



COURSE OVERVIEW ME0527 Steam Boilers Operation & Maintenance

Course Title

Steam Boilers Operation & Maintenance

Course Date/Venue

February 09-13, 2025/Meclis 1 Meeting Room,
Divan Istanbul Sisli, Istanbul, Turkey

Course Reference

ME0527

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



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 course is designed to provide participants with a detailed and up-to-date overview of Steam Boilers Operation and Maintenance. It covers the safety measures and importance of steam boilers in mechanical utilities; the types of boilers and construction covering fire-tube, water-tube and electric boilers; the roles of critical components of boilers like drums, tubes, burners, blowdown systems and economizers; the fundamentals and principles of boiler operation, heat transfer and thermodynamics; and the importance, methods and chemicals used in treatment to prevent scaling, corrosion and foaming.



Further, the course will also discuss the codes and standards in boiler design and operation covering ASME, ASTM and other relevant standards; the safe boiler operations, boiler commissioning, startup procedures and shutdown procedures; the potential hazards in a boiler room and the common boiler accidents and how to prevent them; the proper inspections and efficiency testing; the preventive maintenance practices, boiler components maintenance, boiler cleaning and inspection techniques; the boiler typical issues and practical repair techniques; and the advanced boiler technology and boiler troubleshooting.





During this interactive course, participants will learn the techniques and tools for advanced preventive maintenance; the use of data and analytics to predict potential failures; the techniques to enhance boiler efficiency including tuning, optimization of heat transfer and combustion analysis; the methods to reduce emissions and incorporating sustainable practices in boiler operations; the maintenance record keeping and documentation; the emergency maintenance procedures and advanced methods to manage and prevent corrosion and scale buildup; how to retrofit or upgrade boiler systems for improved performance; and conducting energy audits and using benchmarks to compare boiler performance.

Course Objectives

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

- Apply and gain a good working knowledge on steam boilers operation and maintenance
- Discuss the safety measures and importance of steam boilers in mechanical utilities
- Recognize the types of boilers and construction covering fire-tube, water-tube and electric boilers
- Identify the roles of critical components of boilers like drums, tubes, burners, blowdown systems and economizers
- Explain the fundamentals and principles of boiler operation, heat transfer and thermodynamics
- Discuss the importance, methods and chemicals used in treatment to prevent scaling, corrosion and foaming
- Review the codes and standards in boiler design and operation covering ASME, ASTM and other relevant standards
- Carryout safe boiler operations and boiler commissioning, startup procedures and shutdown procedures
- Identify and mitigate potential hazards in a boiler room, recognize the common boiler accidents and how to prevent them and conduct proper inspections and efficiency testing
- Implement preventive maintenance practices, boiler components maintenance, boiler cleaning and inspection techniques
- Identify boiler typical issues and practical repair techniques as well as carryout advanced boiler technology and boiler troubleshooting
- Apply techniques and tools for advanced preventive maintenance as well as use data and analytics to predict potential failures
- Employ techniques to enhance boiler efficiency including tuning, optimization of heat transfer and combustion analysis
- Implement methods to reduce emissions and incorporate sustainable practices in boiler operations as well as maintenance record keeping and documentation
- Carryout emergency maintenance procedures and advanced methods to manage and prevent corrosion and scale buildup
- Explain how to retrofit or upgrade boiler systems for improved performance and conduct energy audits and using benchmarks to compare boiler performance



Who Should Attend

This course provides an overview of all significant aspects and considerations of steam boilers operation and maintenance for senior boiler plant operators, repairers and installers, boiler plant construction managers, plant engineers, operation, maintenance, inspection and repair managers, supervisors and engineers, mechanical engineers and technicians, design engineers, consulting engineers, insurance company inspectors, control system engineers, instrumentation engineers and technicians.

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

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.. This rate includes H-STK® (Howard Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation


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

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.



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. Andrew Ladwig is a **Senior Process & Mechanical Engineer** with over **25 years** of extensive experience within the **Oil & Gas, Refinery, Petrochemical & Power** industries. His expertise widely covers in the areas of **Ammonia Manufacturing & Process Troubleshooting, Distillation Towers, Crude Oil Distillation, Fundamentals of Distillation** for Engineers, **Distillation Operation and Troubleshooting, Advanced Distillation Troubleshooting, Distillation Technology, Vacuum Distillation, Ammonia Storage & Loading Systems, Ammonia Plant Operation, Troubleshooting & Optimization, Ammonia Recovery, Ammonia Plant Safety, Hazard of Ammonia Handling, Storage & Shipping, Operational Excellence in Ammonia Plants, Fertilizer Storage Management (Ammonia & Urea), Fertilizer Manufacturing Process Technology, Sulphur Recovery, Phenol Recovery & Extraction, Wax Sweating & Blending, Petrochemical & Fertilizer Plants, Nitrogen Fertilizer Production, Petroleum Industry Process Engineering, Refining Process & Petroleum Products, Refinery Planning & Economics, Safe Refinery Operations, Hydrotreating & Hydro-processing, Separators in Oil & Gas Industry, Gas Testing & Energy Isolations, Gas Liquor Separation, Industrial Liquid Mixing, Wax Bleachers, Extractors, Fractionation, Operation & Control of Distillation, Process of Crude ATM & Vacuum Distillation Unit, Water Purification, Water Transport & Distribution, Steam & Electricity, Flame Arrestors, Coal Processing, Environmental Emission Control, R&D of Wax Blending, Wax Molding/Slabbing, Industrial Drying, Principles, Selection & Design, Certified Process Plant Operations, Control & Troubleshooting, Operator Responsibilities, Storage Tanks Operations & Measurements, Process Plant Troubleshooting & Engineering Problem Solving, Process Plant Performance, Efficiency & Optimization, Continuous Improvement & Benchmarking, Process Troubleshooting Techniques, Oil & Gas Operation/Introduction to Surface Facilities, Pressure Vessel Operation, Process Equipment Performance & Troubleshooting, Plant Startup & Shutdown, Startup & Shutdown the Plant While Handling Abnormal Conditions, Flare & Relief System, Process Gas Plant Start-up, Commissioning & Problem Solving, Process Liquid and Process Handling & Measuring Equipment. Further, he is also well-versed in **Compressors & Turbines Operation, Maintenance & Troubleshooting, Heat Exchanger Overhaul & Testing Techniques, Balancing of Rotating Machinery (BRM), Pipe Stress Analysis, Valves & Actuators Technology, Inspect & Maintain Safeguarding Vent & Relief System, Certified Inspectors for Vehicle & Equipment, Optimizing Equipment Maintenance & Replacement Decisions, Certified Maintenance Planner (CMP), Certified Planning and Scheduling Professional (AACE-PSP), Tank Design, Construction, Inspection & Maintenance, Material Cataloguing, Specifications, Handling & Storage, Steam Trap Design, Operation, Maintenance & Troubleshooting, Steam Trapping & Control, Column, Pump & Exchangers, Troubleshooting & Design, Rotating Equipment Operation & Troubleshooting, Control & ESD System, Detailed Engineering Drawings, Codes & Standards, Budget Preparation, Allocation & Cost Control, Root Cause Analysis (RCA), Production Optimization, Permit to Work (PTW), Project Engineering, Data Analysis, Process Hazard Analysis (PHA), HAZOP Study, Sampling & Analysis, Training Analysis, Job Analysis Techniques, Storage & Handling of Toxic Chemicals & Hazardous Materials, Hazardous Material Classification & Storage/Disposal, Dangerous Goods, Risk Monitoring Authorized Gas Tester (AGT), Confined Space Entry (CSE), Personal Protective Equipment (PPE), Fire & Gas, First Aid and Occupational Health & Safety.****

During his career life, Mr. Ladwig has gained his practical experience through his various significant positions and dedication as the **Mechanical Engineer, Project Engineer, Reliability & Maintenance Engineer, Maintenance Support Engineer, Process Engineer, HSE Supervisor, Warehouse Manager, Quality Manager, Business Analyst, Senior Process Controller, Process Controller, Safety Officer, Mechanical Technician, Senior Lecturer and Senior Consultant/Trainer** for various companies such as the Sasol Ltd., Sasol Wax, Sasol Synfuels, just to name a few.

Mr. Ladwig has a **Bachelor's degree in Chemical Engineering** and a **Diploma in Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)** and has delivered various



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: Sunday, 09th of February 2025

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Introduction to Steam Boilers: Overview of the Course, Safety Measures, & Importance in Mechanical Utilities
0930 - 0945	Break
0945 - 1045	Types of Boilers & Construction: Detailed Study of Fire-Tube, Water-Tube, & Electric Boilers; Understanding Construction Differences
1045 - 1145	Boiler Components & their Functions: Identifying & Understanding the Roles of Critical Components Like Drums, Tubes, Burners, Blowdown Systems, & Economizers
1145 - 1230	Fundamentals of Boiler Operations: Principles of Boiler Operation, Heat Transfer, & Thermodynamics
1230 - 1245	Break
1245 - 1330	Boiler Water Treatment: Importance, Methods, & Chemicals used in Treatment to Prevent Scaling, Corrosion, & Foaming
1330 - 1420	Codes & Standards in Boiler Design & Operation: Introduction to ASME, ASTM, & Other Relevant Standards; How they Influence Design & Operation
1420 - 1430	Recap
1430	Lunch & End of Day One

Day 2: Monday, 10th of February 2025

0730 – 0830	Safe Boiler Operations: Operating Boilers at Appropriate Pressures & Temperatures; Understanding & Managing Operational Risks
0830 – 0930	Boiler Commissioning & Startup Procedures: Step-By-Step Process for Both Newly Installed & Returning Boilers
0930 – 0945	Break
0945 – 1030	Shutdown Procedures & Considerations: Effective Methods for Short-Term & Long-Term Shutdown
1030 – 1230	Boiler Plant Safety Practices: Identifying & Mitigating Potential Hazards in a Boiler Room
1230 – 1245	Break
1245 - 1330	Common Boiler Accidents & Prevention: Case Studies of Past Accidents & Strategies to Avoid them
1330 - 1420	Inspections & Efficiency Tests: Conducting Thorough Inspections, Understanding Efficiency Metrics, & Identifying Performance Issues
1420 - 1430	Recap
1430	Lunch & End of Day Two

Day 3: Tuesday, 11th of February 2025

0730 – 0830	Preventive Maintenance Practices: Scheduling & Conducting Routine Maintenance for Longevity & Efficiency
0830 – 0930	Maintenance of Boiler Components: Detailed Maintenance Procedures for Key Components Like Burners, Tubes, & Blowdown Systems





0930 – 0945	Break
0945 – 1030	Boiler Cleaning & Inspection Techniques: Methods for Cleaning Boilers & Conducting Detailed Inspections to Ensure Optimal Performance
1030 – 1230	Common Boiler Repairs: Identifying Typical Issues & Practical Repair Techniques
1230 – 1245	Break
1245 – 1330	Advanced Boiler Technology: Exploring Recent Advancements in Boiler Technology, Including Automation & Green Technology
1330 – 1420	Boiler Troubleshooting: Systematic Approach to Diagnose & Resolve Common Operational Problems
1420 – 1430	Recap
1430	Lunch & End of Day Three

Day 4: Wednesday, 12th of February 2025

0730 – 0830	Advanced Preventive Maintenance Techniques: Latest Techniques & Tools for Advanced Preventive Maintenance
0830 – 0930	Predictive Maintenance Strategies: Using Data & Analytics to Predict Potential Failures & Address them Proactively
0930 – 0945	Break
0945 – 1030	Efficiency Optimization: Techniques to Enhance Boiler Efficiency, Including Tuning, Optimization of Heat Transfer, & Combustion Analysis
1030 – 1230	Sustainability in Boiler Operations: Methods to Reduce Emissions & Incorporate Sustainable Practices in Boiler Operations
1230 – 1245	Break
1245 – 1330	Maintenance Record Keeping & Documentation: Importance of Keeping Detailed Maintenance Logs & How to Effectively Document Maintenance Activities
1330 – 1420	Case Studies & Practical Exercises: Hands-On Sessions & Real-World Examples to Reinforce Maintenance Concepts
1420 – 1430	Recap
1430	Lunch & End of Day Four

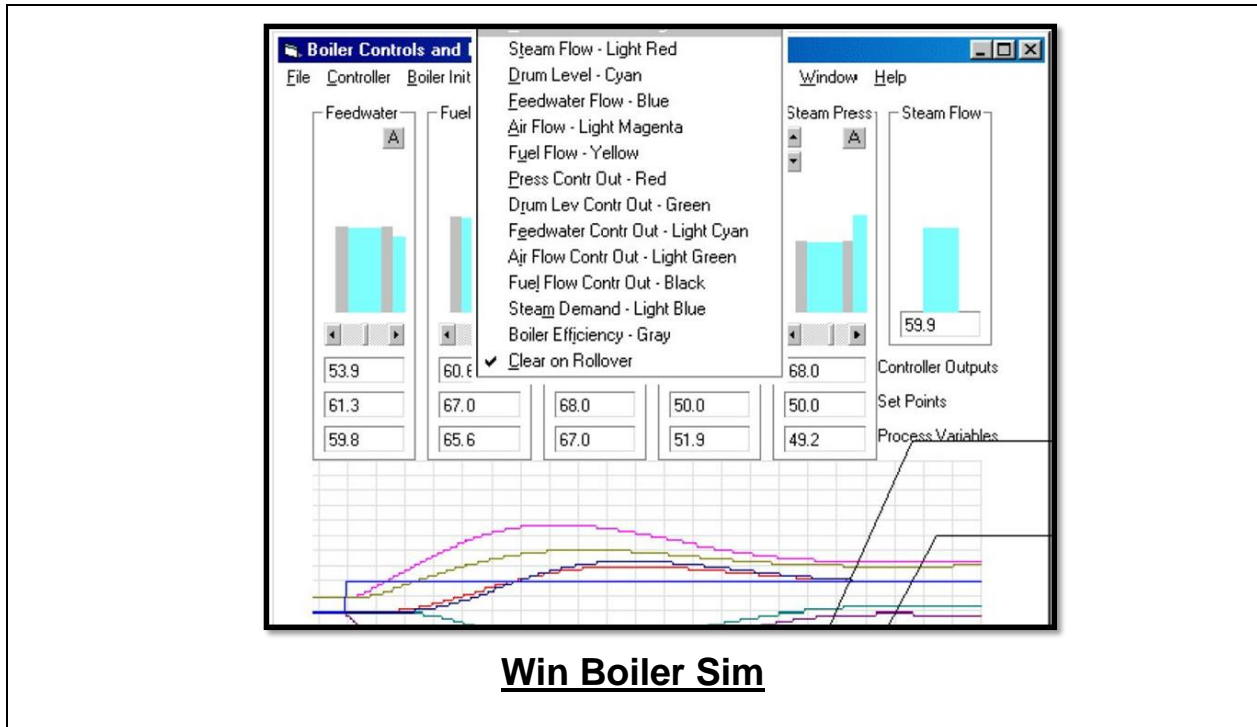
Day 5: Thursday, 13th of February 2025

0730 – 0930	Emergency Maintenance Procedures: Steps to Take During Emergency Situations to Ensure Safety & Minimize Downtime
0930 – 0945	Break
0945 – 1100	Corrosion & Scale Management: Advanced Methods to Manage & Prevent Corrosion & Scale Buildup
1100 – 1230	Boiler Retrofits & Upgrades: When & How to Retrofit or Upgrade Boiler Systems for Improved Performance
1230 – 1245	Break
1245 – 1345	Energy Audits & Benchmarking: Conducting Energy Audits & Using Benchmarks to Compare Boiler Performance
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 simulator “Win Boiler Sim”.



Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org