



## The RCM Analyst - Beyond RCM

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**About the Author:** Daryl Mather was originally trained in RCM in 1991, after which he was involved in the application of the method through a range of capital-intensive industries. He later studied with the late John Moubrey as a former principal of the Aladon network and is the author of two books on the maintenance discipline.

He developed the RCM Analyst method in response to the increasing challenges to implementing RCM during the late 20<sup>th</sup> century and early 21<sup>st</sup> century and currently works with selected clients throughout the world. He has worked through the majority of capital-intensive industries and in over twenty countries in the areas of asset management, reliability and RCM.

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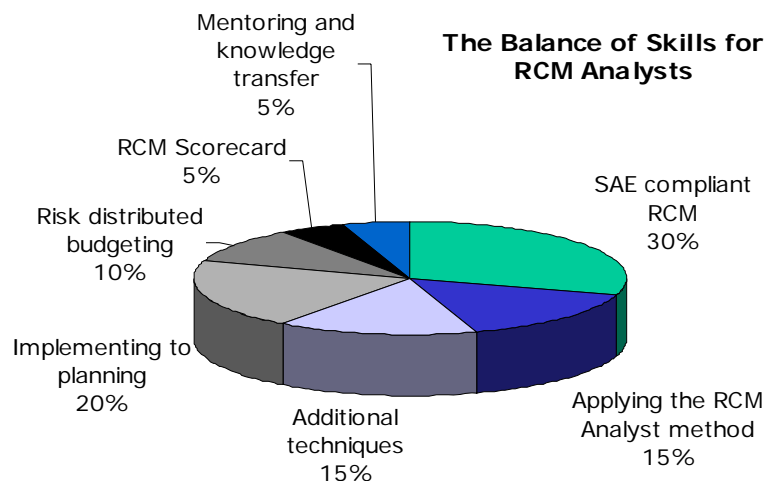
## During the Implementation Phase

The RCM Analyst method is designed to achieve results far beyond traditional measures of equipment performance, in fact a comprehensive end-to-end implementation effort can result in a permanent transformation to the way a companies manages its asset management function. Once a corporation comes to grips with the potential magnitude of an RCM implementation, thoughts often turn to what the future could look like for asset management within their company.

In order to gain an insight into the potential for change, there is a need to understand the role that the central figures, the RCM Analysts, are trained to fulfil to play within the asset management functions of their companies. Through the intensive focus on knowledge transferral the RCM Analyst method brings about permanent change through changing the way that people think about their physical asset base.

The RCM Analyst is a highly trained individual who is focussed not only on the application of the method, but also in areas where there have been notable failures to implement RCM in its recent history.

**Figure 1. Balance of Skills for RCM Analysts**



While there is a consistent and intense focus on the SAE compliant RCM method itself, there is also substantial training and development on areas such as:

- ❑ Executing the analyses using the RCM Analyst approach, thus reducing the resource requirements to match the resource constraints of modern industrial organizations. This is the initial thrust of the RCM analyst method and is outlined in the article "The Age of the RCM Analyst".
- ❑ Implementing the recommendations in each of the areas where action may need to be taken. This includes modification and capital planning interfaces, short / medium and long term planning and scheduling functions, changing operational procedures, and of course, implementing the routine maintenance regimes within the computerised maintenance management systems where these have been used.
- ❑ Using the outputs of RCM to intertwine with risk distributed budgeting models and ties this to the human resources and inventory management areas of maintenance management. This includes an overview of how the RCM method fits into the Whole-of-Life progression from static to stochastic methods.



- ❑ Using business intelligence initiatives, such as the RCM Scorecard<sup>i</sup>, to manage the review process, and to implement the method as part of a living reliability initiative.
- ❑ Additional areas such as selecting assets for analysis, using both the prioritization and asset criticality methods, and teaching how and when these should be applied. As well as human error probabilistic analysis and other related reliability techniques.
- ❑ Continuing the knowledge transfer process through the regular use of models, diagrams and other tools and techniques. This has been one of the failings of knowledge transfer in this area, leading to a dilution of the levels of understanding as the organization moves on from the implementation stage.

The role of RCM Analyst is a role that can accompany people through their career development within the organization. For this reason it is recommended that Analysts are drawn from every level of corporate activity, including the technician and craft level, through to the senior management levels.

This training and specific development makes the core of RCM Analysts the key leaders and implementers of the method throughout the company, as well as becoming the champions for the method. However, even during the implementation it is recommended that the majority of RCM Analysts do not leave their full time roles. Depending on the number of analysts trained, the scale of the implementation and the timeframe for the implementation, Analyst numbers are calculated to allow people to participate part-time for between 15% and 50% of their day-to-day role. Thus allowing for a rigorous and wide spread implementation, while maintaining the low level of resource requirements that has become the hallmark of the method.

### **Post-implementation activities of the RCM Analyst**

The skills that make up the RCM Analysts abilities to implement, lead, and perform RCM analyses, also allow them to provide the long-term support for the asset management efforts throughout the organization. Reliability-centred maintenance, when implemented correctly, forms the backbone of a living reliability program. One that continues to evolve with time, and one that will permanently transform the organization in which it has been implemented.

RCM Analysts are drawn from every level of the organization and include technicians, engineering staff, managers and supervisors as well as higher-level management at times. While there is often a strong case for removing one or two analysts from day-to-day duties to become overall coordinators and managers of the living program, it is usually the case that RCM Analysts return to their pre-implementation roles. Albeit with a greater knowledge of reliability, the physical asset base they are managing, and the issues and success factors that impact on asset management within their organizations.

Once back in their pre-implementation roles, the RCM Analysts remain the guardians and champions of the RCM process within their company. The role is not intended to be one of implementation only; it is intended to be a role that people will be performing throughout their time within the organization regardless of promotion, role changes or other issues.

The post-implementation activities that an RCM Analyst is normally involved in include:

- ❑ Periodic reviews and maintaining the integrity of the analyses
- ❑ Application of RCM to wider fields of endeavour. In particular the areas of reviewing capital equipment at design stages or later to ensure it is the most reliable and maintainable possible.
- ❑ Application of RCM techniques to the purchasing of new equipment, and to the materials and parts that are supplied by manufacturers.
- ❑ Application of reliability techniques to modifications to ensure that they are the most cost effective solutions.
- ❑ Being the mentor and influencer to the immediate surrounding team.



It is in these areas where an implementation of RCM truly becomes the living program. That is, a part of day-to-day management of the physical asset base rather than merely a spot solution or the "program of the month". Through the application of the skills, and experiences, gained during the implementation stages, the RCM Analysts are able to continue guiding the reliability and equipment performance efforts of the organization.

These areas are summarised below in order to clarify the extent and intensity of the work required.

### **Periodic review and optimisation**

RCM programs will deliver the safest minimum level of maintenance, within a given operating context, for a given level of performance. However, over time the way that assets are used can change substantially, as can the requirements of their performance. This impacts directly on the maintenance regimes that have been put into place and will require review to ensure that the equipment continues to receive the safest minimum levels of maintenance.

For this reason it is necessary to ensure that RCM Analysts are continually reviewing past analyses to check if:

1. the operating context has not changed,
2. the performance requirements of the assets themselves has changed;
3. there have been introductions, alterations or increases in the attention paid to legislative and / or regulatory requirements
4. there may have been changes to the way that expenditure is able to be allotted, thus forcing a rethink in terms of the management for the physical asset base

The majority of this information will be able to be managed via the processes and communication paths that have been put in place during the implementation phase. However, there will be times when analysis reviews are required. These will be minor reviews that take a fraction of the time of the initial review or template application.

This also includes the reviews of processes and data gathering techniques to ensure that the full end-to-end benefits of the RCM Analyst approach continue to be achieved long after the initial implementation.

However, the other reason for initiating an analysis review will be if the original analysis was mistaken, or slightly inaccurate, in some fashion. In the past these sorts of modifications or adjustments were made using either personal judgement, communications, or through waiting for an undesirable event to occur.

Through the RCM Analyst method, we have introduced the RCM Scorecard, a business intelligence tool that replaces the inadequacies of human judgement. Particularly when it needs to be applied in a uniform manner across an asset base containing potentially millions of assets.

The RCM Scorecard is aimed at monitoring the RCM implementation to ensure it achieves what RCM should be achieving. When this is not the case it is shown as an exception for action to be taken.

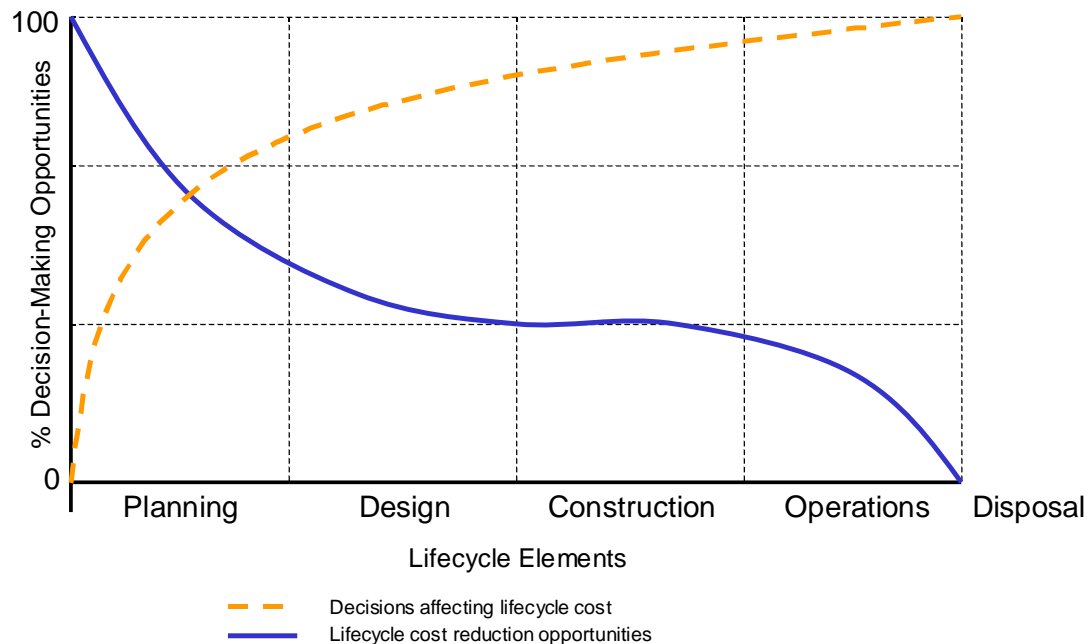
### **Extending the reach of RCM**

The standard approach to implementing RCM is generally to analyse the performance of existing physical assets. However, as organizations become more familiar with the benefits of RCM, its underlying concepts, and the potential risks that are inherent in the management of physical assets, then there is more of a push to integrate reliability concepts earlier in the life cycle of the physical assets.

This leads often to incorporating RCM analyses within the design phase of asset construction and delivery projects, leading to more maintainable, reliable and operable plant delivery. However, it also leads to the incorporation of RCM principles and practices into the purchasing and procurement aspects of asset management. This is a collaborative step that begins to force a greater level of reliability thinking not only within the company, but also from those involved externally with the company.



**Figure 2. Decision Making Opportunities within the Life Cycle of physical assets**



As corporations go down this path, this area can become one of the main drivers of post implementation usage of an RCM Analyst's time. Corporations with a great deal of capital projects that are coming online can find that RCM Analysts time is dedicated to this area, rather than the distribution shown in Figure 4, if the company has embarked on a large scale capital investment program there may even be justification for permanent RCM Analysts within this area.

Likewise, if an organization has decided to collaboratively manage its relationships with suppliers, then there may be a need to apply RCM principles to existing purchasing arrangements in order to reduce in-service failures, increase maintainability and improve the working relationships with suppliers. In past experience this has assisted companies to develop mutually agreed extended warranty situations based on an RCM regime, rather than the originally provided manufacturers recommendations.

### **Modifications and capital efficiencies**

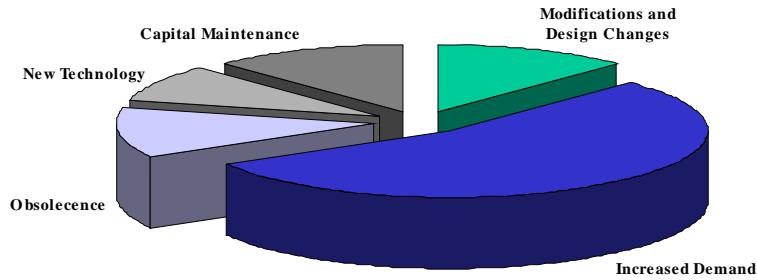
Within most corporations there is a balance of capital spending which includes a range of areas such as:

- capital maintenance (Replacements and major refurbishments. Handled under standard RCM implementations)
- parts and equipment obsolescence
- new technologies
- increased demand forecasting
- and, modifications and design changes to existing plant.

As can be seen in Figure 3 the percentage of this that is spent on design changes, while not the dominant area, is often considerable. AN adaptation of RCM, known within the RCM Analyst method as Technical Change Management, helps organizations to run through these items questioning whether or not this is the most cost effective solution, and also whether or not it is truly cost effective to perform a design change in this situation.



**Figure 3. RCM as applied to modifications optimization**



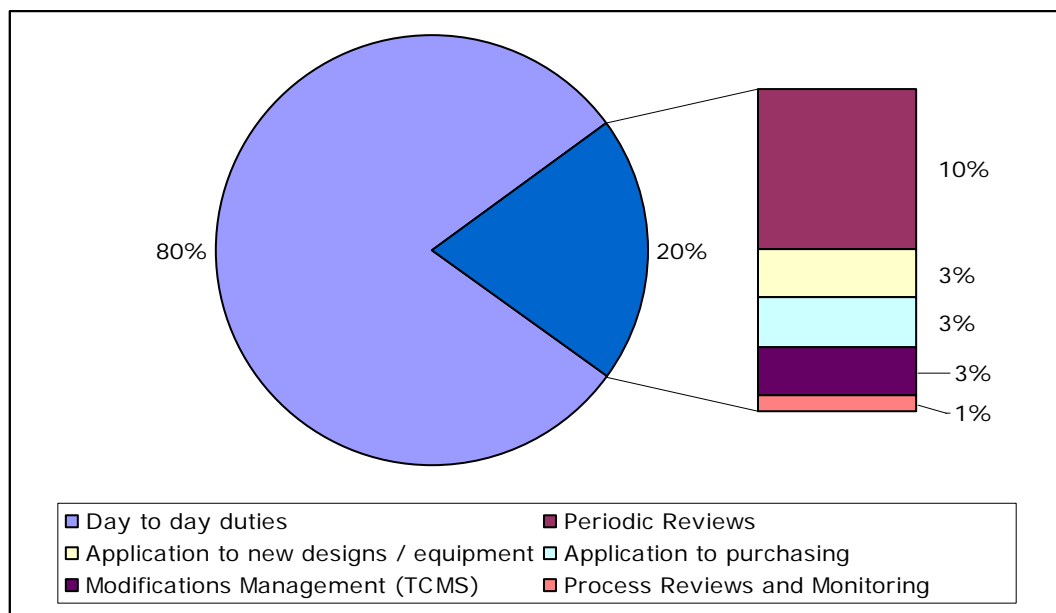
### The mentor and leader

The last main area where the RCM Analyst will be used is that of a mentor and leader to their immediate team members and in specific projects where necessary. This percentage of time is not easily quantifiable and is generally done as a part of the day-to-day running of the business. This is one of the areas where RCM has continually failed to become a permanent element of an organizations asset management regime. Through not becoming proficient in the transferral of information to others within the team, RCM concepts often become diluted, and further distanced from the concepts learned by the original implementation team. The Analyst method teaches members to be able to convey concepts and complex issues throughout their immediate teams.

### Time requirements of post-implementation RCM Analysts

As can be seen by the information presented so far the RCM Analyst is a key individual in the implementation, post implementation and ultimate success of RCM as a company transforming technique. As detailed in Figure 4 their post implementation time is generally around 20% to 40% of their day-to-day duties.

**Figure 4. Post-implementation time requirements of RCM Analysts**





This will depend greatly on the attention given to Analyst development as well as to the number of Analysts that are trained. The RCM Analyst method looks to have a figure of 20% as an ultimate goal towards RCM as a living reliability initiative within companies where it has been implemented.

### **The role of Analyst Practitioners**

By mutual agreement, we are able to train client practitioners to a level that they can deliver the training, development and mentoring to others from within the organization. This is instrumental in institutionalising the RCM Analyst method within an organization in a manner that allows the company to remain at the vanguard of developments within the discipline, receive updates to training materials and methods and provide for a high level of independence, while remaining a part of the larger International RCM Analyst network.

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<sup>i</sup> The RCM Scorecard was first published in the book *The Maintenance Scorecard*, published by Industrial press, ISBN 0831131810