

DEVELOPING & IMPLEMENTING A RELIABILITY PROGRAM FOR POWER GENERATION PLANTS

“Maximizing Equipment Uptime and Performance through Structured Reliability Engineering”

Schedule

Date	Venue	Fees (Face-to-Face)
11 - 15 May 2026	Singapore	USD 3495 per delegate

► **Available delivery methods:** Face-to-Face & Online Training

Introduction

Power generation facilities operate under high performance and availability expectations, where any unplanned outage can lead to significant operational, financial, and safety risks. A structured reliability program helps prevent failures, reduce maintenance costs, and enhance overall asset effectiveness.

This course provides practical guidance on developing and deploying a reliability-centered program for thermal, hydro, and combined-cycle power plants. It focuses on root cause analysis, criticality assessment, reliability-centered maintenance (RCM), condition monitoring, and asset health evaluation. The training integrates best practices from ISO 55000, RCM II, and predictive maintenance philosophies tailored to power generation operations.

Objectives

By the end of this course, participants will be able to:

- Design and implement a plant-wide reliability strategy
- Apply asset criticality and failure mode analysis in a power generation context
- Integrate RCM, condition monitoring, and predictive maintenance into planning
- Perform root cause analysis (RCA) and improve failure response systems
- Use KPIs and dashboards to monitor plant reliability performance
- Align reliability initiatives with operational and safety goals

Why Attend

- Reduce forced outages and extend asset life through structured reliability initiatives
- Identify and eliminate root causes of repeat failures
- Adopt predictive tools and condition-based strategies for power plant components
- Learn industry best practices for maintenance optimization
- Ensure alignment with regulatory and safety standards in power generation

Target Audience

This program is designed for:

- Maintenance and Reliability Engineers in power plants
- Plant Managers and Maintenance Superintendents
- Asset Integrity and Performance Managers
- Planners, Schedulers, and Condition Monitoring Staff
- Technical personnel involved in operations, maintenance, and planning

Individual Benefits

Key competencies that will be developed include:

- Asset criticality assessment and risk prioritization
- Failure mode analysis and RCM application
- Implementation of predictive maintenance technologies
- Problem-solving using root cause analysis
- Reliability performance tracking and continuous improvement

Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Fewer unplanned shutdowns and maintenance-related delays
- Higher asset availability and capacity factor improvements
- Cost savings through optimized maintenance practices
- Better decision-making using failure data and reliability metrics
- Improved regulatory and safety compliance across plant operations

Instructional Methodology

The course follows a blended learning approach combining theory with practice:

- Strategy Briefings - Reliability frameworks, RCM, ISO 55000, asset hierarchy
- Case Studies - Failure events, industry benchmarks, power plant scenarios
- Workshops - Asset criticality ranking, RCA sessions, maintenance strategy design
- Peer Exchange - Common reliability issues and how other utilities resolve them
- Tools - FMEA templates, RCA diagrams, CMMS dashboards

Course Outline

Training Hours: 7:30 AM - 3:30 PM Daily Format: 3-4 Learning Modules | Coffee breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 - 02:00

Day 1: Introduction to Reliability in Power Generation

- Module 1: Fundamentals of Reliability Engineering (07:30 - 09:30) • Reliability, availability, maintainability - definitions and metrics
- Module 2: Power Plant Failures and Reliability Drivers (09:45 - 11:15) • Common failure modes in boilers, turbines, generators, auxiliaries
- Module 3: Reliability Program Architecture and Lifecycle View (11:30 - 01:00) • Policy, asset hierarchy, performance standards
- Module 4: Workshop - Define a Reliability Vision for Your Plant (02:00 - 03:30) • Participants develop site-specific reliability objectives

Day 2: Asset Criticality and Failure Modes

- Module 5: Criticality Ranking and Risk Prioritization (07:30 - 09:30) • Consequence/probability analysis, risk matrix
- Module 6: Failure Modes and Effects Analysis (FMEA) (09:45 - 11:15) • Component breakdown, failure identification, failure effects
- Module 7: Preventive and Predictive Maintenance Planning (11:30 - 01:00) • PM optimization and PdM opportunities in rotating equipment
- Module 8: Workshop - Conduct an FMEA on a Plant Subsystem (02:00 - 03:30) • Teams analyze a key asset and develop mitigation strategies

Day 3: Reliability-Centered Maintenance & RCA

- Module 9: RCM Process and Implementation (07:30 - 09:30) • RCM decision logic, asset applicability
- Module 10: Condition Monitoring Technologies (09:45 - 11:15) • Vibration, thermography, oil analysis, electrical signature
- Module 11: Root Cause Analysis and Investigation Techniques (11:30 - 01:00) • 5 Whys, Fishbone, Fault Tree Analysis
- Module 12: Workshop - Perform an RCA on a Real Failure Case (02:00 - 03:30) • Group simulation based on thermal plant incident

Day 4: Data, KPIs and CMMS Integration

- Module 13: Collecting and Analyzing Reliability Data (07:30 - 09:30) • Failure history, downtime tracking, reliability logs
- Module 14: Key Performance Indicators for Reliability (09:45 - 11:15) • MTBF, MTTR, OEE, failure rates
- Module 15: CMMS and Digital Reliability Dashboards (11:30 - 01:00) • System integration, planning, work feedback loops
- Module 16: Workshop - Build a Reliability Dashboard (02:00 - 03:30) • Participants develop indicator sets for monitoring reliability

Day 5: Implementation and Continuous Improvement

- Module 17: Reliability Program Implementation Plan (07:30 - 09:30) • Steps, milestones, leadership roles
- Module 18: Auditing and Improving the Reliability Program (09:45 - 11:15) • Gaps, performance reviews, audits
- Module 19: Case Study - Reliability Turnaround in a Power Plant (11:30 - 01:00) • Real success story with cost and reliability gains
- Module 20: Final Workshop - Present a Reliability Strategy (02:00 - 03:30) • Teams propose a reliability roadmap for their plant

Certification

Participants will receive a Certificate of Completion in Developing & Implementing a Reliability Program for Power Generation Plants, validating their competence in applying reliability engineering tools and strategies to enhance operational performance in utility and power plant environments.

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