Tel No:+97126654546 | FaxNo:+97126654182 | Email: training@cmc-me.com | www.cmc-me.com



HS050:
Certified HAZOP/PHA Leader: Advanced Process Hazard Analysis (PHA) Methods & Leadership (HAZOP, What-If, FMEA)

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Training Description:

The **Certified HAZOP/PHA Leader: Advanced Process Hazard Analysis (PHA) Methods & Leadership** comprehensive and advanced training course designed to develop competent professionals capable of planning, leading, facilitating, documenting and managing Process Hazard Analysis (PHA) studies in high-risk industries. The course provides in-depth knowledge of internationally recognized PHA methodologies including **HAZOP (Hazard and Operability Study), What-If Analysis, What-If/Checklist, Failure Modes and Effects Analysis (FMEA), Layer of Protection Analysis (LOPA) and Risk Matrix evaluation techniques**.

Participants will gain practical expertise in identifying process hazards, evaluating operational risks, determining safeguard adequacy, recommending risk reduction measures and leading multidisciplinary PHA teams. The training course emphasizes leadership, facilitation skills, regulatory compliance and application of best practices based on **OSHA PSM (29 CFR 1910.119), EPA Risk Management Program (RMP), IEC 61882 (HAZOP), CCPS Guidelines, API Recommended Practices and ISO 31000 Risk Management**.

Through practical workshops, case studies, team exercises and simulated HAZOP sessions, participants will learn how to improve process safety performance, reduce operational risks, strengthen safety culture and ensure compliance with international process safety standards.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Understand Process Safety Management (PSM) principles and Process Hazard Analysis requirements
- ✓ Apply internationally recognized PHA methodologies effectively
- ✓ Lead and facilitate professional HAZOP studies
- ✓ Conduct systematic What-If and What-If/Checklist analyses
- ✓ Perform detailed Failure Modes and Effects Analysis (FMEA)
- ✓ Utilize Risk Matrix methodologies for hazard ranking
- ✓ Understand Layer of Protection Analysis (LOPA) fundamentals
- ✓ Evaluate independent protection layers (IPLs)
- ✓ Identify process hazards throughout the facility lifecycle
- ✓ Analyze process deviations using HAZOP guide words
- ✓ Assess consequences and likelihood of hazardous events
- ✓ Develop practical and cost-effective recommendations
- ✓ Improve risk reduction through engineering and administrative controls
- ✓ Document professional PHA reports
- ✓ Manage multidisciplinary PHA teams effectively
- ✓ Improve facilitation, leadership, and communication skills
- ✓ Ensure compliance with OSHA, EPA, CCPS, IEC, API and ISO standards
- ✓ Integrate PHA findings into Process Safety Management systems
- ✓ Improve incident prevention and operational reliability

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Training Designed for:

This course is intended for Process Engineers, Chemical Engineers, Operations Engineers, Production Supervisors, Process Safety Engineers, HSE Engineers, Safety Managers, Plant Managers, Maintenance Engineers, Instrumentation & Control Engineers, Reliability Engineers, Mechanical Engineers, Project Engineers, Commissioning Engineers, Risk Engineers, Technical Authorities, Asset Integrity Engineers, Engineering Consultants, PSM Coordinators, Regulatory Inspectors and Professionals involved in HAZOP and PHA studies.

Training Requirement:

"Hand's on practical sessions, equipment and software will be applied during the course if required and as per the client's request."

Content, location and duration can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

PROCESS SAFETY MANAGEMENT & FUNDAMENTALS OF PROCESS HAZARD ANALYSIS

- Module 1: Introduction to Process Safety
  - Process safety versus occupational safety
  - Major accident prevention
  - Lessons learned from industrial disasters
  - Safety culture and leadership
- Module 2: Process Safety Management Standards
  - OSHA PSM requirements
  - EPA Risk Management Program
  - CCPS Risk Based Process Safety
  - IEC 61882 HAZOP Standard
  - API Process Safety Guidelines
  - ISO 31000 Risk Management
- Module 3: Fundamentals of Process Hazard Analysis
  - Purpose of PHA
  - Types of hazard studies
  - Lifecycle application
  - Hazard identification techniques
  - Risk concepts
  - Hazard scenarios
- Module 4: Risk Assessment Principles
  - Hazard identification
  - Consequence analysis
  - Frequency estimation

- Risk ranking
- Risk matrix development
- ALARP principles

❖ Activities:

- Hazard identification exercise
- Risk ranking workshop

DAY TWO:

HAZOP METHODOLOGY AND LEADERSHIP

❖ Module 5: HAZOP Principles

- History of HAZOP
- Team structure
- HAZOP objectives
- Study preparation
- Required documentation

❖ Module 6: HAZOP Guide Words

- No
- More
- Less
- Reverse
- As well as
- Part of
- Other than
- Early
- Late

❖ Module 7: Process Parameters

- Flow
- Pressure
- Temperature
- Level
- Composition
- Phase
- Speed
- Voltage
- Current

❖ Module 8: Conducting HAZOP Sessions

- Node selection
- Deviation analysis
- Cause identification
- Consequence analysis
- Existing safeguards
- Recommendations
- Documentation

❖ Module 9: HAZOP Leadership Skills

- Facilitating discussions
- Managing conflicts
- Encouraging participation
- Maintaining objectivity
- Time management
- Decision making

❖ Practical Exercise
- Full HAZOP team exercise

DAY THREE:

ADVANCED PHA METHODS (WHAT-IF, CHECKLIST & FMEA)

❖ Module 10: What-If Analysis
- Methodology
- Brainstorming techniques
- Question development
- Documentation
- Team facilitation

❖ Module 11: What-If/Checklist Method
- Checklist preparation
- Hazard identification
- Compliance verification
- Operational assessment

❖ Module 12: Failure Modes and Effects Analysis (FMEA)
- FMEA principles
- Failure modes
- Failure effects
- Severity analysis
- Occurrence analysis
- Detection analysis
- Risk Priority Number (RPN)

❖ Module 13: Equipment Reliability Assessment
- Mechanical failures
- Instrument failures
- Electrical failures
- Human failures

❖ Exercises:
- FMEA practical exercise
- What-If workshop

DAY FOUR:

ADVANCED RISK ANALYSIS, LOPA & HUMAN FACTORS

❖ Module 14: Layer of Protection Analysis (LOPA)
- Purpose
- Risk scenarios
- Initiating events

- Independent Protection Layers
- Enabling events
- Conditional modifiers
- Risk calculations

❖ Module 15: Human Factors in PHA
- Human reliability
- Operator error
- Maintenance errors
- Organizational factors
- Safety culture

❖ Module 16: Safety Instrumented Systems (SIS)
- SIS overview
- Safety Integrity Levels (SIL)
- Protective systems
- Instrumented safeguards

❖ Module 17: Risk Reduction Strategies
- Engineering controls
- Administrative controls
- Inherently safer design
- Passive protection
- Active protection

❖ Exercises:
- LOPA exercise
- Human factor case study

DAY FIVE:

LEADING SUCCESSFUL PHA STUDIES & CERTIFICATION WORKSHOP

❖ Module 18: PHA Facilitation Excellence
- Preparing for studies
- Managing multidisciplinary teams
- Effective questioning
- Consensus building
- Conflict resolution
- Decision documentation

❖ Module 19: PHA Documentation
- HAZOP reports
- Action tracking
- Recommendation management
- Revalidation requirements
- Audit preparation

❖ Module 20: PHA Lifecycle Management
- Design phase PHA
- Construction review

- Pre-startup safety review
- Operational reviews
- Management of Change (MOC)
- Incident investigation integration

❖ Module 21: Best Practices and Lessons Learned
- Chemical industry case studies
- Oil & gas incidents
- Refinery examples
- Petrochemical lessons
- Power generation case studies

❖ Final Exercises
- Complete multidisciplinary HAZOP/PHA simulation
- Team presentation and peer review
- Development of recommendations and action plans

❖ Course Conclusion
❖ Post Assessment and Evaluation

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Assessment

Training Fees:

USD$ TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Certificate(s):

IAOSHE certificate(s) and wallet card(s) with 3 years validity will be issued to each participant who completed the course and passed the competency exam on the last day of the course.

Sample IAOSHE Wallet Card:



Sample IAOSHE Certificate:



Or CMCT Internationally recognized certificate(s) and wallet card(s) will be issued to each participant who successfully completed the course and passed the exam at the end of the course.





Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:

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