COURSE OVERVIEW ME1142
Utilities Equipment: Steam Generator, Water Treatment and Storage Tanks

Course Title
Utilities Equipment: Steam Generator, Water Treatment and Storage Tanks

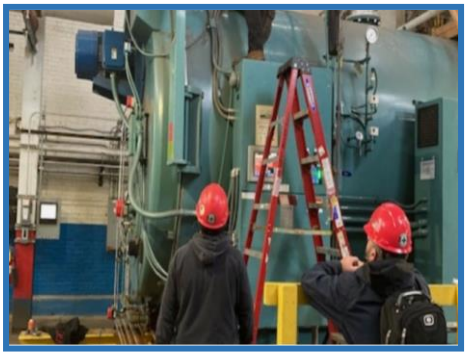
Course Reference
ME1142

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

Course Date/Venue

Session(s)	Date	Venue
1	May 19-23, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
2	July 20-24, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
3	September 22-26, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
4	November 16-20, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, 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 course is designed to provide participants with a detailed and up-to-date overview of Utilities Equipment: Steam Generator, Water Treatment and Storage Tanks. It covers the components and key equipment used of utilities systems and its importance in industrial processes; the steam generator design and components, different types of water sources and water treatment equipment; the steam and water system integration, boiler feedwater treatment, boiler operations and control and boiler maintenance and inspection; the types of boilers in utility systems; and the efficiency optimization in steam generators including boiler and steam system safety.

During this interactive course, participants will learn the water softening and filtration, reverse osmosis systems, chemical treatment in water systems and water treatment monitoring and control; the water storage tank design, water distribution and piping systems; the various types of storage tanks and applications; the tank fabrication and construction, tank inspection, integrity testing, tank safety and regulatory compliance; the tank venting and pressure control systems, tank monitoring and automation systems; the integrated utilities system management and energy recovery and heat integration; and the advanced water treatment technologies, smart water management systems and sustainability in utilities management.

Course Objectives

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

- Apply and gain an in-depth knowledge on utilities equipment: steam generator, water treatment and storage tanks
- Identify the components and key equipment used of utilities systems and its importance in industrial processes
- Recognize steam generator design and components, different types of water sources and water treatment equipment
- Apply steam and water system integration, boiler feedwater treatment, boiler operations and control and boiler maintenance and inspection
- Identify the types of boilers in utility systems and carryout efficiency optimization in steam generators including boiler and steam system safety
- Carryout water softening and filtration, reverse osmosis systems, chemical treatment in water systems and water treatment monitoring and control
- Illustrate water storage tank design, water distribution and piping systems as well as identify various types of storage tanks and applications
- Employ tank fabrication and construction, tank inspection, integrity testing, tank safety and regulatory compliance
- Apply tank venting and pressure control systems, tank monitoring and automation systems, integrated utilities system management and energy recovery and heat integration
- Carryout advanced water treatment technologies, smart water management systems and sustainability in utilities management

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 utilities equipment: steam generator, water treatment and storage tanks for engineers and technical staff, operations and maintenance personnel, health, safety, and environmental (HSE) professionals, project and design engineers, facility and plant managers, consultants and technical advisors.

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: -

- 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.

- 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.

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. Kyle Bester is a **Senior Mechanical & Maintenance Engineer** with extensive years of practical experience within the **Oil & Gas**, **Power & Water Utilities** and other **Energy** sectors. His expertise widely covers in the areas of **Machinery Vibration** Monitoring, **Vibration** Measurement, **Machinery Failure** Analysis, **Vibration & Predictive** Maintenance, **Machinery Diagnostics & Root Cause** Failure Analysis, **Alignment & Leveling**, **Laser Alignment**, **Coupling & Shaft Alignment** Techniques, **Alignment** Techniques, **Mechanical Shaft Alignment & Vibrational** Analysis, **Laser & Dial-Indicator** Techniques, **Mitsubishi & Honeywell HVAC Building Management Systems** (**BMS**), **HVAC & Refrigeration** Systems, **HVAC** System Monitoring, Preventive Maintenance Scheduling, **HVAC** Units Fault Detection, **Energy** Efficiency Optimization, **Mitsubishi HVAC** Operations, **Load** Balancing Techniques, **Steam Boilers & Oil Combustion**, **Utility Boilers**, **Commercial HVAC Controls & DDC**, **Air Conditioning & Refrigeration**, Modern Heating, Ventilation, Air-Conditioning (**HVAC**) **& Refrigeration** Systems, **Gas Turbine** Maintenance & Troubleshooting, **Safety Relief Valve** Sizing & Testing, **PRV & POPRV/PORV**, **Bearing & Bearing** Failure Analysis, **Pumps & Valves** Maintenance, Coupling, Gear Boxes, Bearings & Lubrication, Mechanical Seals, **Pressure Vessel** Design & Analysis, **Steam & Gas Turbine**, **High Pressure Boiler** Operation, **Compressors** Operation & Maintenance, **Tank** Design, Construction, Inspection & Maintenance, **Tank & Tank Farms**, **Hydraulic** Modelling, Advanced Surface Storage Facilities & **Pipeline** Networks, **Process Design & Engineering**, **Piping Control Loops & Heat Exchangers**, Safe **Process Units Start-Up/Shutdown**, **Reliability & Asset Management** Technology Best Practices, Condition Monitoring System of **Rotary Machines**, **Data Analysis** Techniques, **Maintenance Planning & Scheduling**, **Maintenance Shutdown & Turnaround**, **Maintenance Audit** Best Practices, **Maintenance & Reliability** Management, Reliability, Availability & Maintainability (**RAM**), **Root Cause** Analysis and **Reliability-Centered Maintenance** (**RCM**). Further, he is also well-versed in **Water Treatment & Reverse Osmosis** Units, **Water Resources** Management & Policies, **Water** Network Systems & Pumping Stations, **Waste Water Effluent** Treating Facilities, Best Practice in **Sewage & Industrial Waste Water** Treatment & Environmental Protection, **Oil Refinery & Petrochemical Industry Wastewater** Treatment & Operation, **Water Network** Optimization Strategy, **Water Network** Operation & Maintenance and **Chlorination** System.

During his career life, Mr. Bester has gained his practical and field experience through his various significant positions and dedication as the **Project Manager**, **Asset Manager**, **Water Engineer**, **Maintenance Engineer**, **Mechanical Engineer**, **Process Engineer**, **Supervisor**, **Team Leader**, **Analyst**, **Utility Field Supervisor**, **HVAC & Building Controls Supervisor**, **Field HVAC Technician**, **Process Technician**, **Landscape Designer** and **Senior Instructor/Trainer** for various international companies, infrastructures, water and wastewater treatment plants from New Zealand, UK, Samoa, Zimbabwe and South Africa, just to name a few.

Mr. Bester holds a **Diploma** in **Wastewater Treatment** and a **National Certificate** in **Wastewater & Water Treatment**. Further, he is a **Certified Instructor/Trainer**, an **Approved Chemical Handler** and has delivered numerous courses, trainings, conferences, seminars 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.

Accommodation

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

Course Fee

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 workshop 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	***Overview of Utilities Systems*** *Definition and Components of Utilities Systems • Importance of Utilities in Industrial Processes • Key Equipment Used in Utilities Systems • Integration of Utilities with Other Plant Systems*
0930 – 0945	*Break*
0945 – 1030	***Introduction to Steam Generation*** *Basic Principles of Steam Generation • Types of Steam Boilers and Their Applications • Steam Generation Cycle • Fuel Sources and Efficiency*
1030 – 1130	***Steam Generator Design & Components*** *Types of Steam Generators (e.g., Fire-Tube, Water-Tube) • Main Components of a Steam Generator • Heat Exchange Principles in Steam Generation • Safety Features in Steam Generation Equipment*
1130 – 1215	***Water Treatment: Overview & Importance*** *The Role of Water Treatment in Utilities • Different Types of Water Sources (e.g., Well, River, Desalinated) • Key Processes in Water Treatment • Regulatory Standards for Water Quality*
1215 – 1230	*Break*
1230 – 1330	***Water Treatment Equipment*** *Types of Water Treatment Systems (e.g., Filtration, Softening, Reverse Osmosis) • Components of Water Treatment Systems • Chemical Dosing Systems for Water Treatment • Common Troubleshooting Issues in Water Treatment*

1330 – 1420	***Steam & Water System Integration*** *Interplay Between Steam and Water Systems • Energy Recovery in Utilities Equipment • Heat Transfer and Management in Combined Systems • Energy Efficiency Optimization*
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 – 0830	***Boiler Feedwater Treatment*** *Importance of Feedwater Quality • Feedwater Purification Processes • Monitoring and Control of Feedwater Quality • Chemical Treatment of Feedwater*
0830 – 0930	***Boiler Operations & Control*** *Basic Operational Principles of a Boiler • Boiler Startup and Shutdown Procedures • Pressure and Temperature Control in Steam Generation • Safety Protocols During Boiler Operation*
0930 – 0945	*Break*
0945 – 1100	***Boiler Maintenance & Inspection*** *Regular Maintenance Requirements for Boilers • Common Faults in Boilers and Troubleshooting • Inspection Techniques for Boiler Integrity • Preventive Maintenance Practices*
1100 – 1215	***Types of Boilers in Utility Systems*** *Fire-Tube Boilers vs. Water-Tube Boilers • High-Pressure vs. Low-Pressure Boilers • Boiler Selection Criteria Based on Industrial Needs • Modern Advancements in Boiler Technology*
1215 – 1230	*Break*
1230 – 1330	***Efficiency Optimization in Steam Generators*** *Methods to Enhance Steam Generation Efficiency • Boiler Efficiency and Performance Metrics • Fuel Consumption and Waste Heat Recovery • Role of Automation in Efficiency Optimization*
1330 – 1420	***Boiler & Steam System Safety*** *Boiler Safety Relief Systems • Emergency Shutdown Systems • Overpressure and Overheating Risks • Regulatory Safety Standards for Steam Systems*
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 – 0830	***Water Softening & Filtration*** *Principles of Water Softening and Filtration • Types of Softening Techniques (e.g., Ion Exchange) • Filtration Systems (e.g., Sand, Carbon) • Applications and Limitations of Water Softeners*
0830 – 0930	***Reverse Osmosis Systems*** *Overview of Reverse Osmosis (RO) Technology • RO Membranes and Their Operation • Advantages and Limitations of RO Systems • Maintenance and Cleaning of RO Membranes*
0930 – 0945	*Break*

0945 – 1100	***Chemical Treatment in Water Systems*** *Water Treatment Chemicals and Their Applications • Scale, Corrosion, and Fouling Prevention • pH Control and Disinfection Chemicals • Safety Measures When Handling Chemicals*
1100 – 1215	***Water Treatment Monitoring & Control*** *Key Parameters for Water Quality Monitoring • Use of Sensors and Analyzers in Water Treatment • Control Systems for Water Treatment Plants • Data Collection and Interpretation for Water Quality*
1215 – 1230	*Break*
1230 – 1330	***Water Storage Tank Design*** *Design Principles for Water Storage Tanks • Types of Water Storage Tanks (e.g., Elevated, Ground) • Tank Material Selection and Corrosion Resistance • Tank Maintenance and Inspection Schedules*
1330 – 1420	***Water Distribution & Piping Systems*** *Water Distribution Network Design • Pipe Materials and Their Selection • Hydraulic Calculations for Water Systems • Pressure and Flow Regulation in Distribution Systems*
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 Three*

Day 4

0730 – 0830	***Types of Storage Tanks & Applications*** *Different Tank Types (e.g., Vertical, Horizontal) • Storage Tanks for Potable and Non-Potable Water • Environmental Considerations for Tank Design • Tank Selection Criteria Based on Capacity and Usage*
0830 – 0930	***Tank Fabrication & Construction*** *Materials Used in Tank Construction (e.g., Steel, Concrete) • Tank Fabrication Processes • Installation Techniques and Best Practices • Quality Control During Tank Construction*
0930 – 0945	*Break*
0945 – 1100	***Tank Inspection & Integrity Testing*** *Routine Inspection Procedures for Storage Tanks • Non-Destructive Testing Methods (e.g., Ultrasonic, Radiography) • Tank Cleaning Procedures and Safety • Maintaining Tank Integrity and Preventing Leaks*
1100 – 1215	***Tank Safety & Regulatory Compliance*** *Safety Protocols for Storage Tank Operations • Regulatory Requirements for Tank Design and Operation • Preventing Contamination and Cross-Contamination • Emergency Procedures in Case of Tank Failure*
1215 – 1230	*Break*
1230 – 1330	***Tank Venting & Pressure Control Systems*** *Importance of Venting in Storage Tanks • Types of Tank Venting Systems (e.g., Pressure, Vacuum) • Pressure and Vacuum Relief Valves • Ensuring Proper Venting to Avoid Hazardous Situations*

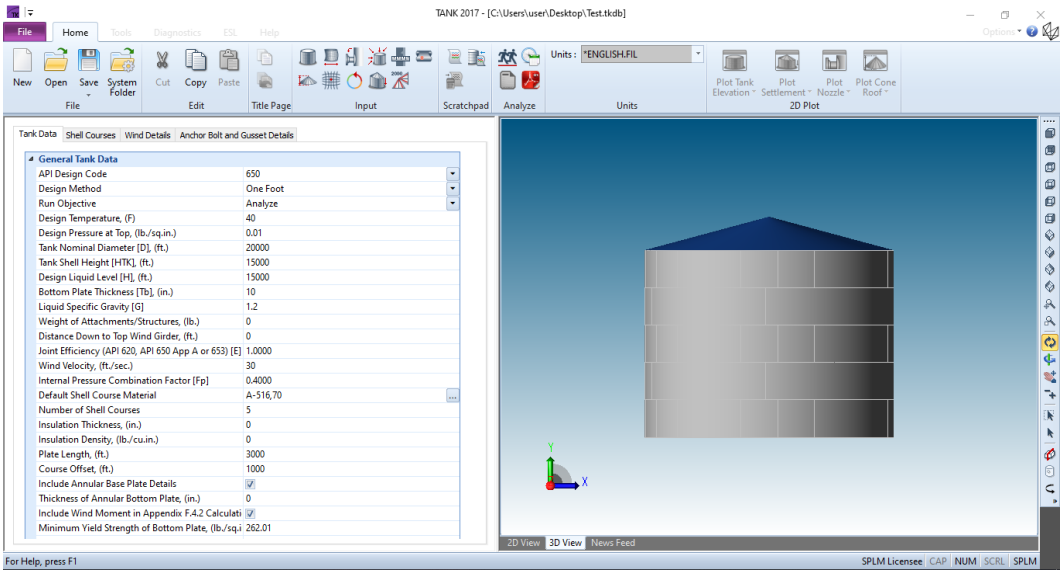
1330 – 1420	***Tank Monitoring & Automation Systems*** *Tank Level Monitoring Systems (e.g., Radar, Float) • Automation in Tank Operations • Leak Detection and Emergency Shutdown Systems • Tank Data Collection and Remote Monitoring*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) 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 Four*

Day 5

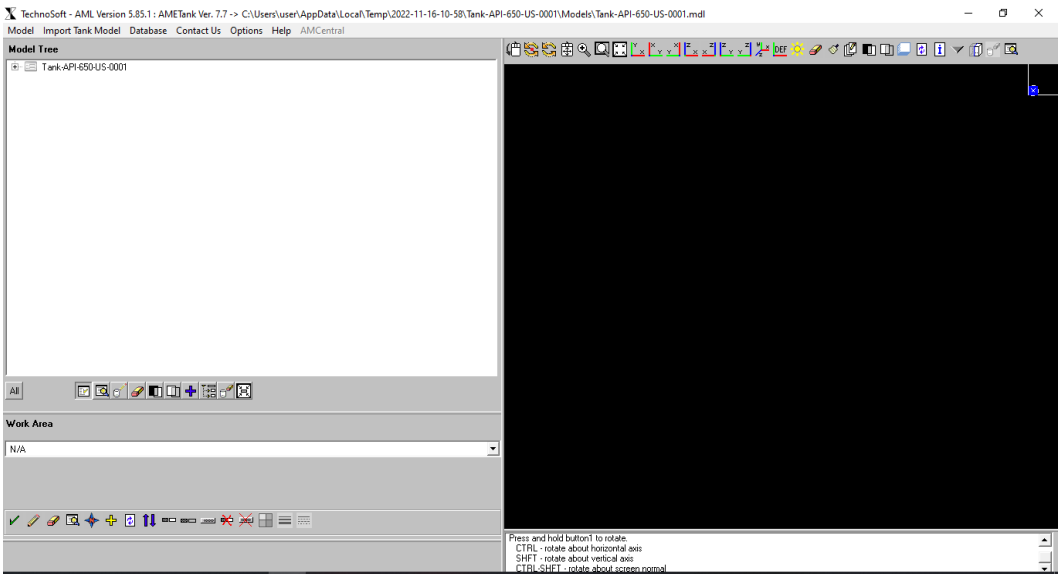
0730 – 0830	***Integrated Utilities System Management*** *Managing Steam, Water, and Tank Systems as a Unified System • Optimization Strategies for System Performance • Role of Automation and Control in Utilities Management • Integrating Utilities with Production and Facility Systems*
0830 – 0930	***Energy Recovery & Heat Integration*** *Heat Exchange Techniques in Utilities Systems • Recovering Waste Heat from Steam Generation • Heat Pumps and Other Energy-Saving Technologies • Design Considerations for Heat Integration*
0930 – 0945	*Break*
0945 – 1100	***Advanced Water Treatment Technologies*** *Emerging Water Treatment Technologies (e.g., UV Treatment, Electrocoagulation) • Nanotechnology in Water Filtration • Membrane Bioreactors and Their Application • Future Trends in Water Treatment*
1100 – 1215	***Smart Water Management Systems*** *Introduction to Smart Water Management Systems • Real-Time Water Quality Monitoring • Smart Sensors and IoT Applications in Utilities • Case Studies of Smart Water Systems in Industry*
1215 – 1230	*Break*
1230 – 1300	***Sustainability in Utilities Management*** *Environmental Impact of Utilities Systems • Sustainable Practices in Water Treatment and Steam Generation • Renewable Energy Integration with Utilities Systems • Regulatory Trends Toward Sustainability in Utilities*
1300 - 1345	***Case Study: Utilities Equipment in Practice*** *Analysis of a Real-World Case Study Involving Utilities Equipment • Problem-Solving Strategies and Lessons Learned • Group Discussion on System Optimization • Identifying Opportunities for Improvement in Existing Systems*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about t Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

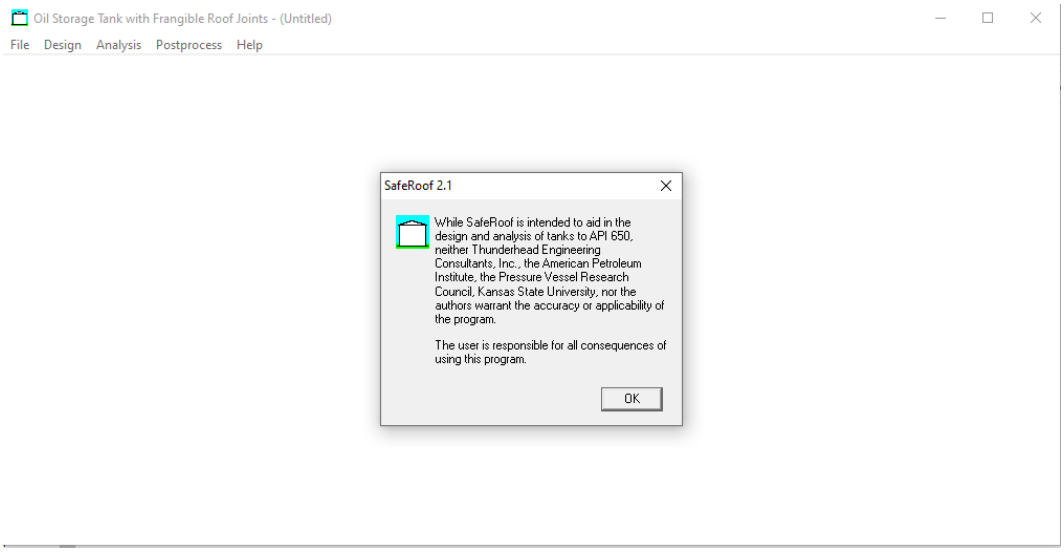
Practical sessions will be organized during the workshop for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulators Hexagon PPM COADE TANK 2017 SP1 v9.00.01 (Integraph Tank)", " AME Tank v7.7" and "SafeRoof v2.1".



Hexagon PPM COADE TANK 2017 SP1 v9.00.01 (Integraph Tank)



AME Tank v7.7



SafeRoof v2.1

Course Coordinator
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