WHEN IT DOESN'T COME WITH A HONDA, YOU CAN KEEP IT GOING WITH ONE.

And the reasons to keep it going with a Honda are as plentiful as they are persuasive.

For starters, our line of Overhead Valve engines use substantially less fuel and oil than comparable side valve engines. And they're especially easy starting, thanks to Automatic Decompression and a maintenance-free electronic ignition.

Almost all of our engines feature Honda's Oil Alert,™ which automatically shuts off the engine before the oil drops below a safe operating level.

And we have replacement engines for all kinds of equipment. Our line includes horizontal and vertical shaft models from 2.2 to 13.0 horsepower.

All of which should persuade you there's not only reason to keep your used equipment running, there's a way to keep it running better than new.

IT'S A HONDA HONDA Power Equipment Engines

For optimum performance and safety, we recommend you read the owner's manual before operating your Honda Power Equipment. © 1986 American Honda Motor Co., Inc.

Circle No. 112 on Reader Inquiry Card

ENGINE *from page 30*

● Check the fuel filter drains. If fluid does not drain and the weather is cold, water in the fuel pump or line may have frozen. If the temperature is above freezing, there is probably a blockage in the fuel system. Check the fuel filters to see if they are clogged with dirt.

● Check to make certain that fuel shutoff valves are open at the tank. Mechanics occasionally forget to reopen these valves after working on a unit, causing operators to crank an engine that is getting no fuel.

● Check the cooling system. Is it at the proper level when cool? If there is an overflow tank, is it at the proper level indicated on the tank?

● Check the antifreeze. It should be bright green or blue in color. If it is rusty or dirty, it may need changing.

● Check the radiator fins to see if they are clean and undamaged. Debris in the radiator fins will reduce the efficiency of a cooling system considerably and can cause engine overheating.

● Run a quick visual check of the wiring, looking for dangling, frayed wires.

While this seems like a long complicated process, it actually takes only five to 10 minutes, and it should become a part of an operator's routine.

Engine startup

Most engine problems can be diagnosed during the pre-start check or within five minutes of starting and operating the machine. Strange noises or unusual-looking smoke are common warning signs.

If the engine does not turn over at all, check to see if the master disconnect switch is deactivated.

If this is not the problem, check the battery by turning on the unit's lights and turning over the starter. If the lights dim excessively, the battery may be low, or electrical or ground connections may be corroded. A good ground connection is as important as the positive battery cable connection. Check all ground straps.

If the engine cranks, but still will not start, it can mean the battery needs recharging or that the connections to the battery are corroded. In cold weather, it might be a sign that engine oil is too thick.

If the engine turns over easily in the cold, but is not starting, try cranking for 30 seconds. Then let the engine rest for 30 seconds and try again. Batteries work better when warm, and cranking heats them up quickly. A brief cranking also heats the air in the engine, which seals the rings and creates better compression.

If the engine still will not start, do not continue cranking. This can burn out the starter. Re-check fuel lines and fuel tank valves. If you are still unable to find any reason the engine will not start, call a mechanic.

If the engine misses after starting, call a mechanic immediately. This can indicate a serious problem such as a faulty injector valve, a piston problem or a blown head gasket. Although the engine will work when firing poorly, unburnt diesel fuel seeping down the cylinder walls washes the oil off the pistons, which can cause serious damage.

Exhaust fumes

One of the best indications that an engine is running properly is the color of the exhaust fumes. Under normal idle conditions, the engine should emit only a slight haze. Under load or acceleration, some black smoke is normal because of less efficient fuel burning.

Here is a review of what an operator can learn from the color of exhaust fumes:

continued on page 34

Lean, green low-thirst machine.

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Arid's finer leaves, rich dark-green color, lower growth and deep roots create an attractive turf requiring less maintenance. Deep roots enable Arid to better withstand temperature extremes—cold winters and hot summers. Arid is an excellent choice for humid transition zones. It has improved drought and heat tolerance and requires less water. Arid's low-growth characteristics mean less mowing.

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TURF TYPE TALL FESCUE

ENGINE *from page 32*

● **Blue smoke**: During idle, this means oil is seeping past the rings or the intake seal on a turbocharger. Some is normal, but excessive amounts of blue smoke signal problems requiring a mechanic's attention.

● **Black smoke**: This usually means the air to fuel mix is too rich and too much fuel is going unburned. This is often caused by a dirty air cleaner or the air filter being blocked by leaves, debris or even a rag. Occasionally, a mechanic will increase fuel to oil mix to increase power. This will give temporary results, but will eventually destroy the engine.

● **White smoke**: A small amount is normal during cranking. This indicates that the invectors and fuel pump are delivering fuel to the cylinder but combustion is not taking place.

● **Misty, white smoke**: This is often visible at the initial startup. In large amounts it may be a sign that abnormal amounts of coolant are entering the combustion chamber due to a blown head gasket, cracked head, cracked block or cracked sleeves. These problems will also cause bubbles in the radiator while the engine is running. This situation requires immediate attention by a mechanic.

● **Gray smoke**: Often an indication that engine compression is too low, gray smoke usually results from broken sealing rings, burnt valves, a cracked engine block, etc. It requires a mechanic's immediate attention.

Power loss

If an operator notes a steady loss of power over time, it may indicate an engine problem. However, such a power loss is just as likely to be caused by other factors. Here is a checklist of possible causes *not* related to the engine:

● **Changed operating conditions**: Wet, muddy conditions will drastically alter the performance of many machines. In fact, mud packed in the tracks of a crawler dozer, loader or excavator can require at least 30 hp more to drive than clean, dry tracks. Solve this by loosening the tracks in muddy conditions and using open grouser pads.

● **Tracks too tight**: A mechanic may have overtightened tracks, which will overwork the machine and require more horsepower.

● **Tracks too large**: Some users put larger-than-recommended tracks on a machine, thinking it will increase traction. To an extent, it does, but it also demands more horsepower from the engine. The rule is to not try to make a machine do more than it is built to do.

● **Blades or buckets too large**: Using blades and buckets larger than recommended for the equipment reduces overall performance. Refer to the manufacturer's requirements to make sure the machine is not being overloaded.

● **Wrong gear**: Running a piece of equipment in third or fourth gear in a situation where first or second gear is required will result in inefficiency.

● **Hydraulic lever not in neutral**: If a hydraulic lever is not in the neutral position, the machine will probably be difficult to start because the starter is forced to turn over both the engine and a loaded hydraulic pump. Putting the lever in neutral should solve the problem.

These are simple points, but in a surprising number of cases, they will isolate the problem. If not, there is a three-step test to further track the source of the power loss.

First, run the engine at full throttle with the transmission and all hydraulics in neutral. Accelerate to maximum rpm. If maximum rpm is not attainable it may be nothing more than a clogged fuel or air filter inhibiting the engine's operation. Locate and correct the problem.

Second, if engine rpm is normal, isolate the hydraulics. Actuate a valve (for example, loader up) and hold it open until the function has reached its limit. At this point, the oil will be deadheaded, causing the main relief valve to open. This will demand greater horsepower. Normally a drop of 100 to 200 rpm will occur. If the hydraulic system pressures are set too high there will be a drop of more than 200 rpms.

Finally, if the unit passes the second test, put the transmission in high gear and, with the hydraulics in neutral, engage the parking brake (this can be done only if the equipment has a torque converter). Go to full throttle. The engine should drop 200 to 400 rpm. If it drops more, the problem then lies with the engine, not the hydraulics.

Throughout the process, watch the exhaust stack to obtain additional information about fuel burning, water or coolant in the system, etc.

If the machine passes all three steps in this test, there may be a problem with the power train or transmission, or it may be an indication of locked brakes or tracks that are too tight.

These sample tests will detect many engine problems. As a result, the small amount of extra time spent checking out equipment in the field can save thousands of dollars in repair bills and make more efficient, effective use of construction equipment. **LM**

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This time we've broken the mold with the first walk-behind tiller to feature a liquid-cooled diesel engine. Three forward speeds, one reverse speed and seven-horsepower will help the AD70 make light of even the toughest, most sod-bound dirt.

Its tines dig especially deep when counter-rotating, pulling hard-packed soil up by the roots. Running forward, they'll turn up fine seed beds and seed cover.

There's a steering clutch on each wheel for precision maneuverability. There's a tiller clutch to stop the tine action immediately—keeping you well out of harm's way. While adjustable handlebars that swing left and right take care of keeping you out of those freshly tilled rows.

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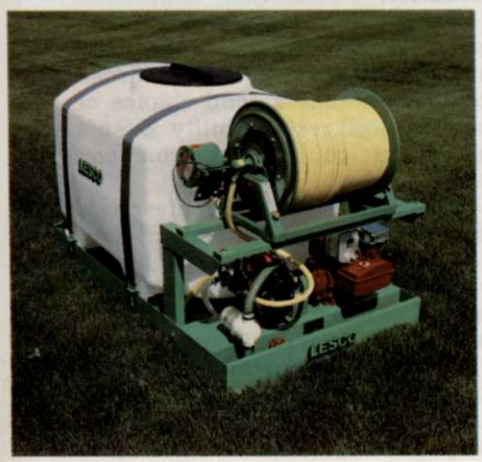

Save more than 23%

The annual LESCO Equipment Early-Order Program is underway. That means the complete line of quality LESCO equipment is on sale. And the earlier you order and pay, the more you save.

Order between now and the end of August and earn a 12% early-order discount. Take delivery at our option and don't pay until April 1, 1989.

Or if you choose, save an additional 7% by paying prior to September 1, 1988. Or pay anytime before March 1, 1989 and take a 1% per month early-payment discount. (See chart.)

There's more. Save another 5% by picking up your equipment at its manufacturing point. Convenient leasing plans also available.

Month	Early-Order Discount	Early-Payment Discount	Pickup Allowance
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November	6%	4%	5%
December	4%	3%	5%
January	2%	2%	5%
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Determine your savings by combining discounts for the month you order and the month you pay. The LESCO Equipment Early-Order Program ends February 28, 1989.

Here's an example of what you save by ordering and paying for a LESCO 500 Fairway Mower prior to September 1, 1988 and picking it up at our Sebring, Florida manufacturing facility.

$13,950.00	Price of Mower
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Circle No. 123 on Reader Inquiry Card

SAFE TRACK RECORD

Keeping train tracks clear serves more than purely aesthetic purposes. It can save lives.

Vegetation management along rights-of-way is an essential part of complete rights-of-way management. As with roadsides, this holds true for railways. Keeping plant material under control serves a number of purposes and is done in a number of areas.

The yard

Vegetation control begins in the rail yard with bare ground as the goal. This is done for two reasons. First and foremost is the safety of employees. Killing the plants removes potential stumbling blocks to workers and reveals hazardous areas so that they can be avoided or corrected.

Secondly, removing vegetation from the yard promotes improved drainage. Getting water away from the surface reduces the chances of wood railroad ties rotting, which reduces danger and replacement costs.

Since the control is non-selective, herbicides such as Roundup are ideal for this task.

Mainline spraying

Spraying serves several purposes along main track lines. First, aesthetically, it's just better looking. Also, it promotes better drainage, needed for the same reason as in the rail yard: to keep the wood from rotting out.

Lastly, spraying controls vegetation on the berm or shoulder of the tracks. This keeps the weeds and grass from overtaking the tracks and making them hazardous for passage or closing them entirely.

Burning bridges

Bridges also need to be cleaned up for one very basic reason. If there is a fire, the bridge is less likely to burn down. Vegetation is non-selectively removed from head walls and embankments to reduce the risk of a fire contributing to the bridge's destruction.

Signal lines

Selective herbicide applications are made around signal or communication lines to keep them clear but also to leave some plant material to control erosion.

Spraying pesticides from booms mounted on trucks or railroad cars is one of the most efficient ways of controlling rail-side vegetation.

A similar scenario exists where roads cross the tracks. High vegetation must be controlled, so low-growing vegetation is desirable.

In the South, this task is made easier by the existence of Bermudagrass. Since this species is anything but an upright grower, it is ideal for crossings. Controlling weeds and brush while leaving the Bermuda behind is feasible with selective herbicide application.

This is somewhat of a problem in the North, though. There is no cheap, low maintenance, low-growing grass species that is cold-tolerant, too.

Still, it is essential to keep the crossings free of high vegetation—for aesthetics, yes, but more importantly for safety.

If a crossing presents a hazard because vegetation blocks visibility and an accident results, the railroad company stands a good chance of holding legal responsibility. Even a bad lawyer could get the company cited.

This is generally sufficient motivation to control vegetation. The railroad company usually has a vegetation engineer who develops the control program, which is then contracted out to a private business.

Programs vary with each contract and not all of the areas stated above are addressed in a contract. However, what is done is what's necessary to keep the tracks open and safe. **LM**

Handle your grub situation fast, before things get really ugly.

At the very first sign of grub damage, apply DYLOX® insecticide. Nothing kills all species of white grubs faster. Within hours, the grubs are dying and the turf is recovering. When grubs threaten, act fast.

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Circle No. 128 on Reader Inquiry Card

Sterling Farms superintendent Greg Wojick (left) and assistant Peter Cavanaugh needed six years to convert fairways to 90-95% perennial ryegrass.

PUTTING POA IN ITS PLACE

Successful annual bluegrass control requires sound chemical and cultural practices, along with some understanding from the golfers.

When Greg Wojick became superintendent at Sterling Farms Golf Course in Stamford, Conn., six years ago, the fairways were a catch-all mixture of turf varieties. But the dominant species was *Poa annua*.

"It was nerve-wracking," says Wojick, "because poa just doesn't want to live in the summertime." Now that he has predominantly perennial ryegrass fairways, Wojick sleeps a lot better at night.

Wojick is one of many golf course superintendents in the northern U.S. trying to rid their fairways of what most consider the biggest problem they face. *Poa annua*—or annual bluegrass—is a profuse seeder which germinates in the fall, overwinters in a dormant state, and resumes activity in late winter/early spring, before most perennial cool-season turf species begin growing. Once established, poa succumbs to stress caused by warm temperatures, moisture, disease and insects.

It often dies out completely during summertime. When this happens, the fairways resemble "one of those Army camouflage trucks you see on the highway," says Wojick. But seed begins to germinate again when weather cools down and continues germinating in flushes until winter dormancy sets in.

The trend toward lower fairway mowing heights in recent years has contributed to the problem since *Poa annua* produces seed and remains competitive at lower cuts. Excessive short mowing, combined with shallow irrigation and use of large maintenance equipment, creates an ideal situation for the shallow-rooted annual bluegrass to flourish.

Ecological niche

In short, poa seems to have found its ecological niche on golf course fairways. "Only two other species can stand up to the stress of lower cuts—perennial ryegrass and bentgrass," says Bruce Branham, Ph.D, assistant professor in the Department of Crop and Soil Sciences at Michigan State University. "But most of the older courses have Kentucky bluegrass fairways and if they've lowered cutting heights, they're mostly annual bluegrass."

Though annual bluegrass forms a dense, tight, upright turf and can be a