Hydrogen Asset Management 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 Asset Management Training Course equips professionals with the strategic, technical, and operational capabilities required to manage hydrogen assets across the rapidly evolving hydrogen economy. The program explores hydrogen production, storage, transportation, distribution, refueling infrastructure, electrolyzers, compression systems, pipelines, renewable hydrogen, green hydrogen, blue hydrogen, asset integrity, reliability engineering, predictive maintenance, digital twins, IoT, data analytics, and risk-based asset management. Participants learn how to optimize asset performance, availability, lifecycle cost, safety, and regulatory compliance while supporting decarbonization, energy transition, net-zero, and industrial sustainability objectives.

The course takes a practical, lifecycle-based approach to hydrogen asset management, connecting engineering decisions with commercial performance and operational resilience. Through real-world case studies, failure scenarios, maintenance strategies, inspection planning, reliability-centered maintenance (RCM), condition monitoring, HAZOP, HAZID, risk assessment, lifecycle costing, performance management, and digital transformation, participants develop the ability to make informed decisions throughout the asset lifecycle from design and commissioning through operation, maintenance, modification, and decommissioning. The training is particularly relevant to organizations scaling hydrogen hubs, Power-to-X projects, green hydrogen plants, hydrogen valleys, mobility infrastructure, and integrated renewable energy systems.

Programme Curriculum

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Course Objectives

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

1. Understand the fundamentals of hydrogen asset management and its role in the energy transition.
2. Apply lifecycle asset management principles to hydrogen production, storage, transport, and distribution assets.
3. Evaluate green hydrogen, blue hydrogen, renewable hydrogen, and Power-to-X asset configurations.
4. Develop asset performance management (APM) strategies using reliability and availability metrics.
5. Apply predictive maintenance, condition monitoring, and reliability-centered maintenance (RCM) techniques.
6. Identify hydrogen-specific asset integrity, corrosion, embrittlement, leakage, and materials degradation risks.
7. Conduct risk-based inspection (RBI), HAZOP, HAZID, and safety-critical asset assessments.
8. Use IoT, AI, machine learning, digital twins, and predictive analytics for intelligent asset management.
9. Optimize maintenance strategies, spare parts, workforce planning, and lifecycle costs.
10. Develop effective key performance indicators (KPIs), dashboards, and data-driven asset performance models.
11. Strengthen process safety, functional safety, emergency preparedness, and hydrogen risk management.
12. Integrate ESG, sustainability, carbon management, regulatory compliance, and net-zero requirements into asset decisions.
13. Build actionable hydrogen asset management roadmaps that improve reliability, resilience, operational efficiency, and return on investment.

Target Audience

1. Hydrogen project managers and energy transition leaders.
2. Asset managers and asset performance management professionals.
3. Operations and maintenance engineers in hydrogen facilities.
4. Reliability, integrity, inspection, and maintenance specialists.
5. Process, mechanical, electrical, and instrumentation engineers.

6. HSE, process safety, and risk management professionals.
7. Energy, utilities, oil & gas, and renewable energy professionals entering the hydrogen sector.
8. Consultants, regulators, investors, and technical decision-makers involved in hydrogen projects.

Course Modules

Module 1: Hydrogen Economy and Asset Management Fundamentals

- Hydrogen value chain
- Asset lifecycle management for hydrogen infrastructure.
- Green hydrogen, blue hydrogen, low-carbon hydrogen, and Power-to-X business models.
- Critical asset identification and strategic asset portfolios.
- Case study: Lifecycle asset management strategy for a large-scale green hydrogen production facility.

Module 2: Hydrogen Production Assets and Process Systems

- Electrolyzer technologies
- Balance-of-plant assets, water treatment, power systems, cooling, and compression.
- Asset criticality, availability, maintainability, and reliability assessment.
- Degradation mechanisms and performance optimization.
- Case study: Diagnosing declining electrolyzer performance and developing an optimization plan.

Module 3: Storage, Compression, Transportation and Distribution Assets

- Hydrogen storage technologies
- Compressors, pipelines, valves, vessels, loading systems, and dispensing equipment.
- Hydrogen embrittlement, leakage, fatigue, and material compatibility.
- Integrity management and risk-based inspection (RBI).
- Case study: Integrity assessment of a hydrogen pipeline and high-pressure storage system.

Module 4: Reliability, Maintenance and Asset Performance

- Reliability-centered maintenance (RCM) and preventive maintenance optimization.
- Predictive maintenance and condition-based maintenance.
- Failure Mode and Effects Analysis (FMEA/FMECA).
- Maintenance KPIs-OEE, MTBF, MTTR, availability, reliability, and maintenance cost.
- Case study: Reducing unplanned downtime through a predictive maintenance program.

Module 5: Hydrogen Safety, Risk and Asset Integrity

- Hydrogen hazards-flammability, leakage, ignition, dispersion, and explosion risk.
- HAZOP, HAZID, bow-tie analysis, LOPA, and quantitative risk assessment.
- Safety-critical elements and functional safety.
- Emergency response, leak detection, ventilation, and safety systems.
- Case study: Risk assessment of a hydrogen refueling station following a simulated leakage scenario.

Module 6: Digital Hydrogen Asset Management

- Industrial IoT (IIoT), AI, machine learning, and predictive analytics.
- Digital twins for hydrogen plants and infrastructure.
- Real-time condition monitoring and asset health scoring.
- Data quality, cybersecurity, dashboards, and digital asset performance management.

- Case study: Using a digital twin and sensor analytics to predict compressor failure.

Module 7: Lifecycle Cost, Sustainability and Strategic Optimization

- Total Cost of Ownership (TCO) and lifecycle cost analysis.
- CAPEX/OPEX optimization and maintenance economics.
- Spare parts, obsolescence, supply-chain resilience, and inventory optimization.
- ESG, carbon intensity, sustainability, and net-zero asset strategies.
- Case study: Selecting an optimal maintenance and replacement strategy for a hydrogen production asset portfolio.

Module 8: Hydrogen Asset Management Strategy and Future Trends

- Building a strategic Hydrogen Asset Management Plan (HAMP).
- Asset management governance, standards, competencies, and digital maturity.
- Performance benchmarking and continuous improvement.
- AI-enabled asset management, autonomous operations, smart maintenance, and hydrogen hubs.
- Case study: Developing a five-year asset management roadmap for an integrated renewable hydrogen hub.

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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