



Audience Profile

The manual aims at every maintenance or asset management professional or practitioner who wants to determine the most effective and efficient tasks for maintaining the functions of their assets at the required performance levels. At the same time, the method records the experience of many people, addresses risk and root causes and optimises your budget and profits.

Objectives

To transfer to the reader the skills and analysis sheets to perform an RDAM analysis to develop a maintenance plan that supports the aims of optimising the quality and quantity of asset outputs (revenue), minimising risk and life cycle costs, ready for immediate implementation.

What makes our RDAM approach different?

We add extra questions, dealing with operator-maintenance, detectability of fault or failure, task duration and required resources. We refer to protective and standby devices instead of 'hidden failures', include a detailed risk assessment and a decision diagram with guiding questions on the analysis sheet. We analyse at root cause level instead of 'failure mode' (defined as 'how you observe a failure', which is the symptom). We include standard six functional failures for each combination of a function and performance level.



Failure Mode Effect & Criticality Analysis	Conventional Reliability Centred Maintenance	Reliability Driven Asset Management
	Identify Function	Identify Functions and Performance Levels
	Identify Functional Failures	Identify Functional Failures (use 6 standard failure types for each F/PL)
Failure Mode (how you observe failure = symptom) Talks about failure	Likely Failure Modes (how you observe failure = symptom) Talks about failure	Identify all possible Root Causes for Faults (deterioration) & Failures
		How can you detect Fault or Failure? (links to design modification)
Failure Effects	Failure Effects	Failure Effects
Failure Criticality Basic Severity * Likelihood	Failure Criticality Severity (4 issues)	Failure Criticality Severity (4 issues) * Likelihood * detectability
	Select Tasks and Frequency (requires looking up selection diagram in a book, spread over two pages)	Select Task Type (BD, TB, CB, OM, FF, DO) (selection diagram and questions on form)
	Identify Tasks and Frequency	Identify actual primary & secondary Tasks, Frequency, Duration and Needed Resources



Contents

1. Reliability Driven Asset Management Explained

Historic development of Reliability Centred Maintenance
What is Reliability Driven Asset Management?
What are the objectives and goals of Reliability Driven Asset Management?
How does Reliability Driven Asset Management link to asset management?
Definitions and Acronyms
What are the benefits of applying Reliability Driven Asset Management?
Why should you consider using Reliability Driven Asset Management?
What is the Reliability Driven Asset Management process?
How should you implement Reliability Driven Asset Management?

2. How to Identify Process or Asset Functions And Performance Standards?

Desired learning outcomes
How to identify the process or assets for analysis?
Do you know your asset hierarchy?
What are process and functional block diagrams?
What is an asset register?
Which asset register structure?
How to collect asset register data?
Who should be responsible for data collection?
Which asset to analyse first?
Pareto analysis
How to select significant functions?
How do you assess criticality?
How can you rank asset reliability costs?
How do you comprehensively describe functions?
What are process or asset functions?
Can you link functions to the current asset application?
Can you include asset policy in function description?
Can you link functions to the operator tasks?
Vandalism and operator error
What are the functional performance levels?
Main outcomes of Chapter Two
Syndicate Exercise 1

3. What Are Faults, Root Causes, Effects, Detectability, Consequences And Criticality?

Desired learning outcomes
From FMECA and RCM to FCECA and RDAM
How does Reliability Driven Asset Management link to risk management?
What are functional faults?
Fault definition
Do you need asset performance data?
Different views on the same fault
Multiple functional faults
How to describe functional faults?
How many faults or failures for each function?
How to identify root causes?
What is the link between failure type and the choice of maintenance tasks?
What are fault effects and consequences?
Fault effects
Rules for defining fault effects
How do you detect a fault?
How do you rank fault consequences

Is the effect different between gradual and sudden faults or failures?
Fault consequences and stand-by or parallel assets
Fault consequences and existing safety features
How do fault consequences relate to buffers and repair time
How to assign failure criticality or risk?
What is the severity of fault consequences?
What is the likelihood of occurrence?
AS/NZS 4360 Risk Management
How to calculate risk?
Do you need to consider detectability?
Main outcomes of Chapter Three
Syndicate exercise 2

4. How To Select Maintenance Tasks?

Desired learning outcomes
How did maintenance techniques evolve?
Breakdown maintenance
Preventive maintenance
Predictive maintenance
Pro-active maintenance
Comparison of techniques
Integrated maintenance or asset management
How do you select tasks?
Task choice criteria
Selecting multiple tasks
How do fault patterns affect task choice?
Count-related fault types
Condition-related fault types
What other maintenance regimes can you use?
Operate to fault or no pre-emptive maintenance
Process protection fault finding
Redesign or design-out
Main outcomes of Chapter Four

5. How to Use the Reliability Driven Asset Management Analysis Sheets?

Desired learning outcomes
What analysis level do you choose?
Analyse functions, not parts
How to use our RDAM information sheet?
Functions, performance levels and functional faults
Functional faults
Fault causes, detection and effects
External causes
What are the conventional task choice diagrams?
Why place a decision diagram on the decision work sheet?
Can you include operator maintenance?
RDAM and operational tasks
How to use our RDAM decision sheet?
Assessing risk
Consequence measured over time
How do you select the most appropriate task?
When do you need primary and secondary tasks?
Task description and assessment of cost-effectiveness
On-line or off-line tasks
Task frequency
Task duration
Who is performing the tasks?
Analyse all assets
How to dramatically improve the value of the risk analysis to decision making?
What does RDAM assess now?
What could RDAM assess?
Further cost finetuning.
What other improvements are possible?



What is the value of these improvements?
Are there other sources of maintenance tasks?
Asset replacement tasks
Activities related to statutory requirements
Community service obligations
Assessment of condition of existing assets
Chapter Five for existing assets
Main outcomes of Chapter Five
Syndicate exercise 3a and 3b
6. How to Develop the Workplan?
Desired learning outcomes
Auditing the Reliability Driven Asset Management analyses
How to develop the work schedules?
Operational planning
Developing an asset management plan
The outputs of the RDAM analysis
Work packaging
Workload leveling
Task administration
How to develop human resource needs?
What is the effect of RDAM on staff numbers?
How to estimate materials and spares needs?
How to estimate the need for tools and equipment?
How to estimate the need for workshops?
How do you optimize life cycle costs and budget forecasts?
What are the consequences of arbitrarily changing the budget?

Benefits of providing the RDAM-based budget
How do you develop standard task instructions?
Implement the RDAM-based asset management plan
Should you use Reliability Centred Maintenance software?
What is the link between RDAM and CAMS?
Up-load the tasks, frequencies and descriptions into the CAMS
Main outcomes of Chapter Six
Syndicate Exercise 4a, 4b and 4c
7. How To Implement Reliability Driven Asset Management?
Desired learning outcomes
Timing of the Reliability Driven Asset Management analysis
How to implement Reliability Driven Asset Management?
Pre-requisites to successful implementation of RDAM
Who must be on the Reliability Driven Asset Management team?
Role of team members
Role of a facilitator
Continuous improvement and Reliability Driven Asset Management
Continuous improvement with the Deming Cycle
Should you fast-track Reliability Centred Maintenance?
Main outcomes of Chapter Seven
Bibliography