



Audience Profile

The book is suitable for everybody seeking to improve their problem solving skills and who would like to apply a successful method to assist in achieving most effective and efficient asset or facility management. The Root Cause Analysis method systematically guides you through solving problems, faults or failures. At the same time, the method records the experience of many people, addresses risk, selects necessary tasks only and optimises the budget and profits.

Asset Owners, Managers, Engineers, Planners, Trades People, Operators, Finance Managers, Safety Officers and all those who contribute in their roles of operators and maintainers, engineers, designers, logisticians, administrators, workshops, etc. to the development of solutions.

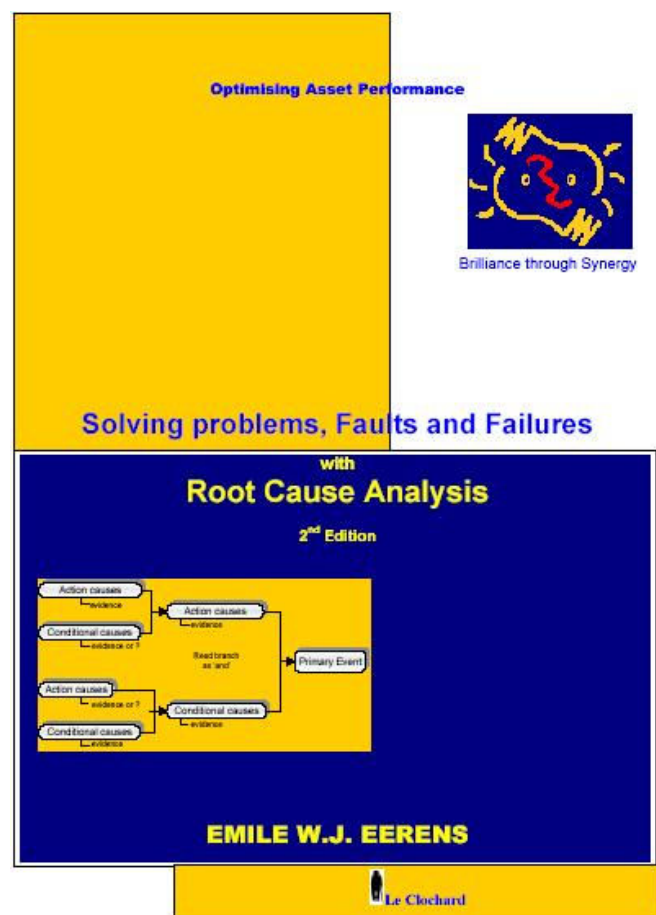
Objectives

To provide the reader with:

- knowledge, understanding, skills and attitude necessary to perform RCA analyses for solving problems, faults or failures
- practical methods for solving problems
- all the documentation, forms and flow-charts required for easy implementation of this technique

What makes our RCA approach different?

We produce analysis and solution evaluation sheets.





Contents

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?

2. 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?
What to Include in the Function and Performance Level Description?
Main Outcomes of Chapter Two
Syndicate Exercise 1

3. 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

4. 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

5. 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

6. 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
7. 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
8. 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
BIBLIOGRAPHY

