

Course Name

Process Hazard Analysis (PHA) and HAZOP

Sector Name

Health, Safety and Environment

Document Type

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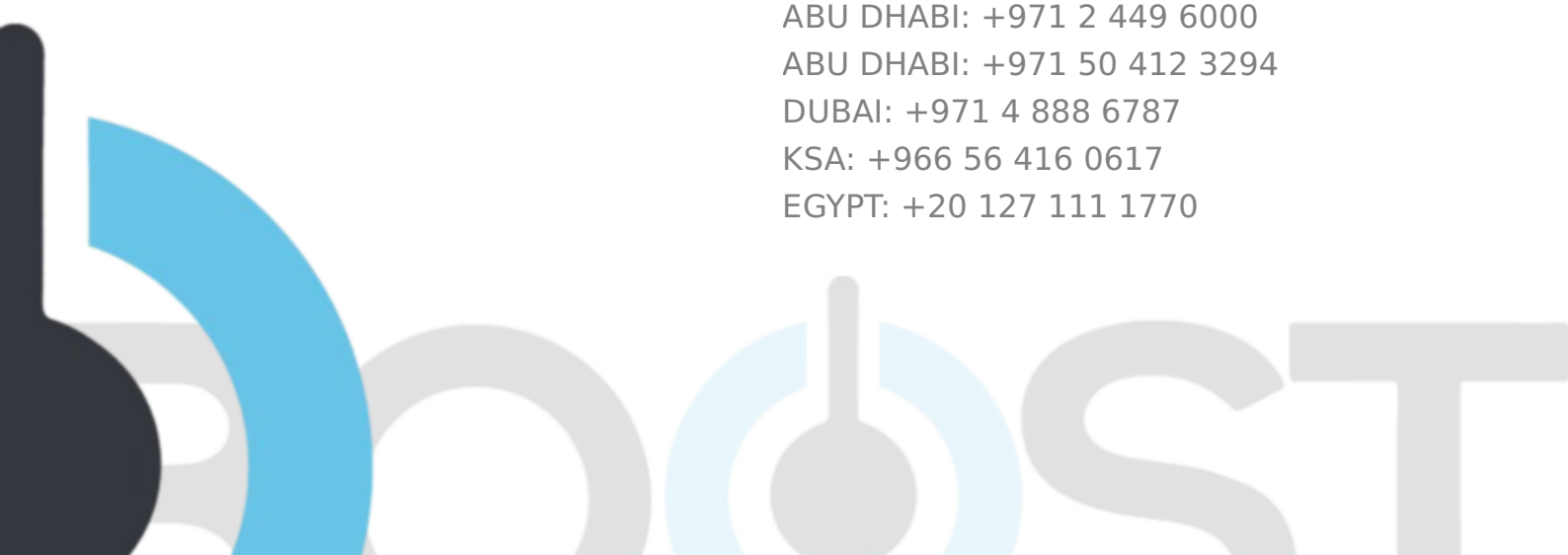
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Process Hazard Analysis (PHA) and HAZOP

Course Introduction

This training program is designed to provide participants with a solid understanding of PHA and HAZOP techniques. The program covers the theoretical foundations, regulatory context, and hands-on application of HAZOP, aligned with the requirements of international functional safety standards such as IEC 61508 and IEC 61511.

Participants will explore key safety concepts such as hazard identification, risk assessment, ALARP (As Low As Reasonably Practicable), and risk ranking methodologies. In addition, special attention will be given to HAZOP study preparation, batch process analysis, and real-world case studies.

The training program also equips participants with the practical tools needed to lead or contribute effectively to a HAZOP workshop and document findings in a structured and compliant manner.

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Process Hazard Analysis (PHA) and HAZOP

Target Audience

- ✓ Process Engineers and Chemical Engineers involved in process design and operations.
- ✓ HSE (Health, Safety, and Environment) Professionals responsible for process safety management.
- ✓ Plant Managers and Operations Managers overseeing industrial facilities.
- ✓ Production Supervisors and Operations Personnel working in high-risk process industries.

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Process Hazard Analysis (PHA) and HAZOP

Learning Objectives

- ✓ Comprehend the role of Process Hazard Analysis within the safety lifecycle and its alignment with IEC 61508 and IEC 61511 requirements for functional safety and risk reduction.
- ✓ Clearly define and apply the concepts of hazard, risk, tolerability, and the As Low As Reasonably Practicable (ALARP) principle within the context of risk assessment and safety management.
- ✓ Identify the essential features of a HAZOP study, including its methodology, team composition, guidewords, and documentation standards.
- ✓ Conduct step-by-step HAZOP analysis, including the identification of deviations, causes, consequences, existing safeguards, and recommendations.
- ✓ Apply qualitative and semi-quantitative risk ranking techniques using risk matrices to prioritize issues and determine necessary follow-up actions.
- ✓ Understand how HAZOP methodology can be tailored to suit non-continuous operations, including start-up, shutdown, and transition phases common in batch processes.
- ✓ Gain practical knowledge of the preparation process for HAZOP workshops, including data collection, document review, node selection, and team coordination.

- ✓ Develop the skills necessary to actively contribute to HAZOP discussions, whether as a facilitator, recorder, or team member, to ensure meaningful and productive outcomes.

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Process Hazard Analysis (PHA) and HAZOP

Course Outline

✓ Day 01

Introduction to Process Hazard Analysis (PHA)

- ✓ Overview of process safety and regulatory drivers
- ✓ Introduction to PHA: Purpose and benefits
- ✓ Relationship between PHA, risk assessment, and functional safety
- ✓ Overview of IEC 61508 and IEC 61511 requirements
- ✓ Lifecycle of safety instrumented systems
- ✓ Group Activity: Map PHA steps to IEC 61511 lifecycle

Fundamentals of Hazard and Risk

- ✓ Definitions: Hazard, risk, exposure, consequence, likelihood
- ✓ Risk assessment principles
- ✓ ALARP concept and safety tolerability
- ✓ Risk control hierarchy and layers of protection
- ✓ Introduction to other PHA techniques (e.g., What-if, FMEA, LOPA)
- ✓ Exercise: Apply risk reduction concepts to real-life scenarios

Process Hazard Analysis (PHA) and HAZOP

Course Outline

✓ Day 02

HAZOP - Overview and History

- ✓ Origins and development of HAZOP
- ✓ Types of processes suitable for HAZOP
- ✓ Objectives and limitations of HAZOP
- ✓ Role of HAZOP in overall PHA strategy
- ✓ Case examples: Real-world incidents where HAZOP could have helped

Core Elements of a HAZOP Study

- ✓ Process description and P&ID review
- ✓ Node identification and parameter selection
- ✓ Guidewords and their application
- ✓ Typical deviations and process consequences
- ✓ Risk identification and control suggestions
- ✓ Workshop: Practice identifying deviations using guidewords

Process Hazard Analysis (PHA) and HAZOP

Course Outline

✓ Day 03

Structured Methodology of HAZOP

- ✓ Step-by-step HAZOP procedure
- ✓ Documentation templates and standard forms
- ✓ Team roles and responsibilities
- ✓ Recording findings, causes, consequences, safeguards, and actions
- ✓ Role of the facilitator and scribe
- ✓ Mock HAZOP Session (Part 1): Node review and deviation identification

Risk Ranking and Risk Matrices

- ✓ Purpose and structure of risk matrices
- ✓ Severity and likelihood scoring
- ✓ Risk class definitions
- ✓ Prioritizing actions and recommendations
- ✓ Example matrix development and customization
- ✓ Exercise: Apply risk ranking to sample HAZOP scenarios

Process Hazard Analysis (PHA) and HAZOP

Course Outline

✓ Day 04

Special Considerations for Batch Processes

- ✓ Differences between batch and continuous processes
- ✓ HAZOP challenges in non-steady-state operations
- ✓ Phased operation HAZOP techniques (start-up, charging, reaction, shutdown)
- ✓ Use of sequential function charts (SFC) in batch HAZOP
- ✓ Case Study Review: HAZOP for a batch reactor system

Preparing for a HAZOP Workshop

- ✓ Pre-workshop data collection and team selection
- ✓ Review of PFDs, P&IDs, cause & effect charts, operating procedures
- ✓ Software tools for HAZOP documentation (e.g., PHA-Pro, HAZOP Manager)
- ✓ Scheduling and organizing the sessions
- ✓ Communicating expectations to team members
- ✓ Checklist Activity: Preparing a HAZOP kick-off packet

Process Hazard Analysis (PHA) and HAZOP

Course Outline

✓ Day 05

Practical Application and HAZOP Simulation

Mock HAZOP Session (Part 2):

- ✓ Full walkthrough using case-based P&ID
- ✓ Team roles simulated
- ✓ Guidewords applied, deviations analyzed, and risks ranked
- ✓ Discussion and feedback on HAZOP performance
- ✓ Common mistakes and how to avoid them
- ✓ Final Project.

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
Sept. 13, 2026	Sept. 17, 2026	5 days	4250.00 \$	KSA , Al Khobar
Oct. 12, 2026	Oct. 16, 2026	5 days	4250.00 \$	UAE , Dubai
Jan. 18, 2027	Jan. 22, 2027	5 days	4250.00 \$	UAE , Dubai
Aug. 16, 2027	Aug. 20, 2027	5 days	4950.00 \$	Austria , Vienna

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