

## **Maintenance, Load Factor and Duty-Cycle Determine Off-Road Engine Life**

Often it is the life of the engine that dictates the useful life of a piece of equipment. There are a number of factors that can impact the useful lifetime of an engine in off-road equipment including:

1. Consistent equipment inspection and maintenance procedures.
2. Continuous, high engine output as measured by fuel burn rates.
3. Proper application of the equipment for its intended service.
4. Close attention to lubrication and the use of regular oil analysis.
5. Use of high quality air, oil and fuel filters coupled with frequent inspections.

Generally, equipment manufacturers try to match the engines to the equipment life-cycle. A recent article in Equipment World magazine estimated the following average hours to overhaul based on engine size:

Small to midrange engines: 50 – 250 hp: Typical overhaul at 8,000 – 10,000 hours.

Full range is 1,000 – 20,000 hrs depending on duty cycle, maintenance and load factor.

Heavy-duty engines: 250 – 600 hp: Typical overhaul at 12,000 – 18,000 hours.

Full range is 5,000 – 25,000 hrs depending on duty cycle, maintenance and load factor.

These engines are usually overhauled once in the equipment life cycle.

High horsepower engines: 600+ hp: Typical overhaul at 15,000 to 22,000 hours.

Full range is 8,000 – 25,000 hrs depending on duty cycle, maintenance and load factor.

Equipment design often calls for multiple engine overhaul/replacement over the equipment life cycle.

### **Equipment and Typical Duty Cycles:**

Light-Duty – Graders, Compactors, Cranes, Dump Trucks.

Medium-Duty – Wheel Loaders, Articulated Dump Trucks, Skid Loaders, Scrapers.

Heavy-Duty - Excavators, Log Skidders, Dozers, Air Compressors, Rock Drills.

Duty-cycle significantly changes the equipment life cycle as does the load factor. Routine maintenance is the key to maximizing engine life.

Source: Equipment World, May 2003

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