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COURSE BROCHURE

Rotating Machinery Failure Mechanisms and Predictive Maintenance Training Course

12 – 16 April 2027
Geneva

Rotating Machinery Failure Mechanisms and Predictive Maintenance Training Course

Ref: 1017_38464 **Date:** 12 – 16 April 2027 **Location:** Geneva **Fees:** 7500 GBP

Rotating Machinery Failure Mechanisms and Predictive Maintenance is a 1-week training course for maintenance technicians, mechanical engineers and condition monitoring staff who examine failed pumps, fans, compressors and gearboxes, and leave with a machine failure case file tracing one breakdown from first symptom to corrective action. Repeat failures on the same machines drain spares, overtime and production, so knowing how parts physically degrade now shapes which predictive checks are worth running. Jupiter Prime Training presents this subject from the failed part outwards.

Why Rotating Machinery Failure Mechanisms Matters Now

Three pressures shape the subject today: ageing pumps and compressors running beyond original duty, fewer senior fitters able to read a worn bearing or scored shaft at a glance, and production teams that expect a defect to be caught before it stops a line. A site that replaces parts without reading the fracture surface or wear pattern buys the same failure again; a site that links each mechanism to a detection method breaks the repeat cycle. The course draws on EN 13306 maintenance terminology, root cause failure analysis RCFA practice and reliability-centred maintenance RCM logic for matching tasks to failure modes.

Who Gains Most from Rotating Machinery Failure Mechanisms

- Fitters and technicians who dismantle failed machines and judge what the parts reveal
- Mechanical engineers who sign off repair scope and decide on redesign or material changes
- Condition monitoring staff who take vibration, temperature and oil readings on running equipment
- Lubrication technicians responsible for oil selection, contamination control and sampling points

A mixed crew of fitters, a mechanical engineer and a monitoring technician from one plant gains most, because the person who sees the broken part and the person who reads the spectrum learn to share evidence.

Rotating Machinery Failure Mechanisms Capabilities

Participants learn to read physical evidence on bearings, seals, gears and shafts and connect it to measurable symptoms on running machines.

- Assess fracture surfaces, wear marks and discolouration on failed parts — informing the repair-or-redesign decision
- Apply cause-and-effect and 5 Whys techniques to a machine breakdown — serving the engineer who owns the corrective action
- Measure overall vibration and read a basic spectrum for unbalance, misalignment and looseness — guiding the condition monitoring route
- Specify which detection method suits each failure mechanism — informing the predictive check list for a machine
- Calculate bearing defect frequencies from geometry and shaft speed — supporting the analyst confirming a bearing fault
- Build a corrective plan that removes the root cause — serving operations and the reliability engineer

Key Rotating Machinery Failure Mechanisms Terms

- Rolling contact fatigue — subsurface cracking in bearing races or gear teeth caused by repeated stress, ending in spalling of the surface.
- Fretting — surface damage from small oscillating movement between tight-fitting parts, often seen on shaft fits and couplings.
- Spectrum — a plot of vibration amplitude against frequency that separates individual fault sources on a running machine.
- Ball pass frequency — the rate at which rolling elements pass a defect on a bearing race, used to identify race damage.
- Root cause — the underlying physical, human or system reason a failure occurred, which when removed prevents recurrence.
- Soft foot — a machine foot that does not sit flat on its base, distorting the casing when bolts are tightened.

Rotating Machinery Failure Mechanisms Day by Day

Day 1: How Machine Parts Physically Fail

- Wear, Fatigue, Corrosion and Overload Mechanisms — Classifying the Damage Seen
- Fracture Surface Reading — Telling Fatigue From Sudden Overload
- Lubrication Breakdown and Contamination — Upstream Cause of Many Failures
- EN 13306 Failure and Fault Terms — Consistent Language in Breakdown Reports
- Failure Examples From Pumping Stations and Process Compressors — Recognising Patterns

Day 2: Component Failures in Bearings, Seals, Gears and Couplings

- Rolling Bearing Damage Modes — Spalling, Brinelling, Electrical Fluting and Smearing
- Mechanical Seal Face and Elastomer Failures — Diagnosing Leak Origins
- Gear Tooth Pitting, Scuffing and Breakage — Load and Lubrication Clues
- Coupling and Shaft Misalignment Damage — Reading Wear on Flexible Elements
- Soft Foot, Pipe Strain and Base Distortion — Installation Causes of Failure

Day 3: Root Cause Failure Analysis on Machinery

- Evidence Preservation and Failed Part Tagging — Protecting Clues After Breakdown
- 5 Whys and Cause-and-Effect Diagrams — Moving Past the Broken Part
- Physical, Human and Latent Causes — Separating Symptom From Origin
- Repeat Failure Records From Work History — Spotting Bad Actors
- RCM Failure Mode Logic — Matching a Task to Each Mechanism

Day 4: Detecting Mechanisms on Running Machines

- Overall Vibration Measurement and Severity Zones — First Screening of Machine Health
- Basic Spectrum Reading for Unbalance, Misalignment and Looseness — Locating the Fault
- Bearing Defect Frequency Calculation — Confirming Race and Cage Damage
- Oil Wear Debris and Temperature Trends — Corroborating Vibration Findings
- Detection Method Selection per Mechanism — Choosing the Right Predictive Check

Day 5: Tracing a Failure From Symptom to Corrective Plan

- Case Symptom Review Using Vibration and Oil Data — Framing the Investigation
- Failed Component Examination Using Damage Mode Charts — Naming the Mechanism
- Cause-and-Effect Build for the Case Machine — Reaching the Root Cause
- Predictive Check Assignment for the Machine Train — Catching Recurrence Early
- Corrective Action and Verification Plan — Completing the Failure Case File

Applying Rotating Machinery Failure Mechanisms After the Course

- Lead a failed-bearing examination on the next breakdown, naming the damage mode and recording it against the asset history
- Take overall vibration and basic spectra on three bad-actor pumps and match each finding to a likely mechanism

Rotating Machinery Failure Mechanisms Questions FAQ

What are rotating machinery failure mechanisms and why do they matter now?

Rotating machinery failure mechanisms are the physical processes, such as fatigue, wear and corrosion, that destroy bearings, seals, gears and shafts. They matter now because ageing equipment and fewer experienced fitters make repeat failures more costly.

Who gains most from rotating machinery failure mechanisms training?

Fitters, mechanical engineers and condition monitoring technicians gain most. They are the people who handle failed parts and take readings on running machines.

How does a rotating machinery failure mechanisms course differ from a predictive analytics course?

It starts from the damaged part. A predictive analytics course concentrates on sensor data and forecasting models, whereas this one teaches damage modes, root cause tracing and basic spectrum reading by hand.

What do you bring back from rotating machinery failure mechanisms training?

You bring back a case file tracing one machine failure from symptom to root cause and corrective plan, with the predictive checks chosen to catch it next time.

Rotating Machinery Failure Mechanisms: The Way Forward

The machine failure case file first informs whether a failed part is simply replaced or the installation, lubrication or design is changed. Engineers use it to justify corrective scope and monitoring staff use it to set routes. After its first use, the detection choices deserve revisiting once the next readings show whether the mechanism has returned.