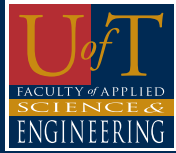


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UNIVERSITY of TORONTO  
Professional Development Centre

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University of Toronto,  
Canada's top University!

# Physical Asset Management Certificate Programme

Course One:

**Reliability Improvement And Maintenance Excellence**

10 – 14 August 2008, Dubai, UAE

Course Two:

**Optimising Maintenance And Replacement Decisions**

5 – 9 August 2007, Madinat Jumeirah, Dubai, UAE

13 – 17 April 2008, Dubai, UAE

## By Attending These Two Highly Practical Training Courses, You Will:

- **Understand** the role played by the function in the "Physical Asset Excellence Cube"
- **Compare** the key strengths and weaknesses of Reliability Centred Maintenance (RCM) and Total Productive Maintenance (TPM)
- **Learn** how to measure performance: Use of KPIs and the Balanced Scorecard
- **Examine** which components should be part of a preventive replacement programme
- **Know** how to establish the economic life of an asset and when to replace it
- **Learn** and distinguish the three sub-processes that constitute an effective Condition-Based Maintenance (CBM) task
- **Explore** the economics of CBM and acquire a methodology for the evaluation of the Return On Investment (ROI) in CBM labour and material
- **Learn** the fundamental principles of machinery prognostics
- **Understand** the impact of demographics on maintenance
- **Explore** the fundamentals of reliability
- **Discuss** the role of risk in reliability
- **Learn** the impact and application of finances in physical asset management
- **Review** the structure and opportunities of Computerised Maintenance Management Systems (CMMS) and how to improve CMMS value

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Dear Maintenance Professional,

Together with IIR, we have had the privilege of working with many of you over the past 12 years or so in the Arabian Gulf Region. We are now extremely pleased to move our training and education programmes to a new level. Together with the Professional Development Centre at the University of Toronto in Canada, we are proud to offer you the Certificate Programme in **Physical Asset Management**. Although the programme has been running very successfully in North America and selected other regions, this is the first time it is being offered in the Arabian Gulf countries. For the first time, delegates successfully completing both courses will be presented with a **Certificate of Accomplishment** from the University of Toronto, Canada's top University. Please note that this is not a certificate of attendance – hence delegates will be awarded the Certificate based on their class participation, workshop contribution, multiple choice tests and overall performance on the course.

This is a management course – it is designed for Physical Asset Managers and those who wish to prepare themselves for this position. It consists of a blend of reliability theory and practice, spares optimisation, software tools and their application and best practice methodology – all with a solid practical underpinning of experience. Discussion periods and participative workshops are a key feature of the programme – providing you with the opportunity to apply your learning to the process of implementation in your own workplace. New concepts and technologies will be introduced and explained; well-proven and successful methodologies will be tested and applied.

The programme is designed in two complementary parts – to be run in April and August. As the programme will be run again next year, you may choose to start the programme with one of these sessions and complete it in a following year if that better fits your schedule. Attendance at each session will be limited so that we can provide personal attention to each of you – so we encourage you to reserve your place as early as possible.

To ensure you get our full attention the courses are capped so that you have ample time to have your questions addressed.

One thing is for sure – you will receive a warm welcome from us both as your course leaders, and we promise you a challenging, interesting and exciting programme. Please join us.

We look forward to welcoming you to this exciting event in April and August.

Best Wishes



Ben Stevens  
Course Director



Andrew Jardine  
Course Director

***P.S. Achieve a Certificate of Accomplishment from the University of Toronto, When you Successfully complete the course with the criteria!***

## Who Should Attend?

The ideal candidate for these courses is an engineer, manager of plant operations, facility manager or maintenance professional who is responsible for maintaining and managing the physical equipment assets of your plant. Participant typically represent large facilities and plants from industries such as mining, oil and gas, pulp and paper, utilities, primary metals, heavy manufacturing and large sophisticated facilities. Participants should have an undergraduate degree or relevant work-related experience in maintenance management or operations.

# Physical Asset Management

*Programme Timings: Registration will be at 8.00 on Day One of each course. The day will*

Course One:

## Reliability Improvement And Maintenance Excellence 10 – 14 August 2008

### Course Outline

#### Leadership And Control

With the increasing pressure to do more with less, companies are increasingly turning to methodologies that will improve their Return On Investment (ROI) and at the same time, improve the quality of the asset management. The use of "Best Practice" is one of the most well recognised of these tools. However, not all organisations are ready for the best practice tools; and trying to implement all these tools will not work. A key task will be to identify which are the most appropriate for your organisation and how to implement them successfully.

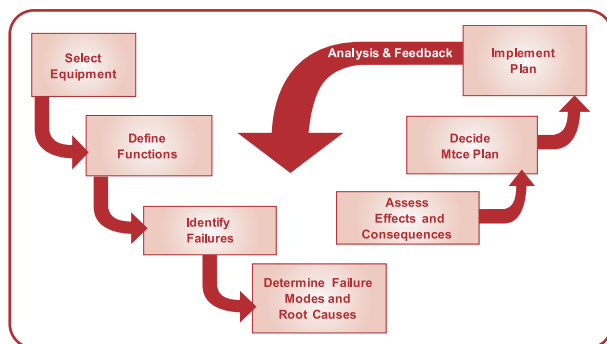
#### Included in this session will be:

- A review of the Physical Asset Excellence Cube and how it can be used as the basis for introducing or upgrading best practice
- The use of maintenance assessments and maintenance audits to establish your starting points and your goals
- A discussion of benchmarking, when it creates benefits and when it should be avoided

The financial management of physical assets is ignored by most maintenance managers – mainly because they do not know where to start in an area that is seen as very complex and difficult to understand. This session will provide an introduction to financial management, using some practical examples that will be useful back in your organisations.

#### Included in this session will be:

- Exploring the basics of financial management
- Defining project Return On Investment (ROI)
- Calculating breakdown costs
- Life cycle costing
- Budgeting and cost reporting



With these techniques, you will have a useful range of tools to assist in the financial management of the assets under your responsibility.

Far too many companies' maintenance departments are still in react mode. This is mostly because there is no clear strategy beyond the production and sales groups.

This session will continue by looking at why maintenance strategy should be an issue for your organisation and, more importantly, how to go about developing one, how do you sell it and who to?

An integral part of the strategy should be performance management – if you are not tracking, how do you know you are improving?

#### Emphasis will be placed on:

- Understanding and developing the different levels of performance measures – executive, asset management and maintenance operations
- Setting up a performance management system
- Selecting the right performance indicators
- Maintaining the performance measurement system
- Exploring what to do with the performance measures once you have them
- Applying Balanced Scorecards to physical asset management

#### Risk And Reliability

Risk and reliability are becoming closely intertwined as modern asset management techniques are developing. In this session you will explore the elements of risk – cost of failure and the probability of failure – and their impact upon decision-making. A methodology for assessing risk will be discussed, and you will be invited to apply it to your own workplace.

A core requirement of physical asset management is to increase reliability; yet the concepts of reliability and how to measure it are poorly understood. The programme will lay a solid basis with an exploration of equipment reliability, its implications and impact on the selection of asset management tactics. This session provides an overview of the physical asset management business and focus on best practices in maintenance and the tools available to help turn them into reality.

The discussion will develop and explain some concepts and apply them in a manner which will not only be readily understood, but which can be easily adapted to your own workplace. Tools and techniques for evaluating the probability of failure will also be explored.

#### Implementing Maintenance Optimisation And Reliability Management

CMMS and EAM are probably the most important tools to have been adopted by organisations around the world in the last 20 years. Huge amounts of money have been spent on them, yet their success rate of improving maintenance and reliability still remains very low. This session will explore why it is that the value is not there and then ask the question "what can we do about it?"

#### The following themes will be the core of the discussion:

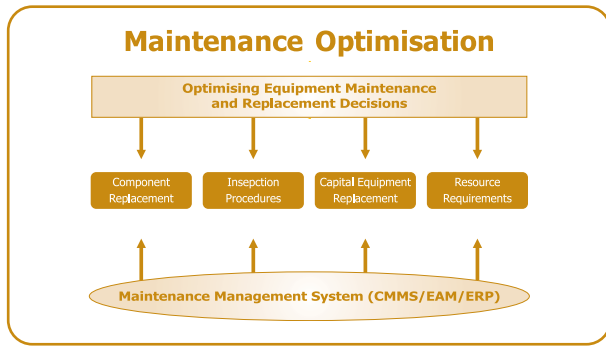
- Identifying whether your CMMS is delivering value in terms of maintenance improvement and ROI
- How the returns can be increased
- Using CMMS to introduce and improve cost control

# nt Certificate Programme

start at 8.30 and conclude at 14.30 with lunch. There will be two breaks at appropriate times.

In each case, you will examine the factors which control the returns and costs, and determine which will be most appropriate to your own organisation. You will also have a look at the future of CMMS.

This session will deal with one of the maintenance techniques that has become indispensable in many industries around the world - RCM. It will take a managerial view of the benefits to be derived from implementing RCM, as well as the difficulties.



## Specifically we will cover:

- The key components of RCM, such as failure modes, failure effects and consequences

- Implementing and manage the RCM project
- Identifying and plan to achieve the benefits
- Identifying and plan to avoid the pitfalls
- The conditions that need to be in place in your organisation before attempting RCM
- Maintaining RCM as an on-going, continuous improvement tool, and tie it in with CMMS

At the same time, we all know that total failure avoidance is impossible – even with RCM. The second part of this session will focus on failure management – the diagnosis, reporting and analysis of failures. You will explore practical measures that will be directly applicable to your workplace.

The leaders in the maintenance management field are now recognising that the next big step takes them into the realm of engineering and statistical analysis – in other words, we have all this data, but what information can we extract from it so as to drive action? Expert systems are emerging as the response to this. In this session, we will look at how they can benefit the modern organisation and relate to the current tools such as CMMS, RCM and CBM – Condition Based Maintenance. Finally you will examine the conditions that need to exist in a company before they will be successful and how they can be used and maintained on an on-going basis.

## Your Expert Course Director



**Ben Stevens** has delivered many successful physical asset management seminars and workshops around the world; he is a frequent speaker at conferences; has chaired the International Maintenance conferences in Dubai on six occasions; and has been published in several languages. He is well-known for his work in Japan and the Middle East as well as North America. Ben is President of OMDEC Inc, a Canadian company dedicated to developing and selling products and services focused on equipment reliability and maintenance improvement. As such, he offers many years of practical experience to his workshop delegates. For seven years, he was Business Development Manager in PricewaterhouseCoopers International Centre of Excellence for Physical Asset Management in Toronto, focusing on PwC's business relationships with asset management system vendors. His prior experience includes President of DataTrak Systems – a CMMS distribution, sales and implementation company since 1984, and VP Finance for a number of manufacturing companies.

Course Two:

## Optimising Maintenance And Replacement Decisions

5 – 9 August 2007

13 – 17 April 2008

Due to the explosion of computerised maintenance management systems and all the data they store, along with the realisation of the high costs associated with maintenance within an organisation, increasing attention is being paid to evidence-based maintenance through formal quantitative techniques that can be used to improve decision-making in the context of equipment maintenance, replacement and reliability.

Many maintenance professionals did not formally study these techniques in their tertiary programmes.

This five-day Programme will bring participants up-to-date and make them comfortable with applying the latest developments that can be used to optimise equipment maintenance and replacement decisions.

### The objectives of the programme can be summarised as follows:

- (1) To focus on the techniques of optimisation – the single most important thrust of this learning programme. Whether the decision is about work-crew sizes, or the replacement of component-parts or entire equipment units, the concept of making the very best, most optimal, decision will be the principal concern of the training programme.
- (2) To equip the participating maintenance and reliability professionals with the know-how to select the most appropriate analytical tools for their maintenance decision-making.

(3) To reflect the growing focus of industrial safety and the profusion of safety-related litigation – think of transportation accidents, chemical spills, and mining disasters – the programme will show how safety objectives relate to the optimisation models, and will underline the advantages of having a well-documented and rigorously-executed programme of maintenance and replacement.

(4) To introduce the critical decision-making topics that can make a significant difference to the in-service time of equipment, to the costs related to doing maintenance too often or too seldom, and the optimisation of asset utilisation.

(5) To not only cover the classic need-to-know material in the area, but to acquaint you with leading-edge and on-the-horizon approaches that you will encounter in the near future.

(6) To further ensure that you, after completion of the programme, continue to apply the course-learning to your work-place problems, each of you will receive a CD containing 400 (approx) powerpoint slides and a copy of Professor Jardine's internationally-adopted text, *Maintenance, Replacement and Reliability: Theory and Applications*.

(7) Educational versions of four software packages will be made available to you. The packages are:

**OREST** for the optimisation of component preventive replacement decisions

**AGE/CON** for the optimisation of the economic life of mobile equipment

**PERDEC** for the optimisation of the economic life of plant and equipment

**SMS** for the optimisation of critical spares stockholding

## Course Outline

### Basic Statistics, Risk Assessment And Economics

- Analysis of component failure data
- Probability density, reliability, and hazard functions
- Definition of failure: Weibull analysis
- Dealing with censored data – three-parameter Weibull and Kolmogorov-Smirnov test statistic
- Weibull software: OREST, RelCode, Winsmith
- How can a piece of equipment fail?
- What is the impact?
- Where do you place your maintenance efforts?

- Aspects of discounted cash flow used in capital equipment replacement analysis
- Estimating the interest rate appropriate for discounting
- Present-value calculations
- The effects of inflation in the analysis
- Calculating the Equivalent Annual Cost (EAC)
- Selecting the best alternative to minimise life cycle cost

### Optimising Maintenance And Replacement Decisions

- Reliability improvement through preventive replacement
- Exercise in analysing component failure data using the Weibull distribution
- Component replacement procedures, including Glasser's graph
- Use of OREST for optimising preventive replacement strategies
- Forecasting spare parts requirements including capital spares
- Establishing optimal component replacement procedures – case studies
- Reliability improvement through inspection – establishing optimal frequency and depth
- Reliability improvement through asset replacement
- Economic life of capital equipment
- The "classic" economic life model
- Establishing optimal replacement strategies for capital equipment - fixed and mobile – case studies
- Use of AGE/CON and PERDEC software for capital equipment replacement
- Role of simulation to establish maintenance resource requirements

### Optimising Condition Based Maintenance Decisions

- CBM from first principles
- Data acquisition, signal processing and decision-making
- A CBM information strategy
- Using "intelligent agents" in CBM
- Refining CBM inspection intervals – "the elusive P-F Curve"
- Determining the 'significant' condition indicators
- Optimally interpreting condition data
- Case studies including vibration monitoring of shear pump bearings in the food process industry, oil analysis of electric motors on mobile mining equipment, use of visual inspection for traction motors ball bearings, oil analysis of transmission and engines on mobile equipment, oil analysis of aircraft engines, vibration monitoring of Warman pump bearings, oil analysis of diesel engines on board ships, vibration monitoring of pumps in the pulp and paper industry

## Your Expert Course Director



**Dr Andrew K.S. Jardine**, Ph.D., C.Eng., M.I.Mech.E., M.I.E.E., P.Eng., is Professor and Principal Investigator at the Condition-Based Maintenance (CBM) laboratory in the Department of Mechanical and Industrial Engineering at the University of Toronto where the EXAKT software for CBM optimisation was developed and the SMS software to optimise the stockholding of emergency spares.

Dr Jardine regularly assists organisations to suggest available tools to ensure excellence in their maintenance practices. Most recently there has become a keen awareness within companies to examine the optimisation of emergency spares taking into account criteria of cost, availability and reliability. Some companies he has advised through their membership of the CBM consortium includes ABB, Barrick Gold, Department of National Defence, Diavik Diamond Mines, Dofasco Steel, Hydro One, INCO, Irving Pulp and Paper, Syncrude Canada, EDF (France), Ministry of Defence (U.K.), and Teck Cominco.

Dr Jardine is a subject matter expert to IBM's Asset Management Centre of Excellence. He is the author of the economic life software AGE/CON and PERDEC, OREST used for optimising component preventive replacement decisions, and the book *Maintenance, Replacement and Reliability*, first published in 1973 and now in its fifth reprinting. In 2001, he co-edited with J.D. Campbell the book *Maintenance Excellence: Optimising Equipment Life Cycle Decisions*. His new book *Optimising Maintenance and Replacement Decisions: Theory and Applications*, co-authored with Dr. A.H.C. Tsang, was published by CRC Press in 2006.

Dr Jardine was the 1993 Eminent Speaker to the Maintenance Engineering Society of Australia and the 1998 recipient of the Sergio Guy Memorial Award from the Plant Engineering and Maintenance Association of Canada. He is listed in Who's Who in Canada.

# Physical Asset Management Certificate Programme

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YES, I want to register for:

### Events

Events	Date	Price
<input type="checkbox"/> BC2303 Optimising Maintenance And Replacement Decisions	5 - 9 August 2007	US\$ 3,995 / AED 14,671
<input type="checkbox"/> BC2304 Optimising Maintenance And Replacement Decisions	13 - 17 April 2008	US\$ 3,995 / AED 14,671
<input type="checkbox"/> BC2304 Reliability Improvement And Maintenance Excellence	10 - 14 August 2008	US\$ 3,995 / AED 14,671

### Book both courses

<input type="checkbox"/> Register on or before 10 June 2007	SAVE US\$ 1500	US\$ 6,490 / AED 23,834
<input type="checkbox"/> Register on or before 1 July 2007	SAVE US\$ 1250	US\$ 6,740 / AED 24,752
<input type="checkbox"/> Register after 1 July 2007	SAVE US\$ 1000	US\$ 6,990 / AED 25,670

Course fees include documentation, luncheon and refreshments.

Delegates who attend all sessions will receive a Certificate of Attendance.

For further information  
and Group Discounts  
contact +971-4-3352483  
email: [info@iirme.com](mailto:info@iirme.com)

### PERSONAL DETAILS

	Title	First Name	Surname	Job Title	Department	Email
1 <sup>st</sup> Delegate						
2 <sup>nd</sup> Delegate						
3 <sup>rd</sup> Delegate						
4 <sup>th</sup> Delegate						

To assist us with future correspondence, please supply the following details:

Head of Department					
Training Manager					
Booking Contact					

Company: .....

Address (if different from label above) .....

Postcode:..... Country: .....

Tel: ..... Fax: .....

No. of employees on your site:

0-49  50-249  250-499  500-999  1000+

Nature of your company's business: .....

**Yes!** I would like to receive information about future events & services via email.

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### Payments

A confirmation letter and invoice will be sent upon receipt of your registration. Please note that full payment must be received prior to the event. Only those delegates whose fees have been paid in full will be admitted to the event. You can pay by company cheques or bankers draft in Dirhams or US\$. Please note that all US\$ cheques and drafts should be drawn on a New York bank and an extra amount of US\$ 6 per payment should be added to cover bank clearing charges. All payments should be in favour of IIR Holdings Ltd.

### Card Payment

Please charge my credit card:  Visa  Mastercard  American Express

Name on Card: .....

Card Number: ..... Exp. Date: .....

Signature: .....

### Cancellation

If you are unable to attend, a substitute delegate will be very welcome in your place. If this is not suitable, a US\$ 200 service charge will be payable. Registrations cancelled less than 7 days before the event must be paid in full.

### Visas

Delegates requiring visas should contact the hotel they wish to stay at directly, as soon as possible. Visas for non-GCC nationals may take several weeks to process.

Due to unforeseen circumstances, the programme may change and IIR reserves the right to alter the venue and/or speakers.

### Accommodation

IIR Middle East have negotiated special delegate rates for you at selected hotels. Please visit our website to find the hotel of your choice on: [www.iirme.com/hospitality](http://www.iirme.com/hospitality). We highly recommend you secure your room reservation at the earliest to avoid last minute inconvenience.

Alternatively, you can contact the IIR hospitality desk for required assistance on:

**Tel: 971-4-4072693 Fax: 971-4-4072517**  
**Email: [hospitality@iirme.com](mailto:hospitality@iirme.com)**

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