

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**

Chris Raymond is a free lance writer who specializes in machine and engine maintenance.

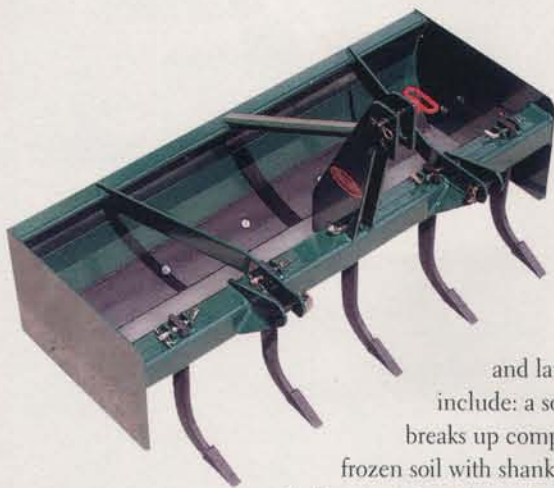




STICK EDGER

The John Deere XT120SE Stick Edger features a 9-in. blade, an angled shaft and wide-guide wheels. The John Deere M-Series heavy-duty engine runs cooler with less vibration. Solid-state ignition and primer bulb assures fast, easy starting. The patented, low-tone muffler uses a glass wool lining to reduce sound levels. The XT120SE also features shock-absorbing grips and a safety guard with rear deflector.

John Deere/800-537-8233
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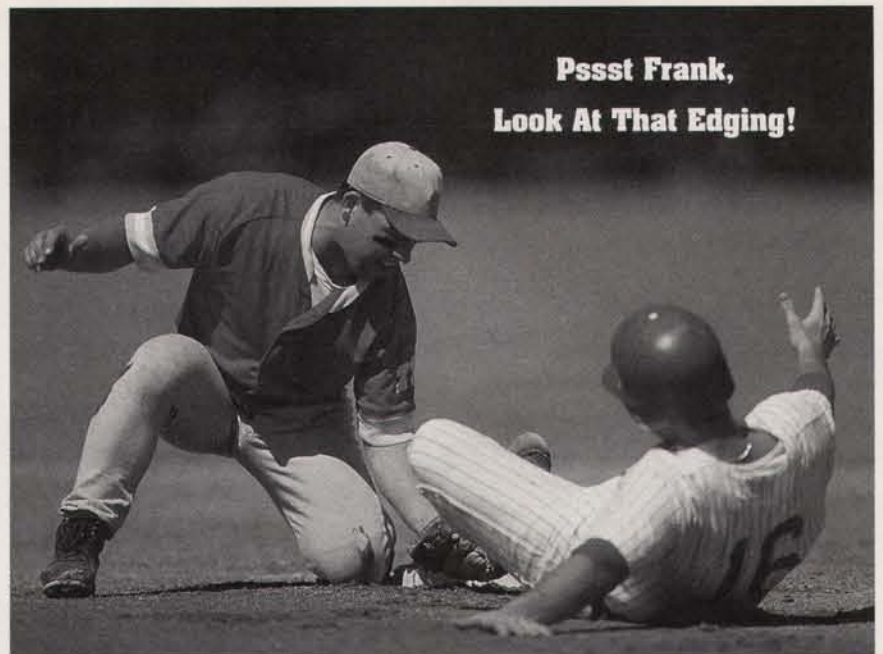


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Freedom site and landscaping tools include: a soil ripper that breaks up compacted or even frozen soil with shanks that are shear-bolt protected; spike-tooth, five-bar leveler that loosens and levels soil with its offset and staggered teeth placement; and the seedbed finisher, which in one pass can turn rough grade into a finished seed or sod bed, says the manufacturer.

The Freedom scarifier can remedy tightly crusted or compacted soil surfaces in advance of seeding; its shanks are set on 12-in. spacings and are replaceable if needed. The box scraper unit has a double-edged scraper blade so you can pull the unit for leveling, or push for backfilling.

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BACKPACK BLOWER

Powered by a 63-cc engine, Echo's new PB-650 provides more than 205 mph and 650 cfm (both measured at the end of the pipe). The unit weighs less than 21 lbs. with pipes, so virtually any operator can easily handle it for hours at a time. Made by Echo, the commercial-grade, dual-ring piston engine has a fully adjustable, hip-mounted throttle with cruise control. In addition, the PB-650 features extra-large diameter pipes; a 69-fl.oz., see-through fuel tank; and a commercial-duty air filtration system. It comes with a 2-yr. consumer, 2-yr. commercial, and 90-day rental warranty.

Echo Inc./847-540-8400
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HANDHELD BLOWER

Powered by RedMax's 22.5-cc, 2-cycle engine, the HB2300 produces a maximum air speed of 150 mph and a maximum air volume of 353 cfm. An optional nozzle increases volume for tough jobs such as moving wet leaves, mulch, and debris. The noise level of the 7.9-lb. unit is just 68 dBA. The HB2300 comes with a 1-yr. commercial warranty, but is available with an optional 2-yr. warranty.

RedMax/Komatsu Zenoah America, Inc./800-291-8251
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PROFESSIONAL EDGER

The Stihl FC 85 Edger helps pro landscapers cut through the toughest grass, wet dirt and clay on the first try. The Edger features Stihl's 4137 25.4-cc, 1.27-hp Professional Series engine. It has Quad Power cylinder technology, which helps reduce scavenging losses of fresh fuel mix and expel burnt fuel from the firing chamber. The FC 85 has an open guard assembly design that minimizes clogging from dirt and debris. A guide wheel increases maneuverability and helps protect the gearbox. Line-of-sight marking provides increased control. A 3-shoe clutch minimizes slippage under extreme load conditions and provides more torque to the cutting head.

Stihl Inc./800-GO-STIHL
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LOW NOISE LEVEL

According to Underwriter's Laboratories, the noise level for the Toro ProLine BP6900 is only 62 dBA at 50 ft. The BP6900 also boasts a fuel capacity of 2.1 qts. and weighs just 18.6 lbs. Other features include an industrial-strength, 41-cc Kawasaki engine; a heavy-duty, commercial air cleaner; and a Walbro choke-type carburetor.

The Toro Co./800-476-9673
For information, circle 186



ALL-FLEX GROOMING MOWER

Land Pride's new AFM4211, 11-ft. all-flex grooming mower incorporates their 25 Series Rear Discharge decks. With three 48-in. rear discharge decks, this mower provides even dispersal, flexibility and is sized right for golf courses, cities, and schools.

These mowers offer independent deck flotation and a zero turning radius due to the frame design and single beam hitch. Available in 11-, 14-, 16-1/2- and 22-ft. models, these mowers offer narrow transport widths and automatic wing locks for safe transport. The low deck pivot on the wing decks allows for ground following capabilities on uneven terrain.

Land Pride/785-820-9629

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COLLECTION SYSTEM FOR ZTRS

Designed for mid-mount, zero-turn-radius mowers, BlueBird's V190Z commercial vacuum has a dump-from-seat mechanism for increased productivity and ease of use. Its 90-gal. container is made of welded steel and well balanced to ensure stable operation. A sight window allows the operator to view the level of debris while in use to reduce downtime. A removable screen also makes clean up quicker and easier. A 7-in. inlet with deflector helps reduce clogging and maximize filling of the container. The 50-degree dump angle of the V190Z makes debris dumping easier and faster, while the slam latch simplifies container closing after emptying. The V190Z's frame height is adjustable for a variety of mowers and its custom hitch, custom boot, and front weights are compatible with most zero-turn mowers.

BlueBird International, Inc./800-808-BIRD

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42-INCH ZERO-TURN MOWER

For easier mowing around trees, shrubs, and obstacles, the Swisher ZTR 42-in. commercial cutting width will make short order of the biggest mowing jobs, says the manufacturer. Features included a 17.5-hp Briggs & Stratton OHV engine; 42-in. width with three blades; twin hydrostatic transmissions; 18 x 9.50 rear tires; high back seat with arm rests; twin comfort grip control levers; mid-mount mowing deck; and cutting height adjustment from 1 1/2 to 3 1/2 in.

Swisher/660-747-8183

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Maintaining the Grounds



SHOP LIFT

The 2000 from Heftee safely hoists up to 2,000 lbs. to 6 ft. in seconds, says the manufacturer. The versatile and adjustable service platform handles many pieces of equipment, and your techs can stand comfortably with good access to service areas.

A new ramping systems eases equipment loading and unloading.

Heftee Industries, LLC/815-732-7540

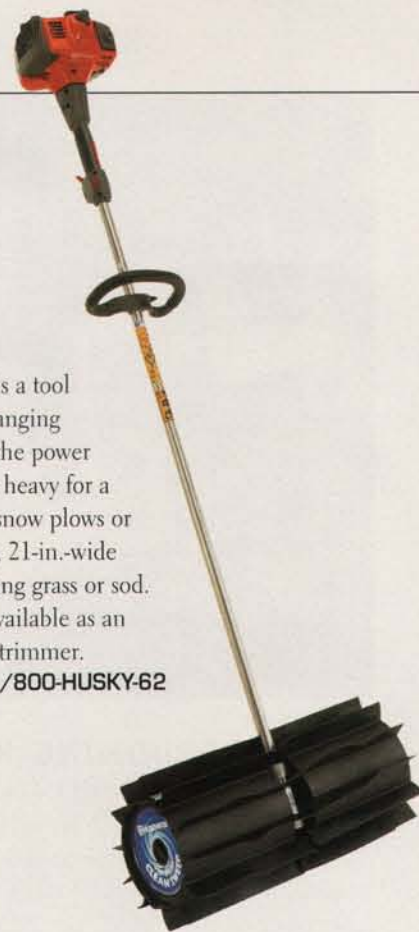
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POWER SWEEPER

The 325LX Clean Sweep is a tool for every cleanup operation, ranging from pavement to turf. It has the power to move materials that are too heavy for a blower, such as debris left by snow plows or construction work. Its flexible, 21-in.-wide fins clean turf without damaging grass or sod. The 325LX Clean Sweep is available as an accessory to the 325LX string trimmer.

Husqvarna Forest & Garden Co./800-HUSKY-62

For information, circle 189



The thing practically crawls up walls.

This may very well be the most versatile tractor line on the globe. To be versatile, you've got to do two things: be agile and be user-friendly. Lots of old guard tractors are so big and clunky that they're hard to maneuver. Yes, they're durable, but difficult. Options can cost you.

Carraro tractors offer a unique array of ergonomic and operational functions built in, and are engineered for simplicity, comfort and increased return on investment.

A patented system called "Actio" in all Carraro tractors lets the chassis

articulate to all terrain types and each wheel independently grips the ground for superior balance and stability. The center of gravity is so low that it virtually hugs the turf. Each wheel being the same size means you get equal ground pressure on all 4 wheels, all the time.

Other neat features include a completely reversible seat and control system that changes direction in seconds, loads of attachments that mount front, back and even on top, as well as powerful, yet fuel minimizing engines that help keep operations costs down. Call us for our free video and more details.



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SMALLER, LIGHTER, LESS EXPENSIVE

One year after developing the industry's first gas-powered blower to meet Category I sound levels of the latest ANSI standards, Solo introduced a smaller, lighter weight, and less expensive unit using the same technology. The new Solo Model 445 Backpack Blower, a smaller version of the award-winning Model 470, is half as noisy as other units and satisfies a nationwide environmental concern about blower noise emission, says the company. The 445 features a 2.1-hp., 36.3-cc, 2-cycle engine that delivers a 470-cfm air stream and makes clean up fast and easy. With a \$349 suggested retail price, the anti-vibration blower also has a unique pistol grip control with 90 swivel blower tubes. The unit weighs 18.26 lbs. and is backed by a 2-yr. limited warranty.

Solo Inc./757-245-4228

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