COURSE OVERVIEW ME0740
API 650: Welded Tanks for Oil Storage

Course Title
API 650: Welded Tanks for Oil Storage

Course Date/Venue
Session 1: July 06-10, 2025/Oryx Meeting Room, Double Tree by Hilton Al Saad, Doha, Qatar
Session 2: November 16-20, 2025/Oryx Meeting Room, Double Tree by Hilton Al Saad, Doha, Qatar

Course Reference
ME0740

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.

Storage tanks store a diverse variety of liquids used in the hydrocarbon processing industry at oil/gas fields, refineries, petrochemical plants, marine terminals, bulk storage, oil depots and marketing terminals. They are also part of the support facilities in other industries, such as fuel storage tanks at power plants. These tanks have gained importance and visibility in recent years due to failures that have resulted in hydrocarbon spills and environmental impact. Following these incidents, there has been a marked increase in governmental regulation and industry attention to tanks.

A tank maintenance and integrity evaluation programme can only be effective if it also considers tank design requirements. Recognizing the primary features of these tanks and understanding how they are designed provide the information needed to better understand their maintenance requirements. The course focuses on atmospheric storage tank design requirements in accordance with API 650.

The course includes slides of actual installations, sample problems, and classroom exercises to illustrate specific points and give course participants the opportunity to practice application of the topics discussed. It is recommended that participants bring copies of API 650 to the course. Participapnts are asked to bring their laptops or hand-held calculators to the course.

This course is meant for providing the participants with the knowledge about types of conventional storage tanks, fixed and floating roof tanks, tank selection and product classification including cost awareness for new structures. The participants will learn the design aspects, codes and standards, tank shell design and tank foundations. Operational aspects like blending, tank mixers, floating roof movements, roof drains and roof seals are also covered under this course. During this course, the participants will also learn to develop proactive maintenance activities, develop tank inspection plans and intervals, design codes and operation of tanks, Safety aspects and dominant failure modes.

Course Objectives

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

- Apply systematic techniques, tools and procedures on the design, installation, operation, maintenance and troubleshooting of tanks and tank farms in order to achieve the maximum performance and efficiency
- Develop and implement a cost-effective tank maintenance strategy
- Assess the configuration, operation and management practices of tank farms in terms of facility capacity, operational effectiveness, and the cost/benefit of feed, intermediate and product storage
- Appreciate the importance of codes, standards, regulations and recommended practices in terms of hazard management and incident scenario layer of protection safeguarding
- Identify the different types and classifications of tanks and their applications
- Recognize considerations of materials-of-construction and various corrosion protection strategies and tactics including cleaning, coating and cathodic protection
- Perform fire protection of tanks and tank farms: venting, frangible roofs, flame and detonation arrestors, protection from ignition by static electricity, principles and practices of bonding and grounding, principles of inerting, electrical classification, selection criteria for fire suppression systems
- Employ the principles, practices and benefits of “Fire System Integrity Assurance”
- Apply tank emission control measures and procedures to satisfy regulatory requirements
- Describe pollution equipment including fugitive emissions potential, hydrocarbons blanketing, nitrogen equipment, tank product containment bund walls and tank floating top drainage systems
- Carryout principles, preparations and practices associated with tank cleaning, entry, and inspection and repair
- Execute a system approach on tank operations including tank entry, tank bottoms, sludge, source reduction, mitigation, vapor freeing, degassing and tank cleaning
- Discuss the various tank accessories used in the tank and tank farm design, operation, inspection and maintenance and explain their features and functions

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 the API 650 for managers, engineers and other technical and operational staff involved in the design, operation, instrumentation, inspection or maintenance of tanks and tank farms. This includes personnel in-charge of oil movement, bulk storage, marine terminals, tank farms and oil depots.

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. This rate includes H-STK® (Haward 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: -

- 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. Steve Magalios, CEng, PGDip, MSc, BSc, is a **Senior Mechanical & Maintenance Engineer** with over **30 years** of extensive **On-shore/Offshore** experience in the **Oil & Gas**, **Construction**, **Refinery** and **Petrochemical** industries. His expertise widely covers in the areas of **Preventive & Predictive** Maintenance, **Reliability Centered** Maintenance, **Applied Maintenance** Management, **Reliability** Modelling, **Reliability** Techniques, **Reliability Design** Techniques, Advanced **Root Causes** Analysis & Techniques, **Reliability** Management, **Pipeline Hot Tapping**, **Hot Tapping** Equipment, **Hot Tapping Operation**, **Boiler** Inspection & Maintenance, **Boiler** Systems, **Boiler** instrumentation & Controls, **Boiler** Start-up & Shutdown, **Boiler** Operation & Steam System Management, **Pipe Cuttings**, **Flange Bolt Tightening** Sequence, **Hydro Testing**, **Pump** Technology, Fundamentals of **Pumps**, **Pump** Selection & Installation, **Centrifugal Pumps & Troubleshooting**, **Reciprocating & Centrifugal Compressors**, **Screw Compressor**, **Compressor** Control & Protection, **Gas & Steam Turbines**, **Turbine** Operations, **Gas Turbine** Technology, **Valves**, **Process Control Valves**, **Bearings & Lubrication**, Advanced **Machinery Dynamics**, **Rubber Compounding**, **Elastomers**, **Thermoplastic**, **Industrial Rubber Products**, **Rubber** Manufacturing Systems, **Heat Transfer**, **Vulcanization Methods**, **Welding** Engineering, **Fabrication** & Inspection, **Welding** Techniques, Practical **Welding** Technology, **Welding** Inspection, **Welding & Machine Shop**, **Welding & Machining**, **Welding** Types & Applications, **Welding** Safety, **Welding** Defects Analysis, **TIG & Arc Welding**, **Shielded Metal Arc Welding**, **Gas Tungsten & Gas Metal Arc Welding**, **Welding** Procedure Specifications & Qualifications (WPS & WPQ), **Aluminium Welding**, Safe **Welding**, International **Welding Codes**, **Welding Procedure** Specifications, **Welding & Brazing**, **Welder** Performance Qualification, **Pipeline** Operation & Maintenance, **Pipeline** Systems, **Pipeline** Design & Construction, **Pipeline** Repair Methods, **Pipeline** Engineering, Pipeline Integrity Management System (**PIMS**). Currently, he is the **Chartered Professional Surveyor Engineer & Urban-Regional Planner** wherein he is deeply involved in providing exact data, measurements and determining properly boundaries. He is also responsible in preparing and maintaining sketches, maps, reports and legal description of surveys.

During his career, Mr. Magalios has gained his expertise and thorough practical experience through challenging positions such as a **Project Site Construction Manager**, **Supervision Head/Construction Manager**, **Construction Site Manager**, **Project Manager**, **Deputy PMS Manager**, **Head of the Public Project Inspection Field Team**, **Technical Consultant**, **Senior Consultant**, **Consultant/Lecturer**, **Construction Team Leader**, **Lead Pipeline Engineer**, **Project Construction Lead Supervising Engineer**, **Lead Site Engineer**, **Senior Site Engineer Lead Engineer**, **Senior Site Engineer**, **Mechanical Engineer**, **R.O.W. Coordinator**, **Site Representative**, **Supervision Head**, **Contractor**, Client Site Representative and Acting Client Site Representative for international Companies such as the Public Gas Corporation, Penspen International Limited, Eptista Servicios de Ingeneria S.I., J/V ILF Pantec TH. Papaioannou & Co. – Emenergy Engineering, J/V Karaylannis S.A. – Intracom Constructions S.A., Ergaz Ltd., Alkyonis 7, Palaeo Faliro, Piraeus, Elpet Valkaniki S.A., Asprofos S.A., J/V Depa S.A. just to name a few.

Mr. Magalios is a **Registered Chartered Engineer** and has **Master** and **Bachelor** degrees in **Surveying Engineering** from the **University of New Brunswick**, **Canada** and the **National Technical University of Athens**, **Greece**, respectively. Further, he is currently enrolled for **Post-graduate** in **Quality Assurance** from the **Hellenic Open University**, **Greece**. He has further obtained a Level 4B Certificates in Project Management from the National & Kapodistrian University of Athens, Greece and Environmental Auditing from the Environmental Auditors Registration Association (EARA). Moreover, he is a **Certified Instructor/Trainer**, a **Chartered Engineer** of Technical Chamber of Greece and has delivered numerous trainings, workshops, seminars, courses and conferences internationally.

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	***API 650: Welded Tanks for Oil Storage*** *Tanks & Tank Farms as Part of Production & Terminal Systems • Tank Design & Engineering Considerations Relative to Performance Parameters, Maximum Allowable Inventory, & Physical, Chemical & Hazardous Properties of Contained Fluids*
0930 – 0945	*Break*
0945 – 1030	***Storage Tank Types & Features*** *Tank Types & Functions • Primary Components • Appurtenances • Design Specifications*
1030 – 1230	***Material Selection*** *Material Property Considerations • Acceptable Material Specification*
1230 – 1245	*Break*
1245 – 1330	***Mechanical Design Requirements*** *Mechanical Design Parameters • Shell Thickness Determination • Wind Girder Requirements • Nozzle Design Details • Roof Requirements*
1330 – 1420	***Video Presentation*** *"Above-Ground Storage Tanks"*
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	***Mechanical Design Requirements*** *Detailed Examples for Thickness Calculations of the Different Courses of the Shell*
0830 – 0930	***Mechanical Design Requirements (cont'd)*** *Detailed Examples for Thickness Calculations of the Roof & Bottom & Foundation Design*
0930 – 0945	*Break*
0945 – 1030	***Fabrication Details*** *Types of Welded Joints • Welding Methodology • Weld Detail Requirements*
1030 – 1230	***Inspection & Testing Requirements*** *Types of Weld Defects • Inspection Methods • Inspection Requirements • Dimensional/Tolerances • Testing*
1230 – 1245	*Break*
1245 – 1330	***Vents & Fire Protection Systems*** *Vents for Fixed Roof Tanks • Vents for Floating Roof Tanks • Fire Protection Systems*
1330 – 1420	***Video Presentation*** *"Hydrocarbon Storage Tank Inspections"*
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	***Tank Roofs*** *Floating Roofs ● Rim Seals ● Flexible Piping System for Roofs Aluminum Dome Roofs ● Fixed Roof Tanks ● Internal Floaters*
0930 – 0945	*Break*
0945 – 1030	***Tank Emissions - Monitoring & Prevention*** *Overview of Tank Emissions Concepts ● Computing Emissions from Internal & External Floating Roofs*
1030 – 1230	***Tank Emissions - Monitoring & Prevention (cont'd)*** *Emission Estimation Procedures for Fixed-Roof Tanks ● Emissions from Slotted & Unslotted Guide Poles*
1230 – 1245	*Break*
1245 – 1330	***Pollution Equipment*** *Fugitive Emissions Potential ● Hydrocarbons Blanketing ● Nitrogen Generation Equipment ● Tank Product Containment Bund Walls ● Tank Floating Top Drainage Systems*
1330 – 1420	***Video Presentation*** *"Storage Tank Accidents"*
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

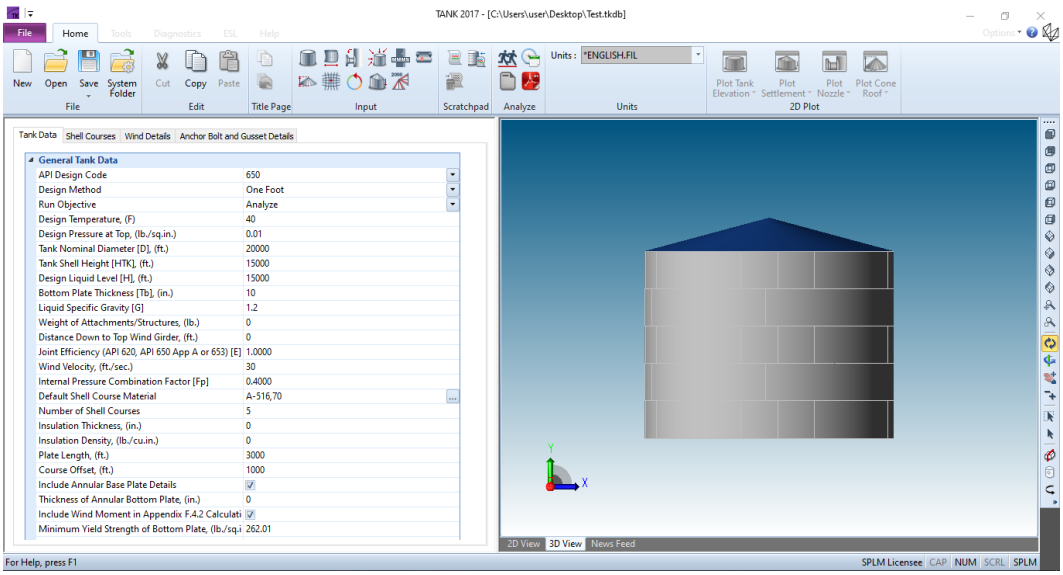
0730 – 0830	***Tank Inspection, Repairs & Maintenance*** *Industrial Standards ● Intent of API Standard 653 ● How does API 653 Prevent Tank Failures? ● Responsibility & Compliance ● How Long Will It Take to Implement the API 653 Program?*
0830 – 0930	***Tank Inspection, Repairs & Maintenance (cont'd)*** *API 653 and Costs ● In-House versus Contract Inspection ● Thoroughness of Inspection ● Getting Started*
0930 – 0945	*Break*
0945 – 1230	***Tank Settlement*** *Settlement & Tank Failure Mechanics ● Different Kinds of Settlement Sloped Bottoms ● Edge Settlement*
1230 – 1245	*Break*
1245 – 1330	***Tank Settlement (cont'd)*** *Designing for Settlement ● Releveling Tanks ● Methods of Releveling*
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

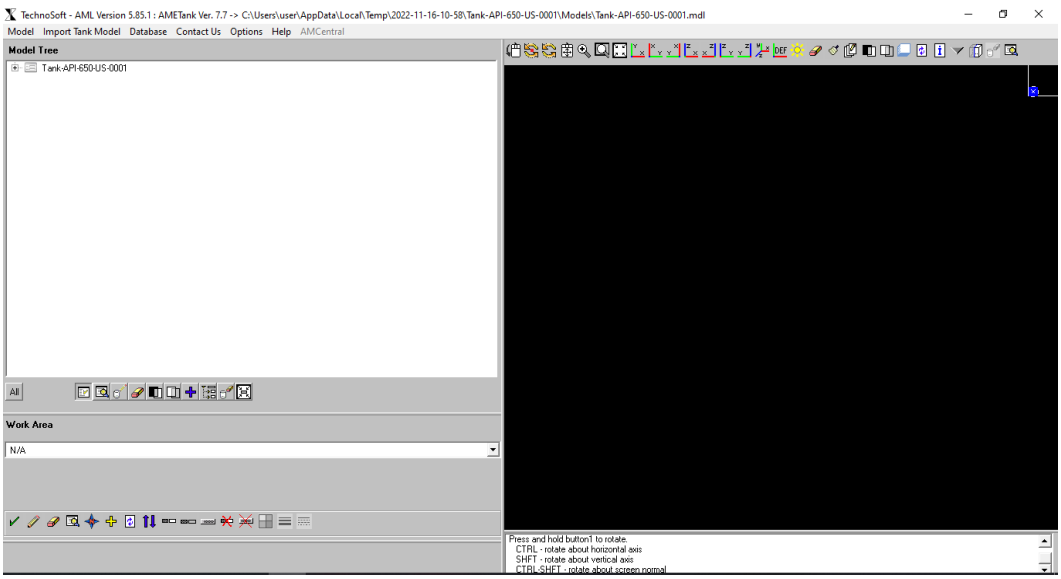
0730 – 0930	***Tank Operations*** *Tank Entry Standard ● Basic Requirements of API 2015 ● Overview of Tank Bottoms & Sludge*
0930 – 0945	*Break*
0945 – 1030	***Tank Operations (cont'd)*** *Problems Caused by Sludge ● Source Reduction & Mitigation ● Vapor Freeing & Degassing*
1030 – 1230	***Tank Operations (cont'd)*** *Tank Cleaning Safe Vapor Freeing, Degassing & Cleaning Operations*
1230 – 1245	*Break*
1245 – 1345	***Tank Accessories*** *Ladders, Platforms, Stairs & Accessways ● Miscellaneous Tank Appurtenances*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulators (Hands-on Practical Sessions)

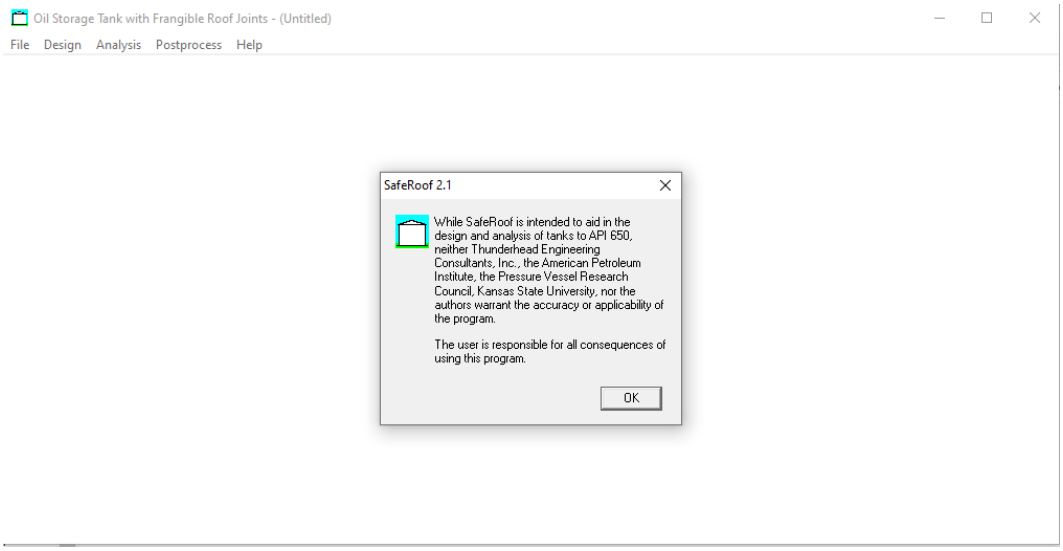
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using one of our state-of-the-art simulators "Hexagon PPM COADE TANK 2017 SP1 v9.00.01 (Integraph Tank)", " AME Tank v7.7",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



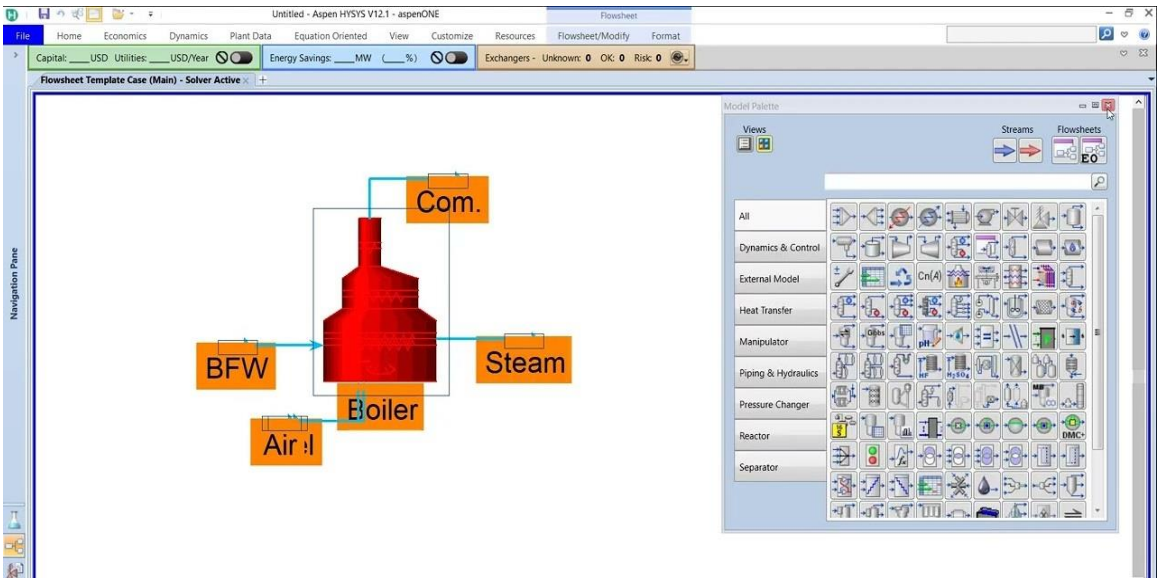
Hexagon PPM COADE TANK 2017 SP1 v9.00.01 (Integraph Tank)



AME Tank v7.7



SafeRoof v2.1



ASPEN HYSYS V12.1 Simulator

Course Coordinator

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