Reliability Centered Maintenance

Enhancing RCM comprehension and renewing maintenance approaches to achieve greater asset reliability and save 1/3 on maintenance cost

Renaissance Shanghai Pudong, Shanghai China

4th & 5th September 2008

“We often take for granted that our lights will come on when we flip the light switch, but the reality is that our reliability standards and the current state of the transmission grid leave us all vulnerable to blackouts.”

Richard Burr

Great news - RCM, the resources consuming monster can actually be tamed to work for your companies special needs! Attend this training to learn how!

An RCM process uses a structured framework to ask the following questions about the selected asset in its operating context:

- What are the functions and the associated performance standards of the asset?
- In which ways does it fail to fulfil its functions?
- What causes each functional failure?
- What happens when each failure occurs?
- In what way does each failure matter?
- What can be done to prevent each failure?
- What should be done if a suitable preventive task cannot be found?

marcus evans training courses are thoroughly researched and structured to provide intense practical training applicable to your organization.

- Combinations of educational presentations, productive in-session assignments and participant collaboration to provide actionable learning
- Strictly limited numbers to allow for greater interaction and one-on-one interaction with the trainer
- Detailed pre-course questionnaires to allow you to tailor the programme to address your individual concerns
- Hard and soft copies of presentation materials and tools

Pre-course questionnaire

To ensure that you gain maximum benefit from the event, a detailed questionnaire will be sent to you to establish some of your background information and exactly which of the topics covered in the seminar are of major importance to you and major issues related to those topics. The course trainer will analyse the completed forms. As a result, we ensure the course is delivered at an appropriate level and that relevant issues will be addressed. The comprehensive course material will enable you to digest the subject matter in your own time.

Facilitated by international facilitator:

Ben Stevens
President
Optimal Maintenance Decisions Inc (OMDEC), Canada

Attend this informative event and gain practical insights into:

- Learning and practicing the fundamentals of RCM
- Gaining some practical exposure and develop strategies to avoid it
- Understanding the process of planning and implementing RCM
- Being able to decide whether this methodology is likely to be successful in your own workplace
- Applying accurate RCM principles to effectively eliminate unplanned downtime, reduce planned downtime and improve quality
- Discovering new approaches and helpful techniques to identify a method that best suits your company’s needs
- Grasping the understanding of failure mode and effects analysis (FMEA) to avoid unnecessary waste
- Solving problems effortlessly through the methodical problem solving techniques
- Advancing your current maintenance program with the aid of appropriate software
- Putting the knowledge into practice by working on real life case studies and practical exercises

*Early Bird & Group Discounts
Ask about our savings
Day 1
Thursday 4th September 2008

Course Outline: RCM - Introduction, examination and practical examples
Many significant advances in equipment reliability analysis in recent years have been based on RCM. This program will start with a practical model of how RCM fits in with equipment reliability, other maintenance improvement tools and the CMMSEAM that we all rely on to deliver these improvements. Many firms struggle with the implementation of RCM, so equally important is to identify the conditions that need to be in place before embarking on an RCM program - how applicable is it to the delegates’ organization.

The core of the program will be a thorough review of what RCM is and the process necessary to put it into place. However, traditional approaches to RCM carry a number of pitfalls and difficulties that delegates will be introduced to - along with techniques to avoid them. The benefits of RCM will be highlighted, along with how it should be implemented. Finally, RCM will be placed in the broader context of reliability - a key component, but one that can be improved by the use of complementary tools.

Delegates will gain a solid understanding of what RCM is by working though a twelve step process, and exploring how RCM can improve reliability, the value of CMM$S, PM’s and PD$’s, AND enhance Planning and Scheduling.

Session One
Innovation, history and role of RCM
Looking at the background of RCM and how it fits into the range of tools available to the modern Physical Asset Manager. In particular emphasizing that it is not a silver bullet, but can be very effective if used in combination with other tools such as CMM$S, CBM etc.

• Why and how does Reliability matter
• Reliability Centred Knowledge - the basis for reliability improvement
• Why and when is failure acceptable?
• The Physical Asset Management paradox
• SAE JA1011 - The 7 basic questions - and why they are not sufficient
• Self-Test - is RCM right for you?

Session Two
Identifying Critical Equipment and selecting target equipment for RCM
The equipment hierarchy is broken down into its functional elements or assemblies to make the examination of the effects of failures easier and more effective.

• Defining critical equipment
• Techniques for selecting the critical equipment.
• How many equipments are critical, and why
• Workshop: identifying critical equipment

Session Three
Determining Primary, Secondary and Protective Functions
Each functional assembly, equipment and system is designed to perform specific functions. Understanding and defining these functions in necessary to ensure a complete analysis of the equipment failures.

• Defining Functions
• Why different types of functions are needed
• How many should we identify
• Using familiar examples of functions
• Workshop: identifying functions

Session Four
Defining Functional Failures
Each function may have several different ways of failing and each may be important to reliability.

• What is failure? - through the eyes of performance expectations
• Are all failures the same - are they all important?
• Types of failure - Functional, Potential, Hidden, Critical, Non-critical
• Workshop: examples of different types of failure

Session Five
Defining Failure Modes
Once the functional failures are identified, we need to define the process that results in the lost performance; i.e. what actually happens to the machinery. Examples will continue to follow the practicality of the delegates’ workplace.

• Why do we care about failure modes?
• How to distinguish failure modes from symptoms
• What is Root Cause Failure Analysis and where does it fit?
• How can we use RCA in the workplace
• RCA Workshop

Session Six
Analysing Failure Effects and Consequences
Each failure mode can have one or more ways of showing up; these will be defined and explored. Here we also apply the economic test - is it worthwhile taking any action? If the impact is minimal, then maybe no action is needed.

• Failure effects - writing the story of failure
• Failure analysis fits in
• Defining significant effects
• And how to prioritise them
• Workshop on Effects and Consequences

About your course facilitator:
Ben Stevens, President of OMDEC Inc. a company dedicated to developing and selling products and services focused on equipment reliability and maintenance improvement. He has been fully involved with the maintenance and reliability business for almost 25 years of experience in all aspects of Maintenance and Physical Asset Management and CMM$EAM systems, built on a base of a blend of a post-graduate degree in economics, CFO and CAO positions in several manufacturing companies, entrepreneurial experience in the high tech sector, and business development for one of the big 5 consultants.

His prior experience included President of DataTek Systems - a CMM$S distribution, sales and implementation company. In an earlier life, he was Vice President Finance for a number of manufacturing companies.

He was a Business Development Manager of PricewaterhouseCoopers Canada for International Centre of Excellence in Maintenance Management. And he was Senior Associate Consultantat the same company. For the more, he was CFO and CAO of Nanotec Limited and Atomic Energy of Canada Ltd. He is a frequent speaker at conferences, has chaired the international Maintenance conferences in Dublin on numerous occasions, and has been published in several languages. He is well-known for his work around the world, having delivered many successful workshops over the past twelve years. He has recently completed long term engagements with a power generation company in Indonesia a leading steel company in Japan and a resort development company in Bahrain.

OMDEC, Optimal Maintenance Decisions Inc (www.omdec.com) is a spin off of the CBM [Condition Based Maintenance] Laboratory of the University of Toronto. OMDEC offers solutions proven to increase operating and production reliability and reduce costs. OMDEC’s solutions include a decision support tool for predicting reliability and optimising Condition Based Maintenance and can help to predict equipment failure - to estimate remaining useful life of equipment - to define the mix of preventive replacement and run to failure and - developed a very unique way that integrates data in EAM/CMM$S with RCM and CBM.

One of his publications are:
• MROP Handbook - PEM 1998 (Contributing Author) - Nation-wide release with PEM Magazine.
• CMM$S and Productivity Improvement - 1999 - Entek - published in Hungarian
• Reliability Handbook - PEM 2000 (Contributing Author)
• Standard Software for ... Maintenance... - PwC (Contributing Author - published in Dutch and English)
• Maintenance Excellence - Dekker 2001 - (Contributing Author)
• Column in “Plant” magazine in Canada
• Numerous magazine and web articles

Some of the industries and international clients who have worked with Ben Stevens:
• Kobelco – Steel maker - Japan - CMM$S Consulting
• ABeam-Jower - Power Generation - Japan - Maintenance Strategy
• Dynergy - US - Power Generation - Training and Asset Management Gap Analysis
• UK Ministry of Defense - UK - EAM Consulting
• PwC UK - Asset Management Training
• University of Barcelona School of Aeronautics - Reliability Courses
• Great Lakes Gas - Maintenance Consulting - North America
• Buckeye Pipeline - Maintenance System Implementation Consulting and Training - North America
• Group of Pharmaceutical Companies (Baxter, Wyeth, Johnson etc) - RCM training (several courses) - North America
• Lone Star Cement - Maintenance Systems Implementation Consulting - North America
• Wellwood Industries - Training and Maintenance Systems Implementation Consulting - North America
• University of Toronto - Education - Canada/Iran - Training in Asset Management (multiple courses/Certificate Training)
• IR - Education - Dubai - Training (multiple courses)
• IBN - Education - Malaysia - Training in Asset Management
• ABeam-PLN/IP/JB Indonesia - Power Generation - M maintenance Assessment
• M of Electricity & Water - Utility - Bahrain - Training (multiple courses)
• Bahrain Society of Engineers - Professional body - Bahrain - Training in Asset Management (multiple courses)
• Aynana Consulting - Iran - Training in Asset Management
• HOT Construction - Civil Engineering - Kuwait - Reliability Improvement Consulting
• ILMC - Education - Kenya - Training in Asset Management
• Drive VFM - Bahrain - Facilities and Asset Management - ERP Consulting and many more.

In-House Training Solutions
If you have a number of delegates with similar training needs, then you may wish to consider having an In-House Training solution delivered locally on-site. Course can be tailored to specific requirements. Please contact Sarah Faradilla on +603 2723 6600 or email sarahf@marcusevanskl.com to discuss further possibilities.

marcus evans would like to thank everyone who has helped with the research and organisation of this event, particularly the trainer, who has kindly committed and supported the event.
Day 2
Friday 5th September 2008

Session One
Selecting Tasks and Schedules
Now we understand the failures and the effects, we can design the best way to react - i.e. what maintenance action do we now propose? Using a logic tree, delegates will segregate the failure modes into what can be done, what should be done and how often.

• What type of tasks? How do we select them?
• How RCM uses consequences of failure to define PM’s, PdM’s or other types of maintenance
• The RCM decision algorithm at work
• Workshop: Impact of consequences on PM’s, PdM’s etc

Session Two
Consolidating Tasks
Maintenance plans are built up from multiple tasks. This step will identify and eliminate duplicate tasks, as well as flagging those tasks that are inter-dependent and can be combined to increase efficiency.

• Defining when to use which task
• Task frequencies and how to reconcile them
• Using RCM to improve Planning and Scheduling

Session Three
Implementing Tasks
Entering the task requirements into, and planning them within the maintenance management system which the plant uses, and training the maintainers in any new techniques with which they may not already be familiar.

• Tying RCM into CMMS and ERP - stage 1
• RCM concepts on a single page
• Making RCM easier and more effective - stage 1 - The RCM worksheet

Session Four
Analysis and Feedback
During task implementation, data is required both for special evaluation of equipment cost and performance, as well as ensuring that the information on which future decisions are made, is kept up to date.

• Why most RCM databases are out of date
• What to do to refresh the RCM database - stage 1
• What needs to be refreshed, why, and when

Session Five
Implementing RCM
A step by step review of what it takes - from training, to team selection, roles and tasks.

• Implementation steps
• The implementation team and their roles
• Training the team
• Workshop on implementation

Session Six
Beyond RCM to Reliability
A summary of how RCM should be integrated with other tools and concepts to ensure its effective use. In this section, the cost effectiveness issue will be addressed - and tied into ROI (Return on Investment). Some collateral tools will be reviewed - especially with reference to how they will build on and enhance RCM in the workplace.

• Using Failure curves to improve maintenance
• RCM, CMMS and ERP - stage 2
• Making RCM easier and more effective - stage 2
• Refreshing the RCM database - stage 2
• Using RCM to improve the value of the CMMS

The session will be a series of presentations, discussions and hands-on workshops as delegates gain practical experience of RCM and the conditions that should surround it. Delegates will work in small groups and will focus on practical case studies so that the results can be applied in their workplace.

Program schedule
Day One & Two
0830 Registration & coffee
0900 Workshop commences
1030 Morning refreshment & networking break
1100 Workshop re-commences
1245 Luncheon
1345 Workshop commences
1500 Afternoon refreshment
1520 Workshop re-commences
1730 Workshop concludes

Why you cannot miss this event
RCM is a systematic way of looking at equipment, its functions, its failure modes, effects and the consequences of failure. The purpose is to select maintenance tactics to minimise the consequences of failure and apply these tactics as part of the maintenance program. This Masterclass will focus on RCM - Reliability Centred Maintenance, its process and benefits as well as its pitfalls and requirements. Delegates will concentrate on understanding and managing these tools, defining how to bring financial returns to the organizations which implement them, and how to avoid the problem areas. Case studies and workshops will be used throughout to keep the discussions on a very practical level so that delegates may apply the techniques to their own work environment.

Course Objectives
Failure Prevention in recent years has become closely related to Reliability Centred Maintenance; although they are not the same thing, RCM is one of the best tools, and one that can add great value to an organization’s maintenance and operations functions. In this course, Delegates will:

• Learn and practice the fundamentals of RCM
• Use practical examples relating to equipment typical of their own work-site
• Practice the steps of RCM
• Understand how RCM is used to develop PM and PdM plans for each equipment and the multiple ways in which they fail
• Learn how RCM is best integrated with CMMS and ERP
• Find how RCM drives Planning and Scheduling

At the same time, delegates will learn that RCM has pitfalls and is not for everyone. The conditions for success will be examined and compared to the Delegates’ work environment. Techniques for avoiding the pitfalls will be examined so as to improve the chances of success in the implementation.

Who should attend
Primary job titles:
• Plant Managers
• Heads of Inspection Team
• Process Automation Managers/Engineers
• Production and Manufacturing Managers
• Heads of Shutdown/Turnaround Planning Team

All manufacturing/process industries with specific focus on:
• Oil and Gas
• Utility and Energy
• Automotive
• Pharmaceutical
• Food and Breweries
• Pulp and Paper
• Water Industry
• Government
• Asset solution providers
• ERP Providers
• Equipment monitoring tools manufacturers

Testimonials from Ben Stevens’ RCM & other maintenance trainings:

From RCM course delivered in Puerto Rico in May 2008:
"It was a pleasure meeting you and wanted to let you know that it was of great benefit for me to participate in the RCM training program last week. I appreciate the theory and experiences shared".

Angel
Wyeth Inc

"I really enjoyed the course. The course has been one of the most productive courses I have taken."

Randall
Shell Corp

"The course went super and the written feedback from the participants were fantastic."

Jesus
Pdm'Tech Inc

From recent Asset Management Courses:
"It has been a privilege to attend the first course in Physical Asset Management last week. I would like to thank you for the productive and the knowledge gained."

Ala
Dolphin Energy

"I would like to thank you for an excellent course and materials; I was very impressed by your knowledge and your practical experience."

James
Tabreed Inc

"Our delegates enjoyed the course very much and they thought it was worth every minute of it."

Hasan
Saudi Oger