

COURSE OVERVIEW PE0230K1
Safe Process Units Start-Up/Shutdown and Development of
Equipment Handling Over/Commissioning Procedures

Course Title

Safe Process Units Start-Up/Shutdown and Development of Equipment Handling Over/Commissioning Procedures

Course Date/Venue

August 03-07, 2025/TBA Meeting Room, Hilton Kuwait Resort, Mangaf, Kuwait City, Kuwait

Course Reference

PE0230K1

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.



Plant modifications are an ongoing process throughout the life of any process plant. Reasons for modification include efforts to improve reliability, production capacity, quality, or productivity. Seamless incorporation is the key concern associated with the installation of any new equipment in an operating plant due to the high cost of process downtime. Several steps shall be taken to minimise the risk associated with the installation of new equipment such as hazard and operability studies, project management, development of redundancy plans, and commissioning of the new equipment.



Start-up and commissioning are essential activities in all process plant-modification projects and have significant implications for project success. Yet paradoxically they tend to be approached in an ad hoc manner. Commissioning is often included in project plans, so it is not that people are ignorant. However, there is usually a lack of systematic approaches to commissioning, so it is frequently left to tradespeople and plant operators to manage in whatever way they see fit. This is an undesirable situation since it results in unpredictable outcomes. In some cases it can even cause serious problems. Lack of experience in dealing with these problems has frequently resulted in prolonged and costly start-ups, caused by inadequate preparation for the events of start-up.

This course is designed to provide participants with an up-to-date overview of the start-up and commissioning of Process plants including troubleshooting of the start-up process. It includes the methodology for start-up and commissioning of process plants, which can be used when commissioning a new plant, or for modified equipment in an existing facility, or in a turnaround, shutdown or overhaul scenario. It takes the approach that commissioning is a series of checks and counter-checks to confirm every unit in the process plant is fit for purpose and suitable for operation.

During the course, each participant will gain enough skills to anticipate and avoid problems associated with start-up processes. Participants will gain a satisfactory understanding of the commissioning strategy, organizational issues, estimation of required resources, CPM planning, mechanical integrity, troubleshooting, start-up operations, technical inspection, instrumentation/control systems, HSE and other necessary knowledge associated with the process plant start-up and commissioning. Actual case studies from around the world will be demonstrated to highlight the topics discussed.

Course Objectives

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

- Apply systematic techniques in process plant start-up, commissioning and troubleshooting
- Carryout planning and preparation as well as cost estimation
- Discuss health, safety and environment, process plant start-up management and develop process plant commissioning strategy
- Conduct mechanical integrity testing and pre-commissioning, technical inspection and dynamic hydraulic testing
- Explain construction completion and the importance of machinery commissioning
- Apply start-up operations, start-up progress monitoring and control as well as determine instrumentation and control systems in commissioning process
- Demonstrate performance trials, troubleshooting and problem solving
- Implement change management including operational techniques and post commissioning audit in process plants

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 a complete and up-to-date overview of the process plant start-up and commissioning for those involved in the start-up operations of a process plant. This includes process engineers, team leaders, project managers, refinery managers, plant managers, section heads, plant supervisors, process engineers, maintenance staff, technical staff and contractor personnel involved in project execution and plant start-up in process industry. Mechanical, electrical, instrumentation and control engineers who are involved in process plant start-up and commissioning will also benefit from this course.

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.

Course Fee

US\$ 5,500 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 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. Mohammad Hamami, is a **Senior Process Engineer** with an extensive practical experience within the **Oil, Gas, Refinery, Petrochemical** and **Power** industries. His experience covers **Clean Fuel Technology & Standards, Clean Fuel Specification, Emission Regulation, Crude Oil Production, Desulphurization, Synthesis Gas Production, Naphtha Isomerization, Diesel Fuel Additives, Storage Tanks Filtration, Fuel Quality Inspection, Process Plant Troubleshooting & Engineering Problem Solving, Process Equipment Operation, Process Plant Operation, Process Plant Start-up & Commissioning, Process Plant Optimization, Oil & Gas Field Operation, Oil Movement, Storage & Troubleshooting, Petroleum Refinery Process, Process Reactor Operation & Troubleshooting, LPG Oil & Gas Operation & Troubleshooting, Crude Oil & LNG Storage, LNG & LPG Plants Gas Processing, Refinery Process Operations Technology, Liquid Bulk Cargo Handling, Gas Conditioning & Processing Technology, Distillation Column Design & Operation and Gasoline & Diesel Fuel Technology**. Further he is also well-versed in **Refinery Operational Economics & Profitability, Aromatics Manufacturing Process, Hydrogen Production Operation, Steam Reforming Technology, Gas Treating, Hydro-treating & Hydro-Cracking, Catalyst Material Handling, Gas Sweetening & Sulfur Recovery, Hydro Carbon Dew Point (HCDP) Control, Heat Exchangers & Fired Heaters, Amine Gas Sweetening, Plastic Additives Selection & Application, Crude & Vacuum Process Technology, Flare & Pressure Relief Systems, Stock Management & Tank Dipping Calculation, NGL Recovery & Fractionation, Refrigerant & NGL Extraction and Catalytic Cracking & Reforming**.

During his long professional career, Mr. Mohammad worked as a **Refinery Manager, Operations Manager, Section Head/Superintendent** and **Process Engineer for Process Units, Utilities & Oil Movement** in various companies. He has been responsible for a number of **technological-driven world-scale hydrocarbon processing projects** from **beginning to successful start-up**.

Mr. Mohammad has a **Bachelor's degree in Chemical Engineering**. He is an **active member** of the **American Institute of Chemical Engineers (AIChE)** and has presented **technical papers** at its **several national meetings**. He has largely participated in the **start-up of seven world-scale process plants** which made him an **International Expert** in **Process Plant Start-Up and Oil Movement** and a **Certified Instructor/Trainer**.

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: Sunday, 03rd of August 2025

0730 – 0800	<i>Registration & Coffee</i>
0800 – 0815	<i>Introduction & Welcome</i>
0815 – 0830	PRE-TEST
0830 – 0930	Introduction to Process Plant Commissioning <i>Terminology • Requirements • Project Details • Contracting Strategy • Organizational Structure & Responsibilities • Success Measures and Problem Avoidance</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Planning & Preparation <i>Project Planning, Critical Path (CPM/PERT) • Gantt Chart • Logic Diagrams • Planning Methods • Preparation of Checklists and Spare Parts Planning</i>
1100 – 1230	Cost Estimation <i>Budget Components • Estimation Sheets • Resource Prediction • Extra Costs & Change Orders</i>
1230 – 1245	<i>Break</i>
1245 – 1420	Cost Estimation (cont'd) <i>Spare parts • Inventory • Material ordering • MIS and Cost control</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day One</i>

Day 2: Monday, 04th of August 2025

0730 – 0930	Health, Safety & Environment <i>Hazard & Operability Analysis (HAZOP) • Hazard Analysis (HAZAN) • Process Safety Management (PSM) • Root Cause Analysis and Why Trees • Risk Assessment</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Health, Safety & Environment (cont'd) <i>Hazard Identification • Safety Training • HSE Problems and contingency plans • Safety Procedures and Implementation • Safety Manual</i>
1100 – 1230	Process Plant Start-Up Management <i>Responsibilities & Authorities • Organizational Structure • Manpower & Staffing • Coordination Procedures • Leadership</i>
1230 – 1245	<i>Break</i>
1245 – 1420	Process Plant Commissioning Strategy <i>The Commissioning Team • Training • Commissioning Strategy • Start-Up Procedures & Logic</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day Two</i>

Day 3: Tuesday, 05th of August 2025

0730 – 0900	Mechanical Integrity Testing & Pre-commissioning <i>Hydraulic Testing • Flushing • Breaking-in Pumps • Drying Heaters</i>
0900 – 0915	<i>Break</i>
0915 – 1100	Technical Inspection & Dynamic Hydraulic Testing <i>Vessel & Column Internals • Dynamic Loop Testing • Tightness Testing</i>
1100 – 1230	Construction Completion (The Beginning of Start-Up) <i>Construction Schedules vs. Start-Up Needs • Start-Up by Systems • Systems Definition • Punch Listing • Handover</i>
1230 – 1245	<i>Break</i>
1245 - 1420	Machinery Commissioning <i>Types of Process Equipment Plant Machinery • Preparation of Machines • Compressor Commissioning • Compressor Surge</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day Three</i>

Day 4: Wednesday, 06th of August 2025

0730 – 0930	Start-Up Operations <i>Isolation of Vessels and Pipes • Types of Isolation • Initial Start-Up Activities • Steaming • Fuel Gas or Nitrogen Purge • Feed-in</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Start-Up Progress Monitoring and Control <i>Planning for Success • Sequence by Units • Sequence by Systems • Recovery from False Starts</i>
1100 – 1230	Instrumentation & Control Systems <i>Instrument Commissioning • Start-up Problems and Causes</i>
1230 – 1245	<i>Break</i>
1245 - 1420	Performance Trials <i>Performance and Acceptance Testing, Preliminary Tests • Performance Test runs</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day Four</i>

Day 5: Thursday, 07th of August 2025

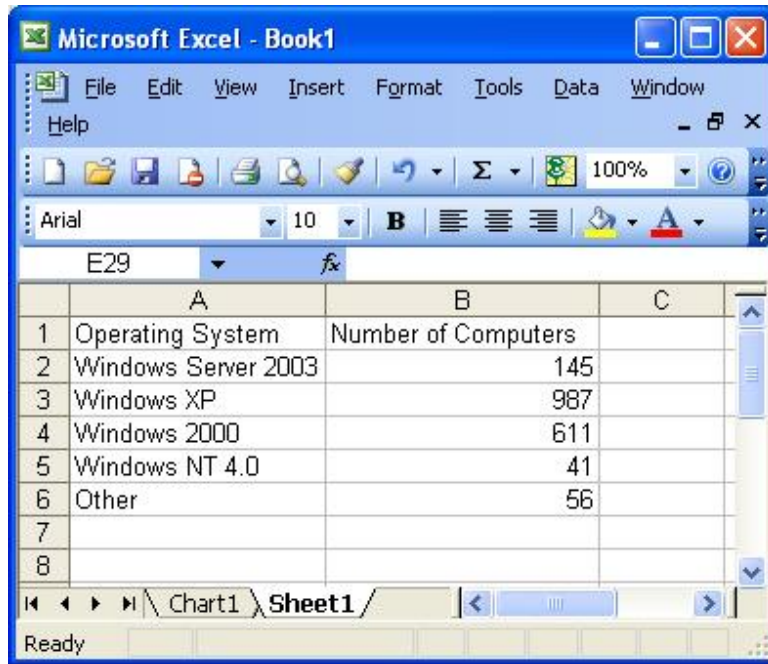
0730 – 0930	Troubleshooting & Problem Solving <i>Identification of Problems & Priorities • Resource Allocation & Teamwork • Data Collection & Solution Selection</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Troubleshooting & Problem Solving (cont'd) <i>Troubleshooting Techniques • RCFA & RCM • Murphy's law</i>
1100 – 1215	Change Management <i>Implementation of Change • Success Measures • Operational Techniques • Post Commissioning Audit • Close-out Certificates</i>
1215 – 1230	<i>Break</i>

1230 – 1345	Case Studies
1345 – 1400	Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
1400 – 1415	POST-TEST
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

Simulator (Hands-on Practical Sessions)

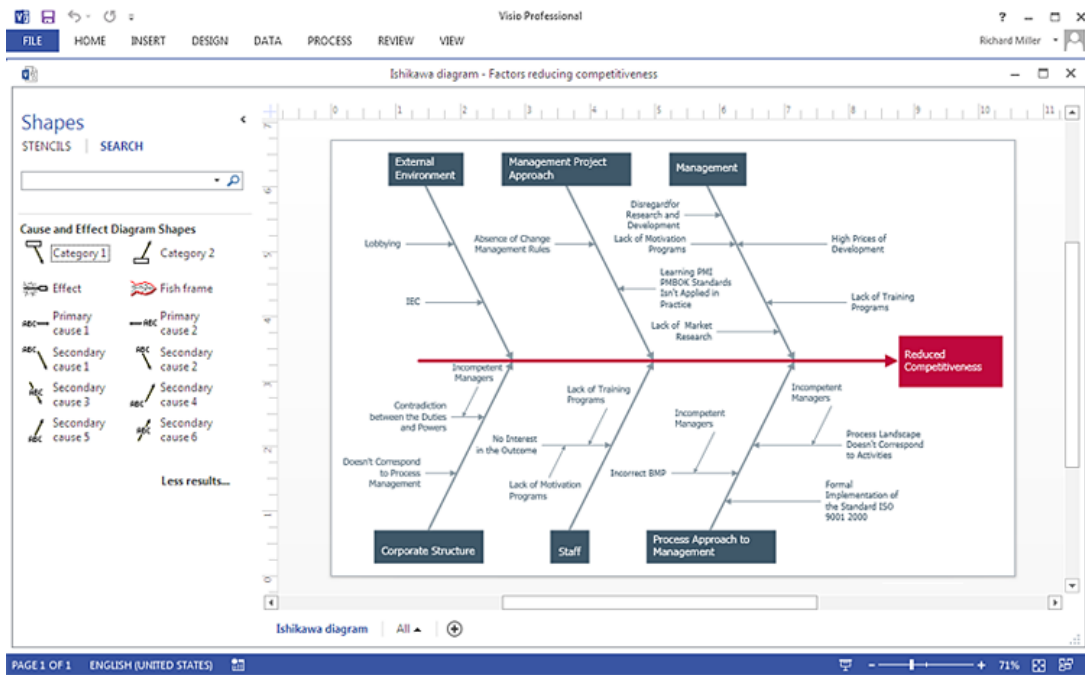
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art “MS -Project”, “MS-Excel”, Visio”, “Mindview”, “Haward PHA/HAZOP Simulator”, “SIM 3300 Centrifugal Compressor Simulator”, “Centrifugal Pumps and Troubleshooting Guide 3.0” simulators and “ASPEN HYSYS” simulator.



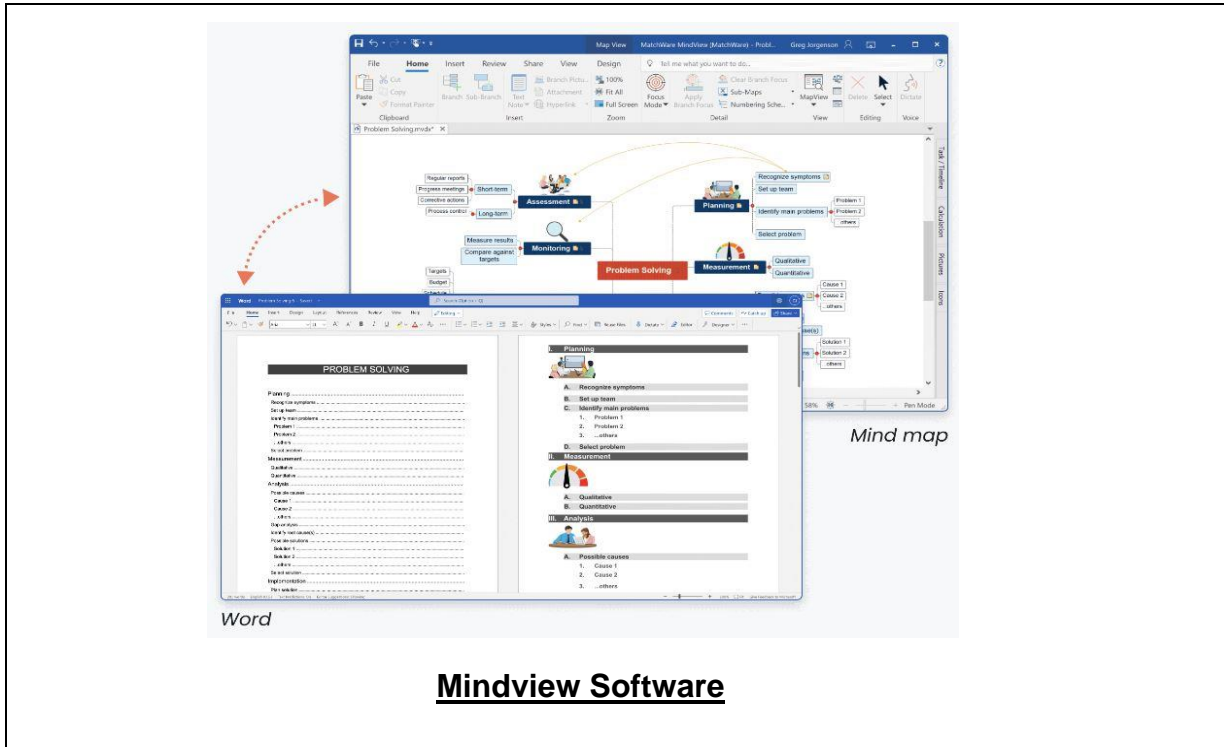


	A	B	C
1	Operating System	Number of Computers	
2	Windows Server 2003	145	
3	Windows XP	987	
4	Windows 2000	611	
5	Windows NT 4.0	41	
6	Other	56	
7			
8			

Microsoft Excel



Visio Software

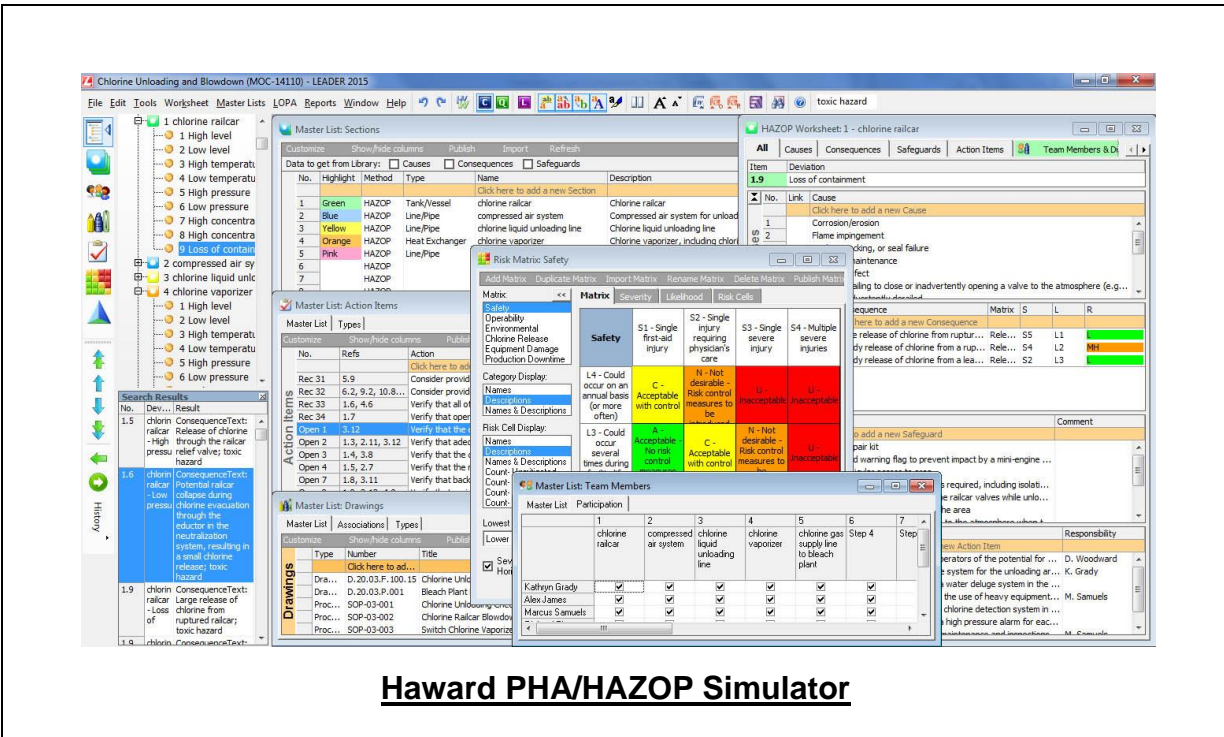


The screenshot displays the Mindview Software interface. At the top, a mind map titled "Problem Solving" is visible, with nodes for "Assessment", "Planning", "Measurement", and "Monitoring". Below the mind map, a Microsoft Word document is open, showing a document titled "PROBLEM SOLVING" with a table of contents and a list of steps. The interface includes a menu bar, a toolbar, and a sidebar with various tool options.

Mind map

Word

Mindview Software



The screenshot shows the Haward PHA/HAZOP Simulator interface. The main window displays a HAZOP worksheet for "chlorine railcar" with various sections for "Causes", "Consequences", "Safeguards", and "Action Items". A "Risk Matrix Safety" is also visible, showing a grid of risk levels (S1, S2, S3, S4) and their corresponding actions. The interface includes a menu bar, a toolbar, and a sidebar with various tool options.

HAZOP Worksheet: 1 - chlorine railcar

Risk Matrix Safety

Matrix	Severity	Likelihood	Risk
S1 - Single first-aid injury	S2 - Single injury requiring physician's care	S3 - Single severe injury	S4 - Multiple severe injuries
L4 - Could occur on an annual basis (or more often)	C - Acceptable with control	N - Not desirable: Risk control measures to be	U - unacceptable
L3 - Could occur several times during	A - Acceptable: No risk control	C - Acceptable with control	N - Not desirable: Risk control measures to be

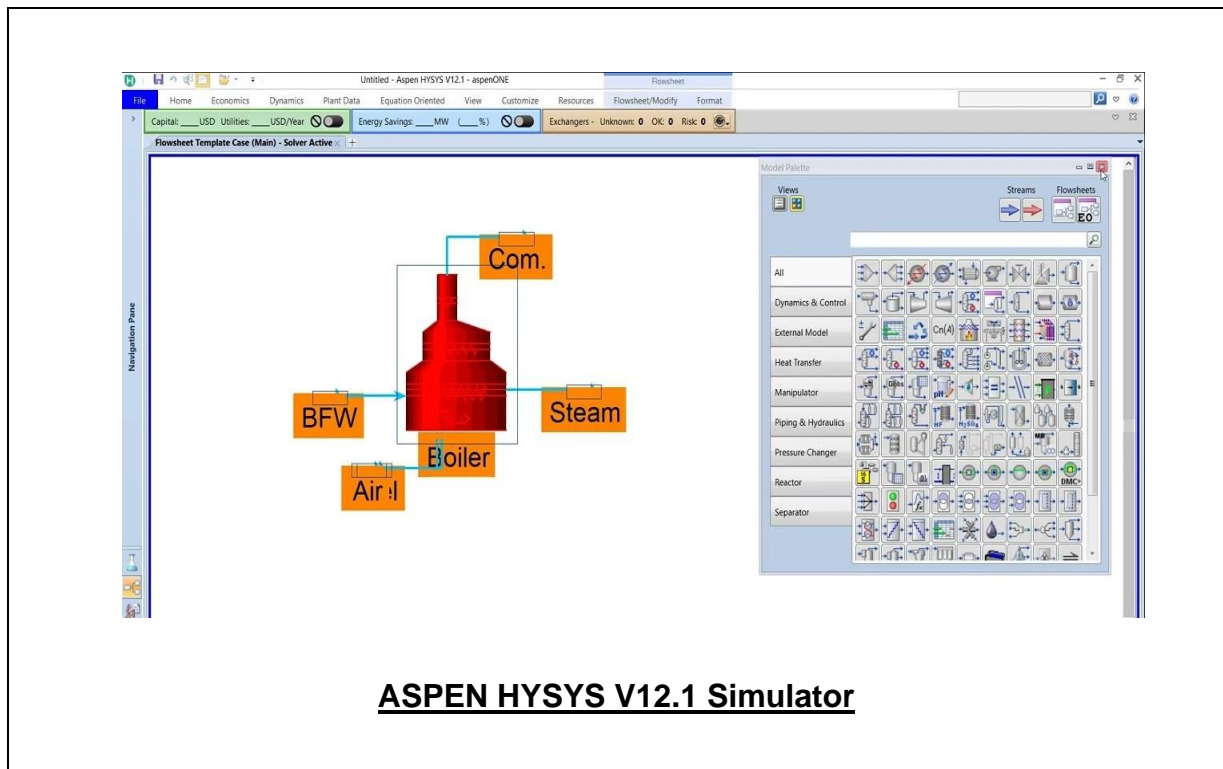
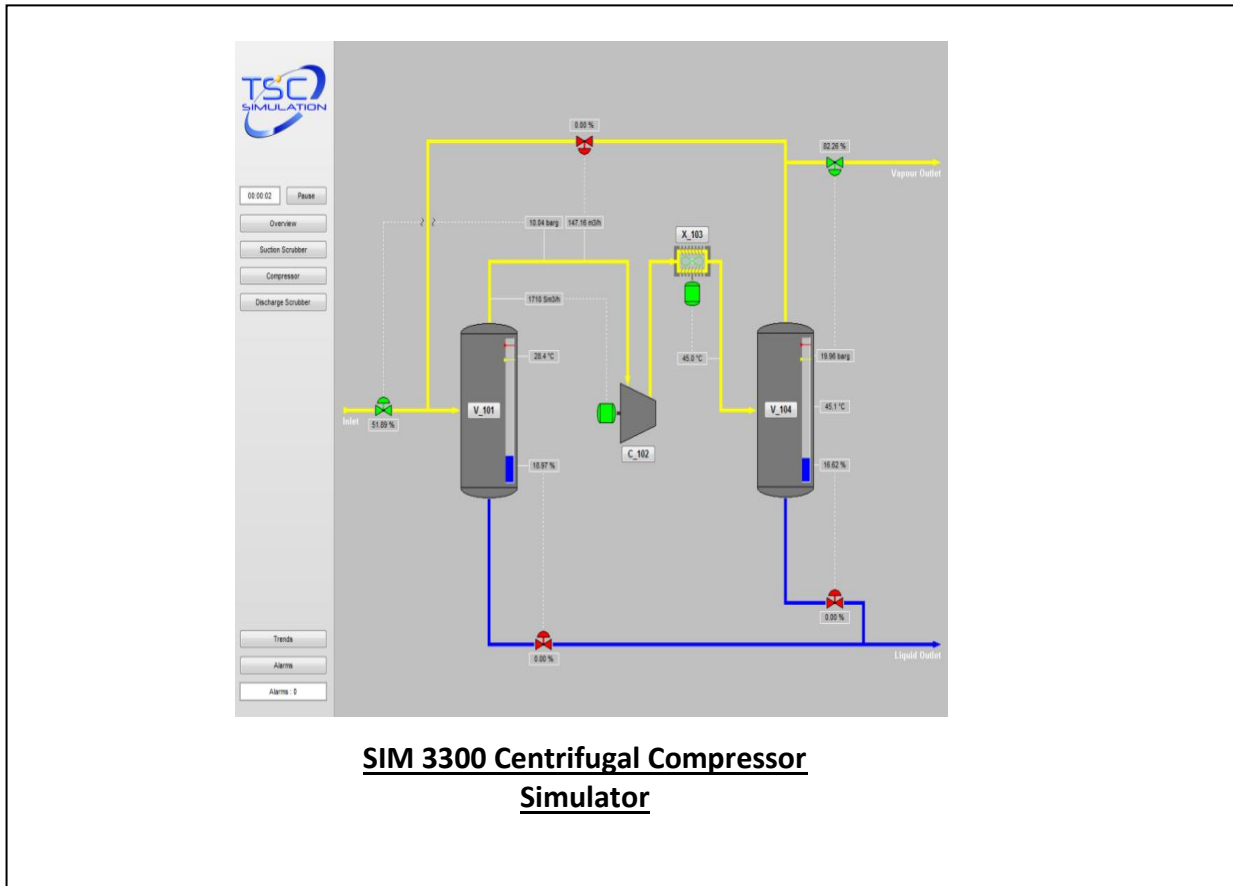
Master List: Action Items

No.	Refs	Action
Rec 31	5.9	Consider provide
Rec 32	6.2, 9.2, 10.8...	Verify that all of
Rec 33	1.6, 4.6	Verify that the
Rec 34	1.7	Verify that the

Master List: Team Members

1	2	3	4	5	6	7
chlorine railcar	compressed air system	chlorine liquid unloading line	chlorine vaporizer	chlorine gas supply line to bleach plant	Step 4	Step 7
Kathryn Grady						
Alex James						
Marcus Samuels						

Haward PHA/HAZOP Simulator



Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org