CONCEPT

Industrial Gearboxes and Power Transmission Course: Gear Inspection and Failure Analysis

21 – 25 June 2027
Amsterdam - Zuidas business district hotel



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Ref: 1367_23030 **Date:** 21 – 25 June 2027 **Location:** Amsterdam - Zuidas business district hotel **Fees:** 23500 SAR

Introduction:

Industrial gearboxes and power transmission, with gear inspection and failure analysis, is a 1-week course for maintenance, reliability and rotating equipment teams that ends with a Gearbox Failure Investigation and Maintenance Plan for a case drive train. Organisations lose production when gear units are undersized, run on the wrong oil or are rebuilt without finding why teeth pitted, scuffed or broke, and when couplings, belts and chains wear unnoticed. Nominees already maintain gear units and drives at work and learn through case studies built on failed gears and site data. CoreConcept Training Center delivers this industrial gearboxes course.

Course Objectives:

- Identify gear types, tooth geometry and gear unit designs, and calculate ratio, torque and efficiency for drive trains in service
- Evaluate gear unit ratings with ISO 6336 and AGMA 2001 concepts and select service factors and thermal capacity for replacement units
- Inspect gear units for backlash, tooth contact pattern and mounting condition, and specify the gear lubrication method and oil grade
- Classify gear tooth damage with ISO 10825 terminology and trace pitting, scuffing and fatigue fracture to their root causes
- Maintain flexible couplings, belt drives and chain drives to correct tension, wear limits and replacement triggers
- Decide between repair, overhaul and replacement of gear units and build a drive train maintenance plan from condition evidence

Target Audience:

- Mechanical maintenance teams responsible for installing, inspecting and overhauling gear units on conveyors, mixers, crushers, cooling tower fans and pumps
- Reliability engineering staff responsible for eliminating repeat gearbox and drive failures on critical production lines
- Rotating equipment technicians responsible for replacing and tensioning couplings, belt drives and chain drives
- Maintenance planning staff responsible for preventive task lists, spare gear units and overhaul scopes
- Workshop teams responsible for gear unit strip-down, measurement and rebuild acceptance

Course Outline:

Day 1: Gear Types, Tooth Geometry and the Drive Train Baseline

- Spur, Helical, Bevel and Worm Gear Arrangements Compared
- Planetary Gear Sets and Shaft Mounted Reducer Designs
- Involute Tooth Geometry with Module, Pressure Angle and Backlash
- Gear Ratio, Output Torque and Efficiency Calculations for Reducers
- Drive Train Asset Register and Gear Unit Criticality Ranking

Day 2: Gear Rating Standards, Service Factors and Gear Unit Selection

- ISO 6336 Load Capacity Concepts for Spur and Helical Gears
- AGMA 2001 Rating Factors for Pitting and Bending Strength
- Service Factor Selection by Driver Type, Load Class and Duty
- Thermal Rating and Housing Heat Dissipation Checks for Reducers
- Gear Unit Datasheet Review for Replacement and Upgrade Decisions

Day 3: Gear Unit Installation, Inspection, Lubrication and Belt and Chain Drives

- Gear Unit Mounting Feet and Shaft Alignment Interface Checks
- Feeler Gauge and Dial Indicator Backlash Measurement Procedure
- Marking Compound Tooth Contact Pattern Checks and Corrections
- Splash and Forced Feed Lubrication with EP Gear Oil Selection
- V-Belt, Synchronous Belt and Roller Chain Tensioning Methods

Day 4: Gear Tooth Damage, Root Causes, Couplings and Condition Monitoring

- ISO 10825 Classification of Gear Tooth Wear and Damage
- Pitting, Micropitting and Scuffing Root Cause Evidence Mapping
- Tooth Root Bending Fatigue and Flank Fracture Surface Reading
- Flexible Coupling Wear Limits, Grease Condition and Replacement Triggers
- Gear Unit Condition Monitoring Overview with Temperature and Debris Checks

Day 5: Case Study Gearbox Failure Investigation and Maintenance Plan

- Case Drive Train Data Pack with Failed Gear Photographs
- Failure Investigation Worksheet Linking Tooth Damage to Root Cause
- Repair, Overhaul or Replace Decision Matrix for Gear Units
- Preventive Task List for Gears, Couplings, Belts and Chains
- Gearbox Failure Investigation and Maintenance Plan Completion and Peer Defence

Skills You Will Gain:

- Gear Geometry Interpretation
- Gear Unit Rating Review
- Service Factor Selection
- Backlash and Contact Pattern Measurement
- Gear Lubricant Specification
- Gear Tooth Damage Classification
- Belt and Chain Drive Tensioning
- Overhaul Decision Making

Why Attend This Course:

- Produce a Gearbox Failure Investigation and Maintenance Plan for a case drive train, ready for the maintenance manager and the reliability lead
- Decide whether a damaged gear unit should be repaired, overhauled or replaced, using tooth damage evidence, ratings and condition data
- Avoid undersized replacement units, the wrong gear oil and over-tensioned belts that cause repeat drive train breakdowns and lost production
- Share backlash and contact pattern record sheets, tensioning procedures and tooth damage charts with workshop and planning colleagues

Conclusion:

Back at work, the participant gives the maintenance manager and the reliability lead a Gearbox Failure Investigation and Maintenance Plan that records the root cause of a gear unit failure, the repair, overhaul or replacement decision, the rating and service factor check for any new unit, and the preventive tasks for gears, couplings, belts and chains on the drive train. Planners use it to set inspection intervals and spares, and the workshop uses it to set rebuild acceptance. After the first overhaul under the plan, the unit should review backlash records, contact patterns and repeat failures.

Frequently Asked Questions FAQ:

What should participants know before an industrial gearboxes and power transmission course?

Participants should already maintain, inspect or plan work on gear units, couplings, belts or chains. No gear design background is needed. Bringing gear unit nameplate data, overhaul reports or photographs of damaged gears helps participants apply the case work to their own drive trains.

How does an industrial gearboxes and power transmission course differ from a vibration analysis or shaft alignment course?

It concentrates on the gear unit and drive components themselves: gear types, ratings, service factors, backlash, contact patterns, lubrication, tooth damage, couplings, belts and chains. Vibration analysis and alignment courses teach those measurement techniques in depth; here they appear only as an overview.

Why do industrial gearboxes fail early after a replacement or overhaul?

Most early failures trace back to an undersized unit chosen without a service factor, the wrong gear oil, poor mounting or an unchecked contact pattern. Pitting, scuffing and root fatigue then follow, so selection and installation checks matter as much as the gears.

What do participants take back from the industrial gearboxes and power transmission course?

Participants take back a Gearbox Failure Investigation and Maintenance Plan for a case drive train, with a failure investigation worksheet, a repair or replace decision matrix, backlash and contact pattern record sheets and a preventive task list for gears, couplings, belts and chains.