Hydrogen Risk Assessment Training Course

Professional Development Training Course Outline

Category	Renewable Energy	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Hydrogen Risk Assessment Training Course is designed to build professional competence in hydrogen safety, hazard identification, risk management, process safety, and emergency preparedness across the rapidly expanding hydrogen economy. As hydrogen projects grow across production, storage, transportation, fueling, mobility, and industrial applications, organizations need structured approaches for recognizing hazards and evaluating risk. The course introduces participants to the fundamental safety characteristics of hydrogen and provides a framework for applying HAZID, HAZOP, What-If analysis, Bow-Tie analysis, consequence assessment, risk matrices, safeguards, ALARP principles, and risk reduction planning. The content is aligned conceptually with current hydrogen-safety frameworks, including ISO/TS 15916:2026 and the NFPA 2:2026 Hydrogen Technologies Code, while emphasizing that applicable legislation, codes, standards, and authority requirements must always be verified for the specific facility and jurisdiction.

Through interactive learning, scenario-based exercises, workshops, case studies, group discussions, and knowledge assessments, participants develop the ability to interpret hydrogen risk information and communicate findings effectively to engineering, operations, HSE, emergency-response, and management teams. The course addresses gaseous and liquid hydrogen safety concepts, loss-of-containment scenarios, fire and explosion risk, ventilation and detection concepts, protection layers, human factors, management of change, emergency planning, and risk communication without replacing site-specific engineering or regulatory review. Current industry guidance recognizes the importance of structured risk-management approaches for hydrogen applications, while NFPA 2 covers hydrogen generation, installation, storage, piping, use, and handling.

Programme Curriculum

Hydrogen Risk Assessment Training Course

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Course Duration

5 days

Course Objectives

By the end of the course, participants should be able to:

1. Understand hydrogen hazard fundamentals and their significance to risk assessment.
2. Apply systematic hazard identification principles to hydrogen-related systems.
3. Distinguish between hazard, consequence, likelihood, and risk.
4. Understand the application of HAZID, HAZOP, What-If, FMEA, and Bow-Tie analysis.
5. Develop structured hydrogen risk registers and risk-ranking approaches.
6. Evaluate fire, explosion, release, and escalation scenarios at a conceptual level.
7. Recognize the role of ventilation, detection, isolation, safeguards, and protection layers.
8. Apply risk reduction and ALARP thinking when reviewing identified hazards.
9. Understand human factors, competency, maintenance, and organizational risks.
10. Integrate emergency preparedness and response considerations into risk studies.
11. Recognize the importance of Management of Change (MOC) and lifecycle risk management.
12. Improve risk communication, documentation, and safety decision-making.
13. Strengthen organizational capability for hydrogen safety governance and continuous improvement.

Target Audience

1. HSE and Process Safety Professionals
2. Hydrogen Project Managers
3. Process and Chemical Engineers
4. Mechanical and Electrical Engineers
5. Operations and Maintenance Personnel
6. Risk, Reliability and Asset Integrity Professionals

7. Emergency Planning and Safety Management Teams
8. Consultants, Auditors, Regulators and Technical Managers

Course Modules

Module 1: Hydrogen Safety Fundamentals

- Hydrogen properties relevant to **hazard identification and risk assessment**.
- Overview of gaseous and liquid hydrogen applications.
- Hydrogen-specific **fire, explosion, release, and escalation hazards**.
- Safety barriers and the **hierarchy of controls**.
- **Case Study:** Preliminary hazard review of a conceptual hydrogen facility.

Module 2: Hydrogen Hazard Identification

- Principles of **HAZID and preliminary hazard analysis**.
- Identification of credible hazardous events.
- Hazard sources, initiating events, and potential consequences.
- Building an effective **hydrogen risk register**.
- **Case Study:** HAZID workshop for a conceptual hydrogen production project.

Module 3: Risk Assessment Methodologies

- Introduction to **HAZOP, What-If, FMEA, Bow-Tie, and risk matrix** methods.
- Selecting an appropriate assessment technique.
- Qualitative and semi-quantitative **risk evaluation**.
- Recording assumptions, uncertainties, and recommendations.
- **Case Study:** Comparing risk-ranking outcomes from two conceptual scenarios.

Module 4: Fire, Explosion and Consequence Risk

- Understanding hydrogen **fire and explosion risk** at a conceptual level.
- Release scenarios and consequence categories.
- Separation, protection, detection, and mitigation concepts.
- Interaction between **initiating events and escalation pathways**.
- **Case Study:** Bow-Tie analysis of a hypothetical loss-of-containment event.

Module 5: Safeguards and Risk Reduction

- **Layers of Protection Analysis (LOPA)** concepts.
- Prevention versus mitigation safeguards.
- Safety-critical controls and performance expectations.
- **Risk reduction, ALARP, and barrier management**.
- **Case Study:** Evaluating the effectiveness of conceptual independent protection layers.

Module 6: Hydrogen Facilities and Lifecycle Risk

- Risk considerations across **design, commissioning, operation, maintenance, and decommissioning**.
- Hydrogen generation and storage risk-management concepts.
- Fueling and industrial-use environments.
- **Management of Change (MOC)** and safety reviews.

- **Case Study:** Lifecycle risk review following a hypothetical facility modification.

Module 7: Emergency Preparedness and Risk Communication

- Emergency planning principles for hydrogen facilities.
- **Emergency scenarios, roles, escalation, and communication**.
- Safety information, procedures, and competency management.
- Interface between facility teams and emergency organizations.
- **Case Study:** Tabletop emergency-planning exercise for a fictional hydrogen site.

Module 8: Integrated Hydrogen Risk Assessment Workshop

- Conducting a complete **conceptual risk assessment workflow**.
- Developing a consolidated risk register and action plan.
- Prioritizing recommendations and safety-critical findings.
- Presenting findings to technical and management stakeholders.
- **Case Study:** Integrated assessment of a fictional hydrogen project from hazard identification through risk-reduction recommendations.

Training Methodology

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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