COURSE OVERVIEW PE0127-4D
Operations Abnormalities & Plant Upset

Course Title
Operations Abnormalities & Plant Upset

Course Date/Venue
December 21-24, 2026/Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
PE0127-4D

Course Duration/Credits
Four days/2.4 CEUs/24 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 Operations Abnormalities & Plant Upset. It covers the normal and abnormal operations, types and categories of abnormal situations; the root causes of plant upsets, early warning signs and alarm management; the risk assessment during abnormal conditions by identifying and evaluating risks, using risk matrices and consequence analysis and barriers and safeguards; the pressure vessel, tank upsets, pumps, compressors and mechanical equipment failures; the heat exchanger and furnace abnormalities, reactors and process chemistry deviations; the utility and support system failures, control loop and instrumentation issues; the systematic troubleshooting approach, process data and trends; and the communication and shift handover best practices.

During this interactive course, participants will learn the emergency operations, safe shutdown and managing human error in upset situations; the process hazard analysis (PHA), design considerations to minimize upsets, predictive maintenance and condition monitoring; the process hazard analysis (PHA), design considerations to minimize upsets, predictive maintenance and condition monitoring; the abnormal situation management (ASM) framework, incident investigation, root cause analysis (RCA) and cross-functional coordination during upsets; the reporting and documentation of abnormalities; and the management of change (MOC) during upsets.

Course Objectives

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

- Apply and gain in-depth knowledge on operations abnormalities and plant upset
- Discuss the normal and abnormal operations, types and categories of abnormal situations, root causes of plant upsets and early warning signs and alarm management
- Carryout risk assessment during abnormal conditions by identifying and evaluating risks, using risk matrices and consequence analysis and barriers and safeguards
- Identify pressure vessel and tank upsets, pumps, compressors and mechanical equipment failures and heat exchanger and furnace abnormalities
- Recognize reactors and process chemistry deviations, utility and support system failures and control loop and instrumentation issues
- Employ systematic troubleshooting approach, process data and trends and communication and shift handover best practices
- Apply emergency operations and safe shutdown and manage human error in upset situations
- Implement process hazard analysis (PHA), design considerations to minimize upsets, predictive maintenance and condition monitoring
- Apply alarm rationalization and management, operator training and simulation, incident investigation (RCA) follow-up, updating SOPs and work instructions and continuous improvement systems
- Describe abnormal situation management (ASM) framework, incident investigation and root cause analysis (RCA) and cross-functional coordination during upsets
- Report and document abnormalities and apply management of change (MOC) during upsets

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 operations abnormalities and plant upset for superintendents, supervisors and foremen in various departments of process plants (production, operations, maintenance, utility, etc.). Further, the course is suitable for emergency teams, managers, supervisors and other technical staff.

Course Fee

US$ 4,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course 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

Haward's 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**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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 **2.4 CEUs** (Continuing Education Units) or **24 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.

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. Mervyn Frampton is a **Senior Process Engineer** with over **30 years** of industrial experience within the **Oil & Gas**, **Refinery**, **Petrochemical** and **Utilities** industries. His expertise lies extensively in the areas of **Process Troubleshooting**, **Distillation Towers**, **Fundamentals of Distillation** for Engineers, **Distillation** Operation and Troubleshooting, **Advanced Distillation** Troubleshooting, **Distillation** Technology, Vacuum **Distillation**, **Distillation Column** Operation & Control, **Oil Movement** Storage & Troubleshooting, **Process Equipment** Design, Applied **Process Engineering** Elements, **Process Plant** Optimization, **Revamping & Debottlenecking**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Plant** Monitoring, **Catalyst** Selection & Production Optimization, Operations Abnormalities & Plant Upset, **Process Plant** Start-up & Commissioning, **Clean Fuel** Technology & Standards, Flare, Blowdown & Pressure Relief Systems, **Oil & Gas Field Commissioning** Techniques, **Pressure Vessel** Operation, **Gas Processing**, **Chemical** Engineering, **Process Reactors** Start-Up & Shutdown, **Gasoline Blending** for Refineries, **Urea Manufacturing** Process Technology, Continuous Catalytic Reformer (**CCR**), **De-Sulfurization** Technology, Advanced Operational & Troubleshooting Skills, Principles of Operations Planning, **Rotating Equipment** Maintenance & Troubleshooting, **Hazardous Waste Management & Pollution Prevention**, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Energy Conservation** Skills, **Catalyst Technology**, **Refinery & Process Industry**, **Chemical Analysis**, **Process Plant**, **Commissioning & Start-Up**, **Alkylation**, **Hydrogenation**, **Dehydrogenation**, **Isomerization**, **Hydrocracking & De-Alkylation**, **Fluidized Catalytic Cracking**, **Catalytic Hydrodesulphuriser**, **Kerosene Hydrotreater**, **Thermal Cracker**, **Catalytic Reforming**, **Polymerization**, **Polyethylene**, **Polypropylene**, Pilot Water Treatment Plant, **Gas Cooling**, **Cooling Water Systems**, Effluent Systems, Material Handling Systems, **Gasifier**, **Gasification**, Coal Feeder System, **Sulphur Extraction Plant**, **Crude Distillation Unit**, **Acid Plant Revamp** and **Crude Pumping**. Further, he is also well-versed in HSE Leadership, Project and Programme Management, Project Coordination, Project Cost & Schedule Monitoring, Control & Analysis, Team Building, Relationship Management, Quality Management, Performance Reporting, Project Change Control, Commercial Awareness and Risk Management.

During his career life, Mr. Frampton held significant positions as the **Site Engineering Manager**, **Senior Project Manager**, **Process Engineering Manager**, **Project Engineering Manager**, **Construction Manager**, **Site Manager**, **Area Manager**, **Procurement Manager**, **Factory Manager**, **Technical Services Manager**, **Senior Project Engineer**, **Process Engineer**, **Project Engineer**, **Assistant Project Manager**, **Handover Coordinator** and **Engineering Coordinator** from various international companies such as the **Fluor Daniel**, **KBR** South Africa, **ESKOM**, MEGAWATT PARK, CHEMEPIC, PDPS, CAKASA, **Worley Parsons**, Lurgi South Africa, **Sasol**, **Foster Wheeler**, **Bosch** & **Associates**, **BCG** Engineering Contractors, Fina Refinery, Sapref Refinery, Secunda Engine Refinery just to name a few.

Mr. Frampton has a **Bachelor's degree** in **Industrial Chemistry** from **The City University** in **London**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) and has delivered numerous trainings, courses, workshops, conferences and seminars 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 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: ***Monday, 21st of December 2026***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Understanding Normal versus Abnormal Operations*** *Definitions and Distinctions • Indicators of Abnormal Conditions • Impact on Safety, Quality, and Production • Common Causes in Process Industries*
0900 – 0930	***Types & Categories of Abnormal Situations*** *Equipment-Related Upsets • Process Chemistry Deviations • External Factor-Induced Abnormalities • Control System Failures*
0930 – 0945	*Break*
0945 – 1030	***Root Causes of Plant Upsets*** *Mechanical Failures • Instrumentation/Control Failures • Human Error and Misoperation • Raw Material and Feedstock Variations*
1030 – 1100	***Early Warning Signs & Alarm Management*** *Recognizing Early Indicators • Role of Alarm Systems in Detection • Nuisance Alarms versus Critical Alarms • Prioritizing Operator Response*
1100 – 1130	***Risk Assessment during Abnormal Conditions*** *Identifying and Evaluating Risks • Using Risk Matrices and Consequence Analysis • Barriers and Safeguards • Immediate versus Long-Term Actions*
1130 – 1215	***Case Studies of Major Industrial Upsets*** *Real-World Incidents and Causes • Lessons Learned • Mitigation Practices Used • How to Apply Lessons Locally*
1215 – 1230	*Break*
1230 – 1330	***Pressure Vessel & Tank Upsets*** *Overpressure Scenarios • Vacuum Conditions and Collapse • Relief Valve Failures • Foam, Carryover and Contamination*
1330 – 1420	***Pumps, Compressors & Mechanical Equipment Failures*** *Cavitation and Vibration Issues • Seal and Bearing Failures • Reciprocating versus Centrifugal Upsets • Diagnostic Tools for Troubleshooting*
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: Tuesday, 22nd of December 2026

0730 – 0830	***Heat Exchanger & Furnace Abnormalities*** *Fouling and Plugging • Tube Rupture and Leaks • Burner Instability • Effects on Downstream Operations*
0830 – 0930	***Reactors & Process Chemistry Deviations*** *Catalyst Deactivation • Exothermic Runaway Reactions • Feed Composition Change Impacts • Temperature/Pressure Control Loss*
0930 – 0945	*Break*
0945 – 1100	***Utility & Support System Failures*** *Cooling Water Failure • Steam System Upsets • Instrument Air Loss • Power Failure and Backup Systems*
1100 – 1130	***Control Loop & Instrumentation Issues*** *Sensor Drift and Failure • Controller Tuning Problems • Valve Malfunction •DCS and PLC Errors*
1130 – 1230	***Systematic Troubleshooting Approach*** *Defining the Problem • Root Cause Hypothesis • Data Collection & Trend Analysis • Validating Solutions*
1230 – 1245	*Break*
1245 – 1330	***Use of Process Data & Trends*** *Analyzing Real-Time Process Trends • Pattern Recognition • Identifying Leading versus Lagging Indicators • Historical Data Correlation*
1330 – 1345	***Communication & Shift Handover Best Practices*** *Structured Communication Protocols • Ensuring Situational Awareness •Logbook and Verbal Handover Methods • Avoiding Miscommunication*
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: Wednesday, 23rd of December 2026

0730 – 0830	***Emergency Operations & Safe Shutdown*** *Emergency Response Plans • Partial versus Full Shutdown Procedures •Interlocks and Safety Instrumented Systems (SIS) • Operator Responsibilities Under Upset*
0830 – 0930	***Managing Human Error in Upset Situations*** *Understanding Cognitive Load • Human-Machine Interface (HMI) Challenges • Reducing Reliance on Operator Memory • Tools for Decision Support*
0930 – 0945	*Break*
0945 – 1100	***Case Studies on Diagnosing Complex Upsets*** *Multi-Factor Upset Scenarios • Escalation Due to Misdiagnosis • Coordination Across Departments • Recovery and Investigation*
1100 – 1130	***Process Hazard Analysis (PHA)*** *HAZOP and What-If Reviews • Identifying Abnormal Scenarios • Safeguard Verification • Integration with MOC Process*
1130 – 1230	***Design Considerations to Minimize Upsets*** *Design Margins and Redundancy • Equipment and Control System Selection •Layout to Support Troubleshooting • Built-In Safety Systems*
1230 – 1245	*Break*

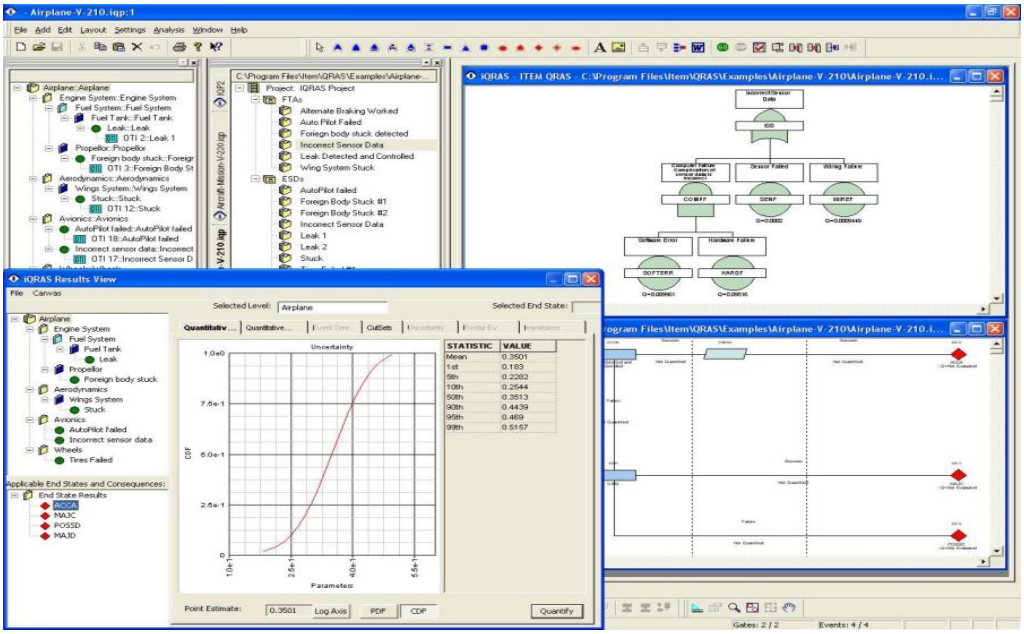
1245 – 1330	***Predictive Maintenance & Condition Monitoring*** *Vibration Analysis and Thermography • Oil Analysis and Corrosion Monitoring • Predictive Analytics in Abnormality Prevention • Link with Reliability-Centered Maintenance*
1330 – 1420	***Alarm Rationalization & Management*** *Alarm Prioritization • Elimination of Nuisance Alarms • Alarm Shelving and Suppression • Operator Overload Avoidance*
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: ***Thursday, 24th of December 2026***

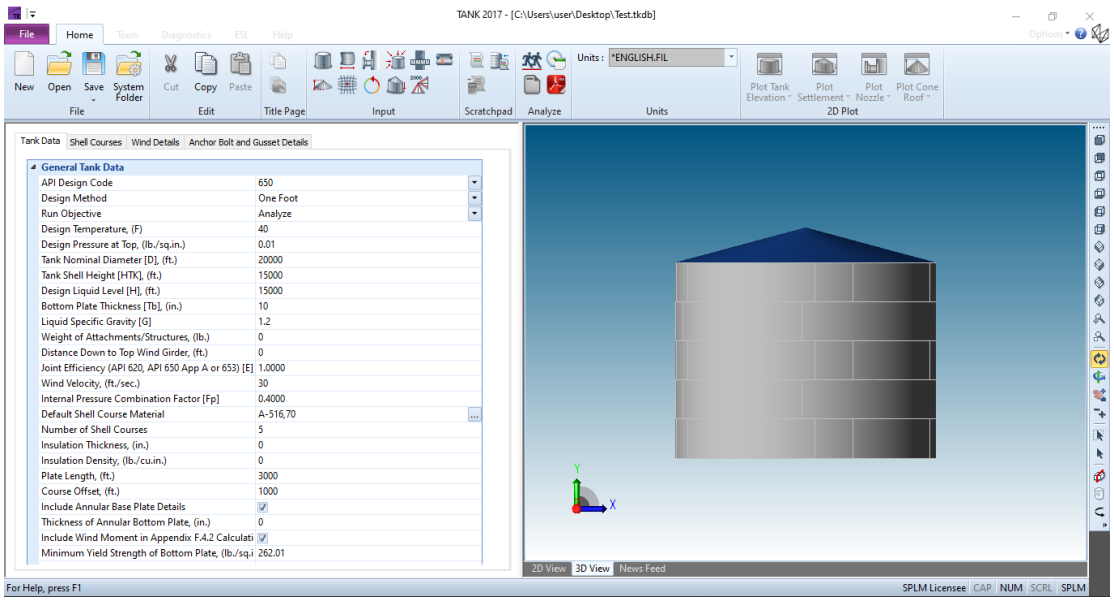
0730 – 0830	***Operator Training & Simulation*** *Scenario-Based Simulator Training • Emergency Drills • Process Simulation Software • Learning from Mock Upsets*
0830 – 0930	***Implementing Lessons Learned*** *Incident Investigation (RCA) Follow-Up • Sharing Learnings Across Teams •Updating SOPs and Work Instructions • Continuous Improvement Systems*
0930 – 0945	*Break*
0945 – 1100	***Abnormal Situation Management (ASM) Framework*** *What is ASM? • ASM Lifecycle and Strategies • Role of Automation and Control • Industry Standards for ASM*
1100 – 1130	***Incident Investigation & Root Cause Analysis (RCA)*** *Types of Investigations (5 Whys, Fishbone, Etc.) • Gathering Facts and Timeline • Recommendations and Follow-Up • Communication of Findings*
1130 – 1230	***Cross-Functional Coordination during Upsets*** *Role of Operations, Maintenance, and Safety • Roles and Responsibilities •Decision-Making Authority • Crisis Management Coordination*
1230 – 1245	*Break*
1245 – 1330	***Reporting & Documentation of Abnormalities*** *What to Document and Why • Tools (eLogs, EHS Systems) • Trend Analysis from Reports • Compliance and Audit Trail*
1330 – 1345	***Management of Change (MOC) during Upsets*** *Temporary versus Permanent Changes • MOC Process during Emergency Fixes • Ensuring Proper Review and Sign-Off • Integrating with PSM*
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*

Simulator (Hands-on Practical Sessions)

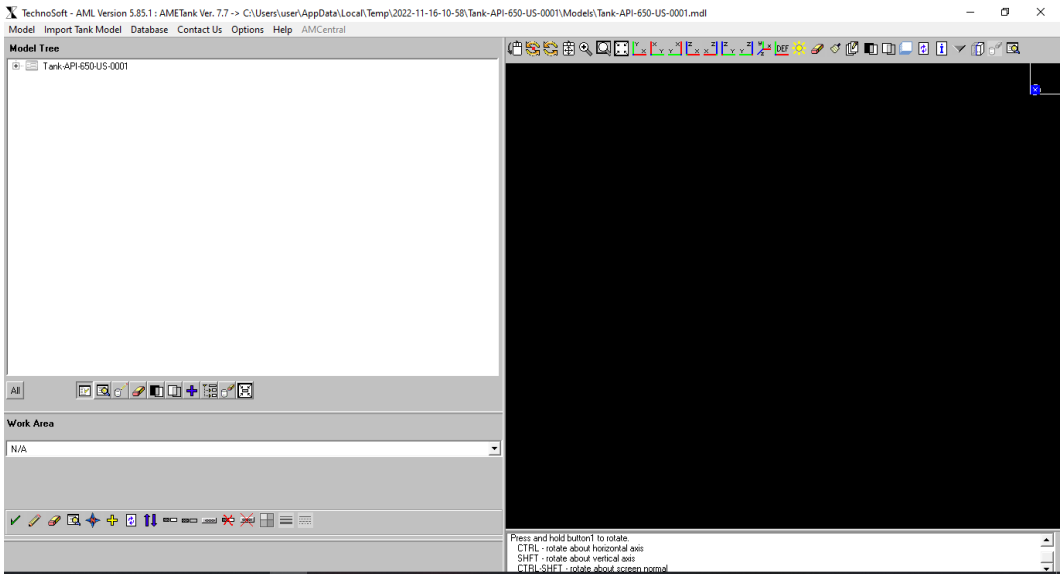
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art "QRA System" simulators," Hexagon PPM COADE TANK 2017 SP1 v9.00.01 (Integraph Tank)" , "AME Tank v7.7", "SIM 3300 Centrifugal Compressor Simulator", CBT on Compressors", "Centrifugal Pumps and Troubleshooting Guide 3.0" and "Heat Exchanger Tube Layout Simulator



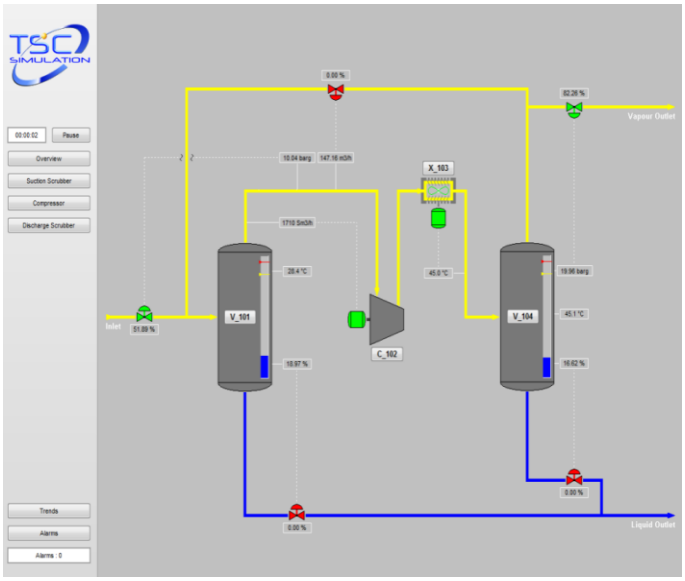
QRA System Simulator



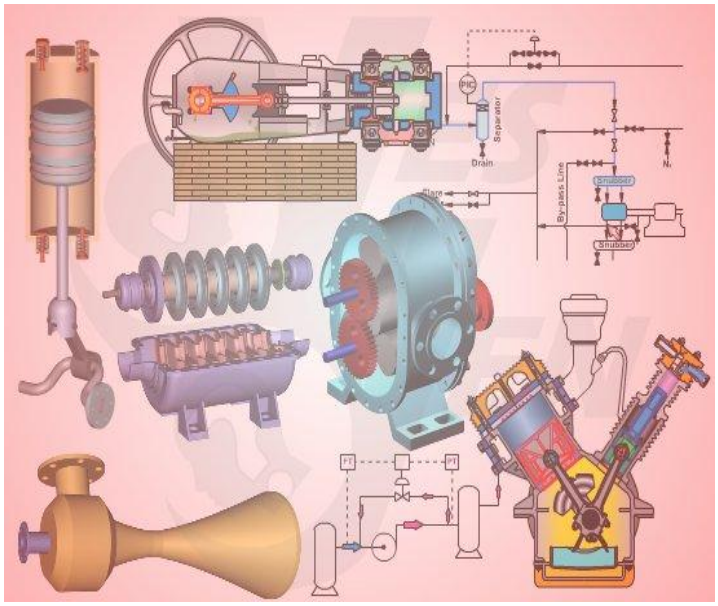
Hexagon PPM COADE TANK 2017 SP1 v9.00.01 (Integraph Tank)



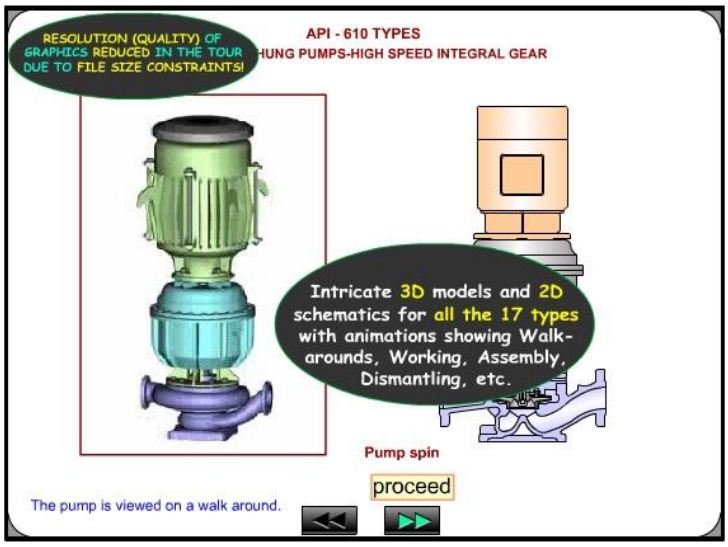
AME Tank v7.7



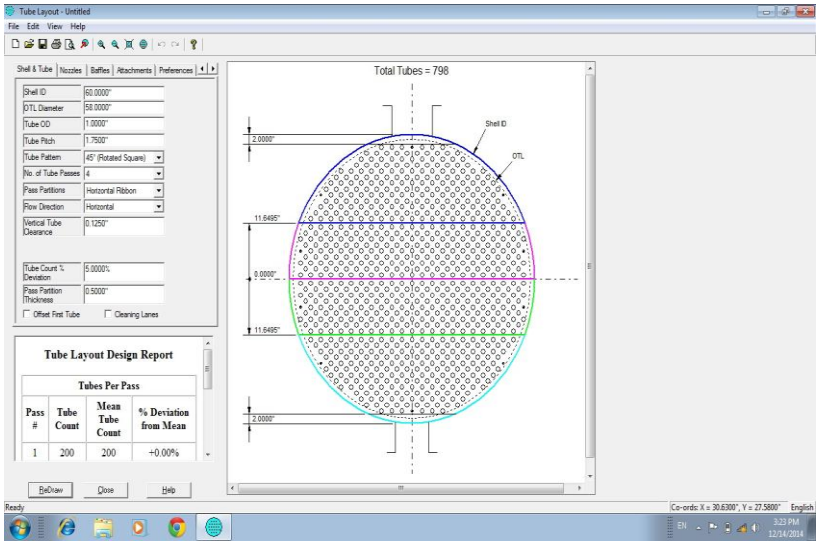
SIM 3300 Centrifugal Compressor Simulator



CBT on Compressors



Centrifugal Pumps and Troubleshooting Guide 3.0



Heat Exchanger Tube Layout Simulator

Course Coordinator

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