

Turbine Condition Monitoring and Maintenance Planning Training Course

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Overview

Turbine Condition Monitoring and Maintenance Planning Training Course is a one-week advanced course for turbine maintenance, reliability, vibration, and planning teams who leave with a Turbine Condition-to-Maintenance Decision Pack. The course connects turbine vibration severity, rotor dynamic evidence, bearing condition, lube-oil analysis, thermal inspection, performance trend analysis, failure-mode diagnosis, condition-based work scope, outage planning, and return-to-service evidence. Agile Leaders Training Center delivers this course on turbine condition monitoring and maintenance planning.

Who Should Attend

- Teams responsible for gas and steam turbine condition monitoring and diagnostic evidence
- Functions responsible for vibration acquisition, analysis, alarms, trends, and machinery protection
- Teams responsible for turbine maintenance strategy, work scope, outage planning, and execution readiness
- Functions responsible for lubrication evidence, thermal inspection, performance monitoring, and reliability
- Teams responsible for inspection findings, failure risk, corrective actions, and return-to-service decisions

The course assumes participants already work with turbine operating data, vibration measurements, inspection records, or maintenance plans and leaves out introductory turbine thermodynamics, sensor installation authorization, and live intrusive work.

Departments and Industries

The course supports turbine condition and maintenance decisions across power and process operations.

- Mechanical maintenance, reliability, condition monitoring, and outage planning
- Power generation, utilities, industrial energy, and cogeneration operations
- Oil and gas, petrochemical, refining, mining, and metals facilities
- Marine propulsion, pipeline compression, manufacturing, and process industries
- Engineering services, technical assurance, inspection, and asset management

Learning Objectives

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

- Build a turbine condition-monitoring evidence plan.
- Analyze vibration, rotor, bearing, oil, thermal, and performance evidence.
- Diagnose turbine failure modes from correlated symptoms.
- Evaluate risk, confidence, urgency, and operating boundaries.
- Prioritize condition-based work scope and outage actions.
- Build a return-to-service decision pack.

Course Agenda

Day 1: Establish Turbine Evidence

- Turbine Train, Rotor, Bearing, Coupling, Seal, Casing, and Support-System Map
- Operating Mode, Load, Speed, Temperature, Pressure, and Baseline Condition Register
- Sensor Location, Measurement Direction, Sampling, Quality, and Data-Lineage Plan
- ISO 20816-4 Scope, Applicability, Exclusion, and Vibration Evaluation Map
- Condition Indicator, Alert, Alarm, Trip, Trend, and Escalation Matrix

Day 2: Interpret Vibration Behavior

- Shaft Relative, Casing Absolute, Radial, Axial, and Thrust Vibration Evidence Sheet
- Time Waveform, Spectrum, Phase, Orbit, Centerline, and Waterfall Interpretation Method
- Run-Up, Coast-Down, Critical-Speed, Load-Change, and Transient Response Plot
- Unbalance, Misalignment, Rub, Looseness, Oil Whirl, and Oil Whip Symptom Matrix
- Bearing Clearance, Support Stiffness, Thermal Growth, Coupling, and Rotor-Dynamic Fault Tree

Day 3: Correlate Condition Sources

- Lube-Oil Particle, Wear-Metal, Viscosity, Moisture, and Contamination Evidence Table
- Thermography, Bearing-Metal Temperature, Exhaust Spread, and Hot-Spot Review
- Performance Trend, Heat Rate, Pressure Ratio, Flow, Efficiency, and Degradation Chart
- Alarm Sequence, Event Log, Startup Curve, Shutdown Curve, and Operating-Context Timeline
- Borescope, Clearance, Seal, Blade, Combustion, and Inspection-Finding Correlation Matrix

Day 4: Plan Maintenance Actions

- Failure Mode, Consequence, Condition Indicator, Confidence, and Risk-Priority Register
- Continue, Monitor, Load-Restrict, Inspect, Repair, or Stop Decision Tree
- Condition-Based Work Scope, Task, Skill, Tool, Material, Access, and Hold-Point Plan
- Outage Window, Opportunity Work, Dependency, Critical Path, and Contingency Map
- Post-Maintenance Test, Acceptance Criterion, Baseline Reset, and Return-to-Service Checklist

Day 5: Practice Turbine Decisions

- Exercise: Build the Turbine Train, Baseline, Sensor, and Evidence Map
- Exercise: Diagnose Vibration, Rotor-Dynamic, Bearing, and Support Symptoms
- Exercise: Correlate Oil, Thermal, Performance, Alarm, and Inspection Evidence
- Exercise: Prioritize Risk, Work Scope, Outage Timing, and Acceptance Actions
- Capstone Exercise: Build the Turbine Condition-to-Maintenance Decision Pack

Practical Exercises

The course uses suggested activities to connect turbine evidence with controlled maintenance plans.

- Suggested activity: compare baselines, spectra, waveforms, phases, orbits, trends, and transient plots.
- Suggested activity: correlate vibration symptoms with oil, thermal, performance, alarm, and inspection evidence.
- Suggested activity: build a risk-based work scope with tasks, resources, dependencies, hold points, and contingencies.
- Suggested activity: define post-maintenance tests, acceptance evidence, baseline reset, and return-to-service controls.

FAQs

Who should attend turbine condition monitoring and maintenance planning training?

Turbine condition monitoring and maintenance planning training suits experienced maintenance, reliability, vibration, inspection, performance, and planning teams and assumes familiarity with turbine operating data, machinery measurements, or maintenance records.

How does turbine condition monitoring differ from general predictive maintenance training?

Turbine condition monitoring focuses on turbine trains, rotor dynamics, bearings, transients, performance, inspection findings, outage scope, and return-to-service evidence, while general predictive maintenance addresses a wider equipment population and technique selection.

How are turbine vibration findings converted into maintenance actions?

Turbine vibration findings become maintenance actions by confirming data quality and operating context, correlating symptoms across sources, identifying plausible failure modes, assessing risk and confidence, and defining a condition-based work scope.

What evidence supports turbine return-to-service decisions?

Turbine return-to-service decisions use completed work records, post-maintenance tests, acceptable vibration and performance behavior, resolved alarms, verified clearances and inspections, updated baselines, and authorized acceptance criteria.

Conclusion

Participants take back a Turbine Condition-to-Maintenance Decision Pack. The pack connects operating context, vibration, oil, thermal, performance, alarms, inspections, failure modes, risk, work scope, outage timing, and acceptance evidence. It changes separate condition signals into a traceable basis for maintenance planning and return-to-service decisions.

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