

# Fault, Failure and Problem Prevention with Root Cause Analysis



## Course Description

### Course Duration

The duration is 2 days.

### Audience Profile

The course applies to anybody who has a need to solve problems, faults or failures, such as Asset Owners, Managers, Finance Managers and all who are eager to achieve sustainable improvement in productivity and return on investment. Secondly, this course aims at anybody else, as you can apply the RCA method to the analysis and solving of any problem in life.

### Course Objectives

To equip those active in the management of productive and infrastructure assets or facilities with the knowledge, skills and attitudes needed to solve problems, faults or failures in their efforts of optimizing the quality and quantity of asset outputs, minimising risk and use of inputs.

The course will combine theoretical concepts and practical considerations to assist with:

1. improving the ability to identify critical assets for immediate detailed analysis
2. understanding the difference between a fault and failure, cause and symptom
3. understanding the cause and effect relationship
4. performing a systematic and effective root cause analysis
5. understanding how RCA compares to other problem solving methods
6. preventing problems, faults and failures as a result of applying RCA, which, in industry, means optimizing asset output and minimizing costs and risk.

### What makes this course different?

We provide a logical and practical approach to solving problems, faults and failures.

## Main Topics – Day 1

- **Root Cause Analysis Explained**
  - Historic Development
  - What is Root Cause Analysis?
  - What Are the Objectives and Goals of Root Cause Analysis?
  - How Does Root Cause Analysis Link to Asset Management?
  - How does Root Cause Analysis link to Reliability Driven Asset Management?
  - Definitions and Acronyms
  - Definitions
  - Acronyms Used in this Manual
  - What Are the Benefits of Applying Root Cause Analysis?
  - Why should You Consider Using Root Cause Analysis?
  - What Is the Root Cause Analysis Process?
  - How Should You Implement Root Cause Analysis?
- **How to Identify Process or Asset Functions and Performance Standards?**
  - Desired Learning Outcomes
  - How to Identify the Process or Assets for Analysis?
  - How Important Is an Asset Hierarchy?
  - What Are Process and Functional Block Diagrams?
  - What Is an Asset Register?
  - Which Asset Register Structure?
  - How to Collect Data?
  - Who Should Be Responsible for Data Collection?
  - Which Asset to Analyze First?
  - Pareto Analysis
  - How to Select Significant Functions?
  - How Do You Assess Criticality?
  - How Can You Rank Asset Reliability Costs?
  - Obtaining the Biggest Return on Effort
  - How Do You Comprehensively Describe Functions?
  - What Are Process or Asset Functions?
  - What Are the Functional Performance Levels?



# Fault, Failure and Problem Prevention with Root Cause Analysis

## Course Description

- What to Include in the Function and Performance Level Description?
  - Main Outcomes of Chapter Two
  - Syndicate Exercise 1
  - **What Are Faults, Failures and Problems?**
    - Desired Learning Outcomes
    - What Are Functional Faults or Failures?
    - How to Deal With Safety or Stand-by Device Faults?
    - Different Views on the Same Loss of Performance
    - How to Describe Functional Faults?
    - Do You Need Asset Performance Data?
    - What Are Problems?
    - Can you use Root Cause Analysis for Meeting Challenges?
    - Main Outcomes of Chapter Three
  - **What Are Symptoms, Root Causes and Effects?**
    - Desired Learning Outcomes
    - Symptoms and Causes
    - What is the Difference between a Cause and an Effect?
    - So, What Is a Root Cause?
    - Two Types of Root Causes
    - Three Root Causes Areas
    - How to Deal with Human Error?
    - What is the close Link between Root Cause and Solution?
    - Why Identify All Root Causes?
    - What Are Fault Effects?
    - Rules for Defining Fault Effects
    - Main Outcomes of Chapter Four
- ### Main Topics – Day 2
- **What is Adequate Problem Solving?**
    - Desired Learning Outcomes
    - Isn't Problem Solving a Natural Skill?
    - Why is Problem Solving Often Ineffective and Inefficient?
    - Jumping to Conclusions or Not Defining the Problem
    - Placing Blame and Issuing Penalties
    - Using the Wrong Analysis Method
    - What Do You Need for Effective Problem Solving?
    - To Which Problems Can You Apply Root Cause Analysis?
    - Is There a Need for Consensus?
    - When to Apply Root Cause Analysis?
    - Continuous Improvement and Root Cause Analysis
  - Can You Use Computers in Root Cause Analysis?
  - Main Outcomes of Chapter Five
  - **How to Prevent Faults, Failures and Problems with Root Cause Analysis?**
    - Desired Learning Outcomes
    - Effective Problem Solving
    - Record Assumptions
    - Step 1. Define the Problem
    - What Is the Problem, Fault or Failure?
    - When and Where Did the Problem, Fault or Failure Happen?
    - Information Gathering
    - Additional Tasks for Events that already Happened
    - Who Was Involved in the Problem, Fault or Failure or in its Detection?
    - What Is the Criticality of the Problem, Fault or Failure?
    - Step 2. Identify Cause and Effect Relationships
    - Causes and Effects
    - Evidence
    - Diagram Development Technique
    - Allocating Severity and Likelihood to Causes
    - Benefits of the Cause and Effect Diagram Method
    - Example of a Cause and Effect Diagram Development
    - Step 3: Identify Effective Solutions
    - What Are Effective Solutions?
    - What Solutions Are Available?
    - Solution Finding Technique
    - Assessing Solutions for Effectiveness and Efficiency
    - Ensure that the Solution Does not Introduce Other Problems
    - Extending the Solution Assessment Sheet
    - Presenting the Findings
    - Which Solutions to Approve?
    - Step 4: Implement the Best Solutions
    - Implementing the Solutions
    - Monitoring the Effectiveness of the Implemented Solutions
    - Root Cause Analysis Documentation
    - Additional Administrative Tasks
    - Can You Apply the Same Analysis Results to Other Assets?
    - Can You Use Root Cause Analyses for Finding Systematic Problems?
    - Main Outcomes of Chapter Six



# Fault, Failure and Problem Prevention with Root Cause Analysis

## Course Description

- **Other Problem Solving Techniques**
  - Desired Learning Outcomes
  - Selecting the Best Root Cause Analysis Method
  - What Are Time Sequence Models?
  - What Are the Gate/Logic and Event/Terminal Symbols?
  - What Are Fault or Success Trees?
  - What Are Event Trees?
  - Failure Cause and Effects Analysis
  - Interrelationship Diagrams
  - Current Reality Tree
  - The Ishikawa or Fishbone Diagram
  - Checklists
  - Management Oversight and Risk Tree Analysis
  - Barrier Analysis
  - Human Performance Evaluation
  - Change Analysis
  - Employee Brainstorming
  - Main Outcomes of Chapter Seven
- **How to Implement Fault, Failure and Problem Prevention with Root Cause Analysis?**
  - Desired Learning Outcomes
  - Pre-requisites to Successfully Implementing Root Cause Analysis
  - Realize and Understand the Need for Root Cause Analysis
  - Why Do You Need Management Support?
  - Adopt Root Cause Analysis Policies and Procedures
  - Training Root Cause Analysis Teams
  - Who Must Be on the Team?
  - How to Implement Root Cause Analysis?
    1. Introduce Root Cause Analysis to the Decision-makers in the Organization
    2. Develop Root Cause Analysis Program, Policy and Procedures
    3. Set-up and Train Root Cause Analysis Teams and Identify Champions
    4. Identify the Criticality of Assets or Possible Problems
    5. Select a Process or Asset for an Initial Root Cause Analysis
    6. Describe Functions and Performance Levels
    7. Define the Problem, Fault or Failure
    8. Analyze the Problem, Fault or Failure with the Cause and Effect Diagram
    9. Communicate Findings & Recommendations and Obtain Approval for Implementation
    10. Immediately Implement the Solutions
    11. Track and Analyze the Results and Feed Back Findings

12. Make Root Cause Analysis Part of Asset Management
- Some Additional Comments
- Analyze One Primary Effect at a Time.
- Have Two Teams Analyze Critical Assets or Problems
- Do not let Consultants Perform Your Root Cause Analyses!
- Main Outcomes of Chapter Eight

All delegates will receive a textbook that sets new standards for industrial training materials that will reinforce the training experience for many years to come.

### Seminar Leader – Emile Eerens

Emile Eerens holds a doctoral degree in Engineering and a Grad.Diploma in Business Management. Emile has experience in planning and managing shutdowns in power stations and mines in Australia and is extensively involved in “training for excellence” in the wider business of asset maintenance and management.

Emile has over 22 years experience as an Asset Maintenance and Management Engineer, Trainer and Consultant. In his career he worked in the Power Generation, Electricity Distribution, Mining, Health Facilities, Construction and Petrochemical Industries and has experience in Supervision, Design, Engineering, Research & Development, Training and Management.

He is in demand as a developer and presenter of various public and in-house Asset Maintenance and Management courses.

