COURSE OVERVIEW HE098(PE7)-3D

Introduction to Process Safety Systems

Course Title
Introduction to Process Safety Systems

Course Date/Venue
October 08-10, 2024/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
HE098(PE7)-3D

Course Duration/Credits
Three days/1.8 CEUs/18 PDHs

Course Introduction

This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

This intense, comprehensive and practical course discusses all aspects of process safety systems with particular focus on the practical aspects of evaluating, analyzing, designing, selecting, installing, operating and testing. A proper understanding and execution of each of the above is essential in assuring surface safety systems operates at maximum efficiency and experiences minimal problems. Frequent reference is made to historical landmark incidents and recurring problem areas. Techniques for analyzing and mitigating process safety hazards applicable to upstream oil and gas processing facilities will be reviewed. Integration of the concepts presented to achieve a measured approach to process safety engineering is the key to this course. In addition, this course also studies the installation of electrical installations in hazardous locations.

The course maintains a balance between lecture and in-class exercises and between theory and application. In-class work sessions are evenly distributed throughout the workshop to enhance the principles covered. In addition, each participant will receive an extensive set of practical in-class “case study” exercises that emphasize the design and “troubleshooting” pitfalls often encountered in the industry. The suitability and applicability of the case studies, is recognized as one of the best in the industry.

Course Objectives

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

- Apply and gain a good working knowledge on the fundamentals of process safety systems and the principles of safe facility design and operation specifically on how to contain hydrocarbons, prevent ignition, prevent fire escalation and provide personnel protection and escape
- Analyze and prevent "worst case" consequences at company facilities
- Develop a safe and environmental proactive process
- Design, install and test process safety systems
- Determine piping system pressure ratings and piping "spec breaks"
- Conduct a "safety analysis" using Safety Analysis Tables (SAT's), Safety Analysis Checklists (SAC's) and Safety Analysis Function Evaluation (SAFE) Charts
- Develop electrical area classification drawings, fire and gas detector location drawings and determine what equipment is acceptable in these areas
- Evaluate your workplace and operating/maintenance procedures for "hidden" hazards
- Design facilities effectively and work areas to reduce human errors and improve performance
- Recognize the principles of plant layout partitioning into fire zones, restricted areas and impacted areas thus minimizing the risk to radiation, explosion, noise and toxicity

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 managing risk, reliability and loss prevention in production operations for all design, safety and reliability managers, engineers and those in-charge of risk, reliability, loss prevention and safe of process plants and production facilities.

Course Fee

US$ 3,750 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

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 **1.8 CEUs** (Continuing Education Units) or **18 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 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. Andrew Ladwig is a **Senior Mechanical & Maintenance Engineer & HSE Consultant** with over **25 years** of extensive experience within the **Oil & Gas**, **Refinery**, **Petrochemical & Power** industries. His expertise widely covers in the areas of Best Practice In **Maintenance Management**, **Maintenance** Troubleshooting, **Preventive Maintenance & Corrective Maintenance**, **Maintenance Planning**, **Scheduling**, **Management & Work Control**, Certified Maintenance Planner (**CMP**), Certified Planning & Scheduling Professional (**AACE-PSP**), **Maintenance Optimization** & Best Practices, **Engine Construction** & Maintenance, **Process Plant Shutdown & Turnaround**, **Maintenance Auditing & Benchmarking**, **Machinery Lubrication**, **Machinery Failure** Analysis, Reliability, Availability & Maintainability (**RAM**), **Reliability-Centered Maintenance** (**RCM**), **Reliability Engineering Analysis** (**RE**), Root Cause Analysis (**RCA**), Asset Integrity Management (**AIM**), **Reactive & Proactive** Maintenance, **Compressors & Turbines** Operation, Maintenance & Troubleshooting, **Reciprocating & Centrifugal Compressors**, **Screw Compressor**, **Compressor** Control & Protection, **Gas & Steam Turbines**, **Turbine** Operations, **Gas Turbine** Technology, **Centrifugal Pumps, Bearings, Couplings**, **Screw Compressors & Heat Exchangers** Operation, Maintenance, Inspection, Troubleshooting, Lubrication & Shaft Alignment, **Gas Turbine** Operating & Maintenance, **Pressure Safety Relief Valve** Repair & Recalibration, **PSV/PRV** Troubleshooting, **Valve** Testing & Inspection, **Control Valves & Actuators**, **Boiler** Inspection & Maintenance, **Boiler** Systems, **Boiler** instrumentation & Controls, **Boiler** Start-up & Shutdown, **Boiler** Operation & Steam System Management, Heat Recovery Steam Generating (**HRSG**), **Impulse Tube** Installation & Inspection, **Pipes & Fittings**, **Tank** Design & Engineering, **Tank Shell**, **Tanks & Tank Farms**, **Bearings & Lubrication** and Advanced **Machinery Dynamics**. Further, he is also well-versed in **Hazardous Materials & Chemicals** Handling, Hazardous Materials (**HAZMAT**), Hazard Identification & Operability (**HAZOP**), Professional **HAZOP/PHA Leader:** Advanced **Process Hazard Analysis** (**PHA**) Methods & Leadership (**HAZOP, What-if**, **FMEA**), **Process Safety** Management (**PSM**), Layer of Protection Analysis **(LOPA**), Behavioural Based Safety (**BBS**), **Job Safety** Analysis (**JSA**), Permit to Work (**PTW**), Authorized Gas Tester (**AGT**), **Confined Space Entry & Rescue**, Pre-Startup Safety Reviews (**PSSR**), **Safety** in **Process Plants**, **Risk** Assessment, **Risk** Management, **Emergency Planning**, **Emergency Response & Crisis** Management Operations and Incident Investigation Advanced & HSE Reporting.

During his career life, Mr. Ladwig has gained his practical experience through his various significant positions and dedication as the **Mechanical Engineer**, **Project Engineer**, **Reliability & Maintenance Engineer**, **Maintenance Support Engineer**, **Process Engineer**, **HSE Supervisor**, **Warehouse Manager**, **Quality Manager**, **Business Analyst**, **Senior Process Controller**, **Process Controller**, **Safety Officer**, **Mechanical Technician**, **Senior Lecturer** and **Senior Consultant/Trainer** for various companies such as the Sasol Ltd., Sasol Wax, Sasol Synfuels, just to name a few.

Mr. Ladwig has a **Bachelor's** degree in **Chemical Engineering** and a **Diploma** in **Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and has delivered various trainings, workshops, seminars, courses and conferences internationally.

Accommodation

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

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, 08th of October 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Process Safety Systems*** *Purpose • Principles of Safe Facility Design • Surface Safety System • Emergency Support System • Emergency Shutdown • Emergency Depressurization • Fire and Gas Detection Systems • Active and Passive Fire Protection Systems • Pressure Ratings and Determining Piping Specification Breaks • High Integrity Protection Systems (HIPPS) • Relief, Flare and Vent Systems • Electrical Area Classification • Installation Layout Considerations • Human Factors Engineering*
0930 – 0945	*Break*
0945 – 1130	***Risk Assessment*** *Review of Major Landmark Incidents • Inherent Safe Design • Layers of Protection Analysis (LOPA) • Risk Analysis Basics • Review of Hazards Analysis Techniques*
1130 – 1230	***Principles of Safe Facility Design*** *Contain Hydrocarbons • Prevent Ignition • Prevent Fire Escalation • Provide for Personnel Protection and Escape*
1230 – 1245	*Break*
1245 – 1345	***Surface Safety System*** *Safety Analysis Overview • Basic Oil and Gas Operations and Equipment • Basic Production Principles • Undesirable Events • Safety Analysis Concepts • Safety Devices (Resource Information)*

1345 - 1420	***Emergency Support System*** *Surface Controlled Sub Surface Valve (SCSSV) • Emergency Shutdown System • Fire Detection System • Gas Detection System • Adequate Ventilation • Containment System • Sump System*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: Tuesday, 09th of October 2024

0730 - 0830	***Fire and Gas Detection System*** *Gas Detection • Fire Detection*
0830 – 0930	***Active and Passive Fire Protection Systems*** *Active Fire Protection • Passive Fire Protection*
0930 – 0945	*Break*
0945 – 1130	***Pressure Ratings and Determining Piping Specification Breaks*** *Design Procedure • ANSI B16.5 and API 6A Pressure Ratings • Determination of Pressure Breaks*
1130 – 1230	***High Integrity Pressure Protection Systems (HIPPS)*** *Advantages/Disadvantages • Industry Standards • Evaluation Procedure • Applications*
1230 – 1245	*Break*
1245 – 1345	***Relief, Vent and Flare Systems*** *Objectives • Understanding the requirements of Industry Codes and Standards*
1345 - 1420	***Relief, Vent and Flare Systems*** *ASME Pressure Vessel Code Section VIII, Division 1 & 2 • API RP 520, Part 1 & 2; 521; 526; 2000 and 14J • Understanding Regulatory Requirements • Determining Worst Case Conditions*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: Wednesday, 10th of October 2024

0730 - 0830	***Electrical Area Classification*** *Objectives • Definitions • Flammability Limits • Hazardous (Classified) Locations • Understanding Applicable Codes, Standards and Recommended Practices • Classification Procedure and Examples • Applying IP 15, API RP 500/505 • Developing Area Classification Drawings • Installing Electrical Equipment in Hazardous Locations*
0830 – 0930	***Plant Layout and Spacing Considerations*** *Fire Zones • Restricted Areas • Impacted Areas • Hazard/Failure Scenario Categories • Principles of Plant Layout Partitioning • Modelling Criteria • Radiation • Toxicity • Explosion Protection • Noise*
0930 – 0945	*Break*
0945 – 1130	***Human Factors Engineering*** *Human Factors Considerations • When to Consider Human Error • Types of Human Error • Incidents that Could Have Been Prevented • Human's Strengths and Weaknesses • Considerations Related to Efficiency and Safety • Questions that Should Be Addressed in Design and Operations • Common Pitfalls Found in Design and Operations • Review of ASTM F1166*

1130 – 1230	***Liquid Drainage Systems*** *Function of Drainage Systems • Segregation • Closed/Open Drains*
1230 – 1245	*Break*
1245 – 1315	***Case Study***
1315 – 1345	***Discussion & Review***
1345 – 1400	***Course Conclusion***
1400 - 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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