COURSE OVERVIEW ME0067(SA1)
Heat Exchangers Design, Selection, TEMA, ASME Section VIII Requirements

Course Title
Heat Exchangers Design, Selection, TEMA, ASME Section VIII Requirements

Course Date/Venue
Session 1: February 25-29, 2024/The Mouna Meeting Room, The H Dubai Hotel, Sheikh Zayed Rd - Trade Centre, Dubai, UAE
Session 2: March 03-07, 2024/Kizkulesi, Crown Plaza Istanbul Asia Hotels & Convention Center, Istanbul, Turkey

Course Reference
ME0067(SA1)

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.

The design, performance and operation of modern heat exchangers requires an understanding of the principles of heat transfer and fluid flow, coupled with access to numerically based techniques and supporting data. This course will review heat transfer fundamentals as applied to tubular and plate devices. Included will be sessions on the practical aspects of shell and tube heat exchanger design with ASME and TEMA codes.

Upon completion of this course, delegates will gain an understanding of the basic principles of heat transfer and fluid flow and their application to the design, operation and maintenance of shell and tube heat exchangers as well as compact and air cooled heat exchangers. Participants will gain an understanding of TEMA and ASME codes and learn how to numerically analyze the different heat exchanger configurations. Attention will be paid to the recognition and solving of a wide variety of industrial problems, taking existing case studies.

The course will also address the ways in which systematic techniques of inspection and maintenance (including Fouling Control) can alleviate major problem areas. Further, the course will explain the Energy Balance in Heat Exchangers and discuss the new technologies of Heat Transfer and heat exchanger within the industry.

There will be troubleshooting workshops devoted to the discussion of regularly occurring heat exchanger problems, performance assessment and methods to improve the overall thermal efficiencies of these devices.

The course will also cover current methods of inspection and maintenance.

Course Objectives

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

- Design, inspect, maintain and operate heat exchangers and analyse their performance in a professional manner
- Discuss heat exchangers including the principles of working, thermal design, LMTD, fouling, film coefficients, thermal resistance, hydraulic design and vibration
- Identify various types, major components, design calculations and selection of shell-and-tube exchanger, air cooled exchanger, hairpin (double pipe) exchanger, plate and frame exchanger, spiral exchanger and plate-fin (cold box) exchangers
- Select heat exchanger for various application and discuss codes and standards
- Perform heat exchanger data sheets preparation for shell-and-tube, air cooled, double pipe, plate and frame, spiral exchanger, and electrical heat exchanger
- Review the engineering documents including GA drawings, design calculation and data sheets

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 all significant aspects and considerations of designing and selection of heat exchangers in accordance with TEMA and ASME section viii requirements for project engineers, process engineers, plant and maintenance engineers and supervisors in the oil, chemical and other process industries who require a wider and deeper appreciation of heat exchanger design, performance, inspection, maintenance and operation, as well as to be able to solve numerical problems. It should also prove useful to those generally knowledgeable on the subject, but who may require a refresher or update. No prior knowledge of heat transfer is required. Participants will be taken through an intensive primer of heat transfer principles as they apply to shell and tube heat exchangers.

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. 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** and **Bachelor** degrees 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 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.
Istanbul	**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 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	***Heat Exchangers*** *Principles of Working ● Thermal Design (Heat Transfer) ● LMTD ● Fouling ● Film Coefficients ● Thermal Resistance ● Hydraulic Design (Pressure Drop) ● Vibration*
0930 – 0945	*Break*
0945 – 1100	***Heat Exchangers Types/Major Components/Design Calculations/Selections: Shell-and-Tube Exchanger*** *TEMA Class ● Configuration ● TEMA Types ● Applications*
1100 – 1215	***Heat Exchangers Types/Major Components/Design Calculations/Selections: Air Cooled Exchanger*** *Codes and Standards ● Tube Bundle Details ● Operational Limitations ● Air versus Water Cooling ● Temperature Control*
1215 – 1230	***Practical Exercises***
1230 – 1330	*Break*
1330 – 1420	***Practical Exercises (cont'd)***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Heat Exchangers Types/Major Components/Design Calculations/Selections: Hairpin (Double Pipe) Exchanger*** *Configuration ● Types ● Application*
0930 – 0945	*Break*
0945 – 1100	***Heat Exchangers Types/Major Components/Design Calculations/Selections: Plate and Frame Exchanger*** *Configuration ● Types ● Application*
1100 – 1215	***Heat Exchangers Types/Major Components/Design Calculations/Selections: Spiral Exchanger*** *Configuration ● Application*
1215 – 1230	***Practical Exercises***
1230 – 1330	*Break*
1330 – 1420	***Practical Exercises (cont'd)***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Heat Exchangers Types/Major Components/Design Calculations/Selections: Plate-Fin (Cold Box) Exchangers*** *Configuration ● Application*
0930 – 0945	*Break*
0945 – 1100	***Selection of Heat Exchanger for Various Application***
1100 – 1215	***Codes and Standards*** *TEMA ● ASME ● SEC VIII ● API 660 ● API 661 ، Design Calculations*
1215 – 1230	***Practical Exercises***
1230 – 1330	*Break*
1330 – 1420	***Practical Exercises (cont'd)***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

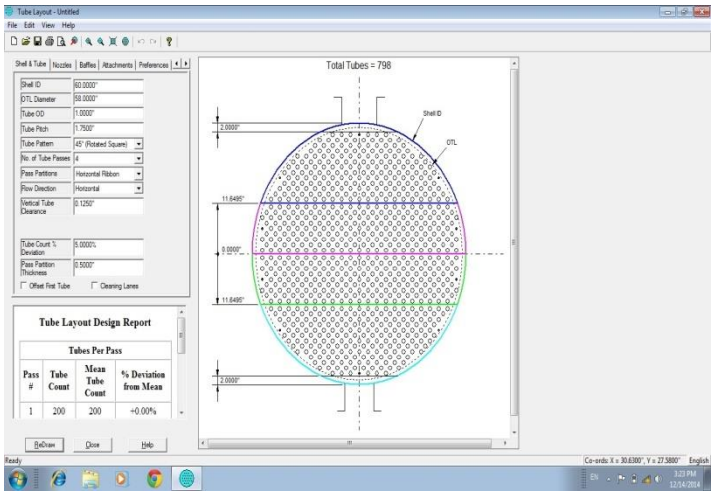
0730 – 0930	***Heat Exchanger Data Sheets Preparation for Shell-and-Tube***
0930 – 0945	*Break*
0945 – 1100	***Heat Exchanger Data Sheets Preparation for Air Cooled***
1100 – 1215	***Heat Exchanger Data Sheets Preparation for Double Pipe***
1215 – 1230	***Practical Exercises***
1230 – 1330	*Break*
1330 – 1420	***Practical Exercises (cont'd)***
1420 – 1430	***Recap***
1430	*Lunch &End of Day Four*

Day 5

0730 – 0930	***Heat Exchanger Data Sheets Preparation for Plate and Frame***
0930 – 0945	*Break*
0945 – 1100	***Heat Exchanger Data Sheets Preparation for Spiral Exchanger***
1100 – 1215	***Heat Exchanger Data Sheets Preparation for Electrical Heat Exchanger***
1215 – 1230	***Review of Engineering Documents*** *GA Drawings ● Design Calculation and Data Sheets*
1230 – 1330	***Practical Exercises***
1330 – 1345	*Break*
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 sessions 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 "Heat Exchanger Tube Layout".



Heat Exchanger Tube Layout Simulator

Course Coordinator

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