engineers, process engineers, maintenance planners, supervisors, technicians, inspectors, condition monitoring specialists, and failure analysis professionals. It supports professionals working in oil and gas, energy, utilities,

manufacturing, transport, infrastructure, property and facilities management, water networks, process plants, data centres, and other asset-intensive or service-critical environments.

Internal audit, compliance, procurement, supply chain, project management, digital transformation, operational excellence, customer service, and business continuity professionals may also benefit where their responsibilities include non-conformities, supplier failures, service disruptions, project delays, system incidents, or process risks. The course promotes a common investigation language across technical and business functions, enabling stronger collaboration and more sustainable improvement decisions.

Learning Outcomes

- Explain the role of Root Cause Failure Analysis in improving asset reliability, safety, quality, compliance, and operational continuity.
- Differentiate between direct causes, contributing factors, latent conditions, root causes, corrective actions, and preventive actions.
- Identify failure events that require a formal RCFA investigation based on risk, recurrence, severity, and business impact.
- Define a clear investigation problem statement, scope, objectives, and stakeholder requirements.
- Gather relevant evidence from maintenance records, operating data, inspection reports, event logs, interviews, and field observations.
- Develop a logical event timeline that separates verified facts from assumptions and identifies key points of failure.
- Select and apply suitable root cause analysis tools for technical, procedural, human, organizational, and system-related failures.
- Test potential root causes against available evidence and validate conclusions through structured technical review.
- Develop practical corrective and preventive actions that reduce recurrence and improve control effectiveness.
- Prepare implementation plans that define actions, owners, deadlines, required resources, and effectiveness measures.
- Produce professional RCFA reports that communicate findings, recommendations, risks, and follow-up requirements clearly.
- Present investigation outcomes effectively to management, operational teams, and other

relevant stakeholders.

Course Outline

DAY 01

Foundations of Root Cause Failure Analysis and Operational Reliability

- The strategic purpose of Root Cause Failure Analysis in maintenance, reliability, risk management, safety, quality, and business continuity.
- Understanding failures, incidents, recurring defects, process deviations, service interruptions, and non-conformities.
- The difference between reactive repair, symptom treatment, corrective action, preventive action, and root cause elimination.
- Criteria for initiating RCFA investigations: severity, recurrence, asset criticality, operational impact, and learning value.

PRACTICAL APPLICATION OR DISCUSSION

Reviewing failure examples and identifying which events require formal root cause failure analysis.

DAY 02

Problem Definition, Evidence Collection, and Event Reconstruction

- Defining the problem, investigation scope, objectives, stakeholders, roles, and responsibilities.
- Developing effective problem statements that identify the event, timing, location, affected asset or process, and business impact.
- Sources of evidence: work orders, maintenance history, operating records, inspection reports, alarms, photographs, procedures, and interviews.
- Building an event timeline and identifying confirmed facts, information gaps, assumptions, decisions, and environmental conditions.

DAY 02 — CONTINUED

PRACTICAL APPLICATION OR DISCUSSION

Creating a problem statement, evidence collection plan, and event timeline for a selected failure scenario.

DAY 03

Root Cause Analysis Methods and Investigation Tools

- Applying the Five Whys method to move systematically from an observed failure to deeper causes.
- Using Fishbone Analysis to examine people, processes, equipment, materials, measurements, environment, and management factors.
- Applying Barrier Analysis to identify missing, weak, bypassed, or ineffective controls.
- Introduction to Fault Tree Analysis, Failure Modes and Effects Analysis, causal factor charts, and their practical applications.

PRACTICAL APPLICATION OR DISCUSSION

Selecting and applying appropriate RCFA tools to analyze a workplace failure case.

DAY 04

Cause Verification and Corrective Action Development

- Distinguishing between possible causes, contributing factors, verified causes, root causes, and latent organizational weaknesses.
- Verifying conclusions through data review, field validation, technical testing, expert input, and multidisciplinary review.
- Designing corrective actions that address the root cause, strengthen controls, and improve operating discipline.
- Developing preventive actions, prioritization criteria, risk-based implementation plans, and measurable effectiveness checks.

DAY 04 — CONTINUED

PRACTICAL APPLICATION OR DISCUSSION

Preparing a corrective and preventive action register with owners, deadlines, priorities, and verification measures.

DAY 05

Reporting, Governance, and Sustainable Improvement

- Preparing professional RCFA reports for technical teams, senior management, auditors, and operational stakeholders.
- Managing recommendations, action tracking, escalation, closure requirements, and evidence of completed implementation.
- Measuring corrective action effectiveness and monitoring recurrence, reliability trends, and operational performance indicators.
- Integrating RCFA findings with CMMS, EAM, quality management, HSE, risk, asset management, and continuous improvement systems.

FINAL WORKSHOP, ACTION PLAN, OR IMPLEMENTATION EXERCISE

Conducting a complete RCFA case analysis and developing a 90-day implementation plan with priorities, accountable owners, milestones, and performance measures.

Register or Request More Information

Course page: <https://quest-training.com/courses/root-cause-failure-analysis-rcfa-training-course>

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