

Course No. 1523

# Process Hazard Analysis (PHA) Training Course

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**PROCESS SAFETY & LOSS PREVENTION**  
**INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS**

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DURATION

**5 Days**

DELIVERY

**Classroom**



## Course Overview

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The Process Hazard Analysis (PHA) Training Course is a specialized professional program designed to strengthen participants' ability to systematically identify, analyze, and evaluate hazards associated with industrial processes. The course focuses on understanding how process conditions, equipment, materials, operating procedures, human factors, and organizational conditions can contribute to hazardous scenarios, enabling professionals to make informed decisions before risks develop into serious operational incidents.

Process Hazard Analysis is a fundamental component of effective process safety management, particularly within high-hazard industries such as oil and gas, petrochemicals, chemicals, power generation, utilities, and large-scale industrial operations. This course provides participants with a structured understanding of how to examine process hazards, identify initiating causes, evaluate potential consequences, and determine whether existing safeguards are adequate and appropriate.

The program covers the practical application of established process hazard analysis methodologies and demonstrates how PHA findings can support engineering, operations, maintenance, inspection, emergency preparedness, and management decision-making. Participants will explore how to use technical documentation, process information, operating procedures, and multidisciplinary expertise to develop meaningful risk scenarios and actionable recommendations.

The Process Hazard Analysis (PHA) Training Course also emphasizes the connection between hazard identification and broader process safety activities, including Management of Change, operating procedures, safety systems, mechanical integrity, emergency response, and continuous improvement. This enables organizations to use PHA results not simply as a compliance activity, but as a practical tool for improving operational reliability, risk control, and organizational resilience.

## Objectives

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- Analyze the fundamental principles of Process Hazard Analysis and explain its role within process safety management during the course.
- Identify major process hazards associated with equipment, materials, energy sources, operating conditions, and human activities using a structured approach.
- Evaluate potential accident scenarios by examining initiating causes, consequences, contributing factors, and existing safeguards.

- Apply appropriate Process Hazard Analysis methodologies to realistic industrial scenarios and operational case studies.
- Develop structured approaches for identifying preventive and mitigating safeguards associated with significant process hazards.
- Assess the quality and relevance of engineering, operational, and process information used to support PHA studies.
- Improve the ability of multidisciplinary teams to document PHA findings and convert identified risks into practical recommendations.
- Apply risk assessment principles to prioritize recommendations according to potential impact on people, assets, environment, and business continuity.
- Strengthen the integration of PHA findings with Management of Change, operating procedures, maintenance activities, and emergency response planning.
- Evaluate the effectiveness of completed PHA studies and establish practical approaches for reviewing and updating findings.
- Design a practical framework for applying Process Hazard Analysis within an organization according to its operational risks and process safety requirements.

## Who Should Attend

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The Process Hazard Analysis (PHA) Training Course is designed for process safety engineers, process engineers, chemical engineers, mechanical engineers, instrumentation and control specialists, safety professionals, risk management specialists, and personnel responsible for identifying and controlling hazards in industrial operations. It is particularly relevant to professionals working within oil and gas, petrochemical, chemical processing, power generation, utilities, manufacturing, and other high-hazard environments.

The course is also suitable for process safety managers, HSE managers, operations managers, maintenance managers, engineering managers, reliability professionals, inspection specialists, facility managers, project managers, PHA team members, and professionals involved in process design, commissioning, operation, modification, and shutdown activities. Executives and decision makers responsible for operational risk, capital projects, business continuity, and organizational safety performance can also benefit from understanding how PHA findings support strategic and operational decisions.

## Learning Outcomes

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- Explain the fundamental principles of Process Hazard Analysis and its relationship with process safety management.
- Identify process hazards and potentially hazardous scenarios associated with industrial processes, equipment, materials, and operating conditions.
- Analyze potential accident causes, consequences, and contributing factors using a structured methodology.
- Select and use appropriate technical and operational information to support effective PHA studies.
- Evaluate hazardous scenarios based on their potential consequences for personnel, facilities, the environment, and business continuity.
- Identify preventive and mitigating safeguards and assess their suitability for controlling identified hazards.
- Distinguish between hazards originating from process design, operating practices, maintenance activities, human factors, and organizational changes.
- Develop practical recommendations for reducing identified risks and strengthening process safety controls.
- Document PHA findings clearly and communicate significant risks and recommendations to technical and management stakeholders.
- Connect PHA findings with Management of Change, operating procedures, maintenance strategies, emergency preparedness, and process safety improvement initiatives.
- Participate effectively in multidisciplinary PHA teams and contribute relevant technical and operational knowledge.
- Develop an implementation plan for converting PHA findings into measurable improvement actions within the workplace.

## Course Outline

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### DAY 01

## Fundamentals of Process Hazard Analysis and Process Safety Management

- Introduction to Process Hazard Analysis, its objectives, scope, and role in process safety.
- Principles of process safety management and the relationship between PHA and major accident prevention.
- Identification of process hazards associated with materials, energy, equipment, pressure, temperature, and operating conditions.
- Process lifecycle considerations from design and commissioning through operation, maintenance, modification, and shutdown.
- Process safety information required for effective PHA studies.
- PHA team composition, responsibilities, competencies, and multidisciplinary participation.
- Hazard identification principles and development of credible process scenarios.

### PRACTICAL APPLICATION

Preliminary identification of hazards within a representative process unit and discussion of key risk scenarios.

### DAY 02

## Hazard Identification Methodologies and Scenario Development

- Overview of Process Hazard Analysis methodologies and selection based on process characteristics and study objectives.
- Systematic identification of deviations from intended process conditions.
- Analysis of initiating events, causes, consequences, and contributing factors.
- Development of credible accident and loss-of-containment scenarios.
- Equipment failure modes and their potential impact on process safety.
- Role of operating procedures, maintenance practices, and human performance in accident prevention.
- Human and organizational factors influencing process risk.

## DAY 02 — CONTINUED

**PRACTICAL APPLICATION**

Analysis of selected industrial scenarios to identify causes, consequences, safeguards, and potential escalation paths.

## DAY 03

## Risk Evaluation and Safeguard Assessment

- Principles of process risk assessment and risk prioritization.
- Risk matrices, risk ranking criteria, and organizational risk acceptance principles.
- Identification and evaluation of scenarios with significant potential consequences.
- Engineering, operational, administrative, and procedural safeguards.
- Assessment of safeguard effectiveness, availability, independence, and suitability.
- Relationship between alarms, shutdown systems, protection systems, operating procedures, and process control.
- Identification of gaps, weaknesses, and vulnerabilities within existing protection measures.
- Integration of PHA with safety instrumented systems, process control systems, and other protection layers.

**PRACTICAL APPLICATION**

Evaluation of selected scenarios, existing safeguards, and gaps requiring additional risk controls.

## DAY 04

## PHA Recommendations, Management of Change, and Operational Improvement

- Effective documentation of Process Hazard Analysis results and study assumptions.
- Development of clear, technically justified, and actionable recommendations.
- Prioritization of corrective and preventive actions according to risk significance.
- Tracking, ownership, verification, and closure of PHA recommendations.
- Integration of PHA findings with Management of Change processes.

## DAY 04 — CONTINUED

- Assessment of how modifications to equipment, processes, materials, procedures, or operating conditions affect process risk.
- Integration of PHA results with emergency preparedness and incident response planning.
- Relationship between maintenance, mechanical integrity, inspection, reliability, and preservation of safeguards.

**PRACTICAL APPLICATION**

Review of a representative PHA study and evaluation of its findings, recommendations, priorities, and action-tracking process.

## DAY 05

**Advanced PHA Application and Process Safety Improvement**

- Review of an integrated approach for planning, conducting, documenting, and maintaining PHA studies.
- Development of complete process risk scenarios including causes, consequences, safeguards, and recommendations.
- Analysis of industrial case studies and identification of lessons applicable to organizational operations.
- PHA revalidation, periodic review, and management of changes in process risk.
- Integration of qualitative PHA techniques with other risk assessment approaches.
- Using PHA findings to support engineering, operational, investment, and risk management decisions.
- Development of performance indicators for monitoring PHA recommendations and process safety improvements.
- Strengthening organizational process safety culture through effective hazard identification and risk management.

**FINAL WORKSHOP**

Conducting an integrated Process Hazard Analysis exercise and developing a workplace implementation and improvement action plan.



## Register or Request More Information

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Course page: <https://quest-training.com/courses/process-hazard-analysis-pha-training-course>

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