

Tech Talk is a regular feature of *Concrete Openings* magazine, focusing on equipment, maintenance and operational issues of interest to concrete cutting contractors. Readers wishing to have a particular subject addressed can call or email CSDA with their suggestions at 727-577-5004 or becky@csda.org.

The Nuts and Bolts of Engine Maintenance

By Dale Gabrielse

Every piece of equipment in a contractor's or a rental center's fleet is designed for a very different purpose, and the equipment comes in a variety of shapes and sizes. However, most equipment has one element in common. Almost all of the equipment requires the use of an engine to be effective. Although the engine is usually small in relation to the entire piece of equipment, it plays a large part in the life and performance of a product, and the engine can single-handedly determine the quality of a piece of equipment. Because engines are essential to most equipment, it is important to pay special attention to maintaining the engine.

An effective maintenance program for a particular piece of equipment is the result of several different factors, such as the type of equipment, the work environment of the machine and the manufacturer's specific requirements. Although there may be a few differences in how various engines are maintained, there are some basic maintenance steps that should be taken with almost any engine.

DAILY GRIND

Although it is often the most overlooked in a maintenance program, daily maintenance is usually the easiest and quickest to perform. Attending to basic maintenance items, such as checking the oil, inspecting the air filter and cleaning the engine, is an easy way to increase the life and performance of an engine.

Perhaps the most important step in a daily maintenance routine is checking the oil. An insufficient amount of oil can cause serious problems and ultimately decrease the life of an engine. If the oil level is below what is recommended by the manufacturer, oil should be added until the specified level is reached. Although many manufacturers claim that air-cooled engines do not use oil, heat created by the engine and working environment may cause the engine to burn a small amount of oil; therefore, it is equally important to check the oil on air-cooled engines.

Checking the condition of the air filter is another important daily maintenance practice that can prevent significant damage. A clogged or damaged air filter can lead to a loss in power and shorten the life of an engine by allowing dust and dirt into sensitive areas of the engine. The owner's manual should be consulted for instruction on how to clean

a dirty filter. If a filter is damaged or so clogged that the dirt cannot be removed with suggested cleaning methods, it should be replaced immediately.

One of the most basic daily maintenance steps is cleaning the engine. Not only does cleaning the engine get rid of potentially harmful dust and dirt, but it also provides the operator with a chance to check the engine for leaks, loose parts and damaged components. Damaged items should be replaced and loose parts tightened. Loose parts are prone to more vibration, which can increase damage and potentially harm nearby components.

Particular attention should be given to any signs of fuel leakage. If a fuel leak is detected, the parts causing the leak should be tightened or replaced immediately. Failing to fix the leak is not only wasteful and inefficient but also potentially dangerous.



MAINTENANCE TIMELINE

In addition to daily maintenance, engines require a variety of maintenance on a less frequent basis. Throughout the year, engines require weekly, monthly, biannual and annual maintenance to retain performance and extend the life of an engine. Although the maintenance on all small engines follows a similar timeline, operators and mechanics should consult their operator's manuals for maintenance requirements that are specific to their equipment.

One item that not only needs to be addressed on a daily basis but also bimonthly is the engine oil. In addition to checking the oil daily, the oil should be changed every 100 hours to remove potentially harmful sludge. The only exception to changing the oil after 100 hours comes when the engine is first purchased. Engine oil should be changed after the first 20 hours of use to remove assembly lube

and the metallic particles left from production and deposited during run in operation.

The air filter is another item that needs attention daily and bimonthly. Regardless of how dirty the air filter is, it should be cleaned every 100 hours. Additionally, the air filter should be changed on a monthly basis. If the air filter is not cleaned and changed, it is prone to clogging, which causes a loss of power and shortens engine life by allowing dirt to enter internal components.

An operator should also inspect the spark plugs every 50 hours for damage, dirt and excessive carbon build up. Dirty spark plugs can cause a decrease in power and poor starting performance. Spark plugs with cracked porcelain should be replaced immediately, and a spark plug with a considerable amount of dirt or carbon build-up should be cleaned. An operator can use a wire brush to clean the spark plug.

Additionally, it is important to clean and inspect the fuel strainer and fuel filter every month. Contaminated fuel that is not removed can lead to trouble starting the engine, and because replacing the fuel line and carburetor can be expensive, it is essential to prevent unnecessary damage caused by contaminated fuel.

On an annual basis, an engine should be thoroughly inspected for dirty, broken and misaligned parts. Dirty, worn and misaligned parts can cause a variety of engine problems. Thoroughly inspecting the engine gives the most comprehensive view of what needs to be cleaned and repaired. Also, the fuel hose should be replaced annually. Changing the fuel hose reduces the chances of fuel leaks that are uneconomical as well as potentially dangerous to the operator.

TROUBLESHOOTING

In addition to following a maintenance schedule, it is important that operators are aware of maintenance needs associated with specific problems. If an engine is experiencing hard starts, the valve clearance on the intake and exhaust valves should be checked and adjusted according to manufacturer specifications. When checking the valve clearance, the piston should be positioned at top dead center of the compression stroke and the engine should be cold. After the clearance is adjusted, the crankshaft should be rotated and the valve clearance checked again.

A reduction in power is often an indication the cylinder head and carburetor should be inspected and cleaned. The cylinder head's valves, seats, ports and guides should be inspected and any carbon or gum deposits removed from the components. Incorrect mixtures of air and fuel cause the majority of carburetor problems; therefore, it is important to prevent clogged jets, air passages and fuel passages that keep air and fuel from flowing freely.

Additionally, a loss of power or a smoking engine may signal an internal engine problem. If power reduction or smoking occurs, a trained mechanic should conduct external tests, such as a leakdown test or compression test, to determine the problem or decide if more extensive testing is needed.

SUITING UP FOR STORAGE

In addition to a regular maintenance routine, some circumstances require special care. Many contractors live in areas where the weather prevents them from working year-round. During the off-season equipment will go for long periods without being used, and damage can occur to engines that are not properly stored during this time. If an engine will be stored for more than 30 days, special steps need to be taken to protect the engine.

The first step in preparing an engine for storage is performing all of the suggested daily maintenance items such as cleaning the engine and checking the air filter. Following the daily maintenance steps, the fuel should be drained from the fuel tank and carburetor float chamber. This is one of the most important steps in preparing an engine for storage. Over time the volatile components of fuel evaporate and the fuel becomes stale. Stale fuel makes starting the engine difficult, if not impossible, when the machine is taken out of storage. Although it is usually suggested to drain the fuel, filling the tank with new fuel and adding a fuel stabilizer is another option for preventing stale fuel.

To prevent corrosion in the cylinder bore during storage, the spark plug should be removed and a few drops of oil injected through the spark plug hole. The recoil starter knob should be pulled gently two or three times before the spark plug is placed back in the spark plug hole.

Additionally, the recoil starter knob should be pulled until the resistance is felt and left in that position. The engine should be cleaned, and a protective cover should be placed over the unit. It is also important to make sure that a pressure washer is not used to clean the engine and that the engine is stored in a dry place.

Whether preparing an engine for storage or merely readying it for a typical day on the job, following appropriate maintenance recommendations will ensure a long engine life and preserve the power and performance of the machine. Although it may appear time consuming to follow a strict maintenance schedule, most steps are fairly quick and easy to perform. And, in relation to the amount of time and money required to fix or replace a faulty engine, a few minutes spent on maintenance is a small investment to make.

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