

Vibration Analysis, Shaft Alignment and Balancing Training Course

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Overview

Vibration Analysis, Shaft Alignment and Balancing Training Course is a one-week practical intermediate course for maintenance, reliability, vibration, rotating-equipment, and condition-monitoring personnel who leave with a Machinery Vibration Correction Decision Pack. The course connects defensible measurement routes, waveform and spectrum interpretation, phase evidence, fault discrimination, precision alignment, field balancing, and post-correction verification. Participants practice choosing corrective action only when machine evidence supports it. Agile Leaders Training Center delivers this course on machinery condition monitoring and precision correction.

Who Should Attend

- Functions responsible for route-based and online vibration data collection
- Teams responsible for rotating equipment fault diagnosis and maintenance recommendations
- Groups responsible for shaft alignment, coupling condition, and machinery installation quality
- Personnel responsible for field balancing, correction control, and result verification
- Functions responsible for reliability trends, alarm review, and work prioritization

The course assumes participants already use basic mechanical drawings, speed data, maintenance records, and safe isolation practices, and leaves out vibration theory modeling, energized work, machine disassembly, and vendor-specific certification.

Departments and Industries

The course supports departments and industries that depend on reliable rotating machinery.

- Mechanical maintenance, reliability, and condition monitoring
- Power generation, water, and utility operations
- Oil, gas, chemicals, and process manufacturing
- Mining, cement, metals, and bulk-material handling
- Facilities, marine, and industrial service organizations

Learning Objectives

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

- Apply repeatable vibration measurement routes and data-quality checks.
- Analyze time waveform, spectrum, phase, and trend evidence.
- Diagnose unbalance, misalignment, looseness, bearing, and gear indications.
- Evaluate shaft alignment and field balancing correction options.
- Build controlled correction and post-work verification records.
- Prioritize findings using severity, change, confidence, and operating context.

Course Agenda

Day 1: Establish Measurement Quality

- Machine Train, Operating State, and Measurement-Point Map
- Accelerometer Mounting and Sensor-Orientation Checklist
- Displacement, Velocity, and Acceleration Selection Matrix
- Sampling Rate, Frequency Range, Resolution, and Averaging Plan
- ISO 20816 Measurement and Evaluation Context Card

Day 2: Interpret Vibration Evidence

- Time Waveform, Spectrum, and Trend Comparison Method
- Running Speed, Orders, Harmonics, and Sideband Identification Grid
- Phase Measurement and Cross-Channel Relationship Sheet
- Unbalance, Misalignment, Looseness, and Resonance Evidence Matrix
- Bearing and Gear Indication Escalation Tree

Day 3: Plan Precision Shaft Alignment

- Pre-Alignment Inspection and Soft-Foot Verification Checklist
- Coupling Offset and Angular Misalignment Model
- Rim-and-Face, Reverse-Indicator, and Laser Method Selection Guide
- Thermal Growth, Pipe Strain, and Target Alignment Register
- Alignment Move, Tolerance, and Final-Reading Record

Day 4: Control Field Balancing and Verification

- ISO 21940 Balance Quality and Residual Unbalance Context
- One-Plane and Two-Plane Balancing Selection Matrix
- Trial Weight, Radius, Angle, and Safety Control Sheet
- Influence-Coefficient Correction Calculation Method
- Before-and-After Vibration Verification and Release Gate

Day 5: Practice Diagnosis and Correction Decisions

- Suggested Exercise: Validate a Route-Based Measurement Set
- Suggested Exercise: Diagnose a Spectrum, Waveform, and Phase Case
- Suggested Exercise: Build a Precision Alignment Move Plan
- Suggested Exercise: Calculate a Controlled Field-Balancing Correction
- Capstone Exercise: Assemble the Machinery Vibration Correction Decision Pack

Practical Exercises

The course uses suggested activities to convert machine evidence into controlled correction and verification decisions.

- Suggested activity: review a machinery condition monitoring route and reject inconsistent points, settings, or operating states.
- Suggested activity: perform rotating equipment vibration diagnosis from waveform, spectrum, phase, speed, and trend records.
- Suggested activity: compare shaft alignment training cases and calculate a documented machine move.
- Suggested activity: complete a field balancing course case with trial-weight controls and post-correction verification.

FAQs

Who suits vibration analysis training, and what does it assume?

Vibration analysis training suits maintenance, reliability, condition-monitoring, and rotating-equipment personnel who already read basic machine records, operating speed, mechanical drawings, and safe-work boundaries.

How does vibration analysis and correction differ from mechanical vibration theory?

Vibration analysis and correction uses plant measurements to diagnose machine condition, select alignment or balancing action, and verify results; mechanical vibration theory concentrates more on mathematical models, dynamic response, and system behavior.

When should shaft alignment be selected instead of field balancing?

Shaft alignment should be selected when coupling geometry, axial and radial patterns, phase relationships, soft foot, thermal targets, or physical checks support misalignment rather than mass unbalance.

What evidence is needed before a field-balancing correction?

Field balancing needs repeatable running-speed amplitude and phase, stable operating conditions, a suitable correction plane, controlled trial-weight data, safety limits, and a defined verification criterion.

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Conclusion

Participants take back a Machinery Vibration Correction Decision Pack. The pack links measurement quality, operating context, spectra, waveforms, phase, fault evidence, alignment records, balancing calculations, and verification criteria. It changes symptom-led adjustments into traceable decisions about monitoring, correction, escalation, and equipment release.

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