CONCEPT

Heavy Equipment Maintenance Course: Engines, Hydraulics, Powertrain and Undercarriage

6 – 17 December 2026
Jeddah - Corniche four-star



Heavy Equipment Maintenance Course: Engines, Hydraulics, Powertrain and Undercarriage

Ref: 1488_31390 **Date:** 6 – 17 December 2026 **Location:** Jeddah - Corniche four-star **Fees:** 35100 SAR

Introduction:

Heavy equipment maintenance for engines, hydraulics, powertrain and undercarriage is a 2-week course for plant engineering, workshop supervision and senior technical roles in construction, mining and contractor fleets, ending with a Fleet Maintenance and Component Life Plan for a case fleet. Fleets lose availability and money when major components run to failure, oil results go unread, undercarriage wear is guessed and workshops rebuild parts without a schedule. Nominees already maintain or supervise mobile machines and learn through inspection walkthroughs of engines, hydraulic circuits, drivetrains and track groups. CoreConcept Training Center delivers this heavy equipment maintenance course.

Course Objectives:

- Set maintenance tactics and component life targets for excavators, dozers, wheel loaders and haul trucks according to machine criticality
- Service and diagnose diesel engine fuel, air, cooling, lubrication and after-treatment systems using fault codes and engine tests
- Test load-sensing pumps, control valves, pilot circuits, cylinders and travel and swing motors to locate mobile hydraulic faults
- Inspect torque converters, powershift transmissions, final drives, brakes, steering and undercarriage and project remaining wear life
- Interpret oil analysis, cleanliness codes and machine health data to trigger planned component replacement before failure
- Organise preventive maintenance, workshop flow, rebuild programmes and safe isolation, and report availability and cost per operating hour

Target Audience:

- Plant and equipment engineering staff responsible for the reliability of construction and mining machine fleets
- Workshop supervisors responsible for repair bays, job allocation and the quality of component repairs
- Senior technicians responsible for diagnosing engine, hydraulic, powertrain and electrical faults on mobile machines
- Maintenance planners responsible for service intervals, component change-outs and parts kitting
- Condition monitoring staff responsible for oil sampling, undercarriage measurement and machine health data
- Field service leads responsible for site breakdown response on contractor and quarry equipment

Course Outline:

Day 1: Heavy Mobile Equipment Maintenance Strategy and Component Life

- Maintenance Profiles of Excavators, Dozers, Wheel Loaders and Haul Trucks
- Run-to-Failure, Scheduled and Condition-Based Tactics by Machine Criticality
- Component Life Expectancy Tables for Engines, Transmissions and Final Drives
- Planned Component Replacement Versus Repair-Before-Failure Decision Rules
- Fleet Baseline Register of Hours, Failures and Repair History

Day 2: Diesel Engine Fuel, Air and Cooling Systems on Mobile Plant

- High-Pressure Common Rail and Unit Injector Fuel System Service
- Fuel Contamination Control With Water Separators and Filtration Stages
- Air Intake Restriction Indicators, Pre-Cleaners and Turbocharger Checks
- Radiator, Coolant Conditioning and Fan Drive Inspection on Dusty Sites
- Engine Overheating and Power Loss Root Cause Trees

Day 3: Engine Lubrication, After-Treatment and Electronic Engine Diagnostics

- Engine Lubrication Circuit, Oil Pressure and Blow-By Measurement
- ISO 22241 Diesel Exhaust Fluid Quality and SCR Dosing Checks
- Diesel Particulate Filter Regeneration Modes and Ash Service Limits
- Engine Control Module Fault Codes and Service Tool Live Data
- Cylinder Cut-Out, Compression and Boost Pressure Diagnostic Tests

Day 4: Mobile Hydraulics, Pilot Controls and Hydraulic Troubleshooting

- Load-Sensing Variable Piston Pumps and Margin Pressure Settings
- Main Control Valve Spools, Main Relief and Port Relief Valves
- Electro-Hydraulic Pilot Joysticks, Pilot Pressure and Solenoid Checks
- Boom, Arm and Bucket Cylinder Drift and Bypass Tests
- Swing and Travel Motor Case Drain Flow Measurement

Day 5: Inspection Walkthrough and Guided Case on Engine and Hydraulic Faults

- Guided Case on a Hydraulic Excavator Slow Cycle Complaint
- Guided Case on a Wheel Loader Low Power Complaint
- Pressure Test Point Map and Gauge Kit Selection
- Fault Tree Write-Up and Repair Verification Checklist
- Week-One Diagnostic Findings Consolidated Into the Fleet Register

Day 6: Powertrain, Braking and Steering Systems

- Torque Converter Stall Test, Stator Clutch and Lock-Up Faults
- Powershift Transmission Clutch Packs, Modulation and Calibration Routines
- Planetary Final Drive and Differential Axle Oil and Seal Inspection
- Wet Multi-Disc Brake Wear Measurement and Retarder Function
- Articulated and Ackermann Steering Circuits With Secondary Steering Tests

Day 7: Undercarriage Wear Management, Haul Truck Tyres and Machine Safety

- Undercarriage Wear Measurement of Links, Pins, Bushings and Rollers
- Track Tension, Idler and Sprocket Wear Life Projection
- Haul Truck Tyre Inflation, Heat Load and Rotation Policies
- Energy Isolation, Lockout and Raised Implement Blocking Procedures
- Working at Height on Machines With Access Systems and Harnesses

Day 8: Machine Electronics, Oil Analysis and Condition Monitoring

- Machine Wiring Harness, CAN Bus and Sensor Circuit Testing
- Battery, Charging and Starting Circuit Load Testing
- Oil Analysis Wear Metals, Viscosity and Contamination Trend Limits
- ISO 4406 Cleanliness Codes for Hydraulic and Transmission Oils
- ISO/TS 15143-3 Telematics Alerts Routed to Planners and Supervisors

Day 9: Maintenance Planning, Workshop Organisation, Rebuild Programmes and KPIs

- Preventive Maintenance Service Intervals by Engine Hours and Duty
- Workshop Bay Layout, Job Cards and Backlog Control
- Component Rebuild Programme With Exchange Pool and Core Returns
- Parts Kitting, Critical Spares and Lead Time Planning
- Mean Time Between Failures, Availability and Cost per Operating Hour

Day 10: Inspection Walkthrough Capstone and Fleet Maintenance and Component Life Plan

- Case Fleet Inspection Walkthrough Against Engine and Hydraulic Checklists
- Undercarriage and Powertrain Life Projections for the Case Fleet
- Oil Analysis Results Linked to Rebuild Timing Decisions
- Maintenance KPI Dashboard and Cost per Hour Targets
- Fleet Maintenance and Component Life Plan Completion and Review

Skills You Will Gain:

- Component Life Management
- Diesel Engine Diagnostics
- Mobile Hydraulic Testing
- Powertrain Fault Analysis
- Undercarriage Wear Assessment
- Oil Analysis Interpretation
- Workshop Backlog Control
- Machine Energy Isolation

Why Attend This Course:

- Present a Fleet Maintenance and Component Life Plan to the plant manager and the maintenance planning team
- Decide whether to rebuild, exchange or run on a major component from measured wear, oil trends and operating hours
- Avoid engine, final drive and undercarriage failures that stop loading and hauling operations and inflate cost per hour
- Share fault trees, test point maps and inspection checklists with workshop crews and field technicians

Conclusion:

Back at work, the participant hands the Fleet Maintenance and Component Life Plan to the plant manager, the maintenance planner and the workshop supervisor. They use it to approve component change-out timing, the rebuild and exchange pool, oil sampling intervals and undercarriage measurement routines for each machine family. After its first quarter of use, the team should compare availability, unplanned failures, backlog hours and cost per operating hour against the plan targets, then adjust component life limits and service intervals where measured wear or oil trends differ from the projections.

Frequently Asked Questions FAQ:

What should participants know before the heavy equipment maintenance course?

Participants should already maintain, supervise or plan work on construction or mining machines and read basic hydraulic and electrical diagrams. Bringing anonymised service records, oil reports or undercarriage measurements from their own fleet helps them apply the case work and the final plan.

How does heavy equipment maintenance differ from an industrial hydraulics or equipment productivity course?

It covers the whole mobile machine: diesel engines, after-treatment, mobile hydraulics, powertrain, brakes, steering, undercarriage and electronics, plus workshop and component life planning. Industrial hydraulics courses stay with fixed plant circuits, and equipment productivity courses size fleets and price machine hours rather than maintaining them.

Why does heavy equipment maintenance rely on component life planning?

Major components such as engines, transmissions, final drives and track groups fail expensively and take long to replace. Planning their change-out from measured wear, oil trends and operating hours lets the workshop rebuild them before failure, keep exchange units ready and protect machine availability.

What do participants take back from the heavy equipment maintenance course?

Participants take back a Fleet Maintenance and Component Life Plan with machine criticality, service intervals, component life limits, undercarriage and oil sampling routines, a rebuild and exchange schedule, isolation checklists and a KPI dashboard including availability and cost per operating hour.