



COURSE OVERVIEW RE0033-4D Condition Monitoring Techniques for Process Plants

Course Title

Condition Monitoring Techniques for Process Plants

Course Date/Venue

Session 1: August 05-08, 2024/ Club B Meeting Room, Ramada Plaza by Wyndham Istanbul City Center, Istanbul, Turkey
Session 2: November 04-07, 2024/ Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE



Course Reference

RE0033-4D

Course Duration/Credits

Four days/2.4 CEUs/24 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 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

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.

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

Istanbul	US\$ 5,000 per Delegate + VAT . This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Abu Dhabi	US\$ 4,500 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: -

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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 **2.4 CEUs** (Continuing Education Units) or **24 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.

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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. His wide expertise includes **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.



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 • Oil Alignment • Balance • Thickness
0930 – 0945	Break
0945 – 1100	Condition Monitoring (cont'd) Power Consumption • Flow Rate • Temperature Drop • Pressure Drop
1100 – 1215	Viscosity Sensors for Engine Oil Condition Monitoring
1215 – 1230	Break
1230 – 1420	Basics of Thermography Definitions (Near-Infrared, Mid-Infrared, Thermal-Infrared) • Thermal Energy • Emissivity • Difference Between Infrared Film & Thermography • Passive vs Active Thermography
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day One

Day 2

0730– 0930	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)
0930 – 0945	Break
0945– 1100	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)
1100 – 1215	Thermography Applications Types of Thermal Imaging Devices (Un-Cooled, Cryogenically Cooled) • Generations (Generation 0, Generation 1, Generation 3, Generation 4) • Night Vision Equipment & Applications (Scopes, Goggles, Cameras) • Electrical Components (Electrical Switches, High Voltage Lines, Motor Control Centers, Electrical Substations, Transformers, etc)
1215 – 1230	Break
1230 – 1420	Thermography Applications (cont'd) Mechanical Components (Bearings, Drive Belts, Steam Lines & Traps, Piping Insulation, Valves, Refractories, Heat Exchangers, etc)
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Two





Day 3

0730 – 0930	Thermography Applications (cont'd) <i>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)</i>
0930 – 0945	Break
0945 – 1100	Thermal Imaging Report <i>Basics of Inspection • Brief Description of Client Concerns • Captured Images Presented Alongside a Digital, Visible-Light Photo & a Description of Discovered Issue • Comparison of Standard, Digital & IR-Imaging Modes</i>
1100 – 1215	Thermal Imaging Report (cont'd) <i>Interpretation of the Results • Proposal of Next Action in Order to Address Source or Asset Problems</i>
1215 – 1230	Break
1230 – 1420	Thermal Imaging Report (cont'd) <i>Camera Technical Data (Camera Used, Settings Use, Brief Description of Weather & Other Relevant Conditions)</i>
1420 – 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow</i>
1430	Lunch & End of Day Three

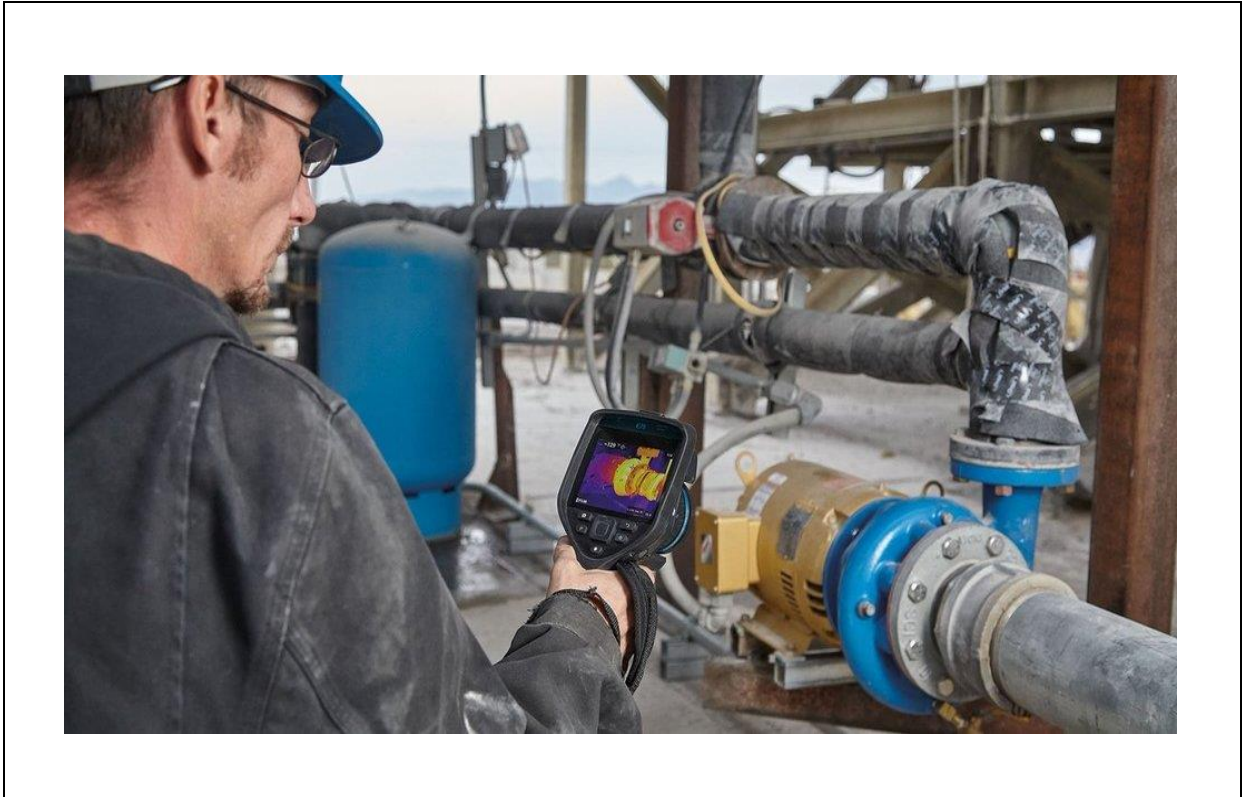
Day 4

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 <i>Dissolved Gas Analysis • Partial Discharges • Moisture Analysis</i>
1215 – 1230	Break
1230 – 1345	Power Transformer Condition Monitoring (cont'd) <i>Assessing DP Value of a Power Transformer • Frequency Response Analysis • Monitoring by Mechanical Oscillations</i>
1345 – 1400	Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
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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