

LONGER LIFE, LOWER COST

Repair options for Cat® Articulated Trucks



PETERSON



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888-PETERSON
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CONTROLLING OWNING AND OPERATING COSTS

REPAIR BEFORE FAILURE

- Repair after failure can cost twice as much
- High risk of contingent damage to other parts
- 90% of failures are preventable

REPAIR OPTION SELECTIONS

- Lower cost options
- Maximize parts reuse

WHY DOES REPAIR AFTER FAILURE HAPPEN SO OFTEN?

WHY FIX IF IT'S NOT BROKEN?

- It will fail at some point - and cost more to repair
- Repairing early can save money down the road

WE'RE TOO BUSY RIGHT NOW.

PRODUCTION DEMANDS REQUIRE US TO KEEP THE MACHINE RUNNING.

- Is current production more important than future breakdown?
- Failure down the road could have a negative impact on the long-term production

TURNAROUND TIME IS TOO LONG.

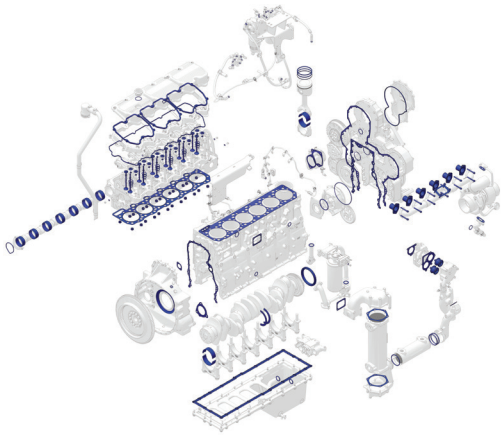
- It will fail at some point - and cost more to repair
- Repair after failure often takes longer

OPERATORS AREN'T RAISING ANY RED FLAGS ABOUT MACHINE PROBLEMS.

- Operators might not be aware
 - Often machines performance degradation is slow and goes unnoticed until it has lost up to 20% of productivity
- Might not communicate potential issues to keep producing

REPAIR OPTIONS AVAILABLE FOR MANY CAT® MODELS

ENGINE REPAIR OPTIONS



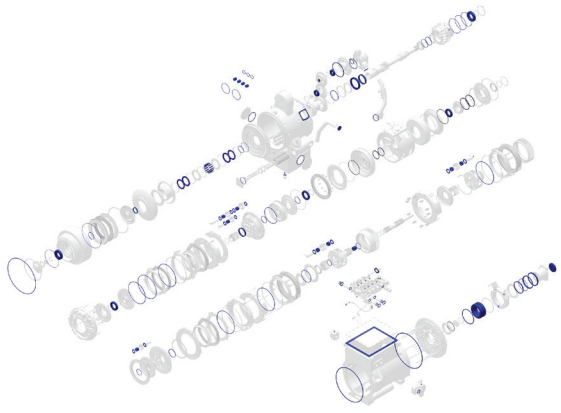
Level 1 Engine Repair Example

Inspect or Test:

- Camshaft
- Cooling system
- Cooling fan
- Coolant hoses
- Radiator
- Crankshaft
- Cylinder block
- ECM
- Engine mounts
- Engine oil cooler
- Exhaust & intake manifolds
- Fan drive, pulleys, belts & belt tensioner
- Flywheel & ring gear
- Front gear train
- Fuel injectors
- Fuel transfer pump & fuel lines
- Fumes disposal & clamps
- Piston spray jets
- Pushrods, lifters & spring guides
- Rocker arm assemblies
- Intake & exhaust
- Rocker arm shaft
- Turbocharger, aftercooler/hoses & clamps
- Unit injection hydraulic pump
- Vibration damper
- Wiring harnesses, switches & sensors

Quote	Level 1	Level 2	Level 3	Level 4
Recondition, repair, or replace	In-frame	Out-of-frame	Out-of-frame	Reman
Camshaft bearings	X	X	X	
Coolant temperature regulator	X	X	X	
Crankshaft thrust plates	X	X	X	
Exhaust manifold studs/locknuts	X	X	X	
Gaskets & seals for components that are removed	X	X	X	
Main bearings & rod bearings	X	X	X	
Breather	X	X	X	
PM Service - oil, fuel, & air filters	X	X	X	
Turbocharger (mounting) studs/locknuts	X	X	X	
Cylinder head	X	X	X	
Cylinder pack	X	X	X	
Water pump		X	X	
Turbocharger		X	X	
Engine oil pump	X	X	X	
Fuel injectors	X	X	X	
Paint engine		X	X	
Fuel transfer pump		X	X	
Engine oil cooler		X	X	
Rocker shaft and arm assemblies (as needed)			X	
Electrical wiring harness and sensors			X	
Piston spray jets			X	
Front gear train bearings		X	X	
V-belt			X	
Polish crankshaft			X	
Inspect fuel lines and replace (as needed)			X	
Camshaft				
Crankshaft				
Exhaust & intake manifolds				
Fan drive, pulleys, belts & belt tensioner				
ECM				
Dyno test engine		X	X	
Replace with Cat remanufactured, includes starter and alternator				X

TRANSMISSION/TORQUE CONVERTER REPAIR OPTIONS



Level 1 Transmission Repair Example

Inspect or Test:

- Clutch discs and plates
- Gears
- Shafts
- Clutch pistons
- Clutch housings
- ECM
- Yokes
- Transfer gears
- Springs
- Planet carriers
- Impeller (model specific)
- Turbine (model specific)
- Stator (model specific)

Quote	Level 1	Level 2	Level 3
Recondition, repair, or replace	Rebearing reseal	Repair or recondition as needed	Reman
All bushings and anti-friction bearings	X	X	
All seals and gaskets	X	X	
Thrust washers	X	X	
Shift solenoids & harness	X	X	
Miscellaneous hardware	X	X	
Replace, repair, or recondition as needed for the following:			
Clutch discs		X	
Clutch plates		X	
Planet gears		X	
Sun gears		X	
Planet shafts		X	
Clutch pistons		X	
Clutch housings		X	
Planet carriers		X	
Springs		X	
Paint		X	
Yokes		X	
Bevel gear		X	
Valve bodies		X	
Transfer gears		X	
Transmission oil cooler		X	
ECM		X	
Shafts		X	
Impeller		X	
Turbine		X	
Stator		X	
Housings & carriers		X	
Electrical components		X	
Bench testing	X	X	
Replace with Cat remanufactured			X

REPAIR OPTIONS

Level 1 Engine

Minor Overhaul

Includes: bearings, seals, gaskets and normal one-life "wear" parts. Assumes all multiple-life parts meet Caterpillar reuse guidelines

Does not include: external parts, including turbos, exhaust, electrical and electronics

Level 2 Engine

Major Overhaul

Includes: all Level 1 parts and turbocharger. Reconditions or replaces other critical parts not meeting Caterpillar reuse guidelines.

Does not include: Replacement housings, carriers, valve bodies, shafts or machine work.

Level 3 Engine

Complete Rebuild

Includes: Complete component rebuild including all Level 1 & 2 parts. Replacement of sensors and harness.

Does not include: Replacement of major housings/castings.

Level 4 Engine

Remanufactured

Includes: Starter and alternator.

Price: _____

Customer name: _____

Customer phone number: _____

Date: _____

Model serial number: _____

Make/model: _____

Salesman: _____

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REPAIR OPTIONS

Level 1 Transmission & Torque Converter

Minor Overhaul

Includes: bearings, seals, gaskets and normal one-life "wear" parts. Assumes all multiple-life parts meet Caterpillar reuse guidelines

Does not include:

Replacement housings, carriers, valve bodies, shafts or machine work.

Level 2 Transmission & Torque Converter

Major Overhaul

Includes: all Level 1 parts. Reconditions or replaces other critical parts not meeting Caterpillar reuse guidelines.

Level 3 Transmission & Torque Converter

Remanufactured

Price: _____

Customer name: _____

Customer phone number: _____

Date: _____

Model serial number: _____

Make/model: _____

Salesman: _____

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