COURSE OVERVIEW ME0390
Heavy Duty Gas Turbine Major Inspections

Course Title
Heavy Duty Gas Turbine Major Inspections

Course Reference
ME0390

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

Course Date/Venue

Session(s)	Date	Venue
1	March 04-07, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
2	June 23-27, 2024	Al Azziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA
3	September 22-26, 2024	Boardroom , Warwick Hotel Doha, Doha, Qatar
4	December 09-13, 2024	Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This This course is designed to provide participants with a detailed and up-to-date overview of Heavy Duty Gas Turbine Major Inspections. It covers the fundamentals, components, operation principles and types of gas turbine; the purpose, frequency and scope of major inspections; the safety standards, personal protective equipment (PPE) and procedures for site preparation; the specialized tools and equipment used during major inspections; the documentation process including inspection checklists, compliance with standards and reporting; the step-by-step guide on the disassembly process for major inspections; and the combustion section inspection, turbine section inspection, compressor section inspection and bearing and seal inspection.

During this interactive course, participants will learn the interactive course, participants will learn the NDT methods used in turbine inspections and the specific application of NDT techniques for detecting flaws in turbine components; the techniques for analyzing turbine vibrations to identify issues; the rotor dynamics and the importance of rotor balancing during inspections; the thermal imaging and best practices for the reassembly of turbine components after inspection; the proper alignment and calibration of turbine components; the effective procedures for conducting performance tests; inspecting and testing turbine control systems for operational integrity; and commissioning the turbine post-inspection in as safely manner.

Course Objectives

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

- Apply and gain a comprehensive knowledge on heavy duty gas turbine major inspections.
- Discuss fundamentals, components, operation principles and types of gas turbine
- Identify the purpose, frequency and scope of major inspections
- Apply the safety standards, personal protective equipment (PPE) and procedures for site preparation
- Recognize the specialized tools and equipment used during major inspections
- Illustrate the documentation process including inspection checklists, compliance with standards and reporting
- Carryout step-by-step guide on the disassembly process for major inspections as well as combustion section inspection, turbine section inspection, compressor section inspection and bearing and seal inspection
- Employ NDT methods used in turbine inspections covering ultrasonic, radiographic, magnetic particle, etc.
- Implement specific application of NDT techniques for detecting flaws in turbine components as well as techniques for analyzing turbine vibrations to identify issues
- Identify rotor dynamics and the importance of rotor balancing during inspections
- Use thermal imaging to identify hot spots and insulation failures
- Employ best practices for the reassembly of turbine components after inspection as well as the techniques for ensuring proper alignment and calibration of turbine components
- Apply effective procedures for conducting performance tests to verify turbine functionality
- Inspect and test turbine control systems for operational integrity and carryout steps for safely commissioning the turbine post-inspection

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 heavy duty gas turbine major inspections for inspection engineers, inspectors, supervisors and managers, operations managers, asset managers, maintenance engineers, reliability engineers, gas turbine technicians, maintenance planners/schedulers: personnel, safety and compliance personnel, engineers and technicians from gas turbine OEMS, quality assurance/quality control personnel.

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. Manuel Dalas MSc, BSc, is a **Senior Mechanical & Maintenance Engineer** with over **20 years** of industrial experience in **Oil**, **Gas**, **Refinery**, **Petrochemical**, **Power** and **Nuclear** industries. His wide expertise includes **Material Cataloguing**, **Maintenance Planning & Scheduling**, Reliability Centered Maintenance (**RCM**), **Reliability Maintenance**, **Gas Turbine Inspection & Overhauling**, **Condition Based Maintenance & Condition Monitoring**, **Asset & Risk** Management, **Vibration Condition Monitoring & Diagnostics** of Machines, **Vibration & Predictive** Maintenance, Reliability Improvement & Vibration Analysis for Rotating Machinery, Effective Maintenance **Shutdown & Turnaround** Management, **Engineering Codes & Standards**, **Rotating Equipment** Maintenance, **Mechanical** Troubleshooting, **Static Mechanical Equipment** Maintenance, **Machinery** Failure Analysis, **Machinery Diagnostics & Root Cause Failure** Analysis, **Plant Reliability & Maintenance** Strategies, **Boiler** Operation & Water Treatment, **Pumps** Maintenance & Troubleshooting, **Fans**, **Blowers & Compressors**, **Process Control Valves**, Piping Systems & Process Equipment, **Gas Turbines & Compressors** Troubleshooting, Advanced **Valve** Technology, **Pressure Vessel** Design & Analysis, **Steam & Gas Turbine**, **High Pressure Boiler** Operation, **FRP Pipe** Maintenance & Repair, **Centrifugal & Positive Displacement Pump** Technology Troubleshooting & Maintenance, **Rotating Machinery** Best Practices, **PD Compressor & Gas Engine** Operation & Troubleshooting, **Hydraulic Tools & Fitting**, **Mass & Material Balance**, **Water Distribution & Pump Station**, **Tank Farm & Tank Termin**al Safety & Integrity Management, **Process Piping** Design, Construction & **Mechanical Integrity**, **Stack & Noise** Monitoring, **HVAC & Refrigeration** Systems, BPV Code, Section VIII, Division 2, **Facility Planning & Energy** Management, Hoist - Remote & Basic **Rigging & Slinging**, **Mobile Equipment** Operation & Inspection, **Heat Exchanger**, **Safety Relief Valve**, **PRV & POPRV/PORV**, **Bearing & Lubrication**, **Voith Coupling** Overhaul, **Pump & Valve** Technology, **Lubrication** Inspection, **Process Plant** Optimization, Rehabilitation, Revamping & Debottlenecking, Engineering Problem Solving and **Process Plant** Performance & Efficiency. Currently, he is the **Technical Consultant** of the **Association of Local Authorities of Greater Thessaloniki** where he is in charge of the mechanical engineering services for piping, pressure vessels fabrications and ironwork.

During his career life, Mr. Dalas has gained his practical and field experience through his various significant positions and dedication as the **Technical Manager**, **Project Engineer**, **Safety Engineer**, **Deputy Officer**, **Instructor**, **Construction Manager**, **Construction Engineer**, **Consultant Engineer** and **Mechanical Engineer** for numerous multi-billion companies including the **Biological Recycling Unit** and the **Department of Supplies** of **Greece**, **Alpha Bank Group**, **EMKE S.A**, **ASTE LLC** and **Polytechnic College of Evosmos**.

Mr. Dalas has a **Master** degree in **Energy System** from the **International Hellenic University, School of Science & Technology** and a **Bachelor** degree in **Mechanical Engineering** from the **Mechanical Engineering Technical University of Greece** along with a **Diploma** in **Management & Production Engineering** from the **Technical University of Crete**. Further, he is a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), a **Certified Project Manager Professional** (**PMI-PMP**), a **Certified Instructor/Trainer**, a **Certified Energy Auditor** for **Buildings**, **Heating & Climate Systems**, a **Member** of the **Hellenic Valuation Institute** and the **Association of Greek Valuers** and a **Licensed Expert Valuer Consultant** of the **Ministry of Development and Competitiveness**. He has further delivered numerous trainings, courses, seminars, conferences and workshops internationally.

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.
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.
Doha	**US$ 6,000** per Delegate. 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 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 – 0900	***Gas Turbine Fundamentals**: Introduction to Gas Turbine Components, Operation Principles & Types*
0900 - 0930	***Overview of Major Inspections**: Purpose, Frequency & Scope of Major Inspections*
0930 – 0945	*Break*
0945 – 1100	***Safety Procedures & Preparations**: Safety Standards, Personal Protective Equipment (PPE) & Site Preparation*
1100 – 1200	***Tools & Equipment for Inspection**: Overview of the Specialized Tools & Equipment Used During Major Inspections*

1200 – 1215	*Break*
1215 – 1420	***Documentation & Compliance**: Understanding the Documentation Process, including Inspection Checklists, Compliance with Standards & Reporting*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Case Study**: Review of a Recent Major Inspection, Highlighting Challenges & Learnings*
0830 - 0930	***Disassembly Procedures**: Step-By-Step Guide on the Disassembly Process for Major Inspections*
0930 – 0945	*Break*
0945 – 1100	***Combustion Section Inspection**: Detailed Inspection of Combustors, Fuel Nozzles & Combustion Liners*
1100 – 1200	***Turbine Section Inspection**: Examination of Turbine Blades, Vanes & Rotor Assemblies*
1200 – 1215	*Break*
1215 – 1420	***Compressor Section Inspection**: Inspection of Compressor Blades, Vanes & Casing*
1420 - 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Bearing & Seal Inspection**: Methods for Inspecting Bearings, Seals & Related Components*
0830 - 0930	***Interactive Workshop**: Hands-On Practice on Component Inspection & Identification of Common Issues*
0930 – 0945	*Break*
0945 – 1100	***NDT Techniques**: Overview of NDT Methods Used in Turbine Inspections (e.g., Ultrasonic, Radiographic, Magnetic Particle)*
1100 – 1200	***Application of NDT in Turbine Inspection**: Specific Applications of NDT Techniques for Detecting Flaws in Turbine Components*
1200 – 1215	*Break*
1215 – 1420	***Vibration Analysis**: Techniques for Analyzing Turbine Vibrations to Identify Issues*
1420 - 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Rotor Dynamics & Balancing**: Rotor Dynamics & the Importance of Rotor Balancing During Inspections*
0830 - 1930	***Thermal Imaging**: Using Thermal Imaging to Identify Hot Spots & Insulation Failures*
0930 – 0945	*Break*
0945 – 1100	***Workshop on NDT Equipment**: Practical Session on Using NDT Equipment on Turbine Components*

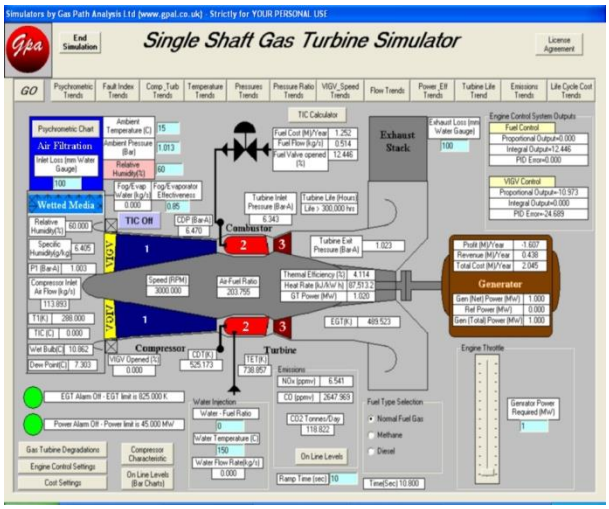
1100 – 1200	***Reassembly Procedures**: Best Practices for the Reassembly of Turbine Components after Inspection*
1200 – 1215	*Break*
1215 – 1420	***Alignment & Calibration**: Techniques for Ensuring Proper Alignment & Calibration of Turbine Components*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

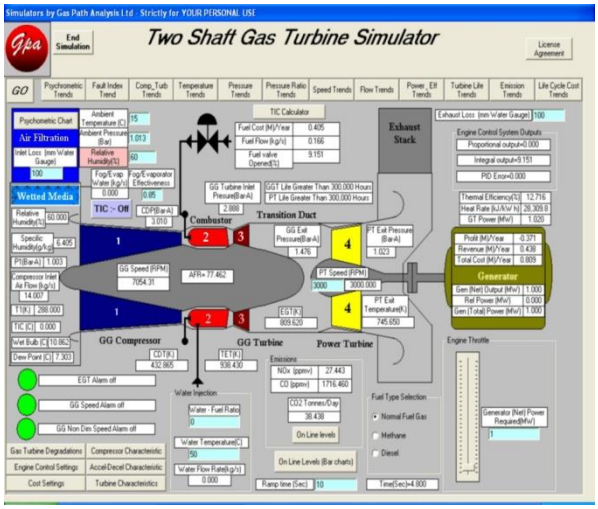
0730 – 0830	***Performance Testing**: Procedures for Conducting Performance Tests to Verify Turbine Functionality*
0830 - 0930	***Control Systems Check**: Inspection & Testing of Turbine Control Systems for Operational Integrity*
0930 – 0945	*Break*
0945 – 1200	***Commissioning Steps**: Steps for Safely Commissioning the Turbine Post-Inspection*
1200 – 1215	*Break*
1215 – 1345	***Group Project**: Teams Work on a Simulated Reassembly & Commissioning Exercise, Applying Learned Techniques*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

Practical session will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the "Single Shaft Gas Turbine Simulator" and "Two Shaft Gas Turbine Simulator".



Single Shaft Gas Turbine Simulator



Two Shaft Gas Turbine Simulator

Course Coordinator

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