

CUTTING-EDGE ENGINEERING LEADERSHIP AND MAINTENANCE OPTIMIZATION



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TRAINING CENTER



Introduction

Cutting-Edge Engineering Leadership and Maintenance Optimization connects two capabilities that heavy-asset operations demand together: leading engineering teams and extracting the most from every asset. Unplanned failures, reactive repairs, and unclear maintenance priorities consume budget and erode reliability. This Cutting-Edge Engineering Leadership and Maintenance Optimization Training Course builds the leadership and technical discipline to change that. Participants work with asset management standards and maintenance methods, including ISO 55000, reliability-centred maintenance (RCM), total productive maintenance (TPM), failure modes and effects analysis (FMEA), and condition-based monitoring. Furthermore, the course covers planning and scheduling, spare parts strategy, and maintenance KPIs. As a result, participants leave able to lead maintenance as a managed, measurable engineering function.

Cutting-Edge Engineering Leadership and Maintenance Optimization Course Objectives

- Apply engineering leadership practices that build reliability-focused teams.
- Implement asset management aligned with ISO 55000 and whole-life cost thinking.
- Apply reliability-centred maintenance (RCM) to select the right maintenance tasks.
- Use failure modes and effects analysis (FMEA) and root cause analysis to prevent recurrence.
- Deploy total productive maintenance (TPM) with autonomous maintenance and 5S.
- Build condition-based maintenance programs using vibration, thermography, and oil analysis.
- Plan and schedule maintenance with work order systems and backlog control.
- Optimize spare parts strategy using criticality, lead times, and minmax settings.
- Measure maintenance performance with MTBF, MTTR, OEE, and availability.
- Lead preventive-to-predictive transformation and continuous reliability improvement.



Course Methodology

The course applies interactive, practice-based methods:

- Facilitated workshops on real plant reliability problems.
- Case studies from manufacturing, energy, and utilities operations.
- Hands-on RCM, FMEA, and criticality analysis exercises.
- Maintenance planning and scheduling simulations.
- KPI dashboard building from maintenance data.
- Action planning that converts each method into a plant commitment.

Who Should Take This Course

- Maintenance managers and reliability engineers.
- Plant, facilities, and asset managers.
- Mechanical, electrical, and instrumentation engineers.
- Maintenance planners and schedulers.
- Operations and production managers.
- Engineering consultants and continuous improvement specialists.

Cutting-Edge Engineering Leadership and Maintenance Optimization Course Outlines

Day 1: Engineering Leadership in Asset-Intensive Operations

- Defining engineering leadership and its effect on reliability.

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- Balancing technical judgement with people leadership.
- Building a reliability culture and accountability habits.
- Aligning maintenance goals with production and business targets.
- Reviewing asset management with ISO 55000 principles.
- Assessing your maintenance organisation's maturity.
- Identifying engineering leadership gaps in your team.

Day 2: Reliability-Centred Maintenance and Failure Analysis

- Understanding failure patterns and the P-F curve.
- Applying reliability-centred maintenance (RCM) decision logic.
- Conducting FMEA and failure mode analysis.
- Using root cause analysis with 5 Whys and fishbone diagrams.
- Setting criticality ranking for assets and components.
- Selecting preventive, predictive, and run-to-failure tasks.
- Building an RCM study for a critical asset.

Day 3: Maintenance Planning, Scheduling, and Execution Control

- Structuring work orders and maintenance workflows.
- Planning work with job plans, permits, and resource loading.
- Scheduling with weekly and daily plans and backlog discipline.
- Managing shutdowns, turnarounds, and major outages.
- Controlling spare parts, kitting, and material availability.
- Optimizing spare parts strategy with minmax and criticality.





- Building a weekly maintenance schedule.

Day 4: Predictive Technologies and Condition Monitoring

- Applying condition-based maintenance principles.
- Using vibration analysis, thermography, and oil analysis.
- Interpreting ultrasound and motor current signature data.
- Setting alarm limits and condition-based triggers.
- Integrating sensors and CMMS data for early warnings.
- Moving from preventive to predictive maintenance.
- Designing a condition monitoring plan.

Day 5: Performance Measurement and Continuous Improvement

- Measuring maintenance with MTBF, MTTR, availability, and OEE.
- Tracking schedule compliance, backlog, and wrench time.
- Using TPM with autonomous maintenance and 5S.
- Applying continuous improvement with PDCA and Kaizen.
- Building maintenance dashboards for decision-making.
- Leading reliability improvement projects.
- Finalizing a personal maintenance optimization action plan.



Conclusion

By successfully completing Cutting-Edge Engineering Leadership and Maintenance Optimization, participants will have acquired practical knowledge of asset management, reliability-centred maintenance, failure analysis, planning and scheduling, condition monitoring, and maintenance performance measurement. They will have gained skills in reliability engineering, maintenance planning, predictive maintenance, and engineering team leadership, plus a personal action plan. Gentex Training Center designed this program to help engineering leaders raise reliability and cut avoidable maintenance cost.

FAQs

Q1 What is the "Cutting-Edge Engineering Leadership and Maintenance Optimization" course about?

It combines engineering leadership with maintenance improvement. Participants study asset management, RCM, failure analysis, planning and scheduling, condition monitoring, spare parts strategy, and maintenance KPIs in asset-intensive operations.

Q2 What are the key benefits of the "Cutting-Edge Engineering Leadership and Maintenance Optimization" course?

Participants gain fewer unplanned failures, better-planned maintenance work, and clearer priorities. Organizations also reduce maintenance cost, extend asset life, improve availability and output, and build a reliability culture that sustains results.



Q3 What skills will I gain from the "Cutting-Edge Engineering Leadership and Maintenance Optimization" course?

You will develop four core skills: engineering leadership and reliability culture building, reliability-centred maintenance and failure analysis, maintenance planning, scheduling and spare parts optimization, and condition monitoring with maintenance performance measurement.

Q4 What tools, methods, or standards are covered in the "Cutting-Edge Engineering Leadership and Maintenance Optimization" course?

The course covers ISO 55000 asset management, reliability-centred maintenance (RCM), FMEA, the P-F curve, root cause analysis with 5 Whys and fishbone diagrams, criticality ranking, TPM with autonomous maintenance and 5S, vibration analysis, thermography, oil analysis, CMMS work order systems, spare parts minmax settings, and KPIs including MTBF, MTTR, availability and OEE.

Q5 How is the "Cutting-Edge Engineering Leadership and Maintenance Optimization" course applied in real-world practice?

Participants apply the methods to live plant tasks, such as running an RCM study on a critical asset, ranking criticality, building a weekly maintenance schedule, setting condition monitoring alarms, and reviewing a KPI dashboard. Each module ends with an action commitment, so learning transfers directly into plant practice.