



# Root Cause Analysis (RCA)



## Introduction:

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RCA is an approach for identifying non-conformance underlying causes of why an incident occurred so that the most effective solutions can be identified and implemented. It's typically used when something goes badly, but can also be used when something goes well. Within an organization, problem solving, incident investigation and root cause analysis are all fundamentally connected by three basic questions: What's the problem? Why did it happen? What will be done to prevent it?

The primary objective of this course is to recognize the value of conducting proper root cause analysis and documenting failure investigations. Emphasis is placed on the application and practical, hands-on aspects of how to facilitate root cause analysis. Additionally, the course will provide candidates with the principles and techniques involved in identifying failures and deviations, categorizing problems, assigning responsibility and tracking team activities. This course is designed to teach the attendee how to use three of the most popular and useful problem solving techniques available today and Five Whys, Logic Trees, and Causal Factor Mapping. Class lecture will be reinforced with numerous practice opportunities, so the attendee will feel comfortable going back to the job and attacking chronic plant problems and incidents right away.

## Who Should Attend?

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Craft, first line supervisors, engineers, Mechanical Engineers, General Supervisors, Consulting Engineers, Design Engineers, Foremen, Supervisors, Technicians, Maintenance Personnel, Engineers of all disciplines, Supervisors, Team Leaders and Professionals in Maintenance, Engineering and Production Managers, Maintenance Personnel, Heads of Maintenance and Operation, Chemical Engineers, Equipment Specialists, Technical Engineers, Operation Engineers, Planning Engineers, Process Engineers, Reliability Specialists, Boiler Plant Construction Managers, Consulting Engineers, Design Engineers, Insurance Company Inspectors, Operation, Maintenance, Inspection and Repair Managers, Supervisors and Engineers, Plant Engineers, Senior Boiler Plant Operators, Repairers and Installers, Product Engineers and Technologists, Operation, technical service and maintenance professionals, Engineers, Consultants and Sales professionals, Technical professionals responsible for interdisciplinary energy projects, Load Lifting Engineers and Supervisors, Mobile Cranes Operators, Mobile Cranes Maintenance Engineers and Technicians, Mobile Cranes Inspectors, Load Lifting Safety Engineers and Professionals, all staff roles in engineering, technical and supporting departments with responsibility for ensuring safety in the workplace and for conducting, leading, reviewing and approving incident investigations and managers who may participate in root cause analysis investigations of chronic equipment problems, or serious incidents related to the environment or safety. Upper level managers who want to understand how rigorously applying Root Cause Analysis techniques can bolster bottom line results should also attend.

## Course Objectives:

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**By the end of this course delegates will be able to:**

- How to define root cause analysis
- What are the 5 Whys technique for failure analysis
- How to get everyone at the plant engaged in doing 5 Whys
- How to find root causes that can benefit corporate goals regarding OEE, injuries, environmental incidents, etc.
- Using Logic Trees to uncover the physical, human and latent causes of failures
- When it is appropriate to use the Logic Tree
- What the primary benefits of the Logic Tree approach

- Why gathering and preserving evidence is critical to root cause analysis
- How to find the best solutions once you have found the causes
- How to insure solutions are implemented and that they are effective
- The Causal Factor Mapping technique for failure analysis
- When it is appropriate to use Causal Factor Mapping
- What the primary benefits of the Causal Factor Mapping approach are
- How to establish triggers to know when RCA is appropriate
- How to find the chronic failures that are creating the most losses
- How to implement an RCA process at your plant
- How to identify effective corrective and preventative actions for problems or issues
- How to use root cause analysis to reduce risk throughout the organization
- How to use root cause analysis to reduce firefighting
- How to use an RCA Playbook to determine when each method is appropriate
- What circumstances trigger the use of RCA
- How driving to the root causes of failures can significantly increase OEE (Overall Equipment Effectiveness), as well as, reduce injuries and environmental incidents

## Course Outline:

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- Introduction to Root Cause Analysis concepts
- Finding root causes of unreliability and incidents versus fire fighting with chronic problems
- Use the team approach to identify the right problem and solution
- Distinguish root cause from symptom
- Use the six problem solving steps
- Basic problem solving
- Problem solving tools
- Compare RCA to FMEA and other reliability improvement techniques
- The simple 5 Whys method of failure investigation

- Finding how root causes impact business goals
- OEE (Overall Equipment Effectiveness)
- Injuries
- Environmental incidents
- Review OEE concepts and how increasing OEE benefits business
- Examples of RCA techniques improving OEE
- Calculate OEE and revenue improvements from RCA techniques
- Causal Factor Mapping for incidents and failures
- Using an RCA playbook and spread sheet to determine when each method is appropriate
- What circumstances trigger the use of RCA
- Flowcharting
- Brainstorming
- Cause & effect diagrams
- Check sheets
- Nominal group techniques
- How to use FMEA and Pareto to determine which problems to work on
- How to implement an RCA process
- Selling the benefits of RCA to management
- Possible approaches to RCA implementation and how to overcome resistance
- Develop an action plan resulting from RCA