

# **COURSE OVERVIEW SE0042 Preventive & Predictive Maintenance**

#### **Course Title**

Preventive & Predictive Maintenance

#### Course Date/Venue

Session 1: November 10-14, 2024/TBA Meeting Room, The Tower Plaza Hotel, Dubai,

Session 2: December 15-19, 2024/Meeting Room Plus TBA, City Centre Rotana Doha, Doha, Qatar

## Course Reference

SE0042

# Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

## **Course Description**







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

This course is designed to provide participants with a detailed and up-to-date overview of Preventive and Predictive Maintenance. It covers the various types and importance of maintenance; the fundamentals of preventive maintenance and its application in civil engineering; the predictive maintenance techniques and reliability-centered maintenance (RCM); the specific roles of civil engineers in maintaining infrastructure in the petroleum industry; maintenance management systems (MMS) as the digital systems used to manage and track maintenance activities: and the maintenance schedules for civil infrastructure.

Further, the course will also discuss the monitoring and inspection of critical civil assets like buildings, foundations and pipelines; the routine maintenance tasks and the importance of proper documentation and record-keeping in preventive maintenance programs; managing maintenance budgets and resources; prioritizing maintenance tasks based on risk assessments for petroleum infrastructure; the condition-based maintenance (CBM), destructive testing (NDT) methods, vibration analysis and thermographic inspections; and monitoring the condition of structures by analyzing wear debris and surface degradation.





















During this interactive course, participants will learn the collection and analysis of data from infrastructure to predict maintenance needs; optimizing preventive maintenance schedules using data to refine and improve preventive maintenance schedules for civil assets; integrating predictive and preventive maintenance strategies for optimal results; implementing condition monitoring systems (CMS), using failure modes, effects, and criticality analysis (FMECA) and improving maintenance planning for civil engineers; the lifecycle cost analysis and safety in maintenance operations; incorporating sustainability into maintenance practices to reduce environmental impact and resource usage; the Lean and Six Sigma principles; and conducting maintenance audits and assessing performance using key metrics.

## **Course Objectives**

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

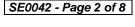
- Apply and gain an in-depth knowledge on preventive and predictive maintenance
- Identify the various types and importance of maintenance covering corrective, preventive and predictive)
- Discuss the fundamentals of preventive maintenance and its application in civil engineering
- Carryout predictive maintenance techniques and reliability-centered maintenance (RCM) to ensure safety, environmental compliance, and cost-effectiveness
- Define specific roles of civil engineers in maintaining infrastructure in the petroleum industry
- Recognize the maintenance management systems (MMS) as the digital systems used to manage and track maintenance activities
- Develop and implement maintenance schedules for civil infrastructure
- Monitor and inspect critical civil assets like buildings, foundations and pipelines
- Perform routine maintenance tasks specific to civil engineering structures within petroleum plants
- Discuss the importance of proper documentation and record-keeping in preventive maintenance programs
- Manage maintenance budgets and resources and prioritize maintenance tasks based on risk assessments for petroleum infrastructure
- Employ condition-based maintenance (CBM), non-destructive testing (NDT) methods, vibration analysis and thermographic inspections
- Monitor the condition of structures by analyzing wear debris and surface degradation
- Collect and analyze data from infrastructure to predict maintenance needs
- Optimize preventive maintenance schedules using data to refine and improve preventive maintenance schedules for civil assets
- Integrate predictive and preventive maintenance strategies for optimal results
- Implement condition monitoring systems (CMS) to continuously monitor the health of civil structures in petroleum facilities



















- Use failure modes, effects, and criticality analysis (FMECA) to assess failure modes and improve maintenance planning for civil engineers
- Perform lifecycle cost analysis to justify maintenance investments in petroleum infrastructure
- Ensure safety in maintenance operations and incorporate sustainability into maintenance practices to reduce environmental impact and resource usage
- Apply Lean and Six Sigma principles to continuously improve maintenance processes
- Conduct maintenance audits and assess performance using key metrics

## 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, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a Tablet PC.

#### Who Should Attend

This course provides an overview of all significant aspects and considerations of preventive and predictive maintenance for those who are involved in assessment, repair and risk-based inspection of concrete structures. This includes design engineers, construction engineers, civil engineers, inspection engineers, project engineers, site engineers, material engineers and other technical staff who are responsible for the integrity of reinforced concrete structures (buildings, bridges, pipelines, tanks, foundations, etc.).

#### Training Methodology

All our Courses are including Hands-on Practical Sessions using equipment, Stateof-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.

#### **Course Fee**

Dubai	<b>US\$ 5,500</b> per Delegate + <b>VAT</b> . This rate includes H-STK <sup>®</sup> (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Doha	<b>US\$ 6,000</b> per Delegate + <b>VAT</b> . This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

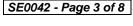




















## Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

#### **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.

#### Accommodation

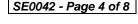
Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

















#### 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. Steve Magalios, CEng, PGDip (on-going), MSc, BSc, is a Senior Civil Engineer with almost 40 years of extensive On-shore & Offshore experience in the Oil & Gas, Construction, Refinery and Petrochemical industries. His expertise widely covers in the areas of Blast Simulation, Blast Resistant & Resilient Design, Building Life Assessment & Retrofit Solutions for Blast Resistance, Seismicity Modelling, Seismic Design for Buildings, Advanced Seismic & Wind Design of Reinforced Concrete, Industrial Building Design, Blast Resistance & Resilient for Oil & Gas Field, Concrete Structures & Building Rehabilitation, Reinforced Concrete Structures Protection, Concrete Structure Inspection & Repair, Concrete Inspection & Reliability

Analysis, Design and Behaviour of Steel Structures, Advanced Steel Design & Stability of Structures Concrete Structural Design, Dynamic Analysis of Rotating Equipment Foundations & Structural Steel Piperacks, Concrete Technology, Construction Planning, Construction & Concrete Works Maintenance, Advanced Building Construction Technology, Geosynthetics & Ground Improvement Methods, Bench Design, Benching, Land Survey and ArcGIS for Earthworks & Management, ArcGIS for Surveying, Computer Aided Design (CAD), AutoCAD Civil 3D, GIS & Mapping, Structural Analysis & Design (STAAD PRO), Land Surveying & Property Evaluation, Earth Measurements, Earthwork & Structural Maintenance, System Safety Program Plan (SSPP) Inspection, Building & Road Design Skills, Civil Engineering Design, Structural Reliability Engineering, Road Construction & Maintenance, Road Pavement Design, Road Maintenance, Drainage System Operations & Maintenance, Blueprint Reading & Interpretation, Blue Print Documentation, Mechanical Drawings, P&ID, Flow Diagram Symbols, Cartographic Representation, Soil Classification, Cadastral Surveying & Boundary Definition, Project Engineering & Design, Construction Management, Project Planning & Execution, Site Management, Site Supervision, Effective Resource Management, Project Evaluation, FEED Management, EPC Projects Design, Project Completion & Workover, Quality Control and Team Management. He is also well-versed in Pipeline Operation & Maintenance, Pipeline Design & Construction, Pipeline Engineering, Scraper Traps, Burn Pits, Risk Assessment, HSE Plan & Procedures, Construction Planning, Methods & Management, Sloping, Embankments, Construction Planning, Construction Quality Management, Project Risk Assessment, Project Quality Plans, Excavation, Backfill & Compaction, Excavation & Reinstatement, Excavation Safety for Construction, Groundworks Supervision, Construction Quality Remote Sensing, Construction Materials, Construction Surveying, Detailed Engineering Drawings, Codes & Standards Quality Plan & Procedures, Safety & Compliance Management, Permit-to-Work Issuer, ASME, API, ANSI, ASTM, BS, NACE, ARAMCO & KOC Standards, MS Office tools, AutoCAD, STAAD-PRO, GIS, ArcInfo, ArcView, Autodesk Map and various programming languages and software such as SHOTPlus, FORTRAN, BASIC and AUTOLISP. Currently, he is the Chartered Professional Surveyor Engineer & Urban-Regional Planner wherein he is deeply involved in providing exact data, measurements and determining properly boundaries. He is also responsible in preparing and maintaining sketches, maps, reports and legal description of surveys.

During his career, Mr. Magalios has gained his expertise and thorough practical experience through challenging positions such as a **Project Site Construction Manager**, **Construction Site Manager**, **Project Manager**, **Deputy PMS Manager**, **Head of the Public Project Inspection Field Team**, **Technical Consultant**, **Senior Consultant**, **Consultant**/Lecturer, **Construction Team Leader**, **Lead Pipeline Engineer**, **Project Construction Lead Supervising Engineer**, **Civil Engineer**, **Lead Site Engineer**, **Senior Site Engineer Lead Engineer**, **Senior Site Engineer**, **R.O.W. Coordinator**, **Site Representative**, **Supervision Head** and **Contractor** for international Companies such as the Penspen International Limited, Eptista Servicios de Ingeneria S.I., J/V ILF Pantec TH. Papaioannou & Co. – Emenergy Engineering, J/V Karaylannis S.A. – Intracom Constructions S.A., Ergaz Ltd., Alkyonis 7, Palaeo Faliro, Piraeus, Elpet Valkaniki S.A., Asprofos S.A., J/V Depa S.A. just to name a few.

Mr. Magalios is a Registered Chartered Engineer and has a Master's and Bachelor's degree in Surveying Engineering from the University of New Brunswick, Canada and the National Technical University of Athens, Greece, respectively. Further, he is currently enrolled for Post-graduate in Quality Assurance from the Hellenic Open University, Greece. He has further obtained a Level 4B Certificates in Project Management from the National & Kapodistrian University of Athens, Greece and Environmental Auditing from the Environmental Auditors Registration Association (EARA). Moreover, he is a Certified Instructor/Trainer, a Chartered Engineer of Technical Chamber of Greece and has delivered numerous trainings, workshops, seminars, courses and conferences internationally.























## **Course Program**

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

Dav 1

Day I	
0730 - 0800	Registration & Coffee
0800 - 0815	Welcome & Introduction
0815 - 0830	PRE-TEST
0830 – 0930	<b>Overview of Maintenance Strategies:</b> Introduction to the Types of Maintenance (Corrective, Preventive & Predictive) & their Importance in Petroleum Industry Infrastructure
0930 - 0945	Break
0945 - 1030	<b>Principles of Preventive Maintenance:</b> Understanding the Fundamentals of Preventive Maintenance & its Application in Civil Engineering
1030 - 1130	<b>Predictive Maintenance Concepts:</b> Introduction to Predictive Maintenance Techniques & the Role of Data-Driven Approaches in Infrastructure Management
1130 – 1215	<b>Reliability-Centered Maintenance (RCM):</b> Implementing RCM in Civil Projects to Ensure Safety, Environmental Compliance & Cost-Effectiveness
1215 - 1230	Break
1230 – 1330	The Role of Civil Engineers in Maintenance of Petroleum Infrastructure: Exploring Specific Roles of Civil Engineers in Maintaining Infrastructure in the Petroleum Industry
1330 - 1420	Maintenance Management Systems (MMS): Overview of Digital Systems Used to Manage & Track Maintenance Activities
1420 - 1430	Recap
1430	Lunch & End of Day One

Day 2

0730 - 0830	<b>Development of Preventive Maintenance Schedules:</b> How to Develop &
	Implement Maintenance Schedules for Civil Infrastructure in Petroleum
	Facilities
0830 - 0930	<b>Inspection &amp; Monitoring Techniques:</b> Methods for Monitoring & Inspecting
	Critical Civil Assets like Buildings, Foundations & Pipelines
0930 - 0945	Break
0045 1100	Common Preventive Maintenance Activities: Routine Maintenance Tasks
0945 – 1100	Specific to Civil Engineering Structures within Petroleum Plants
1100 – 1215	Civil Asset Management & Documentation: Importance of Proper
1100 - 1213	Documentation & Record-Keeping in Preventive Maintenance Programs
1215 - 1230	Break
	Managing Maintenance Budgets & Resources: Cost Management in
1230 - 1330	Preventive Maintenance including Budgeting for Labor, Materials &
	Downtime
1330 – 1420	<b>Risk-Based Maintenance Approaches</b> : How to Prioritize Maintenance Tasks
1550 - 1420	Based on Risk Assessments for Petroleum Infrastructure
1420 - 1430	Recap
1430	Lunch & End of Day Two



















# Day 3

0730 - 0830	Condition-Based Maintenance (CBM): Introduction to CBM & how it is
	Used to Perform Maintenance when Asset Conditions Warrant Intervention
	Non-Destructive Testing (NDT) Methods: Overview of NDT Techniques
0830 – 0930	(Ultrasonic Testing, Radiographic Testing, etc.) & their Application in
	Predictive Maintenance
0930 - 0945	Break
0045 1100	Vibration Analysis for Civil Structures: Understanding Vibration Analysis
0945 – 1100	& its Use in Predicting Structural Failures in Petroleum Facilities
1100 – 1215	Thermographic Inspections: Using Thermal Imaging Technology to Detect
1100 - 1213	Issues in Civil Structures such as Insulation Failures or Leaks
1215 - 1230	Break
1230 - 1330	Wear Debris Analysis for Infrastructure Components: Monitoring the
	Condition of Structures by Analyzing Wear Debris & Surface Degradation
1220 1420	<b>Data Collection &amp; Analysis in Predictive Maintenance:</b> How to Collect &
1330 – 1420	Analyze Data from Infrastructure to Predict Maintenance Needs
1420 - 1430	Recap
1430	Lunch & End of Day Three

## Day 4

Day 7	
0730 - 0830	<b>Optimizing Preventive Maintenance Schedules:</b> Using Data to Refine & Improve Preventive Maintenance Schedules for Civil Assets
0830 - 0930	Integrating Predictive & Preventive Maintenance: Best Practices for Combining Preventive & Predictive Maintenance Strategies for Optimal Results
0930 - 0945	Break
0945 - 1100	<b>Condition Monitoring Systems (CMS):</b> Implementing CMS to Continuously Monitor the Health of Civil Structures in Petroleum Facilities
1100 – 1215	Maintenance Optimization Through Software Tools: Leveraging Digital Tools such as CMMS (Computerized Maintenance Management Systems) to Enhance Planning & Execution
1215 - 1230	Break
1230 - 1330	<b>Failure Modes, Effects &amp; Criticality Analysis (FMECA):</b> Using FMECA to Assess Failure Modes & Improve Maintenance Planning for Civil Engineers
1330 - 1420	Infrastructure Lifecycle Cost Analysis: How to Perform Lifecycle Cost Analysis to Justify Maintenance Investments in Petroleum Infrastructure
1420 - 1430	Recap
1430	Lunch & End of Day Four
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# Day 5

0730 - 0830	Safety in Maintenance Operations: Ensuring Safety During Preventive &
	Predictive Maintenance Activities in Petroleum Facilities
0830 - 0930	Sustainability in Maintenance: Incorporating Sustainability into
	Maintenance Practices to Reduce Environmental Impact & Resource Usage
0930 - 0945	Break
0945 - 1045	Continuous Improvement in Maintenance Processes: Applying Lean &
0943 - 1043	Six Sigma Principles to Continuously Improve Maintenance Processes
1045 – 1145	Maintenance Audits & Performance Metrics: How to Conduct
1045 - 1145	Maintenance Audits & Assess Performance Using Key Metrics
1145 - 1230	Training & Development for Maintenance Teams: Importance of Ongoing
	Training for Maintenance Teams & Civil Engineers to Keep Up with New
	Technologies























1230 - 1245	Break
1245 – 1345	Case Studies & Best Practices in PPM: Reviewing Real-World Examples of Successful Preventive & Predictive Maintenance Programs in the Petroleum Industry
1345 - 1400	Course Conclusion
1400 – 1415	POST-TEST
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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