COURSE OVERVIEW RE0033
Condition Monitoring Techniques for Process Plants

Course Title
Condition Monitoring Techniques for Process Plants

Course Reference
RE0033

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

Course Date/Venue

Session(s)	Date	Venue
1	February 16-20, 2025	Al Khobar Meeting Room, Hilton Garden Inn, Al Khobar, KSA
2	May 11-15, 2025	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
3	August 03-07, 2025	TBA Meeting Room, Taksim Square Hotel, Istanbul, Turkey
4	November 03-07, 2025	Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

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 design to provide participants with a detailed and up-to-date overview of condition monitoring techniques for process plants. It covers condition monitoring and viscosity sensors for engine oil condition monitoring; the basics of thermography covering thermal energy, emissivity, advantages and standards; and the thermography applications covering the types of thermal imaging devices, night vision equipment and applications, electrical components, mechanical components and building inspection.

During this interactive course, participants will learn the thermal imaging report covering its basics of inspection, description of client concerns, captured images presented, comparison of standard and interpretation of results; the condition monitoring of rotating electrical machines and apply artificial intelligence in condition monitoring; the power transformer condition monitoring covering dissolved gas analysis, partial discharges, moisture analysis, assessing DP value of a power transformer, frequency response analysis and monitoring by mechanical oscillations

Course Objectives

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

- Apply and gain an advanced knowledge on condition monitoring techniques for process plants
- Discuss condition monitoring and viscosity sensors for engine oil condition monitoring
- Identify the basics of thermography covering thermal energy, emissivity, its advantages and standards
- Carryout thermography applications including the types of thermal imaging devices, night vision equipment and applications, electrical components, mechanical components and building inspection
- Illustrate thermal imaging report as well as the basics of inspection, description of client concerns, captured images presented, comparison of standard, interpretation of results, etc
- Discuss condition monitoring of rotating electrical machines and the application of artificial intelligence in condition monitoring
- Determine power transformer condition monitoring comprising dissolved gas analysis, partial discharges, moisture analysis, assessing DP value of a power transformer, frequency response analysis and monitoring by mechanical oscillations

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 condition monitoring techniques for process plants for facility integrity engineers, inspection engineers, inspectors, maintenance engineers, maintenance supervisors, mechanical engineers and maintenance technical staff.

Course Fee

Al Khobar	**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.
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.
Istanbul	**US$ 6,000** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Abu Dhabi	**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.

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. Karl Thanasis, PEng, MSc, MBA, BSc, is **Senior Mechanical & Maintenance Engineer** with over **45 years** of extensive industrial experience within the **Power & Water Utilities** and other **Energy Sectors**. His wide expertise includes **District Cooling Plant**, **District Cooling Plant Operations**, **HVAC** Basics, **HVAC&R**, **KOTZA**, **Refrigeration**, **Modern HVAC & Refrigeration Systems Design, Utilization, Operation & Effective Maintenance, Control Valve & Actuators**, **Fire Safe Valves**, **Piping & Pipeline**, Maintenance, Repair, **Shutdown**, **Turnaround & Outages**, **Maintenance & Reliability** Management, **Mechanical Maintenance** Planning, Scheduling & Work Control, Advanced Techniques in **Maintenance** Management, **Predictive & Preventive** Maintenance, **Maintenance & Operation Cost Reduction** Techniques, Reliability Centered Maintenance (**RCM**), **Machinery Failure** Analysis, **Rotating Equipment Reliability** Optimization & Continuous Improvement, **Material Cataloguing**, **Mechanical & Rotating Equipment** Troubleshooting & Maintenance, **Root Cause Analysis & Reliability** Improvement, **Condition** Monitoring, **Root Cause Failure Analysis** (RCFA), **Steam Generation**, **Steam Turbines**, **Power Generator Plants**, **Gas Turbines**, **Combined Cycle Plants**, **Boilers**, **Process Fired Heaters**, Air Preheaters, Induced Draft Fans, All Heaters Piping Work, Refractory Casting, Heater Fabrication, Thermal & Fired Heater Design, **Heat Exchangers**, Heat Transfer, Coolers, **Power Plant** Performance, Efficiency & Optimization, **Storage Tank** Design & Fabrication, **Thermal Power Plant** Management, **Boiler & Steam** System Management, **Pump** Operation & Maintenance, **Chiller & Chiller Plant** Design & Installation, **Pressure Vessel**, **Safety Relief Valve** Sizing & Selection, **Valve** Disassembling & Repair, Pressure Relief Devices (**PSV**), **Hydraulic & Pneumatic** Maintenance, Advanced **Valve** Technology, **Pressure Vessel** Design & Fabrication, **Pumps**, Turbo-Generator, Turbine **Shaft Alignment**, **Lubrication**, Mechanical **Seals**, Packing, **Blowers**, **Bearing** Installation, **Couplings**, **Clutches** and **Gears**. Further, he is also versed in **Wastewater Treatment** Technology, **Networking** System, **Water Network Design**, Industrial **Water Treatment** in Refineries & Petrochemical Plants, **Piping** System, Water Movement, Water Filtering, Mud Pumping, **Sludge Treatment** and **Drying**, **Aerobic Process** of **Water Treatment** that includes **Aeration**, **Sedimentation** and **Chlorination Tanks**. His strong background also includes **Design** and **Sizing** of all **Waste Water Treatment Plant Associated Equipment** such as **Sludge Pumps**, **Filters**, **Metering Pumps**, **Aerators** and **Sludge Decanters**.

Mr. Thanasis has acquired his thorough and practical experience as the **Project Manager**, **Plant Manager**, **Area Manager - Equipment Construction**, **Construction Superintendent**, **Project Engineer** and **Design Engineer**. His duties covered **Plant Preliminary Design**, **Plant Operation**, **Write-up** of **Capital Proposal**, **Investment Approval**, **Bid Evaluation**, **Technical Contract Write-up**, **Construction** and **Sub-contractor Follow up**, **Lab Analysis**, **Sludge Drying** and **Management** of **Sludge Odor** and **Removal**. He has worked in various companies worldwide in the **USA**, **Germany**, **England** and **Greece**.

Mr. Thanasis is a **Registered Professional Engineer** in the **USA** and **Greece** and has a **Master's** and **Bachelor's** degree in **Mechanical Engineering** with **Honours** from the **Purdue University** and **SIU** in **USA** respectively as well as an **MBA** from the **University of Phoenix** in **USA**. Further, he is a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, seminars, workshops and conferences worldwide.

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 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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Condition Monitoring*** *Oil Analysis • Oil Viscosity • Thermography • Vibration & Noise • Dynamic Monitoring*
0930 – 0945	***Break***
0945 – 1100	***Condition Monitoring (cont'd)*** *Oil Alignment • Balance • Thickness*
1100 – 1215	***Condition Monitoring (cont'd)*** *Power Consumption • Flow Rate • Temperature Drop • Pressure Drop*
1215 – 1230	*Break*
1230 – 1420	***Viscosity Sensors for Engine Oil Condition Monitoring***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730– 0930	***Basics of Thermography*** *Definitions (Near-Infrared, Mid-Infrared, Thermal-Infrared) • Thermal Energy • Emissivity*
0930 – 0945	*Break*
0945– 1100	***Basics of Thermography (cont'd)*** *Difference Between Infrared Film & Thermography • Passive vs Active Thermography*
1100 – 1215	***Basics of Thermography (cont'd)*** *Advantages of Thermography (Particularly Good for Large, Distant, or Hazardous Applications, Camera Operations Relatively Easy, Service Companies Specializing in Thermography)*
1215 – 1230	*Break*

1230 – 1420	***Basics of Thermography (cont'd)*** *Thermography Standards (ISO 6781, Thermal Insulation, Qualitative Detection of Thermal Irregularities in Building Envelopes, Infrared Method, ISO 18434-1, Condition Monitoring & Diagnostics of Machines, General Procedures - ISO 18436-7, Requirements for Qualification & Assessment of Personnel)*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Thermography Applications*** *Types of Thermal Imaging Devices (Un-Cooled, Cryogenically Cooled) ● Generations (Generation 0, Generation 1, Generation 3, Generation 4)*
0930 – 0945	*Break*
0945 – 1100	***Thermography Applications (cont'd)*** *Night Vision Equipment & Applications (Scopes, Goggles, Cameras) ● Electrical Components (Electrical Switches, High Voltage Lines, Motor Control Centers, Electrical Substations, Transformers, etc)*
1100 – 1215	***Thermography Applications (cont'd)*** *Mechanical Components (Bearings, Drive Belts, Steam Lines & Traps, Piping Insulation, Valves, Refractories, Heat Exchangers, etc)*
1215 – 1230	*Break*
1230 – 1420	***Thermography Applications (cont'd)*** *Building Inspection (Heat Loss - Air Infiltration in Walls, Ceilings, Floors, Windows & Doors, Damaged and/or Malfunctioning Radiant Heating Systems Air-Conditioner Compressor Leaks, Under-Fastening and/or Missing Framing Members, Other Structural Defects, Broken Seals in Windows, Plumbing Leaks, Hidden Roof Leaks, Missing, Damaged and/or Wet Insulation, Water & Moisture Intrusion, Thermography Limitations)*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0930	***Thermal Imaging Report*** *Basics of Inspection ● Brief Description of Client Concerns*
0930 – 0945	*Break*
0945 – 1100	***Thermal Imaging Report (cont'd)*** *Captured Images Presented Alongside a Digital, Visible-Light Photo & a Description of Discovered Issue ● Comparison of Standard, Digital & IR-Imaging Modes*
1100 – 1215	***Thermal Imaging Report (cont'd)*** *Interpretation of the Results ● Proposal of Next Action in Order to Address Source or Asset Problems*
1215 – 1230	*Break*
1230 – 1420	***Thermal Imaging Report (cont'd)*** *Camera Technical Data (Camera Used, Settings Use, Brief Description of Weather & Other Relevant Conditions)*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	***Condition Monitoring of Rotating Electrical Machines***
0930 – 0945	*Break*
0945 – 1100	***Application of Artificial Intelligence in Condition Monitoring***
1100 – 1215	***Power Transformer Condition Monitoring*** *Dissolved Gas Analysis • Partial Discharges • Moisture Analysis*
1215 – 1230	*Break*
1230 – 1345	***Power Transformer Condition Monitoring (cont'd)*** *Assessing DP Value of a Power Transformer • Frequency Response Analysis • Monitoring by Mechanical Oscillations*
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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