



ACHIEVE MAXIMUM OPERATIONAL AVAILABILITY WITH SAFE OPTIMUM LEVELS OF MAINTENANCE WITH IFS RELIABILITY-CENTERED MAINTENANCE

Reliability-Centered Maintenance (RCM) is the 21st century, defensible, methodical and scientific approach to the establishment of safe optimum levels of maintenance. It also supports changes to operating procedures and strategies and the establishment of capital maintenance regimes and plans. This leads to increases in cost effectiveness, equipment uptime, and a greater understanding of the level of risk that an organization is presently managing.

WHY RCM?

The traditional approach to maintenance planning by service and maintenance engineers applied the premise that it is better to have a preventive service and maintenance regime than one based on only repair when there is a failure.

However, history has proved time and time again that invasive (sometimes unnecessary) maintenance can compound the situation and introduce further failure.

RCM uses a range of approaches, within a decision framework, to deliver the optimum maintenance strategy for complex, safety-critical assets; balancing risk, cost and environmental factors to extend 'through life expectancy'.

WHAT MAKES RCM DIFFERENT?

The origins of the RCM approach were based in the need to manage the increasing equipment complexity and costs within the aviation industry. The driver was to improve safety records in the 1960s and 1970s, during the transition between propeller and jet propulsion technology.

RCM also has its origins in a key study commissioned by the US DOD (carried out by Nowlan and Heap from United Airlines) in 1978. The Nowlan and Heap study found that the fundamental assumptions made by design and maintenance planners on the expected life of reliable service from components such as aero engines, undercarriage, navigation systems etc. were wrong in almost every specific example in a complex jet airliner. These findings created a paradigm shift in the understanding of failure management, including:

- A realization that the vast majority of failures are not necessarily linked to the age of the asset;
- The need to focus on managing the process of failure rather than trying to predict life expectancy;
- A need to understand the differences between the user requirements of an asset compared with the design capability;
- A need for an understanding of the management of the condition of an asset;
- A strategy to link the levels of tolerable risk to maintenance strategy development.

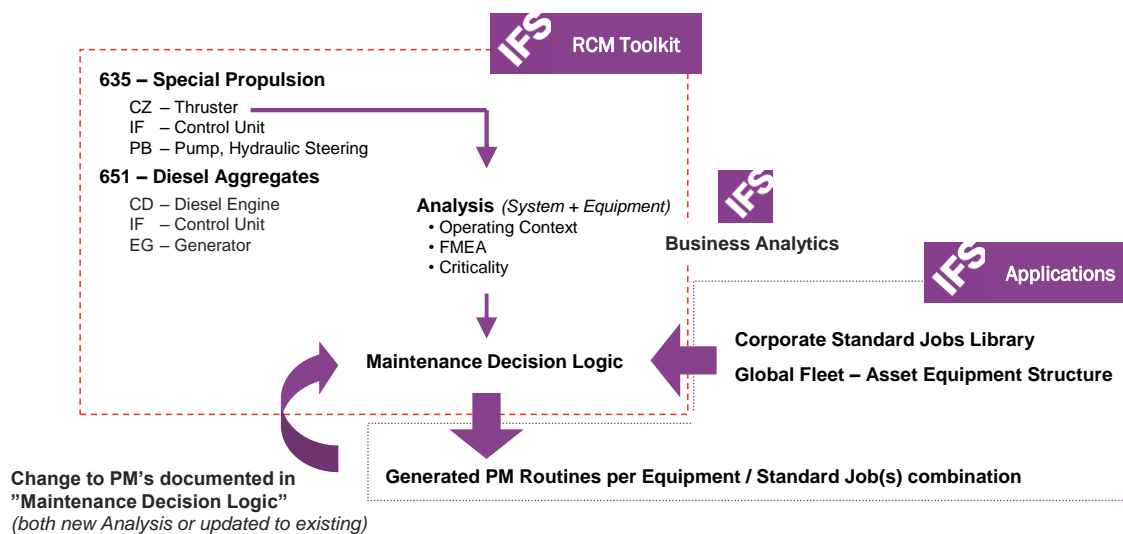
These initial findings were further developed by Moubray in his industry-leading book RCM II, first published in 1991. Here he characterized RCM as a process to establish the maintenance requirements of a physical asset in its operating context and an engineering framework that enables the definition of a complete maintenance regime. Fundamentally, RCM regards maintenance as the means to maintain the functions a user may require of equipment in a defined operating context. It does this by taking a detailed approach to individual components within equipment, such as a pump, while also addressing how the pump fits holistically into the asset in which it operates, together with the performance criteria and safety-related issues that have been established for the asset.

GETTING STARTED WITH RCM

Managers with responsibilities for asset performance—principally for reliability and availability—face a significant challenge in selecting the most appropriate technique in the face of several different failure types.

The IFS RCM Toolkit™ provides a structured decision support process that consists of the following steps:

- Define the maintenance problem and gather basic information;
- Define the functions and desired performance standards for each item of equipment;
- Define all the ways in which it can fail to deliver the required performance (functional failures);
- Establish the causes of failure (failure modes);
- Record what happens when each failure mode occurs (failure effects);
- Establish a strategy for dealing with each failure mode based on an assessment of failure consequences (protection which is not fail-safe, failures which endanger life or the environment, failures which affect the organization’s business objectives, failures that only involve the cost of repair);
- Assess the applicability of different types of failure prevention and establish task frequencies (condition-based maintenance tasks, scheduled overhaul tasks and scheduled discard tasks).



IFS Applications™ provides the framework within a software business solution to:

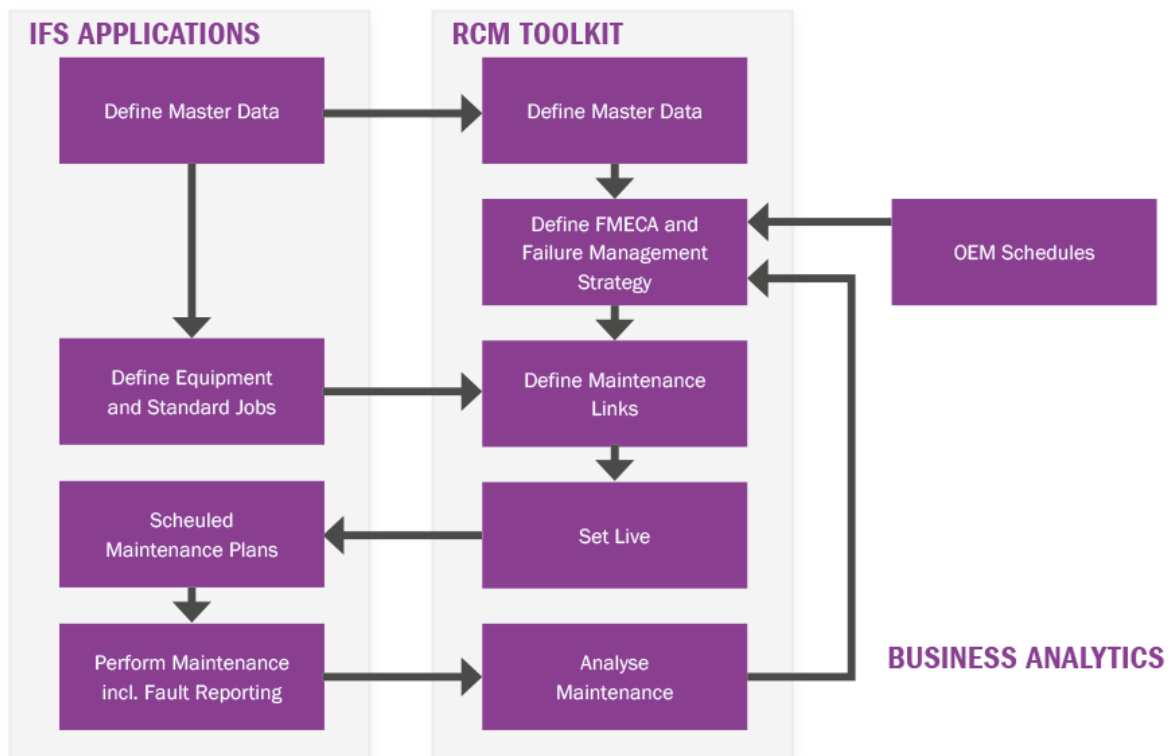
- Help organizations develop an RCM strategy
- Collect the data for the management of complex and mission critical assets
- Enable standardization across a global fleet
- Ensure documented, auditable change to the resulting Maintenance Plan
- Establish ownership of results



IFS'S RCM TOOLKIT

IFS's RCM Toolkit enables storage of maintenance strategies derived using RCM analysis techniques into a database. It is specifically targeted to deliver the optimum maintenance strategy for complex, safety critical assets and balance risk, cost and environmental factors to extend 'through life expectancy'.

The IFS RCM Toolkit delivers core RCM process support capability using the latest presentation technology. It supports the criteria for RCM set out in SAE JA1011 and capable of working in a stand-alone mode (facilitating RCM on site with core team). Customers also have the option to use the RCM Toolkit delivered through Software as a Service (SAAS), where training and consultancy is available using our strategic partners.



THE RCM TOOLKIT:

- Provides an industry standard to define a maintenance program
- Creates a cost-effective maintenance strategy to address dominant causes of equipment failure
- Ensures safety, environmental and operational failures are minimized
- Helps reduce over-maintenance
- Acknowledges that the majority of failures are not age-related
- Results in a maintenance program that focuses scarce economic resources on those items that would cause the most disruption if they were to fail.
- Results in an auditable and defensible maintenance strategy-supporting “PMS RCM” class requirements imposed by classification authorities and regulators



WHAT RCM CAN DO FOR YOU

Some 450 global customers use the IFS RCM Toolkit. The footprint includes such diverse industries as oil production, vineyards and wine production, defense and the chemical industry.

RCM should be used in any industry that implements complex or capital-intensive assets or is reliant on correctly functioning assets to provide an output.

RCM provides an industry standard to define a maintenance program, creating a cost-effective maintenance strategy to address dominant causes of equipment failure. It ensures that safety, environmental and operational failures are minimized, while reducing over-maintenance. It results in a maintenance program that focuses scarce economic resources on those items that would cause the most disruption if they were to fail.

RCM can provide you with a systematic approach to optimizing your asset maintenance. Successful implementation of RCM will lead to an increase in cost effectiveness and machine uptime, and a greater understanding of the level of risk that your organization is presently managing.

CASE STUDY BENEFITS USING IFS RCM

The UK Royal Navy has implemented IFS and RCM throughout its fleet. It predicted a considerable reduction of maintenance, while still ensuring that safety and operations are maintained, even in safety-critical assets such as nuclear submarines.

IFS has supported the delivery of key benefits through its IFS RCM Toolkits, and the UK Royal Navy has seen a significant return on investment, including:

- AC power generation & distribution maintenance reduced some 45%
- Steam system maintenance and diesel generator maintenance reduced by over 60%
- HP air system maintenance reduced by more than 52%
- Radar & ESM maintenance reduced by at least 65%
- Lubrication oil system maintenance reduced by nearly 70%
- Sonar maintenance reduced by nearly 50%

BENEFITS TO YOUR ORGANIZATION

RCM AUTHORIZING TOOL	Authoring of RCM Analyses	Fully configurable to meet diverse industrial needs.
WORKFLOW	Versioning and approvals workflow capability	Aids control and rigor of output production to improve efficiency
FMECA TOOL	FMECA (Failure Mode, Effects and Criticality Analysis)	Intuitive entry for Failure Mode, Effects and Criticality information significantly aids ease of use and thus productivity
FAILURE MANAGEMENT STRATEGY	Maintenance tasks and intervals	Defined schedules aid planning and spares procurement
STANDARDS	Supports multiple standards	User configurable, e.g. RCM 2, DefStan 00-45, etc.
RCM ANALYSIS VALIDATION	Auto-validation	Automatic analysis validation based on the user-defined standard aids QA
FFI CALCULATOR	Built-in Failure Finding Interval Calculator	Aids effective determination of maintenance intervals
REPORT GENERATION	Standard Reports	Proven pre-formatted industry-standard reports

LEARN MORE

To find out more about how IFS Applications for RCM can help improve the efficiency of your operation, visit www.IFSWORLD.com.