

**COURSE OVERVIEW PE0233(GA2)**  
**Process Plant Start-Up & Shutdown**

**Course Title**

Process Plant Start-Up & Shutdown

**Course Date/Venue**

August 26-30, 2024/Fujairah Meeting Room,  
 Grand Millennium Al Wahda Hotel, Abu Dhabi,  
 UAE

**Course Reference**

PE0233(GA2)

**Course Duration/Credits**

Five days/3.0 CEUs/3.0 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 process plant start-up and shutdown. It covers the start-up terminology; the common problems associated with first-time start-ups, its reasons and how to avoid them; the commissioning as the heart of start-up; the initial start-up activities; the start-up troubleshooting techniques; the risks associated with process plant startup/shutdown; and the applicable safety procedures to be followed.



During this interactive course, participants will learn the planning systems and procedures adopted for process plant startup/shutdown; the skills to anticipate and avoid all problems associated with process plant startup/shutdown; the operation of process plants with safety as the prime consideration; the operational systems check lists and procedures adopted for process plant start-up; and the satisfactory understanding of the process unit's startup/shutdown and troubleshooting.

## Course Objectives

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

- Apply and gain in-depth knowledge in process plant start up and shutdown
- Define start-up terminology and identify the common problems associated with first-time start-ups, its reasons and how to avoid them
- Apply commissioning as the heart of start-up and perform the initial start-up activities and start-up troubleshooting techniques
- Discuss the risks associated with process plant startup/shutdown and the applicable safety procedures to be followed
- Examine the planning systems and procedures adopted for process plant startup/shutdown
- Gain enough skills to anticipate and avoid all problems associated with process plant startup/shutdown and operate process plants with safety as the prime consideration
- Review the operational systems check lists and procedures adopted for process plant start-up
- Have a satisfactory understanding of the process unit's startup/shutdown and troubleshooting (case studies)

## 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 an overview of all significant aspects and considerations of process plant start up and shutdown for maintenance engineers, production engineers, engineers, supervisors and all those who are responsible to manage shutdown and turnaround activities of process plant.

## 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 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: -

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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.

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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

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.



**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 course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

**Day 1: Monday, 26<sup>th</sup> of August 2024**

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>Process Plant Overview</b> Process Area • Crude Oil and Natural Gas classifications and Properties • Products from Crude Oil and Natural Gas Processing • Utilities Area
0930 – 0945	Break
0945 – 1100	<b>Process Plant Start-Up</b> Types of Start-ups • Checks and Activities Required Prior to Start-up Schedule Start-up • Process Plant Project Sequence of Events • Preliminary Activities at Site
1100 – 1230	<b>Preparation for Initial Start-Up</b> Hydrostatic Pressure Testing • Plant Inspection • Commissioning of Utilities Commissioning Organization Chart • Final Inspection of Vessels Acid Cleaning • Flushing of lines and Equipment • Inspection and Running of Pumps • Break-In Gas Compressor • Service and Calibrate Instruments Dry Out Fired Heaters • Leak Testing • Purging and Gas Blanketing • All Parties Roles and Responsibility
1230 – 1245	Break
1245 – 1420	<b>Case Study for Dividing Process Plant into Systems, Subsystems &amp; Disciplines</b>
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day One

**Day 2: Tuesday, 27<sup>th</sup> of August 2024**

0730 – 0930	<b>Tips for Efficient Operations</b> What is Meant by Efficient Operations • Discussion and Workshop
0930 – 0945	Break
0945 – 1100	<b>Process Unit Start-Up Procedure</b> First-time Start-Up • General Precautions for FirstTime Start-up
1100 – 1230	<b>Problems Associated with First-Time Start-Up</b> Case Study: Startup of Process Unit • Unit Design Basis • Process Flow Description • Start Up Procedure
1230 – 1245	Break
1245 – 1420	<b>Reasons of Problems Associated with First-Time Start-up &amp; How to Avoid Them</b> Troubleshooting First-Time Start-Up • Discussion and Workshop (Working Groups & Brain Storming)
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Two





**Day 3: Wednesday, 28<sup>th</sup> of August 2024**

0730 – 0930	<b>Pre-Commissioning</b> Definitions • Steps and Sequence • Pre-commissioning Check Forms • Punch List • Discipline Ready for Commissioning Notice • System Mechanical Completion Notice • Mechanical Completion
0930 – 0945	Break
0945 – 1100	<b>Pre-Commissioning Activities</b> Conformity Check of the Plant Facilities and Equipment • Hydro test Flushing and Chemical Cleaning • Air Blowing • Gross Leak Test (GLT) Commissioning Leak Test (CLT)
1100 – 1230	<b>How to Anticipate &amp; Avoid Problems &amp; Consequences During Commissioning &amp; Start-Up</b> Process Failure: Loss of Feed • Furnace Tube Rupture • Loss of Makeup Gas, Loss of Wash Water • Loss of Recycle Gas Compressor • Loss of Column Top Reflux • Loss of Column Pump Around
1230 – 1245	Break
1245 – 1420	<b>How to Anticipate &amp; Avoid Problems &amp; Consequences During Commissioning &amp; Start-Up (cont'd)</b> Utilities Failure: Electrical Power Failure • Steam Failure, Instrument Air Failure • Cooling Water Failure • Fuel gas failure, Explosion • Fire • Line Rupture or Serious Leak
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Three

**Day 4: Thursday, 29<sup>th</sup> of August 2024**

0730 – 0830	<b>Importance of Check Lists</b> Checklist for Towers • Checklist for Heat Exchangers • Checklist for Pumps Checklist for Compressors • Checklist for Fired Heaters • Checklist for Vessels
0830 - 0930	<b>Commissioning /De-commissioning</b> Definition of Commissioning and Decommissioning • Pressure Testing • Leak Testing • Particular Hazards Arising from Pressure Testing • Particular Hazards Arising from Leak Testing • The Housekeeping Issues During Equipment Handover From Projects to Operations
0930 – 0945	Break
0945 – 1145	<b>Shutdown &amp; Decommissioning</b> Normal Shutdown Decommissioning and demolition Unplanned Shutdown
1145 – 1230	<b>Process Plant Shutdown</b> Types of Shutdown • Needs for Shutdown • Actions Should be Taken After Shutdown • Phases of Shutdown Cycle • Shutdown Planning • Shutdown Scheduling • Shutdown Operation • Shutdown Evaluation • Shutdown Durations • Shutdown Cost • Considerations for Shutdown Activities
1230 – 1245	Break
1245 – 1420	<b>Cases Study of Gas Plant Shutdown Due to Turbo Expander Trip</b>
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Four





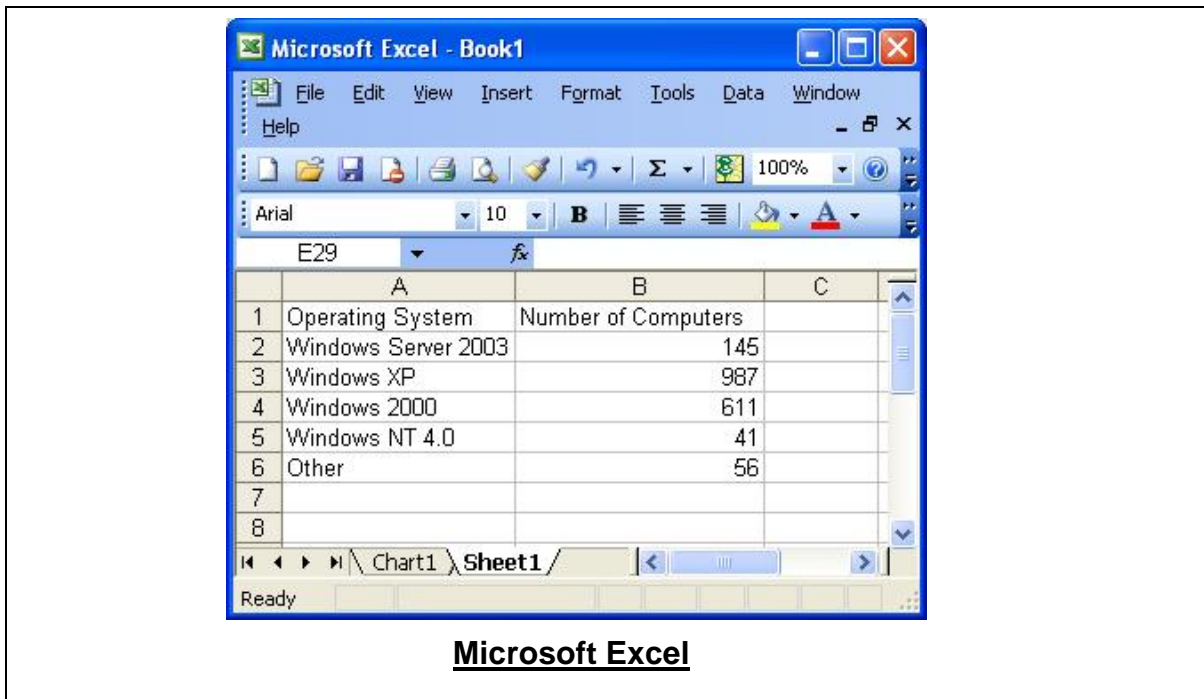
**Day 5: Friday, 30<sup>th</sup> of August 2024**

0730 – 0930	<b>Shutdown Case Studies</b>
0930 – 0945	<i>Break</i>
0945 – 1145	<b>Process Equipment Start-Up/Shutdown Troubleshooting</b> <i>Tray Towers • Fired Heaters • Heat Exchangers • Water Coolers</i>
1145 – 1230	<b>Process Equipment Start-Up/Shutdown Troubleshooting (cont'd)</b> <i>Pumps • Centrifugal Pumps • Reciprocating Pumps • Compressors</i>
1230 – 1245	<i>Break</i>
1245 – 1345	<b>Acceptance Criteria &amp; Performance Test</b>
1345 – 1400	<b>Course Conclusion</b>
1400 – 1415	<b>POST-TEST</b>
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch &amp; End of Course</i>

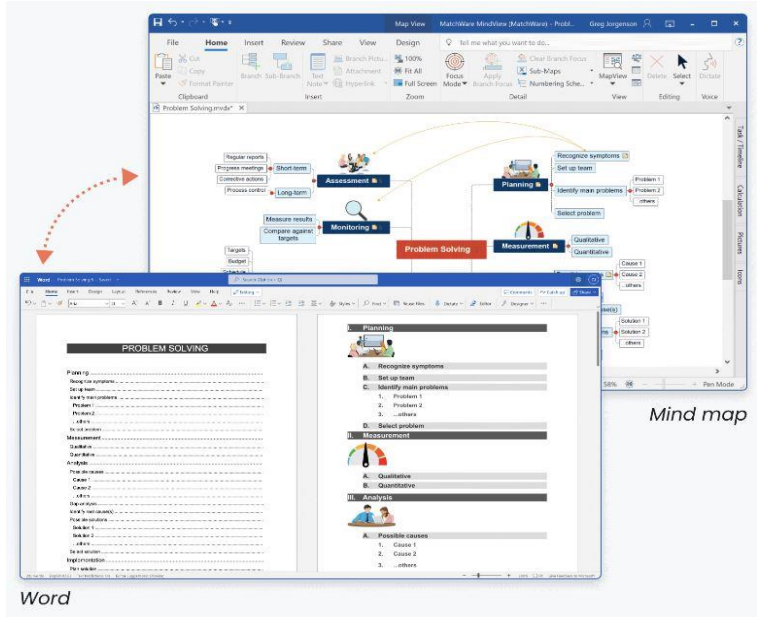
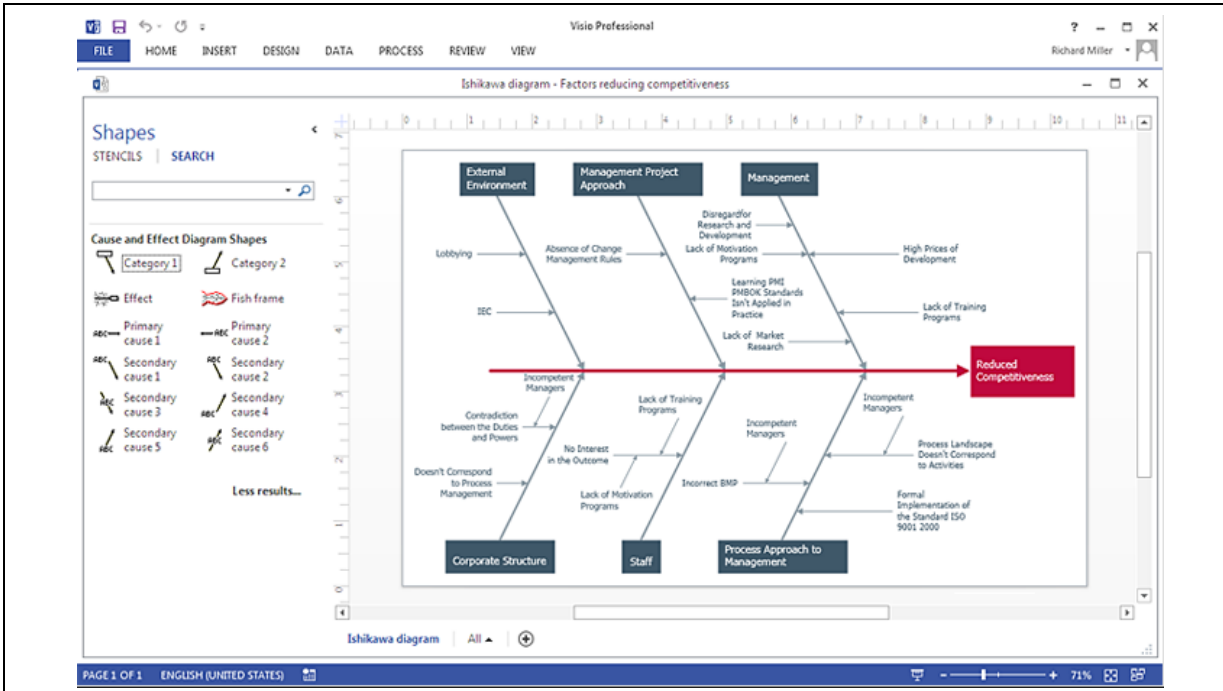


**Simulator (Hands-on Practical Sessions)**

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 “Haward PHA/HAZOP”, “QRA”, “Visio”, “Mindview” and “Workplace Risk Assessment” simulators.

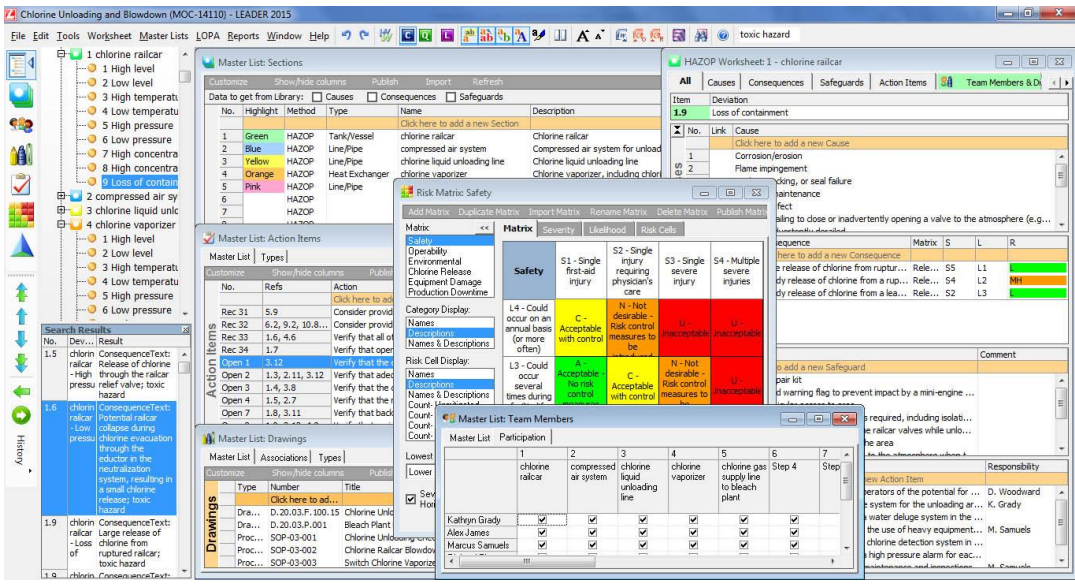




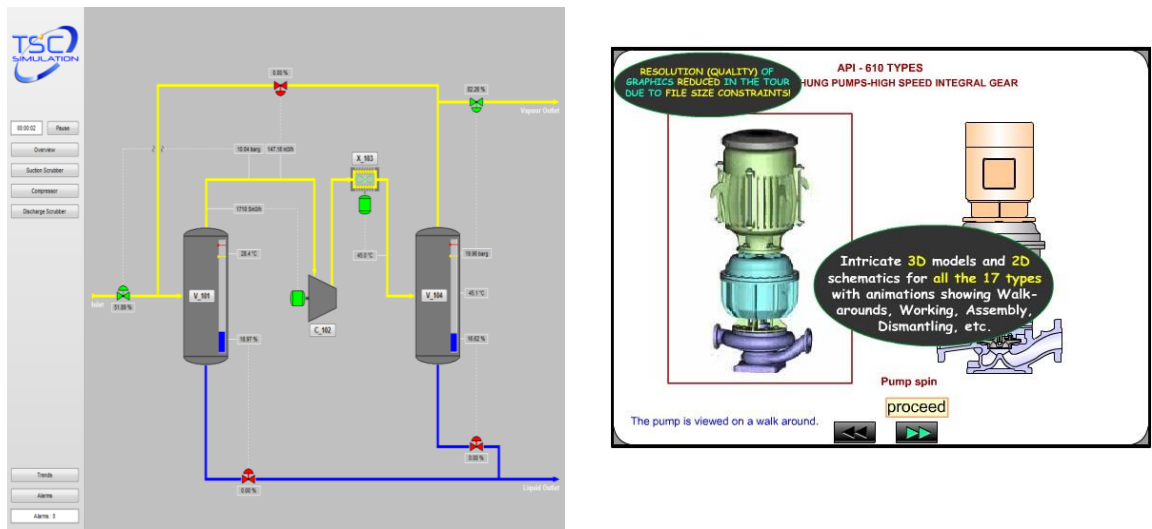


**Mindview And Visio**





**PHA/HAZOP Simulator**



**SIM 3300 Centrifugal Compressor Simulator**

**Centrifugal Pumps and Troubleshooting Guide 3.0**

**Course Coordinator**

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