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Acknowledgement

This work would not have been possible without a few very committed people who encouraged and supported my study. They are firstly my supervisor, prof. ... who put in many hours, and contributed significantly to this ... to my wife, Louise, without whom this would never have ... her continual motivation and support. Also to Sasol Polymers for ...

# An optimised instrument for designing a maintenance plan

*A sequel to Reliability Centred Maintenance*

by

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## Acknowledgement

This work would not have been possible without a few very committed people who contributed and supported my study. They are *firstly* my supervisor, prof Schalk Claasen, who put in many hours, and contributed significantly to this work. *Furthermore*, to my wife, Louise, without whom this would never have realised, for her continual motivation and support. *Also* to Sasol Polymers for providing the proving ground, and especially to Rakesh Mohan for his enthusiastic assistance. And then *lastly* to my colleagues, who allowed me the time for this, the crown of my studies.

By the improved MSG-2. When MSG-2 was used contractually for the United States Department of Defence, it led to the present definition of RCM.

In academic circles there developed a growing dissatisfaction with the technique (Pintelon et al (1999)), of which part stems from watering down its scientific basis to make RCM more marketable (Moxbray (2000)), yet at least part is based on perceived inherent scientific weaknesses in the methodology itself.

This thesis, in setting out to solve these limitations, makes several important contributions to the RCM methodology. The first of these is a method of concentrating the RCM analysis effort on the most critical failure modes encountered by the organisation. Secondly, it introduces a Quality Improvement task in the RCM task selection tree, based on a limitation identified by Harris (1985). The third contribution is the addition of a formal task paradigm methodology, following Girs (1964). The thesis also compares the use of RCM for the most important failure modes with conventional maintenance tasks for the remaining failure modes, to form a total methodology for the typical plant or process. It furthermore introduces the application of sound managerial principles in the implementation of RCM and integrates concepts from different RCM authors, together with the innovations listed above, into a single whole. In summary, the proposed revised methodology can play a very important part to achieve the goal of World Class manufacturing, including ensuring that the organisation's performance is at its best, as far as possible.

### Keywords:

RCM, Reliability Centred Maintenance, maintenance, preventive maintenance, scheduled maintenance, planned maintenance, proactive maintenance, reliability, Industry, World Class Manufacturing.

Christian, meditate much on heaven, it will help thee to press on, and to forget the toil of the way. This vale of tears is but the pathway to the better country: this world of woe is but the stepping-stone to a world of bliss.

C.H. Spurgeon: Morning and Evening,  
Morning, 7 February

## Content

### Synopsis

Reliability Centred Maintenance (RCM) started a new chapter in the history of preventive maintenance strategy setting. It was now possible to develop a scientifically based, highly successful maintenance program for complex systems. It developed as a result of the reliability problems and cost of maintenance of aircraft during the late 50's and early 60's. The result was a methodology called MSG-1, followed by the improved MSG-2. When MSG-2 was used contractually for the United States Department of Defence, it led to the present definition of RCM.

In academic circles there developed a growing dissatisfaction with the technique [Pintelon et al (1999)], of which part stems from watering down its scientific basis to make RCM more marketable [Moubray (2000)], while at least part is based on perceived inherent scientific weaknesses in the methodology itself.

This thesis, in setting out to solve these limitations, makes several important contributions to the RCM methodology. The *first* of these is a method of concentrating the RCM analysis effort on the most important failure modes encountered by the organisation. *Secondly*, it introduces a Quality Improvement task in the RCM task selection tree, based on a limitation identified by Harris (1985). The *third* contribution is the addition of a formal task packaging methodology, following Gits (1984). The thesis *also* combines the use of RCM for the most important failure modes with conventional maintenance tasks for the remaining failure modes, to form a total methodology for the typical industrial concern. It *furthermore* introduces the application of sound management principles in the implementation of RCM and *lastly*, blends concepts from different RCM authors, together with the innovations listed above, into one logical whole. In summary, the proposed revised methodology can play a very important part to achieve the goal of World Class manufacturing standards, including ensuring that the organisation's maintenance effort is as proactive as possible.

## Chapter 3: Literature Study

### Keywords:

RCM, Reliability Centred Maintenance, maintenance, preventive maintenance, scheduled maintenance, planned maintenance, proactive maintenance, reliability, industry, World Class Manufacturing.

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