

Scandinavian Academy
Training Center

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Riyadh - Al Khaleej District - Sheikh Abdul Aziz Bin Abdul Rahman Bin Bishr Street - 13223 - Office No. 5 | P.O.BOX : 13224

Course: Safety in Process Design

Code	City	hotel	Start	End	price	Language - Hours
HS-368SA	Al Baha	Hotel Meeting	2027-09-12	2027-09-16	13950 SR	En - 25

Introduction

Safety in Process Design includes a wide range of subjects with many applications in Oil & Gas, Chemical and Process industries, related to hydrocarbons and chemical processing. This course provides an overview of important elements of process safety as they are often encountered in today's industrial practice. The emphasis is on engineering design aspects of Process Safety Management and it will highlight the safeguarding aspects of processing equipment inside the plant. Techniques for analyzing and mitigating process safety hazards applicable to oil and gas processing will be reviewed. Integration of the concepts required to achieve an optimum approach to Process Safety Engineering is the main goal of this course. Exercises and useful examples will be utilized throughout the course to emphasize the key learning points.

Upon completion of this course, the delegates will learn:

- Importance of the concept of "Inherently Safer Design"
- Design principles based on Codes and Standards for safe operation of process equipment
- Selection and sizing of safety valves and pressure relief systems
- Common process hazards analysis methods: HAZOP, LOPA, FMEA

- Detection and prevention methods for fire and explosion accidents
- Plant Equipment Inspection (NDT) and Maintenance Procedures

Objectives

- Comprehensive understanding of different aspects of process design that influence process safety
- Ability to select an “inherently safer design” for the entire process plant operation
- Knowledge on the mechanical structure integrity of process equipment
- Familiarity with hazards associated with process fluids regarding material degradation
- Experience with the Code requirements for sizing relief valves, methodology for determining the relief flows and handling the relief streams
- Knowledge of how to operate with emergency depressuring systems (EDP) system for prevention of fire and gas explosions

Training Methodology

The seminar will be conducted along workshop principles with formal lectures and interactive examples, which will result in the active participation of all delegates in

discussions and teamwork. Real life examples will be selected to illustrate the efficient operation and potential technical failures as well as their root causes. The emphasis will be on troubleshooting the problems and maintaining plant safety. There will be ample opportunities for active, open discussion and sharing professional experiences on various safety issues. All course materials will be provided.

Organizational Impact

On completion of this seminar the delegate will be able to critically analyse the safety methodologies employed within the organisation and instigate improvements where required.

The knowledge gained in this seminar will:

- Enable the delegate to optimise the operation of various components of equipment while maintaining safety of the plant
- Give the delegate confidence to carry out risk minimization analyses on process equipment thereby avoiding failures
- Enable measures to enhance equipment status for the given operating conditions
- Give better handling of pressure relief system
- Enable better specification of new and replacement of old elements of piping system
- Allow tighter control of maintenance budgets by the avoidance of unplanned

equipment failures in service

Personal Impact

- Improved confidence when considering safety issues
- Better understanding of how the process design impacts safety of the plant
- Better grasp of maintenance and instrumentation on incident prevention
- Improved personal knowledge of risk and hazard analysis
- Better ability to troubleshoot difficult and hazardous situations
- Confidence and ability to select the appropriate depressuring plan thereby improving reliability and personal profile to senior management

Who Should Attend?

- Engineers and technicians in oil & gas, chemical and process industries
- Process, mechanical and chemical engineers
- Engineers and technicians who deal with reactors and piping systems

- Design engineers, project engineers and HSE managers
- Control, automation and instrumentation engineers
- Operators and maintenance personnel

Seminar outline

Overview of Safety in Process Design

- Definition of Safety in Process Design
- Overview of Historical Incidents and Problem Areas
- Components of Process Safety: People, Plant, Process
- Risk Identification and Safety Analysis
- Process Hazard Analysis: HAZOP, LOPA, FMEA
- Hazards Associated with Specific Plant Systems
- Elimination of Hazards through Process Design
- Prevention of Human Error through Process Control and Monitoring

Inherently Safer Design

- "Inherently Safer Design" Methodology
- Pre-Design and Design Phases
- Materials of Construction and Optimized Fabrication
- Hazard Associated with Process Fluids and Chemical Reactions
- Corrosion, Erosion and Material Degradation
- Leakage and Loss of Primary Containment
- Dispersion of Hydrocarbon Release
- Flammability of Chemicals

Safety of Process Equipment

- Hazard Associated with Process Equipment
- Safety Considerations in Reactor Design
- Design Procedure for Safety of Pressure Vessels, Storage Tanks, Reactors, Heat Exchangers
- Venting of Tanks and Vessels: Codes, Standards and Best Practices
- Piping System Design and Safety
- Design of Piping System Accessories: Valves, Fittings, Supports
- Assessment of Material Degradation during In-Life Cycle: Fitness for Service
- Monitoring, Testing and Inspection (NDT)

Design of Pressure Relief Systems

- Design of Safety Valves
- Operation of Pressure Relief System
- Calculation and Sizing of Relief Loads of Pressure Relief Systems
- Pressure Relief Valves vs. Rupture Discs
- Codes, Standards and Best Practices
- Specifics of Pressure Relief Systems for Pumps, Compressors, Turbines
- Process Plant Disposal Systems
- Disposal Hazards, Risk Assessment and Environmental Factors

Process Monitoring and Control

- Safety Instrumented Systems
- Process Plant Monitoring and Control System: SCADA
- Emergency Depressuring Systems (EDP)
- Prevention of Fire and Gas or Dust Explosions
- Safety Consideration in Plant Layout and Equipment Spacing
- Management of Change and Integrity Operation Window
- Plant Equipment Inspection and Maintenance Procedures
- Final Conclusions

The Scandinavian Academy for Training Center adopts the latest scientific and professional methodologies in training and human resource development, aiming to enhance the efficiency of individuals and organizations. Training programs are delivered through a comprehensive approach that includes:

- Theoretical lectures supported by PowerPoint presentations and visual materials (videos and short films).
- Scientific evaluation of participants before and after the program to measure progress and knowledge acquisition.
- Brainstorming sessions and practical role-playing to simulate real-life scenarios.
- Case studies tailored to align with the training content and participants work nature.
- Assessment tests conducted at the end of the program to evaluate the achievement of training objectives.

Each participant receives the training material (both theoretical and practical) in printed form and saved on a CD or flash drive. Detailed reports, including attendance records, final results, and overall program evaluations, are also provided.

Training materials are prepared professionally by a team of experts and specialists in various fields. At the end of the program, participants are awarded a professional attendance certificate, signed and accredited by the Scandinavian Academy for Training Center.

Program Timings: 9:00 AM to 2:00 PM

The program includes:

- A daily buffet provided during the sessions to ensure participants comfort.
- A closing ceremony on the final day to distribute certificates and celebrate participants achievements.
- **Note: All prices are exclusive of 15% Value Added Tax (VAT).**

Our Success Partners

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