Hydropower 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

Hydropower Asset Management Training Course provides a practical, strategic, and technology-focused framework for managing the complete lifecycle of hydropower plants, turbines, generators, dams, gates, electrical systems, balance-of-plant equipment, and supporting infrastructure. The course connects asset management strategy, reliability engineering, maintenance optimization, risk management, lifecycle costing, condition monitoring, performance management, and operational excellence with the principles of ISO 55001:2024. The latest ISO 55001 edition places stronger emphasis on asset-management decision-making and value, risk and opportunity, data and information, knowledge, lifecycle management, and predictive action, making these capabilities increasingly important for modern hydropower organizations.

The course also addresses the accelerating digital transformation of hydropower, including AI, machine learning, predictive maintenance, digital twins, IoT sensors, advanced analytics, remote monitoring, cybersecurity, data-driven decision-making, and intelligent asset management. Current hydropower initiatives are combining condition monitoring, predictive maintenance, ecological monitoring, water management, and weather/flow forecasting to improve operational efficiency and sustainability. Recent research likewise highlights digital-twin-enabled predictive maintenance and adaptive data-driven monitoring as emerging approaches for improving asset reliability and maintenance decisions. Through practical exercises, industry scenarios, and case studies, participants learn how to convert asset data into actionable insights, optimized maintenance strategies, improved availability, reduced downtime, enhanced resilience, and long-term asset value.

Programme Curriculum

Hydropower Asset Management Training Course

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Course Duration

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Course Objectives

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

1. Develop an integrated Hydropower Asset Management Strategy aligned with organizational objectives and ISO 55001:2024.
2. Apply lifecycle asset management principles to turbines, generators, dams, gates, electrical equipment, and balance-of-plant assets.
3. Establish effective asset criticality, risk assessment, and risk-based maintenance frameworks.
4. Design Reliability-Centered Maintenance (RCM) and optimized preventive maintenance programs.
5. Apply condition-based maintenance and predictive maintenance techniques to critical hydropower equipment.
6. Use AI, machine learning, IoT sensors, and advanced analytics to support asset-health monitoring.
7. Understand Digital Twin applications for asset performance, diagnostics, prognostics, and maintenance optimization.
8. Develop meaningful Asset Performance Management (APM), KPI, OEE, availability, reliability, and maintenance dashboards.
9. Optimize lifecycle cost, maintenance expenditure, capital investment, and asset replacement decisions.
10. Strengthen failure-mode analysis, root-cause analysis, defect elimination, and reliability improvement.
11. Integrate SCADA, CMMS/EAM, condition-monitoring systems, and asset-information platforms for data-driven decision-making.
12. Improve operational resilience, climate resilience, environmental sustainability, cybersecurity, and business continuity across hydropower assets.
13. Build a practical asset-management improvement roadmap focused on measurable performance, reliability, sustainability, and long-term value.

Target Audience

1. Hydropower Asset Managers and Asset Management Engineers
2. Plant Managers and Operations Managers
3. Maintenance and Reliability Engineers
4. Mechanical, Electrical, and Civil Engineers
5. Dam Safety and Hydropower Infrastructure Specialists
6. O&M Managers, Supervisors, and Technical Professionals
7. Energy, Utility, and Renewable-Energy Executives
8. Digital Transformation, Data Analytics, and Engineering Consultants

Course Modules

Module 1: Hydropower Asset Management Fundamentals

- Asset Management Principles.
- Hydropower Asset Lifecycle.
- Asset Management System.
- Asset Register & Criticality.
- **Case Study:** Develop an asset-management framework for an **aging hydropower station** facing increasing maintenance costs and declining equipment reliability.

Module 2: Asset Strategy, Risk & Lifecycle Management

- Strategic Asset Management Planning
- Risk-Based Decision Making
- Lifecycle Costing.
- Risk & Opportunity Management
- **Case Study:** Prioritize refurbishment investments for a multi-unit hydropower plant using **risk-based asset prioritization and lifecycle economics**.

Module 3: Reliability Engineering & Maintenance Optimization

- Reliability-Centered Maintenance.
- Preventive & Corrective Maintenance.
- Reliability KPIs.
- Root-Cause Analysis.
- **Case Study:** Analyze repeated **turbine-generator vibration and bearing problems** and develop a reliability-improvement program.

Module 4: Condition Monitoring & Predictive Maintenance

- Condition Monitoring.
- Predictive Maintenance.
- AI & Machine Learning.
- Remaining Useful Life.
- **Case Study:** Examine a data-driven monitoring approach for hydropower equipment where changing operating conditions create additional degradation risks.

Module 5: Digital Hydropower, Digital Twins & Data Analytics

- Digital Twin Technology.

- IoT & Smart Sensors
- SCADA–CMMS–EAM Integration.
- Advanced Analytics.
- **Case Study:** Explore an intelligent hydropower asset-management platform integrating **condition monitoring, predictive maintenance, ecological monitoring, and forecasting**.

Module 6: Hydropower Equipment Performance Management

- Turbine Performance.
- Generator Asset Health
- Hydromechanical Systems
- Electrical & Balance-of-Plant Assets.
- **Case Study:** Develop an **asset-health dashboard** for a hydropower unit combining equipment condition, performance, alarms, maintenance history, and availability KPIs.

Module 7: Sustainability, Resilience & Digital Security

- Sustainable Hydropower.
- Climate Resilience.
- Grid Flexibility.
- Industrial Cybersecurity.
- **Case Study:** Assess a digitally enabled hydropower plant seeking greater **grid flexibility while improving sustainability, forecasting, predictive maintenance, and cyber resilience**

Module 8: Asset Performance Improvement & Management Roadmap

- Asset Performance Management.
- Continuous Improvement.
- Investment & Renewal Planning.
- Implementation Roadmap.
- **Case Study:** Develop a complete **Hydropower Asset Management Improvement Plan** covering strategy, risk, maintenance, digitalization, KPIs, investment priorities, and implementation actions.

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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