COURSE OVERVIEW RE0180
Total Plant Reliability Centered Maintenance (RCM)

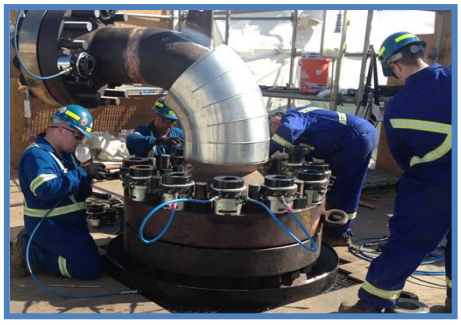
Course Title
Total Plant Reliability Centered Maintenance (RCM)

Course Date/Venue
September 08-12, 2024/Al Aziziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA

Course Reference
RE0180

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description



This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

The maintenance process has moved forward enormously in recent years, it is often difficult for maintainers and managers to keep abreast of the latest thinking and techniques. This course bridges that gap and presents recent, but proven, developments in a practical way enabling delegates to transform maintenance from a cost item to a profit center.

There is a growing realization that maintenance management actually means managing risk. Upon completion of this course, delegates will acquire a practical knowledge and understanding of RCM (Reliability Centered Maintenance), TPM (Total Productive Maintenance) and Continuous Improvement (CI) processes. Application of the methods described in this course will produce a positive impact on business goals, for example:

- Maintain and improve uptime,
- Maximise safety,
- Achieve cost effective maintenance, and,
- Develop world class maintenance performance

This will be an interactive, enjoyable and interesting learning experience. It will utilize a variety of methodologies including lectures and slide presentations. The course is structured to give you an introduction to the RCM, TPM and CI processes with a thorough grounding in the key elements. It offers practical advice and guidance on their use, particularly as they are applied in industry. Examples and group exercises allow delegates to acquire a more detailed and practical understanding. Examples of actual obstacles encountered during RCM, TPM and CI studies will be highlighted. The participation of delegates will be encouraged throughout. Delegates will also have opportunity to discuss issues relevant to their workplace if they so wish.

Course Objectives

Upon the successful completion of this course, each participant will be able to: -

- Apply and gain an in-depth knowledge on the Total Plant Reliability Centered Maintenance (RCM) including its techniques, terminology, objectives and critical success factors
- Recognize reliability and availability and determine the use of reliability information for maintenance
- Analyze the failure process and become familiar with FMEA, FMECA, failure consequences as well as the hidden and evident failures
- Enumerate the various maintenance tasks and emphasize the analytical decision logic for RCM
- Prepare a maintenance programme using the guidelines and procedures and be able to discuss the important key points in developing the maintenance programme
- Recognize the need for modification control and carry-out maintenance implementation strategies
- Demonstrate RCM audits and assessments and be able to identify the other tools used in RCM such as Failure Analysis and HAZOP studies
- Identify total productive maintenance (TPM) tools and techniques and determine the benefits from TPM towards having a world class maintenance
- Recognize the continuous improvement process as well as its tools and techniques and review the Key Performance Indicators (KPIs)
- List the support elements of RCM and use a system approach in work planning, scheduling and work control
- Identify the functionality and integration required from the CMMS and employ modern maintenance management

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of total plant reliability centered maintenance for maintenance managers, maintenance engineers, maintenance supervisors, maintenance foremen, asset managers, maintenance & engineering consultants, project managers and those who are involved in maintenance and operations (M&O) in consultant, contractor or operating companies. The course is also beneficial to both technical and non-technical personnel employed in the activities that support the O&M sector.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.
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Course Fee

US$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

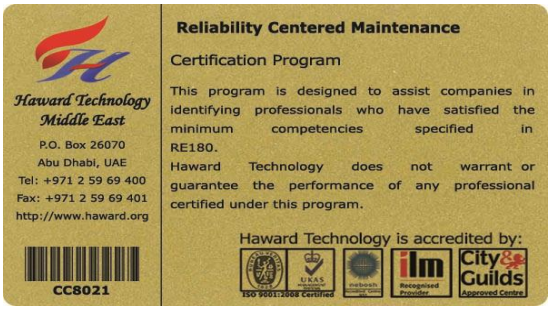
Course Certificate(s)

(1) Internationally recognized Competency Certificates and Plastic Wallet Cards will be issued to participants who completed a minimum of 80% of the total tuition hours and successfully passed the exam at the end of the course. Certificates are valid for 5 years.

There is NO Recertification Fee for a Lifetime.

Sample of Certificate(s)

The following are samples of the certificates that will be awarded to course participants: -



(2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.

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Haward Technology Middle East

Continuing Professional Development (HTME-CPD)

CEUs

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CEU Official Transcript of Records

TOR Issuance Date: 19-Nov-17

HTME No. PAR11317

Participant Name: Rashed Al Ismail

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
RE180	**Total Plant Reliability Centered Maintenance (RCM)**	November 15-19, 2017	30	3.0

Total No. of CEU's Earned as of TOR Issuance Date **3.0**

TRUE COPY

Maricel De Guzman
Academic Director

Haward Technology has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2013 Standard which is widely recognized as the standard of good practice internationally. As a result of their Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2013 Standard.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking Continuing Education Units (CEUs) in accordance with the rules & regulations of the International Association for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology is accredited by

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Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

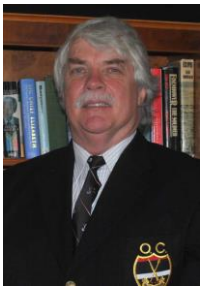
Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

- British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Mr. Den Bazley, PE, BSc, is a **Senior Mechanical Maintenance Engineer** with over **25 years** of industrial experience in **Oil**, **Gas**, **Refinery**, **Petrochemical**, **Power** and **Utilities** industries. His wide expertise includes **Condition Based Monitoring**, **Piping System**, **Process Equipment**, **Mechanical Integrity**, **Maintenance Management**, **Reliability Management**, **Reliability Centred Maintenance** (**RCM**), Total Plant Maintenance (**TPM**) and Reliability-Availability-Maintainability (**RAM**), **Engineering Drawings, Codes & Standards**, **P&ID Reading, Interpretation & Developing**. His experience covers **Design**, **Construction** and **Maintenance** of **Storage Tank**, **Hydraulic Control Valves**, **rotating and static equipment** including **Safety Relief Valves**, **Boilers**, **Pressure Vessels**, **Tanks**, **Heat Exchangers**, **Bearings**, **Compressors**, **Pumps**, **Pipelines**, **Motors**, **Turbines**, **Gears**, **Lubrication Technology** and **Mechanical Seals**. Further, he has experience in Waste Water Treatment, **Water Treatment**, **Welding**, **NDT**, Vehicle Fleet and Budgeting & Cost Control. He is well-versed in **CMMS** and various International Standards including ISO 14001.

During his career life, Mr. Bazley has gained his practical and field experience through his various significant positions and dedication as the **Engineering Manager**, **Maintenance Manager**, **Construction Manager**, **Project Engineer**, **Mechanical Engineer**, **Mechanical Services Superintendent**, **Quality Coordinator** and **Planning Manager** for numerous international companies like **ESSO**, **FFS Refinery**, Dorbyl Heavy Engineering (VECOR), Vandenbergh Foods (Unilever), **Engen Petroleum**, Royle Trust and **Pepsi-Cola**.

Mr. Bazley is a **Registered Professional Engineer** and has a **Bachelor** degree in **Mechanical Engineering**. Further, he is a **Certified Engineer** (Government Certificate of Competency GCC Mechanical Pretoria), a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), an active member of the **Institute of Mechanical Engineers** (**IMechE**) and has delivered numerous trainings, courses, seminars and workshops internationally.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Sunday, 08th of September 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Course Overview*** *Objectives ● Expectations from Delegates ● Discussion–How Good is your Facility Reliability?*

0900 – 0930	***Introduction*** *World Class Manufacturing (WCM) ● History of Maintenance Leading to TPM & RCM ● The Objectives of Maintenance ● Planned and Preventative Maintenance ● Modern Maintenance Terminology*
0930 – 0945	*Break*
0945 – 1100	***Critical Success Factors*** *What you Should Expect from RCM ● Who Should Do RCM? ● Which Maintenance is the Most Effective? ● Ways of Measuring Maintenance Effectiveness ● Selecting Maintenance Significant Items (MSI'S) for RCM Analysis; a Structured Decision Process ● Risk Quantification & the Risk Matrix*
1100 – 1230	***Reliability & Maintainability*** *Understanding Reliability & Availability ● How to Use Reliability Information for Maintenance ● Maintainability*
1230 – 1245	*Break*
1245 – 1420	***The Failure Process–RCM Theory*** *Age Versus Reliability Patterns ● Failure Modes & Effects Analysis (FMEA) & FMEC, ● Failure Consequences (Includes Delegate Exercise) ● Hidden & Evident Failures (Includes Delegate Exercise)*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: Monday, 09th of September 2024

0730 – 0800	***Review of Day 1 Plus Questions***
0800 – 0930	***Maintenance Tasks*** *The Maintenance Wheel ● Some Condition Monitoring Techniques*
0930 – 0945	*Break*
0945 – 1100	***RCM–The Analytical Decision Logic*** *Partitioning & Numbering of Plant ● Understanding the Functions of the Item ● Failure Cause Identification–Cause & Effect Relationships ● The 5 M's ● Screening the Failure Causes ● The Analysis Procedure using MSG3 Logic ● Forms to be Used*
1100 – 1230	***Case Study–Developing a Maintenance Programme*** *Understanding the Function of the Selected Item ● Preparing the Partition Diagram ● Identify the Failure Causes of the MSI's ● Screening the Failure Causes ● Complete Worksheets*
1230 – 1245	*Break*
1245– 1420	***Learning from Case Study*** *Identification & Discussion of Key Points ● Distribution of Completed Solution*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: Tuesday, 10th of September 2024

0730 – 0800	***Review of Day 2 Plus Questions***
0800 – 0830	***Modification Control*** *The Need for Modification Control ● Modification Control Procedures*
0830 – 0930	***Maintenance Implementation Strategies*** *Maintenance Strategy Implementation Alternatives ● Incorrect Strategies ● Maintenance Strategy Selection (Includes Delegate exercise)*

0930 – 0945	Break
0945 – 1100	***Audits and Assessments*** *The RCM Audit ● Assessing the Overall Programme*
1100 – 1230	***Maintenance Case Study*** *Packaged Fire Tube Boiler Failures*
1230 – 1245	Break
1245 – 1420	***Other tools*** *Failure Analysis (FFA & the "5 Why's) ● HAZOP Studies*
1420 – 1430	***Recap***
1430	Lunch & End of Day Three

Day 4: Wednesday, 11th of September 2024

0730 – 0800	***Review of Day 3 Plus Questions***
0800 – 0930	***Total Productive Maintenance (TPM)*** *Overview of TPM Tools & Techniques ● How to Position TPM Within Current Improvement Initiatives ● Organizational Changes Involved to Develop Multifunctional Teams ● The Benefits from TPM & How to Hold on to Them*
0930 – 0945	Break
0945 – 1100	***Total Productive Maintenance (TPM) (cont'd)*** *The 6 Major Machine Losses ● Overall Equipment Effectiveness (OEE) ● Measurements/Accuracy/Reasons Why ● Turning Data Into Information ● World Class Maintenance – Myths & Realities*
1100 – 1230	***Continuous Improvement*** *An Overview of the Continuous Improvement Process ● How to Obtain Buy-In to the Process from Management & Employees ● Tools & Techniques*
1230 – 1245	Break
1245 – 1420	***Continuous Improvement (cont'd)*** *KPIs (Key Performance Indicators) ● Action Plan Template for Implementation*
1420 – 1430	***Recap***
1430	Lunch & End of Day Four

Day 5: Thursday, 12th of September 2024

0730 – 0930	***Review of Day 4 Plus Questions***
0930 - 0945	Break
0945 – 1030	***Support Elements*** *Plant Numbering ● Documentation ● Development of Spares Inventory Management ● Computerised Spares Optimisation Systems*
1030 - 1100	***Work Planning, Scheduling and Work Control*** *Planning and Control ● Types of Job Cards ● Operator Logs*
1100 - 1130	***Functionality and Integration Required From The CMMS*** *Using CMMS History Analysis to Improve Reliability*
1130 - 1200	***Modern Maintenance Management*** *Organisational Structure Influence ● Leadership Role ● Team Based Structures ● Education & Training ● The Role of Engineering ● Multi-Skilling ● Maintenance Budgets ● Supplier Partnering Programmes (SPP)*

1200 - 1215	*Break*
1215 - 1300	***Review Objectives & Expectations***
1300 - 1315	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1315 - 1415	***COMPETENCY EXAM***
1415 - 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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