

Keeping your two-cycle engines Humming

BY CHRIS RAYMOND

The two-cycle engine is like an old dog. It's been around for 100 years. It can stink. It will snarl and snap. It can be an ill-tempered beast that won't obey your desires. Or, like a good hound, it can be a trusty companion and helper. Its behavior depends on whether you feed it well, keep it clean, and give it a good home.

Two-cycle engines are found on handheld equipment—string trimmers, power blowers, chain saws, etc. Occasionally you'll find a two-cycle walk-behind lawn mower or on a specialized piece of equipment like a post-hole auger.

There are no special secrets to handling two-cycle, but there are a few practices worth adopting as habits of operation and maintenance. These good practices will become more important in the years ahead, because two-cycle design changes being forced by pollution-control laws are likely to further emphasize them.

Ups and downs

The two-cycle is called that because to produce power, the piston needs only two journeys through the cylinder bore: one up, one down. The engines used in autos and trucks needs twice as many trips to produce one power stroke, hence they are four-cycle. Despite making twice as many power strokes at a given rotating speed, the two-cycle doesn't produce twice the power of a four-cycle. But it does produce twice as many exhaust pulses, so it sounds as if it is running twice as fast.

The two-cycle is suited for high-speed operation because it needs only 3 major moving parts, the piston, connecting rod, and crankshaft. The piston, as it moves up and down, serves to control the flow of air-fuel mix into the cylinder and the release of exhaust. A tiny bit of oil is mixed into the fuel, so all the internal pieces are bathed in a lubricating mist. The oil is burned along with the fuel and helps produce the characteristic gray exhaust plume that marks a two-cycle.

Care and feeding

"Barking" and "growling" were traditionally ignored in two-cycle design. Minimalist mufflers and air intakes noise control saved a lot of weight. New designs increased the size and weight of these external parts. To keep total engine weight about the same, designers have reduced the weight of core components like cylinders, crankshafts, starters, etc. This shift has serious impact on operation and maintenance.

Newer engine designs typically squeeze more power from each cubic centimeter via a leaner fuel mixture and higher engine speed; both result in higher engine heat loads.

Carburetor passages are physically smaller, with higher precision needles. They are less tolerant of particles coming in with the fuel, so the filters are much better. Partial blockage of a fuel passage can over-lean an already lean-burning engine, causing destruction through under-lubrication and excess heat. Change the fuel filter often. Fuel can't be allowed to linger for months in the tank and evaporate into solids that will load up the filters. Get in the habit of emptying two-cycle handheld fuel tanks when a unit will be in storage more than a week.

The cooling system has a higher load. Attention must be paid to keeping air intake screens free of debris. Cooling fins, on both the fan and cylinder, should be cleaned more often. That means opening up the shrouds more often to blow away chaff.

The higher heat and speed demand better spark plugs. The electrodes are more likely to burn away, opening up the spark gap. This can lead to harder starting. It can also

alter the ignition timing because it may take longer for an electron charge to build enough to jump a larger gap.

Altered timing can change power output and increase engine heat production. So check, re-gap, and replace spark plugs frequently. On daily-use machines, this may mean monthly plug checks. Make sure the engine is cool to avoid stripping out the plug threads in the cylinder head.

It may be worth considering switching to synthetic lubricants for two-cycle engines. Many users have experienced extended engine life with these products. A significant advantage is that a single batch of synthetic fuel-oil blend can serve a wide range of different two cycle engines, which may call for fuel-oil blends ranging from 16:1 up to 100:1. Beside simplifying inventory, the synthetics seem to leave fewer deposits in the critical piston ring area. A seized piston ring is often fatal to a two-cycle engine, so preventing that is usually worth the higher price of the synthetic lube.

The mechanisms downstream from the engine, items like the gear heads in string trimmers, should be checked for proper operation. Any binding or maladjustment should be cured in the interest of reducing engine load and permitting full-speed operation.

Throttle cables and linkages should be checked frequently to verify that they are pulling the carburetor fully open. Air filter elements should be checked and changed more often to allow the free flow of air into the engine. And the muffler system should be frequently checked for blockage.

Carburetor fuel-mixture adjustment is one of the more critical elements to two-cycle operation, since it controls both the leanness of fuel and the quantity of lubricant. Each machine will have a specific system for adjustment. Some will permit no adjustment, while others will. Read the operating manual and follow it strictly.

Store it right

Storage is an important issue for two-cycles. Some are showing up with catalytic converters. These platinum-bearing, ceramic honeycomb exhaust filters have been used on cars for decades. They make unburned fuel molecules combine with oxygen, to eliminate troublesome emissions. But the converter is more fragile because of the internal ceramic honeycomb. It retains its heat longer after the engine is shut down.

The extra heat may be enough to start a fire by inadvertently storing a handheld power tool in a position where the converter contacts flammable materials.

Assess the storage setting for your two-cycle equipment to eliminate wood, grass clippings, or any other potentially flammable materials. Train operators to store the equipment so fuel left in the tank can't inadvertently dribble onto the muffler or converter. **ST**

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