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, UAE
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; the 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), non-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, 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.

Course Fee

Dubai	**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.
Doha	**US$ 6,000** per Delegate + **VAT**. 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 & Maintenance, **Concrete Maintenance & 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:

Day 1

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Maintenance Strategies:*** *Introduction to the Types of Maintenance (Corrective, Preventive & Predictive) & their Importance in Petroleum Industry Infrastructure*
0930 – 0945	*Break*
0945 – 1030	***Principles of Preventive Maintenance:*** *Understanding the Fundamentals of Preventive Maintenance & its Application in Civil Engineering*
1030 – 1130	***Predictive Maintenance Concepts:*** *Introduction to Predictive Maintenance Techniques & the Role of Data-Driven Approaches in Infrastructure Management*
1130 – 1215	***Reliability-Centered Maintenance (RCM):*** *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	***Development of Preventive Maintenance Schedules:*** *How to Develop & Implement Maintenance Schedules for Civil Infrastructure in Petroleum Facilities*
0830 – 0930	***Inspection & Monitoring Techniques:*** *Methods for Monitoring & Inspecting Critical Civil Assets like Buildings, Foundations & Pipelines*
0930 – 0945	*Break*
0945 – 1100	***Common Preventive Maintenance Activities:*** *Routine Maintenance Tasks Specific to Civil Engineering Structures within Petroleum Plants*
1100 – 1215	***Civil Asset Management & Documentation:*** *Importance of Proper Documentation & Record-Keeping in Preventive Maintenance Programs*
1215 – 1230	*Break*
1230 – 1330	***Managing Maintenance Budgets & Resources:*** *Cost Management in Preventive Maintenance including Budgeting for Labor, Materials & Downtime*
1330 – 1420	***Risk-Based Maintenance Approaches****: How to Prioritize Maintenance Tasks 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*
0830 – 0930	***Non-Destructive Testing (NDT) Methods:*** *Overview of NDT Techniques (Ultrasonic Testing, Radiographic Testing, etc.) & their Application in Predictive Maintenance*
0930 – 0945	*Break*
0945 – 1100	***Vibration Analysis for Civil Structures:*** *Understanding Vibration Analysis & its Use in Predicting Structural Failures in Petroleum Facilities*
1100 – 1215	***Thermographic Inspections****: Using Thermal Imaging Technology to Detect 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*
1330 – 1420	***Data Collection & Analysis in Predictive Maintenance:*** *How to Collect & Analyze Data from Infrastructure to Predict Maintenance Needs*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Optimizing Preventive Maintenance Schedules****: 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	***Condition Monitoring Systems (CMS):*** *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	***Failure Modes, Effects & Criticality Analysis (FMECA):*** *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*

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 & Six Sigma Principles to Continuously Improve Maintenance Processes*
1045 – 1145	***Maintenance Audits & Performance Metrics:*** *How to Conduct 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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